

4. Environmental Consequences

Jefferson National Expansion Memorial
Environmental Assessment for Implementing CityArchRiver Initiative Elements



Environmental Consequences

This “Environmental Consequences” chapter analyzes both beneficial and adverse impacts that would result from implementing any of the alternatives considered in this EA. This chapter also includes definitions of impact thresholds (e.g., negligible, minor, moderate, and major), methods used to analyze impacts, and the analysis methods used for determining cumulative impacts. As required by the CEQ regulations implementing NEPA, a summary of the environmental consequences for each alternative is provided in Table 2 which can be found in “Chapter 2: Alternatives.” The resource topics presented in this chapter, and the organization of the topics, correspond to the resource discussions contained in “Chapter 3: Affected Environment.”

GENERAL METHODOLOGY FOR ESTABLISHING IMPACT THRESHOLDS AND MEASURING EFFECTS BY RESOURCE

The following elements were used in the general approach for establishing impact thresholds and/or measuring the effects of the alternatives on each resource category:

- general analysis methods as described in guiding regulations, including the context and duration of environmental effects;
- basic assumptions used to formulate the specific methods used in this analysis;
- thresholds used to define the level of impact resulting from each alternative; and
- methods used to evaluate the cumulative impacts of each alternative in combination with unrelated factors or actions affecting the resources analyzed.

These elements are described in the following sections.

GENERAL ANALYSIS METHODS

The analysis of impacts follows CEQ guidelines and Director’s Order 12 handbook procedures (NPS 2001) and is based on the underlying goal of providing for long-term protection and conservation of cultural and natural resources while implementing CityArchRiver 2015 Initiative projects. This analysis incorporates the best available literature applicable to the region, setting, and the actions being considered in the alternatives.

As described in Chapter 1, the NPS created an interdisciplinary team to provide important input to the impact analysis. For each resource topic addressed in this chapter, the applicable analysis methods are discussed, including assumptions and impact intensity thresholds.

IMPACT THRESHOLDS

Impact thresholds provide the reader with an idea of the intensity of a given impact on a specific topic. The intensity is determined primarily by comparing the effect to relevant/appropriate regulations or guidance, scientific literature and research, or best professional judgment. Because intensity varies by impact topic, impact thresholds are provided separately for each topic analyzed in this document. The definitions of these thresholds are provided throughout the analysis for negligible, minor, moderate, and major impacts. In all cases, the impact thresholds are defined for adverse impacts. Beneficial impacts are addressed qualitatively.

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

Beneficial: A positive change in the condition or appearance of the resource or value.

Adverse: A change that diminishes or degrades a resource or value, or detracts from its appearance or condition.

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

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

Intensity: Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity thresholds are provided separately for each impact topic analyzed.

CUMULATIVE IMPACT ANALYSIS METHODOLOGY

The CEQ regulations implementing NEPA require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as the results of the impact of the proposed action added to the impacts of other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). These impacts can be beneficial or adverse. Cumulative impacts are considered for all alternatives, including the no-action alternative.

The analysis of cumulative impacts was accomplished using four steps:

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

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

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

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

PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, present, or reasonably foreseeable future projects and plans at the park and within the surrounding area. The projects described below were determined to be potential contributors to cumulative impacts on the affected resources, in conjunction with the potential impacts of the alternatives presented in this document. Table 5 identifies the past, present, and future actions that could result in cumulative impacts to the resources of interest for this plan. The past actions considered in this EA are those that have occurred since the publication of the GMP in 2009. As discussed in chapter 1, this document is tiered from the GMP. The present actions considered are those ongoing at the time this EA was prepared. The future actions considered are those not yet occurring but which are planned, programmed, or scheduled for implementation at the time this EA was prepared.

Past Actions

Citygarden. Centered on the Gateway Mall, Citygarden is a recently constructed public sculpture garden bounded by 8th, 10th, Market, and Chestnut Streets. The land is owned by the City of St. Louis, and the sculptures are owned and maintained by the private nonprofit Gateway Foundation. The garden includes 24 sculptures by internationally renowned artists, including Fernand Leger, Mark di Suvero, and Keith Haring, with the landscape designed by Nelson Byrd Woltz. Citygarden had the potential to impact archeological resources, visitor use and experience, and socioeconomics.

Cupples Station Ballpark Lofts. These former warehouses, located west of Busch Stadium, were constructed in the late 1800s and were recently converted into loft condos with commercial/retail space on the first two floors. Renovation plans for other warehouses also include residential, office, and retail space but have not yet been initiated. Cupples Station Ballpark Lofts had the potential to impact socioeconomics.

Hyatt Regency St. Louis Riverfront. Renovations to the hotel were completed in 2010, and include a remodeling of all rooms and renovation of the sports bar, event spaces and lobby restaurant. The Hyatt Regency had the potential to impact socioeconomics.

Old Post Office Plaza. This public space is used for outdoor events such as weekend markets, film series, music, and theater. It is part of the Old Post Office Square area that includes the restored 1884 US Customs House and Post Office, and retail, residential, and office space. The Old Post Office Plaza project had the potential to impact archeological resources, visitor use and experience, and socioeconomics.

Federal Reserve Bank of St. Louis. The existing Federal Reserve Bank office building on Locust Street between North Broadway and 4th Street was renovated, the former Marquette parking garage was remodeled, an existing parking garage was demolished, and an outdoor plaza and a six-story, 100,000-square-foot office addition was constructed. The Federal Reserve Bank had the potential to impact archeological resources and socioeconomics.

Current Actions

Old Courthouse renovations and repairs. The Old Courthouse copper roof was replaced in 2011. Four paintings by Karl Ferdinand Wimar that surround the interior of the rotunda underwent professional cleaning and conservation in 2011 and 2012. Renovation of the stone cornices on the exterior of the building is ongoing, with an expected completion date of December 2012. A life-sized statue of Dred and Harriet Scott was installed in front of the Old Courthouse in June 2012. The following resources could be impacted by the Old Courthouse renovations and repairs: historic buildings, museum collections, soundscape, visitor use and experience, and operations and management.

Eads Bridge Restoration. This structural rehabilitation project includes replacement of support steel, paint removal and repainting, and the repair of MetroLink light rail tracks. The project is expected to be completed by fall 2015. The Eads Bridge Restoration has the potential to impact historic buildings and structures, soundscape, visitor use and experience, and socioeconomics.

The Mercantile Exchange (MX). The Mercantile Exchange complex is being developed to include a hotel, office buildings, a movie theater, and residential and retail space. This project includes the renovation of the One City Centre office building, St. Louis Centre and The Laurel, and the old Dillard's building. The MX will be a full-service retail, dining, entertainment, arts and culture, and residential district along Washington Avenue. Streetscape improvements are planned to include sidewalk cafes, landscaping, and public art. The development also includes space for the proposed National Blues Museum, for which fundraising and planning is ongoing. The Mercantile Exchange has the potential to impact archeological resources, visitor use and experience, and socioeconomics.

Mississippi River Bridge. The I-70 Mississippi River Bridge project will create a new gateway between Illinois and Missouri, providing connections to and throughout St. Louis. It is located one mile north of the Martin Luther King Bridge and is currently under

construction. The four-lane bridge was designed to accommodate construction of a companion bridge in the future. Construction of the bridge will create a partial interchange with existing I-70 near Cass Avenue for local street access. A roadway connection will be constructed between the existing I-55/64/70 Interchange and the new bridge along the I-64 Connector alignment. The following resources could be impacted by the Mississippi River Bridge: archeological resources, soundscape, floodplains, visitor use and experience, and socioeconomics.

Future Actions

Kiener Plaza and streetscape improvements.

As part of the CityArchRiver 2015 Initiative, Kiener Plaza is being redesigned to include elements such as a water feature, a children's play area, concessions, and programming. The roadway along Chestnut Street and Market Street from Tenth Street to Memorial Drive would be narrowed and the sidewalk expanded, creating more visual access to the park for pedestrians. New street trees and landscaping would also be added. The design intends to increase the pedestrian activity and connectivity along the Gateway Mall, from Citygarden through to Luther Ely Smith Square and the park grounds. The following resources could be impacted by the Kiener Plaza and streetscape improvements: archeological resources, historic buildings and structures, visitor use and experience, and socioeconomics.

Construction of the Park Over the Highway structure. The preferred alternative in MoDOT's EA addressing transportation projects adjacent to the park includes the construction of a structure over the depressed section of I-70, to create the park connection over the highway between Market and Chestnut Streets. The existing Washington Avenue ramps for I-70/I-44 would be reversed, allowing the existing five-leg intersection at Washington Avenue and Memorial Drive to be simplified to a four-way intersection and signalized. The existing bridges at the Chestnut, Market, and Walnut Street overpasses would be removed, replaced with the new single span structure between Chestnut and Market Streets, and a new bridge at Walnut Street. The Pine Street bridge would remain and would be converted to pedestrian use. East of

Memorial Drive, the NPS is considering closing all or portions of Washington Avenue to through traffic and so MoDOT is providing for a slip lane off of I-70 to facilitate vehicular access to the Arch Parking Garage should it remain.

The structure over I-70 would close northbound Memorial Drive to through-traffic from Walnut Street to the new Washington Avenue ramps and southbound Memorial Drive between Chestnut Street and Market Street. Traffic around Luther Ely Smith Square would flow from south to north in a clockwise direction, going one-way west on Market Street, one-way north on North 4th Street and one-way east on Chestnut Street. Bus/car pick-up and drop-off would occur on the north and south sides of Luther Ely Smith Square. The structure over I-70 has the potential to impact cultural landscapes, historic buildings and structures, archeological resources, vegetation, soundscape, visitor use and experience, socioeconomics, and operations and management.

Visitor Center/Museum roof replacement. The roof of the Visitor Center/Museum below the Arch (last repaired in the early 1990s) needs to be replaced in order to address leaks. The project is identified by the park as a necessary long-term maintenance project. Installation of the new roof would require the removal of the ground surface above the Visitor Center/Museum roof, directly below the Arch. The existing roof system would be removed and a new roof structure, waterproofing, and drainage installed. The lawn would then be re-graded and seeded to return it to its existing condition. The following resources could be impacted by the Visitor Center/Museum roof replacement: cultural landscapes, museum collections, vegetation, soundscape, water resources, visitor use and experience, and operations and management.

Repair North and South Overlook stairs.

The North and South Overlook stairs need to be repaired to eliminate tripping hazards. The project is identified by the park as a necessary long-term maintenance project. The project would remove cracked and loose surface material to solid substrate and install a new stair system. Construction would be completed at one staircase before construction at the other staircase begins to facilitate visitor

access between the park and the riverfront. The demolition and disposal of the existing step systems at the overlook stairways and the repair of the stairs would follow the intent of the Saarinen site design. The adjacent area would be re-vegetated where any damage occurs during the construction process. The repair of the north and South Overlook Stairs has the potential to impact historic buildings and structures, cultural landscapes, vegetation, soundscape, water resources, visitor use and experience, and operations and management.

Emerald Ash Borer Environmental

Assessment. The Rosehill ash trees in the park, including those that line the Processional Walk, are monitored for the emerald ash borer. Once they are detected to be threatened by the emerald ash borer, the ash trees would be replaced in phases with a species selected by the NPS in accordance with the approved EAB EA (NPS 201b). The EAB EA has the potential to impact soundscape, water resources, and socioeconomic resources. The impacts of the Rosehill ash tree replacement on park vegetation was documented in the approved EAB EA.

Metropolitan St. Louis Sewer District

Improvements. The Metropolitan St. Louis Sewer District (MSD) combined sewer systems throughout the project area are part of a larger regional system that collects and treats domestic, commercial and industrial wastewater from a population of approximately 1.4 million in the City of St. Louis and nearly all of St. Louis County. The system covers more than 525 square miles, and includes seven wastewater treatment plants, 294 pumping stations and more than 9,630 miles of sewer lines, making it the fourth largest sewer system in the United States.

In response to a settlement reached between the United States, the Missouri Coalition for the Environment Foundation and MSD, MSD has agreed to make extensive improvements to its sewer systems and treatment plants, at an estimated cost of \$4.7 billion over the next 23 years, to eliminate illegal overflows of untreated raw sewage, including basement backups, and to reduce pollution levels in urban rivers and streams.

MSD will install a variety of pollution controls, including the construction of three large storage tunnels, and expand capacity at two treatment plants. These controls and similar controls that MSD has already implemented will result in the reduction of almost 13 billion gallons per year of overflows into nearby streams and rivers.

MSD will also develop and implement a comprehensive plan to eliminate more than 200 illegal discharge points within its sanitary sewer system as well as comprehensive and proactive cleaning, maintenance and emergency response programs to improve sewer system performance and to eliminate overflows.

MSD will also substantially advance the use of large scale green infrastructure projects to control wet weather sewer overflows by investing at least \$100 million in an innovative green infrastructure program. Green infrastructure involves the use of properties to store, infiltrate and evaporate stormwater to prevent it from getting into the combined sewer system. Examples of potential green infrastructure projects include green roofs, bioretention, green streets, rain barrels, rain gardens and permeable pavement (US EPA 2011). The Metropolitan St. Louis Sewer District Improvements has the potential to impact water resources.

Poplar Street Bridge Improvements. The project would remove the eastbound ramp from I-70 to the Poplar Street Bridge and provide a two-lane onramp to the Poplar Street Bridge from northbound I-55 as well as widen the eastbound section of the Poplar Street Bridge to add a third eastbound I-64 lane over the bridge. These improvements would help to accommodate eastbound traffic accessing Illinois communities south of I-64 and ease congestion on the eastbound lanes of the Poplar Street Bridge and would occur after completion of the Mississippi River Bridge construction. The Poplar Street Bridge Improvements have the potential to impact transportation resources.

Table 5 Cumulative Action Scenario

Impact Topic	Study Area	Past Actions	Current Actions	Future Actions
Historic Buildings, Structures, Sites, Objects, and Districts; and Cultural Landscapes	The cultural resources impact area as defined in this EA is depicted in Figure 23 of the Affected Environment Section.	NA	Old Courthouse renovations and repairs; Eads Bridge Restoration	Construction of Park Over the Highway structure; Kiener Plaza; Visitor Center/ Museum roof replacement; Repair North and South Overlook stairs; Poplar Street Bridge improvements
Archeological Resources	Historic downtown St. Louis	Citygarden; Old Post Office Plaza; Federal Reserve Bank of St. Louis	The Mercantile Exchange; Mississippi River Bridge	Kiener Plaza; Construction of Park Over the Highway structure; Poplar Street Bridge improvements
Museum Collections	Park boundary	NA	Old Courthouse renovations and repairs	Visitor Center/ Museum roof replacement
Vegetation	Park boundary and Central Riverfront	NA	NA	Visitor Center/ Museum roof replacement; Repair North and South Overlook stairs; Construction of Park Over the Highway structure
Soundscape	Park boundary and Central Riverfront	NA	Old Courthouse renovations and repairs; Eads Bridge Restoration; Mississippi River Bridge	Construction of Park Over the Highway structure; Visitor Center/ Museum roof replacement; Emerald Ash Borer Environmental Assessment; Repair North and South Overlook stairs; Poplar Street Bridge improvements
Floodplains	Central riverfront	NA	Mississippi River Bridge	NA

Impact Topic	Study Area	Past Actions	Current Actions	Future Actions
Water Resources	Park boundary, Central Riverfront, and the Mississippi River adjacent to the park	NA	NA	Visitor Center/ Museum roof replacement; Repair North and South Overlook stairs; Emerald Ash Borer Environmental Assessment; Construction of Park Over the Highway structure; Metropolitan St. Louis Sewer District Improvements
Visitor Use and Experience	Park boundary, Central Riverfront, downtown St. Louis area adjacent to the park	Citygarden; Old Post Office Plaza; Eads Bridge Restoration	Old Courthouse renovations and repairs; Mississippi River Bridge; The Mercantile Exchange	Visitor Center/ Museum roof replacement; Repair North and South Overlook stairs; Kiener Plaza and streetscape improvements; Construction of Park Over the Highway structure; Poplar Street Bridge improvements
Socioeconomics	Park boundary, Central Riverfront, downtown St. Louis area adjacent to the park	Citygarden; Cupples Station Ballpark Lofts; Hyatt Regency St. Louis Riverfront; Federal Reserve Bank of St. Louis; Old Post Office Plaza; Eads Bridge Restoration	Old Courthouse renovations and repairs; The Mercantile Exchange; Mississippi River Bridge	Visitor Center/ Museum roof replacement; Repair North and South Overlook stairs; Emerald Ash Borer Environmental Assessment; Kiener Plaza and streetscape improvements; Park Over the Highway structure; Poplar Street Bridge improvements
Operations and Management	Park boundary	NA	Old Courthouse renovations and repairs	Visitor Center/ Museum roof replacement; Repair North and South Overlook stairs; Park Over the Highway structure

CULTURAL RESOURCES

METHODOLOGY AND ASSUMPTIONS FOR ASSESSING IMPACTS

In this environmental assessment impacts to cultural resources are evaluated consistent with the CEQ regulations implementing NEPA by (1) determining the cultural resources impact area; (2) identifying cultural resources present in this area that are either listed in, or eligible to be listed in, the National Register of Historic Places; (3) evaluating the type, context, duration, and intensity of impacts to National Register eligible or listed cultural resources; and (4) considering ways to avoid, minimize or mitigate adverse effects. These impact analyses are not intended, however, to comply with the requirements of Section 106 of the National Historic Preservation Act (a separate consultation process for compliance with Section 106 has been initiated; see chapter 5 for additional details).

CEQ regulations and the National Park Service's Director's Order 12 also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only and does not suggest that an adverse effect under Section 106 of the National Historic Preservation Act has been avoided. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse.

The NPS guidance for evaluating impacts (DO-12: Conservation Planning, Environmental Impact Analysis, and Decision Making; NPS 2001) requires that impact assessment be scientific, accurate, and quantified to the extent possible. For cultural resources, it is seldom possible to measure

impacts in quantifiable terms; therefore, impact thresholds must rely heavily on the professional judgment of resource experts.

HISTORIC BUILDINGS, STRUCTURES, SITES, OBJECTS, AND DISTRICTS PARKWIDE STRATEGIES

Cultural Resources Impact Area

The cultural resources impact area encompasses the park boundaries, the Central Riverfront, and historic buildings, structures, sites, objects, districts in the immediate vicinity of the project area that are listed on, or determined eligible for listing on, the National Register, or listed in the City Landmarks Registry. It also includes cultural landscapes as identified by the National Park Service. The cultural resources impact area is bounded by Biddle Street to the north, Leonor K. Sullivan Boulevard and the levee to the east, and Chouteau Avenue to the south. The western boundary includes several demarcations: I-55 south of the park, Broadway along the park edge including two blocks further west to encompass Kiener Plaza, and I-70 north of the MLK Bridge. A graphic depicting the cultural resources impact area is provided in chapter 3.

Impact Thresholds

For purposes of analyzing potential impacts on historic buildings, structures, sites, objects and districts, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impacts would be at the lowest levels of detection – barely measurable with no perceptible consequences.

Minor: Impacts would affect character-defining features but would not diminish the overall integrity of the building, structure, site, object or district.

Moderate: Impacts would alter a character-defining feature(s), diminishing the overall integrity of the building, structure, site, object or district. A programmatic agreement is executed among the National Park Service, applicable state or tribal historic preservation officer, and the Advisory Council on Historic

Preservation in accordance with 36 CFR 800.14(b). Measures identified in the programmatic agreement to minimize or mitigate adverse impacts reduce the intensity under NEPA from major to moderate.

Major: Impacts would alter a character-defining feature(s), diminishing the overall integrity of the building, structure, site, object or district. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a programmatic agreement in accordance with 36 CFR 800.14(b).

Duration: Short-term impacts would occur during construction. Long-term impacts would continue or occur after construction is complete.

Impacts of the Alternatives

Alternative 1: No-Action Alternative

Under alternative 1, the NPS would landscape the surface of the Park Over the Highway structure after MoDOT completes its construction, as discussed in Cumulative Impacts. During construction of the landscape, activities such as grading, planting, and staging would be evident in the short term and have an impact on the NHL District's character due to the disturbance of character-defining features such as vegetation and topography. This construction-period change would be reversed once the construction was completed, so would not constitute a permanent disruption or diminishment of the historic integrity of the district.

The Park Over the Highway landscaping would create continuous green space between Luther Ely Smith Square and the park grounds would provide enhanced setting and pedestrian access, both of which are in keeping with Saarinen/Kiley's unrealized design goal of better connecting these sections of the park. It could also change the NHL District due to alterations to the topography and planting, which may alter the visual relationship between the Old

CHARACTER-DEFINING FEATURE

— A prominent or distinctive aspect, quality, or characteristic of a historic property that contributes significantly to its physical character. Structures, objects, vegetation, spatial relationships, views, furnishings, decorative details, and materials may be such features.

Courthouse and the Arch. Measures would be taken to minimize the impact of topographic changes, which would be subject to additional design review requirements and Section 106 compliance to ensure the integrity of the NHL District.

In this alternative, few other changes to the existing condition of the historic buildings, structures, sites, objects, and districts would occur. Historic properties would retain their integrity and remain in their current conditions. The Old Courthouse would remain largely unchanged in appearance and function; however, the addition of an exterior lift for accessibility purposes would not have a substantial impact to the building's structure, but would be visible as a noticeable but small change to the building's exterior appearance. In contrast to the action alternatives, with the exception of the creation of the Park Over the Highway landscape, no other noticeable changes would occur in the park or along the levee.

Parkwide and locally, construction-related impacts under the no-action alternative would result in short-term minor adverse impacts to character-defining features of the NHL District such as vegetation and topography. The addition of the Park Over the Highway landscaping would also have long-term minor adverse impacts to these features, but would also have long-term beneficial impacts for example on the setting of the NHL District.

Cumulative Impacts for Alternative 1

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have

potential impacts on historic buildings, structures, sites, objects, and districts include:

- Old Courthouse renovations and repairs
- Visitor Center/Museum roof replacement
- Repair North and South Overlook stairs
- Construction of the Park Over the Highway structure
- Kiener Plaza
- Poplar Street Bridge improvements

The Old Courthouse renovations and repairs are ongoing, and are expected to improve the condition of the historic building, as well as maintain and enhance its integrity. The replacement of the roof on the underground Visitor Center/Museum is anticipated to occur whether or not the action alternatives occur. During the construction period, the roof replacement would require extensive ground surface and structural disturbance to the Visitor Center/Museum as well as the lawn within the park's primary axis and vista directly beneath the Arch. However, the long-term impacts would be beneficial due to the roof repair; the reduction in leaks would benefit the historic structure as well as the collections maintained within it. The repair of the North and South Overlook stairs would occur in the future to eliminate hazards and repair degraded materials. It is expected to result in negligible short-term disturbance within the NHL District during construction that would dismantle the stairs and limit access, but would support the historic integrity and condition of the structure and the district in the long term due to the resource being repaired and hazards eliminated. The construction of the Park Over the Highway structure over I-70 would require demolition, excavation, grading, construction and staging activities, and disruptions to pedestrian circulation in the West Gateway. This construction-period change would be finished once the construction was completed, so it would not constitute a permanent disruption or diminishment of the historic integrity of the district. The construction at Kiener Plaza

and surrounding streetscape as well as the Poplar Street Bridge improvements would involve construction and staging activities in the short-term that would be visible from adjacent historic structures and districts.

The no-action alternative, as noted above, would result in minor short- and long-term adverse impacts to historic buildings, structures, sites, objects, and districts. Combined with the other past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse and long-term minor adverse as well as beneficial impacts to historic buildings, structures, sites, objects, and districts. However, this alternative would contribute minimally to those impacts.

Alternative 2: Moderate Change

During construction, disruption to traffic, grading, and other construction-related impacts would be evident in the short term and have an effect on the NHL District's character due to the disturbance of character-defining features such as vegetation, topography, and circulation features. This construction-period change would be reversed once the construction was completed, so it would not constitute a permanent disruption or diminishment of the historic integrity of the district. The historic buildings and structures, objects, and sites within the park would only be affected by temporary alterations of appearance (scaffolding, fencing) to protect visitors or resources during the construction period.

The most noticeable long-term adverse impacts would result from the proposed accessibility changes that would affect the Gateway Arch and the Visitor Center/Museum. The addition of both interior and exterior ramps, handrails, guardrails, and security would alter the structure and the entrance/exit experience of visitors as designed by Saarinen. The Park Over the Highway could change the NHL District due to alterations to the topography and planting, which may alter the visual relationship between the Old Courthouse and the Arch. Changes to the Old Courthouse to provide additional access to the first and second

floors would affect the Old Courthouse due to the addition of ramps on the south façade, ramps at the doors, and elevators in the interior; these changes, as well as renovation of galleries and installation of new exhibits on the first and second floors would alter the appearance of the building and may also result in modification to its historic materials (for example, to install elevator mechanisms).

Changes that would noticeably affect historic buildings, structures, sites, objects, and districts in minor ways include topographic alterations, such as grading around the North and South Ponds and along the East Slopes for accessible paths and to control stormwater runoff. The alteration to adjacent topography would change the landform within the grounds adjacent to character-defining features of the NHL district such as the overlooks, Grand Staircase, and railroad tunnels. The addition of two to four accessible paths on the East Slopes would require extensive grading, similarly changing the surrounding topography and therefore the visitor's experience as intended by Kiley-Saarinen. The proposed changes at the Reflecting Ponds have the potential to affect character-defining features of the NHL District, and as a result, the historic setting of the Gateway Arch. They also have the potential to affect the setting of adjacent historic properties such as the Old Cathedral.

The establishment of a continuous security perimeter would affect the Grand Staircase and overlooks as bollards are proposed to be placed at the foot of each of these, creating a visual barrier that alters the structure's character. Alterations to Luther Ely Smith Square, which is part of the setting of the Old Courthouse and adjacent historic buildings such as the International Fur Exchange, would result in increased traffic and idling vehicles along some of the streets around the square as visitors are dropped off. The increased traffic and idling could affect the historic buildings due to increased air pollution from particles from exhaust that are known to cause soiling and damage on historic façade materials such as stonework.

Also, the proposed changes to the Central Riverfront would noticeably affect character-defining features of the NHL District including the North and South Overlooks and the Grand Staircase due to the raising of Leonor K. Sullivan Boulevard's elevation, which would change the relationship of these features to the street, possibly impacting the structure of the staircase and the overlook walls' distinct curved form which is character-defining. The Central Riverfront project would not physically alter the historic fabric of the Eads Bridge, but the addition of fill adjacent to the footings of the bridge would have the potential to alter the visual setting of the bridge, and could obscure portions of the historic structure from view. These changes would also alter the historic levee along the Mississippi River by changing the relationship of the road and the levee, possibly resulting in the removal or alteration of some of the levee's historic cobblestone materials.

The proposed planting plan and mowing regime in this alternative would not noticeably affect historic buildings, structures, sites, objects, and districts due to the minimal changes proposed, compared to the vegetation's existing appearance. The identified historic buildings, structures, sites, objects, and districts outside the park boundary and within the Cultural Resources Impact Area would in general not be affected by the proposed alternative as it is not visible from the vast majority of them and the physical changes are small and localized. The Central Riverfront project would not have a noticeable impact on the historic buildings that compose the Laclede's Landing historic district, although the grade change at Leonor K. Sullivan Boulevard along the riverfront would potentially change the relationship of the street grades to the levee where they meet.

Some beneficial impacts are expected to arise from this alternative. Proposed changes to the Processional Walks would enhance character-defining features of the NHL District as well as the setting of the Gateway Arch. The repair of drainage and surfacing, potential addition of cobbles per the Kiley-Saarinen design, as well as replacement of the declining ash

planting with a tree species in a form closer to the design intent, would have an overall beneficial impact. Likewise, between Luther Ely Smith Square and the park grounds the addition of continuous green space would provide an enhanced setting and pedestrian access, both of which are in keeping with Saarinen/Kiley's unrealized design goal of better connecting these sections of the park; this would benefit historic resources. Proposed changes at the East Slopes would include denser woodland plantings that would enhance the intended appearance of this area, in keeping with how it was designed by Kiley-Saarinen. In the Central Riverfront, there would be improved protection from the river flooding that currently causes risks to the concrete structure of the overlooks and the Grand Staircase.

Mitigation measures would be undertaken to minimize the impact of alterations, such as topographic and visual changes, which would be subject to additional design review requirements and Section 106 compliance to ensure the integrity of the NHL District and the historic resources in the Area of Potential Effects identified in the programmatic agreement developed during the Section 106 process. The programmatic agreement includes the establishment of a Collaborative Design Review Team to review draft schematic and design documents, evaluate how projects may affect resources within the Section 106 Area of Potential Effects, and make recommendations to avoid any adverse effects.

Parkwide and locally, construction-related impacts under alternative 2 would result in short-term moderate adverse impacts to character-defining features of the NHL district such as vegetation and topography, as well as temporary alterations of appearance. The addition of interior and exterior ramps into the Visitor Center/Museum, accessibility modifications at the Old Courthouse, paths around the North and South ponds and along the East Slopes, noticeable changes to character-defining features of the park along the Central Riverfront, and the addition of the Park Over the Highway landscaping

would also have parkwide and local long-term moderate adverse impacts to character-defining features of the NHL district, such as vegetation and topography. Negligible to minor short-term and long-term impacts on resources outside the park boundary within the cultural resources impact area would occur due to changes to the relationship between Leonor K. Sullivan Boulevard and the historic levee and the addition of fill adjacent to the Eads Bridge footings. The Park Over the Highway landscaped connection, replacement of ash trees and repair of the Processional Walks, and additional plantings on the East Slopes would also have long-term beneficial impacts to other character-defining features such as circulation features and the setting of the NHL District.

Cumulative Impacts for Alternative 2

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on historic buildings, structures, sites, objects, and districts include the same projects discussed under alternative 1, the no-action alternative, earlier in this chapter. Cumulative projects described in alternative 1 that are expected to be incorporated into the design and construction process under alternative 2 include the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs.

Alternative 2, as noted above, would involve some alteration of historic buildings, structures, sites, objects, and districts, in particular through changes to their settings and addition of accessibility and security measures that alter the visual character of the resources or their settings. Combined with the other past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse and long-term moderate adverse as well as beneficial impacts to historic buildings, structures, sites, objects, and districts. The coordination of these projects with the implementation of alternative 2 would serve to lessen the short-term impacts of each project occurring on its own.

Alternative 3: Maximum Change

During construction, disruption to traffic, grading, and other related impacts would be evident in the short term and would have an effect on the NHL District's character due to the disturbance of character-defining features such as vegetation, topography, and circulation features. This construction-period change would be finished once the construction was completed, so it would not constitute a permanent diminishment of the historic integrity of the district. The historic buildings and structures, objects, and sites within the park would only be affected by temporary alterations of appearance (scaffolding, fencing) to protect visitors or resources during the construction period.

The greatest impacts would result from the addition and alterations to the Visitor Center/Museum and the West Gateway area. In alternative 3, changes at the West Gateway have the potential to affect the NHL District, the Gateway Arch, the Visitor Center/Museum, and the Old Courthouse; and adjacent historic buildings such as the International Fur Exchange on the south side of Luther Ely Smith Square. The addition of grade changes and new structures to add a new West Entrance to the Visitor Center/Museum would reshape this section of the park landscape, resulting in some changes to the settings of the adjacent historic properties, as well as altering the physical fabric of the Visitor Center/Museum and the NHL District along its primary view axis between the Old Courthouse and the river. The new glass façade would have a direct visual connection to the Old Courthouse and the existing berm height would be modified, altering the visual relationship between the Old Courthouse and the Arch. The use of this area as the park's main entryway would result in increased bus and car traffic at the proposed drop-off area at Luther Ely Smith Square, which could affect historic buildings and structures surrounding the square due to increased air pollution from particles from exhaust that are known to cause soiling and damage on historic façade materials such as stonework. Proposed accessibility changes would affect the Gateway Arch and the Visitor Center/

Museum through the addition of interior and exterior ramps, handrails, guardrails, and security features that would alter the structure and the entrance/exit experience of visitors as designed by Saarinen.

Changes that would noticeably affect historic buildings, structures, sites, objects, and districts in minor ways include topographic alterations, such as grading around the North and South Ponds and along the East Slopes for accessible paths and to control stormwater runoff. The alteration to adjacent topography would change the landform surrounding the overlooks, Grand Staircase, and railroad tunnels within the NHL district. The addition of two to four accessible paths on the East Slopes would require extensive grading, similarly changing the surrounding topography and therefore the visitor's experience as intended by Kiley-Saarinen. The proposed changes at the Reflecting Ponds have the potential to affect character-defining features of the NHL District, which comprises the historic setting of the Gateway Arch. They also have the potential to affect the setting of adjacent historic resources such as the Old Cathedral.

In this action alternative, similar to the impacts discussed in alternative 2, the proposed changes to the Old Courthouse would affect this historic building due to addition of ramps to the building exterior and elevators in the interior, as well as renovation of galleries and installation of new exhibits on the first and second floors. In addition, the proposed changes to the Central Riverfront, as described in alternative 2, would affect character-defining features of the NHL District including the North and South Overlooks and the Grand Staircase due to the raising of Leonor K. Sullivan Boulevard's elevation. These changes would also affect the Eads Bridge and the historic levee along the Mississippi River, also as noted above in alternative 2. Some actions, such as the proposed planting and mowing regime (similar to the one discussed in alternative 2), would not have a detectable impact upon historic buildings, structures, sites, objects, and districts.

Some beneficial impacts would occur under alternative 3. The proposed addition of planted park connection across I-70 would have a beneficial impact on historic buildings, structures, sites, objects, and districts, as described under alternative 2 above. In alternative 3, changes proposed at the North Gateway would be beneficial, as removal of the non-historic parking garage would enhance the setting of character-defining features of the NHL District as well as adjacent resources such as Eads Bridge, the Laclede's Landing Historic District, and the North Overlook. Another beneficial result of eliminating the Arch Parking Garage would be the opening up of views between the park and the Eads Bridge, as well as a visual connection between Laclede's Landing and the park through the four portals underneath the Eads Bridge. In this action alternative, proposed changes at the East Slopes could have beneficial impacts on character-defining features of the NHL District including the railroad tunnel cuts and Grand Staircase due to the addition of denser woodland plantings that would enhance the intended appearance of this area, in keeping with how it was designed by Kiley-Saarinen. Proposed changes to the Processional Walks would have beneficial impacts on character-defining features of the NHL District as well as the setting of the Gateway Arch, as the repair of drainage and surfacing, the potential addition of cobbles per Kiley-Saarinen design, as well as replacement of the declining ash planting with a tree species closer to the design intent would have an overall beneficial impact. There would also be beneficial impacts due to improved protection from flooding that currently causes risks to the concrete structure of the overlooks and the Grand Staircase.

Mitigation measures and additional design review requirements and Section 106 compliance would occur as described under alternative 2.

Parkwide and locally, construction-related impacts under alternative 3 would result in short-term moderate adverse impacts to character-defining features of the NHL district such as vegetation and topography, as well as temporary alterations of appearance.

The addition of the new West Entrance façade and its associated vegetation, circulation, and topographic changes, the installation of interior and exterior ramps into the Visitor Center/Museum, accessibility modifications at the Old Courthouse, paths around the North and South ponds and along the East Slopes, and noticeable changes to the park landscape along the Central Riverfront would have parkwide and local long-term moderate adverse impacts to character-defining features of the NHL District, such as vegetation and topography. Negligible to minor short-term and long-term impacts on resources outside the park boundary within the cultural resources impact area would occur due to changes to relationship between Leonor K. Sullivan Boulevard and the historic levee and the addition of fill adjacent to the Eads Bridge footings. The Park Over the Highway landscaped connection, the removal of the non-historic Arch Parking Garage, replacement of ash trees and repair of the Processional Walks, and additional plantings on the East Slopes would have long-term beneficial impacts to other character-defining features such as circulation features and the setting of the NHL District.

Cumulative Impacts for Alternative 3

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on historic buildings, structures, sites, objects, and districts include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 3, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs. This coordination would serve to lessen the short-term impacts of each project occurring on its own.

Alternative 3, as noted above, would involve some alteration of historic buildings, structures, sites, objects, and districts, in particular through changes to their settings and addition of accessibility and security measures that alter the visual character of the resources or their settings. Combined

with the other past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse and long-term moderate adverse as well as beneficial impacts to historic buildings, structures, sites, objects, and districts.

CULTURAL LANDSCAPES

Study Area/Impact Area

The cultural landscape impact area encompasses the park boundaries, the Central Riverfront, and cultural landscapes identified by the NPS in the immediate vicinity of the project area. The cultural landscape impact area is bounded by Biddle Street to the north, Leonor K. Sullivan Boulevard and the levee to the east, and Chouteau Avenue to the south. The western boundary includes several demarcations: I-55 south of the park, Broadway along the park edge including two blocks further west to encompass Kiener Plaza, and I-70 north of the MLK Bridge. A graphic depicting the cultural landscape impact area is provided on page 64 of chapter 3.

Impact Thresholds

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

Negligible: Impacts would be at the lowest levels of detection-barely measurable with no perceptible impacts.

Minor: Impacts to a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the landscape.

Moderate: Impacts to a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. A programmatic agreement is executed among the National Park Service, applicable state or tribal historic preservation officer, and the Advisory Council on Historic Preservation in accordance with 36 CFR 800.14(b). Measures identified in the programmatic agreement to minimize or mitigate adverse impacts reduce the intensity under NEPA from major to moderate.

Major: Impacts to a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a programmatic agreement in accordance with 36 CFR 800.14(b).

Duration: Short-term impacts would occur during construction. Long-term impacts would continue or occur after construction is complete.

IMPACTS OF THE ALTERNATIVES

Alternative 1: No-Action Alternative

NPS would landscape the surface of the Park Over the Highway structure under alternative 1 after MoDOT completes its construction, as discussed in Cumulative Impacts. During construction of the landscape, activities such as grading, planting, and staging would be evident and would have an impact on the cultural landscape's character in the short term due to temporary alteration of appearance such as excavation, loss of vegetation, or fencing.

The landscaping of the Park Over the Highway would change the cultural landscape by altering the topography, planting, and visual relationship along the primary axis between the Old Courthouse and the Arch. The Park Over the Highway landscape would also enhance the primary axial connection between the Old Courthouse, Arch, and river, and would be in keeping with Saarinen/Kiley's unrealized design goal of better connecting these sections of the park.

The Processional Walks, an important cultural landscape feature together with its adjacent allées of trees, would be maintained. Please see the approved EAB EA for detailed assessment of the plans to address the possible threat of the emerald ash borer on the Rosehill ash trees in the park, including the allées (NPS 201b).

The Central Riverfront would remain largely unchanged; the features of the cultural landscape including the North and South Overlooks and Grand Staircase would continue to risk periodic damage by river flooding that could result in the loss of the resource over time.

The East Slopes and Reflecting Ponds would remain unchanged, with plantings and lawn retaining their current non-historic appearance, as rehabilitation of its historic, denser planted appearance would not be undertaken.

The Park Over the Highway landscape could result in perceptible changes to the cultural landscape of the West Gateway. Mitigation measures would be undertaken to minimize the impact of alterations, such as topographic and visual changes, which would be subject to additional design review requirements and Section 106 compliance to ensure the integrity of the cultural landscape. This alternative would not result in perceptible changes to cultural landscape features elsewhere in the park, including the Gateway Arch; the overall designed landform and spatial organization; the designed views; the system of Processional Walks; the single-species allées; the two ponds; the overlooks, including the stairs; the railroad open cuts and tunnels; the Grand Staircase; the baldcypress circles; the screen plantings and depressed service areas; the entrance ramps into the Gateway Arch; and the concrete benches.

Parkwide, the no-action alternative would have short-term minor adverse impacts due to construction activities that would disrupt cultural landscape features such as vegetation and views. The Park Over the Highway landscape alterations to the visual relationship between the Old Courthouse and the Arch and retention of portions of the park landscape with non-historic appearances would have long-term minor adverse impacts to the Jefferson National Expansion Memorial cultural landscape. However, the Park Over the Highway would also have long-term beneficial impacts by enhancing the primary axial connection between the Old Courthouse, the park, and the river.

Cumulative Impacts for Alternative 1

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on cultural landscapes include:

- Construction of the Park Over the Highway structure
- Visitor Center/Museum roof replacement
- Repair North and South Overlook stairs

The construction of the Park Over the Highway structure over I-70 would require demolition, excavation, grading, and other construction and staging activities in the West Gateway. It would connect Luther Ely Smith Square to the western portion of the park over the I-70 depressed highway and change some associated traffic patterns. It is expected to have a beneficial impact on the cultural landscape as it would implement an unrealized connection that is part of the Saarinen/Kiley conceptual design for the park; and it would reduce the noise and views of the highway below, reinforcing and strengthening the main axis of the park design, without appreciably altering character-defining features of the cultural landscape.

The replacement of the roof on the underground Visitor Center/Museum would require extensive temporary ground surface disturbance to the lawn within the park's primary axis and vista directly beneath the Arch. The repair of the North and South Overlook stairs would also require temporary ground disturbance and during construction.

The no-action alternative, as noted above, would involve short- and long-term minor adverse impacts to the cultural landscape, as well as beneficial impacts. Combined with the other past, present, and reasonably foreseeable future actions, there would be short- and long-term minor adverse and long-term beneficial impacts to the cultural landscape. However, this alternative would contribute minimally to those impacts.

Alternative 2: Moderate Change

During construction, disruption to traffic, grading and excavation, and other construction-related impacts would be evident and would have an impact on the cultural landscape's character. The cultural landscape parkwide and locally would be affected by limiting of access to different areas as construction is phased, and temporary alteration of appearance (excavation, loss of vegetation, fencing) to protect visitors or resources during the construction period.

Under this alternative, the proposed changes that would most affect the character-defining features of the cultural landscape in the long-term include those planned for accessibility and involving topographic change. The landscaping of the Park Over the Highway would change the cultural landscape due to alterations to the topography and planting that may alter the visual relationship along the primary axis between the Old Courthouse and the Arch. The alterations to Luther Ely Smith Square would also enhance the primary axial connection between the Old Courthouse, Arch, and river, resulting in a beneficial impact from the landscaping of the Park Over the Highway structure over I-70, in keeping with Saarinen/Kiley's unrealized design goal of better connecting these sections of the park.

Grading around the North and South Ponds for accessible paths would affect the ponds and views in these areas as well as the sculpted topography of the pond areas. The addition of accessible paths on the East Slopes connecting the park to the riverfront would affect the sculpted topography and processional routes, and thus alter the visitor's experience as intended by Kiley-Saarinen. New accessibility ramps at the Arch legs; and park perimeter walls and bollards would noticeably alter the cultural landscape. Slight regrading in the northwest corner of the park and the addition of accessible paths on the East Slopes and pond areas would result in minor, but noticeable, impacts to the overall landform and spatial organization. The proposed changes to the Central Riverfront could noticeably alter character-defining features of the cultural landscape including

the North and South Overlooks and the Grand Staircase due to the raising of Leonor K. Sullivan Boulevard's elevation.

Some beneficial impacts are expected to arise from this alternative. For example, / proposed changes to the Processional Walks including repair of drainage and surfacing, the potential addition of cobbles per Kiley-Saarinen design, and replacement of the declining ash planting with a tree species in a form closer to the design intent would have a beneficial impact on the cultural landscape. Proposed new planting on the East Slopes with a denser woodland character would enhance the intended appearance of this area, in keeping with how it was designed and originally planted. In the Central Riverfront area, improved protection from river flooding by raising Leonor K. Sullivan Boulevard would be beneficial, protecting the park landscape more effectively from damage and erosion by river flooding. Mitigation measures would be undertaken to minimize the impact of alterations to the landscape, such as topographic and spatial organization changes, which would be subject to additional design review requirements and Section 106 compliance to ensure the integrity of the cultural landscape. The programmatic agreement includes the establishment of a Collaborative Design Review Team to review draft schematic and design documents, evaluate how projects may affect resources within the Section 106 Area of Potential Effects, and make recommendations to avoid any adverse effects.

Parkwide, alternative 2 would have short-term moderate adverse impacts due to construction activities that would disrupt the cultural landscape, including vegetation, topography, and views. Long-term minor adverse parkwide and local impacts to the Jefferson National Expansion Memorial cultural landscape would occur due to the Park Over the Highway landscape alterations to the visual relationship between the Old Courthouse and the Arch, changes to the sculpted topography due to the addition of paths around the ponds and at the East Slopes, as well as the addition of interior and exterior ramps at the Visitor Center/Museum, and the changes to character-defining features

of the landscape such as changes to the North and South Overlooks and the Grand Staircase. Long-term beneficial impacts on the cultural landscape would occur under alternative 2 due to the addition of the landscaped Park Over the Highway that would reinforce the Saarinen/Kiley design intent for a connection. In addition, the replacement of the ash trees and repair of the Processional Walks, as well as the replanting of the East Slopes would be in keeping with the Saarinen/Kiley design intent and would enhance the cultural landscape.

Cumulative Impacts for Alternative 2

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on cultural landscapes include the same projects discussed under alternative 1, the no-action alternative, earlier in this section. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 2, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs.

Alternative 2, as noted above, would involve some alteration of cultural landscapes. Combined with the other past, present, and reasonably foreseeable future projects, there would be short-term moderate and long-term minor adverse impacts to the cultural landscape. There would also be beneficial impacts. The coordination of these projects with the implementation of alternative 2 would serve to lessen the short-term impacts of each project occurring on its own.

Alternative 3: Maximum Change

During construction, disruption to traffic, grading and excavation, and other related impacts would have an impact on the cultural landscape. The cultural landscape parkwide and locally would be affected by limiting of access to different areas as construction is phased, and temporary alteration of appearance (excavation, loss of vegetation, fencing) to protect visitors or resources during the construction period.

The greatest impacts to the cultural landscape would result from the addition and alterations to the Visitor Center/Museum and especially in the West Gateway area. In alternative 3, changes at the West Gateway have the potential to affect the overall landform and spatial organization of the park, altering the cultural landscape's appearance, such as the current visual axis between the Old Courthouse and the Arch. The landscaping of the Park Over the Highway structure over I-70 and a new West Entrance to the Visitor Center/Museum would alter the route of pedestrians approaching the Gateway Arch, the existing berm height would be modified, and the new glass façade would have a direct visual connection to the Old Courthouse, altering the current views along this primary axis. Proposed accessibility changes could affect the cultural landscape. The addition of ramps, handrails, guardrails, and security features would physically and visually alter the entrances at the Arch legs and Visitor Center/Museum as well as changing the overall entrance/exit experience of visitors as intended by Saarinen.

Changes that would also noticeably affect cultural landscapes include topographic alterations, such as grading around the North and South Ponds and along the East Slopes for accessible paths and to control stormwater runoff. This would result in minor alterations of character-defining features of the cultural landscape including the landform and spatial organization, the designed views, and the system of Processional Walks. The proposed changes to the Central Riverfront could noticeably alter character-defining features of the cultural landscape including the North and South Overlooks and the Grand Staircase due to the raising of Leonor K. Sullivan Boulevard's elevation. Existing roads, which form the boundaries of the park, would include altered traffic patterns and types of traffic. With the exception of the removal of the through traffic portions of Washington Avenue and portions of Memorial Drive near the North Gateway, the existing roads would continue to define the boundaries of the park, retaining their spatial role in the cultural landscape. The park's pedestrian circulation, the primary circulation feature of the cultural landscape, would be maintained and vehicular circulation would continue to be restricted to the perimeter of the park.

Some impacts would not have a detectable effect upon cultural landscapes. For example, the accessibility changes proposed for the Old Courthouse and elimination of the Arch Parking Garage would not have a substantial impact on the cultural landscape. The Old Courthouse ramps would be a noticeable addition to the exterior of the building, which is part of the larger landscape. The parking garage area was initially designated by Saarinen/Kiley for parking, but was not refined any further in initial designs; the current garage is relatively low in profile and unobtrusive within the park, so its removal would neither alter the historic nor the existing appearance of the overall landscape substantially. Plantings would be selected to be compatible with the historic landscape.

Some beneficial impacts are expected to arise from alternative 3, similar to those described in alternative 2 above. The landscaping of the Park Over the Highway and related alterations to Luther Ely Smith Square would strengthen the primary axial connection between the Old Courthouse, Arch, and river, in keeping with Saarinen/Kiley's unrealized design goal of better connecting these sections of the park. In alternative 3, changes proposed at the North Gateway, such as removal of the non-historic parking garage, would enhance the cultural landscape. Proposed changes to the Processional Walks, including repair of drainage and surfacing, the potential addition of cobbles per Kiley-Saarinen design, and replacement of the declining ash planting with a tree species in a form closer to the design intent would enhance these character-defining features of the cultural landscape. Proposed new planting on the East Slopes with a denser woodland character would enhance the intended appearance of this area, in keeping with how it was designed and originally planted although changing its current appearance. There would also be beneficial impacts from raising Leonor K. Sullivan Boulevard that would improve protection from flooding and minimize the potential for loss or damage to the East Slopes, overlooks, and Grand Staircase. A programmatic agreement was executed to identify measures to minimize or mitigate adverse impacts. Mitigation measures and additional design review requirements and

Section 106 compliance would occur, as described under alternative 2.

Parkwide, alternative 3 would have short-term moderate impacts due to construction activities that would disrupt the cultural landscape, including vegetation, topography, and views. Long-term moderate adverse parkwide and local impacts to the Jefferson National Expansion Memorial cultural landscape would occur due to the addition of the new West Entrance and its associated paving, planting, and topographic changes; it would also alter the views along the primary axis between the Old Courthouse and the Arch. Changes to the sculpted topography due to the addition of paths around the ponds and at the East Slopes, as well as the addition of interior and exterior ramps at the Visitor Center/Museum, grading around the ponds, and changes to the North and South Overlooks and the Grand Staircase along the Central Riverfront would also contribute to these adverse impacts. Long-term beneficial impacts to the cultural landscape would occur under alternative 3 due to the addition of the Park Over the Highway in keeping with the Saarinen/Kiley design intent for a pedestrian connection. In addition, beneficial impacts would arise from the replacement of the ash trees and repair of the Processional Walks as well as the replanting of the East Slopes, as these changes would be in keeping with the Saarinen/Kiley design intent and would enhance the cultural landscape. Removal of the non-historic parking garage would enhance the cultural landscape and the reduction of flooding along the Central Riverfront would improve protection of the landscape from flooding, contributing to the beneficial impacts.

Cumulative Impacts for Alternative 3

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on cultural landscapes include the same projects discussed under alternative 1, the no-action alternative, earlier in this section. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 3, such as the Visitor Center/Museum roof

replacement and repair of the North and South Overlook stairs. This coordination would serve to lessen the short-term impacts of each project occurring on its own.

Alternative 3, as noted above, would result in moderate short-term and long-term adverse impacts to cultural landscapes. There would also be beneficial impacts. Combined with other past, present, and reasonably foreseeable future projects, there would also be short- and long-term moderate adverse impacts and some beneficial impacts.

ARCHEOLOGICAL RESOURCES

As archeological resources exist essentially in subsurface contexts, potential impacts to archeological resources are assessed according to the extent to which the proposed alternatives would involve ground disturbing activities such as excavation or grading. Analysis of possible impacts to archeological resources was based on a review of previous archeological studies, consideration of the proposed design concepts, and other information available on the archeological context of the area.

Study Area/ Area of Potential Effect

The impact area for archeological resources is broadly defined to extend between Biddle Street and Chouteau Avenue along the riverfront and bounded on the east by the Mississippi River and west by Broadway. While much of the proposed work would focus on the park grounds and Central Riverfront, some elements of the project – particularly elements of the utility systems such as water lines, electrical lines, and stormwater management features – may involve ground-disturbing activities beyond the park boundary and the Central Riverfront.

Impact Thresholds

For purposes of analyzing potential impacts on archeological resources, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact is at the lowest level of detection. Impacts would be measurable but

with no perceptible adverse or beneficial consequences.

Minor: Disturbance of a site(s) results in little, if any, loss of integrity.

Moderate: Disturbance of a site(s) results in loss of integrity. A programmatic agreement is executed among the National Park Service, applicable state or tribal historic preservation officer, and the Advisory Council on Historic Preservation in accordance with 36 CFR 800.14(b). Measures identified in the programmatic agreement to minimize or mitigate adverse impacts reduce the intensity under NEPA from major to moderate.

Major: Disturbance of a site(s) results in loss of integrity. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/ or Advisory Council are unable to negotiate and execute a programmatic agreement in accordance with 36 CFR 800.14(b).

Duration: Archeological resources are non-renewable. Once an impact occurs, the effect is irreversible and permanent; therefore duration is not identified within this analysis.

IMPACTS OF THE ALTERNATIVES

Alternative 1: No-Action Alternative

In the cultural resources impact area, archeological resources are located in subsurface contexts, and are primarily anticipated to be affected by ground-disturbing activities such as excavation or grading. Under alternative 1, the NPS would landscape the surface of the Park Over the Highway structure after MoDOT completes its construction, as discussed in Cumulative Impacts. During construction, activities such as grading the berm at Memorial Drive and planting would occur and could disturb archeological resources if unanticipated resources are located in the vicinity of these activities. Prior to initiating any ground-disturbing activities, the area would be evaluated for its potential to contribute archeological information. The guidance and mitigation measures regarding the treatment

of archeological resources developed through the Section 106 process would be followed if previously unreported and unanticipated resources were to be found during construction of the Park Over the Highway to ensure the resources would be properly handled.

Various maintenance activities such as tree and shrub removal and replacement, turf replacement, irrigation and pavement repair or replacement, and utility work could result in excavation and grading within the park and may have an impact on archeological resources if they exist below ground in those locations. If archeological resources were encountered during ground disturbances proposed under the no-action alternative related to ongoing and planned maintenance at the park, they would be addressed by the NPS standard operating procedures which encourage monitoring of excavation activities in high-potential areas as well as resource preservation through avoidance.

Any ground disturbance related to maintenance activities would be limited in size and depth and would occur primarily in previously disturbed areas. The Park Over the Highway landscape would constitute a larger disruption at Luther Ely Smith Square and the western edge of the park along Memorial Drive and could disturb as-yet unidentified archeological resources, which could result in a loss of integrity; however, the mitigation measures described above would be implemented to minimize impacts. Overall, alternative 1 would cause minor adverse impacts to archeological resources.

Cumulative Impacts for Alternative 1

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on archeological resources include:

- Citygarden
- Old Post Office Plaza
- Federal Reserve Bank of St. Louis

- The Mercantile Exchange (MX)
- The Mississippi River Bridge
- Kiener Plaza and streetscape improvements
- Construction of the Park Over the Highway structure
- Visitor Center/Museum roof replacement
- Ballpark Village
- Bottle District
- Poplar Street Bridge improvements

These cumulative projects involve some amount of excavation and/or grading. As described in the GMP (on pages 3-24 to 3-27), archeological sites recorded within St. Louis such as Cochran Gardens, Walsh's Row, and Lafayette Avenue illustrate that even under significant amounts of building rubble, intact material remains below the surface of St. Louis. The projects at Old Post Office Plaza, Federal Reserve Bank of St. Louis, Mercantile Exchange (MX), the Mississippi River Bridge, the Poplar Street Bridge improvements, and the Park Over the Highway structure all involve new construction requiring excavation and ground disturbance, increasing the likelihood that as-yet unidentified archeological resources could be affected by being uncovered from their subsurface context and/or damaged by construction equipment before they can be properly evaluated. The Kiener Plaza and streetscape improvements also have the potential for ground disturbance to uncover or affect archeological resources.

The Visitor Center/Museum Roof Replacement would require excavation in areas that were disturbed when the Visitor Center/Museum was originally constructed, but could affect as-yet unrecorded adjacent archeological resources.

The no-action alternative, as noted above, would result in minor adverse impacts to archeological resources. Combined with other past, present, and reasonably

foreseeable future actions, there could be moderate adverse cumulative impacts to archeological resources in historic downtown St. Louis from ground-disturbing activities associated with the combined projects. This alternative would contribute minimally to these impacts.

Alternative 2: Moderate Change

As archeological resources are located in subsurface contexts, they are primarily anticipated to be affected by ground-disturbing activities such as excavation or grading. In this alternative, several project elements would require ground disturbance activities that would be somewhat limited in size and depth and would occur primarily in previously disturbed areas of the park. Excavation for implementation of perimeter security measures such as bollards would occur in limited areas. Some grading would occur to create new accessible paths at the ponds and the East Slopes. The removal and replacement of the Rosehill ash trees would include excavation and ground disturbance along the Processional Walks to remove and replant the trees, as well as to provide improved drainage. The addition of new exterior ramps to access the Visitor Center/Museum would require some ground disturbance as would the planting of new trees and other vegetation along the East Slopes, ponds, and other areas within the park. Ground-disturbing activities would occur along the Central Riverfront in order to construct the multi-modal roadway.

The regrading of the berm at Memorial Drive and grading at Luther Ely Smith Square would be required to facilitate the Park Over the Highway landscape connection across I-70 between Luther Ely Smith Square and the park. These activities would create a larger area of disruption and could disturb as-yet unidentified archeological resources.

As the precise locations of archeological resources are not known throughout the entire project area, it is possible that many project elements could disturb previously unknown archeological resources. The programmatic agreement developed during the Section 106 process provides mitigation

measures and guidance on archeological resources identification prior to any ground disturbance, as well as treatment measures if resources are identified. The parameters of the programmatic agreement would be used to determine procedures to be followed in the event that previously unreported and unanticipated resources were to be found during construction, and would provide guidance to ensure the resources are properly handled.

Parkwide and along the Central Riverfront, ground disturbances related to the project elements could disrupt or displace unknown archeological resources and result in a loss of integrity of the archeological resource. However, the mitigation measures established in the programmatic agreement would be implemented to minimize or mitigate adverse impacts. As a result, alternative 2 would have moderate adverse impacts to archeological resources in the cultural resources impact area.

Cumulative Impacts for Alternative 2

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on archeological sites include the same projects discussed under alternative 1, the no-action alternative, earlier in this section. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 2, such as the Visitor Center/Museum roof replacement.

Alternative 2, as noted above, would result in moderate adverse impacts to archeological sites. Combined with other past, present, and reasonably foreseeable future actions, there could be moderate adverse cumulative impacts to archeological resources in historic downtown St. Louis from ground-disturbing activities associated with the combined projects. These cumulative projects, mostly within the vicinity but not inside the areas of the park affected by alternative 2, are identical to the impacts noted under cumulative impacts in alternative 1 above. This alternative would contribute somewhat to impacts on archeological resources.

Alternative 3: Maximum Change

As noted earlier, archeological resources are located in subsurface contexts. Alternative 3 would include the ground-disturbing activities described in alternative 2 and would have similar impacts on archeological resources. In addition, the expansion of the Visitor Center/Museum underground to the west of the existing Visitor Center/Museum and the addition of the new West Entrance would have an impact on any as-yet unidentified archeological resources in that area due to extensive subsurface excavation. The removal of the parking garage would require extensive excavation and could disturb as-yet intact subsurface archeological resources in the vicinity of the existing garage, although this area has been previously disturbed due to the garage's construction.

As noted in alternative 2, the precise locations of all archeological resources in the project area are not known and therefore the project elements have the potential to disturb previously unknown archeological sites. Therefore, as part of the programmatic agreement developed during the Section 106 process, mitigation measures and guidance on archeological resources identification prior to any ground disturbances were developed, as well as treatment measures if resources are identified. The parameters of the programmatic agreement would be used to determine procedures to be followed in the event that previously unreported and unanticipated resources were to be found during construction and would provide guidance to ensure the resources are properly handled.

Parkwide and along the Central Riverfront, ground disturbances related to the project elements could disrupt or displace unknown archeological resources and therefore have the potential to result in a loss of integrity of archeological resources. However, the mitigation measures established in the programmatic agreement would be implemented to minimize or mitigate adverse impacts. As a result, alternative 3 would have moderate adverse impacts to archeological resources in the cultural resources impact area.

Cumulative Impacts for Alternative 3

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on archeological sites include the same projects discussed under alternative 1, the no-action alternative, earlier in this section. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 3, such as the Visitor Center/Museum roof replacement.

Alternative 3, as noted above, would result in moderate adverse impacts to archeological sites. Combined with other past, present, and reasonably foreseeable future actions, there could be moderate adverse cumulative impacts to archeological resources in historic downtown St. Louis from ground-disturbing activities associated with the combined projects. These cumulative projects, mostly within the vicinity but not inside the areas of the park affected by alternative 3, are identical to the impacts noted under cumulative impacts in alternatives 1 and 2 above. This alternative has the potential to contribute substantially to adverse impacts on archeological resources.

MUSEUM COLLECTIONS

Study Area

The study area for museum collections is defined by the park's boundary.

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts on museum collections.

Negligible: Impact is at the lowest levels of detection — barely measurable with no perceptible consequences.

Minor: Impact(s) would affect the integrity of few items in the museum collection but would not degrade the usefulness of the collection for future research and interpretation.

Moderate: Impact(s) would affect the integrity of many items in the museum collection and diminish the usefulness of the collection for future research and interpretation.

Major: Impact(s) would affect the integrity of most items in the museum collection and destroy the usefulness of the collection for future research and interpretation.

Duration: Short-term impacts would occur during construction. Long-term impacts would occur during operations after construction is complete.

Impacts of the Alternatives

Alternative 1: No-Action Alternative

Under the no-action alternative, there would be no changes to museum collections. At the Visitor Center/Museum, existing space, access, electrical and HVAC, and pest control issues that currently exist would continue and collections could be damaged by poor storage conditions, lack of access for curatorial care, temperature and humidity-related conditions outside of acceptable range, and damage from pests that may infest delicate materials such as historic paper or fabric items. At the Old Courthouse, access, poor storage conditions and other issues such as insufficient building climate control systems, would remain as well.

While these conditions could cause damage to or affect the integrity of a limited number of items in the museum collection, they would not cause the overall degradation of the collection or its usefulness for future research and interpretation. Visitors and researchers would continue to have access to the collections and they would be maintained using existing practices and protocols. Therefore, alternative 1 would have minor short-term adverse impacts and long-term negligible to minor adverse impacts to museum collections.

Cumulative Impacts for Alternative 1

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have

potential impacts on museum collections include:

- Old Courthouse renovations and repairs
- Visitor Center/Museum roof replacement

In the short term, access to exhibits and collections could be interrupted during construction related to the Old Courthouse renovations and the Visitor Center/Museum roof replacement and resources may be temporarily removed to protect them. The renovations and repairs on the Old Courthouse would help to protect the collections with updated systems such as improved temperature and humidity control. The repair or replacement of the roof on the existing Visitor Center/Museum, a previously planned project, would result in long-term beneficial impacts as it would diminish the possibility of damage to collections as a result of the roof leaking.

Alternative 1 would result in minor short-term adverse and long-term negligible to minor adverse impacts to museum collections. Combined with other past, present, and reasonably foreseeable future actions, there would be minor short-term adverse cumulative impacts and long-term negligible to minor adverse cumulative impacts as well as some long-term beneficial cumulative impacts. This alternative would contribute minimally to those impacts.

Alternative 2: Moderate Change

The renovation activities at the Visitor Center/Museum and the Old Courthouse would limit visitor, researcher, and staff access to collections as portions would be moved or put into storage. This limited access to various exhibits and collections would be temporary as the collections would be returned to exhibition and storage locations after the completion of renovations.

The proposed renovations to the Visitor Center/Museum would remedy existing electrical and HVAC limitations to help improve climate control for the collections. This would help to preserve the integrity of the museum collections. The proposed

renovations could also provide easier access to the collections to help facilitate their management, preservation, interpretation, and research. Proposed changes at the Old Courthouse include renovations of the galleries and spaces on the first and second floors and would also provide improved building systems that could help improve climate control to better preserve collections held there.

Under alternative 2, the temporary disruption to visitor, researcher, and staff access to the collections would cause short-term minor adverse impacts as the collections would continue to be protected and managed by staff while in storage or in alternate locations and visitor and researcher access would be only be limited temporarily, with access to the collections provided as feasible. The improvements in climate control, the renovation of existing collections spaces within the Visitor Center/Museum and the Old Courthouse, the improved access to the collections, and updated space for collections management, preservation, and interpretation would help to preserve the long-term usefulness of the collections for research and interpretation and would result in long-term beneficial impacts to museum collections.

Cumulative Impacts for Alternative 2

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on museum collections include the same projects discussed above under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 2, such as the Visitor Center/Museum roof replacement and repairs and renovations of the Old Courthouse. This coordination would serve to lessen the short-term impacts of each project occurring on its own.

Alternative 2, as noted above, would result in short-term minor adverse and long-term beneficial impacts to museum collections. Combined with other past, present, and reasonably foreseeable future actions, there would also be short-term minor adverse and

long-term beneficial cumulative impacts. Alternative 2 would contribute somewhat considerably to impacts on museum collections.

Alternative 3: Maximum Change

Under alternative 3, during construction activities for renovations and the addition of new space at the Visitor Center/Museum and renovations at the Old Courthouse, access to collections would be limited and exhibits would be moved or put in storage. This limited access to various exhibits and collections would be temporary as the collections would be returned to exhibition and storage locations after the completion of construction.

Proposed actions include the renovation of existing space and the addition of new space within the Visitor Center/Museum and renovation of galleries on the first and second floors of the Old Courthouse. The renovations and increased museum collection space at the Visitor Center/Museum would remedy existing electrical and HVAC limitations to help improve climate control for the collections. This would help to preserve the integrity of the museum collections. The proposed renovations and new Visitor Center/Museum space would provide easier access to the collections for management, preservation, interpretation, and research. The addition of the West Entrance would introduce some natural light into the Visitor Center/Museum and the placement and types of museum collections exhibits and storage would take this into account in order to properly protect collections. The renovation of galleries on the first and second floors of the Old Courthouse would provide improved building systems that could help improve climate control to better preserve the collections held there.

During construction of alternative 3, the temporary disruption to visitor, researcher, and staff access to the collections would cause short-term minor adverse impacts as the collections would continue to be protected and managed by staff while in storage or in alternate locations and visitor and researcher access would be only be limited temporarily,

with access to the collections provided as feasible. The improvements in climate control, the updated and increased space for collections in the Visitor Center/Museum and renovated space in the Old Courthouse, the improved access to the collections, and improved space for collections management, interpretation, and preservation would help to preserve the long-term usefulness of the collections for research and interpretation and would result in long-term beneficial impacts to museum collections.

Cumulative Impacts for Alternative 3

Past, ongoing, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on museum collections include the same projects discussed above under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 3, such as the Visitor Center/Museum roof replacement and repairs and renovations of the Old Courthouse. This coordination would serve to lessen the short-term impacts of each project occurring on its own.

Alternative 3, as noted above, would result in short-term minor adverse and long-term beneficial impacts to museum collections. Combined with other past, present, and reasonably foreseeable future actions, there would also be short-term minor adverse and long-term beneficial cumulative impacts. Alternative 3 would contribute somewhat considerably to impacts on museum collections.

NATURAL RESOURCES

VEGETATION

Methodology for Assessing Impacts

Available information on the vegetation was compiled and reviewed. Impacts on vegetation were based on general characteristics of the site and vicinity, site observations, previous studies on the health of park vegetation and potential threats, and proposed encroachment into vegetated areas associated with the proposed construction and project elements.

Study Area

The study area for the inventory and analysis of vegetation is the area encompassed by the park's boundaries. The study area also includes the area along the Central Riverfront adjacent to the levee and the Mississippi River, between Biddle Street and Chouteau Avenue.

Impact Thresholds

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

Negligible: Very few individual trees, mature landscape plantings, or turf would be affected.

Minor: A few individual trees and mature landscape plantings, or a small amount of turf would be affected. Mitigation measures such as replanting to avoid or offset impacts on trees could be implemented and would be effective in replacing or reducing losses of vegetation.

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

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

Duration: Short-term impacts would occur during construction and would take less than one year to recover after the disturbance or change occurs; long-term impacts would occur or continue after construction is complete.

Impacts of the Alternatives

Alternative 1: No-Action Alternative

Under alternative 1, MoDOT would construct the Park Over the Highway structure over I-70, as discussed in Cumulative Impacts. The National Park Service would landscape the surface of the structure after completion of MoDOT's construction. Grading, planting, and landscaping staging activities at the West Gateway and on the eastern side of Luther Ely Smith Square would temporarily disturb and remove some vegetation, primarily turf grass, in these locations. Upon completion of construction, grassed areas would be re-vegetated.

Due to its location in an urban park, the park vegetation undergoes daily wear and tear and the turf grass lawn is heavily used. This wear and tear is expected to continue through normal visitor use. In areas of the park where special events are held, high levels of pedestrian foot traffic occur in vegetated areas. Vegetation would be maintained in accordance with current practices that were developed as a routine maintenance program for the rehabilitation of damaged or degraded vegetation that is described in the Landscape Preservation Maintenance Plan (NPS 2010b). The surface on the Park Over the Highway structure would be landscaped and would increase the amount vegetative area in the park, which would be maintained as part of the park's maintenance program.

As the park's vegetation is comprised of a formally planned landscape, impacts to the landscape design are analyzed in this EA under Cultural Landscapes. Overall, under alternative 1, there would be short-term minor adverse impacts to vegetation in the park during construction and while the vegetation matures along the Park Over the Highway and negligible long-term impacts to vegetation in the park and along the Central Riverfront as these areas would remain largely unchanged. There would also be long-term beneficial impacts to vegetation due to the increase in vegetative surface on the Park Over the Highway.

Cumulative Impacts for Alternative 1

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on vegetation include:

- Visitor Center/Museum roof replacement
- Repair North and South Overlook stairs
- Construction of the Park Over the Highway structure

These projects would require construction activities that would disturb vegetation in the park. Replacement of the Visitor Center/Museum roof would require the removal of the turf grass lawn covering the existing Visitor Center/Museum. The lawn would be re-vegetated when construction is complete. The demolition and construction required to repair the North and South Overlook stairs would remove some existing vegetation adjacent to the Overlook steps, which would be replaced following completion of the construction process. The construction of the Park Over the Highway structure over I-70 would disturb vegetation at Luther Ely Smith Square and the West Gateway. Turf grass and a limited number of trees would be removed due to demolition, excavation, grading, and staging of construction equipment. Best management practices would be implemented during construction of these projects to protect existing vegetation. Upon completion of construction, grassed areas would be re-vegetated and trees would be replaced.

As described above, short-term minor adverse impacts would occur to vegetation due to temporary disturbances during the implementation of a planted landscape across the Park Over the Highway under alternative 1. There would be long-term negligible impacts as the regular maintenance and the park and existing conditions along the Central Riverfront would continue and long-term beneficial impacts would occur due to the addition of landscaped area in the park. Combined with other past, present, and reasonably foreseeable future actions, there would be a short-term moderate adverse cumulative impacts and long-term minor adverse cumulative impacts to vegetation. Long-term beneficial impacts would also occur. However, this alternative would contribute minimally to these impacts.

Alternative 2: Moderate Change

During construction, various project elements in alternative 2 would disturb or remove a relatively large number of trees, landscape plantings, and turf. These project elements include perimeter security, site grading for pedestrian accessibility elements, grading for drainage improvements and stormwater management, installation of utilities, streetscape improvements at the Old Courthouse, grading at Luther Ely Smith Square and the West Gateway to landscape the new plaza at Luther Ely Smith Square and the Park Over the Highway structure over I-70, replacement in-kind of the Processional Walks, and the replacement of some existing vegetation with other species and types. Construction along the Central Riverfront would remove the existing street trees. Construction projects would be coordinated and phased to limit the time and amount of vegetation disturbed by overlapping projects where feasible. After construction, areas disturbed by construction activities would be re-vegetated.

Several project elements in alternative 2 would alter or remove existing vegetation once completed. The grading and excavation on the East Slopes for new paved ramps to the riverfront and near the Arch legs for paved

ramps into the Visitor Center/Museum would permanently remove a limited amount of vegetation to accommodate the ramps. The Rosehill ash trees in the park and along the Processional Walks would be replaced under this alternative with a species selected by the NPS in accordance with the approved EAB EA (NPS 2011b). A portion of the grass lawn in Luther Ely Smith Square would be replaced with a paved surface in order to create a large plaza.

The planting plan in alternative 2 proposes the use of various types of vegetation that would decrease maintenance issues, increase the health of the vegetation, and increase the diversity of vegetation on the park grounds. Alternative 2 would implement soil amendment strategies to mitigate existing soil deficiencies to promote vegetation health and would augment these with additional planting soil as needed. High-use turf would be planted in areas where moderate to heavy visitor use is expected in order to reduce bald patches in lawn surfaces, including at the West Gateway from Luther Ely Smith Square and extending underneath the Arch as well as along the interior of the Processional Walks.

Additional plantings would be added to the North Gateway around the Arch Parking Garage and at the northwest intersection where feasible. Trees and other vegetation would be added to Luther Ely Smith Square and across the Park Over the Highway structure over I-70. Additional understory and canopy trees would be added around the park, increasing the amount of vegetation in the park. New street trees would be planted along the Central Riverfront as part of the pedestrian promenade. This alternative would raise the elevation of Leonor K. Sullivan Boulevard, which could help to protect vegetation along the Central Riverfront from seasonal flooding events associated with the Mississippi River.

Short-term moderate adverse impacts would occur during construction of project elements that would disturb or remove a relatively large number of trees, landscape plantings, and turf; however, construction and staging would be phased and coordinated and existing trees would remain wherever possible. The

permanent removal of a limited amount of vegetation would cause long-term minor adverse impacts. Some new vegetation would be added to the park, which would require time to mature, and would result in long-term beneficial impacts. Long-term beneficial impacts due to an increase in the health of vegetation as well as diversified planting types would also occur.

Cumulative Impacts for Alternative 2

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on vegetation include the same projects discussed under alternative 1, the no-action alternative, earlier in this chapter. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 2, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs. This coordination would serve to lessen the short-term impacts of each project occurring on its own; however, the amount of vegetation disturbance would be greater in this alternative than under alternative 1.

Alternative 2, as noted above, would disturb or remove vegetation during construction and the implementation of project elements and would result in moderate short-term and minor long-term adverse impacts to vegetation. Beneficial impacts would also occur. Combined with other past, present, and reasonably foreseeable future actions, there would be cumulative moderate short-term and minor long-term adverse impacts and long-term beneficial impacts. Actions directly related to alternative 2 would contribute somewhat to impacts on vegetation.

Alternative 3: Maximum Change

As in alternative 2, construction of various project elements in alternative 3 would disturb or remove a relatively large number of trees, landscape plantings, and turf. These project elements include those listed in alternative 2, as well as the addition of the

West Entrance to the Visitor Center/Museum, the demolition of the Arch Parking Garage, and the installation of the Explorers Garden in the North Gateway. Construction projects would be coordinated and phased to limit the time and amount of vegetation disturbed by overlapping projects where feasible. These areas would be re-vegetated after completion of construction.

Project elements described in alternative 2 which would alter or remove existing vegetation once completed would also occur under alternative 3. In addition to those elements, a small portion of the park's turf grass would be removed under alternative 3 by a paved entry that would be installed at the western edge of the park in the West Gateway to facilitate the West Entrance to the Visitor Center/Museum. The planting plan in alternative 3 is similar to the plan described in alternative 2. Under alternative 3, the removal of the Arch Parking Garage would create additional vegetated acreage, increasing the amount of vegetation in the park. Plantings in the North Gateway would encourage the use of identified paths to traverse the park, reducing the potential for the formation of social trails. New vegetation would be installed along the segments of Washington Avenue that would be closed to vehicular traffic and converted to parkland. The Explorers Garden would include additional trees and other plantings, would capture stormwater runoff, and would feature plantings to serve as educational tools and support native biodiversity, such as illustrating the botanical aspects of Lewis and Clark's journey. Trees and other vegetation would also be added to Luther Ely Smith Square and across the Park Over the Highway over I-70 to create shade gardens, and additional understory and canopy trees would be added around the park, increasing the amount of vegetation in the park.

As in alternative 2, new street trees would be planted along the Central Riverfront and the elevation of Leonor K. Sullivan Boulevard would be raised to limit seasonal flooding. These efforts could help protect vegetation along the Central Riverfront.

Short-term moderate adverse impacts would occur during construction of project elements that would temporarily disturb or remove a relatively large number of trees, landscape plantings, and turf; however, construction and staging would be phased and coordinated and existing trees would remain wherever possible. While some vegetation would be permanently removed in limited areas of the park and new vegetation would require time to mature, overall long-term beneficial impacts would occur due to a substantial increase in vegetation in the park at Luther Ely Smith Square and the new West Entrance as well as at the North Gateway where the Arch Parking Garage and the through traffic portions of Washington Avenue would be removed and the areas re-vegetated. Beneficial impacts would also stem from an increase in the health of vegetation and diversified planting types.

Cumulative Impacts for Alternative 3

Past, present, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on vegetation include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 3, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs. This coordination would serve to lessen the short-term impacts of each project occurring on its own; however the amount of vegetation disturbance would be greater in this alternative than under alternative 1. Alternative 3 would cause slightly more disturbance than in alternative 2, but alternative 3 would add a greater amount of newly vegetated area.

Alternative 3, as noted above, would disturb or remove vegetation during construction and the implementation of project elements and would result in moderate short-term and minor long-term adverse impacts to vegetation. Long-term beneficial impacts would also occur. Combined with other past, present, and reasonably foreseeable future actions, there would be cumulative moderate

short- and long-term adverse impacts and long-term beneficial impacts. Actions directly related to alternative 3 would contribute somewhat considerably to impacts on vegetation.

SOUNDSCAPE

Methodology for Assessing Impacts

The impacts of each alternative on the soundscape of the park were assessed qualitatively by evaluating the noise generated from construction, noise generated from the operation of various project components, and the noise reduction potential of certain design elements.

Within this analysis, it is assumed that the construction contractor would manage construction operations to comply with local noise ordinances and restrictions at all times, and that the majority of construction activities would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday.

Study Area

The study area for the inventory and analysis of soundscape is the park grounds, bounded by Eads Bridge to the north, Leonor K. Sullivan Boulevard to the east, Poplar Street Bridge to the south, and Interstate 70 to the west, plus a two-block extension to incorporate the Old Courthouse and Luther Ely Smith Square. The study area also includes the area along the central riverfront adjacent to the levee and the Mississippi River, between Biddle Street and Chouteau Avenue. All impacts on the soundscape are assumed to be local impacts that affect only the immediate area of the noise source.

Impact Thresholds

Impact thresholds are as follows:

Negligible: The noise generated during construction or operation is not above background noise levels.

Minor: The noise generated during construction or operation is sometimes above background noise levels.

Moderate: The noise generated during construction or operation is typically above background noise levels, but remains below levels established by regulatory guidelines.

Major: The noise generated by the construction or operation of the proposed elements is frequently above background noise levels and exceeds levels established by regulatory guidelines.

Duration: Short-term impacts would occur during construction. Long-term impacts would occur during operations after construction is complete.

Impacts of the Alternatives

Alternative 1: No-Action Alternative

Under alternative 1, MoDOT would construct the Park Over the Highway structure over I-70, as discussed in Cumulative Impacts. The National Park Service would landscape the surface of the structure after completion of MoDOT's construction. Intermittent noise generated by motorized construction equipment utilized for grading and planting activities at the West Gateway and on the eastern side of Luther Ely Smith Square would temporarily disturb the park's soundscape.

Routine maintenance activities at the park including lawn mowing and other noise-generating landscaping activities, as well as emergency generator testing and trains passing through the railroad tunnels would continue. The noise generated by these activities would be above background noise levels and therefore perceptible within the park. Along the Central Riverfront, noise generating activities and infrastructure would not be added and existing conditions would remain. Noise generating activities and infrastructure would not be added under alternative 1.

Construction-related impacts under the no-action alternative would result in short-term minor adverse impacts from noise generated by grading and planting activities at the West Gateway and Luther Ely Smith Square, which would be intermittently perceptible above background conditions

and would temporarily disturb the park's soundscape. The continuation of existing operational conditions with occasional noises above background conditions would cause long-term minor adverse impacts to the park's soundscape.

Cumulative Impacts for Alternative 1

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on soundscape include:

- Old Courthouse Renovations and Repairs
- Eads Bridge Restoration
- Mississippi River Bridge
- Visitor Center/Museum roof replacement
- Repair North and South Overlook stairs
- Construction of the Park Over the Highway structure
- Emerald Ash Borer Environmental Assessment
- Poplar Street Bridge improvements

Overall, noise generated by construction activities from each of the projects listed above would be greatest in the immediate vicinity of the construction activity and would diminish with distance from the activity. The Old Courthouse renovations and repairs, the Eads Bridge restoration and structural rehabilitation, and the Mississippi River Bridge construction are ongoing. The replacement of the roof on the underground Visitor Center/Museum and the repair of the North and South Overlook stairs are deferred maintenance projects that would occur as funding permits. The replacement of the Rosehill ash trees would be completed in phases and according to the approved EAB EA (NPS 2011b) after detection of the emerald ash borer. Noise generated from these projects would include motorized and non-motorized construction equipment used for demolition, excavation, grading,

tree removal, and building and repairing the structures.

Construction of the Park Over the Highway structure over I-70 and the Poplar Street Bridge improvements would require motorized and non-motorized construction equipment for activities such as demolition, excavation, grading, and structural construction, all of which would generate noise. Upon completion of the Park Over the Highway structure, it could help to attenuate noise from vehicular traffic within the park by adding a barrier between the park and the depressed section of I-70 between Market Street and Chestnut Street. Construction noise generated from these projects would have short-term moderate adverse impacts to the soundscape within the park. Upon completion of both project, long-term impacts to soundscapes would be negligible, and possibly beneficial.

The no-action alternative, as noted above, would result in minor short- and long-term adverse impacts to soundscapes due to construction activities related to the landscaping of the Park Over the Highway and Luther Ely Smith Square and the ongoing operational noises produced at the park. Combined with other past, present, and reasonably foreseeable future actions, there would be a short-term moderate adverse cumulative impacts to soundscapes. Long-term cumulative impacts to soundscapes would be negligible and possibly beneficial; alternative 1 would contribute minimally to those impacts.

Alternative 2: Moderate Change

During construction of the project elements in alternative 2, activities such as excavation and grading, construction of pedestrian paths and ramps, perimeter security elements, the replacement of the Rosehill ash trees and Processional Walks, renovation activities, and construction to raise the elevation of, and create pedestrian and bicycle paths on, Leonor K. Sullivan Boulevard would take place. Motorized and non-motorized construction equipment used during these activities would be intermittently perceptible above background levels within the park.

Construction of project elements would be coordinated and phased, which would help to limit multiple concurrent sources of construction-generated noise. Noise generated by construction activities would be greatest in the immediate vicinity of the activity, would diminish with distance, and would comply with City of St. Louis noise regulations.

Routine maintenance activities at the park including lawn mowing, landscaping and other noise-generating activities, and emergency generator testing would continue. The noise generated by these activities would be above background noise levels and therefore perceptible within the park. Alternative 2 would not add additional noise-generating operational activities or infrastructure within the park.

The slopes planted with trees and other vegetation along the Park Over the Highway could help to attenuate traffic noise from I-70 by buffering the park from vehicular noises in the depressed section of I-70. Along the Central Riverfront, additional activities and special events could create new sources of noise; however, these noises would be similar to existing noises within the park and would be compatible with the use of the area. Noise generating infrastructure would not be added to the Central Riverfront.

Construction-related impacts under alternative 2 would result in short-term moderate adverse impacts from intermittent noise above background conditions that would be generated by excavating, grading and planting activities to implement project elements, which would temporarily disturb the park's soundscape. The continuation of existing operational conditions with occasional noises above background conditions would cause long-term minor adverse impacts to the park's soundscape. The potential sound attenuation from landscape additions to the park would create long-term beneficial impacts by reducing noise intruding on the park's soundscape.

Cumulative Impacts for Alternative 2

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on soundscapes include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 2, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs. As such, construction activities could be coordinated and phased and could lessen the short-term impacts of the projects; however, alternative 2 would generate more noise associated with construction than alternative 1

Alternative 2, as noted above, would result in short-term moderate adverse impacts and long-term minor adverse impacts to soundscapes due to construction activities and ongoing operational noises at the park. Beneficial impacts would also occur due to vegetation acting as a noise buffer between the park and a portion of the depressed section of I-70. Combined with other past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse cumulative impacts, long-term minor adverse cumulative impacts and some beneficial impacts. Actions directly related to alternative 2 would have limited contributions to impacts on soundscapes.

Alternative 3: Maximum Change

The same noise-producing construction activities discussed in alternative 2 would also occur in alternative 3. In addition, the construction of the new West Entrance to the Visitor Center/Museum and the demolition of the Arch Parking Garage would occur. Motorized and non-motorized equipment used during construction would be intermittently perceptible above background levels within the park. Construction of project elements would be coordinated and phased which would help to limit multiple concurrent

sources of construction-generated noise. Noise generated by construction activities would be greatest in the immediate vicinity of the activity, would diminish with distance, and would comply with City of St. Louis noise regulations. Operational activities at the park described in alternative 2, including routine maintenance activities and emergency generator testing, would continue. Alternative 3 would not add additional noise-generating activities or infrastructure.

Slopes with plantings of canopy trees, shrubs, and groundcover would create planted shade gardens along the Park Over the Highway structure over I-70, which could help to attenuate traffic noise from I-70 by acting as a buffer between the park and a portion of the depressed highway. The removal of the Arch Parking Garage and the vehicular through-lanes of Washington Avenue adjacent to the park at the North Gateway would direct most automobile traffic in the North Gateway away from park visitor areas and could reduce vehicular noise. Additional plantings would be added at the North Gateway after the removal of the Arch Parking Garage and could attenuate some noise from Laclede's Landing and Eads Bridge.

Construction-related impacts under the alternative 3 would result in short-term moderate adverse impacts from intermittent noise above background conditions that would be generated by excavating, grading and planting activities to implement project elements, which would temporarily disturb the park's soundscape. The continuation of existing operational conditions with occasional noises above background conditions would cause long-term minor adverse impacts to the park's soundscape. The potential sound attenuation from landscape additions to the park and removal of vehicular traffic noise sources in the North Gateway would create long-term beneficial impacts by reducing noise intruding on the park's soundscape.

Cumulative Impacts for Alternative 3

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have

potential impacts on soundscapes include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 3, such as the Visitor Center/ Museum roof replacement and repair of the North and South Overlook stairs. As such, construction activities could be coordinated and phased and could lessen the short-term impacts of the projects; however, alternative 3 would generate more noise associated with construction than alternatives 1 and 2.

Alternative 3, as noted above, would result in short-term moderate adverse impacts and long-term minor adverse impacts to soundscapes due to construction activities and ongoing operational noises at the park. Beneficial impacts would also occur due to vegetation acting as a noise buffer between the park and a portion of the depressed section of I-70. Combined with other past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse cumulative impacts, long-term minor adverse cumulative impacts and some beneficial impacts. Actions directly related to alternative 3 would have limited contributions to impacts on soundscapes.

FLOODPLAINS

Methodology for Assessing Impacts

Floodplains are defined by the NPS Procedural Manual 77-2: Floodplain Management (NPS 2003) as "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, and including, at a minimum, that area subject to temporary inundation by a regulatory flood." Executive Order 11988: "Floodplain Management" requires an examination of impacts on floodplains and of the potential risk involved in placing facilities within floodplains as well as the protection of floodplain values. The NPS has adopted the policy of preserving floodplain values and minimizing potentially hazardous conditions associated with flooding (NPS 2003).

A portion of the proposed project would be constructed within an existing regulatory

floodplain. As such, impacts on floodplain functions and values were assessed. These assessments were based on the known and potential 100-year floodplains within the study area, information provided by experts in the NPS and other agencies, and professional judgment.

Study Area

The study area for the inventory and analysis of floodplains is the area within the floodplain along the Central Riverfront adjacent to the levee and the Mississippi River, between Biddle Street and Chouteau Avenue.

Impact Thresholds

The following thresholds were used to determine the degree of impacts on floodplains in the project area.

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

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

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

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

Duration: Short-term impacts would occur during construction or sporadically

NO-RISE CERTIFICATION – Section 60.3 (d) (3) of the National Flood Insurance Program (NFIP) regulations states that a community shall “prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base (100-year) flood discharge.” This “no-rise” certification must be obtained prior to activity in a regulatory floodway.

throughout the course of a year. Long-term impacts would occur after completion of construction and would last more than one year.

Impacts of the Alternatives

Alternative 1: No-Action Alternative

Under alternative 1, there would be no disturbance to any floodplains. Therefore, the alternative would not result in any changes to the functions or values of the current designated floodplains in the project area. There would be no short- or long-term impacts to floodplains in alternative 1.

Cumulative Impacts for Alternative 1

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

Alternative 2: Moderate Change

Alternative 2 would include project elements in the designated 100-year floodplain, which is described in the Natural Resources section of the Affected Environment chapter

(see Figure 30). The elevation of Leonor K. Sullivan Boulevard would be raised as a strategy to reduce the frequency and impact of flood events that just overtop Leonor K. Sullivan Boulevard on Central Riverfront infrastructure and activities. These flood occurrences can last up to two weeks, cause the closure of Leonor K. Sullivan Boulevard, and are more frequent than the larger 100-year flood events that close the floodgates. Raising the elevation of Leonor K. Sullivan Boulevard would require modifications to the floodwall and levee system along the Mississippi River. Modifications to floodwall closure structures at Chouteau Avenue, Poplar Street, and Carr Street would be required. This work would include raising the sills of the closure structures and modifications to the closure structure panel systems at each location. Additionally, raising Leonor K. Sullivan Boulevard would require the placement of fill against existing structures within the public right-of-way as well as construction of new retaining walls along the levee. Two lanes of vehicular traffic would be maintained, a bicycle trail and pedestrian promenade would be installed along the existing width of Leonor K. Sullivan Boulevard, and paved paths to the riverfront would be installed on the East Slopes.

Although development in the 100-year floodplain would occur, floodplain values would be protected to the maximum degree possible and the extent of development, placement of structures, and types of structures would be selected to minimize impacts. The East Slopes would remain vegetated, with some loss to accommodate the addition of paved paths to the riverfront. However, this would not change the nature of the development in the floodplain. The functions and values of the floodplain along the Central Riverfront would remain unchanged.

The City of St. Louis is a member of the National Flood Insurance Program (NFIP) and must adhere to the NFIP's regulations concerning development within the floodplain and particularly the floodway. Because fill would be placed into the floodplain and floodway, a "no-rise"

analysis and a "no-rise" certificate would be required to assure the City of St. Louis and the NFIP that all floodplain regulations are in compliance and that the development would not increase base flood heights. A Riverine Hydraulic Analysis of the proposed project elements must be completed prior to development in the floodplain to ensure that a "no-rise" to the 100-year base flood elevation would exist after construction of the proposed project elements. As a result, the project would be designed to minimize the number of flood events that close the roadway, but would not affect the 100-year flood base elevations.

Construction-related activities under alternative 2 would not change floodplain functions or values and no short-term impacts would occur. The "no-rise" analysis and certificate would ensure that no long-term adverse impacts to the 100-year designated floodplain would occur. The raised elevation of Leonor K. Sullivan Boulevard and the addition of pedestrian and bicycle paths would have negligible long-term impacts to floodplains as they would not alter the nature of the development in the floodplain and the functions and values of the floodplain along the Central Riverfront would remain unchanged.

Cumulative Impacts for Alternative 2

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on floodplains include:

- Mississippi River Bridge

Construction of the Mississippi River Bridge is ongoing and is located to the north of the park and the Central Riverfront. According to the Mississippi River Crossing FEIS, impacts from the bridge on the Mississippi River floodplain during the base flood event would affect only storage, and not conveyance, and can be mitigated by providing compensatory storage using roadside ditches along the affected areas (IDOT and MoDOT 2001). The project's compensatory flood storage areas would be designed to ensure no rise in the base flood elevation (100-year flood), or one

or more Conditional Letters of Map Revision would be obtained in accordance with federal and state guidelines.

As noted above, under alternative 2 long-term impacts to floodplains would be negligible. Combined with other past, present, and reasonably foreseeable future actions, long-term cumulative impacts would be negligible. This alternative would contribute minimally to those impacts.

Alternative 3: Maximum Change

The proposed changes to the East Slopes and Central Riverfront described under alternative 2 would also be implemented under alternative 3. As in alternative 2, floodplain values would be protected to the maximum degree possible and the extent of development, placement of structures, and types of structures would be selected to minimize impacts. The proposed actions in alternative 3 would not change the nature of the development in the floodplain and the functions and values of the floodplain along the Central Riverfront would remain unchanged. A “no-rise” analysis and a “no-rise” certificate would be required to assure the City of St. Louis and the NFIP that all floodplain regulations are in compliance and that the development would not increase base flood heights.

Construction-related activities under alternative 3 would not change floodplain functions or values and no short-term impacts would occur. The raised elevation of Leonor K. Sullivan Boulevard and the addition of pedestrian and bicycle paths would have negligible long-term impacts to floodplains as they not alter the nature of the development in the floodplain and the functions and values of the floodplain along the Central Riverfront would remain unchanged.

Cumulative Impacts for Alternative 3

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on floodplains are the same projects discussed under alternative 2.

As noted above, like alternative 2, long-term negligible impacts to floodplains would occur under alternative 3. Combined with other past, present, and reasonably foreseeable future actions, long-term cumulative impacts would be negligible. This alternative would contribute minimally to those impacts.

WATER RESOURCES

Methodology for Assessing Impacts

For the purposes of this document, the term “water resources” is inclusive of the water supply (or source), water quality, and stormwater management. The NPS Management Policies 2006 states that the NPS will “take all necessary actions to maintain or restore the quality of surface waters and ground waters within the Parks, consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations” (NPS 2006).

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

Potential impacts of actions comprising the alternatives often cannot be defined relative to site-specific locations. Consequently, water resource impacts of the alternatives were assessed qualitatively.

Study Area

The geographic study area for water resources, water quality, and stormwater management includes the area encompassed by the park’s boundaries and the Central Riverfront. This includes the North and South

Reflecting Ponds and the Mississippi River in the vicinity of the project.

Impact Thresholds

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

Negligible: Impacts on water resources would not be readily measurable or detectable and would be within historical or desired water quality conditions.

Minor: Impacts on water resources would be small, detectable, and measurable, but would be within historical or desired water quality conditions.

Moderate: Impacts on water resources would be easily detectable. Historical or desired water quality conditions would be temporarily altered.

Major: Impacts on water resources would be substantial and obvious. The historical or desired water quality conditions would be altered.

Duration: Short-term impacts would occur during construction and would take less than one year to recover after the disturbance or change occurs; long-term impacts would occur or continue after construction is complete.

Impacts of the Alternatives

Alternative 1: No-Action Alternative

Under alternative 1, MoDOT would construct the Park Over the Highway structure over I-70, as discussed in Cumulative Impacts. The NPS would landscape the surface of the structure after completion of MoDOT's construction. Construction activities such as grading and planting at the West Gateway and on the eastern side of Luther Ely Smith Square would temporarily disturb soils, creating an increased potential for soil erosion and/or transport of surface pollutants via stormwater runoff into adjacent water bodies and storm sewers. An erosion and sediment control plan would be developed prior to construction

STORMWATER RUNOFF is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated.

in order to reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before entering adjacent storm sewers or the Mississippi River.

Alternative 1 would not alter the existing stormwater management conditions. Existing pervious surfaces on the site, such as turf grass and other vegetated areas would continue to absorb water at their respective varying rates. Stormwater would continue to be collected in the north and south reflecting ponds and would also continue to drain into the storm sewer system and to the Mississippi River. Stormwater runoff from Leonor K. Sullivan Boulevard would continue to flow untreated into the Mississippi River, either directly from Leonor K. Sullivan Boulevard or via inlets and drains that feed into a portion of the storm sewer system that outflows directly into the Mississippi River. During storm events, pollutants and sediment from roadways and surrounding urban development would continue to contaminate stormwater runoff from the project area, negatively affecting water quality.

Construction-related impacts under the no-action alternative would result in short-term minor adverse impacts to water quality as disturbed soils and altered stormwater flows could create an increased potential for soil erosion and transport of surface pollutants into adjacent water bodies and storm sewers. As the site would continue to operate under current conditions, pollutants in stormwater runoff would enter the

Mississippi River during storm events and long-term minor adverse impacts to water resources and water quality would occur.

Cumulative Impacts for Alternative 1

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on water resources include:

- Visitor Center/Museum roof replacement
- Repair North and South Overlook stairs
- Construction of the Park Over the Highway structure
- Metropolitan St. Louis Sewer District Improvements
- Emerald Ash Borer Environmental Assessment

The replacement of the roof on the underground Visitor Center/Museum and the repairs to the North and South Overlook stairs are deferred maintenance projects that would occur in the future as funding permits. The replacement of the Rosehill ash trees would be completed in phases and according to the approved EAB EA (NPS 201b) after detection of the emerald ash borer. The construction of the Park Over the Highway structure over I-70 would occur as part of MoDOT's transportation infrastructure changes in the vicinity of the park. Demolition, excavation, and site grading performed to complete these projects would disturb soils and alter existing stormwater flows during construction, creating an increased potential for soil erosion and/or transport of surface pollutants via stormwater runoff into adjacent water bodies and storm sewers. Best management practices would be implemented during construction to minimize soil erosion and slow the rate at which water leaves the site. These construction projects would be coordinated as necessary.

The Metropolitan St. Louis Sewer District Improvements would upgrade the system's sewer systems and treatment plants as well as implement large scale green infrastructure

projects. This would help to reduce pollution levels in urban rivers and streams across the district, including the Mississippi River in the vicinity of the park.

The no-action alternative, as noted above, would result in minor short- and long-term adverse impacts to water resources. Combined with past, present, and reasonably foreseeable future projects, there would be short- and long-term minor adverse cumulative impacts to water resources. Long-term beneficial impacts would also occur; however this alternative would contribute minimally to those impacts.

Alternative 2: Moderate Change

During construction, excavation, grading, and the replacement of some existing vegetation would temporarily disturb soils and alter existing stormwater flows, creating an increased potential for soil erosion and/or transport of surface pollutants via stormwater runoff into adjacent water bodies and storm sewers. Best management practices, as described in the Alternatives chapter Mitigation Measures section, would be implemented during construction to minimize soil erosion, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before entering the Mississippi River and adjacent storm sewers. These best management practices would include an erosion and sediment control plan that would be developed prior to construction. Construction projects would be coordinated to minimize soil disturbance.

In alternative 2, there would be an increase in vegetation on site, both in area and amount, which would increase water usage for irrigation. Plantings and landscape treatments, such as conservation mown areas and drought-tolerant plant species, would be installed on the park grounds and could help reduce the need for irrigation which would reduce surface runoff and the use of potable water for irrigation purposes. Any irrigation systems that would require replacement under alternative 2 would utilize current technology to reduce potable water usage. A landscape maintenance regime could include organic treatments, which would reduce the

need for the use of pesticides and fertilizers. This would help to improve the water quality in the reflecting ponds and could reduce algal blooms in the ponds, which are used to hold stormwater runoff from the park grounds.

Various project elements in alternative 2 would reduce stormwater generated on the park grounds and increase the amount of stormwater runoff that is handled on-site. While some additional impervious surface area would be added to Luther Ely Smith Square, new pervious surfaces would be added to the Park Over the Highway structure over I-70. Surface runoff would be reduced through grading that would improve drainage in areas such as the reflecting ponds, the East Slopes and across the West Gateway; the installation of swales around the ponds would catch, detain, and filter stormwater runoff; and soil amendments would be made in various locations of the park to improve vegetation growth and increase infiltration properties. The park's green spaces and swales around the ponds would help to promote infiltration to improve groundwater recharge, increase the amount of stormwater utilized by vegetation, capture stormwater runoff before it leaves the site, reduce the velocity and quantity of stormwater during intense storm events, and treat the stormwater runoff to remove pollutants before it leaves the park and enters adjacent water bodies, thereby improving water quality. Stormwater flows that could not be handled on the park grounds would be directed to the existing stormwater conveyance system.

Stormwater along the Central Riverfront would continue to flow untreated into the Mississippi River, either as sheet flows from Leonor K. Sullivan Boulevard across the levee and into the Mississippi River or via inlets and drains that feed into a portion of the storm sewer system that outflows directly into the Mississippi River. Sheet flows move rapidly across the land surface and arrive at the adjacent water source in short, concentrated bursts rather than infiltrating slowly into the ground surface. During storm events, pollutants and sediment from the Central Riverfront and surrounding urban development would continue to contaminate

stormwater runoff from the project area, negatively affecting water quality.

Construction-related impacts under alternative 2 would result in short-term minor adverse impacts to water quality as disturbed soils and altered stormwater flows could create an increased potential for soil erosion and transport of surface pollutants into adjacent water bodies and storm sewers. An increase in water use for irrigation in the park and the continued stormwater runoff that contains pollutants entering the Mississippi River during storm events would result in long-term minor adverse impacts to water resources and water quality. However, new methods used to reduce and treat stormwater runoff before it enters adjacent water bodies and a reduction in the use of pesticides would have long-term beneficial impacts on water quality.

Cumulative Impacts for Alternative 2

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on water resources include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 2, such as the Visitor Center/ Museum roof replacement and repair of the North and South Overlook stairs. As such, construction activities could be coordinated and phased and could lessen the short-term impacts to water quality from the potential erosion of disturbed soils and/or altered stormwater flows during construction; however soil disturbance during construction under alternative 2 would be greater than under alternative 1.

Alternative 2, as noted above, would result in minor short- and long-term adverse impacts to water resources. Beneficial impacts would also occur. Combined with other past, present, and reasonably foreseeable future actions, there would be minor short- and long-term adverse cumulative impacts as well as long-term beneficial cumulative impacts. Actions directly related to alternative 2 would have limited contributions to impacts on water resources.

Alternative 3: Maximum Change

Construction activities including excavation and grading of parts of the park grounds and for the expanded Visitor Center/Museum and new Visitor Center/Museum entrance, demolition of the Arch Parking Garage, and the replacement of some existing vegetation would temporarily disturb soils and alter existing stormwater flows. This would create an increased potential for soil erosion and/or transport of surface pollutants via stormwater runoff into adjacent water bodies and storm sewers. Best management practices, as described in the Alternatives chapter Mitigation Measures section, would be implemented during construction to minimize soil erosion, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before entering the Mississippi River and adjacent storm sewers. These best management practices would include an erosion and sediment control plan that would be developed prior to construction. Construction projects would be coordinated to minimize soil disturbance.

In alternative 3, there would be an increase in vegetation on the site, both in area and amount, which would increase water usage for irrigation. Plantings and landscape treatments, such as conservation mown areas and drought-tolerant plant species, would be installed on the park grounds and could help to reduce the need for irrigation which would reduce surface runoff and the use of potable water for irrigation purposes. Any irrigation systems that would require replacement under alternative 3 would utilize current technology to reduce potable water usage. A landscape maintenance regime could include organic treatments, which would reduce the need for the use of pesticides and fertilizers. This would help to improve the water quality in the reflecting ponds and could reduce algal blooms in the ponds, which are used to hold stormwater runoff from the park grounds.

Various project elements in alternative 3 would reduce stormwater generated on the park grounds and increase the amount of stormwater runoff that is handled on-site. While a limited amount impervious surface area would be added to the park grounds

at the plaza area in front of the new West Entrance to the Visitor Center/Museum, a large amount of new pervious surfaces would be added to the park after demolition of the Arch Parking Garage is complete and the new landscape installed. Some new pervious surfaces would also be added on the Park Over the Highway structure over I-70. Surface runoff would be reduced through grading that would improve drainage in areas such as the reflecting ponds, the East Slopes and across the West Gateway; the installation of swales around the ponds and shallow depressions in the Explorers Garden would catch, detain, and filter stormwater runoff; and soil amendments would be made in various locations of the park to improve vegetation growth and increase infiltration properties.

The increased green space and vegetation and swales around the ponds and Explorers Garden would help to promote infiltration to improve groundwater recharge, increase the amount of stormwater utilized by vegetation, capture stormwater runoff before it leaves the site, reduce the velocity and quantity of stormwater during intense storm events, and treat the stormwater runoff to remove pollutants before it leaves the park and enters adjacent water bodies, thereby improving water quality. Stormwater flows that could not be handled on the park grounds would be directed to the existing stormwater conveyance system.

Construction-related impacts under alternative 3 would result in short-term moderate adverse impacts to water quality as disturbed soils and altered stormwater flows from multiple construction projects could create an increased potential for soil erosion and transport of surface pollutants into adjacent water bodies and storm sewers. An increase in water use for irrigation in the park and the continued stormwater runoff that contains pollutants entering the Mississippi River during storm events would result in long-term minor adverse impacts to water resources and water quality. However, new methods used to reduce and treat stormwater runoff before it enters adjacent water bodies, increased vegetation, and a reduction in the use of pesticides would have long-term beneficial impacts on water quality.

Cumulative Impacts for Alternative 3

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on water resources include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects are expected to be incorporated into the design and construction process under alternative 3, such as the Visitor Center/ Museum roof replacement and repair of the North and South Overlook stairs. As such, construction activities could be coordinated and phased and could lessen the short-term impacts of the projects; however soil disturbance during construction under alternative 3 would be greater than the disturbance under alternatives 1 and 2.

Alternative 3, as noted above, would result in moderate short-term adverse impacts and minor long-term adverse impacts to water resources. Beneficial impacts would also occur. Combined with other past, present, and reasonably foreseeable future actions, there would be moderate short-term adverse cumulative impacts and minor long-term adverse cumulative impacts. Long-term beneficial cumulative impacts would also occur. Actions directly related to alternative 3 would have limited contributions to impacts on water resources.

VISITOR USE AND EXPERIENCE

METHODOLOGY FOR ASSESSING IMPACTS

The purpose of this impact analysis is to assess the effects of the alternatives on the visitor experience goals of the Jefferson National Expansion Memorial and visitor experience in the park, as well as access to the surrounding area and adjacent destinations in downtown St. Louis. To determine impacts, the current uses of the area were considered and the potential effects of the construction and implementation of the revitalization of the park on visitor opportunities and use were analyzed. Available activities and the types of visitor uses that exist in the park and which might be affected by the proposed actions, including recreation and interpretive experiences, pedestrian and bike access to the park, convenient vehicular parking, and universal access were evaluated. These evaluations included consideration of the park's purpose, significance, fundamental resources and values, and what contributes or detracts from desirable visitor opportunities. The visual character of the area and noises experienced by the visitors were also considered.

STUDY AREA

The study area for visitor opportunities and use includes the area encompassed by the park's boundaries, the Central Riverfront adjacent to the levee and the Mississippi River between Biddle Street and Chouteau Avenue, and the area of downtown St. Louis area adjacent to the park within a comfortable walking distance (between one-quarter to one-half mile, which is a five- to ten-minute walk).

IMPACT THRESHOLDS

The impact intensities for the assessment of impacts on visitor opportunities and use follow.

Negligible: Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable

change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.

Minor: Changes in visitor use and/or experience would be slight and detectable but would not appreciably limit critical characteristics of the visitor experience. Visitor satisfaction would remain stable.

Moderate: A few critical characteristics of the desired visitor experience would change and/or the number of participants engaging in a specified activity would be altered. Some visitors who desire their continued use and enjoyment of the activity/visitor experience might pursue their choices in other available local or regional areas. Visitor satisfaction would begin to decline.

Major: Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. Visitors who desire their continued use and enjoyment of the activity/visitor experience would be required to pursue their choices in other available local or regional areas. Visitor satisfaction would markedly decline.

Duration: Short-term impacts would occur during construction. Long-term impacts would continue or occur after construction is complete.

IMPACTS OF THE ALTERNATIVES

Visitor Use and Experience covers impacts related to visitor opportunities and use, at the park and Central Riverfront, as well as bicycle and pedestrian circulation, parking and accessibility.

Alternative 1: No-Action Alternative

Under alternative 1, the no-action alternative, the National Park Service would landscape the surface of the Park Over the Highway structure over I-70 after completion of MoDOT's construction, as described in Cumulative Impacts. Construction activities such as grading and planting at the West Gateway and on the eastern side of Luther

Ely Smith Square would temporarily disrupt the existing visitor experience at the West Gateway as visitors would be directed away from construction activities, which could reduce access to Luther Ely Smith Square and the pedestrian crossings and Market and Chestnut Streets.

Access to and from downtown at the West Gateway area and other pedestrian connections to and within the park would be improved due to the landscaping of the Park Over the Highway. Visitors would continue to have access to the exhibits and programming currently offered, including at the Old Courthouse, the Visitor Center and Museum of Westward Expansion, the Ride to the Top of the Arch, and on the park grounds. Visitor fees would continue to be collected for the Ride to the Top of the Arch and the films screened in the Visitor Center/Museum. While the connections between the park and downtown would be improved, new destinations and activities would not be added to the park; the overall visitor use and experience at the park would not be considerably enhanced, and visitor attendance would be anticipated to follow past patterns.

The Central Riverfront would remain largely unchanged and visitor activity along the riverfront would continue to be periodically interrupted due to seasonal flooding along the Mississippi River which inundates Leonor K. Sullivan Boulevard, resulting in roadway closures and reduced pedestrian and vehicular access along the Central Riverfront.

On-site visitor parking facilities would remain, including the Arch Parking Garage and limited parking at the Old Cathedral. The Arch Parking Garage is currently utilized by the majority of visitors to the park, which provides convenient access for those arriving by vehicle. Vehicular access to the riverfront from downtown St. Louis would change at Washington Avenue due to the slip ramp. Visitor access to the Central Riverfront and the Arch Parking Garage would require a different route through Laclede's Landing to Washington Avenue. A shortage of oversized vehicle (RV) parking and short-term parking or loading and unloading passengers near the

park grounds would persist and could create inconveniences for visitors seeking those types of parking.

In the no-action alternative, a lack of barrier-free access points within the park grounds would continue, and would limit the ability of visitors with mobility disabilities to access some areas of the park including into the Visitor Center/Museum under the Arch, the Overlook stairs and Grand Staircase, and the Central Riverfront.

Construction of the Park Over the Highway landscape under the no-action alternative would result in short-term negligible to minor adverse impacts to visitor access to the West Gateway which would be limited during construction. Long-term negligible to minor adverse impacts to visitor use and experience would occur as new destinations, activities, and improvements would not be added to the park and flooding events would continue to limit access to the Central Riverfront. Landscaping of the Park Over the Highway would have long-term beneficial impacts to visitor use and experience due to the improved landscaped pedestrian connection between downtown and the park.

Cumulative Impacts for Alternative 1

Past, present, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial and Central Riverfront that have potential impacts on visitor use and experience include:

1. Citygarden
2. Old Post Office Plaza
3. Eads Bridge Restoration
4. Old Courthouse Renovations and Repairs
5. Mississippi River Bridge
6. The Mercantile Exchange
7. Visitor Center/Museum roof replacement

8. Repair North and South Overlook stairs
9. Kiener Plaza and streetscape improvements
10. Construction of the Park Over the Highway structure
11. Poplar Street Bridge improvements

Public space development projects in downtown St. Louis including Citygarden and the Old Post Office Plaza improve conditions surrounding the park in downtown St. Louis by providing additional destinations and attractions for visitors and residents. The Eads Bridge restoration and structural rehabilitation and the Mississippi River Bridge construction are ongoing projects, which will provide improved access in downtown St. Louis for visitors and residents alike. The Old Courthouse renovations and repairs are ongoing, and are expected to improve the condition of the historic building, creating a more attractive destination for visitors.

The replacement of the roof on the underground Visitor Center/Museum is anticipated to occur whether or not the action alternatives occur, as it is needed to address leaks. The repair of the North and South Overlook stairs is a deferred maintenance project that would occur in the future to eliminate hazards and repair degraded materials. These projects would contribute to an improved visitor experience at the park by maintaining and improving facilities used by visitors.

The construction of the Park Over the Highway structure would change vehicular access to the riverfront from downtown St. Louis at Washington Avenue due to the slip ramp. Visitor access to the Central Riverfront and the Arch Parking Garage would require a different route through Laclede's Landing to Washington Avenue. Bicycle access to streets designated as part of the regional bikeway network via shared lanes with vehicular traffic, Memorial Drive and Washington Avenue, and a designated bike route, Chestnut Street, would be modified by the Park Over the Highway structure. Bicyclists would be

routed with vehicular traffic around the permanent northbound closure of Memorial Drive, moving from south to north in a clockwise direction around Luther Ely Smith Square. Bicyclists would be routed around the southbound closure of Memorial Drive onto the Pine Street pedestrian bridge. The Poplar Street Bridge improvements would also modify the access to the Poplar Street Bridge from downtown St. Louis. These ongoing and future projects could limit visitor access to areas of the park and downtown during construction, causing short-term adverse impacts to visitor use and experience.

The no-action alternative, as noted above, would result in negligible to minor short- and long-term adverse impacts to visitor use and experience. There would also be beneficial impacts. Combined with other past, present, and reasonably foreseeable future actions, there would be short-term minor adverse cumulative impacts and long-term beneficial cumulative impacts to visitor use and experience.

Alternative 2: Moderate Change

During construction of project elements at the park and along the Central Riverfront, visitor access would be limited and changed to accommodate construction locally at project sites. These projects include the grading and landscaping of the Park Over the Highway, installation of the plaza at Luther Ely Smith Square, renovations to the Visitor Center/Museum and the Old Courthouse, the installation of universally accessible paths around the ponds, along the East Slopes down to the riverfront, and into the Visitor Center/Museum under the Arch, the replacement in-kind of the Processional walks, the installation of stormwater management and new vegetation, streetscape improvements at the Old Courthouse, and construction of the project elements along the Central Riverfront. During construction, signage and other accommodations to allow for maximum visitor access to the park would be implemented. Construction would be coordinated and phased to limit disruptions to visitors wherever possible.

Under alternative 2, additional activities and destinations would be added to the park for local and non-local visitors. The exhibit space in the Visitor Center/Museum would be renovated and updated as would the galleries and exhibits on the first and second floors of the Old Courthouse, improving the interpretive opportunities available to visitors. Visitor fees would continue to be collected for the Ride to the Top of the Arch and the films screened in the Visitor Center/Museum. Areas for passive recreation, gathering spaces, seating during large events, and places to view the trains and the riverfront would be added. Providing these additional activities for visitors would enhance the visitor experience and could increase overall visitor satisfaction. Visitation would be expected to increase due to the updated exhibits and additional activities.

Accessibility improvements would increase visitor comfort and satisfaction by creating additional access to destinations in the park for all visitors, including to the first and second floors of the Old Courthouse and accessible entrance and egress ramps to the Visitor Center/Museum. Paths across the Park Over the Highway landscape would provide an accessible route to the park from downtown at the West Gateway, which would act as a bridge between the Old Courthouse, downtown St. Louis, and the park. The addition of two to four accessible paths on the East Slopes would provide more pedestrian access to the Central Riverfront and riverfront businesses. New pedestrian and bicycle circulation elements would be added to the park grounds, including paths at the ponds, rehabilitation of the Processional Walks, and the addition of a bus drop-off at Luther Ely Smith Square. These pedestrian and accessibility improvements would increase the ways to get to and between the park, the city, and the riverfront, and to destinations within the park. These improvements may attract additional visitors to the site and could encourage return visits. They would also enhance access to the park for downtown workers and residents, creating easier, more approachable and more enjoyable access to the park and the riverfront, expanding visitation to the park by downtown visitors, workers, and residents.

Along the Central Riverfront, improved protection from river flooding due to the raised elevation of Leonor K. Sullivan Boulevard would limit roadway closures and provide more predictable access to riverfront businesses and activities. The bicycle and pedestrian promenade along Leonor K. Sullivan Boulevard would improve the safety, variety, and quality of recreational opportunities along the Central Riverfront. Improving the variety and quality of recreational activities would also improve the visitor experience.

The Arch Parking Garage would remain, with aesthetic improvements, and vehicular access would be provided via a slip lane onto Washington Avenue from the I-70 ramp and from Laclede's Landing. The Arch Parking Garage is currently utilized by the majority of visitors to the park, which provides convenient access for those arriving by vehicle. Vehicular access to the riverfront from downtown St. Louis would change at Washington Avenue due to the slip ramp. Visitor access to the Central Riverfront and the Arch Parking Garage would require a different route through Laclede's Landing to Washington Avenue. In this alternative, a shortage of oversized vehicle and short-term parking for loading and unloading near the park would persist.

Actions under alternative 2 would improve resource conditions, visitor facilities, and infrastructure throughout the park and connect it with the city and the river, positively affecting local users and non-local visitors. Alternative 2 would provide new and upgraded opportunities, destinations, activities, services, and amenities for visitors that could make them stay longer. Improved connections and visitor amenities would create safer and more comfortable conditions for all visitors. These actions could contribute to increased overall visitation levels from first-time visitors and return visitors and could encourage visitors to extend their stay while at the park.

Construction-related impacts under alternative 2 would result in short-term moderate adverse impacts to visitor access to activities and destinations within areas of

the park that could be limited or changed to accommodate construction. In the long term, there would be beneficial impacts to visitor experience and satisfaction due to the increase in destinations, activities, and accessibility within the park and along the Central Riverfront and the improved landscaped pedestrian connection between downtown and the park. Minor adverse impacts to visitor use and experience would also occur due to a continued shortage of oversize and short-term vehicle parking.

Cumulative Impacts for Alternative 2

Past, present, and reasonably foreseeable projects within the area of the park that have potential impacts on visitor experience include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects would be incorporated into the design and construction process under alternative 2, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs.

Alternative 2, as noted above, would result in moderate short-term adverse impacts to visitor use and experience. There would also long-term minor adverse impacts and long-term beneficial impacts. Combined with other past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse cumulative impacts during construction and long-term beneficial cumulative impacts.

Alternative 3: Maximum Change

During construction of project elements at the park and along the Central Riverfront, visitor access would be limited and changed to accommodate construction locally at project sites. In addition to the construction activities and locations described under alternative 2, other construction activities would occur under alternative 3 including construction of the new Visitor Center/Museum entry at the West Gateway and expanded the Visitor Center/Museum structure under the Arch. Alternative 3 would also demolish the Arch Parking Garage and install new landscape features in the North Gateway including the

Explorers Garden and new pedestrian paths and bikeways. As in alternative 2, signage and other accommodations to allow for maximum visitor access to the park during construction would be implemented. Construction would be coordinated and phased to limit disruptions to visitors wherever possible.

An increase in activities and destinations would be anticipated at the park in this alternative. The new Visitor Center/Museum entry at the West Gateway in alternative 3 would include a plaza area in front of the entrance, visitor amenities such as ticket stations, and security in the new lobby. The Visitor Center/Museum addition would include visitor orientation, museum exhibit, and education space, while existing exhibit space in the Visitor Center/Museum would be renovated. The galleries and exhibits on the first and second floors of the Old Courthouse would be renovated and updated. These changes would increase and improve the interpretive opportunities available to visitors.

The ticket stations in the new lobby would create a central entry point that would facilitate the collection of an entrance fee for the Visitor Center/Museum, as well as any other fees for visitor experiences such as the Ride to the Top of the Arch. A fee structure would be determined during the detailed design process. Free access to the Arch grounds and the Old Courthouse would continue. The creation of an entrance fee would create a more inclusive way of collecting visitor fees that support the visitor experience at the park. The centralized ticketing could make the experience of entering the Visitor Center/Museum and obtaining tickets to desired experiences easier than the existing configuration which requires visitors to wait in line to enter the Visitor Center/Museum and then again for tickets to Ride to the Top of the Arch and for film screenings.

The West Gateway and Visitor Center/Museum entry would serve as a major point of arrival for visitors and would act as a bridge between the Old Courthouse, downtown St. Louis, and the park. Visitors would no longer enter the Visitor Center/Museum at

the Arch legs. Entry at the Arch legs is part of the design of the park's integrated purposeful approach and the loss of this historic designed entry experience would negatively affect the visitor experience. The NPS would install accessible egress routes from the Visitor Center/Museum at the Arch legs, which would help mitigate these effects.

Park-wide activities and destinations would be added for local and non-local visitors, providing additional services and activities, which could increase overall satisfaction. These include areas for passive recreation, pedestrian and bicycle paths, seating during large events, gathering spaces, and places to view the trains and the riverfront. Providing these additional activities for visitors would enhance the visitor experience and could increase overall visitor satisfaction. Visitation would be expected to increase due to the updated exhibits and additional activities.

New pedestrian and bicycle circulation elements would be added to the park grounds, including paths and bikeways at the ponds, circulation to the Central Riverfront from the park via accessible paths, and a bicycle path at the north end of the park grounds; as well as improved access to the MetroLink station in Eads Bridge (due to the removal of the Arch Parking Garage), rehabilitation of the Processional Walks, and the addition of a bus drop-off at Luther Ely Smith Square. The dedicated bicycle path along Washington Avenue would enhance its use as part of the regional bikeway network. Collectively, these changes would enhance the ability of visitors to access the park through a variety of transportation modes and new entry points. These improvements may attract additional visitors to the site and could encourage return visits.

Accessibility improvements would increase visitor comfort and satisfaction by creating additional access to destinations in the park for all visitors, including to the first and second floors of the Old Courthouse. The new West Entrance to the Visitor Center/Museum would be accessible. Accessibility would be improved to both the first and second floors of the Old Courthouse.

Accessible paths would be added at the ponds and the addition of two to four accessible paths on the East Slopes would provide more pedestrian access to the Central Riverfront and riverfront businesses. These pedestrian and accessibility improvements would increase the ways to get to and between the park, the city, and the riverfront, and to destinations within the park, improving visitor access and circulation. Local users would also enjoy easier, more approachable access to the park and the riverfront.

The Arch Parking Garage would be demolished after the implementation of an alternative parking strategy. Open space and a lawn that could be used for event space, a children's garden, a drop-off area, and accessible pedestrian and bicycle paths would be installed in the North Gateway, creating more visitor amenities and a more pleasant visitor experience at the north end of the park. The removal of the garage would adversely impact the access and experience of those visitors seeking on-site parking close to the Arch. Washington Avenue would be closed to through traffic and a shared pedestrian/bicycle path would be installed. This path could encourage visitation to the riverfront businesses by pedestrian and bicyclists; however, it would also change vehicular access and parking for those visitors who use this area to access riverfront businesses. The shortage of oversized vehicle parking near the park would persist. However, the new loading/unloading areas around Luther Ely Smith Square would improve short-term drop-off/loading areas for oversize vehicles, such as buses.

Along the Central Riverfront, improved protection from river flooding due to the raised elevation of Leonor K. Sullivan Boulevard would limit roadway closures and provide more predictable access to the riverfront. The bicycle and pedestrian promenade along Leonor K. Sullivan Boulevard would improve the safety, variety, and quality of recreational opportunities along the Central Riverfront. Improving the variety and quality of recreational activities could also lead to increased visitation and enhanced experience.

Construction-related impacts under alternative 3 would result in short-term moderate adverse impacts to visitor access to activities and destinations within areas of the park that could be limited or changed to accommodate construction. Long-term minor adverse impacts to visitor use and experience would occur due to the change in the designed visitor's entry approach to the Visitor Center/Museum and a continued shortage of oversize and short-term vehicle parking. In the long term, there would be beneficial impacts to visitor experience and satisfaction due to the increase in opportunities, destinations, activities, and accessibility within the park and along the Central Riverfront and the new West Entry that would provide a direct pedestrian connection between downtown and the park.

Cumulative Impacts for Alternative 3

Past, present, and reasonably foreseeable projects within the area of the park that have potential impacts on visitor use and experience include the same projects discussed earlier in this section under alternative 1, the no-action alternative. Some cumulative projects would be incorporated into the design and construction process under alternative 3, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs.

Alternative 3, as noted above, would result in moderate short-term adverse impacts. There are also long-term minor adverse impacts and long-term beneficial impacts to visitor use and experience. Combined with other past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse cumulative impacts and long-term beneficial cumulative impacts.

SOCIOECONOMICS

METHODOLOGY FOR ASSESSING IMPACTS

This section analyzes the impacts of the alternatives on the socioeconomic environment surrounding the park in downtown St. Louis, including the Central Riverfront. While the description of the socioeconomic impacts focuses on downtown St. Louis, regional impacts are also addressed. To determine impacts, current socioeconomic conditions were considered and the potential effects of the construction and implementation of the revitalization of the park on socioeconomics were analyzed. The economic contribution of the park and riverfront businesses, and visitor spending in the local economy, as well as population, employment, and income were evaluated.

STUDY AREA

The study area for socioeconomics includes the area encompassed by the park's boundaries and the Central Riverfront, and the area of downtown St. Louis adjacent to the park that is within a comfortable walking distance (between one-quarter to one-half mile, which is a five- to ten-minute walk). Regional impacts within the City of St. Louis are also considered.

IMPACT THRESHOLDS

The impact intensities for the assessment of impacts on socioeconomics follow.

Negligible: No effects would occur, or the effects on businesses or other socioeconomic conditions would be below or at the level of detection.

Minor: The effects on businesses or other socioeconomic conditions would be small but detectable and would only affect a limited number of businesses, organizations, or individuals.

Moderate: The effects on local businesses or other socioeconomic conditions would be readily apparent. Changes in economic

or social conditions would affect many businesses, organizations, or individuals.

Major: The effects on businesses or other socioeconomic conditions would be readily apparent. Changes in social or economic conditions would be substantial and affect the majority of businesses, organizations, or individuals.

Duration: Short-term impacts would occur during construction. Long-term impacts would continue or occur after construction is complete.

IMPACTS OF THE ALTERNATIVES

Economic analyses for proposed projects are ongoing, including a museum analysis and a business plan. As such, the analysis of potential economic impacts of park actions provided in this EA is largely qualitative. The proposed action cannot be quantified without the further data being generated in these ongoing studies. Once available, these studies would be considered in the design and planning process.

Alternative 1: No-Action Alternative

Under alternative 1, the National Park Service would landscape the surface of the Park Over the Highway structure over I-70 after completion of MoDOT's construction of the structure, as described in Cumulative Impacts. Construction-related spending for activities such as grading and planting at the West Gateway and on the eastern side of Luther Ely Smith Square could generate revenue for individual businesses in the region. Potential disruptions caused by construction such as grading and excavating and other construction actions could close or limit areas of the park, could make them less desirable to visit, which could reduce visitor spending in the local area during construction.

In alternative 1, visitors would continue to have access to the exhibits and programming currently offered, including at the Old Courthouse, the Visitor Center/Museum, the Ride to the Top of the Arch, and on the park grounds. The connection between the West Gateway and downtown would be improved;

however, other connections between the park, downtown, and the riverfront would not be improved and new destinations and activities would not be added to the park. Therefore, the overall livability and social benefits the park provides to downtown would not be enhanced.

The Arch Parking Garage would remain in place and its use continued. Vehicular access to the parking garage from Washington Avenue would remain open; however, access to Washington Avenue from Memorial Drive could be modified by MoDOT's proposed changes to the highway and street infrastructure along the I-70 corridor. The Arch Parking Garage bonds are scheduled to be paid in full in 2012. Once these bonds are paid, the revenue stream to NPS and NPS park partner, Metro, is anticipated to increase for the structural and useful lifetime of the parking garage. However, long term, maintenance needs on the garage would increase, as the structure reaches the end of its usable life. Any increase in revenues from the Arch Parking Garage would likely generate additional spending in the local economy. Revenue from visitor fees would continue to be collected at the existing ticket counter locations for the Ride to the Top of the Arch and the films screened in the Visitor Center/Museum.

The Central Riverfront would remain largely unchanged and business activity along the riverfront would continue. Access would continue to be periodically interrupted due to seasonal flooding along the Mississippi River that would inundate Leonor K. Sullivan Boulevard, resulting in roadway closures and reduced pedestrian and vehicular access to businesses and activities along the Central Riverfront.

The economic contribution to industries such as hotels and restaurants in downtown St. Louis would persist and the park would continue to have a long-term local beneficial economic impact on the region; however, local and non-local visitor spending is less than 3% of all tourist-related spending that occurs in the in the St. Louis Area (CVC 2011 and NPS 2011b). The no-action alternative would continue the activities at the park that

generate spending in the local area and in the region, including operational expenditures made by the National Park Service, and visitor spending. The NPS would continue current management practices under the no-action alternative. Standard maintenance activities would continue and would expand to include the maintenance of the landscape along the Park Over the Highway. Deferred maintenance projects, as described in the Cumulative Impacts section, would be undertaken as funding permits. No major new initiatives would be undertaken. Operational expenditures such as payroll, supplies, and materials to maintain the park would continue and visitorship levels would likely follow existing visitorship trends.

Construction-related spending impacts from implementation of the Park Over the Highway landscape under the no-action alternative would have a short-term beneficial economic impact on the local economy as spending could generate revenue for individual businesses in the region. Long-term economic impacts in downtown St. Louis and the region would be negligible as no other broad changes in management, visitation, or operations would occur and visitorship levels and visitor spending in the local area would likely follow existing trends. There would be continued minor short- and long-term adverse impacts to socioeconomic resources as the livability benefits provided by the overall park would not be enhanced and periodic flooding along the Central Riverfront would continue. The park and the Central Riverfront would continue to have a short- and long-term local beneficial economic impact on the region driven by visitor spending and operational expenditures.

Cumulative Impacts for Alternative 1

Past, present, and reasonably foreseeable projects within the area of the Jefferson National Expansion Memorial that have potential impacts on socioeconomic resources include:

- Citygarden
- Cupples Station Ballpark Lofts

- Hyatt Regency St. Louis Riverfront
- Federal Reserve Bank of St. Louis
- Old Post Office Plaza
- Eads Bridge Restoration
- Old Courthouse Renovations and Repairs
- Mississippi River Bridge
- The Mercantile Exchange
- Visitor Center/Museum roof replacement
- Repair north and south overlook stairs
- Kiener Plaza and streetscape improvements
- Construction of the Park Over the Highway structure
- Emerald Ash Borer Environmental Assessment
- Poplar Street Bridge improvements

Development projects in downtown St. Louis including Citygarden, Cupples Station Ballpark Lofts, the renovation of the Hyatt Regency St. Louis Riverfront, the Federal Reserve Bank of St. Louis and the Old Post Office Plaza have all contributed investments and infrastructure improvements in downtown St. Louis. The Old Courthouse renovations and repairs, the Eads Bridge restoration and structural rehabilitation, the Mississippi River Bridge, and the Mercantile Exchange complex are ongoing, creating business opportunities for the construction industry and providing investments and infrastructure improvements in downtown St. Louis.

The replacement of the roof on the underground Visitor Center/Museum and the repair of the North and South Overlook stairs are deferred maintenance projects that would occur as funding permits. The replacement of the Rosehill ash trees would be completed in phases and according to the approved EAB

EA after detection of the emerald ash borer. Replacement and deferred maintenance expenditures would likely occur over time and would positively influence individual businesses; however, regional earnings would be minor. The Poplar Street Bridge improvements would also create investment and new infrastructure downtown, as well as some local earnings during construction.

Cumulative impacts from other projects and planning activities including Citygarden, Cupples Station Ballpark Lofts, the Old Post Office Plaza, the Mercantile Exchange, and Kiener Plaza and streetscape improvements have the potential to increase visitation to the park and downtown, creating benefits for downtown retailers and businesses. These projects and activities would also increase the amount and quality of infrastructure, facilities, and activities for downtown residents, workers, and visitors.

The no-action alternative, as noted above, would result in negligible to minor short- and long-term adverse impacts to socioeconomic resources. There would also be beneficial impacts. Combined with other past, present, and reasonably foreseeable future actions, there would be short- and long-term negligible to minor adverse cumulative impacts and short- and long-term beneficial cumulative impacts to socioeconomic resources; however this alternative would contribute minimally to those impacts.

Alternative 2: Moderate Change

Under alternative 2, construction-related spending would occur to implement CityArchRiver 2015 Initiative projects at the park and along the Central Riverfront. Net construction cost estimates for alternative 2 range between approximately \$75 million and \$100 million; however, it is assumed that expenditures would occur over several years and are not guaranteed. Economic impacts to individual businesses could be substantial, but regional construction earnings would be minor. Potential disruptions caused by construction such as grading and excavating and other construction actions could close or limit areas of the park, could make them

less desirable to visit, and could reduce visitor spending in the local area during construction.

Under alternative 2, the galleries and exhibits on the first and second floors of the Old Courthouse would be renovated and updated, as would the existing exhibit space in the Visitor Center/Museum. Additional activities and destinations would be added for local and non-local visitors, such as pedestrian and bicycle paths, areas for passive recreation, seating during large events, gathering spaces, and places to view the trains and the riverfront. Visitation would be expected to increase due to the updated exhibits and additional activities, which could lead to increased spending.

Pedestrian connectivity and accessibility measures would be implemented around the park, including paths within the park and paths across the new West Gateway and the Park Over the Highway. The Park Over the Highway landscape at the West Gateway would create a link between the Old Courthouse, downtown St. Louis, and the park. Accessibility improvements would create additional access to the first and second floors of the Old Courthouse and accessible entrance and egress routes to the Visitor Center/Museum. The addition of two to four accessible paths on the East Slopes would provide more pedestrian access to the Central Riverfront and riverfront businesses. Increased connectivity between the city, the park, and the riverfront could increase patronage of local businesses by park visitors. These pedestrian and accessibility improvements would increase the ways to get to and between the park, the city, and the riverfront, and to destinations within the park. This would attract additional visitors to the site and could encourage return visits, both of which would increase contributions to the local economy. It would also enhance access to the park for local users, creating easier, more approachable and more enjoyable access to the park and the riverfront, increasing the vitality of the downtown area and enhancing the overall livability and social benefits the park provides to downtown visitors, workers, and residents.

The Arch Parking Garage would remain, with aesthetic improvements, and vehicular access would be provided via a slip lane onto Washington Avenue from the I-70 ramp and from Laclede's Landing. The Arch Parking Garage bonds are scheduled to be paid in full in 2012. Once these bonds are paid, the revenue stream to NPS and NPS' park partner, Metro, is anticipated to increase for the structural and useful lifetime of the parking garage. However, long term maintenance needs on the garage would increase, as the structure reaches the end of its usable life. Any increase in revenues from the Arch Parking Garage would likely generate additional spending in the local economy. Revenue from visitor fees would continue to be collected at the existing ticket counter locations for the Ride to the Top of the Arch and the films screened in the Visitor Center/ Museum.

Along the Central Riverfront, improved protection from river flooding due to the raised elevation of Leonor K. Sullivan Boulevard would limit roadway closures and provide more predictable access to riverfront businesses, which would minimize revenue lost during such events. The bicycle and pedestrian promenade along Leonor K. Sullivan Boulevard would provide an outdoor amenity that could attract visitors and local users to the Central Riverfront. The promenade would provide local users with a place to exercise and recreate outdoors and it could contribute to the social vitality of the local area. It would also connect communities and provide access to The River Ring, a series of interconnected greenways, parks, and trails throughout the St. Louis region. The Central Riverfront would provide a key link in The River Ring by connecting the Mississippi Greenway to the Confluence Greenway. Improving the variety and quality of recreational activities and could also lead to increased visitation and extended stays, which would increase visitor spending and economic contributions to the local economy.

Increased operations and maintenance due to the new destinations and activities in the park would result in an increase in spending and local employment, generating local economic activity. The economic contribution

of park and Central Riverfront visitors to some industries such as hotels and restaurants in downtown St. Louis would continue and could increase.

Alternative 2 would provide new and upgraded opportunities, services, and amenities for visitors that could make them stay longer. Improved connections and visitor amenities would create safer and more comfortable conditions for all visitors. These actions could contribute to increased overall visitation levels from first-time visitors, encourage visitors to extend their stay, and possibly promote more repeat visitation. Resulting impacts from increased visitation on the local and regional economy would be beneficial; however, local and non-local visitor spending is less than 3% of all tourist-related spending that occurs in the in the St. Louis Area (CVC 2011 and NPS 2011b).

Construction-related spending impacts under 2 alternative would have a short-term beneficial economic impact on the local economy as spending would generate revenue for individual businesses in the region. Short-term minor adverse local impacts could also occur during construction if visitation declines while access to areas of the park is limited. Actions under alternative 2 would increase visitorship levels as well as visitor and operational spending by increasing and improving visitor facilities and infrastructure throughout the park and the Central Riverfront and connecting the park with the city and the river, which would have long-term beneficial economic impacts in downtown St. Louis and the region. The pedestrian and accessibility improvements would also have long-term beneficial impacts to socioeconomic resources by enhancing the overall livability and social benefits the park and the Central Riverfront provide.

Cumulative Impacts for Alternative 2

Past, present, and reasonably foreseeable projects within the area of the park that have potential impacts on socioeconomic resources include the same projects discussed earlier in this section under alternative 1, the no-action alternative. Some cumulative projects would be incorporated into the

design and construction process under alternative 2, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs.

Alternative 2, as noted above, would result in minor short-term adverse impacts to socioeconomic resources. There would also be short- and long-term beneficial impacts. Combined with other past, present, and reasonably foreseeable future actions, short-term minor adverse cumulative impacts and short- and long-term beneficial cumulative impacts would occur. Actions directly related to alternative 2 would have limited contributions to impacts on socioeconomic resources.

Alternative 3: Maximum Change

Under alternative 3, construction-related spending would occur to implement CityArchRiver 2015 Initiative projects at the park and along the Central Riverfront. Net construction cost estimates for alternative 3 range between approximately \$180 million and \$250 million; however, as with alternative 2, it is assumed that expenditures would occur over several years and are not guaranteed. The economic impacts to individual businesses and the region would be the same as those discussed under alternative 2.

In addition to the additional activities and destinations that would be added as described in alternative 2, a new West Entrance to the Visitor Center/Museum would be constructed at the West Gateway in alternative 3 and would include a plaza area in front of the entrance and visitor amenities and security in the new lobby. The entry and Visitor Center/Museum addition would include visitor orientation, museum exhibit, and education space and renovation of the existing exhibit space in the Museum of Westward Expansion. Visitation would be expected to increase due to expanded and updated exhibits, additional activities, and new event spaces. These improvements could encourage return visits, both of which would increase contributions to the local economy.

The pedestrian connectivity and accessibility measures described in alternative 2 would be implemented under alternative 3. Alternative 3

would also include the new accessible Visitor Center/Museum entrance in the West Gateway. The West Gateway and Visitor Center/Museum entry would serve as a major point of arrival for visitors and would create a link between the Old Courthouse, downtown St. Louis, and the park. These pedestrian and accessibility improvements would increase the ways to get to and between the park, the city, and the riverfront, and to destinations within the park which may attract additional visitors to the site and could encourage return visits. It would also enhance access to the park for local users, creating easier, more approachable and more enjoyable access to the park and the riverfront, increasing the vitality of the downtown area and enhancing the overall livability and social benefits the park provides to downtown visitors, workers, and residents.

The Arch Parking Garage would be removed after implementation of an alternative parking strategy under this alternative and a lawn that could be used for event space, a children's garden called the Explorers Garden, and accessible pedestrian and bicycle paths would be installed in the North Gateway. Washington Avenue would be closed to through traffic, a shared pedestrian/bicycle path would be installed, and a drop-off area would be established. This path could encourage visitation to the riverfront businesses by pedestrian and bicyclists; however, it would also change vehicular access to the riverfront. The removal of the Arch Parking Garage would provide views between the park and Laclede's Landing, which could encourage visitors to move between the two destinations and patronize venues such as restaurants in Laclede's Landing as well as visit the park.

Removal of the Arch Parking Garage would eliminate the revenue stream currently generated by the garage for NPS and NPS' park partner, Metro. An entrance fee for the Visitor Center/Museum, as well as any other fees for visitor experiences such as the Ride to the Top of the Arch, would be collected at ticket stations in the new lobby. The entrance fee could generate additional revenue, depending on the fee structure and visitation levels into the Visitor Center/Museum. A fee structure would be determined during the detailed design process. Free access to the Arch grounds and the Old Courthouse would continue.

Eliminating on-site parking could encourage visitors to park downtown and visit more attractions, which could extend visitor stays and lead to increased visitor spending. This could improve the utilization of parking facilities in downtown if existing facilities are used to meet visitor parking needs. A parking study conducted for Metro considers existing supplies and the construction of a new garage as potential options for parking solutions (Carl Walker 2012). The parking study would be used to identify parking strategies for park visitors in alternative 3 to continue easy access to parking for visitors.

Along the Central Riverfront, the actions proposed by alternative 3 are the same as those described in alternative 2. The improved protection from river flooding, increase in recreational outdoor space, and connections to the regional greenway, parks, and trails system would improve the variety and quality of recreational activities and could lead to increased visitation and extended stays and increase local economic contributions.

Increased operations and maintenance due to the new facilities, destinations, and activities in the park would result in an increase in spending and local employment, generating local economic activity. The economic contribution of park visitors to some industries such as hotels and restaurants in downtown St. Louis would continue and the park would continue and could increase.

This alternative would improve resource conditions, visitor facilities, and infrastructure throughout the park and connect it with the city and the river. It would provide new and upgraded opportunities, services, and amenities for visitors that could make them stay longer. Improved and increased connections and visitor amenities would create safer and more comfortable conditions for all visitors. These actions could contribute to increased overall visitation levels from first-time visitors, encourage visitors to extend their stay, and possibly promote more repeat visitation. Resulting impacts from increased visitation on the local and regional economy would be beneficial; however, local and non-local visitor spending is less than 3% of all tourist-related

spending that occurs in the in the St. Louis Area (CVC 2011 and NPS 2011b).

Construction-related spending impacts under 3 alternative would have a short-term beneficial economic impact on the local economy as spending would generate revenue for individual businesses in the region. Short-term local minor to moderate adverse impacts could also occur during construction if visitation declines while access to areas of the park is limited. Removal of the Arch Parking Garage would have long-term minor adverse impacts due to the loss of a revenue-generating facility. Actions under alternative 3 would increase visitorship levels as well as visitor and operational spending by increasing and improving visitor facilities and infrastructure throughout the park and the Central Riverfront and connecting the park with the city and the river, which would have long-term beneficial economic impacts in downtown St. Louis and the region. The pedestrian and accessibility improvements would also have long-term beneficial impacts to socioeconomic resources by enhancing the overall livability and social benefits the park and the Central Riverfront provide.

Cumulative Impacts for Alternative 3

Past, present, and reasonably foreseeable projects within the area of the park that have potential impacts on socioeconomic resources include the same projects discussed under alternative 1, the no-action alternative. Some cumulative projects would be incorporated into the design and construction process under alternative 3, such as the Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs.

Alternative 3, as noted above, would result in minor to moderate short-term adverse impacts and long-term minor adverse impacts to socioeconomic resources. There would also be short- and long-term beneficial impacts. Combined with other past, present, and reasonably foreseeable future actions, there would be short-term minor to moderate adverse cumulative impacts, long-term minor adverse impacts, and short- and long-term beneficial cumulative impacts. Actions directly related to alternative 3 would have limited contributions to impacts on socioeconomic resources.

OPERATIONS AND MANAGEMENT

METHODOLOGY FOR ASSESSING IMPACTS

Operations and management, for the purpose of this analysis, refers to the ability of the NPS staff to protect and preserve park resources and facilities, and to provide for an effective visitor experience. It also addresses the effectiveness and efficiency with which the NPS staff are able to perform such tasks. This includes an analysis of energy conservation and sustainability measures. Within this analysis, it is assumed that the expansion of existing facilities or the construction of new facilities would require necessary increases in staff, for which funding is not guaranteed. This analysis also accounts for impacts on the operations and management of entities with responsibilities associated with the Central Riverfront improvements. Staff who are knowledgeable of these issues were members of the planning team that evaluated the impacts of each alternative. The impact analysis is based on the current description of operations and management presented in “Chapter 3: Affected Environment” of this document.

STUDY AREA

The study area for operations and management is the area encompassed by the park’s boundaries, and the area along the Central Riverfront adjacent to the levee and the Mississippi River, between Biddle Street and Chouteau Avenue.

IMPACT THRESHOLDS

The impact intensities for the assessment of impacts on operations and management follow.

Negligible: Operations would not be impacted or the project would not have a noticeable or appreciable impact on operations.

Minor: Impacts would be noticeable, but would be of a magnitude that would not result in an appreciable or measurable change to operations.

Moderate: Impacts would be readily apparent and would result in a substantial change in operations that would be noticeable to staff and the public. Mitigation could be required and may be effective.

Major: Impacts would be readily apparent and would result in a substantial change in operations that would be noticeable to staff and the public and would require organizations to readdress their ability to sustain current operations.

Duration: Short-term impacts would occur during construction. Long-term impacts would continue or occur after construction is complete.

IMPACTS OF THE ALTERNATIVES

Park operations and management covers impacts related to the operations of the park, as well as along the Central Riverfront, and impacts to energy requirements and conservation/sustainability

Alternative 1: No-Action Alternative

Under alternative 1, the National Park Service would landscape the surface of the Park Over the Highway structure over I-70 after completion of MoDOT’s construction of the structure, as described in Cumulative Impacts. Construction activities such as grading and planting at the West Gateway and on the eastern side of Luther Ely Smith Square would temporarily alter maintenance operations in the vicinity of the construction. Activities such as mowing, turf maintenance, and irrigation would be accomplished around any active construction or staging areas.

Current management practices would continue within the park and along the Central Riverfront. Standard maintenance activities would continue and would increase in time and costs to maintain the landscape along the Park Over the Highway, utilizing existing park resources. Deferred maintenance projects, as described in the Cumulative Impacts section, would be undertaken as funding permits. Operation of the park could decline if staffing and maintenance levels are not increased to meet

existing and future needs. The continued existence of the Arch Parking Garage in this alternative would allow for its revenue stream to be maintained. However, long term, maintenance needs on the garage would increase, as the structure reaches the end of its usable life. Revenue from visitor fees would continue to be collected at the existing ticket counter locations for the Ride to the Top of the Arch and the films screened in the Visitor Center/Museum without a change to operations.

At the Central Riverfront, seasonal flooding would continue to cause periodic closures of the roadway that would continue to burden park operations by limiting access for park staff to complete maintenance responsibilities. The demands of post-flood clean-up of the Central Riverfront on Leonor K. Sullivan Boulevard and the levee would continue to be handled by City of St. Louis staff. Flooding events would continue to require placement of temporary traffic control devices for roadway closures. Post-flood cleanup operations by City of St. Louis personnel would be required prior to re-opening the Central Riverfront to the public.

In addition, existing facilities would not benefit from an increase in energy efficiency beyond any existing repairs and renovations described under cumulative impacts. Landscape maintenance practices would continue and stormwater management practices would remain unchanged at the park. Untreated stormwater run-off would continue to include fertilization from the existing grass turf at the park. Energy use related to facilities and landscape maintenance would remain at existing levels as would water usage for irrigation. Therefore, this alternative would not promote NPS energy conservation goals and sustainability measures.

Operations impacts related to construction under the no-action alternative would include short-term minor adverse impacts as maintenance operations access to the Park Over the Highway construction areas would be limited. Flooding events would cause

long-term minor to moderate adverse impacts on operations by limiting park maintenance access and require clean-up action by City of St. Louis staff. The lack of energy conservation and sustainable management practices would also contribute to the long-term adverse impacts.

Cumulative Impacts for Alternative 1

Past, present, and reasonably foreseeable future projects within the area of the Jefferson National Expansion Memorial that have potential impacts on operations and management include:

- Old Courthouse renovations and repairs
- Visitor Center/Museum roof replacement
- Repair North and South Overlook stairs
- Construction of the Park Over the Highway structure

Construction and deferred maintenance projects on the park grounds including the Old Courthouse renovations and repairs, the replacement of the roof on the underground Visitor Center/Museum to address leaks, and the repair of the North and South Overlook stairs to eliminate hazards and repair degraded materials would have short-term minor adverse impacts on operations and management within the park during construction, due to changes in maintenance routines and inconvenience. These changes would have beneficial long-term impacts to operations and management upon completion, due to decreased maintenance upkeep requirements resulting from these infrastructure upgrades. There would be increased maintenance required for upkeep of the landscape in the new Park Over the Highway.

The construction projects listed above and the installation of the landscape on the structure over I-70 that would be constructed by MoDOT would require an increase in energy use and materials during construction, and thus short-term minor adverse impacts

would occur. In the long-term, these projects would not lead to an increase in energy use. If the Visitor Center/Museum roof replacement is more energy-efficient, beneficial impacts due to a reduction in energy consumption could occur.

The no-action alternative, as noted above, would result in minor short-term and minor to moderate long-term adverse impacts to operations and management. Combined with past, present, and reasonably foreseeable future actions, there would be short-term minor cumulative adverse impacts and long-term minor to moderate adverse cumulative impacts to operations and management. Long-term beneficial cumulative impacts would also occur.

Alternative 2: Moderate Change

Park operations and management practices would be disrupted by construction and renovation activities proposed under alternative 2. Construction to install perimeter security elements, site grading for pedestrian accessibility elements, grading for drainage improvements and stormwater management, installation of utilities, streetscape improvements at the Old Courthouse, grading at Luther Ely Smith Square and the West Gateway to landscape the new plaza at Luther Ely Smith Square and the Park Over the Highway structure over I-70, replacement in-kind of the Processional Walks, and the replacement of some existing vegetation, renovations at the Visitor Center/Museum, and renovations at the Old Courthouse would all alter operations at the park for the duration of the construction period by limiting access to areas of the park. The construction to raise the elevation of Leonor K. Sullivan Boulevard and the pedestrian promenade and bicycle paths would limit access for park staff and maintenance to the East Slopes of the park during construction. In alternative 2, construction activities would increase energy and materials use and other resource requirements at the park along the Central Riverfront.

There would be long-term alterations to operations due to an increased need for NPS

management of activities and destinations on the park grounds and higher park visitation. In addition, while the revenue stream of the Arch Parking Garage would be maintained, the continued existence of the Arch Parking Garage would result in long-term maintenance needs. The new landscape on the Park Over the Highway would increase demands on park maintenance staff and increase maintenance costs. Collectively, these increased demands on park staff and operations would place additional burden existing budgets and schedules, without an increase in staff. Revenue from visitor fees would continue to be collected at the existing ticket counter locations for the Ride to the Top of the Arch and the films screened in the Visitor Center/Museum without a change to operations.

Improved maintenance conditions would include new HVAC and other facility systems, stormwater management that could help to control algae growth in the ponds, soil amendments and replacement of the aggregate concrete surfaces of the Processional Walks, and improved drainage. More sustainable landscape practices on the park grounds could result in increased energy and water conservation. The raising of the elevation of Leonor K. Sullivan Boulevard would reduce maintenance needs from flood clean-up.

Operations impacts related to construction under alternative 2 would include short-term minor to moderate adverse impacts due to increased use of energy and resources and limited access to areas of the park during construction. An increase in maintenance requirements would have a long-term minor adverse impact on park operations. Improved maintenance conditions, improved sustainability standards, and the potential for an overall reduction in energy and water use at the park would have long-term beneficial impacts.

Cumulative Impacts for Alternative 2

Past, present, and reasonably foreseeable projects within the area of the park that have potential impacts on operations and

management include the same projects discussed earlier under alternative 1, the no-action alternative. Some cumulative projects would be incorporated into the design and construction process under alternative 2. The Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs are cumulative impact projects that would be incorporated into the design and construction process under alternative 2.

As noted above, this alternative would result in short-term minor to moderate adverse impacts and long-term minor adverse impacts to operations and management. Long-term beneficial impacts would also occur. Combined with past, present, and reasonably foreseeable future actions, there would be short-term minor to moderate adverse cumulative impacts, minor long-term adverse cumulative impacts, and long-term beneficial cumulative impacts.

Alternative 3: Maximum Change

In addition to the construction activities described under alternative 2, other construction activities would occur under alternative 3 including construction of the new Visitor Center/Museum entrance at the West Gateway and the expanded Visitor Center/Museum structure under the Arch. Alternative 3 would also demolish the Arch Parking Garage and install new landscape features in the North Gateway including the Explorers Garden and new pedestrian paths and bikeways. These construction activities would alter operations at the park for the duration of the construction period by limiting access to areas of the park. The construction to raise the elevation of Leonor K. Sullivan Boulevard and the pedestrian promenade and bicycle paths would limit access for park staff and maintenance to the East Slopes of the park during construction. Construction, facility expansion, and renovation activities in the park and along the Central Riverfront would require an increase in energy use and materials.

Changes would occur to operations due to the issues noted in alternative 2, with increased management and operating costs

for the expanded Visitor Center/Museum and associated services, as well as the maintenance and costs of the additional landscaped surface area. Loss of revenue-producing parking due to the removal of the Arch Parking Garage could negatively affect the NPS and its partner, Metro, which operates the garage, reducing revenue. There would however, be no long-term maintenance costs related to upkeep on the existing garage. The ticket stations in the new lobby would generate operational efficiencies by creating one central location for visitor fees to be collected. An entrance fee for the Visitor Center/Museum would be collected, as well as any other fees for visitor experiences such as the Ride to the Top of the Arch. The addition of an entrance fee to the Visitor Center/Museum could generate additional revenue, depending on the fee structure that would be established and the number of visitors to the park.

Improved maintenance conditions would include new HVAC and other facility systems, stormwater management that could help to control algae growth in the ponds, soil amendments and replacement of the aggregate concrete surfaces of the Processional Walks, and improved drainage. Raising the elevation of Leonor K. Sullivan Boulevard would reduce city maintenance needs from flood clean-up.

New construction and renovations would meet energy efficiency and sustainability standards and could result in an overall reduction in energy use at the park. More sustainable landscape practices on the park grounds could result also in increased energy and water conservation.

Operations impacts related to construction under alternative 3 would include short-term moderate adverse impacts due to increased use of energy and resources and limited access to areas of the park during construction. An increase in maintenance requirements and the loss of parking revenue would have a long-term minor adverse impact on park operations. Improved maintenance conditions, increased ticketing efficiency and revenue collection, improved energy

efficiency and sustainability standards, and the potential for an overall reduction in energy and water use at the park would have long-term beneficial impacts.

Cumulative Impacts for Alternative 3

Past, present, and reasonably foreseeable projects within the area of the park that have potential impacts on operations and management include the same projects discussed earlier in this section under alternative 1. The Visitor Center/Museum roof replacement and repair of the North and South Overlook stairs are cumulative impact projects that would be incorporated into the design and construction process under alternative 3.

As noted above, this alternative would result in short-term moderate adverse impacts and long-term minor to moderate adverse impacts to operations and management. Long-term beneficial impacts would also occur. Combined with past, present, and reasonably foreseeable future actions, there would be short-term moderate adverse cumulative impacts, minor to moderate long-term adverse cumulative impacts, and long-term beneficial cumulative impacts.