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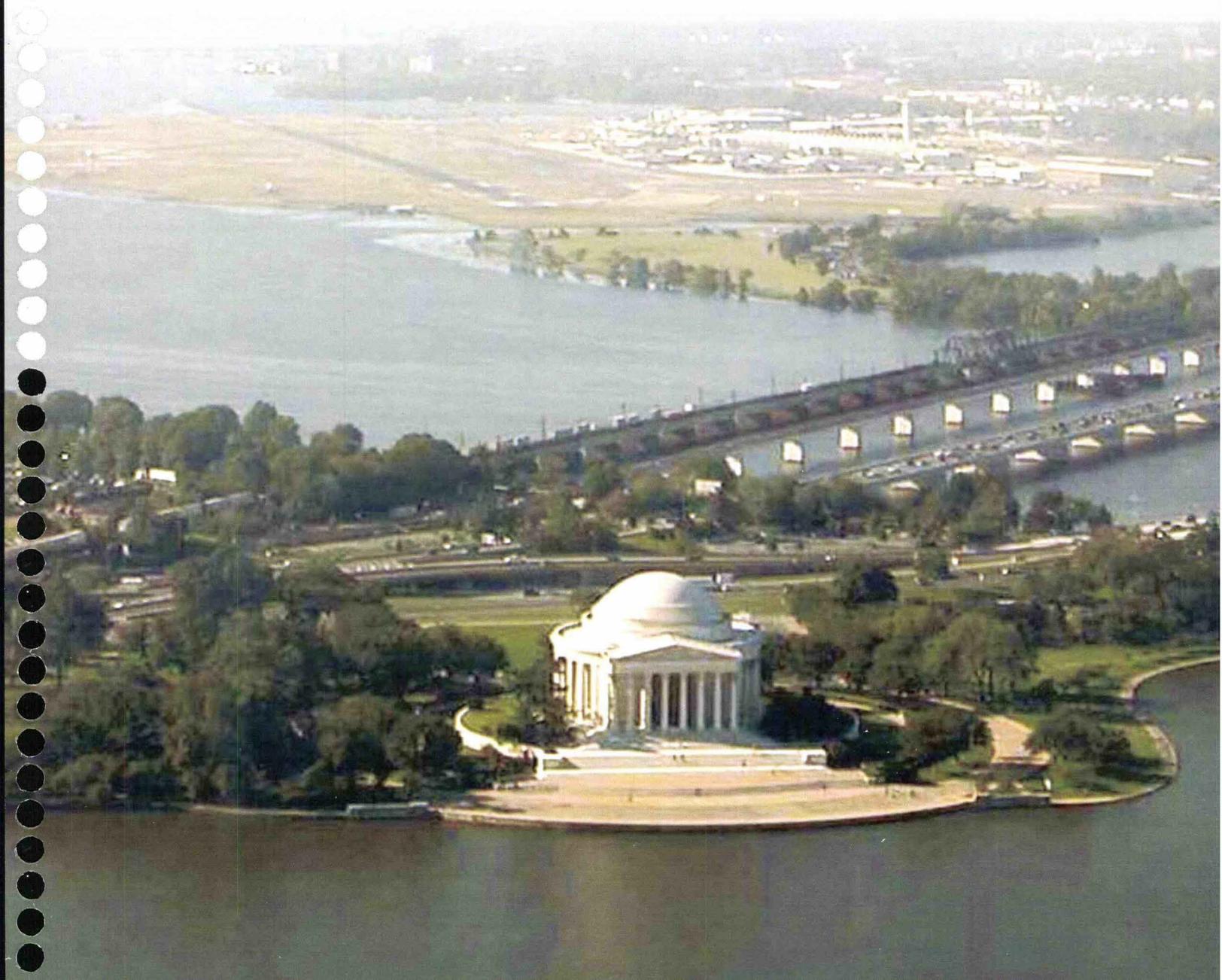
National Park Service  
U.S. Department of the Interior

National Mall and Memorial Parks  
Washington, D.C.



# Repair and Control Settlement *at Thomas Jefferson Memorial Seawall, North Plaza, and Transition Areas*

NAMA 128232



**U.S. Department of the Interior  
National Park Service**

**National Mall and Memorial Parks  
Washington, D.C.**

**Repair and Control Settlement at Thomas Jefferson Memorial Seawall, North Plaza, and Transition  
Areas  
Environmental Assessment/Assessment of Effect**

**April 2009**

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**Proposed Action:** The National Mall and Memorial Parks provides a wide variety of educational and recreational opportunities for visitors. The impressive mingling of natural and cultural resources has made Washington, D.C. one of the most heavily visited and photographed places in the world. Located along the Tidal Basin, the Thomas Jefferson Memorial (the Jefferson Memorial) is one of the most popular sites in the park and plays a key role in many regional events.

Recently, separation and cracking along the Jefferson Memorial's north plaza and seawall has intensified; threatening visitor safety and interfering with the intended experience at the site. In order to improve conditions at the Jefferson Memorial, the National Park Service (NPS) is proposing to rebuild the seawall, resurface the north plaza, and improve transition areas between the plaza and surrounding areas. Implementing the NPS preferred alternative would result in negligible, long-term, beneficial impacts to water quality and floodplains; and moderate, long-term, beneficial impacts to cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure. This document will be used for compliance with both the National Environmental Policy Act (NEPA) of 1969, as amended and the National Historic Preservation Act of 1966, as amended.

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National Mall and Memorial Parks  
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**Note to Reviewers and Respondents:**

During the 30-day public review period, if you wish to comment on this Environmental Assessment/Assessment of Effect, you may mail comments to the name and address below or you may post them electronically at <http://parkplanning.nps.gov>. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Superintendent  
National Mall and Memorial Parks  
900 Ohio Drive, SW  
Washington, DC 20024

TECHNICAL INFORMATION CENTER  
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# ACRONYMS AND ABBREVIATIONS

**Advisory Council** – Advisory Council on Historic Preservation  
**CEQ** – Council on Environmental Quality  
**CLI** – cultural landscapes inventory  
**DO** – Director’s Order  
**EA/AoE** – Environmental Assessment/Assessment of Effect  
**EIS** – Environmental Impact Statement  
**EPA** – Environmental Protection Agency  
**FEMA** – Federal Emergency Management Agency  
**FY** – fiscal year  
**the Jefferson Memorial** – the Thomas Jefferson Memorial  
**MOA** – Memorandum of Agreement  
**National Register** – National Register of Historic Places  
**NEPA** – National Environmental Policy Act of 1969, as amended  
**NGVD29** – National Geodetic Vertical Datum of 1929  
**NHPA** – National Historic Preservation Act of 1966, as amended  
**north plaza** – the Thomas Jefferson Memorial’s north plaza  
**NPS** – National Park Service  
**the park** – National Mall and Memorial Parks  
**PEPC** - Planning, Environment, and Public Comment  
**PCB** – polychlorinated biphenyls  
**PVC** – polyvinyl chloride  
**SHPO** – State Historic Preservation Officer  
**SOF** – Statement of Findings



# 1

## **INTRODUCTION: PURPOSE AND NEED**

The National Mall and Memorial Parks (the park) is a unit of the National Park Service (NPS). Although the park was officially established in 1965, the NPS has been the steward of federal parkland in the nation's capital since 1933. Washington, D.C. contains some of the oldest protected parklands in the national park system. The Thomas Jefferson Memorial (the Jefferson Memorial) is part of the park. The site is the nation's most prominent memorial to Thomas Jefferson, the third president of the United States of America. The 19.2-acre site sits on the southern end of the Tidal Basin (Figure 1). The Jefferson Memorial was opened on April 13, 1943, the 200th anniversary of Jefferson's birth. Today, the site receives over two million visitors a year who come to learn about Thomas Jefferson or take part in other activities around the Tidal Basin. The Jefferson Memorial's north plaza and seawall have experienced accelerated rates of separation of seawall from the plaza, joint separation in the east and west walkways next to the plaza, and cracking and joint separation on the surface of the plaza, as a result of differential settlement and lateral soil movement beneath the site. The condition of these structures directly relates to the integrity of the site and the ability to enjoy it. In order to maintain a safe visitor experience at the Jefferson Memorial, the NPS must find a solution for stabilizing the seawall at the Jefferson Memorial. The study area considered for the proposed action includes the Jefferson Memorial's plaza, seawall, and staircases that connect it to the surrounding pedestrian circulation systems (Figure 2).

This Environmental Assessment/Assessment of Effect (EA/AoE) evaluates alternatives for the proposed action. The EA/AoE further analyzes the potential impacts these alternatives would have on the natural, cultural, and human environment. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; regulations of the Council on Environmental Quality (CEQ) (40 CFR 1508.9); and NPS Director's Order (DO) #12: Conservation Planning, Environmental Impact Analysis, and Decision-Making. This EA/AoE also complies with section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

## PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to protect and preserve the Jefferson Memorial and surrounding plaza in order to maintain a safe visitor experience. The proposed action is needed because soil movement continues to threaten the structural integrity of the plaza and seawall, endangering resources and creating unsafe conditions for NPS staff and visitors.



*Photograph 1: Continued soil movement has resulted in additional separation at previously repaired areas.*

Currently, soil movement beneath the plaza is causing separation between the exposed aggregate concrete that makes up the plaza. Until a long-term solution is implemented, the NPS has maintained patching of separated pavement. Based on the rate of soil movement, new patching is necessary every three to four months. This not only requires constant attention by NPS staff in patching the walkway, but it also does not provide a long-term solution to protecting and preserving the plaza. As a result, there is a need to develop a long-term solution to protect the plaza from lateral soil movement.

Soil movement also is creating a separation between the plaza and the seawall. The horizontal and vertical movement of the seawall has increased in recent months. Unlike the plaza, there is no short-term fix for this problem. The NPS has erected temporary metal fencing set back from the seawall to prevent visitors from tripping and falling into the Tidal Basin. However, there is a need to develop a long-term solution to stabilize the seawall in order to prevent differential movement.

Along with the Jefferson Memorial, the plantings and materials used to construct the plaza and seawall contribute to the site's significance. While the majority of the site's plantings remain unaffected by the soil movement, the condition of the pavement and stones that cover the plaza and seawall may adversely impact the significance of the site. In some cases, the existing materials are not directly related to the significance of the Jefferson Memorial. For example, the exposed aggregate concrete that covers the plaza is a surface layer of recent construction. However, the capstones and facing stones used on the seawall date to its original construction and are critical to the historic nature of the site. Therefore, there is a need to recognize the historic nature of materials on the site and reuse them wherever possible to maintain the significance of the site.

Nonhistoric elements may be replaced in their entirety without the risk of degradation of the historic qualities of the site, in most cases. Lighting that illuminates the edge of the seawall was included in early designs for the site. The current lighting fixtures are replacements which, although sympathetic to the design of the original elements, are not contributing features to the historic nature of the site. Lighting is

required for safety reasons, but the design or location of the lighting is not significant. Therefore, there is a need to maintain lighting along the seawall for safety purposes.

## **STUDY AREA DESCRIPTION**

The Jefferson Memorial is bordered on the east and south by East Basin Drive. The Tidal Basin, constructed by the U.S. Army Corps of Engineers in the late 19th century, forms the site's western and northern borders (Figure 1). The southern side of the Jefferson Memorial is dominated by an open lawn area, which is bordered by a driveway and parking spaces. Vehicular access to the driveway has been blocked for security reasons. This area now provides access for bicycles and pedestrians. Sidewalks form a ring around the Jefferson Memorial, providing access from the parking lot to the north plaza. The sidewalks terminate at the eastern and western ends of the north plaza. A steep staircase provides access from the north plaza into the Jefferson Memorial. The north plaza extends from the stairs of the Jefferson Memorial to the seawall, with linkages to the sidewalk system that borders the Tidal Basin (Figure 2).

The study area for the proposed action is bound by the Jefferson Memorial staircase to the south and extends into the Tidal Basin to the north. The study area's eastern and western boundaries extend beyond the north plaza to the transition areas that link to the regional sidewalk system.

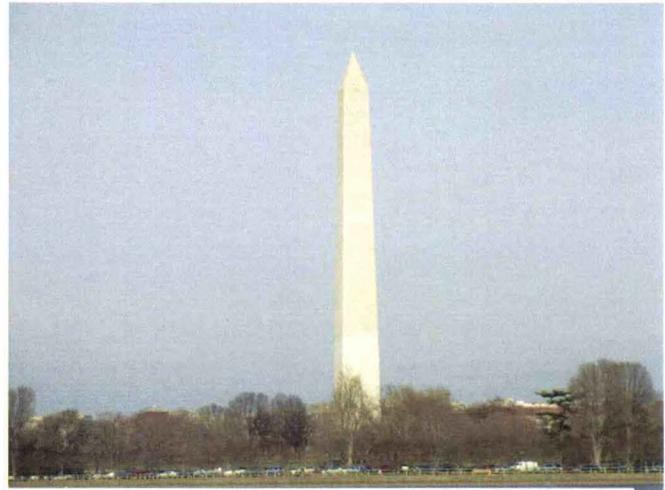
## **HISTORY AND SIGNIFICANCE OF THE NATIONAL MALL AND MEMORIAL PARKS AND THE JEFFERSON MEMORIAL**

The park's origins are as old as the capital city. The open space and parklands envisioned by Pierre L'Enfant's plan, which was commissioned by George Washington and refined by the McMillan Commission in 1901, created an ideal stage for national expressions of remembrance, observance, and protest. With everything from colossal monuments to commemorative gardens, from presidential inaugurations to civil rights protests, the park hosts history in the making.

The park contains over 1,000 acres of the most significant natural and cultural resources in the United States. Located in the core of the nation's capital, the park includes more than 80 historic structures. The park's resources also include 3,000 internationally renowned Japanese cherry trees which line the Tidal Basin, the shoe line of the Potomac River in West Potomac Park, and throughout East Potomac Park. The impressive mingling of natural and cultural resources has created Washington, D.C.'s reputation as one of the most heavily visited and photographed places in the world.

The park offers Americans the opportunity to get in touch with their heritage. Thousands of school children, families, foreign visitors, veterans, and recreational users come to the park daily. They take advantage of interpretive programming, park exhibits, publications, orientation services, and panoramic views of the Washington Monument and other landmarks. The park is responsible for 43 individual recreational areas where sports activities take place, including softball, soccer, rugby, field hockey, volleyball, and polo. Other recreational opportunities, including jogging, biking, picnicking, golf, swimming, tennis, paddle boating, ice skating, and fishing, are enthusiastically pursued by residents and visitors throughout the park, including the areas surrounding the Tidal Basin.

In 1897, Congress created Potomac Park, which includes an area around the Tidal Basin for recreation (NPS 2001). The Jefferson Memorial, located on the southeast shore of the Tidal Basin in West Potomac Park, is a contributing element to the East and West Potomac Parks Historic District. Designed in 1882, the irregularly shaped 110-acre Tidal Basin is a contributing site to West Potomac Park, as well. The Tidal Basin is rimmed with stone seawalls constructed from 1882 through the 1890s by the U.S. Army Corps of Engineers. The stone seawalls are a contributing structure to West Potomac Park; however, the seawall in the vicinity of the Jefferson Memorial was reconfigured and reconstructed in the late 1930s and early 1940s when the Jefferson Memorial was built.



*Photograph 2: The view from the Jefferson Memorial to the Washington Monument is one of the important visual resources at the site and is a significant element of the site's landscape.*

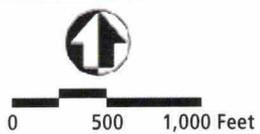
The East and West Potomac Parks Historic District was originally listed in the National Register of Historic Places (National Register) in 1972. A revised nomination was prepared in 1999 to more clearly delineate and update contributing and noncontributing resources, define significance themes, and include historic landscapes within the historic district. The period of significance for the Jefferson Memorial and surrounding portions of the park spans the years 1882-1997, which recognize the initial reclamation of the Potomac Flats by the U.S. Army Corps of Engineers in 1882, ending with the completion of the Franklin Delano Roosevelt Memorial in 1997.

The Jefferson Memorial and surrounding portions of the park are significant in the areas of Architecture, Art, City Planning, Commemoration, Engineering, Entertainment/Recreation, Landscape Architecture, Politics/Government, Social History, and Transportation. The sites are significant under Criterion A (properties that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion C (properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master). Additionally, the sites include individual structures or buildings that fall within exceptions to Criteria Considerations B, F, and G, which respectively recognize properties removed from their original location but which are primarily significant for architectural value, or which is the surviving structure most importantly associated with a historic person or event; properties primarily commemorative in intent, whose design, age, tradition, or symbolic value have invested them with their own historic significance; and properties achieving significance within the past 50 years due to their exceptional importance (Robinson and Associates 1999).

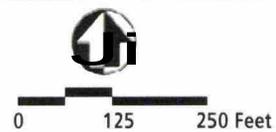


**National Mall and Memorial Parks**

Repair and Control Settlement at Jefferson Memorial  
Seawall, North Plaza, and Transition Areas



**Figure 1**  
**Site Location**



-  Limits of Construction
-  Construction Access
-  Staging Area



## 111 National Mall and Memorial Parks

Repair and Control Settlement at Jefferson Memorial Seawall, North Plaza, and Transition Areas

**Figure 2**  
**Study Area**

The Jefferson Memorial was designed in 1937 by John Russell Pope, already celebrated for his Neo-classical designs in the city. The design was modified by his successor firm of Eggers and Higgins. The Jefferson Memorial was constructed between 1939 and 1943 and was dedicated on the bicentennial of Jefferson's birth on April 13, 1943. The design of the grounds can be attributed to Frederick Law Olmsted, Jr., who was appointed project landscape architect in 1938. The monument stands as a permanent memorial to President Thomas Jefferson, whose thoughts and words have shaped American ideals for over 200 years. Quotations from Jefferson's writings adorn the interior walls of the Jefferson Memorial.

The Jefferson Memorial was administratively listed in the National Register in 1966, followed by an individual nomination in 1981. The areas of significance noted in the 1981 nomination are Architecture, Politics/Government, and Landscape Architecture. The Jefferson Memorial thus meets the exception to National Register Criteria (Consideration F), which provides that properties that are primarily commemorative in intent cannot be registered, unless design, age, tradition, or symbolic value invests such properties with their own historical significance. Its period of significance is 1934.

## **PROJECT BACKGROUND**

Previous and related planning studies have been completed for the park and specifically for the Jefferson Memorial. These plans were reviewed to provide information and guidance for the proposed action. In addition, scoping was undertaken to allow agencies and interested parties to provide further information regarding specific portions of the proposed action. These efforts are summarized below.

### **Previous and Related Planning Studies**

Several plans and studies have informed and led to the development of alternatives for repairing and controlling settlement at the Jefferson Memorial seawall, north plaza, and transition areas. These include the *Revised Thomas Jefferson Memorial Cultural Landscapes Inventory* (NPS 2001) and the *Investigation of Settlement and Upheaval at the Jefferson Memorial* (HNTB 2008a).

The *Revised Thomas Jefferson Memorial Cultural Landscapes Inventory* (CLI) (NPS 2001) was done to reevaluate the Jefferson Memorial's landscape after restoration efforts had been completed on the north plaza and entrance steps. The CLI evaluated the condition of the historic landscape and the elements that contribute to this landscape. These elements include the aggregate used to surface the north plaza and the stones used to cap and face the seawall. The condition and importance of these elements was taken into consideration when planning the alternatives proposed in this document.

The *National Mall Plan and Draft Environmental Impact Statement* (EIS) is an ongoing planning process to develop alternatives for renovating the National Mall. Repairing and controlling settlement at the Jefferson Memorial is an action common to all alternatives analyzed in the National Mall Plan. The National Mall Plan/EIS is projected to be released for agency and public review in the summer of 2009. This document seeks to implement these plans.

The *Investigation of Settlement and Upheaval at the Jefferson Memorial* (HNTB 2008a) documents the settlement and movement of soils beneath the north plaza and the resulting movement of the seawall. This document outlines the history of development at the site and previous efforts taken to stabilize the soils.

Based on the results of these investigations, the report proposes several options for stabilizing the site. These options are incorporated into the alternatives presented in this document.

## **Scoping**

The scoping process for the National Mall Plan/EIS, which includes this project, was initiated in November 2006 as part of the NPS National Mall Plan. The National Mall plan is a comprehensive plan for updating and improving sites and special places managed by the NPS on the National Mall. Currently, the NPS is preparing the preliminary preferred alternative as part of the National Mall Plan/environmental impact statement (EIS). Throughout this process, the NPS is soliciting public comments on what should be included in the plan. Among the recommendations and common to all proposed alternatives is the repair and protection of the Jefferson Memorial seawall and north plaza. The National Mall Plan/EIS is projected to be released for agency and public review in the summer of 2009.

## **Planning Issues and Concerns**

During the scoping process, specific considerations and concerns were identified as critical to the proposed action's development. The following were identified as most important to the planning process: the historic fabric at the site, the cultural landscape, views to and from the site, and visitor experience. Along with the purpose and need for the proposed action, these topics guided the development of alternatives and contributed to the selection of impact topics, as identified in the next section.

***Historic Structures.*** Many of the stone structures at the site were included in the original designs for the Jefferson Memorial. These materials contribute to the historic nature of the site, as well as its appearance. In some cases, these materials have already been damaged by the separation of pavement caused by lateral movement beneath the site. Any proposals made in this plan should not only seek to eliminate further threats to these materials but also maximize the reuse of existing materials.

***Cultural Landscape.*** The historic structures, described above, contribute to the Jefferson Memorial's cultural landscape. The landscape was analyzed and defined in the *Revised Thomas Jefferson Memorial Cultural Landscapes Inventory* (NPS 2001). Along with the historic fabric, other important elements include the plantings and circulation patterns at the site. Currently, none of the vegetation at the Jefferson Memorial is threatened by the lateral movement of soils beneath the site. Access to the plaza from the sidewalks surrounding the Tidal Basin has been hampered by separating pavement, as well as the fencing required along the seawall. Any proposals made in this plan should seek to alleviate these conditions while minimizing short-term impacts and avoiding long-term impacts to the cultural landscape.

***Views.*** The axial layout of Washington, D.C. allows many of the city's landmarks to be visible from multiple locations. For example, from the steps of the Jefferson Memorial, there is a primary axial view of the Washington Monument. The White House, the Capitol Building, and other landmarks are also visible. These views are important to the visitor experience at the Jefferson Memorial, as well as the overall experience in Washington, D.C. Likewise, views of the Jefferson Memorial from other locations are also important. The lighting at the Jefferson Memorial creates a popular view from the White House in the evening, making these views important at any hour. Any proposals made in this plan should take into account the visibility of the site and seek to maintain these important views.

**Visitation.** Washington, D.C. receives millions of visitors each year. The Jefferson Memorial itself has averaged over 2.3 million visitors a year for the last five years. The Jefferson Memorial's highest level of visitation during this period was in 2008, when over 2,360,000 people visited the site. While visitors come throughout the year, there are certain programs or events that bring in additional visitors. Some of the most important events include the Cherry Blossom Festival and the Fourth of July celebrations. Any proposals made in this plan should not only aim to maintain visitation to the site throughout the year but also minimize interference with any of the large events.

### **Regulatory, Management, and Legislative Concerns**

Based on discussions with NPS staff and planning team members, implementation of the *Repair and Control Settlement at Thomas Jefferson Memorial Seawall, North Plaza, and Transition Areas EA/AoE* should not require any changes to existing legislation or management policies. Several permits and approvals would be required prior to construction. These are described further in Chapter 4: Consultation and Coordination.

### **Impact Topics**

Impact topics are resource categories of concern in the study area that could be affected, either beneficially or adversely, by the range of alternatives presented in this EA/AoE. They were identified based on the issues raised during scoping; site conditions; federal laws, regulations, executive orders, NPS *Management Policies 2006* (NPS 2005), and director's orders; and staff knowledge of the park's resources.

### **Impact Topics Retained for Analysis**

Impact topics identified and analyzed in this EA/AoE are listed below along with a brief rationale for the selection of each impact topic. They include: vegetation, water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, site access and circulation, public safety, and operations and infrastructure. Each impact topic is further discussed in detail in Chapter 3: Affected Environment and Environmental Consequences.

**Vegetation.** NPS policy is to protect the natural abundance and diversity of all naturally occurring communities. The NPS *Management Policies 2006* (NPS 2005), and other NPS and park policies provide general direction for the protection of vegetation. The study area is located in a highly developed region. Most of the vegetation found in the region consists of maintained lawns and select shrubs and trees. These species are maintained as part of the cultural landscape (NPS 2001); therefore, vegetation is addressed under the impact topic of cultural landscapes.

**Water Quality.** NPS *Management Policies 2006* (NPS 2005), NPS DO #77: *Natural Resources Management*, along with the Clean Water Act and other federal, state, and local regulations provide general direction for the protection of surface water and groundwater. Water quality in the vicinity of the Jefferson Memorial has been impacted by increased pollutant levels throughout the Potomac River watershed, as well as storm sewer discharges into the Tidal Basin. Because the proposed action includes improvements to the seawall in the Tidal Basin, the impact topic of water quality is addressed.

***Floodplains.*** Executive Order 11988, “Floodplain Management,” and NPS DO #77-2: *Floodplain Management* require an examination of impacts on floodplains and potential risk involved in placing facilities within floodplains. The entire study area falls within the 100-year floodplain. Because the proposed action would occur within the 100-year floodplain and would introduce new structures within the floodplain, the impact topic of floodplains is addressed.

***Cultural Landscapes.*** The NPS defines a cultural landscape as a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person exhibiting other cultural or aesthetic values. There are four kinds of cultural landscapes, which are not mutually exclusive: historic site, historic designed landscape, historic vernacular landscape, and ethnographic landscape (NPS DO #28, *Cultural Resources Management Guidelines*). A revised CLI was completed in 2001 to identify contributing elements at the Jefferson Memorial. Because the proposed action would rehabilitate contributing elements of the cultural landscape and remove some vegetation, the impact topic of cultural landscapes is addressed. See correspondence in Appendix A for additional information.

***Historic Structures.*** A historic structure is defined by the NPS as “a constructed work, usually immovable by nature or design, consciously created to serve some human act” (DO #28). In order for a structure or building to be listed on or eligible for listing on the National Register, it must possess historic integrity of those features necessary to convey its significance, particularly with respect to location, setting, design, feeling, association, workmanship, and materials. The National Register Bulletin #15: *How to Apply the National Register Criteria for Evaluation* (NPS 1990) provides a comprehensive discussion of these characteristics. A number of the structures at the Jefferson Memorial are considered historic, as they contribute to its significance. These structures include the north plaza and the seawall. Because the proposed action would rehabilitate these structures, the impact topic of historic structures is addressed. See correspondence in Appendix A for additional information.

***Visual Resources.*** The Organic Act states that NPS units are charged with conserving park scenery, along with all the natural and cultural resources that contribute to important views. In the evaluation of visual resources, both the visual character of the study area and the quality of the viewshed within the study area were considered. A viewshed comprises the limits of the visual environment associated with the proposed action including the viewsheds within, into, and out of the study area. The study area includes an array of important, historic viewsheds. Because the proposed action could result in short- or long-term changes to these viewsheds, the impact topic of visual resources is addressed.

***Visitor Use and Experience.*** Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks (NPS 2005). The NPS strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in parks. The visitor experience encompasses interpretation, understanding, enjoyment, safety, circulation, and accessibility of the study area. Because the proposed action would result in long-term improvements and some short-term changes to enjoyment, safety, and circulation, the impact topic of visitor use and experience is addressed.

**Site Access and Circulation.** The study area for the proposed action is defined by the Jefferson Memorial property. Within this area, site access and circulation is contained to the driveways, north plaza, and walkways around the Tidal Basin. Because site access and circulation are an important piece of the visitor experience, this impact topic is addressed under “Visitor Use and Experience.”

**Public Safety.** NPS *Management Policies 2006* (NPS 2005) instructs NPS staff to consider public safety in all proposed actions. The cracking and separation of the north plaza and seawall at the Jefferson Memorial poses a growing threat to park visitors and staff. Safety concerns related to these two groups is discussed under the “Visitor Use and Experience” and “Operations and Infrastructure” sections of this document.

**Operations and Infrastructure.** The proposed action would result in changes to operations and infrastructure. These changes would be related to long-term improvements to deteriorating conditions across the north plaza and seawall. This would also result in changes to the current operations and the safety of employees at the site. Therefore, the impact topic of operations and infrastructure is addressed.

### **Impact Topics Dismissed from Further Analysis**

The following impact topics were initially considered but dismissed from further analysis because the resource is not present in the study area or because any potential impacts would be minor or less. They include soils, prime farmland, geologic resources, topography, wildlife, special status species, wetlands, air quality, soundscapes, lightscapes, hazardous materials, energy requirements and conservation potential, archeological resources, ethnographic resources, museum objects, Indian trust resources and sacred sites, socioeconomic resources, public safety and environmental justice. A brief rationale for the dismissal of these impact topics is provided below.

**Soils.** As is the case with much of the Washington, D.C. area, the Jefferson Memorial sits atop a large quantity of fill material. Fill material not only provided support but allowed the site to be graded to a relatively level topography. NPS policy is to protect the natural abundance and diversity of all naturally occurring communities. Because none of the soils within the study area are considered to be “natural,” there would be no impacts to these resources. Any changes in soil content would be related to fill material. Therefore, the impact topic of soils is dismissed.

**Prime Farmland.** Prime farmland is one of several designations made by the U.S. Department of Agriculture to identify important farmlands in the United States. It is important because it contributes to the nation’s short- and long-range needs for food and fiber. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, few to no rocks, and permeable soils (designated as prime farmland soils). All of the soils within the study area are fill material brought in from other locations. The use of fill material has eliminated most of the natural soil conditions that existed at the site hundreds of years ago. As a result, any potential for prime farmland has been eliminated. Therefore, the impact topic of prime farmland is dismissed.

**Geologic Resources.** The geology at the site is consistent with the rest of the region. Washington, D.C. is located in the Coastal Plain, just along the fall line where the plain transitions into the mountains and uplands that define many of the states west of the district. The location of Washington, D.C. along the fall

line has led to more intense cutting of geologic resources from rivers and streams throughout many centuries. As a result, many of the geologic formations that are exposed at the surface are of marine origin, including the glauconite bearing Nanjemoy and Aquia Formations. The proposed action would not impact these resources. Therefore, the impact topic of geologic resources is dismissed.

**Topography.** The topography at the site is consistent with the rest of the region. Because much of the city was constructed on fill material, the topography was designed to be relatively flat. The proposed action would not alter the topography at the site. Therefore, the impact topic of topography was dismissed.

**Wildlife.** NPS policy is to protect the natural abundance and diversity of all naturally occurring communities. The NPS *Management Policies 2006* (NPS 2005), NPS DO #77: *Natural Resources Management*, and other NPS and park policies provide general direction for the protection of wildlife and wildlife habitat. The study area is located in a highly developed region. The wildlife species found in the region, including raccoons, squirrels, fish, and many bird species, have adapted to and thrive in the developed environment. Their success is due to their ability to make use of the available habitats that are interwoven with the developed areas in the city (District of Columbia 2006). The proposed action would introduce a temporary impact into this environment. The impact would be similar to many other existing impacts and would only last through the construction period. Because there would be no new impacts to wildlife from the proposed action, the impact topic of wildlife is dismissed from further analysis.

**Special Status Species.** In addition to NPS policies and management guidelines, the Endangered Species Act of 1973, as amended provides for the protection of rare, threatened, and endangered species (floral and faunal). As part of the ongoing coordination for the National Mall Plan EIS, the U.S. Fish and Wildlife Service acknowledged that no federally listed or proposed threatened or endangered species under their jurisdiction are known to occur within the study area. As a result, the impact topic of special status species is dismissed from further analysis.

**Wetlands.** Executive Order 11990, "Protection of Wetlands," and NPS DO #77-1: *Wetland Protection* define the NPS goal to maintain and preserve wetland areas. There are no wetlands located in or adjacent to the study area (District of Columbia 1997). Therefore, the impact topic of wetlands is dismissed from further analysis.

**Air Quality.** The Clean Air Act and NPS *Management Policies 2006* (NPS 2005) require consideration of air quality impacts from NPS projects. Washington, D.C., the location of the proposed action, is currently classified by the Environmental Protection Agency (EPA) as being in non-attainment for ozone and particulate matter (EPA 2008). The proposed actions would have minimal short-term impacts on air quality. Hauling of material, operating of equipment, and other construction activities could result in temporary increases in vehicle exhaust and emissions. Hydrocarbons, nitrates, and sulfur dioxide emissions, as well as any airborne particulates created by fugitive dust plumes would be rapidly dissipated because air stagnation is rare in the area. Overall, there could be negligible impacts on local air quality; however, such impacts would be short-term, lasting only as long as construction. Therefore, the impact topic of air quality is dismissed from further analysis.

***Soundscapes.*** As described in *NPS Management Policies 2006* (NPS 2005) and NPS DO #47: *Sound Preservation and Noise Management*, preservation of natural soundscapes associated with national park units is an important part of the NPS mission. Natural soundscapes exist in the absence of human-caused sound. The natural, ambient soundscape is the aggregate of all natural sounds that occur in the park beyond the range of sounds that humans can perceive. This sound can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and durations of human-caused sounds considered acceptable vary among NPS units, as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas. At the study area, natural soundscapes do not exist because of the developed nature of the region. Any construction associated with implementation of the proposed action, e.g., the hauling of material or the operation of construction equipment, could result in additional, dissonant sounds, but such sounds would be temporary and not out-of-place in such a developed region. Because the area is already developed and supports a variety of activities and traffic, the impact topic of soundscapes is dismissed from further analysis.

***Lightscaapes.*** In accordance with *NPS Management Policies 2006* (NPS 2005), the NPS strives to preserve natural, ambient lightscaapes, which are natural resources and values that exist in the absence of human-caused light. The study area is located in a highly developed region. As a result, the study area receives regular impacts on existing lightscaapes from passing vehicles, as well as surrounding overhead and security lighting. Any changes in security or overhead lighting would not elevate the existing lightscape impacts within the study area. New lighting would be appropriately located to enhance safety and security without detracting from the resources. Therefore, the impact topic of lightscaapes is dismissed from further analysis.

***Hazardous Materials.*** The Jefferson Memorial is located on a piece of land that was developed from fill material. Prior to the construction of the Jefferson Memorial, this area was open parkland. During the construction and renovation of the Jefferson Memorial, some hazardous materials (fuels) may have been brought on site. However, these materials were properly stored and removed upon completion of these activities. No hazardous materials are currently stored at the site. Therefore, the impact topic of hazardous materials is dismissed from further analysis.

***Energy Requirements and Conservation Potential.*** The CEQ guidelines for implementing NEPA require an examination of energy requirements and conservation potential as a possible impact topic in environmental documents. The park strives to incorporate the principles of sustainable design and development into all facilities and operations. The objectives of sustainability are to design structures to minimize adverse impacts on natural and cultural values; to reflect their environmental setting; to maintain and encourage biodiversity; to construct and retrofit facilities using energy efficient materials and building techniques; to operate and maintain facilities to promote their sustainability; and to illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment (NPS 2008). The action alternatives presented in this document subscribe to and support the practice of sustainable planning and design in part by achieving a long-term solution that does not require future energy expenditures. The park would encourage suppliers and contractors to follow sustainable practices and address sustainable park and non-park practices. Consequently, any adverse impacts relating to energy use, availability, or conservation would be negligible. Therefore, the impact topic of energy requirements and conservation potential is dismissed.

***Archeological Resources.*** The Jefferson Memorial was constructed between 1934 and 1943 on low land and on fill dredged from the Potomac River. Because the Jefferson Memorial is located on fill and construction of the Jefferson Memorial resulted in considerable disturbance to the area, archeological resources are not anticipated. No archeological resources have been identified within the study area. Therefore, archeological resources is dismissed as an impact topic.

***Ethnographic Resources.*** An ethnographic resource is defined as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (DO #28). There are no known ethnographic resources within the study area. Therefore, the impact topic of ethnographic resources is dismissed.

***Museum Objects.*** The NPS defines a museum object as “a material thing possessing functional, aesthetic, cultural, symbolic, and/or scientific value, usually movable by nature or design. Museum objects include pre-contact Native American historic and historic objects, artifacts, works of art, archival material, and natural history specimens that are part of a museum collection” (DO #28, 137). The proposed action would not address or impact any of the park’s collections. Therefore, the impact topic of museum objects was dismissed.

***Indian Trust Resources and Sacred Sites.*** Secretarial Order 3175 requires that any anticipated impacts on Indian trust resources from a proposed project or action by U.S. Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian Trust responsibility is a legally enforceable obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal laws with respect to Native American tribes. There are no known Indian Trust resources in the study area, and the lands comprising the park are not held in trust by the secretary of the interior for the benefit of Indians due to their status as Indians. Therefore, the impact topic of Indian Trust resources and sacred sites is dismissed. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) would be followed.

***Socioeconomic Resources.*** The proposed action would neither change local and regional land-use nor appreciably impact local businesses or other agencies. Implementing the proposed action could result in a marginal boost to the economy of Washington, D.C. (e.g., minimal increases in employment opportunities for the construction workforce and revenues for local businesses and government generated from construction activities and workers). Any increase however, would be temporary, lasting only as long as construction. Therefore the impact topic of socioeconomic resources was dismissed.

***Environmental Justice.*** Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to the EPA, environmental justice is the “...fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations

and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.”

The goal of “fair treatment” is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects and identify alternatives that may mitigate these impacts. Environmental justice is dismissed as an impact topic for the following reasons:

- The park staff and planning team solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors.
- Implementation of the proposed action would not result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect adverse impacts on any minority or low-income population.
- The impacts associated with implementation of the proposed action would not disproportionately affect any minority or low-income population or community.
- Implementation of the proposed action would not result in any identified effects that would be specific to any minority or low-income community.



# 2

## ALTERNATIVES

This chapter describes various alternatives for repairing and controlling settlement at the Jefferson Memorial seawall, north plaza, and transition areas. Alternatives for the proposed action were designed to prevent the north plaza and seawall from being impacted by lateral soil movement below. This EA/AoE examines four alternatives: a no-action alternative (Alternative A) and three action alternatives (Alternatives B, C, and D).

### ALTERNATIVES DEVELOPMENT

Development of the alternatives to repair and control settlement at the Jefferson Memorial seawall, north plaza, and transition areas began in early 2006 when the NPS initiated data collection efforts at the Jefferson Memorial. The survey data measured lateral movement and settlement beneath the north plaza. This data was used to inform the NPS and its consultants about the direction and speed of the soil movement that was causing the cracking and separation at the site. This information was incorporated into the *Investigation of Settlement and Upheaval at the Jefferson Memorial* (HNTB 2008a). Along with documenting the survey information, this report provided a history of the development of the Jefferson Memorial and options for addressing the lateral movement. Following this report, the NPS and its consultants created several combinations of options for protecting the north plaza and seawall from the lateral movement. These combinations were evaluated by the NPS at a value analysis study that was conducted at the park on March 12-14, 2008. The study allowed the NPS to compare the benefits that each option offered. As a result of this analysis, the NPS elected to move forward with an EA/AoE that would analyze the no-action alternative and three action alternatives described below. The value analysis study revealed that there is no economic advantage between any of the alternatives carried forward in the EA/AoE. The decisions made during the value analysis session, along with the impact analysis included in this document, led the NPS to select Alternative B as its preferred alternative.

### ALTERNATIVE A: NO-ACTION

Under Alternative A, the no-action alternative, the NPS would not take action to protect the north plaza and seawall from the lateral movement below (Figure 3). The continued lateral movement of the soil beneath the north plaza would cause additional separation along the surface. The NPS would continue to patch these areas on a regular basis (currently every three to four months). Continued lateral movement could result in increased frequency and magnitude of separation within the north plaza. The NPS would continue to address these locations as available staff and funding permitted.

Continued lateral movement also would result in separation between the north plaza and the Tidal Basin paths that extend east and west from the north plaza. This separation would occur at the transition areas where the sidewalk meets the steps that lead to the north plaza. Without any reduction in differential lateral movement, separation would be expected to occur at these locations as well. The NPS would address these locations as available staff and funding permitted.

Under Alternative A, no action would be taken to address the separation between the seawall and the north plaza. As a result of lateral soil movement and soil settlement, the seawall has separated and dropped between 2-8 inches beneath the north plaza. Under this alternative, this movement would continue, causing further separation between the seawall and the north plaza. This separation has already been identified as a safety hazard, and the park has erected a temporary metal fence to prevent visitors from reaching the seawall. Under Alternative A, it would be necessary to keep this fence.

Under this alternative, there would be no change made to the existing lighting along the seawall. The existing lights would continue to sit within the north plaza pavement, creating a visual boundary along the edge of the seawall during the evening hours. Under Alternative A, the temporary metal fence would sit above these lights.

## **ALTERNATIVE B: REBUILT SEAWALL (NPS PREFERRED ALTERNATIVE)**

Under Alternative B (NPS Preferred Alternative), the NPS would implement a long-term solution to protect the north plaza and seawall from the lateral movement of soil. This protection would be provided through a reconstructed seawall. Under this alternative, the existing seawall would be demolished. Prior to the initiation of work on the seawall, the historic capstones and facing stones that line the seawall would be removed and stored in the staging area or other secure location within the park (Figure 2). Once the old wall was demolished, caissons would be drilled into the bedrock below the Tidal Basin. The new seawall, similar in alignment and design to the existing wall, would be built on top of these caissons to provide a stable surface. The caissons would be designed to withstand the pressure being applied by the lateral movement of soils.



*Photograph 3: Soil movement has caused the seawall to separate from the north plaza. The separation has created a tripping hazard.*

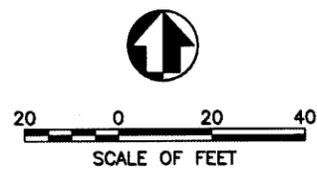
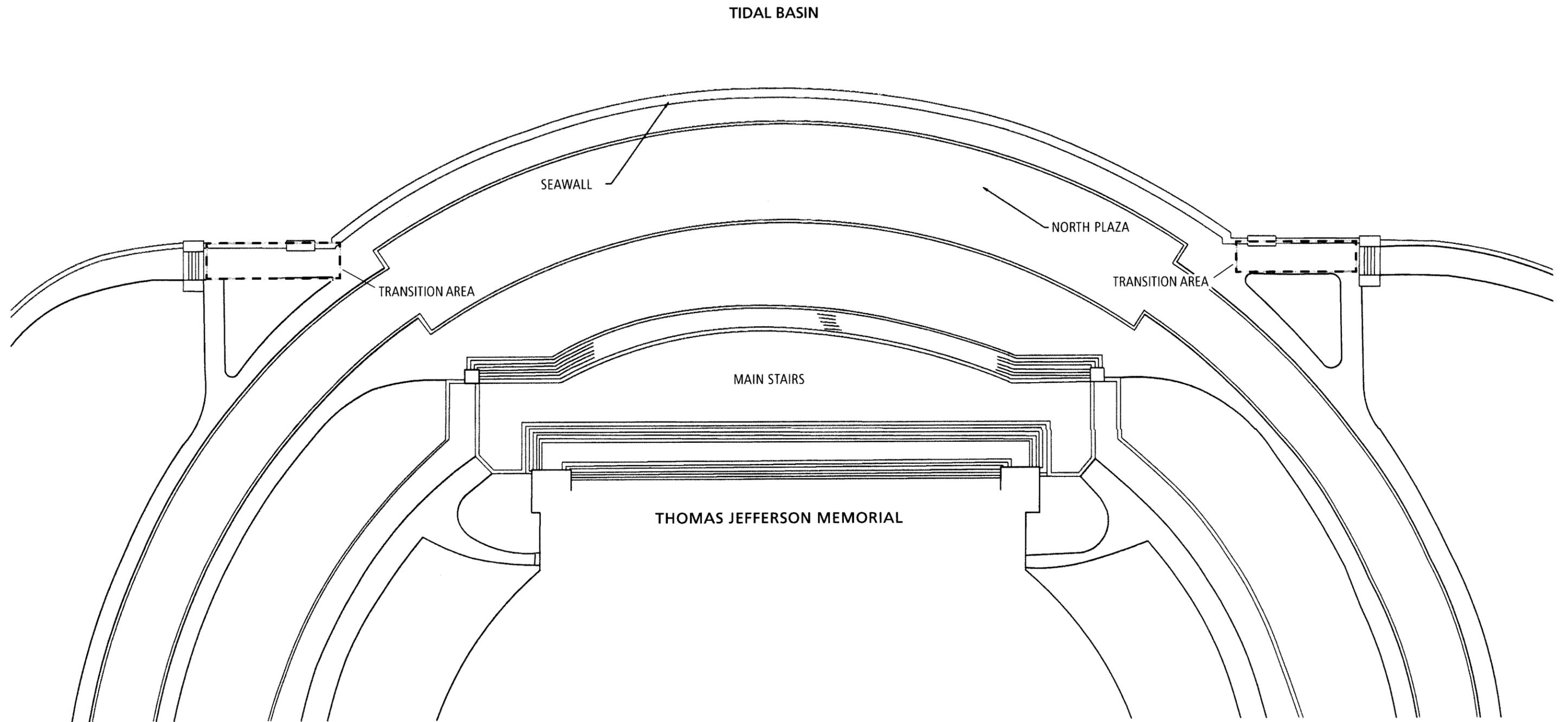


Figure 3  
 Alternative A: No-Action

The caissons would create some disruptions in current soil movement; however, soil would still be able to pass through the caissons and continue moving laterally. To further stabilize the seawall, pipe piles<sup>1</sup> would be driven through the structure into the rock below (Figures 5 and 6). These piles would be divided into two groups that would be installed at different angles. The two angles would provide different points of support to anchor the seawall against the north plaza and resist future movement.

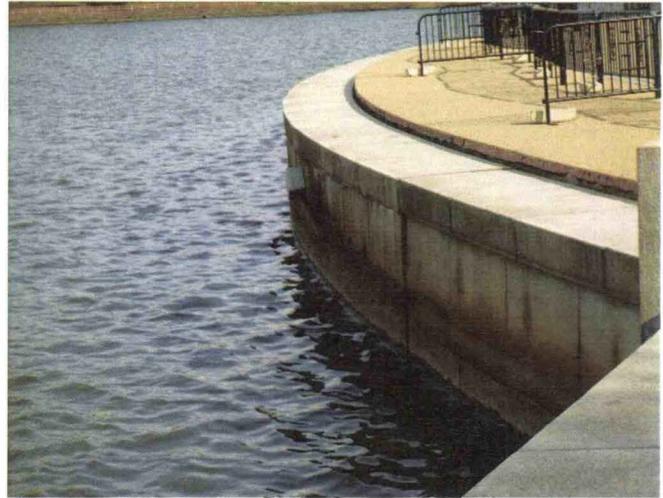
Upon completion of the work on the seawall, the capstones and facing stones would be reinstalled. This masonry work would re-establish the top of the capstones flush with the north plaza and return the wall to its intended appearance. In addition, the portions of the north plaza would be repaved with a similar exposed concrete aggregate surface to repair any separations that have occurred.

The soil and rock that would be displaced through the installation of the caissons would be temporarily stockpiled on site and removed by trucks. The trucks would enter the site along the circular drive that surrounds the Jefferson Memorial. The trucks and construction equipment would be restricted to a given area that would not extend beyond the first set of stairs in the north plaza.

To address the tripping hazards resulting from differential settlement between the north plaza and the adjacent areas, Alternative B would include the installation of concrete pads below the existing sidewalks in the transition areas between the north plaza and surrounding sidewalks. These pads would provide a hinged connection between the two areas to allow future settlement to occur in the surrounding area without separating from the north plaza. These pads would cover less than 1,000 square feet.

In addition, the portions of the north plaza would be repaved with a similar surface to eliminate any cracks that have occurred. Once it was clear that soil had consolidated against the caissons and lateral movement had been halted, additional paving would be completed. The existing lighting along the seawall would be replaced with new lights that would be located in the same approximate location and continue to outline the seawall in the evenings.

During construction activities, some pine trees would be removed from areas adjacent to the seawall at the east and west sides of the study area. This action would be necessary to access and repair the seawall. Along the western edge of the study area, some pines would be removed. At the eastern side of the study



**Photograph 4:** *The historic facing stones and capstones along the seawall are key features at the site. The facing stones and capstones would be removed prior to construction and replaced when the project was complete.*

<sup>1</sup> A steel pipe 6-30 inches in diameter, usually filled with concrete and used for underpinning.

area, additional trees would be removed. After construction, the trees would be replaced according to the historic planting plan.

Under this alternative, construction equipment and material would be stored in a staging area to the southwest of the Jefferson Memorial. The staging area would be well marked to prevent people from entering the area. During the construction process, the East Ring Road along the Jefferson Memorial also may be used to stage the construction activities. The staging area and construction activities would be designed to avoid unintentional impacts to the trees and shrubs that exist within and adjacent to the study area. The anticipated duration of construction work would range from 18-24 months. No work would be performed on federal holidays or during the Cherry Blossom Festival.

### **ALTERNATIVE C: PIPE PILES AND MICROPILES**

Under Alternative C, new pipe piles would be installed throughout the north plaza (Figures 6 and 7). This would involve removing the existing structural slab and pavement that cover the north plaza and driving new pipe piles into the bedrock below. The existing piles within the north plaza would not be removed. These new pipe piles would be installed in groups at different angles to provide different points of support to anchor the plaza against further lateral movement. The installation would be performed with construction equipment positioned on the north plaza or in the Tidal Basin.

Because there would be no drilling under this alternative, the need for hauling material off-site would be reduced to removal of the old pavement. However, there would still be a high volume of construction activity that would require part of the north plaza to be closed to the public.

Alternative C also would address the seawall. Under this alternative, micropiles<sup>2</sup> would be driven through the existing seawall into the rock below (Figures 7 and 8). These piles would be divided into two groups that would be installed at different angles. The two angles would provide different points of support to anchor the seawall against the north plaza and resist future movement.

Like Alternative B, this alternative would require the removal and storage of the historic capstones and facing stones prior to the initiation of work on the seawall. Other actions included in this alternative that are similar to those described in Alternative B include:

- installing concrete pads to connect the transition areas to the north plaza
- repaving portions of the north plaza with a similar exposed concrete aggregate surface
- updating lighting along the seawall
- storage of construction equipment and material in the areas adjacent to the Jefferson Memorial
- removal of pine trees

The anticipated duration of construction work would range from 18-24 months. No work would be performed on federal holidays or during the Cherry Blossom Festival.

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<sup>2</sup> A drilled and grouted pile with a centrally placed steel reinforcing member consisting of single or multiple bars.

## **ALTERNATIVE D: SOIL IMPROVEMENTS AND MICROPILES**

Under Alternative D, lateral soil movement would be addressed by installing a more binding soil material (Figures 9 and 10). To install this material, the existing structural slab and pavement that cover the north plaza would be removed, along with much of the existing soil. The soil would be stockpiled on site until it could be removed by trucks. Appropriate erosion and sediment control techniques would be implemented to contain the exposed and removed soil within the study area. The procedure for bringing trucks into the site would be the same as described under Alternative B. This alternative, however, would require more trucks as the soil removal would be accomplished at a faster pace. Once the new soil material was in place, portions of the north plaza would be repaved with a similar exposed concrete aggregate surface.

Under Alternative D, the treatment of the transition areas, seawall, and north plaza surface would be the same as those described in Alternative C. These actions include:

- installing concrete pads to connect the transition areas to the north plaza
- repaving portions of the north plaza
- temporarily removing the capstones and facing stones on the seawall
- updating lighting along the seawall
- storage of construction equipment and material in the areas adjacent to the Jefferson Memorial
- removal of pine trees

Alternative D could take considerable time, depending on the speed at which soil was excavated and replaced. The anticipated duration of construction work would range from 18-24 months. No work would be performed on federal holidays or during the Cherry Blossom Festival.

## **ALTERNATIVES CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS**

As noted above under “Alternatives Development” earlier in this chapter, the NPS conducted a value analysis session at the park on March 12-14, 2008. Prior to this meeting, the NPS and its consultants had developed a number of options for addressing the plaza and the seawall at the Jefferson Memorial. During the value analysis session, all of these options were reviewed and analyzed. In some cases, these options failed to meet the purpose, need, and objectives of the proposed action. Other options were found to be environmentally infeasible. These options included designs that attempted to halt soil movement, rather than anchoring the north plaza. Finally, some options were variations of the alternatives included in this document, and the impacts were similar. These included varying locations and types of piles used to anchor the north plaza. These options were dismissed from further analysis because they were similar to alternatives retained for analysis in this document.



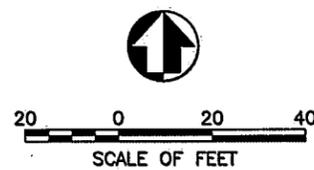
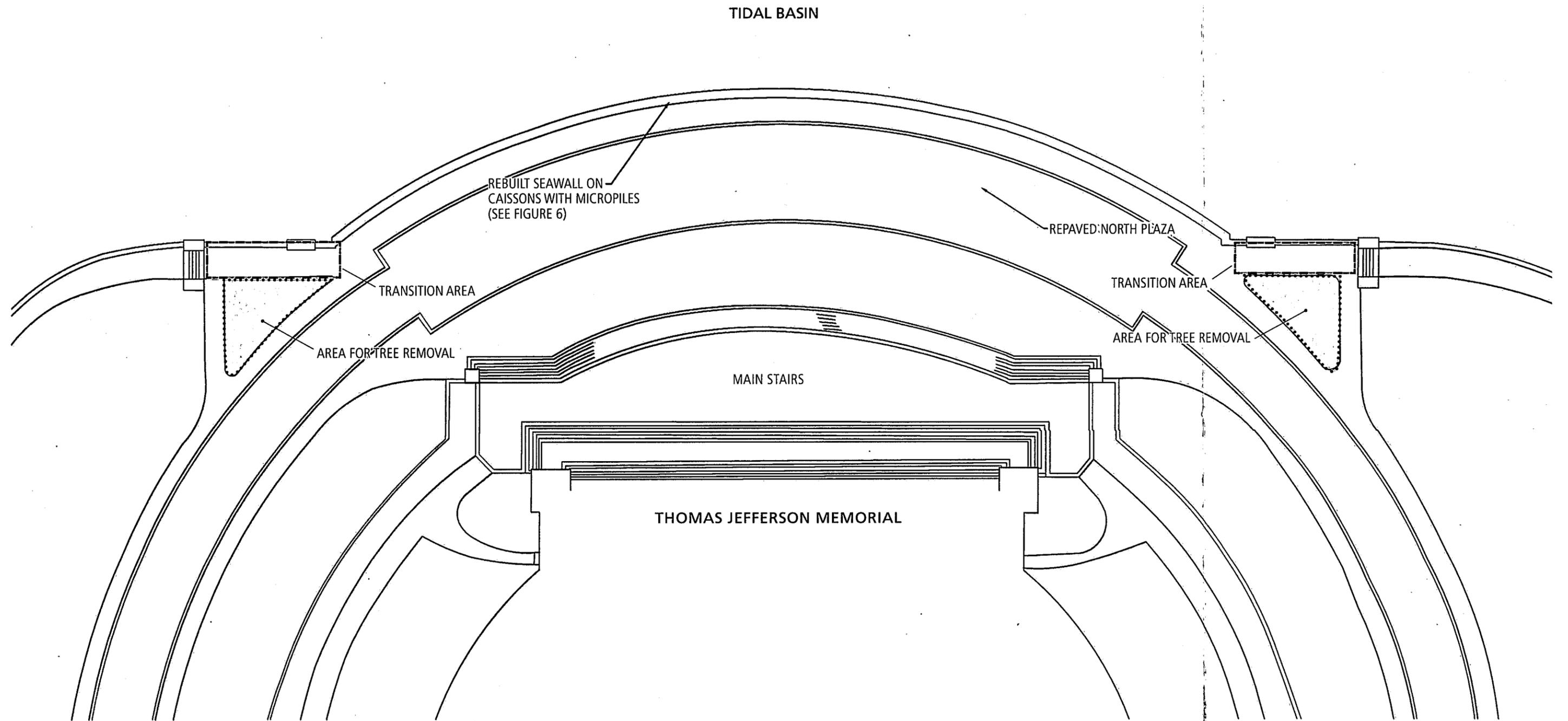
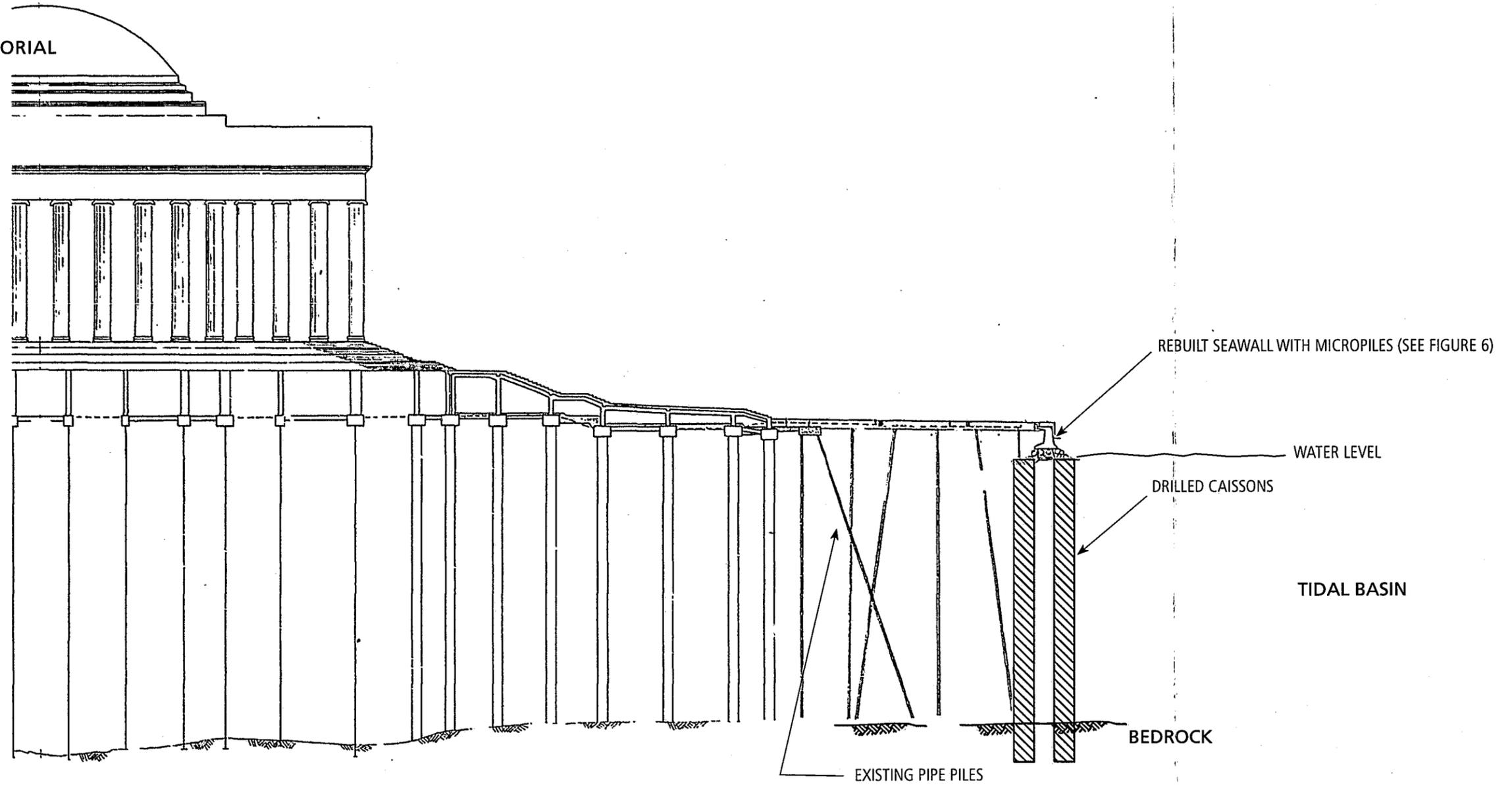
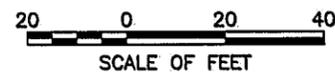


Figure 4  
 Alternative B: Rebuilt Seawall  
 (NPS Preferred Alternative) - Plan View

THOMAS JEFFERSON MEMORIAL



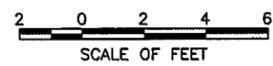
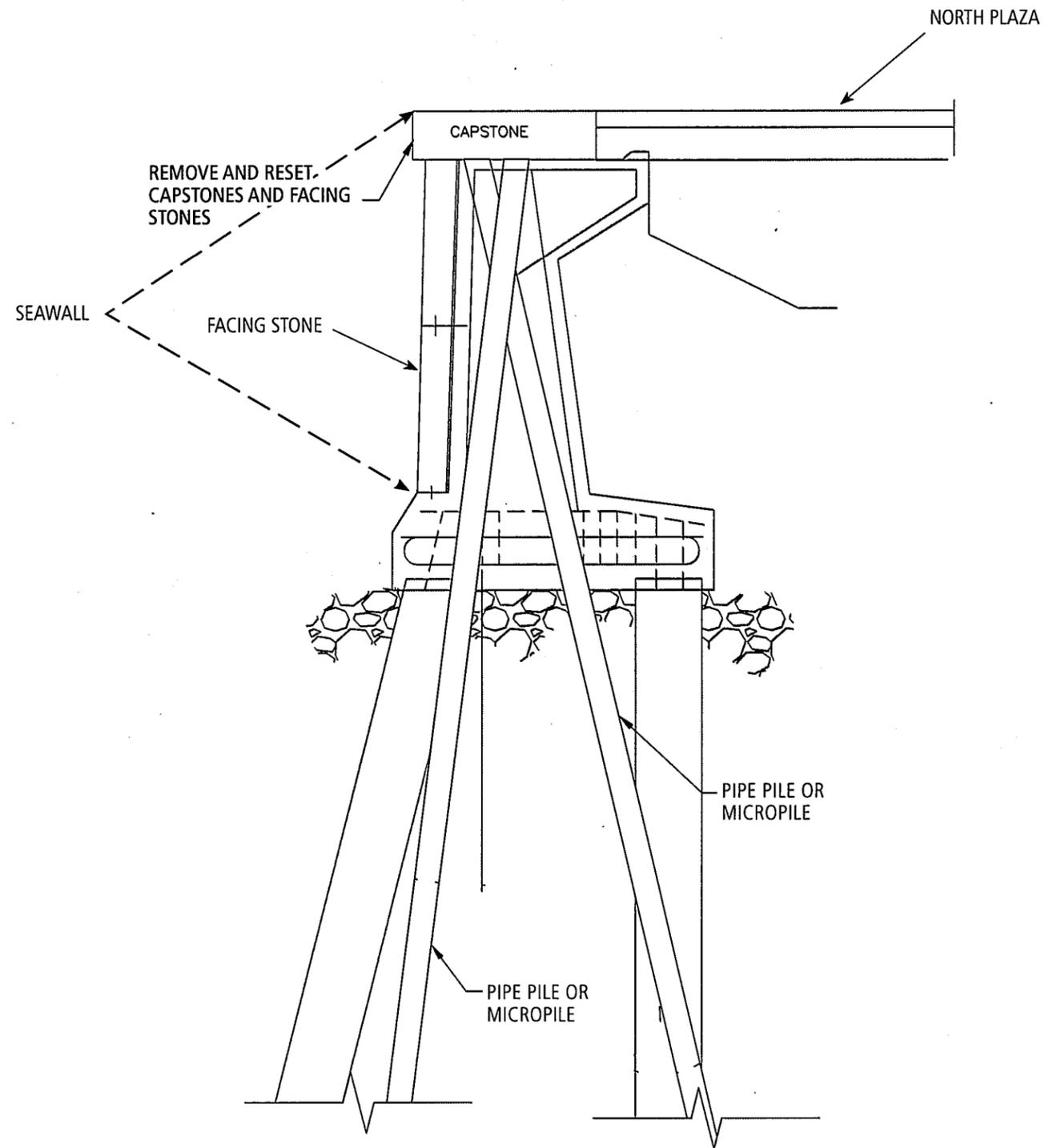
NOTE:  
GEOMETRY BASED ON  
HISTORICAL DOCUMENTS AND  
MUST BE VERIFIED IN FIELD



National Mall and Memorial Parks  
Repair and Control Settlement at Jefferson Memorial  
Seawall, North Plaza, and Transition Areas

Figure 5

Alternative B: Rebuilt Seawall  
(NPS Preferred Alternative) - Elevation View



National Mall and Memorial Parks  
 Repair and Control Settlement at Jefferson Memorial  
 Seawall, North Plaza, and Transition Areas

Figure 6  
 Alternatives B, C, and D: Seawall  
 Pipe Piles or Micropiles - Elevation View

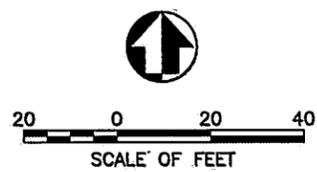
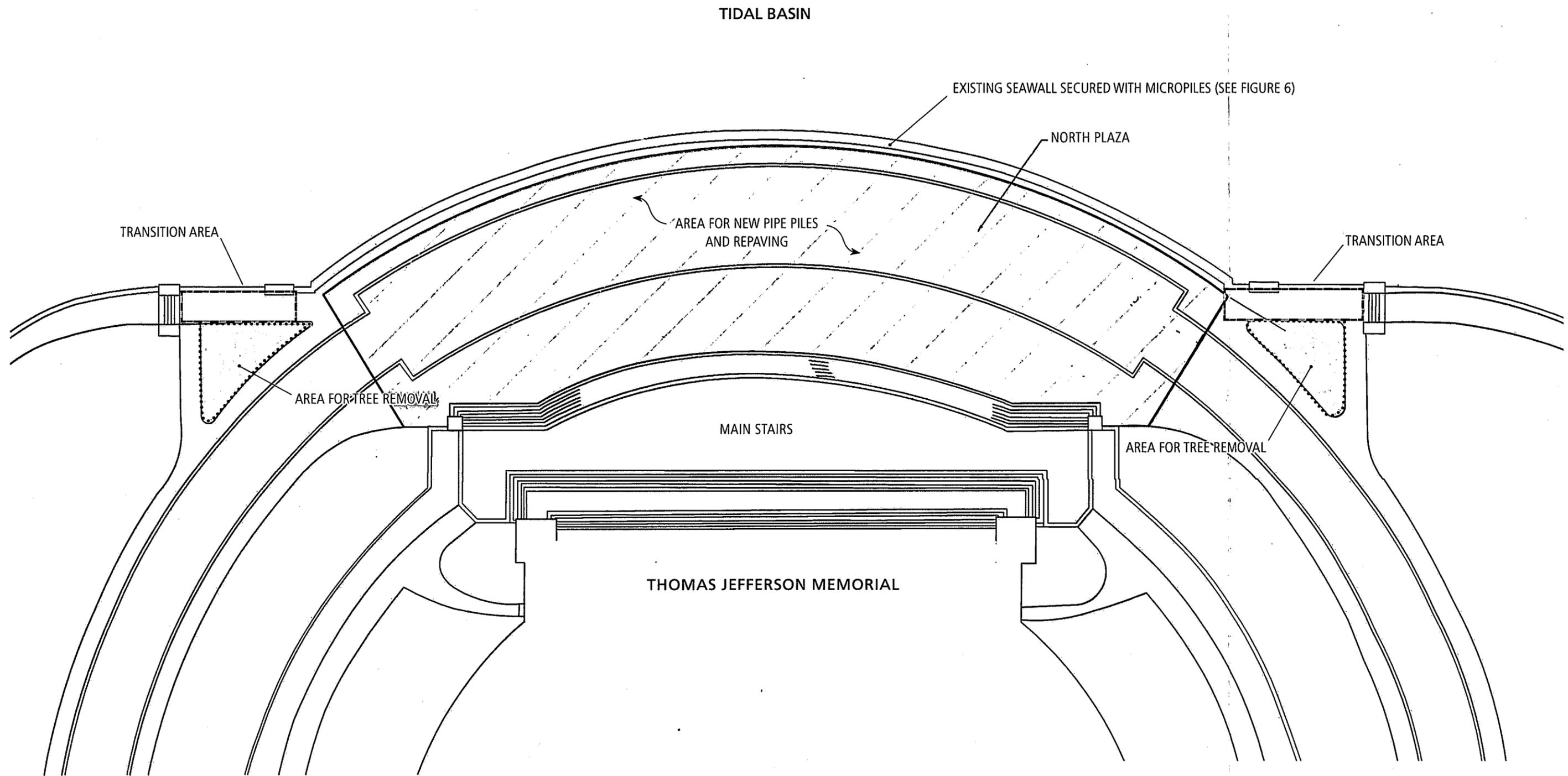
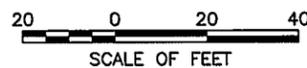
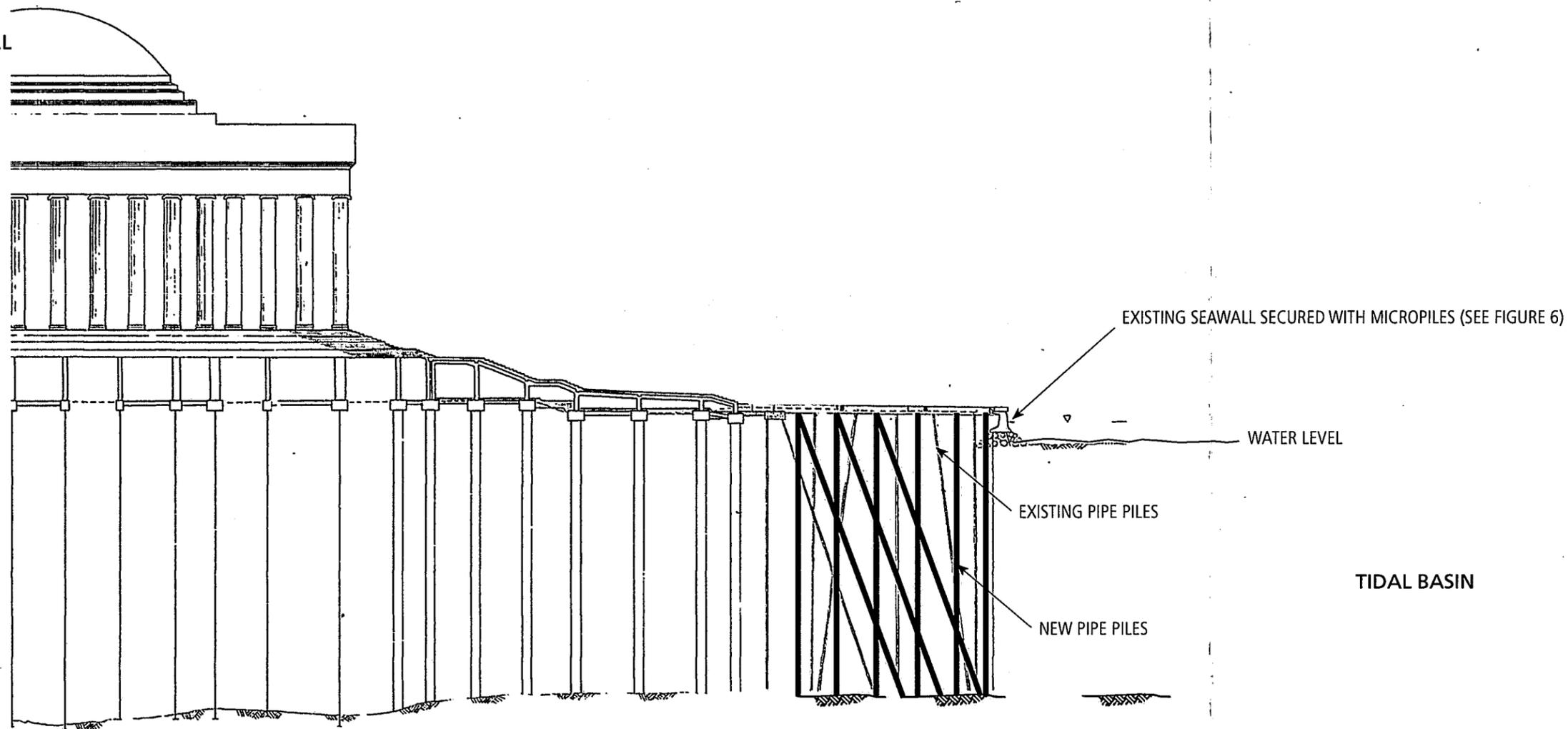


Figure 7  
Alternative C: Pipe Piles  
and Micropiles - Plan View

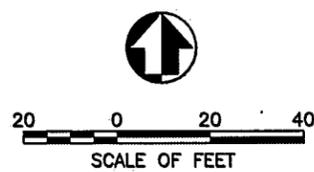
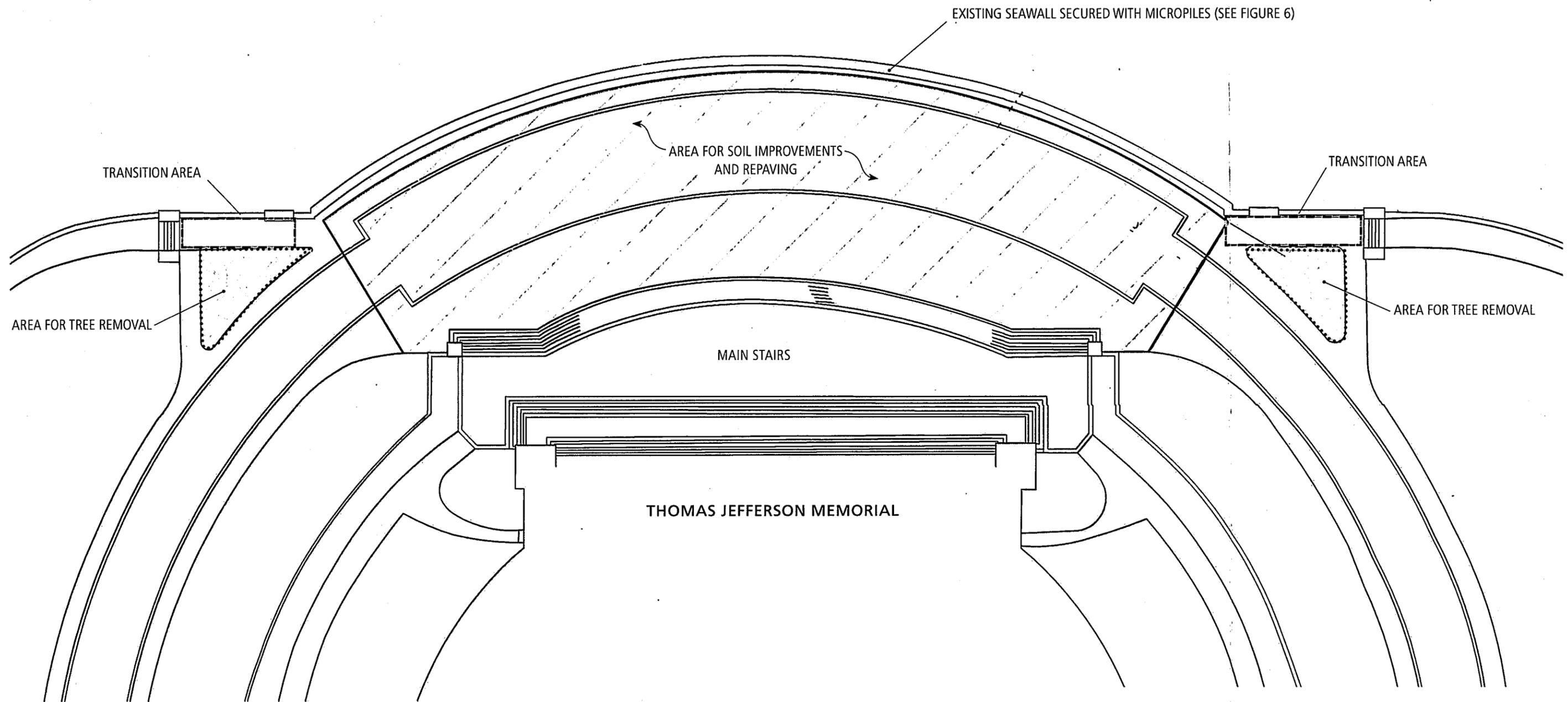
THOMAS JEFFERSON MEMORIAL



National Mall and Memorial Parks  
Repair and Control Settlement at Jefferson Memorial  
Seawall, North Plaza, and Transition Areas

Figure 8  
Alternative C: Pipe Piles  
and Micropiles - Elevation View

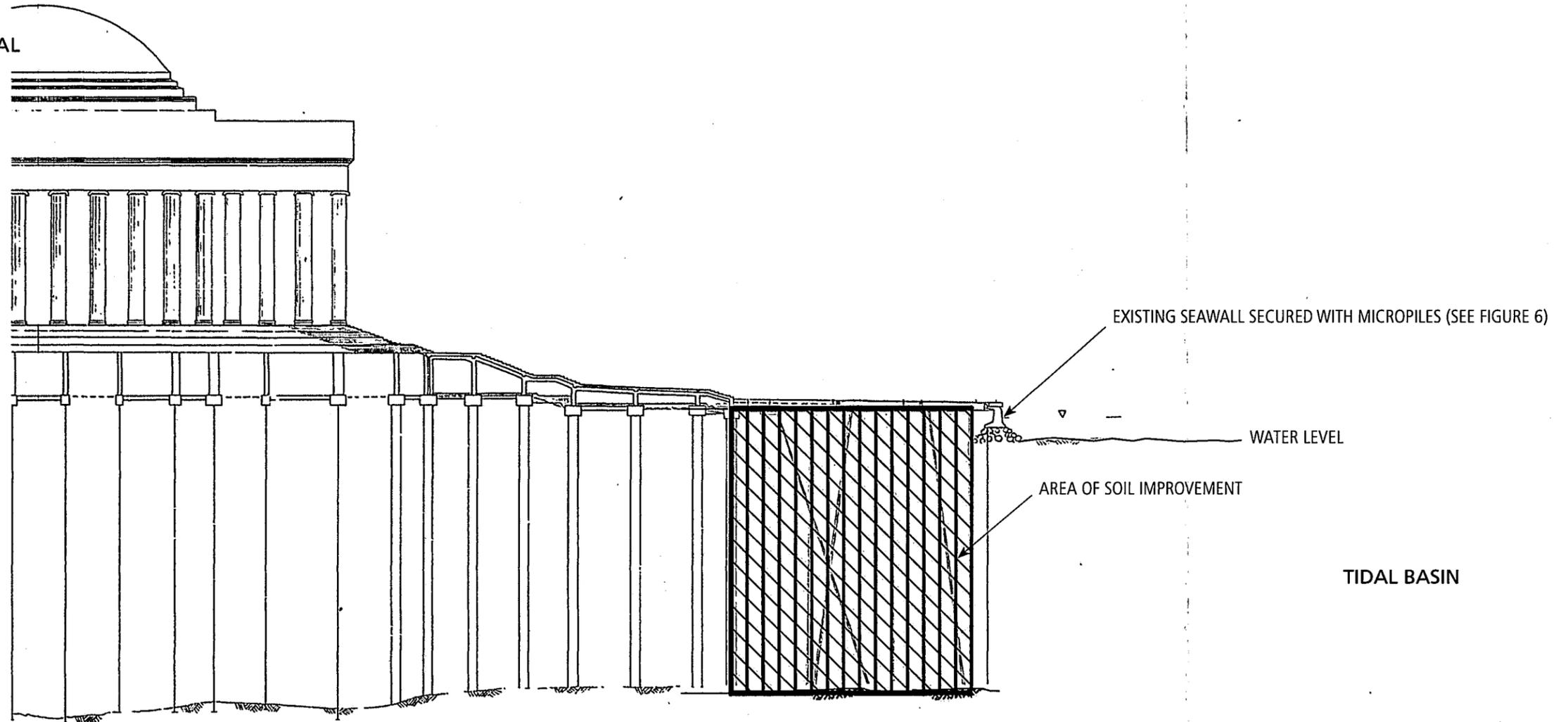
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National Mall and Memorial Parks  
Repair and Control Settlement at Jefferson Memorial  
Seawall, North Plaza, and Transition Areas

Figure 9  
Alternative D: Soil Improvements  
and Micropiles - Plan View

THOMAS JEFFERSON MEMORIAL



National Mall and Memorial Parks

Repair and Control Settlement at Jefferson Memorial  
Seawall, North Plaza, and Transition Areas

Figure 10

Alternative D: Soil Improvements  
and Micropiles - Elevation View

## SUMMARY OF THE ALTERNATIVES

Table 1 provides a summary of the alternatives presented above.

<b>Table 1: Summary of Alternatives</b>				
<b>Alternative Elements</b>	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvements and Micropiles</b>
<b>Lateral Movement Beneath the North Plaza</b>	No action would be taken. Lateral movement would continue to occur, resulting in continued separation of the north plaza.	A new seawall would be constructed on caissons and secured with pipe piles to anchor the north plaza against future lateral movement of the soil. Caissons would be drilled into the floor of the Tidal Basin to contain future lateral movement. Some separation could occur until movement was halted by soil consolidation against the caissons.	Pipe piles would be driven into the north plaza to supplement the existing piles. These piles would anchor the north plaza against future lateral movement of the soil.	The soil beneath the north plaza would be excavated and replaced with a more binding material. The new material would slow and eventually halt lateral movement, preventing future separation.
<b>Settling within the Transition Areas</b>	No action would be taken. Future lateral movement within the area would result in separation within the transition areas.	Concrete pads would be installed to connect the transition areas with the north plaza. The pads would prevent separation while soil in adjacent areas continued to settle.	Same as Alternative B	Same as Alternative B

<b>Table 1: Summary of Alternatives</b>				
<b>Alternative Elements</b>	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvements and Micropiles</b>
<b>Separation of the Seawall</b>	No action would be taken. Future separation of the seawall would continue, causing greater separation between the wall and the north plaza.	The capstones and facing stones would be temporarily removed and the existing seawall would be demolished and replaced with a new seawall set on drilled caissons. Pipe piles would be driven into the new seawall and anchored into the rock below, preventing future separation.	The capstones and facing stones would be temporarily removed and micropiles would be driven into the existing seawall to anchor it against the north plaza.	Same as Alternative C
<b>Resurfacing the North Plaza</b>	Park staff would continue to patch cracks that occur in the north plaza.	Following the completion of the project, the north plaza would be resurfaced with similar materials. Additional resurfacing would occur once soil consolidation had occurred.	Same as Alternative B.	Same as Alternative B.

<b>Table 1: Summary of Alternatives</b>				
<b>Alternative Elements</b>	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvements and Micropiles</b>
<b>Visitor Access</b>	A temporary, metal fence would continue to prevent visitors from accessing the seawall. Future temporary restrictions would occur during patching activities.	Access between the seawall and north plaza steps would be restricted for the duration of the project. Access to the driveways along the Jefferson Memorial would be restricted while soil was removed from the site.	Same as Alternative B.	Same as Alternative B.
<b>Lighting</b>	Existing lighting would remain in the seawall, partially obscured by the temporary metal fence.	New lighting could be installed in the seawall. New lighting would be consistent with what currently exists.	Same as Alternative B	Same as Alternative B
<b>Meets the Purpose and Need</b>	<b>No.</b> This alternative would not protect and preserve the Jefferson Memorial and the surrounding north plaza.	<b>Yes.</b> This alternative would protect and preserve the Jefferson Memorial and surrounding north plaza, with limited impact to the site's natural and cultural resources.	<b>Yes.</b> This alternative would stabilize the north plaza and seawall. However, it risks damaging the existing foundation and piles that support the north plaza.	<b>Yes.</b> This alternative would protect and preserve the Jefferson Memorial and surrounding north plaza, but with notable impacts to the site's natural and cultural resources.

## SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2 provides a summary of the environmental consequences related to each alternative. A more detailed explanation of the impacts is presented in “Chapter 3: Affected Environment and Environmental Consequences.”

<b>Table 2: Summary of Environmental Consequences</b>				
	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvement and Micropiles</b>
<b>Water Quality</b>	<p>Increasing amounts of sediment and rock could be deposited in the surrounding water bodies as separation continued across the north plaza and seawall.</p> <p><b>Overall impact:</b> minor, long-term, and adverse with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an imperceptible adverse increment to a negligible, long-term, adverse cumulative impact.</p>	<p>Appropriate construction methods would avoid short-term impacts. No future separation would limit sediment and rock deposits.</p> <p><b>Overall impact:</b> negligible, long-term, and beneficial with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact.</p>	<p>Appropriate construction methods would avoid short-term impacts. Eliminating separation would limit sediment and rock deposits. Future cracking could increase deposits.</p> <p><b>Overall impact:</b> negligible, long-term, and beneficial with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact.</p>	<p>Same as Alternative C</p>

<b>Table 2: Summary of Environmental Consequences</b>				
	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvement and Micropiles</b>
<b>Floodplains</b>	<p>The seawall would continue to separate from the site. No changes would be made to structures in the floodplain.</p> <p><b>Overall impact:</b> moderate, long-term, and adverse with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an appreciable adverse increment to a negligible, long-term, adverse cumulative impact.</p>	<p>Temporary structures would be introduced to the floodplain. The seawall would be repaired and able to properly convey floodwaters.</p> <p><b>Overall impact:</b> negligible, short-term, and adverse and negligible, long-term, and beneficial with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact.</p>	<p>Same as Alternative B</p> <p><b>Overall impact:</b> negligible, short-term, and adverse and negligible, long-term, and beneficial with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact.</p>	<p>Same as Alternative B</p>

<b>Table 2: Summary of Environmental Consequences</b>				
	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvement and Micropiles</b>
<b>Cultural Landscapes</b>	<p>Safety fencing would remain in place and other tripping hazards would be similarly treated, resulting in some alteration of circulation patterns. Change in circulation patterns and some changes in visual appearance of the seawall and north plaza would occur.</p> <p><b>Overall impact:</b> moderate, long-term, and adverse with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an appreciable adverse increment to a minor, long-term, beneficial cumulative impact</p>	<p>Construction activities would temporarily impact the circulation system, north plaza, existing vegetation, and seawall. These elements would be restored soon after construction. Once construction was complete, the landscape would be restored to its intended condition.</p> <p><b>Overall impact:</b> minor, short-term, and adverse and moderate, long-term, and beneficial with no unacceptable adverse impacts or impairment.</p> <p><b>Section 106 Summary:</b> no adverse effect on cultural landscapes.</p> <p><b>Cumulative impact:</b> contributes an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact</p>	Same as Alternative B	Same as Alternative B

**Table 2: Summary of Environmental Consequences**

	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvement and Micropiles</b>
<b>Historic Structures</b>	<p>Patching and other short-term fixes would continue to alter the seawall. The underlying problem of soil movement and subsidence would not be addressed and the NPS anticipates the seawall would continue to separate from the plaza. The separation could eventually result in structural failure of the seawall.</p> <p><b>Overall impact:</b> moderate, long-term, and adverse with no unacceptable adverse impacts or impairment.</p> <p><b>Cumulative impact:</b> contributes an appreciable adverse increment to a minor, long-term, beneficial cumulative impact</p>	<p>Temporary impacts to the seawall would occur during the construction process. Once construction was complete, the historic structures would be restored and protected against future damage.</p> <p><b>Overall impact:</b> minor, short-term, and adverse and moderate, long-term, and beneficial with no unacceptable adverse impacts or impairment.</p> <p><b>Section 106 Summary:</b> <i>no adverse effect</i> on historic structures.</p> <p><b>Cumulative impact:</b> contributes an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact</p>	Same as Alternative B	Same as Alternative B

<b>Table 2: Summary of Environmental Consequences</b>				
	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvement and Micropiles</b>
<b>Visual Resources</b>	<p>Continuing damage to the north plaza and seawall would disrupt intended views within the site and across the Tidal Basin.</p> <p><i>Overall impact:</i> minor, long-term, and adverse.</p> <p><i>Cumulative impact:</i> contributes a noticeable adverse increment to a minor, long-term, beneficial cumulative impact.</p>	<p>Short-term disruptions would occur during the construction process. The vegetation, north plaza, and seawall would be restored to their originally designed views, and there would be no lasting disruptions across the Tidal Basin.</p> <p><i>Overall impact:</i> minor to moderate, short-term, and adverse and moderate, long-term, and beneficial.</p> <p><i>Cumulative impact:</i> contributes an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact.</p>	<p>Same as Alternative B</p>	<p>Same as Alternative B</p>

**Table 2: Summary of Environmental Consequences**

	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvement and Micropiles</b>
<b>Visitor Use and Experience</b>	<p>Programs and events would continue. The seawall would continue to be inaccessible. Views within and beyond the site would be interrupted. The site could become unsafe.</p> <p><b>Overall impact:</b> moderate, long-term, and adverse.</p> <p><b>Cumulative impact:</b> contributes an appreciable adverse increment to a moderate, long-term, beneficial cumulative impact.</p>	<p>Visitor access and circulation would be limited during construction. The improved site would provide appropriate and safe access and allow the NPS to expand its programs.</p> <p><b>Overall impact:</b> moderate, long-term, and beneficial.</p> <p><b>Cumulative impact:</b> contributes an appreciable beneficial increment to a moderate, long-term, beneficial cumulative impact.</p>	Same as Alternative B	Same as Alternative B

<b>Table 2: Summary of Environmental Consequences</b>				
	<b>Alternative A: No-Action</b>	<b>Alternative B: Rebuilt Seawall</b>	<b>Alternative C: Pipe Piles and Micropiles</b>	<b>Alternative D: Soil Improvement and Micropiles</b>
<b>Operations and Infrastructure</b>	<p>The north plaza and seawall would continue to be damaged by soil movement. The seawall would remain fenced. Damage to the north plaza would be patched.</p> <p><b>Overall impact:</b> moderate, long-term, and adverse.</p> <p><b>Cumulative impact:</b> contributes an appreciable adverse increment to a minor, long-term, beneficial cumulative impact.</p>	<p>Staff would supervise but not carry out construction activities. The repaired north plaza and new seawall would require minimal maintenance.</p> <p><b>Overall impact:</b> minor, short-term, and adverse and moderate, long-term, and beneficial.</p> <p><b>Cumulative impact:</b> contributes an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact.</p>	<p>Staff would supervise but not carry out construction activities. The repaired north plaza and seawall could require continuing existing levels of maintenance in the future, if separation continued.</p> <p><b>Overall impact:</b> minor, short-term, and adverse and moderate, long-term, and beneficial.</p> <p><b>Cumulative impact:</b> contributes an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact.</p>	<p>Same as Alternative C</p>

## **ENVIRONMENTALLY PREFERRED ALTERNATIVE**

In accordance with DO-12 and NEPA, the NPS is required to identify the environmentally preferred alternative in its NEPA documents. The CEQ defines the environmentally preferred alternative as the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. In their Forty Most Asked Questions, CEQ further clarifies the identification of the environmentally preferred alternative, stating "Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (Q6a).

Alternative B best protects the natural, cultural, and visitor resources of the Jefferson Memorial by creating a long-term solution to the lateral movement of soils beneath the north plaza. This solution can be accomplished with limited interruptions to the visitor experience, limited impacts to the resources at the Jefferson Memorial, and with no future threats to the Jefferson Memorial. Based on the analysis of environmental consequences of each alternative in Chapter 3 and summarized in Table 2, Alternative B is the environmentally preferred alternative.



# 3

## **AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES**

This chapter describes the affected environment and environmental consequences associated with the alternatives presented in “Chapter 2: Alternatives.” It is organized by impact topic, which distills the issues and concerns into distinct subjects for discussion analysis. The CEQ regulations that implement NEPA require assessment of impacts on the human environment, which includes natural and cultural resources. Resources examined in detail include water quality, floodplains, cultural resources (cultural landscapes and historic structures), visual resources, visitor use and experience, and operations and infrastructure. Resources dismissed from further consideration were discussed in “Chapter 1: Purpose and Need.”

NEPA requires consideration of context, intensity, and duration of adverse and beneficial impacts (direct, indirect, and cumulative) and measures to mitigate impacts. NPS policy also requires that unacceptable adverse impacts and impairment of resources be evaluated in all environmental documents; therefore, these concerns are addressed in the “Conclusion” section at the end of each alternative section under each impact topic.

### **METHODOLOGY FOR ASSESSING IMPACTS**

As required by NEPA, potential impacts are described in terms of type (beneficial or adverse), context (site-specific, local, or regional), duration, and level of intensity (negligible, minor, moderate, or major). Both indirect and direct impacts also are described; however, they may not be identified specifically as direct or indirect. These terms are defined below. Overall, these impact analyses and conclusions were based on the review of existing literature and studies, information provided by on-site experts and other government agencies, professional judgments, and park staff insight. The impact analyses presented in this document are intended to comply with both NEPA and section 106 of the NHPA; therefore, section 106 summaries for each cultural resource topic also are included.

## **Type**

Impacts can be beneficial or adverse. Beneficial impacts would improve resource conditions, while adverse impacts would deplete or negatively alter resources.

**Beneficial:** A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

**Adverse:** A change that moves the resource away from a desired condition or detracts from its appearance or condition.

**Direct:** An impact that is caused by an action and occurs at the same time and place.

**Indirect:** An impact that is caused by an action but is later in time or farther removed in distance but still reasonably foreseeable.

## **Context**

Context is the setting within which an impact occurs and can be site specific, local, parkwide, or regionwide. Site-specific impacts would occur at the location of the action, local impacts would occur within the general vicinity of the study area, parkwide impacts would affect a greater portion outside the study area yet within the park, and regionwide impacts would extend beyond park boundaries.

**Site-specific:** The impact would affect the project site.

**Local:** The impact would cause an effect outside the study area yet within the park.

**Parkwide:** The impact would affect a greater portion outside the study area yet within the park.

**Regional:** The impact would affect localities, cities, or towns surrounding the park.

## **Duration**

Impacts can be either short term or long term. A short-term impact would be temporary in duration and would be associated with the construction process. Depending on the resource, impacts would last as long as construction was taking place, or up to one year after construction is complete. Long-term impacts last beyond the construction period, and the resources may need more than one year postconstruction to resume to their preconstruction condition. Impact duration for each resource may differ for each resource and is presented for each resource topic, where applicable.

**Short-term:** Impacts that occur only during construction or last less than one year.

**Long-term:** Impacts that last longer than one year.

## **Level of Intensity**

Impact intensity is the degree to which a resource would be adversely affected. Because level of intensity definitions (negligible, minor, moderate, major) vary by resource, separate definitions are provided for each impact topic analyzed.

## **Cumulative Impacts**

The CEQ regulations that implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as impacts which result when the

impact of the proposed action is added to the impacts of other present and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions (40 CFR 1508.7).

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans at the Jefferson Memorial and, if applicable, the surrounding area. The analysis of cumulative impacts was accomplished using four steps:

Step 1 — Identify Resources Affected: fully identify resources affected by any of the alternatives.

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

Step 3 — Identify Cumulative Action Scenario: determine which past, present, and reasonably foreseeable future actions to include with each resource.

Step 4 — Cumulative Impacts Analysis: summarize impacts of these other actions (x) plus impacts of the proposed action (y), to arrive at the total cumulative impact (z).

In defining the contribution of each alternative to cumulative impacts, the following terminology is used:

**Imperceptible:** The incremental effect contributed by the alternative to the overall cumulative impact is such a small increment that it is impossible or extremely difficult to discern.

**Noticeable:** The incremental effect contributed by the alternative, while evident and observable, is still relatively small in proportion to the overall cumulative impact.

**Appreciable:** The incremental effect contributed by the alternative constitutes a large portion of the overall cumulative impact.

To determine the potential cumulative impacts, existing and anticipated future projects at the Jefferson Memorial and area surrounding the Tidal Basin were identified. Potential projects identified as cumulative actions included any planning or development activity currently being implemented or expected to be implemented in the reasonably near future. The projects identified as contributing to cumulative impacts on the resources addressed by this EA/AoE include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, Tidal Basin seawall improvements, the Martin Luther King, Jr. National Memorial, the Potomac Park Levee Project, and the Tidal Basin gate replacement project. These projects are described below.

### ***Previous Renovations at the Jefferson Memorial***

In 1972, plans were developed for several renovations at the Jefferson Memorial, including removal, resetting, and adjustment of the joint spacing on the main stairs, replacing the concrete walk approaching the northwest stairs with an exposed aggregate surface, resetting and replacing the corners of the stylobate wall at the entrances to the lower level of the Jefferson Memorial, replacing the surface at the terrace level of the main stairs, constructing curbs and gutters in the parking area, and jacking the northwest stairs. These improvements were necessary to repair aging infrastructure and to improve the visitor experience at

the Jefferson Memorial. These improvements impacted water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure.

### ***Stylobate Mall Repairs***

In 1993, the NPS completed plans to improve portions of the stylobate mall that surrounds the Jefferson Memorial. These plans included the addition of granite strips along the edge of the stylobate stairs, installation of new storm drainage manholes, the replacement of existing sheeting with new polyvinyl chloride (PVC) sheeting beneath the stylobate stairs, landscape improvements, and the installation of a new irrigation system. Like the renovations at the Jefferson Memorial, these improvements were necessary to repair aging infrastructure and to improve the visitor experience. These improvements impacted water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure.

### ***Security Improvements at the Jefferson Memorial***

In 2004, the NPS initiated plans for several security improvements around the Jefferson Memorial. These plans included the installation of a security barrier at the Jefferson Memorial, the permanent closure of the Jefferson Memorial driveway to create a pedestrian north plaza, new parking configurations that would utilize locations along East Basin Drive, and landscaping improvements associated with these actions. These plans were part of a regional effort to improve security at many of the landmarks within Washington, D.C. These improvements have the potential to impact water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure.

### ***Tidal Basin Seawall Improvements***

Along with the improvements proposed in this EA/AoE, the NPS is planning improvements throughout the Tidal Basin. These improvements are focused on rehabilitating the seawall around the entire Tidal Basin. As part of these improvements, the NPS plans to widen the walkway that borders the Tidal Basin to provide improved pedestrian and bicycle circulation. Various options for repairing and improving the Tidal Basin seawall have been proposed as part of the National Mall Plan. At this time, the NPS has yet to select a preferred alternative but anticipates that some type of improvement will be proposed for this area. These improvements have the potential to impact water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure.

### ***Martin Luther King, Jr. National Memorial***

The NPS is now managing the development of plans to construct the Martin Luther King, Jr. National Memorial. The new memorial will be located between the Jefferson Memorial and the Lincoln Memorial, on the west side of the Tidal Basin. The site has been designed to commemorate Martin Luther King, Jr. in a style comparable with other monuments in Washington, D.C. The construction of the new memorial has the potential to impact water quality, floodplains, visual resources, visitor use and experience, and operations and infrastructure of the Tidal Basin area.

### ***Potomac Park Levee Project***

The NPS, in cooperation with the U.S. Army Corps of Engineers and the National Capital Planning Commission, is developing plans for the design and construction of improvements to the Potomac Park levee

system. The existing Potomac Park levee structure extends from the vicinity of 23rd Street, parallel to the Lincoln Memorial Reflecting Pool in Constitution Gardens, and ends on the Washington Monument Grounds (Monument Grounds) east of 17th Street. The purpose of this action is to improve the reliability of river flood protection provided by the Potomac Park levee system to a portion of the monumental core and downtown Washington, D.C. in a manner that respects the resources and values of the National Mall. This project has the potential to impact floodplains, visual resources, and visitor use and experience.

### ***Tidal Basin Gate Replacement Project***

In 2008, the U.S. Army Corps of Engineers replaced the Tidal Basin gates. The replacement also included some improvements to the infrastructure surrounding the gates. This project had the potential to impact visual resources and visitor use and experience.

### **Unacceptable Adverse Impacts**

NPS *Management Policies 2006* (NPS 2005) also requires analysis of potential effects to determine whether or not actions would cause unacceptable adverse impacts on park resources:

The impact threshold at which impairment occurs is not always readily apparent. Therefore, the Service will apply a standard that offers greater assurance that impairment will not occur. The Service will do this by avoiding impacts that it determines to be unacceptable. These are impacts that fall short of impairment, but are still not acceptable within a particular park's environment. Park managers must not allow uses that would cause unacceptable adverse impacts; they must evaluate existing or proposed uses and determine whether the associated impacts on park resources and values are acceptable (NPS 2005).

Virtually every form of human activity that takes place within a park has some degree of effect on park resources or values, but that does not mean the impact is unacceptable or that a particular use must be disallowed. Therefore, for the purposes of these policies, unacceptable adverse impacts are impacts that, individually or cumulatively, would

- be inconsistent with a park's purposes or values, or
- impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process, or
- create an unsafe or unhealthful environment for visitors or employees, or
- diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values, or
- unreasonably interfere with
  - park programs or activities, or
  - an appropriate use, or
  - the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park, or
  - NPS concessioner or contractor operations or services (NPS 2005).

## **Impairment**

In addition to determining the environmental consequences of the NPS preferred and other alternatives, NPS *Management Policies 2006* (NPS 2005) and DO #12 require analysis of potential impacts to determine whether actions have the potential for impairment of park resources and values.

A fundamental purpose of the NPS, as provided for in its Organic Act (1916) and reaffirmed by the General Authorities Act (1970), as amended in 1978, is a mandate to conserve park resources and values. However, the laws give the NPS management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of the park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirements that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that would otherwise be present for the enjoyment of those resources and values. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in 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 in the park's general management plan or other relevant NPS planning documents as being of significance.

Impairment may result from NPS activities in managing the park, as well as visitor activities or activities undertaken by concessioners, contractors, and others operating in the park. An impairment determination for all impact topics is provided at the end of each alternative section under each impact topic in the "Conclusion" section, with the exception of visitor use and experience, and operations and infrastructure, for which no impairment determination is required.

## **WATER QUALITY**

### **Affected Environment**

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The NPS *Management Policies 2006* states that the NPS will "take all necessary actions to maintain or restore the quality of surface waters and ground waters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations (NPS 2005)."

The Jefferson Memorial sits along the western edge of the Tidal Basin. It is equidistant from the Potomac River and the Washington Channel (Figure 1). The Tidal Basin and the channel were both constructed by the U.S. Army Corps of Engineers in the late 19th century. The Tidal Basin was designed to capture fresh water from the Potomac River and flush it into the channel. Two sets of floodgates allow this to occur. The first set of gates links the Potomac River to the Tidal Basin. Water from the Potomac River passes through these gates when the tidal elevation changes and the Potomac River is higher than the Tidal Basin. Similarly, water passes from the Tidal Basin into the channel as elevations rise.

The Tidal Basin covers approximately 0.15 square miles, with an average depth of 6.5 feet. The majority of the land within the Tidal Basin drainage area, or watershed, is grassed parklands. The remainder of the land is occupied by memorials, institutions, government offices, and commercial uses. The dominance of parkland and grassed areas around the basin protects it from much of the stormwater runoff that occurs in the developed portions of the watershed. One of the exceptions occurs at the Jefferson Memorial where the north plaza and seawall provide a direct route for stormwater runoff to enter the Tidal Basin. However, much of the surrounding runoff is captured by six storm sewers. This discharge is comprised entirely of pollutants absorbed in parking lots and roads and does not include any untreated sewage (District of Columbia 2004).

In addition to these discharges, the water quality within the basin is influenced by the Potomac River. As of 2007, the entire length of the Potomac River that falls within the boundaries of Washington, D.C. was listed as impaired<sup>3</sup>. The primary reason for impairment was the high level of polychlorinated biphenyls (PCBs). These levels do not allow the Potomac to meet the water quality goals of providing conditions suited for primary contact recreation (swimming) or fishing (Interstate Commission on the Potomac River Basin 2007). Many of these pollutants are absorbed upstream of Washington, D.C. and accumulate as they flow through other pollution sources in the region. Some sediment is also carried into the Tidal Basin from the Potomac River or through the storm sewer discharges.

## **Environmental Consequences**

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### **Methodology**

A water quality standard defines the water quality goals of a water body by designating uses of the water, by setting minimum criteria to protect the uses, and by preventing degradation of water quality through anti-degradation provisions. Part of this policy [40 CFR 131.12 (a) (2)] strives to maintain water quality at existing levels if it is already better than the minimum criteria. The anti-degradation policy however is only one portion of a water quality standard. Anti-degradation should not be interpreted to mean that “no degradation” can or will occur, as even in the most pristine waters, degradation may be allowed for certain pollutants as long as it is temporary and short term.

Given the above water quality issues, methodology, and assumptions, the following impact thresholds were established in order to describe the relative changes in surface waters and water quality under the various alternatives.

- Negligible:** Impacts (chemical, physical, biological) would not be detectable, would be well below water quality standards or criteria, and would be within historical or desired water quality conditions.
- Minor:** Impacts (chemical, physical, biological) would be detectable, but would be well below water quality standards or criteria and within historical or desired water quality conditions.
- Moderate:** Impacts (chemical, physical, biological) would be detectable, but would be at or below water quality standards or criteria and within historical or desired water quality conditions.

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<sup>3</sup> In terms of water quality, impairment means that the area does not meet water quality standards.

**Major:** Impacts (chemical, physical, 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 be slightly and singularly exceeded on a long-term basis.

### **Alternative A: No-Action**

#### ***Impact Analysis***

Under Alternative A, the north plaza would continue to be an impervious surface. The continued separation of the north plaza would introduce additional sediment that could be washed into the basin during storm events. The high potential for separation in the transition areas would add additional sediments during storm events. The separation of the seawall also would continue to lead to stone and sediment deposits entering the water. These deposits would be detectable, but of little consequence compared to the overall content and quality of the water in the Tidal Basin.

Overall, Alternative A would result in a minor, long-term, adverse impact to water quality resulting from sediment that could be washed into the basin during storm events.

#### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on water quality in and around the Jefferson Memorial. These projects include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, Tidal Basin seawall improvements, and the proposed Martin Luther King, Jr. National Memorial. All of these projects have involved or would involve the exposure of previously covered soils. These soils would be susceptible to erosion and could be deposited in the surrounding water bodies during storm events. However, through the use of appropriate erosion and sediment control, the water quality could be protected from increased sediment in the stormwater runoff. In some cases, new impervious surfaces would be created. Most increases would be small and would exist in areas that are already dominated by impervious surface. The proposed Martin Luther King, Jr. National Memorial would be developed on previously undeveloped land. However, the increase in impervious surface at this site would represent an insignificant increase in the percentage of impervious surface that surrounds the Tidal Basin and adjacent bodies of water.

These projects, along with Alternative A, would have a negligible, long-term, adverse cumulative impact on water quality resulting from increases in sediment and construction of impervious surfaces. Alternative A would contribute a noticeable adverse increment to this cumulative impact.

#### ***Conclusion***

Overall, Alternative A would result in a minor, long-term, adverse impact to water quality. Alternative A would contribute a noticeable adverse increment to a negligible, long-term, adverse cumulative impact. Because there would be no major, adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's

general management plan or other relevant NPS planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to water quality.

### **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

#### ***Impact Analysis***

Under Alternative B, a new seawall would be installed at the site. The seawall would be built on top of new caissons and secured with pipe piles. The caissons beneath the new seawall would be drilled into the floor of the Tidal Basin. The installation process could result in increased levels of sediment being released into the water; however, the use of appropriate sediment controls would contain the sediment within the construction area. Once the construction was complete, the caissons would be fully submerged, eliminating the potential for future releases of sediment. Once the separation within the north plaza had halted, the amount of exposed sediment that could be absorbed in stormwater runoff would be reduced.

The installation of the new seawall would be accomplished from the north plaza. However, the equipment used to install the new seawall could be temporarily located in the Tidal Basin. The location of the equipment in the Tidal Basin could create some increased levels of sedimentation during the installation process. However, as described above, the use of appropriate sediment controls would contain the sediment within the construction area. Additional sediment could be spread along the wall as the caissons were driven into the ground. The construction site would be protected by appropriate erosion and sediment control to prevent the additional sediment from entering the Tidal Basin. By securing the seawall, there would be no future risk of sediment and other materials eroding from the wall and entering the water.

The work in the transition areas would result in the exposure of previously covered soils. These soils could be washed away during storm events, increasing the level of sedimentation entering the Tidal Basin from the Jefferson Memorial. However, the use of appropriate erosion and sediment control measures would prevent the sediments from reaching the Tidal Basin. The installation of the concrete pads in the transition areas would prevent future separation. By halting separation, no additional sediment would be present on the site to be absorbed in stormwater runoff and deposited into the Tidal Basin.

Finally, repaving the north plaza could introduce sediment and other chemicals to the area. Many of these materials would be captured by the erosion and sediment control facilities installed at the site during the construction process. However, it is possible that some materials may be captured by storm drains and released into the Tidal Basin. These pollutants would represent an insignificant amount of pollution compared to the overall input into the Tidal Basin and surrounding bodies of water and would only exist during and immediately after the construction process.

Overall, Alternative B would result in minor, short-term, adverse and negligible, long-term, beneficial impacts on water quality due to the short-term construction impacts and the long-term reduction in sediment levels in stormwater runoff.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on water quality in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative B, would have a negligible, long-term, adverse cumulative impact on water quality. Alternative B would contribute an imperceptible beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative B would result in minor, short-term, adverse and negligible, long-term, beneficial impacts on water quality. Alternative B would contribute an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to water quality.

### **Alternative C: Pipe Piles and Micropiles**

#### **Impact Analysis**

Under Alternative C, pipe piles and micropiles would be installed at the site. The pipe piles would be driven through the soil beneath the north plaza to anchor it against lateral movement. The installation process could result in increased levels of sediment being released into the water. The use of appropriate sediment controls would contain the sediment within the construction area. Once the construction was complete, portions of the north plaza would be repaved, eliminating the potential for future releases of sediment. Any future separation could release small amounts of sediment into the surrounding water resources and affect water quality.

The impacts related to the installation of concrete pads in the transition area, anchoring the seawall, and repaving portions of the plaza would be the same as those described in Alternative B.

Overall, Alternative C would result in minor, short-term, adverse and negligible, long-term, beneficial impacts on water quality.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on water quality in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative C, would have a negligible, long-term, adverse cumulative impact on water quality. Alternative C would contribute an imperceptible beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative C would result in minor, short-term, adverse and negligible, long-term, beneficial impacts on water quality. Alternative C would contribute an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to water quality.

### **Alternative D: Soil Improvements and Micropiles**

#### **Impact Analysis**

Alternative D would involve soil improvements under the north plaza and the installation of micropiles at the seawall. The excavation of the existing soil and the installation of the new materials could result in increased levels of sediment being released into the water. The use of appropriate sediment controls would contain the sediment within the construction area. Once the construction was complete, portions of the north plaza would be repaved, eliminating the potential for future releases of sediment. Once the lateral movement beneath the north plaza had halted, separation on the north plaza would be eliminated. This would prevent any future separation that could release additional sediment into the surrounding water quality.

The impacts related to the installation of concrete pads in the transition area, anchoring the seawall, and repaving portions of the plaza would be the same as those described in Alternative C.

Overall, Alternative D would result in minor, short-term, adverse and negligible, long-term, beneficial impacts on water quality.

#### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on water quality in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative D, would have a negligible, long-term, adverse cumulative impact on water quality. Alternative D would contribute an imperceptible beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative D would result in minor, short-term, adverse and negligible, long-term, beneficial impacts on water quality. Alternative D would contribute an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS

planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to water quality.

## **FLOODPLAINS**

### **Affected Environment**

Executive Order 11988, "Floodplain Management," and NPS DO #77-2: *Floodplain Management* require an examination of impacts on floodplains and potential risk involved in placing facilities within floodplains. Floodplains are those areas that are inundated during flood events. The floodplain absorbs much of the brunt of the floodwaters, protecting the surrounding area and allowing the waters to recede after the event is over. A 100-year floodplain is the elevation along a river that has a 1 in 100 chance of experiencing a specific-sized flood, or a flood that will occur once every 100 years. A "flood zone" is an area subject to the risk of flooding by any natural means, either by water cresting the banks of channels (fluvial floodplain) or by tidal storm surges. Tidal storm surges occur when water is pushed up by high winds from a low elevation to a higher elevation because of coastal storms and hurricanes. According to Federal Emergency Management Agency (FEMA) mapping, the majority of the study area falls within Zone A-12. Within this zone, the 100-year floodplain exists at elevations at or below 12 feet based on the National Geodetic Vertical Datum of 1929 (NGVD29). The north plaza, seawall, and surrounding pedestrian circulation routes are within this zone. The Jefferson Memorial is the only location with the surrounding area that is elevated out of this floodplain. FEMA mapping identifies the Jefferson Memorial as falling within Zone C, an area with minimal flooding.

### **Environmental Consequences**

#### **Methodology**

The planning team based the impact analysis and conclusions for possible impacts to the 100-year floodplain at the Jefferson Memorial in this document on the review of existing literature and studies, information provided by experts in the NPS and other agencies, and park staff insights, and professional judgment. Mapped locations of the 100-year floodplain were compared with locations of proposed development and modifications of existing facilities. Predictions about short-and long-term site impacts were based on previous studies of impacts to the 100-year floodplain from similar projects and recent scientific data. The thresholds of change for the intensity of an impact are defined as follows:

- Negligible:** There would be no change in the ability of a floodplain to convey floodwaters, or its values and functions. Projects would not contribute to enhancing flood events.
- Minor:** Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local. Project would not contribute to the flood. No mitigation would be needed.
- Moderate:** Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local. Project could contribute to the flood. The impact could be mitigated by modification of proposed facilities in floodplains.

**Major:** Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and regional. Project would contribute to the flood. The impact could not be mitigated by modification of proposed facilities in the floodplains.

According to NPS DO # 77-2: Floodplain Management, a Statement of Findings (SOF) is required when an action is to occur within a floodplain. Although the study area is located within the 100-year floodplain, it is exempt from an SOF. Actions designed to address historic or archeological structures, sites, or artifacts whose location is integral to their significance do not require an SOF (NPS 2003). Therefore, no SOF is included with this document.

### **Alternative A: No-Action**

#### ***Impact Analysis***

Under Alternative A, no changes would be made to the structures at the Jefferson Memorial that fall within the floodplain. The continued separation of the seawall would increase its instability, as it detached from the north plaza. Increased instability could result in the seawall being damaged in a flood event. This also would make the north plaza and transition areas more susceptible to flood damage.

Overall, Alternative A would result in a moderate, long-term, adverse impact on floodplains, as the seawall's ability to convey floodwaters would continue to diminish.

#### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on floodplains in and around the Jefferson Memorial. These projects include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, Tidal Basin seawall improvements, the Martin Luther King, Jr. National Memorial, and the Potomac Park Levee Project. All of these projects would result in construction of new structures within the floodplain. Many of these structures would replace existing structures and would not represent additional development. In addition, many of these structures would be small parking lots or other paved surfaces that would not block the passage of floodwaters. The improvements to the seawall would promote the designed floodplain conditions by enforcing the wall's ability to direct and convey floodwaters. The Martin Luther King, Jr. National Memorial would represent the most notable new development in the floodplain. The new development is beyond the scope of this EA/AoE. However, the new development would be protected by the seawall and would be one of many similar structures within the floodplain. The Potomac Park levee project would repair or replace structures within the floodplain that would be designed to redirect floodwaters. The project would not alter floodwater patterns established by existing levees but would ensure that floodwaters would continue to be conveyed through the region with limited disruption.

These projects, along with Alternative A, would have a negligible, long-term, adverse cumulative impact on floodplains. Alternative A would contribute an appreciable adverse increment to this cumulative impact.

## **Conclusion**

Overall, Alternative A would result in a moderate, long-term, adverse impact to floodplains. Alternative A would contribute an appreciable adverse increment to a negligible, long-term, adverse cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to floodplains.

## **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

### **Impact Analysis**

Under Alternative B, new temporary and permanent structures would be constructed within the floodplain. In order to protect the north plaza from future lateral movement, a new seawall would be constructed on top of caissons. Caissons would be drilled into the floor of the Tidal Basin. During the installation process, temporary work platforms could be installed in the Tidal Basin or along the edge of the north plaza. These structures and the associated construction materials could be quickly removed if a flood event was anticipated. Once construction was complete, these materials would be removed and the new seawall would be covered by the original capping and facing stones. The secured seawall would reduce the threat of future flood damage at the site and would ensure that the floodplain continued to convey floodwaters through the Tidal Basin as it was designed.

Work in the transitional areas would also involve the use and storage of machinery and equipment within the floodplain. The equipment and construction materials could be quickly removed if a flood event was anticipated. Once the construction process was complete, there would be no changes to the floodplain within the transitional areas.

Overall, Alternative B would result in negligible, short-term, adverse and negligible, long-term, beneficial impacts to floodplains, as it would improve the site's ability to effectively convey floodwaters after construction activities were complete.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on floodplains in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative B, would have a negligible, long-term, adverse cumulative impact on floodplains. Alternative B would contribute an imperceptible beneficial increment to this cumulative impact.

## **Conclusion**

Overall, Alternative B would result in a negligible, long-term, beneficial impact to floodplains. Alternative B would contribute an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact. Because there would be no major adverse impacts on a resource or value whose

conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to floodplains.

### **Alternative C: Pipe Piles and Micropiles**

#### ***Impact Analysis***

Under Alternative C, new temporary and permanent structures would be constructed within the floodplain. In order to brace the north plaza against the lateral movement below, pipe piles would be driven into the soil. During the installation process, construction vehicles and equipment would be located in the floodplain. The equipment could be quickly removed if a flood event was anticipated. Once the construction process was complete, the pipe piles would be covered by the north plaza paving. This would result in no changes to the floodplain.

Impacts related to the work in the transitional areas and installation of micropiles into the seawall would be the same as those described under Alternative B.

Overall, Alternative C would result in negligible, short-term adverse and negligible, long-term, beneficial impacts on floodplains, as it would improve the site's ability to effectively convey floodwaters.

#### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on floodplains in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative C, would have a negligible, long-term, adverse cumulative impact on floodplains. Alternative C would contribute an imperceptible beneficial increment to this cumulative impact.

#### ***Conclusion***

Overall, Alternative C would result in negligible, short-term, adverse and negligible, long-term, beneficial impacts on floodplains. Alternative C would contribute an imperceptible beneficial increment to a negligible, long-term, adverse cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to floodplains.

## **Alternative D: Soil Improvements and Micropiles**

### **Impact Analysis**

Under Alternative D, new temporary and permanent structures would be constructed within the floodplain. In order to halt the lateral movement below the north plaza, existing soils would be excavated and replaced with more binding materials. During the installation process, construction vehicles and equipment would be located in the floodplain. The equipment could be quickly removed if a flood event was anticipated. Once the construction process was complete, the new soil material would be covered by the north plaza paving. This would result in no changes to the floodplain.

Impacts related to the work in the transitional areas and installation of micropiles into the seawall would be the same as those described under Alternative B.

Overall, Alternative D would result in negligible, short-term, adverse and negligible, long-term, beneficial impacts on floodplains, as it would improve the site's ability to effectively convey floodwaters.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on floodplains in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative D, would have a negligible, long-term, adverse cumulative impact on floodplains. Alternative D would contribute an imperceptible beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative D would result in negligible, short-term, adverse and negligible, long-term, beneficial impacts on floodplains. Alternative D would contribute an imperceptible adverse increment to a negligible, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no unacceptable adverse impacts or impairment of park resources or values related to floodplains.

## **CULTURAL RESOURCES**

The CEQ regulations that implement NEPA require assessment of impacts on cultural resources as well as natural resources. In this EA/AoE, impacts on cultural resources are described in terms of type, context, duration, and intensity, as defined above, which is consistent with CEQ regulations. These impact analyses are intended, however, to comply with the requirements of both NEPA and section 106 of the NHPA. In accordance with the Advisory Council's regulations for implementing section 106 of the NHPA (36 CFR Part 800 Protection of Historic Properties), impacts on cultural resources also were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed on or eligible for listing on the National Register; (3) applying the criteria of adverse effect to affected cultural resources either listed on or

eligible for listing on the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under Advisory Council regulations, a determination of either adverse effect or no adverse effect also must be made for affected, National Register-listed or eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion on the National Register, e.g., diminishing the integrity (or the extent to which a resource retains its historic appearance) of the resource's location, setting, design, feeling, association, workmanship, or materials. Adverse effects also include reasonably foreseeable effects caused by the alternatives 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 that there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion on the National Register.

CEQ regulations and NPS DO #12: Conservation Planning, Environmental Impact Analysis, and Decision-making also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Cultural resources are non-renewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resources that can never be recovered. Therefore, although actions determined to have an adverse effect under section 106 may be mitigated, the effect remains adverse.

A section 106 summary is included in the impact analysis sections for cultural resources under the action alternatives. The section 106 summary is intended to meet the requirements of section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criteria of effect and the criteria of adverse effect found in the Advisory Council regulations.



**Photograph 5:** *The distant view across the Tidal Basin to the White House is one of the important visual elements at the Jefferson Memorial. Visitors at the White House also enjoy unique views of the Memorial.*

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## **Cultural Landscapes**

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### **Affected Environment**

Cultural landscapes are the result of the long interaction between people and the land, and the influence of human beliefs and actions over time upon the natural landscape. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, as well as a visual chronicle of its history. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes, making them a good source of information about specific times and places, but at the same time rendering their long-term preservation a challenge.

In order for a cultural landscape to be listed on the National Register, it must possess significance (the meaning or value ascribed to the landscape) and have integrity of those features necessary to convey its significance. The character-defining features of a cultural landscape include spatial organization and land patterns; topography; vegetation; circulation patterns; water features; and structures/buildings, site furnishings, and objects (NPS 1996).

Listed on the National Register in 1973, the East and West Potomac Parks Historic District in the District of Columbia is roughly bounded by Constitution Avenue, NW, the Potomac River, the Washington Channel, and by 17th Street. The National Register nomination for the East and West Potomac Parks was revised in 1999, due to changes in documentation standards, by the need to evaluate national monuments and memorials less than 50 years of age, and by the evolving requirement to include historic landscapes in National Register documentation.

The East and West Potomac Parks Historic District is significant under National Register Criterion A because of its association with events that have made a significant contribution to the broad patterns of American history and Criterion C because the property embodies the distinctive characteristics of a type and method of construction, and possesses high artistic values. The period of significance for the East and West Potomac Parks Historic District is 1882 to 1997. West Potomac Park is the larger of the two parks at approximately 400 acres. Together East and West Potomac Parks comprise about 730 acres. Nearly a quarter of West Potomac Park is occupied by the 110-acre Tidal Basin. Designed in 1882 by the U.S. Army Corps of Engineers, the Tidal Basin is a contributing site to the East and West Potomac Parks Historic District.

The most important vistas in the East and West Potomac Parks Historic District follow axial relationships as detailed in the 1791 L'Enfant Plan and in the later 1901 McMillan Plan for the design of the nation's capital. Vistas comprise a defining feature of West Potomac Park. The Thomas Jefferson Memorial occupies the southern cardinal position of the north-south axis and one of the most significant views within West Potomac Park is the vista between the Jefferson Memorial north to the White House. This open view across the Tidal Basin to the north has not changed dramatically since the 1940s.

Spatial relationships, most of which are a direct legacy of the McMillan Plan, are a key component of the design of West Potomac Park. The park has a designed landscape containing naturalistic areas of shrubs, trees, and other vegetation in addition to its memorials and monuments. At the Jefferson Memorial, the original

circular composition of the memorial's immediate landscape was changed in the 1970s when the road surrounding the memorial was truncated with the addition of a plaza for pedestrian use on the north side.

The Jefferson Memorial's cultural landscape is a 19.2-acre parcel composed of the Jefferson Memorial structure, Tidal Basin seawalls that border its north side, associated circulation system, surrounding vegetation, and views to and from the Jefferson Memorial. The white marble structure originally featured a narrow driveway that encircled the entire structure; the north section of the driveway was replaced with the current north plaza adjacent to the Tidal Basin in 1970. The seawall next to the north plaza, modified at the time of the Jefferson Memorial's construction, features molded concrete capstones and facing stones. The Jefferson Memorial's visual setting retains its strong connection to the plan originally envisioned in the L'Enfant plan and 1901-02 McMillan Plan and is only minimally disrupted by the Interstate 395 Bridge and roadway to the south.

The design of the Jefferson Memorial (contributing site to West Potomac Park) can be attributed to Frederick Law Olmsted, Jr., however, much of what is currently planted on the grounds of the Jefferson Memorial is not what was originally specified or planted. The landscape of the Jefferson Memorial is historically significant under National Register Criteria A and C (NPS 2001; HNTB 2008a). The pedestrian plaza, constructed in 1970 to prevent cars from driving around the Jefferson Memorial, changed circulation patterns and the appearance of the landscape in the immediate vicinity of the Jefferson Memorial. The plaza is not linked to the Jefferson Memorial's historic landscape and does not delineate the edge of the Tidal Basin as the roadway's sidewalk originally did nor does the plaza relate to the Jefferson Memorial's shape and form (Robinson & Associates 1999).

The surrounding vegetation displays many elements of the original Olmsted Plan. The plan featured simple, mainly evergreen plantings and small numbers of flowering trees and shrubs along the circular driveway. The design of the celebrated cherry trees that frame the Tidal Basin originally dates to 1912-13. Although some trees were removed during the Jefferson Memorial's construction, the original design intent remains. The landscape design has also been modified through the addition of pine trees and yews. The circulation pattern includes approach sidewalks on both sides of the Jefferson Memorial adjacent to the Tidal Basin; the circular drive, now only intended for pedestrians; and the steps and ramps leading to the Jefferson Memorial. Views to and from the Jefferson Memorial include the most famous vista between the Jefferson Memorial and the White House to the north, narrow views of the Lincoln Memorial, which lies north and west of the Jefferson Memorial, and the view across the Tidal Basin framed by the cherry trees (NPS 2001).

## **Environmental Consequences**

### ***Methodology***

For purposes of analyzing potential impacts to cultural landscapes, the thresholds of change for the intensity of an impact are defined as follows:

**Negligible**      Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. An assessment of effect according to section 106 of the NHPA would result in a determination of *no adverse effect*.

- Minor**            Adverse Impact – Alteration of a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the landscape. An assessment of effect according to section 106 of the NHPA would result in a determination of *no adverse effect*.  
Beneficial Impact – Preservation of landscape pattern(s) or feature(s) in accordance with the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*.
- Moderate**        Adverse Impact – Alteration of a pattern(s) or feature (s) of the landscape would diminish the overall integrity of the cultural landscape. An assessment of effect according to section 106 of the NHPA would result in a determination of *adverse effect*. A memorandum of agreement (MOA) is executed among the NPS and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.  
Beneficial Impact – Rehabilitation of a landscape or its pattern(s) or feature(s) in accordance with the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*.
- Major**            Adverse Impact – Alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. An assessment of effect according to section 106 of the NHPA would result in a determination of *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon, and the NPS and applicable state historic or tribal preservation officer and/or Advisory Council are unable to negotiate and execute a MOA in accordance with 36 CFR 800.6(b).  
Beneficial Impact – Restoration of a landscape or its pattern(s) or feature(s) in accordance with the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*.

### **Alternative A: No-Action**

#### **Impact Analysis**

Under Alternative A, no action would be taken to address the lateral movement that is causing the north plaza to separate. The Jefferson Monument and north plaza were designed to pay tribute to Thomas Jefferson and to match the appearance of many of the other monuments in Washington, D.C. These cracks would disrupt the appearance and condition of the north plaza and detract from its intended appearance. Due to budget constraints and the continued movement of the soil beneath the north plaza, patching would continue. The color variation between the patching materials and the original surface would be striking and further detract from the intended appearance of the north plaza. Over time, as lateral movement continued, the north plaza would become covered with patching materials. It is also expected that separation would spread to the transition areas, increasing the impact on the cultural landscape at the Jefferson Memorial.

The separation of the seawall also would detract from the cultural landscape. Along the edge of the north plaza, the continued degradation of the seawall would be visible and would detract from the designed appearance of the site. Because the seawall would continue to pose a safety hazard, the park would maintain a temporary metal fence between the north plaza and the seawall. This practice would detract from the Jefferson Memorial's overall cultural landscape by disrupting the designed open views and historic circulation patterns. Continued patching would inevitably result in damage and loss to historic materials on the seawall, north plaza, and possibly the steps and sidewalks.



**Photograph 6:** Separation between the north plaza and the seawall has created a tripping hazard. To protect visitors from this hazard, the NPS has erected a temporary metal fence along the length of the seawall.

Despite these intrusions, the site's cultural landscape would remain relatively uninterrupted. Visitors would still be provided with unique views of the Washington Monument, the White House, and other notable landmarks. Similarly, views from these locations to the Jefferson Memorial would remain unchanged, with the temporary metal fence providing a minimal intrusion.

Overall, Alternative A would result in a moderate, long-term, adverse impact on the cultural landscape, as the appearance and condition of the site would continue to diminish.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on cultural landscapes in and around the Jefferson Memorial. These projects include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, and the Tidal Basin seawall improvements. All of these projects would involve temporary construction activities that would impact visual resources in and around the Jefferson Memorial. These activities also could impact historic materials or vegetation that comprise the landscape. Any impacts to these elements of the cultural landscape could be fully mitigated. Following the construction process, the previous renovations at the Jefferson Memorial and the stylobate mall repairs added more historically accurate materials to the sites, restored damaged materials, and provided improved care of the NPS resources. The Martin Luther King, Jr. Memorial would add another resource to the commemorative landscape. The security and seawall improvements would introduce some small change in structures on the landscape. However, these changes would be designed to be consistent with the existing landscape. These projects, along with Alternative A, would have a minor, long-term, beneficial cumulative impact on cultural landscapes. Alternative A would contribute an appreciable adverse increment to this cumulative impact.

## **Conclusion**

Overall, Alternative A would result in a moderate, long-term, adverse impact to the cultural landscape. Alternative A would contribute an appreciable adverse increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to cultural landscapes.

## **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

### **Impact Analysis**

Under Alternative B, the seawall would be removed and replaced with a new wall built on caissons and secured with pipe piles. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The separation would be created with fencing and other barriers that are common to the area, and would affect the immediate setting of the cultural landscape.

The construction of the new seawall would involve the installation of temporary work platforms in the Tidal Basin or along the edge of the north plaza. These platforms would be accompanied by drilling machinery, construction equipment, and stockpiles of soil and rock that were removed as the caissons were installed. The construction activities and presence of construction equipment would temporarily disrupt views within the site, as well as views across the Tidal Basin. Views from other locations around the Tidal Basin to the Jefferson Memorial would also be disrupted during the construction process. When construction activities were not being conducted, construction equipment and materials would be stored outside of the important viewsheds across the north plaza and Tidal Basin. Similarly, once construction was complete, the views across the Tidal Basin would be unobstructed. Disruptions to the circulation system would be noticeable during this period. Any impacts to the circulation system would cease once construction was complete. Once the new seawall was in place, separation in the north plaza and the seawall would be halted. This would eliminate any future interruptions in the intended views across the site and would beneficially impact the historic appearance of the north plaza and seawall.

Under Alternative B, three pines that would be removed along the western edge of the study area. These trees are not original plantings. At the eastern side of the study area, three pines, two of which are original plantings, would be removed. Following construction, new trees would be planted to match the historic planting plan for the Jefferson Memorial. The removal of these pines is necessary to access and repair the seawall. These pines would be replaced with species consistent to the original Jefferson Memorial planting plan. Selecting plants that were consistent with the planting plan would mitigate any impacts to the cultural landscape that would result from the removal of existing trees.

The installation of the concrete pads in the transition areas would involve the use of some small construction equipment. Relative to the time and scale of the caisson drilling, this process would not provide any further disruption to the setting, circulation system, or views to or from the site.

Once construction was complete, portions of the north plaza would be repaved with appropriate materials to re-create the intended views and appearance of the site, without the cracks and patching material.

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the cultural landscape, as the appearance and condition of the site would be improved following construction activities.

### ***Section 106 Summary***

Although short-term construction related impacts are expected, implementation of Alternative B would stabilize plaza and seawall at the Jefferson Memorial. Circulation patterns, spatial relationships, or vistas of the cultural landscape would not be altered. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative B would have *no adverse effect* on cultural landscapes.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on cultural landscapes in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative B, would have a minor, long-term, beneficial cumulative impact on cultural landscapes. Alternative B would contribute an appreciable beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the cultural landscape. Alternative B would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to cultural landscapes.

### ***Alternative C: Pipe Piles and Micropiles***

#### **Impact Analysis**

Under Alternative C, pipe piles would be driven into the ground to anchor the north plaza against lateral movement of the soil, and micropiles would be installed into the seawall. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The separation would be created with fencing and other barriers that would temporarily disrupt the cultural landscape's setting and circulation system.

The installation of the pipe piles and micropiles would require construction machinery and equipment to be onsite for the duration of the project. The construction activities and presence of construction equipment would disrupt views within the site, as well as views across the Tidal Basin. Views from other locations around the Tidal Basin to the Jefferson Memorial would also be disrupted during the construction process. When construction activities were not being conducted, construction equipment and materials would be stored outside of the important viewsheds across the north plaza and Tidal Basin. Similarly, once construction was complete, the views across the Tidal Basin would be unobstructed. The installation of the pipe piles could be accomplished more quickly than the caissons, reducing the time that the cultural landscape was affected. The construction equipment and truck movement may impact

surrounding vegetation. Any impacts to the circulation system or surrounding vegetation would be mitigated once construction was complete.

The impacts related to the installation of the concrete pads in the transition areas, anchoring the seawall, removing and planting trees, and repaving portions of the plaza would be the same as those described under Alternative B.

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impact to the cultural landscape, as the appearance and condition of the site would be improved.

### ***Section 106 Summary***

Short-term construction related impacts are expected to be of longer duration than Alternative B; however, implementation of Alternative C also would address the issue of lateral soil movement and subsidence and stabilize the Jefferson Memorial grounds. Circulation patterns, spatial relationships, or vistas of the cultural landscape would not be altered. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative C would have *no adverse effect* on cultural landscapes.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on cultural landscapes in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative C, would have a minor, long-term, beneficial cumulative impact on cultural landscapes. Alternative C would contribute an appreciable beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the cultural landscape. Alternative C would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major, adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to cultural landscapes.

### ***Alternative D: Soil Improvement and Micropiles***

#### **Impact Analysis**

Under Alternative D, new soil material would replace existing soils beneath the north plaza and micropiles would be installed into the seawall. During these activities, a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The separation would be created with fencing and other barriers that would temporarily disrupt the cultural landscape's setting and circulation system. Views would not be disrupted because these materials are common in the area.

The replacement of the soil would involve machinery, construction equipment, and stockpiles of soil that were being removed or replaced. A number of large trucks would need to be brought on site each day to deliver and remove dirt. The construction activities and presence of construction equipment would disrupt

views within the site, as well as views across the Tidal Basin. Views from other locations around the Tidal Basin to the Jefferson Memorial would also be disrupted during the construction process. When construction activities were not being conducted, construction equipment and materials would be stored outside of the important viewsheds across the north plaza and Tidal Basin. Similarly, once construction was complete, the views across the Tidal Basin would be unobstructed. Vegetation surrounding the north plaza may be affected by the construction equipment and truck movement. Once the soil halted lateral movement, separation would be halted at the north plaza. This would eliminate any future interruptions in the intended views across the site, would improve the appearance of the cultural landscape, and reintroduce the historic circulation pattern.

The impacts related to the installation of the concrete pads in the transition areas, anchoring the seawall, removing and replanting trees, and repaving portions of the plaza would be the same as those described under Alternative B.

Overall, Alternative D would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the cultural landscape, as the appearance and condition of the site would be improved.

#### ***Section 106 Summary***

Short-term construction related impacts are expected to be of longer duration than Alternative B; however, implementation of Alternative D also would address the issue of lateral soil movement and subsidence and stabilize the Jefferson Memorial grounds. Circulation patterns, spatial relationships, or vistas of the cultural landscape would not be altered. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative D would have *no adverse effect* on cultural landscapes.

#### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on cultural landscapes in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative D, would have a minor, long-term, beneficial cumulative impact on cultural landscapes. Alternative D would contribute an appreciable beneficial increment to this cumulative impact.

#### **Conclusion**

Overall, Alternative D would result in a moderate, long-term, beneficial impact to the cultural landscape. Alternative D would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major, adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to cultural landscapes.

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## **Historic Structures**

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### **Affected Environment**

A historic structure is defined by the NPS as “a constructed work, usually immovable by nature or design, consciously created to serve some human act” (DO #28). In order for a structure or building to be listed on or eligible for listing on the National Register, it must possess historic integrity of those features necessary to convey its significance, particularly with respect to location, setting, design, feeling, association, workmanship, and materials. The National Register Bulletin #15: *How to Apply the National Register Criteria for Evaluation* (NPS 1990) provides a comprehensive discussion of these characteristics.

The East and West Potomac Parks Historic District was listed on the National Register in 1973, and the National Register nomination form was subsequently revised in 1999. The boundaries for the revised nomination remain the same as in the original nomination. Four historic features in West Potomac Park, which are documented in both the original and the revised nominations, are also listed individually on the National Register. These historic features are the Lockkeeper’s House, the Arlington Memorial Bridge, the Lincoln Memorial, and the Jefferson Memorial.

The land area that comprises West Potomac Park was created from tidal flats by the U.S. Army Corps of Engineers in the 1890s. The Tidal Basin was dredged in 1885 and re-dredged in 1907. The Tidal Basin is rimmed with stone seawalls (retaining walls) that prevent earth fill from eroding back into the Tidal Basin. Since the reclamation of tidal flats proceeded generally from west to east, it is likely that the seawalls in West Potomac Park were constructed before those in East Potomac Park. The original seawalls date largely from the 1880s and 1890s; however, sections of the seawalls were replaced when the Jefferson Memorial was constructed in the late 1930s and 1940s. An 8-foot wide concrete sidewalk, dating from the late 1920s and early 1930s, caps most of the seawalls around the perimeter of the Tidal Basin. The stone seawalls are a contributing structure to the East and West Potomac Parks Historic District based on National Register Criteria A and C because they are an important feature of the U.S. Army Corps of Engineer’s efforts to reclaim the Potomac Flats.

The Jefferson Memorial is a contributing structure to the East and West Potomac Park Historic District. The Jefferson Memorial is located on the southeast shore of the Tidal Basin on axis with the White House. The Jefferson Memorial, modeled after the Roman Pantheon, was constructed between 1939 and 1943, and was dedicated in 1947. A circular open-air structure, the Jefferson Memorial has a shallow dome, a circular colonnade consisting of 26 unfluted Ionic columns, a 12-column wide north portico, and four columns supporting each of the Jefferson Memorial’s 4 monumental openings. The Jefferson Memorial is constructed of white Imperial Danby marble from Vermont, and it rests upon a series of granite-stepped terraces. A flight of granite steps and landings, flanked by granite buttresses descends to the Tidal Basin. The Jefferson Memorial was individually listed on the National Register in 1981. The Jefferson Memorial and surrounding grounds contribute to the East and West Potomac Parks Historic District based on National Register Criteria A and C in the areas of Architecture, Art, Landscape Architecture, and Commemoration.

The Jefferson Memorial is connected to the surrounding grounds by granite and marble steps leading up to it on the north side. The steps descend to a north plaza laid with aggregate and colored concrete on the

north side, which in 1970 replaced the north section of the narrow driveway that originally encircled the Jefferson Memorial. At the north plaza's north edge is the section of the seawall replaced in 1939-43 when the Jefferson Memorial was constructed. The concrete cap stones and facing stones that cover the seawall date from 1939-43. The seawall was originally constructed in the late 19th century to act as a retaining wall for the Tidal Basin. These structures are all considered contributing (NPS 2001).

## **Environmental Consequences**

### ***Methodology***

For purposes of analyzing potential impacts to historic structures/buildings, the thresholds of change for the intensity of an impact are defined as follows:

- Negligible:** Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. An assessment of effect according to section 106 of the NHPA would result in a determination of *no adverse effect*.
- Minor:** Adverse impact – Alteration of a character-defining feature(s) would not diminish the overall integrity of the resource. An assessment of effect according to section 106 of the NHPA would result in a determination of *no adverse effect*.  
Beneficial impact – Stabilization/preservation of character-defining features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- Moderate:** Adverse impact – Alteration of a character-defining feature(s) would diminish the overall integrity of the resource. An assessment of effect according to section 106 of the NHPA would result in a determination of *adverse effect*. A MOA is executed among the NPS and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.  
Beneficial impact – Rehabilitation of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- Major:** Adverse impact – Alteration of a character-defining feature(s) would diminish the overall integrity of the resource. An assessment of effect according to section 106 of the NHPA would result in a determination of *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon, and the NPS and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a MOA in accordance with 36 CFR 800.6(b).  
Beneficial impact – Restoration of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

### **Alternative A: No-Action**

#### **Impact Analysis**

Under Alternative A, no action would be taken to address the lateral movement that is causing the north plaza to separate. NPS would continue to patch and apply short-term fixes to the seawall and the north plaza. Patches would remove or cover historic fabric and together with the continued use of safety fencing, change the visual appearance of the seawall and north plaza. The underlying problem of soil movement and subsidence would not be addressed. The NPS anticipates that without resolution of these issues, the seawall would eventually suffer structural failure that would require more extensive and invasive reconstruction of the seawall.



**Photograph 7:** The asphalt patching used to cover separation of pavement in the transition areas (shown above) is not consistent with the concrete aggregate that is used in the walkways and the plaza.

The separation of the seawall also would detract from the condition and appearance of one of the site's historic structures. Along the edge of the north plaza, the continued degradation of the seawall would be visible and would detract from the designed appearance of the site. Because the seawall would continue to pose a safety hazard, the park would maintain a temporary metal fence between the north plaza and the seawall. This physical intervention would disrupt the historic appearance of the structure. Future patching would inevitably result in damage and loss to historic materials on the seawall, north plaza, and possibly the steps and sidewalks.

Overall, Alternative A would result in a moderate, long-term, adverse impact on the historic structures, as the condition of the plaza and seawall would continue to diminish.

#### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on historic structures in and around the Jefferson Memorial. These projects include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, and the Tidal Basin seawall improvements. All of these projects would involve temporary construction activities that could impact historic structures that contribute to the significance of the Jefferson Memorial and the surrounding area. Following the construction process, the previous renovations at the Jefferson Memorial and the stylobate mall repairs added more historically accurate materials to the sites, restored damaged materials, and provided improved care of the NPS resources. The security and seawall improvements would involve some changes in historic structures. However, these changes would not detract from the significance of these structures or the overall integrity of the site.

These projects, along with Alternative A, would have a minor, long-term, beneficial cumulative impact on historic structures. Alternative A would contribute an appreciable adverse increment to this cumulative impact.

## **Conclusion**

Overall, Alternative A would result in a moderate, long-term, adverse impact on the historic structures. Alternative A would contribute an appreciable adverse increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to historic structures.

## **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

### **Impact Analysis**

Under Alternative B, a new seawall would be constructed on caissons and secured with pipe piles. The seawall at the Jefferson Memorial would be rebuilt on a firmer foundation on the alignment of the existing seawall. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The fencing may create temporary visual impacts on the north plaza.

The construction of the new seawall would involve the installation of temporary work platforms in the Tidal Basin or along the edge of the north plaza. These platforms would be accompanied by drilling machinery, construction equipment, and stockpiles of soil and rock that were removed as the caissons were installed. The movement of these trucks across the site could threaten the integrity of the driveways and north plaza. These impacts would be mitigated once the surface was repaved.

The historic capstones and facing stones would be removed from the wall during the construction process and would be carefully stored away from the site. This work would be carried out while the caissons were being drilled, reducing the amount of time the site's historic structures would be impacted. Once the new seawall was complete, the capstones and facing stones would be replaced, and the wall would once again be connected with the north plaza. The temporary metal fence could be removed, improving the historic appearance of the north plaza and the seawall.

The installation of the concrete pads in the transition areas would involve the use of some small construction equipment. These activities would create temporary impacts to the historic circulation systems that line the Tidal Basin and connect to the Jefferson Memorial. However, these impacts would only exist through the life of the construction process. Once construction was complete, these elements would be repaved and repaired.

Once construction was complete, portions of the north plaza would be resurfaced in kind with materials similar to existing treatments to re-create the intended appearance of the historic structures without the cracks, patching, and fencing.

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the historic structures, as the condition of the plaza and seawall would be improved and protected.

### **Section 106 Summary**

There would be no change in location, setting, feeling, or association of the Tidal Basin seawall at Jefferson Memorial. The rebuilt seawall would be reconstructed on its existing alignment. The setting of the seawall at the Jefferson Memorial, as part of the Tidal Basin retaining wall, would remain unaltered. The seawall would retain its feeling and association with the Jefferson Memorial by continuing to perform its original design function of preventing soils from eroding back into the Tidal Basin. Settling of the seawall would be arrested. The visual appearance of the seawall would not change. Historic fabric, including capstones and facing stones, would be salvaged and reinstalled on the new seawall. Walkways on top of the seawall would be rebuilt to maintain the visual rhythms and layout of historic pedestrian access and the spatial relationships of built features.

The undertaking to repair and control settlement would be beneficial to the Jefferson Memorial grounds. The proposed action would not diminish the integrity of the Tidal Basin seawall's location, design, setting, feeling, or association such that its eligibility for listing on the National Register would be jeopardized. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative B would have *no adverse effect* on historic structures.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on historic structures in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative B, would have a minor, long-term, beneficial cumulative impact on historic structures. Alternative B would contribute an appreciable beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the historic structures. Alternative B would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to historic structures.

### **Alternative C: Pipe Piles and Micropiles**

#### **Impact Analysis**

Under Alternative C, pipe piles would be driven into the ground to anchor the north plaza against lateral movement of the soil, and micropiles would be installed into the existing seawall. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The fencing may create temporary impacts on the north plaza.

The installation of the pipe piles and micropiles would require construction machinery and equipment to be onsite for the duration of the project. The construction activities and presence of construction equipment would affect the appearance and integrity of the north plaza. However, impacts would only last

through the construction process. Once construction was complete, new paving would mitigate any impacts to the north plaza. The installation of the pipe piles could be accomplished relatively quickly, reducing the time that the historic structures were affected.

The impacts related to the installation of the concrete pads in the transition areas, anchoring the seawall, and repaving portions of the plaza would be the same as those described under Alternative B.

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the historic structures, as the condition of the plaza and seawall would be improved and protected.

### ***Section 106 Summary***

After applying the Advisory Council criteria of adverse effects (36 CFR 800.5 *Assessment of Adverse Effects*), the NPS concludes that implementation of Alternative C would have ***no adverse effect*** on historic structures.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on historic structures in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative C, would have a minor, long-term, beneficial cumulative impact on historic structures. Alternative C would contribute an appreciable beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the historic structures. Alternative C would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to historic structures.

### ***Alternative D: Soil Improvement and Micropiles***

#### **Impact Analysis**

Under Alternative D, new soil material would replace existing soils beneath the north plaza, and micropiles would be installed into the seawall. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The fencing may create temporary impacts on the north plaza.

The installation of the new soil material would involve the removal of portions of the north plaza. Once the new soil was installed, the north plaza would be repaved. The repaving would be done with historically accurate materials and eliminate any existing cracks or patches in this portion of the north plaza. A number of large trucks would need to be brought on site each day to remove the excavated dirt.

The movement of these trucks across the site could threaten the integrity of the driveways and north plaza. These impacts would be mitigated once the surface was repaved.

The impacts related to the installation of the concrete pads in the transition areas, anchoring the seawall, and repaving portions of the plaza would be the same as those described under Alternative B.

Overall, Alternative D would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the historic structures, as the condition of the plaza and seawall would be improved and protected.

### ***Section 106 Summary***

After applying the Advisory Council criteria of adverse effects (36 CFR 800.5 *Assessment of Adverse Effects*), the NPS concludes that implementation of Alternative D would have ***no adverse effect*** on historic structures.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on historic structures in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative D, would have a minor, long-term, beneficial cumulative impact on historic structures. Alternative D would contribute an appreciable beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative D would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the historic structures. Alternative D would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to historic structures.

## **VISUAL RESOURCES**

### **Affected Environment**

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The Organic Act states that NPS units are charged with conserving park scenery, along with all the natural and cultural resources that contribute to important views. In the evaluation of visual resources, both the visual character of the study area and the quality of the viewshed within the study area were considered. The existing visual environment is defined as what is seen by the visitor during the approach to the study area, as well as what is seen within the area itself. The visual environment impacts both the anticipation of and experience at the site.

At the Jefferson Memorial, the site is bordered by maintained lawns and aggregate sidewalks and driveways. Many of the trees and shrubs at the site are part of the city's historic planting plan and include

the popular cherry trees. The Jefferson Memorial and surrounding stairs are made of white marble, creating a consistent appearance with the other monuments in the area.

Some of the most unique views at the site are those looking from the Jefferson Memorial onto the north plaza, the Tidal Basin, and beyond. The north plaza is an open, aggregate covered space that expands radially away from the Jefferson Memorial towards the Tidal Basin. As it reaches the basin, the aggregate transitions to concrete capstones that delineate the top of the seawall at the edge of the north plaza. The edge also is delineated by in-ground lighting that outlines the seawall in the evenings.

Due to soil movement, the north plaza and seawall have experienced increased levels of stress, which have led to increased separation. To avoid further damage or safety concerns, the NPS has patched the cracks in the north plaza. The continued separation requires additional patching every three or four months. The patching material detracts from the historic appearance of the north plaza. It also creates a sense of disrepair at the Jefferson Memorial. The separation between the seawall and the north plaza also contributes to the sense of disrepair at the site. Safety concerns related to the seawall have led the NPS to install temporary metal fencing along the length of the seawall. This interferes with the historic scene at the site and also disrupts the seamless transition between the north plaza and the Tidal Basin.

The metal fencing does not interfere with views beyond the basin. From the Jefferson Memorial, there is a clear view of the Washington Monument. The White House, Capitol Building, and other landmarks are also visible from different locations within the north plaza. These views provide a connection to the overall historic and commemorative viewshed at the site. Likewise, the Jefferson Memorial is visible from many of these locations. The fencing along the seawall does not notably detract from the views of the Jefferson Memorial.

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## **Environmental Consequences**

### **Methodology**

All available information on viewsheds potentially impacted in the study area was compiled for this document. Where possible, map locations of important areas were compared with locations of proposed developments and modifications of existing facilities. Predictions about short- and long-term site impacts were based on previous projects with similar results. The thresholds of change for the intensity of an impact are defined as follows:

- Negligible:** The visual quality of the site would not be affected or the impacts would be at or below the level of detection, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the visual experience.
- Minor:** Impacts on the visual quality of the site would be detectable, although the impacts would be localized and would be small and of little consequence to the visual experience. Mitigation measures, if needed to offset adverse impacts, would be simple and likely successful.
- Moderate:** Impacts on the visual quality of the site would be readily detectable and localized, with consequences to the visual experience. Mitigation measures, if needed to offset adverse impacts, would be extensive and likely successful.

**Major:** Impacts on the visual quality of the site would be obvious and would have substantial consequences to the visual experience in the region. Extensive mitigation measures would be needed to offset any adverse impacts, and their success would not be guaranteed.

### **Alternative A: No-Action**

#### ***Impact Analysis***

Under Alternative A, no action would be taken to address the lateral movement that is causing the north plaza to separate. The Jefferson Memorial was designed to pay tribute to Thomas Jefferson and to match the look of many of the other monuments in Washington, D.C. These cracks would disrupt views of the north plaza and detract from its intended appearance. When time and funding were available, the park would patch these cracks with patching material, as they have done in the past. The color variation between the patching material and the original ground cover would be striking and further detract from the intended visual setting. Over time, as lateral movement continued, the north plaza would become covered with patching. It is also expected that separation would spread to the transition areas, increasing the visual impact to the site.

The separation of the seawall also would detract from the visual resources at the site. Along the edge of the north plaza, the continued degradation of the seawall would be visible and would detract from the designed appearance of the site. Because the seawall would continue to pose a safety hazard, the park would maintain a temporary metal fence between the north plaza and the seawall. This would disrupt the designed open views from the north plaza to the Tidal Basin.

Despite these intrusions on the site's visual resources, the views to and from the site would remain relatively uninterrupted. Visitors would still be provided with unique views of the Washington Monument, the White House, and other notable landmarks. Similarly, views from these locations to the Jefferson Memorial would remain unchanged, with the temporary metal fence providing minimal intrusion.

Overall, Alternative A would result in a minor, long-term, adverse impact on visual resources, as the appearance of the site would continue to degrade.

#### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on visual resources in and around the Jefferson Memorial. These projects include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, Tidal Basin seawall improvements, the Martin Luther King, Jr. National Memorial, the Potomac Park levee project, and the Tidal Basin gate replacement project. All of these projects would involve temporary construction activities that would impact visual resources in and around the Jefferson Memorial. Following the construction process, the previous renovations at the Jefferson Memorial and the stylobate mall repairs added more historically accurate materials to the sites, restored damaged materials, and provided improved care of the NPS resources. The security improvements and seawall improvements would introduce small amounts of impervious surface and other developed structures. However, the

biggest change to visual resources would come from the increase in pedestrian and bicycle movements through the area. Finally, the construction of the Martin Luther King, Jr. National Memorial would represent a change in the views from the Jefferson Memorial. The new monument would replace an undeveloped piece of land along the Tidal Basin and represent another landmark on the viewshed. This would enhance the visual cohesiveness of the sites. The Potomac Park levee project and the Tidal Basin gate replacement project were both designed to replace aging or inadequate infrastructure within Washington, D.C. During the construction process, both of these projects would introduce construction machinery and equipment into scenic and historic viewsheds. The sight of this type of activity is common throughout Washington, D.C. and would not drastically detract from the overall viewshed throughout the region. Once construction was complete, both projects would provide improvements to existing viewsheds by updating and improving the related infrastructure.

These projects, along with Alternative A, would have a minor, long-term, beneficial cumulative impact on visual resources. Alternative A would contribute a noticeable adverse increment to this cumulative impact.

### **Conclusion**

Overall, Alternative A would result in a minor, long-term, adverse impact on visual resources. Alternative A would contribute a noticeable adverse increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to visual resources.

### **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

#### **Impact Analysis**

Under Alternative B, a new seawall would be constructed on caissons and secured with pipe piles. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The separation would be created with fencing and other barriers that are common to the area and would not seem out of place in the viewshed.

The installation of the new seawall would involve temporary work platforms in the Tidal Basin or along the edge of the north plaza. These platforms would be accompanied by drilling machinery, construction equipment, and stockpiles of soil and rock that were removed as the caissons were installed. The construction activities and presence of construction equipment would disrupt views within the site, as well as views across the Tidal Basin, while work was being performed. When construction activities were not in process, equipment and machinery would be stored outside of the important viewsheds across the north plaza and Tidal Basin. Views from other locations around the Tidal Basin to the Jefferson Memorial would also be temporarily disrupted during the construction process. Once construction was complete, the views across the Tidal Basin would be unobstructed. Once the new seawall was secured, there would be no more separation in the north plaza. This would eliminate any future interruptions in the intended views across the site.

The installation of the concrete pads in the transition areas would involve some small construction equipment. Considering the time and scale of the caisson drilling, this process would not provide any further disruption to the visual resources at the site. Also, the removal of five pine trees along the seawall would be necessary.



*Photograph 8: Many of the site's important views are accessible within the Jefferson Memorial.*

Once construction was complete, portions of the north plaza would be repaved with appropriate materials to re-create the intended views of the site, without the cracks and patching material. Following construction, new plantings would be completed to mitigate the lost trees and to conform to the historic planting plan for the Jefferson Memorial.

Overall, Alternative B would result in minor to moderate, short-term, adverse and moderate, long-term, beneficial impacts on visual resources, as the appearance of the site would be improved and protected following construction activities.

### ***Cumulative Impacts***

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Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on visual resources in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative B, would have a minor, long-term, beneficial cumulative impact on visual resources. Alternative B would contribute an appreciable beneficial increment to this cumulative impact.

### ***Conclusion***

Overall, Alternative B would result in minor to moderate, short-term, adverse and moderate, long-term, beneficial impacts on visual resources. Alternative B would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to visual resources.

## **Alternative C: Pipe Piles and Micropiles**

### ***Impact Analysis***

Under Alternative C, pipe piles would be driven into the ground to anchor the north plaza against lateral movement of the soil, and micropiles would be installed into the seawall. During these activities, a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The separation would be created with fencing and other barriers that are common to the area and would not seem out of place in the viewshed.

The installation of the pipe piles and micropiles would require construction machinery and equipment to be onsite for the duration of the project. The construction activities and presence of construction equipment would disrupt views within the site, as well as views across the Tidal Basin while work was being performed. When construction activities were not in process, equipment and machinery would be stored outside of the important viewsheds across the north plaza and Tidal Basin. Views from other locations around the Tidal Basin to the Jefferson Memorial would also be temporarily disrupted during the construction process. Once construction was complete, the views across the Tidal Basin would be unobstructed. The installation of the pipe piles could be accomplished in a short timeframe, reducing the impacts on visual resources.

The impacts related to the installation of the concrete pads in the transition areas, anchoring the seawall, tree removal, and repaving portions of the plaza would be the same as those described under Alternative B.

Overall, Alternative C would result in minor to moderate, short-term, adverse and moderate, long-term, beneficial impacts on visual resources, as the appearance of the site would be improved and protected following construction activities.

### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on visual resources in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative C, would have a minor, long-term, beneficial cumulative impact on visual resources. Alternative C would contribute an appreciable beneficial increment to this cumulative impact.

### ***Conclusion***

Overall, Alternative C would result in a moderate, long-term, beneficial impact to visual resources. Alternative C would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major, adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to visual resources.

## **Alternative D: Soil Improvement and Micropiles**

### ***Impact Analysis***

Under Alternative D, new soil material would replace existing soils beneath the north plaza, and micropiles would be installed into the seawall. During these activities, a portion of the north plaza would be cordoned off to protect visitors from the construction activities. The separation would be created with fencing and other barriers that are common to the area and would not seem out of place in the viewshed.

During construction, machinery, equipment, and stockpiles of soil would be located at the site. A number of large trucks would need to be brought on site each day to deliver and remove dirt. The construction activities and presence of construction equipment would disrupt views within the site, as well as views across the Tidal Basin while work was being performed. When construction activities were not in process, equipment and machinery would be stored outside of the important viewsheds across the north plaza and Tidal Basin. Views from other locations around the Tidal Basin to the Jefferson Memorial also would be temporarily disrupted during the construction process. Once construction was complete, the views across the Tidal Basin would be unobstructed. Once the soil halted lateral movement, there would be no more separation in the north plaza. Therefore, the visual aesthetic would be improved.

The impacts related to the installation of the concrete pads in the transition areas, anchoring the seawall, tree removal, and repaving portions of the plaza would be the same as those described under Alternative B.

Overall, Alternative D would result in a minor to moderate, short-term, adverse and moderate, long-term, beneficial impact to visual resources, as the appearance of the site would be improved and protected following construction activities.

### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on visual resources in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative D, would have a minor, long-term, beneficial cumulative impact on visual resources. Alternative D would contribute an appreciable beneficial increment to this cumulative impact.

### ***Conclusion***

Overall, Alternative D would result in minor to moderate, short-term, adverse and moderate, long-term, beneficial impacts on visual resources. Alternative D would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact. Because there would be no major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's general management plan or other relevant NPS planning documents as being of significance, there would be no impairment of park resources or values or unacceptable adverse impacts related to visual resources.

## **VISITOR USE AND EXPERIENCE**

### **Affected Environment**

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Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks (NPS 2005). The NPS strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in parks. For this analysis, visitor use and experience includes visitor enjoyment/satisfaction, site access and circulation, and visitor safety.

The Jefferson Memorial was opened on April 13, 1943, the 200th anniversary of Jefferson's birth. Today, the site receives over two million visitors a year who come to learn about Thomas Jefferson or take part in other activities around the Tidal Basin. The visitor experience at the Jefferson Memorial begins as the visitor approaches the site. Visitors who reach the site by vehicle are directed to park their vehicles in parking lots that are some distance south and east of the memorial, as there is no general visitor parking adjacent to the memorial. After parking their cars, visitors walk along the sidewalk that forms a loop around the Jefferson Memorial. The sidewalk leads to the north plaza where visitors traveling by foot or bicycle may also enter from the paved trails that encircle the Tidal Basin.

The north plaza area is one of the dominant visitor experiences at the site, as well as being a popular location in the Washington, D.C. area. It provides ample space for visitors to view the Jefferson Memorial or other scenic locations across the water. The site is also a popular location to view the Independence Day fireworks display or the Cherry Blossom Festival. A spot along the seawall is one of the most popular locations for participating in these passive activities. The north plaza also supports more active forms of recreation, as joggers use the area as they circle the Tidal Basin. The separation of the north plaza and seawall have been interfering with these activities.

Although NPS staff patches cracks in the north plaza to minimize safety concerns, the sight of the patching material detracts from the overall visitor experience. Furthermore, the patching does not address the uneven surfaces which may interfere with some visitors' enjoyment of the site. Recently, NPS staff was forced to install metal fencing along the edge of the north plaza to protect visitors from dangerous conditions along the separating seawall. This has taken away one of the most popular visitor activities at the site: sitting along the edge of the wall.

### **Environmental Consequences**

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#### **Methodology**

Past interpretive and administrative planning documents provided background on changes to visitor use and experience over time. Anticipated impacts on visitor use and experience were analyzed using information from previous studies. As noted above, visitor use and experience includes visitor enjoyment/satisfaction, site access and circulation, and visitor safety. Based on these findings, the following intensity levels were developed:

- Negligible:** Changes in visitor use and/or experience would be below or at the level of detection. The visitor would not likely be aware of the impacts associated with the alternative.
- Minor:** Changes in visitor use and/or experience would be detectable, although the changes would be slight. The visitor would be slightly aware of the impacts associated with the alternative.
- Moderate:** Changes in visitor use and/or experience would be readily apparent. The visitor would be aware of the impacts associated with the alternative and would likely be able to express an opinion about the changes.
- Major:** Changes in visitor use and/or experience would be readily apparent and would be severely adverse or exceptionally beneficial. The visitor would be aware of the impacts associated with the alternative and would likely express a strong opinion about the changes.

### **Alternative A: No-Action**

#### ***Impact Analysis***

Under Alternative A, no action would be taken to address the lateral movement that is causing the north plaza to separate. The sight of cracks and more recent patching materials across the north plaza would not present the Jefferson Memorial as it was intended. This would cause visitor expectations of the site to not be met and detract from their experience. These cracks would disrupt views of the north plaza and detract from its intended appearance. The cracks also would create tripping hazards for visitors. The uneven surface created by the separation and patching could prevent some visitors from moving freely across the north plaza. It is also expected that separation would spread to the transition areas, introducing additional safety concerns and visual intrusions.

The separation of the seawall also would not present the Jefferson Memorial as it was intended. This would cause visitor expectations of the site to not be met and detract from their experience. Because the seawall would continue to pose a safety hazard, the park would maintain a temporary metal fence between the north plaza and the seawall. This would prevent visitors from sitting along the edge of the wall, a popular activity during the summer and special events.

Under Alternative A, no action would be taken to address the separation of the north plaza or the seawall. Within the north plaza, the cracks in the pavement would create tripping hazards for visitors. The separation between the north plaza and the seawall also creates a dangerous tripping hazard. The park has already erected a temporary metal fence along the edge of the north plaza to protect visitors from tripping and falling into the Tidal Basin. The fence, however, is not permanent and cannot be expected to fully mitigate this threat. NPS employees would continue to monitor the fence to ensure it is in place to protect visitors.

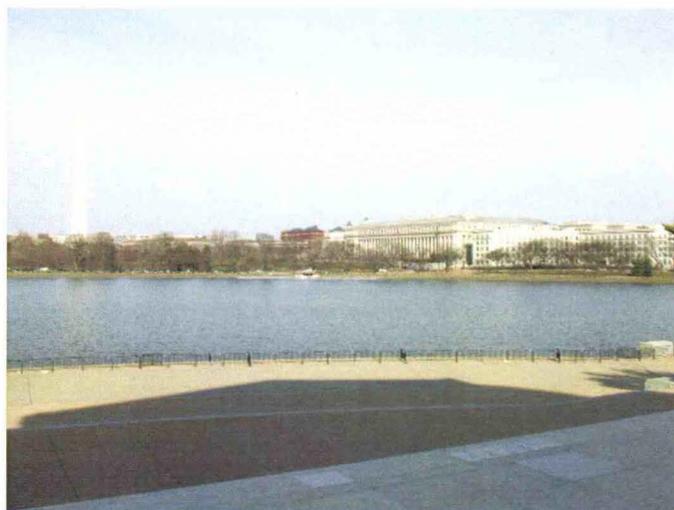
Despite the impacts to the site, visitors would still be able to access the Jefferson Memorial and move across the north plaza to view the Washington Monument, the White House, and other notable landmarks.

Overall, Alternative A would result in a moderate, long-term, adverse impact to the visitor use and experience, as the appearance and opportunities available within the site would continue to diminish.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on the visitor use and experience in and around the Jefferson Memorial. These projects include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, Tidal Basin seawall improvements, the Martin Luther King, Jr. National Memorial, the Potomac Park levee project, and the Tidal Basin gate replacement project. All of these projects would involve temporary construction activities that would interfere with visitor use in and around the Jefferson Memorial. Following the construction process, the previous renovations at the Jefferson Memorial and the stylobate mall repairs added more historically accurate materials to the sites, restored damaged materials, and provided improved care of the NPS resources. This provided the visitor with an enhanced understanding and appreciation of the site. The security and seawall improvements would improve pedestrian movement and safety through the area. Finally, the construction of the Martin Luther King, Jr. National Memorial would represent a new attraction in the area that would further the interpretation of American history. The Potomac Park levee project and the Tidal Basin gate replacement project would both introduce additional construction activities within the region. Construction is common in Washington, D.C., but can detract from the visitor experience through visual and noise intrusions, as well as increased levels of traffic. However, neither of these projects would have long periods of construction and would result in improvements to regional infrastructure that would improve the overall experience in Washington, D.C.

These projects, along with Alternative A, would have a moderate, long-term, beneficial cumulative impact on the visitor use and experience. Alternative A would contribute an appreciable adverse increment to this cumulative impact.



*Photograph 9: From the top of the Jefferson Memorial's north stairs, visitors are presented with a collection of views across northwest Washington, D.C.*

## **Conclusion**

Overall, Alternative A would result in a moderate, long-term, adverse impact to the visitor use and experience. Alternative A would contribute an appreciable adverse increment to a moderate, long-term, beneficial cumulative impact.

## **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

### **Impact Analysis**

Under Alternative B, a new seawall would be constructed on caissons and secured with pipe piles. During these activities, a portion of the north plaza would be cordoned off to protect visitors from the construction activities. This would prevent visitors from accessing much of the north plaza and waterfront areas at the site. Views across the Tidal Basin to the Washington Monument, White House, and other landmarks would be disrupted while construction activities were in progress. Visitors would still have access to portions of the north plaza and the entire Memorial. The noise from the construction process could interfere with the visitor experience throughout the Jefferson Memorial. Efforts would be made to minimize construction noise and conduct activities outside periods of peak visitation. Depending on the project funding, visitor access would be limited for 18-24 months. This would include multiple Cherry Blossom Festivals and Independence Day celebrations. During these events, access to portions of the north plaza would be restricted; however, construction activities would be suspended to avoid interfering with the events.

Once the construction process was complete, the entire site would be reopened to visitors. The new seawall would improve the visitor experience at the site. By replacing the seawall, the NPS could remove the temporary metal fence and reopen the edge of the seawall to the public. This would allow for visitors to resume a popular activity of sitting on the edge of the wall. Portions of the north plaza and surrounding areas would be repaved, eliminating cracks and more recent patching materials. The repaved north plaza would not only improve the visitor's appreciation of the site but also make the site safer for all visitors.

Work would be performed by professionals who would implement appropriate safety measures. The entire construction area would be fenced off, to prevent visitors or other members of the general public from entering the construction area and being injured. Once construction was complete, there would be no more cracks in the north plaza to pose a risk to visitors. The new seawall would be anchored against the north plaza, eliminating a tripping hazard.

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the visitor use and experience, as the appearance and opportunities available within the site would be improved and protected following construction activities.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on the visitor use and experience in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative B, would have a moderate, long-term, beneficial cumulative impact on the visitor use and experience. Alternative B would contribute an appreciable beneficial increment to this cumulative impact.

## **Conclusion**

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the visitor use and experience. Alternative B would contribute an appreciable beneficial increment to a moderate, long-term, beneficial cumulative impact.

## **Alternative C: Pipe Piles and Micropiles**

### **Impact Analysis**

Under Alternative C, pipe piles would be used to anchor the north plaza, and micropiles would be installed into the seawall. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. This would prevent visitors from accessing much of the north plaza and waterfront areas at the site. It also would limit the views and photographic opportunities across the Tidal Basin to the Washington Monument, White House, and other landmarks. Visitors would still have access to portions of the north plaza and the entire Memorial. The noise from the construction process could interfere with the visitor experience throughout the Jefferson Memorial. Efforts would be made to minimize construction noise and conduct activities outside periods of peak visitation. The construction process would be relatively short, reducing the impact on important events and daily visits. However, the construction period could include multiple Cherry Blossom Festivals and Independence Day celebrations. During these events, access to portions of the north plaza would be restricted; however, construction activities would be suspended to avoid interfering with the events.

Once the construction process was complete, the site would be reopened to visitors. Portions of the north plaza and surrounding areas would be repaved, eliminating cracks and patching material. The repaved north plaza would not only improve the visitor's appreciation of the site but also make the site safer for all visitors. Because this alternative would only anchor the north plaza and not prevent future lateral movement of the soils, it is possible that the increasing pressure could cause some additional small cracks in the future. These cracks would be repaired to maintain the safe and aesthetically pleasing visitor experience.

Impacts related to the improvements at the seawall and visitor safety would be the same as those described under Alternative B.

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the visitor use and experience, as the appearance and opportunities available within the site would be improved and protected following construction activities.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on the visitor use and experience in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative C, would have a moderate, long-term, beneficial cumulative impact on the visitor use and experience. Alternative C would contribute an appreciable beneficial increment to this cumulative impact.

## **Conclusion**

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impacts to the visitor use and experience. Alternative C would contribute an appreciable beneficial increment to a moderate, long-term, beneficial cumulative impact.

## **Alternative D: Soil Improvement and Micropiles**

Under Alternative D, soil improvements would be made beneath the north plaza, and micropiles would be installed into the seawall. During these activities a portion of the north plaza would be cordoned off to protect visitors from the construction activities. This would prevent visitors from accessing much of the north plaza and waterfront areas at the site. It also would limit the views across the Tidal Basin to the Washington Monument, White House, and other landmarks. Visitors would still have access to portions of the north plaza and the entire Memorial. The noise from the construction process could interfere with the visitor experience throughout the Jefferson Memorial. Efforts would be made to minimize construction noise and conduct activities outside periods of peak visitation. The construction process would occur within a relatively short time frame, reducing the impact on important events and daily visits. However, the construction period would include multiple Cherry Blossom Festivals and Independence Day celebrations. During these events, access to portions of the north plaza would be restricted; however, construction activities would be suspended to avoid interfering with the events.

Once the construction process was complete, the site would be reopened to visitors. Portions of the north plaza and surrounding areas would be repaved, eliminating cracks and patching material. Some additional separation may occur as the soil halted lateral movement. However, these cracks would be temporarily patched; once construction was complete, the site would be repaved again. The repaved north plaza would not only improve the visitor's appreciation of the site but also make the site safer for all visitors.

Impacts related to the improvements at the seawall and visitor safety would be the same as those described under Alternative B.

Overall, Alternative D would result in a minor, short-term, adverse and moderate long-term, beneficial impact to the visitor use and experience, as the appearance and opportunities available within the site would be improved and protected following construction activities.

## **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on the visitor use and experience in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative D, would have a moderate, long-term, beneficial cumulative impact on the visitor use and experience. Alternative D would contribute an appreciable beneficial increment to this cumulative impact.

## **Conclusion**

Overall, Alternative D would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on the visitor use and experience. Alternative D would contribute an appreciable beneficial increment to a moderate, long-term, beneficial cumulative impact.

## **OPERATIONS AND INFRASTRUCTURE**

### **Affected Environment**

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Operations and infrastructure, for the purpose of this analysis, refer to the quality of effectiveness of the infrastructure and the ability to maintain the infrastructure used in the operation of the park in order to adequately protect and preserve vital resources and provide for an effective visitor experience. This includes an analysis of the condition and usefulness of the facilities and developed features used to support the operations of the park. Operations and infrastructure also include a discussion of appropriate staff to maintain the site and employee safety at the site.

The Jefferson Memorial and surrounding area is sited on a network of deep foundations and grade beams that are arranged radially. The core of the Jefferson Memorial is supported by a series of piles and caissons. The surrounding peripheral roads and grass areas are on grade. The north plaza was initially constructed on grade, but in 1969-70 it was demolished and built on piles and grade beams. The lateral movement of soils within this system is occurring at a rate of 0.5 inches every three months. Recent visual evidence suggests that the separation between the seawall and the north plaza has accelerated beyond this rate. The seawall is supported by vertical and battered timber piles.

NPS has staff that works at numerous sites throughout the park, as well as staff that are specifically assigned to the Jefferson Memorial. Employees at the Jefferson Memorial provide interpretation and security services. Additional employees are dispatched to the site during special events to perform maintenance activities or for emergency response.

Over the last few years, a growing focus of the park's maintenance staff has been the reoccurring separation of the north plaza. Every three to four months, staff spend increasing amounts of time patching new and growing separations in the north plaza. Although the patching reduces tripping hazards across the site, the uneven ground continues to be a hazard to some visitors. When a visitor or staff member trips and is injured, emergency staff must be dispatched to provide first-aid and complete an incident report.

Due to the magnitude and scale of the separation between the north plaza and seawall, NPS staff has been unable to patch this area. To keep visitors from being exposed to this potential hazard, park staff erected temporary steel fencing along the length of the seawall. Periodically, staff inspects the fencing along the seawall to make sure it has not been tampered with or moved.

### **Environmental Consequences**

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#### **Methodology**

Impact analyses are based on the current description of operations and infrastructure presented in this document. As noted above, operations and infrastructure includes quality of effectiveness of the infrastructure and the ability to maintain the infrastructure used in the operation of the park in order to adequately protect and preserve vital resources and provide for an effective visitor experience. Operations and infrastructure also include a discussion of appropriate staff to maintain the site and employee safety at the site. The thresholds of change for the intensity of this impact are defined as follows:

- Negligible:** Operations and infrastructure would not be affected, or the impacts would be at low levels of detection and would not have a noticeable impact on operations and infrastructure.
- Minor:** The impact would be detectable but would be of a magnitude that would not have a noticeable impact on operations and infrastructure. If mitigation was needed to offset adverse impacts, it would be simple and likely successful.
- Moderate:** The impacts would be readily apparent and would result in a substantial change in operations and infrastructure in a manner noticeable to staff and the public. Mitigation measures would be necessary to offset adverse impacts and would likely be successful.
- Major:** The impacts would be readily apparent, would result in a substantial change in operations and infrastructure in a manner noticeable to staff and the public, and be markedly different from existing operations and infrastructure. Mitigation measures to offset adverse impacts would be needed, would be extensive, and their success could not be guaranteed.

### **Alternative A: No-Action**

#### ***Impact Analysis***

Under Alternative A, the park would not take any action to create a long-term solution to the lateral movement beneath the north plaza. As a result, park maintenance staff would continue to patch cracks in the north plaza. Currently, this activity involves a day of work every three months for several employees. In the future, if separation increased or spread to the transition areas, this activity could be required more often. The park would only be able to maintain the patching. Because there would be no long-term solution to address the seawall, park staff would maintain the temporary metal fence along the edge of the north plaza. The fence does not require maintenance but does require regular inspections to ensure it has not been tampered with or moved away from the seawall. Although these maintenance activities would take away from time park staff could spend on other jobs, park staff would continue to be able to offer educational and interpretive programs and support at the Jefferson Memorial.

Under Alternative A, no action would be taken to address the separation of the north plaza or the separation of the seawall. Within the north plaza, the cracks in the pavement would create tripping hazards for visitors. The separation between the north plaza and the seawall also creates a dangerous tripping hazard. The park has already erected a temporary metal fence along the edge of the north plaza to protect visitors from tripping and falling into the Tidal Basin. The fence, however, is not permanent and cannot be expected to fully mitigate this threat. NPS employees would continue to monitor the fence to ensure it is in place to protect NPS staff.

Overall, Alternative A would result in a moderate, long-term, adverse impact to operations and infrastructure, as the condition of the site would continue to degrade and require increasing amounts of maintenance.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on operations and infrastructure in and around the Jefferson Memorial. These projects include previous renovations at the Jefferson Memorial, stylobate mall repairs, security improvements at the Jefferson Memorial, Tidal Basin seawall improvements, and the Martin Luther King, Jr. National Memorial. All of these projects would involve temporary construction activities that would require changes in existing operations. Following the construction process, operations may continue to be modified to incorporate the changes in park infrastructure. The previous renovations at the Jefferson Memorial and the stylobate mall repairs improved the condition of the historic and natural resources at the site, reducing the amount of time staff spent caring for them. The security improvements would introduce some new parking areas and other infrastructure that would require maintenance. However, these improvements also would focus the NPS security operation, allowing it to operate more efficiently. The seawall improvements would introduce additional infrastructure that would need to be maintained. However, this maintenance could be included in existing activities and would be minimal, given the new construction. Finally, the construction of the Martin Luther King, Jr. National Memorial would represent a change in operations and infrastructure. The new monument would represent an addition to the park's extensive list of sites. It would require new staffing, as well as increased work for existing staff.

These projects, along with Alternative A, would have a minor, long-term, beneficial cumulative impact on operations and infrastructure. Alternative A would contribute an appreciable adverse increment to this cumulative impact.

### **Conclusion**

Overall, Alternative A would result in a moderate, long-term, adverse impact to operations and infrastructure. Alternative A would contribute an appreciable adverse increment to a minor, long-term, beneficial cumulative impact.

### **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

#### **Impact Analysis**

Under Alternative B, a new seawall would be constructed on caissons and secured with pipe piles. At the seawall, the historic capping and facing stones would be temporarily removed from the wall and stored in a safe location. The seawall would be removed and rebuilt on top of additional caissons. The new seawall would be anchored into bedrock with pipe piles. The pipe piles would be driven into the wall and covered by the original capping and facing stones. Once the wall was recapped, the pipe piles would not be visible. The seawall would protect the north plaza from lateral movement below. The seawall also would be safe for visitors, allowing the NPS to remove the temporary metal fence that currently blocks the wall.

In addition to these improvements, concrete pads would be installed in the transition areas between the plaza and the surrounding area. The concrete pads would provide a hinged connection between the two areas to allow further settlement to occur the surrounding area without separating from the north plaza.

Once the construction was complete, portions of the north plaza and surrounding areas would be repaved with materials that were similar to the current and historic materials. The repaving could include

replacement of the in-ground lighting along the seawall with similar equipment. The repaving would cover cracks or patching across the north plaza.

The construction activity would not be performed by park staff. Some staff would be required to oversee the process, but this could easily be incorporated into their regular activities. Patrols would make sure that the construction area remained fenced off from the public. These patrols already occur on a regular basis to monitor the seawall and the rest of the site. During the construction, some of the educational and interpretive programs that occur at the site may be disrupted.

Work would be performed by professionals who would implement appropriate safety measures. The entire construction area would be fenced off, to prevent NPS staff from accidentally entering the construction area and being injured. Injuries to construction workers may occur during the project, and would be treated by NPS staff or regional emergency personnel. Once construction was complete, NPS staff would no longer be required to maintain the temporary metal fence along the seawall. NPS interpretive and educational staff could resume programs along the edge of the water.

Once the construction process was complete, these programs would resume or continue without the interruptions. After the north plaza was repaved, there would be no need for staff to spend time patching cracks in the north plaza. Their time could be focused on other projects in the park. The improved conditions would also eliminate tripping risks for staff. The seawall would be anchored against the north plaza, eliminating a tripping hazard. The improved conditions would allow the NPS to remove the temporary metal fence that is currently used to keep staff from the seawall.

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on operations and infrastructure, as the construction process would improve the condition of the site and reduce the need for routine maintenance.

### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on operations and infrastructure in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative B, would have a minor, long-term, beneficial cumulative impact on operations and infrastructure. Alternative B would contribute an appreciable beneficial increment to this cumulative impact.

### ***Conclusion***

Overall, Alternative B would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on operations and infrastructure. Alternative B would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact.

## **Alternative C: Pipe Piles and Micropiles**

### ***Impact Analysis***

Under Alternative C, pipe piles would be driven through the north plaza to anchor it against lateral movement. The existing pavement covering the north plaza would be removed to facilitate the

installation. Once the construction was complete, portions of the north plaza and surrounding areas would be repaved with materials that were similar to the current and historic materials. The repaving could include replacement of the in-ground lighting along the seawall with similar equipment. Because the piles would not halt the lateral movement, there would be a chance for future separation, as pressure beneath the surface intensified. Any future separation would be repaired through current patching methods.

At the seawall, the historic capping and facing stones would be temporarily removed from the wall and stored in a safe location. The seawall would be anchored into bedrock with micropiles. The micropiles would be driven into the wall and covered by the original capping and facing stones. Once the wall was recapped, the micropiles would not be visible. The micropiles would anchor the seawall against the north plaza and prevent any future separation. The secure seawall would be safe for visitors, allowing the NPS to remove the temporary metal fence that currently blocks the wall.

In addition to these improvements, concrete pads would be installed in the transition areas between the plaza and the surrounding area. The concrete pads would provide a hinged connection between the two areas to allow further settlement to occur the surrounding area without separating from the north plaza.

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on operations and infrastructure, as the construction process would improve the condition of the site and reduce the need for routine maintenance.

### ***Cumulative Impacts***

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on operations and infrastructure in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative C, would have a minor, long-term, beneficial cumulative impact on operations and infrastructure. Alternative C would contribute an appreciable beneficial increment to this cumulative impact.

### ***Conclusion***

Overall, Alternative C would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on operations and infrastructure. Alternative C would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact.

### **Alternative D: Soil Improvement and Micropiles**

Under Alternative D, new soil material would be installed beneath the north plaza to halt lateral movement. Once the new material was in place, portions of the north plaza would be repaved. While the soil slowed lateral movement, there would continue to be some cracks in the north plaza. Once the soil was completely consolidated, separation in the north plaza and the transitional areas would cease.

Impacts related to improvements at the seawall, transition areas, construction oversight, repaving portions of the plaza, and staff safety would be the same as Alternative C.

Overall, Alternative D would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on operations and infrastructure, as the construction process would improve the condition of the site and reduce the need for routine maintenance.

### **Cumulative Impacts**

Past, present, and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on operations and infrastructure in and around the Jefferson Memorial and are described above under the Cumulative Impacts section for Alternative A. These projects, along with Alternative D, would have a minor, long-term, beneficial cumulative impact on operations and infrastructure. Alternative D would contribute an appreciable beneficial increment to this cumulative impact.

### **Conclusion**

Overall, Alternative D would result in minor, short-term, adverse and moderate, long-term, beneficial impacts on operations and infrastructure. Alternative D would contribute an appreciable beneficial increment to a minor, long-term, beneficial cumulative impact.

## **SUMMARY OF ENVIRONMENTAL CONSEQUENCES**

In “Chapter 2: Alternatives,” Table 2 provides a summary of the environmental consequences related to each alternative. A more detailed explanation of the impacts is presented in “Chapter 3: Affected Environment and Environmental Consequences.” A summary of the impacts related to each alternative is presented below.

### **Alternative A: No-Action**

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Under Alternative A, increasing amounts of sediment and rock could be deposited in the surrounding water bodies as separation continued across the north plaza and seawall. This would impact water quality and floodplains. In addition, safety fencing would remain in place and other tripping hazards would be treated with patching and other short-term fixes, resulting in some alteration to the cultural landscape and historic structures at the Jefferson Memorial. The continuing damage to the north plaza and seawall would disrupt intended views within the site and across the Jefferson Memorial. Programs and events at the Jefferson Memorial would continue; however, the seawall would continue to be inaccessible. These conditions would result in continued damage to the infrastructure at the Jefferson Memorial and an increase in the amount of staff time spent making repairs. The analysis of potential impacts of Alternative A did not identify any major adverse impacts on water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure; therefore, implementation of Alternative A is not likely to result in unacceptable adverse impacts or impairment of any park resource or value.

### **Alternative B: Rebuilt Seawall (NPS Preferred Alternative)**

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Under Alternative B, the seawall would be repaired and able to properly convey floodwaters. This would reduce the amount of sediment being introduced to surrounding water bodies. This would improve water

quality and floodplains in the vicinity of the Jefferson Memorial. Construction activities would temporarily impact the cultural landscape and historic structures at the Jefferson Memorial. Once construction was complete, the landscape and structures would be restored to their intended condition. Under section 106, these actions would result in ***no adverse effect*** on cultural landscapes or historic structures. The views within the site and across the Tidal Basin also would be restored, after some short-term disruptions during the construction process. During the construction process, visitor access and circulation would be limited. Once construction was complete; however, visitor access would be fully restored. Staff would supervise but not carry out construction activities. The repaired north plaza and new seawall would require minimal maintenance. The analysis of potential impacts of Alternative B did not identify any major adverse impacts on water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure; therefore, implementation of Alternative B is not likely to result in unacceptable adverse impacts or impairment of any park resource or value.

### **Alternative C: Pipe Piles and Micropiles**

Under Alternative C, the seawall would be repaired and able to properly convey floodwaters. This would reduce the amount of sediment being introduced to surrounding water bodies. This would improve water quality and floodplains in the vicinity of the Jefferson Memorial. Construction activities would temporarily impact the cultural landscape and historic structures at the Jefferson Memorial. Once construction was complete, the landscape and structures would be restored to their intended condition. Under section 106, these actions would result in ***no adverse effect*** on cultural landscapes or historic structures. The views within the site and across the Tidal Basin also would be restored, after some short-term disruptions during the construction process. During the construction process, visitor access and circulation would be limited. Once construction was complete; however, visitor access would be fully restored. Staff would supervise but not carry out construction activities. The repaired north plaza and seawall could require continuing existing levels of maintenance in the future, if separation continued. The analysis of potential impacts of Alternative C did not identify any major adverse impacts on water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure; therefore, implementation of Alternative C is not likely to result in unacceptable adverse impacts or impairment of any park resource or value.

### **Alternative D: Soil Improvements and Micropiles**

Under Alternative D, the seawall would be repaired and able to properly convey floodwaters. This would reduce the amount of sediment being introduced to surrounding water bodies. This would improve water quality and floodplains in the vicinity of the Jefferson Memorial. Construction activities would temporarily impact the cultural landscape and historic structures at the Jefferson Memorial. Once construction was complete, the landscape and structures would be restored to their intended condition. Under section 106, these actions would result in ***no adverse effect*** on cultural landscapes or historic structures. The views within the site and across the Tidal Basin also would be restored, after some short-term disruptions during the construction process. During the construction process, visitor access and circulation would be limited. Once construction was complete; however, visitor access would be fully restored. Staff would supervise but not carry out construction activities. The repaired north plaza and seawall could require continuing existing levels of maintenance in the future, if separation continued. The

analysis of potential impacts of Alternative D did not identify any major adverse impacts on water quality, floodplains, cultural landscapes, historic structures, visual resources, visitor use and experience, and operations and infrastructure; therefore, implementation of Alternative D is not likely to result in unacceptable adverse impacts or impairment of any park resource or value.

# 4

## CONSULTATION AND COORDINATION

NPS DO #12 requires the NPS to make “diligent” efforts to involve the interested and affected public in the NEPA process. This process, known as scoping, helps to determine the important issues and eliminate those that are not; allocate assignments among the interdisciplinary team members and/or other participating agencies; identify related projects and associated documents; identify other permits, surveys, consultations, etc. required by other agencies; and create a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. This chapter documents the scoping process for the proposed action and identifies future compliance and permits needed for implementation

### THE SCOPING PROCESS

The scoping process for the National Mall Plan/EIS, which includes this project, was initiated with in November 2006 as part of the NPS National Mall Plan. The National Mall plan is a comprehensive plan for updating and improving sites and special places managed by the NPS on the National Mall. Currently, the NPS is preparing the preliminary preferred alternative as part of the National Mall Plan EIS. Throughout this process the NPS is soliciting public comments on what should be included in the plan. Among the recommendations and common to all proposed alternatives is the repair and protection of the Jefferson Memorial seawall and north plaza. The National Mall Plan/EIS is projected to be released for agency and public review in the summer of 2009.

#### Internal Scoping

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Internal scoping for the specific action at the Jefferson Memorial began in 2008. Staff from the park, NPS National Capital Region, and NPS Denver Service Center met with their consultants and contractors to discuss, identify, and evaluate opportunities to stabilize the Jefferson Memorial seawall. In January 2008 the NPS Denver Service Center completed an initial phase of study on ground movement at the Jefferson Memorial to investigate the cause and extent of subsidence and settling associated with the seawall and other areas near the Jefferson Memorial. Monitoring data collected from this investigation suggests that the soil is moving in both vertical and lateral directions (HNTB 2008a). Information from this investigation informed NPS staff and consultants during the design process for a solution to protect the north plaza and seawall from future lateral soil movement. A value analysis was conducted in March 2008 to examine causes, identify natural and cultural resources affected, and analyze potential solutions for stabilizing the National Register eligible structures and landscape surrounding the memorial. Three alternatives from the value analysis effort were advanced for further evaluation in this EA/AoE.

## **Public Scoping**

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The public was invited to participate in the planning for the National Mall, including the area near the Jefferson Memorial and around the Tidal Basin, in November 2006 with a public newsletter and planning symposium. A second newsletter and opportunity to comment were made available to the public April 2007 and were followed at the end of 2007 by a third newsletter. To date no public comments have been received during the planning for the National Mall specific to the issue of soil movement at the Jefferson Memorial. In April 2009, a press statement specifically for the proposed Jefferson Memorial stabilization project was released and posted to the NPS Planning, Environment, and Public Comment (PEPC) website.

## **Agency Scoping**

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The NPS regularly consults with regulatory agencies on NPS projects in Washington, D.C. These agencies usually include Washington, D.C. Historic Preservation Officer, National Capital Planning Commission, U.S. Commission of Fine Arts, Advisory Council on Historic Preservation, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Washington, D.C. Department of Environmental Protection, and Architect of the Capitol. All of the agencies listed above have regularly participated throughout the National Mall planning process.

The National Mall Plan recognizes that the purpose of the National Mall & Memorial Parks is to preserve, interpret, and manage federal park lands in the national capital on the land delineated by the L'Enfant plan and the 1902 Senate Park Improvement Plan, commonly referred to as the McMillan Plan, including green spaces, vistas, monuments, memorials, statues, historic sites, cultural landscapes, and natural and recreation areas. The proposed undertaking to stabilize the seawall and north plaza of the Jefferson Memorial is an important component in the preservation of a contributing feature of West Potomac Park and is consistent with the National Mall Plan. The Washington, D.C. Historic Preservation Officer, National Capital Planning Commission, U.S. Commission of Fine Arts, Advisory Council on Historic Preservation, and other agencies listed above will receive a copy of this EA/AoE and will have an opportunity to comment on this undertaking at that time. In addition, on March 6, 2009, a letter was sent to the Washington, D.C. Historic Preservation Officer to inform them of the proposed action and the upcoming public review of the EA/AoE.

## **FUTURE COMPLIANCE NEEDS/PERMITS**

Based on conversations with the U.S. Army Corps of Engineers Baltimore District staff, implementing the NPS preferred alternative at the Jefferson Memorial would require a Nationwide Permit 3. Nationwide permits are designed to be streamlined through the regulatory process. The Nationwide Permit 3 addresses the maintenance and repair of current serviceable structures. If, due to the requirements of section 106 of the NHPA, the project does not meet the requirements of the Nationwide Permit 3, an Individual Permit would be required.

Implementing the NPS preferred alternative also would require coordination with the U.S. Environmental Protection Agency (EPA). The EPA administers the permit process for the National Pollutant Discharge

Elimination System (NPDES) for Washington, D.C. The NPDES authorizes discharges into navigable waterways.

Historic resources coordination for section 106 of the NHPA would be required through the Washington, D.C. Office of Planning. The Office of Planning manages the Historic Preservation Office, which maintains the architecture, scale, and uniqueness of Washington, D.C.'s historic buildings. The NPS will continue coordination with the Historic Preservation Office as the proposed action is implemented.

Coordination and permitting with the District Department of the Environment also would be required to obtain a Water Quality permit.

## **DOCUMENT REVIEW**

The EA/AoE will be on formal review for 30 days and has been distributed to a variety of interested individuals, agencies, and organizations. It is also available on the Internet at <http://parkplanning.nps.gov> and at local libraries. If you wish to comment on this Environmental Assessment/Assessment of Effect, you may mail comments to the name and address below or you may post them electronically at <http://parkplanning.nps.gov>. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Superintendent  
National Mall and Memorial Parks  
900 Ohio Drive, SW  
Washington, DC 20024



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## LIST OF PREPARERS AND CONTRIBUTORS

This document was prepared by Vanasse Hangen Brustlin, Inc. with input from staff at the National Mall and Memorial Parks, the NPS National Capital Regional Office, and the NPS Denver Service Center.

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Chris Frye	Alternatives review, impact analysis, and guidance on the permitting process
Tim Hogan, P.E., LEED	Alternatives review and impact analysis
Scott Smizik	Document preparation, natural resource review and analysis
Rita Walsh	Cultural resources review and analysis
Tricia Wingard	Guidance of NEPA process, document review, and project management

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# **APPENDIX A: RELEVANT CORRESPONDENCE**





## United States Department of the Interior

NATIONAL PARK SERVICE  
National Mall & Memorial Parks  
900 Ohio Drive, S.W.  
Washington, D.C. 20024-2000



D2217 ( NAMA-DSC 128232)

March 6, 2009

Mr. David Maloney  
State Historic Preservation Officer  
District of Columbia, Office of Planning  
2000 14<sup>th</sup> Street, NW, 4<sup>th</sup> Floor (Reeves Center)  
Washington D.C. 20009

Subject: Proposed Rehabilitation of Seawall and North Plaza, Thomas Jefferson Memorial,  
Washington, DC

Dear Mr. Maloney:

The National Park Service (NPS) proposes to reconstruct the failing ashlar seawall and rehabilitate the plaza at the Thomas Jefferson Memorial in the West Potomac Park Historic District on the southeast shore of the Tidal Basin in Washington, DC. The seawall and the plaza are located on the north side of the memorial directly in front of the main entrance and stairs leading to the chamber.

In February 2006 the NPS became aware of differential movement between the capstone of the seawall and the exposed aggregate concrete paving of the western portion of the Memorial's plaza. Although movement in the seawall has been observed since its construction (1939-1943), lateral and vertical movement seems to have accelerated since 2005. An engineering study of the seawall in 2008 revealed that the magnitude of differential settlement between the ashlar seawall and the north plaza indicates that immediate rehabilitation of the seawall is necessary. Since early 2007, the area of the plaza immediately adjacent to the seawall has been closed to the public.

The ashlar seawall at the Jefferson Memorial is comprised of ten wall segments separated by joints. At the joints between wall segments, the granite capstones of the seawall are displaced with respect to each other, indicating relative movement and/or rotation between the seawall segments.

The NPS is proposing to rehabilitate the Jefferson Memorial seawall through reconstruction. The seawall would be rebuilt on caissons with pipe piles battered outward from the plaza to

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laterally restrain further movement of the plaza. The seawall, caissons, and pipe piles would act as a buttress to the lateral forces being applied to the existing plaza foundations. Historic fabric of the seawall including capstones and facing veneer stones would be retained and re-used. Fifteen at-grade lighting fixtures, currently installed in the surface of the plaza at the outer edge, would be replaced in-kind. Construction impacts will also necessitate the removal and replacement of the two small groups of trees in the triangular beds located east and west of the plaza. One of these groups consists of two trees that likely date from 1943. Once construction is complete, trees will be planted in these two beds according to historic planting plans. All work will be consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties, Guidelines for the Treatment of Cultural Landscapes*.

Enclosed is additional information on existing conditions and draft construction documents describing and illustrating proposed construction techniques for repair of the seawall and North Plaza at the Jefferson Memorial.

In compliance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is being prepared for the proposed project. The EA will analyze the impacts to natural and cultural resources and determine any required mitigation. The EA will provide detailed descriptions of the Jefferson Memorial seawall rehabilitation alternatives and, as required by law, a no-action alternative. The EA will also describe the rationale for choosing a preferred alternative. These details will be reiterated in a Section 106 Summary in the EA. A draft of the EA will soon be available for public review and comment. A copy will be forwarded directly to your office.

The NPS is aware that implementation of this undertaking could potentially affect properties included in or eligible for inclusion in the National Register of Historic Places. The seawall is listed on the park's List of Classified Structures (LCS) and is considered a contributing feature of the Jefferson Memorial historic designed landscape, as noted in the revision of the Cultural Landscape Inventory (CLI) in 2000. The Thomas Jefferson Memorial is itself a contributing feature to the West Potomac Park portion of the historic district nomination (1999) and is also individually listed on the National Register (1981). The design and configuration of the plaza is not considered historic, as it was constructed in 1970 and resurfaced as recently as 2000.

After applying the Advisory Council on Historic Preservation's criteria of adverse effect, the NPS finds that there would be a no adverse effect on historic properties that qualify the property for inclusion in the National Register. Key considerations include: 1) deteriorated historic features would be repaired rather than replaced; 2) vegetation requiring removal would be replanted per historic plans; 3) the underwater stabilization of the seawall would not be visible after construction; and 4) the proposed adjustments and resurfacing of north plaza would not detract from the cultural landscape's appearance and significance. In addition, the integrity of the property's design, materials, workmanship, feeling and association that characterize the memorial would be retained and preserved, and the memorial would continue to be used as it was historically.

We hope you can concur with this no adverse effect finding. If you have any comments, or if you would like to schedule a meeting to further discuss the proposed project at this time, please contact Ms. Perry Wheelock, Chief, Resource Management at the above address or by telephone at (202) 245-4711. Your continued participation in the planning process for this project is important to the NPS, and we look forward to hearing from you.

Sincerely,

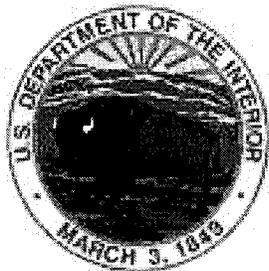


*for* Stephanie Toothman, Ph.D.  
Acting Superintendent  
National Mall and Memorial Parks

I concur that the proposed rehabilitation of the seawall and the north plaza will not have an adverse effect upon the cultural resources of The Thomas Jefferson Memorial.

State Historic Preservation Officer \_\_\_\_\_ Date \_\_\_\_\_

cc:  
John Fowler, Executive Director  
Advisory Council on Historic Preservation  
Old Post Office Building  
1100 Pennsylvania Avenue NW, Suite 809  
Washington, DC 20004



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

April 2009  
D-45

United States Department of the Interior – National Park Service