CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

The National Park Service (NPS), in cooperation with U.S. Army Corps of Engineers (USACE) and the National Capital Planning Commission (NCPC), has prepared this Environmental Assessment (EA) to evaluate a range of alternatives for the design and construction of improvements to the Potomac Park levee system located in Washington, D.C.

This EA presents five action alternatives in two phases for the construction and operation of a redesigned levee system and assesses the impacts that could result from the continued use of the current levee system (the baseline condition, or no action alternative). Upon conclusion of this EA and decision-making process, one of the five alternatives or an alternative that incorporates features of these five will be selected as the preferred alternative.

Phase 1 alternatives provide Potomac Park levee system improvements to protect downtown Washington, D.C., against the effects of a 100-year flood event[1]; a few Phase 1 alternatives would be built to Phase 2 elevation standards, based on specific design requirements. By providing immediate protection against a storm of this frequency, Phase 1 alternatives satisfy Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) requirements. Within this EA, this level of protection is referred to as the FEMA required level of protection.

Phase 2 alternatives are designed to USACE requirements: in 1936, Congress authorized the USACE to design and construct a flood protection project to contain a flow of 700,000 cubic feet per second (cfs) to protect downtown Washington, D.C., during flood events. Phase 2 represents the congressionally authorized level of protection.

During the completion of this EA, it became apparent that considerable costs and time of construction, and therefore time of disturbance to the National Mall and visitors, could be avoided if the levee at 17th Street was constructed to the higher level of protection initially, if funding would be available. However, since funding is not certain, the alternatives in this EA are presented in this phased approach.

There are multiple cooperating agencies and stakeholders with multiple interests in the project area:

- The NPS has jurisdiction over the project area and the broader context of the National Mall. The NPS is the owner responsible for levee operations and maintenance and has contributed funding for the Potomac Park levee project. In addition, the NPS, upon FEMA request, provides certification of the levee by a professional engineer or a federal agency for the 100-year flood event.
- The USACE is a cooperating agency for this EA. The USACE is responsible for the annual inspection of the levee and will review and approve the design of the proposed modifications to the levee since it is a federally authorized project. For the purposes of this project, the USACE is providing technical support to the NPS and concurrently conferring with the U.S. Commission of Fine Arts (CFA) and NCPC.

[1] A one-hundred-year flood is calculated to be the level of flood water expected to be equaled or exceeded every 100 years on average. The 100-year flood can also be thought of as the 1 percent flood, since it is a flood that has a 1 percent chance of being equaled or exceeded in any single year. Data recorded at the USGS Little Falls gauging station near Washington, D.C., indicates that major flood events have occurred on March 19, 1936 and September 10, 1966. Extreme events outside the period of record include a flood on June 2, 1889 which is estimated to be approximately the same magnitude as that of March 19, 1936.

Either the USACE or the affected constituents, in cooperation with NPS, can employ a professional engineer to design and certify the project on their behalf.

- NCPC is also a cooperating agency for this EA. NCPC has approval authority over any modification or construction on the National Mall.
- The government of the District of Columbia (the District) is another stakeholder, and for the purposes of this project included agencies such as the Office of Planning (DCOP), Department of Transportation (DDOT), Department of the Environment (DDOE), and Office of the Deputy Mayor for Planning and Economic Development (DMPED). These agencies monitor the practical impacts on the economic development potential, design character, and future investment in communities in the District. As a result, the District government has committed $2.5 million for the design and certification of the Phase 1 levee solution to ensure that portions of downtown Washington, D.C., are not vulnerable to the effects of a 100-year flood.

PURPOSE OF AND NEED FOR ACTION

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[2] and downtown Washington, D.C., in a manner that respects the resources and values of the National Mall. Without adequate flood protection measures, several downtown District locations, including portions of the monumental core, portions of Pennsylvania and Constitution avenues, and other public and private facilities located south of the U.S. Capitol to Fort McNair, are at risk of flooding from a major (100-year plus) flood event.

The current Potomac Park levee structure, completed in 1938, 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. Currently, during a flood event, the NPS must provide temporary closures at 23rd Street (using sandbags) and at 17th Street. The temporary closure at 17th Street consists of using a combination of sandbags, Jersey barriers, and soil (i.e., an earthen dike) to create a temporary barrier across the street to block the flow of water into portions of downtown and southeast Washington, D.C. Figure 1.1 shows the general project vicinity and the components of the current levee system.

[2] The monumental core currently includes the National Mall and the areas immediately beyond it, including the United States Capitol, the White House and President's Park, Pennsylvania Avenue and the Federal Triangle area, East and West Potomac Parks, the Southwest Federal Center, the Northwest Rectangle, Arlington Cemetery, and the Pentagon.

Figure 1.1 – Historic &Existing Potomac Park Levee System

This temporary levee system has not been favored by the USACE due to the large scope of this type of emergency closure, coupled by unknown weather conditions and logistic requirements. Based on new policies since Hurricane Katrina (33 CFR 208.10), the USACE deemed the 17th Street closure unreliable and consequently gave the levee an unacceptable inspection rating. For this reason, FEMA's most recently proposed 100-year floodplain map for this area reflects a 100-year flood event as if the currently designed 17th Street closure did not exist (44 CFR Part 67 – Federal Register Volume 72, Number 186, page 54631–54635). This new mapping would place portions of southeast and downtown Washington, D.C., including the monumental core, within the 100-year flood insurance rate zone. This placement would require additional flood insurance and/or costly upgrades to comply with building standards for those facilities that would fall within the new 100-year floodplain. In addition, a number of projects that are currently in development on the National Mall would need to be revised and could be delayed in order to comply with these building codes.

FEMA has agreed to delay the final issuance of the new floodplain mapping to allow the District and the NPS to design and implement a solution that would, at a minimum, reliably stop the 100-year flood at 17th Street south of Constitution Avenue. This solution would remove the necessity for FEMA to map this area within the 100-year floodplain. If the criteria for acceptable inspection rating from the USACE is met with this project, and construction is complete by November 2009, an acceptable rating is anticipated by December 2009. Submittal to FEMA for approval and accreditation would then occur in December 2009. However, unless a solution is implemented that meets FEMA accreditation by November 2009, FEMA will issue the proposed floodplain maps (Figure 1.2), and the affected area will be subject to new constraints and more stringent requirements for development.

In 1936, Congress authorized the USACE to design and construct a flood protection project to contain a flow of 700,000 cfs, a flow which exceeds a 100-year flood event. Although at this time, the USACE has not received funds to construct a levee that would meet this level of protection, it is necessary that any

modifications are consistent with the original authorization since the original levee is a congressionally authorized project. Therefore, the 100-year solution will be designed in a way that ensures that the congressionally authorized level of protection can ultimately be achieved once funding is appropriated.

OBJECTIVES

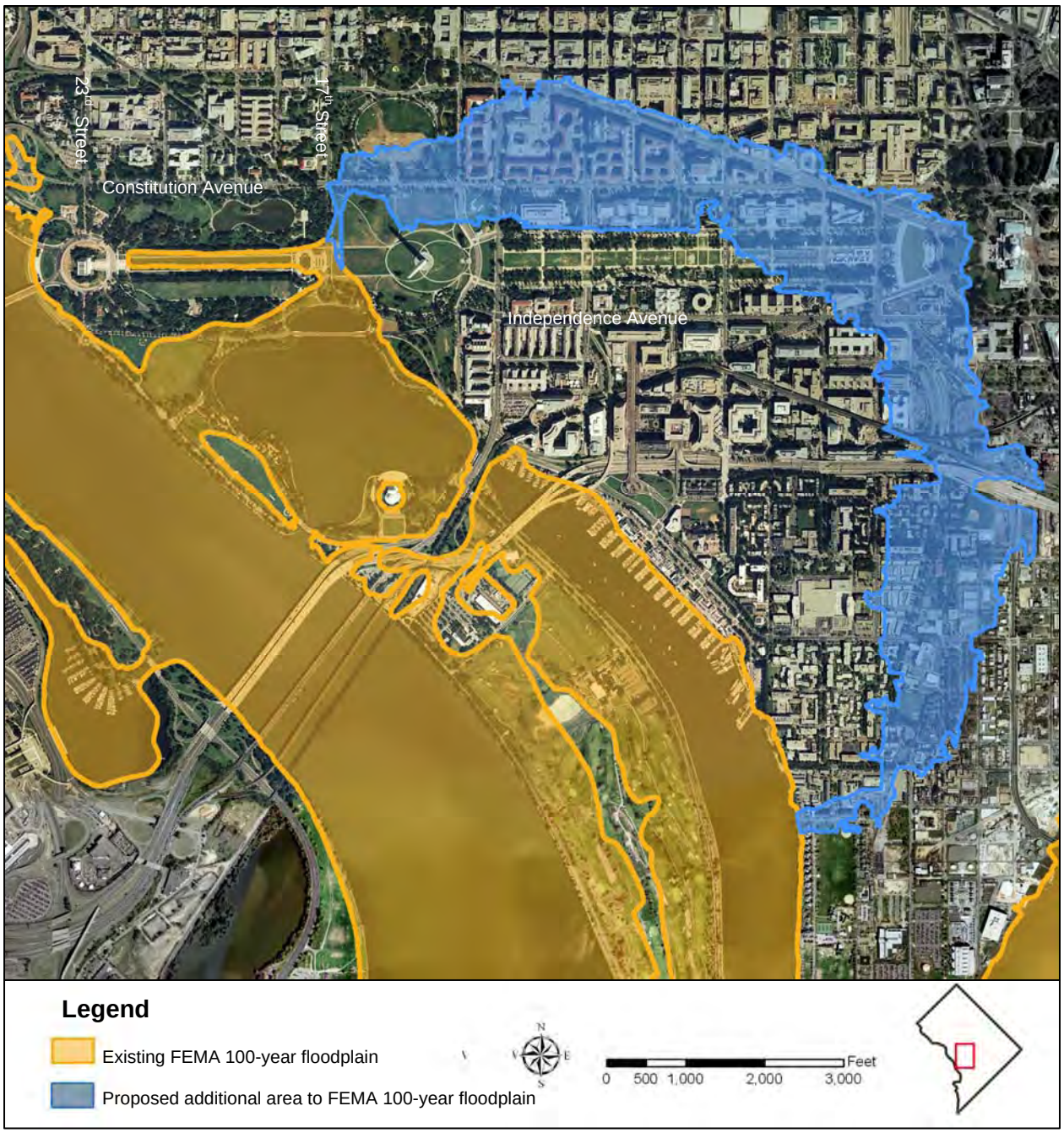
Objectives are "what must be achieved to a large degree for the action to be considered a success" (NPS *Director's Order 12*) and represent more specific statements of purpose and need. All alternatives selected for detailed analysis must meet all objectives to a large degree and must resolve the purpose of and need for action. The following objectives were identified by the planning team for this project:

- Provide immediate protection to downtown Washington, D.C., and the monumental core in the event of a 100-year flood, thereby meeting the FEMA and NFIP requirements (referred to in this EA as the FEMA required level of protection).
- Ensure that the selected design can be easily modified or enhanced to meet the requirements of the congressionally-authorized level of protection.
- Avoid or minimize adverse impacts on the cultural landscapes, historic structures, and other cultural resources of the National Mall and the project area.
- Avoid or minimize adverse impacts on the viewsheds of the National Mall and the monumental core and the visual quality of the project area.
- Minimize disruption to visitor use and experience in the National Mall and monumental core.
- Minimize adverse impacts on park management and operations and provide the NPS with the most effective and reliable closure system in advance of a flood event.
- Avoid additional costs of insurance or construction to property owners in the project area.
- Minimize disruption of traffic in the downtown Washington, D.C. project area during construction.

SCOPE OF THE PROPOSED ACTION

The proposed flood control projects described as action alternatives in this EA address only the river flooding that would likely occur during flood events in the downtown Washington, D.C. area. These projects do not address other high-water problems or issues that may occur or have occurred in the study area from excess precipitation, interior ponding, and localized stormwater runoff. In addition, the scope of the proposed action and the EA is limited to addressing only the design and construction of the levee system, including the initial construction and the construction of the closure, and does not assess impacts on resources from flood effects that could occur in the future.

Figure 1.2 – Existing and Proposed FEMA 100-year Floodplain Boundary



PROJECT BACKGROUND

Washington, D.C. is protected from river flooding by the Potomac Park levee. This system was completed in 1938 and includes a permanent earthen barrier, sandbags along 23rd Street, and construction of a temporary closure across 17th Street (Figure 1.1). During a flood event, the levee system provides protection only if a combination of sandbags, Jersey barriers, and soil (i.e., an earthen dike) are put in place to temporarily close 17th Street, blocking the flow of water into downtown Washington, D.C.

The levee system has a long history which dates back to 1936 when the Potomac River flooded the District's entire downtown area. Several subsequent flood events galvanized legislation and policies. This timeline is summarized in Table 1.1, and the events and actions are more fully described in the following pages.

Table 1.1 – Project Background

1936	1938	1942	1946	1990-1992
Flood Control Act of 1936	Flood levee components completed	October Flood	Flood Control Act of 1946	EA for Modifications to Washington, DC and Vicinity Flood Control Project
As a result of the March flood, the existing project was authorized for construction by the Flood Control Act of 1936 whereby the USACE was directed by Congress to design and construct flood measures to protect downtown Washington during flood emergencies.	▪ Constructed the concrete retaining wall along the length of the Reflecting Pool ▪ Moved substantial fill from 17th Street to the raised earthen mound of the Washington Monument	In October 1942, portions of Washington were flooded when a high tide coincided with the third highest flow on record (447,000 cfs) of the Potomac River. The resulting flood stage was the highest on record and caused an estimated $7,407,000 in damages.	In the Flood Control Act of 1946, Congress authorized the Chief of Engineers to modify the existing project to reduce the amount of emergency work required to close openings in the line of protection during a flood event.	Alternative methods of accomplishing an acceptable closure at 17th Street were the subject of a 1992 EA, and an October 1990 Section 106 finding of no adverse effect for the preferred alternatives by the District of Columbia Historic Preservation Office.

1996	2007	2008
Supplemental EA for additional modifications	▪ In January, the Potomac Park levee System received an Unacceptable Inspection Rating by the USACE. ▪ In September, FEMA proposed issuing new Flood Insurance Rate Maps (FIRMs) that included modifying the 100-year and 500-year floodplains.	▪ In May, FEMA and the District reach a negotiated agreement to delay issuing the FIRMs until NPS and District implement necessary protection for a 100-year event. ▪ From May to December, the Environmental Assessment, concept design, Section 106 Process (and Programmatic Agreement between the DC HPO, NPS and the District) were developed for the project to progress to installing a level of protection to withstand a 100-year flood event. ▪ NCPC & CFA Review occurred in the Fall and will continue through to the Spring 2009. ▪ Final Design Plans will be generated.
Federal funds to design and construct the project were not provided to the USACE in subsequent appropriations, and the project remained dormant.		

Alternative methods of accomplishing a more acceptable closure at 17th Street were the subject of a General Design Memorandum (GDM) in 1992 (USACE 1992), which included an EA and a Section 106 finding of no adverse effect for the preferred alternative by the District of Columbia Historic Preservation Office (DC HPO).

The following subsequent supplemental documents to the 1992 GDM were published by the USACE:

- A 1996 Supplement addressing the Modifications to Washington, D.C. & Vicinity Flood Protection Project and the Feasibility of Portadam Closure Structure for 17th Street (USACE 1996); and
- A 1997 Limited Reevaluation Report and EA / Finding of No Significant Impact (FONSI) to address modifications that were authorized by Congress to the project in the interim (mainly to construct the 17th Street barrier in two phases) and to provide a limited reevaluation of the benefits and costs of the modifications (USACE 1997).

However, federal funds to design and construct the project were not provided to the USACE in subsequent appropriations, and the project remained dormant until January 2007. Based on new policies developed after Hurricane Katrina (33 CFR 208.10), the USACE deemed the 17th Street closure plan unreliable, thus decertifying the entire levee.

In September 2007, FEMA proposed modifying the base 100-year and 500-year floodplain elevations in the District. Properties in downtown Washington, D.C., would be subject to comply with *Executive Order 11988, "Floodplain Management."*(see Applicable Federal Laws, Regulations, Executive Orders, and Policies). As a result of the USACE decertification, FEMA most recently proposed a new 100-year floodplain map for this area that reflects a 100-year flood event as if the currently designed 17th Street closure did not exist (44 CFR Part 67 – Federal Register Volume 72, Number 186, page 54631–54635). This new mapping locates portions of downtown Washington, D.C., and the monumental core within the 100-year flood insurance rate zone, which would require additional flood insurance and/or costly changes to comply with building codes for those facilities that would fall within the new 100-year floodplain.

A 100-year flood has a one percent probability of occurring in any given year. Areas that were preliminarily identified as being located within flood-prone areas include the Federal Triangle Area, portions of the National Mall area, and numerous museums that line the Mall between 4th and 7th streets, other public and private facilities that extend into southwest DC along 3rd Street SW, and many private residences in the community of Capital Park and others southward along 3rd Street to the intersection of P and Canal streets, SW (Figure 1.2). Also, a number of projects currently in development on the National Mall would need to be revised and could be delayed in responding to the building code changes.

As previously described, the District requested that FEMA delay issuing new floodplain maps in March 2008 in order to perform the necessary engineering analysis that may either substantially reduce the flood risk area, or more importantly, provide a levee solution to protect the District from a 100-year event. FEMA agreed to delay the final issuance of the maps until November 2009, provided that the District design and construct a solution by that time. The District was also required to provide milestones for the completion of the FEMA required solution.

Although the main focus of this project is to meet the FEMA required solution per the November 2009 deadline, the 100-year solution will be designed in a way that ensures that the congressionally authorized level of protection can ultimately be achieved once funding is appropriated. To meet this level of protection, various modifications to the existing levee system would be required. At 23rd Street NW & Constitution Avenue, the area to the southwest of the intersection would be re-graded to increase ground elevations. Sandbags would also be required across Constitution Avenue, parallel to 23rd Street. Along the existing levee to the north side of the Reflecting Pool, multiple low spots constituting hundreds of feet along the levee which have settled below the threshold for the congressionally authorized level of protection would need to be filled. As a result of the requirement to consider solutions for both the 100-year flood event and congressionally authorized level of protection, each alternative includes two phases: the first phase includes the design and construction of an improved solution that meets FEMA requirements for the 100-year flood event, with a provision to build to the congressionally authorized

level of protection if funding is available and the design lends itself to this; The second phase provides a solution for the congressionally authorized level of protection and provides for aesthetic improvements.

The Phase 1 and Phase 2 solutions have elevations that vary based on existing grades in the project area. These grade variations yield different requirements for the elevations (heights) of the flood protection systems at 23rd Street, 17th Street, and along the Reflecting Pool levee. In Phase 1, an elevation of 16.7 per the North American Vertical Datum (NAVD)[3] for the top of the flood protection system would meet and exceed FEMA requirements. For Phase 2 (or if funded under Phase 1), the approximate level of protection requirement will be 18.7 NAVD. A more specific breakdown of elevations can be found in the "Appendix F: Top of Protection Summary."

PROJECT LOCATION

Figure 1.3 depicts the general project location for the proposed actions. The study area, or area of analysis, for each topic addressed in this EA may vary from this area depending on the resource and anticipated impacts; if so, that is noted in the discussions provided in chapter 3 of this EA. The Area of Potential Effect (APE)[4] for cultural resources does vary from the general project area and is described in the "Cultural Resources" section of the "Affected Environment" in chapter 3 and delineated in Appendix E.

Figure 1.3 – Project Location for the Potomac Park Levee system improvements

[3] The North American Vertical Datum (NAVD) is the vertical control datum (elevation) established for surveying by the National Geodetic Survey (NGS 2008). All references to elevations and heights are in feet using the NAVD 88 Datum.

[4] According to 36 CFR 800.16(d), the Area of Potential Effect is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.

PURPOSE AND SIGNIFICANCE OF THE NATIONAL MALL AND MEMORIAL PARKS (NAMA)

Establishment — In 1924, Public Law 202 established the National Capital Park Commission (renamed to the NCPC following the passage of the 1952 National Capital Planning Act,) and broadly mandated the commission to "prevent pollution of Rock Creek, and the Potomac and Anacostia Rivers, to preserve forests and natural scenery in and about Washington." In 1930, the *Shipstead-Luce Act* gave the CFA authority to review the designs of private construction projects within certain areas of the National Capital, specifically for construction that fronts or abuts the grounds of the Capitol, the grounds of the White House, the portion of Pennsylvania Avenue extending from the Capitol to the White House, and the Mall park system, as well as Rock Creek Park, the National Zoo, the Rock Creek and Potomac Parkway, the southwest waterfront, and Fort McNair. In 1933–1934, federal parkland was consolidated under the management of the NPS. The Pennsylvania Avenue National Historic Site was established in 1965, and the Pennsylvania Avenue Development Corporation was subsequently established to revitalize the avenue. A portion of the Pennsylvania Avenue National Historic Site was set aside as a unit of the national park system on June 25, 1987; the entire site is a much larger district than the area under the NPS jurisdiction. A number of major memorials were added to the National Mall throughout this period. The boundary of the NAMA is delineated in Figure 1.4.

Purpose — As stated in the Foundation Statement for the National Mall and Pennsylvania Avenue National Historic Park, the purpose of the NPS 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.
- Preserve places where important events in U.S. history occurred (e.g., Pennsylvania Avenue).
- Provide opportunities for visitor contemplation, celebration, commemoration, citizen participation, recreation, and demonstration, where the full expression of the constitutional rights of speech and peaceful assembly occur.
- Maintain space for the symbols and icons of our nation and its ideals (e.g., equality, freedom, and democracy).

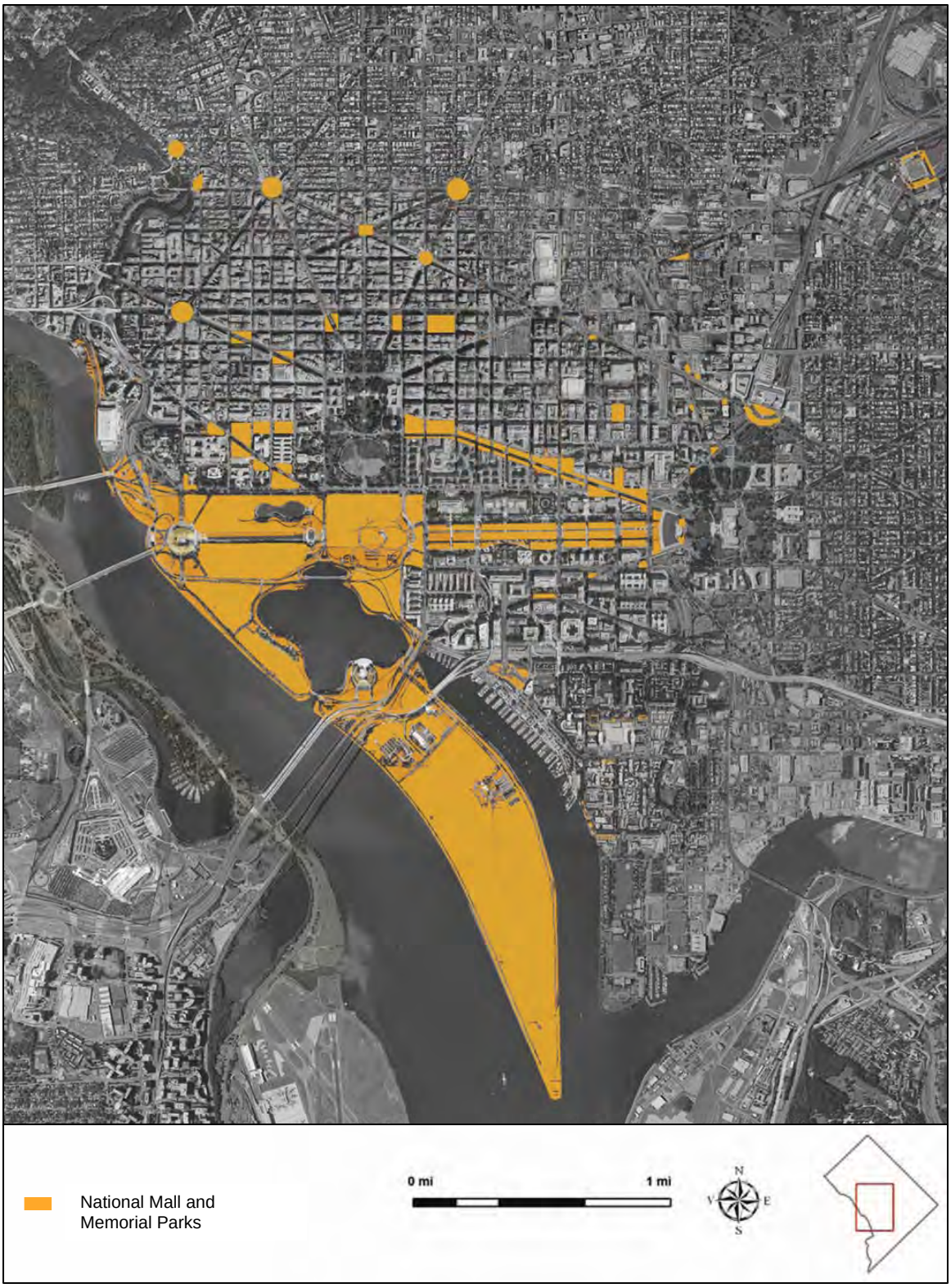
Significance — Park significance statements capture the essence of a park's importance to the nation's natural and cultural heritage. Understanding park significance helps managers make decisions that preserve the resources and values necessary to the park's purpose. Several aspects of the NAMA, of which the Mall is only a part, contribute to its significance.

First, the areas under NPS stewardship are some of the oldest public lands in our nation, dating from 1791 when the District was established. These areas are vital components of the historic federal city. Much of the area managed by the NAMA reflects the physical expression of the historic *L'Enfant* and *McMillan* plans, reflecting City Beautiful tenets with a coordinated system of radiating avenues, parks, and vistas laid over an orthogonal grid, which was both symbolic and innovative for the new nation.

Secondly, the iconography, architecture, and open spaces within the NAMA commemorate individuals and events that symbolize the principal symbols of America's heritage. NAMA has served as the stage upon which historic events of national significance occurred (Marian Anderson, JFK's funeral procession,1963 March on Washington, Dr. Martin Luther King Jr.'s "I Have a Dream" speech at the Lincoln Memorial, Presidential Inaugurations, Rosa Park's state funeral, headquarters of the National Council of Negro Women). Constitution Avenue is part of the planned ceremonial route to Arlington National Cemetery which begins at the U.S. Capitol building and runs westward along Constitution Avenue, south along Henry Bacon Drive, across Memorial Bridge to the cemetery gates.

In addition to historical events, NAMA provides a globally recognized platform to exercise democratic First Amendment rights and has served as the setting for national celebrations, parades, festivals, ceremonies, and rallies as well as local and regional events.

Figure 1.4 – The National Mall and Memorial Parks



APPLICABLE FEDERAL LAWS, REGULATIONS, EXECUTIVE ORDERS, PLANS, AND POLICIES

The NPS is governed by laws, regulations, and management plans before, during, and following any management action related to the developed *National Environmental Policy Act* (NEPA) document. The following are those that are applicable to the proposed action.

APPLICABLE FEDERAL LAWS AND REGULATIONS

Flood Control Act of 1936 (Public Law 78-53)

As a result of the March 1936 flood, the Potomac Park levee project was authorized for construction by the Flood Control Act of 1936 whereby the USACE was directed by Congress to design and construct flood measures to protect downtown Washington during flood emergencies.

NPS Organic Act

By enacting the NPS *Organic Act* of 1916 (*Organic Act*), Congress directed the U.S. Department of Interior and the NPS to manage units "to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations" (16 USC § 1). Congress reiterated this mandate in the *Redwood National Park Expansion Act* of 1978 by stating that NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress" (16 USC § 1a-1).

Despite these mandates, the *Organic Act* and its amendments afford the NPS latitude when making resource decisions that balance resource preservation and visitor recreation. By these acts, Congress "empowered [the NPS] with the authority to determine what uses of park resources are proper and what proportion of the parks resources are available for each use" (*Bicycle Trails Council of Marin v. Babbitt*, 82 F.3d 1445, 1453 (9th Cir. 1996)).

Because conservation remains predominant, the NPS seeks to avoid or to minimize adverse impacts on park resources and values. However, the NPS has discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park (NPS 2006 sec. 1.4.3). While some actions and activities cause impacts, the NPS cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006 sec. 1.4.3). The *Organic Act* prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts (16 USC 1a-1). An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006 sec. 1.4.5). To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts" (NPS 2006 sec. 1.4.5).

Park units vary based on their enabling legislation, natural resources, cultural resources, and missions; management activities appropriate for each unit and for areas within each unit vary as well. An action appropriate in one unit could impair resources in another unit. Thus, this EA will analyze the context, duration, and intensity of impacts related to the construction of a modified levee system as well as the potential for resource impairment as required by *Director's Order 12*: *Conservation Planning, Environmental Impact Analysis and Decision-making* (NPS 2006).

National Environmental Policy Act, 1969, as Amended

The NEPA was passed by Congress in 1969 and took effect on January 1, 1970. This legislation established this country's environmental policies, including the goal of achieving productive harmony between human beings and the physical environment for present and future generations. It provided the tools to implement these goals by requiring that every federal agency prepare an in-depth study of the impacts of "major federal actions having a significant effect on the environment" and alternatives to those actions and required that each agency make that information an integral part of its decisions. NEPA also requires that agencies make a diligent effort to involve the interested and affected public before they make decisions affecting the environment.

Besides setting environmental planning policy goals, NEPA created the Council on Environmental Quality (CEQ), an agency of the president's office, to oversee the implementation of NEPA. CEQ published NEPA regulations in 1978 (40 CFR 1500–1508) and added to them in 1981. These regulations apply to all federal agencies, and in them CEQ requires each federal agency to "implement procedures to make the NEPA process more useful to agency decision-makers and the public" (40 CFR 1500.2). Agencies are to review and update these regulations as necessary. The NPS has in turn adopted procedures to comply with the act and the CEQ regulations, as found in *Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-Making* (NPS 2006), and its accompanying handbook.

National Historic Preservation Act, as amended through 2000 (16 U.S.C. 470)

The *National Historic Preservation Act* (NHPA) of 1966, as amended through 2000, protects buildings, sites, districts, structures, and objects that have significant scientific, historic, or cultural value. The act established affirmative responsibilities of federal agencies to preserve historic and prehistoric resources. Effects on properties that are listed in or eligible for the National Register of Historic Places (NRHP) must be taken into account in planning and operations. Any property that may qualify for listing in the NRHP must not be inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate.

Section 106 of the National Historic Preservation Act of 1966 (NHPA)

Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP. Revised regulations, "*Protection of Historic Properties*" (36 CFR Part 800), became effective January 11, 2001.

National Parks Omnibus Management Act of 1998

The *National Parks Omnibus Management Act* (NPOMA) (16 USC 5901 et seq.) underscores NEPA and is fundamental to NPS park management decisions. Both acts provide direction for articulating and connecting the ultimate resource management decision to the analysis of impacts, using appropriate technical and scientific information. Both also recognize that such data may not be readily available and provide options for resource impact analysis should this be the case.

NPOMA directs the NPS to obtain scientific and technical information for analysis. The NPS handbook for *Director's Order 12* states that if "such information cannot be obtained due to excessive cost or technical impossibility, the proposed alternative for decision will be modified to eliminate the action causing the unknown or uncertain impact or other alternatives will be selected" (*Management Policies 2006*; NPS 2006 sec 4.4).

Redwood National Park Act of 1978, as Amended

All national park system units are to be managed and protected as parks, whether established as a recreation area, historic site, or any other designation. This act states that the NPS must conduct its

actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

Historic Sites Act of 1935

This act declares as national policy the preservation for public use of historic sites, buildings, objects, and properties of national significance. It authorizes the secretaries of the Interior and NPS to restore, reconstruct, rehabilitate, preserve, and maintain historic or prehistoric sites, buildings, objects, and properties of national historical or archeological significance.

Commemorative Works Act 1986

The *Commemorative Works Act* (CWA) provides standards and approval requirements as well as permitting requirements for location and design of new memorials and monuments in the District. The CWA defines the Reserve (an area where no new memorials are to be authorized) and directly references Areas I and II in the *Memorials and Museums Master Plan* (See Figure 1.5). The act distinguishes between the close-in portions of the District, where the commemorative works of "pre-eminent historical and lasting significance" to the nation may be located, and areas outside this zone where works of "lasting historical significance" can be placed. It also seeks to preserve the urban design legacy of the *L'Enfant* and *McMillan* plans by protecting public open space and ensuring that future museums and memorials in areas administered by the NPS and General Services Administration (GSA) are appropriately located and designed (NCPC 1986).

Code of Federal Regulations, 1992

Title 36, Chapter 1 provides the regulations "for the proper use, management, government, and protection of persons, property, and natural and cultural resources within areas under the jurisdiction of the NPS." (16 USC 3).

EXECUTIVE ORDERS / DIRECTOR'S ORDERS

Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

On February 11, 1994, President Clinton issued *Executive Order 12898*. This order directs agencies to address environmental and human health conditions in minority and low-income communities so as to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations.

Executive Order 11593 – Protection and Enhancement of the Cultural Environment

This executive order directs the NPS to support the preservation of cultural properties and to identify and nominate to the National Register cultural properties within the park and to "exercise caution . . . to assure that any NPS-owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered."

Director's Order 28: Cultural Resource Management

Director's Order 28 calls for the NPS to protect and manage cultural resources in its custody through effective research, planning, and stewardship and in accordance with the policies and principles contained in the NPS *Management Policies* (NPS 2006). This order also directs the NPS to comply with the substantive and procedural requirements described in the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation,* the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Treatment of Cultural Landscapes;* and the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Building.* Additionally, the NPS will

comply with the 1995 Servicewide Programmatic Agreement (PA) with the ACHP and the National Conference of State Historic Preservation Officers. The accompanying handbook to this order addressed standards and requirements for research, planning, and stewardship of cultural resources as well as the management of archeological resources, cultural landscapes, historic and prehistoric structures, museum objects, and ethnographic resources.

Director's Order 77-2: Floodplain Management

Director's Order 77-2: Floodplain Management, was issued in response to *Executive Order 11988, Floodplain Management. Director's Order 77-2* applies to all proposed NPS actions that could adversely affect the natural resources and functions of floodplains or increase flood risks. This includes those proposed actions that are functionally dependent upon locations in proximity to the water and for which non-floodplain sites are not practicable alternatives. For all proposed actions determined to be within a regulatory floodplain, a Statement of Findings (SOF) must be prepared. The action defines the applicable regulatory floodplain. An SOF is prepared if the action falls within the defined regulatory floodplain as follows:

Class I includes the location or construction of administrative, residential, warehouse, and maintenance buildings, non-excepted parking lots, or other human-made features, which by their nature entice or require individuals to occupy the site, are prone to flood damage, or result in impacts on natural floodplain values. Actions in this class are subject to the floodplain policies and procedures if they lie within the 100-year regulatory floodplain (the Base Floodplain).

Class II includes "critical actions" – those activities for which even a slight chance of flooding would be too great. Examples of critical actions include schools, hospitals, fuel storage facilities, irreplaceable records, museums, and storage of archeological artifacts. Actions in this class are subject to the floodplain policies and procedures if they lie within the 500-year regulatory floodplain.

Class III includes all Class I or Class II actions that are located in High Hazard areas, including coastal High Hazard areas and areas subject to flash flooding. Actions in this class are subject to floodplain policies and procedures if they lie within the Extreme Flood regulatory floodplain.

Natural Resources Management Guideline, NPS-77, 1991

The purpose of this document is to provide guidance to park managers for all planned and ongoing natural resource management activities. Managers must follow all federal laws, regulations, and policies. This document provides the guidance for park management to design, implement, and evaluate a comprehensive natural resource management program.

LOCAL PLANS

All action alternatives need to consider local plans and policies. The following initiatives serve to guide development and address important planning issues facing the National Capital Region, the monumental core, and the National Mall.

L'Enfant Plan (1791)

The original comprehensive plan of Washington, D.C., was designed by Peter (Pierre) Charles L'Enfant in 1791 as the site of the federal city. L'Enfant developed a plan that featured ceremonial spaces and grand radial avenues while respecting the natural contours of land. The resulting plan was a system of orthogonal streets with intersecting diagonal avenues radiating from the two most significant buildings sites—the Capitol and the White House (Robinson & Associates 2001). A monument dedicated to George Washington, in the form of an equestrian statue, was to be placed at the terminus of the east-west axis from the Capitol to the western horizon and the north-south axis from the president's house to the southern horizon. The area would later become the site of the Washington Monument.

The McMillan Plan (1901)

The ambitious *McMillan Plan*, created by the Senate Park Commission in 1901, sought to re-establish elements of the *L'Enfant Plan*, which included the restoration of the east end of the Mall, the correction of the awkward off-axis placement of the Washington Monument, the inclusion of the new "Potomac Park" (i.e., East and West Potomac Parks), and the removal of railroad tracks from the monumental core (Robinson & Associates 1999). The Commission envisioned the Mall as a formal tree-lined walk flanked by classical buildings, creating an unbroken vista between the Capitol and Washington Monument. The visual focal point of the *McMillan Plan* was the Mall, which the Commission proposed to extend westward and enhance as a formal, axial greensward. The McMillan Commission members interpreted the *L'Enfant Plan* as calling for treating the entire Mall as a continuous space that was set aside entirely for public use. A specific landscape treatment plan for the Mall consisted of a greensward flanked on either side by four rows of elm trees (Moore 1902).

Implementation of the *McMillan Plan* continued throughout the 1930s; however, formal plans for the Monument Grounds were abandoned, and the site remained as an open landscape characterized by the prominent knoll with curvilinear circulation paths throughout the grounds.

NPS Master Plan for the Washington Mall (1976)

In 1976, Skidmore, Owings, and Merrill prepared a master plan for the NPS that delineated how the *McMillan Plan* would actually be realized in the Mall of the 1970s with an emphasis on pedestrian use.

Extending the Legacy Plan (1997)

In 1997, the NCPC completed the plan entitled *Extending the Legacy: Planning America's Capital for the 21st Century*, which is the current guiding document for the monumental core. This plan provides a framework that expands upon the *L'Enfant Plan* and the *McMillan Plan*. It favors preserving the open landscape of the Monument Grounds and also redefines the monumental core, extending its boundaries along North Capitol, South Capitol, and East Capitol Streets.

The plan calls for economic development in every section of the city including new parks, offices, and transit centers throughout. The plan acknowledges the division of the city by elevated highways and railroad tracks and calls for the removal of obsolete tracks and roads and relocation of active tracks and roads into tunnels beneath the city and the Potomac and Anacostia Rivers. This will allow for the broad avenues envisioned by the *L'Enfant Plan* to be restored and increase aesthetic value in the city. With an expected 70 percent increase in automobile traffic by 2025, the *Legacy Plan* suggests that behavioral patterns need to change in regards to commuting options. Two-thirds of the employees working in D.C. commute from outside of the city. Many use single occupancy vehicles. The *Legacy Plan* states that transportation initiatives will only work if employers develop transportation management programs that allow employees to have flexible schedules and carpooling incentives.

Besides transportation initiatives, the *Legacy Plan* calls for restoring the waterfront of the city. Pierre L'Enfant envisioned a great city that focused its attention on the Potomac and Anacostia Rivers. The rivers are not visible in some locations due to buildings situated directly on the banks. The *Legacy Plan* outlines plans for a waterfront stretching from Georgetown to the National Arboretum, with quiet open spaces and other areas used for festivals, concerts, and other urban activities. The Anacostia waterfront would have a relaxed neighborhood feel and would focus on the environment and ecology that will ultimately help reduce the amount of pollution in the Anacostia River.

The plan discusses the revitalization of South Capitol Street and M Street and is considered the first major initiative of the *Legacy Plan*. However, there are smaller projects that will take place during this time. The *Legacy Plan* outlines guidelines and implementation plans and even includes the possibility of relocating the Supreme Court to a location along the waterfront. The *Legacy Plan* is now the general framework for Washington, D.C., and all plans since then have been based on this document.

Because intense construction of memorials and museums in the monumental core would overwhelm the historic open space on the National Mall and surrounding area, this plan encourages new construction away from the National Mall and towards geographically significant areas in other quadrants of the city to generate more dispersed economic development.

Transportation Vision, Strategy, and Action Plan for the Nation's Capital (1997)

The District is required by federal regulations to have a long-range transportation plan and to update the plan regularly. The District chose to meet this requirement by developing a vision and strategic plan for developing a transportation system that would support the city. A *Transportation Vision, Strategy, and Action Plan* for the Nation's Capital was published in 1997 (DDOT 1997).

The plan set a list of proposals for the transportation system aimed at enhancing the District of Columbia's quality of life and its attractiveness for residents, business, and visitors. These include:

- Developing sufficient and consistent funding to sustain a world-class infrastructure and an exemplary multimodal project planning and institutional coordination process.
- Improving the efficiency, safety, and attractiveness of the existing transportation system through improved maintenance, streetscaping, and signage.
- Focusing transit investment on internal circulation to provide city residents and visitors with improved alternatives to the automobile.
- Reducing the impacts of suburb-to-city travel on district residents by intercepting automotive traffic at key locations and providing excellent alternatives to city driving.
- Promoting business in the District by addressing goods movement through improved loading facilities and by improving rail as an alternative method for moving goods into and out of the city.
- Developing nontraditional "signature" transportation for the district, including a water-taxi system, light rail, and a world-class bicycle transportation network.

The 1997 plan also includes recommendations on improving signs and traveler information, public and tour bus parking, light rail, Metrorail and bus fare structure, airport and waterway connections, bicycle and pedestrian movement, truck and rail movement, and expanded multimodal funding.

The plan addresses transportation assets, such as sidewalks and pedestrian trail systems and bicycle routes and off-road trails, in addition to several other modes of transportation. Due to the fact that some bicycle and pedestrian trails in the District under this plan are under NPS jurisdiction, the plan represents an agreement by the NPS with the public on how the park and parkway will be used and managed. The trails under NPS jurisdiction include the Rock Creek Trail, the C/O Towpath, the Capital Crescent Trail, the Fort Circle Hiker/Biker Trail, the Oxon Cove Trail, the Anacostia Trail, and the National Mall Multiuse Walkways. The plan does not propose specific actions or describe how particular programs or projects should be prioritized or implemented. Those decisions will be addressed during the more detailed planning associated with strategic plans, annual performance plans, and implementation plans.

The Memorials and Museums Master Plan (2001)

The *Memorials and Museums Master Plan (2001),* from the NCPC, was developed to identify and promote new memorial and museum sites outside the monumental core of Washington, D.C. This distribution of monuments would protect the Mall and adjacent areas from further development while at the same time offering new opportunities for commemoration, education, and exhibition that are appealing to monument sponsors. The basis for memorial location is the CWA of 1986, which provides standards for the placement of memorials on certain federal land in Washington D.C., and environs.

The Commemorative Zone Policy of the *Memorials and Museums Master Plan* encourages the location of museums and memorials in all quadrants of the city to enhance local neighborhoods and support revitalization efforts. The policy established three commemorative zones:

- Reserve, the cross axis of the Mall, is where no new memorials will be permitted.
- Area I, a sensitive area, is designated for commemorative works of preeminent historic and national significance.
- Area II, the remainder the city, is where development of new memorials and museums is encouraged.

Both the 17th Street and 23rd Street project area are located between the Area I and the Reserve (see Figure 1.5).

Figure 1.5 - Memorials and Museums Master Plan Commemorative Zones

Chapter 89 of Title 40 of the Commemorative Zone Policy of the *Memorials and Museums Master Plan* discourages development on the National Mall and Washington Monument reservation and designates a "Reserve" area on the cross-axis of the Mall where no new memorials will be permitted.

The National Capital Urban Design and Security Plan (2002)

In October 2002, the NCPC developed a *National Capital Urban Design and Security Plan* (NCUDSP). This plan was developed in cooperation with federal agencies, the District government, security experts, the professional planning and design community, the architect of the Capitol, and the public, as well as the U.S. Secret Service. The NCUDSP outlines the need to improve security in the National Capital but to do so in a manner that is aesthetically pleasing to residents, workers, and tourists visiting the area. The temporary security structures put into place after the Oklahoma City bombings and increased after the September 11th, 2001 attacks are often criticized for being unsightly and limiting to pedestrian access. The plan focuses exclusively on perimeter building security designed to protect employees, visitors, and federal functions and property from threats generated by unauthorized vehicles approaching or entering sensitive buildings.

The plans outlined in NCUDSP include using architectural elements to enhance the security around federal buildings. These elements include decorative lighting, planters that are also benches, bollards, fencing and lawns. The plan does not address issues such as building hardening, operation procedures, or surveillance. Initial findings from the NCUDSP state that many of the buildings along Constitution Avenue and Independence Avenue do not meet the minimum setback distance from the curb. To meet the setback requirement, curbs or parking lanes might have to be removed (NCPC 2001).

Comprehensive Plan for the National Capital: Federal Elements (2004)

In August 2004, NCPC adopted the *Comprehensive Plan for the National Capital: Federal Elements*. The plan is a statement of goals, principles, and planning policies for the growth and development of the National Capital during the next twenty years. The plan encompasses all federal lands in Washington, D.C., and the surrounding areas, including Montgomery and Prince George's Counties in Maryland; Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia; and all cities within the boundaries of those counties. The federal elements of the *Comprehensive Plan for the National Capital* identify and address the current and future needs of federal employees and visitors to the Nation's Capital; provide policies for locating new federal facilities and maintaining existing ones; guide the placement and accommodation of foreign missions and international agencies; promote the preservation and enhancement of the region's natural resources and environment; protect historic resources and urban design features that contribute to the image and functioning of the Nation's Capital; and, working with local, state, and national authorities, support access into, out of, and around the Nation's Capital that is as efficient as possible for federal and nonfederal workers. The seven federal elements are: Federal Workplace; Foreign Missions and International Organizations; Transportation Parks and Open Space; Federal Environment; Preservation and Historic Features; and Visitors (NCPC, 2004).

Comprehensive Plan for the National Capital: District Elements (2006)

In December 2006, the DC OP completed the *Comprehensive Plan for the National Capital: District Elements*. This plan focuses on Washington, D.C., as a whole, including federal elements, the framework of many established neighborhoods, and the role of transportation. The plan focused on resource areas, such as Land Use, Transportation, Housing, Environmental Protection, Economic Development, Parks Recreation and Open Space, Urban Design, Historic Preservation, Community Services and Facilities, Educational Facilities, Infrastructure, and Arts and Culture. The comprehensive plan is not intended to be a substitute for more detailed plans nor does it dictate precisely what other plans must cover; rather, it is the one document that bridges all topics and is cross-cutting in its focus. It is the only plan that looks at the "big picture" of how change will be managed in the years ahead.

Proposed Federal Capital Improvements Program (2006)

In 2006, the NCPC completed the Federal Capital Improvements Program (FCIP) for fiscal years 2007–2012. This document lays out the proposed budgetary commitments as reviewed and evaluated by the NCPC regarding federal activities in Washington, D.C., and the surrounding Maryland and Virginia

counties. The FCIP plans the budget for a six fiscal year cycle. Projects listed in this document are not assumed to be approved, but rather the document includes the NCPC's comments and recommendations for future projects. The NCPC drafted a FCIP for fiscal years 2008–2013 on June 7th, 2007. This document is currently awaiting approval. Initial findings include:

- Reconfiguring South Capitol Street corridor into an urban boulevard, providing a gateway to the Nation's Capital and South Capitol Street reconstruction
- Storm water management system throughout Washington, D.C.
- Washington, D.C., and vicinity flood control projects (the subject of this EA), including:
    - A levee between the Lincoln Memorial and the Washington Monument
    - Raising a section of P Street SW, adjacent to Fort McNair
    - Permanent closure of 23rd Street & Constitution Avenue NW
    - Permanent closure of 2nd & P streets, SW
    - Temporary closure at 17th Street NW
- Southeast Federal Center remediation
- Repairs to seawalls in West Potomac Park
- Improved pedestrian linkages between the National Mall attractions and the Anacostia/Potomac River waterfronts
- National Mall road improvements – resurfacing, streetscaping, etc.

National Capital Framework Plan (Planning Initiative)

The *National Capital Framework Plan* (*Framework Plan*) is a multiagency effort led by the NCPC with the CFA. This planning effort, by both agencies, shows how to create new and accessible destinations for cultural attractions throughout the city. The *Framework Pla*n provides a comprehensive approach to easing demand for construction on the National Mall in addition to creating attractive urban locations throughout the city. A preliminary plan was released in fall 2007, accentuating the *Extending the Legacy Plan* and the *Malls and Memorials Master Plan*.

The National Mall Plan (ongoing)

The NPS is preparing the *National Mall Plan*, which will provide a 50-year vision for the use and management of The National Mall and Pennsylvania Avenue National Historic Park. Previously known as the *National Mall Comprehensive Management Plan*, the NPS *National Mall Plan* is a long-term plan to guide resource conservation and management and operations on portions of the Mall under NPS jurisdiction as well as individual monuments and Pennsylvania Avenue between 3rd and 15th streets. The planning effort will result in a plan covering a longer time frame than a general management plan would and will address a finer level of detail. While the NAMA covers many national park units within the nation's capital, this plan will address the National Mall (West Potomac Park, The Washington Monument and the Mall) and the related Pennsylvania Avenue National Historic Park. The National Mall hosts more than 25 million visitors a year, and as a result, there are substantial impacts on its natural and cultural resources. The *National Mall Plan*, the associated environmental impact statement (EIS), and Section 106 process will address issues related to landscape maintenance and visitor use.

One aspect of this plan also includes the enhancement of the plaza at Constitution Gardens that overlooks 17th Street, known as the "Overlook Terrace" (See Figure 1.6). This area is identified in the original plan for Constitution Gardens as the location for a proposed food service facility, which was called the East End Pavilion in the original plan (NPS 2008). Several alternatives currently being considered as part of the *National Mall Plan* include the design and development of an indoor/outdoor multipurpose facility in this location. No decision to pursue this aspect of the alternatives has been made at this time.

Figure 1.6 – Overlook Terrace location

Other elements of the plan common to all alternatives include: relocation of the temporary NPS concession facility northeast of the Washington Monument to allow for construction of the National Museum of African American History and Culture (NMAAHC) and an expanded interpretive visitor transportation system to serve more destinations and offer more frequent service (NPS 2008).

Some alternatives in the *National Mall Plan* propose to relocate the Lockkeeper's House. The Lockkeeper's House has only been relocated one time — in 1915. Thus, the house has gained integrity in its present location as well as retaining its association with its original location less than 50 feet away (NPS 2008).

POLICIES

NPS Management Policies 2006

The NPS *Management Policies 2006* (NPS 2006) is the basic NPS-wide policy document, adherence to which is mandatory unless specifically waived or modified by the NPS Director or certain Departmental officials, including the secretary of interior. Actions under this EA are in part guided by these management policies. Sections which are particularly relevant to the proposed 17th Street levee improvements are described below.

Section 8.2.5.2, Emergency Preparedness and Emergency Operations, deals specifically with visitor and employee safety. It states:

> "The National Park Service will develop a program of emergency preparedness in accordance with title VI of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 USC 5195-5197g); National Security Decision Directive 259 (February 4, 1987); Department of the Interior policy; and other considerations at the Washington headquarters, regional, and park levels. The program will (1) provide guidance for incident management at the park level and management and relief for emergency incidents and events beyond park capabilities; (2) ensure the agency complies with the Presidential Homeland Security Directives, the National Emergency Response Plan, and the National Incident Management System standards; and (3) support interagency and national response to major incidents. The purpose of the program will be to provide for visitor and employee safety and the protection of resources and property to the extent possible. This program will include a systematic method for alerting visitors about potential disasters and evacuation procedures."

The protection of Natural Resources is addressed in Section 4.1.3, Evaluating Impacts on Natural Resources. This section states (NPS 2006):

> "Planning, environmental evaluation, and civic engagement regarding management actions that may affect the natural resources of the national park system are essential for carrying out the Service's responsibilities to present and future generations. The Service will ensure that the environmental costs and benefits of proposed operations, development, and resource management are fully and openly evaluated before taking actions that may impact the natural resources of parks. This evaluation must include appropriate participation by the public; the application of scholarly, scientific, and technical information in the planning, evaluation, and decision-making processes; the use of NPS knowledge and expertise through interdisciplinary teams and processes; and the full incorporation of mitigation measures, pollution prevention techniques, and other principles of sustainable park management."

Section 5.3.1 deals with the Protection and Preservation of Cultural Resources. This section states (NPS 2006):

> "The National Park Service will employ the most effective concepts, techniques, and equipment to protect cultural resources against theft, fire, vandalism, overuse, deterioration, environmental impacts, and other threats without compromising the integrity of the resources."

NPS *Management Policies 2006* also specifically addresses the treatment of Archeological Resources (Section 5.3.5.1), Cultural Landscapes (Section 5.3.5.2), and Historic and Prehistoric Structures (Section 5.3.5.4). The proposed improvements within Potomac Park would be subject to the requirements set forth for the protection of these resources.

NPS *Management Policies 2006* addresses floodplains in Section 4.6.4. This section states (NPS 2006):

> "In managing floodplains on park lands, the National Park Service will (1) manage for the preservation of floodplain values; (2) minimize potentially hazardous conditions associated with flooding; and (3) comply with the NPS *Organic Act* and all other federal laws and executive orders related to the management of activities in flood-prone areas, including *Executive Order 11988* (Floodplain Management), the *National Environmental Policy Act*, applicable provisions of the *Clean Water Act*, and the *Rivers and Harbors Appropriation Act* of 1899. Specifically, the Service will
>
> - protect, preserve, and restore the natural resources and functions of floodplains;
> - avoid the long- and short-term environmental effects associated with the occupancy and modification of floodplains; and
> - avoid direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks.
>
> When it is not practicable to locate or relocate development or inappropriate human activities to a site outside and not affecting the floodplain, the Service will
>
> - prepare and approve a statement of findings, in accordance with procedures described in *Director's Order 77-2* (Floodplain Management);
> - use nonstructural measures as much as practicable to reduce hazards to human life and property while minimizing the impact to the natural resources of floodplains; and
> - ensure that structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60)."

SCOPING

NEPA regulations require an "early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." To determine the scope of issues to be analyzed in depth in this plan, meetings were conducted with park staff and the public.

For the development of this EA, an internal scoping meeting was held with the NPS and the USACE on May 19, 2008, at the National Capital Region Headquarters. Additionally, a public meeting was held on June 10, 2008, at NCPC's offices at 401 9th Street in Washington, D.C. As a result of these scoping efforts (see "Chapter 5: Consultation and Coordination" for additional information), several issues were identified that required further analysis in this document. These issues represent existing concerns as well as concerns that might arise during consideration and analysis of alternatives.

ISSUES AND IMPACT TOPICS

Issues describe problems or concerns associated with current impacts from environmental conditions or current operations as well as problems that may arise from the implementation of any of the alternatives. Park staff identified potential issues associated with the construction or implementation of the levee improvements during internal scoping.

The NPS' primary concern is to ensure that any alternative considered will allow for minimal disturbance of the existing park uses and the cultural landscape. The issues and concerns identified during scoping were grouped into impact topics that are discussed in the "Affected Environment" chapter and analyzed in the "Environmental Consequences" chapter.

Vegetation

Several forms of vegetation located in the project area could be affected by the proposed levee improvements and new construction. These include shrubs and trees, including some larger mature trees. In order to construct the proposed action, some vegetation would need to be removed. In addition, there are certain design constraints that affect the placement of vegetation. For example, no trees or shrubs are allowed on the levee or within a certain distance of foundation footings.

Many of the trees in the area have cultural value and are considered in the discussion of the cultural landscape.

Floodplains

The alternatives considered in this EA would require construction within the floodplain of the Potomac River. Consequently, the impacts of the proposed actions on the floodplain are considered in this EA.

Aesthetics and Visual Quality

The construction of a levee system would result in changes to the topography of the adjacent Washington Monument Grounds (Monument Grounds) and Constitution Gardens within the area of the National Mall. As such, there would be impacts on visual resources and spatial qualities and relationships. There would also be visual impacts associated with the installation of the closure system during a flood event as well as construction related activities for permanent features such as footings and retaining walls.

Cultural Resources

The construction of a levee system would result in changes to the topography of the adjacent Monument Grounds and Constitution Gardens within the area of the National Mall. As such, there would be impacts

on aesthetic and visual resources. There would also be visual impacts associated with the installation of the closure system during a flood event as well as construction-related activities for permanent features, such as footings and retaining walls.

Impacts on Historic Districts and Structures and Cultural Landscapes: The levee construction and improvements would extend from 23rd Street north of the Lincoln Memorial, through the 1970s era Constitution Gardens north of the Reflecting Pool, across 17th Street, and terminate on the east after penetrating the grounds of the Washington Monument. Some sections of the project have relatively minor visual and tree loss impacts such as sandbagging or berm augmentation at 23rd Street and berm restoration or augmentation north of the Reflecting Pool. However, the closure device for the crossing of 17th Street would in all cases be an above ground structure although only fully visible during operation when the post and panel system common to all alternatives is put in place. No historic buildings, structures, or objects would be demolished or otherwise affected. However, the 17th Street closure system would be a visual intrusion on two documented cultural landscapes, the Monument Grounds and Constitution Gardens. The intrusion would result from both the structure itself and the re-grading on either side needed to accommodate it. Also, the no planting (except for grass) clearance zones required on either side of levee floodwalls and berms would cause the loss of trees, many of which are significant components of the cultural landscape. Due to topography, the mitigation of each of these adverse impacts individually tends to work against the mitigation of the other(s). Additionally, the permanent levee structures may adversely impact the views and vista associated with the *L'Enfant* and *McMillan* plans, which are listed NRHP resources.

Impacts on Archeological Resources: Before Washington was laid out, the levee improvements area was within the channel of Tiber Creek, a natural inland waterway. The south bank of Tiber Creek cut across what is now the Monument Grounds. The modern landscape reflects the filling of Tiber Creek and the creation of the formal landscapes of the National Mall. Because most of the land consists of fill deposits and formal landscapes, the potential for archeological sites is limited, but not nonexistent. Archeological resources associated with earlier, historical landscapes, if present, would be found in buried contexts. Two possible archeological resources at the 17th Street closure area have been identified: (1) a prehistoric site, 51NW35, on the Monument Grounds and (2) an early nineteenth century wharf that extended into Tiber Creek along the line of 17th Street. At present, the existence of any physical remains of the two sites is unknown. Subsurface archeological investigations have been deferred, primarily because of the logistical challenges of excavating in a public park or roadway. However, the construction of the 17th Street closure system does have the potential to impact these sites. Consultations are underway to evaluate and mitigate adverse effects on archeological resources, among others, through a PA to include stipulations to insure an appropriate level of archeological documentation.

Visitor Use and Experience

The project area is one of the most visited sites in the country. In the immediate proximity to the project area are numerous museums and memorials including the Lincoln Memorial, Vietnam Veterans Memorial, Korean War Veterans Memorial, Washington Monument, and World War II (WWII) Memorial. The construction of a levee system would result in impacts on visitor use to these resources, affecting things like access, transportation, and soundscapes (noise). Visitor experience along the National Mall would also be affected by changes in the visual character of the project area; the addition or removal of predominant elements in the landscape would alter the perception of and movement through the existing open space of the project area.

Public Safety

The proposed alternatives could result in impacts on both visitor and employee safety during construction and implementation, and there could be potential impacts on emergency routes during construction. While

construction activities are occurring, heavy equipment may be on site along with other construction-related equipment. This could pose a risk to members of the public. In addition, there would likely be road closures during construction activities that could require a re-routing of emergency vehicles, and implementation of the barrier during flood conditions presents safety concerns for those responsible for the barrier. In addition, there are different relative risks to public safety related to the type of closure that would be implemented.

Surrounding Land Use and Economics

There are some District residences and/or businesses in the area that could fall within the proposed FEMA 100-year floodplain maps. These surrounding residents and land owners/operators would be most impacted by the no action alternative. As described in the project background, the decertification of the current levee system and the proposed FEMA floodplain maps could mandate compliance with flood insurance requirements such as conformance with building codes and the procurement of flood insurance. In addition, there may be other impacts associated with certain types of land uses in areas within the flood zone.

Traffic and Transportation

Traffic and transportation could be impacted as a result of construction and implementation of the proposed alternatives. Temporary road closures and access restrictions could impact traffic patterns which would result in additional congestion and delays.

Utilities and Infrastructure

The National Mall contains numerous underground utilities that could be affected by the construction of the 17th Street closure. In the vicinity of 17th Street, there are numerous water, sewer, irrigation, gas, electric, and telephone lines. Any construction that would require subsurface disruption would need to be designed and executed in a manner that minimizes impacts on these utilities and provides for relocation where needed.

Park Management and Operations

Impacts related to park management and operations could result from both the construction and implementation of emergency actions related to erecting portions of the levee system during the threat of a flood event. Shifts in personnel use and the allocation of resources could impact other park operations since the NAMA staff (who would be the first summoned to respond during a flood event) might not be of a sufficient number to implement the closure, and additional NPS staff from other parks would then be called upon to assist.

IMPACT TOPICS ELIMINATED (OR DISMISSED) FROM FURTHER ANALYSIS AND CONSIDERATION

Several impact topics that originated from the NPS Environmental Screening Form (ESF), or that were initiated during the scoping process, were initially considered for analysis in this EA but were eliminated from further analysis following discussions with the park staff.

Wildlife or Wildlife Habitat

The project area is in a relatively urban setting, surrounded by manicured lawns and landscaping. It is adjacent to heavily utilized roads with attendant vehicle noise. As a result, wildlife in the project area is limited to adapted urban species, such as raccoons, waterfowl, squirrels, songbirds, and an occasional hawk using the larger trees as a perch. No nesting of raptors is known or expected.

Although construction-related activities may temporarily displace wildlife from the area, the proposed action would not result in greater than negligible effects on wildlife or wildlife habitat.

Due to the area's urban context, level of human activity, and minimal habitat value, this topic was dismissed from detailed analysis. However, impacts on vegetation are being analyzed in this EA, which indirectly assesses impacts on wildlife habitat.

Air Quality

The 1963 *Clean Air Act*, as amended (42 USC 7401 et seq.), requires federal land managers to protect air quality in national parks. The project site is located in the Washington Metropolitan Area nonattainment zone for ozone. During construction of a levee, local air quality would be temporarily affected by dust and vehicle emissions. Hauling material and operating equipment would result in increased vehicle exhaust and emissions during the construction period. Hydrocarbons, nitrogen oxide, and sulfur dioxide emissions would be rapidly dissipated by air drainage since air stagnation is uncommon at the project site. Fugitive dust plumes from construction equipment would occasionally increase airborne particulates in the area near the project site; however, these loading rates would be of short duration and of negligible to minor consequence.

With the action alternatives, temporary increases in air pollution would occur during construction and implementation, primarily from operation of heavy equipment. Should the no action alternative be selected, there would still be impacts on air quality as this alternative represents the construction of the levee as described in the procedures outlined in the NPS *Maintenance and Operations Manual*, flood protection plan, and emergency manual. The park would apply appropriate mitigation measures to limit idling of construction vehicles. Overall, there would be a slight and temporary degradation of local air quality due to dust generated from road reconstruction activities and emissions from construction equipment and visitor vehicles. These effects would be localized and negligible to minor, lasting only as long as road reconstruction activities occurred. The park's current level of air quality would not be affected by the proposed project; therefore, this impact topic was dismissed from further analysis.

Soundscapes

Natural soundscape resources encompass all the natural sounds that occur in parks, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. However, given the urban landscape and soundscape in the project area, short term noises produced during construction of a levee system would not result in greater than minor effects on natural soundscape.

The effects of noise are considered within the visitor use and experience topic; therefore, soundscapes was not included as a separate impact topic in this EA.

Threatened, Endangered, Rare, and Special Concern Species

There are no rare, threatened, or endangered species or habitat known or expected to occur in the project area. Therefore, this impact topic was dismissed from consideration.

Wetlands

There are no wetlands that would be affected by any of the proposed actions; therefore, wetlands were not addressed as an impact topic in this EA.

Ethnographic Resources

Ethnographic resources are defined by the NPS 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" (NPS 1998). In this analysis, the NPS' term "ethnographic resource" is equivalent to the term "Traditional Cultural Property" (TCP) which is more widely used in cultural resource management. Guidance for the identification of ethnographic resources is found in National Register Bulletin #38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (NPS 1998). The key considerations in identifying TCPs are their association with cultural practices or beliefs of a living community that are (1) rooted in the community's history and (2) are important in maintaining the continuing cultural identity of the community (Parker and King 1998:1). There are no properties that meet the definition of a TCP within the Area of Potential Effects (APE); therefore, ethnographic resources are dismissed as an impact topic.

Prime Farmland

Prime farmland is defined as land with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and which is also available for these uses. Prime farmland is protected under the *Farmland Protection Policy Act* of 1981 to minimize the extent to which federal programs contribute to the unnecessary or irreversible conversion of farmland to nonagricultural uses. There are no prime farmlands found within the project area; therefore, this topic was dismissed from further analysis.

Water Quality and Quantity

There would be minimal impacts related to water quantity or quality as a result of the construction of the levee and implementation of the levee (e.g., constructing the closure at the time of flood events). This EA does not address actual impacts from the flood event itself, only the implementation of a solution to prevent flooding during a 100-year or greater event. Soil erosion as a result of construction of the levee and impacts on the stormwater system would be limited and addressed through best management practices. Therefore, this topic was dismissed from further consideration.

Geohazards

There are no known geohazards located within the proposed project area; therefore, this topic was dismissed from further analysis.

Geological Resources (soils, bedrock, streambeds)

Although the proposed action would require excavation and grading of soils to install foundations and walls and to relocate utilities, the amount of disturbance would be minimal, resulting in no more than negligible to minor effects. In addition, the majority of the portion of the National Mall that would be disturbed consists of fill (USACE 1992). As a result, this topic was dismissed from further analysis.

Paleontological Resources

There are no known paleontological resources located within the proposed project area; therefore, this topic was dismissed from further analysis.

Marine or Estuarine Resources

There are no marine or estuarine resources within the project area; therefore, this impact topic was dismissed from further analysis.

Unique Ecosystems, Biosphere Reserves, World Heritage Sites

There are no known biosphere reserves, World Heritage sites, or unique ecosystems listed in the park; therefore, this impact topic was dismissed from further analysis.

Museum Collections

All of the alternatives would involve new construction in open-air settings that are not designed for the storage or display of museum collections (historic artifacts, natural specimens, and archival and manuscript material). Some objects may exist within the APE that may become incorporated into museum collections; these objects may include artifacts in archeological contexts and items left by visitors to the Vietnam Veterans Memorial. As circumstances arise, these objects are collected and evaluated according to the NPS' current museum collections policy; then, if they meet the guidelines in the current policy, they are incorporated into the museum collections and curated at the NPS Museum Resources Center in Landover, Maryland. Because none of the alternatives would have any direct effects upon recognized museum collections, this impact topic was dismissed from further analysis.

Environmental Justice

According to the Environmental Protection Agency (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."*

EPA defines "fair treatment" as no group of people bearing a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. Similarly, EPA states that "meaningful involvement" affords all people the opportunity to participate in decisions and articulate concerns about activities that may affect their environment and/or health. These comments should have the ability to influence the regulatory agency's decision and should be considered in the decision-making process. It is the responsibility of the decision makers to seek out and facilitate the involvement of those potentially affected (EPA 2006). Both minority and low-income populations are present in the vicinity of the project area; however, environmental justice is dismissed as an impact topic for the following reasons:

- The park staff and planning team actively 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 no action or proposed action alternatives would not result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect adverse effects on any minority or low-income population.
- The impacts associated with implementation of the proposed alternatives would not disproportionately affect any minority or low-income population or community.
- Implementation of the proposed alternatives would not result in any identified effects that would be specific to any minority or low-income community. The lines delineating the proposed new 100-year floodplain are based on topography and watershed characteristics and are in no way tied in any way to minority populations.
- Any impacts on the socioeconomic environment would not appreciably alter the physical and social structure of the nearby communities.

Impacts associated with the subsequent increases in insurance premiums in the event that the proposed new 100-year floodplain maps are carried forward (under the no action alternative) among all property owners are addressed under socioeconomics.

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CHAPTER 2

ALTERNATIVES

INTRODUCTION

The National Environmental Policy Act (NEPA) requires that federal agencies explore a range of reasonable alternatives. The alternatives under consideration must include the "no action" alternative as prescribed by 40 CFR 1502.14. All alternatives analyzed must meet the management objectives of the park, either wholly or partially, while also meeting the purpose of and need for the project.

Project alternatives may originate from the proponent agency, local government officials, or members of the public, at public meetings, or during the early stages of project development. Alternatives may also be developed in response to comments from coordinating or cooperating agencies. The alternatives analyzed in this document, in accordance with NEPA, are the result of internal scoping, public scoping, and agency scoping and consultation. The alternatives represent the outcome of extensive collaboration between project design engineers, project landscape architects, and cooperating agency staff.

The National Park Service (NPS) explored and objectively evaluated a range of alternatives, and six alternatives (the no action and five action alternatives) were carried forward for further analysis. These are briefly summarized below and are described in more detail in this chapter.

- **No Action Alternative -** The no action alternative represents the existing plan for the levee system and the implementation of existing NPS operations and procedures during a flood event. Under the no action alternative, the current Potomac Park levee system 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. When notification of an impending flood is received, NPS would implement temporary closures at 17th Street (construction of a temporary earthen levee using a combination of Jersey barriers, sandbags and soil/fill), and sandbags would be added at the 23rd Street location across Constitution Avenue if the flood would meet or exceed the 100-year level. No action would be required at the existing levee along the north edge of the Reflecting Pool levee location, for it currently meets the 100-year flood level.
- **Action Alternatives (alternatives 1, 2, 3, 4, & 5) -** During the completion of this EA, it became apparent that considerable costs and time of construction, and therefore time of disturbance to the National Mall and visitors, could be avoided if the levee at 17th Street was constructed to the higher level of protection initially, if funding would be available. However, since funding is not certain, the alternatives in this EA are presented in a phased approach:
  - Phase 1 solutions satisfy the FEMA requirements for reliably stopping the 100-year flood at 17th Street, although it is recognized that they may be built to the congressionally authorized level of protection if funding becomes available at the time of construction and the design lends itself to this. A few Phase 1 alternatives would be built to Phase 2 elevation standards, based on specific design requirements.
  - Phase 2 addresses design solutions to satisfy the congressionally authorized level of protection at 23rd Street, the Reflecting Pool, and 17th Street, and includes measures to enhance the visual character of the levee and the surrounding landscape.

The five action alternatives all propose the same actions at 23rd Street and along the Reflecting Pool levee.

- The Phase 1 action for both locations would be the same as the no action alternative since the no action scenario at these locations currently meets the FEMA 100-year floodplain standards.

- The Phase 2 action at 23rd Street would consist of re-grading the northeast portion of the site to raise the ground elevation by approximately one to two feet.
- The Phase 2 action at the existing levee along the Reflecting Pool would consist of filling in several low spots to meet the permanent level of protection.

The 17th Street closures vary among the five action alternatives although all would provide for a post and panel closure system and would use different walls or retention structures at different locations along the area of 17th Street. Additional details on each alternative's physical features, alignment, landscape design, storage space for the post and panels, subsurface feature, construction, and implementation during a flood event are provided in the following sections.

NO ACTION ALTERNATIVE (EXISTING PLAN AND SYSTEM)

Under the no action alternative, the existing flood protection plan would be implemented, and the existing levee configuration would be retained. The actions to be implemented are described in the current flood emergency procedures in the case of an imminent Potomac River flood event (USACE 2006). Figure 1.1 depicts the current Potomac Park levee structure configuration, including the location of the existing earthen levee that parallels the Reflecting Pool, the sandbag closure that would be constructed along 23rd Street, and the temporary earthen levee closure that would be constructed along 17th Street.

17TH STREET CLOSURE

In the event of a flood notification[1], the earthen levee would be constructed across 17th Street, approximately 75 feet south of Constitution Avenue in two steps, both of which can be completed in 24 hours.

- First, a line of Jersey barriers would be installed, and sandbags would be constructed to an elevation of 13.2 NAVD (See Appendix F: Top of Protection Summary for additional elevations). This elevation represents a closure that is approximately three feet high. The current elevation of 17th Street at this location is approximately 10 or 11 feet. Sandbags and Jersey barriers would be brought to the site from the Brentwood maintenance yard or the East Potomac maintenance yard at Haines Point. This initial step is carried out during flood events, some of which have floodwater levels that are less than the 100-year event.
- The second step would require the NPS to construct an earth embankment to 18.7 NAVD (approximately eight feet in height) to provide additional protection. The material used to construct the embankment would either be delivered by truck to the site from an offsite source, or it would be excavated from the adjacent northwest corner of the Monument Grounds (NPS 2006b).

Heavy equipment would be required for the construction of the earth barrier, such as a front end loader, dump trucks, a bulldozer or grader, and a compactor.

Disassembly of the temporary levee and sandbags would involve return of usable sandbags and Jersey barriers back to their respective maintenance facilities and restoration of any excavated areas on the Monument Grounds and Constitution Gardens to their original conditions.

The USACE has decertified the no action alternative because The USACE has decertified the no action alternative because of multiple factors including availability of suitable materials, logistics, time constraints, mandatory compaction requirements under adverse conditions, and a probable catastrophic failure mode. Since 2007, the USACE requires a more stable, reliable, engineered closure structure.

[1] In a typical flood event (not a storm surge), there are gauging stations up river that predict the flood level and NPS preparations would begin immediately upon those predictions.

23RD STREET CLOSURE

At 23rd Street, flood events with floodwater levels that are less than the 100-year event would not require any added protection since the current elevation in this area satisfies the 13.2 NAVD. However, if the floodwaters meet or exceed the 100-year event levels, then sandbags would be brought to the site from either the Brentwood maintenance yard or East Potomac maintenance yard and would be placed to a height of one to two feet along the alignment of 23rd Street, across the eastbound ramp to Roosevelt Bridge at the end of Constitution Avenue. Implementation of a sandbag closure at this location would require that the eastbound ramp of the Roosevelt Bridge be closed to traffic. This ramp serves as a path of entry for vehicles into the District of Columbia (the District); the westbound ramp, which serves as a path of egress from the District, would remain open.

Disassembly of the temporary closure would involve return of usable sandbags back to their respective maintenance facilities.

EXISTING LEVEE ALONG THE REFLECTING POOL

The current alignment of the Reflecting Pool levee satisfies the 100-year flood protection level of 16.7 NAVD; therefore, no additional action would be required under the no action alternative.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES (ALTERNATIVES 1, 2, 3, 4, & 5)

Any of the action alternatives would include the same actions at the 23rd Street location and the Reflecting Pool levee, as follows:

23RD STREET

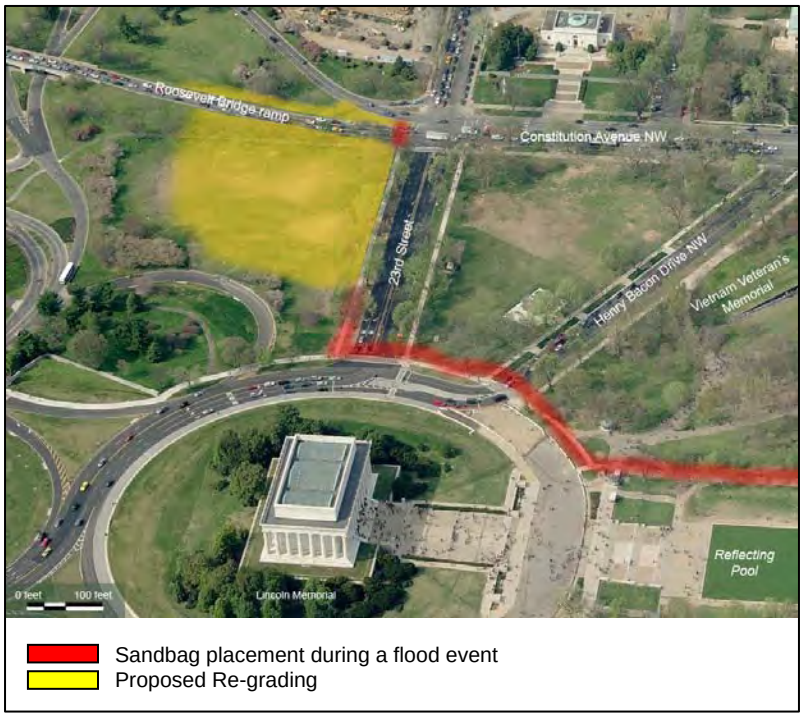
Phase 1 – to meet the level of protection for a 100-year flood (FEMA required solution) – Phase 1 would be the same as the no action alternative for the 100-year level of protection. Sandbags would be placed to a height of approximately one foot, along the alignment of 23rd Street, across the eastbound ramp to Roosevelt Bridge at the end of Constitution Avenue.

Phase 2 – to meet the congressionally authorized level of protection

Alignment and Landscape Design

Two embankments would be constructed. The first embankment would be constructed in the area to the southwest of the intersection of 23rd Street and Constitution Avenue, near the existing softball fields (see Figure 2.1). An area approximately 400 feet in length along 23rd Street would be re-graded to raise the ground elevation by one to two feet, along with a gradual (two percent) slope westward across the site.

Figure 2.1 – Phase 2 Solution at the 23rd Street Location



The main fill area would avoid the root zone of mature trees along 23rd Street although six American elms and several shrubs along Constitution, west of 23rd Street, would be removed, and a landscape plan would be developed and implemented to ensure that affected vegetation and quality of the visual environment is restored. All six trees could be replaced and would be done so in a manner that would not affect the integrity of the levee. The fill would be gently graded and backstops located where necessary so that usable playing field is maintained. The alignment of fill and placement of replanted vegetation would be staked in the field as a cooperative effort between project engineers and NPS representatives (USACE 1992).

The second embankment would be constructed to the north, between the westbound and eastbound Roosevelt Bridge ramps. This area would be re-graded to a height of approximately one to two feet to meet 18.7 NAVD and would gradually blend into the ramp (USACE 1992).

Construction

The implementation of the two embankments at this location would take several months to complete and would not disrupt 23rd Street or Constitution Avenue.

Implementation during a flood event

Since the elevation of the ramp itself would not be altered, sandbags would still need to be placed to a height of approximately one to two feet during a flood event. Similar to Phase 1, these sandbags would be placed along the alignment of 23rd Street, across the eastbound ramp to Roosevelt Bridge at the end of Constitution Avenue.

REFLECTING POOL LEVEE

Phase 1 – FEMA required solution. Phase 1 would be the same as the no action alternative since the current elevation of the levee, despite several low spots, meets the 100-year level of protection (16.7 NAVD).

Phase 2 – Congressionally authorized solution. In Phase 2, the height of the existing levee would be increased at several low spots to bring the line of protection to a uniform level of 18.7 NAVD. The increase in elevation would be approximately 1.5 feet above existing grade in some locations. The fill would be placed such that a minimum crest width of eight feet is maintained at all times.

The filling of low spots at this location would take approximately six to nine months to complete and would be undertaken with low ground pressure equipment to minimize disturbance to the adjacent vegetation. The USACE staked out the alignment in such a way that few if any trees and shrubs would be affected. While the American elms to the south of the levee would not be affected, several red and silver maples would, in all likelihood, need be removed (Ludlam, pers. comm. 2008).

ALTERNATIVE 1 – "ARC WALL"

PHASE 1 – FEMA REQUIRED SOLUTION

Alternative 1 would utilize two concrete flood walls to the east and west of 17th Street, but the options vary in their respective distances south of the centerline of Constitution Avenue and setbacks from 17th Street. These options are also differentiated by their Phase 1 west walls and their overall configuration, in which the flood walls would be either an asymmetric (option 1A) or symmetric (option 1B) to the axis of 17th Street.

Option 1A

Physical Features and Alignment

Option 1A would utilize two concrete walls to the east and west of 17th Street, approximately 198 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be

achieved though a post and panel system that would be 94 feet in length (See Figure 2.2; additional drawings and renderings of the alternatives at 17th Street can be found in Appendix C).

The east wall would be an arc-shaped exposed concrete wall approximately 203 feet in length. Since the elevation of 17th Street is approximately 10.5 feet at the location of the Phase 1 alignment, the concrete wall would be approximately 6.3 feet tall at the sidewalk to meet a top elevation of 16.7 NAVD (8.3 feet if built to 18.7 NAVD in Phase 1). To the east, the wall would appear to recede into the landscape. No road-raising is proposed under this alternative. The west wall would be an exposed concrete wall approximately 189 feet in length that would run parallel to Constitution Avenue and bend back to the southwest at approximately 45 degrees, aligned to the existing sidewalk. The wall would be constructed immediately adjacent to the pedestrian path leading from the Lockkeeper's House to Constitution Gardens, but there would be no modifications to the pedestrian path. Similar to the east wall, the concrete wall would be approximately 6.3 feet tall at the sidewalk to meet a top elevation of 16.7 NAVD (8.3 feet tall if built to 18.7 NAVD at this time). Concrete footings would be used for both the walls and the post/panel system.

Landscape Design

USACE guidelines for flood structures require a minimum 30-foot wide no planting zone when a flood wall is used and a minimum 92-foot wide no planting zone when an earthen berm is used (USACE n.d.)[2]. As a result, a total of 15 trees would need to be removed during this phase, four of which are mature trees of substantial size: two are mature walnut trees, and two are elm trees on 17th Street[3]. In Phase 1, only turf would be replaced. Overall, the total surface/ground area disturbed under Phase 1 would be 0.44 acres. If the walls are raised to 18.7 NAVD at this time, additional trees would be removed (see Phase 2, below)

Storage Space for the Post and Panels

At the end of the east wall on the Monument Grounds, a storage vault would be built to accommodate the storage of the post and panels. The size would be approximately 300 square feet (sf) and measure 20 feet x 15 feet at a depth of approximately seven feet, though the majority of the volume would be underground. The above ground portion of the vault would not be visible from Constitution Avenue or 17th Street. The vault would require a gravity type drain and a service hatch on the roof through which the post and panels would be accessed.

Subsurface Disturbance

As part of Phase 1 for alternative 1A, the design footing required for the east and west walls and the supports for the post and panels would be engineered, and associated costs would be generated. Since the Phase 1 solution would require a wall height and closure structure to 16.7 NAVD, and the Phase 2 solution would require a wall height and closure structure to 18.7 NAVD, footings would be built in Phase 1 to meet Phase 2 requirements, which would minimize future disturbances as well as absorb construction costs in Phase 1. In addition, Phase 1 would also consider the cost of posts at 16.7 NAVD and 18.7 NAVD in order to provide reuse for Phase 2. Implementation of option 1A would require subsurface electric utility lines (that run parallel to 17th Street to the east and west sides) to be sleeved through the structure. In addition, several irrigation lines at various locations in the project area would either be relocated, as needed, to a deeper elevation so that they do not interfere with the foundations for this alternative or sleeved through the

[2] For inspection purposes, USACE guidelines require a turf area within a minimum of 15 feet on both sides from the toe of a levee. The total width of the turf area is dependent on the levee crest width, levee height, and side slopes. Since flood walls are being used at the 17th Street project area, there must be a turf area at a minimum of 15 feet from the face of the wall or eight feet from the foot of the foundation on both sides, whichever is greater. Therefore, at a minimum, a 30-foot wide no plant zone is used. However, this distance represents the minimum requirement based on USACE guidelines. The actual width of the zone might be greater and is dependent on the specific type of wall and foundation which will be determined in the design process.

[3] The volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be based on further soil analysis and other factors that will be determined in the design process.

structure wall. The design for the foundations of this alternative would avoid the water and sanitary sewer lines. Telephone lines would not be relocated.

Construction

Construction of this phase would require trucks, front-end loaders, bulldozers, and an excavator. It would take about four to six months to complete and require a partial closure of 17th Street for approximately eight to 10 weeks.

Implementation during a flood event

Implementation of option 1A during a flood event would require a temporary road closure of 17th Street between Independence Avenue and Constitution Avenue, after which an estimated 19 NPS staff members would retrieve the post and panels from the on-site storage facility and install them across 17th Street using a truck, crane, and forklift. Installation is expected to take approximately 12 hours[4]. Similarly, disassembly would take approximately 12 hours and involve the removal and re-storage of the panels and replacement of the post covers.

The post and panel closure system would also require testing each year, including a mock partial set-up and tear down. This testing would require a partial road closure at 17th Street, but this would be conducted either at night or during the daytime at non-peak rush hour times, so there would be negligible impacts on transportation. Component parts would require inventorying and monitoring for condition assessment periodically (Ludlam, 2008a).

Option 1B (NPS Preferred)

Physical Features and Alignment

This alternative would utilize two exposed concrete walls to the east and west of 17th Street, approximately 253 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved though a post and panel system that would be 140 feet in length (See Figure 2.3). Concrete footings would be used for both the walls and the post/panel system.

The walls would be arc-shaped, symmetrical, and each 120 feet in length. They would be pulled back approximately 20 feet from 17th Street. Since these walls are the shortest in length of all of the alternatives, extensive re-grading is proposed under this alternative to meet the required level of protection. Due to the extensive re-grading, to minimize future disturbance to Constitution Gardens, this alternative would meet the congressionally authorized solution in Phase 1 (18.7 NAVD). The setback of the walls from the sidewalk reduces the impacts to views looking north towards President's Park from 17th Street. The location and width of the opening between the arc walls also serve to maintain the south easterly vista from Virginia Avenue to the Monument Grounds. In addition, since the levee walls are located approximately 50 feet further south than alternative 1A, the impact that the eastern arc wall has on the view of toward the Washington Monument from the north side of Constitution Avenue (looking southeast) is greatly diminished.

The height of the concrete walls would be approximately 8.7 feet tall at the location of the closure to meet a top elevation of 18.7 NAVD.

The west wall would be constructed to the south of the existing the pedestrian path leading from the Lockkeeper's House to Constitution Gardens. This pathway and the other pathway to the south would be relocated, as shown in Figure 2.3.

[4] Based on comparable post and panel systems that have been certified by the USACE.

Landscape Design

The proposed arc walls in alternative 1B are relatively small compared to the structures in the other alternatives. Their scale, coupled with their shape, integrates well into the natural topography on either side of 17th Street, as well as with the proposed curvilinear forms of the Constitution Gardens sidewalks. An added benefit of the newly proposed curving walkways in Constitution Gardens is not only an improvement to site circulation by redirecting paths closer to the intersection of 17th Street and Constitution Avenue and further south closer to the northern entrance of the WWII Memorial, but also the new relationship which is forged between two adjacent, but previously disconnected, cultural landscapes.

Overall, the total surface/ground area disturbed under Phase 1 would be 5.24 acres.

As a result of USACE guidelines for flood structures and the relocation of the pedestrian paths and appropriate grading, a total of 98 trees would need to be removed during this phase. Two of these trees are mature trees of significant size: one is a mature black walnut tree and one is an elm tree along 17th Street. However, the figure of 98 does not represent the net loss of trees. Since this option implements re-grading on the east side of 17th Street as part of Phase 1, a landscape plan would be implemented.

The landscape plan would be a comprehensive design delineating the treatment for the site. The plan would outline the measures that would be taken to restore the overall visual character and integrity of the original cultural landscape to the greatest extent possible, to complement the Monument Grounds and viewsheds, and to preserve the USACE's requirements for maintaining the integrity of the levee.

A subcomponent of the plan would be a treatment plan, addressing treatment for all the elements of the site (i.e. trees and other vegetation, structures, alternative wall surface treatments, site furnishings, and circulation systems such as paths, walkways, and roads). Another subcomponent of the landscape plan would be a planting plan which would prescribe the measures taken to rehabilitate the area disturbed by the construction of the levee. Trees that required removal would be replaced-in-kind with similar species in compatibly designed locations and spacing. The plan would ensure that there would be no net loss of trees on the National Mall. The number of trees replanted would be equal to or greater than the number lost as a result of the proposed action. The plan would provide specific details on the number and specific species of trees that would be replaced, the location where they would be planted, and the timing.

To the extent possible, the new trees shall be replanted as close to their original location as possible but must remain outside of the no plant zone pursuant to the USACE guidelines for flood structures. The actual width of the zone is dependent on the specific type of wall and foundation which will be determined in the design process. If the number of trees that need to be replaced cannot fit within the original project area due to spatial constraints or other visual concerns, the remaining trees would replanted in another appropriate area within the National Mall.

The landscape plan would be produced in the design phase of the project and submitted for approval by the NPS, NCPC, and USACE.

Storage Space for the Post and Panels

Approximately 60 feet south of the Lockkeeper's House, an underground vault would be built to accommodate the storage of the posts and panels. The size of the vault would be approximately 300 sf and measure 20 feet x 15 feet at a depth of approximately seven feet. The vault would not be visible from Constitution Avenue or 17th Street. The vault would require a gravity type drain and a service hatch on the roof through which the post and panels would be accessed.

Subsurface Disturbance, Construction, and Implementation during a flood event

Option 1B has the same criteria for these factors as option 1A.

Figure 2.2 – Alternative 1A Phase 1 Solution at 17th Street

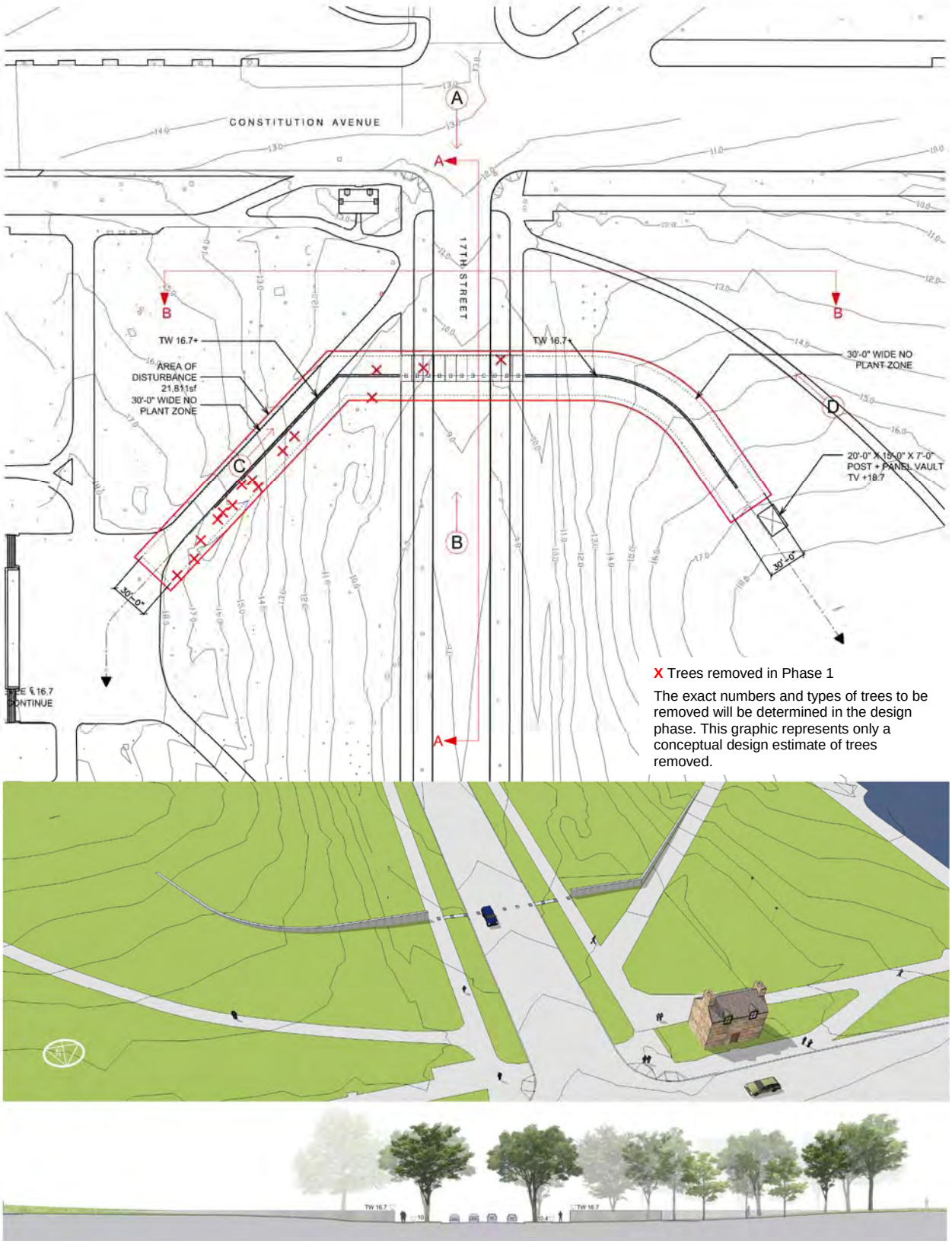
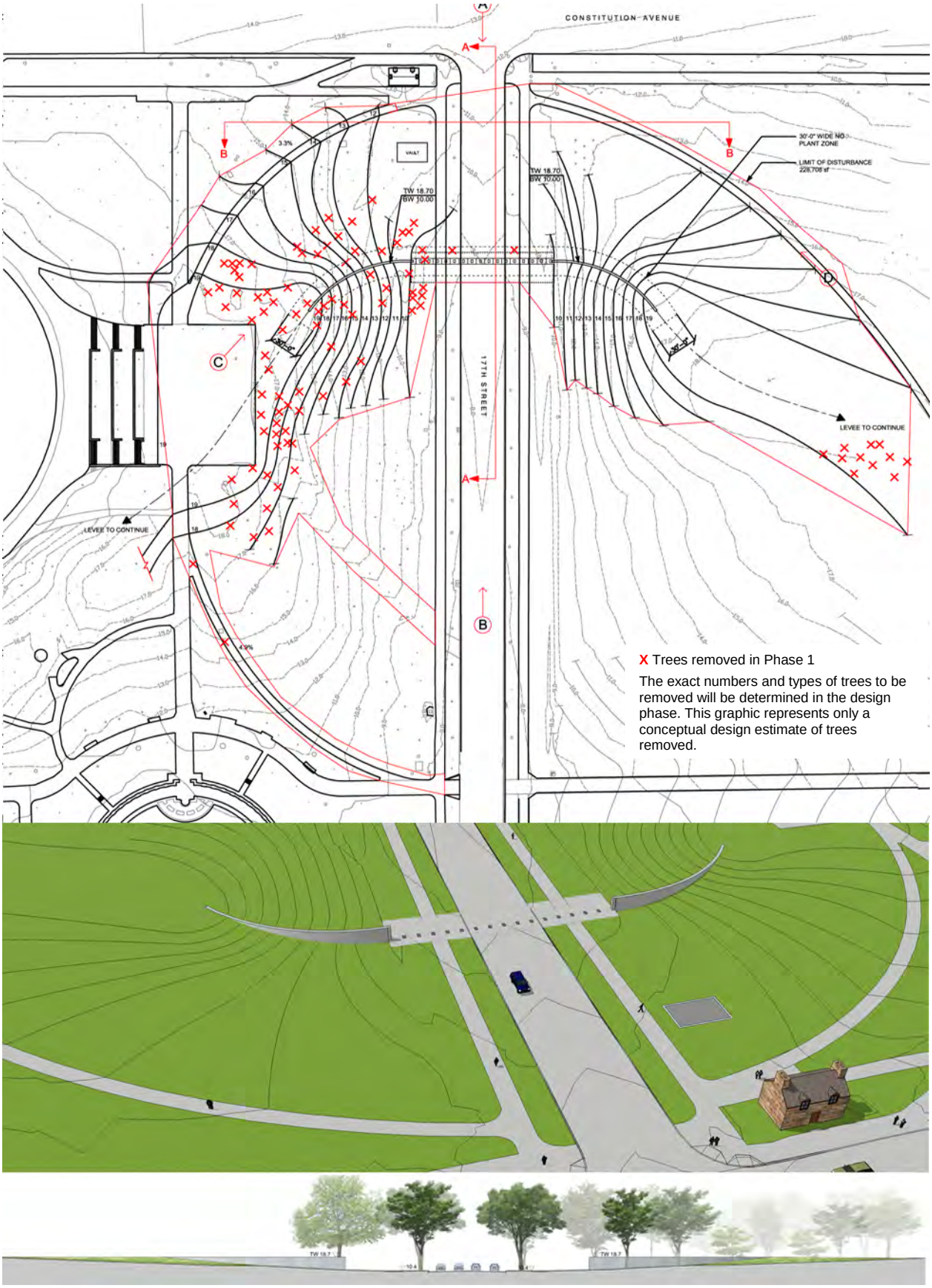


Figure 2.3 – Alternative 1B Phase 1 Solution at 17th Street



PHASE 2 – CONGRESSIONALLY AUTHORIZED SOLUTION

Option 1A

Under Phase 2, the height of the levee would be increased to meet the long-term conditions or the congressionally authorized, permanent level of protection at 18.7 NAVD, and aesthetic improvements would be completed. If the height of the Phase 1 solution meets 16.7 NAVD, the floodwalls would need to increase by approximately two feet.

Physical Features and Alignment

The alignment of the option 1A Phase 2 closure would be the same as the option 1A Phase 1 solution (198 feet south of the centerline of Constitution Avenue). The east flood wall would be the same as Phase 1, but the west flood wall would increase to 239 feet.

The implementation of option 1A Phase 2 would raise the concrete flood walls from an elevation of 16.7 NAVD to 18.7 NAVD. The post and panel closure length would be the same as Phase 1 (94 feet), so no new concrete footings across 17th Street would be required, and no road closure would be required.

Under option 1A Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate against adverse effects associated with concrete walls. An example of two historic resources at 17th Street and Constitution Avenue are shown in Figure 2.4.

Figure 2.4 – Historic Resources in the 17th Street project area

The Lockkeeper's House at the southwest corner of 17th Street and Constitution Avenue

Bulfinch Gate House at the northeast corner of 17th Street and Constitution Avenue

On the west side of 17th Street, the wall would frame the southern edge of the northeast–southwest pedestrian path connecting to the Constitution Gardens, disappearing into the ground as the grade rises to the Gardens level. On the east side of 17th Street, the flood wall would appear as a stand-alone structure, gradually disappearing into the ground as the grade rises towards the Washington Monument.

The design allows for a small plaza extending south from the Lockkeeper's House to the western floodwall, which would be considered as a future project; the development of a plaza is not part of this flood control project.

Landscape Design

Option 1A Phase 2 would require more extensive re-grading than Phase 1. A total of 38 trees would be removed in Phase 2, for a total of 53 trees removed for both phases. Overall, the total surface/ground area disturbed under Phase 2 would be 1.87 acres. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Upon completion of the final designs of the levee in Phase 2 of option 1A, a landscape plan would be completed and submitted for approval. As described in option 1B Phase 1, the landscape plan would be a comprehensive design outlining or delineating the treatment for the site and outlining the measures that would be taken to restore the overall visual character and integrity of the original cultural landscape to the greatest extent possible. The subcomponent planting plan would prescribe the measures taken to rehabilitate

the area disturbed by the construction of the levee during both Phase 1 and Phase 2. The plan would provide specific details on the number and specific species of trees that would be replaced, the location where they would be planted, and the timing (in terms of whether the replanting would occur after Phase 1 or Phase 2).

Storage Space for the Post and Panels

The storage for the post and panels would utilize the vault built as part of Phase 1.

Subsurface Disturbance

Footings to support the requirements for the Phase 2 closure system would be built in Phase 1; this would minimize subsurface disturbances. In addition, the bulk of construction costs would be absorbed in Phase 1.

Construction

Construction of this phase would require the same type of equipment as described for Phase 1. The duration is estimated to take between eight to 12 months (for both construction to 18.7 NAVD and aesthetic improvements) with no road closure of 17th Street since the footings for the post and panels would be built in Phase 1.

Implementation during a flood event

The logistics, duration, equipment, and staff required to install the post and panels during a flood event would be the same as Phase 1.

Option 1B

Generally, there would be fewer short-term impacts in Phase 2 of this alternative since the Phase 1 wall would be built to the congressionally authorized solution and no additional trees would need to be removed in this phase. In addition, Phase 2 is the same as Phase 1 insofar as subsurface disturbance, storage of post and panels, implementation during a flood event, and construction.

Phase 2 is differentiated from Phase 1 by aesthetic enhancements that would improve the appearance of the flood wall and structure and blend it more seamlessly into the landscape of the Monument Grounds (See Figure 2.6). The design allows for a small plaza extending south from the Lockkeeper's House to the western floodwall, which would be considered as a future project; the development of a plaza is not part of this flood control project.

Figure 2.5 – Alternative 1A Phase 2 Solution at 17th Street

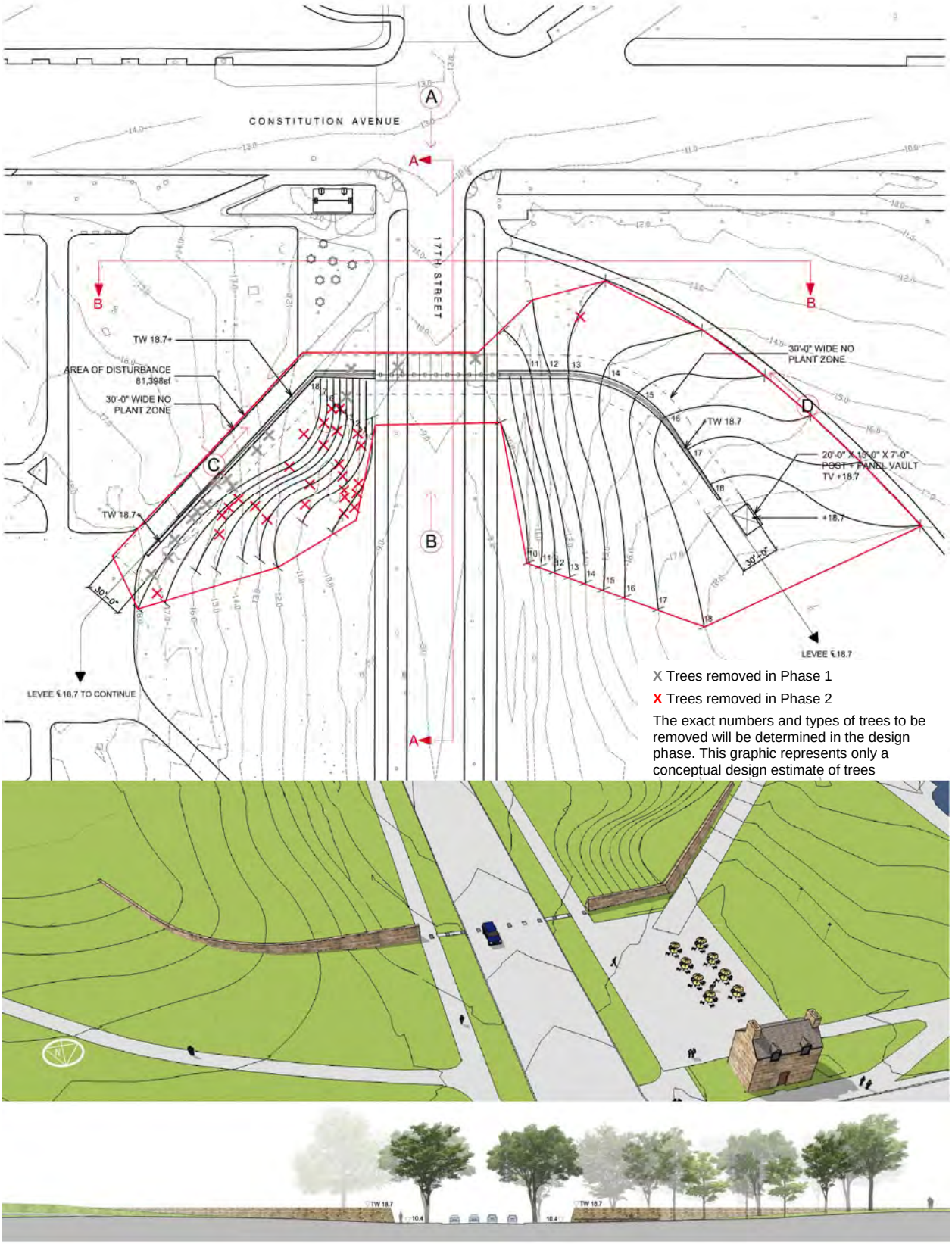
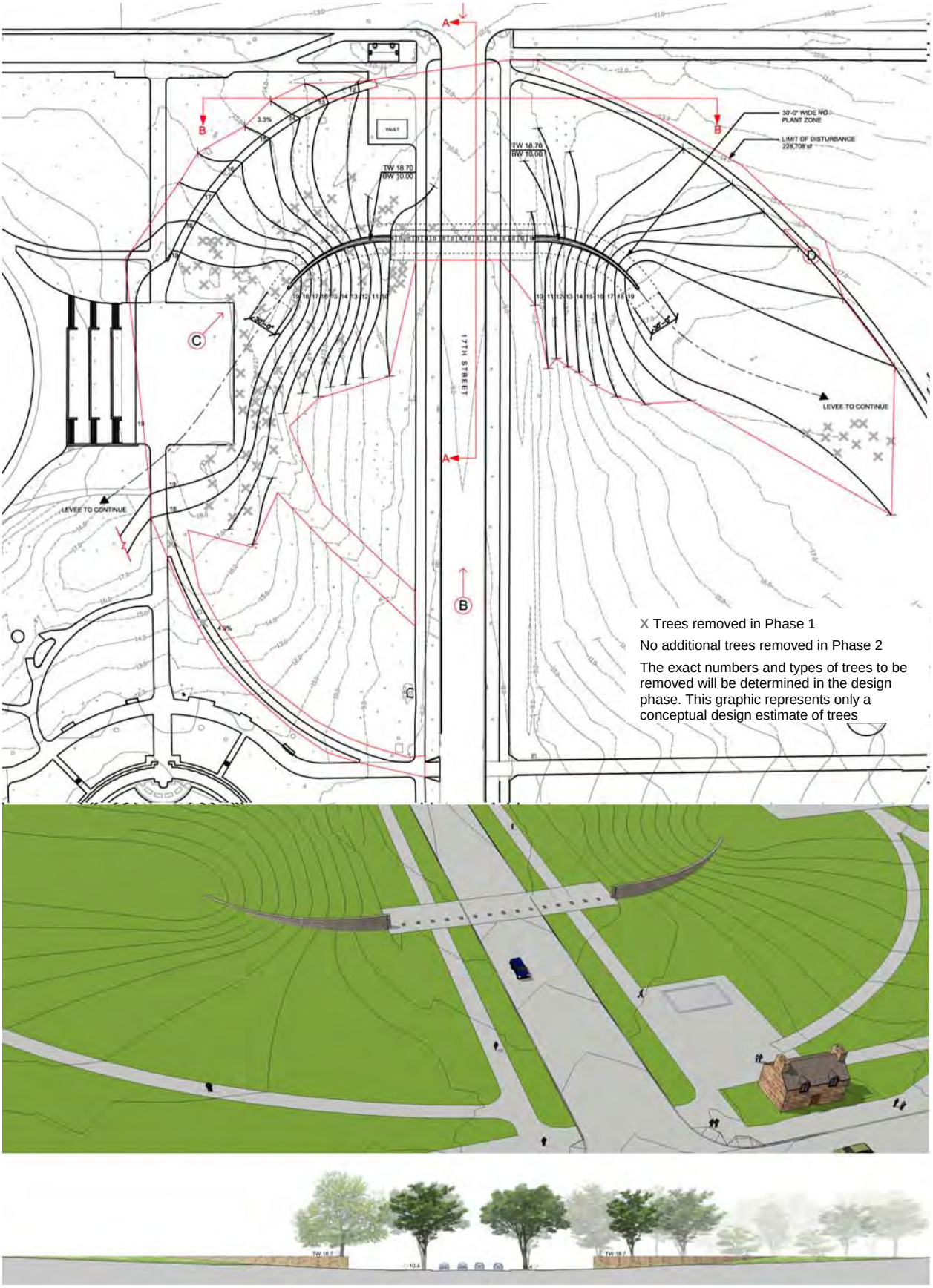


Figure 2.6 – Alternative 1B Phase 2 Solution at 17th Street



ALTERNATIVE 2 – "GATE WALLS"

PHASE 1 – FEMA REQUIRED SOLUTION

This alternative would raise 17th Street approximately one foot in height at a location approximately 138 feet south of the centerline of Constitution Avenue to fill in the current depression. Both options in alternative 2 would utilize two concrete flood walls to the east and west of 17th Street located on the raised portion of 17th Street. However, these options are differentiated by their Phase 1 west walls and their Phase 2 solutions, which would be either an asymmetric (option 2A) or symmetric (option 2B) flood wall design.

Option 2A

Physical Features and Alignment

In option 2A (See Figure 2.7), there would be an L-shaped exposed concrete wall to the east that would require the re-grading of the northwest corner of the Monument Grounds. The west wall would be an exposed concrete wall that runs southwest from Constitution Avenue then bends back to the southwest at approximately 45 degrees for a total length of 202 feet. The wall on the east side would be 54 feet. The combined length of the east and west walls in option 2A would be 256 feet. The concrete wall would be approximately 5.3 feet tall at the sidewalk to meet a top elevation of 16.7 NAVD (7.3 feet tall if built to 18.7 NAVD at this time).

The post and panel closure would extend to a length of 109 feet.

Landscape Design

Due to the USACE guidelines described in alternative 1, a total of 25 trees would need to be removed during this phase, four of which are along 17th Street, and three of which are older mature trees. In Phase 1, only turf would be replaced. Overall, the total surface/ground area disturbed under Phase 1 would be 1.59 acres. If the walls are raised to 18.7 NAVD at this time, additional trees would be removed (see Phase 2, below).

Storage Space for the Post and Panel

The east wall abutment on the Monument Grounds would incorporate a storage vault for the post and panels. The size and dimensions would be the same as described in alternative 1 (300 sf) and similarly, the majority of the volume would be underground. The above ground portion of the vault would not be visible from Constitution Avenue or 17th Street. The vault would require a gravity type drain and a service hatch on the roof through which the post and panels would be accessed.

Subsurface Disturbance

As part of Phase 1, the design footing required for the east and west walls and the supports for the post and panels would be engineered and associated costs would be generated. Since the Phase 1 solution would require a wall height and closure structure to 16.7 NAVD, and the Phase 2 solution would require a wall height and closure structure to 18.7 NAVD, based on funding availability, there may be an opportunity to build the footings in Phase 1 to meet Phase 2 requirements, which would minimize future disturbances. In addition, Phase 1 would also consider the cost of posts at 16.7 NAVD and 18.7 NAVD in order to provide reuse for Phase 2.

Implementation of this alternative would require subsurface electric utility lines (that run parallel to 17th Street to the east and west sides) to be sleeved through the structure. In addition, several irrigation lines at various locations in the project area would either be relocated, as needed, to a deeper elevation so that they do not interfere with the foundations for this alternative or sleeved through the structure wall. The design for the foundations of this alternative would avoid the water and sanitary sewer lines. Telephone lines would not be relocated.

Construction

Construction of this phase would require trucks, front-end loaders, bulldozers, and an excavator. It would take about four to six months to complete and require a partial closure of 17th Street for eight to 10 weeks.

Implementation during a flood event

Implementation of this alternative during a flood event would require a temporary road closure of 17th Street between Independence Avenue and Constitution Avenue, after which an estimated 19 NPS staff members would retrieve the post and panels from the on-site storage facility and install them across 17th Street using a truck, crane, and forklift. Installation is expected to take approximately 12 hours. Similarly, disassembly would take approximately 12 hours and involve the removal and re-storage of the panels and replacement of the post covers.

The post and panel closure system would also require testing each year, including a mock partial set-up and tear down. This testing would require a partial road closure at 17th Street, but this would be conducted at night, so there would be negligible impacts on transportation. Component parts would require inventorying and monitoring for condition assessment periodically.

Option 2B

Physical Features and Alignment

In option 2B (see Figure 2.8), there would be an L-shaped exposed concrete wall to the east which would require the re-grading of the northwest corner of the Monument Grounds. The west wall would be an exposed concrete wall that runs southwest from Constitution Avenue, bending back to the southwest at approximately 45 degrees for a length of 206 feet. The combined length of the east and west walls in option 2B would be 282 feet. The concrete wall would be approximately 5.3 feet tall at the sidewalk to meet a top elevation of 16.7 NAVD (7.3 feet tall if built to 18.7 NAVD at this time).The post and panel closure would extend to a length of 109 feet.

The west walls of options 2A and 2B would be similar, but there would be a slight variation in the bend of their angles to the southwest. In both 2A and 2B, with the raising of 17th Street, the elevation 100 feet south of Constitution Avenue is approximately 11.5 feet. Therefore, the concrete wall would be 5.3 feet tall at the sidewalk to meet a top elevation of 16.7 NAVD (7.3 feet if Phase 1 if built to 18.7 NAVD).

Landscape Design

Due to the USACE guidelines described in alternative 1, a total of 26 trees would need to be removed during this phase, four of which are along 17th Street, and three of which are older, mature trees. In Phase 1, only turf would be replaced. Overall, the total surface/ground area disturbed under Phase 1 would be 1.25 acres. If the walls are raised to 18.7 NAVD at this time, additional trees would be removed (see Phase 2, below)

Storage Space for the Post and Panel, Subsurface Disturbance, Construction, and Implementation during a flood event

Option 2B has the same criteria for these factors as option 2A.

Figure 2.7 – Alternative 2A Phase 1 Solution at 17th Street

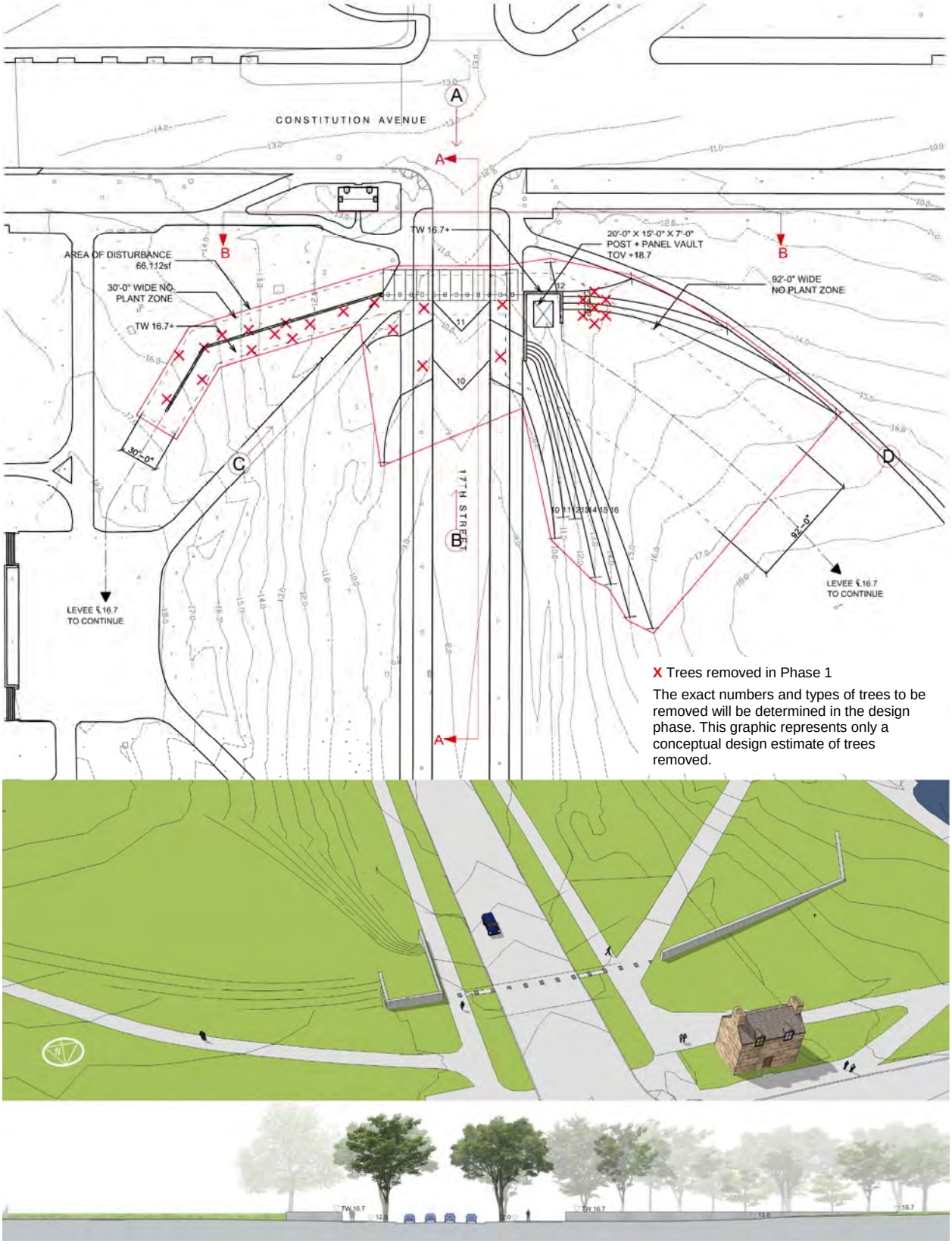
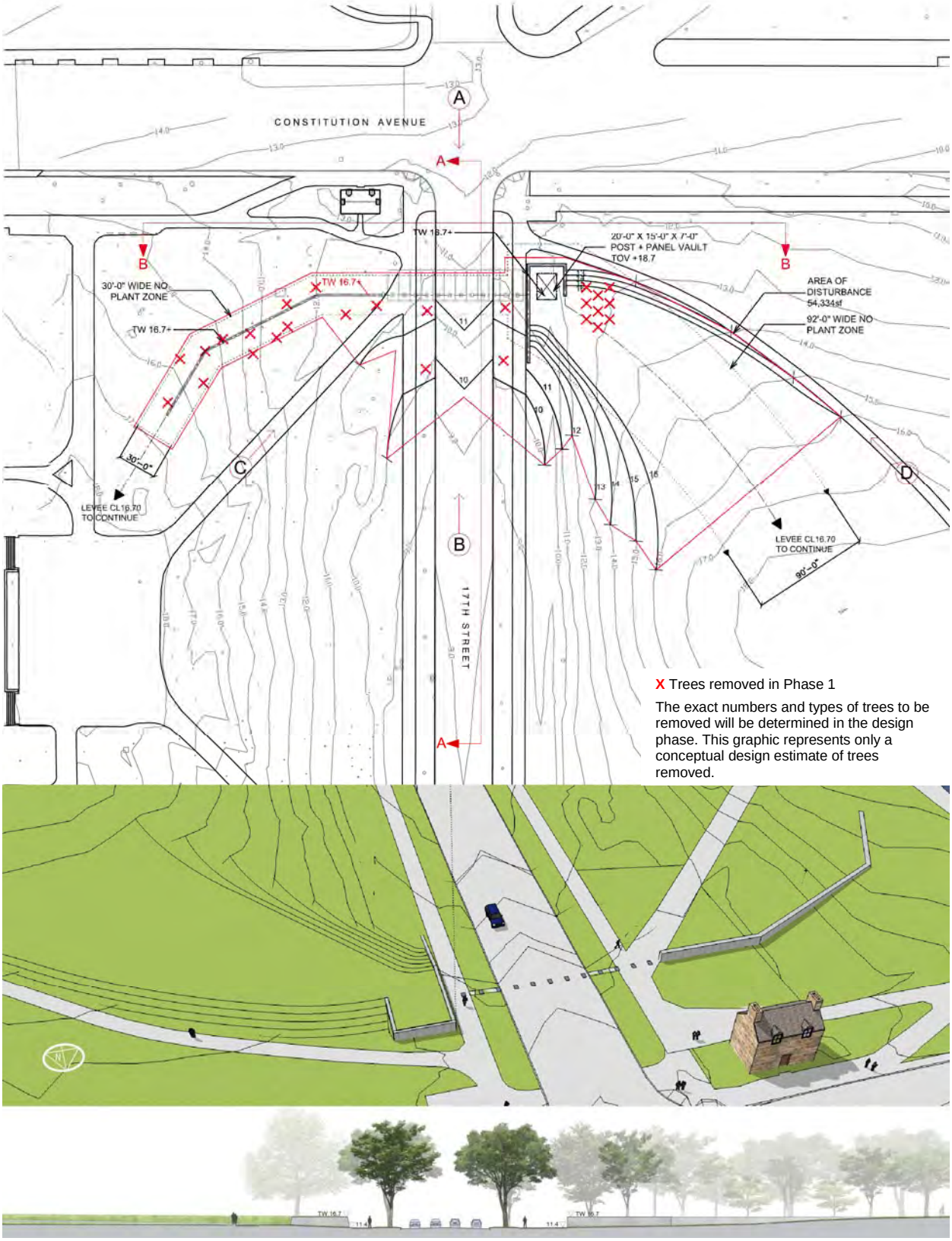


Figure 2.8 – Alternative 2B Phase 1 Solution at 17th Street



PHASE 2 – CONGRESSIONALLY AUTHORIZED SOLUTION

Under Phase 2, the height of the levee would be increased to meet the long-term conditions or the congressionally authorized, permanent level of protection at 18.7 NAVD, and aesthetic improvements would be completed. If the height of the Phase 1 solution meets 16.7 NAVD, the floodwalls would need to increase by approximately two feet.

Option 2A

Physical Features and Alignment

In Phase 2 of option 2A (see Figure 2.9), the west wall would be backfilled with earth and a new V-shaped wall would be constructed that is approximately 134 feet long. To the east, the L-shaped wall would be extended southward along 17th Street for a total length of 112 feet. The combined length of the east and west walls in Phase 2 option 2A is 246 feet. The post and panel closure length would remain the same as Phase 1 (109 feet).

Under Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate against adverse effects associated with concrete walls.

The design allows for a small plaza extending south from the Lockkeeper's House to the western floodwall, which would be considered as a future project; the development of a plaza is not part of this flood control project.

Landscape Design

Twenty nine trees would be removed in Phase 2, for a total of 54 in both phases combined, including the four along 17th Street. Overall, the total surface/ground area disturbed would be two acres. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

As described in alternative 1, prior to implementing Phase 2, a landscape plan would be designed and submitted for approval. The purpose of the plan would be to restore the cultural landscape and visual character of the vegetation in the project area. However, any new trees shall be replanted as close to their original location as possible but must remain outside of the levee's minimum 30-foot no plant zone.

Storage Space for the Post and Panel

The storage for the post and panels would be built in Phase 1.

Subsurface Disturbance

Footings to support the requirements for the Phase 2 closure system would be built in Phase 1; this would minimize subsurface disturbances. In addition, the bulk of construction costs would be absorbed in Phase 1.

Construction and Implementation during a flood event

Construction of this phase would require the same type of equipment as described for Phase 1. It would take eight to 12 months to complete the change from Phase 1 to Phase 2 (for both construction to 18.7 NAVD and aesthetic improvements) with no road closure at 17th Street. The logistics and duration to install the post and panels during a flood event would be the same as Phase 1 (eight to 12 hours).

Option 2B

Physical Features and Alignment

In Phase 2, the west Phase 1 wall would be demolished and a new L-shaped wall would be constructed abutting the last segment, forming an L-shaped wall that complements the L-shaped wall to the east, thereby forming a symmetrical set of walls. The new west wall would be approximately 135 feet long. To the east, the L-shaped wall would be extended southward along 17th Street for a total length of 135 feet. The combined length of the east and west walls in Phase 2 option 2B is 270 feet. The post and panel closure would extend to 154 feet across 17th Street.

Under Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate against adverse effects associated with concrete walls.

The design allows for a small plaza extending south from the Lockkeeper's House to the western floodwall, which would be considered as a future project; the development of a plaza is not part of this flood control project.

Landscape Design

In Phase 2, 38 trees would be removed, for a total of 64 in both phases combined, including the four along 17th Street. Overall, the total surface/ground area disturbed would be 1.9 acres. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

The requirement for a landscape plan would be the same as for option 2A.

Subsurface Disturbance

While the footings to support the requirements for the Phase 2 closure system across 17th Street would be built in Phase 1, new footings to support the additional post and panels would need to be constructed to the south of the Lockkeeper's house to tie into the L-shaped abutment Since the Phase 1 west wall will be demolished.

Storage Space for the Post and Panel and Construction, and Implementation during a flood event

Option 2B has the same criteria for these factors as option 2A.

Figure 2.9 – Alternative 2A Phase 2 Solution at 17th Street

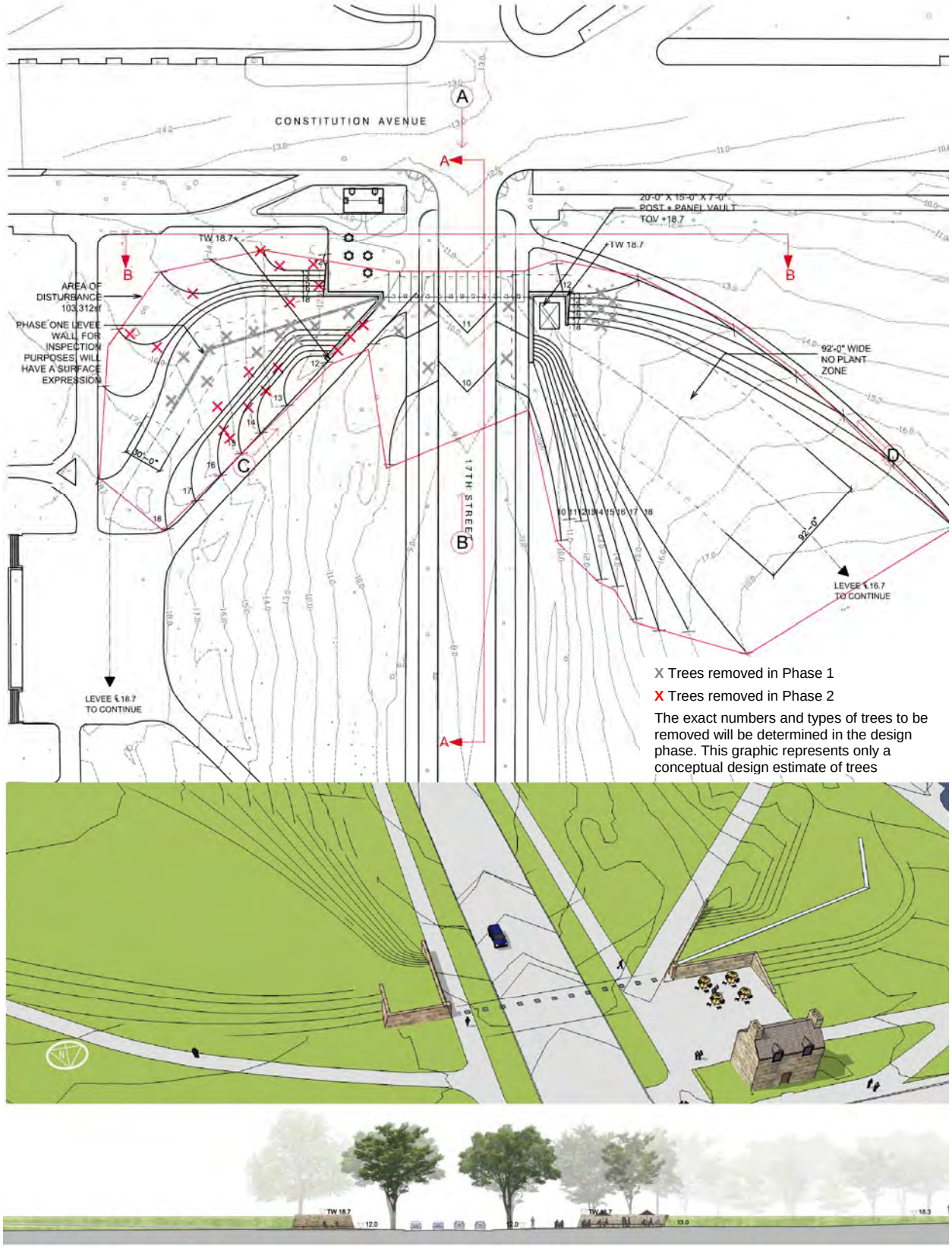
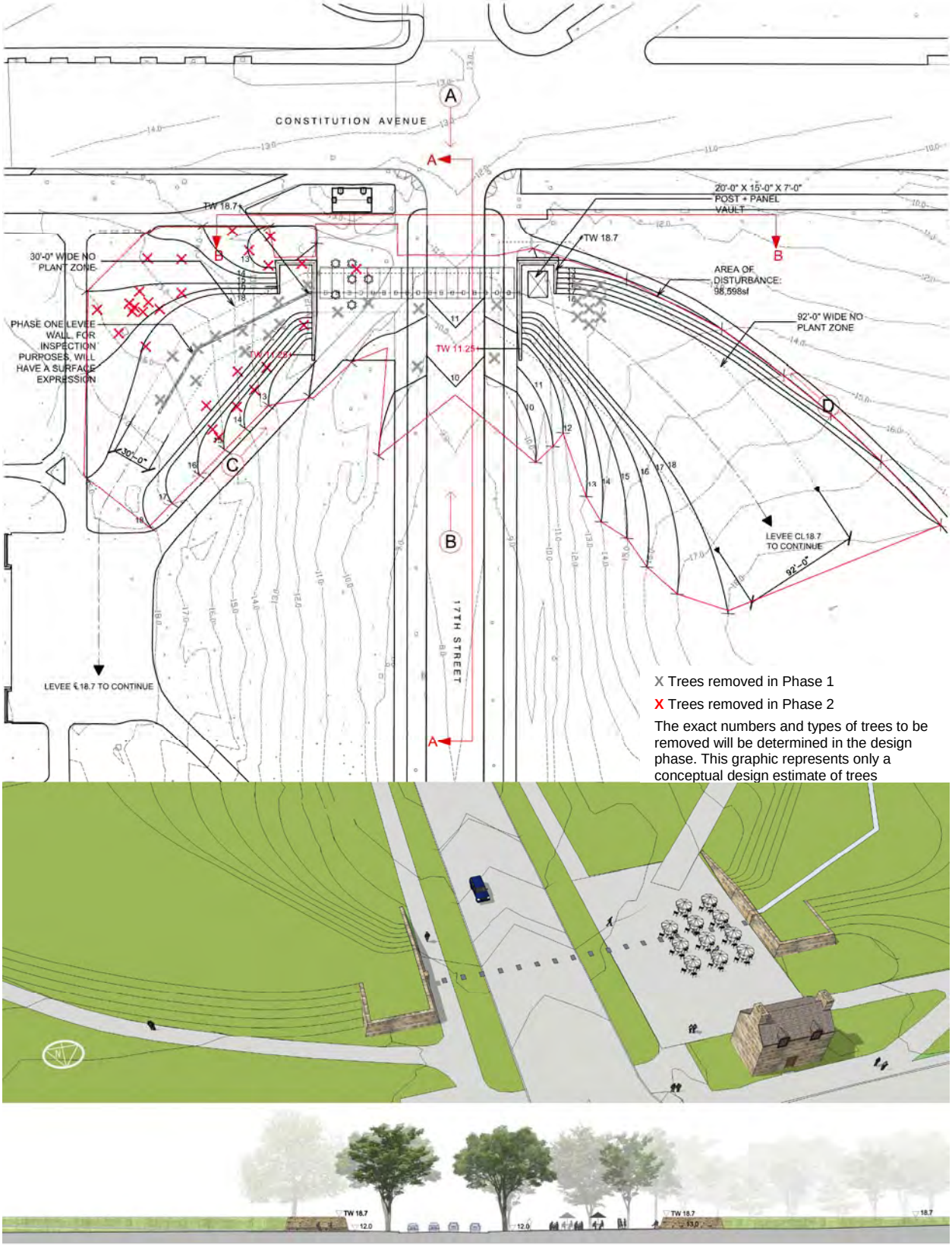


Figure 2.10 – Alternative 2B Phase 2 Solution at 17th Street



ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

PHASE 1 – FEMA REQUIRED SOLUTION

Physical Features and Alignment

This alternative would utilize two concrete walls to the east and west of 17th Street, approximately 365 feet south of the centerline of Constitution Avenue aligned on the centerline of the area known as the "Overlook Terrace"(see chapter 1 for description). During a flood event, the closure across 17th Street would be achieved though a post and panel system that would be 102 feet in length (See Figure 2.11).

The east and west walls would be symmetrical and chevron shaped with the west wall at 205 feet and the east wall at 198 feet for a combined total of 403 feet. The concrete wall would be approximately 7.7 feet tall at the sidewalk to meet a top elevation of 16.7 NAVD (this alternative does not lend itself to increasing the wall height to 18.7 NAVD under Phase 1, since the Phase 2 design is substantially different). The far east and west ends of the wall would appear to recede into the landscape. No road-raising is proposed under this alternative.

Landscape Design

Due to USACE restrictions, a total of 18 trees would need to be removed during this phase, mostly in the grove to the south of the Constitution Gardens pedestrian path. Two trees would need to be removed along 17th Street, one of which is a mature elm. In Phase 1, only turf would be replaced. Overall, the total surface/ground area disturbed under Phase 1 would be 0.4 acres.

Storage Space for the Post and Panel

To the south of the levee walls adjacent to the overlook terrace, a storage vault for the post and panels would be built and incorporated into the design of the landscape. The size and dimensions would be the same as described in alternative 1 (300 sf) and the majority of the volume would be underground. The above ground portion of the vault would not be visible from Constitution Avenue or 17th Street. The vault would require a gravity type drain and a service hatch on the roof through which the post and panels would be accessed.

Subsurface Disturbance

Concrete footings would be used for both the walls and the post/panel system. As part of Phase 1, the design footing that would be required for the east and west walls and the supports for the post and panels would be engineered and associated costs would be generated. Since the Phase 1 and Phase 2 solutions share the same post and panel closure alignment across 17th Street, footings would be built in Phase 1 to meet Phase 2 requirements, which would minimize future disturbances as well as absorb construction costs in Phase 1. In addition, Phase 1 would also consider the cost of posts at 16.7 NAVD and 18.7 NAVD in order to provide reuse for Phase 2.

Implementation of this alternative would require subsurface electric utility lines (that run parallel to 17th Street to the east and west sides) to be sleeved through the structure. In addition, several irrigation lines at various locations in the project area would either be relocated, as needed, to a deeper elevation so that they do not interfere with the foundations for this alternative or sleeved through the structure wall. The design for the foundations of this alternative would avoid the water and sanitary sewer lines. Telephone lines would not be relocated.

Construction

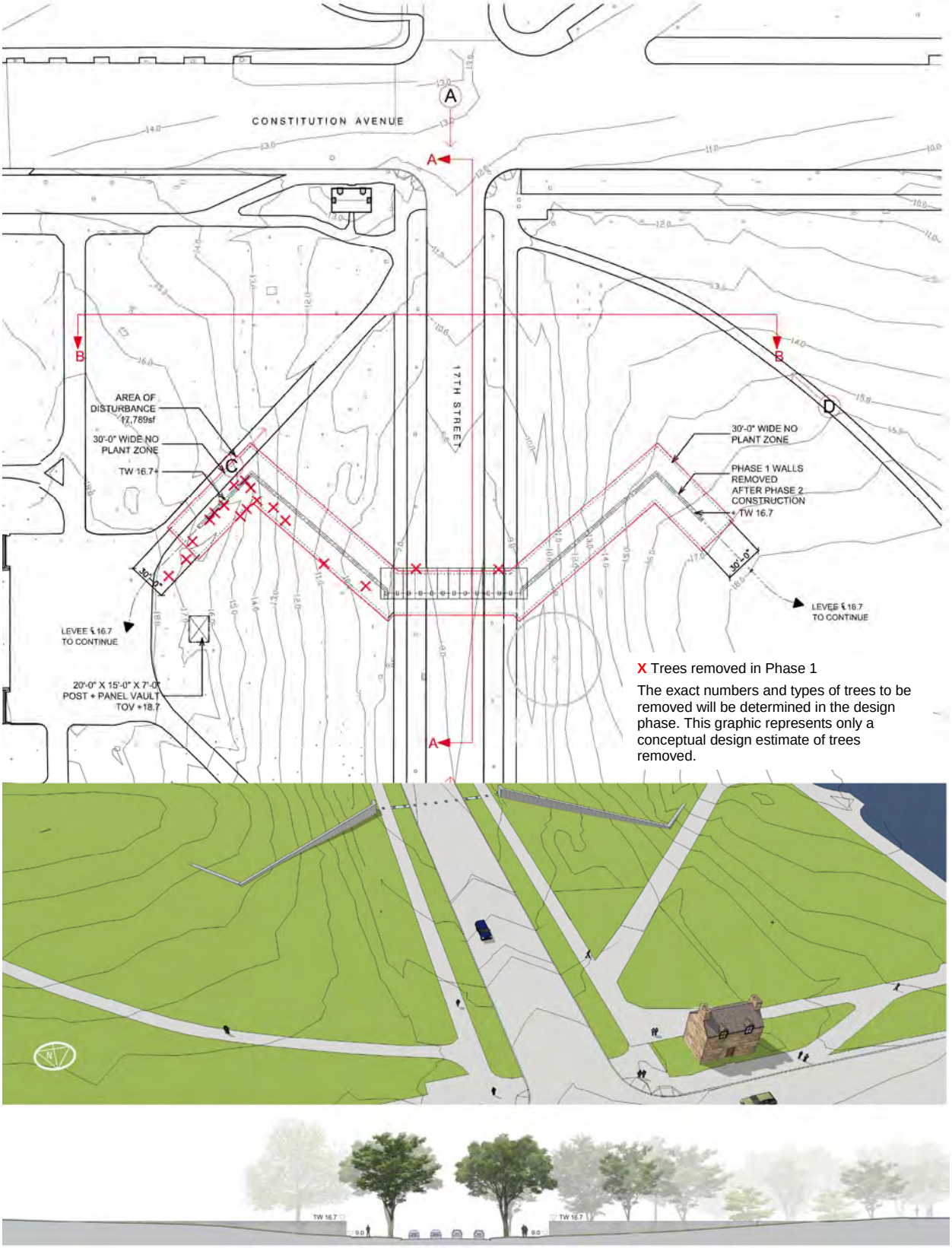
Construction of this phase would require trucks, front-end loaders, bulldozers, and an excavator. It would take about four to six months to complete and require a partial closure of 17th Street for eight to 10 weeks.

Implementation during a flood event

Implementation of this alternative during a flood event would require a temporary road closure of 17th Street between Independence Avenue and Constitution Avenue, after which an estimated 19 NPS staff members would retrieve the post and panels from the on-site storage facility and install them across 17th Street using a truck, crane, and forklift. Installation is expected to take approximately 12 hours. Similarly, disassembly would take approximately 12 hours and involve the removal and re-storage of the panels and replacement of the post covers.

The post and panel closure system would also require testing each year, including a mock partial set-up and tear down. This testing would require a partial road closure at 17th Street, but this would be conducted at night, so there would be negligible impacts on transportation. Component parts would require inventorying and monitoring for condition assessment periodically.

Figure 2.11 – Alternative 3 Phase 1 Solution at 17th Street



PHASE 2 – CONGRESSIONALLY AUTHORIZED SOLUTION

Physical Features and Alignment

Alternative 3 would represent the most substantial change from Phase 1 to Phase 2. In this alternative, the Phase 1 walls would be demolished, and the landscape would be re-graded to accommodate a series of new terraced walls that would appear as steps, descending to 17th Street, similar to the adjacent terraced steps in Constitution Gardens (See Figure 2.13). Each long terrace wall would run parallel to 17th Street and would be approximately 93 feet in length and 2.5 feet high, aligned to the centerline of Overlook Terrace 365 feet south of the centerline of Constitution Avenue. Phase 2 of alternative 3 is delineated in Figure 2.12.

Figure 2.12 – Constitution Gardens Terraced Walls

To achieve the closure during a flood, the post and panels would extend across 17th Street and onto the first two terrace walls. Jersey barriers would be placed on top of the highest terrace walls to absorb the difference in height to 18.7 NAVD. The profile of the terrace walls would step down towards 17th Street and the entire height would not be uniform. The total length of the closure system across 17th Street would be 236 feet with an additional 111 feet on top of the terrace walls for a combined length of 347 feet.

The remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate against adverse effects associated with concrete walls.

Landscape Design

Due to the creation of a terraced landscape and the re-grading, a total of 83 trees would be removed in Phase 2, for a total of 101 trees removed for both phases, none of which are mature sycamores or walnuts. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Some replanting of trees would occur on the western slope in areas outside of the minimum 30-foot no-plant zone; as described in alternative 1, prior to implementing Phase 2, a landscape plan would be designed and submitted for approval. Overall, the total surface/ground area disturbed under Phase 2 would be 2.52 acres.

Storage Space for the Post and Panel

Since the closure across 17th Street is greater than Phase 1, additional storage space for the post and panels would be required for this phase. An additional storage vault of the same size would be constructed next to the Phase 1 storage vault. Similar to Phase 1, it would require a gravity type drain and a service hatch on the roof through which the post and panels would be accessed.

Subsurface Disturbance

Post and panels would still provide the closure across 17th Street during a flood event, similar to Phase 1. It is important to note that, similar to all Phase 2 alternatives, no additional footings across 17th Street would be required. However, the Phase 2 post and panel closure would be 236 feet whereas the Phase 1 closure would be 102 feet. The difference in length would occur to the east and west of 17th Street, between the curb and the edge of the lowest terraced walls. New footings to support this difference in length would be required to the east and west of 17th Street.

Implementation of this alternative would require subsurface electric utility lines (that run parallel to 17th Street to the east and west sides) to be sleeved through the structure. In addition, several irrigation lines at various locations in the project area would either be relocated, as needed, to a deeper elevation so that they do not interfere with the foundations for this alternative or sleeved through the terraced walls. The design for the foundations of this alternative would avoid the water and sanitary sewer lines. Telephone lines would not be relocated.

Construction

Since this alternative represents the most substantial change from Phase 1 to Phase 2, the duration is estimated to take approximately 12 months. Since the footings for the post and panels across 17th Street are the same as Phase 1, no road closure to 17th Street would be required.

Construction of this phase would require the same type of equipment as described for Phase 1.

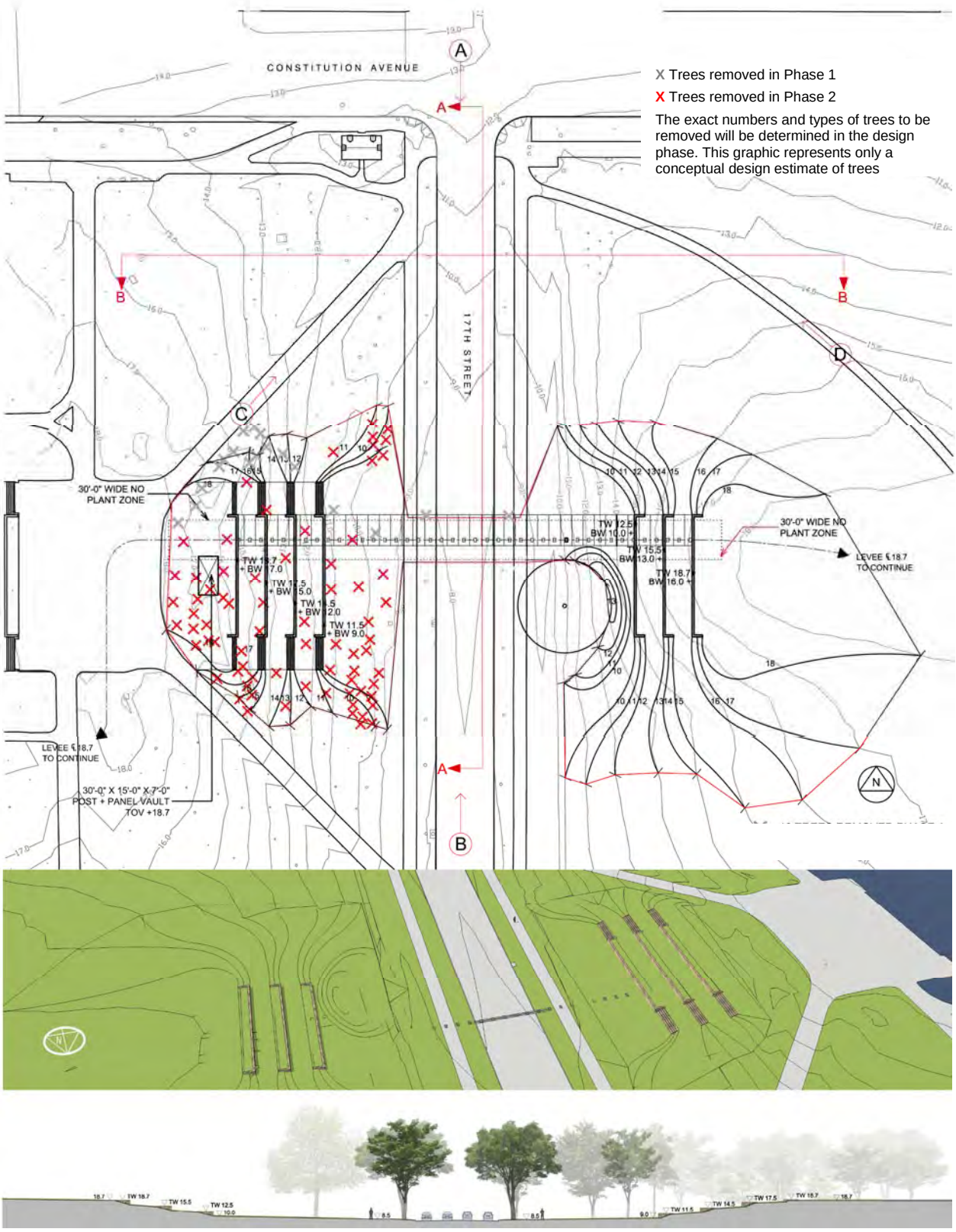
Implementation during a flood event

Since this alternative has the largest length of closure required across 17th Street (236 feet, approximately double the other alternatives) and requires the installation of Jersey barriers on top of the terraced walls to achieve a closure height of 18.7 NAVD, the implementation during a flood would require a proportionately larger effort than the other alternatives.

Implementation of this alternative during a flood event would require a temporary road closure of 17th Street between Independence Avenue and Constitution Avenue, after which an estimated 24 NPS staff members would retrieve the post and panels from the on-site storage facility and install them across 17th Street using a truck, crane, and forklift. The Jersey barriers would be retrieved from the Brentwood maintenance facility or the East Potomac maintenance yard and would be brought to the site. Installation would be expected to take approximately 24 hours. Similarly, disassembly would take approximately 24 hours and involve the removal and re-storage of the panels and replacement of the post covers and the return of the Jersey barriers back to their respective maintenance facility.

The post and panel closure system would also require testing each year, including a mock partial set-up and tear down. This testing would require a partial road closure at 17th Street, but this would be conducted at night, so there would be negligible impacts on transportation. Component parts would require inventorying and monitoring for condition assessment periodically.

Figure 2.13 – Alternative 3 Phase 2 solution at the 17th Street



ALTERNATIVE 4 – "HYBRID"

PHASE 1 – FEMA REQUIRED SOLUTION

Physical Features and Alignment

This alternative would combine the west wall from alternative 2B and the east wall from alternative 1 and would be located approximately 177.5 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved though a post and panel system that would be 190 feet in length (See Figure 2.14). The east wall would be an arc-shaped exposed concrete wall approximately 248 feet in length that would, at its east end, appear to recede into the landscape. The west wall would be an exposed concrete wall that would run parallel to Constitution Avenue then arc back to the southwest, parallel to the angle pedestrian path leading to the overlook Terrace. There would be no modifications to the pedestrian path.

The retaining wall on the west side would have three functions: it would create an abutment for the post and panel system, it would form the west boundary of a new plaza to the south of the Lockkeeper's House, and it would disguise the housing for the post and panel system when not in use. The concrete walls would be approximately 6.2 feet tall at the sidewalk to meet a top elevation of 16.7 NAVD (8.2 feet tall if built to 18.7 NAVD at this time).

Landscape Design

Due to the USACE guidelines described in alternative 1, a total of 28 trees would need to be removed during this phase, four of which are along 17th Street, and one of which is an older walnut. In Phase 1, only turf would be replaced. Overall, the total surface/ground area disturbed would be 0.7 acres. If the walls are raised to 18.7 NAVD at this time, additional trees would be removed (see Phase 2, below)

Storage Space for the Post and Panel

To the southwest of the Lockkeeper's House behind the flood wall, a storage vault for the post and panels would be built. The size and dimensions would be the same as described in alternative 1 (300 sf) and similarly, the majority of the volume would be underground. The above ground portion of the vault would not be visible from Constitution Avenue or 17th Street. The vault would require a gravity type drain and a service hatch on the roof through which the post and panels would be accessed.

Subsurface Disturbance

Concrete footings would be used for both the walls and the post/panel system. As part of Phase 1, the design footing that would be required for the east and west walls and the supports for the post and panels would be engineered and associated costs would be generated. Since the Phase 1 solution would require a wall height and closure structure to 16.7 NAVD and the Phase 2 solution would require a wall height and closure structure to 18.7 NAVD, footings would be built in Phase 1 to meet Phase 2 requirements, which would minimize future disturbances as well as absorb construction costs in Phase 1. In addition, Phase 1 would also consider the cost of posts at 16.7 NAVD and 18.7 NAVD in order to provide reuse for Phase 2.

Implementation of this alternative would require subsurface electric utility lines (that run parallel to 17th Street to the east and west sides) to be sleeved through the structure. In addition, several irrigation lines at various locations in the project area would either be relocated, as needed, to a deeper elevation so that they do not interfere with the foundations for this alternative or sleeved through the structure wall. The design for the foundations of this alternative would avoid the water and sanitary sewer lines. Telephone lines would not be relocated.

Construction

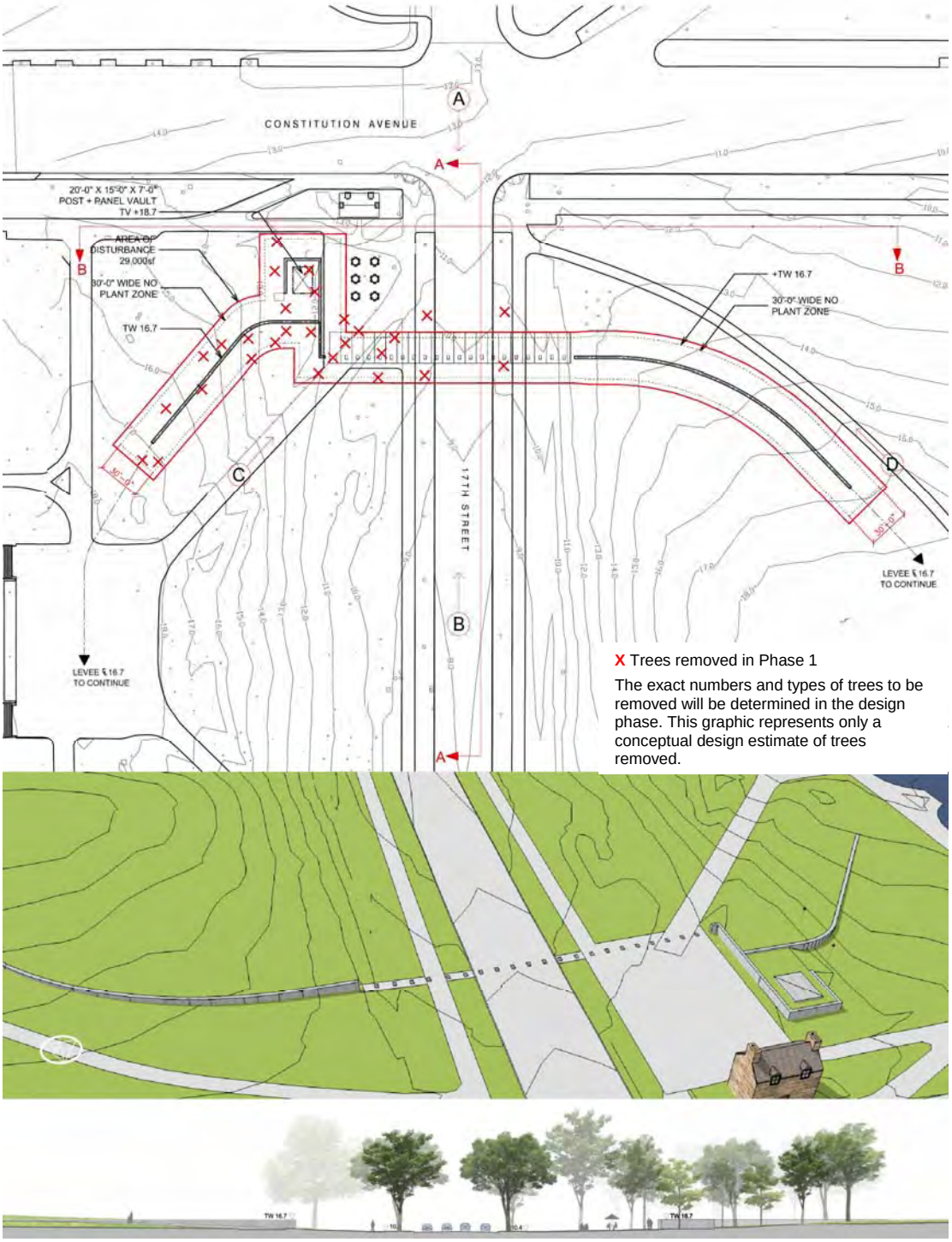
Construction of this phase would require trucks, front-end loaders, bulldozers, and an excavator. It would take about four to six months to complete and require a partial closure of 17th Street for eight to 10 weeks.

Implementation during a flood event

Implementation of this alternative during a flood event would require a temporary road closure of 17th Street between Independence Avenue and Constitution Avenue, after which an estimated 19 NPS staff

members would retrieve the post and panels from the on-site storage facility and install them across 17th Street using a truck, crane, and forklift. Installation is expected to take approximately 12 hours. Similarly, disassembly would take approximately 12 hours and involve the removal and re-storage of the panels and replacement of the post covers. The post and panel closure system would also require testing each year, including a mock partial set-up and tear down. This testing would require a partial road closure at 17th Street, but this would be conducted at night, so there would be negligible impacts on transportation. Component parts would require inventorying and monitoring for condition assessment periodically.

Figure 2.14 – Alternative 4 Phase 1 solution at the 17th Street



PHASE 2 – CONGRESSIONALLY AUTHORIZED SOLUTION

Under Phase 2, the height of the levee would be increased to meet the long-term conditions or the congressionally authorized, permanent level of protection at 18.7 NAVD, and aesthetic improvements would be completed. If the height of the Phase 1 solution meets 16.7 NAVD, the floodwalls would need to increase by approximately two feet.

Physical Features and Alignment

In Phase 2, alternative 4 (see Figure 2.15), the west wall would be backfilled with earth. To the east, the landscape around the arc wall would be re-graded. The post and panel closure length would remain the same as in Phase 1 (190 feet). As a result, no new concrete footings or road closures across 17th Street would be required.

Under Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate against adverse effects associated with concrete walls. An example of two historic resources at 17th Street and Constitution Avenue are shown in Figure 2.3.

The design allows for a small plaza extending south from the Lockkeeper's House to the western floodwall, which would be considered as a future project; the development of a plaza is not part of this flood control project.

Landscape Design

Grading of the slope on either side of the levee walls would require the removal of 32 trees in Phase 2, for a total of 60 in both phases combined, including the two elm trees along 17th Street (Phase 1) and two black walnuts (Phase 1). Overall, the total surface/ground area disturbed would be 1.9 acres. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Prior to implementing Phase 2, a landscape plan would be designed and submitted for approval. The purpose of the plan would be to restore the cultural landscape and visual character of the vegetation in the project area. However, any new trees shall be replanted as close to their original location as possible but must remain outside of the levee's minimum 30-foot no plant zone.

Storage Space for the Post and Panel

The storage for the post and panels would utilize the vault built as part of Phase 1.

Subsurface Disturbance

Footings to support the requirements for the Phase 2 closure system would be built in Phase 1 which would minimize subsurface disturbances. In addition, the bulk of construction costs would be absorbed in Phase 1.

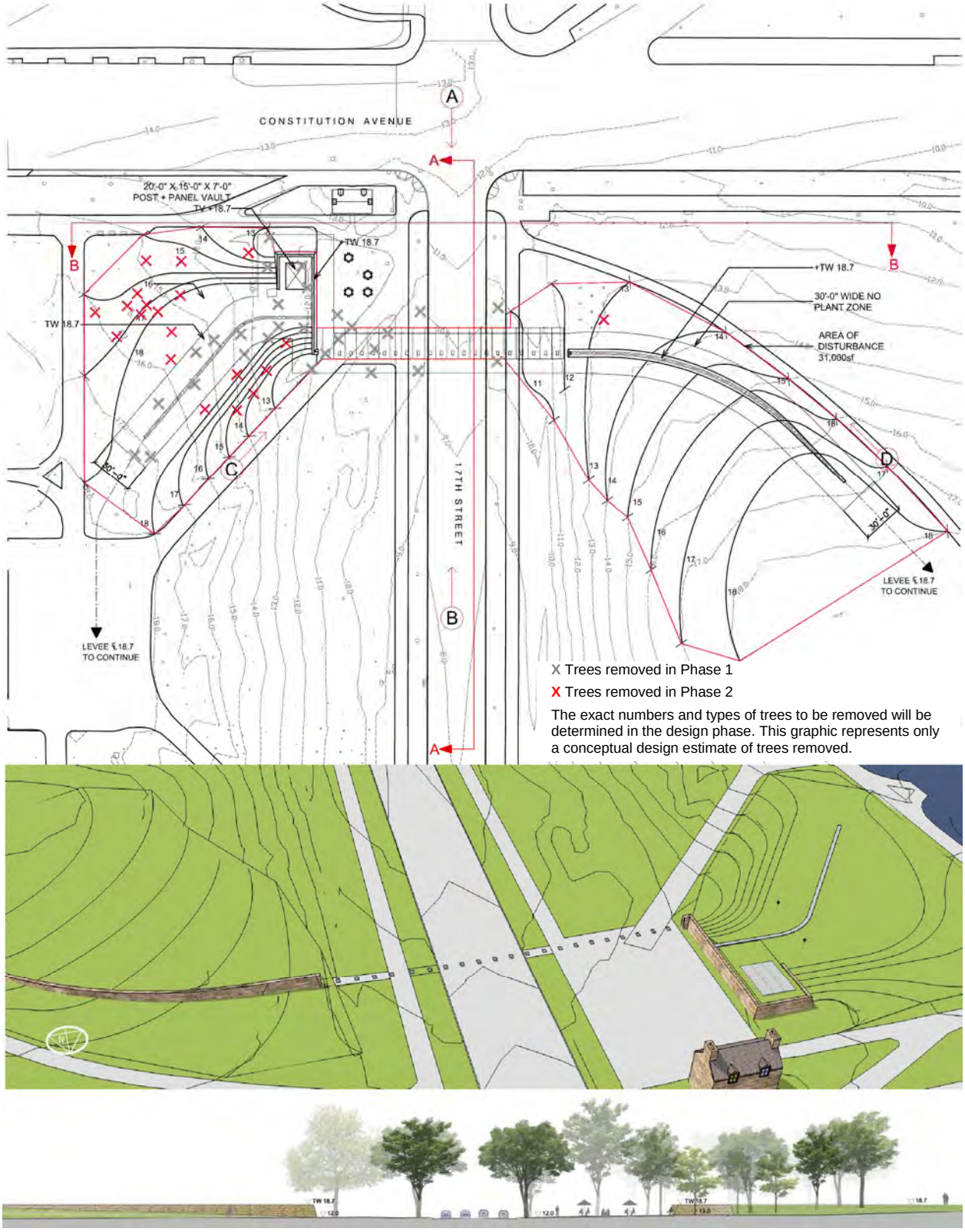
Construction

Construction of this phase would require the same type of equipment as described for Phase 1. The duration is estimated to take between eight to 12 months (for both construction to 18.7 NAVD and aesthetic improvements) with no road closure to 17th Street since the footings for the post and panels would be built in Phase 1.

Implementation during a flood event

The logistics, duration, equipment, and staff required to install the post and panels during a flood event would be the same as Phase 1.

Figure 2.15 – Alternative 4 Phase 2 solution at the 17th Street



ALTERNATIVE 5 – "3B"

PHASE 1 – FEMA REQUIRED SOLUTION

Physical Features and Alignment

This alternative would place one new small structure on the east side of 17th Street on the Monument Grounds and a curved wall extending counter-clockwise from the Overlook Terrace on the west side 17th Street. Both elements would be aligned approximately 525 feet south of Constitution Avenue. The existing pedestrian path to the southeast of Overlook Terrace to the west of 17th Street would also be realigned (See Figure 2.17). During a flood event, the closure across 17th Street would be achieved though a post and panel system that would span 161 feet across 17th Street.

The east structure would be concrete, approximately 11.3 feet high (plus several additional feet for the sloped roof), and would resemble the scale of similar small structures located on the Monument Grounds (See Figure 2.16). The structure would serve as both the east abutment and the storage facility for the post and panel closure system. The height of the structure would satisfy the 18.7 NAVD level of protection.

To the west of 17th Street, there would be a curved levee wall extending southeast from the Overlook Terrace that would provide the western abutment for the post and panel system. The curved levee wall would measure 188 feet in length. Since the east structure would satisfy the congressionally authorized height (18.7 NAVD) in Phase 1, the relatively short length of the west wall would also be built to the 18.7 NAVD level of protection in Phase 1.

Landscape Design

Due to the USACE guidelines described in alternative 1, a total of 43 trees would need to be removed during this phase. Four of these trees are along 17th Street, and of these, two are older mature trees. In Phase 1, only turf would be replaced. Overall, the total surface/ground area disturbed would be 1.8 acres. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Storage Space for the Post and Panel

The post and panel system would be stored in the new structure on the Monument Grounds. The building would measure 25 x 40 feet with an extending unit built into the slope measuring 19.5 x 17 feet. Access to the posts and panels during a flood event would be attained through the removal of the roof using a crane, although there would be a service hatch for maintenance access.

Subsurface Disturbance

Concrete footings would be used for both the walls and the post/panel system. As part of Phase 1, the design footing that would be required for the east and west walls and the supports for the post and panels would be engineered and associated costs would be generated. Alternative 5 is proposing to build the Phase 2 height in Phase 1, so the wall height and posts and panels and all subsurface disturbance would be absorbed in Phase 1 construction and costs.

Implementation of this alternative would require subsurface electric utility lines (that run parallel to 17th Street to the east and west sides) to be sleeved through the structure. In addition, several irrigation lines at various locations in the project area would either be relocated, as needed, to a deeper elevation so that they do not interfere with the foundations for this alternative or sleeved through the structure wall. The design for the foundations of this alternative would avoid the water and sanitary sewer lines. Telephone lines would not be relocated.

Construction

Construction of this phase would require trucks, front-end loaders, bulldozers, and an excavator. It would take about four to six months to complete and require a partial closure of 17th Street for eight to 10 weeks.

Implementation during a flood event

Implementation of this alternative during a flood event would require a temporary road closure of 17th Street between Independence Avenue and Constitution Avenue, after which an estimated 19 NPS staff members would retrieve the post and panels from the on-site storage facility and install them across 17th Street using a truck, crane, and forklift. Installation is expected to take approximately 12 hours. Similarly, disassembly would take approximately 12 hours and involve the removal and re-storage of the panels and replacement of the post covers.

The post and panel closure system would also require testing each year, including a mock partial set-up and tear down. This testing would require a partial road closure at 17th Street, but this would be conducted at night, so there would be negligible impacts on transportation. Component parts would require inventorying and monitoring for condition assessment periodically.

PHASE 2 – CONGRESSIONALLY AUTHORIZED SOLUTION

Phase 2 is the same as Phase 1 in alignment, subsurface disturbance, storage of post and panels, and construction.

Phase 2 is differentiated from Phase 1 by aesthetic enhancements that would improve the appearance of the flood wall and structure and blend it more seamlessly into the landscape of the Monument Grounds (See Figure 2.18).

Figure 2.16 – Small structures on or adjacent to the Monument Grounds

1. Lockkeeper's House
2. 17th Street Bulfinch Gatehouse
3. 15th Street Bulfinch Gatehouse
4. 15th Street Bulfinch Gateposts
5. Washington Monument Lodge
6. Survey Lodge Ranger Station

1. The Lockkeeper's House

2. 17th Street Bulfinch Gatehouse

3. & 4. Looking south down 15th Street NW toward the Bulfinch Gatehouse and Gateposts

5. Washington Monument Lodge

6. Survey Lodge Ranger Station

As described in alternative 1, prior to implementing Phase 2, a landscape plan would be designed and submitted for approval. The purpose of the plan would be to restore the cultural landscape and visual character of the vegetation in the project area. However, any new trees shall be replanted as close to their original location as possible but must remain outside of the levee's minimum 30-foot no plant zone.

Figure 2.17 – Alternative 5 Phase 1 solution at the 17th Street

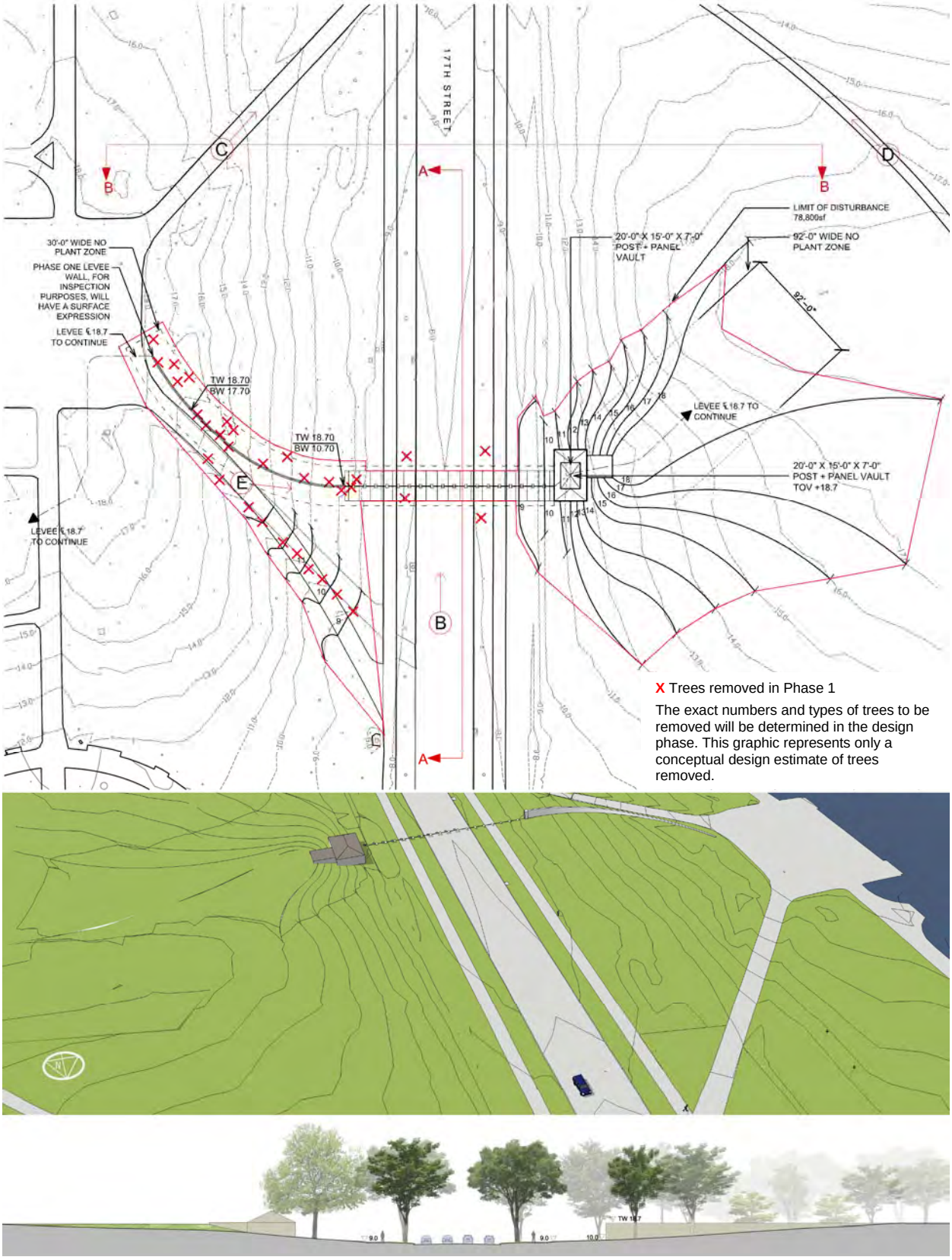
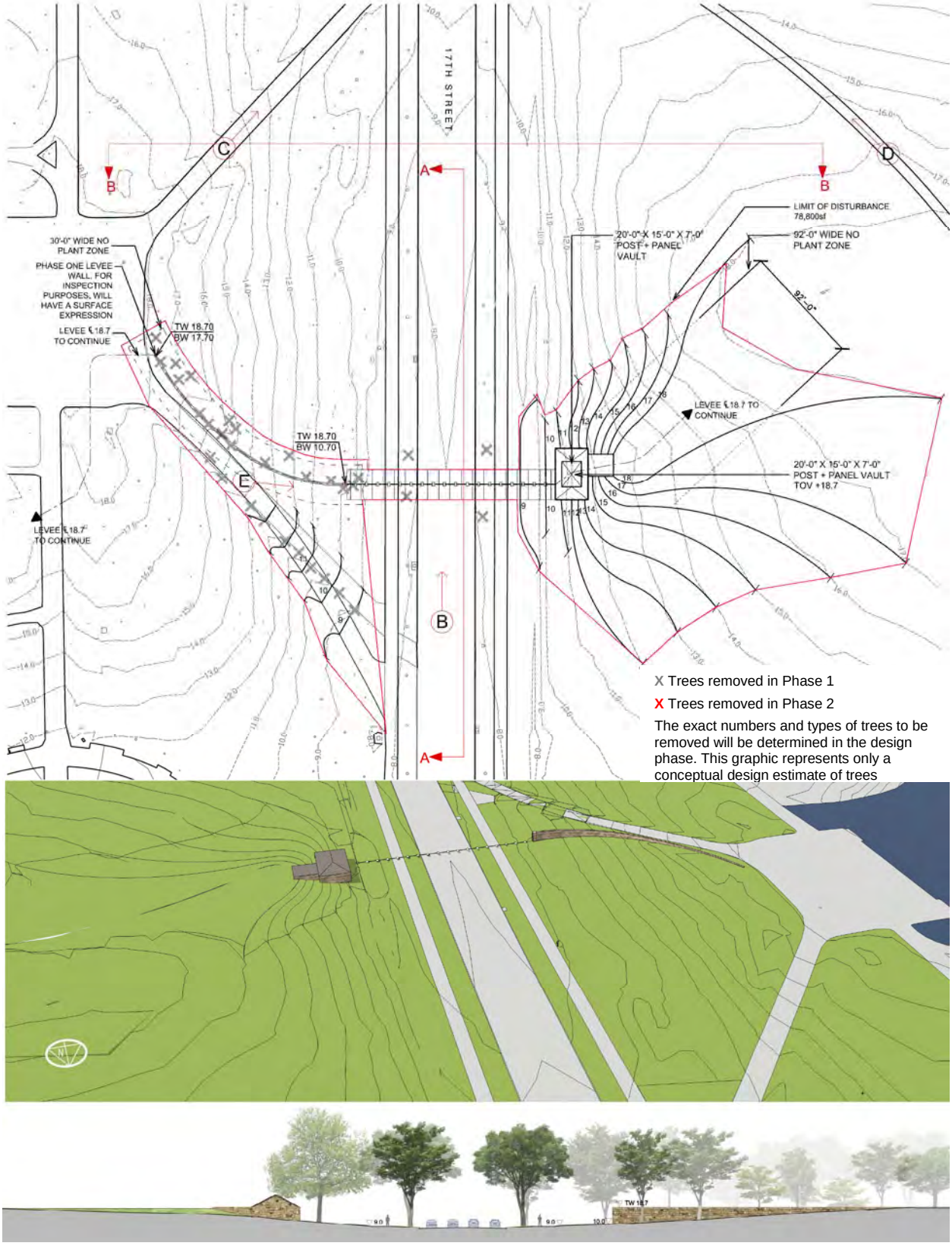


Figure 2.18 – Alternative 5 Phase 2 solution at the 17th Street



MITIGATION MEASURES COMMON TO ALL ACTION ALTERNATIVES

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

GENERAL MITIGATION TO REDUCE IMPACTS ON SURROUNDING ENVIRONMENT

- The amount of disturbed earth area will be minimized, and the duration of soil exposure to rainfall will be limited. Disturbed soil or soil stockpiles will be covered with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material.
- Erosion containment controls such as silt fencing and sediment traps (e.g., hay bales) will be used to contain sediment on site.
- Erosion and sediment control best management practices will be inspected on a regular basis and after each measurable rainfall to ensure that they are functioning properly.
- Exposed soils will be stabilized and replanted with vegetation as soon as possible following completion of construction activities.

VEGETATION

- Prior to clearing and grading, the area to be cleared or disturbed and trees to be removed will be clearly marked to minimize the amount of vegetation loss or impacts on nearby trees.
- Only those areas necessary for construction will be cleared or disturbed and trees will be preserved wherever possible.
- Low ground pressure equipment and structural matting will be used along the levee to minimize impacts on root systems.
- Prior to clearing, vegetated areas will be assessed to determine if there are trees in the area of the proposed alignments that need protection from construction activities. Any trees selected for protection will be marked and/or fenced.
- Where vegetation was removed for construction, new/replacement planting will be installed in Phase 2 in areas in accordance with the landscape plan; in Phase 1, only turf would be replaced (except in alternative 1B where re-grading and planting would occur as part of Phase 1).

  A subcomponent of the landscape plan will be a planting plan which would prescribe the measures to be taken to rehabilitate the area disturbed by the construction of the levee during both Phase 1 and Phase 2. Trees that require removal shall be replaced-in-kind with similar species in compatibly designed locations and spacing. The plan will ensure that there will be no net loss of trees on the National Mall. The number of trees replanted will be equal to or greater than the number lost as a result of the proposed action. The plan will provide specific details on the number and specific species of trees that will be replaced, the locations where they will be planted, and the timing (in terms of whether the replanting will occur after Phase 1 or Phase 2).

  To the extent possible, the new trees shall be replanted as close to their original location as possible but must remain outside of the levee's minimum 30-foot no plant zone. USACE guidelines for flood structures require a minimum 30-foot wide no planting zone when a wall is used to ensure that the trees root systems do not affect the integrity of the levee structure. However, this distance represents the minimum requirement based on USACE guidelines. The actual width of the zone might be greater and is dependent on the specific type of wall and foundation which will be determined in the design

process. If the number of trees that need to be replaced cannot fit within the original project area due to spatial constraints or other visual concerns, the remaining trees would be replanted in another appropriate area within the National Mall.

- Vegetation in areas replanted will be monitored following construction to ensure successful establishment. Any exotic invasive species that appear in the replanted areas will be removed.

VISUAL/AESTHETICS

- A treatment plan will be developed to define how the adverse visual effects of any visible elements (e.g., freestanding concrete walls) of the Phase 1 design will be mitigated through plant material, earthwork, and/or alternative surface wall treatments (such as paint or concrete stains), until such time that the Phase 2 design is completed and implemented.
- Under Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate against adverse effects associated with concrete walls.
- During construction, equipment will be shielded using screening to be specified in the NPS construction permit to partially obscure the view where appropriate and possible.
- Upon completion of the final design, a landscape plan would be completed and submitted for approval. The landscape plan would outline the measures that would be taken to restore the overall visual character and integrity of the original cultural landscape to the greatest extent possible.

CULTURAL RESOURCES

- Additional interpretation and education appropriate to historic context of the project and the site will be developed.
- Under Phase 1, the use of a surface treatment for the concrete flood walls to minimize the adverse effect upon the character of the cultural landscapes will be evaluated and implemented, if feasible.
- Under Phase 2, the exposed portions of the levee wall will be clad in stone which relates to the aesthetic qualities of the structures in the surrounding cultural landscapes.
- Similar to the visual resources mitigations, a landscape plan will be completed following the final design of the levee which will outline the measures to be taken to restore the overall visual character and historic integrity of the original cultural landscapes.
- The historic Lockkeeper’s House will be stabilized. The final design of the levee should allow space for the relocation of the Lockkeeper's house in the event that it is moved south, away from Constitution Avenue in a future project.

VISITOR USE AND EXPERIENCE

In addition to the applicable public safety, transportation, and vegetation mitigation measures that also affect visitor use and experience:

- Public information will be made available on the park website and on signs in the park to inform visitors of the need for and progress of the project.
- At 23rd Street, re-grading will avoid the ball fields so as to not disrupt the permitted recreational use in this area.
- NPS will implement public interpretation and education that broadly addresses the historical development of the flood control system and associated themes by identifying the levee as a

contributing resource to the Constitution Gardens cultural landscape and explaining the importance of the resource. Interpretive media may include, but not be limited to, interpretive posters, wayside exhibits, historical reconstruction drawings, NPS-style brochures and internet-based content. Public interpretation will also include interpretive measures to be undertaken during the archeological fieldwork. These measures will broadly address the historical development of the lower Tiber Creek waterfront, including the Washington City Canal, the 17th Street Wharf, and associated themes.

- Once the levee project is completed, public safety information regarding the levee closure will be communicated to the public in a variety of ways through different forms of media.

PUBLIC SAFETY

- Construction workers and employees will follow an approved health and safety plan which incorporates all applicable regulations.
- Barriers and signs will be used around construction sites to divert the public away from potentially dangerous situations.
- Public announcements will be made on the park website and in the media to alert the public to the construction schedule and locations.
- In the event of a flood notification, U.S. Park Police will evacuate visitors from the area.

TRANSPORTATION

- During peak hours, 17th Street will remain partially open; two lanes will remain open during construction of the post/panel foundation. During off peak hours and at night, the NPS will allow brief periods of full street closure for a duration of one to two hours; in addition, the following measures will be followed:
- As part of the construction permitting process, the contractor will submit Traffic Control Plans to the District Department of Transportation (DDOT) for review and approval prior to the implementation of any changes (lane or sidewalk closures, temporary truck access for site excavation, etc.). The Traffic Control Plans will include measures, such as detour signs, to safely divert traffic, transit and pedestrian and bicycle traffic flows during temporary off-peak closures, or for one-way traffic during peak periods to maintain partial peak directional flow. It is anticipated that the DDOT will provide any signalization, signs, and pavement marking improvements required at the adjacent intersections to accommodate increased vehicular and pedestrian traffic resulting from the diverted traffic within the local area.
- NPS and DDOT will coordinate Public Advisories to notify the public of the detours, likely delays, and alternate routes including transit.
- Additional mitigation measures will be undertaken by NPS in coordination with the DDOT to minimize impacts. These include measures to improve traffic flow at the most heavily impacted intersections, measures to divert traffic to alternate routes before they reach the vicinity of the Mall, and measures to divert trips to transit or shared rides.

Traffic Flow Mitigation:

- Signal timing at 14th Street and Constitution Avenue, 15th Street and Constitution Avenue, 17th Street and Constitution Avenue and 23rd Street and Constitution Avenue will be evaluated and monitored closely to determine whether modest adjustments to timing at these intersections will improve flow without major adverse effects on through traffic on Constitution Avenue.

Diverting Traffic to Other Routes and Modes:

- NPS and the DDOT will develop a cooperative plan to notify travelers well in advance of the lane closures and possible delays and to notify them of potential alternative routes before they reach Independence Avenue and the Mall.
- Major employers and visitor attractions in the vicinity of 17th and Constitution will be contacted (preferably by mail as well as email) well in advance of construction with website and a phone number to contact for updates.
- The notice will include advice on route and mode alternatives and a request to notify all potentially impacted employees.
- Agencies and institutions will be advised to be aware of the partial street closure when planning any special events.
- Agencies and employers should include at a minimum the Commerce Department, the Interstate Commerce Commission, the National Museum of American History, the Organization of American States, the Department of the Interior, the Federal Reserve Board, the National Academy of Sciences and Engineering, the Office of Personnel Management, the General Services Administration, the American Red Cross, the Daughters of the American Revolution, the U.S. Navy Bureau of Medicine and Surgery, and George Washington University.
- It is recommended that advisory Variable Message Signs (VMS) should be deployed at least two weeks prior to the start of construction to let people know of the detours in time to plan alternate routes. In addition, advisories should be posted on Maine Avenue and Independence Avenue. The NPS, the DDOT and the Virginia Department of Transportation (VDOT) should ensure that all local newspapers, radio and TV stations are well aware of the impending construction, particularly the stations noted for traffic advisories.
- The NPS, DDOT and VDOT will work with the Washington Metropolitan Area Transit Authority (WMATA), Commuter Connections, and the employers and agencies listed above to ensure that transit, carpool, vanpool, and other options, such as telecommuting, are made known to employees and visitors.
- Local tour bus companies will be notified as soon as possible to let them adjust schedules and tours as necessary based on diverted traffic and the partial lane closures.
- Visitor Centers and Visitor's Bureaus will be contacted immediately to let them know of the situation and to determine with them the best way to get notice of the partial closure to local and national tour bus companies, if deemed necessary.

UTILITIES AND INFRASTRUCTURE

- The foundation of the walls will be designed to avoid impacts on utilities to minimize impacts on water supply lines, sanitary sewer lines, natural gas lines, and underground electric lines. The water supply lines and electric lines will require the installation of sleeves to allow utilities to pass through constructed walls.
- Several of the irrigation segments will be impacted by the construction of the walls. The affected lines will be relocated as necessary to provide the required irrigation.
- Several underground telephone lines will be in conflict with the wall locations. If they cannot be relocated, then the wall foundation designs will be designed so as to avoid conflict with the lines in their current locations.

ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Several alternatives or alternative elements were identified during internal and external scoping, including variations on the exact location of the 17th Street closure and the types of barriers that could be used. Some of these were determined to be unreasonable, or much less desirable than similar options included in the analysis, and were therefore not carried forward for analysis in this Environmental Assessment (EA). Justification for eliminating alternatives from further analysis was based on factors relating to:

- the alternative's lack of technical feasibility or reliability during a flood event;
- the alternative's lack of ability to obtain certification by the USACE;
- conflicts with already established park uses;
- duplication with other less environmentally damaging alternatives;
- conflict with an up-to-date park plan, statement of purpose and significance, or other policy; or
- severe environmental impact.

USE OF EARTHEN LEVEE AS A CLOSURE STRUCTURE

The use of an earthen levee for the closure at 17th Street was considered but dismissed because it is deemed to be relatively unreliable by the USACE due to the difficulty in implementing it during flood events. Earthen levees are less reliable due to the potential for earth-based closures to give way and fail due to the water pressure generated during a flood. In addition, the reliance on human intervention to implement this type of closure (i.e., constructing the closure under difficult conditions and requiring the use of earthmoving equipment under these conditions) contributes to making this a less reliable option. The earthen levee in the current plan was decertified by the USACE for these reasons, and the use of earthen levees as part of any action alternative was similarly dismissed.

USE OF EARTHEN LEVEE EXCLUSIVELY AS A PHASE I BARRIER

Some of the preliminary concepts for a Phase 1 closure included re-grading of the land along the east and west sides of 17th Street, that is, constructing an earthen levee similar to what was included in the 1992 General Design Memorandum (GDM) and EA (USACE 1992) and subsequent documents instead of constructing a flood wall. This concept was considered but not carried forward because of the number of trees that would need to be removed in Phase 1 and the associated impacts on visual and cultural resources. Based on USACE standards, there can be no trees within approximately 45 feet of either side of the centerline of an earthen levee, which equates to a 90-foot wide tree free zone. For a flood wall, there can be no trees within eight feet of the base of the footing (or 15 feet from the face of the wall), so this would mean a tree-free zone of approximately 30 feet. Therefore, re-grading the earth to form a levee was dismissed for any Phase 1 solution except for alternatives that would involve re-grading where there are no trees, such as alternative 2 on the east side of 17th Street, where the ground is covered by grass and tree loss would not occur. Under Phase 2, it was recognized that the elevation and stability needed for Phase 2 would require some re-grading and tree removal for any alternative selected.

EXCLUSIVE USE OF JERSEY BARRIERS

Although the use of Jersey barriers was discussed as a component of several of the alternative designs throughout the process, this closure method was not carried forward, except along the tops of the terraced walls for the Phase 2 Constitution Avenue wall levee design (alternative 3). The USACE will not certify any closure that is dependent mainly on Jersey barriers because this type of closure has a high risk of failure. Several other factors restrict the reliability of this type of closure if used in large numbers at street level; for example, the placement of these barriers relies on human intervention during a flood event, and there are limits on the height, and therefore, the depth of flood waters that they can withhold.

Preliminary design solutions considered the exclusive use of Jersey barriers following the current levee alignment from the Reflecting Pool, across 17th Street, and continuing eastward on the Monument Grounds as a low cost closure option. This method of closure was dismissed and not considered a reasonable alternative for two reasons. First, it lacks reliability and certifiability. Secondly, there would be a negative visual impact associated with placing a line of Jersey barriers within the current landscape of Constitution Gardens and the Monument Grounds.

LAND BRIDGE

Several of the preliminary alternatives considered during discussions with consulting parties included the possibility of raising the elevation of 17th Street to reduce the required height of panels at the point of closure across 17th Street.

One option proposed elevating 17th Street to create a "land bridge" across the street that would suffice as the congressionally authorized solution without any additional flood control structures. This solution would require 17th Street to be raised by an average of five feet with a slope of 4.6 percent. Although this solution would create the most reliable barrier, it would have an adverse short-term impact on traffic patterns and lines of sight and require a large loss of trees. Implementation of this option would also create adverse long term impacts because it would alter the historically low, horizontal landscape character of West Potomac Park and the Monument Grounds. As a result of these adverse impacts, this option was dismissed.

Other options that considered raising 17th Street would vary in impacts, depending on the height added to the roadway. For these reasons, most of the alternatives that involved the raising of 17th Street by more than two feet were not carried forward. A slight increase in road elevation was carried forward in alternative 2. However, this increase in road elevation is actually a filling of a depression in the current roadway. Therefore, the increase would appear to level out 17th Street rather than raise it.

23RD STREET – STRUCTURE NEAR VIETNAM VETERANS MEMORIAL

The EA previously completed in 1992 (USACE 1992) considered one alternative for the 23rd Street permanent closure that included an alignment near the Vietnam Veterans Memorial. This was eliminated from further study at that time because of its proximity to the memorial and the expected adverse impacts on the aesthetics of the area and traffic disruption during construction. Through the scoping process, the NPS determined that there was no need to reconsider this option, and no other options for the 23rd Street closure were considered.

USE OF SLIDE GATES AND VERTICAL RETRACTABLE CLOSURE SYSTEMS

Use of slide gates, rolling gates, and vertical retractable closure systems were examined as an alternative to post and panel systems for closure of the 17th Street corridor. However, these types of closures were eliminated from consideration due to maintenance and cost concerns. It is difficult to maintain any system that is exposed to constant vehicular traffic and extreme weather conditions. Constant exposure to extreme weather conditions could compromise the reliability of raising the closure during a flood event, so this system requires frequent testing which increases the cost associated with it. As a result, options that utilize moveable gates were dismissed from further consideration.

USE OF A BLADDER DAM

Use bladder dams were examined as an alternative to post and panel systems for closure of the 17th Street corridor. However, this type of closure was eliminated from consideration due to reliability concerns.

THE 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 Council on Environmental Quality defines the environmentally preferred alternative as the alternative that would promote the national environmental policy as expressed in the National Environmental Policy Act's Section 101. In their Forty Most Asked Questions, Council on Environmental Quality further clarifies the identification of the environmentally preferred alternative, stating that "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 (CEQ, nd)."

Based on the analysis of environmental consequences of each alternative, the NPS determined that alternative 1A is the environmentally preferred alternative.

All the alternatives demonstrate approximately equal impacts relative to visitor use, floodplains, public health and safety, land use and socioeconomics, traffic and transportation, utilities and infrastructure, and park management and operations. They are differentiated in their effects on vegetation, visual resources, and cultural resources.

Alternative 1A best protects the vegetation of the area because it has the smallest area of impact per phase (0.44 acres in Phase 1 and 1.87 acres in Phase 2) and would remove the fewest trees (15 in Phase 1 and 38 in Phase 2 for a total of 53 trees). Of the trees removed in both phases, only four are older, mature trees. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

While alternative 1A would not enhance the visual and cultural resources in the project area, it would introduce lesser adverse impacts than the other alternatives. The landscape plan (which includes the planting plan and treatment plan) would ensure that adverse effects to visual and cultural resources would be minimized to the greatest extent possible.

THE PREFERRED ALTERNATIVE

Section 5.4 (d) requires the park to identify a preferred alternative in the EA if one has been identified. This is the alternative that the NPS believes would best accomplish its goals, objectives, and purpose and need. In selecting a preferred alternative, the NPS must consider the associated impacts to natural and cultural resources. Since there is no requirement that the environmentally preferable alternative and the preferred alternative be the same, the NPS chose alternative 1B as its Preferred Alternative because it best meets the objectives of the project and it is consistent with NPS management policies, laws, regulations, and plans.

The implementation of alternative 1B would 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 best respects the resources and values of the National Mall. It meets the requirements of the congressionally authorized level of protection under both phases.

Although this alternative would introduce new built structures and topographic modifications that would adversely affect the visual and landscape character of the project area as well as NRHP resources (primarily the Washington Monument and Constitution Gardens cultural landscapes due to intrusion on historic views, and modifications to character defining landforms, plantings, and open spaces), Alternative 1 most successfully minimizes the adverse impacts on the cultural landscapes, historic structures, and other cultural resources, as well as viewsheds within the project area.

The proposed arc walls in alternative 1B are relatively small compared to the structures in the other alternatives. Their scale, coupled with their shape, integrates well into the natural topography on either side of 17th Street. By slightly raising the natural grade on the Monument Grounds, most of the eastern wall is concealed and the existing character of the Washington Monument landforms is preserved to the greatest extent possible. On the west side of 17th Street, the realignment of two sidewalks into curvilinear paths helps to integrate the arc wall into the Constitution Gardens landscape. This new alignment improves site circulation by redirecting paths closer to the intersection of 17th Street and Constitution Avenue and further south closer to the northern entrance of the WWII Memorial; but more importantly, it forges a new relationship between two adjacent, but previously disconnected, cultural landscapes. With a below grade storage vault for the post and panels, there is no need for large embankments or for a new building to be constructed on the Monument Grounds. As the least intrusive of the proposed levee structures, with an underground storage vault, there will also be less exposed concrete in the interim period between Phases 1 and 2. In addition, the placement of the arc walls in alternative 1B greatly reduces the impacts on viewsheds. Since the levee walls are located approximately 50 feet further south than alternative 1A, the adverse impact that the eastern arc wall has on the view of toward the Washington Monument from the north side of Constitution Avenue (looking southeast) is greatly diminished.

Alternative 1B also reduces the impact on views looking north and east toward the White House and President's Park from 17th Street. As drivers and pedestrians travelling north on 17th Street pass through the closure structure, views looking northeast are more or less truncated depending on the setback of the walls from the 17th Street sidewalk. The closer the walls are to the sidewalks, the more the views toward President's Park are obscured. However, in alternative 1B, the walls are pulled back from 17th Street. As a result, the views and vistas looking north open up, and there would be a distance of approximately 250 feet between the levee walls and the prominent intersection at Constitution Avenue to enjoy an unobstructed vistas looking north.

The location and width of the opening between the arc walls also serve to maintain the southeasterly vista from Virginia Avenue to the Monument Grounds, the only remaining diagonal vista towards the Washington Monument from an existing diagonal street as shown in the L'Enfant Plan. The topography of this solution works well too, as it only partially extends the natural rise/ northwesterly projection of the Monument Grounds.

Like the other alternatives, 1B would create a temporary disruption to traffic and transportation and visitor use in the project area during construction, but the effect would be short-term. This alternative fully meets the objective of minimizing adverse impacts on park management and operations and providing the NPS with the most effective and reliable closure system in advance of a flood event. In doing so, this alternative will prevent the necessity of property owners in the project area to obtain costly flood insurance or modify their buildings or ongoing development.

For these reasons, the NPS has selected alternative 1B at their preferred alternative.

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Table 2.1: Description of Alternatives

	No Action Alternative	Alternative 1 - Arc Walls (1A- asymmetric; 1B- symmetric)				Alternative 2 - Gate Walls (2A- asymmetric; 2B- symmetric)				Alternative 3 - Constitution Garden Walls		Alternative 4 – Hybrid		Alternative 5 – 3B	
		Phase 1		Phase 2		Phase 1		Phase 2		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
23rd Street Closure	Sandbags along 23rd street at Roosevelt Bridge by Constitution	Same as no action		Re-grading to raise ground elevation to 18.7 feet and sandbags across Constitution Ave.		Same as no action		Same as alternative 1		Same as no action	Same as alternative 1	Same as no action	Same as alternative 1	Same as no action	Same as alternative 1
Reflecting Pool Closure	No additional height needed	Same as no action		Fill in low spots to 18.7 feet		Same as no action		Same as alternative 1		Same as no action	Same as alternative 1	Same as no action	Same as alternative 1	Same as no action	Same as alternative 1
17th Street Closure	Done per current levee plan. During flood event, sandbags and Jersey barriers followed by a temporary earthen levee	Floodwalls and re-grading to the east and west. 17th Street to 16.7; may be built to 18.7 if funding becomes available. NAVD with post and panel closure during flood events		Floodwall raised to 18.7 NAVD with post and panel closure during flood events. Re-grading to the east and west of 17th Street		Floodwalls and re-grading to the east and west. 17th Street to 16.7; may be built to 18.7 if funding becomes available with post and panel closure during flood events		East floodwall raised to 18.7 NAVD; new west flood wall to 18.7 NAVD with post and panel closure during flood events. Re-grading to the east and west of 17th Street.		Floodwalls and re-grading to the east and west. 17th Street to 16.7; may be built to 18.7 if funding becomes available. NAVD with post and panel closure during flood events	Series of terraced floodwalls parallel to 17th Street to 18.7 NAVD with post and panel and Jersey barrier closure during flood events. Re-grading to the east and west of 17th Street	Floodwalls and re-grading to the east and west. 17th Street to 16.7; may be built to 18.7 if funding becomes available. NAVD with post and panel closure during flood events	Floodwall raised to 18.7 NAVD with post and panel closure during flood events. Re-grading to the east and west of 17th Street	Floodwalls and re-grading to the east and west; 17th Street to 18.7 NAVD with post and panel closure during flood events	Same as Phase 1, except surfaces of floodwalls are decorated with stone facade.
17th St. Closure Alignment south of centerline of Constitution Ave	75 feet	1A: 198 feet	1B: 253 feet	Same as Phase 1		138 feet		Same as Phase 1		365 feet	Same as Phase 1	177.5 feet	Same as Phase 1	525 feet	Same as Phase 1
Wall Height at sidewalk level	n/a	1A: 6.3 feet	1B: 8.7 feet	1A: 8.3 feet	1B: Same as Phase 1	5.3 feet		7.3 feet		7.7 feet	Terrace walls are 2.5 feet high	6.2 feet	8.2 feet	8.7 feet (west only) 11.3 feet (building)	Same as Phase 1
Trees Removed*	n/a	1A: 15	1B: 98	1A: 38 (53 total)	1B: 0 (98 total)	2A: 25	2B: 26	2A: 29 (54 total)	2B: 38 (64 total)	18	83 (101 total)	28	32 (60 total)	43	0 (43 total)
Along 17th		2 (all older)	2 (1 older)	0	0	4 (3 older)	4 (3 older)	0	0	2 (1 older)	0	4 (3 older)	0	4 (2 older)	0
Sycamore (older)		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walnut (older)		2	1	0	0	0	0	0	0	0	0	1	0	0	0
Cherry (new)		0	5	1	0	7	9	0	0	0	0	0	1	0	0
Length of Wall	n/a	1A: 392 feet W – 189' E – 203'	1B: 240 feet W – 120' E – 120'	1A: 442 feet	1B: Same as Phase 1	2A: 256 feet W – 202 feet E – 54 feet	2B: 282 feet W – 206 feet E – 76 feet	2A: 246 feet W – 134 feet E – 112 feet	2B: 270 feet W – 135 feet E – 135 feet	403 feet West – 205 feet East – 198 feet	654 feet (combined length of terrace walls)	416 feet West – 168 feet East – 248 feet	Same as Phase 1	188 feet West – 188 feet East – N/A	Same as Phase 1
Length of Post/Panel closure Across 17th Street	n/a	94 feet	140 feet	Same as Phase 1	Same as Phase 1	109 feet	109 feet	109 feet	154 feet	102 feet	347feet (236 feet across 17th Street and 111' on top of terraces)	190 feet	Same as Phase 1	161 feet	Same as Phase 1
Area of Disturbance	n/a	0.44 acres	5.24 acres	1.87 acres	Same as Phase 1	1.59 acres	1.25 acre	2 acres	1.9 acres	0.4 acres	2.52 acres	0.7 acres	1.9 acres	1.8 acres	Same as Phase 1
Road Raising	none	none		none		Increase of about one foot 135 feet south of construction		Done in Phase 1		none	none	none	none	none	none
Time to Construct	n/a	4–6 months		8–12 months		4–6 months		8–12 months		4–6 months	8–12 months	4–6 months	8–12 months	4–6 months	8–12 months
Ease of implementation during a flood	24 hours	12 hours		12 hours		12 hours		12 hours		12 hours	24 hours	12 hours	12 hours	12 hours	12 hours

* In general, the volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be determined in the design process.
** It is also important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Table 2.1: Description of Alternatives (continued)

COSTS

	No Action Alternative	Alternative 1 - Arc Walls				Alternative 2 - Gate Walls				Alternative 3 - Constitution Garden Walls		Alternative 4 – Hybrid		Alternative 5 – 3B	
		Phase 1		Phase 2		Phase 1		Phase 2		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
		1A	1B	1A	1B	2A	2B	2A	2B						
Post and panel	n/a	$940,000	$1,400,000	$0	n/a	$1,110,000	$1,110,00	$0	$450,000	$1,020,000	$1,330,000	$1,900,000	$0	$1,350,000	$0
Flood Wall		$429,000	$264,000	$55,000	n/a	$281,600	$282,000	$310.200	$214,000	$390,000	$490,000	$457,600	$0	$228,000	$100,000
On-site storage	n/a	$200,000	$200,000	Included in Ph 1	Included in Phase 1	$200,000	$200,000	Included in Ph 1	Included in Ph 1	$200,000	$200,000	$200,000	Included in Ph 1	$200,000	Included in Ph 1
Wall Cladding	n/a	n/a	n/a	$1,329,868	$316,080	n/a	n/a	$565,115	$605,807	n/a	$929,953	n/a	$888,869	n/a	$785,652
Fill (grading)	n/a	n/a	$8,299	$3,969	n/a	$7,583	$7,390	$3,267	$3,282	n/a	$2,406	n/a	$4,360	$10,303	n/a
Trees (1:1 replacement)	n/a	n/a	n/a	$115,500	$404,250	n/a	n/a	$118,250	$145,750	n/a	$247,500	n/a	$134,750	n/a	$88,000
Shrubs	n/a	n/a	n/a	$2,000	$2,000	n/a	n/a	$2,000	$2,000	n/a	$2,000	n/a	$2,000	n/a	
Lawn (sod)	$150,000	$38,332	$108,152	$140,960	n/a	$138,520	$108,900	$168,884	$155,117	$34,848	$157,254	$60.984	$157,127	$156,816	$218,884
TOTAL Cost per Alternative	**$150,000**	**$1.60M**	**$1.98M**	**$1.68M**	**$722,330**	**$1.79M**	**$650,873**	**$883,959**	**$1.6M**	**$1.64M**	**$3.38M**	**$2.56M**	**$1.22M**	**$2.03M**	**$1.19M**

Notes

- The costs for construction of floodwalls do not include any earthwork (e.g. imported fill) or associated landscape elements shown in alternative 1 (Phase 2 only), alternative 2A and 2B (Phases 1 and 2), alternative 3 (Phase 2 only), alternative 4 (Phases 1 and 2), and/or alternative 5 (Phases 1 and 2) plans.
- The cost of a post and panel system to meet Phase 2 (18.7 NAVD) is assumed to be $10,000 per linear foot (lf) and has been figured into the Phase 1 cost in most cases. The exceptions are alternative 2B and 3 where the Phase 2 designs require lengthening of the Phase 1 post and panel system.
- The cost of a floodwall to meet an elevation of 18.7 NAVD is assumed to be $1,100/lf. Since floodwalls for all alternatives are built to meet 18.7 NAVD in Phase 1, Phase 2 floodwall estimates include costs for demolition, where applicable and to accommodate a new floodwall alignment in alternative 2B and 3, respectively.
- A landscape plan that is submitted for approval prior to construction will yield a more accurate cost for replanting.
- Although alternative wall systems will be explored, the estimate assumes a cost for granite and granite capstone to be conservative since it is a more costly stone material.

Table 2.2: How Alternatives Meet the Objectives

Objective	No Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Provide immediate reliable protection to downtown Washington, D.C., and the monumental core in the event of a 100-year storm, thereby meeting the National Flood Insurance Program requirements (FEMA required level of protection).	Does not meet this objective The USACE decertified this levee system in 2007 because it fails to provide a reliable method of flood protection.	Fully meets this objective	Fully meets this objective	Fully meets this objective	Fully meets this objective	Fully meets this objective
		Phases 1 and 2 would be designed to provide a reliable method of flood protection to 16.7 NAVD at 17th Street, 23rd Street and along the Reflecting Pool Levee.				
Ensure that the selected design can be easily modified or enhanced to meet the congressionally authorized flood protection requirements (authorized or permanent level of protection).	N/A	Fully meets this objective ▪ In alternative 1A, the alignment of Phase 1 and 2 are identical. The wall would easily be heightened from the FEMA required level of protection (16.7 NAVD) to the congressionally authorized level of protection (18.7 NAVD) and the footings to support Phase 2 would be built in Phase 1, and the higher Phase 2 posts and panels would be used for both Phase 1 and 2. ▪ In alternative 1B, the Phase 1 wall would be built to the congressionally authorized solution.	Partially meets this objective ▪ The east wall alignment of Phase 1 and 2 are similar and could easily be heightened from 16.7 to 18.7 NAVD. ▪ The west wall would require modifications to the alignment and foundation to meet the permanent-year level of protection and demolition of a portion of the Phase 1 wall in 2B. ▪ The Phase 1 post and panel footings across 17th Street will fully support Phase 2.	Minimally meets this objective ▪ The Phase 1 wall would need to be demolished, and the landscape would need to be re-graded to build Phase 2. ▪ Phase 2 terrace walls would require extensive new construction. ▪ The Phase 1 post and panel footings across 17th Street will only partially support Phase 2; additional footings will be required west of 17th Street for Phase 2.	Fully meets this objective ▪ The alignment of Phase 1 and 2 are identical. The wall would easily be heightened from 16.7 NAVD to 18.7 NAVD. ▪ The footings to support Phase 2 would be built in Phase 1, and the higher Phase 2 posts and panels would be used for both Phase 1 and 2.	Fully meets this objective ▪ The height of the Phase 1 wall would be built to the Congressionally authorized solution, and Phase 2 would require the cladding of the building and flood walls and/or other surface wall treatments as mitigations to adverse impacts associated with Phase 1 ▪ The footings to support Phase 2 would be built in Phase 1, and the higher Phase 2 posts and panels would be used for both Phase 1 and 2.
Minimize adverse impacts on the cultural landscapes, historic structures, and other cultural resources of the National Mall and the project area.	N/A	Alternative 1A partially meets this objective; it would introduce structures and topographic modifications that would adversely affect NRHP resources, primarily the Washington Monument and Constitution Gardens cultural landscapes, but also the L'Enfant Plan due to intrusion on historic views, inappropriate materials, and loss of character defining landforms, plantings, and open spaces. Alternative 1B fully meets this objective; while it would introduce structures and topographic modifications that would adversely affect NRHP resources (primarily the Washington Monument and Constitution Gardens cultural landscapes) due to loss of character defining landforms, plantings, and open spaces, adverse impacts to historic views would be minimized by the physical configuration of the levee walls. In addition, the proposed curving walkways would provide a new relationship between two adjacent, but previously disconnected, cultural landscapes. Replanting following Phase 1 for alternative 1B would be required mitigation; Phase 2 would lessen the visual intrusion with stone cladding. Mitigation measures such as a landscape plan (which includes a planting plan and a treatment plan), public interpretation, and stabilization of the Lockkeeper's House should allow the objective to be partially met, although the impact remains long term moderate adverse.	Minimally meets this objective; it would introduce structures and topographic modifications that would adversely affect NRHP resources, primarily the WAMO and Con Gardens cultural landscapes, but also the L'Enfant Plan, due to intrusion on historic views, inappropriate materials, and loss of character defining landforms, plantings, and open spaces. Phase 2 would lessen the visual intrusion with stone cladding and berming for concealment but result in more tree loss. Mitigation measures such as a landscape plan (which includes a planting plan and a treatment plan), public interpretation, and stabilization of the Lockkeeper's House, in combination with Phase 2, should allow the objective to be partially met, although the impact remains moderate long term adverse.	Minimally meets this objective; it would introduce structures and topographic modifications that would adversely affect NRHP resources, primarily the WAMO and Con Gardens cultural landscapes, but also the L'Enfant Plan, due to intrusion on historic views, inappropriate materials, and loss of character defining landforms, plantings, and open spaces. Phase 2, different in plan from Phase I, would lessen the visual intrusion with stone cladding and terracing but result in much more tree loss in Con Gardens. Mitigation measures such as a landscape plan (which includes a planting plan and a treatment plan), public interpretation, and stabilization of the Lockkeeper's House, in combination with Phase 2, should allow the objective to be partially met, although the impact remains moderate long term adverse.	Minimally meets this objective; it would introduce structures and topographic modifications that would adversely affect NRHP resources, primarily the WAMO and Con Gardens cultural landscapes, but also the L'Enfant Plan, due to intrusion on historic views, inappropriate materials, and loss of character defining landforms, plantings, and open spaces. Phase 2 would lessen the visual intrusion with stone cladding and berming for concealment but result in more tree loss. Mitigation measures such as a landscape plan (which includes a planting plan and a treatment plan), public interpretation, and stabilization of the Lockkeeper's House, in combination with Phase 2, should allow the objective to be partially met, although the impact remains moderate long term adverse.	Minimally meets this objective; it would introduce structures and topographic modifications that would adversely affect NRHP resources, primarily the WAMO and Con Gardens cultural landscapes due to intrusion on historic views, inappropriate materials, and loss of character defining landforms, plantings, and open spaces. Phase 2 would lessen the visual intrusion with stone cladding and berming for concealment but result in more tree loss. Mitigation measures such as a landscape plan (which includes a planting plan and a treatment plan), public interpretation, and stabilization of the Lockkeeper's House, in combination with Phase 2, should allow the objective to be partially met, although the impact remains moderate long term adverse. .

Objective	No Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Minimize adverse impacts on the viewsheds of the National Mall, the monumental core, and the visual quality of the project area.	N/A	Alternative 1A minimally meets this objective; it would introduce concrete walls at 17th Street, which are inconsistent with the visual character of the project area, and would obscure some views toward the Washington Monument. In Phase 2, stone cladding would minimize visual impact; there would still be a long term adverse impact on the visual character of the project area. Alternative 1B fully meets this objective; while it would introduce visually inconsistent concrete walls at 17th Street and would remove a substantial amount of trees, the physical configuration and alignment of the walls would reduce the impacts to views looking north towards President's Park from 17th Street and would maintain the south easterly vista from Virginia Avenue to the Monument Grounds. In addition, the impact on the view of toward the Washington Monument from the north side of Constitution Avenue (looking southeast) is greatly diminished. In Phase 2, there would still be a long term adverse impact on the visual character of the project area but stone cladding would minimize visual impact. Off all the alternatives, 1B has the least long-term impacts on the visual character and viewsheds of the project area.	Minimally meets this objective; it conflicts with important views from Virginia Avenue toward the Washington Monument. Both phases introduce concrete embankments at 17th Street, which are inconsistent with the visual character of the project area and would obscure some views toward the Washington Monument. While in Phase 2, stone cladding would minimize visual impact; there would still be a long-term adverse impact on the visual character of the project area.	Phase 1 minimally meets this objective; it would introduce concrete walls at 17th Street, which are inconsistent with the visual character of the project area, and would obscure some views toward the Washington Monument. Phase 2 partially meets this objective. The low height terraced walls obscure fewer viewsheds than other alternatives but still introduce new elements in the project area that are very inconsistent with the visual character of the project area, particularly on the Monument Grounds. Stone cladding would minimize visual impacts; however, there would still be a long-term adverse impact on the visual character of the project area.	Partially meets this objective. This alternative does not constrain views toward the Washington Monument since it is pulled closer to the street, back from 17th Street; it minimizes impacts on viewsheds to a greater degree than alternatives 1, 2, & 3. This alternative is also less of a pinch point than other alternatives, so the views south open up more dramatically. However, in Phase 1, new concrete walls would be inconsistent with the visual character of the project area, would be located at 17th Street. While in Phase 2, stone cladding would help minimize visual impact, but there would still be a long-term adverse impact on the visual character of the project area.	Partially meets this objective This alternative leaves the intersection of Constitution Ave. and 17th Street open toward a view of the Washington Monument. It also does not obstruct the axis to Monument from Virginia Avenue. However, this alternative introduces a new structure to the Monument Grounds, which is inconsistent with its visual character. While in Phase 2, stone cladding would minimize visual impact, since there, but there would still be a long-term adverse impact on the visual character of the project area, due to the intrusion of a structure within the open lawn of the Monument Grounds and the viewshed toward the Washington Monument.
Minimize disruption to visitor use and experience in the National Mall and monumental core.	N/A	Alternative 1 Phase 1 partially meets this objective; construction would create a temporary disturbance during construction, and the presence of these walls would create a long-term visual impact at 17th Street.	Phase 1 partially meets this objective; construction would create a temporary disturbance during construction, and the presence of these walls would create a long-term visual impact at 17th Street.	Phase 1 minimally meets this objective; construction would create a temporary disturbance during construction, and the presence of these terraced walls would create a substantial long-term visual impact at 17th Street.	Same as Alternative 1	Same as Alternative 1
Minimize adverse impacts on park management and operations and provide the NPS with the most effective and reliable closure system in advance of a flood event.	N/A	Fully meets this objective ▪ Requires relatively little time and staff to put post and panels in place during a flood event. ▪ Accommodates storage for the posts and panels on site.	Same as alternative 1	Partially meets this objective ▪ Would require relatively more staff to erect the Jersey barriers and lengthy post and panels during a flood event. Accommodates storage for the posts and panels on site.	Same as alternative 1	Same as alternative 1
Avoid additional costs of insurance or construction to property owners in the project area.	N/A	Fully meets this objective The improvements in the levee will provide protection to affected properties from a 100-year flood event, FEMA's required level of protection.	Same as alternative 1	Same as alternative 1	Same as alternative 1	Same as alternative 1
Minimize disruption to traffic in the downtown Washington, D.C., project area during construction.	N/A	Partially meets this objective Construction would require the partial closure of 17th Street for construction with short-term impacts. However, no road closure is anticipated for the construction of Phase 2.	Same as alternative 1	Same as alternative 1	Same as alternative 1	Same as alternative 1

Table 2.3: Summary of Environmental Consequences

Resource Area	No Action Alternative	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Vegetation*	Minor short-term adverse impacts on vegetation as a result of continued visitor use.	Moderate long-term adverse impacts on vegetation as a result of construction activities related to floodwall improvements and removal of 15 trees, including four older, mature trees (alternative 1A) up to 98 trees and three older trees (alternative 1B). Minor to moderate long-term adverse cumulative impacts.	Minor and moderate short- and long-term adverse impacts as a result of construction activities related to floodwall improvements and removal of an additional 38 trees. Minor to moderate and long-term cumulative impacts.	Moderate long-term adverse impacts as a result of construction activities related to floodwall improvements and removal of 25 (alternative 2A) or 26 (alternative 2B) trees, including three older, mature trees. Minor and long-term cumulative impacts.	Minor and moderate short- and long-term adverse impacts on vegetation as a result of construction activities related to floodwall improvements and removal of additional 29 (2A) or 38 (2B) trees. Minor to moderate long-term cumulative impacts.	Moderate long-term adverse impacts as a result of construction activities related to floodwall improvements and removal of 18 trees, including one older, mature tree. Minor long-term cumulative impacts.	Minor and mostly moderate short- and long-term adverse impacts on vegetation as a result of construction activities related to floodwall improvements and removal of an additional 83 trees. Moderate and long-term cumulative impacts.	Moderate long-term impacts on vegetation as a result of construction activities related to floodwall improvements and removal of 28 trees, including three older, mature trees. Minor and long-term cumulative impacts.	Minor and moderate short- and long-term adverse impacts as a result of construction activities related to floodwall improvements and removal of an additional 32 trees. Minor to moderate and long-term cumulative impacts.	Moderate long-term impacts on vegetation as a result of construction activities related to floodwall improvements and removal of 43 trees, including two older, mature trees. Minor and long-term cumulative impacts.	Minor and moderate short- and long-term adverse impacts as a result of construction activities related to floodwall improvements, with no additional removal of trees. Minor to moderate and long-term cumulative impacts.
Floodplains	No impact. *While FEMA would re-map under the no action, there is no inherent alternation to the floodplain (i.e., flows, effect on water table).*	Negligible short-term adverse impacts. The proposed improvements would not alter the ability to convey flood waters, and existing floodplain designations would remain unchanged.		Since this alternative presents relatively similar area of impact as alternative 1, the effects are the same as alternative 1.		Since this alternative presents relatively similar area of impact as alternative 1, the effects are the same as alternative 1.		Since this alternative presents relatively similar area of impact as alternative 1, the effects are the same as alternative 1.		Since this alternative presents relatively similar area of impact as alternative 1, the effects are the same as alternative 1.	

* In all alternatives, the volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be determined in the design process. It is also important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Table 2.3: Summary of Environmental Consequences (continued)

Resource Area	No Action Alternative	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Phase 1	**Phase 2**	**Phase 1**	**Phase 2**	**Phase 1**	**Phase 2**	**Phase 1**	**Phase 2**	**Phase 1**	**Phase 2**
Aesthetics and Visual Quality:	No effects along the Reflecting Pool levee. Short-term moderate adverse impact at 23rd Street due to the presence of sandbags during a flood event; and short-term moderate adverse impact associated with the temporary closure at 17th Street due to the disturbance and subsequent restoration of the Monument Grounds.	Same as no action at Reflecting Pool & 23rd Street; During construction, there would be a moderate short-term impact resulting from the activity and staging. During a flood event, there would be a minor short-term impact due to the presence of the post and panels. For alternative 1A at 17th Street, there would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall, removal of 15 existing trees, and the relatively small area of impact (0.44 acres). This alternative would adversely impact views looking north towards President's Park from 17th Street, the vista looking southeast vista from Virginia Avenue to the Monument Grounds, and the view of toward the Washington Monument from the north side of Constitution Avenue. The net cumulative effect would be a first degree long-term moderate adverse effect. For alternative 1B there would be a long-term adverse impact that is greater than minor but less than moderate. The portion of visible levee wall would be relatively small and the volume of 98 trees removed would be offset by the new relationship which is forged between two adjacent, but previously disconnected, cultural landscapes. In addition, the effects on views and vistas would be minimized under this alternative because the walls are the shortest in length of all alternatives and pulled back from 17th Street. The net cumulative effect would be a long-term minor to moderate adverse effect on visual resources.	Same as no action at Reflecting Pool & 23rd Street. Same effects as Phase 1 during construction and a flood event. For alternative 1A, there would be a long term minor adverse effect on views and viewsheds. A landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area. In addition, stone cladding would enhance the visual character to mitigate the Phase 1 impacts downward one degree (to an adverse effect that is long-term and less than moderate but greater than minor). The net cumulative effect would be long-term minor to moderate adverse impacts on visual resources. For alternative 1B, there would be a long-term minor adverse impact. The stone cladding on the levee walls and aesthetic improvements would reduce the Phase 1 long-term minor to moderate adverse impacts to a long-term minor adverse impact for this phase. The net cumulative impact would be long-term minor and adverse.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long-term first degree moderate adverse effect on views and viewsheds since this alternative would obscure views looking north towards President's Park from 17th Street, the vista looking southeast vista from Virginia Avenue to the Monument Grounds, and the view of toward the Washington Monument from the north side of Constitution Avenue. There would be a long-term second degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and the removal of existing trees. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term second degree moderate adverse effect on visual resources.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long term minor adverse effect on views and viewsheds. For alternative 2A, a landscape plan and stone cladding would mitigate the Phase 1 impacts downward one degree from Phase 1 to a long-term first degree moderate adverse effect. The net cumulative effect would be a long-term first degree moderate adverse effect. For alternative 2B, a long-term second degree moderate adverse impact would result from the visible change in the landscape character and visual character in the project area. The net cumulative effect would be a long-term second degree moderate adverse effect.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and a minor to moderate long-term adverse impact resulting from the removal of 18 existing trees. The low lying nature of the terraced walls would create a minor effect, only minimally obscuring views looking south toward the Monument Grounds or north from 17th Street. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long term minor adverse effect on views and viewsheds. There would be a long-term second degree moderate adverse impact due to the relatively large size of the affected area, the large loss of trees, and the introduction of a new terraced landscape that mimics the adjacent Overlook Terrace walls but which is inconsistent with the existing character of the Monument Grounds. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be long-term second degree moderate adverse effect on visual resources.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and the removal of 28 existing trees. This alternative would obscure views looking north towards President's Park from 17th Street, the vista looking southeast vista from Virginia Avenue to the Monument Grounds, and the view of toward the Washington Monument from the north side of Constitution Avenue. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long term minor adverse effect on views and viewsheds. There would be a long-term adverse impact that is greater than minor but less than moderate because the stone cladding and landscape plan would mitigate the adverse effects on the landscape and visual character of the project area. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a minor to moderate long-term adverse effect on visual resources.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long-term second degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall, the removal of 43 existing trees, and the intrusion of the concrete structure on the Monument Grounds. This alternative would adversely impact views looking north towards President's Park from 17th Street. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term second degree moderate adverse effect.	Same as alternative 1 at 23rd Street and Reflecting Pool levee. Same effects as alternative 1 during construction and a flood event. There would be a long term first degree moderate adverse effect on views and viewsheds. There would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall, the removal of 43 existing trees, and the intrusion of the concrete structure on the Monument Grounds. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect.

Summary of Visual Effects	No Action	Alternative 1A		Alternative 1B		Alternative 2A		Alternative 2B		Alternative 3		Alternative 4		Alternative 5	
		Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2
Impacts on landscape character and vegetation	o	o	x	x	-	x	x	x	xx	o-x	xx	x	x	xx	xx
Impacts resulting from new visual features	-	x	o-x	o-x	o	xx	x	xx	x	x	x	x	o-x	xx	x
Impacts to Views	-	x	o	o-x	o	x	o	x	o	x	o	x	o	x	x
Cumulative Impacts	-	x	o-x	o-x	o	xx	x	xx	xx	x	xx	x	o-x	xx	x
Conclusion	**-**	**x**	**o-x**	**o-x**	**o**	**xx**	**x**	**xx**	**xx**	**x**	**xx**	**x**	**o-x**	**xx**	**x**

(-) **Negligible:** The proposed action would not impact the aesthetics or visual viewshed of the proposed project area during construction or operations.

(o) **Minor Adverse:** The proposed action would not substantially change the scenic vista; would not substantially change scenic resources; and would not substantially change the existing visual character or quality of the site and its surroundings. The effect would be detectable, but slight, and would minimally diminish overall integrity, or affect the character defining feature(s) of the visual resources and aesthetic environment.

Moderate Adverse: The proposed action would result in a noticeable adverse effect on a scenic vista. The proposed elements would adversely alter scenic resources or existing visual character or quality of the project area. The overall integrity of the project area would be diminished because it would adversely alter the aesthetic environment.

(x) **First Degree Moderate Adverse Impact:** There would be an adverse effect on the landscape character due to loss of trees; there would be an adverse effect on the visual character due to new built elements with a large affected area; there would be an adverse effect on the existing views and vistas because they would be partially obscured by new built elements.

(xx) **Second Degree Moderate Adverse Impact:** The adverse effect on the landscape and visual character of the project area would be of a greater intensity than the first degree due to a greater loss of trees or affected area; existing important viewsheds would be completely altered or obscured.

Table 2.3: Summary of Environmental Consequences (continued)

Resource Area	No Action Alternative	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Cultural Resources: Impacts on Historic Structures and Plans	Minor short-term adverse impact on the Washington Monument and Grounds (reversible); Negligible impacts on all other architectural resources	Moderate long-term adverse impact on the Washington Monument and Grounds and *L'Enfant Plan* (1A only) due to compromise of setting by an intrusive structure. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds and *L'Enfant Plan* (1A only) due to compromise of setting by an intrusive structure. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds and *L'Enfant Plan* due to compromise of setting by an intrusive structure. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds and *L'Enfant Plan* due to compromise of setting by an intrusive structure. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds and *L'Enfant Plan* due to compromise of setting by an intrusive structure. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds due to compromise of setting by an intrusive structure. L'Enfant Plan not impacted. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds and L'Enfant Plan due to compromise of setting by an intrusive structure. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds and L'Enfant Plan due to compromise of setting by an intrusive structure. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds due to compromise of setting by an intrusive structure. L'Enfant Plan not impacted. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.	Moderate long-term adverse impact on the Washington Monument and Grounds due to compromise of setting by an intrusive structure. L'Enfant Plan not impacted. Negligible to minor impacts on all other architectural resources. Net cumulative long-term minor to moderate adverse impact.
Cultural Resources: Impacts on Cultural Landscape	Negligible short-term impact on Lincoln Memorial Grounds* due to sandbagging and short-term minor adverse impact on The Washington Monument and Grounds* due to reversible earth moving.	Moderate long-term adverse impact on Constitution Gardens* due to landform and landscape character alteration. (Implementation of Landscape Plan replanting required to avoid major adverse impact.) Moderate long-term adverse impact on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. The proposed curving walkways in alternative 1B would provide a new relationship between two adjacent, but previously disconnected, cultural landscapes. Net cumulative long-term moderate adverse impact.	Negligible short-term impact on Lincoln Memorial Grounds due to sandbagging at 23rd Street. Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration. (Implementation of Landscape Plan replanting required to avoid major adverse impact.) Moderate long-term adverse impact on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. Net cumulative long-term moderate adverse impact.	Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration and on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. Net cumulative long-term moderate adverse impact.	Negligible short-term impact on Lincoln Memorial Grounds due to sandbagging at 23rd Street. Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration and on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. Net cumulative long-term moderate adverse impact.	Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration and on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. Net cumulative long-term moderate adverse impact.	Negligible short-term impact on Lincoln Memorial Grounds due to sandbagging at 23rd Street. Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration and on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. Net cumulative long-term moderate adverse impact.	Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration and on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. Net cumulative long-term moderate adverse impact.	Negligible short-term impact on Lincoln Memorial Grounds due to sandbagging at 23rd Street. Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration and on the Washington Monument and Grounds due to landform and landscape character alteration as well as view loss. Net cumulative long-term moderate adverse impact.	Moderate long-term adverse impact on Constitution Gardens due to the due to landform and landscape character alteration and on the Washington Monument and Grounds due to the introduction of a new structure as well as landform and landscape character alteration. Net cumulative long-term moderate adverse impact.	Negligible short-term impact on Lincoln Memorial Grounds due to sandbagging at 23rd Street. Moderate long-term adverse impact on Constitution Gardens due to landform and landscape character alteration and on the Washington Monument and Grounds due to landform and landscape character alteration. Net cumulative long-term moderate adverse impact.
Cultural Resources: Impacts on Archeological Resources	Negligible impacts on archeology.	Potential negligible to moderate long-term adverse impacts, capable of being mitigated.	Negligible impacts on archeology.	Same as alternative 1. Potential negligible to moderate long-term adverse impacts, capable of mitigation.	Same as alternative 1. Negligible impacts on archeology.	Same as alternative 1. Potential negligible to moderate long-term adverse impacts, capable of mitigation.	Same as alternative 1. Negligible impacts on archeology.	Same as alternative 1. Potential negligible to moderate long-term adverse impacts, capable of mitigation.	Same as alternative 1. Negligible impacts on archeology.	Same as alternative 1. Potential negligible to moderate long-term adverse impacts, capable of mitigation	Same as alternative 1. Negligible impacts on archeology.

* documented as a cultural landscape.

Table 2.3: Summary of Environmental Consequences (continued)

Resource Area	No Action Alternative	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Visitor Use & Experience	Short-term minor adverse impacts from excavation of Washington Monument Grounds during a flood event; otherwise no impacts. Mainly beneficial long-term cumulative impacts from other projects and plans.	Short-term minor to moderate adverse impacts from construction and street closures. Long-term minor to moderate adverse impact on visitor experience due to presence of walls and removal of trees; negligible impacts on visitor use. Long-term minor adverse cumulative impacts.	Minor adverse impacts during construction. Long-term adverse or beneficial impact on visitor experience depending on perception of clad wall, but with long-term adverse impacts from tree loss decreasing to minor over time as trees are replanted. Negligible impact on visitor use. Long-term negligible to minor adverse cumulative impacts.	Same as alternative 1, Phase 1.	Same as alternative 1, Phase 2.	Short-term minor to moderate adverse impacts from construction and street closures. Long-term moderate adverse impact on visitor experience due to presence of concrete wall and removal of trees in currently open expanse of Monument Grounds; negligible impacts on visitor use. Long-term minor adverse cumulative impacts.	Minor adverse impacts during construction. Likely long-term adverse impact on visitor experience due to change in visual character of the area (loss of 90 trees for some time) and the terraced wall appearance, although some visitors could find it beneficial. Negligible impact on visitor use. Long-term minor adverse cumulative impacts.	Same as alternative 1, Phase 1.	Same as alternative 1, Phase 2.	Same as alternative 3, Phase 1, with moderate long-term impact due to presence of and appearance of the unclad structure and wall and removal of 32 trees.	Same as alternative 3, phase 2, except minor to moderate long-term impacts.

Resource Area	No Action Alternative	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Public Health & Safety	Negligible to possible minor impacts on employee safety due to the possibilities of accidents occurring during construction of an earthen levee under adverse conditions. No immediate impact on the public, which would be evacuated from the area. Negligible adverse impact on the delivery of emergency services under expected traffic conditions. Overall, the low relative reliability of the earthen closure represents a moderate adverse impact on public safety.	Short-term negligible impact on public safety during the construction phase. Following its completion, the arc wall would provide a permanent, Congressionally authorized level of protection, which represents a long-term beneficial impact on public safety due to the improvement in reliability over the current levee system. Since each alternative has similar construction requirements and each would provide the same level of protection from the 100-year flood, the effects from alternatives 2 to 5 would be the same as Phases 1 and 2 of alternative 1.		Since each alternative has similar construction requirements and each would provide the same level of protection from the 100-year flood, the effects from alternatives 2 and 3 would be the same as Phases 1 and 2 of alternative 1.							
Land Use and Socio-Economics	Major adverse impacts on residents, businesses, and government entities with buildings located within the 100-year floodplain. If FEMA issues the new 100-year floodplain map, entities would be required to obtain insurance from the NFIP, which would likely approach $50 million per year. Cumulative impacts would occur as new development properties would not only have to purchase the costly insurance but comply with new building codes which would increase total cost of development, making some projects less financially feasible, or eliminate usable commercial space on lower levels of buildings.	Long term beneficial impact on the residents, businesses, and government entities that reside or have facilities within the study area. Existing building owners would not have to purchase costly flood insurance on an annual basis and new construction would not need to comply with regulations and building codes for structures located in floodplains Long term beneficial impact on socioeconomic resources.		Since each alternative has similar construction requirements and each would provide the same level of protection from the 100-year flood, the effects from alternatives 2 to 5 would be the same as Phases 1 and 2 of alternative 1.							
Traffic and Transportation	Minor short-term adverse impacts from disruptions during flood events Minor long-term cumulative impacts, mainly from other sources.	Short-term moderate adverse impact on travel in the area with two lanes open (one lane in each direction) during peak and off-peak hours for the anticipated intense construction period, and if signal timing and aggressive public information mitigation actions are undertaken. Phase 2 is anticipated to have a short-term minor effect on traffic in the area due to minor disruptions while bringing in equipment and materials for construction and re-grading.		Since each alternative has similar construction requirements (staging activity, duration, and closure of 17th Street), the effects from alternatives 2 to 5 would be the same as Phases 1 and 2 of alternative 1.							

Table 2.3: Summary of Environmental Consequences (continued)

Resource Area	No Action Alternative	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Utilities and Infrastructure	No impact, provided the NPS avoids existing subsurface gas and water lines beneath the Monument Grounds when excavating the area during a flood event.	Negligible impacts on water supply lines, sanitary sewer lines, natural gas lines, and underground electric lines. Water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Minor impacts on irrigation lines and moderate impacts on storm drains, sanitary sewer, and communication lines. Negligible cumulative impacts.	Since the design of Phase 2 is situated in the same footprint as Phase 1, the impacts associated with Phase 2 would be the same as those for Phase 1.	Same as alternative 1 phase 1.	Since the design of Phase 2 is situated so that no new footings would be needed, the impacts associated with Phase 2 would be the same as those for Phase 1.	Same as alternative 1 phase 1.	Phase 2 would occupy a new footprint that is different than Phase 1 and would require additional subsurface work. As a result there would be minor short term adverse impacts associated with relocating irrigation lines to the east of the site. All other utilities would be relocated in Phase 1.	Same as alternative 1, phase 1.	Since the design of Phase 2 is situated n the same footprint as Phase 1, the impacts associated with Phase 2 would be the same as those for Phase 1.	Same as alternative 1 phase 1.	Since there would be no new ground disturbance associated with Phase 2 of this alternative, there would be no additional impacts on utilities and infrastructure. No additional cumulative impact; impacts remain negligible.
Park Management and Operations	Negligible impacts except in event of a flood; short-term moderate adverse impacts as the levee plan is implemented over 24-hour period, and resources are reallocated to address the emergency. Long-term minor adverse cumulative effects.	Negligible to minor short-term adverse impacts during initial construction. Short-term minor adverse impacts during implementation of the post and panel system during a flood event; this would require only about 12 hours, a long-term benefit compared to current procedures. Long-term minor adverse impacts associated with annual maintenance. Long-term minor adverse cumulative effects.	Same as Phase 1.	Since implementation would take about the same level of effort, impacts would be the same as alternative 1, Phase 1.	Same as Phase 1.	Since implementation would take about the same level of effort, impacts would be the same as alternative 1, Phase 1.	Same impacts as other alternatives except for impacts from implementation -- would require 24 hours and additional staff due to use of Jersey barriers and longer post and panel system, resulting in a short-term and moderate adverse, with fewer benefits than the other proposed action alternatives.	Since implementation would take about the same level of effort, impacts would be the same as alternative 1, Phase 1.		Since implementation would take about the same level of effort, impacts would be the same as alternative 1, Phase 1.	Same as phase 1

CHAPTER 3

AFFECTED ENVIRONMENT

This chapter of the Environmental Assessment (EA) describes existing environmental conditions in the areas potentially affected by the alternatives evaluated. These following resource areas: vegetation, floodplains, aesthetics and visual use, cultural resources, public safety, socioeconomics, traffic and transportation, utilities, and park management and operations, are described. Potential impacts are discussed in the "Environmental Consequences" chapter following the same order.

VEGETATION

The general vegetative character of the National Mall is that of designed landscape composed of lawn and shade trees typical of the greater National Capital Region. Prevalent features in the region include a complex of upland, floodplain forest, tidal marsh communities, frequently flooded river shores, and areas of open park-like habitat with maintained ornamental vegetation (NPS 2006a). The vegetation found within the National Mall includes more than 2,000 American elm trees (*Ulmus americana*) that line the streets. Yoshino cherry trees (*Prunus x yedoensis*) ring the Tidal Basin. West Potomac Park, which includes the parkland that extends south of the Reflecting Pool from the Lincoln Memorial to the Washington Monument Grounds (Monument Grounds) to the Potomac River, contains landscaped lawns with trees and shrubs. Elm trees are especially significant in West Potomac Park, the Monument Grounds, and other prominent locations in downtown Washington, D.C. The use of elms to line major streets and walkways in this area is specified in historic plans for the area.

Vegetation in the vicinity of the proposed 17th Street levee improvements is limited to maintained lawns and mature trees and shrubs clustered along the site's edges. Various tree species were observed and recorded on the site of the proposed levee improvements during a recent tree survey (TetraTech 2008). Along 17th Street, elm trees line the grounds in the vicinity of the proposed levee improvements. Both sides of 17th Street contain rows of American elm, Dutch elm (*Ulmus hollandica*), and Wilson elm (*Ulmus wilsoniana*). In the area southeast of the 17th Street levee crossing near the Washington Monument, the grounds are characterized by large open lawns with groves of trees along the streets and near buildings and structures. Within the quadrant southwest of the levee, sugar maple (*Acer saccharum*), black walnut (*Juglans nigra*), sweetgum (*Liquidambar styraciflua*), and flowering dogwood (*Cornus florida*) form a wooded edge along the paths toward Constitution Gardens. Further south along 17th Street toward the World War II (WWII) Memorial, groves of trees contain red maple (*Acer rubrum*), tulip poplar (*Lirodendron tulipifera*), yellow buckeye (*Aesculus flava*), northern red oak (*Quercus rubra*), American sycamore (*Platanus occidentalis*), bald cyprus (*Taxodium distichum*), cornelian cherry dogwood (*Cornus mas*), European beech (*Fagus sylvatica*), green ash (*Fraxinus pennsylvanica*), and swamp white oak (*Quercus bicolor*). The originally installed soil on the west side of 17th Street, east of the Overlook Terrace, is poor and has caused problems with drainage which has resulted in stunted growth in the many of the trees; despite being 30 years old, they appear to be far younger (Doug Jacobs, pers. comm. December 2008).

Along 23rd Street, north of the Lincoln Memorial, mature American elm trees line the sidewalks. A large portion of the area near 23rd Street west of Constitution Gardens is used for playing fields and is consequently maintained in turf only. Trees that exist at the perimeter of these fields include white oak (*Quercus alba*), river birch (*Betula nigra*), flowering dogwood, black locust (*Robinia pseudoacacia*), and red maple.

Along the southern edge of Constitution Gardens in the vicinity of the Reflecting Pool levee, the predominant landscaping consists of native trees such as Eastern white pine (*Pinus strobus*) and shrubs planted in an irregular pattern. The groundcover is massings planted in lawn areas.

There are no plant species identified as threatened or endangered within the areas affected by the proposed levee improvement alternatives or in the surrounding area. However, there are individual trees and designated groves of trees that the NPS would like to preserve because they contain several mature specimen trees or trees that are intrinsic to the overall character of the park. Such trees within the project area include: two black walnut trees located along the western edge of 17th Street approximately 150 feet south of Constitution Avenue, a line of more than 10 American elms along the western Edge of 17th Street, and one very large American sycamore on the east side of 17th Street on the Monument Grounds.

FLOODPLAINS

Federal projects are guided by *Executive Order 11988, Flood Plain Management,* which states that "each agency shall provide leadership and shall take action to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains." Under *Executive Order 11988*, the NPS is responsible for evaluating the potential effects of any actions proposed within a floodplain and proposing mitigation to avoid adverse effects resulting from development within a floodplain.

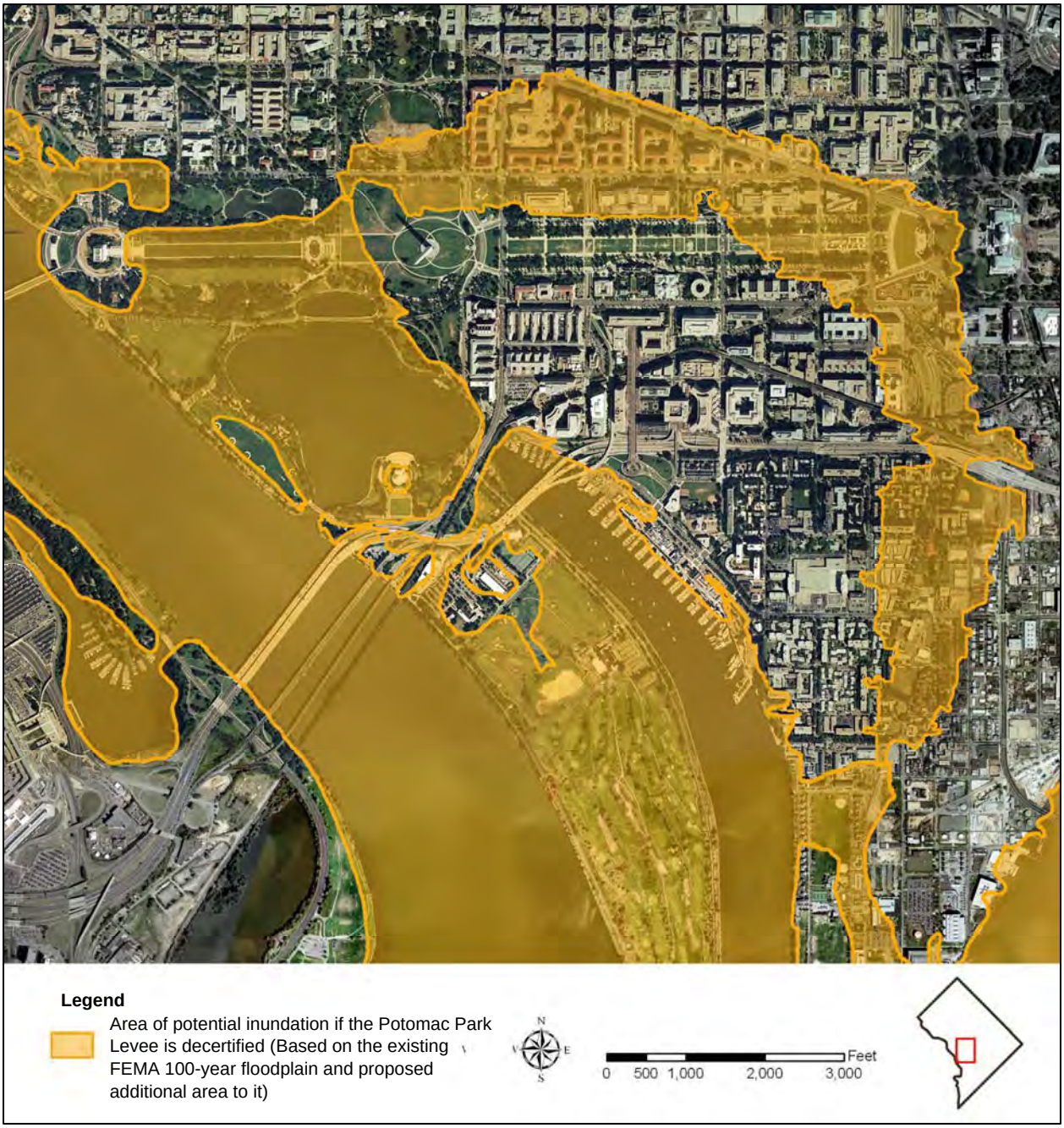
According to Federal Emergency Management Agency (FEMA) mapping, the areas to the north and east of the 17th Street levee are currently designated as Zone C, which has minimal flood potential and is outside of the 100-year floodplain. The 100-year floodplain is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood[1]. The area immediately south is designated as Zone B—between the limits of the 100-year flood and 500-year flood—while the area further south, in the vicinity of the Independence Avenue and 17th Street intersection, is designated as being within the 100-year flood zone (FEMA 1985). Figures 3.1 and 3.2 illustrate, respectively, the existing flood zones and the flood zones expected if decertification were to occur.

Figure 3.1 – Current Areas of Potential Inundation

Source: NCPC 2008

[1] A 100-year flood is a flood that has a one percent chance of being equaled or exceeded in magnitude in any given year; it is not a flood that occurs once every 100 years.

Figure 3.2 – Areas of Potential Inundation if Levee is Decertified



Source: NCPC 2008

AESTHETICS AND VISUAL RESOURCES

The key factors and considerations for the Aesthetics and Visual Resources of the affected environment include the following categories, which provide a framework for evaluation:

- *Landscape Character and Vegetation:* Vegetation and a gently sloping topography are the existing defining visual features of the Potomac Park Levee Project site. The landscape is characterized by large canopy street trees, which define edges and frame vistas. Lawn with minimal understory and shrub planting creates a park atmosphere and preserves views and movement under the trees.
- *Visual Character of Site including Urban Design Context and Built Features:* The visual character of a site, in very general terms, is like a mental snapshot of the place. It embodies the defining and most memorable site features. The urban design context, in the case of Potomac Park and the site area, consists mainly of the Monument Grounds, the Lockkeeper's House, Constitution Gardens, key streets (Constitution Avenue, 17th Street, Virginia Avenue, Ellipse Road), the John Paul Jones statue, and the parks and organizations on the north side of Constitution Avenue at 17th Street. The urban design context is defined by mature street trees planted at regular intervals, generous paved sidewalks, pedestrian-oriented lighting, NPS standard and nonstandard signs, well-traveled pedestrian paths and walkways, and heavy vehicular traffic.
- *Views and Vistas:* The patterns of streets and open spaces, and their associated visual corridors bordering the site, are critical considerations. These views and vistas have been present since the earliest plans for Washington, D.C., and have been maintained throughout the city's development. In addition, there are critical views to and from key cultural resources, such as the Washington Monument. For this analysis, the term "vista" defines views of primary importance that were specifically planned, designed, and implemented while the term "view" describes those unplanned views that resulted from the construction of other features.

The project area is defined visually by a network of roads, memorials, and the historic designed landscape of the Constitution Gardens, the Washington Monument and Lincoln Memorial grounds. The three areas where the levee improvements are proposed have distinct visual characters but all are consistent with the character of the National Mall. Each is described separately below.

EXISTING LEVEE ALONG THE REFLECTING POOL

The existing levee is located along the northern edge of the Lincoln Memorial Reflecting Pool (Reflecting Pool), a prominent rectangular water feature that is centered along the axis of the Washington Monument, Lincoln Memorial, and WWII Memorial. The alignment of the existing levee follows 23rd Street NW, south of Constitution Avenue NW, and continues around the northeastern quarter of the Lincoln Memorial circle; from there it continues east to the northwestern edge of the WWII Memorial where it turns north and breaks at 17th Street NW (see Figure 3.3).

Figure 3.3 – Looking west down the centerline of the existing levee along the Reflecting Pool

Landscape Character and Vegetation:

Currently, the existing levee is barely visible to visitors; it is obscured by the allée of trees that, even in the winter months, is a salient-enough landscape element that it creates a visual edge or boundary. The existing sight lines are orientated to the adjacent focal points (Lincoln Memorial, WWII Memorial, and the Washington Monument). The levee appears to be a berm, or gently rolling hill, that leads north to Constitution Gardens (See Figure 3.4).

Figure 3.4 – Constitution Gardens- Looking West from the Overlook Terrace

Visual Character of Site

The area surrounding the existing levee is characterized by strong visual features on all sides. The levee separates the Reflecting Pool to the south from Constitution Gardens to the north. The north elm walk runs parallel to the levee along the north edge of the Reflecting Pool and is flanked by an allée of mature elm trees.

23RD STREET

The existing project area is located at the southwest corner of Constitution Avenue and 23rd Street, directly to the northwest of the Lincoln Memorial. This site is located at a major point of entry into the District from the west, across the Potomac River.

Landscape Character and Vegetation:

The site is primarily flat and surrounded by mature trees to the east, north, and west. There are several softball fields on the site, which are permitted through the D.C. Department of Parks and Recreation from April 1 through September 30. At all

Figure 3.5 – Phase 2 Solution at the 23rd Street Location

Sandbag placement during a flood event
Proposed Re-grading

other times, these fields are opened on a first use basis or may be closed as part of an annual rehabilitation and maintenance program (NPS 2006a).

Visual Character of Site

There are no built structures on the site, so it functions primarily as a visual backdrop to the landmarks that surround it; to the south is the Lincoln Memorial, to the northwest is the Kennedy Center, and to the northeast is the U.S. State Department. The site is also visible to tourists although it is west of 23rd Street, outside of the travelling pattern of visitors to the adjacent memorials.

Views and Viewsheds

The parcel is highly visible from vehicles entering and exiting the District of Columbia (the District) from the adjacent transportation infrastructure.

17TH STREET

This project location is south of Constitution Avenue at 17th Street. The lake and Overlook Terrace walls at Constitution Gardens are to the west of the project area. To the north of the project area is the Organization of American States building, and the Second Division Memorial at the Ellipse. To the southeast is the Washington Monument. The John Paul Jones statue sits due south in a small park in the center of 17th Street. The WWII Memorial also is located to the south.

Landscape Character and Vegetation:

Vegetation and a gently sloping topography are the existing defining visual features of the Potomac Park Levee Project site. The landscape is characterized by large canopy street trees, which define the street edge and frame axial vistas north and south along 17th Street. The street trees effectively separate pedestrians from the heavy traffic on 17th Street by creating a transparent and regular edge to the pedestrian realm. The grove of mature trees in Constitution Gardens creates a shaded, pastoral sanctuary in an otherwise formal and monumental landscape. Minimal understory and shrub planting further reinforce the park character, preserving views and movement under the trees. Comparatively, on the east side of 17th Street, a dramatic sloping lawn stretches up to the base of the Washington Monument in a grand sweeping gesture of importance.

Visual Character of Site

The Washington Monument is the defining feature of the study area. Its significance in the landscape cannot be mistaken due to its size, prominent location at the top of a slope, and the lack of vegetation on the grounds surrounding it. The Mall itself lends a formal character to the area, which contrasts with the more informal Constitution Gardens. The Overlook Terrace provides an opening in the gardens' vegetation to observe the lake and surrounds. The Lockkeeper's House is partially obscured from view by tall shrubs and because of this, it does not have a strong presence in the landscape. In general, the pedestrian paths in the area show signs of heavy use, particularly at the edges and corners, suggesting their width and termini may not be appropriately sized for the volume of pedestrian use.

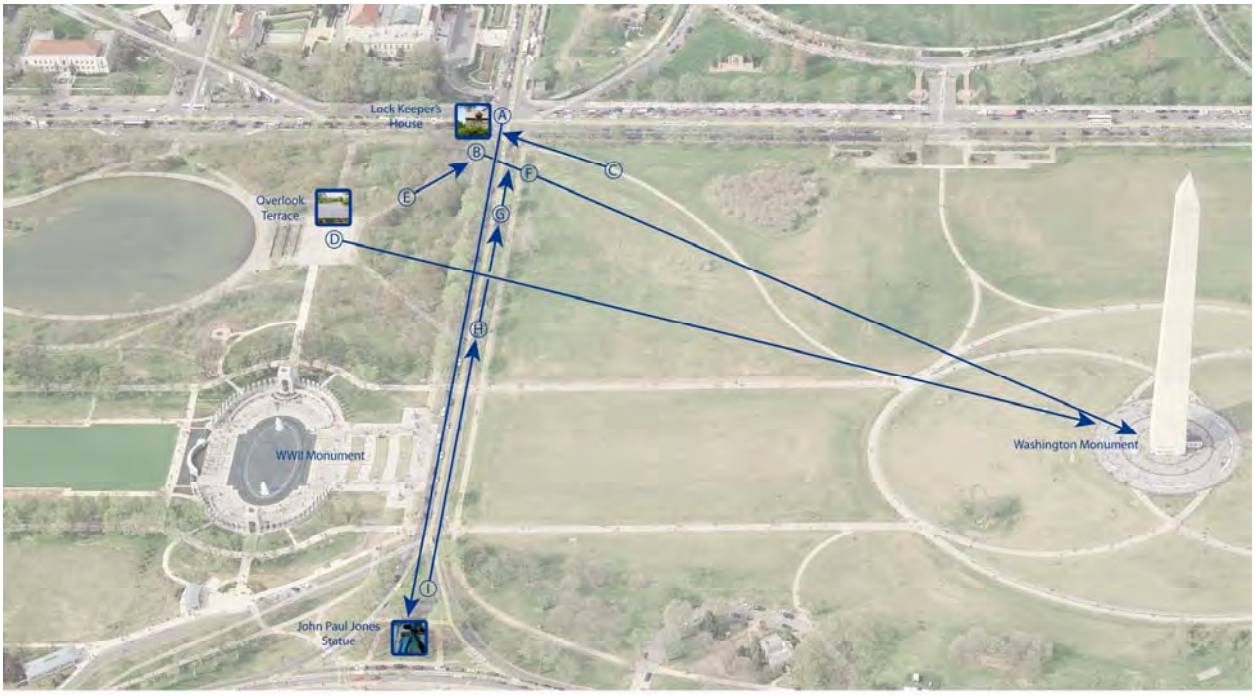
Views and Vistas

Several views are considered to have greater historical and cultural importance for this study. The first view extends from the northwest corner of the intersection of 17th Street and Constitution Avenue towards the Washington Monument and its grounds. This vista includes a view to the Washington Monument that is somewhat obstructed by street trees on 17th Street and a stand of nine young cherry trees located to the south of the pedestrian path leading to the Monument. The second view extends from 17th Street in line with the Overlook Terrace north towards Constitution Avenue. The importance of these views extends from their creation in the *L'Enfant Plan* (formed by the north–south and east–west streets surrounding the

site) and the *McMillan Plan* (formed by the open space and landscape pattern of the Mall). The Viewshed Analysis in Appendix D provides "before" and "after" photographs and perspective views analyzed in this report.

Secondary views and vistas in this area are the views looking south down 17th Street to the John Paul Jones statue (See Figure 3.6, View A), along the pedestrian path to and from the Overlook Terrace and the WWII Memorial, from the Overlook Terrace across 17th Street towards the Washington Monument and its grounds, and other views to and from the Monument Grounds. Views are illustrated in Figure 3.6 as well as corresponding photographs (Views A-I).

Figure 3.6 – 17th Street Location Map and Views



A. View/Panorama south to John Paul Jones Statue
B. View/Panorama southeast towards Washington Monument
C. View/Panorama West to Constitution Avenue
D. View/Panorama east to Washington Monument from Overlook Terrace
E. View/Panorama northeast from Overlook Terrace to 17th Street and Constitution Avenue
F. View/Panorama east from 17th Street
G. View/Panorama north from 17th Street
H. View/Panorama north from 17th Street
I. View/Panorama north from 17th Street

Figure 3.6 Continued - Views A-F

View A: Looking South to the John Paul Jones Statue

View B: Looking Southeast to the Washington Monument

View C: Looking West to Constitution Avenue

View D: Looking East to the Washington Monument from the Overlook Terrace

View E: Looking Northeast from the Overlook Terrace

View F: Looking Southeast from 17th Street

Figure 3.6 Continued - Views G- I

View G: Looking North from 17th Street

View H: Looking North from 17th Street

View I: Looking North from 17th Street from the John Paul Jones Statue

CULTURAL RESOURCES

Section 106 of the *National Historic Preservation Act* (NHPA) of 1966, as amended, and as implemented in 36 CFR 800, requires federal agencies to consider the effects of federally funded, regulated, or licensed undertakings on cultural resources listed on or eligible for inclusion in the National Register of Historic Places (NRHP); moreover, the federal agency must afford the Advisory Council on Historic Preservation (ACHP) the opportunity to comment in the event that an undertaking will have an adverse effect on a cultural resource that is eligible for or listed in the NRHP.

Eligibility for the NRHP is established according to the official Criteria of Evaluation (36 CFR 60.4) issued by the Department of the Interior. The criteria relate to the following:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield, information important in prehistory or history.

For the purposes of this EA, cultural resources impact topics include either recorded or potential historic archeological sites, prehistoric sites, and standing architectural structures, historic districts, cultural landscapes, and memorials. Although not all memorials within the Area of Potential Effect (APE) have been listed on the National Register either individually or as contributing resources to historic districts, they are treated similarly by the NPS. Ethnographic resources and museum collections were dismissed as impact topics. The consideration of cultural resources by the NPS meets pertinent requirements of the NHPA and related legislation and implementing regulations.

The extensive regulatory APE for this undertaking was drawn based upon comments received at the Public Scoping meeting held for the EA on June 10, 2008. It encompasses the area from the Potomac River on the west, north to the Theodore Roosevelt Bridge approaches, north along 23rd Street to E Street, roughly along E Street including the White House, continuing southeast along Pennsylvania Avenue to the western edge of the Capitol grounds, west along Independence Avenue, and south around the Tidal Basin terminating at the Potomac River. Since the development of the three alternatives to be carried forward, it has become apparent that a more limited APE is justified.

A multitude of cultural resources are located within the defined APE, ranging from cultural landscapes, individual buildings, monuments, statues, and potential archeological sites. Thirty-three individual buildings, eight cultural landscapes, and six historic districts are within the official APE. For a complete list of all identified cultural resources within the APE, see Table 3.1. A map of the APE is in the Appendix E, Figure E-3.

However, only the resources that appear to be affected are described in detail in this section. These resources are located in the immediate vicinity of the flood control levee along the Reflecting Pool in Constitution Gardens, along 17th Street and a section of 23rd Street.

HISTORIC STRUCTURES AND DISTRICTS

This section addresses historic properties present that have been determined eligible for the NRHP as buildings, structures, sites, objects, and historic districts, essentially the architectural resources. Because

the Monumental Core of Washington has been a focus of preservation activity from the initial passage of the NHPA in 1966 and before, the official documentation of its historic resources has been accomplished in a series of studies that sometimes overlap and vary in approach with changing technical standards.

Therefore, the following discussion addresses some of the same resources discussed below under Cultural Landscapes.

Table 3.1 - Historic Resources Within the Area of Potential Effects

INDIVIDUALLY LISTED HISTORIC PROPERTIES	HISTORIC DISTRICTS
American National Red Cross	The National Mall Historic District
American Pharmaceutical Institute	Northwest Rectangle Historic District
Arlington Memorial Bridge	Seventeenth Street Historic District
Arts and Industries Building	Pennsylvania Avenue National Historic Site
Bulfinch Gatehouse and Gateposts	Federal Triangle Historic District
Constitution Hall	West Potomac Park Historic District
Corcoran Gallery of Art	
DAR Memorial Continental Hall	CULTURAL LANDSCAPES
District of Columbia District Building	President's Park
The Ellipse	Constitution Gardens
Jefferson Memorial	Lincoln Memorial Grounds
Federal Reserve Board Building	Washington Monument and Grounds
Franklin Delano Roosevelt Memorial	The Mall
Freer Gallery of Art	Thomas Jefferson Memorial
Korean War Veterans Memorial	Union Square
Lincoln Memorial	Pennsylvania Avenue
Lockkeeper's House	West Potomac Park
National Academy of Science and Engineering	
National Archives	MEMORIALS
National Gallery of Art West Building	National World War II Memorial
National Museum of Natural History	John Paul Jones Statue
Old Post Office Building	Second Division Memorial
Pan American Union	
Smithsonian Institution Building	
U.S. Department of the Interior (New Interior Building)	
U.S. Department of the Interior Offices	
U.S. Department of the Interior South Building	
U.S. Department of the Treasury Building	
Van Ness House Stables	
Vietnam Veterans Memorial	
Washington Monument	
White House	
L'Enfant Plan of the City of Washington	

The project has the potential to directly affect seven major NRHP-listed historic properties: the Lincoln Memorial, the Washington Monument and Grounds, the Lockkeeper's House, the Vietnam Veterans Memorial, West Potomac Park Historic District, the Northwest Rectangle Historic District, and the *L'Enfant* and *McMillan* plans of the City of Washington. In addition to these seven properties, the project has the potential to affect the WWII Memorial, which is a protected area because it is a federally legislated property. A number of individually listed properties are not discussed separately here, as they are contributing elements to either the West Potomac Park Historic District or the *L'Enfant* (and *McMillan*) *Plan* of the City of Washington. See Table 3.1 for a complete inventory of listed and eligible resources within the APE.

A number of historic resources stand on the north side of Constitution Avenue near the intersection with 17th Street. These include the Second Divisional Memorial, the Pan American Union, the Ellipse, and the Bulfinch Gatehouses (at the northeast corner of 17th Street and Constitution Avenue, the second located at the Monument Grounds at the intersection of 15th Street and Constitution Avenue). None of these resources would be physically impacted by any of the proposed alternatives; however, potential visual impacts may affect any of these resources. Each of these resources are briefly described below.

Listed on the NRHP in 1981, the Lincoln Memorial, at the foot of 23rd Street NW, is significant for its architecture, landscape architecture, sculpture, and commemoration. It is an excellent and unique example of a Beaux Arts monument in the United States, and it is important as a shrine to Abraham Lincoln. The individual listing includes 19 acres, excluding the Reflecting Pool and grounds to the east (NPS 1981a). The Lincoln Memorial is nationally significant and meets the requirements for listing as a National Historic Landmark (Garcia et al. 2004:128). (National Historic Landmarks [NHLs] are exceptional and nationally significant historic properties, the designation of which began even before the passage of NHPA; they always qualify for the NRHP).

The Washington Monument and Grounds were listed on the NRHP in 1981 for the site's significance as the leading memorial to George Washington, as an example of Egyptian Revival architecture, for its contribution to the history of structural engineering, and as the central core of the Monument Grounds around the National Mall. Construction began on the structure in 1848 and was completed 36 years later in 1884. Utilizing the leftover stone, a Boiler House and a Monument Lodge were constructed on the grounds in 1886 and 1888, respectively. The Boiler House, which was originally constructed to house the steam-generating plant for the Washington Monument elevator, was later renamed the Survey Lodge and now serves as the headquarters for NPS Mall Operations. As of July 2007, the Monument Lodge contains restrooms and a book store and provides will call and ticket reservations for the WAMO. The significance of the Washington Monument and Grounds as a cultural landscape, a term not current in 1981, was not recognized and documented until recently. See the discussion of this property under the "Cultural Landscapes" section below.

The Lockkeeper's House, listed on the NRHP in 1973, is located on the southwest corner of 17th Street and Constitution Avenue. It is significant as the only remnant of the Chesapeake and Ohio (C&O) Canal extension, built in 1832 and 1833, that connected the C&O Canal to the Washington City Canal. It is the oldest historic structure in the care of the National Mall and Memorial Parks (NAMA), pre-dating even the Monument Grounds themselves. After a long period of disrepair and financial losses, both the C&O Canal and Washington City Canal were abandoned; the latter was converted for sewer use, covered over, and later paved, becoming B Street and then renamed Constitution Avenue. Control of the Lockkeeper's House was transferred to the United States around the turn of the twentieth century. It was moved in 1915 to accommodate the extension of 17th Street and is currently interpreted by the NPS as a historic structure reflecting the early canal history of Washington, D.C. A historical marker was placed on the building by the Office of Public Buildings and Public Parks in 1928 (Dillon 1973c).

The Vietnam Veterans Memorial, designed by architect Maya Lin, was administratively listed on the NRHP the same day as its dedication ceremony in November 1982. Located in the northwest corner of

Constitution Gardens, the memorial is comprised of a V-shaped black granite wall. The landscape for the memorial area was entirely re-graded, so the ground slopes down to the walls. One of the walls is aligned with the Washington Monument, while the other looks to the Lincoln Memorial. The memorial was originally inscribed with 57,692 names of those that had served in Vietnam and were killed during the war (NPS 2008:98).

East and West Potomac Parks Historic District was originally listed on the NRHP in 1973 (Dillon 1973b), and a revised nomination was accepted in 2001 (Bobeczko and Robinson 1998). As historic districts include many resources, it is customary to document which ones are "contributing" to the qualities that justify the designation of the historic district as NRHP-eligible and which ones are "non-contributing." The two parks are significant under a vast array of contexts including art, architecture, engineering, landscape architecture, entertainment/recreation, city planning, politics/government, social history, commemoration, and transportation. West Potomac Park includes approximately 400 acres and extends from the Potomac River to 17th Street (west to east) and from Constitution Avenue to the Potomac Railroad Bridge (north to south). It was originally meant to serve passive recreation purposes with areas reserved for active recreation. From its original concept, it has developed into a "designed landscape occupied by prominent monuments and memorials" (Bobezcko and Robinson 1998:7-3). Although the park was developed as a concept of the *L'Enfant Plan* of 1791, its overall design is associated with the *McMillan Plan* from 1901 to1902. These elements include its "traditional Baroque plan, long vistas, axial relationships, and expansive open spaces" (Bobezcko and Robinson 1998:7-4). Elements of the park that are contributing to its significance include many sites previously discussed such as the Lincoln Memorial Grounds, Reflecting Pool, Rainbow Pool, Dutch elm trees, Arlington Memorial Bridge, Constitution Gardens, the flood levee and Vietnam Veterans Memorial. Other important features of West Potomac Park are the Tidal Basin, stone sea walls, Independence Avenue extension, Kutz Bridge, Japanese cherry Trees, Franklin D. Roosevelt Memorial, and Commodore John Paul Jones statue, among others (Bobezcko and Robinson 1998: Section 7). The scale of the above ground features of all alternatives is such that there is no potential to affect this cultural landscape.

The Northwest Rectangle Historic District is bounded on the south by Constitution Avenue, to the east by 17th Street, to the west by 23rd Street, and roughly bounded to the north by E and F Streets. It has been determined eligible by the District of Columbia Historic Preservation Office (DC HPO). The historic district comprises government offices and institutions such as the Pan American Union, Daughters of the American Revolution, the Red Cross, and the National Academy of Sciences. The District is a result of a unified planning effort to develop a complex of federal buildings of the first half of the twentieth century.

The *L'Enfant Plan* was listed on the NRHP in 1997 for its "relationship with the creation of the new United States of America and the creation of a capital city;" its original design was by Pierre L'Enfant, and subsequent alterations were made by notable persons. It was recognized as a "well-preserved, comprehensive, Baroque plan with Beaux Arts modifications" (Leach and Barthold 1994:8-2). The period of significance is 1790 to 1942 and encompasses both the 1791 City of Washington design of Pierre L'Enfant and the 1901 and 1902 *McMillan Plan* developed by a four-member commission of architects: Charles McKim and Daniel Burnham, landscape architect Frederick Law Olmsted, Jr., and the sculptor Augustus Saint-Gaudens. The 3,565-acre "area nominated reflects the street grid, diagonal avenues, parks and their statuary, vistas among monuments and sites over federal land within the plan's boundaries, and the airspace above this matrix up to the legal height limit in the city" (Leach and Barthold 1994:7-2). Contributing features of the *L'Enfant Plan* include the parks, reservations, and streets, although views and vistas are also noted as critical elements that define the design intent by both L'Enfant and the McMillan Commission. With particular relevance to this proposed project, Constitution Avenue and 17th Street (extending from Independence Avenue to Florida Avenue) are both contributing features of the *L'Enfant Plan*. A list of contributing associated vistas in the *L'Enfant Plan* nomination with relevance to this undertaking includes those along the Mall looking east to west and from the White House looking south

to the Jefferson Memorial and along Constitution Avenue, as well as 17th Street south of Constitution Avenue. A specific 17th Street vista is not included as a contributing element (Leach and Barthold 1994).

The WWII Memorial, authorized by Congress in 1993, is the first national memorial dedicated to all who served during WWII. The Rainbow Pool site at the east end of the Reflecting Pool was chosen as the memorial's site, which eventually covered 7.4 acres. Designed by Friedrich St. Florian, an architect based in Providence, Rhode Island, the memorial opened to the public in 2004 after three years of construction. It was at this time when the memorial was transferred from the American Battle Monuments Commission to the NPS. The WWII Memorial consists of 56 pillars and a pair of arches surrounding a plaza and fountain. The pillars, representing each state and U.S. territory during WWII, are 17 feet tall, arranged in a semicircle around a plaza with two 43-foot arches on opposite sides. The north arch is inscribed as "Atlantic" and the southern arch "Pacific." The "Circle of Remembrance" is a garden 38 feet in diameter at the northwest corner of the site enclosed by a two-foot-high stone wall. The area includes a seating area with wooden benches (National World War II Memorial 2003).

The Second Divisional Memorial is located on the southern trail of President's Park. It honors the nearly 18,000 soldiers who lost their lives in the Second Division of the United States Army. It was first dedicated in 1936 to honor those lost in World War I. It has since had two additions to honor the victims of WWII and the Korean War. The memorial is comprised of a large granite doorway flanked with two wreaths with an 18-foot sword guarding the doorway.

The Ellipse, also referred to as President's Park South, is a 52-acre park located to the south of the White House. The Ellipse is a contributing feature of the *L'Enfant Plan* as it was first conceived in 1791. The USACE began work on the Ellipse in 1867, and it was landscaped in 1879. President's Park South was listed on the NRHP in 1979 (Mackintosh 1979).

The Pan American Union building is the headquarters of the Organization of the American States. Located on the northwest corner of 17th Street and Constitution Avenue, the building was designed by Paul P. Cret, a student of the Ecole des Beaux Arts, and was built between 1908 and 1910, almost entirely of marble. It was listed on the NRHP in 1969 (Taylor 1969).

The U.S. Capitol Gatehouses, also known as Bulfinch Gatehouses, are listed on the NRHP and include two gatehouses on Constitution Avenue — one on the northeast corner of 17th Street and the second on the northwest corner of 15th Street — and two gateposts on the south side of Constitution Avenue at the intersection of 15th Street. The Bulfinch Gatehouses and gateposts are nationally significant for their association with Charles Bulfinch, a master architect. Originally built on the Capitol grounds, they were moved to their current locations on 15th and 17th streets in 1874 and 1880. In 1938 and 1939, the gatehouses were disassembled and rebuilt to a slightly new design by a NPS architect (Dillon 1973a).

CULTURAL LANDSCAPES

Cultural landscapes, as defined in the National Park Service's *Preservation Brief 36: Protecting Cultural Landscapes: Planning, Treatment, and Management of Historic Landscapes* (Birnbaum 1996:1), consist of "a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values." The proposed alternatives have the potential to affect three cultural landscapes: Constitution Gardens, Lincoln Memorial Grounds, and Washington Monument and Grounds. All are parts of the National Mall, a term used by the NPS to describe the area between the U.S. Capitol on the east and the Potomac River at the Lincoln Memorial on the west. A fourth cultural landscape, President's Park, includes a component, President's Park South (Ellipse), bounded by E Street NW / South Executive Drive on the north, Constitution Avenue NW on the south, 15th Street NW on the east, and 17th Street NW, on the west. President's Park South is directly north of the Monument Grounds; however, the scale of the above ground features of all alternatives is such that there is no potential to affect this cultural landscape.

Constitution Gardens

Encompassing 43.1 acres, Constitution Gardens is a park unit of West Potomac Park and is therefore part of the National Mall. It is bounded by Constitution Avenue on the north, 17th Street on the east, Henry Bacon Drive on the west, and a flood control levee to the south at the bottom of its slope near the outer elm walks north of the Reflecting Pool. The Washington office of the renowned architectural firm of Skidmore, Owings, and Merrill designed Constitution Gardens in the early 1970s using the 1902 *McMillan Plan* as their base plan. The location on the National Mall with its open spaces and views has been an ideal location for memorials and statues although, due to perceived overcrowding with memorials, the Commemorative Works Act (CWA) of 1986 was amended in 2003 to declare the National Mall a "reserve"(i.e., a completed work of public art on which no more memorials were to be accommodated). The northwest corner of Constitution Gardens is the site of the nationally recognized Vietnam Veterans Memorial (1982). Subsequent additions include the Memorial to the 56 Signers of the Declaration of Independence (1982), the Three Servicemen statue (1984), the Vietnam Women's Memorial (1993), and an "In Memory" plaque commemorating those who served in the Vietnam War (2000/2006 replacement). The most recent addition to Constitution Gardens is the Garden of Remembrance, a feature associated with the WWII Memorial south of Constitution Gardens (NPS 2008b:81).

Constitution Gardens is listed on the NRHP as a contributing site to the revised *East and West Potomac Parks Historic District* nomination (referred to below as *West Potomac Park* nomination; Bobezcko and Robinson 1998) and under *The L'Enfant Plan of the City of Washington* nomination (which also includes the *McMillan Plan*; Leach and Barthold 1994). As the revised *West Potomac Park* nomination was drafted in the late 1990s, it takes account of cultural landscapes. In the *West Potomac Park* nomination, Constitution Gardens is found eligible under Criterion A, for landscape architecture and commemoration. Although less than 50 years old, the usual minimum age for NRHP eligibility, it "has achieved exceptional significance, first as a highly visible project celebrating the American bicentennial in the nation's capital, and later [sic] as the landscaped setting for a number of national memorials" (Bobezcko and Robinson 1998:7-20). The Cultural Landscape Inventory (CLI), completed in 2008, recommends that Constitution Gardens be listed under Criterion C for the work of Skidmore, Owings, and Merrill and the architect Maya Lin, designer of the Vietnam Veterans Memorial. The CLI suggests that the National Mall meets the requirements for NHLs status (NPS 2008b).

The Constitution Gardens' CLI describes significant character-defining features according to the cultural landscape's natural features, topography, spatial organization, land use, vegetation, circulation, buildings and structures, views and vistas, constructed water features, and small-scale features.

There are very few natural features as Constitution Gardens was entirely constructed on landfill, but there has been an attempt to start a functioning ecosystem in the lake (NPS 2008b:65–66). Character-defining features of the topography include the gently rolling slopes, long berms, the small lake, a slope descending to the partially sunken Vietnam Veterans Memorial, and the flood control levee (NPS 2008b:66–68).

Land-use features contributing to the cultural landscape of the park cover a variety of activities including passive recreation, catch-and-release fishing, visiting the memorials, ceremonies at the Vietnam Veterans Memorial and Vietnam Women's Memorial, demonstrations, and a citizenship ceremony at overlook terrace (NPS 2008b:70–72).

The vegetation of Constitution Gardens illustrates a "varied [and] mostly native vegetative character," which is in keeping with the original designs (NPS 2008b:79). However, the recent addition of the Garden of Remembrance is currently a noncontributing feature (NPS 2008b:81).

The circulation of Constitution Gardens is defined principally through two loop walks and a large paved plaza known as Overlook Terrace. The circulation system is further enhanced through a network of narrower winding walkways and stairs.

Important buildings and structures in the park are the Lockkeeper's House; stone terraces and a paved platform at the east end; the island in Constitution Gardens Lake and the 56 Signers Memorial on the island; the flood control levee; the comfort station; the refreshment kiosk; the Vietnam Veterans Memorial, including the Three Servicemen Statue; and the Women's Vietnam Memorial (NPS 2008b:92).

Nearly every direction to and from Constitution Gardens provides a character-defining view or vista excluding the one towards Rosslyn, Virginia (NPS 2008b:106).

The 6.75-acre lake in the eastern section is an important focal point of the park's landscape, and a wide variety of small-scale features scattered throughout the park are significant to the landscape's interpretation, including objects such as benches, light posts, plaques, flagpole, and directory stands.

Lincoln Memorial Grounds

In 1999, a Cultural Landscape Report (CLR) was completed for West Potomac Park, Lincoln Memorial Grounds (Joseph and Wheelock 1999). The Lincoln Memorial Grounds cultural landscape embraces 94 acres and includes the Reflecting Pool, Lincoln Memorial, the circular drive around the memorial, and a portion of the radial roads leading from the memorial. The Potomac River bounds the west side.

A part of the development of Potomac Park and the National Mall by the McMillan Commission was the creation of a memorial to Abraham Lincoln. The Lincoln Memorial Commission, created in 1911, selected Henry Bacon as the architect of the memorial, which was completed in 1917 and officially dedicated in 1922. Landscaping of the grounds continued through the 1920s with the addition of the Ericsson Memorial in a traffic circle south of the Lincoln Memorial in 1927. The grounds were completed in 1932 along with the approaches to the Arlington Memorial Bridge (Joseph and Wheelock 1999:40).

Like Constitution Gardens, the Lincoln Memorial Grounds is a contributing site of the *West Potomac Park* NRHP nomination (Bobezcko and Robinson 1998) and *The L'Enfant Plan of the City of Washington* nomination (Leach and Barthold 1994). Under Criterion A of the NRHP, the memorial and grounds have been found to be nationally significant for landscape architecture and commemoration. They are also nationally significant for the topic of civil rights as the site of a 1939 performance by Marian Anderson and the 1963 March on Washington. These events are also recognized in the 1992 theme study by the NPS entitled *Civil Rights in America: Desegregation of Public Accommodations* (Garcia et al. 1992:128). The Memorial Grounds are significant under Criterion B for their association with Abraham Lincoln and Martin Luther King, Jr., and under Criterion C for its Beaux Arts shrine and the development of the grounds by notable architects and landscape architects such as Charles McKim, Frederick Law Olmsted, Jr., James Greenleaf, and Henry Bacon (Joseph and Wheelock 1999:170).

The CLR indicates that the integrity of location, setting, and feeling of the Lincoln Memorial Grounds has been retained. Some alterations have been made to specific features adversely affecting their integrity; however, the CLR states that the overall "design intent" has been retained. A compromise to the landscape's integrity with respect to materials, workmanship, and association is caused by the new road systems, uses (concession structures and kiosks), materials, and secondary structures. The CLR states that "these effects can be reversed so that the historic character of the Lincoln Memorial Grounds is retained" (Joseph and Wheelock 1999:172). The CLR includes a complete list of each contributing and non-contributing character-defining feature of the Lincoln Memorial and Grounds. A short list of contributing features includes passive recreation at the Reflecting Pool, views to and from the Washington Monument, elm trees along the Reflecting Pool, grassy areas, plantings around the Memorial, the steps to the Reflecting Pool, cast-iron benches, and Washington Globe lampposts.

Washington Monument and Grounds

Comprised of approximately 106 acres, the Washington Monument and Grounds cultural landscape is bounded by 14th and 17th Streets and Constitution and Independence Avenues. It was listed on the NRHP in 1981 as a structure and is significant in the areas of architecture, landscape architecture, engineering, and commemoration. The draft CLR on the Washington Monument and Grounds suggests it is also significant for community planning and development, social history, politics/government, and recreation/entertainment (John Milner Associates 2003:5.1-10). Although it is listed as a structure, the boundaries of the nomination include the grounds from 14th to 17th streets and Constitution to Independence avenues, which comprise 106 acres, for they encompass an entire resource that retains its historic integrity and contributes to the property's historic significance. The monument and grounds are an essential contributing unit to the *L'Enfant Plan of the City of Washington* NRHP nomination.

The Washington National Monument Society, founded in 1833, held a design competition for the Washington Monument, which was won by the noted architect Robert Mills. Construction of Mills' design began in 1848; although the monument was nowhere near completion, work stopped in 1854. Construction restarted soon after the Civil War. The final monument, slightly altered from Mills' original intent, was completed in 1888.

The monument and grounds retain a fair degree of integrity for the "nineteenth-century construction period, a high degree of integrity for the mid-twentieth-century period, and a good degree of integrity for the later political and social forum period" (John Milner Associates [JMA] 2003:5-11). Numerous changes have been made to the circulation, vegetation, and boundaries since completion of the monument in 1889, slightly diminishing the site's integrity. Contributing character-defining features of this park unit include the knoll, mature elm trees, open grass areas, formal pathways, and buildings and objects including Monument Lodge, Survey Lodge, Sylvan Theatre, and the Bulfinch Gatepost. Other contributing features include land uses such as recreation (both passive and active), events, commemorations, and small-scale features such as the flagpoles, dedication plaque, and cast-iron benches. Views and vistas to and from the Washington Monument are among the leading character-defining features of the overall cultural landscape (JMA 2003:5–11).

ARCHEOLOGICAL RESOURCES

Efforts to identify archeological resources included a review of existing databases maintained by the NPS and the DC HPO, a literature review, and research into primary historical documents.

The Potomac Park levee is located within the heart of the District of Columbia's (the District) downtown Monumental Core area, within the NAMA, which the NPS manages as a public space. The eastern end of the levee is within the Monument Grounds, and the remainder is in West Potomac Park. Before the City of Washington was laid out in 1791, most, if not all, of the APE for the Potomac Park levee was within the channel of Tiber Creek, one of the District's natural inland waterways. The south bank of Tiber Creek cut across what is now the Monument Grounds. The modern landscape associated with the APE reflects the filling of Tiber Creek and the creation of formal landscapes of the National Mall. Because most of the land in the APE consists of fill deposits and formal landscapes, the potential for archeological sites is limited but not nonexistent. Archeological resources associated with earlier historical landscapes, if present, would be found in buried contexts.

Earlier planning studies for the Potomac Park levee included a Phase I cultural resource reconnaissance for what was then known as the Washington, D.C. and Vicinity Local Flood Protection Project. That study, completed in 1988 (R. Christopher Goodwin & Associates, Inc. 1988), consisted primarily of archival research. The 1988 study did not include subsurface field testing at the 17th Street or 23rd Street closure areas. Noting that the 17th Street and 23rd Street closures were historically within the channel of Tiber Creek, the 1988 report asserted that "the only buildings in the project area were World War I and

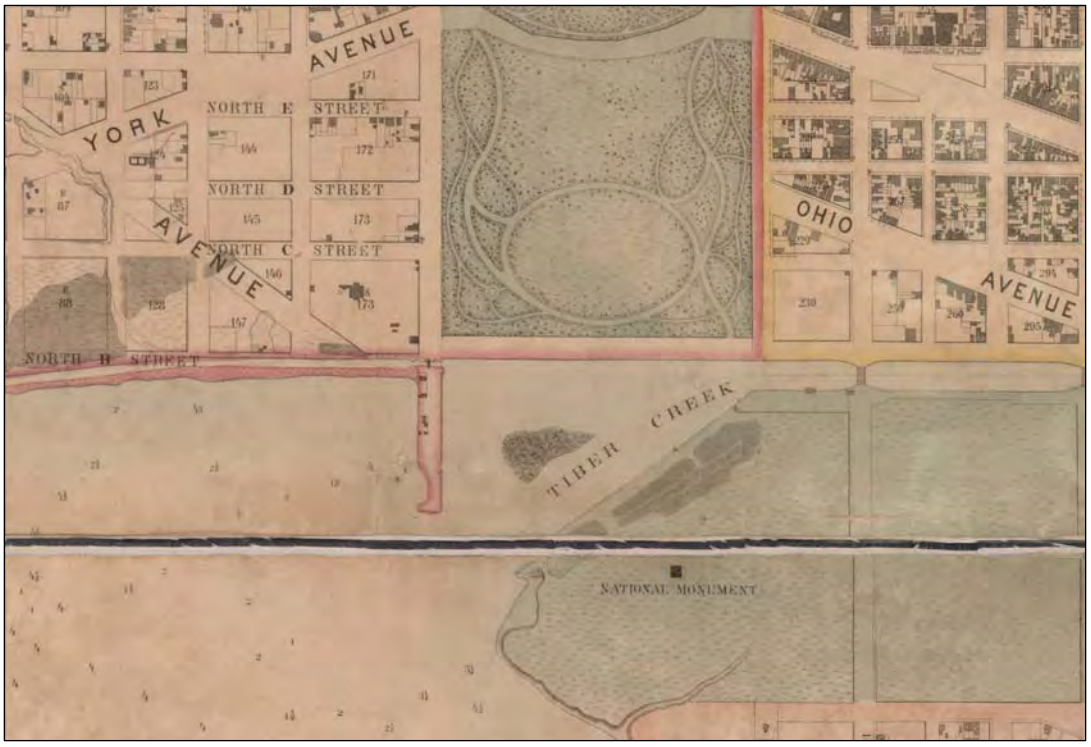
World War II temporary structures" (R. Christopher Goodwin & Associates, Inc. 1988:45), thereby effectively concluding that no archeological resources were present in either closure area.

During the Section 106 scoping for the present EA, however, attention was drawn to two possible archeological resources at the 17th Street closure area: (1) a prehistoric site on the Monument Grounds; and (2) a historic wharf that extended into Tiber Creek along 17th Street. Available information about those two possible archeological resources is summarized below.

Native American occupation in the downtown area around Tiber Creek has been well established despite the urban character of the modern environment. There are many artifact collections from sites in the District that were made prior to the advent of modern archeology, and as such, they typically lack specific information about their origin. Among the prehistoric artifact collections from the District of Columbia is an assemblage of 147 specimens from the Monument Grounds as recently described by Krakker (2005). This collection is apparently from a site on the south bank of Tiber Creek although the exact provenience is unknown. The collection was obtained in the 1880s and includes artifacts that indicate episodic use of the area for at least 7,000 years. The collection has been cataloged as archeological site 51NW35-Monument Grounds. It had been widely assumed that the Monument Grounds have been so severely disturbed that there was no possibility that archeological resources could have survived. However, recent archeological investigations for the National Museum of African American History and Culture (NMAAHC) have demonstrated that some remnants of the natural landscape along Tiber Creek may be preserved beneath deep fill deposits (LeeDecker et al. 2007; LeeDecker et al. 2008). Documentation of areas of the original Tiber Creek shoreline and marsh areas in the National Mall area is one of the goals in the NPS archeological resource management plan for the NAMA (Little 1995).

The wharf at 17th Street was a prominent feature of the 19th century landscape, and it was clearly illustrated on the earliest detailed widely published map of the city (Boschke 1857; Figure 3.7) as well as later maps. Modern-day historians (e.g., Arnebeck 1991; Hawkins 2000) refer to this structure as Commissioner's Wharf, but this is an error, as historical evidence places Commissioner's Wharf a few blocks to the west, along the shoreline of Tiber Creek between 21st and 22nd Streets. Following historical practice, the wharf at 17th Street is referred to here as the "17th Street Wharf".

Figure 3.7 - Boschke Map 1857 Depicting the 17th Street Wharf.



Construction of the 17th Street Wharf followed an act of the City Council for the City of Washington on November 10, 1806, that appropriated $2,000 for the construction of a wharf at the end of 17th Street (Wright 1881). Specifications for the wharf were announced in *National Intelligencer* in 1807, and construction was completed later that year.

One year later, additional improvements to the 17th Street area, including the wharf, were authorized by the City Council, with a $1,000 appropriation. It is uncertain how much of the appropriation was meant for the expansion of the existing wharf. An expansion of the 17th Street Wharf was specifically funded in 1808, according to specifications advertised in the *National Intelligencer* in September that year.

The rates of wharfage set by the City Council indicate the types of materials that were arriving in the city in 1808: building materials (planks, shingles, laths, stone, sand, bricks, house frames, etc.), produce (grain and hay) and household necessities such as soap and candles. Ledger books from the 1840s and 1850s indicate that coal and wood assumed greater importance (National Archives 1845–1856). In the early 1880s, the wharf was used primarily as a landing for sand and gravel (Boyd 1878, 1879; Wright 1881).

The 17th Street Wharf continued to expand in the 19th century. In March 1838, the City Council appropriated $500 to complete walls of the structure (Wright 1881). By mid-century, the wharf extended about 750 feet into the mouth of Tiber Creek with a width of about 150 feet, as shown on the Boschke map of 1857 (see Figure 3.7).

The 17th Street Wharf assumed a significant role at the outbreak of the Civil War in April 1860. Fearing an attack on the city, an escape boat for government officials remained docked at the wharf to allow quickest possible escape from the city.

After the city's defenses were secured by a system of forts, the *USS Pawnee* came under the command of John Dahlgren, who oversaw the blockade of Charleston, South Carolina. Dahlgren is recognized as the "father of naval ordnance" based on his work at the Washington Navy Yard.

WHARF MATERIALS & WORKMANSHIP WANTED

The following materials will be wanted for building a wharf at the south end of 17th Street west (at the mouth of the Tyber Viz)

From 600 to 700 perches of Blu Stones.
2000 feet running of White Oak timber. squared on three sides, 14 inches in the bed and to rails one foot
2000 yards of filling in with earth.

James Hoban
Timothy Caldwell, Commissioners
J.P. Van Ness,

N.B. Proposals will be received either of the above commissioners until the 17th March next for furnishing the above materials, for Laying the stones and logs, and for filling the wharf (National Intelligencer 1807).

EXTENSION OF SEVENTEENTH-STREET WHARF

Proposals for erecting a platform WHARF, to be extended from the end of 17th street wharf (at the mouth of the Tiber) will be received by Messrs. Abraham Bradley, Michael Nourse, and John P. Van Ness, or either of them, until the 5th September next.

The wharf to be 200 hundred feet long and 25 feet wide. It is to consist of three ranges of white oak piles, of 25 feet long and 12 inches diameter, driven at intervals of 15 feet, with cross branches of 15 feet squared 4 by 8 inches from the middle to the outside piles; and three tiers of string pieces 6 by 12 inches, squared, and framed to the buts of the piles lengthwise to the Wharf, to be covered with white oak plank three inches thick, or pine four inches thick, and spiked.

Joint or separate proposals will be received for the materials and workmanship, or any part. The Timber to be sound and free of sap, and delivered forthwith (National Intelligencer 1808).

Excerpt from "A Critical Moment for Washington" (Smith 1918)

The gunboat Pawnee, I was told by a navy officer, had been lying off the 17th Street wharf for some time as a refuge, it was understood, for the officials of the government in case of a successful attack upon the city. In a few minutes all of them could have gone aboard and steamed down the Potomac, leaving the city to its fate (Smith 1918:102).

A detailed description of the 17th Street Wharf was given by General H.G. Wright, chief of engineers, U.S. Army, in an 1881 letter on the wharf's ownership. At that time, the wharf extended approximately 1,180 feet into the mouth of Tiber Creek, or what had become the basin at the mouth of the Washington Canal. At that time, the wharf was no longer accessible on its east side, but it had a shallow dock on the west side to allow mooring for boats. In addition to sand and gravel dealers, the wharf also included a small lunchroom operated by an African American man named Henry Hill (Wright 1881). Wright found no evidence that ownership of the 17th Street Wharf had ever passed from the city, so he concluded that the chief of engineers would be justified in appropriating it for public use. As reclamation of the Potomac Flats neared completion in the 1890s, there was pressure to turn it over to private developers. Instead, an act of the 55th Congress gave control of the land to the City of Washington and the District, and West Potomac Park was created (Chappell 1973).

The 17th Street Wharf finally disappeared from view with the construction of 17th Street (then Park Entrance Road) below B Street (now Constitution Avenue) in 1902 (Chappell 1973). It is not known whether the wharf was dismantled prior to construction of Park Entrance Road or if it was simply buried by deposits that were dredged from the Potomac River.

The existence of any physical remains of the Monument Grounds Site (51NW35) or 17th Street Wharf within the APE for the Potomac Park levee is unknown. Future archeological field investigations will be necessary to determine the presence or absence of either potential resource and to determine whether physical remains of either resource possess sufficient integrity to support a determination of NRHP eligibility. With the information at hand, it is possible to outline the possible significance of the two potential archeological resources.

Under federal guidelines, resources are eligible for the NRHP (i.e., they are *significant*) if they possess integrity and they meet one or more of the criteria of eligibility for inclusion in the NRHP. Most archeological resources found eligible for the NRHP qualify under Criterion D because they have the potential to provide important information about history or prehistory. However, a comprehensive evaluation of archeological resources should also consider their significance according to (1) possible association with events that have made a significant contribution to the broad patterns of our history (NRHP Criterion A); or (2) possible association with the lives of persons significant in our past (NRHP Criterion B); or (3) representativeness of the distinctive characteristics of a type, period, or method of construction (NRHP Criterion C).

Archeological remains of the Monument Grounds Site (51NW35) would be considered NRHP-eligible under Criterion D, depending on the integrity and information content and ability to provide information about prehistory. Located just below the Fall Line and at the junction of the Anacostia and Potomac Rivers, the District was a major focus of Native American settlement and extraction of natural resources. Prehistoric use of this area is well known from the large number of artifact collections that were made before widespread urbanization. The major prehistoric quarry areas of the city are well known, but specialized areas used for camping and fishing, such as sites along Tiber Creek, have not been well documented.

Archeological remains of the 17th Street Wharf could be considered NRHP-eligible not only under Criterion D, but also under Criteria A, B, and C. Under Criterion A, the wharf could be considered historically significant because of its association with the early urban development of the national capital. Under Criterion B, the 17th Street Wharf could be significant because it was one of the first public works built by the City Council; also, the wharf may have been closely associated with enslaved and free African Americans. The historical association of the 17th Street wharf with slave labor is not straightforward. Slave labor was commonly used in the building trades, including wharf construction, and slaves were often used for stevedoring. Arnebeck (1991:233) mentions that slaves were used to unload building stone at the city's wharves. In the late 19th century, there are explicit records of African Americans working on the 17th Street Wharf, including a lunchroom operator Henry Hill. Under NRHP

Criterion C, the 17th Street Wharf represents a specific property type associated with the Colonial and Early National periods in the Chesapeake region when most raw materials and consumer goods were moved by water. Finally, under NRHP Criterion D, the wharf could be significant because of the information it may provide about the early infrastructure of the national capital city.

NRHP significance is also assessed by reference to resource management plans that have been established through a formal planning process. For the District, a series of preliminary historic contexts for archeological resources was prepared in 1985, followed in 1991 by a more comprehensive set of historic contexts covering both archeological resources and historic structures (Historic Preservation Division 1991).

For prehistoric sites, such as the site 51NW35-Monument Grounds, the applicable historic context is *Native American Cultures (A1)*, which encompasses Native American lifeways, settlement patterns, and use of natural resources. While there is evidence of widespread Native American occupation in the District, the complex land use patterns that characterize urban development can leave very small areas of archeological integrity within landscapes that would appear to be highly disturbed; the most notable local example in this regard is the Whitehurst Freeway project where spectacular Native American sites had survived within a tangle of highway ramps. Any well-preserved prehistoric archeological site in the downtown area should be considered NRHP-eligible.

For the 17th Street Wharf, the applicable historic contexts are *Port Commerce in Georgetown and Washington (1750–1830) (C1);* Creation of the Federal City (1791–1878) (P1), and *S2: Slavery and Free Black Society (1650–1865) (S2).* Wharves are one of the principal property types associated with the *Port Commerce in Georgetown and Washington* context. Very few properties associated with this context have been documented in the District, and the only surviving wharves from this period are known from archeological investigations, specifically at the Southeast Federal Center (Parsons Engineering-Science 1996). Properties associated with the *Creation of the Federal City* context include elements of the City Plan and the city's earliest infrastructure, public buildings and roads. Along with the Washington Canal, the James Creek Canal, and the C&O Canal, the 17th Street Wharf would be one of very few historically known elements of transportation urban infrastructure that can be associated with this context. There are only a few churches, cemeteries, and house sites associated with the *Slavery and Free Black Society* context. It is likely that the 17th Street Wharf was built with slave labor and then became a workplace that relied heavily on African American labor, both enslaved and free, for its operation; as such, it would be the only historic property of this type in the District.

VISITOR USE AND EXPERIENCE

Washington, D.C. is one of the most popular tourist destinations in the country. The study area for this EA is located both within and adjacent to the unit of the NPS known as the NAMA. This area contains many of the most famous monuments, memorials, and notable buildings of the city, including the Washington Monument; the Lincoln Memorial; the Vietnam Veterans Memorial; the Korean War Veterans Memorial; the Reflecting Pool; the Constitution Gardens; and the WWII Memorial. Figure 3.8 depicts the many features of the National Mall and surrounding areas that attract visitors from all over the world.

VISITATION

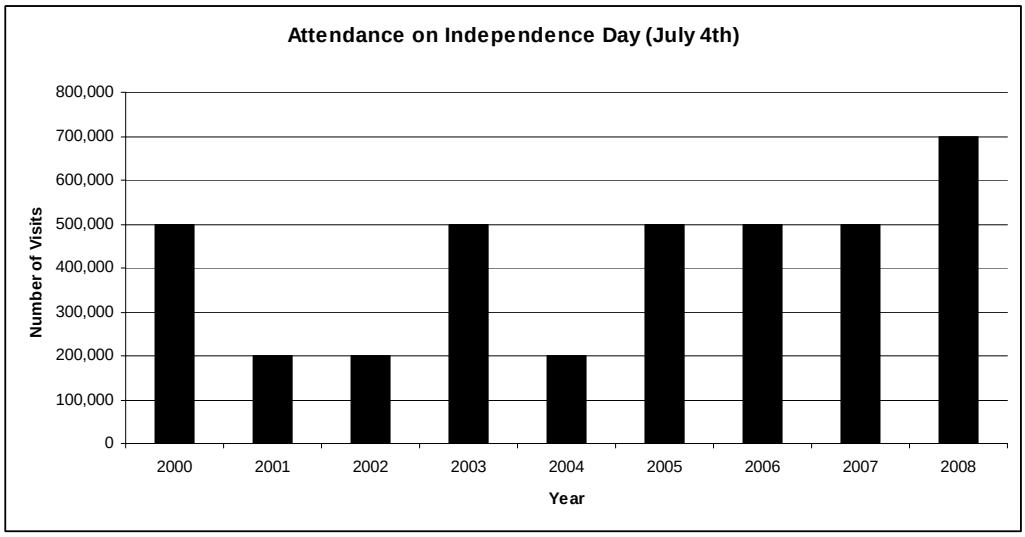
Visitation to the National Mall is highest during the months of April, May, and June. Visitation peaks during the late afternoon and evening hours during these months, rising after 5:00 pm, and continuing until 9:30 pm or 10:00 pm. This is the time at which most high school groups and other sources of visitors come to the National Mall. In August, daytime visitation drops due to the often intense summer heat of the area; most visitors begin their trips by attending the air-conditioned Smithsonian Institution Museums during the day, and then visiting the National Mall and its attractions after 5:00 pm. However, in the fall, winter, and spring months, visitation is highest during the day (Glenn DeMarr, pers. comm. June 2008).

Figure 3.8 – Attractions on the National Mall west of 14th Street NW

The National Mall hosts a variety of special events each year, some of which attract hundreds of thousands of visitors. One of the largest of these is the Cherry Blossom Festival. The National Cherry Blossom Festival takes place every year at the end of March and during the first part of April. The festival is timed to coincide with the annual blooming of the Japanese cherry trees. This event drew approximately 170,000 visitors to the National Mall area between April 1st and 13th in 2008, and approximately 70,000 visitors between March 29th and 31st of 2008 (NPS 2008a). Previous years have had similar visitation (NPS 2008a).

Another important event that takes place on the National Mall area is the annual 4th of July celebration, also known as "Independence Day," the "Glorious Fourth," or simply "The Fourth." Large crowds congregate on the Monument Grounds on July 4 of each year for a pyrotechnics display and a celebration of the American national anniversary. The NPS launches pyrotechnics from areas around the Reflecting Pool. The epicenter of the pyrotechnics display is the National WWII Memorial, which is partially closed after mid-afternoon on July 4. Figure 3.9 shows Independence Day visitation data from 2000–2008 (NPS 2008b).

Figure 3.9 Attendance of the Independence Day Celebration on the National Mall.



Source: NPS 2008b

Other heavily-attended special events include the presidential inauguration, for which no official records are kept, and various discrete charitable and protest events that happen at irregular and unrelated dates each year. Some of these protest events draw upwards of 48,000 people (NPS 2008c).

ATTRACTIONS

The following sections describe those attractions within the National Mall that are relevant for this EA because of their close proximity to the alternative actions being considered. These attractions include the Lincoln, Vietnam Veterans Memorial, Korean War Veterans Memorial; the Washington Monument; the Reflecting Pool; Constitution Gardens; and the WWII Memorial. Table 3.2 summarizes the daily, weekly, and annual management and operations schedules of each of the National Mall's major attractions:

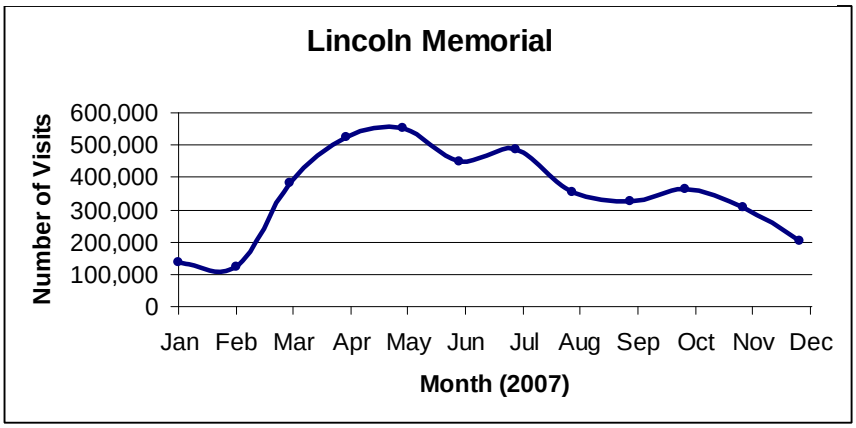
Table 3.2 Management and Operations of the Monuments and Memorials

Monument	Hours of Operation (daily)	Days of Operation	Annual Closures	Tours
Lincoln Memorial	9:30 am – Midnight	7 Days/week	Dec 25	Daily
Vietnam Veterans Memorial	9:30 am – Midnight	7 Days/week	None	Daily
Korean War Veterans Memorial	9:30 am – Midnight	7 Days/week	Dec 25	Daily
Washington Monument	9:00 am – 5:00 pm	7 Days/week	Dec 25	Daily
Constitution Gardens	24 hours a day	7 Days/week	None	Upon Request
World War II Memorial	9:30 am – Midnight	7 Days/week	July 4	Daily

LINCOLN MEMORIAL, VIETNAM VETERANS MEMORIAL, AND KOREAN WAR VETERANS MEMORIAL

The Vietnam Veterans, Lincoln, and Korean War Veterans Memorials are located near the reflecting pool and 23rd Street and could be affected by levee construction in those areas, especially the work that would be needed to meet the Phase 2 permanent level of flood protection. The Vietnam Veterans Memorial, the Korean War Veterans Memorial, and the Lincoln Memorial are open from 9:30 am to midnight, seven days a week.

Figure 3.10 - Recreational Visits to the Lincoln Memorial in 2007



Source: NPS 2008e

Out of an approximate 20 million annual recreational visits to the Monumental Core of Washington D.C., some 4 million visit the Lincoln Memorial. This memorial, seated upon 23rd Street at the western end of the Reflecting Pool, is one of the District's most popular tourist attractions; it drew a total of 3.8 million recreational visitors in 2006, and 4.1 million in 2007 (NPS 2008e). In 2007, recreational visitation was highest during April, May, and July (NPS 2008e), as shown in Figure 3.10.

Figure 3.11 - Recreational Visitation to the Vietnam Veterans Memorial in 2007 January through October

Source: NPS 2008f

Approximately 850 feet northeast of the Lincoln Memorial is the Vietnam Veterans Memorial (flanked by the Three Servicemen statue, which is a part of the Vietnam Veterans Memorial, and the Vietnam Women's Memorial), which also attracts a large number of tourists, having drawn 3.6 million recreational visitors in both 2006 and 2007. The Reflecting Pool levee runs just south of the memorial. Recreational visitation to the Vietnam Veterans Memorial in 2007 peaked in late April to early May, as shown in Figure 3.11.

Approximately 900 feet southeast of the Lincoln Memorial is the Korean War Veterans Memorial, which drew 3.2 million recreational visitors in 2006, and 3.4 million in 2007 (NPS 2008g). The Korean War Veterans Memorial is located approximately 550 to 600 feet south of the current reflecting pool levee structure. Public use data sets for the Korean War Veterans Memorial showed that recreational visitation for 2007 peaked in May and that the winter months (January, December, and February) saw the lowest visitation, as shown in Figure 3.12.

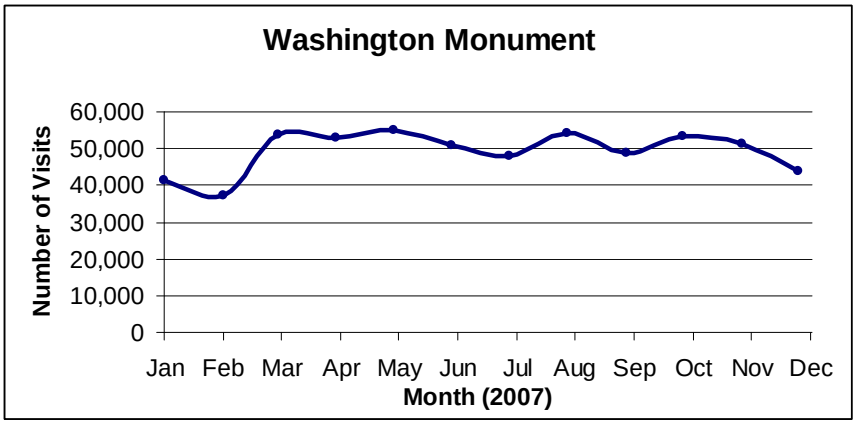
Figure 3.12 - Recreational Visits to the Korean War Veterans Memorial in 2007

Source: NPS 2008g

WASHINGTON MONUMENT

The Washington Monument is a 555-foot-tall obelisk set upon a lawn approximately 106 acres in area. Its lawn borders 17th Street and would be directly affected by any of the alternatives considered. The monument attracted 586,000 recreational visitors in 2006 and 591,000 recreational visitors in 2007. Visitors observe the monument, walk casually on the paved trails leading up to it, and (less commonly) have picnics on its lawn. The Washington Monument is open from 9am to 5pm daily, and is closed on July 4 and December 25 (NPS 2008h).

Figure 3.13 - Recreational Visits to the Washington Monument 2007



Source: NPS 2008h

As shown in Figure 3.13 recreational visitation to the Washington Monument during 2007 peaked in the months of March, April, May, August, and September. However, relative to the other attractions described here, recreational visitation to the Washington Monument is somewhat constant, and the peaks in March, April, May, August, and September are not very different from the other months during the year.

REFLECTING POOL

The Reflecting Pool is a long, rectangular pool of water extending from the foot of the Lincoln Memorial on the western portion of the study area to the foot of the WWII Memorial on the eastern portion. It is approximately 2,020 feet in length from west to east, and approximately 160 feet in width from north to south. The existing levee is a grassy berm that runs along the north side of the pool.

The Reflecting Pool is very popular for recreational use, and visitors walk along it and sit by the water while reading or eating. The NPS does not have explicit visitor use statistics for the Reflecting Pool; however, it constitutes an important part of the visual landscape from the East face of the Lincoln Memorial and is a heavily-used passage between the Lincoln War Memorial and the WWII Memorial for visitors who wish to see both of these sites. Therefore, it is reasonable to conclude that visitor use of the Reflecting Pool is at least approximately proportionate to the visitor use of either of these two major memorials.

CONSTITUTION GARDENS

The NPS web page for Constitution Gardens gives the following description:

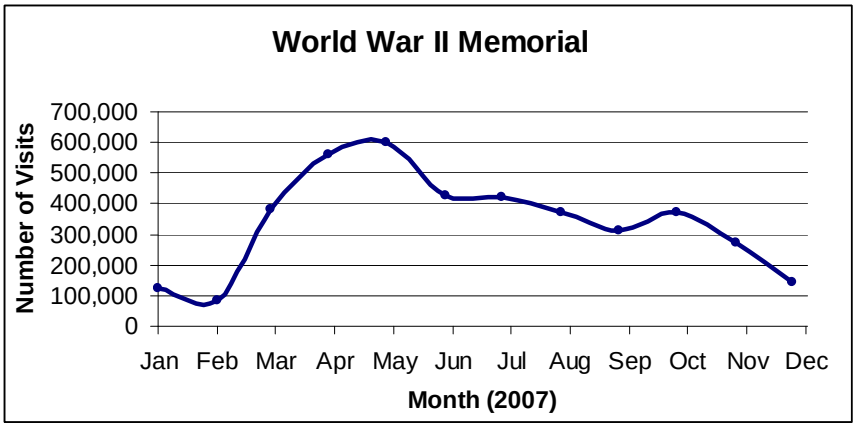
> "Dedicated in 1976, Constitution Gardens serves as an oasis within the bustling city for visitors, residents and wildlife. A memorial island in the middle of an artificial lake has stones bearing the names and signatures of the fifty-six men who signed the Declaration of Independence. Their pledge to freedom exists as a living tribute within this natural setting celebrating the U.S. Constitution" (NPS 2008d).

The Constitution Gardens are located north of the Reflecting Pool and south of Constitution Avenue, between Henry Bacon Drive and 17th Street NW. There is also a "Circle of Remembrance," a garden enclosed by a circular stone wall constructed as part of the WWII Memorial. The Constitution Gardens is open 24 hours a day, seven days per week (NPS 2008d).There is no quantitative data describing visitation to the Constitution Gardens.

WORLD WAR II MEMORIAL

The WWII Memorial is located on the southern portion of the study area, on the west edge of 17th Street. The existing levee runs just north and east of the memorial, and one alternative under consideration includes re-grading the grounds near this site. This memorial is another major tourist attraction in the city of Washington D.C.; it attracted 3.8 million recreational visitors in 2006 and 4.0 million recreational visitors in 2007. Visitation peaks in the months of April and May, as shown in Figure 3.14.

Figure 3.14 - Recreational Visits to the WWII Memorial



Source: NPS 2008i

The WWII Memorial is open to the public seven days per week from 9:30 am to midnight.

PUBLIC SAFETY

The NPS is committed to providing high-quality opportunities for visitors and employees to enjoy parks in a safe and healthy environment. Furthermore, the NPS strives to protect human life and provide for injury-free visits. Various health and safety concerns could result from implementation of the alternatives considered for the levee system. Safety applies to both park visitors and park employees.

Visitor Safety

A visitor incident is defined as an unintentional event or mishap affecting any non-NPS employee that results in serious injury or illness requiring medical treatment, or in death. Park rangers of the Division of Interpretation and Education conduct frequent inspections of visitation areas and assist visitors who are either injured or feeling ill due to excessive weather conditions or personal illnesses, such as fainting, nausea, seizures, etc. Serious incidents or mishaps are brought forward and investigated. Areas determined to be unsafe are identified and marked off so visitors can avoid a risk of injury. Park rangers and other staff frequently provide visitors with information or instructions about safety measures and behavior (Ashdown, pers. comm. 2008).

NAMA visitor incident statistics are based on internal case incident reports and compared or verified against USPP Case Incident Record (Form 10-343). Table 3.3 reflects two year comparative data for the park's fiscal year reporting period 10/1 through 9/30.

Table 3.3. Public Safety Incidents, 2007–2008

Fiscal Year (10/1 – 9/30)	FY 2007		FY 2008 To Date	
	N	% of Total	N	% of Total
Number of Visitor Incidents responded to	299	100%	276	100%
No. of NPS (GPRA) Chargeable Visitor Injuries	174	55%	128	46%
Injury Type: Slips, Trips & Falls	107	63% of the chargeable incidents	58	45% of the chargeable Incidents
Injuries as a result of Normal Walking	55	18%	56	20%
Incidents related to steps of Monument or Memorials	32	10%	17	6%
Bicycle related injuries	15	5%	10	4%
Sports related injuries	21	7%	4	1.4%
Personal Illnesses	137	44%	138	50%

In 2008, there were 276 visitor related incidents within the park of which, for purposes of recordkeeping and tracking in accordance with the Government Performance Results Act (GPRA), 128 were actually chargeable. All visitor incidents responded to by NPS staff are tracked. Many of the incidents are of a

personal illness nature and are not related to direct interaction with the park facilities and equipment. This represents a decrease from the previous fiscal year (Ashdown, pers. comm. 2008). The majority of visitor incidents within the NAMA are related to visitors walking and tripping over curbs, uneven surfaces or unfamiliarity with the steps to the memorials.

Employee Safety & Health

Park staff are also proactive about protecting the safety and health of employees. The park developed a multiyear incident reduction plan for each of its departments which has resulted in some success in reducing the more serious incidents resulting in Occupational Safety and Health Administration Days Away From Work and Restricted Transfer (OSHA DART) Cases. The park has an active Safety and Health Committee made of representatives from each major work group and the union. Members conduct monthly internal safety and health inspections, assist with conducting training, and serve as a review board for all property damage cases. Safety, Health and Environmental Bulletins are sent out frequently to increase communication effectiveness (Ashdown, pers. comm. 2008). Table 3.4 shows recent years' injury rates.

Table 3.4 Employee OSHA Recordable Injury Rates for Recent Years

Fiscal Year	OSHA Recordables		OSHA DART Cases		Office of Worker's Compensation Programs (OWCP) (Continuation-of-Pay) Hours Paid
	N	Incidence Rate[1]	N	Incidence Rate	
2008	29	10.3	22	7.8	4,157
2007	40	12.7	25	7.9	5,625
2006	30	9.7	22	7.1	4,901
2005	27	8.3	21	6.4	4,548

Note 1: OSHA Incidence Rate (IR) for a classification of occupational injuries and illnesses only = (Number of injuries and illnesses X 200,000) / Employee hours worked for a measurable period of time.

Most employee injuries or incidents are usually sustained by maintenance staff who perform manual work and heavy material handling (construction, gardening, etc.). The most common type of injuries were maintenance activity-related, such as low back, shoulder and knee injuries (N=104 for the above four-year period). Ergonomics training has been periodically given in an effort to reduce such repetitive motion disorders (RMD).

U.S. Park Police are present on the National Mall to ensure safety of park visitors as well as to enforce park regulations. Police provide assistance and direct the public away from construction zones or other hazardous conditions. Seventeenth Street is not used as an evacuation or emergency transport route.

Relative Reliability of the Levee System

As described in the Purpose and Need section of this document, there is a public safety concern related to the current levee system, which was decertified by the USACE in 2007 because of concerns relating to the reliability of implementing a large earthen barrier in the face of unknown weather conditions and in a relatively short period of time. The NPS recognizes this concern but is prepared to implement the temporary barrier in accordance with the approved flood control manual currently in effect (USACE 2006). Public safety analysis of the alternatives will take this concern into account with a design that will eliminate some of the more unreliable technologies, such as the use of an earthen barrier.

SOCIOECONOMICS

Recent changes in the USACE's inspection guidelines resulted in decertification of the Potomac Park levee system. As a result, the FEMA proposed new flood insurance maps for the District that include a large section of the metropolitan area in the newly delineated 100-year floodplain. The proposed changes to the flood insurance maps have the potential to impact a large developed section within the area. The following sections will describe current socioeconomic conditions within the potentially impacted area, including current land uses and demographics.

For this topic, the study area is defined as the same as the new 100-year floodplain that would be included on FEMA maps if the 17th Street levee did not function as shown in Figure 3.15. The floodplain area starts at the intersection of 17th Street NW with Constitution Avenue. The area of effect then expands to the west, across the Ellipse, to Pennsylvania Avenue NW. Pennsylvania Avenue NW then forms the northernmost boundary of the area of impact for approximately 1.10 miles to the west, whereupon it extends south, across the lawn of the United States Capitol building into I-395. The boundary of the area of impact continues to extend south to James Creek Parkway, just south of Delaware Avenue SW.

Areas that are included within this study area include:

- The Federal Triangle Area of downtown.
- Portions of the National Mall area and numerous museums that line the Mall between 4th and 7th streets.
- Other public and private facilities that extend into southwest DC along 3rd Street SW.
- Many private residences in the communities of Capital Park and others southward along 3rd Street to the intersection of P and Canal streets, SW.

LAND USE IN THE STUDY AREA

In addition to the cluster of federally owned buildings known collectively as the "Federal Triangle," there are 11 federally owned buildings; seven buildings occupied by nonprofit entities (mostly Smithsonian Institution galleries and museums); and a number of residential and commercial buildings, including 110 single-family homes, 116 multi-family buildings, and 2.3 million square feet of ground-floor commercial space (FEMA 2008), within the study area. All of the federally owned and nonprofit buildings are located north of I-395. The residential and commercial buildings all are located south of I-395.

Tables 3.5 and 3.6 provide a list of the federally owned buildings in the study area with their square footage, while Table 3.7 lists the nonprofit buildings. Note the high-profile nature of this assortment of buildings. The area of impact includes the Federal Triangle (Table 3.5), which houses many federal buildings; some of the most notable are listed here. We have given square footage for the Federal Triangle as a whole. Buildings found within the Federal Triangle include extremely high-profile and politically important buildings, notably the Department of Commerce, Department of Justice, the National Archives, and the Internal Revenue Service.

Figure 3.15 – Defined Study Area for Socioeconomic and Land Impacts

Table 3.5 - Selected Buildings within The Federal Triangle Area of Washington D.C.	
Notable Buildings in the Federal Triangle	**Total Square Footage of Federal Triangle**
Department of Justice	1,750,763
Department of Commerce	
National Aquarium	
White House Visitor Center	
Old Post Office Tower	
Ronald Reagan Building and International Trade Center	
National Archives	
Wilson Building	
DC Visitor Center	
Internal Revenue Service	
Federal Trade Commission	

Table 3.6 – Federally Owned Buildings within the Study Area	
Federal Building Name	**Square Footage**
Ariel Rios Federal Building	735,433
EPA East	436,678
EPA West	403,540
Federal Trade Building	258,831
Federal Office Building 8	477,039
J Edgar Hoover Building	1,874,263
National Archives	265,865
Post Office, Old	375,228
Reagan Building Trade Center	617,880
Robert F. Kennedy Building	1,025,307
Wilbur Wright Building	384,041

Also, while the area of impact does not reach the United States Capitol building itself, it does cover 23 acres of the Capitol building's lawn.

According to FEMA (2008), there are also a number of proposed federal projects that would be affected by the new floodplain designation. These include the Department of Commerce and Federal Office Building 8 modernizations, the General Services Administration (GSA)-sponsored Southeast Federal Center (SEFC)/Yards mixed-development[2], and the Smithsonian Institution NMAAHC.

[2] The development agreement between GSA and the commercial and residential real estate company provides for 3.2 million square feet of residential use and two million square feet for commercial, retail, and cultural space on 44 acres at the Southeast Federal Center on the banks of the Anacostia River in southeast Washington, DC. In addition, there will be a 5-acre waterfront park with a promenade along the Anacostia River, and other public amenities.

Table 3.7 - Nonprofit Buildings within the Study Area	
Nonprofit Buildings	**Square Footage**
Ford Building	36,720
Health and Human Services	93,993
National Air & Space Museum	177,100
National Gallery of Art, West Building	219,142
National Gallery of Art, East Building	129,540
National Museum of American History	164,990
National Museum of the American Indian	91,520
National Museum of Natural History	249,890
Randall Recreation Center	66,220
Voice of America Studio	96,404

Many of the nonprofit buildings within the study area are similarly high-profile. The contents of many of these buildings are extremely valuable. The museum and gallery collections themselves are unique and irreplaceable in addition to being of high monetary value, and many are culturally or intellectually important.

According to FEMA (2008), there are approximately 110 single-family homes, 116 multi-family buildings, and 2.3 million square feet of ground-floor commercial space at risk of flood damages. Note that the new floodplain maps would affect not only existing residential and commercial property but would also affect prospective residential and commercial development.

DEMOGRAPHIC CHARACTERISTICS OF THE STUDY AREA

Most of the study area includes government buildings and museums. However, the southern portion of the study area contains 1,200 residential units (USACE 1992; DC 2008). As a result, this section describes demographic conditions in the southern portion of the study area. The study area does not fit neatly within the defined census tracts. Therefore, data was collected from seven census tracts that fall partially within the study area. Table 3.8 shows minority and low-income population statistics for the District and will be used to compare similar statistics in the study area to determine the presence of potential minority or low-income populations. Table 3.9 summarizes the relevant minority and low-income populations for census tracts 5800, 5900, 6002, 6001, 6002, 6301, and 6400. Census Tracts 5900, 6002, and 6400, block group 1, show indications of the potential populations in terms of income levels while census tracts 5900, 6002, and 6004 show indications of these populations in terms of minority status. Figure 3.16 shows the location of the census tracts with indicators of potential minority or low-income populations, relative to the study area.

Table 3.8 - Race, Population and Poverty Statistics for Washington D.C.	
Race	**DC**
Total Population	581,530
White	34.5%
Black or African American	55.4%
American Indian and Alaska Native	0.3%
Asian	3.4%
Native Hawaiian and Other Pacific Islander	0.0%
Hispanic or Latino	7.7%
Some other race	4.8%
Two or more races	1.5%
Percentage of Population Living in Poverty	20.2%

Source: US Census 2000

Table 3.9 - Minority and Poverty Statistics for Census Blocks in and near the Study Area						
Tract	**Block Group**	**Total Population**	**% Impoverished**	**% Black**	**% Hispanic**	**% Asian**
5800	1	1,470	31%	14%	6%	39%
5900	2	489	52%	85%	15%	0%
6202	1	12	0%	42%	0%	0%
6001	1	2,680	13%	58%	6%	2%
6002	1	608	59%	96%	1%	0.3%
6301	1	3,822	15%	55%	5%	3%
6400	1	1,187	50%	91%	2%	2%
6400	2	1,053	33%	91%	6%	0%

Source: US Census 2000

Figure 3.16 - Location of Census Tracts with Potential EJ Populations

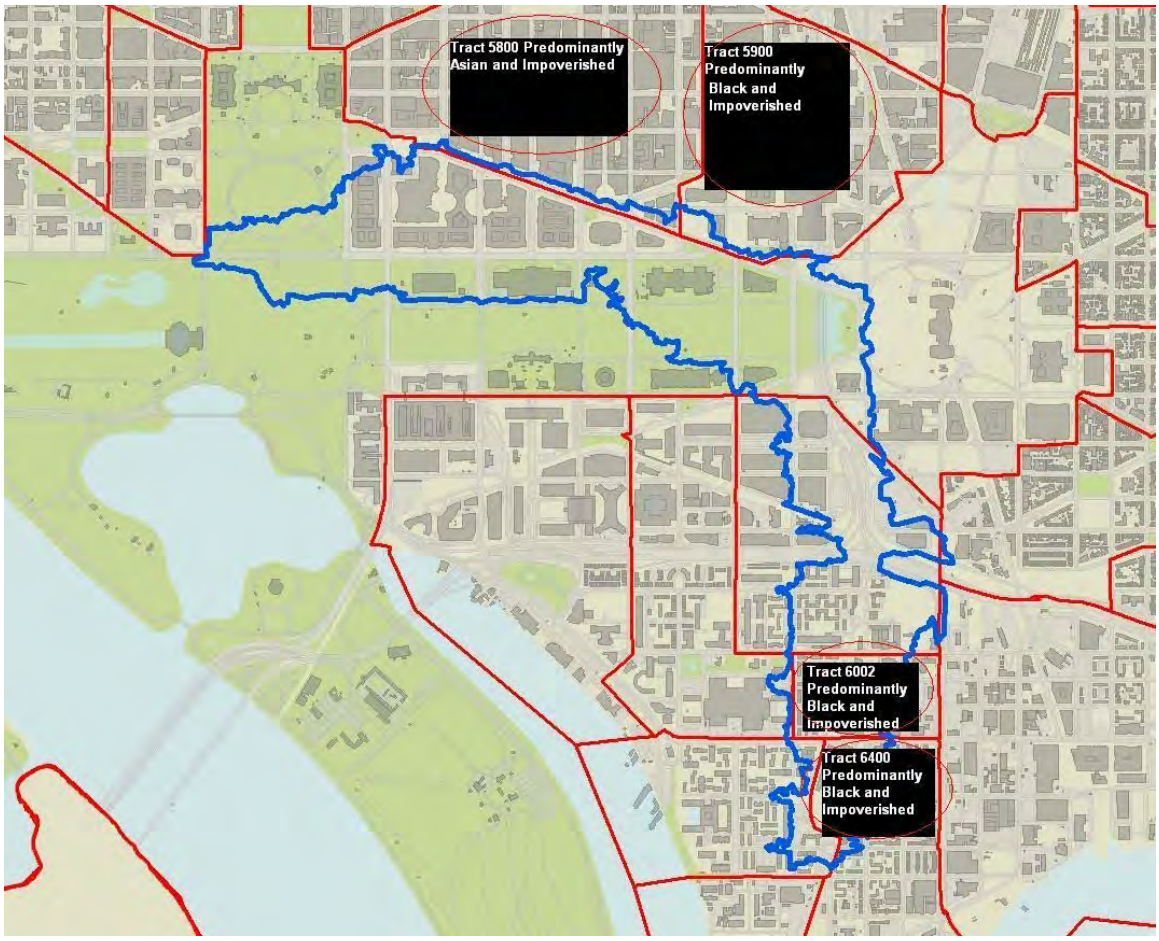


Table 3.10 describes the type and value of housing units in the District and in the study area.

Table 3.10 - Housing Characteristics in the District and in the Study Area, 1999

HOUSING	DC	5800	5900	6001	6002	6202	6301	6302	6400
Total Owner-Occupied Units	274,845	164	10	293	165	0	1,384	0	141
Median Value of Owner-Occupied Units	$157,000	$171,600	$350,000	$159,000	0	0	$88,700	0	$108,400
Total Renter-Occupied Units	146,863	700	652	1,383	165	0	1,104	0	644
Median Gross Rent	$618	$1,086	$397	$693	$163	0	$659	0	$272

Source: US Census, 2000

TRANSPORTATION

This section presents an overview of the existing transportation system that could be affected by the construction of the Potomac levee. This affected environment description is based primarily on relevant information obtained through various document reviews including field observations and data analyses from studies in the vicinity of the proposed project.

Key considerations for the traffic affected environment description include current traffic volumes on the affected roadways, including public and private sector transit service (including tour buses) in the area. To prepare this affected environment description, the following key tasks were undertaken:

- Reviewed the field reconnaissance for a nearby project that examined existing roadway and intersection geometrics, traffic controls, speed limits, and operations during the period April to May 2007;
- Documented District Department of Transportation (DDOT) roadway classifications and 2007 traffic volume counts and estimates for roadways in the vicinity of the proposed construction;
- Documented Washington Metropolitan Area Transportation Authority (WMATA) and DDOT bus services, as well as private sector regularly scheduled tour bus services, to determine potential impacts.

Sources of information for this affected environment description include the Tier I Final Environmental Impact Statement (EIS) for the Smithsonian Institution NMAAHC (June 2008), data from the DDOT, and on-line examinations of private sector bus tours.

ROADWAYS AND TRAFFIC

The Potomac levee area is situated on the National Mall within northwest Washington, D.C. The site also falls within the National Monumental Core. Regional access to the site is served by the I-66 and I-395 freeway systems and several principal arterials that radiate from the city core to suburbs within Maryland and Virginia (Smithsonian 2008). Only one roadway, 17th Street, is proposed for construction closures, as discussed in greater detail in chapter 4. Seventeenth Street is bounded by Constitution Avenue to the north and Independence Avenue to the south. There is no Phase 2 construction that would directly affect the current layout or elevation of either 23rd Street or Constitution Avenue, as a result, this is not considered further in the traffic analysis.

Constitution Avenue and Independence Avenue function as major gateways to the District Downtown Area. Seventeenth Street serves an important function as the only roadway crossing the National Mall between 15th Street, east of the Washington Monument, and 23rd Street, at the Lincoln Memorial. The regional transportation system perspective is shown in Figure 3.17. The functional and service characteristics of the local access roadways are described below.

Constitution Avenue NW

This is an eight-lane, two-way principal arterial (DDOT 2006) running east to west along the northern frontage of the National Mall. It is designated U.S. 1/50 east of 14th Street. West of 14th Street, it is U.S. 50 and connects directly with the I-66 freeway system. This avenue provides access to the National Mall and a number of federal buildings, museums and other visitor attractions. It therefore serves significant commuter and tourist traffic volumes. Curbside parking is provided along both sides of Constitution Avenue, with restrictions during the morning and afternoon peak periods. This roadway serves an Average Daily Traffic (ADT) volume of 36,400 vehicles per weekday east of 17th Street, and 48,900 vehicles immediately west of 17th Street, (DDOT 2006a) with significantly lower volumes on weekends. The posted speed limit is 25 miles per hour (mph).

Figure 3.17 – Regional Transportation System

Seventeenth Street NW

This is a four-lane roadway facility running north to south between Independence Avenue and Constitution Avenue, continuing north to K Street where it intersects with Connecticut Avenue. From Connecticut Avenue north it is not a through route. Seventeenth Street provides access to the Potomac levee site and several important land uses including museums, federal buildings and visitor attractions. Within the boundaries of the National Mall, the Washington Monument is to the east, with the WWII Memorial, Reflecting Pool and Lincoln Memorial to the west. North of Constitution Avenue, the Ellipse and the White House are to the east, with federal and nonprofit agency buildings, art galleries, and other commuter and tourist attractions to the west. It is classified as a minor arterial by DDOT (DDOT 2006). Parking is restricted along 17th Street. This roadway serves an ADT volume of 19,200 vehicles south of Constitution Avenue on weekdays, with 19,900 vehicles immediately north of Constitution Avenue (DDOT 2006a), and with fewer vehicles on weekends. The posted speed limit is 25 mph.

Fourteenth Street NW, 15th Street NW and 23rd Street NW are the most likely detour routes if/when 17th NW is closed for construction.

Fourteenth Street NW

This is a seven-lane, two-way principal arterial running north to south to the east of 17th Street NW. South of Constitution Avenue, it is designated U.S. 1 and connects with the I-395 freeway system providing linkages to areas in Virginia (Smithsonian 2008). Fourteenth Street provides access to several important land uses including museums, federal buildings, and visitor attractions. This facility is therefore a major commuter and visitor travel route. Parking is restricted along 14th Street in the immediate vicinity of the National Mall. This roadway serves an ADT volume of 38,700 vehicles per weekday (DDOT 2006a), with substantially less volumes on weekends. The posted speed limit is 25 mph.

Fifteenth Street NW

This is a four-lane roadway running north to south to the east of 17th Street. It is classified as a principal arterial by DDOT to the north of Constitution Avenue, and to the south, it is classified as a local park road by the NPS. Fifteenth Street provides access to several important land uses including museums, federal buildings and visitor attractions. Parking is restricted along 15th Street between Constitution Avenue and Independence Avenue. This roadway serves an ADT volume of 9,000 vehicles on weekdays (13,600 per DDOT 2006a), with fewer vehicles on weekends. The posted speed limit is 25 mph.

23rd Street NW

This is a four-lane roadway running north to south between Independence Avenue and Constitution Avenue to the west of 17th Street NW. It is bisected by the Lincoln Memorial between Independence Avenue and Constitution Avenue. No through traffic is permitted on the half-circle east of the Memorial. Ramps to and from the Arlington Memorial Bridge, the Rock Creek and Potomac Parkway, and the I-66 Theodore Roosevelt Memorial connect to 23rd Street and Constitution Avenue and provide good access from Arlington and close-in portions of Northern Virginia to major federal and nonprofit agencies, George Washington University, art galleries, and other commuter and tourist attractions to the north and east. It is classified as a minor arterial by DDOT (DDOT 2006). Parking is restricted along 23rd Street. This roadway serves an ADT volume of 22,900 vehicles south of Constitution Avenue on weekdays, 25,000 vehicles immediately north of Constitution Avenue (DDOT 2006a), with fewer vehicles on weekends. The posted speed limit is 25 mph.

PUBLIC TRANSPORTATION

Seventeenth Street between Constitution and Independence is situated within an area that is generally well served by public transportation systems. These include the WMATA Metrorail and Metrobus systems with connections to other regional and national rail lines as well as tourist-oriented transit services.

The WMATA Farragut West Station (on the Orange and Blue Lines) is approximately 6/10ths of a mile from the intersection of Constitution Avenue and 17th Street. Federal Triangle and Smithsonian Institution Metrorail Stations, on the Orange and Blue Lines, are also situated more than a half-mile from the site. These rail lines connect with Union Station (via the Red Line), which serves as the terminus for the Maryland Rail Commuter Service (MARC), Virginia Railway Express (VRE) commuter service and the nationwide passenger rail system (Amtrak).

Several Metrobus routes run along Constitution Avenue (seven routes). The District Circulator provided by the DDOT Mass Transit Administration is the only public transit service directly operating on 17th Street[3]. The Smithsonian/National Gallery of Art Loop (of the District Circulator) runs from east to west along Independence Avenue, heads north on 17th Street, and runs west to east along Constitution Avenue, with a stop located just east of 17th Street on Constitution Avenue (DDOT 2007). The NPS Tourmobile also serves the area with a west to east route from 23rd Street along Constitution Avenue past 17th Street, and portions of 15th Street, but does not traverse 17th Street (Tourmobile 2008).

[3] WMATA buses use 17th Street for non-revenue activity. The buses travel 17th Street to set up for revenue service on several lines.

TOUR BUSES

Tour bus operations are concentrated within the National Mall between the Lincoln Memorial and the Capitol, often with separate loops for other visitor destinations such as Arlington National Cemetery and the National Cathedral. Major routes through the project area are along Constitution Avenue NW and Independence Avenue SW. Local private sector tour bus companies include pick up / drop off services such as the Old Town Trolley and the double-decker Open Top Sightseeing, as well as fully-escorted tours such as DC On Board (Old Town Trolley 2008, Open Top Sightseeing 2008, DC On Board 2008). None of the published schedules or service maps researched for private sector tour bus operations showed service on 17th Street; however, maps were not available for DC On Board, and this and other less publicized tour services may use 17th Street on occasion if not on a regular basis.

Most local and long distance charter tours also focus on the National Mall, and the main access routes are New York Avenue NW, Pennsylvania Avenue NW, George Washington Memorial Parkway, I-66, Connecticut Avenue NW, Wisconsin Avenue NW, Arlington Memorial Bridge and South Capitol Street. In addition, there are an estimated 300 tour bus spaces throughout the District of Columbia and at other major visitor destinations. The Union Station garage provides tour bus parking in the central part of the city. Additional parking facilities are being developed at the old Convention Center site and at RFK Stadium (Smithsonian 2008).

INFRASTRUCTURE AND UTILITIES

There are a variety of utility lines in the project area that could be affected by the implementation of one of the action alternatives. This section describes potable water and irrigation lines, sanitary sewer, storm drain, natural gas, electric, and communication lines within the project area for all alternatives. The existing condition analysis was based on a utility coordination map, which was generated using information provided by the NPS and utility owners, however at this time a utility survey has not been performed. All site utilities will be field verified prior to project construction.

POTABLE WATER SUPPLY AND IRRIGATION SYSTEM

There is a network of water and irrigation lines in the project area. These lines provide a potable water supply to a portion of downtown Washington, D.C., known as the low water system service area. The low service area includes the downtown area around the federal buildings and portions of land along the Anacostia River (District of Columbia 2006b). In addition, irrigation water is used for the maintenance of landscaping on the National Mall. The size and location of the water and irrigation lines are summarized below.

- A line of unknown size and depth is located approximately 33 feet east of the 17th Street centerline and runs north to south. The line extends to approximately 200 feet south of Constitution Avenue.
- A 3-inch diameter line is located approximately 50 feet east of the 17th Street centerline and runs north to south. The line extends to approximately 300 feet south of Constitution Avenue. The depth of the line is unknown.
- A 12-inch diameter line is located approximately 75 feet east of the 17th Street centerline and runs north to south. The line extends all the way through the project impact area. The line is at an approximate depth of four to five feet.
- An abandoned line is located approximately 90 feet south of the Constitution Avenue centerline and runs east to west. The size and depth are unknown.
- A 6-inch diameter line is located approximately 123 feet south of the Constitution Avenue centerline and runs east to west. The line extends to approximately 350 feet east of the centerline of 17th Street. The depth of the line is unknown. This line appears to serve the irrigation system along the east side of 17th Street.
- An 8-inch diameter line is located approximately 150 feet south of the centerline of Constitution Avenue and runs east to west. The line extends to approximately 300 feet east of the centerline of 17th Street. The depth of the line is unknown.
- A 12-inch diameter line is located approximately 350 feet south of the centerline of Constitution Ave and runs east to west. The line extends to a point approximately 300 feet east of the centerline of 17th Street. The depth of the line is unknown. This line serves the irrigation system on the east side of 17th Street
- A series of irrigation lines occur on the east side of 17th Street. These lines are located within 350 feet of the centerline of 17th Street. Various valve boxes and irrigation heads are also components of the irrigation system. The quantities of each are unknown.

SANITARY SEWER

There is one terra-cotta sanitary sewer line in the project area. The line is located approximately 53 feet west of the 17th Street centerline and runs north to south at a depth of approximately 10 feet; it is a gravity line.

STORM DRAIN

There are a number of storm drains in the project areas. These drains reduce and redirect water accumulated during rain and snow events. The following is a summary of all known storm drains in the project area.

- A 10-inch drainage tile and swale are located approximately 66 feet east of the 17th Street centerline. The tile and swale run north to south. The depth of the tile is unknown.
- An 18-inch diameter storm drain is located under 17th Street, approximately 10 feet west of the centerline. The northernmost manhole located on this line is approximately 430 feet south of the centerline of Constitution Avenue. The line extends from this manhole south and extends beyond the southern boundary of the project area. There are several manholes and inlets connected to the pipe. The depth of the storm drain is unknown.
- The storm drain system currently has valves and other backflow prevention devices installed on it to prevent water backing upstream into the system. The location and quantities of these measures are unknown.

NATURAL GAS

There is a 24-inch diameter natural gas main running east to west in the northeast corner of the project area. The line is located approximately 103 feet south of the centerline of Constitution Avenue. The line turns north approximately 80 feet east of the 17th Street centerline and runs north out of the project area.

ELECTRIC

There is a system of underground electric lines within the project area. These lines provide electricity service to a number of buildings in the area. The following is a summary of all known underground electric lines.

- An electric line is located approximately 59 feet west of the centerline of 17th Street. The line runs north to south through the project area and connects to a manhole along the north side of the project site. The size and depth of the line is unknown.
- An electric line located approximately 30 feet west of the 17th Street centerline. The line runs north to south through the entire project area. The size and depth of the line is unknown.
- An electric line located approximately 25 feet east of the centerline of 17th Street. This line starts at a point approximately 380 feet south of the centerline of Constitution Avenue. The line connects into a manhole on the north side of the site, which is also connected to the manhole for the line located 59 feet west of the centerline of 17th Street. The size and depth of the line is unknown.
- An electric line located approximately 45 feet south of the centerline of Constitution Avenue This line runs east to west along the east side of the site and connects to the manhole located approximately 25 feet east of the 17th Street centerline. The size and depth of the line is unknown.

COMMUNICATIONS

There are two underground telephone lines located within the project area that provide service to a number of buildings in the area. The first telephone line is located approximately 55 feet east of the

centerline of 17th Street. This line runs north to south through the project area and terminates at a point approximately 130 feet south of the centerline of Constitution Avenue. The second line is located approximately 75 feet south of the centerline of Constitution Avenue and runs east to west along the north side of the project area. The sizes and depths of the telephone lines are unknown.

PARK MANAGEMENT AND OPERATIONS

This section will discuss the current status of park management and operations for the NAMA and levee system.

CURRENT MANAGEMENT STRUCTURE AND STAFFING

The NPS oversees approximately 1,100 acres making up the NAMA. Park management structure is divided into the Office of the Superintendent and six divisions including: the Administration, Maintenance, Interpretation and Education, Park Programs, and Resource Management.

Budgets are not assigned to specific memorials or areas of the park but rather come as one appropriation. The annual operating budget for NAMA for fiscal years 2007 and 2008 was $30,160,530 and $31,421,740 respectively.

MANAGEMENT AND OPERATIONS DURING FLOOD EVENTS

There is no work force dedicated specifically to the levee. NPS maintenance staff is responsible for maintaining the turf along the berm and throughout the area. The levee is inspected annually by the USACE and also by the chief of maintenance for the NAMA.

In the event of a flood hazard, the NPS would take measures necessary to ensure the public's safety. This could involve the closure of certain monuments and memorials, or even of the entire park, as has been done in the past during potential flood hazard events (Glenn DeMarr, pers. comm. 2008). The U.S. Park Police would enforce whatever safety precautions are necessary at both the park and the levee construction site (Steve Lorenzetti, pers. comm. 2008). The construction of the levee closures themselves would be the responsibility of the NAMA Maintenance Division, and personnel would be drawn from this division's maintenance staff, carpenters, and lawn mowing staff (NPS 2006b).

There are 2 levels of closure that the NPS can erect across 17th Street in order to provide flood protection. The primary level of protection is designed to halt the 100-year flood and would involve a line of Jersey barriers and sandbags across 17th Street. The secondary level of protection is designed to deal with a 500-year flood and would involve an earthen barrier across 17th Street.

The primary level of protection has been constructed on the NAMA four times since 1938 (Glenn DeMarr, pers. comm. 2008), most recently in 2003 for Hurricane Isabel (Sean Kennealy, pers. comm. 2008). This barrier requires approximately 30 people to construct and can be completed in a period of 24 hours (Sean Kennealy, pers. comm. 2008). The sandbags required to complete the first level of protection are stored at the East Potomac Maintenance Yard at Hains Point and Brentwood maintenance facilities of the NPS (Stan Tolman, pers. comm. 2008). The secondary level of protection has never been implemented.

Note that there is no budget or dedicated equipment specifically assigned to the construction of the levee during flood hazard events. The NPS is fully prepared to construct the first level of protection immediately after a decision is made to do so; however, for the secondary level of protection, the earthen barrier, resources (mainly equipment) would have to be drawn in from nearby parks (Sean Kennealy, pers. comm. 2008).

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CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

GENERAL METHODOLOGY FOR ESTABLISHING IMPACT THRESHOLDS AND MEASURING EFFECTS

This chapter addresses the potential impacts on each of the impact topics discussed under the "Affected Environment" chapter for each of the alternatives. The action alternatives are compared to the no action alternative, or baseline condition of the project area within Potomac Park, to determine impacts on resource topics. In the absence of quantitative data, best professional judgment was used. In general, effects were determined through consultation and collaboration with a multidisciplinary team of National Park Service (NPS), District of Columbia (the District), and other professional staff. Regulatory agency consultation with the U.S. Fish and Wildlife Service (USFWS), District of Columbia Department of the Environment (DC DOE), and District of Columbia Environmental Health Administration (DC EHA) were also used to assess the potential impact of each alternative.

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

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

Adverse: A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.

Context: Context is the affected environment within which an impact would occur, such as local, park-wide, regional, global, affected interests, society as whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic. As such, the impact analysis determines the context, not vice versa.

Duration: The duration of the impact is described as short-term or long-term. Duration is variable with each impact topic; therefore, definitions related to each impact topic are provided in the specific impact analysis narrative.

Intensity: Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed. Major impacts are considered "significant" impacts in the context of the *National Environmental Policy Act* (NEPA).

CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR Part 1508.7).

Cumulative impacts are considered for all alternatives, including the no action alternative. Cumulative impacts were determined by combining the impacts of the alternative being considered with impacts of other past, present, or reasonably foreseeable future projects or plans in the study area. Table 4.1 summarizes the actions that could affect the various resources that are evaluated in this Environmental Assessment (EA).

The analysis of cumulative effects was accomplished using four steps:

Step 1—Resources Affected. Fully identify resources affected by any of the alternatives (i.e., the impact topics).

Step 2—Boundaries. Identify an appropriate spatial boundary for each resource (i.e., the study area for each topic).

Step 3—Cumulative Action Scenario. Determine which actions may affect the resources identified.

Step 4—Cumulative Impact Analysis. Summarize the cumulative impact, which are the effects of the proposed action plus other actions affecting the resource.

Table 4.1 - Cumulative Impact Scenario

Impact Topic	Study Area	Past Actions	Present Actions	Future Actions
Vegetation	National Mall and Memorial Parks in vicinity of levee project	Landscape and maintenance Public events and visitor use Security improvements	SAME AS PAST	SAME AS PRESENT, plus: ▪ Construction of: other buildings on the National Mall, including National Museum for African American History and Culture (NMAAHC) and Vietnam Veterans Memorial Visitor Center (VVMC) ▪ Construction of US Institute of Peace (USIP) Headquarters (not on the National Mall) ▪ Martin Luther King, Jr. (MLK) Memorial (northwest corner of Tidal Basin)
Floodplains	National Mall and Memorial Parks in vicinity of levee project and downtown Washington, D.C.	Fill and development Construction in floodplain Road improvements Levee construction Construction of FDR Memorial & WWII Memorial in flood plain	Park operations in West Potomac Park and East Potomac Park; includes many activities such as the maintenance of FDR, WWII and the other memorials	MLK Memorial and VVMC Ongoing operations and maintenance such as maintenance of FDR Memorial & WWII Memorial in floodplain Additional construction activities include the installation of a permanent security barrier around the Jefferson Memorial
Aesthetics and Visual Quality	National Mall and Memorial Parks in vicinity of levee project and downtown Washington, D.C.	Development of the National Mall and Memorials and downtown D.C. Lincoln Memorial Circle rehabilitation Road improvements Landscape and maintenance Public events and visitor Use Security improvements	SAME AS PAST plus ▪ Increased traffic and development	SAME AS PRESENT plus ▪ Construction of: other buildings on and near the National Mall, including NMAAHC, VVMC, USIP Headquarters, and MLK Memorial

Table 4.1 - Cumulative Impact Scenario				
Impact Topic	**Study Area**	**Past Actions**	**Present Actions**	**Future Actions**
Cultural Resources ▪ Historic Plans and Structures ▪ Cultural Landscapes ▪ Archeological Resources	Area of Potential Effect (APE) for cultural resources (see Figure X)	SAME AS AESTHETICS, above	SAME AS AESTHETICS, above	SAME AS AESTHETICS, above
Visitor Use and Experience	National Mall and Memorial Parks in vicinity of levee project	Lincoln Memorial Circle rehabilitation Security improvements including at Washington and Lincoln Memorials Landscape and maintenance Public events and visitor services, including food service and book sales offered by park concessionaires, Tourmobile, boat rental on the Tidal Basin, stand alone restroom facilities, etc.	SAME AS PAST, plus: ▪ Increased traffic and development	SAME AS PRESENT plus ▪ Construction of: other buildings on and near the National Mall, including NMAAHC, VVMC and USIP Headquarters ▪ Proposal for security barriers at Jefferson Memorial ▪ MLK Memorial
Public Safety	National Mall and Memorial Parks in vicinity of levee project and downtown Washington, D.C.	Security projects Road improvements project Public events and security measures Levee construction Occasional visitor accidents	SAME AS PAST, except: ▪ Increased security and levee maintenance	Construction of: other buildings on and near the National Mall, including NMAAHC, VVMC, and USIP Headquarters, MLK Memorial Possible additional security concerns
Socioeconomics	Area surrounding the Mall area that would be affected by new 100-year floodplain delineation	Existing building and residences within the 100-year floodplain	SAME AS PAST	Construction of other buildings on the National Mall, including NMAAHC, VVMC, Department of Commerce, and buildings off the Mall including the USIP and SE Federal Center Yards mixed development
Traffic and Transportation	National Mall and Memorial Parks in vicinity of levee project and downtown Washington, D.C.	Road improvement projects Security improvement projects at Washington and Lincoln Memorials D.C. development	SAME AS PAST plus: ▪ Increased traffic ▪ Use of public transportation ▪ Increasing fuel prices	SAME AS PRESENT plus ▪ Construction of: other buildings on and near the National Mall, NMAAHC, VVMC, and USIP Headquarters, Constitution Avenue repaving. National Mall Transportation Plan, and MLK Memorial (would impact West Basin Drive)

Table 4.1 - Cumulative Impact Scenario				
Impact Topic	**Study Area**	**Past Actions**	**Present Actions**	**Future Actions**
Utilities and Infrastructure	National Mall and Memorial Parks in vicinity of levee project and downtown Washington, D.C.	Road improvements project National Mall and D.C. underground construction	SAME AS PAST	SAME AS PRESENT plus any future road or building underground construction, including construction of: other buildings on and near the National Mall, including NMAAHC, VVMC, and USIP Headquarters, MLK Memorial
Park Management and Operations	National Mall and Memorial Parks	Public events and visitor use Increased security actions and projects Maintenance Vandalism	SAME AS PAST	SAME AS PRESENT plus expected increased visitation, possible additional security concerns Construction of: other buildings on and near the National Mall, including NMAAHC, VVMC, and USIP Headquarters, MLK Memorial

POTENTIAL CUMULATIVE IMPACTS ACTIONS

The following provides additional discussion on how the list of potential cumulative impact actions listed above could contribute to the cumulative impacts. Pursuant to guidance from the CEQ, the past actions listed above are reflected in the description of each resource as part of the affected environment. Therefore, only impacts related to present and reasonably foreseeable future actions are discussed further. In addition to those actions identified below, other current and future plans, including the National Mall Plan (NMP), are described in chapter 1.

- *Landscape and maintenance*: The NPS actively manages and maintains the landscape on the National Mall, resulting in impacts, primarily beneficial, to vegetation, aesthetics, and visitor experience and use. Some adverse impacts may be associated with visitor experience and aesthetics while landscape and maintenance operations are taking place.
- *Public events and visitor use*: The National Mall attracts visitors from all over the world, approximately 26 million people per year. Most visitation to the Monumental Core occurs in spring and summer. In addition, the National Mall also hosts special events each year, including demonstrations, festivals, and holiday celebrations, including the 4th of July Independence Day celebration. These special events can draw hundreds of thousands of people to the area. Special events have the potential to add to the impacts related to levee construction in terms of additional resource damage to vegetation, aesthetics, public safety, and cultural resources as well as park management and operations. The proposed timing of construction will play a role in the level of impacts.
- *Increased security and security improvements*: Since the bombing of the Alfred P. Murrah Federal Building in 1995 and the September 11, 2001 attacks on the Pentagon and World Trade Centers, security improvements have been implemented or will likely be implemented in the future throughout the Washington, D.C. area, including the National Mall and Memorial Parks (NAMA). These have included using concrete barriers and other devices meant to limit access, especially to vehicles. The measures, although important for public safety, have resulted in impacts on the vegetation, aesthetics, and cultural resources of the area. In addition, these improvements have impacts on traffic patterns and congestion. In order to address potential security issues, law enforcement has also been increased, causing impacts on park management and operation. There are planned security improvements at the Jefferson Memorial that will involve the construction of a vehicle barrier.

- *Increased traffic and development*: Like most major metropolitan areas along the east coast of the United States, Washington, D.C. has experienced growth. This has resulted in increases in local development and corresponding traffic. Proposals for improved public transportation could alleviate some of these impacts. However, increased traffic and development could cause impacts on land use, aesthetics, cultural resources, utilities and infrastructure, and visitor use and experience.
- *Road improvements (including Constitution Avenue repaving)*: In order to address an aging transportation infrastructure and increases in population and security concerns, a number of road improvements have been and will be proposed in the area. These projects have the potential to impact traffic and transportation, land use, utilities and infrastructure, public safety, visitor use and experience, aesthetics, and cultural resources.
- *Construction of other buildings on the National Mall*: This development can contribute to impacts concerning vegetation, floodplains, aesthetics, cultural resources, visitor use and experience, utilities and infrastructure, public safety, socioeconomics, and park management and operations. These buildings include:
    - National Museum for African American History and Culture (NMAAHC): This building will provide a place for all Americans to learn about the history and culture of African Americans and their contributions to and relationship with every aspect of our nations' life. It will be located on a five-acre parcel that is part of the Washington Monument grounds on the National Mall, bounded by Constitution Avenue on the north, Madison Drive on the south, 14th Street NW on the east, and 15th Street NW on the west.
    - Vietnam Veterans Memorial Visitor Center (VVMC): This center will educate students and visitors about the Vietnam War and the Memorial itself. The VVMC will be located in the northwestern corner of the National Mall, west of the Vietnam Veterans Memorial, on the east side of 23rd Street between the Lincoln Memorial Circle and Constitution Avenue.
    - Martin Luther King (MLK) Memorial: This project will establish a memorial to Dr. King on a three-acre site within the triangular area bounded by Independence Avenue, relocated West Basin Drive, and the western edge of the Tidal Basin walkway. The memorial will be conceptually a landscape experience, using stone, water, and trees, to convey the main themes of Dr. King's legacy: justice, democracy, and hope.
- *Construction of other buildings near the National Mall.* This development can contribute to impacts concerning vegetation, aesthetics, cultural resources, visitor use and experience, utilities and infrastructure, public safety, socioeconomics, and park operations and management. These buildings include:
    - United States Institute of Peace (USIP) Headquarters: This 154,000 square foot building is to be constructed at the northwest corner of the intersection of 23rd Street and Constitution Avenue.

IMPAIRMENT OF RESOURCES

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

The impairment prohibited by the *Organic Act* and the *General Authorities Act* is an impact, in the professional judgment of the responsible NPS manager, that harms the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. An impact on any park resource or value may constitute impairment, but an impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is

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

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

In analyzing impairment in conjunction with the NEPA analysis for this project, the NPS takes into account the fact that if impairment were likely to occur, by operation of the CEQ's regulations at 40 CFR, such impacts would be considered to be major or significant. This is because the context and intensity of the impact would be sufficient to render what would normally be a minor or moderate impact to be major or significant. Taking this into consideration, NPS guidance notes that "Not all major or significant impacts under a NEPA analysis are impairments. However, all impairments to NPS resources and values would constitute a major or significant impact under NEPA. If an impact results in impairment, the action should be modified to lessen the impact level. If the impairment cannot be avoided by modifying the proposed action, that action cannot be selected for implementation." ("Interim Technical Guidance on Assessing Impacts and Impairment to Natural Resources" National Park Service, Natural Resource Program Center, July 2003).

VEGETATION

METHODOLOGY AND ASSUMPTIONS

Available information on the vegetation occurring at the proposed sites, especially mature trees and landscape, was compiled and reviewed. Impacts on vegetation were based on general characteristics of the site and vicinity, available aerial photos, site observations, proposed encroachment into vegetated areas associated with construction, and removal of vegetation. A tree survey identified all trees that would need to be removed under each of the alternatives considered, including several older mature trees that would be a greater loss because of their age and stature.

STUDY AREA

The study area for vegetation included the NAMA grounds and surrounding areas that would be affected by the levee construction.

IMPACT THRESHOLDS

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

Negligible – Very few individual trees or mature landscape plantings would be affected, and no older mature trees would be impacted.

Minor – A few individual trees or mature landscape plantings would be affected; however, mitigation measures such as replanting to avoid or offset impacts on trees could be implemented which would be effective in replacing or reducing losses of vegetation in a short time. No older mature trees would be impacted.

Moderate – A relatively large number of individual trees or mature landscape plantings would be affected, including older mature trees. Mitigation measures such as replanting to avoid or offset impacts on trees and other landscaping of greater concern could be implemented and would be effective in replacing or reducing losses of vegetation, but extended time may be needed for the regeneration of mature vegetation that is lost.

Major – A substantial number of individual trees or mature landscape plantings would be affected, and numerous older mature trees would also be impacted, either directly or indirectly. Actions would substantially change the vegetation over a large area in the study area. Extensive mitigation would be needed to offset adverse impacts, and its success would not be assured.

Duration – Short-term impacts lasting less than one year; long-term impacts lasting longer than one year.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Under this alternative, in the event of a 100-year or greater flood event, the NPS would implement their existing plan for the levee system at 17th Street, 23rd Street, and the Reflecting Pool. Activities that could affect vegetation within the project area include the implementation of NPS operations and procedures during a flood event and ongoing maintenance activities.

At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. Because of the lack of vegetation at this particular site, and since no ground disturbance or vegetation removal would be necessary, no impacts on vegetation would likely occur as a result of these emergency measures.

Under the park's existing plan, no action at the existing levee along the north edge of the Reflecting Pool levee location is required, as it currently meets the 100-year flood level. Because there would be no need

for any site disturbance or removal of vegetation at this site as a result of existing NPS operations and procedures during a flood event, no impacts on vegetation would occur.

At 17th Street, if notification of an impending flood is received, the park would close 17th Street to construct a temporary earthen levee, using a combination of Jersey barriers, sandbags, and soil/fill. Disturbance to vegetation would result from trenching of borrow pits in the grassy areas immediately adjacent to the temporary levee where the earth would be dug in order to construct the berm. Trees which would be disturbed by the construction of a temporary earthen berm include elms on the west side of 17th Street. Other vegetation on the west side of 17th Street would also be affected because it would be covered by the temporary berm. After the flood event, the levee would be removed and the site would be remediated; however, restoration of the area after cessation of flood waters could potentially incur a substantial amount of time if the grounds were to become highly saturated. As a result, construction of the temporary levee at this site would result in short-term minor adverse impacts on vegetation.

Cumulative Impacts. Activities in the project area that have or could affect vegetation include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions. These ongoing landscape and maintenance activities would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, including the NMAAHC and VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. However, each project would be subject to specific requirements to reduce the individual impact on vegetation. Consequently, any long-term impacts associated with earth-disturbing activities within the study area would remain minor. The impacts of all these actions, in combination with the short-term minor adverse impacts on vegetation at the 17th Street closure under the no action alternative, would result in negligible to minor adverse cumulative impacts on vegetation in the study area.

Conclusion. Implementation of the no action alternative would result in short-term minor adverse impacts on vegetation as a result of construction of the temporary levee. There would be negligible to minor adverse cumulative impacts on existing vegetation found within the study area. The no action alternative would not result in impairment of vegetation.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. Under Phase 1 of alternative 1, the levee at 17th Street would utilize two concrete walls to the east and west of 17th Street, approximately 198 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved through a post and panel system. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative.

Impacts on vegetation associated with the 23rd Street levee would be the same as those described under the no action alternative. The current plan calls for the placement of sandbags across Constitution Avenue if a 100-year or greater flood is expected. Because of the lack of vegetation that occurs at this particular site and because no ground disturbance or vegetation removal would be necessary, no impacts on vegetation would likely occur as a result of these emergency measures.

At the Reflecting Pool levee, impacts on vegetation would be the same as those described under the no action alternative. Because the Reflecting Pool levee currently meets the 100-year flood level requirements, there would be no need for any site disturbance or removal of vegetation at this site. As a result, no impacts on vegetation would occur.

At 17th Street, there are two options: Phase 1 of alternative 1A would entail constructing a floodwall 16.7 feet (possibly 18.7 feet) in height 198 feet south of the centerline of Constitution Avenue, while Phase 1 of alternative 2B would entail re-grading of a large portion of the Washington Monument and Constitution Gardens grounds, and constructing a wall to 18.7 NAVD based on the new elevation of the re-graded area.

For alternative 1A, construction would occur over four to six months and involve the removal of 15 trees[1], including two large black walnuts and two street elms that are older, mature trees. The other trees that would be removed are primarily on the Constitution Gardens grounds and represent a mix of ages and conditions; some are more mature shade trees dating from 1976 (although many are stunted from poor soil and drainage conditions), and others were more recently replanted or are smaller dogwoods. If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis). In addition, adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Moreover, the vegetative area within the proposed footprint of the floodwall would be permanently lost.

For alternative 1B, re-grading would require removal of 98 trees, mostly on the Constitution Gardens grounds, which would again represent a wide mix of ages and conditions. Alternative 1B would require the removal of three larger, mature trees (one street elm along 17th Street, and two large walnuts), and surface vegetation would be disturbed over an area of 5.24 acres, mainly due to the re-grading, and similar effects could occur to vegetation outside of the structural footprint from construction activities and staging. However, because re-grading would be done entirely in Phase 1 of alternative 1B, replanting would immediately follow in this option.

For both options, impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and by replacing the disturbed area with turf. However, replanting of trees is not proposed for Phase 1 for alternative 1A. Replanting would occur following re-grading under alternative 1B, so these replacement trees outside the "no plant" zone would mitigate the net loss of trees. These would take several years to grow to the heights of trees removed, but the replanting would be effective in replacing the initial loss of vegetation. As a result of the actions proposed under this phase of alternative 1, there would be long-term moderate adverse impacts on the vegetation found within the vicinity of the 17th Street levee for both options 1A and 1B.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as described under current conditions and would result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of all these other actions, in combination with the moderate adverse impacts on vegetation at the 17th Street closure under Phase 1 of alternative 1, would result in long-term minor (alternative 1A) to moderate (alternative 1B) adverse cumulative impacts on vegetation in the study area.

Conclusion. Implementation of Phase 1 of alternative 1 would result in long-term moderate adverse impacts on vegetation as a result of construction activities related to levee improvements at 17th Street.

[1] The volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be determined in the design process.

There would be long-term minor to moderate adverse cumulative impacts on existing vegetation found within the study area. Phase 1 of alternative 1 would not result in impairment of vegetation.

Phase 2 Analysis. Under Phase 2 of alternative 1A, the height of the levee at 17th Street would be raised from 16.7 feet to an elevation of 18.7 NAVD to meet the requirement for the congressionally authorized solution (if this was not funded and completed in Phase 1); alternative 1B would already be at the phase 2 height. At 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool site.

The 23rd Street levee improvements would include re-grading to raise the ground elevation to 18.7 NAVD. This would result in an estimated loss of six elm trees along Constitution Avenue, which have 12 to 24-inch trunk diameters and are up to 50-feet tall, and approximately six, 10-foot tall shrubs at the southwest corner of the Roosevelt Bridge ramp and 23rd Street. No older mature trees would be removed under this scenario at these locations. Adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Since some tree species are more susceptible to root zone damage, the potential for tree loss depends on the species of tree. Mitigation measures, such as the use of low ground pressure equipment to minimize disturbance to the root systems and replacing trees in-kind at different locations to restore the vegetative character of the area, would minimize or offset impacts on vegetation. These measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be short-term and minor.

Under Phase 2, filling low areas to obtain a ground elevation of 18.7 NAVD would also occur at the Reflecting Pool site. Construction would occur over approximately six to nine months, or one construction season. No bulldozers would be required for the levee improvements, and as few trees as possible would be affected by filling low spots in this location. In 2007, the NPS and U.S. Army Corps of Engineers (USACE) agreed to move the centerline of the levee north to avoid the elms on the south side of the levee. As a result, some red maple and silver maple trees might be affected by the filling of low spots. Adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Since some tree species are more susceptible to root zone damage, the potential for tree loss depends on the type of tree. Mitigation measures, such as the use of low ground pressure equipment to minimize disturbance to the root systems and replacing trees in-kind at different locations, would minimize or offset impacts on vegetation. These measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at the Reflecting Pool locations would be short-term and minor.

At 17th Street, Phase 2 of alternative 1A would entail augmenting the height of the levee to 18.7 NAVD. The associated increased area of disturbance would result in the removal of several more trees. Overall, there would be 38 additional trees of various ages and sizes (some dating from 1976) removed under Phase 2 of alternative 1, resulting in a total loss of 53 trees over the study area for both phases. No additional older, mature trees would be removed under this scenario. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Under Phase 2 alternative 1B, no additional trees would be removed, since all re-grading (and replanting) would occur in Phase 1.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing a planting plan. Although replanting could not feasibly occur on the levee itself, other areas disturbed by construction activities would be replanted with appropriate vegetation immediately following construction, and would be monitored to ensure successful establishment of vegetation such that the area's previous character would be restored. While replanting would be effective in replacing or reducing losses of vegetation for both options, extended time may be needed for recovery of mature vegetation and the tree canopy that is lost. As a result, the actions proposed or continued (alternative 1B) under this phase of alternative 1 would result in long-term moderate adverse impacts on vegetation.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative and Phase 1. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions and would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of all other actions, in combination with the minor to moderate, short-term and long-term impacts on vegetation under Phase 2 of alternative 1, would result in long-term minor to moderate adverse cumulative impacts on vegetation in the study area.

Conclusion. Implementation of Phase 2 of alternative 1 would result in short- and long-term minor to moderate adverse impacts on vegetation as a result of construction activities related to floodwall improvements. There would be long-term minor to moderate adverse cumulative impacts on existing vegetation found within the study area. Phase 2 of alternative 1 would not result in impairment of vegetation.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Phase 1 Analysis. Under Phase 1 of alternative 2, 17th Street would be raised one foot in height at a location approximately 100 feet south of Constitution Avenue to fill in the current depression. In addition, two options are provided for how the two concrete walls would be aligned to the east and west of 17th Street. These two options are differentiated by their Phase 1 west walls and their Phase 2 solutions, which would be either an asymmetric (alternative 2A) or symmetric (alternative 2B) wall design. During a flood event, the closure across 17th Street would be achieved though a post and panel system. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative.

Impacts on vegetation associated with the 23rd Street and Reflecting Pool levees would be the same as those described under the no action alternative. The current plan calls for the placement of sandbags across Constitution Avenue if a 100-year or greater flood is expected. Because of the lack of vegetation that occurs at this particular site and because no ground disturbance or vegetation removal would be necessary, no impacts on vegetation would likely occur as a result of these emergency measures. At the Reflecting Pool levee, there would be no need for any site disturbance or removal of vegetation. As a result, no impacts on vegetation would occur.

At 17th Street, Phase 1 of alternative 2 would entail constructing a levee 16.7 feet (possibly 18.7 feet) in height and re-grading on the east side of 17th Street. Under this alternative, several large trees would be removed to accommodate the floodwall. Construction would occur over four to six months and involve the removal of different types of trees under alternative 2A and 2B.

- Alternative 2A would require the removal of 25 trees of various ages and conditions, seven of which are recently planted cherry trees on the northeast corner of the Monument Grounds. Four trees along 17th Street would need to be removed, including three larger, mature elms.

- Alternative 2B would require the removal of 26 trees of various ages and conditions, nine of which are recently planted cherry trees on the northeast corner of the Monument Grounds. Four trees along 17th Street would need to be removed, including three larger, mature elms.

If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis).

Additional adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Moreover, the vegetative area within the proposed footprint of the levee would be permanently lost.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and by replacing the disturbed area with turf; however, replanting of trees is not proposed for Phase 1. As a result of the actions proposed under this phase of alternative 1, there would be long-term moderate adverse impacts on the vegetation found within the vicinity of the 17th Street levee.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, which would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of these other actions, in combination with the moderate adverse impacts on vegetation under Phase 1 of alternative 2, would result in long-term minor adverse cumulative impacts.

Conclusion. Implementation of Phase 1 of alternative 2 would result in long-term moderate adverse impacts on vegetation as a result of construction activities related to levee improvements at 17th Street. There would be long-term minor cumulative impacts on existing vegetation found within the study area. Phase 1 of alternative 2 would not result in impairment of vegetation.

Phase 2 Analysis. Under Phase 2 of alternative 2, the height of the floodwall at 17th Street would be raised from 16.7 feet to an elevation of 18.7 NAVD (if this was not funded and completed in Phase 1). At 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool levee.

Impacts on vegetation associated with the 23rd Street levee and the Reflecting Pool would be the same as those described under alternative 1. Re-grading to raise the ground elevation to 18.7 NAVD would occur at the 23rd Street location. The current plan calls for re-grading to raise the ground elevation and the placement of sandbags across 23rd Street if a 100-year or greater flood is expected. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. Mitigation measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be short-term and minor.

Improvements to the levee at the Reflecting Pool would be the same as those described under alternative 1 in which filling of low areas to obtain a ground elevation of 18.7 NAVD would occur. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. Mitigation measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be minor and short-term.

At 17th Street, Phase 2 of alternative 2 would entail augmenting the height of the floodwall to 18.7 NAVD and would not involve any re-grading. Additional tree loss per option is listed below.

- Construction of alternative 2A would involve the removal of an additional 29 trees compared to Phase 1, depending on the design option selected, resulting in the potential removal of 54 trees; many of these are relatively old (planted in 1976); others have been replanted over the years or are smaller dogwoods. No additional older mature trees would be removed in this phase.
- Construction of alternative 2B would involve the removal of an additional 38 trees compared to Phase 1, depending on the design option selected, resulting in the potential removal of 64 trees; many of these are relatively old (planted in 1976); others have been replanted over the years or are smaller dogwoods. No additional older mature trees would be removed in this phase.

It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis. Additional adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Moreover, the vegetative area within the proposed footprint of the floodwall would be permanently lost.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing a planting plan. Although replanting could not feasibly occur on the levee itself, other areas disturbed by construction activities could be replanted with appropriate vegetation immediately following construction and would be monitored to ensure successful establishment. While replanting would be effective in replacing or reducing losses of vegetation, extended time may be needed for recovery of mature vegetation and tree canopy that is lost. Mitigation is expected to be successful. As a result of the actions proposed under this phase of alternative 2, there would be long-term moderate adverse impacts on vegetation, with alternative 2B having a substantially greater impact than many other Phase 2 alternatives of similar design.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative and Phase 1. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, and these would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of these other actions, in combination with the short-term and long-term minor to moderate impacts on vegetation under Phase 2 of alternative 2, would result in long-term minor to moderate adverse cumulative impacts.

Conclusion. Implementation of Phase 2 of alternative 2 would result in short- and long-term minor to moderate adverse impacts on vegetation as a result of construction activities related to levee improvements. There would be long-term minor to moderate (alternative 2B) adverse cumulative impacts on existing vegetation found within the study area. Phase 2 of alternative 2 would not result in impairment of vegetation.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Phase 1 of alternative 3 utilizes two concrete walls to the east and west of 17th Street, approximately 365 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved through a post and panel system. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative.

Impacts on vegetation associated with the levees at 23rd Street and the Reflecting Pool would be the same as those described under the no action alternative. The current plan calls for the placement of sandbags across Constitution Avenue if a 100-year or greater flood is expected. Because of the lack of vegetation that occurs at this particular site and because no ground disturbance or vegetation removal would be

necessary, no impacts on vegetation would likely occur as a result of these emergency measures. At the Reflecting Pool levee, there would be no need for any site disturbance or removal of vegetation at this site. As a result, no impacts on vegetation would occur.

At 17th Street, Phase 1 of alternative 3 would entail constructing a floodwall 16.7 feet in height perpendicular to 17th Street and about 365 feet south of the centerline of Constitution Avenue. Construction would occur over four to six months and involve the removal of 18 trees, two of which are along 17th Street. Of the two 17th Street trees, one is an older mature tree. Some of the trees that would be removed are relatively mature shade trees that were planted in 1976, while others are smaller trees that have been more recently planted or are smaller dogwoods. Adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Moreover, the vegetative area within the proposed footprint of the floodwall would be permanently lost.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and by replacing the disturbed area with turf; however, replanting of trees is not proposed for Phase 1. As a result of the actions proposed under this phase of alternative 1, there would be long-term moderate adverse impacts on the vegetation found within the vicinity of the 17th Street levee.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, and these would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of all other actions, in combination with the moderate adverse impacts on vegetation under Phase 1 of alternative 3, would result in long-term minor adverse cumulative impacts.

Conclusion. Implementation of Phase 1 of alternative 3 would result in long-term moderate adverse impacts on vegetation as a result of construction activities related to floodwall improvements. There would be long-term minor cumulative impacts on existing vegetation found within the study area. Phase 1 of alternative 3 would not result in impairment of vegetation.

Phase 2 Analysis. Phase 2 of alternative 3 would require the removal of the side wing walls and their foundations from Phase 1, and the construction of new terraced walls along both sides of 17th Street along the east–west axis of the Overlook Terrace. In addition, at 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD, and this would also occur at the Reflecting Pool site.

Impacts on vegetation associated with the 23rd Street levee and the Reflecting Pool would be the same as those described under alternative 1. Re-grading to raise the ground elevation to 18.7 NAVD would occur at the 23rd Street location. The current plan calls for re-grading to raise the ground elevation and the placement of sandbags across 23rd Street if a 100-year or greater flood is expected. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. Mitigation measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be short-term and minor.

Improvements to the levee at the Reflecting Pool would be the same as those described under alternative 1 in which filling of low areas to obtain a ground elevation of 18.7 NAVD would occur. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. Mitigation measures, when

implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be short-term and minor.

At 17th Street, Phase 2 of alternative 3 would result in an increased area of disturbance and would necessitate the removal of additional trees. There would be 83 additional trees removed under Phase 2 of alternative 3, many of these are relatively mature trees on the Constitution Gardens grounds (planted in 1976), while others are younger trees or smaller dogwoods; only one is an older, mature tree. However, a total of 101 trees would be removed after Phase 2 was completed which would result in a noticeable loss of vegetation over this portion of the study area. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

In addition, adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing a planting plan. Although replanting could not feasibly occur on the levee terraces, some other areas disturbed by construction activities could be replanted immediately following construction, and would be monitored to ensure successful establishment. While replanting would be effective in replacing or reducing losses of vegetation, extended time may be needed for recovery of mature vegetation and tree canopy that is lost. The actions proposed under this alternative for Phase 2 would result in substantial loss of vegetation, but mitigation is expected to be successful over time. Therefore, there would be long-term moderate adverse impacts on vegetation, but with a greater effect following Phase 2 construction than other action alternatives except alternative 1B.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative and Phase 1. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, and these would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of all other actions, in combination with the short- and long-term moderate, adverse impacts on vegetation under Phase 2 of alternative 3, would result in long-term moderate cumulative impacts.

Conclusion. Implementation of Phase 2 of alternative 3 would result in both short- and long-term minor and moderate adverse impacts on vegetation as a result of construction activities related to floodwall improvements. There would be long-term moderate adverse cumulative impacts on existing vegetation found within the study area. Phase 2 of alternative 3 would not result in impairment of vegetation.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. Under Phase 1 of alternative 4, a "Hybrid" arrangement of floodwalls with elements similar to the west wall from alternative 2B and the east wall from alternative 1 would be located approximately 177.5 feet south of the centerline of Constitution Avenue, and the closure across 17th Street would be achieved though a post and panel system. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative.

Impacts on vegetation associated with the 23rd Street and Reflecting Pool levees would be the same as those described under the no action alternative. The current plan calls for the placement of sandbags across Constitution Avenue if a 100-year or greater flood is expected. Because of the lack of vegetation that occurs at this particular site and because no ground disturbance or vegetation removal would be

necessary, no impacts on vegetation would likely occur as a result of these emergency measures. At the Reflecting Pool levee, there would be no need for any site disturbance or removal of vegetation. As a result, no impacts on vegetation would occur.

Under Phase 1 of alternative 4, a "Hybrid" arrangement of floodwalls with elements similar to the west wall from alternative 2B and the east wall from alternative 1 would be located approximately 177.5 feet south of the centerline of Constitution Avenue. Under this alternative, construction would occur over four to six months and involve the removal of 28 trees of various ages and conditions. Four trees along 17th Street would need to be removed, including three mature elms, and one older mature walnut would also need to be removed. If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis). Additional adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Moreover, the vegetative area within the proposed footprint of the levee would be permanently lost.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and by replacing the disturbed area with turf; however, replanting of trees is not proposed for Phase 1. As a result of the actions proposed under this phase of alternative 1, there would be long-term moderate adverse impacts on the vegetation found within the vicinity of the 17th Street levee.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, which would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of these other actions, in combination with the moderate adverse impacts on vegetation under Phase 1 of alternative 4, would result in long-term minor adverse cumulative impacts.

Conclusion. Implementation of Phase 1 of alternative 4 would result in long-term moderate adverse impacts on vegetation as a result of construction activities related to levee improvements at 17th Street. There would be long-term minor cumulative impacts on existing vegetation found within the study area. Phase 1 of alternative 4 would not result in impairment of vegetation.

Phase 2 Analysis. Under Phase 2 of alternative 4, the height of the floodwalls at 17th Street would be raised from 16.7 feet to an elevation of 18.7 NAVD (if this was not funded and completed in Phase 1). At 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool levee.

Impacts on vegetation associated with the 23rd Street levee and the Reflecting Pool would be the same as those described under alternative 1. Re-grading to raise the ground elevation to 18.7 NAVD would occur at the 23rd Street location. The current plan calls for re-grading to raise the ground elevation and the placement of sandbags across 23rd Street if a 100-year or greater flood is expected. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. Mitigation measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be short-term and minor.

Improvements to the levee at the Reflecting Pool would be the same as those described under alternative 1 in which filling of low areas to obtain a ground elevation of 18.7 NAVD would occur. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. Mitigation measures, when

implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be minor and short-term.

At 17th Street, Phase 2 of alternative 4 would entail augmenting the height of the floodwalls to 18.7 NAVD and would not involve any re-grading. Construction would involve the removal of an additional 32 trees compared to Phase 1, resulting in the potential removal of 60 trees; many of these are relatively old (planted in 1976); others have been replanted over the years, and some are smaller dogwoods. No additional older mature trees would be removed in this phase. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Additional adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Moreover, the vegetative area within the proposed footprint of the floodwall would be permanently lost.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing a planting plan. Although replanting could not feasibly occur on the levee itself, other areas disturbed by construction activities could be replanted with appropriate vegetation immediately following construction, and would be monitored to ensure successful establishment. While replanting would be effective in replacing or reducing losses of vegetation, extended time may be needed for recovery of mature vegetation and tree canopy that is lost. As a result of the actions proposed under this phase of alternative 2, there would be long-term moderate adverse impacts on vegetation.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative and Phase 1. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, and these would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of these other actions, in combination with the short-term and long-term minor to moderate impacts on vegetation under Phase 2 of alternative 4, would result in long-term minor to moderate adverse cumulative impacts.

Conclusion. Implementation of Phase 2 of alternative 4 would result in short- and long-term minor to moderate adverse impacts on vegetation as a result of construction activities related to levee improvements. There would be long-term minor to moderate adverse cumulative impacts on existing vegetation found within the study area. Phase 2 of alternative 4 would not result in impairment of vegetation.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. Phase 1 of alternative 5 would place one new small structure on the east side of 17th Street and a curved wall and realigned walkway to the west side of 17th Street, aligned to the southern edge of the Overlook Terrace, approximately 525 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved through a post and panel system. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative.

Impacts on vegetation associated with the levees at 23rd Street and the Reflecting Pool would be the same as those described under the no action alternative. The current plan calls for the placement of sandbags across Constitution Avenue if a 100-year or greater flood is expected. Because of the lack of vegetation that occurs at this particular site and because no ground disturbance or vegetation removal would be

necessary, no impacts on vegetation would likely occur as a result of these emergency measures. At the Reflecting Pool levee, there would be no need for any site disturbance or removal of vegetation at this site. As a result, no impacts on vegetation would occur.

Phase 1 of alternative 5 would entail constructing both the abutment structure on the Monument Grounds and the floodwall on the west side of 17th Street to 18.7 NAVD. Under this alternative, construction would occur over four to six months and involve the removal of 43 trees. Four of these are street trees of which two are older mature street trees. Some of the trees that would be removed are relatively mature shade trees that were planted in 1976, while others are smaller replacements or dogwoods. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation. Moreover, the vegetative area within the proposed footprint of the floodwall would be permanently lost.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and by replacing the disturbed area with turf; however, replanting of trees is not proposed for Phase 1. As a result of the actions proposed under this phase of alternative 1, there would be long-term moderate adverse impacts on the vegetation found within the vicinity of the 17th Street levee.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, and these would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of all other actions, in combination with the moderate impacts on vegetation under Phase 1 of alternative 5, would result in long-term minor adverse cumulative impacts.

Conclusion. Implementation of Phase 1 of alternative 5 would result in long-term moderate adverse impacts on vegetation as a result of construction activities related to floodwall improvements. There would be long-term minor cumulative impacts on existing vegetation found within the study area. Phase 1 of alternative 5 would not result in impairment of vegetation.

Phase 2 Analysis. Phase 2 of alternative 5 would require minimal changes from Phase 1 to meet the height of the congressionally authorized solution; similar to alternative 1B, and only aesthetic improvements are proposed in Phase 2. At 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD; this would also occur at the Reflecting Pool site.

Impacts on vegetation associated with the 23rd Street levee and the Reflecting Pool would be the same as those described under alternative 1. Re-grading to raise the ground elevation to 18.7 NAVD would occur at the 23rd Street location. The current plan calls for re-grading to raise the ground elevation and the placement of sandbags across 23rd Street if a 100-year or greater flood is expected. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. Mitigation measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be short-term and minor.

Improvements to the levee at the Reflecting Pool would be the same as those described under alternative 1 in which filling of low areas to obtain a ground elevation of 18.7 NAVD would occur. This would result in adverse impacts on trees and other vegetation, such as physical damage to the trees and their root

zones, resulting from construction activities and construction staging. Mitigation measures, when implemented, would be effective in replacing or reducing losses of vegetation in a short time. As a result, adverse impacts on vegetation at these locations would be short-term and minor.

At 17th Street, Phase 2 of alternative 5 would result in no additional disturbance and would require the removal of no additional trees, resulting in a total loss of 43 for Phase 1 and 2. This removal would still result in a noticeable loss of vegetation over this portion of the study area. Adverse impacts on trees and other vegetation outside of the structural footprint would occur, such as physical damage to the trees and their root zones, resulting from construction activities and construction staging. This damage could potentially affect the overall health of surrounding trees and vegetation.

Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing a planting plan. Although replanting could not feasibly occur on the levee terraces, some other areas disturbed by construction activities could be replanted immediately following construction, and would be monitored to ensure successful establishment. While replanting would be effective in replacing or reducing losses of vegetation, extended time may be needed for recovery of mature vegetation and tree canopy that is lost. Therefore, there would be long-term moderate adverse impacts on vegetation, but with a lesser effect relating to total tree loss than other action alternatives.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative and Phase 1. These include ongoing landscape and facility maintenance, security improvements, public events and visitor use, and several future projects that would directly affect the National Mall. Under this scenario, ongoing maintenance, improvements, and public use would continue as under current conditions, and these would likely result in long-term beneficial cumulative impacts. Future projects within the project area that could affect vegetation include construction of other buildings on the National Mall, which would contribute cumulatively to impacts on vegetation in the study area, potentially resulting in long-term minor adverse cumulative impacts on vegetation. The impacts of all other actions, in combination with the short- and long-term minor to moderate, adverse impacts on vegetation under Phase 2 of alternative 5, would result in long-term minor to moderate cumulative impacts.

Conclusion. Implementation of Phase 2 of alternative 5 would result in both short- and long-term minor and moderate adverse impacts on vegetation as a result of construction activities related to floodwall improvements. There would be long-term minor to moderate adverse cumulative impacts on existing vegetation found within the study area. Phase 2 of alternative 5 would not result in impairment of vegetation.

FLOODPLAINS

METHODOLOGY AND ASSUMPTIONS

Floodplains are defined by the NPS Floodplain Management Guideline (NPS 1993) as "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, and including, at a minimum, that area subject to temporary inundation by a regulatory flood." *Executive Order 11988*: *"Floodplain Management"* requires an examination of impacts on floodplains and of the potential risk involved in placing facilities within floodplains as well as the protection of floodplain values. The NPS has adopted the policy of preserving floodplain values and minimizing potentially hazardous conditions associated with flooding (NPS Floodplain Management Guideline July 1, 1993).

The proposed project, while directly related to flood control, would be constructed within an existing regulatory floodplain. As such, impacts on floodplain functions and values were assessed. These assessments were based on the known and potential 100-year floodplains within the study area, review of existing literature and studies, information provided by experts in the NPS and other agencies, and professional judgment.

STUDY AREA

The geographic study area for floodplain resources is the 100-year and 500-year floodplain as mapped in the area of the proposed levee projects. Construction activities would not occur outside the study areas.

IMPACT THRESHOLDS

The thresholds of change for the intensity of an impact on floodplains are as follows:

Negligible: Impacts would result in a change to floodplain functions and values, but the change would be so slight that it would not be of any measurable or perceptible consequence.

Minor: Impacts would result in a detectable change to floodplain functions and values, but the change would be expected to be small, of little consequence, and localized. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Impacts would result in a change to floodplain functions and values that would be readily detectable, measurable, and consequential, but relatively localized. Mitigation measures, if needed to offset adverse effects, could be extensive, but would likely be successful.

Major: Impacts would result in a change to floodplain functions and values that would have substantial consequences on a regional scale. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Duration: Short-term impacts would occur sporadically throughout the course of a year. Long-term impacts would last more than one year.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Under the no action alternative, in the event of a 100-year or greater flood event, the NPS would implement its existing plan for the levee system at 23rd Street, the Reflecting Pool, and 17th Street. At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue. No action would be required at the Reflecting Pool levee because it currently meets the 100-year flood level of protection. At 17th Street, when the notification of an impending flood is received, the park would close 17th Street to construct a temporary earthen levee, using a combination of Jersey barriers, sandbags, and soil/fill.

Under the no action alternative, any physical disturbance conducted in association with the construction of the levees at 17th Street and 23rd Street would be done pursuant to known protocols and would not result in any changes to the functions or values of the current designated floodplains. Since the current system no longer is certified, the area designated as the 100-year floodplain would change under the no action alternative, and the socioeconomic effects of this are addressed in a separate impact topic. However, there would be no change to the natural functions or values of the floodplain under the no action alternative.

Cumulative Impacts. Because there would be no impacts on floodplain functions or values under the no action alternative, no cumulative impacts would occur.

Conclusion. Implementation of the no action alternative would result in no long- or short-term adverse or beneficial or cumulative impacts on the functions or values of the currently existing floodplains found within the study area. Because there would be no impacts on floodplain functions or values under the no action alternative, no cumulative impacts would occur. The no action alternative would not result in impairment of floodplain functions or values.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. Under Phase 1 of alternative 1, the levee at 17th Street would utilize two concrete walls to the east and west of 17th Street, approximately 198 feet south (alternative 1A) or 253 feet south (alternative 1B) of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved through a post and panel system that would be 94 feet (alternative 1A) or 140 feet (alternative 1B) in length. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative. At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. At the Reflecting Pool, no action would be required, as it currently meets the 100-year flood level.

Activities associated with Phase 1 of this alternative that would impact floodplain functions and values include the siting of the proposed 17th Street Levee. Because the location of the proposed levee at 17th Street would be slightly altered from the current levee, flood water flows within the area would be slightly modified. These alterations to flood flows, however, would not be measurable nor would they noticeably alter the ability to convey flood waters. The existing floodplain designations would remain unchanged. As a result, constructing this proposed 17th Street levee system would have short-term negligible adverse impacts on the current floodplain. No impacts on floodplains would occur as a result of either the 23rd Street or Reflecting Pool levees because there would be no changes to the levee systems.

Cumulative Impacts. Projects in the project area that could have effects on floodplain functions or values have involved previous development, including construction and fill, within the floodplain. These past projects have involved road improvements, levee construction, and the construction of the Franklin Delano Roosevelt (FDR) Memorial. The World War II (WWII) Memorial removed soil from the floodplain, but it had no effect. The ongoing maintenance of these memorials, in combination with anticipated future actions (the MLK Memorial and VVMC) would occur alongside levee improvements proposed under this alternative. The MLK Memorial EA states that the proposed Memorial would not adversely impact the floodplain. Due to the lowering of the plaza from the existing level, there would be a negligible net gain in flood storage area (NPS 2005). In addition, the VVMC is not in the current or proposed 100-year floodplain. Therefore, effects on floodplain functions or values in the area of analysis from either the proposed action or from these anticipated future cumulative projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, these impacts, in combination with the short-term negligible impacts on floodplains under Phase 1 of alternative 1, would result in short-term negligible adverse cumulative impacts on floodplain functions or values.

Conclusion. Overall, implementation of Phase 1 of alternative 1 would result in short-term negligible adverse impacts on the currently existing floodplains found within the study area. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplain functions or values as a result of implementation of Phase 1 of alternative 1.

Phase 2 Analysis. Under Phase 2 of alternative 1, the height of the floodwall at 17th Street would be raised from 16.7 feet to an elevation of 18.7 NAVD to meet the requirement for the congressionally authorized solution (if this was not funded and completed in Phase 1). At 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool site. According to Federal Emergency Management Agency (FEMA) mapping, 23rd Street is currently located outside of a floodplain in an area of minimal flooding. The Reflecting Pool levee is within a designated 500-year floodplain that extends along a portion of Potomac Park north of the Reflecting Pool (See Figure 3.1).

While the proposed improvements at 17th Street, 23rd Street, and the Reflecting Pool levees would slightly alter the existing characteristics of the current floodplain, there would be no noticeable or measurable changes in the floodplain's ability to convey flood waters, and existing floodplain designations would remain unchanged. As a result, any adverse impacts that would occur as a result of this alternative would be considered short-term and negligible.

Cumulative Impacts. Cumulative impacts would be the same as those described for Phase 1. Effects on floodplain functions and values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other actions, in combination with the short-term negligible impacts on floodplains under Phase 2 of alternative 1, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Overall, implementation of Phase 2 of alternative 1 would result in negligible short-term adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 2 of alternative 1.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Phase 1 Analysis. Under Phase 1 of alternative 2, 17th Street would be raised approximately one foot in height at a location approximately 138 feet south of the centerline of Constitution Avenue to fill in the current depression. In addition, two options are provided for how the two concrete walls would be aligned to the east and west of 17th Street. These two options are differentiated by their Phase 1 west walls and their Phase 2 solutions, which would be either an asymmetric (alternative 2A) or symmetric (alternative 2B) wall design. During a flood event, the closure across 17th Street would be achieved though a post and panel system. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative. At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. At the Reflecting Pool levee, no action would be required, as it currently meets the 100-year flood level.

Impacts on floodplain functions and values associated with Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. Because the location of the proposed levee at 17th Street would be slightly altered from the current levee, flood waters flows within the area would be slightly modified. These alterations to flood flows, however, would not be measurable nor would they noticeably alter the ability to convey flood waters. The existing floodplain designations would remain unchanged. As a result, constructing this proposed 17th Street levee system would have short-term negligible adverse

impacts on the current floodplain. No impacts on floodplains would occur as a result of either the 23rd Street or Reflecting Pool levees because there would be no changes to the levee systems.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Effects on floodplain functions or values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other projects, in combination with the short-term negligible impacts on floodplains under Phase 1 of alternative 2, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 1 of alternative 2 would result in negligible short-term adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 1 of alternative 2.

Phase 2 Analysis. Under Phase 2 of alternative 2, the height of the floodwall at 17th Street would be raised from 16.7 feet to an elevation of 18.7 NAVD to meet the requirement for the congressionally authorized solution (if this was not funded and completed in Phase 1). At 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool site. According to FEMA mapping, 23rd Street is currently located outside of a floodplain in an area of minimal flooding. The Reflecting Pool levee is within a designated 500-year floodplain that extends along a portion of Potomac Park north of the Reflecting Pool (See Figure 3.1).

Impacts on floodplain functions and values associated with Phase 2 of this alternative would be similar to those described under Phase 2 of alternative 1. While the levee improvements at 17th Street, 23rd Street, and the Reflecting Pool proposed under Phase 2 of this alternative would slightly alter the existing characteristics of the current floodplain, there would be no noticeable or measurable changes in the floodplain's ability to convey flood waters, and existing floodplain designations would remain unchanged. As a result, any adverse impacts that would occur as a result of this alternative would be considered short-term and negligible, for they would only occur during 100-year or greater flood events.

Cumulative Impacts. Cumulative impacts would be the same as those described for Phase 1. Effects on floodplain functions and values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other actions, in combination with the short-term negligible impacts on floodplains under Phase 2 of alternative 1, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 2 of alternative 2 would result in negligible short-term adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 2 of alternative 2.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Phase 1 of alternative 3 utilizes two concrete walls to the east and west of 17th Street, approximately 365 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved though a post and panel system that would be 102 feet in length. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative. At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. At the Reflecting Pool levee, no action would be required, as it currently meets the 100-year flood level.

Impacts on floodplain functions and values associated with Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. As a result, constructing this proposed 17th Street levee system would have short-term negligible adverse impacts on the current floodplain. No impacts on floodplains would occur as a result of either the 23rd Street or Reflecting Pool levees because there would be no changes to the levee systems.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Effects on floodplain functions or values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other projects, in combination with the short-term negligible impacts on floodplains under Phase 1 of alternative 3, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 1 of alternative 3 would result in negligible short-term adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 1 of alternative 3.

Phase 2 Analysis. Phase 2 of alternative 3 would entail the removal of the side wing walls and their foundations from Phase 1, and the construction of new terraced walls along both sides of 17th Street along the east–west axis of the Overlook Terrace. In addition, at 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool site. According to FEMA mapping, 23rd Street is currently located outside of a floodplain in an area of minimal flooding. The Reflecting Pool levee is within a designated 500-year floodplain that extends along a portion of Potomac Park north of the Reflecting Pool (See Figure 3.1).

Impacts on floodplain functions and values associated with Phase 2 of this alternative would be similar to those described under Phase 2 of alternative 1. As a result, any adverse impacts that would occur as a result of this alternative would be considered short-term and negligible, for they would only occur during 100-year or greater flood events.

Cumulative Impacts. Cumulative impacts would be the same as those described for Phase 1. Effects on floodplain functions and values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other actions, in combination with the short-term negligible impacts on floodplains under Phase 2 of alternative 1, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 2 of alternative 3 would result in short-term negligible adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 2 of alternative 3.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. Phase 1 of alternative 3 utilizes two concrete walls to the east and west of 17th Street, approximately 177.5 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved though a post and panel system that would be 190 feet in length. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative. At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. At the Reflecting Pool levee, no action would be required, for it currently meets the 100-year flood level.

Impacts on floodplain functions and values associated with Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. As a result, constructing this proposed 17th Street levee system would have short-term negligible adverse impacts on the current floodplain. No impacts on floodplains would occur as a result of either the 23rd Street or Reflecting Pool levees because there would be no changes to the levee systems.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Effects on floodplain functions or values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other projects, in combination with the short-term negligible impacts on floodplains under Phase 1 of alternative 4, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 1 of alternative 4 would result in negligible short-term adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 1 of alternative 3.

Phase 2 Analysis. Phase 2 of alternative 4 would entail raising the height of the floodwall to 18.7 NAVD (if this was not funded and completed in Phase 1). In addition, at 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool site. According to FEMA mapping, 23rd Street is currently located outside of a floodplain in an area of minimal flooding. The Reflecting Pool levee is within a designated 500-year floodplain that extends along a portion of Potomac Park north of the Reflecting Pool (See Figure 3.1).

Impacts on floodplain functions and values associated with Phase 2 of this alternative would be similar to those described under Phase 2 of alternative 1. As a result, any adverse impacts that would occur as a result of this alternative would be considered short-term and negligible, for they would only occur during 100-year or greater flood events.

Cumulative Impacts. Cumulative impacts would be the same as those described for Phase 1. Effects on floodplain functions and values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other actions, in combination with the short-term negligible impacts on floodplains under Phase 2 of alternative 1, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 2 of alternative 4 would result in short-term negligible adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 2 of alternative 3.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. Phase 1 of alternative 5 utilizes one concrete wall to the west of 17th Street and a small structure to the east of 17th Street on the Monument Grounds, both located approximately 525 feet south of the centerline of Constitution Avenue. During a flood event, the closure across 17th Street would be achieved though a post and panel system that would be 135 feet in length. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative. At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. At the Reflecting Pool levee, no action would be required, for it currently meets the 100-year flood level.

Impacts on floodplain functions and values associated with Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. As a result, constructing this proposed 17th Street levee system would have short-term negligible adverse impacts on the current floodplain. No impacts on floodplains would occur as a result of either the 23rd Street or Reflecting Pool levees because there would be no changes to the levee systems.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Effects on floodplain functions or values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other projects, in combination with the short-term negligible impacts on floodplains under Phase 1 of alternative 5, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 1 of alternative 5 would result in negligible short-term adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 1 of alternative 3.

Phase 2 Analysis. Phase 2 of alternative 5 would require only aesthetic improvements since the height of the congressionally solution at 17th Street would be met in Phase 1. At 23rd Street, the levee would be re-graded to raise the ground elevation to 18.7 NAVD. In addition, low areas would be filled to obtain a consistent ground elevation of 18.7 NAVD at the Reflecting Pool site. According to FEMA mapping, 23rd Street is currently located outside of a floodplain in an area of minimal flooding. The Reflecting Pool levee is within a designated 500-year floodplain that extends along a portion of Potomac Park north of the Reflecting Pool (See Figure 3.1).

Impacts on floodplain functions and values associated with Phase 2 of this alternative would be similar to those described under Phase 2 of alternative 1. As a result, any adverse impacts that would occur as a result of this alternative would be considered short-term and negligible, for they would only occur during 100-year or greater flood events.

Cumulative Impacts. Cumulative impacts would be the same as those described for Phase 1. Effects on floodplain functions and values in the area of analysis from either the proposed action or from other projects in the vicinity are not anticipated to result in any measurable or perceptible change to floodplain functions and values. Therefore, impacts of other actions, in combination with the short-term negligible impacts on floodplains under Phase 2 of alternative 1, would result in short-term negligible adverse cumulative impacts on floodplains.

Conclusion. Implementation of Phase 2 of alternative 5 would result in short-term negligible adverse impacts on the currently existing floodplains found within the study area based on FEMA data. There would be short-term negligible adverse cumulative impacts under this alternative. Based on these findings, there would be no impairment of floodplains as a result of implementation of Phase 2 of alternative 5.

AESTHETICS AND VISUAL RESOURCES

METHODOLOGY & ASSUMPTIONS

This visual impact assessment addresses potential changes to views and vistas that can be attributed to the proposed action. A site survey including a survey of topography and existing trees was conducted and utilized for this analysis.

Since 17th Street was the primary area of focus where the majority of visual impacts would likely occur under the proposed action alternatives, a viewshed analysis was undertaken by OLIN to analyze the different alternatives and their respective wall heights and alignments in context at the 17th Street project area. The viewshed analysis consisted of a multi-step process.

First, OLIN surveyed the existing views and viewsheds in the project area and determined which views would be most effective at conveying the visual impacts associated with the range of alternatives. Digital photographs taken between May and October 2008 served as backgrounds upon which computer generated massing diagrams representing the various alternatives in Phase 1 and Phase 2 were electronically superimposed. The goal was to provide an easily accessible answer to the question of how each alternative would affect the view of the site from all the most significant and/or familiar vantage points.

The volume of each alternative transposed over the existing photograph simulates the area of impact and the degree to which adjacent historic resources would be obscured. The viewshed analysis was performed on all options for viewsheds A and C (below). Additional viewsheds (B, D and E) were analyzed for some options on a case-by-case basis.

- View A: From the north side of the intersection of 17th Street and Constitution Avenue looking south.
- View B: From 17th Street, approximately 330’ south of Constitution Avenue looking north.
- View C: From 17th Street, approximately 445’ south of Constitution Avenue looking north.
- View D: From 17th Street, approximately 725’ south of Constitution Avenue looking north.
- View E: From the southwest corner of 17th Street and Constitution Avenue looking towards the Washington Monument

These views were deemed to be the most significant and represent either a historically important vantage point, as established in the L’Enfant plan, or a well known viewshed.

PROJECT AREA

The study area for visual resources includes the National Mall in the vicinity of the levee project and downtown Washington, D.C. Construction activities would not occur outside the study area.

IMPACT THRESHOLDS

The following thresholds were used to determine the degree of impacts on visual resources in the project area:

Negligible: The proposed action would not impact the aesthetics or visual viewshed of the proposed project area during construction or operations.

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

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

First Degree Moderate Impact - There would be an adverse effect on the landscape character due to loss of trees; there would be an adverse effect on the visual character due to new built elements with a large affected area; there would be an adverse effect on the existing views and vistas because they would be partially obscured by new built elements.

Second Degree Moderate Impact – The adverse effect on the landscape and visual character of the project area would be of a greater intensity than the first degree due to a greater loss of trees or affected area; existing important viewsheds would be completely altered or obscured.

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

The impacts of the proposed action on the visual resources and aesthetic environment are evaluated in terms of both short-term and long-term visual environment.

Duration – Phase 1: In the short-term, the most negative visual impacts would be related to the activity and disruption associated with construction. There would also be short-term visual impacts associated with the implementation of the post and panels during a flood event. Long-term impacts would result between the time of implementation and construction of Phase 2, a period of time that is unknown, but is expected to be multiple years.

Duration – Phase 2: In the short-term, the most negative visual impacts would be related to the activity and disruption associated with construction (if additional height is not added in Phase 1). There would also be short-term visual impacts associated with the implementation of the post and panels during a flood event. The long-term impacts would be related to obscured or disrupted views from the areas where the proposed actions would occur.

IMPACTS OF NO ACTION ALTERNATIVE

Under the no action alternative at 23rd Street, the NPS would place a line of sandbags across the eastbound ramp of the Roosevelt Bridge. The sandbags would remain in place for the duration of the flood event and would be removed within two to three days afterwards.

While the sandbags would create a temporary visual element in the area, it would not substantially change the scenic vista since the height would be less than two feet. In addition, the sandbags would only be put in place during a flood event, during which time the U.S. Park Police would be evacuating the project area, and relatively few people would be present. As a result of the low height of the sandbags, the temporary nature of their presence, and the low probability that the sandbags would be viewed by a large number of people, the resulting impacts would be adverse, but short-term and minor.

At the Reflecting Pool, there would be no enhancements or modifications to the existing landscape as a result of this alternative; therefore, the aesthetic character and visual environment would remain unchanged, and there would be no effect on visual resources.

At 17th Street, under the no action alternative during a flood event, the NPS would place a line of Jersey barriers and sandbags across 17th Street approximately 75 feet south of Constitution Avenue. The NPS would supplement the reliability of this closure with a large volume of earth that would be taken from the northwest corner of the Monument Grounds or would be brought in from an off-site source and dumped

between the Jersey barriers. The sandbags would remain in place for the duration of the flood event and would be removed within two to three days afterwards. However, the restoration of the Monument Grounds would take several months (NPS 2006b).

The temporary closure across 17th Street would create a temporary visual element in the area and a noticeable change to the visual character. This would result from the three foot high barrier of earthen berm with concrete Jersey barriers being placed across a road currently free of obstruction, with views to the Tidal Basin to the south and the Lockkeeper's House to the north. In addition, if excavation of the Monument Grounds was needed, there would be a noticeable effect on the existing scenic resources and on the visual character of the project area around 17th Street, including the northwest corner of the Monument Grounds, both during the flood event and for several months after. Since the earthen berm defense is a temporary practice, the no action alternative would not have a permanent impact on aesthetics and visual resources, but it would create a noticeable effect on the visual character of the existing landscape, diminishing its overall integrity. This includes loss of viable topsoil from berm construction, which would need replacement, and of sod on the Monument Grounds. As a result, there would be short-term moderate adverse impacts on the overall visual character at 17th Street associated with the no action alternative.

Cumulative Impacts. Construction of the VVMC, the USIP, NMAAHC and the MLK Memorial, as well as the Lincoln Memorial security improvements, would impact the visual resources within the project area.

The USIP is establishing its new headquarters in a new building located off the Mall to the north of the 23rd Street project area, at the northwest corner of the intersection of Constitution Avenue. This project would result in a beneficial impact on the existing visual character and view down 23rd Street since a new architecturally rich building would replace a terraced asphalt parking lot; the materials, massing, and elevation would be consistent with surrounding historic structures (NCPC 2006a).

The Lincoln Memorial Circle Rehabilitation and Security Improvements will introduce transportation and security improvements to the area south of the 23rd Street site. A series of bollards would be placed around the circle on the east side of the Memorial, a secure access gate would be constructed on the west side, and two visitor services areas would be constructed on the north and south sides. Pedestrian improvements will provide enhanced access to the Memorial. There would be negligible adverse visual impacts associated with this project because the design and materials are intended to preserve the aesthetic qualities of the area and are compatible with the cultural landscape and historic setting of the Lincoln Memorial and surrounding park resources (NPS 2002a). Security improvements at the Jefferson Monument are also planned and would have similar effects on visitor use/experience as long as the design preserves the aesthetic qualities of the area and access is maintained.

The VVMC will be located to the east of the 23rd Street location. This project would result in a negligible effect on the existing visual character around the project area because the facility will be underground and no existing elms or protected vistas of the park would be affected (NPS 2006d).

These impacts on the visual resources of the National Mall and the project area, when combined with the short-term minor and moderate adverse impacts associated with the no action alternative, would result in net short-term moderate adverse cumulative impacts.

Conclusion. Since the adverse impacts resulting from the no action alternative would only occur during a 100-year or greater flood event, implementation of this alternative would result in short-term moderate adverse impacts on the visual resources in the study area. There would be no effects along the Reflecting Pool levee; a short-term moderate adverse impact would occur at the 23rd Street location, and a short-term moderate adverse impact would be associated with the temporary closure at 17th Street due to the disturbance and subsequent restoration of the Monument Grounds. The no action alternative would result in short-term moderate adverse cumulative impacts.

IMPACTS OF ALTERNATIVE 1A – "ARC WALL"

Phase 1 Analysis. Actions and impacts at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

USACE guidelines for flood structures result in a minimum 30-foot wide no planting zone when a wall is used, and a minimum 92-foot wide no planting zone when an earthen berm is used (USACE n.d.). Due to these restrictions, impacts on the immediate visual environment at 17th Street include the loss of 15 trees, mostly near the Constitution Gardens pedestrian path. Two of these trees are older, mature walnut trees, and two are elm street trees on 17th Street. The volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be determined in the design process.

The removal of these trees would have a noticeable but minor long-term adverse impact on the landscape character of the site as this grove of trees is a character defining feature of the site. If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis). Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and replacing the disturbed area with turf; however, replanting of trees is not proposed for Phase 1.

Impacts resulting from new visual features:

The concrete walls to the east and west of 17th Street would have a long-term second degree moderate adverse impact on the project area because their massing, material (exposed concrete), and height (6.3 feet, but possibly 8.3 if funding is available to build to the Phase 2 height at this time) feet at the sidewalk of 17th Street) would be inconsistent with the existing visual character and open space of the site (See Appendix C for renderings of this alternative).

The storage vault for the post and panels built for this alternative would be located at the end of the east levee wall on the Monument Grounds. It would be built mostly underground and incorporated into the landscape. Therefore, it would not be visible from Constitution Avenue or 17th Street and would have a negligible effect on the visual resources.

The affected area would be 0.44 acres, which compared to other alternatives, is relatively small.

Although the levee walls would introduce new built elements with a second degree moderate adverse impact, the relatively small size of the affected area would result in a net impact that would be a long-term first degree moderate adverse impact.

Impacts on Views

[The following analysis refers to Figures D.7-4.8 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Vegetation and a gently sloping topography are the existing defining visual features of the Potomac Park Levee Project site. The landscape is characterized by large canopy street trees, which define edges and frame vistas. Lawn with minimal understory establishes the park atmosphere and preserves views and movement under the trees. As shown in Fig D.7, Alternative 1, Phase 1 has an abrupt adverse impact on the gentle grade of the Monument Grounds and limits views through the trees in Constitution Gardens. Alternative 1, Phase 1 has an adverse first degree moderate impact on the landscape character in the project area.
- Architecture & Urban Design: The urban design context of the area is defined by mature street trees planted at regular intervals, generous paved sidewalks, pedestrian-oriented lighting, NPS

standard and non-standard signage, well-traveled pedestrian paths and walkways, and heavy vehicular traffic. The Lockkeeper's House provides a unique architectural context to the site. While the views to adjacent cultural resources are not obscured, the wall material, concrete, attracts attention as it has no relationship to materials of other local amenities and structures and does not blend into the landscape. The wall has an immediate adverse impact on the pedestrian experience and views for this reason. Alternative 1, Phase 1 has an adverse first degree moderate impact on the architecture and urban design in the project area.

- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in Washington. In particular, the 17th Street vista from Constitution Ave to the south is among the contributing views and vistas of the National Register of Historic Places (NRHP) Nomination of West Potomac Park. As such, any intrusion or alteration from this vantage point would create an adverse effect. While the viewsheds both north and south are not wholly obscured, Alternative 1, Phase 1 has a substantial impact on the view looking south down 17th Street from the intersection with Constitution Avenue. The wall effectively interrupts sightlines, particularly those of the pedestrian. Alternative 1, Phase 1 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative so there would be no short-term effects.

At 17th Street, the staging area would be located at the northwest corner of the Monument Grounds. For several months during construction, there would be short-term moderate adverse impacts associated with the excavation, stockpiling, staging, and disruption of both physical and visual access to the Constitution Gardens and Monument Grounds through the site. This moderate adverse effect would be short-term and could be mitigated by a screening or visual barrier to obscure the equipment for the duration of construction. These screens could also be used to inform visitors of the history of the Potomac Park levee system and the nature of the project and the effect on downtown DC.

Short-term impacts during a flood event. Impacts from the placement of sandbags along 23rd Street would be adverse, but short-term and minor, and there would be no effect on visual resources at the Reflecting Pool.

During a flood event, there would be short-term minor adverse impacts because the post and panel closure across 17th Street would create a temporary visual element in the area and a noticeable change to the visual character. However, the effect is not anticipated to be above minor because the U.S. Park Police would evacuate the project area and consequently, there would be relatively few people present to perceive the visual change.

Cumulative Impacts. Cumulative impacts would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP, the negligible effects from the VVMC and Lincoln Memorial Circle and the Jefferson Memorial Rehabilitation and Security Improvements. At 17th Street, there would be long-term moderate adverse impacts on visual resources as a result of implementing Phase 1 of alternative 1. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Conclusion. Implementation of Phase 1 of alternative 1A would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, during construction there would be a moderate short-term impact resulting from the activity and staging. During a flood event, in order to meet the requirements of the flood emergency, the post and panel flood protection system would be installed, and there would be a minor short-term impact due to the presence of the closure system.

Overall, there would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and the removal of 15 existing trees. There would be a long-term first degree moderate adverse effect on views and viewsheds as a result of the levee walls due to loss of trees, the type of materials used (concrete) and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a first degree long-term moderate adverse effect on visual resources.

Phase 2 Analysis. At 23rd Street, the re-grading would affect the landscape character and vegetation. The re-grading would be designed to seamlessly blend into the existing landscape and visual character of the project area. Gradual slopes would prevent harsh visual protrusions that may draw the visual attention of pedestrians along the current alignment away from the Lincoln Memorial and Reflecting Pool. The re-grading along the existing softball field would be at approximately two percent, which would allow for continued recreational use, and the visual effects would be negligible. However, while the re-grading and construction activities have been designed to avoid mature trees and the dripline of the mature elms along 23rd Street (USACE 1992), six trees along Constitution Avenue, west of 23rd Street, would be removed to accommodate the implementation of this alternative. The removal of these trees and the re-grading of portions of the project area would have a moderate long-term adverse impact on the existing visual environment because the allée of American elms along Constitution Avenue is currently a prominent visual feature and the view from Constitution Avenue to the Potomac River (known as the Potomac Belvedere) was a prominent historic visual feature. A landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with original design of the project area and would mitigate against adverse visual impacts.

At the Reflecting Pool levee, the filling of low spots (to increased elevations of approximately 1.5 feet) would be designed to seamlessly blend into the existing landscape and visual character of the Reflecting Pool and Constitution Gardens. Gradual slopes would prevent harsh visual protrusions that may draw the visual attention of pedestrians along the current alignment.

There are currently no salient viewsheds between the Reflecting Pool and Constitution Gardens. Since the Reflecting Pool levee improvements have been designed to seamlessly blend into the existing landscape and visual character of the Reflecting Pool and Constitution Gardens, and the changes would not obscure any existing viewsheds, there would be no net visual change in the project area. In addition, trees and shrubs would be avoided where possible or replaced with the same species (USACE 1992). USACE staked out the alignment at this location in such a way that there would be very few if any impacted (Ludlum, pers.comm. 2008). For these reasons, there would be negligible long-term impacts as a result of the implementation of Phase 2 of alternative 1 at the Reflecting Pool.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in a long-term first degree moderate adverse impact on the landscape character of the project area due to the loss of 38 trees (in addition to the trees lost in Phase 1). Their removal is necessitated by the re-grading of the slope to the south of the western levee wall and would result in a loss of the pastoral grove of trees in that area. It is also important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Re-grading of the area to the south of the west wall (west side of 17th Street) and to the north and south of the east wall (east side of 17th Street) would occur to soften the impact of the wall on the visible character of the site, though the re-grading on the west side is somewhat out of character with the existing visual landscape. The landscape plan would ensure that the visual character would be maintained to the greatest extent possible and would incorporate treatment for all the elements of the site. The planting plan (a subcomponent of the landscape plan) would prescribe the measures taken to rehabilitate the area disturbed by the construction. The plan would provide specific details on the

number and specific species of trees that would be replaced, the location where they would be planted.

Impacts resulting from new visual features:

In Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate the first degree moderate adverse effect from Phase 1 downward to an adverse effect that is long-term and less than moderate but greater than minor.

The storage vault for the post and panels would be built in Phase 1 and would not create an additional visual effect in Phase 2.

Impacts on the views:

[The following analysis refers to Figures D.9-10 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Alternative 1, Phase 2 has an abrupt adverse impact on the gentle grade of the Monument Grounds and limits views through the trees in Constitution Gardens. The view north, however, has a completely different impact, as the stone-clad wall blends relatively seamlessly into the landscape. Alternative 1, Phase 2 has an adverse minor impact on the landscape character in the project area.
- Architecture & Urban Design: In Phase 2, the stone-clad walls provide a more respectful aesthetic than the Phase 1 concrete. The wall's proximity to the Lockkeeper's House make the use of the stone cladding purposeful and the stone cladding helps complement the adjacent stone Lockkeeper's House. Alternative 1, Phase 2 has a negligible adverse impact on the architecture and urban design in the project area.
- Significant Viewsheds: The Phase 2 impact on the 17th Street and Constitution Avenue viewshed to the south is lessened due to the stone cladding, but the wall still interrupts pedestrian sightlines. The viewshed to the north is minimally impacted in Phase 2. Therefore, there would be a first degree moderate adverse impact to significant viewsheds as a result of implementation of this alternative.

Short-term impacts during construction. At 23rd Street, the re-grading would require the temporary presence of earth moving equipment for several months. The impact associated with the presence of this equipment is not greater in effect or duration than any of the other maintenance equipment that appears sporadically within the National Mall, but the presence of this equipment would create a noticeable effect on the visual character of the site since it is highly visible to visitors and vehicles coming into the District on the westbound ramp. This moderate adverse effect would be short-term and could be mitigated by a screening or visual barrier to obscure the equipment for the duration of construction.

At the Reflecting Pool levee, there would be short-term minor adverse visual impacts resulting from the temporary presence of earth moving equipment for several months. However, the impact associated with the presence of this equipment is not greater in effect or duration than any of the other maintenance equipment that appears sporadically within the NAMA.

At 17th Street, visual effects associated with construction would be similar to Phase 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event. At 23rd Street during a flood event, the NPS would place a line of sandbags across the eastbound ramp of the Roosevelt Bridge. The sandbags would remain in place for the duration of the flood event and would be removed within two to three days afterwards. While the sandbags would create a temporary visual element in the area, it would not substantially

change the scenic vista since the height would be less than two feet. In addition, the sandbags would only be put in place during a flood event, during which time there would be relatively few people in the project area. As a result of the low height of the sandbags, the temporary nature of their presence, and the low probability that the sandbags would be viewed by a large number of people, the effect would be short-term, minor, and adverse because the effect would be detectable, but slight, and would minimally diminish the overall visual character at 23rd Street.

At the Reflecting Pool levee, no action would be required during a flood event so there would be no effect.

At 17th Street, short-term impacts would also be similar since the alignment and length of the post and panel system is the same as Phase 1.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At 17th Street, there would be long-term moderate adverse impacts on visual resources as a result of implementing Phase 1 of alternative 1. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be long-term minor to moderate adverse impacts on visual resources.

Conclusion. At 23rd Street, the re-grading would affect the landscape character and vegetation. There would be a long-term adverse impact due to the loss of six American elms along Constitution Avenue, but the replanting of comparable trees in a separate location would mitigate the adverse effects. There would be short-term minor adverse impacts on visual resources associated with the presence of equipment during the construction process. Finally, during a flood event, there would be short-term moderate adverse impacts on visual resources due to the presence of sandbags across the Roosevelt bridge ramp, lasting approximately two to three days. Implementation of Phase 2 of alternative 1 would result in a negligible long-term effect along the Reflecting Pool levee, but there would be a short-term minor adverse effect during the construction period.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as Phase 1.

Overall, there would be a long-term adverse impact that is greater than minor but less than moderate resulting from the stone cladding of the levee walls and a landscape plan that would ensure that the overall visual character and integrity of the cultural landscape would be compatible with original design of the project area. There would be a long-term minor adverse effect on views and viewsheds as a result of the levee walls due to changes to the landscape character and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be long-term minor to moderate adverse impacts on visual resources.

IMPACTS OF ALTERNATIVE 1B – "ARC WALL"

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

The proposed arc walls in alternative 1B are relatively small compared to the structures in the other alternatives. Their scale, coupled with their shape, integrates well into the natural topography on either side of 17th Street, as well as with the proposed curvilinear forms of the Constitution Gardens sidewalks. An added benefit of the newly proposed curving walkways in Constitution Gardens is not only an improvement to site circulation by redirecting paths closer to the intersection of 17th Street and Constitution Avenue and further south closer to the northern entrance of the WWII Memorial, but

also provides a new relationship between two adjacent, but previously disconnected, cultural landscapes.

Due to USACE guidelines for flood structures and the relocation of the two Constitution Gardens pathways and grading, impacts on the immediate visual environment at 17th Street include the removal of 98 trees, mostly in Constitution Gardens between the Overlook Terrace and 17th Street. One of these trees is an older, mature walnut tree, and two are elm street trees on 17th Street. The volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be determined in the design process.

In this alternative, the removal of these trees is necessitated by the re-grading of the slope on either side of the western wall and would result in a loss of the pastoral grove of trees in that area. Re-grading would occur to soften the impact of the wall on the visible character of the site and soften the slope where the removed pathways were located. However, the removal of 98 trees does not represent a net loss. Due to the substantial re-grading in alternative 1B, the landscape plan and replanting plan would be implemented as part of Phase 1. Due to the implementation of the planting plan in this phase, the net effect resulting from the removal of 98 trees is a long-term first degree adverse effect on the landscape character of the site. If the wall height is increased to 18.7 feet, no additional trees would be removed (see Phase 2 analysis).

Impacts resulting from new visual features:

The proposed arc walls in alternative 1B are relatively small compared to the structures in the other alternatives. As a result, they would have a long-term first degree moderate adverse impact on the project area because their massing, material (exposed concrete), and height (8.7 feet) at the sidewalk of 17th Street would be inconsistent with the existing visual character and open space of the site (See Appendix C for renderings of this alternative). However, alternative 1B has the least intrusive of the proposed levee structures, so there will also be less exposed concrete in the interim period between Phases 1 and 2.

The storage vault for the post and panels built for this alternative would be located on the southern end of the future Lockkeeper's House plaza at 17th Street and Constitution Avenue. It would be built underground and flush with the level of the plaza. Therefore, it would not be visible from Constitution Avenue or 17th Street and would have a negligible effect on the visual resources.

The affected area would be 5.24 acres, which compared to other alternatives, is larger due to the relocation of the two Constitution Gardens pathways and grading efforts.

Impacts on Views

[The following analysis refers to Figures D.11-12 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Vegetation and a gently sloping topography are the existing defining visual features of the Potomac Park Levee Project site. The landscape is characterized by large canopy street trees, which define edges and frame vistas. Wooded groves with lawn and minimal understory establish the park atmosphere and preserve views and movement under the trees. As shown in Fig. D.11, the walls of Alternative 1B, Phase 1 have a minimal adverse impact on the gentle grade of the Monument Grounds and limits some views through the trees in Constitution Gardens. The removal of a massive number of trees (98) from the grove in Constitution Gardens has a significant adverse impact on the vegetative landscape. However, the removal of 98 trees does not represent a net loss. In the long term, there would be a first degree moderate adverse impact on views to the landscape character in the project area.
- Architecture & Urban Design: The urban design context of the area is defined by mature street trees planted at regular intervals, generous paved sidewalks, pedestrian-oriented lighting, NPS standard and non-standard signage, well-traveled pedestrian paths and walkways, and heavy

vehicular traffic. The Lockkeeper's House provides a unique architectural context to the site. While the views to adjacent cultural resources are not obscured, the wall material, concrete, attracts attention as it has no relationship to materials of other local amenities and structures and does not blend into the landscape. The wall has an adverse impact on the pedestrian experience and views for this reason. Alternative 1B, Phase 1 has an adverse first degree moderate impact on the architecture and urban design in the project area.

- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in the District. In particular, the 17th Street vista from Constitution Ave to the south is among the contributing views and vistas of the NRHP Nomination of West Potomac Park. As such, any intrusion or alteration from this vantage point would create an adverse effect. A secondary viewshed on axis with Virginia Avenue is also considered an important viewshed to maintain because of its establishment in early plans for Washington.

  Since the levee walls are located approximately 50 feet further south than alternative 1A, the adverse impact that the eastern arc wall has on the view of toward the Washington Monument from the north side of Constitution Avenue (looking southeast) is greatly diminished. Alternative 1B also reduces the impact on views looking north and east toward the White House and President's Park from 17th Street. As drivers and pedestrians travelling north on 17th Street pass through the closure structure, views looking northeast are more or less truncated depending on the setback of the walls from the 17th Street sidewalk. The closer the walls are to the sidewalks, the more the views toward President's Park are obscured. However, in alternative 1B, the walls are pulled back from 17th Street. As a result, the views and vistas looking north open up, and there would be a distance of approximately 250 feet between the levee walls and the prominent intersection at Constitution Avenue to enjoy an unobstructed vistas looking north. The location and width of the opening between the arc walls also serve to maintain the southeasterly vista from Virginia Avenue to the Monument Grounds, the only remaining diagonal vista towards the Washington Monument from an existing diagonal street as shown in the L'Enfant Plan. The topography of this solution works well too, as it only partially extends the natural rise/ northwesterly projection of the Monument Grounds. Alternative 1B, Phase 1 has a long-term adverse impact that is greater than minor but less than moderate on the significant viewsheds in the project area.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative so there would be no short-term effects.

At 17th Street, the staging area would be located at the northwest corner of the Monument Grounds. For several months during construction, there would be short-term moderate adverse impacts associated with the excavation, stockpiling, staging, and disruption of both physical and visual access to the Constitution Gardens and Monument Grounds through the site. This moderate adverse effect would be short-term and could be mitigated by a screening or visual barrier to obscure the equipment for the duration of construction. These screens could also be used to inform visitors of the history of the Potomac Park levee system and the nature of the project and the effect on downtown DC.

Short-term impacts during a flood event. Impacts from the placement of sandbags along 23rd Street would be adverse, but short-term and minor, and there would be no effect on visual resources at the Reflecting Pool.

During a flood event, there would be short-term minor adverse impacts because the post and panel closure across 17th Street would create a temporary visual element in the area and a noticeable change to the visual character. However, the effect is not anticipated to be above minor because the U.S. Park Police would evacuate the project area and consequently, there would be relatively few people present to perceive the visual change.

Cumulative Impacts. Cumulative impacts would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP, the negligible effects from the VVMC and Lincoln Memorial Circle and the Jefferson Memorial Rehabilitation and Security Improvements. At 17th Street, there would be long-term moderate adverse impacts on visual resources as a result of implementing Phase 1 of Alternative 1B. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term adverse effect that is greater than minor and less than moderate.

Conclusion. Implementation of Phase 1 of alternative 1B would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, during construction there would be an adverse moderate short-term impact resulting from the activity and staging. During a flood event, in order to meet the requirements of the flood emergency, the post and panel flood protection system would be installed, and there would be a minor short-term impact due to the presence of the closure system.

Overall, there would be a long-term adverse impact that is greater than minor but less than moderate as a result of implementing this alternative. The portion of visible levee wall would be relatively small and the volume of trees removed would be offset by the new relationship which is forged between two adjacent, but previously disconnected, cultural landscapes. In addition, the effects on views and vistas would be minimized under this alternative because the walls are the shortest in length of all alternatives and pulled back from 17th Street. When combined with the long-term first degree moderate adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Phase 2 Analysis. The implementation of Phase 2 for alternative 2A would be identical to alternative 1 in all scenarios at the Reflecting Pool levee and at 23rd Street. At 23rd Street, the effect would be short-term, minor, and adverse because the effect would be detectable, but slight, and would minimally diminish (or enhance) overall visual character at 23rd Street. The implementation of the levee improvements at the Reflecting Pool would result in short-term minor adverse visual impacts resulting from the construction process and negligible long-term impacts.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in a negligible adverse impact on the landscape character as no additional trees would be removed or changes to grading made. A future landscape plan that details replanting efforts would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area.

Impacts resulting from new visual features:

In Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate the first degree moderate adverse effect from Phase 1 downward to a minor adverse effect that is long-.

The storage vault for the post and panels would be built in Phase 1 and would not create an additional visual effect in Phase 2.

Impacts on the views:

[The following analysis refers to Figures D.13-14 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: As shown in Fig. D.13, alternative 1B, Phase 2 has a limited adverse impact on the gentle grade of the Monument Grounds and limits views through the trees in Constitution Gardens. The view north, however, has a completely different impact, as the stone-clad wall blends relatively seamlessly into the landscape. Alternative 1B, Phase 2 has an adverse minor impact on the landscape character in the project area.
- Architecture & Urban Design: In Phase 2, the stone-clad walls provide a more respectful aesthetic than the Phase 1 concrete. The wall's proximity to the Lockkeeper's House make the use of the stone cladding purposeful and the stone cladding helps complement the adjacent stone Lockkeeper's House. Alternative 1B, Phase 2 has a negligible adverse impact on the architecture and urban design in the project area.
- Significant Viewsheds: The Phase 2 impact on the 17th Street and Constitution Avenue viewshed to the south is lessened due to the stone cladding, but the wall still interrupts pedestrian sightlines. The viewshed to the north is minimally impacted in Phase 2. The Virginia Avenue viewshed is not impacted by Phase 2. Therefore, there would be a minor adverse impact to significant viewsheds as a result of implementation of this alternative.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for alternative 1A; therefore the effects would be the same. At 17th Street, the alignment and configuration of the retaining walls and floodwalls is similar to alternative 1A; therefore, the effects would be the same.

Short-term impacts during a flood event. At 17th Street, the effects would be the same as alternative 1A since the alignment is similar, and the configuration of the post and panel system across 17th Street is the same.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At 17th Street, there would be long-term moderate adverse impacts on visual resources as a result of implementing Phase 1 of alternative 1B. When combined with the long-term negligible to minor impacts of other projects in the study area, the net cumulative effect would be long-term adverse effect that is greater than minor but less than moderate.

Conclusion. At 23rd Street, the re-grading would affect the landscape character and vegetation. There would be a long-term adverse impact due to the loss of six American elms along Constitution Avenue, but the replanting of comparable trees in a separate location would mitigate the adverse effects. There would be short-term minor adverse impacts on visual resources associated with the presence of equipment during the construction process. Finally, during a flood event, there would be short-term moderate adverse impacts on visual resources due to the presence of sandbags across the Roosevelt bridge ramp, lasting approximately two to three days. Implementation of Phase 2 of Alternative 1B would result in a negligible long-term effect along the Reflecting Pool levee, but there would be a short-term minor adverse effect during the construction period.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as Phase 1.

Overall, the stone cladding on the levee walls and aesthetic improvements would reduce the Phase 1 long-term minor to moderate adverse impacts to a long-term minor adverse impact for this phase. The net cumulative impact would be long-term minor and adverse.

IMPACTS OF ALTERNATIVE 2A – "GATE WALLS"

Phase 1 Analysis. Actions and impacts at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative. Impacts from the placement of sandbags along 23rd Street would be adverse, but short-term and minor, and there would be no effect on visual resources at the Reflecting Pool levee.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

Implementation of this alternative would necessitate the removal of 25 trees, mostly to the west of the Constitution Gardens pedestrian path; four of these are street trees, three of which are older mature street trees of significant size. This grove of trees to the west is a character-defining feature of the site. To the east of 17th Street, seven trees with a small stand of nine newly planted (in 2006) cherry trees to the south of the Washington Monument pedestrian path would need to be relocated due to the creation of the earthen berm on the east side. Along 17th Street, the loss of four street trees would interrupt the rhythm of the streetscape and further diminish the landscape character of the project area. The volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be determined in the design process

The net effect of the removal of these trees would be a long-term first degree moderate adverse impact on the integrity of the landscape character of the site. If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis). Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and replacing the disturbed area with turf; however, replanting of trees is not proposed for Phase 1.

Impacts resulting from new visual features:

The re-grading of the street would appear to make 17th Street level since there is currently a depression. Therefore, no effect on visual resources is anticipated as a result of slightly raising the road.

The concrete walls to the east and west of 17th Street would have a long-term second degree moderate adverse impact on the project area because their massing, material (exposed concrete), and height (5.3 [possibly 7.3 if funding is available to build to Phase 2 height at this time] feet at the sidewalk of 17th Street) would be inconsistent with the existing visual character and open space of the site.

The storage vault for the post and panels built for this alternative would be built mostly underground and incorporated into the east levee wall abutment. Therefore, it would not be visible from Constitution Avenue or 17th Street and would have a negligible effect on the visual resources.

The affected area would be 1.59 acres, which compared to other alternatives is relatively large.

Impacts on Views

[The following analysis refers to Figures D.15-16 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: The landscape is characterized by large canopy street trees, which define edges and frame vistas, and a gently sloping topography. Phase 1 has a limited adverse impact on the gentle grade of the Monument Grounds and minimally limits views through the trees in Constitution Gardens. Alternative 2A, Phase 1 has an adverse first degree moderate impact on the landscape character in the project area.

- Architecture & Urban Design: While the views to adjacent cultural resources are not obscured, the wall material, concrete, attracts attention as it has no relationship to materials of other local amenities and structures and does not blend into the landscape. The walls have an immediate adverse impact on the pedestrian experience for this reason. Alternative 2A, Phase 1 has an adverse first degree moderate impact on the architecture and urban design in the project area.
- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in Washington. In particular, the 17th Street vista from Constitution Ave to the south is among the contributing views and vistas of the NRHP Nomination of West Potomac Park. As such, any intrusion or alteration from this vantage point would create an adverse effect. Alternative 2A effectively reinforces this viewshed and highlights it as a gateway to the Monument, particularly to the south from Constitution Avenue. Alternative 2A, Phase 1 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative, so there would be no short-term effects. At 17th Street, the effects would be the same as alternative 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event. At 17th Street, the effects would be the same as alternative 1 since the alignment is similar, and the configuration of the post and panel system across 17th Street is the same.

Cumulative Impacts. Cumulative impacts for Phase 1 of alternative 2A resulting from the USIP, Lincoln Memorial Circle, and VVMC, would be similar to the no action alternative. At the 17th Street closure, there would be long-term first degree moderate adverse impacts on visual resources as a result of implementing Phase 1 of alternative 2A. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Conclusion. Implementation of Phase 1 of alternative 2A would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

Overall, there would be a long-term second degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and the removal of a total of 25 existing trees. There would be a long-term first degree moderate adverse effect on views and viewsheds as a result of the levee walls due to loss of trees, the type of materials used (concrete) and obscured views and vistas. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term second degree moderate adverse effect on visual resources.

Phase 2 Analysis. The implementation of Phase 2 for alternative 2A would be identical to alternative 1 in all scenarios at the Reflecting Pool levee and at 23rd Street. At 23rd Street, the effect would be short-term, minor, and adverse because the effect would be detectable, but slight, and would minimally diminish (or enhance) overall visual character at 23rd Street. The implementation of the levee improvements at the Reflecting Pool would result in short-term minor adverse visual impacts resulting from the construction process and negligible long-term impacts.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in the loss of 29 trees (in addition to the trees lost in Phase 1) necessitated by the re-grading of the slope to the north and south of the western levee wall. These trees comprise part of a pastoral grove of trees in that area. It is also important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis. While the landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area, there would still be a long-term first degree moderate adverse impact on the landscape character.

Impacts resulting from new visual features

In Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate the second degree moderate adverse effect from Phase 1 downward to one that would be first degree long-term adverse.

The storage vault for the post and panels would be built in Phase 1 and would not create an additional visual effect in Phase 2.

Impacts on Views

[The following analysis refers to Figures D.17-18 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Alternative 2A, Phase 2 has a limited adverse impact on the gentle grade of the Monument Grounds and establishes a backdrop to a small plaza south of the Lockkeeper's House. The view north is minimally impacted, as the stone-clad walls blend relatively seamlessly into the landscape. Alternative 2A, Phase 2 has an adverse minor impact on the landscape character in the project area.
- Architecture & Urban Design: In Phase 2, the stone-clad walls provide a more respectful aesthetic than the Phase 1 concrete. The wall's proximity to the Lockkeeper's House make the use of the stone cladding purposeful and the stone cladding helps complement the adjacent stone Lockkeeper's House. Alternative 2A, Phase 2 has an adverse negligible impact on the architecture and urban design in the project area.
- Significant Viewsheds: The Phase 2 impact on the 17th Street and Constitution Avenue viewshed to the south is lessened due to the stone cladding and effectively reinforces the gateway experience. The viewshed to the north is minimally impacted in Phase 2. Alternative 2A, Phase 2 has an adverse minor impact on the significant viewsheds in the project area.

Short-term impacts during construction. Implementation of this alternative at 23rd Street and the Reflecting Pool is the same as alternative 1; therefore, the effects would be the same.

At 17th Street, visual effects associated with construction would be similar to Phase 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event. Implementation of this alternative at 23rd Street is the same as alternative 1; therefore, the effects would be the same. At the Reflecting Pool levee, no action would be required during a flood event so there would be no effect.

At 17th Street, short-term impacts would also be similar since the alignment and length of the post and panel system is the same as Phase 1.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC

and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be long-term first degree moderate adverse impacts on visual resources. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be long-term first degree moderate adverse impacts on visual resources.

Conclusion. Implementation of Phase 2 of alternative 2A would result in identical effects as alternative 1 at the Reflecting Pool levee and 23rd Street since the Phase 2 levee improvements at those locations are the same in all alternatives.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

Overall, there would be a long-term first degree moderate adverse impact resulting from the visible change in the landscape character and visual character in the project area. There would be a long-term minor adverse effect on views and viewsheds as a result of the levee walls due to changes to the landscape character and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be long-term first degree moderate adverse impacts on visual resources.

IMPACTS OF ALTERNATIVE 2B – "GATE WALLS"

Phase 1 Analysis. Actions and impacts at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative. Impacts from the placement of sandbags along 23rd Street would be adverse, but short-term and minor. There would be no effect on visual resources at the Reflecting Pool levee.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds:

Impacts on the landscape character and vegetation:

Implementation of this alternative would necessitate the removal of 26 trees, mostly to the west of the Constitution Gardens pedestrian path. Four of these are trees are mature elm street trees on 17th Street. Although the number of trees varies, the effect would not be greater in degree or significance than alternative 2A, so the effects would be the same.

Impacts resulting from new visual features

Impacts resulting from new visual features would be the same as alternative 2A because the alignment and configuration of the retaining walls and floodwalls is similar. The storage vault is identical to alternative 2A. The affected area is slightly larger but has the same net effect.

Impacts on Views

[The following analysis refers to Figures D.19-20 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: The landscape is characterized by large canopy street trees, which define edges and frame vistas, and a gently sloping topography. Similar to alternative 2A, alternative 2B, Phase 1 has a limited impact on the gentle grade of the Monument Grounds and minimally limits views through the trees in Constitution Gardens. Alternative 2B, Phase 1 has an adverse first degree moderate impact on the landscape character in the project area.
- Architecture & Urban Design: While the views to adjacent cultural resources are not obscured, the wall material, concrete, attracts attention as it has no relationship to materials of other local amenities and structures and does not blend into the landscape. The walls have an immediate adverse impact on the pedestrian experience for this reason. Alternative 2B, Phase 1 has an adverse first degree moderate impact on the architecture and urban design in the project area.

- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in Washington. In particular, the 17th Street vista from Constitution Ave to the south is among the contributing views and vistas of the NRHP Nomination of West Potomac Park. As such, any intrusion or alteration from this vantage point would create an adverse effect. Alternative 2B effectively reinforces this viewshed and highlights it as a gateway to the Monument, particularly to the south from Constitution Avenue. Alternative 2B, Phase 1 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative, so there would be no short-term effects. At 17th Street, the alignment and configuration of the retaining walls and floodwalls is similar to alternative 2A; therefore, the effects would be the same.

Short-term impacts during a flood event. At 17th Street, the effects would be the same as alternative 2A since the alignment is similar and the configuration of the post and panel system across 17th Street is the same.

Cumulative Impacts. Since actions at 23rd Street and the Reflecting Pool would be identical to alternative 2A and the alignment and configuration of the 17th Street levee walls is similar, the cumulative impacts would be the same as alternative 2A.

Conclusion. Implementation of Phase 1 of alternative 2B would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

Overall, there would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and the removal of 26 existing trees. There would be a long-term first degree moderate adverse effect on views and viewsheds as a result of the levee walls due to loss of trees, the type of materials used (concrete) and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Phase 2 Analysis. The implementation of Phase 2 for alternative 2B would be identical to alternative 1 in all scenarios at the Reflecting Pool levee and at 23rd Street; therefore, the effects would be the same.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in the loss of 38 trees (in addition to the trees lost in Phase 1) necessitated by the re-grading of the slope to the north and south of the western levee wall. Some of these trees comprise a pastoral grove of trees in that area. It is also important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis. While the landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area, there would be a relatively large volume of trees removed which would result in a long-term second degree moderate adverse impact on the landscape character.

Impacts resulting from new visual features

While the length of levee wall and post and panel closure is greater than alternative 2A, it would not result in impacts of a greater extent or degree, so the impacts resulting from new visual features would be similar to alternative 2A.

Impacts on Views

[The following analysis refers to Figures D.21-22 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Alternative 2B, Phase 2 has a limited adverse impact on the gentle grade of the Monument Grounds and establishes a backdrop to a small plaza south of the Lockkeeper's House. The asymmetrical design maintains the view up the slope into Constitution Gardens. The view north is minimally impacted, as the stone-clad walls blend relatively seamlessly into the landscape. Alternative 2B, Phase 2 has an adverse minor impact on the landscape character in the project area.
- Architecture & Urban Design: In Phase 2, the stone-clad walls provide a more respectful aesthetic than the Phase 1 concrete. The proximity of the Lockkeeper's House makes the use of the stone cladding purposeful and the stone cladding of the levee wall helps complement the adjacent historic resources. Alternative 2B, Phase 2 has an adverse negligible impact on the architecture and urban design in the project area.
- Significant Viewsheds: The Phase 2 impact on the 17th Street and Constitution Avenue viewshed to the south is lessened due to the stone cladding. The gateway experience, however, is minimized due to the asymmetric design of the "gates." The viewshed to the north is minimally impacted in Phase 2 and the sense of arrival that can typically be experienced with a gateway is weaker from this perspective. Alternative 2B, Phase 2 has an adverse minor impact on the significant viewsheds in the project area.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for alternative 1; therefore effects would be the same. At 17th Street, the alignment and configuration of the retaining walls and floodwalls is similar to alternative 2A; therefore, the effects would be the same.

Short-term impacts during a flood event. At 17th Street, the effects would be the same as alternative 2A since the alignment is similar, and the configuration of the post and panel system across 17th Street is the same.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be second degree moderate long-term adverse impacts on visual resources. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be long-term second degree moderate adverse impacts on visual resources.

Conclusion. Implementation of Phase 2 of alternative 2B would result in identical effects as alternative 1 at the Reflecting Pool levee and 23rd Street since the Phase 2 levee improvements at those locations are the same in all alternatives.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

Overall, there would be a long-term second degree moderate adverse impact resulting from the visible change in the landscape character and visual character in the project area. There would be a long-term minor adverse effect on views and viewsheds as a result of the levee walls due to changes to the landscape character and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be long-term second degree moderate adverse impacts on visual resources.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Actions and impacts at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative. Impacts from the placement of sandbags along 23rd Street would be adverse, but short-term and minor, and there would be no effect on visual resources at the Reflecting Pool levee.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in a long-term adverse impact on the landscape character of the project area that is greater than minor but less than moderate due to the loss of 18 trees, mostly in the grove to the south of the Constitution Gardens pedestrian path; two are older mature elm street trees on 17th Street. The removal of these trees would have a noticeable effect on the integrity of the visual character of the site, particularly on the west side of 17th Street since this grove of trees is a character-defining feature of the site. There would be a noticeable effect due to the loss of two street trees along 17th Street, which would alter the visual character of the area by interrupting the rhythm of the streetscape. Impacts on trees and other vegetation would be minimized to the maximum extent possible by implementing mitigation measures to restrict the area of disturbance and by replacing the disturbed area with turf; however, replanting of trees is not proposed for Phase 1.

Impacts resulting from new visual features

The concrete walls to the east and west of 17th Street would have a long-term second degree moderate adverse impact on the project area because their massing, material (exposed concrete), and height would be inconsistent with the existing visual character and open space of the site.

The storage vault for the post and panels built for this alternative would be located to the east of Overlook Terrace. It would be built mostly underground and incorporated into the landscape. Therefore, it would not be visible from Constitution Avenue or 17th Street and would have a negligible effect on the visual resources.

The affected area would be 0.4 acres, which compared to other alternatives, is relatively small.

Although the levee walls would introduce new built elements with a second degree moderate adverse impact, the relatively small size of the affected area would result in a net impact that is a long-term first degree moderate adverse impact.

Impacts on Views

[The following analysis refers to Figures D.23-26 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Vegetation and a gently sloping topography are the existing defining visual features of the Potomac Park Levee Project site. The landscape is characterized by large canopy street trees, which define edges and frame vistas. Lawn with minimal understory establishes the park atmosphere and preserves views and movement under the trees. Alternative 3, Phase 1 interrupts the gentle grade of the Monument Grounds and limits views through the trees in Constitution Gardens. Alternative 3, Phase 1 has an adverse first degree moderate impact on the landscape character in the project area.
- Architecture & Urban Design: The Constitution Gardens terrace walls provide the architectural and urban design context for this alternative. However, in Phase 1, the temporary walls do not share a relationship with the garden walls. The wall material, concrete, attracts attention as it has no relationship to materials of other local amenities and structures and does not blend into the landscape. The wall has an immediate adverse impact on the pedestrian experience for this

reason. Alternative 3, Phase 1 has an adverse first degree moderate impact on the architecture and urban design in the project area.

- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in Washington. In particular, the 17th Street vista from Constitution Ave to the south is among the contributing views and vistas of the NRHP Nomination of West Potomac Park. As such, any intrusion or alteration from this vantage point would create an adverse effect. The distance of the wall from Constitution Avenue diminishes the impact the walls have on this viewshed looking south from Constitution Avenue. When looking north, the walls have a limited impact on views due to the angle of the wall design. Alternative 3 does not function as a gateway as much as other options. Alternative 3, Phase 1 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative, so there would be no short-term effects. At 17th Street, the effects would be the same as alternative 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event. At 17th Street, the effects would be the same as alternative 1 since the alignment is similar, and the configuration of the post and panel system across 17th Street is the same.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be a long-term moderate adverse effect on visual resources as a result of implementing Phase 1 of alternative 3. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Conclusion. Implementation of Phase 1 of alternative 3 would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

Overall, there would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and a minor to moderate long-term adverse impact resulting from the removal of 18 existing trees. There would be a long-term first degree moderate adverse effect on views and viewsheds as a result of the levee walls due to loss of trees, the type of materials used (concrete) and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Phase 2 Analysis. The implementation of Phase 2 for alternative 3 would be identical to alternative 1 in all scenarios at the Reflecting Pool levee and 23rd Street. At 23rd Street, the effect would be short-term, minor, and adverse because the effect would be detectable, but slight, and would minimally diminish (or enhance) overall visual character at 23rd Street. The implementation of the levee improvements at the Reflecting Pool would result in short-term minor adverse visual impacts resulting from the construction process and negligible long-term impacts.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

Re-grading of the area to the north and south of the terraces on both sides of 17th Street would be implemented to connect to the existing topography. Re-grading would require root pruning of a mature sycamore tree on the east side of 17th Street. Though the goal would be to save the sycamore tree, there is a considerable risk of tree loss from construction and grading activities. Loss of the sycamore and the other mature elms would have a noticeable effect on aesthetic and visual resources in the area.

Despite a landscape plan that would ensure that the overall visual character and integrity of the cultural landscape would be compatible with original design of the project area, implementation of this alternative would result in a long-term second degree moderate adverse impact on the landscape character of the project area due to the loss of 83 trees (in addition to the trees lost in Phase 1). It is also important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis.

Existing pedestrian paths would not be impacted physically or visually by this alternative.

Impacts resulting from new visual features

Under Phase 2, the concrete levee wall constructed in Phase 1 would be demolished and replaced with seven stone clad terrace walls, four on the west and three on the east side of 17th Street. These terrace walls would be low lying elements on the landscape, approximately 2.5 feet in height. These walls would also be clad in stone to mitigate against adverse visual impacts. While the terraced walls detract from the open space character of the Monument Grounds, they would not be inconsistent with the project area. The Constitution Garden on the west side of 17th Street has similar visual features (See Figure 2.10). These terraced walls would produce a long-term first degree moderate adverse impact on the project area.

The storage vault for the post and panels built in Phase 1 would be expanded to two times its Phase 1 size, but it would not create an additional visual effect.

The affected area would be 2.52 acres, which compared to other alternatives, is the largest affected area.

Impacts on Views

[The following analysis refers to Figures D.27-30 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: The gently sloping topography of the Monument Grounds and Constitution Gardens is respected in Alternative 3, Phase 2. The terrace walls of the levee mimic the terrace walls in Constitution Gardens. However, the treed grove on the west side of 17th Street is altered dramatically with the removal of many trees to create a new vista to the Washington Monument. Alternative 3, Phase 2 has an adverse first degree moderate impact on the landscape character in the project area.
- Architecture & Urban Design: The Constitution Gardens terrace walls provide the architectural and urban design context for this alternative. In Phase 2, the stone-clad walls provide a more respectful aesthetic than the Phase 1 concrete. The alignment and design of the walls in relationship to the existing stone Constitution Garden walls make the use of the stone cladding purposeful and the design appears to be an intentional complement to the existing terraces. Alternative 3, Phase 2 has an adverse minor impact on the architecture and urban design in the project area.

- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in Washington. The terrace walls have little impact on this viewshed except to open the viewshed into Constitution Gardens more. Alternative 3, Phase 2 has an adverse negligible impact on the significant viewsheds in the project area.

Short-term impacts during construction. Implementation of this alternative at 23rd Street and the Reflecting Pool is the same as alternative 1; therefore, the effects would be the same. At 17th Street, visual effects associated with construction would be similar to Phase 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event. Implementation of this alternative at 23rd Street is the same as alternative 1; therefore, the effects would be the same. At the Reflecting Pool levee, no action would be required during a flood event, so there would be no effect. During a flood event, there would be short-term minor adverse impacts because the post and panel closure across 17th Street would create a temporary visual element in the area and a noticeable change to the visual character. However, the effect is not anticipated to be above minor because the U.S. Park Police would evacuate the project area, and consequently, relatively few people would be present.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be long-term second degree moderate adverse impacts on visual resources as a result of implementing Phase 2 of alternative 3. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term second degree moderate adverse effect on visual resources.

Conclusion. Implementation of Phase 2 of alternative 3 would result in identical effects as alternative 1 at the Reflecting Pool levee and 23rd Street since the Phase 2 levee improvements at those locations are the same in all alternatives.

At 17th Street, impacts associated with construction and implementation during a flood event would be of greater intensity than alternative 1 but would produce the same short-term impacts.

Overall, there would be a long-term second degree moderate adverse impact due to the relatively large size of the affected area, the large loss of trees, and the introduction of a new terraced landscape that mimics the adjacent Overlook Terrace walls but is inconsistent with the existing character of the Monument Grounds. There would be a long-term minor adverse effect on views and viewsheds as a result of the levee walls due to changes to the landscape character. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term second degree moderate adverse effect on visual resources.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis.

23rd Street and the Reflecting Pool would be the same as described for the no action alternative.

17th Street:

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in a long-term first degree moderate adverse impact on the landscape character of the project area due to the loss of 28 trees, mostly to the north of the Constitution Gardens pedestrian path. Four of these trees are mature elm street trees on 17th Street, and two others are mature black walnuts. If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis). The volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be

removed will be determined in the design process. The removal of these trees would have a noticeable effect on the integrity of the visual character of the site.

Impacts resulting from new visual features:

The concrete walls to the east and west of 17th Street would have a long-term second degree moderate adverse impact on the project area because their massing, material (exposed concrete), and height would be inconsistent with the existing visual character and open space of the site.

The storage vault for the post and panels built for this alternative would be built mostly underground and incorporated into the west levee wall abutment. Therefore, it would not be visible from Constitution Avenue or 17th Street and would have a negligible effect on the visual resources.

The affected area would be 0.7 acres, which compared to other alternatives, is relatively small.

Although the levee walls will introduce new built elements with a long-term second degree moderate adverse impact, the relatively small size of the affected area results in a net impact that is a long-term first degree moderate adverse impact.

Impacts on Views (results of viewshed analysis)

[The following analysis refers to Figures D.31-33 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: The landscape is characterized by large canopy street trees, which define edges and frame vistas, and a gently sloping topography. Alternative 4, Phase 1 has an abrupt adverse impact on the gentle grade of the Monument Grounds. The change in landscape is more dramatic in Constitution Gardens as some of the trees are cleared for the creation of the plaza. The wall on the Monument Grounds appears as significant in the landscape as the pedestrian path leading to the Washington Monument. Alternative 4, Phase 1 has an adverse first degree moderate impact on the landscape character in the project area.
- Architecture & Urban Design: The urban design context of the area is defined by mature street trees planted at regular intervals, generous paved sidewalks, pedestrian-oriented lighting, NPS standard and non-standard signage, well-traveled pedestrian paths and walkways, and heavy vehicular traffic. The Lockkeeper's House provides a unique architectural context to the site. While the views to adjacent cultural resources are not obscured, the wall material, concrete, attracts attention as it has no relationship to materials of other local amenities and structures and does not blend into the landscape. The wall has an immediate adverse impact on the pedestrian experience for this reason. Alternative 4, Phase 1 has an adverse first degree moderate impact on the architecture and urban design in the project area.
- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in Washington. In particular, the 17th Street vista from Constitution Ave to the south is among the contributing views and vistas of the NRHP Nomination of West Potomac Park. As such, any intrusion or alteration from this vantage point would create an adverse effect. While the viewshed both north and south are not wholly obscured, alternative 4, Phase 1 has a significant adverse impact on the view looking south down 17th Street from the intersection with Constitution Avenue. The wall effectively interrupts sightlines, particularly those of the pedestrian. The view north is also interrupted by the wall on the Monument Grounds; the wall on the Constitution Gardens side is more obscured due to the existing vegetation. Alternative 4, Phase 1 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term impacts during construction. Actions at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative, so there would be no short-term effects. At 17th Street, the alignment and configuration of the retaining walls and floodwalls is similar to alternative 2A; therefore, the effects would be the same.

Short-term impacts during a flood event. At 17th Street, the effects would be the same as alternative 2B since the alignment is similar and the configuration of the post and panel system across 17th Street is the same.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be long-term first degree moderate adverse impacts on visual resources as a result of implementing Phase 1 of alternative 4. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Conclusion. Implementation of Phase 1 of alternative 4 would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

Overall, there would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall and the removal of 28 existing trees. There would be a long-term first degree moderate adverse effect on views and viewsheds as a result of the levee walls due to loss of trees, the type of materials used (concrete) and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect on visual resources.

Phase 2 Analysis.

At 23rd Street, the re-grading would affect the landscape character and vegetation.

17th Street:

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in a long-term first degree moderate adverse impact on the landscape character of the project area due to the loss of 32 trees (in addition to the trees lost in Phase 1). Their removal is necessitated by the re-grading of the slope to the north and south of the western levee wall and would result in a loss of the pastoral grove of trees in that area. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis. A new landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area.

Impacts resulting from new visual features:

In Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate the first degree moderate adverse effect from Phase 1 downward to a long-term adverse impact that is less than moderate but greater than minor.

The storage vault for the post and panels would be built in Phase 1 and would not create an additional visual effect in Phase 2.

Impacts on Views

[The following analysis refers to Figures D.34-36 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Alternative 4, Phase 2 has an abrupt impact on the gentle grade of the Monument Grounds and establishes a backdrop to a small plaza south of the Lockkeeper's House. The asymmetrical design maintains the view up the slope into Constitution Gardens. The view north does not appear to be as impacted, as the stone-clad wall blends relatively seamlessly into the landscape. The wall on the Monument Grounds appears as significant in the landscape as the pedestrian path leading to the Washington Monument. Alternative 4, Phase 2 has an adverse minor impact on the landscape character in the project area.
- Architecture & Urban Design: In Phase 2, the stone-clad walls provide a more respectful aesthetic than the Phase 1 concrete. The wall's proximity to the Lockkeeper's House make the use of the stone cladding purposeful and the stone cladding helps compliment the adjacent stone Lockkeeper's House. Alternative 4, Phase 2 has an adverse negligible impact on the architecture and urban design in the project area.
- Significant Viewsheds: The Phase 2 impact on the 17th Street and Constitution Avenue viewshed to the south is lessened due to the stone cladding, but the wall still interrupts pedestrian sightlines. The gateway experience, however, is minimized due to the asymmetric design of the "gates." The viewshed to the north is minimally impacted in Phase 2 and the sense of arrival that can typically be experienced with a gateway is weaker from this perspective. Alternative 4, Phase 2 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term impacts during construction. Implementation of this alternative at 23rd Street and the Reflecting Pool is the same as alternative 1; therefore, the effects would be the same. At 17th Street, visual effects associated with construction would be similar to Phase 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event. Implementation of this alternative at 23rd Street is the same as alternative 1; therefore, the effects would be the same. At the Reflecting Pool levee, no action would be required during a flood event, so there would be no effect. At 17th Street, short-term impacts would also be similar since the alignment and length of the post and panel system is the same as Phase 1.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be long-term first degree moderate adverse impacts on visual resources as a result of implementing Phase 2 of alternative 4. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term adverse effect that is greater than minor but less than moderate.

Conclusion. Implementation of Phase 2 of alternative 4 would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

Overall, there would be a long-term adverse impact that is greater than minor but less than moderate because the stone cladding and landscape plan would mitigate the adverse effects on the landscape and visual character of the project area. There would be a long-term minor adverse effect on views and viewsheds as a result of the levee walls due to changes to the landscape character and obscured views and

vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a minor to moderate long-term adverse effect on visual resources.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis.

23rd Street and the Reflecting Pool would be the same as described for the no action alternative.

17th Street:

Impacts on the landscape character and vegetation:

Implementation of this alternative would result in a long-term second degree moderate adverse impact on the landscape character of the project area due to the loss of 43 trees, mostly in the grove to the north and south of the southern Overlook Terrace pedestrian path; four are mature elm street trees on 17th Street. The removal of these trees would have a noticeable effect on the integrity of the visual character of the site, particularly on the west side of 17th Street since this grove of trees is a character-defining feature of the site. The volume of trees removed in each alternative is an estimate, based on the conceptual design. The exact type and number trees that would need to be removed will be determined in the design process. It is important to note that additional grading and tree loss will likely be required beyond what is identified here as a result of an updated USACE soil and flow analysis. There would be a noticeable effect due to the loss of the four street trees along 17th Street, which would alter the visual character of the area by interrupting the rhythm of the streetscape.

Impacts resulting from new visual features:

The combined effect of an exposed concrete wall on the west side of 17th Street and a new concrete structure on the Monument Grounds would create long-term second degree moderate adverse impacts.

While a specific design of the new structure to the east of 17th Street is not proposed, it would need to be consistent with the size, scale, and architectural articulation of the adjacent structures in the project area (See Figure 2.16). While there is precedent for a small structure of this type in the project area, it would detract from the existing open space character of the Monument Grounds and its material (exposed concrete) would be completely incompatible with the character of the National Mall and Monument Grounds. Visual screens and aesthetic vegetation (without a root system that would interfere with the abutment) would be considered as mitigations for this alternative.

Impacts on Views (results of viewshed analysis):

[The following analysis refers to Figures D.37-40 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: Large canopy trees with a minimal understory and a gently sloping topography are the existing defining visual features of the Potomac Park Levee Project site. The wall on the west side of 17th Street in Alternative 5, Phase 1 interrupts the gentle grade of the slope into Constitution Gardens and limits views through the trees to the WWII Memorial. The earthen berm on the east side of 17th Street artificially extends the Monument Grounds hillside close to the street where it abruptly ends at a retaining wall. Alternative 5, Phase 1 has an adverse first degree moderate impact on the landscape character in the project area.
- Architecture & Urban Design: The terrace walls in Constitution Gardens and the granite of the WWII memorial provide some architectural context for Alternative 5. In addition, mature street trees planted at regular intervals, generous paved sidewalks, pedestrian-oriented lighting, NPS standard and non-standard signage, well-traveled pedestrian paths and walkways, and heavy vehicular traffic define the urban design context. However, the wall material, concrete, attracts attention as it has no relationship to materials of other local amenities and structures and does not

blend into the landscape. The wall has an immediate adverse impact on the pedestrian experience for this reason. Alternative 5, Phase 1 has an adverse first degree moderate impact on the architecture and urban design in the project area.

- Significant Viewsheds: The 17th Street and Constitution Avenue viewshed, both north and south, is considered a key gateway in Washington. In particular, the 17th Street vista from Constitution Ave to the south is among the contributing views and vistas of the NRHP Nomination of West Potomac Park. As such, any intrusion or alteration from this vantage point would create an adverse effect. The distance of this alternative from Constitution Avenue diminishes the impact the walls have on the viewshed looking south from Constitution Avenue. While the viewshed is not wholly obscured for this reason, Alternative 5 has a significant adverse impact on the view looking north up 17th Street. The berm effectively interrupts sightlines, particularly those of the pedestrian. Alternative 5, Phase 1 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term Impacts

Short-term impacts during construction: Actions at 23rd Street and the Reflecting Pool would be the same as described for the no action alternative, so there would be no short-term effects. At 17th Street, the effects would be the same as alternative 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event: At 17th Street, the effects would be the same as alternative 1 since the alignment is similar, and the configuration of the post and panel system across 17th Street is the same.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be long-term second degree moderate adverse impacts on visual resources as a result of implementing Phase 1 of alternative 5. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term second degree moderate adverse effect.

Conclusion. Implementation of Phase 1 of alternative 5 would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

There would be a long-term second degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall, the removal of 43 existing trees, and the intrusion of the concrete structure on the Monument Grounds. There would be a long-term first degree moderate adverse effect on views and viewsheds as a result of the levee walls due to loss of trees, the dramatic change in grading of the Monument Grounds slope, the type of materials used (concrete) and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term second degree moderate adverse effect.

Phase 2 Analysis.

At 23rd Street, the re-grading would affect the landscape character and vegetation.

At 17th Street, the implementation of this alternative would affect the landscape character and vegetation, the visual character, and the views and viewsheds.

Impacts on the landscape character and vegetation:

No new trees would be removed with the implementation of Phase 2 of alternative 5. A new landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area.

Impacts resulting from new visual features:

The concrete wall to the west of 17th Street and the new structure on the Monument Grounds would be clad in stone. Additionally, other wall treatments and architectural articualtion would be considered to match the historic character of the adjacent cultural landscapes and historic resources. The cladding and wall treatments would enhance the aesthetic quality and character of the landscape to mitigate the long-term second degree moderate adverse effect from Phase 1 downward to a long-term first degree moderate adverse effect.

Impacts on Views

[The following analysis refers to Figures D.41-44 found in Appendix D. Existing Conditions comparison images and a location map can be found in Figures D.1-D.6 in Appendix D.]

- Landscape Character: As shown in Fig. D.38, the wall on the west side of 17th Street in Alternative 5, Phase 2 interrupts the gentle grade of the slope into Constitution Gardens and limits views through the trees to the WWII Memorial. The earthen berm on the east side of 17th Street artificially extends the Monument Grounds hillside close to the street where it abruptly ends at a retaining wall. Alternative 5, Phase 2 has an adverse first degree moderate impact on the landscape character in the project area.
- Architecture & Urban Design: In Phase 2, the stone-clad walls provide a more respectful aesthetic than the Phase 1 concrete. The wall's proximity to the existing Constitution Gardens terrace walls make the use of the stone cladding purposeful and complement the existing walls. Alternative 5, Phase 2 has an adverse minor impact on the architecture and urban design in the project area.
- Significant Viewsheds: The Phase 2 impact on the 17th Street and Constitution Avenue viewshed is lessened due to the stone cladding, but the earthen berm on the east side of 17th Street still interrupts pedestrian sightlines. The gateway experience is negligible due to the asymmetry of the closure design. Alternative 5, Phase 2 has an adverse first degree moderate impact on the significant viewsheds in the project area.

Short-term impacts during construction. Implementation of this alternative at 23rd Street and the Reflecting Pool is the same as alternative 1; therefore, the effects would be the same. At 17th Street, visual effects associated with construction would be similar to Phase 1 since the staging area and duration of construction would be the same.

Short-term impacts during a flood event. Implementation of this alternative at 23rd Street is the same as alternative 1; therefore, the effects would be the same. At the Reflecting Pool levee, no action would be required during a flood event so there would be no effect. At 17th Street, short-term impacts would also be similar since the alignment and length of the post and panel system is the same as Phase 1.

Cumulative Impacts. Impacts resulting from the USIP, VVMC, and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements would be long-term and negligible to minor, based on the long-term beneficial impact of the USIP and the negligible effects from the VVMC and Lincoln Memorial Circle and Jefferson Memorial Rehabilitation and Security Improvements. At the 17th Street closure, there would be long-term first degree moderate adverse impacts on visual resources as a result of implementing Phase 2 of alternative 5. When combined with the long-term and negligible to minor impacts of other projects in the study area, the net cumulative effect would be a long-term first degree moderate adverse effect.

Conclusion. Implementation of Phase 2 of alternative 5 would result in negligible effects on the integrity of the visual character resources in the project area along the Reflecting Pool levee. At 23rd Street, there would be a short-term minor adverse impact due to the presence of sandbags during a flood event.

At 17th Street, short-term impacts associated with construction and implementation during a flood event would be the same as alternative 1.

There would be a long-term first degree moderate adverse impact due to the aesthetically inconsistent nature of the exposed concrete wall, the removal of 43 existing trees, and the intrusion of the concrete structure on the Monument Grounds. There would be a long-term first degree moderate adverse effect on views and viewsheds as a result of the levee walls due to changes to the landscape character and obscured views and vistas. When combined with the long-term minor adverse effects of the cumulative impact projects, the net cumulative effect would be a long-term first degree moderate adverse effect.

Table 4.2 Summary of Visual Impacts per Alternative

	No Action	Alternative 1A		Alternative 1B		Alternative 2A		Alternative 2B		Alternative 3		Alternative 4		Alternative 5	
		Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2	Ph 1	Ph 2
Impacts on landscape character and vegetation	o	o	x	x	-	x	x	x	xx	o-x	xx	x	x	xx	xx
Impacts resulting from new visual features	-	x	o-x	o-x	o	xx	x	xx	x	x	x	x	o-x	xx	x
Impacts to Views	-	x	o	o-x	o	x	o	x	o	x	o	x	o	x	x
Cumulative Impacts	-	x	o-x	o-x	o-x	xx	x	xx	xx	x	xx	x	o-x	xx	x
Conclusion	**-**	**x**	**o-x**	**o-x**	**o**	**xx**	**x**	**xx**	**xx**	**x**	**xx**	**x**	**o-x**	**xx**	**x**

(-) Negligible

(o) Minor Adverse

(o-x) Minor to Moderate.

(x) First Degree Moderate Adverse Impact

(xx) Second Degree Moderate Adverse Impact

Notes: Phase 2 assumes that mitigations to minimize adverse impacts will be implemented to the greatest extent possible. Mitigations include a landscape plan that would be completed and submitted for approval. The landscape plan would outline the measures that would be taken to restore the overall visual character and integrity of the original cultural landscape to the greatest extent possible. The exception is alternative 1B, where the landscape plan will be implemented in Phase 1.

Under Phase 2, the remaining visible sections of the levee wall would be clad in stone to match the historic character of the adjacent cultural landscapes and historic resources. The cladding would enhance the aesthetic quality and character of the landscape to mitigate against adverse effects associated with concrete walls.

CULTURAL RESOURCES

GUIDING REGULATIONS AND POLICIES

Federal actions that have the potential to affect cultural resources are subject to a variety of laws and regulations. The *National Historic Preservation Act* (NHPA) of 1966, as amended, is the principal legislative authority for managing cultural resources associated with NPS projects. Generally, Section 106 of the NHPA requires all federal agencies to consider the effects of their actions on cultural resources listed and/or determined eligible for listing in the NRHP. Such resources are termed "historic properties." Agreement on mitigation of adverse effects on historic properties is reached through consultation with the State Historic Preservation Officer; Tribal Historic Preservation Officer, if applicable; and as required, the Advisory Council on Historic Preservation (Advisory Council). In addition, the NHPA requires that federal agencies take action to minimize harm to historic properties that would be adversely affected by a federal undertaking. Among other things, Section 110 of the NHPA also charges federal agencies with the responsibility for establishing preservation programs for the identification, evaluation, and nomination of historic properties to the NRHP.

Other important laws and regulations designed to protect cultural resources are:

- *Native American Graves Protection and Repatriation Act* (NAGPRA), 1990
- *American Indian Religious Freedom Act* (AIRFA), 1978
- *National Environmental Policy Act* (NEPA), 1969
- *Archeological Resources Protection Act* (ARPA), 1979
- *Executive Order 11593 Protection and Enhancement of the Cultural Environment*, 1971

In addition, the NPS is charged with the protection and management of cultural resources in its custody. This is furthered through the implementation of *Director's Order #28: Cultural Resources Management Guidelines* (NPS 1998), NPS *Management Policies* (NPS 2001a), and the 1995 Service-wide Programmatic Agreement (PA) with the Advisory Council and the National Conference of State Historic Preservation Officers. These documents charge NPS managers with avoiding, or minimizing to the greatest degree practicable, adverse impacts on park resources and values. Although the NPS has the discretion to allow certain impacts in parks, that discretion is limited by the statutory requirement that park resources and values remain unimpaired, unless a specific law directly provides otherwise.

GENERAL METHODOLOGY AND ASSUMPTIONS

The NPS categorizes cultural resources by the following categories: archeological resources, cultural landscapes, historic districts and structures, museum objects, and ethnographic resources. As noted in "Issues and Impact Topics" of the "Purpose and Need" chapter, only impacts on archeological resources, cultural landscapes, and historic districts and structures, are of potential concern for this project. There would be no impacts on museum collections or ethnographic resources (see chapter 1).

The analyses of effects on cultural resources that are presented in this section respond to the requirements of both NEPA and Section 106 of the NHPA, although the Section 106 compliance is being handled separately. In accordance with the Advisory Council's regulations implementing Section 106 (36 CFR Part 800, *Protection of Historic Properties*), impacts on cultural resources were identified and evaluated by (1) determining the Area of Potential Effects (APE); (2) identifying cultural resources present in the APE that are either listed in or eligible to be listed in the NRHP (i.e., historic properties); (3) applying the criteria of adverse effect to affected historic properties; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the implementing regulations for Section 106, a determination of either *adverse effect* or *no adverse effect* must also be made for affected historic properties. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the NRHP (e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the proposal that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5). A determination of *no adverse effect* means there is either no effect or that the effect would not diminish, in any way, the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

CEQ regulations and the NPS *Conservation Planning, Environmental Impact Analysis and Decision-making* (*Director's Order #12*) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, for example, 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. Cultural resources are nonrenewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse.

The NPS guidance for evaluating impacts (*Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-Making*) (NPS 2001) requires that impact assessment be scientific, accurate, and quantified to the extent possible. For cultural resources, it is rarely possible to measure impacts in quantifiable terms; therefore, impact thresholds must rely heavily on the professional judgment of resource experts.

A summary is included in the impact analysis sections for cultural landscapes, historic districts and structures, and archeological resources requiring Section 106 compliance. The impact analysis is an assessment of the effect of the undertaking (implementation of the alternatives) on NRHP-eligible or listed cultural resources only, based upon the Advisory Council's criteria of adverse effect.

Study Area

As originally defined due to comments received at the public scoping meeting on June 10, 2008, the APE to historic properties was quite extensive. It encompassed the area from the Potomac River on the west, north to the Theodore Roosevelt Bridge approaches, north along 23rd Street to E Street, roughly along E Street including the White House, continuing southeast along Pennsylvania Avenue, to the western edge of the Capitol grounds, west along Independence Avenue, and south around the Tidal Basin terminating at the Potomac River (See map of the APE in the Appendix). Within this APE, there are many cultural resources (see maps delineating Individually Listed Historic Properties, Historic Districts, and Cultural Landscapes, and Table 3.1 in Chapter 3). As alternatives were developed, it became apparent that the actual area of potential impacts is much smaller than originally conceived, so the impact analysis focuses on a smaller number of resources that are in the immediate vicinity of the Potomac Park levee. The impact analysis proceeds according to the broad cultural resource categories: historic structures and districts, cultural landscapes, and archeological resources.

The discussion of impacts on cultural resources begins with historic districts and structures for that is the resource category under which most resources affected by the undertaking were first documented. The recognition of cultural landscapes as a useful organizing concept for documenting certain historic properties is now widespread. Nonetheless, evaluating cultural landscapes is a relatively recent activity that the NPS has embraced with the inventorying of many cultural landscapes, particularly in Washington. Because of these recent studies, there is repetition of some properties as both individually listed resources or districts and significant cultural landscapes. For example, the Washington Monument and Grounds and Lincoln Memorial and Grounds are both individual historic properties and cultural landscapes. Each of these is addressed in the Historic Districts and Structures and Cultural Landscapes sections.

APPROACH TO EFFECTS ANALYSIS

Later in this chapter, a detailed analysis is presented for the effect of each alternative and its phases upon the three broad categories of NRHP historic properties: historic districts and structures, cultural landscapes, and archeological resources. The analysis follows NPS regulations requiring direct and indirect effects, in this resource area as in others, to be assessed as negligible, minor (adverse or beneficial), moderate (adverse or beneficial), or major (adverse or beneficial), all with regard to both short-term and long-term duration and in conjunction with other projects that may generate cumulative effects. Additionally, mitigation measures must be considered for each effect deemed adverse.

Because of the extensive detail inherent in this approach and the complication of addressing sometimes overlapping resource categories and official documentation, a summary analysis is given below. This summary reviews the essential physical and locational features of the Potomac Park levee project in relation to NRHP historic properties between the project's western terminus at the corner of the Constitution Avenue and 23rd Street and its eastern terminus in the grounds of the Washington Monument.

The Reflecting Pool Levee

As a series of linked improvements to an existing flood protection system, the levee project builds upon certain long-term features of the original 1938 system. The grass-covered earthen berm in Constitution Gardens that stretches east–west parallel to the Reflecting Pool is not visually prominent due to the densely planted park above and the axis of the Reflecting Pool and lines of Dutch elms below. However, the berm functions as a levee, a part of the original flood protection system incorporated into Constitution Gardens. While it is the longest section of the flood control system addressed by the project, it requires the least modification. All alternatives for the FEMA required level of protection leave it in place as the berm meets the 100-year flood protection requirement. All alternatives for the congressionally authorized solution require low spots on the levee to be filled, as much as 1.5 feet in some areas, so that a level crest can be maintained.

The existing Reflecting Pool levee, although built to parallel the pool with the development of West Potomac Park, is assessed as a noncontributing site in the current East and West Potomac Park NRHP nomination. However, it has been found contributing in the Constitution Gardens Cultural Landscape Inventory. Although the Reflecting Pool is part of the Lincoln Memorial Grounds cultural landscape — it is a major element of the grand central axis linking the Lincoln Memorial to the Washington Monument and beyond — it is also identified as the southern boundary of Constitution Gardens. In visual terms, it is the berm itself that appears to demarcate the boundary between the Beaux Arts formalism of the Reflecting Pool and the 1970s looping landscape scheme to the north.

23rd Street to the West

The levee described above must be linked to its western terminus near the Potomac River. The FEMA required solution in all alternatives, the same as the current NPS plan of operations in the event of a flood, is the placement of sandbags to the height of one foot along the alignment of 23rd Street across the eastbound ramp of the Roosevelt Bridge at Constitution. The congressionally authorized solution, in all alternatives, is re-grading at two locations: a 400-foot long embankment west of and parallel to 23rd Street with a gradual slope (2 percent), raising the height by one to two feet, and a steeper embankment between the east and west bound ramps of the Roosevelt Bridge. Sandbags might still be used at the eastbound ramp, as in the FEMA required solution, in the event of a flood. The congressionally authorized solution involves tree loss on either side of the eastbound ramp, but not the mature trees to the west of and framing 23rd Street.

Only the congressionally authorized solution has potential for long-term impacts on historic properties. Variously documented as individually qualifying for the NRHP or as contributing elements of the West Potomac Park Historic District in the vicinity of this segment are the Lincoln Memorial and Grounds, the VVMC, the Vietnam Women's Memorial, the Lockkeeper's House, and Constitution Gardens. The

southwest corner of the Northwest Rectangle Historic District adjoins 23rd Street above Constitution Avenue. It should be noted that the vista to the south along 23rd Street from Constitution Avenue has been identified as significant as have the axial views along 17th Street.

17th Street and the Monument Grounds to the East

The knoll of the Monument Grounds provides the eastern terminus of the Potomac Park levee project which must be linked with the Reflecting Pool levee to the west.

The main generator of alternatives in this EA results from the need to replace the current procedures for erecting a flood barrier at 17th Street. That procedure, equivalent to the no action alternative, requires the erection of a three foot high Jersey barrier and sandbag closure on the street 75 feet south of Constitution Avenue for the first stage of flooding and the excavation of earth from the Monument Grounds to achieve a barrier with a height of eight feet at the second stage. As indicated in chapter 2, this procedure is no longer certifiable by USACE. All alternatives for both the FEMA required and congressionally authorized solutions carried forward utilize a post and panel closure embedded in the street that must be secured on both sides with a structure that merges with the land at the desired elevation. With some variation, the Phase 1 or FEMA required solution builds a concrete floodwall to the required 100-year or 16.7 feet above sea level (NAVD), although the levee height may be increased to 18.7 NAVD at this time if funding is available. The Phase 2 or congressionally authorized solution raises the height an additional two feet to 18.7 NAVD and clads the barrier with stone facing. (The variation is that not all Phase 2 walls are a direct expansion of the original Phase 1 wall.)

None of the alternatives require the demolition or alteration of any historic structure, but all action alternatives would alter the cultural landscapes. However, all of the five action alternatives that erect a barrier at 17th Street, anywhere from 138 to 525 feet south of Constitution Avenue, would utilize a combination of structure (mostly floodwalls) and re-grading on each end of the post and panel system to merge the closure with the land. To the east of 17th Street, the land is part of the designated Washington Monument and Grounds cultural landscape; to the west of the street, the land is part of the Constitution Gardens cultural landscape. These two cultural landscapes are historic properties with documented contributing features of landform, vegetation, markers and monuments, and protected views and vistas.

Contributing character-defining features of the Washington Monument and Grounds include the knoll, mature elm trees, open grass areas, formal pathways, and buildings and objects. Other contributing features include land uses such as recreation (both passive and active), commemorative works, the Jefferson Pier, and small-scale features such as the flagpoles, dedication plaque, and cast-iron benches. Views and vistas to and from the Washington Monument are among the leading character-defining features of the overall cultural landscape.

According to the 2008 *Constitution Gardens Cultural Landscape Inventory*, contributing character-defining features of Constitution Gardens include natural features, topography, spatial organization, land use, vegetation, circulation, buildings and structures, views and vistas, constructed water features, and small-scale features. Land-use features contributing to the cultural landscape of the park cover a variety of activities including passive recreation, catch-and-release fishing, visiting the memorials, ceremonies at memorials, demonstrations, and a citizenship ceremony at Overlook Terrace. Although built on fill and having no natural topography or vegetation, the vegetation of Constitution Gardens illustrates a varied and often heavily planted landscape of mostly native species. The pedestrian circulation of Constitution Gardens is defined principally through two loop walks and a large paved plaza known as Overlook Terrace. The circulation system is further enhanced through a network of narrower winding walkways and stairs. Important buildings and structures in the park are, among others, the Lockkeeper's House and the stone terraces and paved platform of Overlook Terrace at the east end of the lake. There are views and vistas from all over Constitution Gardens.

The mature street trees lining either side of 17th Street help define this important view corridor, and on the Constitution Garden side, begin a transformation from the more formal site planning of the National Mall to the meandering, curvilinear site planning of the 1970s park.

Two known archeological resources of potential importance for this segment of the Potomac Park levee project are the early nineteenth century 17th Street Wharf — the subsurface remains of which are likely to extend along the 17th Street alignment below Constitution Avenue — and a poorly documented Native American prehistoric site 51NW35 somewhere on the Monument Grounds. Appropriate archeological investigation of the potential for impacting these sites during the construction of the project, and if warranted, data recovery would be required.

Opportunities and Constraints

Except for the no action alternative, all alternatives for the installation of a flood barrier at 17th Street carried forward in the EA contain the post and panel component at the center (removed when not in use), and the permanent flanking structures. The latter consists of some combination of floodwalls or structure for the outlying panels to attach to when deployed and artificially created embankments or natural rises in the topography. Although berms may appear less visually intrusive than floodwalls, they create greater restraints in terms of no planting zones, a minimum of 92 feet versus a minimum of 30 feet for the wall.

The grade above sea level of 17th Street in the project area varies from 13 feet (NAVD) at Constitution Avenue, to eight feet at the spot where an imaginary line due east from Overlook Terrace would cross. Locations much further south along 17th Street are not feasible for the crossing, for not only would they be further away from the overall alignment of the levee, they would begin to intrude upon the major axis of the National Mall and the WWII Memorial.

As indicated above, the primary predictable impacts of the Potomac Park levee project are on cultural landscapes as a category of cultural resource, and specifically on the Washington Monument and Grounds and Constitution Gardens cultural landscapes. Within the five EA alternatives carried forward, there are unavoidable tradeoffs for both phases due to their differing locations because of: (1) height and length of flood barrier structure; (2) amount of re-grading and alteration of existing landforms; and (3) tree and vegetation loss.

The analysis of effects upon historic properties requires assessing the impacts of each of the alternatives on the qualities and character-defining features that qualified the property for the NRHP. A solution that erects a highly visible floodwall across a wide swath of open sloping lawn of the Monument Grounds might have merit as a design concept (frankly acknowledging the presence of a flood barrier), but is still an adverse effect upon a character-defining feature of the cultural landscape.

CULTURAL RESOURCE IMPACT ANALYSIS

HISTORIC DISTRICTS AND STRUCTURES

Study Area

The proposed activities have the potential to directly impact eight NRHP-listed historic properties: Lincoln Memorial, Bulfinch Gatehouse (17th Street), Washington Monument and Grounds, Lockkeeper's House, Vietnam Veterans Memorial, West Potomac Park Historic District, Northwest Rectangle Historic District, and *L'Enfant* and *McMillan* plans of the City of Washington (referred to throughout the text as the "*L'Enfant Plan*"). In addition to being individually listed, it should be noted that the Lockkeeper's House, the Vietnam Veterans Memorial, and the Lincoln Memorial are contributing elements of the West Potomac Park Historic District.

Impact Thresholds

For a historic district or structure to be listed on the NRHP, it must possess significance (the meaning or value ascribed to the historic district or structure) and have integrity of those features necessary to convey its significance. For purposes of analyzing potential impacts on historic districts and structures, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: The impact is at the lowest level of detection with neither adverse nor beneficial consequences. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Minor: Adverse impact — Alteration of a pattern(s) or feature(s) of a historic district or structure listed on or eligible for the NRHP would not diminish the integrity of a character-defining feature(s) or the overall integrity of the historic property. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Beneficial impact — The character-defining features of the historic district or structure would be stabilized/preserved in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1995), to maintain its existing integrity. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Moderate: Adverse impact — The impact would alter a character-defining feature(s) of a historic district or structure and diminish the integrity of that feature(s) of the historic property. For purposes of Section 106, the determination of effect would be *adverse effect*.

Beneficial impact — The historic district or structure would be rehabilitated in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* to make possible a compatible use of the property while preserving its character defining features. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Major: Adverse impact — The impact would alter a character-defining feature(s) of the historic district or structure and severely diminish the integrity of that feature(s) and the overall integrity of the historic property. For purposes of Section 106, the determination of effect would be *adverse effect*.

Beneficial impact — The historic district or structure would be restored in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* to accurately depict its form, features, and character as it appeared during its period of significance. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Duration – Phase 1: In the short-term, most impacts would be related to the activity and disruption associated with construction. There would also be short-term impacts associated with the implementation of the post and panels during a flood event. Long-term impacts would result between the time of implementation and construction of Phase 2, a period of time that is unknown, but is expected to be multiple years.

Duration – Phase 2: In the short-term, most impacts would be related to the activity and disruption associated with construction. There would also be short-term visual impacts associated with the implementation of the post and panels during a flood event. The long-term impacts would be related to obscured or disrupted views from the areas where the proposed actions would occur to adjacent Monuments and Memorials and to the adverse effects of the proposed action on existing historic properties.

A Note About Cumulative Impacts for Cultural Resources: The general context for the consideration of cumulative impacts on cultural resources is the wide-spread concern that the National Mall is becoming overcrowded with structures and other built features as evidenced by the establishment of plans and commissions to regulate the addition of new projects on the Mall.

The areas of potential effect of the various projects analyzed for cumulative impacts are often more limited than the extensive study area of the levee project. Within the broad categories of cultural resources addressed in the EA: historic districts and structures, cultural landscapes, and archeology, there will be instances in which the anticipated impacts are truly compounding (ex., the construction of the NMAAHC and the levee's 17th Street crossing upon the Washington Monument grounds) and where there is little potential for compounding (ex., the construction of the USIP and the levee's 17th Street crossing upon the Washington Monument grounds - *although the USIP and the 23rd Street component of the levee might, in theory, have a cumulative impact upon the Constitution Gardens cultural landscape*). Adding to the complexity of this issue is the ability of future official design review processes to mitigate the severity of the adverse effects of many projects and the ongoing development of the National Mall Plan, whose recommendations are not fixed as of this writing.

For these reasons, cumulative impacts to cultural resources in the analysis below will frequently be given as a range, and only those that are considered to be substantial highlighted.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. The no action alternative would continue the present system of flood protection that involves temporary closures at 17th and 23rd streets. The temporary closure at 23rd Street involves the placement of sandbags along the west side of 23rd Street to the eastbound ramp of Roosevelt Bridge at the end of Constitution Avenue. At 17th Street, the closure involves the use of sandbags, Jersey barriers, and land-fill from the Monument Grounds. If required, an eight foot earthen embankment would be constructed for further flood control at 17th Street. The existing levee berm above the Reflecting Pool would remain untouched for the no action alternative

Excavation would create a direct minor short-term adverse impact on the setting of the Monument Grounds, which would be mitigated by the reclamation to pre-existing conditions following the flood event. Because the closure would be reversible, the no action alternative would be considered to have a negligible short-term impact on the Lincoln Memorial, Bulfinch Gatehouse, Vietnam Veterans Memorial, West Potomac Park Historic District, Northwest Rectangle Historic District, the *L'Enfant Plan*, and the Lockkeeper's House.

Cumulative Impacts. Other present and future projects within or adjacent to the study area for the Potomac Park levee would have the potential to impact historic districts and structures. These projects include the NMAAHC, the Lincoln Memorial Circle Rehabilitation and Security Project, the VVMC, the MLK Memorial, and the USIP. Additionally, there is currently a major planning effort underway, the National Mall Plan, which may have long-term consequences for the study area; however, its

recommendations have not been finalized, so projects associated with them cannot be included for analysis.

In general, the specific effects of projects for which final design has not been done and which are still in the planning stage cannot be fully evaluated. It is well known, however, that the cumulative effect of continuing demand for project sites on the National Mall, an area often regarded as fully developed, is widely recognized as a cause for concern.

The USIP is constructing its new headquarters at the northwest corner of Constitution Avenue and 23rd Street NW. Continuing a line of prominent buildings along the north side of Constitution Avenue and replacing a parking lot, it will be an appropriate framing building for the historic district and buildings of the study area. The Lincoln Memorial Circle Rehabilitation and Security Improvements will place a series of bollards around the circle on the east side of the Memorial, a secure access gate on the west side, and two visitor services areas to the north and south. The long-term adverse impacts associated with this project are negligible as the design and materials are compatible with the Lincoln Memorial and surrounding historic resources as well as small in scale (NPS 2002a). The VVMC, to be located to the east of 23rd Street NW in Constitution Gardens, may be anticipated to have a moderate long-term adverse impact on the West Potomac Park Historic District and Constitution Gardens, primarily because it will not be in keeping with the design intent of the latter. Construction of NMAAHC, situated on the northeast panel of the Monument Grounds, may result in a future moderate long-term adverse impact on the Monument and Grounds. This adverse impact should be mitigated by the ongoing design development and review process for the NMAAHC. Construction of the MLK Memorial will have a moderate long-term adverse effect on the West Potomac Park Historic District, primarily due to alteration of site features, the removal of cherry trees, modifications to the circulation system, and the addition of a book store and visitor contact station. The negligible long-term impacts to historic districts and buildings that would result from the no action alternative, in combination with the negligible to moderate adverse impacts that would result from construction of the above projects, would result in negligible to moderate long-term adverse cumulative effects.

Conclusion. The no action alternative would result in direct minor short-term adverse impacts on the Monument Grounds and negligible short-term impacts on the Lincoln Memorial, Bulfinch Gatehouse (17th Street), Lockkeeper's House, Vietnam Veterans Memorial, West Potomac Park Historic District, Northwest Rectangle Historic District, and the *L'Enfant Plan*. Cumulative impacts on historic districts and structures would be negligible to moderate adverse. The no action alternative would not result in impairment of historic districts and structures.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. At 23rd Street and the Reflecting Pool, flood control would be the same as the no action alternative. The Phase 1 implementation of alternative 1 would involve closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height just as in the no action alternative.

For Alternative 1A the 17th Street closure would require construction of a post and panel system at a point approximately 198 feet south of Constitution Avenue. This variation of the arc wall alternative would be an exposed concrete wall in two sections 392 feet in total length placed in an arc from Constitution Gardens to the Washington Monument and Grounds interrupted by a 94 linear foot post and panel system at 17th Street. The eastern wall section (203 feet) on the Monument Grounds would be a true arc in plan; however, the western section (189 feet) would be segmented, bending to follow the line of the existing internal walkway at Constitution Gardens. The topmost wall height of 6.3 feet (possibly 8.3 feet if funding is available) would be at the sidewalk but descend to ground level as it extends out from the sidewalk. At the end of the east wall on the Monument Grounds, a storage vault, built mostly underground, would accommodate storage of the post and panels.

For Alternative 1B the 17th Street closure would require construction of a post and panel system 55 feet further south than 1A or approximately 253 feet south of Constitution Avenue. This variation of the arc wall alternative would be more symmetrical with two exposed concrete walls of 120 foot length, true arcs in plan, extending to the east and west 25 feet from the 17th Street sidewalks. The length of the post and panel system would be 140 feet or 46 feet longer than 1A. Due to the lower elevation of the street, the height of the panel system at the sidewalk would have to be 9 feet. Phase 1B would be substantially different from 1A, and from other alternatives as well, in the scale of the area to be graded (5.24 acres) and tree loss (98 trees). It also includes the removal of the two straight paved paths that extend to the NE and SE from Overlook Terrace to 17th Street and substitutes radial walkways in Constitution Gardens that mimic the radial walkway from the corner of 17th Street and Constitution Avenue into the Washington Monument Grounds.

Phase 1 of alternative 1, both options, would not affect the Lockkeeper's House or the Bulfinch Gatehouse. The Lockkeeper's House at the southwest corner of 17th Street and Constitution Avenue is significant as the only remaining remnant of the Chesapeake and Ohio (C&O) Canal extension of the 19th century. This historic property has been moved and the only aspects of integrity it retains that qualify it for the NRHP are design, materials, and workmanship. Its setting, location, feeling, and association have all been compromised, although the current location has acquired integrity with time. There would be negligible direct long-term impacts on the design, materials, and workmanship of the Lockkeeper's House.

The Bulfinch Gatehouse was moved to its current location from the Capitol grounds. This structure is important for its association with a master architect; therefore, its physical location at 17th Street does not reflect its significance. It retains three aspects of integrity: design, workmanship, and materials. There would be negligible indirect long-term impacts on the design, materials, and workmanship of the Bulfinch Gatehouse.

There would be a direct and indirect moderate long-term adverse impact on the Washington Monument and Grounds. The Washington Monument and Grounds includes the entire 106 acres of designed landscape. The integrity of setting, views and vistas, and design of the property would be affected by the physical construction of the levee wall and the re-grading of the topography. Fourteen trees on the Monument Grounds - and one street tree at 17th Street - would be lost.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a Treatment Plan to mitigate the levee project's adverse visual effects.

There would be an indirect minor long-term adverse impact on the Ellipse (President's Park South) under Phase 1 of alternative 1. The integrity of setting and views and vistas of the property would be affected by the construction of the levee wall primarily on the Monument Grounds. The levee walls would not appear highly intrusive to the landscape and setting of President's Park South, especially under alternative 1B, nor would they obscure significant views and vistas of the Washington Monument. The recession of the east levee wall into the Washington Monument landscape would lessen the intrusive effect as well as the negative aesthetic effect, thereby creating a minor adverse effect.

The 17th Street levee walls would have negligible indirect impacts on the Second Division Memorial. Primary views of the memorial are from the north side of Constitution Avenue and within President's Park South. The levee walls on the south side of Constitution Avenue would not be obtrusive to the memorial. Views from the Memorial south towards the Washington Monument would be similar to those described above with the Ellipse. The recession of the east wall into the landscape would lessen any potential aesthetic and intrusive effects. In addition, the tree line along Constitution Avenue prohibits clear open views either south or southwest while standing at the Second Division Memorial.

The West Potomac Park Historic District would be directly impacted with the construction of concrete levee walls on the west side of 17th Street. The character of the view up and down 17th Street, which is a protected feature of the historic district, would be altered – more by 1A than 1B - although not directly obscured. Due to the district's size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be minor adverse long-term impacts on the West Potomac Park Historic District with the arc wall at 17th Street and sandbag closure at 23rd Street.

As noted in Chapter 3, Constitution Gardens is both a contributing element of the West Potomac Park Historic District and a NRHP eligible cultural landscape. The impacts of this alternative upon Constitution Gardens will be described in detail in the Cultural Landscape section below.

Dedicated in 1912, the John Paul Jones statue was the first statue to be placed in either of West or East Potomac Parks. Located at 17th Street and Independence Avenue, it is a contributing feature to the West Potomac Park Historic District. Due to its location at the end of 17th Street, coupled with the surrounding vegetation and roadway, the visual distance between the project location to the statue would be too great to cause an adverse impact.

The WWII Memorial, recently dedicated, is not included in the West Potomac Park Historic District National Register nomination; however, it is protected as a legislated property. There would be no adverse impacts on the WWII Memorial under this alternative.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the *L'Enfant Plan*, and the vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant (Leach et al. 2001). The sandbag closure at 23rd Street would only be a temporary impact on the *L'Enfant Plan*. However, the levee wall construction at 17th Street under Alternative 1A would impact the integrity of the *L'Enfant Plan* by interrupting the extrapolated alignment of Virginia Avenue through the site. However, the placement of the crossing 55 further feet south under alternative 1B would avoid this adverse impact. There would be direct moderate long-term adverse impacts under Phase I of alternative 1A but only negligible short term indirect impacts under alternative 1B.

The sandbag closure at 23rd Street would have negligible indirect short-term impacts on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that will directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term.

These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd Streets closure under Phase 1 of alternative 1, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument landscape and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument and Grounds under 1A and 1B and the *L'Enfant Plan* under 1A would suffer a loss of integrity with respect to their setting and design. Mitigations would include a landscape plan, treatment plans for the levee walls, public interpretation, and stabilization for the Lockkeeper's House. There would be negligible to minor direct and indirect long-term impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 1 of alternative 1 would not result in any impacts that would constitute impairment of historic districts and structures.

Phase 2 Analysis. Areas on either side of the eastbound ramp at 23rd Street to Constitution Avenue from Roosevelt Bridge would be re-graded and filled. The northern embankment would be three feet above the existing grade, and the southern section would be approximately 2.5 feet of fill on average. Three trees would be removed north of the eastbound ramp, and six trees would be removed from below the ramp. Under Phase 2, areas along the Reflecting Pool levee would be filled in to attain a uniform level across its entire length. Phase 2 across 17th Street would differ from Phase 1 with stone facing on the concrete walls, and an increase of the wall height by two feet for Alternative 1A (assuming this was not accomplished in Phase 1). For Alternative 1B, the height would remain 9 feet.

Phase 2 of alternative 1, both options, would not affect the Lockkeeper's House or the Bulfinch Gatehouse. The Lockkeeper's House at the southwest corner of 17th Street and Constitution Avenue is significant as the only remaining remnant of the Chesapeake and Ohio (C&O) Canal extension of the 19th century. This historic property has been moved and the only aspects of integrity it retains that qualify it for the NRHP are design, materials, and workmanship. Its setting, location, feeling, and association have all been compromised, although the current location has acquired integrity with time. There would be negligible direct long-term impacts on the design, materials, and workmanship of the Lockkeeper's House.

The Bulfinch Gatehouse was moved to its current location from the Capitol grounds. This structure is important for its association with a master architect; therefore, its physical location at 17th Street does not reflect its significance. It retains three aspects of integrity: design, workmanship, and materials. There would be negligible indirect long-term impacts on the design, materials, and workmanship of the Bulfinch Gatehouse.

There would be a direct and indirect moderate long-term adverse impact on the Washington Monument and Grounds. The Washington Monument and Grounds includes the entire 106 acres of designed landscape. The integrity of setting, views and vistas, and design of the property would be affected by the physical construction of the levee wall and the re-grading of the topography. Fourteen trees on the Monument Grounds - and one street tree at 17th Street would be lost.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a Treatment Plan to mitigate the levee project's adverse visual effects.

There would be an indirect minor long-term adverse impact on the Ellipse (President's Park South) under Phase 2 of alternative 1. The integrity of setting and views and vistas of the property would be affected by the construction of the levee wall primarily on the Monument Grounds. The levee walls would not appear highly intrusive to the landscape and setting of President's Park South, especially under alternative 1B, nor would they obscure significant views and vistas of the Washington Monument. The recession of the east levee wall into the Washington Monument landscape would lessen the intrusive effect as well as the negative aesthetic effect, thereby creating a minor adverse effect.

The 17th Street levee walls would have negligible indirect impacts on the Second Division Memorial. Primary views of the memorial are from the north side of Constitution Avenue and within President's Park South. The levee walls on the south side of Constitution Avenue would not be obtrusive to the memorial. Views from the Memorial south towards the Washington Monument would be similar to those described above with the Ellipse. The recession of the east wall into the landscape would lessen any potential aesthetic and intrusive effects. In addition, the tree line along Constitution Avenue prohibits clear open views either south or southwest while standing at the Second Division Memorial.

The West Potomac Park Historic District would be directly impacted with the construction of concrete levee walls on the west side of 17th Street. The character of the view up and down 17th Street, which is a protected feature of the historic district, would be altered – more by 1A than 1B - although not directly obscured. Due to the district's size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be minor adverse long-term impacts on the West Potomac Park Historic District with the arc wall at 17th Street and sandbag closure at 23rd Street.

As noted in Chapter 3, Constitution Gardens is both a contributing element of the West Potomac Park Historic District and a NRHP eligible cultural landscape. The impacts of this alternative upon Constitution Gardens will be described in detail in the Cultural Landscape section below.

Dedicated in 1912, the John Paul Jones statue was the first statue to be placed in either of West or East Potomac Parks. Located at 17th Street and Independence Avenue, it is a contributing feature to the West Potomac Park Historic District. Due to its location at the end of 17th Street, coupled with the surrounding vegetation and roadway, the visual distance between the project location to the statue would be too great to cause an adverse impact.

The WWII Memorial, recently dedicated, is not included in the West Potomac Park Historic District National Register nomination; however, it is protected as a legislated property. There would be no adverse impacts on the WWII Memorial under this alternative.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the *L'Enfant Plan*, and the vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant (Leach et al. 2001). The sandbag closure at 23rd Street would only be a temporary impact on the *L'Enfant Plan*. However, the levee wall construction at 17th Street under Alternative 1A would impact the integrity of the *L'Enfant Plan* by interrupting the extrapolated alignment of Virginia Avenue through the site. However, the placement of the crossing 55 further feet south under alternative 1B would avoid this adverse impact. There would be direct moderate long-term adverse impacts under Phase 2 of alternative 1A but only negligible short term indirect impacts under alternative 1B.

The sandbag closure at 23rd Street would have negligible indirect short-term impacts on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that will directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures

including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term.

These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd Streets closure under Phase 2 of alternative 1, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument landscape and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument and Grounds under 1A and 1Band the *L'Enfant Plan* under 1A would suffer a loss of integrity with respect to their setting and design. Mitigations would include a landscape plan, treatment plans for the levee walls, public interpretation, and stabilization for the Lockkeeper's House. There would be negligible to minor direct and indirect long-term impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 2 of alternative 1 would not result in any impacts that would constitute impairment of historic districts and structures.

IMPACTS OF ALTERNATIVE 2A – "GATE WALLS"

Phase 1 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as the no action alternative**.** Phase 1 of alternative 2 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative. The 17th Street closure would require construction of a post and panel system at a point approximately 138 feet south of Constitution Avenue. The Gate Walls alternative for 17th Street consists of two variants, alternative 2A and alternative 2B. The east side of 17th Street would be substantially re-graded, creating an earthen berm. To connect the post and panel system to the berm, an L-shaped, concrete retaining wall would be constructed adjacent to the sidewalk on the Monument Grounds. The concrete retaining wall on the Constitution Gardens side would be longer, either an oblique angle in the plan for alternative 2A or one similar with an additional bend for alternative 2B. Alternative 2A would be exposed concrete, 256 feet in length with nearly 109 feet of post and panels at the central crossing whereas alternative 2B would be 282 feet of wall with 109 feet of post and paneling. The retaining wall heights for both options would be 5.3 feet (possibly 7.3 feet if funding is available) above grade at the sidewalk. Seventeenth Street would be slightly re-graded at the crossing to rise approximately one foot to meet the height of Constitution Avenue. A storage facility for the post and panel apparatus would be constructed on the east side of 17th Street and would be incorporated into the abutment; at a depth of approximately seven feet, it would not be visible from Constitution Avenue or 17th Street.

The Lockkeeper's House and the Bulfinch Gatehouse would not be directly impacted, for this project does not impact any of their aspects of integrity that qualify them for the NRHP, including materials, design, and workmanship. Impacts would be considered negligible long-term.

Under this alternative, one exposed concrete levee wall would be constructed on the Monument Grounds, which would be a direct and indirect impact on this historic property. Alternative 2 would cause a moderate long-term adverse impact on the integrity of setting and design of the Washington Monument landscape.

The West Potomac Park Historic District would be directly impacted with the construction of concrete levee walls on the west side of 17th Street. The character of the view up and down 17th Street, which is a protected feature of the historic district, would be altered although not directly obscured. Due to the district's size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be minor adverse long-term impacts on the West Potomac Park Historic District with the gate walls at 17th Street and sandbag closure at 23rd Street.

There would be no effect upon either the WWII Memorial or the John Paul Jones statue due to their distance.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the *L'Enfant Plan*, and the vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant (Leach et al. 2001). The sandbag closure at 23rd Street would only be a temporary impact on the *L'Enfant Plan*. However, the levee wall construction at 17th Street might impact the integrity of the *L'Enfant Plan* by interrupting the extrapolated alignment of Virginia Avenue through the site. This would constitute a direct moderate long-term adverse impact under Phase I of alternative 2.

Because the closure at 23rd Street is reversible, Phase 1 of the Gate Walls alternative would be considered a negligible indirect short-term impact on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 1 of alternative 2, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument landscape and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument and Grounds would suffer a loss of integrity with respect to its setting and design. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. There would be negligible to minor indirect impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 1 of alternative 2 would not result in any impacts that would constitute impairment of historic districts and structures.

Phase 2 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as Phase 2 of alternative 1. Areas on either side of the eastbound ramp at 23rd Street to Constitution Avenue from Roosevelt Bridge would be re-graded and filled. The northern embankment would be three feet above the existing grade and the southern section would be approximately 2.5 feet of fill on average. Three trees would be removed from north of the eastbound ramp, and six trees would be removed from below the ramp. Under Phase 2, areas along the Reflecting Pool levee would be filled in to attain a uniform level across its entire length.

The portion of Phase 2 east of 17th Street would differ little from Phase 1 in basic concept and structure. The L-shaped wall on the Monument Grounds would be extended 58 feet along the sidewalk and would be faced in a stone veneer. As before, a below-grade structure would be incorporated into the earthen embankment to store the post and panel system. The major difference between Phase 1 and Phase 2 of the Gate Walls alternative is the re-grading and retaining wall addition on the west side of 17th Street. The concrete levee wall built under Phase 1 would be enclosed with an earthen embankment on both the north

and south sides. The fill and grading on both sides of the levee wall would leave a concrete span exposed at the crest of the wall/slope. To contain this berm near 17th Street, a stone-clad retaining wall would be constructed, either in a V-shape (alternative 2A or "Asymmetric"), or an L-shape to mimic the east wall (alternative 2B or "Symmetric"). Alternative 2B would be markedly different from alternative 2Awith respect to its location, for it would be set further west from 17th Street, requiring a longer post and panel system.

The Lockkeeper's House and the Bulfinch Gatehouse would not be directly impacted, for this project would not impact any of their aspects of integrity that qualify them for the NRHP including materials, design, and workmanship. Impacts would be considered negligible long-term.

The Monument Grounds property would be directly and indirectly impacted, compromising its integrity of setting and design. Alternative 2 would cause a moderate long-term adverse impact on the Washington Monument landscape.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

The West Potomac Park Historic District would be directly impacted with the construction of concrete levee walls on the west side of 17th Street. Due to its size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be negligible direct and indirect long-term impacts on the West Potomac Park District with the levee wall closure at 17th Street and re-grading at 23rd Street.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan*. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the plan and the vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant (Leach et al. 2001). The slight re-grading of 17th Street and the re-grading at 23rd Street would be considered negligible indirect and direct long-term adverse impacts on the *L'Enfant Plan*.

Impacts due to the re-grading of the Lincoln Memorial grounds along 23rd Street and along a portion of the eastbound Roosevelt Bridge ramp would cause negligible indirect and direct long-term impacts on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 2 of alternative 2, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument landscape and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument and Grounds would suffer a loss of integrity with respect to its setting and design. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. There would be negligible to minor indirect impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 2 of alternative 2 would not result in any impacts that would constitute impairment of historic districts and structures.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as the no action alternative**.** Phase 1 of alternative 3 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative. The 17th Street closure would require construction of a post and panel system at a point approximately 365 feet south of Constitution Avenue. The post and panel system would be flanked by concrete walls in a chevron pattern on the adjacent slopes. The angled exposed concrete walls across 17th Street would be 7.7 feet tall at the sidewalk. The wall would cover 403 linear feet with approximately 102 feet of post and panels to connect the two levee walls. The tops of the walls would merge into grade as the slopes rise from 17th Street. To the south of the levee walls, adjacent to the Overlook Terrace, a storage vault built mostly underground would accommodate the post and panels.

The Lockkeeper's House and the Bulfinch Gatehouse would not be directly or indirectly impacted as this project does not impact any of their aspects of integrity that qualify them for the NRHP including materials, design, and workmanship. Impacts would be considered negligible long-term.

Under this alternative, one exposed concrete levee wall would be constructed on the Washington Monument landscape, which would be a direct impact on the historic property. Considered a moderate direct and indirect long-term adverse impact, this alternative would limit the visual quality of the west side of the grounds and affect the integrity of setting and design.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects. The West Potomac Park Historic District would be directly impacted with the construction of concrete levee walls on the west side of 17th Street. The character of the view up and down 17th Street, which is a protected feature of the historic district, would be altered although not directly obscured. Due to the district's size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be minor adverse long-term impacts on the West Potomac Park Historic District with the gate walls at 17th Street and sandbag closure at 23rd Street.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects. The West Potomac Park Historic District would be directly impacted with the construction of concrete levee walls on the west side of 17th Street. The character of the view up and down 17th Street, which is a protected feature of the historic district, would be altered although not directly obscured. Due to the district's size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be minor adverse long-term impacts on the West Potomac Park Historic District with the chevron shaped walls at 17th Street and sandbag closure at 23rd Street. Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft

Plan of the City of Washington lists 17th Street as a contributing element to the *L'Enfant Plan*, and the vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant (Leach et al. 2001). The sandbag closure at 23rd Street would only be a temporary impact on the *L'Enfant Plan*. However, the levee wall construction at 17th Street would impact the integrity of the *L'Enfant Plan* by interrupting the extrapolated alignment of Virginia Avenue through the site. This would constitute a direct moderate long-term adverse impact under Phase I of alternative 3.

Because the 23rd Street closure is reversible, the Constitution Garden Walls Phase 1 of alternative 3 would be considered a negligible indirect short-term impact on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 1 of alternative 3, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument and Grounds and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument landscape and the *L'Enfant Plan* would suffer a loss of integrity with respect to their setting and design. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. There would be negligible to minor indirect impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 1 of alternative 3 would not result in any impacts that would constitute impairment of historic districts and structures.

Phase 2 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as Phase 2 of alternative 1. Areas on either side of the eastbound ramp at 23rd Street to Constitution Avenue from Roosevelt Bridge would be re-graded and filled. The northern embankment would be three feet above the existing grade and the southern section would be approximately 2.5 feet of fill on average. Three trees would be removed from north of the eastbound ramp, and six trees would be removed from below the ramp. Under Phase 2, areas along the Reflecting Pool levee would be filled in to attain a uniform level across its entire length. The flood control levee wall across 17th Street would dramatically differ in Phase 2 from the previous phase. Phase 2 construction would include three stone faced terraced walls (retaining walls) on the Monument Grounds, coupled with four terraced walls on the west side of 17th Street. The terraced walls are 2.5 feet in height, and the flood protection would essentially consist of a post and panel system approximately 236 feet across 17th Street along with Jersey barriers on top of the terraced walls. The west walls would mimic Overlook Terrace by including flanking steps. Following construction of Phase 2, the exposed concrete levee walls erected in Phase 1 would be removed.

This alternative would not impact any of the significant aspects of integrity of the Lockkeeper's House or the Bulfinch Gatehouse including materials, design, and workmanship. There would be negligible indirect long-term impacts on these individual historic properties.

Under this alternative, terraces would be constructed on the Washington Monument landscape, which would be a direct impact on the historic property. Considered a moderate long-term adverse impact, this alternative would limit the visual quality of the west side of the grounds and would affect the integrity of setting and design.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects. The West Potomac Park Historic District will be physically impacted with the construction of stone-clad walls on the west side of 17th Street. Due to the district's size, materials, viewsheds (there would be no impact on the protected view up and down 17th Street), and other aspects of integrity, such as feeling and association, there would be negligible long-term impacts on the West Potomac Park District. The overall integrity of the Historic District would remain intact with respect to the levee wall construction at 17th Street and re-grading at 23rd Street.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of Washington* lists 17th Street as a contributing element to the plan (Leach et al. 2001). The vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant in the plan of Washington (Leach et al. 2001). The levee wall construction would not impact the significant features of the *L'Enfant Plan* as the terracing of Phase 2 does not include above ground features that would interrupt the extrapolated alignment of Virginia Avenue for mitigation of adverse effects would include surface treatment of walls to lessen the visual impact, public interpretation programming, and ongoing design review by the U.S. Commission of Fine Arts (CFA), the National Capital Planning Commission (NCPC), and the D.C. Historic Preservation Office.

There would be negligible indirect and direct long-term impacts under Phase 2 of alternative 3.

Impacts due to the re-grading of the Lincoln Memorial grounds along 23rd Street and along a portion of the eastbound Roosevelt Bridge ramp would cause negligible direct and indirect long-term impacts on the Lincoln Memorial, Vietnam Veterans Memorial, and Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 2 of alternative 3, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument landscape and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument and Grounds would suffer a loss of integrity with respect to its setting and design. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. There would be negligible to minor indirect impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 2 of alternative 3 would not result in any impacts that would constitute impairment of historic districts and structures.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. At 23rd Street and the Reflecting Pool, flood control would be the same as the no action alternative. The Phase 1 implementation of alternative 1 would involve closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height just as in the no action alternative. The 17th Street closure would require construction of a post and panel system at a point approximately 176 feet south of Constitution Avenue. The Hybrid alternative would combine the west wall from alternative 2B and the east wall from alternative 1. The east wall would be an exposed concrete arc-shaped wall approximately 248 feet in length, and its east end would appear to recede into the landscape. The west wall would be an exposed concrete wall that runs southwest from Constitution Avenue then bends back to the southwest for a total length of 168 feet. A retaining wall on the west side would create the connection point for the post and panel system. The wall height at the sidewalk would be 5.3 feet (up to possible 7.3 feet if funding is available). A total of 28 trees would be removed during this phase, four of which are along 17th Street.

Phase 1 of alternative 1 would not affect the Lockkeeper's House or the Bulfinch Gatehouse. Similar to alternative 1 Phase 1 the Lockkeeper's House and Bulfinch Gatehouse would not be directly impacted. There would be negligible indirect long-term impacts on the aspects of integrity that qualify it for the NRHP including materials, design, and workmanship.

Similar to alternative 1 Phase 1, there would be a direct and indirect moderate long-term adverse impact on the Washington Monument and Grounds. The integrity of setting, views and vistas, and design of the property would be affected by the physical construction of the levee wall and the re-grading of the topography.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

The West Potomac Park Historic District would be directly impacted with the construction of concrete levee walls on the west side of 17th Street. The character of the view up and down 17th Street, which is a protected feature of the historic district, would be altered although not directly obscured. Due to the district's size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be minor adverse long-term impacts on the West Potomac Park Historic District due to the walls flanking 17th Street and sandbag closure at 23rd Street. Similar to alternative 1 Phase 1, the John Paul Jones statue and the National WWII Memorial would not be directly impacted. There would be negligible indirect long-term impacts. Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the *L'Enfant Plan*, and the vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant (Leach et al. 2001). The sandbag closure at 23rd Street would only be a temporary impact on the *L'Enfant Plan*. However, the levee wall construction at 17th Street would impact

the integrity of the *L'Enfant Plan* by interrupting the extrapolated alignment of Virginia Avenue through the site. This would constitute a direct moderate long-term adverse impact under Phase 1 of alternative 4.

As with alternative 1, there would be an indirect minor long-term adverse impact on the Ellipse (President's Park South) under Phase 1 of alternative 4. The integrity of setting and views and vistas of the property would be affected by the construction of the levee wall primarily on the Washington Monument Grounds. The levee walls do not entirely invade the total landscape and setting of President's Park South nor would they be obtrusive to significant views and vistas of the Washington Monument. The recession of the east levee wall into the Washington Monument landscape would lessen the obtrusive effect as well as the negative aesthetic effect, thereby creating a minor adverse effect.

The 17th Street levee walls would have negligible indirect impacts on the Second Division Memorial. Primary views of the memorial are from the north side of Constitution Avenue and within President's Park South. The levee walls on the south side of Constitution Avenue would not be obtrusive to the memorial. Views from the Memorial south towards the Washington Monument would be similar to those described above with the Ellipse. The recession of the east wall into the landscape would lessen any potential aesthetic and obtrusive effects. In addition, the tree line along Constitution Avenue prohibits clear open views either south or southwest while standing at the Second Division Memorial.

The sandbag closure at 23rd Street would have negligible indirect short-term impacts on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 1 of alternative 4, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument landscape and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument and Grounds and the *L'Enfant Plan* would suffer a loss of integrity with respect to their setting and design. Mitigations would include a landscape plan, treatment plans for the levee walls, public interpretation, and stabilization for the Lockkeeper's House. There would be negligible and minor direct and indirect long-term impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 1 of alternative 4 would not result in any impacts that would constitute impairment of historic districts and structures.

Phase 2 Analysis. Areas on either side of the eastbound ramp at 23rd Street to Constitution Avenue from Roosevelt Bridge would be re-graded and filled. The northern embankment would be three feet above the existing grade, and the southern section would be approximately 2.5 feet of fill on average. Three trees would be removed north of the eastbound ramp, and six trees would be removed from below the ramp.

Under Phase 2, areas along the Reflecting Pool levee would be filled in to attain a uniform level across its entire length. Phase 2 across 17th Street would differ from Phase 1 with re-grading of the Monument Grounds and Constitution Gardens; this would include the loss of 32 additional trees, stone facing on the concrete walls, and an increase of the wall height by two feet.

The Lockkeeper's House and Bulfinch Gatehouse would not be directly impacted. There would be negligible indirect long-term impacts on the aspects of integrity that qualify it for the NRHP including materials, design, and workmanship.

Under this alternative, one stone-clad concrete levee wall would be constructed on the Washington Monument landscape, which would be a direct impact on the historic property. Considered a moderate direct and indirect long-term adverse impact, this alternative would limit the visual quality of the west side of the grounds and affect the integrity of setting and design.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects. The West Potomac Park Historic District would be directly impacted with the construction of stone clad levee walls on the west side of 17th Street. The character of the view up and down 17th Street, which is a protected feature of the historic district, would be altered although not directly obscured. Due to the district's size, materials, viewsheds, and other aspects of integrity, such as feeling and association, there would be minor adverse long-term impacts on the West Potomac Park Historic District with the chevron shaped walls at 17th Street and sandbag closure at 23rd. Similar to alternative 1, there would be no adverse impacts on the John Paul Jones statue or the WWII Memorial.

Similar to alternative 1, there would be no adverse impacts on the John Paul Jones statue or the WWII Memorial.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the *L'Enfant Plan*, and the vista to and from the Washington Monument along the line of Virginia Avenue is listed as significant (Leach et al. 2001). The sandbag closure at 23rd Street would only be a temporary impact on the *L'Enfant Plan*. However, the levee wall construction at 17th Street might impact the integrity of the *L'Enfant Plan* by interrupting the extrapolated alignment of Virginia Avenue through the site. There would be negligible direct and indirect long-term impacts under Phase 2 of alternative 4.

As in Phase 1, there would be an indirect minor long-term adverse impact on the Ellipse (President's Park South) under Phase 2 of alternative 4. The integrity of setting and views and vistas of the property would be affected by the construction of the levee wall primarily on the Monument Grounds. The levee walls do not entirely invade the total landscape and setting of President's Park South nor would they be obtrusive to significant views and vistas of the Washington Monument. The recession of the east levee wall into the Washington Monument landscape would lessen the obtrusive effect as well as the negative aesthetic effect, thereby creating a minor adverse effect.

The 17th Street levee walls would have negligible indirect impacts on the Second Division Memorial. Primary views of the memorial are from the north side of Constitution Avenue and within President's Park South. The levee walls on the south side of Constitution Avenue would not be obtrusive to the memorial. Views from the Memorial south towards the Washington Monument would be similar to those described above with the Ellipse. The recession of the east wall into the landscape would lessen any potential aesthetic and obtrusive effects. In addition, the tree line along Constitution Avenue prohibits clear open views either south or southwest while standing at the Second Division Memorial.

Re-grading of the Lincoln Memorial grounds along 23rd Street and along a portion of the eastbound Roosevelt Bridge ramp would cause negligible direct and indirect long-term impacts on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 2 of alternative 4, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument landscape and the *L'Enfant Plan* would be direct, moderate, long-term, and adverse. The Washington Monument and Grounds would suffer a loss of integrity with respect to its setting and design. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. There would be negligible to minor indirect impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 2 of alternative 4 would not result in any impacts that would constitute impairment of historic districts and structures.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as the no action alternative**.** Phase 1 of alternative 5 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative. The 17th Street closure would require construction of a post and panel system at a point approximately 525 feet south of Constitution Avenue.

This alternative would place one new small structure 11.3 feet above the sidewalk on the east side of 17th Street and a curved wall and realigned walkway to the west side of 17th Street, 8.7 feet above the sidewalk aligned to the southern edge of the Overlook Terrace. The east structure would be placed on the Monument Grounds and would take advantage of the existing, higher topography to allow the ground to slope gently toward the intersection of 17th Street and Constitution Avenue. This concrete structure would resemble the scale of similar small structures located on the Monument Grounds and would serve as both the east abutment and the storage facility for the post and panel closure system.

To the west of 17th Street, there would be a curved levee wall at 18.7 feet NAVD running southeast from the Overlook Terrace that would provide the western abutment for the post and panel system.

Unlike the other action alternatives analyzed, both Phase 1 and 2 of alternative 5 have been conceptually designed to meet the full 18.7 NAVD flood protection standard, because of the difficulty of increasing the height of the building at a later time.

The Lockkeeper's House and the Bullfinch Gatehouse would not be directly or indirectly impacted as no feature of this alternative is in their vicinity. Under this alternative, one utilitarian concrete structure would be constructed on the Washington Monument Grounds, which would be a direct impact on the historic setting of the Monument. Although its scale would be similar to other service buildings on the grounds, its material would not be in keeping with the palette of materials (stone of different kinds) prevalent in the smaller buildings of the Monument Grounds. It would, however, require only modest alterations of the topography of the Monument Grounds. Considered a moderate direct and indirect long-term adverse impact, this alternative would limit the visual quality of the west side of the grounds and affect the integrity of setting and design of the historic property.

This alternative would cross 17th Street at the point closest to that of the historic levee or 700 feet below Constitution Avenue.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

The West Potomac Park Historic District would be directly impacted with the construction of the concrete levee wall on the west side of 17th Street. The design integrity of the contributing Constitution Gardens would be adversely affected as the levee wall, even though much of it would sink into the ground as it approached the rise of Overlook Terrace and would crowd the southeast walkway and compel the removal of 43 trees. No re-planting other than sod is anticipated for Phase 1 of alternative 5. This would be a moderate long-term adverse impact on a contributing feature of the West Potomac Park Historic District.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the plan (Leach et al. 2001). The vista to and from the Washington Monument along the line of Virginia Avenue NW is listed as significant in the plan of Washington (Leach et al. 2001). Alternative 5 pulls back the abutments of the post and panel crossing from both sides of 17th Street so that it does not constrain the feeling of openness that helps to define the character of this *L'Enfant Plan* street. It is also south of the vista which continues the alignment of Virginia Avenue to the monument. This would constitute a direct negligible long-term adverse impact under Phase 1 of alternative 5.

Because the 23rd Street closure is reversible, Phase 1 of alternative 5 would be considered a negligible indirect short-term impact on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above

would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 1 of alternative 5, would result in minor to moderate adverse long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument and Grounds and the West Potomac Park Historic District would be direct, moderate, long-term, and adverse, but impacts on the *L'Enfant Plan* would be negligible. The Washington Monument landscape and West Potomac Park's Constitution Gardens would suffer a loss of integrity with respect to their setting and design. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. There would be negligible indirect impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 1 of alternative 5 would not result in any impacts that would constitute impairment of historic districts and structures.

Phase 2 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as the no action alternative**.** Phase 2 of alternative 5 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative. The 17th Street closure would utilize the post and panel system approximately 525 feet south of Constitution Avenue.

Phase 2 of alternative 5 would clad with stone the small structure on the east side of 17th Street and the curved wall to the west side of 17th Street that would be aligned to the southern edge of the Overlook Terrace and which would be constructed in Phase 1. The east structure, placed on the Monument Grounds, would continue to take advantage of the existing, higher topography to allow the ground to slope gently toward the intersection of 17th Street and Constitution Avenue. This structure would more closely resemble similar small structures located on the Monument Grounds due to the more appropriate exterior material and architectural finishes. It would continue to serve as both the east abutment and the storage facility for the post and panel closure system.

To the west of 17th Street, the curved levee wall running southeast from the Overlook Terrace that would provide the western abutment for the post and panel system would also be clad in stone.

The Lockkeeper's House and the Bullfinch Gatehouse would not be directly or indirectly impacted, for no feature of this alternative is in their vicinity. Under Phase 2 of this alternative, the structure would be a direct impact on the Washington Monument and Grounds but one not dissimilar to other small to medium sized service buildings on the grounds such as the Monument Lodge. The stone cladding would make it more compatible with the design, feeling, and association of the Washington Monument Grounds. It would also require only modest alterations of the topography of the grounds. Considered a moderate direct and indirect long-term adverse impact, this alternative would limit the visual quality of the west side of the grounds and affect the integrity of setting and design of the historic property.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects. The West Potomac Park Historic District would be directly impacted by the stone clad levee wall on the west side of 17th Street. The design integrity of the contributing Constitution Gardens would be adversely affected, for the levee wall, even though much of it would sink into the ground as it approached the rise of Overlook Terrace, would crowd the southeast walkway. The removal of 32 trees east of 17th Street in Phase 1 would be mitigated in Phase 2 by the implementation of landscape and replanting plans to restore, to the extent possible, the character of the landscape. This would still be a moderate long-term adverse impact on a contributing feature of the West Potomac Park Historic District.

Reservation 2 (Washington Monument) and Reservation 332 (now the Reflecting Pool and Constitution Gardens) are contributing features of the *L'Enfant Plan* as a documented historic property. The 2001 draft *Plan of the City of Washington* lists 17th Street as a contributing element to the plan (Leach et al. 2001). The vista to and from the Washington Monument along the line of Virginia Avenue NW is listed as significant in the plan of Washington (Leach et al. 2001). Alternative 5 pulls back the abutments of the post and panel crossing from both sides of 17th Street so that it does not constrain the feeling of openness that helps to define the character of this *L'Enfant Plan* street. It is also south of the vista which continues the alignment of Virginia Avenue to the Monument. This would constitute a direct negligible long-term adverse impact under Phase 2 of alternative 5.

Because the 23rd Street closure is reversible, Phase 2 of alternative 5 would be considered a negligible indirect short-term impact on the Lincoln Memorial, Vietnam Veterans Memorial, and the Northwest Rectangle Historic District.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscaping, facility maintenance, security improvements, public events and visitor use, and several future plans and projects that would directly affect the National Mall. Future projects within the project area that could affect historic districts and structures include the construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on historic districts and structures in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the discussed historic districts and structures: Washington Monument and Grounds, Lincoln Memorial Grounds, Vietnam Veterans Memorial, Northwest Rectangle Historic District, West Potomac Park Historic District, and the *L'Enfant Plan*. However, each project would be subject to specific requirements to reduce the individual impact on historic districts and structures including design review. Consequently, any impacts associated with these projects described above would range from negligible to moderate long-term. These impacts, in combination with the negligible to moderate impacts on historic districts and structures at the 17th and 23rd streets closure under Phase 2 of alternative 5, would result in minor to moderate long-term cumulative impacts to historic districts and structures in the study area.

Conclusion. The above impacts on the Washington Monument and Grounds and the West Potomac Park Historic District would be direct, moderate, long-term, and adverse, but impacts on the *L'Enfant Plan* would be negligible. The Washington Monument landscape and the West Potomac Park's Constitution Gardens would suffer a loss of integrity with respect to their setting and design. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. There would be negligible indirect impacts on the remaining historic districts and structures within the study area. Cumulative impacts on historic districts and structures would be minor to moderate long-term adverse. Based on this impact analysis, Phase 2 of alternative 5 would not result in any impacts that would constitute impairment of historic districts and structures.

CULTURAL LANDSCAPES

Study Area

The proposed alternatives would impact character-defining features of three cultural landscapes: Washington Monument and Grounds, Constitution Gardens, and Lincoln Memorial Grounds.

Impact Thresholds

In order for a cultural landscape to be listed on the NRHP, it must possess significance (the meaning or value ascribed to the landscape) and have integrity of those features which convey its significance. Character-defining features of a cultural landscape may include spatial organization and land patterns, topography, vegetation, circulation patterns, water features, structures/buildings, and small-scale objects (see *The Secretary of the Interior's Standards for the Treatment of Historic Properties and the Guidelines for the Treatment of Cultural Landscapes*, 1992). For purposes of analyzing potential impacts on cultural landscapes, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: The impact is at the lowest level of detection with neither adverse nor beneficial consequences. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Minor: Adverse impact — Alteration of a pattern(s) or feature(s) of the cultural landscape listed on or eligible for the NRHP would not diminish the integrity of a character-defining feature(s) or the overall integrity of the landscape. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Beneficial impact — Preservation of landscape patterns and features would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, thereby maintaining the integrity of the cultural landscape. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Moderate: Adverse impact — The impact would alter a character-defining feature(s) of the cultural landscape and diminish the integrity of that feature(s) of the landscape. For purposes of Section 106, the determination of effect would be *adverse effect*.

Beneficial impact — The landscape or its features would be rehabilitated in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, to make possible a compatible use of the landscape while preserving its character defining features. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Major: Adverse impact — The impact would alter a character-defining feature(s) of the cultural landscape and severely diminish the integrity of that feature(s) and the overall integrity of the historic property. For purposes of Section 106, the determination of effect would be *adverse effect*.

Beneficial impact — The cultural landscape would be restored in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* to accurately depict the features and character of a landscape as it appeared during its period of significance. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Duration – Phase 1: In the short-term, most impacts would be related to the activity and disruption associated with construction. There would also be short-term impacts associated with the implementation of the post and panels during a flood event. Long-term impacts would result

between the time of implementation and construction of Phase 2, a period of time that is unknown, but is expected to be multiple years.

Duration – Phase 2: In the short-term, most impacts would be related to the activity and disruption associated with construction. There would also be short-term visual impacts associated with the implementation of the post and panels during a flood event. The long-term impacts would be related to obscured or disrupted views from the areas where the proposed actions would occur.

It should be noted that all the alternatives evaluated in this EA, except the no action alternative, have been named for their approach to achieving closure at 17th Street. In fact, each action alternative addresses the full undertaking including flood control at 23rd Street and the berm above the Reflecting Pool. However, the fact that all of the action alternatives would be the same for each phase at 23rd Street and the berm, has led to a focus, and to names of alternatives, that reflect the wide variation in approach to building a flood barrier across 17th Street.

A Note About Cumulative Impacts for Cultural Resources: The general context for the consideration of cumulative impacts on cultural resources is the wide-spread concern that the National Mall is becoming overcrowded with structures and other built features as evidenced by the establishment of plans and commissions to regulate the addition of new projects on the Mall.

The areas of potential effect of the various projects analyzed for cumulative impacts are often more limited than the extensive study area of the levee project. Within the broad categories of cultural resources addressed in the EA: historic districts and structures, cultural landscapes, and archeology, there will be instances in which the anticipated impacts are truly compounding (ex., the construction of the NMAAHC and the levee's 17th Street crossing upon the Washington Monument grounds) and where there is little potential for compounding (ex., the construction of the USIP and the levee's 17th Street crossing upon the Washington Monument grounds - *although the USIP and the 23rd Street component of the levee might, in theory, have a cumulative impact upon the Constitution Gardens cultural landscape*). Adding to the complexity of this issue is the ability of future official design review processes to mitigate the severity of the adverse effects of many projects and the ongoing development of the National Mall Plan, whose recommendations are not fixed as of this writing.

For these reasons, cumulative impacts to cultural reasons in the analysis below will frequently be given as a range, and only those that are considered to be substantial highlighted.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. The no action alternative would continue the present system of flood protection. This system involves temporary closures at 17th and 23rd streets. The temporary closure at 23rd Street involves the placement of sandbags along the west side of 23rd Street to the eastbound ramp of Roosevelt Bridge at the end of Constitution Avenue. At 17th Street, the closure involves the use of sandbags, Jersey barriers, and landfill from the Monument Grounds. If required, an eight foot earthen embankment would be constructed for further flood control at 17th Street. The existing levee berm above the Reflecting Pool would remain untouched for the no action alternative

This no action alternative would cause a direct short-term minor adverse impact on the Washington Monument and Grounds cultural landscape, which would be mitigated by restoration to pre-existing conditions following the flood event.

There would be negligible indirect short-term impacts on the Lincoln Memorial Grounds and Constitution Gardens cultural landscape because the no action alternative is reversible.

Cumulative Impacts. Other present and future projects within or adjacent to the study area for the Potomac Park levee would have the potential to impact cultural landscapes. These projects include the construction of the NMAAHC, the VVMC, the MLK Memorial, and the USIP and the Lincoln Memorial

Circle Rehabilitation and Security Project, Additionally, there is currently a major planning effort underway, the National Mall Plan, which may have long-term consequences for the study area; however, its recommendations have not been finalized, so projects associated with them cannot be evaluated.

In general, the specific effects of projects for which final design has not been done and which are still in the planning stage cannot be fully evaluated. It is well known, however, that the cumulative effect of continuing demand for project sites on the National Mall, an area often regarded as fully developed, is widely recognized as a cause for concern.

The USIP is constructing its new headquarters at the northwest corner of Constitution Avenue and 23rd Street NW. Continuing a line of prominent buildings along the north side of Constitution Avenue and replacing a parking lot, it will be an appropriate framing building for the Lincoln Memorial Grounds and Constitution Gardens cultural landscapes. The Lincoln Memorial Circle Rehabilitation and Security Improvements will place a series of bollards around the circle on the east side of the Memorial, a secure access gate on the west side, and two visitor services areas to the north and south. The long-term adverse impacts associated with this project would be negligible as the design and materials would be compatible with the Lincoln Memorial and surrounding historic resources as well as small in scale (NPS 2002a). The VVMC, to be located to the east of 23rd Street NW in Constitution Gardens, may be anticipated to have a moderate long-term adverse impact on the Constitution Gardens cultural landscape, primarily because it will not be in keeping with the design intent of the latter. Construction of NMAAHC, situated on the northeast panel of the Washington Monument Grounds, may result in a future moderate long-term adverse impact on the Washington Monument and Grounds cultural landscape. This adverse impact should be mitigated by the ongoing design development and review process for the NMAAHC. The future MLK Memorial will be visible but is remote from any of the study area's cultural landscapes; its construction will have minor adverse indirect long-term effects on them.

The negligible long-term adverse impacts on cultural landscapes that would result from the no action alternative, in combination with the negligible to moderate adverse impacts that would result from construction of the above projects, would result in negligible to moderate long-term adverse cumulative effects.

Conclusion: The no action alternative would result in minor direct short-term adverse impacts on the Washington Monument and Grounds cultural landscape and negligible indirect impacts on Constitution Gardens and Lincoln Memorial. Cumulative impacts on cultural landscapes would be negligible to moderate adverse. The no action alternative would not result in any impairment of cultural landscapes.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. At 23rd Street and the Reflecting Pool, flood control would be the same as the no action alternative. The Phase 1 implementation of alternative 1 would involve closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height just as in the no action alternative.

For Alternative 1A the 17th Street closure would require construction of a post and panel system at a point approximately 198 feet south of Constitution Avenue. This variation of the arc wall alternative would be an exposed concrete wall in two sections 392 feet in total length placed in an arc from Constitution Gardens to the Washington Monument and Grounds interrupted by a 94 linear foot post and panel system at 17th Street. The eastern wall section (203 feet) on the Monument Grounds would be a true arc in plan; however, the western section (189 feet) would be segmented, bending to follow the line of the existing internal walkway at Constitution Gardens. The topmost wall height of 6.3 feet (possibly 8.3 feet if funding is available) would be at the sidewalk but descend to ground level as it extends out from the sidewalk. At the end of the east wall on the Monument Grounds, a storage vault, built mostly underground, would accommodate storage of the post and panels.

For alternative 1B the 17th Street closure would require construction of a post and panel system 55 feet further south than 1A or approximately 253 feet south of Constitution Avenue. This variation of the arc wall alternative would be more symmetrical with two exposed concrete walls of 120 foot length, true arcs in plan, extending to the east and west 25 feet from the 17th Street sidewalks. The length of the post and panel system would be 140 feet or 46 feet longer than 1A. Due to the lower elevation of the street, the height of the panel system at the sidewalk would have to be nine feet. Phase 1B would be substantially different from 1A, and from other alternatives as well, in the scale of the area to be graded (5.24 acres) and tree loss (98 trees). It also includes the removal of the two straight paved paths that extend to the NE and SE from Overlook Terrace to 17th Street and substitutes radial walkways in Constitution Gardens that mimic the radial walkway from the corner of 17th Street and Constitution Avenue into the Washington Monument Grounds.

Construction of the closure system across 17th Street would impact cultural landscapes located at the Washington Monument and Grounds and Constitution Gardens. The walls would be located directly within these cultural landscapes and could alter several of their character-defining features. The closure of 23rd Street would affect the Lincoln Memorial cultural landscape.

Lincoln Memorial Grounds. This action would cause negligible indirect short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape due to its reversibility.

Washington Monument and Grounds. The Washington Monument and Grounds cultural landscape consists of a designed historic landscape preserving the scenic and aesthetic qualities of the Washington Monument and the National Mall. The scale and materials of the levee walls would introduce physical elements that diminish the integrity of the Washington Monument and Grounds cultural landscape including the topography, vegetation, views and vistas, and the character-defining open space qualities, all of which contribute to the overall design intent.

The integrity of the topography would be compromised with the creation of a fence-like appearance to what was designed as a broad, open landscape and the scale of the re-grading required for alternative 1B. This would cause a direct, long-term moderate adverse impact on the landscape's character-defining topography, views and vista, and use patterns.

The removal of one tree along 17th Street near the Monument Grounds would be considered a direct long-term minor adverse impact on the vegetation and setting of the cultural landscape. The vegetation pattern along 17th Street would remain intact. The removal of 14 trees in two locations on the Monument Grounds including five new cherry trees under alternative 1B would be a direct long-term minor adverse impact but not fundamentally alter the open character of the landscape.

Some of the most important character-defining features of the Monument's cultural landscape are the views and vistas to the monument itself, which would be adversely impacted. "Vistas" are defined as planned views, whereas "views" are unplanned that many times result from the construction of other features. Exposed concrete walls on the monument landscape would not be in keeping with the natural environment or the built fabric associated with or adjacent to the Monument Grounds. The Washington Monument and other historic buildings on the grounds are constructed of marble. The Lockkeeper's House is constructed of fieldstone, and the Bulfinch Gatehouse and Gateposts are brownstone. These walls would create a fence-like appearance to 17th Street. The arc wall gives the sense of a physical barrier to the street and Monument Grounds versus the open and inviting landscape that defines the Monument Grounds. Nonetheless the ability under alternative 1B to pull back the walls further from the 17th Street corridor and to limit the length of each to 120 feet makes this version appear less intrusive than alternative 1A. Its symmetry and balanced setting which links the Washington Monument Grounds and Constitution Gardens cultural landscapes is a positive. However, the grounds were designed with the intent of creating open spaces for passive recreation: strolling, picnicking, admiring the monument, etc. A large concrete wall would still add spatial structure and a visual intrusion on the landscape, thereby

causing direct moderate adverse impacts on significant views to the Washington Monument and the spatial quality of the landscape.

Phase 1 of alternative 1 would in effect diminish the integrity of the landscape's original design intent. The above impacts on the Washington Monument and Grounds cultural landscape would be direct, long-term, moderate, and adverse for Phase 1 of the arc wall alternative.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. The cultural landscape of Constitution Gardens would be directly impacted with the physical construction of the Phase 1 levee walls on the west side of 17th Street, resulting in direct long-term adverse impacts on various character-defining features of the cultural landscape, including vegetation and the views and vistas.

The scale and severity of this impact would be far greater under alternative 1B than 1A. Alternative 1A would remove only 13 trees while alternative 1B would remove 131 trees including two older walnuts, essentially denuding of vegetation - except for replacement sod - the northeast quadrant of Constitution Gardens and broad swaths to the southeast.

Large groupings of mature canopy trees are a contributing feature of Constitution Gardens. Vegetation and topography would incur a direct, long-term moderate adverse impact under alternative 1A of Phase 1 of the arc wall alternative. If funding is available to increase the wall height to 18.7 feet NAVD, additional tress would need to be removed (see Phase 2 analysis).

However, the loss of character defining vegetation and trees under alternative 1B would rise to the level of a major long-term direct adverse effect if not successfully mitigated. For this reason, the development and implementation of Landscape Plan to accomplish the replanting of this area would have to be carried out directly following the execution of alternative 1B in Phase 1.The Cultural Landscape Inventory (CLI) of Constitution Gardens lists a number of contributing views and vistas, two of which are "vistas from park to Washington Monument," and "views from Overlook Terrace" (NPS 2008:105–106). The CLI does not specifically list any views or vistas within the project location. The "vistas from park to Washington Monument" are described in the CLI as generally from the west side of Constitution Gardens Lake and the Vietnam Veterans Memorial. "Views from Overlook Terrace" are described as looking west across the lake toward the Lincoln Memorial.

Views from the present northeast walkway from Overlook Terrace and 17th Street are intermittent. There is one significant view from the eastern edge of Constitution Gardens along the sidewalk of 17th Street looking towards the Washington Monument. The end of the northeast walkway from Overlook Terrace at 17th Street is a prime location for viewing and photographing the Washington Monument. The levee wall in alternative 1A would block the view to the Washington Monument from this point, compromising the integrity of the view. Standing at a height of 6.3 feet above the sidewalk, the wall would intrude into view of the monument, creating a direct long-term moderate adverse impact.

Alternative 1B would be less intrusive on views from Constitution Gardens to the Monument and elsewhere than alternative 1A. In fact, it would improve the visibility from Overlook Terrace to the Monument Grounds.

The diagonal walkways NE and SE from the corners of Overlook Terrace are identified as contributing character defining features # 120814 and 120816 of the circulation system in the Constitution Gardens CLI. Therefore their removal in favor of the proposed radial walkways of alternative 1B would be a long-term direct moderate adverse impact on the integrity of the Constitution Gardens design.

Phase 1 construction would provide an unsympathetic intrusion and diminish the significant qualities of two important cultural landscapes by its exposed concrete walls and, for alternative 1B only, massive tree loss and removal of significant character defining features at Constitution Gardens. However, alternative 1B would be mitigated from a level of major adverse impact to moderate adverse impact by the direct implementation of a Landscape Plan. The Phase 1 arc walls would cause direct moderate adverse impacts on the overall character-defining views of the cultural landscape. Other mitigation measures may include surface treatment of the walls to lessen the visual impact, public interpretation programming, and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 1 of alternative 1, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse for Phase 1 of the Arc Wall alternative. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale, but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. The Landscape Plan would have to be developed and implemented directly after execution of Phase 1 of alternative 1B to avoid a level of major adverse impact. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 1 of alternative 1 would not result in any impacts that would constitute impairment of cultural landscapes.

Phase 2 Analysis. Areas on either side of the eastbound ramp at 23rd Street to Constitution Avenue from Roosevelt Bridge would be re-graded and filled. The northern embankment would be three feet above the existing grade, and the southern section would be approximately 2.5 feet of fill on average. Three trees would be removed north of the eastbound ramp, and six trees would be removed from below the ramp. Under Phase 2, areas along the Reflecting Pool levee would be filled in to attain a uniform level across its entire length. Phase 2 across 17th Street would differ from Phase 1 with stone facing on the concrete walls, and an increase of the wall height by two feet for Alternative 1A (assuming this was not accomplished in Phase 1). For alternative 1B, the height would remain 8.7 feet.

Construction of the closure system across 17th Street would impact cultural landscapes located at the Washington Monument and Grounds and Constitution Gardens. The walls would be located directly within these cultural landscapes and could alter several of their character-defining features. The closure of 23rd Street would affect the Lincoln Memorial cultural landscape.

Lincoln Memorial Grounds. This action would cause negligible direct short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape. The removal of six trees and the slight re-grading of the cultural landscape would not significantly alter the integrity of topography or vegetation.

Washington Monument and Grounds. Most of the impacts described below would already have occurred during implementation of Phase 1 and been mitigated.

The Washington Monument and Grounds cultural landscape consists of a designed historic landscape preserving the scenic and aesthetic qualities of the Washington Monument and the National Mall. The scale of the levee walls would introduce physical elements that diminish the integrity of the Washington Monument and Grounds cultural landscape including the topography, vegetation, views and vistas, and the character-defining open space qualities, all of which contribute to the overall design intent.

The integrity of the topography would be compromised with the creation of a fence-like appearance to what was designed as a broad, open landscape and the scale of the re-grading required for Alternative 1B. This would cause a direct, long-term moderate adverse impact on the landscape's character-defining topography, views and vista, and use patterns.

The removal of one tree along 17th Street near the Monument Grounds would be considered a direct long-term minor adverse impact on the vegetation and setting of the cultural landscape. The vegetation pattern along 17th Street would remain intact. The removal of 14 trees in two locations on the Monument Grounds including five new cherry trees under alternative 1B would be a direct long-term minor adverse impact but not fundamentally alter the open character of the landscape.

Some of the most important character-defining features of the Monument's cultural landscape are the views and vistas to the monument itself, which would be adversely impacted. "Vistas" are defined as planned views, whereas "views" are unplanned that many times result from the construction of other features. The walls would create a fence-like appearance to 17th Street. The arc wall gives the sense of a physical barrier to the street and Monument Grounds versus the open and inviting landscape that defines the Monument Grounds. Nonetheless the ability under alternative 1B to pull back the walls further from the 17th Street corridor and to limit the length of each to 120 feet makes this version appear less intrusive than 1A. Its symmetry and balanced setting which links the Washington Monument Grounds and Constitution Gardens cultural landscapes is a positive. However, the grounds were designed with the intent of creating open spaces for passive recreation: strolling, picnicking, admiring the monument, etc. A large wall, even clad in stone, would still add spatial structure and a visual intrusion on the landscape, thereby causing direct moderate adverse impacts on significant views to the Washington Monument and the spatial quality of the landscape.

Phase 2 of alternative 1 would still diminish the integrity of the landscape's original design intent. The above impacts on the Washington Monument and Grounds cultural landscape would be direct, long-term, moderate, and adverse for Phase 1 of the Arc Wall alternative.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects. As noted in the Phase 1 analysis above, the Landscape Plan may have been accomplished directly after Phase 1 implementation.

Constitution Gardens. The cultural landscape of Constitution Gardens would be directly impacted with the physical construction of the Phase 1 levee walls on the west side of 17th Street, resulting in direct long-term adverse impacts on various character-defining features of the cultural landscape, including vegetation and the views and vistas.

The scale and severity of this impact would be far greater under alternative 1B than 1A. Alternative 1A would remove only 13 trees while alternative 1B would remove 131 trees including two older walnuts, essentially denuding of vegetation - except for replacement sod - the northeast quadrant of Constitution Gardens and broad swaths to the southeast.

Large groupings of mature canopy trees are a contributing feature of Constitution Gardens. Vegetation and topography would incur a direct, long-term moderate adverse impact under alternative 1A of Phase 1 of the arc wall alternative. However, the loss of character defining vegetation and trees under alternative 1B would rise to the level of a major long-term direct adverse effect if not successfully mitigated. For this reason, the development and implementation of Landscape Plan to accomplish the replanting of this area would have to be carried out directly following the execution of alternative 1B in Phase 1.The Cultural Landscape Inventory (CLI) of Constitution Gardens lists a number of contributing views and vistas, two of which are "vistas from park to Washington Monument," and "views from Overlook Terrace" (NPS 2008:105–106). The CLI does not specifically list any views or vistas within the project location. The "vistas from park to Washington Monument" are described in the CLI as generally from the west side of Constitution Gardens Lake and the Vietnam Veterans Memorial. "Views from Overlook Terrace" are described as looking west across the lake toward the Lincoln Memorial.

Views from the present northeast walkway from Overlook Terrace and 17th Street are intermittent. There is one significant view from the eastern edge of Constitution Gardens along the sidewalk of 17th Street looking towards the Washington Monument. The end of the northeast walkway from Overlook Terrace at 17th Street is a prime location for viewing and photographing the Washington Monument. The levee wall in alternative 1A would block the view to the Washington Monument from this point, compromising the integrity of the view. Standing at a height of 6.3 feet above the sidewalk, the wall would intrude into view of the monument, creating a direct long-term moderate adverse impact.

Alternative 1B would be less intrusive on views from Constitution Gardens to the Monument and elsewhere than alternative 1A. In fact, it would improve the visibility from Overlook Terrace to the Monument Grounds.

The diagonal walkways NE and SE from the corners of Overlook Terrace are identified as contributing character defining features # 120814 and 120816 of the circulation system in the Constitution Gardens CLI. Therefore their removal in favor of the proposed radial walkways of alternative 1B would be a long-term direct moderate adverse impact on the integrity of the Constitution Gardens design.

Phase 2 construction would still provide an unsympathetic intrusion and diminish the significant qualities of two important cultural landscapes by its walls, though clad in stone, and, for alternative 1B only, massive tree loss and removal of significant character defining features at Constitution Gardens. However, Alternative 1B could be and may have been mitigated from a level of major adverse impact to moderate adverse impact by the direct implementation of a Landscape Plan and other mitigation measures. The Phase 2 arc walls would cause direct moderate adverse impacts on the overall character-defining views of the cultural landscape. Other mitigation measures may include public interpretation programming and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 1 of alternative 1, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse for Phase 1 of the Arc Wall alternative. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale, but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. The Landscape Plan would have to be developed and implemented directly after execution of Phase 1 of alternative 1B to avoid a level of major adverse impact. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 2 of alternative 1 would not result in any impacts that would constitute impairment of cultural landscapes.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Phase 1 Analysis. Phase 1 of alternative 2 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative while the 17th Street closure would require construction of a post and panel system at a point approximately 138 feet south of Constitution Avenue. The Gate Walls alternative consists of two variants, alternative 2A and alternative 2B. The east side of 17th Street would be substantially re-graded, creating an earthen berm. To connect the post and panel system to the berm, an L-shaped concrete retaining wall would be constructed adjacent to the sidewalk on the Monument Grounds. The concrete retaining wall on the Constitution Gardens side would be longer, either an oblique angle in plan for alternative 2A, or one similar with an addition bend for alternative 2B. See Figures 2.7. and 2.8 for more information. Alternative 2A would be exposed concrete, 256 feet in length with nearly 109 feet of post and panels at the central crossing whereas alternative 2B would be 282 feet of wall with 109 feet of post and paneling. The retaining wall heights for both options would be 5.3 feet above grade at the sidewalk. The road would be slightly re-graded to rise approximately one foot to meet the height of Constitution Avenue. A storage facility (located mostly underground) for the post and panel apparatus would be constructed on the east side of 17th Street.

Construction of the closure system across 17th Street would impact cultural landscapes located at the Washington Monument and Grounds and Constitution Gardens. The walls would be located directly within these cultural landscapes and could alter several of their character-defining features. The closure of 23rd Street would affect the Lincoln Memorial cultural landscape.

Lincoln Memorial Grounds. This action would cause negligible indirect short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape due to its reversibility.

Washington Monument and Grounds. The character-defining features of the Washington Monument and Grounds cultural landscape that could be affected with direct long-term adverse impacts are topography, vegetation, small-scale features, views and vistas, and the character-defining open space.

Approximately 50 feet of the L-shaped concrete wall would directly line the sidewalk along the east side of 17th Street for both alternatives 2A and 2B. Re-grading off the south side of the eastern gate wall would create a new steeper slope. Alternative 2 would cause a moderate adverse impact on the open turf area and gentle slope topography of the Monument's landscape by creating a more spatially structured appearance.

Two street trees will be removed from the east side of 17th Street. This is considered a minor adverse impact on the vegetation of the Washington Monument and Grounds.

Only one small-scale feature, a Washington Globe light post, would be compromised in Phase 1 of alternative 2. This light post is directly in line with the proposed post and panel construction and would be

removed and most likely relocated. This would be a negligible impact on the overall small-scale character-defining features of the Washington Monument and Grounds cultural landscape.

Important views and vistas of the cultural landscape would be impacted and their integrity diminished by the construction of Phase 1 of alternatives 2A and 2B. The use of an earthen berm on the Monument Grounds and a small L-shape wall would create a visual impact. Views to and from the Washington Monument would be affected primarily by the height of the earth berm as well as the exposed concrete wall placed near the walkway.

The base of the monument and the flagpoles, which are a contributing character-defining feature, would no longer be visible from the site on 17th Street in Phase 1. Concrete would not be compatible to the natural landscape or the built fabric of the Washington Monument cultural landscape. The placement of the L-shape wall adjacent to the walkway would create a visual intrusion. This would be a moderate adverse impact on significant viewsheds from 17th Street and Constitution Avenue.

The above impacts on the Washington Monument and grounds cultural landscape would be moderate and adverse for both options of Phase 1 of alternative 2. The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. The cultural landscape of Constitution Gardens would be directly impacted with the physical construction of the Phase 1 levee walls resulting in long-term direct adverse impacts on various character-defining features of the cultural landscape including topography, vegetation, views and vistas, and small-scale features.

The topography of the landscape would be affected with the introduction of a levee wall and a storage building to contain the post and panel apparatus. These effects would have a direct long-term minor adverse impact.

Two street trees along the west side of 17th Street would be removed. Sixteen additional trees would be removed from Constitution Gardens under alternative 2A, and 25 trees would be removed under alternative 2B. The number of trees removed would moderately affect the design intent of Constitution Gardens, which is to create a transition from the formal National Mall to the informal Constitution Gardens park. Long-term adverse impacts on vegetation of Constitution Gardens cultural landscape would be considered moderate. If funding is available to increase the wall height to 18.7 feet NAVD, additional tress would need to be removed (see Phase 2 analysis).

Several Washington Globe light posts illuminate the northeast walkway between 17th Street and Overlook Terrace. One light post would be removed and relocated with Phase 1 construction. This is a minor adverse impact on the overall small-scale character-defining features of the Constitution Gardens cultural landscape.

The CLI for Constitution Gardens does not specifically list any views or vistas within the project location; however, there is one significant view from the eastern edge of Constitution Gardens along the sidewalk of 17th Street looking towards the Washington Monument. At a height of 5.3 feet (possibly 7.3 feet) above the sidewalk, the concrete retaining wall (both alternative 2A and 2B) would intrude on the view of the monument, creating a direct long-term moderate adverse impact.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 1 of alternatives 2A and 2B. Mitigation measures include surface treatment of walls to lessen the visual impact, public interpretation programming, and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 1 of alternative 2, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse for Phase 1 of the Gate Walls alternative. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale, but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes cannot be fully identified; those that can be evaluated would range from negligible to minor adverse, assuming planned mitigation is implemented. Based on this impact analysis, Phase 1 of alternative 2 would not result in any impacts that would constitute impairment of cultural landscapes.

Phase 2 Analysis. The portion of Phase 2 east of 17th Street would differ little from Phase 1 in basic concept and structure. The L-shaped wall on the Monument Grounds would be extended 5 feet along the sidewalk and would be faced in a stone veneer. A below-grade structure would be incorporated into the earthen embankment to store the post and panel system. The major difference between Phase 1 and Phase 2 of the Gate Walls alternative is the re-grading and retaining wall addition on the west side of 17th Street. The concrete levee wall built under Phase 1 would be covered with an earthen embankment on both the north and south sides. The fill and grading on both sides of the levee wall would leave a concrete span exposed at the crest of the wall/slope. It would appear like a concrete sidewalk atop the berm. To contain this berm, near 17th Street a stone-clad retaining wall would be constructed either in a V-shape (alternative 2A or “Asymmetric”) or an L-shape to mimic the east wall (alternative 2B or “Symmetric”). Alternative 2B is markedly different from alternative 2A with respect to its location as it is set further west from 17th Street.

Construction of the closure system across 17th Street would impact cultural landscapes located at the Washington Monument and Grounds and Constitution Gardens. The walls would be located directly within these cultural landscapes and could alter several of their character-defining features. The closure of 23rd Street would affect the Lincoln Memorial cultural landscape.

Lincoln Memorial Grounds. This action would cause negligible direct short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape. The removal of six trees and the slight re-grading of the cultural landscape would not significantly alter the integrity of topography or vegetation.

Washington Monument and Grounds. Character-defining features of the Washington Monument and Grounds that could be impacted in Phase 2 of alternative 2 are the topography and views and vistas.

Under Phase 2 of alternative 2, the landscape would be re-graded, compromising the openness of the setting and causing a direct long-term moderate adverse impact on the landscape’s topography.

The base of the monument and the flagpoles, which are a contributing character-defining feature of the landscape, would no longer be visible from the site on 17th Street due to the height of the berm and walls as well as the length of the wall along 17th Street. The wall along the sidewalk of 17th Street would be raised to 7.3 feet. It must also be noted that a storage facility incorporated into the earthen embankment may cause an additional intrusion. These effects would cause a moderate adverse impact on the character-defining views of the cultural landscape.

The above impacts on the Washington Monument and Grounds cultural landscape would be moderate and adverse for Phase 2 of alternative 2 (both options 2A and 2B). The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. Character-defining features of the Constitution Gardens landscape that could be impacted in Phase 2 of alternative 2 (both options 2A and 2B) are the topography, vegetation, and views and vistas.

The re-grading of the grounds to cover the concrete levee wall would cause moderate adverse impacts on the topography of the cultural landscape.

An additional 16 (alternative 2A) or 25 (alternative 2B) trees would be removed from Constitution Gardens during Phase 2. This additional tree removal would open up the landscape between the Lockkeeper's House and Overlook Terrace. This would impact the design intent of Constitution Gardens in forming a transition between the formal National Mall and the informal Constitution Gardens landscape. Removing trees from the perimeter of the park would cause a moderate adverse impact on the character-defining vegetation of the cultural landscape.

Neither alternative 2A nor 2B would adversely affect character-defining views in Constitution Gardens. The levee wall would be largely encased in an earth berm, creating a more natural appearance, which would terminate at the angular stone-faced retaining wall that runs along a small portion of the northeast walkway. The stone-faced wall is offset from 17th Street so as not to impact the significant views towards the Washington Monument. There would be moderate adverse impacts on the overall character-defining views of Constitution Gardens cultural landscape.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 2 of alternative 2 (both options 2A and 2B). Mitigation measures would include public interpretation programming, and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 2 of alternative 2 (both options 2A and 2B). Mitigation measures would include public interpretation programming, and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in

combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 2 of alternative 2, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse for Phase 2 of the Gate Walls alternative. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 2 of alternative 2 would not result in any impacts that would constitute impairment of cultural landscapes.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Phase 1 of alternative 3 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative while the 17th Street closure would require construction of a post and panel system at a point approximately 365 feet south of Constitution Avenue. The post and panel system would be flanked by concrete walls in a chevron pattern on the adjacent slopes. The angled exposed concrete walls across 17th Street would be 7.7 feet tall at the sidewalk. The wall would cover 403 linear feet, with approximately 102 feet of post and panels to connect the two levee walls. The tops of the walls would descend to grade as the slopes rise from 17th Street. To the south of the levee walls, adjacent to the Overlook Terrace, a storage vault for the post and panels would be built, but it would be located mostly underground.

Lincoln Memorial Grounds. This action would cause negligible direct short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape due to its reversibility.

Washington Monument and Grounds. The character-defining features of the Washington Monument cultural landscape that would be impacted are topography, vegetation, and significant views and vistas.

The expansive concrete wall will cause an intrusion on the distinctive open characteristic of the Monument Ground's landscape by creating a fence-like appearance. The levee wall will be a direct long-term moderate adverse impact on the topography of the cultural landscape.

One tree would be removed from the east side of 17th Street, which would be a negligible long-term impact on the overall integrity of the landscape's vegetation.

The visual intrusion of an exposed concrete angular wall would cause moderate impacts on the visual character of the Monument Grounds and prohibit views to the monument and surrounding flagpoles. In addition, concrete is not in keeping with the natural landscape or built fabric of the Washington Monument and Grounds landscape. This would be a moderate adverse impact on the character-defining views of the cultural landscape.

The above impacts on the Washington Monument and Grounds cultural landscape would be moderate and adverse for Phase 1 of alternative 3. The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. Character-defining features of the cultural landscape that could be impacted include the vegetation and views and vistas.

One street tree along the west side of 17th Street would be removed in Phase 1 to accommodate the post and panel portion of the wall. Sixteen additional trees would be removed from Constitution Gardens. Overall, adverse impacts on the vegetation of Constitution Gardens cultural landscape would be considered moderate.

The placement of the wall 365 feet south of Constitution Gardens would not inhibit views to the Monument from locations near Constitution Avenue and the Lockkeeper's House. The wall vanishing into the topography lessens impacts on possible views to the Washington Monument. The exposed concrete wall is an uncompromising aesthetic, for it is not in keeping with the Constitution Gardens' cultural landscape. The levee wall on the Monument Grounds would cause a minor adverse impact on significant views from within Constitution Gardens.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 1 of alternative 3.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 1 of alternative 3, would result in long-term moderate cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse for Phase 1 of the Constitution Garden Walls alternative. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 1 of alternative 3 would not result in any impacts that would constitute impairment of cultural landscapes.

Phase 2 Analysis. Closures at 17th and 23rd streets would occur, and areas on either side of the eastbound ramp at 23rd Street to Constitution Avenue from Roosevelt Bridge would be re-graded and filled. The northern embankment would be 3 feet above the existing grade and the southern section would be approximately 2.5 feet of fill on average. Three trees would be removed from above the eastbound ramp, and six trees would be removed from below the ramp. Under Phase 2, areas along the Reflecting Pool levee would be filled in to attain a uniform level across its entire length. The flood control levee wall across 17th Street would dramatically differ in Phase 2 from the previous phase. Phase 2 construction includes three 3-foot seat walls (retaining walls) on the Monument Grounds, coupled with four seat walls on the west side of 17th Street. The terraced seat walls are 2.5 feet in height, and the flood protection would essentially consist of a post and panel system approximately 236 feet across 17th Street along with Jersey barriers on top of the terraced walls. The west walls would mimic Overlook Terrace by including flanking steps. Following construction of Phase 2, the exposed concrete levee walls erected in Phase 1 would be removed.

Construction of the closure system across 17th Street would impact cultural landscapes located at the Washington Monument and Grounds and Constitution Gardens. The walls would be located directly within these cultural landscapes and could alter several of their character-defining features. The closure of 23rd Street would affect the Lincoln Memorial cultural landscape.

Lincoln Memorial Grounds. This action would cause negligible direct short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape. The removal of six trees and the slight re-grading of the cultural landscape would not significantly alter the integrity of topography or vegetation.

Washington Monument and Grounds. The character-defining features of the Washington Monument cultural landscape that would be impacted include topography and vistas.

The Washington Monument topography would be altered with the re-grading to create terraces for the seat wall. Additional grading would be done around the sycamore tree left standing near 17th Street. The terraced walls would create an intrusion on the open turf aspect of the topography. Phase 2 would have moderate adverse impacts on the overall integrity of the topography of the cultural landscape.

Visibility to the Washington Monument would diminish along a portion of the sidewalk along 17th Street. This would cause a moderate adverse impact on the character-defining views of the cultural landscape.

The above impacts on the Washington Monument and Grounds cultural landscape would be moderate and adverse for Phase 2 of alternative 3. The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. The character-defining features of the Constitution Gardens cultural landscape that would be impacted include topography, vegetation, and views and vistas.

The ground would be re-graded to accommodate the necessary height of the four terraced seat walls. The integrity of the character-defining topography of gentle slopes of Constitution Gardens would incur direct long-term moderate adverse impacts under Phase 2 of alternative 3.

Sixty-five trees would be removed from Constitution Gardens, which would open up the landscape between Overlook Terrace and 17th Street. The street side of Constitution Gardens was designed to be wooded, creating a gradual transition from the street to the interior of the park. The street edge was to be heavily wooded with gradually fewer trees to the interior. Additionally, the trees were to be aligned in rows of varying density. The removal of 65 trees would severely compromise this transitioning effect between the formal National Mall and the pastoral and intimate landscape of Constitution Gardens. This would be considered a moderate adverse impact on the overall vegetation of the cultural landscape.

Visibility between Overlook Terrace and the Washington Monument and Grounds would greatly increase, which would create a physical connection between the landscapes of the Washington Monument, 17th Street, and Constitution Gardens. This would not be in keeping with the design intent regarding views and vistas of Constitution Gardens and therefore would be considered a moderate adverse effect.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 2 of alternative 3. Proposed mitigation measures include public interpretation programming and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute

cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 2 of alternative 3, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of topography and views and vistas. However, the adverse impact on topography would be less severe than alternatives 1 and 2. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. The integrity of the wooded landscape between Overlook Terrace and 17th Street in Constitution Gardens would be compromised. This vegetation is important in transitioning between the formal landscape of the National Mall to the informal pastoral landscape of Constitution Gardens. These impacts would be moderate in scale but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 2 of alternative 3 would not result in any impacts that would constitute impairment of cultural landscapes.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. The Phase 1 implementation of alternative 4 would involve closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height just as is done now under the no action alternative while the 17th Street closure would require construction of a post and panel system at a point approximately 177 feet south of Constitution Avenue. The Hybrid alternative would combine the west wall from alternative 2B and the east wall from alternative 1. The east wall would be an exposed concrete arc-shaped wall approximately 248 feet in length, and its east end would appear to recede into the landscape. The west wall would be an exposed concrete wall that runs southwest from Constitution Avenue then bends back to the southwest for a total length of 168 feet. A retaining wall on the west side would create the connection point for the post and panel system. The wall would be 5.3 feet high (possible 7.3 feet high) at the sidewalk. A total of 28 trees would be removed during this phase, four of which are along 17th Street.

Construction of the closure system across 17th Street would impact cultural landscapes located at the Washington Monument and Grounds and Constitution Gardens. The walls would be located directly within these cultural landscapes and could alter several of their character-defining features. The closure of 23rd Street would affect the Lincoln Memorial cultural landscape.

Lincoln Memorial Grounds. This action would cause negligible indirect short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape due to its reversibility.

Washington Monument and Grounds. The Washington Monument and Grounds cultural landscape consists of a designed historic landscape preserving the scenic and aesthetic qualities of the Washington Monument and the National Mall. The scale and materials of the levee walls would introduce physical elements that diminish the integrity of the Washington Monument and Grounds cultural landscape including the topography, vegetation, views and vistas, and the character-defining open space qualities, all of which contribute to the overall design intent.

Similar to Phase 1 of alternative 1, the integrity of the topography would be compromised with the creation of a gate-like appearance to what was designed as a broad, open landscape. This would cause a direct long-term moderate adverse impact on the landscape's character-defining topography, views and vista, and use patterns.

The removal of two trees along 17th Street would be considered a direct, long-term minor adverse impact on the vegetation and setting of the cultural landscape. The vegetation pattern along 17th Street would remain intact.

Some of the most important character-defining features of the monument's cultural landscape are the views and vistas to the monument itself, which will be adversely impacted. Exposed concrete walls on the monument landscape would not be in keeping with the natural environment or the built fabric associated with or adjacent to the Monument Grounds. The Washington Monument and other historic buildings on the grounds are constructed of marble. The Lockkeeper's House is constructed of fieldstone, and the Bulfinch Gatehouse and Gateposts are brownstone. These walls would create a gate-like appearance to 17th Street. Similar to the arc wall of alternative 1, the Hybrid wall gives the sense of a physical barrier to the street and Monument Grounds versus the open and inviting landscape that defines the monument grounds. A large concrete wall would add spatial structure and a visual intrusion on the landscape, thereby causing direct moderate adverse impacts on significant views to the Washington Monument and the spatial quality of the landscape.

Phase 1 of alternative 4 would in effect diminish the integrity of the landscape's original design intent. The above impacts on the Washington Monument and Grounds cultural landscape would be direct, long-term, moderate and adverse for Phase 1 of the Hybrid Wall alternative.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. The cultural landscape of Constitution Gardens would be directly impacted with the physical construction of the Phase 1 levee walls, resulting in long-term direct adverse impacts on various character-defining features of the cultural landscape including topography, vegetation, views and vistas, as well as small-scale features.

The topography of the landscape would be affected with the introduction of a levee wall and a sunken storage building to contain the post and panel apparatus. These effects would have a direct long-term minor adverse impact.

Two street trees along the west side of 17th Street would be removed. Twenty-four additional trees would be removed from Constitution Gardens. The number of trees removed would moderately affect the Constitution Gardens design intent, which is to create a transition from the formal National Mall to the informal Constitution Gardens park. Long-term adverse impacts on the vegetation of Constitution Gardens cultural landscape would be moderate. If funding is available to increase the wall height to 18.7 feet NAVD, additional tress would need to be removed (see Phase 2 analysis).

Several Washington Globe light posts illuminate the northeast walkway between 17th Street and Overlook Terrace. One light post would be removed and relocated with Phase 1 construction. This is a minor adverse impact on the overall small-scale character-defining features of the Constitution Gardens cultural landscape.

The CLI for Constitution Gardens does not specifically list any views or vistas within the project location; however, there is one significant view from the eastern edge of Constitution Gardens along the sidewalk of 17th Street looking towards the Washington Monument. At a height of 5.3 feet above the sidewalk, the

concrete walls would intrude on the view of the monument, creating a direct long-term moderate adverse impact. Although the west wall is located north of the pedestrian path between Overlook Terrace and the Lockkeeper's House, views from the sidewalk along Constitution Avenue and Virginia Avenue would be adversely impacted.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 1 of alternative 4. Mitigation measures include surface treatment of walls to lessen the visual impact, public interpretation programming, and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 1 of alternative 4, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse for Phase 1 of the Hybrid Wall alternative. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 1 of alternative 4 would not result in any impacts that would constitute impairment of cultural landscapes.

Phase 2 Analysis. Areas on either side of the eastbound ramp at 23rd Street to Constitution Avenue from Roosevelt Bridge would be re-graded and filled. The northern embankment would be three feet above the existing grade and the southern section would be approximately 2.5 feet of fill on average. Three trees would be removed from above the eastbound ramp, and six trees would be removed from below the ramp. Under Phase 2, areas along the Reflecting Pool levee would be filled in to attain a uniform level across its entire length. Phase 2 across 17th Street would differ from Phase 1 with re-grading of the Monument Grounds and Constitution Gardens; this would include the additional loss of 32 trees, stone facing on the concrete walls, and an increase of the wall height by two feet.

Construction of the closure system across 17th Street would impact cultural landscapes located at the Washington Monument and Grounds and Constitution Gardens. The walls would be located directly within these cultural landscapes and could alter several of their character-defining features. The closure of 23rd Street would affect the Lincoln Memorial cultural landscape.

Lincoln Memorial Grounds. This action would cause negligible direct short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape. The removal of six trees and the slight re-grading of the cultural landscape would not significantly alter the integrity of topography or vegetation.

Washington Monument and Grounds. Character-defining features of the Washington Monument and Grounds that would be impacted in Phase 2 of alternative 4 are the topography and vistas.

The integrity of the open turf area of this section of the monument grounds would be compromised by creating a gate-like appearance as in alternative 1. The topography would be further impacted with re-grading to form a rise from west to east with the wall as the center point of the re-grading. Phase 2 would be considered a direct moderate adverse impact on the topography of the Washington Monument and Grounds cultural landscape.

Similar to the previous phase, Phase 2 would cause a direct moderate adverse impact on significant views to the Washington Monument. The height of the Phase 2 stone wall adjacent to the sidewalk on 17th Street would be considered a moderate adverse impact on significant viewsheds.

Similar to alternative 1, the proposed stone would be considered an adverse impact on the Monument Grounds because it is not in keeping with materials used on the monument grounds. Fieldstone facing of the concrete walls would not be in keeping with the Monument and Grounds and therefore would diminish the integrity of the design intent and materials of the landscape. This would be a direct moderate adverse impact on the cultural landscape.

The above impacts on the original design intent of the Washington Monument and Grounds cultural landscape would be direct, moderate, and adverse for Phase 2 of the Hybrid Wall alternative.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations for mitigation of adverse effects may include public interpretation programming and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Constitution Gardens. The character-defining features of the Constitution Gardens landscape that would be affected by long-term direct adverse impacts are the topography, vegetation, and the views and vistas.

Due to the re-grading of the grounds, Phase 2 calls for the removal of 32 additional trees totaling 60 trees after both phases. The CLI specifically mentions the importance of the perimeter trees to the park in providing a transition from the formal design of the National Mall to the informal design of Constitution Gardens (NPS 2008). The street sides of the park were planted with evenly spaced trees in rows with their "regularity dissolve[ing] as the plantings continue toward the interior of the Gardens" (NPS 2008:47). In addition, the topography of the landscape would be adversely impacted due to the proposed sunken storage unit to be placed to the southwest corner of the Lockkeeper's House. Phase 2 would compromise the integrity of the contributing aspect of vegetation and topography to the landscape; therefore, it is considered a moderate adverse impact on the original design intent of Constitution Gardens.

As in Phase 1, the east wall on the Monument Grounds would be a visual intrusion on one significant view, which is from the eastern edge of Constitution Gardens at 17th Street. The views looking southeast towards the Washington Monument along Constitution Avenue would also be adversely impacted. Phase 2 would have a moderate adverse impact on the overall character-defining views contributing to the Constitution Gardens cultural landscape.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 2 of alternative 4. Mitigation measures include public interpretation programming and ongoing design review by the CFA, NCPC, and the D.C. Historic Preservation Office.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington

Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 2 of alternative 4, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be direct, moderate, and adverse for Phase 2 of the Hybrid Wall alternative. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of topography, vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 2 of alternative 4 would not result in any impacts that would constitute impairment of cultural landscapes.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as the no action alternative**.** Phase 1 of alternative 5 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative. The 17th Street closure would require construction of a post and panel system at a point approximately 525 feet south of Constitution Avenue.

This alternative would place one new small structure on the east side of 17th Street and a curved wall and realigned walkway to the west side of 17th Street, aligned to the southern edge of the Overlook Terrace. The east structure would be placed on the Monument Grounds and would take advantage of the existing, higher topography to allow the ground to slope gently toward the intersection of 17th Street and Constitution Avenue. This concrete structure would resemble the similar small structures located on the Monument Grounds and would serve as both the east abutment and the storage facility for the post and panel closure system.

To the west of 17th Street, there would be a curved levee wall running southeast from the Overlook Terrace that would provide the western abutment for the post and panel system.

Unlike the other action alternatives analyzed, both Phase 1 and 2 of alternative 5 have been conceptually designed to meet the full 18.7 NAVD flood protection standard, because of the difficulty of increasing the height of the building at a later time.

Lincoln Memorial Grounds. This action would cause negligible direct short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape. The removal of six trees and the slight re-grading of the cultural landscape would not significantly alter the integrity of topography or vegetation.

Washington Monument and Grounds. The character-defining features of the Washington Monument cultural landscape that would be impacted include topography, feeling, association, and views.

The Washington Monument topography would be altered with the re-grading required to create a slope just east of 17th Street into which the post and panel storage building would be recessed. No trees on the Monument Grounds would have to be removed although two street trees lining the east side of 17th Street would be lost to accommodate construction of the post and panel foundations. Alteration to topography is

greater than that for Phase 1 of alternatives 1, 3, and 4; however, no further re-grading is needed to achieve Phase 2.

The post and panel storage building would be an intrusion on the distinctive open landscape of the Monument Grounds. However, it may also be seen in the context of the other ancillary service buildings on the grounds such as the Monument Lodge or one of the Bullfinch Gatehouses. These buildings, though of various periods and functions, were typically built with high levels of architectural finish and articulation which make them appear appropriate to the function of a park pavilion. The concrete material and stripped down appearance of the Phase 1 storage building would work against the perception that it was a supporting park structure like the others. This would have moderate adverse impacts on the overall integrity of the feeling, association, and topography of the cultural landscape.

Visibility to the Washington Monument would diminish along a short portion of the sidewalk along 17th Street, although views of the Monument from Overlook Terrace would not be much affected as the building is sunk into the slope. This would cause a moderate adverse impact on the character-defining views of the cultural landscape.

The above impacts on the Washington Monument and Grounds cultural landscape would be moderate and adverse for Phase 1 of alternative 5. The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. The character-defining features of the Constitution Gardens cultural landscape that would be impacted include vegetation and views.

The curved levee wall west of 17th Street would only extend above grade toward the street; as it approaches Overlook, it would be built into the slope (although the top of the wall must remain accessible for inspection purposes). No alteration to the topography would be required.

Twenty-eight trees would be removed from Constitution Gardens, which would open up the landscape between Overlook Terrace and 17th Street. The street side of Constitution Gardens was designed to be wooded, creating a gradual transition from the street to the interior of the park. The street edge was to be heavily wooded with gradually fewer trees to the interior. Additionally, the trees were to be aligned in rows of varying density. The removal of 28 trees would compromise this transitioning effect between the formal National Mall and the pastoral and intimate landscape of Constitution Gardens. This would be considered a moderate adverse impact on the overall vegetation of the cultural landscape.

Visibility between Overlook Terrace and the Washington Monument and Grounds would increase, creating a greater physical connection between the landscapes of the Washington Monument, 17th Street, and Constitution Gardens. This would not be in keeping with the design intent regarding views and vistas of Constitution Gardens and therefore would be a moderate adverse effect.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 1 of alternative 5. Proposed mitigation measures include treatment, landscape, and historic resource stabilization plans as well as public interpretation.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project

would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 1 of alternative 5, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse for Phase 1 of alternative 5. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of vegetation and views and vistas. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. Considered together, these would be moderate in scale but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 1 of alternative 5 would not result in any impacts that would constitute impairment of cultural landscapes.

Phase 2 Analysis. Flood control at 23rd Street and the Reflecting Pool would be the same as the no action alternative**.** Phase 2 of alternative 5 would entail closures at 17th and 23rd streets. The 23rd Street closure would involve the temporary use of sandbags one to two feet in height as stated under the no action alternative. The 17th Street closure would utilize the post and panel system approximately 525 feet south of Constitution Avenue.

Phase 2 of alternative 5 would clad in stone the small structure on the east side of 17th Street and the curved wall to the west side of 17th Street that would be aligned to the southern edge of the Overlook Terrace and which would be constructed in Phase 1. The east structure, placed on the Monument Grounds, would continue to take advantage of the existing, higher topography to allow the ground to slope gently toward the intersection of 17th Street and Constitution Avenue. This structure would more closely resemble the scale of similar small structures located on the Monument Grounds due to the more appropriate exterior material and architectural finishes, and it would continue to serve as both the east abutment and the storage facility for the post and panel closure system.

To the west of 17th Street, the curved levee wall running southeast from the Overlook Terrace that would provide the western abutment for the post and panel system would also be clad in stone.

Unlike the other action alternatives analyzed, both Phase 1 and 2 of alternative 5 have been conceptually designed to meet the full 18.7 NAVD flood protection standard.

Lincoln Memorial Grounds. This action would cause negligible direct short-term adverse impacts on the visual character of the Lincoln Memorial Grounds cultural landscape. The removal of six trees and the slight re-grading of the cultural landscape would not significantly alter the integrity of topography or vegetation.

Washington Monument and Grounds. The character-defining features of the Washington Monument cultural landscape that would be impacted include topography, feeling, association, and views.

The Washington Monument topography would be altered by the re-grading required to create a slope just east of 17th Street into which the post and panel storage building would be recessed. No trees on the Monument Grounds would have to be removed although two street trees lining the east side of 17th Street would be lost to accommodate construction of the post and panel foundations. Alteration to topography is greater than that for Phase 1 of alternatives 1, 3, and 4; however, no further re-grading would be needed to achieve Phase 2.

The post and panel storage building would be an intrusion on the distinctive open landscape of the Monument Grounds. However, it may also be seen in the context of other ancillary service buildings on

the grounds such as the Monument Lodge or one of the Bullfinch Gatehouses. These buildings, though of various periods and functions, were typically built with high levels of architectural finish and articulation which make them appear appropriate to the function of a park pavilion. The use of stone cladding will improve the aesthetic compatibility of this building. This would have minor adverse impacts on the overall integrity of the feeling, association, and topography of the cultural landscape.

Visibility to the Washington Monument would diminish along a short portion of the sidewalk along 17th Street although views of the Monument from Overlook Terrace would not be much affected as the building is sunk into the slope. This would cause a moderate adverse impact on the character-defining views of the cultural landscape.

The above impacts on the Washington Monument and Grounds cultural landscape would be moderate and adverse for Phase 2 of alternative 5. The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties through a PA. Specific stipulations proposed for mitigation of adverse effects include a landscape plan for affected cultural landscapes, a stabilization plan for the Lockkeeper's House, public interpretation of the levee and Tiber Creek waterfront, and a treatment plan to mitigate the levee project's adverse visual effects.

Constitution Gardens. The character-defining features of the Constitution Gardens cultural landscape that would be impacted include vegetation and views.

The curved levee wall west of 17th Street would only extend above grade toward the street; as it approaches Overlook, it would be built into the slope (although the top of the wall must remain accessible for inspection purposes). No alteration to the topography would be required.

No additional trees would be removed in Phase 2. The ones removed in Phase 1 would have opened up the landscape between Overlook Terrace and 17th Street. The street side of Constitution Gardens was designed to be wooded, creating a gradual transition from the street to the interior of the park. The street edge was to be heavily wooded with gradually fewer trees to the interior. Additionally, the trees were to be aligned in rows of varying density. The removal of 28 trees would have compromised this transitioning effect between the formal National Mall and the pastoral and intimate landscape of Constitution Gardens. This would be a moderate adverse impact on the overall vegetation of the cultural landscape.

Visibility between Overlook Terrace and the Washington Monument and Grounds would increase, creating a greater physical connection between the landscapes of the Washington Monument, 17th Street, and Constitution Gardens. This would not be in keeping with the design intent regarding views and vistas of Constitution Gardens and therefore be considered a moderate adverse effect.

The above impacts on the Constitution Gardens cultural landscape would be moderate and adverse for Phase 2 of alternative 5. Proposed mitigation measures would include treatment, landscape, and historic resource stabilization plans as well as public interpretation.

Cumulative Impacts. The same projects and activities would contribute to the cumulative impacts as described previously for the no action alternative. These include construction of other buildings on the National Mall, including the NMAAHC and the VVMC; construction of the USIP; and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to impacts on cultural landscapes in the study area, potentially resulting in long-term minor to moderate adverse cumulative impacts on the three discussed cultural landscapes: Washington Monument and Grounds, Lincoln Memorial Grounds, and Constitution Gardens. However, each project would be subject to specific requirements to reduce the individual impact on cultural landscapes including vegetation, circulation, land use, structures, and vistas. Consequently, any impacts associated with these projects described above would range from negligible to moderate and long-term. These impacts, in combination with the moderate impacts on cultural landscapes at the 17th Street closure under Phase 2 of alternative 5, would result in long-term moderate adverse cumulative impacts on cultural landscapes in the study area.

Conclusion. The above impacts on the Constitution Gardens and Washington Monument and Grounds cultural landscapes would be moderate and adverse. Both the Washington Monument and Grounds and Constitution Gardens would suffer a loss of integrity with respect to their contributing aspects of topography and views and vistas. However, the adverse impact on topography is less severe than in alternatives 1, 2, 3, & 4. This alternative would also compromise the integrity of the open landscape of the Washington Monument and Grounds, an important design intent of the cultural landscape. The integrity of the wooded landscape between Overlook Terrace and 17th Street in Constitution Gardens would be compromised. This vegetation is important in transitioning between the formal landscape of the National Mall to the informal pastoral landscape of Constitution Gardens. These impacts would be moderate in scale but long-term in duration. These adverse effects would be mitigated by treatment, landscape, and historic resource stabilization plans as well as public interpretation. Cumulative impacts on cultural landscapes would be long-term moderate adverse. Based on this impact analysis, Phase 2 of alternative 5 would not result in any impacts that would constitute impairment of historic districts and structures.

ARCHEOLOGICAL RESOURCES

Methodology and Assumptions

As archeological resources exist essentially in subsurface contexts, potential impacts on archeological resources are assessed according to the extent to which the proposed alternatives would involve ground-disturbing activities such as excavation or grading. Analysis of possible impacts on archeological resources was based on archival research, a review of previous archeological studies, consideration of the proposed design concepts, and other information provided by the NPS.

Study Area

For archeological resources, the area of impact analysis is limited to the 17th Street closure, as there are no archeological resources along the north side of the Reflecting Pool or at the 23rd Street closure. At the 17th Street closure, ground-disturbing activities that could have an impact on archeological resources include: the relocation of existing utility lines that are now beneath 17th Street, installation of the foundation system for the post-and panel flood gates that would be used during flood events, and construction of an on-site storage vault for the post and panel floodgates. None of the alternatives would involve activities that would result in any impacts on archeological resources in other areas along the levee, such as the 23rd Street closure and the north side of the Reflecting Pool.

Impact Thresholds

Impacts on archeological resources occur when the proposed alternative results in whole or partial destruction of the resource, which is termed a loss of integrity in the context of Section 106. Impact thresholds for archeological resources consider both the extent to which the proposed alternative results in a loss of integrity and the degree to which these losses can be compensated by mitigating activities, such as preservation or archeological data recovery. The process begins with assessment of a resource according to its eligibility for the NRHP, as only sites considered significant enough for listing on the NRHP are protected by federal regulations.

Under federal guidelines, resources are eligible for the NRHP if they possess integrity and they meet one or more of the criteria of eligibility for inclusion in the NRHP. In this case, there have been no field surveys to identify archeological resources, so the significance of any potential archeological resource is unknown. The two anticipated archeological resources – the Monument Grounds site (51NW35) and the 17th Street Wharf – might be eligible for the NRHP under various criteria.

For purposes of analyzing impacts on archeological resources, thresholds of change for the intensity of an impact are based on the foreseeable loss of integrity. This impact analysis focuses on the direct impacts of construction and operation where ground-disturbing activities have a direct effect on archeological resources. As archaeological resources are below ground, they can be destroyed when construction

excavations or other ground disturbing activities, such as landscaping and installation of underground utilities, occur. Because these ground-disturbing activities permanently alter the physical characteristics of archeological sites, the impacts are considered direct and long-term. The severity of these impacts varies according to the scope of the ground-disturbing activities. Cumulative effects on archeological resources are rarely identified because archeological resources are nonrenewable and unique. By the time they are discovered, most archeological sites have already lost some degree of integrity as a result of natural causes or past human actions. Also, cumulative effects must consider the incremental effect of the action under study with regard to all other past, present, and reasonably foreseeable future actions. The cumulative effects of present and future actions typically result in a further reduction in integrity or outright destruction.

Negligible: Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be *no adverse effect.*

Minor: Adverse impact — Disturbance of a site(s) results in little, if any, loss of integrity. For purposes of Section 106, the determination of effect would be *no adverse effect.*

Beneficial impact — A resource would be preserved in its pre-existing condition. For purposes of Section 106, the determination of effect would *be no adverse effect*.

Moderate: Adverse impact — Disturbance of a site(s) results in loss of integrity to the extent that there is a partial loss of the character-defining features and information potential that form the basis of the site's NRHP eligibility. Mitigation is accomplished by a combination of archeological data recovery and in place preservation. The determination of effect for Section 106 would be *adverse effect.*

Beneficial impact — The site would be stabilized. For purposes of Section 106, the determination of effect would be *no adverse effect.*

Major: Adverse impact — Disturbance of a site(s) results in loss of integrity to the extent that it is no longer eligible for the NRHP. Its character-defining features and information potential are lost to the extent that archeological data recovery is the primary form of mitigation. The determination of effect for Section 106 would be *adverse effect*.

Beneficial impact — The site would be actively stabilized/preserved in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* to accurately depict its form, features, and character as it appeared during its period of significance. For purposes of Section 106, the determination of effect would be *no adverse effect.*

Duration: All impacts on archeological resources are considered long-term.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. At the current time, impacts on archeological resources cannot be fully evaluated because the existence of any physical remains of the Monument Grounds Site (51NW35) or 17th Street Wharf within the APE for the Potomac Park levee is unknown. Under the no action alternative, impacts on archeological resources could result from the use of a part of the Monument Grounds as a borrow pit during flood events. Possible impacts could range from negligible to moderate and would be direct and long-term.

Cumulative Impacts. Cumulative impacts on archeological resources could occur from the reuse of the borrow pit. However, the use of the borrow pit would occur only during extreme (100-year or worse) flood events, which are statistically unlikely. Allowing the possibility that multiple, extreme flood events

may occur, cumulative impacts on archeological resources could occur only if a different borrow pit were used, as subsequent uses of the same borrow pit would not add any impacts beyond those that would have occurred from the initial episode of borrow pit excavation. Therefore, cumulative impacts on archeological resources are highly unlikely.

Conclusion. Implementation of the no action alternative could result in direct negligible to moderate or adverse impacts on archeological resources. Under the no action alternative, cumulative impacts on archeological resources are highly unlikely but could range from negligible to moderate and would be direct and long-term. The no action alternative would not result in any impacts that would constitute impairment of archeological resources.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. At the current time, impacts on archeological resources cannot be fully evaluated because the existence of any physical remains of the Monument Grounds Site (51NW35) or 17th Street Wharf within the APE for the Potomac Park levee is unknown. Subsurface archeological investigations designed to identify, evaluate, and document significant archeological resources have been deferred, primarily because of the logistical challenges posed by opening excavations in a public park or a public roadway. Possible adverse impacts on archeological resources could occur from relocation of utility lines or from construction of the foundations for the post and panel floodgate, the floodwall, or the storage vault for the post and panels. Possible impacts could range from negligible to moderate and would be direct and long-term.

The NPS is continuing Section 106 consultations to evaluate and mitigate adverse effects on historic properties, including archeological resources, through a PA that would include stipulations to insure an appropriate level of archeological documentation. Archeological documentation would occur immediately prior to or during project construction, when subsurface access would be more readily facilitated, during the temporary closure of 17th Street. Mitigation of adverse effects would be accomplished by archeological documentation and in-place preservation, followed by publication of the results to the scientific community and the public.

Cumulative Impacts. There are no other past, present, or future projects within or adjacent to the study area with the potential to impact either of the two expected resources — the Monument Grounds site or the 17th Street Wharf. Therefore, no cumulative impacts on archeological resources would result from Phase 1 of alternative 1.

Conclusion. Activities associated with the implementation of Phase 1 of alternative 1 could have adverse long-term negligible to moderate impacts on archeological resources. However, these impacts would be mitigated through a program of archeological investigations that would be implemented prior to or during construction, followed by in-place preservation. There would be no cumulative impacts on archeological resources associated with this alternative. Based on this impact analysis, Phase 1 of alternative 1 is not likely to result in any impacts that would constitute impairment of archeological resources.

Phase 2 Analysis. No impacts on archeological resources under Phase 2 of alternative 1 would be expected because implementation of Phase 2 would not require significant additional ground-disturbing activities beyond those that would have occurred in Phase 1. Any adverse impacts on archeological resources within the APE for alternative 1 would be mitigated during Phase 1 by a program of archeological documentation and in-place preservation, as stipulated in the PA for continuing compliance with Section 106 of the NHPA. Section 106 consultations would continue during the design development for Phase 2, and if design modifications result in changes that expand the area of ground-disturbing activities, the NPS would determine whether additional mitigation of archeological resources is necessary, in accordance with the terms of the PA.

Cumulative Impacts. There are no other past, present and future projects within or adjacent to the study area with the potential to impact either of the two expected resources — the Monument Grounds site or

the 17th Street Wharf. Therefore, no cumulative impacts on archeological resources would result from Phase 2 of alternative 1.

Conclusion. Activities associated with the implementation of Phase 2 of alternative 1 would have no adverse or beneficial impacts on archeological resources, and there would be no cumulative impacts on archeological resources associated with this alternative. Possible design changes for the Phase 2 implementation that might lead to adverse effects on archeological resources would be mitigated according to the processes and stipulations outlined in the PA. Based on this impact analysis, Phase 2 of alternative 1 would not result in any impacts that would constitute impairment of archeological resources.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

The two options under alternative 2 do not differ to the extent that would merit separate analyses of impacts on archeological resources. Impacts on archeological resources would be the same as those described for alternative 1. Impacts on archeological resources cannot be fully evaluated at this time because the existence of any physical remains of the Monument Grounds Site (51NW35) or 17th Street Wharf within the APE for the Potomac Park Levee is unknown. A program of archeological investigation would be completed during construction, during the temporary closure of 17th Street, under the terms of a PA. Mitigation of adverse effects would be accomplished by archeological documentation and in-place preservation, followed by publication of the results to the scientific community and the public.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Impacts on archeological resources would be the same as those described for alternative 1. Impacts on archeological resources cannot be fully evaluated at this time because the existence of any physical remains of the Monument Grounds Site (51NW35) or 17th Street Wharf within the APE for the Potomac Park levee is unknown. A program of archeological investigation would be completed during construction, during the temporary closure of 17th Street, under the terms of a PA. Mitigation of adverse effects would be accomplished by archeological documentation and in-place preservation, followed by publication of the results to the scientific community and the public.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Impacts on archeological resources would be the same as those described for alternative 1. Impacts on archeological resources cannot be fully evaluated at this time because the existence of any physical remains of the Monument Grounds Site (51NW35) or 17th Street Wharf within the APE for the Potomac Park levee is unknown. A program of archeological investigation would be completed during construction, during the temporary closure of 17th Street, under the terms of a PA. Mitigation of adverse effects would be accomplished by archeological documentation and in-place preservation, followed by publication of the results to the scientific community and the public.

IMPACTS OF ALTERNATIVE 5 – "3B"

Impacts on archeological resources would be the same as those described for alternative 1. Impacts on archeological resources cannot be fully evaluated at this time, because the existence of any physical remains of the Monument Grounds Site (51NW35) or 17th Street Wharf within the APE for the Potomac Park levee is unknown. A program of archeological investigation would be completed during construction, during the temporary closure of 17th Street, under the terms of a PA. Mitigation of adverse effects would be accomplished by archeological documentation and in-place preservation, followed by publication of the results to the scientific community and the public.

VISITOR USE AND EXPERIENCE

METHODOLOGY AND ASSUMPTIONS

The purpose of this impact analysis is to assess the effects of the alternatives on the visitor experience goals of the NAMA and visitor experience in the areas that would be affected by the levee construction as well as visitor use of all attractions on the mall that are in the study area. To determine impacts, the current uses of the area were considered and the potential effects of the construction and implementation of the levee components on visitor experience and use were analyzed. Activities and the type of visitor experience and use/visitation that occur in the park that might be affected by the proposed actions, as well as the visual character of the area and noises experienced by the visitors, were considered.

STUDY AREA

The study area for visitor use and experience is the NAMA and areas surrounding the sites being evaluated for the levee improvements.

IMPACT THRESHOLDS

Negligible: Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.

Minor: Changes in visitor use and/or experience would be slight and detectable but would not appreciably limit critical characteristics of the visitor experience. Visitor satisfaction would remain stable.

Moderate: A few critical characteristics of the desired visitor experience would change and/or the number of participants engaging in a specified activity would be altered. Some visitors who desire their continued use and enjoyment of the activity/visitor experience might pursue their choices in other available local or regional areas. Visitor satisfaction would begin to decline.

Major: Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. Visitors who desire their continued use and enjoyment of the activity/visitor experience would be required to pursue their choices in other available local or regional areas. Visitor satisfaction would markedly decline.

Duration: Short-term impacts would occur sporadically throughout the course of a year. Long-term impacts would last more than one year.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Under the no action alternative at 23rd Street, additional measures would be taken only if the flood exceeds the 100-year level, in which case sandbags would be placed to create a barrier along the alignment of 23rd Street, across the eastbound ramp to Roosevelt Bridge at the end of Constitution Avenue. Thus, the no action alternative would affect visitor use at this location only during a flood event, at which time visitors would be evacuated from the area. For this reason, the no action alternative would not have more than a negligible adverse effect on visitor use at 23rd Street. At the Reflecting Pool, the current alignment of the levee satisfies the 100-year flood protection level of 16.7 NAVD; therefore, no additional action would be required under the no action alternative. For this reason, there would be no impact on visitor use and experience at this site.

At 17th Street, an earthen barrier would be constructed across the street in order to provide closure. This barrier would be created using sandbags, Jersey barriers, soil excavated from the Monument Grounds, or

fill that would be brought to the site via truck transport from an outside source (NPS 2006b). As with the 23rd Street and Reflecting Pool portions of the no action alternative, these actions would only be taken in the event of a flood, during which time visitors would need to be evacuated. The effect upon visitor use and experience would be negligible at that time. After the flood, it would take several months to restore the grounds that have been excavated at the Washington Monument. Visitors would be affected by the change on the Washington Monument lawn after large amounts of soil are excavated, and the area would be closed to visitors during the re-grading and sodding, resulting in a short-term localized minor adverse effect on visitor use and experience.

Cumulative Impacts. Many activities in the project area could affect visitor use and experience including ongoing landscape and facility maintenance, security improvements, public events, and several future projects that would directly affect the Mall. Ongoing grounds and building maintenance activities would likely result in beneficial long-term cumulative impacts on visitor use and experience since they would maintain and enhance the areas used by visitors. However, they would also present short-term minor adverse effects from noise and disturbance in limited areas where visitors may be restricted. Future construction within the project area that could affect visitor use and experience includes the construction of the NMAAHC and the VVMC, construction of the USIP, and construction of the MLK Memorial on the northwest corner of the Tidal Basin. These projects would contribute cumulatively to visitor experience by adding new visual elements and new visitor destinations, mostly a beneficial impact, although additional visitors drawn to these new developments may increase traffic and crowding in the study area at certain times, a minor adverse effect.

The Lincoln Memorial Circle Rehabilitation and Security Improvements would introduce transportation and security improvements to the area south of the 23rd Street site. A series of bollards would be placed around the circle on the east side of the Memorial, a secure access gate would be constructed on the west side, and two visitor services areas would be constructed on the north and south sides. Pedestrian improvements would provide enhanced access to the Memorial. The long-term adverse visitor experience impacts associated with this project would be minor since the design and materials are intended to preserve the aesthetic qualities of the area (NPS 2002a). Security improvements at the Jefferson Monument are also planned and would have similar effects on visitor use/experience as long as the design preserves the aesthetic qualities of the area, and access is maintained.

The impacts from other actions and plans on the visitor use and experience in the study area, combined with the short-term minor adverse impacts associated with the no action alternative, would result in long-term beneficial cumulative impacts in the study area. Adverse impacts resulting from the no action alternative would only occur before and immediately after a flood event.

Conclusion. The no action alternative would have no (negligible) impact upon visitor use and experience during any flood event since visitors would not be on the Mall during a flood. Impacts on visitors at 17th Street would be short-term, minor, and adverse while the area that was excavated to create the earthen levee is restored. Cumulative impacts would be long-term and beneficial, based mainly on other projects in the study area, since this alternative would contribute so few and short-term adverse effects.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. Phase 1 of alternative 1 at both the 23rd Street Closure and the Reflecting Pool levee would be identical to that described under the no action alternative. There would be no impact upon visitor use and experience except in the event of a flood notification, in which case visitors would be evacuated from the area, resulting in little if any impact on visitor use and experience.

Phase 1 of alternative 1 at 17th Street would involve construction of two concrete walls in an arc configuration to the east and west of 17th Street, with a post and panel system in place across the street itself. There are two options for this arrangement and the dimensions and placement of these walls and the post and panel system is described in detail in Chapter 2. If funding is available, the height of the walls

would be increased to 18.7 NAVD in Phase 1 for alternative 1A; alternative 2A would include re-grading of a large area to bring the ground surface and wall to 18.7 NAVD in Phase 1. The posts and panels would be stored on site on the east side of 17th Street.

The levee wall would require four to six months to build, with construction planned from likely late February to July 2009, followed by site restoration through September 2009. For eight to 10 weeks of these months (likely during March to May), 17th Street would be partially closed to motor traffic (2 lanes open during daytime; possible closures at night and during off-peak hours). As 17th Street is a direct route linking Constitution Avenue to Independence Avenue, this would affect visitor use and experience by restricting the degree to which visitors in automobiles would be able to travel on 17th Street, which is a commonly used access point for visitors in cars. This would constitute a minor to moderate adverse short-term impact on visitor use of the area, especially during this time of year, which includes the period of highest visitation for most of the monuments in this area of the Mall (see chapter 3). However, this construction would not be expected to substantially diminish overall expected visitation numbers or tourism. Effects on transportation in general are addressed under the "Traffic and Transportation" topic.

Construction of the arc wall would also restrict the level of pedestrian access to the northwest corner of the Monument Grounds and the Constitution Gardens Grounds, especially under alternative 1B, and the area along 17th Street that would be under construction. Construction barriers would be placed around the area in order to ensure public and employee safety. Pedestrian access would be blocked along 17th Street on one side, and the Monument and Constitution Gardens Grounds would be off limits in the area of construction. Additionally, the presence of construction workers and their equipment and associated noise would disrupt the aesthetic character of the immediate area, potentially affecting visitor experience. Construction is scheduled to occur during a relatively high visitation period of early spring into summer, and any special events that are scheduled during this time would bring more people to the Mall, such as the Cherry Blossom Festival or Fourth of July. Although the immediately affected area is not a primary visitor destination itself, there would be disruption to visitor use and experience from the noise and restricted access, particularly on and around the Monument Grounds during the Fourth of July celebration. Adverse impacts related to this disruption would be short-term, minor to moderate, and localized.

The completed arc wall would introduce a new object into the northwest corner of the Monument Grounds and the north east corner of the Constitution Gardens grounds (primarily alternative 1B, which would be located further away from an existing walkway). The completed arc wall would not affect visitors' views of the monuments unless the visitor would be standing immediately adjacent to the highest point of the arc wall, and this space is not a popular vantage point for visitors. Additionally, the arc wall would be of such a scale relative to the size of the Grounds overall that it would not greatly alter the pedestrian freedom of visitors. Therefore, its impact on the visitor use of this area would be negligible and adverse, and its impact on the ability of visitors to use and enjoy the NAMA as well as on overall tourism on this portion of the mall would be negligible. The primary mall attractions and destinations would continue to be accessible and would be expected to draw the same number of visitors, and the levee wall (with appropriate interpretation) could become a part of that use/experience for visitors passing through this area.

However, the completed wall may have an impact upon visitor experience, particularly those visitors in that area of the Monument or Constitution Gardens Grounds. As the wall (as currently proposed) would be plain concrete under Phase 1, it is possible that some visitors would perceive it as aesthetically unpleasing, which would detract from their experience. This would be exacerbated by the necessary removal of 15 trees (alternative 1A) or 98 trees (alternative 1B) in order to accommodate the arc wall, three(alternative 1B) to four (alternative 1A) of which are older mature walnuts or street elms that provide shade enjoyed by visitors. Under alternative 1A, if the wall height is increased to 18.7 feet; additional trees would be removed (see Phase 2 analysis). The removal of these trees may be an undesirable experience for those visitors who are familiar with and expect the trees' presence on the National Mall. The appearance of the floodwalls themselves, as well as the removal of any trees, may result in a long-

term adverse effect on visitor experience. The degree of the impact upon visitor experience related to changes in the visual character of the area, and whether this impact is neutral, beneficial, or adverse, depends on how the visitors perceive and experience this area of the mall. It is expected that adverse impacts on visitor experience in this area of the NAMA would be minor to moderate, with greater impact in Phase 1 for alternative 1B due to the re-grading and tree removal and resultant change in character and feel of the area.

Information would be posted to help visitors understand the need for the project. This may reduce some negative perceptions, especially if appropriate interpretation is provided and if tourmobile tours incorporate the history of the levee and this area of the Mall.

Following completion of the levee, there would be annual testing of the system that involves a mock partial set-up and tear-down, and the components would require periodic inspection. The testing would occur at off-peak times (at night) so as to minimize impacts on visitors and traffic; therefore, impacts from these activities on visitor use and experience would be short-term, negligible, and adverse.

During a flood event, implementation of the levee would have no expected effects on visitor use, since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembling of the levee after a flood, with little need to restore disturbed grounds as under the no action alternative; therefore, a concurrent rapid return to normal visitor use of this area would occur. This would provide a long-term beneficial effect on visitor use and experience.

Cumulative Impacts. The same projects and actions would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events, and several future projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with periodic maintenance disruptions and increased visitation and the additional crowding and traffic that could occur. These mostly beneficial impacts, in combination with the mostly adverse long-term impacts on visitor use and experience at the 17th Street closure under Phase 1 of alternative 1, would result in minor adverse cumulative impacts in the study area.

Conclusion. Phase 1 of the Arc Wall alternative would have short-term minor to moderate adverse impacts upon visitor use and experience because of the effects of construction activities and street closures that would occur during months that draw large numbers of visitors to this area of the mall. Once completed, the arc wall would have a long-term minor to moderate adverse impact on visitor experience in this area mainly because of the presence and appearance of the wall and the removal of trees, including some larger street trees. The effect on visitor use and enjoyment of the various attractions and monuments/memorials would be negligible. Cumulative impacts would be long-term, minor, and adverse.

Phase 2 Analysis. Phase 2 would include some re-grading and filling at 23rd Street and at the Reflecting Pool. In order to meet the congressionally authorized solution, two embankments would be constructed at 23rd Street. This would include the removal of six American elms and also several small shrubs. The softball fields that are located in the vicinity would be preserved, and a planting plan would provide for planting of trees and shrubs to compensate for those lost. Construction would take several months to complete, during which time visitor use of the areas where the embankments are to be created would be restricted, but other recreational activities could occur on the remainder of the site. This would result in a short-term minor adverse impact on visitor use and experience. At the Reflecting Pool, several low spots on the existing levee would need to be raised by approximately 1.5 feet above existing grade. Construction would take approximately six to nine months to complete, during which time the visitor experience along the pool might be moderately adversely impacted by the sight and noise of construction workers and their equipment, and construction could be scheduled to avoid high visitation months. Long-term adverse impacts on the landscape enjoyed by visitors in this area would be negligible to minor, as only a small number of trees would have to be removed, and a landscape plan would ensure that the

overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area.

Under Phase 2 of alternative 1 at 17th Street, the arc wall constructed in Phase 1 for alternative 1A would be raised by two feet (if not funded and completed under Phase 1). This would be accomplished by re-grading against these concrete walls, and then raising the elevation of the wall from 16.7 feet to 18.7 NAVD. For alternative 1A, the wall would be 8.3 feet high on each side of the sidewalk and would recede into the landscape as per the Phase 1 arc wall. The Phase 2 wall would be the same length as that of Phase 1. For alternative 1B, the wall would be 8.7 feet above the level of the sidewalk, but the wall would be set back about 24 feet from the sidewalk, which would minimize impacts of walking or standing next to a high wall that could feel confining or completely block views. The post and panel system would also be the same as for Phase 1. Under Phase 2, the arc wall would be covered with a stone veneer that complements the historic character of the adjacent cultural landscape. Phase 2 would also be constructed so as to allow space for potential future construction of a plaza extending south from the Lockkeeper's House to the western floodwall, although this plaza is not part of this project.

Completion of Phase 2 would require about eight to 12 months of work for alternative 1A and would require a similar stockpile and use of machinery as Phase 1, initially for re-grading and increasing the height of the wall. However, much of this total construction time would involve cladding and finishing the wall, with a reduced workforce and no heavy equipment use or area restrictions, and there would be no need to close 17th Street. Also, the Phase 2 levee heavy construction period could be scheduled to avoid times of high visitation and large festivals. For alternative 1B, Phase 2 would not require additional construction but mostly replanting and landscaping, along with wall cladding, so the construction period would be reduced. Therefore, for both options, the presence of construction staff and their equipment and the associated noise during Phase 2 construction would result in a short-term minor adverse effect on visitor use and experience in this area.

Unlike the Phase 1 arc wall, the Phase 2 arc wall would be covered by a stone veneer that would complement the historic character of the adjacent cultural landscapes,. However, the presence of the wall and space surrounding it, and the area re-graded with resultant tree removal under alternative 1B, would add a new feature (and new topography and landscape character under alternative 1B) to the area that could result in minor to moderate adverse effects on those visitors that desire the look and feel of the present Mall. Similar to Phase 1, interpretive programs might help to foster a positive perception of the completed arc wall, and it could serve as a new feature that would draw visitor interest in this area.

Unlike the Phase 1 arc wall, the Phase 2 arc wall would be covered by a stone veneer that would complement the historic character of the adjacent cultural landscapes,. However, the presence of the wall and space surrounding it would add a new feature to the area that could result in minor adverse effects on those visitors that desire the look and feel of the present Mall. Similar to Phase 1, interpretive programs might help to foster a positive perception of the completed arc wall, and it could serve as a new feature that would draw visitor interest in this area.

Similar to Phase 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembling of the levee with concurrent rapid return to normal visitation in this area, a long-term beneficial effect.

Cumulative Impacts. The same projects and actions would contribute to the cumulative impacts as described previously for Phase 1. These include ongoing landscape and facility maintenance, security improvements, public events, and several future projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional maintenance and increased visitation/crowding. These impacts, in combination with long-term

minor adverse impacts as well as beneficial impacts on visitor use and experience from implementation of Phase 2 of alternative 1, would result in the long-term negligible to minor adverse cumulative impacts in the overall study area.

Conclusion. During the eight to 12 months of construction, Phase 2 of alternative 1 would have a minor adverse impact on visitor use and experience due to the presence of construction crews and equipment. The completed Phase 2 arc wall would have a negligible impact on visitor use of this area of the Mall, and may have either a long-term minor adverse or beneficial impact on visitor experience, depending on its effect on the visual character of the area and the visitor's perception of the change in the landscape. Removal of trees would result in long-term adverse effects that would be reduced to minor over time. Because of the stone veneer and the synergism with the surrounding cultural landscape, Phase 2 would mitigate many adverse impacts of Phase 1. Cumulative impacts would be long-term, negligible to minor, and adverse.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Phase 1 Analysis. Phase 1 of alternative 2 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative. Action would be taken only in the event of a flood, in which case visitors would be evacuated from the NAMA, resulting in either negligible or no impacts on visitor use and experience.

Under Phase 1 of alternative 2, 17th Street would be raised by one foot at a location approximately 100 feet south of Constitution Avenue. Two concrete "gate walls" would then be constructed on its east and west sides. There are two proposed designs for these concrete walls, referred to as "alternative 2A" and "alternative 2B," which differ in the length of the east and west walls and in the angle at which their west walls bend to the southwest. In either option, the post and panel closure would be the same. NPS would construct a storage facility on the east side of 17th Street as a part of an earthen berm (see chapter 2). If funding is available, the height of the walls would be increased to 18.7 NAVD in Phase 1.

Construction time, logistics, and related impacts would be the same as described for Phase 1 of alternative 1 for both options 2A and 2B. The walls and associated storage structure would take four to six months to complete, with additional time for reclamation, all during high visitation months. During this time, 17th Street, which is a common access point for visitors in automobiles, would need to be closed partially for eight to 10 weeks. Construction would result in minor to moderate short-term impacts on visitor experience from the presence of construction crews, equipment, noise, and the limitations on access.

Alternative 2A would require the removal of 25 trees, while alternative 2B would require the removal of 26 trees. If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis). With the concordant effect upon the visual character of the area and the loss of tree canopy shading. In 2A, seven of these are young, recently planted cherry trees that can be easily and quickly replaced, but four trees that would need to be removed along 17th street are older mature elms. In 2B, nine cherry trees are young, recently planted cherry trees that can be easily and quickly replaced, but four trees that would need to be removed along 17th street are older mature elms.

Although the impacts on visitor use and experience would be similar between alternatives 1 and 2 for Phase 1, the gate walls' design would not intrude as much on the grounds of the Washington Monument. However, the gate walls' structure close to the 17th Street intersection could make the visitor feel more confined or "tunnel-like" in their approach to the Washington Monument coming from the north. While the completed gate walls would have a negligible impact on visitor use of this area of the Mall or of the various attractions along the Mall (tourism), the degree of the impact upon visitor experience related to the visual character of the area, and whether it is beneficial or adverse, depends on how the visitors perceive and experience it. It is expected that any adverse impacts on visitor experience in this area of the NAMA would be minor to moderate at most.

Information would be posted to help visitors understand the need for the project. This may reduce some negative perceptions, especially if appropriate interpretation is provided and if tourmobile tours incorporate the history of the levee and this area of the Mall.

Similar to alternative 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use, since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in this area, a long-term beneficial effect.

Cumulative Impacts. The cumulative impacts for Phase 1 of the Gate Walls alternative would be essentially the same as for Phase 1 of alternative 1. The same projects and actions would contribute to the cumulative impacts as described previously for the no action alternative These include ongoing landscape and facility maintenance, security improvements, public events and several future projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the mostly adverse long-term impacts on visitor use and experience at the 17th Street closure under Phase 1 of alternative 2, would result in minor cumulative adverse impacts in the study area.

Conclusion. Phase 1 of the Gate Walls alternative would have short-term minor to moderate adverse impacts upon visitor use and experience because of the effects of construction activities and street closures that would occur during months that draw large numbers of visitors to this area of the mall. Once completed, the wall would have a long-term adverse impact on visitor experience in this area mainly because of the presence and appearance of the wall and the removal of several mature trees, which would be minor to moderate at most, although the effect on visitor use and enjoyment of the various attractions and monuments/memorials would be negligible. Cumulative impacts would be long-term, minor, and adverse.

Phase 2 Analysis. Impacts of Phase 2 of alternative 2 would be very similar to those of Phase 2 of alternative 1. In order to meet the level of protection necessary for the congressionally authorized solution (Phase 2), two embankments would be constructed at 23rd Street. This would include the removal of six American elms and also several small shrubs. The softball fields that are located in the vicinity would be preserved and a planting plan would provide for planting of trees and shrubs to compensate for those lost. Construction would take several months to complete, during which time visitor use of the areas where the embankments are to be created would be restricted, but other recreational activities could occur on the remainder of the site. At the Reflecting Pool levee, short-term disturbance would occur from workers and from equipment used to fill in the low spots. All this would result in short-term minor adverse impacts on visitor use and experience.

Under Phase 2 of alternative 2 at 17th Street, the level of the floodwalls would be raised to 18.7 NAVD, which is two feet above and beyond the height of Phase 1 (if not funded and completed under Phase 1). Under options 2A and 2B, there would be a re-grading against the concrete wall of Phase 1 to raise it to 18.7 NAVD. The wall would also be covered in a stone veneer so that it complements the historic character of the adjacent cultural landscape. Alternative 2A differs from alternative 2B in that it proposes to use a V-shaped wall on the west side whereas alternative 2B proposes to use an L-shaped wall.

The disturbance created by the eight to 12 months of construction necessary to complete Phase 2 would be the same as described for Phase 2 of alternative 1, resulting in a minor negative impact upon visitor use and experience.

Upon completion of the wall, impacts upon visitor use and experience would be similar to Phase 2 of alternative 1, but the visual aspects are different in where the wall is placed in relation to the Monument Grounds and the effect of the gate walls' concept at the corner entrance to the Mall. Phase 2 of alternative

2A would require the removal of an additional 29 trees, while Phase 2 of alternative 2B would require an additional 38 trees to be removed with the concordant impacts upon the visual character of the area and tree shading. However, a landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area, reducing long-term impacts on the visual landscape to minor levels over time. Pedestrian mobility would only be affected by a somewhat steeper gradient on the lawns to the east and west of 17th Street, with a negligible impact on visitor use since all major attractions could be readily accessed with little change in pedestrian use patterns and little change in the overall accessibility or use of the Monument Grounds.

Unlike the Phase 1 wall, the Phase 2 wall would be covered by a stone veneer that would complement the surrounding cultural landscape. However, the presence of the wall and space surrounding it would add a new feature to the area that could result in minor adverse effects on those visitors that desire the look and feel of the present Mall. Similar to Phase 1, interpretive programs might help to foster a positive perception of the completed arc wall, and it could serve as a new feature that would draw visitor interest in this area.

Similar to Phase 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use, since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in this area, a long-term beneficial effect.

Cumulative Impacts. The cumulative impacts for Phase 2 of alternative 2 would be essentially the same as those identified for Phase 2 of alternative 1. The same projects and actions would contribute to the cumulative impacts as described previously for Phase 1 and the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events, and several future plans and projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the long-term minor adverse impacts and beneficial impacts on visitor use and experience from implementation of Phase 2 of alternative 2, would result in long-term negligible adverse cumulative impacts.

Conclusion. During the eight to 12 months of construction, Phase 2 of alternative 1 would have a minor adverse impact on visitor use and experience due to the presence of construction crews and equipment. The completed Phase 2 of the Gate Walls alternative would have only a negligible impact on visitor use of this area of the Mall, and may have either a long-term minor adverse or beneficial impact on visitor experience depending on its effect on the visual aesthetics of the area and the visitor's perception of the change in the landscape, especially at the entrance to the Washington Monument. Removal of trees would result in long-term adverse effects that would be reduced to minor over time. Because of the stone veneer and the synergism with the surrounding cultural landscape, Phase 2 would mitigate many adverse impacts of Phase 1. Cumulative impacts would be long-term, negligible, and adverse.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Phase 1 of alternative 3 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative. Action would be taken only in the event of a flood, in which case visitors would be evacuated from the NAMA, resulting in no or negligible impacts on visitor use and experience.

Phase 1 of alternative 3 at 17th Street would use 2 concrete walls running on the east and west sides of 17th Street approximately 365 feet south of the centerline of Constitution Avenue, aligned on the centerline of the area known as the "Overlook Terrace." It would also use the post and panel system across 17th Street in the event of a flood. The walls would need to be 7.7 feet tall at 17th Street and then would recede

gradually into the landscape. The east and the west walls would be each 188 feet in length, taking a vague chevron shape, for a total length of 376 feet, giving alternative 3 the longest concrete wall structure of any of the Phase 1 alternatives.

Construction time, logistics, and related impacts would be the same as described for Phase 1 of alternative 1. The walls would take four to six months to complete, with additional time for reclamation, all during busy visitation months. During this time, 17th Street, which is a common access point for visitors in automobiles, would need to be closed partially for eight to 10 weeks. Construction would result in minor to moderate short-term impacts on visitor experience from the presence of construction crews, equipment, noise, and access limitations.

Impacts on visitor use and experience for Phase 1 of alternative 3 would be similar to those described for Phase 1 of alternatives 1 and 2, but the Phase 1 wall would be more prominent in the Constitution Gardens area and could appear to jut into the Monument Grounds, which could detract from the experience of visitors that are accustomed to the uninterrupted expanse of the grounds. Eighteen trees would need to be removed, including one older mature street elm, with the concordant effect upon the visual landscape. While the completed walls would have a negligible impact on visitor use of this area of the Mall or the various attractions along the mall (tourism), the degree of the impact upon visitor experience related to the visual character of the area, and whether it is beneficial or adverse, depends on how the visitors perceive and experience it. It is expected that any adverse impacts on visitor experience in this area of the NAMA would be minor to moderate at most, although more visitors may perceive this as a moderate impact compared to the other alternative designs considered.

Information would be posted to help visitors understand the need for the project. This may reduce some negative perceptions, especially if appropriate interpretation is provided and if tourmobile tours incorporate the history of the levee and this area of the Mall.

Similar to alternative 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use, since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in this area, a long-term beneficial effect.

Cumulative Impacts. The cumulative impacts for Phase 1 of alternative 3 would be essentially the same as those identified for Phase 1 of alternatives 1 and 2. The same projects and actions would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events and several future plans and projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the long-term mostly adverse impacts on visitor use and experience at the 17th Street closure under Phase 1 of alternative 3, would result in cumulative minor adverse impacts in the study area.

Conclusion. Phase 1 of the Constitution Gardens wall would have short-term minor to moderate adverse impacts upon visitor use and experience because of the effects of construction activities and street closures that would occur during months that draw large numbers of visitors to this area of the Mall. Once completed, the wall would likely have a long-term moderate adverse impact on visitor experience in this area mainly because of the presence and appearance of the wall and the removal of trees in a previously open expanse of the Monument Grounds although the effect on visitor use and enjoyment of the various attractions and monuments/memorials would be negligible. Cumulative impacts would be long-term, minor, and adverse.

Phase 2 Analysis. In order to meet the level of protection necessary for the congressionally authorized solution, two embankments would be constructed at 23rd Street. This would include the removal of six

American elms and also several small shrubs. The softball fields that are located in the vicinity would be preserved and a planting plan would provide for planting of trees and shrubs to compensate for those lost. Construction would take several months to complete, during which time visitor use of the areas where the embankments would be created would be restricted, but other recreational activities could occur on the remainder of the site. At the Reflecting Pool levee, short-term disturbance would occur from the workers and equipment used to fill in the low spots. All of this would result in short-term minor adverse impacts on visitor use and experience.

Phase 2 of alternative 3 would require raising the height of the aforementioned concrete walls by two feet so that they are at 18.7 NAVD. This would be done by re-grading the landscape to cover the concrete walls and then adding stone-clad terraced steps in their place. This would still require the use of Jersey barriers and sandbags across 17th Street in the event of a flood notification.

The disturbance created by the eight to 12 months of construction necessary to complete Phase 2 would be the same as described for Phase 2 of alternative 1, resulting in a minor negative impact upon visitor use and experience.

Impacts upon visitor experience would be slightly different for Phase 2 of alternative 3 since the visual aspects would be different due to where the wall is placed in relation to the Monument Grounds and the effect of the terraced wall concept leading up to 17th Street on both sides of the street. Seventy-two additional trees would have to be removed for Phase 2 of alternative 3, including one additional smaller street elm. This means that a total of 101 trees would be removed in both phases of this alternative, so it has the most deleterious effect on trees of the three alternatives considered. To the extent that these trees are considered integral to the area's character and are used by visitors for shade and enjoyment, the removal of trees and installation of the terraced walls where there is currently open space and lawn would constitute a long-term moderate adverse impact on visitor experience of the Monument Grounds. A landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area. This would reduce long-term impacts on the visual landscape from tree removal to minor levels over time. Pedestrian mobility and physical use of this area could be affected by the terraced landscape, which would change how visitors move through the area. However, this would be a negligible adverse impact on overall visitor use in the study area since all major attractions in the study area could be readily accessed, and there would be little change in the overall visitation to the Washington Monument.

Unlike the Phase 1 wall, the Phase 2 wall would be covered by a stone veneer that would complement the surrounding cultural landscape. However, even with the veneer, the Constitution Gardens wall would have an impact on the visitor experience of the area because it would change the area's look and function as well as visitors' perceptions of the area's open space relationships and cultural landscape. The removal of a large number of relatively mature trees, and the presence of the terraced wall, would add a new feature and new use (sitting walls) to the area that is currently a more natural open setting with many trees on the west side of 17th Street. Therefore, it could result in a moderate adverse effect on those visitors that desire the look and feel of the present Mall although some visitors might appreciate the concept of the terraced walls as a new place to visit and sit. Interpretive programs might help to foster a positive perception of the completed terrace.

Similar to Phase 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in this area, a long-term beneficial effect.

Cumulative Impacts. The same projects and actions would contribute to the cumulative impacts as described previously for Phase 1 and the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events, and several future plans and projects that

would directly affect the Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the long-term mostly moderate adverse impacts on visitor experience at the 17th Street closure under Phase 2 of alternative 3, would result in long-term minor adverse cumulative impacts in the overall study area,

Conclusion. During the eight to 12 months of construction, Phase 2 of alternative 3 would have a minor adverse impact on visitor use and experience due to the presence of construction. The completed Phase 2 Constitution Gardens wall would have a negligible impact on visitor use in the study area, but may have a moderate adverse impact on visitor experience due to changes in the area's visual character and the visitors' perceptions. However, some visitors may find a benefit from the addition of the terraced walls since they could be used as a resting spot. Stone cladding to the exposed visual portions of the levee wall would identify with the surrounding cultural landscapes and would mitigate many adverse impacts of Phase 1. Cumulative impacts would be long-term, minor, and adverse.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. Phase 1 of alternative 4 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative. Action would be taken only in the event of a flood, in which case visitors would be evacuated from the NAMA, resulting in either negligible or no impacts on visitor use and experience.

Under Phase 1 of alternative 4, a "Hybrid" arrangement of floodwalls with elements similar to the west wall from alternative 2B and the east wall from alternative 1 would be located approximately 177.5 feet south of the centerline of Constitution Avenue. Construction time, logistics, and related impacts would be very similar to those described for Phase 1 of other alternatives. If funding is available, the height of the walls would be increased to 18.7 NAVD in Phase 1. The walls and associated storage structure would take four to six months to complete, with additional time for reclamation, all during high visitation months. During this time, 17th Street, which is a common access point for visitors in automobiles, would need to be closed partially for eight to 10 weeks. Construction would result in minor to moderate, short-term impacts on visitor experience from the presence of construction crews, equipment, noise, and access limitations.

Phase 1 would require the removal of 28 trees, with the concordant effect upon the visual character of the area and loss of tree canopy shading. Three of the four trees that would need to be removed along 17th Street are older mature elms, and one larger mature walnut would also need to be removed. If the wall height is increased to 18.7 feet, additional trees would be removed (see Phase 2 analysis). Although the impacts on visitor use and experience would be similar to the impacts of Phase 1 for alternatives 1 and 2, the Hybrid wall design would not intrude as much on the grounds of the Washington Monument. The setback of the wall from 17th Street would make visitors feel less confined or "tunnel-like" in their approach to the Washington Monument coming from the north compared to other alternatives with walls at this same general location. The completed walls would have a negligible impact on visitor use of this area of the Mall or the various attractions along the Mall (tourism), and the degree of the impact upon visitor experience related to the visual character of the area, and whether it would be beneficial or adverse, depends on how the visitors perceive and experience it. It is expected that any adverse impacts on visitor experience in this area of the NAMA would be minor at most, given that the curved wall would be less intrusive on the Monument Grounds, and the angled wall on the west side would not be very visible.

Information would be posted to help visitors understand the need for the project. This may reduce negative perceptions, especially if appropriate interpretation is provided and if tourmobile tours incorporate the history of the levee and this area of the Mall.

Similar to alternative 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in this area, a long-term beneficial effect.

Cumulative Impacts. The cumulative impacts for Phase 1 of alternative 4 would be similar to Phase 1 of alternatives 1 and 2. The same projects and actions would contribute to the cumulative impacts as described previously for the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events, and several future projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the adverse long-term impacts on visitor use and experience at the 17th Street closure under Phase 1 of alternative 2, would result in minor adverse cumulative impacts in the study area.

Conclusion. Phase 1 of alterative 4 would have short-term minor to moderate adverse impacts upon visitor use and experience because of the effects of construction activities and street closures that would occur during months that draw large numbers of visitors to this area of the Mall. Once completed, the wall would have a long-term adverse impact on visitor experience in this area mainly because of the presence and appearance of the wall and the removal of several mature trees, which would likely be considered minor. The effect on visitor use and enjoyment of the various attractions and monuments/memorials would be negligible. Cumulative impacts would be long-term, minor, and adverse.

Phase 2 Analysis. Impacts of Phase 2 of alternative 4 would be very similar to those of Phase 2 of alternatives 1 and 2. In order to meet the level of protection necessary for the congressionally authorized solution (Phase 2), two embankments would be constructed at 23rd Street. This would include the removal of six American elms and also several small shrubs. The softball fields that are located in the vicinity would be preserved, and a planting plan would provide for planting of trees and shrubs to compensate for those lost. Construction would take several months to complete, during which time visitor use of the areas where the embankments are to be created would be restricted, but other recreational activities could occur on the remainder of the site. At the Reflecting Pool levee, short-term disturbance would occur from workers and from equipment used to fill in the low spots. All of this would result in short-term minor adverse impacts on visitor use and experience.

Under Phase 2 of alternative 4 at 17th Street, the level of the floodwalls would be raised to 18.7 NAVD, which is two feet above and beyond the height of Phase 1 (if not funded and completed under Phase 1). There would be a re-grading against the concrete wall of Phase 1 to raise it to 18.7 NAVD. The walls would also be covered in a stone veneer so that they complement the historic character of the adjacent cultural landscape.

The disturbance created by the eight to 12 months of construction necessary to complete Phase 2 would be the same as described for Phase 2 of alternative 1, resulting in a minor negative impact upon visitor use and experience.

Upon completion of the wall, impacts upon visitor use and experience would be similar for Phase 2 of alternatives 1 and 2, but the visual aspects would be different due to where the wall is placed in relation to the Monument Grounds and the effect of the arched wall concept that parallels the entrance walkway to the Washington Monument. Phase 2 of alternative 4 would require the removal of an additional 32 trees, with the concordant impacts upon the visual character of the area and canopy tree shading. However, a landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area, reducing long-term impacts on the visual landscape to minor levels over time. Pedestrian mobility would only be affected by a somewhat steeper gradient on the lawns to the east and west of 17th Street, with a negligible impact on visitor use since all

major attractions could be readily accessed with little change in pedestrian use patterns and little change in the overall accessibility or use of the Monument Grounds.

Unlike the Phase 1 wall, the Phase 2 wall would be covered by a stone veneer that would complement the surrounding cultural landscape. However, the presence of the wall and space surrounding it would add a new feature to the area that could result in minor adverse effects on those visitors that desire the look and feel of the present Mall. Similar to Phase 1, interpretive programs might help to foster a positive perception of the completed arc wall, and it could serve as a new feature that would draw visitor interest in this area.

Similar to Phase 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in the area, a long-term beneficial effect.

Cumulative Impacts. The cumulative impacts for Phase 2 of alternative 4 would be very similar to those identified for Phase 2 of alternatives 1 and 2. The same projects and actions would contribute to the cumulative impacts as described previously for Phase 1 and the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events, and several future plans and projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the long-term minor adverse impacts as well as beneficial impacts on visitor use and experience from implementation of Phase 2 of alternative 4, would result in long-term negligible adverse cumulative impacts in the overall study area.

Conclusion. During the eight to 12 months of construction, Phase 2 of alternative 4 would have a minor adverse impact on visitor use and experience due to the presence of construction crews and equipment. The completed Phase 2 Hybrid would have a negligible impact on visitor use of this area of the mall, and may have either a long-term adverse or beneficial impact on visitor experience depending on the effect on the area's visual aesthetics and the visitor's perception of the landscape changes, especially at the entrance to the Washington Monument. Removal of trees would result in long-term adverse effects that would be reduced to minor over time. Because of the stone veneer and the synergism with the surrounding cultural landscape, Phase 2 would mitigate many adverse impacts of Phase 1. Cumulative impacts would be long-term, negligible, and adverse.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. Phase 1 of alternative 5 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative. Action would be taken only in the event of a flood, in which case visitors would be evacuated from the NAMA, resulting in no or negligible impacts on visitor use and experience.

Phase 1 of alternative 5 would place one new small structure on the east side of 17th Street and a curved wall and realigned walkway to the west side of 17th Street that would be aligned to the southern edge of the Overlook Terrace, approximately 525 feet south of the centerline of Constitution Avenue, and constructed to meet the 18.7 feet NAVD level of protection. During a flood event, the closure across 17th Street would be achieved through a post and panel system. Construction time, logistics, and related impacts would be similar to those described for Phase 1 of alternative 1. The structure and wall would take four to six months to complete, with additional time for reclamation, all during busy visitation months. During this time, 17th Street, which is a common access point for visitors in automobiles, would need to be closed partially for eight to 10 weeks. Construction would result in minor to moderate short-

term impacts on visitor experience from the presence of construction crews, equipment, noise, and access limitations.

Impacts on visitor use and experience for Phase 1 of alternative 5 would have some similarities to those described for Phase 1 of alternative 3; however, the appearance and presence of the cement structure and the wall abutment at this location on the Monument Grounds would be more prominent than other alternative structures and could appear to be at odds with the Monument Grounds, which could detract from the experience of visitors that are accustomed to the ground's uninterrupted expanse. Thirty-two trees would need to be removed, including two older mature street elms, with the concordant effect upon the visual landscape. While the completed structure and wall would have a negligible impact on visitor use of this area of the Mall or the various attractions along the Mall (tourism), the degree of the impact upon visitor experience related to the visual character of the area, and whether it would be beneficial or adverse, would depend on how the visitors perceive and experience it. It is expected that any adverse impacts on visitor experience in this area of the NAMA would be minor to moderate at most although more visitors may perceive this as a moderate impact compared to the other designs considered, especially before the Phase 2 cladding is added.

Information would be posted to help visitors understand the need for the project. This may reduce some negative perceptions, especially if appropriate interpretation is provided and if tourmobile tours incorporate the history of the levee and this area of the Mall.

Similar to alternative 1, annual testing of the system at off-peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in the area, a long-term beneficial effect.

Cumulative Impacts. The cumulative impacts for Phase 1 of alternative 5 would be similar to those identified for Phase 1 of alternatives 1 and 2. The same projects and actions would contribute to the cumulative impacts as described previously for the no action alternative These include ongoing landscape and facility maintenance, security improvements, public events, and several future plans and projects that would directly affect the National Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience on the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the long-term mostly adverse impacts on visitor experience at the 17th Street closure under Phase 1 of alternative 3, would result in a minor to moderate adverse cumulative impact.

Conclusion. Phase 1 of alternative 5 would have short-term minor to moderate adverse impacts upon visitor use and experience because of the effects of construction activities and street closures that would occur during months that draw large numbers of visitors to this area of the mall. Once completed, the structures would have a long-term likely moderate adverse impact on visitor experience in this area mainly because of the presence and appearance of the un-clad structure and wall and the removal of trees in a previously open expanse of the Monument Grounds. The effect on visitor use and enjoyment of the various attractions and monuments/memorials would be negligible. Cumulative impacts would be long-term, minor to moderate, and adverse.

Phase 2 Analysis. In order to meet the level of protection necessary for the congressionally authorized solution, two embankments would be constructed at 23rd Street. This would include the removal of six American elms and also several small shrubs. The softball fields that are located in the vicinity would be preserved and a planting plan would provide for planting of trees and shrubs to compensate for those lost. Construction would take several months to complete, during which time visitor use of the areas where the embankments are to be created would be restricted, but other recreational activities could occur on the remainder of the site. At the Reflecting Pool levee, short-term disturbance would occur from workers and

from equipment used to fill in the low spots. All this would result in short-term minor adverse impacts on visitor use and experience.

Phase 2 of alternative 5 would require no change to the structure since the height of the congressionally authorized solution at 17th Street would be met in Phase 1. The disturbance created by the eight to 12 months of construction necessary to complete aesthetic improvements to Phase 2 would be the similar to that described for Phase 2 of alternative 1, resulting in a minor negative impact upon visitor use and experience.

Upon completion of the wall, impacts upon visitor use and experience would be similar to Phase 2 of alternatives 3, but the visual aspects would be different because of where the wall is placed in relation to the Constitution Gardens and the effect of the structure on the Washington Monument open space. No additional trees would be removed in Phase 2 of alternative 5, which is a benefit compared to other alternatives, so it would have the least total adverse effect on trees of the three alternatives considered. However, to the extent that these trees are considered integral to the area's character and are used by visitors for shade and enjoyment, the removal of trees and installation of the structure near 17th Street where there is currently a row of shade trees would constitute a long-term minor to moderate adverse impact on visitor experience of the Monument Grounds. A landscape plan would ensure that the overall visual character and integrity of the cultural landscape would be compatible with the original design of the project area, which would reduce long-term impacts on the visual landscape to minor levels over time. Pedestrian mobility and physical use of this area could be affected by the terraced landscape, which would change how visitors move through the area. However, this would be only a negligible adverse impact on overall visitor use in the study area since all major attractions in the study area could be readily accessed, and there would be little change in the overall visitation to the Washington Monument.

Unlike the Phase 1 wall, the Phase 2 wall and structure would be covered by a stone veneer that would complement the surrounding cultural landscape. However, the complete levee structure would have an impact on the visitor experience of the area because it would change the area's look and function and how as well as visitors' perceptions of the area's open space relationships and cultural landscape. The removal of a number of relatively mature trees, and the presence of the building and wall, would add a new feature to the area that is currently a more natural open setting with many trees on the west side of 17th Street. Therefore, even with cladding, it could result in a minor to moderate adverse effect on those visitors that desire the look and feel of the present Mall. Interpretive programs might help to foster a positive perception of the completed terrace.

Similar to Phase 1, annual testing of the system at off- peak times (at night) would result in short-term negligible adverse impacts on visitor use and experience. During a flood event, there would be no expected effects on visitor use since visitors would not be permitted in the area. However, the use of the post and panel system would allow for a relatively rapid disassembly of the levee with concurrent rapid return to normal visitation in the area, a long-term beneficial effect.

Cumulative Impacts. The cumulative impacts of Phase 2 of alternative 5 would be very similar to those identified for Phase 2 of alternative 3. The same projects and actions would contribute to the cumulative impacts as described previously for Phase 1 and the no action alternative. These include ongoing landscape and facility maintenance, security improvements, public events, and several future plans and projects that would directly affect the Mall. All of these would contribute to the long-term beneficial cumulative impacts on visitor use and experience of the Mall and in the study area, except for the minor adverse cumulative impacts associated with occasional grounds and building maintenance and increased visitation. These impacts, in combination with the long-term minor to moderate adverse impacts on visitor experience at the 17th Street closure under Phase 2 of alternative 5, would result in the long-term minor cumulative adverse impacts in the overall study area.

Conclusion. During the eight to 12 months of construction, Phase 2 of alternative 5 would have a minor adverse impact on visitor use and experience due to the presence of construction. The completed Phase 2

building and wall would have a negligible impact on visitor use in the study area, but may have a minor to moderate adverse impact on visitor experience due to the effect on the area's visual character and the visitor's perceptions, especially of the landscape changes, the appearance of the structure and walls in the previously open area, and the removal of several large street trees. Because of the stone veneer and the cladding which would identify with the surrounding cultural landscapes, Phase 2 would mitigate many adverse impacts of Phase 1. Cumulative impacts would be long-term, minor, and adverse.

PUBLIC SAFETY

METHODOLOGY AND ASSUMPTIONS

The analysis of health and safety considered hazards to park employees and the general public that are associated with the construction, maintenance and implementation of the levee components and the implications for emergency vehicle access as well as the relative reliability associated with the type of levee structure that is provided for under each alternative. Impacts for this resource area were analyzed qualitatively, using information provided by the project engineers and park service staff familiar with the current levee operation and maintenance.

IMPACT THRESHOLDS

The impact intensities for the assessment of impacts on health and safety follow. Where impacts on health and safety become moderate, it is assumed that current visitor satisfaction and safety levels would begin to decline, and some of the park's long-term visitor goals would not be achieved.

Negligible: The impact on health and safety would not be measurable or perceptible. Emergency response capabilities would not be impacted, and visitor satisfaction and safety would not be impacted at measurable levels.

Minor: The impact on health and safety would be measurable or perceptible, but it would be limited to a relatively small number of visitors or employees at localized areas. Emergency response capabilities would be impacted; however, impacts would be small and easily mitigated.

Moderate: The impact on health and safety would be sufficient to cause a change in accident rates at existing low-accident locations or in areas that currently do not exhibit noticeable accident trends. Emergency response capabilities would be impacted and mitigation to offset adverse impacts would be extensive, but likely successful.

Major: The impact on health and safety would be substantial. Accident rates in areas usually limited to low accident potential are expected to substantially increase in the short- and long-term. Emergency response capabilities would be changed substantially and mitigation measures would be extensive.

Duration: Short-term impacts are those lasting less than one year; long-term impacts are those lasting longer than one year.

STUDY AREA

The study area for health and safety issues includes the NAMA and surrounding area.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Under the no action alternative, while standard conditions would pose no threats to public safety beyond what is ordinarily experienced in the NAMA, in the event of a flood there may be some safety concerns related to the construction of the levee system. At 23rd Street, action would only need to be taken if the flood exceeds the 100-year level, in which case sandbags would be brought from the Brentwood and/or the East Potomac maintenance facilities and would be used to create a barrier along the alignment of 23rd Street, across the eastbound ramp to Roosevelt Bridge at the end of Constitution Avenue. Nothing would need to be done at the Reflecting Pool. Impacts related to employee safety from the required actions at these locations would be limited to possible traffic accidents or minor injuries that could occur while placing sandbags and would not be expected to exceed negligible levels.

At 17th Street, the NPS would follow its current flood control plan and construct a closure first of Jersey barriers and sandbags, followed by soil excavated from the Monument Grounds or brought to the site via truck transport from an outside source (NPS 2006b). The public would be evacuated from the area, and no additional public safety concerns would occur, resulting in negligible impacts on the public from the construction of the levee. However, the construction of this type of closure involving excavation and placement of fill with heavy equipment, moving and stacking of Jersey barriers and sandbags, and doing all this during likely adverse high wind and rain conditions would present safety risks to the crews doing this work, and accidents could occur. A health and safety plan would be in place and would be implemented following NPS and Occupational Safety and Health Administration (OSHA) standards. Assuming the plan is followed, under most circumstances, this scenario would represent a short-term minor adverse impact on employee safety.

Under the no action alternative, the incoming ramp of 23rd Street would be blocked off by sandbags, and 17th Street would be closed, which would mean that any emergency service vehicles would be rerouted. However, since this would be occurring only after an announced flood event when people would not be commuting, it is expected that traffic would be relatively light and that alternate routes would be available and not congested. These closures would have a negligible impact on emergency services at the time they occur.

Overall, the no action alternative represents a long-term moderate adverse impact on public safety because of the type of levee constructed and its relative reliability. The earthen barrier has been decertified by USACE, and under the no action alternative, no change would be made to the plans for its construction after flood notification.

Cumulative Impacts. Actions that affect public safety in the study area include any public use that has the potential for accidents. More crowded use of the Mall during special events can lead to increased visitor injuries, a long-term minor adverse impact, and the various construction projects underway or planned for the area all have the potential for injuries and safety issues. However, all of these would be done under an approved health and safety plan, limiting adverse impacts to negligible or minor levels. The additional security that has been and would be constructed or provided within the study area provides a substantial long-term beneficial effect. The impacts of these other actions, in conjunction with the minor to moderate long-term and adverse impacts expected from the no action alternative, would result in long-term minor adverse impacts related to health and safety on the Mall and in the study area, with most of the adverse effect stemming from the uncertain reliability of the current levee plan.

Conclusion. Under the no action alternative, the current levee system would result in negligible to possible minor impacts on employee safety due to the possibilities of accidents occurring during construction of an earthen levee under adverse conditions. There would be no immediate impact on the public, which would be evacuated from the area, and the closure of 17th Street would result in negligible adverse impact on the delivery of emergency services under expected traffic conditions. Overall, the low relative reliability of the earthen closure represents a moderate adverse impact on public safety. Cumulative impacts would be long-term and minor, with most of the adverse effect stemming from the uncertain reliability of the current levee plan.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. Phase 1 of alternative 1 at both the 23rd Street Closure and the Reflecting Pool levee would be identical to that described under the no action alternative. In the event of a flood notification, the U.S. Park Police working in the NAMA would evacuate visitors from the area. Therefore, there would be negligible adverse effects on public safety.

Phase 1 of alternative 1 at 17th Street would involve construction of two concrete floodwalls to the east and west of 17th Street, with a post and panel system in place across the street itself. Construction activities would be of concern because of the potential for accidents or injuries to either park employees or a member of the public. Typical safety measures taken would include the development of site health

and safety plans for the work crew and pedestrian safety measures, including barriers and public announcements and notices on the park website and in the media. Construction barriers and signs would be placed around the sites of ongoing construction in order to divert pedestrian traffic away and inform the public of the nature of the project (Doug Jacobs, pers. comm. Aug 12, 2008). Construction activities associated with the arc wall would present only a negligible adverse impact on public safety.

Seventeenth Street would be partially closed for eight to 10 weeks (one lane open in each direction). Depending on the extent of the closure and ability to access the area and find alternative routes in case of an emergency, impacts of the street closure or restriction could have up to moderate short-term adverse impacts on public safety if alternate routes are overly congested.

In the event of a flood notification, the U.S. Park Police working in the NAMA would evacuate visitors from the area. Adverse impacts on park employees would be limited because the erection of the post and panel system can be done without earth-moving or particularly dangerous actions. For this reason, adverse impacts of the erection of the post and panel system during a flood event on public safety would be negligible to minor.

Because the arc wall would be designed to deal with at least a 100-year flood and is of a reliable design and structure, Phase 1 of alternative 1 would have a long-term beneficial impact on public safety.

Cumulative Impacts. Cumulative impacts from other actions would be the same as described for the no action alternative, ranging from long-term beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction-related incidents. The effects of these actions, added to the long-term benefits of the new levee system and the short-term minor to possibly moderate adverse effects related to construction, would result in long-term overall beneficial impacts on public safety in the study area and surroundings.

Conclusion. Phase 1 of the arc wall would have short-term negligible impacts on public safety during the construction phase when barriers would protect the public from hazardous activities. Moderate adverse effects could occur from the short-term closing of 17th Street. Following its completion, the arc wall would provide protection for the FEMA required solution, and possibly the congressionally authorized solution, which represents a long-term beneficial impact on public safety due to the improvement in reliability over the current levee system. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

Phase 2 Analysis. In order to meet the level of protection necessary for the congressionally authorized solution (Phase 2), two embankments would be constructed at 23rd Street. Construction would take several months to complete, during which time visitor use of the areas where the embankments would be created would not be permitted. Typical construction barriers would be placed in the area during construction, directing the public away from construction activity, so there would be negligible adverse impacts on public safety.

At the Reflecting Pool levee, several low spots on the existing levee would need to be raised by approximately 1.5 feet above existing grade. Construction would take approximately six to nine months to complete. Typical construction barriers would be placed in the area during construction, directing the public away from construction activity, so there would be negligible adverse impacts on public safety.

Phase 2 of alternative 1 is designed to meet USACE certifications for the congressionally authorized solution. The arc wall constructed in Phase 1 alternative 1A would need to be raised by two feet (unless already funded and completed in Phase 1). This would be accomplished by re-grading against these concrete walls, and then raising the elevation of the wall from 16.7 feet to 18.7 NAVD. Under alternative 1B, the wall and surrounding land would already be at 18.7 NAVD in Phase 1. The post and panel system would also be the same as for Phase 1.

Construction of Phase 2 of alternative 1 alternative 1A would require approximately eight to 12 months of construction labor, with less time required for alternative 1B since re-grading and wall construction would have occurred in Phase 1. During this time, construction barriers would be placed around active

worksites; therefore, members of the public would not have access to any potentially dangerous activities. Construction workers would follow the approved health and safety plan, and 17th Street would not be closed. Therefore, adverse impacts on public safety would be negligible to minor. Erection of the post and panel system during a flood event would pose a negligible impact on public safety, as discussed under Phase 1 of alternative 1.

Because the Phase 2 arc wall would be designed to the congressionally authorized solution and is a reliable design and structure, Phase 2 of alternative 1 would have a long-term beneficial impact on public safety.

Cumulative Impacts. The cumulative impacts for Phase 2 are similar to those of Phase 1 of this alternative. Cumulative impacts from other actions would range from long-term beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction-related incidents. The effects of these actions, added to the long-term benefits of Phase 2 of alternative 1 and the short-term minor adverse effects related to construction, would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. Phase 2 of the arc wall would have a short-term negligible impact on public safety during the construction phase when barriers would protect the public from hazardous activities. Following its completion, the arc wall would provide protection for the congressionally authorized solution, which would be a long-term beneficial impact on public safety due to the improvement in reliability over the current levee system. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Phase 1 Analysis. Phase 1 of alternative 2 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative and alternative 1. Concerted action would only need to be taken in the event of a flood, requiring the placement of sandbags and Jersey barriers at 23rd Street. If this were to take place, the U.S. Park Police would evacuate the public from the hazardous areas; therefore, there would be a negligible impact upon public safety.

Phase 1 of alternative 2 is designed to meet USACE certifications for the 100-year flood. Seventeenth Street would be raised by one foot at a location approximately 100 feet south of Constitution Avenue. Two concrete walls would then be constructed on its east and west sides. In either option for this alternative, the post and panel closure would be the same. The NPS would construct a storage facility on the east side of 17th Street as a part of an earthen berm.

Alternative 2 would require four to six months of construction labor to complete. During this time, construction crews would follow approved health and safety plans and barriers would be put in place to keep the public away from the worksite (NPS 2006b). Therefore, construction would have a negligible adverse impact on public safety. However, 17th Street would be partially closed for up to eight to 10 weeks, which could be a short-term moderate adverse impact if this impedes emergency vehicle transport. Erection of the post and panel system would also have a negligible adverse impact on public safety, as described in Phase 1 of alternative 1, and having the posts and panels stored nearby would be a beneficial impact on public safety since they would be quickly available and not dependent on transport from Brentwood.

Cumulative Impacts. The cumulative impacts for Phase 1 of alternative 2 would be the same as those identified for Phase 1 of alternative 1. Cumulative impacts from other actions would range from long-term beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction-related incidents. The effects of these actions, added to the long-term benefits of alternative 1 and the short-term minor to possibly moderate adverse effects related to construction, would result in overall long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. As with Phase 1 of alternative 1, as long as barriers are maintained around the worksite, Phase 1 of alternative 2 would have a negligible impact on public safety although moderate adverse effects could occur from the short-term partial closing of 17th Street. Phase 1 of the Gate Walls alternative would provide a level of protection for the FEMA requirement, against a 100-year flood at a minimum, and possibly the level of protection for the congressionally authorized solution, both of which represent an improvement in reliability over the current system. Therefore, the long-term impacts on public safety would be beneficial. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

Phase 2 Analysis. Phase 2 of alternative 2 would be identical to the Phase 2 of alternative 1. In order to meet the level of protection necessary for the congressionally authorized solution (Phase 2), two embankments would be constructed at 23rd Street. Certain gaps in the Reflecting Pool levee would have to be filled in as well. Construction would take several months to complete, during which time construction barriers would seal the area off from public access. Therefore, this would have a negligible adverse impact on public safety.

Phase 2 of alternative 2 is designed to meet the congressionally authorized solution so the gate walls would need to be raised to 18.7 NAVD, two feet above and beyond the height of Phase 1 (unless already funded and completed in Phase 1). The wall would be covered in a stone veneer. Phase 2 would still use the post and panel system.

Construction barriers would be in place to seal active construction areas off from public access during the construction period, and work crews would follow approved health and safety plans. Seventeenth Street would not be closed. For this reason, there would be a negligible adverse impact on public safety. As discussed in alternative 1, the post and panel system would only be raised in the event of a flood, in which case the U.S. Park Police would evacuate the public. The post and panel system, therefore, poses a negligible adverse impact on public safety.

Cumulative Impacts. The cumulative impacts for Phase 2 of alternative 2 are the same as those for Phase 2 of alternative 1. Cumulative impacts from other actions would range from long-term beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction-related incidents. The effects of these actions, added to the long-term benefits of Phase 2 of alternative 1 and the short-term minor adverse effects related to construction would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. Phase 2 of the Gate Walls alternative would have a short-term negligible impact on public safety during the construction phase, when barriers would protect the public from hazardous activities. Following its completion, the Gate Walls alternative would provide protection for the congressionally authorized solution, which represents a long-term beneficial impact on public safety due to the improvement in reliability over the current levee system. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Phase 1 of alternative 3 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative and other alternatives. Concerted action would only need to be taken in the event of a flood. In such a case, the U.S. Park Police would evacuate the area; for this reason, there would be a negligible adverse impact upon public safety.

Phase 1 of alternative 3 at 17th Street would be designed to meet the USACE certifications for the 100-year flood. It would use two concrete walls running on the east and west sides of 17th Street, approximately 365 feet south of the centerline of Constitution Avenue, aligned on the centerline of the area known as the "Overlook Terrace." It would also use the post and panel system across 17th Street in the event of a flood.

As with alternatives 1 and 2, construction activities would not impact public safety because there would be barriers in place to protect the public, and the work crews would follow approved health and safety plan. For this reason, construction activities would have a negligible adverse impact on public safety; however, 17th Street may be partially closed for up to eight to 10 weeks, which could be a short-term moderate adverse impact. Once construction is complete, there would be no further activity in the area except in the event of a flood. During a flood, the post and panel system would be erected; however, the public would be evacuated by the U.S. Park Police, as mentioned in alternatives 1 and 2. Therefore, the post and panel system would pose a negligible adverse impact upon public safety.

Cumulative Impacts. The cumulative impacts for Phase 1 of alternative 3 are the same as those for Phase 1 of alternatives 1 and 2. Cumulative impacts from other actions would range from long-term beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction-related incidents. The effects of these actions, added to the long-term benefits of alternative 1 and the short-term minor to possibly moderate adverse effects related to construction, would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. As with Phase 1 of alternatives 1 and 2, as long as barriers are maintained around the worksite, Phase 1 of alternative 3 would have a negligible adverse impact on public safety although moderate adverse effects could occur from the short-term closing of 17th Street. Phase 1 of the Constitution Garden Walls alternative would provide more reliable protection from a 100-year flood, an improvement in reliability over the current system. Therefore, the long-term impacts on public safety would be beneficial. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

Phase 2 Analysis. At the 23rd Street closure and the Reflecting Pool levee, Phase 2 of alternative 3 would be identical to the Phase 2 of alternative 1. In order to meet the level of protection necessary for the congressionally authorized solution, two embankments would be constructed at 23rd Street. As with alternatives 1 and 2, construction barriers would be placed around the worksite, preventing the public from accessing the potentially dangerous construction activity. Therefore, there would be a negligible adverse impact on public safety.

Phase 2 of alternative 3 would require raising the height of the aforementioned concrete walls by two feet so that they are at 18.7 NAVD. This would be done by re-grading the landscape to cover the concrete walls, and then adding stone-clad terraced steps in their place. This would still require the use of Jersey barriers on top of some of the terraces in the event of a flood notification.

As with Phase 2 of alternatives 1 and 2, construction barriers would be used during the construction phase, meaning that the impact on public safety would be negligible. Seventeenth Street would not be closed. Also as discussed in alternatives 1 and 2, the post and panel system would only be raised in the event of a flood, in which case the U.S. Park Police would evacuate the public. The post and panel system, therefore, would pose a negligible adverse impact on public safety. Under this alternative, the post and panel system would be almost twice as long as that of the other alternatives and would require supplementing with Jersey barriers (see chapter 2), which reduces the ease of construction and the overall reliability of the system compared to alternatives 1 or 2. This slightly increases the chance of worker injuries during implementation and would be a less beneficial solution compared to other action alternatives that could be implemented faster during times of rising flood waters.

Cumulative Impacts. The cumulative impacts for Phase 2 of alternative 3 would be the same as those identified for alternatives 1 and 2. Cumulative impacts from other action would range from long-term and beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction–related incidents. The effects of these actions, added to the long-term benefits of Phase 2 of alternative 1 and the short-term minor adverse effects related to construction, would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. Phase 2 of the Constitution Garden Walls alternative would have a short-term negligible impact on public safety during the construction phase when barriers would protect the public from

hazardous activities. Following its completion, the wall would provide protection for the congressionally authorized solution, which represents a long-term beneficial impact on public safety due to the improvement in reliability over the current levee system, although with a slightly longer time required for implementation during a flood event. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. Phase 1 of alternative 4 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative and other alternatives. Concerted action would only need to be taken in the event of a flood. In such a case, the U.S. Park Police would evacuate the area; for this reason, there would be a negligible adverse impact upon public safety.

Phase 1 of alternative 4 at 17th Street would be designed to meet the USACE certifications for the 100-year flood. It would use two concrete walls running on the east and west sides of 17th Street, approximately 177.5 feet south of the centerline of Constitution Avenue, similar to alternatives 1 and 2. It would also use the post and panel system across 17th Street in the event of a flood.

As with alternatives 1 and 2, construction activities would not impact public safety because there would be barriers in place in order to protect the public, and the work crews would follow approved health and safety plans. For this reason, construction activities would have a negligible adverse impact on public safety; however, 17th Street may be partially closed for up to eight to 10 weeks, which could be a short-term moderate adverse impact. Once construction is complete, there would be no further activity in the area except in the event of a flood. During a flood, the post and panel system would be erected; however, the public would be evacuated by the U.S. Park Police, as mentioned in alternatives 1 and 2. Therefore, the post and panel system would pose a negligible adverse impact upon public safety.

Cumulative Impacts. The cumulative impacts for Phase 1 of alternative 4 are the same as those for Phase 1 of previous discussed action alternatives. Cumulative impacts from other actions would range from long-term beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction-related incidents. The effects of these actions, added to the long-term benefits of alternative 4 and the short-term minor to possibly moderate adverse effects related to construction, would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. As with Phase 1 of other alternatives, as long as barriers are maintained around the worksite, Phase 1 of alternative 4 would have a negligible adverse impact on public safety although moderate adverse effects could occur from the short-term closing of 17th Street. Phase 1 of the Hybrid alternative would provide level of protection to satisfy the FEMA requirement against a 100-year flood at a minimum, and possibly the level of protection for the congressionally authorized solution, both of which represent an improvement in reliability over the current system. Therefore, the long-term impacts on public safety would be beneficial. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

Phase 2 Analysis. At the 23rd Street closure and the Reflecting Pool levee, Phase 2 of alternative 4 would be identical to the Phase 2 of alternative 1. In order to meet the level of protection necessary for the congressionally authorized solution, two embankments would be constructed at 23rd Street. As with alternatives 1 and 2, construction barriers would be placed around the worksite, preventing the public from accessing the potentially dangerous construction activity. Therefore, there would be a negligible adverse impact on public safety.

Phase 2 of alternative 4 would require raising the height of the aforementioned concrete walls by two feet so that they are at 18.7 NAVD (unless already funded and completed in Phase 1). The walls would be covered in a stone veneer. Phase 2 would still use the post and panel system.

As with Phase 2 of previously discussed action alternatives, construction barriers would be used during the construction phase, meaning that the impact on public safety would be negligible. Seventeenth Street

would not be closed. Also as discussed in previous alternatives, the post and panel system would only be raised in the event of a flood, in which case the U.S. Park Police would evacuate the public. The post and panel system therefore would pose a negligible adverse impact on public safety.

Cumulative Impacts. The cumulative impacts for Phase 2 of alternative 4 would be the same as those identified for previous action alternatives. Cumulative impacts from other actions would range from long-term and beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction–related incidents. The effects of these actions, added to the long-term benefits of Phase 2 of alternative 4 and the short-term minor adverse effects related to construction, would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. Phase 2 of the "Hybrid" alternative would have a short-term negligible impact on public safety during the construction phase when barriers would protect the public from hazardous activities. Following its completion, the wall would provide protection for the congressionally authorized solution, which represents a long-term beneficial impact on public safety due to the improvement in reliability over the current levee system, although with a slightly longer time required for implementation during a flood event. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. Phase 1 of alternative 5 at the 23rd Street closure and the Reflecting Pool levee would be identical to the no action alternative and other alternatives. Concerted action would only need to be taken in the event of a flood. In such a case, the U.S. Park Police would evacuate the area; for this reason, there would be only a negligible adverse impact upon public safety.

Phase 1 of alternative 5 at 17th Street would be constructed to the congressionally authorized solution of 18.7 NAVD. It would use a concrete structure on the east side of 17th Street and a curved wall on the west side, approximately 525 feet south of the centerline of Constitution Avenue. It would also use the post and panel system across 17th Street in the event of a flood.

As with previous discussed action alternatives, construction activities would not impact public safety because there would be barriers in place in order to protect the public, and the work crews would follow approved health and safety plans. For this reason, construction activities would have a negligible adverse impact on public safety; however, 17th Street may be partially closed for up to eight to 10 weeks, which could be a short-term moderate adverse impact. Once construction is complete, there would be no further activity in the area except in the event of a flood. During a flood, the post and panel system would be erected; however, the public would be evacuated by the U.S. Park Police, as mentioned in alternatives 1 and 2. Therefore, the post and panel system would pose only a negligible adverse impact upon public safety.

Cumulative Impacts. The cumulative impacts for Phase 1 of alternative 5 are the same as those for Phase 1 of previous discussed action alternatives. Cumulative impacts from other actions would range from long-term beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction-related incidents. The effects of these actions, added to the long-term benefits of alternative 5, and the short-term minor to possibly moderate adverse effects related to construction, would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. As with Phase 1 of other alternatives, as long as barriers are maintained around the worksite, Phase 1 of alternative 5 would have a negligible adverse impact on public safety although moderate adverse effects could occur from the short-term closing of 17th Street. In the event of a 100-year flood, Phase 1 would provide USACE-certified protection, an improvement in reliability over the current system. Therefore, the long-term impacts on public safety would be beneficial. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

Phase 2 Analysis. At the 23rd Street closure and the Reflecting Pool levee, Phase 2 of alternative 5 would be identical to the Phase 2 of alternative 1. In order to meet the level of protection necessary for the congressionally authorized solution, two embankments would be constructed at 23rd Street. As with alternatives 1 and 2, construction barriers would be placed around the worksite, preventing the public from accessing the potentially dangerous construction activity. Therefore, there would be a negligible adverse impact on public safety.

Phase 2 of alternative 5 would require only aesthetic improvements since the height of the congressionally authorized solution at 17th Street would be met in Phase 1. The wall and structure would be covered in a stone veneer. Phase 2 would still use the post and panel system.

As with Phase 2 of previously discussed action alternatives, construction barriers would be used during the construction phase, meaning that the impact on public safety would be negligible. Seventeenth Street would not be closed. Also as discussed in previous alternatives, the post and panel system would only be raised in the event of a flood, in which case the U.S. Park Police would evacuate the public. The post and panel system therefore would pose a negligible adverse impact on public safety.

Cumulative Impacts. The cumulative impacts for Phase 2 of alternative 5 would be the same as those identified for previous action alternatives. Cumulative impacts from other actions would range from long-term and beneficial, related to increased security, to minor adverse impacts from visitor injuries and possible construction–related incidents. The effects of these actions, added to the long-term benefits of Phase 2 of alternative 5 and the short-term minor adverse effects related to construction, would result in long-term beneficial impacts on public safety in the study area and surroundings.

Conclusion. Phase 2 of the “3B” alternative would have a short-term negligible impact on public safety during the construction phase when barriers would protect the public from hazardous activities. Following its completion, the wall would provide protection for the congressionally authorized solution, which represents a long-term beneficial impact on public safety due to the improvement in reliability over the current levee system, although with a slightly longer time required for implementation during a flood event. Cumulative impacts on public safety would be long-term and beneficial in the study area and surroundings.

LAND USE AND SOCIOECONOMICS

METHODOLOGY AND ASSUMPTIONS

The potential socioeconomic impacts associated with the proposed levee improvements would be focused on the effects of implementing the new 100-year floodplain in the study area. This would require entities residing within the study area to acquire insurance under the National Flood Insurance Program (NFIP). In addition, any new construction or renovation of existing buildings would need to comply with a stricter set of building codes that address flooding issues. Potential impacts were evaluated by examining the type and number of buildings within the study area and the requirements of the NFIP and building codes as required for structures in the 100-year floodplain. The analysis did not consider any impacts associated with the frequency and magnitude of flooding with different levee options.

STUDY AREA

For this topic, the study area is defined as the same as the new 100-year floodplain that would be included on FEMA maps if the 17th Street closure did not function. The floodplain area starts at the intersection of 17th Street NW with Constitution Avenue. The area of effect then expands to the east, across the Ellipse, to Pennsylvania Avenue NW. Pennsylvania Avenue NW then forms the northernmost boundary of the area of impact for approximately 1.10 miles to the east, whereupon it extends south, across the lawn of the United States Capitol building, into I-395. The boundary of the area of impact continues to extend south until hitting James Creek Parkway, just south of Delaware Avenue SW.

The primary facilities considered within the study area include:

- The Federal Triangle Area of downtown;
- Portions of the National Mall area and numerous museums that line the Mall between 4th and 7th streets;
- Other public and private facilities that extend into southwest DC along 3rd Street SW; and
- Many private residences in the communities of Capital Park and others southward along 3rd Street to the intersection of P and Canal streets, SW.

IMPACT THRESHOLDS

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

Negligible: Very few individuals, businesses, or government entities would be impacted. Existing structures would not incur additional costs of insurance and new development would not incur additional costs of construction or restrictions on development.

Minor: A number of individuals, businesses, or government entities would be impacted; however, mitigation measures could be implemented to reduce impacts or impacts would only be short-term.

Moderate: Several individuals, businesses, or government entities would be impacted; mitigation measures would be less likely to reduce impacts in the short- or long-term.

Major: Many individuals, businesses, or government entities would be impacted; impacts would be severe and long-lasting including increased costs of insurance for existing buildings and more costly construction for new development. Mitigation measures would be unable to reduce or eliminate impacts in the long-run.

Duration: Short-term impacts are those lasting less than one year; long-term impacts are those lasting longer than one year.

IMPACTS OF NO ACTION ALTERNATIVE

The no action alternative represents the existing plan for the levee system and the implementation of existing NPS operations and procedures during a flood event. In addition, recent changes in the USACE's inspection guidelines resulted in decertification of the Potomac Park levee system. As a result, the FEMA proposed new flood insurance maps for the District that include a large section of the metropolitan area in the newly delineated 100-year floodplain (study area). A result of these changes is that all entities with property within the 100-year floodplain would be required to comply with new building codes[2] and purchase insurance under the NFIP, which covers flood damage to buildings and structures. Buildings must purchase insurance against damages to the structure of the building itself and also against damages to the contents of any floors below flood level that would be inundated in the event of a 100-year flood. Owners may purchase a basic level of coverage or increase coverage for an additional cost. The cost of the insurance is based on the area of the building (square feet). The insurance rate per square foot is dependent on the building's characteristics, on the date of construction of the building, and on the "flood zone" that the building is located in.

There are four different types of buildings covered under NFIP:

- Non-residential
- Single-family dwellings
- Condominiums
- Two-to-four family dwellings

Each building type has a different flood insurance rate depending on the zone where it is located as delineated in FEMA's Flood Insurance Rate Map (FIRM). The study area for this project would be located in FEMA's designated Zone C.

Table 4.3 summarizes the insurance costs per square foot for buildings of various types located within FEMA's Zone C. This table is based on the May 2008 edition of FEMA's Flood Insurance Manual (FEMA, 2008).

[2] The building codes would require first floor and building entrances in the affected area to be elevated above the floodplain. In addition, older buildings would need to be retrofitted to elevate mechanical and electrical systems and equipment to building levels above the floodplain.

Table 4.3. - Annual Insurance Rates Per Square Foot for $100 in coverage for Buildings in Zone C (basic/additional)

Occupancy		Single Family		2–4 Family		Other Residential		Non-Residential	
		Building	Contents	Building	Contents	Building	Contents	Building	Contents
Building Type	No Basement / Enclosure	.78/.21	1.20/.37	0.78/0.21		0.74/0.21		0.74/0.21	
	With Basement	.89/.30	1.36/.43	0.89/0.30		0.95/0.30		0.95/0.30	
	With Enclosure	.89/.34	1.36/.49	0.89/0.34		0.95/0.34		0.95/0.34	
	Manufactured (Mobile) Home	.78/.38	1.20/.37					0.95/0.39	
Contents Location	Basement & Above				1.53/0.56		1.53/0.56		1.58/0.61
	Enclosure & Above				1.53/0.65		1.53/0.65		1.58/0.73
	Lowest Floor Only - Above Ground Level				1.20/0.59		1.20/0.59		0.97/0.43
	Lowest Floor Above Ground Level and Higher Floors				1.20/0.37		1.20/0.37		0.97/0.31
	Above Ground Level - More than One Full Floor				0.35/0.12		0.35/0.12		0.22/0.12
	Manufactured (Mobile) Home								0.85/0.53

Source: FEMA 2008

According to FEMA, there are ten federally owned buildings that fall within the 100-year floodplain (FEMA 2008). Table 4.3 identifies the building and summarizes the square footage as provided by GSA. The information in Tables 4.5 and 4.6 were used to estimate the cost of the insurance that would be required for these federal buildings under NFIP. These buildings fall into the "non-residential" category and must purchase NFIP coverage for the building as well as for building contents. For this study, we assumed that each of the buildings has one basement floor below ground level (USACE 1992). Therefore, the additional insurance costs would include coverage for buildings and contents for non-residential buildings with a basement. Table 4.4 summarizes the cost for each building. For all 10 federal buildings, the government would incur an additional $16 million per year for basic coverage of the buildings and contents located within the 100-year floodplain and an additional $22 million per year if additional coverage was purchased.

Table 4.4 - Cost to Federally Owned Buildings						
Federal Building[1]	Square Footage of Building	Building Coverage (basic)	Building Coverage (Additional)	Contents Coverage (Basic)	Contents Coverage (Additional)	Total Cost (basic & additional coverage)
Federal Trade Building	258,831	$245,889	$77,649	$408,953	$157,887	$890,379
Robert F. Kennedy Building	1,025,307	$974,042	$307,592	$1,619,985	$625,437	$3,527,056
Ariel Rios Federal Building	735,433	$698,661	$220,630	$1,161,984	$448,614	$2,529,890
Post Office, Old	375,228	$356,466	$112,568	$592,860	$228,889	$1,290,784
Wilbur Wright Building	384,041	$364,839	$115,212	$606,785	$234,265	$1,321,101
FOB 8	477,039	$453,187	$143,112	$753,722	$290,994	$1,641,014
J Edgar Hoover Building	1,874,263	$1,780,550	$562,279	$2,961,336	$1,143,300	$6,447,465
Reagan Building Trade Center	617,880	$586,986	$185,364	$976,250	$376,907	$2,125,507
EPA East	436,678	$414,844	$131,003	$689,951	$266,374	$1,502,172
EPA West	403,540	$383,363	$121,062	$637,593	$246,159	$1,388,178
Total Cost to Federally Owned Buildings in the Area of Impact (for basic coverage):						$16,668,247
Total Cost to Federally Owned Buildings in the Area of Impact (basic and additional coverage):						$22,663,546

Source: GSA 2008.

Note that the analysis made a simplifying assumption that none of the federal buildings had more than one basement floor. In the event that any such buildings have more than one basement floor, the cost of coverage would be even higher.

There are seven special buildings in the northeast portion of the study area including galleries and museums. These facilities would be classified as non-residential for purposes of the NFIP. The square footage of these buildings was estimated with the software program Google Earth. The estimates are summarized in the second column of Table 4.5. Using the estimate of square footage and the rates summarized in Table 4.2, an estimate of the additional insurance costs for the seven buildings was made as shown in Table 4.5. For these seven buildings additional insurance costs for coverage on the building and contents would increase to $2.6 million per year for basic coverage and $3.6 million per year for additional coverage.

Table 4.5 - Additional Insurance Cost to Special Buildings in the Study Area						
Special Building	Square Footage of Building	Building Coverage (basic)	Building Coverage (Additional)	Contents Coverage (Basic)	Contents Coverage (Additional)	Total Cost (basic & additional coverage)
National Museum of American History	130,000	$123,500	$39,000	$205,400	$79,300	$447,200
National Museum of Natural History	258,000	$245,100	$77,400	$407,640	$157,380	$887,520
National Gallery of Art, West Building	199,500	$189,525	$59,850	$315,210	$121,695	$686,280
National Gallery of Art, East Building	69,000	$65,550	$20,700	$109,020	$42,090	$237,360
National Air & Space Museum	168,000	$159,600	$50,400	$265,440	$102,480	$577,920
National Museum of the American Indian	47,000	$44,650	$14,100	$74,260	$28,670	$161,680
Voice of America Studio	177,675	$168,791	$53,303	$280,727	$108,382	$611,202
Total Cost to Special Buildings in the Area of Impact (for basic coverage):						$2,654,413
Total Cost to Special Buildings in the Area of Impact (basic and additional coverage):						$3,609,162

An analysis using Google Earth and ArcGIS revealed that there are approximately 100 residential buildings located in the study area. USACE (1992) states that there are 1,200 units, comprised mostly of multi-family buildings; D.C. (2008) states the same. Evaluation of Geographic Information Systems (GIS) data suggests that these buildings range from large buildings of approximately 155,000 square feet in size to small buildings of approximately 4,235 square feet in size. Assuming that these constitute multi-family buildings as per the NFIP building categories, estimated additional insurance costs for these buildings would be as shown in Table 4.6.

Table 4.6 - Additional Insurance Cost to Residential Buildings in the Study Area						
Residential Buildings	Square Footage of Building	Building Coverage (basic)	Building Coverage (Additional)	Contents Coverage (Basic)	Contents Coverage (Additional)	Total Cost (basic & additional coverage)
Small Residential Buildings	4,235	$4,023	$1,271	$6,480	$2,372	$14,145
Large Residential Buildings	155,000	$147,250	$46,500	$241,800	$86,800	$522,350
Total Cost to Residential Buildings in the Area of Impact (for basic coverage):						$399,553
Total Cost to Residential Buildings in the Area of Impact (basic and additional coverage):						$536,495

A simplifying assumption was made that half the residential buildings in the study area are small in size while the other half are large. Given these assumptions and the rates for residential buildings shown in Table 4.3, the estimated additional cost of insurance for residential buildings in the study area is $46 million per year.

Residential units that would need to comply with the insurance requirements are mainly located in the southern portions of the study area. This includes census tract 6002 and census tract 6400, block group 1. These tracts reported a total population of 2,800 individuals with 809 renter-occupied units and 306 owner-occupied units according to the 2000 Census. The census tracts and block groups do not coincide with the study area boundaries and cover a larger area. The 1,115 total units reported in the 2000 Census is similar to the estimates of residential units reported by the USACE. If the full costs of insurance were passed on to the 1,200 units, residents would incur an additional $38,000 per year for flood insurance. The increased cost of insurance could cause great financial hardship to residents living in this area including potential minority and low-income populations that reside in this area of the study area.

The additional costs of insurance would cause a major impact on residents, businesses, and the federal government on an annual basis. The costs would be expected to continue into the future with little opportunities for mitigation. All entities within the study area would be affected under this alternative. This includes impacts on potential minority and low-income populations that are located in the study area.

Analysis. Socioeconomic resources would not be impacted by the flood control activities at 23rd Street or the Reflection Pool levee. These activities would not impact the issuance of the new 100-year floodplain map that would require additional insurance and compliance with building codes for entities with properties within the study area. Socioeconomic impacts of the no action alternative would be, however, caused by the disassembly of the levee system, particularly the closure at 17th Street. The decommissioning of the levee system would lead to the issuance of a new 100-year floodplain map that would cause affected entities to need to obtain additional insurance from the NFIP, the increased cost of which would likely approach $50 million per year. Additionally, affected entities would be required to comply with stringent building codes for properties within the study area. This would result in major impacts on residents, businesses, and government entities with buildings located within the 100-year floodplain.

Cumulative Impacts. Cumulative impacts would occur as new development properties would not only have to purchase the costly insurance but comply with new building codes which would increase total cost of development, making some projects less financially feasible. This includes construction of other buildings on the National Mall, including the NMAAHC, the VVMC, the USIP, Department of Commerce, and the Southeast Federal Center/Yards mixed development, sponsored by GSA. This could result in construction delays or re-siting to other areas. FEMA has stated that the costs of compliance with more stringent building codes for new proposed developments would be considerable. FEMA also reported that the increased requirements would affect almost 1,000 units of proposed new buildings, that there would be a loss of more than 287,000 square feet of proposed new commercial space and a loss of financial feasibility for certain projects (FEMA 2008, p. 10) if the new floodplain maps were put into effect. The no action alternative, when combined with other past, present, and reasonably foreseeable actions, would result in major adverse cumulative impacts on the socioeconomics of the area.

Conclusion. The no action alternative would have major impacts on residents, businesses, and government entities with buildings located within the 100-year floodplain. If FEMA issues the new 100-year floodplain map, entities would be required to obtain insurance from the NFIP. The increased cost of insurance that would be incurred by affected parties would likely approach $50 million per year. In addition, the no action alternative would contribute to major cumulative impacts that would occur as new development properties would not only have to purchase the costly insurance but also comply with new building codes. This would increase total cost of development, making some projects less financially feasible or eliminating usable commercial space on lower levels of buildings.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. Under Phase 1, as under the no action alternative, flood control activities at 23rd Street or the Reflection Pool levee would have no impact on socioeconomic resources since they would not impact the issuance of the new 100-year floodplain map that would require additional insurance and compliance with building codes for entities with properties within the study area. The closure at 17th Street would be reconstructed, at a minimum, to provide proper protection during a 100-year flood event (and to the 18.7 of level of protection if funding is available); alternative 1B would be constructed to 18.7 NAVD in Phase 1. These improvements to the levee would permanently delay FEMA from issuing the new 100-year floodplain maps for the study area. As such, residents, businesses, and the federal government would not be required to purchase additional flood insurance or incur additional costs to meet stringent building codes for new construction or rehabilitation of existing structures. This alternative would benefit residents, businesses, and government entities that reside or have facilities within the study area.

Cumulative Impacts. Improvements in the Potomac Park levee system would permanently delay the issuance of the new 100-year floodplain map of the study area. As such, new construction and development projects would not be required to purchase flood insurance from NFIP, nor would they need to comply with stricter building codes in flood prone areas. The new facility would also provide added protection from floods in the future. Overall, cumulative impacts would be beneficial and long-term**.**

Conclusion. The improvements to the Potomac Park levee system under Phase 1 would benefit the residents, businesses, and government entities that reside or have facilities within the study area. The improvements in the levee would provide protection to affected properties from a 100-year flood event, FEMA's required level of protection. As such, existing building owners would not have to purchase costly flood insurance on an annual basis, and new construction would not need to comply with regulations and building codes for structures located in floodplains, which can be restrictive and costly. Overall cumulative impacts would be beneficial and long-term**.**

Phase 2 Analysis. Under Phase 2, as under Phase 1, flood control activities at 23rd Street or the Reflection Pool levee would have no impact on socioeconomic resources, since they would not impact the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. Improvements to the Potomac Park levee under Phase 2 would certify the facility to meet the congressionally authorized solution. This improvement is not expected to change requirements for flood insurance or building code requirements from those expected under Phase 1; therefore, it would have similar beneficial impacts on socioeconomic resources, as described under Phase 1, compared to the no action alternative.

Cumulative Impacts. Improvements to the levee system proposed under Phase 2 would be similar to those described for Phase 1, long-term and beneficial, mainly due to the improvements in the levee system that would eliminate the need for costly insurance or upgrades.

Conclusion. Improvements to the levee system under Phase 2 would have beneficial impacts on socioeconomic resources. The improvements would certify the facility to meet the congressionally authorized solution. This improvement is not expected to change requirements for flood insurance or building code requirements compared to Phase 1, and cumulative impacts would be long-term and beneficial.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Phase 1 Analysis. Impacts on socioeconomic resources under Phase 1 of alternative 2 would be the same as those discussed under Phase 1 of alternative 1. Socioeconomic resources would not be impacted by the flood control activities at 23rd Street or the Reflection Pool levee, since activities would not affect the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. The closure at 17th Street would be reconstructed,

at a minimum, to provide proper protection for the FEMA requirement (100-year flood event) and to the provide the congressionally authorized of level of protection to 18.7 NAVD if funding is available; these improvements to the levee would permanently delay FEMA from issuing the new 100-year floodplain maps for the study area. As such, residents, businesses, and the federal government would not be required to purchase additional flood insurance or incur additional costs to meet stricter and more costly building codes for new construction or rehabilitation of existing structures. This would result in positive benefits to residents, businesses, and government entities that reside or have facilities within the study area.

Cumulative Impacts. As with alternative 1, improvements to the 17th Street closure would permanently delay the issuance of the new 100-year floodplain map of the study area. As such, it would have similar beneficial cumulative impacts as described for alternative 1.

Conclusion. The improvements to the 17th Street levee under Phase 1 would benefit residents, businesses, and government entities that reside or have facilities within the study area. The improvements in the levee would permanently delay FEMA from issuing the new 100-year floodplain map. As such, existing building owners would not have to purchase costly flood insurance on an annual basis. In addition, new construction and development would not need to comply with stricter building codes associated with development in flood prone areas which would lower the costs of construction. Overall, cumulative impacts would be beneficial and long-term**.**

Phase 2 Analysis. Under Phase 2, as under Phase 1, flood control activities at 23rd Street or the Reflection Pool levee would have no impact on socioeconomic resources since they would not impact the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. Improvements to the Potomac Park levee system under Phase 2 would have negligible impacts on socioeconomic resources. Improvements to the Potomac Park levee system under Phase 2 would certify the facility to meet the congressionally authorized solution. This improvement is not expected to change requirements for flood insurance or building code requirements and would have similar impacts on socioeconomic resources as described in Phase 1.

Cumulative Impacts. Improvements to the levee system proposed under Phase 2 would have similar cumulative impacts on socioeconomic resources as described in Phase 1. Overall, cumulative impacts would be beneficial and long-term, mainly due to levee system improvements that would eliminate the need for costly insurance or upgrades**.**

Conclusion. Improvements to the Potomac Park levee system under Phase 2 would have similar beneficial impacts on socioeconomic resources as Phase 1. The improvements would certify the facility to meet the congressionally authorized solution. This improvement is not expected to change requirements for flood insurance or building code requirements from those required under phase 1. Overall, cumulative impacts would be beneficial and long-term**.**

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Impacts on socioeconomic resources under Phase 1 of alternative 3 would be the same as those discussed under Phase 1 of alternative 1. Socioeconomic resources would not be impacted by the flood control activities at 23rd Street or the Reflection Pool levee since activities would not affect the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. In addition, under Phase 1, the 17th Street closure would be reconstructed to provide proper protection during a 100-year flood event. These improvements to the 17th Street closure would permanently delay FEMA from issuing the new 100-year floodplain maps for the study area. As such, residents, businesses, and the federal government would not be required to purchase additional flood insurance or incur additional costs to meet stricter and more costly building codes for new construction or rehabilitation of existing structures. This would result in positive benefits to residents, businesses, and government entities that reside or have facilities within the study area.

Cumulative Impacts. As with the other action alternatives, improvements in the 17th Street closure would permanently delay the issuance of the new 100-year floodplain map of the study area. As such, it would have similar beneficial cumulative impacts as described under alternatives 1 and 2. Overall, cumulative impacts would be beneficial and long-term**.**

Conclusion. The improvements to the 17th Street closure under Phase 1 would benefit residents, businesses and government entities that reside or have facilities within the study area. The improvements in the levee would delay FEMA from issuing the new 100-year floodplain map. As such, existing building owners would not have to purchase costly flood insurance on an annual basis. In addition, new construction and development would not need to comply with stricter building codes associated with development in flood prone areas which would lower the costs of construction. Overall, cumulative impacts would be beneficial and long-term**.**

Phase 2 Analysis. Under Phase 2, as under Phase 1, flood control activities at 23rd Street or the Reflection Pool levee would have no impact on socioeconomic resources since they would not impact the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. Improvements to the Potomac Park levee system under Phase 2 would have negligible impacts on socioeconomic resources. This improvement is not expected to change requirements for flood insurance or building code requirements and would have similar impacts on socioeconomic resources as described in Phase 1.

Cumulative Impacts. Improvements to the levee system proposed under Phase 2 would have similar cumulative impacts on socioeconomic resources as described in Phase 1. Overall, cumulative impacts would be beneficial and long-term, mainly due to the improvements in the levee system that would eliminate the need for costly insurance or upgrades**.**

Conclusion. Improvements to the levee system under Phase 2 would have similar beneficial impacts on socioeconomic resources as Phase 1. The improvements would certify the facility to meet the congressionally authorized solution. This improvement is not expected to change requirements for flood insurance or building code requirements from those required under Phase 1. Overall, cumulative impacts would be beneficial and long-term**.**

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. Impacts on socioeconomic resources under Phase 1 of alternative 4 would be the same as those discussed under Phase 1 of alternative 1. Socioeconomic resources would not be impacted by the flood control activities at 23rd Street or the Reflection Pool levee since activities would not affect the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. The closure at 17th Street would be reconstructed, at a minimum, to provide proper protection for the FEMA requirement (100-year flood event) and for the congressionally authorized level of protection if funding is available; these improvements to the levee would permanently delay FEMA from issuing the new 100-year floodplain maps for the study area. As such, residents, businesses, and the federal government would not be required to purchase additional flood insurance or incur additional costs to meet stricter and more costly building codes for new construction or rehabilitation of existing structures. This would result in positive benefits to residents, businesses, and government entities that reside or have facilities within the study area.

Cumulative Impacts. As with the other action alternatives, improvements in the 17th Street closure would permanently delay the issuance of the new 100-year floodplain map of the study area. As such, it would have similar beneficial cumulative impacts as described under alternatives 1 and 2. Overall, cumulative impacts would be beneficial and long-term**.**

Conclusion. The improvements to the 17th Street closure under Phase 1 would benefit residents, businesses, and government entities that reside or have facilities within the study area. The improvements in the levee would delay FEMA from issuing the new 100-year floodplain map. As such, existing

building owners would not have to purchase costly flood insurance on an annual basis. In addition, new construction and development would not need to comply with stricter building codes associated with development in flood prone areas which would lower the costs of construction. Overall, cumulative impacts would be beneficial and long-term**.**

Phase 2 Analysis. Under Phase 2, as under Phase 1, flood control activities at 23rd Street or the Reflection Pool levee would have no impact on socioeconomic resources since they would not impact the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. Improvements to the Potomac Park levee system under Phase 2 would have negligible impacts on socioeconomic resources. This improvement is not expected to change requirements for flood insurance or building code requirements and would have similar impacts on socioeconomic resources as described in Phase 1.

Cumulative Impacts. Improvements to the levee system proposed under Phase 2 would have similar cumulative impacts on socioeconomic resources as described in Phase 1. Overall, cumulative impacts would be beneficial and long-term, mainly due to the improvements in the levee system that would eliminate the need for costly insurance or upgrades**.**

Conclusion. Improvements to the levee system under Phase 2 would have similar beneficial impacts on socioeconomic resources as Phase 1. The improvements would certify the facility to meet the congressionally authorized solution. This improvement is not expected to change requirements for flood insurance or building code requirements from those required under Phase 1. Overall, cumulative impacts would be beneficial and long-term.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. Impacts on socioeconomic resources under Phase 1 of alternative 5 would be the same as those discussed under Phase 1 of alternative 1. Socioeconomic resources would not be impacted by the flood control activities at 23rd Street or the Reflection Pool levee since activities would not affect the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for entities with properties within the study area. In addition, under Phase 1, the 17th Street closure would be reconstructed to provide proper protection for the congressionally authorized solution, which exceeds the 100-year flood event. These improvements to the 17th Street closure would permanently delay FEMA from issuing the new 100-year floodplain maps for the study area. As such, residents, businesses, and the federal government would not be required to purchase additional flood insurance or incur additional costs to meet stricter and more costly building codes for new construction or rehabilitation of existing structures. This would result in positive benefits to residents, businesses, and government entities that reside or have facilities within the study area.

Cumulative Impacts. As with the other action alternatives, improvements in the 17th Street closure would permanently delay the issuance of the new 100-year floodplain map of the study area. As such, it would have similar beneficial cumulative impacts as described under alternatives 1 and 2. Overall, cumulative impacts would be beneficial and long-term**.**

Conclusion. The improvements to the 17th Street closure under Phase 1 would benefit residents, businesses, and government entities that reside or have facilities within the study area. The improvements in the levee would delay FEMA from issuing the new 100-year floodplain map. As such, existing building owners would not have to purchase costly flood insurance on an annual basis. In addition, new construction and development would not need to comply with stricter building codes associated with development in flood prone areas which would lower the costs of construction. Overall, cumulative impacts would be beneficial and long-term**.**

Phase 2 Analysis. Under Phase 2, as under Phase 1, flood control activities at 23rd Street or the Reflection Pool levee would have no impact on socioeconomic resources since they would not impact the issuance of the new 100-year floodplain map that would require additional insurance and stricter building codes for

entities with properties within the study area. Improvements to the Potomac Park levee system under Phase 2 would have negligible impacts on socioeconomic resources. This improvement is not expected to change requirements for flood insurance or building code requirements and would have similar impacts on socioeconomic resources as described in Phase 1.

Cumulative Impacts. Improvements to the levee system proposed under Phase 2 would have similar cumulative impacts on socioeconomic resources as described in Phase 1. Overall cumulative impacts would be beneficial and long-term, mainly due to levee system improvements that would eliminate the need for costly insurance or upgrades**.**

Conclusion. Improvements to the levee system under Phase 2 would have similar beneficial impacts on socioeconomic resources as Phase 1. The improvements would certify the facility to meet the congressionally authorized solution. This improvement is not expected to change requirements for flood insurance or building code requirements from those required under Phase 1. Overall cumulative impacts would be beneficial and long-term.

TRAFFIC AND TRANSPORTATION

METHODOLOGY AND ASSUMPTIONS

The primary purpose of this environmental consequences analysis is to determine the potential traffic and transportation impacts of the alternatives considered, with a focus on impacts from road closures, or restrictions during closures, and possible improvements needed (if any) to mitigate any identified impacts. To prepare this environmental consequences description, the following key tasks were undertaken:

- Discussed proposed construction schedules and likely extent of lane and road closures with project engineers
- Analyzed the likely consequences of construction on the affected traffic environment as described in chapter 3

Sources of information for this environmental consequences description include personal conversations and emails with project engineers, analysis of current traffic in the study area based on the District of Columbia Department of Transportation (DDOT) Average Daily Traffic (ADT) reports and a recent nearby traffic analysis (Smithsonian Institution 2008), and extrapolation of current traffic patterns to the proposed construction scenario. The proposed plan is to keep two lanes of traffic open during peak traffic periods (one lane in each direction) for the eight to 10 week period that is required for the construction of the post and panel footing under 17th Street.

For the purpose of this topic and analysis, alternatives 1, 2, 3, 4, and 5 are very similar. All would have similar construction times and similar proposed partial closures of 17th Street; they vary mainly in the distance of the construction from the intersection of 17th Street and Constitution Avenue. The distance from the construction to the intersection would have marginal impacts on the storage of traffic for turning movements onto Constitution Avenue during morning peak hour traffic but is not expected to change overall levels of service, as discussed below.

Key considerations for the traffic environmental consequences description include traffic operational and safety characteristics of the affected roadway network during construction and mitigation of identified impacts.

STUDY AREA

The study area for traffic impacts for construction includes 17th Street south of Constitution Avenue and extends from 23rd Street to 14th Street and from Independence Avenue to Constitution Avenue.

IMPACT THRESHOLDS

The following thresholds were used to determine the magnitude of impacts on traffic.

Negligible: The impact would be a change that would not be perceptible or would be barely perceptible by transportation system users.

Minor: The impact would have a change to travel times or transportation system utility. The impact would be noticeable but would result in little inconvenience to transportation system users.

Moderate: The impact would result in a change to the travel time or system utility of a large number of transportation system users and would result in a noticeable change in travel time or convenience. A moderate increase in delay may be anticipated, but it is not expected to cause failure of nearby facilities that cannot be mitigated through proactive management.

Major: There would be a substantial impact on the travel time or system utility of a large number of transportation system users, and this would result in a highly noticeable change in travel times or convenience, leading to failure or near-failure of nearby facilities, with little or no potential for mitigation.

"Failure" as used in these thresholds and in the transportation analysis is defined as traffic delays with long average wait times at signals, with travelers during the peak hour frequently having to wait through one or more cycles to clear the intersection. Please see the description of Levels of Service, below, for more detail.

Duration: Short-term impacts would be immediate during construction of the alternative; long-term impacts would be those persisting or resulting after construction of the alternative.

Table 4.7 - Level of Service Descriptions

LOS	Description of the Levels of Service
A	LOS A describes operations with low control delay, up to 10 seconds/vehicle. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	LOS B describes operations with control delay greater than 10 and up to 20 seconds/vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur.
C	LOS C describes operations with control delay greater than 20 and up to 35 seconds/vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level though many still pass through the intersection without stopping.
D	LOS D describes operations with control delay greater than 35 and up to 55 seconds/vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high vehicle per cycle (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	LOS E describes operations with control delay greater than 55 and up to 80 seconds/vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.
F	LOS F describes operations with control delay in excess of 80 seconds/vehicle. This level, considered unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

Derived from the Highway Capacity Manual LOS for Signalized Intersections

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Under this alternative, in the event of a 100-year or greater flood event, the NPS would implement its existing plan for the levee system at 23rd Street, the Reflecting Pool, and 17th Street. Activities that could affect traffic within the project area include the implementation of NPS operations and procedures during a flood event.

At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. Because traffic would be restricted from the area in the event of a flood, and would be restricted after a flood until conditions were restored, no impacts on traffic would likely occur as a result of these emergency measures.

Under the park's existing plan, no action at the existing levee along the north edge of the Reflecting Pool levee location is required, as it currently meets the 100-year flood level. Therefore, no impacts on transportation would occur.

Under the no action alternative, if notification of an impending flood is received, the park would close 17th Street to construct a temporary earthen levee, using a combination of Jersey barriers, sandbags and soil/fill. Traffic, including tour buses, would be diverted from the area for the duration of the emergency, including restoration. After the flood event, the levee would be removed, and the site would be remediated. Removal of the temporary levee at this site could result in short-term minor adverse impacts on traffic.

Cumulative Impacts. Cumulative actions in the project area that could affect traffic include ongoing background traffic growth plus several future plans and projects that would directly affect the Mall. Future projects within the project area that could affect traffic include construction of other buildings on and near the National Mall (NMAAHC, VVMC, USIP, MLK Memorial) and the repaving of Constitution Avenue. These projects would contribute cumulatively to impacts on traffic in the study area. However, each project would be subject to specific requirements to reduce the individual impact on traffic, and none of the projects is anticipated to take place during the construction of the levee, so they would not contribute to cumulative impacts during construction. The number of visitors to the National Mall typically remains constant; however, their travel and circulation patterns vary in response to new projects and points of interest. Any increase in visitation that might be expected to occur from the new attractions on the National Mall, continued development, or new employment opportunities in the District could result in increased traffic. Adverse impacts within the study area from these projects would be minor and long-term. Conversely, rising fuel costs and continued or increased use of public transportation would result in decreased car traffic, with beneficial impacts on traffic in this area. Impacts of all these actions, combined with the short-term minor impacts of the no action alternative, would result in minor long-term cumulative impacts on traffic in the study area.

Conclusion. Implementation of the no action alternative would result in minor short-term adverse impacts from disruptions during flood events. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. Under Phase 1 of alternative 1, the levee at 17th Street would utilize two concrete walls to the east and west of 17th Street. During a flood event, the closure across 17th Street would be achieved though a post and panel system. The levees at 23rd Street and the Reflecting Pool would be managed in the same manner as described under the no action alternative. At the 23rd Street location, the plan calls for the placement of sandbags across Constitution Avenue if the flood would meet or exceed the 100-year level. At the Reflecting Pool levee, no action would be required as it currently meets the 100-year flood level.

Under Phase 1 of alternative 1, levee post and panel construction is proposed for 17th Street, approximately 198 feet (alternative 1A) or 253 feet (alternative 1B) south of the centerline of Constitution Avenue. The full construction is anticipated to require eight to 12 months total, with the construction directly impacting the roadway lasting from eight to 10 weeks. During construction on the roadway, two lanes would be kept open during peak periods, one lane in each direction. During the morning (AM) Peak, one lane of traffic would be directed towards Constitution Avenue. Under Phase 1 of this alternative, up to 135 feet (alternative 1A) to about 190 feet (alternative 1B) of roadway would be available between the construction site and Constitution Avenue where two lanes or more could remain open to allow storage (lining up) of cars for turns and through traffic on Constitution Avenue. Occasional full temporary closures would be permitted in off-peak periods to change staging or change direction of flow, subject to Traffic Control Plans to be worked out with the DDOT and approved by the NPS prior to obtaining a construction permit. Off-peak vehicle traffic might have to detour during portions of the most intense construction period. Extensive public information and outreach, as well as monitoring and possibly modifications to signal timing on Constitution at 17th, 14th, 15th and 23rd streets, would be required in order to avoid more serious degradations of service and possible system failure. Following construction, there would be no anticipated impact on traffic.

As part of the construction permitting process, the contractor would submit Traffic Control Plans to DDOT for review and approval, prior to the implementation of any changes (lane or sidewalk closures, temporary truck access for site excavation, etc.). The Traffic Control Plans would include measures, such as detour signs, to safely divert traffic, transit, pedestrian, and bicycle traffic flows during temporary off-peak closures, or for one-way traffic during peak periods to maintain partial peak directional flow. It is anticipated that the DDOT would provide any signalization, signs, and pavement marking improvements required at the adjacent intersections to accommodate increased vehicular and pedestrian traffic that resulted from the diverted traffic within the local area. NPS and DDOT should coordinate Public Advisories to notify the public of the detours, likely delays, and alternate routes including transit.

Beyond the "standard" measures for construction, additional mitigation measures would be undertaken by NPS in coordination with DDOT and the U.S. Department of Transportation (DOT). These include measures to improve traffic flow at the most heavily impacted intersections, measures to divert traffic to alternate routes before they reach the vicinity of the Mall, and measures to divert trips to transit or shared rides.

Traffic Flow Mitigation: Signal timing at 14th Street and Constitution, 15th Street and Constitution, 17th Street and Constitution and 23rd Street and Constitution would be evaluated and monitored closely to determine whether modest adjustments to timing at these intersections would improve flow without major adverse effects to thru traffic on Constitution Avenue.

Diverting Traffic to Other Routes and Modes:

- NPS, DDOT and the Virginia Department of Transportation (VDOT) would develop a cooperative plan to notify travelers well in advance of the lane closures and possible delays and to notify them of potential alternative routes before they reach Independence Avenue and the Mall.
- Major employers and visitor attractions in the vicinity of 17th Street and Constitution would be contacted (preferably by mail as well as email) well in advance of construction, with a website and a phone number to contact for updates.
    - The notice would include advice on route and mode alternatives and a request to notify all potentially impacted employees.
    - Agencies and institutions would be advised to be aware of the partial street closure when planning any special events. (e.g., Daughters of the American Revolution Constitution

Hall is frequently used for graduation ceremonies, etc., which could be impacted by the closure.)

- Agencies and employers should include at minimum the Commerce Department, the Interstate Commerce Commission, the National Museum of American History, the Organization of American States, the Department of the Interior, the Federal Reserve Board, the National Academy of Sciences and Engineering, the Office of Personnel Management, the General Services Administration, the American Red Cross, the Daughters of the American Revolution, the US Navy Bureau of Medicine and Surgery, and the George Washington University. It is recommended that Advisory Variable Message Signs (VMS) in Virginia be deployed on the 14th Street Bridge, in particular, at least two weeks prior to the start of construction to let people know of the detours in time to plan alternate routes. In addition, advisories should be posted on Maine Avenue and Independence Avenue. The NPS, DDOT and DOT should ensure that all local newspapers, radio and TV stations are well aware of the impending construction, particularly the stations noted for traffic advisories.

- The NPS, DDOT, and VDOT would work with the Washington Metropolitan Area Transportation Authority (WMATA), Commuter Connections and the employers and agencies listed above to ensure that transit, carpool, vanpool, and other options, such as telecommuting, are made known to employees and visitors.
- Local tour bus companies would be notified as soon as possible to let them adjust schedules and tours as necessary based on traffic diversions and partial lane closures.
- Visitor Centers and Visitor's Bureaus would be contacted immediately to let them know of the situation and to determine with them the best way to get notice of the partial closure to local and national tour bus companies, if deemed necessary.

Table 4.8 displays the ADT and Levels of Service (LOS) anticipated at the following levels during construction, compared to base LOS (Smithsonian Institution 2008):

Table 4.8 - ADT and Levels of Service during Construction

	ADT before Construction	ADT During Construction
Between Independence & Constitution		
14th Street	38,700	44,450
15th Street	13,600	15,900
17th Street	19,200	7,700
23rd Street	22,900	26,350

Levels of Service	Before Construction	During Construction	Before Construction	During Construction
	AM Peak	AM Peak	PM Peak	PM Peak
14th & Constitution	C	C	C	C
15th & Constitution	D	D	C	C
23rd & Constitution	D	D	C	C

LOS definitions are provided in the table at the beginning of this section. With the above described mitigation, and allowing two lanes open (one in each direction), the LOS at the intersections listed is predicted to remain the same, based on a nearby study for the Smithsonian Institution (Smithsonian

Institution 2008). By reducing the number of trips that are diverted by keeping two lanes of traffic open on 17th Street during the peak hour, the volume/capacity (V/C) ratio would be expected to remain below 0.9 and, although there may be delays, the effect would not be so great as to result in a change to a lower LOS.

No regularly scheduled buses use 17th Street, except for the D.C. Circulator, a premium bus service public transit which only runs on weekends. During construction, the D.C. Circulator buses operating the Smithsonian / National Gallery of Art Loop might encounter minor delays in its current route that circles the Washington Monument via 17th Street. The NPS Tourmobile does not use 17th Street according to its maps, but its visitors to the WWII Memorial, who currently disembark on Constitution Avenue near 17th Street, would clearly need another alternative.

Numerous tour bus companies operate within the project area in addition to several private sightseeing operators that provide hop-on and off services. There would be no long-term effect on tour buses from the project. During construction, all tour buses that currently traverse 17th Street might experience delays or might be requested to detour, and many would need to adjust schedules and site visits. For example, Old Town Trolleys on its National Mall and Downtown Loop might need to detour. Open Top Sightseeing (double-deckers and hop-on/hop-off like the Old Town Trolleys) does not use 17th Street according to its maps, but its visitors to the WWII Memorial, who currently disembark on Constitution Avenue near 17th Street, would need another alternative. Local and national tour companies would be similarly affected.

The effects from construction traffic and peak and off-peak, short-term lane closures that would be associated with the Potomac levee construction would be temporary. With the mitigation described above, including leaving two lanes open along 17th Street at peak traffic periods, the partial closure of 17th Street during the construction of the levee would have short-term moderate adverse impacts on traffic and transportation.

Cumulative Impacts. Cumulative impacts from other projects and anticipated conditions that would affect traffic in the study area would be the same as described for the no action alternative. Construction and visitor use of the proposed museums and other Mall facilities, and increased traffic from development in the District, would result in minor adverse impacts, and use of public transportation and possible reduction of car use due to increasing fuel prices could result in less traffic and beneficial impacts. These impacts, combined with the short-term moderate impacts of alternative 1, would result in long-term minor adverse impacts on traffic in this area.

Conclusion. Phase 1 of alternative 1 is anticipated to have a short-term moderate adverse impact on travel in the area if two lanes remain open (one lane in each direction) during peak and off-peak hours for the anticipated eight week intense construction period and if the signal timing and aggressive public information mitigation actions described above are undertaken. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions and traffic plans in the study area.

Phase 2 Analysis. Traffic effects expected under alternative 1 for 23rd Street would consist of short-term minor impacts of sandbag closure and minor disruption during the re-grading of the area as heavy equipment is brought into the area. No impacts on traffic are expected at the Reflecting Pool. Based on current information, the Phase 2 of alternative 1 construction on 17th Street would not require any full street closure. Heavy equipment and materials would be brought in for re-grading and increasing height (if not completed in Phase 1- alternative 1A) or treating walls. This would require minimal traffic disruption to no more than one lane of traffic at a time and could be completed mostly during off-peak hours, resulting in short-term minor adverse impacts on all modes of transportation.

Cumulative Impacts. Cumulative impacts would be similar to those described for Phase 1, with even less impact from the project itself. Other projects, plans, and actions in the area would contribute short-term minor adverse effects on traffic as well as long-term beneficial effects. These, added to the short-term minor adverse impacts under Phase 2, would result in long-term minor adverse cumulative impacts.

Conclusion. Phase 2 of alternative 1 is anticipated to have a short-term minor effect on traffic in the area due to minor disruptions while bringing in equipment and materials for construction and re-grading. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Phase 1 Analysis. No impacts on traffic are expected under Phase 1 of alternative 2 for 23rd Street or the Reflecting Pool, consistent with the no action alternative. Impacts on traffic on detour routes anticipated for 17th Street for alternative 2 (alternative 2A or 2B), would be similar to those described under Phase 1 of alternative 1; however, these short-term moderate adverse impacts would be slightly greater than under Phase 1 of alternative 1. This is because alternative 2 proposes construction on 17th Street approximately 138 feet south of the centerline of Constitution Avenue, approximately 60 feet closer than alternative 1. Up to 80 feet of roadway would be available between the construction site and Constitution Avenue, to provide storage for cars at the signal. Additional queuing and delays on 17th Street during the AM Peak may be anticipated under this alternative due to the limited storage space, compared with the other alternatives. Overall, however, the ADTs and LOS on the nearby intersections for alternative 2 are expected to be consistent with alternative 1, requiring the same mitigation measures of signal monitoring and adjustment and public information.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Construction and visitor use of the proposed museums and other Mall facilities, and increased traffic from development in the District, would result in minor adverse impacts, and use of public transportation and possible reduction of car use due to increasing fuel prices could result in less traffic and beneficial impacts. These impacts, combined with the short-term moderate impacts of alternative 2, would result in long-term minor adverse impacts on traffic in this area.

Conclusion. Phase 1 of alternative 2 is anticipated to have a short-term moderate effect on travel in the area, based on the assumption that the signal timing and aggressive public information mitigation actions described above are undertaken, and two lanes remain open to traffic on 17th Street. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

Phase 2 Analysis. Traffic effects expected under Phase 2 of alternative 2 would be the same as those described for Phase 2 of alternative 1. At 23rd Street, there would be short-term minor impacts of sandbag closure and minor disruption during the re-grading of the area as heavy equipment is brought into the area. No impacts on traffic are expected at the Reflecting Pool. Based on current information, construction during Phase 2 of alternative 2 on 17th Street would not require any full street closure. Heavy equipment and materials would be brought in as needed for re-grading and increasing height (if not completed in Phase 1) or treating walls. This would require minimal traffic disruption to no more than one lane of traffic at a time and could be completed mostly during off-peak hours, resulting in short-term minor adverse impacts on all modes of transportation.

Cumulative Impacts. Cumulative impacts would be similar to those described for Phase 1, with even less impact from the project itself. Other projects, plans, and actions in the area would contribute long-term minor adverse effects on traffic as well as long-term beneficial effects. These, added to the short-term minor adverse impacts under Phase 2, would result in long-term minor adverse cumulative impacts.

Conclusion. Phase 2 of alternative 2 is anticipated to have a short-term minor effect on traffic in the area due to minor disruptions while bringing in equipment and materials for construction and re-grading. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. No impacts on traffic are expected under Phase 1 of alternative 3 for 23rd Street or the Reflecting Pool, consistent with the no action alternative. Impacts are anticipated for 17th Street for alternative 3 that are similar to those described under Phase 1 of alternatives 1 and 2 with regard to LOS on likely detour routes. The adverse impacts under alternative 3 are, however, less problematic for traffic compared with alternative 1 or alternative 2. Alternative 3 proposes construction on 17th Street, approximately 365 feet south of the centerline of Constitution Avenue. Up to 315 feet of roadway would be available between the construction site and Constitution Avenue to provide storage for cars at the signal. Less queuing and shorter delays on 17th Street during the AM Peak may be anticipated under this alternative due to the extended storage space, compared with the other alternatives. ADTs and LOS on the nearby intersections for alternative 3 are expected to be consistent with alternatives 1 and 2, requiring the same mitigation measures of signal monitoring and adjustment and public information.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Construction and visitor use of the proposed museums and other Mall facilities, and increased traffic from development in the District, would result in minor adverse impacts, and use of public transportation and reduction of car use due to increasing fuel prices could result in less traffic and beneficial impacts. These impacts, combined with the short-term moderate impacts of alternative 2, would result in long-term minor adverse impacts on traffic in this area.

Conclusion. Alternative 3 is anticipated to have a short-term moderate effect on travel in the area, based on the assumption that the signal timing and aggressive public information mitigation actions described above are undertaken and two lanes remain open on 17th Street. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

Phase 2 Analysis. Traffic effects expected under Phase 2 of alternative 3 would be the same as those described for Phase 2 of alternatives 1 and 2. At 23rd Street, there would be short-term minor impacts of sandbag closure and minor disruption during the re-grading of the area as heavy equipment is brought into the area. No impacts on traffic are expected at the Reflecting Pool. Based on current information, the Phase 2 of alternative 3 construction on 17th Street would not require any full street closure. Bringing in of heavy equipment and materials needed for re-grading and construction of the terraced walls would require minimal traffic disruption to no more than one lane of traffic at a time and could be completed mostly during off-peak hours, resulting in short-term minor adverse impacts on all modes of transportation.

Cumulative Impacts. Cumulative impacts would be similar to those described for Phase 1, with even less impact from the project itself. Other projects, plans, and actions in the area would contribute short-term minor adverse effects on traffic as well as long-term beneficial effects. These, added to the short-term minor adverse impacts under Phase 2, would result in long-term minor adverse cumulative impacts.

Conclusion. Phase 2 for alternative 3 is anticipated to have a short-term minor effect on traffic in the area due to minor disruptions that would occur while bringing in equipment and materials for construction and re-grading. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Phase 1 Analysis. No impacts on traffic are expected under Phase 1 of alternative 4 for 23rd Street or the Reflecting Pool, consistent with the no action alternative. Impacts on traffic on detour routes anticipated for 17th Street for alternative 4 would be the similar to those described under Phase 1 of alternative 1; however, these short-term moderate adverse impacts would be slightly greater than under alternative 1, Phase 1. This is because alternative 4 proposes construction on 17th Street approximately 177.5 feet south of the centerline of Constitution Avenue, approximately 20.5 feet closer than alternative 1. Up to 124 feet of roadway would be available between the construction site and Constitution Avenue to provide storage

for cars at the signal. Additional queuing and delays on 17th Street during the AM Peak may be anticipated under this alternative due to the limited storage space, compared with the other alternatives. Overall, however, the ADTs and LOS on the nearby intersections for alternative 2 are expected to be consistent with alternative 1, requiring the same mitigation measures of signal monitoring and adjustment and public information.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Construction and visitor use of the proposed museums and other Mall facilities, and increased traffic from development in the District, would result in minor adverse impacts, and use of public transportation and reduction of car use due to increasing fuel prices could result in less traffic and beneficial impacts. These impacts, combined with the short-term moderate impacts of alternative 4, would result in long-term minor adverse impacts on traffic in this area.

Conclusion. Phase 1 of alternative 4 is anticipated to have a short-term moderate effect on travel in the area, based on the assumption that the signal timing and aggressive public information mitigation actions described above are undertaken and two lanes remain open to traffic on 17th Street. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

Phase 2 Analysis. Traffic effects expected under Phase 2 of alternative 4 would be the same as those described for Phase 2 of alternative 1. At 23rd Street, there would be short-term minor impacts of sandbag closure and minor disruption during the re-grading of the area as heavy equipment is brought into the area. No impacts on traffic are expected at the Reflecting Pool. Based on current information, construction during Phase 2 of alternative 4 on 17th Street would not require any full street closure. Heavy equipment and materials would be brought in as needed for re-grading and increasing height (if not completed in Phase 1) or treating walls. This would require minimal traffic disruption to no more than one lane of traffic at a time and could be completed mostly during off-peak hours, resulting in short-term minor adverse impacts on all modes of transportation.

Cumulative Impacts. Cumulative impacts would be similar to those described for Phase 1, with even less impact from the project itself. Other projects, plans, and actions in the area would contribute long-term minor adverse effects on traffic as well as long-term beneficial effects. These, added to the short-term minor adverse impacts under Phase 2, would result in long-term minor adverse cumulative impacts.

Conclusion. Phase 2 of alternative 4 is anticipated to have a short-term minor effect on traffic in the area due to minor disruptions while bringing in equipment and materials for construction and re-grading. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

IMPACTS OF ALTERNATIVE 5 – "3B"

Phase 1 Analysis. No impacts on traffic are expected under Phase 1 of alternative 5 for 23rd Street or the Reflecting Pool, consistent with the no action alternative. Impacts are anticipated for 17th Street for alternative 5 that are similar to those described under Phase 1 of alternatives 1 and 2 with regard to LOS on likely detour routes. The adverse impacts under alternative 5 are, however, less problematic for traffic compared with alternative 1 or alternative 2. Alternative 5 proposes construction on 17th Street, approximately 525 feet from the centerline of Constitution Avenue. Up to 460 feet of roadway would be available between the construction site and Constitution Avenue to provide storage for cars at the signal. Less queuing and shorter delays on 17th Street during the AM Peak may be anticipated under this alternative compared with the other alternatives due to the extended storage space. ADTs and LOS on the nearby intersections for alternative 5 are expected to be consistent with alternatives 1 and 2, requiring the same mitigation measures of signal monitoring and adjustment and public information.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Construction and visitor use of the proposed museums and other Mall facilities, and increased traffic from development

in the District, would result in minor adverse impacts, and use of public transportation and reduction of car use due to increasing fuel prices could result in less traffic and beneficial impacts. These impacts, combined with the short-term moderate impacts of alternative 5, would result in long-term minor adverse impacts on traffic in this area.

Conclusion. Alternative 5 is anticipated to have a short-term moderate effect on travel in the area, based on the assumption that the signal timing and aggressive public information mitigation actions described above are undertaken and two lanes remain open on 17th Street. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

Phase 2 Analysis. Traffic effects expected under Phase 2 of alternative 5 would be the same as those described for Phase 2 of alternative 1. At 23rd Street, there would be short-term minor impacts of sandbag closure and minor disruption during the re-grading of the area as heavy equipment is brought into the area. No impacts on traffic are expected at the Reflecting Pool. Based on current information, construction during Phase 2 of alternative 5 on 17th Street would not require full street closure. Heavy equipment and materials would be brought in as needed to improve the visual aspects of the wall. This would require minimal traffic disruption to no more than one lane of traffic at a time and could be completed mostly during off-peak hours, resulting in short-term minor adverse impacts on all modes of transportation.

Cumulative Impacts. Cumulative impacts would be similar to those described for Phase 1, with even less impact from the project itself. Other projects, plans, and actions in the area would contribute long-term minor adverse effects on traffic as well as long-term beneficial effects. These, added to the short-term minor adverse impacts under Phase 2, would result in long-term minor adverse cumulative impacts.

Conclusion. Phase 2 of alternative 5 is anticipated to have a short-term minor effect on traffic in the area due to minor disruptions while bringing in equipment and materials for the wall treatments. Cumulative impacts would be minor and long-term, stemming mainly from the impacts of other actions on traffic in the study area.

INFRASTRUCTURE AND UTILITIES

METHODOLOGY & ASSUMPTIONS

For this topic, only the 17th Street closure area was analyzed. The 23rd Street and the Reflecting Pool portions of the project area were not analyzed since they do not require the relocation or disruption to any subsurface utility lines and would therefore have no impact on infrastructure or utilities.

PROJECT AREA

The project area is along the 17th Street corridor, south of Constitution Avenue. The project impact area extends to approximately 780 feet south of the centerline of Constitution Avenue, 300 feet west of the centerline of 17th Street, and 350 feet east of the centerline of 17th Street.

IMPACT THRESHOLDS

Negligible: There would be no noticeable temporary or permanent disruption to utilities and the serviced community during construction of the levee.

Minor: The impact on the utility lines and the serviced community would not be substantial; utility lines would be relocated, but there would be no noticeable disruption to the service community during construction of the levee.

Moderate: The impact on the utility lines and the serviced community would be substantial; utility lines would be relocated, and there would be a noticeable disruption to the services community during construction of the levee. However, following the construction phase, service to the community would be restored to its former state.

Major: The impact on the utility lines and the serviced community would be substantial, resulting in permanent changes and diminished service experienced by the system and the community.

Duration: Short-term impacts are those lasting less than one year; long-term impacts are those lasting longer than one year.

IMPACTS OF NO ACTION ALTERNATIVE

During a flood event, the NPS would construct a temporary closure across 17th Street by placing Jersey barriers and sandbags across 17th Street. They would supplement the reliability of the closure by excavating fill at a location on the northwest Monument Grounds and dumping it onto the temporary closure. In excavating the Monument Grounds, the NPS would avoid the existing subsurface gas and water lines beneath that portion of the site. Therefore, the placement of the temporary closure across 17th Street and the excavation of fill would have no impact on the existing utilities.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

Phase 1 Analysis. There are numerous subsurface utility lines that transverse the site at 17th Street around Constitution Avenue. These utilities vary in the degree to which they would be affected by the construction and operation of this alternative. Since the foundation of the walls and underground storage vault would be designed to avoid impacts on water supply lines, natural gas lines, and underground electric lines, adverse impacts on these utilities would be short-term and negligible. There would, however, be impacts on other utilities and infrastructure within the project during construction including the irrigation, sanitary sewer, storm drains, and communication systems. All adverse impacts that would occur are expected to be short-term.

*Irrigation System***.** Several of the irrigation segments, along with valve boxes and irrigation heads, would be impacted by the construction of the walls or regrading (alternative 1B). The affected components would be relocated as necessary to provide the required irrigation. As a result of Phase 1, short-term minor adverse impacts during construction, and negligible effects during operation, would be expected.

Sanitary Sewer. Short-term moderate adverse impacts on the sanitary sewer line would likely occur during construction. Since the existing sanitary sewer lines within the project area are terra cotta pipes, the pipes would most likely not survive the construction of the post and panel system or of sleeving. Complete replacement of the existing sanitary sewer lines is anticipated.

*Storm Drain***.** During construction, there would be a need to relocate several of the storm drains within the project area, resulting in short-term moderate adverse impacts. Once the new drainage system is re-established, no long-term impacts on this system would be expected. All design needs would be in compliance with the District of Columbia Department of Health Watershed Protection Division standards and guidelines for storm water management and erosion and sediment control. In addition, backflow prevention devices would be installed on all storm drain lines where water could possibly flow upstream through the storm system and flood the areas protected by the wall.

Communications. Short-term moderate adverse effects during construction, and negligible effects during operation, would be expected. Several underground telephone lines would be in conflict with the wall locations. These lines are sensitive, and scheduling constraints associated with construction of this levee project might preclude their relocation. If they can not be relocated, then the wall foundation designs would have to be modified to avoid conflict with the lines in their current locations.

Once construction of Phase 1 is complete, no additional impacts on infrastructure and utilities found within the project area are expected as a result of the new levee system.

Cumulative Impacts. Projects that could contribute to the cumulative impacts on utilities include the construction of new buildings in the project area (NMAAHC, VVMC, USIP, security improvements). Given the capacity of these utilities for the proposed development, and the scheduling of outages related to construction, cumulative impacts on utilities in the study area would be negligible.

Conclusion. Phase 1 of alternative 1 would impact existing underground water, sewer, storm drain, natural gas, electric and communications lines to varying degrees. Since the foundation of the walls would be designed to avoid impacts on utilities, there would be no to negligible impacts on water supply lines, natural gas lines, and underground electric lines. The water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Minor adverse impacts would be expected for irrigation lines while moderate adverse impacts would be expected for storm drains, sanitary sewer, and communication lines. Cumulative impacts on utilities in the study area would be negligible.

Phase 2 Analysis. Phase 2 follows the same levee wall alignment as Phase 1. As a result, footings would be built in Phase 1 to meet Phase 2 requirements. As a result, implementation of Phase 2 would not require further site disturbance. If Phase 1 were already built to either level of protection, no new utility relocation would be required, so there would be no additional impact on infrastructure or utilities. Therefore, no effects on utilities beyond those characterized for Phase 1 would be anticipated.

Cumulative Impacts. Since the construction of Phase 2 follows the same footprint and alignment of Phase 1, implementation of Phase 2 would not require further site disturbance and would not result in any additional impacts on the utilities or infrastructure within the project area. There would be no new cumulative impacts associated with this alternative; cumulative impacts would be negligible similar to Phase 1.

Conclusion. Since the alignment and footprint of the Phase 2 levee walls are the same as Phase 1, there would be no additional impacts on utilities and infrastructure. In addition, there would be no new cumulative impacts associated with this alternative; cumulative impacts would be negligible.

IMPACTS OF ALTERNATIVE 2A AND 2B – "GATE WALLS"

In addition to the two proposed phases, alternative 2 also includes two options for design and construction. The difference between the two options relate to the shape of the wall design, either being symmetric or asymmetric.

Phase 1 Analysis. As in Phase 1 of alternative 1, the utility corridor that runs along 17th Street is perpendicular to the levee walls, closure structures, and storage vault proposed under this alternative. In addition, the amount of excavation required is approximately the same under all alternatives. As a result, impacts on infrastructure and utilities under Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. However, without an accurate utility survey, the effect of the underground storage vault in this alternative on the existing utility lines and underground utility vault is uncertain. There would be short-term negligible adverse impacts on water supply lines, natural gas lines, and underground electric lines; short-term minor adverse impacts on the site's irrigation system; short-term moderate adverse impacts on the sanitary sewer, storm drains, and communications lines. Once construction of Phase 1 is complete, no additional impacts on infrastructure and utilities found within the project area are expected as a result of the new levee system.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Given the capacity of these utilities for the proposed development and the scheduling of outages related to construction, any adverse cumulative impacts on utilities in the study area would be negligible and of short duration.

Conclusion. Phase 1 of alternative 2 would impact existing underground water, sewer, irrigation, storm drain, natural gas, electric, and communications lines to varying degrees. Since the foundation of the walls would be designed to avoid impacts on utilities, there would be short-term negligible adverse impacts on water supply lines, natural gas lines, and underground electric lines. The water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Short-term minor adverse impacts would be expected for irrigation lines while short-term moderate adverse impacts would be expected for storm drains, sanitary sewer, and communication lines. Cumulative impacts on utilities in the study area would be negligible.

Phase 2 Analysis. Phase 2 follows the same levee wall alignment as Phase 1 on the east side of 17th Street. On the west side, the Phase 1 levee wall would be demolished to grade, and a new retaining wall would be built south of the Lockkeeper's House. The footings for the levee wall would be built in Phase 1 to meet Phase 2 requirements to minimize disturbances. Only the construction of the new retaining wall, if not completed in Phase 1, would require ground disturbance. Since the foundation of the walls would be designed to avoid impacts on utilities, there would be negligible impacts on water supply lines, sanitary sewer lines, natural gas lines, and underground electric lines. The water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Greater than negligible impacts on utilities are described further below.

Irrigation System. Short-term minor adverse effects during construction, and negligible effects during operation, would be expected. Several of the irrigation segments, along with valve boxes and irrigation heads, would be impacted by the construction of the walls. The affected components would be relocated as necessary to provide the required irrigation.

Sanitary Sewer. Moderate adverse effects during construction would be expected. Since the existing sanitary sewer lines within the project area are terra cotta pipes, the pipes would most likely not survive the construction of the post and panel system or of sleeving. Complete replacement of the existing sanitary sewer lines, approximately 750 linear feet, is anticipated.

Storm Drain. Short-term moderate adverse effects during construction, and negligible effects during operation, would be expected. All design would need to be in compliance with the District of Columbia Department of Health Watershed Protection Division standards and guidelines for stormwater management and erosion and sediment control. Backflow prevention devices would be installed on all storm drain lines where water could possibly flow upstream through the storm system and flood the areas protected by the wall.

Communications. Short-term moderate adverse effects during construction, and negligible effects during operation, would be expected. Several underground telephone lines would be in conflict with the wall locations. These lines are sensitive and scheduling constraints associated with construction of this levee project might preclude their relocation. If they can not be relocated, then the wall foundation designs would have to be such to avoid conflict with the lines in their current locations.

Cumulative Impacts. Since the construction of Phase 2 follows the same footprint and alignment of Phase 1, and proposes to raise the floodwalls by approximately two feet, implementation of Phase 2 would not contribute further to cumulative impacts on utilities in the project area, similar to Phase 1.

Conclusion. Phase 2 options A and B of alternative 2 would impact existing underground water, sewer, storm drain, natural gas, electric, and communications lines to varying degrees. There would likely be no to negligible impacts on water supply lines, natural gas lines, and underground electric lines. The water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Minor adverse impacts would be expected for irrigation lines while moderate impacts would be expected for storm drains, sanitary sewer, and communication lines. There would be no new cumulative impacts associated with this alternative; cumulative impacts would be negligible.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Phase 1 Analysis. Like Phase 1 of alternative 1, the utility corridor that runs along 17th Street is perpendicular to the levee walls, closure structures, and storage vault proposed under this alternative, and the amount of excavation required is approximately the same under both alternatives. Impacts on infrastructure and utilities under Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. There would be short-term negligible adverse impacts on water supply lines, natural gas lines, and underground electric lines; short-term minor adverse impacts on the site's irrigation system; short-term moderate adverse impacts on the sanitary sewer, storm drains, and communications lines. Once construction of Phase 1 was complete, no additional impacts on infrastructure and utilities found within the project area would be expected as a result of the new levee system.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Given the capacity of these utilities for the proposed development, and the scheduling of outages related to construction, cumulative impacts on utilities in the study area would be negligible.

Conclusion. Phase 1 of alternative 3 would impact existing underground water, sewer, storm drain, natural gas, electric and communications lines to varying degrees. These impacts would be similar to those described for both alternatives 1 and 2. Specifically, there would likely be no to negligible impacts on water supply lines, natural gas lines, and underground electric lines. The water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Minor adverse impacts would be expected for irrigation lines while moderate adverse impacts would be expected for storm drains, sanitary sewer, and communications lines. Cumulative impacts on utilities in the study area would be negligible.

Phase 2 Analysis. Since Phase 2 requires additional walls and post-and panel sections beyond Phase 1, there would be more potential to impact the existing underground utilities; however, the level of the impacts would be similar to those described above under Phase 1. Phase 2 would occupy a footprint that is different than Phase 1. As a result, there would be short-term minor adverse impacts associated with relocating irrigation lines to the east of the site. All other utilities would be relocated in Phase 1.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Given the capacity of these utilities for the proposed development, and the scheduling of outages related to construction, cumulative impacts on utilities in the study area would be negligible.

Conclusion. Similar to Phase 1 above, Phase 2 of alternative 3 would result in negligible to minor to moderate impacts on existing underground water, sewer, storm drain, natural gas, electric, and communications lines, depending on the utility considered. Cumulative impacts on utilities in the study area would be negligible.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Like Phase 1 of alternative 1, the utility corridor that runs along 17th Street is approximately perpendicular to the levee walls, closure structures, and storage vault proposed under this alternative. In addition, the amount of excavation is approximately the same under all alternatives. As a result, impacts on infrastructure and utilities under Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. There would be short-term negligible adverse impacts on water supply lines, natural gas lines, and underground electric lines; short-term minor adverse impacts on the site's irrigation system; short-term moderate adverse impacts on the sanitary sewer, storm drain, and communications lines. Once construction of Phase 1 was complete, no additional impacts on infrastructure and utilities found within the project area would be expected as a result of new levee system.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Given the capacity of these utilities for the proposed development, and the scheduling of outages related to construction, any adverse cumulative impacts on utilities in the study area would be negligible and of short duration.

Conclusion. Phase 1 of alternative 4 would impact existing underground water, sewer, irrigation, storm drain, natural gas, electric, and communications lines to varying degrees. Since the foundation of the walls would be designed to avoid impacts on utilities, there would be short-term negligible adverse impacts on water supply lines, natural gas lines, and underground electric lines. The water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Short-term minor adverse impacts would be expected for irrigation lines while short-term moderate adverse impacts would be expected for storm drains, sanitary sewer, and communication lines. Cumulative impacts on utilities in the study area would be negligible.

Phase 2 Analysis. Since the construction of Phase 2 follows the same footprint and alignment of Phase 1, implementation of Phase 2 would not require further site disturbance and would not result in any additional impacts on the utilities or infrastructure within the project area.

Cumulative Impacts. Since the construction of Phase 2 follows the same footprint and alignment of Phase 1, and proposes to raise the floodwalls by approximately two feet, no impacts on utilities or infrastructure would occur; as a result, there would be no new cumulative impacts associated with Phase 2 of this alternative; cumulative impacts would be negligible.

Conclusion. Since the design of Phase 2 is situated in the same footprint as Phase 1, there would be no additional impacts on utilities and infrastructure. In addition, there would be no new cumulative impacts associated with this alternative.

IMPACTS OF ALTERNATIVE 5 – "3B"

Like Phase 1 of alternative 1, the utility corridor that runs along 17th Street is perpendicular to the levee walls, closure structures, and storage vault proposed under this alternative. In addition, the amount of excavation that would be required is approximately the same under all alternatives. As a result, impacts on infrastructure and utilities under Phase 1 of this alternative would be similar to those described under Phase 1 of alternative 1. There would be short-term negligible adverse impacts on water supply lines,

natural gas lines, and underground electric lines; short-term minor adverse impacts on the site's irrigation system; and short-term moderate adverse impacts on the sanitary sewer, storm drain, and communications lines. Once construction of Phase 1 was complete, no additional impacts on infrastructure and utilities found within the project area would be expected as a result of new levee system.

Cumulative Impacts. Cumulative impacts would be the same as described for alternative 1. Given the capacity of these utilities for the proposed development, and the scheduling of outages related to construction, any adverse cumulative impacts on utilities in the study area would be negligible and of short duration.

Conclusion. Phase 1 would impact existing underground water, sewer, irrigation, storm drain, natural gas, electric, and communications lines to varying degrees. Since the foundation of the walls would be designed to avoid impacts on utilities, there would be short-term negligible adverse impacts on water supply lines, natural gas lines, and underground electric lines. The water supply lines and electric lines would require the installation of sleeves to allow utilities to pass through constructed walls. Short-term minor adverse impacts would be expected for irrigation lines, while short-term moderate adverse impacts would be expected for storm drains, sanitary sewer, and communication lines. Cumulative impacts on utilities in the study area would be negligible and of short duration.

Phase 2 Analysis. Since Phase 2 deals with only the aesthetic quality of the 3B wall, no further site disturbance would be necessary. Therefore, no additional adverse impact on utilities beyond those described in Phase 1 would be anticipated.

Cumulative Impacts. Since no impacts on utilities or infrastructure would occur, there would be no new cumulative impacts associated with Phase 2 of this alternative.

Conclusion. Since there would be no new ground disturbance associated with Phase 2 of this alternative, there would be no additional impacts on utilities and infrastructure, and no new cumulative impacts associated with this alternative.

PARK MANAGEMENT AND OPERATIONS

METHODOLOGY AND ASSUMPTIONS

Park management and operations, for the purpose of this analysis, refers to the quality and effectiveness of the park staff to maintain and administer park resources and facilities and to provide for an effective visitor experience. This includes an analysis of the condition and maintenance of the facilities and concessioners used to support the operations of the park. Facilities included in this project include the park itself and the sites within the study area. Park staff who are knowledgeable of these issues were members of the planning team that evaluated the impacts of each alternative. The impact analysis is based on the current description of park operations presented in the "Affected Environment" chapter of this document. It should be noted that during a flood event, there would likely be a park closure and shift in resource and employee allocation to address the need to provide additional protection to park resources. It would be expected that after the flood event, park operations would return to normal within a very short period of time.

STUDY AREA

The study area for operations and maintenance includes the NAMA, including staffing, facilities, and budget.

IMPACT THRESHOLDS

Impact thresholds are as follows.

Negligible: Park operations would not be impacted or the impact would not have a noticeable or appreciable impact on park operations.

Minor: Impacts would be noticeable, but would be of a magnitude that would not result in an appreciable or measurable change to park operations.

Moderate: Impacts would be readily apparent and would result in a substantial change in park operations that would be noticeable to staff and the public. Mitigation could be required and may be effective.

Major: Impacts would be readily apparent and would result in a substantial change in park operations that would be noticeable to staff and the public and would require the park to readdress its ability to sustain current park operations.

Duration: Short-term impacts are those lasting less than one year; long-term impacts are those lasting longer than one year.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. The no action alternative would not require any new funding for levee construction, but only implementation of the existing levee plan and system in the event of flooding. Therefore, impacts of the no action alternative prior to implementation of the levee plan in the event of a flood would be negligible.

Under the no action alternative, action would be taken to construct a temporary earthen levee across 17th Street. To provide 100-year flood protection, Jersey barriers and sandbags would be used to construct the levee within 24 hours of flood notification. If flood waters continued to rise, an earthen embankment would be constructed behind the Jersey barrier.

In the event of a flood under the no action alternative, it would take 25 to 30 individuals approximately 24 hours to complete implementation of the levee system at 17th Street and four to six hours for placement of

sandbags across 23rd Street. The individuals necessary to prepare for the flood could vary depending on the equipment that would be needed. Additional staff would be obtained from the various regional parks as needed and would be used to assist with the closure of the park and flood preparations for other memorials along the National Mall. Additional funding may be needed to pay for staff time during the construction and deconstruction of the levee system, as staff would exceed budgeted work hours due to the emergency nature of the action. This would therefore constitute a short-term moderate adverse impact on park management and operations.

Cumulative Impacts. Other actions and plans that could affect park management and operations include time and budget needed for construction and management of buildings on the Mall and in the study area and possible time for dealing with increased or special visitor interactions, for addressing security concerns, and for ongoing park planning efforts. Cumulatively, these have a long-term minor adverse effect on park management and operations. Under the no action alternative, nothing new would be added to NPS staff's managerial and operational responsibilities; therefore, when combined with these potential cumulative actions, cumulative impacts related to the status quo would be long-term, minor, and adverse. During implementation of the levee plan in the event of a flood, any potential cumulative actions, including increased visitation and the construction of new buildings and memorials, would have limited contribution to the cumulative impacts as the park would close, and construction would cease until after flood water receded and the conditions warranted reopening the park and reinitiating construction. Cumulative impacts would not increase beyond the short-term moderate level expected for implementation of the no action alternative, and overall, cumulative effects would continue to be minor.

Conclusion. Under normal conditions, the no action alternative does not impose any special responsibilities on park staff, and its impact would be negligible. However, in the event of a flood, the no action alternative would constitute a moderate adverse short-term impact on park management and operations as the levee plan is implemented, and resources are reallocated to address the emergency. Overall, cumulative impacts would be long-term, adverse, and minor.

IMPACTS OF ALTERNATIVE 1 – "ARC WALL"

The funding necessary to construct alternative 1 would be specifically appropriated for this purpose and would not be derived from park operational budgets. In addition, all construction for the alternative (except for in the event of a flood notification) would be contracted out to non-NPS staff. Therefore, there would be negligible to minor short-term adverse impacts on park management and operations in terms of budget, contract, construction oversight, and long-term maintenance[3]. The remainder of the analysis focuses on the potential impacts of implementing alternative 1 during a flood event.

Phase 1 Analysis. Phase 1 of alternative 1 at both the 23rd Street Closure and the Reflecting Pool levee would be identical to that described under the no action alternative. As noted above, approximately six NPS staff would be required to construct the sandbag closure, taking about four to six hours.

Phase 1 of alternative 1 at 17th Street would involve the installation of the post and panel system in place across the street itself. The post and panel system would require about 19 NPS staff and a crane, truck, and forklift for either option. Park staff members would be drawn from the NPS National Capital Region and would require approximately 12 hours of work to install the post and panel system. While implementation of this alternative would have short-term negligible adverse impacts on park operation and management—as park staff and funds would be diverted to focus on the emergency operations—overall, these impacts would be less than current flood protection procedures. The post and panel system proposed under this alternative would be easier to implement when compared to the 24-hour effort needed to construct the earthen levee under the no action alternative. There would be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

[3] The post and panel closure system would also require testing each year, including a mock partial set-up and tear down. Due to the infrequency of this testing, there would be a resultant negligible effect on park maintenance and operations.

Cumulative Impacts. The cumulative impacts on park management and operations related to other projects and plans would be the same as described under the no action alternative, long-term, adverse, and minor. Short-term adverse impacts related to the arc wall would be minor and would only take place during the initial construction of the wall and the placement of the post and panel system. Minor adverse cumulative impacts would result from overseeing the construction efforts while other park construction projects are ongoing. Once it is complete, any cumulative impacts on park operations and management would cease. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the arc wall and post and panel slots would result in negligible to minor short-term adverse impacts as a result of budget, contract and construction oversight. These impacts, however, would be less than current flood protection procedures, since all that would be needed is about 19 staff members to erect the post and panel system in 12 hours under flood conditions. Cumulative impacts for all projects and plans would be long-term, minor, and adverse.

Phase 2 Analysis. In order to meet the level of protection necessary for the congressionally authorized solution, two embankments would be constructed at 23rd Street. In addition, several low areas of the existing levee would need to be raised by approximately 1.5 feet above existing grade.

Phase 2 at 17th Street would be designed to meet USACE requirements for the congressionally authorized solution. The arc wall constructed in Phase 1 (alternative 1A) would be raised by two feet by re-grading against the concrete walls and then raising the elevation of the wall from 16.7 feet to 18.7 NAVD (if not funded and completed under Phase 1). Alternative 1B would already be at the 18.7 NAVD elevation. The post and panel system would also be the same as for Phase 1. The construction of Phase 2 would have similar impacts as those described for Phase 1 in terms of budget, contract, and construction oversight, resulting in minor short-term adverse impacts.

Impacts related to the implementation of the levee system during a flood event would be the same as described under Phase 1. Therefore, Phase 2 would result in minor short-term adverse impacts on park management and operations; however, the post and panel system proposed under this alternative would be easier to implement when compared to the 24-hour effort needed to construct the earthen levee under the no action alternative.

Cumulative Impacts. The adverse cumulative impacts for Phase 2 of the arc wall would be similar to those described in Phase 1 during the initiation construction of the levee system. Minor adverse cumulative impacts would result from overseeing the construction efforts while other park construction projects are ongoing. Once the levee is complete, any adverse cumulative impacts on park operations and management would cease. Cumulative impacts related to the implementation of the levee system during a flood event would be similar to those described above under the no action alternative. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the levee system of Phase 2 of alternative 1 would likely result in negligible to minor short-term adverse impacts as a result of budget, contract, construction oversight, and long-term maintenance. Implementation of the post and panel system during a flood event would result in short-term minor adverse impacts. These impacts, however, would be less than current flood protection procedures. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would be minor.

IMPACTS OF ALTERNATIVE 2 – "GATE WALLS"

Similar to alternative 1, the funding necessary to construct alternative 2 would be specifically appropriated and would not be derived from park operational budgets. In addition, all construction needed to implement the alternative (except for in the event of a flood notification) would be contracted out to non-NPS staff. Therefore, there would be negligible to minor short-term adverse impacts on park management and operations in terms of budget, contract, construction oversight, and long-term

maintenance. The remainder of this analysis focuses on the potential impacts of implementing alternative 2 during a flood event.

Phase 1 Analysis. Impacts on park operations and management under Phase 1 of alternative 2 would be the same as those described under Phase 1 of alternative 1. Like alternative 1, both the 23rd Street closure and the Reflecting Pool levee would be identical to that described under the no action alternative and would require approximately six NPS staff to construct the sandbag closure, taking about 12 hours, resulting in short-term negligible adverse impacts on park operations and management.

In addition, like Phase 1 of alternative 1, at 17th Street a post and panel system would be installed across the street itself. While the post and panel system under alternative 2 would be approximately 14 feet longer than under alternative 1, it would require about the same level of effort to implement (i.e., 19 NPS staff and a crane, truck, and forklift). Park staff members would be drawn from the NPS National Capital Region and would require approximately 12 hours of work to install the post and panel system. While implementation of this alternative would have short-term negligible to minor adverse impacts on park operation and management, as park staff and funds would be diverted to focus on these emergency operations, overall, these impacts would be less than current flood protection procedures. The post and panel system proposed under this alternative would be easier to implement when compared to the 24-hour effort needed to construct the earthen levee under the no action alternative. There would be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. The adverse cumulative impacts on park management and operations related to other projects and plans would be the same as described under the no action alternative, long-term and minor. Short-term adverse impacts related to the Gate Walls alternative would be minor and would only take place during the initial construction of the wall and the placement of the post and panel system. Minor adverse cumulative impacts would result from overseeing the construction efforts while other park construction projects are ongoing. Once it is complete, any adverse cumulative impacts on park operations and management would cease. Overall long-term cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the gate wall and post and panel slots would result in only negligible to minor short-term adverse impacts as a result of budget, contract and construction oversight. Implementation of the post and panel system during a flood event would result in short-term minor adverse impacts. These impacts, however, would be less than current flood protection procedures. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would be minor.

Phase 2 Analysis. Phase 2 of alternative 2 would be identical to the Phase 2 of alternative 1 at 23rd Street and the Reflecting Pool. Similar to Phase 2 of alternative 1, 17th Street floodwalls would need to be raised to 18.7 NAVD, two feet above and beyond the height of Phase 1(if not funded and completed under Phase 1). The impacts associated with this Phase, under either option, are identical to those described for Phase 2 of alternative 1. The post and panel closure would be the same, though slightly longer than under alternative 1, and would require similar effort for installation. Impacts related to implementing the levee system during a flood event would therefore be minor, short-term, and adverse. Overall, however, these impacts would be less than current flood protection procedures. As with Phase 1, there would also be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. Cumulative impacts for Phase 2 of alternative 2 would be the same as those for Phase 2 of alternative 1. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the Phase 2 of alternative 2 levee system would likely result in short-term minor adverse impacts as a result of budget, contract, construction oversight, and long-term

maintenance. However, under flood conditions, 19 staff members would be needed to erect the post and panel system in 12 hours compared to the 30 staff members and 24 hours needed to set up the sandbags and Jersey barriers under the current flood control procedures. Phase 2 of alternative 2 would result in minor short-term adverse impacts on park management and operations, allowing the park staff to address other flood-related emergency needs. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term cumulative effects on park management and operations would continue to be minor.

IMPACTS OF ALTERNATIVE 3 – "CONSTITUTION GARDEN WALLS"

Similar to the other action alternatives, the funding necessary to construct alternative 3 would be specifically appropriated and would not be derived from park operational budgets. In addition, all construction needed to implement the alternative (except for in the event of a flood notification) would be contracted out to non-NPS staff. Therefore, there would be negligible to minor short-term adverse impacts on park management and operations in terms of budget, contract, construction oversight, and long-term maintenance. The remainder of this analysis focuses on the potential impacts of implementing alternative 3 during a flood event.

Phase 1 Analysis. Impacts on park operations and management under Phase 1 of alternative 3 would be the same as those described under Phase 1 of alternative 1. Like alternative 1, both the 23rd Street closure and the Reflecting Pool levee would be identical to that described under the no action alternative and would require approximately six NPS staff to construct the sandbag closure, taking about 12 hours, resulting in short-term negligible adverse impacts on park operations and management.

In addition, at 17th Street, a post and panel system would be installed across the street itself, similarly to that described under alternative 1. However, under alternative 3, the post and panel system would be approximately six feet longer than under alternative 1, but would require about the same level of effort to implement (i.e., 19 NPS staff and a crane, truck, and forklift). Park staff members would be drawn from the NPS National Capital Region and would require approximately 12 hours of work to install the post and panel system. While implementation of this alternative would have short-term negligible adverse impacts on park management and operations, as park staff and funds would be diverted to focus on the emergency operations, overall, these impacts would be less than current flood protection procedures. The post and panel system proposed under this alternative would be easier to implement when compared to the 24-hour effort needed to construct the earthen levee under the no action alternative. There would be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. The cumulative impacts on park management and operations related to other projects and plans would be the same as described under the no action alternative, long-term and minor. Short-term impacts related to the wall constructed under this alternative would be minor and would only take place during the initial construction of the wall and the placement of the post and panel system. Minor adverse cumulative impacts would result from overseeing the construction efforts while other park construction projects are ongoing. Once it is complete, any cumulative impacts on park operations and management would cease. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the Constitution Garden Walls and post and panel slots would result in only negligible to minor short-term adverse impacts as a result of budget, contract, and construction oversight. Implementation of the post and panel system during a flood event would result in short-term minor adverse impacts. These impacts, however, would be less than current flood protection procedures. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would be minor.

Phase 2 Analysis. At the 23rd Street closure and the Reflecting Pool levee, Phase 2 of alternative 3 would be identical to the Phase 2 of alternative 1. At 17th Street, Phase 2 would require raising the height of the concrete walls by two feet so that they are at 18.7 NAVD. This would be done by re-grading the landscape to cover the concrete walls and then adding stone-clad terraced steps in their place. During a flood event, Jersey barriers would be placed on top of the terraced walls. In addition, the post and panel system would be used across 17th Street; however, it would be approximately 236 feet in length, compared to 102 feet in Phase 1, and would require up to 24-hours to implement. The need for additional heavy equipment and the much longer post and panel system would require a proportionately larger effort to implement, and would likely result in short-term moderate adverse impacts. As with Phase 1, there would also be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. The cumulative impacts for Phase 2 of alternative 3 would exceed the requirements for those identified for the no action alternative. Overall, long-term cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the Phase 2 of alternative 3 levee system would likely result in negligible to minor short-term adverse impacts as a result of budget, contract, construction oversight, and long-term maintenance. Under flood conditions, similar park staff effort would be required as under the no action alternative. Therefore, Phase 2 of alternative 3 would result in moderate short-term adverse impacts on park management and operations and fewer benefits than the other proposed action alternatives. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

IMPACTS OF ALTERNATIVE 4 – "HYBRID"

Similar to the other action alternatives, the funding necessary to construct alternative 4 would be specifically appropriated and would not be derived from park operational budgets. In addition, all construction needed to implement the alternative (except for in the event of a flood notification) would be contracted out to non-NPS staff. Therefore, there would be negligible to minor short-term adverse impacts on park management and operations in terms of budget, contract, construction oversight, and long-term maintenance. The remainder of the analysis focuses on the potential impacts of implementing alternative 4 during a flood event.

Phase 1 Analysis. Impacts on park operations and management under Phase 1 of alternative 3 would be the same as those described under Phase 1 of alternative 1. Like alternative 1, both the 23rd Street closure and the Reflecting Pool levee would be identical to that described under the no action alternative and would require approximately six NPS staff to construct the sandbag closure, taking about 12 hours, resulting in short-term negligible adverse impacts on park operations and management.

In addition, at 17th Street, a post and panel system would be installed across the street itself, similarly to that described under alternative 1. However, under alternative 4, the post and panel system would be approximately 70 feet longer than under alternative 1, and would require a higher level of effort to implement (i.e., 19 NPS staff and a crane, truck, and forklift). Park staff members would be drawn from the NPS National Capital Region and would require approximately 12 hours of work to install the post and panel system. While implementation of this alternative would have short-term minor adverse impacts on park operation and management as park staff and funds are diverted to focus on the emergency operations, these impacts would be less than current flood protection procedures. The post and panel system proposed under this alternative would be easier to implement when compared to the 24-hour effort needed to construct the earthen levee under the no action alternative. There would be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. The cumulative impacts on park management and operations related to other projects and plans would be the same as described under the no action alternative, long-term and minor. Short-term impacts related to the wall constructed under this alternative would be minor and would only take place during the initial construction of the wall and the placement of the post and panel system. Minor adverse cumulative impacts would result from overseeing the construction efforts while other park construction projects are ongoing. Once it is complete, any cumulative impacts on park operations and management would cease. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the wall proposed under this alternative and post and panel slots would result in only negligible to minor short-term adverse impacts as a result of budget, contract, and construction oversight. Implementation of the post and panel system during a flood event would result in short-term minor adverse impacts. These impacts, however, would be less than current flood protection procedures. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would be minor.

Phase 2 Analysis. At the 23rd Street closure and the Reflecting Pool levee, Phase 2 of alternative 3 would be identical to the Phase 2 of alternative 1. At 17th Street, Phase 2 would require raising the height of the concrete walls by two feet so that they are at 18.7 NAVD (if not funded and completed under Phase 1). This would be done by re-grading the landscape to cover the concrete walls and then adding stone-clad terraced steps in their place. In addition, the post and panel system would be used across 17th Street; however, the overall length of the post and panel would be the same as in Phase 1 and would result in minor short-term adverse impacts on park operations and management. As with Phase 1, there would also be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. Cumulative impacts for Phase 2 of alternative 4 would be the same as those for Phase 2 of alternative 1. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. Raising the height of the Hybrid wall would result in only negligible to minor short-term adverse impacts as a result of budget, contract, and construction oversight. Overall, there would be negligible to minor short-term adverse impacts on park operations and management during a flood event. These impacts, however, would be less than current flood protection procedures. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would be minor.

IMPACTS OF ALTERNATIVE 5 – "3B"

Similar to the other action alternatives, the funding necessary to construct alternative 5 would be specifically appropriated and would not be derived from park operational budgets. In addition, all construction needed to implement the alternative (except for in the event of a flood notification) would be contracted out to non-NPS staff. Therefore, there would be negligible to minor short-term adverse impacts on park management and operations in terms of budget, contract, construction oversight, and long-term maintenance. The remainder of the analysis focuses on the potential impacts of implementing alternative 5 during a flood event.

Phase 1 Analysis. Impacts on park operations and management under Phase 1 of alternative 5 would be the same as those described under Phase 1 of alternative 1. Like alternative 1, both the 23rd Street closure and the Reflecting Pool levee would be identical to that described under the no action alternative and would require approximately six NPS staff to construct the sandbag closure, taking about 12 hours, resulting in short-term negligible adverse impacts on park operations and management.

In addition, at 17th Street, a post and panel system would be installed across the street itself, similarly to that described under alternative 1. However, under alternative 5, the post and panel system would be approximately 70 feet longer than under alternative 1 and would require a higher level of effort to implement (i.e., 19 NPS staff and a crane, truck, and forklift). Park staff members would be drawn from the NPS National Capital Region and would require up to 12 hours of work to install the post and panel system. While implementation of this alternative would have short-term minor adverse impacts on park operations and management, as park staff and funds would be diverted to focus on the emergency operations, overall, these impacts would be less than current flood protection procedures. The post and panel system proposed under this alternative would be easier to implement when compared to the 24-hour effort needed to construct the earthen levee under the no action alternative. There would be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. The cumulative impacts on park management and operations related to other projects and plans would be the same as described under the no action alternative, long-term and minor. Short-term impacts related to the wall constructed under this alternative would be minor and would only take place during the initial construction of the wall and the placement of the post and panel system. Minor adverse cumulative impacts would result in overseeing the construction efforts while other park construction projects are ongoing. Once it is complete, any cumulative impacts on park operations and management would cease. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. The initial construction of the wall proposed under this alternative and post and panel slots would result in negligible to minor short-term adverse impacts as a result of budget, contract and construction oversight. Implementation of the post and panel system during a flood event would result in short-term minor adverse impacts. These impacts, however, would be less than current flood protection procedures. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would be minor.

Phase 2 Analysis. At the 23rd Street closure and the Reflecting Pool levee, Phase 2 of alternative 5 would be identical to the Phase 2 of alternative 1. At 17th Street, Phase 2 would include adding aesthetic enhancements that would improve the appearance of the floodwall and structure so that it blends into the landscape of the Monument Grounds. In addition, the post and panel system that would be used across 17th Street would be the same length as in Phase 1. As a result, the adverse impacts associated with the installation of the post and panel system across 17th Street would be minor and short in duration. As with Phase 1, there would also be long-term minor adverse impacts related to the periodic checking and maintenance of the post foundations across 17th Street.

Cumulative Impacts. Cumulative impacts for Phase 2 of alternative 5 would be the same as those for Phase 2 of alternative 1. Overall, long-term adverse cumulative effects on park management and operations would continue to be minor.

Conclusion. Actions associated with improving the aesthetic quality of the 3B wall would result in negligible to minor short-term adverse impacts as a result of budget, contract, and construction oversight. Overall, there would be minor short-term adverse impacts on park management and operations during a flood event. These impacts, however, would be less than current flood protection procedures. There would also be long-term minor adverse impacts associated with the annual maintenance of this new system. Overall, long-term adverse cumulative effects on park management and operations would be minor.

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CHAPTER 5

CONSULTATION AND COORDINATION

National Park Service (NPS) staff place a high priority on meeting the intent of public involvement in the *National Environmental Policy Act* (NEPA) process and on giving the public an opportunity to comment on proposed actions. As part of the NPS NEPA process, issues associated with the proposed action were identified during the internal scoping meeting held with NPS and U.S. Army Corps of Engineers (USACE) staff and have been communicated to other affected agencies and stakeholders. As described in chapter 1, the stakeholders include the cooperating agency, National Capital Planning Commission (NCPC), and other agencies, organizations, and members of the public including:

- Advisory Council on Historic Preservation (ACHP)
- Committee of 100
- District of Columbia Office of Planning (DCOP)
- District of Columbia Department of Transportation (DDOT)
- District of Columbia Historic Preservation Officer (DC HPO)
- District Water and Sewer Authority (DC WASA)
- Federal Highway Administration (FHWA)
- General Services Administration (GSA)
- National Coalition to Save The Mall
- National Trust for Historic Preservation (NTHP)
- Office of the Deputy Mayor for Planning and Economic Development (DMPED)
- Smithsonian Institution
- U.S. Commission of Fine Arts (CFA)
- U.S. Fish and Wildlife Service (USFWS)
- Washington Metropolitan Transportation Administration (WMATA)

PUBLIC MEETINGS AND COMMENT PERIOD

In addition to internal and agency scoping, public scoping for the Potomac Park Levee Environmental Assessment (EA) began on May 19, 2008, and concluded on June 20, 2008. During this time, a public scoping meeting was held on June 10th, at NCPC located at 401, 9th Street NW in Washington, D.C. The purpose of this meeting was to solicit public input on the purpose, need, and objectives of the project, major issues, and potential alternatives. Notice of the public meetings was posted on the Planning, Environment, and Public Comment website (PEPC), and media ads were placed in the Washington Post Express, Washington Hispanic, Current Newspapers, and CityPaper. In addition, the NCPC and the DCOP posted messages on their websites, and the NPS sent notices of the meeting to individuals and organizations.

Public comments were solicited by mail, email, and online via the PEPC website. Several comments received during the public meeting and public comment period focused on the need for additional information on alternatives and appropriate maps for analysis.

The public also requested clarification on whether the proposal represented both a temporary FEMA required solution and a congressionally authorized solution, or simply a congressionally authorized

solution to an elevation of 18.7. The issue of incorporating a more aesthetic quality for the flood protection structures was raised as well as was the potential effects of excavating the Washington Monument Grounds (Monument Grounds) under the current levee plan. One commenter asked if there would be more likelihood of interior flooding in downtown DC during a severe storm event once levee improvements have been implemented. The comments received from the public throughout this process were considered in the development of this EA.

CONSULTATION

Coordination with local and federal agencies and various interest groups was conducted during the NEPA process to identify issues and/or concerns related to the proposed flood protection facilities within Potomac Park. In accordance with Section 7 of the Endangered Species Act, consultation letters were sent from the NPS to the USFWS; the District Department of the Environment (DC DOE), Fisheries & Wildlife Division; and the District Department of Health, Environmental Health Administration on [NPS to confirm], 2008.

In accordance with the regulations implementing Section 106 of the National Historic Preservation Act (NHPA), letters were also sent to the DC HPO and ACHP on June 26, 2008. On July 25, 2008, the ACHP confirmed they would participate in the consultation process. Documentation of these efforts to obtain public agency consultation is contained in the appendix.

For the purposes of this project, the following agencies and organizations are consulting parties:

- ACHP
- CFA
- Committee of 100
- DCOP
- DC HPO
- DC WASA
- GSA
- National Coalition to Save The Mall
- National Parks Conservation Association
- NTHP
- Smithsonian Institution
- Washington DC Guild of Professional Tour Guides

SECTION 106 CONSULTATION PROCESS AND MEETINGS

Section 106 of the NHPA of 1966 requires federal agencies to take into account the effects of their undertakings on historic properties. Throughout this project, the Section 106 process and NEPA assessment have been closely coordinated, and in some cases, public scoping has been utilized to satisfy the requirement for both processes. For the purposes of Section 106, there were several consulting party meetings held:

- On May 23, 2008, at the DCOP, 801 North Capitol Street NE, Washington, D.C., the USACE and NPS first provided a brief background and overview of the project for an initial group of consulting parties. Then, the consultant team presented the project location, the potential impact areas, and the plan for Section 106 consultation. The DC staff archeologist presented archeological concerns associated with the project.

- On June 10, 2008, an EA public scoping meeting was held which also served the purposes of public consultation Section 106. During this meeting, the NPS presented an overview of the historic districts, structures, and cultural landscapes in the project area and presented a preliminary Area of Potential Effect (APE) (subsequently enlarged due to comments received.) With the advice of the DC Historic Preservation Officer (DC HPO), the NPS has already invited many agencies, organizations, and interested parties to be 106 Consulting Parties.

- On August 19, 2008, at the NPS National Capital Region Headquarters at 1100 Ohio Drive SW, Washington, D.C., the project team provided an overview of potentially affected cultural resources, presented the draft EA alternatives, and discussed the possible effects of alternatives on cultural resources. During the meeting, the NPS stated that comments on the alternatives would be accepted until August 29, 2008, but the comment period was extended to September 15, 2008.

- The consulting parties were invited to attend a site visit on September 8, 2008, at the 17th Street closure location (at Constitution Avenue). During this visit, the project team identified the alignments of the closures shown in alternatives 1, 2, and 3 in situ and identified the trees which would be removed under each alternative. At this site visit, the consulting parties were encouraged to furnish comments by September 15, 2008.

- The consulting parties were invited to attend presentations to both the CFA and the Historic Preservation Review Board (HPRB) on November 20, 2008 and the presentation to the NCPC on December 4, 2008. During these meetings, the NPS presented alternatives 4 and 5.

- The consulting parties were invited to view a full scale mock up of alternatives on November 20, 2008 to help visualize the locations, potential heights, and potential effects of the proposed flood control structures at 17th Street.

LIST OF AGENCIES AND ORGANIZATIONS WHO WILL BE NOTIFIED OF THE PUBLICATION OF THE EA

Notice of this EA will be posted on PEPC. In addition, the NPS and the USACE will notify the following organizations, agencies, and individuals of its availability.

FEDERAL AGENCIES

- Advisory Council on Historic Preservation
- General Services Administration
- Federal Emergency Management Agency
- National Trust for Historic Preservation
- U.S. Commission of Fine Arts
- U.S. Department of the Interior
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service

DISTRICT OF COLUMBIA AND REGIONAL GOVERNMENTS

- District of Columbia Historic Preservation Office
- District of Columbia Office of Planning
- District of Columbia Department of Transportation
- National Capital Planning Commission
- Office of the Deputy Mayor for Planning and Economic Development
- Washington Metropolitan Transportation Association

ORGANIZATIONS/OTHER

- Alliance for Global Justice
- American Hiking Society
- American Institute of Architects
- American Society of Landscape Architects
- Architect of the Capitol
- Capitol Hill Business Improvement District
- Casey Trees
- Committee of 100
- Councilmember Carol Schwartz
- Councilmember Jack Evans
- Councilmember Phil Mendelson
- Cultural Tourism DC
- DC Preservation League
- District of Columbia Chamber of Commerce
- Downtown DC Business Improvement District
- Eastern National
- Eisenhower Memorial Commission
- Equal Honor For All
- Howard University
- Landmark Services Tourmobile, Inc.
- Leadership Arlington
- Martin Luther King Jr. Memorial Organization
- Maryland-National Capital Park and Planning Commission
- National Association for Olmsted Parks
- National Coalition to Save the Mall
- National Parks Conservation Association
- Organization of American States
- Penn Quarter Neighborhood Association
- Smithsonian Institution
- The National Park Foundation
- Trust for the National Mall
- United States Navy Memorial Organization
- Urban Land Institute
- Washington Area Bicyclist Association
- Washington DC Guild of Professional Tour Guides
- Washington Post
- Washington Smart Growth Alliance
- World Monuments Fund

LIST OF PREPARERS

LOUIS BERGER GROUP, INC.

Raed El-Farhan (Principal in Charge)
Director
PhD, Environmental Engineering
Clemson University

Jill Cavanaugh (Project Manager)
Architect/Planner
MS, Architecture & Urban Design
Columbia University

Kristie Baynard (Cultural Resources)
Architectural Historian
MS, Historic Preservation
Columbia University

Lisa McDonald (Land Use / Socioeconomics)
Senior Economist
PhD, Mineral Economics
Colorado School of Mines

Nancy Van Dyke (NEPA Lead)
Senior Associate
MS, Environmental Sciences
University of Virginia

Joel Gorder (NEPA Specialist)
Senior Planner
MS Urban/Environmental Planning
Virginia Tech University

Josh Schnabel (Vegetation & Public Safety)
Environmental Planner
MA, Geography
San Francisco State University

Lawrence P. Earle, AICP (Section 106 Lead)
Senior Planner
MA, Planning
University of Virginia

Deborah Matherly (Transportation)
Senior Transporation Planner
MBA, Hood College

Larry Smith (Utilities & Infrastructure)
Senior Civil Engineer
BS, Civil Engineering
West Virginia University

Charles LeeDecker (Archeology Lead)
Senior Archaeologist
MA, Anthropology
George Washington University

Michael Mayer (NEPA Specialist)
Senior Environmental Regulatory Specialist
JD, Lewis and Clark College
MS, Wildlife and Fisheries Biology
University of Massachusetts

Landon Vine (Visitor Use, Park Operations)
Environmental Scientist
MS, Environmental Communication
SUNY College of Environmental Science

THE OLIN PARTNERSHIP

David Rubin (Landscape Architecture Lead)
Partner
MLA, Harvard University

Skip Graffam (Landscape Architecture)
Director of Research
MLA, University of Virginia

Molly O'Neill (Landscape Architecture)
Senior Landscape Designer
MSc Planning
University of British Columbia

Sarah Williams (Landscape Architect)
Landscape Designer
BLA, Purdue University

Trevor Lee (Landscape Architect)
Senior Landscape designer
MLA, Rhode Island School of Design

Sophie Robitaille (Landscape Architect)
Associate
MLA, University of Oregon School of Architecture and Allied Arts

CONTRIBUTORS

U.S. DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

National Capital Region (NCR)

Peter May, Associate Regional Director

Glenn DeMarr, Project Manager, Office of Lands, Resources and Planning

Doug Jacobs, Deputy Associate Director of Lands, Resources, and Planning

Stanley E. Tolman, Civil Engineer

National Mall and Memorial Parks (NAMA)

Stephen Lorenzetti, Deputy Superintendent

Steve Sims, Civil Engineer

Perry Wheelock, Chief, Resource Management

U.S. ARMY CORPS OF ENGINEERS

Steve Garbarino, Project Manager, Baltimore District

Jim Ludlam, Chief Civil Engineer, Baltimore District

Jeff Trulick, Economic and Environmental Team Leader, Baltimore District

Anthony Vidal, PE, Baltimore District

Scott Watson, Baltimore District

NATIONAL CAPITAL PLANNING COMMISSION

Michele Desiderio, Community Planner

Christine Saum, Chief Urban Designer

Nancy Witherell, Historic Preservation Officer

In addition to the NPS, USACE, and NCPC, a number of other federal, regional, and local agencies and organizations participated in a Potomac levee working group, which meets regularly to review the status of the overall project including issues related to design, engineering, construction, and the long-term schedule. The members of the working group include:

ADVISORY COUNCIL ON HISTORIC PRESERVATION

Kelly Fanizzo, Program Analyst

Tom McCulloch, Program Analyst

DISTRICT OF COLUMBIA HISTORIC PRESERVATION OFFICE

David Maloney, Historic Preservation Officer

Andrew Lewis, Senior Historic Preservation Specialist

Ruth Trocolli, City Archeologist

DISTRICT OF COLUMBIA OFFICE OF PLANNING

Anita Hairston, Chief of Staff

DISTRICT DEPARTMENT OF TRANSPORTATION

Joe Dorsey

Jeffrey Seltzer, Program Manager, IPMA

FEDERAL HIGHWAY ADMINISTRATION

Frank Mirack, Traffic and Safety Engineer

GENERAL SERVICES ADMINISTRATION

Michael McGill, National Capital Region

Anthony Mondy, National Capital Region

TETRATECH/HARDIE INDUSTRIES

Mary Wiedorfer, Project Executive

Kena Cofield, Project Manager

Patti Sexton, PE

Jung Suh, PE

Yen Hsu Chen, Principal Project Manager

U.S. COMMISSION OF FINE ARTS

Thomas Luebke, Secretary

WASHINGTON METROPOLITAN TRANSPORTATION AUTHORITY

James Ashe, PE, Manager, Environmental Planning and Compliance

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ACRONYMS AND GLOSSARY

LIST OF ACRONYMS

Above Mean Sea Level	(AMSL)
American Indian Religious Freedom Act	(AIRFA)
Archeological Resources Protection Act	(ARPA)
Area of Potential Effect	(APE)
Average Daily Traffic	(ADT)
Commemorative Works Act	(CWA)
Committee of Fine Arts	(CFA)
Council on Environmental Quality	(CEQ)
Cubic feet per second	(cfs)
Cultural Landscape Inventory	(CLI)
Cultural Landscape Report	(CLR)
District Department of Transportation	(DDOT)
District of Columbia Department of the Environment	(DC DOE)
District of Columbia Environmental Health Administration	(DC EHA)
District of Columbia Historic Preservation Office	(DC HPO)
District of Columbia Office of Planning	(DCOP)
Environmental Assessment	(EA)
Environmental Impact Statement	(EIS)
Environmental Justice	(EJ)
Environmental Protection Agency	(EPA)
Federal Capital Improvements Program	(FCIP)
Federal Emergency Management Agency	(FEMA)
Finding of No Significant Impact	(FONSI)
Flood Insurance Rate Map	(FIRM)
Franklin Delano Roosevelt	(FDR)
General Design Memorandum	(GDM)
General Services Administration	(GSA)
Geographic Information Systems	(GIS)
Historic Preservation Review Board	(HPRB)
Martin Luther King, Jr.	(MLK)
Maryland Rail Commuter Service	(MARC)
Miles Per Hour	(mph)

National Capital Planning Commission	(NCPC)
National Capital Urban Design and Security Plan	(NCUDSP)
National Environmental Policy Act	(NEPA)
National Flood Insurance Program	(NFIP)
National Historic Landmark	(NHL)
National Mall and Memorial Parks	(NAMA)
National Mall Plan	(NMP)
National Museum of African American History and Culture	(NMAAHC)
National Park Service	(NPS)
National Parks Omnibus Management Act	(NPOMA)
National Register of Historic Places	(NRHP)
Native American Graves Protection and Repatriation Act	(NAGPRA)
North American Vertical Datum	(NAVD)
Occupational Safety and Health Administration	(OSHA)
Office of the Deputy Mayor for Planning and Economic Development	(DMPED)
Planning, Environment, and Public Comment website	(PEPC)
Programmatic Agreement	(PA)
Southeast Federal Center	(SEFC)
Statement of Findings	(SOF)
Traditional Cultural Property	(TCP)
United States Army Corps of Engineers	(USACE)
United States Fish and Wildlife Service	(USFWS)
United States Institute of Peace	(USIP)
Variable Message Signs	(VMS)
Vietnam Veterans Memorial Visitor Center	(VVMC)
Virginia Department of Transportation	(VDOT)
Virginia Railway Express	(VRE)
Washington Metropolitan Area Transit Authority	(WMATA)
World War II	(WWII)

KEY WORD GLOSSARY

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

Alignment —The arrangement or relationship of several disparate components along a common vertical or horizontal line or edge.

Allée — A walkway lined with trees or tall shrubs.

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

Commercial Services — Any activity or service that occurs in a park for which compensation is made.

Contributing Resource — A building, site, structure, or object that adds to the historic significance of a property or district.

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

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

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

Enabling Legislation — Legislation that gives appropriate officials the authority to implement or enforce the law.

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

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

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

Environmental Impact Statement — A report that documents the information required to evaluate the environmental impact of a project. It informs decision makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the environment.

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

Finding of No Significant Impact (FONSI) — A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement (EIS). A FONSI is based on the results of an Environmental Assessment (EA).

Floodwall — A flood wall holds back water.

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

Freeboard – An additional levee height above the estimated water surface of a given flood for designing levees. Freeboard reduces the probability of a flood overtopping a levee.

Height — See Building Height.

Jersey barrier — A three foot tall concrete structure that ranges in length, most commonly used as a barrier to separate or stop moving vehicles.

Mall — The area west of the United States Capitol between Madison and Jefferson Drives from 1st to 14th streets NW/SW. The east end of the Mall from 1st to 3rd streets NW/SW between Pennsylvania Avenue and Maryland Avenue and is also known as Union Square. The Mall is characterized by the east–west stretch of lawn bordered by rows of American elm trees.

Massing — The conceptual form of a building that conveys proportion and size.

Monumental Core — The monumental core currently includes the National Mall and the areas immediately beyond it, including the United States Capitol, the White House and President's Park, Pennsylvania Avenue and the Federal Triangle area, East and West Potomac Parks, the Southwest Federal Center, the Northwest Rectangle, Arlington Cemetery, and the Pentagon.

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

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

National Mall — The area comprised of the Mall, the Washington Monument, and West Potomac Park. It is managed by the National Park Service's National Mall & Memorials Parks.

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

No-plant Zone — A no planting zone restricts the planting of trees and shrubs that have root structures that could compromise the integrity of the wall or earthen berm or restrict access for inspection purposes. USACE guidelines require a turf area within 15 feet on both sides from the toe of a levee. The total width of the turf area is dependent on the levee crest width, levee height, and side slopes. Since flood walls are being used at the 17th Street project area, there must be a turf area 15 feet from the face of the wall or eight feet from the foot of the foundation on both sides, whichever is greater. Therefore, a 30-foot wide no plant zone is used.

Record of Decision (ROD) — The ROD closes the EIS process. The ROD presents the basis for the decision, summarizing any mitigation measures to be incorporated in the project, and documenting any required section 4(f) approval.

Reflecting Pool—Located directly east of the Lincoln Memorial, it is a long, rectangular pool visible in many photographs of the Washington Monument. It is lined by walking paths and shade trees on both sides. It reflects both the Washington Monument and the Lincoln Memorial. It is approximately 2,029 feet (618 m) long and 167 feet (51 m) wide. It has a depth of approximately 18 inches (46 cm) on the sides and 30 inches (76 cm) in the center. It holds approximately 6,750,000 U.S. gallons (25,500,000 L) of water.

Remediation — The removal of contaminants or pollution from soil, groundwater, sediment, or surface water for the protection of human health and the environment.

Retaining Wall – A retaining wall holds back soil.

Root prune— Trees can be saved that are in close proximity to construction disturbances such as structural footings, by trimming the sub-surface root systems. This root trimming reduces the shock to the tree by pulling the root system away from future sub-surface construction work. The roots are trimmed at regular intervals over the course of several months prior to construction.

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

Subdrainage Tile — Tile drainage is a process to remove excess water from the subsurface of soil. Drainage brings soil moisture levels down

Swale — A swale is a low tract of land, especially when moist or marshy. It can refer to a natural landscape feature or a human-created one. When created by humans, this open drain system is designed to manage water runoff.

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

Wetlands — The U.S. Army Corps of Engineers and the Environmental Protection Agency jointly define wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands generally include swamps, marshes, bogs, and similar areas.

Viewshed — A viewshed includes a total visible area from a particular fixed vantage point.

Vista – A distant or long view, especially one seen through some opening such as an avenue or trees that form an avenue; a site offering such a view.