

4 ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the potential environmental impacts, both beneficial and adverse, that would occur as a result of implementing Alternative B, as well as potential impacts of the No-Action Alternative. Impact topics analyzed for this project have been identified on the basis of NEPA, CEQ regulations implementing NEPA, NPS Director's Orders, and NPS *2006 Management Policies*. This chapter also includes definitions of impact thresholds and methods used to analyze impacts. The environmental resources presented in this chapter correspond to the environmental resource discussions in **Chapter 3**.

4.1 General Methodology for Establishing Impact Thresholds and Measuring Impacts

The following elements were used in the general approach for establishing impact thresholds and determining the impacts of the alternatives on each environmental resource category:

- General analysis methods as described in guiding regulations;
- Basic assumptions used to formulate the specific methods in this analysis;
- Thresholds used to define the level of impact resulting from each alternative; and
- Methods used to evaluate the cumulative impacts of each alternative.

These elements are described in the following sections.

4.1.1 General Analysis Methods

The analysis of impacts is based on CEQ guidelines, the NPS *2006 Management Policies*, and DO procedures.

4.1.2 Impact Thresholds

Potential impacts of each alternative are described in terms of type (beneficial or adverse), context, duration, and intensity. Definitions of these descriptors follow:

- **Beneficial:** A positive change in the condition or appearance of the resource or a change that moves the resources toward a desired condition.
- **Adverse:** A change that declines, degrades, and/or moves the resources away from a desired condition or detracts from its appearance or condition.
- **Context:** The affected environment in which an impact would occur, such as site-specific, local, regional, affected interests, etc. Context is variable and depends on the circumstances involved with each impact topic. The environmental impact analysis determines the context.
- **Duration:** The duration of the impact is described as short-term or long-term. Duration is variable with each environmental impact topic. Short-term, in the context of this EA, is defined as occurring during and immediately following construction activities; long-term is defined as persisting after construction is completed for an indefinite period.
- **Intensity:** Definitions of impact intensity (negligible, minor, moderate, and major) are defined for each environmental impact topic. The impact intensity threshold is determined by comparing the environmental impact to a relevant standard based on applicable or relevant guidance, standards, or best professional judgment.

4.1.3 Cumulative Impacts Analysis Method

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

Cumulative impacts can result from individually minor but collectively significant action taking place over a period of time. The cumulative impact assessment for the proposed project is largely qualitative in nature because there is not sufficient site-specific data available to permit a quantitative analysis, and because a number of cause and effect relationships are not readily understood.

To conduct the cumulative impact analysis, DC WASA identified other ongoing or reasonably foreseeable future projects within the study area and the surrounding area. Projects anticipated to occur along and near the Anacostia River were included in the assessment based on information from the Office of the Deputy Mayor and DDOT. These projects include transportation improvements, building rehabilitations, and commercial/residential redevelopment. None of these projects would be induced by the proposed project; they would proceed independently, regardless of the status of the proposed project.

The analysis of cumulative impacts was accomplished using the following four steps:

Step 1: Identify Resources Impacted – Fully identify resources impacted by any of the alternatives. Resources include those addressed as impact topics in **Chapter 3** and **Chapter 4** of this EA.

Step 2: Set Boundaries – Identify an appropriate spatial and temporal boundary for each resource. The temporal boundaries are noted at the top of **Table 4.1-1**, and the spatial boundary for each resource topic is listed under each topic.

Step 3: Identify Cumulative Action Scenario – Determine which past, present, and reasonably foreseeable future actions to include with each resource. This analysis is summarized below in **Table 4.1-1**.

Step 4: Cumulative Impact Analysis – Summarize impacts of these other actions, plus impacts of the proposed action, to arrive at the total cumulative impact. This analysis is included for each resource discussed in this chapter.

Cumulative impacts may result from the reasonable foreseeable development projects described below. Locations of these notable development projects are shown on **Figures 4.1-1 through 4.1-3**.

- **Capitol Riverfront Improvement District** – (Currently under construction) A new neighborhood on the river that extends the city’s skyline to the water’s edge. The district is already home to a mixed-use community of 35,000 daytime employees in 6.5 million square feet of office including the Washington Navy Yard and U.S. Department of Transportation, 2,387 residential units including apartments, condos, co-ops and townhouses with an estimated residential population of over 3,000 people, a Courtyard by Marriott, and the 41,000 seat Nationals Park. It is planned to be approximately 16 million square feet of office space, one million square feet of retail space, 8,200 residential units, and 1,125 hotel rooms. There are

over 20 development projects under construction or in various phases of planning within this district.

- **The Yards** – (Currently under construction) Located near Southeast Washington DC with the riverfront to the south, the exciting new baseball district to the west, the historic Navy Yard to the east and all of downtown to the north. The Yards is located within the larger Capitol Riverfront Improvement District, and portions of the Yards’ development projects are under construction or in various phases of planning. There will be 2,800 residential units, 1.8 million square feet of office space, 400,000 square feet of retail and dining, and a riverfront park with thoughtfully designed green space.
- **Washington Canal Park** – (Planned ground breaking; Fall 2010) The banks of Washington Canal will be transformed from a parking lot to a sustainable public park. The 1.85 acres park is planned for D.C.’s Capitol Riverfront Neighborhood.
- **South Capitol Street Corridor** – Enhancements to South Capitol Street are intended to recognize the vision set in the L’Enfant Plan by way of reducing South Capitol Street from an expressway to a boulevard and entry to the District of Columbia’s Monumental Core. This project will also help to enhance pedestrian safety and mobility. Projects include enhancements at I Street, N Street, Suitland Parkway and I-295, and the South Capitol Street Bridge.
- **Suitland Parkways and MLK, Jr. Parkways** – This project intends to provide direct access to the neighborhoods and commercial areas along Martin Luther King, Jr. Boulevard and Howard Road. This improvement is part of the South Capitol Street Corridor improvement project.
- **11th Street Bridge** – This project is intended to replace deteriorating infrastructure, decrease traffic cut-through on residential streets, supply additional freeway connections which will ease congested traffic conditions, and provide better access across the Anacostia River.
- **14th Street Bridge Corridor** – This project will encompass major changes and repairs to the northbound bridge as well as minor changes to the southbound bridge. These changes will encourage easy traffic flow, as well as increase pedestrian and bicyclists use.
- **Barney Circle** – Barney Circle, as it stands, does not operate as a true circle. Improvements to transform Barney Circle into a more traffic friendly circle are in the planning process. These improvements will convert the Southeast Freeway as a boulevard.
- **Pennsylvania Avenue** – This project intends to rejuvenate Pennsylvania Avenue SE by increasing safety and mobility for vehicular, pedestrian, and bicyclist traffic; improving streetscaping and urban design; and boosting economic development. Projects include enhancements at Minnesota Avenue, Anacostia Freeway (295), and Potomac Avenue.
- **Washington Highlands Library** – (Currently under construction) This library will be rehabilitated. The new library, scheduled to open in spring of 2011, will be 22,000 square feet and LEED certified.
- **Anacostia Library** – (Recently completed) The Anacostia Neighborhood Library is being replaced; construction of the new building is underway.
- **Anacostia Gateway Government Center** – (Planned ground breaking; Summer 2010) The proposed Anacostia Gateway Government Center will be the new headquarters of the DDOT.
- **Diamond Teague Park** – (Recently completed) A waterfront park, Diamond Teague Park, will be constructed to link the Anacostia River to Nationals Park.

- 1 • **Poplar Point** – The plan for Poplar Point includes the construction of a significant new
2 waterfront park to serve as a gateway to the Anacostia River Parks. The new park will extend
3 the full length of the area from the Point to the 11th Street Bridge. It will be defined by a
4 crescent-shaped Anacostia Drive east of its present alignment. The new park road will be the
5 western edge of a mix of uses providing a sweeping and lively city edge to the park. The
6 parkland will have gardens, memorials, museums, outdoor performance areas, trails, wetlands,
7 a daylighted Stickfoot Creek, ball fields, and a variety of landscape to serve the local community
8 and visitors.
- 9 • **Kingman Island Park and Heritage Island Park** – This project will restore 40 acres of tidal
10 marsh and will provide the public with a new Environmental Education Center, as well as a
11 memorial tree which will be dedicated to the school children victims of the attacks on
12 September 11, 2001.
- 13 • **Barry Farm Recreation Center** – An improved Barry Farm Recreation Center will be erected
14 at the location of the old Birney Elementary School. The Recreation Center will include an
15 8,000- square-foot gym.
- 16 • **Sheridan Station** – This project will provide high quality housing options and expand
17 mixed-income communities in Ward 8. This housing project which will total 344 new
18 multifamily units, townhomes, Manor Flats and three tot lots.
- 19 • **Barry Farm** – (Construction to begin 2018) More than 2.2 million square feet of development
20 and 1,000 new residential units are already in place or under construction within one mile of
21 the expansive Barry Farm neighborhood. The District Government's New Communities
22 Initiative is spurring the development of mixed income communities.
- 23 • **St. Elizabeth's East Campus** - 86 acres of the 173 East Campus is planned for redevelopment
24 by the District. It would feature a state-of-the-art mental health facility to serve community
25 members in need, improved connections between the Anacostia River and Historic Anacostia
26 and the rest of the District, close proximity to Metrorail (Congress Heights station) and adaptive
27 reuse of up to 28 buildings designated as historic landmarks
- 28 • **Randall School** – A new developer recently purchased the abandoned building, and
29 development plans are on-going. It was recently proposed to be developed into apartments and
30 classroom and studio space.
- 31 • **Waterfront Station** - An urban center in Southwest DC that is planned to be a mixed-use
32 development with seven new buildings totaling over 2 million square feet including Class-A
33 office space, new residential units and neighborhood oriented retail, as well as the re-opening of
34 4th Street, SW.
- 35 • **Southwest Waterfront** – (Planned ground breaking; Late 2010) Plans to transform the
36 southwest waterfront into a mixed-use community which will boast hotels, housing units for-
37 sale and for rent, public parks, promenade, and neighborhood amenities such as grocery stores
38 and restaurants. There would be a cultural component focused on education and maritime
39 history; the development would optimize both water traffic and views; and all building would
40 be LEED Silver Certified.
- 41 • **Minnesota-Benning Metro Station** – On a stretch of land that is 9.2 acres there are plans for a
42 new parking garage, a new headquarters for Department of Employee Services (DOES), a new
43 office building for the District Department of Human Services, and more office space for various
44 businesses.

- **Ray's the Heat-Great Streets** – (Currently under construction) New restaurant part of the East River Park development.
- **Randle Highlands Elementary School** – Offers have been made for the development, redevelopment, or adaptive reuse of the former school's 95,359 square feet lot. Current zoning permits include single-family residential uses.
- **Young Elementary School** – Offers have been made for the development, redevelopment, or adaptive reuse of the former school's 70,900 square feet lot. Current zoning permits include single-family dwellings, flats, and apartment buildings.
- **Bethlehem Baptist Church** – A 5-acre site owned by this church has been identified as a potential site for Barry Farm replacement housing. Its location, which is adjacent to Anacostia Metro Station, presents an opportunity for a transit-oriented, mixed-use, and mixed-income development.
- **Anacostia Riverwalk Trail** – (Portions currently under construction) This trail will be 48 miles in length and will include bicycle and pedestrian trails that will run along the Anacostia River.
- **Fort Stanton Recreation Center** – (Planned ground breaking; July 2010) This existing recreation center along Erie Street will be redeveloped to include an exercise room, a weight room, a gym, and a computer lab.

Table 4.1-1 summarizes the cumulative impact analysis for each environmental resource.



**Figure 4.1-1:
Cumulative Effects Map**

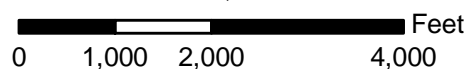
Anacostia River Projects
Long-term CSO Control Plan
Washington, D.C.



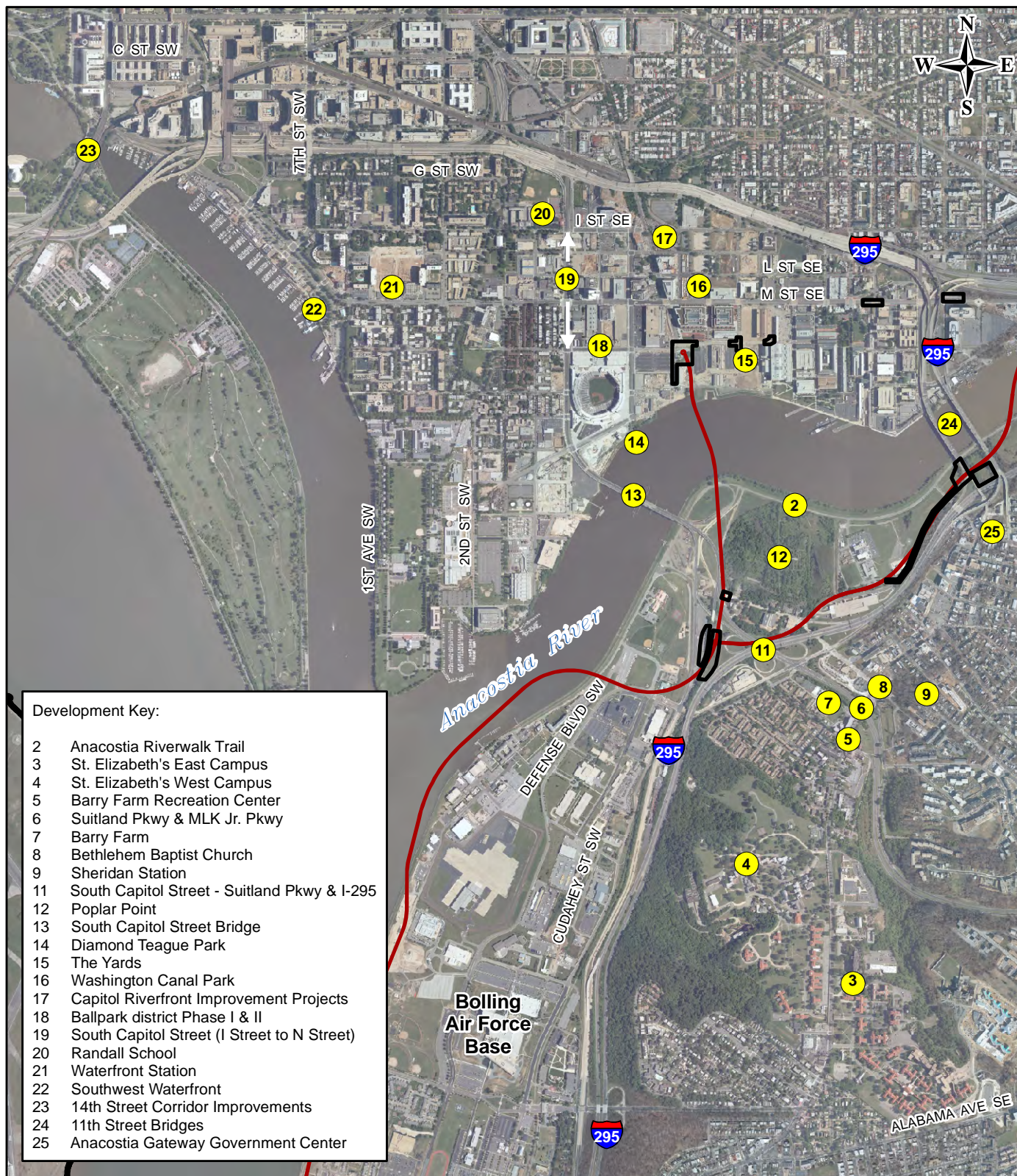
Legend:

- Development Area
- Surface Disturbance Area
- Preferred Tunnel Alignment

Scale: 1 inch = 2,000 feet



Source: DC Office of Planning. 2009. Wards 5, 6, 7, 8 Development Summaries, Summer 2009. Washington, DC.
Office of the Chief Technology Officer. 2008. Raster Digital Data, 2008 Orthophoto. Washington, DC.



**Figure 4.1-2:
Cumulative Effects Map**

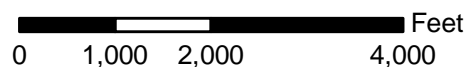
Anacostia River Projects
Long-term CSO Control Plan
Washington, D.C.



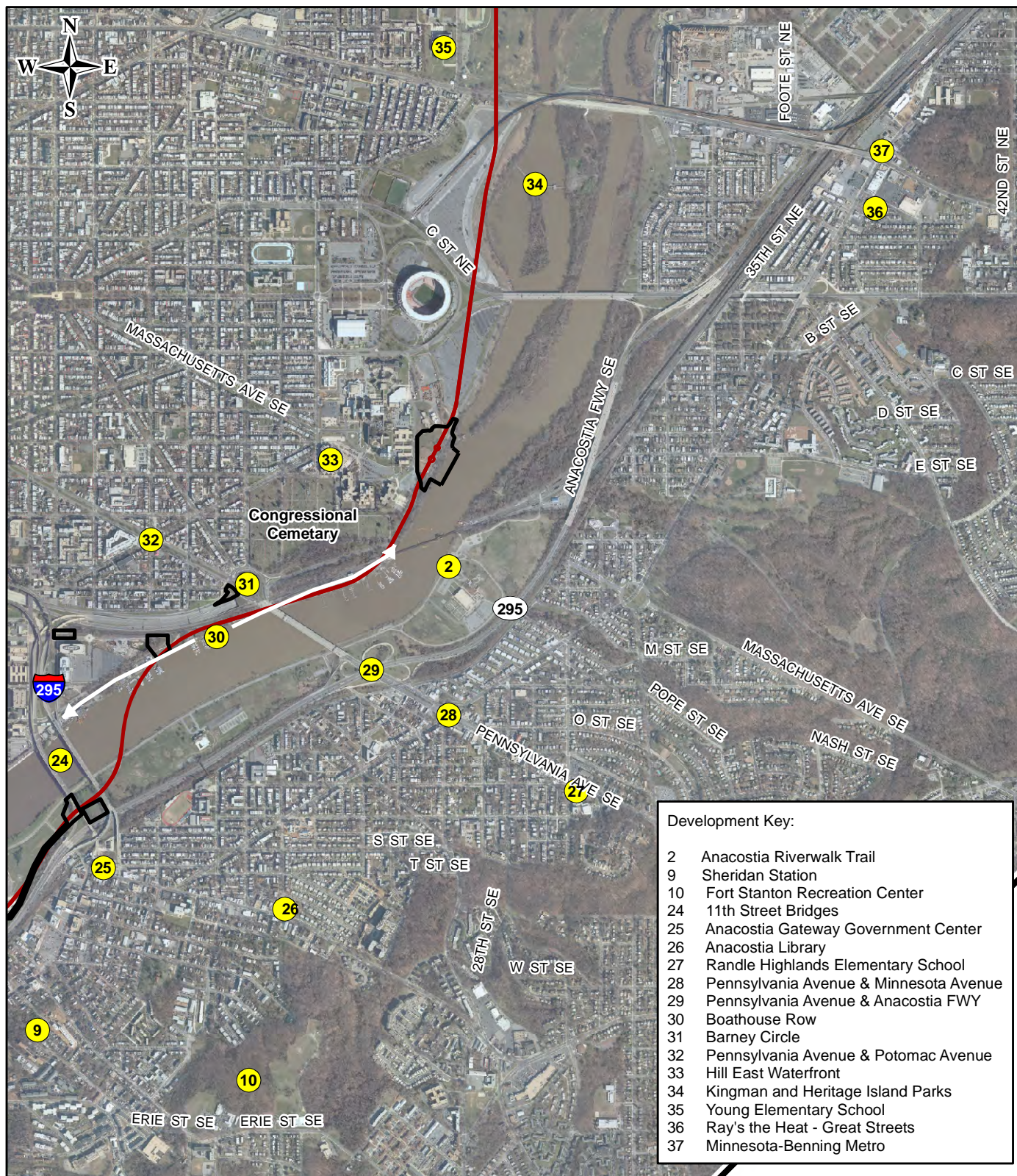
Legend:

- Development Area
- Surface Disturbance Area
- Preferred Tunnel Alignment

Scale: 1 inch = 2,000 feet



Source: DC Office of Planning. 2009. Wards 5, 6, 7, 8 Development Summaries, Summer 2009. Washington, DC.
Office of the Chief Technology Officer. 2008. Raster Digital Data, 2008 Orthophoto. Washington, DC.



**Figure 4.1-3:
Cumulative Effects Map**

Anacostia River Projects
Long-term CSO Control Plan
Washington, D.C.



Legend:

- Development Area
- Surface Disturbance Area
- Preferred Tunnel Alignment

Scale: 1 inch = 2,000 feet

0 1,000 2,000 4,000 Feet

Source: DC Office of Planning. 2009. Wards 5, 6, 7, 8 Development Summaries, Summer 2009. Washington, DC.
Office of the Chief Technology Officer. 2008. Raster Digital Data, 2008 Orthophoto. Washington, DC.

Table 4.1-1: Cumulative Impact Table				
Impact Topic	Study Area	Past Actions	Present Actions	Future Actions SAME AS PRESENT Plus related reasonably foreseeable actions (Figures 4.1-1 – 4.1-3)
Soils	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	All development and construction projects that involve grading, excavation, or placement of fill or an impervious surfaces including roadway projects, housing, commercial, recreational, and institutional construction. Notably, the construction of the Nationals Baseball stadium and the DDOT headquarters.	SAME AS PAST plus the 11 th Street Bridge Project	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Sheridan Station • Barry Farm • St. Elizabeth's East Campus • Waterfront Station - • Southwest Waterfront • Minnesota-Benning Metro Station • Ray's the Heat-Great Streets • Bethlehem Baptist Church • Anacostia Riverwalk Trail
Water Quality	Within the Potomac Watershed	<p>Development that created impervious surface or involved grading/placement of fill including road improvements and housing, commercial, parking, recreational, and institutional construction</p> <p>Development that modifies habitats and hydrologic processes</p> <p>Sewer system and waterway projects and improvements</p> <p>Nonpoint Source Management Program and other projects that provide open space or reforestation</p>	SAME AS PAST plus the 11 th Street Bridge Project	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Barry Farm Recreation Center • Sheridan Station • Barry Farm • St. Elizabeth's East Campus • Waterfront Station • Southwest Waterfront • Minnesota-Benning Metro Station • Ray's the Heat-Great Streets • Bethlehem Baptist Church • Anacostia Riverwalk Trail

Table 4.1-1: Cumulative Impact Table

Impact Topic	Study Area	Past Actions	Present Actions	Future Actions SAME AS PRESENT Plus related reasonably foreseeable actions (Figures 4.1-1 – 4.1-3)
Wetlands	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	<p>Development that involved dredging, filling waterways, or permanent wetland impacts</p> <p>Projects that involve wetland restoration or require wetland mitigation</p>	SAME AS PAST plus the 11 th Street Bridge Project	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • 11th Street Bridge • 14th Street Bridge Corridor • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Sheridan Station • Waterfront Station • Southwest Waterfront • Anacostia Riverwalk Trail
Vegetation	Plant communities and landscaped areas in the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	Development that involved the removal of vegetative communities, creating impervious surface, or landscaping	SAME AS PAST	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Washington Highlands Library • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Sheridan Station • Barry Farm • St. Elizabeth's East Campus • Waterfront Station • Southwest Waterfront • Ray's the Heat-Great Streets • Bethlehem Baptist Church • Anacostia Riverwalk Trail

Table 4.1-1: Cumulative Impact Table

Impact Topic	Study Area	Past Actions	Present Actions	Future Actions SAME AS PRESENT Plus related reasonably foreseeable actions (Figures 4.1-1 – 4.1-3)
Wildlife and Wildlife Habitat	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	<p>Development that involved the removal of vegetative communities, creating impervious surface, or landscaping</p> <p>Development that modifies habitats and hydrologic processes</p> <p>Sewer system and waterway projects and improvements</p> <p>Nonpoint Source Management Program</p>	SAME AS PAST plus the 11 th Street Bridge Project and Anacostia Library	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Washington Highlands Library • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Sheridan Station • Barry Farm • St. Elizabeth's East Campus • Waterfront Station • Southwest Waterfront • Ray's the Heat-Great Streets • Bethlehem Baptist Church • Anacostia Riverwalk Trail
Cultural Resources	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	<p>Archaeological Resources: Development with soil disturbance extending into intact soils.</p> <p>Historic Structures, Buildings, and Districts: Development including construction and improvements of roadway, recreational facilities, memorials, residential, commercial, institutional, and parklands</p>	SAME AS PAST	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • St. Elizabeth's East Campus • Waterfront Station • Southwest Waterfront • Anacostia Riverwalk Trail

Table 4.1-1: Cumulative Impact Table				
Impact Topic	Study Area	Past Actions	Present Actions	Future Actions SAME AS PRESENT Plus related reasonably foreseeable actions (Figures 4.1-1 – 4.1-3)
Aesthetic Resources	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	<p>All past development including construction and improvements of roadway, recreational facilities, memorials, residential, commercial, institutional, and parklands.</p> <p>Landscaping and maintenance</p>	SAME AS PAST	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Washington Highlands Library • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Barry Farm Recreation Center • Sheridan Station • Barry Farm • St. Elizabeth's East Campus • Randall School • Waterfront Station • Southwest Waterfront • Minnesota-Benning Metro Station • Ray's the Heat-Great Streets • Randle Highlands Elementary School • Young Elementary School • Bethlehem Baptist Church • Anacostia Riverwalk Trail • Fort Stanton Recreation Center

Table 4.1-1: Cumulative Impact Table

Impact Topic	Study Area	Past Actions	Present Actions	Future Actions SAME AS PRESENT Plus related reasonably foreseeable actions (Figures 4.1-1 – 4.1-3)
Land Use	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	All past development including construction and improvements of roadway, recreational facilities, memorials, residential, commercial, institutional, utility, and parklands.	SAME AS PAST	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Washington Highlands Library • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Barry Farm Recreation Center • Sheridan Station • Barry Farm • St. Elizabeth's East Campus • Randall School • Waterfront Station • Southwest Waterfront • Minnesota-Benning Metro Station • Ray's the Heat-Great Streets • Randle Highlands Elementary School • Young Elementary School • Bethlehem Baptist Church • Anacostia Riverwalk Trail • Fort Stanton Recreation Center
Human Health and Safety	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	<p>All past development including construction and improvements of roadway, recreational facilities, memorials, residential, commercial, institutional, and parklands</p> <p>Landscaping and maintenance</p> <p>Sewer system, waterway, and utility improvements</p>	SAME AS PAST plus the 11 th Street Bridge Project and Anacostia Library	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Washington Highlands Library • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Barry Farm Recreation Center • Sheridan Station • Barry Farm

Table 4.1-1: Cumulative Impact Table				
Impact Topic	Study Area	Past Actions	Present Actions	Future Actions SAME AS PRESENT Plus related reasonably foreseeable actions (Figures 4.1-1 – 4.1-3)
				<ul style="list-style-type: none"> • St. Elizabeth's East Campus • Randall School • Waterfront Station • Southwest Waterfront • Minnesota-Benning Metro Station • Ray's the Heat-Great Streets • Randle Highlands Elementary School • Young Elementary School • Bethlehem Baptist Church • Anacostia Riverwalk Trail • Fort Stanton Recreation Center
Visitor Use and Experience	In the vicinity of the Anacostia River, south of RFK to the confluence of the Potomac River.	<p>All past development including construction and improvements of roadway, recreational facilities, memorials, residential, commercial, institutional, and parklands</p> <p>Public events and visitor services</p>	SAME AS PAST plus the 11 th Street Bridge Project and Anacostia Library	<ul style="list-style-type: none"> • Capitol Riverfront Improvement District • The Yards • South Capitol Street Corridor • Suitland Parkways and MLK, Jr. Parkways • 11th Street Bridge • 14th Street Bridge Corridor • Barney Circle • Pennsylvania Avenue • Washington Highlands Library • Anacostia Library • Anacostia Gateway Government Center • Washington Canal Park • Diamond Teague Park • Poplar Point • Kingman Island Park and Heritage Island Park • Barry Farm Recreation Center • Sheridan Station • Barry Farm • St. Elizabeth's East Campus • Randall School • Waterfront Station • Southwest Waterfront • Minnesota-Benning Metro Station • Ray's the Heat-Great Streets • Randle Highlands Elementary School • Young Elementary School • Bethlehem Baptist Church • Anacostia Riverwalk Trail • Fort Stanton Recreation Center

The proposed project would change the handling of sanitary waste and stormwater runoff in order to improve the water quality of the Anacostia River. The project would not involve new public parking areas, access roads, or other features that would encourage local development. The project would be located in an urbanized and developed area. The project has been developed in response to the incremental effects of development along the Anacostia River, which have left the river below the CWA and District water quality standards. Decades of development have increased the amount of impervious areas, increased stormwater runoff rates and volumes, and impacted regional water

quality. The use of CSOs has further contributed to the degradation of aquatic resources and other environmental resources along the Anacostia River. The proposed project has a unique opportunity to reverse these cumulative impacts rather than contribute to them. Cumulative impacts to appropriate resources and topics were assessed and are described in the following sections.

4.2 Impairment of Resources

The NPS 2006 *Management Policies* (NPS, 2006) require an analysis of potential effects to determine whether actions would impact or impair Park resources. The fundamental purpose of the national park system, as established by the *Organic Act* and reaffirmed by the *General Authorities Act*, as amended, begins with a mandate to conserve Park resources and values. These laws give NPS the management discretion to allow impacts to Park resources and values (when necessary and appropriate) to fulfill the purposes of a Park, as long as the impact does not constitute impairment of the affected resources and values. NPS managers must always seek ways to avoid or minimize, to the greatest degree practicable, adversely impacting Park resources and values.

Impairment prohibited by the *Organic Act* and the *General Authorities Act* is any impact, in the professional judgment of the responsible NPS manager, that harms the integrity of Park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether or not an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative impact when combined with other projects.

An impact on any Park resource or value may constitute impairment, but an impact would be more likely to constitute impairment, to the extent that it has a major or severe adverse effect upon a resource or value the conservation of which is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the Park;
- Key to the natural or cultural integrity of the Park or to opportunities for enjoyment of the Park; or
- Identified as a goal in the Park's general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the Park, visitor activities, or activities undertaken by contractors and others operating in the Park. An impairment determination is included in the conclusion statement for all impact topics related to cultural resources, visual resources, water resources, soils, vegetation, and floodplains. Impairment determinations are not made for visitor use and enjoyment, public safety, or Park operations and management, because impairment findings relate to Park resources and values, and these impact areas are not generally considered to be Park resources or values. Impairment determinations are not made for visitor use and experience because, according to the *Organic Act*, enjoyment cannot be impaired in the same way that Park resources and values can be impaired.

In analyzing impairment in conjunction with the NEPA analysis for this project, it is taken into account the fact that if impairment were likely to occur, by operation of the CEQ's regulations at 40 CFR, such impacts would be considered to be major or significant. This is because the context and intensity of the impact would be sufficient to render what would normally be a minor or moderate impact to be major or significant. Taking this into consideration, NPS guidance notes that "not all major or significant impacts under a NEPA analysis are impairments. However, all

1 impairments to NPS resources and values would constitute a major or significant impact under
2 NEPA. If an impact results in impairment, the action should be modified to lessen the impact level. If
3 the impairment cannot be avoided by modifying the proposed action, that action cannot be selected
4 for implementation” (NPS 2003b).

5 **4.3 Impacts on Soils**

6 **4.3.1 Methodology and Assumptions**

7 Potential soil resource impacts have been evaluated with respect to changes in soil stability, soil
8 contamination and soil disturbance.

9 **4.3.2 Impact Thresholds**

10 **Negligible** – Soil resources would not be impacted or the impact would be below or at the
11 lower levels of detection.

12 **Minor** – Impacts to soil resources would be detectable. Impacts to undisturbed areas would
13 be small. Mitigation would be needed to offset adverse impacts, would be relatively simple
14 to implement, and would likely be successful.

15 **Moderate** – Impacts to soil resources would be readily apparent and result in a change to
16 the soil character over a relatively wide area. Mitigation measures would be necessary to
17 offset adverse impacts and would likely be successful.

18 **Major** – Impacts to soil resources would be readily apparent and would substantially
19 change the character of the soils over a large area, both in and out of the Park. Mitigation
20 measures necessary to offset adverse impacts would be needed, extensive, and their success
21 would not be guaranteed.

22 **Duration** – Short-term impacts occur during the implementation of the alternative; long-
23 term impacts extend beyond implementation of the alternative.

24 **4.3.3 Impacts of No-Action Alternative**

25 **Analysis.** The No-Action Alternative would not involve construction or excavation and would not
26 disturb any soil. Because this alternative includes small-scale programs (see **Section 2.2.1**) to
27 minimize some of the adverse impacts associated with CSOs, on-going actions associated with the
28 No-Action Alternative would continue. Therefore, the No-Action Alternative could have a negligible
29 impact on soils.

30 **Cumulative Impacts.** Cumulative impacts to soils would occur under the No-Action Alternative as
31 a number of additional projects within the study area are likely to occur even if Alternative B
32 construction does not take place. The list of reasonably foreseeable development projects in the
33 project vicinity that would directly impact soils are listed on **Table 4.1-1**. These projects, including
34 the Anacostia Gateway Government Center and the 14th Street Bridge Corridor, are likely to expose
35 large volumes of soil which would be subject to erosion or compaction, which would change the soil
36 properties. Existing soils could be replaced by fill or impervious surfaces. Also, some of the soils
37 may contain contaminants. However, construction contracts would include requirements for the
38 handling and disposal of contaminated materials. Also, construction documents, which are required
39 for construction permits, would include measures to control dust, protect exposed soil from
40 precipitation and erosion, and protect workers and any nearby sensitive receptors from exposure
41 to soil contaminants. As such, there would be a minor, adverse cumulative impact on soils.

Conclusion. The No-Action Alternative would have negligible short and long-term impacts; and minor, adverse cumulative impacts on soils. The No-Action Alternative would not cause impacts to soils severe enough to result in impairment to NPS resources.

4.3.4 Impacts of Alternative B

Analysis. Alternative B would have adverse, short-term, minor impacts to soil. Soil within the surface disturbance areas would be subject to compaction from heavy machinery used during construction. Disturbed soil in these surface areas would also be subject to erosion transport by both stormwater and winds during construction. However, these short-term impacts would be controlled through the implementation of an approved Sediment and Erosion Control Plan.

During construction, excavation of the proposed tunnels and shafts would produce approximately 590,000 bank (in place) cubic yards of soil. This volume would swell to approximately 830,000 loose cubic yards when excavated. Impacts to soils would be long-term along the alignment and where drop shafts are planned because the soil would be permanently removed. Removal of the soil would not affect the stability of adjacent soils. After being removed from the tunnel or shafts, it would be transported to permitted soil disposal sites or appropriately classified landfills.

Most of the soil is expected to be uncontaminated when removed from the ground. However, because of the relatively urban nature of the project vicinity, any excavation area may be contaminated. Those areas would be identified during construction activities through repeated field testing. As identified in the Facilities Plan, DC WASA has identified multiple areas of concern regarding to soil contamination based on known contamination levels in the soils and/or groundwater and the documented use of hazardous materials on these sites. As appropriate, DC WASA would provide a dedicated environmental manager for the following sites during construction:

- Blue Plains Tunnel Dewatering Shaft - Located within DC WASA BPAWWTP and is in the vicinity of the Naval Research Lab, both of which have multiple regulatory listings
- BAFB Drop/Overflow Shaft - Near the boundary between the Naval Support Facility Anacostia and the BAFB, both of which have multiple regulatory listings
- Poplar Point Junction Shaft - Nearby commercial UST and LUST sites
- Main Pumping Station, CSO 09/11A Diversion Chamber (DC), CSO 012-DC, CSO 013-DC, and CSO 014-DC - Located within the Main and O Street Pumping Stations and Southeast Federal Center sites, in the vicinity of the commercial and municipal LUST sites
- WMATA Green Line crossing – Located within the former Poplar Point Nursery hazardous waste site
- CSO 005-DC – Located within National Park Police LUST and UST site
- CSO 015-DC and CSO 016-DC – Nearby commercial and industrial LUST, and IC/EC sites
- CSO 017-DC and CSO 015/016/017-DS - Nearby commercial and industrial LUST, UST, RCRA, and IC/EC sites

Any contaminated soil encountered during construction would be disposed of in accordance with federal and District laws and regulations. In addition to existing contamination, chemicals for soil conditioning may be injected into the ground depending on the method of tunneling. Soil conditioners aid in excavation and help prevent damage to tunneling equipment. These chemicals are not considered dangerous to humans or the environment when properly used. It would not impact the soil disposal from a permitting standpoint nor the integrity of surrounding soils (see **Appendix J**).

Although disposal of excavated soils would be the responsibility of the contractors, DC WASA would ensure the proper handling and disposal of contaminated soils. All construction contracts would be approved by DC WASA prior to construction. Contract documents would include requirements for the contractor to submit plans for the proper handling of contaminated soils and for their disposal at contained sites that have been approved for such use by the federal or local authorities having jurisdiction. It is the intention of DC WASA not to stockpile excavated soils on site, but to immediately haul them off site for proper disposal. All approved construction documents would also include measures to control dust, protect exposed soil from precipitation and erosion, and protect workers and any nearby sensitive receptors from exposure to hazardous materials. As appropriate, a dedicated environmental manager would supervise construction sites to ensure compliance with the contract specifications for the proper handling and disposal of contaminated soils, dust-control measures, soil erosion and sediment control plans, and the exposure of any nearby sensitive materials to hazardous materials. Alternative B would moderate, adverse, long-term impacts.

Cumulative Impacts. Cumulative impacts to soils would occur under Alternative B as a number of additional projects within the study area are likely to occur in addition to Alternative B. The list of reasonably foreseeable development projects in the project vicinity that would directly impact soils are listed on **Table 4.1-1**. These projects, including the Capitol Riverfront Improvement District, Anacostia Gateway Government Center and the 14th Street Bridge Corridor, in conjunction with Alternative B, are likely to expose large volumes of soil, which would be subject to erosion or compaction. Existing soils could be replaced by fill or impervious surfaces. Also, some of the soils may contain contaminants. To mitigate the potential cumulative soil impacts, construction contracts must include requirements for the handling and disposal of contaminated materials. Also, construction documents, which are required for construction permits, must include measures to control dust, protect exposed soil from precipitation and erosion, and protect workers and any nearby sensitive receptors from exposure to soil contaminants. As such, there would be a moderate, adverse cumulative impact on soils.

Conclusion. Alternative B would have an adverse, short-term, minor impact on soils, due to the temporary nature of surface disturbance occurring over a relatively small area. Alternative B would have adverse, long-term, moderate impacts, because of the large amount soil removal. Alternative B would result in moderate cumulative impacts to soils. Alternative B would not cause impacts to soils severe enough to result in impairment to NPS resources.

4.4 Impacts on Water Quality

4.4.1 Methodology and Assumptions

In order to assess the magnitude of impacts of water quality to the Potomac and Anacostia rivers, DC WASA examined District water quality standards governing these resources as well as available baseline water quality data.

4.4.2 Impact Thresholds

The following thresholds were used to determine the magnitude of impacts on waters resources and water quality:

Negligible – Impacts (chemical, physical, or biological) would not be detectable, would be within water quality standards or criteria, and would be within historical or desired water quality conditions. All permit requirements would be met. Impacts on water or wastewater treatment facilities would not be detectable.

Minor – Impacts (chemical, physical, or biological) would be detectable but would be within water quality standards or criteria and within historical or desired water quality conditions. All permit requirements would be met. Impacts on water or wastewater treatment facilities would be detectable, but would not impact or disrupt plant operations or water demands. Mitigation, if needed, would be simple and successful.

Moderate – Impacts (chemical, physical, or biological) would be detectable but would be at or within water quality standards or criteria; however, historical baseline or desired water quality conditions would be temporarily altered. Necessary permits could be obtained and requirements would be met most of the time. Impacts on water or wastewater treatment facilities would be detectable, and could impact or disrupt plant operations or water demands from other customers. Mitigation measures to offset potential adverse impacts could be extensive, but would be successful.

Major – Impacts (chemical, physical, or biological) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions and/or chemical, physical, or biological water quality standards, or criteria would temporarily be slightly and singularly exceeded. There would be substantial difficulty obtaining permits or meeting permit requirements. However, necessary permits could be obtained and requirements would be met most of the time. Impacts on water or wastewater treatment facilities would be detectable, and would frequently impact or disrupt plant operations or water demands from other customers. Mitigation measures to offset potential adverse impacts would be extensive and their success could not be guaranteed.

Duration – Short-term impacts would take less than one year to recover after the disturbance or change occurs; long-term impacts would take longer than one year to recover after the disturbance or change occurs.

4.4.3 Impacts of No-Action Alternative

Analysis. Under the No-Action Alternative, CSO discharges would continue, and the Anacostia and Potomac rivers would continue to fail to achieve their water quality standards for their designated uses. The Anacostia and Potomac rivers would remain unable to achieve their TMDL targets or reduce existing impairments. Both rivers would continue to experience high concentrations of bacteria, TSS, and other pollutants associated with untreated sanitary waste discharging from CSOs. Under the No-Action Alternative, there would continue to be a ten-fold increases in E. coli counts (colonies per 100 mL) during storms events, and the rivers would remain above the Class A monthly standard for the majority of the average year. Reduced dissolved oxygen would continue to reduce the river's capacity to support aquatic life. TSS levels would continue to experience a 100-fold increase during storm events, with resulting reductions in water clarity, silt deposition, and the possible transport of sorbed pollutants to the rivers. Oil, grease, and trash would continue to discharge from CSOs, impairing water quality and often leaving a visible sheen on the water surface. Organics and metals, which include a wide range of toxic substances such as arsenic, lead, PCBs, PAHs, and pesticides, would continue to discharge from CSOs on a regular basis.

Under the No-Action Alternative, the adverse impacts of CSO discharges on water quality would be moderate. During storm events, peak flow rates into the Anacostia River would remain elevated, as would the risk of flooding and erosion during these high flow events. For small storm events, the concentrated, direct environmental effects of CSOs typically last less than 24 hours. For larger storm events, greater than 1-inch of precipitation, the concentrated, direct environmental effects of CSO on water quality can last up to three days. However, the long-term adverse impacts would result from the approximately 74 annual CSO events that would continue to occur annually because

there are prolonged, incremental environmental effects associated with continued water pollutant loadings.

Cumulative Impacts. Cumulative impacts include water quality impacts associated with past, present, and reasonably foreseeable future development projects in the vicinity of the Anacostia River (see **Table 4.1-1**). Past and present development has incrementally increased the impervious surface in the project vicinity and the larger watershed; this development has also contributed to the exceedance of the existing sewer system. Present and future development projects would likely increase impervious surface area and exacerbate runoff and pollutant loadings into the Anacostia and Potomac rivers. Additionally, upstream sources would continue to add pollutants to the rivers (see **Table 4.4-2**).

However, NPS, EPA, USACE, various public agencies within the District and the surrounding states are creating regulations, enforcing project-specific mitigation, funding projects to improve water quality, and encouraging the public to reduce nonpoint pollution sources. Private and non-profit organizations are involved in similar initiatives. For example, the Washington Canal Park is transforming a parking lot to a park which would decrease impervious surfaces. Also, the Kingman Island Park and Heritage Park Island would restore marsh land and provide a new Environmental Education Center. Although the No-Action Alternative includes some CSO reduction and management projects, there would continue to be considerable CSO discharges. These discharges, in conjunction with incremental water quality impacts associated with other reasonably foreseeable development, would result in moderate, adverse cumulative impacts on water quality.

Conclusion. Under the No-Action Alternative, CSO discharges would continue, and the Anacostia and Potomac rivers would continue to fail to achieve their water quality standards for their designated uses. This would result in moderate adverse, long and short-term moderate impacts; and adverse, moderate cumulative to water quality. Although CSO discharges would continue, based on current and projected volumes, the No-Action Alternative would not cause impacts to water resources and water quality severe enough to result in impairment to NPS resources.

4.4.4 Impacts of Alternative B

Analysis. The purpose of the proposed project is to control CSO discharges and improve the water quality of the Anacostia River and other receiving waters, consistent with the LTCP and the Consent Decree. As outlined in the Consent Decree, the proposed project would result in a 98 percent reduction of CSOs to the Anacostia River. Reducing CSO discharges would decrease the loading of bacteria, TSS, and other pollutants associated with sanitary waste in the Anacostia River, resulting in both short- and long-term beneficial impacts in water quality.

Long-term beneficial impacts would result from a decrease in the chemical reactions, such as biological and chemical oxygen demand, which occur as a result of the introduction of certain pollutants into surface waters from untreated sewage and which cause reduced oxygen concentration in the water. Below certain concentrations, oxygen demanding organisms perish, and their decay further depletes oxygen levels and introduces other pollutants, such as nitrogen, into the waters. These adverse impacts would be reduced by the implementation of Alternative B.

The reduced pollutant loading would help to achieve TMDL targets and reduce existing impairments in the Anacostia River and the Potomac River, as defined in the District's Section 303(d) report. Diverting CSO flows would also decrease the volume and frequency of stormwater discharges into the Anacostia River, reducing peak flow rates and the risk of flooding and erosion during the high flow conditions that occur during storms. The new BAFB Overflow Facility would introduce a new discharge point to the Potomac River, but the total volume of CSO discharge to the river would be decreased, resulting in a net beneficial impact.

Even though implementation of Alternative B would have measurable, beneficial environmental impacts to the Anacostia and Potomac rivers, it may not ensure meeting the water quality standards at all times. While the amount of CSOs and resulting pollutants introduced into the water would be reduced, resulting in overall beneficial impacts to water quality, CSOs would continue to occur during approximately two storm events annually, and pollutants would continue to be introduced into the river during these storm events. Additionally, other sources of pollution to the Anacostia River (described in **Section 4.4.5**) could prohibit the attainment of water quality standards even if no CSO discharges occurred.

During the preparation of the LTCP water quality impacts were analyzed under a number of scenarios including: (a) existing pollution loads, (b) no other loads except CSO, and (c) upstream and storm water loads reduced in line with what might be achievable in the future. In order to accurately analyze the impact of Alternative B on water quality, DC WASA determined the effect of CSO controls with other load sources set to zero and also the effect of CSO controls taking into account other loads and background conditions. Therefore, the data presented in **Table 4.3-1** assesses the impact of Alternative B considering both existing conditions and also CSO controls only with other load sources set to zero.

Table 4.4-1: LTCP Wet Weather Water Quality Conditions

Item		Predicted Conditions for Average Year in Receiving Waters – Anacostia River
A.	Number of Annual Overflow Events	
	1. Location	Navy Yard
	2. No Phase I Controls	82
	3. After Completion, LTCP (Alternative B)	2
B.	Annual Overflow Volume (mg/yr)	
	1. Location	All Outfalls
	2. No Phase 1 Controls	2,142
	3. After Completion LTCP (Alternative B)	54
	4. Percent Reduction	97.5%
C.	Bacteria (As E. Coli, No./ 100 ml)	
	1. Location	Navy Yard
	2. No. Mos. Class A Geo. Mean (126/100 ml) exceeded	
	• All Loads (CSO, Upstream, D.C. Storm Water)	
	* No Phase I Controls	11
	* After Completion, LTCP (Alternative B)	5
	* Percent Reduction	55%
	• CSO Loads Only	
	* No Phase I Controls	9
	* After Completion, LTCP (Alternative B)	0
	3. No. Days 126/100 ml exceeded (Year Round)	
	• All Loads	
	* No Phase I Controls	238

Table 4.4-1: LTCP Wet Weather Water Quality Conditions		
Item		Predicted Conditions for Average Year in Receiving Waters – Anacostia River
	* After Completion, LTCP (Alternative B)	173
	• CSO Loads Only	
	* No Phase I Controls	217
	* After Completion, LTCP (Alternative B)	4
	4. Percent Time (Days) Bacteria Less than 126/100 ml	
	• All Loads	
	* No Phase I Controls	34.8%
	* After Completion, LTCP (Alternative B)	52.6%
	• CSO Loads Only	
	* No Phase I Controls	40.5%
	* After Completion, LTCP (Alternative B)	98.9%
D.	Dissolved Oxygen	
	1. Location	Navy Yard
	2. No. Days Less Than 5.0 mg/L	
	• All Loads	
	* No Phase I Controls	93
	* After Completion, LTCP (Alternative B)	72
	• CSO Loads Only	
	* No Phase I Controls	0
	* After Completion, LTCP (Alternative B)	0
	3. No. Days Less Than 4.0 mg/L	
	• All Loads	
	* No Phase I Controls	57
	* After Completion, LTCP (Alternative B)	35
	• CSO Loads Only	
	* No Phase I Controls	0
	* After Completion, LTCP (Alternative B)	0
	4. No. Days Less Than 2.0 mg/L	
	• All Loads	
	* No Phase I Controls	10
	* After Completion, LTCP (Alternative B)	3
	• CSO Loads Only	
	* No Phase I Controls	0
	* After Completion, LTCP (Alternative B)	0
Notes: Minimum day concentration in entire three-year period (1988-1990) as predicted by the model for the hydraulic conditions occurring in those three years.		

There would be short-term, adverse impacts to the rivers, as discussed in **Section 4.5.4**. However, short-term, adverse impacts to water quality would be mitigated through the use of best management practices, as well as erosion and sediment control measures. These practices would be included in all approved construction documents and contracts, and could include the use of coffer dams and dewatering operations; use of construction fence, super siltfence, haybales, diversion channels and berms, and temporary stormwater basins for stormwater management and perimeter controls; proper disposal of dredged material; and the dedication of an environmental manager to monitor the project during construction.

There would be no long-term adverse impacts on water quality associated with Alternative B. However, there would be a long-term beneficial impact on water quality. Therefore, mitigation for long-term water quality impacts is not proposed.

Cumulative Impacts. Cumulative impacts include water quality impacts associated with past, present, and reasonably foreseeable future development and construction projects in the vicinity of the Anacostia River (see **Table 4.1-1**). Past and present development has incrementally increased the impervious surface in the project vicinity and the larger watershed; this development has also contributed to the exceedance of the existing sewer system.

Present and future development projects would likely increase impervious surface area and exacerbate runoff and pollutant loadings into the Anacostia and Potomac rivers. Additionally, upstream sources would continue to add pollutants to the rivers. However, NPS, EPA, various public agencies within the District and the surrounding states, as well as private organizations, are creating regulations, funding projects to improve water quality, and encouraging the public to reduce nonpoint pollution sources. For example, the Washington Canal Park is transforming a parking lot to a parking which would increase impervious surfaces. Also, the Kingman Island Park and Heritage Park Island would restore marsh land and provide a new Environmental Education Center.

Although upstream sources would continue to add pollutants to the rivers and there would be incremental water quality impacts associated with the reasonably foreseeable development, Alternative B would greatly minimize CSO discharges and improve the overall health of the Anacostia River, thereby reversing some of the cumulative adverse impacts of decades of urbanization and development. Because so many other factors would continue to cumulatively affect the water quality of the Anacostia and Potomac Rivers (see **Table 4.4-2**), the overall adverse cumulative impact for Alternative B would be minor.

Table 4.4-2 Sources of Pollution to the Anacostia River

Source	Biochemical Oxygen Demand (%)	Fecal Coliform (%)
CSO Overflow	14	61
D.C. Stormwater	24	13
Other Stormwater	1	1
Upstream	61	25
Total	100	100

Conclusion. Alternative B would result in short-term, minor, adverse impacts, as well as long-term, beneficial impacts; and thus, would not result in impairment to NPS resources. The cumulative effect would be adverse and minor.

4.5 Impacts on Wetlands

4.5.1 Methodology and Assumptions

To quantify and assess potential impacts to wetlands, DC WASA overlaid the footprints of all areas of proposed surface disturbance with mean high water boundaries of the Potomac and Anacostia rivers, and delineated wetland and waterway boundaries. Short-term impacts due to construction and placement of permanent structures were considered in determining impacts to wetlands and waterways.

4.5.2 Impact Thresholds

Negligible – Wetlands would not be impacted or the impacts would be at the lower levels of detection.

Minor – The impact to wetlands would be detectable and relatively small in terms of area and nature of the change. However, the wetland and waterway processes, functions, and integrity would remain unaffected.

Moderate – Impacts to wetlands would be readily apparent and short-term with regard to the resources defining attributes. In addition, the wetland and waterway processes, functions, and integrity would be temporarily impacted.

Major – Impacts to wetlands would be long-term and readily apparent with regard to the resources defining attributes. In addition, wetland and waterway processes, function, and integrity would likely be eliminated or severely impaired.

Duration – Short-term impacts would take less than one year to recover after the disturbance or change occurs; long-term impacts would take longer than one year to recover after the disturbance or change occurs.

4.5.3 Impacts of No-Action Alternative

Analysis. The Potomac and Anacostia rivers contain two riverine intertidal wetlands, as defined by NPS, within the study area. They are located adjacent to the shore at CSO 019 Outfall Facility in Anacostia Park and at the Bolling AFB outfall facility. These wetlands primarily function to provide freshwater fish, shellfish, and other wildlife habitat; however, these functions are compromised by existing seawall and rip-rap modifications to the shorelines. As a result of these shoreline stabilization structures, these wetlands do not support native emergent vegetation communities, and therefore do not provide critical fish, shellfish, and wildlife habitat. Neither do they provide other important functions associated with intact riverine and open water tidal wetlands, such as flood attenuation and sediment retention.

The No-Action Alternative would result in no changes to the functions and values of wetlands within the study area. They would continue to provide only marginal fish, shellfish, and wildlife habitat, while providing little or no additional important wetland functions. Therefore, impacts to wetlands under the No-Action Alternative would be negligible.

Cumulative Impacts. Cumulative impacts would include potential dredging, filling and conversion of wetlands and waterways associated with past, current, and future development (as listed in **Table 4.1-1**); increases in impervious surfaces; increased source and non-source pollutant loads; and flooding and erosion associated with CSO discharges. Direct and cumulative impacts to wetland and waterways would be minimized and mitigated by project-specific federal and local protective regulations (including Sections 404 and 401 of the CWA). Also, stormwater, sediment, and erosion

control measures must be conditions of development within the District. Additionally, the NPS, EPA, USACE, various public agencies within the District and the surrounding states are creating regulations, funding projects to restore or mitigate wetlands and waterways, and educating the public about wetland benefits. Private and non-profit organizations are involved in similar initiatives. For example, the Kingman Island Park and Heritage Park Island would restore marsh land and provide a new Environmental Education Center. However, there would still be incremental cumulative impacts to wetlands especially associated with pollution loads. Therefore, the No-Action Alternative would have a minor, adverse cumulative impact on wetlands.

Conclusion. The No-Action Alternative would result in continued CSO discharges to the Potomac and Anacostia rivers and would perpetuate the degraded condition of surface waters and wetlands. The continued CSO discharges would result in adverse, short and long-term minor impacts and cumulative adverse, minor impacts to the fish, shellfish, and wildlife habitat values of intertidal wetlands and waterways. Under the No-Action Alternative, continued CSO discharges would not cause impacts to wetlands severe enough to result in impairment to NPS resources.

4.5.4 Impacts of Alternative B

Analysis. Alternative B would result in long-term, adverse impacts to riverine, tidal wetlands; but these impacts would be minor. Approximately 21,820 square feet and 320 linear feet of the Anacostia River, including intertidal wetlands, would be impacted due to placement of riprap at the CSO 019 Overflow Facility. Approximately 11,040 square feet and 184 linear feet of the Potomac River, including intertidal wetlands, would be impacted due to placement of riprap at the BAFB Overflow Facility. Neither construction activity is expected to greatly alter the functions or values of the wetlands. A total of 32,860 square feet (0.75 acre) and 504 linear feet of Waters of the U.S., including wetlands, are expected to be impacted in the long-term by Alternative B. Short-term construction-related impacts to wetlands and Waters of the U.S. would occur at the CSO 019 Overflow Facility (43,815 square feet) and the BAFB Overflow Facility (18,638 square feet). These construction impacts would be minimal and are required for control and containment of benthic sediments. Additionally, DC WASA will investigate other shoreline stabilization methods besides rip-rap that may have a lesser impact to wetland and waters of the U.S.

Impacts to wetlands would require a Section 404 CWA permit from USACE and a Section 401 CWA certification from DDOE, Water Quality Division. Those permits stipulate requirements for mitigation that must be carried out to replace the lost functions and values resulting from long-term impacts to the Anacostia and Potomac rivers. Additionally, NPS requires a 1:1 mitigation ratio for the replacement of lost wetland functions and values. As described in the NPS Statement of Findings (see **Appendix F**), functions and values lost as a result of Alternative B would include marginal fish, shellfish, and wildlife habitat. Compensatory mitigation would be determined through future coordination with USACE, DDOE, and NPS. However, requirements may include the replacement of lost habitat to aquatic species through restoration of tidal marshes, floating aquatic vegetation, or submerged aquatic vegetation beds.

A wetland mitigation project would be based on a functional assessment of existing resources. A specific wetland mitigation project has not been determined at this time; however, an acceptable project would be identified in the future during coordination with NPS. Potential wetland mitigation projects would include the restoration or enhancement of wetlands, the removal of invasive species in an existing wetland or wetland buffer, the installation or retrofit of stormwater management facilities, and/or the restoration of a stream that flows to the Anacostia or Potomac river. The amount of mitigation required would depend on the type of mitigation project. All mitigation must be conducted on NPS property.

Cumulative Impacts. Cumulative impacts would include potential dredging, filling and conversion of wetlands and waterways associated with past, current, and future development (as listed in **Table 4.1-1**); increases in impervious surfaces; increased source and non-source pollutant loads; and flooding and erosion associated with CSO discharges. Direct and cumulative impacts to wetland and waterways would be minimized and mitigated by project-specific federal and local protective regulations (including Sections 404 and 401 of the CWA) and stormwater, sediment, and erosion control measures that would be conditions of development. Additionally, the NPS, EPA, USACE, various public agencies within the District and the surrounding states are creating regulations, funding projects to restore or mitigate wetlands and waterways, and educating the public about wetland benefits. Private and non-profit organizations are involved in similar initiatives. For example, the Kingman Island Park and Heritage Park Island would restore marsh land and provide a new Environmental Education Center. However, there would still be incremental cumulative impacts to wetlands especially associated with pollution loads. Although Alternative B would minimize CSO discharges and manage runoff associated with some pollutant loads, it would still have a minor, cumulative impact on wetlands.

Conclusion. Alternative B would result in minor short-term adverse impacts to wetlands due to construction, and long-term, minor adverse impacts to wetlands due to the placement of riprap or other shoreline stabilization techniques. However, Alternative B would also reduce CSO discharges and would result in a net benefit to the habitat functions of wetlands and waterways. Therefore, the overall, long-term impact to wetlands would be negligible. Cumulative impacts to wetlands and waterways would be minor. Alternative B would not cause impacts to wetlands and waterways severe enough to result in impairment of NPS resources..

4.6 Impacts on Vegetation

4.6.1 Methodology and Assumptions

In determining the impacts to vegetation, DC WASA considered the type, size, and integrity of each area of vegetative cover. To quantify and assess potential impacts to vegetation, DC WASA overlaid the footprints of all areas of proposed surface disturbance with known vegetated areas. Short-term impacts due to construction and placement of permanent structures were considered in determining impacts to vegetation.

4.6.2 Impact Thresholds

Negligible: Impacts would have no measurable or perceptible changes in plant community size, integrity, or continuity.

Minor: Impacts would be measurable or perceptible, but would be localized within a relatively small area. The overall viability of the plant community would not be impacted and, if left alone, would recover.

Moderate: Impacts would cause a change in the plant community (e.g., abundance, distribution, quantity or quality); however, the impact would remain localized.

Major: Impacts to the plant community would be substantial, highly noticeable, and long-term.

Duration: Short-term impacts would take less than one year to recover after the disturbance or change occurs; long-term impacts would take longer than one year to recover after the disturbance or change occurs.

4.6.3 Impacts of No-Action Alternative

Analysis. The No-Action Alternative would not involve the construction of a tunnel system and therefore would not require the removal of terrestrial vegetation. Although the No-Action Alternative would decrease CSOs, aquatic vegetation would still be subject to significant CSOs during storm events. These CSOs can still be expected to carry pollutants, such as heavy metals and PCBs, that accumulate in the river sediments and become concentrated in the tissues of aquatic vegetation that grow in these sediments, which can result in toxic effects to these plants. Silt-laden discharges would still be able to impact the germination and growth of new vegetation; and debris, upon settling along the shoreline, would still be able to result in thick deposits, or wracks, that can injure and or smother aquatic vegetation. CSOs will continue to discharge nutrient-rich water, which tends to favor the growth and establishment of certain invasive, non-native species over other native species. Therefore, there would be a negligible short-term and long-term impact on vegetation.

Cumulative Impacts. Cumulative impacts to vegetation would include the removal or planting of vegetation for development projects and pollutant that would affect the integrity of vegetative communities. Much of the study area is urban and does not support sizable terrestrial vegetative communities. Aquatic vegetation is subject to various pollution sources mostly associated with runoff. Past and present development has incrementally decreased the vegetative community in the project vicinity and contributed to water pollution. The past, present and future development listed on **Table 4.1-1** includes projects that had and would have a cumulative impact on vegetation. Local regulations including the Urban Forest Preservation Act require requires project specific mitigation for the removal of vegetation. And many local government and special interest organizations promote and support tree planting. Federal and local governments are funding projects that would provide more green space or restoring waterways, which would support vegetation. For example, the Diamond Teague Park is proposed as a new park to connect the Anacostia Park to the Nationals Park, and the Washington Canal Park is being planned for the District's Capitol Riverfront Neighborhood. However, incremental reduction in vegetation is still likely, and aquatic vegetation would still be subject to water pollution, as described in **Section 4.4**. Therefore, the No-Action Alternative would have a minor, adverse, cumulative impact predominately on aquatic vegetation.

Conclusion. The No-Action Alternative would involve no surface disturbance, resulting in negligible short and long-term impacts on vegetation. The No-Action Alternative would have minor, adverse cumulative impacts on vegetation. Therefore, impacts to vegetation from the No-Action Alternative would not result in impairment of NPS resources.

4.6.4 Impacts of Alternative B

Analysis. Alternative B would result in only minor, short-term, adverse impacts to vegetation. Construction of the project would result in the removal of some trees and vegetation, but no long-term impacts in plant community integrity or continuity would be anticipated. **Table 4.6-1** identifies the extent of vegetative cover that would be impacted in the long-term by this project.

Table 4.6-1: Vegetation Impacts	
Surface Disturbance Area	Vegetation Impact
Tingey Street Diversion Sewers	Street trees
CSO 019 Overflow and Diversion Facilities	Riparian forest and 19 special trees
M Street Diversion Facilities	Street trees and riparian forest
CSO 005 & 007 Diversion Facilities	Landscaping trees, 2 special trees

Table 4.6-1: Vegetation Impacts

Surface Disturbance Area	Vegetation Impact
Bolling Air Force Base Overflow and Diversion Facilities	Landscaping trees
BPAWWTP Facilities	Landscaping trees
Poplar Point Pumping Station	Landscaping trees, small forested area adjacent to South Capitol Street, 3 special trees

DDOT, Urban Forestry Administration requires a permit for the removal or disturbance of a street tree or special tree. A Special Tree Removal Permit is required by the Urban Forest Preservation Act of 2002, effective June 12, 2003. Twenty-seven special trees would be removed as a result of Alternative B. Mitigation for those trees would occur by either:

- Planting a quantity of saplings whose aggregated circumference equals or exceeds the circumference of the special trees to be removed;
- Paying into the Tree Fund a tree replacement fee of \$35 per inch of circumference of each special tree to be removed; or
- A combination of the two mitigation options.

Additionally, in areas where surface disturbance is proposed, all vegetation would be restored according to NPS or other agency-specific criteria.

Cumulative Impacts. Cumulative impacts to vegetation would include the removal or planting of vegetation for development projects and pollutant that would affect the integrity of vegetative communities. Much of the study area is urban and does not support sizable terrestrial vegetative communities. Aquatic vegetation is subject to various pollution sources mostly associated with runoff. Past and present development has incrementally decreased the vegetative community in the project vicinity and contributed to water pollution. The past, present and future development listed on **Table 4.1-1** includes projects that had and would have a cumulative impact on vegetation. Local regulations including the Urban Forest Preservation Act require requires project specific mitigation for the removal of vegetation. And many local government and special interest organizations promote and support tree planting. Federal and local governments are funding projects that would provide more green space or restoring waterways, which would support vegetation. For example, the Diamond Teague Park is proposed as a new park to connect the Anacostia Park to the Nationals Park, and the Washington Canal Park is being planned for the District's Capitol Riverfront Neighborhood. However, incremental reduction in vegetation is likely and aquatic vegetation would still be subject to water pollution, as described in **Section 4.4**. Although Alternative B would greatly reduce CSO discharge, the cumulative impact on vegetation, primarily aquatic, would be minor and adverse because of the other sources of pollution (see **Table 4.4-2**) to aquatic vegetation communities.

Conclusion. Alternative B would result in minor, short adverse impacts, and negligible, long-term impacts, due to the removal of trees during construction. Alternative B would result in minor, adverse cumulative impacts to vegetation. Alternative B would not cause impacts to vegetation severe enough to result in impairment to NPS resources.

4.7 Impacts on Wildlife and Wildlife Habitat

4.7.1 Methodology and Assumptions

In determining the impacts on wildlife and wildlife habitat, DC WASA considered the required habitat and adaptation of wildlife species in the study area and possible changes to existing habitat conditions.

4.7.2 Impact Thresholds

Negligible – No species of concern (declining, threatened, or endangered species) are present, and there would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within natural fluctuations.

Minor – Non-breeding animals of concern and/or their habitats are present, but only in low numbers; no critical habitats are present; and occasional disturbance to wildlife and wildlife habitat may occur but would not impact feeding, nesting, or breeding.

Moderate – Breeding animals of concern and/or their habitats are present; animals are in vulnerable life stages; and occasional mortality or interference with survival activities are expected but would not threaten the species present.

Major – Breeding animals are present in relatively high numbers and/or during vulnerable life stages; habitat has a history of being used by wildlife during critical periods and is somewhat limited; and mortality is expected on a regular basis and could threaten species survival.

Duration – Short-term impacts would take less than one year to recover after the disturbance or change occurs; long-term impacts would take longer than one year to recover after the disturbance or change occurs.

4.7.3 Impacts of No-Action Alternative

Analysis. The No-Action Alternative would have both short and long-term, minor, adverse impact on wildlife and wildlife habitat. No construction would occur, resulting in no change in terrestrial wildlife habitat and no direct impacts on terrestrial wildlife. However, under the No-Action Alternative; aquatic wildlife and their habitat would still be subject to CSOs during storm events, which contribute to reduced water quality and associated adverse impacts to aquatic wildlife and wildlife habitat.

Cumulative Impacts. Under the No-Action Alternative, past, present, and future development (see **Table 4.1-1**) have contributed and would continue to contribute to incremental loss of localized habitat for terrestrial species. Aquatic habitat is subject to various pollution sources mostly associated with runoff. The reasonably foreseeable development projects occur in an urban environment, and wildlife in these areas are typical of urban environments and urban development. Local and federal regulations protect and require mitigation for tree removal and habitat disturbance. Federal and local governments, as well as private organizations, are funding projects that would provide more trees, green space or restoring waterways, which would support wildlife habitat. For example, the Diamond Teague Park is proposed as a new park to connect the Anacostia Park to the Nationals Park, and the Kingman Island Park and Heritage Island Park would restore 40 acres of tidal marsh. However, aquatic wildlife and their habitat would continue to be exposed to CSOs during storm events and incremental reduction in vegetation is likely. As such, the No-Action

Alternative would have minor, adverse cumulative impacts on wildlife habitat, predominately on aquatic habitat.

Conclusion. The No-Action Alternative would have a short- and long-term minor adverse impact on wildlife and wildlife habitat. No construction would occur, resulting in no change in terrestrial wildlife habitat and no direct impacts on terrestrial wildlife. However, under the No-Action Alternative, aquatic wildlife and their habitat would still be subject to CSOs during storm events, which are periodic disturbances to aquatic wildlife and wildlife habitat. Continued CSOs would also have the potential to contribute to minor, cumulative adverse impacts on wildlife and wildlife habitat. These impacts would not be severe enough to impact NPS resources.

4.7.4 Impacts of Alternative B

Alternative B would result in both short and long-term, minor adverse impacts to terrestrial wildlife and wildlife habitat. Long-term adverse impacts would result from loss of wetlands and the removal of some trees and vegetation, as discussed in **Section 4.5.4** and **Section 4.6.4**, respectively. Short-term adverse impacts would occur during construction; however, most of the aquatic wildlife species present would relocate to adjacent, undisturbed habitat; and these animals can be expected to return to these wetlands habitats once construction is completed. As a result of vegetation removal, existing wildlife habitat would be disrupted, but this would not impact any species of concern or impede feeding, nesting, or breeding activities.

However, the proposed project is essential to the EPA's efforts to improve habitat for aquatic wildlife species and would result in long-term, beneficial impacts for fish and shellfish, by improving the water quality of the Anacostia River, and therefore the river's aquatic habitat values. Since the Anacostia River flows into the Potomac, this beneficial impact would spread by inducing improvements within the Potomac. This, in turn, would be expected to contribute to the overall aquatic health of the Chesapeake Bay watershed. The new BAFB overflow facility would introduce a new discharge point to the Potomac River; but the total volume of CSO discharge to the river would be decreased by 98 percent, resulting in a long-term, net beneficial impact to aquatic habitat.

Mitigation for habitat loss would be accomplished primarily through restoration efforts. All vegetated habitats associated with surface disturbance areas would be restored on-site and in-kind where practicable. Disturbances to aquatic habitat associated with the BAFB Overflow Facilities and the CSO 019 Overflow Facilities would be minimized through the implementation of Section 404 permit conditions, including compensatory mitigation, as required. DC WASA has committed to providing mitigation for impacts to these areas through restoration of a site mutually agreed upon with NPS.

Cumulative Impacts. Under Alternative B, past, present, and future development (see **Table 4.1-1**) have contributed and would continue to contribute to incremental loss of localized habitat for terrestrial species. Aquatic habitat is subject to various pollution sources mostly associated with runoff. The reasonably foreseeable development projects occur in an urban environment, and wildlife in these areas are typical of urban environments and urban development. Also, local and federal regulations protect and require mitigation for tree removal and habitat disturbance. Federal and local governments, as well as private organizations, are funding projects that would provide more trees, green space or restoring waterways, which would support wildlife habitat. For example, the Diamond Teague Park is proposed as a new park to connect the Anacostia Park to the Nationals Park, and the Kingman Island Park and Heritage Island Park would restore 40 acres of tidal marsh. Although aquatic species would benefit from increased water quality afforded by Alternative B, there would still be a minor, adverse cumulative impact on wildlife and wildlife habitat when considering the potential effect of reasonably foreseeable development. Incremental reduction in

vegetation is likely, and aquatic vegetation would be exposed to pollution from other sources (see Table 4.2-2).

Conclusion. Alternative B would result in both short and long-term, minor adverse impacts to terrestrial wildlife and wildlife habitat. These impacts are would result from temporary, adverse impacts during construction, as well as the long-term impacts to wetlands and the removal of some trees and vegetation. Alternative B would also result in long-term, beneficial impacts on aquatic wildlife and wildlife habitat. Nevertheless, the overall, long-term impacts to wildlife habitat would be minor and adverse. Alternative B would have minor, adverse cumulative impacts on wildlife habitat. Impacts to wildlife and wildlife habitat would not be severe enough to impair NPS resources.

4.8 Impacts on Cultural Resources

4.8.1 Methodology and Assumptions

The cultural resources impact analyses are intended to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 (36 CFR Part 800, "Protection of Historic Properties"), impacts to cultural resources will be identified and evaluated by:

- Determining the Area of Potential Effects (APE);
- Identifying cultural resources present in the APE that are either listed in or eligible for listing in the NRHP;
- Applying the criteria of adverse effect to affected cultural resources that are either listed in or eligible for listing in the NRHP; and
- Considering ways to avoid, minimize, or mitigate adverse effects.

The Section 106 regulations require that an *adverse effect* or *no adverse effect* determination be made for all NRHP listed or eligible cultural resources that would be affected by the project undertaking. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the NRHP. Adverse effects also include reasonably foreseeable effects caused by Alternative B that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, "Assessment of Adverse Effects"). A determination of *no adverse effect* means there is an effect, but that the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion on the NRHP.

The Section 106 regulations require that the agency undertaking the project consult with the State Historic Preservation Office and other consulting parties to mitigate adverse effects to cultural resources. Section 106 coordination has been undertaken with the District Historic Preservation Office, National Capital Planning Commission, and the Commission of Fine Arts.

Archaeological studies are ongoing. Due to extensive dredging and land reclamation activities along the Anacostia River, most of the surface disturbance areas contain deep layers of fill - from five to 25 feet deep. The depth of fill precluded conventional archaeological survey methods - such as surface survey or shovel testing - to identify archaeological resources in each surface disturbance area. Historic map research indicated that there is potential for fill to overlay intact prehistoric and historic land surfaces. Because facility construction at surface disturbance areas would extend 100 feet or more, construction would have potential to disturb deeply buried archaeological resources. In addition to historic map research, geoarchaeological soil borings have been conducted to address the potential of each surface disturbance area to contain archaeological resources. The borings,

1 conducted in March and April 2010, produced continuous core soil samples, which extended below
2 fill layers. The soil samples were examined by a geoarchaeologist to determine if each surface
3 disturbance area contained intact soils and the potential to contain archaeological resources. The
4 results of the geoarchaeological investigations are included in **Appendix G**.

5 Identification and evaluation of archaeological resources will be completed following the
6 Environmental Assessment, but prior to construction of any facility elements. Both NPS and the
7 District of Columbia Historic Preservation Office have agreed to develop a Memorandum of
8 Agreement with DC WASA that stipulates a process and schedule for completion of archaeological
9 investigations in compliance with the Section 106 regulations.

10 **4.8.2 Impact Thresholds**

11 For the purpose of analyzing impacts to archaeological resources, thresholds of change for the
12 intensity of an impact are based upon the potential of the site(s) to yield information important in
13 prehistory or history:

14 **Negligible** – The impact is at the lowest level of detection or barely measurable, with no
15 perceptible consequences, either adverse or beneficial, to archaeological resources. For
16 purposes of Section 106, the effect determination would be *no adverse effect*.

17 **Minor** – The disturbance of a site(s) would be confined to a small area with little, if any, loss
18 of important information potential. For purposes of Section 106, the determination of effect
19 would be *no adverse effect*.

20 **Moderate** – Disturbance of a site would not result in a substantial loss of important
21 information. For purposes of Section 106, the determination of effect would be *adverse*
22 *effect*.

23 **Major** – Disturbance of a site would be substantial and would result in the loss of most or all
24 of the site and its potential to yield important information. For purposes of Section 106, the
25 determination of effect would be *adverse effect*.

26 **Duration** – Short-term impacts would be immediately during and following construction of
27 the alternative; long-term impacts would be those persisting or resulting after construction
28 of the alternative.

29 For the purpose of analyzing potential impacts to historic structures, buildings, and districts, the
30 thresholds of change for the intensity of an impact are identified as follows:

31 **Negligible** – The impact is at the lowest level of detection or barely perceptible and not
32 measurable. For purposes of Section 106, the effect determination would be *no adverse*
33 *effect*.

34 **Minor** – The impact would not affect the character defining features of a structure or
35 building listed on or eligible or listed on for the NRHP. For purposes of Section 106, the
36 determination of effect would be *no adverse effect*.

37 **Moderate** – The impact would alter a character-defining feature(s) of the structure,
38 building, or historic district but would not diminish the integrity of the resource to the
39 extent that its national register eligibility would be jeopardized. For purposes of Section
40 106, the determination of effect would be *no adverse effect*.

41 **Major** – The impact would alter a character defining feature(s) of the structure, building or
42 district, diminishing the integrity of the resource to the extent that it is no longer eligible to

1 be listed on the NRHP. For purposes of Section 106, the determination of effect would be
2 *adverse effect*.

3 **Duration** – Short-term impacts would be immediately during and following construction of
4 the alternative; long-term impacts would be those persisting or resulting after construction
5 of the alternative.

6 **4.8.3 Impacts of No-Action Alternative**

7 **Archaeology**

8 **Analysis.** The No-Action Alternative would involve no construction and would have no potential to
9 affect archaeological resources. Therefore, the No-Action Alternative would have a negligible effect
10 on archaeology.

11 **Cumulative Impacts.** Cumulative impacts to archaeological resources may occur under the
12 No-Action Alternative. Past, present, and future projects affected and will continue to affect
13 archaeology resources (see **Table 4.1-1**). Within the District, most archaeological resources are
14 deeply buried because of there is a considerable amount of fill atop of intact land surfaces.
15 Therefore, many construction impacts would not extend deep enough into the fill to disturb
16 archaeological resources. Some projects, including Poplar Point, have potential to extend below
17 deep layers of fill in areas with high potential to contain archaeological resources. As such, there
18 would be an adverse, minor cumulative impact on soils.

19 **Conclusion.** The No-Action Alternative would have a negligible impact on archaeological resources.
20 No construction would occur, resulting in no physical, visual, or auditory effects on archaeological
21 resources. However, the cumulative impacts on archeological resources associated with the
22 No-Action Alternative can be expected to be minor. Impacts to archeological resources would not
23 be severe enough to impair NPS resources.

24 **Historic Structures, Buildings, and Districts**

25 **Analysis.** The No-Action Alternative would involve no construction and would have no potential to
26 affect historic structures, buildings, and districts. Therefore, the No-Action Alternative would have a
27 negligible effect on historic resources.

28 **Cumulative Impacts.** Cumulative impacts to historic structures, buildings, and districts may occur
29 under the No-Action Alternative. The list of reasonably foreseeable development projects in the
30 project vicinity that have potential to physically, visually, or auditorily impact historic structures,
31 buildings, or districts are listed on **Table 4.1-1**. These construction projects within the study area
32 are likely to occur even if Alternative B construction does not take place. These projects would be
33 reviewed by the District Historic Preservation Office, and plans to mitigate adverse effects would be
34 incorporated into project designs. As such, there would be a minor cumulative impact on historic
35 structures, buildings, and districts.

36 **Conclusion.** The No-Action Alternative would have a negligible impact on architectural resources.
37 Although construction of Alternative B would not occur, other development projects in the study
38 area vicinity have potential to result in physical, visual, or auditory effects on architectural
39 resources. Therefore, there would be minor cumulative effects on historic resources. These impacts
40 would not be severe enough to result in impairment to NPS resources.

4.8.4 Impacts of Alternative B

Archaeology

Alternative B would cause negligible impacts to one surface disturbance area (the CSO 018 Diversion Facilities) that does not have potential to contain archaeological resources because of extensive previous disturbance during the construction of the Southeast Freeway (Interstate 395).

Five surface disturbance areas required geoarchaeological studies to address archaeological potential. The borings, conducted in March and April 2010, produced continuous core soil samples that extended below fill layers. The soil samples were examined by a geoarchaeologist to determine if each surface disturbance area contained intact soils and the potential to contain archaeological resources (see **Appendix G**). Alternative B has the potential to cause negligible to moderate, long term impacts to each of the remaining surface disturbance areas, as indicated by geoarchaeology results below.

- **Bolling Air Force Base Overflow and Diversion Facilities:** Geoarchaeological studies have indicated that much of this surface disturbance area has been disturbed and has no potential to contain archaeological resources. However, these same studies revealed that one area in the vicinity of the drop shaft contains soils with the potential to contain archaeological resources. Further archaeological survey will be conducted prior to construction to identify and evaluate any archaeological resources in the vicinity of this surface disturbance area. Alternative B has potential to cause moderate, long term impacts to archaeological resources at this surface disturbance area.
- **Poplar Point Pumping Station:** Geoarchaeological studies have indicated that the northern half of this surface disturbance area is located on fill overlaying former wetlands or graded soils with no potential to contain resources. The southern half of this surface disturbance area contains fill over undisturbed soils with the potential to contain archaeological resources. Further archaeological survey will be conducted prior to construction to identify and evaluate any archaeological resources in the southern half of this surface disturbance area. Alternative B has potential to cause moderate, long term impacts to archaeological resources at this surface disturbance area. Meetings with the SHPO office regarding impacts to archeological resources are pending.
- **CSO 005 and 007 Diversion Facilities:** Geoarchaeological studies have indicated that this surface disturbance area is located entirely on made land with no potential to contain resources. Alternative B has potential to cause negligible, long term impacts to archaeological resources at this surface disturbance area and no further archaeological survey is proposed.
- **M Street Diversion Facilities:** This surface disturbance area has been extensively disturbed by utility related construction. The diversion sewer and drop shaft on the vicinity of the intersection of M Street, S.E. and Water Street would be constructed within fill that is located on top of a substantially graded and steep upland area with no potential to contain archaeological resources. Alternative B has potential to cause negligible, long term impacts to archaeological resources at this surface disturbance area and no further archaeological survey is proposed.
- **CSO 019 Overflow and Diversion Facilities:** The majority of this surface disturbance area is on made land. The sub-area that would contain the proposed diversion structure was considered to be the only part of the facility with potential to contain archaeological resources. Geoarchaeological studies have indicated that this sub-area is located on fill overlaying a portion of the former river channel or mud flats. Alternative B has potential to cause negligible, long term impacts to archaeological resources at this surface disturbance area and no further archaeological survey is proposed.

Recent coordination with the District Historic Preservation Office indicates that additional research is required to address archaeological concerns at two surface disturbance areas:

- **The Main Pumping Station Diversion Facilities:** There is potential for Washington Canal remnants to exist below deep fill. Further archival research and coordination with the District Historic Preservation Office is ongoing to identify and evaluate any archaeological resources in the vicinity of this surface disturbance area. Alternative B has potential to cause moderate, long term impacts to archaeological resources at this surface disturbance area.
- **BPAWWTP:** Initial historic map research indicated that this surface disturbance area was on made land with no potential to contain archaeological resources. Subsequent research indicates that it may be located on fill atop an earlier land surface with potential to contain resources. Geoarchaeological investigations will be completed once the existing Digestion Facility is removed. DC WASA will share geoarchaeological results with the Historic Preservation Office and will coordinate additional survey with them. Alternative B has potential to cause moderate, long term impacts to archaeological resources at this surface disturbance area.

Cumulative Impacts. Cumulative impacts to archaeological resources would occur under Alternative B. Past, present, and future projects have affected and will continue to affect archaeological resources (see **Table 4.1-1**). Along the Anacostia River, most archaeological resources are deeply buried beneath fill which has generally protected them from development projects. Past, present, and future development projects with construction extending below these deep fill layers have disturbed or have potential to disturb archaeological resources. Most Alternative B facilities would extend below the fill and Phase I/II archaeological survey would be conducted in locations with intact soils to determine if there would be direct effects. Future development projects, including Poplar Point, have similar potential to extend below deep layers of fill in areas with high potential to contain archaeological resources, and could result in cumulative effects to archaeological resources. As such, there would be an adverse, minor cumulative impact on archaeological resources.

Conclusion. Alternative B would cause negligible impacts to six surface disturbance areas with no potential to contain resources. Alternative B would cause negligible to moderate, short and long- term impacts to each of the remaining surface disturbance areas. There would be an adverse, minor cumulative impact on archaeological resources.

These impacts would not be severe enough to result in impairment to NPS resources.

Historic Structures, Buildings, and Districts

Analysis. Alternative B would cause minor, long-term, adverse impacts to National Register-eligible historic buildings or structures or districts adjacent to one surface disturbance area. Alternative B would cause negligible, long-term, adverse impacts to historic structures, buildings, or districts at seven surface disturbance areas.

- **Blue Plains Advanced Waste Water Treatment Plant Facilities:** Facility construction would take place in the vicinity of the Digestion Facility, which is being removed as part of another project. Proposed facility construction is consistent with the technologically significant character-defining elements that make the Blue Plains Advanced Waste Water Treatment Plant eligible for the NRHP. Construction would not physically impact any elements of the Digestion Facility or other facilities associated with the Waste Water Treatment Plant. The only visible above ground features associated with the proposed facilities would be access grates and manholes. These are already common, visible features that are consistent with the elements that make the Waste Water Treatment Plant a National Register-eligible resource. Alternative B

would cause a negligible, long-term, adverse impact to the Blue Plains Advanced Waste Water Treatment Plant.

- **Bolling Air Force Base Overflow and Diversion Facilities:** The surface disturbance area is located approximately 2,500 feet northwest of the BAFB Historic District. The facilities proposed in this location would not physically impact the district. In addition, no facility elements would be visible from the historic district. Alternative B would cause a negligible, long-term, adverse impact to the BAFB Historic District.
- **Poplar Point Pumping Station:** The pumping station and diversion facilities proposed for this surface disturbance area would not physically affect any historic structures, buildings, or historic districts. In addition, it would not be visible from the existing Poplar Point Pumping Station. Alternative B would cause a negligible, long-term, adverse impact to the Poplar Point Pumping Station.
- **Main Pumping Station Diversion Facilities:** The proposed diversion facilities would be constructed in the northern yard area of DC WASA's Main Pumping Station. The facilities would not physically impact the historic building, and all facilities would be located underground. The only visual elements associated with the diversion facilities would be manholes and access panels at ground surface. Alternative B would cause a negligible, long-term, adverse impact to the Main Pumping Station.
- **CSO 005 and 007 Diversion Facilities:** The proposed diversion facilities would be constructed underneath an existing roadway within Anacostia Park. All facilities would be located underground, with no above ground visual elements other than a few manholes. Alternative B would cause a negligible, long-term, adverse impact to Anacostia Park.
- **M Street Diversion Facilities:** The CSO 015 diversion chamber surface disturbance area is located adjacent and to the north of the National Register-listed Washington Navy Yard Historic District. All facilities would be located underground, with no above ground visual elements other than a few manholes or access panels. Alternative B would cause a negligible, long-term, adverse impact to the Blue Plains Advanced Waste Water Treatment Plant.
- **CSO 018 Diversion Facilities:** No historic structures or districts are located in the vicinity of this surface disturbance area. Alternative B would cause a negligible, long-term, adverse impact to historic resources.
- **CSO 019 Overflow and Diversion Facilities:** The proposed overflow facility would result in the removal of approximately 200 feet (or 0.2%) of the existing Anacostia Seawall, which is considered to be a contributing element to Anacostia Park. The design of CSO 019 would reconstruct several damaged portions of the seawall and incorporates a stone masonry facing that complements the stone blocks in the existing wall. Because only a small portion of the wall would be removed to construct the CSO 019 Overflow and Diversion Facilities, Alternative B would cause a minor, long-term, adverse impact to the sea wall and to Anacostia Park. These impacts to the wall and Anacostia Park are being mitigated by landscape restoration in the vicinity of the CSO, sea wall restoration, and incorporation of the Anacostia Riverwalk Trail and RFK Access Road into the design of the CSO facility.

Cumulative Impacts. Cumulative impacts to historic structures, buildings, or districts may occur under Alternative B. The list of reasonably foreseeable development projects in the project vicinity that have potential to physically, visually, or aurally impact historic structures, buildings, or districts are listed on **Table 4.1-1**. These construction projects within the study area are likely to occur even if Alternative B construction does not take place. These projects would be reviewed by the District Historic Preservation Office, and plans to mitigate adverse effects would be

1 incorporated into project designs. As such, there would be a minor, adverse cumulative impact on
2 historic structures, buildings, and districts.

3 **Conclusion.** Alternative B would cause minor, short and long-term, adverse impacts to one surface
4 disturbance area (the CSO 019 facilities) which contains a contributing element (the Anacostia
5 Seawall) to Anacostia Park. Alternative B would cause negligible impacts to architectural resources
6 at each of the remaining eight surface disturbance areas. There would be a minor, adverse
7 cumulative impact on historic structures, buildings, and districts. These impacts would not be
8 severe enough to result in impairment to NPS resources.

9 **4.9 Impacts on Aesthetics**

10 **4.9.1 Methodology and Assumptions**

11 This analysis focuses on both short term and long term impacts to aesthetic resources in areas of
12 surface disturbance.

13 **4.9.2 Impact Thresholds**

14 **Negligible:** The proposed action would not impact the aesthetics or visual viewshed of the
15 proposed project area during construction or operations following completion of the
16 project.

17 **Minor:** The proposed action would not substantially change the scenic vista, would not
18 substantially change scenic resources, and would not substantially change the existing
19 visual character or quality of the site and its surroundings. The impact would be detectable,
20 but slight, and would minimally diminish overall integrity, or impact the character defining
21 feature(s) of the visual resources and aesthetic environment.

22 **Moderate:** The proposed action would result in a noticeable impact on a scenic vista; alter
23 scenic resources, including but not limited to, trees and historic buildings; or alter the
24 existing visual character or quality of the site and its surroundings. The impact would
25 diminish the overall integrity, or would alter a character defining feature(s) of the visual
26 resources and aesthetic environment.

27 **Major:** The proposed action would result in a substantial impact on a scenic vista;
28 substantially alter scenic resources, including but not limited to, trees and historic
29 buildings; or substantially alter the existing visual character or quality of the site and its
30 surroundings. The impact would significantly diminish overall integrity, or would
31 significantly alter a character defining feature(s) of the visual resources and aesthetic
32 environment.

33 **Duration:** Short-term impacts would be immediately during and following construction of
34 the alternative; long-term impacts would be those persisting or resulting after construction
35 of the alternative.

36 **4.9.3 Impacts of No-Action Alternative**

37 **Analysis.** There would be no surface disturbances associated with the project under the No-Action
38 Alternative. However, neither would there be any improvement in water quality nor river
39 aesthetics without changes to the frequency or volume of CSOs. Ongoing degradation of water
40 quality due to continuous CSO discharges may have adverse impacts on river aesthetics. Therefore,
41 the No-Action Alternative would have a minor, short and long-term, adverse impact on aesthetic
42 resources.

Cumulative Impacts. Above ground structures associated with the development of past, current and future development projects (see **Table 4.1-1**) would have a negligible cumulative impact because of the nature of built urban environment. Each of these projects is being designed to improve the aesthetics of corridor, and each design contains provisions for associated landscaping. Notably, the design of the Pennsylvania Avenue and Poplar Point projects focuses on improving the aesthetics of the areas. Also, the District's *Comprehensive Plan* and zoning regulations protect the unique vistas around the city. However, many of the District's water bodies are visibly polluted. Under the No-Action alternative, effects of the planned development could continue to decrease visual quality of the Anacostia and Potomac Rivers due to pollutant load associated with continued CSOs and other pollution sources (see **Table 4.4-1**). Therefore, there would be minor, adverse, cumulative impacts to aesthetics.

Conclusion. The No-Action Alternative would fail to reduce the frequency or volume of CSOs which have adverse impacts to river aesthetics. Therefore, the No-Action Alternative would have both short and long-term, minor, adverse impacts and minor, cumulative, minor adverse impacts on aesthetic resources. The No-Action Alternative would not cause impacts to aesthetic resources severe enough to result in impairment to NPS resources.

4.9.4 Impacts of Alternative B

Analysis. During construction, there would be a short-term, moderate, adverse impact on aesthetic resources from site-specific equipment that would be present during construction at the surface disturbance areas listed below. These are areas of moderate to high visual quality. Restoration of disturbance to land and facilities is anticipated after completion of construction.

- Bolling Air Force Base Overflow and Diversion Facilities,
- Tingey Street Diversion Sewers and Main Pumping Station Diversion Facilities,
- CSO 005 & 007 Diversion Facilities,
- CSO 018 Diversion Facilities,
- M Street Diversion Facilities, and
- CSO 019 Overflow and Diversion Facilities.

Alternative B would result in minor, long-term, adverse impacts on aesthetic resources. The two overflow structures and the new pumping station would be permanent above-ground structures. Additionally, there would be removal of riparian forest in two locations. The long-term impacts on aesthetic resources in those areas are described below:

- **BAFB Overflow and Diversion Facilities:** The permanent structure in this area would be adjacent to the bank of the Potomac River, but it would be designed to blend in with its surroundings to the maximum extent practicable. The wall would be designed along the existing riverbank, in accordance with the BAFB Master Plan (see **Figure 2.2-6**).
- **Poplar Point Pumping Station:** The pumping station would be built within an island between various roadways; and would be built close an existing pumping station. Additionally, the new structure would be designed to integrate with the proposed South Capitol Street bridge landscape.
- **CSO 019 Overflow and Diversion Facilities:** The permanent structure in this area would be adjacent to the bank of the Anacostia River, and would be designed to blend in with its surroundings to the maximum extent practicable. See **Figure 2.2-14** through **Figure 2.2-16** for rendering of the proposed project after construction in this area. The design is being developed in conjunction with the NPS to conform to the park area plan. The area of riparian forest that would be removed during construction would be replanted after construction.

- **M Street Diversion Facilities:** The area of riparian forest that would be removed during construction would be replanted following construction.

None of these structures would obstruct the region's scenic vistas, as described in the District's *Comprehensive Plan* (District Office of Planning, 2006).

Additionally, Alternative B could have a long-term, beneficial, moderate impact on the aesthetics of the Anacostia and Potomac rivers; due to reductions in the amount of silt, hydrocarbons, and floating debris that would result from the reduction of CSOs. Reductions in water clarity and a visible sheen of oil on the water surface following CSOs would continue to exist.

Following construction, existing scenic resources that contribute to each area's visual quality and that were impacted by the project would be restored to near pre-construction conditions. In areas with aboveground structures, the structures would be designed to complement the existing or proposed landscape.

Cumulative Impacts. Above ground structures associated with the development of past, current and future development projects (see **Table 4.1-1**) would have a negligible cumulative impact because of the nature of built urban environment. Many of these projects are being designed to improve the aesthetics of corridor, and each design contains provisions for associated landscaping. Notably, the design of the Southwest Waterfront, Pennsylvania Avenue and Poplar Point projects focus on improving the aesthetics of the areas. Also, the District's *Comprehensive Plan* and zoning regulations protect the unique vistas around the city. However, many of the District's water bodies are visibly polluted. Alternative B would improve the long-term aesthetics of the Anacostia and Potomac Rivers due to reductions in visible pollutants resulting from decreased CSOs. Therefore, there would be a negligible adverse cumulative impact on aesthetics.

Conclusion. Alternative B would have minor, long-term, adverse impacts on aesthetic resources due to presence of new permanent facilities. During construction, there would be a short-term, moderate, adverse impact on aesthetic resources from site-specific equipment. Cumulative impacts are expected to be negligible. Alternative B would not cause impacts to aesthetic resources severe enough to result in impairment to NPS resources.

4.10 Impacts on Land Use

4.10.1 Methodology and Assumptions

The proposed project would be located on federal, District, and private property. The property or ROW impacts identified in this section assume that DC WASA would be able to receive the appropriate permissions to construct the project.

4.10.2 Impact Thresholds

Negligible – The project would not impact existing or future land use or require any adjustment or change in plan concepts.

Minor – The project would temporarily change existing land uses, but would not significantly impact future land use or the siting of certain proposed facilities, and would still conform to planning document concepts.

Moderate – The project would possibly impact future land use or would require a change of location or function of existing or proposed facilities while keeping basic plans intact. The action would not preclude the implementation of planning document concepts.

Major – The project would require conversion of existing and future land use or would preclude implementation of planning document concepts.

Duration – Short-term impacts would take less than one year to recover after the disturbance or change occurs; long-term impacts would take longer than one year to recover after the disturbance or change occurs.

4.10.3 Impacts of No-Action Alternative

Analysis. There would be no land acquisitions, no construction, nor induced changes to future land use under the No-Action Alternative. Therefore, there would be a negligible impact on existing and future land use associated with this alternative.

Cumulative Impacts. Concepts for each of the present and reasonably foreseeable development projects listed on **Table 4.1-1** is specified in approved local and regional master planning documents. The land use along each of the roadway corridor projects (i.e. the 11th Street Bridge, 14th Street Bridge, Barney Circle, and Pennsylvania Avenue) may change, but would not be considered impacts. For example, the Anacostia Gateway Government Center project would change the current land use after construction and implementation; however, the proposed changes are outlined in approved comprehensive planning document. The No-Action Alternative would not affect any present land use designations and is not expected to modify any future planned land use designations. Therefore, cumulative impacts to land use would be negligible.

Conclusion. Land use would not be changed or altered under the No-Action Alternative; and therefore there would be a negligible impact on short-term, long-term, and cumulative impacts to land use. No impairment of NPS resources would occur.

4.10.4 Impacts of Alternative B

Analysis. DC WASA must purchase private property or obtain short-term or long-term easements for properties on which the proposed project is planned, including the properties that lie directly above the tunnel alignments (see **Table 2.2-2**).

The proposed project would have a short-term, adverse, minor impact on existing land use in the study area due to changes in the use of the land at the surface disturbance areas during construction. Construction at the surface disturbance areas would likely result in short-term land use conversions in areas ranging from roughly one-half to over five acres depending on the type of shaft or facility being constructed. In all but one surface disturbance area, land use would be restored after construction. In the Poplar Point Pumping Station area, a portion of the area is currently being used as a CDL practice lot. Coordination with the DMV is ongoing to determine if the current use of this lot can be maintained.

The proposed project would have a long-term, adverse, minor impact on future land use in the study area. First, the use of CDL practice lot may not be able to be maintained. Also, the land use above the tunnel alignment would be restricted after construction. The land can support any land use category and any associated structures or facilities. However, the foundation of these structures must be designed in a way as to not impact the structural integrity of the tunnel. Based on the proposed tunnel alignment, there is potential for future conflicts with planned land use within ANS that would require coordination with the Navy to resolve. Additionally, DC WASA must be able to maintain access to all permanent shafts and sewers that are being built within or near surface disturbance areas. Therefore, future land use must maintain access to these locations. The proposed project would not preclude implementation of comprehensive planning document concepts (see **Table 3.8-2**).

Following construction, areas of short term surface disturbance would be returned to their original conditions except near the CDL lot at the Poplar Point Facilities surface disturbance area. DC WASA would continue to coordinate with DMV in the effort to relocate the CDL practice area.

Cumulative Impacts. Concepts for each of the present and reasonably foreseeable development projects listed on **Table 4.1-1** is specified in approved local and regional master planning documents. The land use along each of the roadway corridor projects (i.e. the 11th Street Bridge, 14th Street Bridge, Barney Circle, and Pennsylvania Avenue) may change, but would not be considered impacts. For example, the Anacostia Gateway Government Center project would change the current land use after construction and implementation; however, the proposed changes are outlined in approved comprehensive planning document. Future development within the study area would be slightly restricted by Alternative B as the types of facilities built along the alignment may have to meet specific construction requirements. This requirement may result in adjustments or additional approvals of planned structures or limit new construction along the alignment of Alternative B. Therefore, minor, adverse, cumulative impacts to land use would result from Alternative B.

Conclusion. Alternative B would have a short-term, minor impact on existing land use and a long-term, minor adverse impact on future land use in the study area. Minor, adverse, cumulative impacts may result to future land use as a result of Alternative B.

4.11 Impacts on Human Health and Safety

4.11.1 Methodology and Assumptions

Potential impacts to human health and safety were assessed based on exposure of workers and residents to hazardous materials, changes in pedestrian or vehicle access that could impact human safety, and changes to existing pollutant sources that could impact human health.

Due to the nearly ubiquitous presence of hazardous materials in urban environments and the need to utilize for hazardous materials such as diesel fuel, lubricant, and coolants during construction, the presence or use of hazardous materials in or around the proposed project is inevitable. Due to the large quantity of regulatory sites in the District, specific sites of interest were identified based on their distance and topographical relation to the proposed construction areas. "Closed" or fully remediated sites were assumed to have no potential to impact human health or environmental resources.

4.11.2 Impact Thresholds

Negligible – The impact on health and safety would not be measurable or perceptible.

Minor – The impact on health and safety would be measurable or perceptible, but it would be limited to a relatively small number of visitors, residents, or employees within localized areas.

Moderate – The impact on health and safety would be local, but measurable or perceptible by many visitors, residents, or employees.

Major – The impact on health and safety would be substantial and noticeable by all visitors, residents, or employees.

Duration – Short-term impacts are those lasting during and immediately following construction; long-term impacts are those lasting beyond construction.

4.11.3 Impacts of No-Action Alternative

Analysis. The No-Action Alternative would not require any construction activities, would not alter any pedestrian paths or roadway, and would not require the use of hazardous materials. As such, human safety impacts would be negligible. However, the No-Action Alternative would not substantially reduce the existing health and safety risks that currently occur as the result of CSO discharges to the river. Both the Potomac and Anacostia rivers would remain impaired due to existing violations of EPA's Section 303(d) for primary contact recreational standards (i.e., safe for swimming). Ongoing degradation of water quality would continue due to CSOs, exacerbating the health risks that already exist. Therefore, the No-Action Alternative would result in minor, long-term, adverse impacts to human health.

Cumulative Impacts. Under the No-Action Alternative, CSO discharges would not be reduced and therefore, continued degradation of water quality would occur, as discussed in **Section 4.4**. Present and future development activities identified in **Table 4.1-1** could continue to incrementally increase impervious surfaces and pollutant loading, thereby contributing to existing water quality impairments in the Anacostia River. Furthermore, during the construction of these projects, workers could be exposed to various hazardous materials found underground or in water. Construction documents would require mitigation on the handling and disposal of all contaminated materials although there would still be minimal risks of the release of and exposure to hazardous materials. Cumulative impacts to human health and safety would be minor and adverse.

Conclusions. The No-Action Alternative would not reduce the existing health and safety risks that currently occur as the result of CSO discharges. Therefore, the No-Action Alternative would result in both short and long-term, minor adverse impacts and minor cumulative adverse impacts to human health and safety. It would also result in minor, adverse, cumulative impacts to human health and safety. None of these impacts would be severe enough to impair NPS resources.

4.11.4 Impacts of Alternative B

Analysis. Once operational, Alternative B would have a long-term, beneficial impact on human health and safety. It would reduce existing CSO discharges to the Anacostia River, which would decrease the abundance of hazardous bacteria and other toxins, improve the quality of the river, and help the river meet its designated uses.

Operation and maintenance of the proposed project would require workers to enter the confined spaces of the tunnels for inspections and repairs. However, the tunnels would be designed to provide adequate ventilation of tunnel sections and to allow isolation of all or part of the tunnel system from interconnecting conveyances to protect inspection staff. A temporary watertight plug or bulkhead would be used to separate the NEBT from the ART, as the ART would be operational while the NEBT is under construction.

The majority of potential health and safety hazards would occur during the construction phase. Based on the analysis of potential hazardous material exposure, there is potential for construction workers to be exposed to hazardous materials. These impacts would be reduced to the negligible impact threshold through the construction mitigation measures listed in **Section 4.13.6**.

Construction of Alternative B would require short-term traffic detours that would impact both vehicles and pedestrians. These detours would occur only during the construction period and would have no long-term impacts. As described in **Section 4.12.6**, TCPs and pedestrian re-routing plans would be developed to manage the flow of pedestrian and vehicle traffic during construction. Proper implementation of traffic control measures would mitigate any potential health or safety risks.

1 Unexpected hazards, such as the discovery of undocumented contamination in soil or groundwater,
2 may be encountered during excavation, drilling, or dewatering activities associated with
3 construction. Proper handling procedures for potentially hazardous materials would be required to
4 minimize the risk to construction workers.

5 The presence of UXO have been encountered in excavations near the Navy Yard and BAFB, leading
6 to concerns that additional ordnance may be found during the construction of Alternative B.
7 Approved Navy and USACE UXO avoidance procedures and response actions would be employed at
8 all applicable sub-surface disturbances.

9 There is potential for hazardous waste impacts from the construction of Alternative B, particularly
10 from soil and groundwater containing hydrocarbons from petroleum products. These issues would
11 require mitigation in order to prevent effects to human or environmental health. With mitigation,
12 there would be a negligible impact from hazardous materials.

13 The primary risk from hazardous materials is from the exposure and release of existing soil or
14 groundwater contamination. As discussed in **Section 3.11**, a preliminary list was developed of
15 regulatory sites and associated contaminants of concern with the potential to adversely impact the
16 construction areas for the proposed project. Known contaminant releases and storage locations
17 were identified from reviews of NPL, CERCLIS, RCRA, ERNS, DC LUST, and DC UST/AST databases.
18 The specific risks associated with the construction areas are discussed below. Additional
19 unrecorded or unidentified contamination may exist in soil and groundwater in the project area
20 and may be encountered during excavation and construction.

21 In addition to existing contamination, chemicals for soil conditioning may be injected into the
22 ground during project construction. Soil conditioners aid in excavation and help prevent damage to
23 tunneling equipment. These chemicals are not considered dangerous to humans or the
24 environment when properly used, and would not affect the soil disposal from a permitting
25 standpoint nor the integrity of surrounding soils (see **Appendix J**). A dedicated environmental
26 manager would be assigned to this site to assure compliance with all applicable environmental
27 protection regulations, as well as the proper implementation of all environmental mitigation
28 measures contained in both the construction documents and project permits.

29 **CSO 019 Overflow and Diversion Facilities**

30 There is an existing UST located at DC General Hospital. Since the non-leaking status of this UST
31 cannot be confirmed, and given the proximity to the planned construction site, there is potential for
32 this UST to affect the construction site. Any potential contamination by hydrocarbons of the
33 construction site would require proper handling and disposal techniques, which would be assured
34 by DC WASA and would be part of the construction documents that must be approved prior to
35 construction. After mitigation is completed, there would be a negligible impact from hazardous
36 materials. As appropriate, a dedicated environmental manager would be assigned to this site to
37 assure compliance with all applicable environmental protection regulations, as well as the proper
38 implementation of all environmental mitigation measures contained in both the construction
39 documents and project permits.

40 **BAFB Overflow and Diversion Facilities**

41 According to the regulatory review, ANS has 17 closed LUST cases in the area. There is little
42 potential for any surface contamination at the BAFB Overflow and Diversion Facilities surface
43 disturbance area, given the distance between the ANS and the construction area; but there is higher
44 potential for ANS-related groundwater contamination at the construction site.

The potential for contamination from BAFB to impact the BAFB Overflow and Diversion Facilities construction activities is high for both the excavation activities (soil contamination) and dewatering activities (groundwater contamination). Without mitigation, contamination could affect the safety of the construction workers. Since the BAFB Overflow and Diversion Facilities would be located on the property of BAFB, and given the historical industrial land use of the property and the present day use, it is possible that above ground spills of various chemicals have either occurred or migrated to the excavation site. Additionally, based on historical environmental reports, BAFB has known soil contamination, consisting of persistent pesticides (DDT, DDE, Aldrin, Chlordane, heptachlor epoxide), petroleum products, and heavy metals originating from pre-BAFB land usage as a fertilizer factory and steel plant. BAFB also has known groundwater contamination, with low levels of PCBs, petroleum hydrocarbons, chlorinated solvents, and inorganic constituents reported.

Because of this previous contamination, soil borings would be taken at all excavation sites to determine if soil contamination is present, as well as groundwater samples. Proper handling and disposal techniques would be assured by DC WASA and included in the construction documents. A dedicated environmental manager would be assigned to this site to assure compliance with all applicable environmental protection regulations, as well as the proper implementation of all environmental mitigation measures contained in both the construction documents and project permits.

M Street Diversion Facilities

It is unlikely that soil contamination from Washington Gas and Light has migrated to the construction site based on the distance from the construction activities and the topography of the area. The Washington Gas and Light facility appears to be at gradient with the construction site, with surface water runoff flowing south toward the Anacostia River. Groundwater contamination migration from the Washington Gas and Light facility is possible, given the documentation of subsurface spills at the facility. Additionally, construction dewatering activities could create hydraulic gradients that would potentially draw residual contaminants toward the construction area from this site, if present.

Previous reports reviewed did not address surface water runoff between the Steuart Petroleum facility and the location of the construction site. Based on the general topography of the area, it is possible that soil contamination from the Steuart Petroleum facility could have migrated to the construction site, through surface runoff. Groundwater contamination migration from the Steuart Petroleum facility property to the construction site is probable, given site proximity and the likelihood of groundwater contamination at the site. Additionally, construction dewatering activities could create hydraulic gradients that would potentially draw residual contaminants toward the construction area from this site, if present.

The potential for contamination from the Exxon site to impact the CSO 015 and 016 construction activities/area is high for both excavation activities (soil contamination) and dewatering activities (groundwater contamination). Without mitigation, contamination could affect the safety of the construction workers. The Exxon site is approximately 100 feet north and upgradient of the construction site. It should be noted that previous reports reviewed did not address the issue of surface water runoff between the two properties. Given the proximity of the sites, local topography, and documented soil contamination located at the Exxon site, it is likely that contaminated surface water runoff from the Exxon site may have contaminated the construction site. Additionally, there is a documented history of subsurface spills and groundwater contamination at the Exxon site; and migration of contaminated groundwater is likely to have occurred. Dewatering activities during construction may create hydraulic gradients that could potentially draw additional contaminants toward the construction area.

1 There is also potential for contamination from the Amtrak site, located 150 feet north and up
2 gradient of the construction area. Without mitigation, contamination could affect the safety of the
3 construction workers. There is no documented history of surface spills at the facility, but historical
4 contamination maybe present. It should be noted that previous reports reviewed did not address
5 the issue of surface water runoff between the two properties. Given the proximity, the topography,
6 and the documented soil contamination located at the Amtrak site, it is likely that contaminated
7 surface water runoff from the Amtrak site may have contaminated the construction site. There has
8 been one documented, subsurface spill; but soil and groundwater samples were not collected once
9 cleanup was completed. Due to the documented subsurface spill, it is possible that groundwater
10 contamination is present at the Amtrak facility, and that migration of contaminated groundwater
11 may have occurred due to the proximity to the construction site. Additionally, dewatering activities
12 during construction may create hydraulic gradients that could potentially draw additional
13 contaminants toward the construction area. Without mitigation, contamination could affect the
14 safety of the construction workers. As appropriate, a dedicated environmental manager would be
15 assigned to this site to assure compliance with all applicable environmental protection regulations,
16 as well as the proper implementation of all environmental mitigation measures contained in both
17 the construction documents and project permits.

18 **Main Pumping Station Diversion Facilities**

19 The District Department of Public Works site is located close to the MPS-DS construction site. Based
20 on the surface topography between the two sites, the likelihood of surface contamination from this
21 site impacting the construction site is minimal. However, previous reports that were reviewed do
22 not address surface water runoff in relation to the two properties. Groundwater contamination
23 resulting from natural migration to the construction site is probable, given that the site is up
24 gradient from the proposed construction site and the history of groundwater contamination at the
25 site has been documented. Construction dewatering activities may create hydraulic gradients that
26 could potentially draw residual contaminants toward the construction area from this site, if
27 present.

28 The Shell Oil Company site is located approximately 700 feet upgradient of the construction site.
29 Based on the surface topography between the two sites, the likelihood of surface contamination
30 from this site impacting the construction site is minimal. The Shell Oil Site contains known
31 groundwater contamination, and a possible plume migrating in the direction of the construction
32 site has also been documented. Elevated levels of benzene, TPH, and VOCs have been documented
33 in the groundwater at the site and to the south, at Southeast Federal Center (presumably from a
34 plume originating at the Shell site). Groundwater contamination resulting from natural migration to
35 the construction site is expected. Dewatering activities may create a hydraulic gradient and could
36 increase the levels of groundwater contamination encountered at the site. A dedicated
37 environmental manager would be assigned to this site to assure compliance with all applicable
38 environmental protection regulations, as well as the proper implementation of all environmental
39 mitigation measures contained in both the construction documents and project permits.

40 It should be noted that previous reports reviewed did not discuss the current land use of the site
41 and any potential impact these activities may have on the construction site. The current site usage
42 is for parking. While there is no documented history of spills at the construction site, small fuel,
43 lubricants, and coolant spills from vehicles may have occurred and over the years may have
44 penetrated the paved surface. While it is unlikely that these small spills would have resulted in any
45 groundwater contamination, the possibility cannot be definitively dismissed. As such, potential
46 contamination of the construction site would require mitigation in order to prevent impacts to
47 human or environmental health. Post mitigation, there would be a negligible impact from
48 hazardous materials.

BPAWWTP

No specific areas of contamination have been identified for this component of Alternative B. However, the depth to groundwater remains uncertain in this area. Should soil excavation for construction reach groundwater, there would be the potential that contamination from any of the nearby LUSTs which may have migrated through the groundwater could be encountered. Such contaminants, if present, could be encountered during construction. Without mitigation, contamination could affect the safety of the construction workers. As appropriate, a dedicated environmental manager would be assigned to this site to assure compliance with all applicable environmental protection regulations, as well as the proper implementation of all environmental mitigation measures contained in both the construction documents and project permits.

Poplar Point Pumping Station

While the C&P Telephone site is located close to the Poplar Point Pumping Station construction site, based on the surface topography located between the two sites, the likelihood of surface contamination from this site impacting the construction site is minimal. The potential for groundwater contamination resulting from natural migration to the construction site is minimal, given that the site appears to be downgradient of the construction site, and no history of groundwater contamination has been documented. Construction dewatering activities may create hydraulic gradients that could potentially draw residual contaminants toward the construction area from this site, if present.

Throughout construction, DC WASA would implement the following measures at each surface disturbance area to reduce the risk to human and environmental health, bringing the impact from hazardous materials to the “negligible with mitigation” impact threshold:

- Soil borings would be taken at all excavation sites to determine whether soil contamination is present.
- Groundwater samples would be taken at the excavation site to determine if contamination is present at the construction site. If no groundwater contamination is found at the excavation site, additional steps would be taken during dewatering activities to monitor the water that is pumped and discharged, to ensure that the dewatering activities do not cause the migration of contaminated groundwater to the excavation site.
- Proper handling and disposal techniques would be ensured by DC WASA and would be included in the construction documents (required for construction permits), along with measures to control dust, protect exposed soil from precipitation and erosion, and protect workers and any nearby sensitive receptors from exposure to hazardous materials. A dedicated environmental manager would be assigned to assure compliance with these health and safety measures.
- Chapter 14 of the Navy guidance *NAVSEA OP 5 Volume1 Ammunition and Explosives Safety Ashore* (U.S. Navy, 2006) is entitled “Response Actions Involving Munitions and Explosives of Concern.” Section 14-10.5 of this chapter requires that avoidance techniques be employed on properties known or suspected to contain UXOs or other munitions and explosives of concern. The Navy guidance does not provide specific methods or procedures for completing the required anomaly avoidance. However, the USACE guidance document (EP 75-1-2) entitled “Munitions and Explosives of Concern Support during Hazardous, Toxic, and Radioactive Waste and Construction Activities” (USACE, 2004) contains specific procedures required for anomaly avoidance activities (**Appendix I**). DC WASA would ensure that these procedures would be followed for all applicable activities that are located within areas of concern. Based upon the soil types present, site history, and potential munition types, the depth of screening for MECs was determined to be 10 feet below native soils. All boring locations have been cleared at 12

1 inch increments to a depth 10 feet below native soils. . A dedicated environmental manager
2 would be assigned to assure compliance with these health and safety measures.

- 3 • A dedicated environmental manager would be assigned to this site to assure compliance with
4 all applicable environmental protection regulations, as well as the proper implementation of all
5 environmental mitigation measures contained in both the construction documents and project
6 permits.

7 **Cumulative Impacts.** Once operational, Alternative B would have a beneficial impact on human
8 health and safety by improving water quality and reducing human health risks associated with
9 primary contact with fecal coliform bacteria and other pathogens found in CSOs, as discussed in
10 **Section 4.4.** Current and future development activities identified on **Table 4.1-1** could continue to
11 incrementally increase impervious surfaces and pollutant loading, thereby contributing to existing
12 water quality impairments in the Anacostia River and offsetting some of the benefits associated
13 with the Alternative B. Current and future soil contamination, although difficult to project, is
14 expected to be minimal due to strict environmental regulations. Although substantial efforts would
15 be made to eliminate release of and exposure to hazardous materials as part of Alternative B, past
16 development has resulted in an array of hazardous materials and sites in or near the study area.
17 Any hazardous sites discovered as part of the proposed project would be subject to mitigation.
18 However, future development in or near the study area could uncover or release contaminants.
19 There is the potential for minor, adverse, cumulative impacts to human health and safety.

20 **Conclusion.** With construction safety and mitigation measures in place, Alternative B would have a
21 short-term, negligible impact on human health and safety during construction. Once operational,
22 Alternative B would have a long-term, beneficial impact on human health and safety, due to the
23 reduction of contaminants in the Anacostia and Potomac rivers, which currently pose health and
24 safety risks to those who come into contact with these waters. Alternative B has the potential for
25 adverse, minor cumulative impacts due to future development and discovery of hazardous
26 materials. Impacts would not be severe enough to result in impairment of NPS resources.

27 **4.12 Impacts on Visitor/Resident Use and Experience**

28 **4.12.1 Methodology and Assumptions**

29 Potential impacts to visitor use and experience were assessed based on the potential of the
30 proposed actions to impair park resources or values; create an unsafe or unhealthful environment
31 for other visitors or employees; and unreasonably interfere with the atmosphere of peace and
32 tranquility, or the natural soundscape maintained in wilderness and natural, historic, or
33 commemorative locations within the park. Resident and visitor use and experience beyond the Park
34 was also considered.

35 **4.12.2 Impact Thresholds**

36 Where impacts on visitor/resident use and experience become moderate, it is assumed that current
37 visitor/resident satisfaction levels would begin to decline, and some of the Park's long-term visitor
38 goals would not be achieved.

39 **Negligible** – The impact on visitor/resident use and experience would not be measurable
40 or perceptible.

41 **Minor** – The impact on visitor/resident use and experience would be measurable or
42 perceptible, but it would be limited to a relatively small number of visitors, residents, or
43 employees at localized areas.

Moderate – The impact on visitor/resident use and experience would be sufficient to cause a change in satisfaction and attendance rates at affected locations.

Major – The impact on visitor/resident use and experience would be substantial. Visitor satisfaction and attendance rates are expected to substantially decrease in the short- and long-term.

Duration – Short-term impacts are those lasting during and immediately following construction; long-term impacts are those lasting beyond construction.

4.12.3 Impacts of the No-Action Alternative

Analysis. Under the No-Action Alternative, there would not be a noticeable change in visitor/resident experience; therefore, impacts would be negligible. However, both the Potomac and Anacostia Rivers, portions of which exist on NPS property, would remain unsuitable for primary recreational contact standards (i.e., safe for swimming). Additionally, the Anacostia River would remain unsuitable for secondary recreational contact, such as boating, as well as for fish consumption use. This is due to the presence of bacteria and other toxic substances that are known to cause both short and long-term adverse health risks to humans. Additionally, odors and adverse impacts to aesthetics will continue to reduce the quality of the experience of visitors using the rivers and the parks adjacent to the rivers, and could discourage potential visitors from utilizing these same resources.

Cumulative Impacts. Under Alternative B, past and present development in combination with future development (see **Table 4.1-1**) impact the visitor/resident use and experience of both NPS and non-NPS facilities. Under the No-Action Alternative, past, present, and future development has and could continue to decrease the recreational use of park resources, namely the Anacostia River, due to increased pollutant load associated with continued CSOs. The reasonably foreseeable future development projects, including those on or adjacent to the park resources are generally intended to improve the quality of living within the District. Therefore, there would be a long-term, beneficial, cumulative impact on visitor/resident use and experience. However, there would be short-term nuisances associated with project construction, including noise, air quality, and aesthetics. So, there would be a minor, short-term, adverse cumulative impact on visitor/resident use and experience.

Conclusion. Under the No-Action Alternative there would be a negligible short-term and long-term impacts on visitor/resident experience. There would be a long-term, beneficial cumulative impact on visitor/resident use and experience. There would be a minor, short-term, adverse cumulative impact on visitor/resident use and experience. This change would not be severe enough to impact NPS resources.

4.12.4 Impacts of Alternative B

Analysis. The proposed project would result in long-term, beneficial impact on the quality of the Anacostia River, which has many recreational uses, as well as on the residents within the District. There would also be minor short-term, adverse impacts on visitor/resident use and experience. As discussed in **Section 1.7.12**, portions of the Anacostia Riverwalk, pedestrian trail at BAFB, and sidewalks would be rerouted during construction; and there would also be some short-term road closures. Any impacted trails, paths, sidewalks, and roadways would be restored to full operational status by the end of construction. Each transportation route would be rerouted when necessary. The proposed construction dates for each surface disturbance area are listed in **Section 2.2.2**. Also, the impacted riparian forests areas would be replanted. The only aboveground structure on NPS property would be a low wall, along the shoreline of the Anacostia River, containing an overflow

outlet that would not be visible to the public or impact Park visitor use or experiences (see **Figures 2.2-14 through 2.2-16**).

Once operational, Alternative B would have odor-producing releases when the tunnel would be filling during large storm events because large quantities of air would be exhausted from the tunnel at high rates. Strong odors could discourage visitors to the park, or detract from the user experience of visitors to the park. This release of air would be of short duration and would occur during heavy rains when fewer visitors/residents would be outdoors and exposed to it. The large rate at which the air must be exhausted and the many locations where it must be released makes it impractical to provide odor control; therefore, odor control is not proposed for the large rates of air exhausted during tunnel filling.

To provide odor control during dry conditions, DC WASA is considering providing odor control facilities to maintain the tunnel under a slightly negative pressure to prevent fugitive emissions. The system would withdraw air from the tunnel and pass it through an odor control system such as a carbon adsorption system. Adjustable intake dampers would be provided at shafts to allow air to enter the tunnel. Large adjustable exhaust dampers would also be provided to allow rapid exhaust of air during filling. The use of adjustable intake and exhaust dampers would provide control over airflows and prevent short-circuiting of the odor control system. Based on the experience of other tunnel systems, the system would likely be sized to provide one air change every two hours. The following sites have been considered for odor control facilities:

- BPT-DPS at BPAWWTP (terminus of BPT)
- Poplar Point Pumping Station (junction of BPT and ART); and
- CSO 019 Overflow and Diversion Facilities (junction of ART and NEBT).

When the tunnel is full, the water in the tunnel would prevent odor control facilities at lower ends of the tunnel from drawing air from upper ends of the tunnel. Under these conditions, there would be the potential for odor at selected shaft locations. To address this impact, space would be provided at shaft locations for small, skid-mounted odor control facilities to serve the shaft area itself. The decision to install these facilities at particular shafts would depend on the proximity of the shaft to developed area.

The drop shafts that convey water from near-grade elevations down to tunnel-level may also entrain air in the water that would need to be vented. The drop shaft design includes a 23-foot diameter riser over the center of the tunnel to allow air and water to vent to the atmosphere. Tunnel vents would include air dampeners to prevent fugitive emission of odors. Additional odor control could be necessary when the tunnel is empty.

During construction, impacts in the form of short-term noise generated by heavy equipment would occur. It is not anticipated that blasting would be needed for construction. Noise would be expected during construction at shaft locations where heavy machinery may be used for excavation and construction. In addition, noise from ventilation fans would also occur at the construction shafts. Ventilation fans would need to operate continuously during the tunnel construction period, to ensure a safe working environment for underground workers. Because odor could be a problem during construction, odor control measures would be implemented, as needed. These would include air monitoring within the tunnels, personal breathing apparatus, etc. Additionally, Alternative B would have short-term, adverse air-quality and fugitive dust impacts associated with construction equipment.

Detours around closed trail areas would be provided, where appropriate. Noise impacts during construction could be mitigated by measures such as restricted working hours, shielding of construction sites with noise barriers, and other techniques, as needed. The proposed project also

1 must comply with the District's Municipal Regulations (Title 20, Chapter 27), which set certain
2 standards for noise levels. Under the Municipal Regulations, construction noise shall not exceed
3 80 dB between 7 a.m. and 7 p.m., and are subject to even stricter requirements between 7 p.m. and
4 7 a.m. Noise limits for these times vary between residential, commercial, and industrial areas.
5 Construction hours would be limited based on construction permit requirements. Construction
6 activities for surface facilities could be limited to the hours between 7 a.m. and 7 p.m., to avoid
7 disturbing the more quiet nighttime hours. Construction areas impacting noise-sensitive land uses
8 would be assessed for potential temporary shielding to reduce noise impacts.

9 Fugitive dust would be generated during site grading, construction, from wind erosion, and
10 vehicular activities. Fugitive dust would be mitigated by following state and local regulations
11 regarding dust control and other air quality emission reduction controls such as watering
12 construction areas during dry periods to prevent fugitive dust from entering the air. In addition,
13 trucks used to haul excavated materials would be covered.

14 **Cumulative Impacts.** Under Alternative B, past and present development in combination with
15 future development (see **Table 4.1-1**) impact the visitor/resident use and experience of both NPS
16 and non-NPS facilities. Within Anacostia Park, CSO reduction associated with Alternative B would
17 improve the long-term quality of the Anacostia and Potomac Rivers. This project could mitigate
18 some potential adverse impacts to the River, which is a park resource. Furthermore, the reasonably
19 foreseeable future development projects, including those on or adjacent to the park resources are
20 generally intended to improve the quality of living within the District. Therefore, there would be a
21 long-term, beneficial, cumulative impact on visitor/resident use and experience. However, there
22 would be short-term nuisances associated with project construction, including noise, air quality,
23 and aesthetics. So, there would be a minor, short-term, adverse cumulative impact on
24 visitor/resident use and experience.

25 **Conclusion.** Alternative B would have a long-term, beneficial impact on visitor/resident use and
26 experience. There would be short-term, minor adverse impacts on visitor/resident use and
27 experience. There would be a long-term beneficial cumulative impact on visitor/resident use and
28 experience and a short-term, minor, adverse cumulative impact. Impacts would not be severe
29 enough to impair NPS resources.