



**US Army Corps
of Engineers®**

Louisville District

Draft Environmental Assessment
for the
Stipp Road and Moores Creek Road Projects
at Monroe Lake
Monroe County, Indiana



Prepared by AZTEC Engineering Group, Inc.
for USACE Louisville District

February 17, 2022

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DRAFT FINDING OF NO SIGNIFICANT IMPACT

STIPP ROAD AND MOORES CREEK ROAD PROJECTS MONROE LAKE, MONROE COUNTY, INDIANA

The U.S. Army Corps of Engineers, Louisville District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The draft Environmental Assessment (EA) dated **DATE OF EA**, for the Stipp Road and Moores Creek Road Projects addresses environmental impacts associated with alternatives to address roadway overtopping of Stipp Road and Moores Creek Road and design deficiencies of the Stipp Road bridge, at Monroe Lake in Monroe County, Indiana.

The Draft EA, incorporated herein by reference, evaluated alternatives that would reduce the frequency and duration of roadway overtopping of the Stipp Road bridge in the study area. The Preferred Alternative is:

- Raising the vertical profiles of Moores Creek Road and Stipp Road on their existing alignment and replacing the existing Stipp Road bridge over Butcher Branch Creek.

In addition to a “no action” plan, two alternatives were evaluated. The alternatives included 1) raising the vertical profiles of both roads in their existing alignments and replacing the bridge over Butcher Branch Creek, and 2) realigning portions of both roads to a higher elevation and constructing the bridge over Butcher Branch Creek on the new alignment. For a discussion of the alternatives, refer to Section 3 of the draft EA.

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the Preferred Alternative are listed in Table 1:

Table 1: Summary of Potential Effects of the Preferred Alternative

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aquatic resources/wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish and wildlife habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Threatened/Endangered species/critical habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Historic properties	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other cultural resources	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Floodplains	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous, toxic & radioactive waste	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydrology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



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	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Land use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Noise levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public infrastructure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Socio-economics	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Environmental justice	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Soils	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tribal trust resources	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Climate change	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Preferred Alternative. Best management practices (BMPs) as detailed in the draft EA will be implemented, if appropriate, to minimize impacts. A Storm Water Pollution Prevention Plan (SWPPP) along with BMPs will be implemented to prevent erosion and soil loss, protect water quality, and avoid or minimize hazardous materials releases during construction. Turbid groundwater that is encountered will be filtered or discharged into settling basins to reduce turbidity before being discharged. In addition, to avoid impacts to wetlands, temporary fencing and signage will be erected at wetland boundaries to mark avoidance areas.

Compensatory mitigation will not likely be required as part of the preferred alternative.

In compliance with 33 C.F.R 230.11, this draft EA will be circulated for a 30-day review to concerned agencies, organizations, and the interested public. All comments received during this review period will be evaluated and necessary changes will be incorporated into the Final EA.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the preferred alternative may affect but is not likely to adversely affect the following federally listed species or their designated critical habitat: Indiana Bat (*Myotis sodalis*), and the Northern Long-eared Bat (*Myotis septentrionalis*). The U.S. Fish and Wildlife Service (FWS) concurred with the USACE's determination on 16 June 2021.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the USACE determined that the Preferred Alternative has no effect on historic properties.

Section 404 of the Clean Water Act (CWA) of 1972, as amended, establishes a program that regulates the discharge of dredged or fill material into Waters of the U.S., which generally includes streams, rivers, lakes, wetlands, and some other water courses. Section 404 requires a USACE permit before dredged or fill material is discharged into waters of the U.S., unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities). The USACE Louisville, Detroit, and Chicago Districts have issued Indiana Regional General Permit (RGP) No. 001 for certain activities in waters of the U.S. within the State of Indiana under Section 10 of the Rivers and Harbors Act of 1899 and Section 404



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of the CWA. Certain activities that impact 1 acre or less of waters of the U.S., or 2 acres or less for open waters, and qualify for the associated Indiana Department of Environmental Management (IDEM) Section 401 Water Quality Certification (WQC) are eligible for this RGP. Notification to USACE is required for impacts exceeding the RGP notification thresholds and for any work occurring in navigable waters. Notification to IDEM is required for any and all impacts to waters of the U.S. in the State of Indiana. The Preferred Alternative would be authorized under the Indiana RGP No. 001 with notifications to both USACE and IDEM. All conditions of the RGP, its General Conditions, and IDEM's Section 401 WQC will be implemented in order to minimize adverse impacts to waters of the U.S. and water quality.

Technical, environmental, and cost effectiveness criteria used in the formulation of project alternatives were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the preferred alternative would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date

Eric Crispino
Colonel, Corps of Engineers
District Commander

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1 INTRODUCTION

The Monroe County Highway Department (referred to hereafter as “the County”) is planning a bridge replacement and roadway flooding mitigation project on Moores Creek Road and Stipp Road in Monroe County, Indiana, on lands owned and managed by the U.S. Army Corps of Engineers (USACE). The County is funding the design and construction of the project.

1.1 PROJECT LOCATION

The project is located along portions of Moores Creek Road and Stipp Road (Figure 1). The U.S. Geological Survey location for the Moores Creek Road segment is: Monroe County, Indiana; Perry Township; T8N; R1W & R1E; Section 25 & 30; Allens Creek Quadrangle. The Moores Creek Road segment is located at Latitude 39°06'11.0" N and Longitude 86°27'43.8" W. The U.S. Geological Survey location for the Stipp Road segment is: Monroe County, Indiana; Perry Township; T8N; R1W; Section 25; Allens Creek Quadrangle. The Stipp Road segment is located at Latitude 39°05'57.3" N and Longitude 86°28'13.6" W.

1.2 AUTHORIZATION AND PROJECT DESCRIPTION

The USACE built and oversees operations of Monroe Reservoir (also known as “Monroe Lake”) and jointly manages the associated recreation area with the Indiana Department of Natural Resources (IDNR) Division of Parks and Reservoirs (IDNR, 2011). Monroe Lake was authorized by the Flood Control Act of 1938, Pub. L. No. 75-761, 52 Stat. 1215, and the Flood Control Act of 1958, Pub. L. No. 85-500, 72 Stat. 297, as part of the Ohio River Basin’s flood control plan. This 10,750-acre lake was created by damming Salt Creek, a tributary of the White River, approximately 11 miles south of Bloomington, Indiana (USACE, 1995). The lake’s operations include flood control, water supply, and recreation (USACE, 1995).

The proposed federal action to be undertaken by the USACE is granting new easement to the County for Stipp Road and Moores Creek Road in the project area as there is no existing easement. Title 10 U.S. Code § 2668 authorizes USACE to issue easements for rights-of-way (ROW) over land it controls for roadways or other purposes.

1.3 PURPOSE OF PROPOSED PROJECT

The purpose of the County’s proposed project is to 1) reduce the frequency and duration of roadway overtopping to maintain access for local residents and emergency services to and from properties around the Lake that are only publicly accessible from Moores Creek Road and Stipp Road, and 2)



Figure 1 – Project Overview Map Showing the Stipp Road and Moores Creek Road Sites in Monroe County, Indiana.

address design deficiencies of the Stipp Road Bridge over Butcher Branch Creek as it does not meet current design standards.

Moores Creek Road and Stipp Road are two-way rural minor collector roads that skirt the shores of Lake Monroe in the project area. Along Stipp Road, an existing concrete precast box beam bridge (Monroe County Bridge No. 00912) crosses over Butcher Branch Creek. Existing culverts along Stipp Road and Moores Creek Road allow ephemeral streams to cross under the roadways and eventually reach Monroe Lake.

Part of the Monroe County Stormwater Program's mission is to "address [the county's] drainage concerns and reduce flooding hazards" and make necessary infrastructure improvements to meet these goals (Monroe County Highway Department, 2020). Flooding hazards are present on Stipp Road and Moores Creek Road in the project area due to their low roadway elevations, proximity to Monroe Lake, and location within the Monroe Lake floodplain. Rises in the lake's surface water elevation after substantial rainfall events cause backwatering of Butcher Branch Creek and Moores Creek that overtops Stipp Road and Moores Creek Road, preventing residential and emergency access to residences in the area.



Figure 2 – Moores Creek Road Flooding and Closure in June 2019.

Moores Creek Road and Stipp Road were built prior to the creation of Monroe Lake at elevations lower than the lake spillway elevation of approximately 555.6 feet (North American Vertical Datum of 1988). The minimum roadway elevation of Stipp Road is 550.2 feet at Butcher Branch Creek, and 550.6 feet for Moores Creek Road.

Historic lake gage data was obtained from the USACE for years 1983 through 2018 (see Figures 3 and Table 1 below). This data indicates that within the study area there were 11 overtopping events at Stipp Road and 10 overtopping events at Moores Creek Road over the 35-year data period. While this averages out to approximately one overtopping event every three years, the

duration of these events was an average of 24 days for Stipp Road and 22 days for Moores Creek Road. Roadway overtopping lasting several days to several weeks causes road closures and restricted access to properties for residents and property owners around the lake, as well as emergency services. There are currently only two options for local residents when Stipp Road and/or Moores Creek Road are closed due to flooding: 1) drive through private property via a private driveway, or 2) take a six-mile detour.

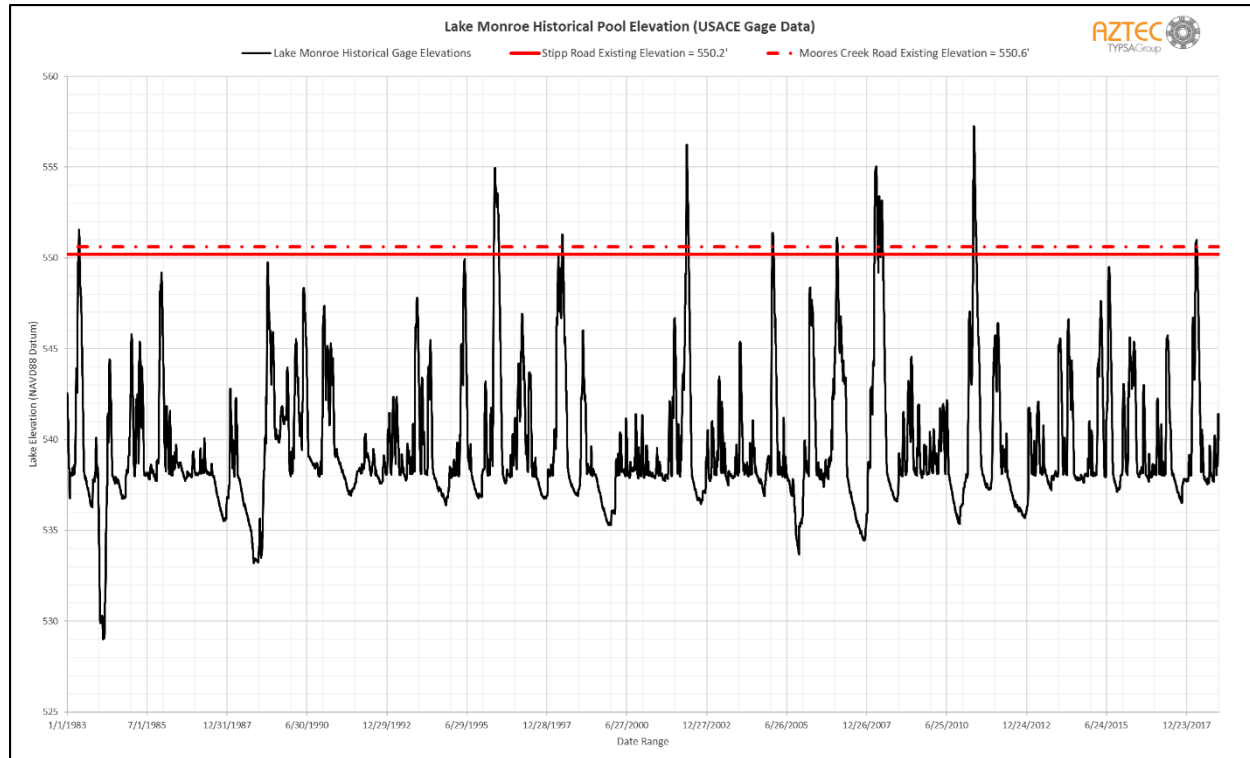


Figure 3 – Lake Monroe Historical Pool Elevation Data.

Table 1 – Monroe Lake Elevations and Stipp Road and Moores Creek Road Flooding Frequencies.

Elevation Exceedance Table

The values in this table are based upon USACE historical lake elevation data from the years 1983 through 2018.

Existing Minimum Stipp Road Elevation at Butcher Branch Creek (ft)

Existing Minimum Moores Creek Road Elevation (ft)

Total Number of Days in Period of Record

550.2

550.6

13,147

Selected Lake Elevation	# of Days Selected Elev Exceeded:	Percentage of Days Selected Elev Exceeded:	Avg Depth Over Selected Lake Elevation*:	# of Days Selected Elev Not Exceeded:	Percentage of Days Selected Elev Not Exceeded:	# of Overtopping Events	Avg # of Days of Overtopping per Event	Avg # of Overtopping Events per Year	Avg # Years Between Overtopping Events	Avg # of Days of Overtopping per Year	Exceedance Probability Based on USACE 36 Yr Data	Overtopped Stipp Rd at Butcher Branch?
549.6	294	2.24%	2.55	12,853	97.76%	11	25	0.31	3.3	8.4	2.37%	No
550.2	258	1.96%	2.25	12,889	98.04%	11	24	0.31	3.3	7.4	2.08%	No
550.6	218	1.66%	2.10	12,929	98.34%	10	22	0.28	3.6	6.2	1.76%	Yes
551.6	154	1.17%	1.81	12,993	98.83%	6	28	0.17	6.0	4.4	1.24%	Yes
552.6	115	0.87%	1.24	13,032	99.13%	7	19	0.19	5.1	3.3	0.93%	Yes
553.6	59	0.45%	1.10	13,088	99.55%	4	15	0.11	9.0	1.7	0.48%	Yes
554.6	21	0.16%	1.03	13,126	99.84%	3	7	0.08	12.0	0.6	0.17%	Yes
555.6	11	0.08%	0.60	13,136	99.92%	2	6	0.06	18.0	0.3	0.09%	Yes
556.6	3	0.02%	0.19	13,144	99.98%	1	3	0.03	36.0	0.1	0.02%	Yes
557.6	0	0.00%	0.00	13,147	100.00%	0	0	0.00	NA	0.0	0.00%	Yes

***Notes:**

- 1 The elevations from USACE data readings are assumed to be at the spillway. Elevations are not correlated to the water surface elevation located adjacent to Stipp Road Bridge over Butcher Branch creek.
- 2 Butcher Branch creek hydraulics and hydrology interacting with the Lake Monroe pool elevations in the table above are not considered.
- 3 Moore's creek hydraulics and hydrology interacting with the Lake Monroe pool elevations in the table above are not considered.
- 4 Vertical Datum of lake data is NAVD88 (Vertical NAVD88 to NGVD27 conversion = +0.387ft)

The design deficiencies of the Stipp Road Bridge over Butcher Branch Creek include drainage/hydraulic and structural deficiencies. The existing bridge was constructed below the lake spillway elevation, and the waterway area below the 100-year storm event through the bridge is only 49.1 square feet. The bridge does not meet the County's 25-year flood protection design standard. Hydraulic modeling for the existing bridge shows extensive flooding and overtopping of Stipp Road from the 10-year storm event through the 100-year event. High lake water levels cause surcharging and backwatering of Butcher Branch Creek, which then causes overtopping of Stipp Road.

The bridge structure was built in 1981. There is some wearing of the bridge surface, with bituminous cracks and patches in the roadway at the bridge ends. The deck and superstructure are satisfactory but show minor wear and scaling on top of exposed beams, and some of the beams show cracks, leaching and spalling. In addition, there is a 6.75 ft hairline longitudinal crack on one of the beams. The bridge scour critical rating, which describes the level of abutment or pier foundation scouring, is rated as "stable, within limits"; however, there is minor scouring at the southwest abutment corner.

2 NATIONAL ENVIRONMENTAL POLICY ACT OVERVIEW

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council of Environmental Quality's (CEQ) Regulations (40 C.F.R. §§ 1500-1508), as reflected in the USACE Engineering Regulation ER 200-2-2. The USACE's ER 200-2-2 supplements and is used in conjunction with the CEQ regulations.

The USACE must follow the process outlined in the USACE Engineering Regulation ER 200-2-2 that requires an assessment of environment effects and consideration of reasonable alternatives to proposed federal actions. Per NEPA, federal agencies are required to gather sufficient information on potential adverse and beneficial environmental effects. The significance and severity of effects to environmental resources determines the type of document prepared. For federal actions that have the potential to create significant environmental effects, an environmental impact statement (EIS) is prepared. For Federal actions that create environmental effects that are not considered significant, an EA with a finding of no significant impact (FONSI) is prepared.

The CEQ Regulations do not dictate the format and content of an EA in detail, but an EA must include:

- Need for the proposed action
- Proposed action and alternatives
- Probable environmental effects of the proposed action and alternatives
- Agencies and persons consulted in the preparation of the EA

The Monroe County Highway Department contracted AZTEC Engineering Group, Inc. (AZTEC) to design the project, coordinate with agencies, and assist with obtaining the necessary environmental clearances and permits for this project, including NEPA authorization. AZTEC, on behalf of and in conjunction with the USACE, has prepared this draft EA to analyze the potential effects from granting an easement to Monroe County for the proposed bridge replacement and roadway flooding mitigation project on Moores Creek Road and Stipp Road.

3 ALTERNATIVES

An important aspect of an EA is developing and evaluating alternatives. The alternatives should provide feasible solutions that achieve the need of the identified problem. The issuance of permits and new roadway easement (the USACE federal action) could be tailored to either of the action alternatives

described below. The alternatives to be considered in this draft EA consist of two action alternatives to reduce the frequency and duration of roadway overtopping and address the Stipp Road Butcher Branch Creek Bridge design deficiencies. Alternative 2 (the Preferred Alternative) would raise the roadways to higher elevations on their existing alignments and replace the Butcher Branch Creek Bridge. Alternative 3 would realign portions of the roadways to higher elevations in the study area and would include a new bridge over Butcher Branch Creek. In addition, a No Action Alternative (NAA) is evaluated as Alternative 1 where USACE would not issue or amend roadway easements along Stipp Road and Moores Creek Road, and the County would not take action to address the roadway flooding and bridge deficiencies.

3.1 ALTERNATIVE 1 – NO ACTION ALTERNATIVE

The NAA would involve the Monroe County Highway Department maintaining Moores Creek Road and Stipp Road in their existing condition without taking action to address the roadway flooding or Butcher Branch Creek Bridge deficiencies. Maintenance would include activities such as pavement repair or replacement, culvert clean-outs, vegetation control, and snow removal within and immediately adjacent to the existing roadways. Under this alternative, flooding and road closures that limit residents' and emergency services access to residential properties in the area would continue and the Stipp Road Butcher Branch Creek Bridge deficiencies would not be corrected.

3.2 ALTERNATIVE 2 – RAISE ROADWAYS AND REPLACE BRIDGE (PREFERRED ALTERNATIVE)

Alternative 2 involves raising the vertical profiles of Moores Creek Road and Stipp Road on their existing alignments and replacing the existing Stipp Road Bridge over Butcher Branch Creek. Raising the roadways to an elevation above the County's minimum design standard of the 25-year flood event would reduce the frequency and duration of roadway flooding and thus reduce the number and duration of road closure events. To establish the design elevation, several elevation options were evaluated. It was determined that raising the roadways to an elevation of 554.6 feet would exceed the County's 25-year flood protection standard and substantially reduce the frequency and duration of overtopping events at a reasonable cost. As previously established, Monroe Lake elevation data from Table 1 indicates there were 11 overtopping events at Stipp Road and 10 overtopping events at Moores Creek Road over the 35-year period. Average duration of these overtopping events was 24 days for Stipp Road and 22 days for Moores Creek Road. In comparison, a roadway elevation of 554.6 feet would have reduced overtopping events to 3 events with an average of 7 days of closure per event for both Stipp Road and Moores Creek Road during that same 35-year period (Table 1). Figure 4 below shows the alignment of Alternative 2.

Under this alternative, both roadways would be widened from approximately 18 feet to 24 feet with a typical section that includes a paved 10-foot-wide travel lane and a 2-foot-wide aggregate shoulder in each direction of travel on embankment fill that varies in width from approximately 50 feet to 70 feet. The existing box beam Stipp Road Bridge over Butcher Branch Creek would be replaced with a larger opening precast concrete arch bridge. The larger opening would increase the waterway area below the 100-year storm event through the bridge from the existing 49.1 square feet to 143.0 square feet. This increased waterway area would reduce the effects of surcharging and backwatering of Butcher Branch Creek caused by lake flood elevations. The new structure would meet the County's 25-year flood event protection standard. In addition, as a new bridge it would not exhibit the level of wearing on the bridge surface and the cracks or spalling of beams that is present on the existing bridge.

At the bridge, the banks of Butcher Branch Creek would be armored with riprap to protect the bridge from erosion. A retaining wall with embankment revetment riprap would be constructed on the south side of Stipp Road to reduce impacts to Butcher Branch Creek and an unnamed tributary, as well as protect the roadway from erosion. Drainage improvements will include new or extended culvert crossings that will provide drainage relief for offsite runoff and meet the County's 25-year storm event standards. Other improvements include new guardrail, signage, and pavement markings. Utility relocations including fiber optic cable, water supply pipes, and overhead powerlines would be required. The fiber optic cable and water supply pipe relocations would occur within the construction limits of the proposed roadways. Powerline relocations would require disturbance outside the roadway construction limits.

This alternative would require importing fill material to raise the roadway profiles. Earthwork, tree removal, and clearing other vegetation to accommodate the increased roadway widths and roadway fill limits would also occur. This work would necessitate ground disturbance in Butcher Branch Creek and several ephemeral drainages in the project area. The total footprint of this alternative would be approximately 8.0 acres and it would require approximately 5.4 acres of tree removal (Table 2). The fill from this alternative would not impact the normal operating pool levels of the lake. The fill would also have no effect on the flood pool elevation or lake operations.

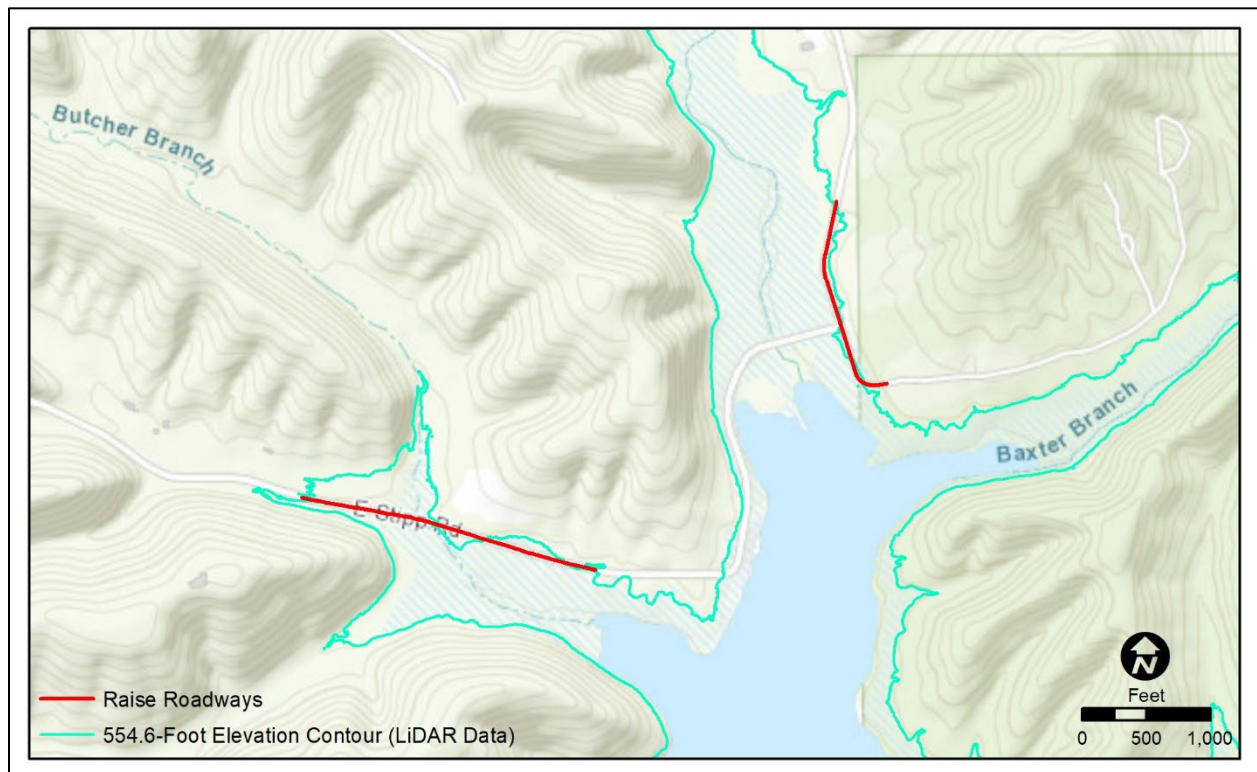


Figure 4 – Map Showing 554.6-Foot Elevation Contour and Alternative 2 Limits.

Table 2 – Alternative 2 Disturbance Area and Tree Removal.

Area	Stipp Road (Acres)	Moores Creek Road (Acres)	Total
Disturbance to Existing Roadways/Driveways	0.8	0.7	1.5
Disturbance Outside Existing Roadways/Driveways	2.0	1.5	3.5
Temporary Disturbance Due to Equipment Access	1.4	1.6	3.0
Total Disturbance	4.2	3.8	8.0
Tree Removal in Construction Limits	2.0	1.3	3.3
Tree Removal in Temporary Disturbance Area	1.3	0.8	2.1
Total Tree Removal	3.3	2.1	5.4

3.3 ALTERNATIVE 3 – REALIGN ROADWAYS AND REPLACE BRIDGE

Alternative 3 would realign portions of Stipp Road and Moores Creek Road to elevations of 554.6 feet or greater and would include construction of a new bridge over Butcher Branch Creek on a new alignment. Figure 5 shows potential realignments.

The new roadways and portions of the roadways on existing alignments would be 24 feet wide with a typical section that includes a paved 10-foot-wide travel lane and a 2-foot-wide aggregate shoulder in each direction of travel on embankment fill that varies in width from approximately 50 feet to 70 feet. The existing Stipp Road box beam bridge over Butcher Branch Creek would be replaced with a larger opening precast concrete arch bridge on a new alignment. Similar to Alternative 2, the larger opening would increase the waterway area below the 100-year storm event through the bridge. The increased waterway area would reduce the effects of surcharging and backwatering of Butcher Branch Creek caused by lake flood elevations. The new structure would also meet the County's 25-year flood event protection standard. In addition, as a new bridge it would not exhibit the level of wearing on the bridge surface, cracks or spalling of beams that is present on the existing bridge. At the bridge, the banks of Butcher Branch Creek would be armored with riprap to protect the bridge from erosion. Drainage improvements including new or extended culvert crossings would provide drainage relief for offsite runoff and would meet the County's 25-year storm event standards. Other improvements would include new guardrail, signage, and pavement markings. Some utility relocations would be required; however, the location and disturbance associated with those relocations is unknown.

This alternative would require tree removal and clearing other vegetation along new roadway corridors for the realigned segments, earthwork to establish relatively flat roadway profiles, ground disturbance in Butcher Branch Creek and several ephemeral drainages in the project area. Acquisition of adjacent private property and/or designation of new easement from USACE and some residential relocations would be necessitated. This alternative would also require rebuilding access to adjacent private property and removal of portions of the existing roadways and the existing Stipp Road Butcher Branch Creek Bridge. Assuming the realignment lengths shown in Figure 5 and a roadway width of 24 feet with a standard clear zone width of 12 feet on each side, standard ditch width of 6 feet on each side, and an additional 15 feet on each side for construction access, the total footprint of this alternative would be approximately 11.9 acres and it would require approximately 7.2 acres of tree removal (Table 3).

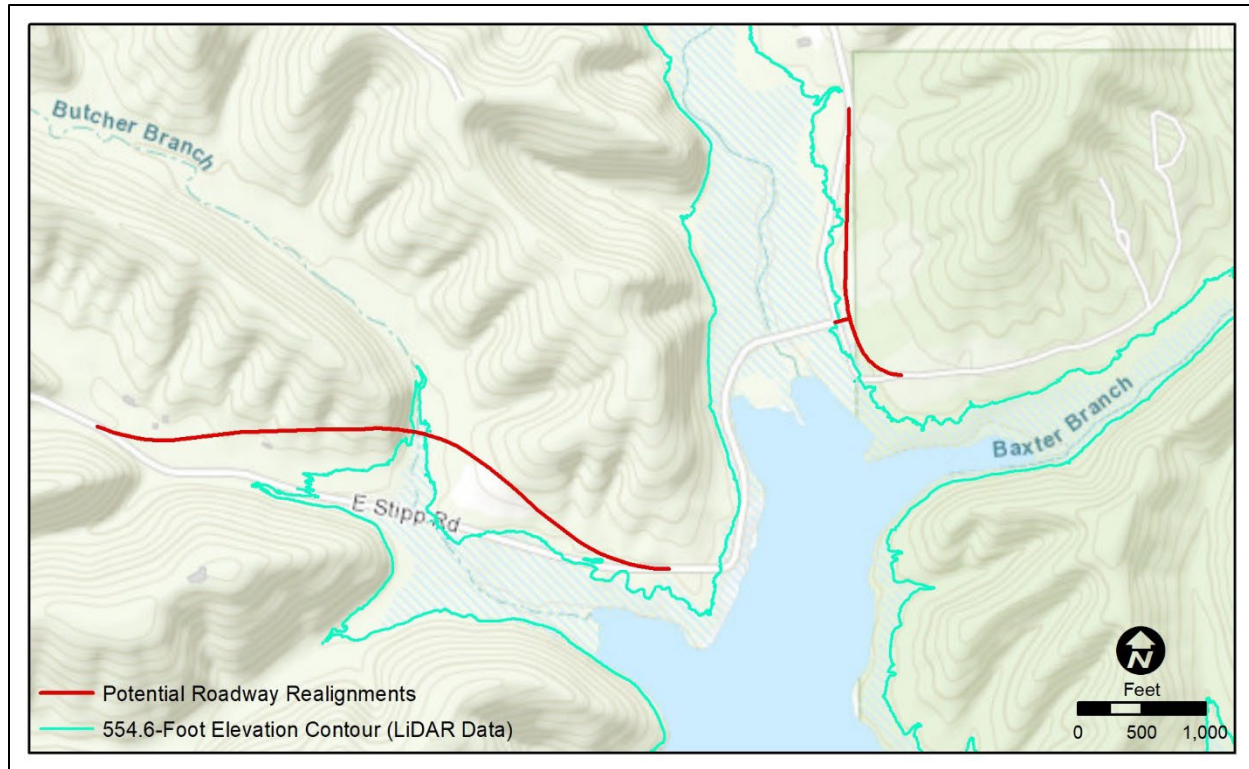


Figure 5 – Map Showing 554.6-Foot Elevation Contour and Potential Alternative 3 Roadway Realignment Limits.

Table 3 – Alternative 3 Disturbance Area and Tree Removal.

Area	Stipp Road (Acres)	Moores Creek Road (Acres)	Total
Disturbance to Existing Roadways/Driveways	0.2	0.5	0.7
Disturbance Outside Existing Roadways/Driveways	5.1	2.3	7.4
Temporary Disturbance Due to Equipment Access	2.6	1.2	3.8
Total Disturbance	7.9	4.0	11.9
Tree Removal in Construction Limits	3.8	0.9	4.7
Tree Removal in Temporary Disturbance Area	2.0	0.5	2.5
Total Tree Removal	5.8	1.4	7.2

4 AFFECTED ENVIRONMENT

4.1 CLIMATE

Climate in the study area is classified as temperate and consists of wide temperature ranges and four distinct seasonal changes throughout the year. Winters are cold with annual average temperatures around 31°F. Spring is slightly warmer and wetter, with annual average temperatures around 53°F and average annual precipitation around 4.6 inches. Summers are warm and humid with annual average temperatures around 74°F and high humidity that can drive the heat index over 100°F. Autumn is typically cooler with temperatures similar to those found in spring (56°F), and typically sunnier and less humid than summer months (Figure 6; NOAA, 2020).

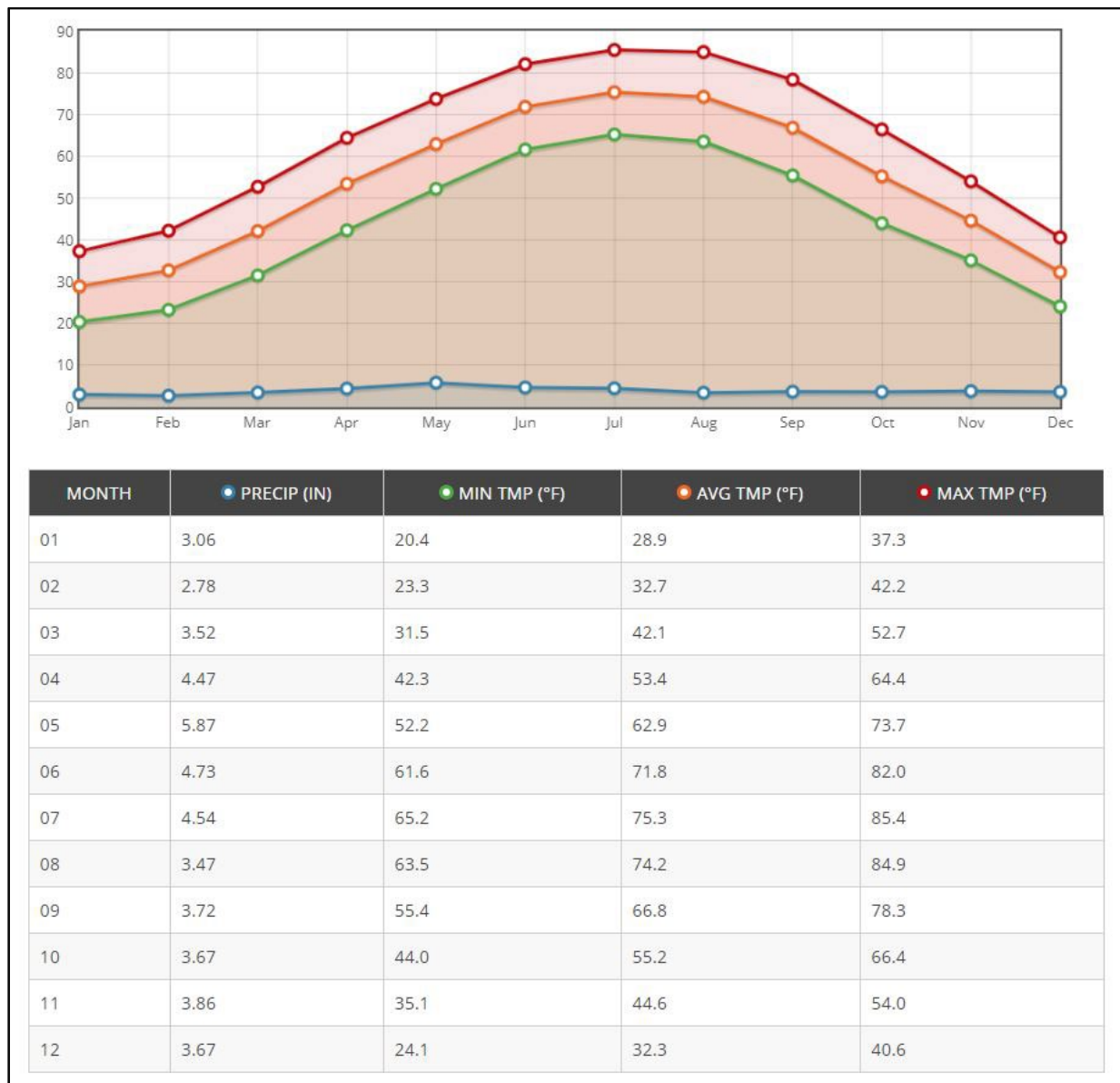


Figure 6 – Climate Data for the Bloomington Indiana University Weather Station from 1981 to 2010 (NOAA, 2020).

4.2 SOILS AND GEOLOGY

4.2.1 *Geology and Physiography*

The study area is located in the Norman Upland sub-region of the Indiana Southern Hills and Lowlands Physiographic Region. Terrain in the study area is intersected by several drainages and is quite hilly outside the drainage valleys, with elevations ranging from 540 feet near the lake shore to 767 feet at the top of the hill just northeast of the Stipp Road study site.

The project lies in the Mississippian Borden Group geological formation and geologic features in the study area consist of early to middle Mississippian siltstone and shale within the Edwardsville, Sprickert Knob, and New Providence Formations of the Borden Group (Indiana Geological Survey [IGS], 2003; IGS, 2013). Geologic features in the study area may also consist of sandstone and the less common limestone (Rexroad, 1986). The geotechnical investigation completed for the study found shale at a depth of 5 to 10 feet below ground surface.

Karst topography is prevalent across southern Indiana. Karst landscape within the study area is classified as Knob-Norman Upland of the Interior Plateau (IGS, 2003). Features that have the potential to occur within the study area include caves, sinkholes, and springs (USACE, 2017). IGS mapping indicates there are no known karst features in the project footprint and no karst features were observed during several site visits between 2017 and 2019. The nearest IGS-mapped karst feature is a sinkhole located approximately 1 mile west-southwest of the Stipp Road project site. IGS mapping also indicates no known existing or potential mineral resources or active or abandoned mineral resource extraction sites in the study area.

4.2.2 *Soil Associations*

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey was utilized to identify soils within the study area (Appendix A). In total, eight soil units were identified.

BkF – Brownstown-Gilwood Silt Loams (25-25% Slopes): Well drained soils found on hills. Parent material is loamy-skeletal and fine-loamy residuum weathered from siltstone. Depth to restrictive feature (lithic bedrock) is typically 30-40 inches with depth to water table at more than 80 inches. This soil does not meet hydric soil criteria and is not considered a prime farmland soil.

Bu – Burnside Silt Loam (Occasionally Flooded): Well drained soils on alluvial fans and floodplains. Parent material is loamy-skeletal alluvium over shale and siltstone. Depth to restrictive feature (paralithic bedrock) is 40-60 inches with depth to water table typically also at 40-60 inches. This soil does not meet hydric soil criteria but is considered a prime farmland soil.

Cu – Cuba Silt Loam (Frequently Flooded): Well drained soils on floodplain steps. Parent material is acid silty alluvium. Depth to restrictive feature as well as water table is typically more than 80 inches. This soil does not meet hydric soil criteria but is considered a prime farmland soil if protected from flooding or not frequently flooded during the growing season.

GrD – Gilpin-Gullied Land Complex (12-22% Slopes): Well drained soils on structural benches or hills. Parent material is loamy residuum over sandstone and shale. Depth to restrictive feature

(paralithic bedrock) is 20-40 inches and depth to water table is more than 80 inches. This soil does not meet hydric soil criteria and is not a prime farmland soil.

PaC – Parke Silt Loam (6-12% Slopes): Well drained soils on outwash plains. Parent material is loess over loamy washout. Depth to restrictive layer and water table is typically more than 80 inches. This soil does not meet hydric soil criteria and is not a prime farmland soil.

PeB – Pekin Silt Loam (2-6% Slopes): Moderately well drained soils on stream terraces. Parent material is fine-silty loess over loamy alluvium. Depth to restrictive feature (fragipan) is 24 to 36 inches and depth to water table is about 18 to 24 inches. This soil does not meet hydric soil criteria but is considered a prime farmland soil.

PeC – Pekin Silt Loam (6-12% Slopes): Well drained soils on stream terraces. Parent material is loess over loamy alluvium. Depth to restrictive feature (fragipan) is 20-38 inches and depth to water table is about 18 to 24 inches. This soil does not meet hydric soil criteria and is not a prime farmland soil.

WmC – Wellston-Gilpin Silt Loams (6-20% Slopes): Well drained soils on hills. Parent material is loess over loamy residuum over shale and loamy residuum over sandstone and shale. Depth to restrictive feature (paralithic bedrock) is 20 to 72 inches and depth to water table is usually more than 80 inches. This soil does not meet hydric soil criteria and is not a prime farmland soil.

4.2.3 Hydric Soils

Soil information from the NRCS Web Soil Survey provides a generalized overview of soils and their properties in a study area. The soil units mapped in the study area have low hydric ratings (0 – 2%) and are not classified as hydric soils. However, this information alone does not preclude the presence of hydric soils as the large-scale mapping may not capture small scale differences in soil properties, thus hydric soils could be present at discrete locations. Soils in the study area may retain water and become inundated or saturated due to flooding from increased lake levels, but not for the long periods of time required for hydric soils to develop over the entire study area. Soil samples were taken during the waters of the U.S. delineation conducted by Little River Consultants, LLC (Little River) on October 6 and 18, 2017. Little River found hydric soil indicators at three out of the six sites where soil cores were taken that are associated with the two delineated wetlands discussed in Section 4.3.4 below.

4.3 SURFACE WATER AND OTHER AQUATIC RESOURCES

4.3.1 Surface Water

Monroe Lake, located at the southern limit of the study area, was built in 1965 by damming Salt Creek north of its confluence with the East Fork of the White River. It is the largest body of water in Indiana at approximately 10,750 acres (USACE, 1995). The primary purpose of Monroe Lake is flood control, though it also serves as a public water supply and recreational area and provides fish and wildlife habitat.

Nine unnamed ephemeral streams and two intermittent streams are present in the study area, including Butcher Branch Creek and an unnamed tributary. A waters of the U.S. delineation conducted by Little River on October 6 and 18, 2017, and a site visit by AZTEC personnel on November 11, 2017, confirmed the presence and location of the streams. Six ephemeral streams occur within the Moores Creek Road study site that are tributaries to Moores Creek/Monroe Lake. Four ephemeral and two intermittent

streams occur at the Stipp Road study site. Butcher Branch Creek flows from north to south, crossing under Stipp Road via Bridge #912 to its confluence with an unnamed intermittent stream. From that confluence, Butcher Branch Creek then flows in an easterly direction, parallel to Stipp Road until it outlets directly into Monroe Lake (Figure 7).

The Indiana Department of Environmental Management 2018 list of Clean Water Act (CWA) Section 303(d) impaired waters includes Monroe Lake as impaired for drinking water use (algae and taste) in both the upper and lower portions of the lake, and for fish consumption use (mercury in fish tissue) in the upper portion (IDEM, 2018a). There are no other 303(d) impaired waters in the study area (IDEM, 2018b).

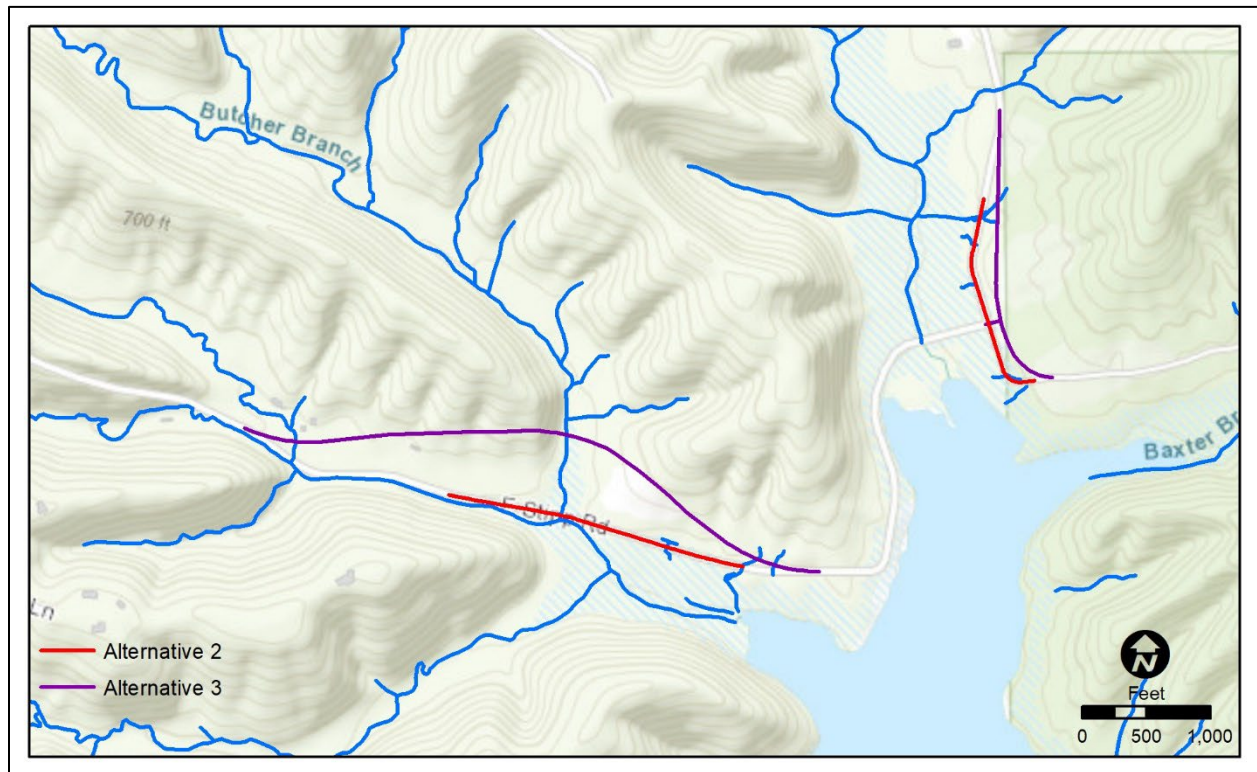


Figure 7 – National Hydrography Dataset and Little River Delineated Ephemeral and Intermittent Streams in the Study Area.

4.3.2 Groundwater

The study area is located within the Borden Group Aquifer System, which is composed primarily of siltstone and shale. The thickness of the Borden Group in Monroe County is up to 660 feet and well depths may exceed 400 feet, though most are between 90 and 200 feet. Static water levels in these wells range from 0 to 200 feet below surface but are commonly between 5 and 60 feet. Production rates are typically from 1 to 7 gallons per minute. Overall, there is little chance for development of high-capacity wells in the Borden Group Aquifer System (Maier, 2003). Ground water was encountered at approximately 7 feet below ground surface at 2 of the 5 borings completed during the project geotechnical investigation. No water wells are located within the study area; the closest known water well is located approximately 0.53 miles southwest of the study area (IDNR, 2021).

As described in Section 4.2.1 above, IGS mapping indicates there are no known karst features in the study area and no karst features were observed at the study site during several site visits between 2017 and 2019. The nearest IGS-mapped karst feature is a sinkhole approximately 1 mile west-southwest of the Stipp Road project site.

4.3.3 Floodplains

Portions of the study area are located within the Federal Emergency Management Agency's (FEMA) 100-year floodplain Zone A for Moores Creek, Baxter Branch Creek, and Butcher Branch (Figure 8). The 100-year regulatory floodway is not mapped by FEMA in the study area. The Zone A floodplain means there is no regulatory base flood elevations or detailed hydraulic study on record by FEMA for the Butcher Branch or Moores Creek area of the project. The 8-Step Process for Executive Order (E.O.) 11988: Floodplain Management is provided in Appendix B.

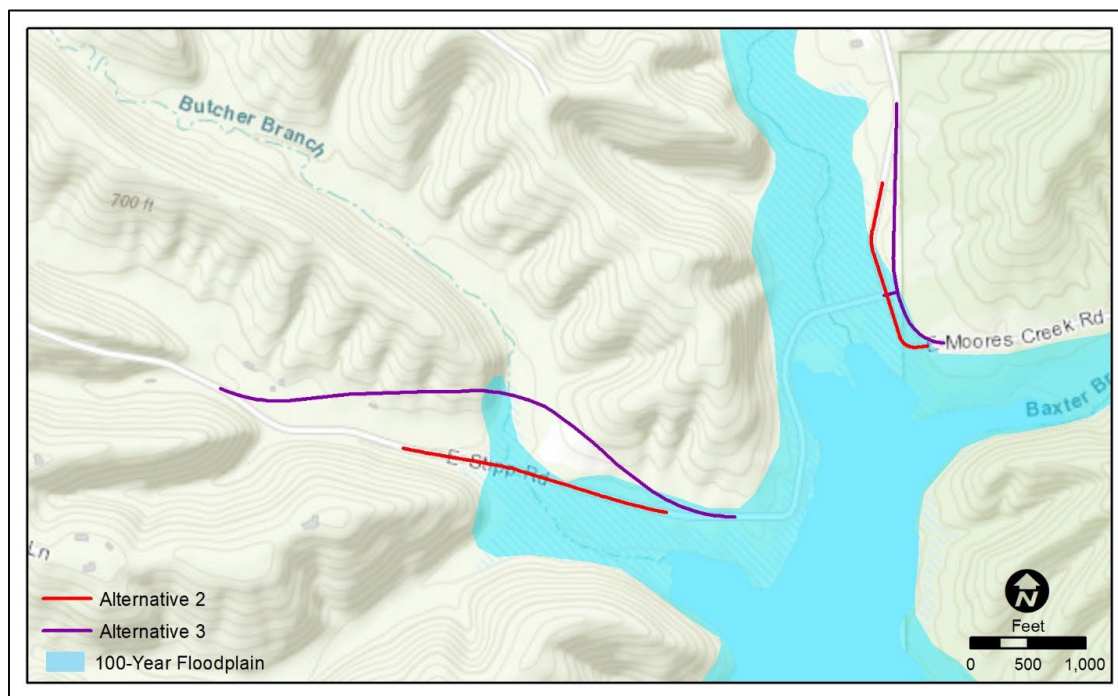


Figure 8 – FEMA 100-Year Floodplain Extent in the Study Area.

4.3.4 Wetlands

The U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI) map identifies several wetlands in the study area (Figure 9; USFWS, 2019). A waterway and wetland delineation was conducted by Little River on October 6 and 18, 2017 and two wetlands were confirmed at the study site (Figure 9). The first wetland is a Palustrine Emergent Wetland located west of Moores Creek Road, adjacent to project limits. Dominant vegetation is comprised of silver maple (*Acer saccharinum*) and buttonbush (*Cephananthus occidentalis*); the area comprising this wetland completely lacks a herbaceous layer. The second wetland is a Palustrine Forested Wetland located south of Stipp Road. Vegetation within this wetland is comprised of silver maple and buttonbush, as well as box elder (*Acer negundo*), pinkweed (*Persicaria pensylvanica*), and awlfruit sedge (*Carex stipata*).

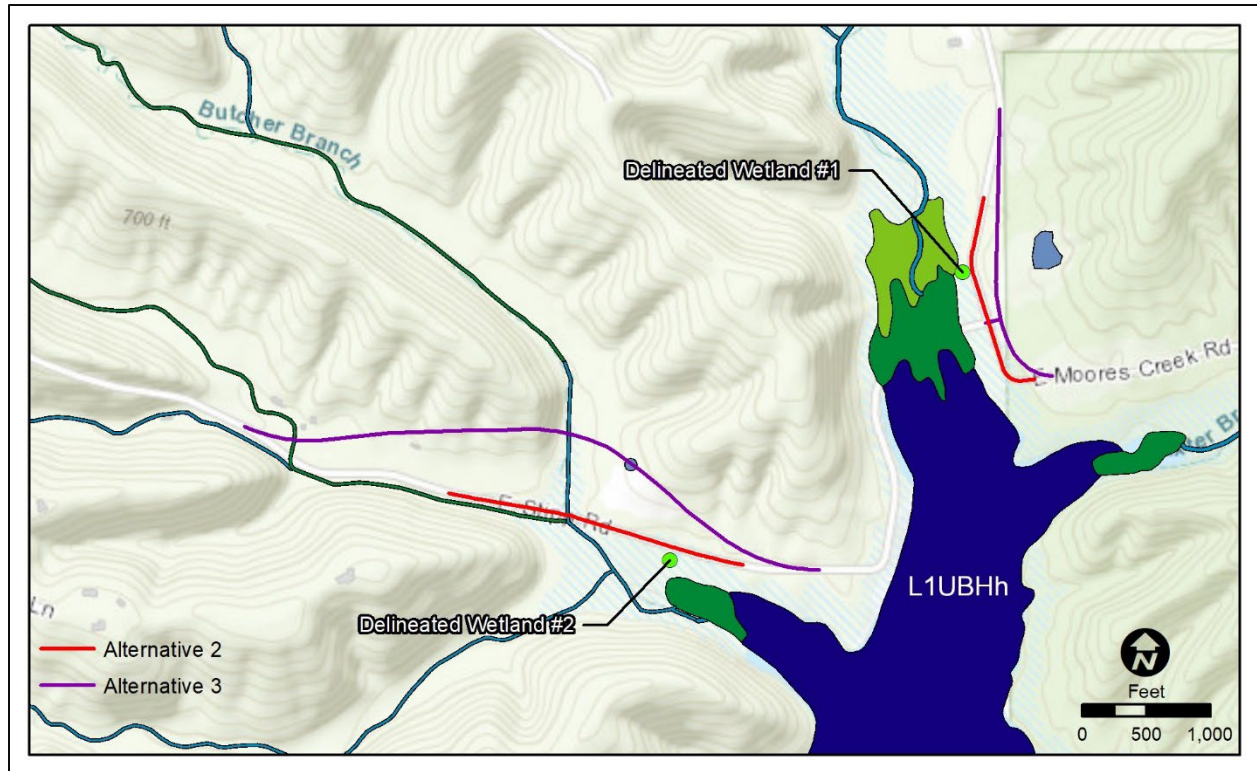


Figure 9 – USFWS National Wetlands Inventory Mapping and Delineated Wetlands in the Study Area.

4.4 FISH AND WILDLIFE HABITATS

4.4.1 Terrestrial and Aquatic Vegetation

Lands in the surrounding area are primarily undeveloped and used for recreation at Monroe Lake, with scattered rural residences north of Stipp Road and east of Moores Creek Road. Areas adjacent to the roadways are primarily hardwood forest with old fields comprised of grassy, treeless areas, and open water land cover types also present. In southern Indiana, oak-hickory is the predominant hardwood forest type (USFS, 2016). Typical canopy trees within an oak-hickory forest include American beech (*Fagus grandifolia*), hickory (*Carya spp.*), maple (*Acer spp.*), oak (*Quercus spp.*), pine (*Pinus spp.*), and tulip poplar (*Liriodendron tulipifera*) (USFS, 2016). Common understory tree species include dogwood (*Cornus spp.*), hophornbeam (*Ostrya virginiana*), and sassafras (*Sassafras albidum*) (USFS, 2016; Pierce, Parker, and Rabenold, 2006). The herbaceous layer may contain various ferns, grasses, sedges, and wildflowers (IUB, 2019).

Moores Creek Road is bounded by tall, mature trees including several oak species such as chestnut oak (*Q. montana*) and white oak (*Q. alba*), silver maple (*A. saccharinum*), box elder (*A. negundo*), American beech (*F. grandifolia*), sycamore (*Platanus occidentalis*), and pine trees (*Pinus spp.*). The understory is comprised of a shrubby mid-layer of pinkweed (*P. pensylvanica*). The corridor of vegetation is relatively narrow along the eastern edge of Moores Creek Road, with the western edge consisting of a wider corridor of vegetation. Trees have been completely removed along the northern portion of Moores Creek Road for residential properties. Ornamental grasses have been planted in place of these trees and adjacent to the roadway.

Stipp Road has a similar vegetation composition to Moores Creek Road. Overall, it has a thicker density of trees of varying age and height. Young medium-sized trees to taller, mature trees extend beyond both sides of the road. Some areas north of Stipp Road have been previously cleared of trees, resulting in an open field that contains an even-aged stand of shorter and younger trees. Ground cover along both Moores Creek Road and Stipp Road is comprised of fallen plant debris, native grasses, and invasive species. Butcher Branch Creek and its unnamed tributary are intermittent streams and typically do not support aquatic vegetation.

Representative photos of terrestrial vegetation along Moores Creek Road and Stipp Road are provided in Figures 10 – 13. Additional ground photos are included in Appendix C.



Figure 10 – Vegetation Along the Middle Portion of the Moores Creek Road Project Limits.



Figure 11 – Vegetation Along the Southern Portion of the Moores Creek Road Project Limits.



Figure 12 – Trees of Varying Age and Height Along the Eastern Portion of the Stipp Road Project Limits.



Figure 13 – Open Area Containing an Even-Aged Stand of Young Trees in the Western Portion of the Stipp Road Project Limits.

4.4.2 Fauna

Mammals that have the potential to be found in the study area include bats, beavers, chipmunks, cottontail rabbits, coyotes, eastern moles, fox squirrels, gray squirrels, gray foxes, groundhogs, opossums, raccoons, red foxes, striped skunks, and white-tailed deer (IDNR, 2020a). Bird types commonly found in the vicinity include raptors, songbirds, and waterfowl (IDNR, 2020a).

Although no longer protected by the federal Endangered Species Act, bald eagles (*Haliaeetus leucocephalus*) nest at Monroe Lake and receive protection under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, which prohibit harming eagles, their eggs, and their nests. Bald eagles nested in Indiana until the 1890s, though habitat loss, over-hunting, and the now-banned pesticide DDT resulted in rapid declines in U.S. populations between 1870 and 1970. Beginning in 1985, bald eagles were reintroduced to Indiana with Monroe Lake being the first reintroduction site. The reintroductions were successful and the Indiana bald eagle population continues to do well. During a USACE National Midwinter Bald Eagle Survey conducted in 2018, 179 eagles were found throughout the state (IDNR, 2018). As of 2016, there were 15 known active and inactive bald eagle nesting locations at Monroe Lake (USACE, 2016). The nearest nest location is approximately one mile southeast of the study site.

Golden Eagles (*Aquila chrysaetos*) receive the same protections as bald eagles under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The golden eagle's range encompasses most of the contiguous United States and Canada. In the western half of the United States, the species nests near cliffs or in large trees (e.g., *Pinus spp.*, *Quercus spp.*, *Eucalyptus spp.*, *Platanus spp.*, etc.) (Kochert et al., 2002). East of the Mississippi River, a smaller population of the golden eagle nest in the

Appalachian Mountains with nests and breeding pairs most prevalent in Quebec, Canada (Katzner et al., 2012). Reports of wintering golden eagles have been recorded in the Appalachian region of Pennsylvania, West Virginia, and Virginia; with regular sightings in Kentucky, Tennessee, North Carolina and New York (Katzner et al., 2012). Golden eagles are unlikely to winter or nest in southern Indiana due to the lack of suitable habitat. There is a small probability golden eagles could use Monroe Lake as a stopover during migration; however, the stopover would be short term with golden eagles only utilizing Monroe Lake and surrounding forested areas for a few days.

4.4.3 Terrestrial and Aquatic Habitat

The study area represents a transition between the terrestrial habitat of the hilly uplands to the north and the aquatic habitat of Monroe Lake to the south. Medium to high quality terrestrial habitat occurs in the forested areas outside of the existing roadways and residences. Moores Creek and other stream inflows into Monroe Lake and their adjacent wetlands contribute to the habitat diversity of the area. Butcher Branch Creek is intermittent but still likely represents additional foraging opportunities and a movement corridor for area wildlife. Monroe Lake offers high quality aquatic habitat for a variety of fish species as well as wading birds and other waterfowl. Monroe Lake backwater events that flood portions of the study area provide additional temporary foraging opportunities for fish, birds, and other wildlife.

4.5 THREATENED AND ENDANGERED SPECIES

4.5.1 Federal

The USFWS Information, Planning, and Consultation (IPaC) system was utilized to generate a species list of federally threatened, endangered, proposed or candidate species for the study area (USFWS, 2021). The report listed the endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*Myotis septentrionalis*) as potentially occurring in the study area (Appendix D). Current threats to the Indiana bats include disturbing hibernating bats during winter, as well as the commercialization of caves, loss of summer roosting habitat, pesticides and other contaminants, and white-nose syndrome (USFWS, 2007; 2009). Suitable habitat for both species occurs in the study area, though no known caves or hibernacula occur in the area. The Indiana Natural Heritage Data Center (INHDC) did not identify any known occurrences of either bat species within 0.5 mile of the project area (Appendix E). Table 4 shows the number of trees ≥ 5 inches diameter at breast height (DBH) surveyed at the study site, including trees classified herein as potential bat roost trees (PBRT). In addition to being of suitable size, PBRT are typically trees that are dead with exfoliating bark but can be living or dying trees with significant cracks, crevices, or loose bark (USFWS, 2007; USFWS, 2019). See Appendix C for photos of habitat and PBRT as well as maps showing photo locations and PBRT locations.

Table 4 – Trees ≥ 5 Inches DBH and PBRT Surveyed in Stipp Road and Moores Creek Road Study Area.

	Stipp Road	Moores Creek Road
Trees ≥ 5 " DBH	648	609
TOTAL	1,257	
Potential Bat Roost Trees (PBRT)	21	22
TOTAL	43	

4.5.2 State Listed Species

The State of Indiana maintains a list of state-ranked endangered, threatened, or rare (ETR) species. The list is organized by county and is obtained from the INHDC. The INHDC documented 30 state-endangered, 5 state-threatened, and 7 state-rare species for Monroe County. This list includes invertebrates, vertebrates, and vascular plants (Appendix E).

On November 21, 2017 AZTEC contacted IDNR requesting information on any ETR within the project area from the INHDC. The query did not identify any known ETR species occurrences, high quality natural communities, or natural areas within 0.5 mile of the project area (Appendix E). In an April 8, 2020 response to an agency scoping letter, IDNR identified the state threatened trailing arbutus (*Epigaea repens*) as documented within 0.5 mile of the project area (Appendix E).

The trailing arbutus is a prostrate, trailing, evergreen shrub that is generally found in sandy or rocky, usually xeric, woodlands with acidic soil and does not grow well under leaf cover (USFS, 2004). In the Hoosier National Forest east of the study area, trailing arbutus can be found on shaded, acidic, dry slopes adjacent to sandstone/siltstone outcrops, typically at the break of the upper slope. In Indiana, this plant species is usually associated with black oak (*Quercus velutina*), white oak (*Q. alba*), and chestnut oak (*Q. prinus*) as an overstory with an understory that includes hillside blueberry (*Vaccinium vacillans*), greenbrier (*Smilax rotundifolia*), and poverty oat grass (*Danthonia spicata*). Beckman (1994) studied four sites with known populations of trailing arbutus in south-central Indiana to identify habitat requirements and found that all the sites occur in forested areas with considerable relief characterized by steep-sided ravines and ridges, and that soils at these sites were of the Berks soil association. Three of the four sites were in Monroe County, and one of the study sites is approximately one mile north of the study area along a hillside overlooking Moores Creek. Additional known occupied sites are located on other hills of the Moores Creek drainage adjacent to the study area (Beckman, 1994). No trailing arbutus were observed during several site visits conducted by AZTEC personnel. Based on the specific habitat requirements of this species, the trailing arbutus is not expected to occur within the project footprint.

4.5.3 Critical Habitat

Designated critical habitat was established for the Indiana bat on September 24, 1976 (USFWS, 1976) and the mapped boundaries include all or portions of Monroe, Crawford, and Harrison counties in Indiana. The USFWS IPaC species list and report generated for the project identified the entire study area as within the mapped boundaries of designated critical habitat for the Indiana bat based upon conservation buffers protecting known hibernacula located in the three-county area. However, the USFWS, Bloomington Indiana Field Office confirmed in a June 16, 2021 email that the proposed project site is not considered critical habitat for the Indiana bat (Appendix E). Critical habitat has not been designated for the northern long-eared bat.

4.6 RECREATIONAL AND AESTHETIC RESOURCES

4.6.1 Local Resources

Monroe Lake provides a multitude of outdoor recreation opportunities. The lake and surrounding land are managed for recreation and wildlife through the Indiana Department of Natural Resources' Division of State Parks and Reservoirs (IDNR, 2011). On the lake, visitors can enjoy boating, fishing, and rental boat activities. Active management of the land by the IDNR also supports hunting and trapping of wildlife (IDNR, 2020d). Scattered around the lake are eight state recreation areas (SRA) that offer camping, hiking, and picnicking. The nearest SRA, Moores Creek SRA, is approximately 5 miles from the

project limits and has a boat ramp, playground, and shelter houses. According to IDNR visitor counts at SRAs, the annual average visitation to Monroe Lake from 2008 to 2018 was 933,651 people (IDNR, 2020c). During the summer, residents of Bloomington and surrounding counties venture to the lake to enjoy boating, fishing, and swimming activities. Seasonal fluctuations increase pressure on roads like Moores Creek Road and Stipp Road that allow travel around the lake.

4.6.2 Regional Resources

Monroe Lake is the largest body of water in Indiana and attracts 800,000 to 1,000,000 visitors annually from around the region (IDNR, 2020c). Besides outdoor recreation around the lake, the City of Bloomington generates tourism. Indiana University is located in Bloomington and hosts collegiate events and conventions. The city has a reputation for being a hub for art, culture, and food from around the world. The college and city appeal to a wide variety of tourists and attract approximately 1.8 million annual visitors (COB, 2018). Visitors to Bloomington may find themselves traveling through the study area to access the lake and SRAs for recreation opportunities.

4.7 CULTURAL RESOURCES

Federal nexus projects that have the potential to affect historic properties are required to adhere to the National Historic Preservation Act (NHPA) Section 106 consultation process. Historic properties may include both prehistoric/archaeological and historic sites and properties. Any potential historic properties identified within the project's Area of Potential Effect (APE) are evaluated for eligibility to be included on the National Register of Historic Places (NRHP) and the effect of the project's activities on any NRHP-eligible properties are also evaluated.

Green3, LLC (Green 3) conducted a Phase Ia Archaeological Study along Stipp Road and Moores Creek Road in the Study Area under an Archaeological Resources Protection Act (ARPA) permit (Permit Number DACW27-4-40-297) and the results were documented in a July 20, 2020 report. The study consisted of a desktop review of the Indiana State Historic Architectural and Archaeological Research Database and relevant literature as well as a field investigation. The desktop review indicated no NRHP-listed or eligible properties or cemeteries had been recorded either in or within 100 feet of the survey area. The field investigation documented that a previously recorded NRHP-ineligible site (12-Mo-1255) did not extend into the survey area and also documented two new sites (12-Mo-1678 and 12-Mo-1679). However, the two new sites (12-Mo-1678 and 12-Mo-1679) were recommended to be NRHP-ineligible (Appendix F).

SJCA, Inc. (SJCA), formerly Green 3, conducted an Addendum Phase Ia Archaeological Study along Stipp Road and Moores Creek Road for the utility relocation work areas outside the original Phase Ia Archaeological APE conducted in 2020 by Green 3. The investigation was conducted under an ARPA permit (Permit Number DACW27-4-21-212), and the results were documented in a May 14, 2021 archaeological short report. The study consisted of a desktop review of the Indiana State Historic Architectural and Archaeological Research Database and relevant literature as well as a field investigation. The desktop review indicated no NRHP-listed or eligible properties or cemeteries had been recorded either in or within 100 feet of the survey area. No archaeological sites were documented in the additional study areas for the Stipp Road or Moores Creek Road Project (Appendix F).

The existing Stipp Road bridge over Butcher Branch Creek (Bridge #912) is a single span prestressed box beam bridge that was built in 1961 but is not identified in the SHAARD database or the Indiana Historic Bridges Inventory as historic. Therefore, there are no NRHP-eligible historic properties present.

4.8 AIR QUALITY

A search of the U.S. Environmental Protection Agency (EPA) Green Book for Indiana nonattainment status by county was conducted for Monroe County. The entire county is in attainment for all regulated criteria pollutant standards (EPA, 2019).

4.9 NOISE

The primary sources of existing noise in the project area are vehicular traffic traveling on Moores Creek Road and Stipp Road and noise associated with area residences. Other sources include boat traffic and human-generated noise from water-related activities, which would be minimal and seasonal in nature. No other outstanding existing sources of noise are expected within the study area.

4.10 HAZARDOUS AND TOXIC SUBSTANCES

An office-based site assessment using data from the Indiana Department of Transportation (INDOT) Red Flag Investigation Map Service and an EPA Envirofacts website query was completed on January 9, 2020, revealing no known hazardous materials or EPA-regulated facilities in or near the project area. A hazardous materials field investigation was conducted for the study sites on December 4, 2019, by AZTEC's Hazardous Materials Manager. The investigation consisted of visual evaluation by car and on foot, evaluating the project for the presence of hazardous materials. The only concern identified was potential lead-based paint on the railing of the Stipp Road Butcher Branch Creek Bridge.

4.11 SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE

4.11.1 *Executive Order 12898 Environmental Justice*

Under *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), federal agencies are instructed to identify and address adverse environmental and human health effects on minority and low-income populations. Federal agencies are required to adopt strategies to address environmental justice concerns and incorporate concerns into the technical analysis and public involvement phases of EAs.

For this analysis, percentages of minority and low-income populations within the study area were identified using the EPA's "EJScreen" environmental justice mapping tool. According to EJScreen, minorities make up approximately 4% of the population in the study area, which is substantially lower than the state average of 21%. Approximately 20% of the population in this same area is considered low income, which is also much lower than the state average of 33% (Appendix G). Therefore, neither minority nor low-income populations are overrepresented in the study area.

4.11.2 *Executive Order 13045 Protection of Children*

Under *Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks* (1997), federal agencies must identify and assess environmental health and safety risks that may disproportionately affect children as a result of federal policies, programs, activities, and standards. For this analysis, percentages of the population under 5 and 18 years of age within the study area were identified using EJScreen. According to EJScreen, approximately 6% of the population within the study area is under the age of 5, compared with the state average of 6% (Appendix H). According to US Census Bureau American Community Survey (ACS) 2019 data, 19% of the population in the study area is under the age of 18, compared with the state average of 23% (Appendix H). Therefore, the study area population contains a lower proportion of children than the state average.

5 ENVIRONMENTAL EFFECTS OF ALTERNATIVES

The National Environmental Policy Act and the Council on Environmental Quality's NEPA Implementing Regulations require that an EA identify the likely environmental effects of a proposed project and that the agency determine whether those impacts may be significant. Effects (or impacts) are changes to the human environment from the Proposed Action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed alternatives. Effects may include ecological, aesthetic, historic, cultural, economic, social, or health effects, and can be either beneficial or adverse. The determination of whether an impact significantly affects the quality of the human environment must consider the potentially affected environment and the degree of the impacts of an action (40 C.F.R. § 1501.3(b)).

The term affected environment (or study area) refers to the area in which the Preferred Alternative or other alternatives would take place, and the potentially affected resources of the area (40 C.F.R. § 1501.3(b)). The affected environment includes reasonably foreseeable environmental trends and planned actions in the area, if applicable (40 C.F.R. § 1502.15). The term "degree" is not defined in the regulations, but generally refers to the magnitude of change that would result if the Preferred Alternative or other alternatives were implemented.

All potentially relevant resource areas were initially considered for analysis in this draft EA. Some resource topics are not discussed, or the discussion is limited in scope, due to the lack of anticipated effect from the Preferred Alternative on the resource or because that resource is not located within the project.

This Section presents the adverse and beneficial environmental effects of the alternatives considered. The section is organized by resource topic, with the effects of alternatives discussed under each resource topic. Impacts are quantified whenever possible. Qualitative descriptions of impacts are explained by accompanying text where used.

Qualitative definitions/descriptions of impacts as used in this section of the draft EA include:

Degree:

- No Effect, or Negligible – a resource would not be affected, or the effects would be at or below the level of detection, and changes would not be of any measurable or perceptible consequence.
- Minor – effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- Moderate – effects on a resource would be readily detectable, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable.
- Significant – effects on a resource would be obvious and would have substantial consequences. The resource would be severely impaired so that it is no longer functional in the project area. Mitigation measures to offset the adverse effects would be extensive, and success of the mitigation measures would not be guaranteed.

Duration:

- Short term – temporary effects caused by the construction and/or implementation of a selected alternative; and
- Long term – caused by an alternative and remain after the action has been completed and/or after it is in full and complete operation.

5.1 CLIMATE

No Action Alternative

The continuation of maintenance activities under the NAA would have negligible short term effects to climate in the study area.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

The Preferred Alternative footprint is approximately 8.0 acres in size though 1.5 acres are existing pavement or gravel driveways. This alternative would result in approximately 5.4 acres of tree removal and would add approximately 0.4 acres of pavement to the existing roadways. Ground disturbance, tree removal, and more pavement may result in a range of micro-climate changes in the study area such as increased temperatures and decreased humidity due to increases in sunlight exposure from a reduced tree canopy and increased heat radiation from exposed pavement. However, once vegetation re-establishes in the temporary impact areas Alternative 2 would have negligible short term effects to climate in the study area.

Alternative 3 – Realign Roadways and Replace Bridge

The footprint of this alternative is approximately 11.9 acres in size though roughly 0.7 acres are existing pavement or gravel driveways. Alternative 3 would also result in approximately 7.2 acres of tree removal and would add approximately 1.2 acres of new pavement to the study area. Alternative 3 could have short term impacts to climate slightly greater than Alternative 2 due to increased ground disturbance, tree removal, and additional pavement; but like Alternative 2, it would have negligible short term effects to climate in the study area.

5.2 SOILS AND GEOLOGY

5.2.1 Geology and Physiography

No Action Alternative

Under the NAA, there would be little to no ground disturbance for maintenance activities when compared with the action alternatives; therefore, the NAA would have negligible short term effects to geology and physiography.

Alternative 2 - Raise Roadways and Replace Bridge (Preferred Alternative)

This alternative would involve excavating down into the shale layer to establish footings/foundations for the Butcher Branch Creek bridge and for the retaining walls on the south side of Stipp Road on either side of Butcher Branch Creek. The geotechnical investigation report completed for this alternative recommends excavating at least two feet into the shale stratum. Alternative 2 would have negligible short term and long term effects to geological features. Due to the lack of karst features, potential mineral resources, or mineral resource extraction sites in the study area, Alternative 2 would have no effect to these features.

Alternative 3 – Realign Roadways and Replace Bridge

Like Alternative 2, Alternative 3 would require excavation into the shale layer to establish footings/foundations for a new bridge over Butcher Branch Creek but would not require retaining walls. Therefore, Alternative 3 would have negligible short term and long term effects to geological features. Due to the lack of karst features, potential mineral resources, or mineral resource extraction sites in the study area, Alternative 3 would have no effect to these features.

5.2.2 Soil Associations

No Action Alternative

Under the NAA, there would be little to no excavation or other disturbance to soils for maintenance activities when compared with the action alternatives. The NAA would have negligible short term effects to soils.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

Raising the roadways will require importing fill material from a County-approved commercial source. See Table 5 below for Alternative 2 earthwork quantities.

Table 5 – Alternative 2 Estimated Earthwork Quantities in Cubic Yards (CY).

Earthwork	Stipp Road (CY)	Moores Creek Road (CY)	Total (CY)
Fill Required	9,166	4,671	13,837
Excavation	1,756	1,684	3,440
Borrow Fill Required	7,410	2,987	10,397

The total amount of fill generated by required on-site excavation for Stipp Road and Moores Creek Road combined would be approximately 3,440 cubic yards (CY), and the total amount of fill required would be approximately 13,837 CY; therefore, the total estimated volume of fill material that would be imported into the study area would be approximately 10,397 CY.

Although some of the soil associations present in the study area are classified as prime farmland soils, the lands impacted by this alternative are not considered prime farmland because they flood frequently and serve flood control purposes and are therefore generally not available for producing food, feed, forage, fiber, or oilseed crops.

This alternative has the potential to result in soil loss due to erosion of exposed soil during construction; however, it will require a CWA Section 402 National Pollutant Discharge Elimination System (NPDES) permit that is intended to control the discharge of pollutants into waterways, such as sediment from soil erosion. In Indiana, NPDES permits are administered by the IDEM. 327 I.A.C. 15-5 or “Rule 5” establishes a construction site run-off general permit for storm water discharges from construction activities that result in one acre or more of ground disturbance (hereafter referred to as a “Rule 5 permit”). Applying for a Rule 5 permit consists of submitting a Notice of Intent (NOI) to IDEM along with a construction plan that includes a Storm Water Pollution Prevention Plan (SWPPP), which establishes Best Management Practices (BMPs) to prevent erosion and soil loss during construction. This alternative will require a Rule 5 permit and a SWPPP will be prepared and implemented with erosion control plans and BMPs to prevent erosion and soil loss during construction. BMPs implemented as part of Alternative 2 will include installing temporary erosion control measures along the perimeter of construction such as silt fence and silt fence filter berms. Filter berms and/or rock check dams will also be installed along ditches and near culvert inlets. To prevent sheet flow on exposed soils during construction, all disturbed areas

will be temporarily seeded and mulched. Once construction is complete, seeding and sodding will occur at unpaved areas. Therefore, Alternative 2 would have minor short term and long term effects to soils.

Alternative 3 – Realign Roadways and Replace Bridge

Because the roadway lengths for this alternative are longer than that of Alternative 2, more earthwork and associated soil disturbance would be required. However, because the profiles of the realigned roadways would not be raised substantially over the surrounding area, less fill material would need to be imported.

Some of the soil associations present in the study area are classified as prime farmland soils and some lands impacted by this alternative would be considered prime farmland because they do not flood as frequently and include private lands that are available for producing food, feed, forage, fiber, or oilseed crops.

Like Alternative 2, this alternative has the potential to result in soil loss due to erosion of exposed soil during construction; however, it would also require a Rule 5 permit and implementation of a SWPPP along with BMPs to prevent erosion and soil loss during construction. Alternative 3 would implement BMPs similar to the ones listed in Section 5.2.2 for Alternative 2. Therefore, Alternative 3 would have minor short term and long term effects to soils.

5.2.3 Hydric Soils

No Action Alternative

The NAA would involve little to no ground disturbance and would have negligible short term effects to hydric soils in the study area.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

Hydric soils were identified at the two delineated wetlands adjacent to the project limits. While Alternative 2 would result in ground disturbance and require earthwork, the wetlands and the associated hydric soils would be avoided. Therefore, Alternative 2 would have no effect to hydric soils.

Alternative 3 – Realign Roadways and Replace Bridge

There is an absence of hydric soil mapping or detailed data to verify or delineate the hydric soils within the study area. The absence of data does not preclude the presence of hydric soils within the study area. Alternative 3 would result in ground disturbance and require earthwork for the new roadway alignments; however, the extent to which hydric soils would be impacted is unknown. Therefore, Alternative 3 could have minor short term and long term effects to hydric soils.

5.3 SURFACE WATER AND OTHER AQUATIC RESOURCES

5.3.1 Surface Water

No Action Alternative

The NAA would have no effect to surface waters such as Butcher Branch Creek and the ephemeral drainages crossing the roadways during maintenance activities.

Alternative 2 - Raise Roadways and Replace Bridge (Preferred Alternative)

The Preferred Alternative would impact Butcher Branch Creek, its unnamed intermittent tributary, and 6 of the 9 ephemeral streams in the study area. Minor long term impacts to the intermittent and ephemeral streams would result from placing riprap at the abutments of the new Butcher Branch Creek

bridge on Stipp Road, constructing the retaining wall along the south side of Stipp Road, and extending and/or realigning culverts to maintain pass-through flow of the ephemeral streams (Table 6). Additional minor short term impacts would also occur during construction for equipment access and utility relocation.

Table 6 – Estimated Impacts to Streams in Linear Feet (LF) or Acres (AC) for Stipp Road and Moores Creek.

Site	Permanent Impact (LF)	Permanent Impact (AC)	Total Length of New Culverts (LF)	Total Length of Existing Culverts (LF)	Net Permanent Impact (LF)	Net New Encapsulation Length (LF)
Stipp Road	281	0.08	95	83	198	12
Moores Creek Road	415	0.02	152	122	293	30

These streams are considered waters of the U.S.; therefore, this alternative will require a CWA Section 404 permit and Section 401 Water Quality Certification (WQC). Impacts to waters of the U.S. resulting from this alternative are anticipated to be authorized under Indiana Regional General Permit (RGP) No. 001, which covers linear transportation projects such as this alternative that do not exceed the following impact limitations:

- Loss of waters of the U.S., including wetlands, is limited to 1.0 acre or less. However, loss of open waters (excluding natural waterbodies) is limited to 2.0 acres or less. Open waters include ponds, impoundments, and borrow/mined pits;
- Loss of waters of the U.S. is limited to 1,500 linear feet of stream channel, not to exceed 1.0 acre
- Dredging in navigable waters is limited to 10,000 cubic yards
- Structures and fills for docking and mooring are limited to similar permitted structures and fills in the vicinity; and
- "Piecemealing" of projects in order to meet these thresholds will not be allowed.

Alternative 2 impacts to waters of the U.S. (Table 6) do not exceed the impact limitations and there are no navigable waters or docking and mooring structures in the study area. This alternative also qualifies for the IDEM Section 401 WQC associated with the RGP.

For linear transportation projects, notification to the USACE is required for any work in navigable waters or when loss of waters of the U.S. will exceed 0.1 acre or there will be a discharge into a special aquatic site such as a wetland. Notification to USACE is also required when a project may affect endangered species or historic properties. Notification to IDEM is required for any impacts to waters of the U.S. Alternative 2 requires notification to USACE because it may affect endangered species (See Section 5.5.1). Notification to IDEM is also required because there will be some impacts to waters of the U.S.

Under Indiana RGP No. 001 and the associated Section 401 WQC, USACE may determine that the adverse effects are minimal and require no mitigation, but mitigation is required for projects that exceed the following thresholds:

- Impacts resulting from the loss of waters of the U.S. by relocation, encapsulation, or channelization of greater than 300 linear feet of ephemeral, intermittent, or perennial stream
- Permanent impacts greater than 0.10 acre to special aquatic sites (including wetlands) and/or loss of waters of the U.S. causing more than minimal effects

- Permanent impacts to waters of the state greater than 0.10 acre
- Permanent impacts to waters of the state greater than 300 linear feet

The Stipp Road and Moores Creek Road segments are single and complete projects with independent utility that require separate Section 404 RGPs and Section 401 WQCs. For Alternative 2, the Stipp Road segment would result in permanent impacts to 198 linear feet and 0.08 acre of waters of the U.S. (and waters of the state), which is below the thresholds requiring mitigation. The Moores Creek Road segment would result in permanent impacts to 293 linear feet and 0.02 acre of waters of the U.S. (and waters of the state). Therefore, mitigation will likely not be required for this alternative.

The Indiana Section 404 RGP No. 001 and the associated Section 401 WQC include conditions that must be met to protect surface water and other aquatic resources. All proposed activities would be conducted in accordance with those conditions, which include measures related to:

- Aquatic life and habitat
- Type of material to be used for structures, or as discharge of dredge or fill material
- Management of water flows
- Soil erosion and sedimentation
- Water quality
- Endangered species and migratory birds
- Historic properties

This alternative would also require a Rule 5 permit and implementation of a SWPPP along with BMPs to protect water quality during construction. In addition to the temporary construction BMPs listed in Section 5.2.2 for Alternative 2, riprap aprons would be installed at culvert outlets as permanent BMPs.

Alternative 3 – Realign Roadways and Replace Bridge

Alternative 3 would impact Butcher Branch Creek and approximately 10 ephemeral streams. Long term minor impacts to the intermittent and ephemeral streams would result from constructing a new Butcher Branch Creek bridge as well as constructing culverts to allow pass-through flow of the ephemeral streams. Additional minor short term impacts would also occur during construction for equipment access as well as obliteration of the old roadway alignments, bridge, and culverts. All obliterated areas would be returned to natural ground surface and would be seeded with native species. Streams that were once culverted would be returned to natural flow paths and conditions. Although this alternative is unlikely to impact the unnamed tributary of Butcher Branch Creek, the realigned roadways cross more ephemeral streams than Alternative 2 and would be constructed where there are no existing culverts, which is likely to result in greater net long term effects and encapsulation via culverts when compared to Alternative 2.

Like Alternative 2, this alternative would require a CWA Section 404 permit, Section 401 WQC, and a Rule 5 permit (with BMPs similar to those listed in Sections 5.2.2. and 5.3.1 for Alternative 2) that require measures to protect water quality from both long term and short term impacts.

5.3.2 Groundwater

No Action Alternative

The NAA would have no effect on groundwater levels or quality within or outside of the study area.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

This alternative would involve excavating down into the shale layer to establish footings/foundations for the Butcher Branch Creek bridge and for the retaining walls on the south side of Stipp Road on either side of Butcher Branch Creek. The geotechnical investigation report recommends excavating at least two feet into the shale stratum, which is 5 to 10 feet below ground surface, and ground water was encountered 7 feet below ground surface at 2 of the 5 borings. Therefore, groundwater will likely be encountered during excavations to construct the Butcher Branch Creek Bridge and the retaining walls south of Stipp Road. Any ground water inflow into shallow excavations would be adequately controlled by conventional methods such as gravity drainage and/or sump pumps. However, additional water exclusion methods may be required to protect deeper excavations depending on creek flow.

Alternative 2 would have short term negligible effects to ground water quality at the Butcher Branch Creek Bridge and retaining walls south of Stipp Road, primarily in the form of increased turbidity due to the excavation work. Due to the lack of karst features, no effect to ground water through karst conduits is expected for this alternative.

This alternative requires a CWA Section 404 permit, Section 401 WQC, and a Rule 5 permit that require measures and BMPs to protect water quality from both long term and short term effects. The BMPs listed in Sections 5.2.2 and 5.3.1 for Alternative 2 would be implemented to protect water quality throughout the construction limits. Should turbid ground water require removal from excavations, the turbid water would either be filtered or discharged into settling basins to reduce turbidity before either being discharged back into the excavations or Butcher Branch Creek or its unnamed tributary.

Alternative 3 – Realign Roadways and Replace Bridge

This alternative would also require excavating down into the shale layer to establish footings/foundations for a new Butcher Branch Creek bridge, though no retaining walls would be necessary. Like Alternative 2, ground water may be encountered at these excavations and construction would have similar short term negligible effects to ground water quality. Due to the lack of karst features in the study area, no effect to ground water through karst conduits is expected for Alternative 3.

This alternative would also require a CWA Section 404 permit, Section 401 WQC, and a Rule 5 permit that require measures to protect water quality from both long term and short term impacts. Similar BMPs to those listed in Sections 5.2.2 and 5.3.1 for Alternative 2 would be implemented to protect water quality for Alternative 3.

5.3.3 Floodplains**No Action Alternative**

The NAA would have no effect to the floodplain. Moores Creek Road and Stipp Road are within the 100-year floodplain but would remain at their existing elevations under the NAA. Maintenance activities would have no effect on the water surface elevation or extent of the 100-year floodplain.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

The Preferred Alternative would replace the existing Butcher Branch Creek bridge on Stipp Road with a bridge that has a larger opening, but would raise the elevation of both roadways, which can increase the water surface elevation and extent of the 100-year floodplain. The drainage report prepared for this alternative identifies a 0.5-foot increase in the 100-year floodplain surface elevation for Butcher Branch Creek upstream of the proposed bridge due to raising the elevation of Stipp Road. There are no adverse

water surface elevation or velocity impacts downstream of the proposed bridge south of Stipp Road. The 0.5-foot increase upstream of the proposed bridge results in only a minor increase in the floodplain extent that will be limited to USACE property north of the bridge and will not impact any buildings or structures. Coordination with the local floodplain administrator would occur to determine the need for a FEMA Letter of Map Revision. Therefore, Alternative 2 would have negligible long term effects to the floodplain.

Alternative 3 – Realign Roadways and Replace Bridge

Alternative 3 would realign most of the Stipp Road and Moores Creek roadways outside the 100-year floodplain though some portions would remain within it. Under this alternative, a new bridge would be constructed at Butcher Branch Creek within the 100-year floodplain, which may increase the floodplain water surface elevation and extent upstream of the bridge. Although the realigned roadways would not be drastically higher in elevation than the surrounding topography, their elevations would be somewhat higher, which again could increase the floodplain water surface elevation and extent. However, these impacts would likely be similar to that of Alternative 2, and coordination with the local floodplain administrator would also occur to determine the need for a FEMA Letter of Map Revision. Therefore, Alternative 3 would have negligible long term effects to the floodplain.

5.3.4 Wetlands

No Action Alternative

The NAA would have no effect to wetlands in the project area. Maintenance activities are unlikely to leave the existing pavement and encroach upon the delineated wetlands in the study area.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

The two delineated wetlands at the study area are not within the construction limits and would be avoided by restricting project activities to the construction limits. To avoid impacting these wetlands, the construction contractor will be informed of their locations and temporary fencing and signage will be erected at the wetland boundaries to mark the areas that need to be avoided. Thus, no effect to wetlands are anticipated under Alternative 2.

Alternative 3 – Realign Roadways and Replace Bridge

Alternative 3 would not impact the two wetlands delineated in the study area. However, this alternative would have long term minor effects to a wetland located within the proposed Stipp Road alignment (Figure 9). Due to the location of the proposed roadway alignment, avoidance of the wetland is unlikely. To construct Alternative 3 the wetland would be filled, resulting in long term minor effects to water resources. Depending on the size of the wetland, Alternative 3 could have long term minor effects to water resources, and could require mitigation.

5.4 FISH AND WILDLIFE HABITAT

5.4.1 Terrestrial and Aquatic Vegetation

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Occasional clearing of understory terrestrial vegetation and tree limbing would occur if vegetation were to restrict right-of-way access or impede other maintenance activities. Vegetation clearing would be infrequent and limited to areas adjacent to the existing roadways. Minimal encroachment upon vegetation adjacent to the project limits would be expected. Therefore, effects to vegetation would be negligible and short term.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

Alternative 2 would result in approximately 6.5 acres of ground disturbance to vegetated areas, including 5.4 acres of tree removal, though 3.0 of the 6.5 acres total would occur within the temporary disturbance area that is likely to revegetate on its own. To minimize and mitigate the short term impacts to vegetation, all disturbed areas would be seeded with native species where appropriate. Areas currently consisting of non-native grass species such as the residential areas east of Moores Creek Road would be seeded with non-native but non-invasive grass species. Therefore, Alternative 2 would have minor short term and long term effects to terrestrial vegetation, and no effects to aquatic vegetation.

Alternative 3 – Realign Roadways and Replace Bridge

This alternative would result in approximately 11.2 acres of ground disturbance to vegetated areas, including 7.2 acres of tree removal, though 3.8 of the 11.2 acres total would occur within the temporary disturbance area that is likely to revegetate on its own. The old roadway alignments, bridge, and culverts would be obliterated, returned to natural ground surface, and seeded with native species. Streams that were once culverted would be returned to natural flow paths and conditions. The alternative would have a greater short term and long term impact to vegetation; however, like Alternative 2, all disturbed areas would be seeded with native species where appropriate or non-native but non-invasive plant species at residential areas. Therefore, Alternative 3 would have minor short term and long term effects to terrestrial vegetation, and no effects to aquatic vegetation.

5.4.2 Fauna**No Action Alternative**

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Maintenance activities such as mowing and culvert clean out could result in direct injury or mortality to any wildlife present, such as small mammals, reptiles, and amphibians. However, impacts to wildlife would be expected to be minor and localized and these activities would not result in a substantial harm to individuals or loss of habitat. Because the nearest known bald eagle nest is approximately one mile southeast of the study area, the NAA would have no effect to bald eagles. No golden eagle nests occur within the study area and maintenance activities are unlikely to impact golden eagles that utilize Monroe Lake as a stopover during migration; therefore, no effects to golden eagles are expected to occur under the NAA.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

As described above, Alternative 2 would result in approximately 6.5 acres of ground disturbance to vegetated areas, including 5.4 acres of tree removal, though 3.0 of the 6.5-acre total would occur within the temporary disturbance area that is likely to revegetate on its own. These activities may result in direct injury or mortality to wildlife present during construction including small mammals, reptiles, amphibians, and eggs or young of birds. Potential impacts to wildlife present in the area caused by construction-related activities would not result in a substantial harm to individuals or loss of habitat. In addition, tree clearing would only occur during the Indiana bat inactive period between October 1 – March 31, which also avoids the general bird nesting season and potential impacts to nesting birds. Because the nearest known bald eagle nest is approximately one mile southeast of the study area, Alternative 2 would have no effect to bald eagles. No golden eagle nests occur within the study area and construction activities are unlikely to impact golden eagles that utilize Monroe Lake as a stopover during migration; therefore, no effects to golden eagles are expected to occur under this alternative.

No perennial watercourses would be impacted by this alternative; therefore, no direct impacts to fish or other aquatic wildlife are expected. In addition, this alternative would require a CWA Section 404 permit, Section 401 WQC, and a Rule 5 permit that require measures to protect water quality. The BMPs listed in Sections 5.2.2 and 5.3.1 for Alternative 2 would be implemented to protect water quality; therefore, no impacts to the aquatic ecosystem are expected.

Alternative 3 – Realign Roadways and Replace Bridge

As described above, this alternative would result in approximately 11.2 acres of ground disturbance to vegetated areas, including 7.2 acres of tree removal, though 3.8 of the 11.2 acres total would occur within the temporary disturbance area that is likely to revegetate on its own. Because of the larger footprint, this alternative would likely have a greater impact to wildlife. However, like Alternative 2, construction would not result in a substantial loss of individuals or habitat for wildlife that would threaten wildlife population viability or significant loss of habitat. In addition, tree clearing would also only occur during the Indiana bat inactive period between October 1 – March 31 under this alternative, which also avoids the avian reproductive season and potential impacts to nesting birds. The nearest known bald eagle nest is approximately one mile southeast of the study area; because the roadway alignments for Alternative 3 are north of the existing Stipp Road and Moores Creek Road alignments, no effects to bald eagles are expected to occur under this alternative. No golden eagle nests occur within the study area and construction activities are unlikely to impact golden eagles that utilize Monroe Lake as a stopover during migration; therefore, no effects to golden eagles are expected to occur under this alternative.

Alternative 3 would not impact any perennial watercourses and would therefore have no direct impacts to fish or other aquatic wildlife. In addition, Alternative 3 would also require a CWA Section 404 permit, Section 401 WQC, and a Rule 5 permit that require measures to protect water quality. Similar BMPs to those listed in Sections 5.2.2. and 5.3.1 for Alternative 2 would be implemented for Alternative 3; therefore, no impacts to the aquatic ecosystem are expected.

5.4.3 Terrestrial and Aquatic Habitats

No Action Alternative

Maintenance activities conducted under the NAA such as mowing and other vegetation control would be limited to areas adjacent to the existing roadways. Therefore, the NAA would have negligible effects to terrestrial and aquatic habitat.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

Alternative 2 would convert approximately 0.4 acres of natural ground surface to pavement and result in approximately 6.5 acres of ground disturbance to vegetated areas, including 5.4 acres of tree removal that is medium to high quality terrestrial wildlife habitat. However, 3.0 of the 6.5-acre total would occur within the temporary disturbance area that is likely to revegetate on its own. Therefore, Alternative 2 would have minor short term and long term effects to terrestrial habitat. Due to the lack of aquatic habitat within the Alternative 2 footprint, no direct impacts to aquatic habitat are expected and no indirect downstream impacts are expected because the BMPs listed in Sections 5.2.2 and 5.3.1 for Alternative 2 would be implemented to protect water quality and avoid those impacts.

Alternative 3 – Realign Roadways and Replace Bridge

Alternative 3 would convert approximately 1.2 acres of natural ground surface to pavement and result in approximately 11.2 acres of ground disturbance to vegetated areas, including 7.2 acres of tree removal that is medium to high quality terrestrial wildlife habitat. However, 3.8 of the 11.2 acres total would

occur within the temporary disturbance area that is likely to revegetate on its own. The old roadway alignments, bridge, and culverts would be obliterated, returned to natural ground surface, and seeded with native species. Streams that were once culverted would be returned to natural flow paths and conditions. Therefore, Alternative 3 would have minor short term and long term effects to terrestrial habitat. Alternative 3 would also directly impact wetlands identified by National Wetlands Inventory mapping within the proposed Stipp Road alignment. However, like Alternative 2, no indirect impacts to aquatic habitat are expected and no indirect downstream impacts are expected because BMPs similar to those listed in Sections 5.2.2 and 5.3.1 for Alternative 2 would be implemented to protect water quality and avoid those impacts.

5.5 THREATENED AND ENDANGERED SPECIES

5.5.1 Federal

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Maintenance activities would be restricted to the existing roadways and immediately adjacent areas and would not include tree removal. Therefore, the NAA would have no effect to the federally listed bats.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

This alternative would result in the removal of approximately 5.4 acres of trees that represent suitable summer habitat for the Indiana bat and northern long-eared bat, though 2.1 of the 5.4-acre tree removal total would occur within the temporary disturbance area that is likely to revegetate on its own. The majority of tree removal would occur within 100 feet of the existing edges of pavement of Stipp Road and Moores Creek Road. This tree removal includes tree removal within Duke Energy easements to allow access and the replacement and relocation of utilities adjacent to the construction limits. There would be no permanent lighting installed as a part of this project and no night work requiring temporary lighting is expected to occur. No known hibernacula or roost sites such as caves, mines, or known roost trees would be impacted. A total of 925 trees \geq 5 inches DBH would be removed, including 43 PBRT (21 along Stipp Road and 22 along Moores Creek Road). Table 7 below provides tree removal information for this alternative. See Appendix C for photos of habitat and PBRT as well as maps showing photo locations and PBRT locations.

Table 7 – Alternative 2 Removal of Trees \geq 5 inches DBH, Including PBRT.

	Stipp Road			Moores Creek Road		
	Construction Limits	Equipment Access Area	Duke Energy Work Area (Extrapolated)	Construction Limits	Equipment Access Area	Duke Energy Work Area (Extrapolated)
Trees ≥ 5" DBH	264	172	69	272	144	4
Sub-Totals	505			420		
TOTAL	925					
Potential Bat Roost Trees (PBRT)	21			22		
TOTAL	43					

To minimize impacts to forest-dwelling bats, all tree clearing would occur during the inactive period between October 1 – March 31; and would be limited to that specified in project plans. This alternative involves tree removal that is expected to have minor short term effects to the Indiana bat and northern long-eared bat. The USFWS has concurred that the Preferred Alternative may affect, but is not likely to adversely affect, the Indiana bat and northern long-eared bat in email correspondence on June 16, 2021, and did not require mitigation for tree removal but strongly encouraged replanting disturbed areas with native trees and shrubs where possible to maintain bat habitat in the long term (Appendix E). All disturbed areas would be seeded with native species where appropriate or non-native but non-invasive plant species at residential areas.

Alternative 3 – Realign Roadways and Replace Bridge

This alternative would result in the removal of approximately 7.2 acres of trees that represent suitable summer habitat for the Indiana bat and northern long-eared bat, though 2.5 of the 7.2-acre tree removal total would occur within the temporary disturbance area that is likely to revegetate on its own. In addition, much of the tree removal would occur more than 100 feet from the existing edges of pavement of Stipp Road and Moores Creek Road. Like Alternative 2, there would be no permanent lighting installed as a part of this project, no night work requiring temporary lighting is expected to occur, and no known hibernacula or roost sites such as caves or mines would be impacted. A survey of trees, including PBRT, within the project limits would need to occur to further determine the extent of impacts to bats.

To minimize impacts to forest-dwelling bats, all tree clearing would also occur during the inactive period between October 1 – March 31; and would be limited to that specified in project plans. Due to the amount of tree removal, Alternative 3 would be expected to have minor short term effects to the Indiana bat and northern long-eared bat. However, consultation with the USFWS would need to occur before an official effects determination for the Indiana bat and northern long-eared bat is made.

5.5.2 State Listed Species

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Maintenance activities such as mowing and other vegetation control would be limited to areas immediately adjacent the existing roadways that do not support suitable habitat for the trailing arbutus. Therefore, the NAA would have no effect to this state-listed species.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

Suitable habitat for the trailing arbutus does not occur within the footprint of Alternative 2. Although some associated plant species such as white and chestnut oak (*Quercus spp.*) occur within the footprint, the Stipp Road and Moores Creek Road study sites are low-lying, relatively flat, and do not contain dry slopes adjacent to sandstone/siltstone outcrops or soil units that consist of the Berks soil association. Therefore, Alternative 2 would have no effect to this state-listed species.

Alternative 3 – Realign Roadways and Replace Bridge

Although a portion of the proposed Stipp Road alignment for Alternative 3 would intersect the lower edge of a hill, it is unknown whether sandstone/siltstone outcrops would be impacted. Thus, it is unlikely that suitable habitat occurs within the footprint of Alternative 3 because none of the soil units

present in the study area consist of the Berks soil association. Therefore, Alternative 3 would have no effect to this state-listed species.

5.5.3 Critical Habitat

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Maintenance activities include vegetation management and may include tree trimming but would be limited to areas immediately adjacent to the existing roadways that are not located in designated critical habitat for the Indiana bat. Therefore, no effect to Indiana bat critical habitat is expected from the NAA.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

This alternative would result in the removal of approximately 5.4 acres of trees that represent suitable summer habitat for forest-dwelling bats, though 2.1 of the 5.4-acre total would occur within the temporary disturbance area that is likely to revegetate on its own. The majority of tree removal would occur within 100 feet of the existing edges of pavement of Stipp Road and Moores Creek Road. This tree removal includes tree removal that would occur within Duke Energy easements to allow access, and the replacement and relocation of utilities adjacent to the construction limits. While PBRTs are located in the project footprint, trees are not a limited resource in the project area and the habitat potentially impacted by the project is not considered critical habitat for listed species. To minimize impacts, tree clearing would occur during the inactive period between October 1 – March 31; and would be limited to that specified in project plans. Therefore, this alternative would have no effect to Indiana bat critical habitat.

Alternative 3 – Realign Roadways and Replace Bridge

This alternative would result in the removal of approximately 7.2 acres of trees that represent suitable summer habitat for forest-dwelling bats, though 2.5 of the 7.2 acre total would occur within the temporary disturbance area that is likely to revegetate on its own. In addition, much of the tree removal would occur more than 100 feet from the existing edges of pavement of Stipp Road and Moores Creek Road. While PBRTs could be potentially located in the project footprint, trees are not a limited resource in the project area and the habitat potentially impacted by the project is not considered critical habitat for listed species. To minimize impacts, tree clearing would also only occur during the inactive period between October 1 – March 31; and would be limited to that specified in project plans. This alternative is not located in designated critical habitat for the Indiana bat. Therefore, no effect to Indiana bat critical habitat would occur under this alternative.

5.6 RECREATIONAL AND AESTHETIC RESOURCES

5.6.1 Local Resources

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. This alternative would not decrease the frequency or duration of flooding for the roads, therefore flooding of the road and road closures would still occur. Road closures negatively impact visitors trying to access SRAs and Monroe Lake by reducing access and forcing visitors to seek out alternate or detour routes to the lake and associated SRAs, resulting in longer travel times. Maintenance activities conducted under the NAA are unlikely to result in negative impacts to aesthetic resources in the study area because they would be limited to minor activities along the existing roadways. Therefore, the NAA would have no effect to local resources.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

This alternative would not directly impact any recreational features associated with Monroe Lake but would reduce the frequency and duration of roadway flooding in the study area, thereby having the beneficial impact of improving access for visitors of Monroe Lake and the associated SRAs. However, Alternative 2 would have short term minor impacts to the aesthetics along Stipp Road and Moores Creek during construction, and long term minor impacts due to the 5.4 acres of tree removal and increased overall roadway footprint. However, as previously described, 2.1 of the 5.4-acre tree removal total would occur within the temporary disturbance area that is likely to revegetate on its own.

Alternative 3 – Realign Roadways and Replace Bridge

Like Alternative 2, this alternative would not directly impact any recreational features associated with Monroe Lake but would reduce the frequency and duration of roadway flooding in the study area, thereby having the beneficial impact of improving access for visitors of Monroe Lake and the associated SRAs. Alternative would have minor effects to the aesthetics of the area, both short term and long term. The existing Stipp Road and Moores Creek Road alignments would be obliterated and would require time to revegetate. Furthermore, Alternative 3 would require more tree removal to construct the greater overall roadway footprints than Alternative 2.

5.6.2 Regional Resources

Because Monroe Lake and associated SRAs are also the primary regional recreational and aesthetic resources within or near the study area, impacts would be similar to those described for local resources.

No Action Alternative

The NAA would not decrease the frequency or duration of flooding for the roads, which negatively impacts visitors trying to access SRAs and Monroe Lake. Maintenance activities conducted under the NAA are unlikely to result in negative impacts to aesthetic resources in the study area because they would be limited to minor activities along the existing roadways. Therefore, the NAA would have no effect to regional resources.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

This alternative would not directly impact any recreational features associated with Monroe Lake but would reduce the frequency and duration of roadway flooding in the study area, thereby having the beneficial impact of improving access for visitors of Monroe Lake and the associated SRAs. However, Alternative 2 would have a short term impacts to the aesthetics along Stipp Road and Moores Creek during construction, and long term minor impacts due to the 5.4 acres of tree removal and increased overall roadway footprint. However, as previously described, 2.1 of the 5.4-acre tree removal total would occur within the temporary disturbance area that is likely to revegetate on its own.

Alternative 3 – Realign Roadways and Replace Bridge

Like Alternative 2, this alternative would not directly impact any recreational features associated with Monroe Lake but would reduce the frequency and duration of roadway flooding in the study area, thereby having the beneficial impact of improving access for visitors of Monroe Lake and the associated SRAs. However, this alternative would have minor impacts to the aesthetics of the area, both short term and long term. The existing Stipp Road and Moores Creek Road alignments would be obliterated and would require some time to revegetate. Furthermore, Alternative 3 would require more tree removal to construct the greater overall roadway footprints than Alternative 2.

5.7 CULTURAL RESOURCES

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Maintenance activities would be limited to the existing roadways and immediately adjacent areas within the area covered by the Phase 1a Archaeological Study and Addendum Report that determined no NRHP-listed or eligible historic properties were present. Therefore, the NAA would have no effect to historic properties.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

The Phase 1a Archaeological Study and Addendum Phase 1a Archaeological Study were conducted for the footprint of this Alternative and the study reports concluded that no NRHP-listed or eligible historic properties will be affected by this alternative (Appendix F). The USACE consulted with the State Historic Preservation Office (SHPO) and Tribes in accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA) on May 25, 2021 and July 13, 2021. The following Tribes were consulted: Absentee Shawnee Tribe of Indians of Oklahoma, the Eastern Shawnee, Shawnee Tribe of Oklahoma, Saginaw Chippewa Indian Tribe of Michigan, Delaware Nation, Miami Tribe of Oklahoma, Peoria Tribe of Oklahoma, Wyandotte Nation of Oklahoma, Bad River Band of Lake Superior Chippewa, Citizen Potawatomi Nation, Pokagon Band of Potawatomi, Gun Lake Tribe, Nottawaseppi Huron Band of Potawatomi, Forest County Potawatomi, Hannahville Indian Community, Kickapoo Tribe of Kansas, Kickapoo Tribe of Oklahoma, Kickapoo Traditional Tribe of Texas, Prairie Band of Potawatomi, Bois Forte Band of Chippewa, Grand Portage Band of Lake Superior of Chippewa, Fond du lac Band of Lake Superior, Grand Traverse Band of Ottawa and Chippewa, Lac du Flambeau Band of Lake Superior, Lac Vieux Desert Band of Lake Superior, Grand Traverse Band of Ottawa and Chippewa, Lac Courte Oreilles Band of Chippewa, Leech Lake Band of Ojibwe, Mille Lacs Band of Ojibwe, Little River Band of Ottawa, Ottawa Tribe of Oklahoma, Little Traverse Bay Band of Odawa, Red Lake Chippewa, Red Cliff Band of Lake Superior Chippewa, St. Croix Chippewa Community, and Sault Ste Marie Tribe of Chippewa.

The SHPO concurred with this determination via letter dated August 10, 2021 (Appendix E). The Eastern Shawnee Tribe concurred with this determination and that the project can move forward as planned via letter dated September 8, 2021 (Appendix E). No other comments or responses were received. Therefore, Alternative 2 would have no effect to historic properties.

Alternative 3 – Realign Roadways and Replace Bridge

A detailed cultural resources investigation was not completed for the Area of Potential Effects of this alternative. The Indiana SHAARD Historic Buildings, Bridges, and Cemeteries map did not indicate the presence of any known NRHP-listed or eligible historic properties within or near the footprint of Alternative 3. However, it is unknown if any NRHP-eligible archaeological sites are located within the footprint; therefore, Alternative 3 has the potential to have minor long term effects to historic properties.

5.8 AIR QUALITY

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Roadway maintenance practices for both roads may consist of activities such as pavement repair or replacement, culvert clean outs, snow removal, and vegetation control, as necessary. These activities may result in negligible increases in emissions of dust and equipment exhaust, though these would be localized and temporary in nature. The maintenance

activities serve as the baseline for air quality in the study area; therefore, the NAA would not contribute additional emissions beyond the baseline levels and would have no effect to air quality.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

Construction activities under this alternative would likely result in increases in emissions of dust and vehicle exhaust from equipment, though these would be localized and temporary in nature and not expected to permanently impact air quality in the study area. Alternative 2 would not add any additional lanes and therefore would not increase vehicle capacity that could result in permanent increases in emissions from vehicles traveling the roadways. Therefore, Alternative 2 would have negligible short term effects to air quality.

Alternative 3 – Realign Roadways and Replace Bridge

Like Alternative 2, construction activities under this alternative would likely result in increases in emissions of dust and vehicle exhaust from equipment, though these would be localized and temporary in nature and not expected to permanently impact air quality in the study area. However, because the footprint of this alternative is larger and would require obliterating the existing Stipp Road and Moores Creek alignments, the short term impacts would be greater than Alternative 2. Alternative 3 would not add any additional lanes and therefore would not increase vehicle capacity that could result in permanent increases in emissions from vehicles traveling the roadways. Therefore, Alternative 3 would have negligible short term effects to air quality.

5.9 NOISE

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Roadway maintenance practices for both roads may consist of activities such as pavement repair or replacement, culvert clean outs, snow removal, and vegetation control, as necessary. These activities would not contribute additional noise and serve as the noise baseline levels. Therefore, the NAA would have no effect to noise.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

Alternative 2 would increase noise above baseline levels during construction, though this would be localized and temporary in nature. No night work is anticipated, which would help minimize construction noise impacts to local residences. This alternative would not add additional lanes that would increase vehicle capacity, which can result in permanent increases in noise levels. The roadways would be raised by approximately four feet, which can project noise further out from the roads, leading to the perception of increased noise levels. However, due to the limited vehicle speeds and traffic levels in the study area combined with existing noise screening in the form of trees, this alternative is unlikely to substantially increase baseline noise levels. Therefore, Alternative 2 would have negligible short term and long term effects to noise.

Alternative 3 – Realign Roadways and Replace Bridge

This alternative would also result in temporary and localized increases in noise above baseline levels during construction, though these temporary impacts are likely to be greater than Alternative 2 due to the larger footprint and obliteration of the existing Stipp Road and Moores Creek Road alignments. Like Alternative 2, this alternative would not add additional lanes that would increase vehicle capacity and result in permanent increases in noise levels. Alternative 3 would not raise roadway profiles like Alternative 2; however, the Alternative 3 proposed alignments would position the roadways closer to

residences east of Moores Creek Road, which is likely to result in a permanent increase in noise levels at those residences greater than that of Alternative 2. Therefore, Alternative 3 would have minor short term and long term effects to noise.

5.10 HAZARDOUS AND TOXIC SUBSTANCES

No Action Alternative

Under the NAA, Moores Creek Road and Stipp Road would be maintained by the Monroe County Highway Department in their existing conditions. Roadway maintenance practices for both roads may consist of activities such as pavement repair or replacement, culvert clean outs, snow removal, and vegetation control, as necessary. Because of the lack of known hazardous materials or EPA-regulated facilities along the existing roadways, it is unlikely hazardous materials would be encountered. Maintenance activities could generate hazardous materials through fuel or chemical spills, though these would be treated as they occur in accordance with applicable regulations. Therefore, there would be no effects to the environment from hazardous materials.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

This alternative would replace the existing bridge over Butcher Branch Creek including the bridge railings, which may have been painted with lead-based paint. If this paint needs to be removed from the railing, lead abatement measures would be implemented during the work. Due to the lack of other known hazardous materials or EPA-regulated facilities along the existing roadways, it is unlikely any other hazardous materials would be encountered.

Construction activities are not anticipated to generate any new hazardous materials and/or potential pollutants. However, hazardous materials BMPs would be developed and implemented as part of the SWPPP prepared for this alternative to avoid or minimize hazardous materials releases. For example, as part of the SWPPP materials would be stored in a manner to prevent or minimize spills reaching soils, groundwater, or surface water. Any releases would be treated as they occur in accordance with applicable regulations (e.g., the use of absorbent materials as a barrier for spills occurring near an inlet to a storm water conveyance system) and reported to IDEM's 24-hour Emergency Spill Line. Therefore, there would be negligible short term effects to the environment from hazardous materials.

Alternative 3 – Realign Roadways and Replace Bridge

This alternative would remove the existing bridge over Butcher Branch Creek including the bridge railings, which may have been painted with lead-based paint. If this paint needs to be removed from the railing, lead abatement measures would be implemented during the work. Due to the lack of other known hazardous materials or EPA-regulated facilities in the study area, it is unlikely any other hazardous materials would be encountered.

Construction activities are not anticipated to generate any new hazardous materials and/or potential pollutants. However, hazardous materials BMPs would be developed and implemented as part of the SWPPP prepared for this alternative to avoid or minimize hazardous materials releases. Any releases would be treated as they occur in accordance with applicable regulations and reported to IDEM's 24-hour Emergency Spill Line. Therefore, there would be negligible short term effects to the environment from hazardous materials.

5.11 SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE

5.11.1 Executive Order 12898 Environmental Justice

No Action Alternative

The study area does not contain a higher proportion of minority or low-income populations when compared to state averages; thus, the NAA would have no disproportionate effect on minority or low-income populations and is in compliance with Executive Order 12898.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

The study area does not contain a higher proportion of minority or low-income populations when compared to state averages; thus, Alternative 2 would have no disproportionate effect on minority or low-income populations and is in compliance with Executive Order 12898. Alternative 2 would have the beneficial impact of improving access to all local residences as well as for all visitors of Monroe Lake and the associated SRAs.

Alternative 3 – Realign Roadways and Replace Bridge

The study area does not contain a higher proportion of minority or low-income populations when compared to state averages; thus, Alternative 3 would have no disproportionate effect on minority or low-income populations and is in compliance with Executive Order 12898. Alternative 3 would also have the beneficial impact of improving access to all local residences as well as for all visitors of Monroe Lake and the associated SRAs.

5.11.2 Executive Order 13045 Protection of Children

No Action Alternative

The study area contains a lower proportion of children than the state average. The NAA would conduct maintenance activities on the existing roadways and would have no disproportionate effect on environmental health or safety risks for children. Therefore, the NAA would not disproportionately impact children and would be in compliance with Executive Order 13045.

Alternative 2 – Raise Roadways and Replace Bridge (Preferred Alternative)

The study area contains a lower proportion of children than the state average. Alternative 2 would have the beneficial impact of improving access to all local residences as well as for all visitors of Monroe Lake and the associated SRAs. This is also likely to reduce health and safety risks by reducing travel times to and from the study area for medical purposes. Therefore, this alternative would have no disproportionate effect on environmental health or safety risks for children and would be in compliance with Executive Order 13045.

Alternative 3 – Realign Roadways and Replace Bridge

The study area contains a lower proportion of children than the state average. Alternative 3 would also have the beneficial impact of improving access to all local residences as well as for all visitors of Monroe Lake and the associated SRAs. This is also likely to reduce health and safety risks by reducing travel times to and from the study area for medical purposes. Therefore, this alternative would have no disproportionate effect on environmental health or safety risks for children and would be in compliance with Executive Order 13045.

6 SUMMARY OF ENVIRONMENTAL EFFECTS

The following table summarizes the potential environmental and socioeconomic consequences of implementation of each alternative, including the no action alternative.

Table 8 – Environmental and Socioeconomic Consequences for Each Alternative.

Resource	Alternative 2	Alternative 3	No Action Alternative
Climate	Negligible short term effects	Negligible short term effects	Negligible short term effects
Soils and Geology	Negligible to minor short term and long term effects	Negligible to minor short term and long term effects	Negligible short term effects
Surface Water and Other Aquatic Resources	Negligible to minor short term and long term effects	Negligible to minor short term and long term effects	No effect
Fish and Wildlife Habitats	Negligible to minor short term and long term effects	Negligible to minor short term and long term effects	Negligible short term effects
Threatened and Endangered Species	May affect, not likely to adversely affect the Indiana bat and northern long-eared bat; no effect to state-listed species; no effect to Indiana bat critical habitat	Minor short term effects to the Indiana bat and northern long-eared bat; no effect to state-listed species; no effect to Indiana bat critical habitat	No effect
Recreational and Aesthetic Resources	Minor short term and long term effects	Minor short term and long term effects	No effect
Cultural Resources	No effect	No effect to minor long term effects	No effect
Air Quality	Negligible short term effects	Negligible short term effects	No effect
Noise	Negligible short term and long term effects	Minor short term and long term effects	No effect
Hazardous and Toxic Substances	Negligible short term effects	Negligible short term effects	No effect
Socioeconomic and Environmental Justice	No effect	No effect	No effect

Degree:

- No Effect, or Negligible – a resource would not be affected, or the effects would be at or below the level of detection, and changes would not be of any measurable or perceptible consequence.
- Minor – effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- Moderate – effects on a resource would be readily detectable, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable.
- Significant – effects on a resource would be obvious and would have substantial consequences. The resource would be severely impaired so that it is no longer functional in the project area. Mitigation measures to offset the adverse effects would be extensive, and success of the mitigation measures would not be guaranteed.

Duration:

- Short term – temporary effects caused by the construction and/or implementation of a selected alternative; and
- Long term – caused by an alternative and remain after the action has been completed and/or after it is in full and complete operation.

7 COMPLIANCE WITH ENVIRONMENTAL LAWS

Construction of the Preferred Alternative would not commence until the proposed actions achieve environmental compliance with the applicable laws and regulations, as described below. Environmental compliance for any proposed actions would be achieved upon coordination of this Environmental Assessment with appropriate agencies, organizations, and individuals for their review and comments.

Bald and Golden Eagle Protection Act (codified as amended at 16 U.S.C §§ 668-668c).

In compliance.

The Bald and Golden Eagle Protection Act contains requirements on USACE projects concerning bald and golden eagles. The nearest known bald eagle nest is approximately one mile southeast of the study sites. No golden eagle nests occur within the study area and construction activities are unlikely to impact golden eagles that may utilize Monroe Lake as a stopover during migration. Therefore, no effects to bald eagles or golden eagles are expected to occur under the Preferred Alternative.

Clean Air Act (codified as amended at 42 U.S.C. §§ 7401-7671g).

In compliance.

The purpose of this Act is to protect public health and welfare by the control of air pollution at its source, and to set forth primary and secondary National Ambient Air Quality Standards to establish criteria for States to attain or maintain. Minor and temporary releases would occur during construction activities for actions to maintain or improve the roadways and bridge in the study area (e.g., fugitive dust, internal combustion engine emissions); however, these emissions would be short term and localized. Therefore, effects to air quality under the Preferred Alternative would be negligible and short term in nature.

Federal Water Pollution Control Act (Clean Water Act) (codified as amended at 33 U.S.C. 1251-1387).*In progress.*

The objective of this Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters (33 U.S.C. 1251). The USACE regulates discharges of dredge or fill material into waters of the U.S. pursuant to Section 404 of the Clean Water Act. This permitting authority applies to all waters of the U.S. including navigable waters and wetlands. CWA Section 404 requires a USACE permit to place dredged or fill material into water bodies or wetlands. For the Preferred Alternative a Section 404 permit from USACE and Section 401 WQC from IDEM is required. A CWA Section 404 permit and associated Section 401 WQC would also be required for Alternative 3. The Preferred Alternative would be authorized under the CWA Section 404 Indiana RGP No.001 with notification to both USACE and the IDEM. IDEM also oversees the state's National Pollutant Discharge Elimination System (NPDES) CWA program. The NPDES program regulates discharges of pollutants to waters of the State and includes those stormwater discharges from construction activities that are authorized by the Rule 5 permit. The Preferred Alternative will require a Rule 5 permit and associated SWPPP to protect water quality. A WQC pursuant to CWA Section 401 was obtained from IDEM on [Insert Date] for permanent impacts that would result from improvements to the roadway and bridge. The signed (pending) RGP No.001 is located in the draft EA Appendix E.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).*In compliance.*

Typically, CERCLA is triggered by (1) the release or substantial threat of a release of a hazardous substance into the environment; or (2) the release or substantial threat of a release of any pollutant or contaminant into the environment that presents an imminent threat to the public health and welfare. To the extent such knowledge is available, 40 C.F.R. Part 373 requires notification of CERCLA hazardous substances in a land transfer if any hazardous substance was stored, known to have been released, or disposed of on the lands subject to transfer. New easement is proposed to be granted to the County for the Preferred Alternative; however, no hazardous substances have been stored, known to have been released, or disposed of on the lands subject to the easement.

Endangered Species Act of 1973 (codified as amended at 16 U.S.C. §§ 1531-1544).*In compliance.*

Section 7 (16 U.S.C. 1536) of the Endangered Species Act states that all Federal departments and agencies shall, in consultation with and with the assistance of the Secretary of the Interior (Secretary), insure that any actions authorized, funded, or carried out by them do not jeopardize the continued existence of any threatened or endangered (T&E) species, or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary to be critical.

This draft EA assessed the Preferred Alternative and provides a Biological Assessment with determinations of effect to the species listed in Section 5.5.1 of this draft EA. The Preferred Alternative may affect but is not likely to adversely affect the Indiana bat and northern long-eared bat. The District received concurrence on these determinations from the USFWS in email correspondence on June 16, 2021 (Appendix E).

Environmental Justice (E.O. 12898).*In compliance.*

Federal agencies shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States. The Preferred Alternative is not expected to disproportionately affect minority or low-income populations.

Fish and Wildlife Coordination Act (codified as amended at 16 U.S.C § 661).*In progress.*

The FWCA requires governmental agencies, including the USACE, to coordinate activities so that adverse effects on fish and wildlife would be minimized when water bodies are proposed for modification. An agency scoping letter dated March 5, 2020 was sent to the USFWS Bloomington Field Office and no response was received. However, the USFWS Bloomington Indiana Field Office will also have the opportunity to comment on the draft EA during the public review period. Any comments received from the agency will be evaluated and necessary changes will be incorporated into the Final EA. The comments received from the agency will also be provided as a reference in the Final EA's Appendix E.

Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C §§ 703-712).*In compliance.*

The Migratory Bird Treaty Act of 1918 (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over utilization. Executive Order 13186 (2001) directs agencies to take certain actions to implement the act. The USACE will consult with the USFWS (through their review of the draft EA) with regard to their consideration of the effects of the actions identified in the alternatives for potential effects on migratory birds. No effects are anticipated.

National Historic Preservation Act (codified as amended at 54 U.S.C. § 300101).*In Compliance.*

Section 106 of National Historic Preservation Act of 1966 requires that Federal agencies take into account the effects of its undertakings on historic properties eligible to, or listed on, the NRHP. This process, implemented and guided by regulations set forth in 36 C.F.R. Part 800, requires Federal agencies to establish the undertaking, initiate consultation, identify consulting parties, notify the public, define an area of potential effect, identify historic properties and/or cultural resources within the Area of Potential Effect, assess the adverse effects and resolve them through either consultation or the signing a MOA. Within this process, the Advisory Council on Historic Preservation (ACHP) is provided a reasonable opportunity to comment on the undertaking.

The Preferred Alternative, Alternative 2, will not impact any NRHP-listed or eligible historic properties. The USACE consulted with the State Historic Preservation Office (SHPO) and Tribes in accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA) on May 25, 2021 and July 13, 2021. The SHPO concurred with this determination via letter dated August 10, 2021 (Appendix E). The Eastern

Shawnee Tribe concurred with this determination and stated the project may continue as planned via letter dated September 8, 2021 (Appendix E). No other comments or responses were received.

National Environmental Policy Act (NEPA) (codified as amended 42 U.S.C. §§ 4321-4347).

In progress.

This draft Environmental Assessment and Finding of No Significant Impact (FONSI) has been prepared in accordance with the Council on Environmental Quality's NEPA Implementing Regulations (40 C.F.R. §§ 1500-1508). If it is found there is no significant impact, an Environmental Impact Statement (EIS) is not required. The signing of the FONSI by the District Commander will complete compliance of NEPA.

Noise Pollution and Abatement Act of 1972 (42 U.S.C. §§ 4901-4918).

In compliance.

This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Federal agencies are required to limit noise emissions to within compliance levels. The Preferred Alternative, Alternative 2, would increase noise emission levels within the study area above current levels temporarily due to construction of improvements or features identified in the alternative. Appropriate measures would be taken to keep the noise level within the compliance levels.

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403)

In compliance.

This law prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. There are no navigable waters of the U.S. within the study area.

Floodplain Management (E.O. 11988).

In compliance.

Section 1 of E.O. 11988 requires each agency to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. The actions identified in the draft EA would result in a minor (0.5-foot) increase in the floodplain extent that would be limited to the USACE property north of the bridge and will not impact any buildings or structure. The 8-step analysis for floodplain management was performed for the Preferred Alternative and is provided in Appendix B.

Protection of Wetlands (E.O. 11990).

In compliance.

Federal agencies shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies responsibilities. Each agency, to the extent permitted by law, shall avoid undertaking or providing

assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands, which may result from such use. The actions identified in the no action alternative and Alternative 2 would not involve construction in, or affects to, wetlands. Impacts to a wetland would occur under Alternative 3.

8 PUBLIC INVOLVEMENT

In compliance with 33 C.F.R 230.11, this draft EA will be circulated for a 30-day review to concerned agencies, organizations, and the interested public. All comments received during this review period will be evaluated and necessary changes will be incorporated into the Final EA. All received comments will be provided in Appendix I of the Final EA. The Final EA and FONSI will be retained in the Louisville District's administrative files for future reference and as a record of NEPA compliance.

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