ENVIRONMENTAL ASSESSMENT

JAMES RIVER STREAMBANK STABILIZATION PROJECT

CONTINUING AUTHORITIES PROGRAM, SECTION 14

AMHERST COUNTY, VIRGINIA

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U.S. Army Corps of Engineers
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US Army Corps of Engineers ®

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1.0 LIST OF ACRONYMS

BMP	Best Management Practice
CEQ	Council on Environmental Quality
cfs	cubic feet per second
dBA	Decibel A
DCR	Virginia Department of Conservation and Recreation
DHR	Virginia Department of Historic Resources
EA	Environmental Assessment
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
fps	feet per second
FWS	U.S. Fish and Wildlife Service
NRCS	U.S. Department of Agriculture, Natural Resource Conservation Service
PCPI	Per Capita Personal Income
VaFWIS	Virginia Fish and Wildlife Information Service
HTRW	Hazardous, Toxic, and Radioactive Waste
IPaC	Information, Planning and Conservation
OHW	Ordinary High Water
PCPI	Per Capita Personal Income
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
PCB	Polychlorinated Biphenyl
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VMRC	Virginia Marine Resources Commission

2.0 PURPOSE AND NEED FOR ACTION

2.1 PROJECT AUTHORITY

The Continuing Authorities Program is a delegated authority for the U.S. Army Corps of Engineers (USACE) to plan, design, and construct limited water resource and environmental restoration projects without specific congressional authorization. The Continuing Authorities Program focuses on water resource related projects of relatively smaller scope, cost and complexity than traditional USACE civil works projects that are specifically authorized by Congress. The Continuing Authorities Program, Section 14 authorizes the USACE to study, design, and, construct emergency streambank and shoreline projects to protect public services from flood damage or loss from erosion. Public services covered by Section 14 include water and sewer infrastructure, bridges, highways, essential public works, and non-profit public services. This study consists of an emergency streambank protection of sewer infrastructure for Amherst County, Virginia adjacent to the James River that is authorized by Section 14 of the Flood Control Act of 1946 (33 U.S.C. 701r), as amended.

2.2 STUDY AREA

The Study Area is located in Madison Heights within Amherst County, Virginia (Figure 1) south of the City of Lynchburg. Amherst County is located within the Northern Piedmont Region in central Virginia approximately 60 miles west of Richmond, the state capitol. The Study Area is part of the Lynchburg Metropolitan Statistical Area. The Study Area is partially located within Civitan Park along the northern bank of the James River and along the shoreline of the James River (Figure 1). The James River is Virginia's largest tributary within the Chesapeake Bay and runs 410 miles through the Commonwealth of Virginia and has a watershed that is approximately 10,432 square miles in area (U.S. Fish and Wildlife Service (FWS) 2015b).

Limited development surrounds the Study Area. The recreational Blackwater Creek Trail, which is part of the James River Heritage Trail, is located to the north of the riverbank and Study Area (Figure 1). The undeveloped Civitan Park extends further north of the Blackwater Creek Trail. The James River and shoreline bound the Study Area to the east, west, and south.

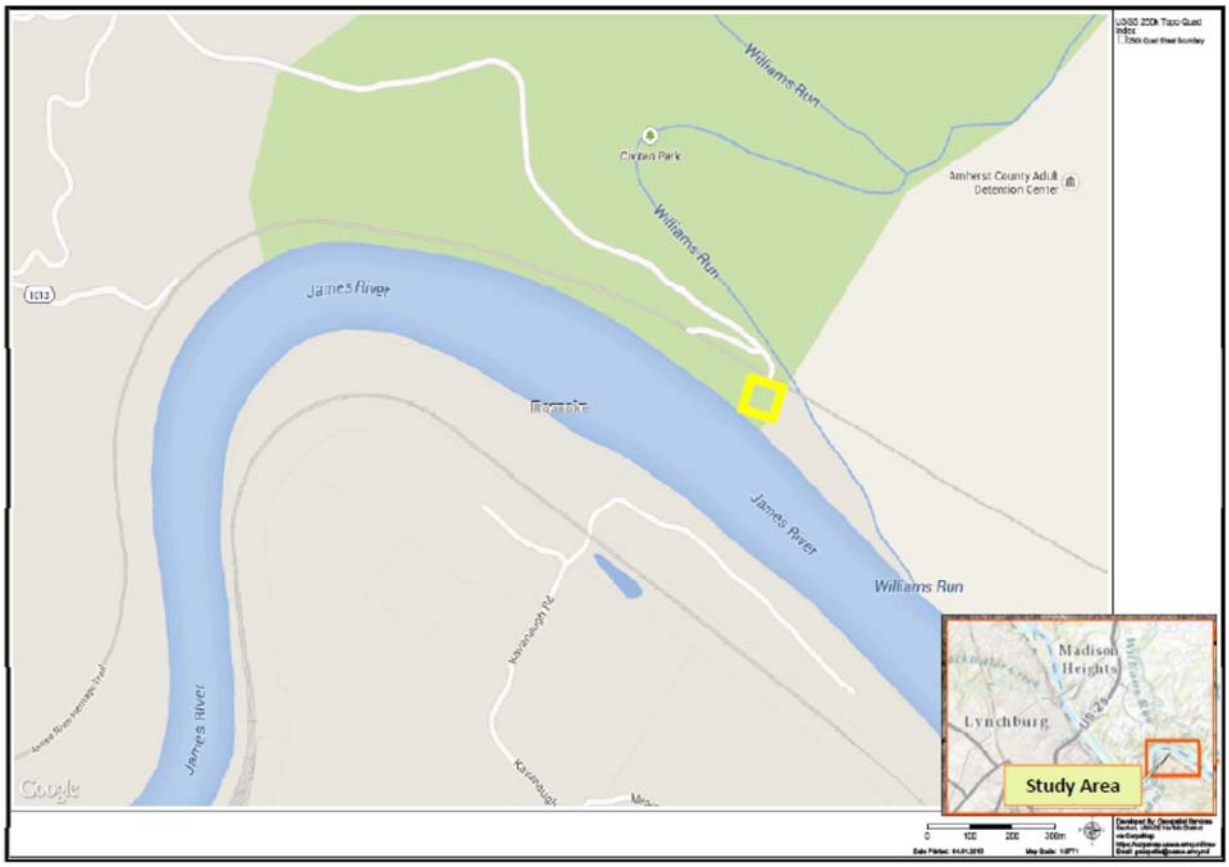

Figure 1. The Study Area and nearby surrounding areas including the Williams Creek Pumping Station (yellow). The Study Area is partially located within Civitan Park (green) and includes the northern bank and shoreline of the James River west of the pumping station. The Blackwater Creek Trail, which is part of the James River Heritage Trail, is located north of the Study Area.

2.3 PROJECT NEED OR OPPORTUNITY

The Amherst County Service Authority within the City of Madison Heights, requested the assistance of the USACE to evaluate erosion issues along the bank of the James River west of the Williams Creek Pumping Station as it is placing the existing sanitary sewer pipeline that runs approximately parallel to the river (located underground near the Amherst County Service Authority maintenance road) at risk of damage and rupture. The sanitary sewer pipeline collects raw sewage from approximately 15,000 customers in the Amherst County and conveys raw sewage to the Amherst County Service Authority's Williams Creek Pumping Station which then conveys the sewage to the Lynchburg Sewage Treatment Plant (Figure 2). A rupture in the sanitary sewer pipeline would result in the release of up to 700,000 gallons (per day) of untreated raw sewage directly into the James River. The release of raw sewage into the James River would cause negative environmental and human health impacts and would also disrupt sanitation services to the public. The James River is designated as an impaired waterway by the Virginia Department of Environmental Quality (VDEQ) (2014) as it does not meet water quality standards for fecal coliform and fish tissue polychlorinated biphenyl (PCB) concentrations. Therefore, a release of raw sewage directly into the James River would further exacerbate its impaired waterbody status.

The northern bank of the James River west of the Williams Creek Pumping Station is severely eroding with undercutting and exposed soil visible along the riverbank. Vegetation with exposed roots is present and trees and other vegetation have fallen into the shoreline resulting from the erosion. The erosion is occurring along a steeply sloped riverbank where the slope is approximately two (horizontal) to one (vertical). Continued erosion along the northern bank of the James River in the Study Area increases the risk that the sanitary sewer pipeline will become damaged and rupture.

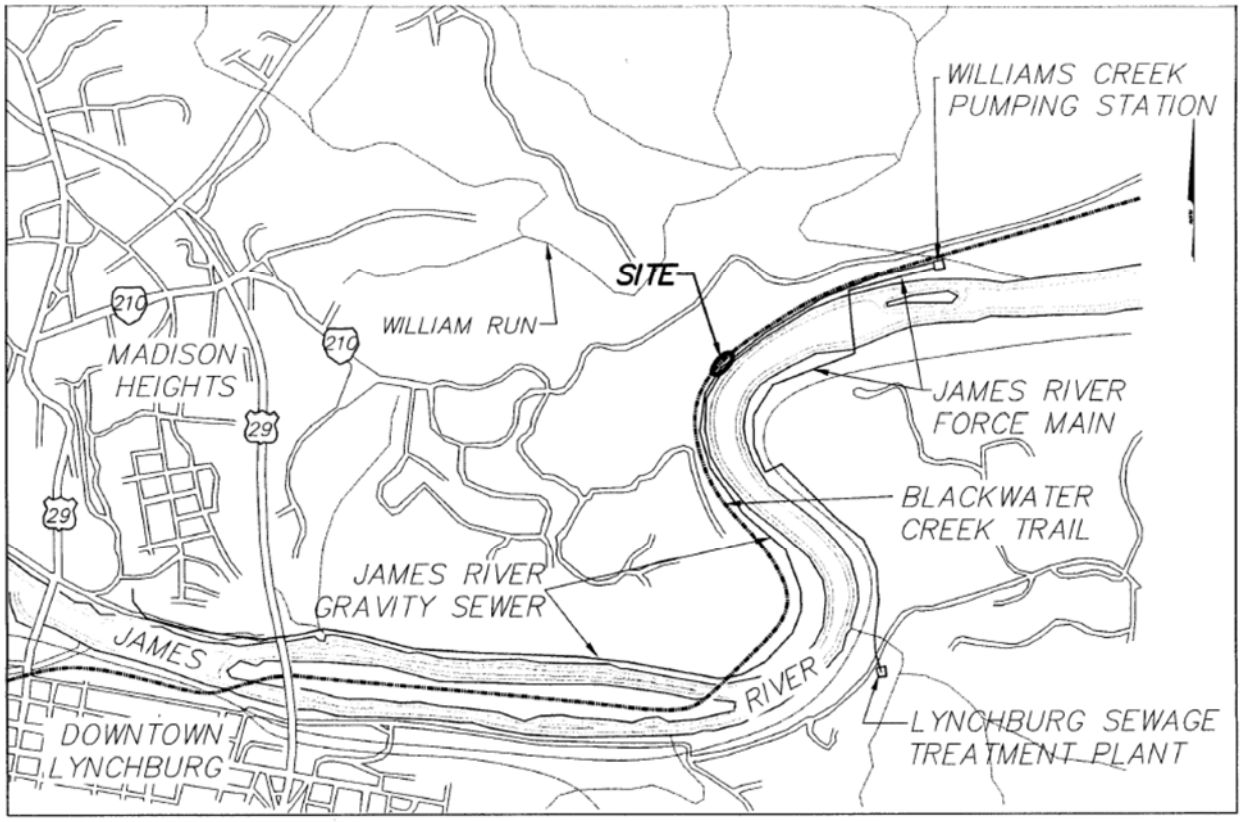

Figure 2. Map depicting general location of erosion sites along the James River in relation to the Blackwater Creek Trail (part of the James River Natural Heritage Trail), the Williams Creek Pumping Station, and the Lynchburg Sewage Treatment Plant.

2.4 PROJECT GOAL AND OBJECTIVE

The goal of this project is to prevent damage and rupture of the existing Amherst County Service Authority sewer infrastructure pipeline from the existing shoreline erosion occurring along the adjacent northern bank and shoreline of the James River located within approximately one-mile west of the Williams Creek Pumping Station. A key objective of this project is to protect the sanitary sewer pipeline in a cost effective manner.

3.0 TENTATIVELY SELECTED PLAN DESCRIPTION

Various project alternatives were evaluated to stabilize the eroding banks and the tentatively selected plan is the placement of stone revetment (riprap) at one, continuous 1,250 feet long stretch along the bank and shoreline of the James River (Figure 3). The construction would include the clearing

and re-grading of approximately 0.944 acre of riverbank (below ordinary high water), and placement of geotextile filter fabric and stone revetment (riprap). Surrounding areas temporarily impacted by the construction activities would be reseeded with a mixture of native grasses. The riprap would be placed along the slope and top of the riverbank and into the riverbed; the riprap would extend no more than approximately five feet from the shoreline (below ordinary high water) into the riverbed. There would be approximately 0.127 permanent acre of subaqueous riverbed impacted by the riprap.
The anticipated construction material staging area is the gated upland area adjacent to the Amherst County Service Authority Williams Creek Pumping Station (Figure 1). The gated area is an unpaved area containing compacted soils and sparse grass cover. This area is currently used by the Amherst County Service Authority for staging materials. The existing Amherst County Service Authority maintenance road would be used to bring materials to the staging area and to the project areas.

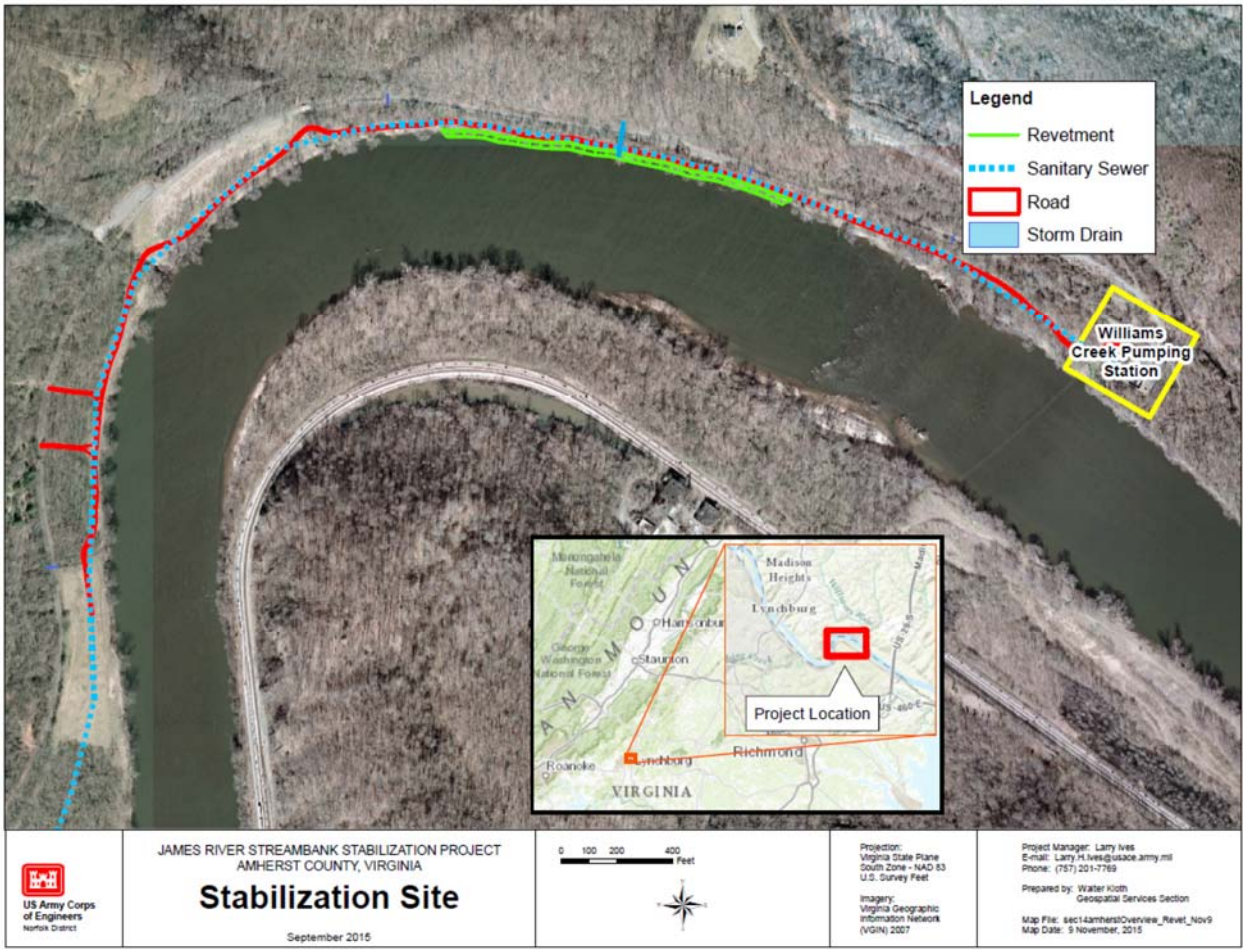

Figure 3. Location of proposed project site along the northern bank and shoreline of the James River approximately parallel to the Amherst County Service Authority sanitary sewer pipeline. Raw sewage is conveyed from the sanitary sewer pipeline to the Williams Creek Pumping Station. The red line depicts the location of the existing Amherst County Service Authority maintenance access road.

4.0 PLAN FORMULATION AND ALTERNATIVES EVALUATION

4.1 RELOCATION OF INFRASTRUCTURE

This alternative consists of the physical relocation of the sanitary sewer infrastructure north of the eroding shoreline. This alternative would entail relocation of approximately 1,000 feet of sanitary sewer pipeline and approximately 30 feet of 24-inch ductile iron river-crossing pipe and six sanitary sewer manholes.

4.2 PLACING FILL MATERIAL

This alternative consists of placing soil fill material along the eroded riverbank (Figure 3). This alternative is anticipated to only provide short-term erosion relief as the fill material will rapidly erode without structural material or planted vegetation to retain the fill material. This alternative will require considerable maintenance to replace the fill on an approximate annual timeframe.

4.3 VERTICAL SHEET PILING

This alternative consists of placing adjoining interlocked metal sheets along the shoreline of the riverbank and backfilling the riverbank with soil to the grade of the top of the riverbank along the eroded riverbank (Figure 3). Failure of the vertical sheet piling is anticipated to result in a slope failure in the riverbank. A disadvantage of this structure is that it does not conform to ground movement or dissipate energy from flowing water. Eventually the vertical sheet piling will require maintenance on an approximate five-year time period. Also, a substantial storm or flooding event could cause a complete failure of the structure.

4.4 GABIONS

This alternative consists of the placement of gabions, which are steel wire cages filled with small stones that can be stacked to form revetments and bank protection along the eroded riverbank (Figure 3). Gabions have some advantages over loose riprap because of their modularity and ability to be stacked in various shapes; they are also resistant to being washed away by moving water. Gabions also have advantages over more rigid structures because they can conform to ground movement, dissipate energy from flowing water, and drain freely. Their strength and effectiveness may increase with time in some cases, as silt and vegetation fill the interstitial voids and reinforce the structure. Gabion structures are not recommended for steeply sloped areas where rock or gavel sediment moves at high velocity in the channel bed as it will cause damage to the wire mesh and eventually cause failure of the structure itself. The life expectancy of gabions depends on the lifespan of the wire, not on the contents of the basket. It will be costly to replace the wire cages. This option will require regular annual maintenance as the wire structures will need to be replaced as the structure will fail when the wire fails.

4.5 PRECAST MODULAR RETAINING WALL

This alternative consists of construction of a precast modular retaining wall with a stone protection toe along the eroded riverbank (Figure 3). This system consists of a gravity retaining wall utilizing precast, interlocking, and reinforced concrete modules. Typically, these modules are filled with select backfill and compacted. This alternative does not conform to ground movement or dissipate energy from flowing water. Failure of this structure due to soil instability could result in substantial maintenance and potentially replacement of the structure. Also, a substantial storm or flooding event could cause a complete failure of the structure. Eventually the structure will require maintenance on an approximate five-year time period.

4.6 STONE REVETMENT

This alternative consists of construction of stone revetment along the eroded riverbank (Figure 3). Stone revetments are sloping structures, composed of armor stone (riprap) that are placed on banks or cliffs in such a way as to absorb the energy of incoming water (flow). The durability of riprap is dependent on the stability of each individual stone to resist dislodgement; therefore, a conservative size stone is needed as a safety factor against extreme flow conditions. Stone riprap is effective in areas of high velocity and boundary shear stress. An armored riprap revetment will assist in the preservation of the existing shoreline and protect the slope of the riverbanks, as a defense against erosion. The slope of the riverbank will be graded to a maximum of no more than one foot vertical rise for every 1.5 feet of horizontal distance. Maintenance of the riprap will consist of the placement of more stone on top of existing stone or in place of missing stone. The stone revetment will require maintenance on an approximate seven-year time period.

4.7 NO ACTION ALTERNATIVE

The No Action Alternative (Future Without Project) serves as the baseline against which alternatives can be evaluated. Evaluation of the No Action Alternative involves assessing the environmental effects that would result if conditions were maintained and a project alternative is not implemented.

4.8 PRELIMINARY SCREENING OF PROJECT ALTERNATIVES

Evaluation criteria that were used to screen the initial array of alternatives are provided in Table 1. Criteria used to compare and ultimately screen out those alternatives that were not considered reasonable included the following:

- Infrastructure Protection – the ability to protect the sanitary sewer infrastructure from damage and rupture by eliminating or reducing erosion;
- Sustainability - the ability to maintain erosion control without substantial maintenance, repair, and inspections; and
- Economic feasibility – an evaluation of whether the construction and maintenance of the alternative is considered reasonable.

Table 1. Screening of potential alternatives.

POTENTIAL ALTERNATIVE	INFRASTRUCTURE PROTECTION	SUSTAINABILITY	ECONOMIC FEASIBILITY[1]	CARRIED FORWARD
Relocation of Infrastructure	Low – High[2]	Low – High[2]	Not Feasible	No
Stone Revetment	Medium	High	Feasible	Yes
Vertical Sheet Piling	Medium	Low	Not Feasible	No
Precast Modular Retaining Wall	Medium	Low	Not Feasible	No
Placing Fill Material	Low	Low	Feasible	No
Gabions	Low	Low	Feasible	No
No Action	None	None - Low	Feasible	Yes

[1]Economic feasibility includes both construction costs and maintenance costs over an approximate 30-year time period.

[2]This potential alternative ranks high until a time period of approximately 30 years and then it ranks low as the erosion will once again threaten the sewer integrity at this time.

Based on the potential project criterion screening analysis, the relocation of the sewer infrastructure and the stone revetment alternatives substantially outranked the other potential alternatives. The relocation of sewer infrastructure alternative ranked slightly higher than the stone revetment alternative; however, the relocation alternative was screened out because it is not economically feasible. Also, a key point is that after approximately 30 years, the relocated infrastructure would again be at risk of damage and rupture in the future if the shoreline erosion is not addressed and the infrastructure is just moved. Therefore, the relocation alternative only ranks highly for a certain period of time and then ranks poorly. The stone revetment alternative provides a sufficient level or erosion control to protect a portion of the sanitary sewer infrastructure and is also economically feasible. Therefore, this alternative was retained for further analysis. This vertical sheet piling alternative did not rank as one of the top potential alternatives as it will be cost prohibitive in terms of maintenance and of limited sustainability. Therefore, this alternative was eliminated from further analysis. The precast modular retaining wall did not rank well as its technical performance would be limited due to the dynamic nature of the soils at the Study Area and was also not economically feasible. Therefore, this alternative was eliminated from further analysis. Although economically feasible, the gabions alternative was screened out and not considered technically feasible because of the steep topography of the riverbank and also because of its limited sustainability. Therefore, this alternative was eliminated from further analysis. The No Action alternative ranked poorly as an alternative as it does not address the erosion issues at the Study Area but was retained for further analysis as a relative comparison to the stone revetment alternative.

5.0 AFFECTED ENVIRONMENT

5.1 GENERAL ENVIRONMENTAL SETTING

5.1.1 PHYSIOGRAPHY AND TOPOGRAPHY

The Study Area is located along the shoreline and bank of the James River which flows primarily along an east-west axis at 37°N latitude in the Northern Piedmont Physiogeographic Region. The Study Area is located within some of the lowest lying elevations within the Northern Piedmont Region. The James riverbed is the lowest lying topography within the Study Area and is located proximate to the steeply (approximately two (horizontal) to one (vertical)) sloped riverbank.

5.1.2 CLIMATE

The project area has a four-season humid subtropical climate, with cool winters and hot, humid summers. Monthly average temperatures range from 25°F in January to 87°F in July, with an annual mean of 56 °F (U.S. Climate Data 2015). Nights tend to be significantly cooler than days throughout much of the year due in part to the moderate elevation. Monthly average precipitation ranges from 2.91 inches in February to 4.37 inches in July, with an annual mean of 41.62 inches (U.S. Climate Data 2015). Average annual snowfall is 15.00 inches (U.S. Climate Data 2015). Weather data was compiled for Lynchburg, Virginia, 1981-2010 (U.S. Climate Data 2015).

5.2 GEOLOGY AND SOILS

The soils are classified as nonhydric combs loam (U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) 2009). These floodplain soils are characterized by frequent

flooding events and have alluvium parent material that was derived from granite and gneiss, schist, greenstone, phyllite, sandstone and shale, and/or limestone (NRCS 2009). The soils in this area were formed by both residual and transported materials. Soil formed from alluvial sediments (unconsolidated materials such as gravel, sand, silt, and clay and mixtures of these materials) that were transported by water and deposited onto the floodplain.

The two main types of rock that occur in Amherst County are igneous and metamorphic rocks (NRCS 2009). Granite parent material that formed soil in this area was from igneous rock. Metamorphic rock is igneous or sedimentary rock that was changed from heat and pressure inside the Earth. Granite gneiss is a type of metamorphic rock found in this county. The Northern Piedmont climate induces rapid weathering of the parent material allowing for the transport of clays and minerals.

5.3 HYDROLOGY

The James River is 410 miles long and drains 10,432 miles of watershed and is entirely located within the Commonwealth of Virginia (FWS 2015b). The James River is Virginia's largest river, flowing across the entire state from its headwaters at Iron Gate to its mouth at the Chesapeake Bay at Fort Monroe (FWS 2015b). The mainstem of the James River in the Valley and Ridge Section is characterized by well developed riffles, runs, and pools (Benke and Cushing 2005). The hydrology substantially shifts from its headwaters in its Valley Ridge Section as it flows into the Northern Piedmont. North of the City of Lynchburg, flow in the James River is controlled by three dams that regulate flow through shallow impoundments. The dams reduce the depth and velocity diversity that is characteristic of the adjacent upstream areas. Downstream of the Study Area, annual discharge at the City of Richmond, just upstream of the tidal portions of the river, is approximately 213 meters^3/second or approximately four times greater than at the river's headwaters (Benke and Cushing 2005). The highest discharges from the James River occur during late winter and spring while the lowest discharges occur during late summer and fall (Benke and Cushing 2005).

5.4 FLOODPLAINS

The Study Area is located within the one-percent-annual-chance floodplain (Zone AE, blue color) and regulatory floodway (hatched area) as designated by the Federal Emergency Management Agency (FEMA), shown below on FEMA's Amherst County, Virginia Flood Insurance Rate Map, Panel Number 51009C0415B, dated September 19, 2007 (Figure 4). The shaded Zone X area (black color) is the 0.2-percent-annual-chance floodplain. Within the Study Area, the one-percent-annual-chance flood elevation is approximately 514 feet, referenced to the North American Vertical Datum of 1988 (NAVD88). At this elevation, the FEMA one- percent-annual-chance discharge is approximately 165,000 cubic feet per second (cfs), with an approximate channel velocity of 10 feet per second (fps). With an approximate channel invert elevation of 484 feet, this gives a maximum depth of 30 feet within the main channel. Similarly, along the Study Area/overbank area at elevation 500 feet, the depth is 14 feet, where velocities are around 5 fps (FEMA 2007, USACE 1975).

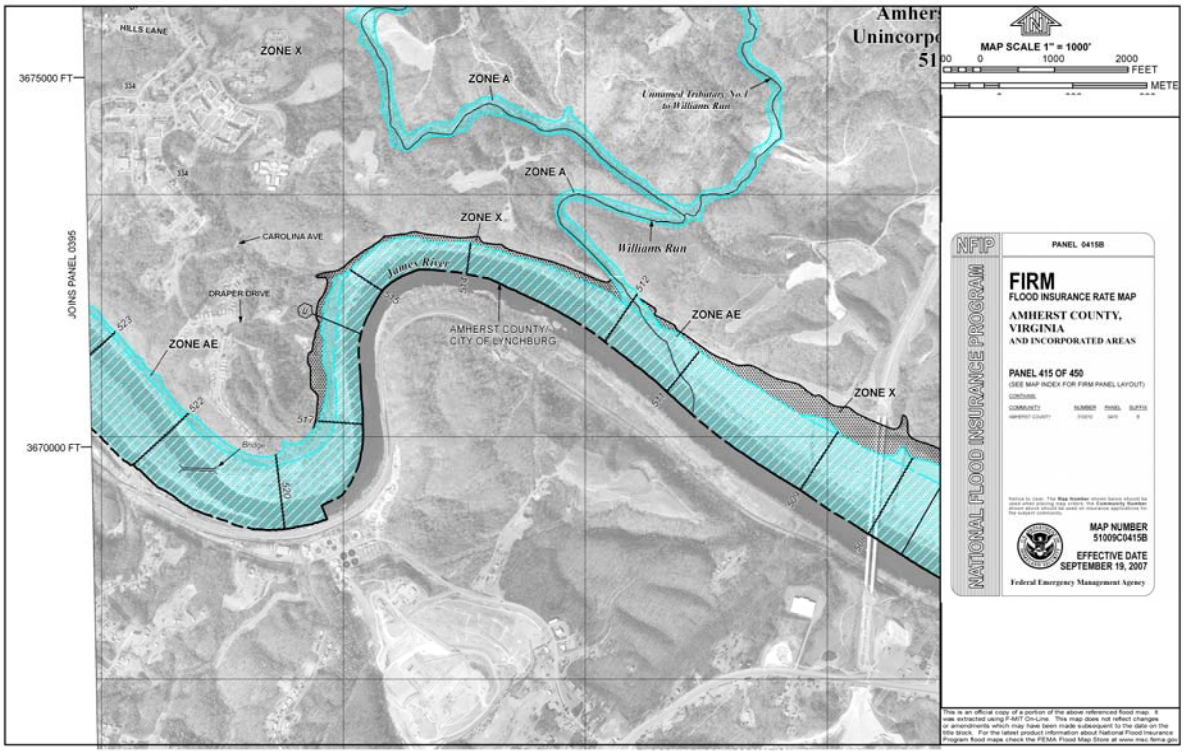

Figure 4. Flood Insurance Rate Map for Amherst County, Virginia within the Study Area (FEMA 2007).

Within and near the Study Area, there are other features in addition to the gravity sanitary sewer pipeline that is to be protected and the Williams Creek Pump Station. This includes the sanitary sewer line that crosses the James River from the pump station to the Lynchburg Treatment Plant, two storm water outfalls, the railroad embankment on the other side of the river, the U.S. Route 29 crossing downstream, and Percival Island upstream. Now part of the James River Heritage Park Trail, a railroad was also once in place along the Study Area and left overbank.

From the Study Area, to approximately 30 river miles upstream to Rockbridge County, there are seven dams that cross the James River and one just upstream of the Study Area that crosses the right flow split at Percival Island. The Percival Dam has been identified by the U.S. Fish and Wildlife Service for possible removal. Also located just upstream of the Study Area and downstream of the first dam (Lynchburg Dam) that crosses the James River, are two larger tributaries that flow into the James River, Fishing Creek (drainage are of 7 square miles) and Blackwater Creek (drainage area of 65 square miles).

5.5 WATER QUALITY

The U.S. Environmental Protection Agency under the authority of the Clean Water Act, requires the Commonwealth of Virginia to develop a program to monitor the quality of its surface and ground waters and report on the water quality status in such waters every two years. The General Assembly enacted the Water Quality Monitoring, Information and Restoration Act §62.1- 44.19:4 through §62.1-44.19:8. This legislation supplements the Clean Water Act 305(b)/303(d) federal requirements.

The Act requires the 303(d) portion of the Integrated Report to identify geographically defined water segments as impaired if monitoring or other evidence shows:

a. exceedences of ambient water quality standards for aquatic life or human health;

b. fishing restrictions or advisories;

c. shellfish consumption restrictions due to contamination;
d. nutrient over-enrichment;
e. significant declines in aquatic life biodiversity or populations; and/or
f. contamination of sediments at levels which violate water quality standards or threaten aquatic life or human health.

The section of the James River where the Study Area is located is included in the 2014 Clean Water A Act Section 303(d) list of impaired waters due to *Escherichia coli (E. coli)* contamination and elevated levels of PCB in fish tissue (VDEQ 2014). While the source(s) of the *E. coli* contamination is unknown, potential sources of contamination include combined sewer overflows, discharges from municipal separate storm sewer systems, livestock (grazing and feeding operations), pet and wildlife waste, and unspecified domestic waste.

Amherst County's public drinking water supply originates from two sources, the Graham Creek Reservoir and Harris Creek (Amherst County 2013). Both of the watersheds supplying the water sources are located solely in Amherst County. Amherst County maintains a rigorous Water Supply Watershed Protection Program. Amherst County consistently meets state and federal drinking water standards (Amherst County 2013).

5.6 VEGETATION

The Study Area is generally characterized as steeply sloped, eroding riverbanks located adjacent to the James River that are denuded of vegetation in many areas but also contain a mixture of hardwoods, grasses, and herbaceous species. Many of the mature hardwoods along the riverbank were falling into the riverbed and dying vegetation was observed that had previously fallen into the riverbed, presumably from the erosion occurring in this area. The top of the riverbank is a disturbed area mainly vegetated with a mixture of hardwoods, grasses, and herbaceous species. The Amherst County Service Authority maintenance road in the Study Area is largely devoid of vegetation but does contain some grasses and herbaceous vegetation. The locked gated area adjacent to the Williams Creek Pumping Station (Figure 1) is a disturbed area that is sparsely vegetated with grass and herbaceous species. A of list commonly observed vegetation species in the Study Area is provided in Table 2. No submerged aquatic vegetation is found in the portions of the James River located in the Study Area.

Table 2. List of commonly observed vegetation species occurring in the Study Area.

SPECIES	COMMON NAME
Acer negundo	box elder
Acer saccharinum	silver maple
Alliaria petiolata	garlic mustard
Allium sp.	onion
Equisetum sp.	horsetail
Genista tinctoria	greenweed
Lamium amplexicaule	hensbit
Lindera benzoin	spicebush
Mertensia virginica	Virginia bluebell
Platanus occidentalis	American sycamore
Prunus serotina	cherry tree
Viola spp.	violet

5.7 AQUATIC RESOURCES AND WILDLIFE

5.7.1 AQUATIC RESOURCES

Essential Fish Habitat. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act strengthened the ability of the NMFS and Fishery Councils to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat" and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Act requires the Councils to describe and identify the essential habitat for the managed species, minimize to the extent practicable adverse effects on essential fish habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of essential fish habitat. The Study Area is located west of the defined geographic limits of essential fish habitat as defined by the NMFS.

Aquatic Community. The Study Area is located west of the tidal fall line and supports freshwater aquatic species and to a lesser extent, anadromous fish species. Anadromous fish species may be present in the Study Area but are not likely abundant as they typically occur further east in the Fall Line and the Coastal Plain (Benke and Cushing 2005). The portion of the Study Area located within the James River is between the upstream Percival Dam and downstream Bosher's Dam. There was a vertical slot fishway installed in the Bosher's dam in 1999 that allows for passage of anadromous fish to upstream areas (Musick 2005). The fish community is diverse in the Study Area with more than 90 fish species with the potential to occur in the Study Area (VDGIF 2015). Dominant fish species within the Study Area include the common carp (*Cyprinus carpio*), catostomids, such as the golden (*Moxostoma erythrurum*) and shorthead red-horse (*Moxostoma macrolepidotum*), and sunfish species (*Lepomis spp.*) (Benke and Cushing 2005). Mussels and snail species observed in the Study Area during a freshwater mussel survey conducted in 2014 were the eastern elliptio mussel (*Elliptio complanata*), the northern lance (*Elliptio fisheriana*), the invasive Asiatic clam (*Corbicula fluminea*), the Piedmont elimia (*Elimia virginica*), and the crested mudalia (*Leptoxis carinata*) (The Catena Group, Inc. 2014). The eastern elliptio was the most abundant mussel species observed during the survey and only two shells (no live mussels) of the northern lance were detected during the survey. Results of the mussel survey are provided in Appendix B. A listing of aquatic species with the potential to occur in and/or near the Study Area compiled from the VaFWIS (species within a 3-mile radius of the Study Area) (VDGIF 2015), Information for Planning and Conservation (IPaC) (species in Study Area) (FWS 2015c), and Virginia Natural Heritage databases (DCR 2015) is provided in Appendix C.

Jurisdictional Wetlands. The lateral limits of federal jurisdiction for non-tidal wetlands as defined per Section 404 of the Clean Water Act is defined by the Ordinary High Water Mark in the absence of adjacent wetland vegetation. If adjacent wetland vegetation is present, the jurisdictional area will extend to the limits of the adjacent wetland vegetation.

The lateral extent of federal jurisdiction per Section 404 of the Clean Water Act at the Study Area is defined by the Ordinary High Water Mark as the adjacent riverbank area is not defined as a wetland due to its lack of hydric soils. Although submerged vegetation is relatively common in many of the Piedmont regions of the James River (Benke and Cushing 2005), submerged aquatic vegetation is not located in the Study Area, possibly due to the substantial water velocities that occur in this section of the James River.

5.7.2 WILDLIFE

Migratory birds, including bald eagles (*Haliaeetus leucocephalus*) and other raptors, ducks, geese, and songbirds, have ranges within the Study Area. No known active bald eagle nests have been reported in the Study Area. Mammals that would typically occur in the area include the gray squirrel, eastern chipmunk, muskrats, beavers, otter, eastern cottontail, woodchuck, porcupine, skunks, Virginia opossum, and raccoon. Some common amphibian and reptiles include bull frogs, snapping turtles, and salamanders. A listing of wildlife species with the potential to occur in and/or near the Study Area was compiled from the VaFWIS (species within a 3-mile radius of the Study Area) (VDGIF 2015), IPaC (species in Study Area) (FWS 2015c), and Virginia Natural Heritage databases (DCR 2015) and is provided in Appendix C.

5.8 THREATENED AND ENDANGERED SPECIES AND ANADROMOUS FISH TRUST RESOURCES

Animals and plants listed as endangered or threatened are protected under the Endangered Species Act of 1973, as amended (ESA). According to the ESA, "endangered species" is defined as any plant or animal species in danger of extinction throughout all or a substantial portion of its range. A "threatened species" is any species likely to become an endangered species in the foreseeable future throughout all or a substantial part of its range. "Proposed Species" are animal or plant species proposed in the Federal Register to be listed under Section 4 of the ESA. "Candidate Species" are species for which the FWS and NMFS have sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA. The *Biological Assessment, Essential Fish Habitat Assessment, and Effects to Anadromous Fish* document and all relevant consultation correspondence is provided in Appendices A – C.

This section provides a summary of the state and federally listed species that have the potential to occur in the Study Area. The following references were consulted for inclusion of applicable information into this section: Virginia Fish and Wildlife Information Service (VaFWIS) database search within a three mile radius of the Study Area (VDGIF 2015), IPaC database search (FWS 2015c), and the Virginia Natural Heritage Database Search (DCR 2015). A copy of the reports generated from the federal and state databases is provided in Appendix C. We also coordinated with the VDGIF and the DCR and requested lists of species known to occur in the project area but did not receive additional lists of species from these state agencies. Federal and state listed species having the potential to occur in the Study Area are described in Table 3.

Table 3. Federally and state listed species with the potential to occur in the Study Area.

TAXONOMIC GROUP/SPECIES	COMMON NAME	FEDERAL STATUS	COMMONWEALTH OF VIRGINIA STATUS	BREEDING IN STUDY AREA
Invertebrates				
Fusconaia masoni	Atlantic pigtoe		T	no
Lasmigona subviridis	green floater		T	no
Paravitrea hera	spirit supercoil		E	no
Pleurobema collina	James spinymussel	E	E	no
Mammal				
Myotis septentrionalis	northern long-eared bat	T		u

E=endangered, T=threatened, u=unknown

Northern long-eared bat. The FWS listed the northern long-eared bat (*Myotis septentrionalis*) threatened on April 2, 2015 with no designated critical habitat. The most severe threat attributed to the substantial population decline of the northern long-eared bat has been the widespread spread of the White-Nosed Syndrome that is caused by the fungal infection *Pd* (*Pseudogymnoascus destructans*). The Study Area is located within the managed White-Nose Syndrome Buffer Zone as defined by the FWS (2015e). Populations in Virginia are thought to have declined by 96% and are anticipated to decline with the continued spread of the White-Nose Syndrome (VDGIF 2014, unpublished data in FWS 2015a). The northern long-eared bat is a dark brown on its back with lighter coloration underneath with a wingspan of approximately 9-10 inches and is approximately 3 – 3.7 inches in body length (FWS 2015a). This bat is distinguished from other similar bat species in its genus by the length of its ears that extend past its nose when folded. During the winter, northern long-eared bats hibernate in caves and mines called hibernacula. During the summer, this species roosts beneath bark and in cavities of both live and dead trees (snags). They will also roost in human-made structures such as culverts, barns, and sheds. Females give birth to one young during the summer. There are no known surveys of this species in the Study Area so it unknown if they forage and/or roost in the Study Area. No reported natural hibernacula are located in the Study Area. It is unknown if northern long-eared bats migrate through the Study Area.

Federally and State Listed Mussels. The FWS listed the James spineymussel (*Pleurobema collina*) endangered on July 22, 1988 with no designated critical habitat. This species has been extirpated from 90% of its historical range (FWS 1990). Threats to the continued existence of this species include declining water quality, disease, and competition with the invasive Asian clam (*Corbicula fluminea*). Siltation of its natural habitat is thought to be a substantial factor that led to the decline of this mussel species (FWS 1990). The James spinymussel is a small, freshwater mussel that inhabits the James River drainage and the Dan/Mayo River Systems in Virginia, North Carolina, and West Virginia (FWS 2015f). Adults are slightly less than three inches in length, brown in color, and characterized by notable growth rings and sometimes contain spines on each valve (FWS 2015f). Juvenile mussels have a yellow shell that sometimes contains short spines (FWS 2015f).

Because of the potential habitat for this species in the Study Area, a full freshwater mussel survey in accordance with the Freshwater Mussel Guidelines for Virginia (FWS and VDGIF 2008) was conducted by a certified surveyor from October 30-31 in 2014 (A copy of the survey is provided in Appendix B). James spineymussels were not detected during the survey, however two freshwater mussel species that are not state or federally protected were observed during the survey. The Asian clam was also detected during the survey.

Based on the VaFWIS (VDGIF 2015) and Virginia Natural Heritage reports (VDCR 2015), three other state listed mussels besides the James spineymussel have the potential to occur in the Study Area (Table 3). This includes the threatened green floater (*Lasmigona subviridis*) which has been documented to occur in the James River by the VDGIF. However, based on the results of the mussel survey, none of the state listed species that have the potential to occur in the Study Area were found in the Study Area.

Atlantic Sturgeon. The Study Area is located west of the reported geographic range of the Atlantic sturgeon (*Acipenser oxyrinchus*) (Musick 2005); therefore we do not anticipate that Atlantic Sturgeon occur in the Study Area and dismiss it from further discussion.

Anadromous Fish Trust Resources. Anadromous fish inhabit oceanic habitats for part of their lifecycle but spawn in freshwater or estuarine habitats. Anadromous fish are a trust resource protected under the Magnuson-Stevens Fishery Conservation and Management Act, as amended, and managed

by the NMFS. Although the Study Area is located between the Percival Dam and Bosher's Dam, a vertical slot fishway was installed in the Bosher Dam in 1999 that allows passage of anadramous fish from the Bosher's Dam to the Study Area. Although we did not survey the Study Area, it is possible anadromous fish occur in this reach of the James River as they are reported to occur in the James River adjacent to the James River National Wildlife Refuge downstream of the Study Area (FWS 2015d). Therefore, there is a potential that anadromous fish occur in the Study Area. Anadromous fish that have the potential to occur in the Study Area are provided in Table 4.

Table 4. Anadromous fish with the potential to occur in the Study Area.

SPECIES	COMMON NAME	POTENTIAL TO BREED IN PROJECT AREA	POTENTIAL TO FORAGE AND SHELTER IN PROJECT AREA?
Alosa pseudoharengus	alewife	yes	yes
Alosa sapidissima	American shad	yes	yes
Morone saxatilis	striped bass	yes	yes
Alosa aestivalis	blueback herring	yes	yes
Perca flavescens	yellow perch	yes	yes
Alosa mediocris	hickory shad	yes	yes

5.9 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

A Phase I Environmental Site Assessment was performed in the Study Area to determine the potential for hazardous, toxic, and radioactive waste (HTRW) in the Study Area. Based on discussions with the county staff, the site visit, and searches in the VDEQ Department of Environmental Quality Pollution Response Program Database and other pertinent records, no evidence of hazardous substances, HRTW, or other regulated contaminants are likely found in the Study Area.

5.10 AIR QUALITY

The U.S. Environmental Protection Agency is mandated by the 1970 Clean Air Act, as amended, 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. The NAAQS have been established for the following six criteria pollutants, as designated in Section 109 of the Clean Air Act:

- Carbon monoxide;
- Lead;
- Nitrogen dioxide;
- Ozone;
- Particulate matter, classified by size as follows:
  - An aerodynamic size less than or equal to 10 micrometers;
  - An aerodynamic size less than or equal to 2.5 micrometers; and
- Sulfur dioxide.

The VDEQ regulates toxic pollutants in addition to the criteria pollutants as designated in 9 Virginia Administrative Code 5 Chapter 60, Part II, Article 5 for New and Modified Stationary Sources. Per 9 VAC 5-20-200, Amherst County is part of Region 3, the Central Virginia Intrastate Air Quality

Control Region. According to the Virginia Administrative Code, this Air Quality Control Region has not exceeded the standards for any of the criteria pollutants and, therefore, is not identified as either a maintenance area or a nonattainment area.

5.11 NOISE

The Study Area consists of the northern James River bank (undeveloped) and adjacent shoreline within Civitan Park, the gated area surrounding the Williams Creek Pumping Station, and the Amherst County Service Authority maintenance road. The areas immediately east, west and south of the Study Area consist of the adjacent James River and (undeveloped) riverbank. The Blackwater Creek Trail and adjacent parking located north of the Study Area is heavily used by the public for biking, running, jogging and wildlife viewing. Sources of noise in the Study Area arise from boats, vehicles, and equipment used to maintain the sanitary sewer infrastructure in the Study Area as well as park users. There is a paved parking lot where park users can park north of the Study Area to access the Blackwater Creek Trail. There is also a picnicking and boat launch area used by the public in the Study Area. Based on activities and land use in the Study Area, ambient noise levels in the Study Area are anticipated to be typically at a park-level at an estimated 67 decibels A (dBA) (23 CFR, Part 772, Table 1 Noise Abatement Criteria). However, noise levels from sanitary sewer pipeline maintenance within the Study Area are estimated to peak at approximately 86 dBA (Federal Highway Administration 2015).

5.12 RECREATION

The Study Area is partially located within the Civitan Park (Figure 1) which is accessed by the public for recreational activities. A picnic and non-motorized boating access area with a dock is located along the James River shoreline in Civitan Park. The Blackwater Creek Trail stretches generally from east to west across the Civitan Park and was built from an abandoned railway bed. The Blackwater Creek Trail is located north of the Study Area and is part of the James River Heritage Trail system, one of the most popular trails in the area used by the public for jogging, walking, and biking. Other recreational activities occurring along the trail and Study Area include bird watching, boating, fishing, and picnicking. During a site visit conducted on Monday, April 13, 2015, we observed approximately 50 people jogging and biking along the Blackwater Creek Trail per hour. We would anticipate a higher level of public usage in the Study Area and surrounding recreational areas during the weekend.

5.13 SOCIOECONOMICS

The census of 2010 reported there were 32,353 people, 12,560 households, and 8,793 families residing in Amherst County. The July 1, 2013 estimated population was 32,178. The population density was 67.54 people per square mile. There were 12,958 housing units at an average density of 27 per square mile. The racial makeup of the county was 76.7 % White, 19.0 % Black or African American, 0.9 % Native American, 0.5 % Asian, 0.02 % Pacific Islander, 0.7 % from other races, and 2.1 % from two or more races. 1.9 % of the population were Hispanic or Latino of any race.

There were 12,560 households out of which 27.3 % had children under the age of 18 living with them, 51.7 % were married couples living together, 14.6 % had a female householder with no husband present, and 30.0 % were non-families. Individuals living alone accounted for 24.5 % of all households and 16.4 % had someone living alone who was 65 years of age or older. The average household size was 2.45 and the average family size was 2.91.

In Amherst County, the 2010 population age ranged relatively evenly distributed with 24.7 % under the age of 20, 6.8 % from 20 to 24, 22.5 % from 25 to 44, 29.6 % from 45 to 64, and 13.80 % who

were 65 years of age or older. The median age was 38 years. Female population was 52.2 %, male 47.8 %.

The median income for a household in the county was $45,020, up from $37,393 in 2000, and the median income for a family was $56,237. The per capita income for the county was $16,952. About 8.00 % of families and 10.70 % of the population were below the poverty line, including 13.20 % of those under age 18 or under and 11.60 % of those aged 65 or over. (“American Fact Finder". United States Census Bureau. Retrieved 2014-07-25).

Amherst is one of 105 counties in Virginia. It is part of the Lynchburg, Virginia Metropolitan Statistical Area. Its 2013 population of 32,178 ranked 52nd in the state. In 2013, Amherst had a per capita personal income (PCPI) of $33,760. This PCPI ranked 77th in the state and was 69 % of the state average, $48,838, and 75 % of the national average, $44,765. The 2013 PCPI reflected an increase of 1.5 % from 2012. The 2012-2013 state change was 0.3 % and the national change was 1.3 %. In 2003, the PCPI of Amherst was $23,907 and ranked 77th in the state. The 2003-2013 compound annual growth rate of PCPI was 3.5 %. The compound annual growth rate for the state was 3.1 % and for the nation was 3.2 % (“Bear Facts” Bureau of Economic Analysis http://www.bea.gov/regional/bearfacts/action.cfm).

In the immediate area, Madison Heights (census block group 510090105021) had an estimated population of 1,062 for 2011. The population is skewed toward older people, with an average age of 46.7 years, and only 87 individuals under the age of 18. Educational levels are low, with those over 25 years old with a 9th grade education or less outnumbering high school graduates (or equivalent) by 424 to 257. Only 87 people held a Bachelor’s degree or higher. The median household income was only $23,036. Marital status includes surprising figures, such as married with spouse absent at 201, vs. married with spouse present at only 147. These numbers may be skewed as the residents of the Central Virginia Training Institute are included. This is likely true given the remarkable contrast of the census block to the south (51680001300) in the furthest east part of the City of Lynchburg. More than four times the size with a population of 4,400, the average age is 35.5, and the status of married with spouse present is 1,170 versus 135 for married with spouse absent (Google Earth Pro 2015).

5.14 CULTURAL RESOURCES

The project area is situated in southern Amherst County, Virginia in the Northern Piedmont region, the foothills of the Blue Ridge Mountains. The sewer pipeline parallels an abandoned railroad grade of the former Norfolk & Western Railroad, now used as a recreational trail, the James River Heritage Trail, a part of the City of Lynchburg’s trail system. The pipeline lies between the trail and the river bluff. The bluff averages a height of about 10 feet above the normal level of the river. The project area is one continuous section of river bluff stretching 1,250 feet along the north shore (left bank) of the James River. Expected ground disturbance is slightly less than one acre. The center point of this transect is at 37°24'26.06"N 79°06'20.04"W.

The land rises steeply to the north, from an elevation of 500 feet at the river bluff, to 700 feet only 420 feet to the north. The terrace that the pipeline runs through is level, but very narrow between the river bluff and the steep colluvial slope to the north. The alluvial terrace the project is situated on is classified as Combs loam (USDA 2014). The thick deposit is consistent with the soil series description, where depth to “restrictive feature” is indicated as more than 80 inches. Underlying geology of most of the project area is Poterozoic biotite gneiss, except for the extreme eastern end which is Proterozoic-Cambrian schist (Virginia Department of Mines, Minerals and Energy 1993).

This rugged wooded area north of the project area is now Civitan Park, run by the town of Madison Heights. Along with the aforementioned railroad, the broad terrace to the west of the parking lot for the trail was formerly occupied by a fertilizer plant. This has been demolished and materials removed. It was a fairly large plant, as shown on the 1944 15 minute USGS map, and was not removed

on the 1951 update. Apart from these dates the period of operation has not been identified in this study. The extensive campus of the Central Virginia Training Center, established in 1910, is about ½ mile northwest. The 1951 USGS map shows the terrace as an open area, not shaded green. The Combs Loam soil is well suited to agriculture, and at least the western end of the project area was probably cultivated; the eastern end is rather narrow if probably less so in earlier times. No other structures are shown near the project areas on the 1944-1950 map. This is the extent of information obtained on historic land use in this study.

Very little historical information exists prior to the mid-18th century for this area. Although explorers Nathanial Batts and William Fallam explored up the Roanoke and New Rivers as far as West Virginia in 1671, areas near the Blue Ridge were mostly 'Indian country' until after the Treaty of Albany of 1725. Aboriginal inhabitants of the area are thought of have been the Monacans (Hantman 1990), although the Cherokee were known to be active nearby. The Monacans are thought to have spoken a Siouan language by modern researchers (Mooney 1894) although Thomas Jefferson (Jefferson 1984) asserted that they spoke "the same language as the Tuscarora," an Iroquoian language, as is Cherokee. People claiming decent from the Monacans still live in Amherst County, and have been recognized by the state of Virginia as a tribe, though not by the federal government. Others claiming descent from the Cherokee have not been recognized by the state.

A prominent early settler of the area was John Bolling II, who in 1742 patented 2,735 acres at a bend in the James River about two miles east of the project area, naming it Buffalo Lick Plantation. Bolling also acquired 425 a few miles upriver at the location of a large island where there was a ford known as Horse Ford. In 1750 Charles Lynch bought this tract.

Charles Lynch together with his sons established a ferry near Horse Ford in 1757. Settlement in the area was proceeding rapidly, and in 1761 Amherst County was formed from the southwestern part of Albemarle County. The location attracted more settlers, and a church was built in 1765. Just across the river from Buffalo Lick Plantation, in northern Campbell County, an iron industry was started, with only a small bloomery about 1770 on Little Beaver Creek, but soon followed by two blast furnaces in operation by 1776.

In 1786 John Lynch, one of Charles' sons, obtained a charter from the Virginia General Assembly to subdivide 45 acres of his property into half acre lots to found a town near the ferry to be named Lynchburg. Location is everything in real estate, and the position of the town primed it for growth. A tobacco warehouse was built in 1791, which was to set the prime industry of the town for the next century.

Thomas Jefferson maintained a second home called Poplar Forest near Lynchburg, and often visited the town. So rapidly were the fortunes of Lynchburg rising that by 1810 Jefferson stated it was second only to Richmond in commercial importance in the state.

In 1850 the Kanawah Canal had reached Lynchburg. With this development tobacco and other goods could be shipped by canal boat to Richmond, and there transferred to ocean going vessels. Adding to this, the first railroad reached Lynchburg in 1852. By 1860, there were three railroads and the number of tobacco businesses had grown to 70. Manufacturing grew as well, helped by the proximity of iron mines and blast furnaces in nearby Campbell and Bedford Counties. Lynchburg was a transportation hub and a boom town.

Lynchburg's position as a transportation hub and manufacturing center would result in its having an important role in the Civil War. It became a training camp and way station for thousands of Confederate troops travelling by rail from southwest Virginia, Tennessee, and the Deep South to the front lines in northern Virginia throughout the first year of the war. From 1862 to the end of the war Lynchburg became one of the Confederacy's major supply centers of all manner of rations and material. It was also to become host to a concentration of hospitals for the wounded who could survive a train trip back from the frontlines.

The first Union threat to Lynchburg came in 1863 prompting the Confederates to dig a line of trenches and artillery positions north of town, across the river where Madison Heights is now. A small fort, Fort Riverview, was constructed to protect a railroad bridge which crossed the James at Buffalo Lick Plantation but the construction date is unknown and this fort is not mentioned in the official records. The bridge served the same, now abandoned, rail route that is found adjacent to the project area. This threat never materialized but the following year, on 12 June 1864, Union forces led by Maj. Gen. David Hunter approached from the south. Invalids from the hospitals and cadets from Virginia Military Academy mustered out to hurriedly dig entrenchments to the south of town. The Union forces altered their course to move toward Lexington, and did not attack until five days later. By that time Confederate General Jubal A. Early had moved his troops into the position, and was able to repel Hunter's advance. For a brief period after the fall of Richmond in 1865, Lynchburg became the de facto capital of Virginia and the Confederacy as the heads of government fled Union forces.

Lynchburg had been spared from destruction in the Civil War, and would be set to prosper as the economy improved. It continued to be primarily a 'tobacco town,' with chewing tobacco being the main variety produced. Along with tobacco, manufacturing grew, and the production of shoes, iron products, paper, and other goods would result in Lynchburg having one of the highest per capita levels of personal wealth of any city in America toward the end of this period. Higher education was added to the activities of Lynchburg when Randolph-Macon Women's College was opened in 1863. Toward the end of this period, in 1910, an institution was established just north of the project area titled "The Virginia State Colony for Epileptics." This was later changed to "The Virginia State Colony for Epileptics and Feebleminded" as the institution's role expanded in 1914. The superintendent, Albert Priddy, was a proponent of the eugenics movement. This sought to improve society by sterilizing mentally unfit persons, and Virginia passed a law allowing for compulsory sterilization in 1924. This law was challenged in the

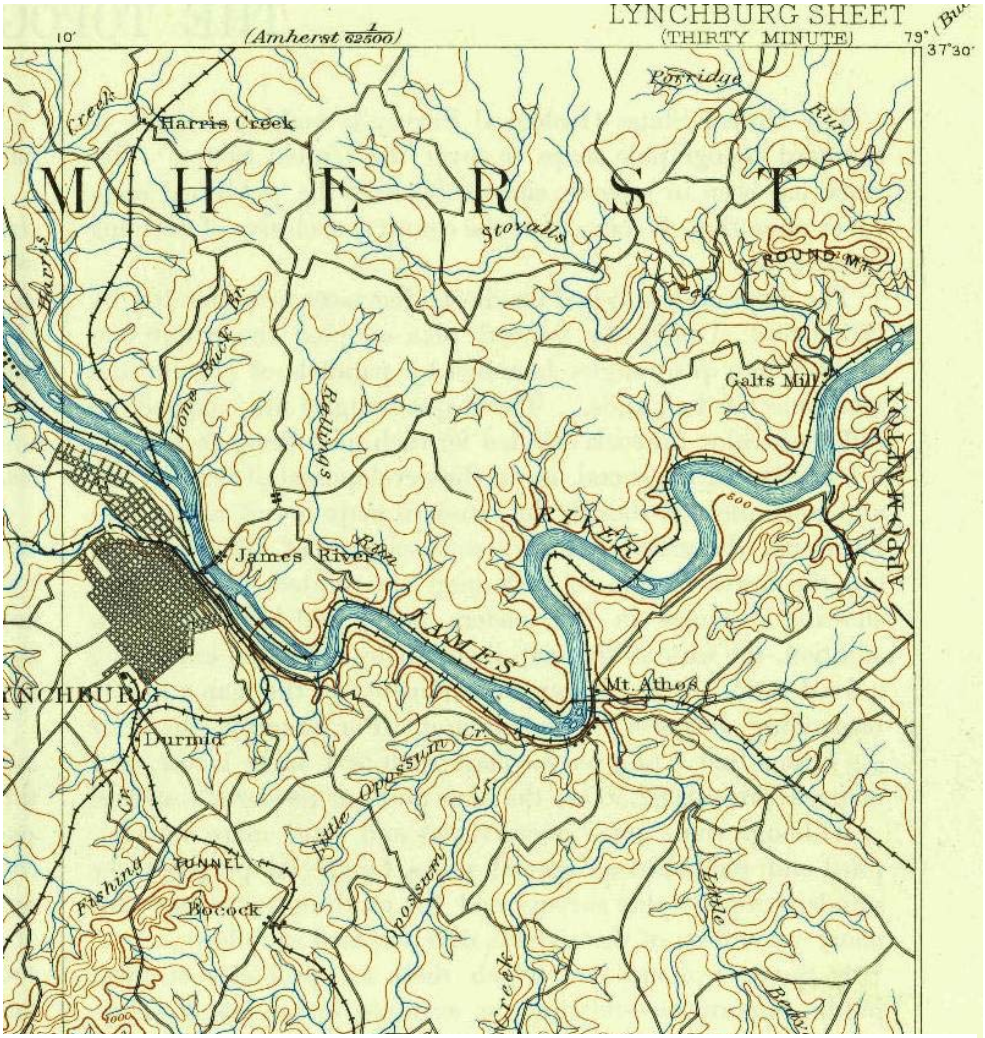

Figure 5. 1892 Geological Survey Map "V.A. Lynchburg 30 Minute"

court, and in 1927 the Supreme Court of the United States ruled in its favor, and compulsory sterilization was legal in Virginia until 1974. The name of the institution would further change to "Lynchburg State Colony" in 1940, Lynchburg Training School and Hospital in 1954, and its present title, "Central Virginia Training Center" in 1983.

There are no recorded archaeological sites or historic architectural properties in the Department of Historic Resources (DHR) data base in or near the project area of potential effect. There are 11 archaeological sites within one mile of the project area, none have been evaluated for potential National Register of Historic Places (NRHP) eligibility:

Archaeological Sites Within One Mile of the Project Area

DHR ID	Site Types	Notes
44AH0093	Dwelling, single	Historic, period unidentified
44AH0094	Other	Stone pier
44AH0095	Bridge	Historic, period unidentified
44AH0096	Dwelling, single	Historic, period unidentified
44AH0097	Cave	Prehistoric use inferred, no information on artifacts if any
44AH0098	Other	Isolated millstone
44CP0011	Camp/settlement	Woodland Period, no other information available
44CP0100	Canal	Kanawha Canal
44CP0101	Canal lock	Kanawha Canal
44CP0102	Ditch, drainage	Canal culvert
44CP0103	Canal	Kanawha Canal

There are three architectural properties recorded within a mile of the project area. The Central Virginia Training Center (DHR# 005-0190) campus, a half-mile north, has been evaluated as potentially NRHP eligible. The ruins of a mid-19th century factory (DHR# 005-5014) are located about 1,500 feet east of the project area, this has not been evaluated. Finally, Norfolk & Western Railroad Bridge N202.35 (DHR # 005-0071) is located .7 mile southwest of the project area, around a bend in the river. It has been evaluated as NRHP eligible.

A Phase I archaeological survey was conducted at the proposed revetment sites in August 2014. Shovel test pits were excavated at intervals of 15 meters (49 feet) and excavated to depths of 30-60 cm (1-2 feet) near the edge of the bluff. No archaeological remains were identified in the test pits or on surfaces exposed along the bluff. Although the final design has all of the revetment placed in one area rather than in four segments as the plan was during the survey, the survey of the four segments had covered all but a short (about 20 meter) segment of the new alignment with no finds and additional survey was not considered necessary. A detailed cultural resources report was submitted to DHR who responded that they concurred with the finding that no historic properties would be affected by this undertaking (Letter Greg LaBudde DHR to John Haynes NAO, 28 August 2015, DHR file #2015-3417).

5.15 CLIMATE CHANGE

The Earth's average temperature has increased by more than one degree Fahrenheit over the last century and scientists have attributed this temperature rise to the burning of fossil fuels and the resulting release of carbon dioxide into the atmosphere (Intergovernmental Panel on Climate Change 2013, referenced in Strauss et al. 2014). Global sea level rise has resulted from this warming with a cascading effect of melting glaciers and ice sheets. Scientists estimate sea level has risen approximately two times faster in the last two decades as compared to the 20th century (Strauss et al. 2014). Coastal

flooding is anticipated to increase with sea level rise as higher sea level increases the potential for more severe storm surge.

Climate change and related sea level rise is anticipated to be accelerated along the eastern coastal portions of the United States. A recent sea level rise study for Virginia predicts record-breaking coastal flooding will occur within the next 20 to 30 years (depending on location within Virginia) (Strauss et al. 2014). Using scenarios from a National Oceanic and Atmospheric Administration (NOAA) - led technical report to the National Climate Assessment (Parris et al. 2012, referenced in Strauss et al. 2014), the Strauss et al. (2014) study predicted mid-range or "intermediate high" local sea level rise projections for different locations in Virginia of roughly 1.2 – 1.5 feet by mid-century, and 4.0 to 4.8 feet by 2100 (using 2012 as the baseline).

6.0 ENVIRONMENTAL IMPACTS

A discussion of the anticipated environmental impacts of the No action Alternative and the Riprap Revetment Alternative is provided in Sections 6.1 – 6.14.

6.1 SOILS AND RIVERBED SEDIMENTS

No Action Alternative

Analysis. Soils and sediments would remain unchanged; therefore, there would be no impact to soil and sediment resources.

Cumulative Impacts. Erosion and shoreline loss along the riverbank of the James River is anticipated to increase over time. Therefore, cumulative impacts of past, present, and reasonably foreseeable future actions are anticipated to result in permanent, adverse, minor impacts to soils and sediments.

Riprap Revetment Alternative

Analysis. Construction of the Riprap Revetment Alternative will require that the riverbank be regraded and covered with stone revetment. This will result in a permanent loss of approximately 0.944 acres of soil. The toe of the riprap will be in the riverbed itself resulting in a conversion of soft bottom sediment to rock revetment. This results in a permanent impact of approximately 0.127 acres to the riverbed. However, following construction soil erosion in the project area is anticipated to decline resulting in permanent benefits to soil resources. Therefore, implementation of the Riprap Revetment Alternative is anticipated to result in permanent, minor impacts that range from adverse to beneficial.

Cumulative Impacts. No cumulative impacts would result from implementation of the No Action Alternative with other past, present, or reasonably foreseeable actions.

6.2 HYDROLOGY

No Action Alternative

Analysis. Hydrology would remain unchanged; therefore, there would be no impact to hydrology.

Cumulative Impacts. A reasonably foreseeable future action that may impact the hydrology in the Study Area is the removal of the upstream Percival Island Dam. However, implementation of the No Action Alternative with past, present, and other reasonably foreseeable actions is not anticipated to result in any synergistic impacts.

Riprap Revetment Alternative

Analysis. Implementation of the riprap revetment alternative is anticipated to have a localized adverse impact of restricting flow in the riprap toe area. This effect will not likely be measurable. Therefore, implementation of the Riprap Revetment Alternative will result in permanent, adverse, negligible impacts to hydrology.

Cumulative Impacts. A reasonably foreseeable future action that may impact the hydrology in the Study Area is the removal of the upstream Percival Island Dam. However, implementation of the Riprap Revetment Alternative with past, present, and other reasonably foreseeable actions is not anticipated to result in any synergistic impacts.

6.3 FLOODPLAINS

No Action Alternative

Analysis. Factors that can influence erosion include: soil conditions, stream bank steepness; range, number, depth, and duration of flow events; upstream sediment supply, stream bed slope, upstream and downstream controls, and/or soil piping. Implementation of the No Action Alternative is anticipated to result in further erosion and potential damage to the sanitary sewer pipeline for the following reasons:

- The Study Area is located along the outer bend of the river, subject to high channel velocities and superelevation of the water level.
- The flow split at Percival Island and the James River Heritage Trail (old railroad bridge crossing, pressure flow conditions for bridge opening) may cause increased downstream velocities due to the constricted flow area and short distance to the Study Area. In addition, being a rigid and maintained structure also in a bend, the existing railroad embankment on the right overbank may also influence high velocities in the downstream direction to the Study Area. There is essentially no stream distance between the two bends, where velocities would have a chance to decrease.
- With seven dams located upstream that cross the James River and one just upstream of the Study Area that crosses the right flow split at Percival Island, the Study Area may be limited to an upstream sediment supply for possible stream bank accretion; although, Blackwater and Fishing Creek tributaries may help provide sediment inflow.
- The range, number, depth, and duration of flow events can also impact stream bank erosion. The main channel invert elevation is approximately 484 feet, NAVD88. At elevation 487 feet, NAVD88, Ordinary High Water (OHW), the discharge is approximately 2,000-5,000 cubic feet per second (cfs), with an estimated channel velocity of one to three feet per second (fps), and depth of three feet. At just three feet higher, the design elevation of 500 feet, NAVD88, the estimated discharge is approximately 78,000-80,000 cfs, with an estimated channel velocity of five to nine fps, and depth of 6 feet. In general, depths greater than three feet and velocities greater than three fps are considered hazardous. The FEMA one-percent-annual-chance flood elevation is approximately 514 feet, NAVD88, where the discharge is approximately 165,000 cfs, channel velocity approximately 10 fps, and depth approximately 30 feet. The last major flood event was in November 1985, where the estimated discharge was over 200,000 cfs. Since then and using estimated flows, each year thereafter, the annual peak flow has been greater than 15,000 cfs, ten times over 50,000 cfs, and two times over 100,000 cfs. For large flood events, the duration of flooding above flood stage can be up to one to two days. Erosion and stream bank failure can occur on the rising stages of a flood event, as well as when the water level falls (FEMA 2007, USACE 1975).

- Where the sanitary sewer and storm water pipes are exposed or where a small amount of soil cover exist, this could cause soil piping/internal erosion, thus promoting more significant stream bank erosion and bank failure.
- The sanitary sewer pipe that crosses the James River from the Williams Creek Pump Station to the Lynchburg Treatment Plant, may be causing localized river bed aggradation, possibly causing higher local velocities at normal low flows.

Cumulative Impacts. Future high water events will only make the stream bank erosion continue. One major flood event could be significant to the Study Area. Removal of Percival Dam may provide some relief with downstream sediment supply.

Riprap Revetment Alternative

Analysis. The Preferred Alternative is not anticipated to have adverse impacts to the local floodplain, nor create negative impacts upstream or downstream of the Study Area.

Cumulative Impacts. The project is designed for an approximate 10-percent-annual-chance flood event. Larger flood events could possibly cause severe erosion and significant damage to the sanitary sewer pipeline. Because the project is located in a bend and subject to high velocities, regular maintenance will most likely be required.

The sanitary sewer pipeline could be considered as critical infrastructure. When possible, critical facilities/infrastructure should be protected from the 0.2-percent-annual-chance flood event.

6.4 WATER QUALITY

No Action Alternative

Analysis. Conditions would remain unchanged; therefore, there implementation of the No Alternative would have no impact on water quality.

Cumulative Impacts. A reasonably foreseeable condition is that water quality will improve over time with development and implementation of total Maximum Daily Load requirements set forth by the VDEQ. However, implementation of the No Action Alternative with past, present, and other reasonably foreseeable actions is not anticipated to result in any synergistic impacts to water quality**.**

Riprap Revetment Action Alternative

Analysis. Soil disturbing activities associated with grading the riverbank and placement of the riprap in the riverbed is anticipated to increase turbidity and Total Suspended Solids (TSS) and reduce dissolved oxygen levels in the in the project footprint and downstream in the James River approximately 50 feet. These temporary impacts are anticipated to be adverse and minor. Following construction, the riprap will reduce erosion into the James River and will serve to provide a negligible improvement by reducing turbidity and TSS in the immediate vicinity of the riprap. However, the permanent loss of a portion of the riparian buffer that serves to filter contaminants from stormwater would result in permanent, adverse, and negligible impacts to water quality. Therefore, these impacts to water quality will be permanent, adverse to beneficial, and negligible.

Cumulative Impacts. A reasonably foreseeable condition is that water quality will improve over time with development and implementation of total Maximum Daily Load requirements set forth by the VDEQ. However, implementation of the No Action Alternative with past, present, and other reasonably foreseeable actions is not anticipated to result in any synergistic impacts to water quality**.**

6.5 VEGETATION

No Action Alternative

Analysis. Vegetation would remain unchanged; therefore, there would be no impact to vegetation.

Cumulative Impacts. Erosion and shoreline loss along the riverbank of the James River is anticipated to increase over time causing further loss and damage to the vegetation community. Therefore, cumulative impacts of past, present, and reasonably foreseeable future actions are anticipated to result in permanent, adverse, minor impacts to vegetation.

Riprap Revetment Alternative

Analysis. Construction of the Preferred Alternative will require that the riverbank be regraded and covered with stone revetment. This will result in a permanent loss of approximately 0.944 acres of vegetation (mixture of herbaceous species, shrubs, and trees). Therefore, implementation of the Riprap Revetment Alternative is anticipated to result in permanent, adverse, minor, impacts to vegetation.

Cumulative Impacts. No cumulative impacts would result from implementation of the No Action Alternative with other past, present, or reasonably foreseeable actions.

6.6 AQUATIC AND WILDLIFE RESOURCES

No-Action Alternative

Analysis. Aquatic and wildlife resources would remain unchanged; therefore, there would be no impact to fish and wildlife resources.

Cumulative Impacts. No cumulative impacts would result from implementation of the No Action Alternative with other past, present, or reasonably foreseeable actions.

Riprap Revetment Alternative

Analysis. Limited mortality of sessile species such as freshwater mussels, clams, and invertebrates may occur during placement of the riprap in the James River. The toe of the riprap has been minimized to the maximum practical extent to reduce impacts and freshwater mussels will be relocated out of the project area to reduce impacts. Temporary disturbance from noise, turbidity, and/or reduced dissolved oxygen levels is anticipated to result in displacement of mobile fish and wildlife during project construction. It is anticipated that turbidity and TSS in the water column will be elevated from a maximum distance of 50 feet from the riprap placement area. However, it is anticipated that most mobile fish and wildlife would move back into the area once construction is complete. The construction will result in temporary, adverse, minor effects to fish and wildlife in the Study Area. Following construction, a total estimated 0.127 acres of James River benthic habitat will be converted from river sediment to the rock revetment. This will result in a permanent loss of foraging and burrowing habitat for some species such as avian resources and burrowing invertebrates. However, other species (variety of fish and invertebrate species) that benefit from rocky substrates will colonize the revetment and also use it for cover and foraging habitat. Therefore, following construction, the effects to fish and wildlife resources would be permanent and would range from adverse – beneficial, minor impacts.

Cumulative Impacts. No cumulative impacts would result from implementation of the Preferred Alternative with other past, present, or reasonably foreseeable actions.

6.7 THREATENED AND ENDANGERED SPECIES AND ANADROMOUS FISH TRUST RESOURCES

No-Action Alternative

Analysis. Fish and wildlife resource would remain unchanged; therefore, there would be no impact to fish and wildlife resources. Therefore, there would be no effect to the northern long-eared bat, the James spineymussel, or state listed mussel species. There would be no effect to anadromous fish trust resources.

Cumulative Impacts. No cumulative impacts would result from implementation of the No Action Alternative with other past, present, or reasonably foreseeable actions.

Riprap Revetment Alternative

Northern Long-eared Bat Analysis. Approximately less than one-acre of trees will be permanently removed to regrade the riverbank prior to placement of the riprap. Some of the trees that will be removed are greater than three inch diameter breast height, which is the approximate diameter of trees used by the northern long-eared bats for roosting and pupping. No reported surveys of the northern long-eared bat have been conducted in the Study Area, therefore, it is unknown if the northern long-eared bat is foraging, roosting, pupping, and/or migrating through the Study Area. Tree removal will not be conducted April 15 – September 15 to reduce any potential impacts to roosting northern long-eared bats. Therefore, we anticipate impacts to the northern long-eared bats and its habitat will be permanent, adverse, and negligible. Therefore, implementation of the Riprap Revetment Alternative may affect, but is not likely to adversely affect the northern long-eared bat.

James Spineymussel Analysis. Based on the full mussel survey conducted in October 2014, the Study Area contains adequate habitat, however, the James Spineymussel is not found in the Study Area. The toe of the riprap has been minimized to the maximum practical extent to reduce impacts to potential James spineymussel habitat. Temporary disturbance from noise, turbidity, and/or reduced dissolved oxygen levels to potential James spiney mussel habitat is anticipated during project construction. It is anticipated that turbidity and TSS in the water column will be elevated from a maximum distance of 50 feet from the riprap placement area. The construction will result in temporary, adverse, minor effects to potential James spineymussel habitat in the Study Area. Following construction, a total estimated 0.127 acres of James River benthic habitat will be permanently converted from sandy sediment to the rock revetment. This will result in a permanent loss of potential habitat for the James spineymussel. Following construction, the riprap will reduce erosion into the James River and will serve to provide a negligible improvement to water quality by reducing turbidity and TSS in the immediate vicinity of the riprap. This type of water quality improvement would have a negligible benefit to the James spineymussel.

Therefore, following construction, the effects to the James spineymussel and its habitat would range from temporary to permanent and would range from adverse – beneficial, negligible to minor impacts. Therefore, implementation of the Riprap Revetment Alternative may affect, but is not likely to adversely affect the James spineymussel. (Impacts to state listed mussels are not separately described as they would be at the same level of impacts anticipated to the James spineymussel.)

Anadromous Fish Trust Resources Analysis. The toe of the riprap has been minimized to the maximum practical extent to reduce impacts to anadromous fish habitat. The construction and placement of the riprap is not anticipated to impede fish migrations as the riprap will only extend approximately less than five feet into the river channel. Temporary disturbance from noise, turbidity, and/or reduced dissolved oxygen levels to anadromous is anticipated during project construction. It is

anticipated that turbidity and TSS in the water column will be elevated from a maximum distance of 50 feet from the riprap placement area. The construction will result in temporary, adverse, minor effects to anadromous fish in the Study Area. There is no submerged aquatic vegetation present in the Study Area. Following construction, a total estimated 0.127 acre of James River benthic habitat will be permanently converted from sandy sediment to the rock revetment. Following construction, the riprap will reduce erosion into the James River and will serve to provide a negligible improvement to water quality by reducing turbidity and TSS in the immediate vicinity of the riprap. This type of water quality improvement would have a negligible benefit to anadromous fish. Impacts to anadromous fish would be temporary to permanent and range from adverse to beneficial with a negligible – minor level of impact. Therefore, implementation of the Riprap Revetment Alternative may affect, but is not likely to adversely affect anadromous fish.

Cumulative Impacts. No cumulative Impacts would result from implementation of the Riprap Revetment Alternative with other past, present, or reasonably foreseeable actions.

6.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

No Action Alternative

Analysis. There is no history of HRTW spills or known HRTW present in the project area, therefore, there is not anticipated to be impacts resulting from HTRW within the study area with the No Action Alternative.

Cumulative Impacts. A gasoline spill from Amherst County Service Authority maintenance vehicles or public recreational vehicles in the Civitan Park could result in temporary, adverse, minor impacts.

Riprap Revetment Alternative

Analysis. Hazardous, radioactive, and/or toxic waste is not anticipated to be generated nor stored onsite with implementation of the Riprap Revetment Alternative. Should a spill of gasoline occur from a fuel tank in construction equipment, the spill will be contained and any gasoline and contaminated soil will be placed into a labeled, approved container and be transported to an approved disposal facility. No aboveground storage tanks will be used to store hazardous materials and no hazardous materials will be stored onsite. Therefore, while a gasoline spill could result in minor, temporary, adverse impacts, there is not anticipated to be any long-term adverse impacts resulting from HTRW within the Study Area with implementation of the No Action Alternative.

Cumulative Impacts. A gasoline spill from Amherst County Service Authority maintenance vehicles or public recreational vehicles in the Civitan Park could result in temporary, adverse, minor impacts; however, implementation of the Riprap Revetment Alternative with past, present, and other reasonably foreseeable actions is not anticipated to result in any synergistic impacts**.**

6.9 AIR QUALITY

No-Action Alternative

Analysis. Air quality would remain unchanged; therefore, there would be no impact to air quality.

Cumulative Impacts. No cumulative impacts would result from implementation of the No Action Alternative with other past, present, or reasonably foreseeable actions.

Riprap Revetment Alternative

Construction and maintenance of the Riprap Revetment Alternative would result in an increase in emissions caused by construction equipment and an increase in dust associated with earth-moving

operations. Emissions generated from construction equipment would be mitigated through the use of best management practices (BMPs) implemented during construction and would not measurably impact air quality. Dust suppression BMPs will be followed if necessary during the construction and maintenance of the riprap revetment. Implementation of the Riprap Revetment Alternative is anticipated to result in long-term, adverse, negligible impacts to air quality.

Cumulative Impacts. No cumulative impacts would result from implementation of the Riprap Revetment Alternative with other past, present, or reasonably foreseeable actions.

6.10 NOISE

No Action Alternative

Analysis. Ambient noise levels within the Study Area would remain unchanged and are estimated to be typically at a park-level of approximately 67 dBA (Federal Highway Administration 2015); estimated peak noise levels of 86 dBA also occur in the Study Area from maintaining the sewer infrastructure and the Williams Creek Pumping Station.

Cumulative Impacts. No anticipated increase in ambient noise levels would result from implementation of the No Action alternative with other past, present, or reasonably foreseeable actions.

Riprap Revetment Alternative

Analysis. Adverse, short-term, minor noise impacts would be expected from construction activities and permanent, adverse, minor noise impacts would result from maintenance of the riprap that would occur approximately every seven years. Based on a sound dissipation rate of 5 dBA per doubling of distance, construction noise impacts were estimated to occur out to a maximum 0.2 miles from the construction area (Table 5).

Table 5. Estimated distance of construction noise resulting from implementation of the Riprap Revetment Alternative.

DISTANCE FROM CONSTRUCTION NOISE (FT)	DBA[1]	DISTANCE NOISE IMPACTS (MILE)
50	86	0.009
100	81	0.02
200	76	0.04
400	71	0.1
800	66	0.2

Placement and maintenance of the riprap would also create underwater noise impacts to aquatic fauna. This impact is discussed in the aquatic fauna and anadromous fish impact sections.

Cumulative Impacts. Cumulative noise impacts resulting from implementation of the Preferred Alternative with the current ambient noise levels would be adverse and would range from temporary to permanent impacts. The level of cumulative impacts is anticipated to result in minor impacts.

6.11 RECREATION

No Action Alternative

Analysis. There would be no effect to the present level of recreational usage of the Study Area and surrounding areas (Civitan Park, Blackwater Creek Trail, and James River).

Cumulative Impacts. Erosion and shoreline loss along the riverbank of the James River within the Study Area is anticipated to increase over time. This may reduce the accessibility of portions of the Study Area to the public for recreational uses in the future. Therefore, cumulative impacts of past, present, and reasonably foreseeable future actions are anticipated to result in permanent, adverse, minor impacts to recreation.

Riprap Revetment Alternative

Analysis. During construction, the public would not be allowed to access portions of the Civitan Park and the James River in the Study Area, however, we anticipate recreational use of the Blackwater Creek Trail would be allowed during project construction. Public usage of the Blackwater Creek Trail may decline due to aesthetic effects and construction noise. Therefore, impacts to recreation would be temporary, adverse, minor impacts. Following construction, the public would not be able to easily access the James River from the five portions of the project area that would contain riprap. However, there are other ample access sites for the public in the Study Area and surrounding areas. Therefore, following construction, impacts to recreation would be permanent, adverse, and minor.

Cumulative Impacts. Erosion and shoreline loss along the bank of the James River is anticipated to increase over time in those portions of the Study Area lacking riprap revetment. This may reduce the accessibility of portions of the Study Area to the public for recreational uses in the future. Also, the areas with riprap revetment will not be easily accessible to the public, further reducing accessibility to the James River shoreline in this area. However, even with the reduced public access anticipated due to future erosion and limited public usage of the riprap revetment areas, there would still be ample public access in the Study Area and surrounding areas. Therefore, cumulative impacts of past, present, and reasonably foreseeable future actions are anticipated to result in permanent, adverse, minor impacts to recreation.

6.12 SOCIOECONOMICS

No Action Alternative

Analysis: Under the no action alternative erosion from the James River would eventually undermine the sewer line. This could result in an extensive sanitation system failure. Such an event would have serious deleterious effects to the health and economic wellbeing of local communities.

Cumulative Impacts. Continued unchecked erosion could also destroy the very popular Blackwater Creek section of the James River Heritage Trail pedestrian and bicycle path that runs along the abandoned Norfolk & Western Railroad grade paralleling this project.

Riprap Revetment Alternative

Analysis. Implementation of erosion control measures would avert the undermining and possible failure of the Amherst County sanitation system. Negative effects to the local population from such a failure would be avoided. Construction activity would have a small, but positive effect on the local economy and employment.

Cumulative Impacts: The cumulative impacts of the riprap revetment alternative for socioeconomic context would be negligible, but generally positive. The main benefit would be the continued uninterrupted functioning of the sanitation system.

6.13 CULTURAL RESOURCES

No Action Alternative

Analysis. No archaeological or historic resources were identified in the cultural resources study, however, if erosion continues unabated it may impact unidentified resources outside of the area surveyed.

Cumulative Impacts. Erosion is a leading cause of the destruction of archaeological sites in Virginia. Not enacting projects that reduce erosion would add to this problem.

Riprap Revetment Alternative

Analysis. Results of the Phase I study found no historic properties affected by this alternative. If archaeological remains are present below the depth tested this alternative would protect archaeological remains in the vicinity, if present, from erosion. The Phase I study concluded with the recommendation that there would be no adverse effects to historic properties from the proposed riprap revetment, DHR commented that no historic properties affected was an appropriate determination for this undertaking.

Cumulative Impacts. Generally, erosion control projects protect archaeological sites and other historic properties. Even where such construction impacts portions of sites, protection from further erosion results in a net positive effect for historic properties.

6.14 CLIMATE CHANGE

No Action Alternative

Analysis. Conditions would remain unchanged; therefore implementation of the No Alternative would have no impact on local, regional, or global climatic patterns.

Cumulative Impacts. A reasonably foreseeable future condition is that sea level rise may increase water depths in the Study Area. However, implementation of the No Action Alternative with past, present, and other reasonably foreseeable actions is not anticipated to result in any synergistic impacts to local, regional, or global climatic patterns.

Riprap Revetment Alternative

Analysis. Implementation of the Riprap Revetment Alterative is not anticipated to have an effect on local, regional, or global climatic patterns.

Cumulative Impacts. A reasonably foreseeable condition is that sea level rise may increase water depths in the Study Area. However, implementation of the Riprap Revetment Alternative with past, present, and other reasonably foreseeable actions is not anticipated to result in any synergistic impacts to local, regional, or global climatic patterns.

7.0 MITIGATION MEASURES

- The riprap will be placed at a minimum distance of at least ten feet from any sanitary sewer infrastructure to ensure the infrastructure will not be compromised by construction or placement of the riprap.
- Only non-forested, disturbed upland site(s) will be used to stage construction materials.
- The contractor will develop a Stormwater Pollution Prevention that includes erosion control practices, inspection procedures, and other BMPs to ensure that increased turbidity and TSS within the James River during construction are minimized to the maximum, practical extent.

- The contractor shall develop a spill response plan should unintentional rupture of the sanitary sewer pipeline occur during construction. This will include containment and response measures as well as emergency notification procedures. This plan will include immediate notification to the Amherst County Service Authority, USACE, and the VDEQ.
- Should an active avian nest be detected during construction activities, the contractor shall contact the USACE contracting officer to determine if protective measures are warranted such as nest protection buffers. The USACE will then coordinate with the FWS and state agencies as appropriate to determine if and what protective measures area warranted.
- Tree removal shall not be allowed from April 15 – September 15 as a protective measure to reduce any potential impacts to northern long-eared bat.
- Hazardous material and hazardous waste will not be stored onsite in any area including the staging area.
- Freshwater mussels will be relocated upstream of the Study Area prior to construction to minimize impacts to the freshwater mussel community.
- The toe of the riprap revetment will be minimized to the maximum, practical extent to reduce impacts to fish and wildlife resources utilizing the James River portion of the Study Area.
- Mufflers will be used on construction equipment, wherever feasible, to reduce noise impacts to the Study Area and surrounding areas.

8.0 COMPLIANCE WITH ENVIRONMENTAL STATUTUES AND REQUIREMENTS

The National Environmental Policy Act of 1969 (NEPA) requires that federal agencies take into consideration the environmental consequences of proposed actions during the decision-making process. The intent of NEPA is to protect, restore, and enhance the environment through well-informed decision-making. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee Federal policy in this process. The CEQ issued regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508). This EA was prepared in compliance with all applicable federal and state statutes, regulations, and executive orders, including:

1. Protection of Historic and Cultural Properties (36 CFR 800 et seq.);
Protection and Enhancement of the Cultural Environment (Executive Order 11593);
Archaeological and Historic Preservation Act of 1974, as amended, 16 U.S.C. 469 et seq.

Compliance: We coordinated with the Historic Resources (DHR) concerning historic and archaeological resources in the project area, and determined that there was no potential for the project to cause adverse effects to archaeological resources.

2. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

Compliance: The project is in compliance with this Act.

3. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972 and Water Quality Act of 1987) PL 100-4, 33 U.S.C. 1251 et seq.

Compliance: The project is in compliance with this Act.

4. Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Compliance: Informal consultation with the FWS has been completed and the project review package is included in Appendix A.

5. Estuarine Protection Act, 16 U.S.C. 1221 et seq.

Compliance: Not Applicable. No designated estuary would be affected by project activities.

6. Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661 et seq.

Compliance: The project is in compliance with this Act.

7. Migratory Bird Treaty Act and Migratory Bird Conservation Act

Compliance: No migratory birds are anticipated to be adversely impacted by implementation of the Preferred Alternative. Should an active migratory bird nest be found in the project area during construction, the protective mitigation measures described in Section 7.0 will be followed.

8. National Environmental Policy Act of 1969, as amended, 42 U.S.C. 432 et seq.

Compliance: Preparation of this report, public coordination and addressing state, federal, and local agency and public comments signifies partial compliance with NEPA. Full compliance is noted with the signing and issuing of the Finding of No Significant Impact (FONSI).

9. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.
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Compliance: In consultation with representatives of the State Historic Preservation Officer it was determined that the project has no potential to cause effects to historic properties. Preparation of the Draft EA and public coordination and comment signifies partial compliance with National Historic Preservation Act. Full compliance is noted with the signing and issuing of the FONSI.

10. Rivers and Harbors Appropriation Act of 1899, as amended, 33 U.S.C. 401 et seq.

Compliance: The proposed work would not obstruct navigable waters of the U.S.

11. Watershed Protection and Flood Prevention Act, as amended, 16 U.S.C. 1001 et seq.

Compliance: No requirements for USACE activities.

12. Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271 et seq.

Compliance: The James River has not been designated as a national wild and scenic river and it is not part of Virginia's Scenic Rivers Program.

Executive Orders

1. Executive Order 11988, Floodplain Management, 24 May 1977, as amended by

Executive Order 12148, 20 July 1979.

Compliance: Implementation of the Preferred Alternative is not anticipated to simulate development in the flood plain. Circulation of this report for public review fulfills the requirements of Executive Order 11988, Section 2(a)(2).

2. Executive Order 11990, Protection of Wetlands, 24 May 1977.

Compliance: There will be no impacts to wetlands with implementation of the Preferred Alternative.

3. Executive Order 12898, Environmental Justice in Minority Populations and Low-Income Populations, 11 February 1994.

Compliance: No impacts are expected to occur to any minority or low income communities in the project area. The Draft EA was made available for comment to all individuals who have an interest in the proposed project.

9.0 FEDERAL, STATE, AND LOCAL AGENCIES CONSULTED

During preparation of the EA, the USACE coordinated with and consulted with the state, federal, and local agencies below to ensure the project would meet all regulatory requirements. The coordination and consultation record is provided in Appendix A.

Amherst County
153 Washington Street
PO Box 390
Amherst, VA 24521

NOAA Fisheries Service
Virginia Field Office
1375 Greate Rd.
P.O. Box 1346
Gloucester Point, VA 23062

david.l.o'brien@noaa.gov
U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Virginia Department of Conservation and Recreation
600 E. Main St., 24th Floor
Richmond, VA 23219

Virginia Department of Game and Inland Fisheries
4010 West Broad St.
Richmond, VA 23230

Virginia Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Virginia Marine Resources Commission
2600 Washington Avenue, 3rd Floor
Newport News, VA 23607

10.0 COMMENTS TO THE DRAFT ENVIRONMENTAL ASSESSMENT

The USACE invited the public as well as federal, state, and local agencies to provide comments to the draft EA by posting a public notice to the U.S. Army Corps of Engineers public website. The log below describes the comments provided by the public and documents how the comments were addressed.

11.0 REPORT PREPARERS

The following individuals from the USACE, Norfolk District office prepared the EA:

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12.0 PERMITS REQUIRED

Anticipated required regulatory permits that will be required to implement the Preferred Alternative are listed in Table 6. Prior to project construction, permit requirements will be reviewed again to ensure full compliance with any regulations that may have changed since preparation of this EA.

Table 6. Compliance permits required for implementation of the Preferred Alternative.

TYPE PERMIT/REVIEW	REGULATORY AGENCY	LEAD APPLICANT	ESTIMATED PERMIT PROCESSING TIME
Land Disturbance	Amherst County	Contractor	45 days
Virginia Pollutant Discharge Elimination System General Construction Permit	DEQ	Contractor	14 days
VMRC General Permit #6	VMRC	USACE	30 days
Virginia Water Protection (General - Utility)	DEQ	USACE	30 days
Section 404/10	USACE	USACE	Not Applicable (N/A) – USACE does not self-regulate
Coastal Zone Management Act Review	VA	N/A	N/A – Outside Coastal Zone Management boundary

FINDING OF NO SIGNIFICANT IMPACT

JAMES RIVER STREAMBANK STABILIZATION PROJECT
CONTINUING AUTHORITIES PROGRAM, SECTION 14
AMHERST COUNTY, VIRGINIA

The purpose of the James River Streambank Stabilization Project is to address erosion issues along the bank of the James River west of the Williams Creek Pumping Station as it is placing the Amherst County sanitary sewer pipeline at risk of damage and rupture. This project is authorized by Section 14 of the Flood Control Act of 1946 (33 U.S.C. 701r), as amended.

The U.S. Army Corps of Engineers, Norfolk District, in partnership with its non-federal sponsor, Amherst County, propose to construct 1,250 linear feet of riprap along the bank and shoreline of the James River to address the erosion issues. The Preferred Alternative and the No Action Alternative were the only alternatives carried forward for detailed evaluation in the feasibility study.

The Norfolk District has taken reasonable measures to analyze the known or foreseeable impacts of the project in the Environmental Assessment. The possible consequences of the Preferred Alternative and No Action Alternative were considered in terms of probable environmental impact, social well-being, and economic factors. This Environmental Assessment presents the impacts that could potentially result from implementation of the Preferred Alternative.

All adverse effects of project implementation are considered negligible to minor, some of which are only temporary. Construction of the riprap will result in temporary, adverse impacts to water quality resulting from increased total suspended solids and turbidity in the James River. Permanent loss of vegetation along the riverbank and benthic habitat in the James River will result from this project; however, the toe of the riprap has been minimized to the maximal, practical extent to reduce impacts to natural resources. No significant economic or social well-being impacts, either adverse or unavoidable, are foreseen as a result of the proposed action. The project is not anticipated to impact sites of significant archeological or historical importance.

No expected adverse effects to threatened or endangered species or species of special concern are foreseeable with project implementation. Endangered Species Act, Section 7 consultation was also concluded with the U.S. Fish and Wildlife Service with “No Effect” and “May Affect, Not likely to adversely affect” determinations. Potential impacts to the endangered northern long-eared bat will be minimized by implementation of a time of year restriction for tree removal.

The conclusions of this report are based on an evaluation of the effects that the proposed action would have on the human environment, including cultural resources, land, air, and water resources. Cumulative impacts of other activities were also considered in this evaluation. Implementing the Preferred Alternative would not have a significant adverse effect on the environment. Design features and best management practices will avoid and

minimize adverse impacts and be incorporated into the project. The effect of the proposed action is not anticipated to be controversial.

Due to the absence of significant adverse environmental impacts, an Environmental Impact Statement will not be required for this project.

Date

Jason E. Kelly

Colonel, Corps of Engineers Commanding

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Appendix A – Coordination and Consultation Correspondence with Regulatory Agencies

Appendix B – Freshwater Mussel Survey Report

Appendix C – Fish and Wildlife Information Service; Information, Planning and Conservation Database; and Natural Heritage Database Search Results