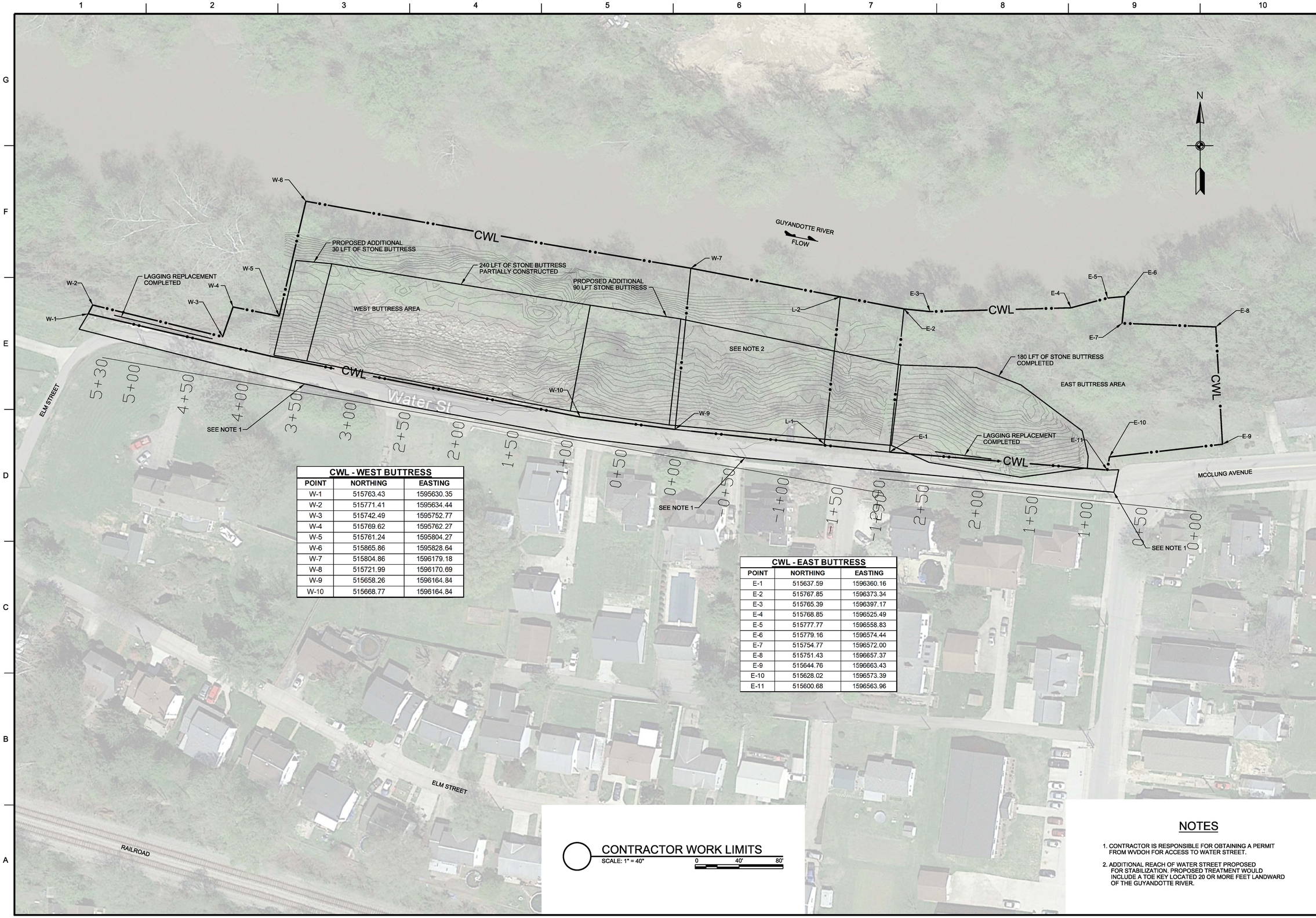
Appendix A

Exhibit



CWL - WEST BUTTRESS		
POINT	NORTHING	EASTING
W-1	515763.43	1595630.35
W-2	515771.41	1595634.44
W-3	515742.49	1595752.77
W-4	515769.62	1595762.27
W-5	515761.24	1595804.27
W-6	515865.86	1595828.64
W-7	515804.86	1596179.18
W-8	515721.99	1596170.69
W-9	515658.26	1596164.84
W-10	515668.77	1596164.84

CWL - EAST BUTTRESS		
POINT	NORTHING	EASTING
E-1	515637.59	1596360.16
E-2	515767.85	1596373.34
E-3	515765.39	1596397.17
E-4	515768.85	1596525.49
E-5	515777.77	1596558.83
E-6	515779.16	1596574.44
E-7	515754.77	1596572.00
E-8	515751.43	1596657.37
E-9	515644.76	1596663.43
E-10	515628.02	1596573.39
E-11	515600.68	1596563.96

CONTRACTOR WORK LIMITS

SCALE: 1" = 40"

0 40' 80'

NOTES

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A PERMIT FROM WVDOH FOR ACCESS TO WATER STREET.
2. ADDITIONAL REACH OF WATER STREET PROPOSED FOR STABILIZATION. PROPOSED TREATMENT WOULD INCLUDE A TOE KEY LOCATED 20 OR MORE FEET LANDWARD OF THE GUYANDOTTE RIVER.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: | ISSUE DATE:
DRAWN BY: | SOLICITATION NO.:
CHECKED BY: | CONTRACT NO.:
SUBMITTED BY: | %UOPTION 1%
SIZE: ANSI X | %UOPTION 2% BM8000-CS101000.dgn

U.S. ARMY CORPS OF ENGINEERS
HUNTINGTON DISTRICT
HUNTINGTON, WEST VIRGINIA
HUNTINGTON, WV 25701

WATER STREET, BARBOURSVILLE, WEST VIRGINIA
BARBOURSVILLE SECTION 14
GUYANDOTTE RIVER

CONTRACTOR WORK LIMITS

SHEET ID

CS101

Appendix B

Agency Coordination

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Danny Porter
Village of Barboursville Floodplain Coordinator
PO Box 266,
Barboursville, WV 25504

Dear Mr. Porter:

Please be advised a copy of the Draft Supplemental Environmental Assessment and draft Finding of No Significant Impact for the Section 14 Emergency Streambank Protection Project in the Village of Barboursville, West Virginia is available for review online at http://www.lrh.usace.army.mil/Missions/PublicReview.aspx. An abstract of the draft document is enclosed with this letter.

If you have any comments regarding the document or you would like to request a paper or compact disc copy of this report please contact:

Chief, Environmental Analysis Section
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070
Commercial Telephone: (304) 399-5924

Comments should be received within thirty (30) days of the date the Notice of Availability is published in The Herald-Dispatch, which will be on or about September 26, 2020. If you have any questions please contact the above listed commercial telephone number.

Sincerely,

Rebecca A. Rutherford
Chief, Environmental Analysis
Section

Enclosure

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Cabell County Floodplain Coordinator
750 Fifth Avenue
Huntington, WV 25701

To Whom It May Concern:

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Chief, Environmental Analysis
Section

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Mr. Danny Bennett
West Virginia Division of Natural Resources
P.O. Box 67
Elkins, West Virginia 26241

Dear Mr. Bennett:

Please be advised a copy of the Draft Supplemental Environmental Assessment and draft Finding of No Significant Impact for the Section 14 Emergency Streambank Protection Project in the Village of Barboursville, West Virginia is available for review online at http://www.lrh.usace.army.mil/Missions/PublicReview.aspx. An abstract of the draft document is enclosed with this letter.

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Sincerely,

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Section

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HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Ms. Barbara Sargent
West Virginia Division of Natural Resources
P.O. Box 67
Elkins, West Virginia 26241

Dear Ms. Sargent:

Please be advised a copy of the Draft Supplemental Environmental Assessment and draft Finding of No Significant Impact for the Section 14 Emergency Streambank Protection Project in the Village of Barboursville, West Virginia is available for review online at http://www.lrh.usace.army.mil/Missions/PublicReview.aspx. An abstract of the draft document is enclosed with this letter.

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Chief, Environmental Analysis Section
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070
Commercial Telephone: (304) 399-5924

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Sincerely,

Rebecca A. Rutherford
Chief, Environmental Analysis
Section

Enclosure

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Mr. Jared Beard
USDA Natural Resources Conservation Service
1550 Earl Core Road, Suite 200
Morgantown, WV 26505

Dear Mr. Beard:

Please be advised a copy of the Draft Supplemental Environmental Assessment and draft Finding of No Significant Impact for the Section 14 Emergency Streambank Protection Project in the Village of Barboursville, West Virginia is available for review online at http://www.lrh.usace.army.mil/Missions/PublicReview.aspx. An abstract of the draft document is enclosed with this letter.

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Chief, Environmental Analysis Section
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070
Commercial Telephone: (304) 399-5924

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Sincerely,

Rebecca A. Rutherford
Chief, Environmental Analysis
Section

Enclosure

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Ms. Susan Pierce
State Historic Preservation Office
1900 Kanawha Blvd., E.
Charleston, West Virginia 25305

Dear Ms. Pierce:

Please be advised a copy of the Draft Supplemental Environmental Assessment and draft Finding of No Significant Impact for the Section 14 Emergency Streambank Protection Project in the Village of Barboursville, West Virginia is available for review online at http://www.lrh.usace.army.mil/Missions/PublicReview.aspx. An abstract of the draft document is enclosed with this letter.

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U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070
Commercial Telephone: (304) 399-5924

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Sincerely,

Rebecca A. Rutherford
Chief, Environmental Analysis
Section

Enclosure

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

U.S. Environmental Protection Agency
Region III
Methodist Building
1060 Chapline Street, Suite 303
Wheeling, WV 26003

To Whom It May Concern:

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Chief, Environmental Analysis Section
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070
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Sincerely,

Rebecca A. Rutherford
Chief, Environmental Analysis
Section

Enclosure

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

United States Fish and Wildlife Service
West Virginia Field Office
6263 Appalachian Highway
Davis, WV 26260

To Whom It May Concern:

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U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070
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Sincerely,

Rebecca A. Rutherford
Chief, Environmental Analysis
Section

Enclosure

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

September 25, 2020

Planning, Programs and Project Management Division
Planning Branch, Environmental Analysis Section

West Virginia Department of Environmental Protection
601 57th Street
Charleston, WV 25304

To Whom It May Concern:

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502 Eighth Street
Huntington, West Virginia 25701-2070
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Sincerely,

Rebecca A. Rutherford
Chief, Environmental Analysis
Section

Enclosure

Appendix C

2017 Detailed Project Report and Integrated Environmental Assessment

Final Detailed Project Report
and Integrated Environmental Assessment

Guyandotte River, Water Street
Village of Barboursville, Cabell County, West Virginia
CAP Section 14 Emergency Streambank Protection Project

Water Street Subsidence and Partial Closure

July 2017

Guyandotte River, Water Street,
Village of Barboursville, Cabell County, West Virginia
CAP Section 14 Emergency Streambank Protection Project
Draft Detailed Project Report and Integrated Draft Environmental Assessment

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CAP Section 14 Emergency Streambank Protection
Guyandotte River, Water Street
Village of Barboursville, West Virginia
Detailed Project Report and Integrated Draft Environmental Assessment

1 INTRODUCTION

1.1 STUDY PURPOSE AND SCOPE

This Detailed Project Report (DPR) and integrated Environmental Assessment (EA) is being prepared by the U.S. Army Corps of Engineers (USACE) to identify the most cost effective alternative while minimizing environmental, economic, and social impacts for the proposed streambank protection project located on the right descending bank of the Guyandotte River in the Village of Barboursville, West Virginia. The Village of Barboursville is the non-Federal sponsor.

The purpose of the project is to provide a cost-effective means to protect Water Street and adjacent public utilities from immediate endangerment as a result of flood erosion. Water Street provides the main transportation route for a residential area within the Village of Barboursville. This residential area, which consists of approximately 34 homes, is located directly adjacent to a reach of Water Street in need of immediate protection and stabilization due to flood flow erosion and related recessional failures. Gas, water, and electric utility lines along with storm sewer drains are located along the failing reach. Approximately 850 linear feet (LF) of streambank is located within the project area. Since December 2014, the USACE Huntington District has monitored flood flow erosion and recessional failure site conditions resulting in the displacement of a retaining wall, drains, slopes, and stone placement intended to protect Water Street. As a result of these failure conditions, an approximately 240 LF reach of Water Street pavement has subsided and a reach of retaining wall has been displaced and overturned. Adjacent up and downstream reaches of retaining wall lagging panels have been displaced with resulting subsidence of road foundation materials. Pavement, drains, and public utilities adjacent to Water Street, within this project, have become misaligned. Without treatment, the outside bend of streambank fill and [1]alluvium would continue to undergo flood-related erosion and failure, resulting in extensive additional road collapse and utilities breaching. Failure to protect this road would result in loss of public access to the residential area and would preclude truck, school bus, and emergency response vehicles and breach adjacent public utilities. As a result, the primary purpose of this study is to develop a viable treatment solution for the protection of Water Street and adjacent public utilities within the Village of Barboursville.

[1] Alluvium – A deposit of clay, silt, sand, and gravel left by flowing streams in a river valley or delta.

1.2 LOCATION

1.2.1 Study Area

The Village of Barboursville is located along the right descending bank of the Guyandotte River in Cabell County, West Virginia (38.409097,-82.299078). The proposed Section 14 project would address streambank erosion along a portion of Water Street between river miles 7.7 and 7.9 of the Guyandotte River. The study area falls within the Lower Guyandotte Watershed, which is identified by Hydrologic Unit Code (HUC) 05070102. The Guyandotte River, a tributary of the Ohio River, is 166 miles long, starting southwest of Beckley in Raleigh County, West Virginia and flows to Guyandotte West Virginia to its confluence with the Ohio River, and drains approximately 1,680 square miles. The Lower Guyandotte Watershed is subject to periodic flooding. Additionally, the Guyandotte River [2]slackwater within this project reach is defined by the Greenup navigation pool at elevation 515 feet mean sea level (MSL). A site location map is shown in Figure 1.

Figure 1 – Water Street site location.

[2] Slackwater: The slack-water pool system occurs when gated navigation dams retain minimal river depths for commercial traffic.

1.2.2 Project Area

The project area is located along the right descending bank of the Guyandotte River, within the Village of Barboursville. Water Street is located along the top of bank. Included in the project area is approximately 850 LF of streambank which is affected by flood flow-related erosion and recession. Water Street, along with adjacent public utilities serving residents of the Village of Barboursville, are endangered by this flood related erosion and bank failure and are in need of immediate stabilization. Historically, Water Street and the adjacent properties included lumber and grist mills, boat yards, seasonal recreational facilities, and wells which supplied raw water for the community, a university, railroad maintenance facilities, foundries, and brickyards. Figures 2 and 3 show active failure conditions along Water Street.

Figure 2 – Water Street road subsidence and partial closure.

Figure 3 – Slope erosion and failure features.

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. The Section 14 authority falls under the 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 require specific authorization by Congress. Certain types of water resource and environmental restoration projects completed under CAP are delegated authority to plan, design, and construct recommendations without specific Congressional authorization.

1.4 RELEVANT PRIOR STUDIES AND REPORTS

In 1967, USACE completed the Barboursville Bank Restoration Project, a downstream bank stabilization project, which was completed to stabilize an adjacent reach of Water Street and Main Street together with bridge abutments. This specifically authorized project included a study report and the construction of a longitudinal dike with tiebacks and fill. The project was constructed to retain sediment which resulted in the re-establishment of an extensive mature riparian woodland. Bank displacements have continued within the adjacent riverfront park and roadway. These subsidence features have required limited backfilling and street repaving.

2 AFFECTED ENVIRONMENT - EXISTING CONDITIONS

2.1 CLIMATE PREPAREDNESS AND RESILIENCE

USACE must ensure that projects are planned and built to assure Climate Preparedness and Resilience. The Lower Guyandotte Watershed's geographic location makes it susceptible to highly variable weather throughout the year. The watershed's climate is greatly influenced by oceanic and atmospheric interactions. The watershed experiences seasonal weather patterns throughout the year, with climatic conditions typical of summer, fall, winter, and spring seasons for the Mid-Atlantic and Southeast Regions of the United States. Variability in weather tends to be greater during the late winter, spring, and fall seasons. Summers are usually characterized by warm to hot weather with periods of high humidity. Winters are typically mild, with areas at higher elevations experiencing slightly harsher winters and greater snowfall. Fall is typically the driest season, while spring is typically the wettest. Average precipitation at the Village of Barboursville is 45 inches per year. The project area is within the temperate zone with most flood events occurring during January and February of each year. Dry weather periods occur most often in October. Base flow conditions on the Guyandotte River are impacted by upstream low flow augmentation multi-purpose projects, including R.D. Bailey Locks and Dam, and the retention of the Greenup slackwater (Ohio River) navigation pool at elevation 515 feet MSL. In regards to climate change, 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 Daft Pilot Study.

2.2 SOILS AND GEOLOGY

2.2.1 Geology and Physiography

The Village of Barboursville is located within the Teays Lake varved lacustrine (lake) deposits together with overlying loess (wind-blown silts) and recent alluvium. Varved sediments consist of thinly layered clayey silt and silty fine sand deposits, which accumulated annually during the period of Pleistocene lake impoundment. Subsequent to this period, wind-blown silt (loess) mantled the lacustrine deposits and were then overlain by recent silty fine sand and fine sand alluvium. Indurated clay and siltstone bedrock was encountered at approximate elevation 492 feet MSL. Project topography includes the Guyandotte River channel, which is referenced by Greenup normal pool slackwater elevation at 515 feet MSL and top of bank (Water Street) elevation 572 feet MSL. The Guyandotte River channel bed elevation at the project is approximately 505 feet MSL.

2.2.2 Soil Associations

Riverbank and terrace soils in the project area include layered and lensing lacustrine and alluvial deposits together with calcareously cemented wind-blown silts. These loessial soils often form near-vertical river banks and terrace slopes and, together with alluvial deposits, are susceptible to erosional undercutting, oversteepening, and recessional failures, with transverse tension crack formation, and subsequent groundwater cleft pressure soil block displacement and toppling. Without the proposed project, these soils will continue to erode and fail. These failed soils and recently deposited alluvium will continue to be eroded during Guyandotte River flood events.

2.2.2 Hydric Soils

According to the NRCS'sSoil Use, National Hydric Soils list for the Village of Barboursville, West Virginia there are no hydric soils present within the project area.

2.3 SURFACE WATER AND OTHER AQUATIC RESOURCES

2.3.1 Surface Water

Water quality in the Guyandotte River adjacent to the project area is relatively poor. In general, industrial pollutants, municipal sewers, storm water discharge, and urban runoff have resulted in long-term impacts on the water quality. Flood flows re-work and transport failed soils and recently deposited sediment, which are then deposited downchannel adjacent to the General McComas Bridge. Per Section 303(d) of the Clean Water Act (CWA) and the Water Quality Planning and Management Regulations (40CFR130.7), the lower Guyandotte River is listed as biologically impaired in the 2012 Final West Virginia Integrated Water Quality Monitoring and Assessment Report. An Ecological Assessment of the Lower Guyandotte River Watershed conducted in 2014 by the West Virginia Department of Environmental Protection (WVDEP), indicates the watershed is heavily urbanized and industrialized which has led to major degradation of the streams in the watershed.

Additionally, high turbidity has also contributed to poor water quality of the river. Currently, a draft 2014 West Virginia Integrated Water Quality Monitoring and Assessment Report was submitted to the U.S. Environmental Protection Agency (USEPA) for review and approval. The draft 2014 report shows some improvement to water quality in sections of the Guyandotte River due to a cessation of area coal mining and dredging of the river for coal fines. Total Maximum Daily Loads (TMDL) have been developed for fecal coliform and iron in the lower Guyandotte River. A TMDL is important as it sets water quality standards for particular pollutants. The Guyandotte River is not a listed river under the Wild and Scenic Rivers Act.

2.3.2 Groundwater

The Guyandotte River Basin in West Virginia is known to have clay, silt, sand, gravel, and boulder alluvium with underlying fractured sandstone aquifers. A U.S. Geologic Survey (USGS) report completed in 2001 identified that aquifers in the Guyandotte River Basin have low ground-water recharge rates due to low relief compared to other parts of the state. In the 2001 Aquifer-Characteristics Data for West Virginia, USGS identified the mean annual recharge rate for the Guyandotte River Basin at 12.6 inches. This recharge rate is lower when compared with other places in West Virginia.

2.3.3 Floodplains

EO 11988 requires Federal agencies to consider the potential effects of their proposed actions on floodplains. The project area is located adjacent to the Guyandotte River which experiences periods of flooding. According to the Flood Insurance Rate Map (FIRM) 54011C0141D, dated June 16, 2005 and produced by the Federal Emergency Management Agency (FEMA), the lower terrace of the project area is within Zone AE and defined as an area which will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year (https://www.fema.gov/floodplain-

management/flood-zones). Based on the zone AE determination, the project area is located within the Special Flood Hazard Area (SFHA) (See Appendix B).

2.3.4 Wetlands

A National Wetland Inventory Map (NWI) was reviewed for the project area and a site reconnaissance was conducted to determine validity of the NWI maps. The NWI map indicated there are no wetlands on or adjacent to the project area (See Appendix B). The site reconnaissance also indicated no wetlands are located within the project area.

2.4 FISH AND WILDLIFE HABITATS

2.4.1 Terrestrial and Aquatic Vegetation

Terrestrial vegetation within the lower bank of the project area consists of Hackberry, River Birch, Willow, Sycamore, Cottonwood, Johnson Grass, Scouring Rush, Mile a Minute (Greenbrier), Purple Loosestrife, Knot Weed, and Multi-Flora Rose vegetation. Vegetation within the upper bank consists of Box Elder, Red Oak, White Oak, Elm, Silver Maple, Virginia creeper, Poison Ivy, Wild Grape, Staghorn Sumac, Jewel Weed, and Reed Canary Grass. The riparian area has been overwhelmed by invasive species including but not limited to the Knot Weed and Multi-Flora Rose. Aquatic vegetation zones along this portion of the Guyandotte River include sandy bars. However, no aquatic vegetation has been observed within the project area.

2.4.2 Fauna

Typical wildlife, although in limited numbers, are found in the project area. The vegetation, cover, habitat, and space allow for a small population of fauna such as squirrels, raccoons, and deer. Observed species include various bird species, which are highly mobile.

2.4.3 Existing Terrestrial and Aquatic Habitats

The project area includes low quality riparian habitat as a result of eroding riverbank along the Guyandotte River. Riparian habitat, which includes zones of inundation-tolerant vegetation along rivers, are important for the aquatic health of a river system. Riparian vegetation intercepts and filters sediment and pollutants during flooding and provides an influx of plant and insect matter which serve as food for the aquatic ecosystem. Dense riparian vegetation is becoming increasingly rare. The project area is prone to erosion and bank failure, therefore, the riparian vegetation is stressed and sediment is transported from the terrace and river bank, rather than being retained as would occur in a healthy riparian environment.

The Guyandotte River supports an aquatic community of species which include invertebrates, mussels, fish, amphibians, and reptiles, which live in spite of human disturbances. The Ecological Assessment of the Lower Guyandotte River Watershed conducted by WVDEP in 2004 identified the substrate of the Guyandotte River as composed mainly of silt, sand, gravel, and bedrock exposures. Fine sediment substrate often causes instability in the aquatic community, leading to a decrease of aquatic habitat diversity and abundance of native species. Common fishes in the lower Guyandotte watershed include, but are not limited to, Common Shiner, Tippecanoe Darter, Popeye Shiner, Eastern Sand Darter, Black

Bullhead, Longhead Darter, Spotted Darter (WVDNR, 2015). Mussel species also include but are not limited to the Longsolid, Wavyrayed Lampmussel, Black Sandshell, Elephantear, Clubshell, Round Hickorynut, and Mudpuppy. Increased fine sediment from streambank erosion can harm mussel species, which are filter feeders and live in the benthic substrate. Fish, which breed, feed, and find shelter near riparian habitat, are also impacted by fine sediment deposition. This sediment mantles the eggs and initial larval stage for several native species.

2.5 ENDANGERED AND THREATENED SPECIES

2.5.1 Federal

The Endangered Species Act of 1973 requires Federal agencies to consider the effects of actions on Federally listed endangered, threatened, and/or candidate species. There are 24 threatened or endangered species found within West Virginia as listed by the U.S. Fish and Wildlife Service (USFWS). Of these, three species may potentially be found within the project area. The species include the Pink mucket (pearlymussel) (Lampsilis abrupta) mussel, Indiana bat (Myotis sodalis) and Northern long-eared bat (Myotis septentrionalis). Cabell County is also within range of the Bald Eagle. The Bald Eagle is protected under the Bald and Golden Eagle Protection Act.

2.5.2 State

The West Virginia Division of Natural Resources (WVDNR) Wildlife Diversity Unit has indicated there are no known records of any rare, threatened, and endangered species or sensitive habitat located within the project area. In West Virginia, there is no state threatened and endangered species legislation. Therefore, the species listed as either threatened or endangered in West Virginia are those Federally listed species. Coordination with WVDNR can be found in Appendix B.

2.5.3 Critical Habitat

According to the USFWS database, there is no critical habitat found in the project area.

2.6 RECREATIONAL, SCENIC, AND AESTHETIC RESOURCES

2.6.1 Local Resources

The Village of Barboursville along Water Street consists of commercial properties, including locally owned businesses and shops, along with residential properties. The immediate project area consists of a residential area located directly adjacent to the Guyandotte River streambank. The Guyandotte River adjacent to the Village of Barboursville provides recreational fishing and boating opportunities. There is no direct access to the river as the shoreline is comprised of vegetation. Public river access exists several miles downstream of the project area in East Huntington, WV at the confluence of the Guyandotte and Ohio River.

The project area contains low quality riparian vegetation along the bankline. The aesthetic quality of the project is further diminished by the presence of an existing H-pile and lagging wall and rubble which was placed in an attempt to stabilize portions of the streambank. A restricted view of the project area is accessible from the top of bank, while a full view of the project area can be seen from the opposing

bank. Recreational boating and fishing are common in the Guyandotte River. This site would be visible to recreational fisherman and boaters.

2.6.2 Regional Resources

The Guyandotte River is a tributary of the Ohio River and is a major channel for recreational uses. Recreational uses include boating and fishing. The intersection of Water Street and McClung Avenue is a significant truck route through the Village of Barboursville as the alternate railroad underpass in the area has limited height restrictions. As mentioned above, Water Street provides the main transportation route for a residential area within the Village of Barboursville.

2.7 CULTURAL RESOURCES

2.7.1 Cultural History

Before 1800, there were few settlers within the bounds of present day Cabell County. However, during the next ten years increased farming on the fertile lowlands resulted in a new town that served as a trade center. By 1814, settlers living in the area grew tired of traveling to Charleston to attend court, so as a result a new county, Cabell was formed (1809) and Barboursville became the county seat in 1814. The Guyandotte River played an important role in the development of the industry in the county. The Guyandotte supported an active logging industry as well as transferring passengers to travel on the Ohio River. As the 19th century continued, the Civil War erupted in 1860's and a Confederate cavalry soon swept down on the town of Barboursville in a surprise attack. The local recruits, not yet uniformed or supplied with rifles, were soon overcome, leaving thirteen dead and wounded. Prisoners of the Confederate Army were transported to Richmond in open cattle cars. Soon after the clash, the County seat moved to the town of Guyandotte.

During the late 19th Century and early 20th Century, Barboursville had some of its most challenging times yet it still continued to grow and flourish into a well-maintained and prosperous commercial district. Much of Barboursville's early growth can be attributed to its location along a major stagecoach route. The town flourished with hotels, shops and restaurants. In the 1870s, the C&O railroad began building tracks that would go through Barboursville and continue on to Huntington. Although the people of Barboursville were against the building of the railroad, believing it would negatively impact the stagecoach travel that the town so depended on, the C&O continued its track expansion and with its completion Barboursville became a junction town while Huntington became the major stop along the route. Huntington began to develop at a fast rate and was eventually chosen to be the new county seat leaving Barboursville with an empty courthouse and an uncertain future. Barboursville would continue to evolve as a center of education and in the 1930s and 1940s as a smaller yet thriving Main Street community.

2.7.2 Previous Investigations

No cultural resource investigations had been performed to date for the project area. Efforts to identify previous investigations within the area have resulted in the following findings. Information obtained during file searches within West Virginia State Historic Preservation Office (WVSHPO) database indicated that two surveys located within 1.6km (1 mile) of the proposed project. The closest survey was done by

West Virginia Department of Transportation in response to the Merrick Creek Connector Project and resulted in identification of 14 sites. This survey was located about .7 miles northeast of the project area. Another survey was performed by Cultural Resource Analysts and resulted in identifying site 46Cb179 about 3/4 of a mile to the west of the project area. The Village of Barboursville's historic structures have been documented and resulted in a National Register Historic District designation. This Section 14 Project will have no impact on the integrity of any of the contributing structures within the Historic District.

2.8 AIR QUALITY

The UUSEPA is required to set air quality standards for pollutants considered harmful to public health and welfare. The Primary 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. Secondary standards set limits to protect public welfare, including protection against decreased visibility, and prevention of damage to animals, crops, vegetation, and buildings. These standards have been established for the following six pollutants, called criteria pollutants (as listed under Section 108 of the Clean Air Act (CAA)):

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO2)
- Ozone (O3)
- Particulate matter, classified by size as follows
  - An aerodynamic size less than or equal to 10 micrometers (PM 10)
  - An aerodynamic size less than or equal to 2.5 micrometers (PM 2.5) 1997 Standard
  - An aerodynamic size less than or equal to 2.5 micrometers (PM 2.5) 2006 Standard
- Sulfur dioxide

According to WVDEP Division of Air, Cabell County is in full attainment of all NAAQS. Air quality reports for Cabell County indicate the maximum measurement of Ozone over an eight hour period is periodically exceeded; however, the county has had an approved Maintenance Plan in place and is therefore considered in attainment with NAAQS.

2.9 NOISE

Noise is measured as Day Night average noise levels (DNL) in “A-weighted” decibels (dBA) most sensitive to the human ear. There are no Federal standards for allowable noise levels. According to the Department of Housing and Urban Development Guidelines, DNLs below 65 dBA are normally acceptable levels of exterior noise in residential areas. The Federal Aviation Administration (FAA) denotes a DNL above 65 dBA as the level of significant noise impact. Several other agencies, including the Federal Energy Regulatory Commission, use a DNL criterion of 55 dBA as the threshold for defining noise impacts in suburban and rural residential areas. According to Dr. Paul Schomer in his 2001 Whitepaper, while there are numerous thresholds for acceptable noise in residential areas, research suggests an area’s current noise environment, which has experienced noise in the past, may reasonably expect to tolerate a level of noise about 5 dBA higher than the general guidelines. The Corps Safety and

Health Requirements Manual provides criteria for temporary permissible noise exposure levels (see Table 1), for consideration of hearing protection or the need to administer sound reduction controls. Ambient noise around the project area is representative of a mixed commercial and residential area.

Table 1 - Permissible Non-Department of Defense Noise Exposures

Duration/day (hours)	Noise level (dBA)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105

2.10 HAZARDOUS AND TOXIC SUBSTANCES

In April 2016, a site visit was conducted for the limited Phase 1 Hazardous, Toxic, and Radioactive Waste assessment within the proposed project area. The following observations were noted during the site visit:

- Petroleum smell along top of bank across from 767 Water Street
- Miscellaneous discarded debris/trash along hillside
- Burn Areas along top of bank across from Elm Street and 735 Water Street
- Barboursville Brickyard, an adjacent property is a WVDEP Voluntary Remediation Site. It is estimated that no chemicals of concern in groundwater would migrate offsite.
- Several sites listed in the environmental database reports were reviewed for potential impacts to the project area.
    - Station #3915/Super America 7315 (602 Water Street)
    - James C. Brown property (651 Musgrave Court)
    - Keaton's Collision Center (100 Keaton Lane)
- The three sites named above from the environmental database report appear to have no actual impacts to the currently envisioned project area.

2.11 SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE

2.11.1 EO 12898 Environmental Justice

Under EO 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, Cabell County population change has varied little since 2000. As of 2015, Cabell County's population was 96,844, down 0.8 percent (%) since 2014. Approximately 91.3% of the population is white and does not contain significant minority populations. The median household

income is $37,716 compared with $53,482 for the State of West Virginia. Individuals residing in Cabell County below the poverty level are at 21.9% compared to 14.8% statewide.

2.11.2 EO 13045 Protection of Children

EO 13045 "Protection of Children from Environmental Health Risks and Safety Risks" was issued in 1997. This order applies to economically significant rules under EO 12866 "Regulatory Planning and Review" that concerns an environmental health or safety risk that USEPA has reason to believe may disproportionately affect children. Environmental health risks or safety risks refer to risks to health or to safety which are attributable to products or substances that the child is 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). When promulgating a rule of this description, USEPA must evaluate the effects of the planned regulation on children and explain why the regulation is preferable to potentially effective and reasonably feasible alternatives.

2.12 TRANSPORTATION AND TRAFFIC

The project area is located along the Guyandotte River and can be accessed from Water Street. Water Street is the main transportation route for a residential area consisting of approximately 34 homes within the Village of Barboursville and is located directly adjacent to the project area. In addition, the intersection of Water Street and McClung Avenue is the main truck route in the area as the alternate railroad underpass has limited height restrictions.

2.13 HEALTH AND SAFETY

Currently, sediment transported from the project area is occurring and impacts water quality and aquatic resources in the Guyandotte River. Streambank erosion and failure conditions are currently threatening the integrity of Water Street and adjacent infrastructure.

3 PLAN FORMULATION

3.1 PROBLEMS AND OPPORTUNITIES

As previously stated, Water Street provides the main transportation route for a residential area within the Village of Barboursville. This residential area, which consists of approximately 34 homes, is located directly adjacent to a reach of streambank affected by flood flow erosion and recessional failures and is in need of immediate protection and stabilization. Since 2014, flood flow erosion and recessional failure site conditions have resulted in displacement of an H-pile and lagging wall and stone slope protection designed to protect Water Street and adjacent utilities, which service residences and commercial facilities in this area of the Village. As a result of these failure conditions, the east travel lane of Water Street has subsided and portions of the wall have been displaced and overturned. In addition to pavement subsidence, drains and public utilities adjacent to Water Street have become misaligned. Two adjacent reaches of H-pile and lagging wall remain as-constructed, but the deteriorated timber lagging has resulted in the loss of road fill and related subsidence. Without treatment, the streambank will continue to undergo flood related erosion and failure and will eventually result in the further collapse of

Water Street and utilities. Implementation of the proposed protection measures will stabilize the streambank and prevent erosion and failures that would impact Water Street and adjacent utilities.

3.2 OBJECTIVES AND CONSTRAINTS

3.2.1 Planning Objectives

The purpose of this study is to recommend an alternative for addressing erosion issues threatening Water Street and adjacent utilities. The objective of the study is to stabilize the failing streambank along the Guyandotte River in the Village of Barboursville, West Virginia.

3.2.2 Planning Constraints

As previously stated, the study will recommend the most cost effective and environmentally acceptable solution for stabilizing the bank of the Guyandotte River at the affected critical reach adjacent to Water Street. At this time, no planning constraints have been identified which would negatively affect resources. Challenges associated with this study would include determining the optimal method and sequence of construction for the Recommended Plan. Land based construction will be implemented due to the close proximity of the treatment to Water Street. Closure of Water Street will be required for construction activities including excavation and placement of stone. The intersection of Water Street and McClung Avenue will be partially closed to allow for the transport of equipment and stone along the access road located within the lower terrace area. The risks associated with this construction method will be addressed by limiting excavation and stone placement increments.. Due to the extent of the project area and its location adjacent to the Guyandotte River, coordination with multiple agencies is necessary for the completion of all required local, state, and Federal regulations, including but not limited to, USFWS, WVSHPO, WVDNR, and WVDEP.

3.3 MOST PROBABLE FUTURE WITHOUT PROJECT CONDITIONS

Without protection of this 850 LF reach of streambank, erosion and failures, as observed after recent Guyandotte River flood events, would continue. Failure of this streambank would lead to the collapse of Water Street within the project area. The breaching of Water Street at the project location would restrict the area to limited access via Elm Street. However, this road is narrow and only allows non-commercial traffic to flow in one direction. If Elm Street becomes the only access (and therefore traffic moves both ways), then the width of the travelway would only allow one car through at a time, and larger public vehicles (e.g. Emergency Responders, Public Safety, Sanitation) would not be able to travel in both directions. Additionally, if Water Street breaches, there would be no turnaround area available to these vehicles. Without assistance from USACE, the Village of Barboursville would continue dumping rubble and re-surfacing the road to effect interim two lane through traffic. These measures do not address bank erosion or the related failure processes and therefore would not be adequate to address design flood (i.e. 100-year occurrence interval) flows and are not permanent solutions. With no action, loss of public access to Water Street would occur and the road, together with adjacent utilities and storm drain outfalls and drop inlets, would be further displaced.

3.4 Measures to Achieve Planning Objectives

3.4.1 Preliminary Structural and Non-Structural Measures

3.4.1.1 Structural Measures

Four structural measures were considered throughout alternative formulation to address streambank erosion impacting Water Street in the Village of Barboursville, West Virginia. These structural measures include the following:

Stone Buttress – Installation of this measure would require the excavation of failed soil, fill, debris, and vegetation to expose a suitable placement surface. Stone would be placed to construct transitions at the upstream and downstream limits of treatment segments. This is not a complete plan and would require additional measures.

Lagging Panel Replacement – Installation of this measure would require temporary sheeting and the installation of concrete panels. This is not a complete plan and would require additional measures.

H-pile – Installation of this measure would require embedment within the sandstone bedrock together with the placement of concrete panels from the terrace elevation to the pile cap and waler. This is not a complete plan and would require additional measures.

Sheet Pile – Installation of this measure would require embedment within the sandstone bedrock together weep holes the installation of a stiffener component. This is not a complete plan and would require additional measures.

3.4.1.2 Non-structural Measures

Two non-structural measures were considered throughout alternative formulation to address streambank erosion impacting Water Street in the Village of Barboursville, West Virginia. These non-structural measures include the following:

Relocation – This measure would involve the relocation of Water Street and adjacent utilities, McClung Avenue intersection, reconstructing cross drains, and acquiring necessary property. Relocation would not address long term streambank erosion and failure processes, which would require subsequent replacements of utilities and cross drains. This is a complete plan and would not require additional measures.

Vegetative Stabilization – Installation of this measure would rely on stabilization through vegetative treatments. Vegetative stabilization would necessitate extensive excavation to stable slope geometries, would require relocation of Water Street, adjacent public utilities, and storm drain outfalls. Relocation would allow for the excavation necessary for plantings, placement of vegetative soil reinforcement, wattles, and live stakes. This is not a complete plan and would require additional measures.

3.5 FORMULATION AND COMPARISON OF ALTERNATIVE SOLUTION SETS

3.5.1 Alternative Plan Descriptions

The following alternative plans and No Action Alternative were considered in response to the Guyandotte River flood erosion and streambank failure adjacent to the Village of Barboursville, which is endangering Water Street and adjacent utilities.

Alternative Plan A (Stone Buttress and Lagging Panel Replacement): Requirements for the construction of Alternative Plan A would include construction of a stone buttress along the approximately 240 LF reach of Water Street that has subsided and partially breached. Within two reaches of adjacent in-place H-pile and lagging walls, where loss of panel integrity has resulted in loss of road fill, concrete panels would be installed to replace damaged panels. Storm drains would be extended through the treatment to Guyandotte River outfalls. The total project cost, at a conceptual level, is estimated to be $2,676,000.

Alternative Plan B (Sheet Pile Wall and Stone Berm) – Installation of Alternative B would include constructing a sheet pile wall and stone berm approximately 240 LF in length. Storm drains will be extended through the treatment to Guyandotte River outfalls. As referenced in Alternative A, two reaches of lagging panels would be replaced. Problematic subsurface conditions including soil and bedrock characteristics as well as failure geometries and extents would result in significant risk during construction. The alignment of the sheet pile wall would be predicated on main scarp geometry. However, the failure surface is not well defined, therefore, the sheet pile wall may not fully intercept this feature. The total project cost at a conceptual level is estimated to be $2,900,000.

Alternative Plan C (H-pile and Lagging Wall together with Stone Berm) – Installation of Alternative C includes constructing an H-pile and lagging wall and stone berm along the 240 LF reach of Water Street. Storm drains would be extended through the treatment to Guyandotte River outfalls. As referenced by Alternative B, problematic subsurface conditions including soil and bedrock characteristics as well as failure geometries and extents would result in significant risk during construction. The alignment of the H-pile wall would be predicated on main scarp geometry. However, the failure surface is not well defined; therefore, the H-pile wall may not fully intercept this feature. The total project cost at a conceptual level is estimated to be $2,700,000.

Alternative Plan D (Limited Vegetative Stabilization) – Alternative D includes stabilizing the bank with vegetative treatments components. This alternative necessitates extensive excavation to stable slope geometries and would require partial relocation of Water Street, adjacent public utilities, and storm drain outfalls. Relocation would allow for the excavation necessary for plantings, placement of vegetative soil reinforcement, wattles, and live stakes. Storm drains would be extended through the treatment to Guyandotte River outfalls. With road and utility relocation, the total project cost at a conceptual level is estimated to be $9,100,000.

Alternative Plan E (Relocation) – Alternative E includes relocating Water Street and adjacent utilities, reconstructing cross drains, and acquiring necessary property. Relocation would not address long term

streambank erosion and failure processes, which requires subsequent realignments and replacements of utilities and cross drains. Although Water Street is immediately endangered by flood flow erosion within the 240 LF reach where major treatment components are proposed, the relocation encompasses the entire 850 LF of road in order to maintain intersections and the travelway. The total project cost, at a conceptual level, is estimated to be $4,100,000.

No Action Alternative (NAA): For the NAA, USACE would not provide streambank stabilization for Water Street along the project reach. The NAA would result in continued bank erosion and failure due to Guyandotte River flood flows, leading to the collapse of Water Street and utilities. Failure to protect the streambank and road would result in loss of public access to the residential area within the Village of Barboursville and would preclude truck, school bus, and emergency response traffic and breach adjacent public utilities. The NAA is not considered to be acceptable due to the immediate need for protection of Water Street and utilities. Without assistance from USACE, the Village of Barboursville would, as funding allows, likely continue dumping rubble and re-surfacing the road as interim measures to allow for through traffic. These measures do not address bank erosion or the related failure processes and therefore would not be adequate to address design flood (i.e. 100-year occurrence interval) flows and are not permanent solutions. With no action, loss of public access to portions of Water Street would occur and limited repair work would likely be undertaken by the Village of Barboursville to temporarily repair failing reaches. The NAA is not considered to be acceptable due to the immediate need for protection of Water Street and adjacent utilities.

3.5.2 Comparison of Alternative Plans

Table 2 – Comparison of Alternative Plans

Criteria	Alternative Plan A (Stone Buttress and Lagging Panel Replacement)	Alternative Plan B (Sheet Pile Wall and Stone Buttress)	Alternative Plan C H-pile and Lagging Wall and Stone Buttress	Alternative Plan D (Vegetative Stabilization)	Alternative Plan E (Limited Relocation)
Cost ($Million)	2.107	2.9	2.7	9.1	4.1
Constructability	YES Clearing and grubbing of vegetation.	YES Clearing and grubbing of vegetation.	YES Clearing and grubbing of vegetation.	YES Requires excavation, placement of material, and relocation of the road and adjacent utilities.	YES Relocation of the road, intersection, utilities, reconstruction of cross drains, and property acquisition.
Environmental	YES Minimal impacts	YES Minimal Impacts	YES Minimal Impacts	NO Significant aquatic and terrestrial impacts	NO Increased footprint will impact terrestrial resources; minimal aquatic impacts
Effectiveness	YES Reduces risk with minimal impacts	YES Reduces risk with minimal impacts	YES Reduces risk with minimal impacts	NO Significant aquatic and terrestrial impacts	YES Reduces risk with impacts
Efficiency	YES Most cost effective plan	NO	NO	NO	NO
Acceptability	YES	YES	YES	YES	YES
Completeness	YES	YES	YES	YES	YES

Alternative Plans A, B, C, D, E and the NAA were compared and evaluated relative to cost, constructability, environmental, effectiveness, efficiency, acceptability, and completeness. Alternative Plans B, C, D, and E have been excluded from further consideration. Table 2 was prepared to show the comparison of Alternative Plans. An expanded explanation of why these plans have been screened is located in Section 3.5.3. Alternative Plan A and the NAA have been moved on to the final array of plans for this project. The full cost breakdown for Alternative Plan A is included in Appendix C. Alternative Plan A, the Recommended Plan, is the Least Cost Alternative Plan.

3.5.3 Excluded Plans

Four of the initial plans, Alternative Plan B, Alternative Plan C, Alternative Plan D, and Alternative Plan E have been eliminated from further consideration.

Alternative Plan B has been eliminated due to cost. Additionally, uncertainty regarding subsurface conditions and causative processes, including soil and bedrock characteristics as well as geometries and extents, would result in significant risk during construction. The risk during construction include failure features that would extend landward of the structure which would require significant design modifications and the placement anchorage systems and/or additional stone.

Alternative Plan C has been eliminated due to cost. Additionally, uncertainty regarding subsurface conditions including soil and bedrock characteristics and causative processes would result in significant risk during construction. The risk during construction include failure features that would extend landward of the structure which would require significant design modifications and the placement anchorage systems and/or additional stone.

Alternative Plan D has been eliminated due to cost. Limited aquatic impacts would occur as a result of Alternative Plan D.

Alternative Plan E has been eliminated due to cost. Relocation would not address long term streambank erosion and failure processes, which would require subsequent realignments and replacements of utilities and cross drains. Relocation of the road, intersection, and adjacent utilities would not be feasible.

3.5.4 Risk and Uncertainty

This study was undertaken using Risk Informed Decision Making to insure that study, implementation, and project outcome risks were taken into account when formulating plans, selecting a plan for implementation, and during feasibility level design efforts. A discussion of risk and uncertainty allows the Project Delivery Team (PDT) and project sponsor to access risks likely to be encountered, as well as the consequences that could result from actions taken (or not taken) and items considered (or not considered) during each stage of the project. The risk and uncertainties for this project were developed using an Abbreviated Cost and Schedule Risk Analysis (CSRA). The analysis identified the 80% confidence level project cost and schedule duration. The risks and uncertainties for this project have been summarized in a Cost Engineering Abbreviated CSRA table which can be found in Appendix C.

3.6 RECOMMENDED PLAN

Alternative A (Stone Buttress and Lagging Panel Replacement) is least costly and has the least construction risk associated with the plan and has been recommended. Construction of this alternative will require limited clearing of vegetation and includes the construction of a stone buttress along the approximately 240 LF reach of Water Street that has subsided and is partially breached. Within two reaches of adjacent in-place H-pile and lagging walls, where loss of panel integrity has resulted in loss of road fill, concrete panels will be installed. Storm drains will be extended through the treatment to Guyandotte River outfalls.

3.6.1 Recommended Plan Description

Alternative Plan A (Stone Buttress and Lagging Panel Replacement):

Alternative Plan A has been chosen as the Recommended Plan. Requirements for the construction of this alternative would include the construction of a stone buttress, replacement of timber lagging panels, the replacement of a catch basin, and storm drain extensions to the Guyandotte River. Within the approximately 240 LF reach where Water Street has subsided and breached, failed soils and rubble will be excavated to form a placement surface for geotextile reinforcement fabric and Corps of Engineers (COE) 15 inch stone buttress construction. The District has determined that gradational requirements for commercially available stone sources as specified by West Virginia Division of Highways and others are suitable for project use, since these gradations exceed the requirements as established by the previously referenced hydraulic analysis methods. Stone with these gradations have been placed by WVDOH at proximate downstream bridge piers and abutments. These armoring features have remained in place during numerous bankfull and flood stage events. An existing road cross drain will be extended through this feature and a headwall will be installed at the outlet discharge location. Grout will be placed to form a splash pad at the cross drain outfall located on the stone buttress. Within two (2) reaches of adjacent in-place H-pile and lagging walls (400 LF total), timber lagging panels have deteriorated with the resulting loss of road fill and related subsidence. This lagging will be replaced with reinforced concrete lagging panels. The existing H-piles are as-constructed and not misaligned. Existing storm outfalls will be located and extended through the treatment to headwalls placed at the Guyandotte River. Pavement replacement along 240 LF of Water Street will require off-site disposal of asphalt materials at an approved facility and the placement of sub-base, base, and pavement. Curb replacement on the landward and riverward limits of the travelway will be required together with the installation of guardrail along the stone buttress. The construction staging area will be located channelward and adjacent to the McClung Avenue intersection. Site access will require an approximate 1,100 LF temporary road along the lower terrace to permit equipment and materials delivery, use during excavation and the construction of a stone buttress together with placement of catch basin, storm drain extensions, and outfalls. Appendix A includes estimated line item quantities. The total project cost of the Recommended Plan at a conceptual level is estimated to be $2,676,000.

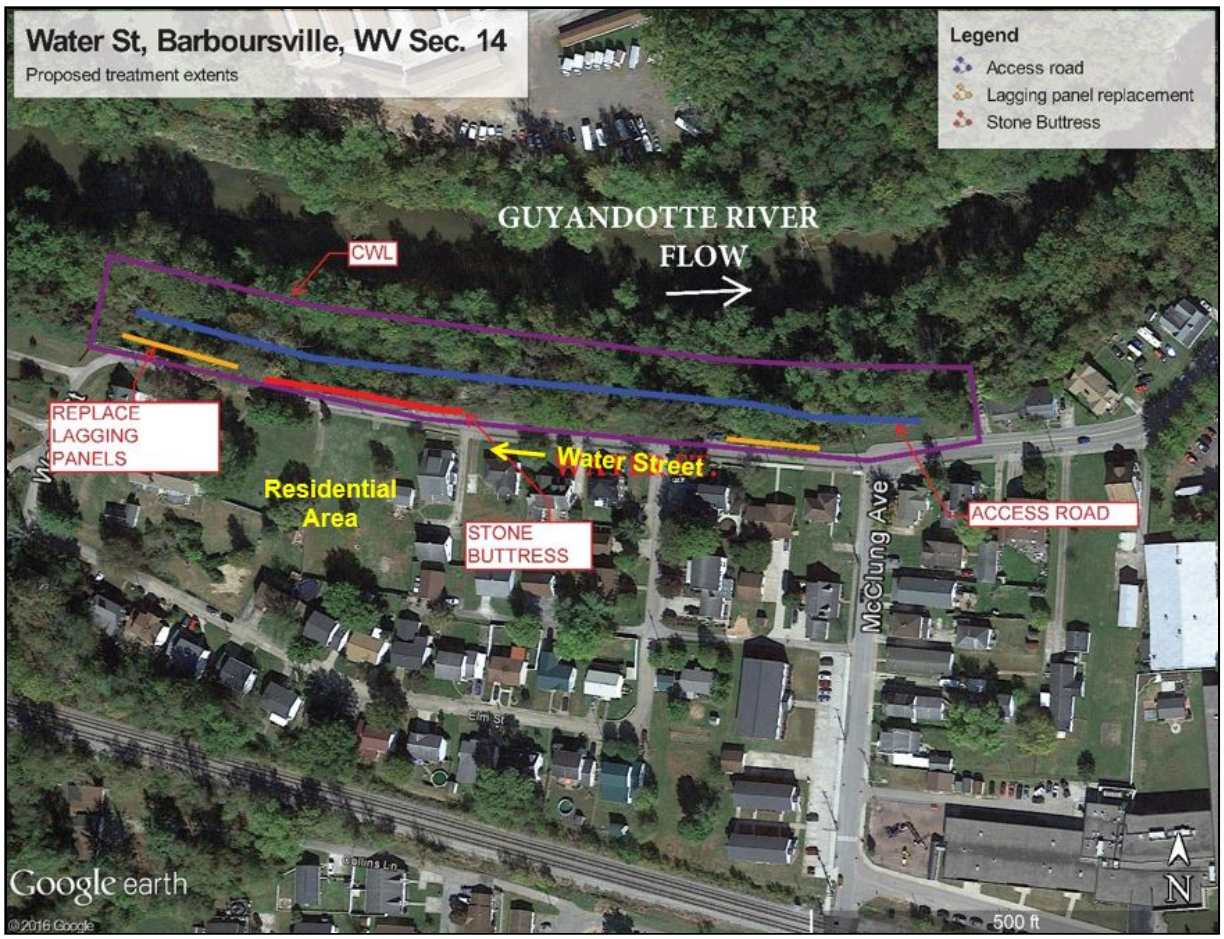

Figure 4: Recommended Plan

3.6.2 Hydraulic Analysis

Stone requirements for streambank protection in the project area were determined based on the criteria and procedures outlined in EM 1110-2-1601, dated 1 July 1991. A one-dimensional HEC-RAS model utilized existing FEMA Flood Insurance Study mapping to approximate flood stage elevations and velocities. CHANLPRO utilizes these velocities and the requirements in EM 1110-2-1601 to calculate minimum and maximum D_{100}, D_{50}, and D_{15} gradations in order to design stone slope protection to resist tractive force mechanisms. The flood frequencies used in this study were previously developed on a regional basis in accordance with the method outlined by Leo Beard and the Water Resources Council in the 1980's for the Cabell County, West Virginia FEMA Flood Insurance Study (FIS). The periods of record ranged from approximately 8 to 86 years. The average local velocity for the 1% chance exceedance discharge was computed to be 5.0 feet per second at the toe of the protected slope. Based on the computed velocity and the procedures outlined in the aforementioned reference, the analysis indicates that a minimum stone thickness of 6.0 inches is required to ensure the integrity of the bank against tractive force failure mechanisms. The recommended gradation limits for the stone size distribution are provided in Table 3. Flood frequencies for the Guyandotte River in the project reach are provided in Table 4.

Table 3 - Gradation Limits for Stone Slope Protection

Percent Lighter by Weight	Maximum Stone Diameter (in.)	Minimum Stone Diameter (in.)
D100	9.0	6.6
D50	6.0	5.3
D15	4.8	3.6

Table 4 - Flood Frequency Summary for the Guyandotte River at approximately River Mile 7.7

Percent Chance Exceedance (yr.)	Discharge (cfs)	Water Surface Elevation (feet above m.s.l.)
99.9%	10,800	533.1
50%	13,400	535.6
20%	17.300	538.7
10%	21,400	541.6
5%	26,100	544.5
2%	32,400	547.5
1%	36,400	549.8
0.5%	42,100	551.7
0.2%	49,500	554.3

The flood frequencies were utilized to determine the required extent of stone slope protection. In areas where stone slope protection is required, it is recommended that the rip rap be placed to an elevation of 530.0 feet, or top of the lower terrace.

3.6.3 Estimated Project Costs and Schedule

A cost estimate for the Recommended Plan was completed based on April 2016 prices and conditions.

Table 5 – Estimated Economic Costs for Recommended Plan

Recommended Plan (Alternative Plan A)	
Annual Project Cost based upon $2,676,00 project cost (at 3.125% for 50 year project life)	$106,486
Annual Operations & Maintenance Cost	$5,000
Total Annual Economic Cost	$111,486
Relocation Alternative	
Annual Project Cost based upon $4,100,000 project cost (at 3.125% for 50 year project life)	$163,151
Annual Operations and Maintenance	$0
Total Annual Economic Cost	$163,151

*Costs are subject to change as a result of Agency Technical Review.

ECONOMIC JUSTIFICATION FOR SELECTED ALTERNATIVE

The benefits for the project are the lesser of:

1. The least cost relocation alternative; or
2. The value of the infrastructure benefits forgone if no corrective action is taken.

The benefit-cost ratio (BCR) of the protection alternative is based on the comparison of the annual cost of the Relocation Alternative with the annual cost of the Recommended Plan.

$$BCR = \frac{\text{Annual Economic Cost of Relocation Alternative}}{\text{Annual Economic Cost of Recommended Plan}}$$

$$BCR = \frac{\$163,151}{\$111,486}$$

BCR = 1.46

The schedule is currently being developed with a target date of executing a Project Partnership Agreement (PPA) in March 2017. The following tables include the Federal and non-Federal apportionment of the estimated total project costs and the key milestones for the project.

Table 6 – Estimated Project Costs and Apportionment

	FY2015	FY2016	FY2017	FY2018
Feasibility Study Costs*		$100,000		
FED share Non-FED		$100,000 $0		
Design and Implementation Costs				
Design Analyses, Plans and Specs Construction LERRDs			$412,000 $2,248,000 $16,000	
FED share Non-FED share			$1,740,000 $937,000	
Non-FED cash/WIK Non-FED LERRD			$921,000 $16,000	
Total Project Cost			2,676,000	
FED share Non-FED share			$1,740,000 $937,000	

Table 7 – Key Project Milestones

Milestone	**Scheduled**	**Actual**
Initiate Feasibility Phase	10/8/2015	10/8/2015
Submit Federal Interest Determination Report	1/14/2016	1/14/2016
MSC Approved FID report	4/26/2016	1/29/2016
Execute Feasibility Cost Share Agreement	N/A	N/A
Submit MDM Draft DPR	7/15/2016	9/3/2016
MSC Approved MDM Draft DPR	9/29/2016	10/19/2016
Submit draft Final DPR	12/9/2016	12/21/2016
MSC Approved Decision Document	2/24/2017	3/9/2017
Project Approval - Initiate D&I phase	2/24/2017	4/6/2017
Fully Executed PPA	3/20/2017	4/6/2017
RE Certification	6/5/2017	7/12/2017
ATR Certified Construction Plans and Specifications	6/5/2017	7/12/2017
Construction Contract Award	9/11/2017	9/28/2017
Construction Complete	4/1/2018	4/11/2018

3.6.4 Non-Federal Sponsor Responsibilities

The project's Non-Federal sponsor, the Village of Barboursville, West Virginia, (referred to as the "Sponsor") has expressed continued interest in participating in this project and has acknowledged their responsibilities as outlined below.

The Sponsor has been working to secure non-federal cost share funds from grants and loans and anticipates they will be able to work with USACE to prepare and execute a PPA for the design and implementation phase of the project. The Sponsor has also been working to identify potential in-kind service opportunities.

The Sponsor has actively participated in the development of alternatives and the selection of the Recommended Plan. The PDT has actively reached out to the Sponsor throughout the duration of the feasibility phase, including, providing exhibits of the alternatives considered. In addition, the Sponsor has met with PDT members on several occasions, at the project site, to discuss treatment alternatives. Once the project has been completed, the Sponsor will accept the project, along with their O&M responsibilities, including, monitoring and performing routine maintenance to maintain its function.

4 ENVIRONMENTAL EFFECTS OF RECOMMENDED PLAN

4.1 CLIMATE PREPAREDNESS AND RESILIENCE

The Recommended Plan also referred to as Alternative Plan A above would not involve any activity that could affect the environment in regard to climate change. This region is not projected to experience severe drought conditions and is instead expected to experience more precipitation in the future. As a result, the Recommended Plan would likely be beneficial in future climate change conditions by protecting the project area from future erosion caused by increase precipitation. However, the action would not be a negative contributing factor to climate change and the project as designed would be robust to withstand projected climate change events. For the same reasons, there are also no impacts expected with respect to climate as a result of the NAA.

4.2 SOILS

Previously referenced bank alluvium, lacustrine, and wind-blown silts would be protected against flood flow-related erosion as a result of construction of the Recommended Plan. The storm drain extensions together with the stone buttress and lagging panel replacements would stabilize bank soils during flood flows and recessional conditions and allow for surface, groundwater, and high stage river recharge and recessional flows to discharge from the slope, through the treatment, while retaining bank soils and fills. This interruption of flood and related failure processes would stabilize Water Street. Soils and sediment, subject to erosion during subsequent flood events, would be stabilized by the stone buttress system. This buttress would preclude additional slope failures. Therefore, the Recommended Plan would have a positive impact on soils in the project area.

Under the NAA, bank soils will continue to scour and be susceptible to flood related saturation and internal erosion. Soils in the project area include silty clays, clayey silts, sandy silts, silty fine sands, and sand lenses together with fill material that was used to construct the road embankment. Upon recession from high water events, the river falls more rapidly than these soils can drain, resulting in increased unit weights and decreased strengths. Continued flood flow fill saturation and oversteepening, together with recessional failures, would result in slope instability and road collapse. Some small scale stabilization projects such as placing rubble and re-surfacing the road would most likely be undertaken by the Village of Barboursville to repair unstable reaches if this project is not constructed. However, under the NAA the project would remain subject to erosion and failure since interim efforts undertaken by the Village of Barboursville would be incomplete. Without treatment, these flood-related erosion and failure processes would continue and result in the breaching of Water Street and adjacent utilities.

4.2.1 Prime and Unique Farmland

The Farmland Protection Policy Act (FPPA) requires Federal agencies to minimize the conversion of prime and unique farmland to non-agricultural uses. After reviewing the project, on March 16, 2016, the Natural Resource Conservation Service (NRCS) determined the Recommended Plan would not impact Prime, Statewide, or Locally Important Farmlands. Based upon the NRCS determination, a Farmland Conversion Impact Rating does not need to be completed and the Recommended Plan would have no impact on Prime or Unique, Statewide, or Locally important farmland (Appendix B).

There are no impacts to Prime and Unique Farmland anticipated as part of the NAA.

4.3 SURFACE WATERS AND OTHER AQUATIC RESOURCES

4.3.1 Surface Water

The Recommended Plan would reduce localized sediment deposition caused by active erosion and failure of the riverbank in the project reach. Temporary impacts of construction would be minimized by following best management practices. Coordination was initiated with WVDEP's Division of Water on March 11, 2016 because preliminary treatment design had placement of stone below Ordinary High Water Mark. The initial treatment was modified to avoid fill material below Ordinary High Water Mark. Therefore, a Clean Water Act (CWA) Section 401 individual water quality certification permit and a CWA 404(b)1 analysis is not required for the proposed action. A National Pollutant Discharge Elimination System (NPDES) permit is required for construction storm water management. A sediment and erosion control plan will be required and implementation of the erosion and sedimentation control plan is mandated.

A Public Land Corporation permit and NPDES permit will be completed during the design and construction phase of the project due to the lack of time and funding during the feasibility phase. The team is aware of the issues and delays to the construction timeframe which may occur as all of the above mentioned permits and documentation must be completed prior to construction. The team is willing to take on the associated risks for the delay in order to complete the feasibility phase in a timely and cost effective manner.

Implementation of the Recommended Plan is expected to have a positive impact on water quality within the proposed project area as it will prevent further erosion of soils into the adjacent Guyandotte River. Under the NAA, water quality would continue to be impaired due to uncontrolled soil erosion even if small scale projects were undertaken together with continued elevated pollution levels and high turbidity.

4.3.2 Groundwater

The Recommended Plan would allow for continued groundwater seepage from the streambank while preventing further internal erosion and failure which may be caused by unrestricted discharge. Therefore, the Recommended Plan would address groundwater related streambank instability in the project area.

Under the NAA, groundwater would contribute to current erosional and failure impacts.

4.3.3 Floodplains

The Recommended Plan is designed in a manner which will not result in increased flood heights in the regulatory floodplains within the vicinity of the project area, as well as areas both upstream and downstream. The nature of this project does not result in incompatible use of the regulatory floodplain nor does it directly or indirectly encourage development of the floodplain. As the failing streambank is located in a floodplain and the proposed action is an emergency streambank protection project, there is no practicable alternative to taking action in the floodplain. Therefore, the Recommended Plan meets the intent of EO 11988 and will not cause a negative impact to the Special Flood Hazard Area. Under the NAA, continued bank erosion would continue and floodplain storage would increase with time.

4.3.4 Wetlands

A NWI map were reviewed for the project reach and a site reconnaissance was conducted to determine the validity of the NWI maps. NWI maps indicated no wetlands are located in the project area. The site reconnaissance also indicated no wetlands are located within the project reach. No impacts to wetlands are anticipated as part of the Recommended Plan or NAA.

4.4 WILDLIFE HABITATS

4.4.1 Terrestrial and Aquatic Vegetation

The Recommended Plan would involve removal of vegetation for placement of stone buttress and lagging panel replacement treatment. Existing vegetation adjacent to the treatment within the project construction work limits would not be removed. Due to an abundance of invasive species, limited clearing, and limited regrowth of vegetation adjacent to the proposed treatment, terrestrial impacts of the Recommended Plan would be minor.

The NAA would allow for continued erosion and bank failure. Some small interim stabilization and road re-surfacing projects would most likely be undertaken by the Village of Barboursville to repair unstable reaches if the Recommended Plan is not implemented. These incremental efforts would have similar impacts to the terrestrial resources as the Recommended Plan. Therefore, terrestrial vegetation impacts of the NAA would be minor.

Due to lack of aquatic vegetation on typically un-vegetated sandy bars along the shallow bench in the project area, the Recommended Plan would have no impacts to aquatic vegetation. Under the NAA, some small interim stabilization and road re-surfacing projects would most likely be undertaken by the Village of Barboursville to repair unstable reaches but would occur intermittently. These efforts would have similar impacts to aquatic vegetation as the Recommended Plan. Therefore, aquatic vegetation impacts of the NAA would be null.

4.4.2 Fauna

Current fauna onsite consists of species which are highly mobile and would not be significantly affected as the majority of proposed treatment would occur along the upper streambank. The Recommended Plan would still allow mobility of fauna onsite. Additionally, affected fauna would be able to find

alternative habitat adjacent to the project area. With no significant amount of wildlife in the project area, neither the Recommend Plan nor the NAA are anticipated to have any impacts to fauna.

4.4.3 Existing Terrestrial and Aquatic Habitats

Currently, the project area is prone to erosion and bank failure, therefore, resulting in stressed terrestrial habitat. The site also has an abundance of invasive species. Existing low quality terrestrial habitats would be impacted during construction due to the removal of existing vegetation. Vegetation adjacent to the proposed treatment would remain intact. Therefore, impacts to terrestrial habitat would be minimal under the Recommended Plan.

The NAA would allow for continued erosion and bank failure to existing terrestrial habitats, thus further degrading habitat within the project area. . Some small interim stabilization and road re-surfacing projects would most likely be undertaken under the NAA to repair unstable reaches. These efforts would have similar impacts to the terrestrial resources as the Recommended Plan. Therefore, terrestrial habitat impacts of the NAA would be minor.

The Guyandotte River supports an aquatic community of species which include invertebrates, mussels, fish, amphibians, and reptiles. There would be no in-water work or impacts to aquatic habitat as a result of the Recommended Plan. Excavation and placement of stone would occur on the top of bank. Additionally, BMP's will be used during construction of the proposed project to prevent runoff from the project into adjacent surface waters. Therefore, there are no anticipated impacts to aquatic resources under the Recommended Plan.

Under the NAA, some small interim stabilization and road re-surfacing projects would most likely be undertaken to repair unstable reaches. These efforts would have similar impacts to the aquatic resources as the Recommended Plan, but would occur intermittently and for a shorter duration. Bank failure is expected to continue within the project reach resulting in further degradation of aquatic habitats. Therefore, impacts to aquatic habitat under the NAA would be significant.

4.5 ENDANGERED AND THREATENED SPECIES

4.5.1 Federal

There are three Federally listed threatened and endangered species which may reside within the project area – these species include the Pink mucket (pearlymussel) (Lampsilis abrupta) mussel, Indiana bat (Myotis sodalis) and Northern long-eared bat (Myotis septentrionalis). The USACE Huntington District has determined that the proposed project may affect but is not likely to adversely affect the Indiana Bat and Northern long-eared bat as only limited woody vegetation would be removed from the site.

According to the 2016 West Virginia Mussel Survey Protocol, the Guyandotte River is a category one stream that is not expected to have Federally listed mussels. A mussel survey will not be conducted as the proposed treatment will be above regulatory Ordinary High Water Mark and land based construction will be implemented. Therefore, the Huntington District has determined the Recommended Plan will have no effect on the Federally listed Pink mucket mussel.

Section 7 consultation under the Endangered Species Act is required. The Huntington District has initiated coordination with USFWS on March 11, 2016. The USFWS concurred on February 23, 2017 with the Huntington District's determination that the proposed action may affect but is not likely to adversely affect listed bat species as seasonal tree clearing between November 15 and March 31 would occur. No further Section 7 consultation is required.

The NAA would result in impacts to bat species if the bank was left destabilized and was allowed to erode into the river, causing the loss of potential bat roost trees from the bank failure. The USACE is aware that the Village of Barboursville would undertake small interim projects to stabilize the banks and re-surface the road as needed. These measures would have similar effects to bat species as the Recommend Plan.

4.5.2 State

On March 23, 2016, WVDNR indicated there are no known records of any rare, threatened, and endangered species and sensitive habitat located within the project area. Coordination with WVDNR can be found in Appendix B. No impacts to these species beyond what was described in Section 4.5.1 are expected from the Recommended Plan or NAA.

4.5.3 Critical Habitat

According to the USFWS database, no critical habitat is located within the project area. Therefore, there would be no impacts to critical habitat under the Recommended Plan and NAA.

4.6 RECREATIONAL, SCENIC, AND AESTHETIC RESOURCES

The project area consists of a vegetated streambank adjacent to a residential neighborhood and does not provide public access to residents of the Village of Barboursville. Recreational boaters in the river would not be affected by the proposed project as work would be constructed from land. Therefore, there are no anticipated impacts to recreational resources under the Recommended Plan. The NAA would have potential significant negative impacts to recreational boaters as the failure of the streambank would lead to increased sedimentation and shoaling. Should the Village of Barboursville undertake small interim stabilization and re-surfacing projects, the effects would be the same as the Recommended Plan.

Under the Recommended Plan, vegetation within the proposed treatment extents (stone buttress) would be removed. The appearance of the stone buttress and concrete lagging wall replacement is a visually unnatural structure and may create an aesthetic impact. The proposed treatment would not significantly decrease the aesthetic quality of the site as there is currently a failed rubble deposit and lagging wall system in portions of the treatment. Under the NAA, viewers would have little change in aesthetics until flood flow erosion and failures breach Water Street. Some small scale stabilization and road re-surfacing projects would occur under the NAA (if the Recommend Plan was not implemented to repair unstable reaches). However, these repair materials which would be variable and subject to launching and therefore, would create an aesthetically displeasing vista. Both the Recommended Plan and NAA introduce visual changes to the project area upper streambank. Compared to the NAA, the

Recommended Plan would protect the streambank from further erosion and failure and provide a robust and complete solution to the streambank erosion. Furthermore, Water Street and adjacent utilities would remain intact; therefore the Recommended Plan would have no significant adverse impacts on proximate aesthetic resources.

4.7 CULTURAL RESOURCES

The project was coordinated with WVSHPO immediately following the Federal Interest Determination of this project and has been ongoing since 19 April 2016. WVSHPO has stated, upon a search of their records, no archeological resources or historic structures were identified as being located within the proposed project area. They also requested that "a USACE staff archeologist conduct a pedestrian survey of the proposed project location to determine if archeological resources are present prior to the excavation of the previous discussed trench." On 23 May 2016, USACE District Archeologist and staff traveled to the site to perform a pedestrian survey to determine if archeological resources are present within the Area of Potential Effect (APE). The visual inspection included reconnaissance of the total surface of the APE in contiguous systematic patterns from east to west augmented with shovel testing. No cultural material was identified as a result of this survey.

In accordance with 36 CFR 800.4(d)(1), it is the District's determination that no historic properties will be affected by the Project. On June 24, 2016, WVSHPO concurred with this determination.

4.8 AIR QUALITY

Construction activities of the Recommended Plan would have the potential to cause localized temporary nuisance air quality impacts which includes particulate emissions. Emission sources include diesel exhaust and fuel odors associated with operation of heavy equipment during construction activities.

All construction would be performed in compliance with applicable control requirements established by WVDEP Division of Air. Construction of the Recommended Plan may require the use of delivery trucks, two excavators, and two end loaders. The total estimated Ozone (O3) eight hour emission from this equipment is estimated to be 1.80 tons/year of NOx and 0.15 tons/year of VOC, and 0.11 tons/year PM 2.5 using 2008 emissions factors from the USEPA NONROAD model

Table 8: Estimated Air Quality Emissions from Construction

Equipment	VOC tons/year	CO tons/year	NOx tons/year	PM 10 tons/year	PM 2.5 tons/year	SO2 tons/year
Diesel Excavators	0.04	0.20	0.52	0.04	0.03	0.01
Diesel Loaders / Backhoes	0.04	0.16	0.17	0.02	0.02	0.00
Totals (tons/year)	**0.08**	**0.36**	**0.69**	**0.06**	**0.05**	**0.01**

In areas which are in nonattainment, or re-designated in attainment with a maintenance plan the CAA requires the Federal government make a conformity determination to assure their actions would conform to the State Implementation Plan. However, because the estimated emissions from construction equipment would be below the de minimis standards of 100 tons/year, a conformity determination is not required for the Recommended Plan. Therefore, the Recommended Plan will have no significant impacts to air quality.

Under the NAA, further erosion and failure of the riverbank and endangerment of Water Street and adjacent utilities would eventually require repairs or relocation by the Village of Barboursville as the streambank fails, leading to similar temporary elevations in emissions from construction equipment and there would be significant impacts to air quality.

4.9 NOISE

Construction of the proposed project would temporarily increase ambient noise levels due to the operation of construction equipment. The noise levels at the site would fluctuate depending on the types of equipment in use and the way the equipment is operated. Therefore, noise levels would be variable throughout the workday and project duration. The majority of the construction work will be completed from the terrace. Equipment to be used during project construction, including, but not limited to, excavators and end loaders would contribute to ambient noise in the area. Construction could potentially be noticeable to residents located immediately adjacent to the site. However, construction equipment would be operated during daylight hours when many residents are at work. A reasonable exposure time of two hours would be expected during the time residents may be home during the day.

Noise generated from construction equipment (excavator and crane) to be utilized during construction range from 80 and 85 dBA, measured from a distance of 50 feet (Federal Highway Administration, 2006). The USACE Safety and Health Requirements Manual, indicate that temporary noise exposure for a period of eight hours at a level of 90 dBA is permissible for Non-Department of Defense Noise Exposures. Since individual noise receptors would be located more than 50 feet from the project construction area, the noise levels and the period of exposure would fall within acceptable limits and would not require additional sound reduction controls.

While the anticipated noise levels resulting from construction would be below the level necessary to protect human health, they have the potential to be a nuisance and interfere with outdoor activities. However, given the elevated noise levels would be short in duration for individual receptors, and no risk to hearing damage would be present, no significant impacts from the Recommended Plan would be expected.

The NAA would allow for continued erosion and bank failure. Some small interim stabilization and road re-surfacing projects by the Village of Barboursville would most likely be undertaken to repair unstable reaches. These efforts would have similar impacts as the Recommended Plan; however the duration of noise impacts would be shorter and would occur intermittently.

4.10 HAZARDOUS AND TOXIC SUBSTANCES

Based on the investigative findings and the planned activities for this project, the following recommendations are presented.

•The miscellaneous trash and debris within the work zone would need to be removed and disposed of in accordance with appropriate solid and hazardous waste regulations.

• The burn piles, if within the work zone, need to be removed and excavated soil and debris properly tested and disposed of in accordance with appropriate solid and hazardous waste regulations.

• Air quality in the area of the petroleum smells needs to be monitored during construction. If the contaminated source for the smell is detected during construction activities, then construction activities shall be halted for additional investigation.

• The construction contractor needs to have a health and safety plan in place which addresses environmental protection.

• No sampling of surface water or soil is recommended at this time.

• If the design plans undergo further changes to include any additional areas (such as the streambank where the former Barboursville Brickyard site is located), the additional areas may also require a Phase 1 Environmental Site Assessment (ESA) (and possible Phase II ESA) prior to implementation of the project.

No further HTRW concerns were noted.

4.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Because Water Street and adjacent utilities serve the public, the Recommended Plan does not unfairly affect any segment of the population. Implementation of the Recommended Plan would aid in protection of the public infrastructure, thereby improving the living environment for all residents. No homes or buildings would be impacted by the proposed project; therefore, the Recommended Plan meets the directive of EO 12898 by avoiding any disproportionately high adverse human health or environmental effects on minority or low income populations. In addition, the project is in compliance with EO 13045 “Protection of Children from Environmental Health Risks and Safety Risks,” as there are no health or safety concerns affecting children.

The NAA will postpone, but may not avoid impacts to the local community. Some small rubble placement efforts and road re-surfacing, temporary in nature, would most likely be undertaken as limited measures along unstable reaches. However, these efforts, similar to the Recommended Plan, would have no effect on minority and low income populations and no safety concerns affecting children.

4.12 TRANSPORTATION AND TRAFFIC

Construction of the Recommended Plan would occur using land based equipment. Stone and equipment would be transported to the site. Equipment and stone will be staged at adjacent to and channelward of McClung Avenue. Water Street would incur limited disruptions from the proposed construction activities. Water Street immediately adjacent to the proposed treatment will require

closure for a short period. Traffic will potentially be affected by the project during the delivery of construction equipment and stone is moved in areas where construction is to take place. The project will utilize flagging and signage as necessary to minimize impacts to traffic. Lane closures will be coordinated with the Village of Barboursville and local residents. Therefore, there would be minimal and temporary impacts to transportation and traffic during the construction of the Recommended Plan.

Under the NAA, it is anticipated that some interim rubble placement and road re-surfacing projects would most likely be undertaken to repair unstable reaches. These efforts would have similar impacts as the Recommended Plan. However, these may be temporary in nature and occur as funding is available. The duration of impacts would be shorter and occur intermittently over time. If no measures are taken, impacts to transportation and traffic would be significant if Water Street failed due to streambank subsidence. Streambank subsidence could lead to the closure of Water Street, which is the primary access to a residential area within the Village of Barboursville. The closure would render parts of the neighborhood and adjacent McClung Avenue intersection inaccessible.

4.13 HEALTH AND SAFETY

The Recommended Plan will increase safety at the site by stabilizing the streambank to protect Water Street and adjacent infrastructure. Stabilizing the streambank would minimize impacts to water quality and aquatic resources by reducing the amount of sediment discharge into the Guyandotte River. The project would provide safety for the Village of Barboursville by preventing further erosion and failure of Water Street and disruption of adjacent utilities. Therefore, the Recommended Plan is anticipated to have a long term beneficial impacts on health and safety of the project area.

Under the NAA, discharge of sedimentation would result in significant adverse effects to water quality and aquatic resources in the Guyandotte River. Even if some small rubble placement projects would be undertaken, they would be insufficient, and not encompass the entire failing reach and have negative effects to water quality and aquatic resources. Collapse of the streambank could also lead to additional closure of Water Street, encroachment on residential properties, and disruption of adjacent utilities. Closure of Water Street could lead to significant effects on residential properties along the road both as a safety hazard as first responders could no longer reach or traverse the site as quickly or the owners would not be able to safely leave their dwellings.

4.14 CUMULATIVE EFFECTS

The Corps must consider the cumulative effects of the proposed project on the environment as stipulated in the National Environmental Policy Act (NEPA). Cumulative effects are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or Non-Federal) or person undertakes such actions." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508.7 Council on Environmental Quality [CEQ] Regulations).

The cumulative effects analysis is based on the potential effects of the proposed project when added to similar impacts from other projects in the region. An inherent part of the cumulative effects analysis is

the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the analysis and states that "when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment...and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR 1502.22).

Temporal and geographical limits for this project must be established in order to frame the analysis. These limits can vary by the resources that are affected. Construction of the Recommended Plan would have very localized effects confined to the area immediately in the vicinity of the project, confined to the reach of the Guyandotte River adjacent to the Village of Barboursville. The geographical extent would be broadened to consider effects beyond the Recommended Plan. The geographical extent considered is the lower Guyandotte Watershed. Project life of stone protection projects are considered to be 50 years, therefore, that is the future temporal boundary of this analysis. The boundary for the past would coincide with the construction of the Greenup Locks and Dam when the locks were open to navigation in 1962 with an upper pool length of 61.8 miles.

The Lower Guyandotte Watershed is listed as impaired under Section 303(d) due to biological levels. One of the suspected leading causes of impaired water are failing septic systems. In the past, the West Virginia Conservation Agency (WVCA) has promoted education and environmental stewardship in the region. The WVCA has taken an active role in emergency watershed protection, stream protection, and restoration programs. In the future, watershed programs may address water quality and other maintenance activities. The Great Kanawha Resource Conservation and Development Council is currently seeking approval to recognize a trail along the Guyandotte River from R.D. Baily Lake to the river's confluence with the Ohio River to create opportunities for conservation and education. Reasonable foreseeable actions that may impact resources include: the completion of additional streambank protection projects, recreational development, sanitary system upgrades, and roadway repairs along Water Street. Future projects could result in additional changes to the riverbank in the Village of Barboursville and have the potential to affect terrestrial resources, as well as water quality. In addition, impairment of the Lower Guyandotte Watershed is expected to continue. Water quality standards and regulations are expected to remain as stringent today as in the future.

Section 4.0 documents the potential environmental effects of the Recommended Plan and NAA with respect to existing conditions. The effects of the Recommended Plan, as discussed beforehand, are localized and minor. Past actions have resulted in similar effects that have included small streambank stabilization projects along the Guyandotte River. Construction activities would temporarily increase noise levels and emissions from construction equipment in the project vicinity and temporarily impact transportation and traffic. However, these impacts will be short in duration and would not contribute significantly to cumulative effects. The Recommended Plan is not expected to have significant impacts on bats or mussels. No reasonably foreseeable incremental future actions that would have similar impacts as the proposed action were identified.

The availability of Federal funds through programs such as the Section 14 program, provides assistance to communities to protect public services through study, design and construction of streambank and

shoreline projects. The significance of this action on safety, aquatic resources, and water quality would be positive. Given the current program is in place for the foreseeable future and the overall beneficial effect from implementation of the Recommended Plan, there is expected to be a positive, though small, cumulative effect on safety, aquatic resources, and water quality based on past, present, and reasonably foreseeable actions.

5 MITIGATION OF ADVERSE EFFECTS

The Recommended Plan is expected to have no significant adverse effects to terrestrial resources, aquatic resources, and the human environment. Therefore, no mitigation is required,

6 IMPLEMENTATION REQUIREMENTS

6.1 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. The feasibility phase for the Village of Barboursville CAP Section 14 project will be completed within the $100,000 limit, a Federal Cost Share Agreement (FCSA) is not required for this action.

Army policy requires the sponsor to perform or ensure performance of investigations to identify the existence and extent of any Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulated substances. Army policy also stipulates that Civil Works funds are not to be spent on response to the presence of CERCLA regulated substances under the on lands, easements, and rights-of-way required for the project. Costs of investigations to identify the potential for CERCLA regulated substances and to configure the project to avoid areas impacted by CERCLA regulated substances are included in the Total Project Cost and are shared between the Non-Federal Sponsor and the USACE. However, if hazardous substances regulated under the CERCLA are found to exist in, on, or under any lands, easements, or rights-of-way that USACE has determined are required for project, any cleanup or response costs must be borne 100% by the Non-Federal Sponsor. Such costs, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination are not sharable and are not included in the Total Project Cost.

The Village of Barboursville provided a Letter of Intent in January 2015 requesting Federal assistance under the Section 14 authority. Prior to submittal of the Federal Interest Determination Report, the Non-Federal Sponsor submitted a new Letter of Intent reaffirming interest in the project. Both letters are included in Appendix H. The Huntington District is scheduled to start development of the Project Partnership Agreement (PPA) in October 2016 following approval of the Detailed Project Report. The PPA is currently scheduled to be executed in April 2017.

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

The land required for the project is approximately 2.463 acres total. Of that total, 2.233 acres of bank protection easement is needed across eleven landowners and 0.23 acre of temporary work area easement is needed across one landowner. Access for construction will be across the temporary work area easement. See Appendix E for the Real Estate Plan.

6.3 MONITORING AND ADAPTIVE MANAGEMENT

Not Applicable for Section 14 projects.

6.4 OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION

The Non-Federal Sponsor has operation and maintenance responsibilities required to assure the continued functionality of the recommended treatment. These responsibilities will include inspecting the project annually and after high water events and correcting adverse conditions, such as loss of as-constructed stone geometries and preventing vandalism. All operation and maintenance responsibilities will be given to the non-Federal sponsor in perpetuity after completion of construction.

6.5 REGULATORY REQUIREMENTS

The Recommended Plan is in full compliance with all local, state, and Federal statutes as well as Executive Orders. Compliance is documented below in Table 7.

Table 9 - 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		
Individual 401 Water Quality Certification**	X		
404 b(1) Analysis**	X		
Wild and Scenic Rivers Act	X		
Clean Air Act	X		
National Historic Preservation Act	X		
Archeological Resources Protection Act			N/A
Comprehensive, Environmental Response, Compensation and Liability Act	X		
Resource Conservation and Recovery Act	X		
Toxic Substances Control Act	X		
Quite 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		

7 PUBLIC INVOLVEMENT

7.1 PUBLIC VIEWS AND COMMENTS

The DPR and Environmental Assessment was made available for public review and comment for a period of 30 days, as required under NEPA and prior to issuance of a FONSI and Final DPR/EA. A Notice of Availability was published in the local newspaper, The Herald Dispatch, advertising the public of this document's availability for review and comment. A copy of the EA was also placed in the Barboursville Public Library and made available on-line **http://www.lrh.Corps.army.mil/Missions/PublicReview.aspx.** The mailing list for the DPR is located in Appendix B. No public comments were received during the review period.

7.2 STAKEHOLDER AGENCY COORDINATION

7.2.1 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, Village of Barboursville, Cabell

County, West Virginia". On March 11, 2016, scoping letters were sent to federal agencies requesting coordination on the proposed project. Direct coordination on March 16, 2016 with the United States Department of Agriculture (USDA) and Natural Resource Conservation Service (NRCS) was completed prior to publication of the Draft DPR and EA to evaluate the project for potential resource impacts. All correspondence letters can be found in Appendix B.

7.2.2 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, Village of Barboursville, Cabell County, West Virginia". On March 11, 2016, scoping letters were sent to state agencies requesting coordination on the proposed project Direct coordination with WVDNR (March 23, 2016), WVSHPO (April 19, 2016 and June 24, 2016), and WVDEP (March 11, 2016 and May 2016) was completed prior to publication of the Draft DPR and EA. They were asked to conduct agency review of the project for potential resource impacts. USACE contacted the WVDEP to address recommendations for compliance under the Clean Water Act and to determine 401 water quality certification applicability. The USACE completed coordination with WVDEP under the Clean Water Act. Additionally, the USACE fulfilled Section 7 consultation with USFWS under the Endangered Species Act on February 23, 2017. All related correspondence can be found in the Appendix B.

7.2.3 Local Agencies

Coordination with local resource agencies was conducted in conjunction with the preparation of the "Section 14 Emergency Streambank Protection Draft DPR and EA, Village of Barboursville, Cabell County, West Virginia". On March 11, 2016, the local floodplain coordinator was asked to review the project for potential resource impacts. All related correspondence can be found in the Appendix B.

7.2.4 Non-Governmental Organizations

Coordination with non-governmental organizations was conducted in conjunction with the preparation of the "Section 14 Emergency Streambank Protection Draft DPR and EA, Village of Barboursville, Cabell County, West Virginia". All correspondence letters can be found in the Appendix B. Also pursuant to NEPA and Section 106 of the NHPA, all federally recognized tribes with historic and/or cultural affiliation within the project boundaries will be contacted, provided an opportunity to comment, and invited to consult on the project. Tribes will receive a copy of this report and EA for review and comment during the public comment period.

8 FINDING OF NO SIGNIFICANT IMPACT

The FONSI was updated to reflect all continued agency coordination and public comments that are drawn. The FONSI can be found in Appendix B.

9 RECOMMENDATION

USACE Huntington District recommends MSC concurrence with the Recommended Plan. Requirements for the construction of Alternative Plan A (Recommended Plan) would include a stone buttress and

lagging panel replacement. Alternative Plan A is the Government Recommended Plan to protect the streambank. Continuation through completion of the feasibility phase will allow for all Alternative Plans to be studied and the recommended plan confirmed.

This Section 14 project will protect approximately 850 LF of streambank adjacent to Water Street and the Village of Barboursville. Work under the Section 14 Authority allows for streambank protection for public facilities (i.e. Water Street and adjacent utilities). The CAP Authority for Section 14 projects has a Federal Funding Limit of $5,000,000. The cost of the proposed project is within the Federal Funding Limit. Therefore, the size, cost, scope, and complexity of the project can be successfully addressed through the Section 14 authority.

10 REFERENCES

Federal Emergency Management Agency (FEMA), 2016. Flood Insurance Rate Map (FIRM).

NOAA 2013 presentation to USACE Pilot Study team on historic climate trends in Ohio River basin.

U.S. Army Corps of Engineers. (Revised 2012). Guyandotte River Navigation Charts,

U.S. Army Corps of Engineers. (2008). Safety and Health Requirements EM 385-1-1

U.S. Census Bureau. (2012). (http://quickfacts.census.gov/qfd/index.html)

U.S. EPA Air Data. (2012). (http://www.epa.gov/airdata)

U.S. Fish and Wildlife Service 2016. (https://www.fws.gov/endangered/)

U.S. Geological Survey (2001). Aquifer-Characteristics Data for West Virginia, Water Resources Investigation Report 01-4036

West Virginia Department of Environmental Protection. (2012). (http://www.dep.wv.gov/daq/planning/NAAQS/Pages/AreaswithApprovedMaintenancePlans.asp)

West Virginia Department of Environmental Protection, (2012). West Virginia Integrated Water Quality Monitoring and Assessment Report. (http://www.dep.wv.gov/WWE/watershed/IR/Pages/303d_305b.aspx)

Wetlands Mapper (2016, March 11). *National Wetlands Inventory*.

Appendix D

Mailing List

Water Street, Village of Barboursville
Section 14 Emergency Streambank Protection Project
Cabell County, West Virginia
SEA Mailing List

Federal Agencies and Officials

The Honorable Shelley Moore Capito
United States Senate
500 Virginia Street East
Charleston, WV 25301

The Honorable Joe Manchin
United States Senate
900 Pennsylvania Avenue, Ste 629
Charleston, WV 25302

The Honorable Carol Miller
United States House of Representatives
Attn: Sidney L. Christie FB.
845 5th Avenue
Suite 314
Huntington, WV 25701

Mr. Jared Beard
USDA Natural Resources Conservation Service
1550 Earl Core Road, Suite 200
Morgantown, WV 26505

U.S. Environmental Protection Agency
Region III
Methodist Building
1060 Chapline Street, Suite 303
Wheeling, WV 26003

United States Fish and Wildlife Service
West Virginia Field Office
6263 Appalachian Highway
Davis, WV 26260

State Agencies and Officials

The Honorable Jim Justice
Governor of West Virginia
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305

Ms. Barbara Sargent, Environmental Resource Specialist
West Virginia Division of Natural Resources
P.O. Box 67
Elkins, West Virginia 26241

Mr. Danny Bennett
West Virginia Division of Natural Resources
P.O. Box 67
Elkins, West Virginia 26241

Ms. Susan Pierce
State Historic Preservation Office
1900 Kanawha Blvd., E.
Charleston, West Virginia 25305

West Virginia Department of Environmental Protection
601 57th Street
Charleston, WV 25304

County Agencies and Officials

Cabell County Floodplain Coordinator
750 Fifth Avenue
Huntington, WV 25701

Danny Porter
Village of Barboursville Floodplain
Coordinator
PO Box 266,
Barboursville, WV 25504

Barboursville Public Library
728 Main Street
Barboursville, West Virginia 25504