Continuing Authorities Program, Section 14, Emergency Streambank and Shoreline Protection Indian Run, Bedford County, Virginia

Draft Integrated Feasibility Report/ Environmental Assessment

US Army Corps of Engineers ®
Norfolk District

Virginia Department of Transportation

May 7, 2021

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FINDING OF NO SIGNIFICANT IMPACT

The U.S. Army Corps of Engineers, Norfolk District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The Final Integrated Feasibility Report and Environmental Assessment (IFR/EA) dated TBD, for the Continuing Authorities Program, Section 14 Emergency Streambank and Shoreline Protection, Indian Run Emergency Streambank Protection Feasibility Study, addresses streambank stabilization opportunities and feasibility in Bedford County, Virginia.

The Final IFR/EA, incorporated herein by reference, evaluated various alternatives that would stabilize the streambank along a approximate 100-foot section of an unnamed tributary in the Indian Run drainage (James River basin) which threatens existing public roadway U.S. Route 501 and creates a public safety issue in the study area. The Recommended Plan is the National Economic Development (NED) Plan which includes:

Modified Alternative 6 consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The rock fill revetment will generally consist of an approximate 5-foot thick section of Class II riprap overlain by an approximate 3-foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, it was recommended that a Class II riprap be used to protect against the erosive forces of the stream. The rockfill revetment is proposed to an approximate slope of 1.8H:1V. It is recommended that an additional subsurface exploration be performed, and the final slope further evaluated during the Design and Implementation Phase. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap to separate the various stone graded materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and support the VDOT No. 1 stone. The proposed revetment and slope design will require relocating the existing stream channel approximately 7-feet south of its existing location and consequently, excavation and stabilization of the right streambank at a 2H:1V slope. This would include replanting native vegetation, and log and/or tree revetments, as natural bank stabilization and erosion control measures for the right streambank. Additionally, the existing streambed substrates will be relocated with the relocated channel.

In addition to a "no action" plan, seven alternatives were evaluated.[1] The alternatives included placement of vertical sheet piling with no rerouting of the stream, rock fill slope to stabilize the base of the slope and berm with rerouting of the stream, a combination of stone revetment and vertical sheet piling with no rerouting of the stream, and a vegetation erosion control with rerouting of stream, a precast modular retaining wall with stone protection at toe with no rerouting of stream, placement of stone revetment with minimum rerouting of stream, placement of stone revetment with rerouting of stream, and road replacement. Only those alternative plans that provide the best protection with the least amount of disruption to the environment for the longest life span and for a reasonable budget were carried forward. The final alternatives for evaluation and consideration included the "no action" alternative and placement of stone revetment with rerouting of the stream (Modified Alternative 6).

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

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

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action	Significant beneficial effects
Aesthetics	☒	☐	☐	☐
Air quality	☒	☐	☐	☐
Aquatic resources/wetlands	☐	☒	☐	☐
Fish and wildlife habitat	☐	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐	☐
Historic properties	☐	☐	☒	☐
Other cultural resources	☒	☐	☐	☐
Floodplains	☒	☐	☐	☐
Hazardous, toxic & radioactive waste	☒	☐	☐	☐
Hydrology	☒	☒	☐	☐
Land use	☒	☐	☐	☐
Noise levels	☒	☐	☐	☐
Socioeconomics	☒	☐	☐	☐
Environmental justice	☐	☐	☒	☐
Geology, Topography, and Bathymetry	☒	☐	☐	☐
Tribal trust resources	☐	☐	☒	☐
Water quality	☒	☐	☐	☐
Climate change	☒	☐	☐	☐
Transportation	☒	☐	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Recommended Plan. Best management practices (BMPs) as detailed in *Table 7-1. Best Management Practices (BMPs) per resource type associated with the implementation of Modified Alternative 6*, of the IFR/EA will be implemented, as appropriate, to minimize impacts. 2 If determined operationally feasible, a turbidity curtain would be used to minimize turbidity impacts during construction.

Mitigation would be required for 0.0085 acres of wetland impacts as part of the Recommended Plan. It would be anticipated that the mitigation would be onsite compensatory mitigation.

Public review of the Draft IFR/EA and FONSI will be completed on TBD. All comments submitted during the public review period were responded to in the Final IFR/EA and FONSI. A 30-day state and agency review of the Final IFR/EA was completed on TBD.

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

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the Recommended Plan may affect and is likely to adversely affect the northern long-eared bat (*Myotis septentrionalis*) that is under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS); these adverse effects would be temporary, and negligible to minor. There would be no effect to critical habitat under the jurisdiction of the USFWS. The Programmatic Biological Opinion on the Final 4(d) Rule for the Northern Long-Eared Bat (USFWS 2016) is being used for this project and consultation with the U.S. Fish and Wildlife Service (USFWS) was concluded on 05 May 2021. The U.S. Army Corps of Engineers also determined that the Recommended Plan does not affect any federally listed species or designated critical habitat under the jurisdiction of the National Marine Fisheries Service (NMFS). The NMFS provided correspondence on 11 January 2021 that no ESA, Section 7 coordination under the jurisdiction of the NMFS would be required.

Pursuant to section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that historic properties would not be adversely affected by the Recommended Plan. The Virginia Department of Historic Resources is ongoing, and their concurrence with the determination is anticipated by TBD.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the Recommended Plan has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in the Environmental Appendix of the IFR/EA.

The State Water Control Board previously issued conditional §401 Water Quality Certification for Regional Permit (RP) 19 (effective date 5 September 2018) as meeting the requirements of the Virginia Water Protection Permit Regulation. A copy of the RP-19 including terms and conditions is provided in the Integrated Report/EA Environmental Appendix. The Recommended Plan appears to meet the requirements of the RP-19 and its associated Water Quality Certification, pending confirmation based on information to be developed during the Design and Implementation Phase. Therefore, this provides reasonable assurance that a Water Quality Certification pursuant to Section 401 of the Clean Water Act could be issued for the Recommended Plan from the Virginia Department of Environmental Quality (VDEQ). A Water Quality Certification pursuant to Section 401 of the Clean Water Act would be obtained from the VDEQ prior to construction. All conditions of the Water Quality Certification would be implemented in order to minimize adverse impacts to water quality.

A determination of consistency with the Virginia Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 was not required from the Virginia DEQ, as the Study Area is outside of the Virginia Coastal Zone Management Program boundaries.
All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed. Pursuant to the Magnuson Stevens Fishery Conservation and Management Act, coordination with NMFS has determined the Study Area is outside the defined geographic limits of Essential Fish Habitat; therefore, it does not apply to this project. The NMFS concurred with the Corps' determination on 11 February 2021.
Technical, environmental, and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives.3 Based on this report, the reviews by other federal, State and local agencies, Tribes, input of the public, and the review by

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

my staff, it is my determination that the Recommended Plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.[4]

Date	Patrick L. Kinsman, P.E. Colonel, Corps of Engineers District Commander

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

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE), Norfolk District initiated this study in June 2017 at the request of the nonfederal sponsor, the Virginia Department of Transportation (VDOT). The study authority is Section 14 of the Flood Control Act of 1946 as amended, for Emergency Streambank Restoration under the Continuing Authorities Program (CAP).

An approximate 100-foot section of streambank along Indian Run will continue to erode due to the effects of the natural erosion process, including stream flow and storm driven water level rise. The resulting 12-foot high receding bluff is an imminent threat to existing public facilities and continual loss of soil is threatening a section of the existing public road along U.S. Route 501.

Continuing Authorities Program Section 14 feasibility studies must evaluate whether it would be more cost effective to relocate the public facilities so that they would no longer be at risk from the streambank erosion or stabilize the shoreline to reduce the risk to the facilities where they are currently located. This report identifies the alternatives that were considered to address this problem and recommends placement of stone revetment as the plan that would best meet the study objectives and protect the public facilities at risk. During the feasibility phase, there were six action alternatives considered, including placement of vertical steel sheet piling, rock sill to stabilize the base of the slope and berm with some rerouting of the stream, combination of stone revetment and vertical sheet piling, vegetative erosion control with slight rerouting of stream, precast modular retaining walls with stone protection at the toe with some rerouting of the stream.

A modified Alternative 6 (the Recommended Plan) is the least cost option at an estimated cost of $1,026,000 and would stabilize the streambank with the placement of stone revetment. This plan includes excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along an approximate100-foot section of the roadway that will consist of approximately 5 foot thick section of Class II riprap overlain by approximately 3 foot section of a VDOT Number 1 aggregate and is proposed to an approximate slope of 1.8 Horizontal to 1 Vertical (1V:1.8H) and rerouting of the existing stream with excavation and stabilization with native vegetation planted on the adjacent streambank at a 2H:1V slope. At the estimated total project cost of $1,026,000, the estimated federal cost-share (65%) is $666,900 and the estimated non-federal cost-share (35%) is $359,100. This report provides the basis for preparing plans and specifications for the subsequent construction of the Recommended Plan.

LIST OF ACRONYMS AND ABBREVIATIONS

AAB	Average Annual Benefits
AAC	Average Annual Costs
ACQR	Air Quality Control Region
ADCIRC	Advanced Circulation Model
APE	Area of Potential Effect
APP	Accident Prevention Plan
ASTM	American Society for Testing and Materials
BMP	Best Management Practice
CAA	Clean Air Act
CAP	Continuing Authorities Program
CCB	Center for Conservation and Biological Diversity
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	Cubic feet / second
CHS	Coastal Hazards Study
CO	Carbon Monoxide
CO2	Carbon Dioxide
CWA	Clean Water Act
dBA	A-weighted decibels
DEQ	Department of Environmental Quality
DHR	Department of Historic Resources
DoD	Department of Defense
EA	Environmental Assessment
FCSA	Feasibility Cost-Share Agreement
EFH	Essential Fish Habitat
ERDC	Engineering, Research and Development Center (USACE)
ESA	Endangered Species Act
EO	Executive Order

FEMA	Federal Emergency Management Act
FID	Federal Interest Determination
FUDS	Formerly Used Defense Site
FWIS	Fish and Wildlife Information System
GARFO	Greater Atlantic Region Fisheries Office
GHGs	Greenhouse Gases
Hz	Hertz
LERR	Lands, Easements, rights-of-way and relocation
LERRDs	Lands, easements, right-of-way, relocations, and disposal areas
MHW	Mean High Water
MHHW	Mean Higher High Water
MLW	Mean Low Water
MLLW	Mean Lower Low Water
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NACCS	North Atlantic Coast Comprehensive Study
NAD	North Atlantic Division
NAVD 88	North American Vertical Datum of 1988
NED	National Economic Development
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Association
NOx	Nitrogen Oxides
NPL	National Priorities List
NRHP	National Register of Historic Places
NTDE	National Tidal Datum Epoch (NTDE)
OHS	Occupational Health and Safety
03	Ozone
P&G	Principles and Guidelines (USACE)

PM2.5	Particulate Matter measured as equal to or less than 2.5 microns in diameter
PM10	Particulate Matter measured as equal to or less than 10 microns in diameter
PPA	Project Partnership Agreement
PPE	Personal Protective Equipment
Ppt	Parts Per Thousand
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SAV	Submerged Aquatic Vegetation
SLR	Sea Level Rise
SO2	Sulfur Dioxide
SPT	Standard Penetration Testing
STWAVE	Steady State Special Wave
TMDL	Total Maximum Daily Load
TRI	Toxic Release Inventory
TRIS	Toxic Chemical Release Inventory System
TSP	Tentatively Selected Plan
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VDGIF	Virginia Department of Game and Inland Fisheries
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VOCs	Volatile Organic Compounds
WRDA	Water Resources Development Act

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1 INTRODUCTION

STUDY AUTHORITY

The Indian Run, Bedford County, Virginia study is authorized by Section 14 of the Flood Control Act of 1946, as amended (P.L.79-526), Emergency Streambank and Shore Protection. The purpose of the Section 14 program is to construct emergency streambank and shore protection to prevent natural erosion processes from damaging highways, bridge approaches, public works, churches, public and private non-profit hospitals, schools, water and sewer lines, and other public or non-profit facilities that offer public services to all, and known historic properties eligible or listed on the National Register of Historic Places. As of today, the term Shore Protection is now referred to as Coastal Storm Risk Management.

If an eligible facility is in imminent danger of failure, an after a request for a project has been received from a potential nonfederal sponsor stating its desire to participate in a solution, USACE will conduct a feasibility study to analyze the problem, develop a solution, and determine the feasibility of a solution. In a feasibility phase, the first $100,000 is 100 percent federally funded. Any additional feasibility study costs require an executed Feasibility Cost-Sharing Agreement (FCSA), stating that all costs above the initial $100,000 are cost-shared 50 percent federal and 50 percent nonfederal.

PURPOSE AND NEED

On June 24, 2017 the Virginia Department of Transportation (VDOT) requested USACE, Norfolk District to evaluate structural and nonstructural measures that could be implemented as part of a federal project under CAP Section 14, Emergency Streambank and Shoreline Protection. VDOT requested this study to address the erosion which is threatening U.S. Route 501 and could impose negative impacts to interstate commerce. The first step in the evaluation process, which is fully federally funded, is to determine if there is federal Interest in pursuing a feasibility study for this area. This task has already been completed; a favorable Federal Interest Determination (FID) for a shoreline erosion protection study along Indian Run was approved in September 2017. With this determination and approval, USACE, North Atlantic Division (NAD) sanctioned the development of the FCSA and the Project Management Plan (PMP) for the feasibility phase.

The purpose of this study is to stabilize the existing streambank along the approximate 100-foot section along Indian Run that will prevent future erosion resulting from the combined effects of river flow, storm driven level rise, and stormwater runoff. The project is needed to provide long-term protection to existing public utilities, causing continual loss of soil and threatening a section of the existing public road along U.S.

Route 501 that was also documented and confirmed from the USACE and VDOT site visit conducted on 11 November 2019. The public road and other public works utilities on U.S. Route 501 is feasible and economically and environmentally justified. The study identifies the least cost alternative and the Recommended Plan is justified if total project costs are less than costs of relocating the threatened road and public utilities. Federal costs are limited to $5,000,000 for CAP Section 14. The cost of lands, easements, right-of-way, relocations of utilities, disposal areas (LERRDs), and the operation and maintenance of the project, once completed, are a nonfederal responsibility.

STUDY AREA

The study area is located in western Virginia approximately 13 miles northeast of Lynchburg. Although closer in proximity to Coleman Falls (approximately ½ mile east), the project site is entirely within the town limits of Big Island. Indian Run is a tributary of the James River, and their confluence is roughly 2000 feet to the north of the study area (Figure 1-1).

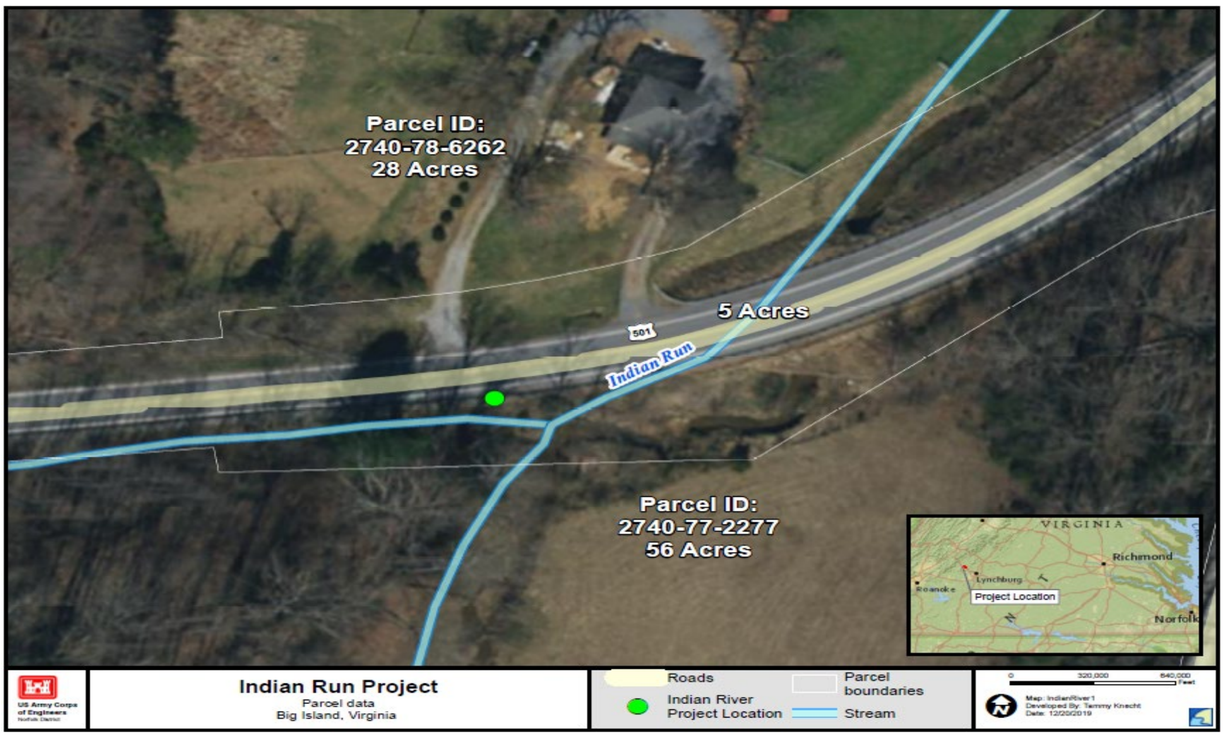

Figure 1-1. Project Location

BACKGROUND

An approximate 100-foot section of streambank along Indian Run is severely eroded by the effects of natural processes including river flow, and storm driven water level rise. The resulting 12-foot high receding bluff is an imminent threat to existing public facilities, causing continual loss of soil and threatening a section of the existing public road along

U.S. Route 501. This threatened section of roadway already received emergency placement of riprap, in the fall of 2016, to help temporarily restore the road shoulder and embankment containing the guardrail.

At the site location, confirmed on 24 January and 11 November 2019 site visits, the bank had encroached to within approximately 1 foot of the existing road, warranting a Risk, indicating “without project” conditions are expected to damage public facilities in less than two years. Furthermore, a total loss of the threatened public facilities would cause an adverse impact to public health, safety, security, welfare or interstate commerce. Also, when considering the average daily traffic (ADT) of 2400 vehicles, based on 2015 data from Virginia Department of Transportation, and the negative impacts to interstate commerce, in conjunction with the given Risk and Consequences analysis, this problem rates a Risk and Consequence and District Priority of 1, according to the Continuing Authorities Program Risk and Consequences Matrix. See below Figures 1-2, 1-3, 1-4, and 1-5 showing erosion at the study area along Indian Run.

Figure 1-2. View showing roadway degradation which occurred prior to emergency slope repair.

Figure 1-3. View showing roadway degradation which occurred prior to emergency slope repair.

Figure 1-4. View showing riprap “slump” due to improperly designed and placed protection.

Figure 1-5. View showing riprap “slump” due to improperly designed and placed protection

This threatened section of roadway received emergency placement of riprap in the fall of 2016 to help temporarily restore the road shoulder and embankment containing the guardrail structure. However, the emergency placement of riprap by VDOT was temporary and not a permanent solution. Based on photographs taken during the site visits by the Norfolk District USACE team, it is the Norfolk District’s engineering team members determined that the side-slopes of the roadway embankment appear to be unstable and over-steepened. The size of the stone placed on the embankment appears to be too small and may erode off the embankment into the stream or be washed downstream by hydraulic forces. A geotechnical engineering evaluation will need to be performed to determine the slope stability of the embankment. The riprap placed on the site was an emergency measure performed by VDOT to prevent the continued efforts of the slope failure and scarping along the embankment. A hydraulic engineering evaluation of the stream would also need to be performed to determine the appropriate stone size for the embankment.

The largest employer in Big Island, Virginia is the Georgia-Pacific L.L.C. paper and pulp mill, which makes cellulose, tissue, and containerboard products. The mill is located along U.S. Route 501 approximately 3 miles northwest of the project site. Based on the 2017 Bedford County Community Planner Report from the Virginia Employment Commission, Georgia-Pacific L.L.C. is the seventh largest employer in Bedford County, and employs approximately 330 employees and 70 contractors at the Big Island plant. The U.S. Census Bureau OnTheMap Application and LEHD Origin-Destination Employment Statistics from 2014, list the City of Lynchburg as the number one area that workers and residents from Bedford County are commuting to and from. Approximately 6,896 workers are commuting to, and 2,017 workers are commuting from Lynchburg, Virginia. The project site is located between the City of Lynchburg and Georgia-Pacific L.L.C. production plant. U.S. Route 501 serves as a major artery between Big Island and Lynchburg city and the failure of the road has the potential to create adverse social and economic impacts. Given the rural location and proximity to James River, the future without project future condition would cause workers, residents, and commercial trucks to partake in detours adding as much as 50 minutes or 30 miles to travel time or distance due to the lack of efficient alternative routes. According to a 2015 article from The Roanoke Times, the Georgia-Pacific plant in Big Island, Virginia is currently implementing $50 million dollars in capital expenditures aimed at upgrading the pulp mill. Given a large investment to upgrade the plant, an assumption can be drawn that the mill will remain operational long into the future and demand for the project area section of the roadway within the study area will remain constant or increase in the future.

PRIOR REPORTS AND EXISTING PROJECTS

The VDOT or USACE have not completed any studies or projects within the study area to this date. The emergency placement of riprap that was placed in the fall of 2016 and is the only know action within the study area.

2 PLAN FORMULATION

In general, the plan formulation process follows six major steps, as listed and summarized below. This procedure is in accordance with the USACE Principles and Guidelines (P&G) and related regulations. These six steps are:

- Step 1: Identification of problems and opportunities;
- Step 2: Inventory of forecasting conditions;
- Step 3: Formulation of alternative plans;
- Step 4: Evaluation of alternative plans;
- Step 5: Comparison of alternative plans; and
- Step 6: Selection of a plan.

Preliminary plans were formulated by combining management measures. Each plan was formulated in consideration of the following four criteria described in the P&G:

- <u>Completeness</u>: Extent to which the plan provides and accounts for all necessary investments or actions to ensure realization of the planning objectives;
- <u>Effectiveness</u>: Extent to which the plan contributes to achieving the planning objectives;
- <u>Efficiency</u>: Extent to which the plan is the most cost-effective means of addressing the specified problems and realizing the specified opportunities, consistent with protecting the nation's environment; and
- <u>Acceptability</u>: Workability and viability of the alternative plan with respect to acceptance by federal and nonfederal entities and the public, and compatibility with existing laws, regulations, and public policies.

The underlying rational of the Planning Process is described in ER 1105-2-100 as "Formulation of Alternative Plans."

- Alternative plans are formulated to identify ways of achieving planning objectives within the project constraints, in order to solve the problems and realize the opportunities listed in Step 1 of the Planning Process, which is to "Identify Problems and Opportunities."
- Structural and nonstructural management measures are identified and combined to form alternative plans.
- Planners will keep focus on complete plan(s) while doing individuals tasks, to ensure their plans address the problems of the planning area.
- Section 904 of the Water Resources Development Act (WRDA) of 1986 requires USACE to address the following during the formulation and evaluation of alternative plan:

- Enhancing national economic development (NED) – including benefits to particular regions that are not transfers from other regions;
- Protecting and restoring the quality of the total environment;
- The wellbeing of the people of the United States; and
- Preservation of cultural as well as historical values.

Plan formulation was conducted with focus on achieving the federal objective of water and related land resources project planning, which is to contribute to NED consistent with protecting the Nation's environmental statutes, applicable executive orders, and other federal planning requirements. Alternative plan development considered study area problems, opportunities, and constraints.

Alternative plan evaluation includes all effects, beneficial or adverse, to each of the four evaluation accounts identified in the Principles and Guidance (1983), which are NED, Environmental Quality, Regional Economic Development, and Other Social Effects.

2.1 PROBLEMS AND OPPORTUNITIES

Problems in the study area include:

1) The streambank is severely eroded so that there is a significant risk that U.S. Route 501 will be compromised if the erosion continues; and
2) The 12-foot high receding embankment is in imminent threat to existing public facilities, local businesses, and interstate commerce, causing continual loss of soil, and threatening a section of the existing public road along U.S. Route 501.

Opportunities in the study area include:

1) Create safe bank conditions;
2) Protect existing public facilities from being replaced;
3) Improve environmental landscape;
4) Preserve the welfare of the residents in the project area; and
5) Provide economic stability for the surrounding businesses.

2.2 PLANNING OBJECTIVES AND CONSTRAINTS

The study goal is to determine if the project would contribute to the NED account in a manner consistent with protecting the nation's environment in accordance with national environmental statues, applicable executive orders, and other federal planning requirements.

2.2.1 PLANNING OBJECTIVES

In general, the primary federal objective is to contribute planning objectives for this study take an integrated systematic approach to the stabilization of the eroding streambank adjacent to U.S. Route 501 and to reduce the risk future erosion poses to that infrastructure. Based on the identified problems that the bank erosion causes within the study area; the following planning objective has been established to assist in the development and evaluation of alternative plans:

1) Stabilize the eroding shoreline to reduce the risk that U.S. Route 501 and the various public utilities in the vicinity will be damaged and ultimately compromised by continued erosion over the period of analysis; and

2.2.2 PLANNING CONSTRAINTS AND CONSIDERATIONS

Planning constraints are any policy, technical, environmental, economic, local, regional, social, and institutional factors that act to restrict the planning process. Constraints that will affect the plan formulation include:

1) Do not induce erosion to the left or right of the project area; and
2) Minimize impacts to existing public facilities, businesses, and interstate commerce.

In addition to constraints, there are also considerations such as state-of-the-art limitations, time, money, uncertainty of the future, policy, and the inaccuracies inherent in design procedures on which alternative plans are based that are considered in the planning process. There is privately owned real estate parcels in the study area that may affect the cost and/or implementation of a project.

2.3 DEVELOPMENT OF ALTERNATIVE PLANS

Per ER 1105-2-100, the formulation and evaluation of plans in CAP Section 14 studies should focus on the least cost alternative solution is environmentally acceptable. The least cost alternative plan is justified if the total cost of the proposed alternative is less than the cost to relocate the threatened facility.

2.3.1 INITIAL MEASURES

Eight streambank stabilization measures were considered in this study to reduce the risk to U.S. Route 501 and the utilities in the vicinity caused by bank erosion:

1. Vertical steel sheet piling, which are long structural sections with a vertical interlocking system that create a continuous wall to retain soil or water;
2. Rock sill to stabilize the slope base, which consists of a sill that is a rock structure that is placed parallel to the streambank so that the soil can be contained;
3. Rerouting of stream, which would move the stream away from the eroding streambank;
4. Berm, which could be used to divert stormwater run-off from the eroded streambank;

5. Stone revetment, which is the placement of rock along the bank/shoreline to absorb or deflect incoming wave energy in order to minimize and mitigate erosion;
6. Vegetated erosion control, which would provide stability by the ability of the plant life growing on slopes to prevent erosion of the slope;
7. Precast modular retaining walls, with consist of modular precast concrete units and select backfill. The system is a simple proven solution for grade separation on highways, bridges, railroads, or water;
8. Longitudinal peaked stone toe protection, which is a stone structure consisting of well sorted, self-launching stone built on the toe of an eroding bank;
9. Relocating the road and utilities was also considered as a non-structural measure; and
10. No action, or the future without project condition, was also considered.

2.3.2 SCREENING OF MEASURES

The team evaluated measures based on meeting objectives and avoiding the constraint. If a measure met objectives, it was evaluated with respect to avoiding the constraint.

1. Vertical steel sheet piling was screened out because it would be cost prohibitive in that it would exceed the cost of the road relocation or that it would exceed the total cost allowed for a CAP Section 14;
2. Rock sill to stabilize to stabilize base of slope was carried forward because this is a typical measure that is used to solve similar study problems and is generally cost effective;
3. Rerouting of stream was carried forward because this is a typical measure that is used to solve similar study problems and is generally cost effective;
4. Berm was not carried forward because potentially this measure would not last the lifecycle criterion of 25 years;
5. Stone Revetment was carried forward because this is a typical measure used to solve similar study problems and is generally cost effective;
6. Vegetated erosion control was carried forward but had some concern due to the 3 years of monitoring (cost concern), but it has been used for other projects;
7. Precast modular retaining walls were not carried forward due to the environmental (vegetation or habitat) resources that could be impacted. These impacts could be mitigated but that mitigation cost would likely

increase the cost of the measure so that it exceeds the cost limit allowed for CAP Section 14; and

8. Longitudinal peaked stone protection was carried forward because this is a typical measure used to solve similar study problems and is generally cost effective.

The measures that provided the "best protection with the least amount of disruption to the environment for the longest life span and for a reasonable budget" were carried forward. A summary of measures screening is shown in Table 2-1.

Table 2-1. Summary of Measures Screening

Measure Description	Carried Forward?	Notes
Vertical steel sheet piling	N	Cost criteria and difficult to install at location
Rock sill to stabilize base of slope	Y	Typical measure used to solve similar study problems
Re-routing of stream	Y	Typical measure used to solve similar study problems
Berm	N	Lifecycle criteria – 25 years
Stone revetment	Y	Typical measure used to solve similar study problems
Vegetative erosion control	Y	Lifecycle criterion – 3 years, long fetch
Precast modular retaining walls	N	Cost criteria and difficult to install at location
Stone protection at the toe	Y	Typical measure used to solve similar study problems
Relocation of Road and Utilities	Y	The baseline to which all other measures are compared

2.4 ALTERNATIVE FORMULATION

Alternatives include one or more management measures functioning together to address the planning objectives. Only alternatives that were practical in terms of the engineering, economic, environmental, and social impacts were developed and included the measures carried forward in Table 2-1. Relocation of the road and utilities, the no action alternative (future without project), and four action alternatives with various means of protecting the bank from erosion. The alternatives included in the initial array are discussed below:

- *Relocation of Road and Utilities:* Involves relocating public utilities and relocating the road. The baseline to which the cost of all other alternatives is compared.

- *Alternative 0:* Is the No Action/Future Without Project Alternative.

- *Alternative 1:* Rock Sill with Vegetated Slope. This will consist of the entire slope being graded back to a 1V:3H slope, placement of VDOT Class III rip rap on top of VDOT number 1 stone and filter fabric at the toe (See Figure 2-1).

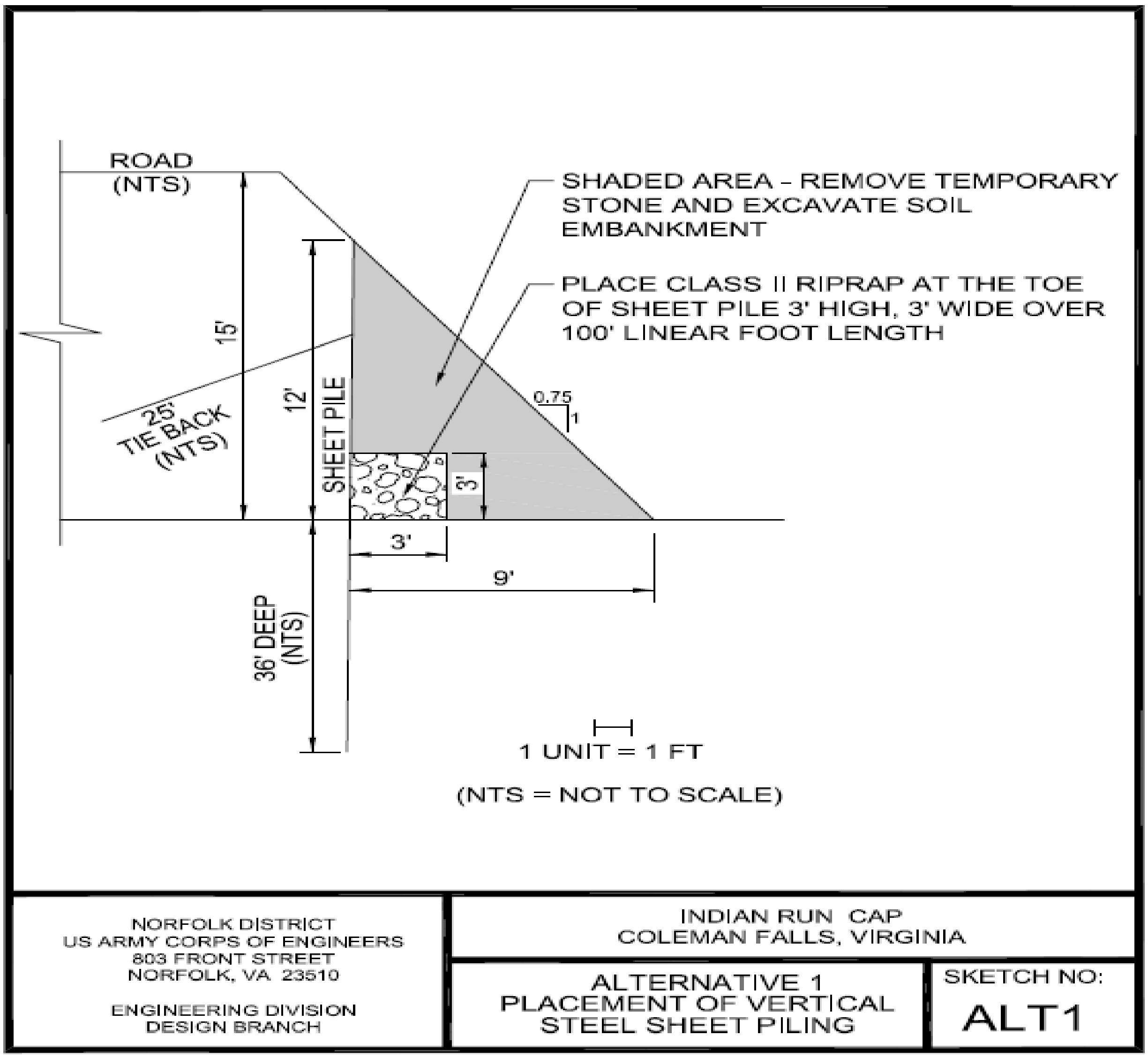

Figure 2-1. Alternative 1.

- *Alternative 2:* Rock sill slope to stabilize the base of the slope and a berm. This consists of re-grading the slope to a 1V:2H slope and the placement of VDOT Class II rip rap (See Figure 2-2).

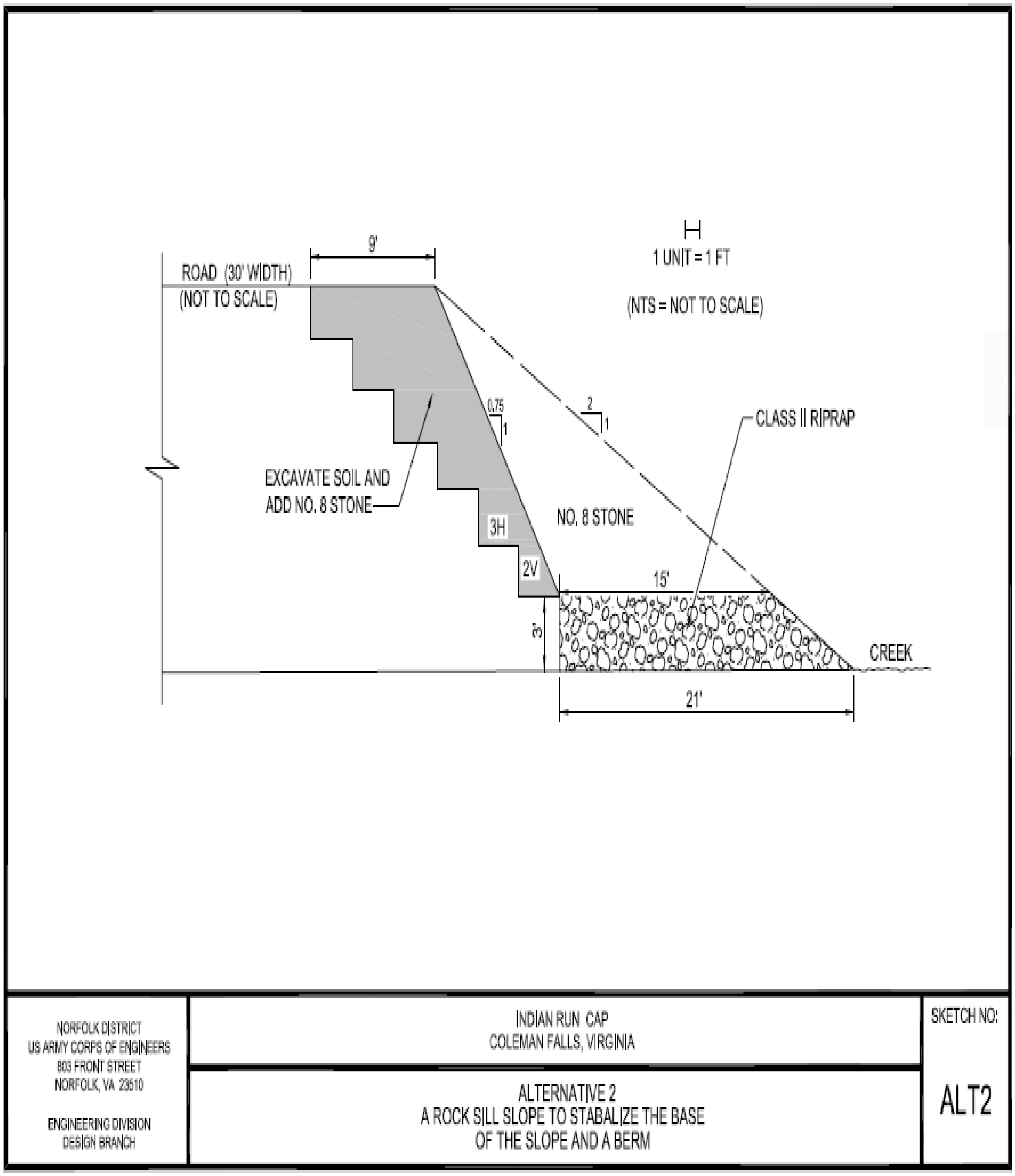

Figure 2-2. Alternative 2.

- *Alternative 3:* Combination of stone revetment and vertical sheet piling. This consists of re-grading the slope to 1V:2H slope that will be vegetated, placement of sheet piling, with VDOT Class II rip rap (See Figure 2-3).

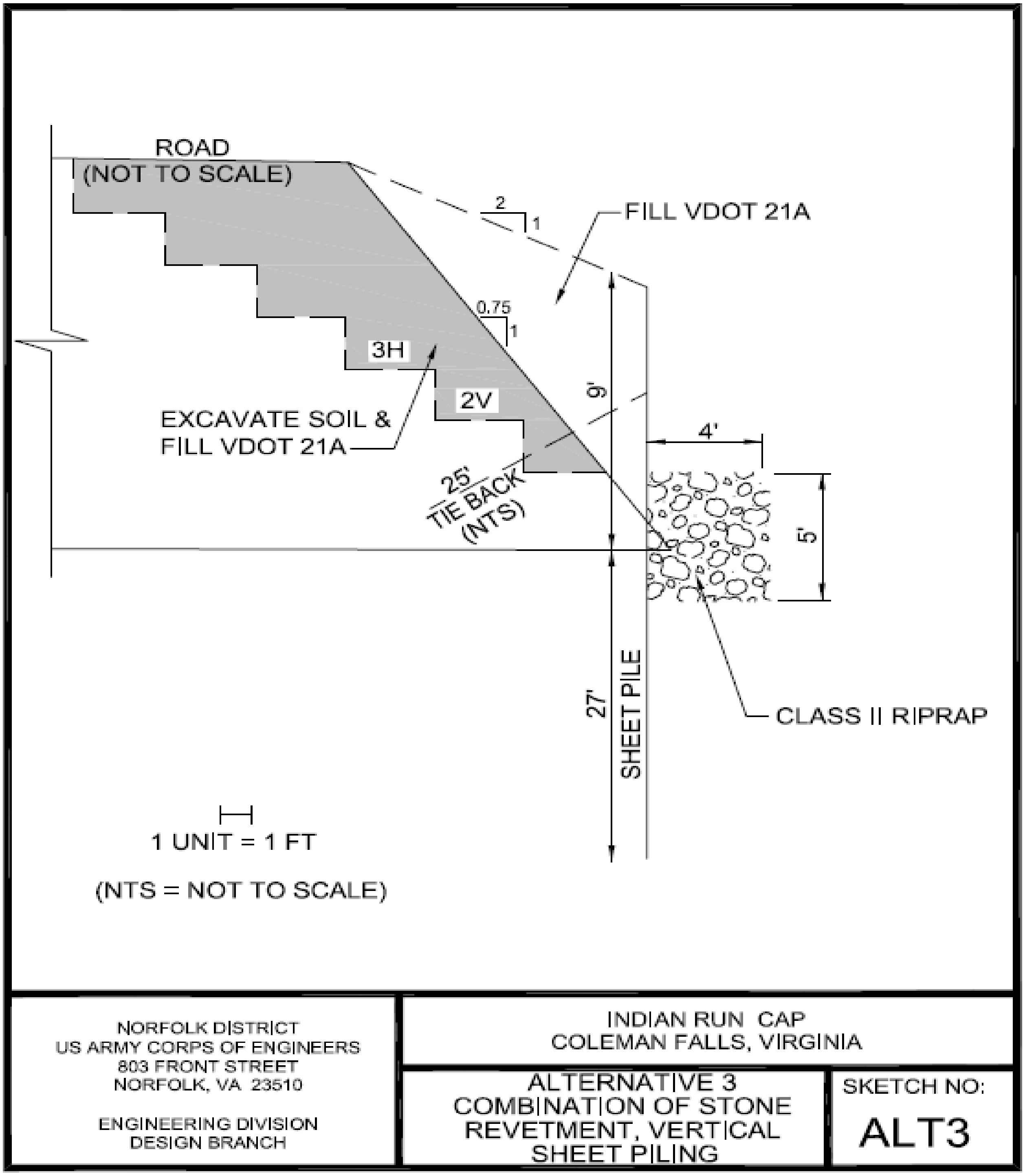

Figure 2-3. Alternative 3.

- *Alternative 4:* Vegetated erosion control with slight rerouting of the stream. This consists of re-grading a portion of the slope to a 1V:3H, placement of filter fabric, VDOT Class II rip rap (See Figure 2-4).

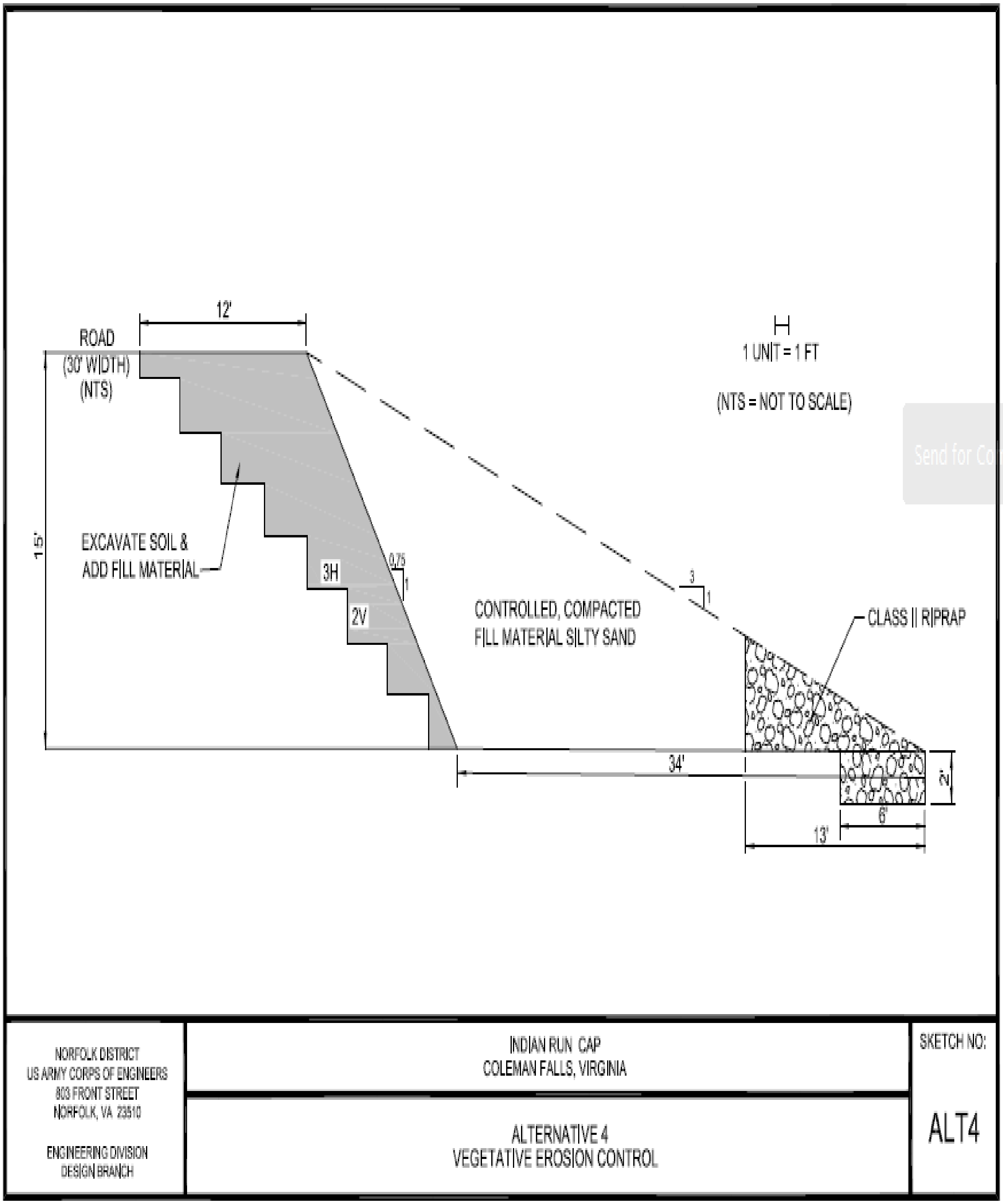

Figure 2-4. Alternative 4

- *Alternative 5:* Pre-cast modular retaining walls with stone protection at the toe with some rerouting of the stream. This consists of re-grading a portion of the slope, placement of modular wall, VDOT Class II rip rap (See Figure 2-5).

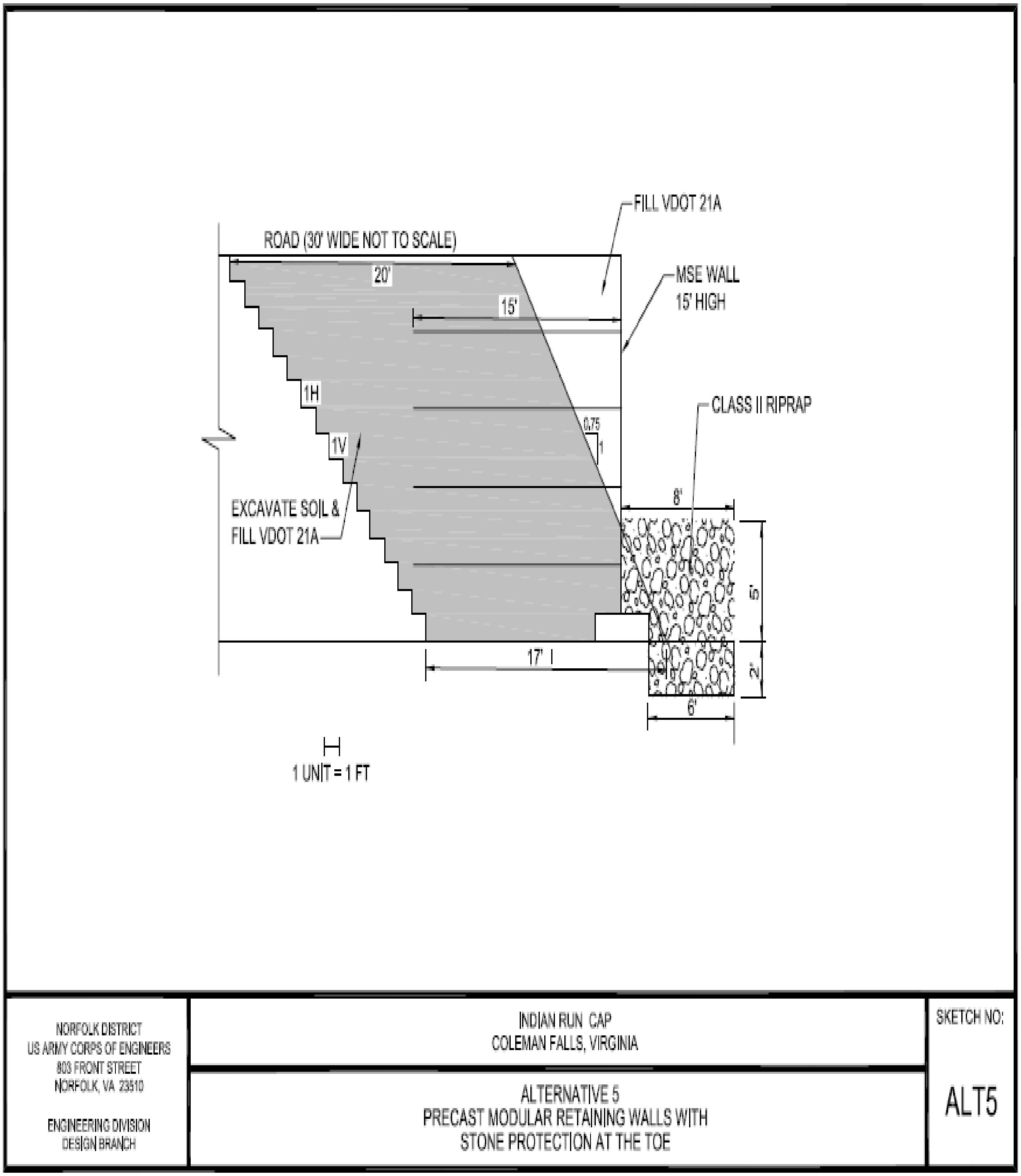

Figure 2-5. Alternative 5.

- *Alternative 6:* Full Rock Revetment. This consists of re-grading the slope to a 1V:1H slope, placement of filter fabric, and the placement of VDOT Class II rip rap (See Figure 2-6).

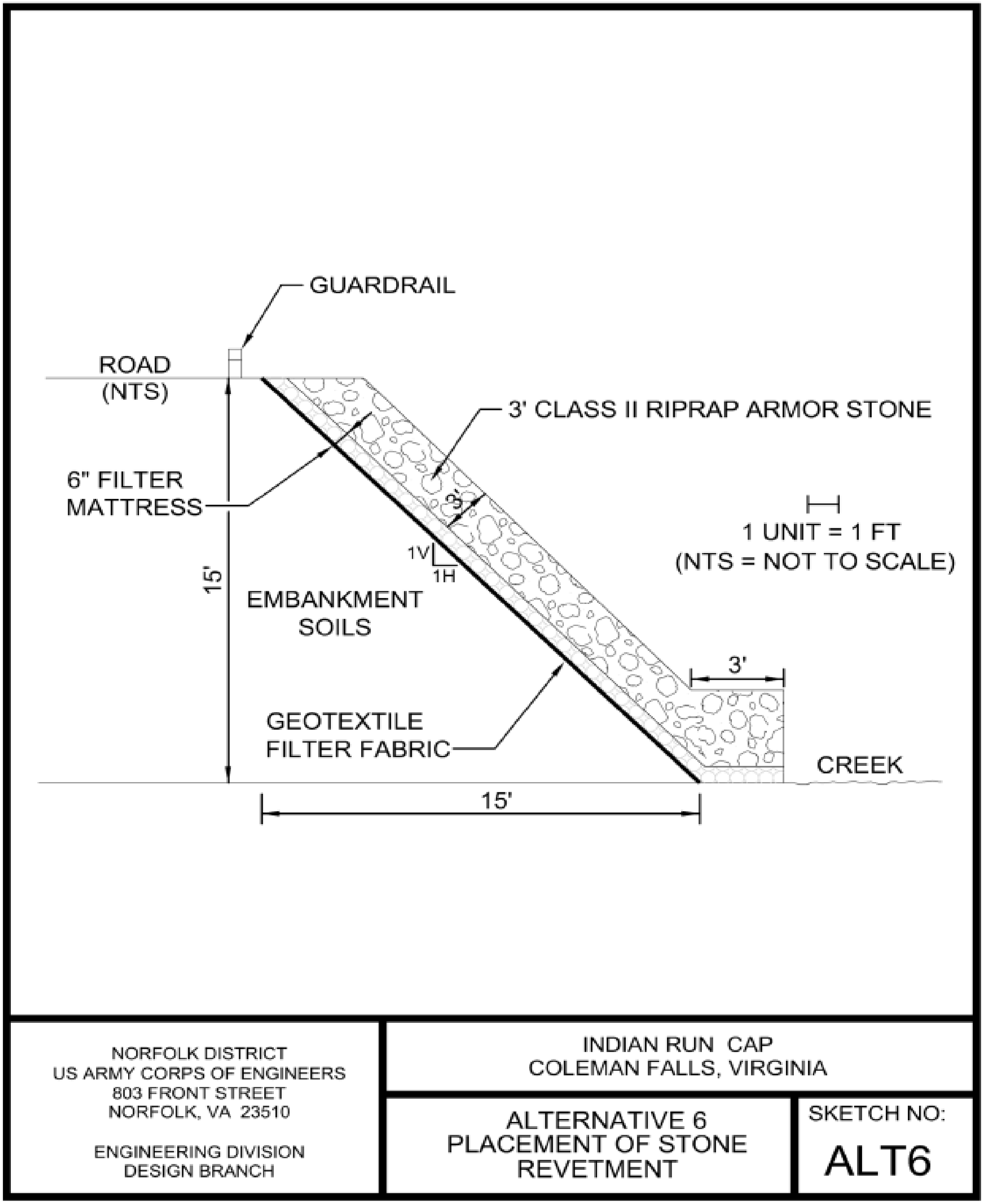

Figure 2-6. Alternative 6.

3 AFFECTED ENVIRONMENT

3.1 AESTHETICS

Visual resources are the natural and man-made features that comprise the visual qualities of a given area, or "viewshed." These features form the overall impression that an observer receives of an area or its landscape character from a certain vantage point. Topography, water, vegetation, man-made features, and the degree of panoramic view available are examples of visual characteristics of an area. Visual resources can be subjective by nature, and therefore the level of the proposed project's visual impacts can be challenging to quantify. Generally, projects that create a high level of contrast to the existing visual character of a project setting are more likely to generate adverse visual impacts due to visual incompatibility. Thus, it is important to assess project effects relative to the existing conditions of the area.

Within a discrete viewshed, an individual's visual perception is a function of the area's spatial properties, visual content, and an individual's previous experiences. The visual character of an area can be altered by actions that would modify the landscape. To provide a baseline for assessing potential visual impacts on a viewshed, the Study Area, or Region of Influence (ROI) must be described in terms of its visual characteristics and a description of the user groups (viewer groups) who would experience any changes in visual character.

The ROI is defined by the areas in which temporary or permanent visual changes could occur. For this project, the ROI includes the floodplain vegetation (primarily trees and scrub/shrub), streambanks, and channel of the unnamed tributary to Indian Run, the roadway and traffic associated with U.S. Route 501, and the grass-covered open field and parking landscapes of each of the potential laydown areas identified. The project site is located in a low-density rural area with visual landscape characterized by views disturbed by the roadway and traffic of U.S. 501, and the emergency riprap and severe erosion on the north bank of the unnamed tributary (Figure 2-1). The primary user groups of this viewshed include the private property owners directly across U.S. 501 (i.e., north of) from the eroding streambank, and the general public driving on U.S. 501.

3.2 AIR QUALITY

The U.S. Environmental Protection Agency (USEPA) 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 Virginia Department of Environmental Quality (VDEQ) regulates toxic pollutants in addition to the criteria pollutants as designated in 9 Virginia Administrative Code 5 Chapter 60, Part II, Article 5 (9 VAC 5-20-200) for New and Modified Stationary Sources. Per 9 VAC 5-20-200, Bedford County (i.e., containing the Study Area) is part of Region 3, the Central Virginia Intrastate Air Quality Control Region. In accordance with the Clean Air Act and Virginia Administrative Code, this area has not exceeded the standards for any criteria pollutants and is not designated "Nonattainment" or "Maintenance" status.

3.3 HYDROLOGY

The ROI is located along an unnamed 1st-Strahler order tributary flowing primarily northeast-east immediately upstream the confluence with Indian Run, and shortly thereafter, mainstem James River. The Study Area is approximately 0.6 fluvial kilometers (0.4 fluvial miles) from Indian Run's confluence with James River. The catchment area of the unnamed tributary measures 0.72 km2 (USEPA 2020a). There is no USGS stream gage on Indian Run, however, the U.S. Environmental Protection Agency (USEPAa) Watershed Assessment, Tracking & Environmental Results System (WATERS) tool estimates mean annual discharge as 1.02 cubic feet / second (cfs) (USEPA 2020a). For additional reference, the segment of Indian Run that meets the unnamed tributary immediately downstream of the project footprint is 2nd-Strahler order with an estimated mean annual discharge of 3.82 cfs, and the segment of Indian Run downstream of their confluence is 2nd-Strahler order and has an estimated mean annual discharge of 5.05 cfs.

3.4 CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

The Earth's average temperature has increased by more than one degree Fahrenheit over the last century and scientists rise have attributed this temperature to the burning of fossil fuels and the resulting release of carbon dioxide into the atmosphere (Strauss et al. 2014). Shifts in rainfall distribution, storm intensity, evapotranspiration, groundwater recharge, peak flows, and water yields have resulted from this warming in the Southeast United States (Sun 2013). Flood and drought are anticipated to increase in magnitude while rainfall dynamics becoming increasingly unpredictable and intense (Sun 2013). These are characteristics that may apply to our Study Area.

3.5 CULTURAL RESOURCES

The ROI is in the drainage of Indian Run, a tributary of the James River. It is within the Piedmont geophysical province of Virginia, characterized by steeply rolling hills and swift streams. The project is on an unnamed rank two tributary of Indian Run. The area of potential effect (APE) consists of existing roadway embankment on the south side of the stream, and first order floodplain/cut bank on the north.

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 were the Monacans, although the Cherokee were known to be active nearby. People claiming decent from the Monacans still live in the area and have been recognized by the federal government and state of Virginia as a tribe.

There are no recorded archaeological sites or historic architectural properties in the Department of Historic Resources (DHR) data base, the Virginia Cultural Resource Information System (VCRIS) in or near the project APE, however, there are no surveys recorded for this area (VDHR 2021). Geophysical characteristics of some locations in the area are favorable for archaeological potential. These include well drained alluvial terraces above Indian Run and tributaries, and hilltops. The former, while limited in breadth would be attractive for late Native American and early Colonial agriculture.

There are no buildings in the visual APE, so there are no potentially historic buildings. Cultural modifications, from highway construction, and natural transformations from stream scouring have left only recent deposits, and low archaeological potential. No historic properties would be affected by the proposed undertaking.

No National Register of Historic Places eligible sites exist or can be anticipated to be found in the APE.

3.6 FISHERY RESOURCES AND ESSENTIAL FISH HABITAT

Aquatic Community. The ROI is located west of the 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 Indian Run drainage that contains the Study Area is located upstream of the Holcomb Rock Dam in the James River basin. There was a vertical slot fishway installed in the Bosher’s dam on the James River in 1999 that allows for passage of anadromous fish to upstream areas (Musick 2005), however, the likelihood of anadromous fishes occurring in the unnamed tributary within the Study Area is low. The fish community is diverse near the Study Area, with approximately 79 native fish species reported by Virginia Department of Wildlife Resources’ (VDWR) Virginia Fish and Wildlife Information Service (VaFWIS) tool as occurring within a 3-mile radius of the Study Area (VDWR 2020); this search included portions of mainstem James River. Dominant fish species within the Indian Run watershed are likely to include the bluehead and bull chubs

(*Nocomis spp*.); sunfish species (*Lepomis spp*.); rock bass (*Ambloplites rupestris*); common, rosefin, spottail, and swallowtail shiners (*Notropis spp*.); Eastern blacknose and longnose daces (*Rhinichthys spp*.); central stoneroller (*Campostoma anomalum*); cutlips minnow (*Exoglossum maxillingua*), bluntnose minnow (*Pimephales notatus*), fallfish (*Semotilus corporalis*), margined madtom (*Noturus insignis*); fantail darter (*Etheostoma flabellare*), Roanoke darter (*Percina roanoka*); white sucker (*Catostomus commersoni*); black jumprock and torrent sucker (*Moxostoma spp.*); and smallmouth bass (*Micropterus dolomieu*) (Leonard and Orth 1988).

Mussel species with some likelihood of occurrence in and near the Study Area include the James spinymussel (*Parvaspina collina*), yellow lance (*Elliptio lanceolata*), green floater (*Lasmigona subviridis*), Atlantic pigtoe (*Fusconaia masoni*), and the invasive Asian clam (*Corbicula fluminea*). Coordination with experts at VDWR has indicated that the four native mussel species are unlikely to occur within the Study Area though and that mussel surveys will not be required at this site (personal communication, Brian Watson September 2020 – January 2021; see Appendix B, Environmental Coordination). A full listing of aquatic species reported with the potential to occur in and/or near the Study Area by our searches with the VaFWIS tool (VDWR 2020); the Information for Planning and Conservation (IPaC) (USFWS 2021a); and the Virginia Natural Heritage databases (VDCR 2020) is provided in Appendix A, Biological Assessment. The four native species are discussed more extensively in the Special Species Status section.

Aquatic Habitat. The aquatic habitat present within the ROI was typical of a headwater stream (1st-Strahler order) in the Blue Ridge physiographic province, located adjacent to a roadway, and contained in a partially developed watershed. The segment of stream adjacent the project footprint was primarily riffle habitat, and there are shallow pool habitats immediately upstream and downstream of this segment. Character and quality of instream substrate conditions within the project footprint were assessed visually following qualitative portions of U.S. Geological Survey's National Water Quality Assessment (NAWQA) sampling protocol (Fitzpatrick et al. 1998). The qualitative visual assessment was focused on streambed substrate size, siltation, and embeddedness. Results of the assessment suggested the benthic habitat was of moderate quality because fine sediment sizes (sand and smaller) made up larger proportions of observed substrate than is typical for riffle habitats; this is indicative of excess fine sedimentation. The dominant substrate as sand and pebble particle sizes in equal proportions followed by gravel, cobble, and silt in decreasing proportions among all three sampled profiles cumulatively (Table 3-1; Figure 3-1). Sandy substrate conditions at the downstream profile (Profile 3) strongly influenced the overall proportions; when excluding the downstream profile, substrates were dominated by coarser substrate classes (e.g., pebbles and cobbles) (Table 3-1). Substrates finer than silt (clay) and coarser than cobbles (boulder) were not observed within the profile samples. Bedrock was also not observed in the streambed surface bedload; however, field notes indicate that bedrock did underly the streambed surface bedload and that streambed surface bedload was relatively shallow in depth.

Table 3-1. Percentages of substrate particle sizes at cross-sectional profiles (individually and cumulatively) from the topography surveys. Bolded percentages with and without asterisks indicate the primary and secondary dominant substrate classes in a column, respectively.

Substrate Class	Particle size (mm)	Profile 1 - Upstream boundary	Profile 2 - Mid-reach	Profile 3 - Downstream boundary	Cumulative Percentages
Silt	0.004-0.063	5	5	15	8
Sand	0.063-2	5	10	**60***	**25***
Gravel	2-8	20	30	20	23
Pebble	8-64	**30**	**40***	5	**25***
Cobble	64-256	**40***	15	0	18

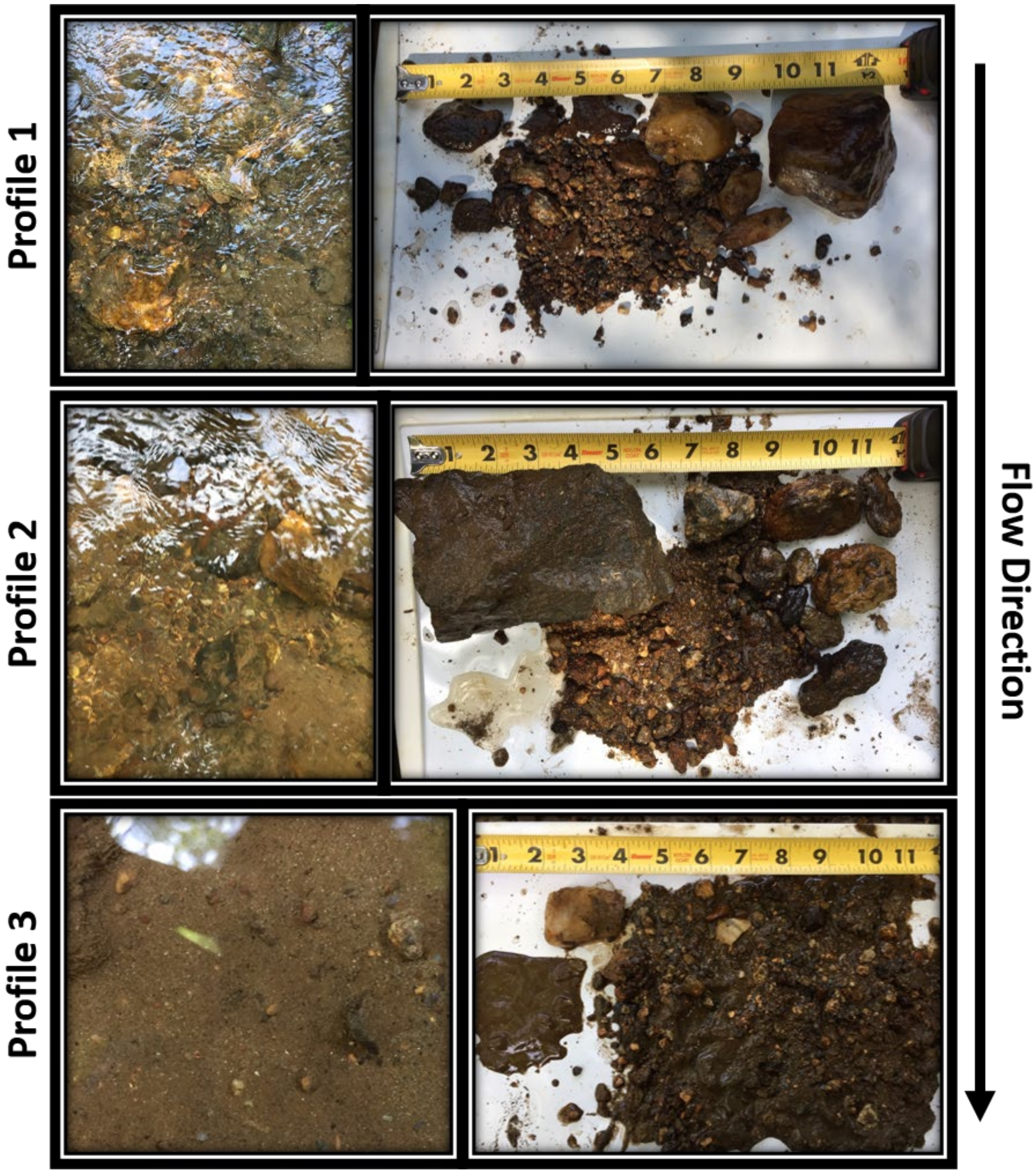

Figure 3-1. Streambed substrate from each cross-sectional profile sampled during topography surveys.

Jurisdictional Waters of the United States, including 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 (OHW) mark, in the absence of adjacent wetland vegetation. If adjacent wetland vegetation is present, the jurisdictional area extends to the limits of the adjacent wetland vegetation.

There are several small, disjunct emergent and/or scrub wetlands present on bench streambanks in the Study Area as determined by a Preliminary Jurisdictional Determination (Appendix B, Preliminary Jurisdictional Determination Sub-appendix). 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 substantially high water velocities and low light penetration occurring in this small tributary. Therefore, the lateral extent of federal jurisdiction per Section 404 of the Clean Water Act at the ROI is defined by the OHW mark on the streambanks not characterized as wetland, and by any of the wetland vegetation.

Essential Fish Habitat. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act strengthened the ability of the National Marine Fisheries Service (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" or EFH. The EFH 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 ROI is located west of the defined geographic limits of EFH as defined by the NMFS; therefore, it does not apply to this project (NOAA 2020). Therefore, this topic is dismissed from further discussion.

3.7 FLOODPLAINS

For the following discussion, floodplains are defined as any land area susceptible to being inundated by floodwaters from any source.

Methodology

The ROI are the floodplain areas at, upstream, and downstream of the project site where potential impacts may exist.

Framework

Executive Order 11988 – Floodplain Management. Through Executive Order (EO) 11988, federal agencies are required to evaluate all proposed actions within the 1-percent annual chance floodplain or Base Floodplain as defined by the Federal Emergency Management Agency (FEMA). Actions include any federal activity involving 1) acquiring, managing, and disposing of federal land and facilities, 2) providing federally undertaken, financed, or assisted construction and improvements, and 3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, and licensing activities. In addition, the FEMA 0.2-percent annual chance floodplain should be evaluated for critical actions or facilities, such as storage of hazardous materials or construction of a hospital.

USACE Engineering Regulation (ER) 1165-2-26 - Implementation of EO 11988 on Floodplain Management. This regulation sets forth general policy and guidance for USACE implementation of EO 11988 as it pertains to the planning, design, and construction of Civil Works projects and activities under the Operation and Maintenance and Real Estate Programs. As shown in ER 1165-2-26 and in accordance with EO 11988, USACE uses an eight-step process as part of the decision-making for projects that have potential impacts to or are within the Base Floodplain. The eight steps and project-specific responses for EO 11988 are discussed further in Chapter 8 (Environmental Compliance).

Existing Conditions

The project site is located along a tributary to Indian Run, where the roadway embankment of U.S. Route 501/Lee Jackson Highway is on the left bank side of the stream. See Figures 3-2 and 3-3 below, looking downstream from a site visit during November 2019. Figure 3-2 shows where stone riprap has been placed to protect the embankment from erosion. From the 2019 site visit and photographs from 2017, the natural floodplain upstream, downstream, and opposite the stone riprap appears to be generally stable with no signs of significant degradation. Topographic mapping and the site visit show the natural ground/rock outcrop on the right overbank and the roadway embankment form a constriction, such that high stream velocities at the constriction could be contributing to the erosion problem along the roadway embankment. See white arrows showing the location of the natural ground/rock outcrop on Figures 3-2 and 3-3.

Figure 3-2. Looking downstream at project site, location of natural ground/rock outcrop (white arrows), November 2019.

Figure 3-3. Looking at right bank side, location of natural ground/rock outcrop (white arrows), November 2019.

Figure 3-4 below shows one-foot contour interval topographic mapping that was collected in December 2020, with the project site identified using a red colored box, elevations referenced to NAVD88. The 645-foot elevation contour is represented by the yellow colored dashed line and the 648-foot elevation contour with the green colored dashed line. The channel invert elevation through the project area is generally at (+/-) 640 feet, NAVD88. The 645 and 648 contours help to show the constriction at the project site. Being a mountainous stream with steep terrain, the tributary is subject to flooding, where with flash flooding, increased water levels can occur within hours of heavy rainfall. As part of this study, hydraulic modeling was completed for the tributary using HEC-RAS. From the Engineering Appendix, the 0.2-percent (500-year) annual chance flood, discharge at 953 cubic feet per second (cfs), will generally reach to the top of the roadway embankment (648 feet, NAVD88), with a channel velocity ranging from approximately 7 to 13 feet per second (fps) through the project area. At elevation 645 feet, NAVD88, discharge of 372 cfs, 4-percent (25-year) annual chance flood, channel velocities range from 5 to 10 fps through the project area. Just upstream and downstream of the project site, channel velocities are less than 6 fps for the two discharges.

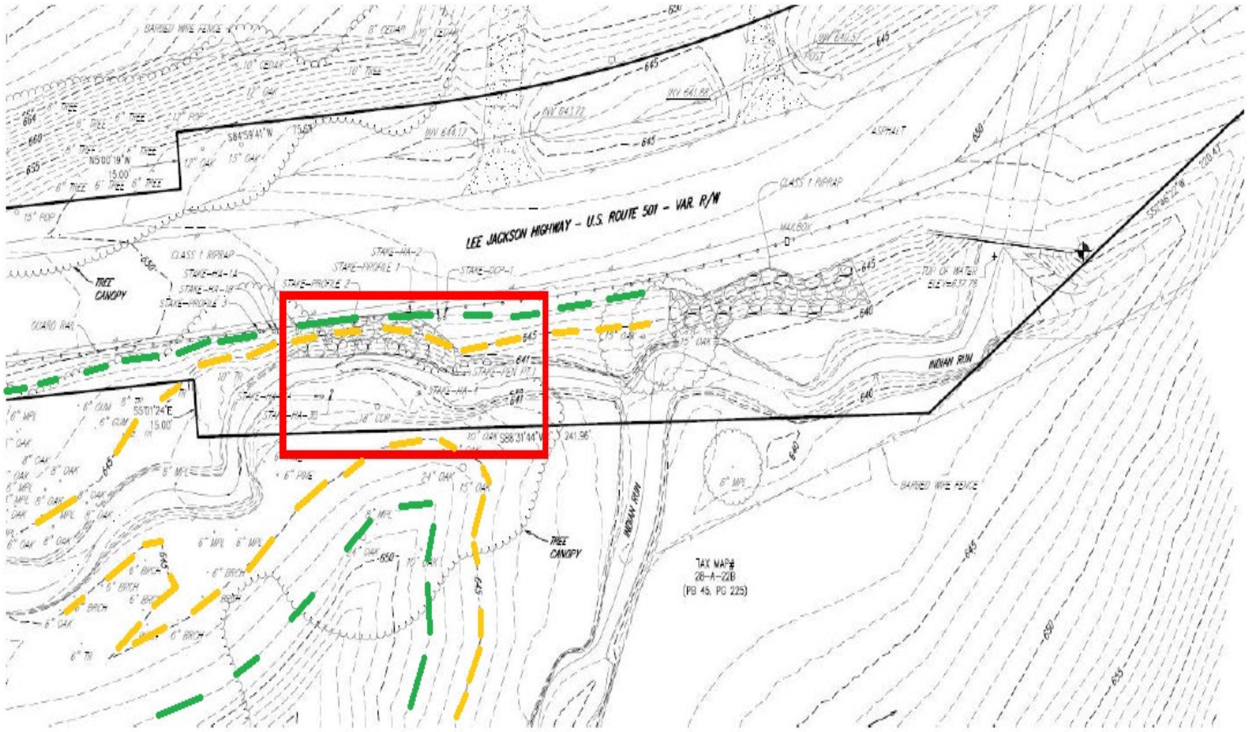

Figure 3-4. December 2020 topographic survey, project area shown by red box.

With the mountain terrain, overland sheet flow along the roadway can also cause erosion along the embankment. Being located approximately 200 feet upstream of the culvert under U.S. Route 501/Lee Jackson Highway and the confluence with Indian Run, the project site may be subject to backwater flooding from the roadway/culvert crossing during high flows. The HEC-RAS hydraulic modeling did not include the culvert under U.S. Route 501/Lee Jackson Highway.

Aside from the U.S. Route 501/Lee Jackson Highway crossing, there is no other existing development just downstream of the project site that may be impacted by the streambank erosion. The 2019 site visit showed some sediment and rock material inside the culvert under the U.S. Route 501/Lee Jackson Highway crossing, which could be from natural erosion along the tributary and Indian Run. It is possible water levels along the tributary could overtop U.S. Route 501/Lee Jackson Highway and cause flooding onto the private property located adjacent to the project site; it is unknown if this has occurred. The current property owner has lived there approximately 1.5 years and stated there were two flood events last year, but the flooding did not impact his property nor overtop U.S. Route 501/Lee Jackson Highway.

EO 11988 references the FEMA 1- and 0.2-percent annual chance floodplains. Bedford County participates in FEMA's National Flood Insurance Program. The effective FEMA Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRM) for Bedford County and incorporated areas are dated September 29, 2010. As shown in Figure 3-5 below from FEMA's Map Service Center, FIRM Panel 51019C0070D, the project site is located in Zone A associated with Indian Run, the approximate 1-percent annual chance floodplain, where flood elevations have not been determined by Detailed Methods. The

0.2-percent annual chance floodplain was not determined by FEMA. The drainage area of the tributary is approximately one square mile or less. Considering the drainage area and being undeveloped, although flooding can occur, FEMA generally does not complete flood studies for small streams such as the tributary.

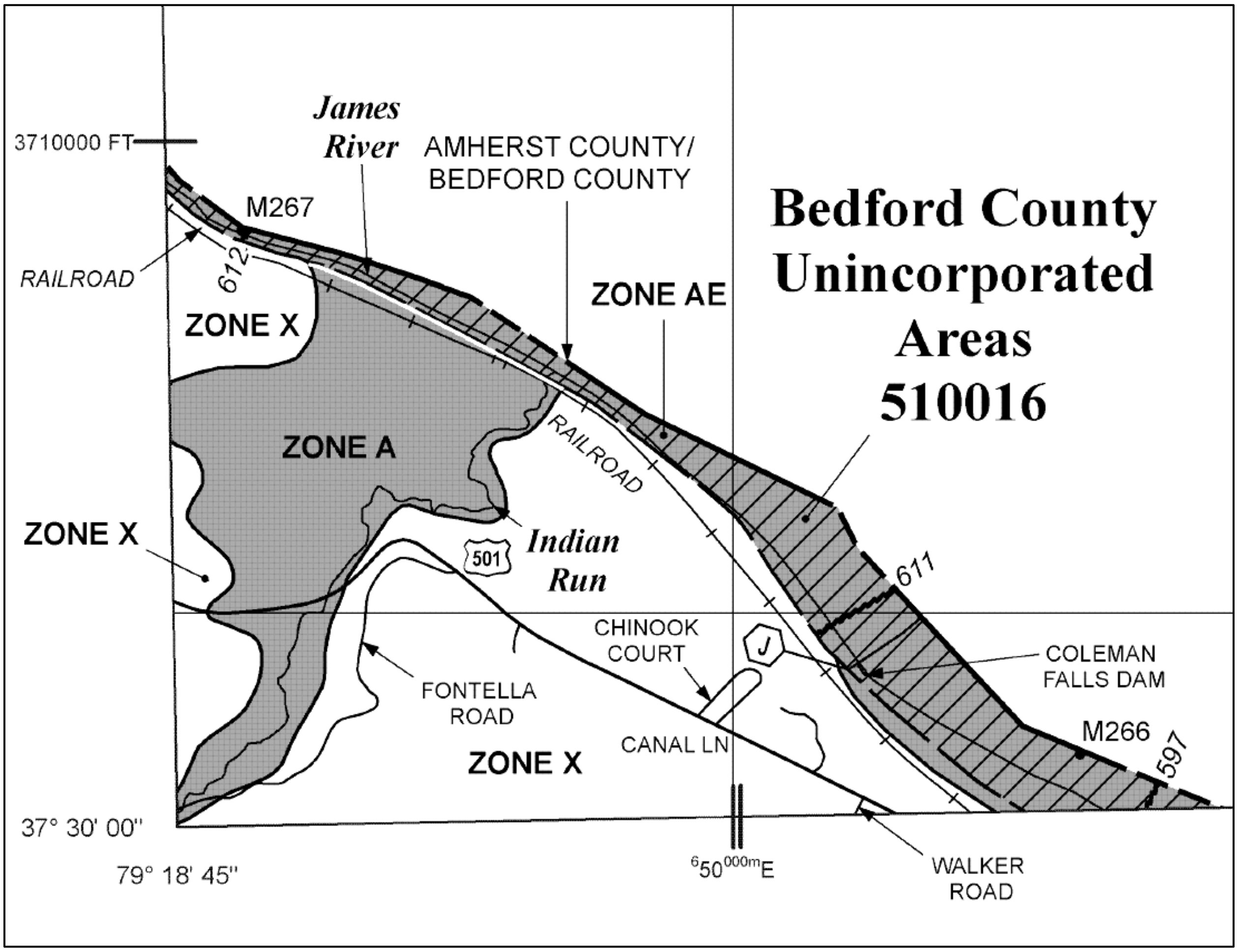

Figure 3-5. Effective 2010 FEMA 1-Percent Annual Chance Floodplain

Source: FEMA Map Service Center

As previously mentioned, completed HEC-RAS hydraulic modeling shows water levels for the 1-percent (100-year) and 0.2-percent (500-year) annual chance floods will generally reach to the top of the roadway embankment, mainly staying within the limits of the stream channel and overbanks.

3.8 GEOLOGY, PHYSIOGRAPHY, AND TOPOGRAPHY

The ROI is located within some of the lowest lying elevations within the Northern Section of the Blue Ridge physiographic province. The USEPA WATERS tool estimated the mean elevations within the local catchment area and total watershed area are approximately 797 feet (243 meters) and 925 feet (282 meters), respectively (USEPA 2020a).

A preliminary field survey was conducted 17 – 23 September 2020 to characterize site topography, channel geomorphology, and underlying geology; surveys will be completed within the Design and Implementation (DI) Phase of the project. Cross-sectional profiles and topographic maps developed from this survey are presented in the Geotechnical Sub-appendix of the Engineering Appendix. The topographic maps show elevations within the Study Area ranging from 638ft to 665ft NAVD88; this illustrates that the Study Area is at a relatively low elevation within its catchment and watershed areas. The terrain within the project area varies from gently to steeply sloping. The right-ascending bank of the unnamed tributary through much of the Study Area is steeply sloped (i.e., a 1:1 grade) to nearly vertical. The nearly vertical portion of right-ascending bank is a severely eroding bank located immediately downstream of the existing emergency revetment. The left-ascending bank across from the existing emergency revetment has a much shallower grade. Both banks exhibit minor to moderate undercuts in several locations along the fluvial length of the Study Area. The stream channel is narrow with an approximate channel width of 4 feet and bankfull channel height between 1 and 2 feet. Particle sizes of instream substrate are characterized in Section 3.6 Fishery Resources and Essential Fish Habitat. Depth of streambed substrates was determined to be no greater than 12 inches before reaching bedrock during topography surveys.

Streambank and floodplain soils within the ROI were characterized during topography surveys and the Preliminary Jurisdictional Determination using a hand auger. The auger sampling also indicated hitting hard, coarse material (gravel to bedrock) underlying streambanks. Soils are further characterized based on hand auger sampling in the Vegetation, Wetlands, and Submerged Vegetation section, Appendix A (see Sub-Appendix 3, Preliminary Jurisdictional Determination), and Appendix B (see Geotechnical Engineering Analysis) of this report.

3.9 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

A site assessment was performed in the ROI to determine the potential for hazardous, toxic, and radioactive waste (HTRW) in the Study Area. When accessing contaminant pathways for previous spill releases, a more expansive ROI that included the drainage area and potential spill pathways leading to the Study Area was taken into account. More specifically, spill areas were considered within a three-mile radius (including the Study Area itself), plus any of the potential upstream drainage area to the unnamed tributary were considered. Based on the site visit and searches in the VDEQ's Environmental Data Mapper and Pollution Incident (PREP) Lookup Tool (VDEQ 2020a, VDEQb) and the USEPA Toxic Release Inventory Program (USEPA 2020b), no evidence of hazardous substances, HRTW, or other regulated contaminants are likely to be found in the ROI. For hazardous, toxic, and radioactive waste

3.10 LAND USE

Land use comprises the natural conditions and/or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. State laws, management plans, and zoning regulations determine the type and extent of land use allowable in specific areas and often intend to protect specially designed or environmentally sensitive areas. Zoning requirements are regulations developed by the locality to control potential future development. Comprehensive plans evaluate long-term demographic trends to identify how the region of analysis should be developed. Where zoning focuses on immediate trends in development, comprehensive plans are generally less regulatory in nature and often serve as guidance when current planning department is evaluating applications for development.

In describing land use, all existing and proposed future land uses within the ROI are considered. This includes consideration of the zoning as well as comprehensive plans for the entire ROI.

Existing Conditions

In general, the ROI contains a small unnamed tributary, unmanaged mixed (primarily deciduous) forest, and a federal roadway. Also, there is a residential and an open field used for grazing cattle / growing hay immediately surrounding/adjacent the ROI. We further formally characterized land use using the USEPA WATERS tool which references 2011 National Land Cover Database (NLCD, Homer et al. 2011) at four different spatial and hydrologically-based resolutions containing the ROI: (1) total catchment, (2) riparian catchment, (3) total watershed, and (4) riparian watershed (Table 3-2) (USEPA 2020a). Catchment refers to the local drainage area associated with only the National Hydrography Dataset (NHD) segment associated with the ROI. Watershed refers to the entire cumulative drainage area upstream of the local NHD segment's pour point. Total areas include all upland drainage area within a catchment or watershed. The riparian resolutions are defined as 100-m buffer areas surrounding segments of NHD flowline. Deciduous forest was the dominant NLCD class at all spatial resolutions examined containing the ROI, making up approximately 70% - 81% of the drainage areas. Developed (open space) and mixed forest (deciduous and evergreen) were the only other land covers that occurred in greater than 5% of the drainage areas. The field in the southeast corner of the Study Area may be used as pasture or growing hay, and it may be missed by the USEPA WATERS analysis. Lastly, the Virginia Natural Heritage reports indicates that the Development Vulnerability Index score was "already developed" and moderately vulnerable to development, and the Agricultural Model land suitability score was a 2 (of 5, 5 = most suitable for agricultural use) (VDCR 2020).

Table 3- 2. Drainage areas (km2) and land use / land cover types associated with the unnamed tributary to Indian Run in the Study Area (USEPA 2020a). Land use / land cover is summarized as percentage of areas at four spatial resolutions--total catchment, riparian catchment, total watershed, and riparian watershed. Catchment refers to local drainage area for only the NHD segment associated

with the Study Area. Watershed refers to the cumulative drainage area upstream of the local NHD segment's pour point. The riparian area was defined as a 100-m buffer surrounding the NHD segment(s).

	Catchment		Watershed	
	Total	Riparian	Total	Riparian
Drainage area measurement (km²)	0.72	0.27	1.83	0.36
Land cover/land use class				
Deciduous forest	70.32	71.48	81.16	71.11
Developed, open space	13.22	15.41	6.49	14.81
Mixed deciduous/evergreen forest	5.99	4.59	3.94	4.44
Developed, low intensity	3.99	5.90	1.57	4.44
Evergreen forest	3.24	2.62	1.67	1.98
Pasture/hay	1.87	0.00	4.57	3.21
Developed, medium intensity	0.75	0.00	0.30	0.00
Open water	0.62	0.00	0.25	0.00
Grassland/herbaceous	0.00	0.00	0.05	0.00

3.11 NOISE AND VIBRATION

The ROI consists primarily of the northern streambank of the unnamed tributary to Indian Run and adjacent shoreline, the Route 501 roadway, and two parcels of residential land north and southeast of the unnamed tributary. Route 501 is heavily used by the public and vehicles using this road are the primary source of noise in the ROI. Based on activities and land use in the Study Area, ambient noise levels in the ROI are anticipated to be typically at a residential level which the Federal Highway Administration (FHWA) estimates as 67 decibels A (dBA) (23 Code of Federal Regulations (CFR), Part 772, Table 1 Noise Abatement Criteria). However, noise levels from the heavily used roadway (U.S. Route 501) within the ROI are likely sometimes higher than residential levels, and the FHWA estimates highway traffic noise ranges from 70 to 80 dB(A) at a distance of 15 meters (50 feet) from the highway (FHWA 2003).

3.12 SOCIOECONOMICS

The ROI for socioeconomics is Bedford County which covers nearly 760 square miles, making it the fifth-largest county in Virginia (U.S. Census Bureau 2021). The U.S.

Census Bureau estimated the population of Bedford County as 78,997 in 2019 (U.S. Census Bureau 2021). Trends suggest Bedford County's population is aging, as median age increased from 35.7 to 44.3 between the 1990 and 2010 censuses, respectively (Bedford County 2015, U.S. Census Bureau 2021). Likewise, the 65 and over population increased from 12.2% to 16.2% over the same time period. Racial demographics show the Bedford County population to be 91.4% white, 5.7% black, 1.2% mixed race (i.e., more than one race), 1.0% Asian, 0.4% "other", 0.3% American Indian or Alaskan Native, <0.0% (14 people) Native Hawaiian or Other Pacific Islander. Included in any of these racial demographics, 1.6% were characterized as Hispanic or Latino. Gender demographics are evenly split in Bedford County, with 49.6% male and 50.4% female. The most recent estimated median household income in Bedford County is $32,436, and 8.4% of the population is estimated to be below the poverty level. Industries making up the majority of the over age-16 employed workforce include educational services, health care, and social assistance (27.3%), retail trade (14.3%), and manufacturing (13.1%). The major manufacturing employer in Bedford includes the Big Island Georgia-Pacific Paper Mill, and this mill relies on U.S. Route 501 for commercial use.

3.13 SPECIAL STATUS SPECIES

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 U.S. Fish and Wildlife Service (USFWS) and NMFS have sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA. Critical habitat is designated per 50 CFR parts 17 or 226 and defines those habitats that are essential for the conservation of a federally threatened or endangered species and that may require special management and protection.

This section provides a summary of the state and federally listed species that have the potential to occur in the Action Area (Table 3-3). The following references were consulted for inclusion of applicable information into this section: VaFWIS database search within a three mile radius of the Action Area (VDWR 2020), IPaC database search (USFWS 2021a), and the Virginia Natural Heritage Database Search (VDCR 2020). Copies of the reports generated from the federal and state databases are provided in Appendix A (see Sub-Appendix 1 Biological Assessment). We also coordinated with the Virginia Department of Wildlife Resources (VDWR) and the Virginia Department of Conservation and Recreation (VDCR) and requested lists of species known to occur in the ROI, but did not receive additional lists of species from these state agencies. Federal and state listed species having the potential to occur in the ROI are described in Table 3-3. There is no designated critical habitat in the ROI.

Table 4-3. Federally and state listed species with the potential to occur in the Action Area based on iPaC and VaFWIS searches. Notably, the VaFWIS records returned an invalid occurrence of Roanoke logperch (*Percina rex*); this species is native to the Roanoke River drainage and does not occur in the James River drainage.

Taxonomic Group/Species	Common Name	Federal Status	Commonwealth of Virginia Status	Breeding in Action Area
Mammal				
Myotis septentrionalis	Northern long-eared bat	T	T	u
Myotis lucifugus	Little brown bat		E	
Perimyotis subflavus	Tri-colored bat		E	
Birds				
Falco peregrinus	Peregrine falcon		T	
Lanius ludovicianus	Loggerhead shrike		T	
Centronyx henslowii	Henslow's sparrow		T	
Lanius ludovicianus migrans	Migrant loggerhead shrike		T	
Invertebrates				
Parvaspina collina	James spinymussel	E	E	
Elliptio lanceolata	Yellow lance	T	T	
Lasmigona subviridis	Green floater		T	
Fusconaia masoni	Atlantic pigtoe		T	

E=endangered, T=threatened, u=unknown, but unlikely

Federally and State Listed Bats. Three listed bats were found in the VaFWIS report, including the little brown bat, tri-colored bat, and Northern long-eared bat. Little brown bat and tri-colored bat are both state endangered, and the Northern long-eared bat is federally and state threatened. The USFWS listed the northern long-eared bat (*Myotis septentrionalis*) threatened on April 2, 2015, with no designated critical habitat (USFWS 2015, USFWS 2021b). 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 ROI is located within the managed White-Nose Syndrome Buffer Zone as defined by the USFWS (2020). Populations in Virginia are thought to have declined by 96% and are anticipated to decline with the continued spread of the White-Nose Syndrome (USFWS 2015). The northern long-eared bat is dark brown on its back, with lighter coloration underneath, and a wingspan of approximately 9-10 inches, and is approximately 3 – 3.7 inches in body length (USFWS 2015). 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 these species in the ROI, so it is unknown if they forage and/or roost in the Action Area. No reported roosting trees or natural hibernacula are located in the Action Area. It is unknown if northern long-eared bats migrate through the ROI.

State Listed Birds. State listed birds found in the VaFWIS report included the peregrine falcon (Falco peregrinus), loggerhead shrike (*Lanius ludovicianus*), migrant loggerhead shrike (*Lanius ludovicianus migrans*), and Henslow's sparrow (*Centronyx henslowii*) (VDWR 2020). All four of these species are state threatened.

There are no known surveys of these species in the ROI, so it is unknown if they forage and/or nest in the Action Area. No reported nests or nesting trees are located in the Action Area. It is also unknown if these species migrate through the ROI.

Federally and State Listed Mussels. Federally and state listed mussels found in the VaFWIS and Virginia Natural Heritage reports for the Study Area included James spinymussel (*Parvaspina collina*), yellow lance (*Elliptio lanceolata*), green floater (*Lasmigona subviridis*), and Atlantic pigtoe (*Fusconaia masoni*) (VDCR 2020, VDWR 2020). The USFWS listed the James spineymussel endangered on July 22, 1988 with no designated critical habitat. This species has been extirpated from 90% of its historical range (USFWS 1990), and has not been found in the James River drainage since the 1960s (see personal communication with VDWR Malacologist, Brian Watson, in September 2020; Appendix A, Sub-appendix 4). 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 (USFWS 1990). The James spineymussel is a small, freshwater mussel that inhabits the James River drainage and the Dan/Mayo River Systems in Virginia, North Carolina, and West Virginia (USFWS 2021c). 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 (USFWS 2021c). Juvenile mussels have a yellow shell that sometimes contains short spines (USFWS 2021c). VDWR's state malacologist has indicated that James spinymussel has not been detected in the James River drainage since the 1960s (personal communication, Brian Watson September 2020 – January 2021).

Based on the VaFWIS (VDWR 2020) and Virginia Natural Heritage reports (VDCR 2020), three other state listed mussels besides the James spineymussel have the potential to occur in the ROI (Table 3-3). This includes the state threatened green floater, yellow lance, and Atlantic pigtoe which have been documented to occur in the James River by the VDWR. The possible yellow lance (*Elliptio lanceolata*) occurrence in the ROI is based on VaFWIS and Virginia Natural Heritage reports. These resources ultimately rely on the relatively coarse-scale Predicted Suitable Habitat (PSH) models produced by the VDCR Natural Heritage Program. The possible Atlantic pigtoe and green floater occurrences were based on the VaFWIS report, and these records likely represented observations documented in mainstem James River within the 3-mile search radius.

Because of the unlikely occurrence and unsuitable potential habitat for these species in the ROI, a freshwater mussel survey in accordance with the Freshwater Mussel Guidelines for Virginia (USFWS & VDGIF 2018) will not need to be conducted (see personal communication with VDWR Malacologist, Brian Watson, January 2021, Appendix A, Sub-appendix 4).

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 NMFS. Indian Run is a small, 2nd-Strahler-order tributary in the upper James River basin which is very unlikely to host anadromous fishes. Although we did not survey the Study Area, there is no potential that anadromous fish trust-resources occur in the ROI (NOAA 2020).

3.14 TRANSPORTATION

Transportation refers to the operational characteristics of the land transportation network, including the network's capacity to accommodate existing and projected future travel demand. Networks may encompass many types of facilities serving a variety of transportation modes, such as vehicular traffic, public transit, and non-motorized travel. Access to, within, and from the ROI is provided via a network of freeways, arterial streets, connector streets, bridges, public transit services, freight rail lines, and non-motorized transportation facilities (including bicycles, sidewalks, and pedestrian trails). The Study Area for transportation includes all roadways to include the right-of-way (ROW) of (freeways, major and minor arterial roads, collector roads, and neighborhood roads) and bridges; train, light rail, bus routes, other mass transit, and pedestrian sidewalks within the ROI, that will be affected directly or indirectly by the project.

The project site is located on Route 501 approximately 0.5 miles north of Coleman Falls in Bedford County, Virginia. This section of Route 501 is frequently traveled with traffic patterns varying by time of day. Route 501 carries local and tractor trailer traffic due to the nearby Big Island Paper Mill, a major employer. This road represents the most efficient route for users bound for the Paper Mill. Alternative routes to the paper mill are an extra 50 to 60 miles of driving distance.

The stability of the roadway within the ROI has been at risk in recent history due to erosion of the southern embankment. In November 2016 the Virginia Department of Transportation (VDOT) placed Class I riprap stone on the road embankment as an emergency measure to prevent further erosion; however, this is a temporary solution and there is still evidence of instability of the roadway embankment slope.

3.15 VEGETATION, WETLANDS, AND SUBMERGED VEGETATION

The ROI is partially characterized by an eroding streambank denuded of vegetation, particularly the length of northern streambank with the existing emergency stone revetment. Elsewhere in the ROI (the southern streambank and floodplain adjacent the emergency revetment, streambanks and floodplain upstream and downstream of the revetment) there is a mixture of hardwoods, evergreens (hemlocks), grasses, and herbaceous species. No submerged aquatic vegetation is found in the tributary within the ROI. When using the VDCR Natural Heritage Mapper, we found the ROI scored as average (index value = 1) for the Virginia Department of Forestry (VDOF) Forest Conservation Value (1 – 6), was listed as a Natural Heritage Site under Natural Habitat and Ecosystem Diversity layers, and was listed in the Virginia Wetlands Catalog under Floodplains and Flooding Resilience layers (VDCR 2020).

Wetlands in National Wetland Inventory (NWI)— Our preliminary geospatial analysis shows the ROI overlaps NWI wetland classes R5UBH and R2UBH (Figure 3-6), which represent riverine wetland systems contained in channels with streambed substrates at least 25% cover and vegetative less than 30%. These classes differed in gradient character—including 'low' and 'unknown' gradient determinations.

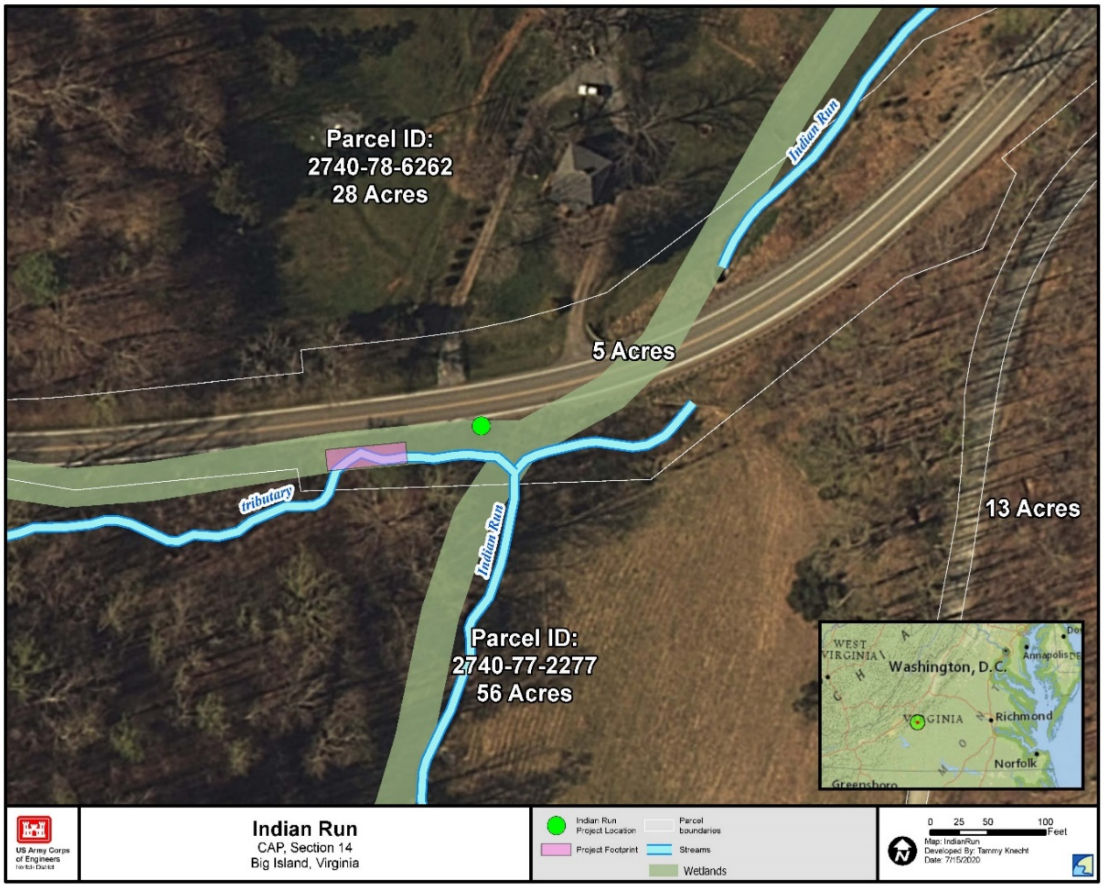

Figure 3-6. Indian Run project area with National Wetland Inventory layers. The spatial extent shown includes two classes of NWI wetland area.

Preliminary Jurisdictional Determination (PJD). The USACE Norfolk District team performed a PJD of wetlands of the ROI site on 11 December 2020, and specifically sampled four points for preliminary wetland determinations (Figure 3-2). Data sheets and summary from the PJD are included in Appendix A, Sub-Appendix 3 for full survey details, which will be presented alongside a letter from USACE Regulatory in the Final IFR/EA. Two points sampled (points #2 and #3) during the PJD were on bankfull bench landforms and their hydrology, vegetation, and soils met all three wetland determination criteria to be identified as potential emergent and/or scrub riverine wetlands. These two areas cumulatively represented 0.0118 acres of total wetland in the ROI. The sampling point #2 wetland was an approximately 0.0033 acre triangular area (16-ft long x 18-ft deep x 21-ft wide) on the north bankfull bench upstream up the existing emergency riprap revetment. The wetland hydrology indicator noted at #2 was the presence of saturation at 8 inches deep based on a hand auger sample. The wetland soil indicator included soil with a depleted matrix. Wetland vegetation indicators included hydrophytic shrub (spicebush (*Lindera benzoin*)) and herbaceous (honeysuckle (*Lonicera japonica*)) plants.

The sampling point #3 wetland was an approximately 0.0085 acre area (53-ft long by 7-ft deep) on the south bankfull bench directly cross channel from the existing emergency riprap revetment. Wetland hydrology indicators noted here were saturation present at 5 inches and oxidized rhizospheres on living roots. Wetland soil indicators included black histic soil with a depleted matrix and redox depressions. Wetland vegetation indicators included hydrophytic shrub (pawpaw (*Asimina triloba*), strawberry bush (*Euonymus americanus*), spicebush (*Lindera benzoin*)) and herbaceous (honeysuckle (*Lonicera japonica*) and Christmas fern (*Polystichum acrostichoides*)) plants.

3.16 WATER QUALITY

There are no current physical, chemical, or biological impairments to the integrity of the water quality within the ROI (VDEQ 2020). Indian Run is listed under the Clean Water Act (CWA) Section 303(b) Assessed Waters and not listed under the CWA Section 303(d) Impaired Waters by the USEPA and VDEQ. The portion of the James River which Indian Run flows into is listed as 303(d) impaired for mercury in fish tissue; there is no Total Maximum Daily Load (TMDL) established at this time for this impairment. This listing applies from Balcony Falls Dam downstream to Holcomb Rock Dam on the James River. Also, when using the VDCR Natural Heritage Mapper, the ROI was classified as the lowest priority (Class 1 of 5 classes) for BMP/Restoration and Urban Stormwater Management priority classes based on the Virginia Conservation Vision Watershed Model (VDCR 2020).

3.17 OCCUPATIONAL HEALTH AND SAFETY

The existing project site conditions are characterized by an eroding streambank that is threatening the stability of the U.S. Route 501 roadway, and the safety of anyone using this road. There public has open access to this heavily-used roadway and is currently openly exposed to the risk of streambank failure and roadway collapse. Additionally, the existing site conditions include the steep northern streambank to the unnamed tributary that poses risk to roadway users and pedestrians. Lastly, traffic and vehicles on and around U.S. Route 501 pose a risk to occupational health and safety within the Study Area.

The most prominent risk factors associated with the occupational health and safety environment are primarily associated with the future construction of the project which are more extensively characterized in Chapter 7 (Environmental Consequences). In short, these risk factors include operation of heavy equipment, placement of materials, and potential exposure to environmental elements. The existing site conditions which include a steep shoreline and limited access points, potential hazards would involve the mobilization and demobilization of equipment, land disturbance, and construction of the project.

4 EVALUATION AND COMPARISON OF ALTERNATIVES

In accordance with Engineering Regulation 1105-2-100, the Recommended Plan is considered to be justified if it is the least cost of all alternative streambank protection plans and is also less than the cost to relocate the threatened facilities.

4.1 SCREENING OF PRLIMINARY ALTERNATIVES

Alternatives 1, 2, 3, 4 and 5 were screened from further consideration since these alternatives were found to have significantly higher costs than Alternative 6. Based on the economic analysis shown in table 4-1 below, Alternative 6 is the least cost alternative and meets the project objective of protecting the facilities at risk.

4.2 FINAL ALTERNATIVES FOR EVALUATION AND CONSIDERATION

Remaining alternatives include relocation of the road and utilities, Alternative 0 (no action), and Alternative 6. Alternative 6 was studied further as the least cost alternative that would meet the study's objective of reducing the risk of erosion to the road and utilities.

4.2.1 RELOCATION OF ROAD AND UTILITIES:

U.S. Route 501 and the utilities at risk could be relocated further away from the shoreline so they are no longer at risk from erosion. The road would have to be relocated far enough that the risk of erosion is addressed but that there is continued access the homes in that area. Relocating the road is the baseline to which all other alternative costs are compared.

4.2.2 ALTERNATIVE 0: NO ACTION/FUTURE WITHOUT PROJECT ALTERNATIVE

There would be no federal action. This is also the same as the future without project condition.

4.2.3 ALTERNATIVE 6: PLACEMENT OF STONE REVETMENT

Alternative 6 consists of the following:

- Longitudinal rock sill running the length of the project area at a height of 5-feet (NAVD88);
- Re-grade the earthen slope berm to 1V:1H;
- Place geotextile filter fabric running length of project; and
- 6-inch filter mattress length of project.

4.2.4 COMPARISON OF ALTERNATIVES

Table 4-1 below compares the relocation alternative with alternatives 1, 2, 3, 4, 5, and 6. Alternative 6 is the least cost alternative and the Recommended Plan (Preferred Alternative).

Table 4-1. Comparison of the No Action Alternative with Alternatives 1, 2, 3, 4, 5, and 6.

Cost Description	(1) The Placement of vertical steel sheet piling	(2) A rock sill to stabilize the base of the slope and a berm and some re-routing of stream	(3) A combination of stone revetment, vertical steel sheet piling	(4) Vegetative erosion control with slight re-routing of stream	(5) Precast modular re-taining walls with stone protection at the toe with some re-routing of stream	(6) Placement of stone revetment	Road Replacement and Utilities
ROM Construction Cost with 50% contingency	$897,000	$612,000	$866,000	$616,000	$975,000	$397,000	$713,000
Traffic Control Maintenance Cost	$38,000	$38,000	$38,000	$38,000	$38,000	$38,000	$38,000
Survey Cost (Real estate and topographic)	$38,000	$38,000	$38,000	$38,000	$38,000	$38,000	$38,000
Real Estate (LERRD)	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000
Study Cost (50/50 Shared with Non-Federal Sponsor)	$349,000	$349,000	$349,000	$349,000	$349,000	$349,000	$349,000
Initial Study Cost (100% Federal)	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Environmental Mitigation	$0	$0	$0	$0	$0	$0	$0
Annual O&M				$55,000			
O&M 50 year Present Value (PV) based on 2.75% FY2020 discount rate				$800,000			
Planing, Engineering, and Design (PED) (20% of construction cost)	$199,000	$142,000	$192,800	$142,800	$214,600	$99,000	$162,200
Construction Management (CM) (20% of construction cost)	$199,000	$142,000	$192,800	$142,800	$214,600	$99,000	$162,200
TOTAL (Construction and Study)	$1,742,000	$1,343,000	$1,698,600	$2,203,600	$1,851,200	$1,042,000	$1,484,400

1 Source: Total Project Cost Summary prepared 20 April 2020
2 October 2019 FY20 price level, Interest Rate 2.75%, $1,000

Operations and Maintenance (O&M) costs are not included in the table above. The non-federal Sponsor is responsible for 100% of the O&M costs, per ER 1105-2-100 Appendix G Section III F-23.

Average Annual Costs v. Average Annual Benefit

The least cost alternative plan is considered to be justified if the total cost of the proposed alternative is less than the cost to relocate the threatened facility. In this case, the average annual cost (AAC) of the road relocation alternative was compared to the AAC of Alternative 6.

Table 4-2. AAB v. AAC

AAC - Alt 6 v. Relocation	
Average Annual Benefit (Relocation of Road)	$38,000
Average Annual Cost (Alternative 6)	$21,000
Net Benefit	$17,000
BCR	1.8

1 October 2020 FY21 price level, Interest Rate 2.5%, $1,000, 25 year Period of Analysis
2 Length of construction assumed to be 12 months; and
3 Capital Recovery Factory 0.0542.

Similarly, one can compare Average Annual Benefits to Average Annual Costs using the same method. It is clear that the benefits significantly outweigh the costs.

4.2.5 MODIFIED ALTERNATIVE 6:

The TSP was approved in the MDM that was held on April 30th, 2020. Shortly after the MDM, further internal review by Engineering PDT members and subsequent preliminary site exploration, it was determined that placement of the riprap on the existing very steep (1H:1V) earthen embankment slopes would not be stable. Placement of the 3-foot-thick riprap section with bedding and a 3-foot-wide toe berm would also result in shifting the creek. However, this was not considered to be a viable option and a modified Alternative 6 was proposed. The modified alternative 6, generally consist of rock fill revetment at a flatter slope of 1.8:1V and a slight shift of the existing stream. The highway earth embankment would be excavated to properly support the riprap revetment. The modified Alternative 6 is very similar to Alternative 2 which was the least cost alternative during the Federal Interest Determination, and the next least cost behind the selected TSP Alternative 6 for the MDM presentation. Therefore, modified Alternative 6 was considered and shown in Figure 4-1 below as the new Recommended Plan.

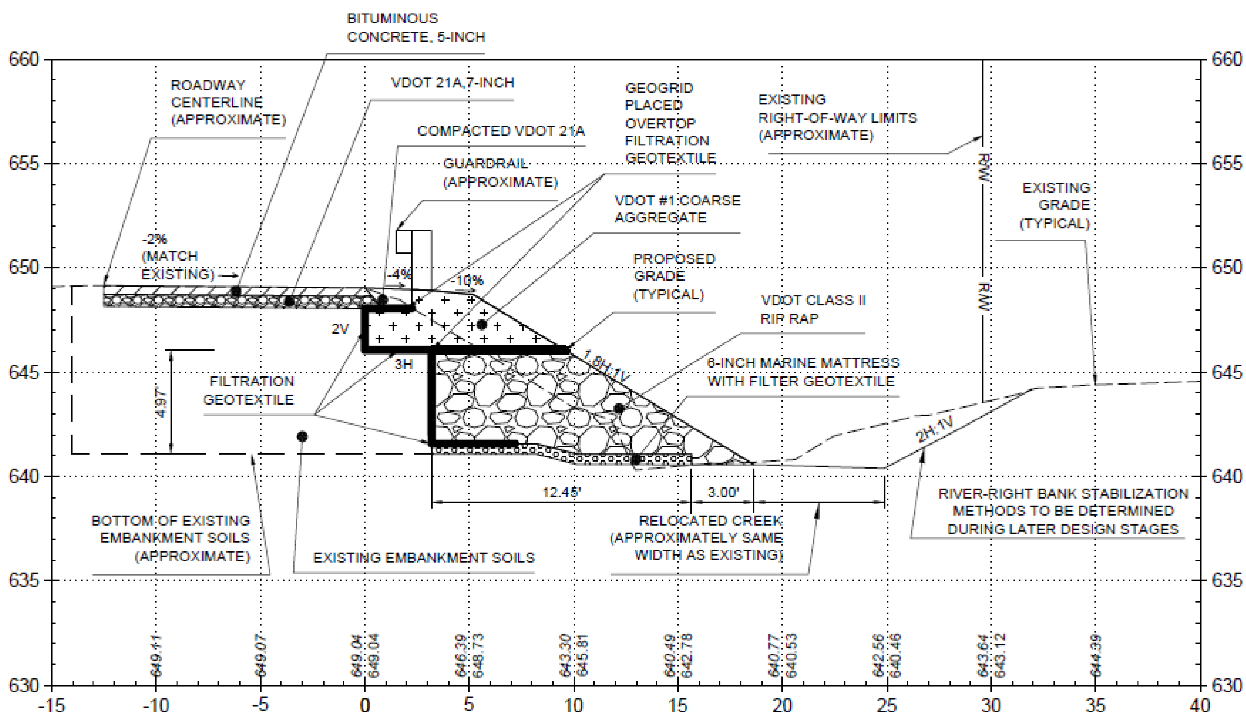

Figure 4-1. Modified Alternative 6.

4.2.6 COMPARISON OF THE MODIFIED ALTERNATIVE 6 & ROAD RELOCATION

Based on the economic analysis shown in table 4-3 below, the Modified Alternative 6 is still the least cost alternative and still meets the project objective of protecting the facilities at risk better than the original TSP selected on April 30, 2020 MDM Meeting.

Table 4-3. Comparison of the No Action Alternative with Modified Alternative 6.

Cost Description	(Modified 6) Placement of stone revetment and some re-routing of stream	Road Replacement and Utilities
ROM Construction Cost with 25% Contingency	$657,000	$728,000
Traffic Control Maintenance Cost		$39,000
Survey Cost (Real estate and topographic)		$39,000
Real Estate (LERRD)	$118,000	$22,000
Study Cost (50/50 Shared with Nonfederal Sponsor)		$356,000
Initial Study Cost (100% Federal)		$102,000
Planning, Engineering, and Design	$125,000	$166,000
Construction Management (CM)	$126,000	$166,000
TOTAL (Construction and Study)	$1,026,000	$1,618,000

1 Source: Road replacement and utilities summary prepared on 20 April 2020 and Modified Alternative 6 was prepared 08 February 2021; and
2 Updated April 2020 Road Replacement and Utilities Cost Estimates to March 2021 using CWCCIS Index Factor of 1.0215
3 October 2020 FY21 price level, Interest Rate 2.5%, $1,000

Average Annual Costs v. Average Annual Benefit

The least cost of the Modified Alternative 6 is considered to be justified if the total cost of the proposed alternative is less than the cost to relocate the threatened facility. In this case, the average annual cost (AAC) of the relocation alternative was compared to the AAC of Modified Alternative 6. Interest during construction was computed assuming midyear payments intervals for a construction period of twelve months. Considering the construction period, yearly construction period expenditures, a fiscal year 2021 interest rate of 2.5 percent.

Table 4-4. AAB v. AAC

AAC - Alt Modified Alt. 6 v. Relocation	
Average Annual Benefit (Relocation of Road)	$89,000
Average Annual Cost (Modified Alternative 6)	$57,000
Net Benefit	$32,000
BCR	1.5

1 October 2020 FY21 price level, Interest Rate 2.5%, $1,000, 25 year Period of Analysis
2 Length of construction assumed to be 12 months; and
3 Capital Recovery Factor 0.0542

4.2.7 LOCALLY PREFERRED PLAN

The nonfederal sponsor has not requested a locally preferred plan.

5 DESCRIPTION OF RECOMMENDED PLAN

The Recommended Plan (RP) is Modified Alternative 6 (Figure 5-1), which is the stabilization of the 12-foot bluff of eroding streambank to provide risk management from further erosion that would damage and ultimately compromise U.S. Route 501 and utilities that are currently at risk. The plan accounts for the existing longitudinal rock sill running the length of the project area at a height of 648-feet (NAVD88).

Specifications of the plan include:

1. Proposed Slope of 1.8 Horizontal to 1 Vertical along a 100-foot section;
2. 5-foot thick section of Class II riprap;
3. Overlain by a 3-foot section of VDOT No. 1 aggregate;
4. Geotextile filtration fabric running the length of project;
5. Geogrid placed over filtration fabric;
6. 6-inch marine mattress with filter geotextile; and
7. Shifting of the stream with excavation and stabilization with native vegetation plantings on the adjacent streambank at a 2 horizontal to 1 Vertical slope. Mitigation would be required for 0.0085 acres of wetland impacts as part of the Recommended Plan. It would be anticipated that the mitigation would be onsite compensatory mitigation.
8. Approximately 0.0085 acre of onsite compensatory wetland impacts would be required.

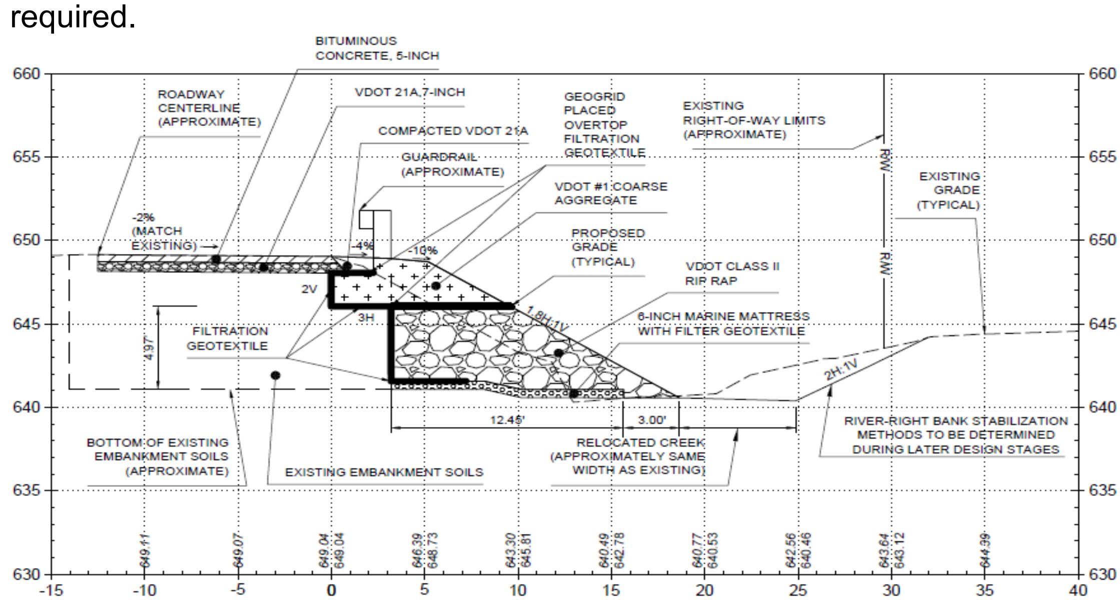

Figure 5-1. Tentatively Selected Plan (TSP) Modified Alternative 6.

The Norfolk District has completed similar projects within the District using toe protection that have been successful at reducing erosion while providing a more natural, vegetated bank. Modified Alternative 6, the least cost alternative, underwent design and cost estimates to arrive at a feasibility level cost that was District Quality Control reviewed.

6 ENGINEERING CONSIDERATIONS

6.1 DESIGN AND CONSTRUCTION CONSIDERATIONS

This section includes a summary of the design considerations on the RP. For more information regarding the other alternatives in the focused array, please refer to the Engineering Appendix. The 10% plans for Modified Alternative 6 are provided in Attachment 2 to the Engineering Appendix.

The RP consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The rock fill revetment will generally consist of an approximate 5-foot thick section of Class II riprap overlain by an approximate 3-foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, it was recommended that a Class II riprap be used to protect against the erosive forces of the creek. The rockfill revetment is proposed to an approximate slope of 1.8H:1V.

Highway 501 is highly depended upon by the local community. The Sponsor has expressed concern that roadway cannot be closed to daily traffic. During construction the Contractor will be limited to utilizing only one traffic lane on Highway 501.

Direction will need to be provided in the design specifications to the Contractor as to how the excavation of the highway embankment should be performed. Excavation of the highway embankment should be performed as not to allow the existing embankment soils to remain exposed for long periods of time. The Contractor may need to perform excavation in approximate 20-linear foot open face increments. Once 20-linear feet of the embankment is exposed, filtration geotextile and stone will need to be immediately placed into the excavation. The amount of open excavation face to remain exposed shall be further evaluated during the Design and Implementation phase. The Contractor may need to develop sheeting, shoring, or trench box plan as it would apply to the construction of the design.

The contractor should anticipate the fluctuation of the water table depending on variations in precipitation, surface runoff, pumping, stream levels, and similar factors. When performing excavations, the Contractor will encounter groundwater. The Contractor will need to implement dewatering methods such as but not limited to open sumps with pumping to allow for construction under dry conditions. If the groundwater is not properly controlled the soil may begin to slough and unravel during the slope excavation. The Contractor shall also take into consider the possibility of fluctuating stream levels.

Once the project has been constructed and turned over to the sponsor, USACE will provide an operations, maintenance, repair, replacement, and rehabilitation (OMRR&R) manual which will be written specifically for the local Sponsor, VDOT, who will have the primary responsibility for maintaining the project. The intent of the document is to provide the Sponsor with some clear and comprehensive guidance on the maintenance of the shoreline stabilization. Debris and vegetation growing on the shoreline stabilization measures will need to be removed periodically. Beyond these examples of ongoing maintenance, there are also more significant repairs that will be necessary from time to time. On occasion, the Sponsor may have to add stone if evidence of structure displacement or deterioration occurs or do some major earthwork to repair an embankment.

6.2 CONSTRUCTION SEQUENCING STRATEGY

The sequencing recommendation for the Recommended Plan Alternative is as follows:

1. Environmental Mitigation
2. Perform pre-construction survey of laydown area and project site as required;
3. Implement traffic control;
4. Install erosion and control measures were applicable;
5. Mobilize heavy equipment and materials to laydown area;
6. Remove guardrail;
7. Remove existing Class I riprap, any debris, and vegetation on south and Highway 501 embankment;
8. Excavate soil or remove rock to finished grade the new stream channel and the south bank (utilize cofferdams as needed);
9. Install filtration geotextile fabric and stabilization plantings on the south bank;
10. Excavate highway embankment as proposed in the specifications to limit the exposed excavated face before backfilling;
11. Install sheeting and shoring;
12. Compact exposed in-situ soils;
13. Immediately install filtration geotextile, filter mattress, Class II riprap, filtration geotextile and geogrid layer, then VDOT No. 1 aggregate and finally the VDOT 21A to finished elevation and design slope;
14. Continue steps 8 through 11 until highway embankment is constructed;
15. Restore guardrail;
16. Restore and repair Highway 501;
17. Demobilize heavy equipment and materials; and
18. Post construction survey of laydown area.

7 ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing and projected future conditions for each of the resources that reasonably could be expected to be impacted by the project. These conditions are described without implementation of the Preferred Alternative (Section 7.1 No Action/Future Without Project) and with implementation of the Preferred Alternative (Modified Alternative 6; Section 7.2 Modified Alternative 6/Future With Project). The comparison of the No Action/Future Without Project Alternative provides a baseline for comparison to evaluate the impacts of the Future With Project Alternative (Modified Alternative 6).

Guidelines established by the CEQ (40 CFR 1508.27) specify that the significance of an impact should be determined in relationship to both context and intensity (severity). The assessment of potential impacts and the determination of their significance are based on the requirements of 40 CFR 1508.27. Three levels of impact can be identified:

- No impact – No impact is predicted;
- Less than significant impact – An impact is predicted, but the impact does not meet the intensity/context significance criteria for the specific resource;
- Significant impact – An impact is predicted that meets the intensity/context significance criteria for the specific resource.

Impacts are defined in general terms and are qualified as adverse or beneficial and as temporary or permanent. Beneficial impacts provide desirable situations or outcomes; whereas adverse impacts may negatively impact a resource area. Negligible impacts are localized and are generally not measurable. Minor impacts are localized and slight but detectable; moderate impacts are readily apparent and appreciable, and major impacts are severely adverse or highly noticeable and considered to be significant.

Moderate impacts may not meet the criteria to be classified as significant, but the degree of change is noticeable and has the potential to become significant if not effectively mitigated. Additionally, CEQ regulations (at 40 CFR § 1508.20) further define mitigation in the following five ways, in order of preference:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

5. Compensating for the impact by replacing or providing substitute resources or environments.

The means for reducing adverse environmental impacts, including the use of BMPs, are also discussed for each resource area where appropriate.

7.1 NO ACTION/FUTURE WITHOUT PROJECT

Table 7-1. Environmental consequences for the No Action/Future Without Project Alternative (Alternative 0).

Resource	Alternative 0 - No Action/Future Without Project Alternative	
	Environmental Consequences	**Cumulative Impacts**
Air Quality	There would be no air quality impacts of the No Action Alternative.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Hydrology	There could be impacts to the hydrology of the Study Area due to collapse of the roadway and fragmentation / blockage of the stream channel, resulting in impoundment or rerouting of the waterway. This impact would likely be temporary, minor to moderate, and adverse to neutral.	There would be cumulative impacts in and around the Study Area. This would include accelerated / acute nearby channel migration in the case of a channel blockage, and creation of a more lentic habitat upstream of the blockage in the case of an impoundment.
Climate Change and Greenhouse Gas Emissions	There would be no climate change impacts of the No Action Alternative.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Fishery Resources and Essential Fish Habitat	There could be impacts to the fishery resources from collapse of the roadway and fragmentation of the stream network and aquatic habitat.	There would cumulative impacts upstream, and to a lesser extent, downstream of the fragmentation point in the stream network.

Resource	Alternative 0 - No Action/Future Without Project Alternative	
	Environmental Consequences	**Cumulative Impacts**
Geology, Physiography, and Topography	There would minor impacts to the Study Area in the event of a streambank failure and roadway collapse. This is largely an impact on topography. The geology and physiography of the Study would remain the same.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Hazardous, Toxic, and Radioactive Waste	There would be no impacts as the stone revetment would not be constructed.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Land Use	There would be no impacts as the stone revetment would not be constructed.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Noise and Vibration	Ambient noise levels within the Study Area would largely remain unchanged. In the event the roadway experienced a catastrophic failure due to streambank erosion in the Future Without Project scenario, there may be adverse, temporary, minor noise impacts from emergency construction.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Species Status Species	There would be no Special Status Species impacts of the No Action Alternative.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.

Resource	Alternative 0 - No Action/Future Without Project Alternative	
	Environmental Consequences	Cumulative Impacts
Transportation	There would be impacts such as the eventual loss of the approximately 70-foot section of U.S. 501, resulting in possible vehicle damage and endangering public safety. Secondarily, this would result in road closures and rerouting of residential and commercial traffic. If reconstructing the emergency revetment following catastrophic events was in the interest of VDOT and Town of Big Island, then this would likely be a recurring cost with this temporary, reactionary approach. This impact would be temporary, moderate to significant, and adverse.	Cumulative transportation impacts of the No Action Alternative would be increased traffic pressure on roadways that serve as alternative routes. The impacts would likely be temporary, moderate to significant, and adverse.
Vegetation, Wetlands, and SAV	There would be impacts such as the eventual loss of a tree on the northern streambank near the upstream edge of the existing revetment.	No anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Water Quality	Implementing a No Action Alternative would result in continued long-term erosion of the northern streambank during high flow events and potentially a streambank failure and roadway collapse. The continued erosion would have associated long-term, minor, adverse water quality impacts, particularly as increased suspended sediment concentration and total suspended solids. Streambank failure and roadway collapse would have temporary, moderate, adverse water quality impacts in	Adverse water quality impacts of the No Action Alternative in the Study Area would be exacerbated by adverse water quality impacts (as increased suspended sediment concentration, total suspended solids, and turbidity) from upstream resulting during high flow events. Moreover, these impacts during high flow events would be amplified downstream, particularly at the confluence of the unnamed tributary and Indian Run (immediately downstream of the Action Area). These cumulative or synergistic impacts

Resource	Alternative 0 - No Action/Future Without Project Alternative	
	Environmental Consequences	Cumulative Impacts
	the Study Area, particularly as increased suspended sediment concentration, total suspended solids, and turbidity.	are anticipated to be temporary, moderate, and adverse.
Cultural Resources	There would be no anticipated impacts to cultural resources.	No cumulative impacts would result from implementation of the No Action Alternative with other past, present, or reasonably foreseeable actions.
Socioeconomics	There would be no construction impacts under the No Action Alternative. Potential impacts of leaving the erosion problem untreated could be significant. Severe erosion, over time or from a major flooding event, could force the partial or complete closure of the highway. Impacts to traffic, along with personal inconvenience, could result in a loss of income for commuters, retailers, and truckers.	There would be no anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Floodplains	With the No Action Alternative, VDOT would continue addressing current erosion problems and those in the future with needed maintenance and repairs to keep the road open and safe for travel. It is likely there would be some loss of the stone riprap material, deposited downstream, although adverse, there would be temporary and negligible floodplain impacts. VDOT would need to remove material collected under the U.S. Route 501/Lee Jackson Highway culvert if it became a problem.	Predicted climate change could cause an increase in storm frequency, rainfall, and flooding. Development in the watershed could produce more rainfall run-off. As a result, VDOT may need to consider additional measures in the future to avoid streambank erosion problems and any negative impacts to the floodplain.

Resource	Alternative 0 - No Action/Future Without Project Alternative	
	Environmental Consequences	Cumulative Impacts
Occupational Health and Safety	Implementation of the No Action/Future Without Project Alternative would result in the existing streambank continuing to erode over time posing a threat to the existing utilities, U.S. Route 501, and roadway users. Eventually, this erosion would lead to streambank failure and, in turn, potentially roadway collapse and damage to utilities. Consequently, these public goods would likely need to be relocated further north away from the streambank. The site conditions would be expected to continue to potentially threaten public safety due to the long-term deteriorating conditions of the site. Minor to moderate, permanent adverse impacts to occupational health and safety would be anticipated with implementation of the No Action Alternative.	There would be no anticipated cumulative impacts resulting from implementing the No Action Alternative and other past, present, or reasonably foreseeable actions.
Conclusion	Ultimately, significant impacts of the No Action Alternative could include temporary, adverse impacts on transportation, socioeconomics, and safety in the Study Area.	Ultimately, significant cumulative impacts of the No Action Alternative could include temporary, adverse impacts on transportation in the Study Area.

7.2 MODIFIED ALTERNATIVE 6/FUTURE WTH PROJECT

Table 7-2. Environmental consequences of the Recommended Plan

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	**Cumulative Impacts**
Aesthetics	There would be minor, temporary adverse temporary impacts to the visual quality of the construction and laydown sites during construction. There would be a minor, adverse permanent change in the visual landscape with the additional riprap revetment to the visual landscape, but impacts would integrate well into the existing landscape as riprap and stream vegetation already occurs in the ROI.	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and other past, present, or reasonably foreseeable actions.
Air Quality	Construction would generate emissions from the combustion of fuel used to operate vehicles and construction equipment. There would be adverse, temporary, negligible to minor impacts to air quality.	Planned development in the region would continue resulting in emissions from combustion of fuel to operate vehicles and operation equipment. However, there would be no anticipated substantive cumulative or synergistic impacts.
Hydrology	Implementing Modified Alternative 6 would include moving the stream channel, so impacts on hydrology would be permanent, minor to moderate, and beneficial to neutral. The constructed channel would have similar hydrologic function with decreased erosional migration; thus, the long-term impact would be beneficial. Construction may require temporarily rerouting streamflow using something like a coffer dam system and dewatering the existing channel.	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and other past, present, or reasonably foreseeable actions.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	**Cumulative Impacts**
	This impact would be temporary, minor, and adverse. Overall, hydrologic impacts would be permanent to temporary, minor to moderate, and beneficial to adverse.	
Climate Change and Greenhouse Gas Emissions	Construction would result in increased 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 these impacts may be detectable / measurable . Dust suppression BMPs would be followed if necessary during the construction and maintenance of the riprap revetment. Implementation of the Modified Alternative 6 would be anticipated to result in temporary, adverse, negligible to minor impacts to climate change and greenhouse gas emissions.	Planned development in the region would continue resulting in greenhouse gas emissions from combustion of fuel to operate vehicles and operation equipment. There would be no anticipated substantive cumulative or synergistic impacts.
Fishery Resources and Essential Fish Habitat	Construction of Modified Alternative 6 would result in temporary, minor to moderate, adverse impacts to fishery resources. During construction, the channel may be temporarily dewatered by rerouting streamflow and using something like a coffer dam. In this case, aquatic biota would be temporarily removed from the approximately 100 fluvial feet of existing stream habitat. Headwater species tend to recolonize intermittent streams (i.e., or re-watered) quickly.	Cumulative impacts of Modified Alternative 6 on fishery resources may be temporary, minor, and adverse due to temporary fragmentation of this aquatic habitat and community assemblage. This cumulative impact would primarily be to upstream of the Study Area.
Geology, Physiography, and Topography	Construction of Modified Alternative 6 would result in permanent, significant, and beneficial impacts to topography. The north bank of the Study Area	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
	would be regraded to a shallower, more stable bank. The channel planform may also be slightly impacted when the channel is moved several feet south.	other past, present, or reasonably foreseeable actions.
Hazardous, Toxic, and Radioactive Waste	There is a potential for hazardous materials and/or waste or petroleum or fuel spills to be at the laydown site as some equipment/vehicles are currently parked on the grass. A Phase I, Environmental Site Assessment would be conducted during the design and construction phase to determine the potential presence of any contaminants. Should any remediation be required, the nonfederal sponsor would be required to remediate any potential hazardous materials, hazardous wastes or any other regulated materials or wastes on site. Hazardous, radioactive, and/or toxic waste would not anticipated to be generated nor stored onsite with implementation of the Modified Alternative 6. Should a fuel spill occur from a vehicle or construction equipment, the spill would be contained and any fuel and contaminated soil would be placed into a labeled, approved container and be transported to an approved disposal facility. No aboveground storage tanks would be used to store hazardous materials and no hazardous materials would be stored onsite. Therefore, while a gasoline spill could result in minor, temporary, adverse impacts, there would not be any anticipated long-term adverse impacts resulting from HTRW within	A fuel spill from maintenance vehicles, commercial vehicles, or residential and recreational vehicles could result in temporary, adverse, minor impacts; however, implementation of Modified Alternative 6 with past, present, and other reasonably foreseeable actions would not be anticipated to result in any substantive cumulative or synergistic impacts.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
	the Study Area with implementation of Modified Alternative 6.	
Land Use	There would be permanent, minor land use impacts resulting from implementing Modified Alternative 6 due to the conversion of streambank to stream (and vice versa) resulting from the re-routing of the stream and regrading of the north streambank.	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and other past, present, or reasonably foreseeable actions.
Noise and Vibration	Implementing Modified Alternative 6 would have adverse, temporary, minor noise impacts expected from initial construction activities and from periodic maintenance of the riprap. 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 (FHWA 2006). Underwater noise impacts to aquatic fauna would also be expected and are further discussed in the aquatic fauna/fishery resource impact sections.	Cumulative noise impacts resulting from implementation of the Modified Alternative 6 with the current ambient noise levels would be adverse and would result in temporary, minor, and adverse cumulative impacts. However, no substantive cumulative or synergistic impacts would be anticipated.
Species Status Species	There would be temporary, negligible to minor, adverse Special Status Species impacts from implementing Modified Alternative 6. There would be no impacts to Critical Habitat for any federally listed species, candidate species, state listed species, bald eagles, or migratory birds (see Appendix A-1 for more detail). There is some potential northern long-eared bat (NLEB) could occur within the Study Area; they were on the official species list for the Study Area from USFWS (USFWS 2021; see Appendix A, Sub-Appendix 1). The removal of four large size trees (>6-in diameter) required by Modified Alternative 6 is the primary threat and may affect the	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and other past, present, or reasonably foreseeable actions.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	**Cumulative Impacts**
	NLEB. While the Study Area is more than 25 miles from known summer maternity roosts and more than 35 miles from known winter hibernaculum, any tree removal would occur, to the maximum extent practicable, outside of the time-of-year guidelines (15 April – 15 September) in the interest of NLEB. Any tree removal within 15 April – 15 September would have the potential to temporarily, adversely affect NLEB. Our finding on NLEB reported to USFWS is “may affect, likely to adversely affect” due to the tree removal, and these adverse effects would be temporary, and negligible to minor; the project would be excepted from the incidental take prohibitions as addressed in the USFWS Programmatic Biological Opinion on the Final 4(d) rule for the NLEB and Activities Excepted form Take Prohibitions.	
Transportation	There would be temporary to permanent, minor to significant direct and indirect impacts to transportation. There would be temporary adverse impacts to transportation during construction. Traffic may be re-routed during the period of construction (approximately 90 days). The significant impact to transportation would be positive, permanent, and indirect in that the long-term stability of the roadway would be ensured, and the safe residential and commercial use of the roadway would be maintained.	Cumulative transportation impacts of implementing Modified Alternative 6 would be increased traffic pressure on roadways that serve as alternative routes during the period of construction. The impacts would be temporary, minor, and adverse.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
Vegetation, Wetlands, and SAV	There would be temporary and permanent direct impacts such as the loss of trees and wetland area. Several trees would be removed due to construction of the northern bank and movement of the stream channel south. Wetland area identified during the Preliminary Jurisdictional Determination will be directly, permanently, minor to moderate, and adversely impacted. The impact is estimated to be approximately 0.0085 acres of emergent and scrub/shrub riverine wetland. These impacts would be mitigated via a combination of on-site compensatory mitigation and the purchase of credits from a mitigation bank or in-lieu fee program. There is no upland mitigation required, and this area is not in a Chesapeake Bay Protection Area. There are no impacts to SAV as there is none that occurs in the ROI.	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and other past, present, or reasonably foreseeable actions.
Water Quality	Soil disturbing activities associated with grading the northern streambank, movement of the stream channel via excavation of the southern streambank, and placement of the riprap could result in a minor increase in turbidity and total suspended solids (TSS) and reduce dissolved oxygen levels in the project footprint and downstream in Indian Run temporarily. However, erosion and sediment control measures such as a weighted turbidity curtain would be used to contain sediment within the water column during construction and reduce these impacts. Therefore these temporary impacts are anticipated to be adverse, but minor.	Adverse water quality impacts of the Modified Alternative 6 in the Study Area would be exacerbated by adverse water quality impacts (as increased suspended sediment concentration, total suspended solids, and turbidity) from upstream portions of the unnamed tributary resulting during high flow events. Moreover, these impacts during high flow events would be amplified downstream, particularly at the confluence of the unnamed tributary and Indian Run

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
	Following construction, the riprap on the northern streambank will reduce erosion into the unnamed tributary during high flow events, and in turn will provide minor water quality improvement locally in the unnamed tributary and downstream in Indian Run. These minor beneficial effects will include reduced turbidity and TSS. However, the movement of the stream channel several feet south would result in the temporary to permanent loss of a portion of the riparian buffer and wetland on the bench of the southern streambank that serves to filter contaminants from stormwater. In turn, this would result in adverse, temporary, minor impacts to water quality. Importantly though, the final designs and mitigation for Alternative 6 will incorporate stabilization measures for the southern streambank including techniques with short-term (installation coconut fiber mats) and long-term (replanting riparian vegetation) benefits for reducing bank erosion and maintaining filtration capacity, and improving/maintaining water quality. Therefore, these impacts to water quality will be both temporary and permanent. Minor adverse and beneficial impacts to water quality would be anticipated.	(immediately downstream of the Action Area). These cumulative or synergistic impacts are anticipated to be temporary, minor to moderate, and adverse.
Cultural Resources	The north bank of the stream is a heavily modified roadbed and embankment that is not anticipated to contain intact archeological deposits and the south bank is a cut bank and scoured flood plain with a very low potential to contain intact archaeological deposits. Based on the	No cumulative impacts would result from implementation of the Modified Alternative 6 with other past, present, or reasonably foreseeable actions.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
	level of disturbance at the proposed stream construction site and lack of sufficient integrity for archeological deposits, no eligible National Register of Historic Places eligible sites would be anticipated to occur in the portion of the APE. An Archeologist would be required inspect all staging areas prior to their use including laydown and construction entrances to verify there would be no historic resources that could potentially be disturbed by the use of the staging areas. The fortuitous finds clause would be added to our plans and specifications and would state that there would be a work stoppage and proper notification and National Historic Preservation Act, Section 106 compliance procedures should the inspection result in a finding of a potential archeological resource. There are no historic properties located at or in the visual landscape of the construction or staging areas; therefore, there would be no adverse effects to historic structures. Therefore, implementation of Modified Alternative 6 would not be anticipated to have adverse effects to cultural resources.	
Socioeconomics	Implementation of Modified Alternative 6 would have permanent to temporary, negligible to minor, adverse to beneficial. Averting roadway failure with the erosion control measures would have a permanent, negligible to minor,	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and other past, present, or reasonably foreseeable actions.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
	beneficial impact on socioeconomics. Construction impacts to socioeconomic conditions would be temporary, negligible, and adverse. Small crews active for limited times would have little effect. Slight traffic delays could occur around the construction area, but again with little effect. There are no anticipated impacts on minority populations.	
Floodplains	With Modified Alternative 6, losses of natural and beneficial floodplain values, such as vegetation, from stream relocation, excavation, and armoring with riprap are considered adverse, permanent, and negligible to minor impacts, as the project is generally small in scale and the project should improve the stream hydraulics. It is likely there would be some loss of the stone riprap material over time, deposited downstream, although adverse, there would be temporary and negligible floodplain impacts. VDOT would need to remove material collected under the U.S. Route 501/Lee Jackson Highway culvert if it became a problem. Possible floodplain impacts from construction activities would generally be within the footprint of the project and would be adverse and temporary, ranging from negligible to minor and accounted for during design and construction using Best Management Practices. Possible dewatering or alteration of flows would be a minor, adverse, and temporary impact. If project failure occurs, impacts to the embankment and roadway would be	Erosion problems and any negative impacts to the floodplain.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
	adverse, temporary, ranging from negligible to major depending on the level of damage. With failure, possible floodplain impacts, such as downstream deposition of material, would be adverse and temporary, ranging from negligible to minor depending on the level of road damage and streambank erosion.	
Occupational Health and Safety	During project construction, safety risks would be associated with operating machinery and equipment during construction of the stone revetment, grading of the bank, and re-routing of the stream. These risks would be temporary, minor, and adverse to occupational health and safety. While working in and around the water, drowning is always a safety risk, therefore, work vessels, if required, should be equipped with first aid equipment; the stream conditions are shallow enough that floatation devices would be ineffective and would not be required, but the shallow stream depth does not eliminate the possibility of drowning. While working from and around U.S. Route 501, vehicles will pose a risk to occupational health and safety too. The existing site constraints, including bank steepness and a shallow stream environment, present access and staging issues that may increase hazardous work conditions during construction. Therefore, impacts associated with occupational health and safety would be less than significant with implementation of Modified Alternative 6.	No anticipated substantive cumulative or synergistic impacts of implementing Modified Alternative 6 and other past, present, or reasonably foreseeable actions.

Resource	Modified Alternative 6 - Placement of Stone Revetment	
	Environmental Consequences	Cumulative Impacts
Conclusion	Ultimately, no significant impacts would result from implementing Modified Alternative 6. There would be long-term, beneficial impacts on transportation and topography/hydrology/physical processes in the Study Area. The impact to transportation would be beneficial, permanent, and indirect in that the long-term stability of the roadway would be ensured, and the safe residential and commercial use of the roadway would be maintained. The permanent, beneficial impact to topography/hydrology/physical process in the Study Area would result from re-grading the north bank to a shallower, more stable streambank with a significantly reduced rate of northward migration/retreat.	No significant cumulative impacts would result from implementation of the Alternative 6 with other past, present, or reasonably foreseeable actions.

Table 7-3. Best Management Practices (BMPs) per resource type associated with the implementation of Modified Alternative 6.

Resource	BMPs
Air Quality	• Dust suppression BMPs that minimize fugitive dust emissions in accordance with 9VAC-5060 et seq. would be employed when feasible, including covering open equipment for conveying materials, and prompt removal of spilled, tracked, or eroded dirt or other materials from the roadway. • All construction equipment will be maintained in accordance with manufacturer's specifications; • Fuel powered equipment shall not idle for more than five minutes at a time; • If available and to the maximum practical extent practicable, electrically powered equipment will be used in lieu over gasoline or diesel-powered equipment; and

	• If available and to the maximum practical extent practicable, alternatively fueled construction equipment (compressed natural gas, liquefied natural gas, or biodiesel) will be used in lieu of diesel powered equipment.
Hydrology	N/A
Climate Change and Greenhouse Gas Emissions	Please refer to the BMPs for Air Quality
Fishery Resources and Essential Fish Habitat	• The toe of the riprap revetment will be minimized to the maximum, practical extent to avoid and reduce impacts to aquatic biota. • Turbidity curtain(s) will be used if feasible to control increases in turbidity / suspended sediments caused by construction activities. • The PDT will integrate natural channel design approaches to rerouting and reconstructing the stream channel and associated habitat, and the south streambank, where feasible during the PED Phase, such as tree / log / rootward revetment, planting native streambank ; feasibility of such tactics will be evaluated during PED Phase
Geology, Physiography, and Topography	• Erosion and sediment control measures will be employed during construction. For instance, once the streambanks have been graded to achieve the designed slopes, slope stabilization blankets, typically made of biodegradable materials, would be installed to control erosion of soil and seeds until vegetation is established and/or riprap is placed.

Hazardous, Toxic, and Radioactive Waste	• An accident and spill prevention plans would be developed (and will be required per the construction contract specifications) to prevent most spills. • All fuels and other materials generated by or used for the project would be properly managed, stored, and disposed. Should a fuel spill occur from a vehicle or construction equipment, the spill would be contained, and any fuel and contaminated soil would be placed into a labeled, approved container and be transported to an approved disposal facility. • No aboveground storage tanks would be used to store hazardous materials and no hazardous materials would be stored on-site.
Land Use	N/A
Noise and Vibration	• Mufflers will be used on construction equipment, wherever feasible, to reduce noise impacts to the Study Area and surrounding areas.
Species Status Species	• Tree removal will take place outside of April 15 – September 15 to the maximum extent practicable in the interest of avoiding incidental take of the NLEB. This follows tree removal time-of-year guidance from USFWS. In the unlikely event a NLEB is detected during tree removal, the contractor will contact the USACE, who will then contact USFWS for further instruction. • Our coordination with USFWS and VDWR during Feasibility Phase determined that a freshwater mussel survey would not be required In the unlikely event that a federally listed mussel species is found, the contractor must immediately contact the USACE, who will then contact USFWS for further instruction. Also, a brief report of the event shall be drafted and submitted to the VDWR and USFWS. • 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 USFWS and state agencies as appropriate to determine if and what protective measures are warranted.

Vegetation, Wetlands, and SAV	• Once the streambanks have been graded to achieve the designed slopes, slope stabilization blankets, typically made of biodegradable materials, would be installed to hold soil and seeds in place until vegetation is established and/or riprap is placed. • At minimum, all disturbed areas where riprap will not be placed will be stabilized and seeded with native vegetation seed mix. Planting native stabilizing streambank and riparian scrub/shrub vegetation and trees will be evaluated during PED while considering how to integrate natural channel design methods into the final PED designs.

Water Quality	• The contractor will develop a Stormwater Pollution Prevention Plan that details erosion control practices, inspection procedures, and other BMPs to ensure that increased turbidity and TSS within the unnamed tributary to Indian Run, and Indian Run itself, during construction are minimized to the maximum, practical extent. • Turbidity curtain(s) or other measures will be used if feasible to control increases in turbidity / suspended sediments caused by construction activities. • Install and monitor erosion-prevention BMPs, such as silt fences, sediment berms, and/or other equivalent sediment control measures as appropriate and in accordance with the approved Storm Water Pollution Prevention Plan; • Apply permanent or temporary soil stabilization to denuded areas within seven days after final grade is reached on any portion of the site; • Apply nutrients to landscaping areas in accordance with manufacturer's recommendations and do not apply nutrient during rainfall events; • Inspect stormwater water BMPs and potential risks to stormwater (e.g. material stockpiles, silt fences, etc.) (i) at least once every four business days or (ii) at least once every five business days and no later than 48 hours following a measurable storm event. In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection shall be conducted on the next business day; and • Stabilize disturbed areas immediately whenever any clearing, grading, excavating, or other land-disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 days.

Cultural Resources	• An Archeologist would be required inspect all staging areas prior to their use including laydown and construction entrances to verify there would be no historic resources that could potentially be disturbed by the use of the staging areas. • The fortuitous finds clause would be added to our plans and specifications and would state that there would be a work stoppage and proper notification and National Historic Preservation Act, Section 106 compliance procedures should the inspection result in a finding of a potential archeological resource.
Socioeconomics	• Minimize adverse effects on socioeconomics through regular communication and coordination with affected residents.
Floodplains	N/A
Transportation and Occupational Health and Safety, and Noise	• Contractors would be required to prepare an Accident Prevention Plan (APP) for review by USACE safety staff prior to the start of construction (USACE EM-385-1-1). The APP specifies the safety and occupational health plan, responsible personnel and their Occupational Safety and Health Administration certifications, safety training for all personnel, protective equipment. • Clothing and Personal Protective Equipment (PPE) are typically required for workers and may include: appropriate clothing for weather conditions; steel toed boots; hard hat; eye protection, work vest with reflective material; and hearing protection. • Two-way flagging and road protective markings would be put in place while construction vehicles are working in/near the roadway. • The construction entrance and construction area would be properly marked and secured to ensure the public is not to subject to any potential safety issues. • During construction and laydown, the contractor would adhere to all noise restrictions and noise ordinance requirements.

7.3 CONCLUSION

Potential impacts to the aforementioned resource areas resulting from implementation of Modified Alternative 6 range from permanent to temporary, negligible to moderate, adverse to beneficial, and indirect to direct. There are no anticipated significant impacts of implementing Modified Alternative 6. Based on our findings, Modified Alternative 6 is preferred over a No Action Alternative / Future Without Project. Consequences of the long-term stabilization design in Modified Alternative 6 include (1) relocating the adjacent 100 linear feet (or approximately 0.009 acres) of stream channel 7 feet to the south, and thus, (2) excavating 100 linear feet (or approximately 0.016 acres) of the south bank which contains a small wetland area (0.008 acres), and (3) removing four large size trees (>6-in diameter). Put in terms of resources, the greatest adverse impacts are anticipated to fisheries resources, bathymetry, benthic habitat, and wetlands. In the case of benthic and wetlands, these impacts would be mitigated via on-site compensatory mitigation or a combination of on-site compensatory mitigation and purchasing credits from mitigation banks and/or an in-lieu fee program. These impacts of Implementing Modified Alternative 6 with best management practices and environmental mitigation would be less than the impacts anticipated for the No Action/Future Without Project alternative. Alternatively, the No Action/Future Without Project alternative would include temporary, adverse impacts on transportation, socioeconomics, and safety in the ROI. The Recommended Plan would provide long-term stabilization of the severely eroding north bank and eliminate these threats and potential impacts to the public roadway, public safety, and local socioeconomics.

8 ENVIRONMENTAL COMPLIANCE

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. This EA has been prepared under the procedural provisions of NEPA (40 CFR 1500-1508) that were last amended in 2005 as this project was initiated prior to September 14, 2020. This EA was prepared in compliance with all applicable federal and state statutes, regulations, and executive orders, including but not limited to:

Table 8-1. Environmental Compliance.

Title of Law	U.S. Code	Compliance Status
Abandoned Shipwreck Act of 1987	43 United States Code (U.S.C.) 2101	N/A
American Bald and Golden Eagle Protection Act of 1962, as amended	16 U.S.C. 668	Full compliance
Anadromous Fish Conservation Act of 1965	16 U.S.C. 757 a et seq	N/A
Clean Air Act of 1972, as amended	42 U.S.C. 7401 et seq	Full compliance
Clean Water Act of 1972, as amended	33 U.S.C. 1251 et seq	Full compliance
Coastal Zone Management Act of 1972, as amended	16 U.S.C. 1451 et seq	N/A.
Comprehensive Environmental Responses, Compensation and Liability Act of 1980	42 U.S.C. 9601	Full compliance
Deepwater Port Act of	33 U.S.C. 1501	N/A

Title of Law	U.S. Code	Compliance Status
1974, as amended		
Emergency Wetlands Resources Act	16 U.S.C. 3901-3932	N/A
Endangered Species Act of 1973	16 U.S.C. 1531	Full compliance
Estuary Protection Act of 1968	16 U.S.C. 1221 et seq	N/A
Fish and Wildlife Coordination Act of 1958, as amended	16 U.S.C. 661	Full compliance
Flood Control Act of 1970	33 U.S.C. 549	N/A
Land and Water Conservation Act	16 U.S.C. 460	N/A
Magnuson-Stevens Fishery Conservation and Management Act	16 U.S.C. 1801	N/A
Marine Mammal Protection Act of 1972, as amended	16 U.S.C. 1361	N/A
Marine Protection, Research, and Sanctuaries Act of 1972	33 U.S.C. 1401	N/A
Migratory Bird Conservation Act of 1928, as amended	16 U.S.C. 715	Full compliance
Migratory Bird Treaty Act of 1918, as amended	16 U.S.C. 703	Full compliance

Title of Law	U.S. Code	Compliance Status
National Environmental Policy Act of 1969, as amended	42 U.S.C. 4321 et seq	Public review, consultations, and coordination are in progress. Full compliance is anticipated following the signing of the Finding of No Significant Impact (FONSI).
National Historic Preservation Act of 1966, as amended	16 U.S.C. 470	Full Compliance anticipated. Section 106 coordination is ongoing with the SHPO.
National Historic Preservation Act Amendments of 1980	16 U.S.C. 469a	Full compliance anticipated
Native American Graves Protection and Repatriation Act of 1990	25 U.S.C. 3001	N/A
Noise Control Act of 1972, as amended	42 U.S.C. 4901	Full compliance
Resource Conservation and Recovery Act of 1976	42 U.S.C. 6901 et seq	Full compliance
River and Harbor Act of 1888, Section 11	33 U.S.C. 608	Full compliance
River and Harbor Act of 1899	33 U.S.C. 401 et seq	Full compliance
Safe Drinking Water Act of 1974, as amended	42 U.S.C. 300	Full compliance
Submerged Lands Act of 1953	43 U.S.C. 1301 et seq	Full compliance
Toxic Substances Control Act of 1976	15 U.S.C. 2601	Full compliance

Table 8-2. Executive Orders.

Title of Executive Order	Executive Order Number	Compliance Status
Protection and Enhancement of Environmental Quality	11514/11991	Full compliance
Protection and Enhancement of the Cultural Environment	11593	Full compliance
Floodplain Management	11988	Full compliance
Protection of Wetlands	11990	Full compliance
Federal Compliance with Pollution Control Standards	12088	Full compliance
Offshore Oil Spill Pollution	12123	N/A
Federal Compliance with Right-to-Know Laws and Pollution Prevention	12856	N/A
Federal Actions to Address Environmental Justice and Minority and Low-income Populations	12898	Full Compliance
Protection of Children from Environmental Health Risks and Safety Risks	13045	Full compliance
Invasive Species	13112	Full compliance
Marine Protected Areas	13158	N/A
Consultation and Coordination with Indian Tribal Governments	13175	Full compliance

Title of Executive Order	Executive Order Number	Compliance Status
Responsibilities of Federal Agencies to Protect Migratory Birds	13186	Full compliance
Facilitation of Cooperative Conservation	13352	N/A
Planning for Federal Sustainability in the Next Decade (2015)	13693	Full compliance

Table 8-3. Environmental Permitting Requirements.

Law	Agency Responsible	Permit, Agreement, Authorization, or Notification Required
American Bald and Golden Eagle Protection Act of 1962, as amended	USFWS	“Take” permit if any eagles are intentionally harmed or killed; no take permit is required
Comprehensive Environmental Responses, Compensation and Liability Act of 1980, as amended	USEPA	N/A
Clean Water Act, Section 401	VDEQ	401 Water Quality Certification anticipated
Coastal Zone Management ACT (CZMA)	VDEQ	CZMA Federal Consistency Concurrence not required; outside of the Virginia Coastal Zone Management boundaries
Coastal Barrier Resources Act (CBRA)	USFWS	CBRA not required; Project not located in the

Law	Agency Responsible	Permit, Agreement, Authorization, or Notification Required
		designated coastal barrier area
Endangered Species Act of 1973	NMFS	USFWS concurrence determination (Informal Consultation) recieved; no consultation with NMFS is required for this project
Fish and Wildlife Coordination Act (FWCA)	USFWS	Coordination with USFWS, NMFS, and VDWR is complete.
Magnuson-Stevens Fishery Conservation and Management Act	NMFS	N/A
Marine Mammal Protection Act of 1972, as amended	NMFS	N/A
Marine Protection, Research, and Sanctuaries Act of 1972*	USEPA	N/A
Migratory Bird Treaty Act of 1918, as amended	USFWS	No take permit required
National Historic Preservation Act of 1966, as amended	Advisory Council on Historic Preservation, Virginia Department of Historic Resources	Concurrence anticipated from the SHPO
Noise Control Act of 1972	USEPA	Full compliance
Resource Conservation and Recovery Act of 1976	USEPA, VDEQ	Full compliance

Law	Agency Responsible	Permit, Agreement, Authorization, or Notification Required
Section 28.2-1200 et seq. of the Code of Virginia, Submerged Lands	VMRC	Subaqueous permit required for impacts to State-owned submerged lands channelward of mean low water

N/A = Not Applicable; VDEQ = Virginia Department of Environmental Quality; VDWR = Virginia Department of Wildlife Resources; NMFS = National Marine Fisheries Service; USEPA = U.S. Environmental Protection Agency; USFWS = U.S. Fish and Wildlife Service

National Environmental Policy Act of 1969, as amended

The NEPA requires that all federal agencies use a systematic, interdisciplinary approach to protect the human environment. This approach promotes the integrated use of natural and social sciences in planning and decision-making that could have an impact on the environment. NEPA requires the preparation of an EIS for any major federal action that could have a significant impact on quality of the human environment and the preparation of an Environmental Assessment (EA) for those federal actions that do not cause a significant impact but do not qualify for a categorical exclusion. The NEPA regulations issued by CEQ provide for a scoping process to identify and the scope and significance of environmental issues associated with a project. The process identifies and eliminates from further detailed study issues that are not significant. As previously stated, the USACE used this process to comply with NEPA and focus this IFR/EA on the issues most relevant to the environment and the decision-making process. Full compliance under NEPA is anticipated in the future with signature of the Finding of No Significant Impact (FONSI).

Clean Water Act

This IFR/EA contains sufficient information to demonstrate that the Recommended Plan is in compliance with the Clean Water Act. The draft Clean Water Act, 404(b)(1) Report provided in Appendix B documents this project is in full compliance with Section 404 of the Clean Water Act.

The USACE will obtain a 401 Water Quality Certification from the Commonwealth of Virginia pursuant to the Clean Water Act (if required).

There are wetlands located at the project site for which <0.1 acres of impact acreage (0.008 acres) were estimated as a result of Modified Alternative 6. One-to-one wetland mitigation is required for this project. Onsite compensatory mitigation is planned.

Coastal Zone Management Act

The Federal CZMA requires each federal agency activity performed within or outside the coastal zone (including development projects) that affects land or water use, or natural resources of the coastal zone to be carried out in a manner which is consistent to the maximum extent practicable, i.e. fully consistent, with the enforceable policies of approved state management programs unless full consistency is prohibited by existing law applicable to the federal agency.

To implement the CZMA and to establish procedures for compliance with its federal consistency provisions, the U.S. Department of Commerce, NOAA, promulgated regulations which are contained in 15 C.F.R. Part 930. As per 15 CFR 930.37, a federal agency may use its NEPA documents as a vehicle for its consistency determination.

The Virginia Coastal Management Program was established under the guidelines of the National Coastal Zone Management Act (1972) as a state-federal partnership to comprehensively manage coastal resources. The VDEQ is the designated state coastal management agency and is responsible for the implementation of the state's Coastal Management Program. Implementation includes the direct regulation of impacts to coastal resources within the critical areas of the state including coastal waters, tidelands, beaches, and beach dune systems; and indirect certification authority over federal actions and state permit decisions within the eight coastal counties.

The goals of the Virginia Coastal Management Program are attained by enforcement of the policies of the State as codified within the Virginia Code of Regulations. "Policy" or "policies" of the Virginia Coastal Management Program means the enforceable provisions of present or future applicable statutes of the Commonwealth of Virginia. The statutes cited as policies of the program were selected because they reflect the overall program goals of developing and implementing a balanced program for the protection of the natural resources, as well as promoting sustainable economic development of the coastal area. In accordance with the CZMA, our coordination with the VDEQ has determined that the proposed project falls outside of boundaries with the enforceable policies of the Virginia CMP (Appendix A, Sub-Appendix 4).

Clean Air Act, as amended

There will be negligible to minor, temporary increases in air emissions from operation of construction equipment during construction operations. These emissions will be below de minimis levels. No conformity analysis is required for this project.

Fish and Wildlife Coordination Act

The project encroachment into the waterway will affect the water course and several trees will be removed, but its impact on fish and wildlife is minimal. Coordination with USFWS on the FWCA is complete, and comments and recommendations received from the USFWS through the NEPA process. Full compliance achieved.

Endangered Species Act

A Biological Assessment evaluating the potential impacts to endangered and threatened species under the jurisdiction of USFWS has been prepared and informal consultation complete (see Appendix A). Coordination with USFWS pursuant to Section 7 of the ESA for the species and affect determinations provided in Table 8-4. There is no effect to critical habitats under the jurisdiction of the U.S. Fish and Wildlife Service. Additionally, during coordination with the NMFS pursuant to Section 7 of the ESA, NMFS has stated that the project will have no effect on jurisdictional species or Critical Habitats; no further coordination with NMFS is required. Full compliance achieved.

Table 8-4. Federally listed species known or with the potential to occur in the Action Area.

Taxonomic Category/Common Name	Scientific Name	Status	Critical Habitat	Affect Determination
Mammals				
Northern long-eared bat	*Myotis septentrionalis*	T	N	May Affect, Likely to Adversely Affect

T = Threatened; N = No.

Magnuson-Stevens Fishery Conservation and Management Act, as amended

This Act requires federal action agencies to consult with the NMFS if a proposed action may adversely affect EFH. The USACE evaluated potential impacts on NMFS-managed fish species and their Essential Fish Habitats (Chapter 7 Environmental Consequences). The Study Area is located west of the defined geographic limits of any Essential Fish Habitat as defined by the NMFS; therefore, it does not apply to this project (NOAA 2020). Relevant coordination correspondence with NMFS is provided in Appendix A, Sub-Appendix 4.

Anadromous Fish Conservation Act

It is highly unlikely that anadromous fishes occur in Indian Run, and the EFH Mapper indicates there is no potential that anadromous fish trust-resources occur in the Study

Area (NOAA 2020).

Marine Mammal Protection Act

The Marine Mammal Protection Act prohibits the take of marine mammals in the ROI. There would be no anticipated impacts to marine mammals with implementation of the Modified Alternative 6.

Section 106 of the National Historic Preservation Act

The NHPA applies to properties listed in or eligible for listing in the NRHP; these are referred to as "historic properties." Historic properties eligible for listing in the NRHP include prehistoric and historic sites, structures, buildings, objects, and collections of these in districts. Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800, require the lead federal agency to assess the potential effects of an undertaking on historic properties that are within the proposed project's Area of Potential Effect, which is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 C.F.R. § 800.16[d]).

The project is not anticipated to cause adverse effects to historic resources. Preparation of the Draft EA and public coordination and comment signifies partial compliance with National Historic Preservation Act. Coordination is ongoing with the SHPO.

Resource Conservation and Recovery Act, as amended

The RCRA controls the management and disposal of hazardous waste. "Hazardous and/or toxic wastes," classified by the RCRA, are materials that may pose a potential hazard to human health or the environment due to quantity, concentration, chemical characteristics, or physical characteristics. This applies to discarded or spent materials that are listed in 40 CFR 261.31-.34 and/or that exhibit one of the following characteristics: ignitable, corrosive, reactive, or toxic. Radioactive wastes are materials contaminated with radioactive isotopes from anthropogenic sources (e.g., generated by fission reactions) or naturally occurring radioactive materials (e.g., radon gas, uranium ore). There are no RCRA generators in the vicinity of the project area.

Comprehensive Environmental Response, Compensation and Liability Act

The CERCLA (or Superfund) governs the liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and the cleanup of inactive hazardous substance disposal sites. There is no evidence or history of contamination at the project site under the CERCLA. There are no designated CERCLA sites in the ROI.

Executive Order 11988, Floodplain Management

Federal agencies should avoid, to the extent possible, the long-and short-term adverse impacts associated with the occupancy and modification of the Base Floodplain (1% annual chance floodplain as defined by FEMA, and the avoidance of direct and indirect support of development in the Base Floodplain wherever there is a practicable alternative. Under the EO, USACE is required to provide leadership and take action to: a. Avoid development in the Base Floodplain unless it is the only practicable alternative; b. Reduce the hazard and risk associated with floods; c. Minimize the impact of floods on human safety, health and welfare; and d. Restore and preserve the natural and beneficial values of the Base Floodplain. For critical facilities, the 0.2% annual chance floodplain should be evaluated.

From USACE ER 1165-2-26, in accordance with EO 11988, USACE uses the eight-step process below to address floodplain management, with project-specific responses:

1. Determine if the proposed action is in the Base Floodplain. Due to location, type, and nature of the proposed action involving shoreline protection, all alternatives are located in the Base Floodplain.
2. If the action is in the Base Floodplain, identify and evaluate practicable alternatives to the action or to location of the action in the Base Floodplain. Chapter 4 discusses the process of considering, screening, and comparing alternatives. Due to location, type, and nature of the proposed action involving shoreline protection, all alternatives are located in the Base Floodplain.
3. If the action must be in the floodplain, advise the general public in the affected area and obtain their views and comments. As shown in Chapter 1, as part of NEPA, public scoping was conducted in April 2020 to solicit public comments on the study scope, identify potential measures to be included in the study, and to discuss potential issues to be addressed during the environmental impact analysis for the study. No comments were received with specific concerns for flooding or the Base Floodplain. Please refer to Appendix C for scoping coordination.
4. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial floodplain values. Where actions proposed to be located outside the Base Floodplain will affect the Base Floodplain, impacts resulting from these actions should also be identified. The Environmental Consequences section identifies beneficial and adverse impacts. There are no expected losses of natural and beneficial floodplain values with the proposed action.
5. If the action is likely to induce development in the Base Floodplain, determine if a practicable non-floodplain alternative for the development exists. Some of the

study area is developed, such that the purpose of the proposed action is not to induce development, but to help protect existing public facilities.

6. As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial floodplain values. This should include reevaluation of the "no action" alternative. If the proposed action is properly constructed and maintained, any adverse impacts would be temporary and minimal. The project is not intended to induce development, but to restore and preserve the streambank.
7. If the final determination is made that no practicable alternative exists to locating the action in the Base Floodplain, advise the general public in the affected area of the findings. Due to location, type, and nature of the proposed project involving flood risk management, all alternatives are located in the Base Floodplain. The public has been advised and informed of the study through an initial scoping process and public notification for review of the draft Integrated Feasibility Report and Environmental Assessment.
8. Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order. Modified Alternative 6, Stone Revetment with Rerouting of Stream, is the best protection with the least amount of disruption to the environment for the longest life span and for a reasonable budget and is consistent with the requirements of the Executive Order.

Executive Order 11990, Protection of Wetlands

This EO directs all federal agencies to minimize the destruction, loss, or degradation of wetlands; and preserve and enhance the natural beneficial values of wetlands in the conduct of the agency's responsibilities. This project is in full compliance with this EO. While there are anticipated impacts to a small vegetated wetland (approximately 0.008 acres) resulting from implementation of the Modified Alternative 6, the PDT will continue avoid and minimize those impacts to the maximum extent practicable and anticipates 1-for-1 mitigation of any remaining wetland impacts.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

In accordance with this EO, the USACE has determined that no group of people would bear a disproportionately high share of adverse environmental consequences resulting from the proposed work. Modified Alternative 6 is in full compliance with this EO.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

This EO ensures that all federal actions address the unique vulnerabilities of children. In accordance with this EO, the USACE has determined that no children would bear a disproportionately high share of adverse environmental consequences resulting from the proposed work. The Modified Alternative 6 is in full compliance with this EO.

Migratory Bird Treaty Act; Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

This Act makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. No take permits would be required, and Modified Alternative 6 is in full compliance with the Migratory Bird Treaty Act.

9 TRIBAL, AGENCY, AND PUBLIC COORDINATION

The NEPA regulations issued by CEQ provide for a scoping process to identify the scope and significance of environmental issues associated with a proposed project. The process identifies issues important to the stakeholder community which includes the general public and federal and state resource agencies. The NEPA scoping process was initiated on Sunday, January 10, 2021 with the publication of a legal notice in The Roanoke Times requesting public scoping comments and concluded on February 08, 2021. A public scoping notice was made available on the project website: www.nao.usace.army.mil/About/Projects/Indian-Run/. For copies of all scoping and coordination related materials, please see Appendix A-4.

9.1 PUBLIC VIEWS AND RESPONSES

Only one email inquiry was received from the general public as a result of the scoping process (see Appendix A-4). The inquiries related to the potential for impacts of Modified Alternative 6 to private property in an adjacent parcel of land and clarification of the Road Relocation Alternative details. No additional concerns or issues were raised as a result of the public scoping process.

9.2 AGENCY RESPONSES

Agency scoping comments received during the scoping period identified general information recommended for inclusion in the draft Integrated Feasibility Report/Environmental Assessment. Agency scoping comments are provided in (see Appendix A-4). Coordination is ongoing with federal and state resource agencies in accordance with consultation requirements

10 PLAN IMPLEMENTATION REQUIREMENTS

The Norfolk District must complete the feasibility study before the recommended project can be constructed. The integrated feasibility report and EA must go out for public review for 30 days, and the North Atlantic Division Commander must approve the report. After approval, the feasibility phase ends, and the project moves to the design and implementation phase. Steps in this phase include:

1. Execution of a Project Partnership Agreement (PPA) – The Virginia Department of Transportation must declare their intent in a letter (See Appendix D) to enter into a PPA for the design and construction of the project. This letter must state they are willing and have the authority to sign a PPA. The PPA defines the obligations of the federal government and the sponsor in the construction, maintenance, and cost sharing of the project;

2. Preparation of the plans and specifications and land acquisition – USACE must complete plans and specifications for project construction, and project lands, easements, right-of-way, access routes, relocations, and disposal areas must be acquired by sponsor, and right-of-entry must be provided to USACE;

3. Permits for Clean Water Act Section 404 and 401 and National Environmental Policy Act (NEPA) compliance must be obtained;

4. Construction contracts must be advertised and awarded; and

5. Project construction begins.

With respect to cost apportionment, the nonfederal sponsor is responsible for a minimum of 35 percent of the total project costs to maximum of 50 percent during the design and implementation phase. In accordance with terms of the PPA, the nonfederal sponsor must pay at least 5 percent of the total project costs in cash and provide all lands, easements, right-of-way, relocations, and disposal areas (LERRDs). The Virginia Department of Transportation will receive receive partial credit for the value of LERRDs. In addition to providing the LERRD required for the project implementation, the non-federal sponsor must pay additional cash contribution so that its total contribution equals 35 percent of the total project costs. The federal project limit for CAP Section 14 is $5,000,000. Any costs above the federal expenditure limit cannot be cost shared and would be 100 percent nonfederal cost. The total project cost of Modified Alternative 6 is $1,039,000, of which $356,000 is the sponsor’s share. The Sponsor’s 5 percent cash contribution would be $50,900 (Table 10-1).

Table 10-1. Summary of Federal and Nonfederal Cost for Recommended Plan.

Feature	Federal Cost	Nonfederal Cost	Total Cost
Totals	**$1,026,000**	**$0**	**$1,026,000**
Cash Contribution (5%)	($52,000)	$0	0
Add'l Contribution (30%)	($307,800)	$0	0
Final Cost Allocation	**$666,900**	**$359,100**	**$1,026,000**
Cost Share Percentage	**65%**	**35%**	**100%**

Costs were determined using FY21 price levels. Operations and Maintenance (O&M) costs are not included in the cost share. The nonfederal sponsor is responsible for 100% of the O&M costs, per ER 1105-2-100 Appendix G Section III F-23.

10.1 FEDERAL RESPONSIBILITIES

The USACE would be responsible for plans and specification as well as constructing the bank stabilization project. The sponsor would be responsible for right of way and easements and disposal lands. Project construction is contingent upon the sponsor and the USACE executing a PPA.

10.2 NON-FEDERAL RESPONSIBILITIES

Prior to implementation, the nonfederal sponsor must:

1. Provide without cost to the United States all lands, easements, right-of-way, access routes, relocations, and disposal areas necessary for project construction;

2. In accordance with the Water Resources Development Act of 1986 (PL 99-662), provide a cash contribution equal to at least 5 percent of the total cost (See Table 10-1);

3. Provide additional cash contribution such that the total non-federal share is equal to 35 percent of the project total cost (See Table 10-1)

4. Hold and save the United States free from damages caused by the construction, operation, and maintenance of the project, excepting damages due to the fault or negligence of the United States or its contractors;

5. Maintain and operate the project after completion without cost to the United States;

6. Assume full responsibility for all project costs in excess of the federal cost limitation of $5,000,000; and

7. Execute a Project Partnership Agreement incorporating all required measures of local operation.

10.3 VIEW OF NONFEDERAL SPONSOR, LETTER OF SUPPORT

Appendix D contains the Virginia Department of Transportation's support letter, Dated May 4, 2021, stating their support for the Recommended Plan.

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13 RECOMMENDATION

An approximate 100-foot section of streambank along Indian Run will continue to erode by the effects of the natural erosion process, stream flow and storm driven water level rise. The resulting 12-foot high receding bluff is an imminent threat to existing public facilities, causing continual loss of soil, and threatening a section of the existing public road along U.S. Route 501. This threatened section of roadway already received emergency placement of riprap, in the fall of 2016, to help temporarily restore the road shoulder and embankment containing the guardrail structure.

The Recommended Plan is the least cost option, Modified Alternative 6, and involves excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of the roadway that will consist of approximately 5 foot thick section of Class II riprap overlain by approximately 3 foot section of a VDOT Number 1 aggregate and is proposed to an approximate slope of 1.8 Horizontal to 1 Vertical (1V:1.8H) and re-routing of the existing stream with excavation and stabilization with native vegetation plantings on the adjacent streambank at a 2H:1V slope. At the estimated total project cost of $1,026,000, the estimated federal cost-share (65%) is $666,900 and the estimated non-federal cost-share (35%) is $359,100.

The Virginia Department of Transportation is willing and financially capable of cost sharing in the project construction. The Corps of Engineers finds that the Recommended Plan will have no significant adverse environmental impacts, and an Environmental Impact Statement according to the National Environmental Policy Act of 1969 (PL 91-190) is not required. Therefore, the Corps of Engineers recommends that the Recommended Plan, as generally described in this report, be approved for implementation under the authority of Section 14 of the Flood Control Act of 1946, as amended.

Date: ______________________ ________________________________

Patrick V. Kinsman
Colonel, EN
Commanding

ENVIRONMETAL APPENDIX

INDIAN RUN EMERGENCY STREAMBANK PROTECTION FEASIBILITY STUDY

BEDFORD COUNTY, VIRGINIA

APPENDIX A

MAY 2021

U.S. Army Corps
of Engineers
Norfolk District

BIOLOGICAL ASSESSMENT
APPENDIX A-1

CONTINUING AUTHORITIES PROGRAM, SECTION 14

EMERGENCY STREAMBANK AND SHORELINE PROTECTION

INDIAN RUN STREAMBANK, BEDFORD COUNTY

SUBMITTED TO U.S. FISH AND WILDLIFE SERVICE

MAY 2021

U.S. Army Corps
of Engineers
Norfolk District

CONTINUING AUTHORITIES PROGRAM, SECTION 14, EMERGENCY STREAMBANK AND SHORELINE PROTECTION INDIAN RUN STREAMBANK, BEDFORD COUNTY, VIRGINIA

BIOLOGICAL ASSESSMENT

1.0 INTRODUCTION

The Emergency Streambank and Shoreline Protection Feasibility Study for a streambank on an unnamed tributary to Indian Run in Bedford County, Virginia is authorized by Section 14 of the Flood Control Act of 1946, as amended (P.L.79-526), Emergency Streambank and Shore Protection. The purpose of the Section 14 program is to construct emergency streambank and shore protection to prevent natural erosion processes from damaging highways, bridge approaches, public works, churches, public and private non-profit hospitals, schools, water and sewer lines, and other public or non-profit facilities that offer public services to all, and known historic properties eligible or listed on the National Register of Historic Places. If an eligible facility is in imminent danger of failure, and after a request for a project has been received from a potential non-federal sponsor stating its desire to participate in a solution, the Corps will conduct a feasibility study to analyze the problem, develop a solution, and determine the feasibility of a solution.

The study area is located in western Virginia approximately 13 miles northeast of Lynchburg. Although closer in proximity to Coleman Falls (approximately ½ mile east), the project site is entirely within the town limits of Big Island. Indian Run is a tributary of the James River, and their confluence is roughly 2000 feet to the north of the project area (Figure 1-1).

An approximate 70-foot section of streambank along Indian Run is severely eroded by the effects of natural processes; river flow, and storm driven water level rise. The resulting 12-foot high receding bluff is an imminent threat to existing public facilities, causing continual loss of soil and threatening a section of the existing public road along U.S. Route 501. This threatened section of roadway already received emergency placement of riprap, in the fall of 2016, to help temporarily restore the road shoulder and embankment containing the guardrail.

The purpose of the proposed project, which is identified as the Recommended Plan in the draft Integrated Feasibility Report and Environmental Assessment (IFR/EA) is to conduct a streambank stabilization project to reduce the public safety hazard resulting from the failure of the 70 linear feet streambank and to eliminate the current threat to existing public facilities (i.e., U.S. Route 501).

2.0 ACTION AREA

The Action Area, or Study Area, encompasses approximately 100-linear feet of streambank as identified in Figure 1-1.

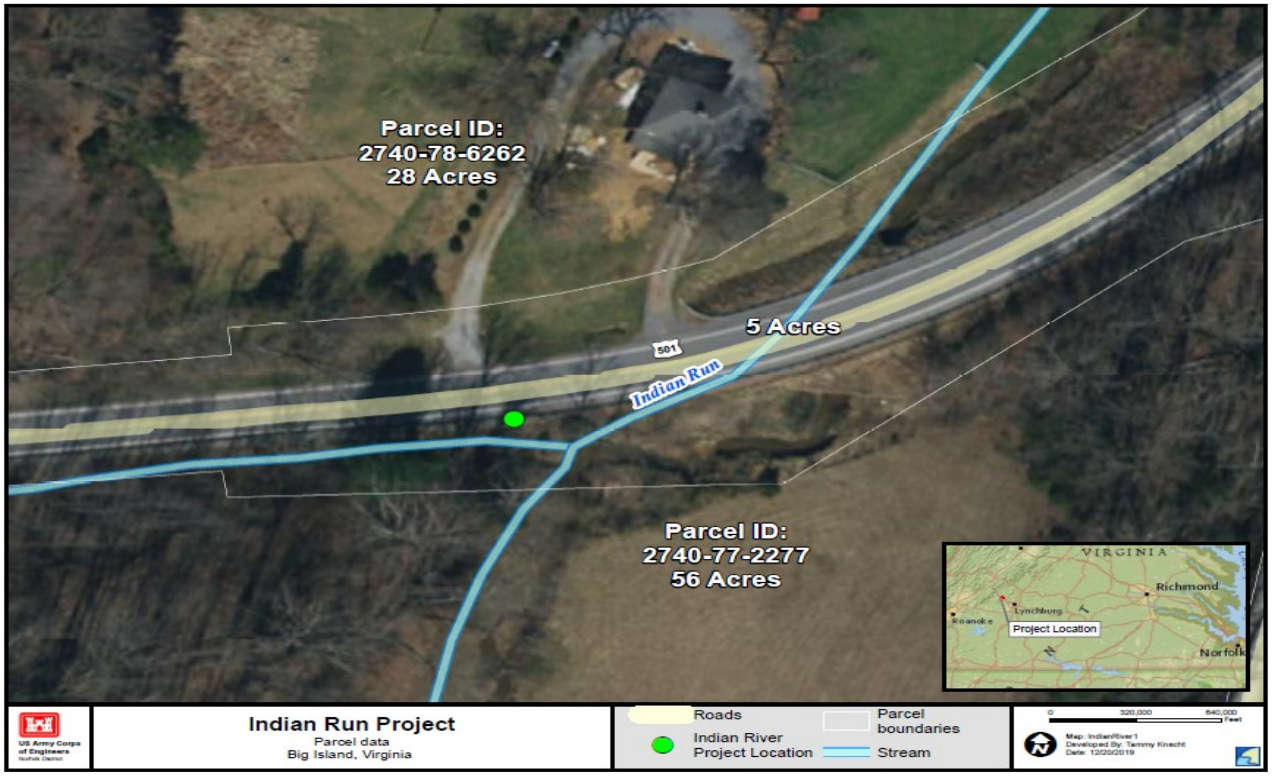

Figure 1-1. Vicinity map for the Indian Run Streambank Stabilization Project.

3.0 PROJECT DESCRIPTION

The Preferred Alternative consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The design will consider extending beyond the failed section and tie into the stable existing bank. The rock fill revetment will generally consist of an approximate 5-foot thick section of Class II riprap overlain by an approximate 3-foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, Class II riprap is recommended to protect against the erosive forces of the creek. The rock fill revetment is currently proposed to an approximate 1.8H:1V slope, and the final slope will be further evaluated during the Preconstruction Engineering and Design (PED) Phase of the project. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap and used to separate the various stone graded materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and support the VDOT No. 1 stone. Based on the proposed revetment, the adjacent 100-ft of stream channel will need to be relocated approximately 7-feet south of its existing location, and consequently, excavation of the right bank. The design proposes a 2H:1V slope for the proposed right channel bank. Initial estimates consider armoring the right bank with a 3-foot section of Class II riprap overlaying a filtration geotextile. However, designs and measures aligned with natural channel design concepts will be considered as project designs mature during the PED Phase. This would include replanting native vegetation, and log and/or tree revetments, as natural bank stabilization measures for the right streambank bank. Additionally, the existing streambed substrates will be relocated with the relocated channel. It is estimated that the alternative will require, for both the river-left and river-right banks approximately: 1,066 tons of VDOT Class III riprap; 186 tons of VDOT No. 1 coarse aggregate; 48 tons of Bituminous Concrete Asphalt; 970 tons of VDOT 21A; 640 SY of geotextile filter fabric; 170 SY of geogrid; 640 CY of soil excavation; 203 tons of rock excavation; and 100-linear feet of guardrail. We also anticipate the construction of the Preferred Alternative will require the removal of 4 large size trees (>6-in diameter) from the Study Area. Lastly, three potential laydown areas ≤0.36 acres in size have been identified for storing and staging construction materials and equipment; only one area will be needed. Two of the areas are within 150 feet of the proposed revetment. The third laydown area substantially increases the size of the Action Area, as it is approximately ¼ mi away from the proposed revetment site.

4.0 THREATENED AND ENDANGERED SPECIES

Animals listed as endangered or threatened are protected under the Endangered Species Act (ESA) of 1973, as amended. According to the ESA, an "endangered species" is defined as any animal 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 species for which there is sufficient information on their biological status to consider them as endangered or threatened under the ESA. Critical habitat is designated per 50 CFR parts 17 or 226 and defines those habitats that are essential for the conservation of a Federally-listed threatened or endangered species and that may require special management and protection.

Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect the listed species and/or designated critical habitat. This section provides a summary of the federally listed species that have the potential to occur in the Action Area. Coordination with the National Marine Fisheries Service (NMFS) is ongoing and a separate Biological Assessment has been submitted to the Greater Atlantic Region Fisheries Office (GARFO) for species listed under NMFS jurisdiction. The following references were consulted: U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Consultation System (IPaC) database search and the Virginia Department of Wildlife Resources (VDWR) Virginia Fish and Wildlife Information Service (VaFWIS) database search within a 3-mile radius of the Action Area.

The IPaC database was consulted initially on June 11, 2020 and updated on February 10, 2021. The official species list included one result for threatened and endangered species: the Northern long-eared bat (*Myotis septentrionalis*), or referred to as NLEB hereafter (Table 4-1) The official species list from USFWS is provided in Attachment B. There are no critical habitats identified within the proposed Action Area.

Table 4-1 Federally listed species with the potential to occur in the Action Area

TAXONOMIC GROUP/SPECIES	COMMON NAME	FEDERAL STATUS	COMMONWEALTH OF VIRGINIA STATUS
Myotis septentrionalis	Northern Long-eared Bat	T	T

E=endangered, T=threatened

The VaFWIS search results which identifies federally and state protected species with the potential to occur within a three mile radius are also provided in Attachment C. According to

National Environmental Policy Act (NEPA) scoping comments received on February 8, 2020 from the Virginia Department of Conservation and Recreation, a natural heritage resource associated with this project area that is also a federal trust resource was yellow lance (*Elliptio lanceolata*). Coordination with VDWR Malacologist, Brian Watson, has suggested yellow lance occurrence is unlikely, the existing habitat is unsuitable for yellow lance, and that a mussel survey is unlikely to be required in the Action Area (see Appendix A-4). Please see Chapter 3 of the IFR/EA for additional analysis on this topic.

There would be no anticipated impacts to bald eagles (*Haliaeetus leucocephalus*) since the closest reported bald eagle nest is located approximately 7 miles east-southeast of the project site according to the Center for Conservation Biology (CCB) Mapping Portal (CCB 2021). Additionally, there would be no anticipated impacts to migratory birds, as none are reported in our official species list from IPaC (Attachment B).

4.1 *Northern Long-eared Bat (NLEB)*

The NLEB is listed as threatened under the ESA. This bat is distinguished by its long ears, particularly as compared to other bats in its genus. The NLEB is found across much of the eastern and north central United States and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. The species' range includes 37 states (USFWS 2020a). NLEBs roost underneath bark, in cavities, or in crevices of live and dead trees in the summer and spend winters hibernating in large caves or mines known as hibernacula. Suitable habitat for this species includes trees with trunk diameters of three inches or more with shag bark and crevices.

Additionally, NLEBs may occasionally roost in structures like building overhangs, old bridges, sheds, and barns. Males and non-reproductive females may also roost in cooler places such as caves and mines over summer. NLEBs breed in late summer/early fall, hibernate, and then migrate to summer habitats to give birth and roost in maternity colonies.

White-nose syndrome (WNS) is a disease named for the white fungus (*Pseudogymnoascus destructans*) that infects the muzzle, ears, and wings of hibernating bats and has caused the northeast population of the NLEB to decline by 99 percent. According to the USFWS published white-nose syndrome map, the project site in Bedford County is within 150 miles of counties/districts with infected bats and/or hibernacula (USFWS 2020b); data as of 07/10/20). A survey for NLEBs has not been conducted within the Action Area; however, due to the location of the project site, their presence is unlikely.

5.0 EFFECTS ANALYSIS: MAY AFFECT, LIKELY TO ADVERSELY AFFECT

5.1 *Effects to the NLEB population*

Existing trees on the upland in the Action Area are primarily white oak (*Quercus alba*), red maple (*Acer rubrum*), black oak (*Quercus velutina*), cherry bark oak (*Quercas pogoda*), tulip poplar (*Liriodendron tulipifera*), and Eastern hemlock (*Tsuga canadensis*). Four large size trees (>6 inches in diameter) would need to be removed from the project site during construction. Tree removal would occur, where practical, outside of the April 15 to September 15 window which includes the pupping season (June 1 to July 30) to avoid potential adverse impacts to the NLEB. The Action Area is >25 miles from known maternity roosts and >35 miles from known hibernacula. If tree removal actions occurred between April 15 and September 15, they would have the potential to temporarily adversely affect the NLEB, if present. Although, it is highly unlikely that implementing the Preferred Alternative would require doing so, there is some uncertainty in the construction schedule due to extraneous factors (e.g., availability of contractors). Construction, including tree removal, is currently projected to take place in late 2021 – early 2022 over approximately 90 days. Tree removal associated with construction activities does not include forest conversion. The tree removals will focus only on hazardous trees that impede the implementation of the stabilization project; if not removed the north bank can not be stabilized and thus these trees contribute to threat to human life and property posed by the existing and future streambank conditions.

Based on the project description, we propose an effects finding for the Preferred Alternative on NLEB of “may affect, likely to adversely affect”. Our coordination with USFWS and the results of NLEB determination key from the Programmatic Biological Opinion (PBO) for the Final 4(d) rule have guided this finding (see Attachment 4 for email record of coordination, official verification letter, and determination key results). The USACE would rely upon the finding of the PBO for the Final 4(d) rule to fulfill their project-specific Section 7 responsibilities assuming the Proposed Action “may affect, likely to adversely affect” the NLEB. In accordance with the Final 4(d) Rule for the NLEB, the proposed project would fall under the incidental take exception because the proposed activities would not involve tree removal within 0.25 miles of any known occupied maternity roost trees (during the pup season (i.e., June 1 to July 31) or within 0.25 miles of any known hibernacula (VDWR 2020). If new and relevant information on the NLEB, or other federal or state listed species, becomes available, then any potential impacts would be re-evaluated in accordance with the ESA as project designs advance in the PED Phase. In summary, the Proposed Action is likely to adversely affect the NLEB if present during construction.

5.2 Effects to Critical Habitat

There are no identified critical habitats within the Action Area; therefore, there is no effect to critical habitat resulting from the proposed construction of a stone revetment and re-routing the channel of the unnamed tributary to Indian Run within the Action Area.

6.0 CUMULATIVE EFFECTS ANALYSIS

The cumulative impact assessment is the evaluation of the effects that other past, present, or reasonably foreseeable future actions, alternatives, or plans might have on the environment when considered along with the proposed project's impacts. Cumulative impacts can either be additive or interactive. Additive impacts are those that can collectively have a profound effect on the given resource due to the collective magnitude of the effect. Interactive impacts are impacts that accrue as a result of assorted similar or dissimilar actions, alternatives, or plans that tend to have similar effects, relevant to the resource in questions.

The construction of the stone revetment and re-routing the stream would stabilize the currently unstable streambank resulting in improved site conditions that would eliminate the current threat to existing the public utilities and roadway (U.S. Route 501). This would not be expected to substantially cumulatively impact the NLEB as their presence in the Action Area is not likely.

Moreover, construction of the proposed stone revetment and re-routing the stream would not be anticipated to substantially cumulatively or synergistically interact with climate change and/or other cumulative effects on the NLEB.

7.0 CONCLUSION AND DETERMINATION OF EFFECTS

In summary, the information contained in this Biological Assessment is based on best available science and a review of current literature and studies. The proposed construction of the stone revetment and re-routing the stream may adversely affect the NLEB if it is present in the Action Area, particularly due to tree removal activities. It is worth noting that (1) the NLEB is not anticipated to be present due to the location of the project site, and (2) the USACE will plan tree removal activities required for the Proposed Action outside of the time-of-year criteria for NLEB to the maximum extent practicable. However, uncertainty in the construction schedule related to extraneous factors (e.g., project review processes, contractor availability) was accounted for in our ultimate determination. Therefore, the effects determination for the Proposed Action on NLEB should be “may affect, likely to adversely affect”.

Table 8.1 Species Conclusion Table

Species Name	ESA Section 7 Determination	Notes/Documentation
Northern Long-eared Bat	May Affect, Likely to Adversely Affect	There are no known maternal roosting colonies or hibernacula in the Action Area. Tree removal, if determined practical, would occur outside of April 15 – September 15 which includes the pupping season of June 1 - July 30 for NLEBs. If tree removal occurred within the April 15 – September 15 window, the project would be excepted from the incidental take prohibitions as addressed in the USFWS Programmatic Biological Opinion on the Final 4(d) rule for the NLEB and Activities Excepted form Take Prohibitions. However, it is most likely that any tree removal activities will be planned outside of this window.
Candidate Species	No Effect	Atlantic pigtoe (*Fusconaia masoni*) is a candidate species that occurs in the James River that showed up in the VDWR VaFWIS report findings. However, based on coordination with VDWR experts, *F. masoni* is unlikely to occur in the project area and the VaFWIS report finding is discountable.
Critical Habitat	No Effect	No critical habitat documented in project area.
Bald Eagle	No Effect	There would be no anticipated impacts to bald eagles (*Haliaeetus leucocephalus*) since the closest reported bald eagle nest is located approximately 7 miles east-southeast of the project site according to the Center for Conservation Biology (CCB) Mapping Portal (CCB 2021).
Migratory birds	No Effect	No migratory birds reported in the official species list provided by IPaC (Attachment B).

9.0 LITERATURE CITED

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U.S. Fish and Wildlife Service (USFWS). 2020a Environmental Conservation Online System (ECOS). Northern Long-eared Bat (*Myotis septentrionalis*) Species Profile. Retrieved from: https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A0JE. Accessed on 07 July 2020.

USFWS. 2020b. Northern Long-Eared Bat Final 4(d) Rule White-Nose Syndrome Zone Around WNS/Pd Positive Counties/Districts. Retrieved from: https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf Accessed on 11 August 2020.

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ATTACHMENT 1: PROJECT DESIGNS

The Recommended Plan (RP) is Modified Alternative 6 (Figure 1), which is the stabilization of the 12-foot bluff of eroding streambank to provide risk management from further erosion that would damage and ultimately compromise U.S. Route 501 and utilities that are currently at risk. The plan accounts for the existing longitudinal rock sill running the length of the project area at a height of 648-feet (NAVD88).

Specifications of the plan include:

1. Proposed Slope of 1.8 Horizontal to 1 Vertical along a 100-foot section;
2. 5-foot thick section of Class II riprap;
3. Overlain by a 3-foot section of VDOT No. 1 aggregate;
4. Geotextile filtration fabric running the length of project;
5. Geogrid placed over filtration fabric;
6. 6-inch marine mattress with filter geotextile; and
7. Shifting of the stream with excavation and stabilization on the adjacent streambank at a 2 horizontal to 1 Vertical slope.

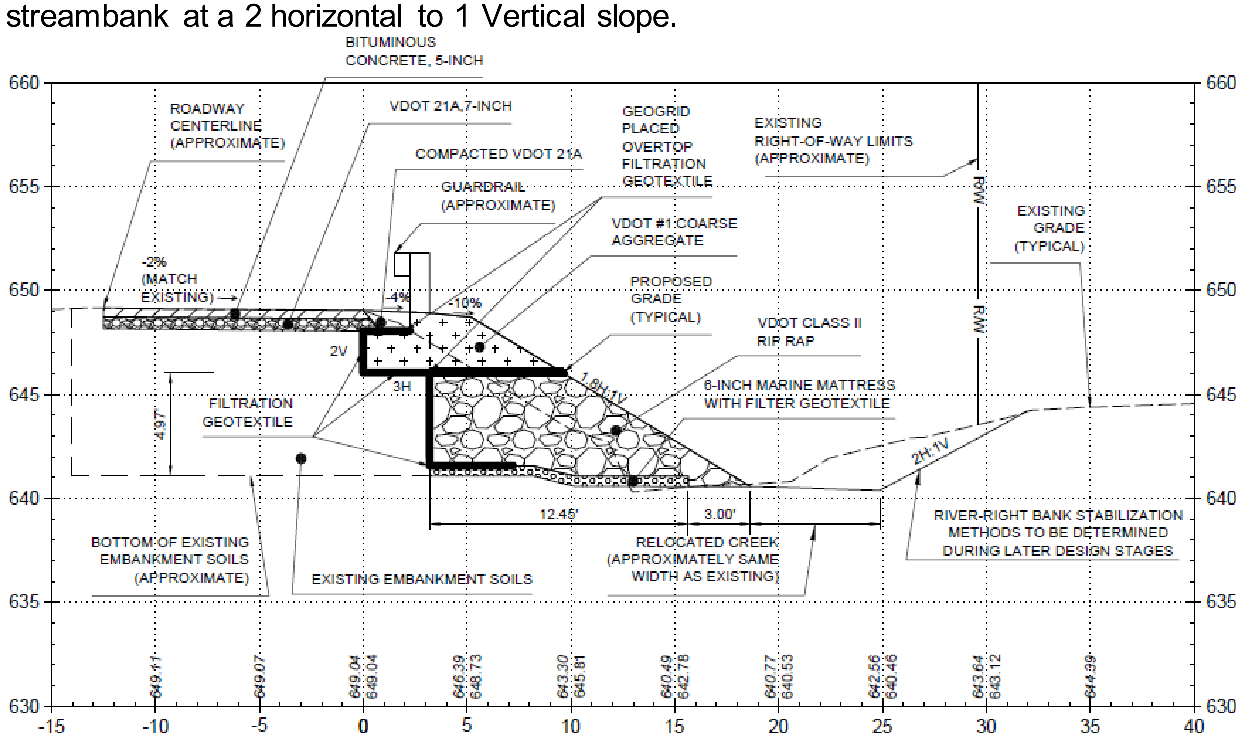


Figure 1. The Recommended Plan, Modified Alternative 6.

The Norfolk District has completed similar projects within the District using toe protection that have been successful at reducing erosion while providing a more natural, vegetated bank. Modified Alternative 6, the least cost alternative, underwent design and cost estimates to arrive at a feasibility level cost that was District Quality Control reviewed.

ATTACHMENT 2: SPECIES LIST FROM USFWS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
Phone: (804) 693-6694 Fax: (804) 693-9032
http://www.fws.gov/northeast/virginiafield/

In Reply Refer To: February 10, 2021
Consultation Code: 05E2VA00-2020-SLI-6008
Event Code: 05E2VA00-2021-E-06042
Project Name: Indian Run Streambank Stabilization

Subject: Updated list of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
(804) 693-6694

Project Summary

Consultation Code: 05E2VA00-2020-SLI-6008
Event Code: 05E2VA00-2021-E-06042
Project Name: Indian Run Streambank Stabilization
Project Type: TRANSPORTATION
Project Description: The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study authorized through Section 14 of the Flood Control Act of 1946 to evaluate plans to resolve erosion issues along the streambank of an unnamed 1st-order (Strahler) tributary to Indian Run along U.S. Route 501 in Bedford County, VA. The site is approximately 0.6 fluvial kilometers upstream from the Indian Run confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway.

The Preferred Alternative consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The design will consider extending beyond the failed section and tie into the stable existing bank. The rock fill revetment will generally consist of an approximate 5-foot thick section of Class II riprap overlain by an approximate 3-foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, Class II riprap is recommended to protect against the erosive forces of the creek. The rock fill revetment is currently proposed to an approximate 1.8H:1V slope, and the final slope will be further evaluated during the Preconstruction Engineering and Design (PED) Phase of the project. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap and used to separate the various stone graded materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and support the VDOT No. 1 stone. Based on the proposed revetment, the adjacent 100-ft of stream channel will need to be relocated approximately 7-feet south of its existing location, and consequently, excavation of the right bank. The design proposes a 2H:1V slope for the proposed right channel bank. Initial estimates consider armoring the right bank with a 3-foot section of Class II riprap overlaying a filtration geotextile. However, designs and measures aligned with natural channel design concepts will be considered as project designs mature during the PED Phase. This would include replanting native vegetation, and log and/or tree revetments, as natural bank stabilization measures for the right streambank bank. Additionally, the existing streambed substrates will be relocated with the relocated channel. It is estimated that the alternative will require, for both the river-left and river-right banks approximately: 1,066 tons of VDOT Class III riprap; 186 tons of VDOT No. 1 coarse aggregate; 48 tons of Bituminous Concrete Asphalt; 970 tons of VDOT 21A; 640 SY of geotextile filter fabric; 170 SY of geogrid; 640 CY of soil excavation; 203 tons of rock excavation; and 100-linear feet of guardrail. We also anticipate the construction of the Preferred Alternative will require the removal of 4 large size trees (>6-in diameter) from the Study Area. Lastly, three potential laydown areas ≤0.36 acres in size have been identified for storing and staging construction materials and equipment; only one area will be needed. Two of the areas are within 150 feet of the proposed revetment. The third laydown area increases the size of the Action Area relative to our original polygon, as it is approximately ¼ mi away from the proposed revetment site. I tested an Action Area with the unofficial IPaC tool that included the expanded area that contains the third laydown area east-northeast of the original polygon; there were no new results included in the unofficial IPaC report.

Construction would be expected to commence in FY22 (late 2021 - early 2022), and is anticipated to take several months.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.50286381646626,-79.3105992991812,14z

Counties: Bedford County, Virginia

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

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

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

ATTACHMENT 3: ALTERNATIVE SPECIES DATABASE RESULTS

VaFWIS Search Report Compiled on 2/3/2021, 1:26:13 PM

Help

Known or likely to occur within a **3 mile radius around point 37.5028810 -79.3102775** in **009 Amherst County, 019 Bedford County, VA**

View Map of Site Location

628 Known or Likely Species ordered by Status Concern for Conservation (displaying first 34) (34 species with Status* or Tier I** or Tier II**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name
060017	FESE	Ia	Spinymussel, James	Parvaspina collina
010214	FESE	IIa	Logperch, Roanoke	Percina rex
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis
060029	FTST	IIa	Lance, yellow	Elliptio lanceolata
050020	SE	Ia	Bat, little brown	Myotis lucifugus
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus
040096	ST	Ia	Falcon, peregrine	Falco peregrinus
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus
040379	ST	Ia	Sparrow, Henslow's	Centronyx henslowii
060173	FPST	Ia	Pigtoe, Atlantic	Fusconaia masoni
060081	ST	IIa	Floater, green	Lasmigona subviridis
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans
030031	CC	IIIc	Kingsnake, scarlet	Lampropeltis elapsoides
030012	CC	IVa	Rattlesnake, timber	Crotalus horridus
010174		Ia	Bass, Roanoke	Ambloplites cavifrons
010077		Ia	Shiner, bridle	Notropis bifrenatus
040092		Ia	Eagle, golden	Aquila chrysaetos
040040		Ia	Ibis, glossy	Plegadis falcinellus
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera
050024		Ia	Myotis, eastern small-footed	Myotis leibii
080214		Ia	Stonefly, Beartown perlodid	Isoperla major
100248		Ia	Fritillary, regal	Speyeria idalia idalia
020039		Ic	Salamander, Peaks of Otter	Plethodon hubrichti
040213		Ic	Owl, northern saw-whet	Aegolius acadicus
020023		IIa	Salamander, mole	Ambystoma talpoideum
040052		IIa	Duck, American black	Anas rubripes
040036		IIa	Night-heron, yellow-crowned	Nyctanassa violacea violacea
040320		IIa	Warbler, cerulean	Setophaga cerulea
040140		IIa	Woodcock, American	Scolopax minor
040203		IIb	Cuckoo, black-billed	Coccyzus erythropthalmus

040105		IIb	Rail, king	Rallus elegans
080336		IIc	Beetle, Gammon's stenelmis riffle	Stenelmis gammoni
100154		IIc	Butterfly, Persius duskywing	Erynnis persius persius
100256		IIc	Crescent, tawny	Phyciodes batesii batesii

To view **All 628 species** View 628

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need
Virginia Widlife Action Plan Conservation Opportunity Ranking:
a - On the ground management strategies/actions exist and can be feasibly implemented.;
b - On the ground actions or research needs have been identified but cannot feasibly be implemented at this time.;
c - No on the ground actions or research needs have been identified or all identified conservation opportunities have been exhausted.

Anadromous Fish Use Streams

N/A

Impediments to Fish Passage (2 records)

View Map of All Fish Impediments

ID	Name	River	View Map
960	COLEMANS FALL DAM	JAMES RIVER	Yes
981	HOLCOMB ROCK DAM	JAMES RIVER	Yes

Threatened and Endangered Waters (35 Reaches - displaying first 20)

View Map of All Threatened and Endangered Waters

Stream Name	T&E Waters Species						View Map
	Highest TE*	BOVA Code, Status*, Tier**, Common & Scientific Name					
James River (0111462)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
Pedlar River (0106499)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
Pedlar River (0108531)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
Pedlar River (0143024)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes

		060081	ST	IIa	Floater, green	Lasmigona subviridis	
Pedlar River (0148160)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
Pedlar River (0158100)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
Pedlar River (097294)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
Pedlar River (098172)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
(095630)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (0100462)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (0101602)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (0103374)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (0105748)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (0105884)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (0106166)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (0108652)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (087331)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (088077)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (088339)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes

James River (088357)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (088949)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (090044)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (090143)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes

To view **All 35 Threatened and Endangered Waters records** View 35

Managed Trout Streams

N/A

Bald Eagle Concentration Areas and Roosts

N/A

Bald Eagle Nests

N/A

Habitat Predicted for Aquatic WAP Tier I & II Species (6 Reaches)

View Map Combined Reaches from Below of Habitat Predicted for WAP Tier I & II Aquatic Species

Stream Name	Tier Species						View Map
	Highest TE*	BOVA Code, Status*, Tier**, Common & Scientific Name					
James River (20802031)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
James River (20802032)	FPST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
		060173	FPST	Ia	Pigtoe, Atlantic	Fusconaia masoni	
James River (20802032)	ST	060081	ST	IIa	Floater, green	Lasmigona subviridis	Yes
Pedlar River (20802031)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	

Pedlar River (20802032)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes
		060081	ST	IIa	Floater, green	Lasmigona subviridis	
tributary (20802031)	FESE	060017	FESE	Ia	Spinymussel, James	Parvaspina collina	Yes

Habitat Predicted for Terrestrial WAP Tier I & II Species

N/A

Virginia Breeding Bird Atlas Blocks (5 records)

View Map of All Query Results
Virginia Breeding Bird Atlas Blocks

BBA ID	Atlas Quadrangle Block Name	Breeding Bird Atlas Species			View Map
		Different Species	Highest TE*	Highest Tier**	
36093	Big Island, CW	5			Yes
36096	Big Island, SE	55		III	Yes
36095	Big Island, SW	22		II	Yes
36082	Boonsboro, NE	3		III	Yes
36081	Boonsboro, NW	1		III	Yes

Public Holdings: (1 names)

Name	Agency	Level
George Washington National Forest	U.S. Forest Service	Federal

Summary of BOVA Species Associated with Cities and Counties of the Commonwealth of Virginia:

FIPS Code	City and County Name	Different Species	Highest TE	Highest Tier
009	Amherst	394	FESE	I
019	Bedford	466	FESE	I

USGS 7.5' Quadrangles:

Boonsboro
Big Island

USGS NRCS Watersheds in Virginia:

N/A

USGS National 6th Order Watersheds Summary of Wildlife Action Plan Tier I, II, III, and IV Species:

HU6 Code	USGS 6th Order Hydrologic Unit	Different Species	Highest TE	Highest Tier

JM01	James River-Otter Creek	78	FESE	I
JM02	Reed Creek	64	FTST	I
JM03	James River-Thomas Mill Creek	65	FESE	I
JM06	Pedlar River-Horsley Creek	55	FESE	I
JM07	James River-Judith Creek	65	FESE	I
JM09	Ivy Creek-Cheese Creek	57	ST	I
RU51	Elk Creek-Chestnut Branch	61	FESE	I

Compiled on 2/3/2021, 1:26:13 PM V1076403.0 report=V searchType= R dist= 4827 poi= 37.5028810 -79.3102775

Site Location

37,30,10.3 -79,18,37.0
is **the Search Point**

Show Position Rings
(•) Yes ( ) No
1/2 mile and 1/8 mile at the **Search Point**

Show Search Area
(•) Yes ( ) No
3 Search distance miles radius

Search Point is at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, BECAR, BAEANests, TEWaters, TierII, Habitat, Trout, Anadromous

Map Overlay Legend

T & E Waters
- Federal
- State

Predicted Habitat WAP Tier I & II
- Aquatic
- Terrestrial

Trout Waters
- Class I - IV
- Class V - VI

Anadromous Fish Reach
- Confirmed
- Potential

23 Impediment

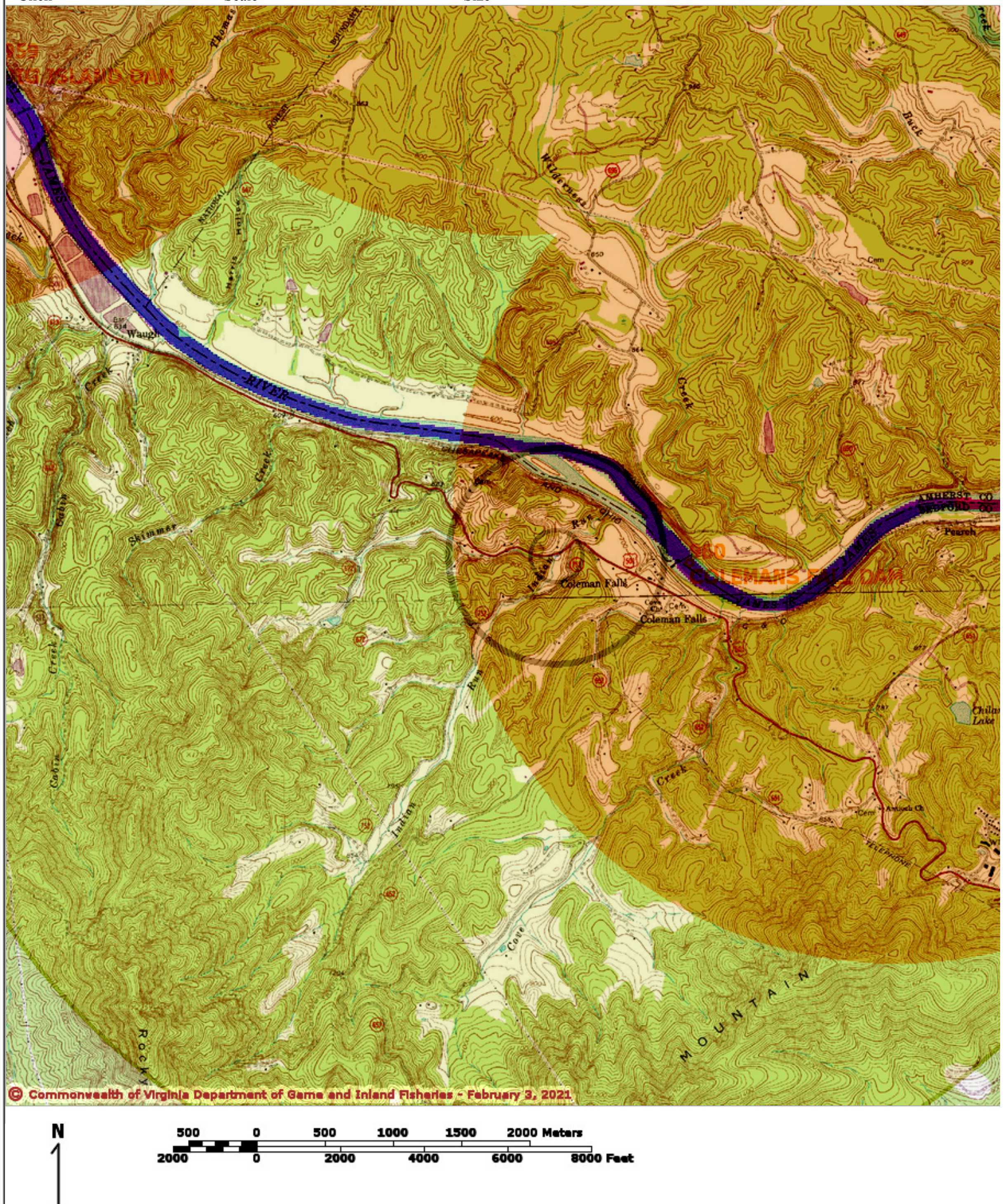
Position Rings 1/2 mile and 1/8 mile at the Search Point

3 mile radius Search Area

Bald Eagle Concentration Areas and Roosts

back | Refresh Browser Page | Help

Map Click: Pan Id M | Map Scale: In Zoom Out | Screen Size: Small Size Big



Point of Search 37,30,10.3 -79,18,37.0
Map Location 37,30,10.3 -79,18,37.0

Select **Coordinate System:**
- (•) Degrees,Minutes,Seconds Latitude - Longitude
- ( ) Decimal Degrees Latitude - Longitude
- ( ) Meters UTM NAD83 East North Zone
- ( ) Meters UTM NAD27 East North Zone

Base Map source: Topographic maps from TOPO! copyright 2006 (see National Geographic Maps for details)

Map projection is UTM Zone 17 NAD 1983 with left 645355 and top 4156002. Pixel size is 8 meters . Coordinates displayed are Degrees, Minutes, Seconds North and West. Map is currently displayed as 1000 columns by 1000 rows for a total of 1000000 pixles. The map display represents 8000 meters east to west by 8000 meters north to south for a total of 64.0 square kilometers. The map display represents 26251 feet east to west by 26251 feet north to south for a total of 24.7 square miles.

Topographic maps and Black and white aerial photography for year 1990+-
are from the United States Department of the Interior, United States Geological Survey.
Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia Geographic Information Network.
Shaded topographic maps are from TOPO! ©2006 National Geographic
http://www.national.geographic.com/topo
All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries.

map assembled 2021-02-03 13:19:52 (qa/qc March 21, 2016 12:20 - tn=1076403.0 dist=4827 Visitor)
$poi=37.5028810 -79.3102775

Natural Heritage Resources

Your Criteria

Taxonomic Group: Select All

Global Conservation Status Rank: Select All

State Conservation Status Rank: Select All

Federal Legal Status: Select All

State Legal Status: Select All

County: Bedford

Watershed (8 digit HUC): 02080203 - Middle James-Buffalo

Subwatershed (12 digit HUC): JM03 - James River-Thomas Mill Creek

Search Run: 9/22/2020 14:14:33 PM

Result Summary

Total Species returned: 1

Total Communities returned: 0

Click scientific names below to go to NatureServe report.

Click column headings for an explanation of species and community ranks.

Common Name/Natural Community	Scientific Name	Scientific Name Linked	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
Bedford								
Middle James-Buffalo								
James River-Thomas Mill Creek								
BIVALVIA (MUSSELS)								
Yellow Lance	Elliptio lanceolata	Elliptio lanceolata	G2	S2	LT	LT	47	N

Note: On-line queries provide basic information from DCR's databases at the time of the request. They are NOT to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.

For Additional Information on locations of Natural Heritage Resources please submit an information request.

To Contribute information on locations of natural heritage resources, please fill out and submit a rare species sighting form.

ATTACHMENT 4: NLEB DETERMINATION KEY

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
Phone: (804) 693-6694 Fax: (804) 693-9032
http://www.fws.gov/northeast/virginiafield/

In Reply Refer To: March 11, 2021
Consultation code: 05E2VA00-2020-TA-6008
Event Code: 05E2VA00-2021-E-07413
Project Name: Indian Run Streambank Stabilization

Subject: Verification letter for the 'Indian Run Streambank Stabilization' project under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions.

Dear Zach Martin:

The U.S. Fish and Wildlife Service (Service) received on March 11, 2021 your effects determination for the 'Indian Run Streambank Stabilization' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the Service's January 5, 2016, Programmatic Biological Opinion (PBO). The PBO addresses activities excepted from "take"[1] prohibitions applicable to the northern long-eared bat under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, the Action is consistent with activities analyzed in the PBO. The Action may affect the northern long-eared bat; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the PBO satisfies and concludes your responsibilities for this Action under ESA Section 7(a)(2) with respect to the northern long-eared bat.

Please report to our office any changes to the information about the Action that you submitted in IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation. If the Action is not completed within one year of the date of this letter, you must update and resubmit the information required in the IPaC key.

If the Action may affect other federally listed species besides the northern long-eared bat, a proposed species, and/or designated critical habitat, additional consultation between you and this Service office is required. If the Action may disturb bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act is recommended.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Indian Run Streambank Stabilization

2. Description

The following description was provided for the project 'Indian Run Streambank Stabilization':

> The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study authorized through Section 14 of the Flood Control Act of 1946 to evaluate plans to resolve erosion issues along the streambank of an unnamed 1st-order (Strahler) tributary to Indian Run along U.S. Route 501 in Bedford County, VA. The site is approximately 0.6 fluvial kilometers upstream from the Indian Run confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway.
>
> The Preferred Alternative consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The design will consider extending beyond the failed section and tie into the stable existing bank. The rock fill revetment will generally consist of an approximate 5-foot thick section of Class II riprap overlain by an approximate 3-foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, Class II riprap is recommended to protect against the erosive forces of the creek. The rock fill revetment is currently proposed to an approximate 1.8H:1V slope, and the final slope will be further evaluated during the Preconstruction Engineering and Design (PED) Phase of the project. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap and used to separate the various stone graded materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and support the VDOT No. 1 stone. Based on the proposed revetment, the adjacent 100-ft of stream channel will need to be relocated approximately 7-feet south of its existing location, and consequently, excavation of the right bank. The design proposes a 2H:1V slope for the proposed right channel bank. Initial estimates consider armoring the right bank with a 3-foot section of Class II riprap overlaying a filtration geotextile. However, designs and measures aligned with natural channel design concepts will be considered as project designs mature during the PED Phase. This would include replanting native vegetation, and log and/or tree revetments, as natural bank stabilization measures for the right streambank bank. Additionally, the existing streambed substrates will be relocated with the relocated channel. It is estimated that the alternative will require, for both the river-left and river-right banks approximately:

1,066 tons of VDOT Class III riprap; 186 tons of VDOT No. 1 coarse aggregate; 48 tons of Bituminous Concrete Asphalt; 970 tons of VDOT 21A; 640 SY of geotextile filter fabric; 170 SY of geogrid; 640 CY of soil excavation; 203 tons of rock excavation; and 100-linear feet of guardrail. We also anticipate the construction of the Preferred Alternative will require the removal of 4 large size trees (>6-in diameter) from the Study Area. Lastly, three potential laydown areas ≤0.36 acres in size have been identified for storing and staging construction materials and equipment; only one area will be needed. Two of the areas are within 150 feet of the proposed revetment. The third laydown area increases the size of the Action Area relative to our original polygon, as it is approximately ¼ mi away from the proposed revetment site. I tested an Action Area with the unofficial IPaC tool that included the expanded area that contains the third laydown area east-northeast of the original polygon; there were no new results included in the unofficial IPaC report.

Construction would be expected to commence in FY22 (late 2021 - early 2022), and is anticipated to take several months.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.50286381646626,-79.3105992991812,14z

Determination Key Result

This Federal Action may affect the northern long-eared bat in a manner consistent with the description of activities addressed by the Service's PBO dated January 5, 2016. Any taking that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o). Therefore, the PBO satisfies your responsibilities for this Action under ESA Section 7(a)(2) relative to the northern long-eared bat.

Determination Key Description: Northern Long-eared Bat 4(d) Rule

This key was last updated in IPaC on May 15, 2017. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for Federal actions is to assist determinations as to whether proposed actions are consistent with those analyzed in the Service’s PBO dated January 5, 2016.

Federal actions that may cause prohibited take of northern long-eared bats, affect ESA-listed species other than the northern long-eared bat, or affect any designated critical habitat, require ESA Section 7(a)(2) consultation in addition to the use of this key. Federal actions that may affect species proposed for listing or critical habitat proposed for designation may require a conference under ESA Section 7(a)(4).

Determination Key Result

This project may affect the threatened Northern long-eared bat; therefore, consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) is required. However, based on the information you provided, this project may rely on the Service's January 5, 2016, *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions* to fulfill its Section 7(a)(2) consultation obligation.

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   Yes

2. Have you determined that the proposed action will have "no effect" on the northern long-eared bat? (If you are unsure select "No")

   No

3. Will your activity purposefully **Take** northern long-eared bats?

   No

4. [Semantic] Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

5. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases and other sources of information on the locations of northern long-eared bat roost trees and hibernacula is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

6. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

7. Will the action involve Tree Removal?

   Yes

8. Will the action only remove hazardous trees for the protection of human life or property?
   Yes

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

0.008

2. If known, estimated acres of forest conversion from April 1 to October 31

0.008

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

Clean Water Act 404(b)(1) Guidelines Draft Evaluation

APPENDIX A-2

INDIAN RUN EMERGENCY STREAMBANK PROTECTION FEASIBILITY STUDY

BEDFORD COUNTY, VIRGINIA

MAY 2021

U.S. Army Corps
of Engineers
Norfolk District

Draft Evaluation of 404(b)(1) Guidelines

Indian Run Streambank Stabilization Draft Integrated Feasibility Study and Environmental Assessment

Bedford County, Virginia

February XX, 2021

1. Technical Evaluation Factors

   a. Physical and Chemical Characteristics of the Aquatic Ecosystem (40 CFR §§ 230.20-230.25)(Subpart C)

	N/A	Not Significant	Significant
(1) Substrate impacts	☐	☒	☐
(2) Suspended particulates/turbidity impacts	☐	☒	☐
(3) Water Quality Control	☐	☒	☐
(4) Alteration of current patterns and water circulation	☐	☒	☐
(5) Alteration of normal water fluctuations/hydro-period	☐	☒	☐
(6) Alteration of salinity gradients	☒	☐	☐

Modified Alternative 6 (the Recommended Plan) is the least cost option that would stabilize the streambank with the placement of stone revetment while avoiding and minimizing environmental to the extent practicable. This plan includes a longitudinal rock revetment, six-inch mattress, and geotextile fabric running the length of the project area (100 feet), earthen slope berm regraded on a 1.8 Vertical to 1 Horizontal (1.8V:1H). Regrading the left (north) bank will require relocating the stream channel seven feet south. Final designs of the structural features would be conducted in the Preconstruction, Engineering, and Design (PED) Phase of the project.

The anticipated construction material staging area(s) is a parcel of private land approximately ¼ mile east-northeast of the construction site (*see Appendix B, Engineering Appendix of the Integrated Feasibility Report and Environmental Assessment*). The gated area is an unpaved area containing compacted soils and sparse grass cover. The existing U.S. Route 501 roadway would be used to bring materials to the staging area and to the project areas. There are two alternative laydown sites that have been identified if additional areas are needed for temporary stockpile of construction materials / for excavated material from the banks; and suitable excavated material could be used as fill along the existing maintenance road. Any remaining material would be taken to a suitable disposal site. The total area to be disturbed temporarily for staging and stockpiling would be approximately 0.36 acres.

Potential permanent and temporary impacts would occur to the physical substrate, turbidity, water quality, water velocity, current patterns and water circulation, and normal water fluctuations from the installation and construction of measures proposed in Modified Alternative 6. It is anticipated that the impacts would not be significant and would be avoided or minimized to the maximum extent practicable. As this initial analysis is being conducted as part of a Environmental Assessment (EA), Clean Water Act (CWA) 404(b)(1) compliance would be reevaluted during future phases of the project to ensure compliance and generate additional CWA(b)(1) reports as needed.

b. Biological Characteristics of the Aquatic Ecosystem (40 CFR §§ 230.30-230.32) (Subpart D)

	N/A	Not Significant	Significant
(1) Effect on threatened/endangered species and their habitat	☐	☒	☐
(2) Effect on the aquatic food web	☐	☒	☐
(3) Effect on other wildlife (mammals, birds, reptiles, and amphibians)	☐	☒	☐

Pursuant to Section 7 of the Endangered Species Act (ESA) coordination is underway with the U.S. Fish and Wildlife Service (USFWS) for the potential impacts that could occur directly and/or indirectly from the implementation of the Indian Run Streambank Stabilization project; formal consultations is not anticipated for the project, and more detail is provided on this topic in the Biological Assessment (Appendix A-1). Essential Fish Habitat (EFH) consultation with the National Marine Fisheries Service (NMFS) pursuant to the Magnuson-Stevens Fishery Conservation Management Act is not required for this study as the project is outside of the jurisdictional EFH limits.

The project is also undergoing coordination with the USFWS and the Commonwealth of Virginia in accordance with the Fish and Wildlife Coordination Act. A Memorandum of Agreement has been signed by the USACE and the USFWS stating that Fish and Wildlife Coordination Act review will be integrated with the National Environmental Policy Act (NEPA) review process.

Formal consultation pursuant to the ESA with the NMFS is not anticipated because there would be no effects to listed species or critical habitat due to the construction of the proposed regraded the left (north) bank, stone revetment, and relocated stream channel. The analysis and findings for listed species and critical habitat are described in detail in the Special Status Species Section of the Integrated Feasibility Report and EA, and in Appendix A-1.

Potential impacts of the project to the federally-threatened northern long-eared bat (NLEB) were assigned a “may affect, likely to adversely affect” determination; this species is under the jurisdiction of the USFWS. These adverse effects to the NLEB are anticipated to be temporary, and negligible to minor. Potential impacts resulting from the project will have no effect on yellow lance, James spineymussel, and Roanoke logperch. Coordination is ongoing with USFWS. The analysis and findings for listed species and critical habitat are described in detail in the Special Status Species Section of the Integrated Feasibility Report and EA, and in Appendix A-1.

Federal action agencies are required to consult with the NMFS if a proposed action may affect Essential Fish Habitat (EFH). As mentioned above, the Study Area is located west of the defined geographic limits of Essential Fish Habitat as defined by the NMFS; therefore, it does not apply to this project. Coordination with the NMFS per the Magnuson-Stevens Fishery and Conservation Management Act has concluded as consultation is not required.

c. Special Aquatic Site (40 CFR §§ 230.40-230.45) (Subpart E)

	N/A	Not Significant	Significant
(1) Sanctuaries and refuges	☒	☐	☐
(2) Wetlands	☐	☒	☐
(3) Mud flats	☒	☐	☐
(4) Vegetated shallows	☒	☐	☐
(5) Coral reefs	☒	☐	☐
(6) Riffle and pool complexes	☐	☒	☐

The proposed action would adversely impact 0.008 acres of wetland and 0.009 acres of riffle in the Study Area. The wetland is located on the right (south) bank along the 100 linear feet of the unnamed tributary to Indian Run (James River basin) streambank. Additional analysis for the existing conditions and the potential impacts to Special Aquatic Sites can be found in the Integrated Feasibility Report and EA. The wetland was identified in a Preliminary Jurisdictional Determination performed by Norfolk District that can be found in Appendix A-3. A formal Wetland Determination and Wetland Delineation would occur in PED Phase.

d. Human Use Characteristics (40 CFR §§ 230.50-230.54) (Subpart F)

	N/A	Not Significant	Significant
(1) Effects on municipal and private water supplies	☒	☐	☐
(2) Recreational and Commercial fisheries impacts	☐	☒	☐
(3) Effects on water-related recreation	☐	☒	☐
(4) Aesthetic impacts	☐	☒	☐

(5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves	☒	☐	☐

Potential impacts to the following resources were examined: land use; geology, physiography, and topography; hydrology; water quality; floodplains; vegetation; wetlands, and SAV; fishery resources and Essential Fish Habitat; benthic communities; special status species; cultural resources; visual and aesthetic resources; socioeconomics; hazardous materials and wastes; safety; transportation; utilities; air quality; and noise and vibration. The anticipated impacts based on available existing data ranged from adverse to beneficial, temporary to permanent, and included impacts classifications from negligible to moderate.

The current findings would be re-evaluated once the final siting and footprints are determined, and resource surveys are conducted, and subsequent data has been analyzed.

2. Evaluation of Dredged or Fill Material (40 CFR § 230.60) (Subpart G)

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (**Check only those appropriate**)

☒ (1) Physical characteristics
☒ (2) Hydrography in relation to known or anticipated sources of contaminants
☒ (3) Results from previous testing of the material in the vicinity of the project
☐ (4) Known, significant, sources of persistent pesticides from land runoff or percolation
☒ (5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances
☒ (6) Other public records of significant introduction of contaminants from industries, municipalities or other sources
☐ (7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge/fill
☐ (8) Other sources (specify)

The existing conditions for hazardous, toxic, and radioactive waste and materials producers are discussed in the Draft Integrated Feasibility Report and EA. It is anticipated as a standard practice that only clean fill material demonstrating no potential for contaminants would be used. In addition, extensive testing, characterization, and evaluation would be conducted for any material that would need to be removed (and/or filled) in conjunction with the installation or construction of the proposed structures.

There are currently no Hazardous, Toxic, or Radioactive Waste (HTRW) producers adjacent to the potential project impact sites that discharge effluents along the unnamed tributary to Indian Run. However, the areas surrounding the proposed project sites are highly developed; therefore, hazardous waste sources such as gas stations, dry cleaners, etc., exist around the entire study area.

b. An evaluation of the appropriate information in 2a above indicated that there is reason to believe the proposed dredged or fill material is not a carrier of contaminants, of that levels of contaminants are substantively similar at extraction and disposal sites and not likely to exceed constraints. The material meets the testing exclusion criteria.

YES ☒ NO ☐

3. Disposal Site Delineation (40 CFR § 230.11(f))

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

☐ (1) Depth of water at disposal site
☐ (2) Current velocity, direction, and variability at disposal site
☐ (3) Degree of turbulence
☐ (4) Water volume stratification
☐ (5) Discharge vessel or fill speed and direction
☐ (6) Rate of discharge/fill
☐ (7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)
☐ (8) Number of discharges/fill per unit of time
☐ (9) Other factors affecting rates and patterns of mixing (specify)

Dredging operations are not forecasted for this project. It is anticipated that all disposal of material in conjunction with the construction of the stone revetment would be disposed of at a certified, upland disposal facility. A Clean Water Act Section 401 Water Quality Certification is required from the Commonwealth of Virginia for this project. Any and all applicable authorizations will be coordinated and obtained prior to the start of construction.

Construction of the stone revetment (Alternative 6) would require fill materials consisting of VDOT No. 1 aggregate, VDOT Class II riprap, and soil and rock excavated on-site. However, a natural design to slope protection on the right channel bank will be considered in place of riprap armor during the PED Phase. The fill material will be clean and acquired from an appropriate upland source, and/or purchased. All excess material will be disposed of in an approved landfill or other facility.

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable.

YES ☒ NO ☐

4. Actions to Minimize Adverse Effects (40 CFR §§ 230.70-230.77)(Subpart H)

All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge/fill.

YES ☒ NO ☐

It is anticipated that the impacts would not be significant and would be avoided or minimized to the maximum extent practicable. At that time all appropriate and practicable steps would be employed to ensure minimal adverse effects of the proposed discharge/fill.

5. Factual Determination (40 CFR § 230.11)

A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short or long-term environmental effects of the proposed discharge/fill as related to:

☒ a. Physical substrate at the disposal site (review sections 2a, 3, 4, & 5)
☒ b. Water circulation, fluctuation & salinity (review sections 2a 3, 4, & 5)
☒ c. Suspended particulates/turbidity (review sections 2a, 3, 4, & 5)
☒ d. Contaminant availability (review sections 2a, 3, & 4)
☒ e. Aquatic ecosystem structure and function (review sections 2b, c; 3, & 5)
☒ f. Disposal site (review sections 2, 4, & 5)
☒ g. Cumulative impact on the aquatic ecosystem
☒ h. Secondary impacts on the aquatic ecosystem

Potential impacts to environmental resources are described in the Integrated Feasibility Report and EA and would be further refined in the PED Phase. The anticipated direct or indirect and cumulative impacts based on available existing data ranged from adverse to beneficial, temporary to permanent, and included classifications as to whether the impacts would have a negligible, minor, moderate, or major (significant).

This initial analysis was conducted to evaluate the overall potential for environmental impacts based on projected project features and estimated impacts using existing data. The findings from this analysis would be revisited once the final designs are determined, cultural and environmental surveys are conducted, and subsequent data has been analyzed. During the PED Phase of the project, detailed surveys of the extent, diversity, and coverage of wetland would be conducted.

6. Review of Compliance (40 CFR § 230.10(a)-(d) (Subpart B)

A review of the permit application indicates that:

a. The discharge/fill represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge/fill must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for EA alternative);

YES ☒ NO ☐

b. The activity does not appear to 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies; YES ☒ NO ☐

c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see section 2); YES ☒ NO ☐

d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge/fill on the aquatic ecosystem (if no, see section 5);

YES ☒ NO ☐

The project siting, design, and footprint of the Preferred Alternative is anticipated to be the preliminary least environmentally damaging practicable alternative (LEDPA) and additional analysis and evaluation during the PED Phase would serve to further substantiate this. At that time all appropriate and practicable steps would be employed to ensure minimal adverse effects of the proposed discharge/fill to human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values. The project would be designed to not violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA nor jeopardize the existence of any federally designated marine sanctuaries.

7. Findings

☐ a. The proposed disposal site for discharge of dredged or fill material complies with the Section 404 (b)(1) guidelines

☒ b. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines with the inclusion of the following conditions:

Project specifications would ensure that any proposed disposal site for discharge of dredged or fill material would be in full compliance with Section 404(b)(1) guidelines.

c. The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404(b)(1) guidelines for the following reason(s):

☐ (1) There is a less damaging practicable alternative

☐ (2) The proposed discharge/fill will result in significant degradation of the aquatic ecosystem

☐ (3) The proposed discharge/fill does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem

PRELIMINARY WETLAND JURISDICTIONAL DETERMINATION

APPENDIX A-3

INDIAN RUN EMERGENCY STREAMBANK PROTECTION FEASIBILITY STUDY

BEDFORD COUNTY, VIRGINIA

MAY 2021

U.S. Army Corps of Engineers
Norfolk District

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WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Indian Run City/County: Bedford Co Sampling Date: 12/11/20

Applicant/Owner: VDOT State: VA Sampling Point: #1

Investigator(s): Martin, Perdue Section, Township, Range: ______

Landform (hillslope, terrace, etc.): riparian area of stream Local relief (concave, convex, none): none Slope (%): ______

Subregion (LRR or MLRA): MLRA Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks:

Upper terrace along a streambank.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	( )	(●)	
Water Table Present?	( )	(●)	
Saturation Present? (includes capillary fringe)	( )	(●)	

Wetland Hydrology Present? **Yes** ______ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: #1

Tree Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus alba (white oak)	30	☑	FACU
2. Acer rubrum (red maple)	10	☐	FAC
3. Quercus velutina (black oak)	10	☐	FAC
4. Quercus pogoda (cherry bark oak)	5	☐	FACW
5. Liriodendron tulipifera (tulip poplar	10	☐	FACU
6.		☐	
7.		☑	
8.		☐	
	65 = Total Cover		

Sapling/Shrub Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Asimina triloba (pawpaw)	15	☑	FAC
2. Lindera benzoin (spicebush)	10	☑	FACW
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
	25 = Total Cover		

Herb Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Polystichum acrostichoides (Christmas fern)	10	☑	FACU
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	10 = Total Cover		

Woody Vine Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis spp (grape vine)	5	☐	
2. Lonicera japonica	5	☐	FACU
3. Smilax rotundifolia	5	☐	FAC
4.		☐	
5.		☐	
6.		☐	
	15 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 = 1
FAC species		x 3 = 1
FACU species		x 4 = 1
UPL species		x 5 = 1
Column Totals:	0 (A)	5 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: ____________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/2	0%		0%			sandy loam	
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) **(LRR N)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ☐ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13) **(MLRA 136, 122)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(MLRA 147)**
- ☐ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________________

Depth (inches): ________________________

Hydric Soil Present? Yes ○ **No** ◉

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Indian Run City/County: Bedford Co Sampling Date: 12/11/20

Applicant/Owner: VDOT State: VA Sampling Point: #2

Investigator(s): Martin, Perdue Section, Township, Range: ______

Landform (hillslope, terrace, etc.): bankfull bench Local relief (concave, convex, none): none Slope (%): ______

Subregion (LRR or MLRA): MLRA Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )
Hydric Soil Present?	Yes (●)	No ( )
Wetland Hydrology Present?	Yes (●)	No ( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks:

This is a very small bankfull bench in the upper reach of the Indian Run project. It measures only approximately 15' by 18'. Fluvial, riverine wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ( )	No (●)	Depth (inches):
Water Table Present?	Yes ( )	No (●)	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes (●)	No ( )	Depth (inches): 8

Wetland Hydrology Present? Yes X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

n/a

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: #2

Tree Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
= Total Cover	0		

Sapling/Shrub Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Lindera benzoin (spicebush)		☑	FACW
2.		☐	
3.		☐	
4.		☐	
5.		☐	OBL
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
= Total Cover	0		

Herb Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
= Total Cover	0		

Woody Vine Stratum (Plot size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Lonicera japonica (honeysuckle)		☑	FAC
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
= Total Cover	0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species	1	x 2 = 1
FAC species	1	x 3 = 1
FACU species		x 4 = 1
UPL species		x 5 = 1
Column Totals:	2 (A)	5 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ◉ **No** ○

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: ____________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-2	7.5YR3/2	0%		0%		PL	loamy sand	
2-8	7.5YR3/2	0%	7.5YR 4/6	0%	C		sand and sandy clay	mottles mixing in; somewhat transitional
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) **(LRR N)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ☐ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13) **(MLRA 136, 122)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(MLRA 147)**
- ☐ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________________

Depth (inches): ______________________

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks:

Clay starting around 6", but not completely restrictive

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Indian Run streambank stabilization   City/County: Bedford Co   Sampling Date: 12/11/20

Applicant/Owner: VDOT   State: VA   Sampling Point: 3

Investigator(s): Martin, Perdue   Section, Township, Range: ______

Landform (hillslope, terrace, etc.): bankfull bench   Local relief (concave, convex, none): none   Slope (%): ______

Subregion (LRR or MLRA): MLRA   Lat: ______   Long: ______   Datum: ______

Soil Map Unit Name: ______   NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ○ No ○ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed?   Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	◉	○
Hydric Soil Present?	◉	○
Wetland Hydrology Present?	◉	○

Is the Sampled Area within a Wetland? **Yes** ◉ **No** ○

Remarks:

This is a narrow bankfull bench along the right streambank (facing downstream). It's opposite the existing riprap revetment. It is approximately 53' long by 12' (average width)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	○	◉	
Water Table Present?	○	◉	
Saturation Present? (includes capillary fringe)	◉	○	5

Wetland Hydrology Present? **Yes** X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 3

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. Asimina triloba (pawpaw)	30	☑	FAC
2. Euonymus americanus (strawberry bush)	10	☐	NI
3. Lindera benzoin (spicebush)	5	☐	FACV
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
	45	= Total Cover	
Herb Stratum (Plot size:)			
1. Lonicera japonica (honeysuckle)	15	☑	FACL
2. Christmas fern	5	☐	FACL
3.		☐	
4.		☐	
5.		☐	
6.		☐	
7.		☐	
8.		☐	
9.		☐	
10.		☐	
11.		☐	
12.		☐	
	20	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.		☐	
2.		☐	
3.		☐	
4.		☐	
5.		☐	
6.		☐	
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 = 1
FAC species		x 3 = 1
FACU species		x 4 = 1
UPL species		x 5 = 1
Column Totals:	0 (A)	5 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: ____________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR3/2	0%		0%			loamy clay	
2-8	7.5YR3/2	0%	7.5YR4/4	0%			loamy clay	but notably higher clay content
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				
		0%		0%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) **(LRR N)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ☐ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☑ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13) **(MLRA 136, 122)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(MLRA 147)**
- ☐ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks:

Environmental Coordination
Appendix A-4

INDIAN RUN EMERGENCY STREAMBANK PROTECTION FEASIBILITY STUDY

U.S. Army Corps of Engineers
Norfolk District

803 Front Street
Norfolk, Virginia 23510

May 2021

U.S. Army Corps
of Engineers
Norfolk District

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Notice Content

NOTICE OF SCOPING FOR INDIAN RUN EMERGENCY STREAMBANK STABILIZATION DRAFT INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT. The U.S. Army Corps of Engineers (USACE), Norfolk District and Virginia Department of Transportation (VDOT) are conducting a feasibility study authorized by Section 14 of the Flood Control Act of 1946 as amended for an emergency streambank stabilization project along the north bank of a small tributary of Indian Run (James River drainage) adjacent to US Highway 501. The approximate 50-linear-foot section of streambank is located 0.5 miles north of Coleman Falls in Bedford County, Virginia and is severely eroded resulting from natural erosion processes and stormwater runoff. The erosion is an imminent threat to US Highway 501, and its commercial and residential users. The associated receding bank has already required action from VDOT in November 2016 when Class I riprap stone was placed on the road embankment as an emergency measure, but continued erosion remains a threat. The joint Feasibility Study and Environmental Assessment (EA) will consider alternative streambank stabilization measures and evaluate the impacts to the human and natural environment pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Council of Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations 1500 1508). The USACE requests comments to determine the scope of content to be included in the draft feasibility study/EA. Comments may include, but are not limited to, the range of resource areas to be analyzed, potential alternatives, and data needs. The following website has been established for the project: https://www.nao.usace.army.mil/ About/Projects/Indian-Run. To submit scoping comments, please contact Zach Martin by email: Zachary.Martin @usace.army.mil; or telephone 757-201-7320. Please submit comments by 8 February 2021. (1175469)

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Notice Content

NOTICE OF SCOPING FOR INDIAN RUN EMERGENCY STREAMBANK STABILIZATION DRAFT INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT. The U.S. Army Corps of Engineers (USACE), Norfolk District and Virginia Department of Transportation (VDOT) are conducting a feasibility study authorized by Section 14 of the Flood Control Act of 1946 as amended for an emergency streambank stabilization project along the north bank of a small tributary of Indian Run (James River drainage) adjacent to US Highway 501. The approximate 50-linear-foot section of streambank is located 0.5 miles north of Coleman Falls in Bedford County, Virginia and is severely eroded resulting from natural erosion processes and stormwater runoff. The erosion is an imminent threat to US Highway 501, and its commercial and residential users. The associated receding bank has already required action from VDOT in November 2016 when Class I riprap stone was placed on the road embankment as an emergency measure, but continued erosion remains a threat. The joint Feasibility Study and Environmental Assessment (EA) will consider alternative streambank stabilization measures and evaluate the impacts to the human and natural environment pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Council of Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations 1500 1508). The USACE requests comments to determine the scope of content to be included in the draft feasibility study/EA. Comments may include, but are not limited to, the range of resource areas to be analyzed, potential alternatives, and data needs. The following website has been established for the project: https://www.nao.usace.army.mil/ About/Projects/Indian-Run. To submit scoping comments, please contact Zach Martin by email: Zachary.Martin @usace.army.mil; or telephone 757-201-7320. Please submit comments by 8 February 2021. (1175469)

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DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Mr. and Mrs. Frank and Ginger Knight
6773 Lee Jackson Highway
Big Island, Virginia 24526

Dear Mr. and Mrs. Knight:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

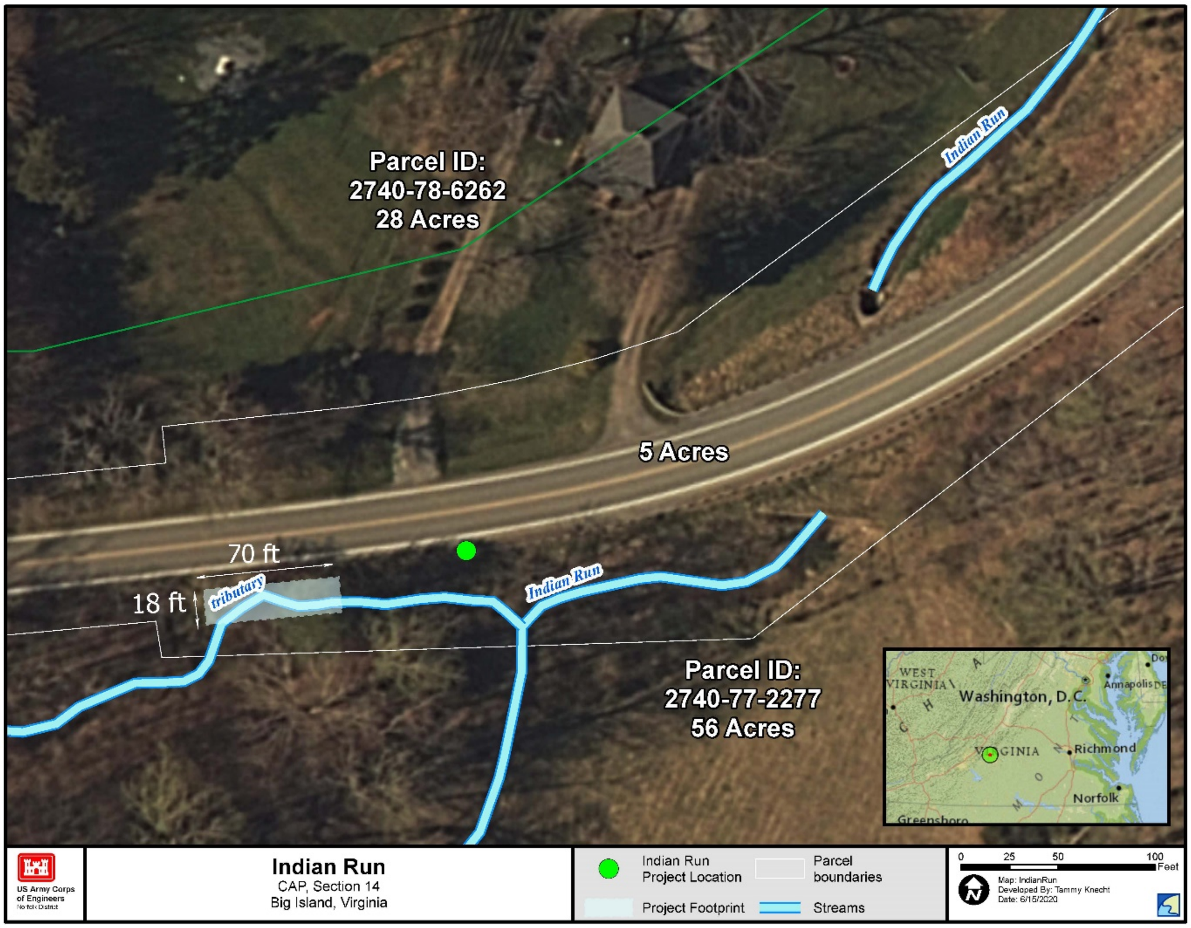
Sincerely,

Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

Enclosure 1. Map of the project area.



Enclosure 2. Drawings of Alternatives 1 – 6.

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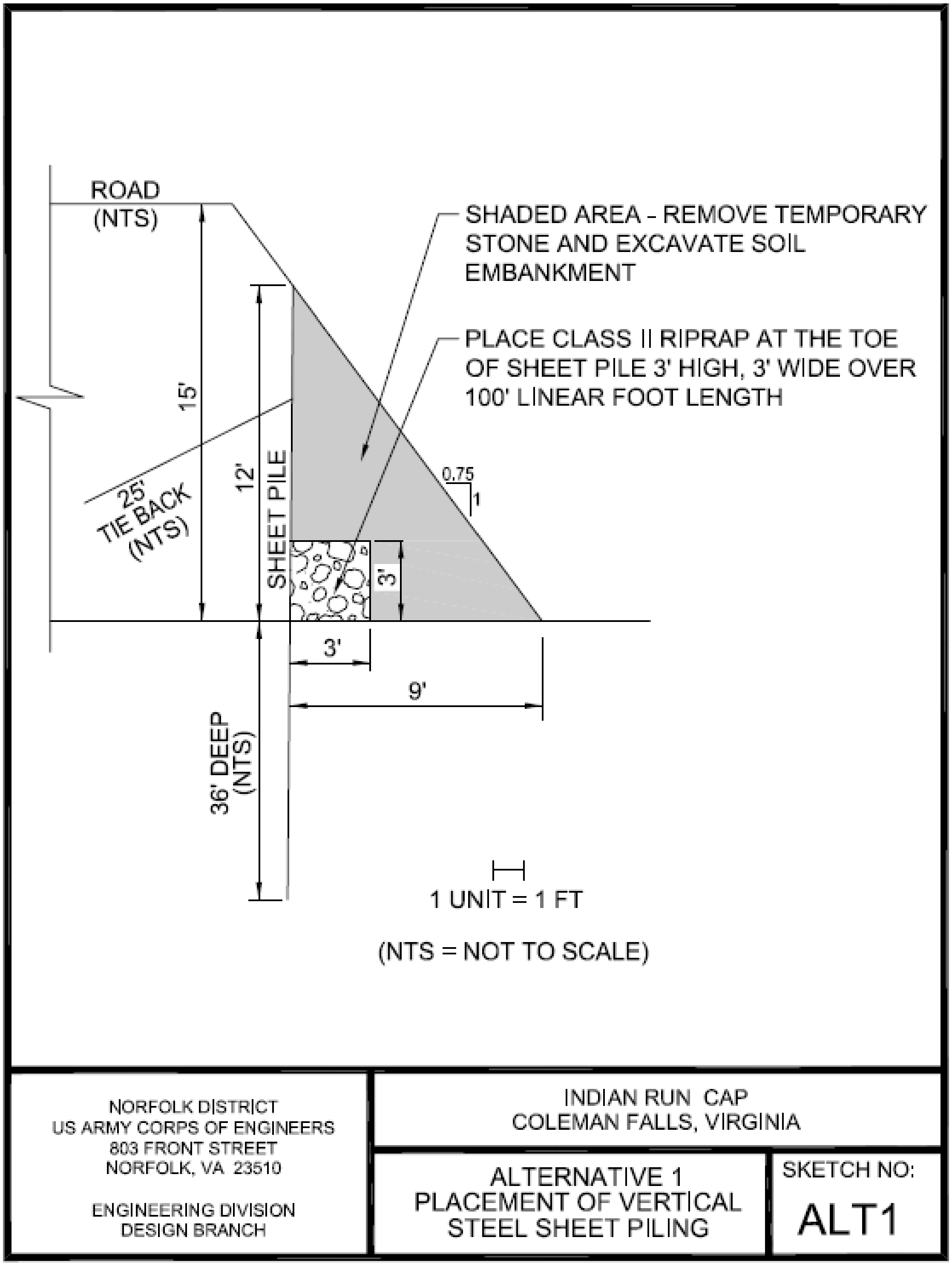
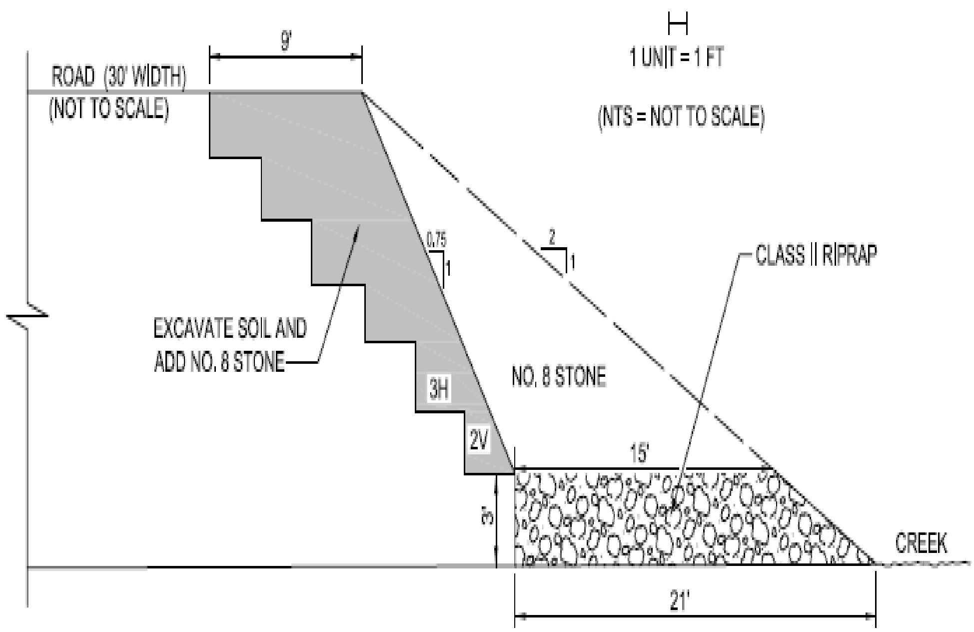
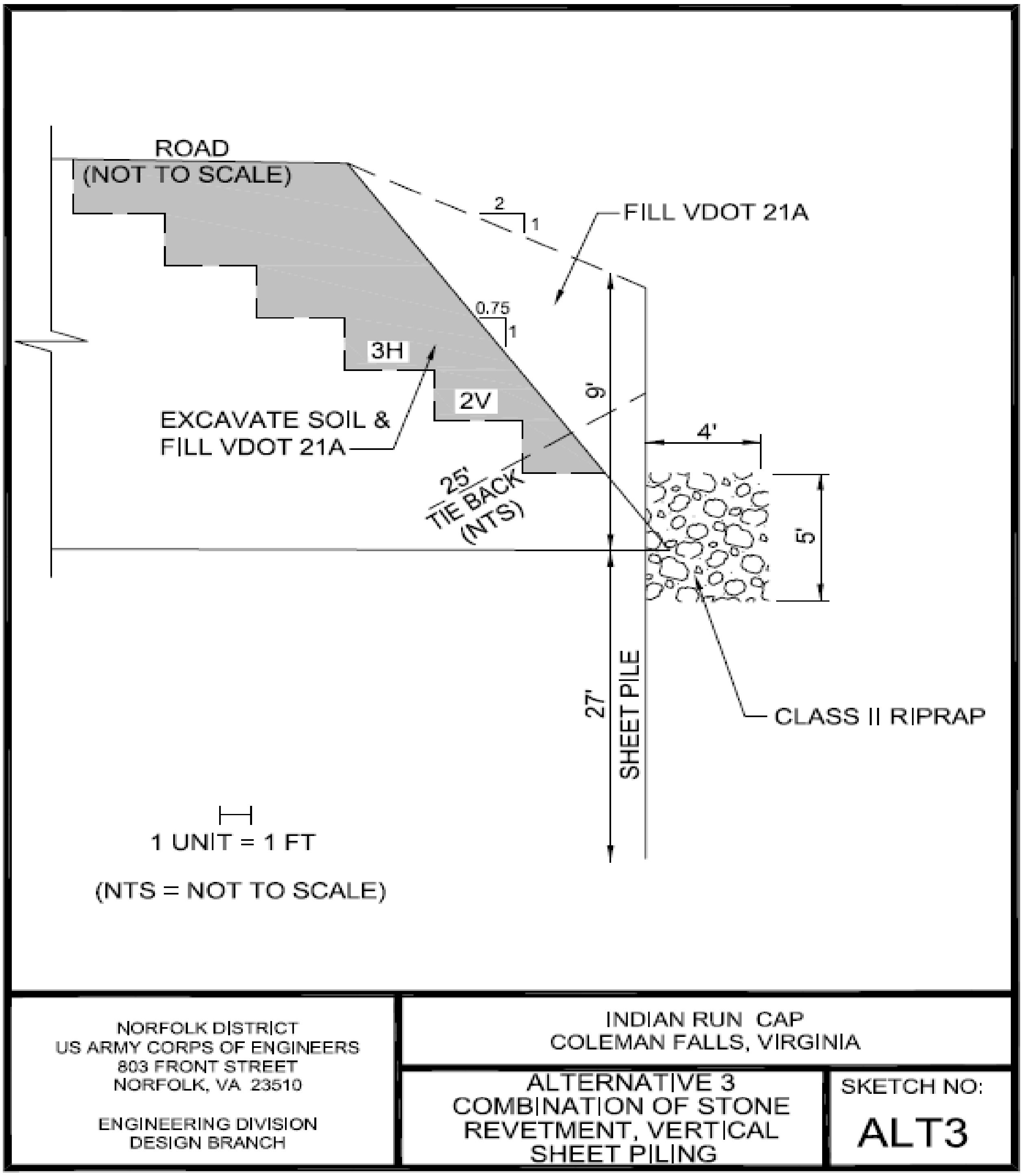


Alternative 2. A rock sill slope to stabilize the base of the slope and a berm

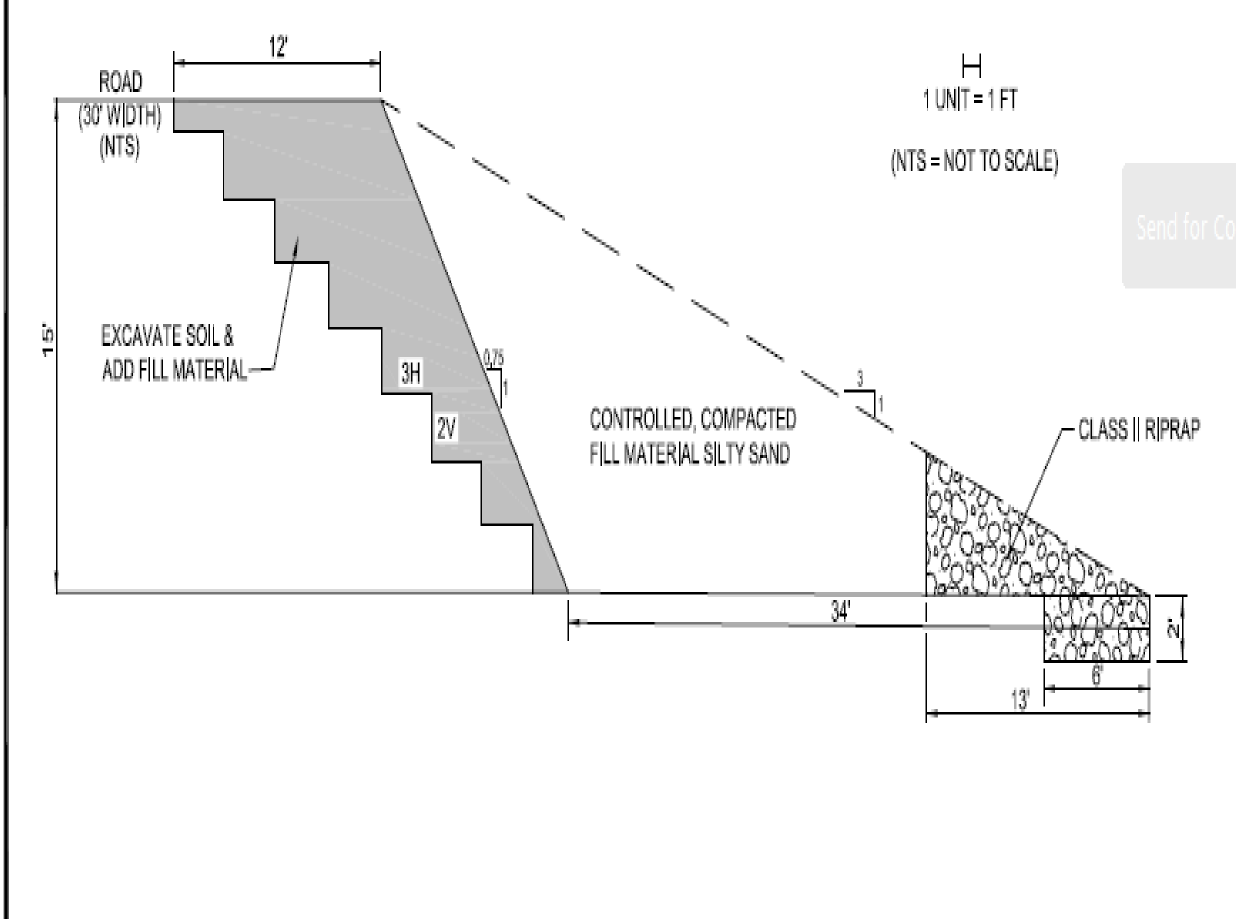


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2

Alternative 3. Combination of stone revetment and vertical sheet piling

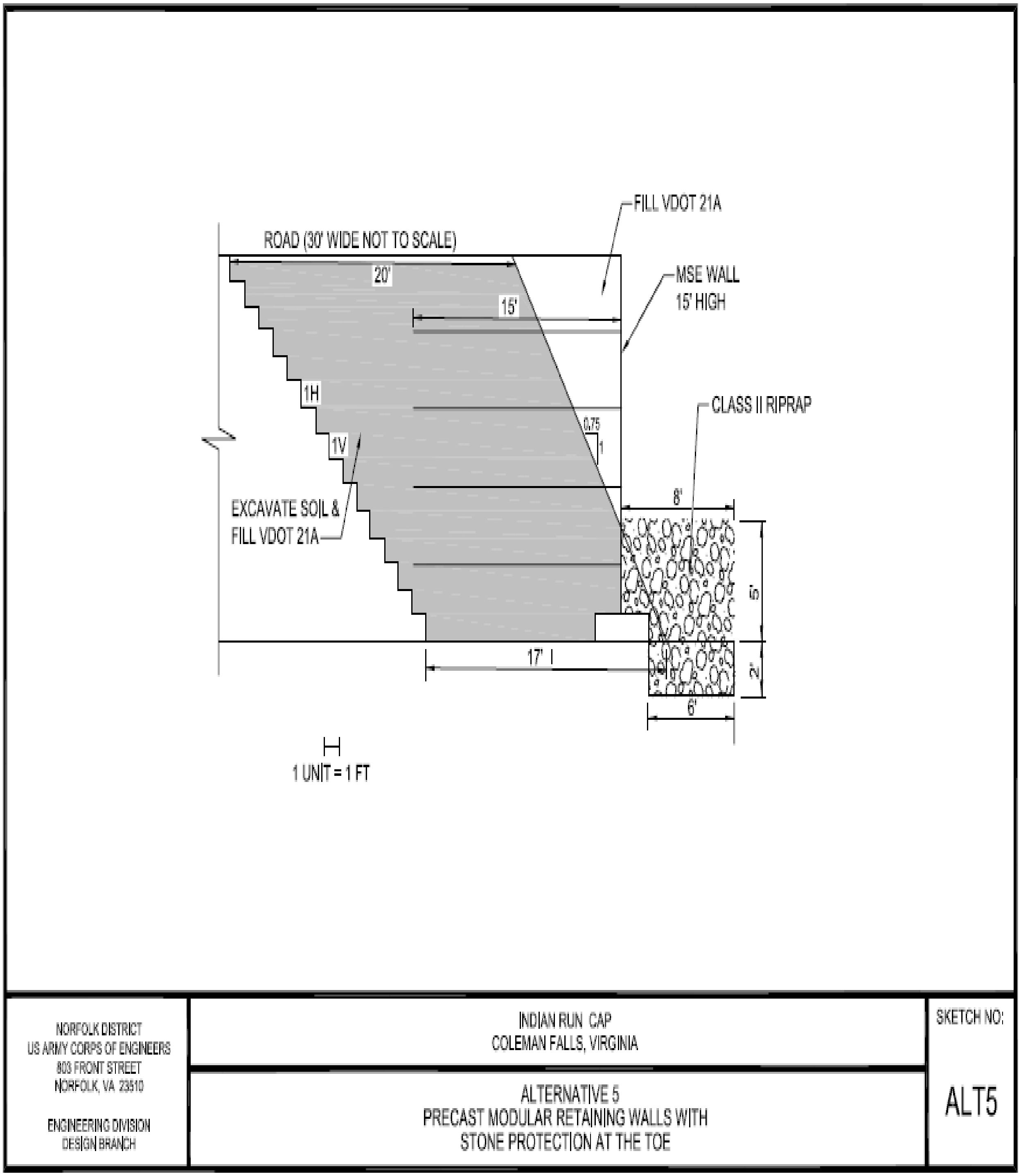


Alternative 4. Vegetated erosion control with slight re-routing of the stream



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 4 VEGETATIVE EROSION CONTROL	SKETCH NO: ALT4

Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



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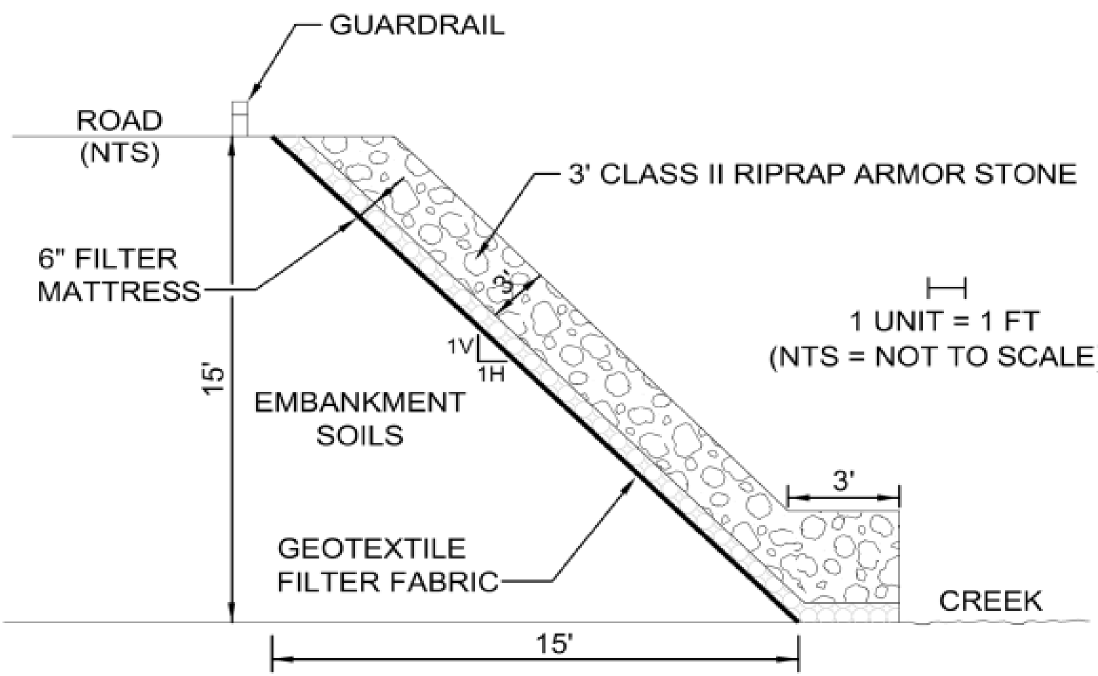
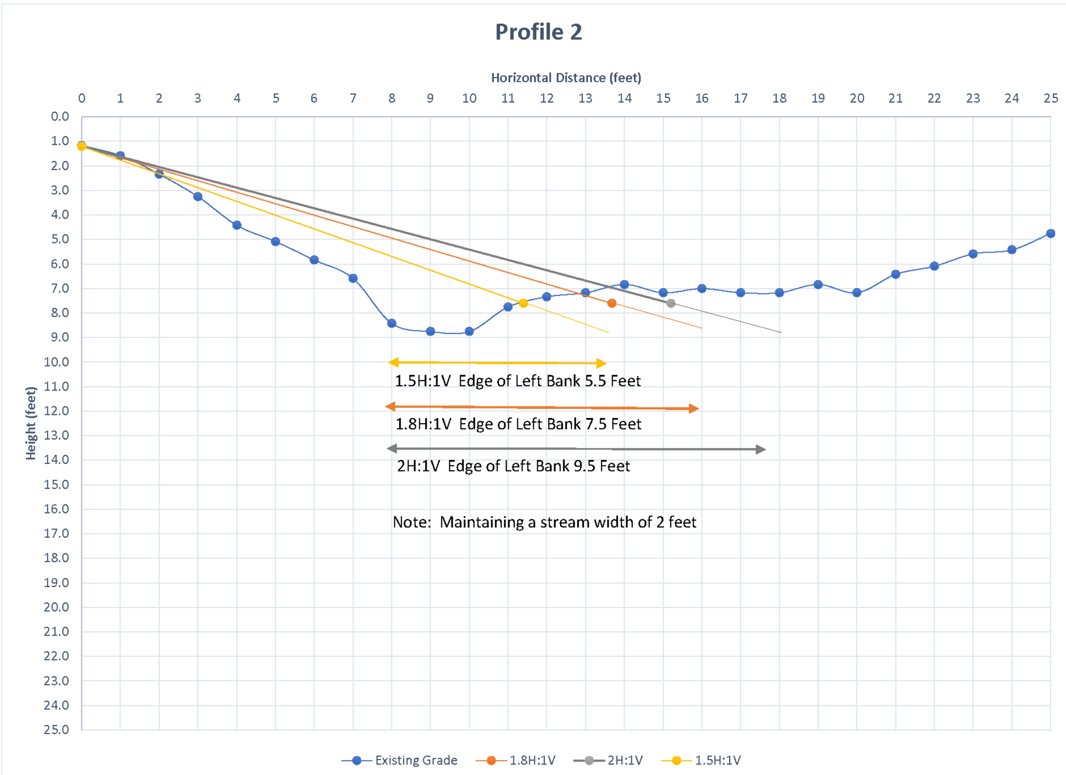


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



Martin, Zachary CIV USARMY CENAO (US)

From:	Martin, Zachary CIV USARMY CENAO (US)
Sent:	Wednesday, February 3, 2021 12:35 PM
To:	Ginger Knight
Subject:	RE: [Non-DoD Source] Re: Indian Run Streambank Stabilization Project NEPA Scoping Request

Hello again,

Thanks for your follow up responses!

Regarding your new questions, from what I have always understood, there would be no modifications to either culvert(s) included in the project. I'll share these notes/questions with our engineers though and follow up with their response.

Zach

From: Ginger Knight <all7knights@gmail.com>
Sent: Tuesday, January 26, 2021 8:55 AM
To: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Subject: Re: [Non-DoD Source] Re: Indian Run Streambank Stabilization Project NEPA Scoping Request

Thanks for your response. Just a couple more things below.

Sent from my iPhone

> On Jan 22, 2021, at 4:35 PM, Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil> wrote:
>
> Hi Ginger and Frank,
>
> Thanks for reaching out with questions. Below, I provided my responses in red. I also include a couple questions of my own in my response to #4. Please let me know if these responses help, or if you have more questions. I am also copying our Project Manager (Richard Harr) for this study here to provide clarification as needed.
>
> Respectfully,
> Zach Martin
>
> ---
>
> **From:** Ginger Knight <all7knights@gmail.com>
> **Sent:** Monday, January 11, 2021 4:00 PM
> **To:** Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
> **Subject:** [Non-DoD Source] Re: Indian Run Streambank Stabilization Project NEPA Scoping Request
>
> We have looked at the proposal. Our questions are
> 1. Is the work affecting the side of the street our house is on?

There is the potential of requesting the use of a small area (<14,000sqft) at the edge of this parcel, next to the road, as a lay down area for any construction materials and/or equipment. This is 1 of 3 such potential lay down areas. See my response to #4 for additional notes on the lay down area topic.

Aside from lay down areas, we do not anticipate impacts in the parcel of land your house is on.

2. Is any work purposed for the water flowing under Rt 501 and along the side of our property.

There are no measures included in any of the proposed study alternatives that would extend this far downstream. All possible alternatives propose measures focused on the smaller tributary that hugs RT 501 upstream of its confluence with Indian Run proper (and likewise, the culvert under 501).

Can we see the proposed changes to the culvert on 501. Will the changes improve the flood we experience along the stream that boarders our property?

3. We would like further explanation of the relocation of utilities and road as mentioned in alternative #7

When planning and conducting an infrastructure project like this, federal agencies are obligated to consider an array of alternatives that capture all/most possible solutions to the problem. Generally, this array of alternatives also captures a wide range of possible costs to solve the problem. Alternative #7 implies an expensive and unlikely solution that starts fresh by abandoning the endangered road and utilities and relocating that infrastructure in a way that maintains the benefits to the local community. For more context, as we are drafting the Feasibility report and Environmental Assessment, the most likely and cost-effective solution appears to be Alternative #6. This is a solution that regrades the retreating roadside streambank as a shallower, more stable streambank. This shallower sloping streambank would require moving and restoring the stream channel several feet to the south.

4. Is any work being considered to the culvert downstream at the bend of the stream on our lower pasture?

First, I'll note I may need some clarification on what areas this question refers to. For now, my answer assumes the 'lower pasture' is the parcel of open pasture/field south of Rt 501 and Indian Run proper. Is that what you meant?

As I noted above for #2, there are no measures in consideration that would directly impact or overlap with the culvert under 501. The lower pasture itself contains another of the 3 potential lay down areas proposed for the project and permission for its use would be requested and coordinated with you. FYI – from what I understand, the final and most likely of the 3 potential lay down areas is east of your property. We'll know more on this topic as we enter the Pre-construction, Engineering, and Design Phase of the project.

Lastly, I have a question for you. Is the 'lower pasture' (as I understand it) actively grazed or used to harvest hay? I'm writing parts of our report that briefly describes land use in the surrounding area. When I visited, I didn't notice any cattle/livestock on that plot but could have just missed them.

When referring to our lower pasture I'm referring to the fenced area on the right side of our house (when facing the house). We use it for chickens,guineas and goats plan to have our garden this summer there and have three storage containers. We're still open to our property being used as the lay down area depending on what our payment for use would be and what assistance we would get in relocating things if that were necessary. The culvert I'm referring to here is further down stream from the one under 501 along the side of our property. It has two culverts pipes there. Things get trap there during heavy rain and backs up the stream.

Frank and Ginger Knight

Sent from my iPhone

On Jan 8, 2021, at 4:08 PM, Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil> wrote:

Good Afternoon,

Please see the attached NEPA scoping request for the streambank stabilization project on the north bank of a tributary to Indian Run (James River basin) in Bedford County, Virginia (i.e., adjacent to your property). We have entered the public scoping period of the project, and we will be accepting scoping comments up to February 8, 2020. If you have any questions or require any additional information, please let me know. Thank you again for your past engagement and cooperation on this project.

Best Regards,
Zach Martin
Biologist, Planning and Policy Branch, Environmental Analysis Section
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510

Work: 757-201-7320
Cell: 910.232.3154

<Indian Run CAP_NEPA scoping letter_6773 Lee Jackson Highway.pdf>

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

David O'Brien, Marine Habitat Resource Specialist
NOAA Fisheries, Greater Atlantic Regional Fisheries Office
P.O. Box 1346
Gloucester Point, VA 23062-1346

Dear Mr. O'Brien:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

Sincerely,

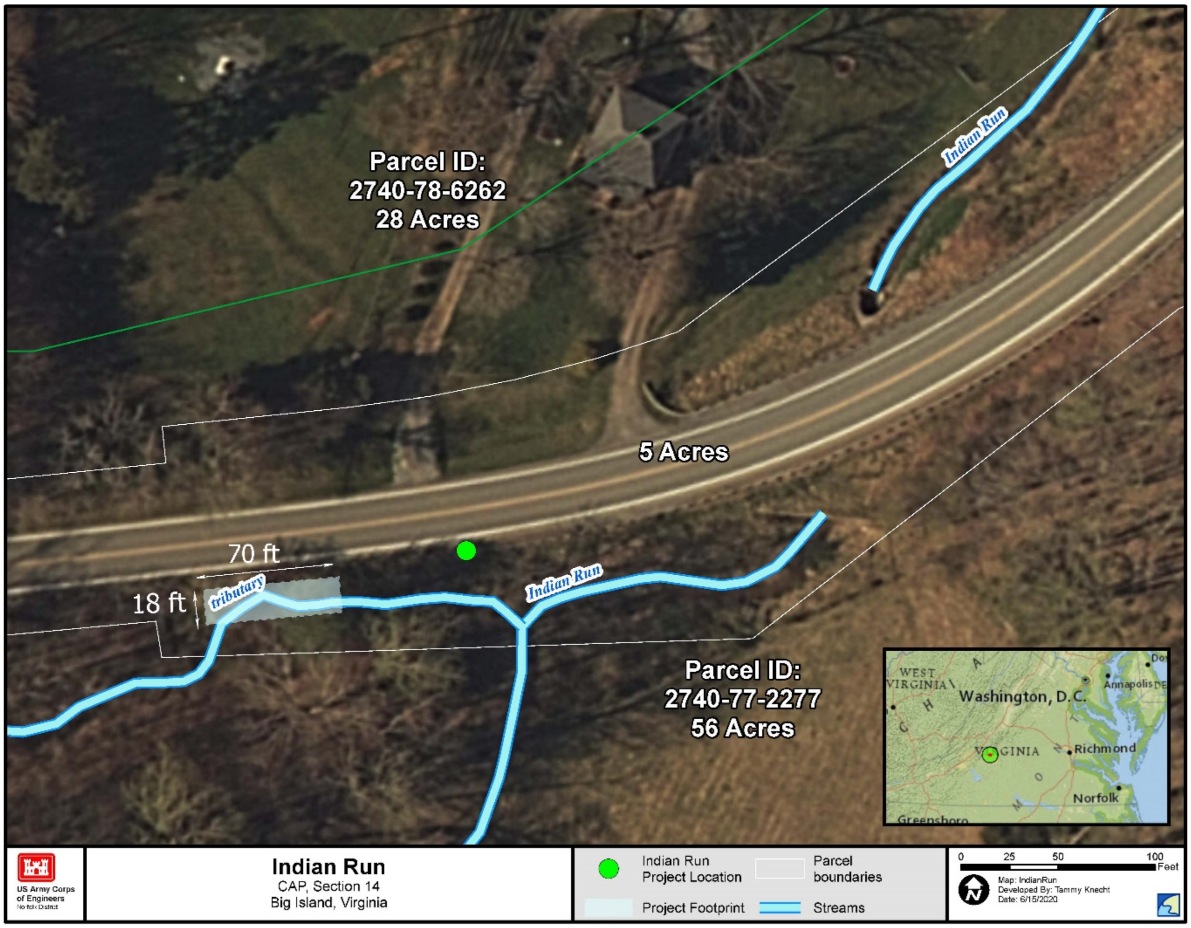
Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

CC Karen Green, Mid-Atlantic Field Office Supervisor and EFH Coordinator

Enclosure 1. Map of the project area.



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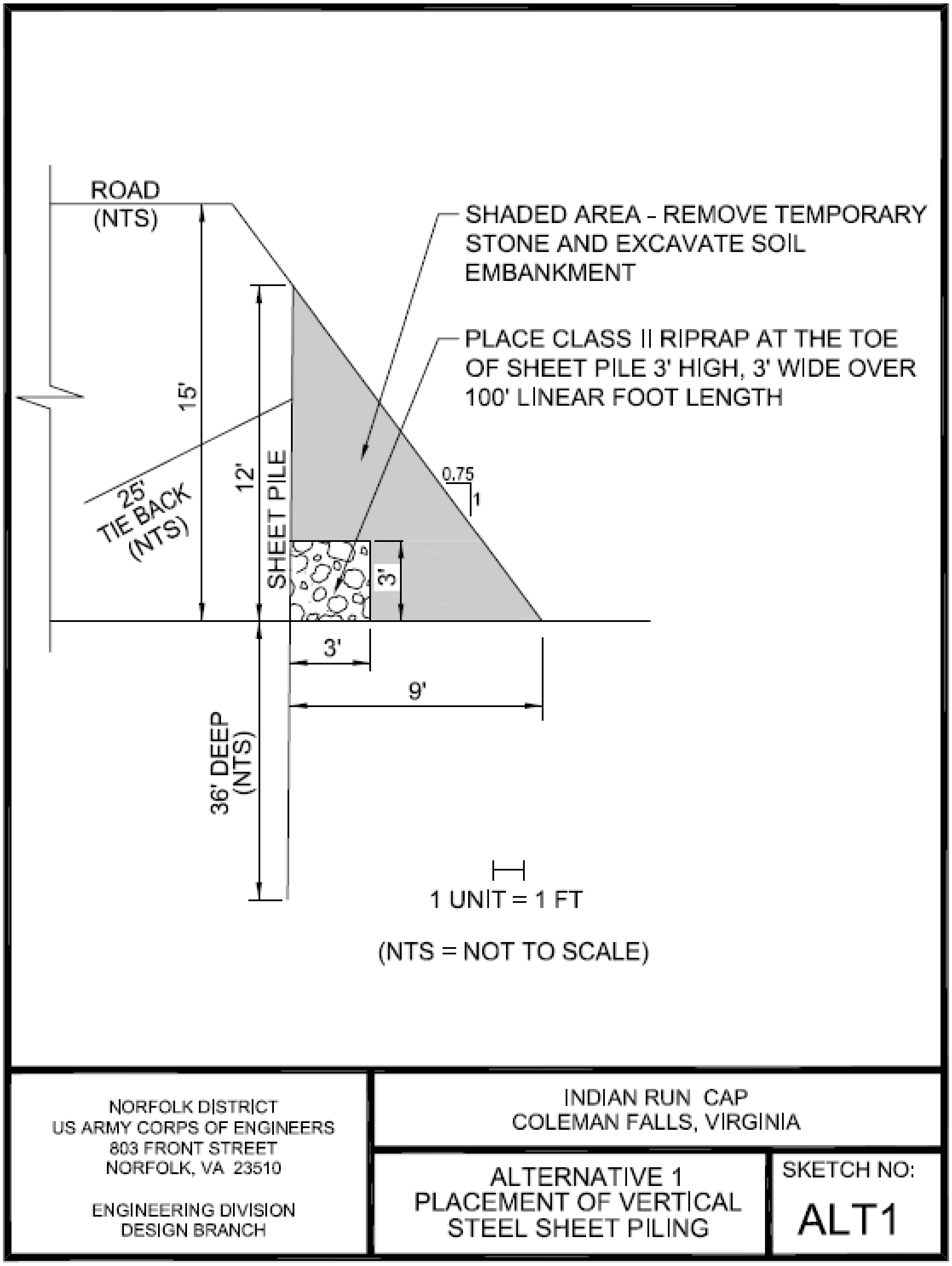

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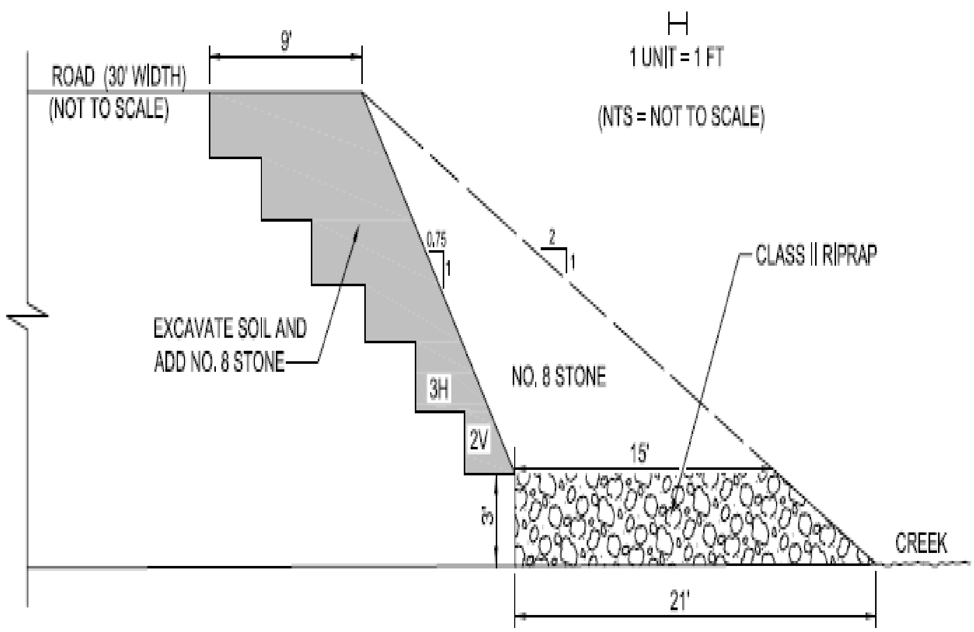
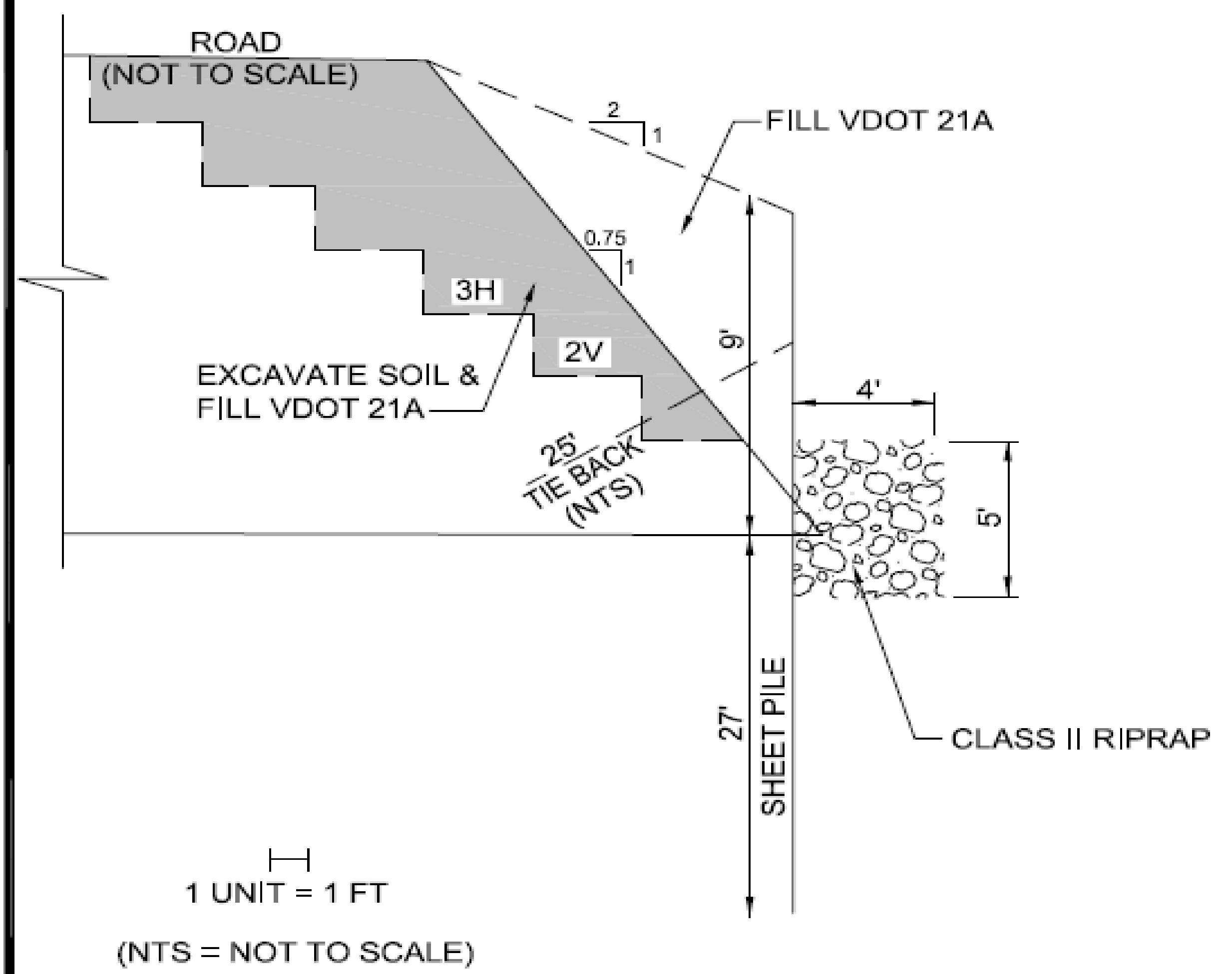


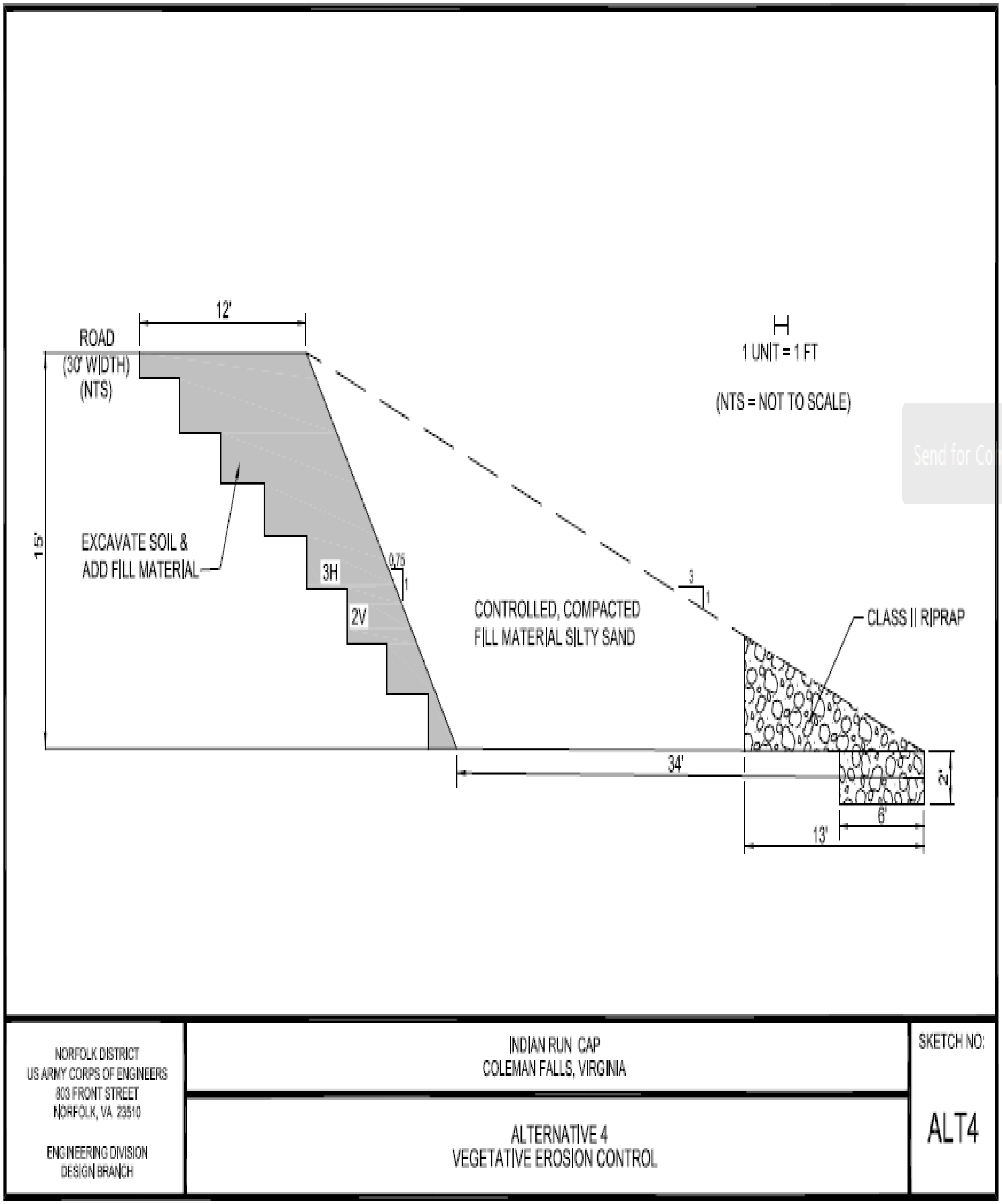
NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2

Alternative 3. Combination of stone revetment and vertical sheet piling

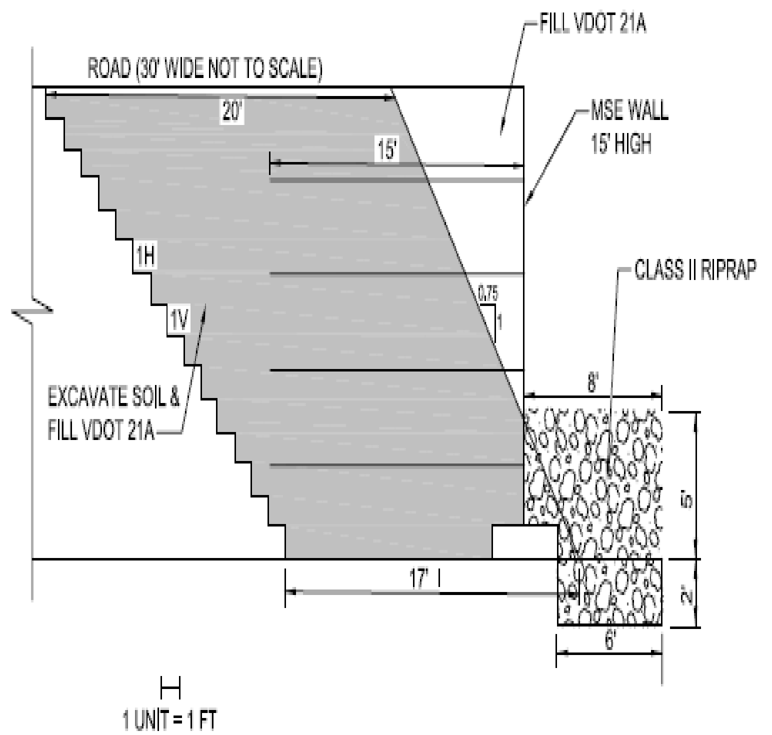


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 3 COMBINATION OF STONE REVETMENT, VERTICAL SHEET PILING	SKETCH NO: ALT3

Alternative 4. Vegetated erosion control with slight re-routing of the stream

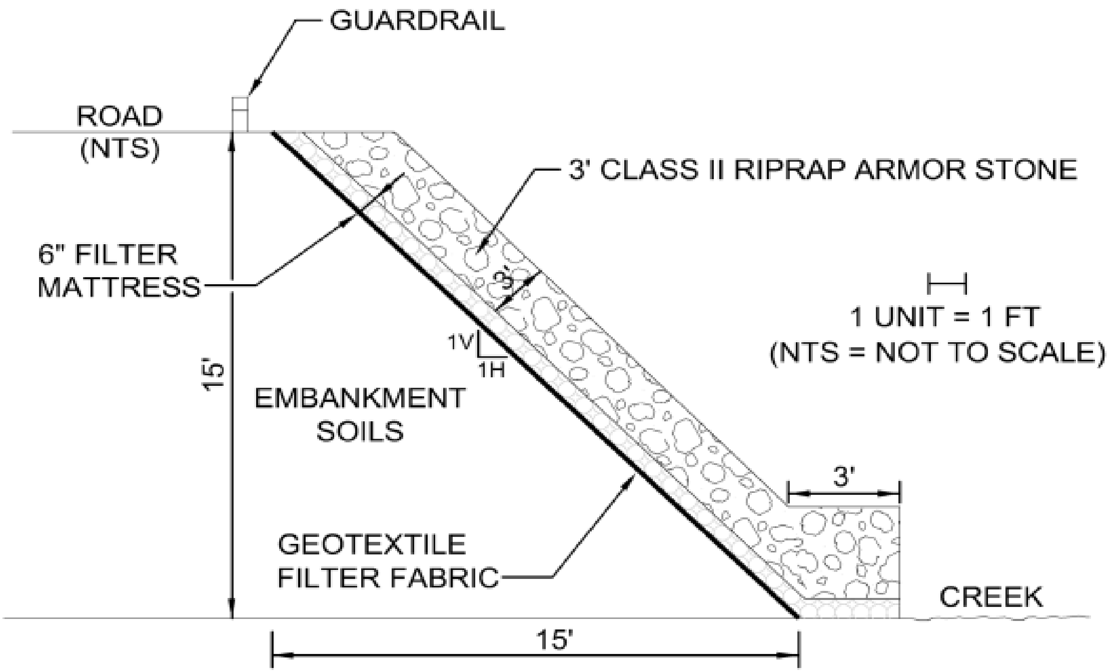


Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



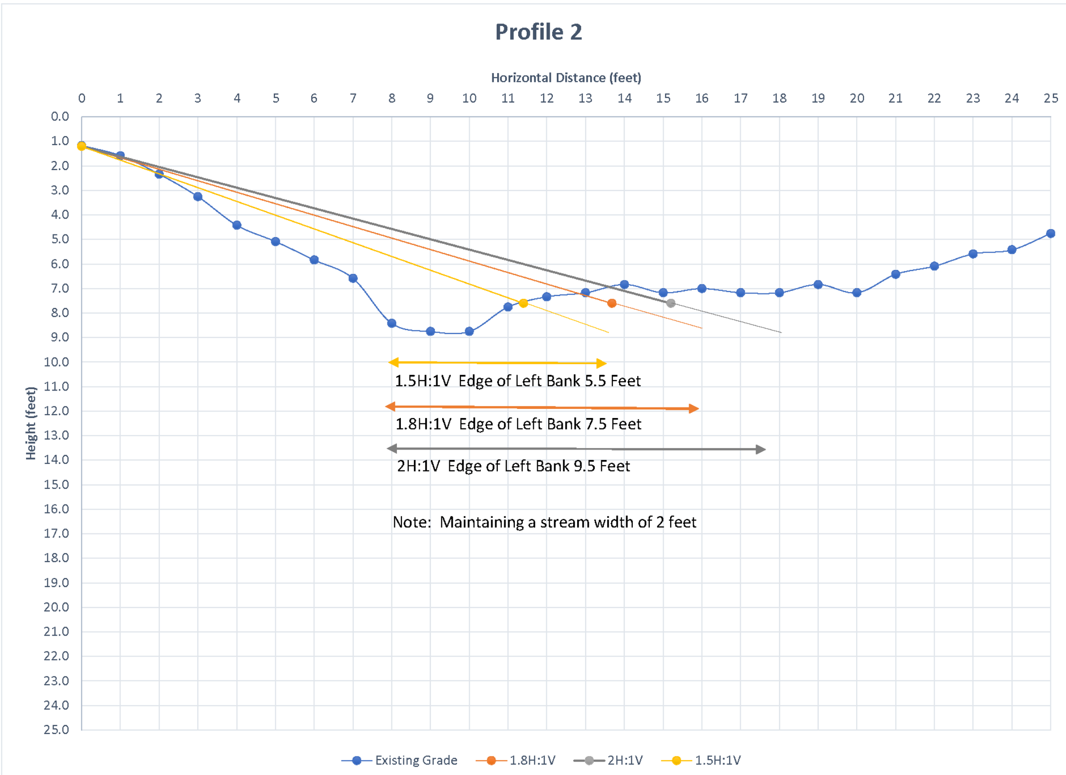
NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Chris Vaccaro, Section 7 Biologist
NOAA Fisheries, Greater Atlantic Regional Fisheries Office
P.O. Box 1346
Gloucester Point, VA 23062-1346

Dear Ms. Vaccaro:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

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The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

Sincerely,

Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

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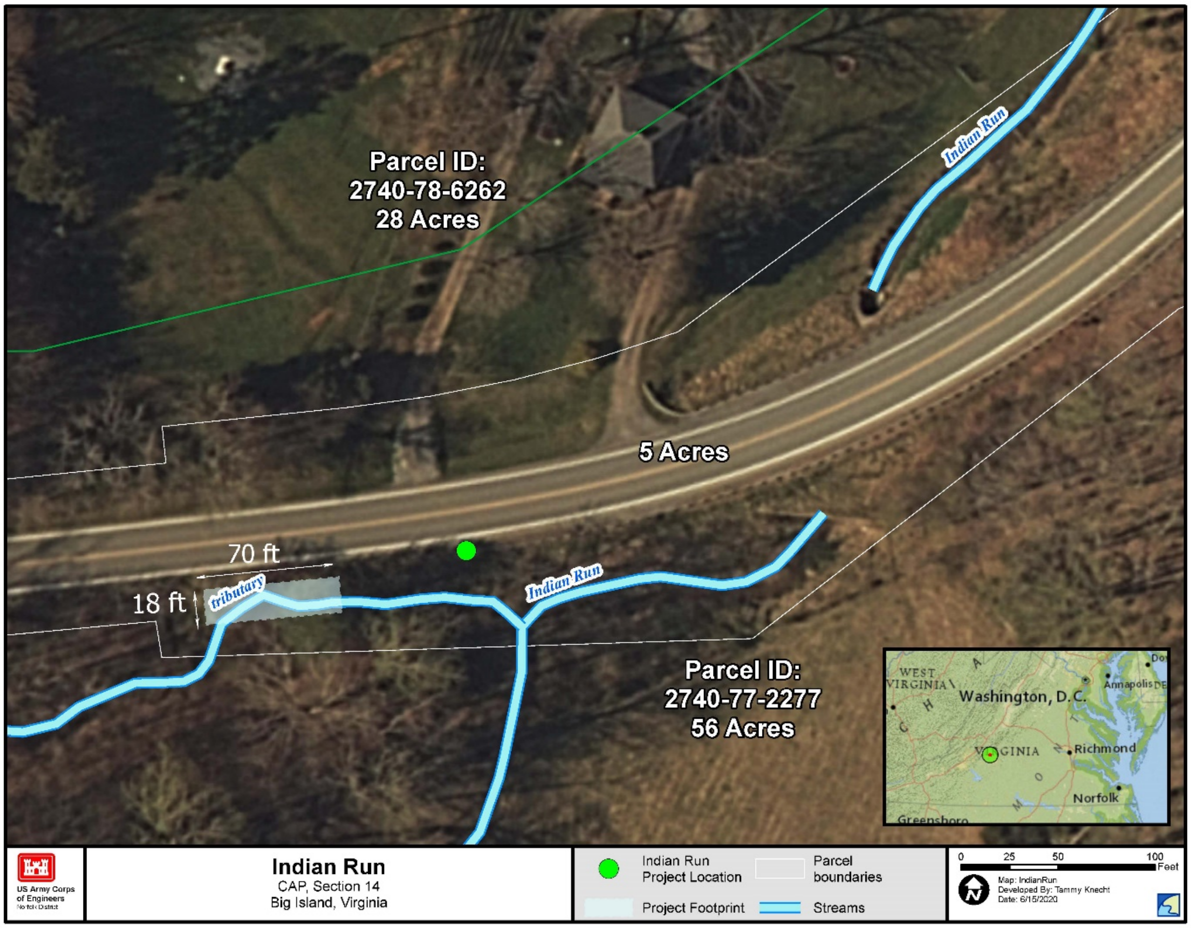

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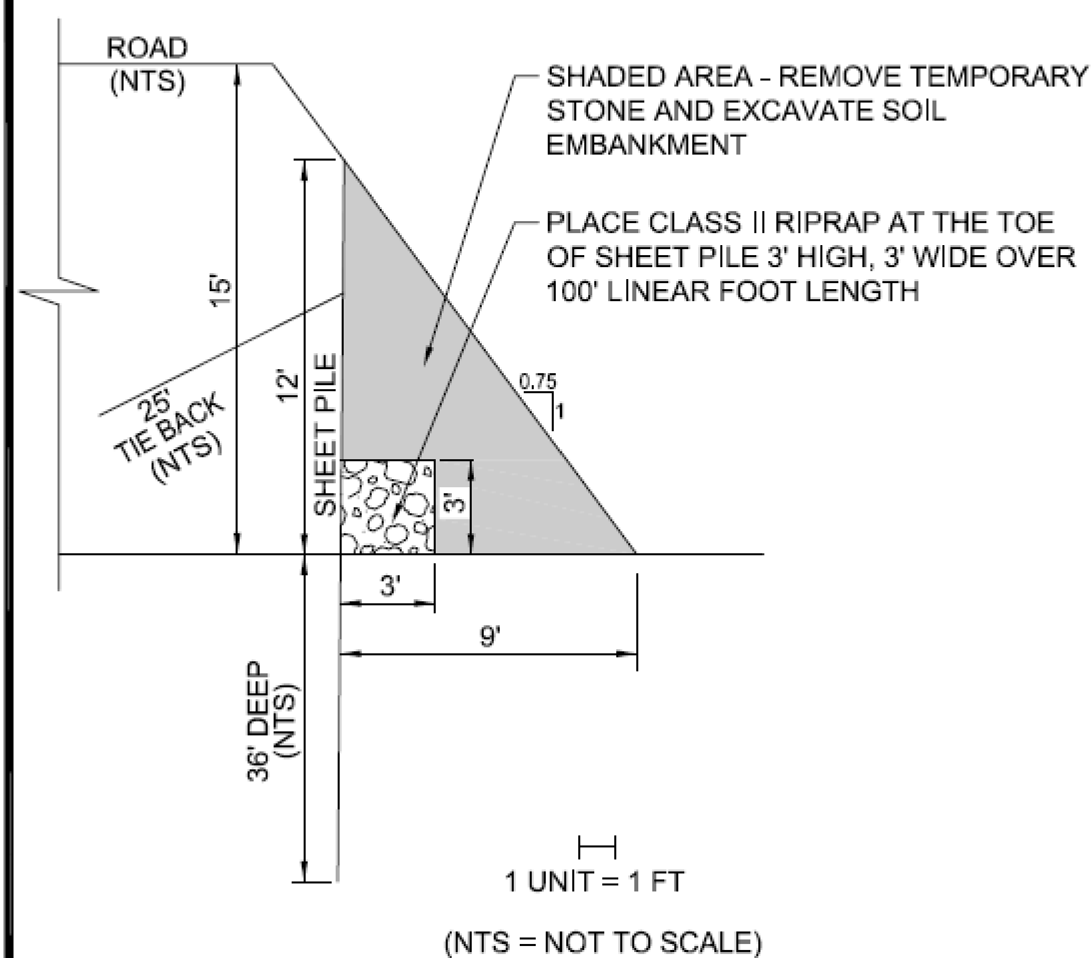
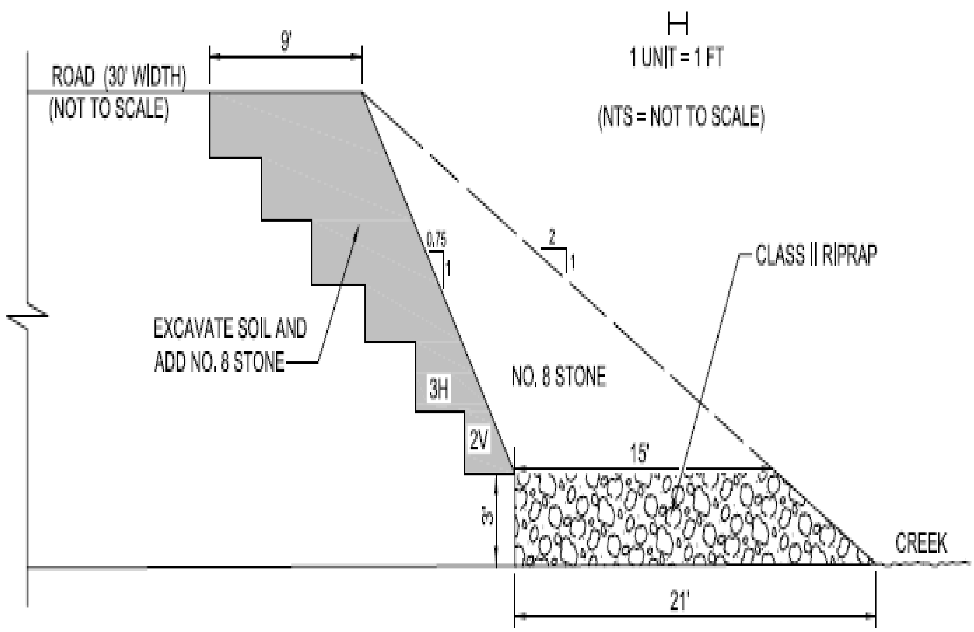


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 1 PLACEMENT OF VERTICAL STEEL SHEET PILING	SKETCH NO: ALT1

Alternative 2. A rock sill slope to stabilize the base of the slope and a berm



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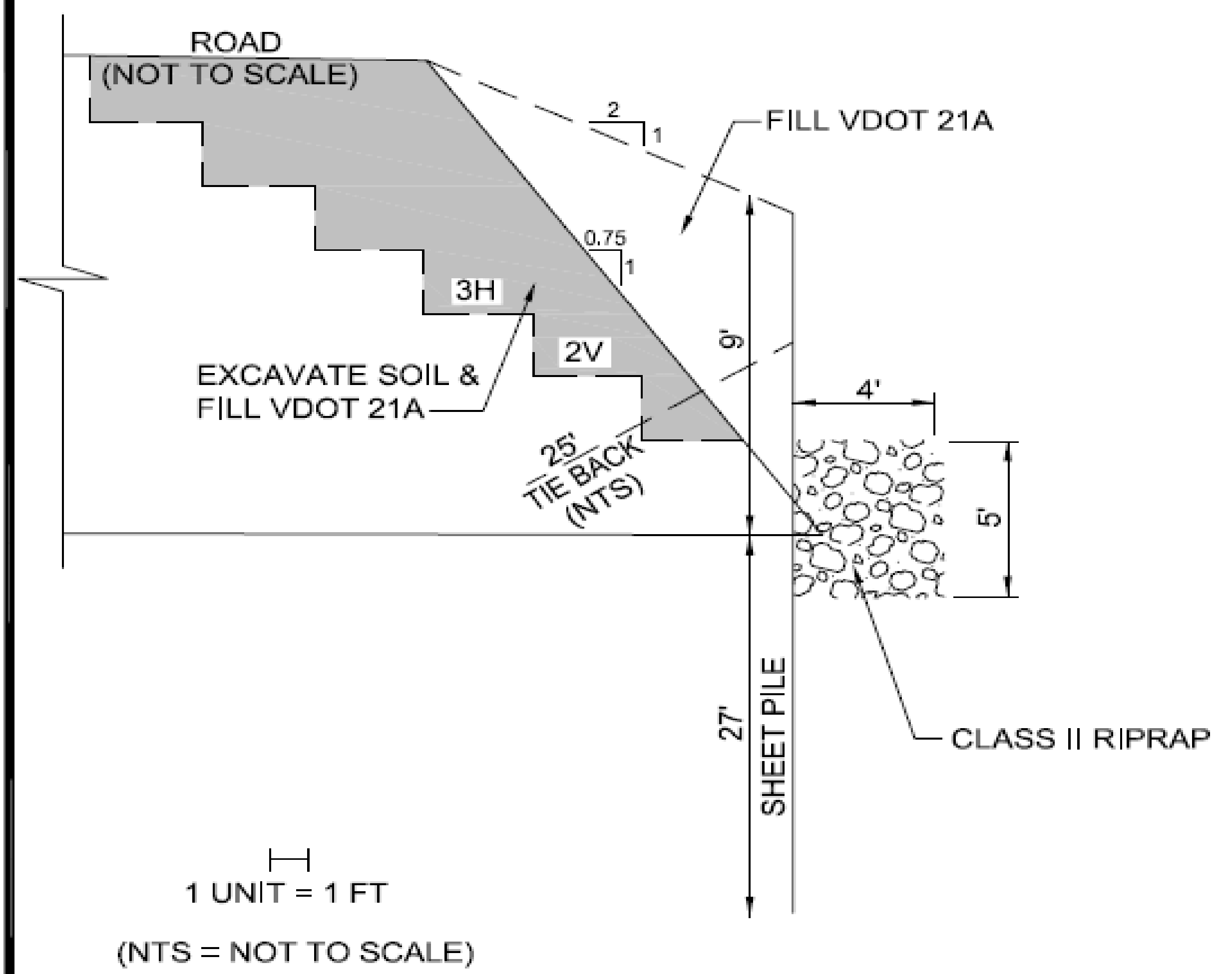
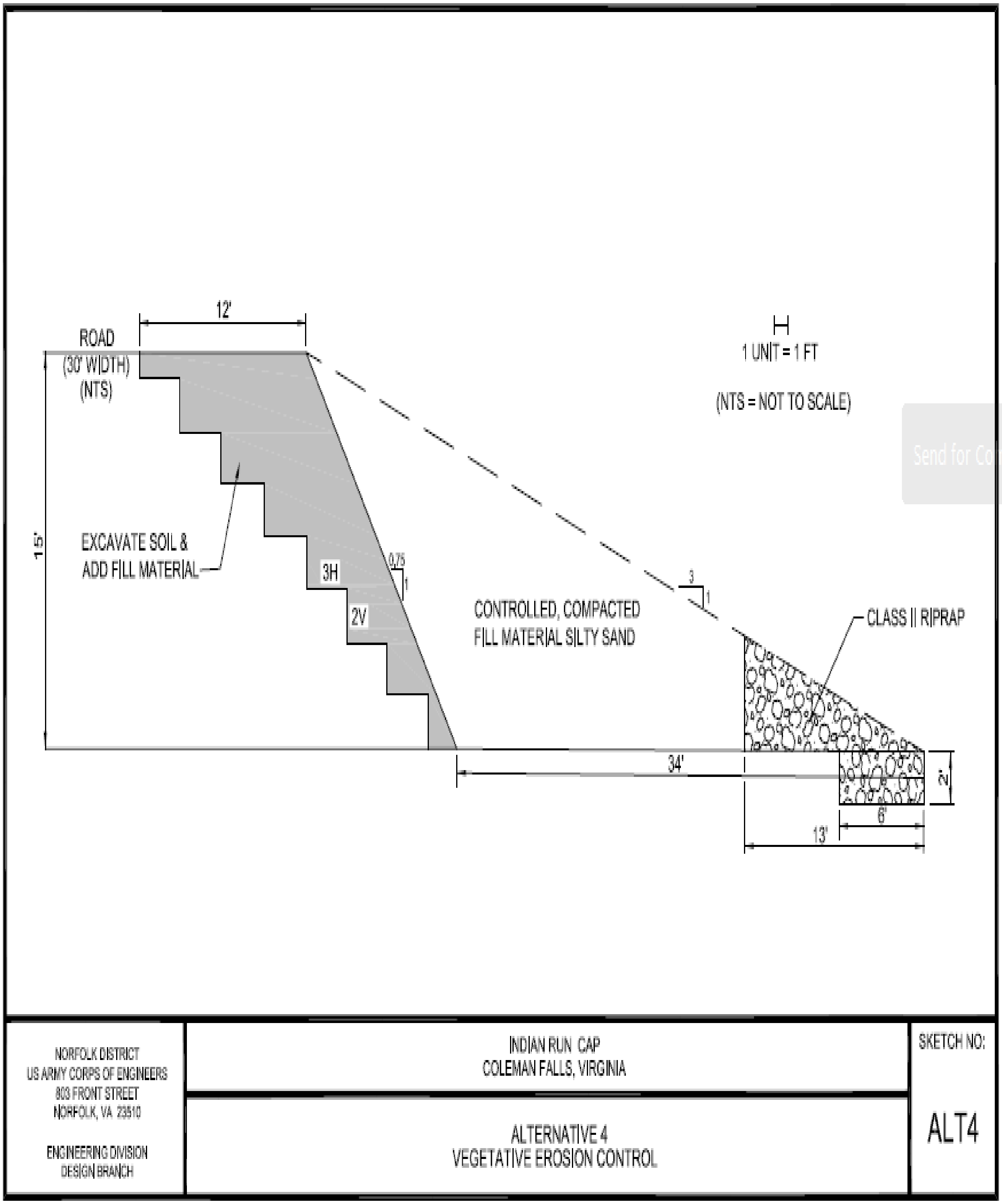


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 3 COMBINATION OF STONE REVETMENT, VERTICAL SHEET PILING	SKETCH NO: ALT3

Alternative 4. Vegetated erosion control with slight re-routing of the stream



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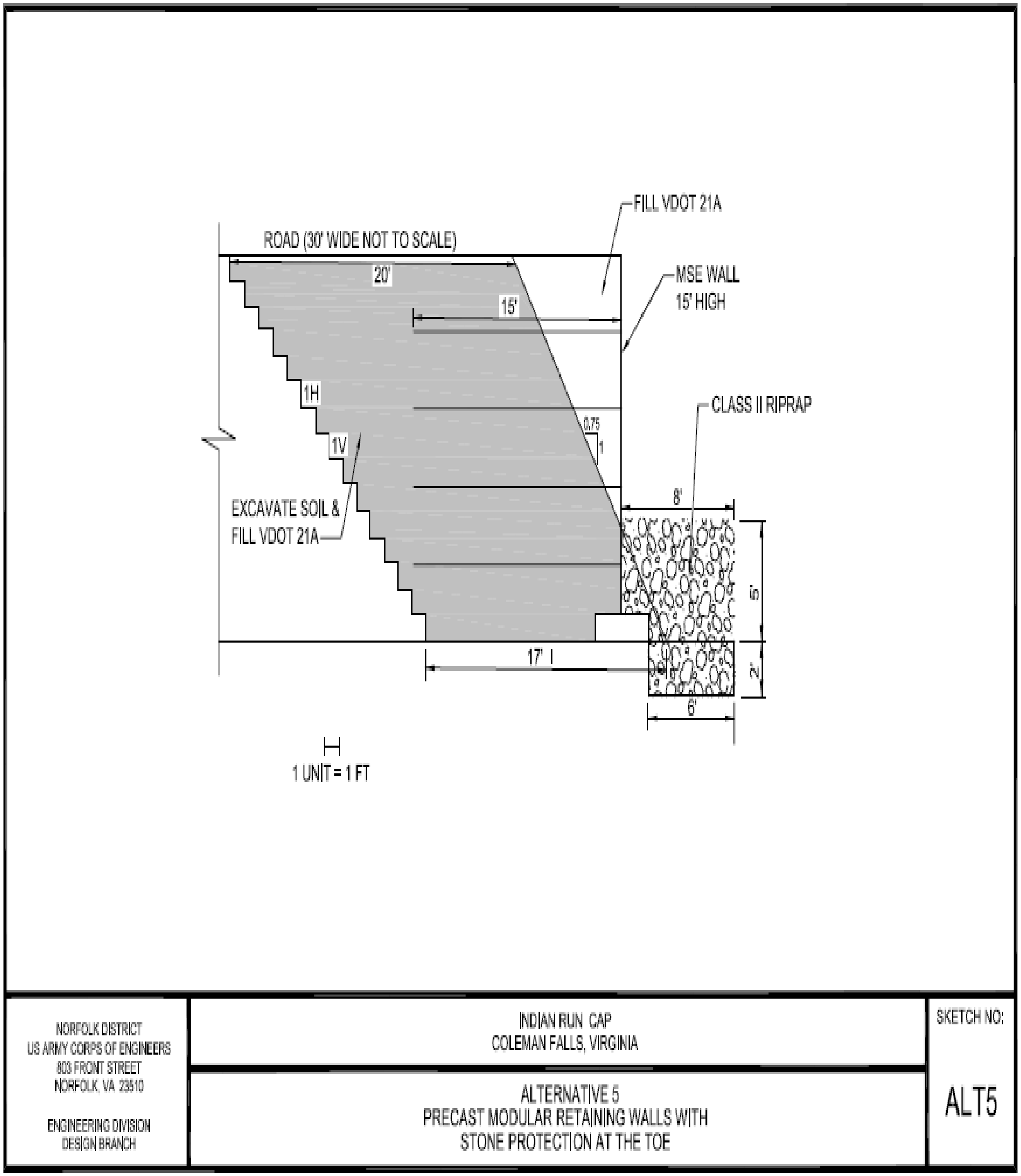

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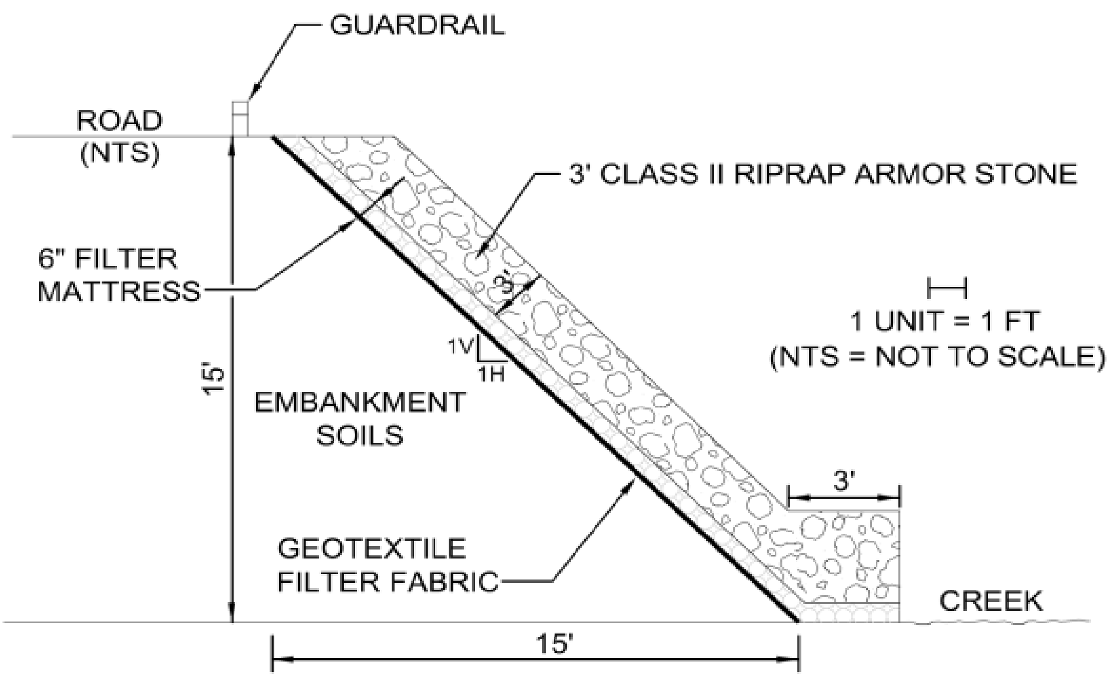

NORFOLK DISTRICT
US ARMY CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VA 23510

ENGINEERING DIVISION
DESIGN BRANCH

INDIAN RUN CAP
COLEMAN FALLS, VIRGINIA

ALTERNATIVE 6
PLACEMENT OF STONE
REVETMENT

SKETCH NO:
ALT6

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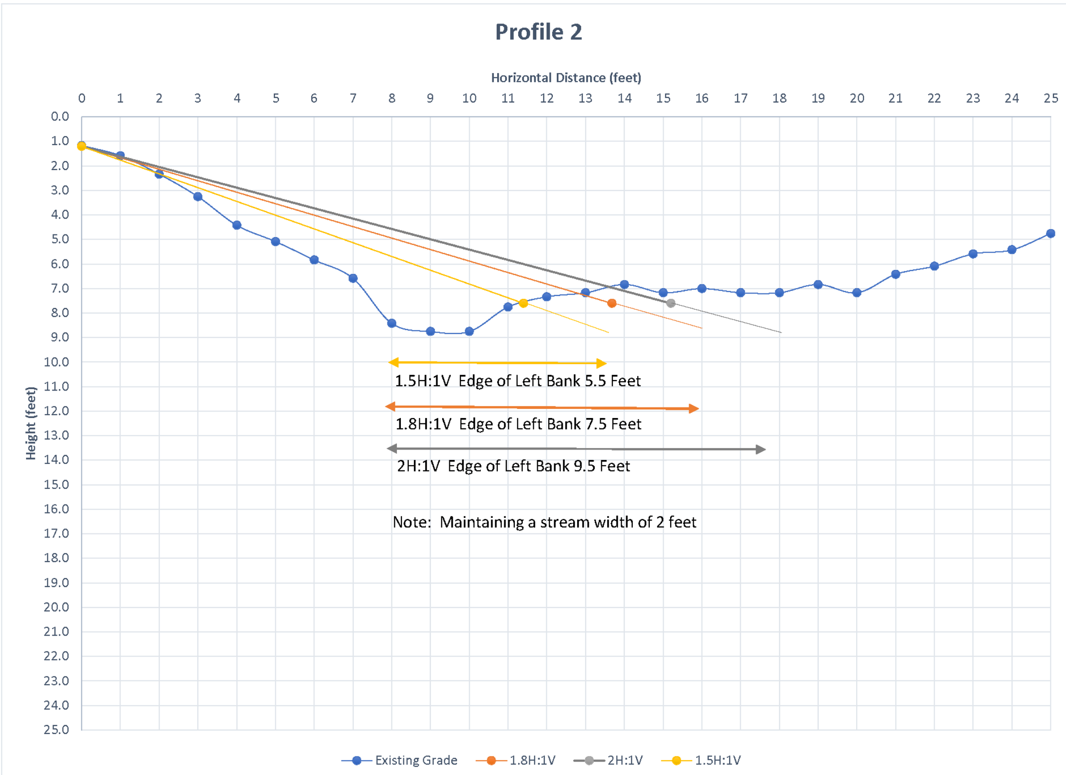

Martin, Zachary CIV USARMY CENAO (US)

From:	Martin, Zachary CIV USARMY CENAO (US)
Sent:	Monday, January 11, 2021 3:45 PM
To:	Brian D Hopper - NOAA Federal
Cc:	Christine Vaccaro - NOAA Federal; Logalbo, Alicia M CIV USARMY CENAO (USA)
Subject:	RE: [Non-DoD Source] Re: Indian Run Streambank Stabilization Project NEPA Scoping Request to NOAA (Vaccaro)

Hi Brian,

Your quick correspondence has been received and is appreciated. Thank you for providing your input on the likelihood of potential section 7 conflicts, and indicating that formal consultation should not be necessary. We will reach out to continue coordination as needed (e.g., major revisions to project plan) regarding this project.

Respectfully,
Zach Martin

From: Brian D Hopper - NOAA Federal <brian.d.hopper@noaa.gov>
Sent: Monday, January 11, 2021 1:24 PM
To: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Cc: Christine Vaccaro - NOAA Federal <christine.vaccaro@noaa.gov>
Subject: [Non-DoD Source] Re: Indian Run Streambank Stabilization Project NEPA Scoping Request to NOAA (Vaccaro)

Hi Zach,

Your email and attached letter dated January 8, 2021, regarding VDOT's proposed streambank stabilization project on the north bank of a tributary to Indian Run (James River basin) in Bedford County, Virginia, requested early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment.

Although shortnose sturgeon and Atlantic sturgeon originating from five Distinct Population Segments (DPS) are known to occur in the Chesapeake Bay and its rivers and tributaries, based on the activities associated with the project, the location of the project, and information you provided in your email and letter, we believe that these species will not be exposed to any direct or indirect effects of the action. Therefore, we do not believe a consultation in accordance with section 7 of the Endangered Species Act (ESA) is necessary. As such, no further coordination on this activity with the NMFS Protected Resources Division is necessary at this time. Should there be additional changes to the project plans or new information becomes available that changes the basis for this determination, further coordination should be pursued. Please contact me (brian.d.hopper@noaa.gov), should you have any questions regarding these comments.

Regards,
-Brian

On Fri, Jan 8, 2021 at 2:32 PM Christine Vaccaro - NOAA Federal <christine.vaccaro@noaa.gov> wrote:

> Hey Brian - could you take a look at this and see if its something we are concerned with and/or already handled under a form?
>
> Thanks!

Chris Vaccaro
Fisheries Biologist
Protected Resources Division
NOAA Fisheries, Greater Atlantic Region
Gloucester, MA
Phone: 978-281-9167
Email: christine.vaccaro@noaa.gov

For additional ESA Section 7 information and Critical Habitat guidance, please see:
www.greateratlantic.fisheries.noaa.gov/protected/section7

---------- Forwarded message ---------
From: **Martin, Zachary CIV USARMY CENAO (US)** <Zachary.Martin@usace.army.mil>
Date: Fri, Jan 8, 2021 at 2:22 PM
Subject: Indian Run Streambank Stabilization Project NEPA Scoping Request to NOAA (Vaccaro)
To: christine.vaccaro@noaa.gov <christine.vaccaro@noaa.gov>
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>

Good Afternoon,

Please see the attached NEPA scoping request for a streambank stabilization project on the north bank of a tributary to Indian Run (James River basin) in Bedford County, Virginia. Please provide a read receipt since a hard copy will not be sent due to the current circumstances. If you have any questions or require any additional information, please let me know.

Regards,

Zach Martin

Biologist, Planning and Policy Branch, Environmental Analysis Section

Norfolk District, U.S. Army Corps of Engineers

803 Front Street

Norfolk, VA 23510

Work: 757-201-7320

Cell: 910.232.3154

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Brian D. Hopper
Protected Resources Division
NOAA Fisheries
Greater Atlantic Regional Fisheries Office
200 Harry S Truman Parkway
Suite 460
Annapolis, MD 21401
410 267 5649
Brian.D.Hopper@noaa.gov
http://www.greateratlantic.fisheries.noaa.gov/

To help protect your privacy, Microsoft Office prevented automatic download of this picture from the Internet.

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Ms. Barbara Rudnick
U.S. Environmental Protection Agency, Region III
1650 Arch Street #3RA10
Philadelphia, PA 19103-2029

Dear Ms. Rudnick:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

Sincerely,

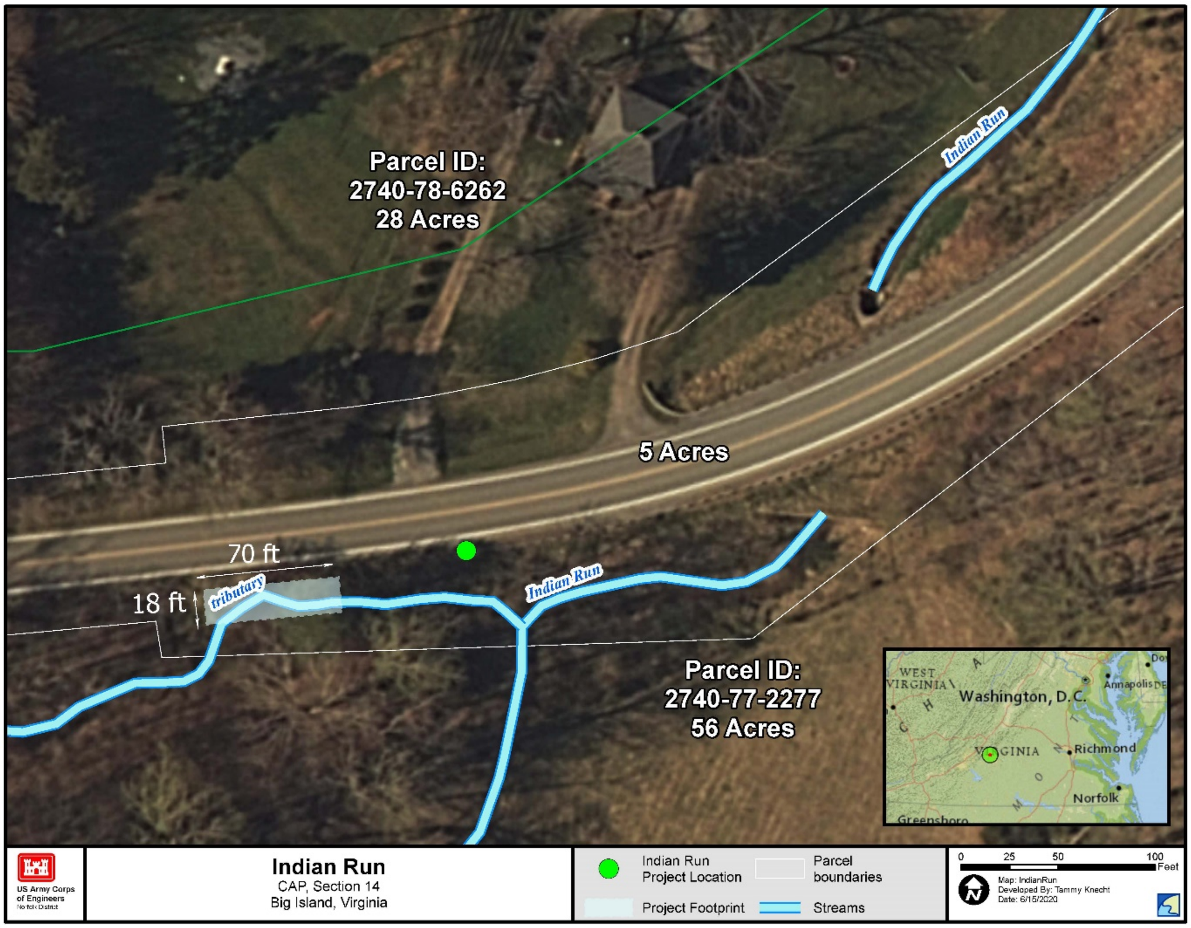
Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

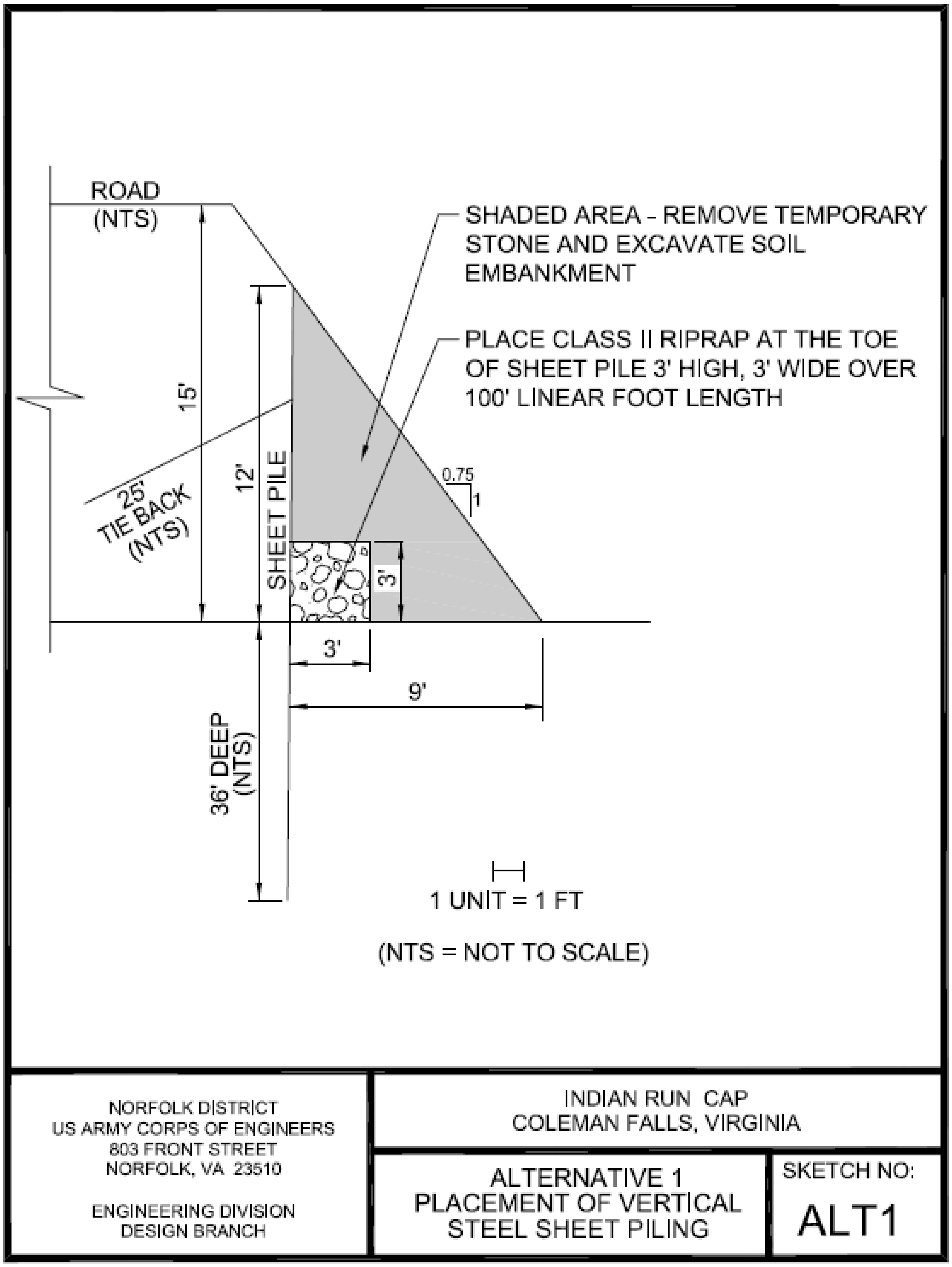
CC Carrie Traver
Stepan Nevshehirlian

Enclosure 1. Map of the project area.

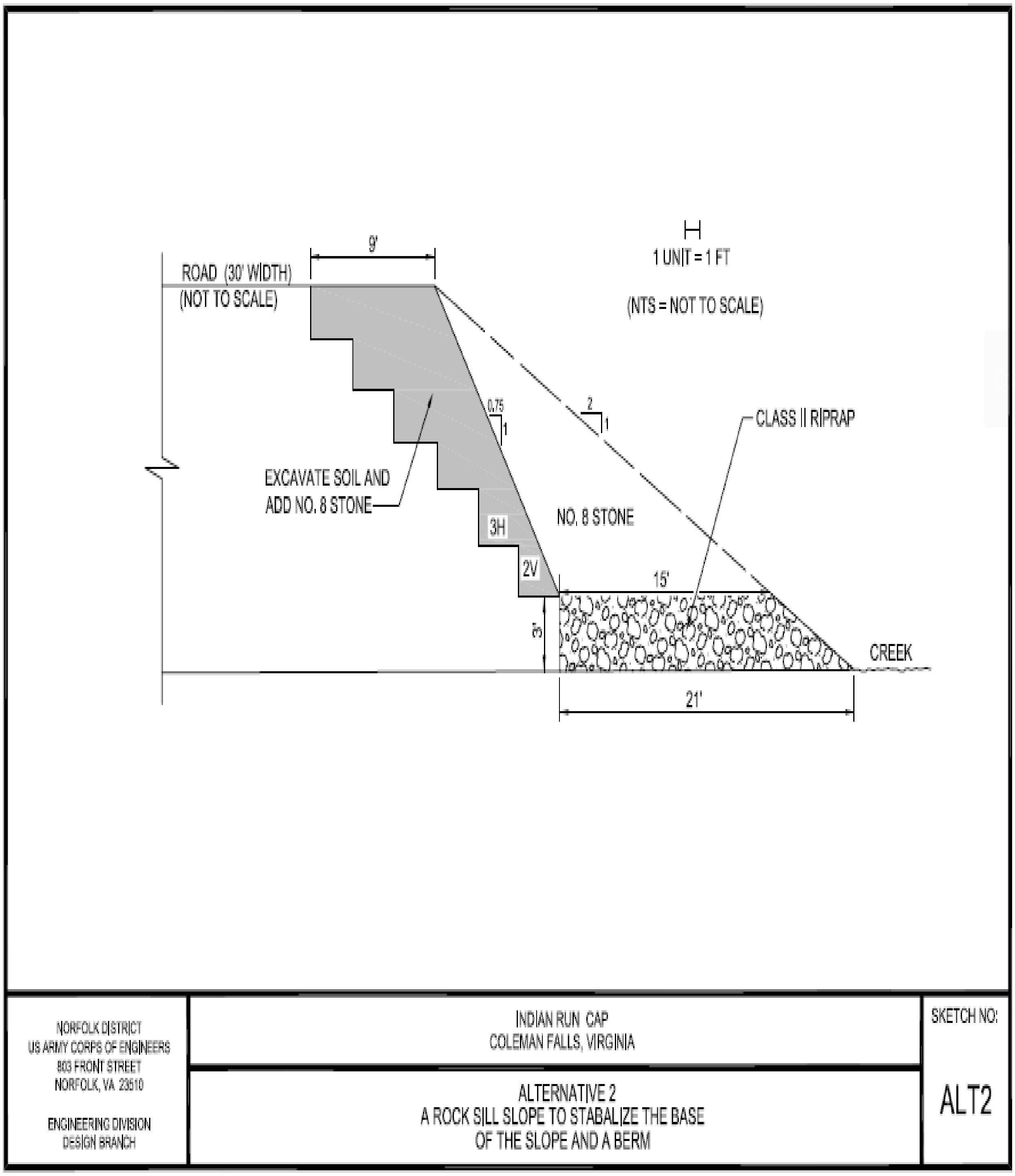


Enclosure 2. Drawings of Alternatives 1 – 6.

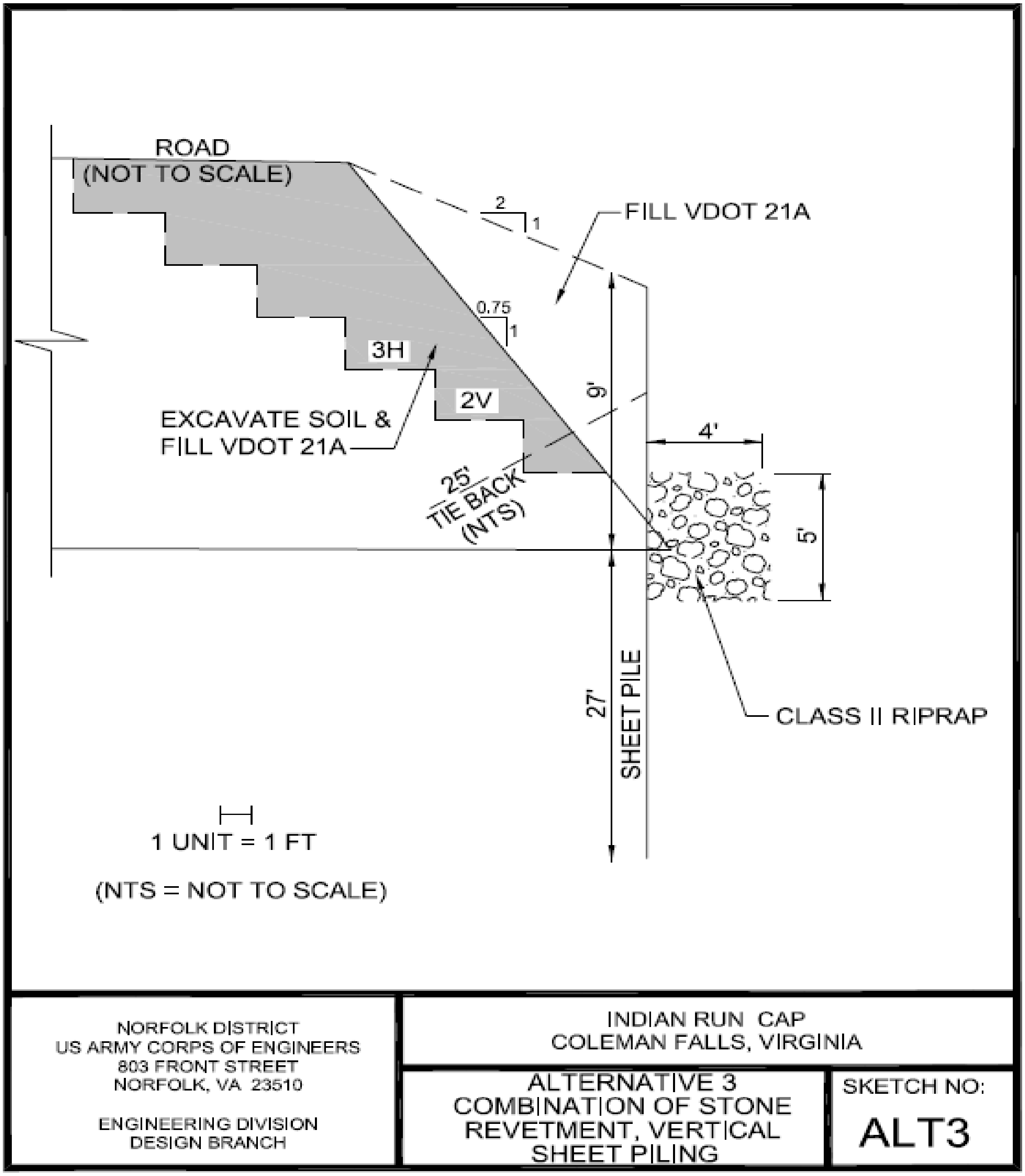
Alternative 1. Placement of vertical steel sheet piling



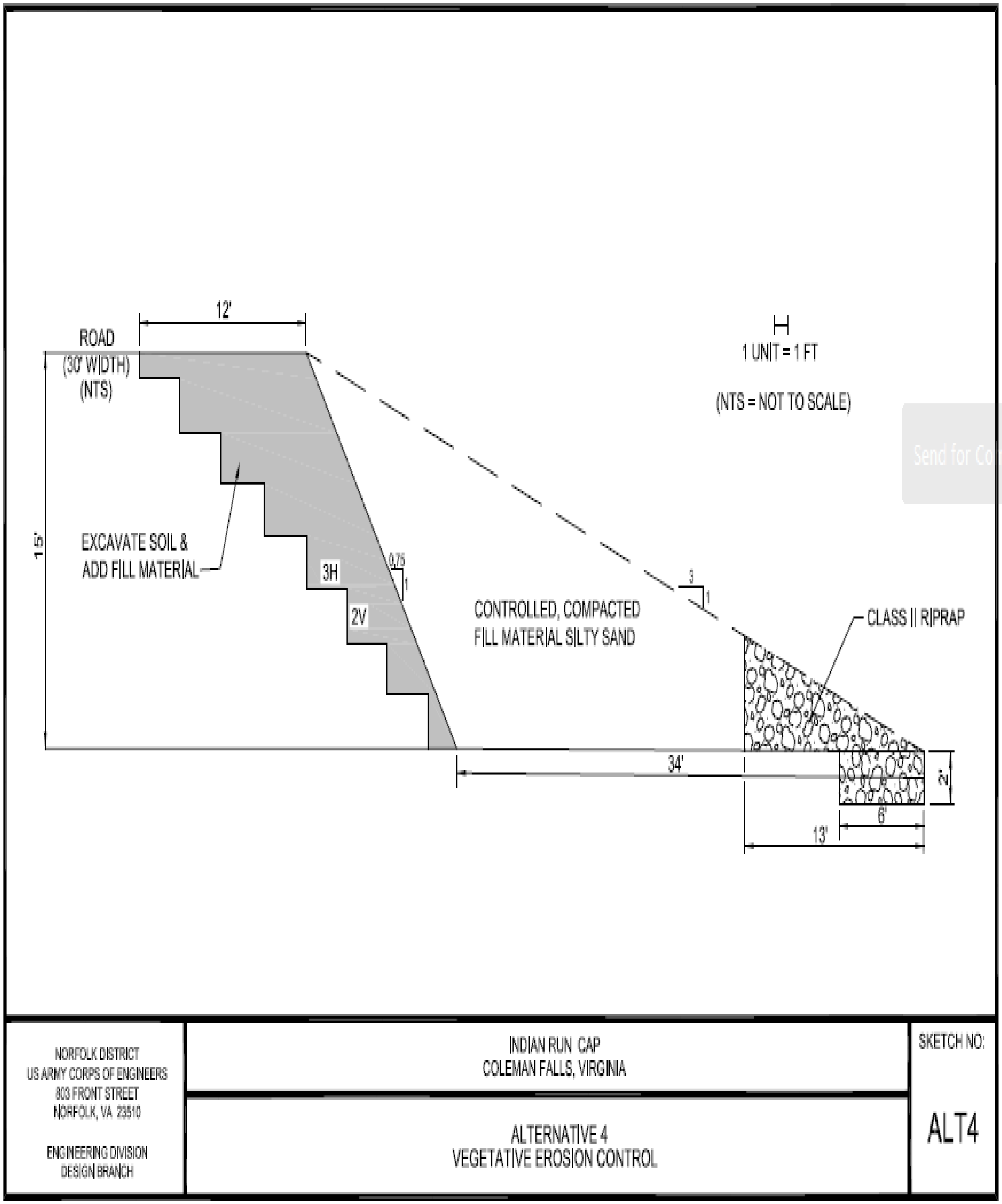
Alternative 2. A rock sill slope to stabilize the base of the slope and a berm



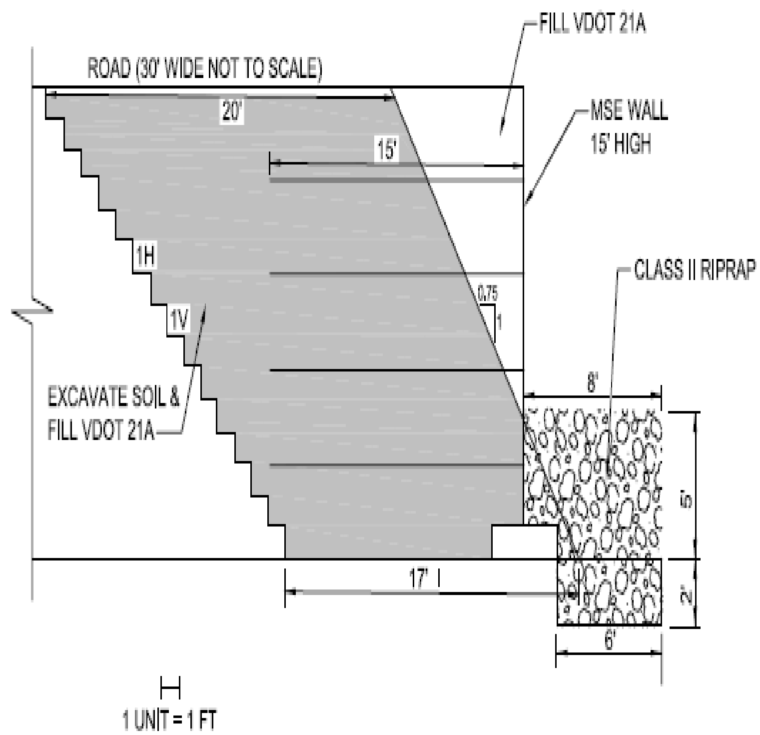
Alternative 3. Combination of stone revetment and vertical sheet piling



Alternative 4. Vegetated erosion control with slight re-routing of the stream

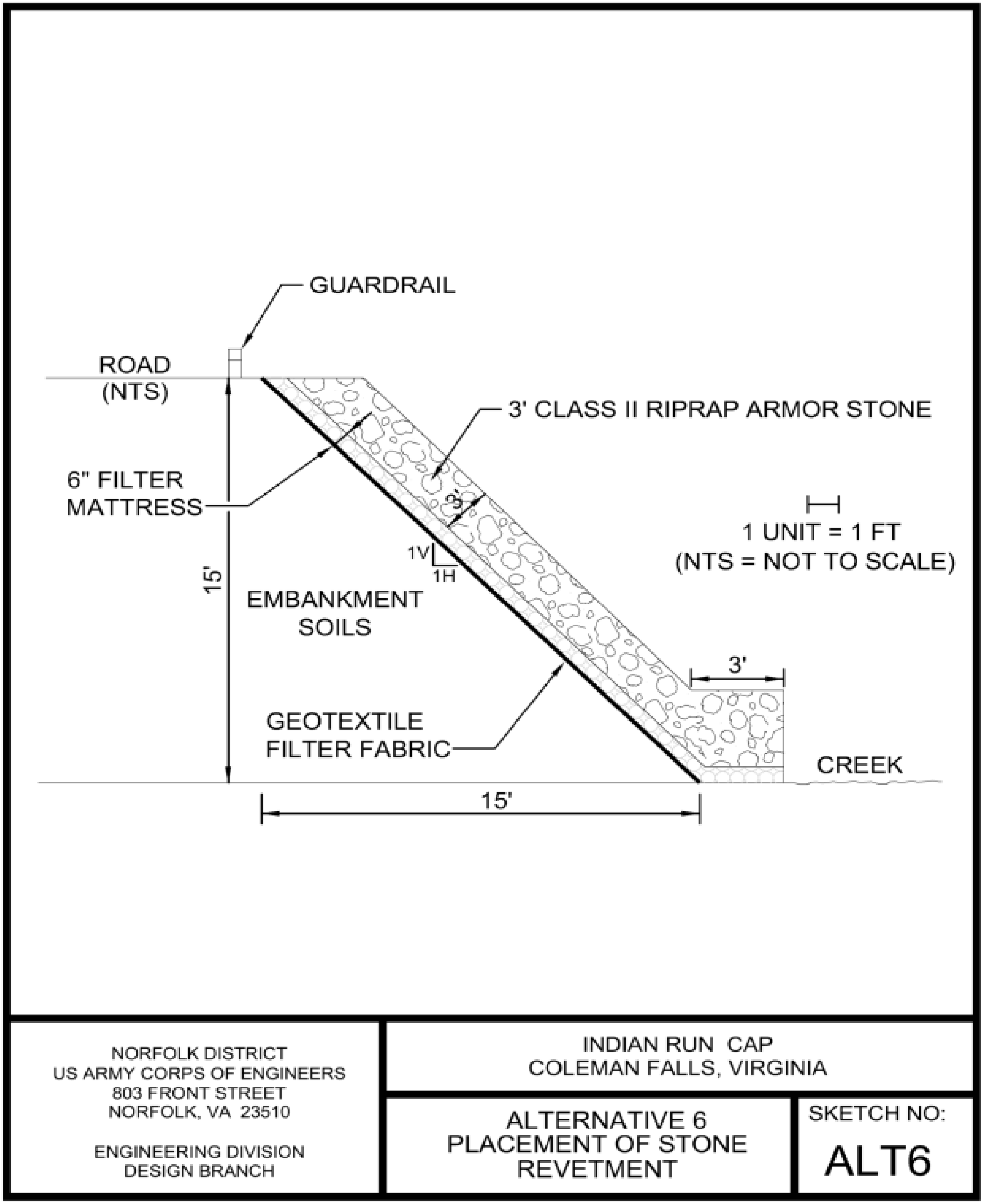


Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe

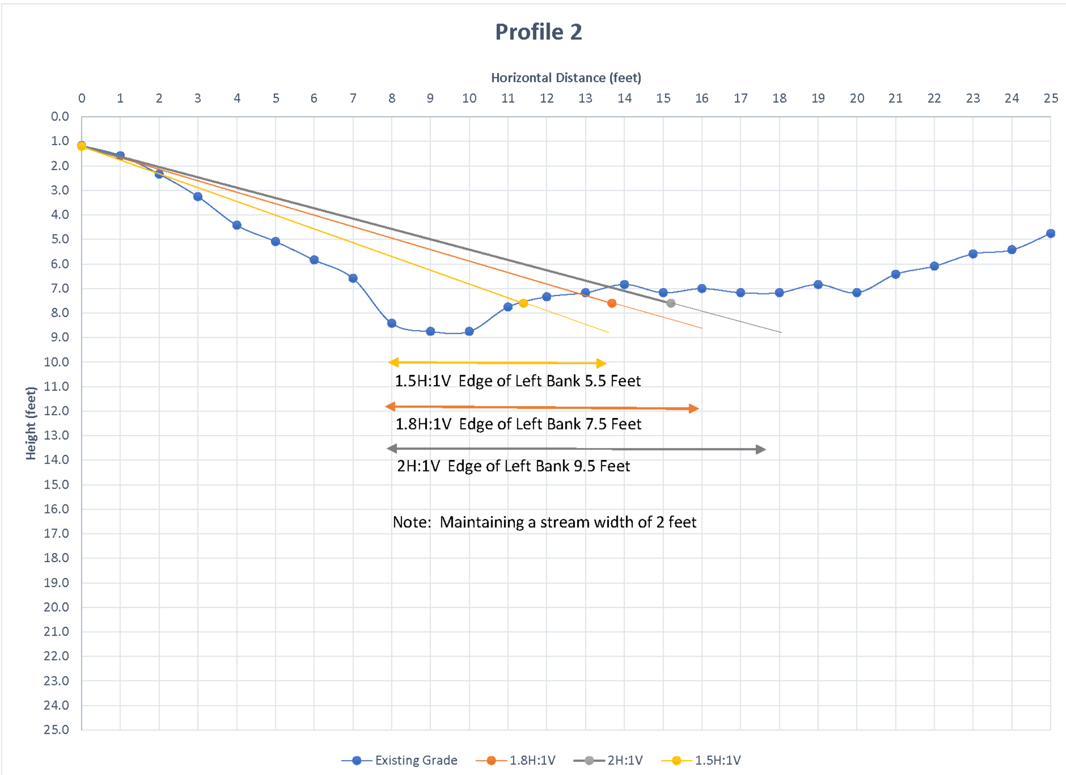


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Troy Andersen, Supervisory Fish and Wildlife Biologist
U.S. Fish and Wildlife Service, Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Dear Mr. Andersen:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

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The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

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Sincerely,

Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

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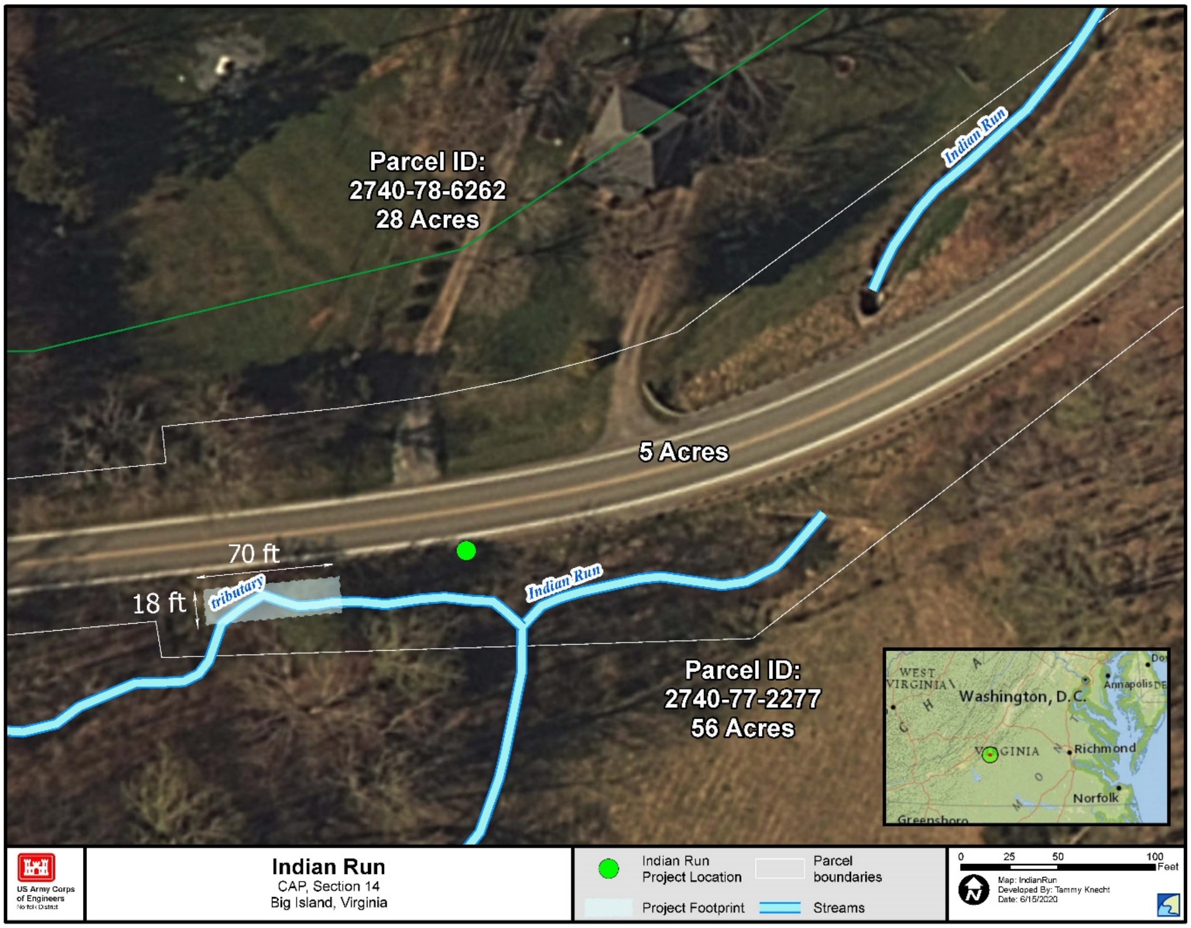

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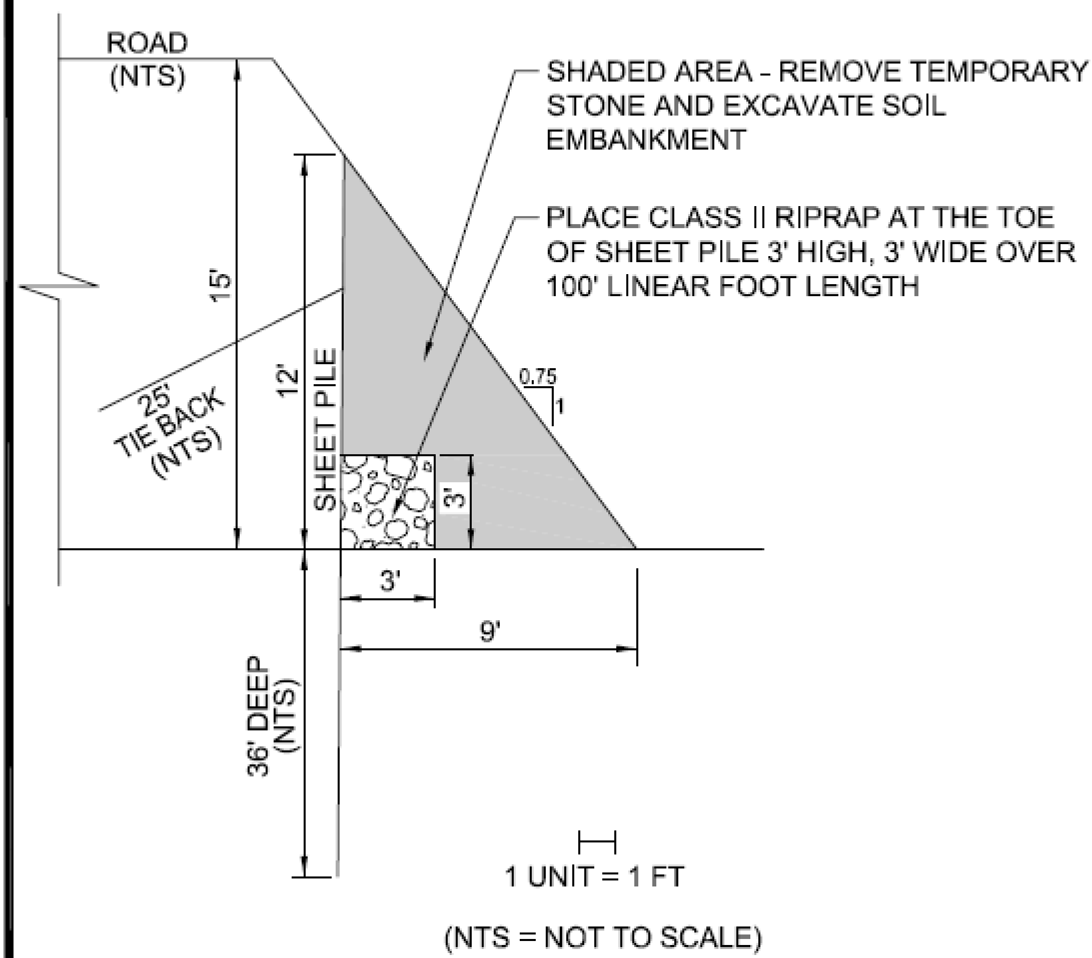
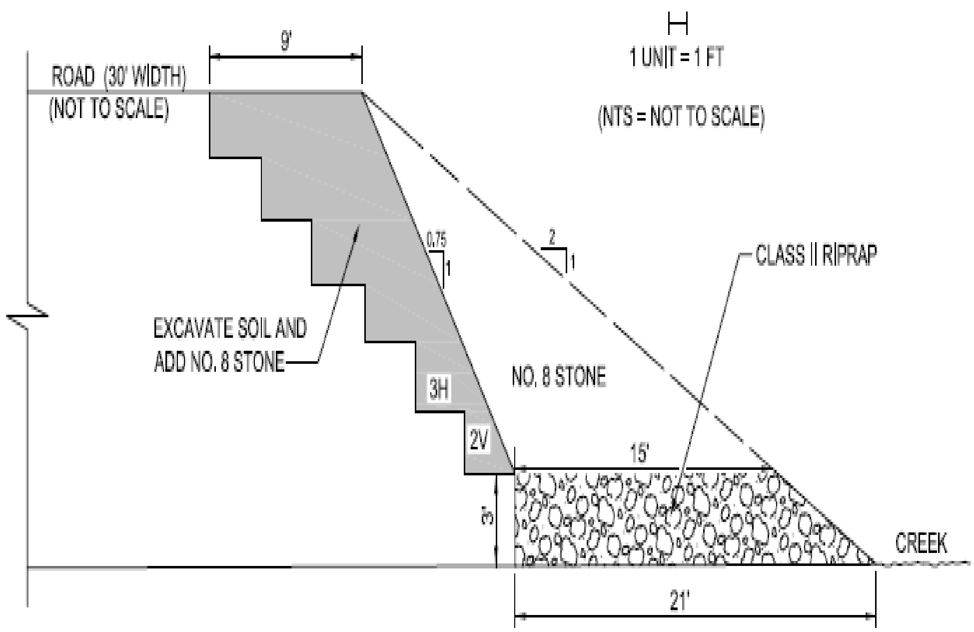


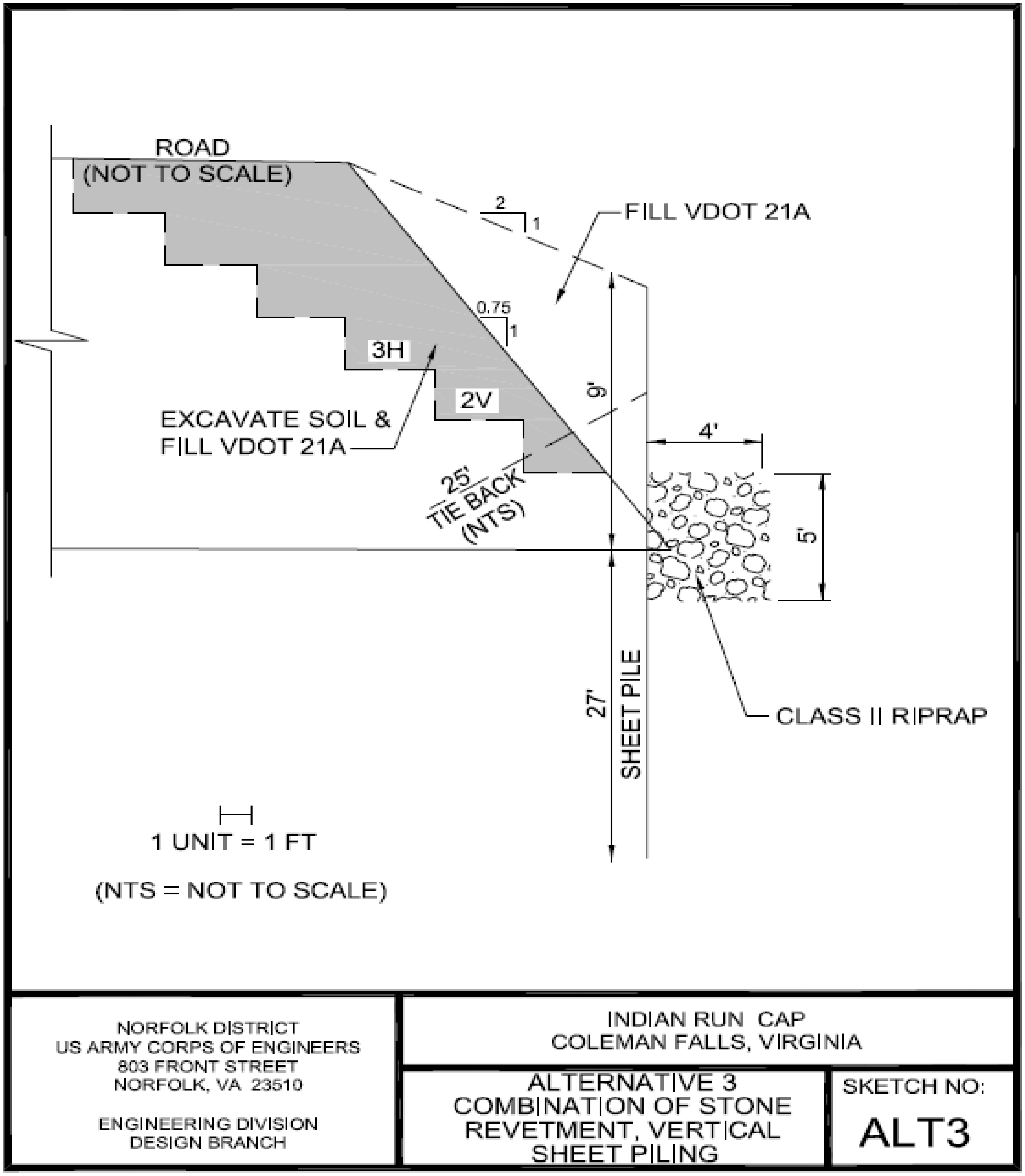
NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 1 PLACEMENT OF VERTICAL STEEL SHEET PILING	SKETCH NO: ALT1

Alternative 2. A rock sill slope to stabilize the base of the slope and a berm

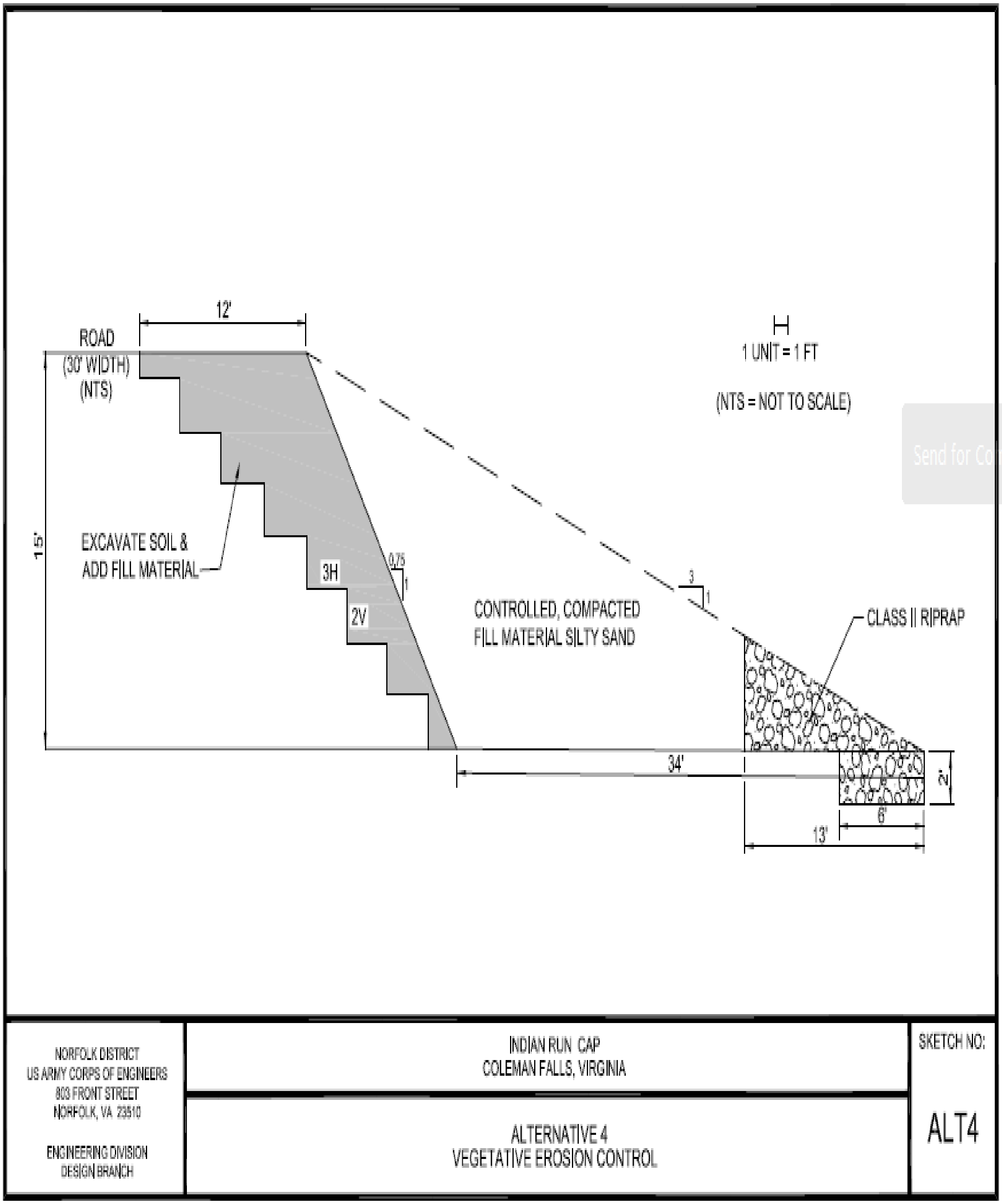


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2

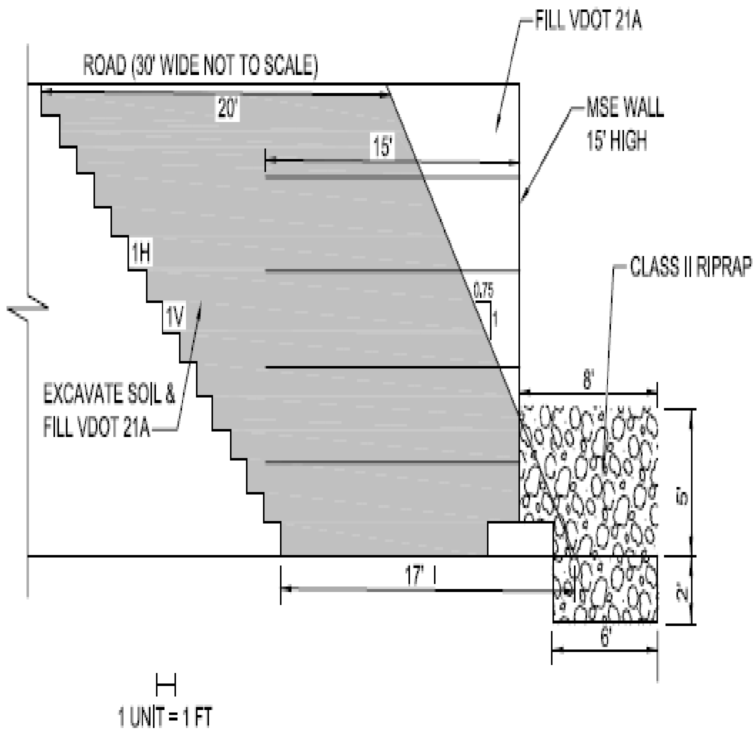
Alternative 3. Combination of stone revetment and vertical sheet piling



Alternative 4. Vegetated erosion control with slight re-routing of the stream



Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

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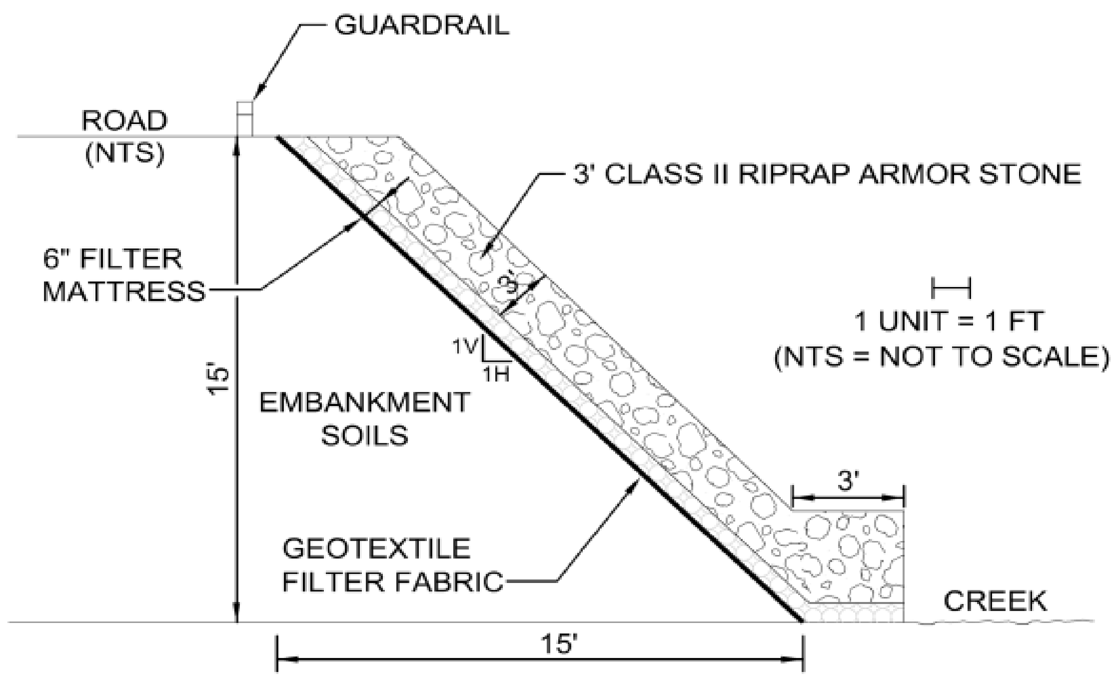
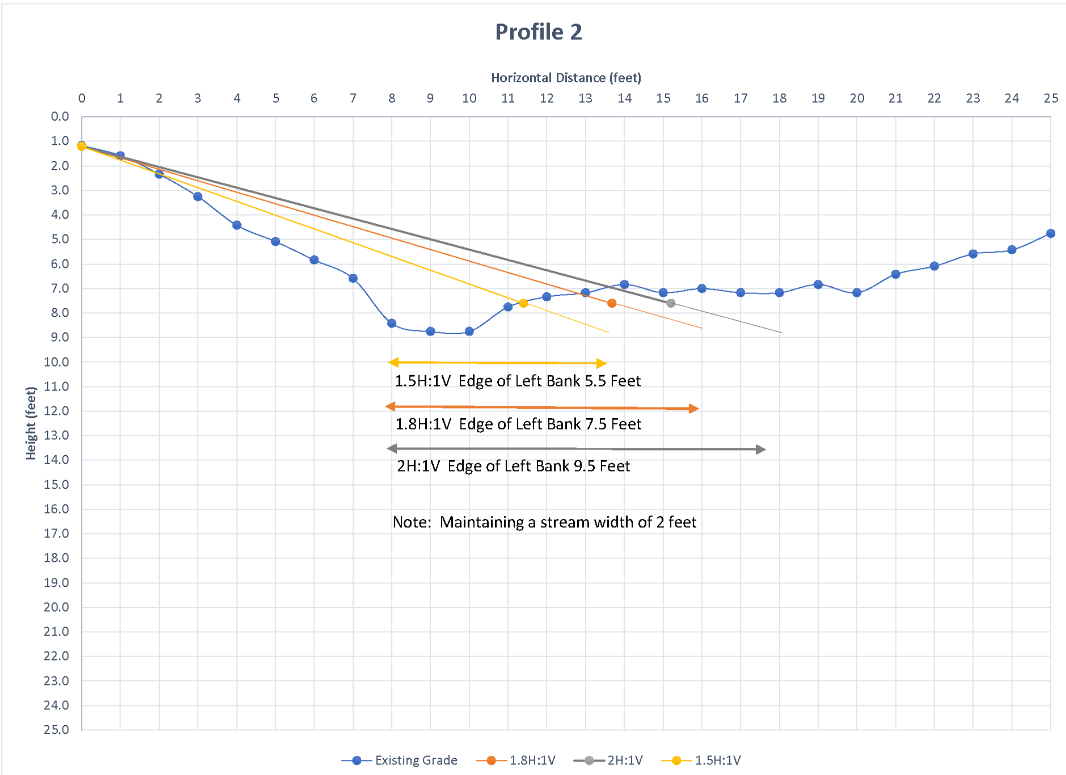


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



Martin, Zachary CIV USARMY CENAO (US)

From: Martin, Zachary CIV USARMY CENAO (US)
Sent: Wednesday, March 24, 2021 11:09 AM
To: VirginiaFieldOffice@fws.gov
Cc: Andersen, Troy M; Logalbo, Alicia M CIV USARMY CENAO (USA)
Subject: Project review package for the Indian Run Emergency Streambank Protection Feasibility Study
Attachments: Review Package.zip

Categories: Indian Run CAP Project

Dear Mr. Andersen (or whom it may concern),

On behalf of U.S. Army Corps of Engineers (USACE), Norfolk District, please find the attached zipped folder of project review materials pursuant to Section 7 of the Endangered Species Act for the Indian Run Emergency Streambank Protection Feasibility Study (Bedford County, Virginia). Virginia Department of Transportation (VDOT) is the nonfederal sponsor for the study.

The ESA Section 7 determinations were No Effect on federally listed species (aside from Northern long-eared bat [NLEB]) and Critical Habitat (including NLEB) for the study. The determination for NLEB was May Affect, Likely to Adversely per the NLEB Determination key and informal coordination with USFWS; the results of our analysis and coordination indicate the project may rely on the NLEB Final 4(d) rule. The project review package folder includes:

(1) "Appendix A-1_USFWS Biological Assessment_202100315.pdf" - A Biological Assessment with project description, determinations, and supporting attachments. Supporting attachments include:
   a. Attachment 1: Project designs
   b. Attachment 2: Official Species List
   c. Attachment 3: Other documentation supporting determinations (VDWR VaFWIS + VDCR Natural Heritage reports)
   d. Attachment 4: NLEB determination key verification letter and results

(2) "online_project_review_certification_SIGNED_20210323.pdf" – Self-certification Letter

(3) "Informal email coordination with VA Field Office on Indian Run project.pdf" – record of informal coordination with USFWS on this project

(4) "VDWR_coordination with VDWR Malacologist Brian Watson on Indian Run project.pdf" – record of coordination with Brian Watson (VDWR) regarding potential impacts to fw mussels and need for surveys; this coordination is referenced in the Biological Assessment

Should you have any questions or concerns, or would like a copy of the Draft Integrated Feasibility Report / Environmental Assessment for this study, please contact me.

Thank you in advance for your time.

Zach Martin
Biologist, Planning and Policy Branch, Environmental Analysis Section
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510

Work: 757-201-7320
Cell: 910.232.3154

Martin, Zachary CIV USARMY CENAO (US)

From: Martin, Zachary CIV USARMY CENAO (US)
Sent: Thursday, May 6, 2021 7:58 AM
To: 'Andersen, Troy M'
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA); Case, Rachel L
Subject: RE: [EXTERNAL] Indian Run Shoreline Protection Project Description

Hi Troy,

Thank you for your confirmation. I appreciate the help from you and your team along the way. I look forward to coordinating with you again on future projects.

Zach

From: Andersen, Troy M <troy_andersen@fws.gov>
Sent: Wednesday, May 5, 2021 2:17 PM
To: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>; Case, Rachel L <rachel_case@fws.gov>
Subject: [Non-DoD Source] RE: [EXTERNAL] Indian Run Shoreline Protection Project Description

Zach:

I checked-in with our project review folks and can confirm ESA coordination is complete. Additionally, I concur that based on the small extent of the project a FWCA report is not necessary thus your FWCA requirements are also complete.

V/R
Troy

Troy Andersen
Assistant Field Office Supervisor – Endangered Species
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061
804-824-2428

From: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Sent: Monday, May 3, 2021 10:26 AM
To: Andersen, Troy M <troy_andersen@fws.gov>

Cc: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>; Guy, Chris <chris_guy@fws.gov>
Subject: RE: [EXTERNAL] Indian Run Shoreline Protection Project Description

Good morning,

I'm hoping discuss FWCA and ESA coordination status and needs for the Indian Run project. Please see the email below. Are you available to discuss today via phone? Or, please let us know if you feel only simple email coordination is needed at this time to confirm completion of FWCA and ESA compliance requirements.

Respectfully,

Zach Martin
Biologist, Planning and Policy Branch, Environmental Analysis Section
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510
Work: 757-201-7320
Cell: 910.232.3154

From: Martin, Zachary CIV USARMY CENAO (US)
Sent: Tuesday, April 27, 2021 12:00 PM
To: Andersen, Troy M <troy_andersen@fws.gov>
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>; chris_guy@fws.gov
Subject: FW: [EXTERNAL] Indian Run Shoreline Protection Project Description

Hello Troy,

I hope you are doing well. We are seeking your review and determination if preparation of a Fish and Wildlife Coordination Act Report is required for the Indian Run Streambank Protection Project. A project description is attached, as well as an email delivering our Project Review Package for Section 7 of the ESA to you and your team. With the very small extent of the project (100 ft project) and limited impacts of the project (much of this project is placement of riprap on a previously riprapped area), and a slight rerouting of the stream with vegetative plantings we are recommending that we do not prepare a report on this particular project but would need your confirmation that our FWCA requirements are complete. Initially, we discussed this with Chris Guy, and he concurred with this FWCA approach for this project; however, he explained that this coordination is most appropriate with your office. I am available much of this week to discuss the project further (my cell number is best), and I am also curious to know the status of the ESA Project Review. Let's continue the conversation and arrange for a meeting as needed in follow up emails.

Respectfully,

Zach Martin
Biologist, Planning and Policy Branch, Environmental Analysis Section
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510
Work: 757-201-7320
Cell: 910.232.3154

From: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>
Sent: Tuesday, March 23, 2021 1:39 PM
To: Guy, Chris <chris_guy@fws.gov>
Cc: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Subject: RE: [EXTERNAL] Indian Run Shoreline Protection Project Description

Chris,
Talk to you soon at 2 pm! Also, if you have time, we have some funding to assess if the USACE in coordination with the state can do a restoration project for the nesting shorebirds displaced from the Hampton Roads Bridge Tunnel Construction (it is not a mitigation project but rather a potential restoration project). Just wanted to let you know about that potential project and see if you have any staff that may be interested to be on the team or do the FWCAR. Thank you in advance.
Alicia

Alicia Logalbo
Norfolk District, U.S. Army Corps of Engineers
Planning and Policy Branch
Chief, Environmental Analysis Section
803 Front Street
Norfolk, VA 23510

(757) 201-7210 office
(757) 335-8075 cell

Alicia.Logalbo@usace.army.mil

From: Guy, Chris <chris_guy@fws.gov>
Sent: Tuesday, March 23, 2021 11:46 AM
To: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>
Cc: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Subject: [Non-DoD Source] Re: [EXTERNAL] Indian Run Shoreline Protection Project Description

Give me a call and we can discuss your needs I am available today until 2:30.

Christopher P. Guy
Acting Habitat Goal Implementation Team Coordinator Chesapeake Bay Program
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Md 21401
410-573-4529 (office)
443-758-8628 (cell)

From: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>
Sent: Friday, March 19, 2021 6:50 PM
To: Guy, Chris <chris_guy@fws.gov>

Cc: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Subject: [EXTERNAL] Indian Run Shoreline Protection Project Description

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Chris,
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Alicia

Alicia Logalbo
Norfolk District, U.S. Army Corps of Engineers
Planning and Policy Branch
Chief, Environmental Analysis Section
803 Front Street
Norfolk, VA 23510

(757) 201-7210 office
(757) 335-8075 cell

Alicia.Logalbo@usace.army.mil

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Rene Hypes, Environmental Review Coordinator
Virginia Department of Conservation and Recreation, Natural Heritage Program
600 East Main Street, 24th Floor
Richmond, VA 23219

Dear Ms. Hypes:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

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We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

Sincerely,

Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

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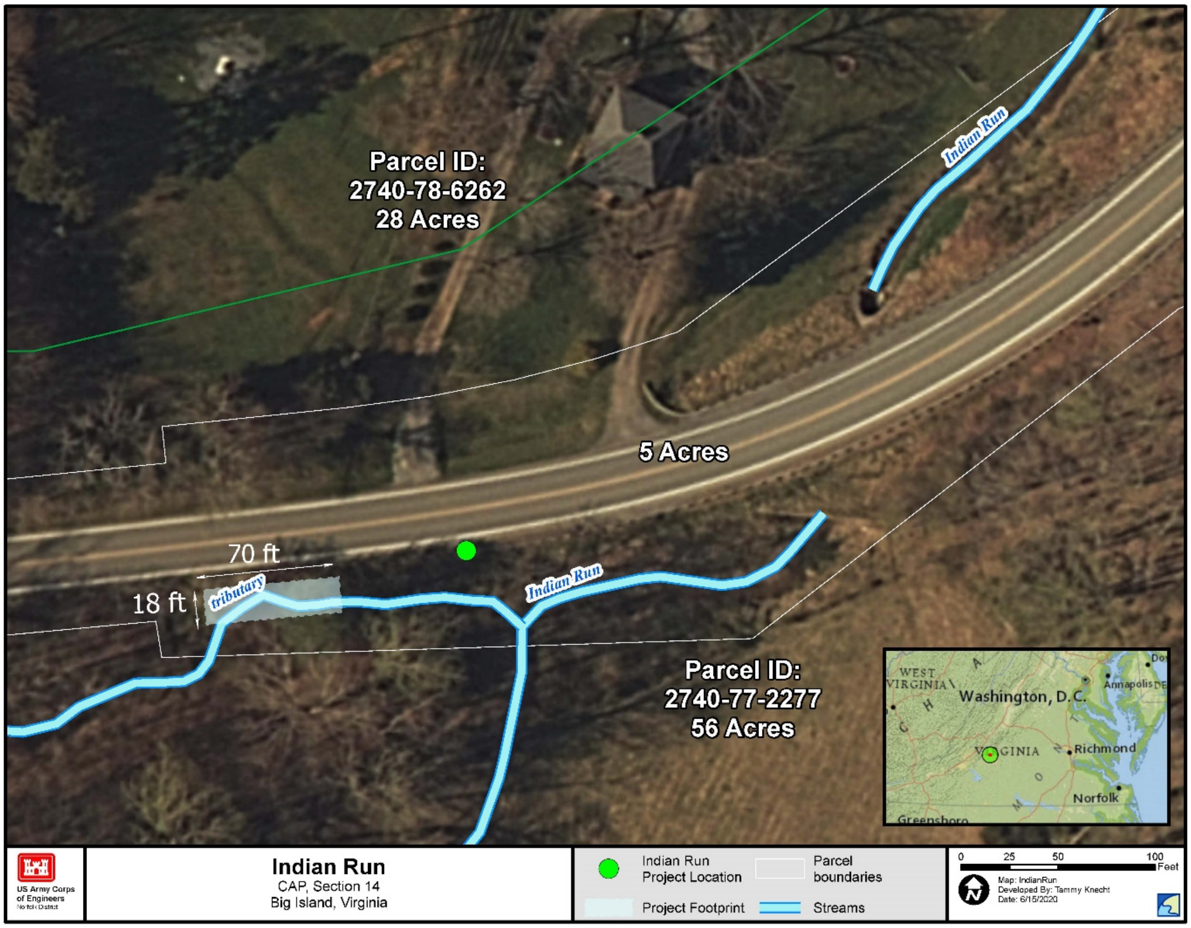
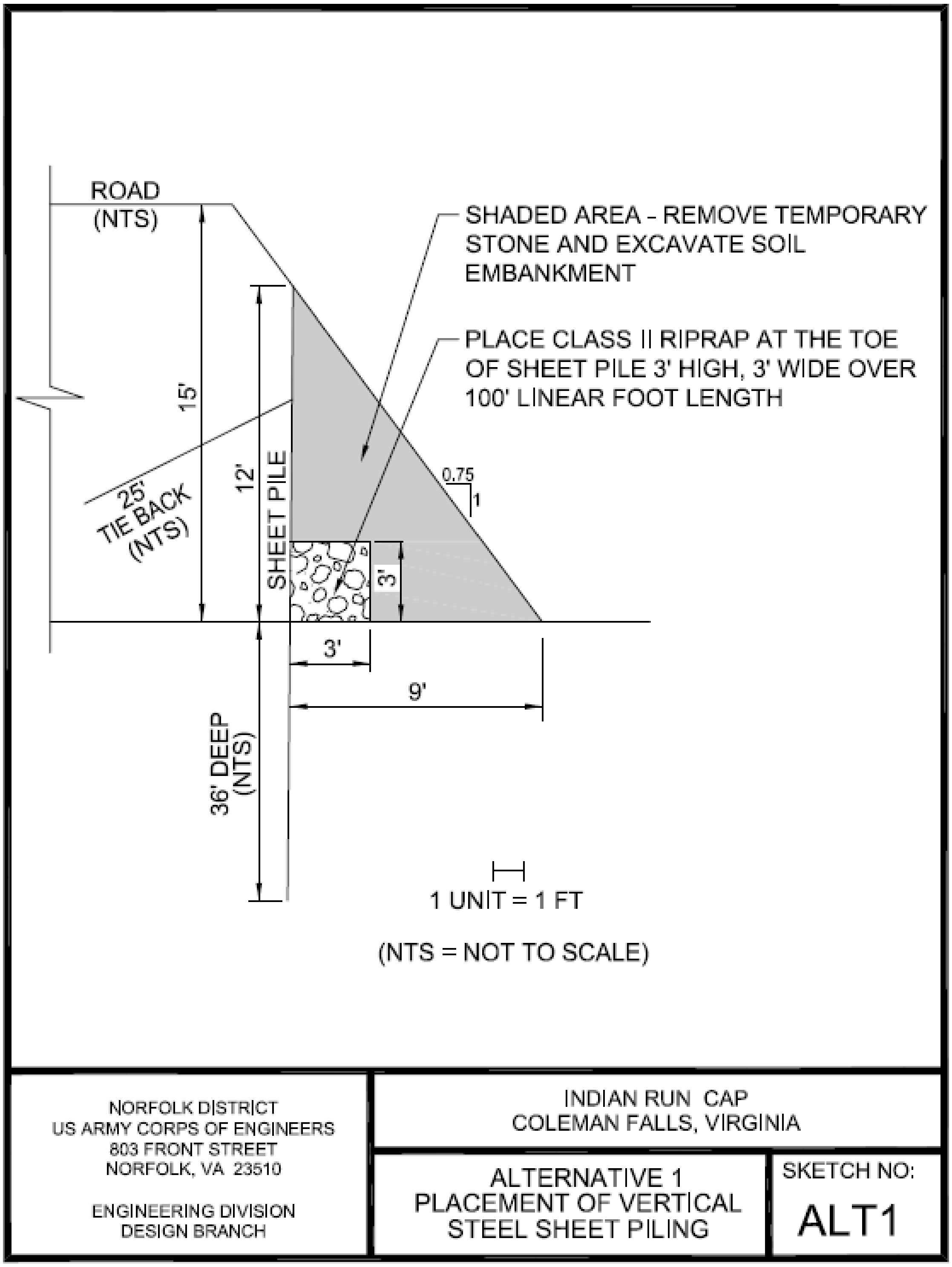


Enclosure 2. Drawings of Alternatives 1 – 6.

Alternative 1. Placement of vertical steel sheet piling



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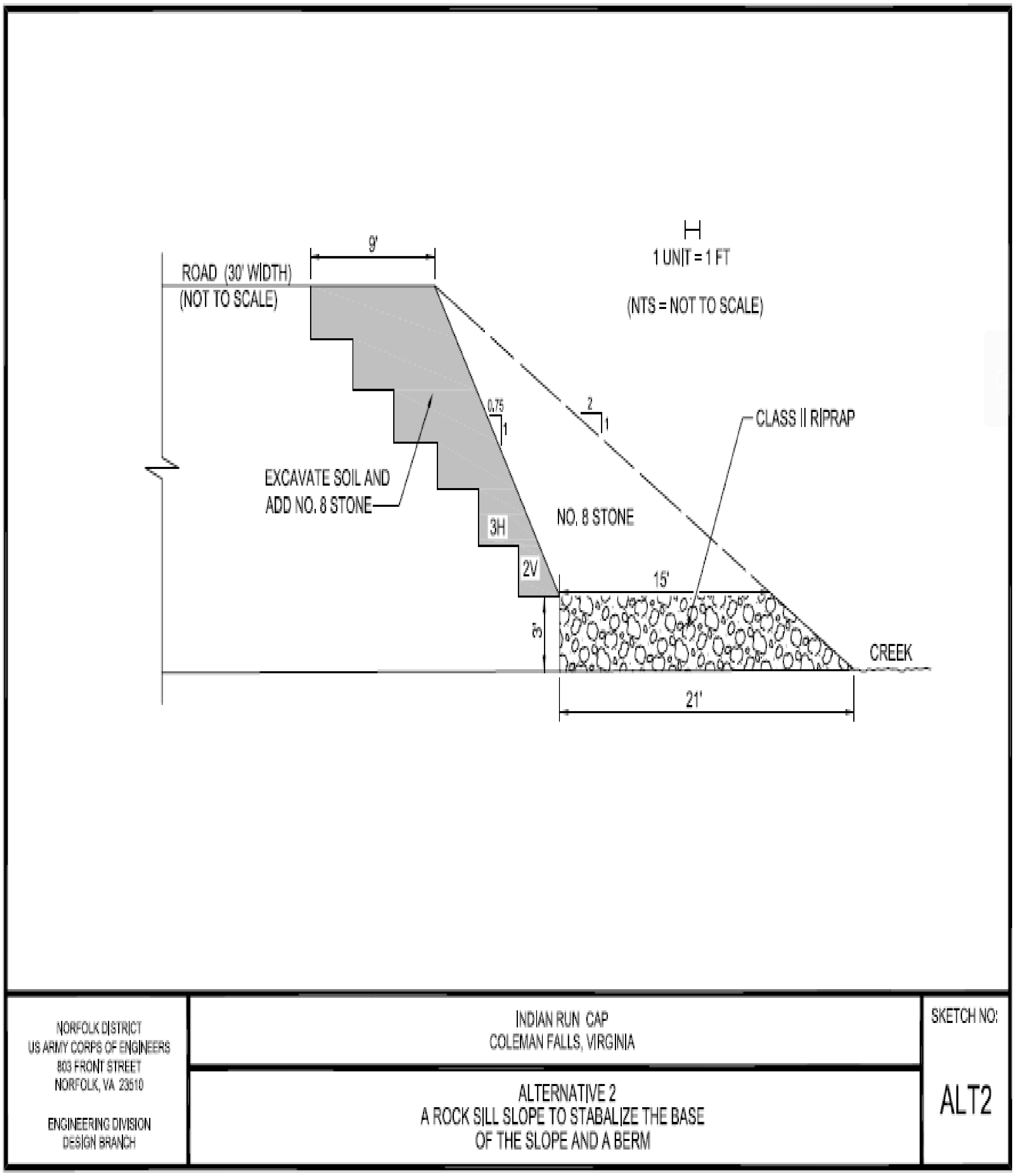
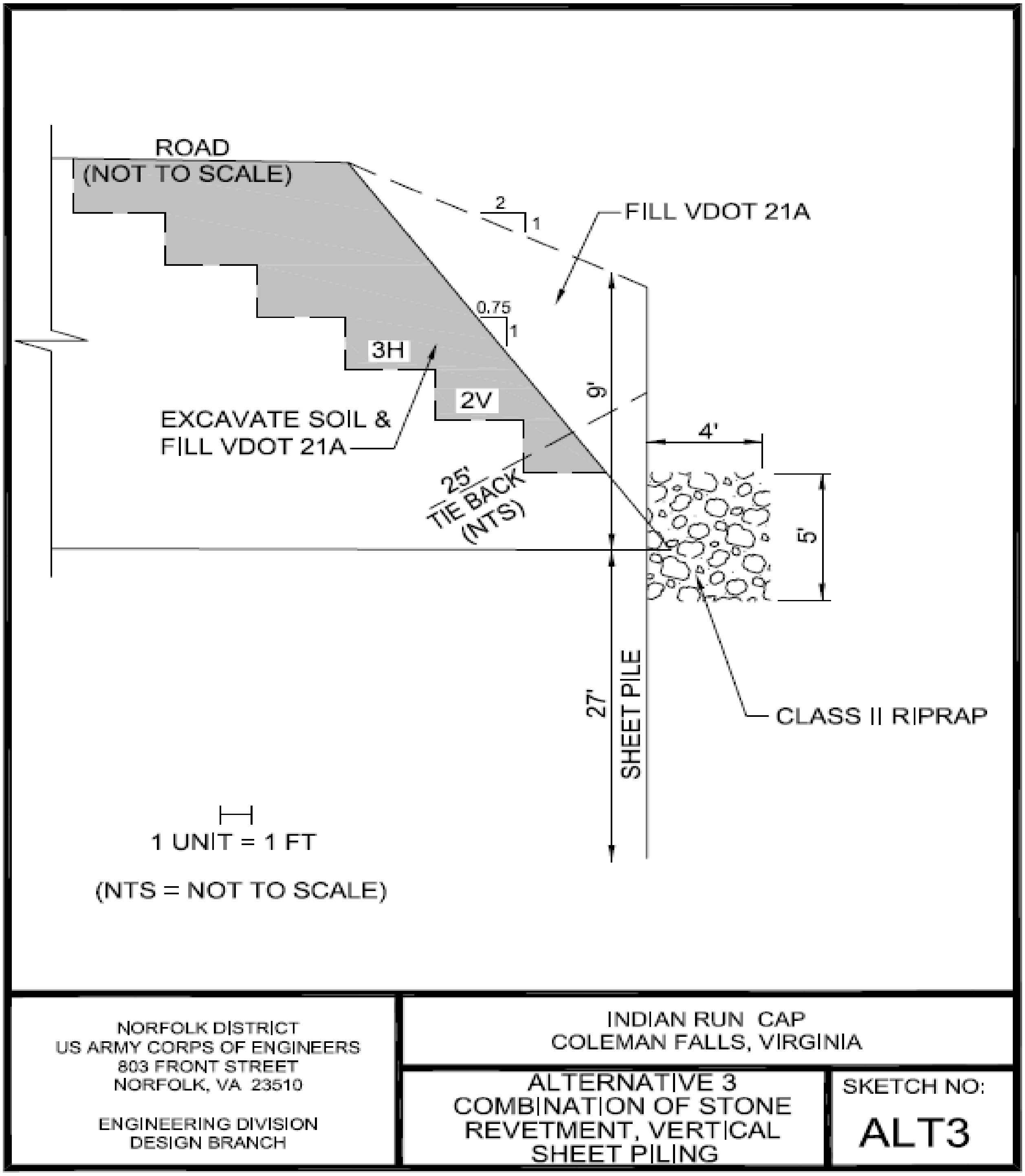
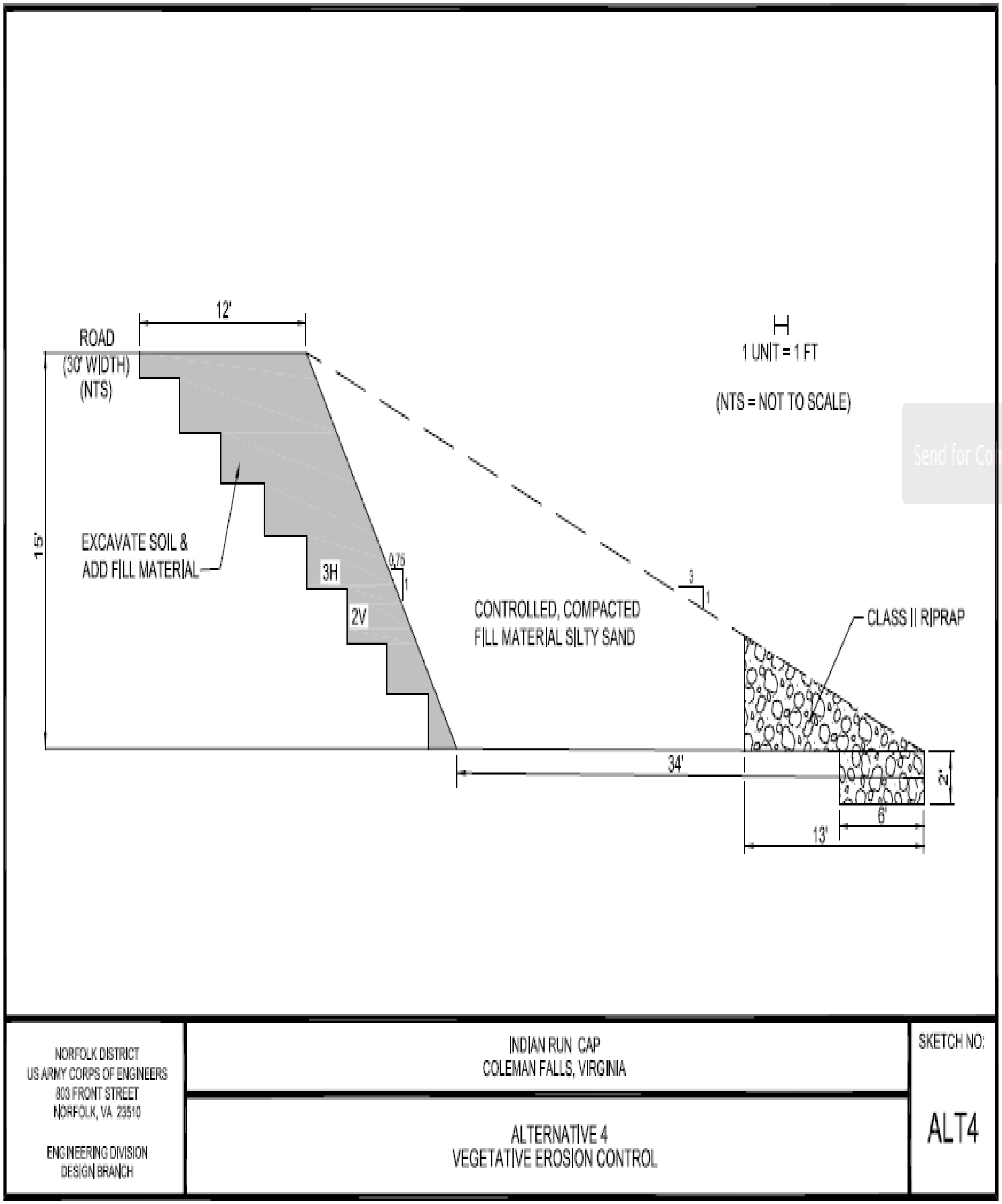


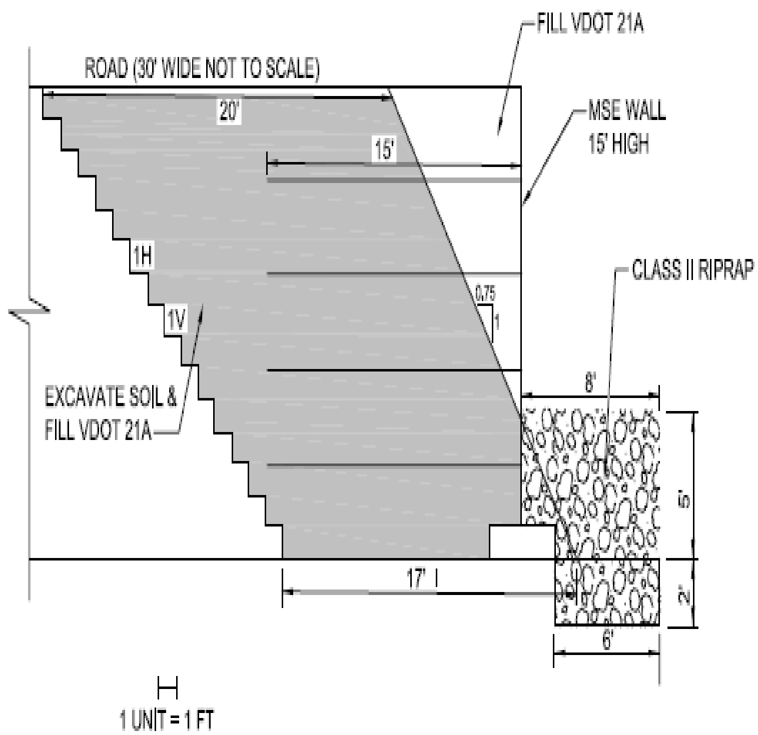
Alternative 3. Combination of stone revetment and vertical sheet piling



Alternative 4. Vegetated erosion control with slight re-routing of the stream

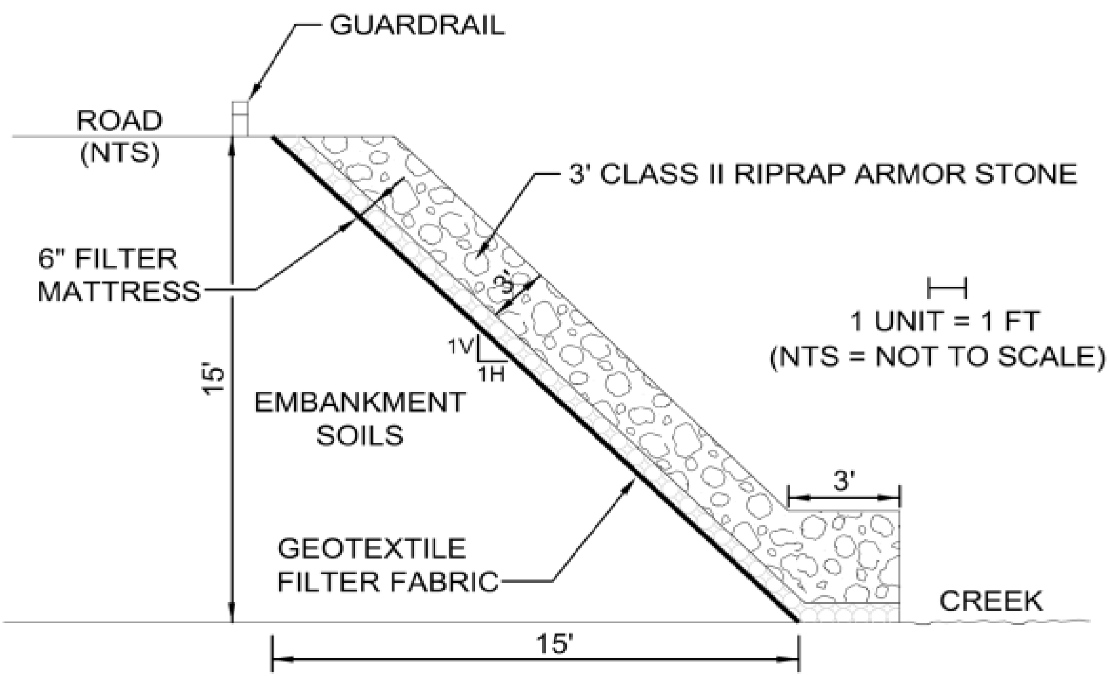


Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



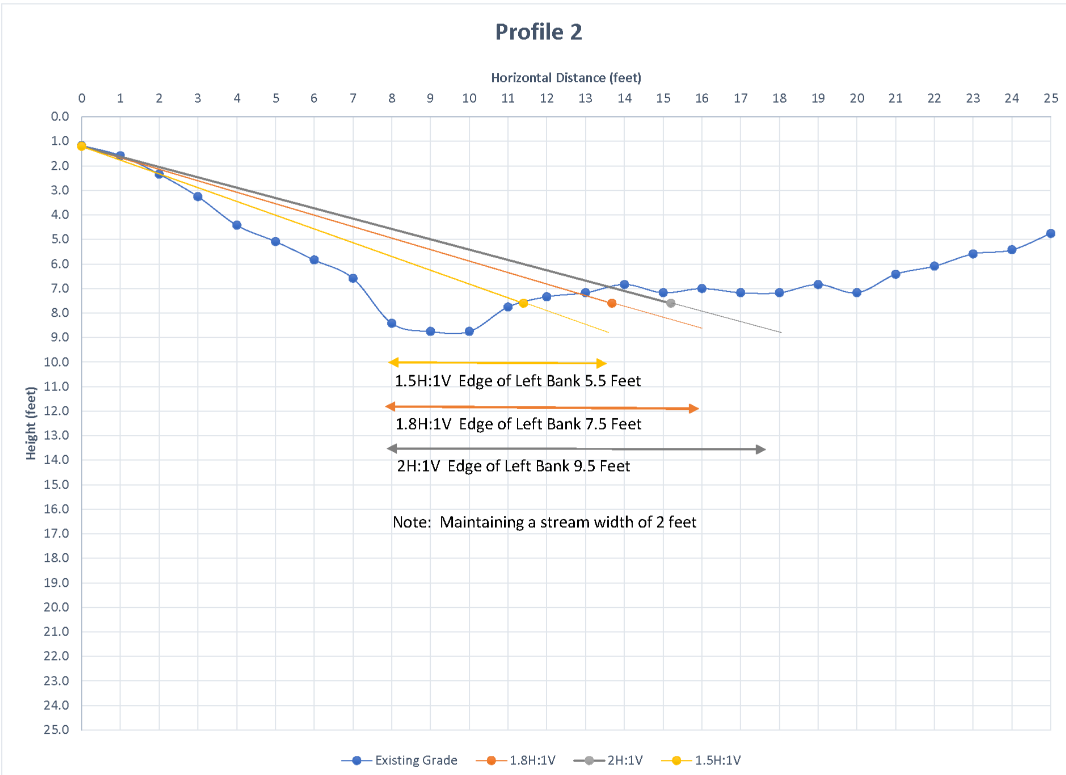
NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Valerie Fulcher, Executive Secretary Senior
Virginia Department of Environmental Quality
Office of Environmental Impact Review
P.O. Box 1105
Richmond, VA 23218-1105

Dear Ms. Fulcher:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

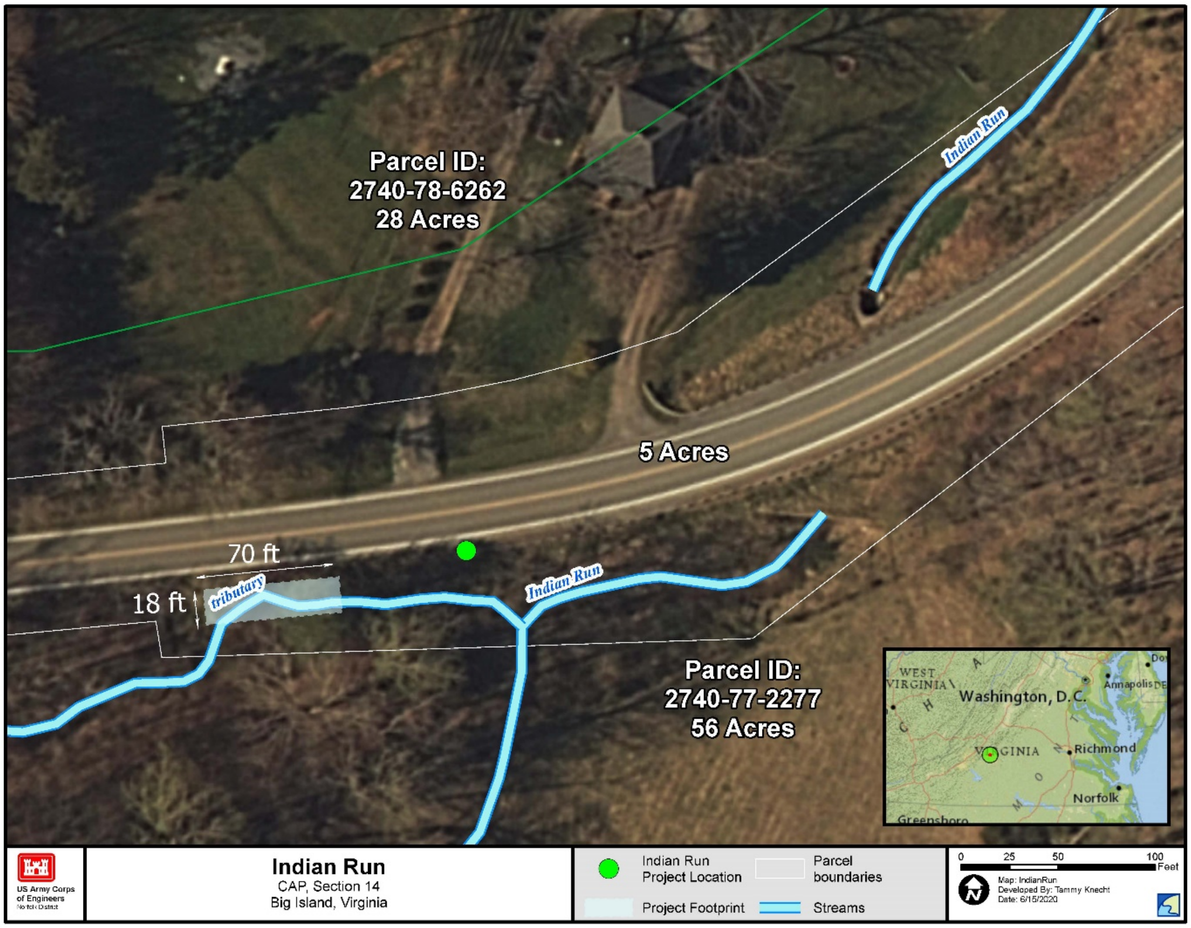
Sincerely,

Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

Enclosure 1. Map of the project area.



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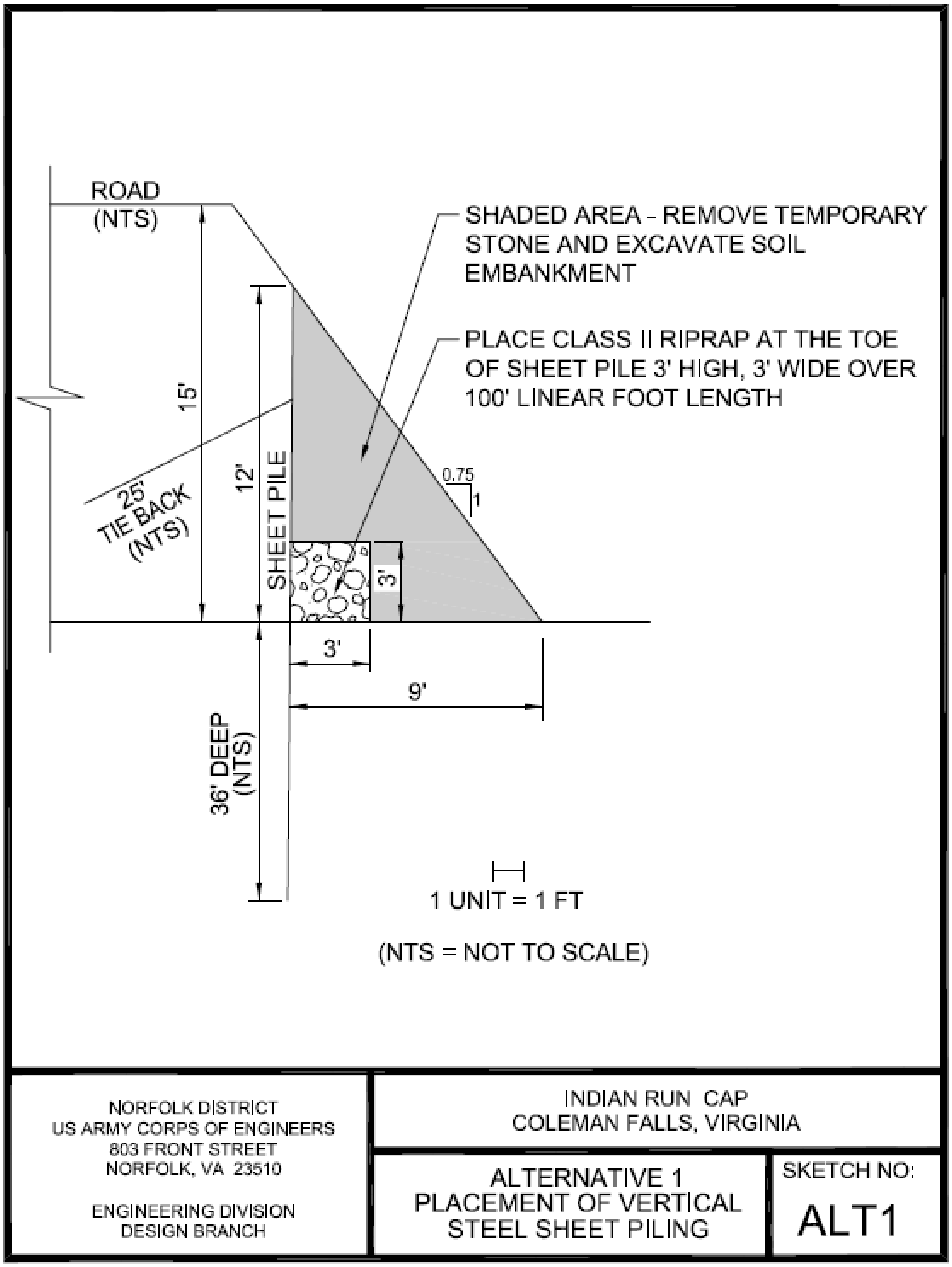

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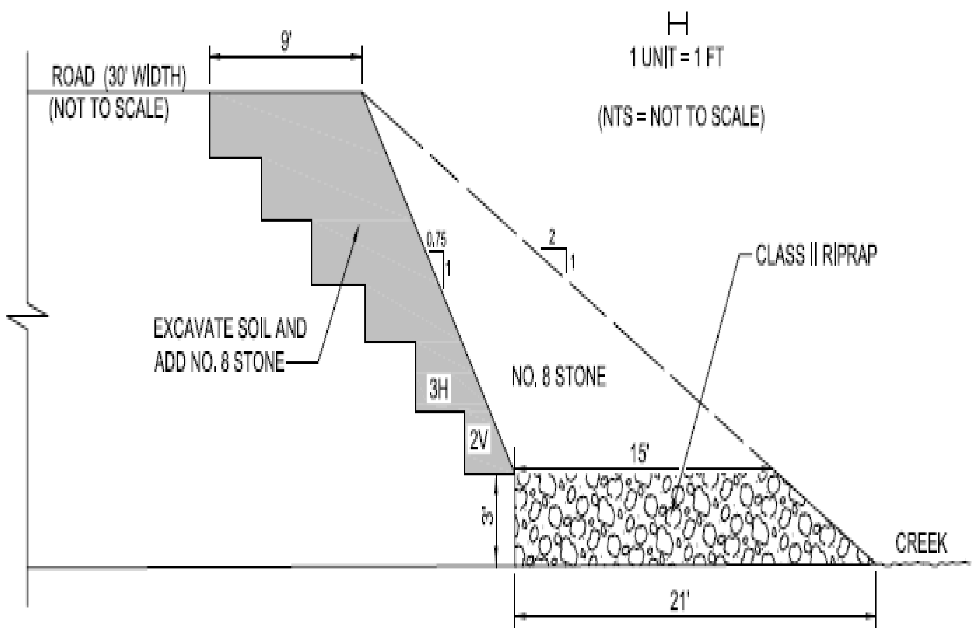
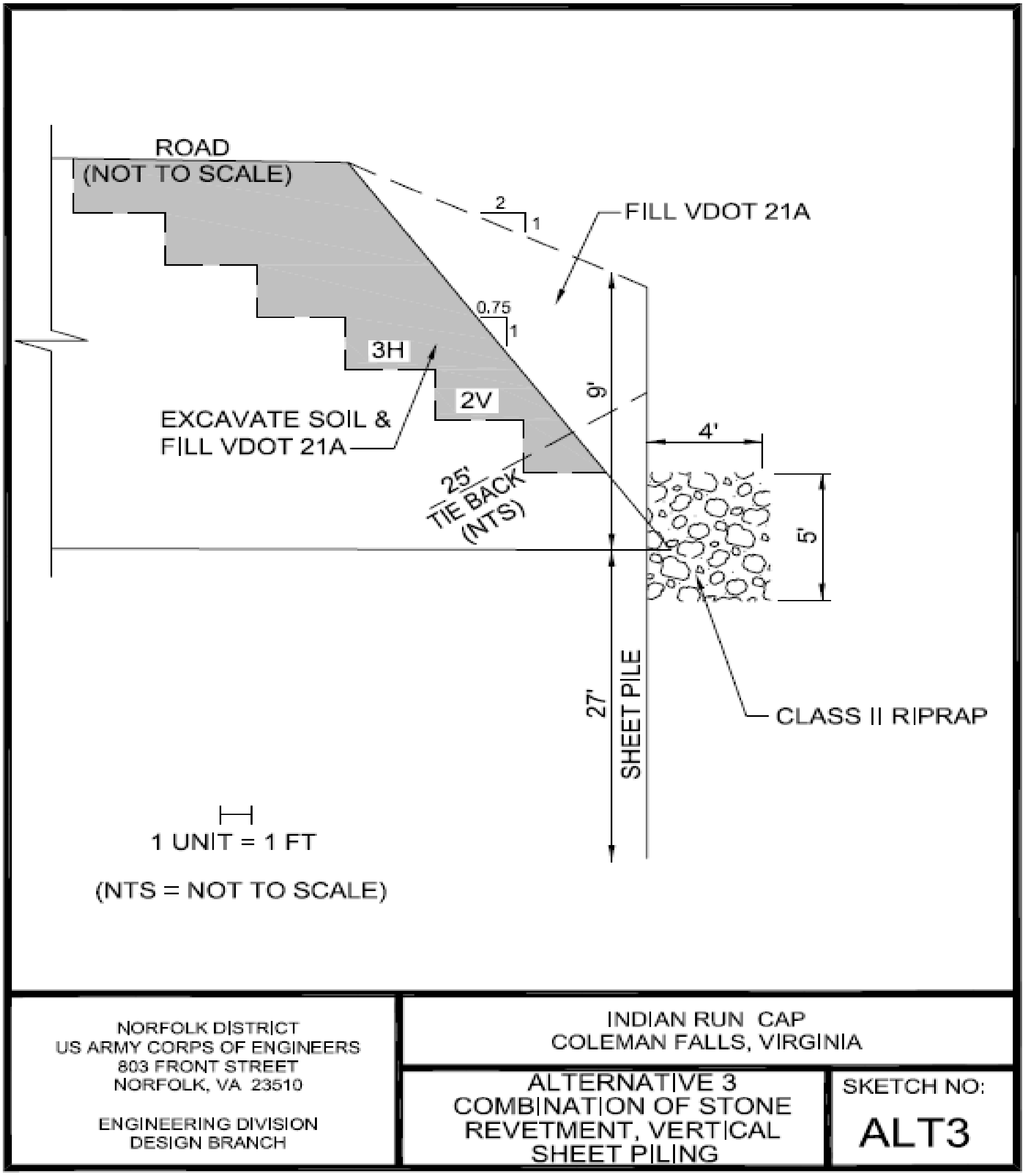


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2

Alternative 3. Combination of stone revetment and vertical sheet piling



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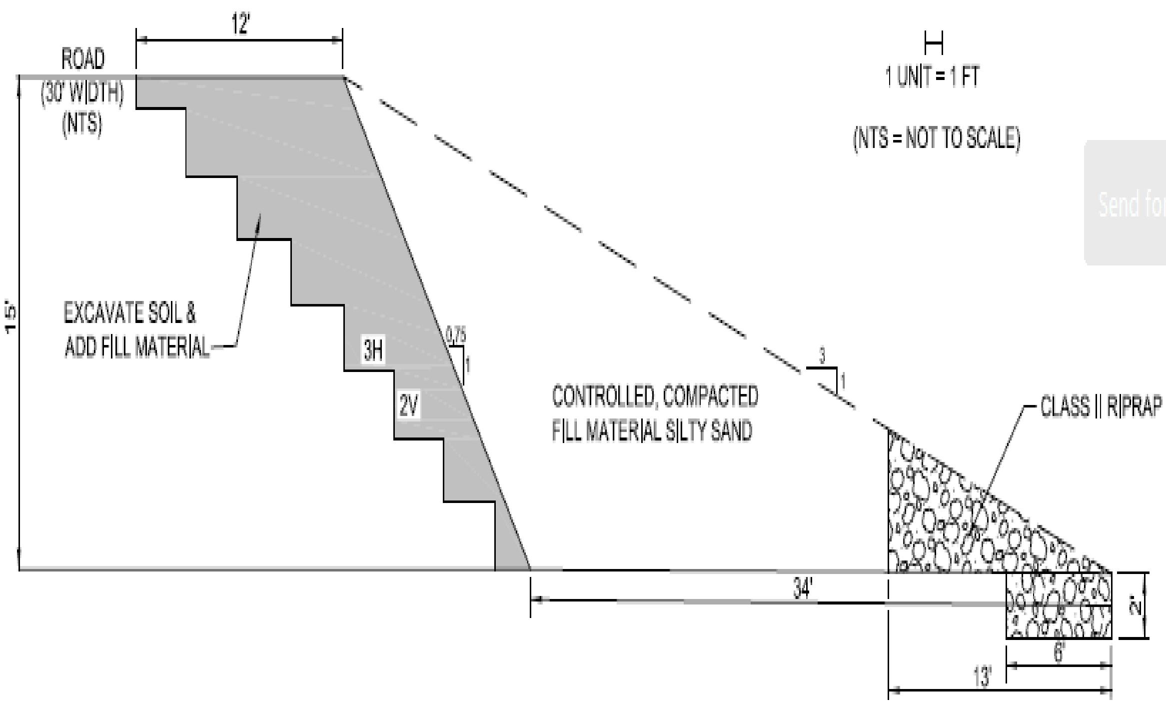
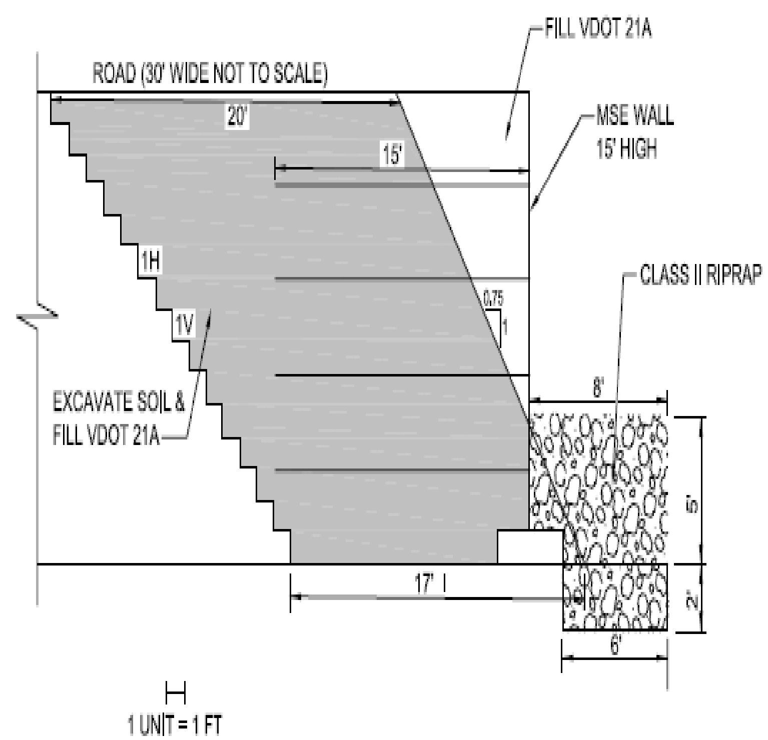


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 4 VEGETATIVE EROSION CONTROL	SKETCH NO: ALT4

Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

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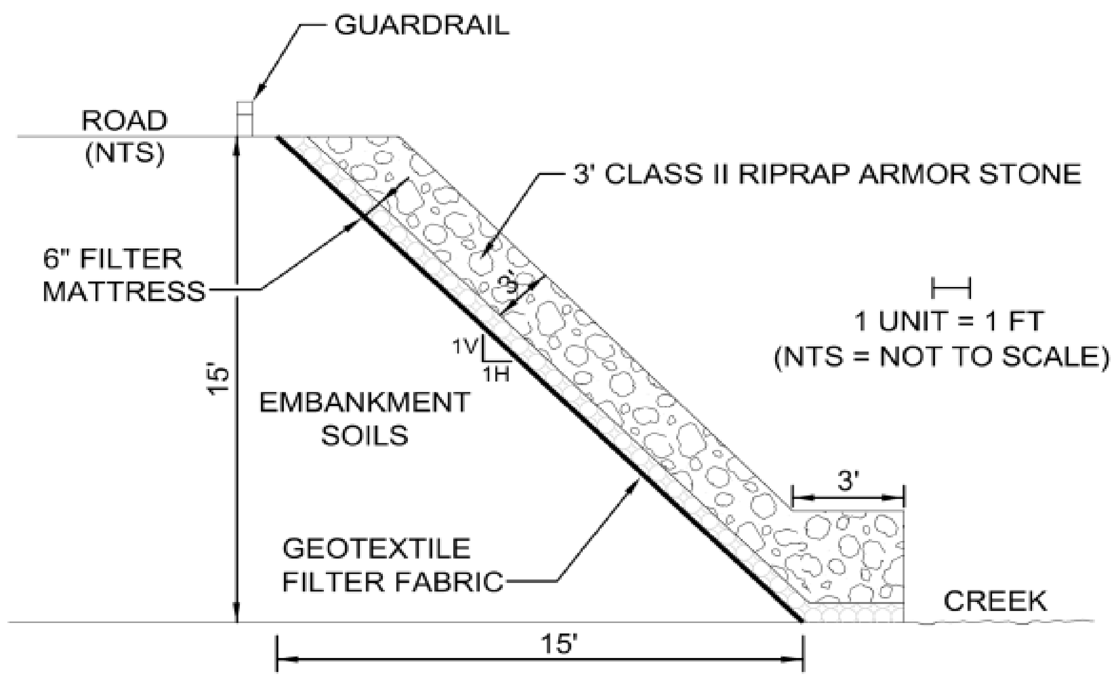

NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

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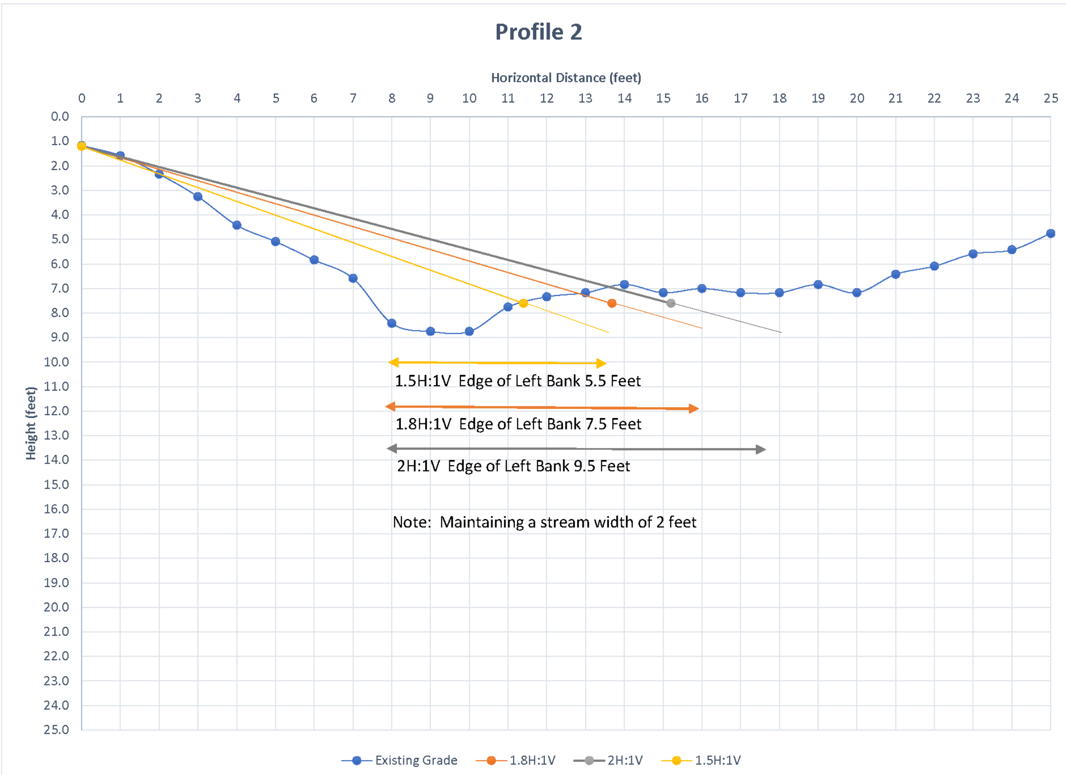

From:	Fulcher, Valerie
To:	rr dgif-ESS Projects; Roberta Rhur; odwreview (VDH); Keith Tignor; Carlos Martinez; Kotur Narasimhan; Lawrence Gavan; Daniel Moore; Holly Sepety; Scott Kudlas; Michelle Henicheck; Kevin Harlow; Terrance Lasher; Deborah Gosney; Birge, Tiffany; Emily A. Hein; rhiss@bedfordcountyva.gov; bwarner@bedfordva.gov
Cc:	Martin, Zachary CIV USARMY CENAO (US); rr EIR Coordination
Subject:	[Non-DoD Source] NEW SCOPING Indian Run Emergency Streambank Stabilization
Date:	Monday, January 11, 2021 2:55:30 PM
Attachments:	Indian Run CAP_scoping response.pdf Indian Run CAP_NEPA scoping letter_VDEQ.pdf

Good afternoon—attached is a request for scoping comments on the following:

Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

If you choose to make comments, please send them directly to the project sponsor (Zachary.Martin@usace.army.mil) and copy the DEQ Office of Environmental Impact Review: eir@deq.virginia.gov. We will coordinate a review when the environmental document is completed.

DEQ-OEIR's scoping response is also attached.

If you have any questions regarding this request, please email our office at eir@deq.virginia.gov.

Valerie

--

Valerie A. Fulcher, CAP, OM, Admin/Data Coordinator Senior

Department of Environmental Quality

Environmental Enhancement - Office of Environmental Impact Review

1111 East Main Street

Richmond, VA 23219

804/698-4330

Email: Valerie.Fulcher@deq.virginia.gov

https://www.deq.virginia.gov/permits-regulations/environmental-impact-review

OUR ENFORCEABLE POLICIES HAVE BEEN UPDATED FOR 2020: https://www.deq.virginia.gov/permits-regulations/environmental-impact-review/federal-consistency

For program updates and public notices please subscribe to Constant Contact: https://lp.constantcontact.com/su/MVcCump/EIR

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

January 11, 2021

Zach Martin
US Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, Virginia 23510-1011
Zachary.Martin@usace.army.mil

RE: Indian Run Stream Stabilization, Big Island, Virginia

Dear Mr. Martin:

This letter is in response to the scoping request for the above-referenced project.

As you may know, the Department of Environmental Quality, through its Office of Environmental Impact Review (DEQ-OEIR), is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act (NEPA) and responding to appropriate federal officials on behalf of the Commonwealth.

DOCUMENT SUBMISSIONS

In order to ensure an effective coordinated review of the NEPA document, notification of the NEPA document and federal consistency documentation should be sent directly to OEIR. We request that you submit one electronic to eir@deq.virginia.gov (25 MB maximum) or make the documents available for download at a website, file transfer protocol (ftp) site or the VITA LFT file share system (Requires an "invitation" for access. An invitation request should be sent to eir@deq.virginia.gov.).

The NEPA document should include U.S. Geological Survey topographic. We strongly encourage you to issue shape files with the NEPA document. In addition, project details should be adequately described for the benefit of the reviewers.

ENVIRONMENTAL REVIEW UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT: PROJECT SCOPING AND AGENCY INVOLVEMENT

As you may know, NEPA (PL 91-190, 1969) and its implementing regulations (Title 40, *Code of Federal Regulations*, Parts 1500-1508) requires a draft and final Environmental Impact Statement (EIS) for federal activities or undertakings that are federally licensed or federally funded which will or may give rise to significant impacts upon the human environment. An EIS carries more stringent public participation requirements than an Environmental Assessment (EA) and provides more time and detail for comments and public decision-making. The possibility that an EIS may be required for the proposed project should not be overlooked in your planning for this project. Accordingly, we refer to "NEPA document" in the remainder of this letter.

While this Office does not participate in scoping efforts beyond the advice given herein, other agencies are free to provide scoping comments concerning the preparation of the NEPA document. Accordingly, we are providing notice of your scoping request to several state agencies and those localities and Planning District Commissions, including but not limited to:

Department of Environmental Quality:
- DEQ Regional Office
- Air Division
- Office of Wetlands and Stream Protection
- Office of Local Government Programs
- Division of Land Protection and Revitalization
- Office of Stormwater Management

Department of Conservation and Recreation
Department of Health
Department of Agriculture and Consumer Services
Department of Game and Inland Fisheries
Virginia Marine Resources Commission
Department of Historic Resources
Department of Mines, Minerals, and Energy
Department of Forestry
Department of Transportation

DATA BASE ASSISTANCE

Below is a list of databases that may assist you in the preparation of a NEPA document:

- DEQ Online Database: Virginia Environmental Geographic Information Systems

  Information on Permitted Solid Waste Management Facilities, Impaired Waters, Petroleum Releases, Registered Petroleum Facilities, Permitted Discharge (Virginia Pollution Discharge Elimination System Permits) Facilities, Resource Conservation and Recovery Act (RCRA) Sites, Water Monitoring Stations, National Wetlands Inventory:
    - www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx

- DEQ Virginia Coastal Geospatial and Educational Mapping System (GEMS)

  Virginia's coastal resource data and maps; coastal laws and policies; facts on coastal resource values; and direct links to collaborating agencies responsible for current data:
    - http://128.172.160.131/gems2/

- MARCO Mid-Atlantic Ocean Data Portal

  The Mid-Atlantic Ocean Data Portal is a publicly available online toolkit and resource center that consolidates available data and enables users to visualize and analyze ocean resources and human use information such as fishing grounds, recreational areas, shipping lanes, habitat areas, and energy sites, among others.

http://portal.midatlanticocean.org/visualize/#x=-73.24&y=38.93&z=7&logo=true&controls=true&basemap=Ocean&tab=data&legends=false&layers=true

- DHR Data Sharing System

  Survey records in the DHR inventory:
  - www.dhr.virginia.gov/archives/data_sharing_sys.htm

- DCR Natural Heritage Search

  Produces lists of resources that occur in specific counties, watersheds or physiographic regions:
  - www.dcr.virginia.gov/natural_heritage/dbsearchtool.shtml

- DGIF Fish and Wildlife Information Service

  Information about Virginia's Wildlife resources:
  - http://vafwis.org/fwis/

- Total Maximum Daily Loads Approved Reports
  - https://www.deq.virginia.gov/programs/water/waterqualityinformationtmdls/tmdl/tmdldevelopment/approvedtmdlreports.aspx

- Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database: Superfund Information Systems

  Information on hazardous waste sites, potentially hazardous waste sites and remedial activities across the nation, including sites that are on the National Priorities List (NPL) or being considered for the NPL:
  - www.epa.gov/superfund/sites/cursites/index.htm

- EPA RCRAInfo Search

  Information on hazardous waste facilities:
  - www.epa.gov/enviro/facts/rcrainfo/search.html

- EPA Envirofacts Database

  EPA Environmental Information, including EPA-Regulated Facilities and Toxics Release Inventory Reports:
  - www.epa.gov/enviro/index.html

- EPA NEPAssist Database

  Facilitates the environmental review process and project planning:
  http://nepaassisttool.epa.gov/nepaassist/entry.aspx

If you have questions about the environmental review process, please feel free to contact me (telephone (804) 698-4204 or e-mail bettina.rayfield@deq.virginia.gov).

I hope this information is helpful to you.

Sincerely,

Bettina Rayfield, Program Manager
Environmental Impact Review and
Long-Range Priorities

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Amy Ewing, Environmental Services Biologist/FWIS Manager
Virginia Department of Wildlife Resources
7870 Villa Park Drive
Henrico, VA 23228

Dear Ms. Ewing:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

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Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

Sincerely,

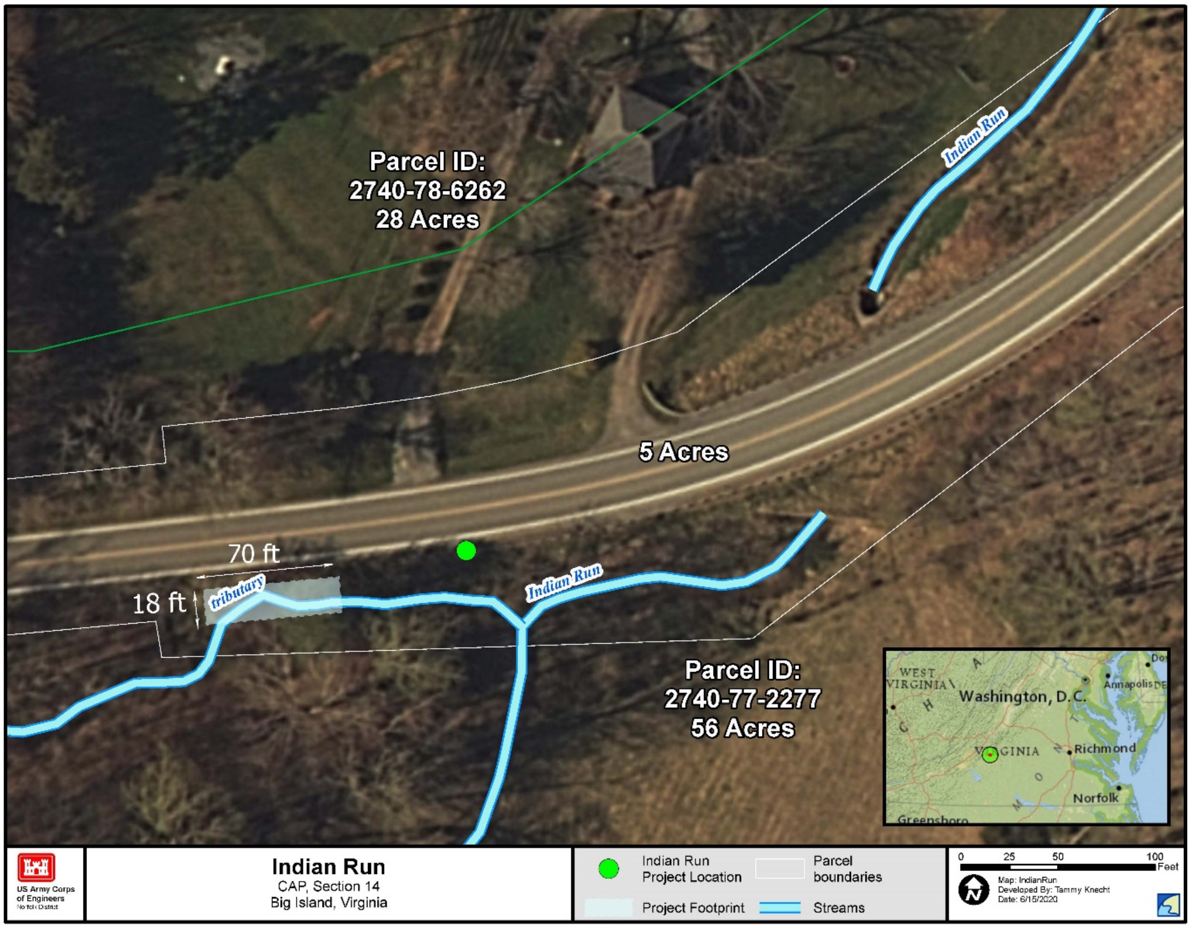
Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures 1 – 3

CC Brian Watson, Malacologist

Enclosure 1. Map of the project area.



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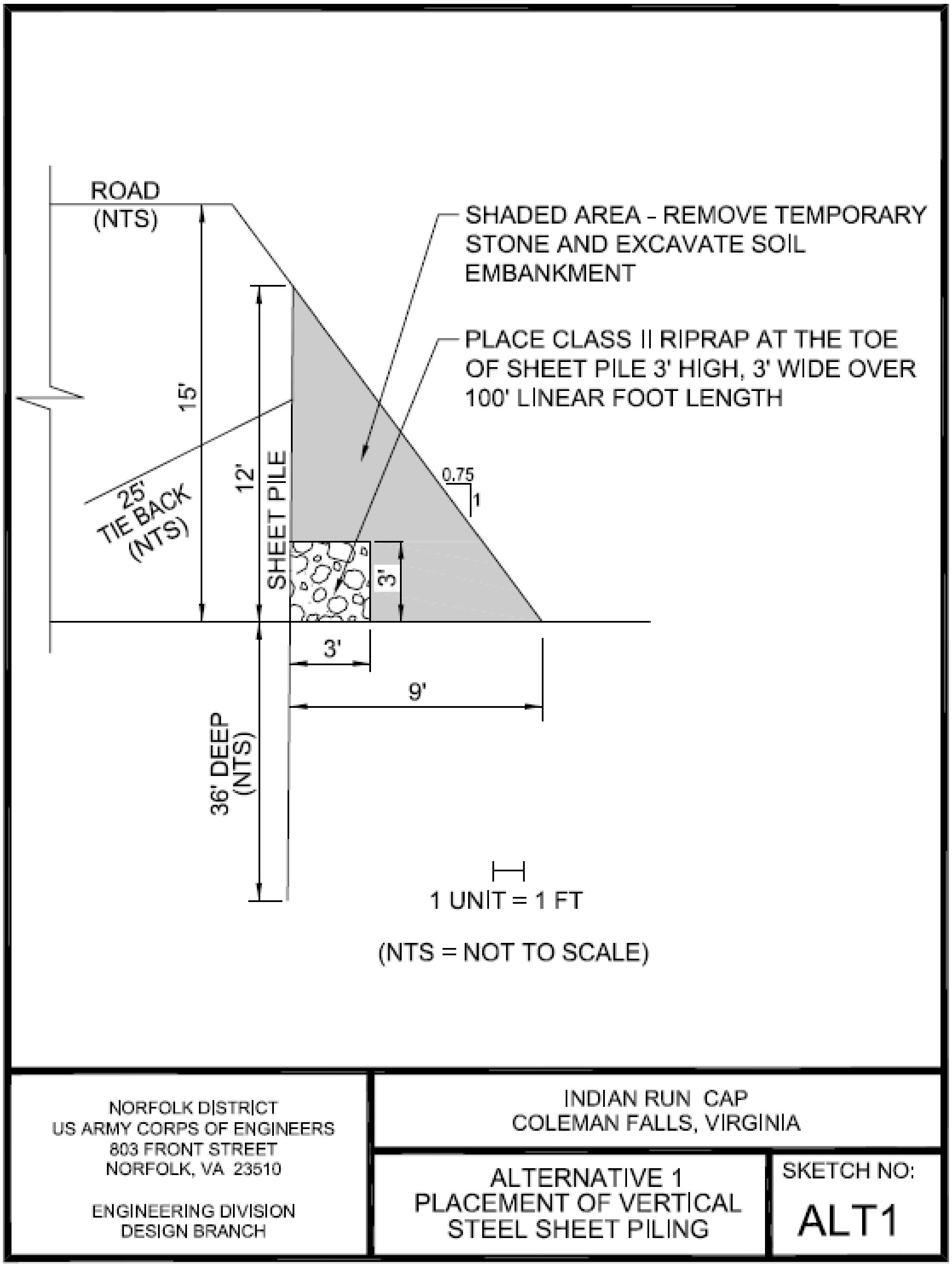

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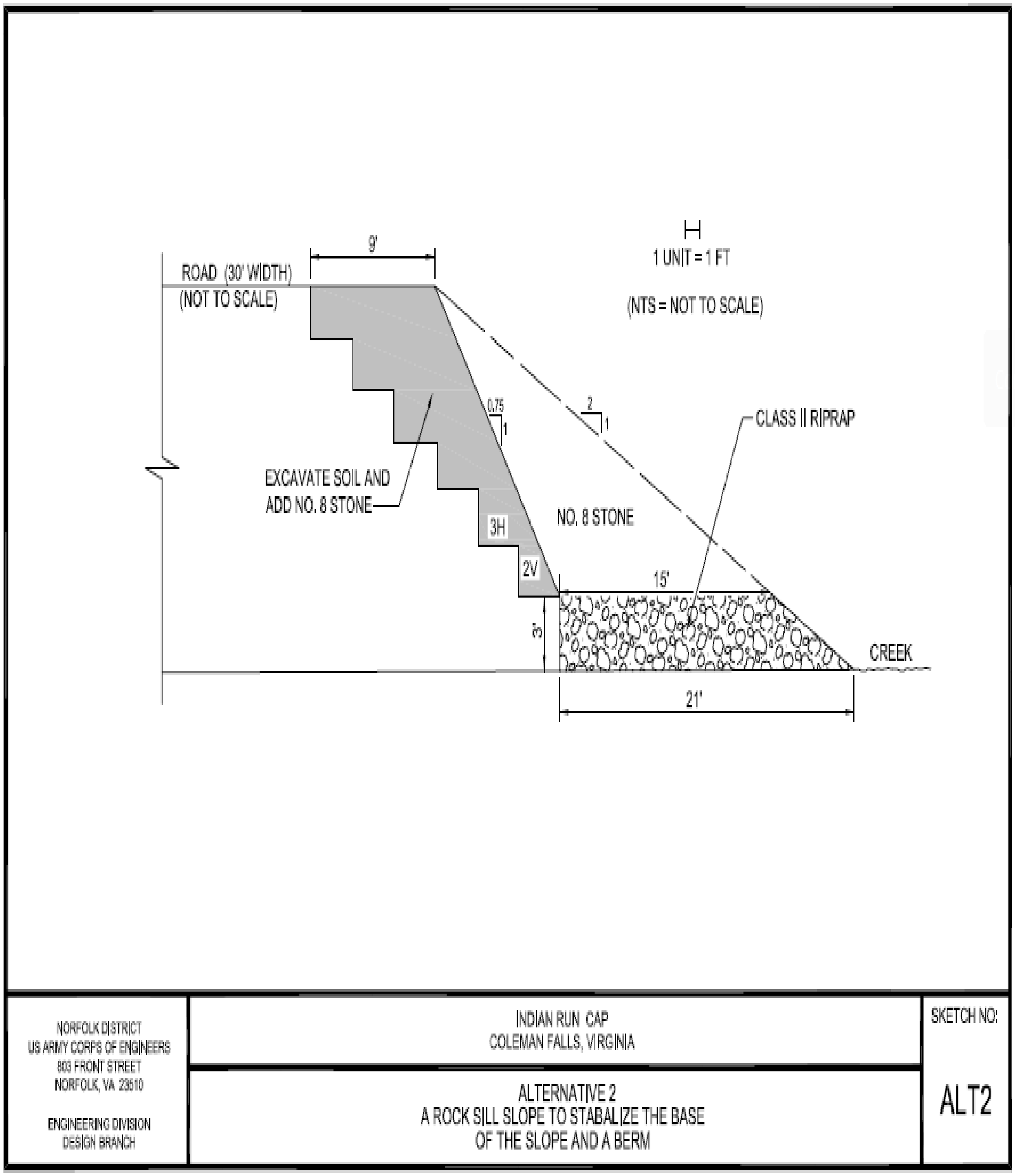

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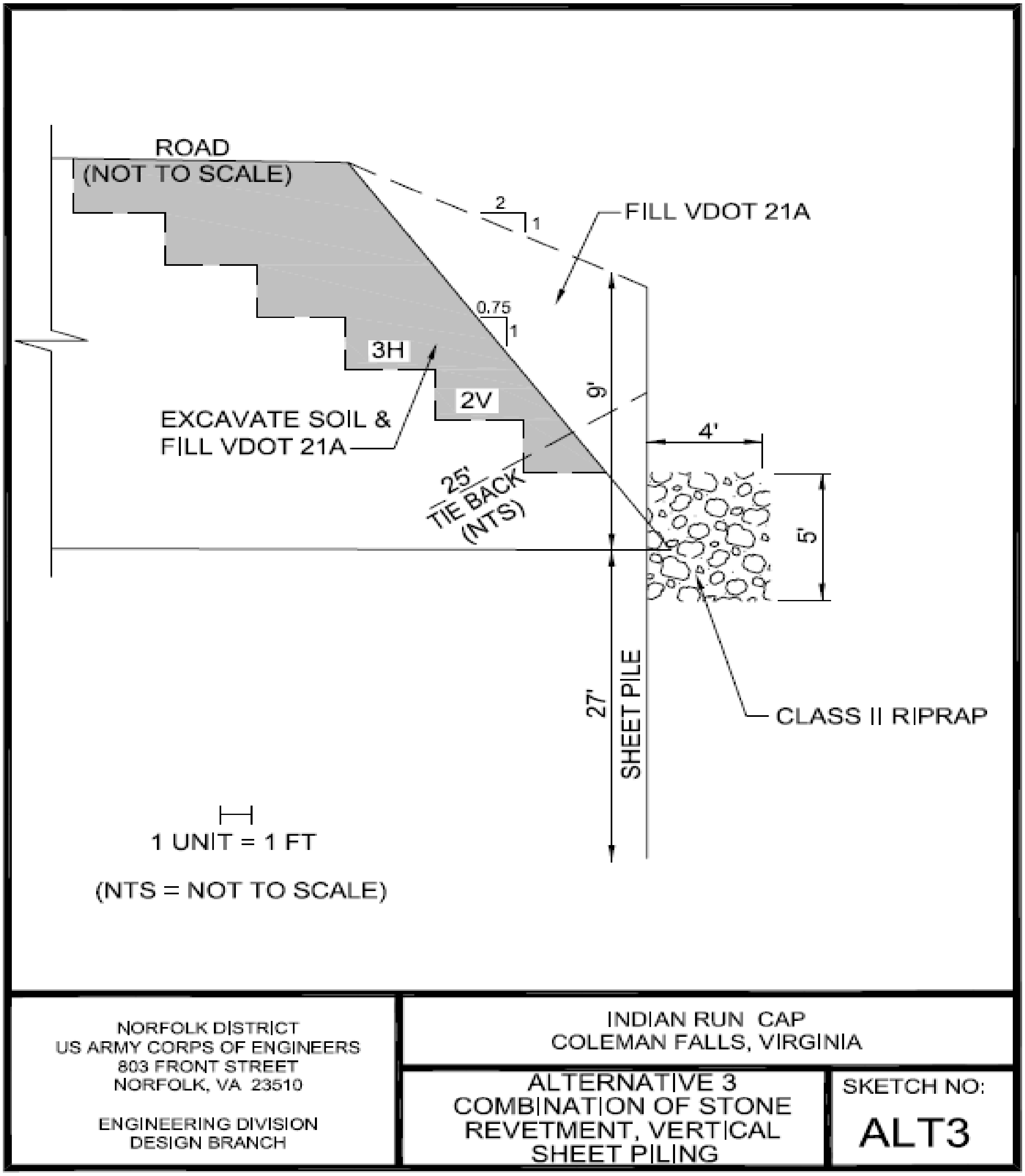

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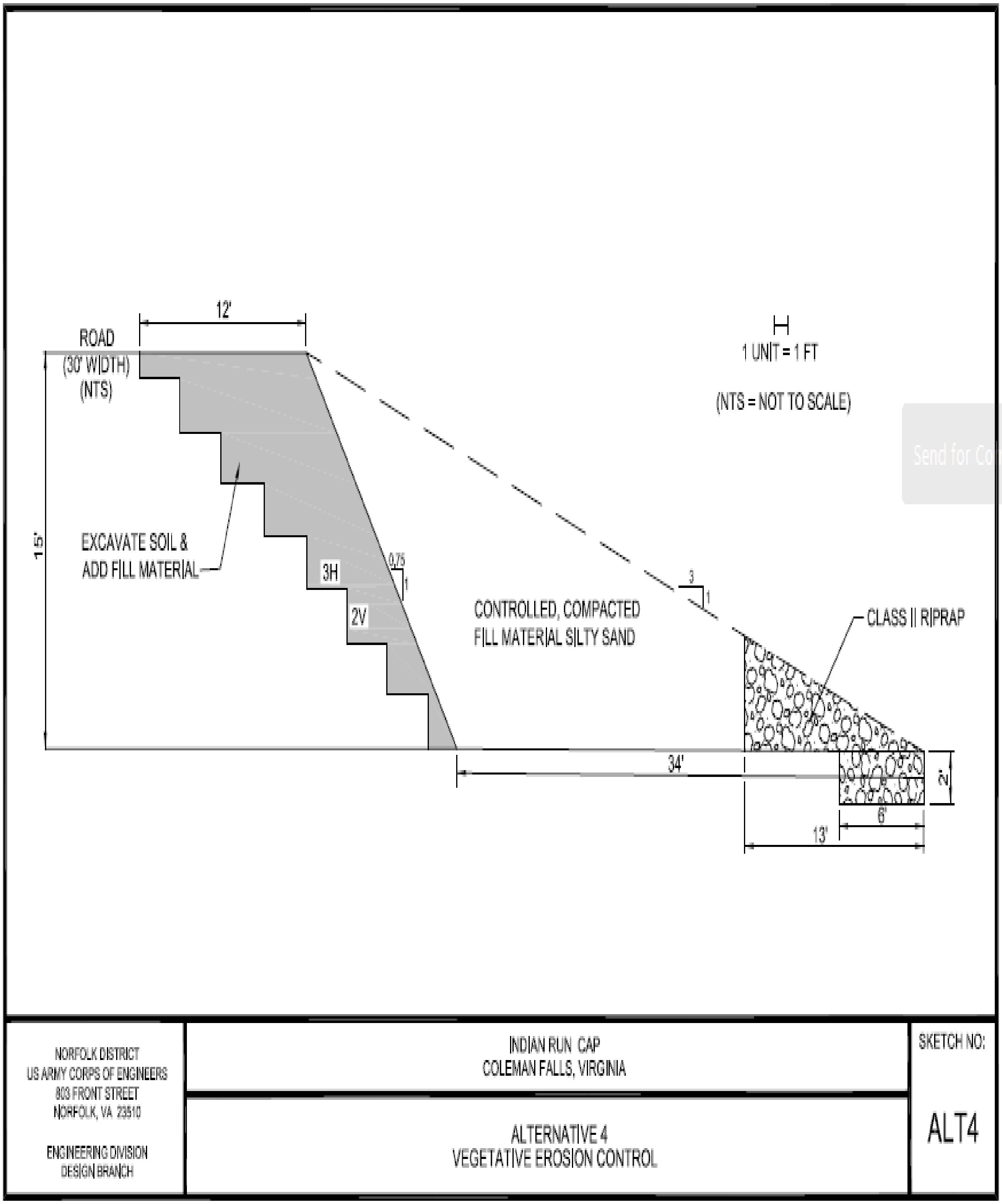

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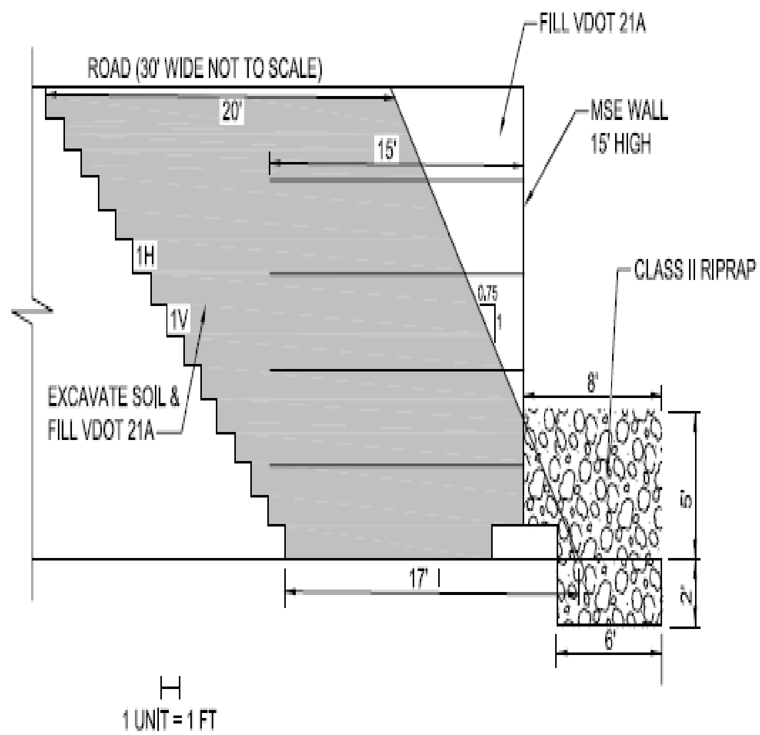

NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

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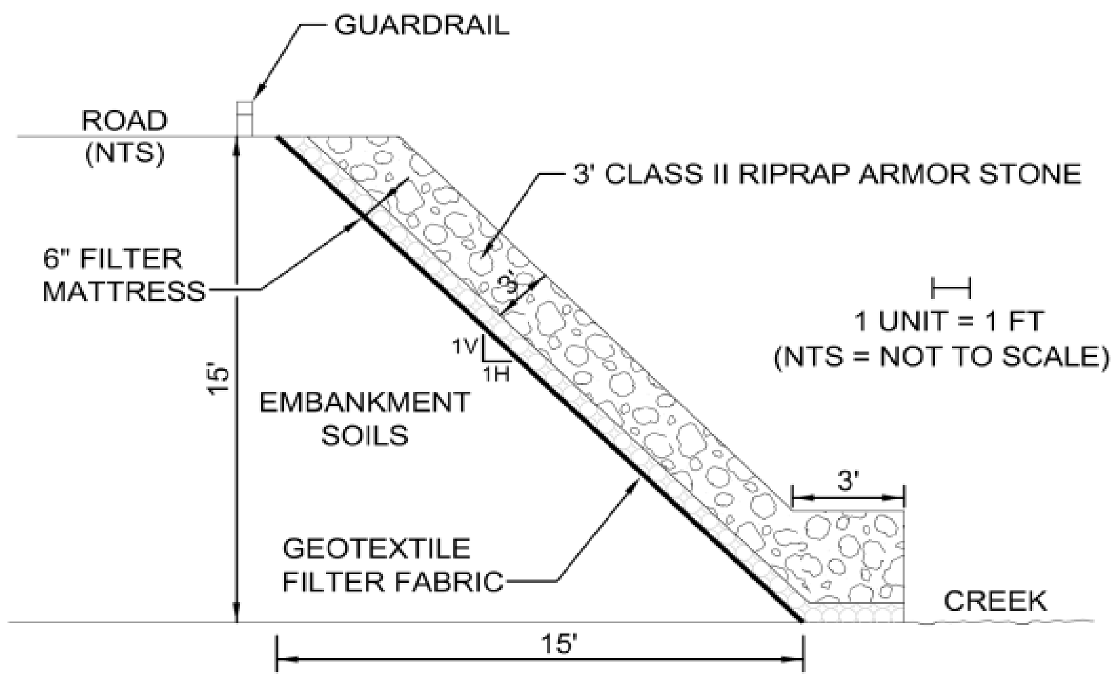
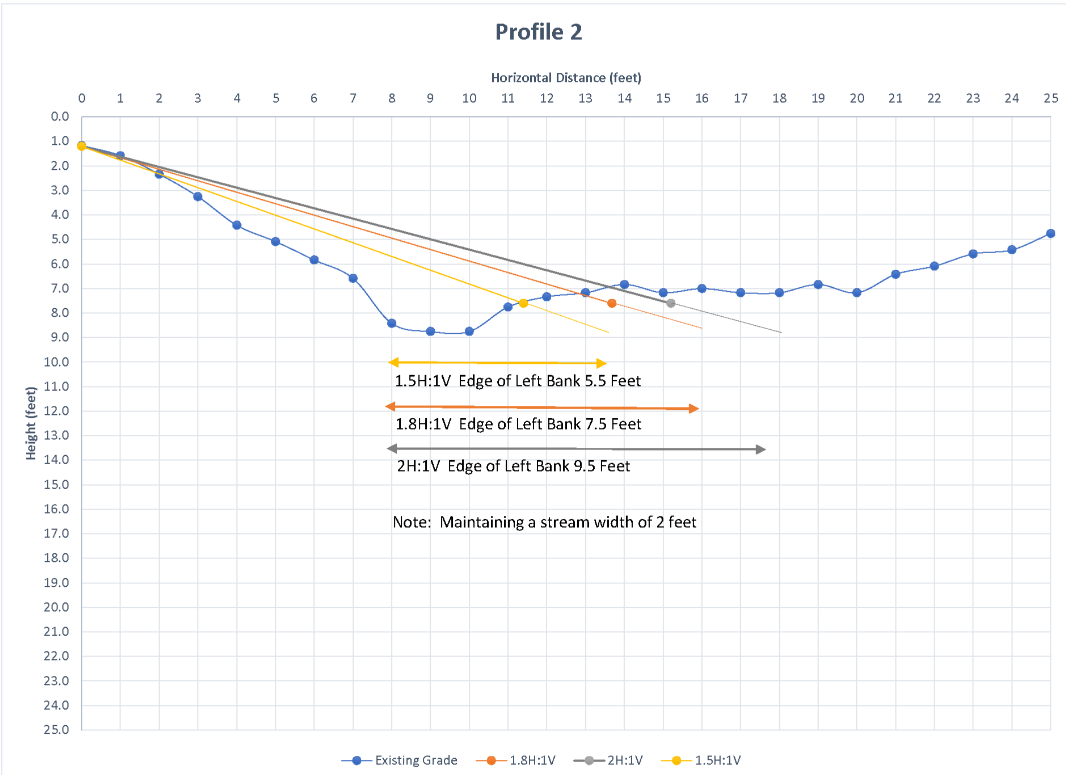


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



Martin, Zachary CIV USARMY CENAO (US)

From:	Brian Watson <brian.watson@dwr.virginia.gov>
Sent:	Thursday, January 14, 2021 4:32 PM
To:	Martin, Zachary CIV USARMY CENAO (US)
Subject:	RE: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)
Categories:	Indian Run CAP Project

Zach,

Sorry I missed you e-mail from November 5th. I had a few others from that time frame I did not see so I am wondering if they got hung up and came thru a bit later and I just missed them since they were pushed down my e-mail box and off the screen. Then I went on leave right around the time you e-mailed again and just got back in this week so wading thru the e-mail glut.

Based on the photos you sent on 11/5, I would not have any concerns regarding freshwater mussels in that area. The stream looks a bit smaller and rocky to really trigger any concerns, especially with Green Floater like I initially mentioned. I also checked the modeling and Indian Run is not popping up as potential JSM habitat. So I would say just the standard BMPs like E&S control, work in the dry, work during low flow, etc., where those BMPs are applicable and appropriate. Let me know if that clears things for you guys regarding mussels.

Brian

From: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Sent: Thursday, January 14, 2021 12:52 PM
To: Brian Watson <brian.watson@dwr.virginia.gov>
Subject: RE: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Hey Brian,

Just throwing out another line on this email thread. Ultimately, hoping to resolve the question on whether there could/will be a need for a mussel survey. See the site photos I've attached and the "FYI" on an updated project design from my 05 November communication for reference.

Zach

From: Martin, Zachary CIV USARMY CENAO (US)
Sent: Monday, December 7, 2020 10:11 AM
To: 'Brian Watson' <brian.watson@dwr.virginia.gov>
Subject: RE: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Hey Brian,

I'm hoping to bring my last email on Indian Run to the top of your inbox, particularly in the interest of evaluating whether a mussel survey will be needed. Give me a call if that's easier for ya. 910-232-3154.

Zach

From: Martin, Zachary CIV USARMY CENAO (US)
Sent: Thursday, November 5, 2020 12:33 PM
To: Brian Watson <brian.watson@dwr.virginia.gov>
Subject: RE: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Hey Brian,

I'm attaching a sample of site photos and a map from this project. Would these help you determine if a mussel survey is needed here? I tried attaching a more comprehensive zipped folder, but it's too large to send; just let me know if you could use more context.

FYI – our engineers made a site visit in September that changed how we are likely to treat this project. Originally, we simply planned to stabilize the bank with additional stone revetment. Based on the instability of the existing steep slope at this site though, our team is going to propose a shallower slope revetment that will require shifting the channel <10 feet to the south; any constructed channel would maintain the current channel width.

Thanks,
Zach

From: Martin, Zachary CIV USARMY CENAO (US)
Sent: Friday, September 25, 2020 3:24 PM
To: Brian Watson <brian.watson@dwr.virginia.gov>
Subject: RE: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

It is a small trib (1st order), immediately upstream of confluence with Indian Run (which itself appears to be 2nd order). Our engineers just visited the site this past week. I'll forward you relevant photos when I have access to help with determining whether we'll need a survey.

Thanks for the notes on the PSH models. That makes sense that it was yellow lance.

From: Brian Watson <brian.watson@dwr.virginia.gov>
Sent: Tuesday, September 22, 2020 6:09 PM
To: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Subject: RE: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Zach,

If I can get some good photos of the site, usually I can determine if a mussel survey is needed. If it is a small trib, I can usually rule those out, or in, pretty easily. As far as BMPs, typical recommendations are possible TOYR for instream work depending on the location to larger streams and the scope of work, any E&S controls that are appropriate, seeding exposed ground ASAP, storing machinery with fluids away from waterways, maintaining as many mature tress as possible.

Looking at the PSH models, Yellow Lance it the only species that modeled in Indian Run and the lower end. That could be why you are seeing it in heritage's database. I think they are using the layer but we only use it informally.

Brian

From: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Sent: Tuesday, September 22, 2020 2:30 PM
To: Brian Watson <brian.watson@dwr.virginia.gov>
Subject: RE: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Hey Brian,

Thanks for following up.

I just searched the Natural Heritage Program species/community database from the VDCR website, and the only thing that pops up with that tool is yellow lance. It sounds like it could be helpful to know if there are others according to PSH models (unless that's what that database is telling me?). When you have the time, that would be great.

Other details that I'm ultimately trying to iron out are (1) whether we'll need to conduct a mussel survey, and (2) related best practices during construction to avoid impact if there are mussels present (e.g., relocation upstream). This project is small enough, and on a small trib, that I'm guessing no survey will be needed.

Hope you are well,

Zach

From: Brian Watson <brian.watson@dwr.virginia.gov>
Sent: Monday, September 14, 2020 10:11 PM
To: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Subject: [Non-DoD Source] RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Zach,

I did get your e-mail, just got lost in the blizzard of e-mails as I have been in the field quite a bit over the past 5-6 weeks. I have never been a big fan of humans so the current state-of-affairs has confirmed my thinking. If I am in the river with mussels and away from the noise and drama, that is fine with me.

Good to hear you are with the Corps. I do not have any survey data for Indian Run. My guess is the hits are coming from the James River, unless Indian Run is popping up as potential suitable habitat for some of the federal species based on the Heritage Program Maxent modeling. If from the James, the only concern I would have is for the Green Floater. That species has been found in the river in Lynchburg, and at a number of sites from Scottsville downstream. JSM and Atlantic Pigtoe have not been found in the James River since the 1960s. Yellow Lance records are likely a misidentified common lanceolate Elliptio species. The has been a problem with Yellow Lance with a bunch of lances were lumped as Yellow Lance but there is a true Yellow Lance. So bad IDs are roaming around in the data sets.

If you need me to check more on the PSH models, I can look at those when I am back in the office since all my GIS stuff is on our server.

Brian

Brian T. Watson
Aquatic Resources Biologist/State Malacologist
P 434.525.7522, x114 / M 434.941.5990 / F 434.525.7720

Virginia Department of Wildlife Resources
CONSERVE. CONNECT. PROTECT.
A 1132 Thomas Jefferson Road, Forest, VA 24551
BlockedBlockedwww.VirginiaWildlife.gov

From: Martin, Zachary CIV USARMY CENAO (US) <Zachary.Martin@usace.army.mil>
Sent: Wednesday, September 2, 2020 4:48 PM
To: Brian.Watson@dgif.virginia.gov; brian.watson@dwr.virginia.gov
Subject: RE: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Hi Brian,

Please see my message below. If you've already transitioned to a new email address format (i.e., not @dgif.virginia.gov), this definitely missed you.

Zach

From: Martin, Zachary CIV USARMY CENAO (US)
Sent: Friday, August 7, 2020 4:45 PM
To: Brian.Watson@dgif.virginia.gov
Subject: Planning for streambank stabilization project on Indian Run (James River, Bedford Co.)

Hi Brian,

I hope this message finds you well. These days, mussels make better company than humans, so you've got it pretty good.

I recently made a move from VT Angermeier Lab to Army Corps in Norfolk, VA. One of the projects I'm involved with is a streambank stabilization project on Indian Run, trib to James River (NW of Lynchburg) in Bedford Co. We are in the early planning stages, and I'm writing our Environmental Assessment. When searching the VaFWIS I get hits on a couple James spinymussel, yellow lance, green floater, and Atlantic pigtoe. I'm curious what you know about occurrences in this trib. I also just wanted to reach out and open a dialogue on this project. As a new guy with the Corps, I'm not always sure what the next move is on projects, but I expect informal conversation is a good start.

I'm happy to share more detail on the project any time, and I'm interested to hear what you know about Indian Run. Emails or phone calls are fine with me.

Thanks much,
Zach Martin
910-232-3154

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 08, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Allison Lay, Environmental Engineer
Virginia Marine Resources Commission
Building 96, 380 Fenwick Rd
Ft. Monroe, VA 23651-1064

Dear Ms. Lay:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February, 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact Zach Martin at Zachary.Martin@usace.army.mil or 757-201-7320, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

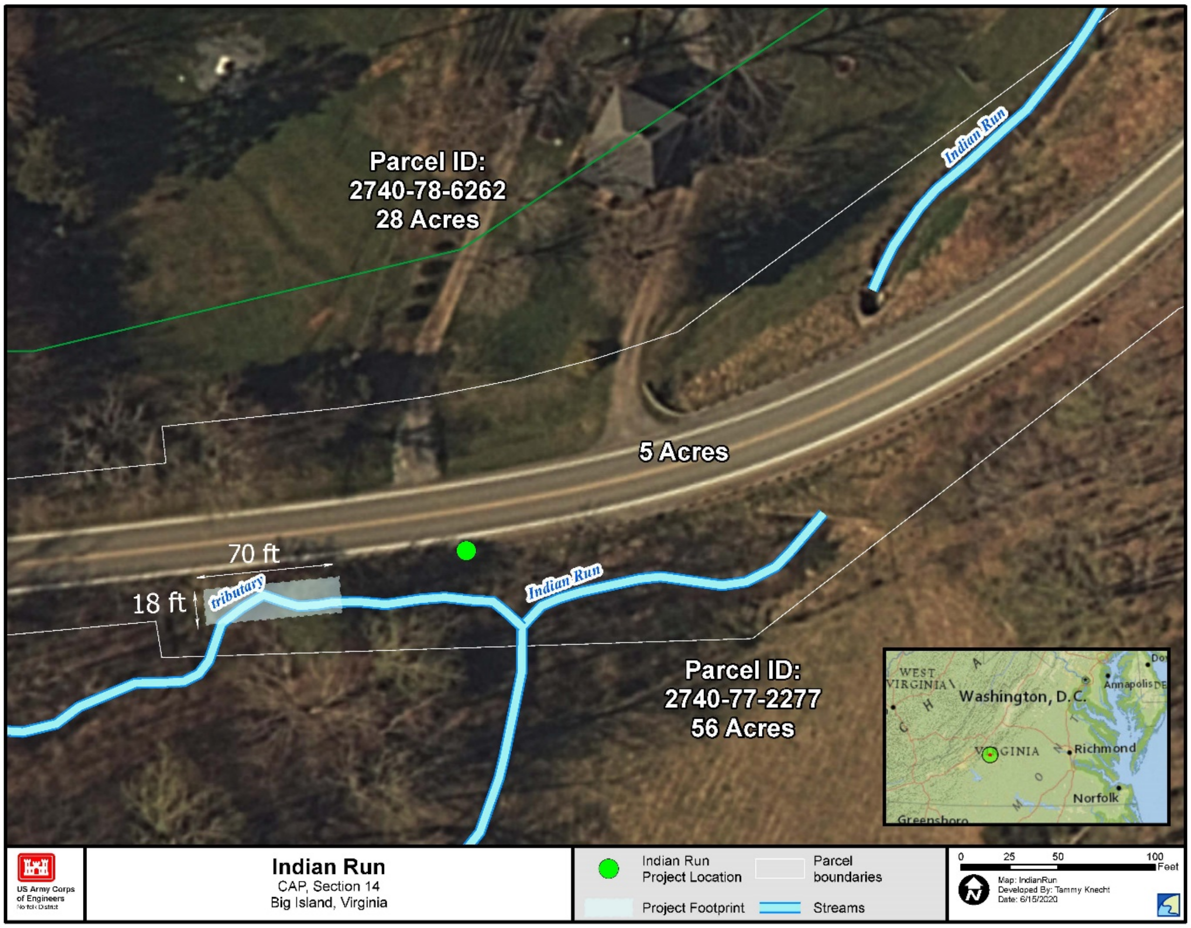
Sincerely,

Zachary P. Martin

for Alicia M. Logalbo
Chief, Environmental Analysis Section

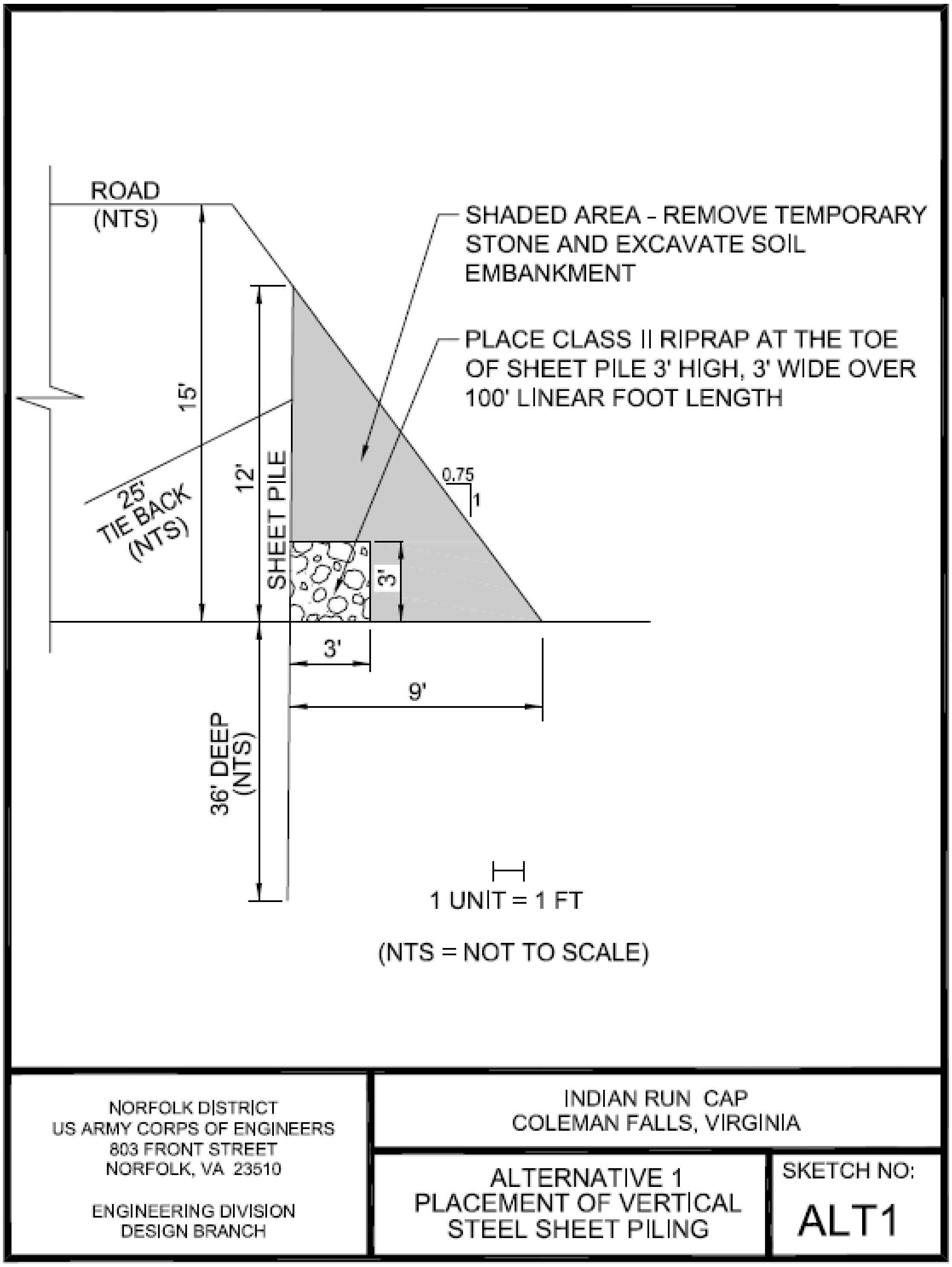
Enclosures 1 – 3

Enclosure 1. Map of the project area.

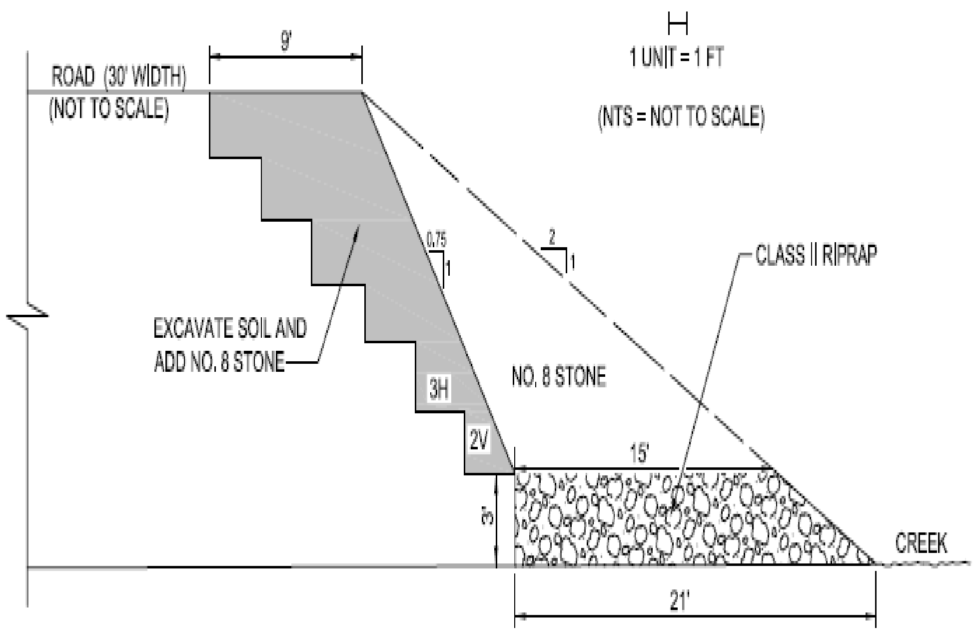


Enclosure 2. Drawings of Alternatives 1 – 6.

Alternative 1. Placement of vertical steel sheet piling

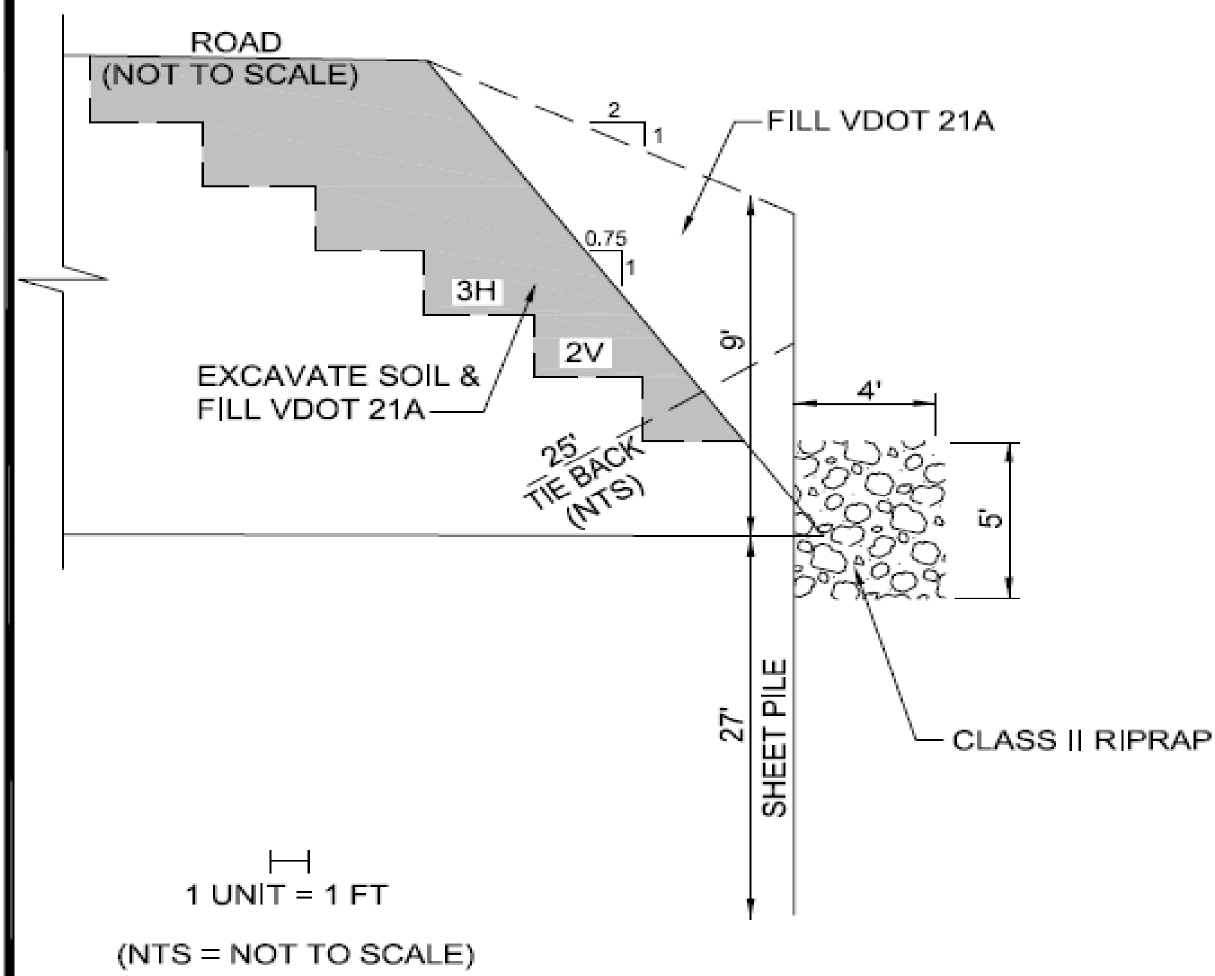


Alternative 2. A rock sill slope to stabilize the base of the slope and a berm



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2

Alternative 3. Combination of stone revetment and vertical sheet piling



NORFOLK DISTRICT
US ARMY CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VA 23510

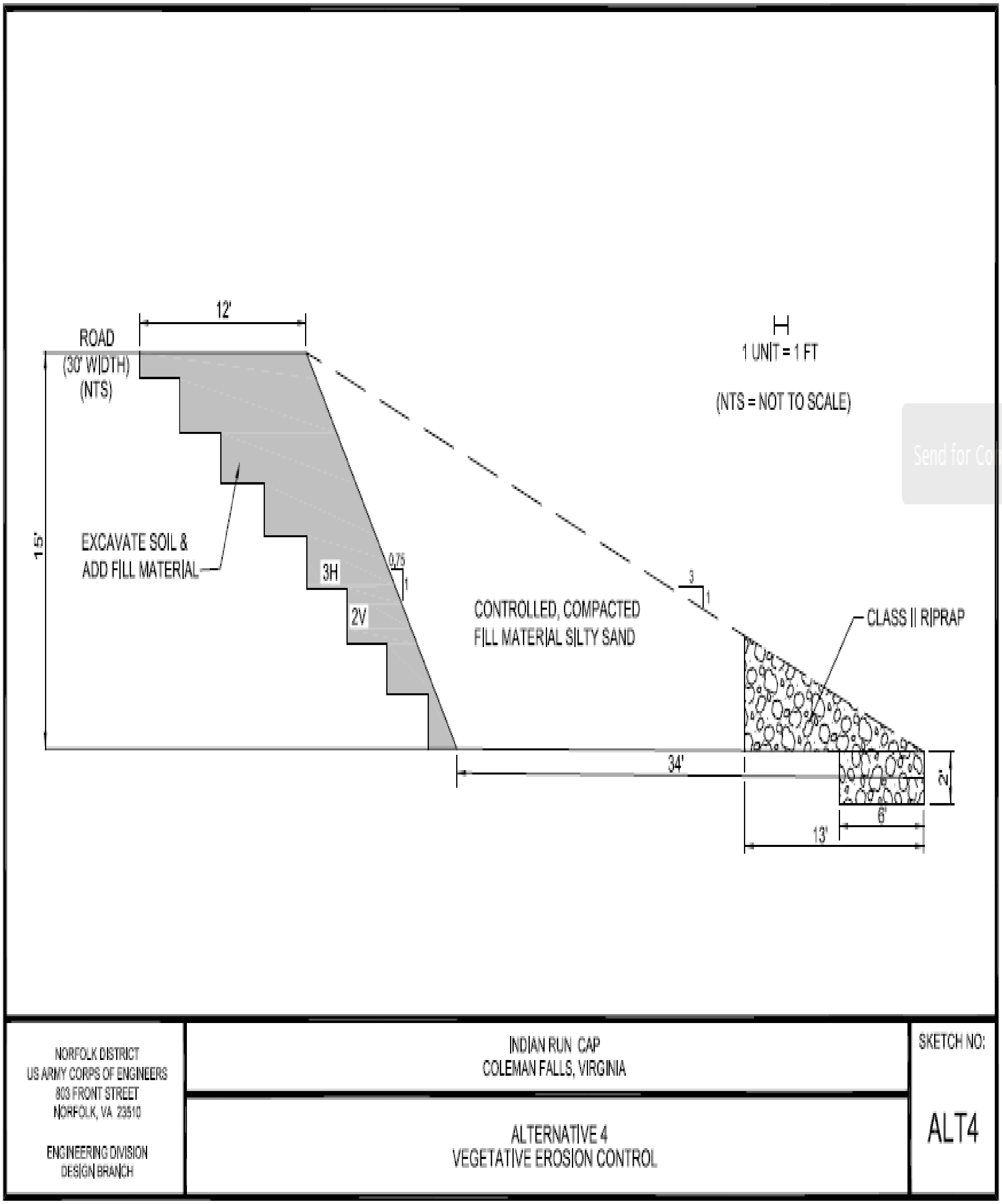
ENGINEERING DIVISION
DESIGN BRANCH

INDIAN RUN CAP
COLEMAN FALLS, VIRGINIA

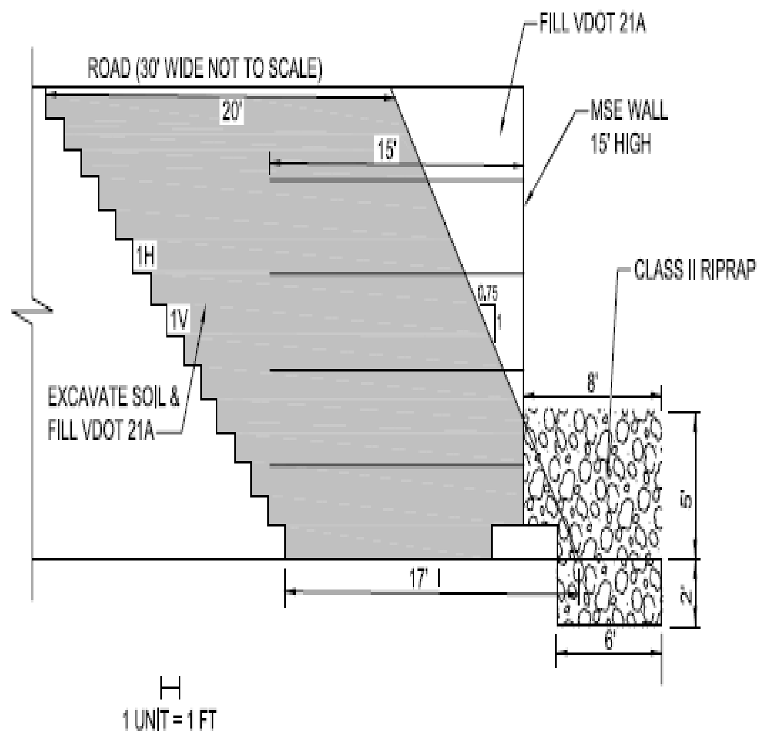
ALTERNATIVE 3
COMBINATION OF STONE
REVETMENT, VERTICAL
SHEET PILING

SKETCH NO:
ALT3

Alternative 4. Vegetated erosion control with slight re-routing of the stream

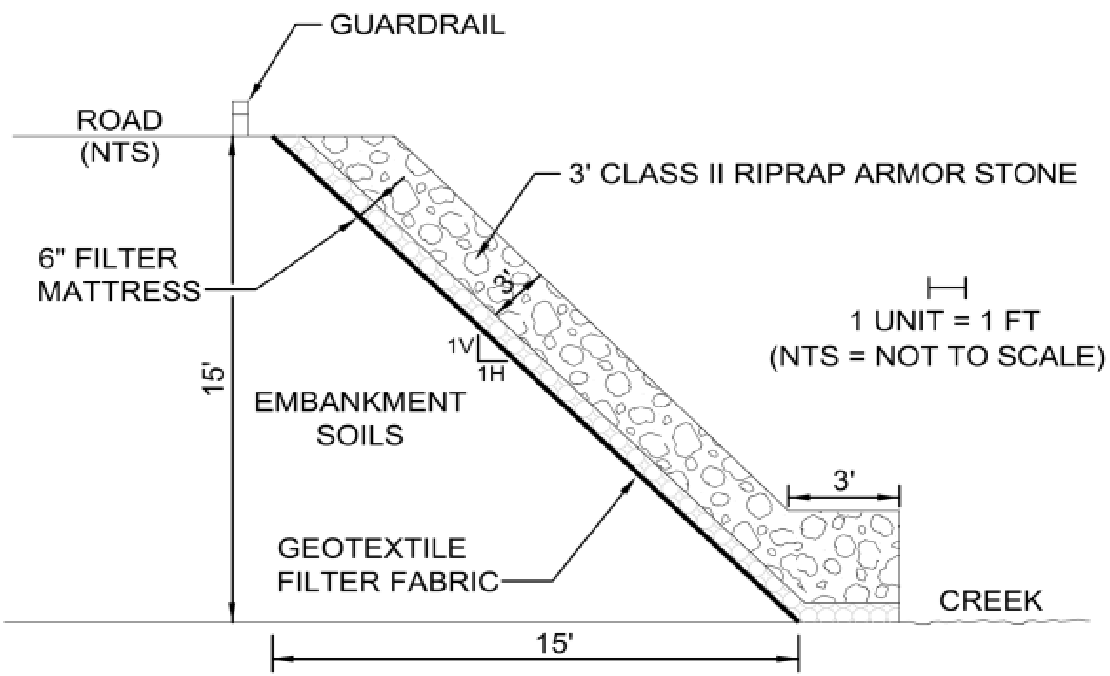


Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



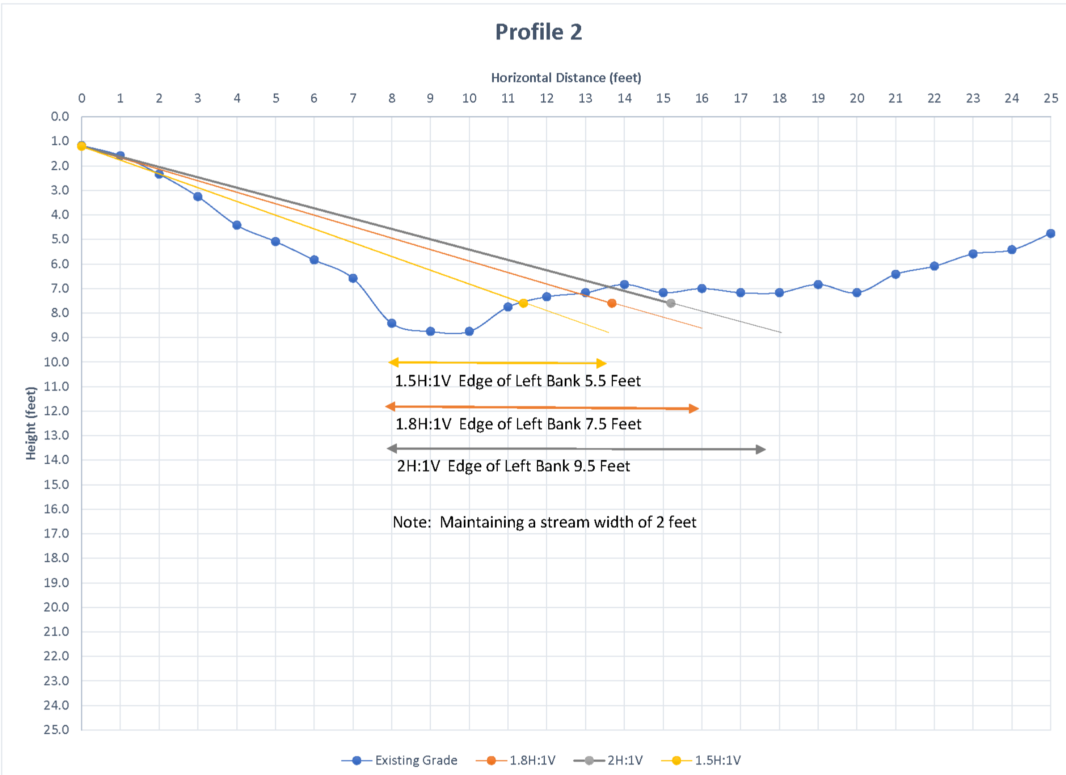
NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



COMMONWEALTH of VIRGINIA

Marine Resources Commission
380 Fenwick Road
Bldg 96
Fort Monroe, VA 23651-1064

Matthew J. Strickler
Secretary of Natural Resources

Steven G. Bowman
Commissioner

January 28, 2021

U.S. Army Corps of Engineers, Norfolk District
Attn: Zach Martin
803 Front Street
Norfolk, VA 23510

Re: Indian Run Streambank Stabilization Project NEPA Scoping Request

Dear Mr. Martin,

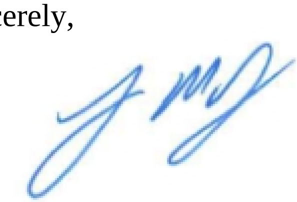
This will respond to a request for comments regarding the Indian Run Emergency Streambank Stabilization Project prepared by the U.S. Army Corps of Engineers (USACE) and the Virginia Department of Transportation (VDOT). Specifically, USACE and VDOT are proposing non-tidal stream impacts to an unnamed tributary to Indian Run in order to stabilize a 70 linear foot section of the streambank and prevent further slope failure and erosion threatening the roadway in Bedford County, Virginia.

We reviewed the provided project documents and found that the project and proposed alternatives, as currently presented, may be within the jurisdiction of the Virginia Marine Resources Commission (VMRC) and may require a permit from this agency.

Please be advised that the VMRC, pursuant to §28.2-1200 et seq of the Code of Virginia, has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks which are the property of the Commonwealth. Accordingly, if any portion of the subject project involves encroachments channelward of ordinary high water along non-tidal, natural rivers and streams with a drainage area greater than 5-square miles, a permit may be required from our agency. Any jurisdictional impacts will be reviewed by the VMRC during the JPA process. Should the proposed project change, a new review by this agency may be required relative to these jurisdictional areas.

If you have any questions please contact me at (757) 247-2255 or by email at mike.johnson@mrc.virginia.gov. Thank you for the opportunity to comment.

Sincerely,



Mike Johnson
Environmental Engineer, Habitat Management

JMJ/tlb
HM

ENVIRONMENTAL MITIGATION PLAN
Appendix A-5

INDIAN RUN EMERGENCY STREAMBANK PROTECTION FEASIBILITY STUDY

BEDFORD COUNTY, VIRGINIA

MAY 2021

U.S. Army Corps of Engineers
Norfolk District

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 PURPOSE OF THIS DOCUMENT AND MITIGATION OBJECTIVES

The Draft Indian Run Emergency Streambank Protection Integrated Feasibility Study and Environmental Assessment describes the avoidance and minimization measures for potential impacts to protected resources that includes jurisdictional wetlands. The purpose of this document is to describe the types and quantity of required compensatory wetland mitigation required for implementation of the placement of stone revetment with re-routing of stream (Modified Alternative 6). This document also serves to describe the mitigation strategies and mitigation alternatives that were considered, how they were evaluated, and the justification for selection of the preferred mitigation alternative.

The compensatory mitigation objectives for the Indian Run Emergency Streambank Protection Study are the following:

- Quantify the loss of unavoidable impacts to jurisdictional wetlands, with implementation of Modified Alternative 6;
- Identify potential environmental mitigation plan alternatives that compensate for the loss of jurisdictional wetlands;
- Identify the most cost-effective compensatory mitigation alternative that strategizes to identify and implement the most cost-effective mitigation plan while also meeting all environmental mitigation requirements; and

This mitigation plan is meant to be a living document that will be revised (as needed) during the Preconstruction, Engineering, and Design (PED) Phase of the project when the final engineering designs are provided and the quantity and type of required environmental mitigation as well as real estate acquisitions are finalized.

2.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

On June 24, 2017 the Virginia Department of Transportation (VDOT) requested USACE, Norfolk District to evaluate structural and nonstructural measures that could be implemented as part of a Federal project under CAP Section 14, Emergency Streambank and Shoreline Protection. VDOT requested this study to address the erosion along U.S. Route 501, which is threatening U.S. Route 501 and could impose negative impacts to interstate commerce. The north bank of a tributary to Indian Run is within the project area is subject to natural erosion processes including river flow, water level rise, and tidal, storm, and wind driven wave action. The first step in the evaluation process, which is fully federally funded, is to determine if there is Federal Interest in pursuing a feasibility study for this area. This task has already been completed; a favorable Federal Interest Determination (FID) for a shoreline erosion protection study along Indian Run was approved in September 2017. From this determination and approval, USACE, North Atlantic Division (NAD) sanctioned the development of the FCSA and the Project Management Plan (PMP) for the feasibility phase.

The purpose of this study is to determine if constructing emergency streambank protection to prevent bank erosion from damaging U.S. Route 501 and other public works utilities on U.S.

Route 501 is feasible and economically justified. The study identifies the least cost alternative, and the Recommended Plan is justified if total project costs are less than costs of relocating the threatened road and public utilities. Federal costs are limited to $5,000,000 for CAP Section 14. The cost of lands, easements, right-of-way, relocations of utilities, disposal areas (LERRDs), and the operation and maintenance of the project, once completed, are a non-federal responsibility.

The purpose of the proposed action is to stabilize the existing shoreline along the 70- foot section of streambank along Indian Run will prevent future erosion resulting from the combined effects of river flow, storm driven water level rise, and stormwater runoff. The project is needed to provide long-term protection to existing public utilities, causing continual loss of soil and threatening a section of the existing public road along U.S. Route 501.

3.0 ENVIRONMENTAL MITIGATION REQULATORY BACKGROUND

The USACE and U.S. Environmental Protection Agency (USEPA) published regulations entitled, “Compensatory Mitigation for Losses of Aquatic Resources” (Mitigation Rule) on April 10, 2008. One of the primary goals of these regulations (33 Code of Federal Regulation (CFR) Parts 325 and 332) was to improve the quality and success of compensatory mitigation plans that are designed to offset impacts to aquatic resources. The Mitigation Rule emphasizes the strategic selection of mitigation sites on a watershed basis and established equivalent standards for all types of compensatory mitigation (mitigation banks, in-lieu fee (ILF) programs, and permittee-responsible mitigation plans). Per these regulations, compensatory mitigation means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of wetlands for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. The three mechanisms for providing compensatory mitigation listed in order of preference as stated in the Mitigation Rule are the following: mitigation banks, ILF programs, and permittee-responsible mitigation. Compensatory mitigation is necessary to offset these unavoidable impacts to aquatic resource functions and services and to meet the programmatic goal of “no overall net loss” of aquatic resource functions and services.

The Commonwealth of Virginia Water Protection permit regulations define mitigation as “sequentially avoiding and minimizing impacts to the extent practicable, and then compensating for remaining unavoidable impacts of a proposed action" (9 Virginia Administrative Code (VAC) 25-210-10). The VAC states that compensation must be sufficient to achieve no net loss of existing wetlands acreage and functions. (§ 62.1-44.15:21 B, Code of Virginia).

Per the Virginia Water Protection Program regulation, compensatory mitigation is defined as "actions taken that provide some form of substitute aquatic resource for the impacted aquatic resource" (9 VAC 25-210-10). In Virginia, compensatory mitigation may include the following:

- Purchase or use of wetland mitigation bank credits at a Virginia Department of Environmental Quality (VDEQ)-approved mitigation bank
- Contributing to a VDEQ-approved ILF fund

- Wetland creation or restoration
- Stream restoration (see the Unified Stream Methodology below)
- Preservation of existing wetland and streams, when utilized in conjunction with creation, restoration, or mitigation bank credits
- Preservation or restoration of upland buffers adjacent to surface waters, when utilized in conjunction with creation, restoration, or mitigation bank credits

4.0 SCREENING OF PROJECT ALTERNATIVES, PROJECT ALTERNATIVES CONSIDERED BUT ELIMINATED, AND SELECTION OF THE PREFERRED PROJECT ALTERNATIVE

A requirement of the National Environmental Policy Act of 1969, as amended (NEPA) during the planning of a federal project is to develop and evaluate reasonable project alternatives, including the No Action Alternative. Evaluating reasonable alternatives is a crucial part of the NEPA process and provides necessary information and analyses that assist the decision-maker in selecting a Preferred Alternative. In evaluating alternatives, alternatives should meet the purpose and need of the project. Alternatives must also avoid and minimize negative impacts to natural and cultural resources, to the extent practicable, with unavoidable impacts mitigated to the fullest extent practicable.

In addition to a "no action" plan, seven alternatives were evaluated. The alternatives included placement of vertical sheet piling with no re-routing of the stream, rock fill slope to stabilize the base of the slope and berm with re-routing of the stream, a combination of stone revetment and vertical sheet piling with no re-routing of the stream, and a vegetation erosion control with re-routing of stream, a precast modular retaining wall with stone protection at toe with no re-routing of stream, placement of stone revetment with minimum re-routing of stream, placement of stone revetment with re-routing of stream, and road replacement. Only those alternative plans that provide the best protection with the least amount of disruption to the environment for the longest life span and for a reasonable budget were carried forward. The final alternatives for evaluation and consideration included the "no action" alternative and placement of stone revetment with re-routing of stream (Modified Alternative 6).

Avoidance and minimization of project features to natural resources were considered during the planning process during the development of project alternatives and avoidance and minimization measures will be incorporated to the maximum, practicable extent. Construction Best Management Practices will also be employed to avoid and minimize to the maximum extent practical temporary and permanent impacts to streams and wetlands.

5.0 DESCRIPTION OF THE PREFERRD ALTERNATIVE, MODIFIED ALTERNATIVE 6

The Preferred Alternative (Modified Alternative 6) is described briefly in Section 4.0 above as the "placement of stone revetment with re-routing of stream". More specifically, Modified Alternative 6 consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The design will consider extending beyond the failed section and tie into the stable existing bank. The rock fill revetment will generally consist of an approximate 5-foot thick section of Class II riprap overlain by an approximate 3-foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, it was recommended that a Class II riprap be used to protect against the erosive forces of the stream. The rockfill revetment is proposed to an approximate slope of 1.8H:1V. It is recommended that an additional subsurface exploration be performed, and the final slope further evaluated during Preconstruction Engineering and Design (PED) Phase. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap to separate the various stone graded materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and support the VDOT No. 1 stone. The proposed revetment and slope design will require relocating the existing stream channel approximately 7-feet south of its existing location and, consequently, excavation and stabilization of the right streambank at a 2H:1V slope. The initial estimates consider armoring the right bank with a 3-foot section of Class II riprap overlaying a filtration geotextile. However, designs and measures aligned with natural channel design concepts will be considered as project designs mature during the PED Phase. This would include replanting native vegetation, and log and/or tree revetments, as natural bank stabilization and erosion control measures for the right streambank. Additionally, the existing streambed substrates will be relocated with the relocated channel. Natural slope protection may be less expensive than the riprap armor protection and it may prevent possible mitigation requirements for disturbance of wetlands and submerged lands. Initial estimates of what the alternative will require, for both the river-left and river-right banks approximately: 1,066 tons of VDOT Class III riprap; 186 tons of VDOT No. 1 coarse aggregate; 48 tons of Bituminous Concrete Asphalt; 970 tons of VDOT 21A; 640 SY of geotextile filter fabric; 170 SY of geogrid; 640 CY of soil excavation; 203 tons of rock excavation; and 100-linear feet of guardrail.

6.0 DESCRIPTION OF PROJECT SITE AND WETLAND AND STREAM IMPACT ANALYSIS

Our initial assessment of the Study Area included evaluating potential overlap with any USFWS National Wetland Inventory (NWI) extents. This evaluation showed the Study Area overlaps NWI wetland classes “R5UBH” and “R2UBH”, which represent riverine wetland systems (Figure 6-1). Subsequently, a preliminary field assessment was completed on a portion of the Study Area, by the USACE, Norfolk District in December 2020 to assess potential environmental impacts of the project features and to assess potential mitigation requirements. This assessment included a Preliminary Jurisdictional Determination (PJD), a preliminary estimate of the dimensions of any wetland areas identified, and a stream assessment following Unified Stream Methodology (USM). An Approved Jurisdictional Determination and a formal Wetland Delineation will be conducted as the study moves forward with obtaining required permits during PED Phase. The formal Wetland Delineation will be conducted in accordance the 1987 USACE Wetland Delineation Manual, along with the appropriate regional supplement manual. For these purposes, USACE has been granted real estate right of entry on all VDOT-owned parcels.

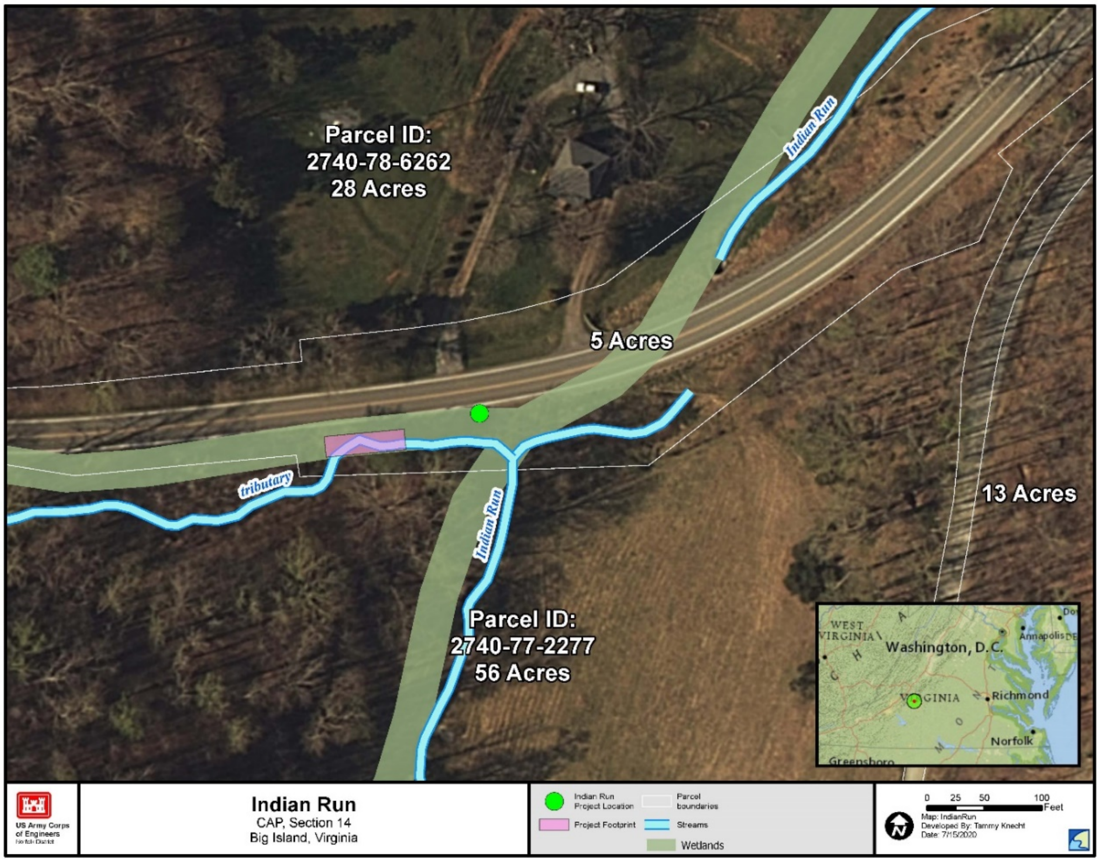

Figure 6-1. Indian Run project area with National Wetland Inventory layers. The spatial extent shown includes two classes of NWI wetland area.

The PJD identified two separate small parcels on bankfull bench landforms within the Study Area with hydrology, vegetation, and soils characteristics that met all three wetland determination criteria. to be identified as potential emergent and/or scrub riverine wetlands. The sampling point #2 was characterized as a riverine emergent wetland with dimensions of approximately 16-ft long x 18-ft deep x 21-ft wide (0.0033 acres) on the north banfull bench upstream up the existing emergency riprap revetment. The sampling point #3 was characterized as a riverine scrub-shrub wetland with dimensions of approximately 53-ft long by 7-ft average depth (0.0085 acres) on the south bankfull bench directly cross channel from the existing emergency riprap revetment. Ultimately, preliminary geospatial drawings (polygons) of these two wetland parcels were developed based on a comparison of the (1) coordinates and dimensions of these two parcels, and (2) topography lines from engineering survey drawings (see Appendix D); the resultant wetland polygons were used in the impact analysis described below. Data sheets and summary from the PJD are included in Appendix A, Sub-Appendix 3 for full survey details, which will be presented alongside a letter from USACE Regulatory in the Final IFR/EA.

Anticipated temporary and permanent wetland and stream impacts of implementing Modified Alternative 6 were estimated via geospatial analysis in ArcMap 10.7.1. The impacts were quantified and visualized based on intersecting the temporary and permanent easement areas proposed for Modified Alternative 6 with the preliminary geospatial wetland polygons (Figure 6-2). Permanent and temporary wetland impact estimates were 0.025 acres and 0.004 acres, respectively. Permanent stream impact estimates were 105 fluvial feet, including a 75-ft riffle adjacent the existing riprap and 30-ft of run/pool upstream of the existing riprap. For this mitigation plan and analysis of mitigation requirements (Section 8.0 ANALYSIS OF WETLAND AND STREAM MITIGATION REQUIREMENTS) we assumed only permanent wetland and stream impacts would require compensatory mitigation.

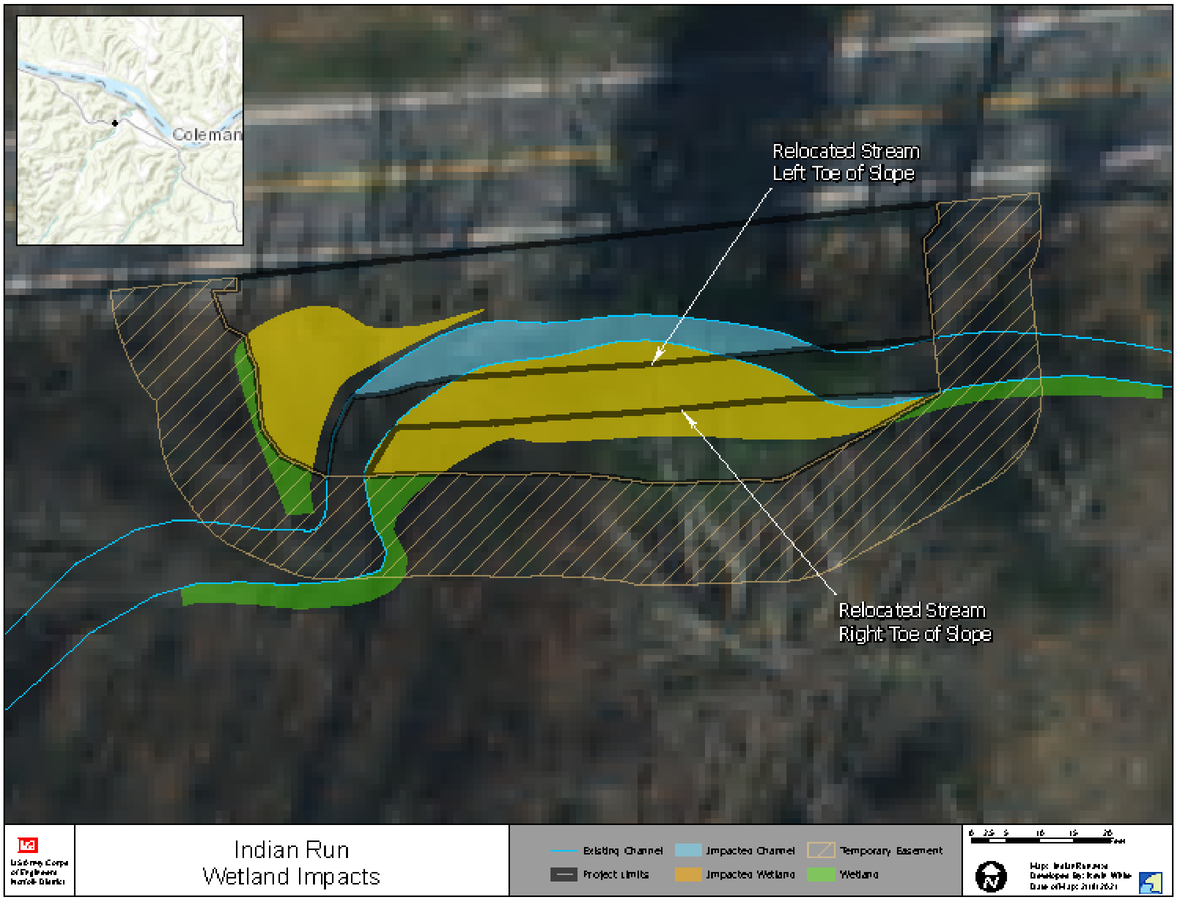

Figure 6-2. Modified Alternative 6, Placement of stone revetment with re-routing of stream, location of permanent and temporary impact sites.

The wetland types permanently impacted by implementation of Modified Alternative 6 are the following:

- Riverine emergent;
- Riverine scrub shrub.

The location and quantities of wetland impacts may vary depending on the final site design and the results of the final wetland delineation that will be fully determined during the PED Phase of the project.

7.0 POTENTIAL WETLAND MITIGATION STRATEGIES/ALTERNATIVES

This section describes the wetland mitigation alternatives that were evaluated that serve to meet the mitigation objectives. Overall we evaluated multiple mitigation alternatives so that we could identify the alternative that best met our mitigation objectives. Currently there are potential wetland mitigation credits available for purchase from a local mitigation bank within the service area for the impact site. However, mitigation credits and potential mitigation credits available will need to be reevaulated during the PED Phase of the project as these credits may not be available for purchase at the time of project implementation. Therefore our potential mitigation alternatives consist of the full potential array of mitigation alternatives that consist of onsite compensatory mitigation, purchasing of mitigation credits at a mitigation bank and/or ILF fund, and a combination of onsite compensatory mitigation and purchasing of mitigation credits:

- Mitigation Alternative 1 - This alternative consists of onsite compensatory wetland mitigation on the south bank within the project footprint, plus following natural channel design for re-routed stream channel.
- Mitigation Alternative 2 - This alternative consists of purchasing wetland and stream mitigation credits from a private mitigation bank and/or an ILF fund.
- Mitigation Alternative 3 - This alternative consists of a combination of onsite compensatory mitigation on the south bank within the project footprint, and purchasing of wetland/stream mitigation bank credits from either a mitigation bank and/or ILF fund.

7.1 Mitigation Alternative 1: Potential Wetland Onsite Compensatory Mitigation Site Natural Channel Design Plus Natural Channel Design

Based on limited site visits and a geospatial analysis conducted in ArcMap 10.7.1, potential stream and wetland compensatory mitigation sites would be focused on the re-routed channel and the south streambank. Onsite wetland compensatory mitigation would consist of the restoration of the stream channel and riverine wetlands using a natural channel design approach. Restoration measures would include root wad/toe wood revetments and replanting native vegetation for streambank stabilization, toe protection, and instream enhancement . For both the Modified Alternative 6, a portion of the existing south streambank would be removed and graded down to the adjacent riverine scrub-shrub wetland grade. Approximately 0.007 acres of land for the NW emergent wetland and approximately 0.018 acres of land for the central scrub-shrub wetland would be removed and available for the mitigation project. Hydric wetland soils displaced from adjacent construction activities in these riverine wetlands would be moved to the mitigation site and the site would be planted with native riverine emergent and scrub-shrub wetland species. Other materials needed include 9-foot coir logs, streambank matting, and geotextile fabric. Based on personal communications with the USFWS Virginia Field Office (Abingdon, Virginia), similar projects in Virginia can range from $75 - $200 per linear foot of restoration including materials, equipment, and labor costs (personal communication with Corey Kanuckle, USFWS 2021).

7.2 Mitigation Alternative 2: Purchase of mitigation credits from a mitigation bank and/or an ILF fund

For this alternative the RIBITS Database was used to identify, evaluate and select the most appropriate mitigation bank and/or ILF fund in the servicing area to compensate for the wetland functional loss (USACE 2021). Based on this review, there were five mitigation banks and one ILF program in the primary service area (Table 7-1). The Byrd Creek site of Byrd Creek, LLC was the highest ranking mitigation bank site; this site is an ILF fund mitigation site. Sponsors for all sources were contacted about prices, and Innisfree indicated that stream bank credits were priced at $475/credit. Advance credit prices with the ILF program would be $500/credit and $50,000/credit for stream and wetland mitigation, respectively.

Table 7-2. Results from RIBITS Database of all available mitigation bank credits and ILF advance credits in the primary service area.

Name	Sponsor	Bank/ILF	Wetland Credits	Stream Credits
Byrd Creek	Byrd Creek, LLC	Bank	0.06	121.00
Elk Island	Byrd Creek, LLC	Bank	0.08	-
Glenthorne Farm	Glenthorne Farm Stream Bank, LLC	Bank	0	1,564.00
Innisfree Stream Mitigation Bank	Innisfree Stream Mitigation Bank, LLC	Bank	0	6,432.90
Windrow Farm	John Shepherd	Bank	0	8,382.00
Virginia Aquatic Resources Trust Fund	The Nature Conservancy of Virginia	ILF	0.46	4,987.00

The Virginia Aquatic Resources Trust Fund Program Instrument is an agreement among the Norfolk District, U.S. Army Corps of Engineers, the Virginia Department of Environmental Quality and the Nature Conservancy of Virginia. This agreement details the Virginia Aquatic Resources Trust Fund Program, which allows land owners and developers to offset their project's impacts on Virginia's streams, rivers and wetlands. This trust fund is used for aquatic environment creation or restoration. The overall goal of the program is a no-net-loss of wetland acreage.

Currently, The Virginia Aquatic Resources Trust Fund Program Instrument has released credits available in the Chowan watershed, meaning that these are credits for mitigation projects already in the ground. Credits are based on meeting success monitoring and approved by the Interagency Review Team. These credits are equivalent to mitigation bank credits and may be sold to satisfy mitigation requirements.

If mitigation credits in the future were not available at the Byrd Creek sites (or others), a review of potential mitigation bank and ILF funds available would be reviewed again and another appropriate mitigation bank and/or ILF fund would be selected.

7.3 Mitigation Alternative 3: Combination of onsite compensatory mitigation and purchasing of mitigation credits and/or ILF mitigation credits

For this alternative onsite compensatory mitigation would be done to the extent possible at the streambank stabilization site, particularly the south streambank in the project footprint, and then any remaining needed mitigation credits would be purchased at either a mitigation bank and/or ILF fund. This alternative assumes that it would be wetland credits that would need to be purchased, as the on-site mitigation measures described under Mitigation Alternative 1 would be employed and are, at least, anticipated adequately mitigate for the stream impacts.

For this alternative the RIBITS Database was used to identify and evaluate and select the most appropriate mitigation bank and/or ILF fund in the servicing area to compensate for the wetland functional loss. Based on this review, the Byrd Creek site was the highest ranking mitigation bank site.

If mitigation credits in the future were not available at this particular site, a review of potential mitigation bank and ILF funds available would be reviewed again and another appropriate mitigation bank and/or ILF fund would be selected.

8.0 ANALYSIS OF WETLAND AND STREAM MITIGATION REQUIREMENTS

8.1 Analytical Approach and Functional Analysis Requirements

Generally, USACE policy requires a functional analysis to model mitigation quantities required for wetland and stream impacts associated with the implementing project alternatives. However, there has been agreement within USACE that models are not accurate enough to develop functional values for small impacts; impacts under an acre do not need to be modeled. We do need to mitigate but can use ratios, or other approaches as a proxy as long as there is a statement as to limitations of models and basis for the approach used. Implementing Modified

Alternative 6 would result in impacts below one acre, thus the mitigation analysis applied ratios to our impact estimates.

8.2 Stream Mitigation Analysis

The stream mitigation analysis followed the Unified Stream Methodology (USM) for use in Virginia (USACE & VDEQ 2007). This method helps planners estimate a Compensation Requirement (*CR*) for stream impacts incurred by a proposed project alternative. *CR* can be viewed as the mitigative fluvial length for stream impacts, or the number of credits required for mitigation. *CR* estimates are computed as:

$$CR = L_i \times RCI \times IF$$

where L_i is length of impact, *RCI* is reach condition index, and *IF* is impact factor. Values for each parameter were established using the USM Stream Assessment Form for two stream reaches during our PJD site visit. The separate sample reaches within the Study Area represented the 30-ft of run / pool habitat upstream of the existing riprap and 75-ft of riffle habitat adjacent to the existing riprap. *RCI* is a multimetric index ranging from 0.5-1.5 and is estimated by scoring the channel condition, riparian buffer, instream habitat/available cover, channel alteration of a reach; 1.5 represents the highest quality stream condition. *IF* ranges from 0-1 is determined using the guidance provided in the USM manual; an IF of 1 is indicative of severe impact activity such as channel alteration, elimination or filling of the channel, impoundment, or hardening of the streambed. A *CR* was estimated for each sample reach and then summed to estimate the total *CR* for stream impacts of Modified Alternative 6 (Table 8-1).

Table 8-4. Compensation Requirements (*CR*) computed for stream mitigation using Unified Stream Methodology (USACE & VDEQ 2007).

Reach Name	LI	RCI	IF	CR
Reach 1: run/pool habitat upstream existing riprap	30	1.12	1	34
Reach 2: riffle habitat adjacent existing riprap	75	1.03	1	77
			Total CR	**111**

8.3 Clean Water Act, 401 Water Quality Wetland Mitigation Requirements

While mitigation analyses are required to meet USACE planning requirements, the wetland mitigation must also meet the minimum wetland compensation ratios required in the Commonwealth of Virginia in order to obtain the Clean Water Act, 401 Water Quality Certification. Since the wetland impacts of Modified Alternative 6 did not require a functional assessment, this analysis was based primarily on the Virginia requirements. The compensation ratios for wetland impacts typically required to obtain a 401 Virginia Water Quality Certification issued by the Commonwealth of Virginia are the following:

- 2 acres compensation for each 1 acre of impact (2:1) for forested wetland impacts
- 1.5 acres of compensation for each 1 acre of impact for scrub-shrub (1.5:1) wetland impacts
- 1 acre of compensation for each 1 acre of impact (1:1) for emergent wetland impacts

8.4 Comparison of Mitigation Alternatives

Table 8-5. A listing of potential measures to account for required mitigation and form mitigation alternatives.

Measures	Resource Impacted	Mitigation Method	Per Unit Cost	Estimated Impact area (ac) or length (ft)	Mitigation Ratio	Required Mitigation Area or Length	Mitigation Cost
1	Wetland (NW bankfull bench - emergent)	ILF	$55,000.00	0.007	1.00	0.01	$384.07
2	Wetland (south bankfull bench, scrub-shrub)	ILF	$55,000.00	0.018	1.50	0.03	$1,519.82
3	Stream	ILF	$500.00	105.000	1.06	111	$55,650.00
4	Stream	Bank	$475	105.000	1.06	111	$52,867.50
5*	Stream (and potentially wetand)	On-site Compensatory	$200	105.000	1.06	111	$22,260.00

*If appropriately designed, an on-site compensatory approach following natural channel design principles may be suitable to mitigate for both stream and wetland impacts. Such a design will need to be coordinated and approved with VDEQ.

Table 8-6. Mitigation Alternatives based on combinations of measures noted in Table 8-2.

Alternatives	Measures Included	Total Estimated Mitigation Cost
1	5	$22,260.00
2	1 + 2 + 3, or 1 + 2 + 4	$54,771.39 - $57,553.89
3	1 + 2 + 5	$24,163.89

9.0 CONCLUSIONS

Implementation of either Modified Alternative 6 will result in unavoidable stream and wetland impacts that will require compensatory mitigation. We evaluated available mitigation alternatives that included onsite compensatory mitigation via natural channel design methods within the project footprint as well as purchasing of mitigation bank credits at a mitigation bank and/or ILF fund. We also looked at a combination of onsite compensatory mitigation and/or purchasing of mitigation bank credits at a mitigation bank and/or ILF fund. Based on our analysis, the most cost effective solution that also will meet all of our stream and wetland mitigation requirements will either be to conduct on-site compensatory mitigation exclusively (~$22,260; Mitigation Alternative 1) or a combination of on-site compensatory mitigation and purchase of wetland mitigation credits at either a mitigation bank and/or ILF fund (~$24,163.89; Mitigation Alternative 3) (Table 8-2, Table 8-3). Evaluating the efficacy of on-site compensatory mitigation to meet our estimate of required wetland mitigation area (0.04 acres) is difficult at this time, and will need to be discussed with Virginia Department of Environmental Quality. We fully anticipate the on-site mitigation to cover the required stream mitigation. If the proposed on-site compensatory mitigation is deemed adequate to account for the wetlands impacts, then mitigation credits will not need to be purchased and Mitigation Alternative 1 will be the preferred mitigation alternative. In the event credits are needed, our review of the RIBITS Database suggested the Byrd Creek site from Byrd Creek, LLC was the highest ranking mitigation site. Our mitigation analysis consisted of a combination of field work assessments and geospatial analyses and was conducted to assess the wetland and stream losses. Based on the results of the mitigation analysis we estimated approximately 0.04 wetland mitigation credits and 111 stream mitigation credits would need to be purchased at the Byrd Creek site to compensate for losses from implementation of Modified Alternative 6. The actual quantity and acreage of mitigation impacts and quantity of mitigation credits will be finalized during the PED Phase of the project when the project designs are finalized.

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Approved by:

________________________________ ________________

Michelle L. Hamor DATE

U.S. Army Corps of Engineers, Norfolk District

Acting Chief, Planning and Policy Branch

CULTURAL RESOURCES

Indian Run, Bedford County, VA
Continuing Authority Program, Section 14
Emergency Streambank & Shoreline Protection

APPENDIX A-6

MAY 2021

U.S. Army Corps
of Engineers
Norfolk District

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 07, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Marion Werkheiser, Attorney at Law
Cultural Heritage Partners
1811 E. Grace St., Suite A
Richmond, VA 23223-6955

Dear Ms. Werkheiser:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact John Haynes at John.H.Haynes@usace.army.mil or 757-201-7008, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

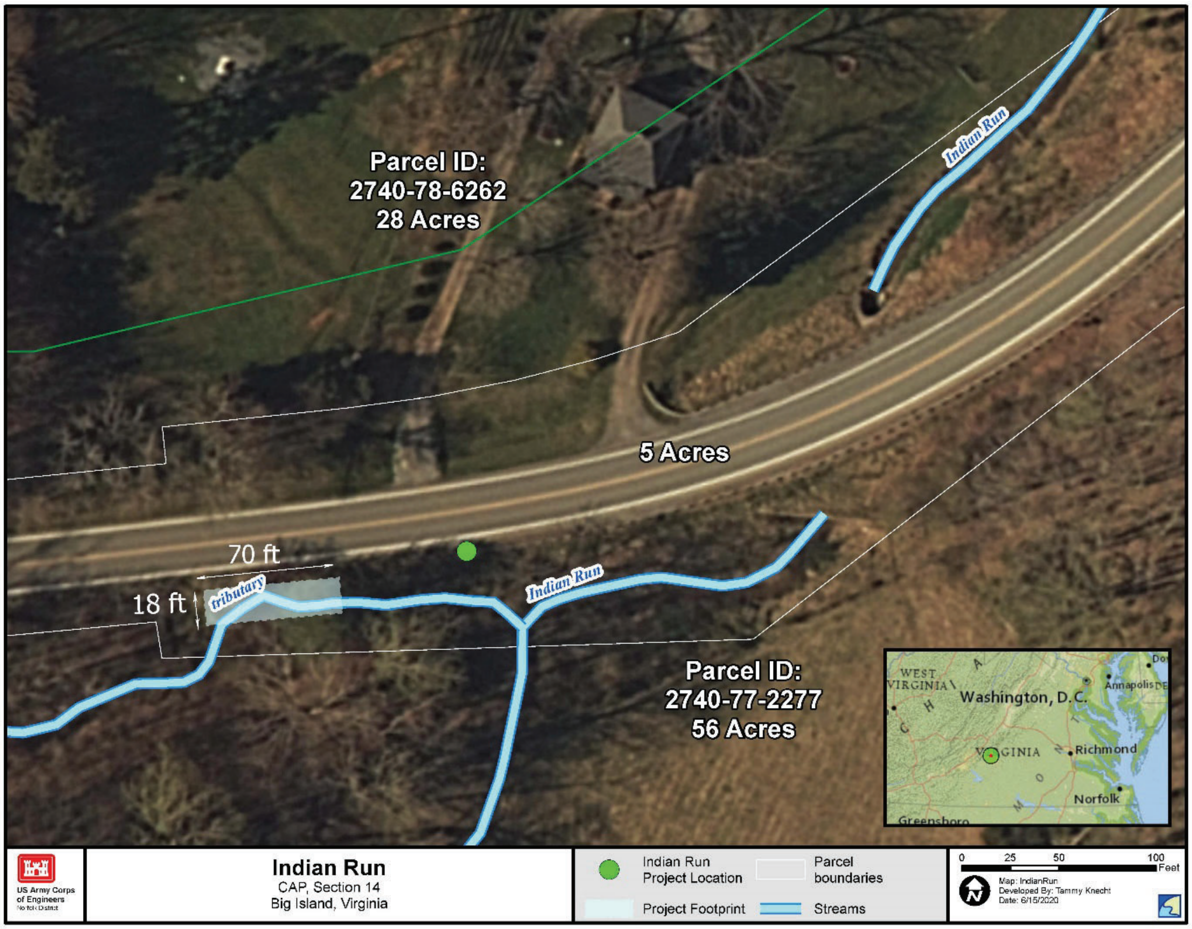
Sincerely,

Alicia Logalbo Digitally signed by Alicia Logalbo
Date: 2021.01.13 09:14:18 -05'00'

Alicia M. Logalbo
Chief, Environmental Analysis Section

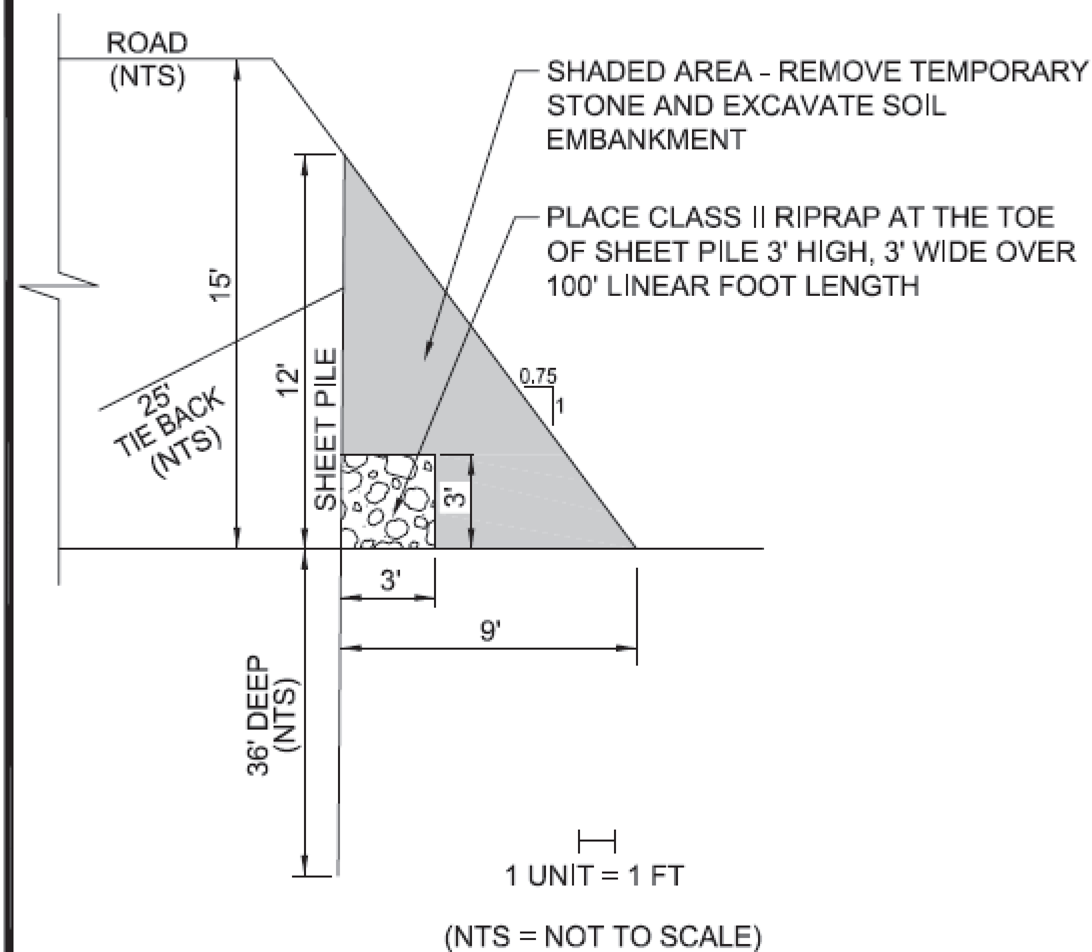
Enclosures

Enclosure 1. Map of the project area.



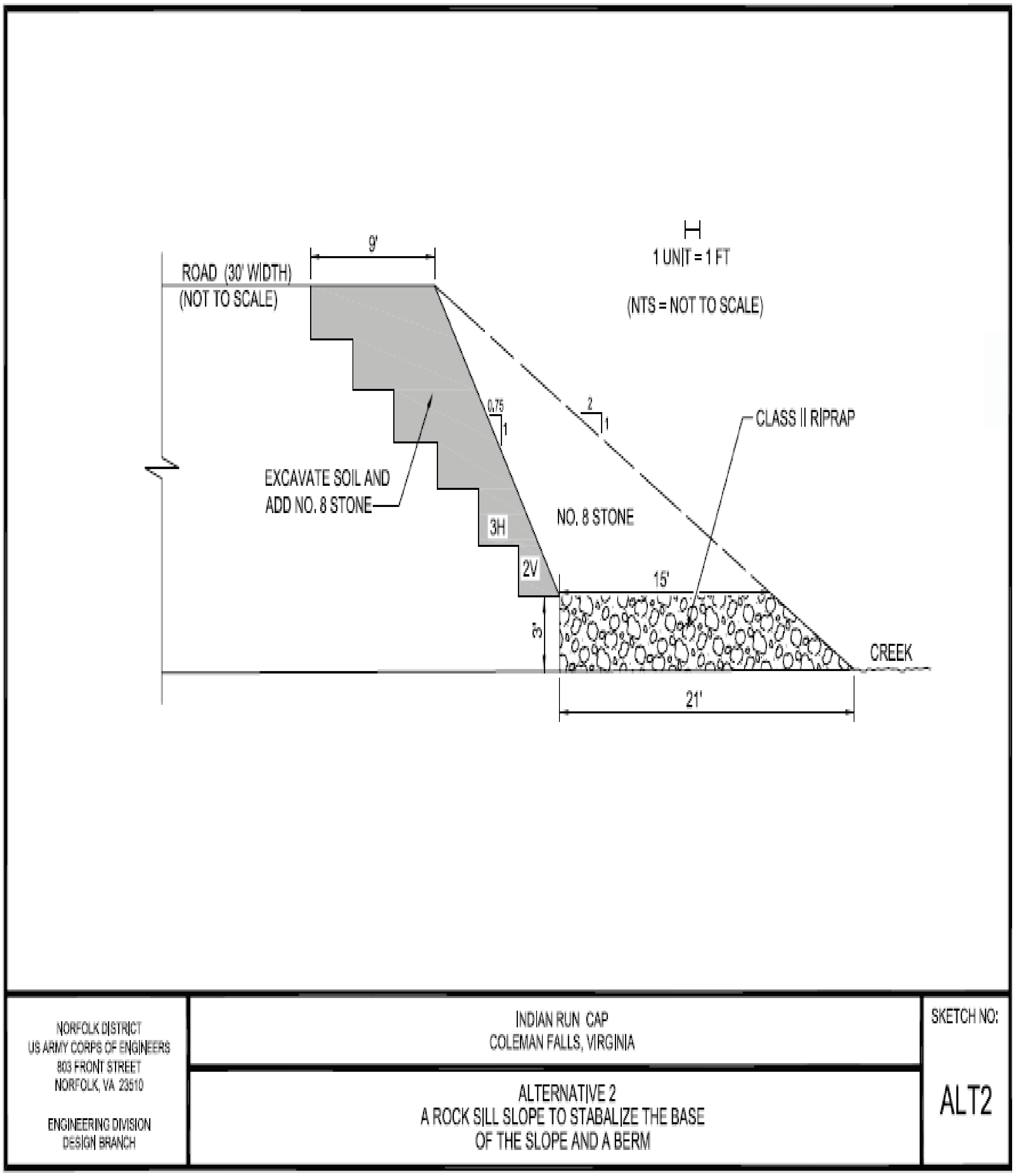
Enclosure 2. Drawings of Alternatives 1 – 6.

Alternative 1. Placement of vertical steel sheet piling

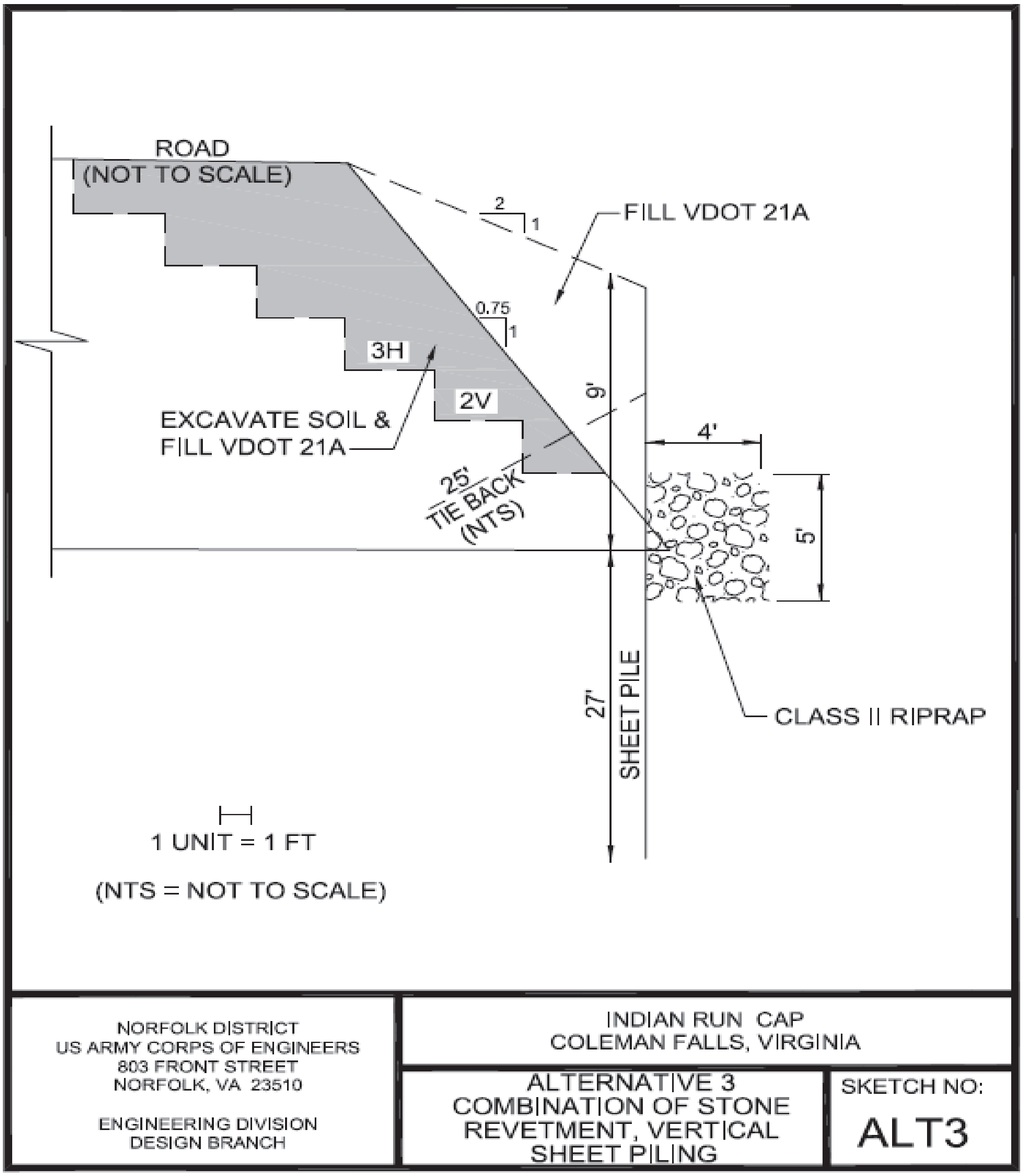


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 1 PLACEMENT OF VERTICAL STEEL SHEET PILING	SKETCH NO: ALT1

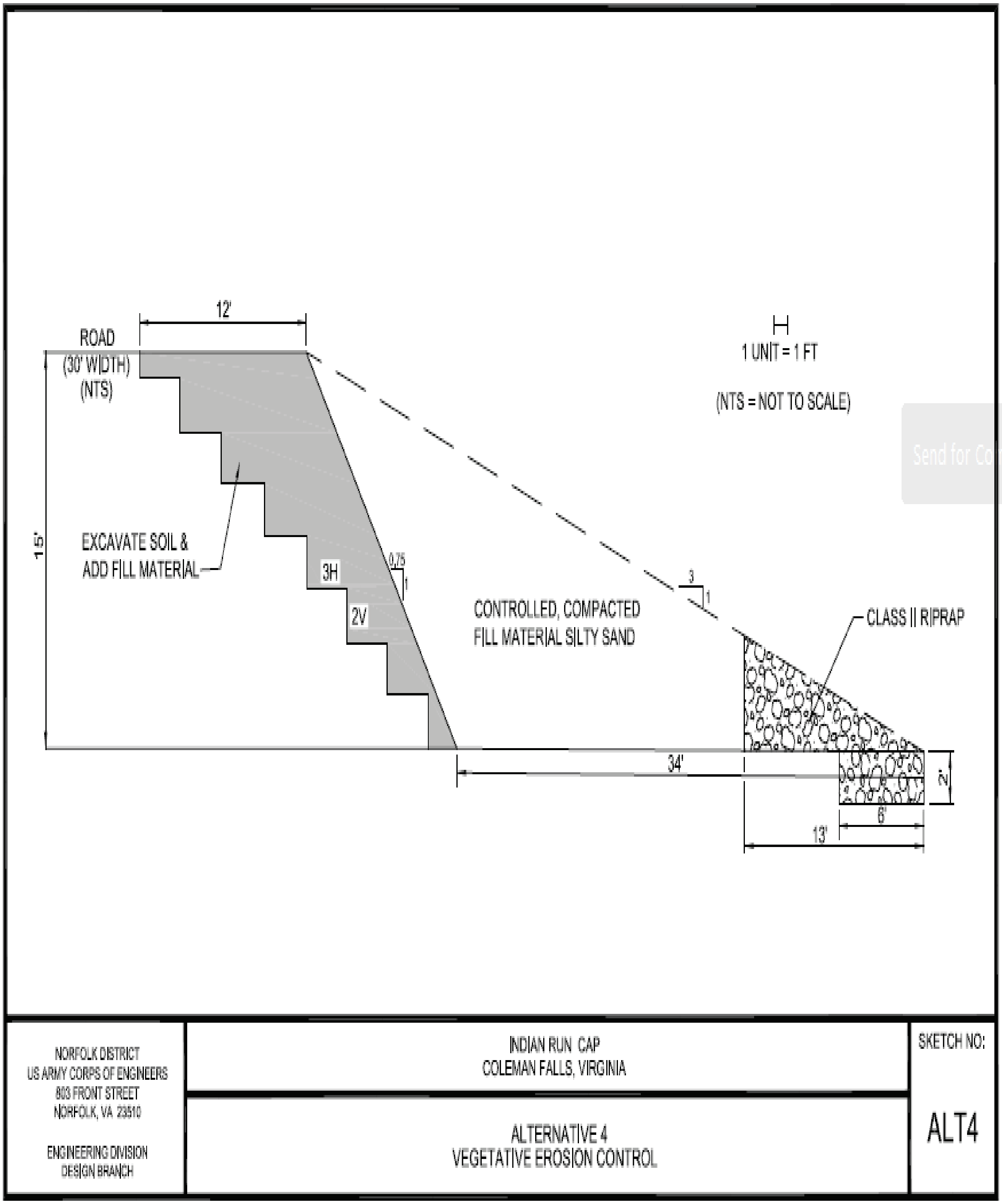
Alternative 2. A rock sill slope to stabilize the base of the slope and a berm



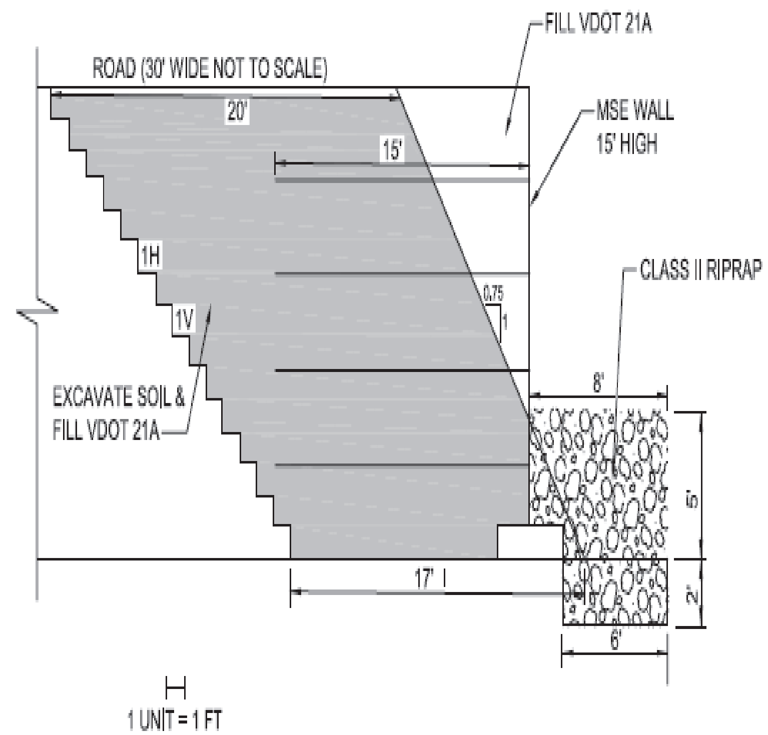
Alternative 3. Combination of stone revetment and vertical sheet piling



Alternative 4. Vegetated erosion control with slight re-routing of the stream

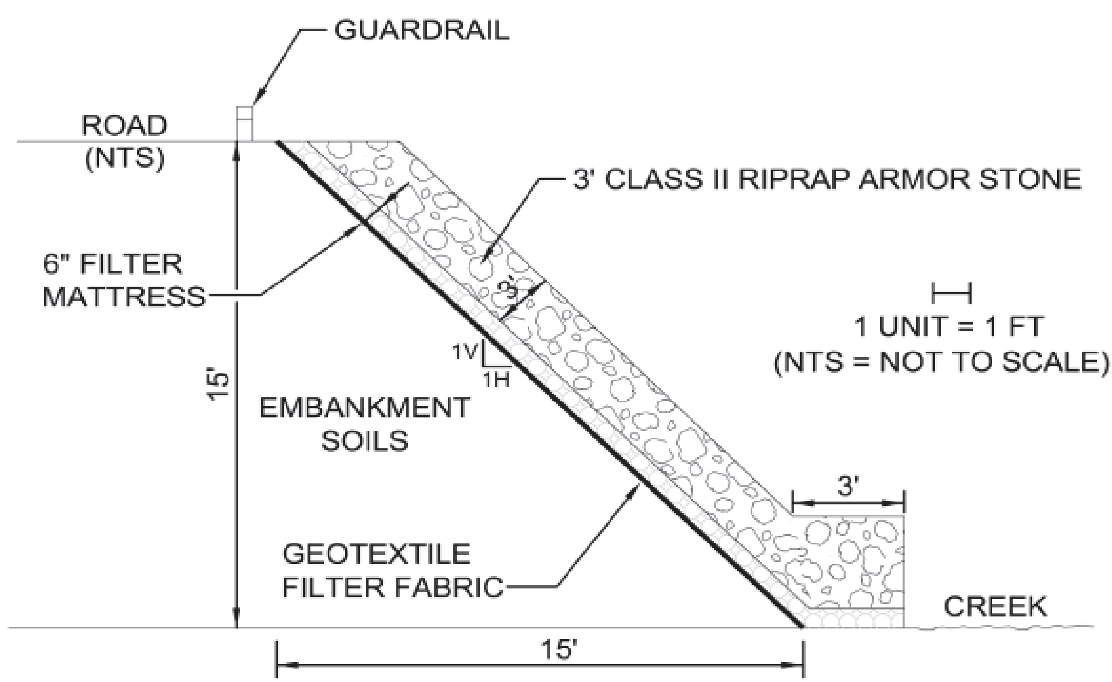


Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



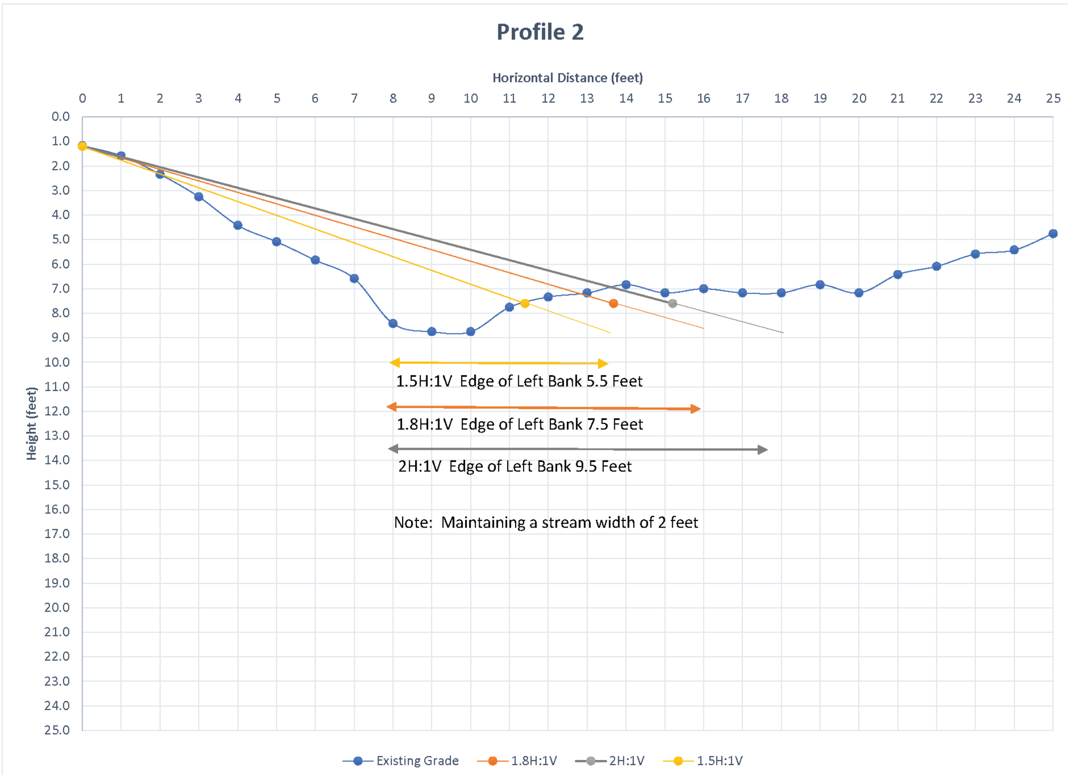
NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 07, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Erin Thompson-Paden
Director of Historic Preservation
Delaware Nation
31064 State Highway 281
Anadarko, OK 73005

Dear Ms. Paden:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact John Haynes at John.H.Haynes@usace.army.mil or 757-201-7008, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

Sincerely,

Alicia Logalbo Digitally signed by Alicia Logalbo
Date: 2021.01.13 09:19:32 -05'00'

Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures

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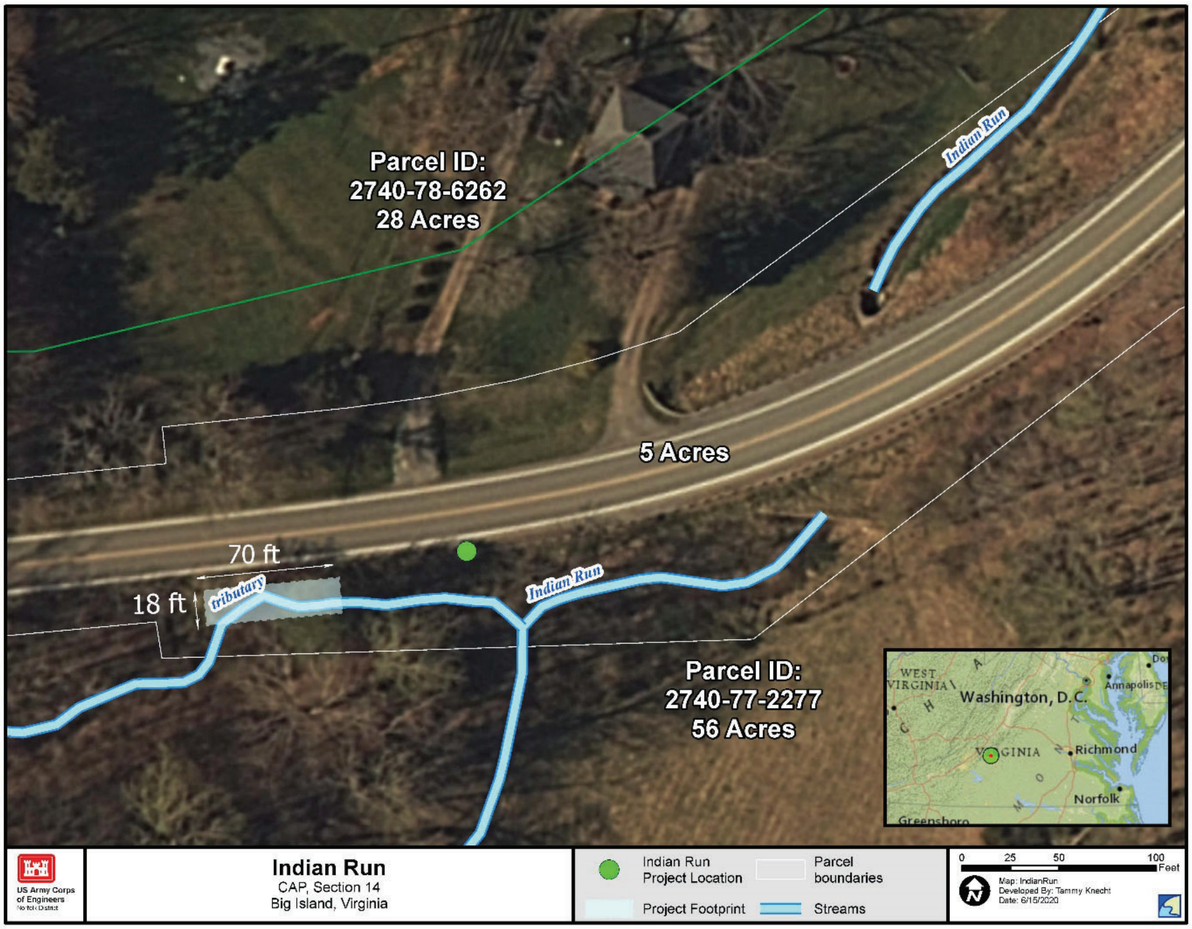

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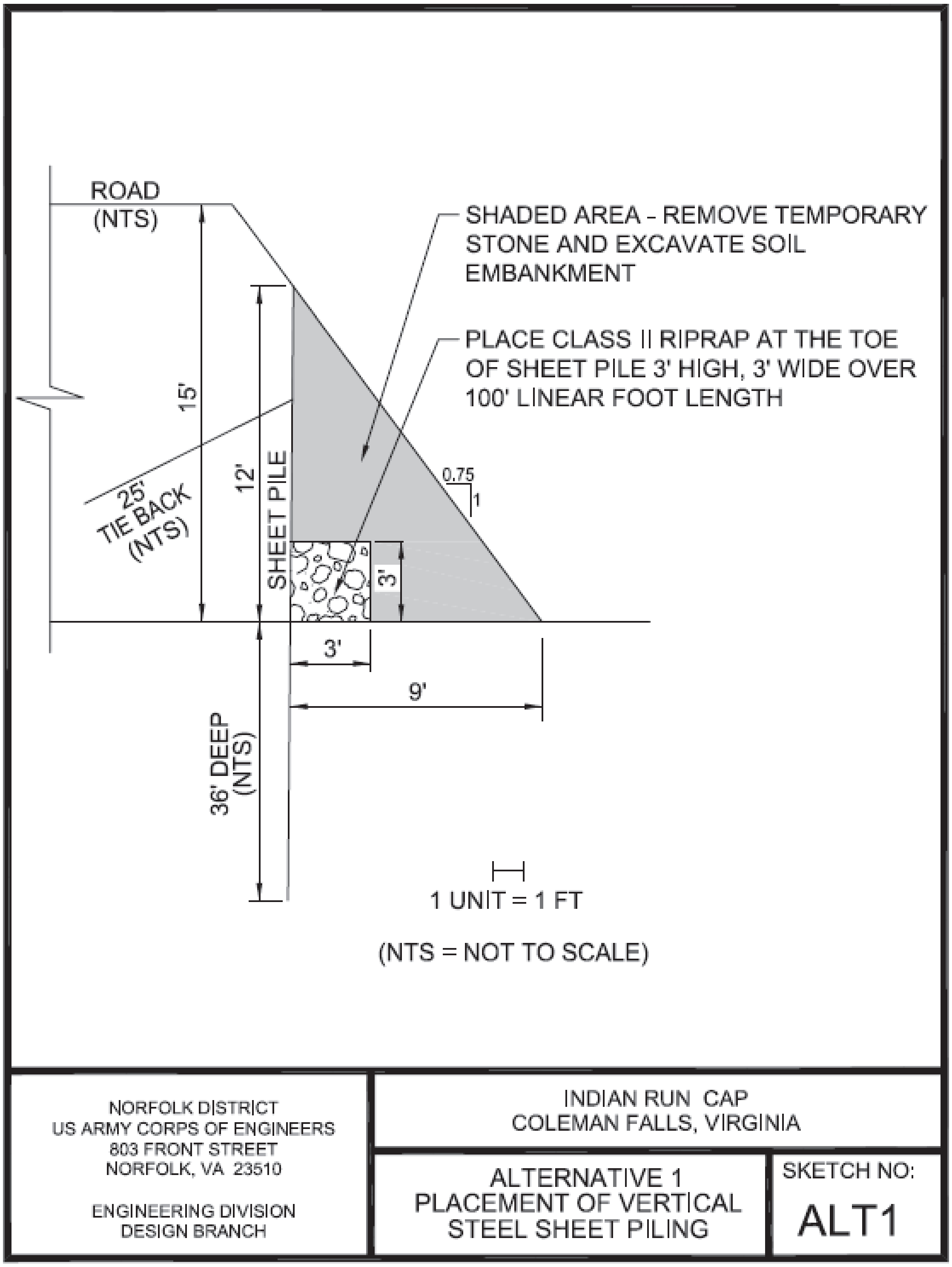

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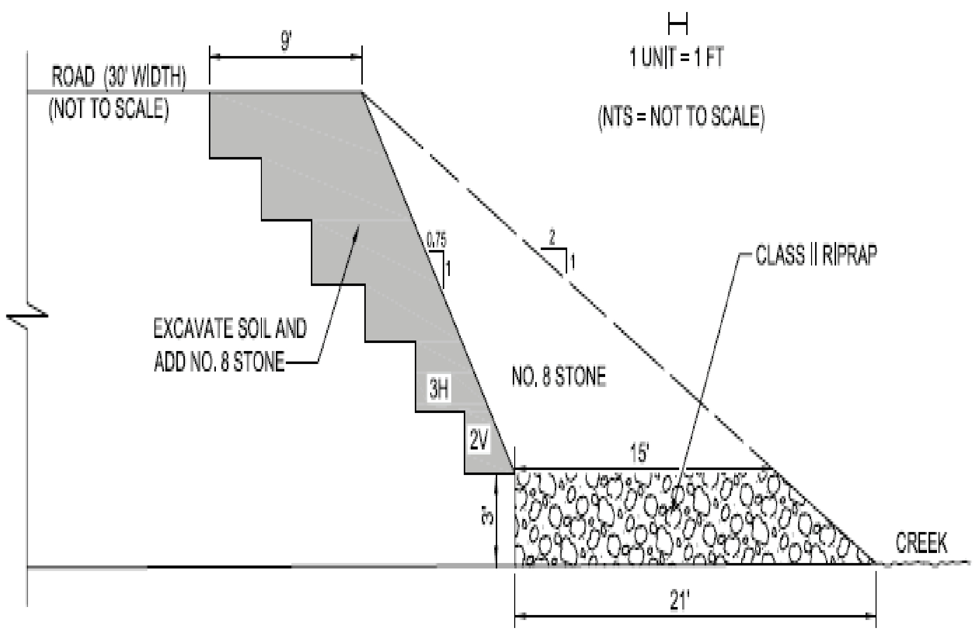
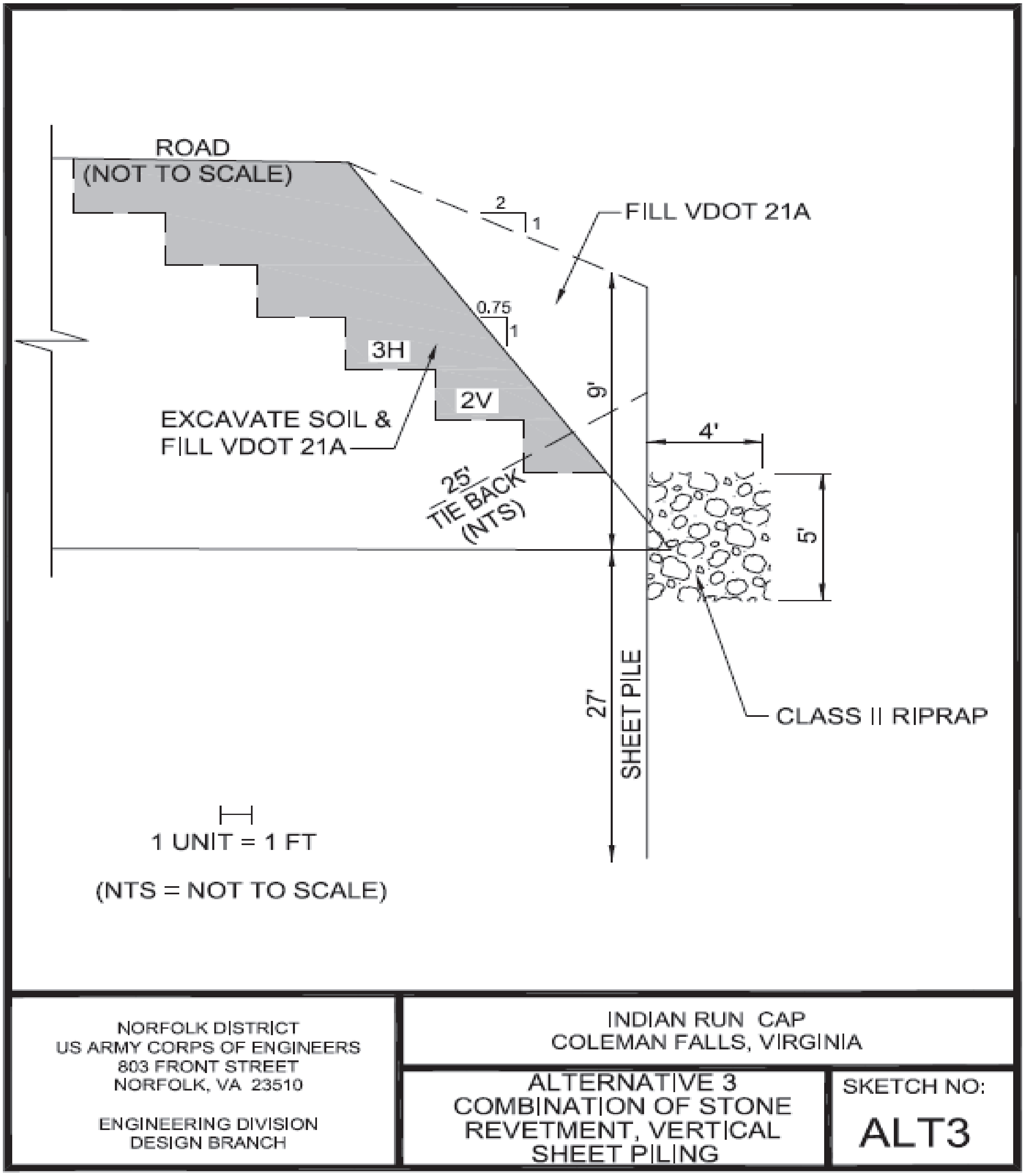


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2

Alternative 3. Combination of stone revetment and vertical sheet piling



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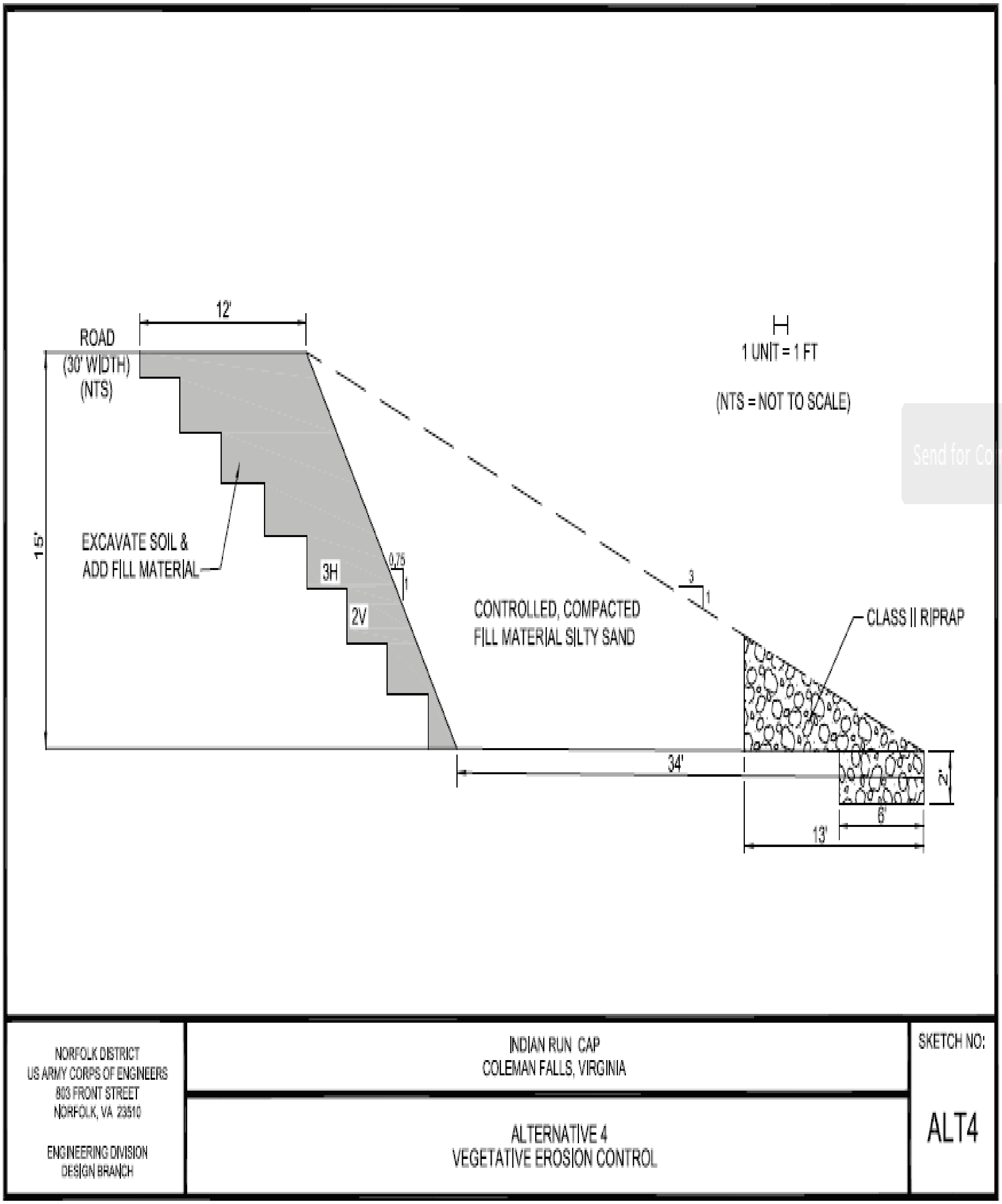

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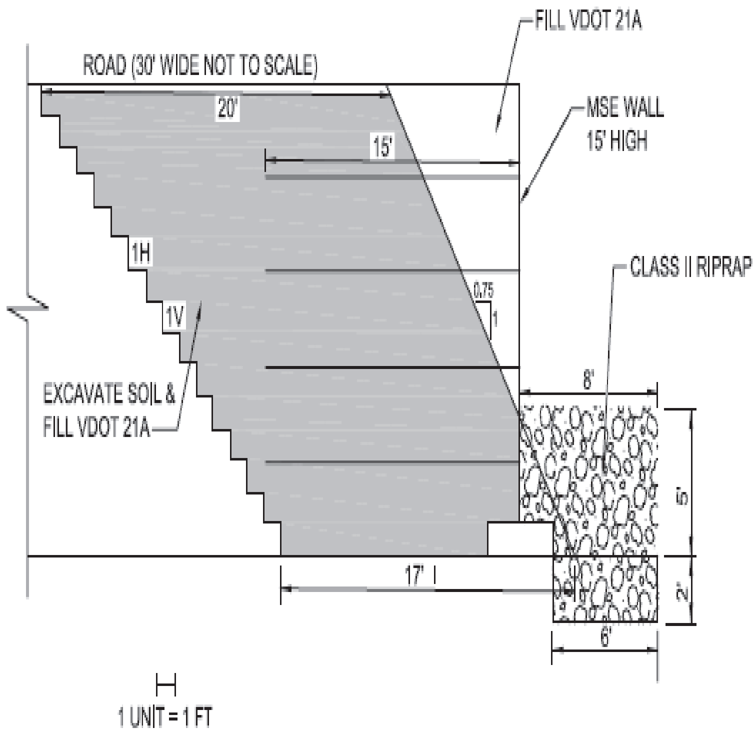
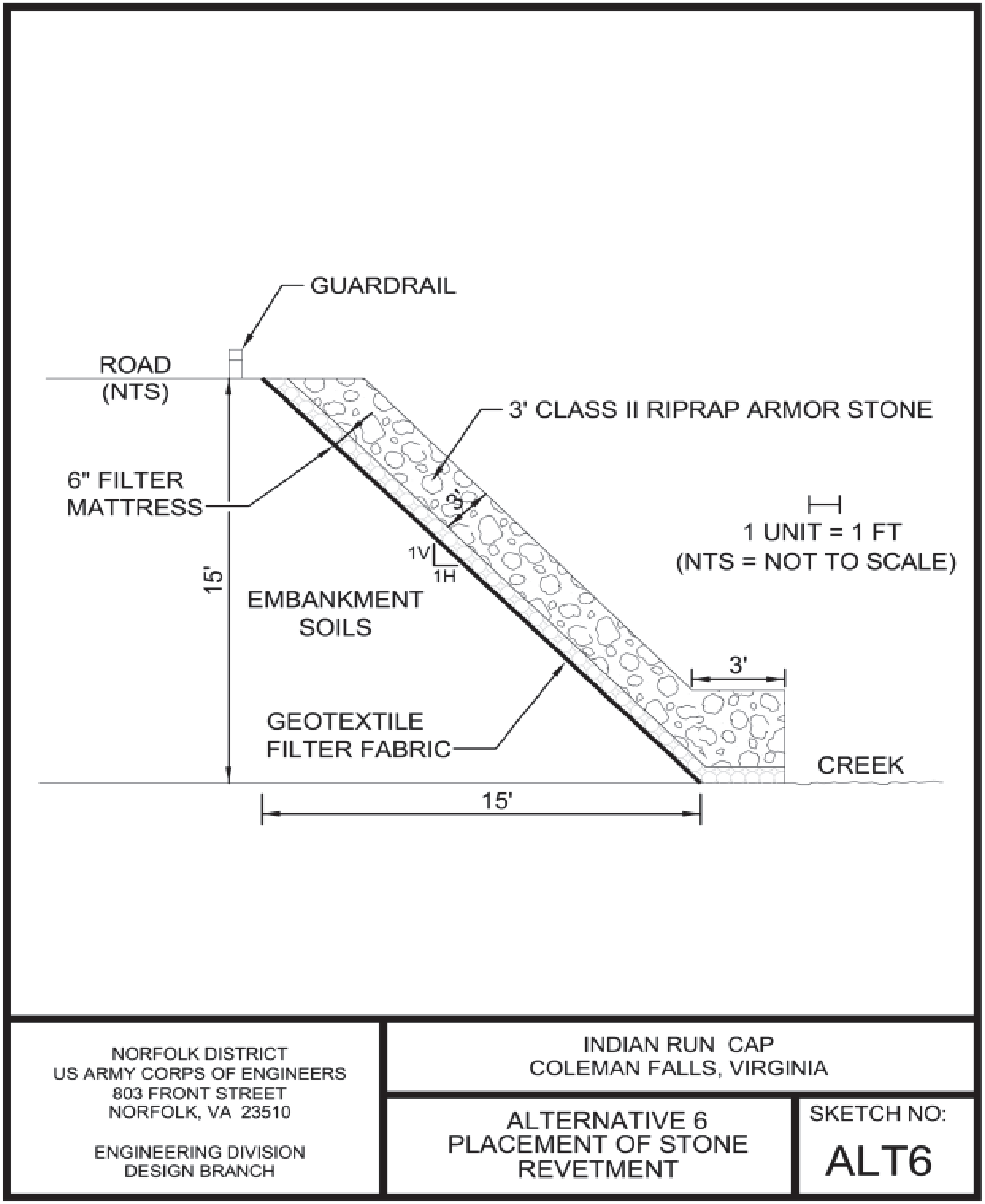


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



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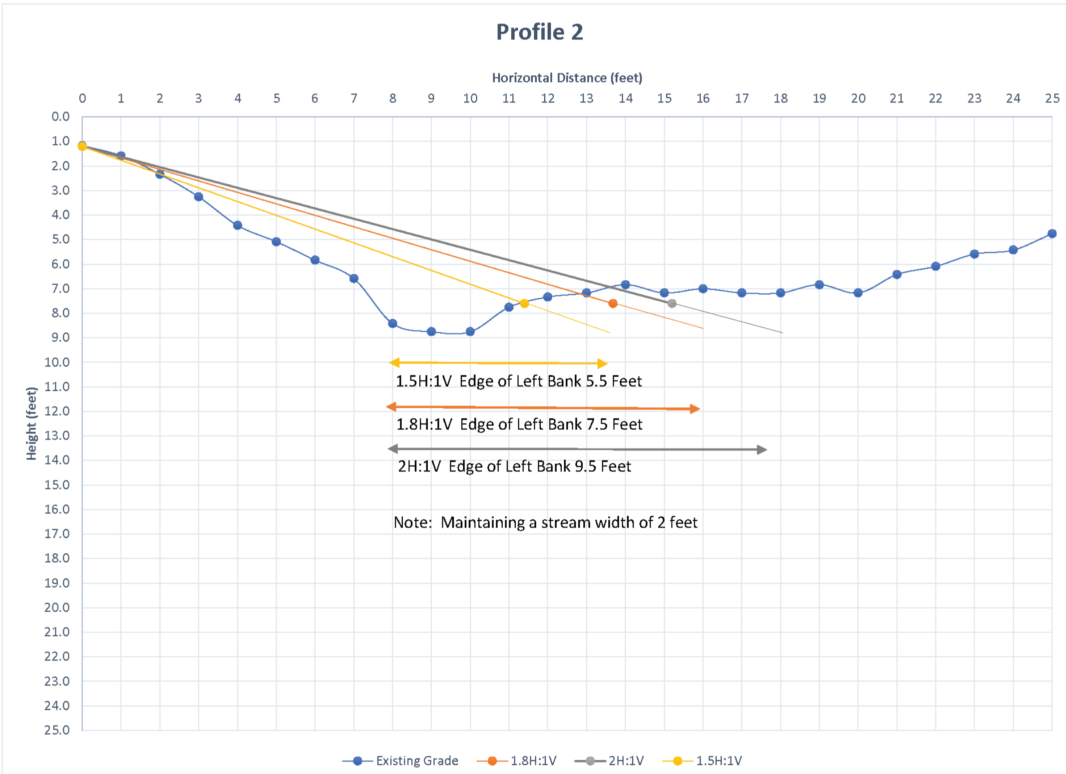


DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 07, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Kaleigh Pollak
Administrative Assistant
Monacan Indian Nation
P.O. Box 960
Amherst, Va. 24521 0960

Dear Ms. Pollak:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact John Haynes at John.H.Haynes@usace.army.mil or 757-201-7008, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

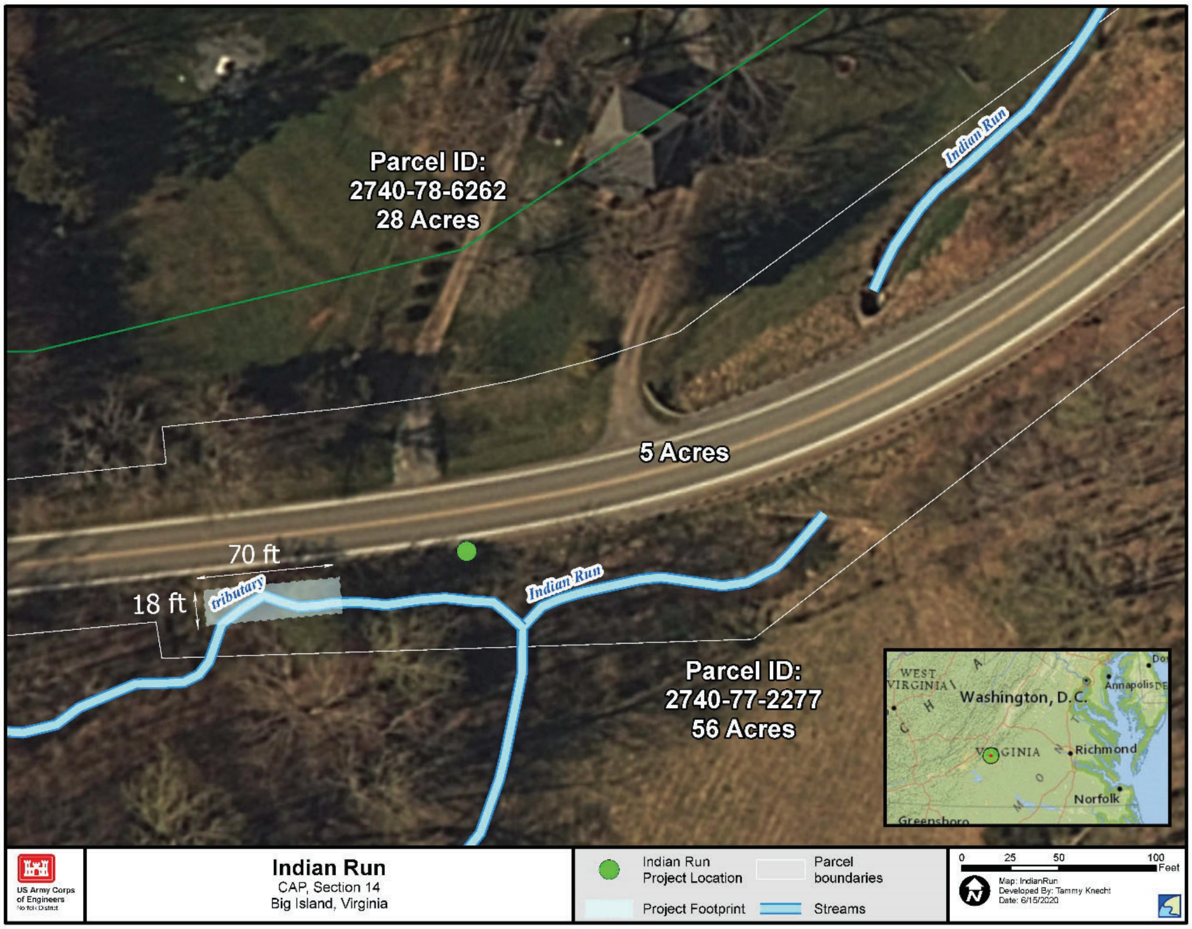
Sincerely,

Alicia Logalbo Digitally signed by Alicia Logalbo
Date: 2021.01.13 09:20:29 -05'00'

Alicia M. Logalbo
Chief, Environmental Analysis Section

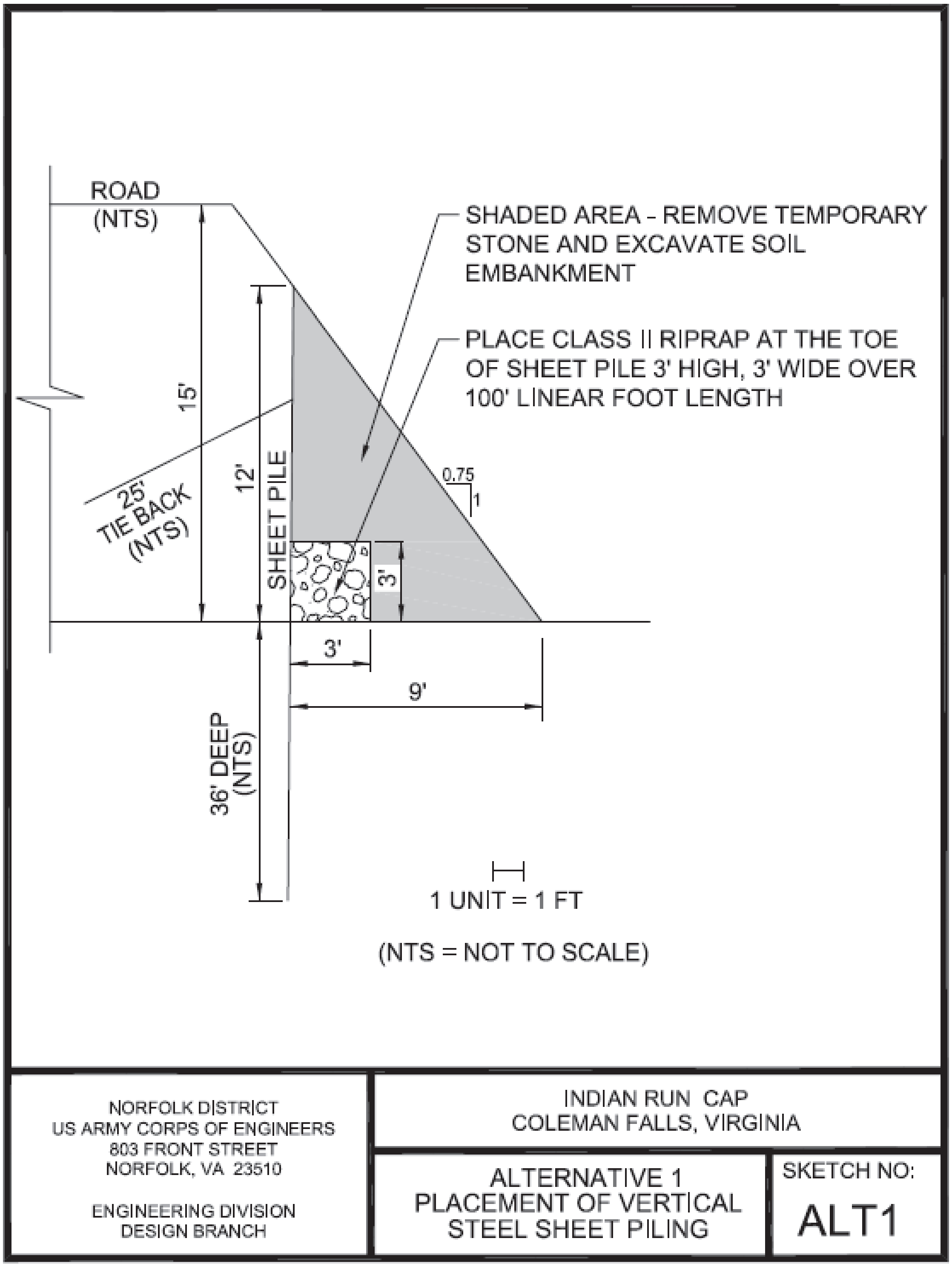
Enclosures

Enclosure 1. Map of the project area.

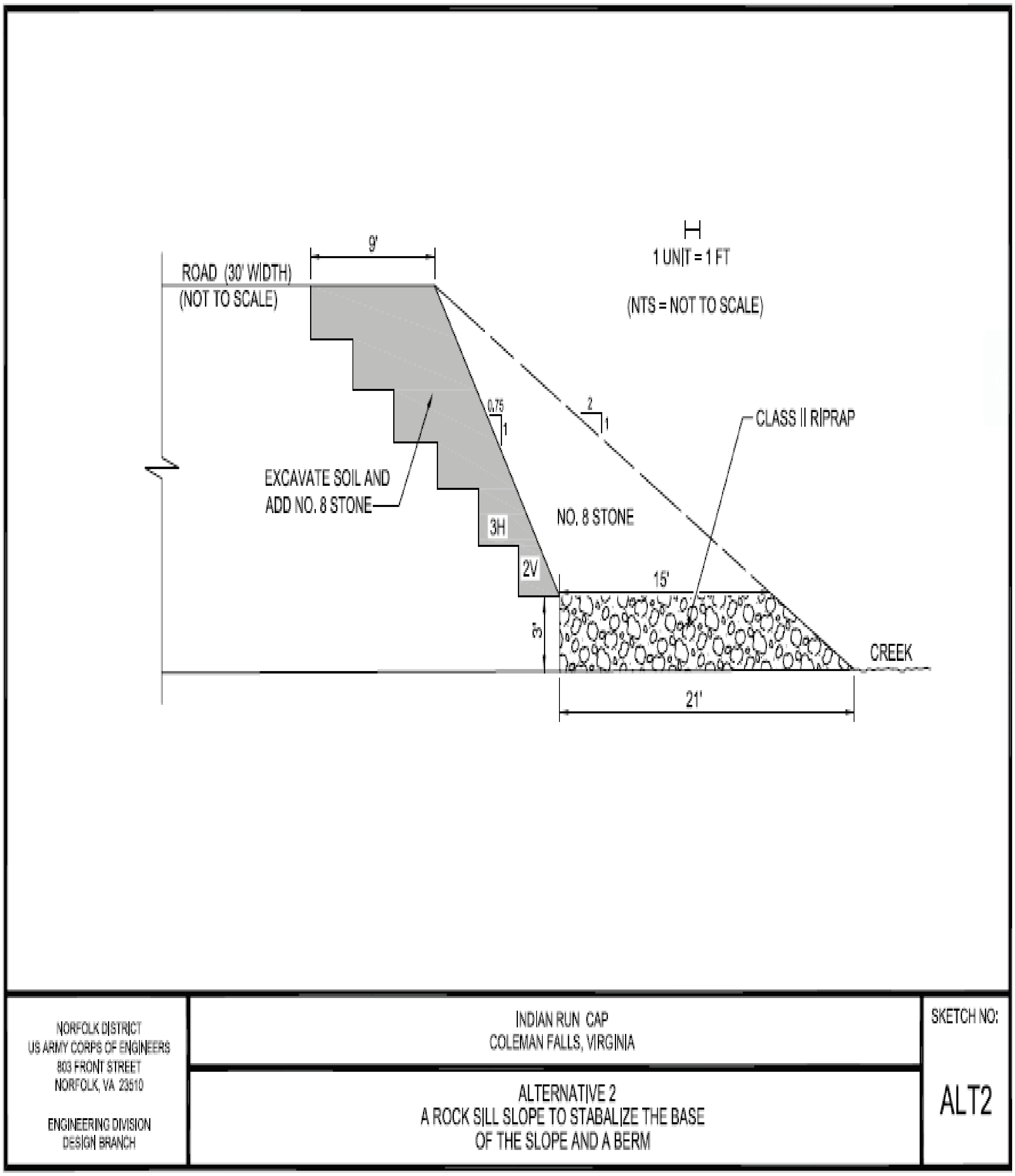


Enclosure 2. Drawings of Alternatives 1 – 6.

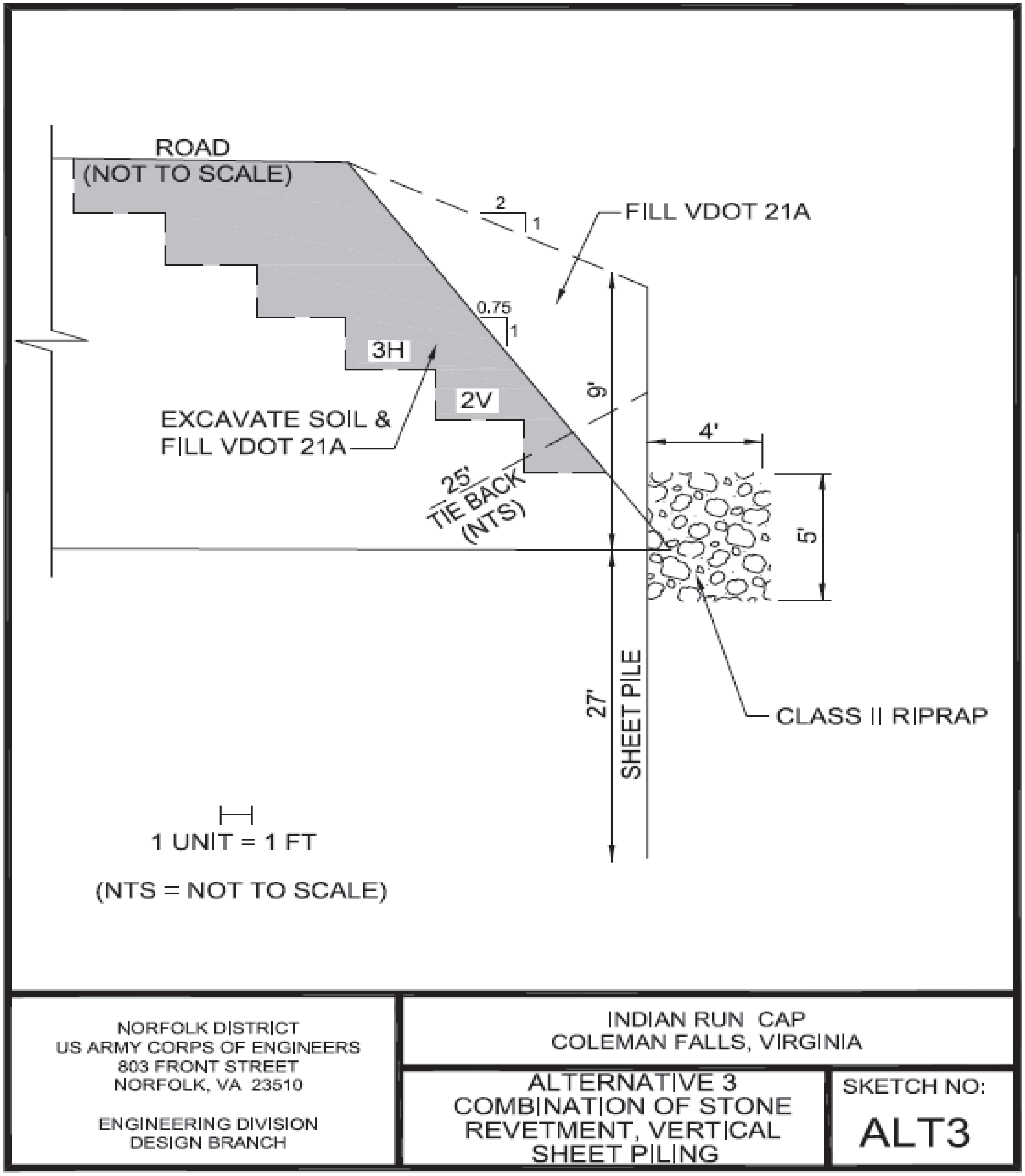
Alternative 1. Placement of vertical steel sheet piling



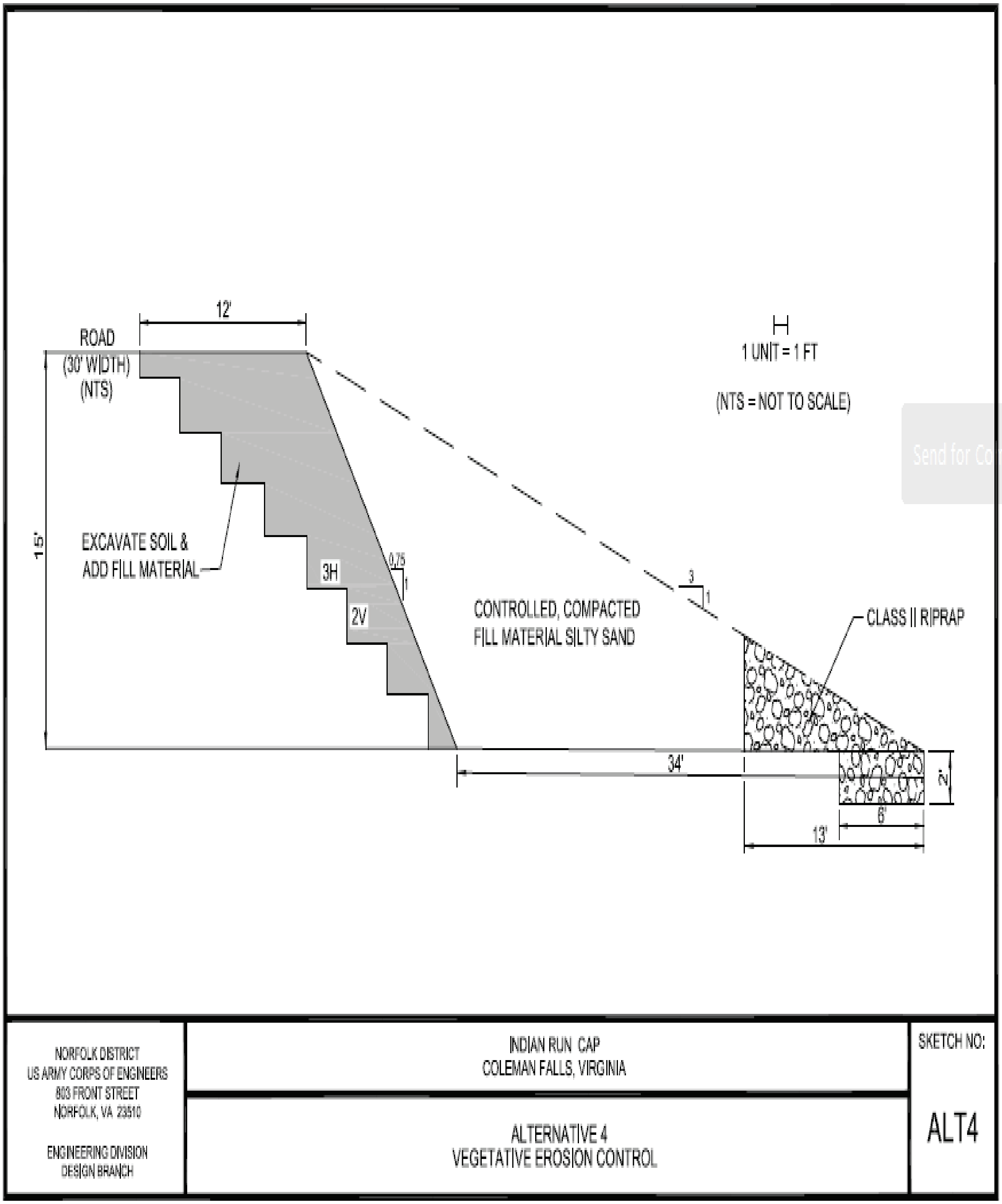
Alternative 2. A rock sill slope to stabilize the base of the slope and a berm



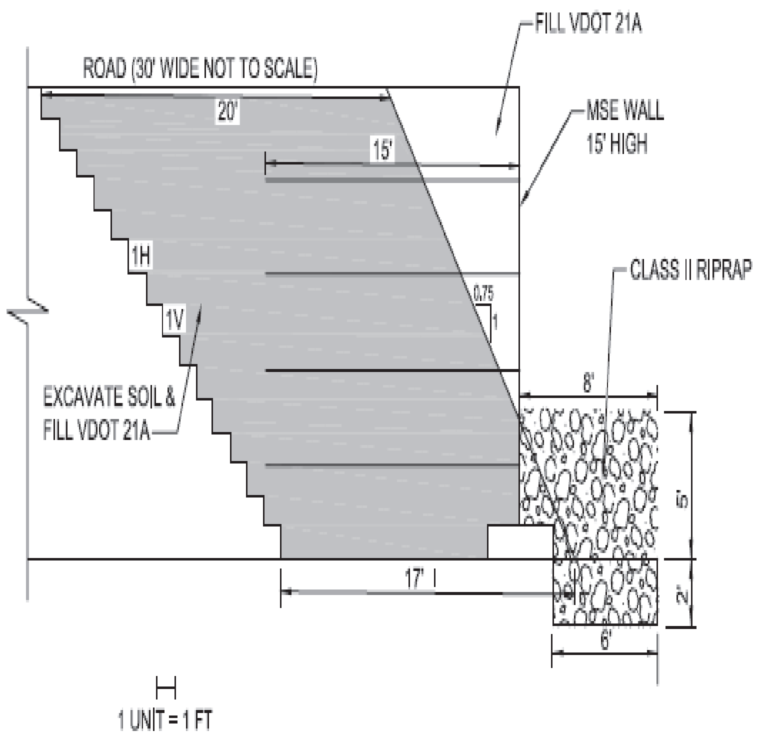
Alternative 3. Combination of stone revetment and vertical sheet piling



Alternative 4. Vegetated erosion control with slight re-routing of the stream

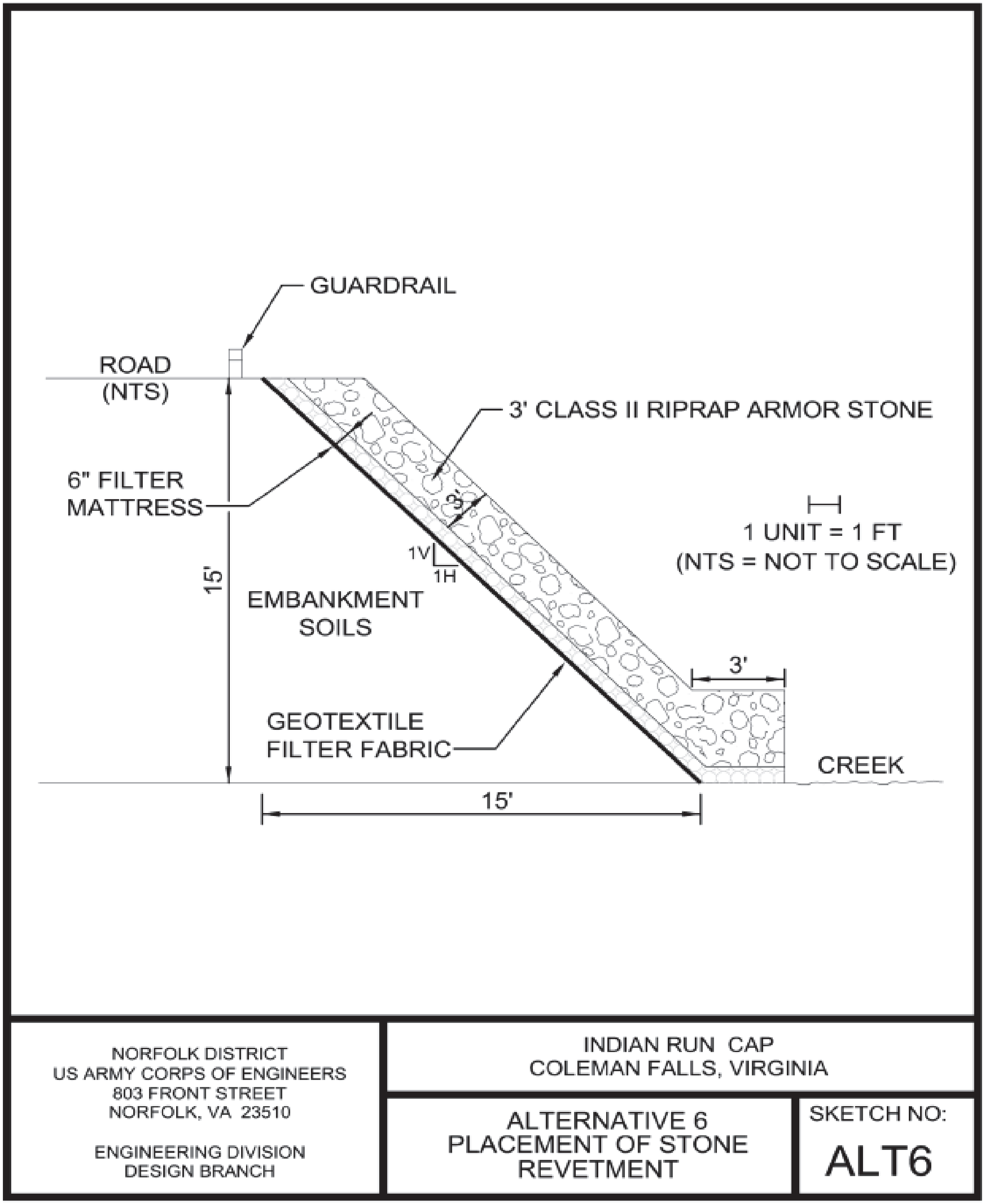


Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe

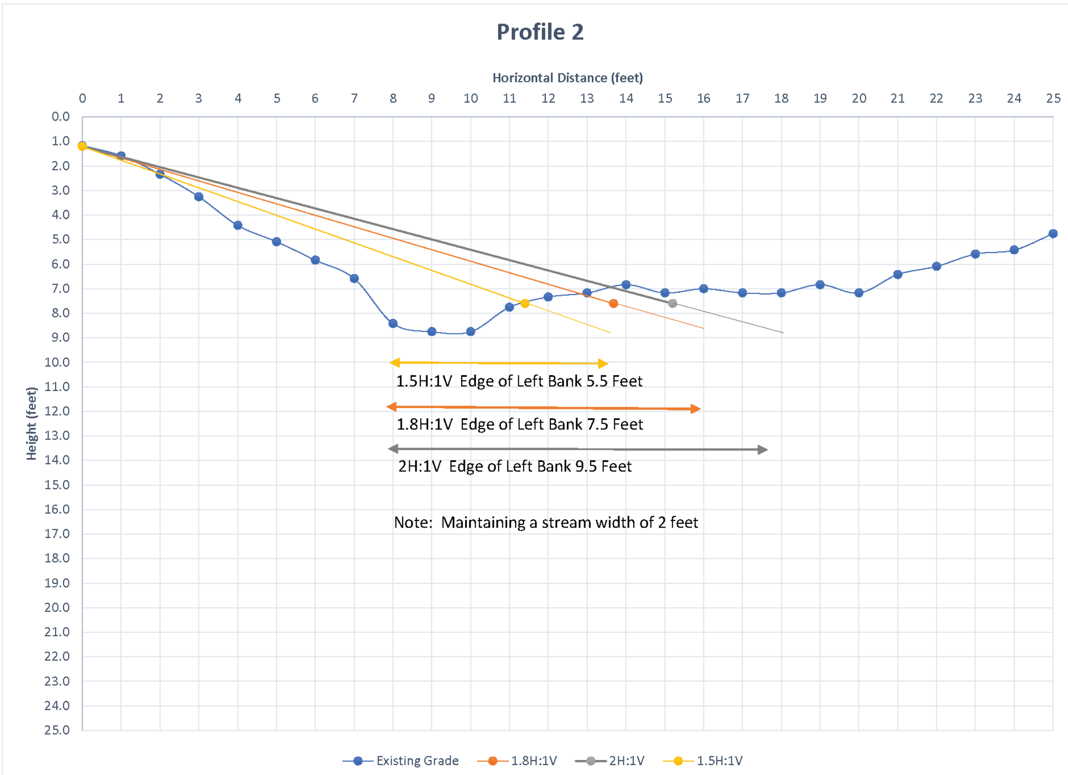


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 07, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Mr. Terry Clouthier
Cultural Resource Director
Pamunkey Indian Tribe
1054 Pocahontas Trail
King William, VA 23086-2114

Dear Mr. Clouthier:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

The alternatives in the initial array included (1) placement of vertical steel sheet piling, (2) a rock sill slope to stabilize the base of the slope and a berm, (3) a combination of stone revetment and vertical sheet piling, (4) vegetated erosion control with slight re-routing of the stream, (5) installing pre-cast modular retaining walls with stone protection at the toe, (6) placement of stone revetment with slight re-routing of the stream, (7) relocation of public utilities and the roadway, and (8) a No Action/Future without Project Alternative. Additional alternatives or combinations of alternatives may also be considered as the study progresses. The terrain within the project area varies from gently to steeply sloping. The project area is heavily vegetated with hardwoods and brush, and several of the construction alternatives would require clearing and re-grading of approximately 0.03 acres of streambank. Any stream re-routing would be the consequence of re-grading a shallower, more stable streambank on north bank of the tributary. Enclosure 2 shows basic cross-sectional drawings of any of the action alternatives (Alternatives 1 – 6). Enclosure 3 shows three re-graded slope profiles for any alternatives that would require re-grading the north stream bank.

The Feasibility study was authorized through Section 14 of the Flood Control Act of 1946, as amended – Emergency Streambank and Shoreline Erosion Protection of Public Works and Non-Profit Public Services – provides authority for USACE to implement projects to protect public facilities that are in imminent threat of damage or failure by natural erosion processes on streambanks and shorelines. The lead federal agency for the study is USACE and the nonfederal sponsor is VDOT.

Based on the scope of this study and the resources involved, the USACE is requesting early comments for NEPA scoping as well as any additional topics that may need to be evaluated as part of the environmental assessment. We would also welcome comments on potential alternatives for the project.

We respectfully request a response by February 8, 2021, if possible, so that we can properly address all comments as needed. In the interim, please do not hesitate to contact John Haynes at John.H.Haynes@usace.army.mil or 757-201-7008, if you have any questions or need additional information. Thank you very much for your consideration and assistance.

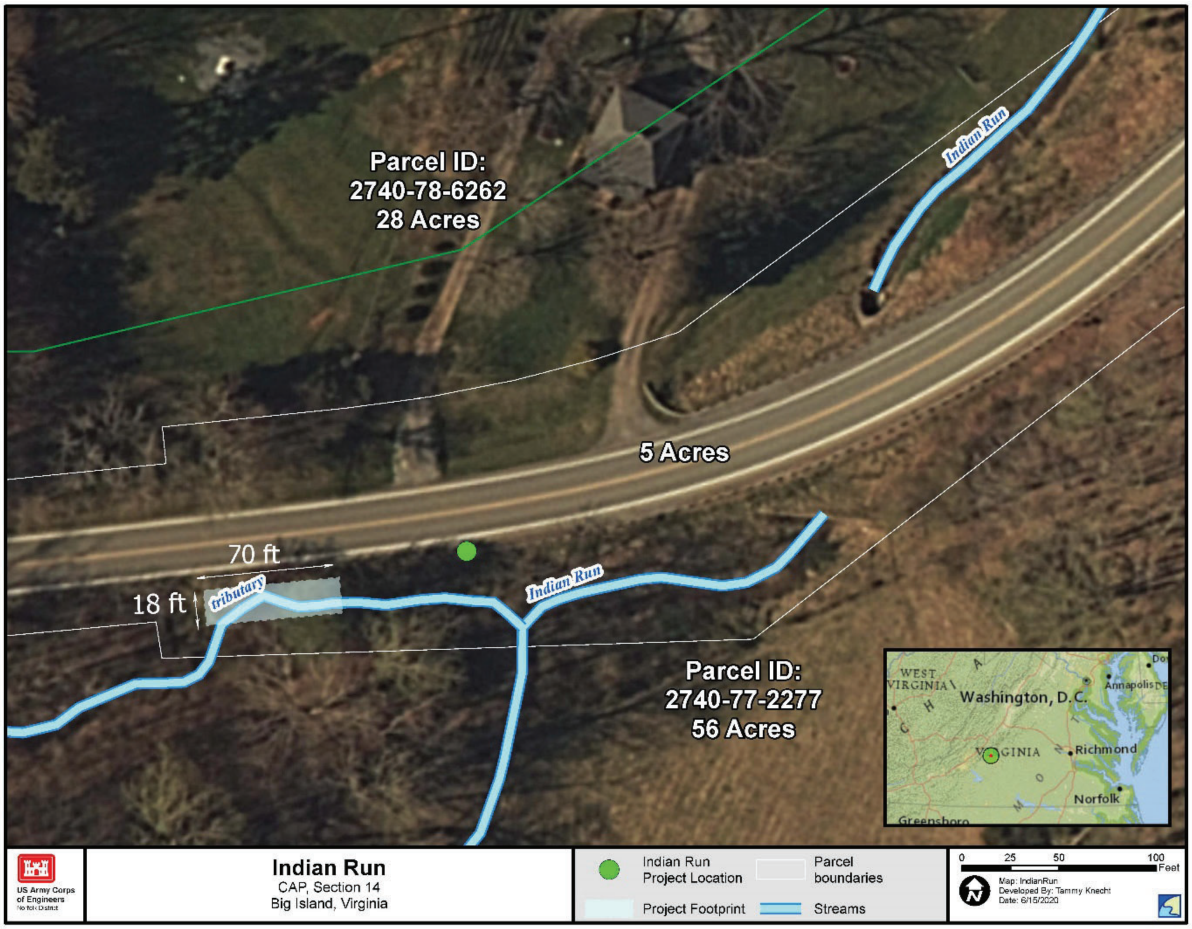
Sincerely,

Alicia Logalbo Digitally signed by Alicia Logalbo
Date: 2021.01.13 09:21:17 -05'00'

Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures

Enclosure 1. Map of the project area.



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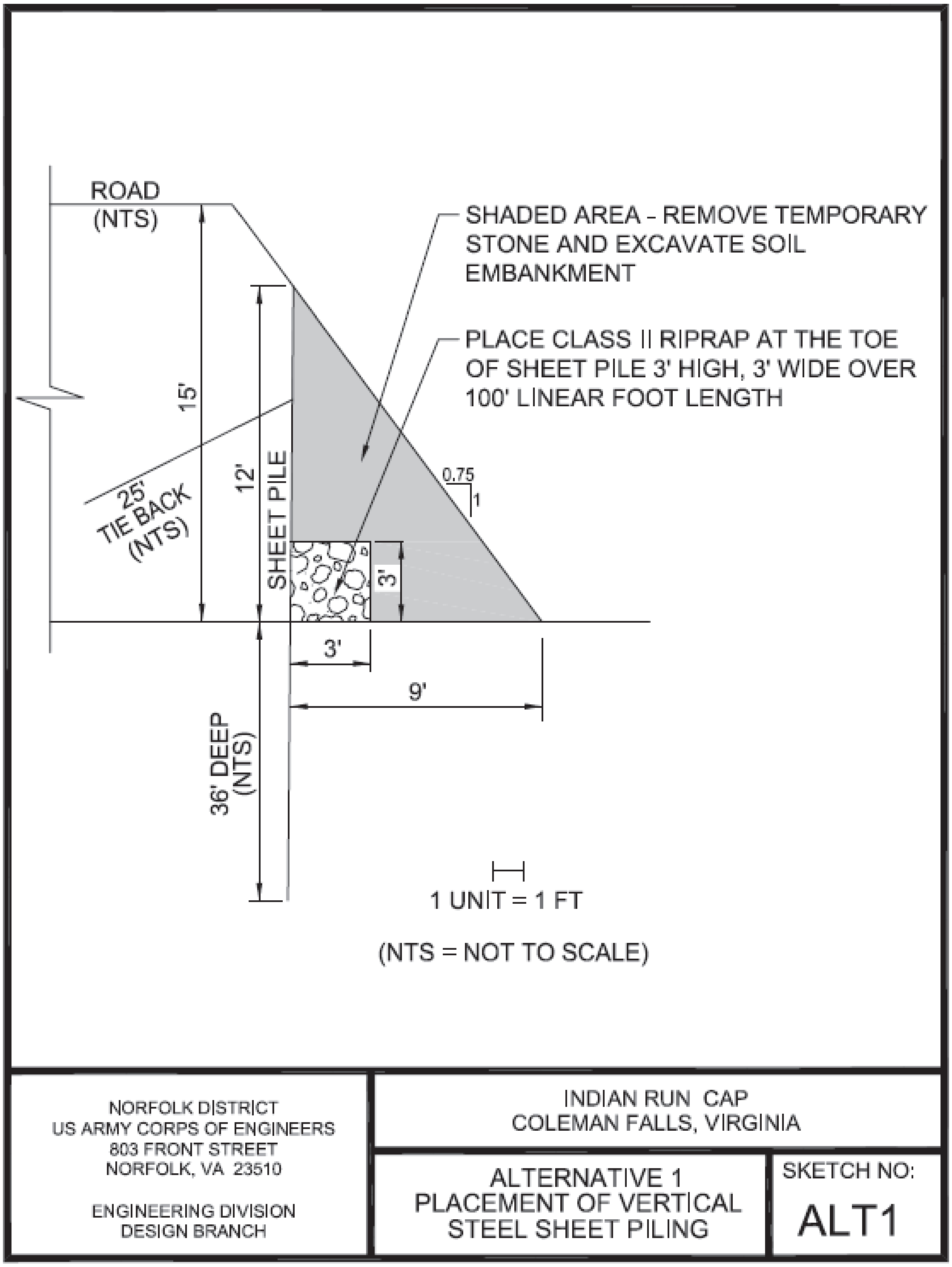
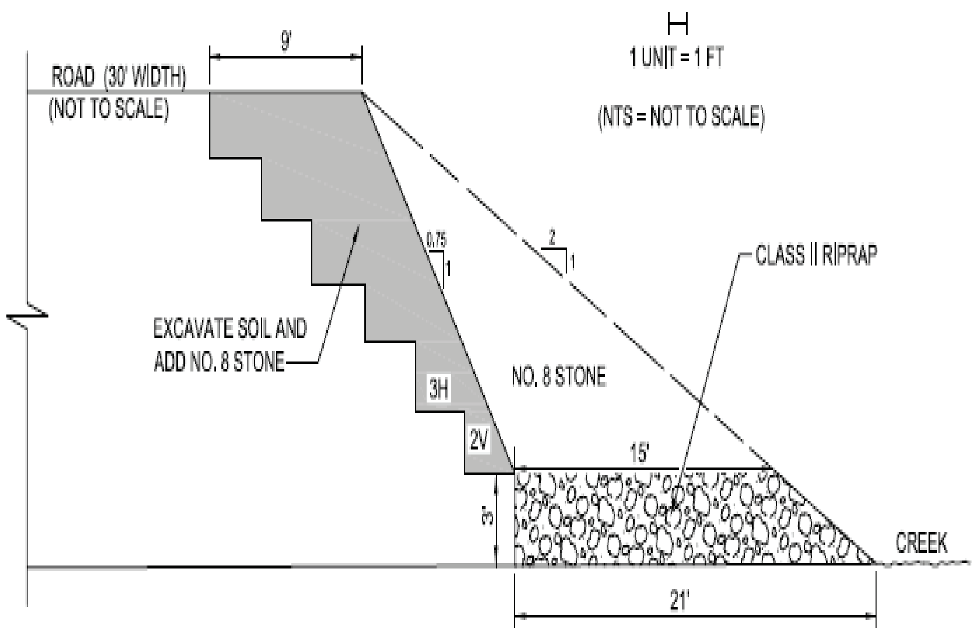
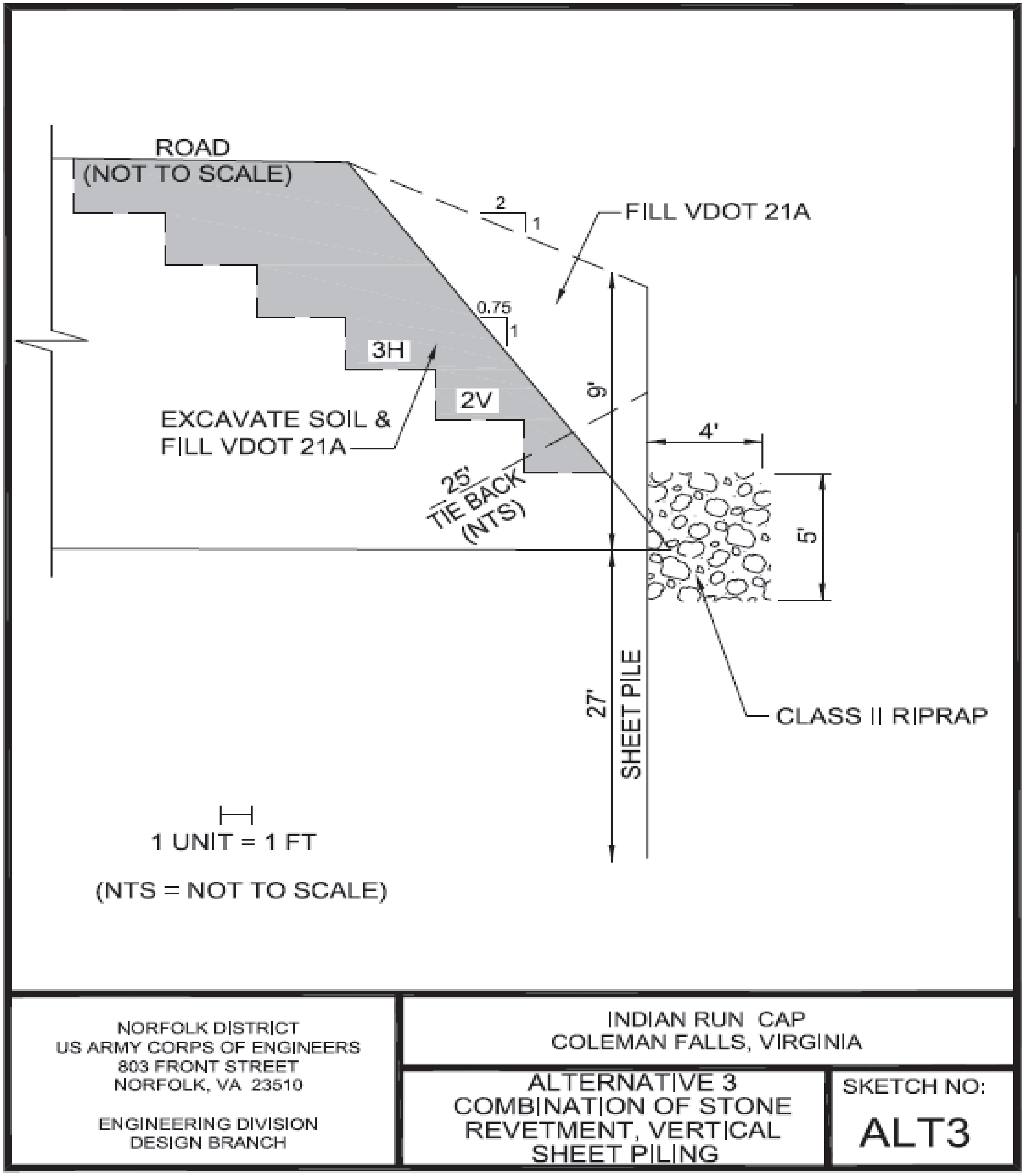


Alternative 2. A rock sill slope to stabilize the base of the slope and a berm

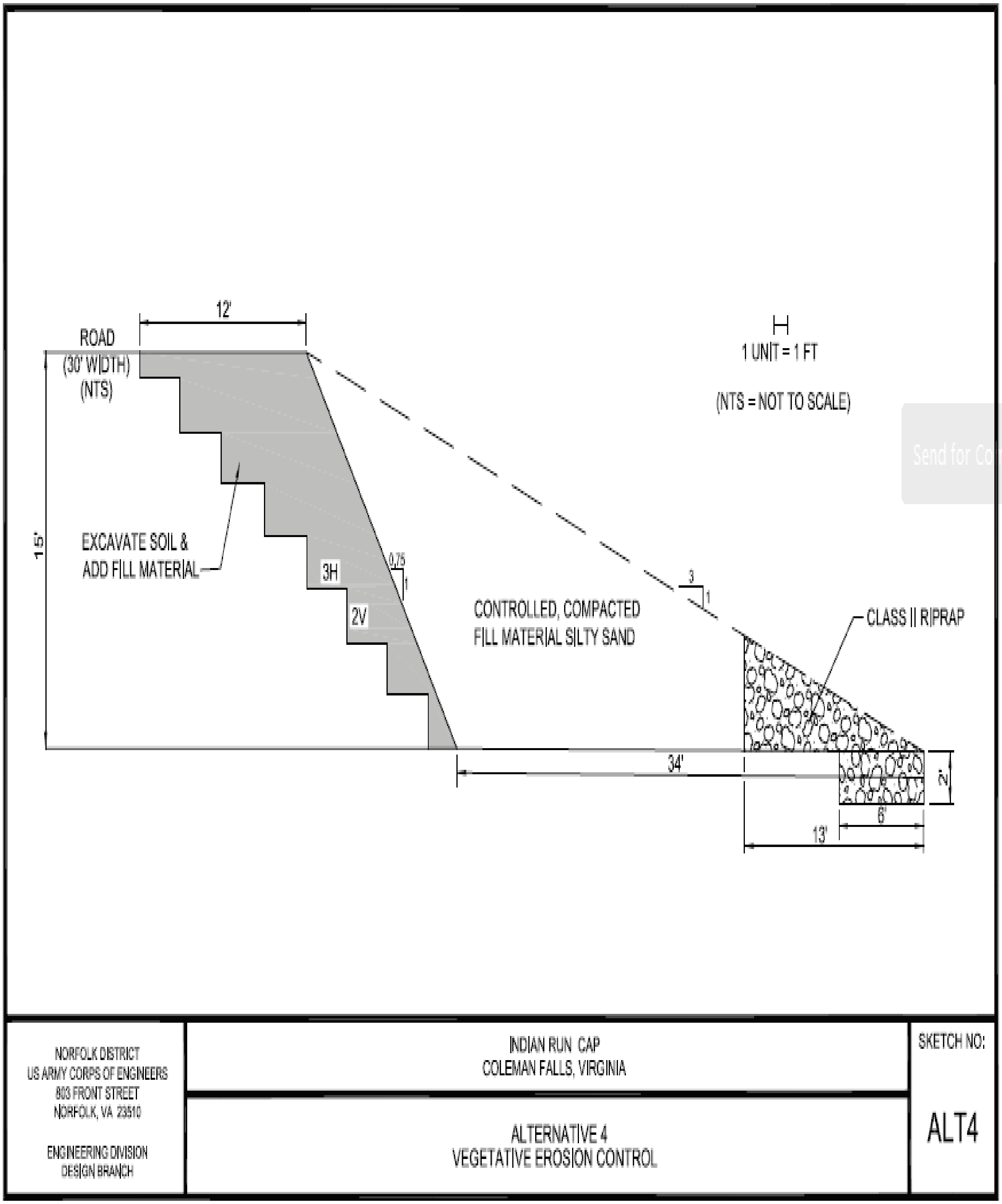


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2

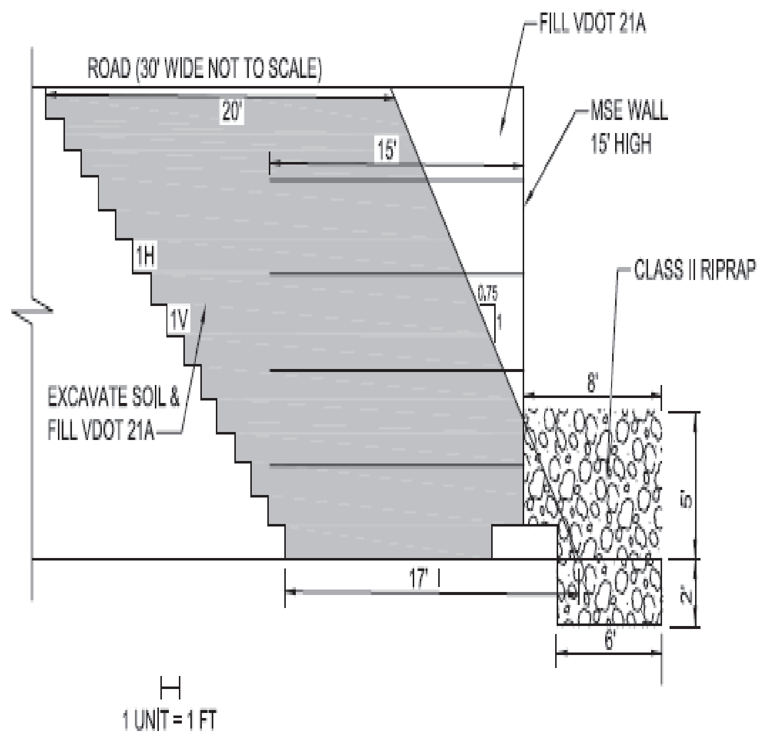
Alternative 3. Combination of stone revetment and vertical sheet piling



Alternative 4. Vegetated erosion control with slight re-routing of the stream

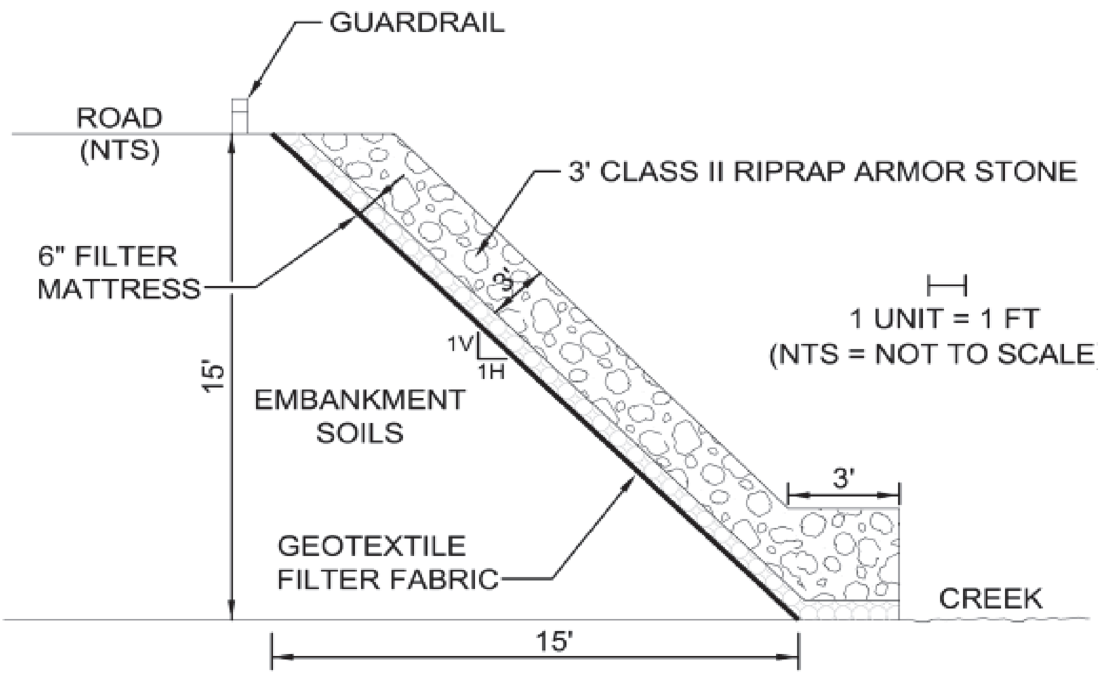


Alternative 5. Installing pre-cast modular retaining walls with stone protection at the toe



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 5 PRECAST MODULAR RETAINING WALLS WITH STONE PROTECTION AT THE TOE	SKETCH NO: ALT5

Alternative 6. Placement of stone revetment with slight re-routing of the stream



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

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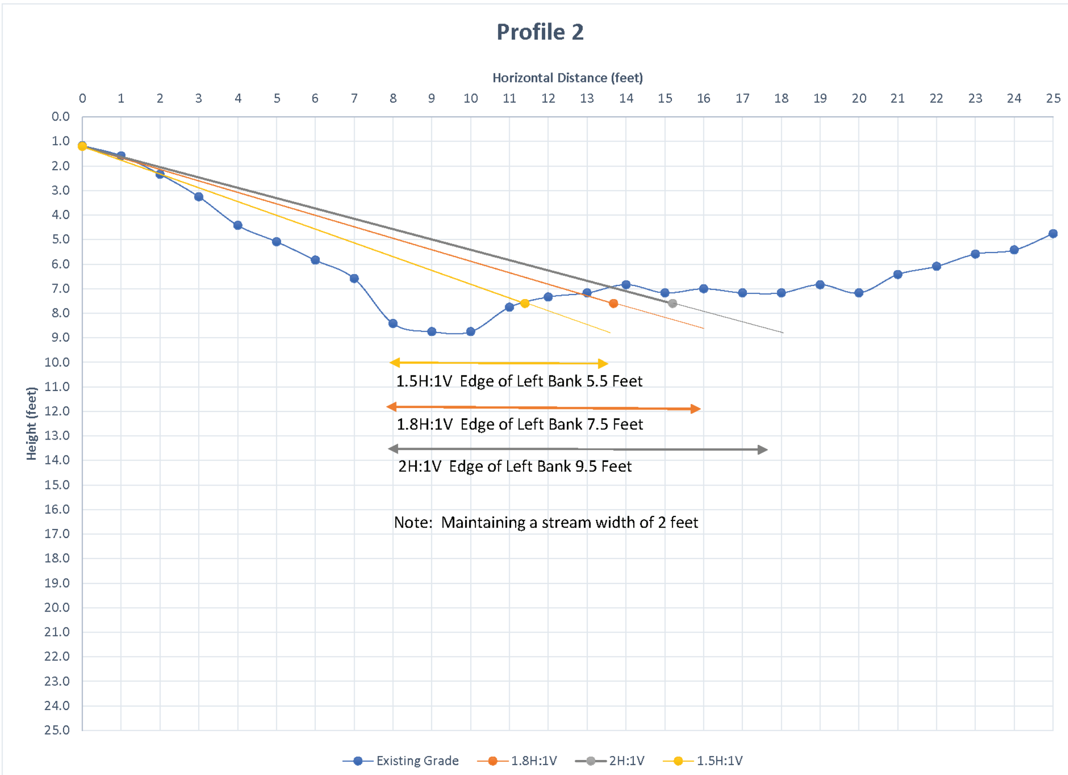

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

January 07, 2021

SUBJECT: Scoping of Feasibility Study for Indian Run Emergency Streambank Stabilization Project

Samantha Henderson
Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221-2470

Dear Ms. Henderson:

The U.S. Army Corps of Engineers (USACE), with Virginia Department of Transportation (VDOT) as the non-federal sponsor, is currently performing a study to evaluate plans to resolve erosion issues along the streambank of an unnamed tributary to Indian Run along U.S. Route 501, upstream from its confluence with the James River. This issue has already required VDOT to take emergency action to protect the public road and its stakeholders. The goal of this project is to stabilize the streambank and prevent future slope failure and erosion of a 70-foot section of bank threatening the roadway. Enclosure 1 provides a map of the project study area.

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Sincerely,

Alicia Logalbo Digitally signed by Alicia Logalbo
Date: 2021.01.13 09:23:01 -05'00'

Alicia M. Logalbo
Chief, Environmental Analysis Section

Enclosures

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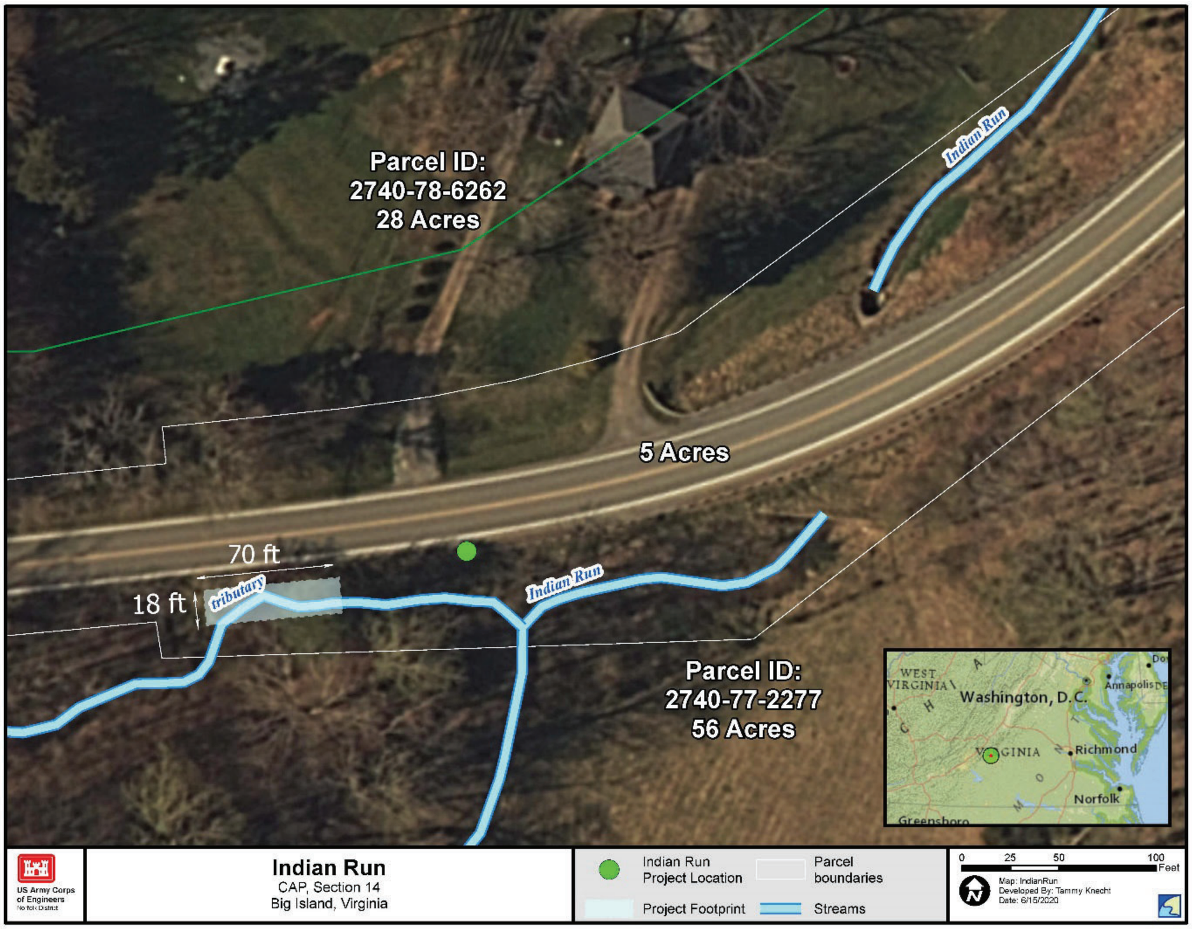

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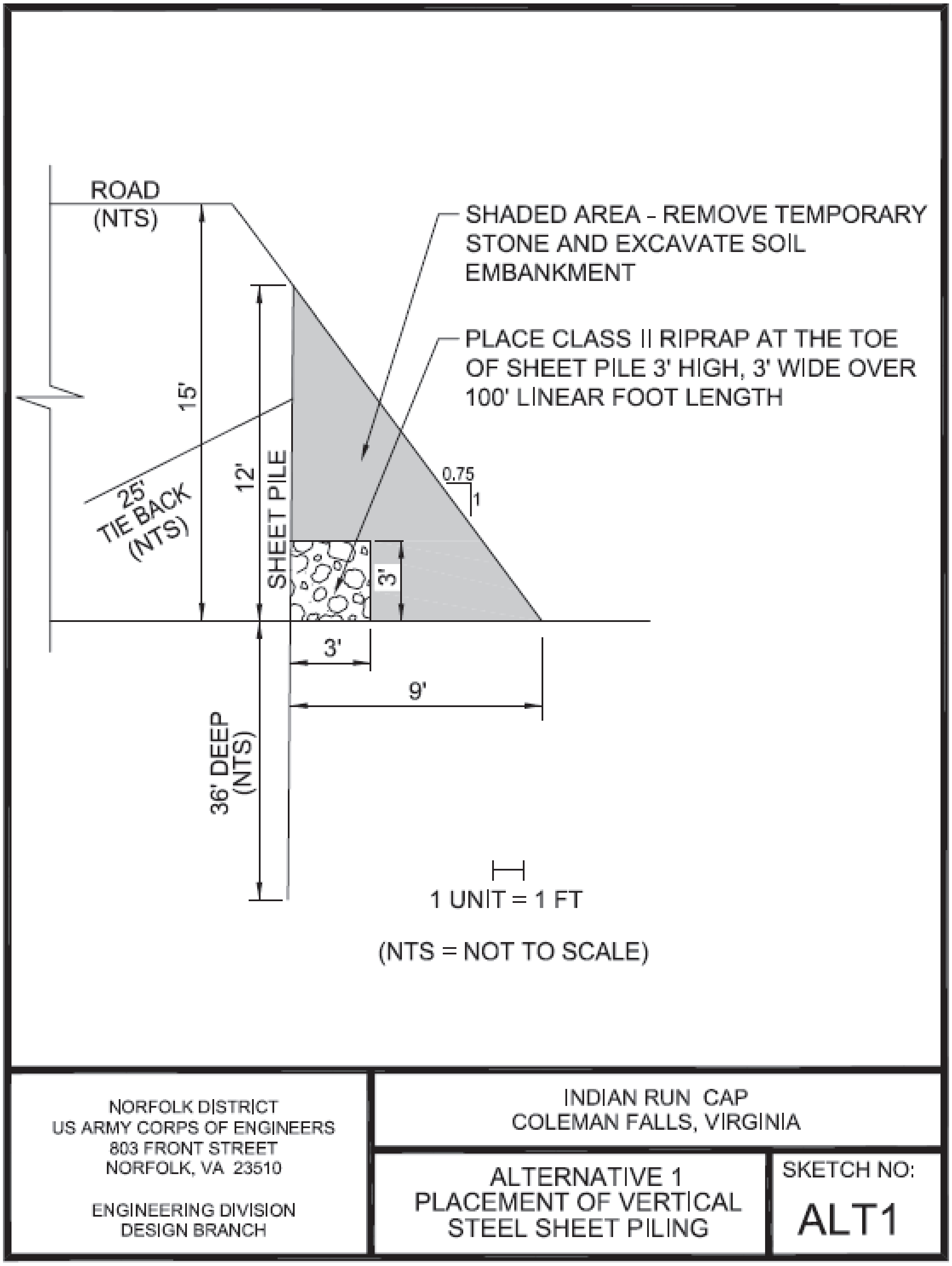

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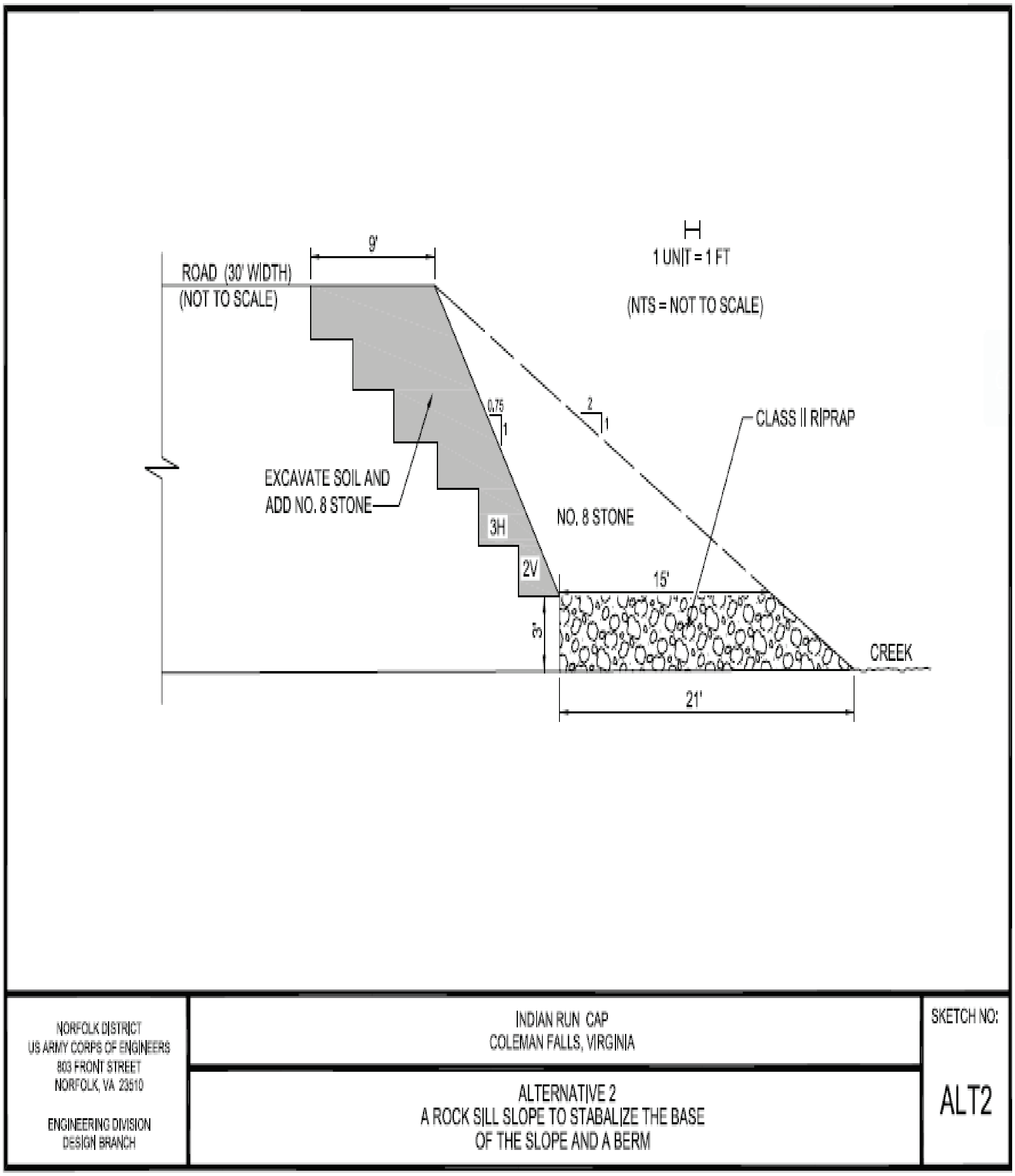

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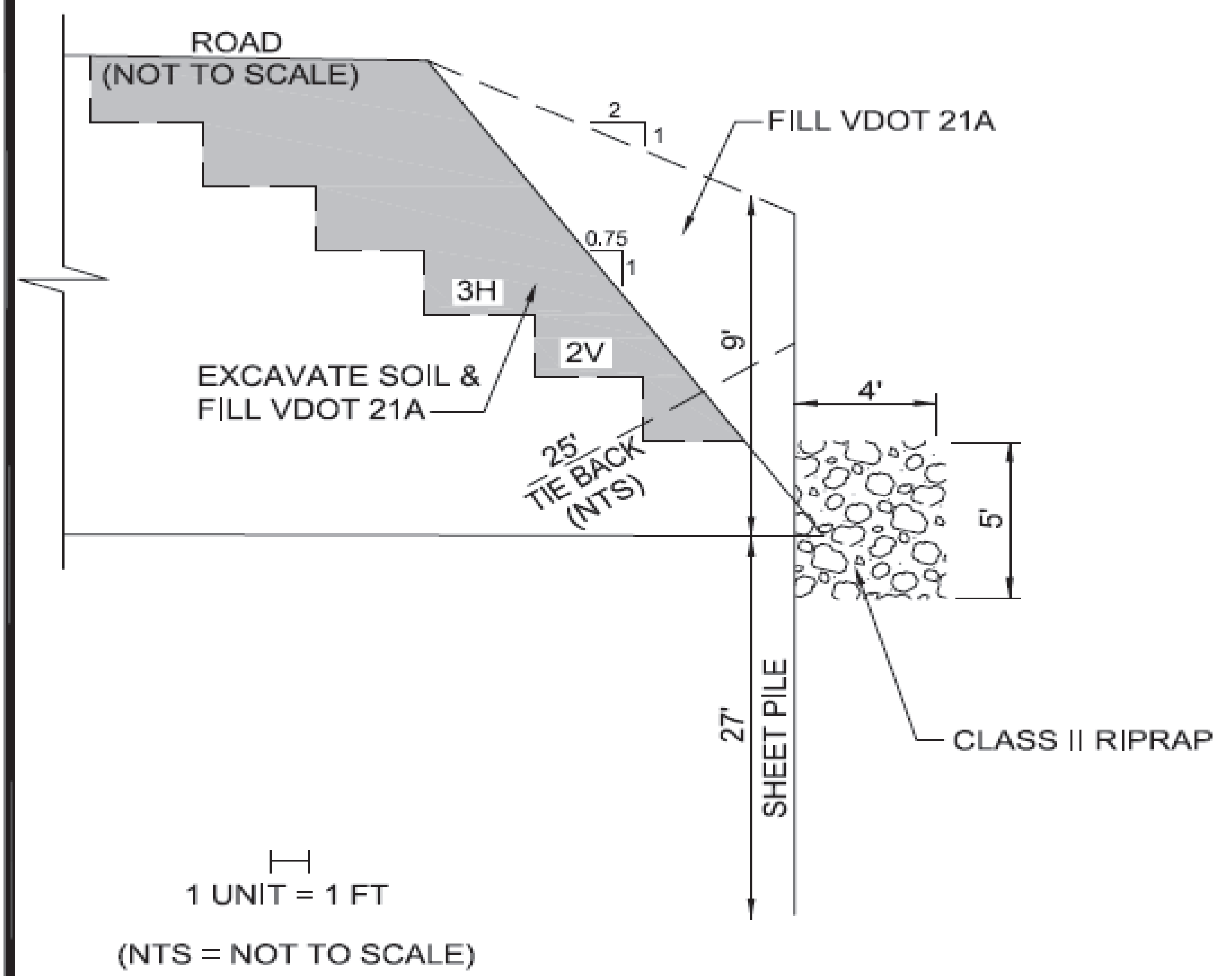
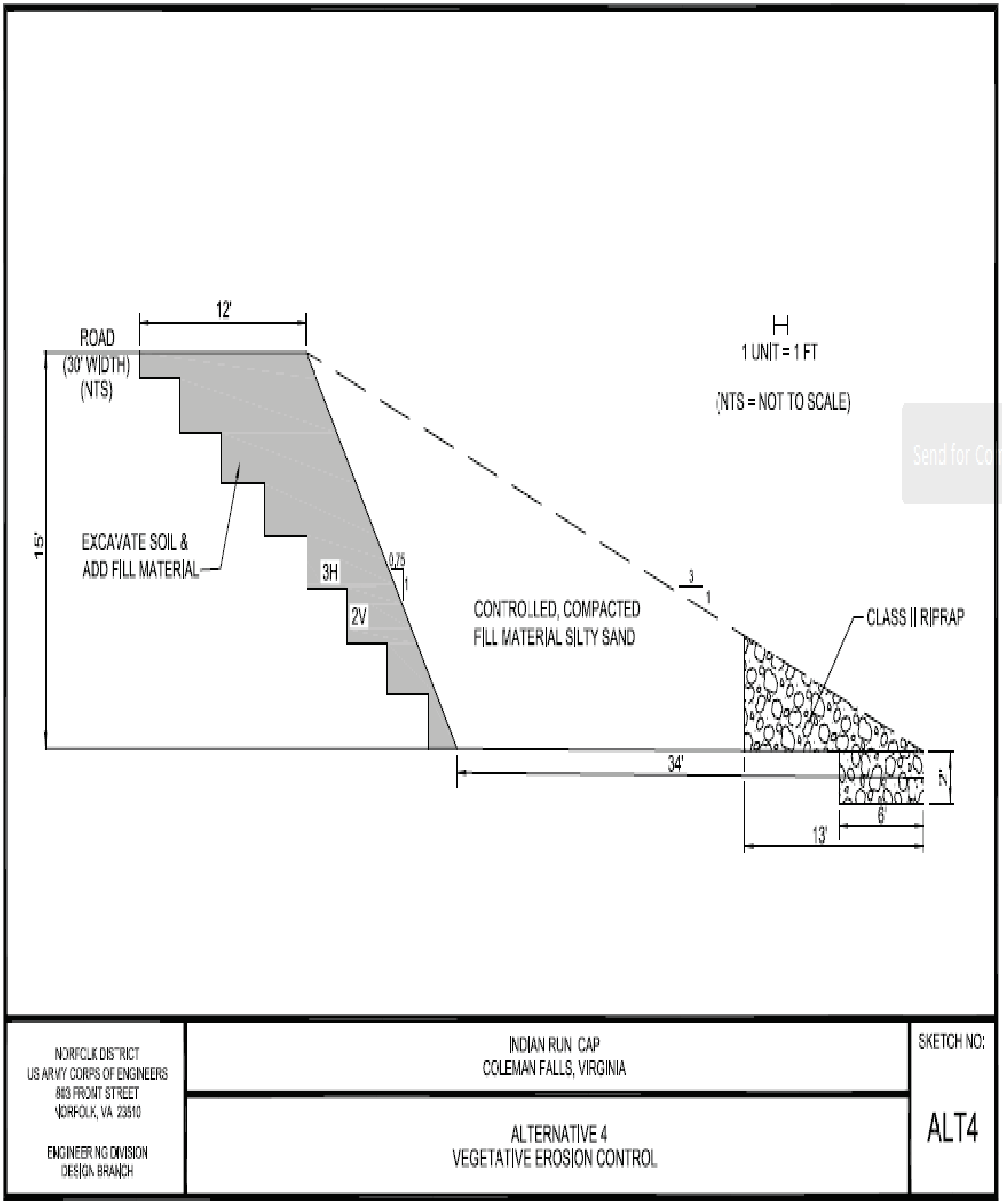


NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 3 COMBINATION OF STONE REVETMENT, VERTICAL SHEET PILING	SKETCH NO: ALT3

Alternative 4. Vegetated erosion control with slight re-routing of the stream



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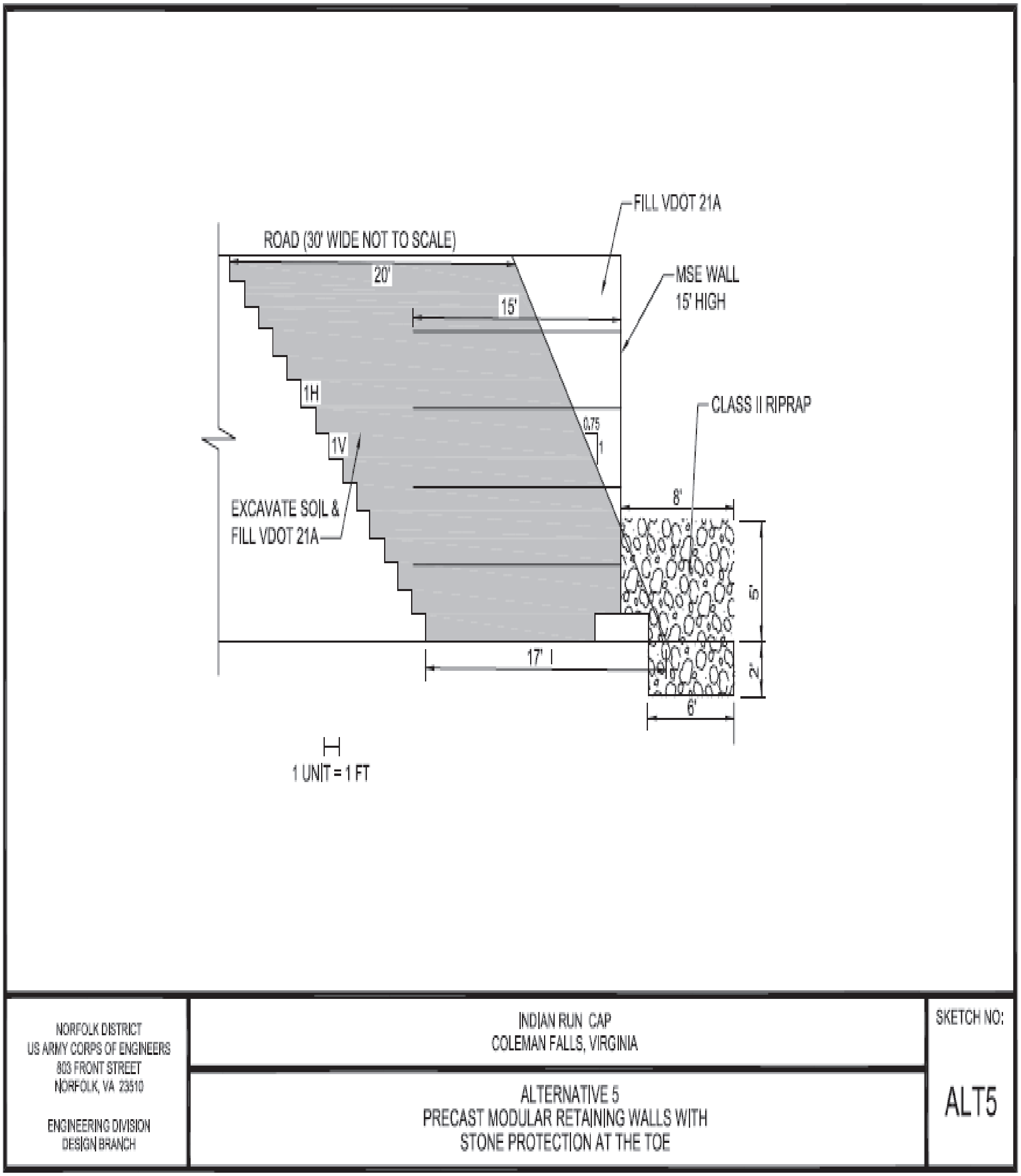
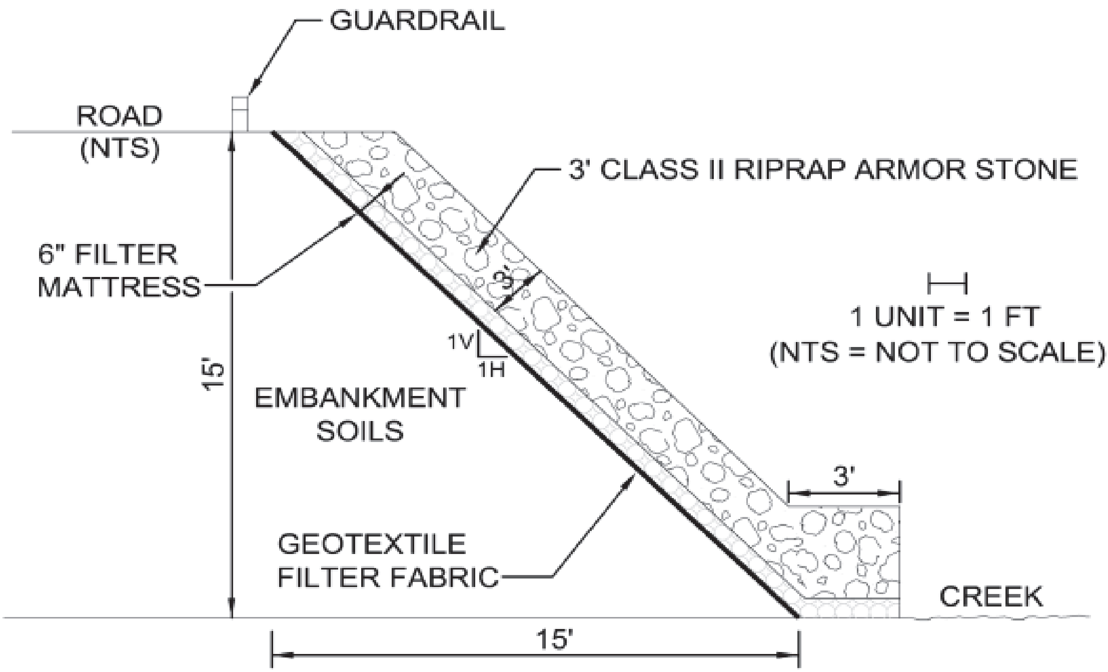


Alternative 6. Placement of stone revetment with slight re-routing of the stream



NORFOLK DISTRICT
US ARMY CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VA 23510

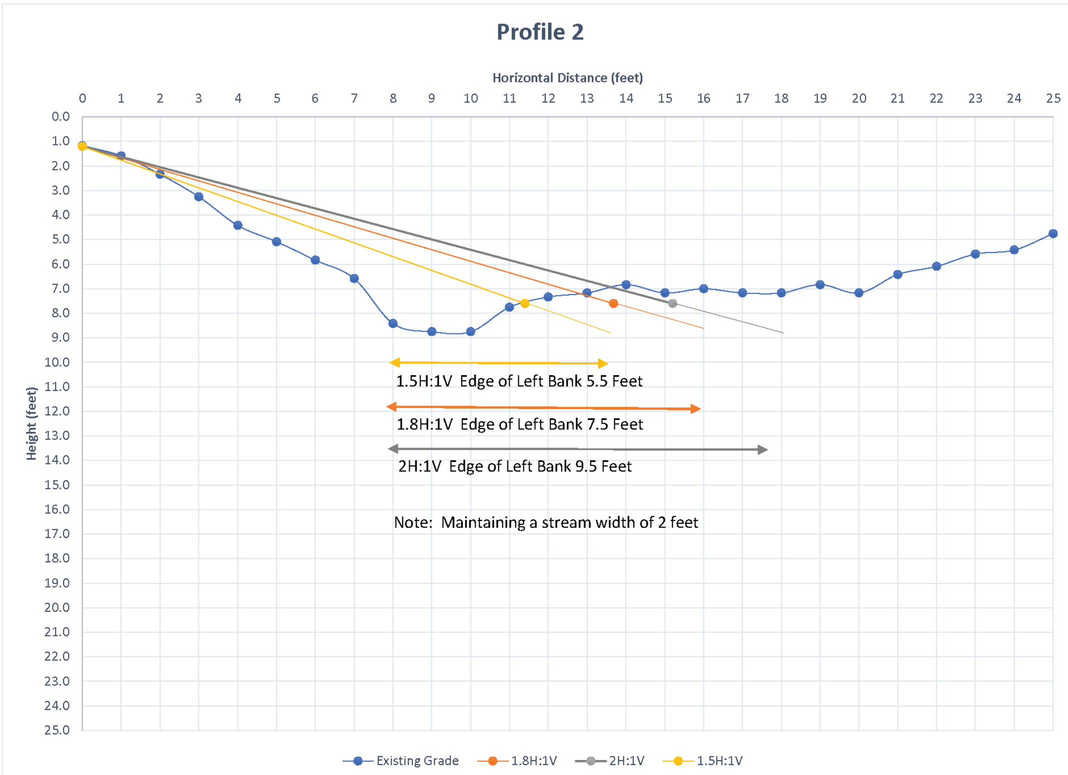
ENGINEERING DIVISION
DESIGN BRANCH

INDIAN RUN CAP
COLEMAN FALLS, VIRGINIA

ALTERNATIVE 6
PLACEMENT OF STONE
REVETMENT

SKETCH NO:
ALT6

Enclosure 3. Three potential re-graded slope profiles for alternatives requiring re-grading the north stream bank.



Haynes, John H Jr CIV USARMY CENAO (USA)

From: Henderson, Samantha <samantha.henderson@dhr.virginia.gov>
Sent: Friday, February 12, 2021 1:33 PM
To: Haynes, John H Jr CIV USARMY CENAO (USA)
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA)
Subject: [Non-DoD Source] Re: Indian Run Streambank Stabilization, Bedford County, Virginia

Dear Mr. Haynes:
Thank you for providing the Department of Historic Resources (DHR) the opportunity to review and comment on this project during the NEPA scoping stage. At this time DHR is unable to provide any substantial comments because the information provided does not clearly indicate where the project will occur. DHR requests that the Corps provide DHR with a location map with sufficient information to determine where the project is located, including the County, or project coordinates at which point DHR may be able to make recommendations regarding the presence of historic properties within the project area and potential effects of the project on historic properties.
Regards,
Samantha Henderson, Archaeologist
Division of Review and Compliance

On Wed, Jan 13, 2021 at 1:16 PM Haynes, John H Jr CIV USARMY CENAO (USA) <John.H.Haynes@usace.army.mil> wrote:

> Please see the attached correspondence. No hardcopy will be sent.
>
> Regards,
>
> John H. Haynes, Jr. RPA
>
> Archaeologist & Tribal Liaison
>
> U.S. Army Corps of Engineers
>
> Norfolk District (NAO)
>
> Office 757-201-7008
>
> Mobile 757-754-1589
>
> John.H.Haynes@usace.army.mil

--
Samantha J. Henderson

Project Review Archaeologist
Review and Compliance Division
Virginia Department of Historic Resources
2801 Kensington Avenue | Richmond, VA 23221
(804) 482-6088 | samantha.henderson@dhr.virginia.gov

DHR is currently teleworking. Please consider contacting me via email rather than via a phone call as I am not at my desk.

Haynes, John H Jr CIV USARMY CENAO (USA)

From: Kaleigh Pollak <TribalOffice@monacannation.com>
Sent: Tuesday, February 2, 2021 3:53 PM
To: Haynes, John H Jr CIV USARMY CENAO (USA)
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA)
Subject: [Non-DoD Source] RE: Indian Run Streambank Stabilization, Bedford County, Virginia

Good Afternoon,

Thank you for contacting us regarding the proposed project in Bedford County, VA.

The Monacan Indian Nation is a federally recognized sovereign tribe, headquartered on Bear Mountain in Amherst County. Citizens of the Nation are descended from Virginia and North Carolina Eastern Siouan cultural and linguistic groups, and our ancestral territory includes Virginia west of the fall line of the rivers, sections of southeastern West Virginia, and portions of northern North Carolina. At this time, the active Monacan consultation areas include:

Virginia: Albemarle, Alleghany, Amherst, Appomattox, Augusta, Bath, Bedford, Bland, Buchanan, Buckingham, Campbell, Carroll, Charlotte, Clarke, Craig, Culpepper, Cumberland, Dickenson, Floyd, Fluvanna, Franklin, Frederick, Giles, Goochland, Grayson, Greene, Halifax, Henry, Highland, Lee, Loudoun, Louisa, Madison, Mecklenburg, Montgomery, Nelson, Orange, Page, Patrick, Pittsylvania, Powhatan, Prince Edward, Pulaski, Rappahannock, Roanoke, Rockbridge, Rockingham, Russell, Scott, Shenandoah, Smyth, Tazewell, Warren, Washington, Wise, and Wythe Counties, and all contiguous cities.

West Virginia: Greenbrier, Mercer, Monroe, Pendleton, Pocahontas, and Summers Counties.

North Carolina: Alamance, Caswell, Granville, Orange, Person, Rockingham, Vance, and Warren Counties.

At this time, the Nation does not wish to actively participate in this consultation project, because:

	This project is outside our ancestral territory
X	The project's impacts are anticipated to be minimal
	The project is more closely related to _____, which should be contacted to participate in consultation
	The tribal office does not currently have the capacity to participate in this project
	Other:

However, the Nation requests to be contacted if:

- Sites associated with native history may be impacted by this project;
- Adverse effects associated with this project are identified;
- Human remains are encountered during this project;
- Unanticipated native cultural remains are encountered during this project;
- Other tribes consulting on this project cease consultation; or
- The project size or scope becomes larger or more potentially destructive than currently described.

Please do not make any assumptions about future consultation interests based on this decision, as priorities and information may change. We request that you send any future consultation communications in electronic form to TribalOffice@MonacanNation.com. We appreciate your outreach to the Monacan Indian Nation and look forward to working with you in the future.

Thank you,

Kaleigh Pollak
Program Manager
Monacan Indian Nation
O: (434) 363-4864
D: (434) 363-4876
C: (434) 473-1029
111 Highview Drive
Madison Heights, VA 24572

From: Haynes, John H Jr CIV USARMY CENAO (USA) <John.H.Haynes@usace.army.mil>
Sent: Wednesday, January 13, 2021 1:12 PM
To: Kaleigh Pollak <TribalOffice@monacannation.com>
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>
Subject: Indian Run Streambank Stabilization, Bedford County, Virginia

Please see the attached correspondence. No hardcopy will be sent.

Regards,

John H. Haynes, Jr. RPA
Archaeologist & Tribal Liaison

U.S. Army Corps of Engineers
Norfolk District (NAO)
Office 757-201-7008
Mobile 757-754-1589
John.H.Haynes@usace.army.mil

Haynes, John H Jr CIV USARMY CENAO (USA)

From: Haynes, John H Jr CIV USARMY CENAO (USA)
Sent: Monday, March 15, 2021 10:06 AM
To: Henderson, Samantha
Subject: RE: [Non-DoD Source] Re: Indian Run Streambank Stabilization, Bedford County, Virginia
Attachments: Google Maps.pdf

37.50349349274105, -79.31664078813272

From: Henderson, Samantha <samantha.henderson@dhr.virginia.gov>
Sent: Monday, March 15, 2021 9:11 AM
To: Haynes, John H Jr CIV USARMY CENAO (USA) John.H.Haynes@usace.army.mil

Subject: Re: [Non-DoD Source] Re: Indian Run Streambank Stabilization, Bedford County, Virginia

John:
Can you send me longitude and latitude coordinates or a street address for this project? The map provided does not have enough information for me to look this up in VCRIS.
Sam

On Mon, Mar 15, 2021 at 9:06 AM Haynes, John H Jr CIV USARMY CENAO (USA) <John.H.Haynes@usace.army.mil> wrote:

> Dear Ms. Henderson,
>
> The Indian Run stream stabilization project proposed by USACE and the Virginia Department of Transportation would lay rip rap along a short section of a tributary of Indian Run, near Coleman Falls in Bedford County, Virginia. The project extent and location is shown on the attached map.
>
> The area of potential effect for archaeology is disturbed by road construction and natural scouring. No archaeological sites or built historic resources are recorded in or near the project area. I recommended no field survey. We have determined that there would be no adverse effects to historic properties from this undertaking.
>
> Regards,
>
> John H. Haynes, Jr. RPA
>
> Archaeologist & Tribal Liaison

U.S. Army Corps of Engineers

Norfolk District (NAO)

Office 757-201-7008

Mobile 757-754-1589

John.H.Haynes@usace.army.mil

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Sent: Friday, February 12, 2021 1:33 PM
To: Haynes, John H Jr CIV USARMY CENAO (USA) <John.H.Haynes@usace. . No field survey army.mil>
Cc: Logalbo, Alicia M CIV USARMY CENAO (USA) <Alicia.M.Logalbo@usace.army.mil>
Subject: [Non-DoD Source] Re: Indian Run Streambank Stabilization, Bedford County, Virginia

Dear Mr. Haynes:

Thank you for providing the Department of Historic Resources (DHR) the opportunity to review and comment on this project during the NEPA scoping stage. At this time DHR is unable to provide any substantial comments because the information provided does not clearly indicate where the project will occur. DHR requests that the Corps provide DHR with a location map with sufficient information to determine where the project is located, including the County, or project coordinates at which point DHR may be able to make recommendations regarding the presence of historic properties within the project area and potential effects of the project on historic properties.

Regards,

Samantha Henderson, Archaeologist

Division of Review and Compliance

On Wed, Jan 13, 2021 at 1:16 PM Haynes, John H Jr CIV USARMY CENAO (USA) <John.H.Haynes@usace.army.mil> wrote:

> Please see the attached correspondence. No hardcopy will be sent.
>
> Regards,

John H. Haynes, Jr. RPA

Archaeologist & Tribal Liaison

U.S. Army Corps of Engineers

Norfolk District (NAO)

Office 757-201-7008

Mobile 757-754-1589

John.H.Haynes@usace.army.mil

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Samantha J. Henderson

Project Review Archaeologist

Review and Compliance Division

Virginia Department of Historic Resources

2801 Kensington Avenue | Richmond, VA 23221

(804) 482-6088 | samantha.henderson@dhr.virginia.gov

DHR is currently teleworking. Please consider contacting me via email rather than via a phone call as I am not at my desk.

--

Samantha J. Henderson
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Virginia Department of Historic Resources
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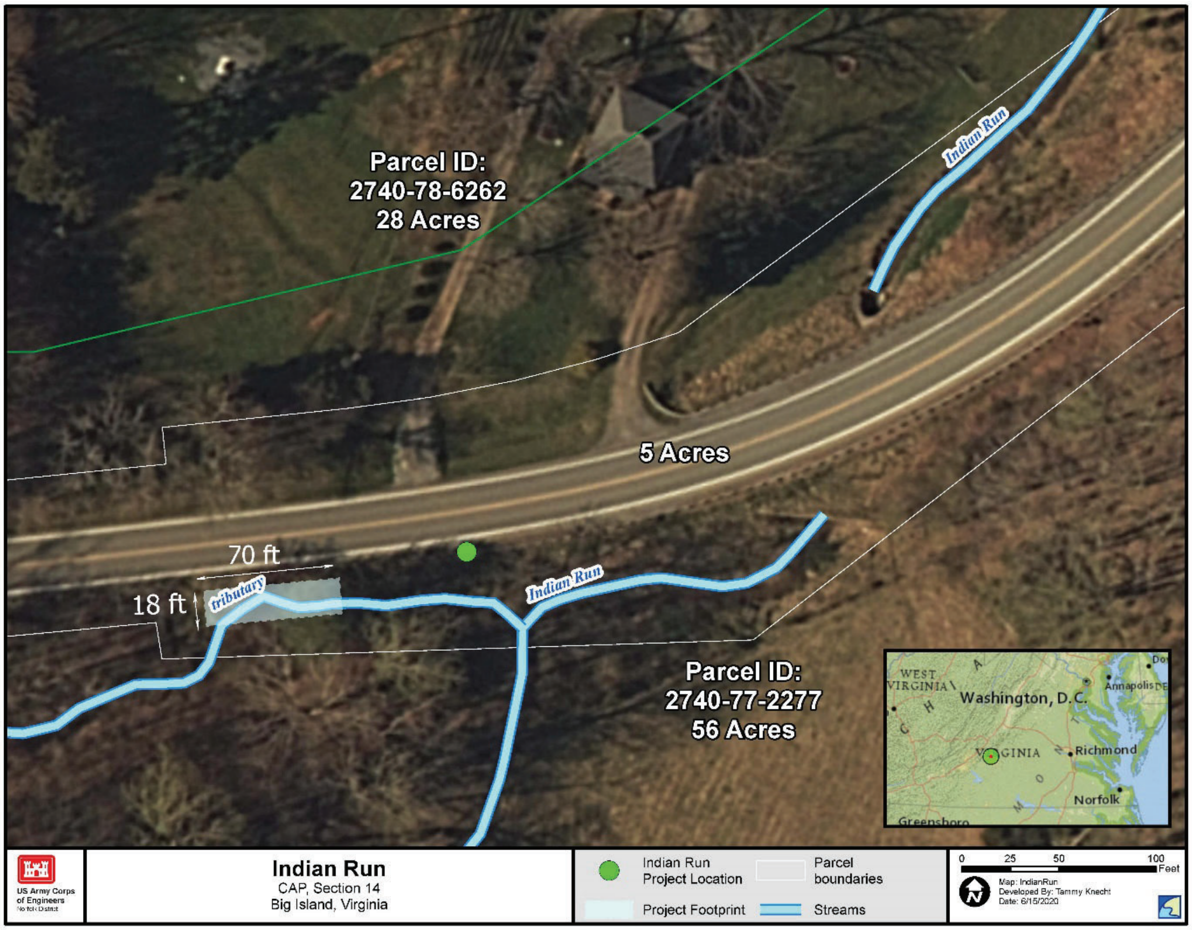
(804) 482-6088 | samantha.henderson@dhr.virginia.gov

DHR is currently teleworking. Please consider contacting me via email rather than via a phone call as I am not at my desk.

Enclosure 1. Map of the project area.



REGIONAL PERMIT (19-RP-01) & CWA 401 WATER QUALITY CERTIFICATION

APPENDIX A-7

CONTINUING AUTHORITIES PROGRAM, SECTION 14

EMERGENCY STREAMBANK AND SHORELINE PROTECTION

INDIAN RUN STREAMBANK, BEDFORD COUNTY

MAY 2021

U.S. Army Corps
of Engineers
Norfolk District

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 1111 East Main Street, Suite 1400, Richmond, VA 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

August 22, 2018

Mr. William T. Walker
Chief, Regulatory Branch
U.S. Army Corps of Engineers
803 Front Street
Norfolk, Virginia 23510-1096

RE: Final Section 401 Certification of Regional Permits 18-RP-01, 18-RP-02, 18-RP-11, 18-RP-15, 18-RP-16, 18-RP-17, 18-RP-18, 18-RP-19, 18-RP-22 and Regional Permit General Conditions

Dear Mr. Walker:

Provided herein is the Commonwealth of Virginia's decision with regard to Section 401 Water Quality Certification for activities authorized by the U.S. Army Corps of Engineers (the Corps) 2018 Regional Permits RP-02, RP-15, RP-17, RP-18, RP-19, and RP-22 and applicable Regional Permit Conditions, as public noticed by the Corps on February 26, 2018, and for activities authorized by the U.S. Army Corps of Engineers (the Corps) 2018 Regional Permits RP-01 and RP-11 and applicable Regional Permit Conditions, as public noticed by the Corps on May 17, 2018.

Pursuant to 40 CFR 121.2 (a)(2) and (3), the Virginia Department of Environmental Quality (DEQ) on behalf of the State Water Control Board (the Board) has examined (i) the RPs and the Norfolk District Regional Permit Conditions and (ii) other decision documents provided by the Corps to base its certification. Accordingly, the Board finds that there is a reasonable assurance that the activities permitted under the Corps' regional permits, including the Norfolk District Regional Permit Conditions, will be conducted in a manner which will not violate applicable water quality standards, provided permittees comply with all applicable Section 401 conditions (see table attached herein).

Further, pursuant to Virginia Water Protection (VWP) Permit Regulation 9VAC25-210-130 H, the Board is issuing this final §401 Water Quality Certification as meeting the requirements of the VWP regulation after having advertised and accepted public comment for 30 days on our intent to provide this certification. The public comment period began on July 16, 2018 and ended on August 15, 2018. No comments were received.

Please be aware that the final review for consistency with Virginia's Coastal Resources Management Program (VCP) pursuant to the federal Coastal Zone Management Act of 1972, as amended, is not yet complete. Projects in the Tidewater area of Virginia may require additional coordination with the VCP prior to issuance of these regional permits until the federal consistency review is complete. A map depicting those localities within the coastal zone can be found at http://www.deq.virginia.gov/coastal/coastmap.html. Questions regarding federal consistency with VCP should be directed to Bettina Sullivan at (804) 698-4204 or bettina.sullivan@deq.virginia.gov.

The Commonwealth reserves its right to require an individual application for a permit or a certificate or otherwise take action on any specific project that could otherwise be covered under any of the Corps' regional, general, or programmatic general permits when it determines on a case-by-case basis that concerns for water quality and the aquatic environment so indicate.

Please do not hesitate to contact Dave Davis (804) 698-4105 or dave.davis@deq.virginia.gov if you have any questions regarding this Section 401 Water Quality Certification.

Sincerely,

David K Paylor

David K. Paylor

Attachment: Commonwealth of Virginia Section 401 Water Quality Certification Actions Table – Norfolk District 2018 Regional Permits

cc: Ms. Bettina Sullivan, DEQ Office of Environmental Impact Review
Ms. Kim Prisco-Baggett, Norfolk District Army Corps of Engineers
Ms. Scharlene Floyd, Norfolk District Army Corps of Engineers
Mr. William Seib, Baltimore District Regulatory Branch
Mr. Tony Watkinson; Chief, Habitat Division, Virginia Marine Resources Commission
Regional VWP Managers

Commonwealth of Virginia Section 401 Water Quality Certification Actions Table – Norfolk District 2018 Regional Permits

Final §401 Certification (* indicates a change from existing certification)	Conditions
18-RP-01 Denied Certain Virginia Department of Transportation (VDOT) roadway and railway projects in waters of the United States, within the geographical limits of the Commonwealth of Virginia under the regulatory jurisdiction of the Norfolk District Army Corps of Engineers (Corps)	
18-RP-02 Unconditional 1 (Maintenance Dredging for Previously Authorized Projects)	
18-RP-02 *Conditional 2 (New Dredging in Navigable Waters) 3 (Navigationally-Related Dredging/Excavation of Non-tidal Waters Not Subject to the Exemption Under Section 404(f)(1)(c))	(1) Dredging shall not be used to create a deep space for water withdrawal. (2) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C, except in the absence of same river watershed alternatives in Hydrologic Unit Codes (HUC) 02040303 and 02040304, single family dwellings or locality projects may use compensatory mitigation in HUC 02080102, 02080108, 02080110, or 02080111 in Virginia.
18-RP-11 (new) Conditional Certain Virginia Department of Transportation (VDOT) roadway and railway projects that qualify for the conditions and thresholds of a Nationwide Permit (NWP) but require a Pre-Construction Notification (PCN) in accordance with General Condition 18(c)	VDOT shall copy DEQ-Office of Wetland and Stream Protection, Central Office, on all documentation meeting the requirements of Part IV Notification Requirements of the 18-RP-11.
18-RP-15 *Conditional Maintenance of existing drainage ditches	Deviations from the original configuration or filled area shall not change the character, scope, or size of the original design or approved alternative design.

Final §401 Certification (* indicates a change from existing certification)	Conditions
18-RP-17 and RP17 Certificate of Compliance Form *Conditional Installation and/or construction of open-pile piers, mooring structures/devices, certain covered boathouses/boatslips, boatlifts, osprey poles/platforms, accessory pier structures, and devices associated with shellfish gardening, for private use.	(1) The discharge shall not include structures such as pilings to construct a platform to mount a pump for water withdrawals unless otherwise excluded from surface water withdrawal permitting per 9VAC-25-210-310. (2) The impact(s) shall not exceed 2 acres of wetlands or 1, 500 linear feet of stream bed. (3) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C, except in the absence of same river watershed alternatives in Hydrologic Unit Codes (HUC) 02040303 and 02040304, single family dwellings or locality projects may use compensatory mitigation in HUC 02080102, 02080108, 02080110, or 02080111 in Virginia. (4) For water-based energy projects using similar structures, the discharge shall not include water withdrawals, such as the construction of an intake structure, weir, water diversion structure, or other structure transporting non-potable raw surface water.
18-RP-18 *Conditional Installation and/or construction of open-pile piers, mooring structures/devices, fender piles, covered boathouses/boatslips, boatlifts, osprey pilings/platforms, accessory pier structures, and devices associated with shellfish gardening, for private, commercial, community, and government use.	(1) The discharge shall not include structures such as pilings to construct a platform to mount a pump for water withdrawals unless otherwise excluded from surface water withdrawal permitting per 9VAC-25-210-310. (2) The impact(s) shall not exceed 2 acres of wetlands or 1, 500 linear feet of stream bed. (3) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C, except in the absence of same river watershed alternatives in Hydrologic Unit Codes (HUC) 02040303 and 02040304, single family dwellings or locality projects may use compensatory mitigation in HUC 02080102, 02080108, 02080110, or 02080111 in Virginia. (4) For water-based energy projects using similar structures, the discharge shall not include water withdrawals, such as the construction of an intake structure, weir, water diversion structure, or other structure transporting non-potable raw surface water.

Final §401 Certification (* indicates a change from existing certification)	Conditions
18-RP-19 Unconditional 1 (Living Shoreline Group 1: Non-structural activities that provide substrate necessary to support wetland vegetation and/or beach nourishment) and 2 (Living Shoreline Group 2: Sill structures with tidal marsh and/or beach nourishment)	
18-RP-19 Unconditional for activities conducted in tidal waters that are authorized by any applicable, required permits issued by the Virginia Marine Resources Commission *Conditional for the following activities conducted in non-tidal surface waters of Virginia: 3 (Low breakwaters and associated sandy fill material) 4 (Bulkheads, riprap, and associated backfill and/or excavation, including bulkhead repair and/or replacement) 5 (Groins, jetties, spurs and/or baffles and associated sandy fill material)	(1) Stabilization activities shall not be placed for the purpose of a stream diversion. (2) Stabilization activities shall not permanently impact more than 1,500 linear feet of any type of non-tidal stream bed. (3) For maintenance of bulkhead structures, the discharge shall not increase the capacity of an impoundment or reduce the quantity of instream flows downstream. (4) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C, except in the absence of same river watershed alternatives in Hydrologic Unit Codes (HUC) 02040303 and 02040304, single family dwellings or locality projects may use compensatory mitigation in HUC 02080102, 02080108, 02080110, or 02080111 in Virginia.
18-RP-19 *Conditional 6 (Aquaculture or mariculture activities)	(1) The activity shall comply with the conditions of any Virginia Pollutant Discharge Elimination System (VPDES) permit issued for the facility. (2) The associated activities shall not include a surface water withdrawal or diversion unless otherwise excluded from surface water withdrawal permitting per 9VAC-25-210-310. (3) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C, except in the absence of same river watershed alternatives in Hydrologic Unit Codes (HUC) 02040303 and 02040304, single family dwellings or locality projects may use compensatory mitigation in HUC 02080102, 02080108, 02080110, or 02080111 in Virginia.

Final §401 Certification (* indicates a change from existing certification)	**Conditions**
18-RP-19 Unconditional for activities conducted in tidal waters that are authorized by any applicable, required permits issued by the Virginia Marine Resources Commission *Conditional for the following activities conducted in non-tidal surface waters of Virginia: 7 (Boat ramps and accessory structures, including any fill or excavation for installation)	Construction of boat ramps in non-tidal waters that *do not* meet the following criteria require application to DEQ for consideration of a VWP permit: (a) The discharge into surface waters is 50 cubic yards or less of concrete, rock, crushed stone or gravel into forms, or in the form of pre-cast concrete planks or slabs, unless waived in writing by the Corps district engineer because the discharge will result in no more than minimal adverse environmental effects; (b) The boat ramp is 20 feet or less in width, unless waived in writing by the Corps district engineer because the discharge will result in no more than minimal adverse environmental effects; (c) The base material is crushed stone, gravel or other suitable material; (d) The excavation is limited to the area necessary for site preparation and all excavated material is removed to an area that has no surface waters; and, (e) No material is placed in special aquatic sites, including wetlands.

Final §401 Certification (* indicates a change from existing certification)	Conditions
18-RP-22 *Conditional 1 (Construction of piers, boat docks, jetties, breakwaters structures, dolphins, boat ramps and boathouses using materials commonly acceptable for their construction such as unsinkable flotation materials, pressure treated lumber, pilings, and concrete) 2 (Construction and backfilling of bulkheads and placement of riprap or appropriate bioengineering technique along eroding shorelines for shoreline stabilization and erosion control)	(1) Stabilization activities shall not be placed for the purpose of a stream diversion or impounding flow in an intermittent or perennial water body. (2) Activities shall not permanently impact more than 1,500 linear feet of any type of non-tidal stream bed or more than 1/10 of an acre non-tidal wetlands. (3) Construction of boat ramps that *do not* meet the following criteria require application to DEQ for consideration of a VWP permit: (a) The discharge into surface waters is 50 cubic yards or less of concrete, rock, crushed stone or gravel into forms, or in the form of pre-cast concrete planks or slabs, unless waived in writing by the Corps district engineer because the discharge will result in no more than minimal adverse environmental effects; (b) The boat ramp is 20 feet or less in width, unless waived in writing by the Corps district engineer because the discharge will result in no more than minimal adverse environmental effects; (c) The base material is crushed stone, gravel or other suitable material; (d) The excavation is limited to the area necessary for site preparation and all excavated material is removed to an area that has no surface waters; and, (e) No material is placed in special aquatic sites, including wetlands. (4) Deviations from the original configuration or filled area shall not change the character, scope, or size of the original design or approved alternative design. (5) The discharge shall not include water withdrawals, such as the construction of an intake structure, weir, water diversion structure, or other structure transporting non-potable raw surface water. (6) The discharge shall not include structures such as pilings to construct a platform to mount a pump for water withdrawals unless otherwise excluded from surface water withdrawal permitting per 9VAC-25-210-310. (7) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C.

Final §401 Certification (* indicates a change from existing certification)	Conditions
18-RP-22 *Conditional 3 (Excavation of boat slips and channels (channelward of the normal high pool elevation) for recreational boating, where excavated material is placed in high ground)	(1) The dredging shall not be used to create a deep space for water withdrawal. (2) The discharge shall not increase the capacity of an impoundment or reduce the quantity of instream flows downstream. (3) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C.
18-RP-22 *Conditional 4 (Installation of submerged and aerial power lines and utility lines where U. S. Coast Guard requirements for aerial lines are met and pre-project elevation contours are restored)	(1) The activities shall not be associated with a surface water withdrawal or the transport of non-potable raw surface water, except for the purpose of hydrostatic testing and when the associated discharges are authorized by a VPDES permit, if required. (2) Activities shall not permanently impact more than 1,500 linear feet of any type of non-tidal stream bed or more than 2 acres of non-tidal wetlands. (3) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44.15:23 A through C. (4) Temporary diversions of surface water associated with "pump-arounds" during the construction of utility crossings are specifically allowed.
18-RP-22 *Conditional 5 (Maintenance of existing water intake and outfall structures provided all State and Federal required authorization have been obtained)	(1) Deviations from the original configuration or filled area shall not change the character, scope, or size of the original design or approved alternative design. (2) The structure or maintenance shall not be associated with intake structures unless otherwise excluded from surface water withdrawal permitting per 9VAC-25-210-310. (3) The discharge shall not increase the capacity of an impoundment or reduce the quantity of instream flows downstream. (4) The Corps of Engineers shall provide DEQ an annual report of projects authorized by this Regional Permit that includes detailed information on physical changes to water withdrawal structures, such as the maintenance of an intake, dam, weir, or water diversion structure that are deviations from the original configuration, or are a change in the character, scope, or size of the original design, or where those deviations would otherwise reduce instream flows. (5) Any compensatory mitigation shall meet the requirements in the Code of Virginia, Section 62. 1-44. 15:23 A through C.

U.S. Army Corps
Of Engineers
Norfolk District

Fort Norfolk, 803 Front Street
Norfolk, VA 23510-1011

CENAO-WRR
19-RP-01

REGIONAL PERMIT

Effective Date: April 15, 2019 **Expiration Date: April 15, 2024**

I. AUTHORIZED ACTIVITIES:

19-RP-01, Regional Permit 01 (RP), authorizes certain Virginia Department of Transportation (VDOT) roadway and railway projects involving work, structures, and filling (both temporary and permanent), in waters of the United States, within the geographical limits of the Commonwealth of Virginia under the regulatory jurisdiction of the Norfolk District Army Corps of Engineers (Corps). The maximum impacts allowed under this RP for projects that are single and complete with independent utility and purpose are:

a. the TOTAL permanent loss of not more than one (1) acre of waters of the U.S., to include stream channel, wetlands, and open waters

AND

b. the permanent loss of not more than 1,000 linear feet of stream channel.

VDOT is the only entity that may apply for authorization under this RP. Authorization received by VDOT under this RP may not be transferred to any other entity.

II. AUTHORITIES:

VDOT is hereby authorized by the Secretary of the Army and the Chief of Engineers pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) and Section 404 of the Clean Water Act (33 U.S.C. § 1344) to perform the aforementioned work in waters of the U.S. of the Commonwealth as further described herein and pursuant to the terms and conditions herein.

Activities receiving written authorization under this RP do not require further authorization under the provisions contained in 33 CFR Part 325 unless the District Engineer determines, on a case-by-case basis, that additional review is in the public interest. This RP shall not be interpreted as authorizing any work other than that which is outlined below. All work undertaken outside the following terms, conditions, standards, and limitations will require separate Department of the Army authorization.

III. STATE AND LOCAL APPROVALS:

1. A permit from the Virginia Marine Resources Commission (VMRC) to encroach upon state bottom and/or a local wetlands board permit may also be required for work authorized by this RP.

2. Those activities on the Potomac River extending beyond the mean low water line may require authorization by VMRC and/or the Maryland Department of Natural Resources. Authorization may also be needed from the Tennessee Valley Authority for projects constructed on the Clinch and Holston River.

3. To assure preservation of water quality, VDOT must apply for and obtain a 401 Water Quality Certification or waiver from the Virginia Department of Environmental Quality (DEQ) for all discharges of dredged or fill material.

4. Pursuant to the Coastal Zone Management Act (CZMA) of 1972, the Virginia DEQ, Virginia Coastal Zone Management Program completed its review of the Federal Consistency Determination and issued its conditional concurrence on August 16, 2018. Specifically, DEQ concurs that the RPs and General Conditions are consistent to the maximum extent practicable with the Virginia CZM Program provided that the following conditions are satisfied:

    a. Prior to construction, applicants shall obtain all required permits and approvals for the activities to be performed that are applicable to the enforceable policies and that applicants adhere to all conditions contained therein.

    b. The activities that qualify for the RPs meet the requirements of DEQ's Virginia Water Protection Permit Regulation, and the permittee abides by the conditions of the RP as certified under Section 401 of the Clean Water Act.

5. Unless otherwise exempt, permittees should ensure that their projects are designed and constructed in a manner consistent with all state and local requirements pursuant to the Chesapeake Bay Preservation Act (CBPA) (Virginia Code 10.1-2100 *et seq.*) and the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20-10 *et seq.*).

6. Authorizations under this RP do not supersede state or local government authority or responsibilities pursuant to the CBPA, the Virginia Tidal Wetlands Act, or to any state or local laws or regulations.

IV. PROCEDURES:

VDOT must submit a pre-construction notification (PCN) in accordance with the procedures outlined below and in *General Condition 29: Pre-construction Notification.* No work is authorized under this RP until the Corps issues the permittee a written permit verification.

1. Within Virginia, the U.S. Army Corps of Engineers, Norfolk District encourages perspective permittees to utilize the Joint Permit Application (JPA) as the PCN. The JPA is also used to apply for corresponding permits from the Virginia Marine Resources Commission, the Virginia DEQ, and/or Local Wetlands Boards (LWB). The JPA process and JPA forms are used by the Corps, the VMRC, the DEQ, and the LWB for permitting purposes involving tidal and/or non-tidal water, tidal and/or non-tidal wetlands, and/or dune/beach resources, including, but not limited to, construction, dredging, filling, or excavation. Read the directions on the application carefully to determine how many copies must be submitted to the VMRC, who acts as the clearinghouse for permit applications. Permit applicants may obtain paper copies of the JPAs by calling the Corps at 757-201-7652, or by downloading and using one of the two versions of the JPA on the Norfolk District Regulatory Webpage: http://www.nao.usace.army.mil/Missions/Regulatory/JPA.aspx.

2. Following the submittal of a PCN, projects proposed by VDOT will be discussed at a regularly scheduled interagency coordination meeting (IACM) attended by representatives of the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the Environmental Protection Agency (EPA), and the Corps. At the meeting, these agencies will comment on each of the projects. Five calendar days after the meeting, the aforementioned agencies will receive a copy of their comments from VDOT and will then have an additional fifteen calendar days to change their comments. VDOT will notify the Corps of any comment changes. For those projects where the Federal agencies do not object and VDOT agrees to incorporate agency recommendations into the final project plans, written notification indicating the project meets the terms and conditions of RP-01 can be issued by the Corps at the end of the fifteen-day comment period. However, a project will be authorized by this RP only after final permit sketches have been presented which are acceptable to the aforementioned agencies

V. CONDITIONS:

1. The activity must be a single and complete project with independent utility.

    a. Single and complete linear transportation projects: For projects with multiple crossings or encroachments, a determination of "single and complete" will typically apply to each crossing of waters that occurs (i.e., single waterbody and/or wetlands) at separate and distinct locations and with independent utility. However, in cases where there are many crossings in close proximity, numerous crossings of the same waterbody, multiple crossings, or multiple encroachments that otherwise may have more than minimal individual or cumulative impacts, the Corps has the discretion to consider all the crossings cumulatively as one single and complete project.

    b. Independent utility for linear transportation projects: Separate impact areas on a new location roadway are not considered to have independent utility, and impacts would be considered cumulatively and eligible for a single RP-01 verification. However, separate impact areas on a roadway that is being widened or where pipes are being replaced at multiple crossings are considered to have independent utility, and each crossing would be considered eligible for a separate RP-01 verification.

2. In those cases where objections other than those concerning compensatory mitigation ratios cannot be resolved, the project will be processed as an Individual Permit in accordance with 33 CFR Part 325. Federal agency objections concerning appropriate mitigation ratios will be carefully considered by the Corps, and the Corps will determine the ratios required for authorization under this RP. The Corps can issue the RP-01 even if agency objections regarding mitigation ratios are unresolved. However, this exception applies only to mitigation ratios and not to other mitigation issues.

3. The District Engineer will require that the project be processed for an Individual Department of the Army Permit for any project which he/she determines to have greater than minimal individual or cumulative impacts.

4. Any waters of the U.S., including wetlands, that will not be impacted under this permit and that are located within 50 feet of any proposed clearing, excavation, or other construction activities must be clearly marked in the field with 4-foot high orange fencing prior to commencing work onsite to ensure that additional stream/wetland areas are not inadvertently impacted during construction.

5. All state and local requirements and regulations pertaining to the project are applicable, including the Virginia Sedimentation and Erosion Control Handbook.

6. Any necessary modification to the project plans, made after final permit coordination, must be re-coordinated at an IACM. The project modification must be acceptable to the aforementioned agencies in order for it to qualify under this RP. Excluded from this requirement are minor modifications which do not increase the project's total impacts and/or lessen the impacts (for example, changes in the dimensions of a causeway which do not result in increased fill quantities, provided that less than 50% of the width of the waterway is blocked and no additional wetlands are involved; the placement of a causeway on the upstream side of a bridge project rather than on the downstream side, provided that no additional wetlands are involved; any reductions in fill quantities, unless the purpose of the fill is erosion control). These minor modifications must be approved by the Corps prior to implementation.

7. Prior to the commencement of any work authorized by this RP, VDOT shall advise the Corps, in writing, of the time the authorized activity will be commenced. VDOT shall furnish appropriate VDOT staff and the contractor(s) a complete copy of this permit along with all drawings and any special conditions. Further, VDOT shall advise the Corps upon completion of the project, including any required mitigation.

8. For all projects authorized by this RP, VDOT shall follow and comply with the "Programmatic Agreement Among the Federal Highway Administration, the U.S. Army Corps of Engineers, Norfolk District, the Tennessee Valley Authority, the Advisory Council on Historic Preservation, the Virginia State Historic Preservation Officer, and the Virginia Department of Transportation Regarding Transportation Undertakings Subject to Section 106 of the National Historic Preservation Act of 1966."

9. VDOT is authorized to use the Craney Island Rehandling Basin and/or the Craney Island Dredged Material Management Area (DMMA) for placement of dredged material if the project meets the requirements for such use (see H.D.563, 79th Congress, 2nd Session, P.O. 79-525). Requirements include that the work must be related to the development or maintenance of navigation improvements in the port of Hampton Roads. The special conditions which must be adhered to and forms which must be completed in order to use Craney Island will be added to this permit for those projects where applicable. (Please note that there are restrictions on the use of Craney Island.)

10. The outer facing of temporary cofferdams must be installed first and must consist of non-erodible materials. Riverjack (i.e., rocks, cobbles and pebbles with small amounts of sand and silt) is considered suitable for the construction of temporary cofferdams. Causeways are to be constructed of non-erodible material. Projects may not block more than one-half of the width of the waterway unless the equivalent hydraulic opening is provided. Cofferdams and causeways must be completely removed from the waterway upon completion of the project for which they were constructed. All riprap material must consist of clean non-erodible material.

11. If the waterway affected is a "Navigable Waterway of the United States", over which the United States Coast Guard (USCG) asserts jurisdiction, the location and clearances of the bridge or structure must also be approved by the USCG. If the waterway affected is within the Tennessee River watershed over which the Tennessee Valley Authority (TVA) asserts jurisdiction, the bridge or structure must also be approved by TVA.

12. VDOT hereby recognizes the possibility that the structure permitted herein may be subject to damage by waves from passing vessels. The issuance of this RP does not relieve VDOT from taking all proper steps to ensure the integrity of the structure permitted herein and the safety of boats moored thereto from damage by wave wash. VDOT acknowledges and admits that the United States is not liable for any such damage and that it shall not seek to involve the U.S. in any actions or claims regarding such damages.

13. VDOT must supply the USFWS with information concerning the intended route of an entire roadway or railway so that, if necessary, they may exercise their authority under the Endangered Species Act (ESA).

14. If the activity involves a discharge of dredged or fill material, the discharge will be carried out in conformity with the goals and objectives of the EPA Guidelines established pursuant to Section 404(b) of the Clean Water Act and published in 40 CFR Part 230.

15. Work must be performed in accordance with the "Memorandum of Agreement for a Procedure for the Coordination of Virginia Department of Transportation (VDOT) Projects Located in Trout Waters."

16. For all impacts associated with transportation projects funded in part or in total by local, state or Federal funds, compensatory mitigation will generally be required for all permanent wetland impacts (including impacts less than 1/10 acre). Therefore, the VDOT PCN for authorization under this RP must include a compensatory mitigation plan.

17. Conditions Pertaining to Countersinking of Pipes and Culverts:

NOTE 1: COUNTERSINKING PER THE FOLLOWING GUIDELINES WILL BE REQUIRED. JUSTIFICATON MUST BE PROVIDED FOR CONSIDERATION BY THE CORPS FOR ANY PROJECT WHERE VDOT BELIEVES COUNTERSINKING IS NOT PRACTICABLE.

NOTE 2: COUNTERSINKING IS NOT REQUIRED IN TIDAL WATERS. However, replacement pipes/culverts in tidal waters must be installed with invert elevations no higher than the existing pipe/culvert invert elevation, and a new pipe/culvert must be installed with the invert no higher than the stream bottom elevation.

For Non-tidal Waters: Following consultation with the Virginia Department of Game and Inland Fisheries (VDGIF), the Norfolk District has determined that fish and other aquatic organisms are most likely present in any stream being crossed, in the absence of site-specific evidence to the contrary. Although VDOT has the option of providing such evidence, extensive efforts to collect such information is not encouraged, since countersinking will in most cases be required except as outlined in the conditions below. The following conditions will apply in Non-tidal waters:

a. All pipes: All pipes and culverts placed in streams will be countersunk at both the inlet and outlet ends, unless indicated otherwise by the Norfolk District on a case-by-case basis (see below). Pipes that are 24" or less in diameter shall be countersunk 3" below the natural stream bottom. Pipes that are greater than 24" in diameter shall be countersunk 6" below the natural stream bottom. The countersinking requirement does not apply to bottomless pipes/culverts or pipe arches. Federal In sets of multiple pipes or culverts (with bottoms) at least one pipe or culvert shall be depressed (countersunk) at both the inlet and outlet to convey low flows.

b. When countersinking culverts, permittees must ensure reestablishment of a surface water channel (within 15 days post construction) that allows for the movement of aquatic organisms and maintains the same hydrologic regime that was present pre-construction (i.e. the depth of surface water through the permit area should match the upstream and downstream depths). This may require the addition of finer materials to choke the larger stone and/or placement of riprap to allow for a low flow channel.

c. Exemption for extensions and certain maintenance: The requirement to countersink does not apply to extensions of existing pipes or culverts that are not countersunk, or to maintenance to pipes/culverts that does not involve replacing the pipe/culvert (such as repairing cracks, adding material to prevent/correct scour, etc.).

d. Floodplain pipes: The requirement to countersink does not apply to pipes or culverts that are being placed above ordinary high water, such as those placed to allow for floodplain flows. The placement of pipes above ordinary high water is not jurisdictional (provided no fill is discharged into wetlands).

e. Hydraulic opening: Pipes should be adequately sized to allow for the passage of ordinary high water with the countersinking and invert restrictions taken into account.

f. Pipes on bedrock or above existing utility lines: Different procedures will be followed for pipes or culverts to be placed on bedrock or above existing buried utility lines where it is not practicable to relocate the lines, depending on whether the work is for replacement of an existing pipe/culvert or a new pipe/culvert:

   (1) Replacement of an existing pipe/culvert: Countersinking is not required provided the elevations of the inlet and outlet ends of the replacement pipe/culvert are no higher above the stream bottom than those of the existing pipe/culvert. Documentation (photographic or other evidence) must be maintained in VDOT's records showing the bedrock condition and the existing inlet and outlet elevations. That documentation will be available to the Norfolk District upon request, but notification or coordination with the Norfolk District is not otherwise required.

   (2) A pipe/culvert is being placed in a new location: If VDOT determines that bedrock or an existing buried utility line that is not practicable to relocate prevents countersinking, VDOT should evaluate the use of a bottomless pipe/culvert, bottomless utility vault, span (bridge) or other bottomless structure to cross the waterway, and also evaluate alternative locations for the new pipe/culvert that will allow for countersinking. If VDOT determines that neither a bottomless structure nor an alternative location is practicable, then VDOT must

submit supporting documentation in their application. VDOT must provide documentation of measures evaluated to minimize disruption of the movement of aquatic life as well as documentation of the cost, engineering factors, and site conditions that prohibit countersinking the pipe/culvert. Options that must be considered include partial countersinking (such as less than 3" of countersinking, or countersinking of one end of the pipe), and constructing stone step pools, low rock weirs downstream, or other measures to provide for the movement of aquatic organisms. The application must also include photographs documenting site conditions. VDOT may find it helpful to contact the regional fishery biologist for the VDGIF, for recommendations about the measures to be taken to allow for fish movements. When seeking advice from VDGIF, VDOT should provide the VDGIF biologist with all available information such as location, flow rates, stream bottom features, description of proposed pipe(s), slopes, etc. Any recommendations from VDGIF should be included in the application. NOTE: Blasting of stream bottoms through the use of explosives is not acceptable as a means of providing for countersinking of pipes on bedrock.

g. Pipes on steep terrain: Pipes being placed on steep terrain (slope of 5% or greater) must be countersunk in accordance with the conditions above and will in most cases be non-reporting. It is recommended that on slopes greater than 5%, a larger pipe than required be installed to allow for the passage of ordinary high water in order to increase the likelihood that natural velocities can be maintained. There may be situations where countersinking both the inlet and outlet may result in a slope in the pipe that results in flow velocities that cause excessive scour at the outlet and/or prohibit some fish movement. This type of situation could occur on the side of a mountain where falls and drop pools occur along a stream. Should this be the case, or should VDOT not propose to countersink the pipe/culvert for other reasons, VDOT must include documentation in their application. Documentation must include measures evaluated to minimize disruption of the movement of aquatic life as well as documentation of the cost, engineering factors, and site conditions that prohibit countersinking the pipe/culvert. VDOT should design the pipe to be placed at a slope as steep as stream characteristics allow, countersink the inlet 3-6", and implement measures to minimize any disruption of fish movement. These measures can include constructing a stone step/pool structure, preferably using river rock/native stone rather than riprap, constructing low rock weirs to create a pool or pools, or other structures to allow for fish movements in both directions. Stone structures should be designed with sufficient-sized stone to prevent erosion or washout and should include keying-in as appropriate. These structures should be designed both to allow for fish passage and to minimize scour at the outlet. The quantities of fill discharged below ordinary high water necessary to comply with these requirements (i.e., the cubic yards of stone, riprap or other fill placed below the plane of ordinary high water) must be included in project totals.

VDOT may find it helpful to contact the regional fishery biologist for the VDGIF for recommendations about the measures to be taken to allow for fish movements. When seeking advice from VDGIF, VDOT should provide the VDGIF biologist with all available information such as location, flow rates, stream bottom features, description of proposed pipe(s), slopes, etc. Any recommendations from VDGIF should be included in the application.

h. Problems encountered during construction: When a pipe/culvert is being replaced, and the design calls for countersinking at both ends of the pipe/culvert, and during construction it is found that the streambed/banks are on bedrock, a utility line, or other documentable obstacle, then VDOT must stop work and contact the Norfolk District (contact by telephone and/or email is acceptable). VDOT must provide the Norfolk District with specific information concerning site conditions and limitations on countersinking. The Norfolk District will work with VDOT to determine an acceptable plan.

i. Emergency pipe replacements: In the case of an emergency situation, such as when a pipe/culvert washes out during a flood, VDOT is encouraged to countersink the replacement pipe at the time of replacement, in accordance with the conditions above. However, if conditions or timeframes do not allow for countersinking, then the pipe can be replaced as it was before the washout, but the permittee will have to come back and replace the pipe/culvert and countersink it in accordance with the guidance above. In other words, the replacement of the washed out pipe is viewed as a temporary repair, and a countersunk replacement should be made at the earliest possible date. The Norfolk District must be notified of all pipes/culverts that are replaced without countersinking at the time that it occurs, even if it is an otherwise non-reporting activity, and must provide VDOT's planned schedule for installing a countersunk replacement (it is acceptable to submit such notification by email). VDOT should anticipate whether bedrock or steep terrain will limit countersinking, and if so, should follow the procedures outlined in (g) and/or (h) above.

18. <u>Conditions for the Repair of Pipes</u>:

NOTE 1: COUNTERSINKING PER THE FOLLOWING GUIDELINES WILL BE REQUIRED. JUSTIFICATON MUST BE PROVIDED FOR CONSIDERATION BY THE CORPS FOR ANY PROJECT WHERE VDOT BELIEVES COUNTERSINKING IS NOT PRACTICABLE.

NOTE 2: COUNTERSINKING IS NOT REQUIRED IN TIDAL WATERS. However, replacement pipes/culverts in tidal waters must be installed with invert elevations no higher than the existing pipe/culvert invert elevation, and a new pipe/culvert must be installed with the invert no higher than the stream bottom elevation.

For Non-tidal Waters: If any discharge of fill material will occur in conjunction with pipe maintenance, such as concrete being pumped over rebar into an existing deteriorated pipe for stabilization, then the following conditions apply:

a. If the existing pipe or multi-barrel array of pipes are NOT currently countersunk:

(1) As long as the inlet and outlet invert elevations of at least one pipe located in the low flow channel are not being altered, and provided that no concrete apron is being constructed, then the work can be considered for authorization under RP-01.

(2) Otherwise, VDOT must submit the following information in the application:

(a) Photographs of the existing inlet and outlet;

(b) A measurement of the degree to which the work will raise the invert elevations of both the inlet and outlet of the existing pipe;

(c) The reasons why other methods of pipe maintenance are not practicable (such as metal sleeves or a countersunk pipe replacement);

(d) A vicinity map showing the pipe locations.

Depending on the specific case, the Norfolk District may discuss potential fish usage of the waterway with the VDGIF. The Norfolk District will assess all such pipe repair proposals in accordance with guidelines that can be found under "Pipe Repair Guidelines" at: http://www.nao.usace.army.mil/Missions/Regulatory/GuidanceDocuments.aspx.

(3) If the Norfolk District determines that the work qualifies for RP-01, additional conditions will be placed on the authorization. Those conditions can be found at the web link above (in item 18a.(2)).

(4) It is anticipated that VDOT will be required to perform the work such that the waterway is not blocked or restricted to a greater degree than its current conditions.

b. If the existing pipe or at least one pipe in the multi-barrel array of pipes IS countersunk and at least one pipe located in the low flow channel will continue to be countersunk, and no concrete aprons are proposed; the work can be authorized by RP-01.

c. If the existing pipe or at least one pipe in the multi-barrel array of pipes IS countersunk and no pipe will continue to be countersunk in the low flow channel, it is anticipated that VDOT will still be required to perform the work such that the waterway is not blocked or restricted more so than its current conditions.

d. In emergency situations, if conditions or timeframes do not allow for compliance with the procedure outlined herein, then the pipe can be temporarily repaired to the condition before the washout. VDOT must submit an application via the IACM at the earliest practicable date, but no longer than 30 days after the temporary repair.

VI. GENERAL CONDITIONS:

1. Navigation:

   a. No activity may cause more than a minimal adverse effect on navigation.

   b. Any safety lights and signals prescribed by the USCG, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the U.S. The USCG may be contacted at the following address: Commander (oan), Fifth Coast Guard District, Federal Building, 431 Crawford Street, Portsmouth, Virginia 23704 or by telephone: 757-398-6230.

   c. The permittee understands and agrees that if future operations by the United States require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his/her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements: No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas: Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas: Activities in waters of the U.S. that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds: No activity may occur in areas of concentrated shellfish populations.

6. Submerged Aquatic Vegetation (SAV) Beds: Activities in SAV beds must be avoided and minimized to the maximum extent practicable. Avoidance and minimization measures, such as relocating a structure and/or the implementation of a time-of-year restriction for work in waters, may be required to reduce impacts to the SAV habitat. Information regarding SAV may be found at the Virginia Institute of Marine Science's website at: http://web.vims.edu/bio/sav/.

7. Suitable Material: No activity may use unsuitable material (e.g. trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

8. Water Supply Intakes: No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public waters supply intake structures or adjacent bank stabilization.

9. Adverse Effects from Impoundments: If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

10. Management of Water Flows: To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound waters or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

11. Fills Within 100-Year Floodplains: The activity must comply with applicable Federal Emergency Management Agency (FEMA)-approved state or local floodplain management requirements.

12. Equipment: Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

13. Soil Erosion and Sediment Controls: Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the

earliest practicable date. Permittees are encouraged to perform work within waters of the U.S. during periods of low-flow or no-flow, or during low tides.

14. Invasive Species: Plant species listed by the most current version of Virginia Department of Conservation and Recreation's (DCR) Invasive Alien Plan List shall not be used for re-vegetation for activities authorized by these RPs. The list of invasive plants in Virginia may be found at: http://www.dcr.virginia.gov/natural-heritage/invsppdflist. The DCR recommends the use of regional native species for re-vegetation as identified in the DCR Native Plants for Conservation, Restoration and Landscaping brochures, which can be found at: http://www.dcr.virginia.gov/natural-heritage/nativeplants#brochure or by using the DCR native plant finder: http://www.dcr.virginia.gov/natural-heritage/native-plants-finder.

15. Removal of Temporary Fills and Impacts: The soils of any temporarily impacted areas located in wetlands that are cleared, grubbed, and/or filled, must be restored once these areas are no longer needed for their authorized purpose, no later than completion of project construction, and not to exceed twelve (12) months after commencing the temporary impacts. To restore, temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations, the soil surface loosened by ripping or chisel plowing to a depth of 8-12", and then seeded using native wetland species. See *General Condition 14: Invasive Species* for more information on vegetation recommendations.

    Fill or dredged material into waters of the U.S. that are not removed within the 12 month period will be considered a permanent impact, unless otherwise determined by the Corps. This additional impact to waters of the U.S. may result in the Corps initiating a permit non-compliance action which may include, but not limited to, a restoration order, after-the-fact permitting, and/or compensatory mitigation.

16. Proper Maintenance: Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable RP conditions, as well as any activity-specific conditions added by the District Engineer to an RP authorization.

17. Wild and Scenic Rivers: Currently, there are no designated Wild and Scenic Rivers in the Commonwealth of Virginia. No RP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river has determined, in writing, that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area

(e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, USFWS).

18. Tribal Rights: No RP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

19. Endangered Species:

a. No activity is authorized under this RP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal ESA, or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under this RP which "may affect" a listed species or critical habitat, unless ESA Section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the RP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the RP activity and are later in time, but still reasonably certain to occur.

b. Federal permittees should follow their own procedures for complying with the requirements of the ESA. The Federal permittee must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements. The District Engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA Section 7 consultation may be necessary for the activity and respective Federal agency would be responsible for fulfilling its obligation under Section 7 of the ESA.

c. VDOT must submit a PCN to the District Engineer if any proposed or listed species or proposed or designated critical habitat may be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. Information on the location proposed/listed species and proposed/designated critical habitat can be obtained directly from the USFWS online project review process at: https://www.fws.gov/northeast/virginiafield/endangered/projectreviews.htm l and from NMFS at: http://www.nmfs.noaa.gov/pr/species/.

The District Engineer, or lead Federal agency, will determine whether the proposed activity "may affect" or will have "no effect" to listed species or designated critical habitat and will notify VDOT of the Corps' determination. In cases where the Corps is the lead Federal agency and VDOT identified listed species or designated critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the permittee shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or designated critical habitat, or until Section 7 consultation has been completed. VDOT must wait for notification from the Corps to proceed.

If the Corps is the lead Federal agency and the District Engineer determines that the proposed activity may affect a listed species or designated critical habitat, the Corps will initiate consultation with the USFWS. The USFWS developed an online system to allow applicants and agencies to find information about sensitive resources that may occur within the vicinity of a proposed project. This system is named "Information, Planning and Conservation System," (IPaC), and is located at: https://ecos.fws.gov/ipac/.

Additional consultation may also be required with NMFS for species or critical habitat under their jurisdiction, including sea turtles, marine mammals, Shortnose Sturgeon, and Atlantic Sturgeon. For additional information about their jurisdiction in Virginia, please visit: https://www.greateratlantic.fisheries.noaa.gov/protected/index.html.

d. As a result of formal or informal consultation with USFWS or NMFS, the District Engineer may add species-specific regional endangered species conditions to the RP.

e. Authorization of an activity by this RP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from USFWS or NMFS, the ESA prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

f. If VDOT has a valid ESA Section 10(a)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed RP activity, the VDOT should provide a copy of that ESA Section 10(a)(1)(B) permit in the JPA. The District Engineer will coordinate with the agency that issued the ESA Section 10(a)(1)(B) permit to determine whether a separate ESA Section 7 consultation is needed.

20. Migratory Birds and Bald and Golden Eagle Protection Act: The Bald Eagle (*Haliaeetus leucocephalus*) is no longer a Federally listed threatened or endangered species; therefore, the ESA provisions are not applicable to this species. The Bald and Golden Eagle Protection Act (BGEPA) does not require

that a Federal agency involved in permitting the proposed action conduct coordination. The permittee is responsible for obtaining any "take" permits required under USFWS regulations governing compliance with the Migratory Bird Treaty Act or the BGEPA. The applicant should either obtain "take" permit or a letter of concurrence from USFWS indicating that a permit is not necessary prior to initiating construction activities. You should contact USFWS concerning this matter at U.S. Fish and Wildlife Service, Virginia Field Office, 6669 Short Lane, Gloucester, VA 23061. Information on active bald eagle nests and concentration areas can be obtained in Step 6 of the USFWS' online project review system available at: https://www.fws.gov/northeast/virginiafield/endangered/projectreviewprocess.html.

21. Essential Fish Habitat: The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297; 11 October 1996), requires all Federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service Habitat Conservation Division (NOAA HCD) on all actions, or proposed actions, permitted, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH). The EFH Designations within the Northeast Region (Maine to Virginia), dated March 1, 1999, has identified EFH for a number of species and their life stages within Virginia waters. If EFH consultation is required with NOAA HCD, the applicant shall not begin work until the Corps has provided notification that the EFH consultation has concluded.

22. Anadromous Fish: Authorizations associated with this RP shall not adversely affect documented spawning habitat or a migratory pathways for anadromous fish. Areas of anadromous fish use are indicated on the VDGIF information system at: http://vafwis.org/fwis/. If a project is located within an area documented as an anadromous fish use area (confirmed or potential), all in-stream work is prohibited from occurring between February 15 through June 30 of any given year or other time of year restriction (TOYR) specified by the VDGIF and/or the VMRC. Should the Norfolk District determine that the work is minimal and no TOYR is needed, the District will initiate consultation with NOAA Fisheries Service for their concurrence.

    A TOYR is not required for dredging activities in the Elizabeth River upstream of the Mid-Town Tunnel on the main-stem and the West Norfolk Bridge (Route 164, Western Freeway) on the Western Branch of the Elizabeth River.

23. Designated Critical Resource Waters and National Estuarine Research Reserves: This RP does not authorize the discharge of dredged or fill material into the Chesapeake Bay National Estuarine Research Reserve (Reserve) in Virginia. This Reserve is a multi-site system along a salinity gradient of the York River, which includes Sweet Hall Marsh, Taskinas Creek, Catlett Islands, and Goodwin Islands. Additional information may be found at: http://www.vims.edu/cbnerr/.

24. Discovery of Previously Unknown Remains and Artifacts: If you discover any previously unknown historic, cultural, or archaeological remains and artifacts while accomplishing activities authorized by this permit, you must immediately stop work and notify the Corps of what has been found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. See Special Condition 10 above for treatment and procedures regarding recovery and coordination for any such remains or artifacts.

25. Mitigation: Mitigation in all its forms (avoiding, minimizing, or compensating for resource losses) may be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal. The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the U.S. to the maximum extent practicable at the project site (i.e., on site).

26. Use of Multiple Regional Permits: This RP may be combined with any Corps general permits (including Nationwide (NWP) or RP) for a single and complete project, as long as the acreage loss of waters of the U.S. authorized by the NWPs/RPs does not exceed the acreage limit of the NWP/RP with the highest specified acreage limit.

27. Compliance Certification: A Certificate of Compliance, enclosed with the Corps' written authorization for the activity, must be completed and a copy retained for your records. The original Certificate of Compliance shall be mailed to, U.S. Army Corps of Engineers, Regulatory Branch, 803 Front Street, Norfolk, Virginia 23510-1011, or to the Regulatory Field Office listed on the Certificate of Compliance, within 30 days of completion of the authorized activity.

28. Activities Affecting Structures or Works Built by the United States: If the RP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a Corps Federally authorized Civil Works project, the activity that requires Section 408 permission is not authorized by the RP until the appropriate Corps District office issues the Section 408 permission to alter, occupy, or use the Corps Civil Works project, and the District Engineer issues a written RP verification.

    Contact a Norfolk District Regulatory Project Manager to assist in determining if your proposed activity might alter or temporarily or permanently occupy or use a Corps project.

    Locations of Norfolk District Civil Works projects can be found at: http://www.nao.usace.army.mil/Portals/31/docs/regulatory/RPSPdocs/RP-17_Corps_Project_Maps.pdf.

    For projects located within the Civil Works boundary of the Baltimore, Huntington, Nashville or Wilmington District, please contact a Norfolk District Project Manager for assistance.

29. Pre-Construction Notification: Prior to commencing the activity, prospective permittees ("permittees") must submit a PCN to the District Engineer, unless otherwise specified in the RP, and must receive written notification from the Corps acknowledging that the project is authorized pursuant to this RP.

Notification to the Corps must be in writing (the JPA may also be used, as described below) and must include the following information:

- Name, address and telephone number of the prospective permittee.
- Name, address and telephone number of the property owner, if different from the prospective permittee.
- Location of the project (including Tax Parcel ID Number, if available).
- Vicinity map, aerial photograph, and/or drawing accurately showing the extent of proposed activity and the extent of waters of the U.S., including wetlands. Drawings, plans and/or sketches should contain sufficient detail to project an illustrative description of the proposed activity.
- Identify the specific RP or RPs the prospective permittee wants to use to authorize the proposed activity.
- A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expect to result from the RP activity, in acres, linear feet or other appropriate unit of measure; a description of any proposed mitigation measures; and any other Corps permit used or intended to be used to authorize any part of the proposed project or any related activity.
- A delineation of special aquatic sites and other waters of the U.S. on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the U.S., but there may be a delay if the Corps does the delineation.
- If compensatory mitigation is required, the prospective permittee must submit a statement describing how any required compensatory mitigation will be provided. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. In accordance with 33 CFR 332.3 (a) the Corps will consider what is environmentally preferable. Factors considered will be likelihood of success, sustainability, location relative to the impact site and significance within the watershed, and the costs of the compensatory mitigation project. The Corps will require the most appropriate and practicable mitigation pursuant to 33 CFR 320.4(r).

A JPA may be obtained by writing to the U.S. Army Corps of Engineers, Norfolk District, Regulatory Branch, 803 Front Street, Norfolk, Virginia 23510-1011; by telephoning the Norfolk District Regulator of the Day at 757-201-7652 or via the following link to the Norfolk District Regulatory Branch website: http://www.nao.usace.army.mil/Missions/Regulatory/JPA/.

The Corps must determine if the PCN is complete. If the PCN is determined to be incomplete, the Corps will request the prospective permittee to provide the additional information necessary to make the request complete. The request must specify the information needed to make the PCN complete. As a general rule, the Corps will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the Corps will notify the prospective permittee that the PCN is still incomplete and the review process will not commence until all of the requested information has been received by the Corps. The prospective permittee shall not begin the activity until he or she is notified in writing by the Corps that the activity may proceed under the RP, subject to any additional conditions imposed by the Corps.

If, after reviewing the request, the Corps determines that the proposed activity would have more than minimal individual or cumulative adverse impacts on the aquatic environment or otherwise may be contrary to the public interest, then the Corps will notify the project proponent that the activity is not authorized by the RP and will provide instructions for seeking authorization under an Individual Permit. The Corps may revoke this RP for an individual activity by following the procedures set forth in 33 CFR 325.7.

30. Environmental Justice: Activities authorized under this RP must comply with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

31. Inspections: The permittee must provide a copy of this permit and any verification letter to the contractor(s) and made available at the project site to any regulatory representative. The permittee shall allow the Corps to make periodic inspections at any time deemed necessary in order to assure that the activities being performed under authority of this permit are in accordance with the terms and conditions prescribed herein. The Corps reserves the right to require post-construction engineering drawings and/or surveys of any work authorized under this RP, as deemed necessary on a case-by-case basis.

VII. DISTRICT ENGINEER'S DECISION:

1. In reviewing the JPA for the proposed activity, the District Engineer will determine whether the activity authorized by the RP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific RP, the District Engineer should issue the RP verification for that activity if it meets the terms and conditions of that RP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual or cumulative adverse effects on the aquatic environment and other aspects of the public interest and require an Individual Permit for the proposed activity.

2. When making minimal adverse environmental effects determinations the District Engineer will consider the direct and indirect effects caused by the RP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by the RP and whether those cumulative adverse environmental effects are no more than minimal. The District Engineer will also consider site specific factors, such as the environmental setting in the vicinity of the RP activity, the type of resource that will be affected by the RP activity, the functions provided by the aquatic resources that will be affected by the RP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the RP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the District Engineer. The District Engineer may add case-specific special conditions to the RP authorization to address site-specific environmental concerns.

3. If the District Engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the District Engineer will notify the applicant that the activity does not qualify for authorization under the RP and instruct the applicant on the procedures to seek authorization under an Individual Permit or process to modify the proposed activity and/or the mitigation plan to reduce the adverse environmental effects so that they are no more than minimal. In addition, if the District Engineer determines on a case-by-case basis that concerns for the aquatic environment so indicate, the District Engineer may exercise discretionary authority to override the RP and require authorization under an Individual Permit.

VIII. ADDITIONAL INFORMATION:

1. District Engineers have the authority to determine if an activity complies with the terms and conditions of the RP.

2. Limits of This Authorization:

    a. RPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law.

    b. RPs do not grant any property rights or exclusive privileges.

    c. Regional permits do not authorize any injury to the property or rights of others.

    d. RPs do not authorize interference with any existing or proposed Federal project (see General Condition 32).

    e. RPs do not authorize the impingement upon Federal Lands.

f. RPs do not grant any Corps or Federal real estate rights. If real estate rights are needed from the Corps, you must contact the appropriate U.S. Army Corps of Engineers District's Real Estate Office.

3. Limits of Federal Liability: In issuing this RP, the Federal government does not assume any liability for the following:

   a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes;

   b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest;

   c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this RP;

   d. Design or construction deficiencies associated with the permitted work;

   e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: The District Engineer may reevaluate the decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

   a. The permittee fails to comply with the terms and conditions of this permit.

   b. The information provided by the permittee in support of your PCN proves to have been false, incomplete, or inaccurate.

   c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

   Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Binding Effect: The provisions of the permit authorization shall be binding on any assignee or successor in interest of the original permittee.

7. Expiration: Unless further modified, suspended, or revoked, this RP will be in effect until April 15, 2024. Activities which have commenced (i.e. under construction) or are under contract to commence in reliance upon this RP will remain authorized provided the activity is completed within twelve (12) months of the date of the RP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization. Activities completed under the authorization of the RP which was in effect at the time the activity was completed continue to be authorized by that RP.

Date

FOR:

Patrick V. Kinsman, PE
Colonel, U.S. Army
Commanding

ENGINEERING APPENDIX

Indian Run, Bedford County, VA
Continuing Authority Program, Section 14
Emergency Streambank & Shoreline Protection

APPENDIX B

May 2021

U.S. Army Corps of Engineers
Norfolk District

Table of Contents

1.0 Study Area and Purpose

The project is located on State Highway 501 approximately 0.5 miles north of Coleman Falls in Bedford County, Virginia. Approximately 50 to 70-linear feet of a section of a highway embankment has started failing (slope instability) which is most likely the result of erosion at the embankment toe by a small stream that is adjacent to the highway embankment. Repairs to the highway embankment will need to extend beyond 50 to 70-linear feet to tie into stable ground. A combination of the over steepen earth embankment slope and the erosive action of the stream at the toe are threatening the integrity of the highway. In November 2016, the Virginia Department of Transportation (VDOT) placed a thin layer of Class I riprap on the embankment slope as an emergency measure to prevent further erosion and stability; however, instability of the highway embankment slope appears evident. Highway 501 carries local and tractor trailer traffic due to the nearby Big Island Paper Mill, a major employer. If the road closes, citizens will be required to take alternate routes to the Paper Mill, which would add an extra 50 to 60 miles of driving distance. VDOT has requested emergency assistance from the Federal Government to stabilize the embankment under the Continuing Authorities Program, Section 14.

The purpose of the engineering study was to evaluate the site conditions, identify measures for the road embankment stabilization, and recommend a preferred alternative for the stabilization of the highway embankment.

Figure 1.1 Satellite image of project location (Image from Google Earth Pro)

Figure 1.2 Close up satellite image of project vicinity (Image from Google Earth Pro)

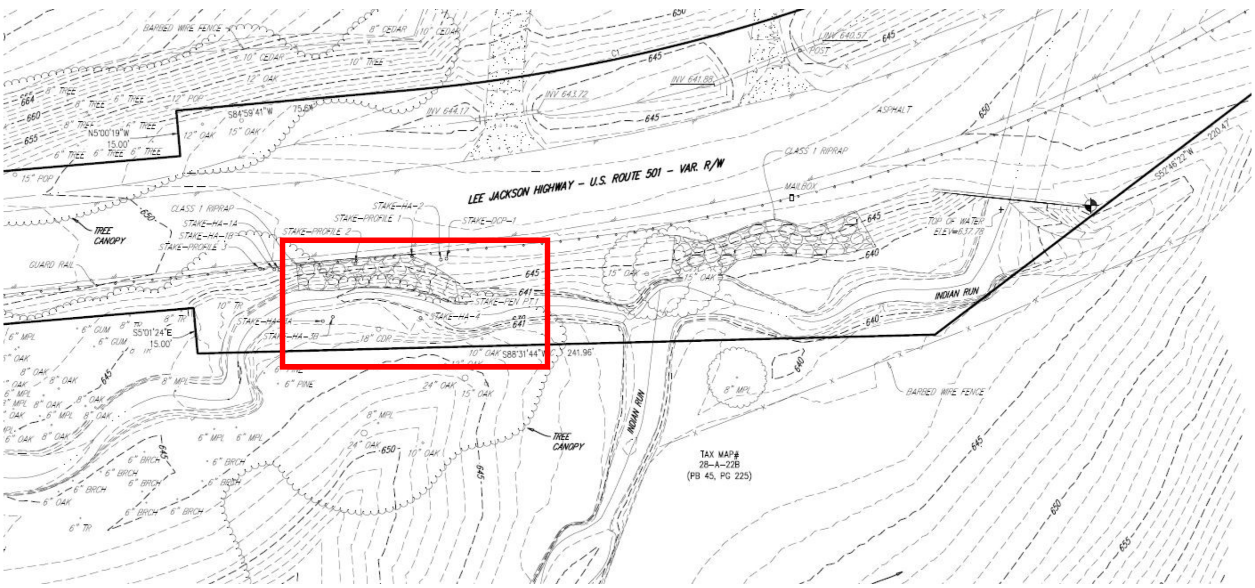


Figure 1.3 Close up view of project area from topographic survey. Red box indicates general project location.

2.0 Definitions

- **<u>Revetments</u>** (Figure 2.1) are river bank/stream bank armoring systems that protect the base of eroding river banks and stream banks. Revetments are typically placed atop a graded slope. This slope may be achieved by excavating eroding banks in a landward direction (commonly referred to as bank "layback") or via the placement of fill materials toward the direction of a water body or by a combination of both cut and fill. The dimensions of the revetment are dependent on existing bank conditions and design parameters. These parameters determine the size of the stone required for long-term structural integrity. Generally, two interlocking faces of armor stone are laid over a bedding stone layer with filter cloth between the earth sub-grade and the bedding layer. The size of materials used within the revetment depends on the flood events and stream/river velocities experienced at the location.

Figure 2.1 Typical Rock Revetment

- **<u>Mechanically Stabilized Earth Retaining Wall</u>** (Figure 2.2) A Mechanically Stabilized Earth (MSE) retaining wall is a composite structure consisting of alternating layers of compacted backfill and soil reinforcement elements, fixed to a wall facing. The stability of the wall system is derived from the interaction between the backfill and soil reinforcements, involving friction and tension. The wall facing is relatively thin, with the primary function of preventing erosion of the structural backfill. The result is a coherent gravity structure that is flexible and can carry a variety of heavy loads. The properties and materials of the three major components can vary, and an engineer must choose the most efficient combination of materials based on the wall's design criteria. The first component is the facing elements which are modular precast concrete panels or wire mesh. Each facing type offers different advantages when considering criteria such as aesthetics, durability, construction procedure, and expected settlement. The second component is soil reinforcements, which are typically steel or geosynthetic, in the form of strips or ladders. All soil reinforcement options have unique characteristics for pullout and tensile capacity, corrosion, and durability. The third component is select backfill, which allows for reliable construction and performance of the wall, in which the gradation, plasticity, electrochemical properties, and overall durability should be closely analyzed. It can be obtained on site, or from a distributor. Some benefits of an MSE wall include: extreme wall heights can be achieved; extreme loads can be carried (bridge abutment footings, cranes); high resistance to seismic and other dynamic forces; Free-draining, due to granular backfill and open panel joints; rapid, predictable, and repetitive construction; and superior finished wall alignment.

Figure 2.2 Modular Retaining Wall with Armor Stone Toe Protection

- **Vertical Sheet Piling** (***Figure 2.***3) combine elements of sheet pile wall and armor stone toe protection. Sheet pile walls are retaining walls used to retain earth, water, or other fill materials. These walls are thinner in section compared to masonry walls. Sheet pile walls can be used for riverbank protection. Sheet pile walls can be made of timber, reinforced concrete, or steel. Steel sheet piles are the most commonly used. Advantages to using steel sheet pile walls is that they are resistant to high driving stresses, used either below or above water and have a long life span, suitable joints can be provided to have a continuous wall, and pile length can be increased either by bolting or welding. Disadvantages to using sheet piling include the following: if the soil is rocky or has boulders, installation is difficult; use vibratory hammers or impact hammers to install the sheets into the ground which can cause neighborhood disturbance; and most sheets are used as temporary structures.

Figure 2.3 Sheet Pile Wall with Armor Stone Toe Protection

- **<u>Vegetative Erosion Control</u>** (Figure 2.4) is typically located up in the higher bank above a rock structure planted with native grasses. Maintained slopes reduce erosion from surface water, shallow groundwater, and to some extent coastal processes. The vegetation on the slope provides good erosion and sediment control. Vegetation limits the capacity of flowing water to detach soil particles and transport sediment by decreasing runoff volume, slowing velocity, and protecting soil surface from flowing water. Infiltration rates increase under vegetation. Plant roots physically anchor the soil from movement induced by gravity, raindrop impact, and surface runoff. A planned management program must be developed to account for the functions of the vegetation, the soil and climatological conditions on site, and the management capacity of the owner or maintaining authority.

Figure 2.4 Example of Vegetated Slope with Stone Toe Protection

3.0 Existing Site Conditions

The Engineering members of the Project Delivery Team (PDT) made a couple of site visits to the project site to observe the site conditions. The first site visit was performed with the project team and the Sponsor in November 2019. A second site visit, a preliminary field exploration, was performed in September 2020 to gather more accurate site information and data. Approximately 50 to 70-linear feet of an 8-foot high section of highway earthen embankment is failing due to toe erosion caused by a meandering tributary stream of Indian Run and the over steepened earthen embankment slope. The embankment slope is as steep as 45 degrees (I horizontal to 1 vertical). Photos in Figures 3.1 and 3.2 show the highway embankment distress. Instability of the embankment has caused some of the guardrail supports to fail; however, it has not currently affected the highway surface. In November 2016, the Virginia Department of Transportation (VDOT) placed a thin layer of Class I riprap on the slope of the highway embankment as an emergency measure to prevent further erosion. The east and west sides of the riprap on the highway embankment and the south stream bank consist of brush and tree vegetation. Most of the trees within the project area are less than 6-inches in diameter. At the downstream end of the failed bank section along the south (right) stream bank, rock outcropping is evident in areas along the stream and south of the stream channel bank as land increases in grade, as shown in the photo in Figure 3.6. The small stream generally parallels Highway 501 as it flows toward Indian Run. In the area of the failed embankment, the stream makes a sharp turn towards the embankment and flows directly along the toe for approximately 50 feet. At this location the stream is cutting and scouring into the embankment toe. The highway embankment is a raised section of the highway as traverses over the Indian Run floodplain.

Approximately 80 feet east of the project site is the confluence of the tributary stream and Indian Run. Just beyond the stream confluence, Indian Run flows east and northward, and travels beneath Highway 501 through a large corrugated metal storm pipe. Figures 3.9 through 3.11 show photos of the pipe. The top of the pipe is approximately 10-feet from the stream bed and approximately 16-feet in diameter. During the field visit the pipe invert was observed to have been covered with soil and gravel deposits. The downstream end of the pipe was observed to have grass vegetation on the west bank and east bank of the pipe.

A topographic survey of the project area was performed as part of the feasibility study by a licensed surveyor and the survey also determined the limits of the VDOT highway Right of Way. The results of the survey determined that no major utilities are located within the project area.

Figure 3.1 Highway embankment with Class I riprap.

Figure 3.2 Guardrail failure on the highway embankment.

Figure 3.3 Project site photo looking west (upstream).

Figure 3.4 Project site photo showing upstream area west of project site.

Figure 3.5 Project site photo looking east (downstream). White arrow indicates general location of rock outcrop on right stream bank.

Figure 3.6 Rock outcropping in areas along the stream and south bank.

Figure 3.7 East of project site looking downstream towards tributary and Indian Run confluence.

Figure 3.8 East of project area looking south upstream at Indian Run.

Figure 3.9 Looking upstream at corrugated metal pipe entrance.

Figure 3.10 Looking downstream inside corrugated metal pipe. Gravel and soil deposits inside pipe.

Figure 3.11 Looking downstream at corrugated metal pipe exit. Vegetation growth on sides of pipe.

4.0 Alternatives

4.1. Focused Alternatives Array

Based on requests from Planning, engineering developed several alternatives to be considered during the initial plan formulation. Alternatives were based on preliminary information and photographs of the project site which were provided to engineering. The Alternatives considered were conceptual solutions based on common designs that could be used for riverbank stabilization projects. The alternatives were presented in the Initial Federal Interest Determination (FID) submittal, dated 28 February 2018. Alternative methods for streambank stabilization included (1) the placement of vertical steel sheet piling retaining structure (2) rock fill slope at a 2 Horizontal to 1 vertical to stabilize the highway embankment and to include shifting of the stream channel, (3) a combination of stone protection and vertical sheet piling and some shifting of the creek, (4) flattening the highway embankment slope to 3 H to 1 V with a vegetative cover, a riprap toe and shifting the stream channel, and (5) constructing a mechanical stabilized earth (MSE) wall system with precast panels. Rough Order of Magnitude (ROM) estimates of construction costs were developed based on concept drawings and the least cost alternative was Alternative 2, the rock fill slope to stabilize highway embankment and to prevent further erosion on the earth embankment due to the adjacent stream.

After the FID phase and during a site visit in November 2019, another alternative was suggested by a member of the Sponsor's team. This alternative consisted of placing a thicker riprap section (3-foot) with 6 inches of bedding and placing it on the existing embankment slope. The alternative also considered constructing a 3-foot-wide and 3-foot-thick berm at the toe of the slope. A ROM estimate for construction costs was developed on concept drawings for this alternative and the alternative was found to have the least cost. Construction costs for alternatives 1 through 5 were also updated and re-evaluated. A MSC Decision Meeting (MDM) was held on 30 April 2020 to discuss the alternatives and to recommend Alternative 6 as the Tentatively Selected Plan (TSP). Shortly after the MDM, further internal review by engineering members and a subsequent preliminary site exploration, it was determined the placement of the riprap on the existing very steep (1 H to 1 V) earthen embankment slopes would not be stable. Placement of the 3-foot-thick riprap section with bedding and a 3-foot-wide toe berm would also result in shifting the creek. However, this was not considered in the initial cost estimates. As a result of these findings, Alternative 6 was not considered to be a viable option and a modified Alternative 6 was proposed. The modified alternative 6, generally consists of a rock fill revetment at a flatter slope of 1.8H to 1V and a shifting of the existing stream. The highway earth embankment would be excavated to properly support the riprap revetment. The modified Alternative 6 is very similar to Alternative 2 which was the least cost alternative during the FID, and the next least cost behind Alternative 6 for the MDM presentation. Therefore, modified Alternative 6 was considered the TSP.

4.2. Alternatives Evaluation, Comparison, and Selection

For Alternatives 1 through 6 quantities and costs were developed for each alternative based on preliminary information and photographs of the project site provided to engineering. Modified Alternative 6 quantities and costs were developed using the topographic survey data, utilizing the software comparison tool in the Autodesk Civil 3D-2020 version, and engineering assumptions based on the preliminary field exploration.

4.3. Description of the Selected Plan Alternative

After further evaluation and reconsideration, Modified Alternative 6 was determined to be the new TSP by the PDT. The plan consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The rock fill revetment will generally consist of an approximate 5 foot thick section of Class II riprap overlain by an approximate 3 foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, it was recommended that a Class II riprap be used to protect against the erosive forces of the stream. The rockfill revetment is proposed to an approximate slope of 1.8H:1V. It is recommended that an additional subsurface exploration be performed and that the final slope be further evaluated during the PED phase. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap and used to separate the various stone graded materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and to better support the VDOT No. 1 stone. Based on the proposed revetment section, the existing stream channel will need to be relocated approximately 7-feet south of its existing location, and shifting the stream channel will require excavation of the right bank. The design proposes a 2H:1V sideslope for the proposed right channel bank. The initial estimates consider armoring the right bank with a 3-foot section of Class II riprap overlaying the excavated soils with a filtration geotextile. However, a natural vegetative slope protection can be considered on the right channel bank during the PED phase. This natural slope protection may be less expensive than the riprap armor protection. It is estimated that the alternative will require, for both the river-left and river-right banks approximately: 1,066 tons of VDOT Class III riprap; 186 tons of VDOT No. 1 coarse aggregate; 48 tons of Bituminous Concrete Asphalt; 970 tons of VDOT 21A; 640 SY of geotextile filter fabric; 170 SY of geogrid; 640 CY of soil excavation; 203 tons of rock excavation; and 100-linear feet of guardrail.

5.0 Hydraulics and Hydrology Analysis

5.1. River Analysis and Stone Size

Before the stone size of the revetment can be determined, the Indian Run Tributary next to US Route 501 in Bedford County, Virginia must be understood. The top elevation of the proposed revetment is approximately 648 feet NAVD88 with a vertical height of approximately 8 feet. The next step is to find what the velocities are occurring at the 2, 5, 10, 25, 50, 100- and 500-year rainfall events. The purpose of knowing the velocity is to choose an appropriate size of rock that will not move.

To find the velocities at the project site, an HEC-HMS (Hydrologic Modeling System) model was created to determine the flows in the watershed. Figure 5.1 shows the subbasins that were modeled in HEC-HMS. ***Figure 5.2*** shows a closer view of the top right of the basin model. The purple square indicates the project location.

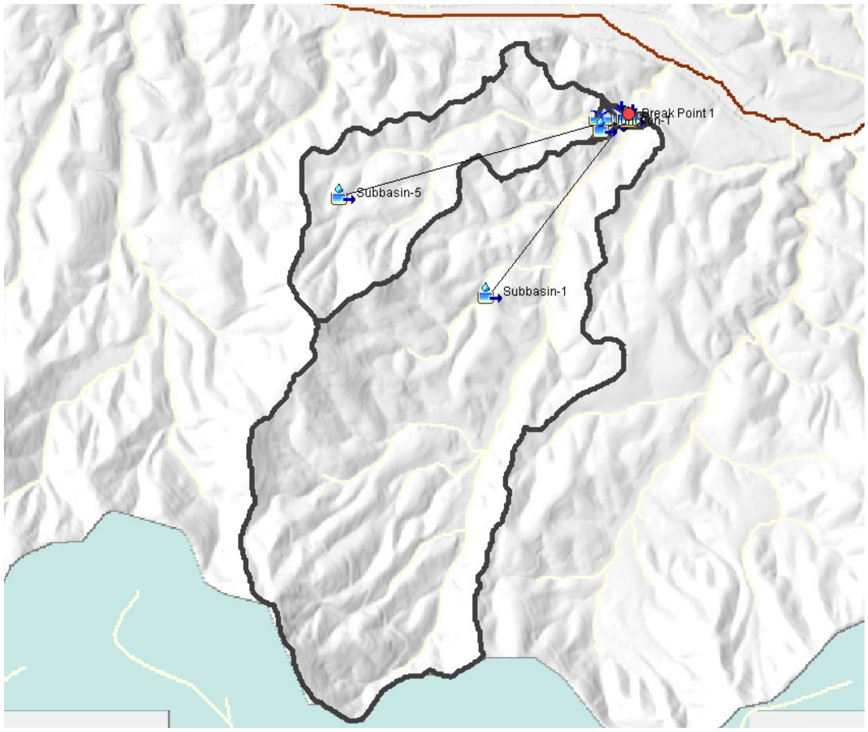


Figure 5.1 HMS Basin Model

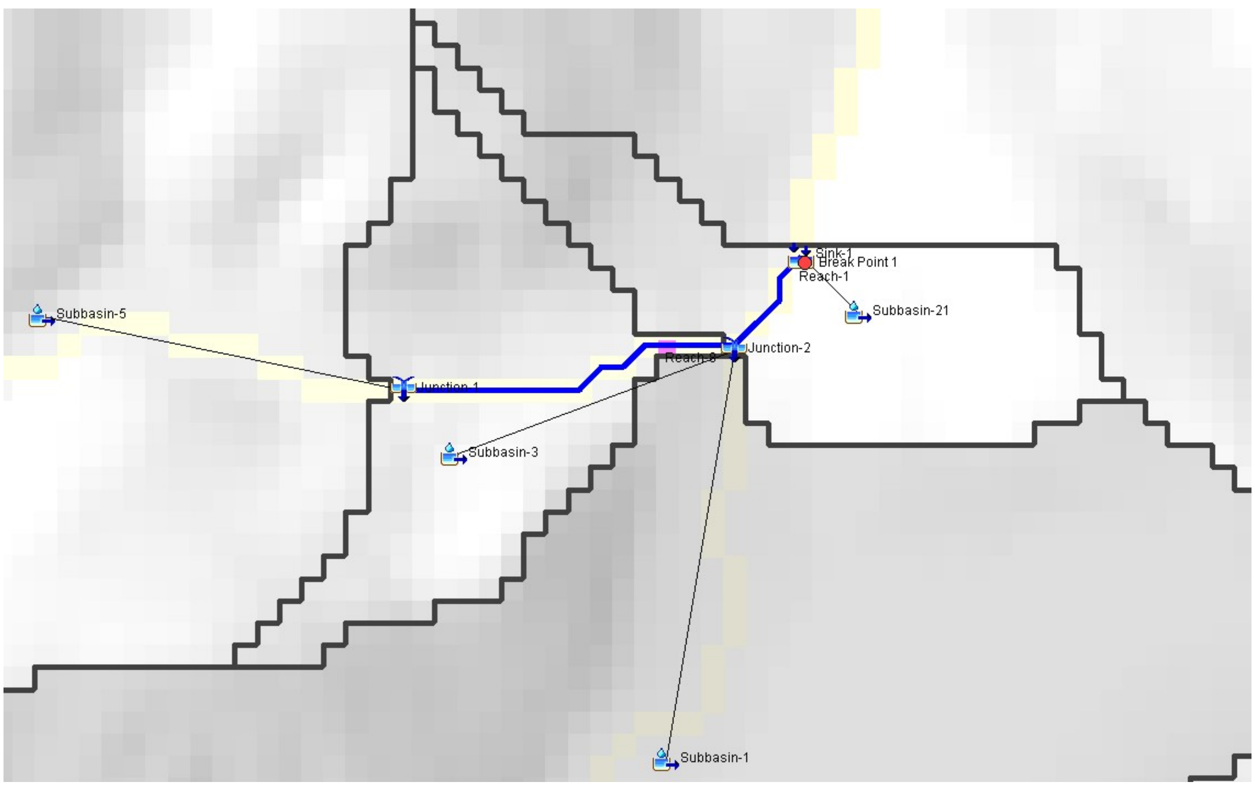


Figure 5.2 Zoomed in image of the Basin Model

Clark's T_c (time of concentration) and R (storage coefficient) were utilized in the analysis. R, which represents a storage relationship of the hydrograph. In the case of the Bedford County, R was 0.6 of T_c to represent the terrain. Channel shapes for the longest flow path were assumed. The storm parameters assumed in HEC-HMS was a 50 percent intensity position, 15-minute intensity duration, and a storm duration of 1 day.

The soils at the project location are classified as hydrologic soil group B. Soils in Group B have moderately low runoff potential when thoroughly wet. From the soils info, curve numbers (CN) were computed based on the land use categories from data retrieved from the USGS National Land Cover Database (NLCD). More information on the soils found in the project site can be found in the Section 7.3 General Subsurface Stratigraphy.

The flows from HEC-HMS were added to the appropriate cross sections in the HEC-RAS (River Analysis System) model. After reviewing the summary results from a HEC-RAS model of the Indian Run tributary, the velocity is approximately between 6-12 feet per second for the 100 year event at the three cross sections closest to the proposed revetment (Cross section 121, 93 and 65). Results of HEC-RAS model runs are shown in ATTACHMENT 3 of this report.

Table 5.1 Recommended sizes for riprap.

Velocity of stream during high flow	Size range (diameter across longest part of rock)
Slow (2-4 ft/sec)	3" - 6"; average 4"
Moderate (4-6 ft/sec)	4" - 12"; average 8"
* Fast (6-12 ft/sec)	5" - 18"; average 14"

From Table 5.1 shown above and because the velocity is between 6-12 ft/s, the recommended rock size should be between 5 inches to 18 inches (average 14 inches), which is in the range of VDOT Class II stone. Therefore, it is recommended that VDOT Class II stone is used for the construction of this project including smaller rocks to fill in the spaces between the larger rocks. The average diameter for VDOT class stone is 1.6 feet. Assuming that there will be two layers of VDOT Class II stone, the thickness (D) shall be approximately 3 feet.

6.0 Surveying, Mapping and Other Geospatial Data

The following is an overview of the survey, mapping, and geospatial data available in and around the study area:

- A licensed surveyor from MSA, P.C., was Contracted by Norfolk District to complete a topographic survey for the project area. Elevations shown in the survey are based on NAVD88. North Meridian shown is based on Virginia State Plane coordinate system, south zone NAD83.
- The HEC-HMS and HEC-RAS models used a 10-meter DEM (digital elevation model) from the seamless 2009 USGS National Elevation Dataset for the study. The elevations of the NED are in meters, so the elevation data were converted from meters to feet (NAVD 88).

6.1 Horizontal and Vertical Datums

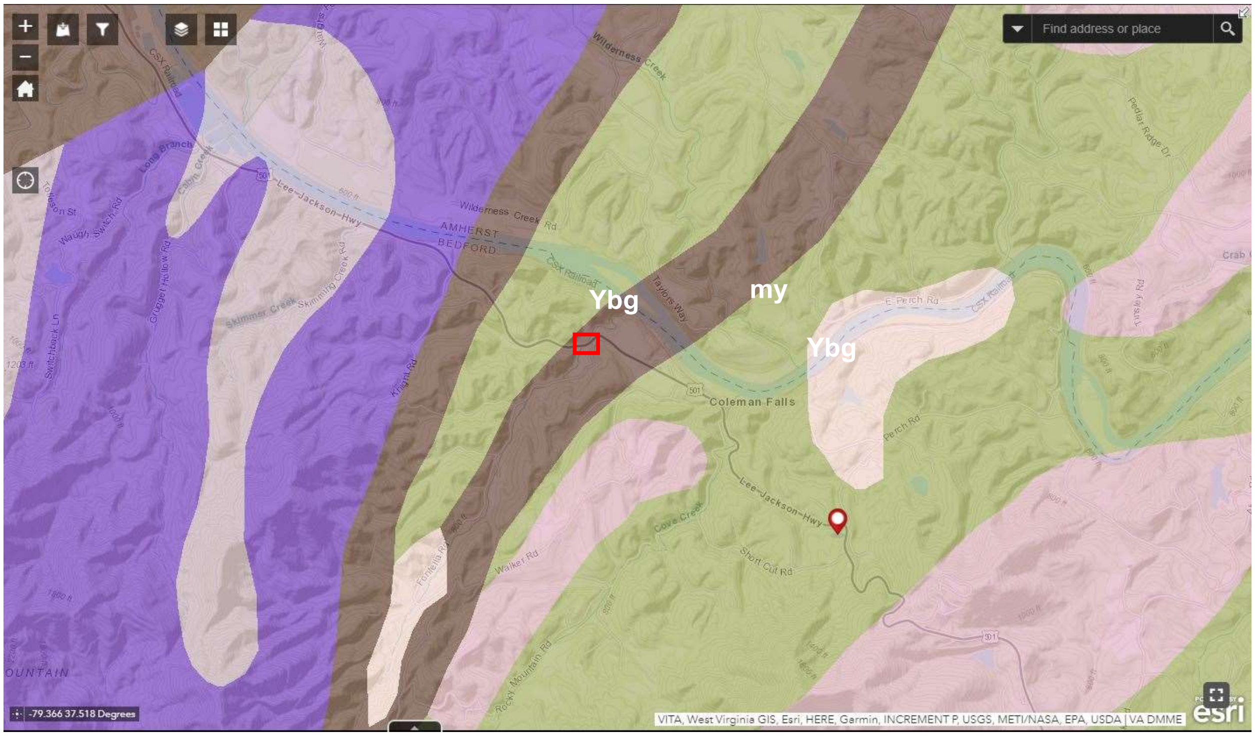
All surveys and mapping products should have the same horizontal and vertical datum. The horizontal datum for this study is tied to the State Plane Coordinate System using North American Datum of 1983 (NAD83, Virginia South, 4502). Distances are in feet by horizontal measurement. Coordinates are Virginia South Zone. The vertical datum for this study is tied to the North American Vertical Datum of 1988 (NAVD88), a requirement of ER 1110-2-8160. Elevations are in feet.

7.0 Geotechnical Engineering Considerations

7.1. Regional Geology

The project site is located within the Blue Ridge Province of Virginia. This geologic province is primarily composed of coarse grained igneous and metamorphic basement rocks although there are late Proterozoic intrusive and clastic sediments. Structurally, the province is known as an eroded, overturned anticline where the rocks have been arched upwards into a fold. Geologic forces have pushed the rock units that make up this formation westward so that the rocks on the westward flank are no longer right side up. The rocks located within this province are known to be the oldest in the state. According to the Division of Geology and Mineral Resources of Virginia, the project area lies near the boundary of two different geologic formations. The project site is located within a Mylonite [my] formation in which the primary rock type is mylonite, the secondary rock type is gneiss, and the age estimation is considered to be Proterozoic-Paleozoic. The formation directly to the west of the site is considered to be Porphyroblastic Biotite Plagioclase Augen Gneiss [Ybg], in which the primary rock type is augen gneiss, and the age estimation is considered to be Proterozoic Y. The location of these formations relative to the project area are shown in Figure 7.1 .

Figure 7.1 Geologic Formation for Indian Run Project Area



Red Rectangle Indicates General Project Area.

The United States Department of Agriculture (USDA) Soil Survey of Bedford County, Virginia identifies the soils on the site as the Edneytown loam, 25 to 60 percent slopes, map symbol 11E. The map from the USDA website is shown in Figure 7.2. According to the Soil Survey of Bedford County, Virginia, these soils are considered to be deep, well drained, steep with very steep soil on the sides of ridges above streams and drainageways in the Blue Ridge Mountains. The surface layer is dark yellowish-brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is a strong brown clay loam to a depth of 31 inches and strong brown sandy loam to a depth of 40 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam. These soils are considered to be moderately permeable with very rapid surface runoff, and erosion potential is high. Shrink-swell potential is low, depth to high water table is more than 72 inches, and depth to bedrock is more than 60 inches.

Figure 7.2 USDA Soils Survey Map Indian Run Project Site

Red square indicates approximate project area.

7.2. Field Visit and Limited Subsurface Exploration

The Norfolk District, U.S. Army Corps of Engineers (USACE) Geo-Environmental Engineering Section performed a preliminary and limited field exploration at the proposed project site on 22 and 23 September 2020. Please refer to the Indian Run Field Exploration Sketch provided in ATTACHMENT 4. A total of six (6) hand auger (HA) borings were performed on the highway embankment and on the south (right) stream bank to observe the on-site soil conditions. Soil samples were collected, visually classified in accordance with ASTM D2488, stored in plastic one-gallon storage bags, and returned to our soil laboratory at the District. Soil samples were selected and delivered to a local USACE approved soil testing laboratory. Soil Index tests were performed on seven (7) samples in accordance with American Society for Testing and Materials (ASTM) D4318, ASTM D2216, ASTM D422 and ASTM D1140. Laboratory test results are provided in ATTACHMENT 4.

One (1) handheld dynamic cone penetrometer (DCP) test was performed near the top of the embankment in accordance with ASTM D6951 to an approximate depth of 7.1 feet below ground surface. The DCP test provides a measure of the penetration rate through the underlying soils. The penetration rate can be correlated to in-situ soil strength such as an estimated in-situ CBR (California Bearing Ratio) and a soil bearing capacity. The location is identified as DCP-1 in the Indian Run Field Exploration Sketch in ATTACHMENT 4. The data obtained in the field for the DCP test is provided in ATTACHMENT 4 and will be further evaluated during the PED phase. A T-bar (a 2.0 foot long, 1/4 inch diameter steel rod with handle) was also used to push into the surface to observe the ease of penetration into surface soils along the stream and south bank.

Table 7.1 shows a summary of all the field test locations, depths below ground surface to termination, and elevations to termination. The borings were terminated due to obstructions which prevented further advancement of the hand auger, probe, or testing device. The restriction at hand auger locations HA-1 and HA-2 was possibly due to gravel, and for the remainder of the test locations it was possibly due to a very hard surface layer, gravel, cobbles, or boulder. It should be noted that exploration with a hand auger is very limited when compared to mechanically operated exploration methods. The Civil Plans provided in ATTACHMENT 2.

Table 7.1 Limited Subsurface Exploration Boring Data

Test Location	Approximate Ground Elevation (feet)	Approximate Termination Elevation (feet)	Approximate Termination Depth Below Ground Surface (feet)
HA-1A	+647.5	+645.5	2
HA-1B	+647.5	+644.92	2.58
HA-2	+647.5	+639.5	8
HA-3A	+641.83	+640.16	1.67
HA-3B	+641.8	+640.05	1.75
HA-4	+641	+639.5	1.5
DCP-1	+647.5	+641.09	7.1
Pen. Pt. 1	+639.5	+638.92	0.58 (7-inches)

Although a survey by a professional licensed surveyor was planned, it was not available at the time of the field visit. A rough field survey was performed at the time of the field visit to determine the embankment height, the general embankment configuration, and the relative ground surface elevations. The rough survey methodology is described as follows: a string was positioned at the level of the highway along the guardrail and connected to a tree on the south stream bank. Measurements were recorded in one-foot intervals along the full length of the string to the ground surface unless important features such as the edges of the stream channel were encountered. Measurements were taken for water depth and at the bottom of the stream bed. The locations of the stream profiles are shown in the Indian Run Field Exploration Sketch in ATTACHMENT 4. The survey was performed at three locations along the highway embankment. The locations were designated as Profile 1 (located on the east side of the project area), Profile 2 (located generally in the center of the project area), and Profile 3 (located on the west side of the project area). This data was utilized by the design team to further develop plans until the topographic survey data became available.

All Hand auger borings, the DCP test and Profile locations were staked in the field and were later field located by a survey team from Architectural-Engineering Firm MSA, P.C. when the topographic survey was performed. The Civil plans sheet VF101 provided in ATTACHMENT 2 also shows the locations and elevations of the test locations. During the site visit, rock outcropping was observed near the downstream end of the existing riprap embankment section along the south (right) stream bank. Rock outcropping is also evident in areas south of the stream channel bank at this location as land increases in grade. Refer to as the photo Figure 3.6. It appears that a resistant rock ledge maybe trending in the northeast direction toward the stream channel near the downstream edge of the existing riprap.

7.3. General Subsurface Stratigraphy

Highway Embankment

Hand auger locations HA-1A and HA-1B were taken on the top of the embankment on the west side of the riprap embankment slope. The soils at these locations consisted generally of Brown and Reddish Brown, Clayey Fine to Coarse SAND with some gravel, roots, and mica which was classified in accordance with the Unified Soil Classification System (USCS) as SC, but is considered to be man-placed FILL. Both locations were terminated at shallow depths due restrictions, most likely gravel, which prevented the advancement of the hand auger. Gravel was placed on the surface to a depth of approximately 0.1 feet at hand auger location HA-1A and HA-1B. The FILL ranged in depth of 0.6 to 2.6 feet below ground surface (bgs). Roots and glass were encountered at depths of 4-inches and 1.5-feet bgs at hand auger location HA-1A. Soil test results for HA-1A depth range of 1 to 2 feet bgs indicate a moisture content of 13.3% and 32% fines passing the number 200 sieve.

Hand auger location HA-2 was augered on top of the embankment on the east side of the riprap embankment slope. The soil encountered at this location is generally considered to be an upper layer of FILL consisting of Reddish Brown and Brown, Brown Mottled Reddish Brown, Silty CLAY with fine to medium sand, roots, little mica, trace weathered rock, moist, classified in accordance with USCS as CL. This layer extended to an approximate depth of 4.2-feet bgs. Soil test results for HA-2 for depth range 2 to 3.5-feet bgs indicate a moisture content average of 25.1% and an average of 70% fines passing the number 200 sieve. Underlying the upper CLAY Fill is a layer of Brown and Gray Mottled Brown, Micaceous Clayey Fine to Medium SAND with trace coarse sand and roots, moist to wet, classified in accordance with the USCS as SC. This layer extended to an approximate depth of 8-feet bgs. Soil test results for HA-2 for depth range 6.33 to 7.6-feet bgs indicate a moisture content average of 36.3% and an average of 43% fines passing the number 200 sieve. Hand auger location HA-2 was terminated at 8-feet due to an obstruction. Due to the sound of the auger scraping on a hard surface on the bottom of the hole, and ground water encountered at approximately 7.8 feet bgs, it is believed that boring may have been terminated on rock or hard rock like material. (Note is this layer Fill or Possible Fill. The VDOT profile shows 8 feet of fill was required at this location).

At location Pen. Pt. 1, the T-bar was used to probe through the bottom soils at or near the streambed to determine a general consistency or density of the surface soils. The probe was taken at the streambed in line with HA-2 which was taken at the top of the embankment. The probe bar encountered hard resistance at a depth of 7-inches and it was unable penetrate further. As shown in Table 7.1, the difference in the approximate termination elevations of HA-2 and Pen. Pt. 1 location is within 1-foot. Considering the observed rock outcropping in the area, the many cobbles in the stream bed and the hard resistance to penetrating the surface soils with the hand equipment, this maybe an indication that rock could be shallow at this location. Again, it should be noted that the preliminary exploration used hand equipment only and not heavy mechanical equipment which is commonly used for subsurface exploration methods. The methods used in the limited exploration cannot accurately determine or define a bedrock surface or the degree of hardness and weathering of underlying rock material. The obstructions that prevented penetration with the hand equipment could have also been due to gravels, cobbles or boulders and not competent bedrock. Additional exploration with appropriate equipment would be necessary to further distinguish the actual materials. The general average elevation of the streambed from the topographic drawings in ATTACHMENT 2 is +640.82 feet as indicated in the topographic survey.

South Stream Bank

Hand auger locations HA-3A, HA-3B, and HA-4 were taken on the south (right) stream bank. The material encountered generally consisted of Brown, Micaceous, Clayey Fine to Medium SAND, with organics, roots, glass, and quartz gravel, classified in accordance with USCS as SC. Termination depth for the hand auger locations ranged from 1.4 to 1.8-feet bgs. Termination depth was shallow at all locations due to encountering a hard surface. The hand auger made a scraping sound on the bottom of each hole, and groundwater water was encountered at approximately 1.3 to 1.6-feet bgs. As shown in Table 7.1, termination depth elevation was generally within 1-foot difference in elevation of location HA-2, which may indicate possible depth to rock. As noted above, this conclusion is based on very limited information. The general average elevation of the streambed near these locations, as stated in the previous paragraph, was +640.82 feet.

Hand auger logs and profiles are provided in ATTACHMENT 4 of this report.

7.4. Groundwater Conditions

Groundwater was encountered at hand auger locations HA-2, HA-3A, HA-3B, and HA-4. Depth of groundwater on the highway embankment at location HA-2 was measured at an approximate depth of 7.8 feet bgs, and for the south bank HA-3A, HA-3B, and HA-4 ranged in depth of approximately 1.3 to 1.6 feet bgs. The groundwater was generally at the same elevation of the stream channel. It should be noted that groundwater levels will fluctuate with rainfall amounts and the water levels in the stream. Table 7.2 presents the groundwater depths and approximate elevations. Groundwater depths are provided in the hand auger logs in ATTACHMENT 4 of this report.

Table 7.2 Preliminary Field Exploration Groundwater Depths and Elevations

Hand Auger Locations	Approximate Ground Elevation (feet)	Approximate Groundwater Elevation (feet)	Approximate Depth to Ground Water (feet)
HA-2	+647.5	+639.7	7.8
HA-3A	+641.83	+640.23	1.6
HA-3B	+641.8	+640.4	1.4
HA-4	+641	+639.7	1.3

7.5. Geotechnical Engineering Design Analysis

Since the modified Alternative 6 was considered the TSP, the geotechnical analysis focused on the further design of this alternative. Due to limited funds available during the Feasibility Report Phase, a rigorous slope stability analysis was not performed for this study but rather approximations and past experience were used to determine the appropriate slope for the riprap revetment. Ideally the flatter the slope, the more stable for a slope. However, a flatter slope will require the existing stream to shift further south away from the embankment and result in extending the limits further off the VDOT Right of Way. The existing slope which is as steep as 1H:1V is currently marginally stable or unstable as observed from the evidence of the current distress. Placing riprap on the existing 1H:1V would intuitively not be stable. VDOT recommends an angle of response of 42 degrees for riprap in Virginia. The existing slope is at 45 degrees; therefore, it is too steep, and the riprap would slide. Generally, it is not recommended to place riprap on slopes steeper than 1.5H to 1V. An example of a rockfill slope is one located at Gathright Dam, a US Army Corps of Engineers (USACE) project located in Alleghany County. The dam consists of a rockfill outer shell with a 1.8H:1V slope. The dam is over 250 feet in height and has been performing since construction was completed in the 1970s. Considering the existing rock slope at Gathright, a 1.8H:1V slope was considered as reasonable slope for the Modified Alternative 6.

To evaluate the slope stability, the infinite slope method was utilized. The method is appropriate for cohesionless soils such as the rock fill that is proposed. For slopes composed of uniform cohesionless soils (c'=0), the critical slip surface will be parallel to the outer slope at a small depth. Analyses of this condition using a circular slip surface will result in a critical circle that approximates the infinite slope analysis. The infinite slope analysis is simpler and easier to use than the circular analysis, and it is usually used for slopes in cohesionless materials.

The USACE Slope Stability Manual, EM 1110-2-1902 dated 31 October 2003, provides several equations for the infinite slope method of stability. Equation C-27 was considered for the analyses and is used for a situation with no pore water pressure. Since no groundwater was encountered in the embankment materials, this equation was deemed appropriate. The shear strength of the rock fill (riprap) was assumed to be 40 degrees.

Factor of Safety = $\tan\varphi'/\tan\beta$, where

φ' = the angle of internal friction assumed for rock, the angle of repose (degrees), and

β = the angle produced by the dimensions of the proposed slope (degrees)

For preliminary design purposes:

φ' of the riprap embankment is assumed to be 40 degrees and

β is $\tan^{-1}(1/1.8)$ = 29.1 degrees

Therefore: Factor of Safety = $\tan(40^o)/\tan(29.1^o)$ = 1.5

Appropriate factors of safety are required to ensure adequate performance of slopes throughout their design life. Although, the Corps Stability Manual provides minimum required factors of safety for new earth and rockfill dams, these factors of safety do provide suitable guidance appropriate for slopes of other types of embankments and excavated slopes. Considering the uncertainties in the conditions being analyzed such as the shear strength and consequences of failures, a Factor of Safety of 1.5 was considered appropriate for our analysis. Refer to Figure 7.1 which was taken from the Slope Stability Manual. Therefore, the proposed slope of 1.8H:1V is considered safe.

Figure 7.1. Table 3-1 EM 1110-2-1902

EM 1110-2-1902
31 Oct 03

Table 3-1
Minimum Required Factors of Safety: New Earth and Rock-Fill Dams

Analysis Condition[1]	Required Minimum Factor of Safety	Slope
End-of-Construction (including staged construction)[2]	1.3	Upstream and Downstream
Long-term (Steady seepage, maximum storage pool, spillway crest or top of gates)	1.5	Downstream
Maximum surcharge pool[3]	1.4	Downstream
Rapid drawdown	1.1-1.3[4,5]	Upstream

[1] For earthquake loading, see ER 1110-2-1806 for guidance. An Engineer Circular, "Dynamic Analysis of Embankment Dams," is still in preparation.

[2] For embankments over 50 feet high on soft foundations and for embankments that will be subjected to pool loading during construction, a higher minimum end-of-construction factor of safety may be appropriate.

[3] Pool thrust from maximum surcharge level. Pore pressures are usually taken as those developed under steady-state seepage at maximum storage pool. However, for pervious foundations with no positive cutoff steady-state seepage may develop under maximum surcharge pool.

[4] Factor of safety (FS) to be used with improved method of analysis described in Appendix G.

[5] FS = 1.1 applies to drawdown from maximum surcharge pool; FS = 1.3 applies to drawdown from maximum storage pool.

For dams used in pump storage schemes or similar applications where rapid drawdown is a routine operating condition, higher factors of safety, e.g., 1.4-1.5, are appropriate. If consequences of an upstream failure are great, such as blockage of the outlet works resulting in a potential catastrophic failure, higher factors of safety should be considered.

Sheet C-101 provided in ATTACHMENT 2 shows the limits of the proposed design. The southern and western edges of the proposed relocated right channel bank slope will extend slightly beyond the VDOT Right of Way onto the adjacent property. It is possible that additional property may need to be acquired during the design phase to accommodate possible changes to the stream relocation. At this time for preliminary design purposes, the stream is to maintain the proposed relocation.

Based on the results of the preliminary and limited field exploration and the observed rock outcropping along the existing right channel bank, some rock removal will probably be required when re-routing the stream to accommodate design dimensions and grade. For the highway embankment soil removal will be required to obtain the proposed excavation grades. If rock is encountered, it can remain in place and the proposed rockfill revetment can be constructed around or overtop the rock. If rock is encountered on the proposed right channel bank then riprap slope protection may not be necessary and if the channel dimensions are not required to meet the required design hydraulic capacity, then the bank slopes can be steeper than the proposed.

A more detailed subsurface exploration during the PED phase would mitigate risks from these current design issues.

A filtration geotextile is proposed for all areas of the design to protect any further erosion to exposed soils that may be caused by embankment runoff or stream erosion. Both a layer of geogrid and filtration geotextile is proposed for Modified Alternative 6 to provide strength and separation of the overlying VDOT #1 Coarse Aggregate placed overtop the VDOT Class II riprap stone.

For areas of the highway that need to be repaired after construction, it is proposed that VDOT 21A aggregate will be used for the base coarse material and the type of bituminous concrete will be determined by the Civil Engineering Section during final design.

8.0 Alternative Design Considerations

As it was mentioned in 4.3 Description of the Selected Plan Alternative, Modified Alternative 6 – Rockfill Revetment with Re-routing of the Stream, is the Tentatively Selected Plan (TSP), however the following paragraphs detail the engineering design consideration for all the alternatives initially considered in the FID phase and the more recent alternatives considered at the start of the Feasibility Study.

There are three general types of shoreline erosion control structures: “hard”, “soft”, and “hybrid.” For this site, both “hard” and “hybrid” erosion control alternatives were considered. A “Hard” solution is considered to be a structural solution such as rock revetments, sheet pile walls and precast modular retaining walls. A “Soft” solution is considered to be a natural solution such as vegetative planting aimed at stabilizing soil. A “Hybrid” solution which is a combination of both “hard” and “soft” solutions such as vegetative erosion control which combines an imported fill slope with riprap stone toe. For this site, both “hard” and “hybrid” erosion control alternatives were considered based on experience with similar projects for stream or riverbank protection.

The alternative concept designs (ATTACHMENT 2), with the exception of Modified Alternative 6 (also provided in ATTACHMENT 2), were developed during the FID phase prior to a preliminary and limited field exploration and reconnaissance was performed by engineering personnel and the submission of the topographic survey by the AE firm. The 15-foot embankment height considered in the earlier concept designs was based on approximations obtained from site visit information provided by planning members of the team prior to the FID phase. Refer to Section 4.1” Focused Alternative Arrays” for further discussion on the events that led to the selection of Modified Alternative 6 as the TSP.

On 22 and 23 September 2020 a preliminary and limited field exploration and site reconnaissance was performed to further evaluate subsurface and site conditions. A rough field survey was also performed. Based on the results of field survey, the height of the embankment was measured to be approximately 8-feet rather than 15-feet as originally estimated for the FID phase of the work. Based on the observed rock outcropping and the results of the limited exploration, it is believed that bedrock has the potential to be much closer to the surface at the project site. Because of the potential for shallow bedrock, a driven sheet pile wall would not be constructible. This would eliminate two (2) alternative designs, Alternatives 1 and 3. The sheet pile alternatives were proposed to avoid re-routing of the stream, but further evaluation of the designs and site conditions yield that some re-routing of the stream and a re-evaluation of the dimensions of the Class II riprap layer would need to be performed. If the designs for Alternatives 1 and 3 were to be modified to accommodate potential bedrock site conditions, the design team would recommend modifying the alternatives to consist of the installation of a soldier pile and lagging retention wall system. The soldier piles would need to be drilled and grouted into underlying rock, and tie backs may need to be installed. The design could be configured to avoid any re-routing of the stream.

8.1 Alternative 1 – Placement of Vertical Sheet Piling with No Re-Routing of the Stream

As stated above, this alternative is no longer considered to be constructible unless the design is modified to consider a different type of retaining structure. The concept design consisted of a driven sheet pile wall with tiebacks. A 3-foot by 3-foot layer of Class II riprap stone would be placed at the toe of the sheet pile wall to protect the wall from further stream erosion. Removal of the Class I riprap placed as a temporary measure by VDOT and excavation of embankment soils would be required. This alternative would require rerouting of the stream due to the design dimensions of the Class II riprap layer at the toe of the wall. Rerouting of the stream was not originally considered during the FID or prior to the MDM meeting. A stabilization design for the south bank would also need to be evaluated if the stream is re-routed. No roadway repair would be necessary, and the guardrail would need to be removed and restored by the Contractor after construction. The design was proposed during the FID and is estimated based on preliminary engineering assumptions made as shown in sheet ALT1 in ATTACHMENT 2.

8.2 Alternative 2 – Rock Fill Slope to Stabilize the Base of the Slope and Berm with Re-Routing of the Stream

This alternative would comprise of a rock sill slope which would consist of No. 8 stone overlying a layer of Class II riprap. The proposed design slope for the revetment is 2H:1V, and re-routing of the stream was considered. The temporary Class I riprap would be removed, and the in-situ soils in the existing highway embankment would be excavated and benched at a 3H:2V slope to support the rock fill. At least one lane of highway would need to be removed and repaired, and the guardrail would also need to be removed and restored and restored by the Contractor. A stabilization design for the south bank was not proposed for this alternative during the FID phase or prior to the MDM meeting, but it would need to be evaluated. No geotechnical engineering analysis was performed during the Feasibility Phase to validate the design, but the design was proposed and estimated based on preliminary engineering assumptions prior to the preliminary and limited field exploration as shown in sheet ALT2 in ATTACHMENT 2. This alternative had the least cost when compared to the other alternatives that were presented during the FID phase.

8.3 Alternative 3 – Combination of Stone Revetment and Vertical Sheet Piling with No Re-Routing of the Stream

This alternative is no longer considered to be constructible due to the potential for shallow bedrock unless the design is modified to consider another type of retaining structure. The design consisted of a driven sheet pile wall with tiebacks and a 4-foot by 5-foot layer of Class II riprap at the ground surface of the sheet pile wall. The highway embankment would be excavated and benched at a 3H:2V slope and backfilled with VDOT 21A aggregate. At least one lane of roadway would need to be reconstructed and the guardrail would need to be removed and restored by the Contractor. Although it was proposed that the stream would not need to be rerouted, but after further evaluation during this study, it appears that the stream would need to be rerouted based on the dimensions of the Class II riprap layer placed at the toe of the sheet pile. A stabilization design for the south bank was also not proposed for this alternative but would need to be evaluated. The design was originally proposed and estimated based on preliminary engineering assumptions as shown in sheet ALT3 in ATTACHMENT 2.

8.4 Alternative 4 – Vegetative Erosion Control with Re-Routing of Stream

This alternative comprises of a Class II riprap stone toe and a compacted, controlled structural fill of silty sand, vegetative berm with native grasses or plantings. The finished slope was proposed at a flatter and more stable slope at 3H:1V which would also minimize surface erosion and to allow easy maintenance of the slope. Due to the flatter slope, the project limits would extend the furthest into the adjacent property. The toe of the stone is excavated approximately 2-feet below the proposed finished grade, but after results were received from the preliminary field exploration that rock is possibly shallow at the streambed, this portion of the toe may not be constructible. The existing highway embankment would be excavated at a 3H:2V slope and backfilled with controlled and compacted structural fill, silty sand. Both lanes of traffic may need to be repaired and the guardrail would need to be removed and restored by the Contractor after construction. The temporary Class I riprap would be removed, and re-routing of the stream was considered. A stabilization design was not considered for the south bank for this alternative, but it would need to be evaluated. The design was originally proposed and estimated based on preliminary engineering assumptions made during the FID phase as shown in sheet ALT4 in ATTACHMENT 2.

8.5 Alternative 5 – Precast Modular Retaining Walls with Stone Protection at Toe with No Re-Routing of Stream

This alternative consists of a precast modular retaining wall with soil reinforcement. The toe of the wall would have a layer of Class II riprap which would be constructed with dimensions of 8-feet by 7-feet across the length of the wall. The existing soils in the highway embankment would need to be excavated and benched at a 1H:1V slope, and at least one if not two lanes of the roadway would need to be repaired. The guardrail would need to be removed and restored by the Contractor. The temporary Class I riprap would need to be removed off site. The stream was originally proposed not to be re-routed but after further evaluation of the preliminary field exploration results, the stream would require re-routing. A stabilization design for the south bank was not considered for the south bank for this alternative during the FID phase or prior to the MDM meeting, but it would need to be evaluated. The design was originally proposed and estimated based on preliminary engineering assumptions made during the FID phase as shown in sheet ALT5 in ATTACHMENT 2.

8.6 Alternative 6 – Placement of Stone Revetment with minimum Re-Routing of Stream

This alternative comprises of the temporary Class I riprap to be removed from the slope, and a 6-inch marine mattress with a filtration geotextile would be placed over the existing soils of the slope. A 3-foot layer of Class II riprap would be placed over top the mattress, and the toe of the revetment would extend about 3-feet from the toe of the embankment. After further evaluation of the design, the slope would need to be greater than 1H:1V to be stable. It was also later noticed that the toe of the revetment, would also extend into the stream and the stream would also need to be re-routed. A stabilization design for the south bank was not considered and would need to be evaluated, but as suggested earlier, this design is not feasible. Rock removal would also need to be considered for re-routing the stream channel.

Alternative 6 was proposed after the FID phase. The riprap revetment design was suggested by a member on the Sponsor's team during the site visit after the FID phase. This suggestion was developed into a proposed design and was based on limited site information that was available during that time. After this alternative was cost estimated, it was determined to be the least cost design and was selected as the TSP. The proposed design was further evaluated and determined not to be feasible based on general engineering assumptions, and new field data gathered during the preliminary field exploration in September 2020. Based on the results of the preliminary field exploration, the design for alternative 6 was revised to Modified Alternative 6. The design was originally proposed and estimated as shown in sheet ALT6 in ATTACHMENT 2.

8.7 Modified Alternative 6 – Placement of Stone Revetment with Re-Routing of Stream

After further evaluation and reconsideration, Modified Alternative 6 was determined to be the new TSP by the PDT. The plan consists of excavating a portion of the highway embankment to support a rock fill and constructing a rock fill revetment along a 100-foot section of roadway. The design will consider extending beyond the failed section and tie into the stable existing bank. The rock fill revetment will generally consist of an approximate 5-foot thick section of Class II riprap overlain by an approximate 3-foot section of a VDOT No. 1 aggregate with an approximate top elevation of +648 feet NAVD88. Based on recent hydraulic analysis, it was recommended that a Class II riprap be used to protect against the erosive forces of the creek. The rockfill revetment is proposed to an approximate slope of 1.8H:1V. It is recommended additional exploration and that the final slope be further evaluated during the PED phase. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap and used to separate the various stone graded materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and to better support the VDOT No. 1 stone. Based on the proposed revetment section, the existing stream channel will need to be relocated approximately 7-feet south of its existing location and shifting the stream channel will require excavation of the right bank. The design proposes a 2H:1V sideslope for the proposed right channel bank. The initial estimates consider armoring the right bank with a 3-foot section of Class II riprap overlaying a filtration geotextile. However, a natural vegetative slope protection can be considered on the right channel bank during the PED phase. This natural slope protection which may be less expensive than the riprap armor protection and it may prevent possible mitigation requirements for disturbance of wetlands. It is estimated that the alternative will require, for both the river-left and river-right banks approximately: 1,066 tons of VDOT Class III riprap; 186 tons of VDOT No. 1 coarse aggregate; 48 tons of Bituminous Concrete Asphalt; 970 tons of VDOT 21A; 640 SY of geotextile filter fabric; 170 SY of geogrid; 640 CY of soil excavation; 203 tons of rock excavation; and 100-linear feet of guardrail.

8.8 Road Replacement

This alternative considers the full replacement of an approximately 100-linear feet of Highway 501 which would include the bituminous concrete, base coarse, and the highway embankment if a "do nothing" alternative is considered and the embankment would eventually have a major failure and result in the loss of the highway. This alternative would be a potential life safety issue and it is not recommended as an acceptable alternative for the project.

9.0 Cost Analysis

As previously stated in this report, the cost estimates for Alternatives 1 through 5 were based on preliminary information and photographs of the project site which were provided to engineering during the FID phase. These same considerations were also used to develop a cost estimate for Alternative 6 after the November 2019 site visit, which was later determined not to be an acceptable solution after further internal review and a subsequent preliminary site exploration. The cost estimate for Modified Alternative 6 is based on actual field observations, field measurements, and the AE's topographic survey data.

The total project estimated cost for Modified Alternative 6 is approximately $1,121,000. This project estimate cannot be compared with the other cost estimates for Alternatives 1 through 6 for the following reasons:

1. The proposed height of the highway embankment for Alternatives 1 through 6 was assumed to be 15-feet. After the preliminary field reconnaissance and the completion of the AE's topographic survey, the height of the highway embankment is approximately 8-feet. Modified Alternative 6 cost estimates were based on the 8-foot height embankment.

2. Material and excavation quantities for Alternatives 1 through 6 were rough order of magnitude estimates based on concept drawings and hand calculations. Material and excavation quantities for Modified Alternative 6 were calculated utilizing the AE's topographic survey in Autodesk Civil 3D-2020 software and therefore a more accurate determination of quantities.

3. Based on the results of the preliminary and limited field exploration, it is possible that rock may be shallow on site. Rock outcropping was observed near the downstream end of the project area, and Alternatives 1 through 6 did not consider rock excavation and removal. Rock excavation and removal was included in the Modified Alternative 6 cost estimate for re-routing the stream.

4. Alternatives 1 and 3 are sheet pile designs which would not be a viable solution due to the evidence of potential shallow bedrock. Another retaining wall structure such as a soldier pile and lagging retention wall system could be considered. However, the soldier piles would need to be drilled and grouted into rock. This system would likely be more costly than a sheet pile design. These alternatives were originally designed so that no re-routing of the stream would be required but some stream relocating would be required which was not considered.

5. The cost estimates for Alternatives 2, 4, and 5 do not include the proposed armored stone in the south (right) bank design. This would allow for an increase in the cost estimates for these alternatives. Modified Alternative 6 included the slope protection costs.

6. Construction duration for Alternatives 1 through 6 were originally estimated to be 90 days but did not include a total period of performance of 180 days. The cost estimate for Modified Alternative 6 includes a 90 day construction duration with a period of performance of 180 days.

7. Alternatives 1 through 6 were cost estimated with a 50% contingency. Because an ARA was performed for the project, the cost contingency for Modified Alternative 6 was reduced to 31%.

8. Civil engineering included a 20% material and excavation contingency in their quantity estimates which was also included with the total project cost for Modified Alternative 6.

9. Real estate costs for land acquisition and a temporary work area easement were considered for Modified Alternative 6. It is estimated that approximately 244.95 square feet of land on the south property will need to be acquired by the Non-Federal Sponsor. A 15-foot temporary work area easement, estimated to be approximately 1,910.02 square feet, was included for the Contractor to utilize during construction. A 12-month duration was assumed for land acquisition in the project schedule. Refer to the temporary easement map dated 2/8/2021 in ATTACHMENT 2.

10. Environmental mitigation costs were included in the engineering total project estimated cost for Modified Alternative 6. An estimate of $22,260 was provided to Cost Engineering by Environmental to include with the engineering total project cost estimate. A 31% contingency and an escalation cost through the midpoint of construction were considered.

Based on the items listed above, it is our belief that the cost estimates for Alternatives 1 through 6 would increase proportionately if the same appropriate design and construction requirements were applied as were included for Modified Alternative 6.

However, the total project cost estimates for Alternatives 1 through 6 would need to be re-evaluated in order to accurately conclude that Modified Alternative 6 is the least cost option for the project. Based on Engineering's evaluation of the project site conditions, Modified Alternative 6 is proposed to be a feasible and constructible option for design. If it is desired that the stream should not be re-routed, it is suggested that the designs for Alternatives 1 and 3 be revised to a soldier pile and lagging retention wall system. A large crane would need to be positioned on top of the highway to drill the holes and install the steel piles for these designs, which may require the entire roadway to be closed.

During the PED phase, it is proposed that the design for the right bank protection be designed for a naturally stabilized slope rather than a riprap slope. The placement of natural bank protection may be a more acceptable design to mitigate any wetland destruction. A general cost evaluation was performed for the 900 square foot area of the south bank slope. For 2-inch caliper willow trees planted 5-feet apart, which includes the cost of the trees, labor, and equipment, the general cost for the south bank would be approximately \$130,000 to \$150,000. This would be a less expensive alternative and more environmentally friendly to consider during the PED phase, as the general cost for the riprap right bank slope was estimated to be approximately \$200,000.

The environmental mitigation cost estimate for Modified Alternative 6 were is based upon the assumption that the right bank would be re-designed utilizing natural channel design principles and would not be armored. It is our understanding that the majority of the impacts and mitigation costs are due to the re-routing of the stream, the armoring of the streambanks, and excavation of the riverine wetland areas on the south bank across from the revetment and north bank upstream of the revetment. It is also our understanding that if a naturally stabilized slope for the right bank is considered during the design phase, these costs could represent/be folded into construction costs and consequently mitigation costs could be reduced. Natural bank protection for the right bank will need to be considered during the PED phase. Please refer to Appendix A-5 Mitigation Plan in the Feasibility Report, Section 8.4 Comparison of Mitigation Alternatives and 9.0 Conclusions for further information on the environmental mitigation costs and conclusions.

The project team determined for Alternatives 1 through 6 that an environmental mitigation cost was not required, which was approved by NAD during the MDM meeting. However, Modified Alternative 6 was not a part of the original Plan Formulation that was approved by NAD 30 April 2020, and environmental mitigation was later determined to be required for Modified Alternative 6. If the engineering cost estimates and designs for Alternatives 1 through 6 were to be re-evaluated, based on the observations made during the most recent field investigation, environmental mitigation costs may also need to be reconsidered for Alternatives 1 through 6.

Please refer to ATTACHMENT 1 of this report for the cost engineering appendix document.

10.0 Risk and Uncertainty

Risk is a measure of the probability (or likelihood) and consequences of uncertain future events. Risk analysis is a decision-making framework that explicitly evaluates the level of risk if no action is taken and recognizes the monetary and non-monetary costs and benefits of reducing risks when making decisions. A variety of variables and their associated uncertainties may be incorporated into the risk assessment of a CAP-14 Emergency Streambank and Shoreline Protection project.

The HEC-RAS and HEC-HMS models were not calibrated since this is a small stream without gauges. The HEC-RAS model was created only for the existing channel. The risk of not evaluating the new stream alignment is that the PDT does not know how relocating will affect the stream hydraulics. The PDT will not know if the velocity will change with the new alignment. Generally, if the stream's velocity increases, so does the erosion. This could create new erosion problems for the project site and the rock could be improperly sized.

For the HEC-RAS, the terrain was created from a DEM (digital elevation model) and not the survey. The schedule did not allow the Hydrology and Hydraulics team member enough time to use the survey in the model. Using the survey would have given more accurate results. The DEM does not pick up the stream; the stream cross section must be entered manually into HEC-RAS. The survey stream cross sections were used to edit the channel elevations from bank to bank. The elevations outside of the riverbanks were not altered. The cross sections in RAS and the survey are not at the same location. The survey cross sections were used to approximate the elevations at the RAS cross sections. The estimation of the channel cross sections can affect the velocity.

11.0 Preconstruction Engineering and Design (PED) Considerations

During PED, design refinements will be conducted for the project based on new field investigation and analyses. This chapter will discuss, not only what information and field investigation will be needed to achieve a final design, but also what has been proposed in this study and how it may be changed or adjusted.

11.1 Update the HEC-RAS Model

In PED, the HEC-RAS model should be updated with the survey information or best information available. New cross sections should be drawn to match the surveyor's cross section for more accurate velocities. The stone size should be reevaluated.

The Hydrology and Hydraulics team member and/or the engineering team will need to compare the old velocity to the new velocity of the stream realignment. The realignment of the stream can be modeled in HEC-RAS to compare the new and old stream conditions. The channel may need to be modified to make sure that the velocity of the stream remains relatively the same as before. If the velocity increases or decreases, the channel will have to modified. The channel may need to have a steeper slope or be wider if the velocity increases for example. After this is analyzed, a sample cross section of the stream realignment will be created.

11.2 Geotechnical Engineering Exploration and Analysis

During the PED phase, a thorough geotechnical subsurface exploration will need to be performed for the project area to better define the surface conditions and the potential for shallow bedrock that could affect construction. It is proposed that a minimum of two (2) Standard Penetration tests in accordance with ASTM D1586 be performed to a minimum depth of approximately 30-feet below ground surface of the highway embankment or to top of rock. Depth to rock will be determined by both auger refusal and 50 or more blows within a 6-inch depth interval. In accordance with VDOT standards, traffic control will be required during drilling to direct traffic safely around the drill team. The drill team will only be able to utilize one traffic lane when performing the drilling. Drilling on Highway 501 may also need to be performed during the time of day or night in which traffic volumes are low. Heavy equipment (such as drill rig) access would be limited on the south bank due to tree growth and the difficulty for the equipment to cross the stream. It is possible that depth to rock may vary depending on each location. In order to have a more accurately evaluate the depth to rock over the south bank, a geophysical survey, such as but not limited to a resistivity imaging study, could be performed. Several test pit locations utilizing a backhoe can also be performed within the south bank area to further validate the results of the geophysical survey results. Looking at the topographic survey drawings of the south bank on Sheet C-103 in ATTACHMENT 2, the selected backhoe should have the capability to excavate at least 10-feet. This would allow the design team to develop more accurate costs for rock excavation and removal. Coordination with property owners beyond the easement area may be required to allow the backhoe to gain access to the project site. Coordination may also be required with property owners for drill rig and backhoe laydown at the end of each workday. Soil samples will be collected by the geologist/engineer, placed in jars, and selected samples will be sent to a U.S. Army Corps of Engineers certified laboratory for soils testing. Soils testing will be utilized to classify the soils in accordance the Unified Soils Classification System (USCS). Tests will be performed in accordance with ASTM D4318, ASTM D2216, ASTM D422, and ASTM D1140. The test results will support the assumed soil property values that will be utilized for the slope stability analysis of the highway embankment and the south bank (if determined to be required).

A 1.8H:1V design slope was proposed during the feasibility phase for the highway embankment design based on general assumptions. This slope will need to be evaluated by performing a slope stability analysis, which could be performed by utilizing a computer software program during the PED phase. Sheet C-101 of the Civil plans provided in ATTACHMENT 2 shows that the edge of the south bank slope extends beyond the easement onto the south property. It is possible that the proposed horizontal dimension of the design slope, 1.8, may need to be revised based on the results of the slope stability analysis. If the horizontal dimension of the design slope is increased to obtain a stable design, the west and south bank slope will need to be constructed further beyond the limits shown in sheet C-101. This would require additional property to be acquired from the property owner.

11.3 Other Design Considerations

It is recommended that design for the proposed right south bank slope will need to be further evaluated during the PED phase. Although the cut bank side of the stream meanders along highway embankment and the depositional area of the stream would typically be considered along the south bank, the south bank may still experience some erosion from the stream and will require stabilization and protection methods. It was suggested that the south bank would be excavated at a 2H:1V slope, exposed in-situ soils would be protected by a filtration geotextile and armored with VDOT Class II riprap 3-feet in thickness. It is our understanding, as suggested by members of the Norfolk District team, that armoring both sides of the stream with riprap may result in additional mitigation costs from stream mitigation. It was also suggested that stream mitigation is generally more expensive than wetland mitigation, so much so that it could deem that design cost prohibitive. During the design phase planting vegetation for stabilization (e.g., willows), using tree revetments, and generally adopting a natural channel design will be considered during design, but the 2H:1V slope will still be proposed for the south bank.

At least (2) borings will be performed along the roadway on top of the highway embankment. The thickness of the bituminous pavement section and base coarse material will be measured and recorded on the boring logs during the subsurface exploration. The Civil design team will need to include the type of bituminous pavement mixes into the roadway-repair design accordance with VDOT standards. Based on the existing thicknesses of pavement and base coarse observed in the field, at most one lane of highway will need to be re-paved to new condition.

The location of the highway embankment behind the guardrail was designed in accordance with the 2017 (revised August 2019) VDOT Guardrail Installation Training Manual (GRIT). According to the GRIT, Chapter 1, Subsection F through I, the embankment should be placed at least 24-inch or 2-feet behind the back of a W-beam guardrail system at a 10H:1V slope or flatter. This 2-foot separation is required by the VDOT GRIT to allow for deflection purposes of the W-Beam Guardrail Systems. During the design phase, these criteria may be further evaluated by the design team in cooperation with the Sponsor (VDOT) to determine if there are any opportunities available to decrease the distance between the guardrail and the top of the embankment while still meeting the performance requirements of the guardrail system. This may not be an option, but further analysis during design would be required to make that determination. If the 2-foot deflection distance is revised during design phase, then the design must demonstrate that the revised distance meets all applicable requirements for the performance of the guardrail system.

During the feasibility study phase and Architectural-Engineering (AE) firm performed the topographic survey for the project area. The AE finalized the topographic survey the Engineering team used for the feasibility study with the exception of locating the septic tank field on the north property directly north of the project site. The north property is considered to be a potential laydown area, and for the purposes of storing heavy equipment and materials on the owner's land, the Contractor will need to know the location of the septic tank area. Due to schedule and time constraints during the feasibility study, the Engineering team proceeded to utilize the AE's topographic survey submittal without the location of the north property owner's septic tank location. During the design phase, the topographic survey Computer Aided Design and Drafting (CADD) files will need to be replaced with the revised files that show the north property owner's septic tank location.

During the PED phase, the condition of the corrugated metal storm pipe that allows the Indian Run stream to pass underneath Highway 501 will need to be assessed. This may have some impact on the performance of the project, especially during flood events, which will need to be evaluated during the PED phase. The Sponsor provided the design team with a Structure Inspection Report-Summary dated 05/11/17, provided in ATTACHMENT 6. The report provides the following recommendations: the embankment erosion behind end treatment at the outlet needs to be repaired; channel material that is accumulated in the pipe needs to be removed; and cracks in the headwall and outlet end treatment need to be sealed. The report also indicates that 2-feet of channel material is in the right two-thirds of the pipe, and approximately 70 percent of the design opening is remaining. During the design phase, requirements for restoration of the pipe may need to be included as part of the project, and the Sponsor be responsible for maintenance and repairs.

11.4 Construction Considerations

Highway 501 is a vital roadway used by the local community. The Sponsor has expressed concern that roadway cannot be closed to daily traffic. During construction the Contractor will be limited to utilizing only one traffic lane on Highway 501. Site conditions, site access, and constraints must be stated in the design specifications. Traffic control will be required by the Contractor during construction to safely divert traffic around the construction area. All Contractors shall wear the proper personal protective equipment (PPE) in accordance with EM 385-1-1 and shall follow all VDOT standards for safety. The construction contractor will need an extensive traffic control plan and will need to have coordination with Virginia Department of Transportation (VDOT) to provide public notice of any traffic impacts on Highway 501. The Engineering design team will include language in the design specifications during the PED phase to accommodate and concerns and requirements that are addressed by the Sponsor. An accelerated construction schedule may also be considered during the PED phase. An accelerated construction schedule would increase project cost but may be a possible option if it falls within the cost constraints for the project.

Three (3) potential Contractor laydown locations were considered by the design team. Location maps are provided in ATTACHMENT 5. The design team selected the East site to be the proposed Contractor laydown area. The East site is located approximately 2,000 feet east of the project site along Highway 501 and was estimated to be approximately 15,447 square feet. The terrain is generally gently sloping to flat, contains a large area of generally open space, and would allow easy access for the Contractor on and off the highway without having to cross the stream to access the site. A second laydown area that was considered by the design team was the north laydown area, which was estimated to be approximately 13,886 square feet. This area is located on the north property owner's property just across the highway and is closest to the project area. This area was observed in the field to be a sloped area, which may be difficult for the Contractor to store construction materials and equipment. During the Feasibility Study phase, the location of the septic tank area was also not known by the design team, as the AE was still in the process of researching public documents to locate the septic area on the topographic survey. Members of the design team have had conversations with the property owners in which they have expressed potential interest in allowing their property to be a Contactor laydown area. During the PED phase, this area could be re-evaluated to determine if the Contractor would have the laydown area that they would require while working around the limits within the homeowner's property. The final laydown area considered was the South site, which was estimated to be approximately 14,792 square feet. This area is located near the project site, contains open space, but is located on a sloped terrain which may make it difficult for the Contractor to store heavy equipment and materials. In order for the Contractor to gain access to the project site, the Contractor would need to use a nearby private roadway to access Highway 501 or would be required to cross the stream to access the site. It will be proposed in the design specifications during the PED phase that the Contractor perform a pre-construction survey and a post construction survey of the private property owner's land. This will allow existing conditions for the laydown area to be documented, and any damage caused to the private property during construction will be repaired at the Contractor's expense. Cooperation between the project team and the property owner(s) may be required so that all construction concerns are addressed in the design specifications.

Depending on the amount of time it will take for the project to transition from the feasibility phase, to the PED phase, and to the Construction phase, prior to construction the Contactor may need to re-survey the project area to identify any site conditions that may have changed since the feasibility study topographic survey was performed.

When writing the earthwork specifications for the project, the Contractor will be required to perform clearing and grubbing of or some trees, vegetation, stumps, and roots on the south bank as suitable to the design to be determined during the PED phase. Due to some large trees, roots may extend two to three feet below the ground surface. Some clearing and grubbing will be required north bank. Reuse of the project site soils will be determined based on the results of the subsurface exploration and if they meet the specification requirements. Compaction requirements for on-site and imported soils will be in accordance with ASTM D1557 modified proctor, and the number of tests and test methods to be used will be provided. Cohesionless soils will be required to meet the 95% compaction requirements, and cohesive soils will be required to meet 90% compaction requirements.

Because rock outcropping was observed on the south bank of the project site, some rock removal may be required by the Contractor while re-routing the stream to proposed grade. Although a thorough geotechnical exploration has not been performed, it is believed that the rock may not be suitable for ripping. This will need to be further evaluated during the PED phase when more information becomes available. Methods for rock excavation the Contractor may consider during construction are a powerful percussion hammer or "hoe ram" fitted to a large track backhoe excavator, or blasting. During the PED phase a geophysical survey could be performed. Several test pit locations utilizing a backhoe can also be performed within the south bank area to further validate the results of the geophysical survey results. This would allow the design team to provide more accurate quantities and a cost estimate as to the amount of rock that will need to be excavated and removed to re-route the stream.

Excavation and construction near and/or on top of the highway embankment may result in failure of the embankment. The Contractor shall proceed with extreme caution and will be required to provide whatever means necessary to prevent failure of the embankment. The Contractor shall take into consideration if construction may need to proceed from the toe of the highway embankment until the bank is adequately supported.

Direction will need to be provided in the design specifications to the Contractor as to how the excavation of the highway embankment should be performed. Excavation of the highway embankment should be performed as not to allow the existing embankment soils to remain exposed for long periods of time. The Contractor will need to perform excavation in approximate

20-linear foot open face increments. Once 20-linear feet of the embankment is exposed, filtration geotextile and stone will need to be immediately placed into the excavation. The amount of open excavation face to remain exposed shall be further evaluated during the PED phase. The Contractor will need to develop sheeting, shoring, or trench box plan as it would apply to the construction of the design.

The Contractor should anticipate the fluctuation of the water table depending on variations in precipitation, surface runoff, pumping, stream levels, and similar factors. When performing excavations, the Contractor will encounter groundwater. To maintain dry working conditions, the Contractor will need to implement dewatering methods such as but not limited to open sumps with pumping. If the groundwater is not properly controlled the soil may begin to slough and unravel during the slope excavation. The Contractor shall also consider the fluctuating stream levels.

The Contractor will be required to implement the proper sheeting, shoring, or trench box plan when excavating the highway embankment. The Contractor's plan will be a submittal requirement in the Earthwork specification. The proper method determined by the Contractor shall be applicable to the site conditions as presented in the design documents.

The design team will need to provide information or direct the Contractor to provide a plan in the design specifications as to how the stream water will be diverted while excavation and re-routing of the new stream channel is performed. Water may also need to be diverted away from the construction area of the highway embankment and south bank. Utilization of cofferdams will be evaluated by the design team as well as any other measures that may be used by the Contractor.

During construction, weather could also impact work and schedule. The number of monthly anticipated adverse weather delay workdays for a five-day work week, based data provided by the National Oceanic and Atmospheric Administration (NOAA) or similar, will be provided in the design specifications for the Contractor.

Once the project has been constructed and turned over to the Sponsor, USACE will provide an operations, maintenance, repair, replacement, and rehabilitation (OMRR&R) manual which will be written specifically for the local Sponsor, VDOT, who will have the primary responsibility for maintaining the project. The intent of the document is to provide the Sponsor with some clear and comprehensive guidance on the maintenance of the shoreline stabilization. Debris and vegetation growing on the shoreline stabilization measures will need to be removed periodically. Beyond these examples of ongoing maintenance, there are also more significant repairs that will be necessary from time to time. On occasion, the Sponsor may have to add stone if evidence of structure displacement or deterioration occurs or do some major earthwork to repair an embankment.

12.0 References

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Attachments

1. Cost Engineering Appendix
2. 10% Modified Alternative 6 Design Plans and Quantities
3. HEC-RAS Results
4. Geotechnical Field Data and Results
5. Proposed Laydown Areas
6. Sponsor Provided Documents

ATTACHMENT 1:
COST ENGINEERING
APPENDIX

Indian Run

Bedford County, VA

Continuing Authority Program, Section 14
Emergency Streambank & Shoreline Protection

COST ENGINEERING
APPENDIX
March 2021

Contents

SECTION 1. GENERAL

1.1 Guidance

1. ER 1110-2-1302, CIVIL WORKS COST ENGINEERING
2. ER 1110-2-1150, ENGINEERING AND DESIGN FOR CIVIL WORKS PROJECTS
3. ETL 1110-2-573, CONSTRUCTION COST ESTIMATING GUIDE FOR CIVIL WORKS
4. ECB 2007-17, APPLICATION OF COST RISK ANALYSIS TO DEVELOP CONTINGENCIES FOR CIVIL WORKS TOTAL PROJECT COSTS

1.2 Computer Aided Software

1. Micro-Computer Aided cost Estimating System (MCACES), Second Generation (MII). MII 4.4
2. Abbreviated Risk Analysis Spreadsheet maintained by USACE Cost Center of Expertise, Walla Walla, WA.

SECTION 2. THE COST ESTIMATE REPORT

2.1 Report Description

This report is tentative in nature and is intended to be used for planning purposes only.

The estimate reflects the very early stages and concepts of design. The project is located on Highway 501 approximately 0.5 miles north of Coleman Falls in Bedford County, Virginia. Approximately 100-linear feet of a section of a highway embankment has started failing (slope instability) which is most likely the result of erosion at the toe by a small stream that is adjacent to the highway embankment. It is believed that a combination of the over steepen embankment slope and the erosive action of the stream at the toe are threatening the integrity of the highway. In November 2016 the Virginia Department of Transportation (VDOT) placed Class I riprap on the road embankment as an emergency measure to prevent further erosion; however, this was a temporary solution and there is still evidence of instability of the highway embankment slope. Highway 501 carries local and tractor trailer traffic due to the nearby Big Island Paper Mill, a major employer. If the road closes, citizens will be required to take alternate routes to the Paper Mill, which would add an extra 50 to 60 miles of driving distance.

The Tentatively Selected Plan (TSP) was chosen based on economic factors indicating the greatest effectiveness. The Cost Estimate supporting the TSP is prepared using the MCACES, Second Generation (MII 4.4).

- MCACES references the MII English Cost Book 2016 as the source library for all construction based activities unless otherwise adjusted by the user.

- Equipment cost is referenced through the MII Equipment Region II – 2018 based on the EP 1110-1-8, Construction Equipment and Operation Expense Schedule 2018 version.

- MCACES Labor Defaults to Labor National – Seattle 2016. This data has been adjusted by the User to reflect region and Virginia labor rates as illustrated in the Department of Labor Wage Rates with a reasonable markup for payroll taxes, insurance, fringes and burdens. DOL Wage Rates are referenced in Section 8.

- MCACES Labor Defaults to Labor National – Seattle 2016. This data has been adjusted by the User to Reflect region and Virginia labor rates as illustrated in the Department of Labor Wage Rates with a reasonable markup for payroll taxes, insurance, fringes and burdens. DOL Wage Rates are referenced in Section 8.

- Based on economic evaluation, Modified Alternative 6 was chosen as the TSP. This plan consists of excavating the existing highway embankment benching with a 3H:2V slope. Class I riprap is to be removed. A 6-inch filter mattress with filtration geotextile is placed on the bottom of the excavation. A layer of filtration geotextile is placed over the embankment wall soils. Class II riprap stone is placed overtop the marine mattress. A layer of VDOT No. 1 aggregate is placed overtop a layer of filtration geotextile and geogrid. The proposed slope of the revetment design is 1.8H:1V. Highway 501 will require minimal restoration. The guardrail will need to be removed and restored by the Contractor. Re-routing of the stream is required with some rock excavation. The south stream bank is proposed to be graded to a 2H:1V design slope and a 3-foot layer of Class II riprap stone will be placed over a filtration geotextile. Natural vegetation may be another alternative for the design of the south bank but will be determined during the PED phase.

The Current Working Estimate (CWE) for Construction of the TSP is approximately $501,597.00 These costs have been established to be the Baseline Cost Estimate for 1 October 2020 price levels. This value does not include contingency and escalation through the mid-point of construction, yielding the fully funded construction dollar value. Please see the TPCS and/or ARA for these values.

2.2 Estimate Qualifications

• The project construction cost estimate is prepared as though the Government were a prudent and well-equipped contractor estimating the proposed measures based on the current feasibility level design. The estimates are developed in as much detail as can be assumed based on the best information available at this time.

• The estimate adheres to the civil works work breakdown structure and was internally verified for quality control addressing cost, schedule and risk issues as practical. The estimate was developed based on a limited scope of work. Record of assumptions, construction methods, concerns, and unknowns are maintained within the MII estimate for each construction task.

• Parametric estimating techniques were used to develop the estimate. They are based on engineering parameters, historical information, practical construction practices and engineering principles. Project definition characteristics to include physical properties of the project site, functional purpose of the project and methods of construction were considered when developing the estimate.

• The structure of the cost estimate is planned so that all tasks are logical and are in accordance with appropriate plan of construction and good understanding of the project scope. A unit cost for each task is developed in an effort to increase the accuracy of the estimate and includes consideration given to site specific conditions as they pertain to constructability, biddability, and operability issues.

• The district developed a baseline cost estimate within which the project can be designed and constructed. An MII estimate was prepared with careful analysis of contingencies appropriate for each feature. No new surveys were collected to evaluate the final array of alternatives and only existing data was used. Up to date surveys and data will be required as the project moves forward towards solicitation.

• The estimated costs developed for this project are fair and reasonable to a well-equipped and competent contractor and include overhead costs and profit. Actual crew sizes, equipment and production rates that contractors have achieved previously on similar types of projects were implied in developing the unit costs for the work items contained in this project.

• Unit prices for construction features were developed using the MII Cost Book database and drew from expertise maintained within the Norfolk District.

2.3 Quantities

The quantities were supplied by the design team. See attached Section 9 for the list of quantities.

2.4 Estimate Assumptions

• Bid Items and Tasks are based on the English 2016 MII Cost Book.

• Fuel rates are set at $2.24 for unleaded gasoline, $2.50 for Off-Road diesel, and $2.70 for on-road diesel.

• Prime Contractor's job office overhead is set at 15%, home office overhead is set at 10%, profit is set at 10%, and bond is set at 2%.

• It is anticipated that the prime contractor will be a marine construction and/or site contractor performing the work herein for Modified Alternative 6.

• It is anticipated that the sub-contractor will be a marine construction and/or site contractor performing the work in a complementary fashion, with respect to the prime, herein for Modified Alternative 6.

• Preconstruction submittals and project closeout administration is anticipated to be included with the contractors HOOH. It is not detailed out in the construction estimate.

• It is not anticipated that a USACE field office will be required; therefore, no costs are included in the estimate for such.

• Construction Duration was estimated at 90 work days – roughly 3 months, however additional time may be added for preconstruction submittals and closeout procedures as design develops. Total Period of Performance is estimated to be 180 days. (6 months).

SECTION 3. CODE OF ACCOUNTS

3.1 Current Working Estimate (CWE)

The detailed CWE's are shown in the attached MCACES (Microcomputer Aided Cost Engineering System) files. The estimates are formatted into a Code of Accounts framework in compliance with Civil Works Breakdown Structure. The costs included under each Code of Accounts are described below.

3.2 Account 01: Lands and Damages

The costs included in this account were furnished by the Norfolk District's Real Estate Branch who assessed potential real estate impacts. No contingency was established for this account by the Abbreviated Cost Risk Analysis.

3.3 Account 16: Bank Stabilization

This plan consists of constructing a VDOT No. 1 aggregate and Class II riprap stone revetment along the existing highway embankment with an approximate crest elevation of +648 feet NAVD88. The stone revetment is proposed to an approximate slope of 1.8H:1V which will need to be further evaluated during the PED phase. A 6-inch filter mattress with a filtration geotextile will be placed underneath the Class II riprap and used to separate the various stone materials. A layer of geogrid will also be included overtop the filtration geotextile to separate and to better support the VDOT No. 1 stone. Prior to any design evaluation performed on the proposed dimension of the slope, at this time it is proposed that the north stream bank will need to be re-routed approximately 7-feet south of its existing location. The design will also include the installation of a soil stabilization design on the south stream bank with a 2H:1V excavated slope by means of a 3-foot layer of Class II riprap stone with a filtration geotextile over the existing soils or the planting of natural vegetation. The south stream bank design will be further evaluated during the PED phase. It is estimated that this alternative will require, for both the river-left and river-right banks approximately: 1,066 tons of VDOT Class III riprap; 186 tons of VDOT No. 1 coarse aggregate; 48 tons of Bituminous Concrete Asphalt; 970 tons of VDOT 21A; 640 SY of geotextile filter fabric; 170 SY of geogrid; 640 CY of soil excavation; 203 tons of rock excavation; and 100-linear feet of guardrail. A contingency of 31% was established for this account by the Abbreviated Cost Risk Analysis.

3.4 Account 30: Planning, Engineering, and Design

The costs included in this account were furnished by those responsible for performing each activity during PED. This account includes plans, specifications, cost estimates, field investigations, surveys, engineering during construction, environmental/physical monitoring, and project management. A contingency of **23**% was established for this account by the Abbreviated Cost Risk Analysis.

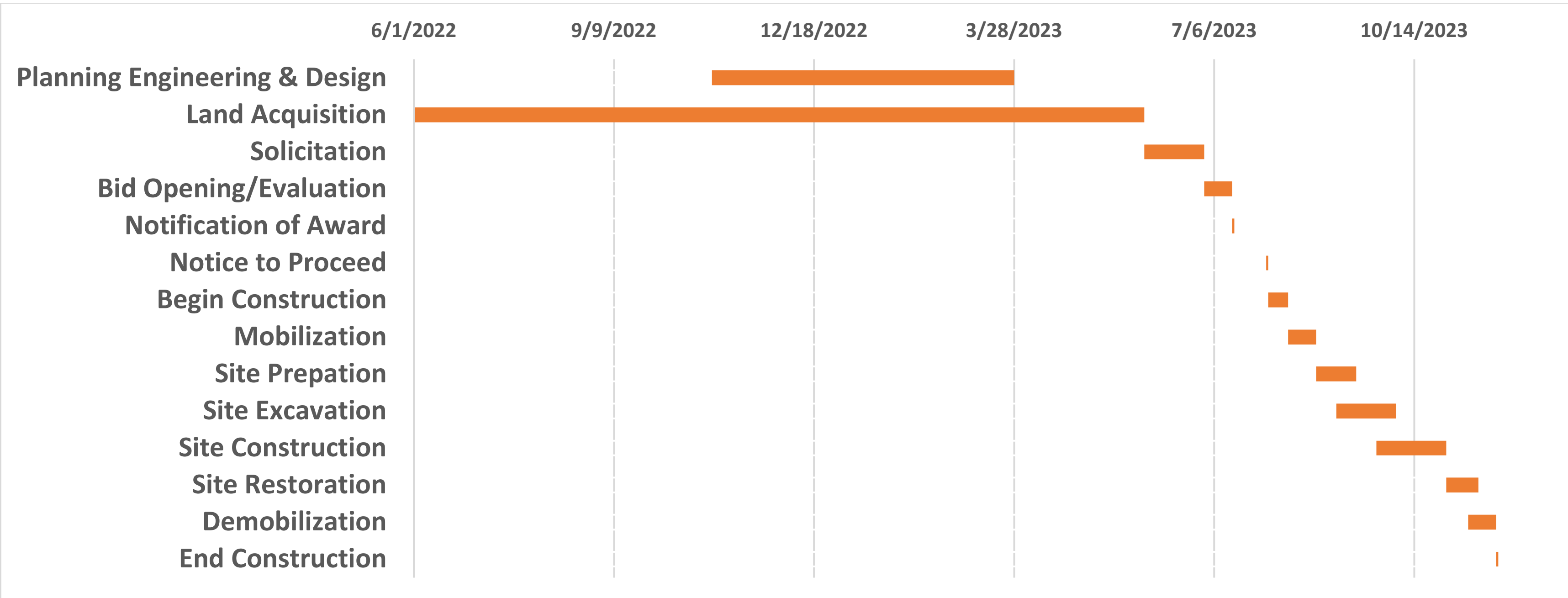
3.5 Account 31: Construction Management

This account includes supervision and administration of the contracts by construction management. A contingency of **25**% was established for this account by the Abbreviated Cost Risk Analysis.

SECTION 4
CONSTRUCTION SCHEDULE

Indian Run Coleman Falls, VA CAP Section14

Assumed Schedule



SECTION 5
TOTAL PROJECT COST

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

PROJECT: **INDIAN RUN, BEDFORD COUNTY, VIRGINIA**
Alt 6 Modified- Placement of Stone
PROJECT NO: **Revetment**
LOCATION: **BEDFORD COUNTY, VIRGINIA**

DISTRICT: **Norfolk District**
PREPARED: **3/11/2021**
POC: **CHIEF, COST ENGINEERING, Thomas Rice**

This Estimate reflects the scope and schedule in report; Report Name and date

Civil Works Work Breakdown Structure		**ESTIMATED COST**				**PROJECT FIRST COST (Constant Dollar Basis)**						**TOTAL PROJECT COST (FULLY FUNDED)**			
						Program Year (Budget EC): 2021									
						Effective Price Level Date: 1-Oct- 20									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Oct-20 ($K)	**TOTAL FIRST COST ($K)**	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
16	BANK STABILIZATION	$502	$155	31%	$657		$502	$155	$657		$657	9.3%	$548	$170	$718
	#N/A			-		-						-			
				-		-						-			
				-		-						-			
	CONSTRUCTION ESTIMATE TOTALS:	$502	$155		$657		$502	$155	$657		$657	9.3%	$548	$170	$718
01	LANDS AND DAMAGES	$118			$118		$118		$118		$118	6.1%	$125		$125
30	PLANNING, ENGINEERING & DESIGN	$101	$23	23%	$124		$101	$23	$124		$124	9.6%	$111	$25	$136
31	CONSTRUCTION MANAGEMENT	$101	$25	25%	$126		$101	$25	$126		$126	11.9%	$113	$28	$141
	PROJECT COST TOTALS:	$822	$204	25%	$1,026		$822	$204	$1,026		**$1,026**	9.3%	$897	$224	$1,121

ESTIMATED TOTAL PROJECT COST:		**$1,121**
ESTIMATED FEDERAL COST:	65%	$728
ESTIMATED NON-FEDERAL COST:	**35%**	$392
22 - FEASIBILITY STUDY (CAP studies):		**$2**
ESTIMATED FEDERAL COST:	50%	$1
ESTIMATED NON-FEDERAL COST:	50%	$1
ESTIMATED FEDERAL COST OF PROJECT		**$729**

______________________ CHIEF, COST ENGINEERING, Thomas Rice

______________________ PROJECT MANAGER, Richard Harr

______________________ CHIEF, REAL ESTATE, Donna Carrier-Tal

______________________ CHIEF, PLANNING, Susan Conner

______________________ CHIEF, ENGINEERING, Aaron Edmondson

______________________ CHIEF, OPERATIONS, XXX

______________________ CHIEF, CONSTRUCTION, Robert Stewart

______________________ CHIEF, CONTRACTING, Katya Oxley

______________________ CHIEF, PM-PB, xxxx

______________________ CHIEF, DPM, XXX

**** CONTRACT COST SUMMARY ****

PROJECT: INDIAN RUN, BEDFORD COUNTY, VIRGINIA
LOCATION: BEDFORD COUNTY, VIRGINIA

DISTRICT: Norfolk District
PREPARED: 2/8/2021
POC: CHIEF, COST ENGINEERING, Thomas Rice

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

This Estimate reflects the scope and schedule in report; Report Name and date

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 25-Jan-21 Estimate Price Level: 1-Oct-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1 -Oct-20								
WBS NUMBER *A*	Civil Works Feature & Sub-Feature Description *B*	COST ($K) *C*	CNTG ($K) *D*	RISK BASED CNTG (%) *E*	TOTAL ($K) *F*	ESC (%) *G*	COST ($K) *H*	CNTG ($K) *I*	TOTAL ($K) *J*	Mid-Point Date *P*	ESC (%) *L*	COST ($K) *M*	CNTG ($K) *N*	FULL ($K) *O*
	PHASE 1 or CONTRACT 1													
16	BANK STABILIZATION	$502	$155	31.0%	$657		$502	$155	$657	2024Q1	9.3%	$548	$170	$718
	#N/A			31.0%										
	CONSTRUCTION ESTIMATE TOTALS:	$502	$155	31.0%	$657		$502	$155	$657			$548	$170	$718
01	LANDS AND DAMAGES	$118			$118		$118		$118	2023Q1	6.1%	$125		$125
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$13	$3	23.0%	$16		$13	$3	$16	2023Q2	8.8%	$14	$3	$17
1.0%	Planning & Environmental Compliance	$5	$1	23.0%	$6		$5	$1	$6	2023Q2	8.8%	$5	$1	$7
8.0%	Engineering & Design	$40	$9	23.0%	$49		$40	$9	$49	2023Q2	8.8%	$44	$10	$54
1.0%	Reviews, ATRs, IEPRs, VE	$5	$1	23.0%	$6		$5	$1	$6	2023Q2	8.8%	$5	$1	$7
1.0%	Life Cycle Updates (cost, schedule, risks)	$5	$1	23.0%	$6		$5	$1	$6	2023Q2	8.8%	$5	$1	$7
1.0%	Contracting & Reprographics	$5	$1	23.0%	$6		$5	$1	$6	2024Q1	11.9%	$6	$1	$7
3.5%	Engineering During Construction	$18	$4	23.0%	$22		$18	$4	$22	2024Q1	11.9%	$20	$5	$25
2.0%	Planning During Construction	$10	$2	23.0%	$12		$10	$2	$12	2023Q2	8.8%	$11	$3	$13
3.5%	Adaptive Management & Monitoring			23.0%										
1.0%	Project Operations			23.0%										
31	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	$50	$13	25.0%	$63		$50	$13	$63	2024Q1	11.9%	$56	$14	$70
7.5%	Project Operation:	$38	$10	25.0%	$48		$38	$10	$48	2024Q1	11.9%	$43	$11	$53
2.5%	Project Management	$13	$3	25.0%	$16		$13	$3	$16	2024Q1	11.9%	$15	$4	$18
	CONTRACT COST TOTALS:	$822	$204		$1,026		$822	$204	**$1,026**			$897	$224	**$1,121**

SECTION 6
TSP DETAIL ESTIMATE

Indian Run Road Embankment Repair MII Estimate 3 Feb 2021
Project is on State Route 501 near Coleman Falls & Big Island (Bedford Co), Virginia

Estimated by	Keith Butler
Designed by	USACE - Norfolk District
Prepared by	Keith Butler
Preparation Date	2/5/2021
Effective Date of Pricing	10/1/2020
Estimated Construction Time	180 Days

Designed by
USACE - Norfolk District
Estimated by
Keith Butler
Prepared by
Keith Butler

Design Document	
Document Date	1/12/2021
District	Norfolk District
Contact	keith.r.butler@usace.army.mil
Budget Year	2020
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost

Timeline/Currency

Preparation Date	2/5/2021
Escalation Date	1/1/2016
Eff. Pricing Date	10/1/2020
Estimated Duration	180 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB16EN: 2016 MII English Cost Book

Labor VA: General Decision Number: VA20210038 01/01/2021

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP18R02: MII Equipment 2018 Region 2

Region 02 - MIDEAST, (2018)

Sales Tax	5.30
Working Hours per Year	1,410
Labor Adjustment Factor	1.02
Cost of Money	0.88
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.101
Gas	2.240
Diesel Off-Road	2.500
Diesel On-Road	2.700

Shipping Rates

Over 0 CWT	10.53
Over 240 CWT	7.72
Over 300 CWT	6.40
Over 400 CWT	5.57
Over 500 CWT	5.89
Over 700 CWT	5.89
Over 800 CWT	8.66

Currency in US dollars

Date	Author	Note
1/25/2021	Keith Butler	"General Decision Number: VA20210105 01/01/2021Superseded General Decision Number: VA20200105State: VirginiaConstruction Type: HighwayCounties: Bedford and Bedford* Counties in Virginia.*including the independent city of BedfordHIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction;bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).Note: Under Executive Order (EO) 13658, an hourly minimum wageof $10.95 for calendar year 2021 applies to all contractssubject to the Davis-Bacon Act for which the contract is awarded(and any solicitation was issued) on or after January 1, 2015.If this contract is covered by the EO, the contractor must payall workers in any classification listed on this wagedetermination at least $10.95 per hour (or the applicablewage rate listed on this wage determination, if it is higher)for all hours spent performing on the contract in calendaryear 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.Modification Number Publication Date 0 01/01/2021* ELEC0080-011 06/01/2019 Rates FringesELECTRICIAN, Includes Traffic Signalization....................$ 28.35 3%+19.95-- SUVA2016-041 07/02/2018 Rates FringesCARPENTER, Includes Form Work....$ 17.65 0.00 CEMENT MASON/CONCRETE FINISHER...$ 19.94 0.00 IRONWORKER, REINFORCING..........$ 22.71 0.00 IRONWORKER, STRUCTURAL...........$ 27.38 0.00 LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor......................$ 15.40 0.00 LABORER: Common or General......$ 14.07 0.00 LABORER: Grade Checker..........$ 15.07 0.00 LABORER: Pipelayer.............$ 15.11 0.00 LABORER: Power Tool Operator....$ 15.69 0.00 OPERATOR: Backhoe/Excavator/Trackhoe.......$ 18.53 0.00 OPERATOR: Bobcat/Skid Steer/Skid Loader................$ 19.16 4.45 OPERATOR: Broom/Sweeper.........$ 14.32 0.25 OPERATOR: Crane.................$ 25.82 0.00 OPERATOR: Drill.................$ 24.66 0.00 OPERATOR: Gradall...............$ 18.65 0.00 OPERATOR: Grader/Blade..........$ 26.13 0.00 OPERATOR: Hydroseeder...........$ 16.64 0.00 OPERATOR: Loader................$ 18.39 0.00 OPERATOR: Mechanic.............$ 20.60 0.00 OPERATOR: Milling Machine.......$ 23.12 3.60 OPERATOR: Paver (Asphalt, Aggregate, and Concrete).........$ 17.50 2.54 OPERATOR: Piledriver............$ 21.83 4.08 OPERATOR: Roller................$ 14.47 2.28 OPERATOR: Screed................$ 22.13 4.89 OPERATOR: Asphalt Spreader and Distributor..................$ 16.51 0.00 OPERATOR: Bulldozer, Including Utility................$ 17.99 0.00 TRAFFIC CONTROL: Flagger.......$ 11.76 0.00 TRUCK DRIVER : HEAVY 7CY & UNDER............................$ 15.36 0.00 TRUCK DRIVER: 1/Single Axle Truck............................$ 16.59 0.00 TRUCK DRIVER: Fuel and Lubricant Service................$ 18.25 0.00 TRUCK DRIVER: HEAVY OVER 7 CY...............................$ 16.60 0.00 TRUCK DRIVER: MULTI AXLE........$ 17.99 0.00--WELDERS - Receive rate prescribed for craft performingoperation to which welding is incidental.

Currency in US dollars

Direct Cost Markups		**Category**			**Method**		
Productivity		Productivity			Productivity		
Overtime		Overtime			Overtime		
	Days/Week	*Hours/Shift*		*Shifts/Day*	*1st Shift*	*2nd Shift*	*3rd Shift*
Standard	*5.00*	*8.00*		*1.00*	*8.00*	*0.00*	*0.00*
Actual	*5.00*	*8.00*		*1.00*	*8.00*	*0.00*	*0.00*

Day	*OT Factor*	*Working*	*OT Percent*	*FCCM Percent*
Monday	*1.50*	*Yes*	*0.00*	*0.00*
Tuesday	*1.50*	*Yes*		
Wednesday	*1.50*	*Yes*		
Thursday	*1.50*	*Yes*		
Friday	*1.50*	*Yes*		
Saturday	*1.50*	*No*		
Sunday	*2.00*	*No*		

Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		

Contractor Markups	**Category**	**Method**
JOOH (Small Tools)	JOOH	% of Labor
JOOH	JOOH	JOOH (Calculated)
HOOH	HOOH	Running %
Profit	Profit	Running %
Bond	Bond	Running %

Owner Markups	**Category**	**Method**
Escalation	Escalation	Running %
Contingency	Contingency	Running %
SIOH	SIOH	Running %

Labor ID: VA EQ ID: EP18R02 Currency in US dollars TRACES MII Version 4.4

Description	Quantity	UOM	BareCost	DirectCost	CostToPrime	ContractCost	ProjectCost
Summary			**504,518.60**	**510,617.26**	**168,357.26**	**771,888.95**	**821,597.02**
			504,518.5996	*510,617.2611*	*168,357.2611*	*771,888.9481*	*821,597.0173*
16 Bank Stabilization - Indian Run Alternatives	**1.0000**	**EA**	**504,518.60**	**510,617.26**	**168,357.26**	**771,888.95**	**821,597.02**
			118,000.0000	*118,000.0000*	*0.0000*	*118,000.0000*	*118,000.0000*
Account 01 - Lands and Damages	**1.0000**	**EA**	**118,000.00**	**118,000.00**	**0.00**	**118,000.00**	**118,000.00**
			184,518.5996	*190,617.2611*	*168,357.2611*	*451,888.9481*	*501,597.0173*
Account 16 - Bank Stabilization	**1.0000**	**EA**	**184,518.60**	**190,617.26**	**168,357.26**	**451,888.95**	**501,597.02**
			184,518.5996	*190,617.2611*	*168,357.2611*	*451,888.9481*	*501,597.0173*
Modified Alt 6 - Placement of Stone Revetment	**1.0000**	**EA**	**184,518.60**	**190,617.26**	**168,357.26**	**451,888.95**	**501,597.02**
			35,000.0000	*35,000.0000*	*35,000.0000*	*89,316.0953*	*99,649.9675*
Mobilization	**1.0000**	**EA**	**35,000.00**	**35,000.00**	**35,000.00**	**89,316.10**	**99,649.97**
			56,823.9293	*60,156.4061*	*60,156.4061*	*153,512.4373*	*171,273.8263*
Demolition	**1.0000**	**EA**	**56,823.93**	**60,156.41**	**60,156.41**	**153,512.44**	**171,273.83**
			16,229.3033	*17,123.6598*	*17,123.6598*	*43,697.6695*	*48,753.4898*
Rock Site Demlition	**1.0000**	**EA**	**16,229.30**	**17,123.66**	**17,123.66**	**43,697.67**	**48,753.49**
			1,127.8287	*1,307.8222*	*1,307.8222*	*3,337.4162*	*3,723.5553*
Road Demolition	**1.0000**	**EA**	**1,127.83**	**1,307.82**	**1,307.82**	**3,337.42**	**3,723.56**
			39,466.7973	*41,724.9242*	*41,724.9242*	*106,477.3516*	*118,796.7811*
Earthwork Demolition	**1.0000**	**EA**	**39,466.80**	**41,724.92**	**41,724.92**	**106,477.35**	**118,796.78**
			9,132.2325	*9,313.1224*	*9,313.1224*	*23,766.0493*	*26,515.7812*
New Roadwork	**1.0000**	**EA**	**9,132.23**	**9,313.12**	**9,313.12**	**23,766.05**	**26,515.78**
			61,302.4378	*63,887.7326*	*63,887.7326*	*163,034.3662*	*181,897.4424*
New Sitework	**1.0000**	**EA**	**61,302.44**	**63,887.73**	**63,887.73**	**163,034.37**	**181,897.44**
			22,260.0000	*22,260.0000*	*0.0000*	*22,260.0000*	*22,260.0000*
Enironmental Mitigation	**1.0000**	**EA**	**22,260.00**	**22,260.00**	**0.00**	**22,260.00**	**22,260.00**
			101,000.0000	*101,000.0000*	*0.0000*	*101,000.0000*	*101,000.0000*
Account 30: Planning, Engineering, and Design	**1.0000**	**EA**	**101,000.00**	**101,000.00**	**0.00**	**101,000.00**	**101,000.00**
			101,000.0000	*101,000.0000*	*0.0000*	*101,000.0000*	*101,000.0000*
Account 31: Construction Management	**1.0000**	**EA**	**101,000.00**	**101,000.00**	**0.00**	**101,000.00**	**101,000.00**

Currency in US dollars

SECTION 7
COST RISK ANALYSIS

Abbreviated Risk Analysis

Project (less than $40M): **Indian Run**

Project Development Stage/Alternative: **Feasibility (Recommended Plan)**

Risk Category: **Low Risk: Typical Construction, Simple**

Alternative: Modified 6

Meeting Date: 7/16/2020

Total Estimated Construction Contract Cost = $ 501,597

	CWWBS	Feature of Work	Estimated Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ 118,000		0%	$ -	$ 118,000
1	16 BANK STABILIZATION	Mob/Demob	$ 99,650		26%	$ 26,076	$ 125,726
2	16 BANK STABILIZATION	Slope Treatment	$ 401,947		32%	$ 129,695	$ 531,642
3					0%	$ -	$ -
4					0%	$ -	$ -
5					0%	$ -	$ -
6					0%	$ -	$ -
7					0%	$ -	$ -
8			$ -		0%	$ -	$ -
9			$ -		0%	$ -	$ -
10			$ -		0%	$ -	$ -
11			$ -		0%	$ -	$ -
12	All Other	Remaining Construction Items	$ -	0.0%	0%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	$ 101,323		23%	$ 23,412	$ 124,734
14	31 CONSTRUCTION MANAGEMENT	Construction Management	$ 101,323		25%	$ 25,341	$ 126,663
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals				
Real Estate	$ 118,000	0%	$ -	$ 118,000.00
Total Construction Estimate	$ 501,597	31%	$ 155,771	$ 657,368
Total Planning, Engineering & Design	$ 101,323	23%	$ 23,412	$ 124,734
Total Construction Management	$ 101,323	25%	$ 25,341	$ 126,663
Total Excluding Real Estate	**$ 704,242**	**29%**	**$ 204,524**	**$ 908,766**

	Base	50%	80%
Confidence Level Range Estimate ($000's)	$704k	$827k	$909k

* 50% based on base is at 5% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Indian Run Modified 6

Feasibility (Recommended Plan)

Abbreviated Risk Analysis

Meeting Date: 16-Jul-20

Risk Level

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

Risk Register

Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Management & Scope Growth				**Maximum Project Growth**		**40%**
PS-1	Mob/Demob			Negligible	Unlikely	0
PS-2	Slope Treatment		May have funding issues on either side. Culvert repair and pipe under road may require rehabilitating as well. Scope may change with hydraulic modeling.	Marginal	Possible	1
PS-3	0			Negligible	Unlikely	0
PS-4	0			Negligible	Unlikely	0
PS-5	0			Negligible	Unlikely	0
PS-6	0			Negligible	Unlikely	0
PS-7	0			Negligible	Unlikely	0
PS-8	0			Negligible	Unlikely	0
PS-9	0			Negligible	Unlikely	0
PS-10	0			Negligible	Unlikely	0
PS-11	0			Negligible	Unlikely	0
PS-12	Remaining Construction Items		Concerns the guard rail. VDOT standard.	Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design		Survey results may result in additional time required to perform design analysis. Fish and wildlife species report - May find mussels, long earred bats, and etc for endangered species onsite which may require stream diversion/relocation. Stream impacts to environmental, may have to grout.	Marginal	Possible	1
PS-14	Construction Management		Funding availability. Stream diversion may result in real estate issue with access to property from other side of stream.	Marginal	Possible	1
Acquisition Strategy				**Maximum Project Growth**		**30%**

AS-1	Mob/Demob		Small business 8a contract likely due to project magnitude.	Marginal	Likely	**2**
AS-2	Slope Treatment		Small business 8a contract likely due to project magnitude. Contractor must specialize in this field of work - slope stabilization.	Marginal	Likely	**2**
AS-3	0			Negligible	Unlikely	**0**
AS-4	0			Negligible	Unlikely	**0**
AS-5	0			Negligible	Unlikely	**0**
AS-6	0			Negligible	Unlikely	**0**
AS-7	0			Negligible	Unlikely	**0**
AS-8	0			Negligible	Unlikely	**0**
AS-9	0			Negligible	Unlikely	**0**
AS-10	0			Negligible	Unlikely	**0**
AS-11	0			Negligible	Unlikely	**0**
AS-12	Remaining Construction Items		Concerns the guard rail. VDOT standard.	Negligible	Unlikely	**0**
AS-13	Planning, Engineering, & Design		Delay in real estate acquirement. Contingent survey results concerning fish and wildlife species report (Environmental impacts) - May find mussels, long earred bats, and etc for endangered species onsite - Time of year restrictions on construction could ensue resulting in construction schedule issues. Upper Tennessee watershed has had many issues. Must determine what regulations this tributary is subject to. Advertisement date could be shifted. Time of yerar we can cut trees is unknown at current	Marginal	Possible	**1**
AS-14	Construction Management		Time of year restrictions on construction could ensue resulting in construction schedule issues.	Marginal	Possible	**1**

Construction Elements

Maximum Project Growth **15%**

CON-1	Mob/Demob		difficulty. Need area to stockpile materials, place equipment, and place trailer. May have to stockpile across the road. May potentially impact productivity if no area provided. Rent portion of private property via modification for us to pay cost? Temporary crossing for working on other side of tributary? Pump around requirement possible? Traffic controls may be required. The driveway at project area may require and agreement with RE owner?	Moderate	Likely	**3**
CE-2	Slope Treatment		Wet weather, water diversion, site access, personal property claims (damage during construction), heavy equipment onsite, site conditons may become complex, and traffic impacts.	Moderate	Likely	**3**
CE-3	0			Negligible	Unlikely	**0**

CE-4	0			Negligible	Unlikely	0
CE-5	0			Negligible	Unlikely	0
CE-6	0			Negligible	Unlikely	0
CE-7	0			Negligible	Unlikely	0
CE-8	0			Negligible	Unlikely	0
CE-9	0			Negligible	Unlikely	0
CE-10	0			Negligible	Unlikely	0
CE-11	0			Negligible	Unlikely	0
CE-12	Remaining Construction Items		Guardrail. VDOT standard. Contingent survey results concerning Fish and wildlife species report (Environmental impacts) - May find mussels, long earred bats, and etc. for endangered species onsite - Time of year restrictions on construction could ensue resulting in construction schedule issues.	Marginal	Possible	1
CE-13	Planning, Engineering, & Design		Site laydown decision may have RE impacts.	Marginal	Possible	1
CE-14	Construction Management		Requests for information impact USACE SIOH, encounter differing site conditions - modification possible.	Marginal	Possible	1
Specialty Construction or Fabrication				**Maximum Project Growth**		**50%**
SC-1	Mob/Demob		N/A	Negligible	Unlikely	0
SC-2	Slope Treatment		Stream relocation possible - specialized contractor may be required.	Marginal	Possible	1
SC-3	0			Negligible	Unlikely	0
SC-4	0			Negligible	Unlikely	0
SC-5	0			Negligible	Unlikely	0
SC-6	0			Negligible	Unlikely	0
SC-7	0			Negligible	Unlikely	0
SC-8	0			Negligible	Unlikely	0
SC-9	0			Negligible	Unlikely	0

SC-10	0			Negligible	Unlikely	0
SC-11	0			Negligible	Unlikely	0
SC-12	Remaining Construction Items		N/A	Negligible	Unlikely	0
SC-13	Planning, Engineering, & Design		Stream Diversion - Specs required, SME assistance may be necessary, environmental impacts, RE issues, archaelogical field survey may be required - may not find anything however.	Marginal	Possible	1
SC-14	Construction Management		May require assistance of another district as COR to ensure proper means and methods are in use during construction, DEQ may require additional oversite, environmental impacts, and difficult site conditions.	Marginal	Possible	1
Technical Design & Quantities					**Maximum Project Growth**	**20%**
T-1	Mob/Demob		Laydown area must be defined.	Negligible	Unlikely	0
T-2	Slope Treatment		Topographic survey results could impact length of treatment, slope may be modified from 1:1, and there may be stream/enviromental impacts.	Marginal	Possible	1
T-3	0			Negligible	Unlikely	0
T-4	0			Negligible	Unlikely	0
T-5	0			Negligible	Unlikely	0
T-6	0			Negligible	Unlikely	0
T-7	0			Negligible	Unlikely	0
T-8	0			Negligible	Unlikely	0
T-9	0			Negligible	Unlikely	0
T-10	0			Negligible	Unlikely	0
T-11	0			Negligible	Unlikely	0
T-12	Remaining Construction Items		Length of treatment for guard rail, culvert maintenance.	Moderate	Possible	2
T-13	Planning, Engineering, & Design		Modified slope, evironental/stream impacts.	Marginal	Possible	1
T-14	Construction Management		Differing site conditions, contract modifications due to unknown soil conditions.	Marginal	Possible	1
Cost Estimate Assumptions					**Maximum Project Growth**	**25%**
EST-1	Mob/Demob		Laydown area must be defined. Construction site accessibility. Traffic impacts.	Marginal	Possible	1

EST-2	Slope Treatment		Optimal time of day to perform work must be considered/night work may be required, and site accessibility may be an issue.	Marginal	Possible	1
EST-3	0			Negligible	Unlikely	0
EST-4	0			Negligible	Unlikely	0
EST-5	0			Negligible	Unlikely	0
EST-6	0			Negligible	Unlikely	0
EST-7	0			Negligible	Unlikely	0
EST-8	0			Negligible	Unlikely	0
EST-9	0			Negligible	Unlikely	0
EST-10	0			Negligible	Unlikely	0
EST-11	0			Negligible	Unlikely	0
EST-12	Remaining Construction Items		Quantities could change due to topographic survey results, optimal time of day to perform work must be considered/night work may be required, and site accessibility may be an issue.	Negligible	Possible	0
EST-13	Planning, Engineering, & Design		No time of day restrictions will be employed. Biological survey may be required which is an added cost to the project. Project is designed to 10% level.	Negligible	Possible	0
EST-14	Construction Management		Construction duration could be modified based upon changes to scope, weather, differing site conditons.	Marginal	Possible	1
External Project Risks				**Maximum Project Growth**		**20%**
EX-1	Mob/Demob		Weather, RE, funding constraints, market volatility at time of construction.	Moderate	Possible	2
EX-2	Slope Treatment		Weather, RE, funding constraints, market volatility at time of construction.	Moderate	Possible	2
EX-3	0			Negligible	Unlikely	0
EX-4	0			Negligible	Unlikely	0
EX-5	0			Negligible	Unlikely	0
EX-6	0			Negligible	Unlikely	0
EX-7	0			Negligible	Unlikely	0
EX-8	0			Negligible	Unlikely	0

EX-9	0			Negligible	Unlikely	**0**
EX-10	0			Negligible	Unlikely	**0**
EX-11	0			Negligible	Unlikely	**0**
EX-12	Remaining Construction Items		Weather, RE, funding constraints, market volatility at time of construction.	Moderate	Possible	**2**
EX-13	Planning, Engineering, & Design		Weather, RE, funding constraints, market volatility at time of construction.	Moderate	Possible	**2**
EX-14	Construction Management		Weather, RE, funding constraints, market volatility at time of construction.	Moderate	Possible	**2**

SECTION 8
LABOR RATES

"General Decision Number: VA20210105 01/01/2021

Superseded General Decision Number: VA20200105

State: Virginia

Construction Type: Highway

Counties: Bedford and Bedford* Counties in Virginia.
*including the independent city of Bedford

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

* ELEC0080-011 06/01/2019

	Rates	Fringes
ELECTRICIAN, Includes Traffic Signalization....................	$ 28.35	3%+19.95

SUVA2016-041 07/02/2018

	Rates	Fringes
CARPENTER, Includes Form Work	$ 17.65	0.00
CEMENT MASON/CONCRETE FINISHER	$ 19.94	0.00
IRONWORKER, REINFORCING	$ 22.71	0.00
IRONWORKER, STRUCTURAL	$ 27.38	0.00
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor	$ 15.40	0.00
LABORER: Common or General	$ 14.07	0.00
LABORER: Grade Checker	$ 15.07	0.00
LABORER: Pipelayer	$ 15.11	0.00
LABORER: Power Tool Operator	$ 15.69	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 18.53	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 19.16	4.45
OPERATOR: Broom/Sweeper	$ 14.32	0.25
OPERATOR: Crane	$ 25.82	0.00
OPERATOR: Drill	$ 24.66	0.00
OPERATOR: Gradall	$ 18.65	0.00
OPERATOR: Grader/Blade	$ 26.13	0.00
OPERATOR: Hydroseeder	$ 16.64	0.00
OPERATOR: Loader	$ 18.39	0.00
OPERATOR: Mechanic	$ 20.60	0.00
OPERATOR: Milling Machine	$ 23.12	3.60
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 17.50	2.54
OPERATOR: Piledriver	$ 21.83	4.08
OPERATOR: Roller	$ 14.47	2.28

OPERATOR: Screed................$ 22.13 4.89

OPERATOR: Asphalt Spreader
and Distributor..................$ 16.51 0.00

OPERATOR: Bulldozer,
Including Utility................$ 17.99 0.00

TRAFFIC CONTROL: Flagger.......$ 11.76 0.00

TRUCK DRIVER : HEAVY 7CY &
UNDER............................$ 15.36 0.00

TRUCK DRIVER: 1/Single Axle
Truck............................$ 16.59 0.00

TRUCK DRIVER: Fuel and
Lubricant Service................$ 18.25 0.00

TRUCK DRIVER: HEAVY OVER 7
CY...............................$ 16.60 0.00

TRUCK DRIVER: MULTI AXLE........$ 17.99 0.00

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

SECTION 9
QUANTITIES

DATE: 1/12/2021
DISTRICT: USACE, Norfolk District
ENGINEER: S.Vo
LOCATION: Bedford County, VA
PROJECT: Indian Run CAP Project
SUBJECT: **Quantities Calculations**

QUANTITY ITEM **VDOT CLASS II RIP RAP**
Unit CUBIC YARD (CY)
Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities.

Station (START)	STATION (END)	SIDE	Area (sqft)	Length (ft)	Volume(CF)	Volume(CY)
0+00	1+00	RIVER-LEFT	55	100	5500	204
0+00	1+00	RIVER-RIGHT	50	100	5000	185
					Contigency	20%
					Total	**467**
					USE	**470**

QUANTITY ITEM **VDOT #1 Coarse Aggregate**
Unit CUBIC YARD (CY)
Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities.

Station (START)	STATION (END)	SIDE	Area (sqft)	Length (ft)	Volume(CF)	Volume(CY)
0+00	1+00	RIVER-LEFT	19	100	1900	70
					Contigency	20%
					Total	**84**
					USE	**85**

QUANTITY ITEM **6-inch Marine Matrress**
Unit CUBIC YARD (CY)
Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities.

Station (START)	STATION (END)	SIDE	Area (sqft)	Length (ft)	Volume(CF)	Volume(CY)
0+00	1+00	RIVER-LEFT	7	100	700	26
					Contigency	20%
					Total	**31**
					USE	**35**

Note:
1) These quantities include an estimate of the potential armoring of the River-Right stream bank. Armoring material is assumed to be VDOT Class II Rip Rap with depth of 3 feet and placed at the River-Right stream bank at a slope of 2H:1V and lined with geotextile filter fabric.

DATE:	**1/12/2021**
DISTRICT:	**USACE, Norfolk District**
ENGINEER:	**S.Vo**
LOCATION:	**Bedford County,VA**
PROJECT:	**Indian Run CAP Project**
SUBJECT:	**Quantities Calculations**

QUANTITY ITEM **Bituminous Concrete, 5-INCH**
Unit CUBIC YARD (CY)
Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities.

Station (START)	STATION (END)	SIDE	Area (sqft)	Length (ft)	Volume(CF)	Volume(CY)
0+00	1+00	LEFT	5.5	100	550	20
					Contigency	20%
					Total	**24**
					USE	**25**

QUANTITY ITEM **VDOT 21A, 7-INCH & COMPACTED VDOT 21A**
Unit CUBIC YARD (CY)
Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities.

Station (START)	STATION (END)	SIDE	Area (sqft)	Length (ft)	Volume(CF)	Volume(CY)
0+00	1+00	LEFT & RIGHT	10	100	1000	37
					Contigency	20%
					Total	**44**
					USE	**45**

QUANTITY ITEM **GUARDRAIL**
Unit LINEAR FEET (FT)
Assumption

Station (START)	STATION (END)	SIDE	Area (sqft)	Length (ft)	Volume (CY)	LENGTH (FT)
0+00	1+00	RIGHT	XX	100	XX	100
					Contigency	20%
					Total	**120**
					USE	**120**

DATE:	**1/12/2021**
DISTRICT:	**USACE, Norfolk District**
ENGINEER:	**S.Vo**
LOCATION:	**Bedford County, VA**
PROJECT:	**Indian Run CAP Project**
SUBJECT:	**Quantities Calculations**

QUANTITY ITEM **EARTHWORK CUT**

Unit CUBIC YARD (CY)

Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities for excavation for placement of Rip Rap for both the River-Left and River-Right stream Bank.

Station (START)	STATION (END)	SIDE	Area (sqft)	Length (ft)	Volume(CF)	Volume(CY)
0+00	1+00	RIVER-LEFT	75	100	7500	278
0+00	1+00	RIVER-RIGHT	50	100	5000	185
0+00 *	1+00	RIVER-RIGHT	XXX	100	XXX	65
					Contigency	20%
					Total	**634**
					USE	**640**

QUANTITY ITEM **Geotextile**

Unit Square Yard

Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities.

Station (START)	STATION (END)	SIDE	Width (sqft)	Length (ft)	AREA (SQFT)	Area(SQYD)
0+00	1+00	RIVER-LEFT	23	100	2300	256
0+00	1+00	RIVER-RIGHT	25	100	2500	278
					Contigency	20%
					Total	**640**
					USE	**640**

QUANTITY ITEM **Geogrid**

Unit Square Yard

Assumption Since the difference in area was minor for each cross section, the larger area was used to determine quantities.

Station (START)	STATION (END)	SIDE	Width (sqft)	Length (ft)	AREA (SQFT)	Area(SQYD)
0+00	1+00	RIVER-LEFT	12.5	100	1250	139
					Contigency	20%
					Total	**167**
					USE	**170**

Note:

1) River-Right excavation value includes excavation for the channel.

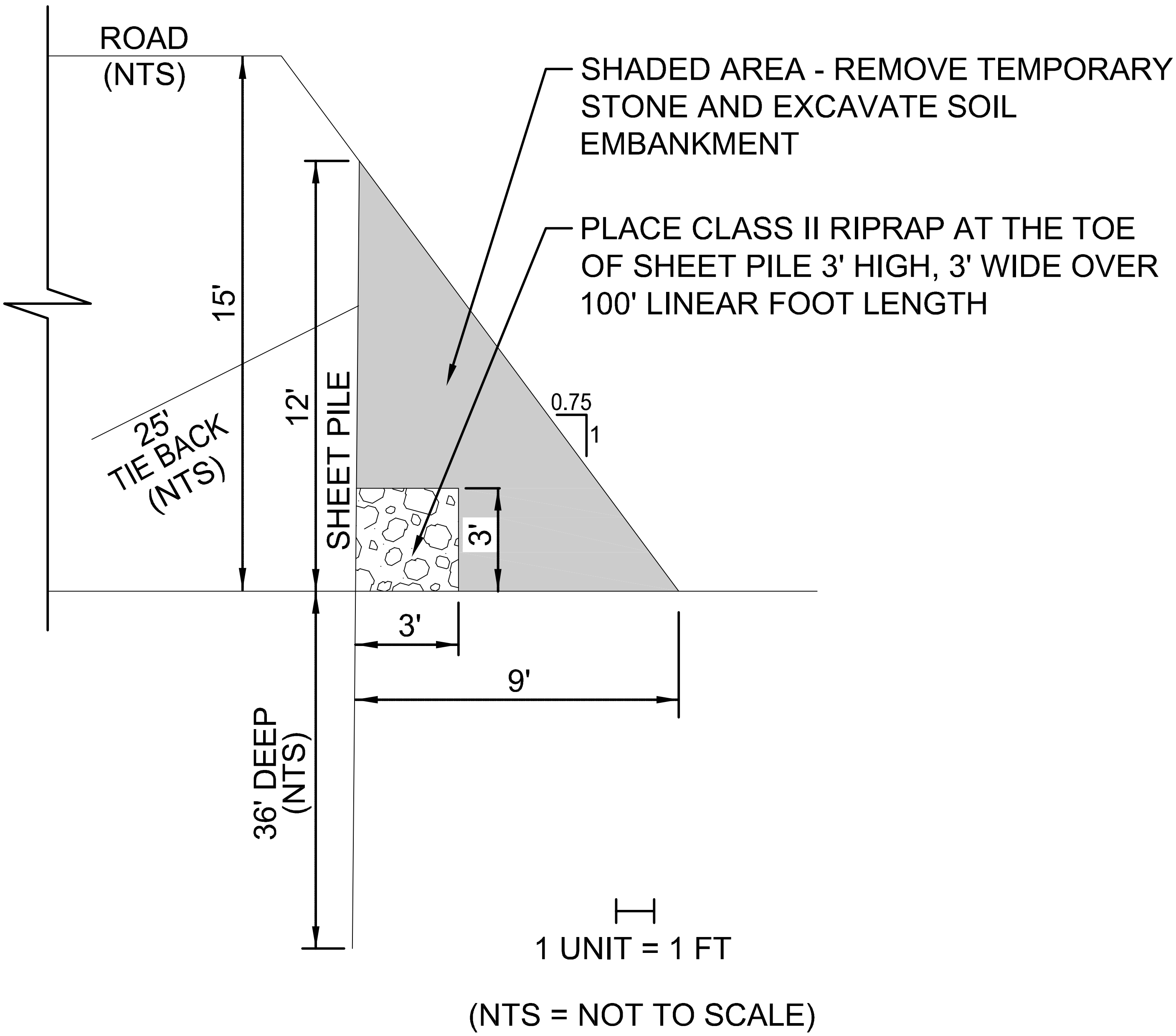
2) These quantities include an estimate of the potential armoring of the River-Right stream bank. Armoring material is assumed to be VDOT Class II Rip Rap with depth of 3 feet and placed at the River-Right stream bank at a slope of 2H:1V and lined with geotextile filter fabric.

* The second row of earthwork cut for the River-Right stream bank represents the value of cut between the existing grade and the proposed grade, obtained from the software's surface comparison tool. The estimated value of cut below the proposed grade is provided in the first row for the River-Right stream bank in this category.

BASELINE COST ESTIMATE FOR REAL ESTATE THE FLORIDA KEYS COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY				
	COST CATEGORY	NON-FEDERAL	FEDERAL	TOTAL COSTS
01A	**INCIDENTAL COSTS**	**$35,000**	**$18,500**	**$53,500**
01A1	**Administrative**	**$10,000**	**$5,000**	**$15,000**
01A1A	By the Non-Federal Sponsor	$10,000		
01A1B	By Government (Gov't) on behalf of NFS		$0	
01A1C	By Gov't		$5,000	
01A2	**Land Surveys**	**$3,000**	**$500**	**$3,500**
01A2A	By NFS	$3,000		
01A2B	By Gov't on behalf of NFS		$0	
01A2C	Review of NFS		$500	
01A3	**Land Appraisals**	**$10,000**	**$10,000**	**$20,000**
01A3A	By NFS	$10,000		
01A3B	By Gov't on behalf of NFS		$0	
01A3C	Review of NFS		$10,000	
01A4	**Title Services & Closing**	**$10,000**	**$1,000**	**$11,000**
01A4A	By NFS	$10,000		
01A4B	By Gov't on behalf of NFS		$0	
01A4C	Review of NFS		$1,000	
01A5	**Other Professional Services**	**$0**	**$0**	**$0**
01A5A	By NFS	$0		
01A5B	By Gov't on behzlf of NFS		$0	
01A5C	Review of NFS		$0	
01A6	**PL 91-646 Uniform Relocation Assistance Benefits**	**$0**	**$0**	**$0**
01A6A	By NFS	$0		
01A6B	By Gov't on behalf of NFS		$0	
01A7	**Audit for Sponsor's Credit Approval**	**$2,000**	**$2,000**	**$4,000**
01A7A	BY NFS	$2,000		
01A7B	By Gov't		$2,000	
01B	**ACQUISITION COSTS**	**$45,500**	**$0**	**$45,500**
01B1	**Land Payments**	**$45,500**	**$0**	**$45,500**
01B1A	By NFS	$45,500		
01B1B	By Gov't on behalf of NFS		$0	
01B2	**Damage Payments**	**$0**	**$0**	**$0**
01B2A	By NFS			
01B2B	By Gov't on behalf of NFS		$0	
01B4	**Condemnation**	**$0**	**$0**	**$0**

01B4A	By NFS	$0		
01B4B	By Gov't on behalf of NFS		$0	
01B5	**Disposals**	**$0**	**$0**	**$0**
01B5A	By Government	$0		
01B5B	By NFS	$0		
01B5C	By Gov't on behalf of NFS		$0	
	Subtotal Lands & Damages (01A + 01B)	$80,500	$18,500	$99,000
	Contingency (20%)	$16,000	$3,000	$19,000
01	**TOTAL LANDS & DAMAGES**	**$96,000**	**$22,000**	**$118,000**
02	**TOTAL RELOCATIONS (Utilities / Facilities)**	**$0**	**$0**	**$0**
	TOTAL PROJECT REAL ESTATE COSTS (01 & 02)	**$96,000**	**$22,000**	**$118,000**

ATTACHMENT 2:
10% MODIFIED ALTERANTIVE DESIGN PLANS AND QUANTITIES



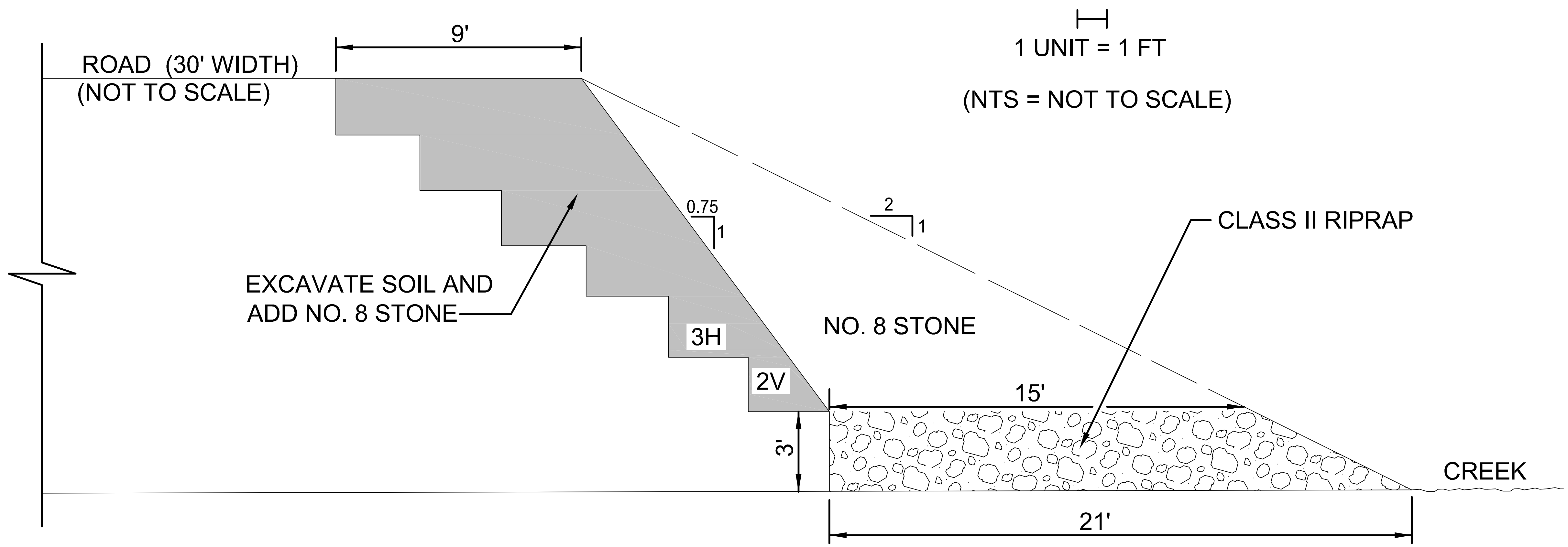
NORFOLK DISTRICT
US ARMY CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VA 23510

ENGINEERING DIVISION
DESIGN BRANCH

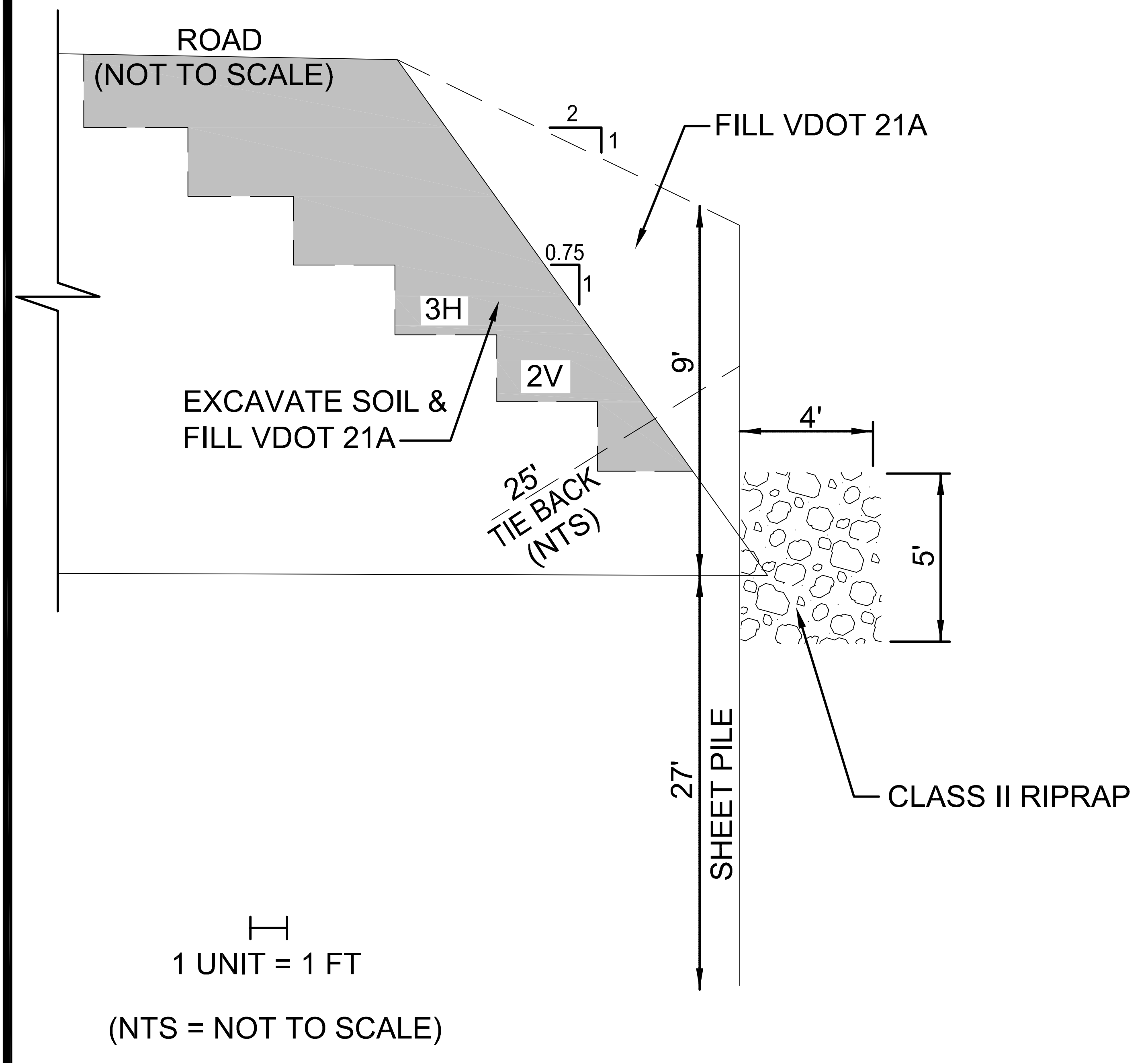
INDIAN RUN CAP
COLEMAN FALLS, VIRGINIA

ALTERNATIVE 1
PLACEMENT OF VERTICAL
STEEL SHEET PILING

SKETCH NO:
ALT1



NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA ALTERNATIVE 2 A ROCK SILL SLOPE TO STABALIZE THE BASE OF THE SLOPE AND A BERM	SKETCH NO: ALT2



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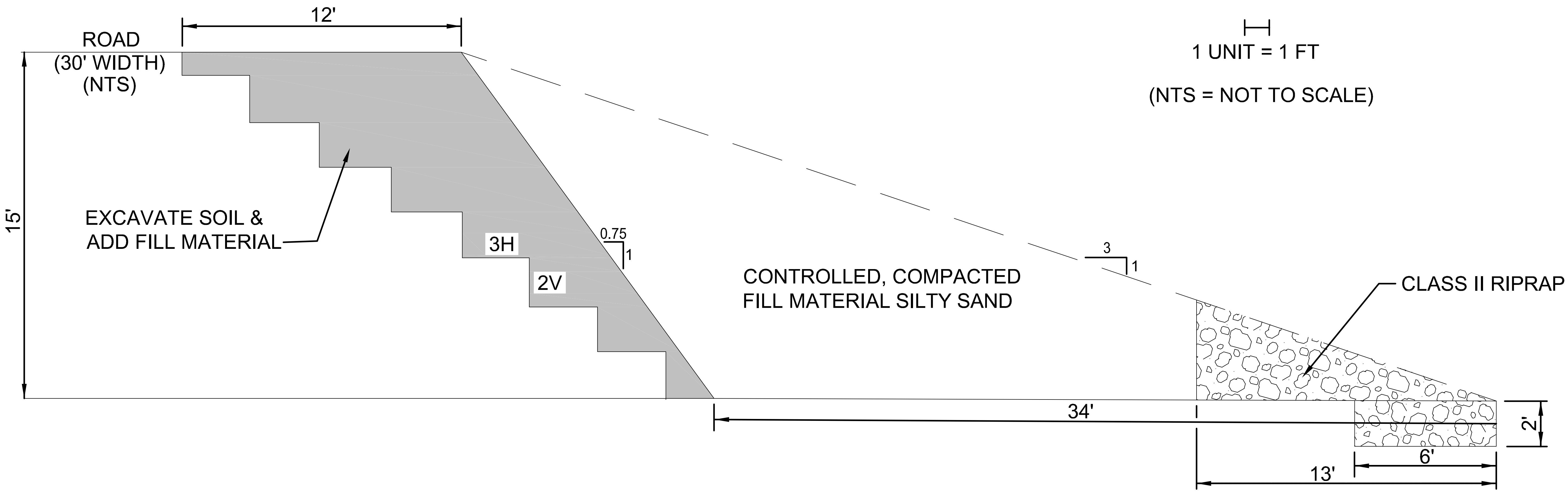
ENGINEERING DIVISION
DESIGN BRANCH

INDIAN RUN CAP
COLEMAN FALLS, VIRGINIA

ALTERNATIVE 3
COMBINATION OF STONE
REVETMENT, VERTICAL
SHEET PILING

SKETCH NO:

ALT3



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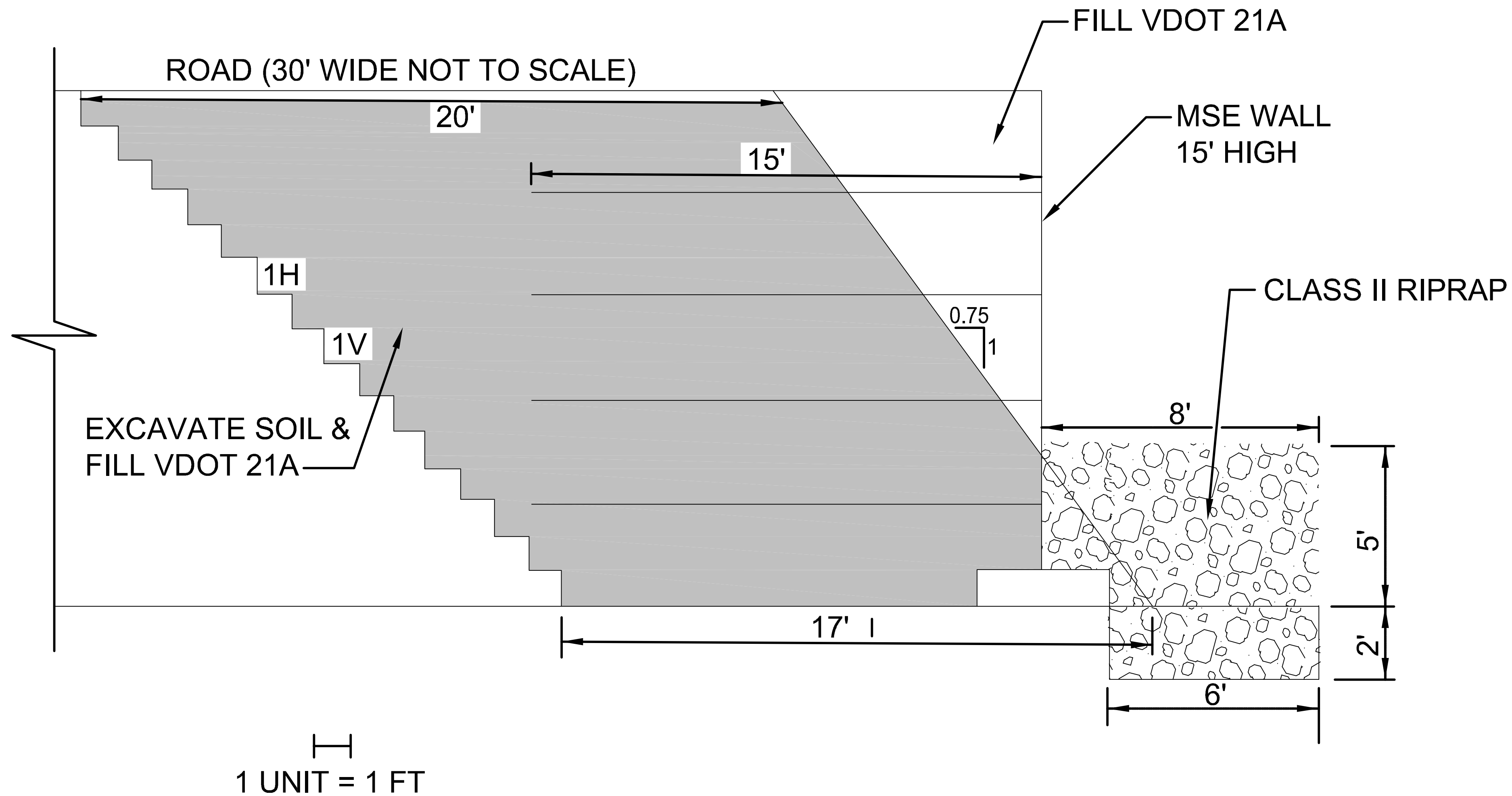
ENGINEERING DIVISION
DESIGN BRANCH

INDIAN RUN CAP
COLEMAN FALLS, VIRGINIA

ALTERNATIVE 4
VEGETATIVE EROSION CONTROL

SKETCH NO:

ALT4



NORFOLK DISTRICT
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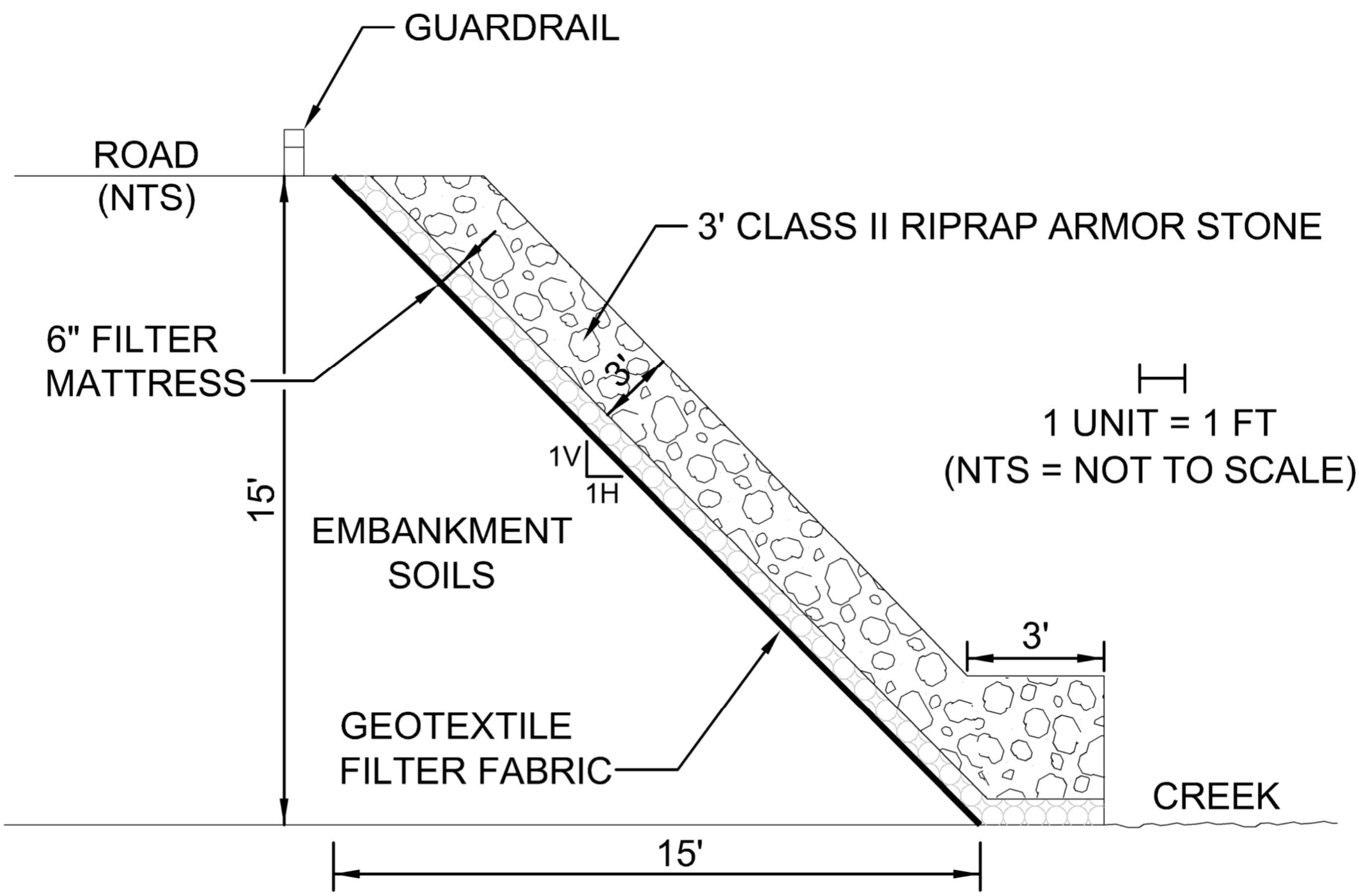
NORFOLK, VA 23510

ENGINEERING DIVISION
DESIGN BRANCH

INDIAN RUN CAP
COLEMAN FALLS, VIRGINIA

ALTERNATIVE 5
PRECAST MODULAR RETAINING WALLS WITH
STONE PROTECTION AT THE TOE

SKETCH NO:
ALT5



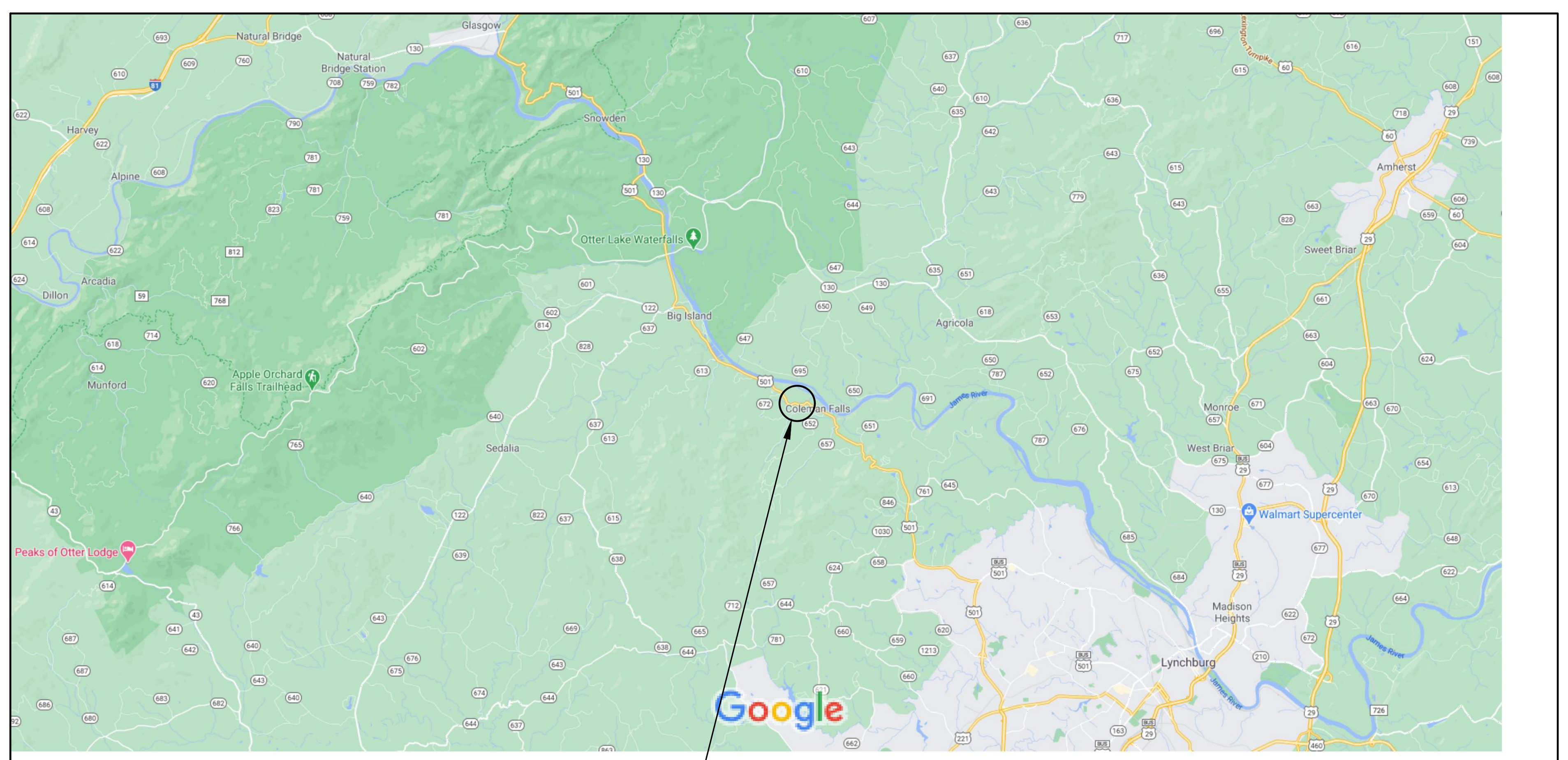
NORFOLK DISTRICT US ARMY CORPS OF ENGINEERS 803 FRONT STREET NORFOLK, VA 23510 ENGINEERING DIVISION DESIGN BRANCH	INDIAN RUN CAP COLEMAN FALLS, VIRGINIA	
	ALTERNATIVE 6 PLACEMENT OF STONE REVETMENT	SKETCH NO: ALT6

US Army Corps of Engineers®
NORFOLK DISTRICT

COLEMAN FALLS
BEDFORD COUNTY, VIRGINIA
INDIAN RUN CAP PROJECT

INDEX OF SHEETS	
SHEET NUMBER	SHEET TITLE
G-001	COVER SHEET, LOCATION MAP, VINCINITY MAP, AND INDEX OF SHEETS
VF101	EXISTING SITE CONDITIONS
C-101	PRELIMINARY SITE LAYOUT
C-102	EXISTING GROUND CROSS SECTIONS
C-103	PRELIMINARY CROSS SECTIONS

NORTH
LOCATION MAP
NOT TO SCALE



INDIAN
RUN
CAP
PROJECT

NORTH
VICINITY MAP
NOT TO SCALE

INDIAN
RUN
CAP
PROJECT

LEGEND	
SYMBOL/ABREVIATION	DESCRIPTION
WELL	WELL
PP	POWER POLE
>	GUY WIRE
TEXT	PEDESTAL
---x-----x---	FENCE
	PROPERTY LINE
	RIGHT-OF-WAY LINE
	BUILDINGS
(ST) XX" RCP (1)	STORM SEWER PIPE LABEL (SIZE, TYPE, ID)
	SIGN
	MAIL BOX
	TREE
	BUSH/HEDGE
	PAVEMENT
CONC	CONCRETE
	TEMPORARY BENCHMARK(TBM)
10.00	ELEVATIONS
	GUARD RAIL
	CLASS 1 RIPRAP
	NAIL SET/HUB SET FOR SURVEY TRAVERSE
	STREAM FLOW DIRECTION
PIN(F)	IRON PIN FOUND
VDHT PIN(F)	VIRGINIA DEPARTMENT OF HIGHWAYS & TRANSPORTATION IRON PIN FOUND
	STREAM FLOWLINE
	MAJOR CONTOUR LINE
	MINOR CONTOUR LINE
OHE	OVERHEAD ELECTRIC LINE
TW 10.00	TOP OF WALL ELEVATIONS
CMP	STORM CORRUGATED METAL PIPE

NOTES:

1. THESE DRAWINGS REPRESENT THE IMPLEMENTATION OF MODIFIED ALTERNATIVE NO.6 FOR THE INDIAN RUN CAP PROJECT. THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED FOR CONSTRUCTION. THESE DRAWINGS SHALL SERVE AS AN EXHIBIT TO THE ENGINEERING APPENDIX FOR THIS PROJECT. FURTHER ENGINEERING ANALYSIS AND DESIGN SHALL BE REQUIRED FOR ADVANCEMENT OF THESE DRAWINGS TO FURTHER STAGES OF DESIGN.

2. EXISTING SITE INFORMATION, INCLUDING EXISTING SITE IMPROVEMENTS, TOPOGRAPHIC INFORMATION, UTILITY INFORMATION, PROPERTY LINE AND RIGHT-OF-WAY INFORMATION SHOWN PER SURVEY TITLED "TOPOGRAPHIC SURVEY FOR INDIAN RUN CAP PROJECT, COLEMAN FALLS", DATED 14 DECEMBER 2020, AS PREPARED BY MSA, P.C.

SOLICITATION NO.:
CONTRACT NO.:
ISSUE DATE: JANUARY 2021

US Army Corps of Engineers®

MARK | DESCRIPTION | DATE

ISSUE DATE: JANUARY 2021
SOLICITATION NO.:
CONTRACT NO.:
NAO FILE NO.: 878

DESIGNED BY: S.VO
DRAWN BY: S.VO
CHECKED BY: B.HARRIS
SUBMITTED BY: B.HARRIS
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
803 FRONT STREET
NORFOLK, VA 23510

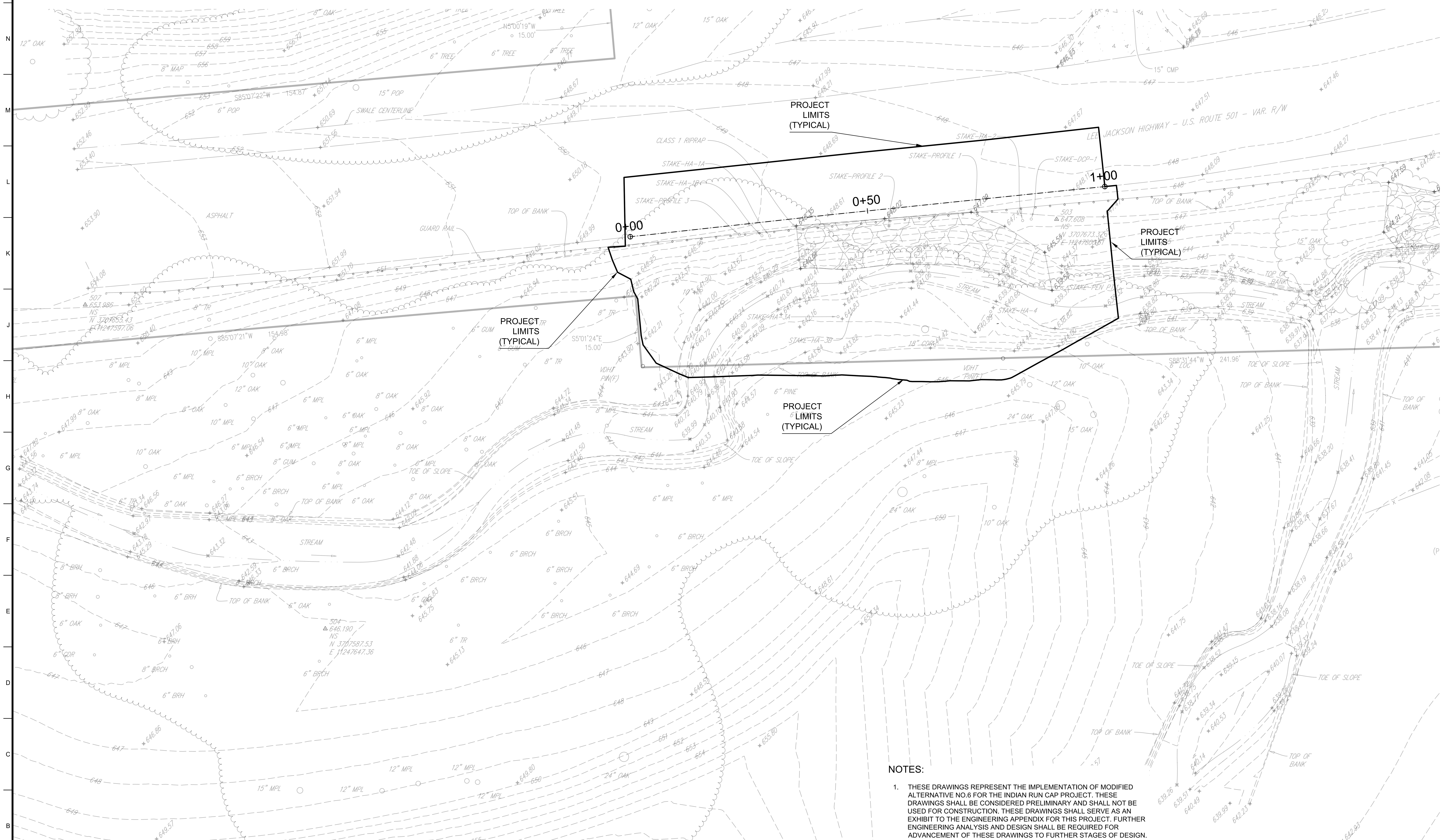
10% CAP SUBMITTAL
(NOT FOR CONSTRUCTION)

COLEMAN FALLS
BEDFORD COUNTY, VIRGINIA
INDIAN RUN CAP PROJECT

COVER SHEET, LOCATION MAP,
VINCINITY MAP, INDEX OF SHEETS

SHEET ID
G-001

S:\BEDFORD COUNTY\878_000000_464451 (INDIAN RUN CAP)\2_DESIGN\A_FEASIBILITY STUDY\CADD\GRADING\EXHIBIT_GRADING.DWG
8:46:09 AM 1/12/2021
E4ECESHV
AEC_B&W.STB



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US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE: JANUARY 2021
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SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
803 FRONT STREET
NORFOLK, VA 23510

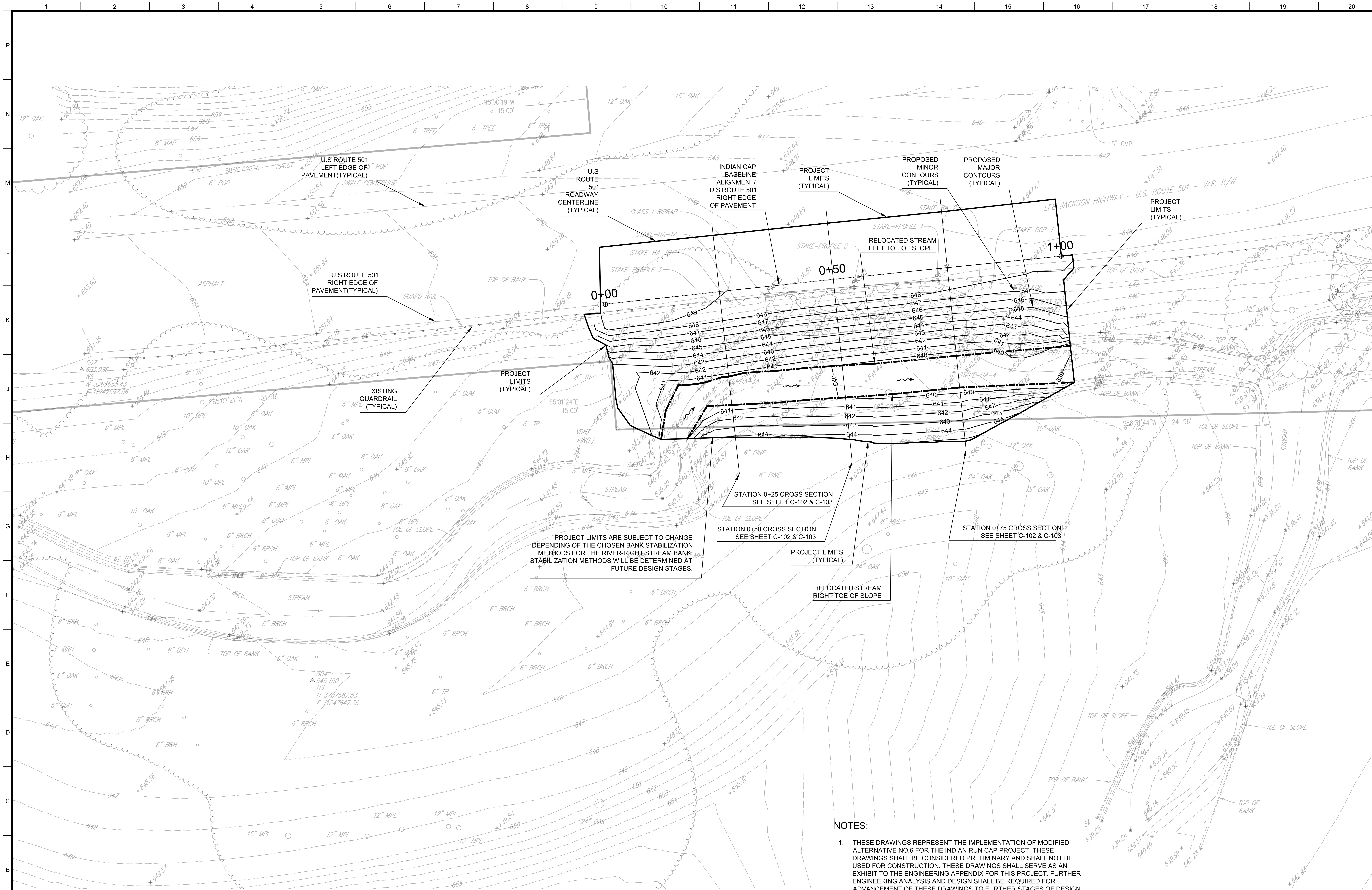
10% CAP SUBMITTAL
(NOT FOR CONSTRUCTION)

COLEMAN FALLS
BEDFORD COUNTY, VIRGINIA
INDIAN RUN CAP PROJECT

EXISTING SITE CONDITIONS

SHEET ID
VF101

S:\BEDFORD COUNTY\878_000000_464451 (INDIAN RUN CAP)\2_DESIGN\A_FEASIBILITY STUDY\CADD\GRADINGEXHIBIT_GRADING.DWG
E4ECESHV
AEC_B&W.STB
8:46:14 AM 1/12/2021



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US Army Corps of Engineers

MARK	DESCRIPTION	DATE

DESIGNED BY: S.VO
DRAWN BY: S.VO
CHECKED BY: B.HARRIS
SUBMITTED BY: B.HARRIS
SIZE: ANSI D

ISSUE DATE: JANUARY 2021
SOLICITATION NO.:
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NAO FILE NO.: 878

U.S. ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
803 FRONT STREET
NORFOLK, VA 23510

10% CAP SUBMITTAL
(NOT FOR CONSTRUCTION)

COLEMAN FALLS
BEDFORD COUNTY, VIRGINIA
INDIAN RUN CAP PROJECT

PRELIMINARY SITE LAYOUT

SHEET ID
C-101

S:\BEDFORD COUNTY\878_000000_464451 (INDIAN RUN CAP)\2_DESIGN\A_FEASIBILITY STUDY\CADD\GRADING\EXHIBIT_GRADING.DWG E4ECESHV
AEC_B&W.STB
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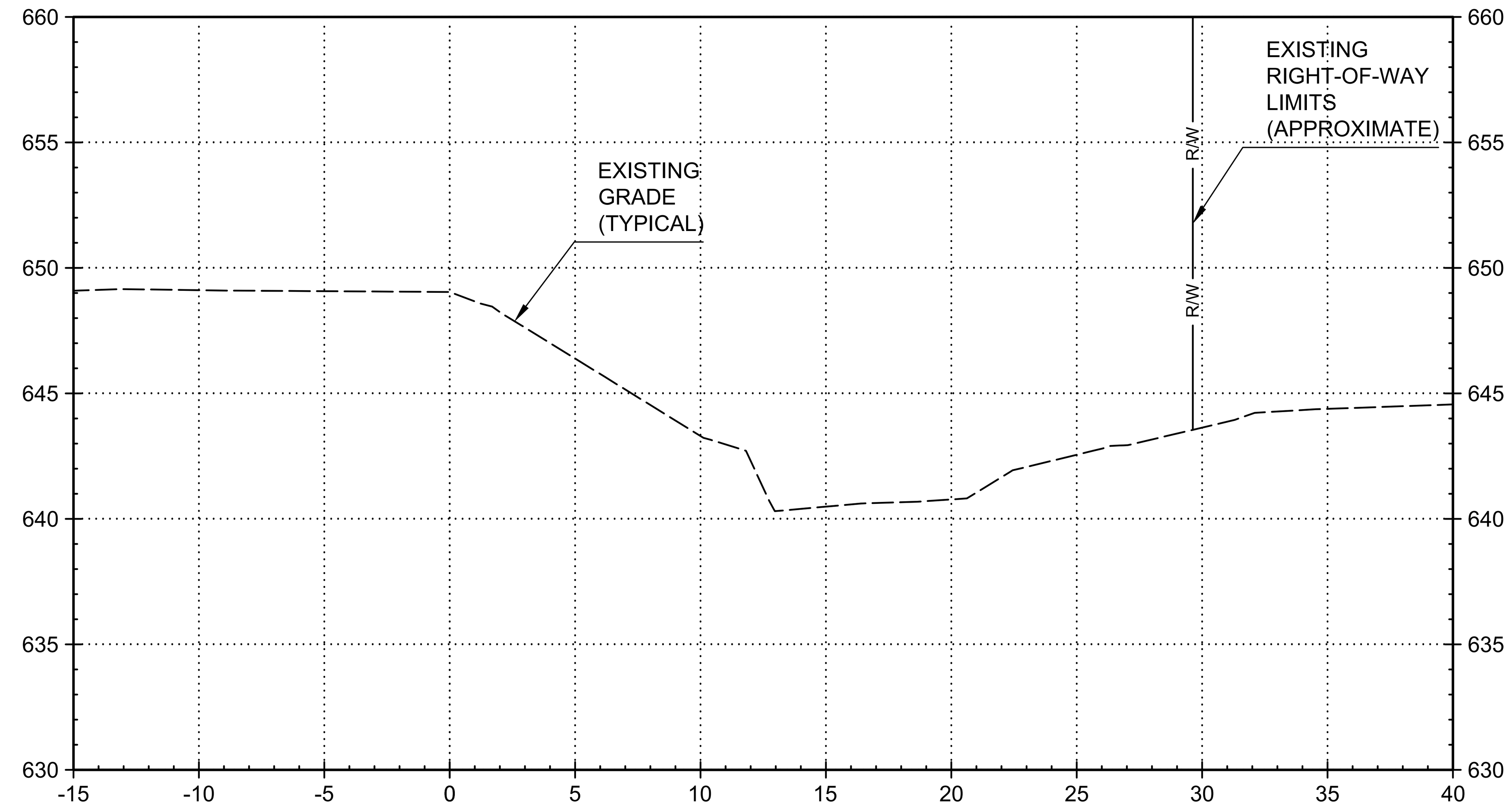

STATION
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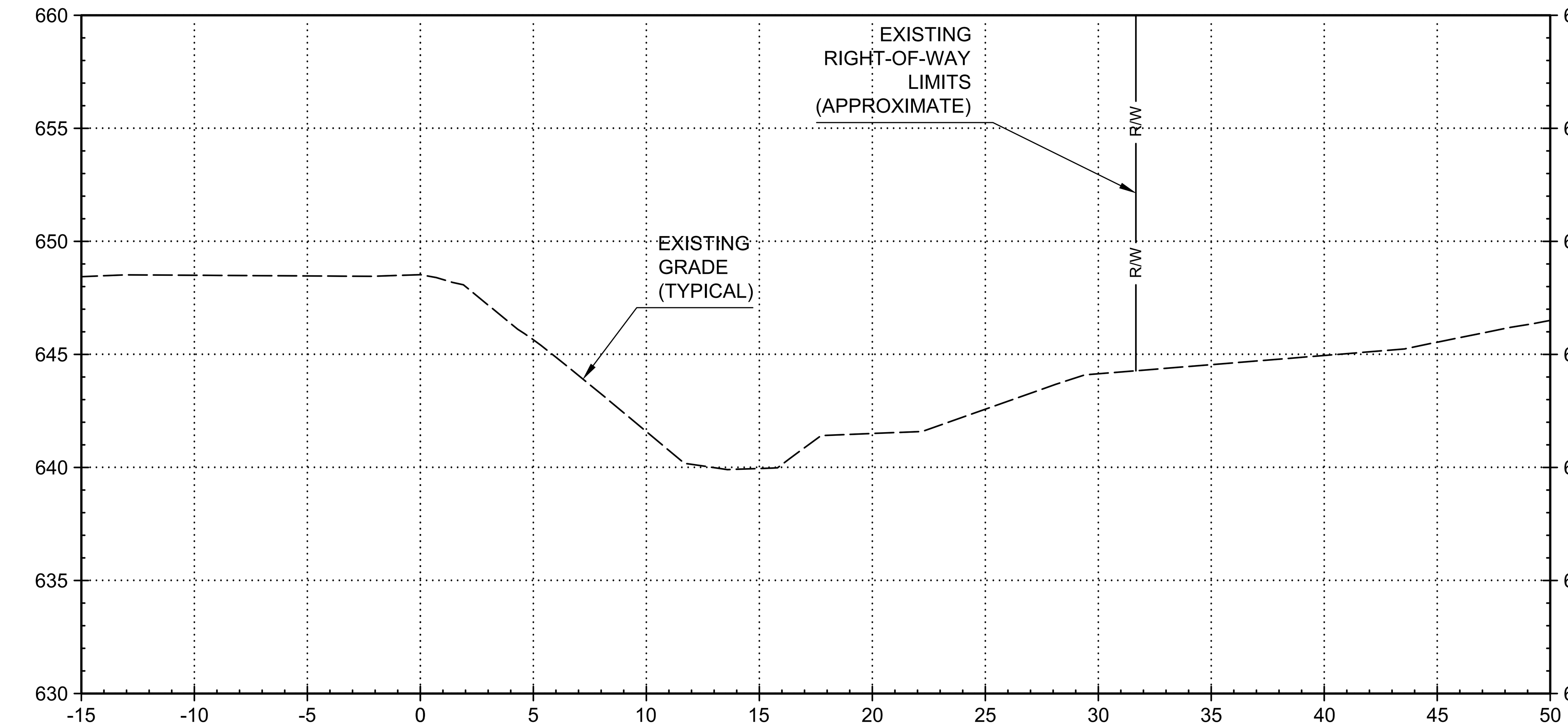
V: 1"=10'

0 10' 20'
SCALE: 1"=10'



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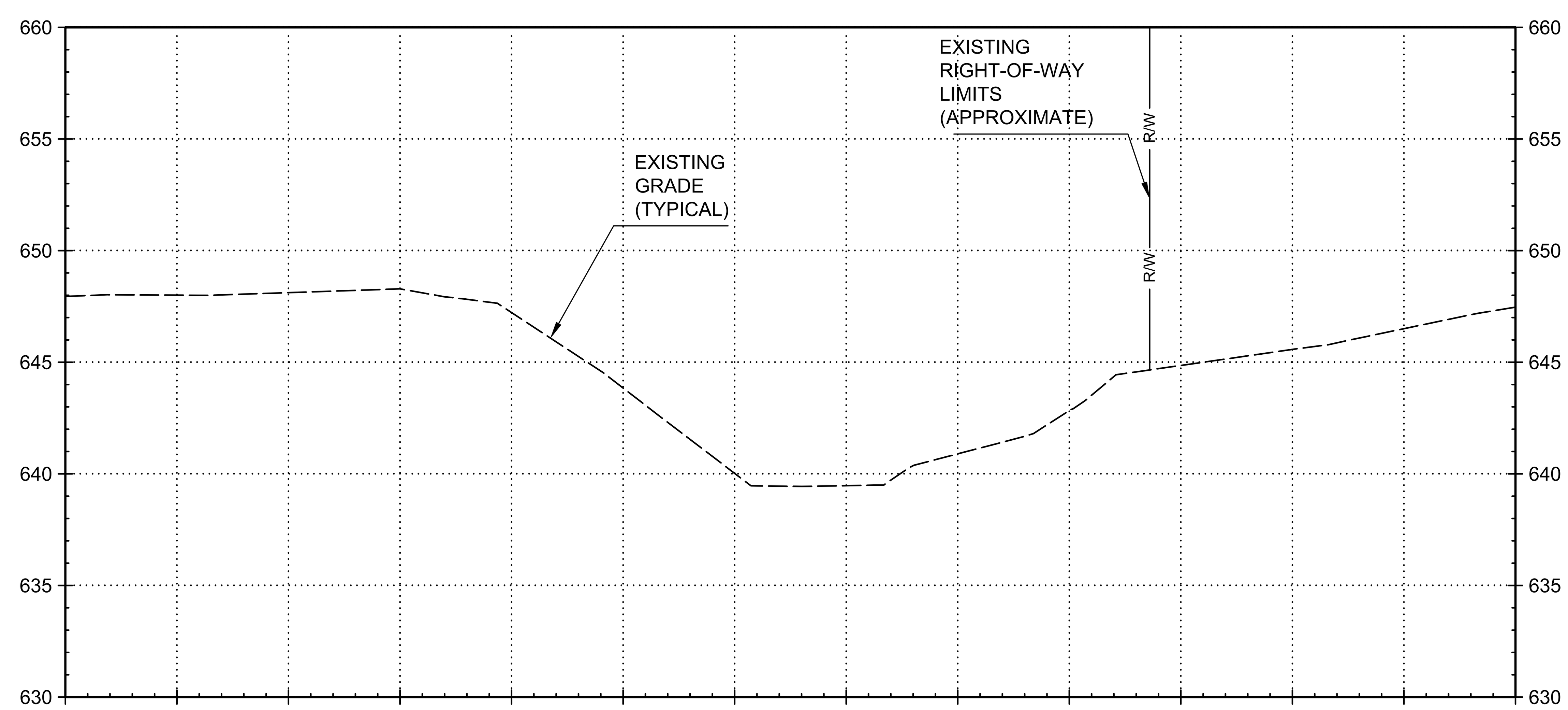

STATION
0+75

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V: 1"=10'

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SCALE: 1"=10'

NOTES:

1. EXISTING GROUND CROSS SECTION INFORMATION, INCLUDING, TOPOGRAPHIC INFORMATION, PROPERTY LINE AND RIGHT-OF-WAY INFORMATION SHOWN PER SURVEY TITLED "TOPOGRAPHIC SURVEY FOR INDIAN RUN CAP PROJECT, COLEMAN FALLS", DATED 14 DECEMBER 2020, AS PREPARED BY MSA, P.C.
2. SEE SHEET C-103 FOR EXISTING ELEVATION OFFSETS.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: S.VO	ISSUE DATE: JANUARY 2021
DRAWN BY: S.VO	SOLICITATION NO.:
CHECKED BY: B.HARRIS	CONTRACT NO.:
SUBMITTED BY: B.HARRIS	NAO FILE NO.: 878
SIZE: ANSDI D	

U.S. ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
803 FRONT STREET
NORFOLK, VA 23510

10% CAP SUBMITTAL
(NOT FOR CONSTRUCTION)

COLEMAN FALLS
BEDFORD COUNTY, VIRGINIA
INDIAN RUN CAP PROJECT

EXISTING GROUND CROSS SECTIONS

SHEET ID

C-102

S:\BEDFORD COUNTY\878_000000_464451 (INDIAN RUN CAP)\2_DESIGN\A_FEASIBILITY STUDY\CADD\GRADING\EXHIBIT_GRADING.DWG E4ECESHV
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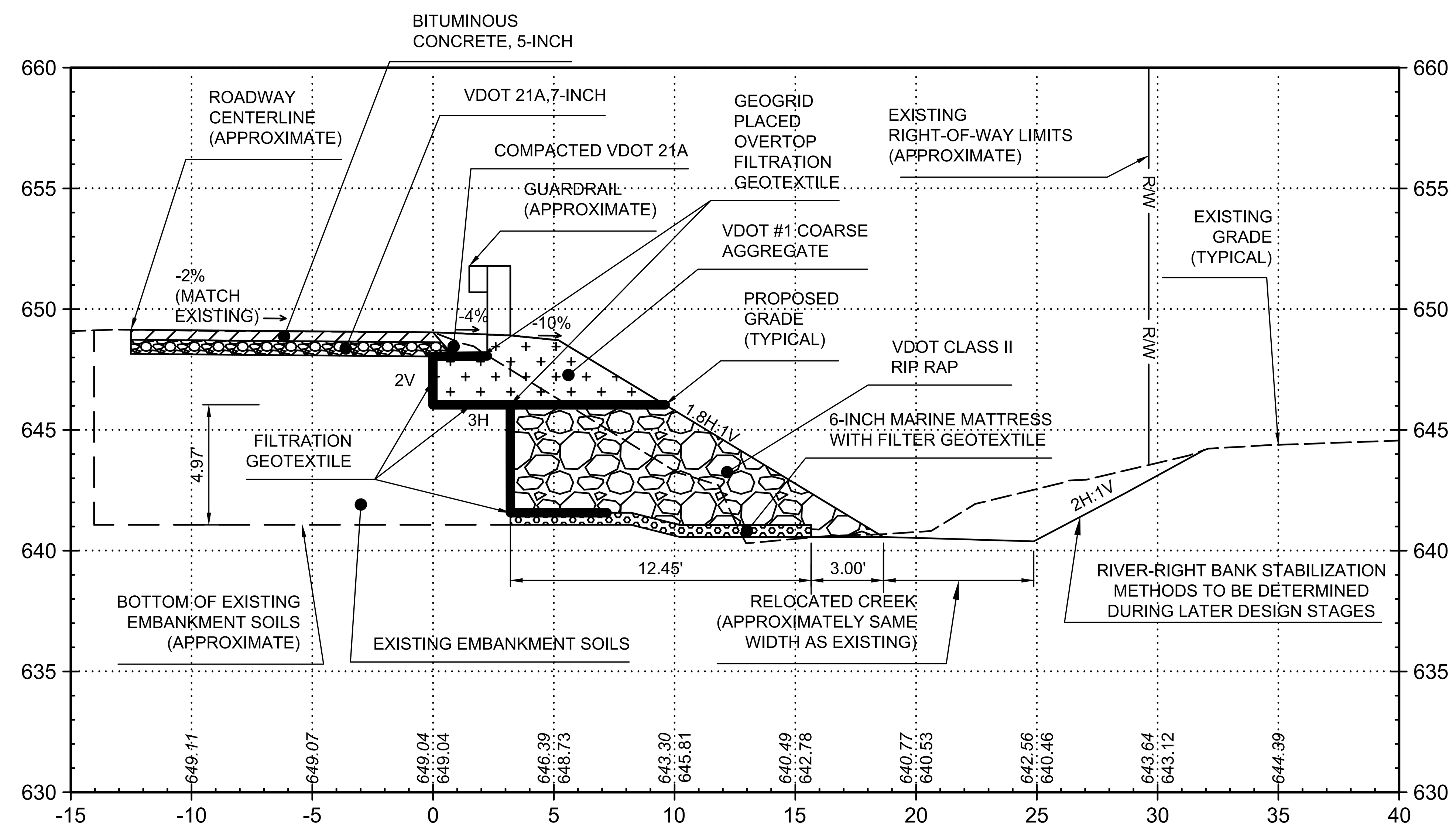

STATION 0+25

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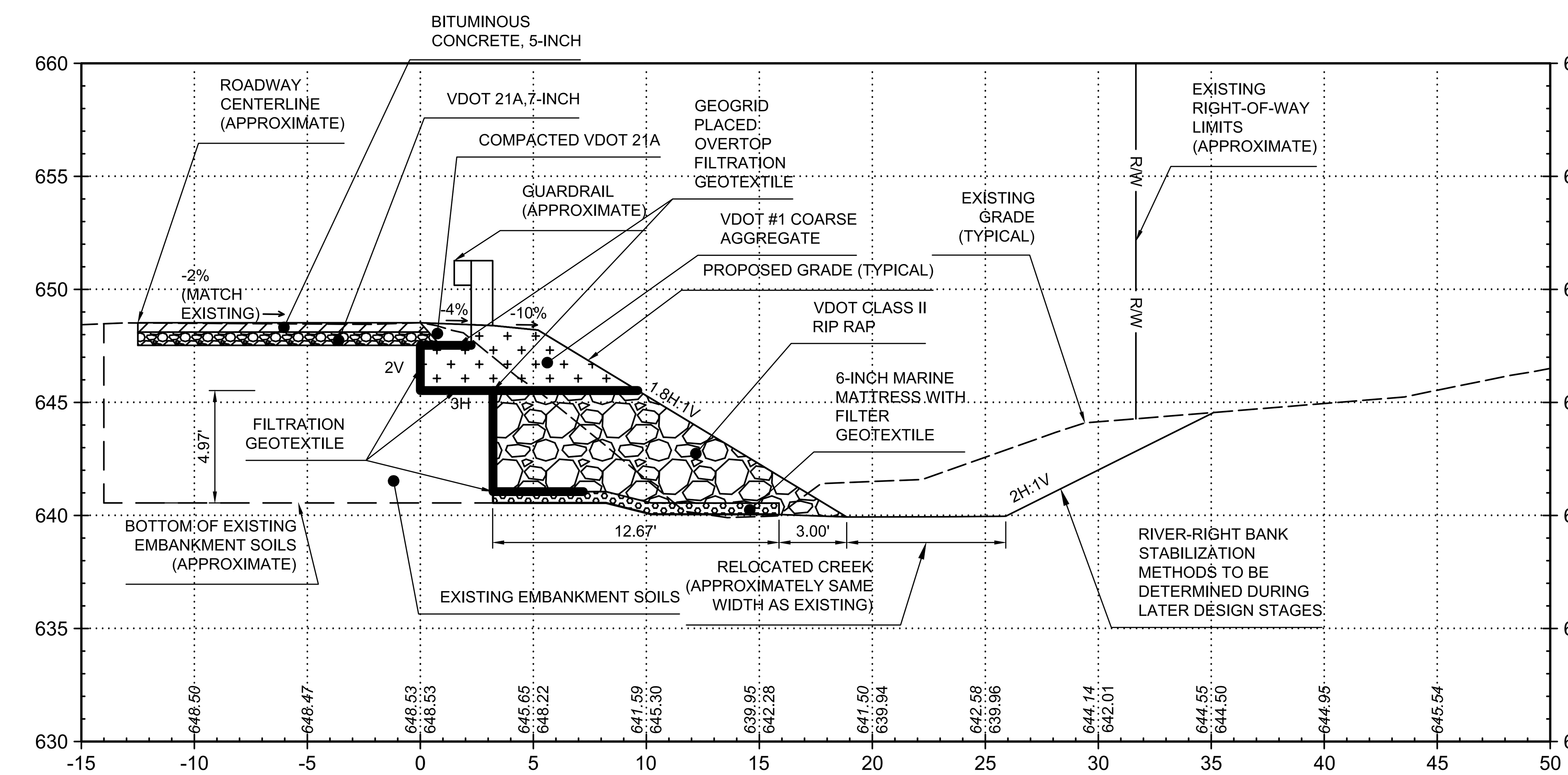
V: 1"=10'

SCALE: 1"=10'



STATION 0+50

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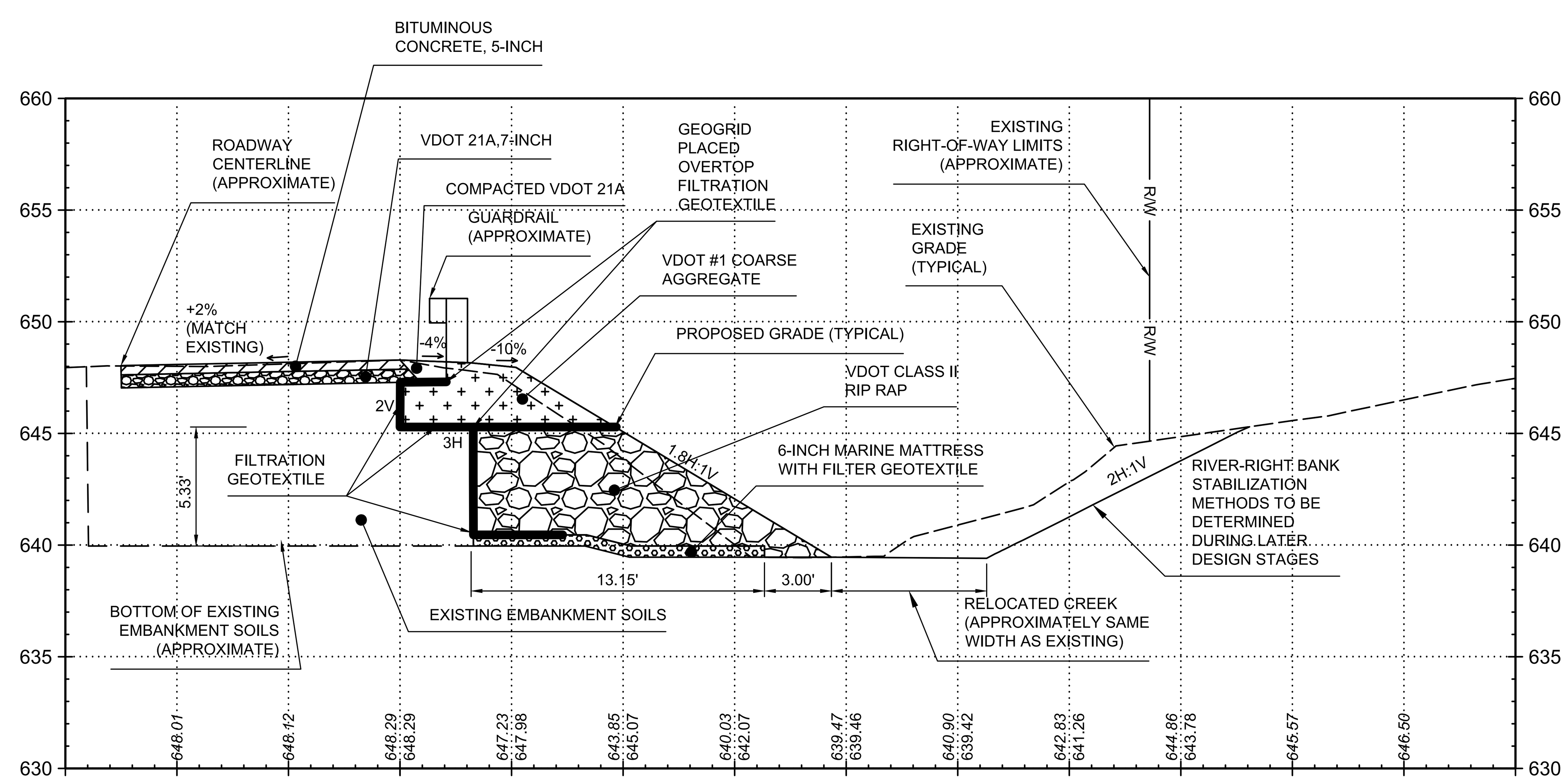
SCALE: 1"=10'



STATION 0+75

SCALE: H:1"=10'
V: 1"=10'

SCALE: 1"=10'

NOTES:

1. THESE CROSS-SECTIONS VIEWS REPRESENT THE IMPLEMENTATION OF MODIFIED ALTERNATIVE NO.6 FOR THE INDIAN RUN CAP PROJECT. THIS DOCUMENT SHALL NOT BE USED FOR CONSTRUCTION.
2. THE RIGHT-OF-WAY LINE SHOWN IN THESE CROSS-SECTIONS VIEWS WAS DELINEATED BASED ON THE SURVEY DATA. THIS LINE SHALL BE CONSIDERED APPROXIMATE AS IT IS SHOWN IN THESE CROSS-SECTION VIEWS.
3. WHERE THE PROPOSED IMPROVEMENTS REQUIRED RECONSTRUCTION OF THE ROADWAY SECTION, THE PROPOSED GRADES AND CROSS SLOPE OF THE ROAD SHALL MATCH THE EXISTING GRADES AND CROSS SLOPE OF THE ROAD. ANY PROPOSED CROSS SLOPE VALUES FOR THE ROADWAY SHOWN IN THESE CROSS SECTION VIEW ARE PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY. THE EXISTING GRADES AND CROSS SLOPES OF THE ROADWAY SHALL REMAIN.
4. THE PAVEMENT SECTION PROPOSED IN THESE CROSS SECTIONS IS AN ESTIMATED PAVEMENT SECTION. AN ENGINEERED DESIGN SHALL BE REQUIRED FOR THE PROPOSED PAVEMENT SECTION DURING SUBSEQUENT DESIGN STAGES FOR THE PROJECT.
5. THE PROJECT LIMITS ARE SUBJECT TO CHANGE DEPENDING ON THE CHOSEN METHOD OF BANK STABILIZATION FOR THE RIVER-RIGHT STREAM BANK. RIVER-RIGHT STREAM BANK STABILIZATION METHODS MAY INCLUDE ARMORING WITH RIP RAP OR IMPLEMENTING NATURAL CHANNEL DESIGN PRINCIPLES, WHICH SHALL BE DETERMINED DURING FUTURE DESIGN STAGES AND ARE NOT SHOWN ON THIS EXHIBIT.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: S.VO
DRAWN BY: S.VO
CHECKED BY: B.HARRIS
SUBMITTED BY: B.HARRIS
SIZE: ANSI D

ISSUE DATE: JANUARY 2021
SOLICITATION NO.:
CONTRACT NO.:
NAO FILE NO.: 878

U.S. ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
803 FRONT STREET
NORFOLK, VA 23510

10% CAP SUBMITTAL
(NOT FOR CONSTRUCTION)

COLEMAN FALLS
BEDFORD COUNTY, VIRGINIA
INDIAN RUN CAP PROJECT

PRELIMINARY CROSS SECTIONS

SHEET ID
C-103

S:\BEDFORD COUNTY\878_000000_464451 (INDIAN RUN CAP)\2_DESIGN\A_FEASIBILITY STUDY\CADD\GRADINGEXHIBIT\GRADINGEXHIBIT_GRADING.DWG E4ECESHV
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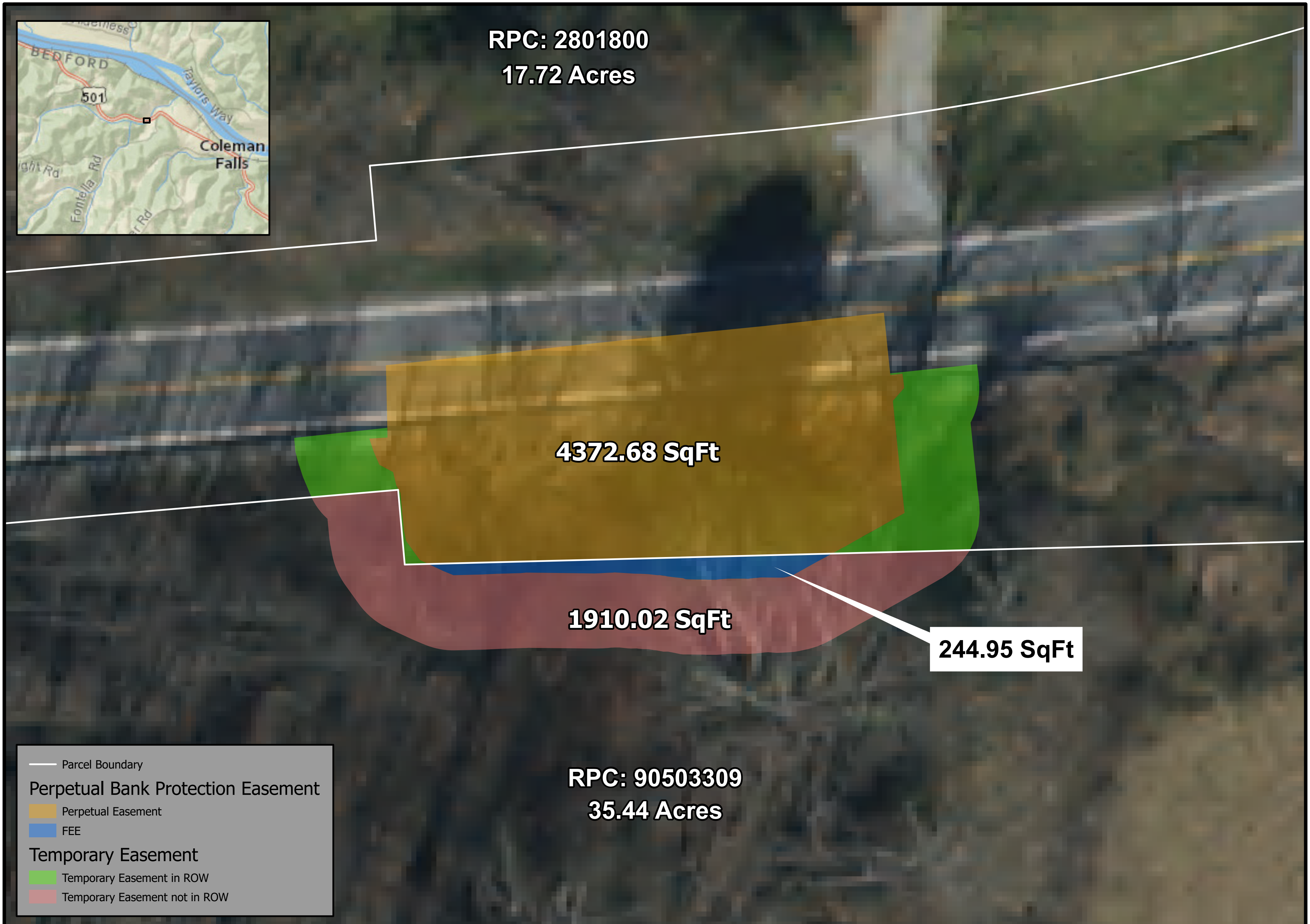


US Army Corps of Engineers
Norfolk District

CAP Section 14
Emergency Streambank Protection,
Indian Run, Coleman Falls, Virginia

0 5 10 20 30 40 Feet

Map: IndianRun
Developed By: Kevin White
Date: 2/8/2021

ATTACHMENT 3:
HEC-RAS RESULTS

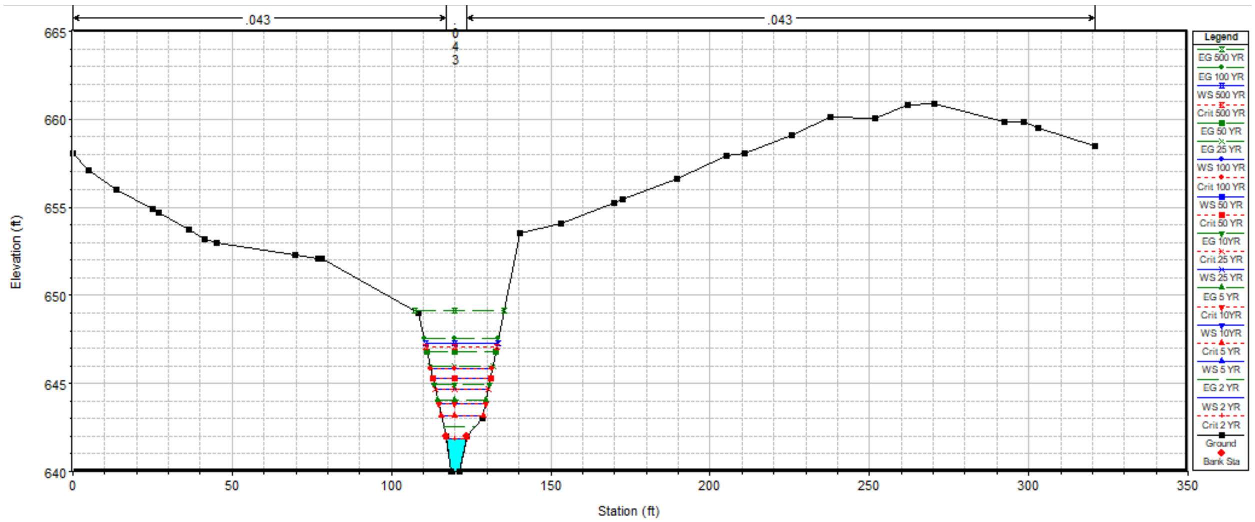
ATTACHMENT 3:

HEC-RAS MODEL OUTPUT FILES

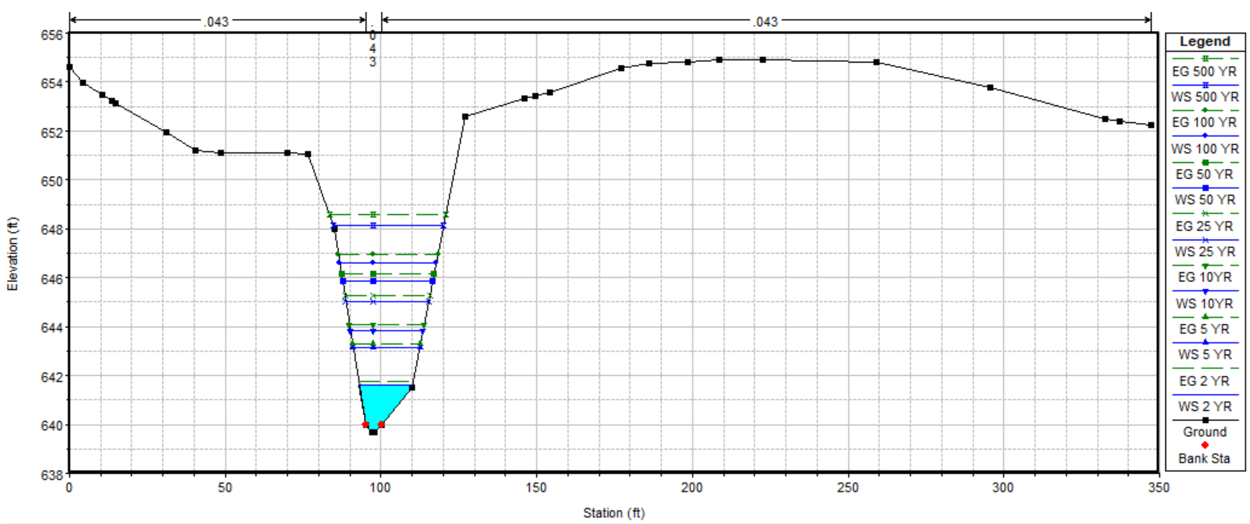
HEC-RAS MODEL & CROSS SECTIONS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	248	25 YR	371.70	642.50	646.84	646.84	647.96	0.018210	9.83	47.76	21.12	0.88
Reach 1	248	50 YR	493.30	642.50	647.35	647.35	648.64	0.018240	10.68	59.00	23.17	0.90
Reach 1	248	100 YR	623.00	642.50	647.85	647.85	649.26	0.017651	11.30	71.17	25.19	0.90
Reach 1	248	500 YR	953.10	642.50	648.86	648.86	650.56	0.017340	12.71	98.63	29.25	0.92
Reach 1	165	2 YR	54.70	641.00	643.09		643.40	0.012150	4.46	12.27	7.89	0.63
Reach 1	165	5 YR	144.50	641.00	644.16	643.77	644.84	0.016986	6.62	22.12	13.68	0.78
Reach 1	165	10YR	233.00	641.00	644.98	644.98	645.64	0.012133	6.88	41.82	34.26	0.69
Reach 1	165	25 YR	371.70	641.00	646.13		646.50	0.005375	5.65	84.45	39.79	0.48
Reach 1	165	50 YR	493.30	641.00	646.92		647.24	0.003798	5.33	117.31	43.37	0.42
Reach 1	165	100 YR	623.00	641.00	647.65		647.95	0.003028	5.20	150.04	46.66	0.38
Reach 1	165	500 YR	953.10	641.00	649.19		649.49	0.002199	5.20	227.32	53.64	0.34
Reach 1	121	2 YR	54.70	640.00	641.85	641.85	642.52	0.033625	6.57	8.32	6.22	1.00
Reach 1	121	5 YR	144.50	640.00	643.18	643.18	644.03	0.019112	7.69	21.14	13.08	0.84
Reach 1	121	10YR	233.00	640.00	643.87	643.87	644.91	0.018260	8.80	30.75	14.69	0.85
Reach 1	121	25 YR	371.70	640.00	644.70	644.70	646.01	0.017887	10.11	43.65	16.62	0.88
Reach 1	121	50 YR	493.30	640.00	645.28	645.28	646.81	0.017821	11.02	53.81	17.99	0.90
Reach 1	121	100 YR	623.00	640.00	645.87	645.87	647.55	0.017233	11.72	64.69	19.35	0.90
Reach 1	121	500 YR	953.10	640.00	647.28	647.07	649.13	0.014510	12.59	94.46	22.66	0.86
Reach 1	93	2 YR	54.70	639.70	641.63		641.78	0.004855	3.56	19.62	17.22	0.47
Reach 1	93	5 YR	144.50	639.70	643.14		643.30	0.002421	3.76	48.78	21.41	0.36
Reach 1	93	10YR	233.00	639.70	643.85		644.08	0.002835	4.63	64.51	23.36	0.41
Reach 1	93	25 YR	371.70	639.70	645.01		645.29	0.002536	5.19	93.58	26.59	0.40
Reach 1	93	50 YR	493.30	639.70	645.85		646.16	0.002415	5.59	116.80	28.92	0.40
Reach 1	93	100 YR	623.00	639.70	646.60		646.95	0.002372	5.99	139.30	31.00	0.41
Reach 1	93	500 YR	953.10	639.70	648.13		648.58	0.002391	6.89	189.92	35.43	0.42
Reach 1	65	2 YR	54.70	638.80	641.51		641.66	0.003698	3.44	18.82	11.42	0.41
Reach 1	65	5 YR	144.50	638.80	642.92		643.20	0.003781	4.87	37.49	15.06	0.45
Reach 1	65	10YR	233.00	638.80	643.43		643.94	0.005755	6.57	45.63	16.40	0.57
Reach 1	65	25 YR	371.70	638.80	644.49		645.15	0.005848	7.72	64.43	19.64	0.60
Reach 1	65	50 YR	493.30	638.80	645.27		646.02	0.005703	8.38	80.95	22.52	0.61
Reach 1	65	100 YR	623.00	638.80	645.99		646.81	0.005553	8.92	98.03	25.15	0.61
Reach 1	65	500 YR	953.10	638.80	647.48		648.43	0.005240	9.91	139.58	30.63	0.61
Reach 1	27	2 YR	54.70	638.50	640.77		641.33	0.024811	5.95	9.19	5.55	0.82
Reach 1	27	5 YR	144.50	638.50	642.23	642.23	642.90	0.016743	6.96	25.10	21.41	0.72
Reach 1	27	10YR	233.00	638.50	643.31		643.65	0.006967	5.55	57.90	39.15	0.49
Reach 1	27	25 YR	371.70	638.50	644.69		644.85	0.002678	4.19	129.71	68.48	0.32
Reach 1	27	50 YR	493.30	638.50	645.61		645.72	0.001601	3.61	204.05	94.26	0.25
Reach 1	27	100 YR	623.00	638.50	646.42		646.51	0.001105	3.25	293.72	125.76	0.22
Reach 1	27	500 YR	953.10	638.50	648.06		648.11	0.000608	2.77	576.71	225.91	0.17
Reach 1	14	2 YR	182.90	637.82	641.00		641.07	0.001400	2.95	91.66	55.73	0.29
Reach 1	14	5 YR	462.90	637.82	642.33		642.44	0.001474	3.84	179.78	76.22	0.32
Reach 1	14	10YR	745.50	637.82	643.36		643.49	0.001339	4.20	265.75	91.51	0.32
Reach 1	14	25 YR	1211.70	637.82	644.61		644.77	0.001239	4.64	392.52	109.82	0.32
Reach 1	14	50 YR	1640.40	637.82	645.46		645.65	0.001222	4.99	490.14	119.71	0.32
Reach 1	14	100 YR	2109.20	637.82	646.22		646.43	0.001231	5.34	590.42	158.58	0.33
Reach 1	14	500 YR	3336.10	637.82	647.78		648.03	0.001224	5.96	860.29	188.11	0.33

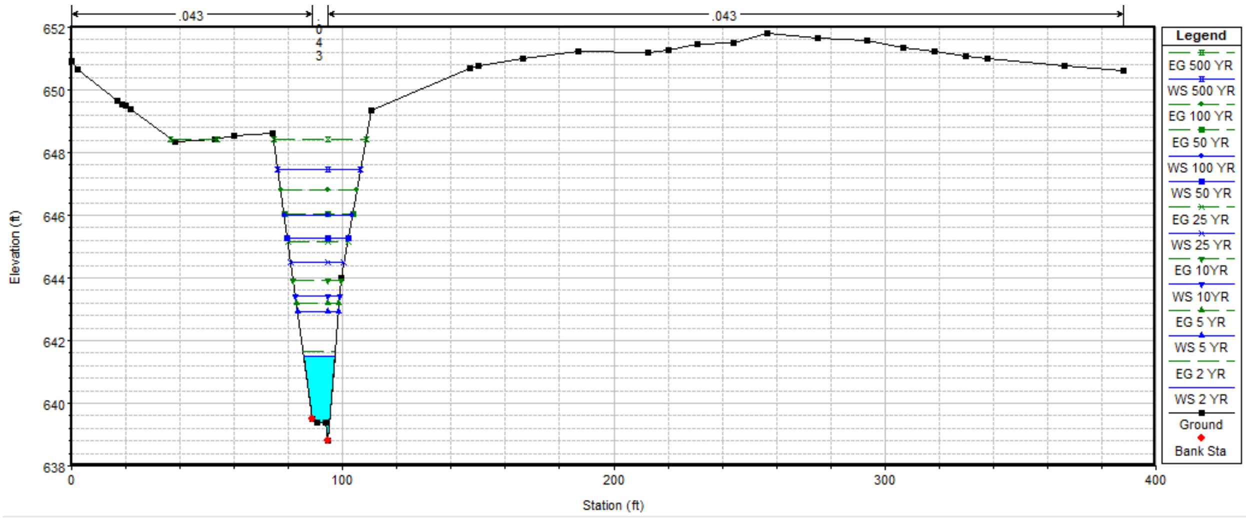
HEC-RAS Profile Output Table (River Station 121, 93 and 65 are near the current revetment)



Cross Section-121

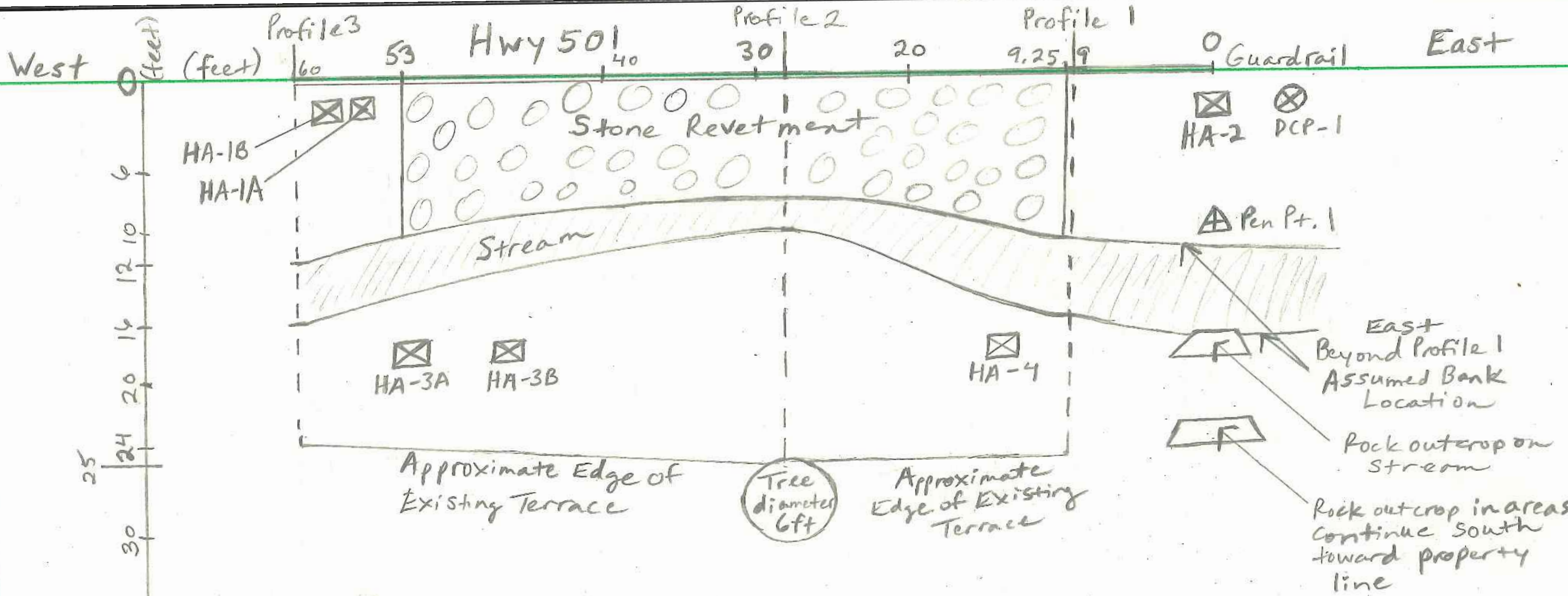


Cross Section-93



Cross Section-65

ATTACHMENT 4:
GEOTECHNICAL FIELD DATA AND RESULTS



Indian Run Field Exploration Sketch with Approximate Cross Section Locations

Note: Profile 2 approximately 233 feet west of culvert center that passes beneath Highway 501. Measurement was recorded along the south edge of the roadway.

Key

- Hand Auger Location
- DCP Location
- Pen Pt. Location
- General Profile Alignment
- Rock Outcrop

September 22 and 23, 2020
U.S. Army Corps of Engineers, Norfolk District
Geo-Environmental Engineering Section

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Indian Run	10. SIZE AND TYPE OF BIT 2 1/4 HA
2. LOCATION (Coordinates or Station) Coleman Fall, VA N 3,707,669.9 E 11,247,738.9	11. DATUM FOR ELEVATION SHOWN (*TBM or MSL*)
3. DRILLING AGENCY US Army Corps of Engineers, Norfolk District	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (*As shown on drawing title and file number*) HA-1A & HA-1B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Jennifer Spitz	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 9/22/2020 — COMPLETED 9/22/2020
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE +647.5
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 2.6	19. GEOLOGIST Jennifer Spitz

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS (*Drilling time, water loss, depth weathering, etc., if significant*) g
+647.4	0.1		[GRAVEL]			
+644.9	2.6		[FILL] Brown and Reddish Brown, Clayey Fine to Coarse SAND with some gravel, moist, roots, mica			Roots and piece of glass at 4 inches bgs Soil Sample HA-1A depth 1-2 feet: LL=20, PL=12, PI=8, WC=13.3% Large root encountered at 1.3 feet bgs Roots and piece of glass encountered at 1.5 feet bgs HA-1A terminated at 2 feet bgs. HA-1B augered down to 2 feet. Soil conditions similar to HA-1A down to 2 feet bgs. HA-1B locacated approximately 1.7 feet east of location HA-1A. Bottom of hole was observed to feel like gravelly material. No groundwater encountered
			Hand auger terminated at 2.6 feet below ground surface.			

1/18/2021

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Indian Run	10. SIZE AND TYPE OF BIT 2 1/4 HA
2. LOCATION (Coordinates or Station) Coleman Fall, VA N 3,707,673.1 E 11,247,793.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY US Army Corps of Engineers, Norfolk District	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) HA-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Jennifer Spitz	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.	15. ELEVATION GROUND WATER 639.7
	16. DATE HOLE STARTED 9/22/2020 COMPLETED 9/22/2020
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE +647.5
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 8.0	19. GEOLOGIST Jennifer Spitz

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+647.5 +646.9	0.0 0.6		[FILL] Brown, Dark Brown, and Orangish Brown Silty Fine SAND with roots and clay balls, moist			Roots encountered to 6 inches bgs
+645.5	2.0		[CL] Reddish Brown and Brown, Silty CLAY with little fine to medium sand, moist, roots (possible fill to 2 feet bgs)			
+644.5	3.0		[CL] Reddish Brown and Brown, Silty CLAY with trace weathered rock, roots, trace to little fine to medium sand, moist			Soil Sample HA-2 depth 2 to 3 feet: LL=42, PL=20, PI=22, WC=28.5% Trace roots encountered from 2.3 to 2.5 feet bgs Clay observed to become more plastic from 2.5 to 2.8 feet bgs
+643.3	4.2		[CL] Brown Mottled Reddish Brown Silty CLAY with little to some fine to medium sand, trace roots, moist, little mica			Soil Sample HA-2 depth 3 to 3.5 feet: LL=30, PL=18, PI=12, WC=21.6%
+641.2	6.3		[SC] Brown, Micaceous Clayey Fine SAND, trace roots, trace medium sand, moist			Natural ground observed at approximately 4.2 feet bgs Trace roots extend to approximately 4.8 feet bgs
+640.7	6.8		[SC] Brown, Micaceous Clayey Fine to Medium SAND, trace coarse sand, moist to wet			Soil Sample HA-2 depth 6.33 to 6.8 feet: LL=21, PL=11, PI=10, WC=24.9%
+639.5	8.0		[SC] Gray Mottled Brown, Clayey Fine SAND, trace roots, trace gravel in bottom of hand auger, wet			Soil Sample HA-2 depth 6.8 to 7.6 feet: LL=37, PL=19, PI=18, WC=47.6% Groundwater encountered at 7.8 feet bgs
			Hand auger terminated at 8 feet below ground surface. Hand auger scraping on hard surface, possible rock.			

1/18/2021

Hole No. HA-3A & HA-3B

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Indian Run	10. SIZE AND TYPE OF BIT 2 1/4 HA
2. LOCATION (Coordinates or Station) Coleman Fall, VA N 3,707,654.4 E 11,247,758.1	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
3. DRILLING AGENCY US Army Corps of Engineers, Norfolk District	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. *(As shown on drawing title and file number)* HA-3A & HA-3B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER Jennifer Spitz	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.	15. ELEVATION GROUND WATER 640.2
	16. DATE HOLE STARTED 9/23/2020 COMPLETED 9/23/2020
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE +641.8
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 1.8	19. GEOLOGIST Jennifer Spitz

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
+641.8	0.0		[SC] Brown, Micaceous Clayey Fine SAND with roots, organics, moist			
+641.1	0.7		[SC] Brown, Micaceous Clayey Fine SAND with roots, trace to little organics, glass bottle top excavated in hand auger, moist to wet			Soils in HA-3A and HA-3B observed to be stream bank deposits Groundwater encountered at HA-3B at approximately 1.4 feet bgs. Soil Sample HA-3A depth 1.25 to 1.67 feet: LL=37, PL=21, PI=16, WC=48.4% Groundwater encountered at HA-3A at approximately 1.6 feet bgs. Hand auger location HA-3A terminated at approximately 1.7 feet bgs due to hard surface, possible rock. Moved approximately 4 feet east to HA-3B. Hand augered down to 1.8 feet bgs and encountered hard surface, possible rock.
+640.1	1.7		[SC] Brown, Micaceous Clayey Fine to Medium SAND with cobble size rock in auger, wet			
+640.0	1.8		Hand auger terminated at approximately 1.8 feet bgs. Hand auger scraping on hard surface, possible rock.			

1/18/2021

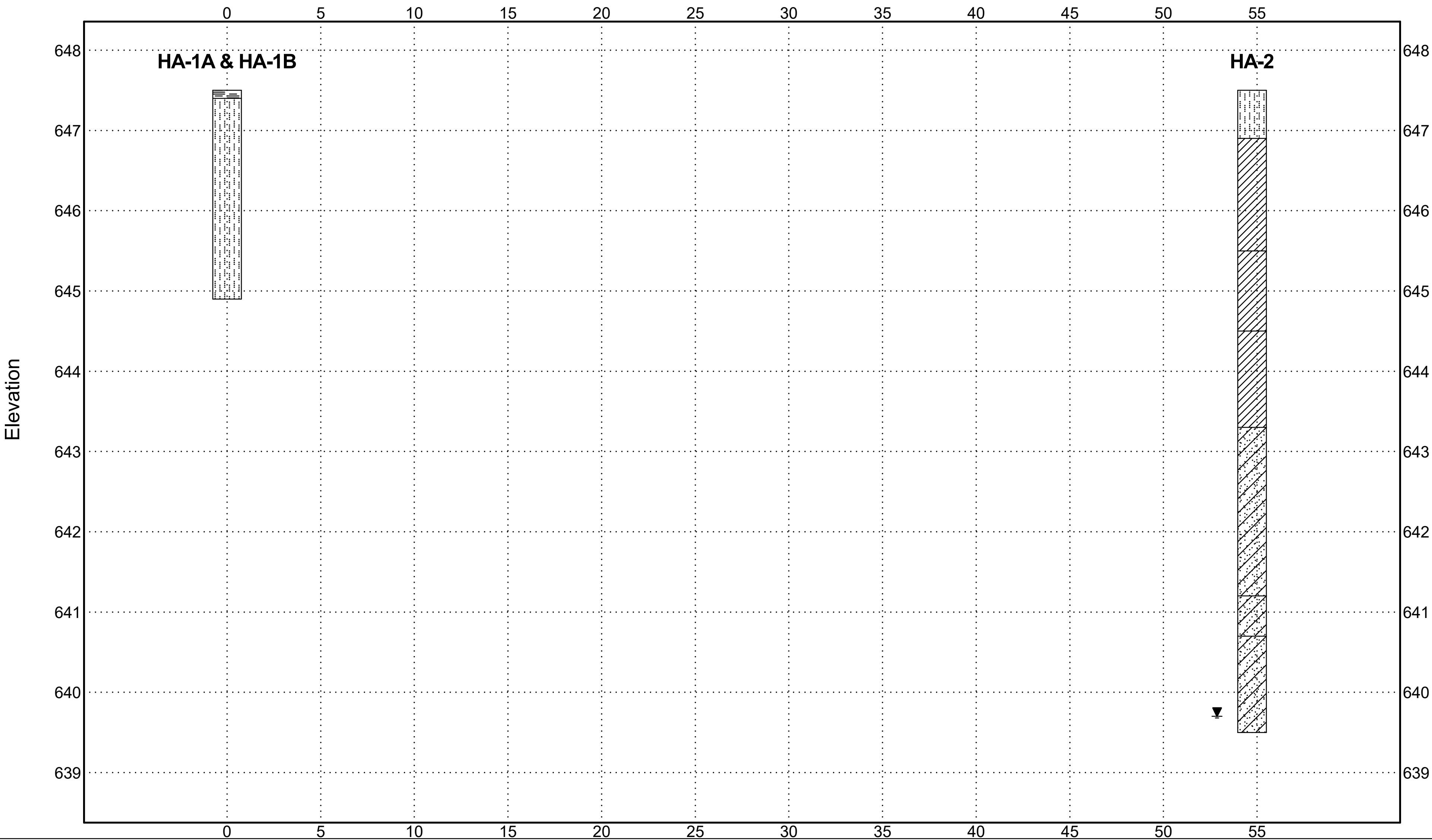
Hole No. HA-4

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Indian Run	10. SIZE AND TYPE OF BIT 2 1/4 HA
2. LOCATION (Coordinates or Station) Coleman Fall, VA N 3,707,654.0 E 11,247,786.8	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
3. DRILLING AGENCY US Army Corps of Engineers, Norfolk District	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. *(As shown on drawing title and file number)* HA-4	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER Jennifer Spitz	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.	15. ELEVATION GROUND WATER 639.7
	16. DATE HOLE: STARTED 9/23/2020; COMPLETED 9/23/2020
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE +641.0
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 1.4	19. GEOLOGIST Jennifer Spitz

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS *(Drilling time, water loss, depth weathering, etc., if significant)* g
+641.0	0.0		[SC] Brown, Micaceous Clayey Fine SAND with roots and organics, moist			
+640.2	0.8		[SC] Brown, Micaceous Clayey Fine to Medium SAND with trace gravel and coarse sand, roots, moist to wet			Soils in HA-4 observed to be stream bank deposits Soil Sample HA-4 depth 0.83 to 1.25 feet: LL=28, PL=17, PI=11, WC=38.7% Groundwater encountered at 1.3 feet bgs.
+639.7	1.3					
+639.6	1.4		[SC] Brown, Micaceous Clayey Fine to Medium SAND with quartz gravel in bottom of auger, wet			
			Hand auger terminated at approximately 1.4 feet below ground surface. Auger scraping hard surface, possible rock.			

1/18/2021



Graphic Symbol Legend

Lean clay, low to moderate plasticity

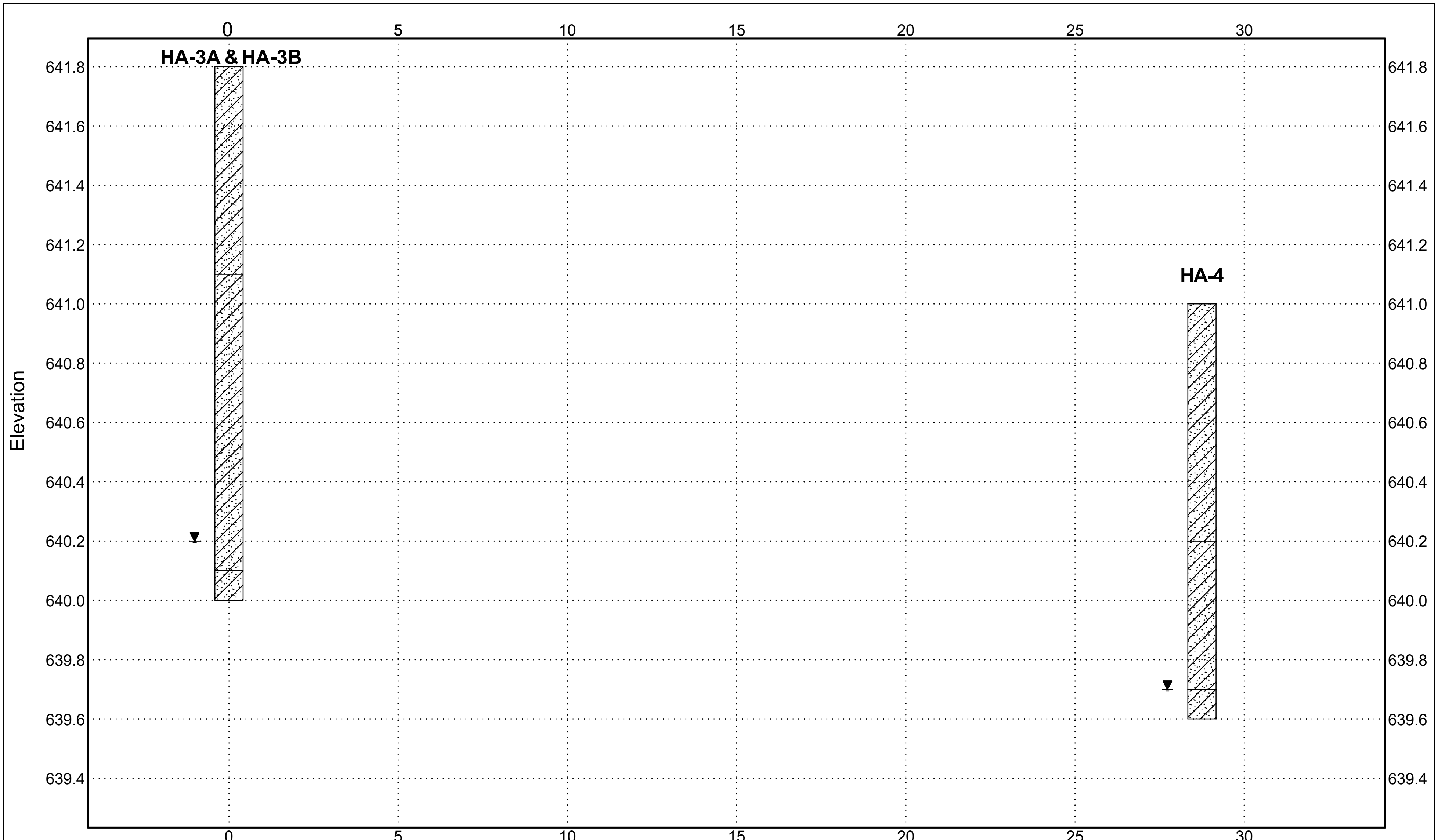
Fill

Clean gravel

Clayey sand

Project: Indian Run
Installation:
Location: Coleman Fall, VA
Date:

US Army Corps of Engineers Norfolk District



Graphic Symbol Legend

Lean clay, low to moderate plasticity | Fill | Clean gravel | Clayey sand

Project: Indian Run
Installation:
Location: Coleman Fall, VA
Date:

US Army Corps of Engineers Norfolk District

GET Solutions, Inc.
Geotechnical • Environmental • Testing

November 24, 2020

TO: **U.S. Army Corps of Engineers, Norfolk District**
803 Front Street
Norfolk, VA 23510

Attn: Ms. Jennifer Spitz, E.I.T.

RE: Report of Laboratory Testing
Indian Run – Lab Testing
Coleman Falls, Virginia
G E T Project No: VB20-282G

Dear Ms. Spitz:

As requested, **G E T Solutions, Inc.** performed laboratory testing on soil samples delivered to our Virginia Beach laboratory by the client. Soil testing was performed in accordance with American Society for Testing and Materials (ASTM) standards. All laboratory testing was performed in our AASHTO re:source (formally AMRL) and US Army Corps of Engineers certified Virginia Beach laboratory as detailed below. The comprehensive laboratory test results are attached.

Sample ID	Sample Depth (feet)	Natural Moisture	Gradation	Atterberg Limits
HA-1A	1 – 2	X	X	X
HA-2	2 – 3	X	X	X
HA-2	3 – 3.5	X	X	X
HA-2	6.33 – 6.8	X	X	X
HA-2	6.8 – 7.6	X	X	X
HA-3A	1.25 – 1.67	X	X	X
HA-4	0.83 – 1.25	X	X	X

We trust that the information contained herein meets your immediate need, and we would ask that you call this office with any questions that you may have.

Respectfully Submitted,
G E T Solutions, Inc.

Kelly Hale

Kelly Hale
Project Geologist

Attachments:
Classification System for Soil Exploration
Summary of Laboratory Results
Grain Size Distributions
Atterberg Limits Results

GET Solutions, Inc.
Geotechnical • Environmental • Testing

Virginia Beach
5465 Greenwich Road
Virginia Beach, VA 23462
(757) 518-1703

Williamsburg
1592 Penniman Rd. Suite E
Williamsburg, Virginia 23185
(757) 564-6452

Elizabeth City
504 East Elizabeth St. Suite 2
Elizabeth City, NC 27909
(252) 335-9765

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

Standard Penetration Test (SPT), N-value

Standard Penetration Tests (SPT) were performed in the field in general accordance with ASTM D 1586. The soil samples were obtained with a standard 1.4" I.D., 2" O.D., 30" long split-spoon sampler. The sampler was driven with blows of a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment (4 increments for each soil sample) of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value.

NON COHESIVE SOILS

(SILT, SAND, GRAVEL and Combinations)

Relative Density

Very Loose	4 blows/ft. or less
Loose	5 to 10 blows/ft.
Medium Dense	11 to 30 blows/ft.
Dense	31 to 50 blows/ft.
Very Dense	51 blows/ft. or more

COHESIVE SOILS

(CLAY, SILT and Combinations)

Consistency

Very Soft	2 blows/ft. or less
Soft	3 to 4 blows/ft.
Medium Stiff	5 to 8 blows/ft.
Stiff	9 to 15 blows/ft.
Very Stiff	16 to 30 blows/ft.
Hard	31 blows/ft. or more

Particle Size Identification

Boulders	8 inch diameter or more	
Cobbles	3 to 8 inch diameter	
Gravel	Coarse	1 to 3 inch diameter
	Medium	1/2 to 1 inch diameter
	Fine	1/4 to 1/2 inch diameter
Sand	Coarse	2.00 mm to 1/4 inch (diameter of pencil lead)
	Medium	0.42 to 2.00 mm (diameter of broom straw)
	Fine	0.074 to 0.42 mm (diameter of human hair)
Silt		0.002 to 0.074 mm (cannot see particles)

Relative Proportions

Descriptive Term	Percent
Trace	0-5
Few	5-10
Little	15-25
Some	30-45
Mostly	50-100

Strata Changes

In the column "Description" on the boring log, the horizontal lines represent approximate strata changes.

Groundwater Readings

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as tidal influences and man-made influences, such as existing swales, drainage ponds, underdrains and areas of covered soil (paved parking lots, side walks, etc.).

Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent	GW, GP, SW,SP
More than 12 percent	GM, GC, SM, SC
5 to 12 percent	Borderline cases requiring dual symbols

CLASSIFICATION SYMBOLS (ASTM D 2487 and D 2488)

Coarse Grained Soils

More than 50% retained on No. 200 sieve

GW - Well-graded Gravel
GP - Poorly graded Gravel
GW-GM - Well-graded Gravel w/Silt
GW-GC - Well-graded Gravel w/Clay
GP-GM - Poorly graded Gravel w/Silt
GP-GC - Poorly graded Gravel w/Clay
GM - Silty Gravel
GC - Clayey Gravel
GC-GM - Silty, Clayey Gravel
SW - Well-graded Sand
SP - Poorly graded Sand
SW-SM - Well-graded Sand w/Silt
SW-SC - Well-graded Sand w/Clay
SP-SM - Poorly graded Sand w/Silt
SP-SC - Poorly graded Sand w/Clay
SM - Silty Sand
SC - Clayey Sand
SC-SM - Silty, Clayey Sand

Fine-Grained Soils

50% or more passes the No. 200 sieve

CL - Lean Clay
CL-ML - Silty Clay
ML - Silt
OL - Organic Clay/Silt

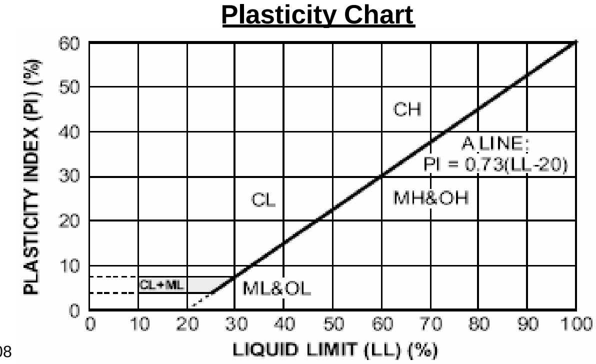
Liquid Limit 50% or greater

CH - Fat Clay
MH - Elastic Silt
OH - Organic Clay/Silt

Highly Organic Soils

PT - Peat

Plasticity Chart



SUMMARY OF LABORATORY RESULTS

GET Solutions, Inc.

CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia

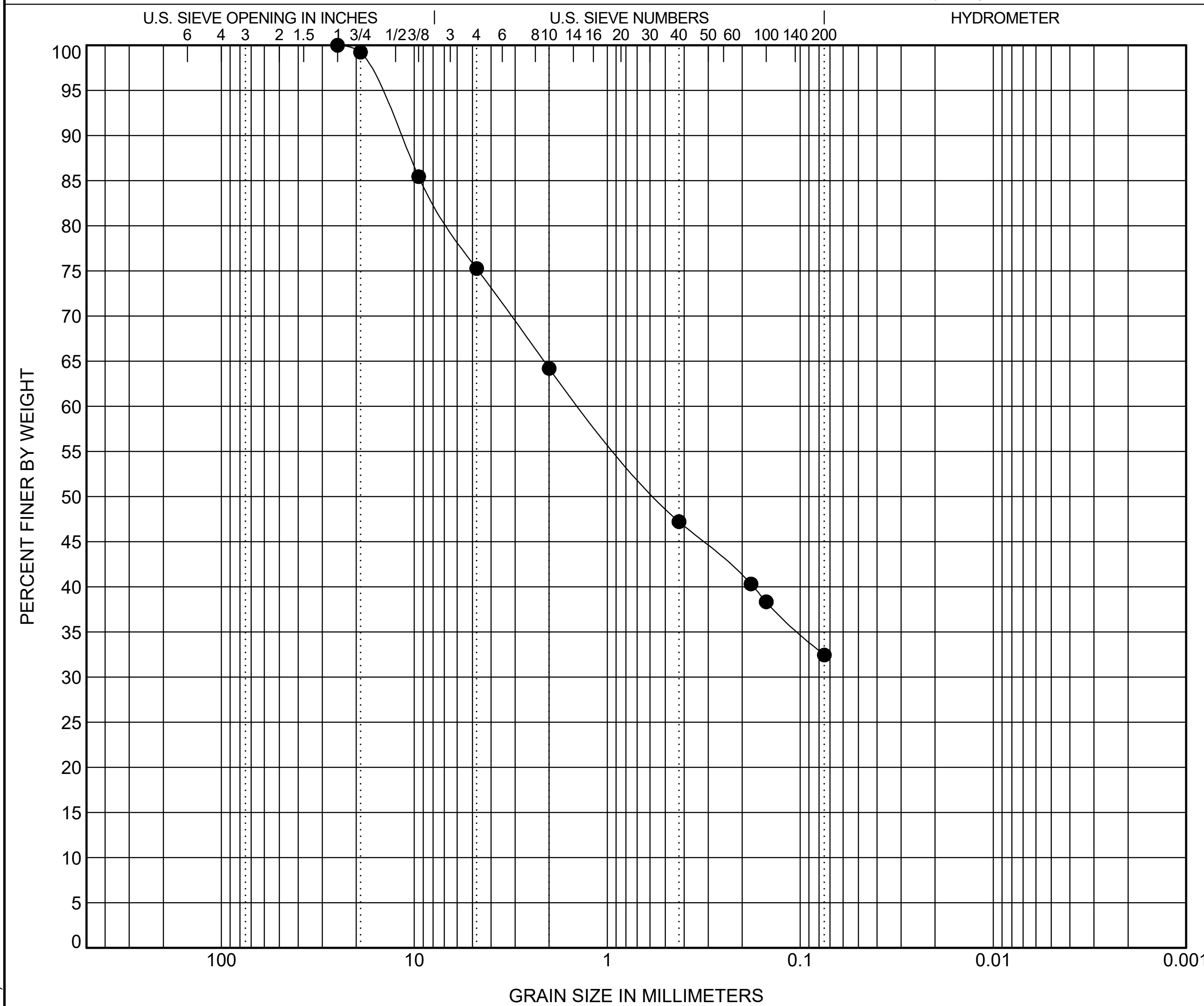
Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
HA-1A	1.5	20	12	8	0.075	32	SC	13.3			
HA-2	2.5	42	20	22	0.075	79	CL	28.5			
HA-2	3.3	30	18	12	0.075	61	CL	21.6			
HA-2	6.5	21	11	10	0.075	37	SC	24.9			
HA-2	7.2	37	19	18	0.075	49	SC	47.6			
HA-3A	1.5	37	21	16	0.075	40	SC	48.4			
HA-4	1.1	28	17	11	0.075	23	SC	38.7			

GET Solutions, Inc.

GRAIN SIZE DISTRIBUTION

CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HA-1A**	**1.5**	**CLAYEY SAND with GRAVEL(SC)**	**20**	**12**	**8**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HA-1A**	**1.5**	**25**	**1.364**			**24.7**	**42.8**	**32.4**	

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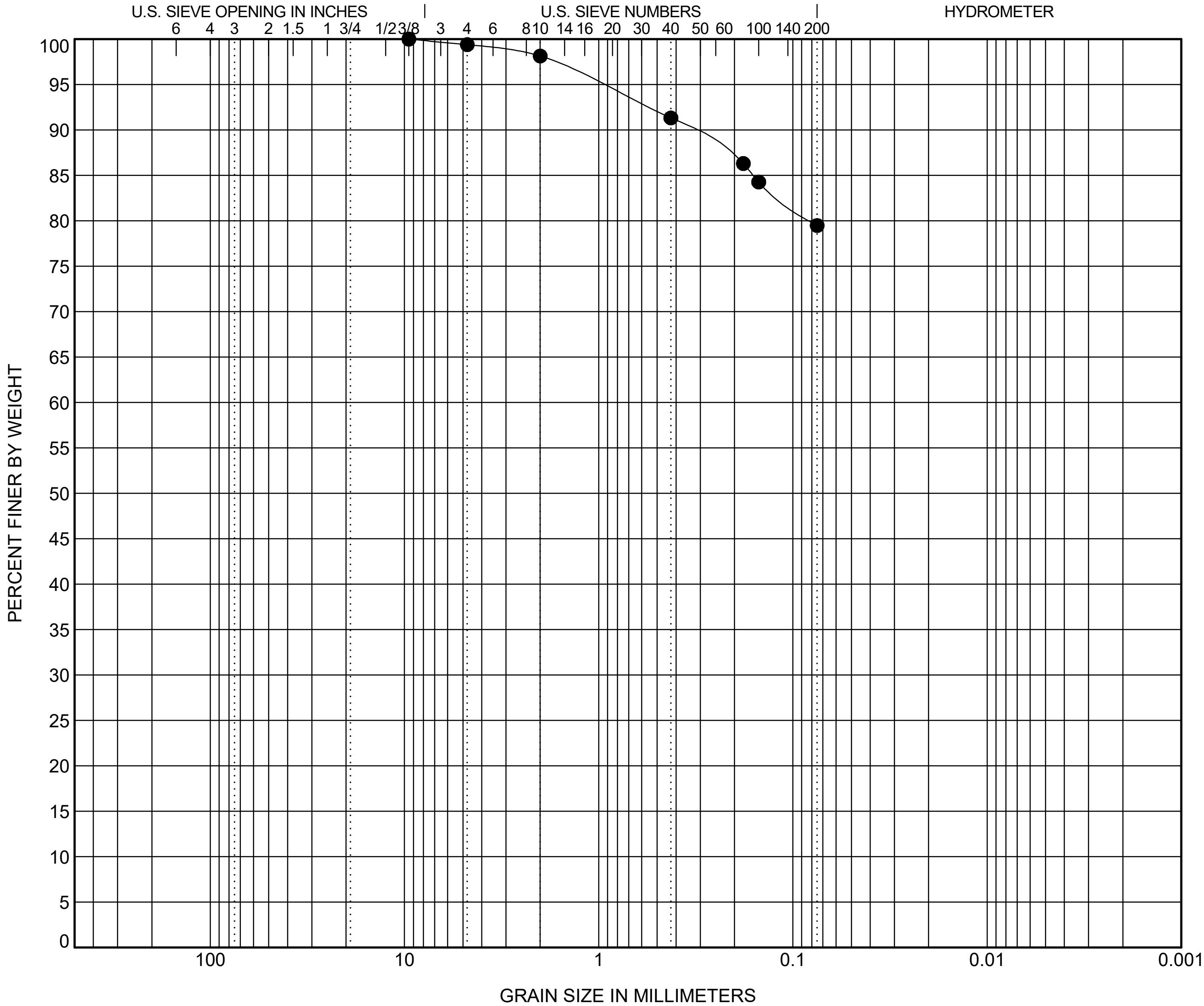
GRAIN SIZE DISTRIBUTION

CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HA-2**	**2.5**	**LEAN CLAY with SAND(CL)**	**42**	**20**	**22**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HA-2**	**2.5**	**9.5**				**0.6**	**19.9**	**79.5**	

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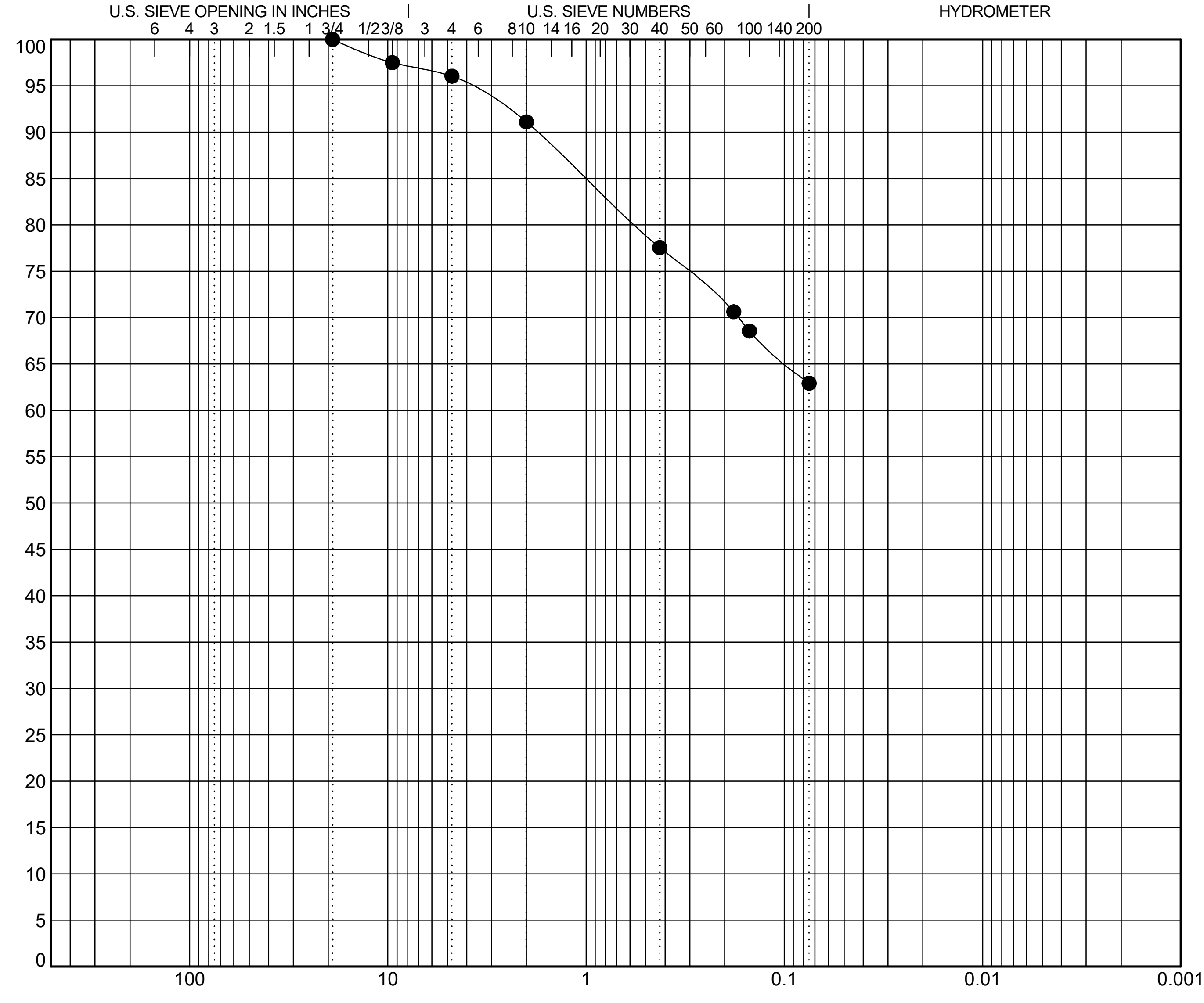
GRAIN SIZE DISTRIBUTION

CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia



	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HA-2**	**3.3**	**SANDY LEAN CLAY(CL)**	**30**	**18**	**12**		

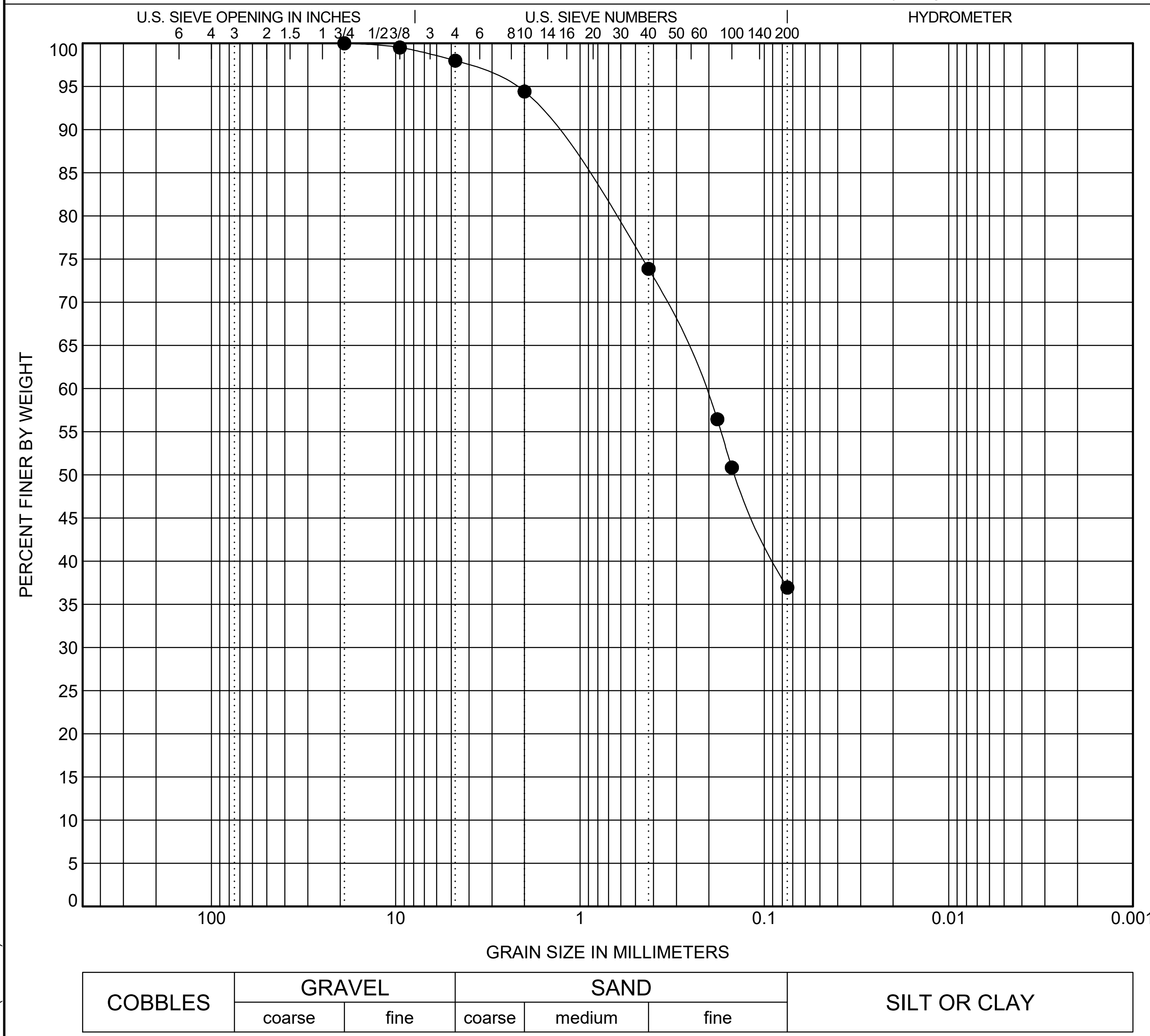
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HA-2**	**3.3**	**19**				**4.0**	**33.1**	**62.9**	

GRAIN SIZE DISTRIBUTION

GET Solutions, Inc.

CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **HA-2**	**6.5**	**CLAYEY SAND(SC)**	**21**	**11**	**10**		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **HA-2**	**6.5**	**19**	**0.215**			**2.0**	**61.0**	**36.9**	

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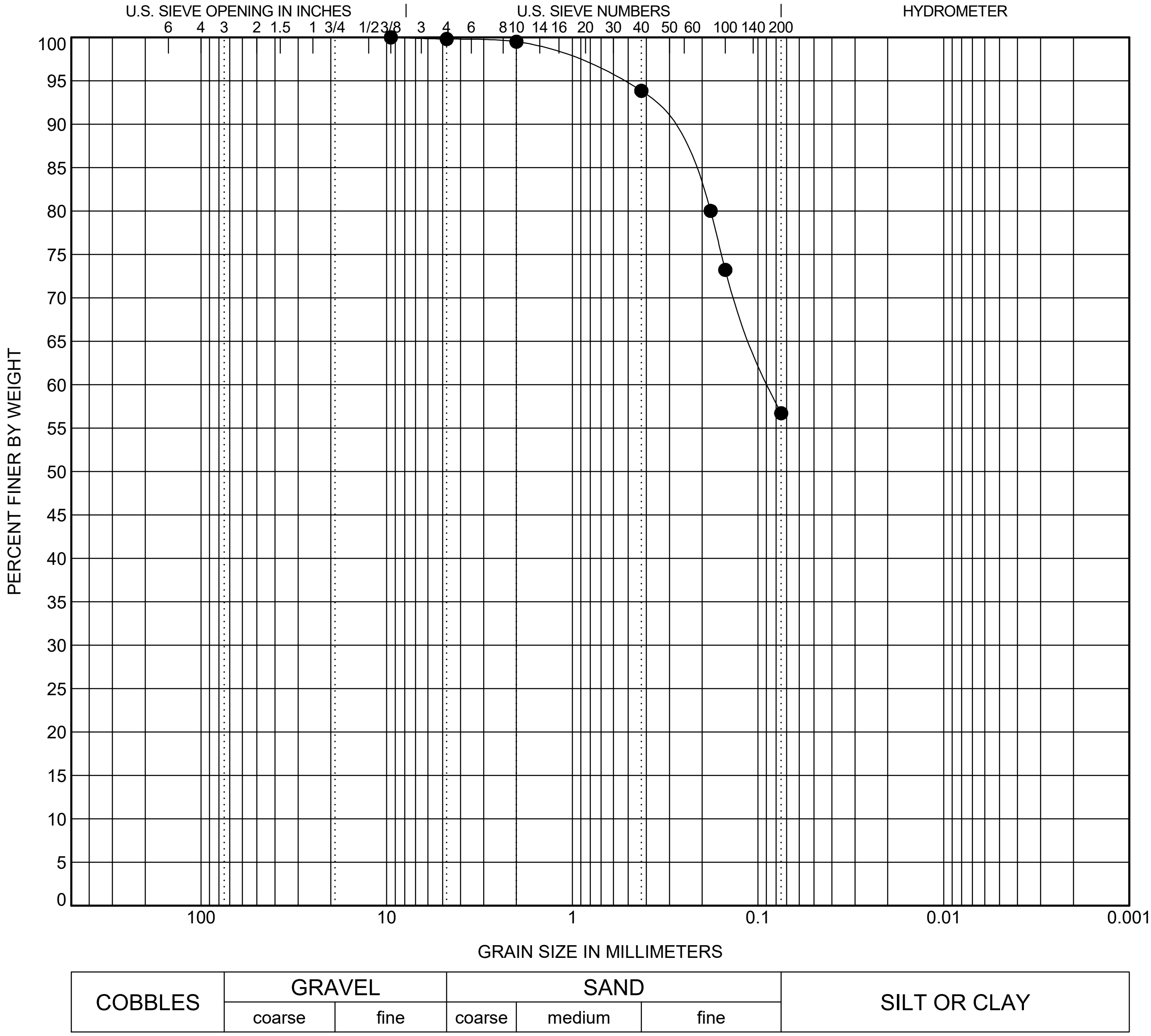
GRAIN SIZE DISTRIBUTION

CLIENT U.S. Army Corps of Engineers, Norfolk District

PROJECT NAME Indian Run

PROJECT NUMBER VB20-282G

PROJECT LOCATION Bedford County, Virginia



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● HA-2	7.2	**SANDY LEAN CLAY(CL)**	**37**	**19**	**18**		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● HA-2	7.2	**9.5**	**0.086**			**0.2**	**43.1**	**56.7**	

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GRAIN SIZE DISTRIBUTION

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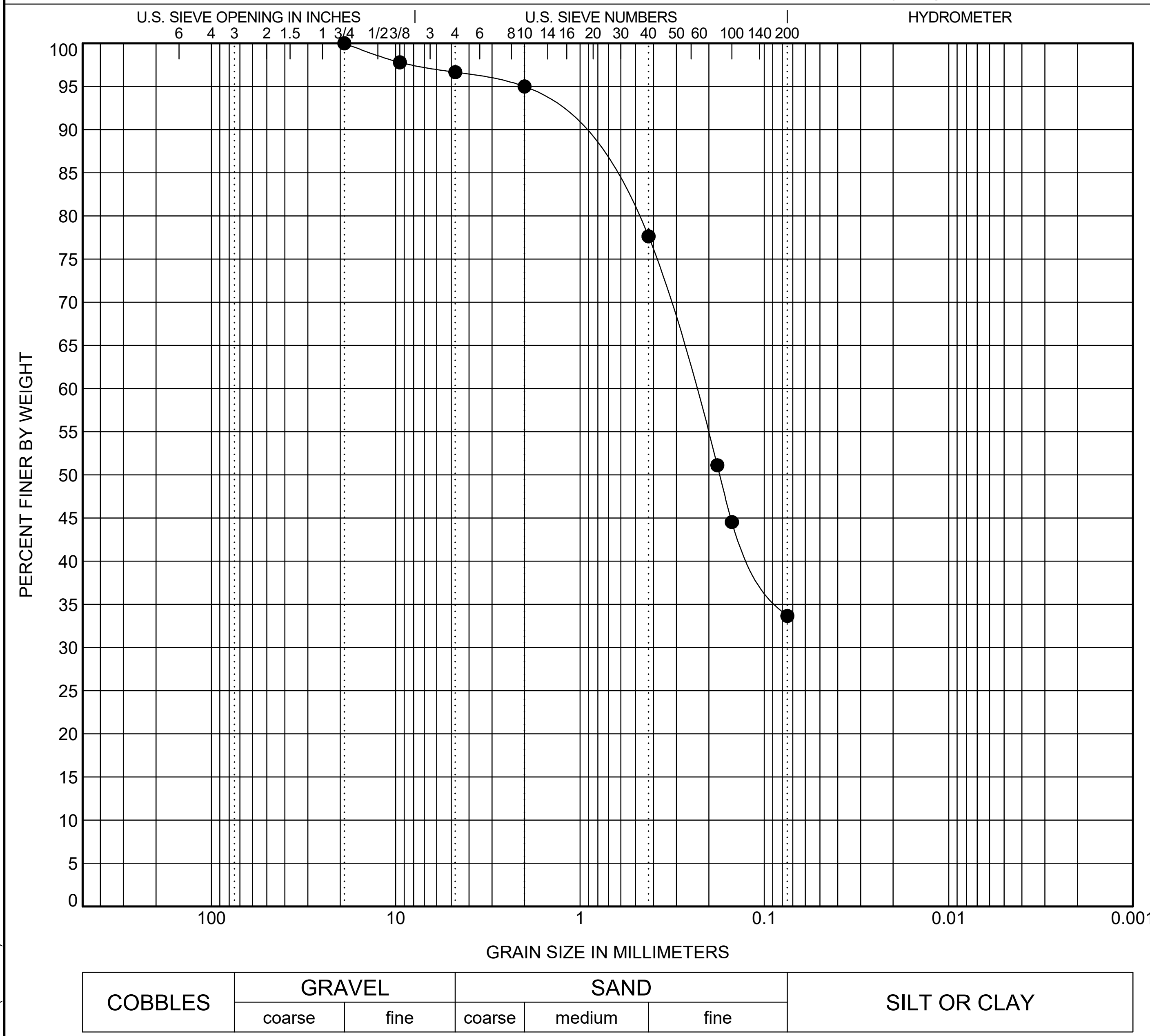
CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● HA-3A	1.5	**CLAYEY SAND(SC)**	37	21	16		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● HA-3A	1.5	19	0.24			3.3	63.0	33.7	

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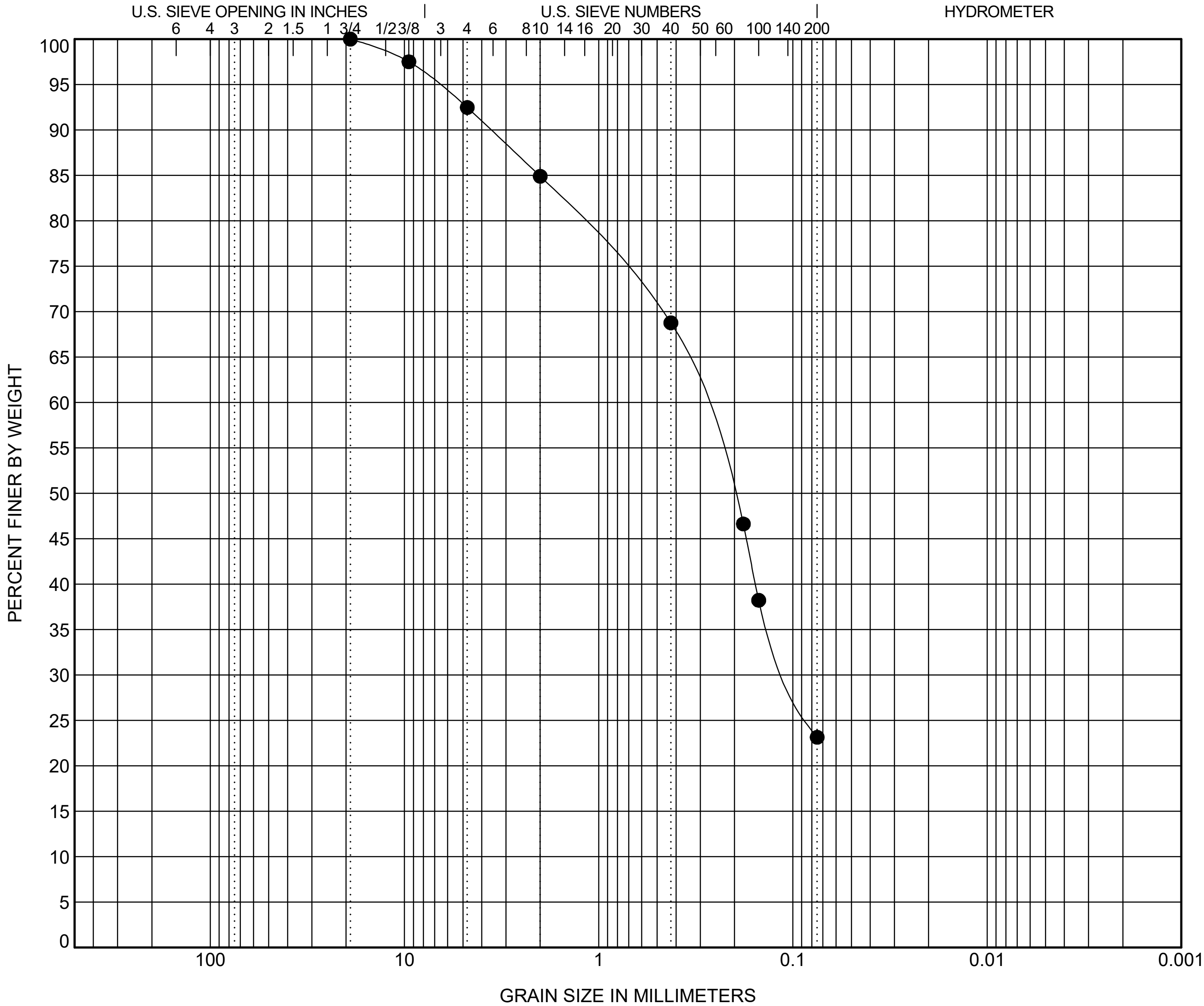
GRAIN SIZE DISTRIBUTION

CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HA-4**	**1.1**	**CLAYEY SAND(SC)**	**28**	**17**	**11**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HA-4**	**1.1**	**19**	**0.302**	**0.103**		**7.5**	**69.3**	**23.1**	

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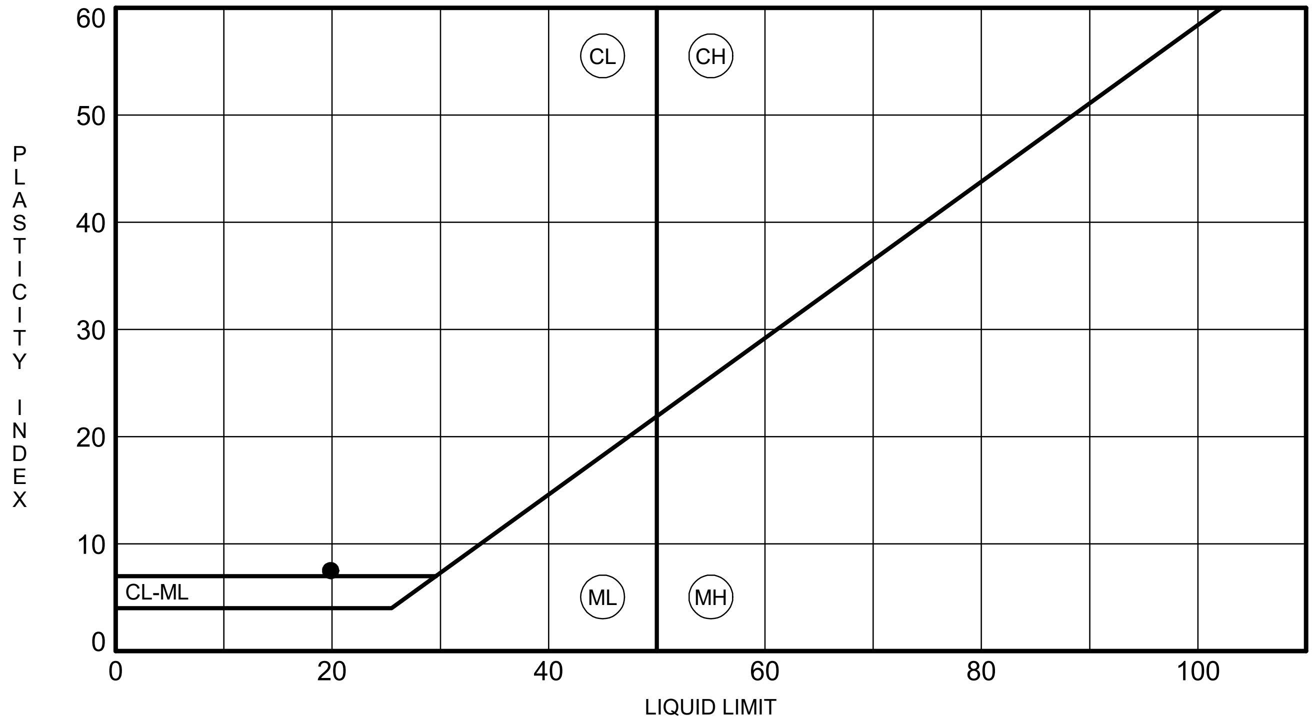
ATTERBERG LIMITS RESULTS

CLIENT U.S. Army Corps of Engineers, Norfolk District
PROJECT NAME Indian Run
PROJECT NUMBER VB20-282G
PROJECT LOCATION Bedford County, Virginia



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**HA-1A**	**1.5**	**20**	**12**	**8**	**32**	**CLAYEY SAND(SC)**

GET Solutions, Inc.

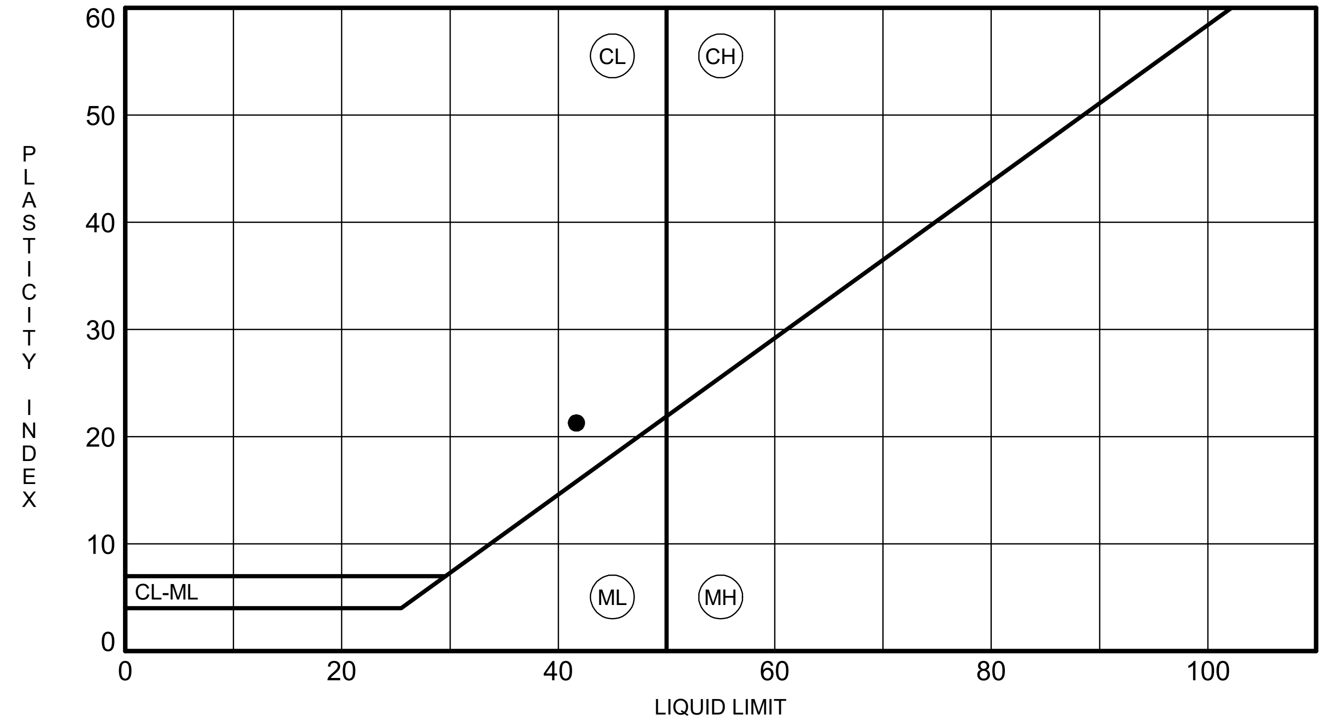
ATTERBERG LIMITS RESULTS

CLIENT U.S. Army Corps of Engineers, Norfolk District

PROJECT NAME Indian Run

PROJECT NUMBER VB20-282G

PROJECT LOCATION Bedford County, Virginia



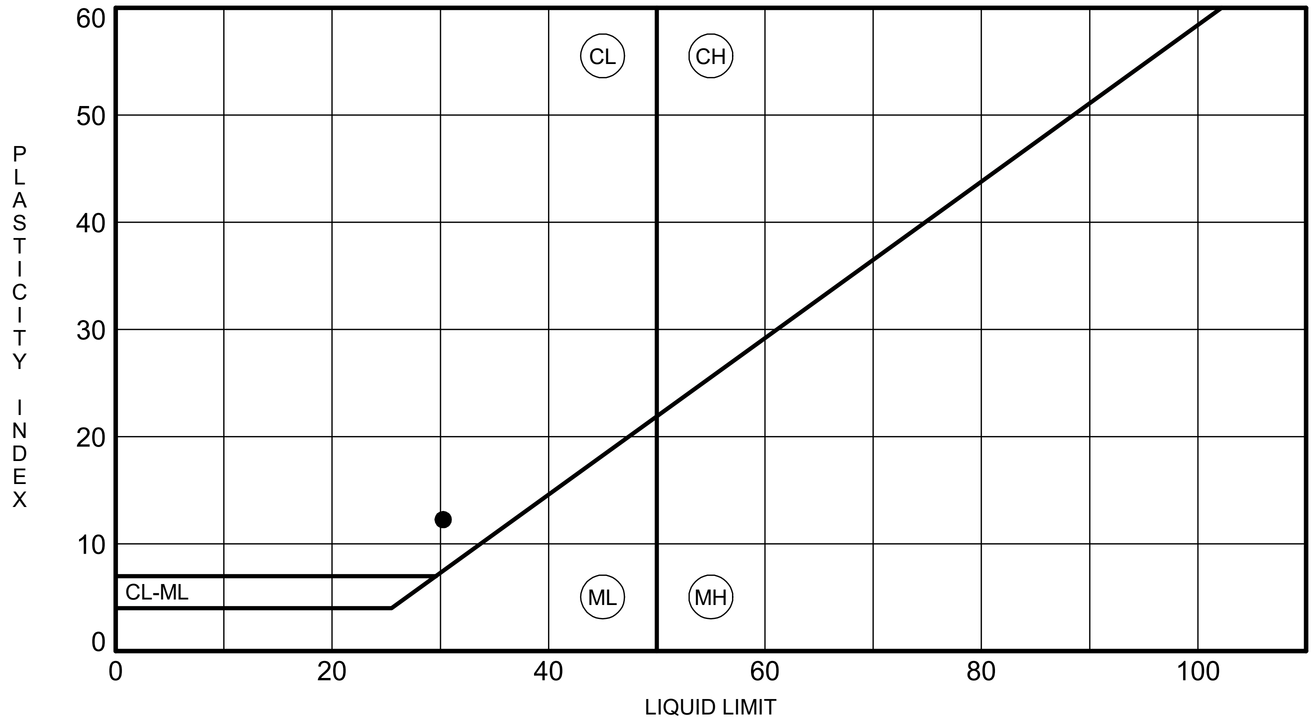
	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**HA-2**	**2.5**	**42**	**20**	**22**	**79**	**LEAN CLAY with SAND(CL)**

ATTERBERG LIMITS RESULTS

GET Solutions, Inc.

CLIENT U.S. Army Corps of Engineers, Norfolk District **PROJECT NAME** Indian Run

PROJECT NUMBER VB20-282G **PROJECT LOCATION** Bedford County, Virginia



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**HA-2**	**3.3**	**30**	**18**	**12**	**61**	**SANDY LEAN CLAY(CL)**

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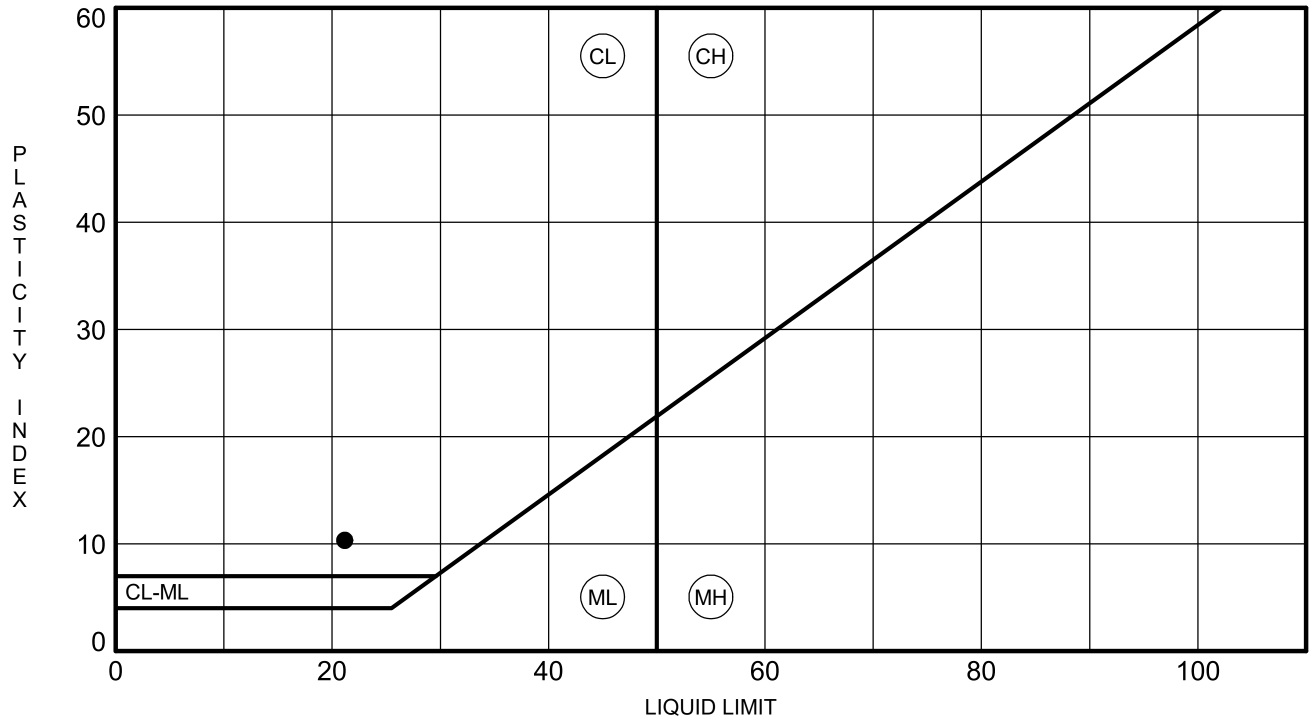
ATTERBERG LIMITS RESULTS

CLIENT U.S. Army Corps of Engineers, Norfolk District
PROJECT NAME Indian Run
PROJECT NUMBER VB20-282G
PROJECT LOCATION Bedford County, Virginia



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**HA-2**	**6.5**	**21**	**11**	**10**	**37**	**CLAYEY SAND(SC)**

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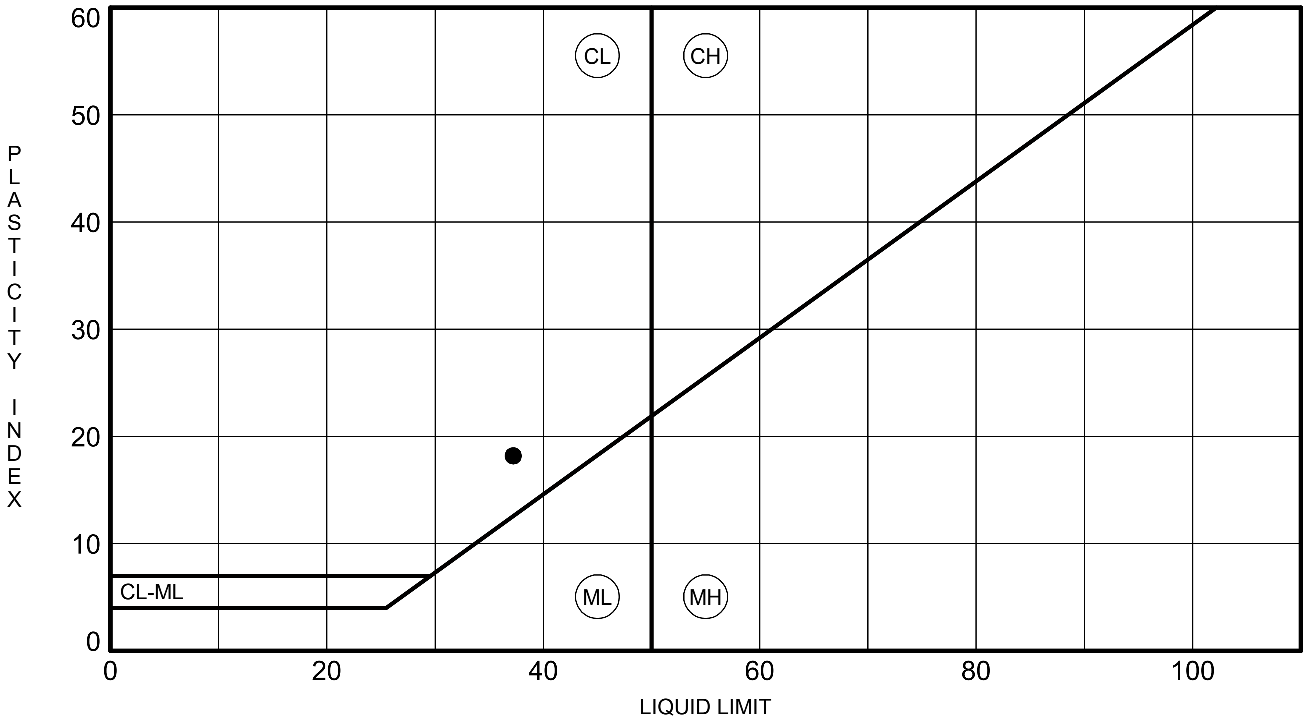
ATTERBERG LIMITS RESULTS

CLIENT U.S. Army Corps of Engineers, Norfolk District
PROJECT NAME Indian Run
PROJECT NUMBER VB20-282G
PROJECT LOCATION Bedford County, Virginia



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**HA-2**	**7.2**	**37**	**19**	**18**	**49**	**CLAYEY SAND(SC)**

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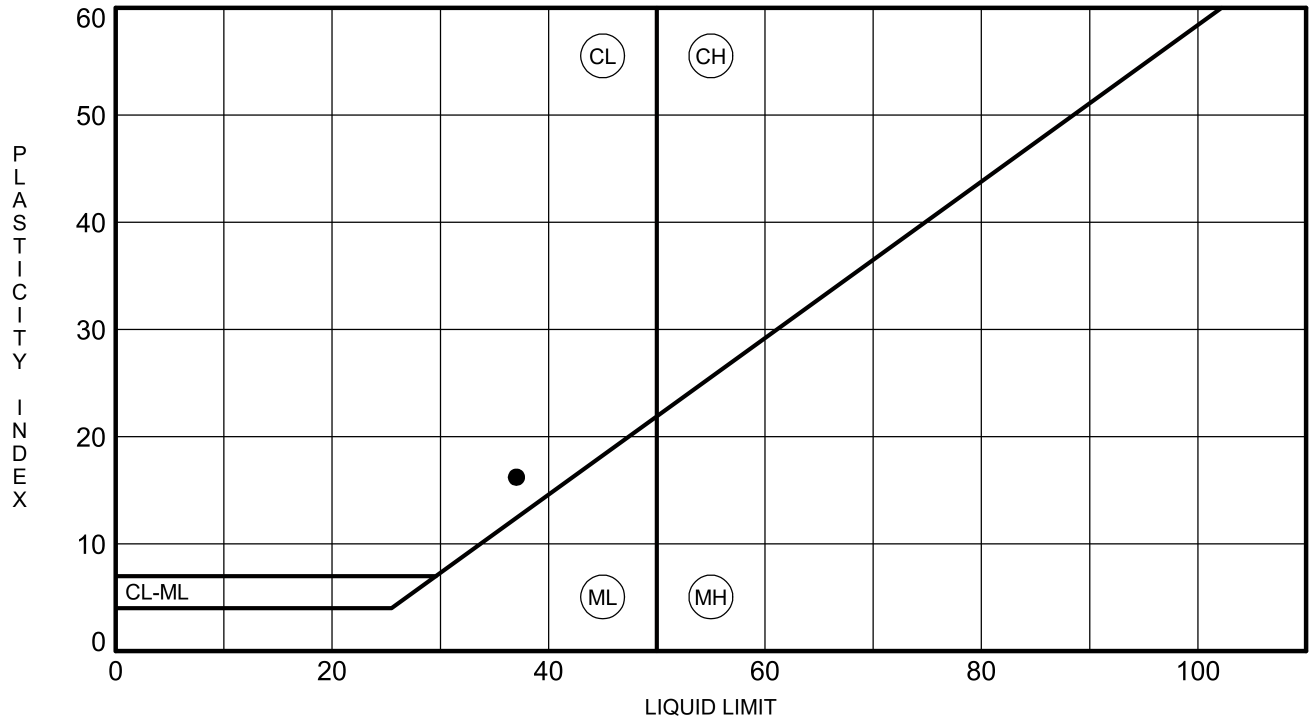
ATTERBERG LIMITS RESULTS

CLIENT U.S. Army Corps of Engineers, Norfolk District
PROJECT NAME Indian Run
PROJECT NUMBER VB20-282G
PROJECT LOCATION Bedford County, Virginia



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**HA-3A**	**1.5**	**37**	**21**	**16**	**40**	**CLAYEY SAND(SC)**

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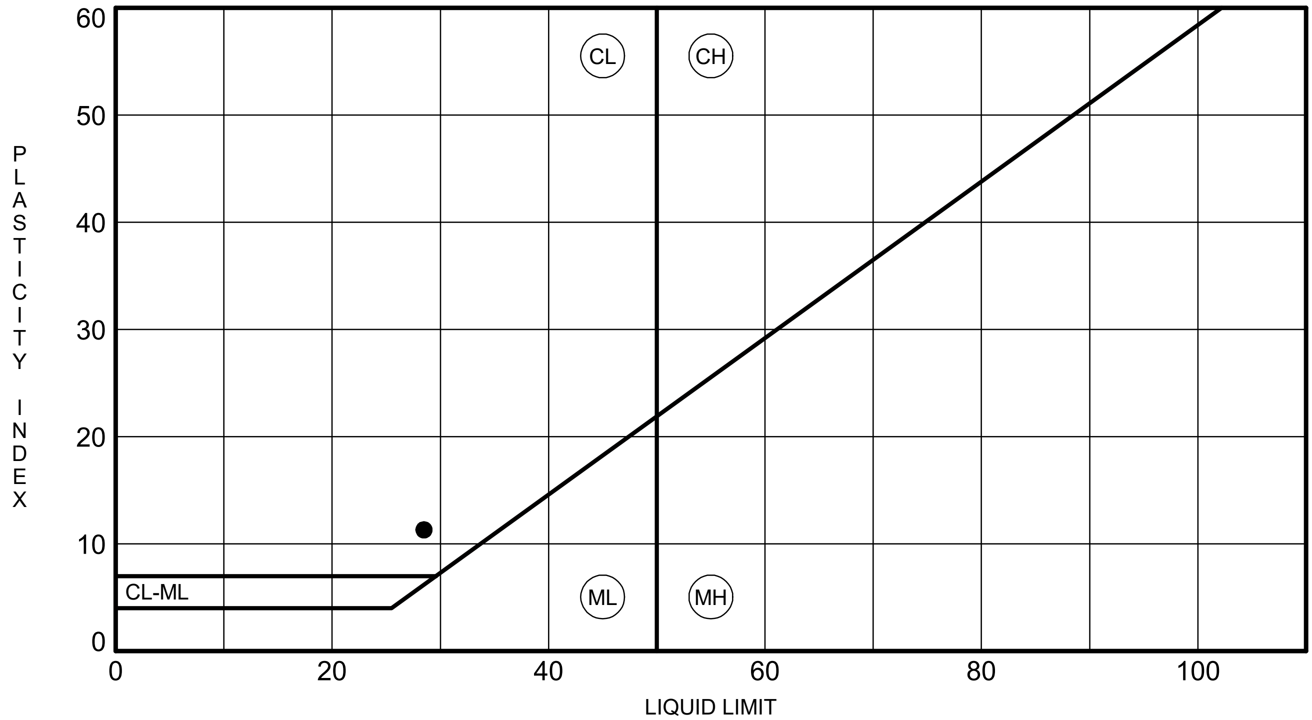
ATTERBERG LIMITS RESULTS

CLIENT U.S. Army Corps of Engineers, Norfolk District

PROJECT NAME Indian Run

PROJECT NUMBER VB20-282G

PROJECT LOCATION Bedford County, Virginia



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**HA-4**	**1.1**	**28**	**17**	**11**	**23**	**CLAYEY SAND(SC)**

Project: Indian Run
Date: 9/22/2020
Loction: DCP-1
Soil types: [CL] for 0-4.2 feet CBR = 1/(0.432283xDCP)^2 (in/blow)
[SC] for 4.2-8 feet CBR = 292/(DCPx25.4)^1.12 (in/blow)
ASTM D6951

Raw Test Data							DCP Index				
# of Blows	Field Cum. Penetration (mm)	Actual Cum. Penetration (mm)	Actual Cum. Penetration (in)	Actual Cum. Penetration (feet)	Soil Type [USCS]	Penetration Increase (in)	Penetration per Blow (in)	Hammer Blow Factor	DCP Index (in/blow)	CBR %	Moisture %
0	386	0	0.0	-	[CL]	0	-	-	-	-	
1	447	61	2.4	0.2	[CL]	2.4	2.4	2	4.8	0.2	
1	528	142	5.6	0.5	[CL]	3.2	3.2	2	6.4	0.1	
1	602	216	8.5	0.7	[CL]	2.9	2.9	2	5.8	0.2	
1	648	262	10.3	0.9	[CL]	1.8	1.8	2	3.6	0.4	
1	684	298	11.7	1.0	[CL]	1.4	1.4	2	2.8	0.7	
1	724	338	13.3	1.1	[CL]	1.6	1.6	2	3.1	0.5	
1	765	379	14.9	1.2	[CL]	1.6	1.6	2	3.2	0.5	
1	817	431	17.0	1.4	[CL]	2.0	2.0	2	4.1	0.3	
1	876	490	19.3	1.6	[CL]	2.3	2.3	2	4.6	0.2	
1	937	551	21.7	1.8	[CL]	2.4	2.4	2	4.8	0.2	
1	990	604	23.8	2.0	[CL]	2.1	2.1	2	4.2	0.3	28.5
1	1044	658	25.9	2.2	[CL]	2.1	2.1	2	4.3	0.3	28.5
1	1100	714	28.1	2.3	[CL]	2.2	2.2	2	4.4	0.3	28.5
1	1162	776	30.6	2.5	[CL]	2.4	2.4	2	4.9	0.2	28.5
1	1222	836	32.9	2.7	[CL]	2.4	2.4	2	4.7	0.2	28.5
1	1281	895	35.2	2.9	[CL]	2.3	2.3	2	4.6	0.2	28.5
1	1332	946	37.2	3.1	[CL]	2.0	2.0	2	4.0	0.3	21.6
1	1386	1000	39.4	3.3	[CL]	2.1	2.1	2	4.3	0.3	21.6
1	1430	1044	41.1	3.4	[CL]	1.7	1.7	2	3.5	0.4	21.6
1	1464	1078	42.4	3.5	[CL]	1.3	1.3	2	2.7	0.7	21.6
2	1516	1130	44.5	3.7	[CL]	2.0	1.0	2	2.0	1.3	
3	1560	1174	46.2	3.9	[CL]	1.7	0.6	2	1.2	4.0	
3	1625	1239	48.8	4.1	[CL]	2.6	0.9	2	1.7	1.8	
4	1670	1284	50.6	4.2	[CL]	1.8	0.4	2	0.9	6.8	
5	1705	1319	51.9	4.3	[SC]	1.4	0.3	2	0.6	15.2	
3	1750	1364	53.7	4.5	[SC]	1.8	0.6	2	1.2	6.5	
3	1805	1419	55.9	4.7	[SC]	2.2	0.7	2	1.4	5.2	
2	1860	1474	58.0	4.8	[SC]	2.2	1.1	2	2.2	3.3	
2	1930	1544	60.8	5.1	[SC]	2.8	1.4	2	2.8	2.5	
2	1973	1587	62.5	5.2	[SC]	1.7	0.8	2	1.7	4.3	
2	2025	1639	64.5	5.4	[SC]	2.0	1.0	2	2.0	3.5	
2	2077	1691	66.6	5.5	[SC]	2.0	1.0	2	2.0	3.5	
2	2118	1732	68.2	5.7	[SC]	1.6	0.8	2	1.6	4.6	
2	2182	1796	70.7	5.9	[SC]	2.5	1.3	2	2.5	2.8	
1	2216	1830	72.0	6.0	[SC]	1.3	1.3	2	2.7	2.6	
1	2249	1863	73.3	6.1	[SC]	1.3	1.3	2	2.6	2.7	
1	2285	1899	74.8	6.2	[SC]	1.4	1.4	2	2.8	2.4	
1	2322	1936	76.2	6.4	[SC]	1.5	1.5	2	2.9	2.4	24.9
1	2357	1971	77.6	6.5	[SC]	1.4	1.4	2	2.8	2.5	24.9
1	2395	2009	79.1	6.6	[SC]	1.5	1.5	2	3.0	2.3	24.9
2	2450	2064	81.3	6.8	[SC]	2.2	1.1	2	2.2	3.3	24.9
2	2495	2109	83.0	6.9	[SC]	1.8	0.9	2	1.8	4.1	47.6
2	2530	2144	84.4	7.0	[SC]	1.4	0.7	2	1.4	5.4	47.6
1	2545	2159	85.0	7.1	[SC]	0.6	0.6	2	1.2	6.5	47.6

ATTACHMENT 5:
PROPOSED LAYDOWN AREAS

US Army Corps of Engineers
Norfolk District

Indian Run

Laydown Area - East
Big Island, Virginia

Temporary Easement

Parcel boundaries

0 25 50 100 Feet

Map: IndianRun
Developed By: Kevin White
Date: 2/8/2021

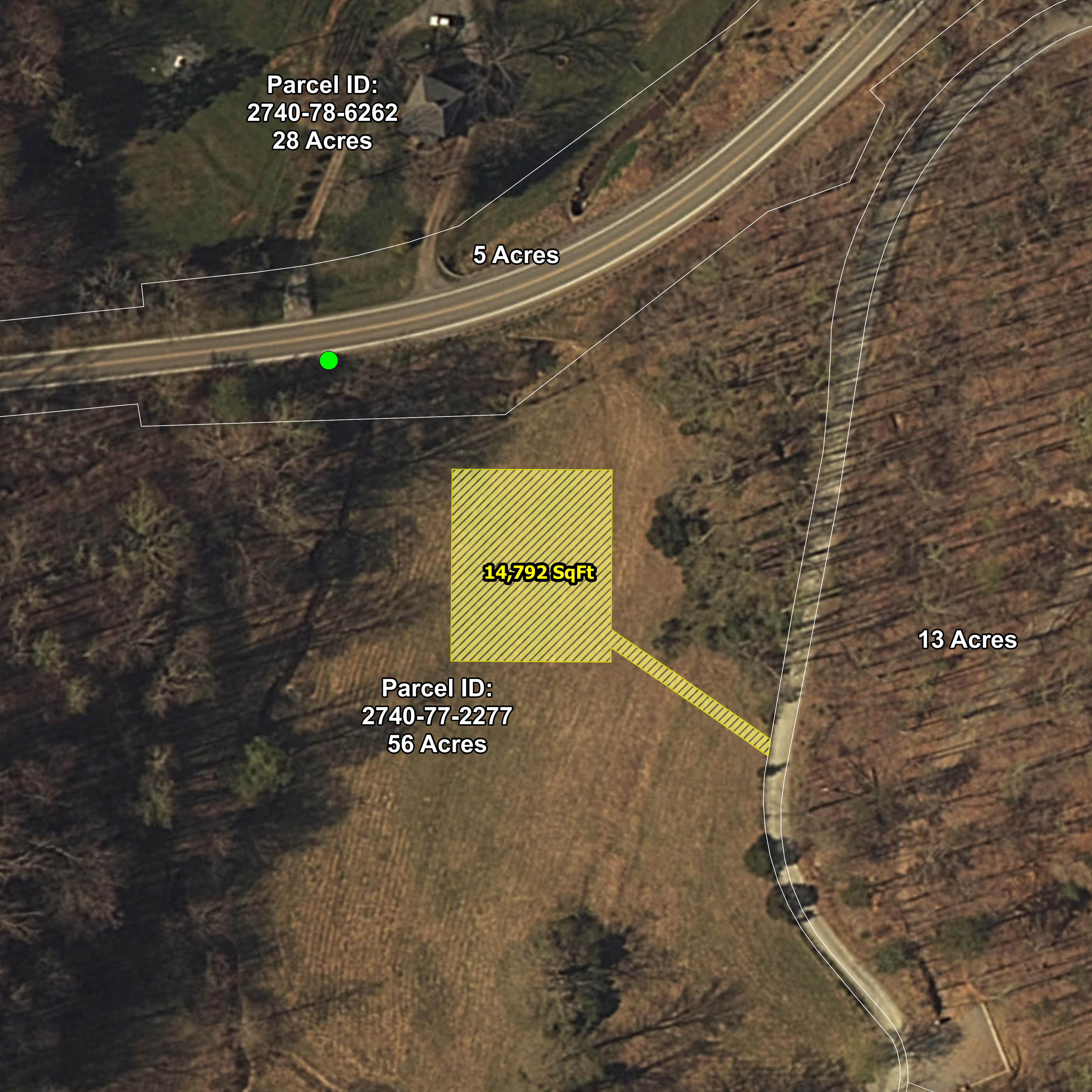
US Army Corps of Engineers
Norfolk District

Indian Run
Laydown Area - North
Big Island, Virginia

Parcel boundaries
Easement

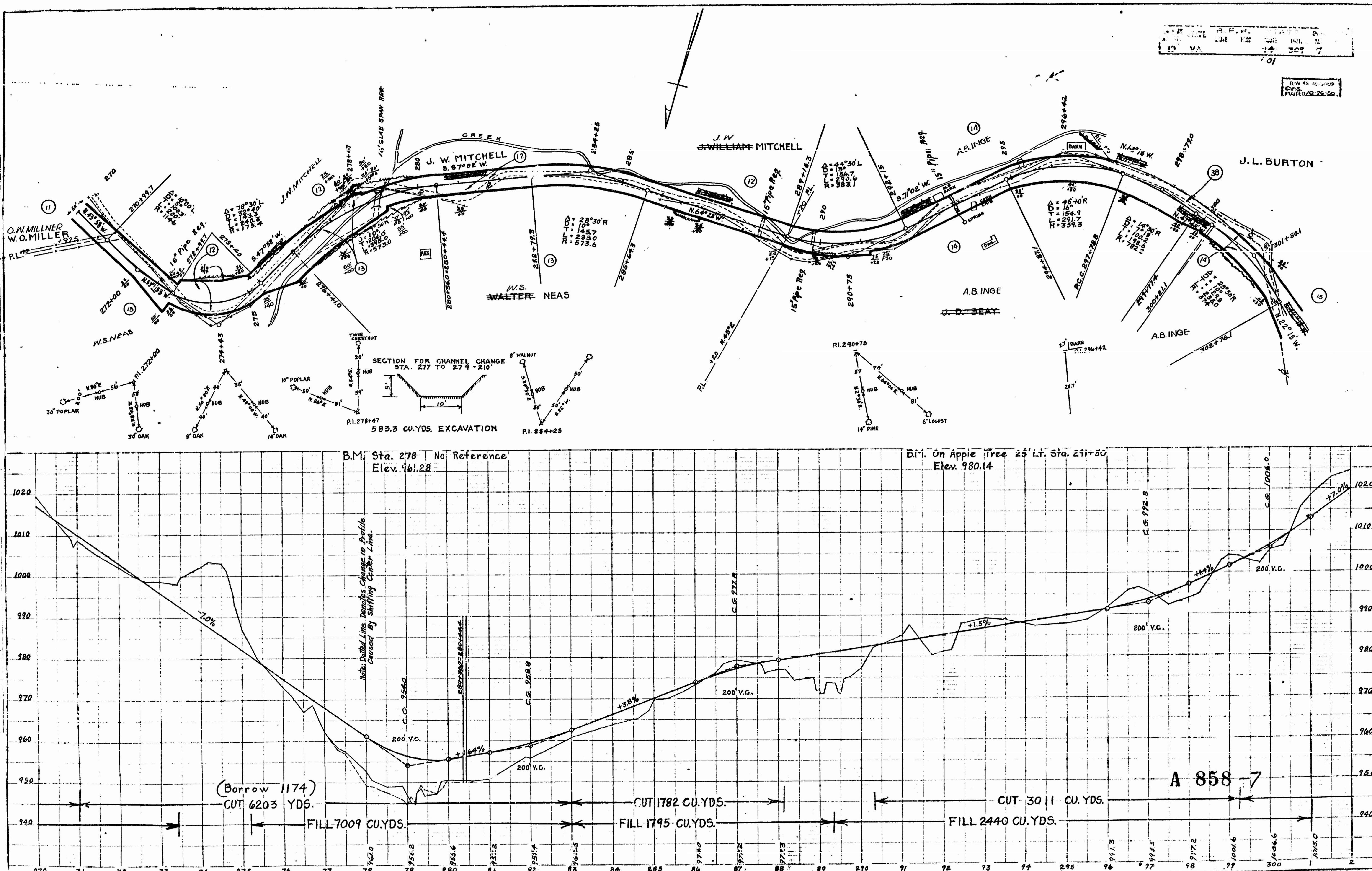
0 25 50 100
Feet

Map: IndianRun
Developed By: Tammy Knecht
Date: 7/28/2020



Parcel ID:
2740-78-6262
28 Acres
5 Acres
14,792 SqFt
Parcel ID:
2740-77-2277
56 Acres
13 Acres

ATTACHMENT 6:
SPONSOR PROVIDED DOCUMENTS



A0858-07

T21-1

STRUCTURE INSPECTION REPORT - SUMMARY

Regular

Inspection Frequency: 48 mos.

Agency ID	: 0091120-000000000002664	Inspection Date	: 04/18/2017
County/City	: Bedford	Feature Intersected	: Indian Creek
Main Route	: 00501	Facility Carried	: Lee-Jackson Hwy501
Lead Inspector	: Richard Wymer	Location	: 0.73-RT 672; 0.14-RT 752

ATTACHMENTS

Inspection Notes	☐	Channel Profile	☐
Sketches	☐	Clearance Sheet	☐
Photographs	☐		☐

Signature of Inspector Date

Reviewed by Date

CRITICAL FEATURE INSPECTIONS Fracture Critical ☐ Underwater ☐ Other Special ☐

CONDITION RATINGS		FIELD POSTING		TRAFFIC SAFETY FEATURES	
Deck	: N	Sign Legibility	: N	Bridge Railings	: N
Superstructure	: N	Sign Visibility	: N	Transitions	: N
Substructure	: N	Capacity Sign R12-1 (tons)	: 0	Approach Guardrail	: 0
Channel/Channel Prot.	: 7	Capacity Sign R12-5		Approach Guardrail Ends	: 0
Culvert	: 7	Single (tons)	: 0		
		Semi (tons)	: 0	YEAR PAINTED	0

ELEMENT CONDITION STATE DATA

No.	Description	Env.	Unit	State1	State2	State3	State4	Total
240	Steel Culvert	Low	ft	102.00	0.00	0.00	0.00	102.00
515	Steel Protective Coating	Low	sq.ft	2562.00	0.00	0.00	0.00	2562.00
831	Culvert Endwall/Headwall	Low	(EA)	0.00	1.00	1.00	0.00	2.00
1130	Cracking (RC and Other)	Low	(EA)	0.00	1.00	1.00	0.00	2.00
833	Roadway over culvert	Low	(EA)	1.00	0.00	0.00	0.00	1.00
854	Channel Protective Elements	Low	(EA)	0.00	1.00	0.00	0.00	1.00
6500	Debris	Low	(EA)	0.00	1.00	0.00	0.00	1.00

Virginia Department of Transportation
Structure and Bridge

Revised 11-16-99

STRUCTURE INSPECTION REPORT
Culvert

Agency ID:	**0091120-000000000002664**	**Date of Inspection:**	April 18, 2017
	Route 501	**Type of Inspection:**	Regular

Cnty/City:	Bedford		**Feature Intersected:**	Indian Creek
Main Route:	501		**Facility Carried:**	Lee-Jackson Highway
Location:	0.73 miles from Rte. 672; 0.14 miles from Rte. 752			
Lead Inspector:	Richard Wymer			Photos: 2017
Additional Inspectors:	Drew Sturgill			FR: 48 months, due April 2021

Approach View with inlet on right

Outlet View

Virginia Department of Transportation
Structure and Bridge

Revised 11-16-99

STRUCTURE INSPECTION REPORT
Culvert

Agency ID:	**0091120-000000000002664**	**Date of Inspection:**	April 18, 2017
	Route 501	**Type of Inspection:**	Regular

ORIENTATION **Route Direction:** **Latitude:** **Longitude:**	Oriented looking downstream. North 37° 30′ 10.62″ 79° 18′ 36.61″
MISCELLANEOUS	* Denotes significant changes since last inspection. Asbestos screening complete. 65 Degrees/Mostly Cloudy
WORK DONE	None.
STRUCTURAL ANALYSIS	**Assumed Legal Load Capacity** 27 TON Single-Unit Truck 40 TON Semi-Truck & Trailer **No change to rating assumptions this inspection.**
OVERALL CONDITION	**Good.** Asphalt coating missing in flowline. Cracks in headwall and end treatment. Channel material accumulated in pipe. Embankment erosion behind end treatment at outlet.
RECOMMENDATIONS	• Repair embankment erosion. • Remove channel material from pipe. • Seal cracks in outlet end treatment.
CULVERT	**Rated 7**
Barrel	* Asphalt coating missing in flowline where visible.
Headwall	* Three vertical hairline cracks over pipe. * Two 1 LF transverse cracks at left side of pipe. * 60 SF of hairline map cracking.
End Treatment	• 1/2" vertical crack in end treatment at right side of outlet. Concrete at this location has settled away from steel barrel approximately 2". • Two 1/4″ vertical cracks over pipe and one 1/4″ transverse crack at left side of pipe at outlet. * One 1/8″ transverse crack at bottom left side at outlet.
Debris	* 2′ of channel material in right 2/3rds of pipe.
Undermining	None.
Settlement	None.
Adequacy of Opening	Approximately 70% of design opening remaining.
Adequacy of Cover	Approximately 5′ of fill over culvert.

Virginia Department of Transportation
Structure and Bridge

Revised 11-16-99

STRUCTURE INSPECTION REPORT
Culvert

Agency ID:	**0091120-000000000002664**	**Date of Inspection:**	April 18, 2017
	Route 501	**Type of Inspection:**	Regular

CHANNEL	**Rated 7**
Scour	None.
Embankment Erosion	• Approximately 30 LF of upstream right channel embankment is eroded up to 3' deep. * Approx. 4 CY (total) of erosion behind top and left side of end treatment at outlet. Areas average 3' long x 2' wide and appear to be full depth (probed).
Drift	None.
Vegetation	Acceptable.
FIELD POSTING	
Actual Posting	Not posted.
Legibility	N/A
Visibility	N/A
Advance Posting	N/A
OTHER	
Roadway Over Culvert	Good -asphalt.
Traffic Safety Features	
Bridge Railing	0
Transitions, Approach	0
Guardrail Approach	0
Guardrail Terminal	0
Object Markers	None.

APPENDIX C

DRAFT REAL ESTATE PLAN

CAP Section 14

Emergency Streambank and Shoreline Protection

Indian Run Feasibility Study

Bedford County, Virginia

Prepared for

U.S. Army Corps of Engineers
North Atlantic Division
Norfolk District

Prepared by

Alicia Barrette
Realty Specialist
Real Estate Division
Acquisition, Management, and Control Branch
Norfolk District

MAY 2021

Table of Content

1. Preamble

a) Study Authorization: The Indian Run, Bedford County, Virginia study is authorized by Section 14 of the Flood Control Act of 1946, as amended (P.L.79-526), Emergency Streambank and Shore Protection. The purpose of the Section 14 program is to construct emergency streambank and shore protection to prevent natural erosion processes from damaging highways, bridge approaches, public works, churches, public and private non-profit hospitals, schools, water and sewer lines, and other public or non-profit facilities that offer public services to all, and known historic properties eligible or listed on the National Register of Historic Places.

If an eligible facility is in imminent danger of failure, an after a request for a project has been received from a potential non-Federal sponsor stating its desire to participate in a solution, the Corps will conduct a feasibility study to analyze the problem, develop a solution, and determine the feasibility of a solution. In a feasibility phase, the first $100,000 is 100 percent Federally funded. Any additional feasibility study costs require an executed Feasibility Cost Sharing Agreement, stating that all costs above the initial $100,000 are cost-shared 50 percent Federal and 50 percent non-Federal.

b) Official Study Designation: Continuing Authorities Program, Section 14 Emergency Streambank and Shoreline Protection, Indian Run, Bedford County, Virginia Feasibility Study (the "Study").

c) Study Location: The study area is located in western Virginia approximately 13 miles northeast of Lynchburg. Although closer in proximity to Coleman Falls (approximately ½ mile east), the project site is entirely within the town limits of Big Island. Indian Run is a tributary of the James River, and their confluence is roughly 2000 feet to the north of the project area

d) Non-Federal Sponsor: The non-Federal partner for the Study is the Virginia Department of Transportation (VDOT) (the "Sponsor"). VDOT will also serve as the non-Federal sponsor for the construction of the Study's Recommended Plan (defined in paragraph 3(b)) at a 65% (Federal) and 35% (non-Federal) cost share. In accordance with the Project Partnership Agreement (PPA) between the Sponsor and the Department of the Army (the "Government"), which is scheduled to be executed in August 2021, the Sponsor will be responsible for performing or ensuring the performance of the Lands, Easements, Rights-of-Way, Relocation, and Disposal Area (LERRD) requirements for the Study's Recommended Plan as outlined in this Real Estate Plan (REP).

2. Statement of Purpose

This Real Estate Plan (REP) is presented in support of the Indian Run Emergency Streambank and Shoreline Protection Feasibility Study (Study), and describes the real estate required to implement the project. The purpose of the Real Estate Plan is to identify the LERRD necessary to support construction, operation and maintenance of the proposed project elements described in the Study, and to outline the costs and real estate considerations associated with project implementation.

This Study is preliminary and written to the level of detail of the main report, other details may be added and is intended for planning purposes only. Both the final real property lines and land value estimates are subject to change even after approval of this report. There may be modifications to the plans that occur during Pre-construction, Engineering and Design (PED) phase, thus changing the final acquisition area(s) and/or administrative and land costs.

3. Project Purpose and Features

a) Study Purpose: The purpose of this study is to determine if constructing emergency streambank protection to prevent bank erosion from damaging U.S. Route 501 and other public works utilities on U.S. Route 501 is feasible and economically justified. The study identifies the least cost alternative and the Recommended Plan is justified if total project costs are less than the cost of relocating the threatened road and public utilities. Federal costs are limited to $5,000,000 for CAP Section 14. The cost of LERRDs, and the operation and maintenance of the project, once completed, are a non-federal responsibility.

b) Recommended Plan: The recommended plan, modified alternative 6, which is the stabilization of the 12-foot bluff of eroding streambank to provide risk management from further erosion that would damage and ultimately compromise U.S. Route 501 and utilities that are currently at risk. The plan includes longitudinal rock sill running the length of the project area at a height of 648-feet (NAVD88). and re-routing of the existing stream.

c) Required Lands, Easements, Right-of-Ways (LER): In accordance with the executed PPA, the Sponsor will be responsible for acquiring or ensuring the acquisition of all LER required for the construction, operation and maintenance of the Recommended Plan. Table-1 reflects the required real estate to implement the Recommended Plan.

Since this report was prepared during a feasibility level study, the size of the required real estate interests presented are preliminary estimates based only on existing, readily available Geographic Information System (GIS) data. The LER requirements are subject to change with plan optimization during the Recommended Plan's PED phase when final plans, specifications and detailed drawings are prepared.

Table 1 LERRD details

Parcel ID #	**Estate Required**	**Ownership**	**Required Acreage**
2801900	Temporary Work Area Easement	Private	.35 Acres
90503309	Bank Protection Easement	Private	.006 Acres
	Bank Protection Easement	Public	.1004 Acres
90503309	Temporary Work Area Easement	Private	.044 Acres

Parcel Id # 2801900 is proposed currently as the staging area for the project. However, this area may not be utilized as VDOT may have available areas in the vicinity that could be utilized instead. Access to the project will be using U.S. Route 501 for any land access.

The following details the minimum interest in real property required for the Recommended Plan.

(1) <u>Permanent Bank Protection Easement (USACE Standard Estate No. 21)</u> – Approximately .006 acres are required for permanent bank protection easement to construct, operate, and maintain the TSP, the majority of the project footprint is within the Right-of-Way, which is owned in fee by VDOT.

(2) <u>Temporary Work Area Easement (TWAE) (USACE Standard Estate No. 15</u> – Approximately .394 acres are required in TWAEs for work and staging purposes. The term of the proposed TWAE would be for 12 months.

The easement for the lands acquired by the Sponsor must contain the USACE-approved standard estate language as written herein (see **Exhibit "A"** for the estate language). After the PPA is fully executed and once the final design of the recommended plan is complete, a general written description of the final LER with corresponding real estate maps required will be provided to the Sponsor in their formal written *Notice to Proceed with Real Estate Acquisition* letter (hereinafter, the "NTP").

Once the Sponsor receives the NTP from USACE, the Sponsor will commence real estate acquisition activities. To delineate the precise boundary of the required estate and mitigate against potential boundary disputes, a boundary land survey with a corresponding legal description for each required estate will be completed by the Sponsor. Further, the Sponsor is advised to obtain a chain of title and title insurance on all acquired property to identify potential encumbrances and to protect against "defects" in title. To ensure easements acquired remain in effect in the event of a foreclosure, a Subordination of Mortgage is necessary for properties with an existing mortgage(s). The Sponsor must work with the property owners and their mortgage lenders to execute the appropriate agreement that allows the mortgage to be subordinate to the easement. USACE will remain in close coordination with the Sponsor throughout the real estate acquisition process for support and guidance.

After the Sponsor completes its acquisition efforts and prior to USACE's issuance of the solicitation for construction contracts, the Sponsor must provide USACE with copies of all real estate conveyance agreements recorded in their respective county and a signed *Authorization for Entry for Construction* (with an attorney's Certificate of Authority) (See **Exhibit "B"**) for all the LER USACE identified in the NTP for that construction contract. USACE will examine and evaluate all records received to ensure sufficient real property interests are available to support construction. USACE will then certify in writing to the appropriate USACE District elements that the real estate for the Recommended Plan has been obtained and the solicitation for construction contract(s) may commence.

4. <u>LER Owned by the Non-Federal Sponsor</u>

VDOT currently owns the majority of the land within the required project footprint in fee. This land consists of 4,372.68 square feet out of the 6,527.65 square feet required for the project. The Sponsor confirmed that they have no competing needs for the land and will grant an authorization for entry for construction in accordance with ER 405-1-12.

5. <u>Non-Standard Estates</u>

Currently, there are no proposed non-standard estates for the Recommended Plan. Non-standard estates are necessary only when there is no corresponding USACE approved standard estate for the real property interest required, or when changes to a corresponding standard estate (or previously approved non-standard estate) are desired. In such situations, a non-standard estate will be drafted in collaboration with the Sponsor, then distributed for approval by the District Chief of Real Estate or Headquarters USACE, as appropriate.

6. Existing Federal Project

There are no existing federal projects within the project area.

7. Federally-Owned Land

The TSP includes no Federally-owned lands as part of its LER requirements.

8. Navigational Servitude

The application of Navigational Servitude is not available for the Recommended Plan. Navigational Servitude is the dominant right of the Federal government under the Commerce Clause of the U.S. Constitution (Article 1, Section 8, Clause 3) to use, control, and regulate the navigable waters of the United States and the submerged lands thereunder for various commerce-related purposes, including navigation and flood control. Generally, the Federal government does not acquire interests in real property that it already possesses or over which its use or control is or can be legally exercised. If navigational servitude is found to be available, then the Federal Government will generally exercise its right thereunder and, to the extent of such rights, will not acquire a real property interest in the land to which the navigational servitude applies.

9. Real Estate Maps

Real estate maps are provided in **Exhibit "C"**. The GIS tax parcel data and ownership was obtained from Bedford County, Virginia in January 2021. The lot boundaries delineated in the real estate maps do not represent legal boundaries and should not be used to provide a legal determination of land ownership. The parcels boundaries are not survey data and should not be used as such. There may be boundary discrepancies between what is shown on the real estate maps and the property's actual deeded boundary. The GIS tax parcel data obtained is intended for planning purposes only to provide a reasonable representation of parcel boundaries and project features. Surveys of the Recommended Plan's final design are needed to determine the precise location on properties based on the property's deeded legal description.

10. Induced Flooding

The Recommended Plan does not induce flooding.

11. Baseline Cost Estimate for Real Estate (BCERE)

a) The BCERE establishes the estimated financial costs (for both the Government and Sponsor) that are attributed to the Recommended Plan's real estate requirements. It is recorded in the 01-Lands & Damages project cost account. Itemized under "Incidental" and "Acquisition" cost categories, the BCERE provides a list of work activities/items with its associated estimated cost. The TSP's total estimated real estate cost is ***$118,000.00***. Table-2 provides a summary of the BCERE.

Table-2: BCERE Summary

BCERE Categories	**Estimated Costs**
Incidental Costs	$53,500.00
Acquisition Costs	$45,500.00
Contingency (LS)	$19,000.00
Total 01- Lands & Damages	**$118,000.00**

b) For civil works projects that are cost-shared between the Federal government and a non-Federal interest, the Water Resources Development Act of 1986 ("WRDA 86" or "Public Law 99-662") assigns the non-Federal sponsor the responsibility of providing the LER, performing the facility/utility relocations, and fulfilling any disposal area requirements (collectively referred to as "LERRD") for the project. All LERRD requirements must be performed in accordance with the project's PPA, WRDA 86, and Public Law 91-646 (Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970) as amended.

LERRD costs represent a non-Federal sponsor's estimated upfront direct and indirect financial costs in fulfilling its real estate responsibilities. The non-Federal sponsor receives credit for their actual associated costs if found to be reasonable, allowable, and allocable. They must document all their LERRD expenses (i.e., receipts, invoices, official certified timesheets, etc.) and submit to USACE for review and approval as part of their claim for credit. LERRD costs are calculated by adding the non-Federal costs in a project's 01-Lands & Damages cost account with the costs in the project's 02-Relocations (facility/utility) cost account (See paragraph 17 for 02-Relocation costs). LERRD costs do not include Federal costs.

The Sponsor's estimated LERRD cost is ***$99,000.00***, which represents their approximate upfront financial obligation in fulfilling their real estate responsibilities to implement the TSP. The Sponsor is aware of its requirement to document all LERRD expenses for its claim for credit. Table-3 shows the Sponsor's itemized LERRD costs.

Table-3 Sponsor's Estimated LERRD Costs

LERRD Category	**Costs**
Lands, Easements, and Rights-of-Way	$99,000.00
Relocations (Facility/Utilities)	$0.00
Disposal Areas	$0.00
Sponsor's Total LERRD:	***$99,000.00***

12. Public Law 91-464, Uniform Relocation Assistance

Public Law 91-646 provides uniform equitable treatment of persons and businesses displaced by a Federal or Federally assisted project. Along with the PPA, it requires the non-Federal sponsor to provide assistance and certain benefits to be paid to all persons and businesses that are displaced and must be relocated from their residence or place of business due to a Federally-funded project. The cost incurred by the non-Federal sponsor to provide relocation assistance is part of its LERRD responsibilities.

There are no anticipated relocations under PL 91-646 required for this project.

13. Mineral and Timber Activity

There are no known present or anticipated mineral extraction or timber harvesting activities within the LER required for the TSP.

14. Land Acquisition Experience and Capability of the Non-Federal Sponsor

To date we have not been able to coordinate a meeting time with the Sponsor to complete the Capability Assessment. If the Sponsor does not cooperate with us to complete the assessment, it will be determined that they are a capable Sponsor. This determination is made from previous projects where VDOT and USACE have worked well together.

15. Land Use Zoning

No application or enactment of local zoning ordinances is anticipated in lieu of or to facilitate the TSP's LERRD requirements.

16. Schedule of Real Estate Acquisition

Table -4: Forecasted Real Estate Acquisition Schedule

Milestone	Date
Execution of Project Partnership Agreement with Sponsor	January 2022
Notice to Proceed with Real Estate Acquisition furnished to Sponsor	January 2022
USACE receives Authorization for Entry from Sponsor	February 2023
USACE Certifies the Real Estate for the Recommended Plan	March 2023
USACE Commences with Advertising for Construction Contracts	April 2023

17. Relocation of Facilities or Public Utilities

There are no facility or utility relocations anticipated within the project area at this time.

18. Hazardous, Toxic, and Radioactive Waste (HTRW)

There are no known hazardous, toxic and radioactive waste materials at this time that would affect the implementation or operation of the TSP.

19. Project Support

At this time, there is no known opposition for this project.

20. Risk Associated with Advanced Land Acquisition

The NFS has been advised of the risks associated with advance land acquisition activities, as indicated in the risk letter sent to the Sponsor.

Risks associated with advanced land acquisition include, but are not limited to, the following:

- Congress may not appropriate funds to construct the proposed project.
- The proposed project may otherwise not be funded or approved for construction.
- A Project Partnership Agreement (PPA) mutually agreeable to the NFS and the Government may not be executed and implemented.
- The NFS may incur liability and expense by virtue of its ownership of contaminated lands, or interests therein, whether such liability should arise out of local, state, or Federal laws, or regulations including liability arising out of Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended.
- The NFS may acquire interests or estates that are later determined by the Government to be inappropriate, insufficient, or otherwise not required for the project.
- The NFS may initially acquire insufficient or excessive real property acreage which may result in additional negotiations and/or benefit payments under Public Law 91-646, as well as, the payment of additional fair market value to affected landowners which could have been avoided by delaying acquisition until after the PPA execution and the Government's notice to commence acquisition; and performance of LERRD.
- The NFS may incur costs or expenses in connection with its decision to acquire real estate interest and/or perform LERRD in advance of the executed PPA and the Government's notice to proceed which may not be creditable under the provisions of Public Law 99-662 or the PPA.

21. Recommendation

This report has been prepared in accordance with Corps of Engineers Regulation 405-1-12, Chapter 12. Recommend approval of this draft Real Estate Plan, that includes preliminary estimates of impacts, potential required property rights and interests, and a cost estimate based on identified limitations, factors, and assumptions as identified to the extent practicable at this time, be accepted for the purposes herein.

Prepared by: 4/23/21

Alicia Barrette — Date
Realty Specialist
Acquisition, Management
And Disposal Branch

Approved by: 4/23/21

Elizabeth Babineau — Date
Chief, Acquisition, Management
and Disposal Branch
Real Estate Contracting Officer

EXHIBIT "A"
REQUIRED ESTATES

BANK PROTECTION EASEMENT

A perpetual and assignable easement and right-of-way in, on, over and across the land hereinafter described for the location, construction, operation, maintenance, alteration, repair, rehabilitation and replacement of a bank protection works, and for the placement of stone, riprap and other materials for the protection of the bank against erosion; together with the continuing right to trim, cut, fell, remove and dispose therefrom all trees, underbrush, obstructions, and other vegetation; and to remove and dispose of structures or obstructions within the limits of the right-of-way; and to place thereon dredged, excavated or other fill material, to shape and grade said land to desired slopes and contour, and to prevent erosion by structural and vegetative methods and to do any other work necessary and incident to the project; together with the right of ingress and egress for such work; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however to existing easements for public roads and highways, public utilities, railroads and pipelines.

TEMPORARY WORK AREA EASEMENT:

A temporary easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts Nos. _____, _____ and _____), for a period not to exceed 1 year, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a work area, including the right to move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the James River Bank Stabilization Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

EXHIBIT “B”

DEPARTMENT OF THE ARMY

AUTHORIZATION FOR ENTRY FOR CONSTRUCTION

I, ____________, Commissioner, Virginia Department of Transportation (VDOT), do hereby certify that VDOT has acquired the real property interests required by the Department of the Army, and otherwise is vested with sufficient title and interest in lands, to support construction of the Indian Run Emergency Streambank and Shoreline Protection. Further, I hereby authorize the Department of the Army, its agents, employees and contractors, to enter upon the tracts shown in Exhibit A (parcel ID;s) to use as a work area, including the right to, move, store and remove equipment and supplies, and erect and remove temporary structures and permanent structures for the Indian Run Emergency Streambank and Shoreline Protection project on the land and to perform any other work necessary and incident to the construction of the Project as set forth in the plans and specifications held in the U.S. Army Corps of Engineers' District Office, Norfolk, Virginia.

WITNESS my signature as Commissioner for the Virginia Department of Transportation this ___ day of ________, 2021.

BY: ____________________________

TITLE: __________________________

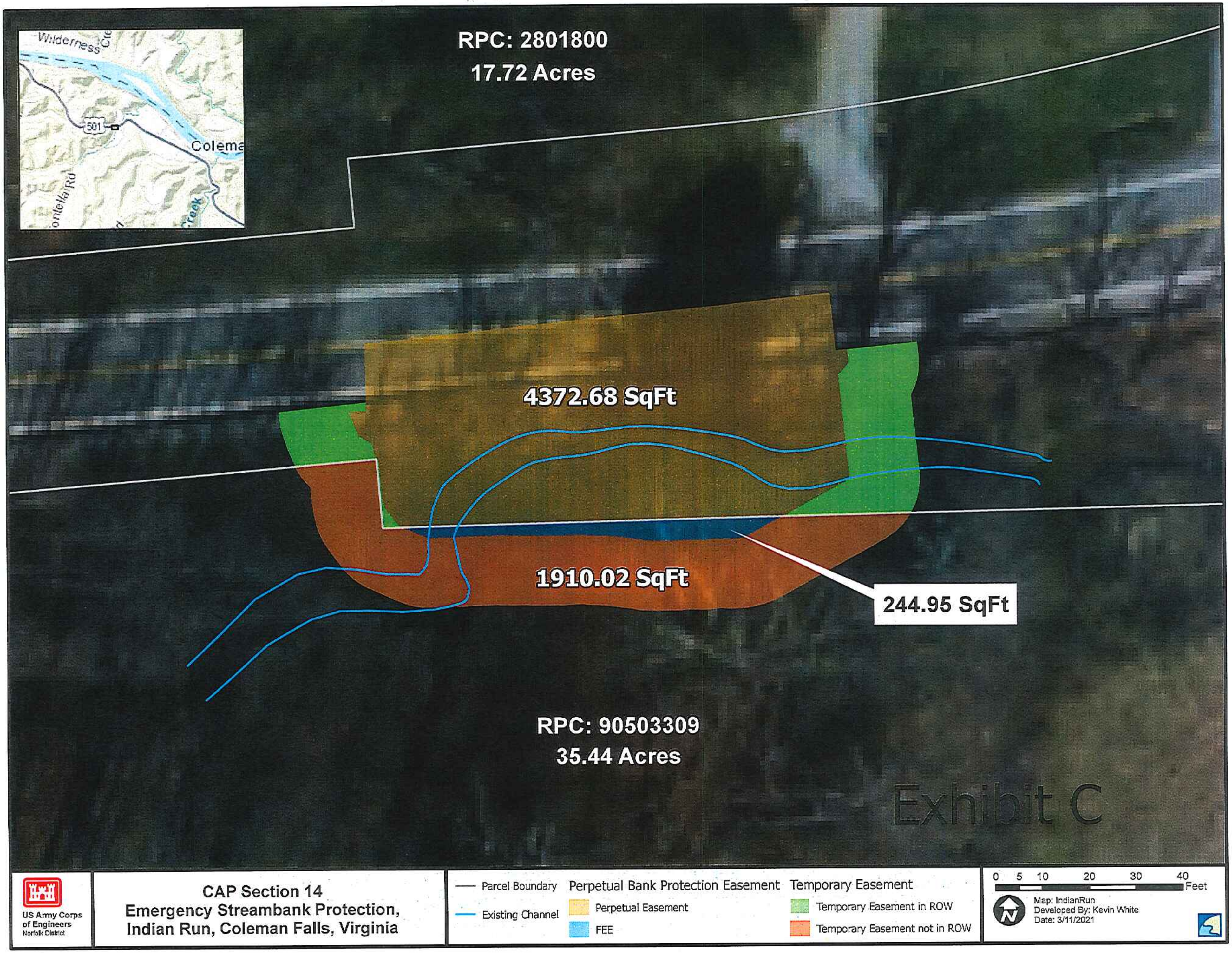
ATTORNEY'S CERTIFICATE OF AUTHORITY

I,______________, Attorney, with the Virginia Department of Transportation, certify that VDOT has authority to grant the above Authorization for Entry; that said Authorization for Entry is executed by the proper duly authorized officer; and that the Authorization for Entry is in sufficient form to grant the authorization therein stated.

WITNESS my signature as Attorney with Virginia Department of Transportation this ___ day of ________, 2021.

BY: ____________________________

TITLE: __________________________



RPC: 2801800
17.72 Acres
4372.68 SqFt
1910.02 SqFt
244.95 SqFt
RPC: 90503309
35.44 Acres
Exhibit C
Wilderness Cr
501
Colema
Creek
US Army Corps of Engineers
Norfolk District
CAP Section 14
Emergency Streambank Protection,
Indian Run, Coleman Falls, Virginia
Parcel Boundary
Existing Channel
Perpetual Bank Protection Easement
Perpetual Easement
FEE
Temporary Easement
Temporary Easement in ROW
Temporary Easement not in ROW
0 5 10 20 30 40 Feet
N
Map: IndianRun
Developed By: Kevin White
Date: 3/11/2021

NON-FEDERAL SPONSOR SUPPORT LETTER

Indian Run, Bedford County, VA
Continuing Authority Program, Section 14
Emergency Streambank & Shoreline Protection

APPENDIX D

MAY 2021

U.S. Army Corps
of Engineers
Norfolk District

From: Ahlin, Jennifer
To: Harr, Richard M CIV USARMY CENAO (USA)
Cc: Quinn, Angela; tammy.sloan@vdot.virginia.gov; todd.daniel@vdot.virginia.gov; Miranda, Candice J CIV USARMY CENAO (USA); dan.eberhardt@vdot.virginia.gov; wade.pence@vdot.virginia.gov; travis.higgs@vdot.virginia.gov; john.morris@vdot.virginia.gov; Moye, Paul B CIV USARMY CENAO (US); kenneth.turner@vdot.virginia.gov; laura.cordrey@vdot.virginia.gov; Kristen Williby; robbie.williams@vdot.virginia.gov

Subject: Re: [Non-DoD Source] Re: Letter or email from non-federal sponsor indicating support for the Selected Plan

Date: Tuesday, May 4, 2021 7:09:18 AM

Dear Richard Harr,

The Virginia Department of Transportation (VDOT) supports the submission of the Draft Integrated Feasibility Report/Environmental Assessment (Draft Feasibility Report) conducted by the U. S. Army Corp of Engineers (USACE) Norfolk District. The Draft Feasibility Report provides 6 alternative plans for addressing streambank stabilization along a 100-foot embankment in Bedford County, Virginia. The goal of each of the 6 alternative plans is to stabilize the streambank along an approximate 100 foot section of a tributary along U.S. route 501. The final report will contain USACE's recommendation on the best alternative plan for the site.

We at VDOT would like to express our sincere appreciation for your work on the Integrated Feasibility Report/Environment Assessment for Indian Run in Bedford County and identification of options for stabilizing the streambank. Once the USACE submits the Draft Feasibility Report to VDOT for review and consideration, we will evaluate the USACE recommendations and make a determination on how to proceed in the future.

Again, thank you,

Jennifer Ahlin
Director / Asset Management Division
Virginia Department of Transportation
804-786-6581
Jennifer.Ahlin@VDOT.Virginia.gov

VDOT Virginia Department of Transportation

NORFOLK DISTRICT LEGAL CERTIFICATION

Indian Run, Bedford County, VA
Continuing Authority Program, Section 14
Emergency Streambank & Shoreline Protection

APPENDIX E

MAY 2021

U.S. Army Corps
of Engineers
Norfolk District

CERTIFICATION OF LEGAL REVIEW

The Continuing Authorities Program Section 14, Emergency Streambank and Shoreline Protection, Indian Run, Bedford County, Virginia, Draft Integrated Feasibility Report/Environmental Assessment has been reviewed by the Office of Counsel, Norfolk District, and, conditioned on completion of Section 106, National Historic Preservation Act, compliance, has been determined to be legally sufficient.

Date: 07 May 2021

Thomas M. Emerick
District Counsel