Environmental Assessment

Missouri Route 19
Shannon County, Missouri

Sinking Creek Bridge

October 2016

MISSOURI ROUTE 19, Shannon COUNTY, MISSOURI

Sinking Creek Bridge Project

JOB NUMBER J9P0438

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to 42 U.S.C 4332(2)(c)
And 49 U.S.C 303 by the

U.S. Department of Transportation
Federal Highway Administration

And

The Missouri Department of Transportation

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*The FHWA signature gives approval to distribute this information for public and agency review and comment. Such approval does not commit to approve any future grant requests to fund the preferred alternative.

Table of Contents

Figures

Tables

Appendices

Introduction

Missouri Route 19 (Route 19) begins at U.S. Route 61 south of Hannibal in northeastern Missouri. From there, Route 19 then travels south through Montgomery City, Hermann, Cuba, Salem, Winona, and Thayer, Missouri where it intersects with U.S. Route 63 coming to an end near the Arkansas state line (Figure 1). Route 19 through these locations is an important part of Missouri's primary road system as it connects with two major interstate systems, Interstate 44 and Interstate 70, which is vital to the movement of traffic that promotes industry. Route 19 serves communities, the logging industry, tourism, and various other commercial activities in transporting their goods and services to the north and south throughout the region. This artery serves as one of the main north-south accesses for emergency response, access to public lands, and delivery of goods and services for southeastern Missouri.

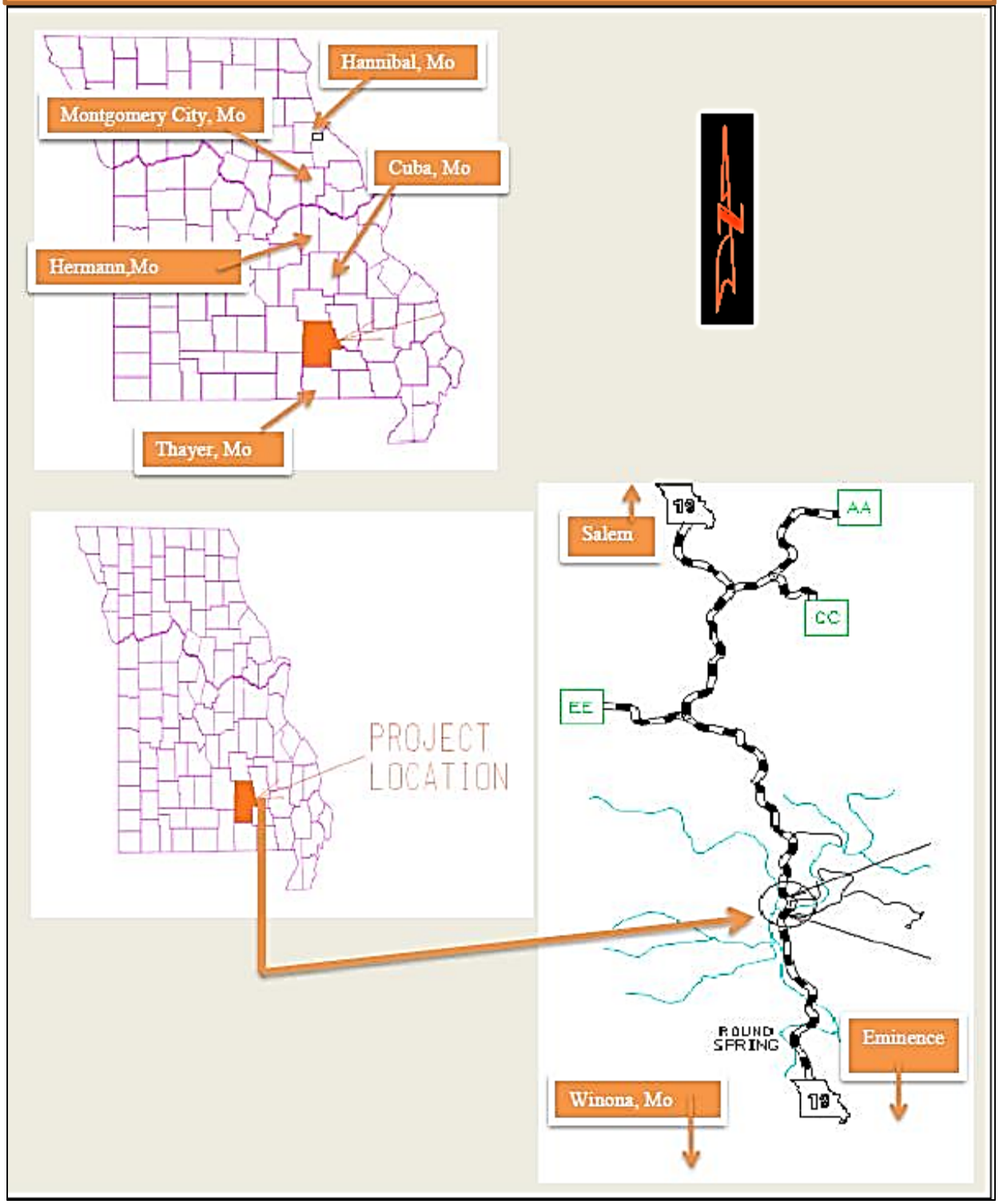
The existing Sinking Creek Bridge (Bridge #H0079) is a historic open spandrel arch bridge with architectural detail fitting in well with the rural forested landscape. The historic bridge was constructed in 1926 and has primarily undergone only routine maintenance to date. In March of 2015, MoDOT discovered the bridge had structural issues that necessitated making it a one-lane structure with a load restriction of 20 tons. MoDOT temporarily realigned Route 19 in the area and constructed a temporary bridge in May of 2015 and the existing Sinking Creek Bridge was closed. The construction of the temporary structure was a necessary venture after load posting of the existing bridge as heavy trucks were taking substantial detours in order to access Route 19 on either side of Sinking Creek. However, this is a temporary measure until a permanent solution is implemented that will provide a safe and reliable Route 19 crossing over Sinking Creek.

A permanent solution to address the issues with the existing bridge is in the Statewide Transportation Improvement Program (STIP) with three million dollars allocated to correct the deficient bridge. If approved the project is slated to begin construction in January of 2017 with a completion date in the Fall of 2017.

Why is this Environmental Assessment being prepared?

The Missouri Department of Transportation (MoDOT) anticipates receiving federal funds from the Federal Highway Administration (FHWA) for a permanent solution to provide a safe and reliable crossing over Sinking Creek on Route 19. As the lead federal agency, the FHWA is responsible for ensuring that all highway improvement projects using federal money comply with the National Environmental Policy Act (NEPA). This Environmental Assessment (EA) was developed in accordance with 23 CFR 771 to document and inform interested parties about the decision making process for the proposed project.

Figure 1: Missouri Route 19



Location of the Study Area

The study area of this EA extends approximately 0.32 mile north and 0.30 mile south of Sinking Creek and is approximately 14.2 miles north of Eminence on Route 19 in Shannon County, Missouri (Figure 2). Three side roads intersect Route 19 within the study area; County Road 19-250 southeast of Sinking Creek accesses Pioneer Forest property and Missouri State Park property, an unnamed road north of Sinking Creek heading east accessing Missouri State Park property, and an unnamed road north of Sinking Creek headed west that serves as public access to a public campground, Sinking Creek, and the Current River.

The Existing Bridge and Roadway

Classified as a minor route across Missouri, Route 19 has two 10-foot lanes with 2-foot earth shoulders and 55 miles per hour (mph) speed limit as it approaches the Sinking Creek Bridge from both the north and south. Several curves approaching the bridge are posted with speed reduction plaques and chevrons similar to the entire Route 19 corridor in the region. The temporary alignment and bridge are posted at 30 mph due to the roadway geometry and the steel grate type deck on the temporary structure.

The existing Sinking Creek Bridge opened to traffic in 1926 and is eligible for listing on the National Register of Historic Places (NHRP). The Sinking Creek Bridge is an open-spandrel arch bridge that is 18 feet wide with three 80 foot open-spandrel arch spans and two 40 foot deck girder spans (Figure 3). MoDOT Bridge Transportation Management System (TMS) data lists the structure as 339 feet long with an 18 foot wide deck that carries two 9 foot lanes with no shoulders. The bridge was closed in May of 2015 due to structural issues that could not be repaired.

In 2015, the Annual Average Daily Traffic (AADT) on the bridge was approximately 700 vehicles per day (vpd). This volume is expected to increase to 850 vpd by 2025. Commercial trucks average almost 7% of the total traffic on the bridge or 50 vpd. The narrow bridge width had been a concern for local residents that meet large trucks, farm equipment, and construction equipment that often use the bridge. The two-lane temporary bridge consists of two-12 foot lanes with no shoulders, providing more width for vehicles to meet and pass. The temporary structure is currently rated an 8 (very good) for the deck, superstructure, and substructure.

Figure 2: Study Limits for Route 19 Sinking Creek EA

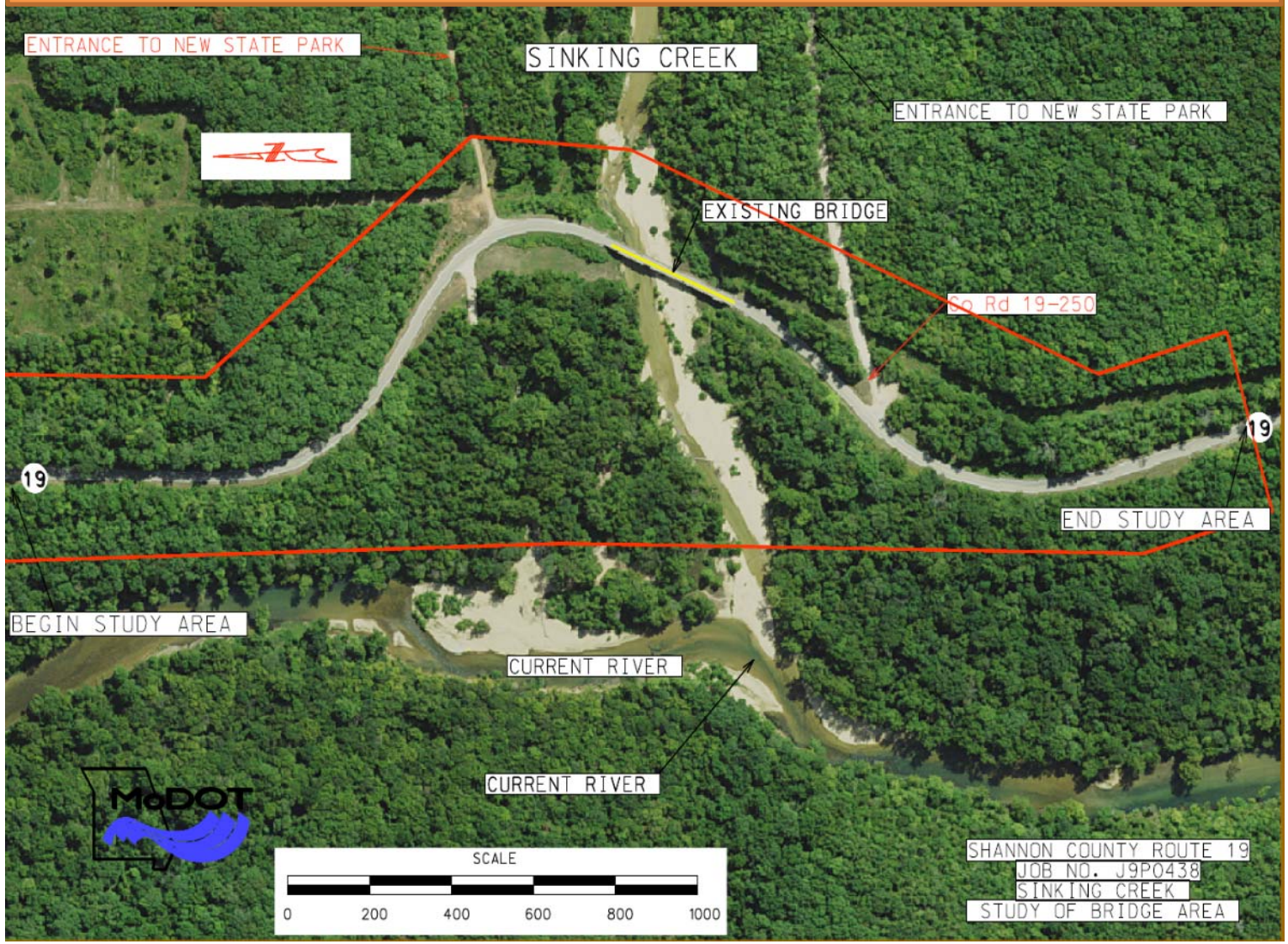
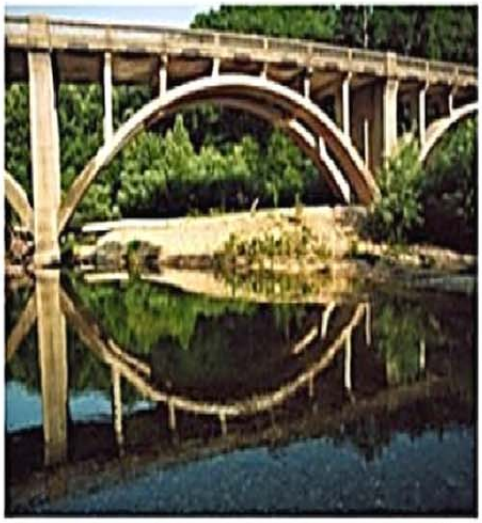


Figure 3: The Historic Missouri Route 19 Sinking Creek Bridge



MO Route 19 Sinking Creek Bridge, Looking southeast

On the bridge, looking north

East side of bridge, South approach

South bound on MO 19, looking at west side of bridge

Project Purpose

The primary purpose of the project is to provide a reliable, safe, and cost efficient Route 19 crossing over Sinking Creek in Shannon County.

Project Needs

- The Sinking Creek Bridge (H0079) is 89 years old and structurally deficient. Its age and condition require regular maintenance resulting in periodic closures that create an inconvenience to the traveling public and substantial expense to taxpayers. The bridge is currently closed and traffic has been placed on a temporary structure.
- The bridge's design is functionally obsolete. It does not meet MoDOT's standards for lane width, shoulders, or vertical clearance.
- The current Route 19 temporary bridge over Sinking Creek does not provide a long-term solution as it is more prone to flooding, requires more routine maintenance, and is not constructed as a structure to be utilized long-term.

The remainder of this chapter discusses the project needs in more detail.

The Bridge's Structurally Deficient Condition

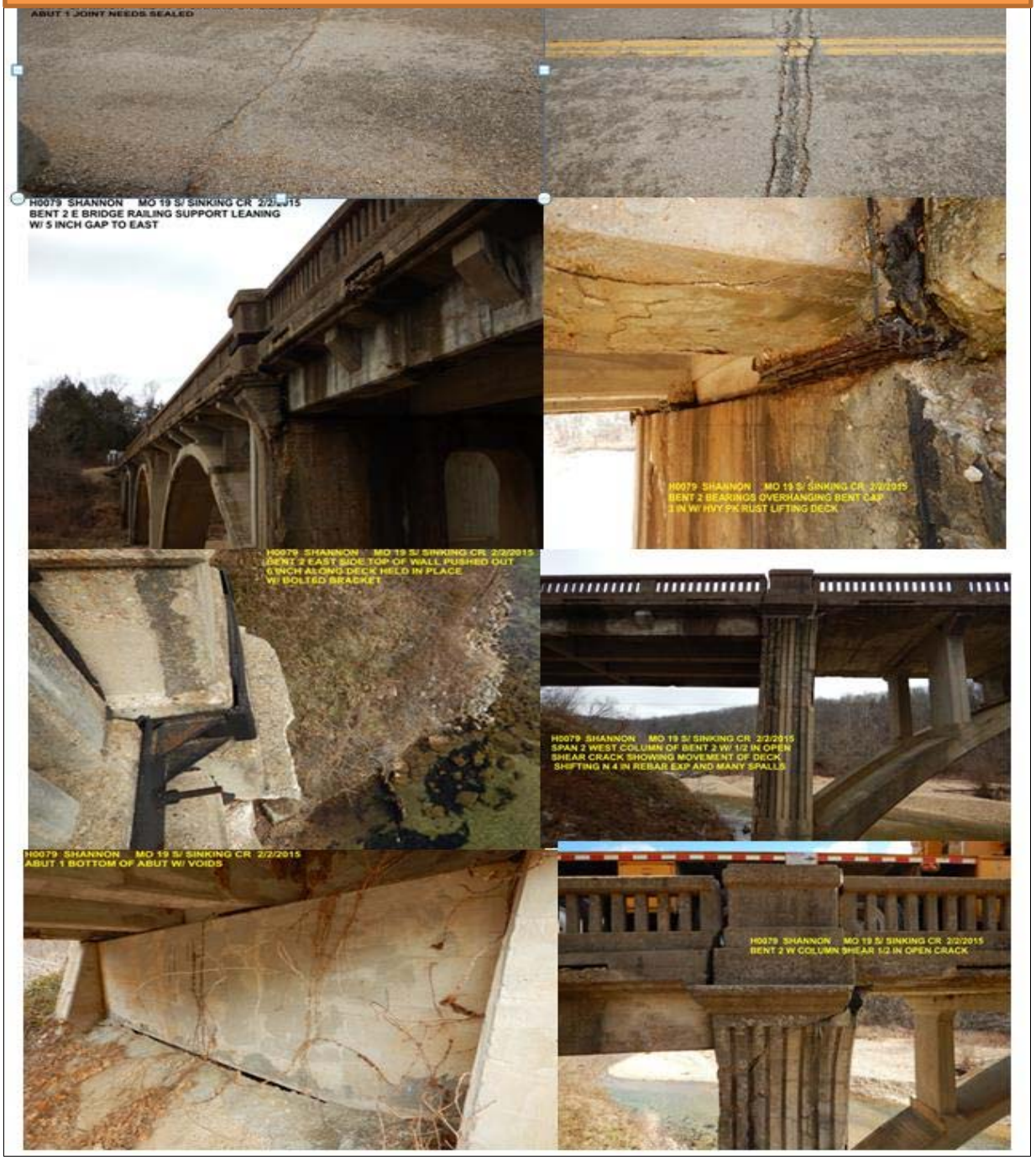
Bridge repairs have been completed over a period of time from 2002 to 2015. The superstructure repairs to the girder ends were completed in 2002, bridge deck repair and concrete work was completed in 2004, and the east side of the handrail center post was repaired in 2013. A bolted bracket was placed along the deck to secure the top side of the wall at Bent Number 2 that had shifted in spring 2013.

MoDOT conducted a routine inspection on the existing Sinking Creek Bridge on Route 19 in Shannon County in February 2015. The bridge is inspected every other year and the substructure (foundation and supporting piers), superstructure (arches and bents), and deck (riding surface), as seen on Figure 8, are each assigned numerical condition ratings. These ratings range from zero, a failed condition that cannot be corrected and typically requires closing the bridge, to nine, excellent condition. Currently, the substructure condition is rated a five (fair), the deck is rated a three (serious), and superstructure is rated a four (poor). During the inspection it was discovered the deck girders at the northernmost span have significant deterioration including concrete spalls and rusting steel rebar. It was also discovered the southernmost span has shifted approximately three inches to the south. If the shifting continues the span could fall off of its supports (see Figure 4 showing bridge deterioration). Because of this inspection, it was determined to reduce the load carrying capacity to a gross weight of 20 tons and reduce it to a one-lane bridge.

What is a "structurally deficient" bridge?

A bridge is considered structurally deficient when the deck, superstructure, or substructure condition is rated as 4 or lower. This designation does not mean the bridge is unsafe or likely to collapse; however, it must be monitored, inspected, repaired, or replaced as appropriate to retain structural integrity. In some cases, the gross vehicular weight allowed on the bridge may be reduced to keep it safely open to traffic. If a physical inspection identifies unsafe conditions, the bridge must be closed.

Figure 4: Existing Bridge Conditions



The bridge restrictions placed a hardship on the traveling public due to a detour distance of approximately 90 miles for vehicles over 20 tons resulting in a temporary bridge being built just downstream of the existing structure. This structured opened near the end of May 2015. This bridge is intended to be only temporary until a permanent solution is determined. (See Figure 5).

Figure 5: Temporary Bridge Photo

The Bridge's Functionally Obsolete Design

Missouri's current standards for new bridges on this type of roadway require 12 foot lanes and 2 foot shoulders. The existing bridge is only 18 feet wide providing two 9 foot lanes, and was restriped to a one-lane bridge in May of 2015. These dimensions result in the bridge being functionally obsolete by current roadway standards. In late May of 2015 the bridge was closed and the temporary bridge, which is 24 feet wide and not weight restricted, was opened for all traffic.

What makes a bridge "functionally obsolete"?

A functionally obsolete bridge lacks adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand or to meet today's geometric standards. Although functionally obsolete bridges were built to standards that are no longer used, they are not necessarily unsafe.

Design deficiencies such as one-lane bridges and narrow lane widths can affect the efficient flow of traffic and contribute to head-on, sideswipe, and rear-end accidents. Such effects could cost lives and possibly irreversible damage to the bridge. The weight restriction applied to the bridge affects traffic in the area as many of the vehicles utilizing the bridge are heavy trucks. This weight reduction causes heavy vehicles to use alternative routes resulting in longer travel times and reduced efficiency.

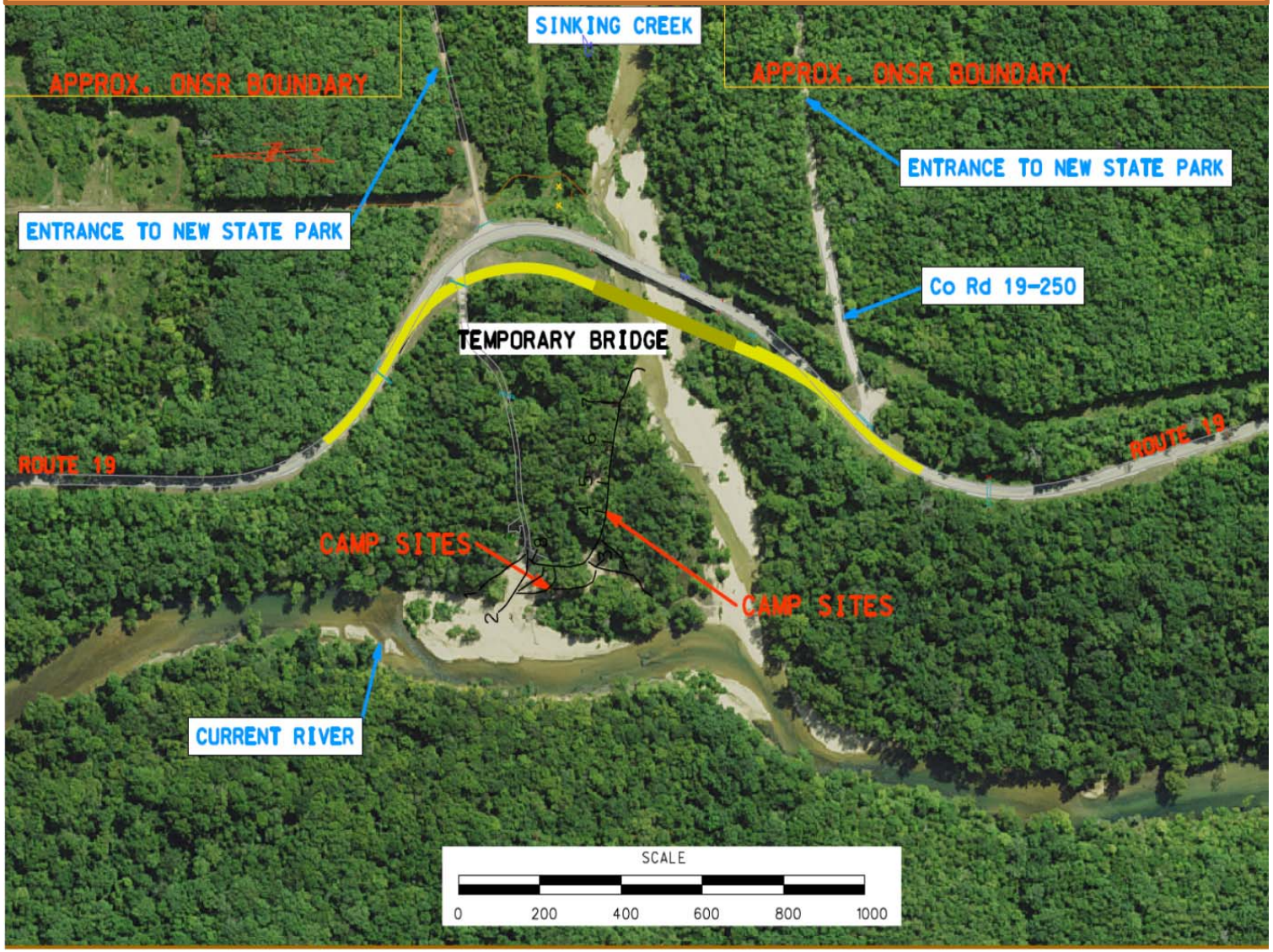
The historic bridge's narrow lane width and lack of shoulders discourage pedestrians and bicyclists from utilizing the bridge. Any new bridge alternative would consider providing shoulders wide enough that bicyclists and pedestrians could use to access destinations on both sides of Sinking Creek.

A full in-depth hydraulic analysis has not yet been performed; however, discussions with local officials indicate that on one occasion flood waters reached as high as the deck of the historic bridge. Once completed, the hydraulic analysis will determine the height of the new structure to avoid flooding issues.

The Temporary Bridge is not a long-term solution

The Temporary Bridge (Figures 5 and 6) was constructed approximately 7 (seven) feet lower than the historic bridge which does not meet design high water requirements and is susceptible to being over topped by flood waters and potentially washed away. One set of columns is located in the middle of the channel causing concern for erosion at the base of the columns and an obstruction that could catch drift/debris. A temporary structure of this type is typically only in use for one year. Keeping it open longer than this translates into more maintenance in terms of tightening bolts and checking welds. The grate type deck is rough riding and very noisy.

Figure 6: Temporary Bridge Location



Conclusion

The bridge over Sinking Creek provides an important north/south connection of Route 19 in southern Missouri. The 89-year-old bridge is currently closed because it is structurally deficient and is functionally obsolete with substandard lane width and shoulders. The existing bridge has deteriorated beyond repair and was closed because it is not a desirable crossing in its current single lane, load posted condition. The temporary bridge is not intended to be a permanent solution and requires much more maintenance than a new permanent structure. There is also concern about the reliability of the temporary structure during a flood event as it is not designed to withstand a major flood.

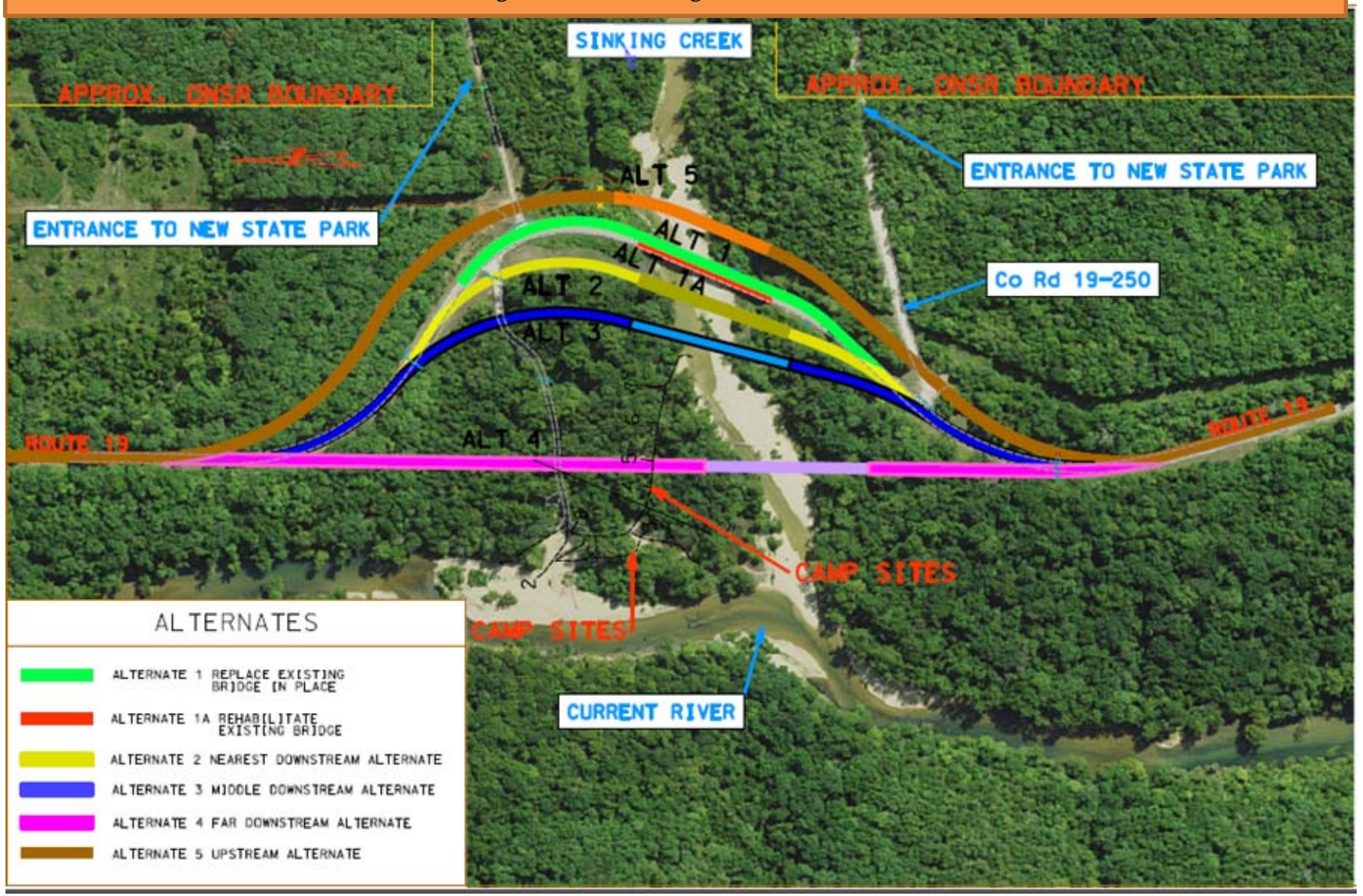
Alternatives Considered

The initial range of alternatives (See Figure 7) considered includes the No-Build Alternative, rehabilitation of the existing bridge, and five build alternatives. Any of the proposed build alternatives would satisfy the project purpose and needs and would eliminate the ongoing maintenance needs, expense, and inconvenience to motorists arising from the age and condition of the existing bridge. Each new bridge alternative would meet current MoDOT standards and AASHTO national standards for lane width and vehicular load. Consideration will be given for the inclusion of bicycle/pedestrian facilities with each of the build alternatives.

No-Build Alternative

The No-Build alternative would make no improvements and only normal maintenance would be performed on the existing Sinking Creek Bridge. Normal maintenance, including pothole patching, pavement replacement, striping, and overlays, would only delay the permanent closure of the bridge due to structural deterioration and would not remove the load restriction. Traffic cannot remain on the temporary bridge long term because it may be unreliable during flood events and is not intended to handle the hydraulic forces for which a permanent bridge is designed. The temporary bridge requires monitoring for larger rain events and has an increased possibility of being structurally compromised by flooding versus a permanent bridge. For these reasons, the No-Build alternative fails to meet the project purpose of providing a reliable Route 19 crossing over Sinking Creek, but it will be retained in this EA as a baseline for comparison with the other alternatives evaluated.

Figure 7: Initial Range of Alternatives

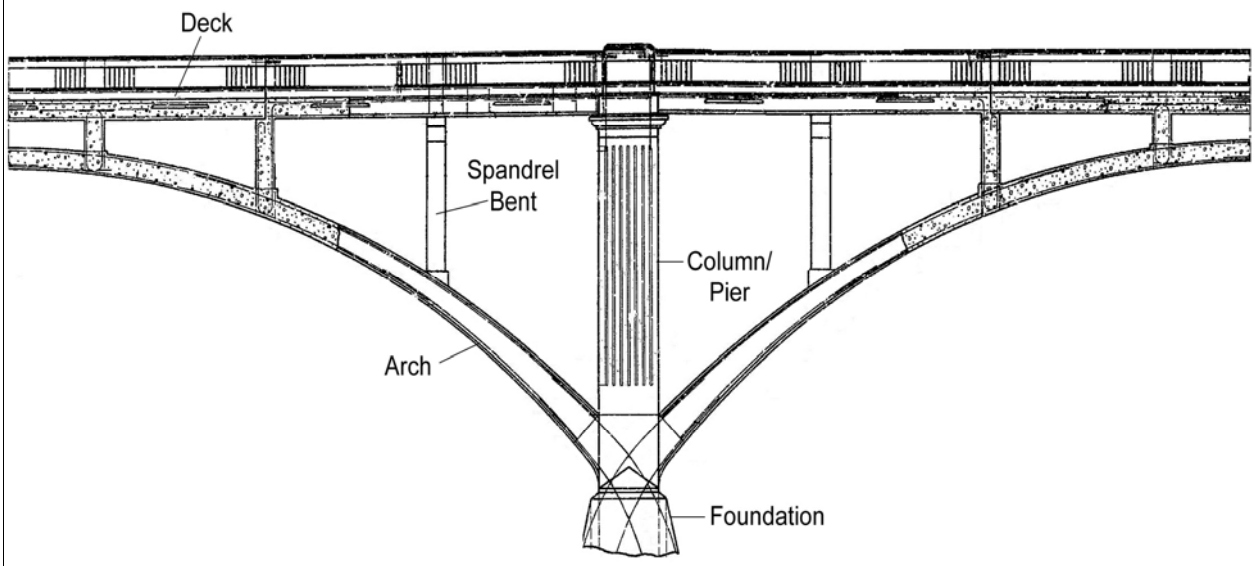


Alternative 1
Alternative 1 requires the existing Sinking Creek Bridge to be replaced in its current location with a new two-lane bridge. This alternative would construct approximately 400 feet of new roadway north and south of the new bridge to tie in each bridge end to the existing roadway and allows the temporary bridge to be used to carry traffic while construction is being performed.

This alternative has the least amount of impacts of the build alternatives to the surrounding natural resources. It also allows for the old roadway to be used as a contractor staging area since traffic would continue to use the temporary bridge during construction.

Alternative 1a (Rehabilitation)
Alternative 1a would rehabilitate and widen the existing bridge by removing the deck, spandrel bents and columns (See Figure 8). A new deck, pre-stressed concrete girders and column bents would be installed and the load restriction would be lifted. The existing arches and column footings would remain in place. With this proposed alternative, the spandrel arch ribs would no longer contribute to the structural capacity of the bridge as the load would be placed on the new girders. Traffic would remain on the temporary bridge during construction.

Figure 8: Bridge Components



This alternative has constructability and structural concerns. To widen the existing bridge and correct its structural deficiencies the columns and spandrels must be replaced with stronger columns and girders that would be added to span between the new columns. The new columns and girders would carry the traffic loads and would remove these loads from the arches. The existing footings, underneath the columns, and arches would remain in place to maintain the historical appearance of the bridge. There are serious concerns with replacing the columns without damaging the existing arches. Also, when the loads are removed from the arches, freeze/thaw cycles will most likely cause the arches to deteriorate at a quicker rate because they were designed to stay under a loaded condition. It would be impractical to use the footings that were constructed in 1926 because of their lack of longevity (see engineering study – Bridge Rehabilitation or Reconstruction Alternatives for Environmental Impact Study by Harrington & Cortelyou, Inc. in Appendix A). Concrete testing was completed on the Sinking Creek Bridge in 2002. Chloride content in the spandrel arches was determined to be more than twice the threshold for corrosion which will continue to accelerate the deterioration of the historic bridge's architecturally significant design.

Because of these constructability and structural concerns, the bridge rehabilitation proposed with Alternative 1a will not meet the project's purpose of providing a safe, reliable long-term crossing. The existing bridge would remain functionally obsolete and structurally deficient. The rehabilitation alternative will be retained for further study similar to the No-Build Alternative as a base line for comparison with the other alternatives evaluated. This will be important information for the consulting parties and the 4(f) evaluation.

Alternative 2

Alternative 2 constructs approximately 1,400 feet of new roadway and requires constructing a new bridge that would replace the existing Temporary Sinking Creek Bridge on the same alignment. It would raise the vertical alignment of the new bridge higher than the temporary one and traffic would need to be temporarily rerouted. Two potential traffic detour options exist. The western detour would be along Route 60 to Route 17 in Mountain View to Route 32 in Licking to Route 19 in Salem. The eastern detour would be Route 60 to Route 21 near Van Buren to Route 72 near Centerville to Route 19 in Salem. These detours are each approximately 90 miles long. Another potential option is placing non-truck traffic on the existing Sinking Creek Bridge and rerouting truck traffic on a nearby paved county road that goes through the new Echo Bluff State Park located just east of the proposed bridge site. This would be about a 2 mile detour for truck traffic. Neither detour option is ideal. The 90-mile long detours would be a financial hardship to the many commercial and tourism industries that depend on Route 19, would be a potential two hour inconvenience to local travel, would delay school bus travel, and would hinder response time for emergency vehicles. The other detour would direct large trucks through the state park which would disrupt campers and other recreational activities as well as deteriorate the county road through the park.

Alternative 3

Alternative 3 constructs approximately 2,400 feet of new roadway and constructs a new bridge just downstream of Alternative 2. The temporary bridge would be used to carry traffic while construction is being performed.

The elevation of Route 19 as it crosses the side road that serves as access to Current River and camping area is 20 feet to 25 feet higher than the existing access road. This will result in a new access road connection that will be much steeper than existing and impact a wide area of forested land. The steeper roadway would be much more difficult to negotiate than the existing.

Alternative 4
Alternative 4 would construct a new structure to replace the Sinking Creek Bridge downstream of the other alternatives. Alternative 4 is the furthest alternative from the existing location and the closest in proximity to the Current River. Alternative 4 is the straightest of the proposed alignments and would require approximately 2,600 feet of new roadway to be constructed to connect to existing Route 19. Both truck and non-truck traffic would still be able to use the temporary bridge during construction of this alternative.

Alternative 5
Alternative 5 would build a new structure upstream from the existing Sinking Creek Bridge. To construct at this location would require that 3,100 feet of new roadway be built to connect back with the existing road. Traffic would still be able to use the temporary bridge during the construction of this upstream alternative.

Alternatives Dismissed from Further Evaluation

Alternative 4 Dismissal
Alternative 4 has been dismissed from further evaluation due to constructability issues and impacts to the surrounding landscape. The elevation of Route 19 as it crosses the side road that serves as access to Current River and camping area is 25 feet to 30 feet higher than the existing access road. This will result in the need for a new access road connection that will be much steeper than existing and impact a wide area of forested land and potentially the campground restrooms. Several of the existing campsites would be eliminated with this alignment.

Because of the alternative's close proximity to the confluence of Sinking Creek and the Current River, the roadway fill has the potential of creating excess backwater, flooding properties upstream of the Current River. This alternative would require a longer structure as the Sinking Creek valley is widening at the confluence of the Current River. Sinking Creek, which is on a steeper stream gradient, is depositing its sediment load in this area as it merges with the shallower gradient, slower flowing Current River. Building a structure in Alternative 4's proposed location would impact hydraulics and potentially deposit sediment into the Current River. Constructing a bridge in such a dynamic location may alter the natural deposition of materials and sediment into the Current River.

Though the roadway and bridge relocation proposed with Alternative 4 does meet the project's purpose and need of having a crossing that is functionally and structurally sufficient and provides a long-term crossing, it greatly impacts the surrounding landscape and has operational issues associated with the close proximity to the confluence of Sinking Creek and Current River.

Alternative 5 Dismissal

Alternative 5 has been dismissed from further evaluation because of safety issues and impacts to the surrounding landscape. This alternative includes significant excavation south and north of the Sinking Creek crossing. These two cut sections would be approximately 35 feet to 40 feet in depth as measured from the ditch bottom, and the combined backslope and roadway widths would impact a 200 foot to 250 foot wide area of forested land. With the use of retaining walls, this width might be reduced to 100 feet to 150 feet with added associated costs. This alternative would also require the relocation of a recently installed 3-phase overhead/underground power line. Existing County Road 19-250 just south of Sinking Creek is currently a steep upgrade road. This road has recently been surfaced with full depth concrete pavement to serve as the main south entrance into the new Echo Bluff State Park. The new roadway elevation for Route 19 would be much lower than the county road resulting in the need for complete reconstruction of a portion of County Road 19-250. The connection work would be lengthy and consist of excavation that would impact yet another large, wide area of forested land. Also, the final grade of County Road 19-250 would be much steeper than the existing and could present safety concerns especially during snow/ice conditions.

Though the roadway and bridge relocation proposed with Alternative 5 does meet the project's purpose and need of having a crossing that is functionally and structurally sufficient and provides a long-term crossing, it greatly impacts the surrounding landscape and compromises safety at CR 19-250.

Alternatives Retained in this EA

Alternatives 1, 2, and 3 will be retained and evaluated in detail for this EA along with the No-Build Alternative and the Rehabilitation (1a) Alternative, which serve as baselines for evaluating the proposed build alternatives. The three build alternatives are being retained because they best meet the purpose and need established earlier of having a crossing that is not functionally obsolete or structurally deficient and provides a safe, reliable long-term crossing.

Preferred Alternative

MoDOT has designated Alternative 1 as the Preferred Alternative to address the purpose of providing a reliable, safe, and cost efficient Route 19 crossing over Sinking Creek in Shannon County. Alternative 1 will require the existing Sinking Creek Bridge to be replaced in its current location with a new two-lane bridge. This alternative would construct approximately 400 feet of new roadway north and south of the new bridge to tie in each bridge end to the existing roadway and allows the temporary bridge to be used to carry traffic while construction is being performed. Although this is the current Preferred Alternative, the final selection of an alternative will not be made until after consideration of impacts along with any public and agency comments made during the comment period.

Table 1: Impact Summary for Reasonable Alternatives					
	No-Build Alternative	**Alternative 1**	**Alternative 1a**	**Alternative 2**	**Alternative 3**
Cost (Millions)					
Construction	0	2.8	2.9	3.0	3.3
Right of Way	0	0	0	0.017	0.031
Total:	0	2.8	2.9	3.017	3.331
Right of Way					
Residential Relocations	0	0	0	0	0
Commercial Relocations	0	0	0	0	0
Acres (New)	0	0	0	2.10	3.93
Environmental Impacts					
Potential Section 4(f) Properties (Parks)	0	0	0	1	1
Wetlands	0	0	0	0	0
Creek/Stream/River Crossings	0	1	0	1	1
Farmland (Acres)	0	0	0	0	0
Floodplain*	0	0	0	0	0
Threatened and Endangered Species	No	Yes	Yes	Yes	Yes
Hazardous Waste	0	0	0	0	0
Cultural Resources Impacts					
Cemeteries	0	0	0	0	0
Archaeological Sites	0	0	0	1	2
Potential Section 4(f) Properties (Historic)	No	Yes	Yes	Yes	Yes
*Shannon County is not mapped for floodplain.					

Land Use

The land use within the study area is for forest management and recreation. No permanent residences or business facilities are located in the immediate area.

The majority of the land within the project area is undeveloped forested land. Although right of way would be required for all proposed alternatives except for Alternative 1and 1a; the minor amounts needed would not inhibit the remaining land from being available for its current intended use. Any new right of way or easements necessary for the proposed project would be obtained from the Ozark National Scenic Riverways (ONSR).

Prime and Unique Farmland

Recognizing the importance of protecting farmland from conversion to non-agricultural uses, Congress passed the Farmland Protection Act (FPPA) in 1981. Before a federal project or federally funded program can use farmland, the farmland that would be affected must be assessed in a collaborative process with the Natural Resources Conservation Service (NRCS). NRCS classifies farmland as prime, unique or of statewide or local importance based on soil type. If the project would convert any prime, unique, statewide, or locally important farmland to non-agricultural uses in excess of parameters developed by NRCS, then the federal agency must take measures to minimize farmland impact.

Alternatives 1 and 1a would not require any new right of way, and therefore would not have any impacts to farmland. Alternatives 2 and 3 would require minor amounts of right of way (2.10 and 3.93 acres respectively). Although Alternatives 2 and 3 would require new right of way, the right of way that would be acquired is currently incorporated into the ONSR. Because the land needed is part of ONSR, it meets the FPPA definition of "land committed to other uses" and farmland would not need to be further evaluated for Alternatives 2 and 3.

Socioeconomics

Demographic Characteristics

This section provides insight into the population characteristics of the immediate project area and the region. Accordingly, demographic information was compiled by Census Block Groups shown below in Figure 9 (Census Bureau, 2010).

Figure 9: Census Block Groups

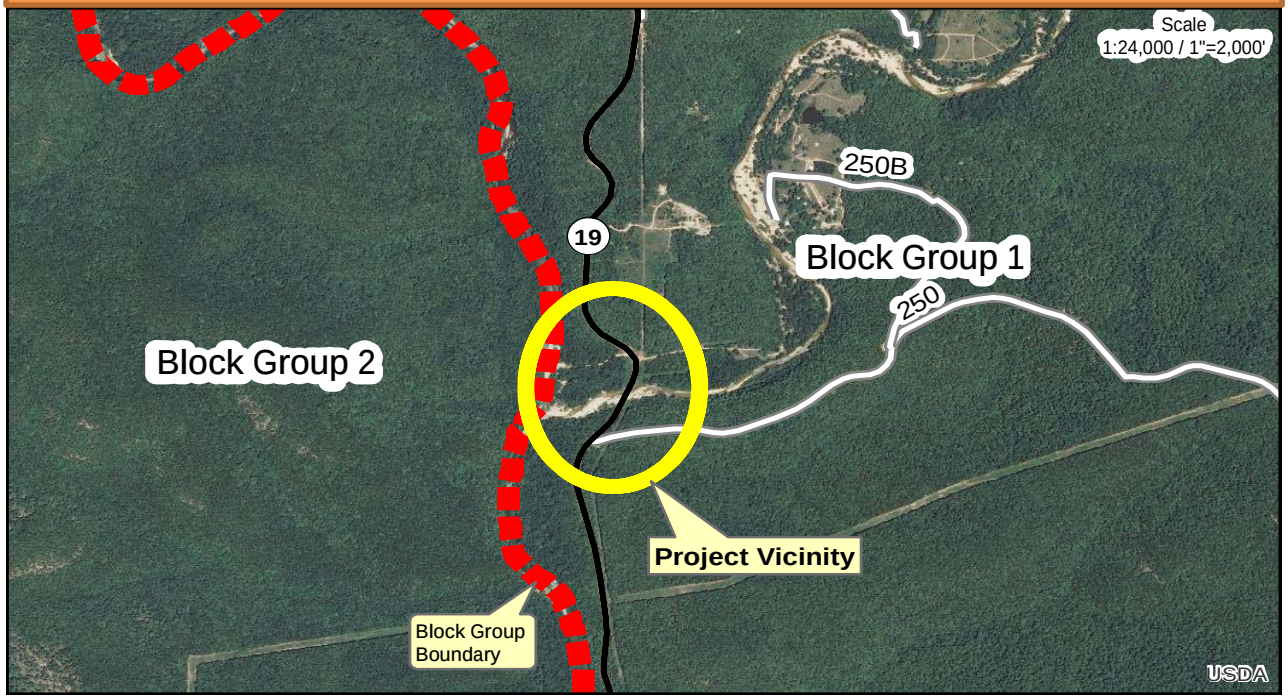


Table 2: Population Statistics

	Census Block Groups Block 1	Census Block Groups Block 2	Census Tract 4701	Shannon County	Missouri
Total Population	618	1,194	3,385	8,329	6,063,589
White Alone (non-Hispanic)	618 100%	1,134 95%	3,284 97%	7,846 94%	4,856,935 80%
Minority	0 0%	60 5%	101 3%	483 6%	1,206,654 20%
Poverty Level*	Poverty level not available at Block Group Level.		660 19%	2,099 25%	939,856 15%
Limited English Proficiency	0 0%	0 0%	0 0%	200 2%	369,879 6%
Less than High School Ed	74 12%	191 16%	516 15%	1,583 19%	751,885 12%
Greater than 64 Years Old	155 25%	191 16%	619 18%	1,632 20%	933,793 15%

*Poverty level not available at the Block Group level.

Population statistics for the city, county, and state from the American Community Survey (2009-2014) are provided in Table 2. The population of individual's age 65 or greater within the Block Groups is fairly consistent with that of the Census Tract, Shannon County, and Missouri. In terms of racial characteristics for the area, Table 2 shows that the racial make-up of the Census Block Groups is consistent with that of Shannon County, with only small minority populations.

The percentage of those with low income indicated that the Census Tract exhibit a similar percentage of individuals with low income. Other demographic characteristics that were noted in the American Community Survey indicated that English is the primary language within these Census Block Groups as no individuals were identified that spoke English less than well. The percentage of the Census Block Groups population with less than a high school education was consistent with both Shannon County and the state of Missouri.

Employment Impacts

Employment impacts are measured by jobs lost and jobs generated by the proposed project. Under the proposed action, no employers in the project area will be displaced. Primary employers in the area include the National Parks Service and canoeing/camping outfitters. Positive economic effects may be realized during the construction period due to the expenditure of public funds within the project area. This includes direct income for construction workers and suppliers which may be expended for goods and services within the area.

Pedestrian and Bicycle Traffic

Currently there is no strong evidence of existing use in the project vicinity by either pedestrians or bicyclists. The current pedestrian and bicycle activities are primarily restricted to Route 19 due to the restricted roadway width. When combined with the numerous curves and hills, there are safety concerns because this route is heavily used by commercial logging trucks. MoDOT considered the inclusion of pedestrian or bicycle facilities as part of this project and it was deemed unnecessary due to the lack of an existing or planned connection to a pedestrian system.

Community Cohesion

Geographically, a community can refer to anything from a neighborhood, to a city, state, or even a nation. The most consistent aspect of any of these communities is that they all have a residential component. This project is within a rural, primarily forested, community.

Alternative 1 and 1a will not require any new right of way. Alternatives 2 and 3 will require a limited number of acres to construct, and will not significantly disrupt current land use patterns or community components, cause a considerable change in the community, or result in community segmentation. The proposed action is to improve the local travel network through the removal of load restrictions on the bridge and providing width to allow two lanes of traffic.

Community Facilities

The proposed action would have both positive and negative impacts on the area. This includes negative short-term impacts associated with construction activities, and positive long-term impacts once construction is completed. These impacts have been documented throughout the preceding analysis and the discussion of construction impacts beginning on page 40.

There will be a two week closure to tie-in the access road to the Sinking Creek Backcountry Campground to the existing roadway. Other than the two week closure, access to the campground will be available through the Traffic Management Plan (TMP). No other recreational facilities, schools, private recreational areas, or churches in the immediate project area will be impacted. While people that regularly work or visit the area may need to learn new directions of travel, with the exception of temporary impacts during construction, the overall patterns should remain very similar and the proposed action should benefit access. Police and fire protection should benefit from the proposed action due to improved access and reduced congestion that will improve response time of emergency vehicles.

Acquisition Impacts

While the No-Build Alternative, Alternative 1, and Alternative 1a would have no acquisitions, and therefore no acquisition impacts, Alternatives 2 and 3 would require new right of way and easements. Alternative 2 would require 2.1 acres of new right of way to construct a new bridge on new alignment and 0.28 acres of temporary easement for tying the new roadway to the campground access road. Alternative 3 would require slightly more right of way at 3.93 acres to construct a new bridge on an alignment just downstream of Alternative 2 and would require 0.38 acres of temporary easement for tying into the campground access road. All right of way and easements needed to construct Alternatives 2 or 3 would have to be acquired from the ONSR. Because of the rural nature of the project location, none of the alternatives would result in displacements of individuals or businesses.

MoDOT will ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964), the President's Executive Order on Environmental Justice, and the Americans with Disabilities Act. In accordance with the Uniform Act and the states' relocation programs, fair market compensation will be provided to property owners who are affected by this project. Temporary easements required by some of the projects alternatives will be granted by a special use permit from the National Parks Service.

Environmental Justice

Title VI of the 1964 Civil Rights Act prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving federal financial assistance. Title VI seeks to ensure that all groups and individuals have the right too access and participate in the transportation decision-making process. The 1994 Executive Order 12898 directs federal agencies to take steps to ensure that minority of low-income neighborhoods are not subjected to disproportionate impacts from projects.

Environmental justice seeks to:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on low-income populations.
- Ensure full and fair treatment of all people and their involvement in the transportation decision-making process regardless of race, color, national origin, age, or income.

- Prevent the denial of, reduction in, or significant delay in benefits received by minority and low-income populations.

Impacts caused by the project such as health risks, loss of neighborhood cohesion, excessive noise, reduced mobility, or loss of residence are considered and efforts are made to avoid or minimize these issues. If negative impacts cannot be resolved through avoidance or minimizations, they may be mitigated through such solutions as sound walls or designing alternative methods of access to avoid isolating communities or important elements within a community.

Groups that are included in the analysis for environmental justice include minority persons defined as any person who is African American, Hispanic, Asian American, American Indian, or Alaskan Native. Also included in the groups for environmental justice are low-income populations.

The project corridor was evaluated to identify the presence of low-income or minority populations and the potential impacts. No minority or low-income populations have been identified that would be adversely impacted by the proposed project as determined above. Therefore, in accordance with provisions of Executive Order 12898 and FHWA Order 6640.23, no further environmental justice analysis is required.

Water Resources

Water resources are important because they provide essential biological functions in the environment. Wetlands provide water storage and energy dissipation during storm events, promote cycling of nutrients including removal and retention of some elements. Streams support animal and plant community types and are an integral part of the hydrologic cycle. In addition to these functions, public water resources provide aesthetic benefits, as well as recreational opportunities such as fishing, canoeing, etc.

The Clean Water Act of 1972 (CWA) requires an evaluation of every project to determine whether the project could have a negative impact on any waters of the U.S. including wetlands, streams, ponds, and special aquatic sites. Section 404 of the CWA requires that all federal, state, and public entities obtain a permit from the U.S. Army Corps of Engineers (USACE) before placing dredged of fill materials into waters of the U.S. Section 401 (CWA) requires that water quality certifications be obtained for any activity that results in discharges into streams or jurisdictional wetlands. The Missouri Department of Natural Resources (MDNR) manages this program.

The following overview provides a summary of the potential impacts from each of the four build alternatives to water resources with the construction of a new Route 19 bridge over Sinking Creek in Shannon County. Environmental features within the corridor were identified using the U.S. Fish and Wildlife Service's Nation Wetland Inventory (NWI) maps, United States Geological Survey (USGS) 7.5-minute topographic maps, the Shannon County Soil Survey, field investigation, and 2010 aerial photographs.

The project areas of the proposed alternatives are not within any designated conservation opportunity area and there are no spawning restrictions for impacted drainages.

Wetlands
Wetlands are classified in accordance with the USACE 1987 Wetland Delineation Manual. Potential wetland areas are considered jurisdictional wetlands if they meet all three wetland criteria (USACE, 1987):

- **Vegetation**-The prevalent vegetation consists of species that are typically adapted to inundated or saturated soil conditions.
- **Soil**-Soils have been classified as hydric, or that they possess visual characteristics that are associated with reduced soil conditions.
- **Hydrology**-The area is either inundated or saturated to the surface continuously for at least 5% of the growing season in most years (50 percent probability of recurrence).

According to the NWI maps and field investigations, there are no wetlands located within the project limits of any of the alternatives. The Shannon County soil survey indicates all of the soils in the project areas are either non-hydric or partially hydric. The partially hydric soils are within the Alternative 2 and 3 locations where the soils receive overbank flow from Sinking Creek during high water events.

Ponds
According to the NWI maps, recent aerial photographs, and field investigation, no ponds are located within the area of any of the alternatives.

Stream/River Crossings
Sinking Creek is a large, perennial, Class P stream*. All alternatives have similar impacts to Sinking Creek and the riparian corridor including pier placement, rock lining under the abutments, and clearing of the existing riparian corridor. All build alternatives will impact Sinking Creek due to placement of bridge piers and removal of the existing piers.

*A Class P stream is defined as a stream that maintains permanent flow during drought conditions.

Riparian Corridor
The existing riparian corridor along Sinking Creek is heavily forested and composed of mature trees. Alternatives 2 and 3 will have similar impacts to the existing riparian corridor including pier placement, rock lining under the abutments, and clearing of the existing riparian corridor. Alternative 2 will have little impact to the riparian corridor due to the current placement of the temporary bridge which has already impacted the corridor. Alternatives 1 and 1a will have minor impacts to the existing riparian corridor as either alternative will be located on the existing bridge alignment.

Mitigation
Mitigation is required after avoidance and minimization have been accomplished for impacts to streams, wetlands, and some ponds in the project area. The total impacts of the project area expected to be below the 0.5 acre limit for a Nationwide Permit (NWP) 14, Linear Transportation Projects for any of the alternatives, therefore, none of the alternatives are anticipated to require mitigation.

Permits

Under Section 404 and 401 of the CWA, permitting is necessary for dredge and fill activities within waters of the United States. A USACE Section 404 permit and a Missouri Department of Natural Resources Section 401 certification will be needed prior to construction. Impacts to construct any of the alternatives will likely require a Nationwide Permit (NWP) authorization. Final impacts from pier placement and rock blanket under the abutments will require permit submittal to USACE. The project will likely be authorized by a NWP 14, Linear Transportation Projects. Permit application submittal is typically completed during the design phase.

Water Quality

Water quality is the physical, chemical, and biological characteristics of water in relationship to a set of standards. Water quality standards provide a means by which attainment of water quality objectives can be measured. The objective is protection of designated uses through the application of narrative or numeric criteria. The level of protection given to a stream, lake, or river is dependent of the expected of "designated use(s)," of that water. Classified waters in Missouri have been assigned the designated uses that are listed in 10 CSR 20-7.031(C) page 10 of chapter 7. The anti-degradation section requires actions to maintain existing uses. Attainment frequency of water quality standards are used in identifying and characterizing waters of the state for purposes of compiling the 303(d) list and 305(b) report. There is a set of eight narrative or general criteria for Missouri that must be met in all waters of the state. These criteria can be found in Appendix B.

Sinking Creek has beneficial uses as designated in the water quality standards established by the Missouri Clean Water Commission. The designated uses for Sinking Creek include livestock and wildlife watering (LWW), protection of aquatic life (AQL), cool water fishery (CLF), and whole body contact (WBC) category A. This category applies to waters that have been established by the property owner as public swimming areas welcoming access by the public for swimming purposes and waters with documented existing whole body contact recreational use(s) by the public. None of the impacts from construction, operation or maintenance of the bridge are expected to affect any of the designated uses for Sinking Creek. Other than the beneficial uses designated by MDNR, Sinking Creek is not afforded any other special protections.

MoDOT's Storm Water Pollution Prevention Plan (SWPPP) shall be implemented to prevent or minimize adverse impacts to stream, water courses, lakes, ponds, or other impoundments within and adjacent to the project area. This plan, which is updated regularly (most recently August 2014), describes best management practices and procedures designed to reduce suspended soils, turbidity, and downstream sedimentation that may degrade water quality and adversely impact aquatic life. The plan provides for temporary erosion control measures that will be included within construction contract specifications.

Potential water quality impacts from the alternatives are associated with constructing, operating, and maintaining a new bridge. Impacts to water quality will be similar for all of the build alternatives. Short-term impacts to water quality are associated with the construction phase of the project from erosion, siltation, and an increase in contaminants during construction. Best management practices (BMPs) will be implemented to minimize sediment and erosion. The project will be subject to the National Pollution Discharge Elimination System (NPDES) requirements of the CWA. None of the alternatives considered are located in MoDOT's Municipal Separate Storm Sewer System (MS4) areas, therefore, MS4 requirements do not apply.

Noise

The primary sources of highway traffic noise are the tire-pavement interface, engine noise and exhaust noise. In very general terms, the lower threshold of highway noise impact is roughly the point at which interference with normal human speech is appreciable. For the purpose of noise analysis, the FHWA noise policy divides projects into three types: Type I, Type II, and Type III.

The Preferred Alternative does not involve the physical alteration of the existing highway, one of the criteria for a project to be classified as a Type 1 project. The design of the replacing the bridge will not cause substantial changes to the horizontal or vertical alignment of the bridge or roadway. A substantial horizontal alteration is one that halves the distance between the existing highway and the closest noise sensitive receptor, which in this case, is a campsite adjacent to the project area. There would also not be a substantial vertical alignment change from the existing alignment. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor by removing, shielding, and exposing the receptor's line of sight to the highway. Neither of these conditions will take place with the construction of the Preferred Alternative. The final criteria for a project being Type I is adding through lanes. The proposed project will not add through lanes on Route 19; therefore, the project does not meet any of the criteria for a Type I project.

The bridge replacement would not be a retrofit project otherwise known as a Type II project. A Type II project is a noise abatement project on an existing highway resulting from situations that predate the FHWA noise regulation or adjacent developments that occur after highway construction.

The Preferred Alternative meets the criteria for a Type III project established in 23 CFR 772. Therefore, the project requires no analysis for highway traffic noise impacts. Type II projects do not involve added capacity, construction of new through lanes or auxiliary lanes, changes in horizontal or vertical alignment of the roadway, or exposure of noise sensitive land uses to new or existing highway noise source. MoDOT acknowledges that a noise analysis is required if changes to the proposed project result in reclassification to a Type 1 project.

Floodplains

Floodplains are managed under Executive Order 11988 "Floodplain Management", FHWA policy and procedures in 23 CFR 650, and other federal floodplain management guidelines, which direct agencies to evaluate proposed projects for impacts to floodplain. With Executive Order 11988, the base, or one percent annual chance, flood was adopted as a standard for use by all federal agencies. The base flood is the flood that has a one percent chance of being equaled or exceeded each year. The base flood is commonly labeled as the "one percent flood".

Shannon County does not participate in the National Flood Insurance Program (NFIP); therefore, Flood Hazard Boundary Maps are unavailable for Shannon County. Because Shannon County does not participate in the NFIP, permitting from the State Emergency Management Agency (SEMA) will not be required for the proposed bridge replacement project.

Federal Emergency Management Agency (FEMA) Buyout Lands

The Flood Disaster Protection Act of 1973, as amended by the Disaster Relief and Emergency Assistance Act of the 1988 (The Stafford Act), identified the use of disaster relief funds under Section 404 for the Hazard Mitigation Grant Program (HMGP), including the acquisition and relocation of flood damaged property. The Volkmer Bill further expanded the use of HMGP funds under Section 404 to "buyout" flood damaged property, which had been affected by the Great Flood of 1993.

There are numerous restrictions on these FEMA buyout properties. No structures or improvements may be erected on these properties unless they are open on all sides. The site shall be used only for open space purposes, and shall stay in public ownership. These conditions and restrictions (among others), along with the right to enforce same, are deemed to be covenants running with the land in perpetuity and are binding on subsequent successors, grantees, or assigns. Any decision involving these properties should take into consideration that 2-3 years is necessary to process an exemption from FEMA to utilize them. This exemption would likely be a permanent easement rather than a transfer of property.

According to the TMS FEMA Buyout Layer, that there are no FEMA/SEMA buyouts within the project limits.

Public Lands

Section 4(f) is part of the Department of Transportation (DOT) Act of 1966 that was designed to preserve the natural beauty of the countryside, public park and recreation lands, wildlife and waterfowl refuges, and historic sites. To be considered Section 4(f) eligible, the property must be publicly owned, except for historic sites, which can be either publicly or privately owned. Section 4(f) eligible sites cannot be impacted by federally funded actions unless there is no reasonable and prudent alternative. Section 4(f) protected properties in the project vicinity include: the Sinking Creek Backcountry Campground (owned by the National Parks Service), and the newly developed Echo Bluffs State Park (owned by MDNR). The Sinking Creek Backcountry Campground offers river access, restrooms, and campsites with picnic tables and fire rings. Echo Bluffs State Park offers rustic campsites, full service campsites, and also a lodge. Other than camping, the park also offers floating, hiking, swimming, and fishing. See Figure 10 for the location of the properties in relation to the project.

Alternative 1 requires the existing Sinking Creek Bridge to be replaced in its current location with a new two-lane bridge. This alternative would construct approximately 400 feet of new roadway north and south of the new bridge to tie in each bridge end to the existing roadway and allows the temporary bridge to be used to carry traffic while construction is being performed. This alternative has the least amount of impacts to the surrounding natural resources of any of the build alternatives. It also allows for the old roadway to be used as a contractor staging area since traffic would continue to use the temporary bridge during construction.

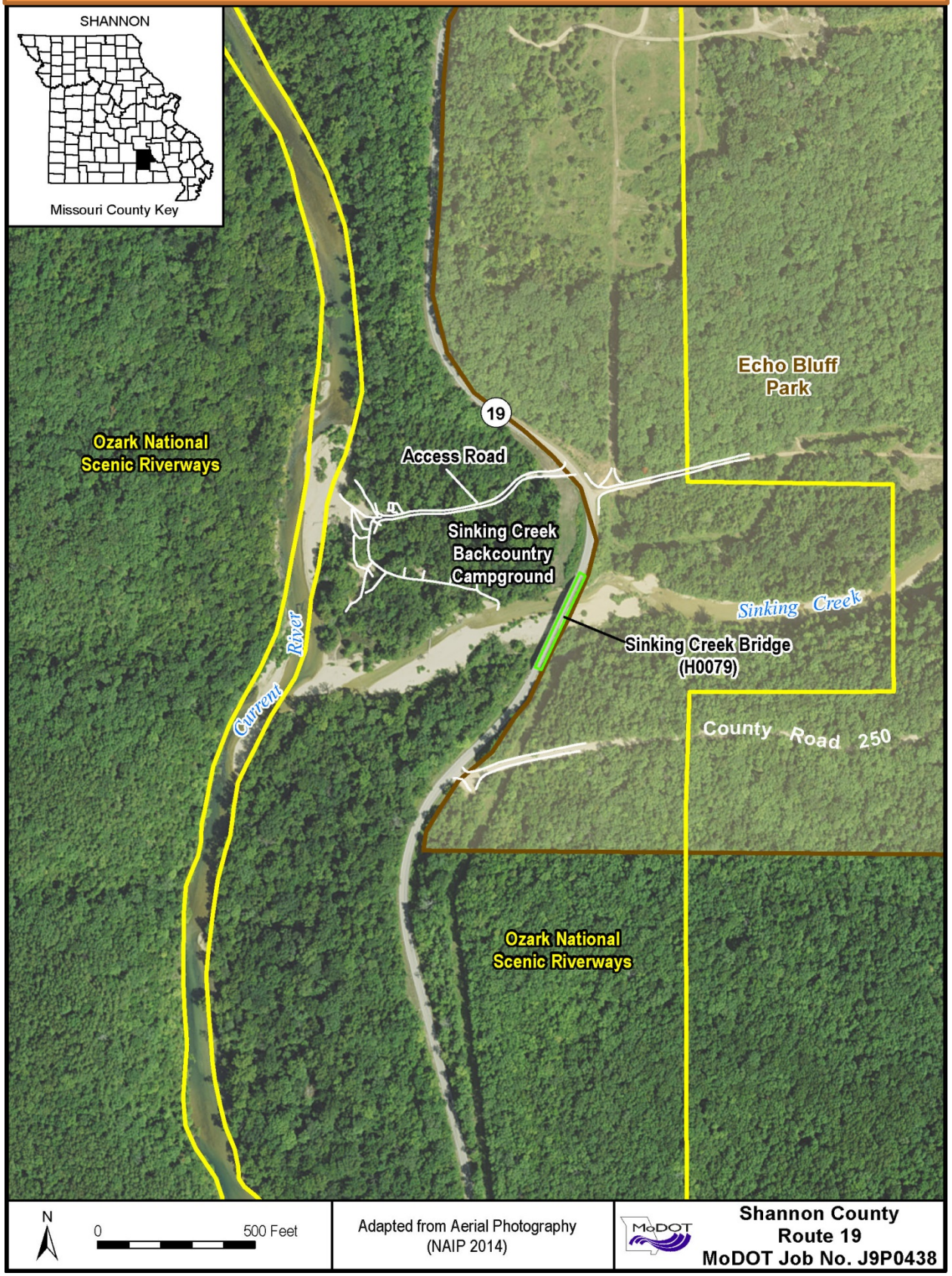
For this alternative, it is anticipated that a *de minimis* determination will be made for the impacts to the Sinking Creek Backcountry Campground. No new right of way will be required and this alternative would cause only minimal disruption (two week closure) while the roadway and campground access are tied together. Of the four potential alternatives, this alternative, along with Alternative 1a, will have the least amount of impacts to the campground and ONSR properties.

Alternative 1a would rehabilitate and widen the existing bridge by removing the floor system, spandrel bents and columns. A new deck, pre-stressed concrete girders and column bents, would be installed. The existing spandrel arch ribs and column footings would remain in place. With this proposed alternative, the spandrel arch ribs would no longer contribute to the structural capacity of the bridge. Traffic would remain on the temporary bridge during construction.

As with alternative 1, it is anticipated that a *de minimis* determination will be made for Alternative 1a for the impacts to the Sinking Creek Backcountry Campground. No new right of way will be required and this alternative would cause only a very minimal disruption to accessing the campground while the new bridge and roadway are tied together. Out of the four potential alternatives, this alternative, along with Alternative 1, will have the fewest impacts to the campground and Ozark National Scenic Riverways (ONSR) properties.

Alternative 2 constructs approximately 1,400 feet of new roadway and requires constructing a new bridge that would replace the existing temporary Sinking Creek Bridge on the same alignment. It would raise the vertical alignment of the new bridge higher than the temporary bridge and traffic would need to be temporarily rerouted (See page 14). This alternative would also result in a temporary closure of CR-19-250 and an unnamed gravel road when the new alignment is tied into the existing roadway. These roads are secondary entrances into the newly established Echo Bluffs State Park. The main entrance will not be impacted by any of the proposed alternatives.

Figure 10: Public Lands Surrounding the Project Area



It is anticipated that a *de minimis* determination will be made for Alternative 2 for the impacts to the Sinking Creek Backcountry Campground and ONSR property. This alternative would require the purchase of 2.1 acres of new right of way from ONSR in order to construct the bridge on the new alignment. This alternative would be the second least impactful to ONSR properties and would have the similar impacts to the campground as Alternatives 1 and 1a.

Alternative 3 constructs approximately 2,400 feet of new roadway and constructs a new bridge just downstream of Alternative 2. The temporary bridge would be used to carry traffic while construction is being performed. The elevation of Route 19 as it crosses the side road that serves as access to Current River and camping area is 20 to 25 feet higher than the existing access road. This will result in a new access road connection that will be much steeper than existing and impact a wide area of forested land. The steeper roadway would be much more difficult to negotiate than the existing. This alternative would also result in a temporary closure of CR-19-250 and an unnamed gravel road when the new alignment is tied into the existing roadway. These roads are secondary entrances into the newly established Echo Bluffs State Park. The main entrance will not be impacted by any of the proposed alternatives.

It is anticipated that a *de minimis* determination will be made for Alternative 3 for the impacts to the Sinking Creek Backcountry Campground and ONSR property. This alternative would require the purchase of 3.93 acres of new right of way from ONSR in order to construct the bridge on the new alignment. This alternative would have the most impact to ONSR properties and would place the new structure closest to the existing campsites.

A review of the project impacts and proposed construction show that the net impact to the use of the Sinking Creek Backcountry Campground will not be adverse and all measures to minimize harm have been considered. Based on this assessment, the determination of impacts to the property would be classified as *de minimis*.

A letter was sent to ONSR (the owner with jurisdiction over the 4(f) property) on April 13, 2016 for their concurrence in MoDOT's evaluation that the proposed project impacts to the ONSR property would not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection. Concurrence was received back from ONSR on April 25, 2016 that they agreed with MoDOT's evaluation. This letter can be found in Appendix C as part of the Section 4(f) document.

Section 6(f) is part of the Land and Water Conservation Fund (LWCF) Act, which was designed to provide restrictions for public recreation facilities funded with LWCF money. The LWCF Act provides restrictions for public recreation facilities that could include community, county, and state parks, trails, fairgrounds, conservation areas, boat ramps, shooting ranges, etc. Facilities that are LWCF-assisted must be maintained for outdoor recreation in perpetuity and therefore require mitigation that includes replacement land of at least equal value. No LWCF money was used to purchase or improve the subject area; therefore, Section 6(f) does not apply.

Cultural Resources

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their projects on historic properties prior to the commitment of federal funds, and to consult with parties that have an interest in those historic properties. FHWA and MODOT use the Section 106 identification, evaluation, and resolution processes to comply with the National Environmental Policy Act (NEPA). Section 106 also requires consultation with the State Historic Preservation Office (SHPO), tribes, local governments, and other interested parties (the consultation process is summarized in the Information to Accompany the Programmatic Agreement in Appendix C).

Architecture and Bridges

In 1999, as a result of a large study of resources associated with Route 19 in Shannon County and Route 17 in Texas County, a potential historic district was identified by the SHPO. The district encompasses the Sinking Creek, Current River, and Spring Valley Bridges on Route 19, the highway connecting the bridges and the views from the highway and the Current River as contributing elements. The views from the highway range from being restricted by adjacent rock cuts to outlooks of hollows, streams, the Current River, and Round Springs. These changing vistas show how the road was engineered to fit into the landscape in the 1920s and take advantage of the terrain. The district is eligible for listing on the National Register of Historic Places (NHRP) under criterion A* and C* for significance in transportation, engineering, and recreation. It will be referred to in the narrative below as the landscape.

NRHP Criterion

***A**: Be associated with events that have made a significant contribution to broad patterns in American history; or*

***B**: Be associated with the lives of persons significant in our past; or*

***C**: Embody the distinctive characteristics of a type of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*

***D**: Have yielded, or may be likely to yield, information important in American history or prehistory.*

In November 2015, MoDOT Historic Preservation staff surveyed the historic district to determine appropriate boundaries. These boundaries were refined during consultation with the SHPO and other consulting parties. The boundaries reflect the views from Route 19 and the Current River from just north of the Sinking Creek Bridge to just south of the Spring Valley Bridge. These boundaries can be found in Appendix C

In addition to being a contributing element of the historic district, the Sinking Creek Bridge, H0079, is individually eligible for the NRHP under criterion C for significance in engineering. The bridge was constructed in 1925-1926 and consists of three 80-foot open-spandrel arch main spans and concrete girder approach spans on each end and has a concrete balustrade. The bridge is significant for engineering as a well-preserved, representative example of open-spandrel concrete arch construction.

The Sinking Creek Bridge was advertised as available for reuse through the consulting parties and according to MoDOT's Historic Bridge Marketing Plan for a period of sixty days. The bridge was marketed through direct mail to local agencies, historical organizations and trail organizations and a flyer on the bridge was distributed through the Missouri Preservation list serve. The bridge was also posted on the MoDOT Free Bridges web page and through the Southeast District social media and a press release about the availability of the bridge was prepared and was carried by local, regional and national news outlets. Missouri State Parks and the Ozark National Scenic Riverways were asked to consider taking the bridge into their systems. Despite the marketing efforts, no proposals for reuse were received. MoDOT will not leave the bridge in place without a new owner or use identified due to liability concerns, because of this, all alternatives except the rehabilitation alternative, assume the removal of the historic bridge.

Alternative 1 would cause the removal of the historic bridge, having an adverse effect on the bridge under Section 106. The removal of the historic bridge, a contributing element of the landscape, would also be an adverse effect on the historic landscape. Since the roadway on a new bridge would need to be about two feet higher, the approach roads would need to be raised to meet the raised profile of the bridge causing slight alterations to the landscape. These alterations to the roadway engineering would be minor.

Alternative 1a would rehabilitate the historic bridge. The rehabilitation would have an adverse effect on the bridge since it would cause the removal of the superstructure and columns of historic bridge, replacing it with concrete girders with the existing concrete arches left in place in non-structural capacity for aesthetic purposes. It has not been determined if the arches would be stable when not carrying a load. The loss of historic material and workmanship by the removal of the superstructure and columns would have an adverse effect on the integrity of the bridge. The rehabilitation alternative would have no adverse effect on the historic landscape since the views from the roadway and bridge would remain largely unchanged. The surrounding landscape and the views from the stream would also remain unchanged by the rehabilitation alternative.

Alternative 2 would have an adverse effect on the historic bridge if the bridge is not saved for pedestrian purposes. The alternative would have an adverse effect on the historic landscape since it would change the alignment of the roadway, therefore changing the engineering of the roadway. It would also introduce non-historic elements into the landscape through the new roadway and bridge and alter the views from the roadway, pulling the roadway away from the rock cuts on the south end of the bridge which would harm the overall integrity of the landscape. If the historic bridge remains in place, a new bridge would be an intrusion into the viewshed from the historic corridor.

Alternative 3 would have an adverse effect on the historic bridge if the bridge is not saved for pedestrian purposes. This alternative would have an adverse effect on the historic landscape since it would change the alignment of the roadway, significantly reducing the curve to the north of Sinking Creek, changing the engineering of the roadway. It would also change the views from the roadway since the view of Sinking Creek and the bridge would be altered, as could the view of the rock cuts to the south of Sinking Creek. It would introduce non-historic elements into the landscape through the introduction of a non-historic bridge and would remove historic landscape features including trees and the rock cut. If the historic bridge remains in place, a new bridge would be an intrusion into the viewshed from this historic corridor.

All three build alternatives would have an adverse effect on the bridge under Section 106 if they include the removal of the bridge. All three build alternatives would have an adverse effect on the historic landscape through the introduction of new design elements, changes in engineering, and changes in the views and vistas from the road. The effects of the various alternatives are summarized in Table 3 below:

Table 3: Effects of Alternatives on Historic Bridge and Landscape

Alternative	Sinking Creek Bridge	Three Bridges Historic District
Alternative 1	Adverse Effect	Adverse Effect
Alternative 2-With removal of historic bridge	Adverse Effect	Adverse Effect
Alternative 2-Without removal of historic bridge	No Adverse Effect	Adverse Effect
Alternative 3-With removal of historic bridge	Adverse Effect	Adverse Effect
Alternative 3-Without removal of historic bridge	No Adverse Effect	Adverse Effect

The adverse effect on the historic landscape could be minimized through the design of the new bridge. Consultation to develop a Programmatic Agreement, in which the consultation process for future projects involving the Three Bridges Historic District and specific mitigation measures for the Sinking Creek Bridge project, is ongoing and will be completed prior to the conclusion of the NEPA process.

If a project has an adverse effect under Section 106 on a historic property it is considered a "use" of the historic property under Section 4(f) of the Department of Transportation Act. The use of the Three Bridges Historic District and the Sinking Creek Bridge require the consideration of alternatives that will not use these historic properties, and for FHWA and MoDOT to show that there are no feasible and prudent alternatives to the use.

Archaeological Resources

An archaeological survey of the area of potential effect (APE) for the proposed Sinking Creek Bridge replacement project (Alternatives 1, 1a, 2, and 3) was conducted under an Archaeological Resources Protection Act (ARPA) permit issued to MoDOT by the National Parks Service (NPS). That survey resulted in the identification of two archaeological sites, one on the north side of Sinking Creek (23SH97) and another on the south side of Sinking Creek (23SH1566). These sites include multiple prehistoric and historic components. Both sites extend well beyond the proposed project area on both the east and west sides of Route 19.

The eligibility of these sites for listing on the NHRP remains uncertain. The archeological survey indicates that both sites include diagnostic artifacts and areas of apparently intact cultural deposits sufficient to conclude that they may be eligible for the NRHP under criterion D, potential to include significant archaeological data. There is currently no evidence that either site includes burials or human remains, funerary objects, sacred objects, or objects of cultural patrimony. Should either of both of these sites be affected by the proposed undertaking, it appears reasonable to assume that adverse effects could be minimized and satisfactorily mitigated through a program of archaeological data recovery.

Alternative 1

The portion of site 23SH97 within the existing highway right of way and recently acquired temporary easement at Sinking Creek that would be affected by removal of the existing bridge and construction of a new bridge on existing alignment (Alternative 1) has been thoroughly disturbed by borrow and grading activities during previous episodes of highway and bridge construction. In the 1920's, fill material used to construct the northern roadway approach to the bridge was obtained by borrowing material from the right of way. Original 1920's highway plans indicate borrow areas were located within the right of way on both the east and west sides of Route 19 north of Sinking Creek at site 23SH97. Additional impacts may have occurred during widening and paving of the highway in the early 1940's. As a result of those activities, the portion of site 23SH97 within the existing right of way was removed and/or heavily disturbed and the part of the site within the right of way no longer retains integrity. It is MoDOT's assessment that any future construction activities, if confined to the previously disturbed existing right of way and easements on the north side of Sinking Creek, would not result in any adverse effects to site 23SH97. Should Alternative 1 be selected as the preferred alternative, no additional archaeological work would be necessary at site 23SH97.

On the south side of Sinking Creek, the portions of site 23SH1566 between the west edge of the existing right of way and the powerline corridor east of the highway lack integrity. The portion of site 23SH1566 that was once in the right of way was removed or disturbed by original construction of the road in the 1920's and widening in the 1940's. On the slope above the road cut, a thin veneer of soil overlies bedrock and there does not appear to be any potential there for intact cultural deposits or features. Alternative 1 could be constructed within that area without adversely affecting site 23SH1566, provided that ground disturbing activities are limited to the east side of the highway and previously disturbed portions of the existing right of way and easements. Portions of site 23SH1566 within the recently acquired temporary bridge easement on the west side of the highway, above the road cut, appear to retain some integrity. West of the road cut, between the top edge of the cut and the tree line, soil is thicker and bedrock is deeper that on the east side of the road such that intact archaeological features could potentially exist. Should construction of Alternative 1 require ground disturbance on the west side of the southern roadway approach to the temporary bridge south of Sinking Creek, further archaeological test excavations would be required to evaluate those effects. Any impacts to archaeological resources will be handled according to stipulation 5 of the Programmatic Agreement among the FHWA, SHPO, Missouri Highway and Transportation Commission for mitigation of adverse effects to the Three Bridges Historic District.

Alternative 1a

Alternative 1a is virtually identical to Alternative 1 and could be accomplished within the existing right of way and the previously disturbed portions of the adjacent temporary bridge easement and would therefore not result in any impacts to site 23SH97. A portion of site 23SH1566 within the temporary easement west of the road cut that was expanded for the temporary bridge might be subject to use during the construction of Alternative 1a. Any impacts to archaeological resources will be handled according to stipulation 5 of the Programmatic Agreement among the FHWA, SHPO, Missouri Highway and Transportation Commission for mitigation of adverse effects to the Three Bridges Historic District.

Alternative 2

On the north side of Sinking Creek, construction of a new bridge on Alternative 2 immediately downstream from the existing bridge within the existing right of way and easements would be possible without adversely affecting site 23SH97. That part of site 23SH97 has been thoroughly disturbed by borrow and grading activities associated with previous road and bridge construction in the 1920s and 1940s as described above in Alternative 1.

On the south side of Sinking Creek, MoDOT believes that portions of site 23SH1566 located along the west edge of the temporary bridge easement have not been disturbed by previous construction activities and could retain some intact cultural deposits. MoDOT believes that there may be areas of the site not completely disturbed by previous construction activities. Avoiding ground disturbance to that part of site 23SH1566 during construction of a permanent bridge on Alternative 2 would likely be difficult or impractical. Should Alternative 2 be selected and avoidance of the site proves impractical, archaeological testing would be necessary to evaluate possible adverse effects. Any impacts to archaeological resources will be handled according to stipulation 5 of the Programmatic Agreement among the FHWA, SHPO, Missouri Highway and Transportation Commission for mitigation of adverse effects to the Three Bridges Historic District.

Alternative 3
Construction of Alternative 3 on new right of way west of the existing alignment would require clearing, grubbing, grading, and other ground disturbing activities within parts of sites 23SH97 and 23SH1566 that may include intact archaeological deposits. If Alternative 3 is selected as the preferred alternative, archaeological testing of the affected portions of both sites would be necessary to evaluate their eligibility for inclusion on the NRHP and to assess the project effects. Any impacts to archaeological resources will be handled according to stipulation 5 of the Programmatic Agreement among the FHWA, SHPO, Missouri Highway and Transportation Commission for mitigation of adverse effects to the Three Bridges Historic District.

Table 4: Archaeological Site Impacts and Testing Recommendations

Site	Alternative 1	Alternative 1a	Alternative 2	Alternative 3
23SH93	No Impacts-No Testing	No Impacts-No Testing	Limited Site Testing	Testing/Data Recovery
23SH1566	No Impacts-No Testing	No Impacts-No Testing	Limited Site Testing	Testing/Data Recovery

A report documenting MoDOT's archaeological survey of the area of potential effect (APE) for the Sinking Creek Bridge project has been submitted to and reviewed by the Missouri SHPO. In a letter dated June 20, 2016 in response to that report, the SHPO concluded that the survey was thorough and adequate. Written concurrence was provided by the SHPO with the report's recommendations, which are summarized in Table 4.

Any additional archaeological work that may be necessary in relation to construction of the new Sinking Creek Bridge will be conducted under the terms of a Programmatic Agreement among the FHWA, SHPO, and the Missouri Highway and Transportation Commission for mitigation of adverse effects to the Three Bridges Historic District (See Appendix C).

Threatened and Endangered Species and Protected Resources

An official species list was obtained for the current project using United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation Webtool (IPaC) on March 1, 2016 (Consultation Code: 03E14000-2016-SLI-0993 See Appendix D). The following species list was generated:

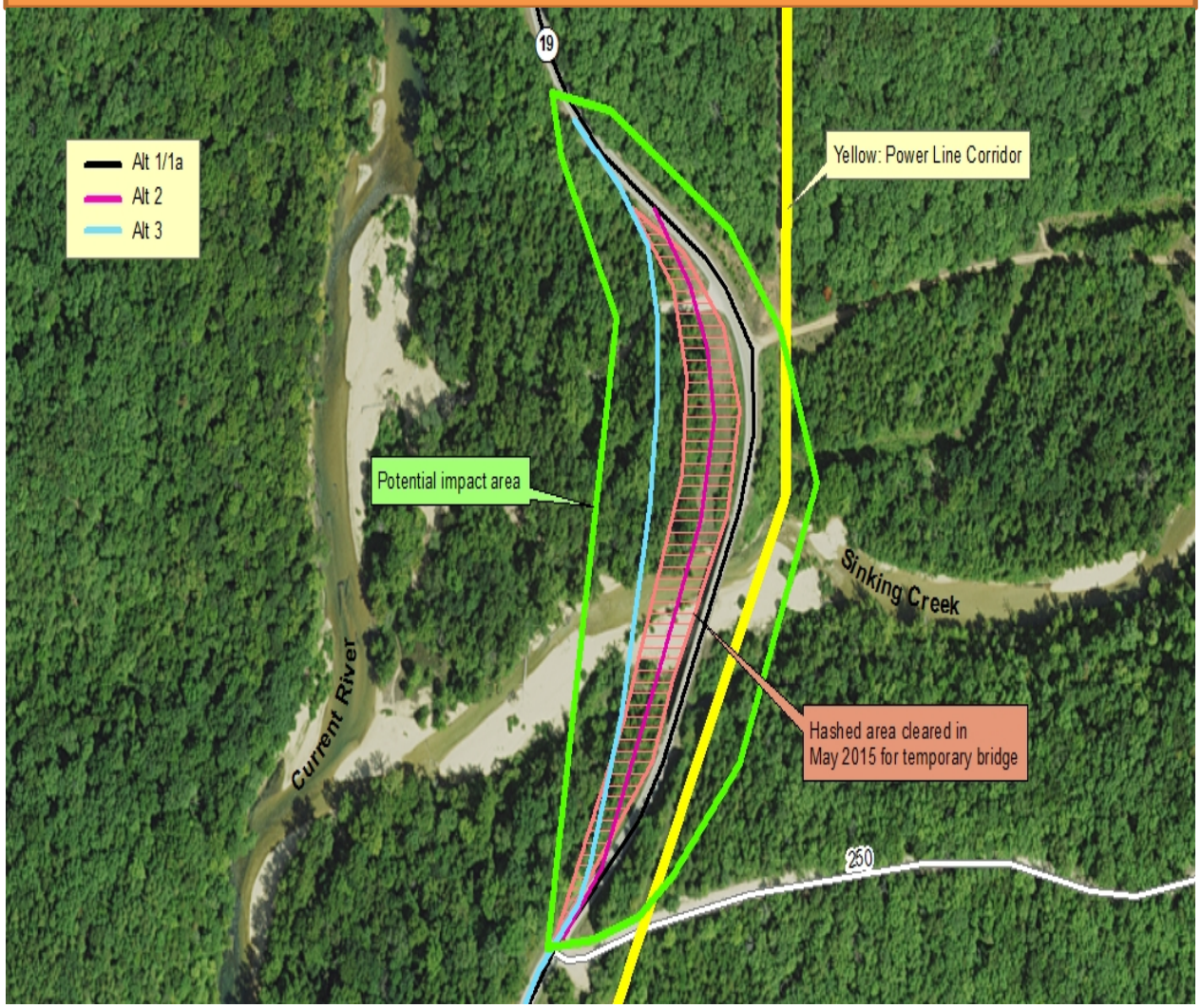
- Red-cockaded Woodpecker (*Picoides borealis*)
- Virginia sneezeweed (*Helenium virginicum*),
- Hine's emerald dragonfly (*Somatochlora hineana*)
- Gray, Indiana, and northern long-eared bats (*Myotis grisescens*, *Myotis sodalis*, *Myotis septentrionalis*)
- Ozark hellbender (*Cryptobranchus alleganiensis bishopi*)

Acting as the designated non-federal representative of FHWA, MoDOT has determined that this project will have No Effect on Red-cockaded Woodpecker, Virginia sneezeweed, or Hine's emerald dragonfly nor any federally designated critical habitat. This project May Affect, but is Not Likely to Adversely Affect the gray bats, Indiana bats, northern long-eared bats, or Ozark hellbender. MoDOT, acting as the designated non-federal representative for FHWA, will submit informal consultation documentation to the USFWS and anticipates concurrence and anticipates concurrence with this effect determination.

Construction Footprint and Disturbance Limits

The existing Route 19 Bridge and a temporary bridge cross Sinking Creek approximately 800 feet upstream of the Current River. The alternatives being considered are in a fairly narrow corridor between the right-of-way boundary east of the bridge to approximately 300 feet west of existing Route 19 (Figure 11). The total project review area is 10.5 acres.

Figure 11: Potential Impact Area Surveyed



In May 2015, an emergency construction project was completed to erect a temporary bridge crossing just west within 100 feet of the existing Route 19 Bridge at Sinking Creek. Approximately 0.75 acres of forest was cleared to realign a portion of the road, place fill, and construct a bridge on temporary piers. Of the remaining potential impact area, a little over 4.25 acres are treeless being either part of the stream, existing power line corridor, road corridor, or side roads. Depending on the alternative chosen, between zero (Alternative 2-temporary bridge) and 2.8 (Alternative 3-west) acres of trees could be removed (1.7 acres for Alt 1-existing).

Natural Resource Review

The general project area was screened for federally protected species concerns in March 2016, April 2015, and September 2014. The same list of threatened and endangered species was generated using IPaC for the FHWA/MoDOT temporary bridge project in April 2015. The footprint of the temporary bridge project is completely encompassed within the current project's limits and the species impact assessments are very similar. In late 2014, MoDOT assisted the FHWA in completing USFWS Section 7 Endangered Species Act (ESA) Consultation for the Echo Bluff State Park (formerly called Camp Zoe) development project, which lies east of the Route 19 Sinking Creek Bridge. Except for Red-cockaded Woodpecker, the same list was provided in a technical assistance letter from USFWS to consultants for the Missouri Office of Administration (OA) and Missouri Department of Natural Resources-State Parks (MDNRSP) in September 2014 (See Appendix D). Though the project limits for that development are completely separate from the current bridge replacement project, bat surveys provided pertinent information in completing the temporary bridge USFWS Section 7 consultation and will be used to assess impacts for this project. The OA and the MDNRSP maintain the documentation for the Camp Zoe Bat Survey Report from 2014 and the technical assistance letter from USFWS from 2014.

Previous Survey Information and Site Assessments

MoDOT conducted initial environmental scoping site visits for the replacement of the existing Route 19 Sinking Creek Bridge between March 2012 and September 2014. MoDOT, FHWA, and ONSR personnel held a joint NEPA scoping meeting in December 2013. Coordination began at that time between ONSR and MoDOT environmental specialists regarding the assessments needed for bats and hellbender considerations during the NEPA process.

FHWA took the lead for the primary access road construction and site distance improvements on Route 19 for the Echo Bluff State Park development project east of the current project area along Sinking Creek. A MoDOT Environmental Specialist worked closely with consultants for the OA, MDNRSP, and USFWS in October and November 2014 to complete the consultation document. That project is under construction east of the Route 19 Sinking Creek Bridge location.

MoDOT reviewed the cave survey data and bat survey information from summer 2014 for the state park project and wrote sections of the USFWS Section 7 consultation document. All information from those field studies and assessments are pertinent to this bridge replacement project as well since the surveys are fairly recent and the information is still current for this analysis. MoDOT began the informal consultation process for the proposed project through discussions and coordination with USFWS in 2014. This process has continued through the development and completion of the temporary bridge construction in 2015 and the development of this EA for the permanent bridge replacement project.

Multiple site visits and habitat surveys were conducted by MoDOT, USFWS, and Missouri Department of Conservation (MDC) personnel in April 2015 for the temporary bridge construction area which also includes the current proposed project area. An on-site stakeholders meeting, involving five natural resource agencies, MoDOT, FHWA, and the construction contractor was held and all impacts to the natural environment were discussed and finalized. MoDOT and USFWS conducted a habitat assessment of forested areas for potentially suitable bat roost habitat for Indiana and northern long-eared bats and stream survey for suitable Ozark hellbender habitat in Sinking Creek to the confluence with the Current River on April 14, 2015. MDC conducted an Ozark hellbender survey in suitable habitat downstream of the confluence of Sinking Creek April 23, 2015, repeating a survey from the previous year. No hellbenders were observed in either year.

No Effect Determinations

The Red-cockaded Woodpecker is only known from few isolated populations in remnant habitat in the southeastern United States. The April 20, 2015 Section 7 Consultation concurrence letter from USFWS confirmed that this species is considered extirpated from the state of Missouri. There is no suitable habitat in the project area and there will be **No Effect on Red-cockaded Woodpeckers from this project.**

Virginia sneezeweed is a plant of wet prairies and wet ditches in southwest and south central Missouri. There is no pond edge or suitable wet ditch habitat for Virginia sneezeweed. The Hine's emerald dragonfly lives in calcareous spring-fed marshes and sedge meadows overlaying dolomite bedrock. In Missouri, many Ozark fens provide suitable habitat. There is no known Ozark fen habitat in the project area for Hine's emerald dragonfly. There were no critical habitat resources identified in the project area. MoDOT and FHWA have determined that this project will have **No Effect on Virginia sneezeweed, or Hine's emerald dragonfly, or any critical habitat resources**.

May Affect Determinations
Review of MDC Heritage database (March 2016 version) and the Missouri Speleological Survey cave database (current to 2015) indicate several known bat and cave resources within a few miles of the project area. There is a known gray bat and Indiana bat hibernaculum within one mile of the project area. There is a known cave entrance north of the project area, within 1,000 feet, but no known federally protected resources from that location. There are no known sinkholes evident in the project impact area. There will be no impacts to caves from any of the temporary or permanent construction elements for the removal of the temporary bridge or any replacement of the existing Route 19 Sinking Creek Bridge alternatives; therefore impacts to winter habitat for federally protected bats are not anticipated.

Gray bats are cave obligate species which congregate in maternity or bachelor colonies in the summer, and mixed colonies during winter hibernation, utilizing mainly stream corridors for foraging spring through fall. The results of a bat survey conducted for the Echo Bluff State Park development project east of this bridge project area in summer 2014 was provided to USFWS as part of Section 7 consultation in November 2014 by FHWA. There were several mist net locations sampled and multiple acoustic monitoring sites through-out the Echo Bluff State Park project area, all within approximately one mile of the current proposed project. Gray bats were captured in abundance, likely tied to the Sinking Creek corridor as travel and foraging habitat. The removal of up to 4.5 acres of forest will have a negligible effect on the amount of riparian corridor along Sinking Creek providing cover and diverse aquatic insect habitat for gray bat travel corridors and foraging. Gray bats have been known to utilize manmade structures such as concrete bridges for habitat during summer breeding season as temporary roosting sites. There is no evidence of bat use of the existing concrete structure of the Route 19 Sinking Creek Bridge.

This project is situated in the heavily forested ONSR on Sinking Creek, a major tributary to the Current River. Indiana bats can occur in forested areas of the state where they may utilize suitable summer roost trees with exfoliating bark. Summer habitat for the threatened northern long-eared bat overlaps greatly with Indiana bat habitat and includes additional habitat use of trees with splits, crevices, hollow sections, and other damage. A MoDOT Environmental Specialist conducted a site habitat assessment in April 2015 with USFWS personnel in the area of the temporary bridge location (see Figure 10) and in March 2016 in the broader area covering all viable alternatives for the Route 19 Bridge replacement project. There are a few examples of suitable summer roost habitat for Indiana bats and northern long-eared bats in the project limits that could be removed. MoDOT will only remove suitable bat habitat trees outside the breeding season, or between November 1 and March 31.

From the summer 2014 bat survey on the Echo Bluff State Park project area, there are known maternity trees for northern long-eared bats within 0.75 miles of the current project location. There was a summer capture of an Indiana bat within 1.0 mile as well. Data from the 2014 Bat Survey Report for Camp Zoe acoustic survey (using ultrasonic detectors to survey for a spectrum of bat species) indicated that all three federally protected bat species are using Echo Bluff State Park Development area, including detections in or near a power line to the south and east of the existing Route 19 Bridge (H0079) within 0.5 mile of the current bridge replacement project (see Figure 11).

On the behalf of FHWA, MoDOT conducted Section 7 Endangered Species consultation with the Columbia Missouri Ecological Services Office of the USFWS for clearing mature trees representing potentially suitable bat roost habitat in the area of the Shannon County Route 19 temporary bridge project in spring 2015. MoDOT committed to conducting a breeding season visual observation bat tree emergence survey and acoustic survey for presence/probable absence for roosting bats in the project area. USFWS returned concurrence for Not Likely to Adversely Affect determinations for the three listed bat species on April 20, 2015. These surveys were completed detecting no bat species of concern acoustically, and bats were not observed using suitable roost trees leading to the removal of those trees within 24 hours of the survey. The survey was conducted April 22, 2015, and trees removed in the project area April 23, 2015. The current project limits are not substantially different from the previously surveyed limits from 2014 and 2015. This survey, evaluation of impacts, and determination are still valid as of the writing of this document in April 2016.

In consideration of the range of alternatives for the proposed project, tree removal for this project could take place in the southeast quadrant of the existing Sinking Creek Bridge between Route 19 and the limits of the MoDOT right of way beyond the power line corridor to the east (Alternatives 1, 2, 3) and within approximately 300 feet of the edge of existing Route 19 to the west of the bridge (Alternatives 2, 3). This presents a total impact area of approximately 4.5 acres of trees. Even if all of the 4.5 acres of trees in the project area are removed, additional similar habitat will remain in the surrounding area. There will not be a significant impact to the integrity of the existing riparian corridor.

Given the small amount of available habitat scattered throughout the project area, the proximity to a cleared existing road corridor, the low number of maximum acreage of tree removal, and the conservation measure to only remove suitable bat roost trees between November 1 and March 31, MoDOT has determined that this project **May Affect, but is Not Likely to Adversely Affect the federally endangered gray bat or Indiana bat or the federally threatened northern long-eared bat**. MoDOT, acting as the designated non-federal representative for FHWA, will submit informal consultation documentation to the USFWS and anticipates concurrence prior to publishing the finding of no significant impact (FONSI) for this project.

The project location is approximately 600-800 feet above the confluence with the Current River, which supports the federally endangered Ozark hellbender, a large aquatic salamander that inhabits the Ozark Highlands. Hellbenders live in large permanent streams and rivers and need clean, clear and cool rivers to survive. This species can be negatively affected by sedimentation and direct disturbance of suitable rock cover used for sheltering under. There is known potential habitat in the Current River within one mile of the proposed project area on Sinking Creek. On April 14, 2015 MoDOT and USFWS personnel surveyed from just above the existing Route 19 Bridge to the mouth of Sinking Creek for potential suitable hellbender habitat. From the project location, on the west side of the existing bridge, downstream to the Current River there is no suitable habitat for the Ozark hellbender. There is one possible patch of useable (though not ideal) habitat on the upstream side of the existing bridge, consisting of large diameter rip rap, from the original bridge abutment that has overtime tumbled into Sinking Creek. Sedimentation could occur in varying degrees depending on temporary construction impacts for Alternatives 1, 2, or 3. Even Alternative 1a would involve the removal of the temporary piers for the temporary bridge alignment.

Regardless of the method of bridge and pier removal, temporary construction elements placement and removal, and construction of new piers and bank stabilization these impacts can be minimized in size and duration. At this time, MoDOT has determined that this project **May Affect, but is Not Likely to Adversely Affect the federally endangered Ozark hellbender**. MoDOT, acting as the designated non-federal representative for FHWA, will submit informal consultation documentation to the USFWS and anticipates concurrence on the effect determination.

On the behalf of FHWA, MoDOT conducted Section 7 Endangered Species consultation with the Columbia Missouri Ecological Services Office of the USFWS in April 2015 for the construction of the temporary bridge. No hellbenders were observed during the habitat assessment in Sinking Creek for the temporary bridge construction in April 2015. A hellbender survey of the suitable habitat on the Current River was conducted in Spring 2014 and April 2015 by the Missouri Department of Conservation and no hellbenders were found. USFWS returned concurrence for a Not Likely to Adversely Affect determination for Ozark Hellbenders on April 20, 2015. The current project limits are not substantially different from the previously surveyed limits from 2014 and 2015. These surveys, evaluation of impacts, and determination are all still valid as of the writing of this document in April 2016.

Hazardous Waste

A records review was conducted for the project area for potential hazardous and solid waste concerns. The following sources were searched : Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS); National Response Center Hotline data base; Missouri Department of Natural Resources (DNR) Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri; DNR Missouri Hazardous Waste Treatment, Storage, and Disposal Facilities List; DNR Solid Waste Facilities List; DNR Underground Storage Tank (UST) database; Center for Agricultural, Resource and Environmental Systems; Google Earth and Missouri Petroleum Storage Tank Insurance Fund database.

Based on the sources reviewed, no sites were found within the project area. The potential to encounter wastes from sites unknown to MoDOT should always be a consideration. Any previously unknown sites that are found during project construction will be handled in accordance with Federal and State Laws and Regulations.

If an alternative is chosen that would result in the removal of the existing bridge, evaluation of the potential presence of asbestos containing materials prior to demolition would be required. These materials, depending on their condition and quantity, would need to be removed and disposed according to current regulations and MoDOT procedures.

MoDOT will ensure that all structures scheduled for demolition are inspected for asbestos and lead based paint. MoDOT and the contractor shall submit all required demolition notices, abatements notices, and project notifications to MDNR as required by regulation prior to beginning demolition activities. Asbestos containing material and demolition debris shall be disposed according to state and federal regulations. The reports of these inspections for asbestos and the presence of lead-based paint will be included in the construction bid proposal.

If regulated solid or hazardous wastes are found during construction activities, the MoDOT construction inspector will direct the contractor to cease work at the suspect site. The construction inspector will contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office, and the contractor will develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical and remediation services will be contracted if necessary. The Missouri Department of Natural Resources and U.S. Environmental Protection Agency will be contacted for coordination and approval of required activities.

Indirect and Cumulative Impacts

Indirect and cumulative impacts can be positive or negative depending on the environmental impact of the resource being evaluated. Indirect impacts are defined as: impacts that are caused by the project and are later in time or farther removed in distance than direct impacts, but are still "reasonably foreseeable." Examples of indirect impacts include: induced growth due to changes in land use, and impacts on the environmental resources that occur as a result of the project's influence on land use.

The proposed project does not introduce a new transportation facility or corridor into the region, and will not provide any new access. Local suppliers of materials that are used in the construction industry may see an increase of sales from contractors using local sources for their materials needed to construct the bridge and roadway.

Overall, no significant negative indirect impacts are anticipated as a result of the implementation of the proposed project.

Cumulative impacts are defined as: impacts on the environment resulting from the incremental impact of the project when added to other past, present, and reasonably foreseeable future projects regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Replacing the Sinking Creek Bridge could have cumulative impacts on the Three Bridges Historic District and on the Ozark National Scenic Riverways, if the Current River and Spring Valley Bridges are replaced. These bridges enhance the scenic qualities of the Riverway and Route 19. Cumulative bridge replacements could diminish those scenic qualities.

Placing new bridge piers in the river could contribute to cumulative negative effect on the habitat of some species of fish that live in Sinking Creek; however, these effects are anticipated to be minimal. The removal of mature trees in the project area could also contribute to cumulative negative effects on the habitat of some species of bats that live in the vicinity of Sinking Creek, these effects are also expected to be minimal. Construction of a bridge at the newly developed Echo Bluffs State Park resulted in similar impacts to mature trees, Sinking Creek, and associated terrestrial and aquatic habitat. In addition Echo Bluffs State park is anticipated to increase tourism traffic on Route 19 in the project vicinity.

MoDOT's Pollution Prevention Plans describes erosion control practices that will be implemented for the project to minimize potential impacts. Because of the measures that will be implemented to minimize these impacts, it is not anticipated that the implementation of the project will have significant negative impacts to the area surrounding the project area.

Construction Impacts

During construction of any of the alternatives there will be some short-term impacts to the public and environment due to noise, dust, and pollutants discharged by construction equipment. Route 19 will remain open to traffic throughout the project duration for Alternatives 1, 1a, and 3. Alternative 2 would require that Route 19 be closed for the project duration and a 91 mile detour would be necessary. The two Echo Bluff State Park secondary access roads on the east side of Route 19 and the west Current River access road will most likely remain open throughout the project duration for Alternatives 1 and 1a. Alternatives 2 and 3 would most likely cause the access road into the Sinking Creek Backcountry Campground (See Figure 10) to be closed for approximately two weeks to allow for new tie-ins with Route 19 to be made.

Pollution control measures outlined in the Missouri Standard Specifications for Highway Construction (http://www.modot.mo.gov/business/standards_and_specs/BEGIN.pdf) will be used to minimize impacts associated with the construction of all of the alternatives. These measures pertain to air, noise, and water pollution as well as traffic control (e.g., temporary signing) and safety measures. Best management practices will be employed to minimize or mitigate potential impacts.

Traffic Control/Safety

One of a contractor's first tasks on a construction job is to set up traffic control. Traffic control measures include warning signs, channelizers, and barricades needed to keep traffic safely in the right place and out of the way of the contractor's operations. The majority of the project can be constructed without having any impacts to Route 19 traffic, except for Alternative 2 as noted above. The north and south roadway tie-ins may require traffic to operate in a one-lane day time operation using flaggers for a period of approximately two weeks for Alternatives 1 and 3. Alternative 1a will have very minimal impacts to traffic.

Constructing the bridge over Sinking Creek will have some impact on traffic in the immediate area as the contractor's personnel work around the project site. Vehicles bringing materials in and out will add to the existing traffic in the area. A Traffic Management Plan (TMP) will be developed during project design. A TMP lays out a set of coordinated traffic management strategies to manage the work zone impacts. Proposed strategies for managing traffic on this project include conducting active public information and outreach and installing temporary traffic control devices.

Utilities

Overhead utilities exist to the upstream side of the Sinking Creek Bridge. If an alternative is chosen that will require the removal of the existing bridge, these lines will be relocated further upstream to allow room for the demolition equipment between the existing bridge and the utility lines. MoDOT's utility engineers and representatives of the utilities will work out details of individual utility adjustments on a case-by-case basis.

Air Quality
Equipment utilized in highway construction use diesel engines that emit exhaust gases that vary depending on the condition of the equipment. Emissions from construction equipment will be controlled in accordance with emission standards prescribed under state and federal regulations.

Under dry conditions, traffic or strong winds can cause dust from the soil to become airborne, resulting in impacts to air quality. Contractors are required to control this dust to ensure that it does not leave the project limits, just as they must make efforts to control soil particles that stormwater carries away. Typically, contractors will water the area during dry periods to control fugitive dust.

Contractors will be required to comply with all federal, state, and local laws and regulations. They will also work within the requirements of their operating permits issued through the Missouri Department of Natural Resources. Air quality during construction will be protected to generally accepted levels through project site monitoring and enforcement of these various requirements.

Noise
The most noticeable noise generated during construction will occur during the installation of bridge pilings. Driving piles creates a sound much like ringing a bell in that the sound travels long distances. The pile-driving activity would be relatively short in duration, lasting days or weeks until the work is completed.

Noise can also be expected from the operation of equipment such as bulldozers, trucks, and other large construction equipment. To reduce the impacts of construction noise, MoDOT has special provisions in the construction contract requiring that all contractors comply with all applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site.

Though it is not anticipated with this project, the use of explosives may be used for the demolition of the bridge over Sinking Creek. These blasts would be expected to be limited in number and will be scheduled for daytime occurrence to avoid disrupting night time quiet.

Water Quality
During construction activities, the area in the immediate project vicinity will be reduced to bare earth. Because of this, the appropriate erosion and sediment control measures will need to be in place once construction begins to prevent and minimize pollutant and sediment loaded runoff from reaching surface waters and flood areas to ensure that the water quality is maintained in the area.

The Missouri Department of Natural Resources regulates the control of runoff from land disturbances and issues a National Pollution Discharge Elimination System (NPDES) permit for the work to MoDOT. MoDOT's Pollution Prevention Plan ensures the design, implementation, management, and maintenance of Best Management Practices (BMPs) in order to reduce the amount of sediment and other pollutants in stormwater discharges associated with the land disturbance activities, comply with the Missouri Water Quality Standards, and ensure compliance with the terms and conditions of the general permit.

Agency and Tribal Involvement

At the initial stages of the project (June 2015), MoDOT and FHWA notified potentially interested Native American tribes and governmental agencies of the proposed plan. Scoping letters, as well as a map of the project area, were sent requesting that they review the proposed project and notify MoDOT of any resources of concern that may be located in the area. In addition to these scoping letters, the National Park Service was also invited as a cooperating agency in the development of the EA and the agency accepted this designation. Of the scoping letters sent to the agencies and tribes (See Appendix E for list of agencies and tribes notified), the only responses to these letters were received from the United States Army Corps of Engineers, Advisory Council on Historic Preservation, United Keetoowah Band of Cherokee, Osage Nation, and the Delaware Tribe. None of the agencies or Tribe expressed concerns with the proposed scope and goals of the project.

An agency scoping meeting was held on July 13, 2015 at the Havener Center in Rolla. Agencies in attendance included MoDOT, FHWA, Environmental Protection Agency, National Parks Service, Department of Conservation, and the Department of Natural Resources (SHPO). Project alternative maps, the public involvement plan, the EA schedule, and the Section 106 process were all reviewed and discussed at this meeting.

On September 22, 2015, MoDOT sent a draft purpose and need and the initial range of alternatives to the cooperating agencies. The United States Army Corps of Engineers and the National Parks Service (ONSR) responses received were in support of Alternative 1 because of the minimization of impacts to the surrounding landscape and stream.

Public Involvement

On October 5, 2015, MoDOT held a public meeting at the Shannon County Courthouse in Eminence, Missouri to provide information about the project to interested parties. This meeting was advertised in a press release prior to the meeting date. Representatives from MoDOT answered any questions that were raised about the proposed locations of the Sinking Creek Bridge and encouraged input to help determine which location was preferred. MoDOT plans to hold a location and design public hearing in October 2016 to present the preferred alternative. This hearing will also be advertised in a press release prior to the hearing date.

In association with the physical meeting, there was also a virtual public meeting for those who were unable to attend the physical meeting. All displays and material that was available at the public meeting was posted on the webpage and an opportunity to comment was also available online.

Approximately 15 people attended the physical meeting and approximately 1,300 visited the online virtual public meeting site. The majority of the comments received recommended Alternative 1. A few comments recommended either 1 or 1a and one mentioned only if 1a was feasible. Reasons given for these recommendations were that these alternatives had the fewest impacts on the surrounding environment. In general, comments related to preserving the scenic beauty of this area in terms of curves in the roadway and not destroying the landscape with a lot of new roadway construction. A summary of these comments and how they were responded to are located below in Table 5. Copies of the handouts provided at the Public Meeting and the comments that were received are located in Appendix F.

Table 5: Public Comments and Responses

Public Comments	No. Of Comments	Responses
Prefer that the new bridge be constructed on the existing bridge alignment.	10	Alternates 1 and 1a are both studying this possibility
Would like a 3-lane bridge with a pedestrian overlook and ability to connect to any future trail systems.	1	Since there are no existing trails along Route 19 or any plans for future trails, it is not practical to incorporate this as part of the project.
Would like the addition of a turn lane.	1	Traffic turning movements do not warrant a left turn lane into the south park entrance.
Concerned with the potential impacts to Ditch Cave with some of the initial range of alternatives.	2	Alternate 5 would have impacted Ditch Cave, since the time of the initial range of alternatives, Alternative 5 has been dismissed from further consideration.

Commitments:

- MoDOT will ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964), the President's Executive Order on Environmental Justice, and the Americans with Disabilities Act. In accordance with the Uniform Act and the states' relocation programs, fair market compensation will be provided to property owners who are affected by this project.

- Temporary easements required by some of the projects alternatives will be granted by a special use permit from the National Parks Service.

- A USACE Section 404 permit and a Missouri Department of Natural Resources Section 401 certification will be needed prior to construction.

- MoDOT's Storm Water Pollution Prevention Plan (SWPPP) shall be implemented to prevent or minimize adverse impacts to stream, water courses, lakes, ponds, or other impoundments within and adjacent to the project area.

- Best management practices (BMPs) will be implemented to minimize sediment and erosion.

- Any additional archaeological work that may be necessary in relation to construction of the new Sinking Creek Bridge will be conducted under the terms of a Programmatic Agreement among the FHWA, SHPO, and the Missouri Highway and Transportation Commission for mitigation of adverse effects to the Three Bridges Historic District.

- MoDOT will only removing suitable bat habitat trees outside the breeding season, or between November 1 and March 31.

- Any previously unknown hazardous waste sites that are found during project construction will be handled in accordance with Federal and State Laws and Regulations.

- If an alternative is chosen that would result in the removal of the existing bridge, evaluation of the potential presence of asbestos containing materials prior to demolition would be required. MoDOT will ensure that all structures scheduled for demolition are inspected for asbestos and lead based paint. These materials, depending on their condition and quantity, would need to be removed and disposed according to current regulations and MoDOT procedures.

- Any adverse effects to site 23SH1566 that cannot be avoided or adequately minimized during the design will be mitigated by a program of archaeological data recovery.

- Regardless of the alternative selected, in consultation with the National Parks Service, MoDOT will conduct limited test excavations to evaluate the significance and integrity of the portion of site 23SH1566 that lies within the temporary bridge easement, prior to construction of the new bridge and/or removal of the temporary bridge.

- If regulated solid or hazardous wastes are found during construction activities, the MoDOT construction inspector will direct the contractor to cease work at the suspect site. The construction inspector will contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office and the contractor will develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical and remediation services will be contracted if necessary.

- MoDOT and the contractor shall submit all required demolition notices, abatements notices, and project notifications to MDNR as required by regulation prior to beginning demolition activities.

- The reports of these inspections for asbestos and the presence of lead-based paint will be included in the construction bid proposal.

- A Traffic Management Plan (TMP) will be developed during project design.

- Emissions from construction equipment will be controlled in accordance with emission standards prescribed under state and federal regulations.

- Contractors are required to control this dust to ensure that it does not leave the project limits, just as they must make efforts to control soil particles that stormwater carries away. Typically, contractors will water the area during dry periods to control fugitive dust.

- Contractors will be required to comply with all federal, state, and local laws and regulations.

- MoDOT's utility engineers and representatives of the utilities will work out details of individual utility adjustments on a case-by-case basis.

- Air quality during construction will be protected to generally accepted levels through project site monitoring and enforcement of the operating permit requirements.

- To reduce the impacts of construction noise, MoDOT has special provisions in the construction contract requiring that all contractors comply with all applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site.

- If blasting is to occur, blasts would be limited in number and will be scheduled for daytime occurrence to avoid disrupting night time quiet

- If changes in design result in changes to impacts from what has been evaluated in this document, MoDOT will reevaluate the NEPA document to ensure the determination remains valid.