



## FINDING OF NO SIGNIFICANT IMPACT

### Rehabilitation of the Arlington Memorial Bridge

Washington, DC

#### INTRODUCTION

The National Park Service (NPS) proposes to rehabilitate the Arlington Memorial Bridge including temporary shoring of the bridge's trunnion posts and full rehabilitation or replacement of the steel draw span (technically referred to as the bascule span); repairs to the deteriorated portions of the abutments, piers, and concrete arch spans; replacement of the concrete bridge deck; resurfacing of the travel lanes; replacement of the concrete sidewalks and refitting of granite curbs; repairs to granite bridge railings; repairs to lamp posts; repairs to access panels; installation of an improved drainage system; and other minor nonstructural bridge improvements.

The NPS prepared an Environmental Assessment (EA) that evaluated a no-action alternative and four action alternatives and analyzed the potential impacts that will result from the implementation of these alternatives on the natural, cultural, and human environment. The Arlington Memorial Bridge Rehabilitation EA (2016) was prepared in accordance with the National Environmental Policy Act (NEPA) and its implementing regulations (40 CFR 1500-1508.9); NPS Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-Making (2011); and the NPS NEPA Handbook (2015).

During preparation of the EA, the NPS consulted with federal and state agencies, tribes, interested and affected parties, and the general public. The EA was made available for a 30-day review period. A few minor revisions have been made to the EA based on comments received during the public and regulatory review, which are detailed in an errata included as Appendix E. These changes have also been incorporated into this Finding of No Significant Impact (FONSI) for the bridge rehabilitation project.

#### SELECTED ACTION

Based on the analysis presented in the EA, the National Park Service has selected Replacement of the Bascule Span with a New Span Comprised of Variable Depth Steel Girders (Alternative 1B), which is the NPS preferred alternative, for implementation. The NPS selected alternative was described on pages 39, and 44 to 46 of the EA. A graphic illustrating the proposed site plan is provided on page 46 of the EA. The NPS selected alternative will include the following elements:

- Replacement of the bascule span with a fixed span of variable depth steel girders;

- Repairs to the concrete arch spans, such as filling cracks with epoxy, patching concrete spalling with concrete repair compound, and replacing the concrete edge beams and frames;
- Repairs to the concrete bridge piers, such as filling cracks in the bridge piers/abutments using an epoxy suitable for underwater applications, and then wrapping the piers/abutments with fiber reinforced polymer; filling undermined footing areas with grout; and addressing scouring by placing scour countermeasures, such as stone (riprap) placed on or below the river bottom around the piers, for protection;
- Replacement of expansion joints and bearings;
- Replacement of the bridge deck and sidewalks, including replacing the existing concrete bridge deck with concrete deck designed to minimize water intrusion; installing a concrete/polymer concrete overlay on top of the deck that will serve as the road surface; and replacing the existing exposed aggregate sidewalks with an exposed aggregate concrete/polymer concrete sidewalk;
- Repair bridge railings and other nonstructural bridge components, such as the following:
  - The balustrade railings will be removed, inspected for any needed repair or in-kind replacement, and put back in the original positions;
  - The existing bridge drainage system including pipes, drains, inlets, and grates will be cleaned or repaired. Certain aspects of the drainage system may need to be replaced or upgraded where significant deterioration has occurred or to conform to current stormwater management guidelines;
  - The granite curbs that run along the roadside edge of the sidewalks will be removed to install the new bridge deck and sidewalks. As these structures are installed, the existing granite curbs will be reset into place. Some sections of granite curb are cracked or chipped and will be replaced;
  - The light poles will be removed prior to the removal of the existing bridge deck and sidewalks. Each light pole will be painted and reset as part of the new sidewalk construction. To conform to current electrical standards, an upgraded lighting system will be installed with conduits inside each arch span;
  - The stone façade that adorns each side of the concrete arch spans will be cleaned, repaired, or replaced in kind as needed; and
  - The metal fascia on the bascule span will be maintained.
- Throughout the bridge, existing access hatches, ladders, and personnel platforms for inspections and maintenance access will be repaired, removed, or replaced as needed.

In addition, the National Park Service has selected the Temporary Trunnion Shoring, described on page 51 of the EA, to address the continuing deterioration of steel within the trunnion posts prior to the full rehabilitation of the Arlington Memorial Bridge. The trunnion posts provide critical support to the bascule span.

## DECISION REACHED AND RATIONALE

For the rehabilitation of Arlington Memorial Bridge, the National Park Service has selected two actions that will be undertaken in a phased approach, as described in this Finding of No Significant Impact. First, the National Park Service has selected the Temporary Trunnion Shoring, described on page 51 of the Environmental Assessment, to address the continuing deterioration of steel within the trunnion posts to be completed prior to the full rehabilitation project. The trunnion posts provide critical support to the bascule span and must be reinforced before the full rehabilitation is undertaken. For the second phase, the National Park Service has selected Replacement of the Bascule Span with a New Fixed Span Comprised of Variable Depth Steel Girders (Alternative 1B). This will result in the removal of the original bascule span truss from the bridge and replacement with a fixed span. The second phase also includes repair, preservation, and rehabilitation actions on the remainder of the existing bridge [or the non-bascule span] portions of the bridge.

In selecting these actions, the National Park Service considered the following: impacts to the human environment including cultural resources; effects on the historic fabric of the bridge and its status as a National Register of Historic Places-listed property; the initial construction cost and 75-year life-cycle maintenance cost of each alternative; the potential need for additional major rehabilitation projects during the life-span of the bridge; current condition of the bridge structure; and risks associated with the design and condition of the current bridge structure. Initial rehabilitation expenses, future life cycle costs, unpredictability of performance of original components, elevated potential for future additional short-term rehabilitation projects, the deterioration of original components, and similar factors influenced the decision to select Alternative 1B over other alternatives such as Alternative 2 (Complete Replacement In-kind) or Alternative 3 (Repair and Replace In-kind).

The National Park Service, in conjunction with the Federal Highway Administration, undertook numerous studies including multiple inspections of the bridge and individual bridge components; a Constructability Review Workshop with engineers with expertise in bridge rehabilitation and bascule bridges; a Value Analysis/Choosing by Advantage process; a Historic Preservation Study; Historic American Engineering Record documentation; and a cost estimate review/risk analysis. A summary of these studies is included in Appendix B.

The Constructability Review Workshop, indicated that retention of the existing bascule span (Alternative 3) was feasible. In addition, the Value Analysis/Choosing by Advantage process and the Historic Preservation Study recommended Alternative 3 as the preferred alternative. However, based on results of inspections and the cost estimate review/risk analysis, the Federal Highway Administration in consultation with the National Park Service determined that the initial construction investment for the selected alternative is \$30 to 35 million dollars less than the rehabilitation of the existing bascule span. Operation and maintenance costs during the life span of the bridge are estimated to be \$40 million less than if the existing bascule span is retained. The selected alternative will require painting every 25 years; however; painting the variable depth steel girders will require significantly less effort than painting the existing bridge's truss system.

The National Park Service and the Federal Highway Administration have determined that there is substantial risk with retaining the existing bascule span. The existing bascule span is a highly articulated truss comprised of various steel beams, posts, and other members. Once these elements start to deteriorate as the inspections have shown is already occurring, a thick layer of corrosion (i.e., pack-rust) starts forming between these articulated pieces. Due to the design and configuration of

these elements, it is presently impossible to clean and treat these areas adequately prior to the application of the protective paint system. If members are left in place, it is highly likely that these areas will continue to deteriorate prior to the 20-year paint life. In addition, it is extremely difficult to adequately clean confined areas of the main trusses, which will jeopardize the quality and durability of the protective paint coating. During the 2015 in-depth inspection of the bascule span, the bridge inspection team under the direction of the Federal Highway Administration, found a significant change in the condition of the bascule span's structural steel. The inspection team found moderate to severe corrosion and steel section loss on the bascule span's steel members. Thus, the level of the steel deterioration found in 2015 was much higher than originally anticipated. As a result, the National Park Service instituted a 10-ton load restriction on the entire bridge.

Based on the 2015 inspection, the Federal Highway Administration estimates that approximately 20 percent of the structural steel that is visible needs to be replaced now, and that approximately 25 percent of the structural steel that is visible will need to be replaced by 2018. Additionally, the Arlington Memorial Bridge superstructure continues to deteriorate at an accelerated pace. Federal Highway Administration believes that the amount of steel needing replacement may be even higher due to areas that are not visible to the inspectors.

The original design of the road and curb line on the bascule span allows water and road salts to reach the steel members and is one of the main contributing factors to the current corrosion issues. The original design can be improved, but it is unknown how long the existing members may last. The likelihood of water leakage along the curb lines in 20 to 25 years is high. Once a water leak is detected, the deck along the curb lines will require immediate repair otherwise, there will be high risk of deterioration similar to what the bridge is currently experiencing. By extending the road across the entire span and placing the sidewalk on top of the road, the selected alternative will eliminate the design issues that have caused the past corrosion and will greatly reduce the risk for future corrosion.

Therefore, given the above-listed reasons related to preservation maintenance, financial considerations, and the safety of all those who travel across the bridge, the National Park Service selected replacement of the bascule span with a fixed span system (Alternative 1B).

While the rehabilitation alternative (Alternative 3) was identified as the best alternative for preserving the historic resource, the selected alternative, while not offering the most retention of historic fabric and design, provides for numerous opportunities for cultural resource preservation. The guard's cabin, the overseer's cabin, and the machinery rooms will remain in place, and the bascule span abutments will remain as part of the new design. In addition; the selected alternative will retain the concrete arch spans and bridge piers; the statuary; bridge railings; granite curbs; light poles; existing drainage system; stone façade, including the masonry arch keystones and the medallions that adorns the sides of the concrete arch spans; and the metal fascia on the bascule span. Retention of these features will maintain historic views of the bridge from the top and sides and only the limited views and visitor experience from beneath the bridge will be diminished. In addition, significant visitor experience and continued ceremonial uses will be maintained under the selected alternative. While original architectural and engineering design elements of the bascule span will be adversely impacted by their complete removal, opportunities exist to provide an alternative interpretive experience for the structure and engineering of the original bridge.

For these reasons and in consideration of the likely environmental impacts described in this Finding of No Significant Impact, I have decided to select Alternative 1B, Replacement of the Bascule Span

with a New Span Comprised of Variable Depth Steel Girders, the NPS preferred alternative, and the temporary trunnion shoring project for implementation.

## **MITIGATION MEASURES**

The selected alternative incorporates the mitigation measures and best management practices listed in Appendix A. Mitigation measures were updated based on comments received during public and regulatory review of the EA. This list provides a framework for mitigation measures that will be included in the contractor's specifications. Additional mitigation measures and best management practices could be added to this list at the discretion of the National Park Service.

## **FINDING OF NO SIGNIFICANT IMPACT**

As described in the EA, adverse impacts to water quality; riverine habitat; wildlife, including threatened and endangered species; cultural resources including historic structures and cultural landscapes; visitor use and experience; transportation; and navigation are likely to occur as a result of implementing the NPS selected alternative; however, no significant impacts were identified.

Rehabilitation of the Arlington Memorial Bridge under the selected alternative will result in temporary impacts to water quality impacts from suspension of sediment into the water column during the dredging of barge staging areas and a channel bring barges to the bridge and from the installation and removal of falsework and cofferdams. If the temporary trunnion shoring project requires in-water work, it will result in similar impacts to water quality. Mechanical dredge techniques (as opposed to hydraulic dredging techniques) will be employed to minimize impacts to federally listed species as discussed in the wildlife section. Water quality impacts of dredging include turbidity/siltation effects and potential contaminant suspension. Erosion and sediment controls and various best management practices such as the use of cofferdams and floating turbidity curtains will be employed as needed during construction to limit the areas affected by sediment suspension to a limited work area around the pilings and cofferdams. Floating turbidity curtains will be installed around the work area while construction activities will be taking place. Floating turbidity barriers extend from the surface of the water and will be anchored to the river bottom and do not allow the sediment to pass through thereby trapping the sediment within the work area.

Removal of the bascule span will also eliminate the potential for lead paint to flake off and enter the Potomac River. The steel bascule span was painted to match the concrete arch spans with what can be assumed to be a lead based paint due to the time of construction. The existing bascule span will be removed and taken off-site for disposal. A debris shield or some other containment system to ensure that construction debris, including lead-containing paints, do not fall into the Potomac River. After the bascule span is removed, the lead paint will be properly removed from the steel components prior to their disposal or recycling.

The unconsolidated bottom of the deepwater riverine system will be impacted by dredging for barge staging areas and from the installation and removal of falsework and cofferdams. If the temporary trunnion shoring project requires in-water work, it will result in similar impacts to riverine systems. Temporary impacts to submerged aquatic vegetation will result from dredging of barge staging areas and from the use of the cofferdams to repair to the concrete bridge piers along the western shoreline. If the footings of piers at the western side of the bridge are undermined, scour countermeasures, such as riprap, will be placed on the river bottom around the piers for protection and will

permanently impact submerged aquatic vegetation. Mitigation for temporary impacts to unconsolidated bottom wetland areas will include restoration of the river bottom to existing elevations. Mitigation measures for temporary impacts to submerged aquatic vegetation will include restoration of the areas to pre-construction elevations and re-establishing submerged aquatic vegetation in the areas previously colonized. In addition, compensatory mitigation will be undertaken for impacts to submerged aquatic vegetation at a 2:1 ratio for all temporary and permanent impacts. The preferred alternative requires compensatory mitigation for 1.4 acres of temporary impacts and 6.0 acres of permanent impacts within the causeway/platform areas, barge staging areas, and associated dredging area (see attached Wetland Statement of Findings for details).

Impacts to wildlife habitat will be limited to construction-related temporary impacts to deepwater riverine habitat. The riverine impacts will be and limited to the bridge and adjacent work areas. No terrestrial habitat will be impacted under the selected alternative. Dredging for barge staging areas and the barge channel, the installation of temporary falsework and associated pilings within the deepwater portion of the Potomac River, and construction work on the bridge piers could affect the native fish species through the disturbance to the river bottom. If the temporary trunnion shoring project requires in-water work, it will result in similar impacts to fish habitat. Exclusionary devices including cofferdams and visual deterrents such as turbidity curtains will serve to limit potential direct effects with the fish in addition to limiting the amount of noise generated into the water column from pile driving activities. Construction activities will affect submerged aquatic vegetation that serves as fish habitat. Impacts to submerged aquatic vegetation is described above. Under the Endangered Species Act, it has been determined that the Arlington Memorial Bridge rehabilitation “may affect, but is not likely to adversely affect” the Atlantic and shortnose sturgeon. The National Marine Fisheries Service concurred with this finding in a letter dated October 15, 2015.

Unless already undertaken, there is a need to re-initiate informal ESA Section 7 consultation with NMFS regarding the proposed critical habitat for Atlantic sturgeon. Concurrence that the AMB rehabilitation is Not Likely to Adversely Affect first began in 2015 for the sturgeon, itself. However, on June 2, 2016, NOAA proposed rules designating critical habitat for the sturgeon, which means consultation is needed for both the fish and its habitat. A request for conference should be sent, in order for the National Park Service to ensure that any habitat impacts are properly mitigated. The analysis, in terms of the critical habitat, should focus on the physical alterations, such as the pilings, the cofferdams/turbidity curtains, and the stone riprap proposed to be placed on or below the river bottom for protection of the bridge structure.

The selected alternative will result in impacts to historic structures and cultural landscapes from temporary construction activities. Temporary trunnion post shoring will affect an area approximately 6 feet wide on each side of each trunnion posts. The construction will require the permanent removal of historic features including steel beams and up to 6 feet of the machinery rooms at the base of the bascule span. Removal of these character defining features of the bridge will permanently affect the integrity of the historic resource. Placement of falsework, construction staging, and other construction activities will result in visual impacts to the Arlington Memorial Bridge and surrounding historic landscapes for up to two years. The concrete arch spans, bridge piers, bridge deck, sidewalks, granite curbs, bridge railings, and lighting will be repaired under the selected alternative, and the steel fascia on the bascule span will be removed and rehabilitated offsite. Following completion of construction of the new bascule span, the fascia will be reattached to the bascule span. These repairs will be done in accordance with the Secretary of the Interior's Standards for Rehabilitation. The Arts of War statuary and the eagle sculptures located on the ends of the

bridge will be protected in place or removed during construction and stored until they could be returned following the bridge rehabilitation. Replacement of the bascule span with a fixed span of variable depth steel girders will not be in keeping with the Secretary of Interior's Standards and will result in long-term impacts to the historic bridge. Mitigation measures for impacts to cultural resources are identified in a Programmatic Agreement executed under Section 106 of the National Historic Preservation Act (see Appendix H).

Construction activities for the rehabilitation of the Arlington Memorial Bridge will affect visitor use and experience through road and sidewalk closures, detours, and impacts to the views and vistas of the bridge and surrounding memorials, monuments, and recreational spots on the east and west sides of the Potomac River. These impacts will be temporary during the construction period and will be mitigated through park alerts and signage at and near the construction zone.

Construction activities for the rehabilitation of the Arlington Memorial Bridge will affect vehicular, pedestrian, and bicycle users for approximately 1.5 years. Lane and sidewalk closures are anticipated to be 24-hours per day, 7 days per week for the duration of the construction. Barriers will be used to block lanes and separate traffic from construction activities. Signage and flaggers will be used to safely direct vehicles through the construction zone and into proper lanes on the bridge and the circles at either end of the bridge. Full or partial closure of the bridge's vehicular travel lanes will diminish the overall vehicle capacity of the bridge during the construction period resulting in traffic delays on the bridge and on roadways surrounding the bridge. As vehicles attempt to cross the Arlington Memorial Bridge, eastbound traffic will back up onto the George Washington Memorial Parkway and Memorial Avenue, while westbound traffic will back up onto the Rock Creek and Potomac Parkway and Ohio Drive, SW. Lane closures and diminished capacity will also increase the likelihood that drivers will utilize other Potomac River crossings. The Metropolitan Washington Council of Governments models indicate that traffic will primarily be diverted to the three Potomac River crossings closest to the Arlington Memorial Bridge: the Theodore Roosevelt Memorial Bridge, the Key Bridge, and the 14th Street Bridge; while the Woodrow Wilson Bridge, the Chain Bridge, and the American Legion Bridge will see a smaller increase in traffic volumes. Maintenance of traffic plans will be instituted to provide a safe working environment for construction workers and safe passage for motorists during construction. Signage and fencing will be used to keep passersby out of construction areas, and appropriate distances will be maintained between construction workers and vehicle traffic. Detours and notifications to drivers, including emergency evacuation plans, will be coordinated with local agencies including the District Department of Transportation, Arlington County, and the Virginia Department of Transportation, and the Washington Metropolitan Area Transit Authority.

Construction activities for the rehabilitation of the Arlington Memorial Bridge will temporarily affect the federal navigation channel located directed under the bascule span. During the time that the falsework is in place, the navigation channel will be temporarily relocated under an adjacent span and boaters will be restricted from boating around or under the bascule span. According to the National Oceanic and Atmospheric Administration's navigation map, the water depth under the bascule span is approximately 16 to 22 feet. Water depths under the adjacent spans range from 22 to 25 feet. The navigation channel will return to its original span after the falsework has been removed. The temporary relocation of the navigation channel will be closely coordinated with the US Coast Guard to ensure that navigation on the Potomac River is not restricted. The adjacent span which will be used for navigation will provide boaters with similar water depth and height clearance and will not restrict the types of boats currently using the river in the vicinity of the Arlington Memorial

Bridge. The National Park Service and the Federal Highway Administration will coordinate installation of required lighting and signage to protect boaters, and an update will be posted to the USCG District 5's Local Notice to Mariners to notify boaters of the change in navigation. Non-motorized boaters, including canoes, kayaks, and crews, will be affected by repairs to the bridge piers and in-water staging areas. Construction activities and staging areas will restrict boater access, and non-motorized boaters may need to use arches used by motorized boats. This could result in increased boat congestion and possible boating conflicts on this portion of the river. The National Park Service and the Federal Highway Administration will coordinate with the Potomac River Safety Committee and local marinas and rowing clubs regarding access restrictions and hazards during construction. Under the existing bascule span will be replaced with a fixed span. Although the bascule span of the Arlington Memorial Bridge was originally designed to open for large boats, the construction of other, lower, bridges in the area negated the need to open the span. Measures were put in place to seal the span, and it has not opened since the 1960s. The Arlington Memorial Bridge is listed on National Oceanic and Atmospheric Administration navigation maps as a fixed span bridge with a vertical clearance of 30 feet. The new fixed span will have the same vertical and horizontal clearance as the existing bascule span. Large vessels traveling from the south cannot navigate past the 14th Street Bridge Complex due to height restrictions which are lower than the Arlington Memorial Bridge. The vertical clearance of the 14th Street Bridge Complex is 18 feet. There are no marinas for motorized boats up-river of the 14th Street Bridge Complex, and there are no locations to dock or launch a large vessel between the 14th Street Bridge Complex and the Arlington Memorial Bridge. Therefore, vessels traveling on this portion of the Potomac River, and under the Arlington Memorial Bridge, are limited to those with a height under 18 feet. Given that there have been no requests for an opening since the 1960s and because vessels that require a greater vertical clearance than what is available when the bascule span is in the closed position cannot reach the Arlington Memorial Bridge, replacing the bascule span with a fixed span that provides the same vertical clearance will not result in any long-term impacts to navigation. The National Park Service will seek a new bridge permit from the US Coast Guard designating the bridge as a fixed-span bridge.

In summary, the selected alternative, Replace the Bascule Span with a New Span Comprised of Variable Depth Steel Girders, and the temporary trunnion shoring project will not have a significant impact on water quality; riverine habitat; wildlife, including threatened and endangered species; cultural resources including historic structures and cultural landscapes; visitor use and experience; transportation; and navigation or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedence were identified. Implementation of the selected alternative will not violate any federal, state, or local environmental protection law. Base on the foregoing, it has been determined that an environmental impact statement is not required for this action and thus will not be prepared.

CONCLUSION

As described above, the selected alternative (replacement of the bascule span with a new span comprised of variable depth steel girders) does not constitute an action meeting the criteria that normally requires preparation of an environmental impact statement (EIS). The selected alternative will not have a significant effect on the human environment in accordance with Section 102(2)(c) of NEPA.

Based on the foregoing, it has been determined that an EIS is not required for this project and, thus, will not be prepared.

Recommended: Alexy Romero 2/6/17  
Alexcy Romero Date  
Superintendent  
George Washington Memorial Parkway

Approved: Robert A. Vogel 2/6/17  
Robert A. Vogel Date  
Regional Director  
National Capital Region  
National Park Service

Appendix A	Mitigation Measures
Appendix B	Bridge Studies
Appendix C	Agency and Tribal Consultation
Appendix D	Environmental Assessment Comments and Responses
Appendix E	Errata Sheet
Appendix F	Non-Impairment Determination
Appendix G	Final Wetland Statement of Findings
Appendix H	Section 106 Programmatic Agreement

## **APPENDIX A**

### **MITIGATION MEASURES**

To prevent and minimize environmental impacts related to the action alternative, the National Park Service will implement best management practices and mitigation measures will be implemented during the construction and post construction phases of the project. General and resource specific best management practices and mitigation measures are listed below by impact topic. This list provides a framework for mitigation measures that will be included in the contractor's specifications; future mitigation measures could be added to this list at the discretion of the National Park Service.

Various best management practices will be adopted as part of the selected alternative and will be incorporated into design plans and specifications, providing a contractual requirement that any contractor retained for any phase of the action that will abide by the conditions and procedures identified in this document and permits. Those typical mitigation measures that could be applied are described below. The list of mitigation measures has been updated based on comments received during the public and regulatory review of the EA. The mitigation measures included below supersedes the list of mitigation measures presented in the EA. Mitigation measures will continue to be refined as the design of the project develops and as permit conditions are defined by the regulatory agencies.

#### **Water Quality**

Various best management practices such as the use of cofferdams and floating turbidity curtains will be employed as needed during construction to limit the areas affected by sediment suspension to a limited work area around the pilings and cofferdams. Erosion and sediment control measures will be put in place at the land-based staging areas to minimize runoff of sediments from the site into the Potomac River.

#### **Riverine**

Erosion and sediment controls and various best management practices such as the use of cofferdams and floating turbidity curtains will be employed as needed during construction to limit the areas affected by sediment suspension to a limited work area around the pilings and cofferdams.

Mitigation will be undertaken for impacts to submerged aquatic vegetation and to unconsolidated bottom wetlands. Mitigation for temporary impacts to unconsolidated bottom wetland areas will include restoration of the river bottom to existing elevations. Mitigation measures for temporary impacts to submerged aquatic vegetation will include restoration of the areas to pre-construction elevations and re-establishing submerged aquatic vegetation in the areas previously colonized. In addition, compensatory mitigation will be undertaken for impacts to submerged aquatic vegetation at a 2:1 ratio for all temporary and permanent impacts. The preferred alternative requires compensatory mitigation for 1.4 acres of temporary impacts and 6.0 acres of permanent impacts within the causeway/platform areas, Barge Staging Areas 1 and 2, and associated dredging area.

### **Wildlife including Rare, Threatened, and Endangered Species**

Construction fencing will be used to separate wildlife from construction zones and staging areas. Best management practices such as turbidity curtains and cofferdams can act as exclusionary devices to reduce the direct effects of the construction on fish. This includes the sound attenuation provided by cofferdams thereby reducing the decibels associated with the piling installation within the water column. In-water work will not occur between February 15th and July 1st when the Atlantic and shortnose sturgeon and other anadromous fish are in the area.

### **Historic Structures and Districts/Cultural Landscapes**

Mitigation measures for impacts to historic structures and landscapes will be undertaken in accordance with the Section 106 Programmatic Agreement.

### **Visitor Use and Experience**

Maintenance of traffic plans will be instituted to provide a safe working environment for construction workers and safe passage for motorists during construction. Signage and fencing will be used to keep passersby out of construction areas; appropriate distances will be maintained between construction workers and vehicle traffic; and lighting will be used on equipment, barges, and falsework. Notices of construction will be provided to boaters, and they will be rerouted through an adjacent bridge span, maintaining a safe distance from construction areas.

### **Transportation**

Maintenance of traffic plans will be instituted to provide a safe working environment for construction workers and safe passage for motorists during construction. Signage and fencing will be used to keep passersby out of construction areas, and appropriate distances will be maintained between construction workers and vehicle traffic. Detours, notifications to drivers, and emergency evacuation plans will be coordinated with local agencies including the District Department of Transportation, Arlington County, and the Virginia Department of Transportation, and the Washington Metropolitan Area Transit Authority.

Notices of construction will be provided to boaters, and they will be rerouted through an adjacent bridge span, maintaining a safe distance from construction areas, and lighting will be used on equipment, barges, and falsework.

### **Navigation**

Currently, a federal navigation channel is directed under the bascule span of the Arlington Memorial Bridge. During the time that the falsework (temporary support structures) is in place, the navigation channel will be temporarily relocated under an adjacent span. The navigation channel will return to its original span after the falsework has been removed. The temporary relocation of the navigation channel will be closely coordinated with the US Coast Guard to ensure that all required lighting and signage is installed. An update will be posted to the USCG District 5's Local Notice to Mariners to advise mariners of the change to the navigation channel and to any hazards associated with the

bridge construction. Notices will also be provided to marinas and local rowing organizations on the Potomac River and Anacostia River within the District of Columbia. In addition, construction activities will be coordinated with the US Army Corps of Engineers in accordance with Section 10 of the Rivers and Harbors Act of 1899.

## APPENDIX B

### BRIDGE STUDIES

#### Bridge Inspections, Studies, and Assessments

Inspection Type	Date Performed	Purpose	Findings
Utility Survey	February 2010	Identify utilities on and surrounding bridge	Utilities mapped.
Bridge Deck Study	September 2003	To assess the condition of the concrete deck	Core samples indicated moderate deterioration throughout the bridge deck with fracturing and water intrusion evident at various depths within the original concrete.
	June 2010	To assess the condition of the concrete deck	Core samples indicated moderate deterioration of the bridge deck concrete with fracturing, spalling, crumbling, and water intrusion evident.
	February 2013	Condition assessment of the bridge deck using a robotic system	The assessment was conducted using the RABIT™ Bridge Inspection Tool, a fully automated robotic system, as well as several other evaluation technologies such as ground-penetrating radar, impact echo, and ultrasonic surface wave testing. Results of the surveys indicated a high degree of deterioration, including severe delamination over the majority of the bridge deck.
	March 2015	Condition assessment of the bridge deck using a robotic system	The deck is in poor condition and is mostly delaminated or debonded.

Inspection Type	Date Performed	Purpose	Findings
Bascule Span	October 2009	Identify areas of deterioration and section loss throughout the bascule span	The sidewalks of this structure have widespread deterioration, including delamination and spalling of the concrete surface and displacement of the granite curbs. Additionally, there are issues which present a hazard for pedestrians on this highly traveled structure including misaligned sliding plate expansion joint covers and access hatches with severely corroded support framing.
	April 2011	Monitor deterioration and identify and map area of section loss or other deterioration throughout the superstructure of the bascule span	The inspection indicated that the superstructure of the bascule span was in fair condition overall with isolated areas of severe deterioration. These isolated areas include the framing for the fixed portions of the sidewalks over the bascule abutments, the bearing seats for the fixed stringers along the back of both bascule abutments, and the curb stringers on the south side of the west bascule leaf.
Bascule Span	April 2014	Monitor deterioration and identify and map area of section loss or other deterioration throughout the superstructure of the bascule span	Overall the superstructure of the bascule span was in fair to poor condition with isolated areas of severe deterioration. The deterioration of the structure continues to progress at a rapid pace.
	September 2014	Special inspection of catwalk system inside bascule span	The most severe deterioration was located in the areas adjacent to the inner trunnion posts in both leaves, where leakage occurs through the roadway/curb interface.
	April 2015	Foundation investigation of bascule span abutments	Concluded that the bascule span abutments are adequate to support the bascule span.

Inspection Type	Date Performed	Purpose	Findings
Trunnion Posts	February 2011	Obtain data to evaluate current condition of trunnion posts	Significant amount of visible corrosion was identified on the inner trunnion members as well as spalled concrete and poor drainage conditions at each trunnion post. Ultrasonic testing indicated severe section loss of the steel plates that make up the inner trunnion posts.
	January 2014	More in-depth study to evaluate current condition of trunnion posts	Findings from the 2011 were confirmed. Additional debris was cleaned from access points which indicate continuing deterioration.
Underwater inspection	December 2012	Examination of bridge substructure from waterline to channel bottom	Inspected substructures were found to be in fair condition. Several piers were observed to have vertical cracking, section loss mostly along construction joints, spalling, scaling, and impending mortar patch failure. Serious structural deficiencies observed included scour pockets, tremie seal undercutting and exposure at multiple piers and abutments, and larger than hairline cracks (greater than 1/8") on at least one abutment.
In-depth Inspection	April 2013	In-depth assessment of all portions of the bridge	Bridge is in poor condition overall. Interior trunnion posts exhibit significant corrosion. Sidewalks have widespread deterioration. Widespread deterioration of the superstructure and substructure concrete continues to be a problem and there are widespread areas of patching and rutting throughout the asphalt road surface.
	April 2015	In-depth assessment of all portions of the bridge	Bridge is in poor condition overall. Framing for sidewalks is severely deteriorated as are the inner trunnion posts. Several recommendations are made in order to slow the rate of deterioration.

Inspection Type	Date Performed	Purpose	Findings
Other Bridge Components	November 2013	Assess quality and monitor deterioration of other arches and underpasses of bridge	One of two cores was found to have inadequate compressive strength.
	August 2013	Assess quality and monitor deterioration of west abutment of bascule span	Compressive strength of core was acceptable.
	February 2014	Assess quality and monitor deterioration of east abutment wall of bascule span and abutment 1 - channel side	Two of five cores were found to have inadequate compressive strength.

### Constructability Review Workshop

In January 2014, FHWA-Eastern Federal Lands Highway Division (EFLHD) held a three-day Constructability Review Workshop with engineering experts from around the country to assess the feasibility of construction associated with rehabilitation of the Arlington Memorial Bridge. Rehabilitation of the bridge involves many complex issues including the historic importance of the bridge and its features; the complex engineering design of the bridge; and the need to maintain access to the bridge for pedestrians, bicyclists, vehicles, and special events. The workshop focused on construction phasing, maintenance of traffic (including pedestrian and bicycle), and site constraints and other construction challenges associated with this unique bridge. Engineers provided insight on construction methods for repairing or replacing the bascule span trunnion posts, deck construction options, and methods to reduce construction duration, minimize traffic impacts, etc. Following the workshop, FHWA-EFLHD provided a Constructability Review Summary Report that included updated cost, construction duration, lane closure/full bridge closure durations, and maintenance life cycle estimates for each preliminary alternative. Possible sequences of construction were also made available as a part of the workshop summary report.

### Value Analysis

The NPS and FHWA held a Value Analysis (VA) workshop in February 2014 for the Arlington Memorial Bridge project that was facilitated by Kirk Value Planners. The purpose of the VA was to identify the alternative with the most value for the lowest cost through team consensus using the Choosing By Advantages (CBA) evaluation method; seek ideas to help maximize the value improvements of the project; and review/discuss the key focus areas of the project. Using the CBA evaluation method, the team identified Alternative 4 (now renamed Alternative 3) – Rehabilitate the

Existing Bascule Span in Place as offering the highest total importance of advantages at the lowest cost (both initial and life cycle), as compared to the other alternatives included in the VA.

### **Historic Preservation Study**

In October 2014, the NPS hired Quinn Evans Architects to perform a Historic Preservation Study for the rehabilitation of the Arlington Memorial Bridge. The study considered the impacts of each alternative to determine the potential effects on character-defining features that make the bridge historically significant. The study included the review of background documents to provide context for understanding the historical significance of the bridge, including the Historic Structures Report completed for the bridge in 1986, and updated Historic American Engineering Record (HAER) documentation completed by NPS in 2014. In addition, planning and design studies were reviewed to develop knowledge about the technical and constructability issues associated with the alternatives, including the Constructability Review Summary Report and the VA report. A site visit was also conducted.

The Historic Preservation Study culminated in a report that summarized the key historical elements of the bridge, outlined which features would be retained/replaced/lost under each alternative, and discussed the degree to which the integrity of the bridge would be impacted under each alternative. The study stated that Alternative 4 – Rehabilitate the Existing Bascule Span in Place preserves the greatest amount of the original material and best preserves the memorial character and integrity of the Arlington Memorial Bridge, as well as offers cost and constructability advantages over the other alternatives. The study concluded that Alternative 4 (now renamed Alternative 3) – Rehabilitate the Existing Bascule Span in Place best meets the stated goals of the project.

It should also be noted that due to the findings of the Historic Preservation Study and the results of the VA Workshop, Alternative 2 – Replace the Existing Bascule Span with a New Concrete Arch Span to Match the Approach Spans, has been dismissed from further analysis by NPS and FHWA.

### **Traffic Studies**

FHWA and the Metropolitan Washington Council of Governments (MWCOG) Transportation Planning Board (TPB) are in the process of modeling additional traffic scenarios for the Arlington Memorial Bridge project. Initially, traffic modeling efforts included projected traffic volume increases throughout the regional transportation network, particularly focusing on the other Potomac River crossings, if the Arlington Memorial Bridge were completely closed to traffic during construction. The initial analysis was also conducted using a partial closure scenario that assumed one eastbound and one westbound lane closed to traffic during construction. In 2014, NPS and FHWA requested MWCOG-TPB supplement the analysis by revising the traffic model to project traffic volume increases using a three lane closure scenario. This effort is ongoing as of the date of this letter.

## APPENDIX C

### AGENCY AND TRIBAL CONSULTATION

#### Section 7 Consultation

##### National Marine Fisheries Service – Office of Protected Resources

On November 6, 2012, the National Park Service consulted with the National Marine Fisheries Service Office of Protected Resources via teleconference to obtain guidance in regards to the shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) as it pertains to compliance with Section 7 of the Endangered Species Act for the Arlington Memorial Bridge project. The meeting included members of the National Park Service, Federal Highway Administration, and the National Marine Fisheries Service Office of Protected Resources. The National Oceanic and Atmospheric Administration indicated that the federally listed endangered shortnose sturgeon and the Chesapeake Bay Distinct Population Segments of the Atlantic sturgeon are known to occur in the Potomac River. The National Oceanic and Atmospheric Administration provided the National Park Service with valuable technical assistance and species information that helped the team to identify appropriate conservation measures to avoid and/or minimize impacts to the shortnose and Atlantic sturgeon during the proposed rehabilitation of the Arlington Memorial Bridge.

On June 18, 2015, the National Park Service sent a letter to the Office of Protected Resources to request concurrence that the proposed rehabilitation of the Arlington Memorial Bridge is not likely to adversely affect either the shortnose or Atlantic sturgeon based on the implementation of appropriate mitigation measures. The letter provided details regarding the proposed methods to be used during construction, particularly those methods that will affect the Potomac River and the sturgeons' ability to migrate through the project area. The letter also detailed the National Park Service's proposed measures to avoid and/or minimize potential impacts to the shortnose and Atlantic sturgeon. In a response letter dated October 15, 2015, the Office of Protected Resources concurred with the National Park Service's finding that, with the implementation of appropriate mitigation measures, the proposed rehabilitation of the Arlington Memorial Bridge is not likely to adversely affect either the shortnose or Atlantic sturgeon.

The National Park Service will reinitiate Section 7 consultations with the National Marine Fisheries Service during the Design Process when information is available on the extent of pile driving, dredging, vessel traffic and other construction features/methodologies that could have effects on the shortnose and Atlantic sturgeon or on any proposed or designated critical habitat. The National Park Service and the Federal Highway Administration will design the project to minimize effects on sturgeon.

### **US Fish and Wildlife Service**

On February 19, 2016, the National Park Service requested a project review by the US Fish and Wildlife Service Chesapeake Bay and Virginia Field Offices using the Information, Planning, and Conservation (IPaC) System to initiate informal consultation in accordance with Section 7 of the Endangered Species Act. Both field offices identified no federally listed species within the project area.

### **Virginia Department of Conservation and Recreation – Natural Heritage Program**

To comply with Virginia's endangered species regulations, the National Park Service submitted an Information Services Order Form to the Virginia Department of Conservation and Recreation's Natural Heritage Program on March 4, 2015 to request a project review for natural heritage occurrences including state-listed rare plants, animals, and significant communities, etc. in the vicinity of the Arlington Memorial Bridge. In a letter dated August 7, 2015, the Virginia Department of Conservation and Recreation responded stating there was a potential for the Northern Long-eared bat (*Myotis septentrionalis*) to occur within the project area and recommended consultation with the US Fish and Wildlife Service to determine potential impacts. Ongoing consultation with US Fish and Wildlife Service has revealed no potential for the project to impact the Northern Long-eared bat.

### **District Department of Energy and Environment**

On June 18, 2015, the National Park Service sent a letter to the District Department of Energy and Environment to request a project review to determine the potential for any plant or animal species of concern and/or any unique habitat that may occur in the project area. In a letter dated September 2, 2015, District Department of the Environment responded that "the proposed project area does not harbor any species listed by the federal Endangered Species Act, any species classified by NatureServe as G1 (critically imperiled), any species classified by NatureServe as G2 (imperiled), nor any ecologically sensitive communities."

### **Section 106 Consultation**

In accordance with Section 106 of the National Historic Preservation Act, consultation letters were sent to the Advisory Council on Historic Preservation, the District of Columbia Historic Preservation Office, and the Virginia Department of Historic Resources on December 6, 2012. The DC State Historic Preservation Officer provided a written response on January 15, 2015, and a written response was received from the Virginia Department of Historic Resources on December 17, 2012. Copies of these correspondences are provided in the Environmental Assessment.

Understanding that consultation is of critical importance to the success of the project, the National Park Service scheduled a meeting with the Advisory Council on Historic Preservation and the State Historic Preservation Offices of Washington, DC and Virginia on March 14, 2013. This meeting began with a presentation by Federal Highway Administration staff to provide the group with an understanding of the deterioration issues of the bridge structure. Following the presentation, topics of discussion included the delineation of the Area of Potential Effect, the need to fully consider all

options for the project from preservation to replacement, and the need to ensure public participation in the planning process. Meeting attendees also discussed the project schedule and acknowledged that the National Environmental Policy Act and Section 106 compliance will follow two separate but parallel paths.

On August 8, 2013, the National Park Service sent letters to potential consulting parties inviting them to participate in the Section 106 process for the proposed rehabilitation of the Arlington Memorial Bridge. Approximately 50 consulting party invitation letters were sent to agencies, organizations, and individuals whom the National Park Service identified as having a potential interest in the project. Twelve responses were received accepting the National Park Service's invitation. Agencies and organizations who accepted the invitation to participate as consulting parties include the National Trust for Historic Preservation; the DC Historic Preservation Office; the Arlington County Department of Community Planning, Housing & Development; the Arlington County Manager's Office; the Virginia Department of Historic Resources; the US Commission of Fine Arts; the Arlington Historical Society; the National Capital Planning Commission; the American Institute of Architects, Northern Virginia Chapter; the Arlington National Cemetery; and the Virginia Department of Planning and Zoning. The National Park Service hosted a meeting with the consulting parties at the George Washington Memorial Parkway headquarters on September 26, 2013. The meeting included an overview of the project planning status, discussion of the project purpose and need, refined alternative concepts, and significance of the historic property. Meeting participants were also invited to tour the bridge's bascule span and operator's area. In August 2015, the National Park Service sent a letter to all consulting parties providing an update on the Arlington Memorial Bridge project and studies that had been conducted since the 2013 consulting parties' meeting.

The National Park Service submitted a Finding of Adverse Effect to the District Historic Preservation Office and the Virginia State Historic Preservation Office in accordance with Section 106 of the National Historic Preservation Act in August 2016. On August 31, 2016, the National Park Service held a Consulting Parties meeting to discuss the Finding of Adverse Effect and to discuss mitigation measures. A Programmatic Agreement detailing the necessary avoidance, minimization, and mitigation measures was signed on February 6, 2017 and is included in this Finding of No Significant Impact in Appendix H.

### **Tribal Consultation**

The National Park Service sent a letter to the Delaware Nation on May 8, 2014 to initiate consultation with the Indian tribe. In a letter dated September 17, 2014, the Delaware Nation Cultural Preservation Office stated that the location of the project does not endanger cultural or religious sites and that the project should continue as planned; however, if archeological sites or objects are uncovered, construction should stop until the appropriate state agencies and tribal organizations are consulted. The National Park Service sent a letter to the Pamunkey Indian Tribe on November 14, 2016 to initiate Section 106 consultation; no response was received.

## **Section 401/404 and Section 10 Consultation**

On April 8, 2013, the NPS initiated consultation with the US Army Corps of Engineers through the project scoping process. On January 15, 2015, the National Park Service and Federal Highway Administration held a conference call with the US Army Corps of Engineers and the US Coast Guard to discuss project approvals and permitting. The US Army Corps of Engineers indicated that a permit will be needed for any dredging activities greater than 500 square feet. The US Army Corps of Engineers will provide a formal determination on their decision to issue permits once they receive a permit application.

The National Park Service and Federal Highway Administration will continue consultation with the US Army Corps of Engineers and the District Department of Energy and Environment on potential permit and mitigation requirements for impacts to the Potomac River as a result of the Arlington Memorial Bridge rehabilitation.

## **US Coast Guard Consultation**

On April 8, 2013, the National Park Service initiated consultation with the US Coast Guard through the project scoping process. On January 15, 2014, the National Park Service and Federal Highway Administration held a conference call with the US Coast Guard and US Army Corps of Engineers to discuss project approvals and permitting. The US Coast Guard informed the National Park Service that, despite the fact that the Arlington Memorial Bridge has not opened since the 1960s and cannot presently open, the bridge is currently permitted as a drawbridge. Any rehabilitation efforts which resulted in the bridge becoming a permanently fixed bridge will require a US Coast Guard permit. In addition, any construction activities that could impact navigation on the Potomac River must be coordinated with the US Coast Guard.

On June 12, 2014, the National Park Service invited the US Coast Guard to participate as a cooperating agency in the National Environmental Policy Act and Section 106 processes for the Arlington Memorial Bridge rehabilitation. The US Coast Guard accepted this invitation in a letter dated July 18, 2014.

The National Park Service and Federal Highway Administration will continue consultation with the US Coast Guard on potential permit and mitigation requirements for impacts to the Arlington Memorial Bridge and navigation of the Potomac River.

## **Transportation**

The National Park Service and Federal Highway Administration have conducted on-going coordination with local and regional transportation authorities including the Metropolitan Washington Council of Governments Transportation Planning Board, the DC Department of Transportation, the Virginia Department of Transportation, Arlington County, and the Washington Metropolitan Area Transit Authority.

The Federal Highway Administration engaged the Metropolitan Washington Council of Governments Transportation Planning Board to assess the impacts to regional traffic from full and partial bridge closures during the rehabilitation of the Arlington Memorial Bridge. The

Transportation Planning Board provided analysis of various closure scenarios as well as no action scenarios. This analysis was used to inform the impact analysis in this Environmental Assessment.

On October 23, 2012, Federal Highway Administration hosted a meeting with the transportation departments to introduce the project, discuss the bridge condition, provide an overview of alternatives, and begin discussions on transportation impacts from construction activities. On May 5, 2015, Federal Highway Administration hosted a second meeting to discuss construction impacts and maintenance of traffic during construction, including impacts to emergency evacuation routes and methods for informing the public about on-going construction and detours. Lastly, on June 2, 2015, Federal Highway Administration met with the Washington Metropolitan Area Transit Authority to discuss the implementation of weight restrictions on the bridge and detours to be used by the Washington Metropolitan Area Transit Authority buses until the rehabilitation of the bridge is complete.

## APPENDIX D

### ENVIRONMENTAL ASSESSMENT COMMENTS AND RESPONSES

As part of the National Environmental Policy Act process, the National Park Service made the Environmental Assessment for the Arlington Memorial Bridge rehabilitation available for public and regulatory review from April 15, 2016 through May 16, 2016. The public, agencies, and stakeholders were invited to submit comments on the project during this time period.

On April 13, 2016, the National Park Service mailed a newsletter to nearly 400 individuals to inform them of the availability of the Environmental Assessment for public review and comment. Hardcopies and electronic copies of the Environmental Assessment were sent to over 40 agencies and stakeholder organizations, and hardcopies of the Environmental Assessment were also distributed to several District libraries to be made available for public review. The National Park Service issued a press release to area wide news organizations, and the project page on the PEPC website was updated to notify interested members of the public of the availability of the Environmental Assessment. Members of the public were invited to submit comments on the project, alternatives, and potential impacts electronically through PEPC or via U.S. mail by sending written comments to the Office of the Superintendent of the George Washington Memorial Parkway.

### COMMENTS

A total of 230 pieces of correspondence from five states and the District of Columbia were received during the public scoping period. Individuals living within the vicinity of the project area (Virginia and the District of Columbia) submitted 217 (approximately 94.3%) of those correspondence pieces. The majority of the comments received during initial scoping expressed interest in including a dedicated bicycle lane as part of the project.

Five federal government agencies provided comments on the project, including the National Oceanic and Atmospheric Administration Habitat Conservation Division, the National Capital Planning Commission, the U.S. Army Corps of Engineers, and the U.S. Environmental Protection Agency. Five state and local government agencies provided comments on the project, including: the Department of Energy and Environment, the District Department of Transportation, the Virginia Department of Conservation and Recreation, and the Virginia Department of Historic Resources, and the Arlington County Division of Transportation. DOEE provided comments from three separate divisions: the Air Quality Division, the Water Quality Division, and the Watershed Protection Division.

Responses to concerns raised through the public comment process are provided below.

AL2000 Alternatives: Elements Common to all Alternatives – Support safer design to improve driver, pedestrian, and bicycle safety.	
Concerns	Action(s) taken to resolve the issue/concern
<p>Commenters encouraging a design that will safely accommodate pedestrians, bicyclists, and motorists.</p> <p><b>Representative Quote:</b> “I strongly urge that you modify the current plan to include bicycle lanes on the Memorial Bridge Rehabilitation project.”</p> <p>Correspondence ID: 9 Comment ID: 403219</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Removal of vehicular traffic lanes for use by bicyclists will have substantial impacts on traffic flow resulting in congestion and air quality issues.</p>
AL4000 Alternatives: New Alternatives or Elements – Improve pedestrian/bicycle facilities on and approaching the bridge.	
Concerns	Action(s) taken to resolve the issue/concern
<p>Commenters suggested including a dedicated bike lane in each direction on the bridge.</p> <p><b>Representative Quote:</b> “I strongly urge that you modify the current plan to include bicycle lanes on the Memorial Bridge Rehabilitation project.”</p> <p>Correspondence ID: 45 Comment ID: 520113</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Removal of vehicular traffic lanes for use by bicyclists will have substantial impacts on traffic flow resulting in congestion and air quality issues.</p>

<p>A few commenters do not support protected bike lanes.</p> <p><b>Representative Quote:</b> “I do not believe adding fully protected bicycle lanes as part of the rehabilitation of the Arlington Memorial Bridge is necessary. Reducing the number of lanes for vehicular traffic to add bicycle lanes is a bad idea. The current width of the current sidewalks has more than satisfied my commuting and recreational biking needs since November 2002.”</p> <p>Correspondence ID: 143 Comment ID: 520339</p>	<p>Comment noted.</p>
<p>AL4500 Alternatives: New Alternatives or Elements – Miscellaneous</p>	
<p>Concerns</p>	<p>Action(s) taken to resolve the issue/concern</p>
<p>Examine materials other than exposed aggregate for the sidewalk.</p> <p><b>Representative Quote:</b> “Furthermore, the BAC suggests that NPS look at materials other than exposed aggregate for the sidewalk surface. Aggregate gets slippery when wet and can cause slip and falls and bicycle crashes.”</p> <p>Correspondence ID: 1 Comment ID: 520014</p>	<p>The proposed action seeks to minimize impact to the design and appearance of the historic bridge, and changes to the sidewalk material will result in an adverse impact to the historic resource.</p> <p>Alternative sidewalk materials will be considered in the final design. Sidewalks could be modified for improved traction using one of the following methods:</p> <ol style="list-style-type: none"> <li>1. The sidewalk surface could be diamond ground after placement to give it a slightly textured surface.</li> <li>2. An epoxy overlay and broadcast aggregate could be applied over the surface to provide traction.</li> </ol>
<p>Support closing the bridge down completely during construction.</p> <p><b>Representative Quote:</b> “...closing the bridge down completely is the fastest way to rehab it.”</p> <p>Correspondence ID: 4 Comment ID: 520027</p>	<p>The National Park Service will weigh environmental impacts, duration of construction, construction techniques, and cost to determine if the bridge will remain open during construction or be closed for all or a portion of the construction period.</p>

<p>Make the bridge exclusively for pedestrian/bicycle use.</p> <p><b>Representative Quote:</b> “I’d be in favor of closing the bridge to car traffic and making it a dedicated bike/pedestrian pathway!”</p> <p>Correspondence ID: 124 Comment ID: 520310</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Closure of the bridge to vehicular traffic will have substantial impacts on regional traffic patterns and create congestion on other area roadways and bridges over the Potomac River.</p>
<p>Install a balcony along the bridge.</p> <p><b>Representative Quote:</b> “Opportunities exist to provide an alternative interpretive experience for the structure and engineering of the original bridge. I will ask that my earlier submissions be included in any considerations. I hope that my balcony concept for the middle of the bridge will be used in the final design.”</p> <p>Correspondence ID: 206 Comment ID: 520535</p>	<p>The Arlington Memorial Bridge is listed in the National Register of Historic Places (NRHP) for its status as a memorial and for its architectural and engineering design. The proposed action seeks to minimize impact to the design and appearance of the historic bridge.</p>
<p>Include a traffic counting station.</p> <p><b>Representative Quote:</b> “The District also recommends a permanent traffic counting station be a part of this project.”</p> <p>Correspondence ID: 211 Comment ID: 520599</p>	<p>A permanent traffic counting station will be installed as part of the Arlington Memorial Bridge project.</p>
<p>Widen the Mt. Vernon Trail underpass.</p> <p><b>Representative Quote:</b> “As the bridge is undergoing renovation, the Mt. Vernon Trail (MVT) underpass also should be widened to about 15 feet.”</p> <p>Correspondence ID: 216 Comment ID: 520616</p>	<p>Modifications to the trail system off of the Arlington Memorial Bridge are not included as part of the proposed action.</p>
<p><b>AL6000 Alternatives: New Alternatives or Elements – Mitigation and Minimization Measures</b></p>	
<p><b>Concerns</b></p>	<p><b>Action(s) taken to resolve the issue/concern</b></p>

<p>Commenter suggested coordination regarding appropriate mitigation for the removal of the bascule span in accordance with Section 106 of the National Historic Preservation Act.</p> <p><b>Representative Quote:</b> “If further investigation were to result in the conclusion that removal of the bascule span is unavoidable because of severe deterioration, mitigation will need to be appropriate for the loss of the bascule span. We request an opportunity to consult specifically regarding the range of appropriate mitigation that might be included in a Section 106 agreement. In our view, it will be especially important for mitigation to address the stewardship of other historic bridges owned by the National Park Service. As the National Trust suggested at the April 20th consulting parties meeting, mitigation for the permanent loss of a major character defining feature of Arlington Memorial Bridge should be crafted to ensure that other important bridges are not neglected. We strongly encourage the National Park Service to consider this mitigation option as consultation continues.”</p> <p>Correspondence ID: 223 Comment ID: 520679</p>	<p>The National Park Service will work with the National Trust for Historic Preservation and other consulting parties to identify mitigation measures. A Programmatic Agreement detailing the necessary mitigation and minimization measures will be completed with and signed by the necessary parties prior to the final decision document.</p>
<p>Utilize cofferdams, turbidity curtains, and other BMP, as well as time of year restrictions, to minimize impacts to fish.</p> <p><b>Representative Quote:</b> “Incorporation of best management practices (BMPs) such as the use of cofferdams and floating turbidity curtains to limit the area affected by the suspension of sediment around pilings and cofferdams and to exclude fish from construction areas.”</p> <p>Correspondence ID: 229 Comment ID: 520720</p>	<p>As noted on page 138 of the Environmental Assessment, the bridge rehabilitation work associated with Alternative 1B will require the installation of cofferdams around bridge piers, and turbidity curtains will be used to minimize the disturbances and to prevent fish from entering the construction areas.</p>

<p>Temporary fill and structures should be avoided and minimized.</p> <p><b>Representative Quote:</b> “As the bridge is undergoing renovation, the Mt. Vernon Trail (MVT) underpass also should be widened to about 15 feet.”</p> <p>Correspondence ID: 220 Comment ID: 520640</p>	<p>Widening the Mt. Vernon Trail under the Arlington Memorial Bridge will require demolition and reconstruction of the existing bridge arch. There is not sufficient width beneath the arch to accommodate the vehicular travel lanes of the George Washington Memorial Parkway and Washington Boulevard and a wider trail. The trail under the arch is separated from vehicular traffic by a guardrail and railing.</p>
<p>Minimize or mitigate impacts to SAV.</p> <p><b>Representative Quote:</b> “In addition, the placement of filter fabric and fill material will likely have greater impacts on SAV than installation of temporary docks and work platforms, given the weight of fill material on existing SAV beds. When possible, we recommend use of docks and work platforms instead of construction causeways to minimize impacts to existing SAV beds.”</p> <p>Correspondence ID: 229 Comment ID: 520728</p>	<p>Comment noted. The National Park Service and the Federal Highway Administration will consider the environmental impacts of causeways along with engineering requirements in determining the appropriate construction methodology.</p>
<b>AQ1000 Air Quality: Impact of Proposal and Alternatives</b>	
<b>Concerns</b>	<b>Action(s) taken to resolve the issue/concern</b>

<p>Keep the bridge to 4 lanes to lower emissions/air pollution.</p> <p><b>Representative Quote:</b> “Air quality impacts were dismissed from consideration because the scope of study is limited to construction activities related to rehabilitation of the bridge. The scope does not consider the change from existing bridge conditions to a rehabilitated condition. Today, the bridge is restricted to four vehicle lanes with a maximum bridge load of 10 tons due to structural concerns. A full rehabilitation of the bridge will restore six vehicle lanes, effectively adding tens of thousands of vehicle trips per day to this corridor and creating significantly higher emissions than experienced today. Additionally, after rehabilitation, the weight limit will likely be lifted, further adding heavy diesel vehicles and their emissions to the surrounding areas. Limiting the scope of analysis to construction activities, while ignoring the conditions of the past two years, omits essential data from the environmental assessment. The Environmental Assessment should use vehicle trip data from 2015 after the bridge was restricted to 4 travel lanes.”</p> <p>Correspondence ID: 185 Comment ID: 520448</p>	<p>The year 2011 was selected as the baseline year for the travel demand forecasting analysis as being representative of the typical transportation system supply and demand situation which existed at that time. The temporary closure of two of the six permanent travel lanes on the bridge was an action taken primarily for safety considerations impacting all users of the bridge. This temporary action is not the new “normal” situation for this major Potomac River crossing. The “normal” roadway cross section for the Arlington Memorial Bridge, both today and in the future, is three travel lanes in each direction at all times, for a total of six vehicular travel lanes.</p>
<p>Commenter agrees that impacts to air quality will be minor.</p> <p><b>Representative Quote:</b> “AQD agrees that impacts on air quality, although detectable, will be minor for the following reasons: the project does not involve terrestrial roadway construction; the project footprint is over open water with no nearby residential dwellings; and odorous emissions from the asphalt hot-mix will likely readily dissipate due to atmospheric dilution over open water.”</p> <p>Correspondence ID: 218 Comment ID: 520620</p>	<p>Comment noted.</p>
<p>CR4000 Cultural Resources: Impact of Proposal and Alternatives</p>	
<p>Concerns</p>	<p>Action(s) taken to resolve the issue/concern</p>

<p>Providing dedicated bicycle/pedestrian facilities will allow users to better experience the historic nature of the bridge.</p> <p><b>Representative Quote:</b> “This bridge and its surrounding planning area are invaluable historic and natural resources. By encouraging pedestrian and bicycle traffic for commuters, recreational users, and tourists, you fulfill the NPS mission of 'preserving and promoting natural and historic resources' rather than becoming subservient to demands to build roads.”</p> <p>Correspondence ID: 108 Comment ID: 520252</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Removal of vehicular traffic lanes for use by bicyclists will have substantial impacts on traffic flow resulting in congestion and air quality issues.</p>
<p>Include the USACE as a co-consulting agency or signatory for Section 106.</p> <p><b>Representative Quote:</b> “. . .in your updated letter to Section 106 Consulting Parties received by the Corps on March 17, 2016, you have identified that your preferred alternative will be Alternative 1 B, which will result in an affect to historic properties. Since the Corps will regulate the proposed temporary construction activities and structures associated with the rehabilitation of the bridge, any adverse effects to cultural resources will need to be addressed in the Corps permitting process. We recommend that the National Park Service either include the Corps as a co-consulting agency for Section 106 of the National Historic Preservation Act or that the Corps be included as a signatory on any memorandum of agreement that may result from consultation to avoid the need for additional consultation during the Corps permit review process.”</p> <p>Correspondence ID: 220 Comment ID: 520643</p>	<p>The National Park Service will include the U.S. Army Corps of Engineers as a concurring party for Section 106 of the National Historic Preservation Act.</p>

Consider an alternative to the Memorial Circle as a staging area that will be less impactful to viewsheds from surrounding historic properties.

**Representative Quote:** “The Environmental Assessment considers the use of Memorial Circle to constitute "a short-term moderate adverse impact to cultural resources" due to the temporary impairment of the viewsheds from Arlington House, Arlington National Cemetery, along the Memorial Avenue Corridor, the George Washington Memorial Parkway, and Lady Bird Johnson Park (Page 160). However, we believe that this assessment does not capture some of the more intangible affects that will be a consequence of utilizing Memorial Circle as a construction staging area even temporarily. For instance, during the period Memorial Circle is a staging area visitors to Arlington National Cemetery, many of whom will only make the trip once in their lifetimes, will be deprived of the incredible vista extending from the cemetery, across Arlington Memorial Bridge, to the Lincoln Memorial. Additionally, staging construction materials and equipment at the gateway entrance to our nation's most hallowed ground, Arlington National Cemetery, may be considered not only unsightly, but disrespectful. For these reasons we request that NPS consider an alternative to Memorial Circle to use as a staging area.”

Correspondence ID: 221 Comment ID: 520654

The National Park Service has revised the proposed Memorial Circle, and not the area within the Circle, staging area to utilize areas on the north and south side of the Circle to minimize impacts to Memorial Avenue and to the views and experience of visitors to Arlington National Cemetery and surrounding destinations.

<p>Alternatives 1A, 1B, and 2 do not meet the Secretary of the Interior's Standards for rehabilitation due to the bascule span replacement.</p> <p><b>Representative Quote:</b> "Clarification of "Rehabilitation and Repair." The Environmental Assessment characterizes the undertaking as "rehabilitation and repair" to Arlington Memorial Bridge. The Secretary of the Interior's Standards (Standards) for Rehabilitation defines "rehabilitation" as "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values" (bolding added). Considering all but one alternative, Alternative 3, proposes to replace the bascule span (including the Preferred Alternative 1B) an important character-defining feature of the historic bridge, a legitimate argument may be made that "rehabilitation" of the bridge will not result from this undertaking as defined by the Standards."</p> <p>Correspondence ID: 221 Comment ID: 520655</p>	<p>The Environmental Assessment does not conclude that replacement of the bascule span is in keeping with the Secretary of the Interior Standards for Rehabilitation. The Assessment of Effects, prepared in compliance with Section 106 of the National Historic Preservation Act, for the project documents that replacement of the bascule span will not be in keeping with the Secretary of the Interior Standards.</p>
<p>"Refurbished" is not a recognized treatment option.</p> <p><b>Representative Quote:</b>  "Refurbished/Rehabilitated. In the narrative for Alternative 1B on page 44, the word "refurbished" is used with respect to what will occur to the exterior face of the bascule span. Strictly speaking, "refurbished" is not a recognized treatment option under the Standards. "Rehabilitated" is more appropriate in this context."</p> <p>Correspondence ID: 221 Comment ID: 520658</p>	<p>An errata to the Environmental Assessment has been added revising the text to read "rehabilitated."</p>

AMB may qualify as a National Historic Landmark.

**Representative Quote:** “National Historic Landmark Status. It is DHR's belief that Arlington Memorial Bridge may qualify as a National Historic Landmark. Has this possibility been taken into consideration and, if so, how has NPS fulfilled its responsibilities under Section 110(f) of the National Historic Preservation Act, as amended, and 36 CFR § 800.10?”

Correspondence ID: 221 Comment ID: 520657

The Arlington Memorial Bridge was originally listed in the National Register of Historic Places in 1980 and is significant in architecture, engineering, landscape architecture and art (sculpture). An updated National Register nomination is currently being prepared that determines the bridge is significant under Criterion A and C for Politics & Government, Art (sculpture), Architecture, Engineering, and Landscape Architecture with a Period of Significance 1901 to 2000.

The Arlington Memorial Bridge may qualify as a National Historic Landmark. The NPS NHL staff have explored the possibility of NHL designation for the bridge and has determined that it is a possible candidate and thus pursuing a nomination would be warranted. The project's Programmatic Agreement contains mitigation regarding this possibility.

Replacement of the Bascule span (Alternatives 1A, 1B, and 2) should be determined to be an Adverse Effect.

**Representative Quote:** "Definition of Effect. Under Section 106 of the National Historic Preservation Act and its implementing regulation codified at 36 CFR Part 800, impacts to historic properties are determined to be the following: No Historic Properties Affected, No Adverse Effect, and Adverse Effect. The gradation of Adverse Effect as defined in the "Impact Threshold" section of the Environmental Assessment on Page 148 is something not recognized in Section 106. While we understand that the Environmental Assessment is prepared in accordance with National Environmental Policy Act, a project alternatives considered to have a Minor, Moderate or Major Adverse Impact to the Arlington Memorial Bridge will, under Section 106, all be considered an Adverse Effect, although, as defined in the Environmental Assessment a "Minor Adverse Impact" appears to correspond to a Section 106 determination of No Adverse Effect. Additionally, in Section 106 the effects of an undertaking as a whole are considered to produce a single effect determination unlike in the current Environmental Assessment where each individual aspect of the project is evaluated and an effect determination made. So, for example, when a change in circulation patterns for Alternative 1B is judged to have a "short-term moderate adverse impact" to historic properties, under Section 106 the entire undertaking will be determined to be an Adverse Effect"

Correspondence ID: 221 Comment ID: 520659

The definition for "Moderate Intensity" the National Park Service used for the Environmental Assessment is: "Adverse: impacts to an NRHP-eligible or listed building, structure, or district will change the character-defining features of the resource, but does not diminish the integrity of the resource to the point of being ineligible".

A Programmatic Agreement may be executed among the National Park Service and applicable SHPO and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b) 'Measures identified in the Programmatic Agreement to minimize or mitigate adverse impacts and/or preserve important information.'

Alternative 1B does not diminish the integrity of the resource to the point of being ineligible for listing in the NRHP. A Programmatic Agreement detailing the necessary mitigation and minimization measures will be completed with and signed by the necessary parties prior to the final decision document.

There are several tribes actively consulting in Virginia that should be contacted.

**Representative Quote:** “Please note that the Delaware Tribe of Indians is actively consulting on several projects in Virginia and has indicated the entire state is its area of interest. Further, the Catawba Indian Nation is also actively consulting in Virginia, including with the National Park Service at George Washington's Boyhood Home (Ferry Farm) in Stafford County and in the Green Springs National Historic Landmark District in Louisa County, and lists Arlington County as an area of interest. Finally, as you are aware, Virginia now has its first federally recognized tribe, the Pamunkey Tribe.”

Correspondence ID: 221 Comment ID: 520661

The National Park Service has consulted with the Delaware Nation and the Pamunkey Tribe. To date, the National Park Service has not received a response from either tribe. The Catawba Nation was not consulted because their ancestral lands did not extend to the Arlington Memorial Bridge project area.

Environmental Assessment does not address archaeological potential of mitigation areas.

**Representative Quote:** “Archaeological Resources. On page 32 it is stated that there is limited potential for the presence of terrestrial or submerged archaeological resources in the vicinity of the Arlington Memorial Bridge within the proposed staging and construction areas. We do not disagree with that assessment. However, the Environmental Assessment does not address the potential effects to archaeological sites resulting from the permit and mitigation requirements of the Army Corps of Engineers as a result of this project. The Statement of Findings for Executive Order 11990(Protection of Wetlands) states on page 14 of that section that the activity of rehabilitating the bridge will result in unavoidable impacts to 15.4 acres of riverine wetlands. The preferred alternative requires compensatory mitigation for 1.4 acres of temporary impacts and 6.0 acres of permanent impacts within the causeway/platform areas, Barge Staging Areas 1 and 2 and associated dredging area. Areas proposed for compensation will be within the reaches of the Potomac and/or Anacostia Rivers and will need to be assessed for potential impacts to archaeological resources, including underwater archaeological resources.”

Correspondence ID: 221 Comment ID: 520662

The potential for archeological resources, including underwater archeological resources, in areas proposed for submerged aquatic vegetation mitigation will be investigated prior to selection and use of restoration activities.

Replacement of Bascule Span not supported due to irreversible consequences and will require further coordination.

**Representative Quote:** “We request an opportunity to consult further with the National Park Service regarding the agency's proposal to adopt Alternative 1B and to remove and replace the bascule span. Given the irreversible consequences of removing the bascule span, consulting parties and the public are entitled to fully understand the National Park Service's proposal to replace and not rehabilitate the bascule span. Specifically, we seek to understand the basis for the National Park Service's shift from Alternative 3 to Alternative 1B. Environmental Assessment at 63.”

Correspondence ID: 223 Comment ID: 520668

The National Park Service will continue coordination under Section 106 of the National Historic Preservation Act to identify adverse effects and appropriate mitigation measures.

<p>Environmental Assessment does not define “to the extent possible.”</p> <p><b>Representative Quote:</b> “It is not clear from the purpose statement or the list of project objectives how the National Park Service is defining “to the extent feasible” in the context of this project. Under the definition adopted by the U.S. Supreme Court for transportation projects (and embodied in the regulations of the Federal Highway Administration), the National Park Service will be required to preserve the historic bascule span if preservation is possible “as a matter of sound engineering.” <i>Citizens to Preserve Overton Park v. Volpe</i>, 401 U.S. 402, 411 (1971); 23 C.F.R. § 774.17.”</p> <p>Correspondence ID: 223 Comment ID: 520668</p>	<p>The definition of feasible cited (<i>Citizens to Preserve Overton Park v. Volpe</i>, 401 U.S. 402, 411 (1971); 23 C.F.R. § 774.17) refers to Section 4(f) of the Department of Transportation Act. Section 4(f) does not apply to the Arlington Memorial Bridge as federal lands transportation facilities are exempt from Section 4(f). Federal lands transportation facilities include public highways, roads, bridges, trails, and transit systems that are located on, adjacent to, or provide access to federal lands for which title and maintenance responsibility is vested in the federal government, and that appears on the national federal lands transportation facility inventory.</p> <p>National Park Service roads are exempt from Section 4(f) per the Federal Highway Administration Memorandum titled “FLH Guidance on Section 4(f) Exception for Federal Lands Transportation Facilities under MAP-21”</p> <p>The language in the Environmental Assessment is included to demonstrate the National Park Services commitment to minimizing impacts to historic and other resources while meeting the purpose and need for the proposed action.</p>
<p>The National Trust for Historic Preservation requests additional information and consultation opportunities regarding standards, conclusions, and mitigation.</p> <p><b>Representative Quote:</b> “We, therefore, request additional information and an opportunity to consult further regarding the National Park Service’s conclusion that Alternative 1B will result in similar adverse impacts to Alternative 3.”</p> <p>Correspondence ID: 223 Comment ID: 520677</p>	<p>The National Park Service will continue coordination under Section 106 of the National Historic Preservation Act to identify adverse effects and appropriate mitigation measures.</p>

It is not clear if the economic benefits outweigh the impacts to cultural resources from Alternative 1B.

**Representative Quote:** “The economic cost factor/savings is an important reason for selection of Alternative 1 B. However, aside from cost savings, it is not clear if the impact to cultural resources outweighs the benefit of choosing Alternative 1 B over Alternative 3.”

Correspondence ID: 230 Comment ID: 523032

The National Park Service must weigh many factors in the decision making process, including impacts to historic resources.

Removal of the Bascule Span should be considered a Major Adverse Impact as opposed to moderate.

**Representative Quote:** “We disagree with the assessment that replacement of the center bascule span contemplated in Alternative 1A, 1B, and 2 represents a "moderate adverse impact on both the materials and aesthetics of the Arlington Memorial Bridge" as described in the Environmental Assessment. If removing the center bascule span, a character-defining feature of the historic bridge and significant engineering element that is one of the justifications for it being listed in the National Register of Historic Places does not constitute a "Major Adverse Impact" what does?”

Correspondence ID: 221 Comment ID: 520660

The definition for “Moderate Intensity” the National Park Service used for the Environmental Assessment is: “Adverse: impacts to an NRHP-eligible or listed building, structure, or district will change the character-defining features of the resource, but does not diminish the integrity of the resource to the point of being ineligible.”

While the conclusion under NEPA may be that each of the alternatives will have a “moderate” effect based on the definition above, the NPS has included information in the EA to fully describe the differences in the impacts of each of the alternatives.

A Programmatic Agreement may be executed among the National Park Service and applicable SHPO and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b) ‘Measures identified in the Programmatic Agreement to minimize or mitigate adverse impacts and/or preserve important information.’

Alternative 1B does not diminish the integrity of the resource to the point of being ineligible. A Programmatic Agreement detailing the necessary mitigation and minimization measures will be completed with and signed by the necessary parties prior to the final decision document.

<p>Request for additional information regarding the cause of deterioration of the bridge.</p> <p><b>Representative Quote:</b> “Given the importance of the bridge and the cost of rehabilitation, consulting parties and the public are entitled to understand the cause of the severe deterioration to date. For example, we learned during the April 20th consultation meeting that the historic bridge was last painted in 1980. We request additional information regarding the cause of the deterioration and an explanation for how and why this lack of maintenance was allowed to persist for so long.”</p> <p>Correspondence ID: 223 Comment ID: 520671</p>	<p>The Arlington Memorial Bridge has deteriorated for a number of reasons. The bridge, as designed, is susceptible to water intrusion, especially between the road surface and the sidewalks. This water intrusion has, over time, caused the steel within the trunnion posts to deteriorate. Likewise, the concrete arches and pilings have deteriorated from exposure to runoff and exposure to the Potomac River.</p>
<p>Request information/opportunity to consult on NPS’ future maintenance plans.</p> <p><b>Representative Quote:</b> “We also request additional information and an opportunity to consult further regarding the National Park Service's plan for the next 75 to 100 years to avoid repetition of deferred maintenance when the bridge is newly rehabilitated.”</p> <p>Correspondence ID: 223 Comment ID: 520672</p>	<p>The National Park Service will continue coordination under Section 106 of the National Historic Preservation Act to identify adverse effects and appropriate mitigation measures.</p>

Explain the differences in maintenance and rehabilitation costs between the different alternatives.

**Representative Quote:** “In our view, the Environmental Assessment should provide more explanation about the considerable difference in the estimated future maintenance and rehabilitation costs for the different alternatives. 2 The EA also should explain why Alternatives 2 and 3 require painting every 20 years, when painting in Alternative 1B is only required every 25 years. In any event, since painting of the existing historic bridge apparently did not occur for 35 years, we will like additional information on how the National Park Service will ensure that these maintenance protocols are actually implemented in the future.”

Correspondence ID: 223 Comment ID: 520673

The high future maintenance cost for Alternatives 2 and 3 is mainly due to cleaning and painting a complex steel structure with large number of steel elements and difficult access to some of these elements.

Even though alternative 1B is a steel structure, it is much simpler to clean and paint a steel plate girder bridge than a complex truss bridge. The frequency for cleaning and painting a bridge is based on the type of the bridge. Based on case studies and research, the Federal Highway Administration recommends painting truss bridges every 20 years and steel plate girder bridges every 25 years.

Based on results of inspections and the cost estimate review/risk analysis, it was determined that the initial construction investment for alternative 1B is \$30 to 35 million dollars less than alternative 3. Operation and maintenance costs during the life span of the bridge are estimated to be \$40 million less than if the existing bascule span is retained. Alternative 1B will require painting every 25 years; however, painting the variable depth steel girders will require significantly less effort than painting the existing bridge’s truss system.

The Federal Highway Administration will provide the National Park Service with a maintenance manual specific to the Arlington Memorial Bridge. This maintenance manual will provide the timeline for all upcoming maintenance items which will allow the NPS to budget for these maintenance items ahead of time.

<p>Rehabilitation of the bascule span will result in minor cumulative adverse impacts, not moderate.</p> <p><b>Representative Quote:</b> “Additionally, with the cumulative impacts analysis, the Environmental Assessment finds that Alternative 1B (removal of the bascule span) and Alternative 3 (rehabilitation of the bascule span) will both have short and long-term "moderate" adverse impacts. In our opinion, rehabilitation of the bascule span will result in only minor cumulative adverse impacts, if any.”</p> <p>Correspondence ID: 223 Comment ID: 520675</p>	<p>Cumulative impacts result from all past, present, and future actions in the vicinity of the proposed project, not just the impacts of the proposed project. It is the National Park Services’ determination that the impacts of projects and actions in the vicinity of the Arlington Memorial Bridge, when added to the impacts of Alternative 3, will have moderate cumulative adverse impacts.</p>
<p>Additional analysis of beneficial impacts of the alternatives.</p> <p><b>Representative Quote:</b> “The analysis also does not include degrees of the beneficial impacts; it simply states there will be long-term beneficial impacts. Again, it is our opinion that rehabilitating the bascule span will have a greater long-term beneficial impact on the historic bridge than removing the bascule span. The adverse impacts of removing the bascule span versus rehabilitating the bascule span warrant further analysis to fully understand the differences between the alternatives.”</p> <p>Correspondence ID: 223 Comment ID: 520676</p>	<p>The National Park Service does not include degrees of beneficial impacts in its Environmental Assessments.</p>
<p>National Capital Planning Commission supports Alternative 1B since it balances historic preservation with other project goals.</p> <p><b>Representative Quote:</b> “Supports Alternative 1B (Replace Bascule Span with Variable Depth Girders) as the preferred alternative for the Arlington Memorial Bridge rehabilitation, as it best balances historic preservation goals with constructability, maintenance, and cost.”</p> <p>Correspondence ID: 228 Comment ID: 520711</p>	<p>Comment noted.</p>

<p>National Capital Planning Commission does not support 1A as it is not sympathetic to the existing bridge.</p> <p><b>Representative Quote:</b> “Does not support Alternative 1A (Replace Bascule Span with Precast Concrete Box Girders) because its materials and design approach is not sympathetic to the existing bridge. The new bascule span will replace the existing steel arch with a straight concrete span.”</p> <p>Correspondence ID: 228 Comment ID: 520714</p>	<p>Comment noted.</p>
<p>National Capital Planning Commission notes that Alternative 2 and 3 will replicate/preserve the elements of the bridge but will not address design flaws/operational issues.</p> <p><b>Representative Quote:</b> “Notes that Alternative 3 (Rehabilitate the Existing Bascule Span in Place) will preserve elements of the existing bridge, however, the continued challenge of maintaining and repairing the existing span may lead to more substantial operational issues over time.”</p> <p>Correspondence ID: 228 Comment ID: 520716</p>	<p>Comment noted.</p>
<p>Closing lanes will not affect the historic design.</p> <p><b>Representative Quote:</b> “If there is a minimal impact of closing a single lane of car traffic in each direction on the bridge during reconstruction, it should be repurposed entirely as a single travel lane for bicycle traffic. This road diet does not change the historic design of the sidewalk, curbs, or roadway space.”</p> <p>Correspondence ID: 130 Comment ID: 520321</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Removal of vehicular traffic lanes for use by bicyclists will have substantial impacts on traffic flow resulting in congestion and air quality issues.</p>

<p>The National Trust for Historic Preservation supports Alternative 3 and the retention of the bascule span.</p> <p><b>Representative Quote:</b> “In our view, removal of this unique and "contributing feature" of the historic bridge should be a last resort. Environmental Assessment at 152. "Rehabilitation of the bridge components will require conformity with the Secretary of the Interior's Standards for the Treatment of Historic Properties." Environmental Assessment at 25. Indeed, the National Park Service's initial determination was to adopt Alternative 3, which calls for retention and rehabilitation of the original bascule span.”</p> <p>Correspondence ID: 223 Comment ID: 520667</p>	<p>Comment noted.</p>
ED1000 Editorial	
Concerns	Action(s) taken to resolve the issue/concern
<p>Grammatical/Typographical errors or incorrect information</p> <p><b>Representative Quote:</b> “On page 187 and 188 it talks about "both construction methods for Alternative 2 and 3", but there is only one method for those two.”</p> <p>Correspondence ID: 1 Comment ID: 520015</p>	<p>An errata to the Environmental Assessment has been added revising the text to read “Under Alternative 2, travel delays will result in short-term moderate adverse impacts to vehicular traffic, including cars and buses, within the study area” and “Under Alternative 3, travel delays will result in short-term moderate adverse impacts to vehicular traffic, including cars and buses, within the study area.”</p>
<p>Request for clarification of construction method for NPS Preferred Alternative.</p> <p><b>Representative Quote:</b> “The NPS Preferred Alternative does not clarify which construction method will be included. This is important since Method A includes full lane closures for 70 days where as Method B does not require full lane closures.”</p> <p>Correspondence ID: 211 Comment ID: 520598</p>	<p>The preferred construction method had not been determined when the Environmental Assessment was released. The National Park Service and the Federal Highway Administration have identified Construction Method B as the selected alternative in the Finding of No Significant Impact.</p>

<p>Incorrect information regarding Jefferson Memorial/AMB relationship.</p> <p><b>Representative Quote:</b> “Jefferson Memorial. On page 15 the Jefferson Memorial is cited as one of the monuments that the neoclassical style Arlington Memorial Bridge was intended to complement. However, the completion date for the bridge pre-dates the beginning of construction for the Jefferson Memorial by seven years, so the claim in the Environmental Assessment that the bridge was intended to complement this memorial is erroneous.”</p> <p>Correspondence ID: 221 Comment ID: 520656</p>	<p>An errata to the Environmental Assessment has been added revising the text to read “The bridge was designed in the neoclassical style and complements the other monumental buildings in Washington, DC such as the White House, the Lincoln Memorial, and the Jefferson Memorial. The bridge was designed to preserve views to the Lincoln Memorial from the Virginia shore of the Potomac River.”</p>
<p>Commenter recommends conducting a third party review of the project.</p> <p><b>Representative Quote:</b> “Given the gravity of the decision at hand, the National Trust recommends that the National Park Service arrange for a third-party review by independent experts to assess the condition of the historic bridge, alternatives for rehabilitation, and the proposal to adopt Alternative 1B (removal) versus Alternative 3 (rehabilitation) for the bascule span.”</p> <p>Correspondence ID: 223 Comment ID: 520678</p>	<p>The National Park Service has enlisted the assistance of a number of third party experts in assessing the condition of the Arlington Memorial Bridge and the alternatives for repairing the bridge. As noted on page 60 of the Environmental Assessment, Quinn Evans Architects undertook a third party review of the alternatives under consideration.</p> <p>In addition, the Federal Highway Administration conducted a Constructability Workshop with government and private sector engineers and construction contractors from around the United States to assess the feasibility of construction associated with rehabilitation of the Arlington Memorial Bridge including construction phasing, maintenance of traffic (including pedestrian and bicycle), and site constraints and other construction challenges associated with this unique bridge.</p>

<p>National Capital Planning Commission requests additional information be submitted at the time of preliminary review.</p> <p><b>Representative Quote:</b> “Requests the following information be submitted at the time of preliminary review to better evaluate the proposal:  - Detailed project plans, sections and elevations of the bascule span, to understand the elements of the design and their relationship to any character-defining features, either retained or removed. - Additional renderings and perspectives from several locations indicating the visibility of the bascule span elements, including upstream from the Kennedy Center River Terrace, downstream from the GWMP, and at a location approaching the bascule span at the river level. - Plans for pedestrian and bicycle access and alternative routes during the construction period; and - The location and configuration of specific construction staging areas, including screening measures, to minimize impacts on views and circulation between the Lincoln Memorial and Arlington National Cemetery.”</p> <p>Correspondence ID: 228 Comment ID: 520713</p>	<p>Comment noted. The National Park Service looks forward to submitting the requested information at the time of the National Capital Planning Commission’s preliminary review of the project.</p>
<p>More information regarding the staging areas is required.</p> <p><b>Representative Quote:</b> “Please describe Staging Areas B and C and state what (if anything) may be disturbed to accommodate storage of construction materials and equipment. The Environmental Assessment should depict these staging areas on the maps (including photos of areas) as well as provide the size of these areas and whether trees or other impacts besides grass will be removed to accommodate the area for equipment.”</p> <p>Correspondence ID: 230 Comment ID: 523033</p>	<p>Staging Areas B and C, along with Areas A and D, are described on pages 54 and 55 of the Environmental Assessment. A map of the staging areas is included on page 53 of the Environmental Assessment. Impacts to vegetation are described on page 31 of the Environmental Assessment.</p>

Environmental Assessment should consider future climate change in its analysis.

**Representative Quote:** “Alternatives should consider future climate scenarios and weather events from the National Climate Assessment (NCA), and describe how those scenarios may impact the project and its design.”

Correspondence ID: 230 Comment ID: 523035

Impacts to climate change are described on page 35 of the Environmental Assessment. The Federal Highway Administration will take future climate scenarios into account when preparing design documents for the project.

Environmental Assessment should detail potential contaminants in dredge materials.

**Representative Quote:** “Dredging can create a whole host of adverse environmental impacts where the magnitude of the impact is contingent upon site-specific details. Impacts can be caused by the dredging process itself or by the fill which has been dredged. A major concern is the content of the fill. Dredging by definition disturbs and breaks up the substrate mobilizing substrate particles. If the substrate contains any kind of contaminant, the contaminant can potentially pose risks to the benthic and plant communities and the organisms that consume them or can be transported to other areas. The amount of potential harm associated with dredging depends upon the amount and the type of constituent (e.g., lead, copper, etc.) and the communities at risk. The sediments to be dredged should be tested for contamination. If contaminants are present, further research should be conducted to understand the potential environmental effects of dredging specific to the contaminants identified. The Environmental Assessment did not address the sediment to be dredged and whether it contains contaminants. Please discuss if the sediments to be dredged will be tested for contamination and possible consequences if contaminants are found (i.e. effects of its removal on the water column including biological/aquatic/biota communities, as well as disposal options).”

Correspondence ID: 230 Comment ID: 523043

Page 57 of the Environmental Assessment notes that dredge material will be tested for contaminants and properly disposed of at an appropriate location determined by the contractor and with the approval of the Federal Highway Administration. As noted on pages 121 of the Environmental Assessment, erosion and sediment controls and various best management practices such as floating turbidity curtains will be employed as needed during construction to limit the areas affected by sediment suspension to a limited work area.

<p>Additional information and analysis of Environmental Justice populations is requested.</p> <p><b>Representative Quote:</b> “As required by the Executive Order, please identify low-income and minority populations (using census tracks) within and surrounding the proposed action. In addition, discuss potential impacts to these populations as a result of the proposed action due to transportation changes, particulate/exhaust emissions (due to construction equipment, traffic), etc. In addition, please discuss public outreach to communities during the National Environmental Policy Act process.”</p> <p>Correspondence ID: 230 Comment ID: 523045</p>	<p>The project area and surrounding vicinity are largely unpopulated as the area is made up almost entirely of federally owned land. Census Tract 62.02 includes the Arlington Memorial Bridge and the land to the east comprised of the National Mall, national monuments and memorials, White House, and U.S. Capitol Building. The area to the west is comprised of Census Tract 9801 which encompasses Arlington National Cemetery and the Pentagon.</p> <p>An errata to the Environmental Assessment providing information on the census tracts surrounding the project.</p>
<p>Environmental Assessment should to outline minimization and mitigation measures.</p> <p><b>Representative Quote:</b> “Coordination with the District Historic Preservation Officer and the Virginia State Historic Preservation Officer is commendable. It will have been valuable to have minimization and/or mitigation measures outlined in the Environmental Assessment. Although the MOA will detail minimization and mitigation measures; it is not clear when the MOA will be signed and which "final decision document" it will be included in. Will there be a Final Environmental Assessment for the Arlington Bridge Memorial?”</p> <p>Correspondence ID: 230 Comment ID: 523046</p>	<p>The Programmatic Agreement will be executed prior to the National Park Services’ final decision on the proposed action which will be documented in either a Finding of No Significant Impact or a decision to prepare an Environmental Impact Statement.</p>

<p>The scope of the alternatives should be much broader than just the bascule span.</p> <p><b>Representative Quote:</b> “I do, however, have strong objections and concerns about the scoping of the environmental assessment leading to additional concerns with consideration of environmental impacts to air quality and the transportation network. The scoping of this project focuses the Environmental Assessment on the impacts of the rehabilitation of the Memorial Bridge, but that scope is set so narrow that the only alternatives to consider only deal with the particulars of the Bascule span. I believe that a much broader scope is necessary.”</p> <p>Correspondence ID: 185 Comment ID: 520440</p>	<p>The scope of the project is the rehabilitation of the entire Arlington Memorial Bridge, not only the bascule span. Impacts to all components of the proposed action alternatives are considered in the Environmental Assessment. In many cases, the treatment of the bascule span differs from alternative to alternative and has the most impacts, thus requiring more analysis in the document.</p>
<p>NA1000 Natural Resources: Impact of Proposal and Alternatives</p>	
<p>Concerns</p>	<p>Action(s) taken to resolve the issue/concern</p>
<p>No impact to State Natural Area Preserves or state listed plants or insects.</p> <p><b>Representative Quote:</b> “There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.”</p> <p>Correspondence ID: 6 Comment ID: 520031</p>	<p>Comment noted.</p>
<p>Commenters were concerned with impacts to SAV.</p> <p><b>Representative Quote:</b> “The west causeway and barge staging area 2 are described as temporary impacts to SAV; however given the dredging of the barge staging area and the length of time the west causeway/platform will be in place, SAV is unlikely to recover on its own after construction is completed.”</p> <p>Correspondence ID: 229 Comment ID: 520726</p>	<p>The National Park Service will work with the DC Department of Environment, the U.S. Army Corps of Engineers, and the National Oceanic and Atmospheric Administration on measures to reestablish submerged aquatic vegetation (SAV) in areas disturbed as part of the construction process. The National Park Service will monitor these areas for the success of the SAV beds.</p>

In-water work should be avoided from February 15 to June 15 to avoid impacts to migrating anadromous fish.

**Representative Quote:** “In order to minimize the adverse effects of suspended sediment and noise on migrating anadromous fish, we recommend in-water work be avoided from February 15 to June 15 during the upstream migration to their spawning grounds. We appreciate that you have already included in-water work restrictions during this time of year in your project plans. Types of construction activities that should be included in this time of year restriction are: a) Actions that re-suspend fine-grain sediments into the water column, such as dredging, piling and cofferdam installation and removal from the sediment, tug/barge abrasion of bottom sediments, jetting of structures into position, and flushing of sediments and other contaminants into the waterway from construction vessels. b) Actions that produce heavy underwater shock waves, such as subaqueous blasting (i.e., should the existing bridge be demolished), and driving of large pilings into position, which kill and injure finfish. c) Blockage of the waterway (i.e., by temporary structures, vessels, etc.) that inhibits movements of instream fauna.”

Correspondence ID: 229 Comment ID: 520732

As noted, the National Park Service and the Federal Highway Administration will avoid in-water work from February 15 to June 15 to minimize impacts to migrating anadromous fish during the upstream migration to their spawning grounds.

**VC2000 Visitor Conflicts and Safety: Improve visitor safety**

Concerns

Action(s) taken to resolve the issue/concern

<p>Consider safer material for sidewalk.</p> <p><b>Representative Quote:</b> “Please consider an alternative sidewalk material to the composite currently on the Memorial Bridge when the work is done. This material is slippery when wet and potentially hazardous for cyclists.”</p> <p>Correspondence ID: 2 Comment ID: 520017</p>	<p>The proposed action seeks to minimize impact to the design and appearance of the historic bridge, and changes to the sidewalk material will result in an adverse impact to the historic resource.</p> <p>Alternative sidewalk materials will be considered in the final design. Sidewalks could be modified for improved traction using one of the following methods:</p> <ol style="list-style-type: none"> <li>1. The sidewalk surface could be diamond ground after placement to give it a slightly textured surface.</li> <li>2. An epoxy overlay and broadcast aggregate could be applied over the surface to provide traction.</li> </ol>
<p>A dedicated bike lane will reduce conflict between pedestrians, bicyclists, and motorists.</p> <p><b>Representative Quote:</b> “As a long-time bike commuter who has used most of the Potomac River bridges, I feel that for the safety of all users, it will be best to include protected bike lines in rehabilitation plans such as Memorial Bridge's. It is important to include bicycling as a distinct and growing component of surface transportation planning. For the safety of all users (drivers, pedestrians, and cyclists), it is best to separate each of these modes of transport.”</p> <p>Correspondence ID: 71 Comment ID: 520169</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Removal of vehicular traffic lanes for use by bicyclists will have substantial impacts on traffic flow resulting in congestion and air quality issues.</p>
<p>VC4000 Visitor Conflicts and Safety: Traffic</p>	
<p>Concerns</p>	<p>Action(s) taken to resolve the issue/concern</p>

<p>Reduce vehicles on the bridge by closing lanes and provided protected bike lanes.</p> <p><b>Representative Quote:</b> “Please consider reducing the amount of vehicles traveling through here as a commuter route by placing the bridge on a road diet and protected bike lanes.”</p> <p>Correspondence ID: 24 Comment ID: 520064</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Removal of vehicular traffic lanes for use by bicyclists will have substantial impacts on traffic flow resulting in congestion and air quality issues.</p>
<p>Closing a lane on each side will increase auto traffic and safety concerns.</p> <p><b>Representative Quote:</b> “. . .the bridge is one of the most heavily traveled automobile bridges in the area during commute times, and taking away two car lanes will create a choke point that will certainly create traffic jams and many additional rear-end collisions. Bicyclists should show a mature civic prudence - - and consider larger traffic interests, not merely the preference of bicyclists.”</p> <p>Correspondence ID: 119 Comment ID: 520300</p>	<p>Comment noted.</p>
<p>Minimize full bridge closures to avoid impacts to mobility.</p> <p><b>Representative Quote:</b> “Encourages continued coordination with local and regional agencies to address potential impacts to mobility during the period of construction.”</p> <p>Correspondence ID: 228 Comment ID: 520718</p>	<p>The National Park Service and the Federal Highway Administration will continue to coordinate mobility and transportation issues during the construction period with regional agencies including the DC Department of Transportation, the Virginia Department of Transportation, Arlington County, and the Washington Metropolitan Area Transit Authority.</p>

<p>The Environmental Assessment accounts for impacts to automobile traffic but not bicycle and pedestrian traffic.</p> <p><b>Representative Quote:</b> “The Transportation section considers the impacts and possible mitigation for motor vehicle traffic, yet does not make allowances for the 2,000 measured bicyclists and pedestrians each day who use the bridge. Bicyclists and pedestrians are particularly impacted by bridge closures. Adding 1.4 miles to a trip, especially when it is not anticipated, adds 20 minutes to an hour of extra travel time. Any plan must include detailed plans for routing bicyclists and pedestrians through the work area while the bridge is open.”</p> <p>Correspondence ID: 185 Comment ID: 520450</p>	<p>The Environmental Assessment considers the impacts to bicyclists and pedestrians during the construction period including the impact of bicycle/pedestrian detour routes. It is the National Park Service’s goal to maintain at least one open sidewalk on the Arlington Memorial Bridge during construction. However, if both sidewalks and/or the entire bridge need to be closed during construction, the National Park Service will provide detour information to the biking community.</p>
<p>The Environmental Assessment does not utilize the latest traffic data and current conditions of the bridge.</p> <p><b>Representative Quote:</b> “Since 2015, when new weight and lane restrictions were put into place on the Memorial Bridge, only four car lanes cross the bridge. While this study relies on traffic counts from 2011, the new traffic pattern and user behavior suggests that four lanes are enough. The configuration of the past year and a half may have arisen out of necessity, but it is the new normal. Any potential change should be compared to this new standard. Analysis based on 2011 traffic volumes ignores current conditions and invalidates the conclusion that volumes will not change. If rehabilitated as planned, the net impact will be to add two vehicle lanes, where there are none currently.”</p> <p>Correspondence ID: 185 Comment ID: 520446</p>	<p>The year 2011 was selected as the baseline year for the travel demand forecasting analysis as being representative of the typical transportation system supply and demand situation which existed at that time. The temporary closure of two of the six permanent travel lanes on the bridge was an action taken primarily for safety considerations impacting all users of the bridge. This temporary action is not the new “normal” situation for this major Potomac River crossing. The “normal” roadway cross section for the Arlington Memorial Bridge, both today and in the future, is three travel lanes in each direction at all times, for a total of six vehicular travel lanes.</p>

Conclusions regarding traffic impacts require additional data/support/analysis/coordination.

**Representative Quote:** “On page 72, in Transportation Section, the impacts are described to be short-term moderate adverse impacts. This term is defined on page 175, which also defines negligible, minor and major impacts. The distinction between minor and major impacts centers around the ability to mitigate failure of nearby facilities. However, minimal quantitative traffic analysis is provided in the document. How has this conclusion been reached? Need data and mitigation measures to support the conclusion.”

Correspondence ID: 211 Comment ID: 520576

The transportation system impact threshold definitions presented on page 175 for the terms negligible, minor, moderate, and major are associated with the anticipated responses of the users of the subject transportation facilities in the defined project study area to the various alternative actions which were considered. These definitions are those traditionally used in the conduct of an environmental assessment of this nature. The perception of “failure” is related to the inability of the users of the project study area’s roadway system to move through the area without encountering extremely high levels of traffic congestion. The generalized roadway level of service / congestion assessment undertaken by the Metropolitan Washington Council of Governments (MWCOG) provided the basis for the determination of only “short term moderate adverse impacts” as presented on page 72.

As described on page 59 of the Environmental Assessment, “Detours and notifications to drivers will be coordinated with local agencies including the District Department of Transportation, Arlington County, and the Virginia Department of Transportation, and the Washington Metropolitan Area Transit Authority.” These measures will mitigate impacts to nearby facilities. In addition, these impacts are temporary, lasting the duration of construction, after which time no lasting impact is anticipated on the Arlington Memorial Bridge or surrounding facilities.

<p>An evacuation plan needs to be developed.</p> <p><b>Representative Quote:</b> “Arlington Memorial Bridge is one of DDOTs evacuation routes. An evacuation plan needs to be developed with DDOTs input and approval.”</p> <p>Correspondence ID: 211 Comment ID: 520590</p>	<p>The National Park Service and the Federal Highway Administration will work with the DC Department of Transportation on evacuation planning during the construction period.</p>
<p>Provide safe and practical ways for pedestrians/bicyclists to cross the bridge and/or Potomac during construction.</p> <p><b>Representative Quote:</b> “Full closure of the bridge will add 2.5 miles to a normal bike or pedestrian trip, according to the document. This is far more burdensome on bikes and pedestrians than it is for car drivers. Additional study is needed to ensure bicyclists and pedestrians have safe and practical ways to cross the Potomac River, during and after Memorial Bridge rehabilitation.”</p> <p>Correspondence ID: 213 Comment ID: 520606</p>	<p>The Environmental Assessment considers the impacts to bicyclists and pedestrians during the construction period including the impact of bicycle/pedestrian detour routes. It is the National Park Service’s goal to maintain at least one open sidewalk on the Arlington Memorial Bridge during construction. However, if both sidewalks and/or the entire bridge need to be closed during construction, the National Park Service will provide detour information to the biking community.</p>
<p>VU1000 Visitor Use and Experience: Improve visitor experience for pedestrian/bicyclists.</p>	
<p>Concerns</p>	<p>Action(s) taken to resolve the issue/concern</p>
<p>Creating a dedicated lane for cyclists will make the visitor experience more desirable.</p> <p><b>Representative Quote:</b> “Please include a protected bike lane in the final configuration. Compared to existing conditions, this will keep car traffic volumes at the current rates, avoid higher emissions, and vastly improve the visitor and commuter experience for the pedestrians and bicyclists who already share too little space.”</p> <p>Correspondence ID: 185 Comment ID: 520453</p>	<p>While the National Park Service understands the desire for dedicated bicycle lanes on the Arlington Memorial Bridge, the current design of the bridge facilitates use by bicycles, pedestrians, and vehicular traffic. The existing sidewalks on the bridge are 15-foot wide and can accommodate both bicyclists and pedestrians safely. Removal of vehicular traffic lanes for use by bicyclists will have substantial impacts on traffic flow resulting in congestion and air quality issues.</p>

<p>Focus of the project should be on visitor use and experience over creating a commuter route.</p> <p><b>Representative Quote:</b> “I encourage you to think long-term about the grand vision for this area, connecting the Lincoln Memorial to Arlington Cemetery. This vision should emphasize the preservation and enjoyment of that area rather than seeing at as vehicle commuter route.”</p> <p>Correspondence ID: 108 Comment ID: 520260</p>	<p>The National Park Service recognizes that the Arlington Memorial Bridge serves as both a visitor destination and as a travel route for vehicles, pedestrians, and bicycles. The proposed project with rehabilitate the bridge so that it may continue to be enjoyed by visitors while also serving the traveling public.</p>
<p><b>VU2000 Visitor Use and Experience: Improve Bicycle Connectivity</b></p>	
<p><b>Concerns</b></p>	<p><b>Action(s) taken to resolve the issue/concern</b></p>
<p>Commenters desire more bicycle connectivity via the bridge, including connections to the Mt. Vernon Trail.</p> <p><b>Representative Quote:</b> “I can attest to the fact that Arlington Memorial Bridge needs better bicycle and pedestrian access. At a minimum bikers accessing the bridge from the Mount Vernon Trail need an easier and safer way to get on.”</p> <p>Correspondence ID: 109 Comment ID: 520267</p>	<p>The National Park Service, as part of the Memorial Circle Transportation project, is studying options for improvements to the circle to accommodate bicycles, pedestrians, and vehicular traffic.</p>
<p><b>VU5000 Visitor Use and Experience: Viewsheds</b></p>	
<p><b>Concerns</b></p>	<p><b>Action(s) taken to resolve the issue/concern</b></p>
<p>Create space to better appreciate viewsheds.</p> <p><b>Representative Quote:</b> “The viewshed in both directions along the bridge is highly valued and should be honored.”</p> <p>Correspondence ID: 85 Comment ID: 520191</p>	<p>Comment noted.</p>
<p><b>WQ4000 Water Resources: Impact of Proposal and Alternatives</b></p>	
<p><b>Concerns</b></p>	<p><b>Action(s) taken to resolve the issue/concern</b></p>

<p>Design should consider sea level rise and extreme weather events.</p> <p><b>Representative Quote:</b> “Consideration of extreme weather events and sea level rise in design for future resiliency.”</p> <p>Correspondence ID: 219 Comment ID: 520627</p>	<p>Impacts to climate change are described on page 35 of the Environmental Assessment. The Federal Highway Administration will take future climate scenarios into account when preparing design documents for the project.</p>
<p>Coordination regarding the relocated navigation channel is requested.</p> <p><b>Representative Quote:</b> “The Corps requests additional information on the location of temporary relocated navigation channel, including a map showing the bridge span of the proposed relocated channel, the vertical clearance below the bridge span to Mean High Water and the existing water depths in the temporary channel. The water depths within the temporarily relocated channel should be the same depth or greater than the current channel depth (See the November 2015 Corps survey attached). Approval of the temporary relocation will be required by the Corps.”</p> <p>Correspondence ID: 220 Comment ID: 520636</p>	<p>Figure 50 on page 103 shows the water depth in the navigation channel under the bridge to be 22 feet. The water depth under the spans to the east of the navigation channel to be 16 to 25 feet deep. The temporary relocated channel will be placed in these deeper areas. A map of the proposed relocated channel has been added as an errata to the Environmental Assessment.</p>
<p>Environmental Assessment to mention Washington Harbor Federal Navigation Project will be restored after construction.</p> <p><b>Representative Quote:</b> “The Corps also recommends that a statement be included in the environmental assessment that the portion of the Washington Harbor Federal Navigation Project within the bridge rehabilitation project area will be restored to preconstruction conditions upon completion of the work. Further, that any and all debris introduced into the waterway as a result of any construction and/or demolition activities will be immediately removed and disposed of properly.”</p> <p>Correspondence ID: 220 Comment ID: 520638</p>	<p>An errata has been added to the Environmental Assessment stating that “the portion of the Washington Harbor Federal Navigation Project within the bridge rehabilitation project area will be restored to preconstruction conditions upon completion of the work. Further, that any and all debris introduced into the waterway as a result of any construction and/or demolition activities will be immediately removed and disposed of properly.”</p>

<p>Minimize or avoid the placement of temporary structures.</p> <p><b>Representative Quote:</b> “Temporary fill activities and temporary structures should be avoided and minimized to the maximum extent practicable.”</p> <p>Correspondence ID: 220 Comment ID: 520640</p>	<p>The National Park Service and the Federal Highway Administration will work with construction contractors to avoid and minimize temporary fill activities and temporary structures.</p>
<p>Project will have minimal to no expected impact on groundwater or surface water quality.</p> <p><b>Representative Quote:</b> “Based on the size and location of the temporary staging areas, the proposed project is anticipated to have minimal impact on groundwater recharge in the areas.”</p> <p>Correspondence ID: 227 Comment ID: 520707</p>	<p>Comment noted.</p>
<p>Demonstrate project will have no adverse impact on flood risk.</p> <p><b>Representative Quote:</b> “Demonstrate that the project will have no adverse impact on the flood risk to the community by increasing the Base Flood Elevations (BFEs) or the extent of the Special Flood Hazard Area (SFHA).”</p> <p>Correspondence ID: 226 Comment ID: 520699</p>	<p>The National Park Service and the Federal Highway Administration will require the construction contractor to demonstrate that construction activities including use of docks, work platforms, or causeways and the use of temporary barge staging areas, and the use of falsework in the river will not increase the base flood elevations or the extent of the existing floodplain (e.g. Special Flood Hazard Area).</p>
<p>Impacts to NOAA resources are similar under all proposed alternatives.</p> <p><b>Representative Quote:</b> “Impacts to NOAA trust resources will be similar under all proposed alternatives and appear to differ only in Alternatives IA and IB, depending on if Construction Method A or B is used.”</p> <p>Correspondence ID: 229 Comment ID: 520719</p>	<p>Comment noted.</p>

Impacts to WUS outside of NPS areas should be analyzed.

**Representative Quote:** “Clarification should be provided in the Environmental Assessment regarding the assessment of aquatic resource impacts. For example, at times, the Environmental Assessment refers to "National Park Service jurisdictional areas "and "NPS defined wetlands/waters.” Potential impacts caused by this project to Waters of the U.S. should be fully assessed regardless of the property owner.”

Correspondence ID: 230 Comment ID: 523041

The Environmental Assessment notes that the National Park Service and the U.S. Army Corps of Engineers use different classifications to delineate wetlands. The National Park Service uses the Cowardin System which is a classification based evaluation and if the habitat meets the definition it is considered a wetland or deepwater habitat. The U.S. Army Corps of Engineers uses the 1987 Corps of Engineers Wetland Delineation Manual and regional supplements to provide a detailed evaluation process for determining if a habitat is a wetland.

An errata to the Environmental Assessment has been included with the Finding of No Significant Impact to clarify this difference and to clarify impacts to riverine resources under each of the classifications.

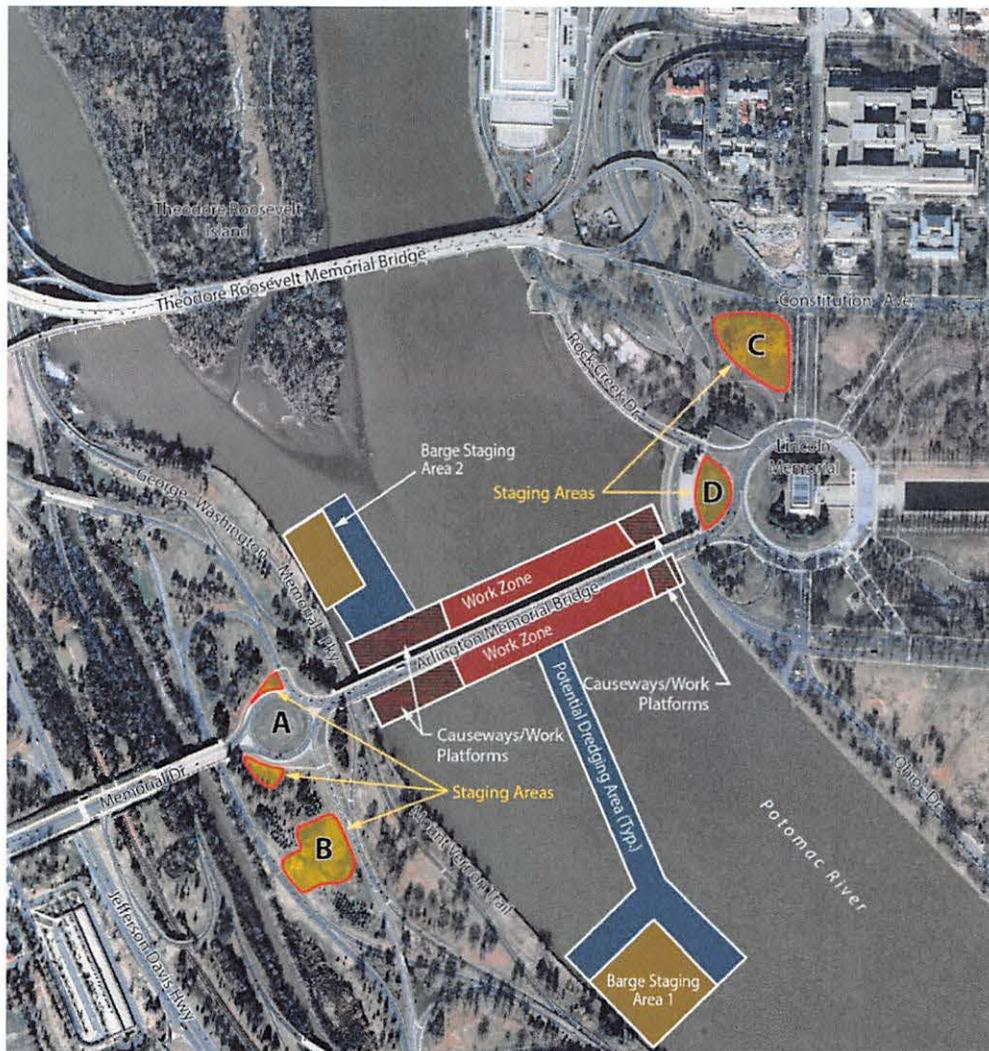
## APPENDIX E

### ERRATA SHEET

This errata sheet documents updates to the text of the Arlington Memorial Bridge Rehabilitation Environmental Assessment as a result of comments received from agencies and the public. Additions to the text are identified in bold and deleted text is identified by ~~strikeout~~.

1. Text was updated in the description of the staging areas to reflect that the land within Memorial Circle was no longer being considered a potential land staging area.

The National Park Service has revised the proposed Memorial Circle staging area to utilize areas on the north and south side of the Circle to minimize impacts to Memorial Avenue and to the views and experience of visitors to Arlington National Cemetery and surrounding destinations. The staging area will not include the land in the center of Memorial Circle. The revised staging areas can be found on the map below.



2. Text was revised to replace the word “refurbished” to “rehabilitated” on 9 occurrences in the description of the alternatives.
3. Text has been updated to correct grammatical/typographical errors or incorrect information regarding traffic impacts in Chapter 4.
- 4.

Under both construction methods for Alternative 3, travel delays will result in short-term moderate adverse impacts to vehicular traffic, including cars and buses, within the study area.

Under Alternative 2, travel delays will result in short-term moderate adverse impacts to vehicular traffic, including cars and buses, within the study area.

Under both construction methods for Alternative 2, travel delays will result in short-term moderate adverse impacts to vehicular traffic, including cars and buses, within the study area.

Under Alternative 3, travel delays will result in short-term moderate adverse impacts to vehicular traffic, including cars and buses, within the study area.

5. Text has been updated to correct information regarding Jefferson Memorial/AMB relationship.

The bridge was intentionally designed in the neoclassical style to complement the other monumental buildings in Washington, DC such as the White House, the Lincoln Memorial, and the Jefferson Memorial and to preserve views to the Lincoln Memorial from the Virginia shore of the Potomac River.

The bridge was designed in the neoclassical style and complements the other monumental buildings in Washington, DC such as the White House, the Lincoln Memorial, and the Jefferson Memorial. The bridge was designed to preserve views to the Lincoln Memorial from the Virginia shore of the Potomac River.

6. Text has been added to address comments regarding potential dredging impacts.

The sediment in the Potomac River that is slated for dredging will be tested in situ for contaminants and grain size prior to dredging activities. As stated in the EA, mechanical dredging techniques will be used for the proposed project. Mechanical dredging must be used in this case to avoid harming federally listed species, specifically the Sturgeon. Mechanical dredging involves excavating sediment using a clam shell type bucket. The bucket can be fitted with various attachments such as rubber seals that reduce the amount of sediment released to the water. Dredged materials will be immediately placed in lined containers which will prevent sediments from returning to the water. Dredged materials will be transported offsite to an approved upland location for dewatering and storage. Specific dewatering and storage methods will be determined by the construction contractor and will be approved by the appropriate agencies prior to the beginning of dredging. If contaminated sediment is found there is potential for short-term minor adverse impacts.

7. Text has been added to provide additional low-income and minority population data and the impacts this project will have. Public outreach information has also been added.

The project area and surrounding vicinity are largely unpopulated as the area is made up almost entirely of federally owned land. Census Tract 62.02 includes the Arlington Memorial Bridge and the land to the east comprised of the National Mall, national monuments and memorials, the White

House, and the U.S. Capitol Building. The area to the west is comprised of Census Tract 9801 which encompasses Arlington National Cemetery and the Pentagon.

Selected population data is presented in the table below. Although minority populations exist in the area surrounding the Arlington Memorial Bridge, all construction is proposed in park and roadway settings. As a result, all impacts, whether beneficial or adverse, will affect all populations equally. The minority population residing in Census Tract 62.02 is likely located approximately 3 miles away from the Arlington Memorial Bridge, across from the Library of Congress. The population will not experience any temporary adverse traffic, air quality or noise impacts from the proposed action since it is located so far from where the action is occurring.

Census tract	Total Population	% Minority	Poverty Level
62.02	33	78.8	0
9801	2	0	0

An extensive mailing list was generated during project scoping which included residences, government agencies, businesses and other interested parties located in the vicinity of the Arlington Memorial Bridge. Throughout the development of the EA, invitations to public meetings and newsletters were sent with project updates. Additionally, notices of meetings and public comment opportunities were posted on the National Park Service website and local newspapers. Every effort was made to inform the local community during the National Environmental Policy Act process.

- Additional information, including a map, has been added to provide more details on the location and dimensions of the proposed temporary navigation channel.

Figure 50 on page 103 shows the water depth in the navigation channel under the bridge to be 22 feet. The water depth under the spans to the east of the navigation channel are shown to be 16 to 25 feet deep. The vertical clearance under the eastern spans are 30 feet, which is the same as under the bascule span where the current navigation channel is located. The temporary relocated channel will be placed in these deeper areas. A map of the proposed relocated channel is found below.



- A statement has been added to address the restoration of preconstruction conditions of the navigation channel.

The portion of the Washington Harbor Federal Navigation Project within the bridge rehabilitation project area will be restored to preconstruction conditions upon completion of the work. Further, all debris introduced into the waterway as a result of construction and/or demolition activities will be immediately removed and disposed of properly.

10. Additional text has been added to clarify the difference in the definition of wetlands between the Cowardin System and the US Army Corps of Engineers.

The National Park Service classification system differs from the US Army Corp of Engineers in that the Cowardin system is classification based evaluation and if the habitat meets the definition it is considered a wetland or deepwater habitat. According to Cowardin, deepwater and wetland habitats occur within the mile radius around the Arlington Memorial Bridge and is located along both the eastern and western shoreline in areas less than 6.6 feet in depth. By contrast the US Army Corp of Engineers uses the 1987 Corps of Engineers Wetland Delineation Manual and regional supplements to provide a detailed evaluation process for determining if a habitat is a wetland. This evaluation requires an examination of the vegetation, soils and hydrology of the area to determine if it is a wetland or waters of the US. According to the US Army Corp of Engineers, the entire bottom of the Potomac River from the mean high water line on either side of the river will be considered waters of the United States. The Potomac River contains soft bottom habitat and submerged aquatic vegetation.

Wetland scientists performed a field visit during the preparation of the EA and investigated the project area and the potential land staging areas for potential jurisdictional wetlands using the methods outlined in the 1987 Corps of Engineers Wetland Delineation Manual. No wetlands were identified that fit the definition used by the U.S. Army Corps of Engineers and therefore there will be no impacts under any of the proposed alternatives. The Potomac River is a Waters of the US as defined by the U.S. Army Corps of Engineers. The proposed rehabilitation of the Arlington Memorial Bridge will impact approximately 26.9 acres of river bottom.

## APPENDIX F

### NON-IMPAIRMENT DETERMINATION

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the US 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). NPS Management Policies 2006, Section 1.4.4, explains the prohibition on impairment of park resources and values:

While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the Nation Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

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). However, the NPS cannot allow an adverse impact that will constitute impairment of the affected resources and values (NPS 2006 sec 1.4.3). An action constitutes an impairment when its impacts “harm the integrity of Park resources or values, including the opportunities that otherwise will 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 will 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).

This determination on impairment has been prepared for the selected alternative described in this Finding of No Significant Impact. An impairment determination is made for all resource impact topics analyzed for the selected alternative. An impairment determination is not made for visitor use and experience or navigation because impairment findings relate back to park resources and values, and these impact areas are not generally considered to be park resources or values according to the Organic Act, and cannot be impaired in the same way that an action can impair park resources and values.

## **Water Quality**

Rehabilitation of the Arlington Memorial Bridge under the selected alternative will result in temporary impacts to water quality impacts from suspension of sediment into the water column during the dredging of barge staging areas and a channel bring barges to the bridge and from the installation and removal of falsework and cofferdams. If the temporary trunnion shoring project requires in-water work, it will result in similar impacts to water quality.

The National Park Service's selected alternative will not result in impairment of water quality because of the temporary nature of the impacts and because the construction methods will include best management such as the use of cofferdams and floating turbidity curtains will be employed as needed during construction to limit the areas affected by sediment suspension to a limited work area around the pilings and cofferdams. Erosion and sediment control measures will be put in place at the land-based staging areas to minimize runoff of sediments from the site into the Potomac River.

## **Riverine**

The unconsolidated bottom of the deepwater riverine system will be impacted by dredging for barge staging areas and from the installation and removal of falsework and cofferdams. If the temporary trunnion shoring project requires in-water work, it will result in similar impacts to riverine systems. Temporary impacts to submerged aquatic vegetation will result from dredging of barge staging areas and from the use of the cofferdams to repair to the concrete bridge piers along the western shoreline. If the footings of piers at the western side of the bridge are undermined, scour countermeasures, such as riprap, will be placed on the river bottom around the piers for protection and will permanently impact submerged aquatic vegetation.

The National Park Service's selected alternative will not result in impairment of riverine habitats because of the temporary nature of the impacts and because permanent impacts will be mitigated through restoration of the river bottom to existing elevations. Mitigation measures for temporary impacts to submerged aquatic vegetation will include restoration of the areas to pre-construction elevations and re-establishing submerged aquatic vegetation in the areas previously colonized. In addition, compensatory mitigation will be undertaken for impacts to submerged aquatic vegetation at a 2:1 ratio for all temporary and permanent impacts. The selected alternative requires compensatory mitigation for 1.4 acres of temporary impacts and 6.0 acres of permanent impacts within the causeway/platform areas, barge staging areas, and associated dredging area.

## **Wildlife including Rare, Threatened, and Endangered Species**

Impacts to wildlife habitat will be limited to construction-related temporary impacts to deepwater riverine habitat. No terrestrial habitat will be impacted under the selected alternative. Dredging for barge staging areas and the barge channel, the installation of temporary falsework and associated pilings within the deepwater portion of the Potomac River, and construction work on the bridge piers could affect the native fish species through the disturbance to the river bottom. If the temporary trunnion shoring project requires in-water work, it will result in similar impacts to fish habitat.

The National Park Service's selected alternative will not result in impairment of wildlife habitats because of the temporary nature of the impacts which will be mitigated through exclusionary devices such as cofferdams and visual deterrents such as turbidity curtains and because permanent impacts will be mitigated through restoration of the river bottom to existing elevations. Under the Endangered Species Act, it has been determined that the Arlington Memorial Bridge rehabilitation "may affect, but is not likely to adversely affect" the Atlantic and shortnose sturgeon. The National Marine Fisheries Service concurred with this finding in a letter dated October 15, 2015.

### **Historic Structures and Districts/Cultural Landscapes**

The selected alternative will result in impacts to historic structures and cultural landscapes from temporary construction activities. Temporary trunnion post shoring will affect an area approximately 6 feet wide on each side of each trunnion posts. The construction may require the permanent removal of historic features including steel beams and the staircase outside of the machine rooms. New expansion joints will be needed on the bridge deck to allow for movement of the bridge which will protect the machinery rooms at the base of the abutments to the bascule span. If portions of the machine rooms were to be impacted by the temporary shoring, the mechanical gears will be removed, stored, and then put back in place as part of the full bridge rehabilitation. If possible, the stairs outside of the machine room will also be restored in their original location as part of the full bridge rehabilitation. Removal and alteration of these features will permanently affect the integrity of the historic resource. It may be possible to restore the machine rooms after the trunnion posts are permanently replaced as part of the full bridge rehabilitation. This undertaking will result in an adverse effect.

The concrete arch spans, bridge piers, bridge deck, sidewalks, granite curbs, bridge railings, and lighting will be repaired under the selected alternative, and the steel fascia on the bascule span will be removed and rehabilitated offsite. Following completion of construction of the new bascule span, the fascia will be reattached to the bascule span. These repairs will be done in accordance with the Secretary of the Interior's Standards for Rehabilitation. The Arts of War statuary and the eagle sculptures located on the ends of the bridge will be protected in place or removed during construction and stored until they could be returned following the bridge rehabilitation. Replacement of the bascule span with a fixed span of variable depth steel girders will not be in keeping with the Secretary of Interior's Standards and will result in long-term impacts to the historic bridge. Mitigation measures for impacts to cultural resources are identified in a Memorandum of Agreement executed under Section 106 of the National Historic Preservation Act. Placement of falsework, construction staging, and other construction activities will result in visual impacts to the Arlington Memorial Bridge and surrounding historic landscapes for up to two years.

While the selected alternative will have an adverse effect on resources listed in the National Register of Historic Places, the National Park Service's selected alternative will not result in impairment of cultural resources because the Arlington Memorial Bridge will retain sufficient features to retain its status as National Register listed site and adverse effects will be minimized and mitigated through the measures outlined in the February 2017 Programmatic Agreement. The temporary nature of construction impacts will not result in the loss of National Register eligibility for other resources in the project area.

## **Transportation**

One of the Arlington Memorial Bridge's primary functions is that of a transportation facility. Construction activities for the rehabilitation of the Arlington Memorial Bridge will affect vehicular, pedestrian, and bicycle users for approximately 1.5 years. Lane and sidewalk closures are anticipated to be 24-hours per day, 7 days per week for the duration of the construction. Barriers will be used to block lanes and separate traffic from construction activities. Signage and flaggers will be used to safely direct vehicles through the construction zone and into proper lanes on the bridge and the circles at either end of the bridge. Full or partial closure of the bridge's vehicular travel lanes will diminish the overall vehicle capacity of the bridge during the construction period resulting in traffic delays on the bridge and on roadways surrounding the bridge.

The National Park Service's selected alternative will not result in impairment of transportation because of the temporary nature of the impacts. At the conclusion of the rehabilitation project, the capacity of the bridge will return to its pre-construction level.

**APPENDIX G**

**FINAL WETLAND STATEMENT OF FINDINGS**

**STATEMENT OF FINDINGS  
FOR  
EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)**

**THE ARLINGTON MEMORIAL BRIDGE REHABILITATION  
GEORGE WASHINGTON MEMORIAL PARKWAY**

Recommended:

*Alexandro*

Superintendent, George Washington Memorial Parkway

*12/1/16*

Date

Certification of Technical Adequacy and Service-wide Consistency:

*Eva DiDonato - Acting Chief*

Water Resources Division

*2/2/17*

Date

Approved:

*Robert A. Vogel*

Regional Director, National Capital Region

*2/6/17*

Date

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## **INTRODUCTION**

Executive Order 11990 - Protection of Wetlands (Published in 1977) requires the National Park Service (NPS) and other federal agencies to evaluate the likely impacts of actions in wetlands. NPS Director's Order #77-1: *Wetland Protection* (effective October 2002) and Procedural Manual #77-1: *Wetland Protection* (reissued in January 2012) provides NPS policies and procedures for complying with Executive Order 11990.

Pursuant to the National Environmental Policy Act of 1969, Section 101(2)(C) as amended, the National Park Service, in cooperation with the Federal Highway Administration, is evaluating the proposed rehabilitation of the Arlington Memorial Bridge. The historic bridge spans the Potomac River between the National Mall in Washington, DC, and Arlington National Cemetery in Arlington County, Virginia. The bridge, administered by the George Washington Memorial Parkway, is an important element to both the regional transportation network and the monumental core of Washington, DC. The Arlington Memorial Bridge is in need of repair to restore the structural integrity of the bridge. Therefore an Environmental Assessment is being completed to evaluate the impacts of several proposed alternatives.

This Statement of Findings for Wetlands was prepared per Director's Order #77-1: *Wetland Protection* for the proposed Arlington Memorial Bridge Rehabilitation. A Statement of Findings has been completed because some of the proposed rehabilitation and reconstruction activities would take place in the Potomac River and would affect wetlands as defined by the National Park Service. The project area is shown in Figure B-1.

## **PURPOSE OF PROPOSED ACTION**

The purpose of the proposed action is to restore the structural integrity of the Arlington Memorial Bridge while protecting and preserving, to the extent feasible, its memorial character and significant design elements. The Arlington Memorial Bridge is more than 80 years old and has never undergone a major rehabilitation. Several temporary repairs have kept it operational to meet the needs of the traveling public. However, like many other older highway bridges across the nation, this bridge needs comprehensive repair to ensure its ability to provide adequate traffic service for decades to come.

The Federal Highway Administration regularly inspects the bridge in accordance with industry standard structural engineering guidelines and standards. These detailed structural inspections and studies have identified significant amounts of corroded steel and deteriorated concrete. The most critical elements needing repair are the concrete spans and the steel bascule (drawbridge) span. Therefore, the project is needed to address the ongoing corrosion of steel structural members of the bascule span, deterioration of the concrete on the bridge's approach spans, and deterioration of the sidewalks and wearing surface.

While the bridge is still considered safe for travel, the superstructure is deteriorating at an accelerated pace. The National Park Service, at the recommendation of the Federal Highway

## Arlington Memorial Bridge Rehabilitation Wetland Statement of Findings

Administration, has posted a 10-ton load limit across the entire length of the bridge. The load restriction, which has eliminated most bus traffic, would remain in effect until such time as the permanent rehabilitation project is complete. As the bridge continues to deteriorate, the National Park Service and the Federal Highway Administration may impose further weight restrictions or close the bridge.

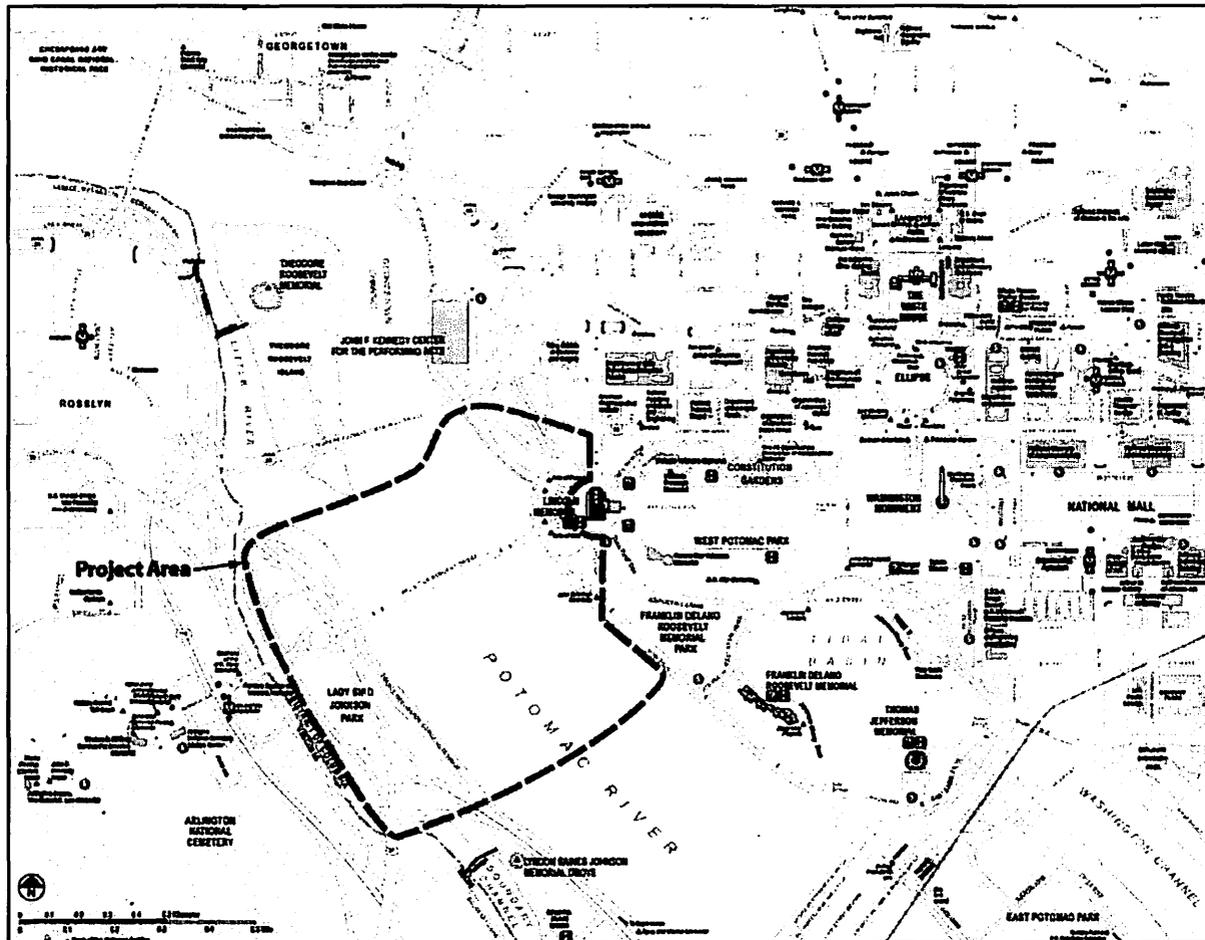


Figure B-1: Project Area Map

## ALTERNATIVES

### No-Action Alternative

The No-Action Alternative describes the action of continuing present management operations and conditions. While the No-Action Alternative does not meet the purpose and need of the project, it provides a basis for comparing the management direction and environmental consequences of the Action Alternatives.

Under the No-Action Alternative, the National Park Service and Federal Highway Administration would not perform a major rehabilitation project on the Arlington Memorial Bridge and therefore there would be no resulting wetland impacts. Under the No-Action Alternative the load restriction would remain in effect indefinitely as no major repairs would be made to the bridge.

### **Elements Common to the Action Alternatives**

There are several construction elements that are common to all the Action Alternatives that have the potential to impact wetland/waters within the Potomac River.

**Repairs to the Concrete Arch Spans.** The Arlington Memorial Bridge consists of 10 reinforced concrete arch spans that require varying levels of structural repair. The work needed to rehabilitate the concrete spans includes replacing the concrete deck, filling cracks with epoxy, patching concrete spalling with concrete repair compound, and replacing the concrete edge beams.

**Repairs to the Concrete Bridge Piers.** Several concrete bridge piers have cracking and scouring surrounding the piers that require repair below water. In order for structural repairs to occur, cofferdams would be installed to dewater the area around the bridge piers. Cofferdams are installed into the substrate and provide a barrier around the site to keep water from entering. This allows concrete repairs to be completed in a dry working environment. Cracks in the bridge piers/abutments would be filled using an epoxy suitable for underwater applications and then wrapped with fiber reinforced polymer. Undermined footing areas would be filled with grout, and scouring would be addressed by placing scour countermeasures around the piers for protection.

### **Action Alternatives**

The Environmental Assessment presents four Action Alternatives all of which include the rehabilitation and repair of the concrete spans and associated bridge features. The four alternatives evaluate different ways to repair/replace the bascule span.

**Alternative 1A.** Alternative 1A involves the replacement of the existing bascule span with a new fixed span comprised of precast concrete box girders. Alternative 1A includes two potential construction methodologies; Construction Methodology A which requires full closure of the bridge for a portion of the construction period, and Construction Methodology B which includes partial closure of the bridge during construction.

**Alternative 1B (Preferred Alternative).** Alternative 1B would include the replacement of the existing bascule span with a new fixed span comprised of variable depth steel girders. Alternative 1B would also use one of two construction methodologies as described in Alternative 1A. The preferred construction methodology is Method A.

**Alternative 2.** Alternative 2 consists of replacing the existing bascule span with a new fixed arch span of welded steel truss construction that would visually replicate the construction of the existing

span. Alternative 2 only has one possible construction methodology which includes full closure of the bridge for a portion of the construction period.

**Alternative 3.** Alternative 3 consists of repairing / rehabilitating all necessary elements of the existing bascule span in place. Alternative 3 construction methodology includes full closure of the bridge for a portion of the construction period.

The construction methodology would be determined by the selected contractor. The potential construction areas are described below. The preferred alternative includes construction activities within the upland staging areas, work zone which includes the causeway/platform area, Barge Staging Area 1 and the associated dredge area.

### **Upland Staging Areas**

Four potential land-based staging areas, two on the west side of the bridge and two on the east side of the bridge may be used for any of the Action Alternatives. Staging Areas A, B, C and D are currently maintained grass areas that contain no jurisdictional wetlands.

### **Staging Areas within the Potomac River**

**Barge Staging Area 1.** Barge Staging Area 1 would be used under all of the Action Alternatives and is located downstream from the bridge along the west bank of the Potomac River and the George Washington Memorial Parkway see Figure B-2. Approximately 225,000 square feet (5.2 acres) of area would be needed to accommodate the barges that would access this staging area. Barges would be secured with spud anchors, and a temporary piling-supported platform may be constructed for access to the barge from land.

Due to the shallow depths of the Potomac River within Barge Staging Area 1 access route, dredging of the river would be necessary (see Figure B-2 for river bathymetry). Approximately 10,000 cubic yards of sediment over an 11.2-acre surface area would need to be dredged to a depth of approximately 15 feet from the current river surface. Dredging activities would avoid areas where underwater cables and potential shipwrecks are located. Dredge material would be tested for contaminants and properly disposed of at an appropriate location determined by the contractor and with the approval of the Federal Highway Administration.

**Barge Staging Area 2 (Preferred Alternative).** Barge Staging Area 2 would be used for Alternatives 1A and 1B using Construction Method B which would allow the bridge to remain open to vehicular traffic for the duration of the construction. Approximately 100,000 square feet (2.3 acres) of area would be needed to accommodate the barges that would access Barge Staging Area 2.

Similar to Barge Staging Area 1, dredging would be required within the Barge Staging Area 2 access route. Approximately 80,000 cubic yards of dredge material over a 6.2-acre area would need to be dredged to a depth of approximately 15 feet from the current river surface. Dredging activities would avoid areas where underwater cables are located and the material would be tested for contaminants

and properly disposed of at an appropriate location with the approval of the Federal Highway Administration.

**Causeways.** Up to four temporary causeways would be constructed from the east and west shores of the Potomac River. The causeways would extend between 250 and 750 feet into the river parallel to the north and south sides of the bridge. A filter fabric would be laid on the bottom of the river and the causeway built on top of the fabric. Appropriately sized pipes would be placed through the causeway to allow the river to continue to flow through the area. When construction activities are complete, the causeways would be removed and the river bottom restored to its current condition.

**Work Platforms.** Up to four temporary docks would be constructed from the east and west shores of the Potomac River to be used as work platforms. The docks would be built on temporary pilings and would extend approximately 250 to 750 feet into the river parallel to the north and south sides of the bridge. When construction activities are complete, the dock/work platforms would be removed and the river bottom restored to its current condition.

## **TEMPORARY TRUNNION SHORING**

Regardless of the alternative selected, including the No-Action Alternative, immediate repairs to the bridge are needed. Each leaf of the bascule span consists of two main steel trusses that are supported by an axle, or trunnion, that rests on trunnion posts, which carry the load of the bridge down to the bridge abutments. Because the trunnion posts are critical to the structural integrity of the bascule span and due to the continuing deterioration of steel within the trunnion posts, temporary repairs to the posts are needed by approximately 2017. Under this action, Federal Highway Administration would install a shoring system to provide additional strength to the trunnions.

Installation of the shoring system would extend approximately 6 feet on each side of the trunnion posts. Depending on design, pilings may need to be placed in the Potomac River to support the bascule span during the period of these trunnion post repairs. These pilings would be placed in deep water and would not impact NPS defined wetlands/waters.

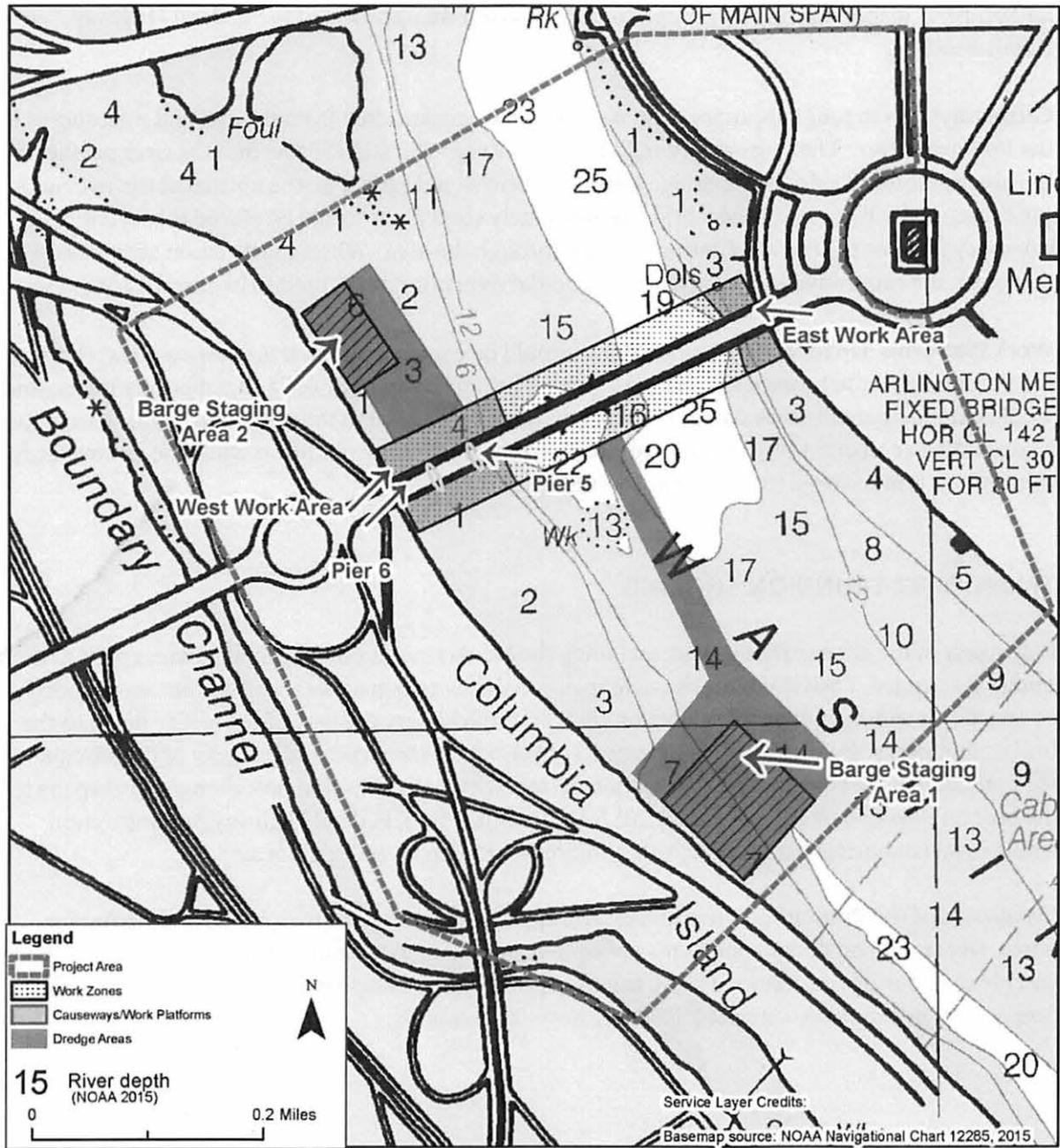


Figure B-2: Proposed Work Areas within the Potomac River

## **SITE DESCRIPTION**

### **Wetlands**

Wetlands associated with this project area are limited to the riverine habitat within the Potomac River below the mean high water line. The Potomac River is considered a riverine wetland, specifically Riverine Tidal Unconsolidated Bottom Vegetated (R1UBV) (USDOI 1979). The riverine system includes both wetland and deep water habitat. The boundary between wetland and deep water habitat in the riverine systems lies at a depth of 6.6 feet below low water (USDOI 1979).

### **Wetland Assessment Methodology**

A wetland assessment was completed by a professional wetland scientist for the entire project area including the areas that lie outside the Potomac River. The wetland assessment utilized the Cowardin system from *The Classification of Wetlands and Deepwater Habitats of the United States* and the 1987 Corp of Engineers Wetland Delineation Manual and the Regional Supplement for the Atlantic and Gulf Coast Plain Region (USDOI 1979). The National Park Service classification system differs from the US Army Corp of Engineers in that the Cowardin system is classification based evaluation and if the habitat meets the definition it is considered a wetland or deepwater habitat. By contrast the US Army Corp of Engineers uses the 1987 Corps of Engineers Wetland Delineation Manual and regional supplements to provide a detailed evaluation process for determining if a habitat is a wetland. This evaluation requires an examination of the vegetation, soils and hydrology of the area to determine if it is a wetland or waters of the US.

The wetland assessment verified that jurisdictional wetlands do not occur outside of the boundaries of the Potomac River. The Potomac River is considered jurisdictional by the National Park Service according to Procedural Manual #77-1: *Wetland Protection* including the unconsolidated bottom habitat and submerged aquatic vegetation (SAV) from a depth of 8 feet and shallower. The US Army Corp of Engineers also claims jurisdiction over the Potomac River as a navigable waterway. Actions that may reduce or degrade wetlands are governed by Section 404 of the Clean Water Act and Section 10 of the Rivers and the Harbors Act. At the federal level, the US Army Corps of Engineers regulates activities in navigable waters of the United States, which includes jurisdictional wetlands. In addition, within the District of Columbia, the Department of Energy and Environment is responsible for issuing water quality certifications and would therefore regulate waters within the Potomac within the boundaries of the District of Columbia.

Submerged aquatic vegetation was delineated using the most recent 2014 SAV data layer provided by the Virginia Institute of Marine Science (VIMS). The Virginia Institute of Marine Science is an established and reputable program that has been mapping submerged aquatic vegetation since the late 1970s. The SAV program uses fly-over aerial photography and ground-truthing information, when available, to map SAV beds within the Chesapeake Bay and its tributaries (VIMS, 2014).

In addition to delineating the SAV bed boundaries, the Virginia Institute of Marine Science provides an estimate of SAV density within each bed. This is accomplished by visually comparing each bed to

an enlarged crown density scale similar to those utilized for estimating crown cover of forest trees from aerial photography. Bed density is categorized into four classes based on a subjective comparison with the density scale. The four categories include: 1) very sparse (<10% coverage); 2) sparse (10 to 40%); 3) moderate (40 to 70%); or 4) dense (70 to 100%). The classification is assigned to the whole bed or the bed is divided into subsections if there is variation in coverage (VIMS, 2014).

### **Wetlands within the Project Area**

Wetlands in the project area are limited to deepwater and wetland riverine habitat within the Potomac River. By definition, the NPS jurisdictional wetland habitat is located along both the eastern and western shorelines in areas less than 8 feet in depth. The wetland habitat consists of both SAV beds and unconsolidated bottom habitat.

Established beds of submerged aquatic vegetation are located along the western and eastern shorelines of the river. The 2014 data for these beds is preliminary, but the outline of the beds was available for reference although the coverage and composition has not yet been released. During a previous survey in 2013, the bed along the western shoreline was characterized as having 70 to 100% coverage. According to the Maryland Department of Natural Resources, hydrilla (*Hydrilla verticillata*), coontail (*Ceratophyllum demersum*) and watermilfoil (*Myriophyllum spicatum*) were the most frequently reported of the eight common species found during ground-truthing by citizens and the US Geological Survey (MDDNR 2015). The bed along the eastern shoreline was not identified during the 2013 mapping effort; therefore, the coverage and composition are unknown. Figure B-3 shows the location of the submerged aquatic vegetation as mapped by the Virginia Institute of Marine Science.

The areas not mapped as submerged aquatic vegetation are understood to be unconsolidated bottom habitat, which is most prevalent in this type of environment. There are no other mapped habitat types, such as oyster beds, in the vicinity of the project area. The upper Potomac River is considered a non-shellfish area by the Maryland Department of the Environment (MDDOE 2015).

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 Wetland Statement of Findings

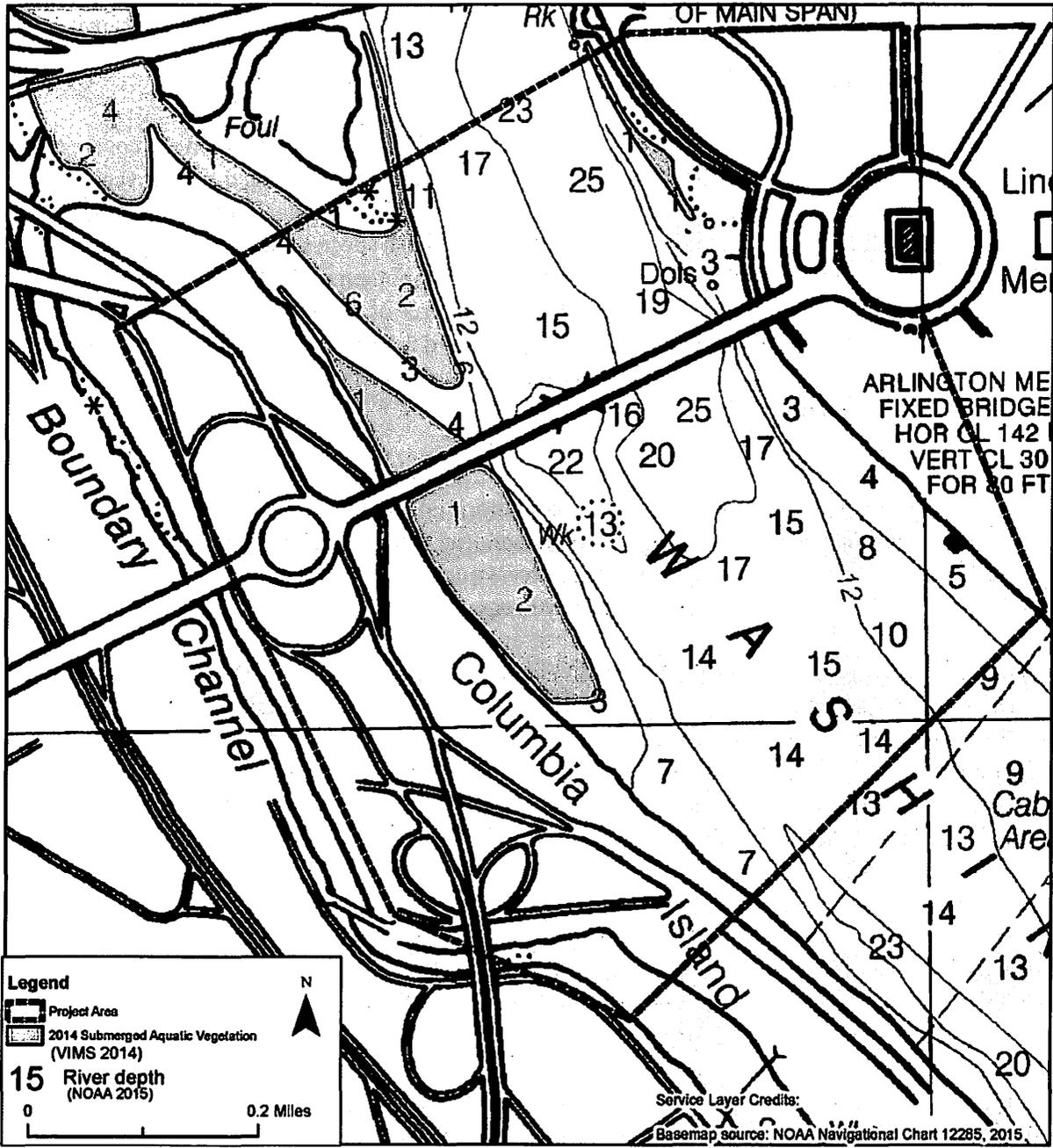


Figure B-3: Location of SAV beds

## **EVALUATION OF WETLAND FUNCTIONS AND VALUES**

### **Submerged Aquatic Vegetation Beds**

The SAV beds within the Potomac are understood to be high quality beds based on the coverage and information received from the Virginia Institute of Marine Science. Submerged aquatic vegetation provides a series of functions including habitat, water quality enhancement, and sediment stability. SAV beds provide habitat for a number of species. Crab and fish species find protective nurseries in bay grass beds. Microscopic zooplankton, an important component of the food chain, feed on the decaying bay grasses, thereby keeping the bed healthy and free of waste. Bay grass stems and leaves are often covered with small invertebrates that attach to and feed on the grass. In addition to marine species, migratory waterfowl feed on bay grasses and the animals that live in the bay grass beds (Chesapeake Bay Program 2012a).

Submerged aquatic vegetation is an ecological indicator of water quality that provides a quick and visible monitoring method for water quality degradation. Ecosystem services of submerged aquatic vegetation include absorption of nitrogen and phosphorus, release of dissolved oxygen from photosynthesis, sediment trapping, and reduce excess nutrients that would otherwise further impair the Chesapeake Bay watershed (Chesapeake Bay Program 2012a).

SAV beds attenuate wave action and water velocity which decreases turbidity in the water column and can benefit the animals in the area as well the submerged aquatic vegetation itself. The submerged aquatic vegetation acts as a natural filter which traps sediment reducing adverse impacts of sedimentation. The roots of the vegetation provide stability at the bottom of the Bay and its tributaries thereby reducing erosion and further sediment pollution (Virginia Department of Education 2013).

### **Unconsolidated Bottom Habitat**

Although focus is often placed on SAV beds, soft sediment habitat is typically the most common habitat type in bays and estuaries. Unconsolidated bottom habitats include environments where the bottom consists of fine grain sediments, sand and mud. Their biodiversity and productivity vary depending upon depth, light exposure, temperature, sediment grain size and abundance of microalgae and bacteria (Ocean Health Index 2015). This habitat typically supports high densities of clams, worms, crustaceans, and other benthic invertebrates. Benthic microalgae are also present in this habitat when shallow enough that light can penetrate to the bottom (VIMS 2015). The organisms that dwell in this habitat are important to the overall food chain and diversity of the system.

## **IMPACTS TO WETLANDS/WATERS**

Potential impacts to the wetlands within the Potomac River related to the Arlington Memorial Bridge Rehabilitation are anticipated to be both temporary and permanent. Permanent and temporary impacts resulting from dredge and fill activities were calculated for National Park Service jurisdictional area less than 8 feet in depth within the impacted areas. The preferred alternative

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Wetland Statement of Findings

(Alternative 1B) and associated construction methodology would include temporary and permanent impacts within the work zone, Barge Staging Areas 1 and 2, and the associated dredge footprint. Temporary impacts would result from construction activities, while permanent impacts would result from bridge pier stabilization.

Temporary impact calculations have been determined for both submerged aquatic vegetation and unconsolidated bottom habitat for areas that would be disturbed under all of the Action Alternatives (e.g. barge staging areas and associated dredge areas, the east and west causeway/platform areas, and the areas where scour countermeasures would be placed) (see Table 1). It is assumed that the entire area within these areas would be temporarily impacted in order to account for all possible construction activities. Due to the assumption that the entire area within the work areas outlined above could be potentially impacted it was not necessary to calculate impacts from specific activities such as cofferdams. Figure B-4 graphically represents the impact areas presented in Table B-1.

TABLE B-1. PREFERRED ALTERNATIVE TEMPORARY AND PERMANENT IMPACT TOTALS

Impact Area	Temporary Submerged Aquatic Vegetation (Acres)	Permanent Submerged Aquatic Vegetation (Acres)	Temporary Unconsolidated Bottom (Acres)	Permanent Unconsolidated Bottom (Acres)
Barge Staging Area 1	0.0	0.0	2.6	0.0
East Causeway/Platform Area	0.0	0.0	1.3	0.0
West Causeway/Platform Area	2.7	0.0	1.2	0.0
Scour Countermeasures (Pier #5 and #6)	0.0	1.4	0.0	0.0
Barge Staging Area 2	3.3	0.0	2.9	0.0
Additional US Army Corps Jurisdictional Area (Disturbed areas below 6.6 ft in depth)	0.0	0.0	11.5	0.0
Total Impact	6.0	1.4	19.5	0.0

Permanent wetland impacts are limited to the scour countermeasures that could be installed at the base of the bridge piers. The necessity of the installation of the countermeasures would be based on the extent of damage and scour observed around each individual pier. The calculations are limited to the two piers on the western side of the bridge (Pier #5 and #6) that are located in NPS defined Wetlands. Table B-2 demonstrates the total permanent impacts resulting from the scour countermeasures which were calculated using the guidelines outlined in *Publication No. FHWA-NHI-09-112, Design Guidelines 11: Rock Riprap at Bridge Piers*. Standard riprap scour countermeasure dimensions were used to calculate the total impact along with the size of the piers.

TABLE B-2. IMPACTS RESULTING FROM SCOUR COUNTERMEASURES

	Pier Width	Riprap scour Placement Width (ft)	Area of Pier (sf)	Total Area (sf)	Area of Scour Protection (sf)	Area of Scour Protection (ac)
Pier 5	28	56	3,724	34,300	30,576	0.70
Pier 6	27	54	3,591	34,464	30,464	0.70
Total					61,040	1.40

Approximately 1.4 acres of SAV habitat would be impacted around Pier #5 and #6. It is understood that this area is currently colonized by submerged aquatic vegetation based on the information gathered from the Virginia Institute of Marine Science.

### JUSTIFICATION FOR THE USE OF WETLANDS

The purpose of the project is to restore the structural integrity of the Arlington Memorial Bridge. The project is needed to address the ongoing corrosion of steel structural members of the bascule span, deterioration of the concrete on the bridge's approach spans, and deterioration of the sidewalks and wearing surface.

Impacts to the Potomac River result from several site and construction limitations. Due to the weight of some equipment and bridge materials including precast concrete bridge decking and the new bascule span, they cannot be moved over land and brought onto the bridge utilizing the existing bridge superstructure; rather they must be brought to the bridge via the Potomac River. Because of the shallow water depths on both sides of the Potomac River approaching and surrounding the bridge, dredging is necessary to move the equipment and materials to and within the bridge work zone. In addition, some work on the bridge must be performed from below the bridge deck, and causeways or work platforms in the shallow portions of the river are needed to hold equipment for this work. In addition, scour countermeasures are needed to protect bridge piers. Piers 5 and 6 are located in wetland areas and the scour countermeasures for these two piers must be placed within these wetlands.

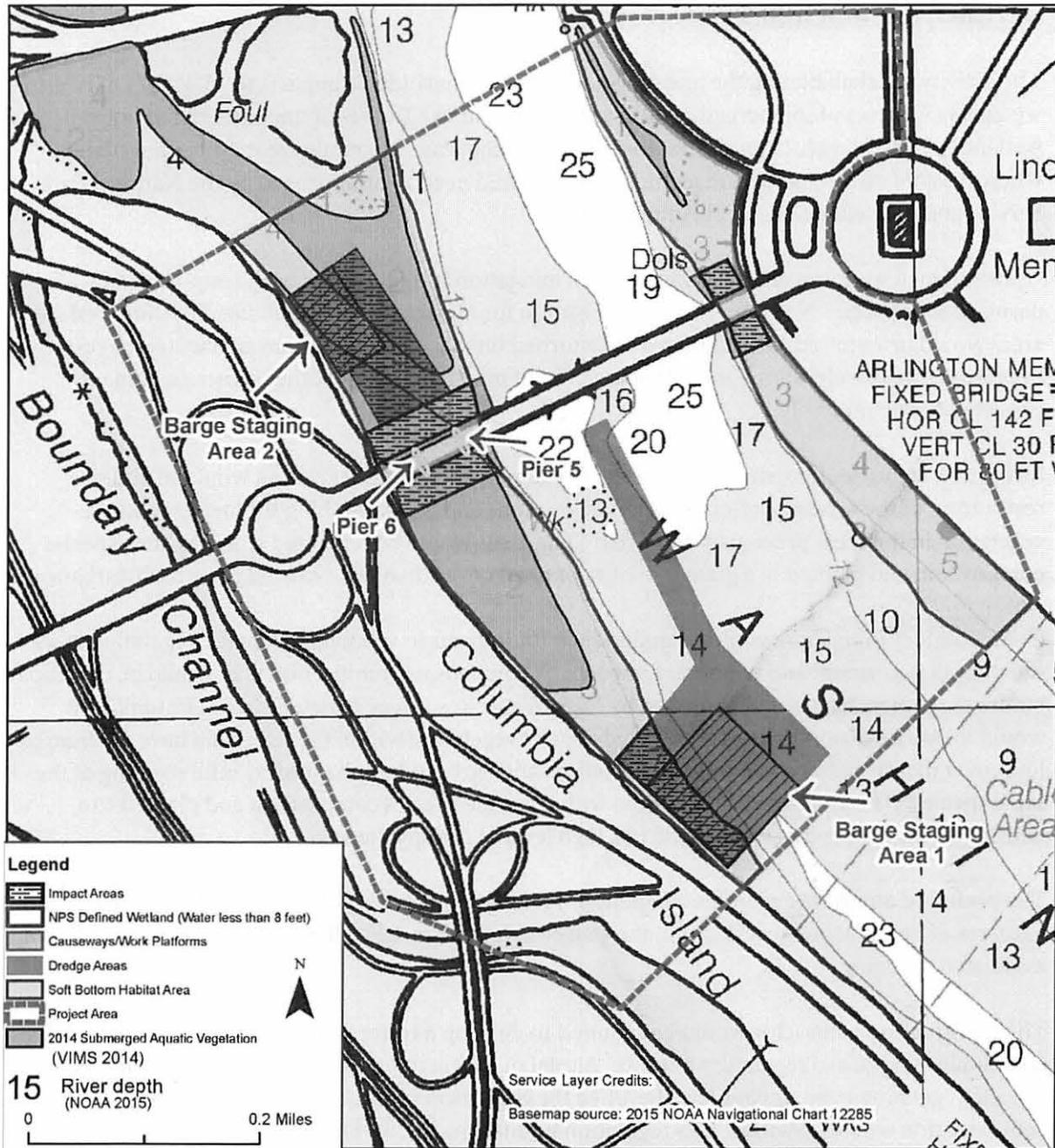


Figure B-4: Wetland Impact Areas

## MITIGATION MEASURES

The activity of rehabilitating the bridge would result in unavoidable impacts to 15.4 acres of riverine wetlands (7.4 acres of submerged aquatic vegetation and to 8.0 acres of unconsolidated bottom wetlands). The construction contractor would be encouraged to minimize impacts to wetlands where feasible, and construction methodologies would need to be approved by the National Park Service and the Federal Highway Administration.

In accordance with Procedural Manual #77-1, mitigation is required for both temporary and permanent impacts. No compensatory mitigation for impacts to unconsolidated bottom wetland areas would be required. The 8.0 acres of disturbed unconsolidated bottom area would be restored to pre-disturbance elevations and recolonization of invertebrates and other substrate fauna is expected to occur rapidly.

Mitigation measures for temporary impacts to submerged aquatic vegetation would include restoration of the areas to pre-construction elevations and re-establishing submerged aquatic vegetation in the areas previously colonized. The areas would be replanted with the same species composition and planted to a greater density of plant cover than what existed prior to disturbance.

Compensatory mitigation would be undertaken for impacts to submerged aquatic vegetation at a 2:1 ratio for all permanent and temporary impacts. A compensatory mitigation plan would be developed before the project begins and approved by NPS, Water Resources Division staff. The applicant would identify existing areas of submerged aquatic vegetation within the river, that have medium to low cover density submerged aquatic vegetation, and that can be enhanced by infill planting of the same species. The areas would be planted with the same species composition and planted to a density of plant cover that would infill to a high level of canopy density.

The preferred alternative requires compensatory mitigation for 1.4 acres of temporary impacts and 6.0 acres of permanent impacts within the causeway/platform areas, Barge Staging Areas 1 and 2, and associated dredging area.

The construction contractor would be required to develop a restoration plan approved by the NPS and obtain all required regulatory permits. A total of 14.8 acres of existing, degraded submerged aquatic vegetation habitat would be identified for vegetation restoration. The areas proposed for compensation would be within NPS regulation boundaries, i.e. within reaches of the Potomac and/or the Anacostia river that are under NPS management. The areas designated for compensatory mitigation would need to be assessed for potential impacts to natural and cultural resources including potential for impacts to underwater archeology. It is understood that additional mitigation may be required by the US Army Corp of Engineers or the DC Department of Energy and the Environment.

The submerged aquatic vegetation restoration plan would include a description of how restoration enhancement areas were selected and the parameters used to select the most appropriate areas for replanting (including location within the riverine system, water chemistry, hydraulic and

geomorphologic conditions at the sites; and the individual species present, species density and cover, and delineation of the replanting areas). The plan would also include planting/seeding, 5-year monitoring plans, and a contingency replanting plan to ensure successful reestablishment. The details of this plan would be formulated once a submerged aquatic vegetation survey is completed during the permitting phase of the project and the current species makeup and percent cover is known.

### **Submerged Aquatic Vegetation Restoration Opportunities**

The National Park Service has investigated possible in-kind mitigation opportunities within the Potomac and Anacostia rivers to restore submerged aquatic vegetation. Potential sites have been identified within the Potomac River based on depth and locations in which grasses historically occurred. The 2010 SAV maps from the Virginia Institute of Marine Science were used to identify areas within the Potomac that were previously colonized by submerged aquatic vegetation. These areas were then further refined to only include locations within the boundaries of NPS jurisdiction and within a river depth of 6 feet or less. The potential sites along the Anacostia were identified based only on the boundaries of NPS jurisdiction and river depth because SAV coverage has not been present, with the exception of some small patches in 1993, since 1971. The Virginia Institute of Marine Science does not have historic SAV data available for the Potomac River or Anacostia River dating earlier than 1971.

It has been documented that submerged aquatic vegetation within the Chesapeake Bay area are limited to waters less than 6.0-foot depth due to their light requirements. This was used as a guidance to preliminarily select potential restoration locations with the understanding that light availability is site specific and depends largely on localized water quality parameters. Water quality parameters such as dissolved inorganic nitrogen and phosphorus, water column light attenuation coefficient, planktonic chlorophyll and total suspended solids affect not only SAV physiology and ecology but also strongly influence the plant's light climate. It is important to recognize that easily available water clarity data obtained from a secchi disk does not take into account light attenuation by epiphytes on SAV leaves which is a dominant factor in regulating plant growth (Kemp, et al 2004).

Mitigation for SAV impacts resulting from the Woodrow Wilson Bridge project included planting 90,000 shoots of eelgrass (*Zostera marina*) at Piney point in the lower Potomac River estuary. The planting occurred between 2003 to 2005 and was completely gone by the end of the summer of 2007. Prior to planting, the project team undertook extensive analysis including a habitat evaluation using a Preliminary Transplant Suitability Index and test to determine the likelihood of success. The suitability index looked at historical SAV distribution, current SAV distribution, water depth, water quality, sediment composition, proximity to natural bed, and shoreline configurations. The transplant grass experienced season summer mortality which is common in the Chesapeake due to the large seasonal temperature fluctuations, but unlike natural beds the grass never recovered. The failure is attributed to high temperatures, hypoxic conditions, low percent light at leaf level and a heavy epiphyte load (Chesapeake Bay Program 2010).

The localized water quality plays a large role in the design of the restoration plan (i.e. which species to plant) and the ultimate success of the restoration. In addition to the parameters previously discussed, salinity is important in deciding which species to plant and varies within the different reaches of the Potomac and Anacostia Rivers. Salinity tolerances have been established for the most commonly found species in Chesapeake Bay and its tributaries. Although generally understood for the Potomac and Anacostia Rivers, salinity can vary seasonally and experience large fluctuation resulting from high rain years. It has been hypothesized that this was also the cause of failure for a 2002 seagrass transplant that was being monitored by the US Geologic Survey in 2003 and 2004 in the mesohaline waters of the Potomac River. This was a transplanting project for the destruction of 33.7 acres of submerged aquatic vegetation in Alexandria, Virginia. The transplanted eelgrass was completely gone by the end of 2004 and it was determined that water clarity and light penetration were sufficient. The transplant failure may be attributed to above average precipitation which drove salinity below eelgrass tolerance limits (10 ppt) percent of the time at the transplant site. Other factors that have could have contributed to the failure includes low sediment nutrient concentration and poor substrate (Schenk and Rybicki 2006).

Some shallow areas that meet the water quality requirements are subject to high currents and wave action or contain sediments that are high in organic content and may not have potential for SAV growth. Therefore it is important to have a complete understanding of the area sediment composition and water velocity. Areas historically colonized with submerged aquatic vegetation are much more likely to have the necessary growth conditions. It is important to recognize that conditions could have changed and that there is likely a reason that they are no longer present in that area.

A decline in water quality has been identified as the primary cause for the overall decline in submerged aquatic vegetation in the lower Potomac River and Chesapeake Bay in the last century. Due to this a large component of the overall Bay restoration plan includes measures to improve overall water quality by decreasing nutrients and suspended solids. Since 2000, the overall SAV restoration goal established by the Chesapeake Bay Program has been decreasing. Between 2003 and 2013 approximately 173 acres of grasses were planted in the Chesapeake Bay and have met mixed success. The National Oceanic and Atmospheric Administration's Chesapeake Bay Office and US Army Corps of Engineers Engineer and Research and development Center have funded almost all of the large-scale plantings in the region. They have since not been able to increase funding enough to meet the annual planting need. Large scale bay grass plantings have become rarer as the managers continuing to evaluate the best and most cost-effective methods for planting bay grasses (Chesapeake Bay Program 2012b).

### **Potomac River Mitigation Opportunities**

As discussed above, Chesapeake Bay SAV restoration efforts have focused on the mesohaline portion of the Potomac River. There were a number of federally funded restoration projects conducted by the US Army Corp of Engineers and the National Oceanic and Atmospheric Administration between 2003 and 2006 that included the planting of 32.75 acres of eelgrass in the Potomac River. Several different collection and planting methodologies were employed with mixed results. The potential

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sites identified for this project include this area but also the areas upstream closer in location to the project area.

Figure B-5 provides a key to the maps that follow. Figure B-6 through Figure B-10 show the potential restoration areas identified based on previous SAV colonization and depth. A total of 882 acres has been identified.



Figure B-5: Key to SAV Restoration Opportunity Maps

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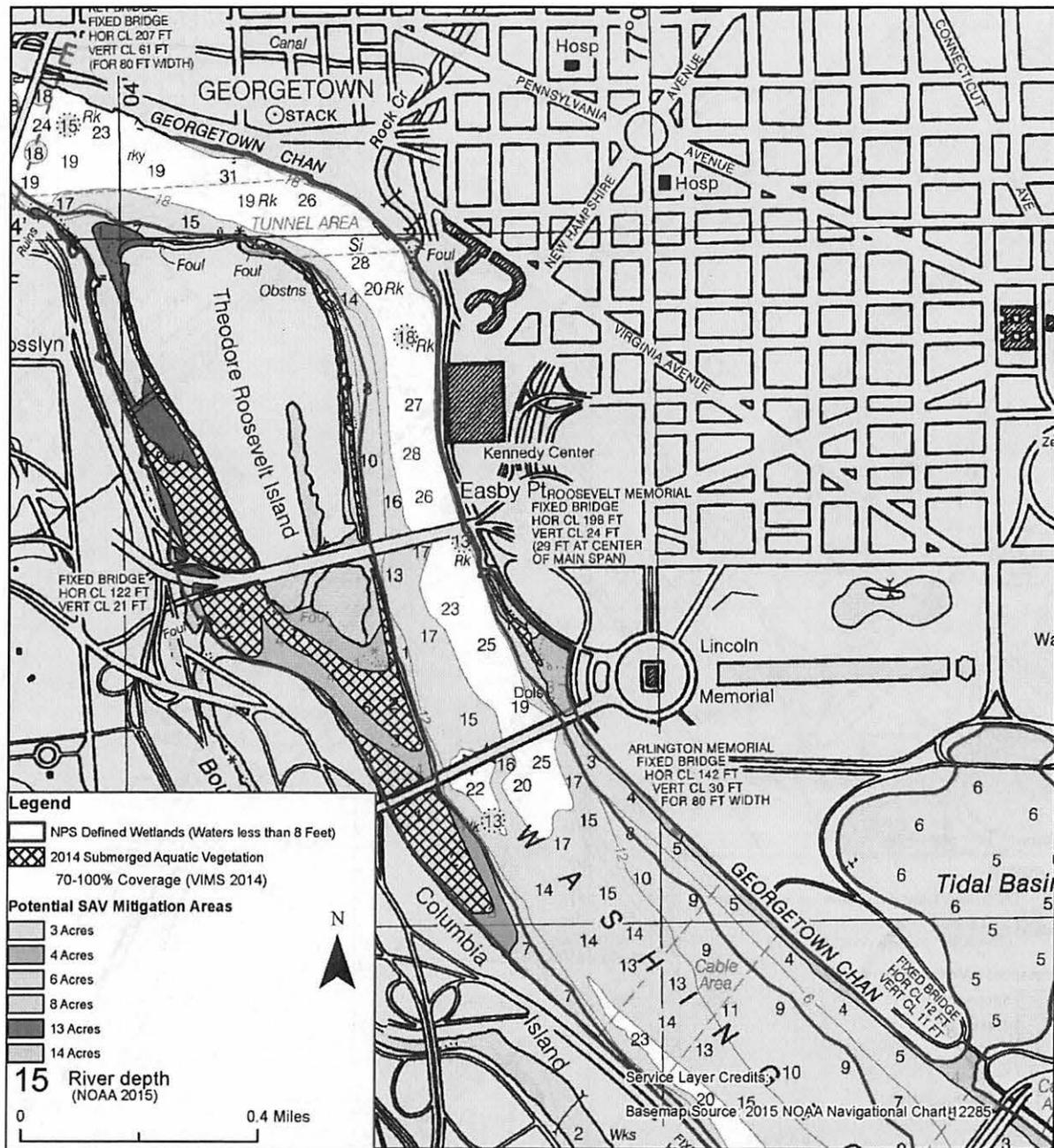


Figure B-6: Tile #1-Potential SAV Mitigation Opportunities

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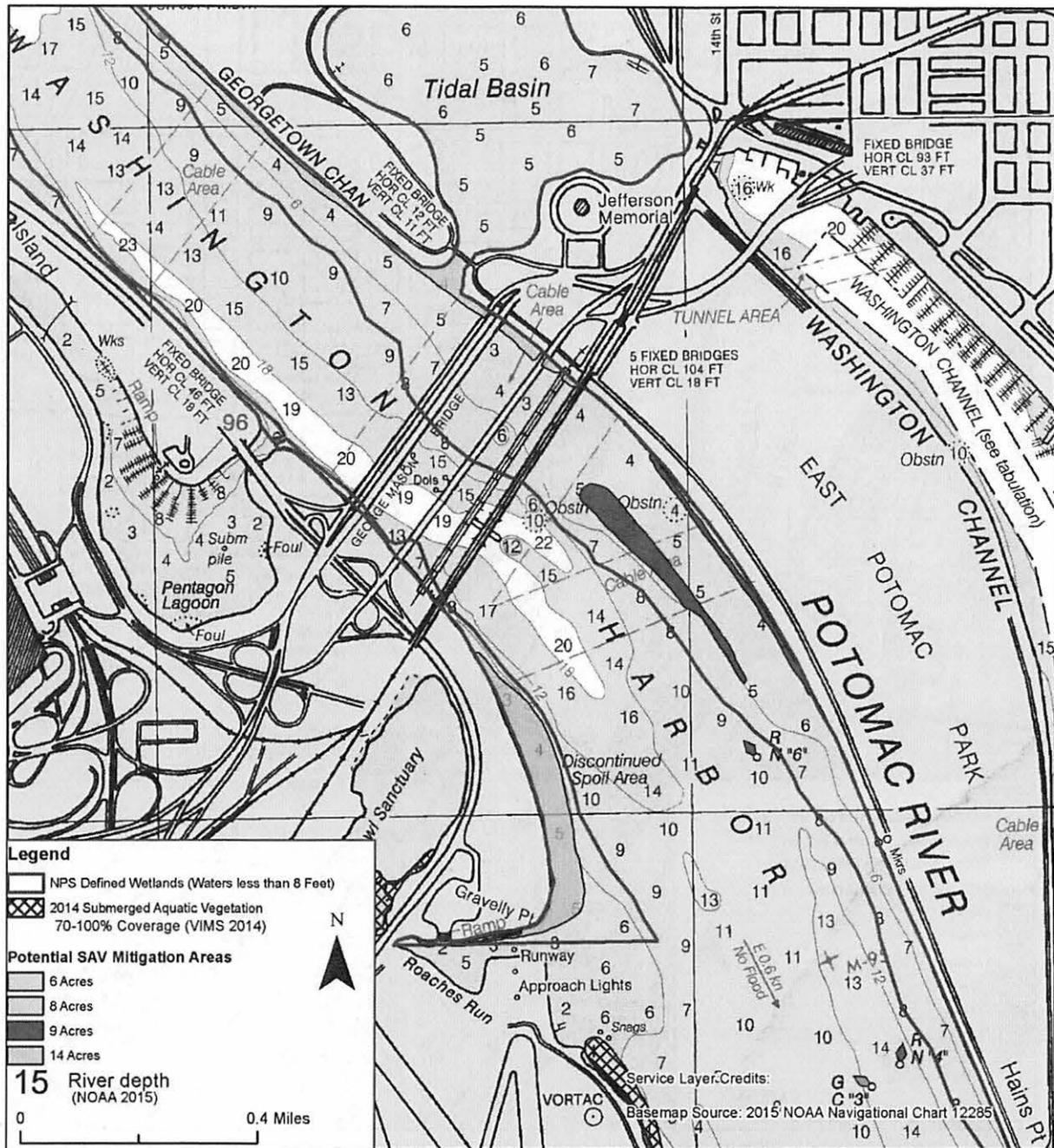


Figure B-7: Tile #2-Potential SAV Mitigation Opportunities



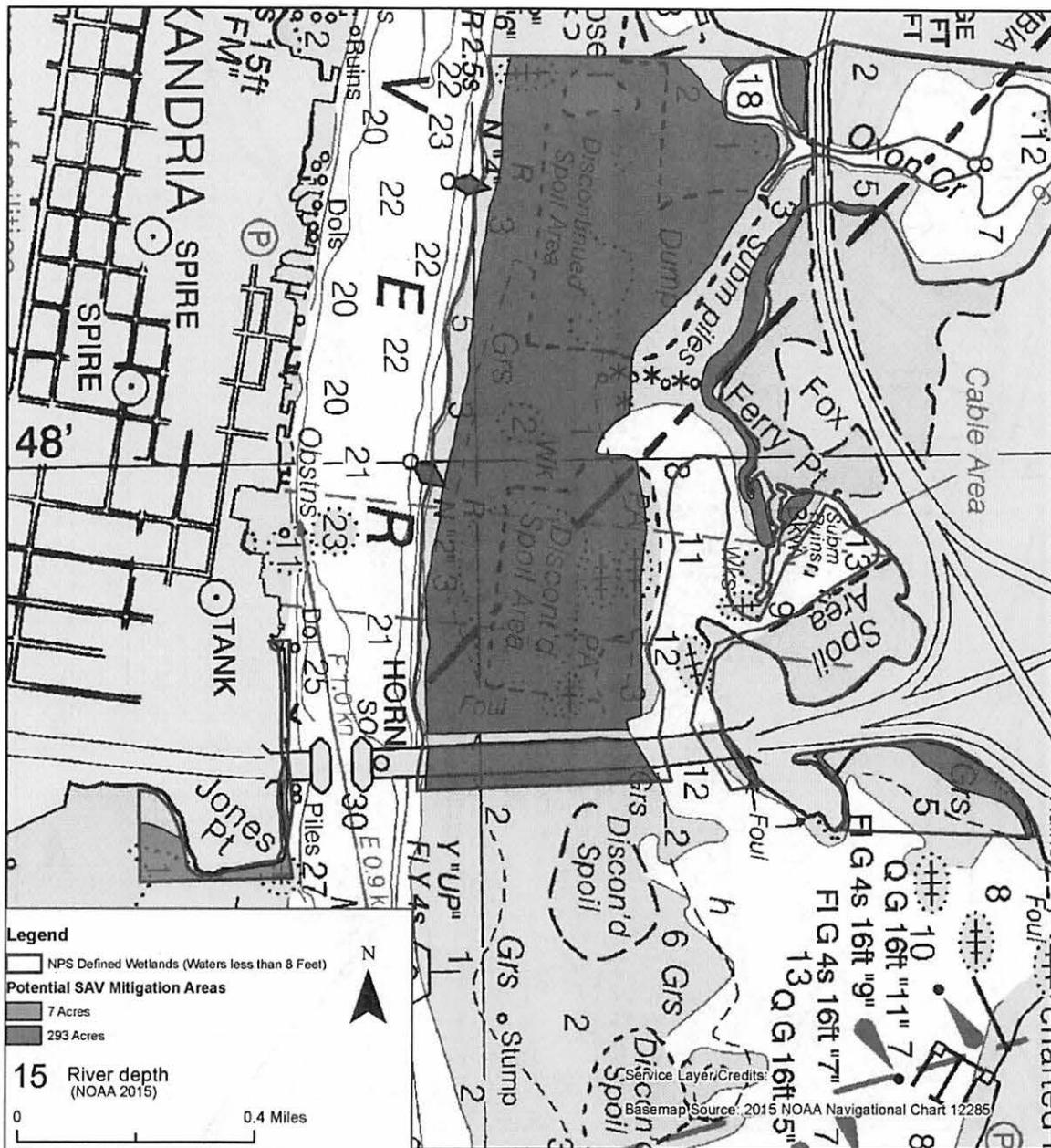


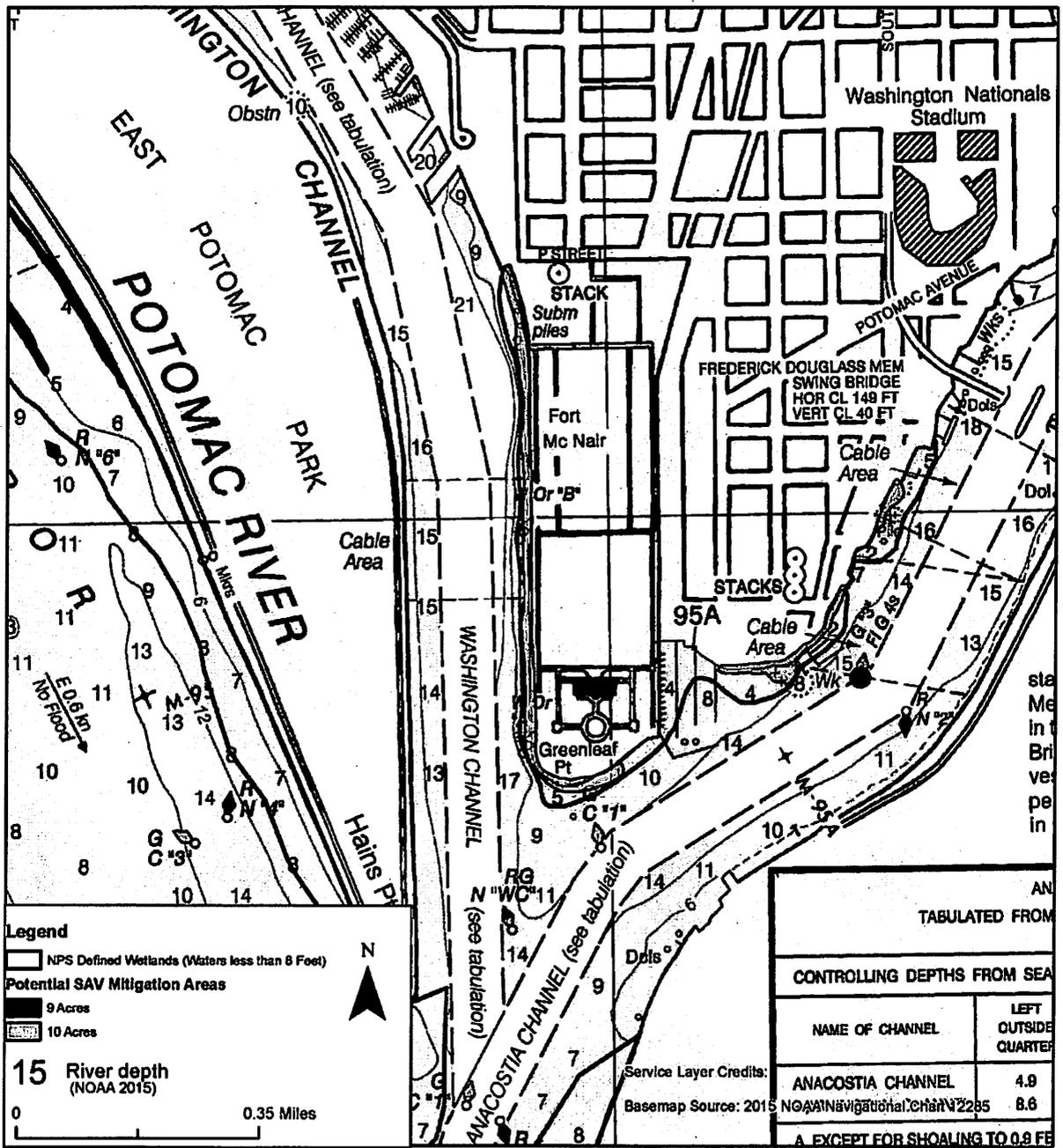
Figure B-9: Tile #4-Potential SAV Mitigation Opportunities



### **Anacostia River Mitigation Opportunities**

The Anacostia River has been devoid of submerged aquatic vegetation since before 1971 as demonstrated by the VIMS historical aerial maps. The absence is largely attributed to poor water quality. High levels of suspended solids and nutrients flow into the Anacostia River from the surrounding watershed. Restoration efforts have focused almost exclusively on improving the water quality of the system. Recently the Anacostia Watershed Society has received a permit to establish a 400 square foot test bed in the tidal Anacostia primarily wild celery (*Vallisneria Americana*). Due to the infancy of the research in establishing grass beds within the Anacostia River it is important to understand the risks. Extensive data would be necessary to further understand the water quality, light penetration, water velocity, and sediment composition. Potential locations based only on water depth have been called out on Figure B-11 and Figure B-12. A total of 240 acres has been identified.

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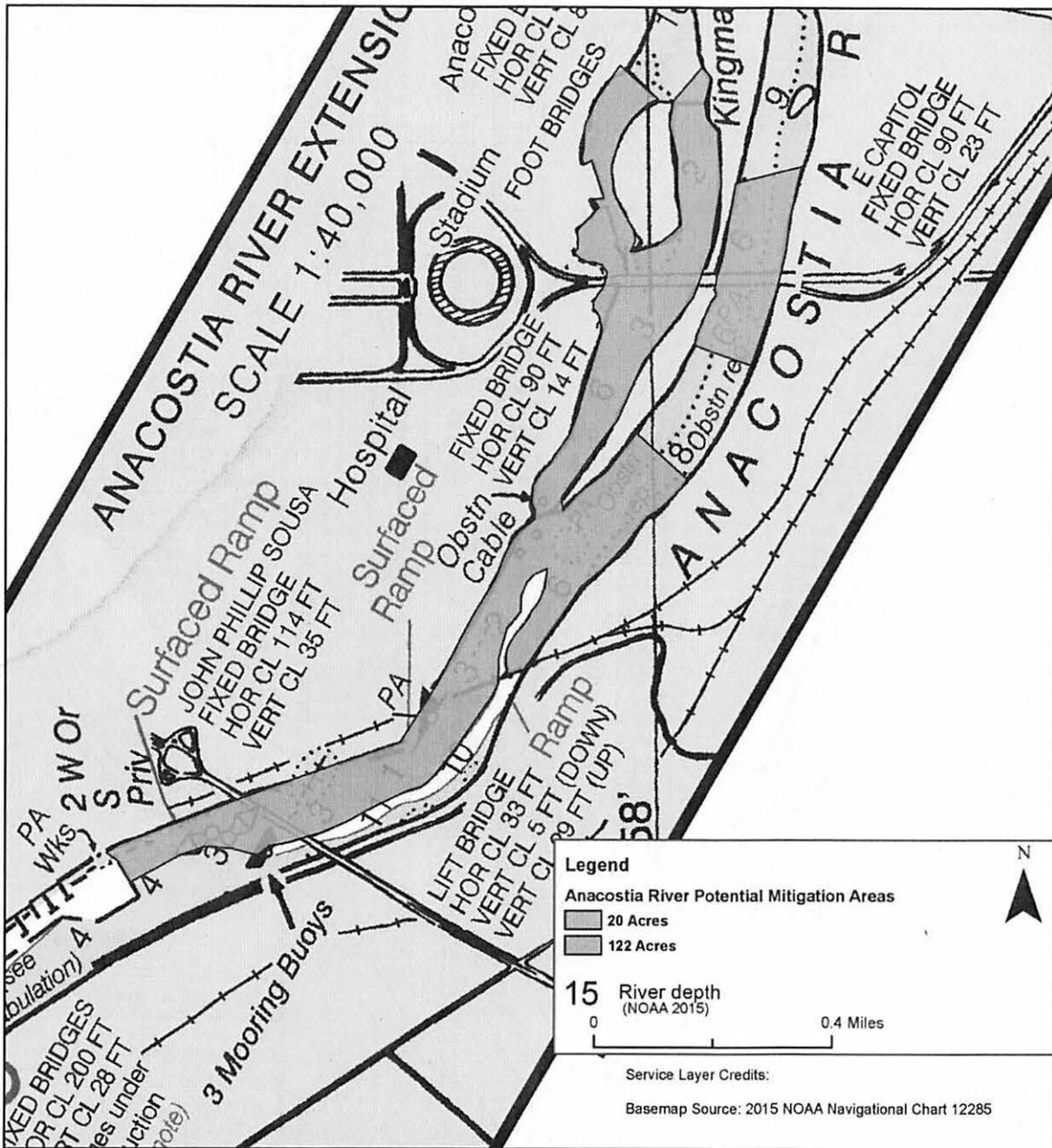


Figure B-12: Tile #7-Potential SAV Mitigation Opportunities

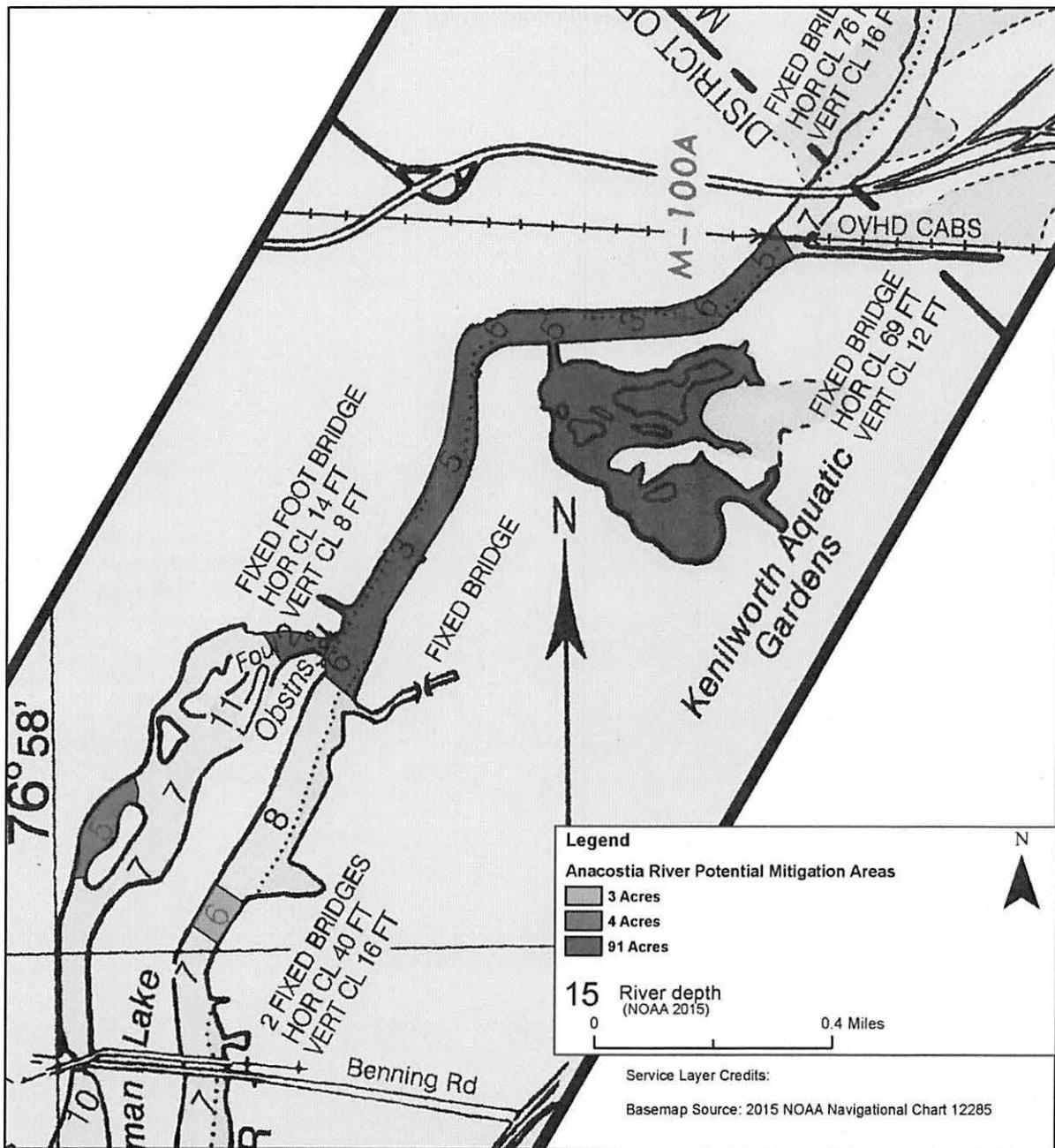


Figure B-13: Tile #8-Potential SAV Mitigation Opportunities

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**APPENDIX H**

**SECTION 106 PROGRAMMATIC AGREEMENT**