INVITATION FOR BIDS

Piedmont SWCD Name:

PIEDMONT SWCD
100B DOMINION DRIVE
FARMVILLE, VIRGINIA 23901
(434) 392-3782 ext 128

Project Name & Location:

TRAINING DIKE - BUFFALO CREEK WATERSHED DAM #2 (14706)
STOCKTON LAKE, PRINCE EDWARD COUNTY, VIRGINIA

OUTFALL POOL STONE REPLACEMENT- BUFFALO #2 (14706
STOCKTON LAKE, PRINCE EDWARD COUNTY, VIRGINIA

PROJECT CODE NO: ***2020 Training Dike/Stone Replacement***

Engineers of Record:

DEPARTMENT OF CONSERVATION & RECREATION
SOIL & WATER DIVISION
600 EAST MAIN STREET, 24FL
RICHMOND, VIRGINIA 23219

USDA-NRCS
CULPEPER BUILDING, SUITE 209
1606 SANTA ROSA ROAD
RICHMOND, VA 23229-5014

DATE: November 4, 2019

INVITATION FOR BIDS FOR:

TRAINING DIKE
Buffalo #2 (Stockton Lake)
Prince Edward County

STONE REPLACEMENT
Buffalo #2 (Stockton Lake)
Prince Edward County

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VA-706 Seeding
VA-707 Site Preparation
VA-708 Salvaging and Spreading Topsoil
VA-721 Excavation
VA-723 Earthfill
VA-761 Loose Rock RipRap
VA-795. GEOTEXTILE

Project Designs (PDF Attachments)
Engineering Design Cover Sheet
Outfall Pool Repair Cross Section

NOTICE OF INVITATION FOR BIDS

Sealed bids are invited for: Modifications to training dike on Buffalo Creek Watershed Dam #2, Stockton Lake, Prince Edward County, VA; and Outfall stone replacement Buffalo #2 (Stockton Lake), Prince Edward County

Bid Deadline: January 8, 2020 1:00pm

If interested, request detailed *Invitation For Bid* package by contacting Piedmont Soil and Water Conservation District (SWCD) at 434-392-3782 ext. 128.

Pre-Bid Site Visit: A mandatory pre-bid site visit for the "Training Dike" and "Stone Replacement" will be held at Piedmont Soil & Water Conservation District, 100 Dominion Drive, Farmville, VA 23901 on December 4, 2019 at 9:00am.

BID SPECIFICATIONS

DATE: **November 4, 2019**

PROJECTS: **Training Dike-Buffalo Creek Watershed Dam #2 Stockton Lake**
Stone Replacement at Outfall Pool– Buffalo Creek Watershed Dam #2 Stockton Lake

Project Code: 2020 Training Dike/Stone Replacement

To: **Piedmont Soil & Water Conservation District**
100B Dominion Drive
Farmville, VA 23901

Scope of Work

Bid Item #1: Training Dike (Buffalo #2) – This project involves raising the height and increasing the length of the training Dike located on the right side (looking downstream) of the emergency spillway. Topsoil is to be stripped, stockpiled and replaced. An additional 200 cubic yards of topsoil will need to be imported. Clearing and grubbing will be required on approximately .2ac. Approximately 650 cubic yards of earth fill will be required to construct the training Dike. Earth fill to be excavated from borrow site indicated on design. Borrow site and training Dike will be finished with 6 inches of topsoil. All disturbed areas will be fully stabilized per specifications. Top of dam will be protected from damage due to construction traffic.

Bid Item #2: Stone Replacement at watershed dam outfall pool (Buffalo #2). This project involves re-grading side slopes of outfall pool areas and augmenting riprap according to needs. Rip rap will be Class 1 stone. All disturbed areas will be fully stabilized per specifications.

Compliance with Erosion and Sediment control regulations including any permits will be the responsibility of the contractor.

Bid Requirements

All bidders shall use the attached Bid Form (page 8 & 9) for submitting their bid proposal. All bidders shall submit certification of Insurance Requirements as outlined below. All bidders must be licensed to work in the Commonwealth of Virginia **(minimum Class B license required). Two references of qualifications are required as part of the bid submittal.** The successful bidder shall comply with all applicable local, State and Federal regulations, including safety, while working on Piedmont SWCD property. In addition to the Bid form, all bids submitted must be accompanied by a copy of bidders Contractors License and insurance documents as identified below. Failure to include all documents will eliminate your eligibility to be considered.

Design and Specifications:

The repairs shall be completed in accordance with the attached design and specifications:

ENGINEERING DESIGN COVER SHEET
VA-705. POLLUTION CONTROL
VA-706. SEEDING
VA-707. SITE PREPARATION
VA-708. SALVAGING AND SPREADING TOPSOIL
VA-721. EXCAVATION
VA-723. EARTHFILL
VA-761. LOOSE ROCK RIPRAP
VA-795. GEOTEXTILE

Preconstruction Conference
A preconstruction conference to include Piedmont SWCD, their engineer and contractor will be required.

Erosion and Sediment Control
The contractor shall comply with all local, state, and federal regulations regarding erosion and sediment control. Reference: Virginia Erosion and Sediment Control Handbook

Construction Access

A. Construction access to the sites will be off state roadways along existing routes per District easements.
B. Any damage to the existing ground along access route or within the work limits shall be repaired at the contractor's expense prior to demobilization. Repair shall include any necessary re-grading, seeding and mulching.

Notification
The contractor shall notify the Piedmont SWCD one (1) week prior to the start of construction to allow for inspection scheduling.

Insurance Requirement
Along with bid submission, the contractor must furnish Certificates of General Liability, Vehicle Liability and Workman's Compensation Insurance in amounts not less than $1,000,000, $1,000,000 and $500,000 respectively to the Piedmont SWCD. All insurance coverages shall be written by companies licensed to do business in Virginia and shall be administered by a Virginia registered agent. Proof of insurance must include dams listed as an insured construction item. The contractor will maintain these coverages during the entire term of the contract.

Hold Harmless: The contractor agrees to hold the Piedmont SWCD harmless and exonerate the Piedmont SWCD from any and all liability for injury or damage to persons or property caused by the negligence or willful misconduct of contractor, its agents, employees, or subcontractors in carrying out its duties. This indemnification shall apply to any costs incurred by the Piedmont SWCD, including reasonable attorney's fees, in defense of such actions.

Negotiation of Bid
The Piedmont SWCD reserves the right to accept or reject any or all bids submitted.

Negotiation with Low Bidder
The Piedmont SWCD reserves the right to negotiate options with the lowest responsive/responsible bidder.

Submission of Bid
Sealed bids shall be submitted on the attached bid submission form to the Piedmont Soil & Water Conservation District. Bids can be mailed to Piedmont SWCD, 100B Dominion Drive, Farmville, VA 23901. All Bids should be marked on the outside of the envelope with the letters "Bid" so as to avoid its possible opening with regular mail. Bids will be rejected if not on the attached form. **Sealed bids must be received by January 8, 2020 1:00 pm.**

Opening of Bid
The bids will be opened at 10:00 am on January 9, 2020 at the Piedmont Soil & Water Conservation District office. In the event of bad weather that closes the Piedmont SWCD office, the bids will be opened the next business day. The successful bidder will be notified by January 29, 2020.

If notice of acceptance of this bid is given to the undersigned within 30 days after the date of opening of bids, or any time thereafter before this bid is withdrawn, the undersigned will execute and deliver a

contract in the prescribed form (Commonwealth of Virginia Contract Between Piedmont SWCD and Contractor, Form CO-9) within 10 days after the contract has been presented to him for signature

Timeline
The undersigned understands that time is of the essence and agrees that the time for Substantial Completion of the entire project shall be 30 consecutive calendar days from the date of commencement of the Work as specified in the Notice to Proceed.

Requirements for Certification prior to payment
The contractor must notify the Piedmont SWCD one (1) week prior to completion in order to schedule a final inspection visit by the certifying engineer. The certifying engineer will inspect the completed work within 2 weeks of completion. The contractor must submit receipts to verify the required quantities were purchased for use. A bill representing the contract price must be submitted. All necessary seeding, grading and final mulching must be completed prior to payment. Any temporary erosion and sediment devices must also be removed.

Payment Time
Payment will be made within 30 days after certification by a professional engineer licensed in Virginia that the repair meets the above NRCS specifications, and all invoices have been received by Piedmont SWCD. The engineer will be an authorized employee of either the Virginia Department of Conservation and Recreation or the USDA Natural Resource Conservation Service. Individual contractors shall provide their social security numbers and proprietorships, partnerships and corporations shall provide either Federal Employer Identification Number in the space indicated on the bid form.

Fair Employment Practices
The bidder will not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The proposer agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth this nondiscrimination clause. The bidder, in all solicitations or advertisements for employees placed because of this proposal, will state that such bidder is an equal opportunity employer.

Drug-free Workplace
During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, \possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition: (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000 so that the provisions will be binding upon each subcontractor or vendor.

Immigration Reform and Control Act of 1986: The undersigned certifies that it does not and will not during the performance of the Contract for this project violate the provisions of the Federal Immigration Reform and Control Act of 1986, which prohibits employment of illegal aliens.

Disqualification of Contractors: By signing this bid or proposal, the undersigned certifies that this Bidder or any officer, director, partner or owner is not currently barred from bidding on contracts by any Agency of the Commonwealth of Virginia, or any public body or agency of another state, or any agency of the federal government, nor is this Bidder a subsidiary or affiliate of any firm/corporation that is currently barred from bidding on contracts by any of the same. We have attached an explanation of any previous disbarment(s) and copies of notice(s) of reinstatement(s).

Modification of Bid
Either the bidder or a specified individual, listed by the bidder on the bid form, if any, is authorized to modify this bid prior to the deadline for receipt of bids by writing the modification and signing their name on the face of the bid and on the envelope in which it is enclosed. This document will be attached to the previous received sealed bid envelope and marked as "modified bid received."

Nondiscrimination Statement
In accordance with the Code of Virginia, this public body does not discriminate against faith based organizations or against a bidder or offeror because of race, religion, color, sex, nation origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.

Right to Terminate Contract
In the event that any provisions of this Contract are violated by the Contractor, the Piedmont SWCD shall have the right to serve written notice upon the Contractor of its intention to terminate such Contract, such notice to contain the reasons for such intention to terminate. The Contractor shall immediately upon receipt of such notice, cease such violation or make satisfactory arrangements for corrections, or the Piedmont SWCD may declare the Contract terminated by serving written notice upon the Contractor. The termination shall be effective and the Contract shall cease five (5) days after mailing such written notice via certified United States mail to the Contractor and his surety. In the event of such termination, the Piedmont SWCD may take over the work or any portion thereof, and prosecute the same, by contract or any other method, for the account and at the expense of the Contractor and the Contractor shall be liable to the Piedmont SWCD for any excess cost occasioned by the Piedmont SWCD thereby.

Negotiation with Successful Bidder
A. If all bids received exceed the available funds for the proposed purchase, the Piedmont SWCD, pursuant to Code provisions, may meet with the lowest responsive and responsible bidder to discuss a reduction in the scope for the proposed purchase and negotiate a contract price within the available funds.
B. After bid negotiations, the lowest responsive and responsible bidder shall submit an addendum to his bid, which addendum shall include the change in scope for the proposed purchase, the reduction in price and the new contract value.
C. If the proposed addendum is acceptable to the Piedmont SWCD, the Piedmont SWCD may award a contract within funds available to the lowest responsive and responsible bidder based upon the amended bid.
D. If the Piedmont SWCD and the lowest responsive and responsible bidder cannot negotiate a contract within available funds, all bids may be rejected.

Directions to the Site
Contact the Piedmont SWCD office for specific directions.

BID SUBMISSION FORM
Projects – Training Dike and Stone Replacement

Issue Date: November 4, 2019

Projects: Training Dike-Buffalo Creek Watershed Dam #2 Stockton Lake
Stone Replacement at Outfall Pool– Buffalo Creek Watershed Dam #2 Stockton Lake

Issuing Agency: Piedmont Soil & Water Conservation District

Completion Date: July 31, 2020

Sealed Bids will be received until January 8, 2020 1:00pm at the Piedmont Soil & Water Conservation District office.

All inquiries for information should be directed to: Charlie Wootton, Phone (434) 392-3782 ext 128, cwootton@piedmontswcd.org

Submission of Bid (certified mail or hand deliver) to:
Piedmont Soil & Water Conservation District, 100B Dominion Drive, Farmville, VA 23901

Bids will be rated on the following criteria:

1. ***Combined Cost-Both Projects***
2. ***Ability to complete the contract in the specified time.***
3. ***Experience of contractor to perform task.***
4. ***Bidder meeting all bid requirements and providing all submittals.***

The Piedmont Soil & Water Conservation District reserves the right to refuse any and all bids.

In compliance with and subject to your Invitation for Bids and the documents therein specified, all of which are incorporated herein by reference, the undersigned bidder proposes to furnish all labor, equipment, and materials and perform all work necessary for construction of this project, in accordance with the Plans and Specifications incorporated in the "Invitation for Bids" package dated November 4, 2019 for the consideration of the following amount:

BID Item #1: Lump sum price to modify training Dike and fully stabilize the site in accordance with the Specifications.

BID Amount $_____

BID Item #2: Lump sum price to grade side walls and augment rip rap at outfall pool in accordance with the Specifications.

BID Amount $_____

TOTAL LUMP SUM BID OF BOTH PROJECTS $_____

Name of person who attended pre-bid site visit:_____

I certify that the firm name given below is the true and complete name of the bidder and that the bidder is legally qualified and licensed by the Commonwealth of Virginia, Department of Commerce, State Board for Contractors, to perform all Work included in the scope of the Contract.

Virginia License No. _____

Contractor Class _____

Specialty _____

Valid until _____

FEIN/SSN: _____

Bidder _____
(Name of Firm)

By _____
(Signature)

_____
(Typed Name)

Title _____

If Partnership (List Partners' Names)

_____

_____

_____

_____

If Corporation, affix Corporate Seal & list State of Incorporation

State: _____

(Affix Seal)

Business Address:

_____

_____

_____

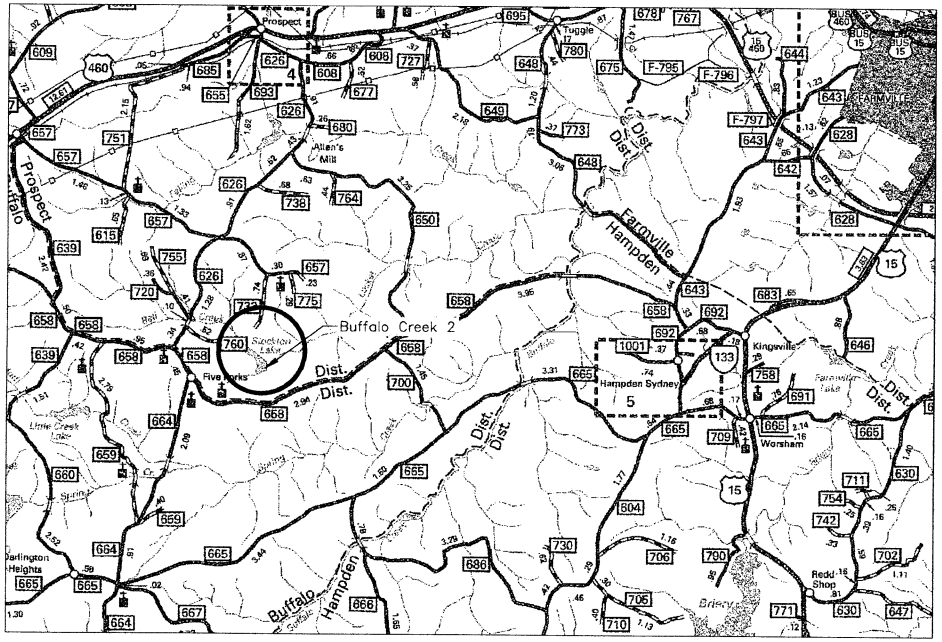
_____

Telephone # _____

FAX # _____

Email _____

Design Copy Routing: ____ Cooperators Folder ____ Landowner ____ Contractor ____ Supplier



Site Location Map

Not to Scale

Notes

1. The contractor is responsible for obtaining and complying with all permits and easements. This includes all federal, state and local permits.
2. The contractor is responsible for checking and complying with all local ordinances that may affect the project.
3. MISS UTILITY (Virginia telephone number 811) must be contacted at least 3 working days before construction begins. The landowner/operator is responsible for ensuring that the contractor contacts MISS UTILITY. The contractor must be able to provide the MISS UTILITY ticket number within 24 hours upon request by the SWCD representative. The landowner/operator is responsible for locating any buried utilities (water lines, electric lines, telephone lines, gas lines, sewer lines, etc.) in the work area that are not covered by the MISS UTILITY program.
4. SWCD makes no representation of the existence or nonexistence of utilities. The presence or absence of utilities on the construction drawings does not assure that there are or are not utilities in the work area.
5. The contractor is responsible for knowing and following the appropriate safety standards required by the Virginia Safety and Health Codes Board.
6. The contractor shall notify the local SWCD representative at least one week prior to beginning construction, and at all other times specified in this construction plan and attached specifications.
7. The Drawings and specifications will not be modified unless approved in writing by the Engineer who has sealed these drawings.

The Representative for this project is: Piedmont SWCD

The office telephone number is: 434-392-3782

Benchmark Descriptions

TBM # 100 Assumed Elev. 452.98
Description: Top of rebar flush with ground, CL of dam on left (looking downstream) end. See Sheet 2 for coordinates.

TBM # 101 Assumed Elev. 452.95
Description: Top of rebar flush with ground, CL of dam and CL of Principal Spillway. Sheet Sheet 2 for Coordinates.

Index of Sheets

Sheet No.	Title
1	Dam O&M Cover Sheet
2	Site Plan
3	Plan & Profile

Specification Table

No.	Title
705	Pollution Control
706	Seeding
707	Site Preparation
708	Salvaging and Spreading Topsoil
721	Excavation
723	Earthfill

Table of Estimated Quantities

Item	Unit	Quantity
Clearing & Grubbing	Acre	0.2
Seeding & Mulching	Acre	1.0
Excavation	CY	600
Earthfill	CY	650
Topsoiling	Acre	0.75
Topsoil Import	CY	200

Engineering Job Class: V

"As Built" Documentation

Certified By and Date

Practice Completion Date

811 Know what's below. Call before you dig.

	Date
Designed R. Evans	2/18
Drawn R. Evans	2/18
Checked C. Hamilton	2/18
Approved M. Lyons	3/18

Buffalo Creek 2
Training Dike
Prince Edward County, Virginia
Dam O&M Cover Sheet

In Cooperation with Virginia Department of Conservation and Recreation Division of Soil & Water Conservation

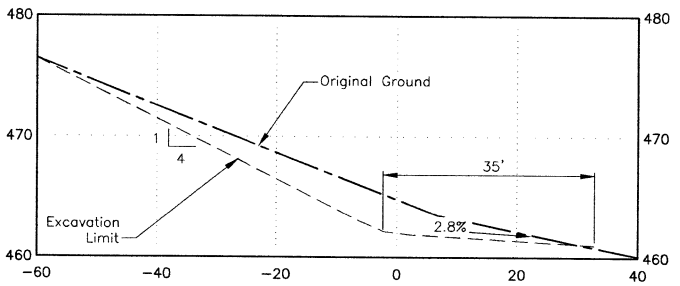
USDA United States Department of Agriculture
Natural Resources Conservation Service

File Name Buffalo Creek 2 Training Dike.dwg
Drawing Name

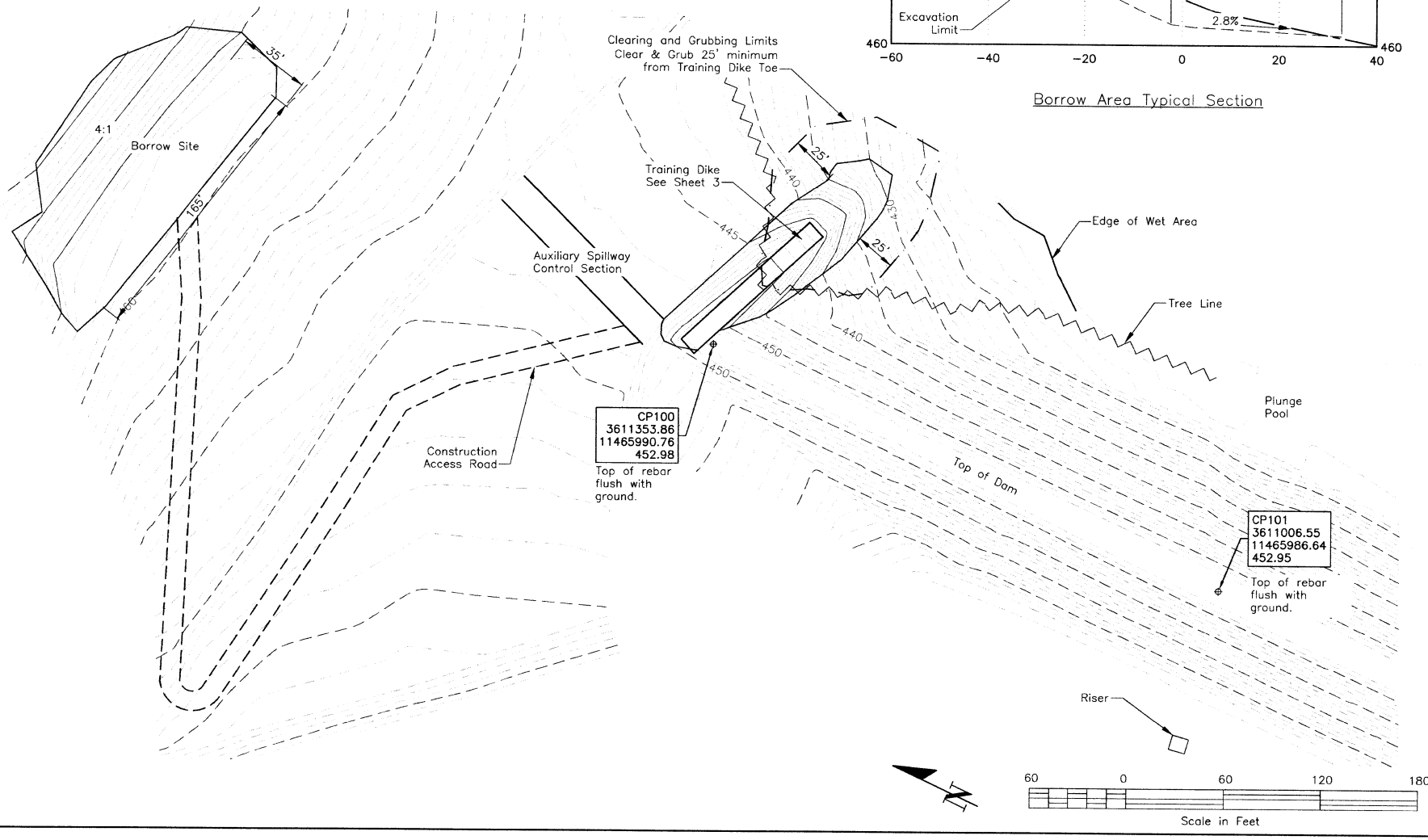
3/9/18 11:46 AM
Sheet 1 of 3

Construction Notes:

1. The borrow area as shown should provide the required amount of material for the training dike. Limits may be adjusted in the field by the Engineer.
2. Once enough material has been removed from the borrow area, re-grade to smooth transition with original ground and slopes no steeper than 4:1.
3. Remove and stockpile topsoil prior to all earthwork activities. Place 6" topsoil on completed training dike and excavated borrow area.
4. Approximately 200 CYs of topsoil will need to be imported to meet site requirements. Imported Topsoil source to be approved by Engineer prior to import on site.
5. Seed and mulch all bare areas.
6. Re-grade, mulch, and seed all existing disturbed areas including, but not limited to, the downstream embankment of the dam, construction access road location, borrow area, and auxiliary spillway.
7. See Sheet 3 for Training Dike Construction Details.



Borrow Area Typical Section



		Date
Designed	R. Evans	2/18
Drawn	R. Evans	2/18
Checked	C. Hamilton	2/18
Approved	M. Lyons	3/18

Buffalo Creek 2
Training Dike
Prince Edward County, Virginia
Site Plan

In Cooperation with Virginia Department of Conservation and Recreation Division of Soil & Water Conservation

USDA United States Department of Agriculture
Natural Resources Conservation Service

File No.
Buffalo Creek 2 Training Dike.dwg

Drawing No.

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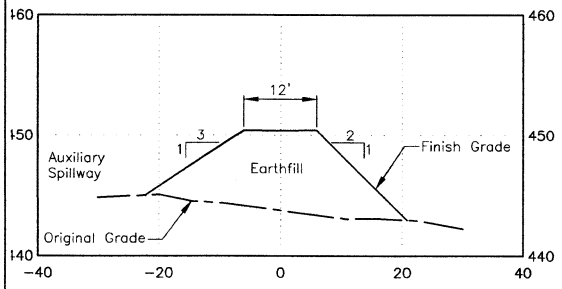
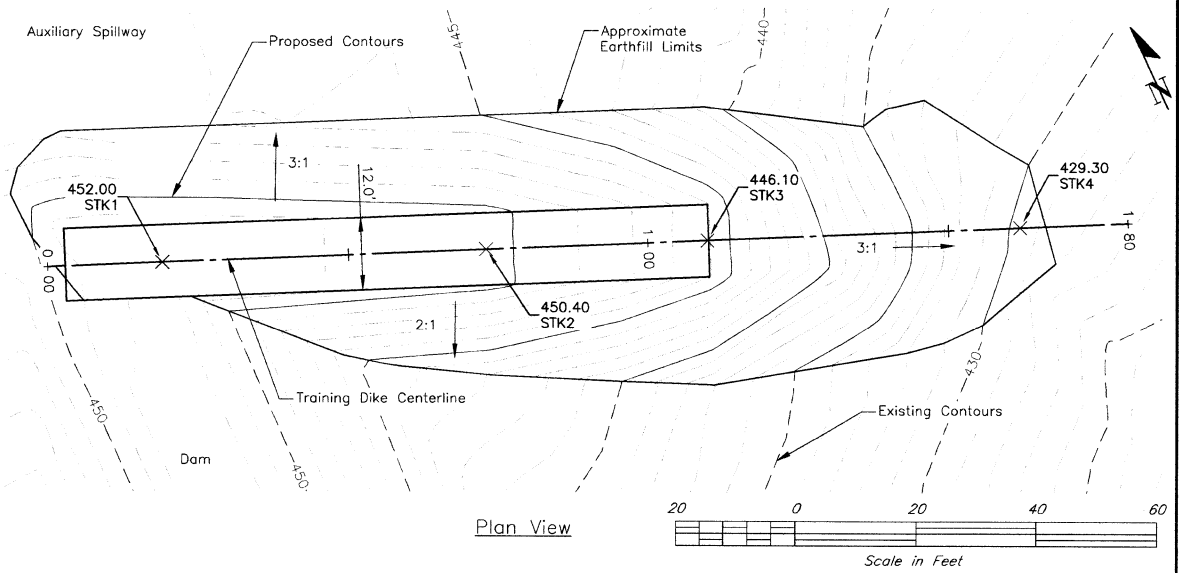
Sheet 2 of 3



Training Dike Typical Section

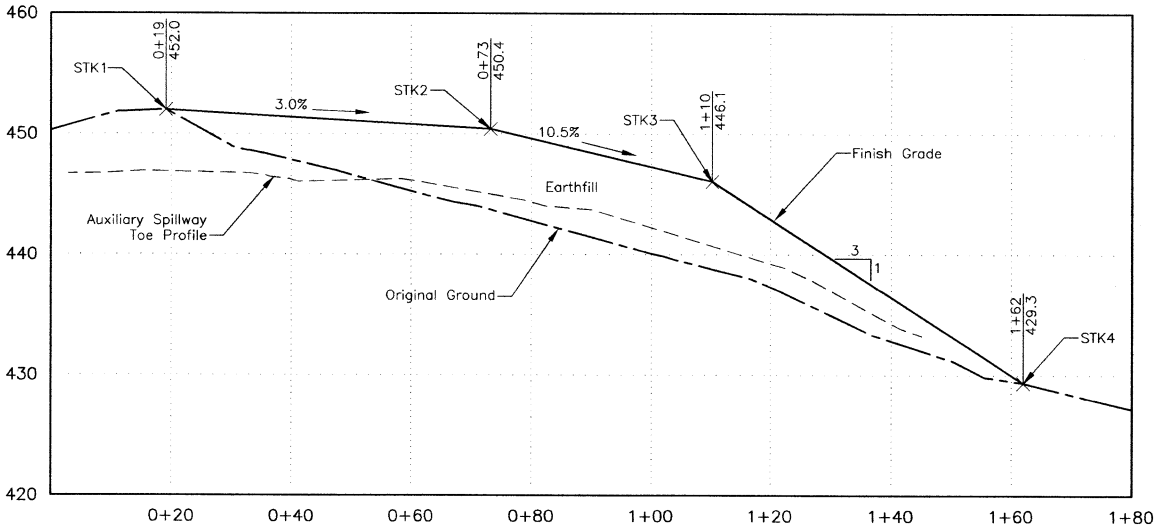


Plan View

Construction Notes:

1. Approximately 650 CYDs of Earthfill (Construction Specification 723) will be needed to construct the Training Dike. The borrow area as shown on Sheet 2 will provide the material (CS 721).
2. Tamping Sheepsfoot Roller or Pneumatic (Rubber Tire) Roller to be used for Earthfill Compaction.
3. Remove and stockpile topsoil prior to all earthwork activities. Place 6" topsoil on completed training dike and excavated borrow area (CS 708).
4. Re-grade, mulch, and seed all existing disturbed areas including, but not limited to, the downstream embankment of the dam, access road location, borrow area, and auxiliary spillway (CS 706).

Stakeout Point Data				
Pt. No.	Northing	Easting	Elev.	Description
STK1	3611361.5	11465997.6	452.0	CL of Training Dike at STA 0+19, Finish Elevation, Start of Earthfill
STK2	3611340.8	11466047.4	450.4	CL of Training Dike at STA 0+73, Finish Elevation, Grade Break
STK3	3611326.6	11466081.6	446.1	CL of Training Dike at STA 1+10, Finish Elevation, Grade Break
STK4	3611306.6	11466129.6	429.3	CL of Training Dike at STA 1+62, Finish Elevation, End of Earthfill



Training Dike Centerline Profile

Buffalo Creek 2
Training Dike
Prince Edward County, Virginia
Plan & Profile

In Cooperation with Virginia Department of Conservation and Recreation Division of Soil & Water Conservation

USDA United States Department of Agriculture
Natural Resources Conservation Service

		Date
Designed	R. Evans	2/18
Drawn	R. Evans	2/18
Checked	C. Hamilton	2/18
Approved	M. Lyons	3/18

File No. Buffalo Creek 2 Training Dike.dwg
Drawing No.
3/9/18 11:46 AM
Sheet 3 of 3

CONSTRUCTION SPECIFICATIONS

For

Buffalo Creek 2 Training Dike

Prince Edward County, Virginia

List of Specifications

Title	No.	Pages
Pollution Control	VA-705	2
Seeding	VA-706	3
Site Preparation	VA-707	1
Salvaging and Spreading Topsoil	VA-708	1
Excavation	VA-721	2
Earthfill	VA-723	3

CONSTRUCTION SPECIFICATION

VA-705. POLLUTION CONTROL

1. SCOPE

This work will consist of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air from construction.

2. MATERIALS

All material furnished will meet the requirements listed in the construction drawings and referenced specifications.

3. EROSION AND SEDIMENT CONTROL MEASURES

All erosion and sediment control measures will be installed in accordance with all applicable federal, state and local laws, ordinances and regulations.

a. Earthwork Activities

The excavation and moving of soil materials will be scheduled and staged to minimize the size of areas disturbed and unprotected from erosion for the shortest reasonable time.

b. Seeding

Seeding of disturbed areas will occur as soon as reasonably possible following the completion of earthwork activities. All seeding, mulching, fertilizer and associated work will conform to Construction Specification VA-706, Seeding.

c. Diversions

Diversions to divert water away from work areas will be installed as necessary to prevent erosion. Temporary diversions will be removed and the area restored to its original condition upon project completion.

d. Sediment Filters

Straw bale filters or silt fence will be used as necessary to prevent sediment from leaving the construction site. Sediment filters will be properly anchored to prevent erosion under or around them. These filters are temporary and will be removed and the area restored to its original condition upon project completion.

e. Sediment Basins

Temporary sediment basins will be used as necessary to collect, settle, and eliminate sediment from eroding areas as well as to prevent impact to properties and streams below the construction site. These basins are temporary and will be removed and the area restored to its original condition upon project completion.

f. Other Measures

Additional protections measures will be used as necessary or as required by federal, state, or local laws, ordinances and regulations to prevent erosion.

4. CHEMICAL POLLUTION

Measures will be taken to contain chemical pollutants such as fuels, grease and soaps produced as a by-product of construction activities. Pollutants will be disposed of in accordance with all appropriate federal, state, or local laws, ordinances and regulations.

5. AIR POLLUTION

The burning of brush, wood debris or other construction related material will be in accordance with all applicable federal, state, or local laws, ordinances and regulations. Fire prevention measures will be taken to prevent the start or spreading of wildfires that may result from construction activities.

Dust control methods will be used as necessary. All dust control methods will ensure safe construction operations at all times. If chemical dust suppressants are used, the material will be a commercially available product specifically designed for dust suppression and the application will follow the manufacturer's requirements and recommendations. A copy of the product data sheet and manufacturer's recommended application procedures will be provided to the NRCS or SWCD representative prior to the first application.

6. MAINTENANCE, REMOVAL, AND RESTORATION

All pollution control measures will be adequately maintained in a functional condition for the duration of the construction period. All temporary measures will be removed and the site restored to original condition upon project completion.

CONSTRUCTION SPECIFICATION

VA-706. SEEDING

1. SCOPE

The work will consist of seeding, mulching, liming and fertilizing all disturbed areas and other areas shown on the construction drawings or otherwise designated.

2. GENERAL

Liming, fertilizing, seeding and mulching will be performed within 10 days from disturbance unless the seedbed cannot be properly prepared due to wetness, snow or frozen soil or as otherwise directed by the NRCS or SWCD representative.

3. FERTILIZER AND LIME

Lime will be standard agricultural ground limestone. Fertilizer will meet the requirements of the applicable Virginia state laws, and will be in such physical condition to ensure uniform application over the area to be fertilized. Rates of application will be as specified on the construction drawings or as shown on the attachment to this specification.

4. SEED

The seed will conform to the latest seed laws of the United States and of Virginia. Species, the source of production if native grasses are used, and rate of seeding will be as specified on the construction drawings or as shown on the attachment to this specification.

5. PREPARATION OF SEEDBED

The entire area to be seeded will be reasonably smooth and all washes and gullies will be filled to conform to the desired cross-section before actual seedbed preparation is begun. Scarify subsoil areas perpendicular to water flow before they are filled. After final grading, the required fertilizer (except that applied with a hydraulic seeder) and/or lime will be applied uniformly and incorporated into the top 3 inches of the soil. The seedbed preparation operation will be suspended when the soil is too wet or too dry.

On side slopes steeper than 3:1, the 3 inch minimum depth of seedbed preparation is not required, but the soil will be worked enough to ensure sufficient loose soil to provide adequate seed cover.

6. SOWING THE SEED

Seed immediately after preparation of the seedbed. Uniform seed distribution will be accomplished by drilling, broadcasting or hydraulic seeding. If a hydraulic seeder is used, the seed, fertilizer and mulch may be applied together with water.

7. MULCHING

The required mulching will be performed with hydraulic seeding or immediately after seeding. The mulch will be applied uniformly over the area. The type and rate will be as specified on the construction drawings or as shown on the attachment to this specification.

The mulch, except for hydraulically placed mulch, will be anchored. Anchoring of the mulch will be performed by application of a commercially available tackifier at the rate recommended by the manufacturer; by a mulch anchoring tool, a tandem disk weighted and set nearly straight, or a track type tractor; or by installation of mulch netting. Mechanical anchoring will be performed in a manner that creates ridges perpendicular to flow of water. Where netting is used in flow areas, the upstream end of each section will be buried in a trench to a minimum depth of 6 inches and a maximum of 50 ft. intervals thereafter.

ATTACHMENT TO CONSTRUCTION SPECIFICATION VA-706

The estimated area to be seeded =_____(acres) (1000 square feet)

1. LIME

   The following minimum amount of lime will be applied:

   _____ pounds per (acre) (1000 square feet)

   _____ (pounds) (tons) total

2. FERTILIZER

   Without soil tests, apply a minimum of _____ pounds per acre or _____ pounds per 1000 square feet of a commercial fertilizer having an analysis of _____ or equivalent.

   With a soil test, apply the Virginia Polytechnic Institute and State University recommended rate of fertilizer for establishment of the seeding specified.

   _____ pounds of _____ fertilizer total

   or

   _____ pounds of _____ fertilizer total

3. SEED

   The following types/species and rates of seed will be sown:

Nurse Crop: Types/Species of Seed	Pounds Per (acre) (1000 sq. ft.)	Total Seed (Pounds)

Primary Seed: Types/Species of Seed	Pounds Per (acre) (1000 sq. ft.)	Total Seed (Pounds)

4. MULCH

   Straw mulch will be uniformly spread over the seeded area at the rate of 1.5 to 2 tons per acre or 2 to 3 bales per 1000 square feet.

   _____ (tons) (bales) total mulch

   _____ (square yards) (linear feet) total of netting (linear feet based on ___wide roll)

CONSTRUCTION SPECIFICATION

VA-707. SITE PREPARATION

1. SCOPE

Site preparation work will consist of clearing all woody growth, vegetation and other undesirable materials from the construction area.

2. FOUNDATION PREPARATION

The construction areas will be stripped of all materials not suitable for the foundation. Such materials will include organic matter, grasses, weeds, sod, debris and stones larger than 12 inches in diameter.

All trees, snags, logs, brush, stumps, and shrubs not marked for preservation and rubbish will be removed from within the limits of the construction areas. Unless otherwise specified, all stumps, roots and root clusters having a diameter of 1 inch or larger will be grubbed out to a depth of at least 2 feet below subgrade elevation for concrete structures and 1 foot below the ground surface for earthfills.

In an earth embankment foundation area, all channel banks and sharp breaks will be sloped to no steeper than 1:1.

3. STRIPPED MATERIAL DISPOSAL

Suitable stripped soil material will be stockpiled for use as topsoil. The other stripped materials will be buried, removed from the site or otherwise disposed of as indicated by the NRCS or SWCD representative.

Stockpiled materials around a construction site should not hinder subsequent construction operations.

Waste material excavated from channels will be deposited and shaped into spoil banks as indicated on the construction drawings or as directed by the NRCS or SWCD representative.

4. DISPOSAL

Where the use of brush piles for wildlife is not specified on the construction drawings, cleared and grubbed materials will be disposed of by burning, burying, or hauling offsite. Locations for burning or burying will be approved by the NRCS or SWCD representative. Materials to be buried will be placed at least 2 feet below the surrounding ground line and have a minimum of 2 feet of cover with the finished surface graded to provide positive drainage. Any burning operations will be subject to all federal, state and local laws, ordinances and regulations governing such operations.

CONSTRUCTION SPECIFICATION

VA-708. SALVAGING AND SPREADING TOPSOIL

1. SCOPE

The work will consist of salvaging or obtaining topsoil and spreading it in the designated areas to the specified depths.

2. QUALITY OF TOPSOIL

Topsoil will consist of friable soil reasonably free of grass, roots, weeds, sticks, stones or other foreign materials.

3. EXCAVATION

Topsoil will be removed after site preparation activities and removal of vegetation. Objectionable materials will be removed and buried, or disposed of, at locations approved by the NRCS or SWCD representative.

4. SPREADING

Spreading will not be done when the ground or topsoil is frozen, excessively wet or otherwise in a condition detrimental to the work. Surfaces to be covered will be lightly scarified just prior to the spreading operation.

Topsoil will be placed in such a manner to achieve the lines and grades and the minimum depths shown on the construction drawings or as directed by the NRCS or SWCD representative.

After placement is completed, the topsoil surface will be finished to a reasonably smooth surface.

CONSTRUCTION SPECIFICATION

VA-721. EXCAVATION

1. SCOPE

The work will consist of the excavation required to achieve the lines and grades indicated on the construction drawings. All applicable Virginia Occupational Safety and Health Act (OSHA) regulations regarding excavation safety will be followed.

2. USE OF EXCAVATED MATERIALS

To the extent they are needed, all suitable materials from the specified excavations will be used in the construction of required permanent earth fill or rock fill. The suitability of materials for specific purposes will be determined by the NRCS or SWCD representative. The contractor will not waste or otherwise dispose of suitable excavated materials.

3. DISPOSAL OF WASTE MATERIALS

All surplus or unsuitable excavated materials will be designated as waste and will be disposed of at the locations shown on the construction drawings or designated by the NRCS or SWCD representative or landowner.

4. BRACING AND SHORING

Excavated surfaces too steep to be safe and stable if unsupported will be supported as necessary to safeguard the work and workmen, to prevent sliding or settling of the adjacent ground, and to avoid damaging existing improvements. The width of the excavation will be increased if necessary to provide space for sheeting, bracing, shoring and other supporting installations. The contractor will furnish, place and subsequently remove such supporting installations.

5. STRUCTURE AND TRENCH EXCAVATION

Structure or trench excavation will be completed to the specified elevations and to sufficient length and width to include allowance for forms, bracing and supports, as necessary, before any concrete or earth fill is placed or any piles are driven within the limits of the excavation.

6. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials will be obtained from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas will be as directed by the NRCS or SWCD representative.

Borrow pits will be excavated and finally dressed in a manner to eliminate steep or unstable side slopes or other hazardous or unsightly conditions.

7. OVER EXCAVATION

Excavation beyond the specified lines and grades will be corrected by filling the resulting voids with approved compacted earth fill, except that if the earth is to become the subgrade for riprap, rock fill, sand or gravel bedding, or drain fill, the voids may be filled with material conforming to the specifications for the riprap, rock fill, bedding or drain fill.

CONSTRUCTION SPECIFICATION

VA-723. EARTHFILL

1. SCOPE

The work will consist of placing the required earthfill to achieve the lines and grades indicated on the construction drawings.

2. MATERIALS

All earthfill materials will be obtained from required excavations and designated borrow areas. The selection of fill materials will be subject to approval by the NRCS or SWCD representative.

Earthfill materials will contain no sod, roots, frozen soil, snow or ice, or other perishable materials. Stones larger than 6 inches in diameter will be removed prior to compaction of the fill.

The type of materials that are acceptable will be as listed in this specification and/or described on the construction drawings.

3. FOUNDATION PREPARATION

Foundations for earthfill will be stripped to remove vegetation and other unsuitable materials.

Earth foundation surfaces will be graded to remove surface irregularities and scarified to a depth of not less than 2 inches.

4. PLACEMENT

Earthfill will not be placed upon a frozen surface, nor will snow, ice or frozen material be incorporated in the fill.

Adjacent to structures, earthfill will be manually tamped in a manner which will prevent damage to the structures.

Earthfill in dams, levees and other structures designed to restrain the movement of water will be placed so as to meet the following additional requirements.

a. The distribution of materials throughout each zone will be essentially uniform, and the fill will be free from lenses, pockets, streaks or layers of material differing substantially in texture, moisture content or gradation from the surrounding material.

b. If the surface of any layer becomes too hard and smooth to achieve a suitable bond with the succeeding layer, it will be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.

c. The top surfaces of embankments will be maintained approximately level during construction, except that a crown or cross-slope of approximately 2 percent will be maintained to ensure effective drainage.

d. Dam embankments will be constructed in continuous layers from abutment to abutment, except where openings to facilitate construction or to allow passage of stream flow during construction are specified.

5. CONTROL OF WATER CONTENT

The earthfill material will have a water content sufficient to achieve the required density. When kneaded in the hand, it will form a ball which does not readily separate when struck sharply with a pencil and will not extrude out of the hand when squeezed tightly.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the earthfill becomes too dry to permit suitable bond, it will either be removed or scarified and wetted by sprinkling to an acceptable water content prior to placement of the next layer of fill.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the earthfill becomes too slick or saturated, it will be allowed to dry and will be thoroughly scarified to a depth of not less than 2 inches before placing additional layers of fill.

6. COMPACTION

If a minimum required density is specified, each layer of earthfill will be compacted as necessary to obtain that density. The methods of compaction listed below are intended to achieve at least 90 percent of the maximum density as determined by the Standard Proctor Test, ASTM D698. Methods other than those listed below may need to be utilized to achieve the desired compaction. All earthfill materials will be placed and spread in layers not over 9 inches thick before compaction unless otherwise specified. Earthfill materials adjacent to structures will be placed and spread in layers not exceeding 4 inches in thickness before compaction. Each layer will be compacted by traversing the entire surface using one of the following methods:

a. Tamping (Sheepsfoot) Roller - Minimum of 4 passes with contact pressure of at least 100 pounds per square inch (psi), at speeds not exceeding 5 miles per hour (mph).

b. Pneumatic (Rubber Tire) Roller - Minimum of 4 passes with a wheel load of at least 18,000 pounds and a tire pressure of 80 psi, at speeds not exceeding 5 mph.

c. Loaded Earth Moving Equipment - Minimum of 4 passes with a wheel load of at least 10 psi. Equipment speeds will not exceed 5 mph during compaction process.

The following limitations apply to this method:

(1) Earthfill height will be less than 8 feet.

(2) Earthfill will not have permanent water stored against it.

d. Wheel Type Tractor (Farm Tractor) - Minimum of 4 passes with a wheel type tractor (minimum 100 horsepower) exerting a pressure of not less than 10 psi. Tractor speeds will not exceed 5 mph during compaction process.

The following limitations apply to this method:

(1) Earthfill height will be less than 8 feet.

(2) Earthfill will not have permanent water stored against it.

e. Track Type Tractor (Crawler. Bulldozer) - Minimum of 4 passes with a track type tractor exerting a pressure of not less than 8 psi. Tractor speeds will not exceed 5 mph during compaction process.

The following limitations apply to this method:

(1) Maximum loose lift thickness of 6 inches. Stones larger than 3 inches in diameter will be removed prior to compaction.

(2) Earthfill height will be less than 8 feet.

(3) Earthfill will not have permanent water stored against it.

CONSTRUCTION SPECIFICATION

VA-761. LOOSE ROCK RIPRAP

1. SCOPE

The work will consist of the construction of loose rock riprap revetments and blankets, including filter layers or bedding where specified.

2. MATERIALS

Rock for loose rock riprap, filter layers or bedding will come from sources approved by an NRCS or SWCD representative and meet the size and gradation requirements shown on the construction drawings. The rock will be excavated, selected and handled as necessary to meet the quality and grading requirements of this specification and the construction drawings. Individual rock fragments will be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments will be angular to subrounded in shape. The least dimension of an individual rock fragment will be not less than 1/3 the greatest dimension of the fragment unless otherwise specified on the construction drawings.

Except as provided below, the rock shall have the following properties:

a. Bulk specific gravity (saturated surface-dry basis) not less than 2.5.

b. Absorption not more than 2 percent

c. Soundness: Weight loss in five cycles not more than 10 percent then sodium sulfate is used or 15 percent when magnesium is used.

Bulk specific gravity and absorption will be determined according to ASTM C127. The test for soundness will be performed according to ASTM C88.

Rock that fails to meet the requirements stated in a, b, and c above may be accepted only if similar rock from the same source has been demonstrated to be sound after 5 years or more of service under conditions of weather, wetting and drying, and erosive forces similar to those anticipated for the rock to be installed under this specification.

The in place rock will conform to the grading limits shown on the construction drawings.

3. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap or bedding course is to be placed will be cut or filled and graded to the lines and grades shown on the construction drawings. When fill to subgrade lines is required, it will consist of approved materials and will be compacted to a density equal to the adjacent existing soil material. Rock materials will not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by the NRCS or SWCD representative.

4. EQUIPMENT-PLACED ROCK RIPRAP

The rock will be placed by equipment on the surfaces and to the depths shown on the construction drawings. The rock will be constructed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock will be delivered and placed so that it is uniformly distributed and

firmly in contact, one to another, with the smaller rocks and spalls filling the voids between the larger rocks. The rock will not extend above grade on side slopes so that water is ponded outside the riprap. The rock will be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to the permanent works.

5. HAND-PLACED RIPRAP

The rock will be placed by hand on the surfaces and to the depths specified. It will be securely bedded with the larger rocks firmly in contact, one to another. Spaces between the larger rocks will be filled with smaller rocks and spalls. Smaller rocks will not be grouped as a substitute for larger rock. Flat slab rock will be laid on edge unless otherwise specified.

6. FILTER LAYERS OR BEDDING

When the construction drawings specify filter layers or bedding beneath riprap, the filter or bedding material will be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface will be finished reasonably free of mounds, dips or windrows.

When the construction drawings specify geotextile, it will conform to Construction Specification VA-795, Geotextile.

7. TESTING

The contractor will furnish such test data as required to verify that the riprap, geotextile, bedding materials and the completed work meet the requirements of this specification and the construction drawings.

CONSTRUCTION SPECIFICATION

VA-795. GEOTEXTILE

1. SCOPE

This work will consist of furnishing all materials, equipment and labor necessary for the installation of geotextile for slope protection, subsurface drains and road stabilization.

2. MATERIALS

Geotextile will be manufactured from synthetic long chain or continuous polymeric filaments or yarns having a composition of at least 95 percent, by weight, of polypropylene, polyester or polyvinylidene-chloride. The geotextile will be formed into a stable network of filaments or yarns that retain their relative position to each other, are inert to commonly encountered chemicals and are resistant to ultraviolet light, heat, hydrocarbons, mildew, rodents and insects. The geotextile will be free of any chemical treatment or coating that might significantly reduce its permeability and will have no flaws or defects that significantly alter its physical properties. Unless otherwise specified, the class and type of geotextile will be as shown on the construction drawings and will meet the requirements for materials as follows:

a. Woven Geotextile

Woven geotextile will conform to the physical properties listed in Table 1. Woven geotextile will be manufactured from monofilament yarns that are woven into a uniform pattern with distinct and measurable openings. The geotextile will be manufactured so that the yarns will retain their relative position with regard to each other. The yarns will contain stabilizers and/or inhibitors to enhance their resistance to ultraviolet light or heat exposure. The edges of the material will be selvaged or otherwise finished to prevent the outer yarn from unraveling.

b. Nonwoven Geotextile

Nonwoven geotextile will conform to the physical properties listed in Table 2. Nonwoven geotextile will be manufactured from randomly oriented fibers that have been mechanically bonded together by the needle-punched process. In addition, one side may be slightly heat bonded. Thermally bonded nonwoven geotextiles, or mechanically bonded nonwoven geotextiles, may be used for road stabilization.

The geotextile will be manufactured from individual fibers formed into a random pattern with distinct but variable small openings, retaining their position relative to each other when bonded by needle punching, heat, or resin bonding. The filaments will contain stabilizers and/or inhibitors to enhance their resistance to ultraviolet light or heat exposure.

c. Shipping, Product Identification, Certification and Test Data

The geotextile will be shipped in rolls wrapped with a protective covering to protect against mud, dirt, dust, debris and direct sunlight (UV rays). Each roll of geotextile will be clearly marked to identify the brand, type and production run.

The geotextile will meet the specified requirements (Table 1 or 2) for the product style or type shown on the label. The manufacturer or distributor will provide a letter of certification to the NRCS or SWCD representative stating the compliance of the delivered product to the requirements of Table 1 or Table 2, whichever is applicable. Test data pertaining to the production run of the product must be submitted to the NRCS or SWCD representative if

requested to do so, in writing, by the NRCS or SWCD representative. All geotextile materials will be subject to sampling and testing by an independent testing laboratory at any time until final inspection and acceptance.

3. STORAGE

Prior to use, the geotextile will be stored in a clean, dry place, out of direct sunlight, not subject to extremes of either hot or cold, and with the manufacturer's protective cover in place. The geotextile will be stored and handled in accordance with the requirements listed in ASTM D4873.

4. SURFACE PREPARATION

The surface on which the geotextile is to be placed will be graded to the neat lines and grades as shown on the construction drawings. The surface will be reasonably smooth and free of loose rock and clods, holes, depressions, sharp objects, projections, muddy conditions, and standing or flowing water (unless otherwise specified). The surface preparation will be inspected and approved by the NRCS or SWCD representative prior to placing the geotextile.

5. PLACEMENT

a. General

The geotextile will be placed on the approved, prepared surface at the locations and in accordance with the details shown on the construction drawings. The geotextile will be unrolled along the placement area and loosely laid (not stretched) in such a manner that it will conform to the surface irregularities when stone or other material is placed on or against it. The geotextile may be folded and overlapped to permit proper placement in the designated area.

The geotextile will be secured during placement of the overlying materials to prevent slippage, folding, wrinkling, or other movement of the geotextile. Unless otherwise specified, methods of securing will not cause punctures, tears or other openings to be formed in the geotextile.

When seaming is required or desired, the seam will be joined by machine sewing using thread material meeting the chemical requirements for the geotextile fibers or yarn. The sewn overlap will be a minimum of 6 inches, and the sewing will consist of two parallel stitched rows at a spacing of about 1 inch and will not cross (except for any required re-stitching). The stitching will be a lock-type stitch. Each row of stitching will be located a minimum of 2 inches from the geotextile edge. The seam type and sewing machine used will produce a seam strength that provideds a minimum of 90 percent of the tensile strength in the weakest principal direction of the geotextile being used, when tested in accordance with ASTM D4884. The seams may be factory or field sewn.

Should the geotextile be torn or punctured, or the overlaps or sewn joint disturbed, as evidenced by visible geotextile damage, subgrade pumping, intrusion, or grade distortion, the backfill around the damaged or displaced area will be removed and restored to the original approved condition. The repair will consist of a patch of the same type of geotextile being used, overlaying the existing geotextile. When the geotextile seams are required to be sewed, the overlay patch will extend a minimum of one foot beyond the edge of any damaged area and joined by sewing as required for the original geotextile except that the sewing will be a

minimum of 6 inches from the edge of the damaged geotextile. Geotextile panels joined by overlap will have the patch extend a minimum of 2 feet from the edge of any damaged area.

b. Slope Protection

The roll or panel length will be placed parallel to the direction of water flow unless otherwise indicated on the construction drawings. The upstream or up-slope geotextile will overlap the abutting down-slope geotextile. The minimum overlap will be 18 inches, in any direction, unless adjacent panels are sewn together.

The geotextile will not be placed until it can be anchored and protected with the intended covering within 48 hours. In no case will the cover material be dropped on uncovered geotextile from a height greater than 3 feet.

Securing pins, approved by the NRCS or SWCD representative and provided by the geotextile manufacturer, will be placed along the edge of the panel to adequately secure it during placement, except as noted under section 5.d. below. At vertical laps, securing pins will be inserted through both layers along a line through the approximate midpoint of the overlap. At horizontal laps and laps across slopes, securing pins will be inserted through the bottom layer only. Securing pins will be placed no closer than 2 inches from the edge of the geotextile at intervals not greater than 12 feet, unless otherwise specified. Additional pins will be installed as necessary to prevent any slippage of the fabric, regardless of locations. The use of securing pins will be held to the minimum necessary. The fabric may be secured with other methods when specified or directed by the Engineer. Pins will be steel or fiberglass, formed as a "U", "L", or "T" shape or with "ears" to prevent total penetration. Steel washers will be provided on all but the "U"-shaped pins.

c. Subsurface Drains

The geotextile will be covered by drainfill or other material within the same working day. Drainfill material will be placed in a manner that prevents damage to the geotextile. In no case will material be dropped on uncovered fabric from a height greater than 5 feet. Seams will be joined by sewing as detailed in section 5.a. above or by overlapping a minimum of 18 inches and secured with pins as outlined in section 5.b. above. If neither method is specified on the construction drawings then either method may be used.

d. Road Stabilization

The geotextile will be unrolled parallel to the roadway centerline. The minimum overlap of adjacent geotextile panels will be 24 inches for unsewn fabric. Alternately, adjacent panels may be sewn together per section 5.a. above. Securing pins, approved by the NRCS or SWCD representative and provided by the geotextile manufacturer, may be used when necessary to ensure temporary anchoring of the geotextile during the installation process. The pins will be removed prior to permanent backfilling.

Backfill will be dumped and spread in a uniform thickness generally not to exceed 9 inches after compaction. The first 2 or 3 lifts may be used to seal and consolidate with only light compaction. Over-stressing the soil and severe rutting should be avoided by utilizing spreading and dumping equipment that exerts only moderate pressures on the soil. Granular backfill depths may have to be increased and equipment loads reduced to control soil stress if determined necessary by the NRCS or SWCD representative. Ruts developed during spreading and compacting will be filled with additional backfill material so that backfill thickness can be maintained. In no case will blading or backblading of a rutted surface be

allowed to reduce rut depth.

Gravel and other coarse-grained backfill will be compacted with vibratory rollers except on animal trails or stream crossings. Compaction methods for these practices will be as shown on the construction drawings or as determined by the NRCS or SWCD representative. Vibration will not be used for coarse-grained backfill when the resulting dynamic forces will cause a loss in subgrade or backfill soil strength; e.g., fine sand backfill over a sand or silt subgrade having a high water table. If such conditions exist, moderate to heavy static rollers (steel drum or rubber tired) will be used. Fine-grained backfill will be compacted with sheepsfoot or rubber tired rollers.

TABLE 1 - REQUIREMENTS FOR WOVEN GEOTEXTILES

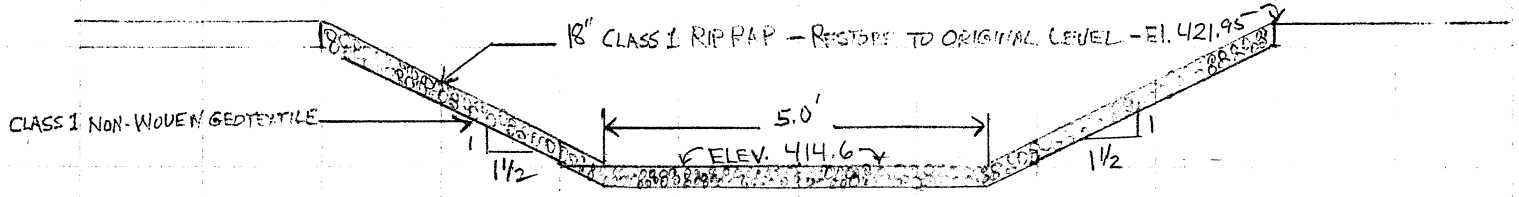
Property	Test Method	Units	Class I	Class II
Grab Tensile Strength	ASTM D4632	pounds	247 (min.)	180 (min.)
Elongation at Failure	ASTM D4632	percent	<50	<50
Trapezoidal Tear Strength	ASTM D4533	pounds	90 (min.)	67 (min.)
Puncture Strength	ASTM D6241	pounds	495 (min.)	371 (min.)
Ultraviolet Stability (Retained Strength)	ASTM D4355	percent	50 (min.)	50 (min.)
Permittivity	ASTM D4491	sec^{-1}	0.7 (min.), or as specified	
Apparent Opening Size (AOS) *2/*	ASTM D4751	mm	0.22 (max.), or as specified	
Percent Open Area (POA)	USACE CWO-02215	percent	4 (min.)	

1/ *All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.*
2/ *Maximum average roll value.*
Note: *CWO is a United States Army Corps of Engineers (USACE) reference.*

TABLE 2 - REQUIREMENTS FOR NONWOVEN GEOTEXTILES

Property	Test Method	Units	Class I *2/*	Class II *2/*
Grab Tensile Strength	ASTM D4632	pounds	202 (min.)	157 (min.)
Elongation at Failure	ASTM D4632	percent	50 (min.)	50 (min.)
Trapezoidal Tear Strength	ASTM D4533	pounds	79 (min.)	56 (min.)
Puncture Strength	ASTM D6241	pounds	433 (min.)	309 (min.)
Ultraviolet Stability (Retained Strength)	ASTM D4355	percent	50 (min.)	50 (min.)
Permittivity	ASTM D4491	sec^{-1}	0.7 (min.), or as specified	
Apparent Opening Size (AOS) *3/*	ASTM D4751	mm	0.22 (max.), or as specified	

1/ All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.
2/ Needle punched geotextiles are required for both class I and class II.
3/ Maximum average roll value.



BUFFALO #2

NOT TO SCALE – ILLUSTRATION ONLY

Cross Section Sheet
Buffalo Creek Watershed
Dams(2)3,6,7,8
Typical Outfall Pool Bank Repair

Designed
Drawn C. WOOTTON 3/13/12
Checked
Benchmark

This drawing adapted from NRCS Standard Drawing VA-SO-315A v1.1

File Name

Drawing Name
Engineering X Section Sheet, Virginia NRCS

Sheet 1 of 1

VIRGINIA ENGINEERING STANDARD DRAWING	
Amanda Pennington, PE. DCR Ag. BMP Engineer	Standard Drawings shall NOT be altered without DCR Agricultural BMP Engineer Approval
STANDARD DWG NO.	VA-SO-315A, X Section Sheet
DATE 07/11	SHEET 1 OF 1