Final Statement of Findings: Wetlands and Floodplains

Big Spring Bridge Project
Ozark National Scenic Riverways
Carter County, Missouri
Project Number PRA-OZAR 10(2)

Recommended:

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Introduction

Executive Order (EO) 11990, *Protection of Wetlands*, EO 11988, *Floodplain Management*, and EO 13690 *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, require the National Park Service (NPS) and other Federal agencies to evaluate the likely impacts of action in wetlands and floodplains, respectively. NPS Director's Order #77-1: Wetland Protection and Procedural Manual #77-1 provide NPS policies and procedures for complying with EO 11990. NPS Director's Order 77-2: Floodplain Management and the Procedural Manual 77-2: Floodplain Management provide NPS policies and procedures for complying with EO 11988 and EO 13690.

This Statement of Findings (SOF) has been prepared to comply with EO 11990, 11988 and 13690. The FHWA and Ozark National Scenic Riverways (ONSR) has also prepared and made available an Environmental Assessment (EA) for the proposed rehabilitation or replacement of the Big Spring Bridge. In the EA, the NPS identified the replacement of the existing bridge with a concrete bridge as the preferred alternative.

The purpose of this SOF is to present the rationale for the proposed improvements to the Big Spring Bridge in the floodplain area and to document the anticipated effects on these resources. The proposed project is a Class 1 Action, per Director's Order #77-2. Class 1 Actions include manmade features which by their nature require individuals to occupy the site and are prone to flood damage. Avoidance of impacts to the floodplain is not possible because the existing road and bridge are located in the 100-year floodplain; therefore, any improvements made to the existing bridge would be located in the floodplain. The SOF also discloses the temporary and permanent impacts of the project on wetlands and explains how such impacts have been avoided and minimized to the extent practicable in accordance with Procedural Manual #77-1.

Proposed Action

Under the preferred alternative, Replacement with Concrete Bridge, the existing bridge would be demolished. The asphalt pavement wearing surface and glue laminated deck would be saw cut and lifted off of the bent caps by a crane. The bent caps would be removed, and the timber piles would be snapped off or saw cut at the mudline and removed. All of the debris from the bridge removal would be disposed of off-site.

The new concrete bridge would be constructed along the same alignment, and would have two 11-foot lanes, two 3-foot shoulders and a 6.8-foot sidewalk on the upstream side of the bridge. The concrete bridge would be approximately 3.5 feet wider than the existing bridge. The bridge would have a pre-cast concrete box beam. The bridge would have two spans with each being 70 feet in length, for a total length of 140 feet. This design would result in the placement of one pier in the channel. The pier would have a concrete micropile footing supporting a stone faced concrete column with a concrete cap. The concrete retaining wall abutments would be supported on piles with flared wingwalls.

Site Description

The Big Spring Bridge is located along Peavine Road in Carter County, Missouri. Big Spring Bridge provides access to the Big Spring area, the largest spring in Missouri and one of the largest in the world. Big Spring has an average daily discharge of 288 million gallons of cool spring water (National Park Service, 2014). In the summer, the spring branch becomes the primary tributary to the Current River and contains a variety of rare aquatic organisms. The Big Spring area also includes a large campground, historic cabins and dining lodge, shelter house and picnic area, canoe and boat access, and trails.

Although Big Spring was established as a state park in 1924, substantial development of the area began in 1933. A pine log foot bridge across Big Spring branch was built, and around 1940, a new single lane vehicular bridge was built. Around 1941 or 1942, a concession stand with adjacent boat docks located on the south bank of the spring branch and on the east side of the bridge was constructed. The entrance to the bridge that is currently in place is almost directly over where the concession building once stood. In 1964 the Ozark National Scenic Riverways was established, and by the mid-1970s, the NPS had upgraded the bridge crossing. The approach on the south side had a sharp turn and steep grade which made large vehicle travel challenging. The route was realigned to pass through the site of the concession stand (National Park Service, 2014). A Phase I Archeological Investigation and geotechnical investigation confirmed that the project area has been severely disturbed by previous road and bridge construction activities and that a substantial amount of fill material has been added on all four quadrants of the bridge.

Wetlands in the Study Area

Extensive disturbance of the site resulting from multiple bridge replacement and development efforts has resulted in the bridge approaches being raised by several feet above the surrounding landscape on fill material. The Big Spring branch was delineated as described in Cowardin et al. in accordance with Procedural Manual #77-1. The spring branch has a defined bed and bank with a streambed of gravel and cobble. The ordinary high water elevation is located at approximately 431 feet. Under the Cowardin system, this stream is classified as riverine, upper perennial, unconsolidated bottom, and permanently flooded (R3UBH). Due to the presence of fill material at the bridge approaches, the spring branch is incised only at this location and the banks are fairly steep. A fringe of herbaceous and woody vegetation is present along the banks of the spring branch. This vegetation is primarily American sycamore (*Platanus occidentalis*) giant cane (*Arundinaria gigantea*) Virginia creeper (*Parthenocissus quinquefolia*) and cutleaf coneflower (*Rudbeckia laciniata*). The riverine system includes all wetland and deepwater habitat contained within the channel; and at the spring branch, is bounded on the landward side by the channel bank. The landward limits of the riverine wetland are described as at the limits of the emergent or woody vegetation (L.M. Cowardin, 1979). A palustrine emergent fringe is present along the banks of the spring branch.

For sites where vegetation and soils were present (the areas surrounding the bridge approaches), vegetation, soils and hydrology were analyzed to determine if any areas met the definition of a wetland as stated in the 1987 Corps of Engineers Wetland Delineation Manual in accordance with Procedural Manual #77-1. A site visit was conducted in March of 2013 with the project team. Subsequent geotechnical borings taken in August 2014 and soil testing for an archeological investigation in May of 2015 confirmed that the project area, including the banks of the spring branch, consisted of fill material and that no wetland hydrology or hydric soils were present. The soils present in the study area are not hydric; they have not formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

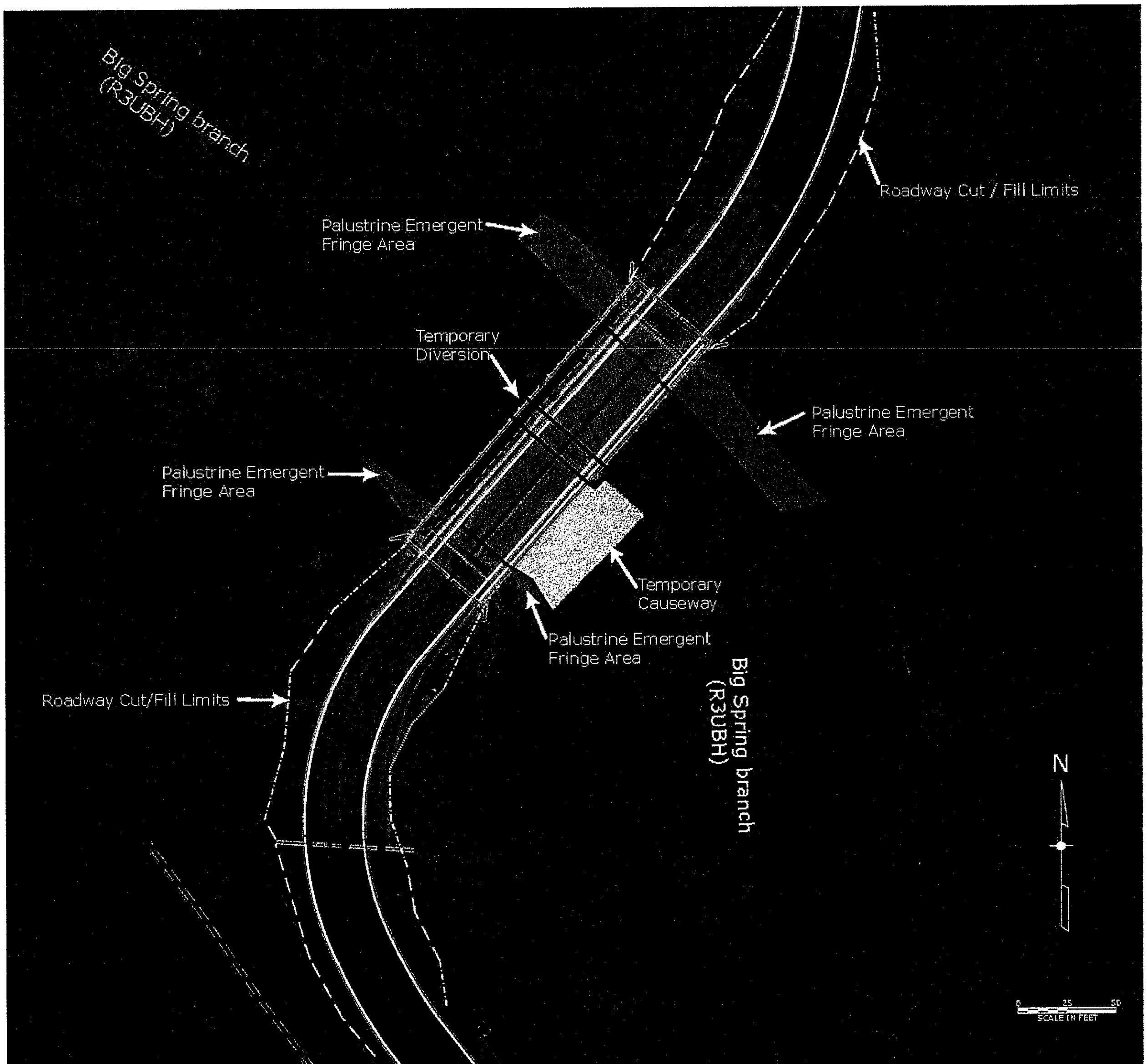

Figure 1. Wetlands in the Study Area

Wetland Functions and Values

Biotic Functions

The wetlands in the study area provide habitat for characteristic Ozark fish, including the knobfin sculpin (*Cottus immaculatus*) and the bleeding shiner (*Luxilus zonatus*). Star duckweed *(Lemna trisulca)*, a plant species restricted to springs, occurs in the spring branch along with a variety of other plant species characteristic of springs, including water starwort (*Callitriche spp.*) and broad waterweed (*Elodea canadensis). * The R3UBH wetland provides suitable habitat for one Federally-listed species, the Ozark hellbender (*Cryptobranchus alleganiensis bishopi).* In May of 2015, the NPS and the Missouri Department of Conservation completed a survey of the spring branch in order to assess habitat and identify any individuals present in the project area. Suitable habitat was found in the project area; however, no individuals were observed. Although the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*) and northern-long-eared bat (*Myotis septentrionalis*) have the potential to occur in the project area, no evidence of gray bats was found at Big Spring Bridge. Missouri Department of Conservation Natural Heritage records indicate that State-ranked species have the potential to occur in the project area. These species are the Ouachita kidneyshell *(Ptychobranchus occidentalis)*, star duckweed, liverworts (*Riccardia multifidia), (Nowellia curvifolia)* and *(Metzgeria furcate)*, and broad waterweed. The palustrine emergent fringe areas include predominantly giant cane and mature and sapling American sycamores. At the top of the bank these areas are bounded by mowed turf grass, and so they provide limited wildlife habitat.

In addition to Federal- and State-listed species in the project area, Missouri has designated natural areas, which represent some of the best and last examples of original landscape. These areas feature rare plants, animals, and geologic features (Missouri Department of Conservation). Big Spring Natural Area, designated on February 14, 1983, is a 17 acre area extending from the spring down to the upstream side of the bridge.

Similar habitat is available in the approximately 2,000 foot length of the spring branch both upstream and downstream of the project area. Other spring-fed streams can also be found elsewhere in the park. The park contains more than 134 miles of spring-fed streams (United States Geological Survey, 1997).

Hydrologic Functions

Riverine wetlands occur in floodplain and riparian corridors in association with stream channels. The R3UBH wetland within the project area provides the functions of base flow, flood storage, sediment transport and local water quality control. The project area is in a large spring (Big Spring) that flows into the Current River, an Outstanding National Resource Water. Although the existing bridge abutments are exposed and experiencing material loss, during normal water levels the water surface elevation does not reach the abutments. The width of the spring is not confined by the bridge abutments. The channel is somewhat incised at and downstream of the bridge to a depth of 10 to12 feet. At the bridge, the stream banks are comprised primarily of fill material that is likely associated with the construction of the existing bridge to a depth of 9 to10 feet. The fill consisted primarily of loose to dense brown silty sand with various amounts and sizes of gravel. Underneath the fill material, loose to medium dense light brown sandy gravel, with some silt and clay was encountered from approximately 9 to 30 feet. The existing channel is stable and there has be relatively little change in the stream bed elevation since the measurements have been taken as part of the bridge inspections for this bridge in 1983 (Federal Highway Administration, 2014). The palustrine emergent fringe areas along the banks of the spring branch provide erosion control and help to maintain a stable stream channel.

Cultural Values

The culture value of the wetlands within the study area is intrinsically high due to their association with the Big Spring Historic District. As stated in the Cultural Landscape Inventory, "The Big Spring Historic District is a sight that uniquely conveys concurrent developments in national recreation trends, CCC public works projects, and the associated architecture and landscape design (National Park Service, 2009)." Prior to the CCC's development of the area, there is evidence that the area was used by European Settlers and the Native Americans before them. However, no historic or archeological sites were identified during the Phase I Archeological Investigation.

Research/Scientific Values

As a unique feature, the Big Spring has critical research and scientific value; however, the project area would not be appropriate for research given it past disturbance and development.

Economic Values

The spring branch frequently floods due to its proximity to the Current River. The Big Spring is a destination for visitors to the park, and visitors access the parking area and trail by traveling from the south or north across the bridge.

Floodplains in the Study Area

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps show that the project areas are within the 100-year floodplain, Zone A. Zone A flood zones are areas subject to a one percent annual chance of a flood event (FEMA). Big Spring is located in FEMA mapped floodplain Zone A where the base flood elevations have not been determined.

The project area frequently floods, primarily due to its low elevation and proximity to the Current River. During high flow at Big Spring and the Current River, the discharge of Big Spring increases well before the flow increases in the Current River. During this period, no backwater occurs in the spring branch and the spring branch slowly rises in response to the increased flow in from the spring. Hours later, the flow in the Current River at the mouth of the spring branch begins to rapidly increase, causing the spring branch to rise quickly and eventually causing backwater conditions in the spring branch (Imes, 2007). The most recent major floods took place in 2011, 2012 and 2015; where the combination of flood water and backwater covered the bridge.

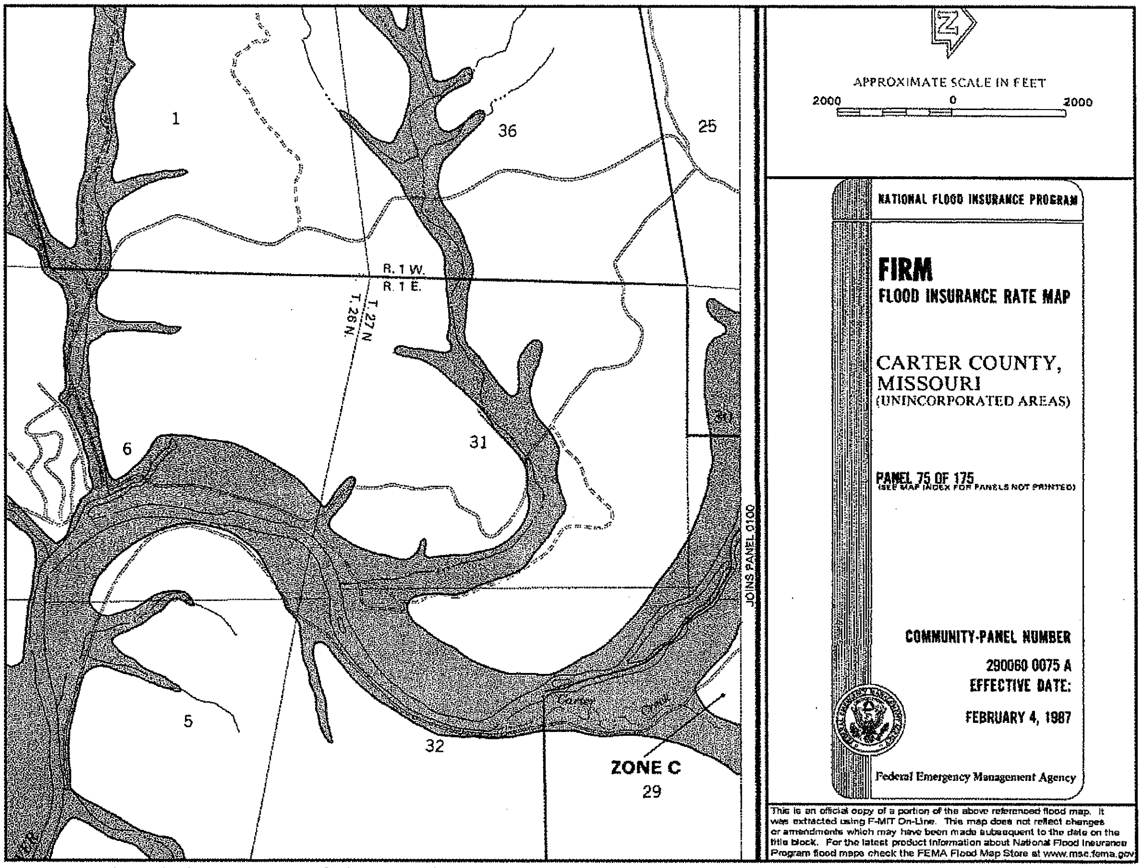

Figure 2. Floodplain Map of the Study Area

Impacts to Wetlands and Floodplains

Wetland Impacts

The construction of the center pier associated with the two-span concrete bridge would permanently impact 125 square feet of the R3UBH wetland. During construction, additional temporary impacts would be realized. The new bridge abutments would be set ten feet behind the existing abutments, and so there would be no permanent impacts to the palustrine emergent fringe. The existing piles in the R3UBH wetlands would be removed, restoring 13.5 square feet of the R3UBH wetland. A riprap causeway would be constructed across half of the spring in order to provide access for a crane. Also, a sheet pile diversion would be installed around the center pier while it is under construction. The temporary causeway and diversion would impact approximately 2,600 square feet of the R3UBH wetland. Construction equipment would need to cross through the palustrine emergent fringe to access the riprap causeway, temporarily impacting approximately 110 square feet. The total temporary (2710 square feet) and permanent (125 square feet) impact on the R3UBH wetland from the proposed action is 2835 square feet, or 0.07 acres.

Impacts to Biotic Wetland Functions:
The in-water work associated with the proposed project could potentially affect the aquatic species. The activities most likely to affect aquatic species are the construction of the temporary causeway and increased sedimentation associated with construction activities. The construction of the temporary causeway would displace individuals, disturb and potentially alter suitable habitat, and limit access across the Big Spring branch. Efforts to minimize these potential impacts would include the placement of a geotextile prior to the laying of riprap to limit disturbance to the stream bed. The removal of the existing timber bridge piles (by snapping them off or saw cutting them at the mudline) could also increase sedimentation of the spring branch. Turbidity curtains would be placed in the stream to reduce the flow of sediment outside of the project area. Erosion and sediment controls would be implemented so that impacts associated with increased sedimentation of the stream could be minimized. The proposed action would also have impacts related to the construction of the center pier. The driving of steel sheet piling for the temporary diversion may create a small amount of sediment redistribution. The in-water work is not anticipated to create large sediment plumes that could impact the State-listed/ranked hellbender, kidneyshell, liverworts, duckweed or waterweed.

Project activities may affect, but are not likely to adversely affect, the Federally-listed gray bat, Indiana bat, northern long-eared bat, and Ozark hellbender. Mitigation and minimization measures have been proposed and would be implemented in order to reduce the impact of the project. Tree clearing around the existing bridge abutments and approaches has the potential to adversely affect the Federally-listed Indiana bat and northern-long eared bat; however, no evidence of either of these species was found during the species surveys. In order to minimize the potential for impacts, tree clearing would be completed between November 1 and April 1. The new concrete bridge would be 3.5 feet wider than the existing bridge and would extend 1.75 feet into the Big Spring Natural Area.

Impacts to Hydrologic Wetland Functions:
The hydrologic functions of the spring branch would not change as a result of the proposed action. The new bridge would be 20 feet longer than the existing bridge, and so the abutments would be set approximately 10 feet back from the bank on each side. Since the spring branch is not currently constrained by the existing abutments, it is not anticipated that major changes to the bank morphology would occur.

Research/Scientific values and economic values would not be impacted by the proposed action.

Impacts to Cultural Wetland Functions:
The new concrete bridge would be constructed on the existing alignment and at a similar profile, which would result in no change to the relation of the bridge to the surrounding landscape. The configuration of two travel lanes and a sidewalk on the upstream side of the bridge would also be present in the new bridge, and so circulation patterns would not change. The new bridge would be noticeably newer than the surrounding features, and the more modern design may distract from the rustic qualities of the area. The bridge would have one solid pier wall, rather than five timber pile bents. The superstructure would be of a similar depth; however, it would be constructed of concrete instead of timber. Since the bridge is located within the Big Spring Historic District, aesthetic treatments, such as facing the bridge with natural stone would help to blend the new bridge into the surrounding Historic District. Also, timber rail elements would be incorporated into the design of the new bridge. Although the new bridge rail would not be noticeably higher, the new rail would include a steel-backed

timber vehicle rail in combination with a timber and cable pedestrian rail. Views experienced by those in vehicles on the bridge would be noticeably different. At the sight line of the driver, visitors would look through cables and the timber handrail to see Big Spring. Several large sycamore trees that are next to the bridge would have to be removed in order to replace the bridge. The clearing of vegetation and presence of a different looking bridge would change the views of the bridge experienced by visitors looking downstream from Big Spring.

Floodplain Impacts:
Approximately 675 cubic yards of riprap would be temporarily placed in the floodplain; however, after construction is completed, the material would be removed. The low chord elevation of the proposed bridge would be 0.2 feet higher than the existing bridge. The low chord elevation of the existing bridge is submerged during the two-year return period, and the bridge is entirely underwater during the 10-year return period. Raising the profile of the bridge and roadway approaches in order to provide freeboard for the 50-year event is not feasible. Therefore, the bridge is designed in order to withstand being overtopped during flood events. Since the entire area is underwater during the 100-year event, the proposed bridge would have no change to the water surface elevation of the 100-year event.

Justification for Use of the Wetlands and Floodplains

Wetlands
The existing Big Spring Bridge is deteriorated and requires rehabilitation or replacement. Under the preferred alternative, the bridge would be replaced along the existing alignment. Since the existing bridge is being replaced along an existing road in order to cross the spring branch, no non-wetland sites are practicable.

Floodplains
The study area lies within the 100-year floodplain. Replacement of the bridge is needed to maintain safe access to the Big Spring area. The project has been proposed to rehabilitate or replace the existing bridge across Big Spring and in order to do so; all of the alternatives would require crossing the spring branch. Therefore, there is no practicable alternative site within which to conduct the proposed action. No occupancy of floodplain areas will be encouraged by the implementation of this project. The new bridge would be located along the same alignment, minimizing the impact on previously undisturbed areas.

Investigation of Alternative Sites

In addition to the preferred alternative, three other action alternatives and a no action alternative were considered. The purpose of this project is to maintain the Ozark National Scenic Riverways' ability to safely serve visitors by providing safe vehicular access to the Big Spring area while minimizing impacts to natural, cultural, and aesthetic resources.

Alternative A - No Action Alternative
Under Alternative A, the No Action Alternative, no substantial improvements would be performed other than in accordance with routine maintenance operations. Analysis of the No

Action Alternative is required as part of the National Environmental Policy Act process in order to provide a basis for the comparison of other feasible alternatives.

Alternative A would have no impacts to wetlands or floodplains.

Alternative B – Rehabilitate the Existing Bridge

The existing bridge would be rehabilitated in order to address the deterioration noted in the Bridge Inspection Report (Federal Highway Administration, 2014). The timber piles would be encapsulated with a jacket, the abutments would be retrofitted, the deck would be replaced, and the railing would be updated to a crashworthy railing. Fiberglass jackets or an equivalent jacketing system would be installed on the most deteriorated timber piles. The jacket would be filled with epoxy grout to encapsulate the timber and protect it from further deterioration. The wrapping would extend from the mudline to approximately two feet above the normal high water level. Sections of severely deteriorated timber piles may be replaced, if needed. It is estimated that 200 linear feet of piles would have new fiberglass jackets installed.

The glulam timber deck would also need to be replaced. The asphalt wearing surface is in fair condition, but allows runoff to drain between the asphalt and glue laminated deck, which is causing decay. The asphalt wearing surface would be removed during the deck replacement. The wearing surface would be replaced with timber running planks, which allow for better drainage and are easier and less costly to maintain. Dewatering may also be necessary if any sections of deteriorated timber piles need to be replaced.

Alternative B would have no to negligible impacts to wetlands or floodplains depending on whether minor dewatering is needed to replace sections of the timber piles.

Alternative C – Replace with Timber Bridge

The existing bridge would be demolished. The asphalt pavement wearing surface and glulam deck would be saw cut and lifted off of the bent caps by a crane. The bent caps would be removed, and the timber piles would be snapped off or saw cut at the mudline and removed. All of the debris from the bridge removal would be disposed of off-site.

The existing bridge would be replaced in-kind with a six-span timber bridge (Figure 5). The bridge would have timber piles, glulam beams and a glulam deck. The spans would be 23.3 feet in length for a total length of 140-feet, resulting in the placement of five bents in the channel. Each bent would be supported by eight 12-inch-diameter timber piles. The timber bent caps would be constructed over the piles, upon which timber glulam beams would be placed, followed by a glulam deck (Federal Highway Administration, 2012).

The new bridge would have two 14-foot travel lanes, a 10-foot sidewalk, and would be approximately 40 feet wide, including the railing width. A steel-backed timber guardrail would be installed along the bridge. The low chord elevation (LSEL), the point on a bridge which is the lowest part of the super structure, would be 438.56 feet. The bridge would be closed during construction.

The total temporary (2600 square feet) and permanent (net increase of 4 square feet) impact on R3UBH wetlands from the proposed action is 2604 square feet, or 0.06 acres. The total temporary impact to the palustrine fringe is 110 square feet. The total impact to wetlands would be 2714 square feet or 0.06 acres. The wetland functions of fish and wildlife habitat would be minimally impacted by the implementation of Alternative C. The installation of the riprap causeway would increase velocity, and may impact aquatic species movement, as flow would be constrained to half of the channel width. The causeway would also reduce available habitat for foraging. The bridge would be similar in appearance to the existing bridge, and so cultural values would not be impacted.

Alternative E – Replace with Steel Bridge
The existing bridge would be removed as described in Alternative C. The new steel bridge would be constructed along the same alignment as the existing bridge. The bridge would have a 140-foot long prefabricated steel truss span and two buried supports. A steel backed timber guard rail would be installed along the bridge and a pedestrian rail would be installed. The design of this bridge would eliminate the need for bents in the water.

The steel truss and floor beams would be constructed off-site and set in place with a crane positioned on a temporary causeway. A form would be added to the frame of the bridge and a cast-in-place concrete deck would be poured. The new bridge would have two 14-foot travel lanes, a 10-foot sidewalk, and would be approximately 42 feet wide (including the railing and truss width). The low chord elevation would be 437.52 feet, approximately one foot lower than the existing bridge.

The total temporary impact on R3UBH wetlands is 2600 square feet and the total temporary impact to the palustrine fringe is 110 square feet, for a total temporary impact of 2710 square feet or 0.07 acres. The steel bridge would span the R3UBH wetlands, resulting in no permanent impacts. The wetland functions of fish and wildlife habitat would be minimally impacted by the implementation of Alternative E during construction. The installation of the riprap causeway would increase velocity, and may impact aquatic species movement, as flow would be constrained to half of the channel width. The causeway would also reduce available habitat for foraging. The cultural functional values would be impacted. The change in material could prevent the new bridge from being integrated into the cultural landscape, and may cause confusion if visitors associate the bridge with other steel truss bridges in Ozark National Scenic Riverways. The design may also distract from the rustic qualities of the area. The new structure would also be considerable deeper (16 feet at midspan to six feet at the ends), becoming a focal point when viewing Big Spring from the bridge rather than blending into the surrounding landscape. Views of Big Spring from the bridge would also be impacted, since visitors would have to look through the railing and truss.

Utility Relocation
Currently at the Big Spring Bridge, the Park's utility lines are suspended from the underside of the existing bridge. These utilities consist of a six inch ductile iron pipe (DIP) waterline, four inch DIP sewer line, one 4.5 inch galvanized rigid conduit (GRC), one 3.5 inch GRC, and one 1.75 inch GRC. One of the larger GRC's is thought to contain three phase 7,200 VAC (volts of alternating current) electrical conductors, the other is assumed to contain electrical conductors for the existing pump stations on the west side of the bridge. The 1.75 inch GRC is assumed to contain telecom lines.

Three options are under consideration for utility relocation. The first option would reinstall the utility lines on the rehabilitated bridge. This could be done by hanging them from the underside of the bridge or routing the utilities through the support structure. Each of the utilities would be installed inside a casing pipe to protect the pipe from flood damage. While the bridge deck is being replaced, temporary bypass lines would be installed to maintain service. The second option, which is the preferred option, would permanently remove the utility lines from the bridge and install them underground adjacent to the bridge. A casing pipe would also be installed under this option. The entire pipe would be below the frost line and the stream bed. In order to run them underground two directional borings would be drilled to separate the water and sewer lines. Tying into the existing utilities would require open cut trenching to lay the pipe or conduit back to the current location of the utilities to make connections. A third option for installing the power, water and sanitary underground is the jack and bore a casing pipe under the spring to allow a passage way for the utilities.

The boreholes and trenching to relocate the utilities would be located outside of the R3UBH wetland and palustrine emergent fringe. There would be no impacts to wetlands as a result of the utility relocation.

Identification of Preferred Alternative

Although Alternative D has more wetland impacts than Alternatives A, B, C and E; it was determined to be the preferred alternative. Alternative A, the No Action Alternative would not meet the purpose and need of the project. Alternative B would only extend the life of the bridge by approximately 10 years, at which point the bridge would need to be replaced. Alternative C would likely require replacement again in approximately 35 years, unlike Alternative D which has an estimated service life of 75 years. Alternative C would also continue to require debris removal from the numerous timber piles in the spring branch. Alternative E would result in an increase of maintenance due to the large superstructure. Alternative E would also have more of an adverse effect on the cultural landscape since the steel truss would be out of character with the surrounding historic district.

Other Permits

In order to construct the project, additional permits and approvals would be necessary.

Clean Water Act Section 404 Permit/ Section 10 of the Rivers and Harbors Act

The Rivers and Harbors Appropriation Act of 1899 prohibits the creation of any obstruction to the navigable capacity of any of the waters of the United States. The Federal Water Pollution Control Act, more commonly known as the "Clean Water Act," under Section 404, directs the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into waters of the United States at specified disposal sites. This project would discharge dredged or fill material into the waters of the United States, including a nearby Outstanding National Resource Water. The proposed project would most likely qualify for coverage under Nationwide Permit 3, Maintenance, or Nationwide Permit 14, Linear Transportation Projects. There is no associated fee, and the review period is typically 45 calendar days for Nationwide Permits.

NPDES (National Pollutant Discharge Elimination System) Permit

This project would likely disturb greater than one acre of bare soil, and therefore would need a Land Disturbance General Permit (MOAA00000). This general permit regulates stormwater discharges at land disturbance construction sites, and must be obtained prior to conducting any land disturbance activity. The removal of vegetation leaves bare soil which is more vulnerable to erosion. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris and chemicals and transport these to a water body. Polluted stormwater runoff can harm or kill fish and other wildlife (Missouri Department of Natural Resources).

401 Water Quality Certification
The 401 Water Quality Certification is a "certification," needed for any Federal permit involving impacts to water quality. Most 401 Certifications are triggered by Section 404 Permits issued by the U.S. Army Corps of Engineers. Typical types of projects involve filling in surface waters or wetlands. Section 401 of the Clean Water Act delegates authority to the States to issue a 401 Water Quality Certification for all projects that require a Federal permit (such as a Section 404 Permit). The "401" is essentially verification by the State that a given project will not remove or degrade existing, designated uses of "Waters of the State," or otherwise violate water quality standards. Mitigation of unavoidable impacts and inclusion of stormwater management features are two of the most important aspects of water quality review. This certification is issued by the Missouri Department of Natural Resources – Water Pollution Control Program. Missouri DNR normally reviews 401 Certification within five days of receipt of a complete application

Mitigative Actions

Wetlands

Avoidance and Minimization
Construction would take place during a full road closure so that the bridge can be replaced on the same alignment. In order to minimize impacts to wetlands, the bridge was lengthened by 20 feet so that the abutments could be moved further back into the banks of the spring branch. Best Management Practices (BMPs) and mitigation measures would be implemented in order avoid and minimize impacts to wetland functions. These mitigation measures include:

- No work would occur in the channel from March 15 to June 15 to avoid impacts to fish spawning.
- Tree clearing would be done from November 1 through April 1 to avoid impacts to Indiana bats and northern long-eared bats.
- Temporary BMPs would be utilized to minimize erosion and sedimentation from ground disturbing activities that expose bare soil. The BMPs may include the use of silt-fence, sediment logs, or erosion matting. These BMPs would be used only during construction and would be removed once the disturbed area has been permanently stabilized.
- Disturbed areas would be graded and seeded as soon as possible to minimize erosion. A revegetation plan would be developed to ensure that the disturbed stream banks are restored. Crown vetch and *Sericea lespedeza* would be avoided.
- Debris shields would be installed to capture any debris released due to repairs completed above the surface of the water.
- Any dewatering activities would include the filtering of the water prior to reintroducing it to the spring. Pumping water directly into the spring would be prohibited.
- BMPs, such as turbidity barriers, would also be used to minimize sedimentation during the temporary diversion of water and installation of riprap to create a temporary

causeway. Geotextile would be placed on the streambed prior to installing the causeway so that all of the riprap can be removed more easily after construction is completed. Disturbance to stream banks and riparian areas would be minimized. Channel modification, flow interruption or bank modification would only occur in compliance with conditions established in permits required under the Clean Water Act.

- For construction access, the temporary access pad would avoid water impoundment and allow for fish passage.
- Staging areas for equipment and materials would be established away from the spring branch.
- Stationary fuel and oil storage would remain within the staging area to avoid accidental spills into the spring branch.
- Excess concrete and wash water from trucks and other concrete mixing equipment would be disposed of in designated areas where this material cannot enter the spring branch.
- No equipment would be allowed to enter the spring branch. Equipment would be washed and rinsed thoroughly with hard spray or hot water (greater than 104 degrees Fahrenheit) and allowed to dry in the hot sun before use at the site.
- Mud, soil, trash, plants and animals would be removed from equipment before starting any work area near the water.

Justification for Proposed Waiver to Wetland Compensation Requirements:
The implementation of the proposed action, including all of the BMPs and mitigation measures, would result in minor permanent impacts (125 square feet or .003 acres) to wetlands. Approximately 2600 square feet or 0.06 acres of the R3UBH wetland and approximately 110 square feet of the palustrine emergent fringe would be temporarily impacted during construction, for a maximum duration of six months. After construction of the new bridge is completed all of the material installed for temporary construction access would be removed and the banks of the spring branch would be restored per a revegetation plan. The new bridge would direct storm runoff to the roadway approaches and shoulders rather than draining through scuppers directly into the spring branch as the existing bridge does. The existing bridge also is experiencing a loss of fill material from behind the bridge abutments. This material is currently entering the spring branch and impacting wetlands. Replacement of the existing bridge would correct this issue. The proposed action meets the intent of the NPS policy with respect to no-net loss of wetlands because the construction of a new bridge would reduce long-term sedimentation of the spring branch and downstream wetlands, mitigating for the minor long-term wetland impact of 125 square feet.

Floodplains

In order to construct the bridge, a riprap causeway would be constructed across half of the spring in order to provide access for a crane. Approximately 675 cubic yards of riprap would be placed in the floodplain; however, after construction is completed, the material would be removed. Scour protection at the abutments and pier was determined to not be necessary and so no riprap would be permanently placed in the floodplain. The construction of the solid pier would require the installation of a sheet pile diversion, temporarily impacting the floodplain.

The bridge would be replaced at approximately the same elevation. The top of the bridge deck would be constructed at approximately the same elevation as the existing bridge. The low chord elevation would be 438.95 feet, which is 0.2 feet higher than the low chord elevation of the existing bridge (438.75 feet). Although the concrete bridge would be a wider structure than the existing bridge, the concrete bridge would have one pier instead of five bents providing larger hydraulic openings to pass debris.

The new bridge would be located within the floodplain and under the 100-year flood elevation. The bridge is designed to withstand being overtopped during flood events rather than placing additional fill material in the floodplain in order to raise the profile of the bridge and its approaches. There would be no change to the water surface elevation as a result of the new bridge during the 100-year event. Design considerations were sensitive to the location within the Big Spring Historic District cultural landscape. Altering the bridge drastically from the existing location and profile would cause an adverse effect to the cultural landscape. The new bridge is designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).

The proposed action will not have an adverse impact on the floodplain and its associated value. Minimization and mitigation include the protection of human health and safety, protection of investment, and protection of floodplain resources and processes. The construction of a new bridge would replace an existing investment. Risk to the investment exists and would continue to exist after the bridge is replaced. The NPS would repair or reconstruct the facility if and when damage occurs. Protection of floodplain resources and processes was achieved to the extent possible.

Conclusion

The NPS and FHWA conclude that there is no practical alternative to improve safe access for pedestrians, cyclists and vehicles to access along Peavine Road across the Big Spring branch in the Ozark National Scenic Riverways. Mitigation and compliance with regulations and policies to prevent impacts to wetlands and water quality would be strictly adhered to during and after construction. Permits with other Federal and State agencies would be obtained prior to construction activities. The total temporary (2710 square feet) and permanent (125 square feet) impact on R3UBH wetlands from the proposed action is 2835 square feet, or 0.07 acres; however, the implementation of the mitigation measures would allow the proposed action to meet the intent of the no-net-loss policy of the NPS. Therefore, the NPS finds the Preferred Alternative to be acceptable under Executive Order 11988 for floodplain management, Executive Order 13690 for the Federal Flood Risk Management Standard and Executive Order 11990 for the protection of wetlands.

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Appendix A: Analysis of Characteristics of Big Spring Branch Banks

<u>Methodology:</u>
For sites where vegetation and soils were present (the areas surrounding the bridge approaches), vegetation, soils and hydrology were analyzed to determine if any areas met the definition of a wetland as stated in the 1987 Corps of Engineers Wetland Delineation Manual in accordance with Procedural Manual #77-1.

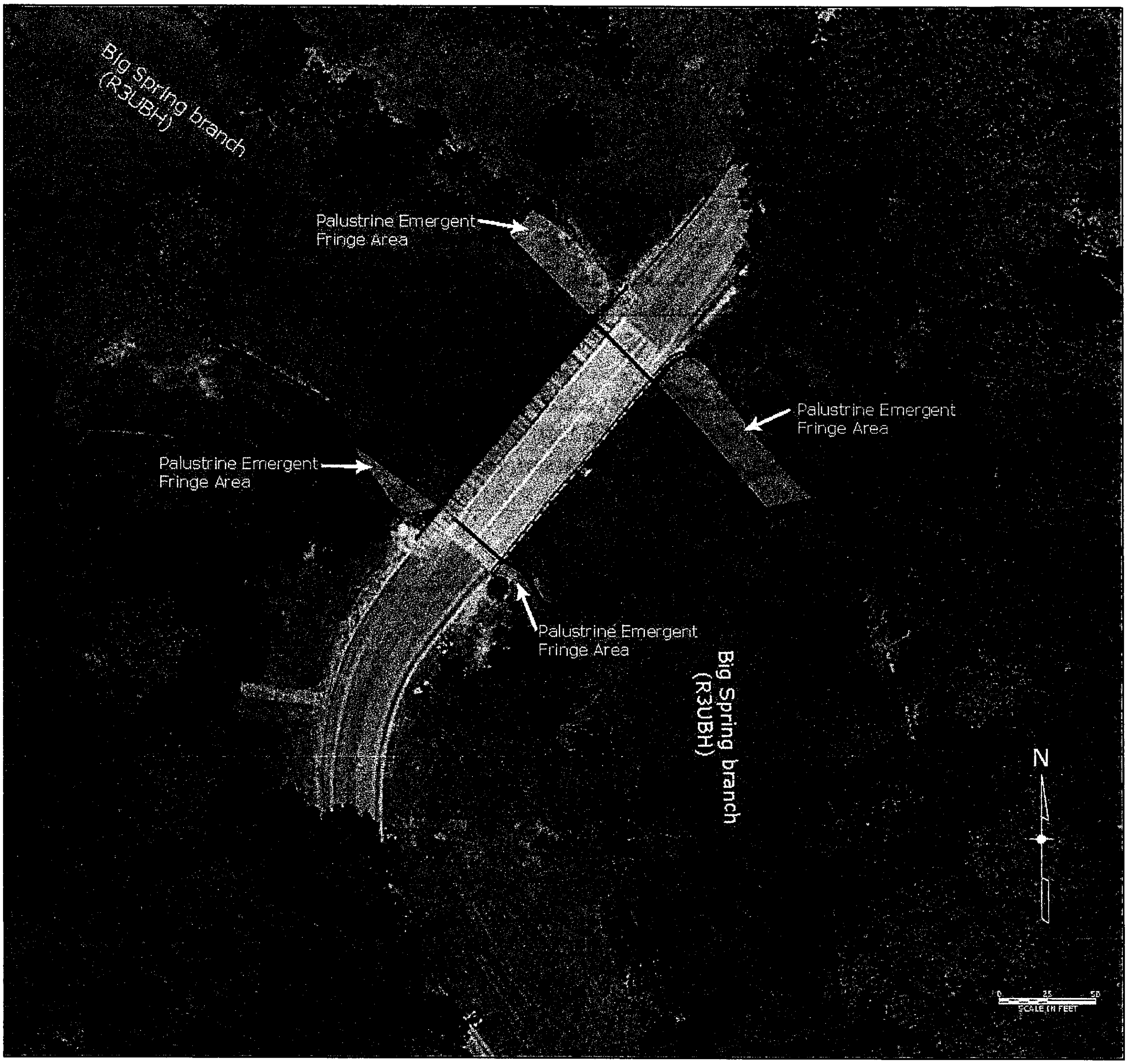

Figure 1. Study Area

Soils:

Three soils are mapped by the Natural Resources Conservation Service Web Soil Survey as being present in the study area:

1. Alred-Rueter complex, 15-35 percent slope. This soil is mapped as covering the entire study area south of the branch. Hydrologic soil group rating of C.
2. Gladden silt loam, 0-3 percent slope, occasionally flooded. This soil covers almost all of the study area north of the branch. Hydrologic soil group of A
3. Wideman fine sandy loam, 0-3 percent slope, occasionally flooded. This soil is mapped only in a small area north of the branch. Hydrologic soil group of B

Although these soils are mapped as present in the study area, extensive fill was brought in during the development and multiple replacements of the bridge. A site visit was conducted in March of 2013. Subsequent geotechnical borings taken in August 2014 and soil testing for an archeological investigation in May of 2015 confirmed that the project area, including the banks of the spring branch, consisted of fill material and that no wetland hydrology or hydric soils were present. Fill material extends to a depth of approximately 10 feet, followed by a layer of slope alluvium over residuum derived from dolomite. The fill material is described as being brown silty sand with some gravel. Munsell soils charts indicate the first layer of the fill material, which extends approximately 10 centimeters, as 10YR 3/2 silt loam and the second layer of fill material as 10YR 4/2 silt loam. Soil profiles indicate that the original A horizon has been removed or severely truncated, a layer of gravel had been deposited, and fill was brought in to reestablish grass. Soils along the steep banks of the spring branch adjacent to the bridge are consistently eroding with each flood event. The soils present in the study area are not hydric; they have not formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

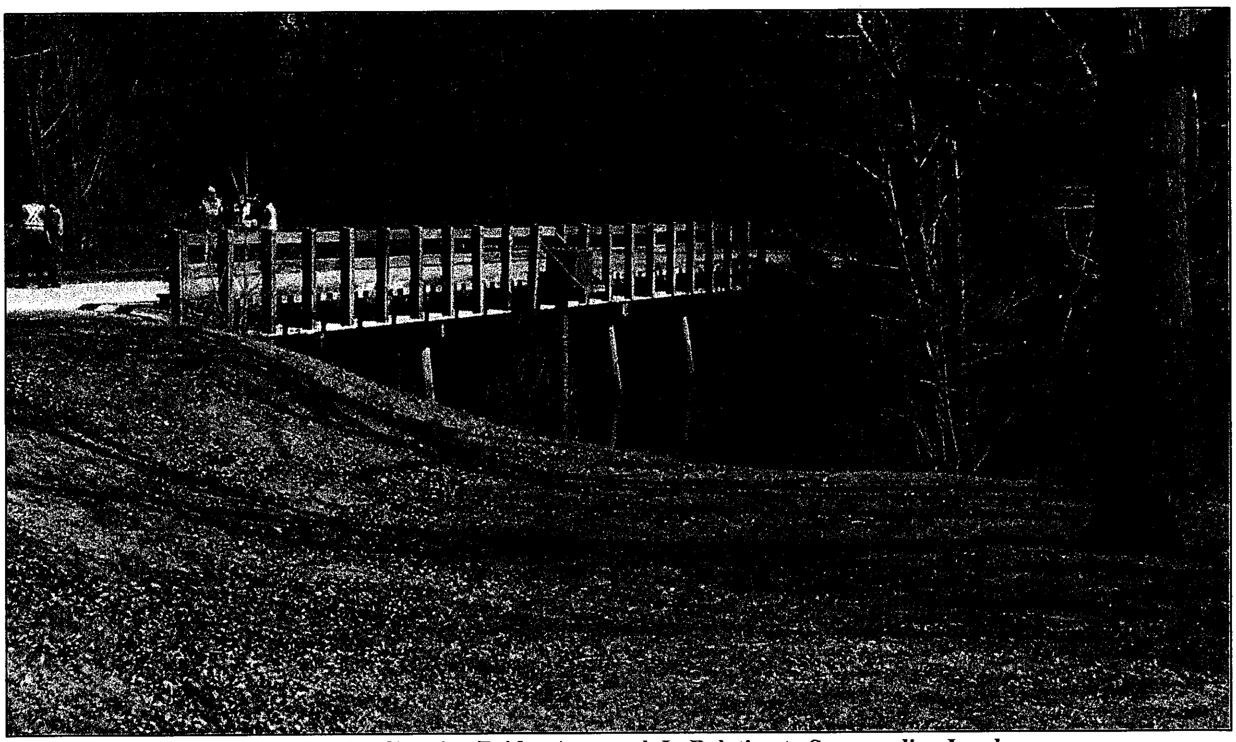

Figure 2. View of Big Spring Bridge Showing Bridge Approach In Relation to Surrounding Landscape

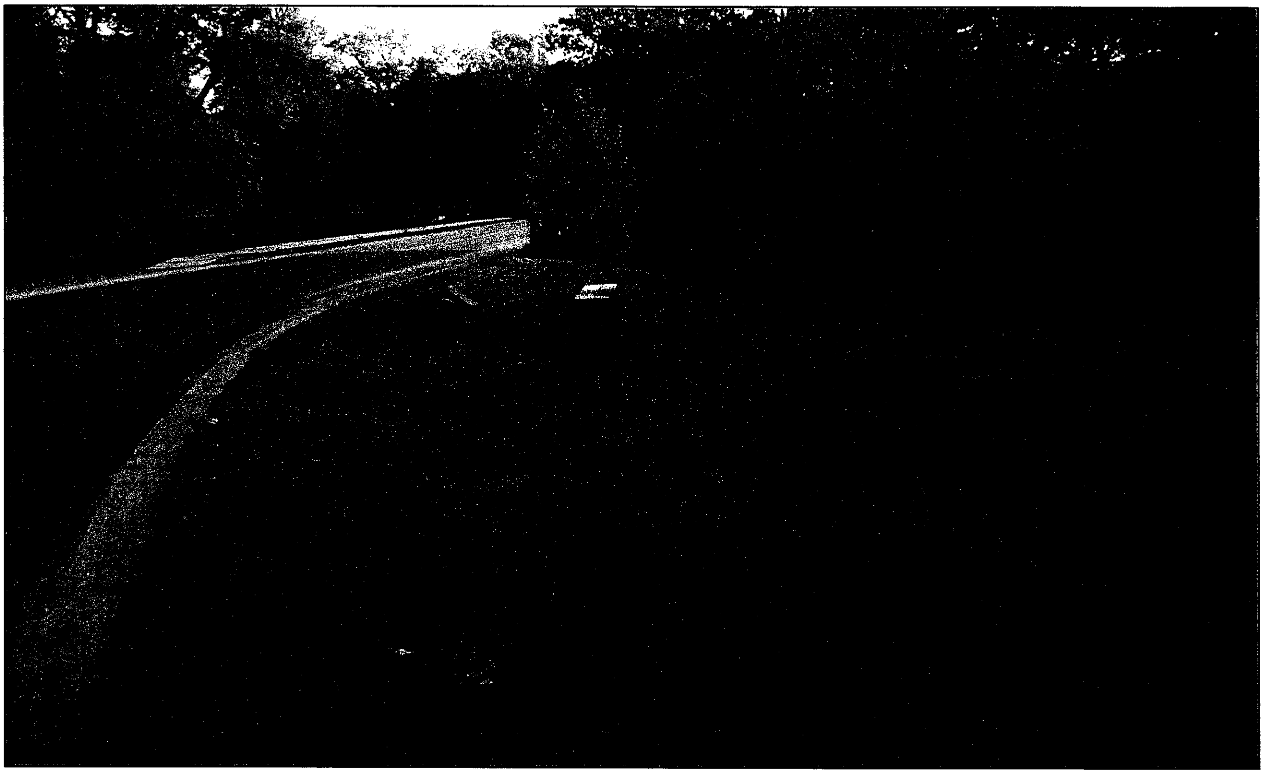
Figure 3. View of Opposite Bridge Approach

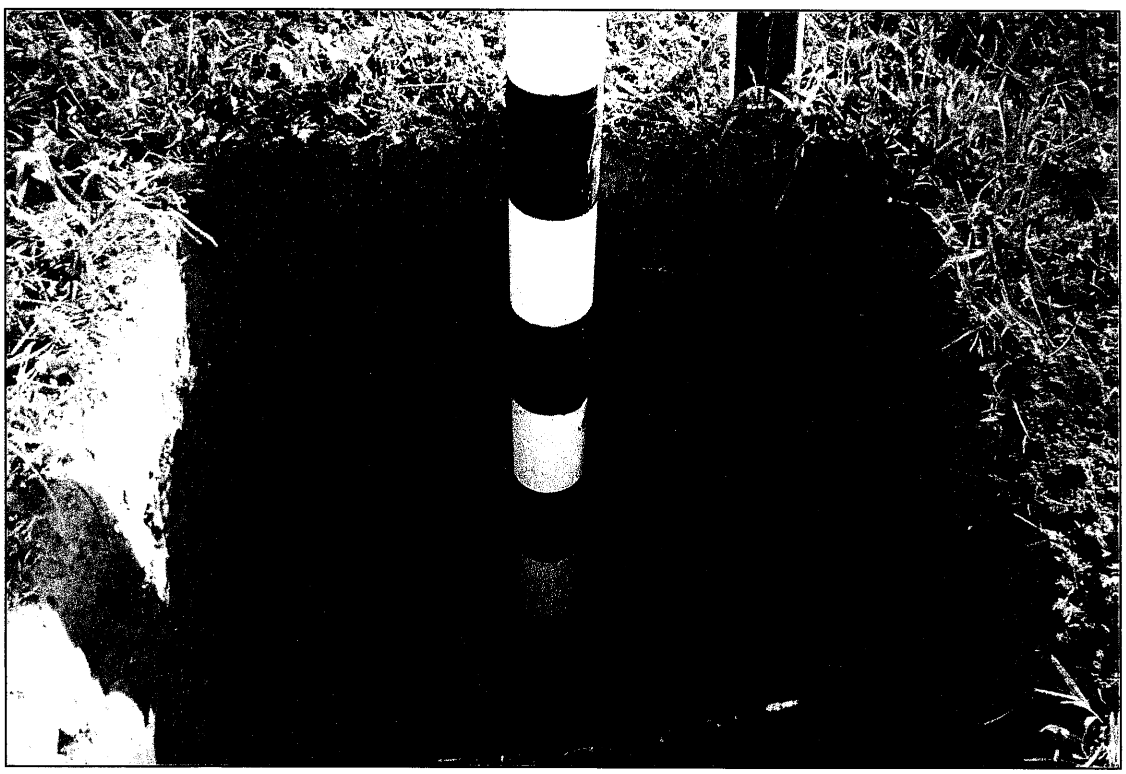
Figure 4. Soil Test Pit NW of the Bridge

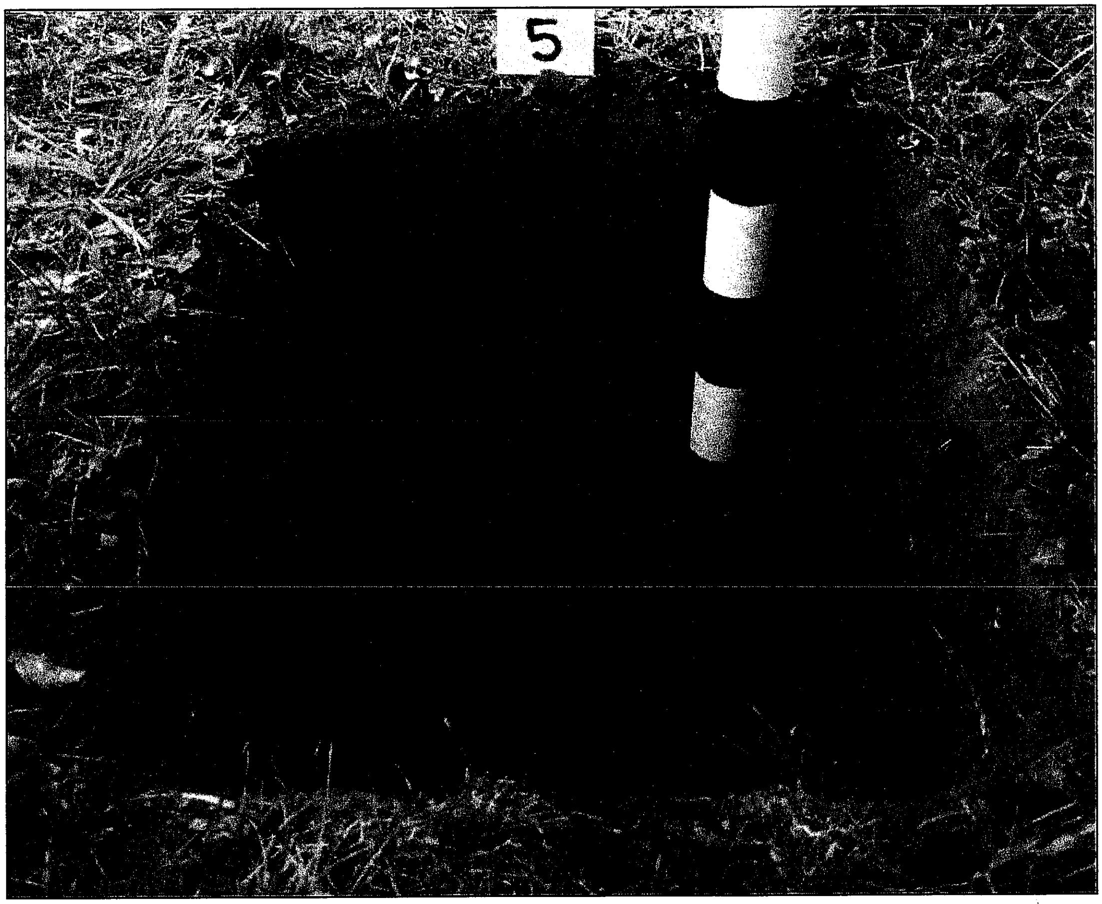

Figure 5. Soil Test Pit NE of the Bridge

Vegetation:

The vegetation in the study area is comprised primarily of mowed turf grass. A fringe of herbaceous and woody vegetation is present along the bank of the spring branch immediately adjacent to the bridge and includes American sycamore (*Platanus occidentalis*) (FACW), white oak (*Quercus alba*) (FACU) and green ash (*Fraxinus pennsylvanica*) (FACW) are found along with giant cane (*Arundinaria gigantea*) (FACW), Virginia creeper (*Parthenocissus quinquefolia*) (FACU), cutleaf coneflower (*Rudbeckia laciniata*) (FACW), wild grape (*Vitus spp.*) can be found. American sycamore and giant cane are the predominate species. A palustrine emergent fringe is present along the banks of the spring branch.

Hydrology:

Big Spring emerges from an exposed hydraulic conduit at the base of a buff and flows approximately 2,000 feet to the main channel of the Current River. The project area frequently floods, primarily due to its low elevation and proximity to the Current River. During high flow at Big Spring and the Current River, the discharge of Big Spring increases well before the flow increases in the Current River. During this period, no backwater occurs in the spring branch and the spring branch slowly rises in response to the increased flow in from the spring. Hours later, the flow in the Current River at the mouth of the spring branch begins to rapidly increase, causing the spring branch to rise quickly and eventually causing backwater conditions in the spring branch (Imes, 2007). The mean annual discharge of Big Spring is 445 cubic feet per second. The normal/ordinary water surface elevation is at approximately 431 feet.

Findings:

A site visit was conducted in March of 2013. Subsequent geotechnical borings taken in August 2014 and soil testing for an archeological investigation in May of 2015 confirmed that the project area, including the banks of the spring branch, consisted of fill material and that no wetland hydrology or hydric soils were present. The soils present in the study area are not hydric; they have not formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

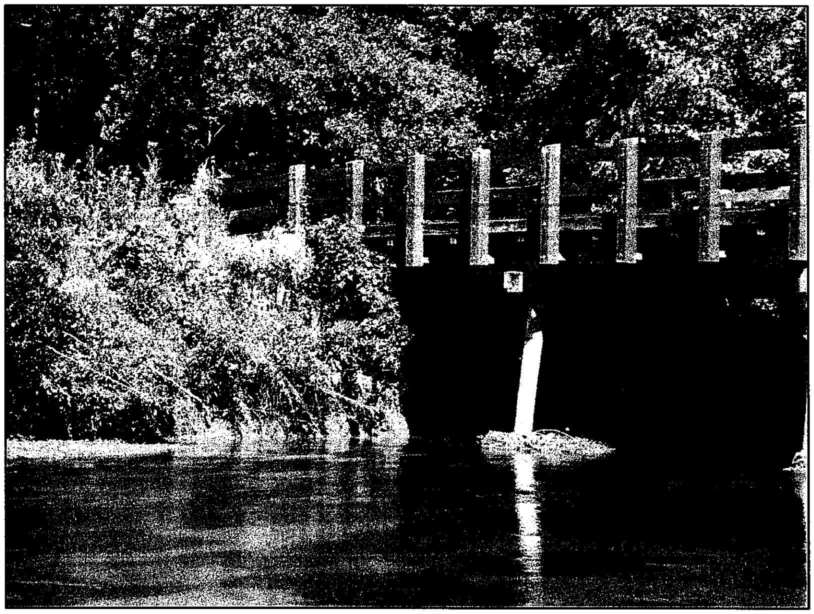

Figure 6. NE Corner of the Bridge

Figure 7. SW Corner of the Bridge

Figure 8. NE Corner of the Bridge

Figure 9. SE Corner of the Bridge