



US Army Corps
of Engineers
Louisville District®

Fulton County, Indiana County Road 350 N

Section 14

DRAFT Detailed Project Report and Environmental Assessment

7/5/2016





DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DIVISION, GREAT LAKES AND OHIO RIVER
CORPS OF ENGINEERS
550 MAIN STREET
CINCINNATI, OH 45202

CELRD-PD-S

07 July 2016

MEMORANDUM for Louisville District Commander, (CELRD-PM-P-F/Nathan Moulder),
PO Box 59, Louisville, KY 40201-0059

SUBJECT: Approval of Draft Detailed Project Report & Environmental Assessment, Section 14
Project, County Road 350 North, Fulton County, Indiana

1. Reference CELRD-PM-P-F Memorandum, District Transmittal Package for the County Road 350 North, Fulton County, Indiana, Section 14 Project, MSC Decision Milestone (MDM) Draft Detailed Project Report (DPR) dated May 26, 2016, copy attached.
2. The MSC review team has conducted a quality assurance and policy compliance review of the subject report and provided comments in DrChecks. The District provided responses to the DrChecks comments and submitted a revised Draft Detailed Project Report and Environmental Assessment dated 5 July 2016. An MSC Decision Milestone briefing by the District was not needed.
3. The MSC Chief of Planning and Policy is providing approval and release of this Section 14 Draft Detailed Project Report and Environmental Assessment for public review.
4. The point of contact for the MSC's approval is Phil Tilly, and can be reached at 513-684-3025.

FOR THE COMMANDER:

A handwritten signature in black ink that reads "Noel C. Clay".

Encl

NOEL C. CLAY
Chief, Planning and Policy Division

**County Road 350 N, Fulton County, Indiana
CAP Section 14
DRAFT Detailed Project Report (DPR)
AND
Environmental Assessment**

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1 INTRODUCTION

1.1 PROJECT AUTHORITY

This project is being conducted under Section 14 of the Flood Control Act of 1946, as amended, which authorizes the US Army Corps of Engineers (USACE) to study, design and construct emergency streambank and shoreline works to protect public services including (but not limited to) streets, bridges, schools, water and sewer lines, National Register Historic sites, and churches from damage or loss by natural erosion. It is a Continuing Authorities Program (CAP) which focuses on water resource related projects of relatively smaller scope, cost and complexity.

1.2 PROJECT OVERVIEW

Traditional USACE civil works projects are of wider scope and complexity and are specifically authorized by Congress. Section 14 is among the authorities delegated to plan, design, and construct certain types of water resource and environmental restoration projects without specific Congressional authorization.

Projects conducted under the Section 14 authorization are completed in two phases. The Fulton County project is currently in the first phase (Feasibility), which identifies a viable solution that will stabilize the eroding streambank and protect County Road 350 N. This phase concludes with a Detailed Project Report (DPR) and Environmental Assessment that documents the Corps of Engineer's decision to proceed with the second phase of the project (Design and Implementation). The Feasibility phase for Fulton County is being conducted at full Federal expense and is scheduled to conclude in September 2016. In order to proceed with Design and Implementation (D&I), the project proposed in the DPR must be in compliance with Corps of Engineers policy regarding the implementation of Section 14 projects.

Upon approval of the DPR, and subject to the availability of Federal and non-Federal funds, the project would proceed into the Design and Implementation Phase (D&I). The D&I Phase is cost-shared with the non-federal sponsor at a 65% Federal and 35% non-Federal cost-share ratio, which is outlined in a Project Partnership Agreement (PPA) executed between the Corps of Engineers and the non-federal-sponsor. The PPA defines the obligations of the Federal government and the sponsor in the construction, maintenance, and cost sharing of the project. No more than 12 months should pass between the start of the PPA and the time the project is ready for construction.

1.3 STUDY PURPOSE AND NEED

This investigation was initiated by a request from the Fulton County Highway Department to investigate stabilization solutions for approximately 100 linear feet of the left descending bank of the Tippecanoe River adjacent to County Road 350 North in Fulton County, Indiana.

Local officials indicate that the initial bank failure at this location occurred in 2009 after a large sycamore tree fell into the river. When this occurred, bank material was taken with the root wad exposing the bank to additional scour and erosive flow conditions. The County completed a temporary repair (Photo 1); however, erosion is still active upstream and downstream of the repair site.

The County Road is currently open; however during communications with the Fulton County Highway Department in March of 2016, it was expressed that the road will likely be closed if additional erosion occurs. Closure of this road would disrupt local traffic patterns (including emergency response times); county school bus routes; and access to an Indiana Department of Natural Resources boat launch from the east on County Road 350 N.

The Louisville District conducted an initial field inspection along the left bank at River Mile 107.2 of the Tippecanoe River in Fulton County, Indiana on June 9, 2015. A second site visit was conducted by the Louisville District's Engineering Division on September 3, 2015 to collect data and evaluate an additional bank failure upstream of the temporary riprap repair, which occurred in late July. The Federal Interest Determination (FID), an interim milestone that occurs during the feasibility study to confirm the viability of a project, was approved for this project on September 23, 2015 by the US Army Corps of Engineers, Great Lakes and Ohio River Division.

During the first inspection the river was high, which prevented an adequate inspection of the bank to determine the cause of the erosion. The Tippecanoe River remained high until late August. The second inspection revealed that the river thalweg is adjacent to the bank, with a water depth of between 4 and 5 feet and near vertical banks upstream and downstream of the temporary repair. In October 2015, a survey team from the Corps completed a topographic survey of the left descending bank along the area of study. The data shows that the bank slopes are approximately 1.5H: 1V with many locations failing and having a 1H: 1V slope.

Based on the field inspection it is apparent that the primary cause of the erosion is the stream velocity along the bank. As the river makes essentially a 180 degree turn, the primary channel where the higher velocities reside shifts to along the left bank (Photo 1). During periods of high flow, the velocities increase significantly and are capable of scouring away the bank material within the lower bank, thereby undermining the upper bank, resulting in a bank failure with a near vertical failure plane.

The predominant soil type that makes up the upper bank is a silty-sand, which provides enough cohesiveness to maintain near-vertical slopes. Vegetation and the associated root systems on the upstream and downstream of the erosion site also provide temporary reinforcement for the bank material.



Photo 1. View upstream from erosion site

1.4 LOCATION

1.4.1 Study Area

The project is located in north-central Indiana in Fulton County approximately 100 Miles north of Indianapolis and 60 miles west of Fort Wayne (Figure 1). Rochester, Indiana is approximately 4 miles south of the project site. The erosion site on County Road 350 North is contained within the Menominee Public Fishing Area, which is owned and maintained by the Indiana Department of Natural Resources. Specifically, the area of concern is located on the Tippecanoe River at River Mile 107.6 along the left bank of the river in a horseshoe bend (Latitude 41° 6' 23", Longitude 86° 12' 30").

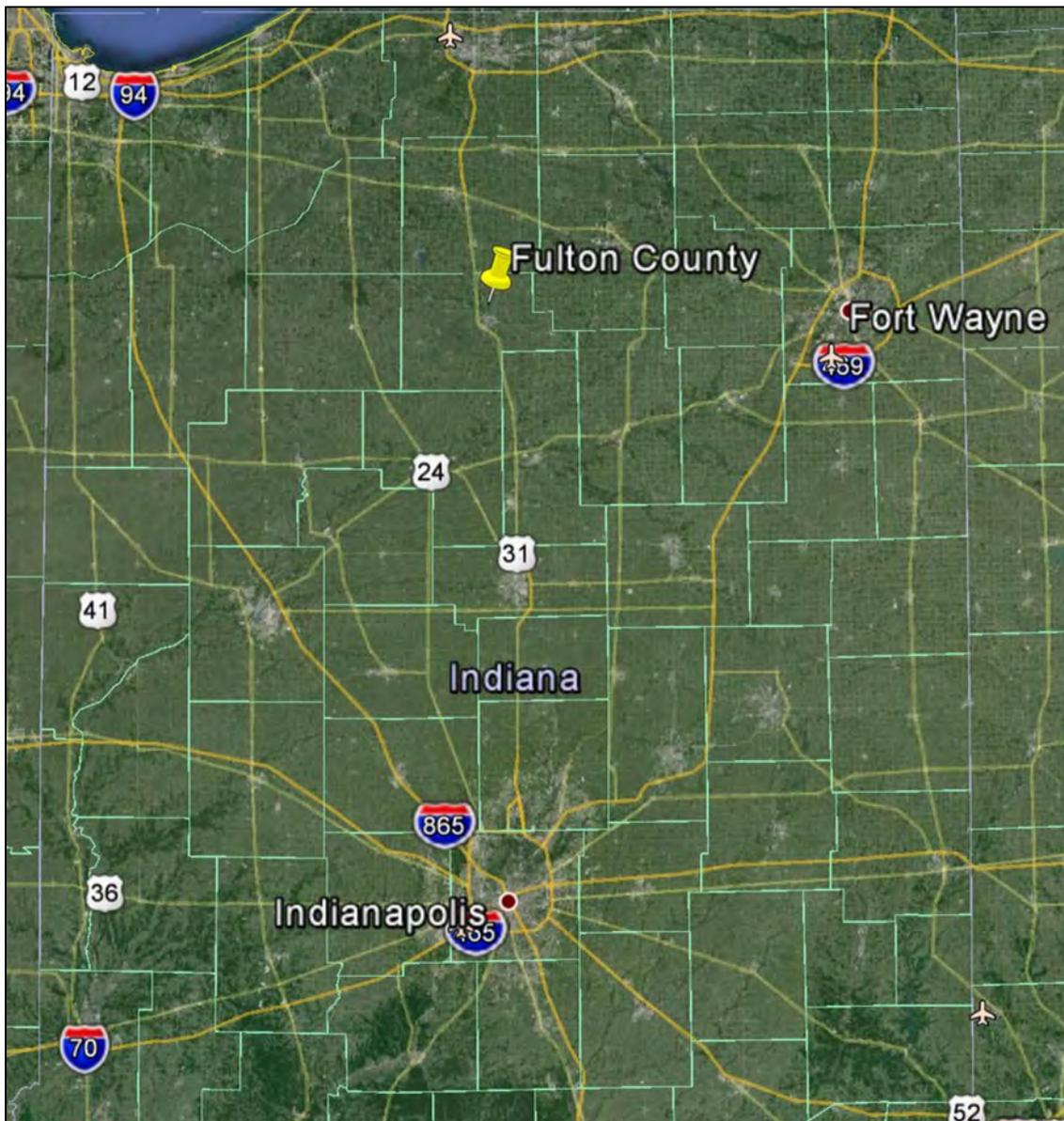


Figure 1 Location of Study Area

1.4.2 Project Area

Approximately 250 linear feet of bank have failed adjacent to the Tippecanoe River along this stretch of County Road 350 N. The county has placed road barriers at the site to improve safety, but erosion is still active and the streambank is nearly vertical at this location.

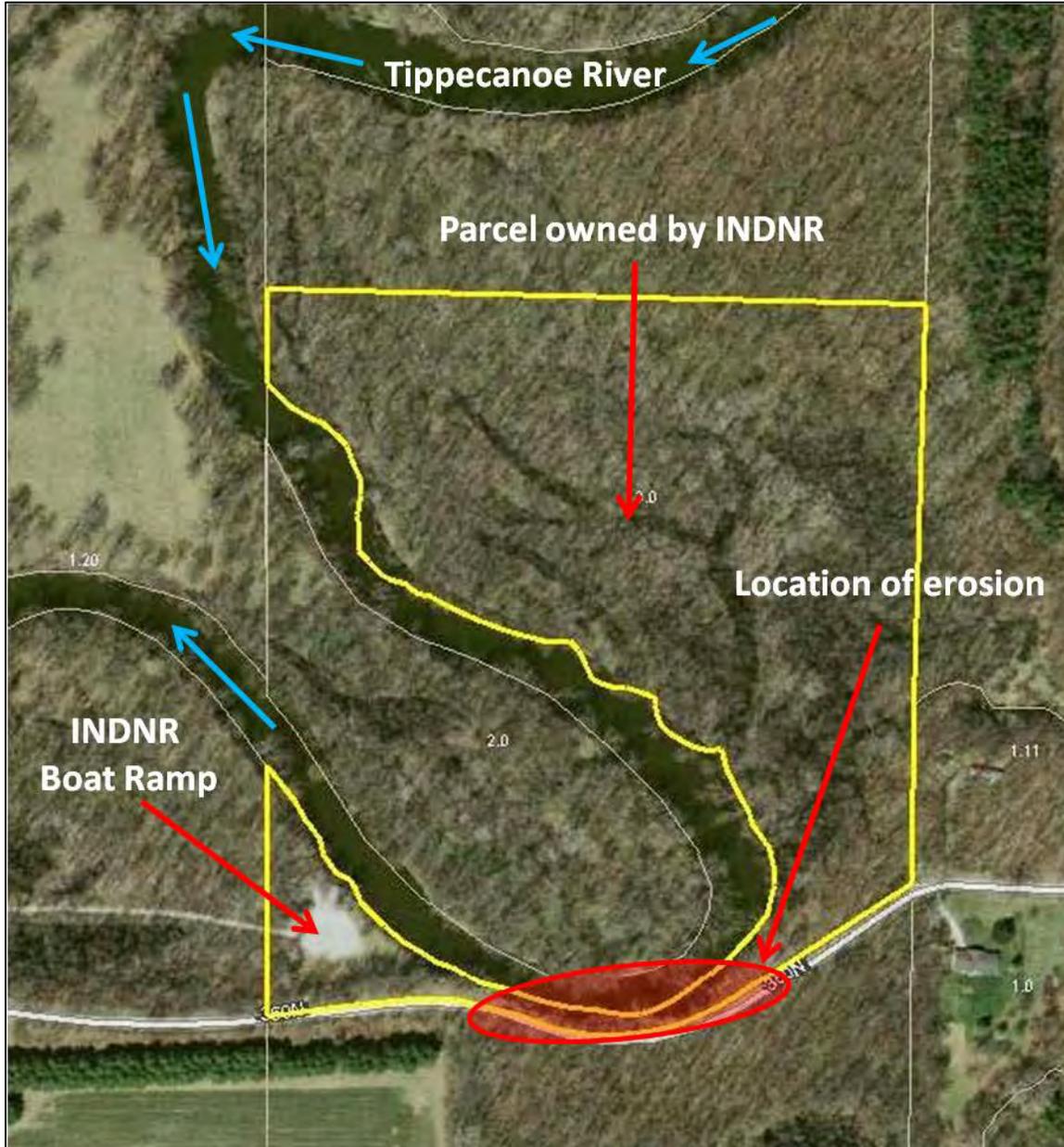


Figure 2 Location of Project Area and Key Features

1.5 RELEVANT PRIOR STUDIES AND REPORTS

There are no USACE projects or reports in the project area that would inform the formulation of this project. In 2011 Fulton County completed a temporary stabilization project in order to keep the road open to vehicles. Survey information for that project was reviewed and it was determined that it no

longer reflected existing conditions at the site. In the 2011 survey, the bank slopes are shown as being approximately 2 horizontal to 1 vertical, which would be considered stable. Updated surveys indicate that the bank is near vertical.

2 AFFECTED ENVIRONMENT - EXISTING CONDITIONS

2.1 CLIMATE

Figure 3 depicts averages for temperature and precipitation using data from National Oceanic and Atmospheric Administration (NOAA) weather station (IN127482) in Rochester, Indiana. This is the closest station to the project site, approximately three miles away. In association with global climate change, the annual mean precipitation and temperature is projected to increase over North America with droughts and flood events increasing in frequency and intensity (IPCC 2007a, 2007b).

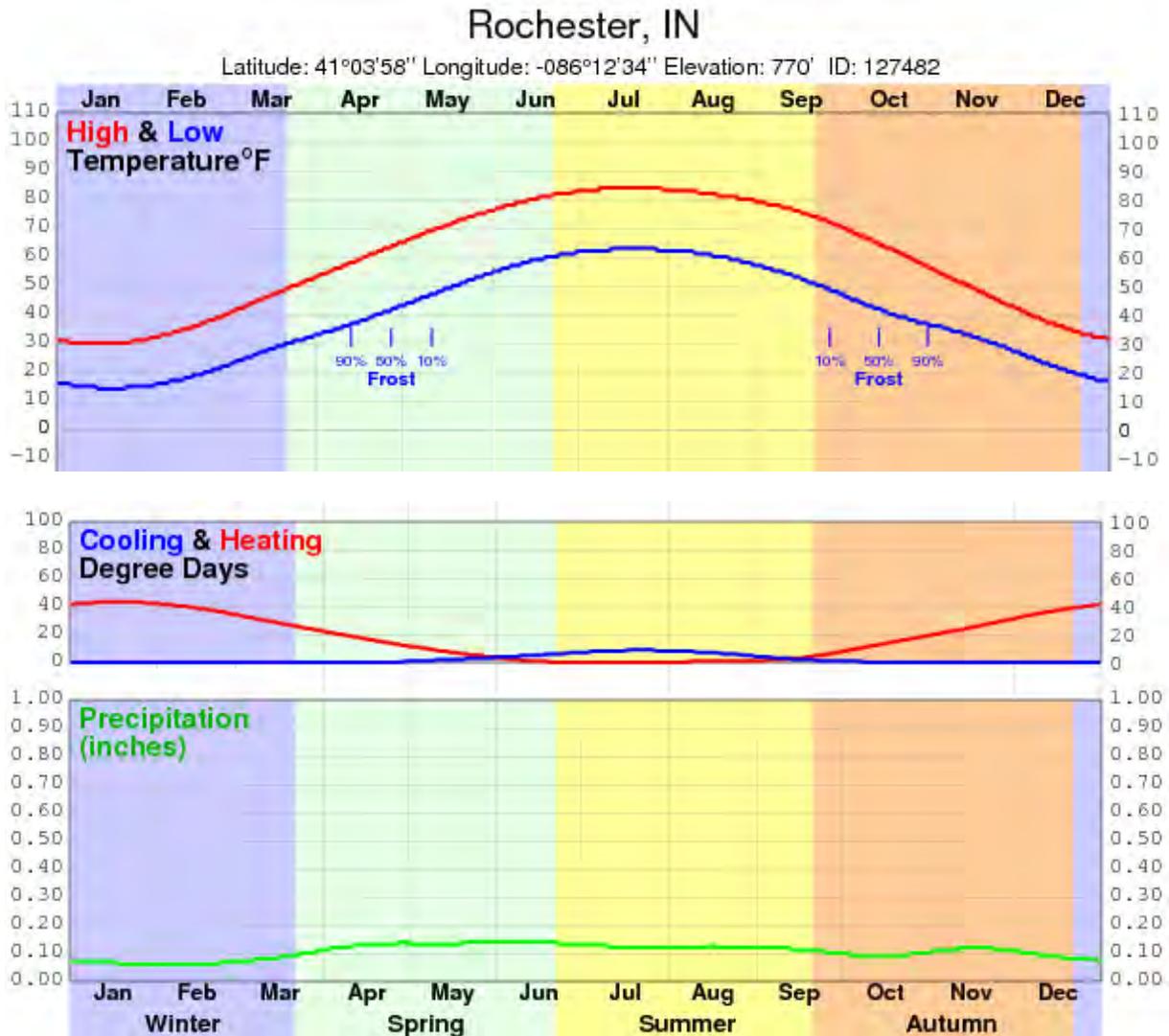


Figure 3. Temperature and precipitation averages for Rochester, Indiana from 1971 to 2006.

2.2 SOILS AND GEOLOGY

2.2.1 Geology and Physiography

The project area lies near the southern end of the Northern Moraine and Lake physiographic region, near the border the Silurian and Mississippian bedrock units. The bedrock in this area is old seafloor sediment made up of shales, siltstones, limestones, and dolomites, which is buried under many feet of glacial drift.

2.2.2 Soil Associations

The project area lies within the Spinks-Houghton-Boyer soil association. According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, the majority of the project site is contained in the Ormas loamy sand map unit. The upstream and downstream peripheries of the project site are mostly Cohoctah fine sandy loam, which is classified by the NRCS as occasionally flooded. The Kosciusko-Ormas complex with two to six percent slopes comprises a small percentage of the soils on the downstream boundary of the project site. The NCRS soil map can be found in the Environmental Appendix.

2.2.3 Hydric Soils

According to the Indiana State Soil Geographic (STATSGO) database, the project area lies within the Spinks-Houghton-Boyer soil association and is comprised of approximately 20 percent hydric soils.

2.3 SURFACE WATER AND OTHER AQUATIC RESOURCES

2.3.1 Surface Water

The proposed project would be implemented on the left descending bank of the Tippecanoe River. The Tippecanoe River has its origins in Noble and Whitley Counties and drains 1,950 square miles (Hoggatt, 1975) in northern and central Indiana before joining the Wabash River in Tippecanoe County, Indiana. Figure 4 depicts the eight digit Hydrologic Unit Code that encompasses the Tippecanoe River. Despite being surrounded by agricultural land, the river generally exhibits good water quality that supports excellent biodiversity.

The Tippecanoe River in Fulton County was listed on the Draft Indiana Department of Environmental Management *2012 Section 303(d) List of Impaired Waters*. The list is a requirement of states under Sections 305(d) and 303(d) of the Clean Water Act (CWA). The causes of impairment for the Tippecanoe River included polychlorinated biphenyls (PCBs), total mercury and, *E. coli*. Waters are considered impaired due to the presence of mercury or PCBs, or both in the edible tissue of fish collected from them at levels exceeding Indiana's human health criteria for these contaminants. To date, the U.S. Environmental Protection Agency (EPA) has not issued a decision regarding Indiana's 2012 303(d) List of Impaired Waters.

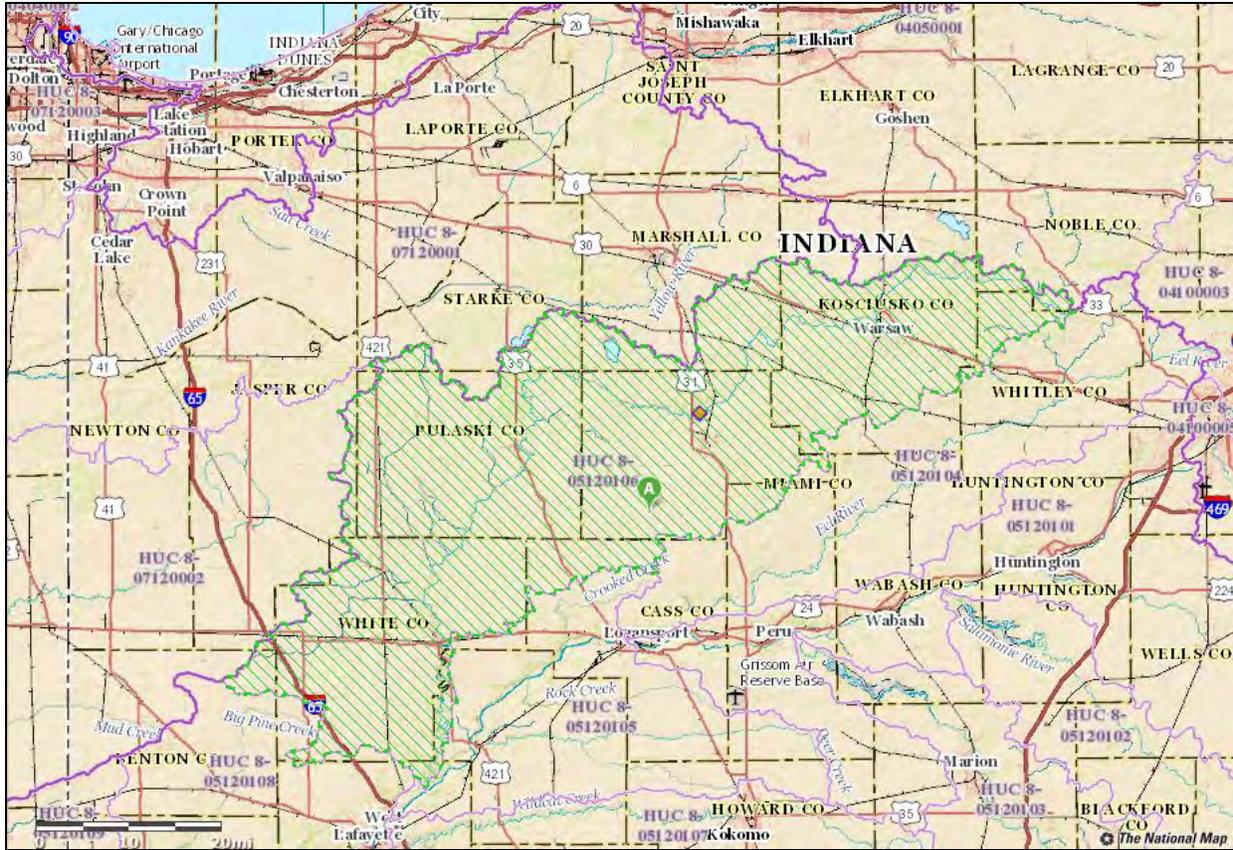


Figure 4. Tippecanoe River watershed (HUC 8)

2.3.2 Groundwater

Groundwater flow direction in the majority of Fulton County is generally towards the Tippecanoe River and westward. Potentiometric surface elevations near the project area are directly influenced by water levels of the river, but are generally around 765 feet above mean sea level. See the Environmental Appendix for a potentiometric surface map of aquifers in Fulton County.

2.3.3 Flood Plains

In the vicinity of the proposed project, the Tippecanoe River is characterized by a wide floodplain, which includes most of the proposed project area. County Road 350 N is just outside the floodplain; however, any project implemented below the elevation of the road will be in the 100-year floodplain of Tippecanoe River (Figure 5).

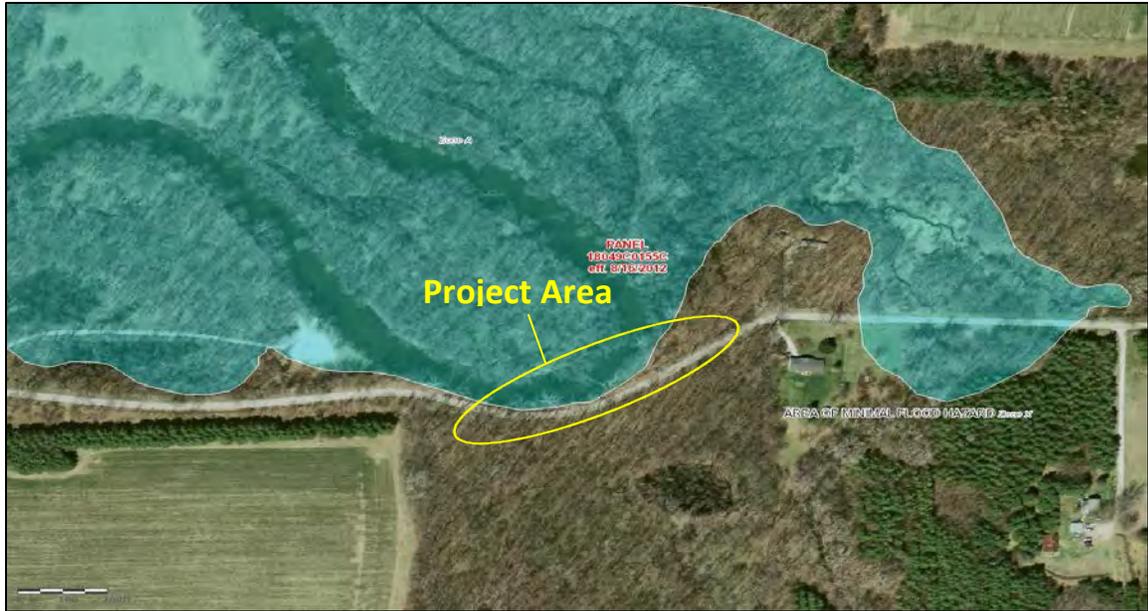


Figure 5. Floodplain map at and surrounding the proposed project area

2.3.4 Wetlands

The United States Fish and Wildlife Service (USFWS), National Wetlands Inventory classifies both sides of the Tippecanoe River at the project site as freshwater forested/shrub wetlands (Figure 6). An official

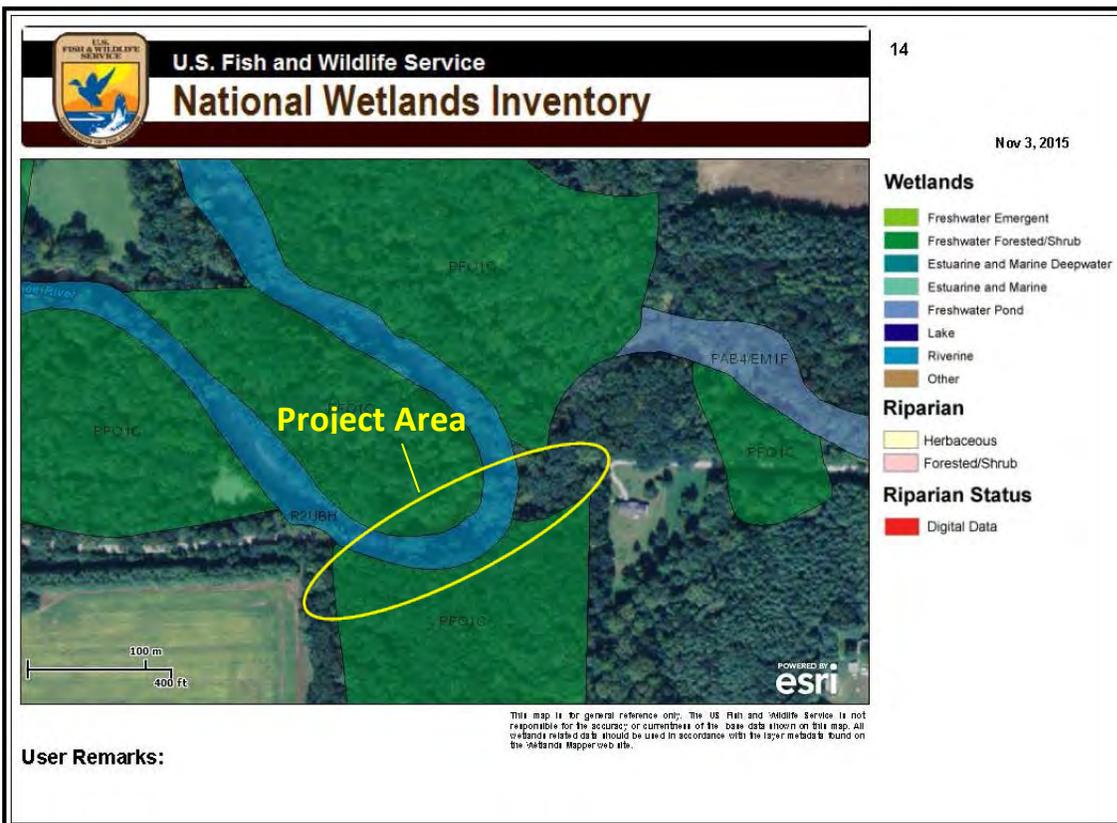


Figure 6. USFWS National Wetlands Inventory map of the proposed project area

wetland delineation was not performed; however, a site visit on December 10, 2015 by the USACE project biologist confirmed the National Wetland Inventory map appears to accurately reflect wetland locations and classifications in the project area.

2.4 FISH AND WILDLIFE HABITATS

2.4.1 Terrestrial and Aquatic Vegetation

Land use within the Tippecanoe River watershed is predominantly agricultural, although several urban areas (Warsaw, Rochester, Winamac) fall within its boundaries. Erosion at the proposed project site has eliminated much of the streambank vegetation, leaving an eroded steep slope with minimal vegetation remaining (Photo 2). There are approximately 40 to 50 trees greater than four inches diameter at breast height (DBH) on or near the slope of the river bank at the project area. The largest of the trees are American sycamores (*Platanus occidentalis*) and exceed 24 inches DBH. Other tree species include oak (*Quercus* spp.), maple (*Acer* spp.), and black cherry (*Prunus serotina*). The limited understory and shrub layer consists mostly of tree saplings and invasive honeysuckle species (*Lonicera* spp.). No aquatic vegetation was observed or recorded at the project site.



Photo 2. Photo of eroded streambank at project site, looking southwest toward temporarily protected bank section

2.4.2 Fauna

The Tippecanoe River is one of the most biologically diverse rivers in the United States. It remains one of the last strongholds for several federally endangered mussel species and a number of fish species that are rare or declining throughout their historic ranges. Because of its extensive biodiversity, the Nature Conservancy considers the Tippecanoe River as one of the top ten rivers that must be preserved.

The total number of known fish species in the Tippecanoe is 84. A 1987 survey by Carny et al. yielded 68 species from 13 different families, while surveys performed for the Nature Conservancy in 2003 and 2004 included 55 species from six families (Commonwealth Biomonitoring, 2005). All fish in the Tippecanoe River are warmwater species.

The Commonwealth Biomonitoring assessment (2005) also included mussel and macroinvertebrate surveys. Thirty-four species of mussels were recorded. All standardized macroinvertebrate biotic indices scored in the “excellent” category, except for one site in 2003, which scored as “good”.

The wooded stream banks of the Tippecanoe River offer a haven for many bird species including warblers, woodpeckers, bobwhites, and wild ducks. The USFWS identified 21 migratory bird species that may occur seasonally in the project area. See the *IPaC Trust Resource Report* in the Environmental Appendix for the full list of migratory birds identified.

2.4.3 Existing Terrestrial and Aquatic Habitats

Despite the fact that the watershed is primarily composed of erodible agricultural land and the river system has been subjected to channelization, urban development, and mainstem impoundment, the Tippecanoe River generally retains a variety of instream habitats and water of sufficient quality to support a rich aquatic fauna.

Tippecanoe River substrates are primarily clean gravel and sand. Cobble and, to a lesser extent, large boulders are present in some reaches (Carney et al. 1993). Moderate silt accumulation near stream margins and organic enrichment, as evidenced by abundant filamentous algae, occurs in most reaches.

As streambank erosion continues in the proposed project area, especially following storm events, riparian vegetation will continue to become increasingly scarce, as roots are undercut and the plants are washed into the river. The proposed project area lies on the outer bank of a sharp bend of Tippecanoe River, which experiences higher water velocities and increased erosive forces as compared to the river’s opposite bank. Due to these relatively higher water velocities and severe bank erosion, it is not expected that there exists a thriving benthic community in the immediate project area.

2.5 ENDANGERED AND THREATENED SPECIES

2.5.1 Federal

According to the USFWS scoping letter dated February 1, 2016 (Environmental Appendix A), there are six federally threatened or endangered species that may be present within the project area (Table 1). The federally endangered status represents any species that is in danger of extinction throughout all or a significant portion of its range. A federally threatened status represents any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Table 1. Federally listed species that may occur within the project area

Scientific Name	Common Name	Federal Status
<i>Pleurobema clava</i>	Clubshell (mussel)	Endangered
<i>Quadrula cylindrica cylindrica</i>	Rabbitsfoot (mussel)	Threatened
<i>Vilosa fabalis</i>	Rayed Bean (mussel)	Endangered
<i>Plethobasus cyphus</i>	Sheepnose Mussel	Endangered
<i>Myotis sodalis</i>	Indiana Bat	Endangered
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	Threatened

According to Fisher (2006), the clubshell, rabbitsfoot, rayed bean, and sheepnose had reproducing populations of species historically found in mainstem Wabash River but are now restricted to its tributaries. The clubshell is found throughout the Tippecanoe River (Fisher, 2006), and prefers clean, loose sand and gravel, in which it will bury itself to depths of up to four inches.

2.5.2 State

The Indiana Division of Fish and Wildlife classifies rare species into two categories- “endangered” and “special concern.” State endangered species are defined as any animal species whose prospects for survival or recruitment within the state are in immediate jeopardy and are in danger of disappearing from the state. This includes all species classified as endangered by the federal government that occur in Indiana. Species of special concern are defined as any animal species requiring monitoring because of known/suspected limited abundance or distribution or because of a recent change in legal status or required habitat.

The Division of Fish and Wildlife lists 80 species as State Endangered and 72 as Special Concern species. See the Environmental Appendix for the complete list of these species. An analysis of the known ranges of the endangered species (IUCN, 2015) indicated that the project site lies within the range of 34 species.

2.5.3 Critical Habitat

Of the six identified federally listed species, only the rabbitsfoot (*Quadrula cylindrica cylindrica*) has designated critical habitat, however, there is no designated critical habitat within the project area. Rabbitsfoot mussels prefer shallow areas with sand and gravel along the bank and next to shoals, which provide a refuge in fast-moving rivers. The proposed project would occur along an outside bend of the river, which experiences the greatest water velocities within a cross section of the river and excessive scouring, as evidenced by the eroding streambank. Because of the higher velocities, the existing habitat would not be preferred by the rabbitsfoot. However, additional coordination with USFWS to address the potential presence of the rabbitsfoot within the project area will occur during the public review period.

2.6 RECREATIONAL, SCENIC, AND AESTHETIC RESOURCES

2.6.1 Local Resources

The relatively flat topography of Fulton County affords the Tippecanoe River a high degree of sinuosity and relatively unconstrained floodplain. The project site falls within the IDNR owned and managed

Tippecanoe River Menominee Public Fishing Area. Along this stretch of the river, the banks are bordered by woodlands, which offer pleasing aesthetic qualities. Primary recreational opportunities present in the proposed project vicinity are recreational shoreline and small craft fishing, hiking, wading, and sunbathing on sandy accretionary portions of shoreline.

2.6.2 Regional Resources

The Tippecanoe River regularly draws sportsmen and other outdoor enthusiasts from Northern Indiana and beyond. The river offers some of the best sport fishing and hunting opportunities in the region, as well as more passive activities such as bird watching and canoeing.

2.7 CULTURAL RESOURCES

A number of steps were taken in an effort to identify any cultural resources within the area of the proposed project along the Tippecanoe River. These included a background check of the National Register of Historic Places, a background records review at the Indiana State Historic Preservation Office (SHPO), a background review of the Indiana State Historic Architectural and Archaeological Research Database, and a search of the Louisville District's Geographic Information System (GIS) database. The purpose of the search was to identify and locate any cultural resources or historic properties that could potentially be impacted by the proposed project. The records review resulted in no evidence within the project area of recorded archaeological sites or historical structures listed on, or eligible for listing on the National Register of Historic Places.

The proposed project area was examined by means of a visual pedestrian ground surface inspection by the USACE project Archeologist. No shovel tests were excavated due to the slope being greater than 15%. No cultural resources or historic properties were observed during the site visit on December 10, 2015.

Pursuant to the NEPA and Section 106 of the NHPA, all federally recognized tribes with historic and/or cultural affiliation within the project boundaries will be contacted, provided an opportunity to comment, and invited to consult on the project. Tribes will receive a copy of this report and EA for review and comment.

2.8 AIR QUALITY

The proposed project area, located in Fulton County, IN, is in attainment with both State and Federal National Ambient Air Quality Standards parameters (Indiana Department of Environmental Management, 2015 and U.S. Environmental Protection Agency, 2015).

2.9 NOISE

In the proposed project area vicinity, noise levels are typically low, but are dependent on occasional residential construction and seasonal agricultural activities.

2.10 HAZARDOUS AND TOXIC SUBSTANCES

EPA's Envirofacts website was queried to identify the presence of EPA-regulated facilities within three miles of the proposed project area. The Envirofacts website contains information collected from regulatory programs and other data relating to environmental activities with the potential to affect air,

water, and land resources in surrounding areas. There were no EPA-regulated facilities within a two-mile radius of the project site.

Multiple on-site inspections of the project area and surroundings have been performed by USACE, Louisville District staff. Based on the site visit on December 10, 2015, and an investigation of historic aerial photographs, no evidence of improperly-managed hazardous and/or toxic materials, or indicators of those materials were present in the proposed project area.

2.11 SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE

2.11.1 EO 12898 Environmental Justice

Environmental justice is defined by the EPA as the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA further defines fair treatment to mean that no group of people should bear a disproportionate share of the negative environmental consequences of industrial, governmental, or commercial operations or policies.

2.11.2 EO 13045 Protection of Children

Under this order, federal agencies must identify and assess environmental health and safety risks that may disproportionately affect children as a result of the implementation of federal policies, programs, activities, and standards.

3 PLAN FORMULATION

3.1 PROBLEMS AND OPPORTUNITIES

Problem:

- The integrity of County Road 350 N in Carroll County, Indiana is threatened by streambank erosion along a bend of the Tippecanoe River, which is likely to result in imminent failure of the road and associated traffic route.

Primary Opportunities:

- Prevent the failure of County Road 350 N and resulting disruption of traffic route.
- Improve safety for vehicles traversing this segment of County Road 350 North.
- Maintain response times for emergency responders.

Secondary Opportunities:

- Remove invasive vegetation on the river bank and install native vegetation.
- Reduce sedimentation in the Tippecanoe River.

3.2 OBJECTIVES AND CONSTRAINTS

3.2.1 Planning Objective

Identify and implement a long-term stabilization solution on the Tippecanoe River to protect County Road 350 North that is environmentally and economically acceptable.

3.2.2 Planning Constraint

- Minimize impacts to benthic habitat and riparian corridor along the Tippecanoe River

3.3 MOST PROBABLE FUTURE WITHOUT PROJECT CONDITIONS

During a recent high-flow event (June 2015) the stream bank failed just upstream of the temporary riprap repair installed by the Fulton County Highway Department (Photo 3 and Photo 4). With the additional granular bank material now exposed, it is likely that erosion rates will continue to accelerate further threatening the road. In addition, the under-sized stone and lack of toe protection in the temporary repair will likely result in failure of the repaired area in the near-future.



Photo 3. June 2015 bank failure (looking downstream)



Photo 4. June 2015 bank failure (view from road)

3.4 Measures to Achieve Planning Objectives

3.4.1 Preliminary Structural and Non-Structural Measures

3.4.1.1 Structural Measures

- Riprap Stone Protection: To protect the area will require an estimated 650 linear feet of riprap be placed along the bank. In addition, along the approximately 100 foot section where the county has placed riprap, additional riprap may need to be placed at the toe of the protected bank to create the recommended thickened toe. To protect the river bank in this manner would require clearing approximately 0.4 acres of bank and placing approximately 2,300 cubic yards of riprap.
- Vane Dikes: Vane dikes would be placed through the bend in the Tippecanoe River and direct the flow velocity responsible for the erosion away from the bank. The advantage that these vane dikes would have over traditional riprap placement is that they would reduce the amount of bank clearing and provide some potential environmental benefits, such as creating stream riffles.
- Gabion Basket Toe with Riprap Slope: Gabion baskets are wire mesh cages filled with stone used to armor the underlying soil. This alternative plan includes removing all debris and vegetation in the excavated area and placing material in a state approved landfill. The bank would be excavated, graded and gabion baskets would be placed along the stream bank starting at the river's edge and progressing up the bank.
- Marine Mattress System: This system consists of rock filled mattresses constructed of high strength structural grids. This alternative does not require toe excavation as each individual mattress is joined to the next adjacent and then anchored toward the top of bank. This alternative also reduces the amount of bank excavation and filling as the mattress system can generally follow the existing bank contour.

3.4.1.2 Non-structural Measures

- Bioengineering: This alternative includes removing all debris and vegetation and placing material in a state approved landfill. Approximately 650 linear feet of bank would be excavated and graded to a slope no steeper than 3H: 1V. Natural fiber coils would be placed on the bank and anchored accordingly. Dead tree roots would also be anchored into the bank to provide stability. Native plant species would be placed along the bank to encourage root development and promote stability.
- Road Relocation: Realign County Road 350 north through adjacent woodland to avoid current bank failure location.

- Permanent Road Detour: A signed detour route could direct traffic around the erosion site. The detour route would increase travel distance by approximately 4 miles for residences east of County Road 350 N to access Old US Highway 31.

3.4.2 Excluded Measures

- Vane Dikes: The quantity of rock required to construct the number of vane dikes required would be greater than what is required to protect the bank by placing a riprap blanket with thickened toe protection over the affected area. Also the required length of the vane dike would protrude into the river channel disrupting recreational boating, as well as induce erosion on the opposite bank.
- Bioengineering: The slope necessary to accommodate the vegetative treatment would require the road to be relocated or extension of the bank almost halfway across the existing river channel, which would direct flows at the opposite bank as well as bury any existing benthic communities.
- No Action: County Road 350 N will eventually fail if no-action is taken to stabilize the left descending bank. In the event of failure, it is expected that Fulton County would close the road to vehicular traffic and establish a signed detour route. The road closure and detour route would result in increased travel time for emergency responders and school buses and is unacceptable to Fulton County. Additional discussion regarding the environmental effects of the no-action alternative are outlined below.
 - Soils: Under the No Action Alternative, the unstable riverbank would continue to erode and threaten the structural integrity of County Rd 350 N.
 - Surface Waters and Other Aquatic Resources: The No Action alternative would result in continued unchecked erosion within the project areas. This may lead to lead to minor impacts to surface water, water quality, and aquatic habitat from increased sedimentation that results from erosion.
 - Wildlife Habitats: The No Action Alternative would maintain the status quo. The No Action alternative would likely result in the loss of terrestrial habitat as the river bank is eroded. Several Trees in the project area currently have exposed roots, and will eventually fall as the soil around the roots is washed away.
 - Endangered and Threatened Species: It is unlikely that any endangered species would be affected by maintaining the status quo. However, it is possible that undercut trees could fall while serving as roosts for the Indiana bat. This may injure or kill roosting bats and thus negatively impact the local population.
 - Recreational Scenic and Aesthetic Resources: The No Action Alternative would not significantly impact aesthetic or recreational resources.
 - Cultural Resources: Under the No Action alternative none of the recommended measures would be undertaken therefore there would be no project effect on any known cultural resources.

- Air Quality and Noise: The No Action Alternative would maintain the status quo and would have no impact to air quality or noise from its current condition.
- Hazardous Toxic and Radioactive Waste: There are no known HTRW concerns associated with the No Action Alternative.
- Socioeconomics and Environmental Justice: Under the No Action Alternative, County Road 350 N could fail disrupting local traffic patterns and emergency response times. The traffic delay would not disproportionately affect any one group.

3.5 FORMULATION AND COMPARISON OF ALTERNATIVE SOLUTION SETS

3.5.1 Alternative Plan Descriptions

- Alternative 1A and 1B – Riprap Stone Protection: Alternative 1A and 1B are different only in the length of protection. For this method of protection, the bank would be cleared of all trees with exposed roots and any trees that are dead, dying or otherwise unstable. During the D&I phase, specific tree species of a certain diameter and spacing will be identified for preservation.

Once the bank has been cleared, granular fill would be placed to form a 2 horizontal to 1 vertical slope. Riprap from the temporary repair would be reused on site (see Appendix B for location of existing riprap). Because of the proximity of the bank to the road, excavating to form the slope is not possible for the majority of the length of the protection and in those areas where it is possible, it would require removing a much larger number of trees than by using granular fill to form the slope.

Once the desired slope is formed a 24-inch layer of 205 pound maximum riprap would be placed over the bank. With the hydraulic conditions that exist in this section of the river, the riprap would only need to be placed to elevation 755, which is at least 5 feet below the top of bank. Where possible, this upper 5 feet of bank could be excavated to form a 2 horizontal to 1 vertical slope and planted with native vegetation as recommended by the Indiana Department of Natural Resources (IDNR) or treated with riprap. Based on EM 1110-2-1601, the riprap protection would use Method C toe protection, which is a thickened toe 3 feet thick and extending horizontally out from the slope 10 feet.

There are two possible options to setting the length of the protection; the first option (Alternative 1A) would be to protect the bank to the extent that the distance between the edge of the bank and the road is at least 25 feet; the second option (Alternative 1B) would be to extend the riprap such that it begins and ends in areas of non-eroding velocities. Alternative 1A would protect approximately 650 feet of bank and would require thickened end protection to prevent the erosion from flanking the protection. This end protection would be Method C as given in EM-1110-1601. Alternative 1B would protect approximately 850 feet of bank and would extend from the IDNR channel access area, upstream to near McMahan Ditch (see Appendix B for location details).

- Alternative 2A and 2B-Gabion Basket Toe with Riprap Slope: Alternative 2A and 2B are different only in the length of protection. There are two possible options to setting the length of the protection; the first option (A) would be to protect the bank to the extent that the distance between the edge of the bank and the road is at least 25 feet; the second option (B) would be to extend the riprap such that it begins and ends in areas of non-eroding velocities.

The first option would protect approximately 650 feet of bank and the second option would protect approximately 850 feet of bank. Both alternatives would require clearing the bank, removing all the trees with exposed roots and any trees that are dead, dying or otherwise unstable and excavating as needed to create a stable foundation for placement of the gabions. Alternative 2A would require clearing approximately 0.45 acres, placement of 650 linear feet of gabion wall 12 feet in height, 2,200 cubic yards of rock fill for the gabion baskets, 1,083 cubic yards of 205 pound maximum size riprap for the upper bank slope, 1,000 cubic yards of granular backfill, 217 gabion baskets (assuming 3 foot cubes), excavating 1,600 cubic yards of material and planting approximately 0.2 acres of native vegetation.

Alternative 2B would require clearing approximately 0.6 acres, placement of 850 linear feet of gabion wall 12 feet in height, 2,867 cubic yards of rock fill, 1,372 cubic yards of 205 pound maximum size riprap for the upper bank slope, 1,444 cubic yards of granular backfill, 284 gabion baskets (assuming 3 foot cubes), excavating 2,000 cubic yards of material from the upper bank and planting approximately 0.25 acres of native vegetation.

- Alternative 3A and 3B – Marine Mattress System: Alternative 3A and 3B are different only in the length of protection. There are two possible options to setting the length of the protection; the first option (A) would be to protect the bank to the extent that the distance between the edge of the bank and the road is at least 25 feet; the second option (B) would be to extend the protection such that it begins and ends in areas of non-eroding velocities.

The first option would protect approximately 650 feet of bank and the second option would protect approximately 850 feet of bank. For these alternatives the bank would need to be cleared, removing all the trees with exposed roots and any trees that are dead, dying or otherwise unstable. Once the bank has been cleared, granular fill would be placed to form a stable slope upon which the mattress system can be installed. Because of the proximity of the bank to the road, excavating to form the slope is not possible for the majority of the length of the protection and in those areas where it is possible, it would require removing additional trees than by using granular fill to form the slope. Once the slope was formed, a rock filled Marine Mattress System 18-inches thick would be placed over the slope and anchored into the bank.

Alternative 3A would protect 650 linear feet of bank and require clearing approximately a half acre, placing 550 cubic yards of granular fill, 1,625 cubic yards of rock fill for the Marine Mattress System, excavating approximately 480 cubic yards of material and planting approximately 0.25 acres of native vegetation.

Alternative 3B will protect 850 linear feet of bank and require clearing approximately 0.6 acres, placing 735 cubic yards of granular fill, 2,125 cubic yards of rock fill for the Marine Mattress System, excavating approximately 628 cubic yards of bank material and planting approximately 0.25 acres of native vegetation.

- **Road Relocation:** An alternative to stabilizing the bank is to re-route the county road. This alternative would require relocating approximately 1,800 feet of County Road 350 N through a well forested area, which would result in having to clear approximately 2.55 acres of mature hardwood trees as well as having to fill in an area that appears in the wetland registry. Relocating the road would require demolishing 15,840 square feet of existing pavement, clearing and grubbing 2.55 acres of hardwood trees, placing approximately 13,000 cubic yards of fill for the road embankment, excavating 1,700 cubic yards for ditches and placing 39,600 square feet of new asphalt pavement. There would also be mitigation cost associated with relocating the road.

3.5.2 Comparison of Alternative Plans

The final array of alternatives considered for implementation were evaluated for their success in meeting the Planning Objectives (purpose and need, as well as sustainability) and the planning criteria (feasibility, environmental acceptability, and economic feasibility). The evaluation criteria were then considered in screening the alternatives according to their overall acceptability. As stipulated under the Section 14 Authority, formulation and evaluation should focus on the least cost alternative solution that is less expensive than relocating the threatened public facility (County Road 350 N).

Each alternative plan evaluated protecting 650 lf versus 850 lf of bank. Treatment of 650 lf of bank provides long-term stabilization for County Rd 350 N. Extending the length of protection an additional 200 lf would also provide long-term stability for an Indiana DNR boat ramp. The threat to the Indiana DNR boat ramp does not appear to be imminent. Also extending the bank treatment downstream to the boat ramp would require additional vegetative clearing. Consequently, the 850 lf bank treatment option was screened out for each alternative.

A discussion of the evaluations follows, with a summary of findings and screening results shown in Table 2 (note that Table 2 only includes rough order of magnitude costs and only estimates costs of construction activities). Cross-sections and site plans are included in Appendix B and a details on the cost estimate for the recommended plan are located in Appendix C.

Alternative 1 – Riprap Stone Protection: The stone protection alternative is estimated to be the least costly and fulfills the immediate goal of stabilizing the failing bank that is threatening the road; however, while this type of riprap placement is commonly used to protect an eroding bank, in this area there are several undesirable conditions that would develop, making this alternative environmentally unacceptable. These conditions are as follows:

1. Placement of the riprap slope and toe protection would block a significant area of the main flow channel, which would result in increased stages upstream and higher velocities in the remaining channel.
2. As the river responds and attempts to reclaim the lost flow area, erosion along the right bank will occur, resulting in an increase in the sediment load being carried by the river.
3. Somewhere downstream the sediment carrying capacity of the river would decrease and deposition would occur.

Alternative 2A and 2B-Gabion Basket Toe with Riprap Slope: Both of these alternatives fulfill the immediate goal of stabilizing the failing bank that is threatening the road. With these alternatives the impact to the existing channel will be minimized, there would be little to no increase in flow velocities or upstream stages. This alternative would also reduce the footprint of the stone protection out into the river channel compared to Alternative 1. The primary challenges with this method of protection is ensuring a good foundation for the gabion baskets, which most likely would require constructing some type of diversion structure and excavation into the river bottom. Excavation and the associated diversion structure will negatively impact benthic communities. Additionally, riparian vegetation cannot easily establish in gabion baskets.

Alternative 3A and 3B – Marine Mattress System: With these alternatives the impact to the existing channel is reduced significantly compared to the traditional stone protection and gabion baskets. While there will be some loss in the channel's flow area, it is considered acceptable and would produce only very small increases in flow velocities or upstream stages.

Table 2. Alternative Screening

Fulton County Alternatives - Alternative Screening						
Alternative	Planning Objectives		Planning Constraints			Screening Result
	Meets Purpose and Need	Sustainable	Technically Feasible	Environmentally Acceptable	Estimated Construction Cost	
No Action	N/A	N/A	N/A	N/A	N/A	Does not meet project purpose and need
Stone Protection	Required slope would result in road relocation	Minimal-to-moderate level of maintenance	Yes	Required slope would intrude too far into the river	Alternative was screened early and a cost was not developed	Does not meet purpose and need, not environmentally acceptable.
Gabion Basket Toe with Riprap Slope (650 lf)	Yes	Medium maintenance, long-term concern with corrosion associated with gabion cages	Yes	Riparian vegetation cannot easily be reestablished. Diversion structure and excavation would disrupt benthic communities	\$1.2M	Not environmentally acceptable or sustainable
Gabion Basket Toe with Riprap Slope (850 lf)	No, study objective is road stabilization	Medium maintenance, long-term concern with corrosion associated with gabion cages	yes	Riparian vegetation cannot easily be reestablished. Diversion structure and excavation would disrupt benthic communities	\$1.5M	Not environmentally acceptable or sustainable. Additional length of treatment exceeds what is needed to protect road.
Marine Mattress System (650 lf)	Yes	Minimal maintenance, High long-term stability	yes	Minimizes impact to river bed. Mattress also allows for easy establishment of vegetation	\$1.2M	Preferred Alternative: technically, economically and environmentally acceptable
Marine Mattress System (850 lf)	No, study objective is road stabilization	Minimal maintenance, High long-term stability	yes	Minimizes impact to river bed. Mattress also allows for easy establishment of vegetation. Would require additional bank clearing.	\$1.5M	Additional length of treatment exceeds what is needed to protect road.
Relocate County Road 350 N	No, transportation route disrupted	Medium to high long-term maintenance	Yes	Relocation would impact adjacent wetlands	\$1.4M	No environmentally acceptable. Does not meet purpose and need.

3.5.3 Risk and Uncertainty

Table 3. Risk Matrix

Risk Description	Category	Consequence	Likelihood	Mitigation Recommendation
Marine Mattress System is a new technology to LRL	Technical	Delay in design schedule	Medium	Coordinate with other Districts that have implemented the technology. Coordination with various system manufacturers.
Soil borings and analysis shifted to D&I Phase	Technical	Impact to cost estimate for mattress anchoring system	Low	Conduct geotechnical investigation and reevaluate cost estimate early in design
Toe of marine mattress system will overlay a small portion of the river bed	Environmental	Mitigation could be required by resource agencies	Low	Alternative identified provided least impact to the river.
Project implementation will require some vegetation clearing.	Environmental	Impact to implementation schedule	Low	Coordinate with resource agencies on timing for vegetation clearing
FID determined that that repair is "essential" and "important enough to merit federal participation	Policy & Law	Project DPR is not approved	Low	Coordination with LRD
Sponsor will need to obtain a MOU from INDNR (property owner) for construction site access.	LEERDS	Potential schedule delay	Low	LRL has coordinated early with INDNR and they have expressed interest in assisting with this project
Cost share for D&I is estimated at \$600K	Non-federal	Start of D&I could be delayed	Medium	Sponsor is working with County Commission and Congressional Representative to identify funds
Road fails prior to implementation of Corps project	Non-federal	Road could be closed or restricted to one lane of travel. Repair cost would increase	Medium-High	Continue to monitor road stability. Implement temporary repairs

3.6 RECOMMENDED PLAN (PREFERRED ALTERNATIVE)

3.6.1 Recommended Plan Description

Marine Mattress System (650 lf): This alternative would protect approximately 650 feet of bank. The bank would be cleared, removing all the trees with exposed roots and any trees that are dead, dying or otherwise unstable. Once the bank has been cleared, granular fill would be placed to form a stable slope upon which the mattress system can be installed. Because of the proximity of the bank to the road, excavating to form the slope is not possible for the majority of the length of the protection and in those areas where it is possible, it would require removing more trees than would using granular fill to form the slope.

Once the slope was formed, a rock filled Marine Mattress System 18-inches thick would be placed over the slope and anchored into the bank. This alternative would require clearing approximately a half acre, placing 550 cubic yards of granular fill, 1,625 cubic yards of rock fill for the Marine Mattress System, excavating approximately 480 cubic yards of material and planting approximately 0.25 acres of native vegetation. Guardrail would be installed between the top of the bank and the edge of the road to meet roadside safety requirements. In the area of existing riprap slope, the marine mattress would be placed on top of the existing riprap to provide a more stable slope. Additional detail, including typical cross sections is located in Engineering Appendix B.



Photo 6. Example of bank preparation for mattress system installation



Photo 5. Example of mattress system installation

Contractor Access: The repair site is accessible from County Road 350 North (CR 350 N). The road is approximately twenty-four foot wide asphalt paved road that is accessible from N Old US Hwy 31. During construction, the road will require a minimum of one lane closure in the vicinity of the repair area. An assumed laydown area which seeks to avoid tree impact is located nearby at the IDNR public access area. Depending on the final design of the preferred alternative, additional laydown area may be required adjacent to the repair site. There are no known utility impacts in this area.

3.6.2 Estimated Project Costs and Schedule.

Table 4. Total Project Cost and Federal and Non-Federal Cost Share

	Project First Cost (Constant Dollar Basis)	Total Project Cost (Fully Funded)
Construction	\$1,556,000	\$1,588,000
Land and Damages	\$6,000	\$6,000
Planning, Engineering & Design	\$411,000	\$418,000
Construction Management	\$208,000	\$215,000
Total Investment Cost	\$2,181,000	\$2,227,000
TOTAL Federal (65%)	\$1,417,650	\$1,447,550
TOTAL Non-Federal (35%)	\$763,350	\$779,450
TOTAL PROJECT COST*	\$2,181,000	\$2,227,000

*does not include feasibility

Additional information on the cost estimate is located in Appendix C.

Implementation Schedule

Execute Project Partnership Agreement	November-2016
Complete Design	May-2017
Construction Contract Awards	June -2017
Begin Construction	July-2017
Project Completion*	March-2018

* Estimated duration for construction is nine months. As the location is adjacent to the Tippecanoe River, the actual construction start date is highly dependent on river conditions.

3.6.3 Non-Federal Sponsor Responsibilities

In order to implement the Recommended Plan, Fulton County would be responsible for the following:

1. Without cost to the U.S. Government, provision of legally sufficient title to real estate for all necessary land, easements, rights-of-way, and access routes necessary for project construction and subsequent operation and maintenance. Land provisions would include:

a. construction site to accommodate all emergency streambank and shoreline erosion protection features to be constructed, and

b. temporary staging area of acceptable location and acreage for contractor's use during construction period. Staging area will be a previously disturbed site.

2. Cash contribution, provided during the period of implementation, toward cost of the project totaling 35% of Total Project Cost (not including Feasibility Study costs which are 100% Federally funded), less value of the non-Federal sponsor's real estate contribution and in-kind services, as well as Feasibility Phase costs. The amount of cash contribution is currently estimated to be \$779,450 of the total \$2,227,000. This cash amount will vary depending on the actual real estate costs and in-kind services.

3. Funding of 100% of the cost of Annual Operation and Maintenance required to keep the project in viable condition to satisfy its design function. This funding would not be provided for during the initial implementation of the project, but would become a yearly responsibility of the non-Federal sponsor upon completion of the construction phase.

4. Satisfy all provisions of the Project Partnership Agreement (PPA) regarding non-Federal sponsor responsibilities in implementing the project.

4 ENVIRONMENTAL EFFECTS OF RECOMMENDED PLAN (PREFERRED ALTERNATIVE)

4.1 SOILS

Construction impacts of the recommended plan to soils would result from excavation and grading of the streambank, allowing for proper marine mattress placement. These impacts are considered to be temporary and minimal, and further reduced by implementing appropriate erosion control measures

during construction. It is expected that implementation of the recommended plan would result in an overall reduction in erosion at the proposed project.

4.2 SURFACE WATERS AND OTHER AQUATIC RESOURCES

4.2.1 Surface Water

The recommended plan is expected to have favorable long-term effects on water quality in, and downstream of, the project area by decreasing erosion and subsequent turbidity introduced to Tippecanoe River following high water events. Appropriate sedimentation and erosion control measures that equal or exceed IDEM standards will be designed, installed, and maintained properly to assure compliance with the appropriate turbidity standards, although temporary increases in turbidity may occur during construction. These measures include a Type 2 DOT Turbidity Curtain to be used during in-water material placement, and silt fence use on the upland perimeter of construction activity and along most improved access roads.

A Section 401 water quality certification (WQC) will be acquired prior to implementation of the proposed action. No work will begin until IDEM has either formally approved the WQC or issued a water quality certificate that covers this project. All proposed work would be in compliance with the conditions of the appropriate water quality certificate.

4.2.2 Groundwater

The recommended plan is not expected to have any effects on ground water levels or quality within or outside of the project area.

4.2.3 Flood Plains

Executive Order 11988, which directs federal agencies to avoid long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development whenever practical. Due to the limited size and scope of the preferred alternative, there is less potential for adverse impacts to the adjacent floodplain. Every effort will be taken to minimize potential harm to or within the flood plain by reducing the amount of material placed in the floodplain to only that which is required to stabilize the streambank. The construction of the preferred alternative within the established floodway/floodplain will comply with state/local floodplain protection standards and obtain appropriate Construction in a Floodway permits.

4.2.4 Wetlands

In order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative, 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 agency's responsibilities.

The recommended plan will not adversely affect wetlands or alter their function and will be in full compliance with Executive Order 11990 following completion of the NEPA process.

4.3 WILDLIFE HABITATS

4.3.1 Terrestrial and Aquatic Vegetation

The recommended plan would require grading of the streambank, principally by material placement, to a contour of 1.5H:1V. Clearing of grasses, vines, and trees, not to exceed one acre, will be required to allow for equipment operation. This clearing will be minimized as to retain as much existing riparian vegetation as practicable. No other impacts to terrestrial resources are expected, and all disturbed areas would be re-vegetated with grasses or other native plants upon project completion.

4.3.2 Fauna

The construction activities associated with the proposed project are expected to have negligible adverse impacts to the local fauna in and around the project site. Currently, terrestrial fauna within the immediate riparian area is limited due to the lack of vegetation on the eroded slope. Installation of a marine mattress system would improve terrestrial habitat over the existing terrestrial habitat on eroded slope, which is of poor quality. Over time, sediment would accumulate over the mattress system and allow for the establishment of vegetation. During the D&I phase, options will be explored to cover the mattress with soil and vegetation rather than waiting for sedimentation and natural plant establishment.

Likewise, the streambed at the toe of the slope offers marginal to poor habitat, consisting mostly of erodible soils and is subjected to high water velocities. Construction of the recommended plan would stabilize sediments in the most eroded portions of the proposed project area and provide hard structure for utilization by benthic organisms and other aquatic fauna.

4.3.3 Existing Terrestrial and Aquatic Habitats

Aquatic resources are impacted by a number of watershed activities, including residential development, pollution sources, and wastewater discharges. The Tippecanoe River generally has good water quality and is a diverse aquatic resource. From a watershed perspective, the stabilized 650 feet of streambank would not be highly visible in the overall reduction of aquatic resource/water quality impairments due to sedimentation; however, it would provide some minor progress in reducing riverbank erosion. The cumulative impacts of the preferred alternative on aquatic resources would be minor. Bank stabilization would likely provide long-term improvements in aquatic resources and water quality.

The recommended plan would have negligible impacts on benthic resources in the proposed project area as the majority of work would occur in the upland portion of the project area. Additionally, material excavation would be minimal, if any. The marine mattress system will likely be filled with four-inch diameter riprap would be placed on the eroding streambank from the edge of the slope to the toe in the streambed. The proposed project area lies on the outer bank of a sharp bend of Tippecanoe River, which experiences higher water velocities and increased erosive forces as compared to the river's opposite bank. Due to these relatively higher water velocities, severe bank erosion, it is not expected that there exists a thriving benthic community in the proposed project area. However, construction of the recommended plan would permanently alter the predominant habitat from a highly eroded sandy habitat to a rocky habitat (riprap) in the immediate project area and bury existing benthic fauna.

Construction of the recommended plan would stabilize sediments in the most eroded portions of the proposed project area and provide hard structure for utilization by benthic organisms and other aquatic fauna. Impacts to benthic community composition in areas surrounding construction activities would be short-lived.

The recommended plan will involve in-water placement of material, which will have minimal and short-lived impacts on fisheries resources, primarily by temporarily increasing turbidity during construction and by alteration of bottom habitat from sandy sediment to rock structure (riprap). Short-lived turbidity increases and construction activity in the proposed project area may temporarily displace fish species; however, these mobile species are capable of foraging in similar, nearby waters for the duration of the project and are not expected to be negatively impacted by the proposed action.

The recommended plan would require grading of the streambank, principally by material placement, to a contour of 1.5H:1V. Clearing of grasses, vines, and trees, not to exceed one acre, will be required to allow for equipment operation. This clearing will be minimized as to retain as much existing riparian vegetation as practicable. No other impacts to terrestrial resources are expected, and all disturbed areas would be re-vegetated with grasses or other native plants upon project completion.

4.4 ENDANGERED AND THREATENED SPECIES

4.4.1 Federal

No Federally listed threatened or endangered species known to inhabit Fulton County, Indiana are expected to be encountered during proposed project construction. To minimize potential impacts to roosting endangered Indiana bats (*Myotis sodalis*), no trees over four inches in diameter at breast height will be removed from April 1st to September 30th.

The proposed marine mattress system can be placed on steeper slopes than traditional stone protection methods. Because of this, the toe of the bank protection is greatly reduced, which reduces the impact to aquatic habitat. Because of the reduced toe size and the appropriate application of construction best management practices to reduce potential adverse impacts to fish and wildlife habitat, the Corps has determined the proposed project may affect, but is not likely to adversely affect the Federally listed threatened or endangered species that may occur in the project area.

4.4.2 State

The recommended plan may affect, but is not likely to adversely affect State listed threatened or endangered species, or other species of concern.

4.4.3 Critical Habitat

No federally designated critical habitat will be affected through the implementation of the proposed project.

4.5 RECREATIONAL, SCENIC, AND AESTHETIC RESOURCES

The recommended plan is not expected to significantly impact aesthetic or recreational resources. Construction would be restricted to the immediate proposed project area and would provide

stabilization to the eroding streambank. Any impacts related to construction, including noise (see Section 4.8), presence of construction equipment, and effects on traffic circulation would be temporary and short-lived. The recommended plan would not adversely impact any scenic views or adversely impact recreation in the proposed project area, but would provide continued access to the IDNR boat ramp via County Road 350 North.

4.6 CULTURAL RESOURCES

No cultural resources were reported in the project location, therefore, no cultural resources are expected to be impacted by construction of the proposed project.

4.7 AIR QUALITY

Air quality would be temporarily and insignificantly affected by the recommended plan. Emissions are expected from equipment used during construction, and any other support equipment which may be on or adjacent to the proposed project area. Increases in dust emissions would occur during construction, but these impacts would be short-term, only occur while construction is active, and not impact overall air quality. Any proposed project-related emissions are not expected to contribute significantly to direct or indirect emissions and would not impact air quality within the project area.

4.8 NOISE

Noise levels may be temporarily elevated during construction activities, with expected duration of up to 180 days. Construction activity Area associated with the recommended plan is expected to comply with all published noise ordinances.

4.9 HAZARDOUS AND TOXIC SUBSTANCES

The recommended plan would not adversely impact hazardous and toxic materials in the proposed project area, nor would it produce hazardous and toxic materials.

4.10 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The recommended plan will not have the potential for disproportionate health or environmental effects on minorities or low-income populations and communities and will be in full compliance with Executive Orders 12898 following completion of the NEPA process.

The recommended plan will not have the potential to disproportionately affect the safety or health of children and will be in full compliance with Executive Order 13045 following completion of the NEPA process.

4.11 CUMULATIVE EFFECTS

The Federal Executive Branch's Council on Environmental Quality defines cumulative effects as "the impact on the environment [that] results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7, National Environmental Policy Act of 1969, as amended).

The recommended plan provides approximately 650 linear feet of the Tippecanoe River streambank to be armored with a riprap mattress system to prevent the closure of County Road 350 North. The closure of this road would disrupt local traffic patterns (including emergency response times); county school bus routes; and access to the Indiana Department of Natural Resources boat launch. Large stone protection has been placed on approximately 200-300 linear feet of the streambank immediately downstream of the project area to protect the IDNR parking lot and boat launch (Photo 7). The streambank abutting the proposed project area upstream is, and would remain, unarmored. The proposed action is expected to have minimal impact on overall functionality and quantity of riparian vegetation and available wildlife habitat in the proposed project area.

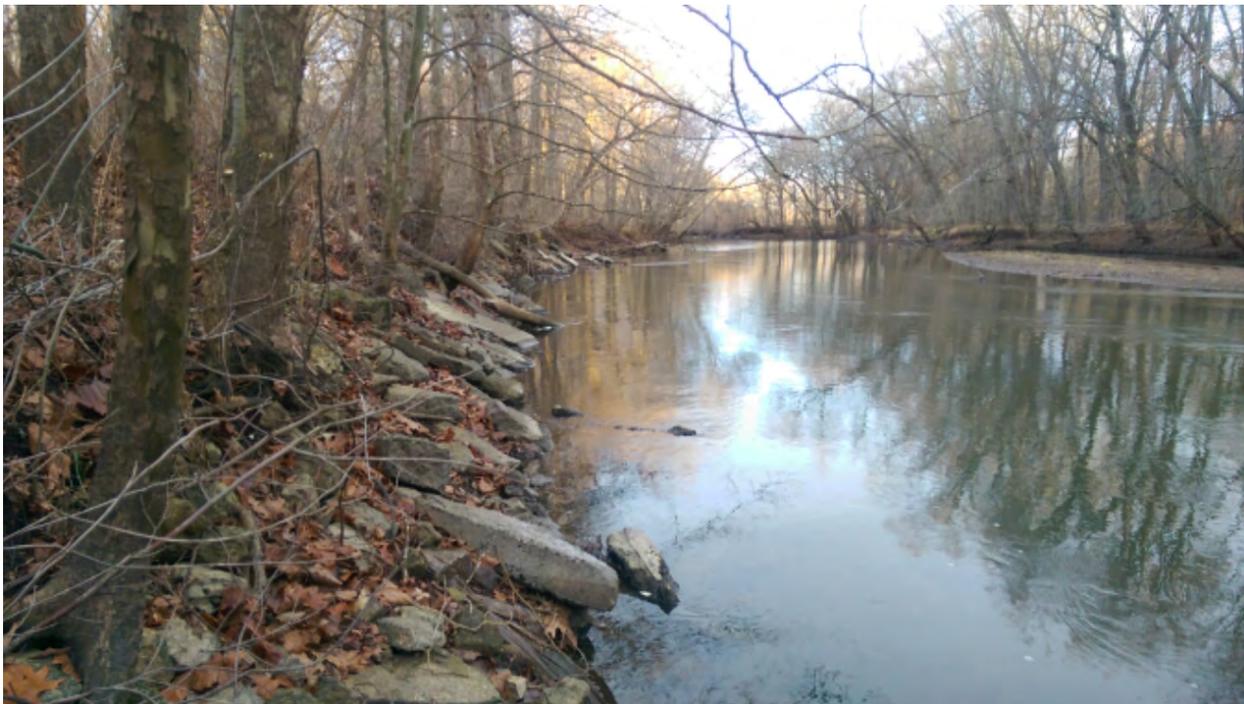


Photo 7. Photograph of left descending bank downstream of project area showing previously protected streambank

5 MITIGATION OF ADVERSE EFFECTS

Impacts to surface water and physical substrates from placement of fill material would be minimized by using appropriate erosion control measures, such as sediment fences, turbidity curtains, and by constructing the project at low water, which would further reduce erosion potential.

The required removal of riparian vegetation will be coordinated with the appropriate state and federal agencies and properly mitigated for if necessary.

6 IMPLEMENTATION REQUIREMENTS

6.1 PROJECT PARTNERSHIP AGREEMENT

Fulton County, as stated in a letter dated 27 July 2015 (Appendix E), has expressed support for the project and has agreed to accept the role of non-Federal sponsor in the event of approval of a final Detailed Project Report.

6.2 LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS AND DISPOSAL AREAS

County Road 350 North is owned and maintained by the non-Federal Sponsor. However, all of the property required for access and implementation of the bank stabilization is owned by the IDNR and managed by the Division of Fish and Wildlife. Typically, a permanent easement (Channel Improvement Easement) would be required to be acquired by the Sponsor, however, the IDNR is precluded from conveying State-owned property interests without statutory authority. As a result, the non-Federal Sponsor will obtain a Memorandum of Understanding, or similar, from the IDNR in order to facilitate the proposed repairs and to provide access for inspection and maintenance once construction is complete. The proposed project has been coordinated with IDNR staff and they have indicated their interest in assisting with the repairs as needed to include providing full cooperation with respect to granting access to the repair site as appropriate.

The full real estate plan is located in Appendix D.

6.3 MONITORING AND ADAPTIVE MANAGEMENT

Not Applicable.

6.4 OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION

Fulton County, Indiana will be responsible for operation, maintenance, repair, replacement and rehabilitation of the project. An Operation and Maintenance manual will be provided to Fulton County with detailed instructions on annual inspections and maintenance. The estimated cost for these inspections and minor repairs is \$30,000 per year.

Inspections should be conducted on a regular basis, at least once a year (preferably at low water) and after every significant flood event. Minimal routine maintenance and prompt repairs will be necessary to ensure the project's longevity. Repair is considered to entail those activities of a routine nature that maintain the project in a well-kept condition. Replacement covers those activities taken when a worn-out element is replaced. Rehabilitation refers to activities necessary to bring a deteriorated project back to its original condition.

6.5 REGULATORY REQUIREMENTS

6.5.1 Clean Water Act (CWA)

Compliance with Section 404 of the CWA is required for discharges of dredged or fill material in to waters of the United States, including adjacent wetlands. A 404 (b)(1) evaluation has been prepared and is included in the Environmental Appendix. Construction impacts would occur below the ordinary high water mark of the Ohio River; therefore the Corps would need to obtain a Section 401 Water Quality Certification from the State of Indiana before the start of construction.

6.5.2 Floodplain Management

Executive Order (EO) 11988, Floodplain Management requires federal agencies to evaluate and minimize to the extent possible, impacts and modifications to the floodplain. Riverbank stabilization would inherently occur within the floodplain; therefore, there is no alternative to working in the floodplain. The proposed action does not conflict with applicable state and local standards concerning floodplain protection, nor would it have any impacts to the 100-year floodplain.

6.5.3 Endangered Species Act (ESA)

The ESA requires the determination of possible harm or degradation to federally listed threatened or endangered species and critical habitat. The USFWS provided an official list of threatened or endangered species that may be present within the project vicinity. Based on available information compiled from mussel surveys conducted within the nearby vicinity, existing habitat conditions at the project site, and timing of construction activities to offset potential adverse impacts to Indiana bats, the Corps made a determination of “may affect, but not likely to adversely affect” for the following species: clubshell (*Pleurobema clava*), rabbitsfoot (*Quadrula cylindrica cylindrica*), rayed bean (*Vilosa fabalis*), sheepsnose (*Plethobasus cyphus*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*). This EA has been provided to USFWS for their review and comment with regard to their determination of compliance with the Endangered Species Act (ESA), 16 U.S.C. §§ 1531-1544 and the Corps determination of effects.

6.5.4 Fish and Wildlife Coordination Act (FWCA)

In compliance with the Fish and Wildlife Coordination Act, coordination is ongoing with the USFWS and Indiana DNR regarding endangered species and other sensitive species and natural areas with the project area. This DPR and integrated EA will be provided to USFWS and DNR for their review and comment with regard to their determination of compliance with the FWCA. All correspondences will be included in the Environmental Appendix.

6.5.5 Clean Air Act (CAA)

In compliance with the CAA (42 USC § 7401 et seq.) and the 1977 and 1990 amendments, the Environmental Protection Agency has promulgated ambient air quality standards and regulations to protect health and the environment. Areas that are below the standards are in “attainment,” while those that are equal or exceed the standards are said to be in “non-attainment.” The proposed project site is within an attainment area and none of the alternatives described would impact long-term ambient air quality standards (U.S. Environmental Protection Agency, 2015).

6.5.6 National Pollutant Discharge Elimination System Storm Water Permit (NPDES)

A NPDES permit for stormwater discharges is required for activities that disturb more than one acre of land. For the proposed project, clearing of only 0.5 acres along the riverbank is anticipated; therefore a Storm Water Pollution Prevention Plan would not be required.

6.5.7 National Historic Preservation Act (NHPA)

Section 106 of the NHPA, as amended, requires federal agencies to consider the effects of their undertakings on historic properties. The implementing regulations at 36 CFR 800 detail the process that requires consultation with the SHPO, tribes, local governments, the public, and others. Suitable efforts to identify historic properties must be taken and consulting parties afforded an opportunity to comment on the area of potential effect and an undertaking's effect determination. Only sites, building structures, objects, or landscapes listed in or determined eligible for listing in the National Register of Historic Places (NRHP) are afforded the safeguards of the NHPA. Archival research for this project involved consulting the NRHP and Indiana SHPO, and review of the Indiana State Historic Architectural and Archaeological Research Database. A visual pedestrian survey was also performed by Louisville District personnel. As a result of this research, the Corps has determined, in accordance with 36 CFR 800. 4(d), that there will be no effect on historic properties or other cultural resources. Coordination with the Indiana SHPO is ongoing. All correspondences will be included in the Environmental Appendix.

7 PUBLIC INVOLVEMENT

7.1 PUBLIC VIEWS AND COMMENTS

TBD

7.2 STAKEHOLDER AGENCY COORDINATION

7.2.1 Federal Agencies

The Natural Resources Conservation Service was contacted to confirm that there are no current projects on this segment of the Tippecanoe River.

7.2.2 State Agencies

Coordination with Indiana DNR has occurred specifically regarding permitting, as well as required real estate. Unofficial response indicate that the agency is willing to participate in developing a MOU between Fulton County and the agency for construction access.

7.2.3 Local Agencies

TBD

7.2.4 Non-Governmental Organizations

TBD

7.2.5 Federally Recognized Tribes

TBD

8 FINDING OF NO SIGNIFICANT IMPACT

The draft FONSI is located in the Environmental Appendix.

9 RECOMMENDATION

After considering the engineering, economic, environmental, and social aspects relative to the construction of the proposed emergency bank stabilization project in Fulton County, IN at County Road 350 N, it is recommended that the selected plan be authorized and constructed by the Great Lakes and Ohio River Division as a Federal project under the authority of Section 14 of the 1946 Flood Control Act (P.L. 79-526), as amended.

10 REFERENCES

- Bioassessment in the Tippecanoe River watershed 2003 and 2004. Final Report to the Nature Conservancy, Indiana Chapter. 14+ pp.
- Carney, D.A., L.M. Page, and T.M. Keevin. 1993. Fishes of the Tippecanoe River, Indiana: an outstanding Midwestern stream. *Proceedings of the Indiana Academy of Science* 101:201-219.
- Fisher, Brant. 2006. Current Status of Freshwater Mussels (Order Unionoida) in the Wabash River Drainage of Indiana. *Proceedings of the Indiana Academy of Science* 115(2):103–109.
- Hoggatt, R.E. 1975. Drainage areas of Indiana stream. U.S. Geological Survey, Water Resources Division, Indianapolis, Indiana. 231 pp.
- Indiana Department of Environmental Management. *Nonattainment Status for Indiana Counties*. 04 July 2015. Web. 05 Jan. 2016. <http://www.in.gov/idem/airquality/2339.htm>
- Intergovernmental Panel on Climate Change (IPCC), 2007a: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B.M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.
- Intergovernmental Panel on Climate Change (IPCC), 2007b: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Parry, M.L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden, C.E. Hanson (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- IUCN Red List of Threatened Species. Version 2015-4. Downloaded on 06 January 2016. <www.iucnredlist.org>
- U.S. Census Bureau. *State & County QuickFacts- Fulton County, Indiana*. 02 Dec. 2015. Web. 05 Jan. 2016. < <http://www.census.gov/quickfacts/table/PST045215/18049> >

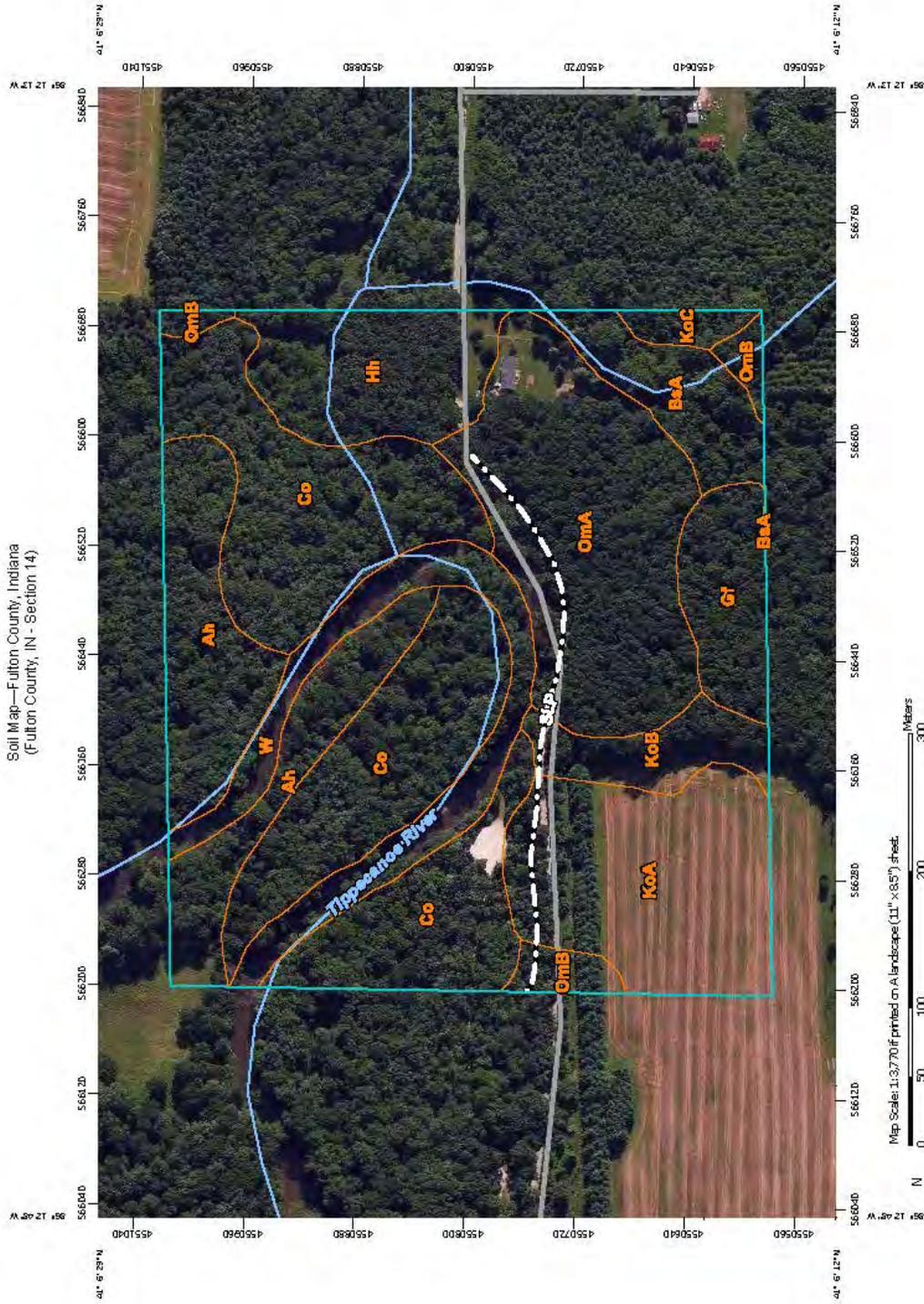
U.S. Environmental Protection Agency. *Current Nonattainment Counties for All Criteria Pollutants*. N.p., 01 October 2015. Web. 05 Jan. 2016. <<http://www3.epa.gov/airquality/greenbook/ancl.html>>

Fulton County

Section 14

Appendix A: Environmental

Soil Map—Fulton County, Indiana
(Fulton County, IN - Section 14)



Map Scale: 1:3,770 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge: UTM Zone 16N WGS84



Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND		MAP INFORMATION	
<p>Area of Interest (AOI)</p> <ul style="list-style-type: none"> Area of Interest (AOI) <p>Soils</p> <ul style="list-style-type: none"> Soil Map Unit Polygons Soil Map Unit Lines Soil Map Unit Points <p>Special Point Features</p> <ul style="list-style-type: none"> Blowout Borrow Pit Clay Spot Closed Depression Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or Swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Salina Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot 	<ul style="list-style-type: none"> Spot Area Stony Spot Vary Stony Spot Wet Spot Other Special Line Features <p>Water Features</p> <ul style="list-style-type: none"> Streams and Canals <p>Transportation</p> <ul style="list-style-type: none"> Rails Interstate Highways US Routes Major Roads Local Roads <p>Background</p> <ul style="list-style-type: none"> Aerial Photography 	<p>The soil surveys that compose your AOI were mapped at 1:15,800.</p> <p>Warning: Soil Map may not be valid at this scale.</p> <p>Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.</p> <p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov Coordinate System: Web Mercator (EPSG 3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: Fulton County, Indiana Survey Area Data: Version 17, Sep 9, 2015</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Apr 29, 2011—Oct 3, 2011</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p>	

Map Unit Legend

Fulton County, Indiana (N049)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ah	Alganssee loamy sand, frequently flooded	8.7	12.5%
BsA	Branch loamy sand, 0 to 2 percent slopes	2.3	4.3%
Co	Cohoctah fine sandy loam, occasionally flooded	15.3	28.5%
Gt	Gilford fine sandy loam, 0 to 2 percent slopes, gravelly subsoil	2.3	4.2%
Hh	Histosols-Aquolls complex, ponded	3.9	7.3%
KoA	Kosciusko-Ormas complex, 0 to 2 percent slopes	6.7	12.4%
KoB	Kosciusko-Ormas complex, 2 to 6 percent slopes	1.8	3.4%
KoC	Kosciusko-Ormas complex, 6 to 12 percent slopes	0.5	1.0%
OmA	Ormas loamy sand, 0 to 2 percent slopes	8.9	16.6%
OmB	Ormas loamy sand, 2 to 6 percent slopes	1.1	2.1%
W	Water	4.1	7.7%
Totals for Area of Interest		53.8	100.0%

Fulton County, Indiana

IPaC Trust Resource Report

Generated January 06, 2016 10:48 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (<http://ecos.fws.gov/ipac/>): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

US Fish & Wildlife Service

IPaC Trust Resource Report



NAME

Fulton County, Indiana

LOCATION

Fulton County, Indiana

DESCRIPTION

Section 14 - Emergency Streambank Protection

IPAC LINK

<http://ecos.fws.gov/ipac/project/FPEIV-2MXOZ-DV3A2-SV7IU-HXMAFI>



U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

Bloomington Ecological Services Field Office

620 South Walker Street

Bloomington, IN 47403-2121

(812) 334-4261

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Clams

Clubshell *Pleurobema clava* Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F01D

Rabbitsfoot *Quadrula cylindrica cylindrica* Threatened

CRITICAL HABITAT

There is final critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F03X

Rayed Bean *Villosa fabalis* Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F01A

Sheepnose Mussel *Plethobasus cyphus* Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F046

Mammals

Indiana Bat *Myotis sodalis*

Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat *Myotis septentrionalis*

Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php>

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle <i>Haliaeetus leucocephalus</i>	Bird of conservation concern
Year-round https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008	
Bell's Vireo <i>Vireo bellii</i>	Bird of conservation concern
Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX	
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i>	Bird of conservation concern
Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI	
Blue-winged Warbler <i>Vermivora pinus</i>	Bird of conservation concern
Season: Breeding	
Bobolink <i>Dolichonyx oryzivorus</i>	Bird of conservation concern
Season: Breeding	
Brown Thrasher <i>Toxostoma rufum</i>	Bird of conservation concern
Season: Breeding	
Common Tern <i>Sterna hirundo</i>	Bird of conservation concern
Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09G	

Dickcissel <i>Spiza americana</i> Season: Breeding	Bird of conservation concern
Henslow's Sparrow <i>Ammodramus henslowii</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B09D	Bird of conservation concern
Least Bittern <i>Ixobrychus exilis</i> Season: Breeding	Bird of conservation concern
Loggerhead Shrike <i>Lanius ludovicianus</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0FY	Bird of conservation concern
Marsh Wren <i>Cistothorus palustris</i> Season: Breeding	Bird of conservation concern
Peregrine Falcon <i>Falco peregrinus</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0FU	Bird of conservation concern
Pied-billed Grebe <i>Podilymbus podiceps</i> Season: Breeding	Bird of conservation concern
Prothonotary Warbler <i>Protonotaria citrea</i> Season: Breeding	Bird of conservation concern
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> Year-round	Bird of conservation concern
Rusty Blackbird <i>Euphagus carolinus</i> Season: Wintering	Bird of conservation concern
Short-eared Owl <i>Asio flammeus</i> Season: Wintering https://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0HD	Bird of conservation concern
Upland Sandpiper <i>Bartramia longicauda</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0HC	Bird of conservation concern
Willow Flycatcher <i>Empidonax traillii</i> Season: Breeding https://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0F6	Bird of conservation concern
Wood Thrush <i>Hylocichla mustelina</i> Season: Breeding	Bird of conservation concern

Refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuges in this location

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wetland data is unavailable at this time.

Indiana Division of Fish & Wildlife
Endangered and Special Concern Species

Mammals

<i>Endangered</i>		<i>Special Concern</i>	
Gray Myotis (FE)	<i>Myotis grisescens</i>	Smoky Shrew	<i>Sorex fumeus</i>
Indiana Myotis (FE)	<i>Myotis sodalis</i>	Pygmy Shrew	<i>Sorex hoyi</i>
Evening Bat	<i>Nycticeius humeralis</i>	Star-nosed Mole	<i>Condylura cristata</i>
Swamp Rabbit	<i>Sylvilagus aquaticus</i>	Southeastern Myotis	<i>Myotis austroriparius</i>
Franklin's Ground Squirrel	<i>Spermophilus franklinii</i>	Eastern small-footed	<i>Myotis Myotis leibii</i> <i>Myotis Myotis lucifugus</i>
Allegheny Woodrat	<i>Neotoma magister</i>	Little Brown Northern long-eared Bat (FT)	<i>Myotis septentrionalis</i> <i>Lasionycteris noctivagans</i>
		Silver-haired Bat	<i>Perimyotis subflavus</i>
		Tri-colored Bat	<i>Lasiurus borealis</i>
		Eastern Red Bat	<i>Lasiurus cinereus</i>
		Hoary Bat	<i>Corynorhinus rafinesquii</i>
		Rafinesque's Big-eared Bat	<i>Geomys bursarius</i>
		Plains Pocket Gopher	<i>Mustela nivalis</i>
		Least Weasel	<i>Taxidea taxus</i>
		Badger	

Birds

<i>Endangered</i>		<i>Special Concern</i>	
Trumpeter Swan	<i>Cygnus buccinator</i>	Ruffed Grouse	<i>Bonasa umbellus</i>
American Bittern	<i>Botaurus lentiginosus</i>	Great Egret	<i>Ardea alba</i>
Least Bittern	<i>Ixobrychus exilis</i>	Mississippi Kite	<i>Ictinia mississippiensis</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Bald Eagle	<i>Haliaeetus leucocephalus</i>
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	Sharp-shinned Hawk	<i>Accipiter striatus</i>
Osprey	<i>Pandion haliaetus</i>	Red-shouldered Hawk	<i>Buteo lineatus</i>
Northern Harrier	<i>Circus cyaneus</i>	Broad-winged Hawk	<i>Buteo platypterus</i>
Black Rail	<i>Laterallus jamaicensis</i>	Sandhill Crane	<i>Grus canadensis</i>
King Rail	<i>Rallus elegans</i>	American Golden-Plover	<i>Pluvialis dominica</i>
Virginia Rail	<i>Rallus limicola</i>	Solitary Sandpiper	<i>Tringa solitaria</i>
Common Gallinule	<i>Gallinula galeata</i>	Greater Yellowlegs	<i>Tringa melanoleuca</i>
Whooping Crane (FE)	<i>Grus americana</i>	Ruddy Turnstone	<i>Arenaria interpres</i>
Piping Plover (FE)	<i>Charadrius melodus</i>	Rufa Red Knot (FT)	<i>Calidris canutus rufa</i>

Upland Sandpiper	<i>Bartramia longicauda</i>	Buff-breasted Sandpiper	<i>Calidris subruficollis</i>
Least Tern (FE)	<i>Sternula antillarum</i>	Short-billed Dowitcher	<i>Limnodromus griseus</i>
Black Tern	<i>Chlidonias niger</i>	Wilson's Phalarope	<i>Phalaropus tricolor</i>
Barn Owl	<i>Tyto alba</i>	Common Nighthawk	<i>Chordeiles minor</i>
Short-eared Owl	<i>Asio flammeus</i>	Eastern Whip-poor-will	<i>Antrostomus vociferous</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Peregrine Falcon	<i>Falco peregrinus</i>
Sedge Wren	<i>Cistothorus platensis</i>	Black-and-white Warbler	<i>Mniotilta varia</i>
Marsh Wren	<i>Cistothorus palustris</i>		<i>Helmitheros vermivorum</i>
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Worm-eating Warbler	
Kirtland's Warbler (FE)	<i>Setophaga kirtlandii</i>	Hooded Warbler	<i>Setophaga citrina</i>
Cerulean Warbler	<i>Setophaga cerulea</i>	Western Meadowlark	<i>Sturnella neglecta</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>		
	<i>Xanthocephalus xanthocephalus</i>		
Yellow-headed Blackbird			

Fish

Endangered

Special Concern

Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	Pugnose Shiner	<i>Notropis anogenus</i>
Lake Sturgeon	<i>Acipenser fulvescens</i>	Bigmouth Shiner	<i>Notropis dorsalis</i>
Redside Dace	<i>Clinostomus elongatus</i>		<i>Rhinichthys cataractae</i>
Pallid Shiner	<i>Hybopsis amnis</i>	Longnose Dace	<i>Catostomus catostomus</i>
Greater Redhorse	<i>Moxostoma valenciennesi</i>	Longnose Sucker	<i>catostomus</i>
Hoosier Cavefish	<i>Amblyopsis hoosieri</i>	Northern Madtom	<i>Noturus stigmosus</i>
Bantam Sunfish	<i>Lepomis symmetricus</i>	Ohio River Muskellunge	<i>Esox masquinongy ohioensis</i>
Variegate Darter	<i>Etheostoma variatum</i>	Cisco Coregonus	<i>artedi</i>
Channel Darter	<i>Percina copelandi</i>		<i>Coregonus clupeaformis</i>
Gilt Darter	<i>Percina evides</i>	Lake Whitefish	<i>Percopsis omiscomaycus</i>
		Trout-perch	<i>Cottus cognatus</i>
		Slimy Sculpin	<i>Cottus cognatus</i>
		Western Sand Darter	<i>Ammocrypta clara</i>
			<i>Etheostoma maculatum</i>
		Spotted Darter	<i>Etheostoma proeliare</i>
		Cypress Darter	<i>Etheostoma</i>
			<i>Etheostoma</i>
		Tippecanoe Darter	<i>tippecanoe</i>
		Banded Pygmy Sunfish	<i>Elassoma zonatum</i>

Mollusks

Endangered

Special Concern

Fanshell (FE)	<i>Cyprogenia stegaria</i> <i>Epioblasma obliquata</i>	Wavyrayed Lampmussel	<i>Lampsilis fasciola</i>
White Catspaw (FE)	<i>Epioblasma torulosa</i> <i>rangiana</i>	Ohio Pigtoe	<i>Pleurobema cordatum</i> <i>Ptychobranchnus</i>
Northern Riffleshell (FE)	<i>Epioblasma torulosa</i> <i>torulosa</i>	Kidneyshell	<i>fasciolaris</i>
Tubercled Blossom (FE)	<i>Epioblasma triquetra</i>	Salamander Mussel	<i>Simpsonaias ambigua</i>
Snuffbox (FE)	<i>Fusconaia subrotunda</i>	Purple Lilliput	<i>Toxolasma lividum</i> <i>Venustaconcha</i>
Longsolid	<i>Lampsilis abrupta</i>	Ellipse	<i>ellipsiformis</i>
Pink Mucket (FE)	<i>Obovaria subrotunda</i>	Little Spectaclecase	<i>Villosa lienosa</i>
Round Hickorynut	<i>Plethobasus cicatricosus</i>	Pointed Campeloma	<i>Campeloma decisum</i>
White Wartyback (FE)	<i>Plethobasus cooperianus</i>	Swamp Lymnaea	<i>Lymnaea stagnalis</i>
Orangefoot Pimpleback (FE)	<i>Plethobasus cyphus</i>		
Sheepnose (FE)	<i>Pleurobema clava</i>		
Clubshell (FE)	<i>Pleurobema plenum</i>		
Rough Pigtoe (FE)	<i>Pleurobema rubrum</i>		
Pyramid Pigtoe	<i>Potamilus capax</i> <i>Quadrula cylindrica</i>		
Fat Pocketbook (FE)	<i>cylindrica</i>		
Rabbitsfoot (FT)	<i>Villosa fabalis</i>		
Rayed Bean (FE)			

Amphibians

Endangered		Special Concern	
Hellbender	<i>Cryptobranchus alleganiensis</i>	Mudpuppy Streamside Salamander	<i>Necturus maculosus</i>
Mole Salamander	<i>Ambystoma talpoideum</i>	Blue-spotted Salamander	<i>Ambystoma barbouri</i>
Green Salamander	<i>Aneides aeneus</i>	Four-toed Salamander	<i>Ambystoma laterale</i> <i>Hemidactylum</i>
Red Salamander	<i>Pseudotriton ruber</i>	Blanchard's Cricket	<i>scutatum</i>
Crawfish Frog	<i>Lithobates areolatus</i>	Frog	<i>Acris blanchardi</i>
Plains Leopard Frog	<i>Lithobates blairi</i>	Northern Leopard Frog	<i>Lithobates pipiens</i>

Reptiles

Endangered		Special Concern	
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>	Eastern Box Turtle	<i>Terrapene carolina</i>
Eastern Mud Turtle	<i>Kinosternon subrubrum</i>	Red-bellied Mudsake	<i>Farancia abacura</i>
Spotted Turtle	<i>Clemmys guttata</i>	Rough Greensnake	<i>Opheodrys aestivus</i>
Blanding's Turtle	<i>Emydoidea blandingii</i>	Western Ribbonsnake	<i>Thamnophis proximus</i>

River Cooter	<i>Pseudemys concinna</i>
Ornate Box Turtle	<i>Terrapene ornata</i>
Scarletsnake	<i>Cemophora coccinea</i>
Kirtland's Snake	<i>Clonophis kirtlandii</i>
Copper-bellied Watersnake(FT†)	<i>Nerodia erythrogaster neglecta</i>
Smooth Greensnake	<i>Opheodrys vernalis</i>
Southeastern Crowned Snake	<i>Tantilla coronata</i>
Butler's Gartersnake	<i>Thamnophis butleri</i>
Cottonmouth	<i>Agkistrodon piscivorus</i>
Timber Rattlesnake	<i>Crotalus horridus</i>
Massasauga (FC)	<i>Sistrurus catenatus</i>

Highlight indicates that known species' range overlaps with the proposed project.

† Only the northern population of copper-bellied watersnake is federally threatened



**US Army Corps
of Engineers**
Louisville District

Finding of No Significant Impact and Section 404(b)(1) Finding of Compliance

County Road 350 North, Fulton County, Indiana Continuing Authorities Program Section 14 Project

1. The U.S. Army Corps of Engineers has proposed a project to address streambank erosion along the Tippecanoe River near County Road 350 North in Fulton County, Indiana. The study is authorized by Section 14 of the 1946 Flood Control Act (P.L. 79-526) as amended. Section 14 allows the Corps to plan and construct emergency streambank and shoreline protection projects to protect highways, highway bridge approaches, public facilities such as water and sewer lines, hospitals, non-profit schools, churches and other public non-profit facilities. The study was initiated in response to a letter dated June 2009 from the Fulton County Highway Department requesting assistance with streambank erosion on the Tippecanoe River.
2. Alternatives considered for the streambank protection project are: (1) no action, (2) protection of the riverbank with riprap (3) protection of the riverbank with rock-filled gabion baskets, (4) protection of the riverbank with a marine mattress system, and (4) relocation of County Road 350 North. Implementation of the marine mattress system is considered the most cost-efficient and effective means to address current bank stabilization issues while minimizing adverse environmental impacts, and is considered the preferred alternative. The No Action alternative would not be in the public's best interest and would eventually impact county infrastructure, thus requiring more costly means to address the issue.
3. In accordance with ER 200-2-2, *Policy and Procedures for Implementing the National Environmental Policy Act* (NEPA), an EA has been prepared and circulated to other agencies and groups for review. Coordination with the Indiana State Historic Preservation Officer (SHPO) and federally recognized tribes was conducted. The preferred alternative (hereinafter, "proposed project") would not significantly impact socioeconomic conditions within the project area. Recreational and ecological benefits are expected to be realized with improved streambank stabilization.
4. Construction activities associated with the implementation of the proposed project would cause minor and temporary adverse impacts to water quality, aquatic resources, and noise

in the immediate project area. No impacts to wetlands from the proposed project are anticipated. No issues were noted regarding hazardous, toxic, or radioactive materials. Overall impacts from construction of this project would be beneficial after construction is complete. The preferred alternative is in compliance with the Clean Air Act and Executive Order 12898 for Environmental Justice. It would not disproportionately place any adverse environmental, economic, social, or health impacts on minority or low-income populations.

5. The proposed project will entail placement of fill material into waters of the U.S. An evaluation and finding of its compliance with the Section 404(b)(1) Guidelines is appended to the EA. Because construction impacts will occur below the ordinary high water mark of the Tippecanoe River, a Section 401 Water Quality Certification from the Indiana Division of Water (DOW) must be obtained prior to construction. These steps will ensure that all requirements under the Clean Water Act (CWA) will have been met. Construction activities associated with the proposed project would not result in the disturbance of more than one acre of total land.
6. Coordination with U.S. Fish and Wildlife Service (USFWS) and Indiana Department of Natural Resources (DNR), per the Fish and Wildlife Coordination Act (FWCA 48 Stat, 401, as amended; 16 U.S.C. 661 et seq.) and Endangered Species Act (16 U.S.C. §§ 1531-1544) has been completed.
7. Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulations at 36 CFR 800 require consideration of cultural resources prior to a federal undertaking and requires consultation with the SHPO, federally recognized tribes with a connection to the project location, and other consulting parties defined at Section 800.3. The NHPA only affords protection to sites, buildings structures, objects, or landscapes listed in or determined eligible for listing in the National Register of Historic Places (NRHP). Archival research for this project involved consulting the NRHP and Indiana SHPO, and review of the Indiana State Historic Architectural and Archaeological Research Database. A visual pedestrian survey was also performed by Louisville District personnel. As a result of this research, the Corps has determined, in accordance with 36 CFR 800. 4(d), that there will be no effect on historic properties or other cultural resources. This information has been coordinated with the Indiana SHPO.
8. I have evaluated this project in accordance with the guidelines promulgated by the Administrator of the Environmental Protection Act pursuant to Section 404 (b)(1) of the CWA. Based on that evaluation, I have determined that the proposed bank stabilization project is specified as complying with the guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.
9. I have reviewed the proposed project, the public and agency comments, and the EA in light of the general public interest. I have determined that issuing the respective approvals and allowing the proposed project to be implemented would not constitute a major federal

action significantly affecting the quality of the human environment within the meaning of the NEPA of 1969, as amended. Accordingly, I have concluded that preparation of an Environmental Impact Statement would not be required.

Christopher G. Beck
Colonel, Corps of Engineers
Commanding

Date



**US Army Corps
of Engineers**
Louisville District

**Clean Water Act Section 404(b)(1) Evaluation
Section 14 Emergency Streambank Protection,
Fulton County, Indiana**

Prepared by:
U.S. Army Corps of Engineers, Louisville District
March 2016

I. Project Description

a. Location

The project is located in north-central Indiana in Fulton County approximately 100 Miles north of Indianapolis and 60 miles east of Fort Wayne (Figure 1). Rochester, Indiana is approximately 4 miles south of the project site. The erosion site on County Road 350 North is contained within the Menominee Public Fishing Area, which is owned and maintained by the Indiana Department of Natural Resources. Specifically, the area of concern is located on the Tippecanoe River at River Mile 107.6 along the left bank of the river in a horseshoe bend (Latitude 41° 6' 23", Longitude 86° 12' 30")



Figure 1. Project site location map

b. General Description

This Clean Water Act Section 404(b)(1) evaluation addresses the proposed discharge of dredged or fill material into the waters of the U.S. The U.S. Army Corps of Engineers (USACE) prepared a draft Environmental Assessment for Section 14 Emergency Streambank Protection Project, which included the proposed placement of 650 linear feet (LF) of marine mattress system along the streambank of the Tippecanoe River

This alternative would protect approximately 650 feet of bank. The bank would be cleared, removing all the trees with exposed roots and any trees that are dead, dying or otherwise unstable. Once the bank has been cleared, granular fill would be placed to form a stable slope upon which the mattress system can be installed. Because of the proximity of the bank to the road, excavating to form the slope is not possible for the majority of the length of the protection and in those areas where it is possible, it would require removing additional trees than by using granular fill to form the slope.

Once the slope was formed, a rock filled marine mattress system 18-inches thick would be placed over the slope and anchored into the bank. This alternative would require clearing approximately a half acre, placing 550 cubic yards of granular fill, 1,625 cubic yards of rock fill for the Marine Mattress System, excavating approximately 480 cubic yards of material and planting approximately 0.25 acres of native vegetation. Guardrail would be installed between the top of the bank and the edge of the road to meet roadside safety requirements. In the area of existing riprap slope, the marine mattress would be placed on top of the existing riprap to provide a more stable slope.

c. Authority and Purpose

This project is being conducted under Section 14 of the Flood Control Act of 1946, as amended, which authorizes the US Army Corps of Engineers (USACE) to study, design and construct emergency streambank and shoreline works to protect public services including (but not limited to) streets, bridges, schools, water and sewer lines, National Register Historic sites, and churches from damage or loss by natural erosion. It is a Continuing Authorities Program (CAP) which focuses on water resource related projects of relatively smaller scope, cost and complexity.

d. General Description of Dredged or Fill Material

(1) General Characteristics of Material

Fill material would consist solely of a rock filled marine mattress system, which is 18-inches thick and would be placed over the slope and anchored into the bank. The rock would be commercially available limestone, graded to the appropriate size.

(2) Quantity of Material

The marine mattress system would require placing 550 cubic yards of granular fill, and 1,625 cubic yards of rock fill mattresses

(3) Source of Material

The mattress system and rock would be obtained from commercial sources.

e. Description of the Proposed Discharge Sites

(1) Location

The project site is located on the left descending bank of the Tippecanoe River at river mile 107.2, adjacent to County Road 350 North in Fulton County, Indiana.

(2) Size

The proposed project involves placement of 550 cubic yards of granular fill, 1,625 cubic yards of four-inch diameter rock fill for the Marine Mattress System, and excavation of approximately 480 cubic yards of material.

(3) Type(s) of Sites and Habitats

Tippecanoe River substrates are primarily clean gravel and sand. Cobble and, to a lesser extent, large boulders are present in some reaches. Moderate silt accumulation near stream margins and organic enrichment, as evidenced by abundant filamentous algae, occurs in most reaches.

Despite the fact that the watershed is primarily composed of erodable agricultural land and the river system has been subjected to channelization, urban development, and mainstem impoundment, the Tippecanoe River retains a variety of instream habitats and water of sufficient quality to support a rich aquatic fauna.

(4) Time and Duration of Discharge

The total construction time of the recommended plan would be 90 days.

f. Description of Disposal Method

Placement of the rock-filled mattress system will be accomplished from land by crane and/or excavator. Excavated material will be hauled off site to a commercial landfill.

II. Factual Determinations

a. Physical Substrate Determinations

(1) Substrate

The substrates are primarily clean gravel and sand. Cobble and, to a lesser extent, large boulders are present in some reaches. Moderate silt accumulation near stream margins have occurred from eroded banks.

(2) Sediment Type

Sediments at the project sites are mostly fine sediments, sands, and deposited material from the river. Sediments resulting from erosion along the riverbank transported by water flow are composed of sorted gravel, sand, silt, and other fine materials.

(3) Dredged/Fill Material Movement

The installed mattress system will be securely anchored to the streambank to reduce possible movement.

(4) Physical Effects on Benthos

Temporary and localized impacts to benthic organisms and their habitats would occur in the immediate areas of construction; however, benthic organisms are expected to quickly rebound from the short-term impacts of material placement.

(5) Other Effects

No other effects are known.

(6) Actions Taken to Minimize Impacts

Impacts to surface water and physical substrates from excavation of riverbed material would be minimized by using appropriate construction best management practices and limiting excavation quantities and ground disturbance to the absolute minimum required.

The marine mattress system was proposed due the smaller toe size requirement compared to other methods of streambank protection. The decreased toe size will limit impact to benthic habitats.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water

Temporary increases in turbidity would occur at the construction areas and downstream of the areas during construction. These changes in turbidity have not been modeled; however, due to the limited scope of the project, they are not expected to significantly impact water quality.

No significant negative impacts would be expected to water quality or sensitive organisms where material would be placed.

(a) Salinity

There are no impacts expected to salinity.

(b) Water Chemistry

There are no impacts expected to water chemistry.

(c) Clarity

There may be a local and temporary increase in turbidity during construction activities. Because of reduced sediment load, water clarity near the project site is expected to improve from preconstruction conditions shortly after operations are completed.

(d) Color

Water immediately surrounding the construction area may become discolored temporarily due to disturbance of the sediment during placement of the riprap.

(e) Odor

Negligible amounts of hydrogen sulfide may be expected when disturbing possible anoxic sediments at the construction sites. Otherwise, there are no long-term impacts to odor.

(f) Taste

There are no impacts expected to taste.

(g) Dissolved Gas Levels

No impacts to dissolved gas levels would be expected.

(h) Nutrients

The proposed action could cause temporary nutrient increases during periods of resuspension of sediment and organic debris. Once construction is complete, nutrients entering the water column from would be prevented.

(i) Eutrophication

Construction activities would not lead to eutrophication of surrounding waters.

(j) Others as Appropriate

None known

(2) Current Patterns and Circulation

(a) Current Patterns and Flow

Construction activities would not have a significant effect on inflows to the system or water surface elevations.

(b) Velocity

Placement of material within the channel would not significantly impact velocities.

(c) Stratification

No changes in water stratification are anticipated.

(d) Hydrologic Regime

Hydrologic regimes would not be altered with placement of material.

(3) Normal Water Level Fluctuations

The average water surface elevation throughout the study area would be unaffected by construction activities.

(4) Salinity Gradients

There would be no change in salinity gradients.

(5) Actions That Would Be Taken to Minimize Impacts

Impacts to surface water and physical substrates from excavation of riverbed material would be minimized by using appropriate construction best management practices and limiting excavation quantities to the absolute minimum required.

c. Suspended Particulate/Turbidity Determination

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site

A temporary and localized increase in suspended particulates and turbidity levels is expected during excavation and placement of material at the project site. Upon completion of construction activities, suspended particulates and turbidity levels are expected to quickly return to preconstruction levels.

(2) Effects on Chemical and Physical Properties of the Water Column

(a) Light Penetration

Turbidity levels would be temporarily increased during placement operations material. Upon completion of construction activities light penetration is expected to improve from preconstruction levels due to reduced sedimentation from erosion at the project sites.

(b) Dissolved Oxygen

No adverse impacts to dissolved oxygen (DO) are expected; a reduction in DO may occur at localized and temporary events during construction activities.

(c) Toxic metals and organics

Suspended particles resulting from placement would not result in detrimental effects to chemical and physical properties of the water column.

(d) Pathogens

None expected or found.

(e) Aesthetics

No impacts to aesthetics would be anticipated.

(f) Others as Appropriate

None known

(3) Effects on Biota

No impacts are expected on photosynthesis, suspension/filter feeders, and sight feeders, except for temporary and localized impacts from placement operations (e.g., burial of benthos or temporary increase of local turbidity levels).

(4) Actions Taken to Minimize Impacts

Impacts to surface water and physical substrates from excavation of riverbed material would be minimized by using appropriate construction best management practices and limiting excavation quantities and ground disturbance to the absolute minimum required.

d. Contaminant Determinations

The marine mattress system and rock fill would be acquired from a state-approved commercial source. No contaminated materials would be released during construction of this project. Should contamination be found, necessary steps to avoid the materials or cleanup of the area would take place.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton

The proposed action could cause some negligible mortality because of increases in total suspended solids and turbidity and decreases in dissolved oxygen levels during construction periods. Impacts would be temporary and short-term in nature, and recolonization of the area by plankton should occur quickly after construction is complete.

(2) Effects on Benthos

Temporary effects on benthic macroinvertebrates could occur during construction, but once the project is complete, recolonization of the project areas by the native benthos is expected.

(3) Effects on Nekton

No significant impacts to the nekton of the area from the proposed construction and placement operations are expected.

(4) Effects on Aquatic Food Web

Reductions in primary productivity from turbidity would be temporary and localized around the immediate area of the construction and would be limited to the duration of the plume at a given site.

(5) Effects on Special Aquatic Sites

Construction activities would not have detrimental effects on special aquatic sites in the study area (i.e., sanctuaries and refuges, wetlands, mudflats).

(6) Threatened and Endangered Species

Coordination is ongoing with the U.S. Fish and Wildlife Service (USFWS) and the Indiana Department of Natural Resources (DNR). The scoping response received from the USFWS on February 1, 2016 listed six threatened or endangered species that may occur in the proposed project area. Coordination has been ongoing with the USFWS, and the Corps has made a determination of “may affect, not likely to adversely affect”, for these species.

(7) Other Wildlife

Because existing conditions (eroded river bank) within the proposed project area provide poor quality wildlife habitat, there would be no significant loss of wildlife habitat. However, placed stone, over time, could provide wildlife habitat.

(8) Actions to Minimize Impacts

Construction and riprap placement operations would be limited to low flow conditions, where possible, to minimize the overall impacts of disturbance. Construction best management practices would be implemented to minimize impacts. Additionally, USACE is coordinating with the USFWS regarding potential impacts to threatened and endangered species in the action area, and a Clean Water Act - Section 401 Water Quality Certification will be obtained from the Indiana DNR, Division of Water before construction begins. To minimize impacts to roosting endangered Indiana bats (*Myotis sodalis*), no trees over four inches diameter at breast height will be removed from April 1st to September 30th.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination

N/A

(2) Determination of Compliance with Applicable Water Quality Standards

In the No Action Alternative condition, water and sediment quality are not expected to substantially change in the Ohio River or its surrounding waters.

For the proposed project alternative, no violation of water quality standards is anticipated. A Clean Water Act - Section 401 Water Quality Certification will be obtained from the Indiana DNR, Division of Water before construction begins.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply

Construction activities would not impact any municipal or private water supplies.

(b) Recreational and Commercial Fisheries

No significant impacts to recreational and commercial fishing are anticipated from implementation of the proposed project. Completion of the bank stabilization project may have positive effects on the aquatic food chain by providing additional habitat below OHW for aquatic plant and animal species. This in turn, could potentially improve the local fishery.

(c) Water-related Recreation

No impacts to water-related recreation would occur as a result of the proposed construction activities.

(d) Aesthetics

No significant impacts to aesthetics are expected. Some trees will be removed from the project site; however, without the implement of an erosion protection, these trees will be undercut and fall in a relatively short timeframe. Construction of the project will protect the river bank and allow new vegetation to establish.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

No special sites would be negatively impacted by the project.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

From a watershed perspective, the stabilized 650 feet of riverbank would not be highly visible in the overall reduction of aquatic resource impairments due to sedimentation; however it would provide some minor progress in reducing riverbank erosion.

The construction activities of the proposed project are expected to have negligible adverse impacts to the environment when considered directly, indirectly, and/or cumulatively. The placement of bank protection is expected to improve water quality from preconstruction conditions by reducing erosion in the area. Riprap protection currently exists in the footprint of the project, but will be improved and extended to protect more riverbank from erosion. Cumulative effects are discussed in further detail in Section 4.11 of the Environmental Assessment.

h. Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill material but do not result from the actual placement of the material. No adverse significant secondary effects on the aquatic ecosystem should occur as a result of the proposed project.

III. Findings of Compliance with Restrictions on Discharge with Section 404(b)(1) Guidelines for the Portland Wharf Park and Louisville River Walk Emergency Stream Bank Protection Study

- a. **Adaptation of the Section 404(b)(1) Guidelines to this Evaluation:** No significant adaptations of the Guidelines were made relative to the evaluation for this project.
- b. **Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem:** The proposed project is the result of thorough evaluation of four proposed alternatives (including the No-Action Alternative). Refer to the associated Environmental Assessment and Feasibility Report for a complete comparative analysis of available alternatives. The proposed alternative of streambank protection in the form of riprap mattress system is the practicable alternative that would have the least adverse impact on the aquatic ecosystem.
- c. **Compliance with Applicable State Water Quality Standards:** The discharges associated with the proposed project alternative are not anticipated to cause or contribute to violation of any water quality standards. A Clean Water Act Section 401 Water Quality Certification will be obtained from the State of Indiana before commencing any work in waters of the U.S. Additionally, the proposed project alternative would not violate any toxic effluent standards of Section 307 of the Clean Water Act.

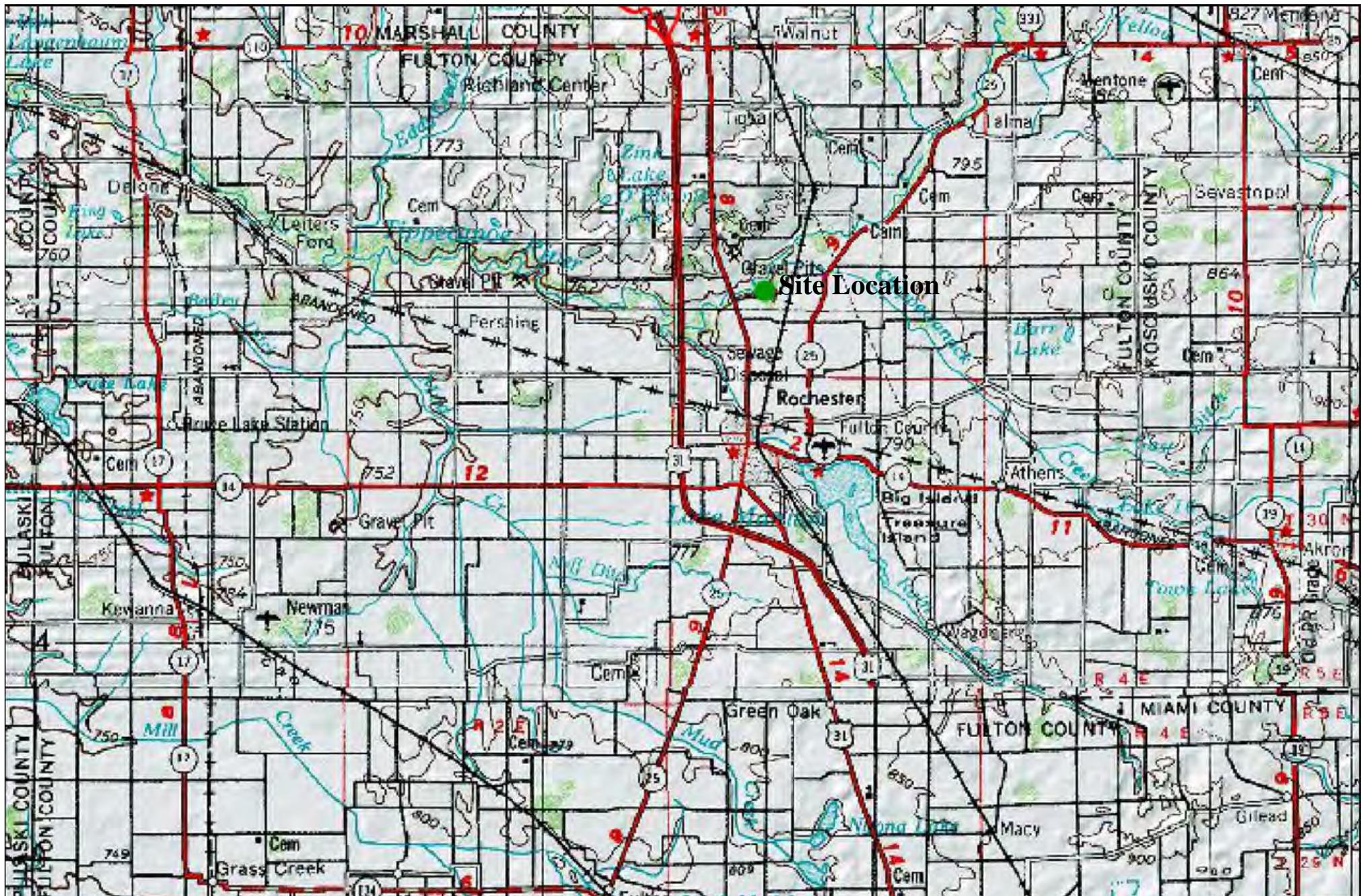
- d. **Compliance with Applicable Toxic Effluent Standard of Prohibition Under Section 307 of the Clean Water Act:** Bank stabilization operations would not violate Section 307 of the Clean Water Act.
- e. **Compliance with the Endangered Species Act:** The Corps has made a determination that the proposed project may affect, but is not likely to adversely affect any federally or State-listed threatened or endangered species or their critical habitat or violate any protective measures for any sanctuary. The US Fish and Wildlife Service is being consulted regarding the potential issues of any federally or State-listed threatened or endangered species or their critical habitat.
- f. **Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972:** Not applicable.
- g. **Evaluation of Extent of Degradation of the Waters of the United States:** The proposed project would not result in adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. There are no significant adverse impacts expected to the aquatic ecosystem diversity, productivity and stability, or recreational, aesthetic, and economic values.
- h. **Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the discharge on the Aquatic Ecosystem:** Appropriate steps to minimize potential adverse impacts on the aquatic system include close coordination with the State and Federal resource agencies during the final design prior to construction to incorporate all valid suggestions. Construction best management practices would be implemented to minimize impacts to the riparian zone and river bed and to control erosion and resuspension of soil and sediments. Additionally, construction activities would be limited to low flow conditions to minimize the overall effects of sediment disturbance and alterations of the river bank, riparian vegetation, and the river substrate would be limited to the greatest extent possible.
- i. **On the Basis of EPA 404 (b) (1) Guidelines, the Proposed Disposal Site for the Discharge of Dredged or Fill Material is:** in compliance with requirements of these guidelines, with the inclusion of the appropriate conditions and construction best management practices to minimize impacts to the aquatic ecosystem.

Fulton County

Section 14

Appendix B: Engineering

**COUNTY ROAD 350 NORTH
FULTON COUNTY, INDIANA
VICINITY MAP**



Site Location

VICINITY MAP
ENCLOSURE 1

**COUNTY ROAD 350 NORTH
FULTON COUNTY, INDIANA
SITE MAP**



Road 350 N

Tippecanoe River

Tippecanoe River

Site Location

E County Road 350 N

**SITE MAP
ENCLOSURE 2**

**COUNTY ROAD 350 NORTH
FULTON COUNTY, INDIANA
PHOTOGRAPHS
SEPTEMBER 3, 2015**

PHOTOGRAPHS (SEPTEMBER 3, 2015)
TIPPECANOE RIVER
FULTON COUNTY, INDIANA



Looking upstream from the IDNR River Access Ramp. Broken Concrete has been placed on the bank Upstream of the ramp.



Looking upstream at the protection placed by the Fulton County Road Department. Tree just downstream of the riprap placement is unstable and on the verge of falling into the river.

PHOTOGRAPHS (SEPTEMBER 3, 2015)
TIPPECANOE RIVER
FULTON COUNTY, INDIANA



Looking at the back just downstream of the riprap protection, where a failure had occurred in July.



Looking upstream at woody debris that collects as trees along the bank fail and fall into the river. Until these debris piles are transported downstream by the river they create undesirable flow conditions that can result in additional erosion of the bank.

PHOTOGRAPHS (SEPTEMBER 3, 2015)
TIPPECANOE RIVER
FULTON COUNTY, INDIANA



Looking down the slope where there had been a failure in July of 2015.



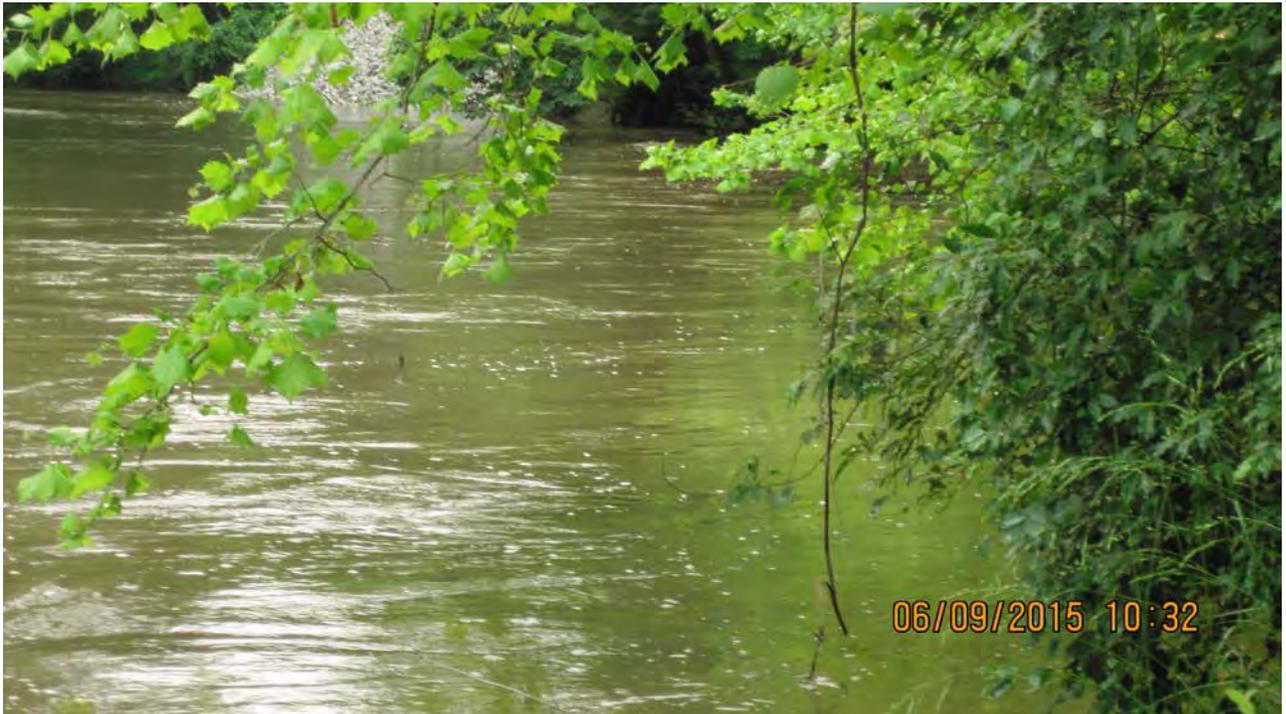
Looking at the eroded bank and unstable trees that are leaning severely. Additional erosion will result in these trees falling into the river, taking with it a root wad.

**COUNTY ROAD 350 NORTH
FULTON COUNTY, INDIANA
PHOTOGRAPHS
JUNE 9, 2015**

PHOTOGRAPHS (JUNE 9, 2015)
TIPPECANOE RIVER
FULTON COUNTY, INDIANA



Emergency riprap and barrier placed by the Fulton County Road Department. The stone size appears to be on the small side and may require an overlay of larger stone. With the high flow conditions occurring at the time of the inspection, by looking upstream it can be seen how the current is concentrating along the left bank.



Looking upstream from the IDNR boat ramp. Protection of the bank would extend from the existing riprap to the boat ramp.

PHOTOGRAPHS (JUNE 9, 2015)

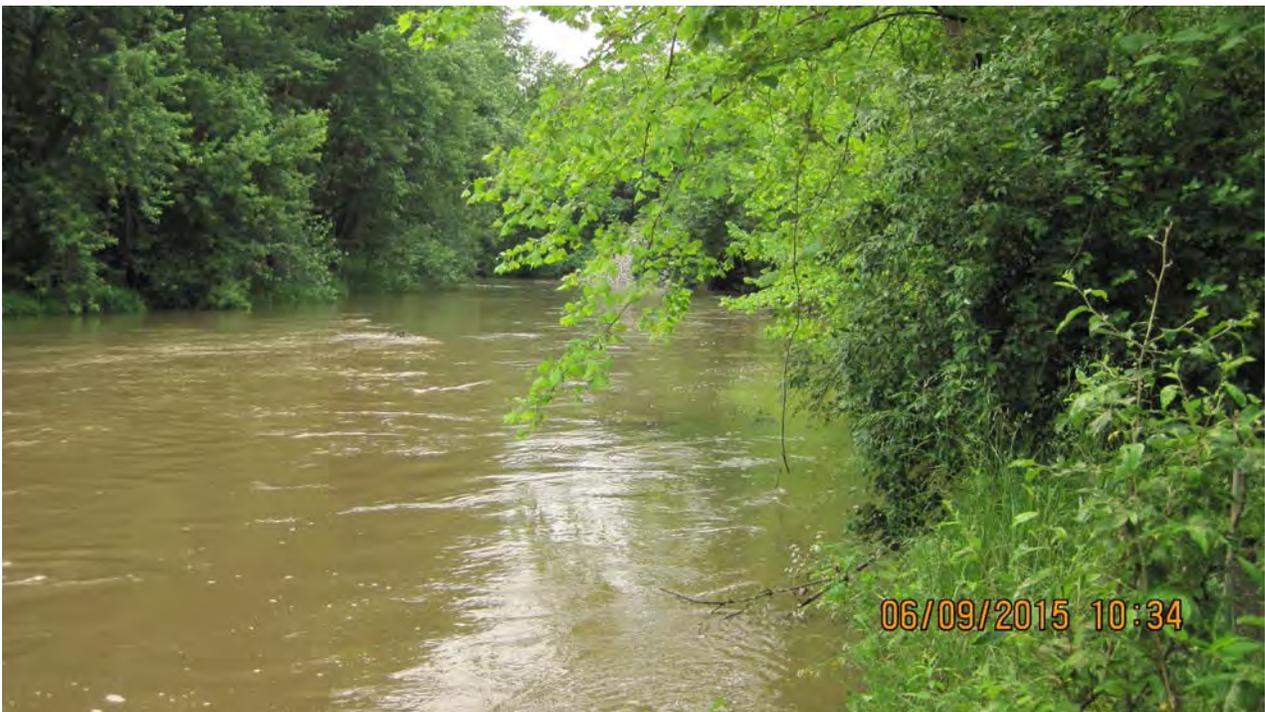
ENCLOSURE 4

SHHET 1 of 2

PHOTOGRAPHS (JUNE 9, 2015)
TIPPECANOE RIVER
FULTON COUNTY, INDIANA



Looking upstream from the existing riprap protection at the heavily vegetated left bank. This vegetation will help to resist the erosive forces of the river but once a tree becomes unstable and ultimately falls into the river, there will be a significant loss of bank material and an increase in the rate of erosion.



Looking upstream from the IDNR boat ramp at the heavily vegetated left bank. Again this vegetation will help to resist the erosive forces of the river but once a tree becomes unstable and ultimately falls into the river, there will be a significant loss of bank material and an increase in the rate of erosion.

**COUNTY ROAD 350 NORTH
FULTON COUNTY, INDIANA
DESIGN DRAWINGS**

1

2

3

4

5

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11

12



US ARMY CORPS
OF ENGINEERS
LOUISVILLE DISTRICT

PRELIMINARY ASSESSMENT SECTION 14 STUDY COUNTY ROAD 350 NORTH FULTON COUNTY, INDIANA

P2# 446626



US ARMY CORPS
OF ENGINEERS
LOUISVILLE DISTRICT

SYMBOL	REVISIONS DESCRIPTION	DATE	APPR.

DESIGNED BY: K. DORSCH	DATE: MARCH 2016
DRAWN BY: A. HAMILTON	SCALE: NONE
CHECKED BY: J. SINKHORN	DRAWING CODE:
PROJECT ENGINEER/ARCHITECT RONALD W. HOLMBERG, P.E.	DATE MARCH 2016

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

COUNTY ROAD 350 NORTH
SECTION 14 ASSESSMENT
FULTON COUNTY, INDIANA

COVER SHEET

SHEET
REFERENCE
NUMBER:
G1001

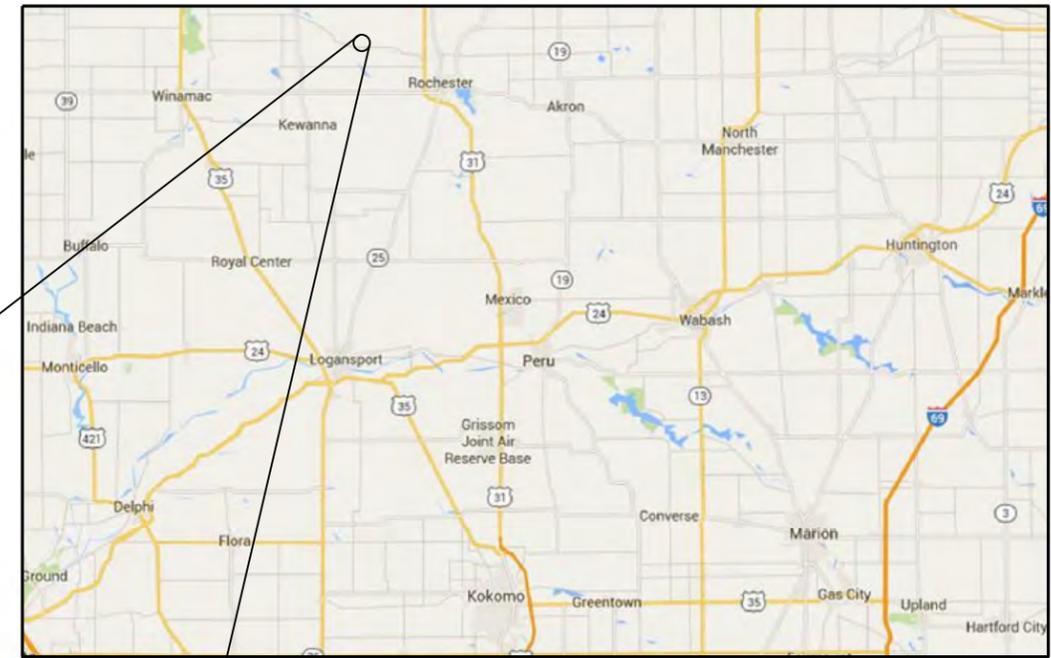
SHEET ___ OF ___

H
G
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1 2 3 4 5 6 7 8 9 10 11 12

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Sh. No.	Sheet Filename	Sh. Ref No.	Sheet Description
GENERAL			
1	446626_GI001.DGN	GI001	COVER SHEET
2	446626_GI002.DGN	GI002	VICINITY AND LOCATION MAPS
3	446626_GI003.DGN	GI003	AERIAL PHOTOGRAPH
CIVIL			
4	446626_CS101.DGN	CS101	SITE PLAN ALTERNATE 1
5	446626_CS102.DGN	CS102	SITE PLAN ALTERNATE 2
6	446626_CS103.DGN	CS103	SITE PLAN ALTERNATE 3
7	446626_CS104.DGN	CS104	SITE PLAN ALTERNATE 4
8	446626_CG301.DGN	CG301	TYPICAL SECTIONS ALTERNATE 1
9	446626_CG302.DGN	CG302	TYPICAL SECTIONS ALTERNATE 2
10	446626_CG303.DGN	CG303	TYPICAL SECTIONS ALTERNATE 3



VICINITY MAP



SITE LOCATION MAP

REPAIR SITE



US ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

SYMBOL	REVISIONS DESCRIPTION	DATE	APPR.

DESIGNED BY: K. DORSCH	DATE: MARCH 2016
DRAWN BY: A. HAMILTON	SCALE: NONE
CHECKED BY: J. SINKHORN	DRAWING CODE:
PROJECT ENGINEER/ARCHITECT: RONALD W. HOLMBERG, P.E.	MARCH 2016 DATE

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

COUNTY ROAD 350 NORTH
SECTION 14 ASSESSMENT
FULTON COUNTY, INDIANA

VICINITY MAP AND
LOCATION MAPS

SHEET REFERENCE NUMBER:
GI002
SHEET ___ OF ___



US ARMY CORPS OF ENGINEERS LOUISVILLE DISTRICT

SYMBOL	REVISIONS DESCRIPTION	DATE	APPR.

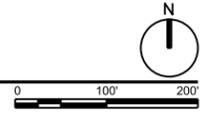
DESIGNED BY: K. DORSCH	DATE: MARCH 2016
DRAWN BY: A. HAMILTON	SCALE: 1"=100'
CHECKED BY: J. SINKHORF	DRAWING CODE:
RONALD W. HOLMBERG, P.E.	MARCH 2016
PROJECT ENGINEER/ARCHITECT	DATE

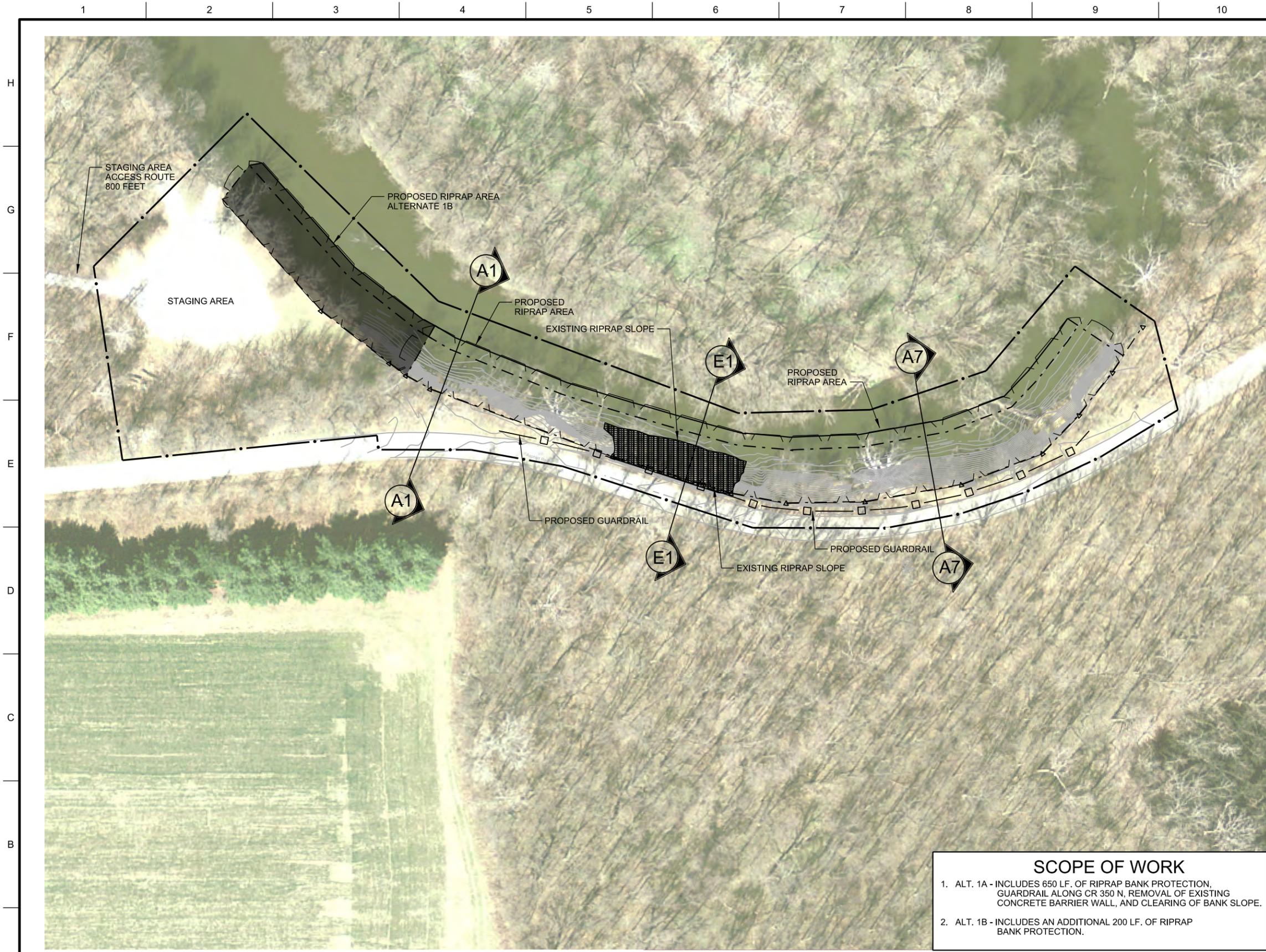
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS LOUISVILLE, KENTUCKY

COUNTY ROAD 350 NORTH SECTION 14 ASSESSMENT FULTON COUNTY, INDIANA
AERIAL PHOTOGRAPH

SHEET REFERENCE NUMBER:
G1103
SHEET ___ OF ___

A1 AERIAL PHOTOGRAPH
1"=100'





SCOPE OF WORK

- ALT. 1A - INCLUDES 650 LF. OF RIPRAP BANK PROTECTION, GUARDRAIL ALONG CR 350 N, REMOVAL OF EXISTING CONCRETE BARRIER WALL, AND CLEARING OF BANK SLOPE.
- ALT. 1B - INCLUDES AN ADDITIONAL 200 LF. OF RIPRAP BANK PROTECTION.

GENERAL SHEET NOTES

- AERIAL IMAGERY IS DATED APRIL 2013.
- TOPOGRAPHICAL DATA OBTAINED OCT. 2015.
- CONTOUR INTERVAL IS 1 FOOT.
- HORIZONTAL DATUM IS NAD83 (2011).
- VERTICAL DATUM IS NAVD88.
- EXTENT OF WORK SHOWN IS APPROXIMATE
- NO KNOWN UTILITIES EXIST IN THE WORK AREA.
- SEE SHEET CG301 FOR TYPICAL SECTIONS.



SYMBOL	REVISIONS DESCRIPTION	DATE	APPR.

SHEET KEYNOTES

DESIGNED BY: K. DORSCH	DATE: MARCH 2016
DRAWN BY: A. HAMILTON	SCALE: 1"=40'
CHECKED BY: J. SINKHORN	DRAWING CODE:
PROJECT ENGINEER/ARCHITECT: RONALD W. HOLMBERG, P.E.	DATE: MARCH 2016

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

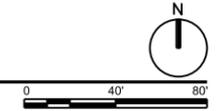
COUNTY ROAD 360 NORTH
SECTION 14 ASSESSMENT
FULTON COUNTY, INDIANA

**SITE PLAN
ALTERNATE 1A AND 1B**

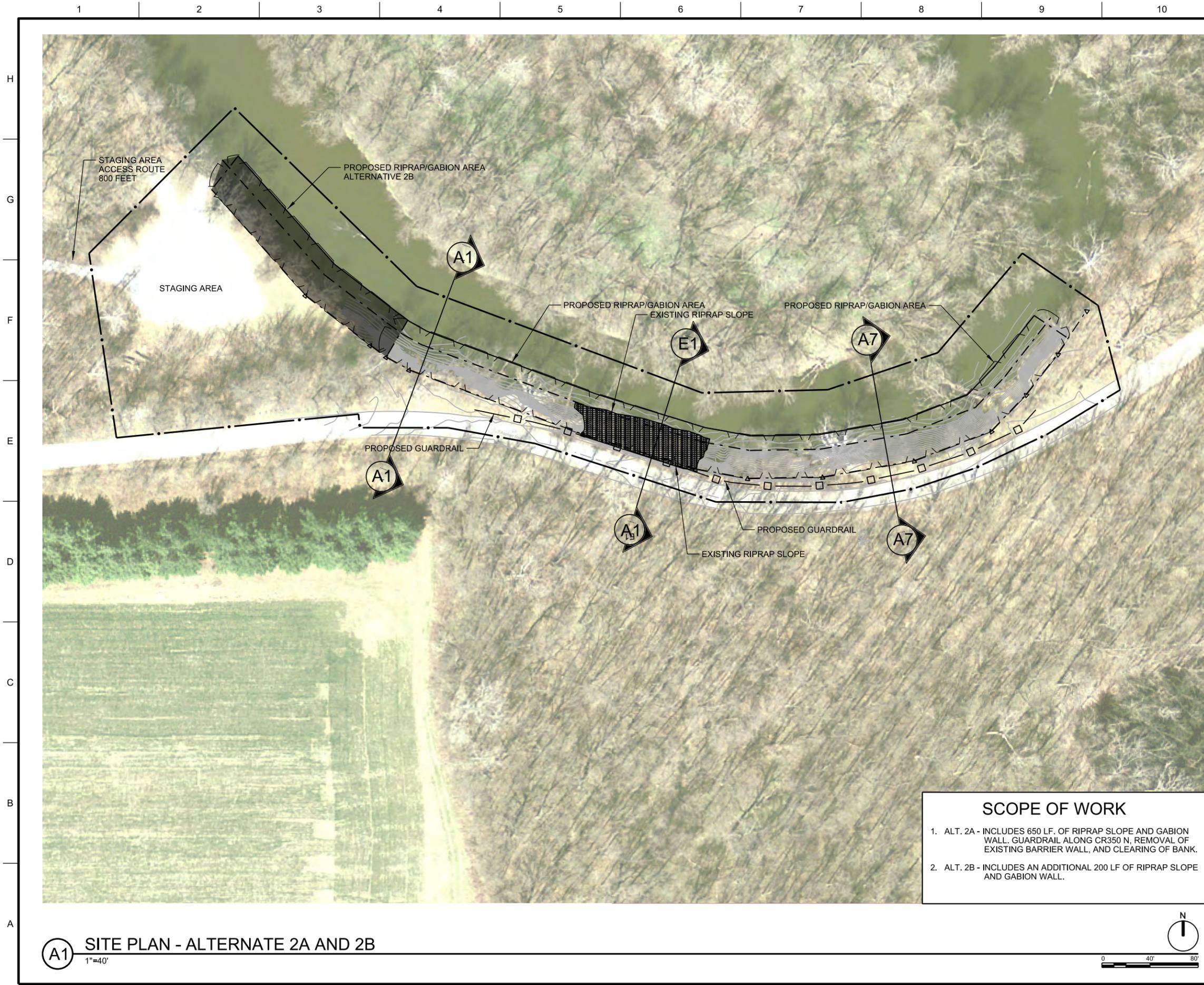
LEGEND

- · — · — · CONTRACTOR WOK LIMITS
- / — / — / RIPRAP
- - - - - SLOPE BREAKLINE

A1 SITE PLAN - ALTERNATE 1A AND 1B
1"=40'



SHEET REFERENCE NUMBER:
CS101
SHEET ___ OF ___



GENERAL SHEET NOTES

1. AERIAL IMAGERY IS DATED APRIL 2013.
2. TOPOGRAPHICAL DATA OBTAINED OCT. 2015.
3. CONTOUR INTERVAL IS 1 FOOT.
4. HORIZONTAL DATUM IS NAD83 (2011).
5. VERTICAL DATUM IS NAVD88.
6. EXTENT OF WORK SHOWN IS APPROXIMATE
7. NO KNOWN UTILITIES EXIST IN THE WORK AREA.
8. SEE SHEET CG302 FOR TYPICAL SECTIONS.



SYMBOL	REVISIONS DESCRIPTION	DATE	APPR.

SHEET KEYNOTES

DESIGNED BY: K. DORSCH	DATE: MARCH 2016
DRAWN BY: A. HAMILTON	SCALE: 1"=40'
CHECKED BY: J. SINKHORN	DRAWING CODE:
PROJECT ENGINEER/ARCHITECT: RONALD W. HOLMBERG, P.E.	DATE: MARCH 2016

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

COUNTY ROAD 360 NORTH
SECTION 14 ASSESSMENT
FULTON COUNTY, INDIANA

**SITE PLAN
ALTERNATE 2A AND 2B**

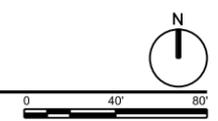
SCOPE OF WORK

1. ALT. 2A - INCLUDES 650 LF. OF RIPRAP SLOPE AND GABION WALL. GUARDRAIL ALONG CR350 N, REMOVAL OF EXISTING BARRIER WALL, AND CLEARING OF BANK.
2. ALT. 2B - INCLUDES AN ADDITIONAL 200 LF OF RIPRAP SLOPE AND GABION WALL.

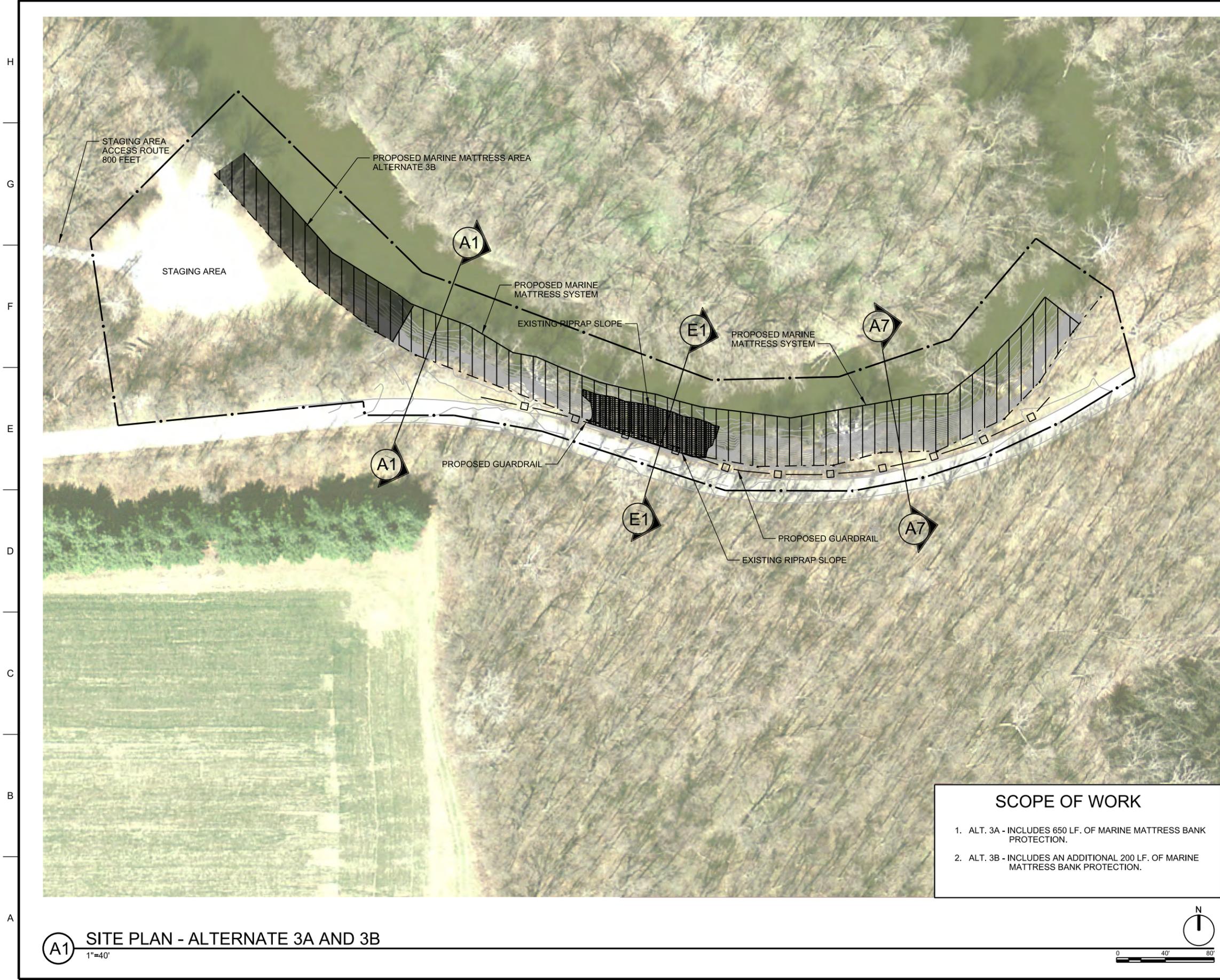
LEGEND

- · — · — · CONTRACTOR WOK LIMITS
- / — / — / RIPRAP
- - - - - SLOPE BREAKLINE

A1 SITE PLAN - ALTERNATE 2A AND 2B
1"=40'



SHEET REFERENCE NUMBER:
CS102
SHEET ___ OF ___



GENERAL SHEET NOTES

1. AERIAL IMAGERY IS DATED APRIL 2013.
2. TOPOGRAPHICAL DATA OBTAINED OCT. 2015.
3. CONTOUR INTERVAL IS 1 FOOT.
4. HORIZONTAL DATUM IS NAD83 (2011).
5. VERTICAL DATUM IS NAVD88.
6. EXTENT OF WORK SHOWN IS APPROXIMATE
7. NO KNOWN UTILITIES EXIST IN THE WORK AREA.
8. SEE SHEET CG303 FOR TYPICAL SECTIONS.



SYMBOL	REVISIONS DESCRIPTION	DATE	APPR.

SHEET KEYNOTES

DESIGNED BY: K. DORSCH	DATE: MARCH 2016
DRAWN BY: A. HAMILTON	SCALE: 1"=40'
CHECKED BY: J. SINKHORN	DRAWING CODE:
PROJECT ENGINEER/ARCHITECT: RONALD W. HOLMBERG, P.E.	DATE: MARCH 2016

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

COUNTY ROAD 360 NORTH
SECTION 14 ASSESSMENT
FULTON COUNTY, INDIANA

**SITE PLAN
ALTERNATE 3A AND 3B**

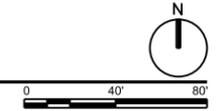
SCOPE OF WORK

1. ALT. 3A - INCLUDES 650 LF. OF MARINE MATTRESS BANK PROTECTION.
2. ALT. 3B - INCLUDES AN ADDITIONAL 200 LF. OF MARINE MATTRESS BANK PROTECTION.

LEGEND

- CONTRACTOR WOK LIMITS
- /—/—/— RIPRAP
- - - - - SLOPE BREAKLINE

A1 SITE PLAN - ALTERNATE 3A AND 3B
1"=40'



SHEET REFERENCE NUMBER:
CS103
SHEET ___ OF ___



SCOPE OF WORK
 1. ALT. 4 - INCLUDES 1800 LF. OF ROAD RELOCATION

GENERAL SHEET NOTES

1. AERIAL IMAGERY IS DATED APRIL 2013.
2. EXTENT OF WORK SHOWN IS APPROXIMATE



SYMBOL	REVISIONS DESCRIPTION	DATE	APPR.

SHEET KEYNOTES

DESIGNED BY: K. DORSCH	DATE: MARCH 2016
DRAWN BY: A. HAMILTON	SCALE: 1"=80'
CHECKED BY: J. SINKHORN	DRAWING CODE:
PROJECT ENGINEER/ARCHITECT: RONALD W. HOLMBERG, P.E.	DATE: MARCH 2016

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

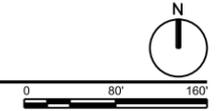
COUNTY ROAD 360 NORTH
SECTION 14 ASSESSMENT
FULTON COUNTY, INDIANA

**SITE PLAN
ALTERNATE 4**

LEGEND

--- CONTRACTOR WOK LIMITS

A1 SITE PLAN - ALTERNATE 4
1"=80'



SHEET REFERENCE NUMBER:
CS104
SHEET ___ OF ___

Fulton County

Section 14

Appendix C: Cost Engineering

**WALLA WALLA COST ENGINEERING
MANDATORY CENTER OF EXPERTISE**

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 446626

**LRL – Fulton County, Road 350N, Section 14
Emergency Streambank Erosion Protection**

The Fulton County Road 350N Section 14 as presented by Louisville District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of May 31, 2016, the Cost MCX certifies the estimated total project cost:

FY 16 Project First Cost:	\$2,181,000
Total Project Cost:	\$2,227,000
Estimated Federal Cost:	\$1,547,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.



Digitally signed by CALLAN.KIM.C.1231558221
DN: c=US, o=U.S. Government, ou=DoD,
ou=PKI, ou=USA,
cn=CALLAN.KIM.C.1231558221

**Kim C. Callan, PE, CCE, PM
Chief, Cost Engineering MCX
Walla Walla District**

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **Fulton County, Rd 350N, Section 14**
 PROJECT NO: **P2 446626**
 LOCATION: **Fulton County, IN**

DISTRICT: **Louisville District**

PREPARED: **5/19/2016**

POC: **CHIEF, COST ENGINEERING**

This Estimate reflects the scope and schedule in report; Detailed Project Report and Environmental Assessment 2016

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)					TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	REMAINING COST (\$K)	Program Year (Budget EC):	TOTAL FIRST COST (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
										2016					
										1-Oct- 15					
										Spent Thru:					
										10/1/2015					
16	BANK STABILIZATION	\$1,165	\$391	34%	\$1,556		\$1,165	\$391	\$1,556		\$1,556	2.0%	\$1,189	\$399	\$1,588
	CONSTRUCTION ESTIMATE TOTALS:	\$1,165	\$391		\$1,556		\$1,165	\$391	\$1,556		\$1,556	2.0%	\$1,189	\$399	\$1,588
01	LANDS AND DAMAGES	\$5	\$1	20%	\$6		\$5	\$1	\$6		\$6	0.6%	\$5	\$1	\$6
30	PLANNING, ENGINEERING & DESIGN	\$332	\$79	24%	\$411		\$332	\$79	\$411		\$411	1.7%	\$338	\$80	\$418
31	CONSTRUCTION MANAGEMENT	\$169	\$39	23%	\$208	0.0%	\$169	\$39	\$208		\$208	3.4%	\$175	\$40	\$215
	PROJECT COST TOTALS:	\$1,671	\$510	31%	\$2,181		\$1,671	\$510	\$2,181		\$2,181	2.1%	\$1,706	\$521	\$2,227

- _____ CHIEF, COST ENGINEERING
- _____ PROJECT MANAGER
- _____ CHIEF, REAL ESTATE
- _____ CHIEF, PLANNING
- _____ CHIEF, ENGINEERING
- _____ CHIEF, OPERATIONS
- _____ CHIEF, CONSTRUCTION
- _____ CHIEF, CONTRACTING
- _____ CHIEF, PM-PB
- _____ CHIEF, DPM

ESTIMATED TOTAL PROJECT COST: \$2,227
 ESTIMATED FEDERAL COST: **65%** \$1,447
 ESTIMATED NON-FEDERAL COST: **35%** \$779

22 - FEASIBILITY STUDY (CAP studies): \$100
 ESTIMATED FEDERAL COST: \$100
 ESTIMATED NON-FEDERAL COST:

ESTIMATED FEDERAL COST OF PROJECT \$1,547

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Fulton County, Rd 350N, Section 14

DISTRICT: Louisville District

PREPARED: 5/19/2016

LOCATION: Fulton County, IN

POC: CHIEF, COST ENGINEERING

This Estimate reflects the scope and schedule in report; Detailed Project Report and Environmental Assessment 2016

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 12-May-16 Estimate Price Level: 1-Oct-15				Program Year (Budget EC): 2016 Effective Price Level Date: 1-Oct-15								
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	RISK BASED			ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J	Mid-Point Date P	ESC (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
			CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F									
16	BANK STABILIZATION	\$1,165	\$391	33.6%		\$1,165	\$391	\$1,556	2017Q2	2.0%	\$1,189	\$399	\$1,588	
CONSTRUCTION ESTIMATE TOTALS:		\$1,165	\$391	33.6%		\$1,165	\$391	\$1,556			\$1,189	\$399	\$1,588	
01	LANDS AND DAMAGES	\$5	\$1	20.0%		\$5	\$1	\$6	2016Q3	0.6%	\$5	\$1	\$6	
30	PLANNING, ENGINEERING & DESIGN													
2.50%	Project Management	\$29	\$7	23.8%		\$29	\$7	\$36	2016Q3	1.3%	\$29	\$7	\$36	
0.02	Planning & Environmental Compliance	\$23	\$5	23.8%		\$23	\$5	\$28	2016Q3	1.3%	\$23	\$6	\$29	
15.00%	Engineering & Design	\$175	\$42	23.8%		\$175	\$42	\$217	2016Q3	1.3%	\$177	\$42	\$220	
0.01	Engineering Tech Review ITR & VE	\$12	\$3	23.8%		\$12	\$3	\$15	2016Q3	1.3%	\$12	\$3	\$15	
0.01	Contracting & Reprographics	\$12	\$3	23.8%		\$12	\$3	\$15	2016Q3	1.3%	\$12	\$3	\$15	
0.03	Engineering During Construction	\$35	\$8	23.8%		\$35	\$8	\$43	2017Q2	3.4%	\$36	\$9	\$45	
0.02	Planning During Construction	\$23	\$5	23.8%		\$23	\$5	\$28	2017Q2	3.4%	\$24	\$6	\$29	
0.02	Project Operations	\$23	\$5	23.8%		\$23	\$5	\$28	2016Q3	1.3%	\$23	\$6	\$29	
31	CONSTRUCTION MANAGEMENT													
0.1	Construction Management	\$117	\$27	22.8%		\$117	\$27	\$144	2017Q2	3.4%	\$121	\$28	\$149	
0.02	Project Operation:	\$23	\$5	22.8%		\$23	\$5	\$28	2017Q2	3.4%	\$24	\$5	\$29	
0.025	Project Management	\$29	\$7	22.8%		\$29	\$7	\$36	2017Q2	3.4%	\$30	\$7	\$37	
CONTRACT COST TOTALS:		\$1,671	\$510			\$1,671	\$510	\$2,181			\$1,706	\$521	\$2,227	

**Fulton County Flood Control
Feasibility Study
Fulton County, Indiana
Continuing Authorities Program, Section 14**

Detailed Project Report

Appendix C:

Cost Engineering

Based on the inspection and subsequent survey of the area, there are several possible alternatives for protecting the bank, these alternatives are as follows:

Alternative 1 - Stone Protection:

For this method of protection, the bank would need to be cleared, removing all the trees with exposed roots and any trees that are dead, dying or otherwise unstable. Once the bank has been cleared, granular fill would be placed to form a 2 horizontal to 1 vertical slope. Because of the proximity of the bank to the road, excavating to form the slope is not possible for the majority of the length of the protection and in those areas where it is possible, it would require removing a much larger number of trees than by using granular fill to form the slope. Once the desired slope is formed a 24-inch layer of riprap would be placed over the bank. With the hydraulic conditions that exist in this section of the river, the riprap would only need to be placed to elevation 755, which is at least 5 feet below the top of bank. Where possible, this upper 5 feet of bank could be excavated to form a 2 horizontal to 1 vertical slope and planted with native vegetation as recommended by the Indiana Department of Natural Resources (IDNR) or treated with riprap. Based on EM 1110-2-1601, the riprap protection would use Method C toe protection, which is a thickened toe 3 feet thick and extending horizontally out from the slope 10 feet. There are two possible options to setting the length of the protection; the first option would be to protect the bank to the extent that the distance between the edge of the bank and the road is at least 25 feet; the second option would be to extend the riprap such that it begins and ends in areas of non-eroding velocities. The first option would protect approximately 650 feet of bank and would require thickened end protection to prevent the erosion from flanking the protection. This end protection would be Method C as given in EM-1110-1601. The second option would require protecting approximately 850 feet of bank and would extend from the IDNR channel access area, upstream to near McMahan Ditch. The stone protection alternative is estimated to be the least costly and fulfills the immediate goal of stabilizing the failing bank that is threatening the road. However, while this type of riprap placement is commonly used to protect an eroding bank, in this area there are several undesirable conditions that would develop, making this alternative environmentally unacceptable. These conditions are as follows:

1. Placement of the riprap slope and toe protection would block a significant area of the main flow channel, which would result in increased stages upstream and higher velocities in the remaining channel.
2. As the river responds and attempts to reclaim the lost flow area, erosion along the right bank will occur, resulting in an increase in the sediment load being carried by the river.
3. Somewhere downstream the sediment carrying capacity of the river would decrease and deposition would occur.

This alternative was evaluated by the PDT, however, because of environmental concerns was considered unacceptable and eliminated from consideration. No cost information was developed for this alternative.

Alternative 2A and 2B –Gabion Basket Toe with Riprap Slope:

Alternate 2A and 2B are different only in the length of protection. There are two possible options to setting the length of the protection; the first option (A) would be to protect the bank to the extent that the distance between the edge of the bank and the road is at least 25 feet; the second option (B) would be to extend the riprap such that it begins and ends in areas of non-eroding velocities. The first option would protect approximately 650 feet of bank and the second option would protect approximately 850 feet of bank. Both alternatives would require clearing the bank, removing all the trees with exposed roots and any trees that are dead, dying or otherwise unstable and excavating as needed to create a stable foundation for placement of the gabions. Alternative 2A would require clearing, placement of 650 linear feet of gabion wall 12 feet in height, rock fill for the gabion baskets, riprap for the upper bank slope, granular backfill, and gabion baskets. Alternative 2B would require clearing, placement of 850 linear feet of gabion wall 12 feet in height, rock fill, riprap for the upper bank slope, granular backfill, gabion baskets (assuming 3 foot cubes), excavating material from the upper bank and planting approximately of native vegetation. Both alternatives fulfill the immediate goal of stabilizing the failing bank that is threatening the road.

With these alternatives the impact to the existing channel will be minimized, there would be little to no increase in flow velocities or upstream stages. The primary challenges with this method of protection is ensuring a good foundation for the gabion baskets, which most likely would require constructing some type of diversion structure.

Alternative 3A and 3B – Marine Mattress System:

Alternate 3A and 3B are different only in the length of protection. There are two possible options to setting the length of the protection; the first option (A) would be to protect the bank to the extent that the distance between the edge of the bank and the road is at least 25 feet; the second option (B) would be to extend the protection such that it begins and ends in areas of non-eroding velocities. The first option would protect approximately 650 feet of bank and the second option would protect approximately 850 feet of bank. For these alternatives the bank would need to be cleared, removing all the trees with exposed roots and any trees that are dead, dying or otherwise unstable. Once the bank has been cleared, granular fill would be placed to form a stable slope upon which the mattress system can be installed. Because of the proximity of the

bank to the road, excavating to form the slope is not possible for the majority of the length of the protection and in those areas where it is possible, it would require removing additional trees than by using granular fill to form the slope. Once the slope was formed, a rock filled Marine Mattress System would be placed over the slope and anchored into the bank. Of the two alternatives mentioned above (3A and 3B), Alternative 3A will be less costly and fulfill the immediate goal of stabilizing the failing bank that is threatening the road and will require the removal of fewer trees.

While this type of bank protection will provide the protection necessary, there will still be minor undesirable conditions that would develop that would need to be evaluated. These conditions are as follows:

1. Forming the necessary slope and placing the mattress would block a small portion of the main flow channel, which could increase both the velocities in the channel in the vicinity of the protection and the stages upstream.
2. As the river responds and attempts to reclaim the lost flow area, erosion along the right bank could occur, resulting in an increase in the sediment load being carried by the river.
3. Somewhere downstream the sediment carrying capacity of the river would decrease and deposition would occur.

With these alternatives the impact to the existing channel is reduced significantly compared to the traditional stone protection and while there will be some loss in the channels flow area it is considered acceptable and would produce only very small increases in flow velocities or upstream stages.

Alternative 4 - Road Relocation:

An alternative to stabilizing the bank is to re-route the county road. This alternative would require relocating approximately 1,800 feet of County Road 350N through a well forested area, which would result in having to clear mature hardwood trees as well as having to fill in an area that appears in the wetland registry. Relocating the road would require demolishing existing pavement, clearing and grubbing acres of hardwood trees, placing fill for the road embankment, excavating for ditches and placing new asphalt pavement. There would also be mitigation cost associated with relocating the road. This alternative is not environmentally feasible and therefore dropped from further consideration.

5. Of the alternatives evaluated, the recommended alternative is Alternative 3A. This alternative will have limited impact on the existing channel and with the design of the Marine Mattress System, the bank will over time take on a more natural appearance.

General Estimate Information

Markup Info

The following markups have been applied to the Prime Contractor:

JOOH – 10%
HOOH – 12%
Profit – 8%
Bond – 1%

Subcontractor markups have been applied as follows:

HOOH – 10%
Profit – 8%

Schedule Info

Estimate structure assumes a 5 day week, with 8 hours of work per day.

Mii Estimate Miscellaneous Notes:

The 2014 Region II equipment manual was used to calculate equipment costs.

Labor Rates are from Davis-Bacon General Wage Determination IN160006

Gas and diesel prices updated on 16 February 2016 from
<http://tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp>

Electricity prices updated on 16 February 2016 from the EIA's electric power monthly

Cost of money updated on 16 February 2016 from <http://www.fms.treas.gov/prompt/rates.html>

Real Estate Plan

County Road 350 North

Fulton County, Indiana

Emergency Streambank Erosion Protection for a Public Facility

Continuing Authorities Program, Section 14



U.S. Army Corps of Engineers

Louisville District

Real Estate Division

Purpose of Real Estate Plan

This Real Estate Plan (REP) will identify the real estate interests required to implement the County Road 350 North, Fulton County, Indiana, Continuing Authorities Program (CAP) Section 14 Project in accordance with ER 405-1-12, Chapter 12. This REP is tentative in nature and preliminary for planning purposes only. Final real property acquisition lines and estimates of value are subject to change even after approval of the report. This REP will accompany the Feasibility Report of the same name.

Project Authority

This study is authorized by Section 14 of the 1946 Flood Control Act (P.L. 79-526) as amended. Section 14 allows the Corps to study, design and construct emergency stream bank and shoreline protection projects to protect public services including, but not limited to, streets, bridges, schools, churches, water and sewer lines, National Register sites, and other public non-profit facilities from damage and/or loss by natural erosion.

The non-Federal Sponsor is Fulton County, Indiana (Highway Department).

Project Description

The Tippecanoe River has eroded into County Road 350 North requiring the Fulton County Highway Department to place approximately 100 linear feet of riprap to prevent further erosion and install barriers to prevent a vehicle from driving off the edge of the road and into the river. The principal cause of the erosion is the scouring of the bank due to high velocities that concentrate along the left bank of the river during high flow conditions. With limited information it is not possible to estimate the rate of erosion; however, based on statements made by the non-Federal Sponsor the rate of erosion has increased significantly in the last year.

County Road 350 North is approximately two-miles long and connects Old State Highway 31 and State Route 25. It is a typical two-lane country road servicing residential and agricultural land uses. Approximately a dozen residences are situated along the road as well as an access point to the Tippecanoe River located within the Menominee Public Fishing Area. This area is owned and managed by the Indiana Department of Natural Resources (IDNR).

Recommended Plan: The recommended plan consists of clearing the affected portions of the eroding bank, removing all trees with exposed roots and any trees that are dead, dying, or otherwise unstable. A rock-filled Marine Mattress System would then be installed over a layer of granular fill. The area protected would cover approximately 650 feet of bank. This method has been determined to be the least costly, require the fewest number of trees to be removed, and fulfill the goal of stabilizing the failing bank.

The repair site is accessible from County Road 350 North. During construction, the road will require a minimum of one lane closure in the vicinity of the repair area. In an effort to reduce tree

removal, the contractor's staging area will be located at the IDNR-owned river access point parking/boat ramp area adjacent to the repair site.

LERRD Required for Construction, Operation and Maintenance

County Road 350 North is owned and maintained by the non-Federal Sponsor. However, all of the property required for access and implementation of the bank stabilization is owned by the IDNR and managed by the Division of Fish and Wildlife. Typically, a permanent easement (Channel Improvement Easement) would be required to be acquired by the Sponsor, however, the IDNR is precluded from conveying State-owned property interests without statutory authority. As a result, the non-Federal Sponsor will obtain a Memorandum of Understanding, or similar, from the IDNR in order to facilitate the proposed repairs and to provide access for inspection and maintenance once construction is complete. The proposed project has been coordinated with IDNR staff and they have indicated their interest in assisting with the repairs as needed to include providing full cooperation with respect to granting access to the repair site as appropriate.

It should be noted that the facility proposed to be protected under the project, County Road 350 North, is the only roadway servicing the IDNR's Menominee Public Fishing Area.

See attached Exhibit "A" indicating the Contractor Work Limits and Repair Site.

Estates

If it is determined that additional lands for staging not owned by the State of Indiana are required to support construction of the recommended repairs, the standard estate of Temporary Work Area Easement as referenced in ER 405-1-12 will be acquired by the non-Federal Sponsor:

TEMPORARY WORK AREA EASEMENT

A temporary easement and right-of-way in, on, over and across the land described in Exhibit A, attached hereto, for a period not to exceed _____ months, beginning with date construction commences, is granted to _____, its representatives, agents, and contractors as a work area, including the right to move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the _____ Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

No non-standard estates are anticipated to be necessary to complete the project.

Existing Federal Projects

No existing Federal projects are located in the vicinity of the project.

Navigational Servitude

The purpose of the proposed project is protection of an existing public roadway. The Tippecanoe River is non-navigable waterway. Navigational Servitude does not apply to this project.

Induced Flooding

The project will not induce flooding in the project area.

Public Law 91-646 Relocation Assistance Benefits

No residences or businesses require relocation assistance as a result of the proposed project.

Facility/ Utility/ Cemetery Relocations

No cemeteries or public facilities/utilities are required to be relocated as a result of the proposed project.

Environmental Considerations

All required environmental assessments, evaluations, and documentation (National Environmental Policy Act (NEPA), Section 404, Endangered Species, Cultural Resources, Executive Order (EO) 11988) will be conducted during the Engineering & Design phase of the proposed project. The environmental compliance review will be completed prior to commencement of construction activities.

In addition, to comply with State regulatory requirements, a Construction in a Floodway Permit issued by the Indiana Department of Natural Resources, Division of Water will be obtained prior to commencement of construction activities.

Acquisition Schedule

It is anticipated that the an appropriate agreement between the non-Federal Sponsor and the State of Indiana (DNR) to facilitate access for the construction, operation and maintenance of the project can be processed within 60-90 days after notice to proceed is issued.

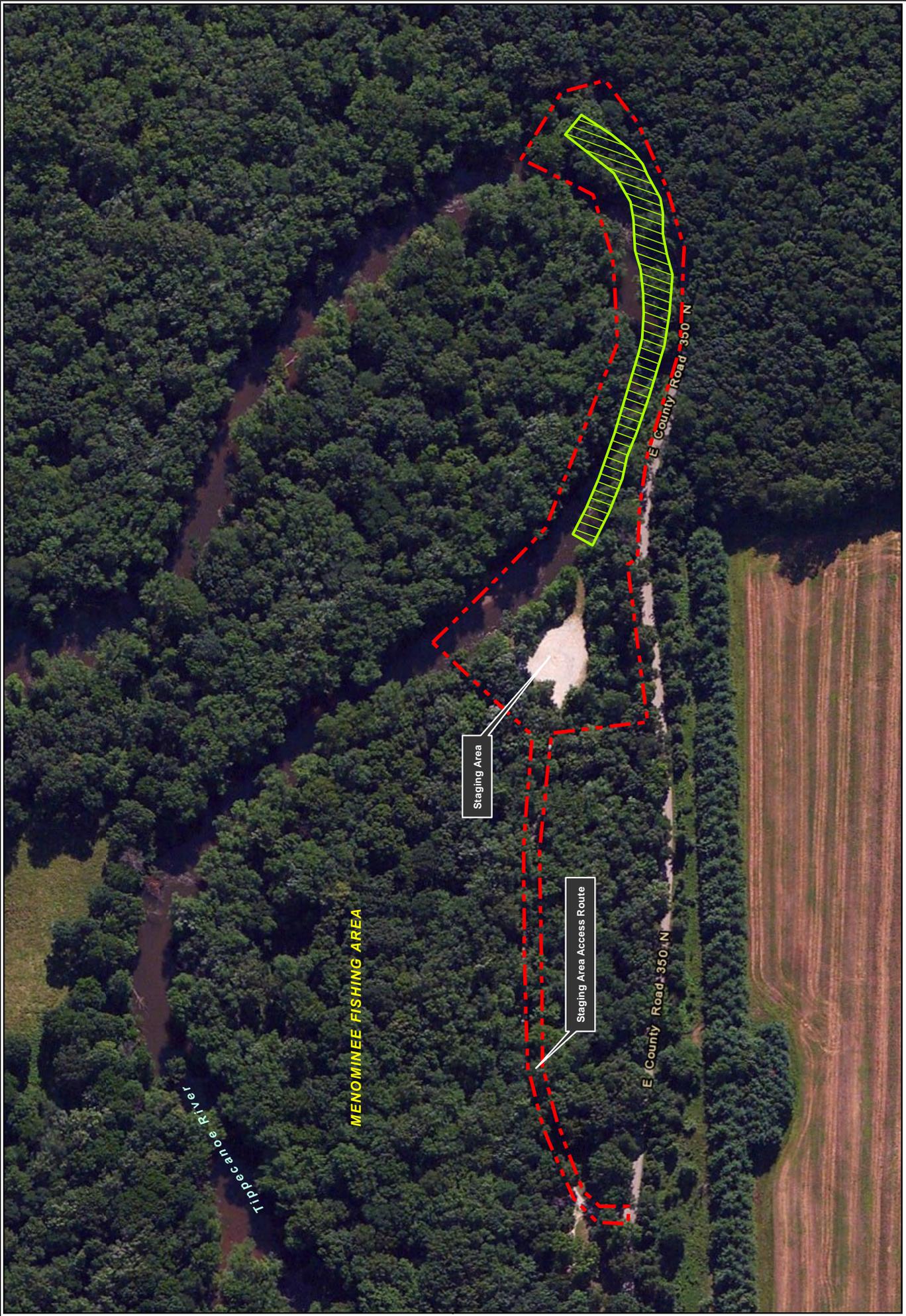
Real estate acquisitions are not anticipated to be required to complete the proposed project. However, should additional real estate interests be identified, the non-Federal Sponsor will be responsible for acquisitions in accordance with Public Law 91-646, as amended. In any circumstance, the non-Federal Sponsor is required to furnish all lands, easements, rights-of-way, and suitable borrow and dredged, or excavated material disposal areas, and perform all relocations determined by the Government to be necessary for construction, operation, and maintenance for the project. All lands, easements and rights-of-way determined by the Government to be necessary for work to be performed under a construction contract must be furnished prior to the solicitation of that construction contract. The non-Federal Sponsor will be

Real Estate Plan
County Road 350 North, Fulton County, Indiana
CAP Section 14 – Streambank Erosion Protection Project

required to provide sufficient documentation to verify its rights to the real estate requirements and provide an Authorization-for-Entry-for Construction.

Capability Assessment

A Quality Control Checklist for Sponsor Ability Determination has been completed and is attached hereto. It has been determined that the non-Federal Sponsor has the ability to perform the land acquisition requirements of this project within a reasonable period of time.



LEGEND

-  Contractor Work Limits
-  Repair Site



CAP Section 14
Emergency Streambank Erosion Protection
County Road 350 North
Fulton County, Indiana



US ARMY ENGINEER DISTRICT
 LOUISVILLE DISTRICT CORPS OF ENGINEERS
 REAL ESTATE DIVISION

DATE: MARCH 2016

SHEET: REP - EXHIBIT A

County Road 350 North
Fulton County, Indiana

**ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY**

Sponsor(s): Fulton County, Indiana

Authority: Continuing Authorities Program – Section 14

Non-Federal Sponsor Real Estate Contact:

Richard Ranstead
Highway Department Superintendent
574 223-2385
fulcohwy@rtcol.com

I. Legal Authority

- a. Does the non-Federal Sponsor have legal authority to acquire and hold title to real property for project purposes?

Yes No

Non-Federal Sponsor is authorized to acquire and own land by authority of _____

Note: If NO; who will acquire LERRD? Who will hold title?

- b. Does the non-Federal Sponsor have the power of eminent domain for this project?

Yes No

The use of eminent domain is authorized by _____

Note: If NO, who will acquire tracts if condemnation is required?

The lands required to implement the project are owned by the State of Indiana (IDNR). IDNR has agreed to grant the Sponsor a permanent easement. The Sponsor cannot condemn lands of the State; condemnation will not be required.

- c. Does the non-Federal Sponsor have "quick-take" authority for this project?

Yes No See 1.b. note above.

Non-Federal Sponsor's "quick-take" authority is authorized by _____

Note: If NO; will lack of "quick take" authority impact the project schedule?

- d. The non-Federal Sponsor has reviewed the project maps and confirmed that all of the lands/ interests in land required for the project are located inside of their political boundary.

Yes No

Note: If NO; what is the plan for acquiring? Can the non-Federal Sponsor hold title to land outside of their political boundary?

- e. Are any of the lands/ interests in land required for the project owned by an entity whose property the non-Federal Sponsor cannot condemn?

Yes No See 1.b. note above.

Note: If YES; what is the plan for acquiring?

Section I. MEYER.JASON.E.1255 230529 Date: / / Realty Specialist

II. Financial Capability

- a. The non-Federal Sponsor has reviewed and concurs with the real estate cost estimates.

Yes No

Note: If NO; provide the anticipated resolution.

The State of Indiana will grant a no cost easement to the Sponsor. The Sponsor will incur incidental costs to obtain a survey and prepare a legal descriptions for the easement.

- b. It has been established by the responsible district element that the non-Federal Sponsor is financially capable of fulfilling all requirements identified in the Project Partnership Agreement (PPA).

Yes No

Note: If NO; is another entity going to provide the non-Federal Sponsor with financial assistance?

Section II. MEYER.JASON.E.1255 5230529 Date: / / Realty Specialist

VII. Capability

With regard to this project, the non-Federal Sponsor is anticipated to be:
Fully Capable. Condemnation will not be required.

Note: Choices are: fully capable, moderately capable, marginally capable, and insufficiently capable.

- a. Fully Capable: *Previous experience. Financially capable. Authority to hold title. Can perform, with in house staff, the necessary services (survey, appraisal, title, negotiation, closing, relocation assistance, condemnation & "quick-take" authority) required to provide LERRD.*
- b. Moderately Capable: *Financially capable. Authority to hold title. Can provide, with contractor support, the necessary services (survey, appraisal, title, negotiation, closing, relocation assistance and condemnation authority) required to provide LERRD. Quick-take authority will be provided by _____.*
- c. Marginally Capable: *Financially capable. Authority to hold title. Will rely on approved contractors to provide the necessary services (survey, appraisal, title, negotiation, closing, and relocation assistance). Quick-take authority and authority to condemn will be provided by _____.*
- d. Insufficiently Capable: *Financially capable. Will rely on approved contractors to provide the necessary services (survey, appraisal, title, negotiation, closing, and relocation assistance). Quick-take authority and authority to condemn will be provided by _____.*
Will rely on _____ to hold title.

Summarize what support will be provided to the non-Federal Sponsor to ensure project success.

LRL-RE has coordinated with Sponsor and IDNR Land office to determine how the necessary interests can be lawfully granted to the Sponsor for project purposes. LRL-RE will review the survey plat and legal description and further coordinate with Sponsor and State as needed.

County Road 350 North, Fulton County, Indiana – CAP Section 14

VIII. Coordination

This assessment has been coordinated with the non-Federal Sponsor and it concurs with the assessment.

Yes X

Prepared by:

Jason Meyer
Realty Specialist
CELRL-REC

Considering the capability of the non-Federal Sponsor and the ancillary support to be provided by N/A, and identified above, it is my opinion that the risks associated with LERRD acquisition and closeout have been properly identified and appropriately mitigated.

DAVIS.NANCY.L.1: Digitally signed by DAVIS.NANCY.L.1230573251
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI,
ou=ISA, cn=DAVIS.NANCY.L.1230573251
Date: 2016.07.11 13:47:39 -0400

Chief, Real Estate Division

Non-Federal Sponsor Representative:

Signature: Richard Ranstead

Name: Richard Ranstead

Title: Highway Department Superintendent

Date: 7 / 8 / 16

Fulton County

Section 14

Appendix E: Supporting Information

Fulton County Highway Department
1037 South State Road 25
Rochester, IN 46975
Richard Ranstead, Superintendent
Phone- 574-223-2385
Fax- 574-223-9852
E-mail- fulcohwy@rtcol.com

July 27, 2015

Ms. Sharon Bond
Chief, Planning Branch
U.S. Army Engineer District, Louisville
P.O. Box 59
Louisville, Kentucky 40201-0059

Dear Ms. Bond:

The county of Fulton, hereinafter called the "sponsor", is interested in obtaining Corps of Engineers assistance in addressing a stream bank erosion problem on the Tippecanoe River .5 miles East of Old 31 on 350N. Under the authority of Section 14 of the 1946 Flood Control Act. During the flooding in this county a large tree's root system was exposed and the tree fell into the river. This has caused a large bank erosion area that now threatens the road way near the river bank.

We are aware of the following cost sharing requirements associated with the projects undertaken under this authority and are able to meet these obligations.

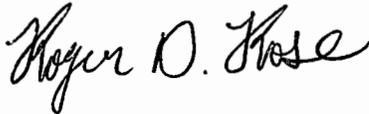
- a. Feasibility Phase is 100% federally funded for the first \$100,000 of planning efforts. Any additional cost beyond this amount is cost shared on a 50%-50% basis and requires the execution of a Feasibility Cost-Sharing Agreement.
- b. Design/Implementation Phase costs are shared 65% federal and 35% non-Federal and requires the execution of a Project Cooperation Agreement.
- c. The sponsor's share of construction consists of provisions of lands, easements, right-of-ways, relocations, and disposal areas, plus a cash contribution of at least 5% of the total project cost. If this amount is less than 35% of the total project cost, the sponsor will provide any additional cash contribution required to equal 35%.
- d. The sponsor is responsible for removal of all Hazardous, Toxic and Radioactive Wastes prior to any construction.
- e. The sponsor is responsible for the operations and maintenance of the project after completion.

This letter constitutes an expression of intent and not a contractual obligation and we understand that the Sponsor or the Corps may opt to discontinue the project development process prior to the execution of a Feasibility Cost Sharing Agreement.

If you need additional information, please contact Richard Ranstead at (574-223-2385)



Richard Ranstead
Superintendent
Fulton County Highway



Roger Rose
President of Commissioners
Fulton County

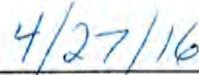
cc: Louisville District Corps of Engineers
ATTN: Mr. Brandon R Brummett, P.E., PMP
CELRL-PM-P (Outreach Coordinator)
P.O. Box 59
Louisville, Kentucky 40201-0059

COMPLETION OF AGENCY TECHNICAL REVIEW

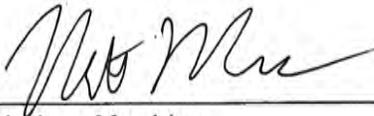
The Agency Technical Review (ATR) has been completed for the Detailed Project Report and Environmental Assessment for the Fulton County, Indiana, County Road 350 N, Continuing Authorities Program, Section 14 project. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks.



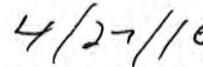
Adrian Leary
ATR Team Leader
CENAP-PL-PS



Date



Nathan Moulder
Project Manager
CELRL-PM-P

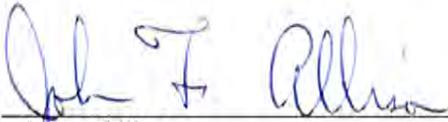


Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows. The largest concerns were comments regarding the geotechnical design and hydraulic analyses (anchoring of the marine mattress, use of geotextile filter, toe protection, abrasion, and flow velocities). All of the comments were resolved through revision of the report and appendices. DrChecks contains the synthesis of the issues and can be considered the review report for this project.

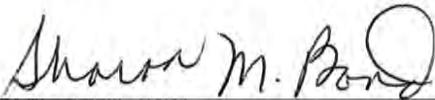
As noted above, all concerns resulting from the ATR of the project have been fully resolved.



John Allison
Chief, Civil Engineering Branch

12 May 2016

Date



Sharon Bond
Chief, Planning Branch

12 May 2016

Date

**WALLA WALLA COST ENGINEERING
MANDATORY CENTER OF EXPERTISE**

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 446626

**LRL – Fulton County, Road 350N, Section 14
Emergency Streambank Erosion Protection**

The Fulton County Road 350N Section 14 as presented by Louisville District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of May 31, 2016, the Cost MCX certifies the estimated total project cost:

FY 16 Project First Cost:	\$2,181,000
Total Project Cost:	\$2,227,000
Estimated Federal Cost:	\$1,547,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.



Digitally signed by CALLAN.KIM.C.1231558221
DN: c=US, o=U.S. Government, ou=DoD,
ou=PKI, ou=USA,
cn=CALLAN.KIM.C.1231558221

**Kim C. Callan, PE, CCE, PM
Chief, Cost Engineering MCX
Walla Walla District**

Comment Report: All Comments

Project: Fullton Co SEC 14

Review: ATR - Feasibility

Displaying 37 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
6478871	Hydraulics	n/a	n/a	n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

The documents provided do not indicate if a hydraulic analysis was performed to determine the flow velocities or flood impacts in the Tippecanoe River at the project site. In the comparison of alternative plans, factors such as location of non-eroding velocities, size of rock/mattress material, magnitude/extent of flow changes resulting from each alternative, and potential for increased stages upstream are discussed as decision making criteria. Although this is a feasibility phase document, critical features such as the project extent and selected alternative are based on these hydraulic factors. Please indicate the type of hydraulic analysis performed and how the results of that analysis were used to select the recommended alternative.

Submitted By: [Stephen England](#) (215-656-6605). Submitted On: Apr 14 2016

Revised Apr 14 2016.

1-0 Evaluation Concurred

Section 14 Projects utilize available hydraulic data but as with many such projects, there was very little available. Therefore, to estimate elevations and velocities the gage at Ora, Indiana was used. This gage provided flow and stage information that was used to estimate flow velocities in the channel. These flow velocities were converted to velocities at the toe of the left bank based on the channel geometry. Utilized CHANLPRO to determine the velocity at the bank and acceptable rock sizes. With the impacts associated with riprap placement, the use of a channel matting was pursued. The velocity was provided to the Geotechnical Engineer who consulted mat manufactures and it was determined that flexible matting filled with stone with anchors would provide protection based on the velocities. There is also a significant amount of professional judgment in assessing the channel and possible protection.

Submitted By: [Ronald Holmberg](#) (502-315-6456) Submitted On: Apr 18 2016

1-1 Backcheck Recommendation Close Comment

Understood...During the design phase of this project, additional documentation concerning the flow velocities used in the design should be incorporated into the design documents.

Submitted By: [Stephen England](#) (215-656-6605) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6478873 Hydraulics n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Since the recommended alternative of the marine mattress is to be left uncovered, has an evaluation been performed on potential abrasion damage of the mattress shell from material (gravel or debris) in suspension during erosive flows in the Tippecanoe River? If suspended material flowing in the river will potentially harm the mattress, some type of cover material may be warranted. If cover material is needed, this may affect alternative evaluation factors such as cost and encroachment into the channel.

Submitted By: [Stephen England](#) (215-656-6605). Submitted On: Apr 14 2016

Revised Apr 14 2016.

1-0 Evaluation Concurred

here was no analysis performed on potential damage to the mattress from river debris and suspended solids. With regard to cover material, per one of the manufacturers of these types of mattresses, vegetation will grow through the mattresses providing not only a more natural bank appearance but protection against abrasive sediments being carried by the river. Since there is no guarantee that the mattresses won't be damaged by abrasion or debris, these mattresses are designed so that they can be repaired in place. Repair of the mattresses will be covered in the O&M Manual once the actual manufacturer is determined.

See the Geotechnical response to Comment 6480430.

Submitted By: [Ronald Holmberg](#) (502-315-6456) Submitted On: Apr 18 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Stephen England](#) (215-656-6605) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6478874 Hydraulics n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Based on a comparison of the plan sheets CS102 and CS103 and the section sheets CG302 and CG303, it appears that the extent of encroachment into the stream by the marine mattress is slightly greater than the gabion wall; however, Section 3.5.2 indicates that "impact to the existing channel is reduced significantly compared to the traditional stone protection". Table 2 further indicates that the marine mattresses "minimizes impacts to river bed". It is unclear if these comparisons are to Alternative 1 only or if they pertain to Alternative 1 and 2. Based on the drawings provided it appears that the long term impacts to the streambed from Alternatives 2 and 3 are comparable. Please indicate how the relative impacts between Alternatives 2 and 3 to the environmentally acceptable planning constraints shown in Table 2 were determined.

Submitted By: [Stephen England](#) (215-656-6605). Submitted On: Apr 14 2016

Revised Apr 14 2016.

1-0 Evaluation Concurred

The comparison is to Alternative 1 only. You are correct that the long term impacts to the streambed are comparable, in fact the impact is likely going to be slightly less with Alternative 2. However, the negative of having to excavate in the river in order to construct Alternative 2 is an overriding factor. Thus only the negative environmental factor is given in the table.

Submitted By: [Ronald Holmberg](#) (502-315-6456) Submitted On: Apr 18 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Stephen England](#) (215-656-6605) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6478876	Geotechnical	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

No toe protection is shown in sheet CG303 for the end of the mattresses. In a high energy, erosive environment such as the project area, toe protection may needed to properly anchor the mattresses in the river. If toe protection is required due to the flow conditions of the Tippecanoe River, this may negate the stream encroachment benefits in comparison to Alternatives 1 and 2 and increase the projected costs of Alternative 3.

Submitted By: [Stephen England](#) (215-656-6605). Submitted On: Apr 14 2016

1-0 Evaluation Concurred

The mattress is extended along the channel bottom approximately 6 to 10 feet to provide for potential scour at the mattress and natural channel inter-face. One of the advantages of the mattress is its flexibility and similar to what would happen with a thickened rock toe, the mattress will adjust over time to conform to any potential scour that occurs.

Submitted By: [Ronald Holmberg](#) (502-315-6456) Submitted On: Apr 18 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Stephen England](#) (215-656-6605) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6478877	Civil	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

Appendix B – The location of the sections shown on Sheets CG301, CG302 and CG303 not identified in the other drawings provided for the review. The location of these section should be shown for clarity.

Submitted By: [Stephen England](#) (215-656-6605). Submitted On: Apr 14 2016

1-0 Evaluation Concurred

Concur, will add section markers to plan sheets.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Stephen England](#) (215-656-6605) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6478878	Civil	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

The location of McMahan Ditch (referenced in Section 3.5.1) is not shown on any of the figures provided for the review. If this feature is referenced, the location should be shown on the figures.

Submitted By: [Stephen England](#) (215-656-6605). Submitted On: Apr 14 2016

1-0 Evaluation Concurred

Concur, will show McMahan ditch on sheet GI003.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Stephen England](#) (215-656-6605) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6480425	Geotechnical	Section 3.5.1	DPR Pg. 17	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

(**Document Reference: DPR**)

Section 3.5.1, Page 17 – Alternative Plan Descriptions: For Alternative 3A and 3B, the DPR states that "once the slope was formed, a rock filled Marine Mattress System 18-inches thick would be placed over the slope and anchored into the bank." The proposed 18-inch thickness seems appropriate, but it is possible that a 12-inch mattress thickness may be sufficient for the Fulton Co. project application. Reducing to a 12-inch thickness would reduce the project's construction cost. Conversely, since the design does not show the mattresses being anchored down to the river bed (i.e., buried in an anchor trench and covered by riprap), the 18-inch thickness may be needed in

lieu of an anchor trench in the river bed. Suggest that a D & I Phase design narrative discuss how the 18-inch mattress thickness was determined/selected. This discussion should include support calculations for shearing resistance (i.e., permissible shear resistance of mattress vs. the applied hydrodynamic shear stress of channel), sliding veneer stability, anchoring requirements (e.g., required size of anchor trench and/or soil anchor requirements), and uplift. The Triton Marine Mattress manufacturer (i.e., Tensar) has Excel design spreadsheets for calculating some of these parameters, as well as calculation procedures shown in their Technical Notes (i.e., TN 1.1, 1.3, and 1.4). The Corps reference ERDC/CHL CHETN-III-72, Feb 2006, also addresses design of marine mattresses.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

Revised Apr 15 2016.

1-0 Evaluation Concurred

Agreed. Design calculations supporting the size of the mattress will be provided in the final design.

Submitted By: [Eric Springston](#) (502-315-2627) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480430 Geotechnical Section 3.5.3 DPR Pg. 20 n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

(**Document Reference: DPR**)

Section 3.5.3, Page 20 – Risk and Uncertainty: To reduce the possibility of the mattresses being damaged by abrasion from river gravel moving downstream during high river flow events (the Tippacano river seems like an alluvial channel) and to make the project more "green," consideration should be given to topsoil filling (i.e., top dressing/vegetating) the marine mattresses. While this will nominally add to the initial project cost, it will likely extend the marine mattress lifespan by being buried under about an inch of topsoil/vegetation. It would also blend in better with the natural river bank setting once it vegetates. Topsoil filling is an acceptable practice per discussions with a Tensar technical representative. Topsoil filling could also be done at any time after construction is complete.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

Revised Apr 15 2016.

1-0 Evaluation Concurred

This is something that we will look into in the final design. Natural siltation on the mattress could also take place as time goes on.

Submitted By: [Eric Springston](#) (502-315-2627) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480431 Geotechnical Section 3.6.1 DPR Pg. 21 n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(**Document Reference: DPR**)

Section 3.6.1, Page 21 – Recommended Plan Description: The recommended plan (Alternative 3A) states that "In the area of existing riprap slope, the marine mattress would be placed on top of the existing riprap to provide a more stable slope." Consideration should be given to choking off the existing riprap with smaller aggregate to fill voids and provide a more uniform/smooth bearing surface for the mattresses placed in this area. Since the design will likely incorporate a geotextile for separation/filtration (installed either over the prepared slope, attached to the underside of the marine mattresses, or inside the mattresses themselves), the concern is that the riprap without choke stone could puncture the geotextile and lead to subgrade soil piping loss through the mattress stone.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

1-0 Evaluation Concurred

Agreed, a choke stone was intended to be used between the existing riprap and the new mattress.

Submitted By: [Eric Springston](#) (502-315-2627) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480433 Civil Sheet CS101 to CS103 n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(**Document Reference: Appendix B - Engineering Design Drawings**)

Sheet CS101-CS103: There are no cross-section cut lines shown in plan to locate the typical sections. Suggest adding the cross-section cut lines to the respective plan views.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

Revised Apr 15 2016.

1-0 Evaluation Concurred

Concur, will add section cut lines to plan sheets.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480435	Civil	Sheet CS103	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

(Document Reference: [Appendix B - Engineering Design Drawings](#))

Sheet CS103: The plan shows new riprap limits, but no new riprap is proposed for the marine mattress alternative. Presumably, this was a drafting oversight. Suggest removing the riprap line symbols from the plan and legend since none is shown on the typical sections. Also, the limit of the existing riprap to be covered by the mattresses should be shown on the plan.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

1-0 Evaluation Concurred

Concur, will remove the riprap lines and will show the existing riprap limits on the plan sheets.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480440	Geotechnical	Sheet CG303	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

(Document Reference: [Appendix B - Engineering Design Drawings](#))

Sheet CG303: Section 3.4.1.1, Page 15 of the DPR states that the "mattress is joined to the next adjacent and then anchored toward the top of bank." Based on this, it is suggested that the Alternative 3A/3B typical sections shown the anticipated tieback anchor system (e.g., pipe through mattress lifting loops at upper end that is anchored typically with Manta-ray anchors or similar soil anchoring systems). Per ERDC/CHL CHETN-III-72, "tieback anchors should be installed with the anchor point located landward of any potential soil failure (e.g., slip surface failure), erosion of backfill, etc. Geotechnical engineers should be involved in this aspect of design." As stated in ATR reviewer comment #6480425, the proposed anchor system should be designed and included during the D & I Phase.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

Revised Apr 15 2016.

1-0 Evaluation Concurred

Concur. Tie back design would be included in the final design.

Submitted By: [Eric Springston](#) (502-315-2627) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480446	Civil	Sheet CG303	n/a	n/a
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Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
([Document Reference: Appendix B - Engineering Design Drawings](#))

Sheet CG303: There is not a detail for anchoring the upstream side of the marine mattress system in the river bed and then extending up the slope (i.e., perpendicular to the channel flow to serve as end protection). Such a detail should be added during the D & I Phase. It is typical to anchor the upstream edge of marine mattresses in an anchor trench that extends from the river bed to the top-of-bank, which is subsequently backfilled with riprap. This will prevent erosion from flanking or undermining the mattress slope protection. If installing such an anchor trench/riprap is not feasible, anchoring of this leading edge could be accomplished by installing Manta-ray soil anchors or equivalent.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

1-0 Evaluation Concurred

agreed. Both upstream and downstream edges will be "turned in" into the existing bank.

Submitted By: [Eric Springston](#) (502-315-2627) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480451	Civil	Sheet CG303	n/a	n/a
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Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
([Document Reference: Appendix B - Engineering Design Drawings](#))

Sheet CG303: Geotextile filter fabric is not shown on the typical sections, but should be incorporated into the design. Suggest adding geotextile to the sections or adding a note requiring a nonwoven geotextile (probably having a weight of at least 10 oz./SY). At the designer's discretion,

the geotextile should be installed in one of 3 possible ways: over the prepared bank subgrade, attached to the bottom of the mattresses, or placed in the mattresses themselves prior to filling with stone. Any underwater placement of mattresses would require the geotextile to be attached or placed in the mattresses.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

1-0 Evaluation Concurred

Concur, will show filter fabric along bottom of mattress in the sections.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480452	Civil	Sheet CG303	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

([Document Reference: Appendix B - Engineering Design Drawings](#))

Sheet CG303: It appears that some underwater placement of the mats will be required and channel diversion is not anticipated for Alternative 3A/3B. As such, to ensure that there will be sufficient continuity/subgrade protection between abutting mattresses, the longitudinal edge of an assembled mattress typically has a factory-installed, 2-foot extension of geogrid/geotextile. If the slope length was longer, the transverse edge would have this 2-foot extensions as well, but considering the maximum slope length for the project, this tranverse extension may not be necessary (i.e., a single panel will be installed from top of bank to out in the river bed. The D & I Phase should address this detail. Tensar has standard details for this design.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

1-0 Evaluation Concurred

Concur, will design toe extension during D & I Phase.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480455	Civil	Sheet CG303	n/a	n/a
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Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: [Appendix B - Engineering Design Drawings](#))

Sheet CG303: The D & I Phase drawings should include standard marine mattress details, including dimensions and specialized connections. Specifications will also have to be included in the contract documents.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

1-0 Evaluation Concurred

Concur, will add the appropriate details in the D& I Phase.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480459	Civil	Sheet CG303	n/a	n/a
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Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: [Appendix B - Engineering Design Drawings](#))

Sheet CG303: The mattress's toe run-out distance (i.e., mattress length on the river bed beyond the toe) varies between the three sections. Suggest that this be dimensioned and made more uniform for ease of constructability in the D & I Phase. Currently, this distance appears to be 6', 10' and 0' for Sections E1, A1, and A7, respectively. Also, Sheet CS103 does not seem to accurately depict the proposed run-out distances, so it should be revised accordingly.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

Revised Apr 15 2016.

1-0 Evaluation Concurred

Concur. The run-out distance will be calculated during the D & I Phase. I have revised the plans and sections to show 10' runout from the bottom of slope breakline.

Submitted By: [Kathy Dorsch](#) (502-315-6424) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6480460	Civil	Sheet CG301 to CG303	n/a	n/a
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Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: [Appendix B - Engineering Design Drawings](#))

Sheet CG301-303: There are no water levels shown on the typical sections. Photo 2 in the DPR seems to show typical water level conditions, which would not seem to affect construction. However, in the D & I Phase drawings, suggest that the different storm event elevations be shown, e.g., 2-year, 10-year, 100-year so the contractor is made aware of potential storm impacts. Alternatively, identify these elevations in a note on the respective drawings.

Submitted By: [Richard DePasquale](#) (215-656-6675). Submitted On: Apr 15 2016

1-0 Evaluation Concurred

There is very little hydraulic information on the Tippecanoe River in Fulton County. There is a Flood Insurance Study done for Pulaski County but the only frequency evaluated was the 100 year. The flow depth for the 100 year on the Tippecanoe River was approximately 14 feet, which could be considered to be the same at the project location. The 2 year could be considered the channel forming event and therefore, the elevation of the right bank of the river could be considered the 2 year frequency. These two frequencies will be added to the design drawings.

Submitted By: [Ronald Holmberg](#) (502-315-6456) Submitted On: Apr 18 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Richard DePasquale](#) (215-656-6675) Submitted On: Apr 26 2016

Current Comment Status: **Comment Closed**

6482602	Planning - Plan Formulation	n/a	n/a	n/a
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Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

The description of the No Action Alternative does not include an analysis of the costs associated with abandoning the road and permanently detouring traffic. Recommend performing such an analysis to demonstrate that the road is "essential and important enough to merit Federal participation" in protecting it. (PGN, App F, Sec III, F-23, a.)

Submitted By: [Adrian Leary](#) (215-656-6576). Submitted On: Apr 18 2016

1-0 Evaluation Concurred

Alternative added to analysis to discuss permanent road closure and signed detour. The cost to stabilize the streambank is less than the cost to relocate the road. The broad community interest, and desire to maintain emergency response times and school bus routes appears to be sufficient evidence to merit Federal participation.

Submitted By: [Nathan Moulder](#) (502-315-6776) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Adrian Leary](#) (215-656-6576) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6482612	Planning - Plan Formulation	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

Recommend adding additional detail to the discussion of the existing "temporary" riprap to more clearly demonstrate that this measure is insufficient to protect the road in the future (design deficiency, undersized riprap, etc.)

Submitted By: [Adrian Leary](#) (215-656-6576). Submitted On: Apr 18 2016

1-0 Evaluation Concurred

Discussion added to SEC 3.3 - Most Probable Future Without Project Conditions to reinforce the "temporary" nature of riprap repair.

Submitted By: [Nathan Moulder](#) (502-315-6776) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Adrian Leary](#) (215-656-6576) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6482647	Environmental	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

Page 19 - Table 2 "Alternative Screening" - "Marine mattress also allows for easy establishment of vegetation". Recommend clarifying this statement in the document text and describing how this would occur, riparian habitat benefits, etc.

Submitted By: [Adrian Leary](#) (215-656-6576). Submitted On: Apr 18 2016

1-0 Evaluation Concurred

See Section 4.3.2. The marine mattress allows for a thinner layer of riprap (12-18") which better accommodates vegetation. Additional discussion is in the revised report.

Submitted By: [Nathan Moulder](#) (502-315-6776) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Adrian Leary](#) (215-656-6576) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6482699 Planning - Plan Formulation n/a n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

Page 20, Table 3 "Risk Matrix" - Indicates that road failure prior to USACE project is low likelihood. This characterization suggests that the imminent threat of failure required for Section 14 justification is not present. Recommend clarifying the urgency associated with the project.

Submitted By: [Adrian Leary](#) (215-656-6576). Submitted On: Apr 18 2016

1-0 Evaluation Concurred

Risk was revised to medium-high given the July 2015 bank failure. Also contacted the County on April 18, 2016 and the County has recently implemented weight and width restrictions.

Submitted By: [Nathan Moulder](#) (502-315-6776) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Adrian Leary](#) (215-656-6576) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6482721 Planning - Plan Formulation n/a n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

Section 3.6.3, 2., (page 22)- project coordination team activities are no longer considered in-kind services per updated guidance on ER 1165-2-208 (effective Dec 16, 2015).

Submitted By: [Adrian Leary](#) (215-656-6576). Submitted On: Apr 18 2016

1-0 Evaluation Concurred

Removed

Submitted By: [Nathan Moulder](#) (502-315-6776) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Adrian Leary](#) (215-656-6576) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6482730 Planning - Plan Formulation n/a n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

Recommend clarifying the threat associated with the INDNR boat ramp since the access road appears to be a safe distance from the river and photo 7 (pg 27) shows that the river bank adjacent to the launch is armored.

Submitted By: [Adrian Leary](#) (215-656-6576). Submitted On: Apr 18 2016

1-0 Evaluation Concurred

Clarified.

Submitted By: [Nathan Moulder](#) (502-315-6776) Submitted On: Apr 21 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Adrian Leary](#) (215-656-6576) Submitted On: Apr 25 2016

Current Comment Status: **Comment Closed**

6484440	Cost Engineering	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**

(**Document Reference: Quantity Take-Offs**)

1. Quantities – CONCERN: Quantities and take-offs were not provided to support the various final array of alternatives. It is unclear how quantities were developed and whether they included waste/loss. SIGNIFICANCE: HIGH. RESOLUTION: Provide the Quantity records that support the alternative estimates. Explain how quantities were checked and processes applied to cover material waste or loss of major cost items.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

Quantities were provided by Engineering Division utilizing measuring tools in the drafting software. Quantities were verified by estimator utilizing typical cross sections across the project area. Estimate did not include waste. 10% waste was added to granular fill material quantity as a result of this review but not to marine mattresses as those volumes are fixed.

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Close Comment

Confirmed.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

Current Comment Status: **Comment Closed**

6484443	Cost Engineering	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(Document Reference: Report Conflict)

2. Recommended Plan – CONCERN: There seems to be a scoping conflict of alternatives (construction features) between Main Report, Engineering Appendix, Cost Appendix and MII estimate. The MII estimate presents Alternative 2A as the apparent recommended plan and it includes a marine mattress. But the Main Report refers to Alternative 3 that includes the marine mattress as does the Engineering Appendix. SIGNIFICANCE: VERY HIGH. RESOLUTION: The document nomenclature and scoping should match between the various documents.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

2. In each instance the Marine mattress alternative is the recommended choice and is the estimate included for final review. It is acknowledged that the alternative numbers have an error as they are currently listed, but the final product is not affected. MII Estimate folder title changed to Alt 3.

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Close Comment

MII Correction confirmed.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

Current Comment Status: **Comment Closed**

6484444	Cost Engineering	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(Document Reference: Contract Method)

3. MATOC – CONCERN: The estimate refers to MATOC criteria and contracts. But it is unclear how the MATOC might affect certain portions of the estimates such as markups, unit prices...SIGNIFICANCE: UNCLEAR. RESOLUTION: Explain how MATOC influences contractor markups and any other contract work.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

3. MATOC contractors in the LRL pool tend to self-perform very little or no work at all. This can be seen in the assignment of work throughout the estimate. Its important to the estimate as more of the work is subject to multiple layers of contractor mark-ups

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Open Comment

Response suggests that more risk and markups are then required for the subcontractors.
Recommend 20-24% markups for subcontractors.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

2-0 Evaluation Concurred

Subcontractor markups increased to 20%

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: May 11 2016

2-1 Backcheck Recommendation Close Comment

Confirmed. The subcontractor double tiering on a MATOC seems reasonable and it decreases the acquisition risks.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

Current Comment Status: **Comment Closed**

6484445 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
([Document Reference: MII Estimate](#))

4. Project Properties: The Escalation Index Date and Effective Price level should be the previous 1 Oct 2015 for economic escalation.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

MII revised

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Open Comment

Correction not apparent in the Project Properties General tab.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

2-0 Evaluation Concurred

changed to 1 Oct 2015

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: May 11 2016

2-1 Backcheck Recommendation Close Comment

Confirmed.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

Current Comment Status: **Comment Closed**

6484450 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(Document Reference: MII Estimate)

5. Fuel Costs – CONCERN: Off-Road diesel is set at \$1.67/gal. This low price might not last to time of construction. SIGNIFICANCE: MODERATE. RESOLUTION: Assuming the low price does not last, consider a higher price for time of construction.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

5. Acknowledged – added 20% to fuel costs.

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Close Comment
Confirmed.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

Current Comment Status: **Comment Closed**

6484451	Cost Engineering	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(Document Reference: MII Estimate)

6. Subcontractor – CONCERN: The estimate applies a generic subcontractor; however, the various construction items will likely be performed by separate types of subcontractors and possibly double tired subcontractors when assuming a prime MATOC pass thru. The subcontractor structure could result in a cost shortfall in markups and in separate mobilizations. SIGNIFICANCE: HIGH. RESOLUTION: Further consider subcontractor markups, assignments, tiering and mobilizations.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

6. Additional subcontractors added to estimate structure

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Open Comment

W/ MATOC, I would expect more subcontract risk and markup. Apply 20-24%.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

2-0 Evaluation Concurred

subcontractor markups increased to 20%

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: May 11 2016

2-1 Backcheck Recommendation Close Comment

Confirmed. The subcontractor structure includes some double tiering, reducing acquisition risk.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

Current Comment Status: **Comment Closed**

6484452 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(**Document Reference: MII Estimate**)

7. Disposal costs – CONCERN: Check need for disposal costs for Selective Clearing and Demo Concrete Wall.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

7. Disposal costs added to cost item for clearing

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Close Comment

Confirmed.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

Current Comment Status: **Comment Closed**

6484454 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(**Document Reference: MII Estimate**)

8. Topsoil Placement – CONCERN: Shouldn't there be material costs for this item?

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Non-concurred

8. No new topsoil will be brought onsite. All topsoil is from temporary access road or excavating hillside slope.

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Close Comment

Closed without comment.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

Current Comment Status: **Comment Closed**

6484456 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: MII Estimate)

9. Vehicle Guardrail Duration – CONCERN: Having inspected guardrail installation, the crew of 8 hrs seems very optimistic. Considering mobilization, setup work and cleanup, would expect at least 3-4 days. RESOLUTION: Reconsider since this will likely be a different subcontractor.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Non-concurred

9. Guardrail install item is a cost book item based on linear feet. Crew time was not set by estimator. A guardrail subcontractor was added to the project and markups applied accordingly.

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Open Comment

Non-concur. Cost book items are based on large quantities and do not consider what I had described: mob, setup, takedown and cleanup. Further the subcontract markup is just 17%.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

2-0 Evaluation Concurred

crew output reduced to reflect longer duration

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: May 11 2016

2-1 Backcheck Recommendation Close Comment

Confirmed.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

Current Comment Status: **Comment Closed**

6484457	Cost Engineering	n/a	n/a	n/a
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Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: MII Estimate)

10. Seeding - CONCERN: The estimate folder notes say that productivity was reduced to 8-hr day, but productivity shows 1.4 hours. RESOLUTION: Consider further as a separate subcontractor.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

10. Landscape subcontractor was added and mark-ups applied

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Open Comment

The 1.4 hour duration remains in the estimate and does not consider the hydra-seeder mob and demob. A subcontractor w/ such equipment would charge at least a full day because he has no other work to go to.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

2-0 Evaluation Concurred

subcontractor markups increased and output reduced to reflect a full day

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: May 11 2016

2-1 Backcheck Recommendation Close Comment

Confirmed.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

Current Comment Status: **Comment Closed**

6484460	Cost Engineering	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
([Document Reference: MII Estimate](#))

11. CONCERN: For the Recommended Plan, the Engineering and Cost App includes detailed quantities and unit prices which could be used by bidders. SIGNIFICANCE: HIGH.
RESOLUTION: Remove detailed quantities and unit prices that could become public knowledge.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

Will revise PM document

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Open Comment

Awaiting final - Post ATR.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

1-2 Backcheck Recommendation Close Comment

Provided; however, discussions of the contractor markups within the Cost APP is also FOUO and should not be included.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 31 2016

Current Comment Status: **Comment Closed**

6484461	Cost Engineering	n/a	n/a	n/a
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Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
(Document Reference: Risk Analysis)

12. ARA –

- a. Given design level, the construction contingencies seem quite low at 20% for this project. I would have expected a value closer to 30-35%. Acquisition risk strategy still exists.
- b. Project Scope Growth refers to quantity risks, not design change potential. Consider further.
- c. Water levels can also impeded contractor, increasing risks for bidding, contract modification potential.
- d. Risk register discussions: improve sentence structure and spelling. The risk register should be placed in the cost appendix report.

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

12. A. I feel the design is simple enough as is the actual work, that 20% contingency is appropriate for the project. The slope cross sections are rather straight with few scours to fill which lessens the possibility of overruns, which would be the largest risk to the project.

B. Acknowledged

C. Water levels are not a concern expressed by the hydrology department, and the marine mattress system is laid on the slope with no toe excavation required. The lack of a toe reduces risks associated with rising water levels.

D. Acknowledged

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Open Comment

Non-concur. Being in the business for 35 years, 20% too low and will not be certified based on existing open comments. Risks still remain in acquisition (competition and subcontract structure) as well as construction mods.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 10 2016

2-0 Evaluation Concurred

risk register revised and resubmitted.

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: May 11 2016

2-1 Backcheck Recommendation Close Comment

Revisions accepted.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

Current Comment Status: **Comment Closed**

Comment Classification: **Unclassified\For Official Use Only (U\FOUO)**
([Document Reference: Risk Analysis](#))

13. TPCS: CWCCIS tab: Excel box F28 should be Government Personnel: "1".

Submitted By: [Jim Neubauer](#) (509-527-7332). Submitted On: Apr 19 2016

1-0 Evaluation Concurred

Acknowledged, changed in TPCS Sheet

Submitted By: [Chris Rutledge](#) ((502) 772-3492) Submitted On: Apr 26 2016

1-1 Backcheck Recommendation Close Comment

MCX assisted in completing the final TPCS.

Submitted By: [Jim Neubauer](#) (509-527-7332) Submitted On: May 19 2016

Current Comment Status: **Comment Closed**

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