

Detailed Project Report with Integrated Environmental Assessment

**Continuing Authorities Program (CAP)
City of Ledbetter, Livingston County, Kentucky
Section 14 Emergency Streambank Stabilization Project**



Photo above shows active erosion along the Ohio

May 2021

DRAFT FINDING OF NO SIGNIFICANT IMPACT

Continuing Authorities Program (CAP) City of Ledbetter, Livingston County, Kentucky Section 14 Emergency Streambank Stabilization Project City of Ledbetter, Livingston County, Kentucky

The U.S. Army Corps of Engineers, Louisville District (Corps) conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The Detailed Project Report and Environmental Assessment (DPR/EA) dated 18 May 2021, for the Continuing Authorities Program (CAP) City of Ledbetter, Livingston County, Kentucky Section 14 Emergency Streambank Stabilization Project addresses potential environmental impacts associated with the stabilization of a section of the Ohio River bank to protect a critical public road (Riverview Drive) in the City of Ledbetter, Livingston County, Kentucky.

The draft DPR/EA, incorporated herein by reference, evaluated various alternatives that would halt the severe erosion occurring on the bank of the Ohio River and/or continue to allow access to Riverview Drive in the study area. The recommended plan is the National Economic Development (NED) Plan and includes: the backfill of the severely eroded bank, armament of the bank with riprap, installation of a drain to prevent flow over top of the armament.

In addition to a “no action” plan, five alternatives were evaluated.¹ The alternatives included: (1) a road realignment to provide access to Riverview Drive, (2) an alternate road realignment to provide access to Riverview Drive, (3) riprap protection of the bank (preferred alternative), (4) construction of a sheetpile retaining wall along the riverbank, and (5) a combination of a sheetpile retaining wall and riprap protection of the bank. All alternatives considered are described in detail in section five of the DPR/EA.

For all alternatives, the potential effects were evaluated, as appropriate in section 4 of this DPR/EA. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

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

¹ 40 CFR 1505.2(b) requires a summary of the alternatives considered.

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

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the DPR/EA will be implemented, if appropriate, to minimize impacts.² This includes the use of silt fences and revegetation of disturbed land, limiting vegetation removal to minimum extent practicable, reseeding any areas disturbed, etc. to reduce erosion as much as possible. Clearing of seasonal nuisance vegetation (e.g. Japanese knotweed, Johnson grass, purple loosestrife) will be required in areas of backfill placement. No soil material would be disposed within the River or other waters of the United States. Only clean commercial stone (riprap) would be placed along the edge of the river. Any excess material would be disposed of at an approved location. No compensatory mitigation is required as part of the recommended plan.

A 30-day public review of the draft DPR/EA and FONSI was completed on *[PENDING]*. All comments submitted during the public review period were responded to in the Final DPR/EA and FONSI. Comments from the public review did not result in significant changes to the EA. *[PENDING]*

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the recommended plan would have no effect on federally listed species or their designated critical habitat.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that the recommended plan has no potential to cause adverse effects on historic properties.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed. *[PENDING]*

² 40 CFR 1505.2(C) all practicable means to avoid and minimize environmental harm are adopted.

Technical, environmental, economic, and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives.³ Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.⁴

Date Eric D. Crispino
 Colonel, Corps of Engineers
 District Commander

³ 40 CFR 1505.2(B) requires identification of relevant factors including any essential to national policy which were balanced in the agency decision.

⁴ 40 CFR 1508.13 stated the FONSI shall include an EA or a summary of it and shall note any other environmental documents related to it. If an assessment is included, the FONSI need not repeat any of the discussion in the assessment but may incorporate by reference.

Draft Detailed Project Report and Environmental Assessment
City of Ledbetter, Livingston County, Kentucky
Section 14 Emergency Streambank Stabilization Project

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Detailed Project Report and Environmental Assessment

City of Ledbetter, Livingston County, Kentucky

Section 14 Emergency Streambank Stabilization Project

1 INTRODUCTION

1.1 STUDY PURPOSE AND SCOPE

This Detailed Project Report (DPR) which includes an integrated Environmental Assessment (EA) was prepared by the Louisville District of the U.S. Army Corps of Engineers (USACE) to identify the most cost effective alternative for providing streambank erosion protection along the Ohio River in the City of Ledbetter, Livingston County, Kentucky, while minimizing environmental, economic, and social impacts. Livingston County (the County) is the non-Federal sponsor. The County requested Federal assistance in addressing streambank erosion issues under the Section 14 authority in April 2020.

The purpose of the project is to provide a cost-effective means to prevent active erosion with the potential to negatively impact a public road (Riverview Drive) which provides access to nine (9) residential properties in the City of Ledbetter. A portion of the streambank is eroding in an area estimated to extend approximately 80 feet along the Ohio River and also extends approximately 80 feet inland toward the public road. Failure to protect the road would eliminate ingress and egress for the nine residential properties. As a result, the primary purpose of the study is to identify the sections of the streambank in immediate need of treatment and to develop a viable solution for the prevention of active erosion.

The primary failure mechanism of the bank is the rise and fall of the Ohio River. Precipitation leads to high water events, where the increased water elevation allows the bank material to saturate. When the water level in the river draws down, the resisting force is removed, and saturated sand seams with low cohesion flow out of the bank. This undermines the material around it, causing the soil to collapse. This typically results in several feet of bank being lost at one time. Subsequent high-water events remove the collapsed material, re-expose the sand seams, and allow the process to repeat.

Comparing recent aerial imagery, the bank is failing towards the road at approximately six (6) feet per year and four (4) feet per year out from the side slopes. The progression will fluctuate year-to-year based on high water events. Based on measurements taken during the site inspection the erosion rate within the last year (2020) in the direction of the road has increased to approximately eight (8) feet per year. This is likely the result of a number of high-water events during early 2020 that impacted the area. It is expected that this trend will continue into the future and failure of the public road is imminent.

1.2 LOCATION

1.2.1 Study Area

Ledbetter is located on the southern bank of the Ohio River in Livingston County, Kentucky (latitude: 37.057834 / longitude: 88.484594) at approximately River Mile 928, approximately 8.6 miles downstream of the Smithland Lock and Dam. Ledbetter is proximate to the communities of Paducah,

Calvert City, Reidland and Farley, Kentucky. The Ohio River is 981 miles long, starting in Pittsburgh, Pennsylvania and running to Cairo, Illinois where it joins the Mississippi River. The Ohio River Basin is subject to periodic flooding and is the cause of frequent streambank erosion and recessional failure. Site location maps are shown in Figures 1 and 2.

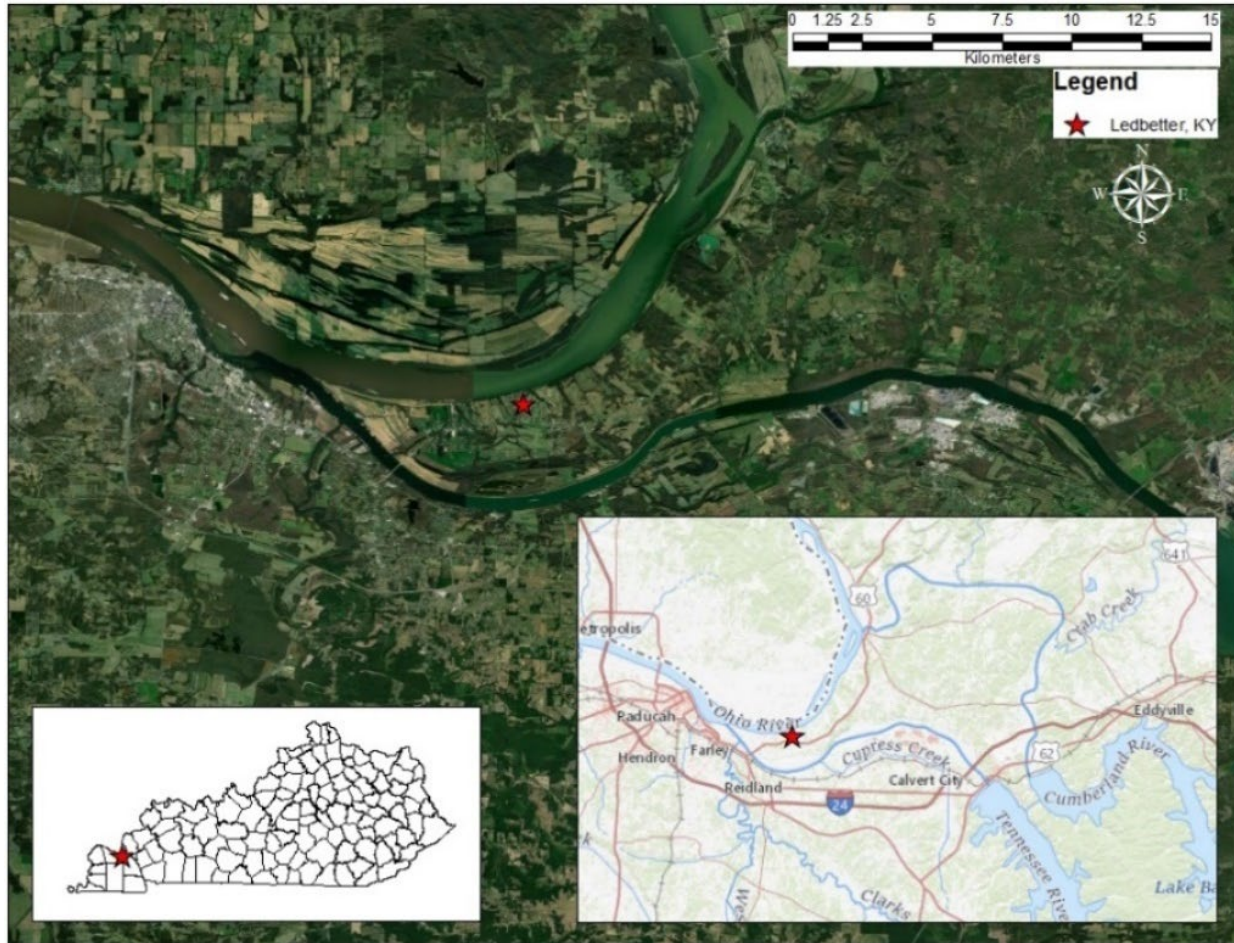


Figure 1. Ledbetter Study Area



Figure 2. Ledbetter Site Location

1.2.2 Project Area

The project area is located on the Ohio River near Riverview Drive on the northern side of Ledbetter. Riverview Drive, a public road that runs parallel to the Ohio River in an east-west direction, provides access to nine (9) residential properties. The project reach is an eroded area in need of immediate stabilization that is estimated to extend approximately 80 feet along the Ohio River and also extends approximately 80 feet inland toward the public road. Failure to protect the road would eliminate access to the nine residential properties. A project area map is shown in Figure 2.

1.3 STUDY AUTHORITY

Section 14 of the Flood Control Act of 1946, as amended, authorizes 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 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. Traditional USACE civil works projects are of wider scope and complexity and are specifically authorized by Congress. The CAP is a delegated authority to plan, design, and construct certain types of water resource and environmental restoration projects without specific Congressional authorization.

1.4 RELEVANT PRIOR STUDIES AND REPORTS

No previous USACE studies have been conducted in the current project area or in the immediate vicinity.

Approximately 11 miles downstream of the project area, the City of Paducah, Kentucky operates and maintains a concrete and earthen levee system constructed by USACE between 1939 and 1949. USACE is currently completing a project with Paducah to rehabilitate the original levee system. Streambank stabilization in the project area will have no impact on the Paducah levee system.

Smithland Locks and Dam is approximately 8.6 miles upstream from the project area and provides for normal upper pool elevation of 324 feet mean sea level (msl) above the dam. Olmsted Locks and Dam is approximately 36 miles downstream of the project area and maintains a pool elevation of 302 feet msl through the project area. The operation of these two locks and dam has no impact on erosion in the project area.

2 AFFECTED ENVIRONMENT - EXISTING CONDITIONS

2.1 CLIMATE

Located in Northwestern Kentucky, Ledbetter has a temperate climate with relatively cold winters and hot, humid summers, with moderate precipitation. The mean annual temperature for the area is about 57 degrees Fahrenheit (F), with extremes ranging from 30 degrees F below zero to 108 degrees F above zero. Average monthly temperatures range from 78 degrees F in July to 33 degrees F in January. All seasons are marked by weather changes resulting from passing weather fronts and associated centers of high and low pressure. Precipitation in the Ledbetter area is fairly well distributed throughout the year. The average annual precipitation is 49.24 inches, with the monthly averages ranging from 2.99 inches in August to 4.95 inches in April. Appendix A gives the average monthly rainfall for Ledbetter, Kentucky. Because of the limited amount and duration of snowfall, snowmelt generally does not contribute significantly to runoff for this basin.

Analysis of data and toolsets related to climate change indicate historic and projected future increases in temperature have and are likely to continue for the project area; however, temperature is not a particularly important variable related to streambank stabilization or erosion. Both precipitation and streamflow, which more directly influence streambank stability, have increased uncertainty regarding their historic and projected trends when compared with temperature. Locally observed precipitation has exhibited a slight increasing trend over the last 70-years; however, this trend was not found to be statistically significant at a 95% confidence level. Streamflow on the Ohio River has not exhibited any significant trend over the available 90-year period of record. Over this period, the Ohio River watershed has experienced significant dam and levee construction and is now a regulated system. Despite this upstream regulation, no nonstationarities which could be attributed to climate change or other impacts were detected using the nonstationarity detection tool.

Future projections of hydrologic trends are uncertain, although most projections forecast increases in rainfall and storm events. These increases in the frequency and magnitude of storm events could result in additional runoff which could further exacerbate erosion in the future. The proposed stabilization measures (discussed in detail in proceeding sections) are resilient to future conditions in that they are thought to be able to accommodate slight increases in precipitation, runoff, and streamflow. Slight increases in precipitation, such as those which may occur due to climate change, would not result in failure of the bank protection. Based on this assessment, it is recommended that the potential future effects of climate change be treated as occurring within the uncertainty range for the current hydrologic analysis.

2.2 GEOLOGY, SOIL, AND PRIME FARMLAND

Ledbetter is located in the Mississippi Embayment physiographic region on the banks of the Ohio River, which is a part of the larger Coastal Plain physiographic province. The geology of this area is characterized by unconsolidated alluvium, which is overtopped by deep alluvial soils. These soils are typically easily eroded (Kentucky Geological Survey, 2012).

There are two soil types present in the project area and are shown in Table 1. The Henshaw Silt Loam soil type is considered prime farmland if drained. The Nelse-Huntington-Wheeling complex is located on 2-55% slopes and is frequently flooded. Based off published data, the slopes appear to be highly erodible. The Henshaw Silt Loam is located on 0-2% slopes and is rarely flooded.

Table 1. Soil types present in the City of Ledbetter Emergency Streambank Stabilization Project

Soil Type	Prime Farmland (yes/no)
Nelse-Huntington-Wheeling complex	No
Henshaw Silt Loam	Yes – if drained

2.3 SURFACE WATER AND OTHER AQUATIC RESOURCES

2.3.1 Surface Water

The project area is located at river mile 928 upstream from the Olmsted locks and dam. The Olmsted pool has two major tributaries draining into it, the Cumberland and Tennessee Rivers, which are both in Kentucky. Like many large rivers, the Ohio River is threatened by pollution from sedimentation, nutrients (e.g., from agricultural runoff and malfunctioning septic systems), stormwater, habitat destruction, and invasive aquatic species. Construction of locks and dams, associated river traffic, and riverside development along much of the Ohio River have resulted in declines in many aquatic populations and extirpation of others. Sewage overflows and failing septic tanks are persistent problems in many municipalities within the Ohio River basin. Within Livingston County, the Ohio River was listed on the Kentucky Energy and Environment Cabinet, Division of Water 2016 Section 303(d) List of Impaired Waters (approved on June 19th, 2018). This is a requirement of states under Sections 305(d) and 303(d) of the Clean Water Act (CWA). The causes of impairment of the Ohio River in Livingston County include PCB in the water column, the presence of Dioxin (including 2,3,7,8-TCDD), *Escherichia coli* (E. coli), and iron. The sources of these contaminants are not known.

2.3.2 Groundwater

The Ohio River alluvium is a good source of groundwater in Livingston County. Many properly constructed drilled wells in the alluvium will produce several hundred gallons per minute and are generally less than 150 feet in depth. Water can be soft to moderately hard and is of good quality (Carey and Stickney, 2004).

2.3.3 Flood Plains

A floodplain is flat or nearly flat land adjacent to a stream or river that experiences periods of flooding during high discharge events. The project area is located entirely within the floodplain of the Ohio River, with the most up to date Federal Emergency Management Agency (FEMA) flood hazard maps showing the project area within the 1% annual flood hazard zone (Figure 3).

National Flood Hazard Layer FIRMette

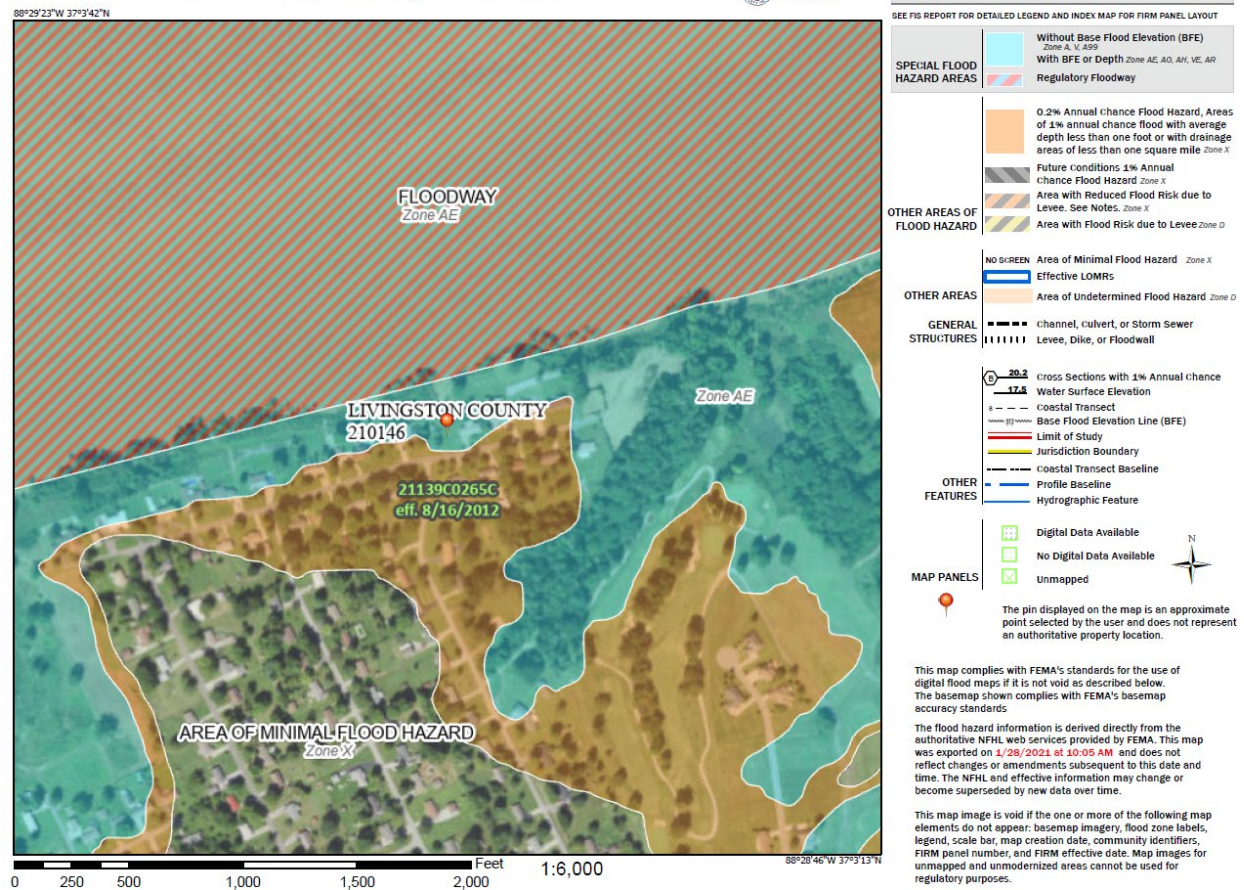


Figure 3. FEMA flood hazard map for Ledbetter Emergency Streambank Stabilization Project Area

2.3.4 Wetlands

The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) indicates there are no wetlands within the project area (Figure 4). This was confirmed by a site visit on August 13, 2020.



Figure 4. National Wetlands Inventory Map for Ledbetter Emergency Streambank Stabilization Project Area

2.4 HABITAT TYPES AND ASSOCIATED FLORA AND FAUNA

Habitat refers to the living space of an organism or community of interacting organisms and can be described by its physical or biotic properties, such as substrate, woody debris or a depression. Communities are naturally occurring groups of species that live and interact together as a relatively self-contained unit, such as a floodplain forest. Ecosystems may contain many habitat types. Habitats are usually assessed by describing and/or quantifying the physical structure, quality and/or present organism community contained in the area of interest. They may also be assessed at various scales, depending on the level of resolution needed to answer specific questions.

The only discernable natural habitat within the project area is a degraded Lower Ohio River Shoreline habitat (Figure 5). This community is characterized by frequent flooding events that maintain high levels of disturbance. This community is typically dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), and spike rushes (*Eleocharis* spp.), as well as hedge hyssop (*Gratiola viscidula*), mermaidweed (*Proserpinaca palustris*), small-flowered St. John's-wort (*Hypericum mutilum*), and tooth-cup (*Ammannia coccinea*) (Jones, 2005). These various species were present; however, a number of exotic invasive species were present as well including Johnson grass (*Sorghum halepense*), purple loosestrife (*Lythrum salicaria*), and

Japanese knotweed (*Reynoutria japonica*). The small size, frequent disturbance regime, and overall poor quality of this habitat means that it is not a significant resource for terrestrial fauna. No fauna including amphibians, birds, mammals, or reptiles were observed utilizing the habitat on August 13, 2020.



Figure 5. Photo of Lower Ohio River Shoreline Habitat within the Ledbetter Emergency Streambank Stabilization Project Area (August 13, 2020)

The area above the shoreline was likely a floodplain forest habitat prior to residential development, with a floral community consisting of black willow (*Salix nigra*), boxelder maple (*Acer negundo*), eastern cottonwood (*Populus deltoides*), false indigo-bush (*Amorpha fruticosa*), green ash (*Fraxinus pennsylvanica*), river birch (*Betula nigra*), silver maple (*Acer saccharinum*), and sycamore (*Platanus occidentalis*) (Jones, 2005). However, since development occurred along Riverview Drive this community has all but been destroyed with only a heavily degraded remnant remaining. Only a few species typical of this community remain including black willow, boxelder maple, and false-indigo-bush. This remnant community appears to be further stressed by the extreme loss of soil within the project area, which is causing trees to be washed away (Figure 6). No fauna including amphibians, birds, mammals, or reptiles were observed utilizing this habitat fragment on an USACE site visit conducted on August 13, 2020.



Figure 6. Photo of erosion threatening fragment floodplain forest in the Ledbetter Emergency Streambank Project Area (August 13, 2020)

Below the Ordinary High Water Mark (OHWM), and outside of the project footprint, the Ohio River supports an assemblage of mussel species. Habitat loss has resulted from navigational dredging as shown in a loss of shallow riffle/gravel bar habitat. This habitat used to be abundant and would have provided critical refuge and food resources for small fish and for juveniles of larger river species as cover from predators. Nevertheless, the lower Ohio River contains a diverse freshwater mussel population with nearly 80 species from the river; 15 are now federally listed and five are probably extinct (see section 2.5 for detailed discussion of threatened and endangered species). Mussels are an important component of the aquatic ecosystem below the OHWM. They naturally filter water, improve water quality (Li et. al., 2010), are food for other aquatic species, and were an important economic driver by providing tools, food, ornamentation, and pearls.

2.5 THREATENED AND ENDANGERED SPECIES

A federally endangered species is any species that is in danger of extinction throughout all or a significant portion of its range. A federally threatened species is any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. According to an official species list from the USFWS dated February 2, 2021 (Appendix A), there are 15 federally threatened or endangered species that have ranges which overlap with the project area (Table 2). There is no critical habitat within the Project Area.

Table 2. Federally threatened and endangered species with a range that overlaps with the Ledbetter Emergency Streambank Stabilization Project Area

	Common Name	Scientific Name	Status
Mammals	Gray bat	<i>Myotis grisescens</i>	E
	Indiana bat	<i>Myotis sodalist</i>	E
	Northern long-eared bat	<i>Myotis septentrionalis</i>	T
Clams	Clubshell	<i>Pleurobema clava</i>	E
	Fanshell	<i>Cyprogenia stegaria</i>	E
	Fat pocketbook	<i>Potomilus capax</i>	E
	Northern riffleshell	<i>Epioblasma torulosa rangiana</i>	E
	Orangefoot pimpleback	<i>Plethobasus cooperianus</i>	E
	Pink mucket	<i>Lampsilis abrupta</i>	E
	Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	T
	Ring pink	<i>Obovaria retusa</i>	E
	Rough pigtoe	<i>Pleurobema plenum</i>	E
	Sheepnose mussel	<i>Plethobasus cyphus</i>	E
	Spectaclecase	<i>Cumberlandia monodonta</i>	E
Plants	Prices potato-bean	<i>Apios priceana</i>	T

E = Endangered; T = Threatened

2.5.1 Species Descriptions

Gray Bat (*Myotis grisescens*)

The gray bat occupies areas of karst limestone of the southeastern United States. They are mainly found in Alabama, northern Arkansas, Kentucky, Missouri, and Tennessee. Florida, Georgia, Kansas, Indiana, Illinois, Oklahoma, Mississippi, Virginia, and North Carolina (USFWS 2019b). Gray bats live in caves year-round. During the winter gray bats hibernate in deep, vertical caves. In the summer, they roost in caves which are scattered along rivers. The bats eat a variety of flying aquatic and terrestrial insects present along rivers or lakes.

Gray bats are endangered largely because of their habit of living in large numbers in only a few caves. As a result, they are vulnerable to disturbance. Arousing bats while they are hibernating can cause them to exert excessive energy, which lowers their energy reserves. If a bat runs out of reserves, it may leave the cave too soon and die. In June and July, when flightless young are present, human disturbance can lead to mortality as frightened females drop their young while fleeing the intruder.

The gray bat has range that includes the project area and the species is considered potentially present in areas in which they have not been previously documented. However, because there are no known caves occurring in the project area, this species is not anticipated to be present.

Indiana Bat (*Myotis sodalis*)

Indiana bats are found over most of the eastern half of the United States. They hibernate during winter in caves. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing (USFWS 2006). Very few caves within the range of the species have these conditions. If bats are disturbed or cave temperatures increase during hibernation, more energy is needed, and hibernating bats may starve. In the spring, Indiana bats emerge from hibernation and migrate to summer roost sites between mid-April through late October where they usually roost under loose tree bark of dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats forage in or along the edges of forested areas. Loss and fragmentation of forest habitat are among the major threats to Indiana bat populations. Other threats include white-nose syndrome, winter disturbance, and environmental contaminants (USFWS 2006). There are no known records of roosts occurring in the project area, and the only tree species at the site that is larger than a sapling is black willow, which is not suitable roosting habitat for Indiana bats. Additionally, there are no trees in the project areas that display suitable roost tree characteristics (i.e., loose bark, dead/dying branches, or cavities).

Northern Long-eared Bat (*Myotis grisescens*)

The northern long-eared bat was listed as a threatened species in 2015 due to declines mostly associated with white-nose syndrome. The bats spend winter hibernating in caves and mines. During the summer (mid-April through late October), the bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags. Males and non-reproductive females may also roost in cooler places, like caves and mines. There are no known records of roosts occurring in the project area, and the only tree species at the site that is larger than a sapling is black willow, which is not suitable roosting habitat for northern long-eared bats. Additionally, there are no trees in the project areas that display suitable roost tree characteristics (i.e., loose bark, dead/dying branches, or cavities).

Clubshell (*Pleurobema clava*)

Listed as endangered in 1993, the clubshell prefers clean, loose sand and gravel in medium to small rivers and streams and will bury itself in the bottom substrate to depths of up to four inches. Reproduction requires a stable, undisturbed habitat and a sufficient population of fish hosts to complete the mussel's larval development. Once found all over the eastern U.S., it is now only known to occur in 13 streams. Reasons for its decline in the upper Ohio and Wabash watersheds are mainly due to pollution from agricultural run-off and industrial wastes, and extensive impoundments for navigation (USFWS 1997a). This species potentially occurs in the Ohio River immediately north of the project area.

Fanshell (*Cyprogenia stegaria*)

The fanshell, listed as endangered in 1990, is found in medium to large rivers. It buries itself in sand or gravel in deep water of moderate current, with only the edge of its shell and its feeding siphons exposed. Reproduction requires a stable, undisturbed habitat and a sufficient population of fish hosts to complete

the mussel's larval development. Increased regulation of rivers has degraded most of this mussel's habitat, reducing its gravel and sand habitat and affecting the distribution of its fish hosts. Dredging for channel maintenance, erosion caused by strip mining, and logging and farming have been known to destroy or degrade fanshell habitat. Other threats include pollution from agricultural and industrial runoff (USFWS 1997b). This species potentially occurs in the Ohio River immediately north of the project area.

Northern Riffleshell (*Epioblasma torulosa rangiana*)

The Northern riffleshell is found in a variety of streams from large to small. It buries itself in bottoms of firmly packed sand or gravel with its feeding siphons exposed. Increased regulation of rivers, resulting in the degradation of habitat is the main cause the species impairment. Erosion, pollution, and invasive mussel species likely contribute to the species' decline (USFWS 2018). Preferred habitat appears to require swiftly moving water (Clarke 1981). The species' current distribution includes waters in Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, West Virginia, and Ontario, Canada (NatureServe 2018). Because of the rarity of live material (and their enforced protection), it is not known if existing populations are reproductively active (NatureServe 2018). This species potentially occurs in the Ohio River immediately north of the project area.

Orangefoot Pimpleback (*Plethobasus cooperianus*)

In 1976, the orangefoot pimpleback (*Plethobasus cooperianus*) was designated as endangered by the Service. The range of the orangefoot pimpleback has been reduced to over 70% with even greater declines (likely > 80%) in occupied habitat. Long-term viability is in doubt as this species exists in small numbers in widely disjunct, localized beds. Continued human modification of the large rivers of the eastern United States and the impacts caused by zebra mussels continue to hasten the decline of this species (NatureServe 2018). This species is found in medium to large rivers in sand, gravel, and cobble substrates in riffles and shoals in deep water and steady currents as well as some shallower shoals and riffles (Gordon and Layzer 1989; Bogan and Parmalee 1983; Cummings and Mayer 1992; USFWS 1984a). This species potentially occurs in the Ohio River immediately north of the project area.

Rough Pigtoe (*Pleurobema plenum*)

The rough pigtoe was listed as endangered in 1987. In the 1980s, this species was confined to under 20 sites in the Tennessee, Clinch, Cumberland, Barren and Green rivers (USFWS 1984b); fewer than half are still likely extant. The species is found in medium to large rivers (20 m wide or greater) in sand, gravel, and cobble substrates in shoals. It is occasionally found on flats and muddy sand (Gordon and Layzer 1989). The impoundment, siltation, and pollution of rivers are driving factors of the species decline. This species potentially occurs in the Ohio River immediately north of the project area.

Sheepnose (*Plethobasus cyphus*)

The sheepnose was listed as endangered in 2012. Historically, the sheepnose occurred throughout much of the main stem of the Ohio and many of its tributaries (Butler 2003a), in shallow shoal habitats with moderate to swift currents over coarse sand and gravel (Oesch 1984). Habitats with sheepnose may also have mud, cobble, and boulders and may occur at depths exceeding six meters (Williams et al. 2008). Historically, the sheepnose was documented from the entire length of the Ohio River (its type locality)

and was first collected there in the early 1800s. Currently, the mainstem Ohio River and 10 tributary streams have extant sheepsnose populations. The sheepsnose is generally distributed, but rare, in most mainstem pools of the Ohio River. The population appears to be more abundant in the lower section of the river with a smaller population in the upper Ohio River pools. The population in the lower Ohio River mainstem is viable with documented recruitment, but the population overall continues to show signs of decline. This species potentially occurs in the Ohio River immediately north of the project area.

Spectaclecase (*Cumberlandia monodonta*)

The spectaclecase was listed as endangered in 2012 by the USFWS. Historically, this species is known from 45 streams in 15 states including the Ohio River (Butler 2003b; USFWS 2003). Spectaclecase mussels are found in large rivers where they live in areas adjacent to, but sheltered from, the main force of the river current. This species often lives in firm mud and shelters beneath rock slabs and boulders. The species is evidently absent from hundreds of river miles and from numerous reaches of habitat in which it occurred historically. Extant populations of the spectaclecase are known from 20 streams in 10 states. Of the 20 extant populations, seven are represented by only a single specimen each and are likely not viable. The status of the Ohio River population of this species is declining. The last observation of the spectaclecase in the Ohio River came in 1994, when a single individual was recorded. The decline of the spectaclecase across its range is primarily the result of habitat loss and degradation. Chief among the causes of decline are impoundments, channelization, chemical contaminants, mining, and sedimentation (Neves 1993, Neves et al. 1997, Watters 2000). Less serious are disease or predation (Butler 2003b) and invasive species (Asiatic clam, zebra mussel, black carp). This species potentially occurs in the Ohio River immediately north of the project area.

Ring Pink (*Obovaria retusa*)

The ring pink was listed as endangered in 1989. This species is extirpated from nearly all its formerly wide range through loss of habitat and is reduced to five known populations, most of which are represented by few collected specimens and are not viable. The only known extant populations are in the Green River (and possibly lower Tennessee River), Kentucky, where it is very sporadic (Cicerello and Schuster 2003), and possibly the middle reaches of Cumberland River and tailwaters of Wilson Dam, Alabama/Tennessee (Garner and McGregor 2001; Mirarchi et al. 2004). Because the species is found in such low numbers and appears to be no longer reproducing at most occurrences, artificial propagation will probably be the only way the species can survive. This species potentially occurs in the Ohio River immediately north of the project area.

Rabbitsfoot (*Quadrula cylindrica cylindrica*)

The rabbitsfoot was listed as threatened in 2013. Historically, the rabbitsfoot occurred in the lower Great Lakes sub-basin and Mississippi River Basin including Ohio River system. It is found throughout the Ohio River drainage from headwaters in Pennsylvania to the mouth of the Ohio River (Cummings and Mayer 1992). Based on historical and current data, the rabbitsfoot is declining range-wide and is now extant only in 46 of 137 streams of historical occurrence, representing a 66% decline. Further, in the streams where it is extant, populations with few exceptions are highly fragmented and restricted to short reaches (Butler 2005). The chief causes of this species' decline are impoundments, channelization, chemical contaminants, mining, and sedimentation. This species potentially occurs in the Ohio River

immediately north of the project area.

Fat Pocketbook (*Potamilus capax*)

The fat pocketbook was federally listed as endangered in 1976 by the USFWS. This species was once widely distributed in the Mississippi River drainage. The greatest threats to the fat pocketbook include activities related to navigation and flood control (USFWS, 1989). Channel maintenance activities and impoundments remain the greatest threats to the continued existence of this species (USFWS, 1989). Other common threats to mussel species include siltation, pollution, and exotic species. This species potentially occurs in the Ohio River immediately north of the project area.

Pink Mucket (*Lampsilis orbiculatus*)

The pink mucket is a freshwater mussel that was once found throughout the interior basins of the eastern United States including the Ohio River, although never found in great numbers. The species was federally listed as endangered in 1976 by the USFWS. The species is still found in the Ohio River with an extant population known at the Ohio River Islands National Wildlife Refuge. The greatest threats to the pink mucket include channel modification and the impoundment of rivers. Sedimentation caused by strip mining and other land disturbance activities is also a threat to the species. This pink mucket potentially occurs in the Ohio River immediately north of the project area.

Price's Potato-bean (*Apios priceana*)

The Price's Potato-bean is a flowering plant in the bean family that grows in rocky woods and forest openings in Alabama, Illinois, Kentucky, Mississippi, and Tennessee. There are only 13 extant populations known to exist today. This species requires regular disturbance and is threatened by loss of natural disturbance regimes such as fire and disturbance caused by large native grazers like Bison. However, unnatural disturbance such as intense cattle grazing, and clearcutting are significant threats to known populations. Due to the extreme erosion at the site, and specific habitat requirements of this species it is not expected to be present in the project area and was not observed during the site visit on August 13, 2020.

2.6 RECREATIONAL, SCENIC, AND AESTHETIC RESOURCES

The area is severely eroding causing a degradation to any scenic or aesthetic properties of the shoreline that could be viewed by the public from the river. There are no recreation facilities in the project area.

2.7 CULTURAL RESOURCES

A number of steps were taken in an effort to identify any cultural resources within the proposed emergency streambank protection project. These included a background check of the National Register of Historic Places (NRHP), Louisville District Geographic Information System (GIS), the Kentucky Office of State Archaeology (OSA) records, and previous cultural resource survey reports that have occurred near the vicinity of the project area. The purpose of this records search was to identify and locate any cultural resources or historic properties that could be potentially impacted by the proposed undertaking. The records review of the OSA on June 30, 2020 found no known prehistoric or historic sites in the immediate project area. No archaeological sites were located within a 2-kilometer radius of the

proposed streambank stabilization project. The records review of the NRHP database conducted on June 30, 2020 also found no evidence within the project area of recorded archaeological sites or historical structures listed on, or eligible for the listing on the NRHP.

An onsite cultural resources assessment was conducted on July 6, 2020 in the APE of the proposed streambank stabilization. Three judgmental shovel tests were excavated in the north-northwest direction of the project area to determine if there were any intact soils in the area. Soils consisted of Nelse-Huntington-Wheeling Complex located along the shoreline of the Ohio River extending to a depth of 48 centimeters below ground surface. The parent material for this complex consists of a sand alluvium, mixed fine-silty alluvium, and mixed fine loamy alluvium on terrain with 2% to 55% slopes that are frequently flooded (USDA NRCS, 2020). All shovel tests were negative for cultural material.

2.8 AIR QUALITY

The Clean Air Act (CAA) allows the U.S. Environmental Protection Agency (EPA) to set air quality standards for pollutants considered harmful to public health and welfare. The National Ambient Air Quality Standards (NAAQS) set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. These standards have been established for six criteria pollutants including carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), and sulfur dioxide (SO₂), and each state is required to develop implementation plans for each pollutant. Areas are generally designated as being either in “attainment” of the standards for the pollutants listed above or in “nonattainment.” Nonattainment areas are required by the CAA to comply with the NAAQS standards through the evaluation and development of a maintenance plan. The U.S. EPA makes a conformity determination to assure that the actions within the maintenance plan conform to the respective state’s implementation plan for each nonattainment pollutant.

According to the EPA Green Book, which describes the nonattainment/maintenance area status for each county by year for all criteria pollutants, Livingston County is classified as in “attainment” for criteria pollutants. This means that air pollutants are not known to exceed acceptable limits established by the EPA.

2.9 NOISE

Noise is measured as day-night average sound levels (DNL) in “A-weighted” decibels (dBA), which the human ear is most sensitive to. The DNL sound levels are an average exposure to sound over a 24-hour period, and sound generated between 10:00 PM and 7:00 AM have 10 dBA added artificially before averaging. The EPA identifies a long-term DNL exposure of 70 dBA or less as the level of environmental noise that will prevent any measurable effect to hearing loss over a lifetime.

Additionally, the Occupational Safety and Health Administration (OSHA) provides criteria for short-term permissible noise exposure levels for consideration of hearing protection or the need to administer sound reduction controls (Table 3).

Table 3. OSHA noise exposure standards for consideration of hearing protection or sound reduction controls.

Duration/day (hours)	Noise level (dBA)
8	85
4	88
2	91
1	94
0.5	97
0.25	100

The project area is bordered by a neighborhood and is not near a main road. As such the typical noise level of the area would be expected to be quite low. The loudest typical source of noise for the project area is likely lawn mowers, which emit approximately 90 dBA.

2.10 HAZARDOUS AND TOXIC SUBSTANCES

The EPA Envirofacts database was queried regarding the potential location of any Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Resource Conservation and Recovery Act (RCRA) sites in the vicinity of the proposed project. There are no CERCLA or RCRA sites within one mile of the project area. Additionally, historical imagery, dating to 1938, was analyzed and no previous land use at the site would suggest any contamination of hazardous material. As such, no hazardous or toxic substances are expected to be present at the project area.

2.11 SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE

2.11.1 Executive Order 12898 Environmental Justice

Under Executive Order 12898 “Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations,” Federal agencies are directed to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations.

According to the U.S. Census Bureau, the 2018 population estimates for the City of Ledbetter, Kentucky was 1,196. The area is 97% Caucasian and 76% of residents are age 18 and above, and 14% are age 65 and over. There are 479 households in the City and 17% of the households have an income of \$25,000 or less.

2.11.2 Executive Order 13045 Protection of Children

Executive Order 13045 “Protection of Children from Environmental Health Risks and Safety Risks” was issued in 1997. This order applies to economically significant rules under Executive Order 12866 “Regulatory Planning and Review” that concerns an environmental health or safety risk that the United States Environmental Protection Agency has reason to believe may disproportionately affect children. Environmental health risks or safety risks refer to risks to health or to safety that are attributable to products or substances that children are likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink or use for recreation, the soil we live on, and the products we use or are exposed to).

The U.S. Census Bureau estimated the 2018 population of the City of Ledbetter between the ages of 0 and 17 to be 282, or 24% of the total population. Additionally, the site borders a neighborhood where children are likely to play.

3 PLAN FORMULATION

3.1 PROBLEMS AND OPPORTUNITIES

Riverview Drive (Figure 7) provides the primary source of access for nine (9) residential properties upstream of the project area. The active erosion occurring in the project area has the potential to negatively impact Riverview Drive. Based on engineering estimates, since 2015 there has been six (6) feet of shore loss per year in the direction of the road. This erosion occurs during high water events resulting in several feet of bank being lost at one time, so the progression will fluctuate year-to-year based on high water events. This trend is expected to continue and failure to Riverview Drive is imminent.

Without treatment, the risk and consequences of a failure to Riverview Drive are threefold. The most serious is to vehicles and their occupants that are unaware of the failure and its impact to the road. The other two are environmental and economic. As the active erosion occurs, a large amount of sediment is introduced into the Ohio River, which in turn has an environmental impact. A road closure due to erosion would result in the loss of ingress and egress for nine (9) residential properties. Implementation of the proposed protection measures will restore stability to the streambank and prevent failure that would impact Riverview Drive and the nearby residential properties.



Figure 7. Ledbetter Emergency Streambank Project Area

3.2 OBJECTIVES AND CONSTRAINTS

3.2.1 Planning Objectives

The planning process for this project is to investigate a cost-effective means to prevent active erosion with the potential to negatively impact a public road in the City of Ledbetter, Kentucky. The study being conducted will recommend the most cost effective and environmentally acceptable solution for stabilizing the Ohio River streambank in the project area. The Project Delivery Team (PDT) identified the following objectives:

- Implement a long-term shoreline stabilization plan that protects Riverview Drive from foreseeable failure;
- Stabilization efforts should be environmentally and economically acceptable; and
- Identify the least cost alternative meeting the purpose of this study.

3.2.2 Planning Constraints

The PDT identified the following constraints:

- Cannot provide shoreline protection to private property (unless considered a betterment requested by the non-Federal sponsor (NFS))
- Avoid disturbance to adjacent private property
- Minimize impacts to shoreline habitat

3.3 MOST PROBABLE FUTURE WITHOUT PROJECT CONDITIONS (FWOP/No Action Alternative)

Without protection, the shoreline erosion resulting from high water events will continue towards Riverview Drive. Failure to implement treatment will eventually result in Riverview Drive being adversely affected by erosion and loss of ingress and egress for nine (9) residential properties. Under the no action alternative, no other projects are planned to occur in the area in the foreseeable future.

Based on a comparison between the 2015 and 2019 aerial images (Figure 8), the rate of bank loss in the direction of Riverview Drive is approximately 6 feet per year. However, based on measurements taken during the site inspection the erosion rate within the last year (2020) in the direction of the road has increased to approximately 8 feet per year. This is likely the result of a number of high water events during early 2020 that would have impacted the area. It is expected that this trend will continue.



Figure 8. Comparison between October 15, 2015 (left) and March 15, 2019 (right)

Precipitation in the City of Ledbetter area is fairly well distributed throughout the year. The average yearly precipitation is 49.24 inches. The wettest average month is April (4.95 inches), and the driest average month is August (2.99 inches). This region is projected to receive more precipitation within the watershed system at a higher frequency as described in the July 2015 Ohio River Basin Climate Change Impacts and Adaptation Draft Pilot Study.

The estimated progression of the failure is based on the assumption that the river will experience high water events similar to what has occurred in the last five (5) years and that there will continue to be rainfall events that generate high flow runoff similar to what has been occurring. If there is an increase in the number of high water events, the progression would accelerate. Failure of the public road is imminent.

4 MEASURES TO ACHIEVE PLANNING OBJECTIVES

4.1 PRELIMINARY STRUCTURE AND NON STRUCTURAL MEASURES

4.1.1 Structural Measures

Based on the project location on the Ohio River and the failure mechanism, two structural measures were identified for consideration:

Rip Rap Protection – Streambank will be backfilled with rip rap stone.

Sheetpile Protection – A sheetpile retaining wall along the streambank.

4.1.2 Non-structural Measures

Three non-structural measures were considered throughout alternative formulation to address the erosion impacting Riverview Road:

Road Alignment 1 – A 930 linear foot relocated road.

Road Alignment 2 - A 1,230 linear foot relocated road.

Bio-engineering –Vegetative stabilization of the streambank.

4.1.3 Excluded Measures

The PDT evaluated the measures against objectives and constraints (Section 3.2) based on a three-tiered rating scale (Table 4):

- Fully meets objectives / avoids constraints (2)
- Partially meets objectives / avoids constraints (1)
- Does not meet objectives / avoids constraints (0)

The PDT then assigned each measure a 2, 1 or 0 rating on how well it met the criteria.

After initial screening, only Vegetative Stabilization was screened based on effectiveness. Installation of this measure would rely on stabilization through filling the area of erosion, contouring, and vegetative treatments with native plant species. Vegetative stabilization would not be effective at this site due to continuing streambank erosion and recession. This measure alone is not a complete plan and would require additional measures. The high flows and frequency of inundation at the project site highly constrain the effectiveness of this treatment. The remaining measures were carried forward to develop alternatives.

Table 4. Screening of Potential Restoration Measures

Measures	Objective #1	Objective #2	Objective #3	Constraint 1	Constraint 2	Constraint 3	Score Summary
NS1 - No Action	0	0	0	0	0	0	0
Justification	The no action plan does not meet any objectives.			The No-Action plan does not avoid any constraints			
NS2 - Road Alignment 1	1	1	1	2	0	2	7
Justification	This alternative partially meets all objectives			This alternative meets constraints 1 and 3, but does not avoid constraint 2.			
NS3 - Road Alignment 2	1	1	1	2	0	2	7
Justification	This alternative partially meets all objectives			This alternative meets constraints 1 and 3, but does not avoid constraint 2.			
B1 – Bio-engineering	0	1	1	2	0	2	6
Justification	This alternative meets objectives 2 and 3, but not objective 1.			This alternative avoids constraints 1 and 3, but partially meets constraint 2.			
S1 – Rip Rap Protection	2	2	2	2	1	2	11
Justification	This alternative meets all objectives.			This alternative avoids constraints 1 and 3, but partially meets constraint 2.			
S2 – Sheetpile Protection	2	1	1	2	1	1	8
Justification	This alternative meets all objectives.			This alternative avoids constraints 1 and 3, but partially meets constraint 2.			

5 FORMULATION AND COMPARISON OF ALTERNATIVE SOLUTION SETS

After screening, each measure became a standalone alternative plan, and rip rap protection and sheetpile protection were combined to form an additional alternative. Per EP 1105-2-58, 29, d the least cost alternative plan is considered to be justified if the total costs of the proposed alternative are less than the costs to relocate the threatened facility.

5.1 ALTERNATIVE PLAN DESCRIPTIONS

The remaining streambank erosion management measures were combined to form an initial array of alternative plans. Per EP 1105-2-58, the option of relocating threatened facilities must be considered and compared with alternatives in CAP Section 14 analysis. In this case, relocation of Riverview Drive was considered a Nonstructural “measure” and was the basis for cost comparison and alternative selection.

In addition to No-Action, five alternatives were identified as an initial array:

Alternative Plan 1 (Road Alignment 1) – Re-aligning Riverview Drive by moving it to the south away from the area of erosion does not solve the erosion issue but it does provide residents with an alternative means of ingress and egress when the erosion reaches Riverview Drive in its current location (Figure 9). The new road in this configuration would be approximately 930 linear feet in length and would require clearing of 0.33 acres as well as partial acquisition of nine (9) parcels. This cost estimate was not fully developed and under-estimates the actual cost of the alternative. The alternative became cost-prohibitive before factors such as wetland mitigation and real estate acquisition were considered. The cost for relocation at a conceptual level is estimated to be \$1,022,000 (FY2021).



Figure 9. Road Alignment 1

Alternative Plan 2 (Road Alignment 2) – Re-aligning Riverview Drive by moving it to the south away from the area of erosion on a route slightly longer than Road Alignment 1 does not solve the erosion issue but it does provide residents with an alternative means of ingress and egress when the erosion reaches Riverview Drive in its current location (Figure 10). The new road in this configuration would be approximately 1,230 linear feet in length and would require clearing of 0.81 acres as well as partial acquisition of nine (9) parcels. This cost estimate was not fully developed and under-estimates the actual cost of the alternative. The alternative became cost-prohibitive before factors such as wetland mitigation and real estate acquisition were considered. The cost for relocation at a conceptual level is estimated to be \$1,178,000 (FY2021).



Figure 10. Road Alignment 2

Alternative Plan 3 (Rip Rap Protection) – To repair the failure and stabilize the streambank, the material will need to be replaced and protection will need to be provided that will resist the primary failure mechanism. This would be accomplished by first backfilling the void area with a granular fill. The granular fill will act as a filter so water can exit the bank without removing the sand seams. Filter fabric, 12-inches of topsoil, seed and mulch would be placed over the granular fill to stabilize the backfill. Finally, the fill would be overlaid with an 18-inch layer of KY Class II Channel Lining that would resist the forces of the Ohio River. A 24-inch culvert is also proposed that will keep water from travelling over top of the channel lining. The base repair would include approximately 520 cubic yards of KY Class II Channel Lining and 1,030 cubic yards of KY No. #357 stone. The project first cost of this treatment is estimated to be \$673,000 (FY2021).

Alternative Plan 4 (Sheetpile Protection) – A sheetpile retaining wall along the river bank is an alternate method to address the channelization of the drainage ditch and the erosion along the river bank. Approximately 80 linear feet of sheet piles would be installed along the approximate length of the river bank at the area of erosion. In addition, the sheet pile retaining wall would need to be properly keyed

into the adjacent side slopes to the east and west of the eroded area. The cost for construction of this treatment is estimated to be \$1,006,000 (FY2021).

Alternative Plan 5 (Rip Rap and Sheetpile Protection) – This measure would combine Alternative 3 and Alternative 4. Cost for construction of this treatment is estimated to be \$1,006,000 (FY2021).

No Action Alternative (NAA): The ‘No Action’ alternative would result in continued bank erosion leading to adverse impacts to Riverview Drive. Failure to stabilize the streambank would result in loss of access to the public and the residential structures on Riverview Drive. Without protection, the shoreline erosion, resulting from high water events, will continue towards Riverview Drive. The rate of erosion towards the road is estimated to be six (6) feet per event. Failure to implement treatment will eventually result in Riverview Drive being adversely affected by erosion and loss of ingress and egress for nine (9) residential properties. Without the USACE funded project, the county would have to fix the problem themselves, relocate Riverview Drive, or buy out the properties (or a combination of these activities). Under the no action alternative, no other projects are planned to occur in the area in the foreseeable future.

5.1.1 Comparison of Alternative Plans

Alternative Plans 1, 2, 3, 4, 5, and the NAA were compared and evaluated relative to cost, constructability, environmental acceptability, effectiveness, efficiency and acceptability (Table 5).

Table 5. Comparison of Alternative Plans

Criteria	Alternative Plan 1 (Road Alignment 1)	Alternative Plan 2 (Road Alignment 2)	Alternative Plan 3 (Rip Rap Protection)	Alternative Plan 4 (Sheetpiles)	Alternative Plan 5 (Rip Rap and Sheetpiles)
Cost (\$Million) (FY2021)	1.022	1.178	0.673	1.006	1.006
Constructability	YES Clearing of vegetation and other possible obstructions and placement of paving material	YES Clearing of vegetation and other possible obstructions and placement of paving material	YES Excavation of material and vegetation and placement of granular fill with filter fabric, topsoil, seed and mulch	YES Requires excavation and placement of sheetpile material	YES Combination of Alternatives 3 and 4
Environmental Acceptability	YES Minimal impacts; overall more impact to the environment, increased runoff	YES Minimal impacts; overall more impact to the environment, increased runoff.	YES Minimal impacts	YES Minimal impacts	YES Minimal impacts
Effectiveness	YES Reduces risk with minimal impacts	YES Reduces risk with minimal impacts	YES Reduces risk with minimal impacts	YES Reduces risk with minimal impacts	YES Reduces risk with minimal impacts
Efficiency	NO	NO	YES Most cost effective plan	NO	NO
Acceptability	YES	YES	YES	YES	YES

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As existing and Future Without Project (FWOP) conditions were more clearly defined, measures initially considered were eliminated. Alternatives were also evaluated against planning objectives and constraints. No alternatives were screened during that evaluation. Finally, other factors relevant to the screening of measures were discussed amongst the PDT which begin to incorporate the Principles & Guidelines alternative selection criteria of Completeness, Effectiveness, Efficiency and Acceptability (Table 6).

These criteria are defined in the USACE Planning Guidance Notebook as different measures of the extent to which each alternative plan achieves its goal of meeting the planning objectives.

- Completeness: A measure of the extent to which the necessary investments and actions, both Federal and Non-Federal, have been considered and provided for.
- Effectiveness: The extent to which each alternative plan contributes to achieving the planning objectives.
- Efficiency: A measure of the cost effectiveness of each alternative to meet the project objectives.
- Acceptability: The extent to which the alternative plans are acceptable in terms of applicable laws, regulations and public policies.

Table 6. Principles and Guidelines Alternative Screening

Alternative	Screen Summary Score	Cost	Effective	Efficient	Acceptable	Complete
No Action	0	\$0	LOW	HIGH	LOW	LOW
1 - Road Alignment 1	7	\$1,022,000	LOW	LOW	MED	MED
2 - Road Alignment 2	7	\$1,178,000	LOW	LOW	MED	MED
3 – Rip Rap	11	\$673,000	HIGH	HIGH	HIGH	HIGH
4 - Sheetpiles	8	\$1,006,000	MED	LOW	HIGH	MED
5 - Sheetpiles and Rip Rap	8	\$1,006,000*	MED	LOW	HIGH	HIGH

* Assumes similar costs to the overall sheetpile alternative.

In a memorandum dated January 5, 2021, USACE Headquarters office issued direction on the comprehensive assessment and documentation of benefits in the conduct of USACE water resources development project planning. In compliance with this memorandum USACE also conducted an evaluation of alternatives (Table 7) based on National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ) and Other Social Effects (OSE).

- The NED account for Section 14 identifies the least cost environmentally acceptable plan, which is less than relocation cost of the facility.

- The RED account registers changes in the distribution of regional economic activity that result from each alternative plan.
- The EQ account displays non-monetary effects on significant natural and cultural resources.
- The OSE account registers plan effects from perspectives that are relevant to the planning process but. are not reflected in the other three accounts.

Table 7. Focused Array of Alternatives

Alternative	National Economic Development (Base Relocation Plan - ALT) (NED)	Regional Economic Development (RED)	Environmental Quality (EQ)	Other Social Effects (OSE)
No Action	N/A	N/A	Continued discharge of sediment into the Ohio River.	Increased life safety risk to 9 residential properties in the event of complete road failure. Safety issues remain with gully given steep and unstable slopes.
1 - Road Alignment 1 - Base Relocation Plan (\$1,022,000) (FY2021)	\$0	It is expected that a comparatively larger and diverse group of trades will be required. The production of required asphalt will have a negligible benefit that extends beyond local impact area.	Continued discharge of sediment into the Ohio River. High likelihood of wetland and riparian impacts near the vicinity of Drake Branch.	Visual disruption to south viewshed of 5 homes. Safety issues remain with gully given steep and unstable slopes.
2 - Road Alignment 2 (\$1,178,000) (FY2021)	-\$156,000	It is expected that a comparatively larger and diverse group of trades will be required. The production of required asphalt will have a negligible benefit that extends beyond local impact area.	Continued discharge of sediment into the Ohio River. Moderate likelihood of wetland and riparian impacts near the vicinity of Drake Branch.	Road relocation disconnects 9 homes from larger neighborhood. Visual disruption to south viewshed of 13 homes. Safety issues remain with gully given steep and unstable slopes.

3 - Rip Rap Protection (\$673,000) (FY2021)	\$349,000	Comparatively this alternative will require the least amount of trades and laborers. Quarries are located in the vicinity and yield sufficient stone with minimal processing. Regional and local economic impacts are considered negligible given the scale of the project.	Sediment discharge mitigated. Rock habitat preferable over sheetpile alternatives as sediment will accumulate in rock voids and revegetate with herbaceous plants.	Moderate visual degradation of shoreline as viewed from the Ohio River. Treatment is consistent with adjacent upstream and downstream parcels.
4 - Sheetpiles (\$1,006,000) (FY2021)	\$16,000	The limited volume of sheetpiles would result in a negligible regional economic impact. Specialized equipment and laborers are available in the local area.	Sediment discharge mitigated. Limited opportunities for shoreline habitat.	High visual degradation of streambank as viewed from the Ohio River. Treatment is out of context with adjacent upstream and downstream parcels.
5- Rip Rap and Sheetpiles (\$1,006,000*) (FY2021)	\$16,000	Regional and local economic impacts are considered negligible given the scale of the project.	Sediment discharge mitigated. Limited opportunities for shoreline habitat.	High visual degradation of shoreline as viewed from the Ohio River. Treatment is out of context with adjacent upstream and downstream parcels.

* Assumes similar costs to the overall sheetpile alternative.

Based on alternative evaluation and screening, Alternative 3 - Rip Rap Protection was identified as the Tentatively Selected Plan (TSP) as the total costs of the TSP are less than the costs to relocate the threatened facility (Riverview Drive). The cost of the road relocation is not fully developed, but the difference in cost between Alternative 3 and the lowest cost road relocation alternative (Alternative 1) of \$349,000 provides economic justification for the TSP. Alternatives 1, 2, 4 and 5 have been excluded from further consideration. An expanded explanation of why these plans were screened is located in Section 5.1.2. Alternative 3 and the NAA were moved on to the final array of plans for this project. The full cost breakdown for Alternative 3 is included in Appendix C.

Alternative 3 (TSP) is the Least Cost Alternative Plan.

5.1.2 Excluded Plans

Four of the initial plans, Alternatives 1, 2, 4 and 5 were eliminated from further consideration. The screening rationale is considered below:

Alternative 1. This alternative was eliminated due to high cost, low effectiveness and low efficiency, low environmental quality and low social effects. Although the road realignment provides an alternative means of ingress and egress, it does not prevent erosion or stabilize the streambank so sediment would continue to discharge into the Ohio River and there is a high likelihood of wetland and riparian impacts near Drake Branch. The increase in regional economic development is negligible beyond the local impact area. The alternative creates a visual disruption to the south viewshed of five (5) homes and the safety issues with steep and unstable slopes in the area of erosion would not be addressed.

Alternative 2. This alternative was eliminated due to the reasons listed under Alternative 1. Additionally, Alternative 2 would disconnect nine (9) homes from the larger neighborhood and would disrupt the viewshed of an additional eight (8) homes for a total of thirteen (13) homes.

Alternative 4. This alternative was eliminated due to high cost and low efficiency, negative environmental quality effects and negative social effects. This alternative is not cost effective in meeting the project objectives and the local economic impact would be negligible. Although the sediment discharge into the Ohio would be mitigated, the treatment would provide limited opportunities for streambank habitat. The streambank as viewed from the Ohio River would suffer visual degradation as the sheetpile protection treatment is out of context with adjacent upstream and downstream parcels.

Alternative 5. This alternative was eliminated due to high cost and low efficiency, negative environmental quality effects and negative social effects. This alternative is not cost effective in meeting the project objectives and the local economic impact would be negligible. Although the sediment discharge into the Ohio would be mitigated, the treatment would provide limited opportunities for streambank habitat. The streambank as viewed from the Ohio River would suffer visual degradation as the sheetpile protection treatment is out of context with adjacent upstream and downstream parcels.

5.1.3 Risk and Uncertainty

Louisville District has completed several similar projects along the Ohio River. Given the method of failure and the characteristics of the site, there are low risks during Design & Implementation. The risks and uncertainties for this project are discussed in more detail in the risk register and Cost Engineering

Abbreviated Cost and Schedule Risk Analysis (CSRA) table in Appendix C. Based on Louisville District's previous experience with CAP Section 14 projects, the following three items were identified for monitoring as the project progresses:

- Feasibility level estimates of material quantities
- Environmental permitting
- Ohio River water levels

Due to lack of initial investigations and surveys, material quantity development is lacking. The risk associated with the materials quantities is low. The project is relatively small so any materials adjustments that could arise would have low impact. Quantities are developed based on current assumptions. Additional quantity development will be gathered during the design and implementation phase and will contain some level of conservatism. The main driver for the lack of materials investigations is due to the limited funding in the feasibility phase. Due to the relative simplicity of the project, USACE is willing to accept these risks in order to complete the feasibility phase within the limited funds.

Current environmental mitigation cost assumes that the work will stay above the OHWM. Work below this level would cause the cost of permits and mitigation to increase and would potentially require a mussel survey to prove no impact.

Plans and specifications development could be coordinated to avoid potentially high water during the wet season. The risk of a potential modification or claim is generally a risk on any construction project. The risk associated with the water level is low.

5.2 TENTATIVELY SELECTED PLAN (TSP)

Alternative 3 (**Rip Rap Protection**) is the least cost plan and is the Recommended Plan.

5.2.1 Tentatively Selected Plan Description

Alternative Plan 3 (Rip Rap Protection): Alternative Plan 3 (Rip Rap Protection) is recommended for implementation as the most cost-effective solution. To repair the failure and stabilize the bank, the eroded material will need to be replaced and protection will need to be provided that will resist the primary failure mechanism. The proposed repair provides a new face material that is suited to resist erosion from the river. The existing soils will be retained behind the stone repair to prevent erosion. Construction will be accomplished using land-based equipment by first backfilling the void area with a granular fill. The granular fill will act as a filter so water can exit the bank without removing the sand seams. Filter fabric, 12-inches of topsoil, seed and mulch would be placed over the granular fill to stabilize the backfill. Finally, the fill would be overlaid with an 18-inch layer of KY Class II Channel Lining that would resist the forces of the Ohio River. A 24-inch culvert is also proposed that will keep water from travelling over top of the channel lining. The TSP can accommodate future changing climate conditions because the stone sizing which comprises the channel lining is relatively conservative and can accommodate higher flow velocities than are anticipated. Additionally, if the 24-inch culvert discharge capacity is exceeded, the bank grading is such that surcharge flow will be evenly distributed over the armored bank section to prevent areas of concentrated runoff and potential erosion. Figure 11 shows a site plan view of the Ledbetter project site and Figure 12 provides a profile view. The estimated project first cost for Alternative 3 Rip Rap Protection is \$673,000 (FY2021).

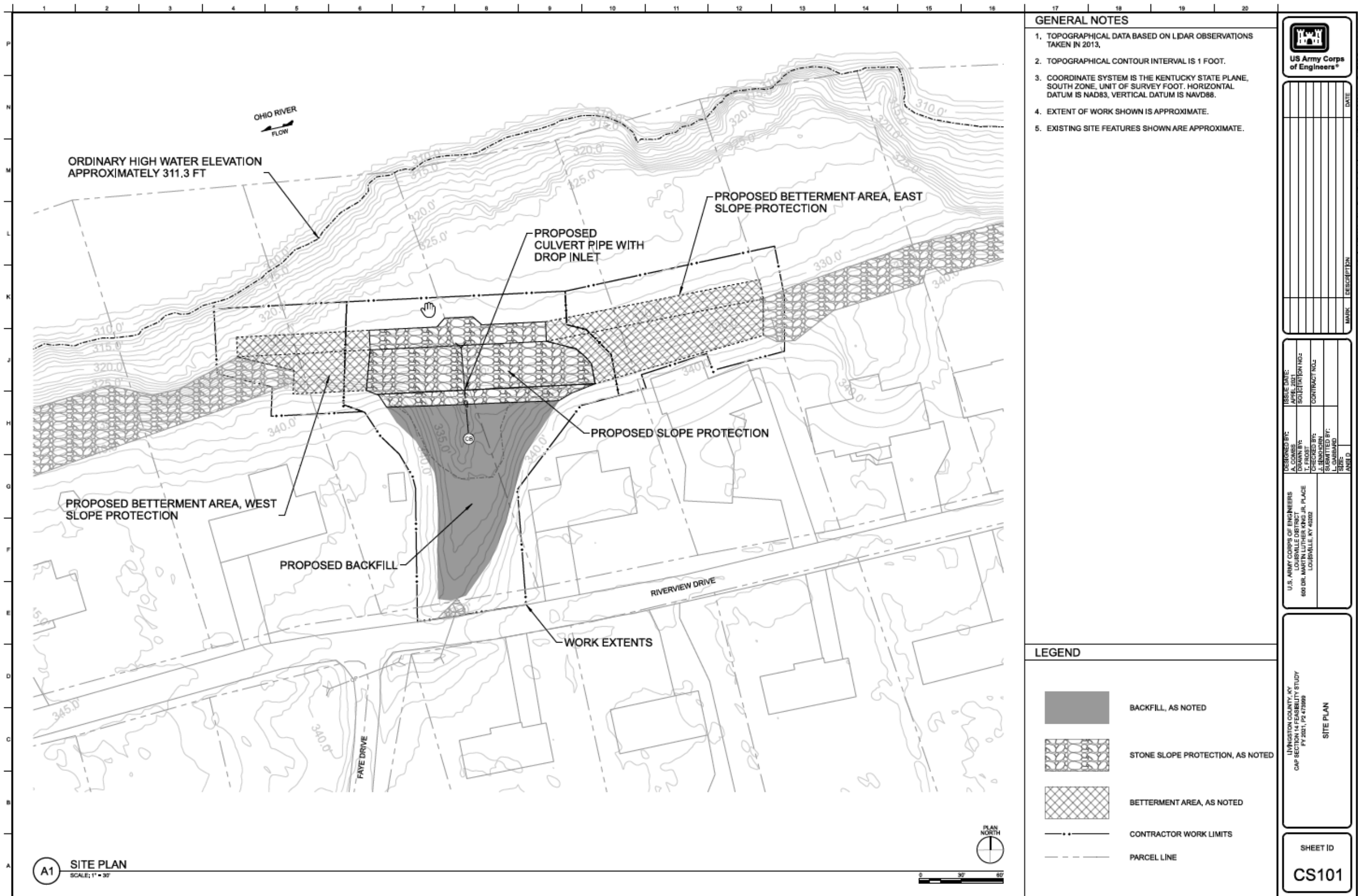
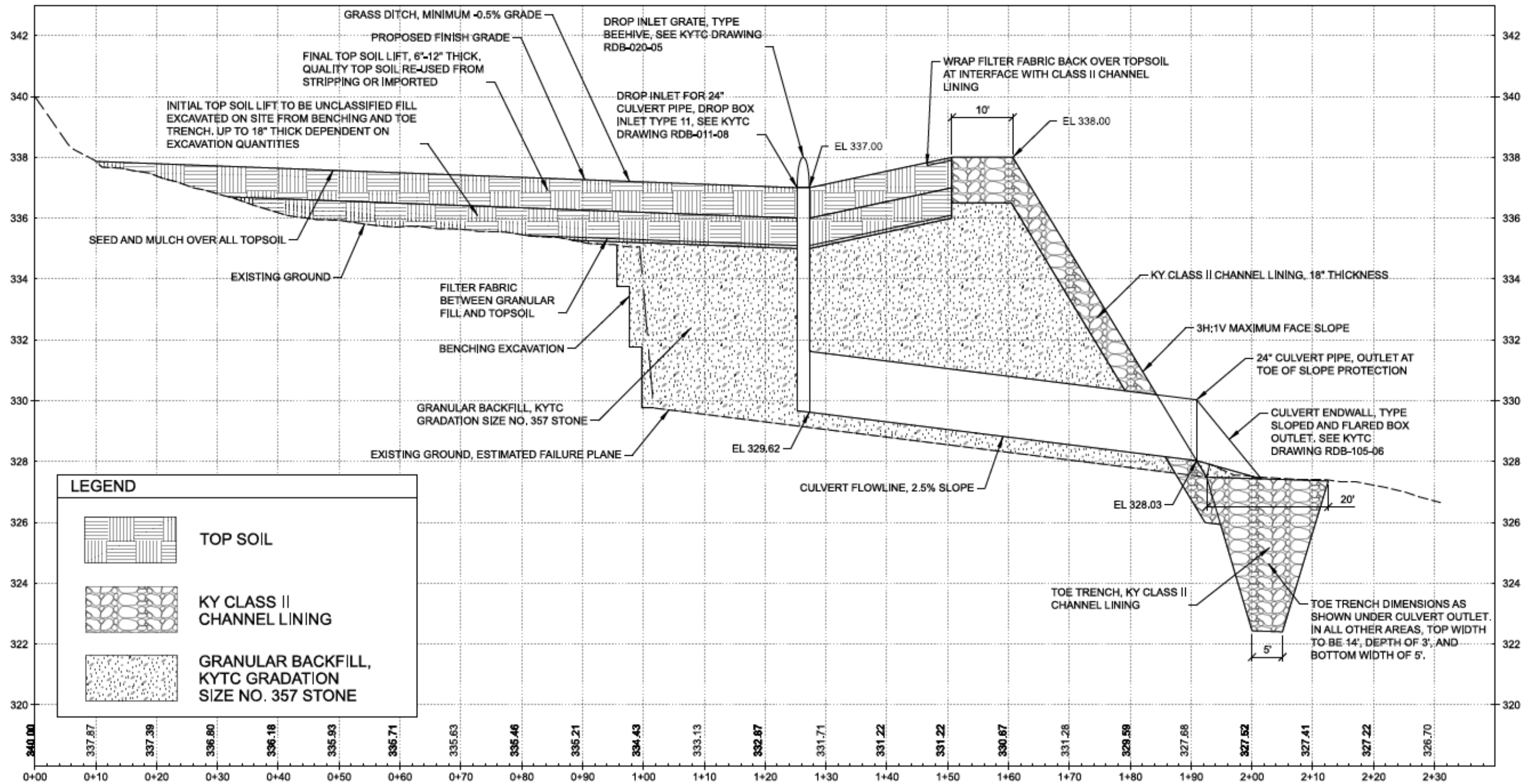


Figure 11. Ledbetter Site Plan



A1 PROFILE - CENTERLINE PROPOSED REPAIR
SCALE: 1"=10' HORIZONTAL, 1"=2' VERTICAL

Figure 12. Ledbetter Profile View

Appendix A includes engineering diagrams, work limits, extents and typical cross sections. Table 8 below includes line item quantities for the recommended treatment. The design and implementation cost will be further refined and broken out in the design and implementation phase of the project.

Table 8. Line Item Quantities

Estimated Quantity Summary Table		
<i>Work Item</i>	<i>Unit</i>	<i>Quantity</i>
Clearing and Grubbing	0.5	Acre
Erosion and Sediment Control	350	LF
Top Soil Stripping	100	CuYd
Unclassified Excavation	250	CuYd
KY No. 357 Stone	1030	CuYd
KY Class II Channel Lining	520	CuYd
Filter Fabric	920	SqYd
Top Soil	550	CuYd
Seeding	0.2	Acre
24" Culvert	65	LF
24" Drop Inlet with Frame and Beehive Grate	8	LF

5.2.2 Estimated Project Costs

Feasibility will be completed in FY2021 for under \$100,000. Consequently, a Feasibility Cost Share Agreement (FCSA) was not required. Table 7 presents the estimated first cost and apportionment for design and construction in FY2021 dollars.

Table 9. Estimated Project Costs and Apportionment

Feature	Project First Cost (FY21)
Fish & Wildlife Facilities	\$11,800
Cultural Resource Preservation	\$10,500
Lands and Damages	\$49,700
Bank Stabilization	\$389,400
Planning Engineering & Design	\$180,000
Construction Management	\$32,000
TOTAL PROJECT COST (FY2021)	\$673,000
TOTAL Federal (65%)	\$437,450
TOTAL Non-Federal (35%)	\$235,550

5.2.3 Project Schedule.

The current schedule reflects a target date for executing a Project Partnership Agreement (PPA) in December 2021. However, both execution of the PPA and initiation and on schedule completion of subsequent project phases are contingent upon funding availability. Table 10 provides the actual to date estimated schedule for the remaining key milestones for the project.

Table 10. Project Schedule

Milestone	Date
Initiate Feasibility Phase	4/3/2020
Federal Interest Determination (FID)	8/26/2020
Federal Interest Determination	8/26/2020
TSP Decision Meeting	4/28/2021
Public/ATR/LRL	6/21/2021
Final Report Approval	7/27/2021
District Executes PPA	12/1/2021
Approve CAP Plans and Specs	4/15/2022
Construction Contract Award	6/15/2022
Project Physically Complete	10/6/2022
Project Complete	12/1/2022

5.2.4 Non-Federal Sponsor Responsibilities

The County of Livingston, Kentucky, the non-Federal sponsor, expresses continued interest in participating in the proposed project and has acknowledged their responsibilities and as outlined below.

The non-Federal sponsor will perform all necessary steps to complete and execute a PPA for the design and implementation phase of the project. In addition, the non-Federal sponsor will provide the required non-Federal contribution. The County is working to secure non-Federal cost share funds from grants and loans. The non-Federal sponsor is also working to clarify potential in-kind service opportunities.

The non-Federal sponsor actively participated in the development of alternatives and the selection of the Recommended Plan. Louisville District has actively reached out to the non-Federal sponsor throughout the duration of the feasibility phase. In addition, the non-Federal sponsor met with representatives from Louisville District at the project site to discuss treatment alternatives.

The non-Federal sponsor is working with a Real Estate representative from Louisville District regarding their requirements to provide Land, Easements, Rights-Of-Way, Relocation, and Disposal Areas (LERRDs) during implementation. There are approximately 0.77 acres required for the project. Of that total, 0.60 acres of bank protection easement is required across two landowners on two separate parcels, and 0.17 acres of temporary work area easement is required on a third parcel. The non-Federal sponsor does not own any property required for this project. The estimated costs required to acquire the LERRDs is \$49,700 (FY2021).

The non-Federal sponsor is requesting approximately 225 feet of additional rip rap to protect streambank outside of the Federal project area to protect adjacent parcels. There are approximately 0.38 acres across five parcels to be acquired for the betterments, at an estimated land value of \$13,900. Any betterments will be completed at full non-Federal cost. The current project first cost estimate for betterments is approximately \$311,000. Betterments are not eligible for LERRD crediting.

Once the project has been completed, the non-Federal sponsor will accept the project, along with their O&M responsibilities, including monitoring and performing routine maintenance to maintain its function.

The total project costs for design and construction of the project will be shared 65% Federal and 35% non-Federal, as presented in the estimated costs in Table 9 above. Additionally, during the design and implementation, the non-Federal sponsor shall:

- Provide all lands, easements, rights-of-way, relocations and disposal areas.
- Provide, during construction, any additional costs as necessary to make the total non-Federal contributions equal to 35% of the total project costs. The non-Federal sponsor may provide work in kind during final design and construction. The non-Federal share is estimated at \$235,550 which includes the estimated value of the LERRDs.
- Operate, maintain, repair, replace, and rehabilitate the completed project or functional portion of the completed project at no cost to the Federal Government, in accordance with the applicable Federal and State laws and any specific directions prescribed by the Federal Government for so long as the project is authorized.
- Hold and save the Federal Government harmless from damages due to the construction and operation and maintenance of the project, except where such damages are due to the fault or negligence of the Federal Government or its contractors.

- Grant the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon land which the non-Federal sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purposes of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.
- Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs for a minimum of three years after completion of the project construction for which such books, records, documents, and other evidence are required.
- Perform, or cause to be performed, any investigations for hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way necessary for construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Federal Government determines to be subject to the navigation servitude without prior specific written direction by the Federal Government.
- Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA-regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines are necessary for construction, operation, and maintenance of the project.
- Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.
- Prevent obstructions of, or encroachments on, the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the streambank restoration, hinder its operation and maintenance, or interfere with the proper function such as any new development on project lands or the addition of facilities that would degrade the benefits of the project.
- Not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.
- Assume the financial responsibility for the construction, operation, maintenance, repair, replacement, and rehabilitation of the completed betterments outside of the project area.

6 ENVIRONMENTAL EFFECTS OF RECOMMENDED PLAN

The National Environmental Policy Act (NEPA) and the Council on Environmental Quality's NEPA Implementing Regulations require that an EA identify the likely environmental effects of a proposed project and that the agency determine whether those impacts may be significant. The determination of whether an impact significantly affects the quality of the human environment must consider the context of an action and the intensity of the impacts. The term "context" refers to the society, region, interests, and locality that an action will affect, and significance will vary with the setting of a proposed action. The term "intensity" refers to the magnitude of change that would result if the proposed action were implemented.

Determining whether an effect significantly affects the quality of the human environment also requires an examination of the relationship between context and intensity. In general, the more sensitive the context (i.e., the specific resource in the proposed action's affected area), the less intense an impact needs to be for the action to be considered significant. Conversely, the less intense of an impact, the less scrutiny even sensitive resources need because of the overt inability of an action to effect change to the physical environment. This section describes the existing environmental conditions in the project area (affected environment), providing a baseline for measuring expected changes that would result from implementation of the Preferred Alternative.

This section presents the adverse and beneficial environmental effects of the Preferred Alternative, referred to as the TSP in this document, and the no action alternative (NAA). Other alternatives were eliminated from detailed analysis due to high cost, low efficiency, and increased environmental effects. The section is organized by resource topic, with the effects of alternatives discussed under each resource topic. Impacts are quantified whenever possible. Qualitative descriptions of impacts are explained by accompanying text where used.

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

Intensity:

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

Duration:

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

6.1 CLIMATE

Tentatively Selected Plan: The TSP would have no effect on climate. There would be a temporary negligible increase in greenhouse gas emissions during construction due to the use of heavy equipment. However, these emissions would not have any effect on climate and would not significantly alter current regional or national greenhouse gas emissions.

No Action: The NAA would have no effect on climate.

6.2 GEOLOGY, SOIL, AND PRIME FARMLAND

Tentatively Selected Plan: The TSP would have no effect on geology and only positive effects on soil and prime farmland. The current loss of land caused by bank erosion along the Ohio River would be halted, thereby saving further loss of soil and prime farmland.

No Action: The NAA would have no effect on geology and significant long-term adverse effects on soil and prime farmland. The bank would continue to erode, and vast amounts of soil would continue to be lost.

6.3 SURFACE WATERS AND OTHER AQUATIC RESOURCES

6.3.1 Surface Water

Tentatively Selected Plan: The TSP would have short-term negligible effects on surface water. Due to construction activities there may be an increase in turbidity due to ground disturbance near the river, however this would be expected to be short-term and negligible. Best management practices (BMPs) would be employed to reduce stormwater runoff, including silt fences and revegetation of disturbed ground, to minimize erosion of soils during and after construction activities. The TSP would entail the introduction of rock material into the channel above the OHWM, and no material would be placed below the OHWM.

No Action: The NAA would have long-term minor adverse effects on surface water. The bank would continue to erode, which would increase turbidity. Additionally, residential structures and roads may eventually be eroded into the channel, which could release a host of toxins into the Ohio River.

6.3.2 Groundwater

Tentatively Selected Plan: Construction activities required for implementation of the TSP would not be expected to have any effect on groundwater.

No Action: The NAA would have no effect on groundwater.

6.3.3 Floodplains

Tentatively Selected Plan: The TSP would have no effect on floodplains and would not alter flooding regimes. A floodplain construction permit would be acquired from the Kentucky Environment and Energy Cabinet prior to any construction taking place.

No Action: The NAA would have no effect on floodplains.

6.3.4 Wetlands

Tentatively Selected Plan: The TSP would have no effect on wetlands, as they do not occur within the project area.

No Action: The NAA would have no effect on wetlands.

6.4 HABITAT TYPES AND ASSOCIATED FLORA AND FAUNA

Tentatively Selected Plan: The TSP would only have negligible effects on any habitat types or their

associated flora and fauna. The communities are highly disturbed, dominated by common ruderal vegetation, and offer little to no habitat for native fauna. Some vegetation would be destroyed during construction of the bank stabilization; however, this vegetation is likely to be lost to erosion in the long-term due to flooding events. No trees over 3-inches in diameter at breast height (DBH) would be removed between April 1 and November 14 for the protection of threatened and endangered bat species (see section 4.5). No additional mitigation requirements are expected from implementation of the project.

No Action: The NAA would have long-term minor adverse impacts on habitat types and their associated flora and fauna. The continued loss of land due to erosion will provide less space for communities to exist and therefore less habitat for plants and animals to utilize. Furthermore, the vegetation that currently exists at the site, including a number of trees that are over 3-inches in DBH, would be lost to erosion.

6.5 THREATENED AND ENDANGERED SPECIES

Tentatively Selected Plan: The TSP would have no effect on threatened or endangered species listed in Table 2.

Listed bat species would not be affected because no caves would be disturbed and no suitable roost trees would be removed. There would be seven black willows removed with a DBH between 3- and 6-inches DBH, however this species is not a suitable roost tree for Indiana bats (USFWS 2007) and none of the trees at the site display characteristics of roost trees for northern long-eared bats (i.e., loose bark, dead or dying branches, and cavities). No other trees with a DBH greater than 3-inches would be removed.

No listed mussel species would be affected because none of the riverbed would be disturbed below the OHWM and there would be no discharges of material into the Ohio River. The Prices potato-bean would not be affected because there is no habitat for this species at the site and it does not occur there. Additionally, there would be no critical habitat affected by the TSP.

No Action: The NAA would have no effect on threatened or endangered species.

6.6 RECREATIONAL, SCENIC, AND AESTHETIC RESOURCES

Tentatively Selected Plan: The TSP would have no effect on recreational, scenic, and aesthetic resources. There would be some negligible land disturbance, however this would be temporary, and any disturbed land would be revegetated.

No Action: The NAA would have no effect on threatened or endangered species.

6.7 CULTURAL RESOURCES

Based on the July 6, 2020 site visit, review of cultural resources records on file at the Louisville District, search of the NRHP database, and search of the OSA records, in accordance with 36 CFR800.4, the USACE determined that no historic properties will be affected by the proposed streambank erosion project.

The determination of no historic properties affected cultural resources assessment was coordinated with tribal nations and the Kentucky State Historic Preservation Office (KY-SHPO) on December 18, 2020. The KY-SHPO concurred with USACE determination of no effect to historic properties on January 15, 2021. The Cherokee Nation does not foresee this project imparting impacts to Cherokee cultural resources. The United Keetoowah Band (UKB) concurs with the USACE finding of no effects. However, UKB provided

conditions if unrecorded cultural resources, including human remains are encountered during construction and or earthmoving activities associated within the project. In the event this condition is met, the USACE will contact their office so they can provide comments under 36 CFR800.13.

6.8 AIR QUALITY

Tentatively Selected Plan: The TSP would have short-term negligible effects on air quality. Potential sources of these impacts include emissions from heavy equipment operation which include diesel fuel fumes and exhaust. The TSP would not require around the clock construction, and therefore, equipment downtime and the remote nature of the sites would allow for dispersion of any fumes generated during construction.

No Action: The NAA would have no effect on air quality.

6.9 NOISE

Tentatively Selected Plan: The TSP would have short-term negligible effects on noise. Construction noise would be similar to that of small machinery, such as lawn mowers, commonly used in the local area. Additionally, equipment would only be operating during daylight hours while most local residents would be at work.

No Action: The NAA would have no effect on noise.

6.10 HAZARDOUS AND TOXIC SUBSTANCES

Tentatively Selected Plan: The TSP would not generate hazardous and toxic substances or have an effect on existing hazardous and toxic substances, as none are expected to occur at the project location. Best management practices (BMP's) would be employed to prevent and/or minimize any impact from spills of oils, petroleum, or coolants related to the use of heavy equipment, including:

- Any equipment or vehicles driven and/or operated within or adjacent to the channel or basin should be checked and maintained daily, to prevent leaks.
- All maintenance will occur in a designated offsite area.
- Materials for the containment of spills (i.e., absorbent materials, silt fencing, filter fabric, coir rolls) will be identified and be available onsite prior to commencement of construction or maintenance activities.

As such, it has been determined that the TSP would have a negligible impact on hazardous and toxic substances.

No Action: The NAA would have no effect on hazardous and toxic substances.

6.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Tentatively Selected Plan: The TSP would have only positive effects on socioeconomics and environmental justice, as this project would only benefit the surrounding community by protecting critical infrastructure. There would be no significant impacts to the natural or human environment and therefore no disproportionately affected populations.

No Action: The NAA would have no effect on socioeconomics and environmental justice.

6.12 CONCLUSION

The TSP, which includes riprap protection of the bank, installation of a culvert to direct water from travelling over top of the channel lining, and reseeding of disturbed ground would not have significant impacts on the environment and would halt the extreme erosion which causing the loss of soil and plant communities. As such, a Finding of No Significant Impact (FONSI) has been prepared and circulated for a 30-day public review.

7 MITIGATION OF ADVERSE EFFECTS

There would be no significant adverse effects to the natural or human environment with the implementation of the Tentatively Selected Plan. Listed bat species would not be affected because no caves would be disturbed and no trees greater than 3-inches in DBH would be removed between April 1st and November 14th. No listed mussel species would be affected because none of the riverbed would be disturbed below the OHWM and there would be no discharges of material into the Ohio River. Therefore, aside from the tree clearing window, no mitigation will be required.

The implementation of construction BMP's would be utilized, including the use of silt fences and revegetation of disturbed land, limiting vegetation removal to minimum extent practicable, reseeding any areas disturbed, proper use and maintenance of equipment, etc. to reduce erosion and impact from equipment as much as possible. Clearing of seasonal nuisance vegetation (e.g. Japanese knotweed, Johnson grass, purple loosestrife) will be required in areas of backfill placement. No soil material would be disposed within the River or other waters of the United States. Only clean commercial stone (riprap) would be placed along the edge of the river. Any excess material would be disposed of at an approved location. Though unlikely, if the footprint of the project were to change, the new footprint and associated impacts would be evaluated under NEPA and coordination would be initiated as appropriate.

8 IMPLEMENTATION REQUIREMENTS

8.1 PROJECT PARTNERSHIP AGREEMENT

The first \$100,000 of the feasibility phase for a Section 14 project is funded at full Federal expense and the balance is cost shared 50-50 with a non-Federal sponsor. Given the feasibility phase for the CAP Section 14 project for the County of Livingston is expected to be completed within the \$100,000 limit, a Federal Cost Share Agreement (FCSA) will not be executed at this time.

The County provided a Letter of Intent in April 2020 requesting Federal assistance under the Section 14 authority. The Letter of Intent is included in Appendix H. The Louisville District is scheduled to start development of the Project Partnership Agreement (PPA) in July 2021 following approval of the Detailed Project Report. The PPA is currently scheduled to be executed in December 2021. Following the execution of the PPA, all efforts related to design and implementation will be cost shared 65% Federal and 35% non-Federal.

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

The land required for the project is approximately 0.77 acres on property owned by private landowners,

0.17 of which is a temporary work (laydown) area easement. The non-Federal sponsor may receive LERRDs credit towards the project, but not the betterments. Significant construction activities will access the site via public roads, so no temporary access easements will be required. Rights-of-entry will be obtained for ingress and egress to adjoining private properties for survey and exploration. No relocations or disposal sites are anticipated for this action. See Appendix D for the Real Estate Plan.

8.3 OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION

Local sponsor operation and maintenance responsibilities required to assure the continued functionality of the recommended treatment will include inspecting the project annually and after high water events and correcting adverse conditions such as loss of as-constructed stone geometries and repairing areas which have been vandalized. An Operation and Maintenance Manual will be developed by USACE at the completion of construction and all operation and maintenance responsibilities will be given to the non-Federal sponsor in perpetuity after completion of construction. The non-Federal sponsor should reserve \$1,200 yearly for the continued maintenance of the project to be used on an as-needed basis with the assumption that this amount exceeds the cost of typical yearly maintenance and any surplus should be reserved in case of future larger repairs. The project site should be maintained in accordance with Chapter 3 of the Flood Control Operations & Maintenance Policies (ER-1130-2-350).

8.4 REGULATORY REQUIREMENTS

The Tentatively Selected Plan is in full compliance with all local, state, and Federal statutes as well as Executive Orders. Compliance is documented below in Table 11.

Table 11. Environmental Compliance Status

Statute/Executive Order	Full	Partial	N/A
National Environmental Policy Act (considered partial until the FONSI is signed)*		X	
Fish and Wildlife Coordination Act*			X
Endangered Species Act*	X		
Clean Water Act**	X		
National Historic Preservation Act*	X		
Archeological Resources Protection Act	X		
Wild and Scenic Rivers Act			X
Clean Air Act	X		
National Historic Preservation Act*	X		
Archeological Resources Protection Act	X		
Comprehensive, Environmental Response, Compensation and Liability Act	X		
Resource Conservation and Recovery Act	X		
Toxic Substances Control Act	X		
Quiet Communities Act	X		
Farmland Protection Act	X		

Executive Order 11988 Floodplain Management**	X		
Executive Order 11990 Protection of Wetlands	X		
Executive Order 12898 Environmental Justice in Minority Populations and Low-Income Populations	X		
Executive Order 13045 Protection of Children from Environmental Health Risks and Safety Risks	X		

*Completed coordination and affect determination will be completed prior to execution of FONSI.

**Completed coordination and all necessary permits will be obtained prior to construction.

9 PUBLIC INVOLVEMENT

9.1 PUBLIC REVIEWS AND COMMENTS

The DPR/EA and FONSI will be made available for public review and comment for a period of 30 days. This section will be updated following the conclusion of the review period. All public and agency comments will be placed in Appendix B.

9.2 STAKEHOLDER AGENCY COORDINATION

9.2.1 Federal Agencies

Coordination with Federal resource agencies was conducted in conjunction with the preparation of the Section 14 Emergency Streambank Protection, Draft DPR and EA, City of Ledbetter, Livingston County, Kentucky. All correspondence letters can be found in the Appendix B. The U.S. Fish & Wildlife Service (USFWS) were contacted for comment on potential resource impacts.

9.2.2 State Agencies

Coordination with State resource agencies was conducted in conjunction with the preparation of the Section 14 Emergency Streambank Protection, Draft DPR and EA, City of Ledbetter, Livingston County, Kentucky. All correspondence letters can be found in Appendix B.

USACE has coordinated with the KY-SHPO and Federally recognized tribes the determination of no effect to historic properties on December 14, 2020. The KY-SHPO concurred with the USACE determination that the project will result in no effect to historic properties, under 36 CFR 800.4(d)(1) on January 15, 2021. Cherokee Nation provided comments on February 8, 2021, stating the undertaking will not impact cultural resources significant to the Cherokee. On March 1, 2021, The United Keetoowah Band of Cherokee Indians concur with the USACE findings of “no adverse effect” and provided a list of conditions for USACE to adhere to for inadvertent discoveries and post review discoveries (see Appendix B) if any are observed during construction.

10 RECOMMENDATION

After considering the engineering, economic, environmental, and social aspects relative to the construction of the proposed emergency bank stabilization project in the City of Ledbetter, Livingston County, Kentucky at approximately Ohio River Mile 928, I recommend that the selected plan be authorized and constructed as a Federal project under the authority of Section 14 of the 1946 Flood Control Act (P.L. 79-526), as amended.

The estimated fully funded total project cost is \$673,000 (not including feasibility costs). The estimated Federal share of 65% is \$437,450 and the non-Federal 35% share is \$235,550. Approximately \$49,700 is estimated in LERRDs credit for the non-Federal sponsor. I further recommend that the project be funded and constructed subject to cost-sharing and financing arrangements acceptable to the Chief of Engineers and the Secretary of the Army.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the national civil works construction program nor the perspective higher review levels within the Executive Branch. Consequently, these recommendations may be modified before implementation. However, the non-Federal sponsor, the State, interested Federal agencies, and other parties would be advised of any modifications and would be afforded an opportunity to comment further.

Date Eric D. Crispino
 Colonel, Corps of Engineers
 District Commander

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Livingston County, KY Continuing Authorities Program Section 14 Feasibility Study

Appendix A Engineering

May 2021

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Appendix A1

Hydraulics Engineering

1. General Information

The community of Ledbetter is located in the northwestern area of the Commonwealth of Kentucky in Livingston County, along the left bank of the Ohio River. The Ohio River flows in a southwesterly direction to its confluence with the Mississippi River approximately 981.4 miles from its beginning. The project site is located at Ohio River Mile 927.6 (Latitude 37° 3' 28" Longitude 88° 29' 4"). The site is approximately 8.6 miles downstream of Smithland Lock and Dam. A site location map is shown in Attachment #1.

This study evaluates river bank stability, potential impact on an existing public road and the most cost effective method for stabilizing the river bank. One factor that is unique to this site is an existing drainage swale that discharges into the eroded area.

2. Climate

Located in Northwestern Kentucky, Ledbetter has a temperate climate with relatively cold winters and hot, humid summers. The mean annual temperature for the area is about 57 degrees F, with extremes ranging from 30 degrees F below zero to 108 degrees F above zero. Average monthly temperatures range from 78 degrees F in July to 33 degrees F in January. Average monthly temperatures are shown in Table 1. All seasons are marked by weather changes resulting from passing weather fronts and associated centers of high and low pressure.

TABLE 1
MEAN MONTHLY TEMPERATURE (°F)
FOR THE LEDBETTER, KY AREA

Month	Temperature	Month	Temperature
January	32.9	July	78.2
February	38.1	August	76.2
March	47.6	September	69.1
April	57.0	October	58.0
May	65.9	November	46.8
June	74.5	December	36.9

Average Annual Temperature – 56.8

2.1. Precipitation

Precipitation in the Ledbetter area is fairly well distributed throughout the year. The average annual precipitation is 49.24 inches, with the monthly averages ranging from 2.99 inches in August to 4.95 inches in April. Table 2 gives the average monthly rainfall for Ledbetter, Kentucky. Because of the

limited amount and duration of snowfall, snowmelt generally does not contribute significantly to runoff for this basin.

TABLE 2
MEAN MONTHLY PRECIPITATION (INCHES)
FOR THE PADUCAH, KY AREA

Month	Precipitation (Inches)	Month	Precipitation (Inches)
January	3.47	July	4.45
February	3.93	August	2.99
March	4.27	September	3.56
April	4.95	October	3.45
May	4.75	November	4.53
June	4.51	December	4.38

Average Annual – 49.24”

For this study, the average monthly precipitation for Livingston County has no real significances. The primary influence is how precipitation in the Ohio River Basin causes increased stages on the Ohio River. A contributing factor to the erosion process that relates to precipitation but isn’t captured by the mean monthly values is localized heavy precipitation that results in high runoff rates in the existing drainage channel. High discharges that would be generated by heavy localized rainfall will contribute to the ongoing erosion, with the principal factor being the rate of bank regression. In July 2016 there was a significant rainfall event that recorded 5.55 inches of rain. This amount of rain could have produced high runoff rate that could have been capable of accelerating the erosion process. While daily records are all that is available, given that the event was in the summer, it is probable that there was a heavy downpour associated with thunderstorms. There have been other events that would have produced runoff rates that would have been capable of head cutting and removing failed material.

3. High Water

High water on the Ohio River is a significant factor in the erosion process. The elevation that the river rises to in a high water event and the duration that the river is elevated play a significant role in the bank failure process. It isn’t the annual exceedance probability floods that are of primary importance such as the 98% (1-year), 50% (2-year), 20% (5 year), 10% (10-year), 2% (50-year) or 1% (100-year) although they could cause bank failure when they do occur, it is the events that rise to a level and remain long enough to allow the bank material to saturate. Table 3 gives the exceedance frequency flood elevation for the Ohio River at Ledbetter. This table also includes the Ordinary High Water Mark (OHWM) Elevation for the site, which is important because it is a demarcation that impacts permitting requirements. The major driver as mentioned is the rise and fall of the river, which is better represented by hydrographs. Attachment 3 contains hydrographs for the years 2015 through 2020, which is the period when the bank erosion process has been very active.

TABLE 3
OHIO RIVER EXCEEDANCE FREQUENCY ELEVATIONS
@ RIVER MILE 927.6

Annual Exceedance Probability (Return Period)	Ohio River Elevation (ft-NAVD88)
OHW	311.2
98% (1-year)	318.1
50% (2-year)	323.2
20% (5-year)	328.9
10% (10-year)	332.4
4% (25-year)	336.1
2% (50-year)	338.8
1% (100-year)	341.0
0.2% (500-year)	344.4

4. Hydraulic Evaluation of Streambank Stability/Erosion

Based on the evaluation of the site, the primary erosion mechanisms present are rapid drawdown, sand seam piping, and scour of the failed material resulting from flow exiting a drainage swale. With rapid drawdown, the saturated soils fail when the river falls out rapidly and the hydrostatic pressures that provide resisting forces are removed. Internal erosion occurs when the sand seams are removed by the flow out of the bank, resulting in the clay and silt material above the sand seams being undermined. This piping process typically happens after a high water event but can occur if there is a source of water feeding the sand seam. With both mechanisms of erosion, failure occurs when the driving forces (weight of the soil block) exceeds the resisting forces (cohesive strength of the soil). These mechanisms of erosion typically result in several feet of bank being lost at one time. Once failure occurs, the failed material remains at the toe of the failure plane until it is reworked and the material removed. This reworking process is typically accomplished by the river during high water events, but at this location the primary culprit is the flow coming out of the drainage swale; although the river could account for some degree of removal during high water events. The flow coming from the drainage swale is concentrated with flow velocities capable of head cutting in addition to the ability to remove failed material. As a result, failed material is removed more rapidly and once removed, the cycle begins again.

While it is not possible to determine when the erosion began, in reviewing aerial images that date back to 1993, the area remained relatively unchanged until after 2015 (which was the aerial image prior to the March 2019 image). In the March 2019 aerial imaging the erosion is very apparent. To pin point what occurred to trigger the bank failure would be based solely on experience with streambank stability. Based on experience of the Hydraulic Design Engineer, sometime after 2015, either river bank piping began in the area or a significant rainfall event initiated a head cut in what was a relatively stable bank, exposing sand seams that were susceptible to piping. Exactly what precipitated the erosion is somewhat irrelevant. However, without the bank being stabilized, the erosion will continue and eventually claim two private houses and Riverview Drive. Based on a comparison between the 2015 and 2019 aerial images, the rate of bank loss in the direction of the private homes is approximately 6 feet per year; and the rate of bank loss in the direction of the road is approximately 2 feet per year. However, based on measurements taken during the site inspection the erosion rate within

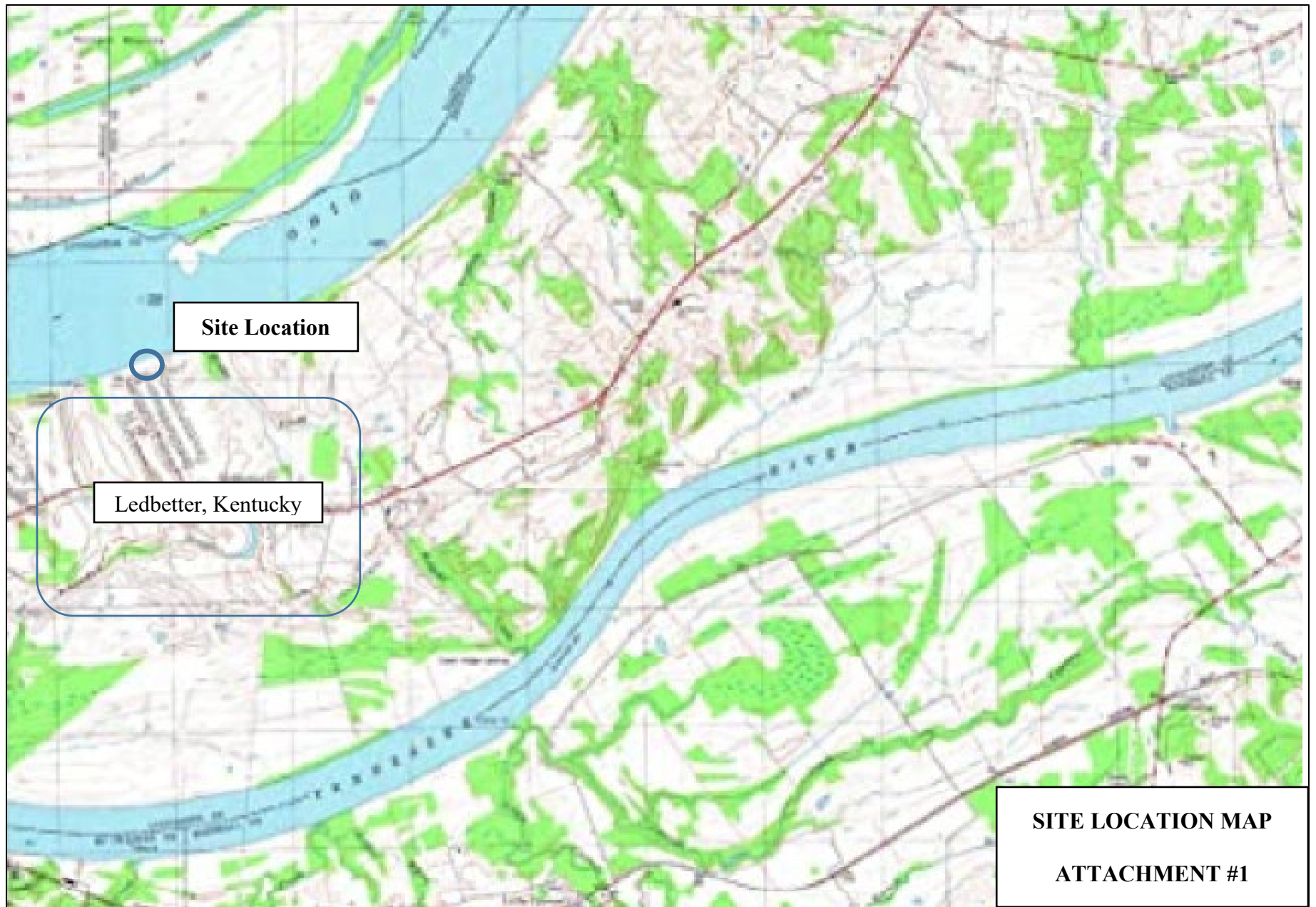
the last year in the direction of the road has increased to approximately 8 feet per year. This is likely the result of a number of high water events during early 2020 that would have impacted the area. Attachment 2A is the 2015 aerial image of the area, and Attachment 2B is the 2019 aerial image. At the time of the 2019 aerial imaging, the river was over 20 feet above the normal pool elevation of approximately 302 NAVD.

4.1. River Bank Restoration And Stabilization

In the preliminary assessment the Hydraulic Engineer developed one alternative for protecting the river bank. The alternative developed was based on decades of experience in streambank erosion and protection and represented the most cost effective way of restoring and protecting the river bank. While additional alternatives were developed as part of the Federal Interest Determination, the alternative developed by the Hydraulic Engineer is the recommended alternative, with only a minor modification. This recommended alternative for protecting the river bank, would be to restore the river bank to its original alignment, thereby eliminating the scalloped area. This would be accomplished by backfilling the void area with a granular fill (KY 357's), placing a filter fabric over the granular fill, place 12-inches of topsoil and then seeding and mulching the area. Once the backfilling operation had been completed, the fill would be overlaid with an 18-inch layer of KY Class II Channel Lining at a slope no steeper than 3H:1V to the top of the slope. The protection along the bank would extend for approximately 130 feet (65 feet on either side of the scalloped areas centerline). The protection would have a trenched toe and the end protection would be keyed into the bank (see Civil Design Section of this Appendix for design details). The granular fill would act as a filter, allowing the water to exit the bank through the sand seam but prevent the sand from being removed in the process. The minor modification is to install a drop inlet in the drainage swale at the upslope edge of the scalloped area and place a 24-inch pipe in the existing channel that would extend to the toe of the Channel Lining. This would eliminate flow over the Channel Lining in a manner for which the Channel Lining is not designed. An alternative to the drop inlet would be to install a grouted ditch in the Channel Lining from the top of the slope to the toe of the slope.

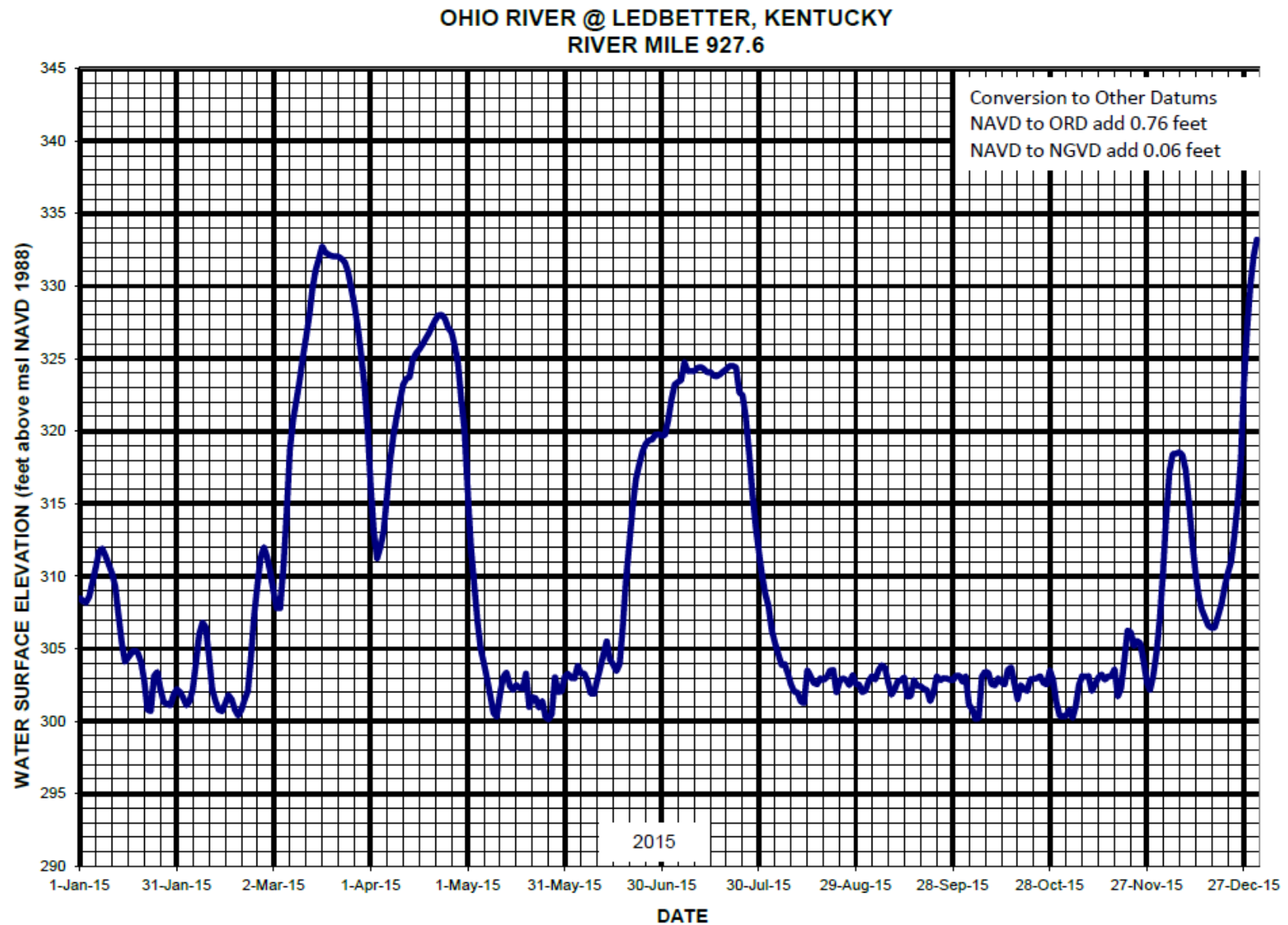
The Local Sponsor has requested that the Channel Lining be extended 75 feet downstream and 150 feet upstream. This extension of the Channel Lining is reasonable as it will tie the Channel Lining being placed into existing bank protection. However, this additional protection is not necessary to protect the road and would only be protecting private property and would be considered a betterment. If the protection is extended, the end protection mentioned in the above paragraph would not be required.

A detailed survey of the area would be necessary to accurately calculate material quantities. However, since detailed mapping is not available, digital terrain mapping will be used by the Civil Design Engineer to develop typical cross-sections and calculate material quantities (see the Civil Design Section of this appendix).



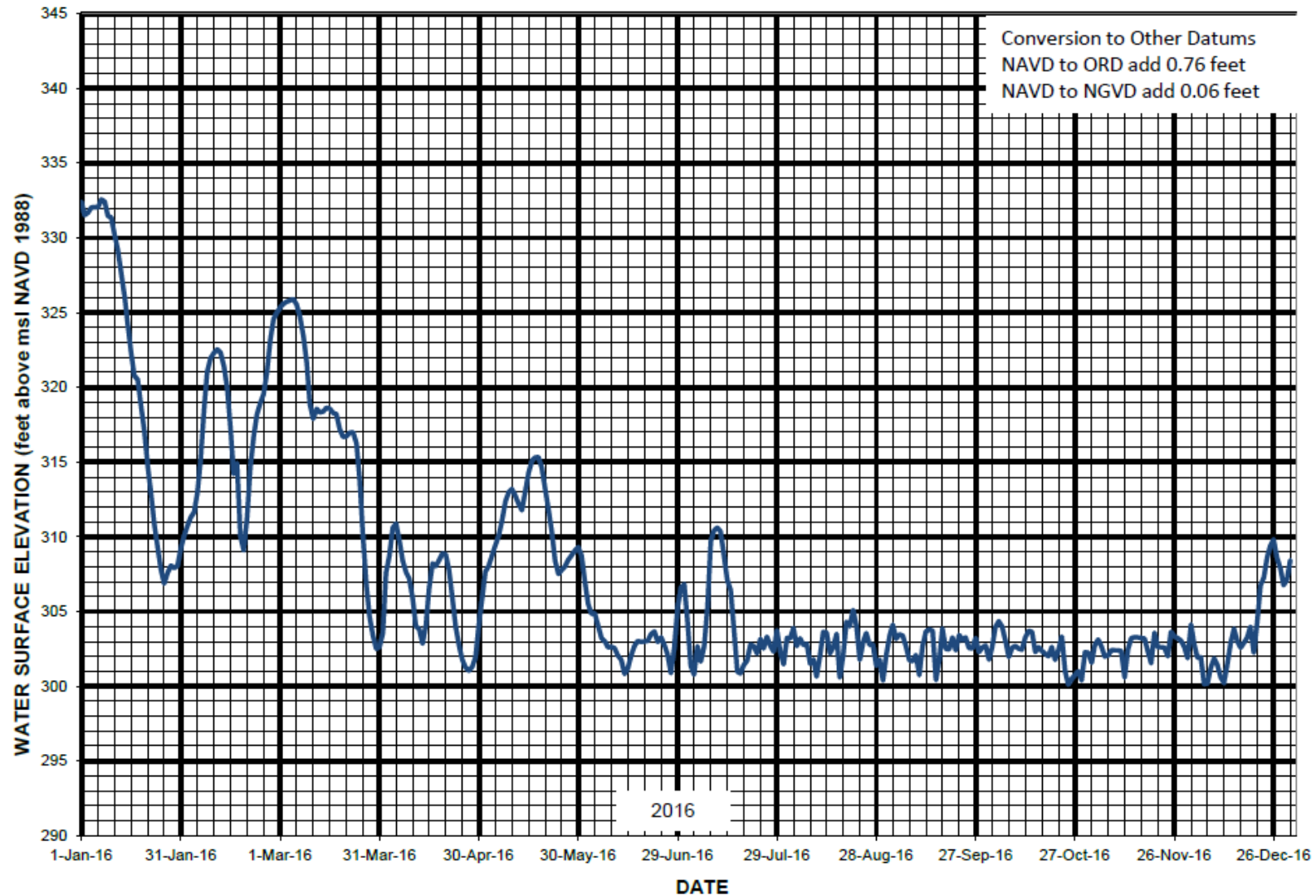






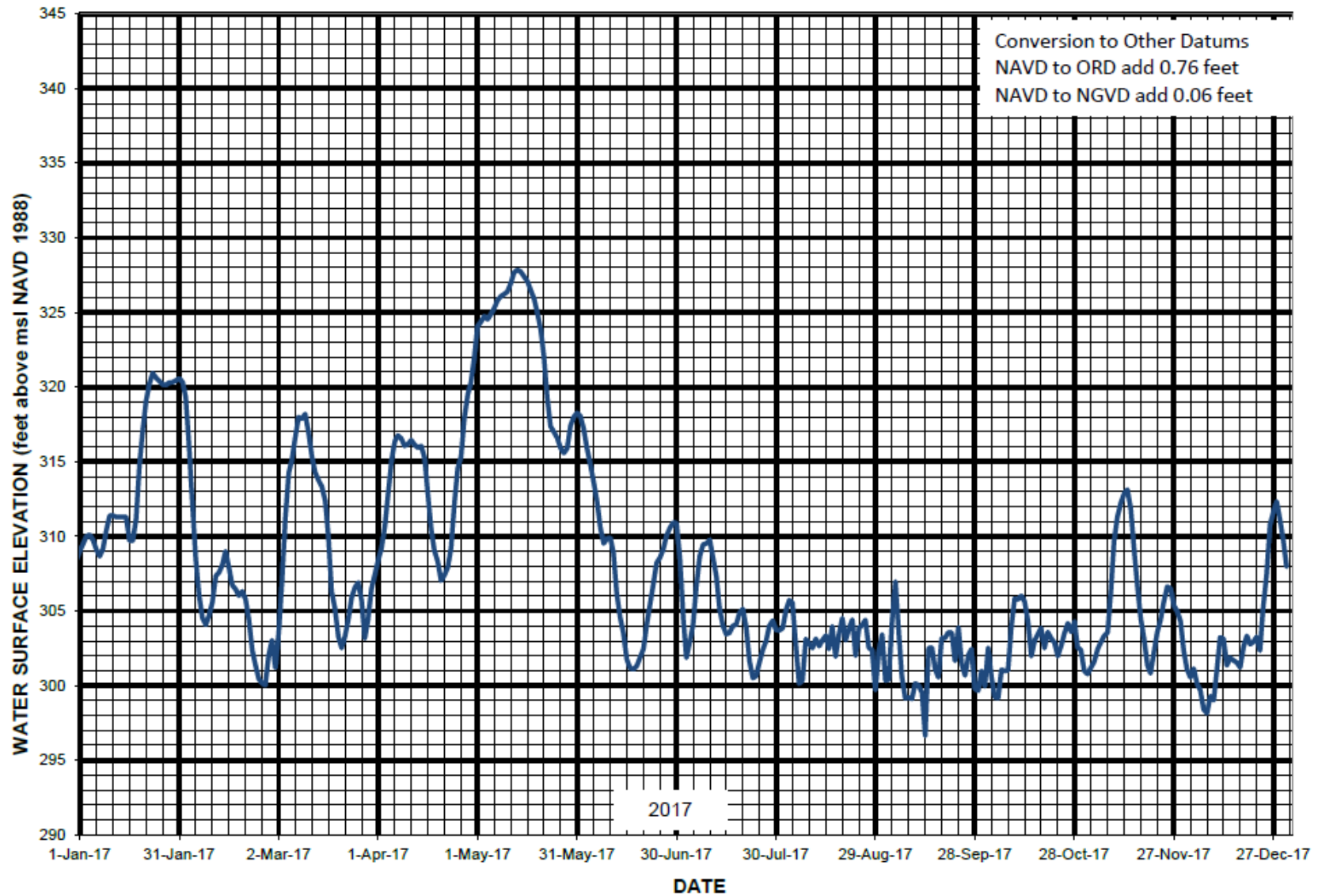
ATTACHMENT #3
2015 OHIO RIVER HYDROGRAPH
@ LEDBETTER, KY
(TRANSPosed FROM PADUCAH GAGE DATA)

**OHIO RIVER @ LEDBETTER, KENTUCKY
RIVER MILE 927.6**



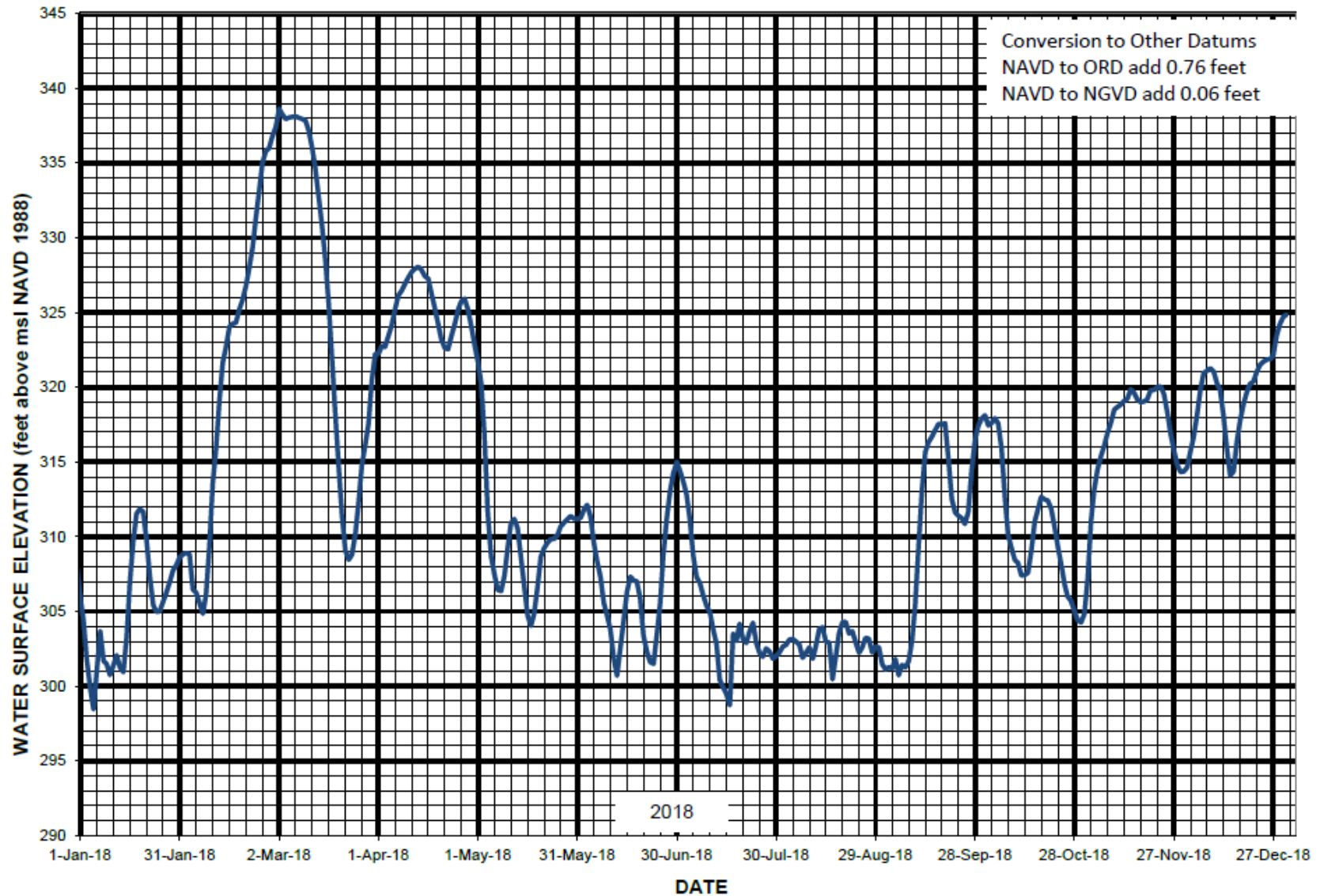
**ATTACHMENT #3
2016 OHIO RIVER HYDROGRAPH
@ LEDBETTER, KY
(TRANSPosed FROM PADUCAH GAGE DATA)**

**OHIO RIVER @ LEDBETTER, KENTUCKY
RIVER MILE 927.6**



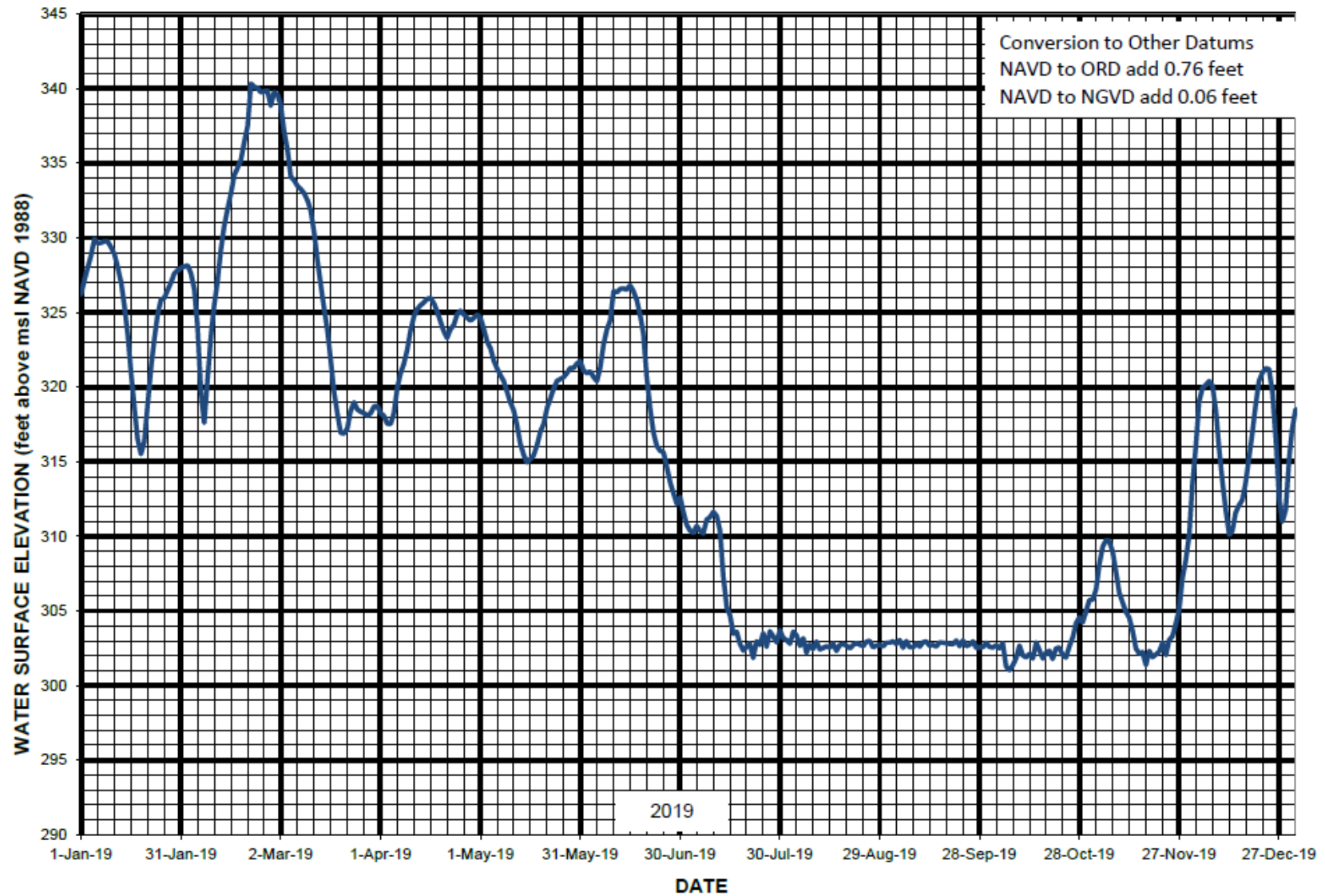
**ATTACHMENT #3
2017 OHIO RIVER HYDROGRAPH
@ LEDBETTER, KY
(TRANSPosed FROM PADUCAH GAGE DATA)**

**OHIO RIVER @ LEDBETTER, KENTUCKY
RIVER MILE 927.6**



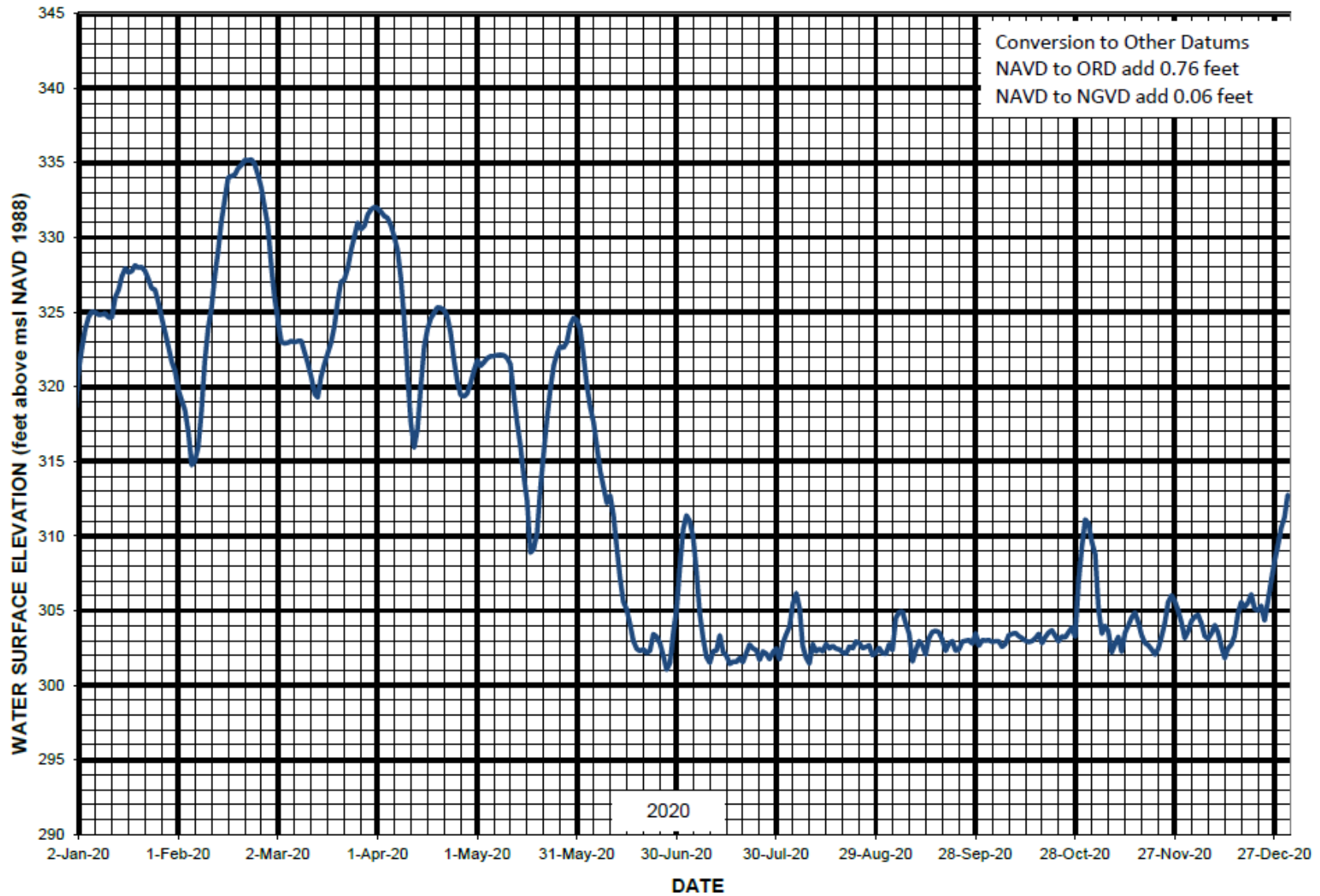
**ATTACHMENT #3
2018 OHIO RIVER HYDROGRAPH
@ LEDBETTER, KY
(TRANSPosed FROM PADUCAH GAGE DATA)**

**OHIO RIVER @ LEDBETTER, KENTUCKY
RIVER MILE 927.6**



**ATTACHMENT #3
2019 OHIO RIVER HYDROGRAPH
@ LEDBETTER, KY
(TRANSPosed FROM PADUCAH GAGE DATA)**

**OHIO RIVER @ LEDBETTER, KENTUCKY
RIVER MILE 927.6**



**ATTACHMENT #3
2020 OHIO RIVER HYDROGRAPH
@ LEDBETTER, KY
(TRANPOSED FROM PADUCAH GAGE DATA)**

Appendix A2

Climate Analysis

1. Introduction and Background

Because of the limited scope of this emergency streambank restoration study, this qualitative analysis of climate change has been abbreviated but still meets the requirements per ECB 2018-14. For this assessment of climate change, the most relevant stream gage of interest with an adequate stream discharge period of record is USGS gage 03611500, Ohio River at Metropolis, IL. This stream gage is located on the Ohio River approximately 15.7 miles downstream of the project location. The gage has nearly continuous daily and peak-annual discharge data available for water years 1929 through 2014, and is appropriate for use within the suite of climate preparedness and resilience toolsets.

Due to the small drainage area and lack of a flow data on the small swale flowing to the erosion site, rainfall data must be used as a proxy for discharge data. Precipitation and temperature data are available through the NOAA Cooperative Observer Network at the Paducah Barkley Regional Airport. This gage is located 16 miles to the west of the project location and has daily precipitation and temperature observations available from August 1949 through present (May 2021).

2. Observed Trends

2.1. Locally Observed Trends in Precipitation and Temperature

Analysis of observed trends in historic precipitation and temperature was conducted using local climate data available from the National Weather Service in Paducah, KY. Precipitation data analyzed includes annual total precipitation and annual maximum daily precipitation.

Temperature data analyzed includes annual average daily maximum and annual average daily minimum temperature.

Figure 1 displays annual total precipitation from 1950 through 2020. Note that there appears to be an increasing trend in annual rainfall with time, however the dataset's p-value (0.105) indicates that the trend shown is not statistically significant at a 95% confidence level. The magnitude of this increasing trend is roughly 0.1 inches/year. Increasing trends were also observed in annual daily and monthly maximum precipitation, however neither dataset exhibited p-values which would indicate statistical significance.

Figure 2 displays annual average minimum and maximum temperatures which were derived from daily temperature records. Note that both minimum and maximum temperatures exhibit increasing trends over time. The magnitude of these increasing trends is roughly 0.03 °F/year, which is relatively small compared with annual variability in temperature. While the trend's

magnitude is relatively small, the low p-values for both datasets (0.0005 for maximum temperatures and 0.001 for minimum temperatures) indicate that these trends are statistically significant.

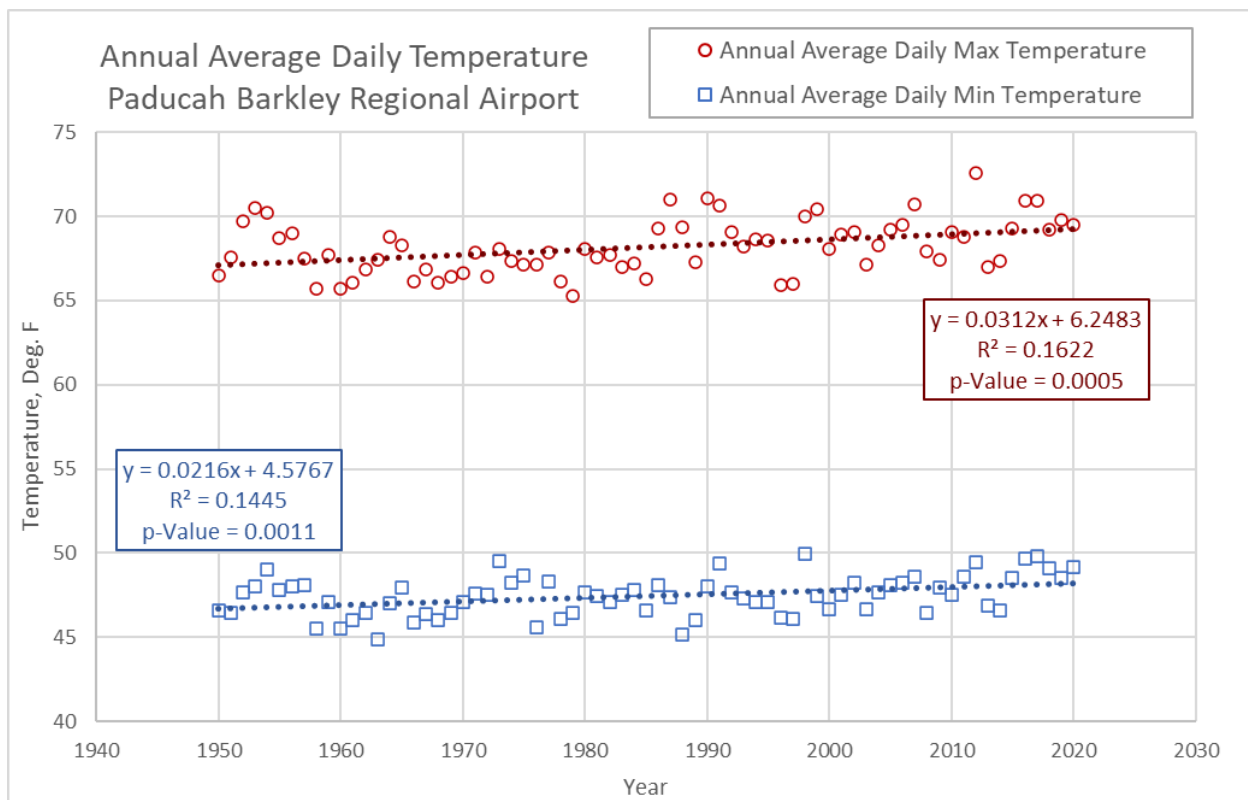


Figure 1. Trends in Observed Total Annual Precipitation

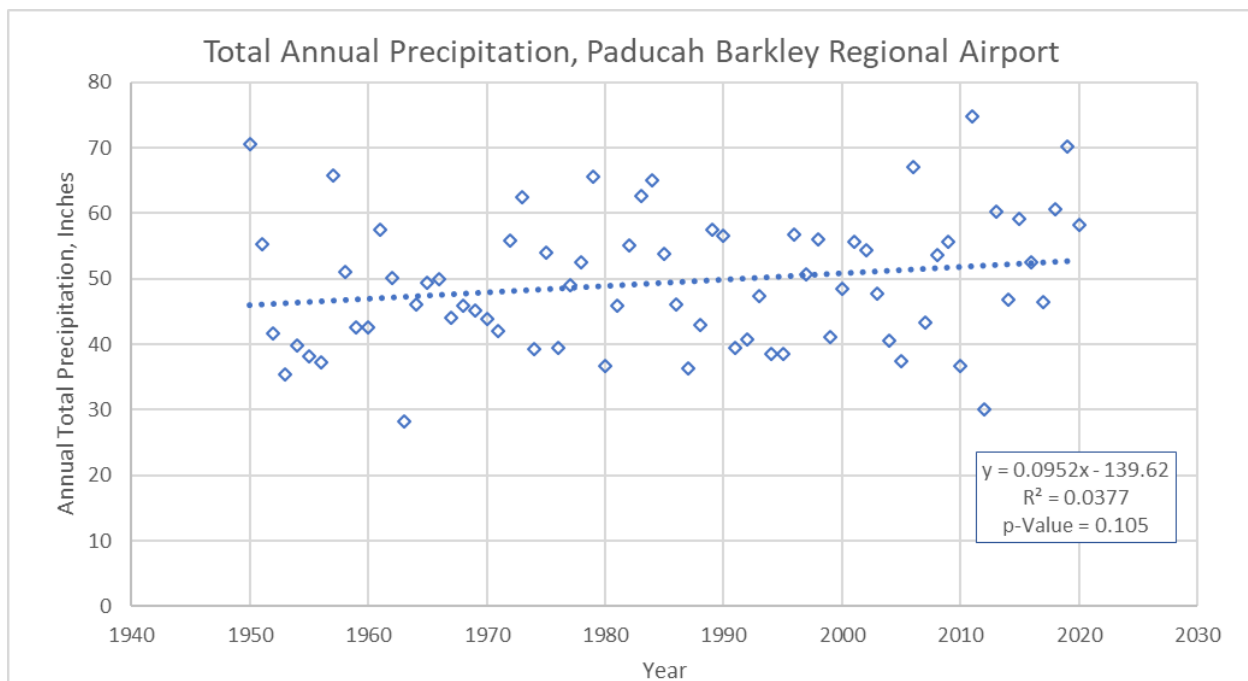


Figure 2. Trends in Observed Minimum and Maximum Temperatures

2.2. Literature Review

There is general consensus that temperature and precipitation have increased for the study area in recent decades compared with long term averages. A 2015 report conducted by the USACE Institute for Water Resources summarizes the available peer reviewed literature related to trends in both observed and projected hydrometeorological variables for the Ohio River Region (HEC02 05). This literature synthesis found a majority of reports supported increasing trends in observed temperature for the Ohio Region. A mild increasing trend in precipitation, in terms of both annual totals and occurrence of storm events, was identified by multiple authors, however a clear consensus regarding observed precipitation trends is lacking.

The 4th National Climate Assessment Volume II (NCA4), published in 2018 gives additional insight into climatic trends. This document generally agrees with the findings of the 2015 USACE literature synthesis and analysis of locally observed precipitation and temperature. The NCA4 indicates that increases in temperature, precipitation, and extreme weather events have occurred in recent decades.

2.3. Climate Hydrology Assessment

The Climate Hydrology Assessment Tool (CHAT) developed by USACE was utilized to examine trends in observed annual peak streamflow for the Ohio River near the project location. The USGS stream gage at Metropolis, IL was used for this assessment. Water years 1929 through 2014 were used for this analysis and the period of record is nearly continuous over this period. The CHAT indicated a slight decreasing trend in streamflow over time, however the relatively high p-value associated with this trend (p-value = 0.76) indicates that this trend is not statistically significant and may be attributed to natural variability of the dataset. It should also be noted that the Ohio River upstream of this gage is a highly regulated system, with numerous flood control reservoirs and Lock and Dam systems upstream. These flood risk management structures may be contributing to the slight reduction in annual peak streamflow over time.

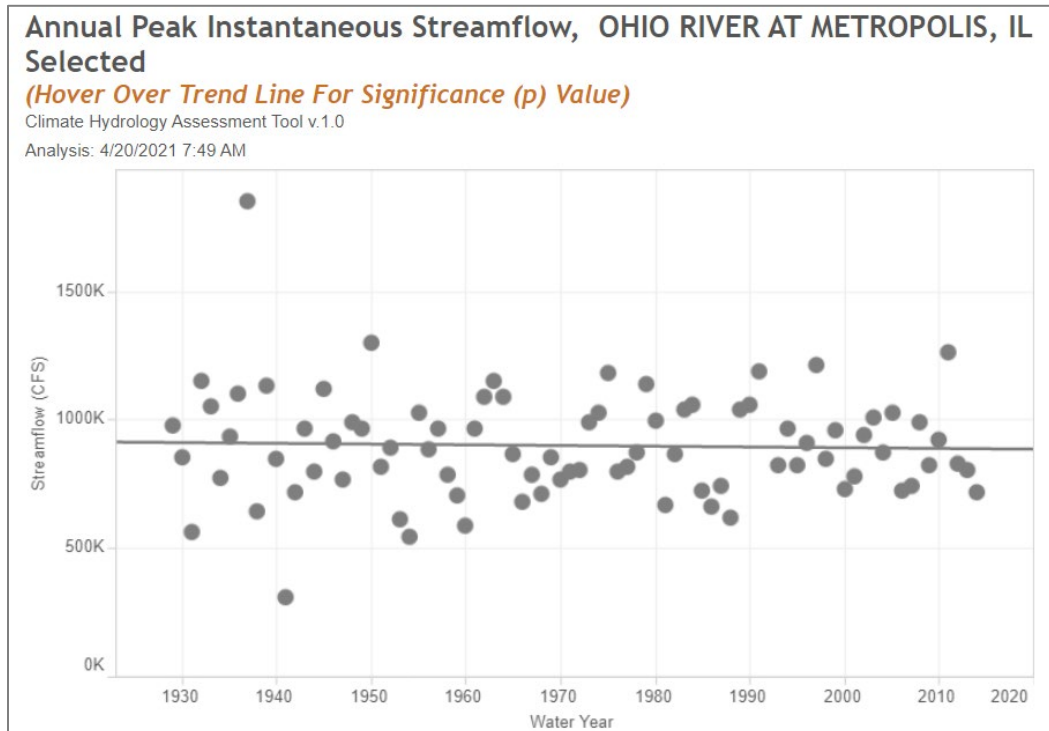


Figure 3. Annual Peak Streamflow on Ohio River at Metropolis, IL.

2.4. Nonstationarity Detection

The USACE Nonstationarity Detection Tool (NSD) was applied to the Ohio River at Metropolis, IL for a period of 1928 through 2014. This tool is used to assess whether the assumption of stationarity, which is the assumption that the statistical characteristics of a time-series dataset are constant over the period of record, is valid for a given hydrologic time-series dataset. This tool identified a single nonstationarity in 1991, however the nonstationarity exhibited neither consensus nor robustness as it was detected by only a single test at a single point in time and is therefore not considered to be a genuine nonstationarity. Based upon the findings of the NSD tool, the hydrologic record for peak streamflow on the Ohio River at Metropolis, IL can be considered stationary.

3. Projected Trends

3.1. Literature Review

The 2015 USACE literature synthesis referenced in the Observed Trends section above also summarizes available peer-reviewed literature regarding projected future trends in climate variables. For the Ohio River region, this document found a strong consensus that air temperatures will be increasing over the next century, likely somewhere in the range of 0 to 14.4°F. Precipitation projections are less certain than those associated with temperature. Most studies project increases in rainfall and storm events, however some predict decreases. Projections tend toward more intense and frequent storm events than have been observed in the recent past. These findings are echoed by the 4th National Climate Assessment (2018) and a 2017

USACE study entitled *Ohio River Basin – Formulating Climate Change Mitigation/Adaptation Strategies through Regional Collaboration*.

3.2. Climate Hydrology Assessment and Nonstationarity Detection Tool

The USACE Climate Hydrology Assessment Tool (CHAT) was used to assess projected, future trends within the Lower Ohio River Basin watershed, HUC-0514. The tool displays the range of projected annual maximum monthly streamflows from 1950 - 2099, with the projections from 1950 – 1999 representing hindcast projections and 2000 – 2099 representing forecasted projections. The outputs from the CHAT qualitatively suggest that annual maximum monthly flows, and therefore annual peak flows, are expected to increase in the future relative to the current time. Another important caveat is that the CHAT tool is simulating an unregulated watershed. Reservoir operations can be expected to decrease the variance of flows shown in the CHAT, as well as decrease the magnitude of their peaks. The results indicated by the CHAT largely agree with many of the trends found within the literature review regarding projected future extreme event streamflow.

3.3. Vulnerability Assessment

The USACE watershed Vulnerability Assessment Tool (VA) facilitates screening level comparative assessment of how vulnerable a given HUC-4 watershed is to the impacts of climate change relative to the other 202 HUC-4 watersheds across the country. HUC-4 0514 (Lower Ohio River) was analyzed within the VA tool and showed no outstanding vulnerabilities to climate change. Although the Lower Ohio River watershed was not within the top 20% of vulnerable watersheds, that is not to say that vulnerability to climate change does not exist. Indicators driving vulnerability to the Flood Risk Reduction business line include the flood magnification factor (indicators 568C and 568L) and the large elasticity between rainfall and runoff (indicator 277). The flood magnification factor represents how the monthly flow exceeded 10% of the time is predicted to change in the future; a value greater than 1 indicates flood flow is predicted to increase, which is true for the Lower Ohio Basin. The rainfall/runoff elasticity (277) measures the tendency for small changes in precipitation to result in large changes in runoff. Additional information regarding indicators can be found within the Vulnerability Assessment Tool Users Guide.

4. Summary and Conclusions

The purpose of this Section 14 Continuing Authorities Program (CAP) study is to evaluate Ohio River streambank stability at a small scale near Ledbetter, KY in Livingston County. The erosion of interest is induced by periodic inundation from the Ohio River and also local swale runoff contributing to head-cut erosion.

Analysis of data and toolsets related to climate change indicate historic and projected future increases in temperature have and are likely to continue for the project area; however temperature is not a particularly important variable related to streambank stabilization or erosion. Both precipitation and streamflow, which more directly influence streambank stability, have increased uncertainty regarding their historic and projected trends when compared with

temperature. Locally observed precipitation has exhibited a slight increasing trend over the last 70-years; however this trend was not found to be statistically significant at a 95% confidence level. Streamflow on the Ohio River has not exhibited any significant trend over the available 90-year period of record. Over this period, the Ohio River watershed has experienced significant dam and levee construction and is now a regulated system. Despite this upstream regulation, no nonstationarities which could be attributed to climate change or other impacts were detected using the NSD tool.

Future projections of hydrologic trends are uncertain, although most projections forecast increases in rainfall and storm events. These increases in the frequency and magnitude of storm events could result in additional runoff which could further exacerbate erosion in the future. The proposed solution to improve streambank stability is to regrade and restore the streambank to its pre-eroded location, and then armor this streambank with Class II stone at a stable slope. The drainage swale will be routed into a 24-inch diameter culvert to prevent flow from traveling over the stone armored channel lining and reduce the potential for future head cut erosion. These stabilization measures are resilient to future conditions in that they are thought to be able to accommodate slight increases in precipitation, runoff, and streamflow. This is because the stone sizing which comprises the channel lining is relatively conservative and can accommodate higher flow velocities than are anticipated. Additionally, if the 24-inch culvert discharge capacity is exceeded, the bank grading is such that surcharge flow will be evenly distributed over the armored bank section to prevent areas of concentrated runoff and potential erosion. Slight increases in precipitation, such as those which may occur due to climate change, would not result in failure of the bank protection. Based on this assessment, it is recommended that the potential future effects of climate change be treated as occurring within the uncertainty range for the current hydrologic analysis.

5. References

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U.S. Army Corps of Engineers website with climate impact analysis tools:
<https://maps.crrel.usace.army.mil/projects/rcc/portal.html>

Appendix A3

Geotechnical Engineering

1. Background

A site visit was conducted on 20 May 2020 to observe erosion on the southern bank of the Ohio River north of Riverview Drive in Ledbetter, Kentucky. USACE employees met with the non-Federal sponsor to observe an area of erosion that has the potential to negatively impact Riverview Drive.

2. Site Conditions

The site conditions described below are based on field observations from USACE employees and Livingston County officials and available site photographs and aerial photography. The approximate dimensions of the eroded area were estimated from Google Earth aerial imagery. The eroded area is estimated to extend approximately 80 feet in a generally north-south direction into the bank and is estimated to be approximately 80 feet long in a generally east-west direction along the bank of the Ohio River.

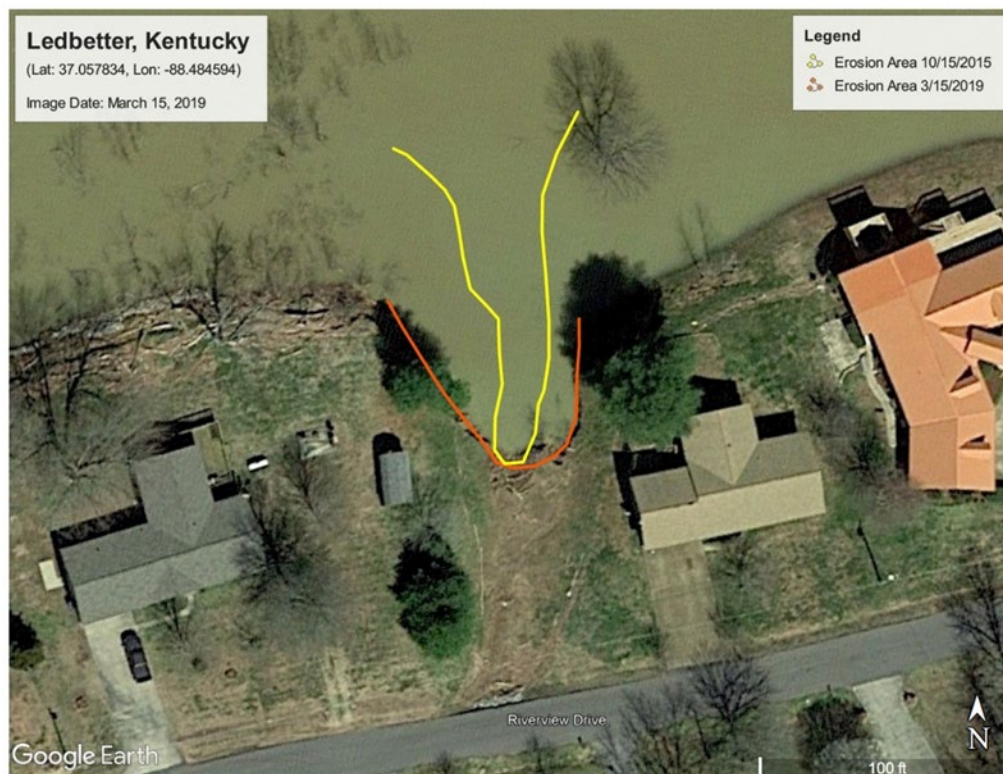


Figure 4. Approximate Erosion Area (10/15/2015 and 3/15/2019).

The estimated outline of the eroded area is shown on Figure 1. Over time, the eroded area appears to have widened significantly as seen in the difference in the approximate extents of the area from 15 October 2015 (yellow line) and 15 March 2019 (orange line).



Figure 5. View of erosion within the drainage channel looking southwest (8 JULY 2020 site visit).

Based on the provided site photographs and the field report prepared by the USACE Hydraulics Engineer, the observed site conditions appear to be the result of the rise and fall of the Ohio River. See the hydraulics section of this appendix for more information of the failure mechanism. The drainage channel has a visually estimated slope to the Ohio River of approximately six horizontal to one vertical (6H:1V). The slopes on the eastern side of the drainage channel are very gradual and are similar to the 6H:1V slope of the channel to the river. The slopes on the western side of the drainage channel are considerably steeper with several areas having slopes that are near vertical. There appears to have been erosion occurring for many years at this location. If the process continues there is a risk that future erosion and slope failures will impact Riverview Drive.

3. Remediation Options

Upon reviewing the site information available, the apparent cause(s) of the observed erosion and slope failures, and the amount of area available to construct a suitable repair; multiple

remediation options were identified and considered. Through the planning process, the options were narrowed down to one tentatively selected plan. The selected repair is a slope remediation.

3.1. Slope Remediation

To decrease the risk of future erosion on the riverbank, the eroded slopes can be remediated by benching or flattening the existing slopes and creating suitable crushed stone fill slopes. The slopes should be created out of suitably sized rip rap placed over a crushed stone separation layer. The crushed stone used to create the fill slopes should be sized such that the mass of the stone is sufficient to resist displacement from the anticipated water volume and velocity within the drainage channel and Ohio River. The separation layer beneath the rip rap should be designed to prevent the loss of soil-sized particles migrating through the rock mass due to the action of water.

Depending on the soil composition of the slope material encountered, the fill slopes should be properly benching or laid back into the existing slopes of the drainage channel and the bank of the Ohio River. In general, it is recommended that horizontal benches should not exceed 1H:2V for cohesive soils. The actual height, length, and total number of benches will depend on the actual site geometry and existing soil type encountered. It should be assumed that multiple different benching techniques will be required given the observed site conditions. If subsurface soils encountered during the design phase are granular in nature, benching methods should be replaced with flattening the slope to an appropriate angle to allow installation of specified backfill. An acceptable angle to which flatten the granular slopes will need to be determined during the design phase due to the variability of sand along the Ohio River.

Prior to placement of the crushed stone fill, the exposed surfaces should be clean of soft or organic material. The crushed stone fill should be placed in properly sized lifts according to the material(s) selected. Each layer of crushed stone should be properly compacted until the desired grades are achieved. The crushed stone fill slopes should be constructed to a maximum slope of three horizontal to one vertical (3H:1V).

It is anticipated that the outer face of the crushed stone fill slope along the Ohio River will extend approximately 80 feet (west to east) as shown in red on Figure 3. The fill slopes along the riverbank should extend from the top of the existing riverbank outward at an approximate 3H:1V slope. The constructed slopes along the riverbank will be designed to tie into the slopes of the drainage channel where they turn to become parallel with the Ohio River. Given the observed site conditions, it may not be possible to achieve the recommended crushed stone fill slope geometry without cutting back the top of the existing riverbank.

4. Geotechnical Exploration

The design (extents, backfill material, etc.) is dependent on a geotechnical investigation. The geotechnical investigation would be employed to further validate the analyses, design parameters and recommendations. After the geotechnical investigation has been completed, it is recommended

that a slope stability analysis be performed. The geotechnical investigation and slope stability analysis will guide the design during the next phase of this project.

Appendix A4

Civil Engineering

1. Introduction

This appendix covers civil engineering topics that were considered to develop this feasibility study as well as topics that will need to be covered in more detail as the project moves into Preconstruction Engineering and Design (PED) phase. Assumptions used to develop this appendix and the civil plan sheets are stated in their respective sections.

2. Site Description and Project Development

The project site is in Livingston County, KY on the left bank of the Ohio River. The Ohio River has exposed a soil face in the riverbank at the base of a drainage. High water events in the Ohio are causing the bank to collapse in sections and erode towards a public road, Riverview Drive. For more information of the failure mechanism, see the hydraulics portion of this engineering appendix. The project is being pursued under Section 14 of the Continuing Authorities Program. Section 14 authority is under the Flood Control Act of 1946 for emergency streambank and shoreline erosion protection for public facilities and services. After an initial site visit in May of 2020, USACE Louisville District developed alternative repair solutions for the site. Of the alternatives developed, a riprap rock slope remediation repair was chosen as the Tentatively Selected Plan (TSP) to evaluate under this feasibility study. For more information on alternative development and plan selection, see the main body of the detailed project report.

3. Surveying and Mapping

The horizontal coordinates used in development of the included civil plan sheets reference the Kentucky State Plane Coordinate System, South Zone. The horizontal datum is the North American Datum of 1983 (NAD83), units of U.S. survey feet. The vertical datum used is the North American Vertical Datum of 1988 (NAVD88), units of U.S. survey feet.

A site topographic survey was not performed for this feasibility study. Ground elevations used for preliminary quantities were obtained from publicly available Digital Elevation Models (DEM). The DEM used was developed using Light Detection and Ranging (LiDAR) by the state of Kentucky and was measured for this area in 2013. The resolution of the DEM is specified at 2 feet.

Historical aerial imagery available from Google Earth shows the erosion existing as early as 2011. The imagery shows that between 2015 and 2019, the erosion extents moved southward as it cut towards the road. The available 2013 DEM is prior to the erosion movement and does not capture the additional material loss. Using the 2013 DEM alone would underestimate the repair quantities required. To compensate, the current ground surface of the failure was estimated using

aerial imagery. From the 2019 aerial image, the edge of the failure scarp was projected onto the DEM. The edge of the failure scarp was then projected downwards at a 1H:2V slope to estimate the failure plane. The profile grade was projected from the north boundary of the failure. Where the projected failure plane and profile grade met formed the estimated bottom of the failure surface. The estimated failure surface was used with the DEM to generate excavation and repair quantities. These quantities will be adequate for cost estimating purposes in the feasibility phase, but a full site survey will need to be performed for the design phase. The site survey should include a topographic survey, geotechnical exploration and classification, and utility mapping.

4. Design and Quantity Estimation

Without a topographical survey performed for this feasibility study, design development, assumptions, and quantities relied on existing available information. A base LiDAR DEM was modified with some failure assumptions to create an existing ground surface. For more discussion on the assumptions, see the previous section of this appendix.

A preliminary design was jointly developed by the hydraulics, geotechnical, and civil engineering disciplines. To prepare the site for the repair, topsoil would be stripped from any existing areas in the repair footprint. The topsoil would be stockpiled for re-use in the repair. The over steepened failure surfaces would then be prepared for backfill by excavating benches into the side slope. The bench excavation would remove loose, unsuitable material, stabilize the failure slope, and provide a prepared surface to tie the new backfill into. After surface preparation, the primary backfill material would be placed. KYTC gradation No. 357 stone was selected as the backfill material. The material would allow water to travel out of the existing bank while retaining the material, preventing future erosion. During backfill, a 24" culvert with a drop inlet would be installed in the drainage. The culvert would convey runoff from the existing drainage to the toe of the slope protection. The intent of the culvert is preventing concentrated runoff from flowing over top of the channel protection stone. The drop inlet would reduce the flowline slope of the culvert and reduce the velocity of water being discharged out of the culvert onto the toe of the repair. Over top of the stone backfill, filter fabric will be placed to prevent material migration. Over top of the filter fabric, topsoil would be placed that would be seeded and mulched. On the slope facing the river, 18 inches of KY class II channel lining would be installed as slope protection. The face would be constructed at a maximum slope of 3H:1V.

The top of the slope protection will be set at a designed elevation during the design and implementation phase of this project. The top of slope elevation and alignment was set in this feasibility phase based on the elevations and alignment of nearby slope protection. The width of the repair was set to provide slope protection on the exposed failure face, terminating where the existing riverbank is parallel with the Ohio River.

The toe elevation and alignment of the slope were set by projecting downward from the top at a 3H:1V slope. At the toe of the slope protection, a trench filled with KY class II channel lining would be installed to key the repair into the existing ground. The proposed repair backfill would raise the profile grade of the drainage by placing excavated unclassified fill over the existing ground. The fill will be excavated from the benching and toe trench and will be placed here to

reduce off haul needs from the project. The raised grade will not change the drainage patterns at the site and will generally reduce the velocity of surface runoff.

At either end of the repair, the slope protection ties into the existing bank. There is existing slope protection further west and east of the project. The primary repair would leave gaps between the proposed slope protection and the existing slope protection. These gaps are proposed to be filled in as betterments to the project. They are classified as betterments because they are not necessary for the primary repair. The sponsor requested these betterments to tie the repair into the existing slope protection to create a continuous section of protection. For more information on the betterments, see the main body of the Detailed Project Report.

Using the assumptions, material layers, and slopes stated above, preliminary quantities were developed. Three-dimensional modelling in CAD was used to project the proposed repair over top of the assumed failure surface. The total volume between surfaces was triangulated. The volumes of the material layers were then adjusted from the total volume with areas and depths. Benching and toe trench excavation quantities were calculated using the average end-area method.

5. Access Roads and Construction Laydown

No temporary construction access roads or haul routes will be needed for this project. The repair site can be accessed directly from Riverview Drive with construction equipment. The transition between the edge of Riverview drive and the grass may need to be built up to protect the asphalt as equipment moves on and off the road. To access the base of the failure, construction equipment may need to cut their way down to the failure from the existing ground level. These access measures will be temporary, will be restored during the backfill repair, and will not increase the footprint of the construction. During construction, the work area will be congested with construction equipment and haul trucks entering and leaving the site. A separate temporary construction laydown area is proposed in an empty parcel on Faye Drive. The laydown area would be used by the contractor for employee parking, equipment, and material storage. The laydown area would be restored to pre-construction condition at the end of the project.

6. Construction Procedures and Water Control Plan

6.1. Clearing and Grubbing

Clearing and grubbing will be minimal on this project. A review of available aerial imagery and site visit photos shows that all the vegetation present on site is grass, weeds, brush, and small trees. Topsoil will be stripped and stockpiled for re-use.

In addition to quality topsoil that will be stripped and stockpiled, there will also be over excavation of failed soil material and benching excavation at the failure edge. This low-quality soil can be re-used in the repair by placing the material above the stone backfill layer and below the final topsoil lift. This will reduce the amount of material that needs to be hauled off project. The final soil layer above the stone backfill will vary in thickness based on how much material is over excavated. The final soil lift will be 6-12" of high-quality topsoil. The high-quality topsoil

will be re-used from what is available on site and will likely need to be supplemented with imported material.

6.2. Dewatering

The backfill and repair are being constructed in an existing drainage swale. The drainage swale only conveys surface runoff during storm events and does not stay wet full time. During construction, the swale will need to be dewatered during or after storm events until the culvert is installed to convey runoff.

6.3. River Level

This project is located on the shore of the Ohio River. All work is planned above the ordinary high-water mark. Construction can be timed for the portion of the year when water levels are low. However, high water events are possible that could affect construction.

6.4. Erosion and Sediment Control

The primary repair area and staging areas combined cover less than 1 acre of ground disturbance. This stays below the threshold that would require a Construction General Permit from the Kentucky Pollutant Discharge Elimination System (KPDES) and Stormwater Pollution and Prevention Plan (SWPPP). If the areas for the betterments are included into one project, then the project would disturb more than an acre and would require a KPDES permit. Even if a permit is not required for the project, erosion control measures would still need to be installed and maintained during construction. These might include silt fence and fiber rolls.

6.5. Construction Impacts to Facilities

This project is in a residential area. Access to the site will require heavy truck traffic to travel along residential streets. There are approximately 0.9 miles of residential roads between U.S. Route 60 and the project site. The county engineer has indicated that the anticipated haul route from U.S. 60 along Blankenship Drive and Riverview drive was resurfaced with an 1½" asphalt overlay around 2015. The road section has been built up with multiple overlays on the route since the original construction of the road. Based on the age of the recent overlay, the route is expected to be in good condition for haul. However, truck traffic over the course of construction will likely have some impact on the remaining service life of the overlay. During the site survey, the condition of the haul route should be documented. This information will be used by the design team to mitigate any potential road impacts. A reduced weight limit on haul trucks will be evaluated during the design phase to reduce wear on the road. This weight limit may not be necessary and will be determined based on the condition of the road. The design team may consider other mitigation strategies to preserve the road surface.

7. Borrow and Disposal Sites

No material borrow area is expected for this project. The proposed backfill materials are stone that will be sourced from a quarry. No spoils or disposal area is expected for this project. Some of the excavated material is expected to be re-used at the site. Any remaining quantity of unsuitable material that will need to be off hauled is too small to need a disposal site.

8. Relocations

8.1. Utilities

There are not utilities in the project area that will need relocation. The project site is along the shore of the Ohio River, behind the residential streets in the neighborhood. Any utilities servicing the residences are expected to run along Riverview Drive. There are no utilities visible that have been exposed from the erosion. The proposed repair is primarily backfilling and not excavation. The minor benching excavation proposed will not be extensive enough to affect any existing utilities. Existing utility locations will be fully explored during the design phase of this project with the completion of a full site investigation and topographic survey.

9. Real Estate

Feasibility level of right-of-way was developed for this study. Right-of-way need was determined for the proposed project work, access for construction, construction laydown, and access for maintenance after construction completion. An acquisition or easement type was set for each project element and the areas for each type was totaled. More information on the real estate instruments used, right-of-way areas, and real estate costs for this project can be found in the real estate appendix. The right-of-way limits are displayed on the civil plan sheets, found at the end of this appendix.

In the repair area, right-of-way was set 15 feet outside the edge of any proposed cut or fill extents. The right-of-way meets the edge of Riverview Drive for construction access. For the staging area, right-of-way borders the edge of Faye Drive and extends east to run parallel to the parcel line at a 5-foot offset. Two betterment areas are proposed as part of this project, one to the west and one to the east of the primary repair. The betterments right-of-way was set 15 feet outside the edge of any proposed cut or fill extents.

The right-of-way obtained for the project work units will need to persist for as long as the projected lifecycle of each element. The right-of-way obtained for the access, staging, laydown, and buffers will need to persist through the construction phase. The right-of-way limits and easements shown on the plan sheets will be further refined during the design phase with the completion of a full site survey.

10. Maintenance of Traffic

There are minimal impacts to existing traffic with this project. The section of Riverview Drive beyond the repair area is a dead-end street with access to 9 residences. Daily traffic from these residences is low. All construction equipment will be located off the roadway. There will be

frequent truck traffic entering and leaving the site during the backfill portion of the repair. These trucks are expected to pull off the road completely but will have some impact on traffic as they enter and exit Riverview Drive. The Manual on Uniform Traffic Control Devices (MUTCD) will be followed.

11. Operation and Maintenance

There are minimal ongoing operation and maintenance needs for the project once construction is completed. The backfill and slope protection will not need maintenance. The repair should be monitored for stability and further erosion. The grassed drainage will need to be mowed. The culvert inlet basin and outlet will need to be monitored and cleared.

12. Plan Sheets

Attached to the end of this appendix. See next page.



ANDY BESHEAR
GOVERNOR

**TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE**

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JACQUELINE COLEMAN
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410 HIGH STREET
FRANKFORT, KENTUCKY 40601
(502) 564-7005
www.heritage.ky.gov

CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

January 15, 2021

United States Army Corps of Engineers
ATTN: Ms. Jennifer Guffey
P.O. Box 59
Louisville, KY 40201-0059

Re: Streambank Stabilization, Riverview Drive, Ledbetter, Livingston County, Kentucky

Dear Ms. Guffey:


Thank you for your letter and enclosed documentation concerning the above-mentioned project, received December 18, 2020. We understand that the United States Army Corps of Engineers and Livingston County propose to place riprap and granular fill to address streambank erosion in a residential neighborhood in Ledbetter, Livingston County, Kentucky.

After review of the proposed project, we **concur** with the USACE determination that the project will result in **No Effect to Historic Properties**.

In the event of the unanticipated discovery of an archaeological site or object of antiquity, the discovery should be reported to the Kentucky Heritage Council and to the Kentucky Office of State Archaeology in the Anthropology Department at the University of Kentucky in accordance with KRS 164.730. In the event that human remains are encountered during project activities, all work should be immediately stopped in the area and the area cordoned off, and in accordance with KRS 72.020 the county coroner and local law enforcement must be contacted immediately. Upon confirmation that the human remains are not of forensic interest, the unanticipated discovery must be reported to the Kentucky Heritage Council.

Should you have any questions concerning archaeological resources, feel free to contact Chris Gunn of my staff at chris.gunn@ky.gov.

Sincerely,


Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP:cmg KHC# 60676



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Office of the Chief

Chuck Hoskin Jr.
Principal Chief

Bryan Warner
Deputy Principal Chief

February 8, 2021

Jennifer Guffey
United States Army Corps of Engineers
Louisville District
600 Dr. Martin Luther King Jr. Place
Louisville, KY 40202

Re: Ledbedder Emergency Streambank Protection Project

Ms. Jennifer Guffey:

The Cherokee Nation (Nation) is in receipt of your correspondence about and related assessment for the proposed **Ledbedder Emergency Streambank Protection Project**, and appreciates the opportunity to provide comment upon this project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the United States Army Corps of Engineers (USACE) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that USACE conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389



**United Keetoowah Band
Of Cherokee Indians in Oklahoma
Office of Historic Preservation**
P.O. Box 746 • Tahlequah, OK 74465
4547 S Whitmore Lane • Tahlequah, OK 74464
Phone: (918) 871-2800 • Fax: (918) 414-4038
ukbthpo@ukb-nsn.gov



March 1, 2021

RE: Streambank Protection Project

To whom it may concern,

Thank you for consulting with the United Keetoowah Band of Cherokee Indians in Oklahoma (UKB). This response is regarding the request from your office for a review of the project listed above located in Ledbetter, Livingston County, Kentucky. We have reviewed the information provided in your letter of December 14, 2020. We find after review of the information we concur with your findings of “no adverse effects”.

We remain interested in further communication regarding this project due to the location. The UKB people have a documented historical presence in Livingston County, Kentucky. While there are no documented village sites within the project site or within a proximity outside the project site, there is always the potential of finding unknown sites in and surrounding the project location. There is the possibility that unrecorded cultural resources, including archaeological artifact or human remains, may be encountered during construction, demolition, or earthmoving activities of this project. Should this occur, we require that you contact our office immediately so we may offer appropriate comments under 36 CFR 800.13. As the project moves forward, we request the following conditions be followed:

Condition 1: Inadvertent Discoveries - If human remains, burials, funerary items, sacred objects, or objects of cultural patrimony are found during project implementation, the proponent or his/her authorized agent shall cease work immediately within 200 ft of the find. They shall take steps to protect the find from further damage or disruption. They shall contact the Certified Tribal Historic Preservation Officer (CTHPO), Whitney Warrior to report the find. The CTHPO shall contact the appropriate law enforcement authority if human remains are found. No further work shall be allowed on the project until the CTHPO has approved a plan for managing or preserving the remains or items.

Condition 2: Post Review Discoveries - In the event that pre-contact artifacts (i.e., arrowheads, spear points, mortars, pestles, other ground stone tools, knives, scrapers, pottery or flakes from the manufacture of tools, fire pits, culturally modified trees, etc.) or historic period artifacts or features (i.e., fragments of old plates or ceramic vessels, weathered glass, dumps of old cans, cabins, root cellars, etc.) are found during project implementation, the proponent or his/her authorized agent shall cease work immediately within 200 ft of the find. They then shall contact the Certified Tribal Historic Preservation Officer, Whitney Warrior to report the find. No further



**United Keetoowah Band
Of Cherokee Indians in Oklahoma
Office of Historic Preservation**

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work shall be allowed on the project until the CTHPO has approved a work plan for managing or preserving the artifacts or features.

Condition 3: Activities that have the potential to disturb cultural resources outside the areas specified in the accompanying document(s) are not approved and will not proceed until cultural resources review of potential adverse effects in the new area has been completed.

Please note that due to COVID-19, response times are longer than expected for correspondences. Thank you for your patience during this time. We are diligently working to complete all Section 106 consultations in as timely a manner as possible. If you have any questions or concerns, please feel free to contact our office. These comments are based on information available to us at the time of the project review. We reserve the right to revise our comments as information becomes available. If you have any questions or concerns, please contact our Certified Tribal Historic Preservation Officer/NAGPRA Coordinator, Whitney Warrior at (918) 871-2838 or by email wwarrior@ukbnsn.gov.

Thank you for your consultation,

Whitney Warrior

Whitney Warrior
Director Office of Historic Preservation
United Keetoowah Band of Cherokee
918-871-2838
wwarrior@ukb-nsn.gov



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Craig A Potts
Executive Director and
State Historic Preservation Officer
410 High Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

The U.S. Army Corps of Engineers-Louisville District (USACE) completed a cultural resources assessment to analyze the potential effects of an emergency streambank protection project in Ledbetter, Livingston County, Kentucky conducted under Section 14 of the Flood Control Act of 1946, as amended. This project is a cooperative effort between USACE and Livingston County, Kentucky. The project is located in Livingston County, Kentucky along Riverview Drive and the Ohio River near river mile 928 (Figures 1 and 2), approximately 8.6 miles downstream of the Smithland Locks and Dam.

Flooding events along the Ohio River have resulted in an imminent threat to Riverview Drive from the creation of a large gully advancing towards the road (Figure 3). USACE recommends stabilization of the site with a combination of granular fill and riprap, which will be keyed into the shoreline at the toe of the slope. The total acreage of the project site is 0.28 acres and is identified as the Area of Potential Effects (APE) on Figure 3.

A number of steps were taken in an effort to identify any cultural resources within the APE. These included a background check of the National Register of Historic Places (NRHP), Louisville District Geographic Information System (GIS), the Kentucky Office of State Archaeology (OSA) records, and previous cultural resource survey reports that have occurred near the vicinity of the project area. The purpose of this records search was to identify and locate any cultural resources or historic properties that could be potentially impacted by the proposed undertaking. The records review of the OSA on June 30, 2020 found no known prehistoric or historic sites in the immediate project area. No archaeological sites were located within a 2-kilometer radius of the proposed streambank erosion project. The records review of the NRHP database was also conducted on June 30, 2020 also found no evidence within the project area of recorded archaeological sites or historical structures listed on, or eligible for the listing on the NRHP. USACE has determined that the proposed undertaking will have no effect to historic properties and/or previously recorded cultural resources.

An onsite cultural resources assessment was conducted on July 6, 2020 in the APE of the proposed streambank stabilization (Figures 4-7). Three judgmental shovel tests were excavated in the north-northwest direction of the project area to determine if there were any intact soils in the area. Soils consisted of Nelse-Huntington-Wheeling Complex located along the shoreline of the Ohio River extending to a depth of 48 centimeters below ground surface. The parent material for this complex consists of a sand alluvium, mixed fine-silty alluvium, and mixed fine loamy alluvium on terrain with 2% to 55% slopes that frequently flooded (Figures 8-10) (United States

Department of Agriculture, Soil Conservation Service 2020). All shovel tests were negative for cultural material.

Based on the July 6, 2020 site visit; review of cultural resources records on file at the Louisville District; search of the NRHP database; and search of the OSA records, USACE determined that no historic properties will be affected by the proposed streambank erosion project. In accordance with 36CFR800.4, we request your agency to concurrence on the proposed undertaking.

Your input and/or concurrence is requested within 30 calendar days. A Tribal Consultation List is also enclosed. If you have any questions and/or comments regarding this effort, please direct them to Ms. Jennifer Guffey at (502) 315-7468 or jennifer.m.guffey@usace.army.mil.

Sincerely,

A handwritten signature in black ink that reads "Dan Vogler". The signature is written in a cursive, slightly slanted style.

Dan Vogler, P.G.
Chief, Planning Section

Enclosures



Figure 1: Location of the proposed streambank erosion project adjacent to River Mile 928.



Figure 2: Proposed streambank erosion project location between Ohio River and Riverview Drive.



Figure 3: Area of Potential Effects highlighted in yellow.



Figure 4: Exposed shoreline and banks of the project area, view to the northwest (photo taken July 6, 2020).



Figure 5: Eroded vertical bank of the project area, view to the southwest (photo taken July 6, 2020).



Figure 6: Eroded shoreline within the project area, view north-northeast (photo taken July 6, 2020)



Figure 7: Eroded shoreline with gullying occurring, view to the southwest (photo taken July 6, 2020).



Figure 8: Location of negative shovel tests.



Figure 9: Negative shovel test with sand hydric soils (photo taken July 6, 2020).



Figure 10: Negative shovel test with sandy loam hydric soils (photo taken July 6, 2020).

Tribal Consultation List

Karen Brunso
Tribal Historic Preservation Officer
Chickasaw Nation
Karen.Brunso@chickasaw.net

Devon Frazier
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe of Oklahoma
106NAGPRA@astribes.com

Brett Barnes
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
bbarnes@estoo.net

Tonya Tipton
Tribal Historic Preservation Officer
Shawnee Tribe
tonya@shaneetribes.com

Elizabeth Toombs
Tribal Historic Preservation Officer
Cherokee Nations
Elizabeth-toombs@cherokee.org

Whitney Warrior
Tribal Historic Preservation Officer
United Keetoowah Bands of Indians in Oklahoma
wwarrior@ukb-nsn.gov

Stephen J. Yerka
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians
syerka@nc-cherokee.com

Colleen Bell
Tribal Historic Preservation Officer
Osage Nation
colleen.bell@osagenation-nsn.gov



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Edwina Butler-Wolfe, Governor
Absentee-Shawnee Tribe of
Oklahoma
2025 S Gordon Cooper Dr
Shawnee, OK 74801

Dear Honorable Governor Butler-Wolfe:

The U.S. Army Corps of Engineers-Louisville District (USACE) completed a cultural resources assessment to analyze the potential effects of an emergency streambank protection project in Ledbetter, Livingston County, Kentucky conducted under Section 14 of the Flood Control Act of 1946, as amended. This project is a cooperative effort between USACE and Livingston County, Kentucky. The project is located in Livingston County, Kentucky along Riverview Drive and the Ohio River near river mile 928 (Figures 1 and 2), approximately 8.6 miles downstream of the Smithland Locks and Dam.

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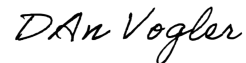
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Department of Agriculture, Soil Conservation Service 2020). All shovel tests were negative for cultural material.

Based on the July 6, 2020 site visit; review of cultural resources records on file at the Louisville District; search of the NRHP database; and search of the OSA records, USACE determined that no historic properties will be affected by the proposed streambank erosion project. In accordance with 36CFR800.4, we request your agency to concurrence on the proposed undertaking.

Your input and/or concurrence is requested within 30 calendar days. Also, a letter has been emailed to the Tribal Historic Preservation Officer. If you have any questions and/or comments regarding this effort, please direct them to Ms. Jennifer Guffey at (502) 315-7468 or jennifer.m.guffey@usace.army.mil.

Sincerely,

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Dan Vogler, P.G.
Chief, Planning Section

Enclosures



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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Chuck Hoskin, Jr., Principal Chief
Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Dear Honorable Principal Chief Hoskin:

The U.S. Army Corps of Engineers-Louisville District (USACE) completed a cultural resources assessment to analyze the potential effects of an emergency streambank protection project in Ledbetter, Livingston County, Kentucky conducted under Section 14 of the Flood Control Act of 1946, as amended. This project is a cooperative effort between USACE and Livingston County, Kentucky. The project is located in Livingston County, Kentucky along Riverview Drive and the Ohio River near river mile 928 (Figures 1 and 2), approximately 8.6 miles downstream of the Smithland Locks and Dam.

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Chief, Planning Section

Enclosures



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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Bill Anoatubby, Governor
Chickasaw Nation
220 E. Arlington
Ada, OK 74820

Dear Honorable Governor Anoatubby:

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Enclosures



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DEPARTMENT OF THE ARMY
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LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Glenna Wallace, Chief
Eastern Shawnee Tribe of
Oklahoma
12755 S 705 Rd
Wyandotte, OK 74370-3148

Dear Honorable Chief Wallace:

The U.S. Army Corps of Engineers-Louisville District (USACE) completed a cultural resources assessment to analyze the potential effects of an emergency streambank protection project in Ledbetter, Livingston County, Kentucky conducted under Section 14 of the Flood Control Act of 1946, as amended. This project is a cooperative effort between USACE and Livingston County, Kentucky. The project is located in Livingston County, Kentucky along Riverview Drive and the Ohio River near river mile 928 (Figures 1 and 2), approximately 8.6 miles downstream of the Smithland Locks and Dam.

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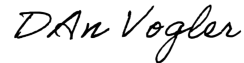
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Chief, Planning Section

Enclosures



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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Richard Sneed, Principal Chief
Eastern Band of Cherokee Indians
P.O. Box 1927
Cherokee, NC 28719

Dear Honorable Principal Chief Sneed:

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Your input and/or concurrence is requested within 30 calendar days. Also, a letter has been emailed to the Tribal Historic Preservation Officer. If you have any questions and/or comments regarding this effort, please direct them to Ms. Jennifer Guffey at (502) 315-7468 or jennifer.m.guffey@usace.army.mil.

Sincerely,

A handwritten signature in black ink that reads "Dan Vogler". The signature is written in a cursive, slightly slanted style.

Dan Vogler, P.G.
Chief, Planning Section

Enclosures



Figure 1: Location of the proposed streambank erosion project adjacent to River Mile 928.



Figure 2: Proposed streambank erosion project location between Ohio River and Riverview Drive.



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Figure 4: Exposed shoreline and banks of the project area, view to the northwest (photo taken July 6, 2020).



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Figure 8: Location of negative shovle tests.



Figure 9: Negative shovel test with sand hydric soils (photo taken July 6, 2020).



Figure 10: Negative shovel test with sandy loam hydric soils (photo taken July 6, 2020).



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Geoffrey Standing Bear, Principal Chief
Osage Nation
627 Grandview Avenue
Pawhuska, OK 74056

Dear Honorable Principal Chief Standing Bear:

The U.S. Army Corps of Engineers-Louisville District (USACE) completed a cultural resources assessment to analyze the potential effects of an emergency streambank protection project in Ledbetter, Livingston County, Kentucky conducted under Section 14 of the Flood Control Act of 1946, as amended. This project is a cooperative effort between USACE and Livingston County, Kentucky. The project is located in Livingston County, Kentucky along Riverview Drive and the Ohio River near river mile 928 (Figures 1 and 2), approximately 8.6 miles downstream of the Smithland Locks and Dam.

Flooding events along the Ohio River have resulted in an imminent threat to Riverview Drive from the creation of a large gully advancing towards the road (Figure 3). USACE recommends stabilization of the site with a combination of granular fill and riprap, which will be keyed into the shoreline at the toe of the slope. The total acreage of the project site is 0.28 acres and is identified as the Area of Potential Effects (APE) on Figure 3.

A number of steps were taken in an effort to identify any cultural resources within the APE. These included a background check of the National Register of Historic Places (NRHP), Louisville District Geographic Information System (GIS), the Kentucky Office of State Archaeology (OSA) records, and previous cultural resource survey reports that have occurred near the vicinity of the project area. The purpose of this records search was to identify and locate any cultural resources or historic properties that could be potentially impacted by the proposed undertaking. The records review of the OSA on June 30, 2020 found no known prehistoric or historic sites in the immediate project area. No archaeological sites were located within a 2-kilometer radius of the proposed streambank erosion project. The records review of the NRHP database was also conducted on June 30, 2020 also found no evidence within the project area of recorded archaeological sites or historical structures listed on, or eligible for the listing on the NRHP. USACE has determined that the proposed undertaking will have no effect to historic properties and/or previously recorded cultural resources.

An onsite cultural resources assessment was conducted on July 6, 2020 in the APE of the proposed streambank stabilization (Figures 4-7). Three judgmental shovel tests were excavated in the north-northwest direction of the project area to determine if there were any intact soils in the area. Soils consisted of Nelse-Huntington-Wheeling Complex located along the shoreline of the Ohio River extending to a depth of 48 centimeters below ground surface. The parent material for this complex consists of a sand alluvium, mixed fine-silty alluvium, and mixed fine loamy alluvium on terrain with 2% to 55% slopes that frequently flooded (Figures 8-10) (United States Department of Agriculture, Soil Conservation Service 2020). All shovel tests were negative for

cultural material.

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Chief, Planning Section

Enclosures



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600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Ben Barnes, Chief
Shawnee Tribe
P.O Box 189, 29 S Highway 69A
Miami, OK 74355

Dear Honorable Chief Barnes:

The U.S. Army Corps of Engineers-Louisville District (USACE) completed a cultural resources assessment to analyze the potential effects of an emergency streambank protection project in Ledbetter, Livingston County, Kentucky conducted under Section 14 of the Flood Control Act of 1946, as amended. This project is a cooperative effort between USACE and Livingston County, Kentucky. The project is located in Livingston County, Kentucky along Riverview Drive and the Ohio River near river mile 928 (Figures 1 and 2), approximately 8.6 miles downstream of the Smithland Locks and Dam.

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Dan Vogler, P.G.
Chief, Planning Section

Enclosures



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Google Earth

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600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2020

Planning, Programs and
Project Management Division
Planning Section

Joe Bunch, Chief
United Keetoowah Band of
Indians in Oklahoma
P.O. Box 746
Tahlequah, OK 74465

Dear Honorable Chief Bunch:

The U.S. Army Corps of Engineers-Louisville District (USACE) completed a cultural resources assessment to analyze the potential effects of an emergency streambank protection project in Ledbetter, Livingston County, Kentucky conducted under Section 14 of the Flood Control Act of 1946, as amended. This project is a cooperative effort between USACE and Livingston County, Kentucky. The project is located in Livingston County, Kentucky along Riverview Drive and the Ohio River near river mile 928 (Figures 1 and 2), approximately 8.6 miles downstream of the Smithland Locks and Dam.

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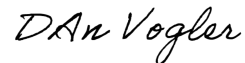
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Dan Vogler, P.G.
Chief, Planning Section

Enclosures



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Livingston County, KY
Continuing Authorities Program Section 14
Feasibility Study

Appendix C
Cost Engineering

May 2021

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1 INTRODUCTION

This Appendix presents cost estimates that have been assembled for the proposed Emergency Streambank Stabilization Feasibility Study for Ledbetter, KY (Livingston County). This project falls under Section 14 of the Continuing Authorities Program (CAP). A discussion regarding cost, schedule and risk is included in this Appendix which contains all appropriate feature accounts. What follows is a discussion regarding the methodology used to develop the first cost for the Recommended Plan.

2 REFERENCES

- ER 1110-1-1300, Cost Engineering Policy & General Requirements, 26 Mar 1993.
- ER 1110-2-1302, Civil Works Cost Engineering, 30 June 2016.
- EI 01D010, Construction Cost Estimates, 1 Sept 1997.
- ER 1110-2-1150, Engineering & Design for Civil Works Projects, 31 Aug 1999.
- ER 37-2-10 Change 89, Accounting And Reporting – Civil Works Activities, 31 Oct 2000.
- EC 11-2-187, Corps of Engineers Civil Works Direct Program: Program Development Guidance – Fiscal Year 2009, 30 Mar 2007.
- EP 1110-1-8 Volume 2, Construction Equipment Ownership and Operating Expense Schedule – Region II, July 2007.
- EC Bulletin No 2007-17, Application of Cost Risk Analysis Methods to develop Contingencies for Civil Works Total Project Costs, 10 Sep 2007.
- EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS), 30 Sept 2020.
- EC 1105-2-410, Review of Decision Documents, 22 Aug 2008
- ETL 1110-2-573, Construction Cost Estimating Guide for Civil Works, 30 Sept 2008.

3 METHODOLOGY

3.1 GENERAL

The cost estimate was prepared using the Micro-computer Aided Cost Estimating System (MCACES) Second Generation (MII), version 4.4.2 for all feature accounts associated with construction. Applicable crews and equipment were applied in the estimate to correspond with the work being performed. Material prices were developed using the 2016 MII Cost Book and quotes were obtained from suppliers, when available.

3.2 COST METHODOLOGY

3.2.1 Historical Unit Pricing

In some instances, historical cost information was referenced and documented accordingly. These historical references include past contract bid prices for projects of similar design and magnitude and recent government studies and cost estimates.

3.2.2 Quote-in-Place

In some instances, a quote from a subcontractor may have been received that included overhead and profit. In that case, no additional markups were included for subcontractor's overhead.

3.2.3 Detailed MII Cost Estimate

The MII estimating software was used to develop a construction sequence for each item of work and applying detailed line items and crews to perform the work. Crews were developed in correspondence with the work being performed and estimated productivities. Wage rates were taken from the local Davis Bacon rates. The latest MII equipment database was also used and adjusted for current fuel and energy costs. Material prices were obtained through solicitations with vendors via telephone or via email, online pricing searches, the MII Cost Book, and RS MEANS data. A summary level report of the MII cost estimate for the TSP can be found in Attachment A.

3.3 DIRECT COSTS

Direct costs are based on anticipated equipment, labor, and materials necessary to construct this project. Following formulation of the direct cost, a determination is made as to whether the work would be performed by the prime contractor or a subcontractor.

3.3.1 Labor - Wage Determination

Wage rates were taken from the latest Davis-Bacon wage determination - KY20210061 02/19/2021 & KY20210040 were used for determining wage rates.

3.3.2 Equipment Costs

The 2018 Equipment database, based on EP 1110-1-8, Construction Equipment Ownership and Operation Expense Schedule, Region II, was used and adjusted for current, local fuel and energy costs.

3.3.3 Vendor Quotes

Vendor quotes have been acquired and documented for the anticipated material costs for most features of work.

3.3.4 Crews

Project specific crews have been developed and applied to the detailed line items as appropriate. Crew members consist of selected complements of labor classifications and equipment pieces assembled to perform specific tasks. Productivity has been assigned to each crew reflective of the expected output per unit of measure for the specific activities listed in the cost estimate. In considering the crews and productivities, the engineer typically referenced other, similar work found in national reference manuals such as RS MEANS construction data, the MI Cost book, and other projects developed by USACE.

3.3.5 Quantities

Quantities were developed through close coordination with appropriate PDT members, primarily provided by the civil engineer. Quantities were checked / verified by the estimator and adjusted to account for construction methodology, shrink, swell, waste, etc. Other associated sub-quantities were also developed by the estimator, as needed.

3.4 INDIRECT COSTS

3.4.1 Contract Acquisition Strategy

Through discussions with the Project Manager (PM) & PDT, one contract is planned for the work. The assumption is that the winning Prime contractor would self-perform a small portion (~10%) of the major civil activities, while the remaining work will be subcontracted out, essentially mimicking a Full & Open solicitation.

3.4.2 Prime Contractors

3.4.2.1 Job Office Overhead (JOOH)

Job Office Overhead (JOOH) is estimated by percentage within the estimate for the Prime contractor. The estimate of 60.93% is based on itemizing the particular needs based on similar-sized projects and includes such items as project supervision, contractor quality control, contractor field office supplies, personal protective equipment, field engineering, and other incidental field overhead costs.

3.4.2.2 Home Office Overhead (HOOH)

For Home Office Overhead (HOOH) expense, the cost estimate includes an allowance applied as percentage at 12% of direct cost, plus field overhead. HOOH includes items such as office rental / ownership costs, utilities, office equipment ownership/maintenance, office staff (managers, accountants, clerical, etc.), insurance, and miscellaneous. The range of home office overhead can be quite broad and depends largely on the contractor's annual volume of work and the type of work that is generally performed by the contractor.

3.4.2.3 Profit

Profit was calculated using the Profit Weighted Guidelines (PWG) wizard in MII with a result of 6.58% profit.

3.4.2.4 Bonding

Bond was calculated as a running percentage at 1.50%, based on the estimator's judgement and past project experience.

3.4.3 Subcontractors

3.4.3.1 Overhead

All subcontractor overhead costs are set to 12% and 10% of direct cost to account their JOOH and HOOH costs, respectively. The exception is where a subcontractor has provided a quoted price including overhead. In that case, no additional markups have been included for subcontractor's overhead.

3.4.3.2 Profit

Subcontractor Profit was included as a running percentage of 8% based on estimator judgement.

3.4.4 Escalation

The contract was escalated to the mid-point of construction using EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS), to account for potential inflation during construction. This is included in the TPCS file, not the cost estimate in MII. The estimated mid-point of construction was identified through the development of a rough order of magnitude (ROM) construction schedule and can be seen in Attachment D, of this Appendix.

3.4.5 Contingency

Contingency was applied on the individual Civil Works WBS Feature Accounts as a result of an Abbreviated Risk Analysis, conducted March 25th, 2021. The details, including the risk register can be seen in Attachment B of this Appendix.

4 PROJECT FEATURE ACCOUNTS AND ASSOCIATED SCOPE

4.1 (01) LANDS & DAMAGES

- This feature account covers all costs associated with Real Estate, including lands, easements, rights of way, etc. The cost estimate for this account was provided by the Real Estate PDT team member and inserted into the MII estimate and TPCS. More information can be found in the RE appendix/tab.

4.2 (06) FISH & WILDLIFE FACILITIES

- Environmental mitigation and permitting cost are included in this account for the restoration of 0.25 acres.

4.3 (18) CULTURAL RESOURCES PRESERVATION

- This account includes all costs incurred by the government for actions associated with historic preservation, including, but not limited to, the identification and treatment of historic properties, and the mitigation of adverse effects, will be included in construction costs.

- These costs were provided by the Archeological PDT member for \$10,000. The provided price did not include contingency but was added based on results from the risk analysis.

4.4 (30) PLANNING, ENGINEERING, AND DESIGN

- The work covered under this account includes project management, project planning, preliminary design, final design, geotechnical and HTRW investigations, hydraulic modeling, preparation of plans & specifications, engineering during construction, adaptive management, coordination efforts, contract advertisement, opening of bids, and contract award.
- Cost for the Engineering and Design portion of the PED account were coordinated with the Civil PDT (PE/A) and their supervisor and account for the geotechnical investigations, surveying, geotechnical and civil design, and money for cost engineering to develop current working estimate and the IGE.

4.5 (31) CONSTRUCTION MANAGEMENT (S&A)

- The work covered under this account includes contract supervision, contract administration, construction administration, technical management activities, and District office supervision and administration costs. The cost for this account was estimated with input from the project manager, engineering design branch chief, and historical S&A rates from other similar-sized projects.

5 PROJECT SCHEDULE & DURATION

The construction phase of this project is anticipated to take approximately 90 days including submission/approval of submittals, mobilization, placement of fill and topsoil, and demobilization. Additional information can be found in Attachment D of this Appendix.

6 TOTAL PROJECT COST SUMMARY (TPCS)

The feasibility-level cost estimate for the Recommended Federal Plan at the FY21 price level (Project First Cost) is \$673,000 – excluding betterments. This estimate was escalated over the implementation schedule to generate a fully funded cost estimate in the amount of \$701,000. These costs can be found in Attachment B of this Appendix.

The feasibility-level cost estimate for the Betterments Plan (Non-Federal expense) at the FY21 price level (Project First Cost) is \$312,000. This cost would be the responsibility of the Non-Federal Sponsor and cannot be considered a part of any cost sharing. This estimate was escalated over the implementation schedule to generate a fully funded cost estimate in the amount of \$325,000.

ATTACHMENT A
MII SUMMARY REPORT

Tentatively Selected Plan (TSP) Estimate - MII Report

Title Page

P2#: 473999

Location: Ledbetter, KY (Livingston County, KY)

Unrestricted/Full & Open Procurement (Assumed)

Bid Opening (Assumed)

Solicitation: N/A

Files located at <O:\ED\Public\MCACES\ED-M-C\0 Civil\FY20\473999 - Livingston County, Sec 14>

SCOPE: The scope of this study is to find an acceptable plan which will correct/prevent active erosion which has been identified as a threat to an existing public road and residential properties. A portion of the Ohio River bank is eroding due to rapid drawdown, sand seam piping, and scour of the failed material resulting from flow coming out of a drainage swale. The area of erosion is estimated to extend approximately 80 feet in a generally north-south direction into the bank and is estimated to be approximately 80 feet long in a generally east-west direction. Since 2015, engineering estimates six (6) feet of bank loss per year along the headcut and four (4) feet per year out from the side slopes.

There are nine (9) properties and two (2) residential structures that could be negatively impacted when Riverview Drive fails due to erosion. Failure to protect this road would result in loss of access. As a result, the primary purpose of the study is to identify the sections of the shoreline in immediate need of treatment and to develop a viable solution for the prevention of active erosion.

The method of streambank protection is to backfill the area with a granular fill, likely KY 357's, place a filter fabric over the granular fill, place 12-inches of topsoil and then seed and mulch the area and then overlay the bank with an 18-inch layer of KY Class II Channel Lining for approximately 130 feet. The granular fill will act as a filter, allowing the water to exit the bank through the sand seam but prevent the sand from being removed in the process.

Estimated by Neal Ralston LRL (502) 315-6126

Designed by

Prepared by Neal Ralston LRL (502) 315-6126

Preparation Date 2/26/2021

Effective Date of Pricing 2/26/2021

Estimated Construction Time 90 Days

Checked by: Jay Thomas PE, CCE

This report is not copyrighted, but the information contained herein is For Official Use Only.

Description	Quantity	UOM	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Project Cost Summary Report			535,433	592,415	213,766	806,180	806,180
Base Repair - Repair Failing Embankment	1.00	LS	372,911	410,373	143,220	553,593	553,593
Lands and Damages	1.00	LS	47,520	47,520	0	47,520	47,520
Fish and Wildlife Facilities	1.00	LS	11,063	11,063	0	11,063	11,063
Bank Stabilization	1.00	LS	113,329	150,790	143,220	294,010	294,010
Cultural Resource Preservation	1.00	LS	10,000	10,000	0	10,000	10,000
Planning, Engineering and Design	1.00	LS	162,000	162,000	0	162,000	162,000
Construction Management	1.00	LS	29,000	29,000	0	29,000	29,000
Betterments - Additional Rip Rap Placement	1.00	LS	162,522	182,042	70,546	252,588	252,588
Lands and Damages	1.00	LS	13,900	13,900	0	13,900	13,900
Fish and Wildlife Facilities	1.00	LS	0	0	0	0	0
Bank Stabilization	1.00	LS	63,622	83,142	70,546	153,688	153,688
Cultural Resource Preservation	1.00	LS	0	0	0	0	0
Planning, Engineering and Design	1.00	LS	71,000	71,000	0	71,000	71,000
Construction Management	1.00	LS	14,000	14,000	0	14,000	14,000

ATTACHMENT B
ABBREVIATED RISK ANALYSIS

Abbreviated Risk Analysis

Project (less than \$40M): **Livingston County/Ledbetter, KY - Section 14 (CAP)**
 Project Development Stage/Alternative: **Feasibility (Recommended Plan)**
 Risk Category: **Moderate Risk: Typical Project Construction Type**

Alternative: **Tentatively Selected Plan**

Meeting Date: **3/25/2021**

Total Estimated Construction Contract Cost = **\$ 468,761**

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ 61,420	5.00%	\$ 3,071	\$ 64,491
1	06 FISH AND WILDLIFE FACILITIES	Environmental Mitigation	\$ 11,063	7.37%	\$ 816	\$ 11,879
2	16 BANK STABILIZATION	Bank Stabilization	\$ 447,698	32.46%	\$ 145,314	\$ 593,012
3	18 CULTURAL RESOURCE PRESERVATION	Cultural Resource Preservation	\$ 10,000	5.00%	\$ 500	\$ 10,500
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 233,000	10.97%	\$ 25,558	\$ 258,558
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 43,000	8.99%	\$ 3,868	\$ 46,868
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -	

Totals						
	Real Estate	\$	61,420	5.00%	\$	64,491
	Total Construction Estimate	\$	468,761	31.28%	\$	615,391
	Total Planning, Engineering & Design	\$	233,000	10.97%	\$	258,558
	Total Construction Management	\$	43,000	8.99%	\$	46,868
	Total Including Real Estate	\$	806,181	22.22%	\$	985,308

Livingston County/Ledbetter, KY - Section 14 (CAP) Tentatively Selected Plan

Feasibility (Recommended Plan)

Abbreviated Risk Analysis

Meeting Date: 25-Mar-21

Risk Level					
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Moderate	Significant	Critical

23%

Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Likelihood & Impact)			Risk Level	Line Item Magnitude (\$000)
Project Management & Scope Growth						Maximum Project Growth	75%
PS-1	Environmental Mitigation	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplish intent 	Current mitigation cost assume the work will stay above the Ordinary High Water level. Getting below this could change permitting/mitigation cost. Potentially could require "Mussel Survey" to prove no impacts - conservative estimate ~\$30k	Marginal	Possible	1	\$437k
PS-2	Bank Stabilization	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplish intent 	Potential for scope growth relatively small; Project is not technically complex - consist of primarily excavation/fill, rock placement.	Marginal	Unlikely	0	
PS-3	Cultural Resource Preservation	<ul style="list-style-type: none"> Potential for scope growth, added features? 	No major risk identified, unless footprint of the project were to expand which is unlikely. In the event it were to expand the cost which would be added are considered minimal	Marginal	Unlikely	0	
PS-13	Planning, Engineering, & Design	<ul style="list-style-type: none"> Potential for scope growth, added features? 	If scope growth were to happen, the design would also be expanded - Impact/Likelihood tied to Risk Element PS-2	Marginal	Unlikely	0	
PS-14	Construction Management	<ul style="list-style-type: none"> Potential for scope growth, added features? 	If scope growth were to happen, the design would also be expanded - Impact/Likelihood tied to Risk Element PS-2	Marginal	Unlikely	0	

Acquisition Strategy				Maximum Project Growth		30%	
AS-1	Environmental Mitigation		Acquisition Strategy should have no impact on Environmental Mitigation cost	Negligible	Unlikely	0	\$11k
AS-2	Bank Stabilization	<ul style="list-style-type: none">Contracting plan firmly established?8a or small business likely?High-risk acquisition limits competition, design/build? Limited bid competition anticipated?	Current estimate assumption is that project will advertise under Full & Open procurement (IFB - sealed bid). Typically, this is the most competitive environment. It is possible the project would go out under a Small Business set aside or even 8(a) Sole source. This could drive cost upwards of 10%-15%. However the project is solicited,competition would be expected as the project is low risk/simple in nature. Timing can play a factor as well -end of year can drive cost	Moderate	Likely	3	\$437k
AS-3	Cultural Resource Preservation		Acquisition Strategy should have no impact on Cultural Resource Preservation cost	Negligible	Unlikely	0	\$10k
AS-13	Planning, Engineering, & Design		Acquisition Strategy should have no impact on Planning, Engineering, & Design cost. DB not likely for this project.	Negligible	Unlikely	0	\$156k
AS-14	Construction Management		Acquisition Strategy should have no impact on Construction Management cost	Negligible	Unlikely	0	\$67k

Construction Elements				Maximum Project Growth		25%	
CON-1	Environmental Mitigation		Construction Elements should have no impact on Environmental Mitigation cost	Negligible	Unlikely	0	\$11k
CE-2	Bank Stabilization	<ul style="list-style-type: none">• Accelerated schedule or harsh weather schedule?• Potential for construction modification and claims?	Potential for adverse/harsh weather could be a factor with the work being performed on the Ohio. Specifications/timing could be coordinated to avoid potentially high water (wet season). The risk of a potential mod or claim is general a risk on any construction project that should be considered.	Moderate	Possible	2	\$437k
CE-3	Cultural Resource Preservation		Construction Elements should have no impact on Cultural Resource Preservation cost.	Negligible	Unlikely	0	\$10k
CE-13	Planning, Engineering, & Design	<ul style="list-style-type: none">• Potential for construction modification and claims?	Project is not high risk or technically complex, but there is the potential for modifications or claims to come up during construction	Marginal	Possible	1	\$156k
CE-14	Construction Management	<ul style="list-style-type: none">• Potential for construction modification and claims?	Project is not high risk or technically complex, but there is the potential for modifications or claims to come up during construction	Marginal	Possible	1	\$67k

Specialty Construction or Fabrication					Maximum Project Growth		65%	
SC-1	Environmental Mitigation		• Not applicable for this project.	Negligible	Unlikely	0	\$11k	
SC-2	Bank Stabilization		• Not applicable for this project.	Negligible	Unlikely	0	\$437k	
SC-3	Cultural Resource Preservation		• Not applicable for this project.	Negligible	Unlikely	0	\$10k	
SC-13	Planning, Engineering, & Design		• Not applicable for this project.	Negligible	Unlikely	0	\$156k	
SC-14	Construction Management		• Not applicable for this project.	Negligible	Unlikely	0	\$67k	

Technical Design & Quantities					Maximum Project Growth		30%	
T-1	Environmental Mitigation		• Not applicable for this project.	Negligible	Unlikely	0	\$11k	
T-2	Bank Stabilization	<ul style="list-style-type: none">• Sufficient investigations to develop quantities?• Possibility for increased quantities due to loss, waste, or subsidence?	Due to lack of upfront investigations, it is possible that quantity development is lacking. Quantity development currently relies on those developed in the initial H&H report. Quantity development to still to come by end of Feasibility will contain some level of conservatism, so we dont want to overexagerate the risk impact and have indentified it as Marginal	Moderate	Likely	3	\$437k	
T-3	Cultural Resource Preservation		• Not applicable for this project.	Negligible	Unlikely	0	\$10k	
T-13	Planning, Engineering, & Design		Estimated cost to perform investigations/design identified in TPCS. Risk of uncertainty still present, but minimal	Marginal	Possible	1	\$156k	
T-14	Construction Management		• Not applicable for this project.	Negligible	Unlikely	0	\$67k	

Cost Estimate Assumptions				Maximum Project Growth		35%	
EST-1	Environmental Mitigation	• Lack confidence on critical cost items?	No wetlands being impacted/project to stay above OHW mark - no issues foreseen with mitigation fees	Negligible	Unlikely	0	\$11k
EST-2	Bank Stabilization		Currently rock prices are based on previously received quote from local quarry. Bulk of the project is rock placement. Any material cost changes would be minimal impact. Possibility for road repairs along the route of equipment/material deliveries. Possible that portions of the road could be damaged from Heavy traffic.	Significant	Possible	3	\$437k
EST-3	Cultural Resource Preservation			Negligible	Unlikely	0	\$10k
EST-13	Planning, Engineering, & Design		Based on a percentage of the construction costs. Will increase as complexity and scope of the project increases. Changes will be picked up by the calculation in the TPCS sheet	Negligible	Unlikely	0	\$156k
EST-14	Construction Management		Based on a percentage of the construction costs. Will increase as complexity and scope of the project increases. Changes will be picked up by the calculation in the TPCS sheet	Negligible	Unlikely	0	\$67k

External Project Risks				Maximum Project Growth		40%	
EX-1	Environmental Mitigation		No major external risk were identified or discussed.	Negligible	Unlikely	0	\$11k
EX-2	Bank Stabilization	<ul style="list-style-type: none">• Potential for severe adverse weather?• Political influences, lack of support, obstacles?• Unanticipated inflations in fuel, key materials?• Potential for market volatility impacting competition, pricing?	Adverse weather conditions could impact the project schedule - at a minimum adding additional OH cost. This risk item (EX-2) has been deemed negligible because of a previously discussed risk (CE-2). It is the understanding of the PDT that the sponsor is on-board with the project as well as the nearby homeowners	Negligible	Possible	0	\$437k
EX-3	Cultural Resource Preservation	<ul style="list-style-type: none">• Political influences, lack of support, obstacles?• Potential for market volatility impacting competition, pricing?	Discussed was the possiblity for the discovery of human remains - though with the area being fairly built-up/residential, the possibility is unlikely for this to occur	Marginal	Unlikely	0	\$10k
EX-13	Planning, Engineering, & Design	<ul style="list-style-type: none">• Potential for severe adverse weather?• Unanticipated inflations in fuel, key materials?	No major external risk were identified or discussed. Acts of God could have potential impacts to anticipated DDC cost	Marginal	Possible	1	\$156k
EX-14	Construction Management	<ul style="list-style-type: none">• Potential for severe adverse weather?• Unanticipated inflations in fuel, key materials?	No major external risk were identified or discussed.	Marginal	Possible	1	\$67k

ATTACHMENT C
TOTAL PROJECT COST SUMMARY SHEET (TPCS)

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

Printed:5/25/2021

Page 1 of 3

PROJECT: **Ledbetter/Livingston County, Section 14**
 PROJECT NO: **473999**
 LOCATION: **Ledbetter, KY**

DISTRICT: **LRD-LRL**

PREPARED: **5/19/2021**

POC: **CHIEF, COST ENGINEERING, Jim Vermillion**

This Estimate reflects the scope and schedule in report; DPR_Livingston_County_CAP_Section_14_FONSI

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)	Program Year (Budget EC): Effective Price Level Date:			2021 1-Oct-20 Spent Thru: 1-Oct-15	TOTAL FIRST COST (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)	
						ESC (%)	COST (\$K)	REMAINING COST (\$K)							
06	FISH & WILDLIFE FACILITIES	\$11	\$1	7%	\$12		\$11	\$1	\$12		\$12	4.8%	\$12	\$1	\$12
16	BANK STABILIZATION	\$448	\$145	32%	\$593		\$448	\$145	\$593		\$593	4.8%	\$470	\$152	\$622
18	CULTURAL RESOURCE PRESERVATION	\$10	\$1	5%	\$11		\$10	\$1	\$11		\$11	4.8%	\$10	\$1	\$11
CONSTRUCTION ESTIMATE TOTALS:		\$469	\$147		\$616		\$469	\$147	\$616		\$616	4.8%	\$492	\$154	\$645
01	LANDS AND DAMAGES	\$61	\$2	4%	\$64		\$61	\$2	\$64		\$64	4.8%	\$64	\$2	\$67
30	PLANNING, ENGINEERING & DESIGN	\$229	\$25	11%	\$254		\$229	\$25	\$254		\$254	3.0%	\$236	\$26	\$262
31	CONSTRUCTION MANAGEMENT	\$43	\$4	9%	\$47		\$43	\$4	\$47		\$47	2.4%	\$44	\$4	\$48
PROJECT COST TOTALS:		\$802	\$178	22%	\$980			\$178	\$980		\$980	4.2%	\$836	\$186	\$1,022

____ CHIEF, COST ENGINEERING, Jim Vermillion

____ PROJECT MANAGER, Lacey Gabbard

____ CHIEF, REAL ESTATE, Veronica Hiriams

____ CHIEF, PLANNING, Amy Babey

____ CHIEF, ENGINEERING, John Bock

____ CHIEF, OPERATIONS, Tim Fudge

____ CHIEF, CONSTRUCTION, Kurt Daily

____ CHIEF, CONTRACTING, Denise Bush

____ CHIEF, RM, Vicki Vasquez

____ CHIEF, DPM, Linda Murphy

\$802

ESTIMATED TOTAL PROJECT COST: \$1,022

ESTIMATED FEDERAL COST: \$454

ESTIMATED NON-FEDERAL COST: \$568
(includes Betterments)

22 _ FEASIBILITY STUDY (CAP studies): \$100

ESTIMATED FEDERAL COST: \$100

ESTIMATED NON-FEDERAL COST:

ESTIMATED FEDERAL COST OF PROJECT \$554

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

Printed:5/25/2021
Page 2 of 3

**** CONTRACT COST SUMMARY ****

PROJECT: Ledbetter/Livingston County, Section 14

LOCATION: Ledbetter, KY

This Estimate reflects the scope and schedule in report;

DPR_Livingston_County_CAP_Section_14_FONSI

DISTRICT: LRD-LRL

POC: CHIEF, COST ENGINEERING, Jim Vermillion

PREPARED: 5/19/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 18-May-21 Estimate Price Level: 1-Oct-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1-Oct-20								
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	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
		COST (\$K) C	CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F									
PHASE 1 or CONTRACT 1														
06	FISH & WILDLIFE FACILITIES	\$11	\$1	7.4%	\$12		\$11	\$1	\$12	2023Q1	4.8%	\$12	\$1	\$12
16	BANK STABILIZATION	\$294	\$95	32.5%	\$389		\$294	\$95	\$389	2023Q1	4.8%	\$308	\$100	\$408
18	CULTURAL RESOURCE PRESERVATION	\$10	\$1	5.0%	\$11		\$10	\$1	\$11	2023Q1	4.8%	\$10	\$1	\$11
CONSTRUCTION ESTIMATE TOTALS:		\$315	\$97	30.7%	\$412		\$315	\$97	\$412			\$330	\$101	\$432
01	LANDS AND DAMAGES	\$48	\$2	4.6%	\$50		\$48	\$2	\$50	2023Q1	4.8%	\$50	\$2	\$52
30	PLANNING, ENGINEERING & DESIGN													
1.5%	Project Management	\$5	\$1	11.0%	\$6		\$5	\$1	\$6	2022Q2	3.0%	\$5	\$1	\$6
1.0%	Planning & Environmental Compliance	\$3	\$0	11.0%	\$3		\$3	\$0	\$3	2022Q2	3.0%	\$3	\$0	\$3
38.5%	Engineering & Design	\$121	\$13	11.0%	\$134		\$121	\$13	\$134	2022Q2	3.0%	\$125	\$14	\$138
2.5%	Reviews, ATRs, IEPRs, VE	\$8	\$1	11.0%	\$9		\$8	\$1	\$9	2022Q2	3.0%	\$8	\$1	\$9
1.0%	Life Cycle Updates (cost, schedule, risks)	\$3	\$0	11.0%	\$3		\$3	\$0	\$3	2022Q2	3.0%	\$3	\$0	\$3
1.0%	Contracting & Reprographics	\$3	\$0	11.0%	\$3		\$3	\$0	\$3	2022Q1	2.4%	\$3	\$0	\$3
3.0%	Engineering During Construction	\$9	\$1	11.0%	\$10		\$9	\$1	\$10	2022Q1	2.4%	\$9	\$1	\$10
0.5%	Planning During Construction	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2022Q2	3.0%	\$2	\$0	\$2
0.5%	Adaptive Management & Monitoring	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2023Q1	4.9%	\$2	\$0	\$2
1.0%	Project Operations	\$3	\$0	11.0%	\$3		\$3	\$0	\$3	2023Q1	4.9%	\$3	\$0	\$3
31	CONSTRUCTION MANAGEMENT													
5.7%	Construction Management	\$18	\$2	9.0%	\$20		\$18	\$2	\$20	2022Q1	2.4%	\$18	\$2	\$20
2.0%	Project Operation:	\$6	\$1	9.0%	\$7		\$6	\$1	\$7	2022Q1	2.4%	\$6	\$1	\$7
1.5%	Project Management	\$5	\$0	9.0%	\$5		\$5	\$0	\$5	2022Q1	2.4%	\$5	\$0	\$6
CONTRACT COST TOTALS:		\$551	\$119		\$669		\$551	\$119	\$669			\$573	\$124	\$698

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

Printed:5/25/2021
Page 3 of 3

**** CONTRACT COST SUMMARY ****

PROJECT: Ledbetter/Livingston County, Section 14

LOCATION: Ledbetter, KY

This Estimate reflects the scope and schedule in report;

DPR_Livingston_County_CAP_Section_14_FONSI

DISTRICT: LRD-LRL

POC: CHIEF, COST ENGINEERING, Jim Vermillion

PREPARED: 5/19/2021

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 18-May-21 Estimate Price Level: 1-Oct-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1-Oct-20								
		RISK BASED												
WBS	Civil Works	COST	CNTG	CNTG	TOTAL	ESC	COST	CNTG	TOTAL	Mid-Point	ESC	COST	CNTG	FULL
NUMBER	Feature & Sub-Feature Description	(\$K)	(\$K)	(%)	(\$K)	(%)	(\$K)	(\$K)	(\$K)	Date	(%)	(\$K)	(\$K)	(\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
06	Contract #2 (Betterments)													
16	FISH & WILDLIFE FACILITIES			7.4%										
18	BANK STABILIZATION	\$154	\$50	32.5%	\$204		\$154	\$50	\$204	2023Q1	4.8%	\$161	\$52	\$214
	CULTURAL RESOURCE PRESERVATION			5.0%										
CONSTRUCTION ESTIMATE TOTALS:		\$154	\$50	32.5%	\$204		\$154	\$50	\$204			\$161	\$52	\$214
01	LANDS AND DAMAGES	\$14			\$14		\$14		\$14	2023Q1	4.8%	\$15		\$15
30	PLANNING, ENGINEERING & DESIGN													
1.5%	Project Management	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2022Q2	3.0%	\$2	\$0	\$2
1.0%	Planning & Environmental Compliance	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2022Q2	3.0%	\$2	\$0	\$2
30.0%	Engineering & Design	\$46	\$5	11.0%	\$51		\$46	\$5	\$51	2022Q2	3.0%	\$47	\$5	\$53
2.5%	Reviews, ATRs, IEPRs, VE	\$4	\$0	11.0%	\$4		\$4	\$0	\$4	2022Q2	3.0%	\$4	\$0	\$5
1.0%	Life Cycle Updates (cost, schedule, risks)	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2022Q2	3.0%	\$2	\$0	\$2
1.0%	Contracting & Reprographics	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2022Q1	2.4%	\$2	\$0	\$2
3.0%	Engineering During Construction	\$5	\$1	11.0%	\$6		\$5	\$1	\$6	2022Q1	2.4%	\$5	\$1	\$6
2.0%	Planning During Construction	\$3	\$0	11.0%	\$3		\$3	\$0	\$3	2022Q2	3.0%	\$3	\$0	\$3
1.0%	Adaptive Management & Monitoring	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2023Q1	4.9%	\$2	\$0	\$2
1.0%	Project Operations	\$2	\$0	11.0%	\$2		\$2	\$0	\$2	2023Q1	4.9%	\$2	\$0	\$2
31	CONSTRUCTION MANAGEMENT													
5.7%	Construction Management	\$9	\$1	9.0%	\$10		\$9	\$1	\$10	2022Q1	2.4%	\$9	\$1	\$10
2.0%	Project Operation:	\$3	\$0	9.0%	\$3		\$3	\$0	\$3	2022Q1	2.4%	\$3	\$0	\$3
1.5%	Project Management	\$2	\$0	9.0%	\$2		\$2	\$0	\$2	2022Q1	2.4%	\$2	\$0	\$2
CONTRACT COST TOTALS:		\$252	\$59		\$311		\$252	\$59	\$311			\$262	\$62	\$324

ATTACHMENT D
CONSTRUCTION SCHEDULE

ID	Task Name	Duration	Start	Finish	Predecessors	Half 2, 2021					Half 1, 2022					Half 2, 2022					Half 1, 2023												
						J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J				
1	Final Report Approval (Division Level)	0 days	Tue 7/27/21	Tue 7/27/21																													
2	PPA Execution	0 days	Wed 12/1/21	Wed 12/1/21																													
3	Design (Plans & Specs)	185 days	Mon 8/2/21	Fri 4/15/22																													
4	Pre-Construction Period	85 days	Fri 5/13/22	Fri 9/9/22																													
5	Solicitation	24 days	Fri 5/13/22	Wed 6/15/22																													
6	Project Award	0 days	Thu 6/16/22	Thu 6/16/22	5																												
7	Generate Contractor Submittals	30 days	Thu 6/16/22	Wed 7/27/22	6																												
8	Review/Approve Submittals	30 days	Fri 7/29/22	Thu 9/8/22	7																												
9	NTP	0 days	Fri 9/9/22	Fri 9/9/22	8																												
10	Construction Period	59 days	Fri 9/9/22	Thu 12/1/22																													
11	Contractor Mobilization	5 days	Fri 9/9/22	Thu 9/15/22	9																												
12	Over-excavate failure locations, includes toe trench	10 days	Fri 9/16/22	Thu 9/29/22	11																												
13	Place Fill, bedding material	15 days	Fri 9/30/22	Thu 10/20/22	12																												
14	New Drop Inlet and Culvert Pipe	5 days	Fri 10/21/22	Thu 10/27/22	13																												
15	Place Riprap material	7 days	Fri 10/28/22	Mon 11/7/22	14																												
16	Import topsoil/spread/grade	2 days	Tue 11/8/22	Wed 11/9/22	15																												
17	Spread seed/straw	1 day	Thu 11/10/22	Thu 11/10/22	16																												
18	Survey for as-builts	2 days	Fri 11/11/22	Mon 11/14/22																													
19	Site clean-up/Contractor Demobilization	5 days	Fri 11/11/22	Thu 11/17/22																													
20	Contract Closeout	0 days	Thu 12/1/22	Thu 12/1/22	17FS+14 days																												
21																																	
22																																	
23																																	
24																																	
Project: Livingston Cty, CAP Section 14 Date: Wed 5/19/21		Task		Inactive Task		Manual Summary Rollup		External Milestone		Manual Progress																							
		Split		Inactive Milestone		Manual Summary		Deadline																									
		Milestone		Inactive Summary		Start-only		Critical																									
		Summary		Manual Task		Finish-only		Critical Split																									
		Project Summary		Duration-only		External Tasks		Progress																									
Page 1																																	

**CITY OF LEDBETTER
LIVINGSTON COUNTY, KY**

**CAP SECTION 14 PROJECT
EMERGENCY STREAM BANK STABILIZATION**

REAL ESTATE PLAN

APPENDIX D

**Real Estate Division
Louisville District
US Army Corps of Engineers**

April 2021

**CITY OF LEDBETTER
LIVINGSTON COUNTY, KY
CAP SECTION 14
EMERGENCY STREAM BANK STABILIZATION**

1. **PURPOSE:** This Real Estate Plan (REP) will identify the real estate interests required to implement the City of Ledbetter, 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 Detailed Project Report/Environmental Assessment (DPR/EA) of the same name.

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 purpose of this project is to protect a public road.

The Non-Federal Sponsor (NFS) is Livingston County, Kentucky. A Letter of Intent dated 13 April 2020 was provided by the NFS.

2. **PROJECT DESCRIPTION:** The project is located on the left bank of the Ohio River at approximately River Mile 927.6, roughly 8.6 miles downstream of the Smithland Lock & Dam. The project site is on Riverview Drive, a residential street in a residential neighborhood in north central Ledbetter. The area of erosion is located between two residential properties, 671 and 709 Riverview Drive. If the road were to fail, nine properties would be cut off from all ingress and egress as Riverview Drive is their only access to the rest of Ledbetter. See Exhibit D-1 for real estate mapping.

The proposed project measures consist of approximately 0.6 acres of bank stabilization by installing rip rap along the shore and backfilling. In addition to the project measures intended to protect the public roadway, the NFS will also include betterments in the final plan. The betterments will extend the shoreline protection approximately 75 feet downstream and 150 feet upstream to protect private residences that are also threatened by the eroding shoreline. The cost of these betterments will not be included in the total project costs as there is no cost share for betterments. The land on which the betterments will be constructed is also ineligible for LERRD crediting.

3. **ESTATES:** Approximately 0.6 acres will be needed for installation of the primary project features (not the betterments). A bank protection easement will need to be acquired from the property owners on either side of the site. An additional laydown area of 0.17 acres will necessary during construction. This will be acquired through a temporary work area easement. The tract register and easement language are below. It is unknown at this time how many additional acres will be required for the betterments.

Parcel ID	Estate	Acres
010-07-02-066.00	Bank Protection Easement	0.36

010-07-02-067.00	Bank Protection Easement	0.24
010-07-02-074.00	Temporary Work Area Easement	0.17

Bank Protection Easement

A perpetual and assignable easement and right-of-way in, on, over and across the land hereinafter described for the location, construction, operation, maintenance, alteration, repair, rehabilitation and replacement of a bank protection works, and for the placement of stone, riprap and other materials for the protection of the bank against erosion; together with the continuing right to trim, cut, fell, remove and dispose therefrom all trees, underbrush, obstructions, and other vegetation; and to remove and dispose of structures or obstructions within the limits of the right-of-way; and to place thereon dredged, excavated or other fill material, to shape and grade said land to desired slopes and contour, and to prevent erosion by structural and vegetative methods and to do any other work necessary and incident to the project; together with the right of ingress and egress for such work; 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.

Temporary Work Area Easements

A temporary easement and right-of-way in, on, over and across the land described in Schedule A for a period not to exceed three (3) years, beginning with date possession of the land is granted to [grantee], for use by the [grantee], 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.

4. **NON-FEDERAL SPONSOR LANDS:** The NFS does not own any land that is required for this project.
5. **NON-STANDARD ESTATES:** No non-standard estates are proposed for this project.
6. **EXISTING FEDERAL PROJECTS:** There are no existing Federal projects within the project area.
7. **FEDERALLY OWNED LAND:** There is no Federally owned land within the work limits of this project.

8. **NAVIGATION SERVITUDE:** While the project is located on navigable waters, navigational servitude does not apply.

9. **PROJECT AREA MAPS:** Real Estate mapping is attached as Exhibit D-1.

10. **POSSIBLE INDUCED FLOODING:** No induced flooding is anticipated as a result of project construction or maintenance.

11. **BASELINE COST ESTIMATE:** A preliminary rough order of magnitude baseline cost estimate of LERRDs required for this project is approximately \$50,000. See Exhibit D-2. This estimate is based on a review of assessed land values, recent property sales, and current sales listings of similar properties surrounding the project site. The land values utilized in the Rough Order of Magnitude Real Estate Cost Estimate were reviewed by the LRL staff appraiser and deemed acceptable for planning purposes. The estimated land values for the betterments are included in the cost estimate for informational purposes. Betterments are not eligible for LERRD crediting.

01 Lands & Damages

Lands	3 Acquisitions		\$22,745
Damages			\$2,275
P.L. 91-646 Relocation Benefits			\$0.00
Non-Fed Sponsor Incidental Costs	Acquisitions	3 @ \$5,000	\$15,000
Contingency		10%	\$2,275
		Subtotal	\$42,295
Federal Real Estate Admin Costs			\$7,500
<i>02 Relocations (Utility/Facility)</i>			\$0.00
Real Estate Total			\$49,795
Estimated betterments land value <i>(not eligible for LERRD crediting)</i>			\$13,900

12. **RELOCATION ASSISTANCE BENEFITS (P.L. 91-646):** Relocation benefits issued in accordance with Public Law 91-646 are not anticipated to support the proposed project.

13. **MINERAL/TIMBER ACTIVITY:** There is no mineral or timber activity in the project areas.

14. **SPONSOR CAPABILITY:** The NFS is moderately capable of fulfilling the real estate requirements of the project. See Exhibit D-3 for the completed Sponsor Capability Assessment.

15. **ZONING ORDINANCES ENACTED:** No rezoning is necessary to support the project.

16. **ACQUISITION SCHEDULE WITH MILESTONES:** The real estate acquisition schedule is yet to be determined. However, upon issuance of a notice to proceed with real estate acquisitions, the NFS is expected to be capable of acquiring the necessary real estate within 9 to 12 months.

17. **UTILITIES / FACILITIES TO BE RELOCATED:** No public utilities will be affected or require relocation as a result of the proposed project.

ANY CONCLUSION OR CATEGORIZATION CONTAINED IN THIS REAL ESTATE PLAN, OR ELSEWHERE IN THIS PROJECT REPORT, THAT AN ITEM IS A UTILITY OR FACILITY RELOCATION TO BE PERFORMED BY THE NON-FEDERAL SPONSOR AS PART OF ITS LERRD RESPONSIBILITIES IS PRELIMINARY ONLY. THE GOVERNMENT WILL MAKE A FINAL DETERMINATION OF THE RELOCATIONS NECESSARY FOR THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE PROJECT AFTER FURTHER ANALYSIS AND COMPLETION AND APPROVAL OF FINAL ATTORNEY'S OPINIONS OF COMPENSABILITY FOR EACH OF THE IMPACTED UTILITIES AND FACILITIES.

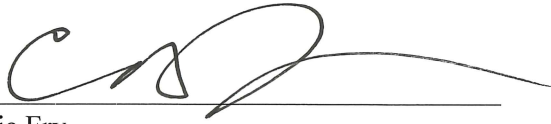
18. **HTRW CONSIDERATIONS:** A phase I site assessment was performed to evaluate the presence of hazardous substances at the site. A visual site inspection was performed on August 13, 2020 by a biologist in the planning section of the U.S. Army Corps of Engineers, Louisville District, and no evidence of contamination was discovered. The U.S. Environmental Protection Agency (EPA) Envirofacts database was queried regarding the potential location of any Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Resource Conservation and Recovery Act (RCRA) sites in the vicinity of the proposed project. There are no CERCLA or RCRA sites within one mile of the project area. Additionally, historical imagery, dating to 1938, was analyzed and no previous land use at the site would suggest any contamination by hazardous substances. As such, no hazardous, toxic, or radioactive waste is expected to be present at the project area, and the site is in suitable condition for construction repair.

19. **OWNER ATTITUDE / ISSUES:** The affected property owners are in support of the project, and no opposition is anticipated.

20. **SPONSOR NOTIFIED OF RISKS OF ADVANCE ACQUISITION:** The NFS was notified in writing of the risk of advance acquisition on 8 January 2021.

21. **ANY OTHER REAL ESTATE ISSUE:** All lands required for installation of betterment features will not be included in total project costs and will not be counted towards any LERRD credits.

Prepared by:




Carrie Fry
Realty Specialist
Louisville District

This REP is in compliance with applicable regulations, policy, and delegations.



Ashley N. Klimaszewski
Acting Chief, Real Estate
Louisville District



<p>PARCEL LINES</p> <p>BANK PROTECTION EASEMENT</p> <p>TWAE</p> <p>BETTERMENTS</p>	<p>0 35 70 140 210 280 Feet</p>	<p>LEDBETTER, LIVINGSTON COUNTY, KENTUCKY</p>	<p> US ARMY ENGINEER DISTRICT LOUISVILLE DISTRICT CORPS OF ENGINEERS REAL ESTATE DIVISION</p> <p>DATE: APRIL 2021</p> <p>SHEET: EXHIBIT D-1</p>
------------------------------------------------------------------------------------	---------------------------------	--------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Ledbetter, KY
CAP Section 14
April 2021

Real Estate Cost – Rough Order of Magnitude

This rough order of magnitude real estate cost estimate is based on a review of recent property sales around the project site. Based on this review, a reasonable estimate of the land value for the properties on the river is \$0.85 per square foot. A reasonable estimate of the land value for the property along Faye Drive is \$0.55 per square foot. Therefore, the rough order of magnitude real estate cost for the land required to repair the bank failure is **\$49,795**.

Betterments will also be included in this project. While the land required for betterments does not count toward total project costs and cannot be credited, a cost estimate of those lands is included below for informational purposes.

PROJECT FEATURES:

Parcel# 010-07-02-066.00 – 15,657 sq ft

Bank stabilization easement (\$0.85/sq ft)	\$13,308
Damages (10% of easement)	\$1,331
Incidental cost (surveys, title work, negotiations, etc.)	\$5,000
LRL cost (oversight, review)	\$2,500
Incremental cost/Contingency (10% of easement)	\$1,331
Subtotal	\$23,470

Parcel# 010-07-02-067.00 – 10,523 sq ft

Bank stabilization easement (\$0.85/sq ft)	\$8,945
Damages (10% of easement)	\$895
Incidental cost (surveys, title work, negotiations, etc.)	\$5,000
LRL cost (oversight, review)	\$2,500
Incremental cost/Contingency (10% of easement)	\$895
Subtotal	\$18,235

Parcel# 010-07-02-074.00 – 7,477 sq ft

TWAE – 1 year (12% of fee value, \$0.55/sq ft)	\$492
Damages (10% of easement)	\$49
Incidental cost (surveys, title work, negotiations, etc.)	\$5,000
LRL cost (oversight, review)	\$2,500
Incremental cost/Contingency (10% of easement)	\$49
Subtotal	\$8,090

TOTAL: \$49,795

BETTERMENTS:

Parcel	Sq Ft	Estimated Land Value (\$0.85/sq ft)
010-07-02-067.00	1,719.00	\$1,461
010-07-02-068.00	7,555.45	\$6,422
010-07-02-069.00	879.10	\$747
010-07-02-031.01	3,604.92	\$3,064
010-07-02-066.00	2,594.29	\$2,205
TOTAL		\$13,900

Betterments are not eligible for LERRD crediting.

Prepared by:
Carrie Fry
Realty Specialist
Louisville District

Concurrence:

CARNES.GREGOR
Y.N.1278039672

Digitally signed by
CARNES.GREGORY.N.1278039672
Date: 2021.04.15 11:19:49 -04'00'

Gregory Carnes
Review Appraiser
Louisville District

**LEDBETTER, LIVINGSTON COUNTY, KY
BANK STABILIZATION PROJECT
CAP SECTION 14**

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

Sponsor(s): Livingston County, KY

Authority: CAP Section 14

Non-Federal Sponsor Real Estate Contact:

Judge Garrett Gruber

Livingston County Judge/Executive

garrett.gruber@livingstonco.ky.gov

270-928-2105

I. Legal Authority

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

Yes X No _____

Non-Federal Sponsor is authorized to acquire and own land by authority of
KRS 820.81.

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 X No _____

The use of eminent domain is authorized by KRS 82.082.

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

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

Yes X No _____

Non-Federal Sponsor's "quick-take" authority is authorized by
KRS 416.610.

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 ☒ _____

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

Section I.


Realty Specialist

Date: 2 / 5 / 21

II. Financial Capability

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

Yes ☒ No _____

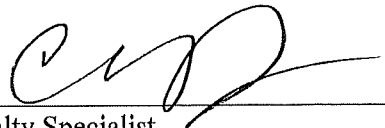
Note: If NO; provide the anticipated resolution.

- 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.


Realty Specialist

Date: 2 / 5 / 21

III. Willingness To Participate

- a. The non-Federal Sponsor has stated in writing its general willingness to participate in the project and its understanding of the general scope of the project and its part of the project.

Yes X

Letter of Intent from the NFS dated 4 / 13 / 2020.

Note: If more than one sponsor is to be involved explain the Real Estate roles of each non-Federal Sponsor.

- b. The non-Federal Sponsor is agreeable to signing a project partnership agreement and supplying funding as stipulated in the agreement.

Yes X

- c. The non-Federal Sponsor was provided the Local Sponsors Toolkit on 1 / 19 / 2021.

http://www.lrd.usace.army.mil/Portals/73/docs/RealEstate/Non-Federal_Sponsor_Package.pdf

Section III.


Realty Specialist

Date: 2 / 15 / 21

IV. Acquisition Experience and Capability

- a. Taking into consideration the project schedule and complexity, the non-Federal Sponsor has the capability with in-house staffing or contract capability, to provide the necessary services such as surveying, appraising, title, negotiating, condemnation, closings, and relocation assistance that will be required for the acquisition of properties for this project.

Yes X No _____

Note: If work will be done in-house give brief summary, staff size, expertise, experience, etc.

- b. The non-Federal Sponsor's staff is familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended.

Yes X No _____

Note: If NO; additional funding for USACE training/ oversight will be required.

- c. The non-Federal Sponsor can obtain contractor support and meet project schedules.

Yes X No _____

Note: If NO; does the acquisition timeline account for this?

- d. The non-Federal Sponsor's staff is located within a reasonable proximity to the project site.

Yes X No _____


Note: If NO; provide summary of plan to make contact; i.e., project office, travel, local contractors etc.

- e. Will USACE assistance likely be requested by the non-Federal Sponsor in acquiring real estate?

Yes _____ No X

Note: If YES; provide a summary of the level of support that will be requested. Will a Memorandum of Agreement be required in accordance with the Project Partnership Agreement?

Section IV.


Realty Specialist

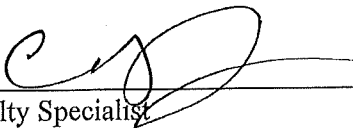
Date: 2 / 5 / 21

V. Schedule Capability

The non-Federal Sponsor has approved the tentative project/ real estate schedule/ milestones and has indicated its willingness and ability to incorporate its financial, acquisition, and condemnation capability to provide the necessary project LERRDs in accordance with proposed project schedules so the Government can advertise and award the construction contract as required by overall project schedules and funding limitations.

Yes X

Section V.


Realty Specialist

Date: 2 / 5 / 21

VI. LERRD Credits

The sponsor has indicated its understanding of LERRD credits and its capability and willingness to gather the necessary information to submit as LERRD credits in within six months after possession of all real estate and completion of relocations in order that the project can be financially closed and there can be a final financial accounting with a proper settlement with the non-Federal Sponsor.

Yes X

Note: If a multi-year phased project discuss plan for interim submittals.

Section VI.


Realty Specialist

Date: 2 / 5 / 21

VII. Capability

With regard to this project, the non-Federal Sponsor is anticipated to be:
moderately capable.

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 n/a.*
- 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.

VIII. Coordination

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

Yes X

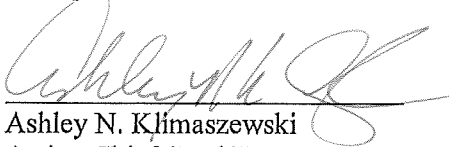
This assessment has been coordinated with:

Name: Judge Garrett Gruber
Title: Livingston County Judge/Executive

Prepared by:


Carrie Fry
Realty Specialist
Real Estate Division
Louisville District

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.



Ashley N. Klimaszewski
Acting Chief, Real Estate
Louisville District

Non-Federal Sponsor Representative:

Signature:  _____

Name: Garrett Gruber

Title: Livingston County Judge/Executive

Date: 02 / 04 / 2021



Garrett Gruber
Livingston County Judge Executive

(270) 928-2105
(270) 928-2106

321 Court Street • P.O. Box 70
Smithland, KY 42081

Fax (270) 928-3262
garrett.gruber@livingstonco.ky.gov

April 13, 2020

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

Dear Ms. Babey:

The County of Livingston, hereinafter called the "Sponsor", is interested in obtaining Corps of Engineers assistance in addressing a stream bank erosion problem on the Ohio River in Ledbetter, Kentucky at GPS coordinates 37°03'28.6"N 88°29'04.5"W under authority of Section 14 of the 1946 Flood Control Act. Acceleration of erosion patterns has created an unsafe living situation for households in impact area. Current rate of erosion is currently threatening 3 households, and will continue to move towards active road if no action is taken.

We are aware of the following cost sharing requirements associated with 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, rights-of-way, 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.

DEPARTMENT OF THE ARMY
RIGHT-OF-ENTRY FOR SURVEY AND EXPLORATION
DACW27-9-20-389

Smithland L&D

Project

653 Riverview DR
Leadbetter Ky

Tract No. or Other Property Identification

The undersigned, hereinafter called the "Owner", hereby grants to the UNITED STATES OF AMERICA, hereinafter called the "Government," a right-of-entry upon the following terms and conditions:

1. The Owner hereby grants to the Government an irrevocable right to enter upon the lands hereinafter described at any time within a period of 1 years from the date of this instrument, in order to survey, make test borings, and carry out such other exploratory work as may be necessary to complete the investigation being made of said lands by the Government.
2. The right-of-entry includes the right of ingress and egress on other lands of the Owner not described below, provided such ingress and egress is necessary and not otherwise conveniently available to the Government.
3. All tools, equipment, and other property taken upon or placed upon the land by the Government shall remain the property of the Government and may be removed by the Government at any time within a reasonable period after the expiration of this right-of-entry.
4. If any action of the Government's employees or agents in the exercise of this license results in damage to the real property, the Government will, in its sole discretion, either repair such damage or make an appropriate settlement with the Licensor. In no event shall such repair or settlement exceed the fair market value of the fee title to the real property at the time immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment, and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet any deficiencies. The provisions of this clause are without prejudice to any rights the Licensor may have to make a claim under applicable laws for any damages other than provided for herein.
5. The land affected by this right-of-entry is located in the State of Kentucky,
County of Livingston.

WITNESS MY HAND AND SEAL this 8th day of June, 2020.

BY: Cyndel Bobbitt
Signature of Owner

NAME: Cyndel Bobbitt

PHONE: Cyndel7008@gmail.com

EMAIL: 270-704-6388

UNITED STATES OF AMERICA

Veronica A. Hiriama

Veronica A. Hiriama
Real Estate Contracting Officer
Chief, Real Estate Division
Louisville District, Corps of Engineers
Louisville, Kentucky

DEPARTMENT OF THE ARMY
RIGHT-OF-ENTRY FOR SURVEY AND EXPLORATION
DACW27-9-20-390

Smithland L&D

Project

671 Riverway Dr
Tract No. or Other Property Identification

The undersigned, hereinafter called the "Owner", hereby grants to the UNITED STATES OF AMERICA, hereinafter called the "Government," a right-of-entry upon the following terms and conditions:

1. The Owner hereby grants to the Government an irrevocable right to enter upon the lands hereinafter described at any time within a period of 1 years from the date of this instrument, in order to survey, make test borings, and carry out such other exploratory work as may be necessary to complete the investigation being made of said lands by the Government.
2. The right-of-entry includes the right of ingress and egress on other lands of the Owner not described below, provided such ingress and egress is necessary and not otherwise conveniently available to the Government.
3. All tools, equipment, and other property taken upon or placed upon the land by the Government shall remain the property of the Government and may be removed by the Government at any time within a reasonable period after the expiration of this right-of-entry.
4. If any action of the Government's employees or agents in the exercise of this license results in damage to the real property, the Government will, in its sole discretion, either repair such damage or make an appropriate settlement with the Licensor. In no event shall such repair or settlement exceed the fair market value of the fee title to the real property at the time immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment, and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet any deficiencies. The provisions of this clause are without prejudice to any rights the Licensor may have to make a claim under applicable laws for any damages other than provided for herein.

5. The land affected by this right-of-entry is located in the State of Kentucky,
County of Letcher.

WITNESS MY HAND AND SEAL this 26 day of JUNE, 2020.

BY: Shirley Smiley
Signature of Owner

NAME: SHIRLEY SMILEY

PHONE: 270-898-4276

EMAIL: _____

UNITED STATES OF AMERICA

Veronica A. Hiriama

Veronica A. Hiriama
Real Estate Contracting Officer
Chief, Real Estate Division
Louisville District, Corps of Engineers
Louisville, Kentucky

DEPARTMENT OF THE ARMY
RIGHT-OF-ENTRY FOR SURVEY AND EXPLORATION
DACW27-9-20-391

Smithland L&D

Project

709 Riverview Dr. Ledbetter, KY 42058
Tract No. or Other Property Identification

The undersigned, hereinafter called the "Owner", hereby grants to the UNITED STATES OF AMERICA, hereinafter called the "Government," a right-of-entry upon the following terms and conditions:

1. The Owner hereby grants to the Government an irrevocable right to enter upon the lands hereinafter described at any time within a period of 1 years from the date of this instrument, in order to survey, make test borings, and carry out such other exploratory work as may be necessary to complete the investigation being made of said lands by the Government.
2. The right-of-entry includes the right of ingress and egress on other lands of the Owner not described below, provided such ingress and egress is necessary and not otherwise conveniently available to the Government.
3. All tools, equipment, and other property taken upon or placed upon the land by the Government shall remain the property of the Government and may be removed by the Government at any time within a reasonable period after the expiration of this right-of-entry.
4. If any action of the Government's employees or agents in the exercise of this license results in damage to the real property, the Government will, in its sole discretion, either repair such damage or make an appropriate settlement with the Licensor. In no event shall such repair or settlement exceed the fair market value of the fee title to the real property at the time immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment, and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet any deficiencies. The provisions of this clause are without prejudice to any rights the Licensor may have to make a claim under applicable laws for any damages other than provided for herein.
5. The land affected by this right-of-entry is located in the State of Kentucky,
County of Livingston.

WITNESS MY HAND AND SEAL this 25 day of June, 2020.

BY: Linda Haney
Signature of Owner

NAME: Linda Haney

PHONE: 270-556-5805

EMAIL: Linda.h.3@yahoo.com

UNITED STATES OF AMERICA

Veronica A. Hiriama

Veronica A. Hiriama
Real Estate Contracting Officer
Chief, Real Estate Division
Louisville District, Corps of Engineers
Louisville, Kentucky



Garrett Gruber
Livingston County Judge Executive

(270) 928-2105
(270) 928-2106

321 Court Street • P.O. Box 70
Smithland, KY 42081

Fax (270) 928-3262
garrett.gruber@livingstonco.ky.gov

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 Garrett Gruber at 270-928-2105.

Respectfully,

Garrett Gruber
Livingston County Judge/Executive

Allen O. Wilson
Livingston County Attorney

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

Christopher D. Wernick
Planner / Project Manager
USACE - Louisville District
600 Dr. Martin Luther King Place
Louisville, KY 40201
502-315-6786 (office)
502-548-1852 (mobile)