COUNTY OF ROANOKE, VA

GENERAL NOTES

PRE-CONSTRUCTION MEETING AND CONSTRUCTION COMMENCEMENT:

1. All construction methods and materials shall conform to the Construction Standards and Specifications of Roanoke County, the Western Virginia Water Authority, and the Virginia Department of Transportation.
2. Stormwater Management Agreements with an attached 8 1/2" x 11" or 8 1/2" x 14" plat must be approved and recorded prior to the pre-construction meeting.
3. Once all required items are submitted to Roanoke County, the developer must contact the Development Review Coordinator to indicate that a pre-construction meeting needs to be scheduled. The pre-construction meeting will be scheduled with the owner/developer two (2) working days later.
4. All land disturbing projects that require approval of an erosion and sediment control plan, grading or clearing permit shall require that the applicant provide the name of an individual who will be responsible for land disturbing activities and that this individual hold a Responsible Land Disturber (RLD) Certificate from the Department of Environmental Quality. The Responsible Land Disturber can be anyone from the Project team that is certified by the Commonwealth of Virginia to be in charge of carrying out the land disturbing activity for the project.
5. It is the responsibility of the owner/developer to notify the certified Responsible Land Disturber and the Utility Contractor to attend the pre-construction meeting.
6. The Development Review Coordinator will schedule the pre-construction meeting with the County Review Engineer, the County Inspector, and the Western Virginia Water Authority and the Town of Vinton personnel if applicable.
7. An approved set of plans, Storm Water Pollution Prevention Plan (SWPPP), VSMP coverage letter, and all permits must be available at the construction site at all times.
8. The developer and/or contractor shall supply all utility companies with copies of approved plans, advising them that all grading and installation shall conform to approved plans.
9. The project engineer will inform the owner/developer verbally and in writing of the County's obligation to perform inspections on site. Everyone in the meeting will be required to sign a pre-construction checklist indicating their knowledge of Roanoke County's obligation to perform inspections on site.
10. The Erosion Control Permit or Combined Erosion Control & VSMP Permit is given to the developer at this pre-construction meeting.
11. Notify Roanoke County prior to beginning installation of ESC measures. The County will inspect initial installations to ensure compliance with approved plan prior to start of grading. The developer SHALL contact the project inspector 24 hours before beginning any grading or construction on the property.
12. County inspectors must inspect storm drain / stormwater management / BMP installations during the process of installation. Please contact the site inspector 24 hours in advance.
13. All work shall be subject to inspection by Roanoke County, the Western Virginia Water Authority and the Virginia Department of Transportation Inspectors.
14. Contractors shall notify utilities of proposed construction at least two (2), but not more than ten (10) working days in advance. Area public utilities may be notified thru "Miss Utility": 1-800-552-7001 or VA 811.
15. The 100 year Floodway shall be staked prior to any construction.
16. Grade stakes shall be set for all curb and gutter, culvert, sanitary sewer and storm sewer at all times of construction.
17. Roanoke County shall be notified when a spring is encountered during construction.
18. Construction debris shall be containerized in accordance with the Virginia Litter Control Act. No less than one litter receptacle shall be provided on site.
19. The contractor shall provide adequate means of cleaning mud from trucks and/or other equipment prior to entering public streets or rights of ways. It is the contractors responsibility to insure that the streets are in a clean, mud and dust free condition at all times.
20. Plan approval in no way relieves the developer or contractors of the responsibilities contained within the erosion and sediment control or stormwater management policies.
21. Field construction shall honor proposed drainage divides as shown on plans.
22. Field corrections shall be approved by the Roanoke County and/or the Western Virginia Water Authority and the Professional of Record, prior to such construction.
23. The developer or contractor shall supply the County and the Western Virginia Water Authority with correct As-Built plans before final acceptance.

VIRGINIA DEPARTMENT OF TRANSPORTATION:

1. Plan approval by Roanoke County does not guarantee issuance of any permits by the Virginia Department of Transportation.
2. A permit must be obtained from the Virginia Department of Transportation, Salem Residency Office prior to construction in the highway right-of-way.
3. The preliminary pavement designs should be based on a predicted sub-grade CBR value of 7.0 and with a Resiliency Factor (RF) of 2.0 as shown in the current edition of the Virginia Department of Transportation Pavement Design Guide for Subdivision and Secondary Roads. The sub-grade soil is to be tested by an independent laboratory and the results submitted to the Virginia Department of Transportation prior to base construction. Should the sub-grade CBR value and/or the RF value be less than the predicted values, additional base material will be required in accordance with Departmental specifications. Refer to the same manual as the number and locations of the required soil samples to be tested. All pavement designs shall be submitted to the Department for review and approval. The sub-grade shall be approved by the Virginia Department of Transportation prior to placement of the base. Base shall be approved by the Virginia Department of Transportation for depth, template, and compaction before the surface is applied.
4. Standard guardrail with safety end sections may be required on fills or in areas where hazards exist as deemed necessary. After completion of rough grading operations, the County Engineer and Virginia Department of Transportation shall be contacted to schedule a field review. Where guard rail is warranted, the standard shoulder width shall be provided and the guard rail shall be installed in accordance with the current edition of the VDOT Road and Bridge Standards as part of this development.
5. Standard street and traffic control signs shall be erected at each intersection by the developer prior to final street acceptance.
6. All traffic devices shall be in accordance with current edition of the "Manual on Uniform Traffic Control Devices" (MUTCD).
7. All unsuitable material shall be removed from the construction limits of the roadway before placing embankment.

See Sheet N/A for Stormwater Site Statistics Table.
See Sheet N/A for New BMP Information Table.

The Project Engineer shall provide electronic copies of the approved plans to the Development Review Coordinator within 5 working days of the pre-construction meeting.

The notes on this sheet shall not be modified.

NAME OF DEVELOPMENT	RESTORATION OF WOLF CREEK PHASE II
MAGISTERIAL DISTRICT(S)	VINTON
OWNER (name, address, telephone)	COUNTY OF ROANOKE, 5204 BERNARD DRIVE, ROANOKE, VA 24018-0798, 540.772.2083 ATTN: DAVID HENDERSON, COUNTY ENGINEER
DEVELOPER (name, address, telephone)	COUNTY OF ROANOKE, 5204 BERNARD DRIVE, ROANOKE, VA 24018-0798, 540.772.2083 ATTN: DAVID HENDERSON, COUNTY ENGINEER
ENGINEER, ARCHITECT OR SURVEYOR (name, address, telephone)	EMILY DARR BROWN, PE, FREESE AND NICHOLS, INC. 531 N LIBERTY ST, WINSTON-SALEM, NC 27101 336.899.9803
TAX MAP NO(S)	061.01-01-03.06-0000 AND 061.02-01-55.60-0000

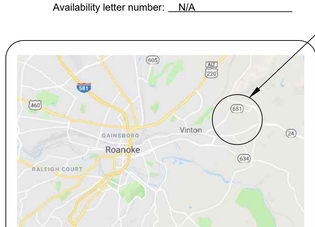
I, _____ **OWNER/DEVELOPER,** AM AWARE OF THE SITE DESIGN REQUIREMENTS IMPOSED BY THIS SITE DEVELOPMENT PLAN, ALL REVISIONS THEREOF, AND OTHER APPLICABLE ROANOKE COUNTY CODES AND ORDINANCES.

I HEREBY CERTIFY THAT I AGREE TO COMPLY WITH THESE REQUIREMENTS SHOWN ON THIS COVER SHEET UNLESS MODIFIED IN ACCORDANCE WITH LOCAL LAW.

WATER AND SEWER NOTES

1. All construction methods and materials shall conform to the latest edition of the Design and Construction Standards and Specifications of the Western Virginia Water Authority (WVWA) available at www.westernvawater.org or by contacting the authority at 540-853-5700. The project shall also comply with the governing jurisdiction's standards and other agency standards (e.g. VDOT, DEQ, DCR, VDH, etc.) where applicable.
2. A minimum cover of three (3) feet is required on all WVWA water and sewer lines.
3. All existing utilities may not be shown in their exact locations. The contractor shall notify Miss Utility and shall verify location and elevation of all underground utilities in the areas of construction prior to starting work.
4. Please show all WVWA water and sewer utilities on any development plan.
5. The location of existing utilities across or along the line of proposed work are not necessarily shown on the plans and where shown are only approximately correct. The contractor shall on his own initiative and at no extra cost, locate all underground lines and structures and pothole as necessary. The contractor shall be responsible for any damage to underground structures. All damage incurred to existing utilities during construction shall be repaired at the contractor's expense.
6. Plan approval by the WVWA does not remove the contractor's responsibility to remove or relocate any existing conflicts found during construction.
7. The contractor shall maintain a minimum of 18" clearance vertically and two (2) feet minimum horizontally from the outside of pipe to outside of pipe with all other underground utilities. Where this cannot be achieved, additional measures in accordance with the WVWA standards shall be enforced.
8. All utility grade adjustments shall be in accordance with WVWA standards and are the responsibility of the contractor.
9. Field changes shall be submitted by the engineer of record to the locality and approved by the WVWA.

Western Virginia Water Authority
Availability letter number: N/A



Vicinity Map

PRIVATE UTILITIES

Underground utilities installed on private property or in private utility easements and building related storm drains shall be designed and installed per the current edition of the Virginia Uniform Statewide Building Code (including amendments). Design and installation requirements issued by the Western Virginia Water Authority that meet or exceed the USBC requirements are acceptable for private utilities. All private utilities are to be permitted through and inspected by the Roanoke County Inspections Office. Vaults, valves and other devices installed by or under the control of the Western Virginia Water Authority may not be substituted for the code required devices.

PR #:	NOTES:

Revision Table

T-1.....COUNTY COVER SHEET
T-2.....TITLE SHEET
T-3.....DATA POINT TABLES
C-1 THRU C-4.....PLAN AND PROFILE, STA 1+00 TO STA 15+56
DT-1 THRU DT-6.....GENERAL DETAILS
DT-7 THUR DT-8.....PLANTING PLAN
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CS-1 THRU CS-6.....DETAILED CROSS SECTIONS, STA 1+00 TO STA 15+50
EC-1 THRU EC-4.....EROSION CONTROL PLAN VIEWS
EC-5 .....EROSION CONTROL NOTES AND LEGEND
EC-6 THRU EC-8.....EROSION CONTROL DETAILS

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LEGEND

Property Line — P
Right-of-way — R/W
Centerline — CL
Minimum Building Line — MBL
Existing Storm Sewer — SD
Existing Sanitary Sewer — SS
Existing Water Main — W
Existing Contour — 1045
Proposed Contour — 1045
Proposed Drainage Divide
Proposed Limits of Clearing
Proposed Storm Sewer — 24" S.D.
Proposed Sanitary Sewer — 8" M.H.
Proposed Water Main — HYDRANT, VALVE, BLOWOFF

SURVEY INFORMATION

Horizontal and vertical control surveys were performed in year: 2022
By: H&B SURVEYING AND MAPPING, LLC. 614 MOOREVILLE PARK DR., RICHMOND, VA 23236 VA #002617

All vertical elevations must be referenced to the National Geodetic Vertical Datum of 1988.
All horizontal elevations must be referenced to the North American Datum of 1983.

Horizontal Datum: NAD 83 Vertical Datum: NAVD 88

Source of topographic mapping is dated APRIL 13, 2022

Boundary was performed by MAPPING, LLC. dated: JUNE 7, 2022

Benchmark Information: CONTINUALLY OPERATING REFERENCE STATION (CORS) "LS04" MEASURED THROUGH GPS OBSERVATION USING RTK REAL TIME NETWORK CORRECTION

The professional seal and signature certifies the boundary survey and topographic mapping to be accurate and correct.

QUANTITY & COST ESTIMATE

ITEM	QUANTITY	UNIT	UNIT PRICE	COST	BONDABLE
CLEARING AND GRUBBING		AC			
EXCAVATION		C.Y.			
EMBANKMENT		C.Y.			
CURB INLET DI-		EA			
CURB INLET DI-		EA			
MANHOLE MH-		EA			
MANHOLE MH-		EA			
-IN. CONCRETE PIPE, CLASS III		LF			
-IN. CONCRETE PIPE, CLASS IV		LF			
-IN. C.M. CULVERT		LF			
-IN. C.M. CULVERT		LF			
BOX CULVERT		LS			
PAVED SWALE		LF			
RIPRAP - CLASS		SF			
PERMANENT GRASS SWALE		LF			
-IN. CONCRETE ENDWALL EW-		EA			
-IN. END SECTION ES-		EA			
HEADER CURB & GUTTER CG-		LF			
CURB & GUTTER CG-		LF			
VALLEY GUTTER		EA			
GRAVEL BASE		SY			
GRAVEL SHOULDER		SY			
SURFACE TREATMENT		SY			
-IN. BIT. CONC.: TYPE B-		SY			
-IN. BIT. CONC.: TYPE S-		SY			
-IN. BASE MATERIAL		C.Y.			
-IN. SUBBASE MATERIAL		C.Y.			
TRAFFIC BARRICADE		EA			
8" WATER LINE		LF			
6" WATER LINE		LF			
FIRE HYDRANT ASSEMBLIES		EA			
BLOW OFFS W/ VAULT, FRAME & COVER		EA			
-IN. GATE VALVES, W/ VAULT, FRAME & COVER		EA			
-IN. GATE VALVES, W/ VAULT, FRAME & COVER		EA			
8" SANITARY SEWER		LF			
STANDARD MANHOLE W/FRAME & COVER		EA			
SAMPLING MANHOLE/PORT		EA			
LANDSCAPING		LS			
AMENITIES (INCLUDING BUT NOT LIMITED TO TRAILS, ETC...)		LS			
STORMWATER MANAGEMENT		LS			
AS-BUILT PLANS (STORM SEWER SYSTEMS)		LS			
AS-BUILT PLANS (STORMWATER MANAGEMENT)		LS			
10% CONTINGENCY					
ESTIMATED TOTAL					

BY SEALING THE PLANS, THE DESIGN PROFESSIONAL HEREBY CERTIFIES THAT THE FOREGOING ESTIMATE REFLECTS THE CURRENT IMPROVEMENT COSTS OF THIS PROJECT.

FREESE AND NICHOLS
531 NORTH LIBERTY STREET
WINSTON-SALEM, NC 27101
864.506.1465 TEL
VA LICENSE # 0407007129
Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

COMMONWEALTH OF VIRGINIA
Emily D Brown
EMILY DARR BROWN
Lic. No. 0402065407
04.05.2023
PROFESSIONAL ENGINEER

ISSUED FOR BIDS

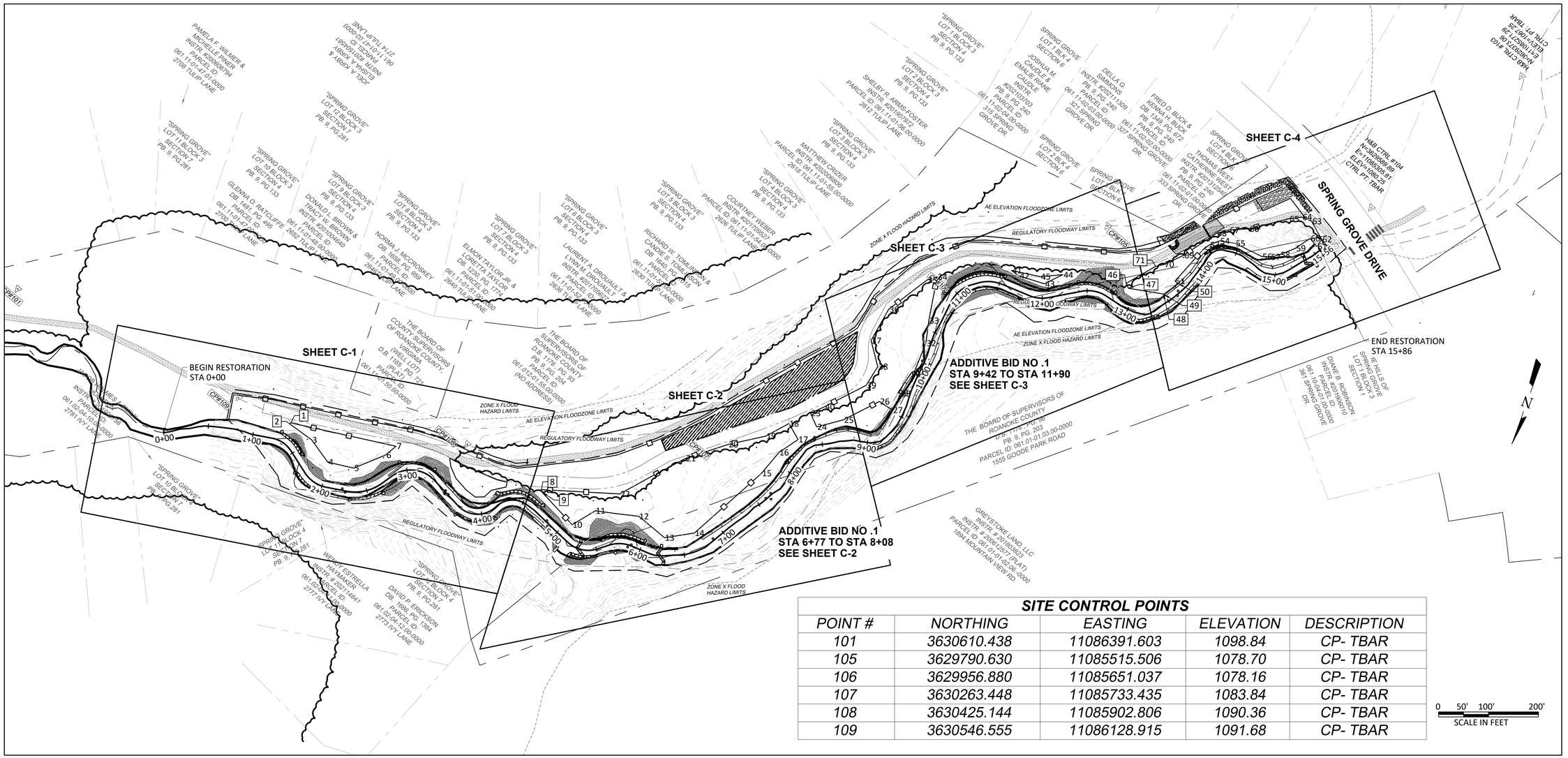
Restoration of Wolf Creek Phase II
Spring Grove Dr
Vinton, Virginia

SHEET 1 OF 30

RESTORATION OF WOLF CREEK
PHASE II
ROANOKE COUNTY, VA
(PROJECT PLAN SHEETS)

Clearing, grading, erosion control, stream restoration, drainage, landscaping, and other improvements as noted on the plans. This work will include all items necessary to construct the stream, and associated structures with the associated landscaping, plantings, seeding and live staking.

RECEIVING STREAM: WOLF CREEK



SITE CONTROL POINTS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	3630610.438	11086391.603	1098.84	CP- TBAR
105	3629790.630	11085515.506	1078.70	CP- TBAR
106	3629956.880	11085651.037	1078.16	CP- TBAR
107	3630263.448	11085733.435	1083.84	CP- TBAR
108	3630425.144	11085902.806	1090.36	CP- TBAR
109	3630546.555	11086128.915	1091.68	CP- TBAR

0 50' 100' 200'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129

COMMONWEALTH OF VIRGINIA
EMILY DARR BROWN
Lic. No. 0402065407
04.05.2023
PROFESSIONAL ENGINEER

FREESE NICHOLS
531 North Liberty Street
Winston-Salem, NC 27101
Phone - (336) 790-6744
Web - www.freese.com

ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

TITLE SHEET

NO.	ISSUE	BY	DATE

PLAN JOB NO. RNC19591
DATE 2/8/2023
DESIGNED LRW
DRAWN
REVISED
CHECKED BMD
FILE NAME TITLE_SHT.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET T-2
SEQ.

ACAD Rel: 24.2s (LMS Tech)
Filename: N:\SW\Drawings\TITLE_SHT.dwg
Last Saved: 4/3/2023 12:44 PM Saved By: 02298

Plot Date: 4/3/2023 1:50 PM Plot By: 02298 Filename: N:\SW\Drawings\TITLE_SHT.dwg

TREE PROTECTION COORDINATES

TREE PROTECTION - POINT TABLE		
PNT	NORTHING	EASTING
1	3630531.27	11086066.87
2	3630532.99	11086067.44
3	3630530.99	11086037.34
4	3630538.52	11086008.22
5	3630525.35	11085982.06
6	3630491.73	11085964.23
7	3630477.12	11085961.65
8	3630411.46	11085808.44
9	3630413.14	11085805.76
10	3630419.44	11085757.64
11	3630391.33	11085747.95
12	3630365.44	11085707.39
13	3630365.44	11085670.52
14	3630340.37	11085648.57
15	3630242.57	11085633.93
16	3630212.95	11085633.93
17	3630188.59	11085626.85
18	3630181.49	11085645.83
19	3630208.19	11085656.33
20	3630242.07	11085682.55
21	3630283.65	11085708.56
22	3630359.97	11085739.15
23	3630157.71	11085634.84
24	3630164.91	11085619.97
25	3630139.99	11085602.40
26	3630099.26	11085584.92
27	3630097.41	11085567.90
28	3630077.66	11085572.52
29	3630079.03	11085575.42
30	3630054.45	11085578.02
31	3630049.45	11085576.35
32	3630017.39	11085586.65
33	3629996.18	11085600.12
34	3629953.49	11085623.83
35	3629963.04	11085630.14
36	3630014.84	11085641.92
37	3630053.60	11085634.86
38	3630071.06	11085610.77
39	3630095.11	11085607.52
40	3630142.47	11085627.70

TREE PROTECTION - POINT TABLE		
PNT	NORTHING	EASTING
41	3629895.74	11085565.65
42	3629895.10	11085555.58
43	3629883.90	11085528.45
44	3629863.29	11085519.34
45	3629880.91	11085537.14
46	3629826.03	11085459.68
47	3629828.46	11085454.17
48	3629808.68	11085420.59
49	3629808.62	11085419.42
50	3629789.29	11085415.29
51	3629789.75	11085419.98
52	3629743.29	11085418.49
53	3629734.84	11085416.41
54	3629724.43	11085410.66
55	3629715.54	11085395.80
56	3629707.91	11085363.96
57	3629702.18	11085356.50
58	3629693.54	11085349.90
59	3629677.26	11085341.31
60	3629658.76	11085335.98
61	3629660.59	11085324.69
62	3629651.34	11085325.45
63	3629643.16	11085346.80
64	3629646.44	11085357.92
65	3629656.94	11085367.54
66	3629693.60	11085394.35
67	3629708.54	11085410.20
68	3629720.17	11085418.58
69	3629761.68	11085430.71
70	3629783.60	11085441.15
71	3629790.85	11085446.70

PROPOSED CHANNEL HORIZONTAL ALIGNMENT DATA

STATION	ALIGNMENT POINT	CURVE/TANGENT LENGTH	RADIUS	TANGENT BEARING	DELTA ANGLE	CHORD LENGTH	NORTHING	EASTING	CENTER POINT NORTHING	CENTER POINT EASTING
0+00.00'	PT	7.23'		S40° 22' 06.92"W			11086167.38	3630629.2		
0+07.23'	PT	11.81'		S35° 40' 46.13"W			11086162.7	3630623.694		
0+19.04'	PT	10.35'		S47° 02' 19.47"W			11086155.81	3630614.098		
0+29.39'	PT	8.74'		S38° 27' 37.54"W			11086148.24	3630607.044		
0+38.13'	PT	7.75'		S42° 43' 27.42"W			11086142.8	3630600.201		
0+45.88'	PT	9.52'		S54° 22' 27.77"W			11086137.55	3630594.51		
0+55.40'	PT	9.35'		S55° 49' 40.19"W			11086129.81	3630588.965		
0+64.75'	PT	13.97'		S57° 49' 03.85"W			11086122.07	3630583.712		
0+78.72'	PT	11.62'		S64° 44' 01.80"W			11086110.24	3630576.27		
0+90.35'	PT	8.22'		S70° 17' 14.07"W			11086099.73	3630571.308		
0+98.56'	PT	14.89'		S61° 03' 43.37"W			11086091.99	3630568.536		
1+13.45'	PT	8.51'		S61° 01' 43.30"W			11086078.97	3630561.333		
1+21.96'	PC	24.96'	30.67'		046.6188 (d)	24.28'	11086071.52	3630557.211	11086056.66	3630584.047
1+46.92'	PT	28.71'		N72° 21' 09.04"W			11086047.36	3630554.816		
1+75.63'	PC	29.08'	36.00'		046.2815 (d)	28.30'	11086020	3630563.521	11086009.09	3630529.215
2+04.71'	PT	22.61'		S61° 21' 57.57"W			11085991.84	3630560.812		
2+27.32'	PC	41.04'	50.00'		047.0291 (d)	39.90'	11085971.99	3630549.978	11085995.95	3630506.093
2+68.36'	PT	13.54'		S14° 20' 12.66"W			11085947.51	3630518.474		
2+81.90'	PC	51.71'	35.68'		083.0402 (d)	47.30'	11085944.16	3630505.359	11085909.59	3630514.193
3+33.60'	PT	37.99'		N82° 37' 22.62"W			11085905.01	3630478.812		
3+71.60'	PC	46.10'	29.11'		090.7412 (d)	41.43'	11085867.34	3630483.69	11085863.6	3630454.821
4+17.70'	PT	0.57'		S06° 38' 09.07"W			11085834.68	3630458.185		
4+18.27'	PC	36.55'	26.20'		079.9272 (d)	33.65'	11085834.62	3630457.618	11085808.59	3630460.646
4+54.82'	PT	10.40'		S86° 33' 47.16"W			11085810.16	3630434.495		
4+65.21'	PT	37.36'		N85° 49' 11.21"W			11085799.79	3630433.872		
5+02.58'	PT	13.66'		N86° 46' 37.69"W			11085762.52	3630436.595		
5+16.23'	PC	34.82'	32.72'		060.9668 (d)	33.20'	11085748.89	3630437.363	11085747.05	3630404.694
5+51.05'	PT	13.41'		S32° 15' 21.93"W			11085719.38	3630422.157		
5+64.46'	PC	25.65'	36.00'		040.8232 (d)	25.11'	11085712.22	3630410.819	11085681.78	3630430.032
5+90.11'	PT	20.24'		S73° 04' 45.47"W			11085692.26	3630395.591		
6+10.34'	PC	16.69'	36.00'		026.5580 (d)	16.54'	11085672.89	3630389.7	11085683.37	3630355.259
6+27.03'	PT	12.07'		S46° 31' 16.52"W			11085658.6	3630381.382		
6+39.10'	PT	11.42'		S49° 44' 05.73"W			11085649.84	3630373.076		
6+50.52'	PT	1.45'		S18° 52' 58.60"W			11085641.13	3630365.695		
6+51.98'	PT	10.20'		S34° 23' 39.34"W			11085640.66	3630364.32		
6+62.17'	PT	11.96'		S26° 56' 35.64"W			11085634.9	3630355.905		
6+74.13'	PT	9.64'		S10° 55' 30.94"W			11085629.48	3630345.244		
6+83.77'	PT	11.40'		S10° 43' 11.54"W			11085627.65	3630335.777		
6+95.17'	PT	12.35'		S10° 07' 04.63"W			11085625.53	3630324.581		
7+07.52'	PT	9.79'		S12° 36' 07.12"W			11085623.36	3630312.42		
7+17.31'	PT	7.57'		S16° 08' 03.29"W			11085621.22	3630302.864		
7+24.89'	PT	9.18'		S13° 24' 07.05"W			11085619.12	3630295.59		
7+34.07'	PT	9.96'		S04° 40' 37.76"W			11085616.99	3630286.659		
7+44.02'	PT	8.51'		S19° 48' 45.13"W			11085616.18	3630276.735		
7+52.54'	PT	8.44'		S11° 07' 07.64"W			11085613.3	3630268.726		
7+60.98'	PT	8.27'		S08° 12' 19.03"W			11085611.67	3630260.445		
7+69.25'	PT	9.85'		S19° 15' 20.28"W			11085610.49	3630252.261		
7+79.10'	PT	9.18'		S02° 46' 18.09"E			11085607.24	3630242.961		
7+88.28'	PT	8.04'		S12° 01' 54.87"E			11085607.68	3630233.793		
7+96.31'	PT	2.27'		S25° 01' 57.75"E			11085609.36	3630225.93		
7+98.58'	PT	0.34'		S01° 07' 27.30"W			11085610.32	3630223.875		
7+98.92'	PT	9.99'		S06° 37' 38.27"E			11085610.31	3630223.537		
8+08.91'	PT	11.81'		S02° 28' 06.33"E			11085611.46	3630213.616		
8+20.72'	PT	10.66'		S03° 10' 53.61"E			11085611.97	3630201.815		
8+31.38'	PT	9.89'		S21° 58' 15.51"W			11085612.56	3630191.168		
8+41.27'	PT	11.24'		S43° 19' 58.90"W			11085608.87	3630182		
8+52.51'	PT	6.60'		S42° 17' 18.62"W			11085601.15	3630173.821		
8+59.11'	PT	10.44'		S37° 32' 01.08"W			11085596.71	3630168.942		
8+69.55'	PT	5.72'		S48° 23' 56.68"W			11085590.35	3630160.661		

Freese and Nichols, Inc.
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

DATA POINT TABLES

NO.	ISSUE	BY	DATE

FWN JOB NO. RNC19591
DATE 2/8/2023
DESIGNED LRW
DRAWN LRW
REVISED
CHECKED BMD
FILE NAME TITLE_SHT.dwg

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0 1"

SHEET T-3
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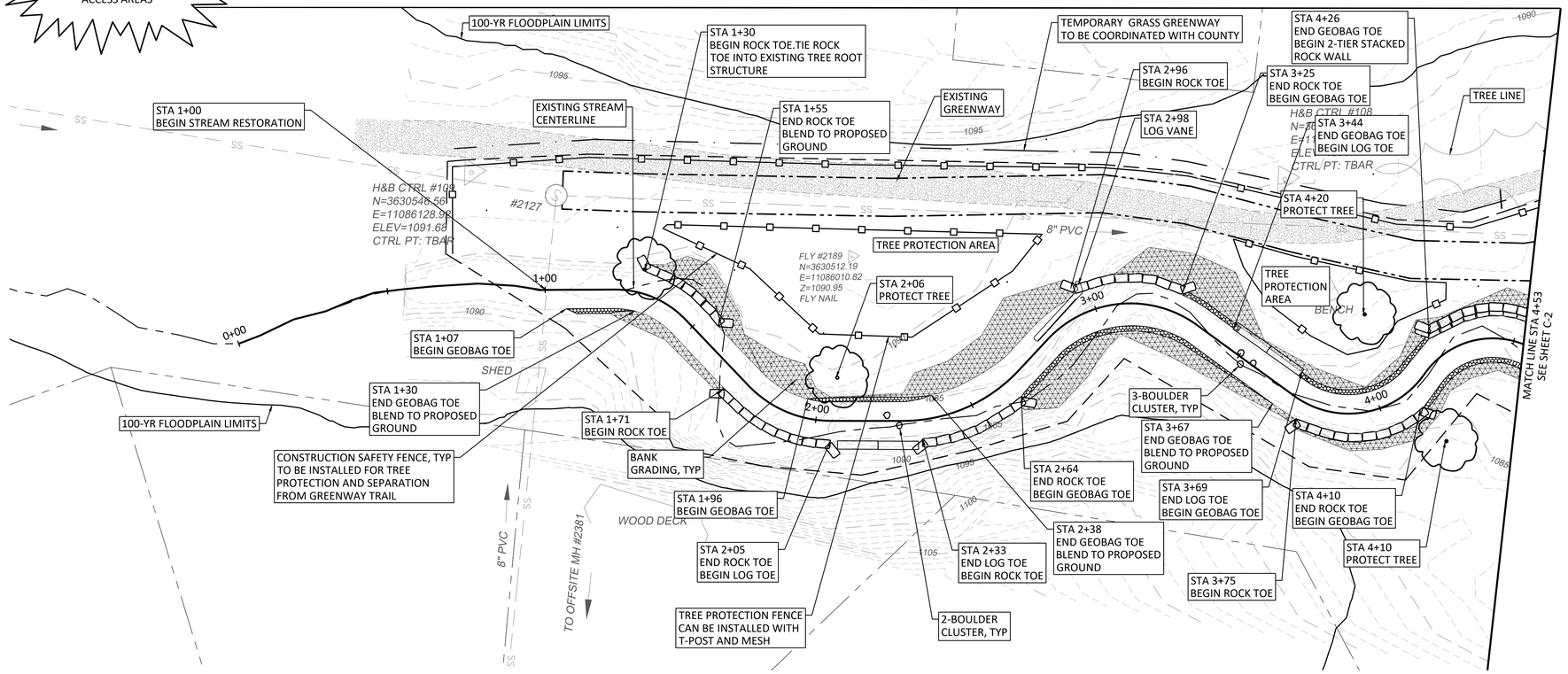
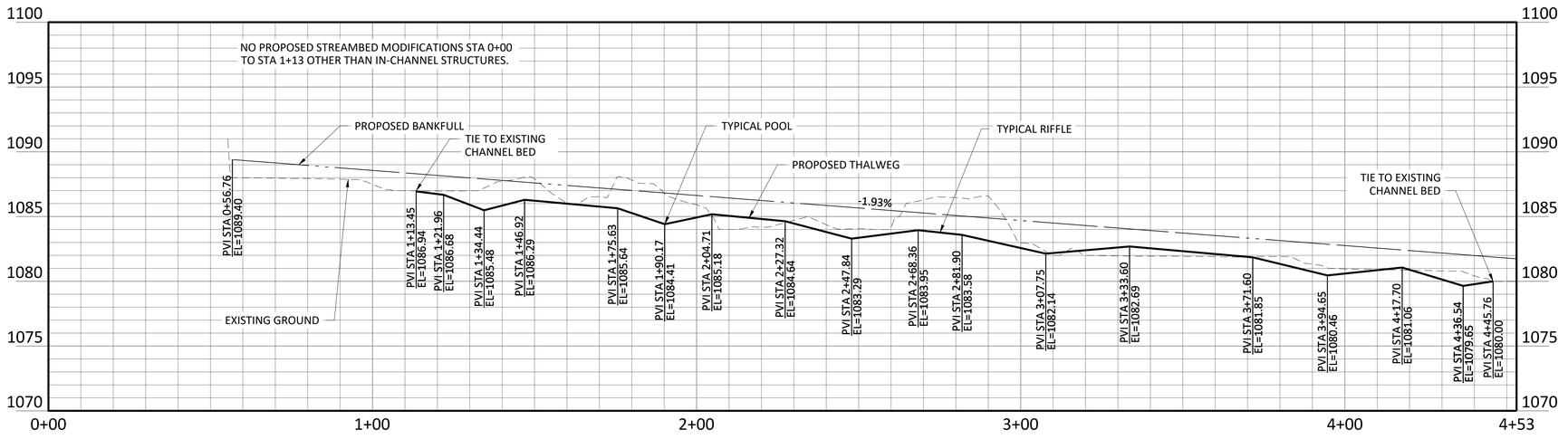
WARNING!!!
EQUIPMENT MUST STAY IN CHANNEL EXCEPT WHERE SHOWN IN ALLOWED ACCESS AREAS





LEGEND

- PROPERTY LINE BOUNDARY
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- EXISTING MINOR CONTOURS
- EXISTING MAJOR CONTOURS
- EXISTING GROUND (PROFILE VIEW)
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- STACKED ROCK WALL OR ROCK TOE
- TREES TO PROTECT

NOTES:
1. FEMA FIS MAP # 51161C0186G
2. CONTRACTOR SHALL CONTACT VIRGINIA 811 PRIOR TO CONSTRUCTION AND OBTAIN TICKET.
3. CONSTRUCTION FENCING SHALL BE PLACED AROUND ALL TREES TO BE PROTECTED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
4. DISTURB ONLY THE ACCESS AREAS NOTED ON THE PLANS TO ACCESS THE STREAM AND DO NOT REMOVE ANY TREES WITHIN THE TREE PROTECTION AREAS OR FLAGGED FOR PROTECTION UNLESS INSTRUCTED BY THE ENGINEER.

TREE CLEARING:
1. THERE IS A 15' TREE CLEARING ZONE FROM THE TOP OF STREAMBANK (SEE DT-7 REVEGETATION SECTION).
2. THE FIRST 5' FROM THE TOP OF BANK, ANY TREE LESS THAN 10" (UNLESS SPECIFIED OTHERWISE) CAN BE CUT OR MULCHED, BUT NOT GRUBBED.
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N

0 20' 40'
SCALE IN FEET

ISSUED FOR BID

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Virginia Registered Business Firm #0407001129

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Emily D. Brown
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

PLAN AND PROFILE BEGIN TO STA 4+50

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SHEET C-1
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NOTES:
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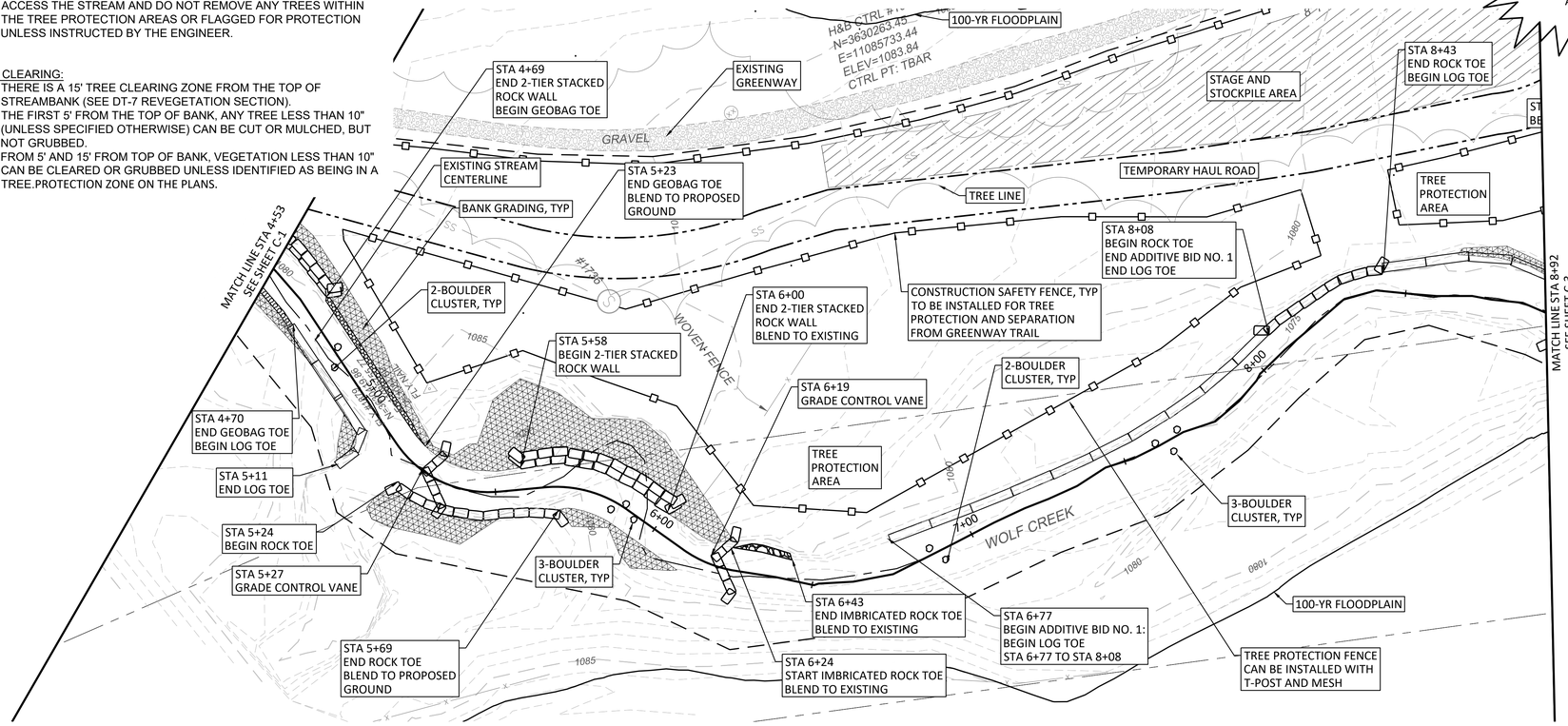

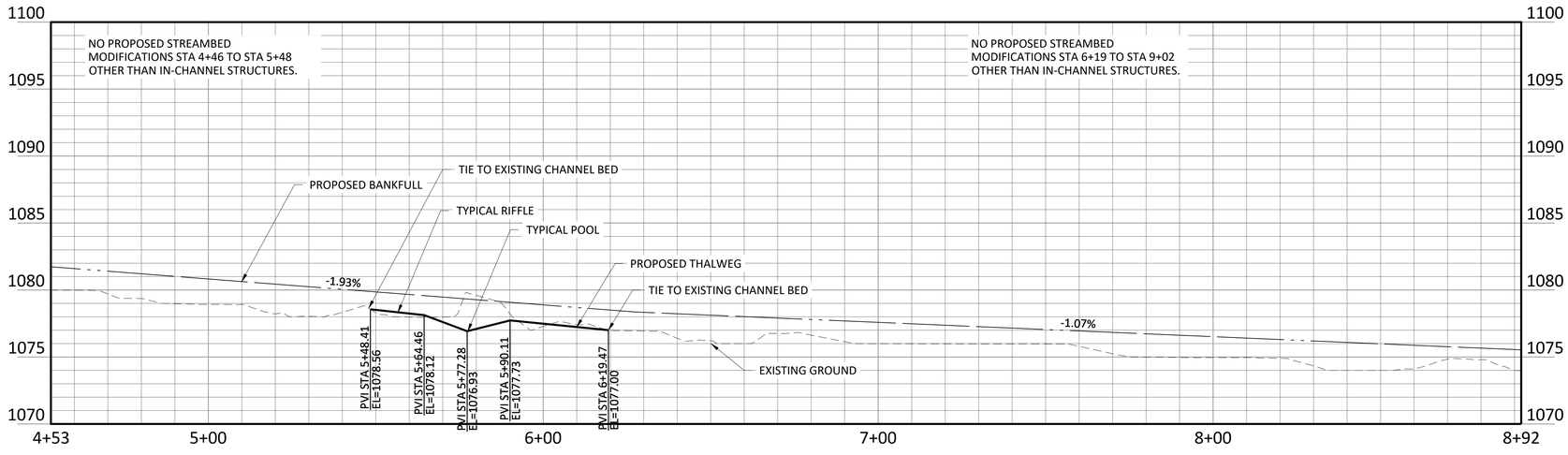

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0 20' 40'
SCALE IN FEET

ISSUED FOR BID

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

PLAN AND PROFILE STA 4+50 TO STA 9+00

FAN JOB NO.	RNC19591
DATE	2/8/2023
DESIGNED	LRW
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REVISED	
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Plot Date: 4/3/2023 1:52 PM Plot By: 02298 Filename: N:\SW\Drawings\STREAM-PP.dwg

NOTES:

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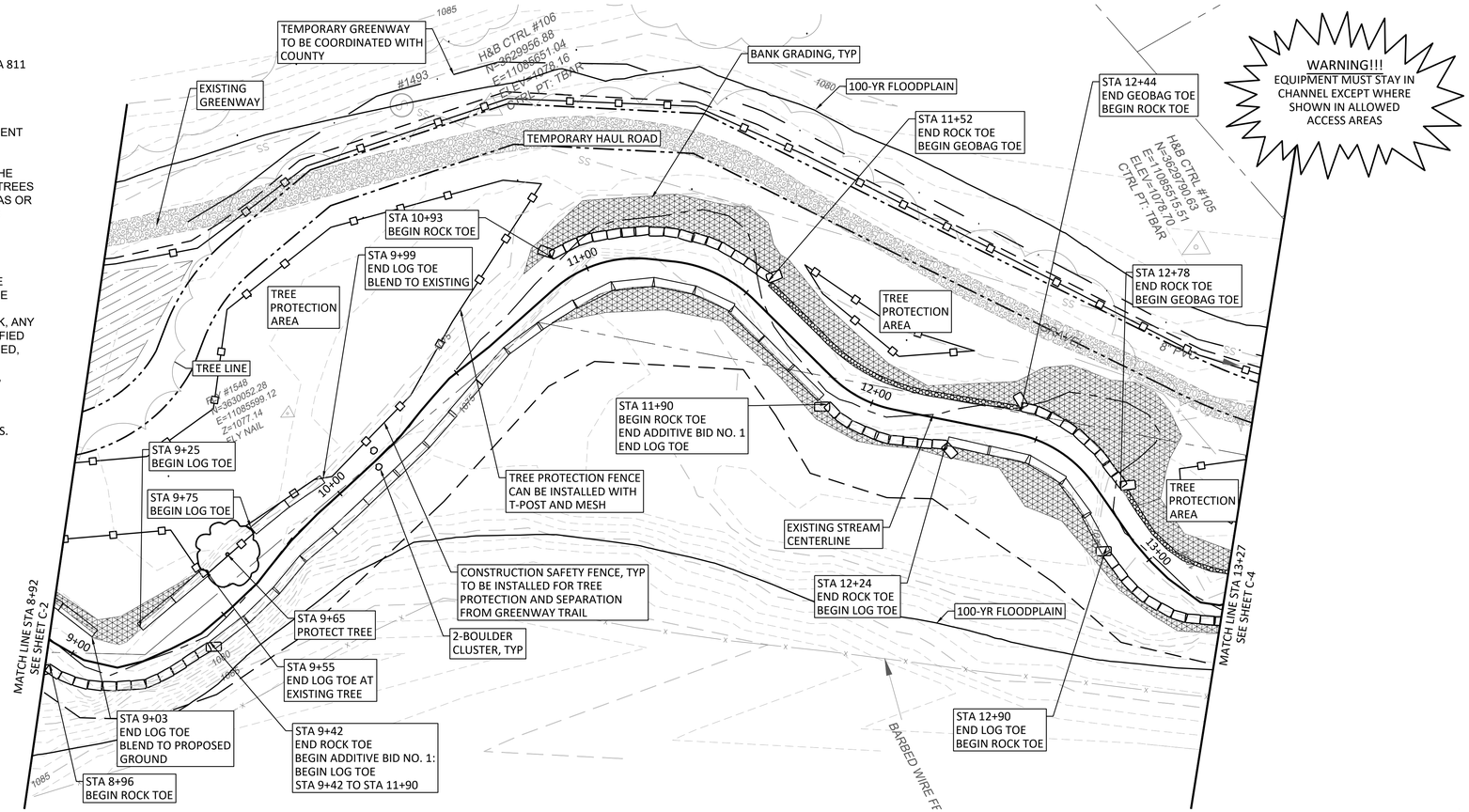

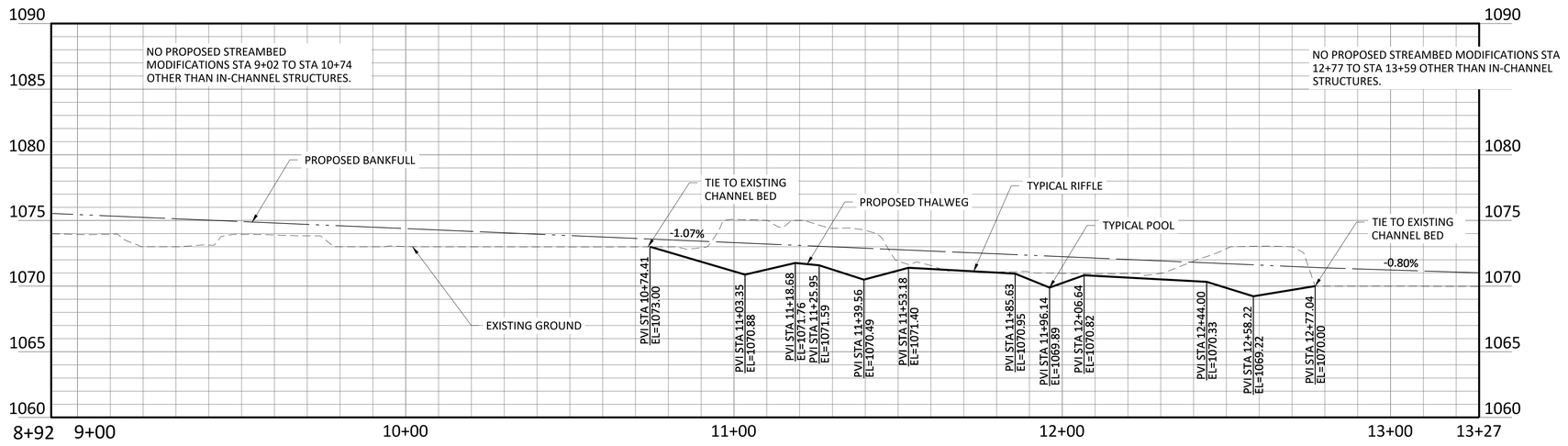

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- TREES TO PROTECT

0 20' 40'
SCALE IN FEET

ISSUED FOR BID

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

PLAN AND PROFILE STA 9+00 TO STA 13+50

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Plot Date: 4/3/2023 1:52 PM Plot By: 02298 Filename: N:\SW\Drawings\STREAM-PP.dwg

NOTES:

1. CONTRACTOR TO FILL AND GRADE SECTION OF TEMPORARY HAUL ROAD. INSTALL A 12" HDPE IN EXISTING LOW SPOT TO CONVEY WATER ACROSS THE HAUL ROAD. ENSURE 2' OF COVER AND POSITIVE DRAINAGE TOWARDS THE CREEK.
2. FILL HAUL ROAD GRADE TO BE FLUSH WITH SS MANHOLE WITH MIN 3' DIAMETER GRAVEL JACKET. RESTORE GREENWAY TO EXISTING CONDITIONS POST-CONSTRUCTION.
3. EXISTING GREENWAY SIGN TO REMAIN. CONTRACTOR TO REPAIR AND REPLACE SIGNAGE IF DAMAGED.
4. 6' CHAIN LINK FENCE SHALL BE CONSTRUCTED FROM SPRING GROVE DRIVE TO SANITARY SEWER MANHOLE (STA 13+94, LT 57.66) AS SHOWN ON THE PLANS. FROM STA 13+94, LT 57.66 TO STA 0+71 , CONSTRUCTION SAFETY FENCE SHALL BE CONSTRUCTED TO SEPARATE PEDESTRIAN AREA FROM CONSTRUCTION AREA.
5. FEMA FIS MAP # 51161C0186G
6. CONTRACTOR SHALL CONTACT VIRGINIA 811 PRIOR TO CONSTRUCTION AND OBTAIN TICKET.
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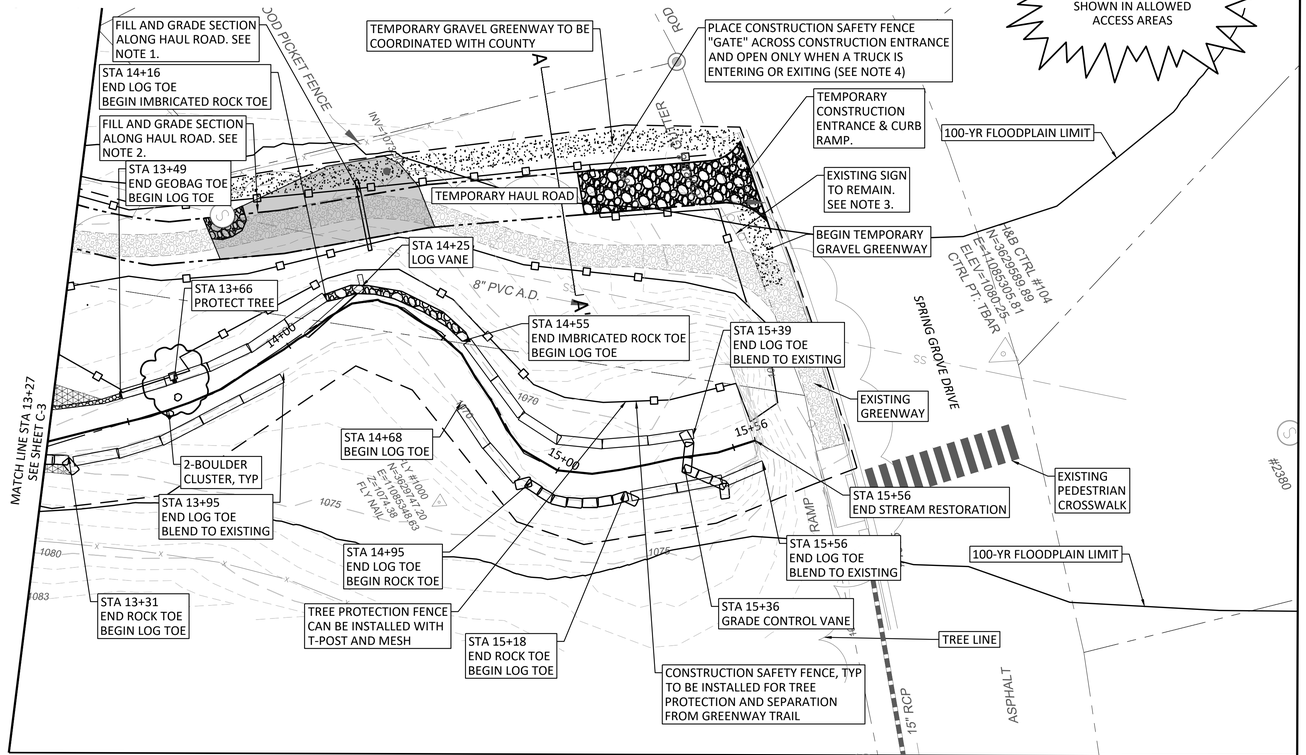

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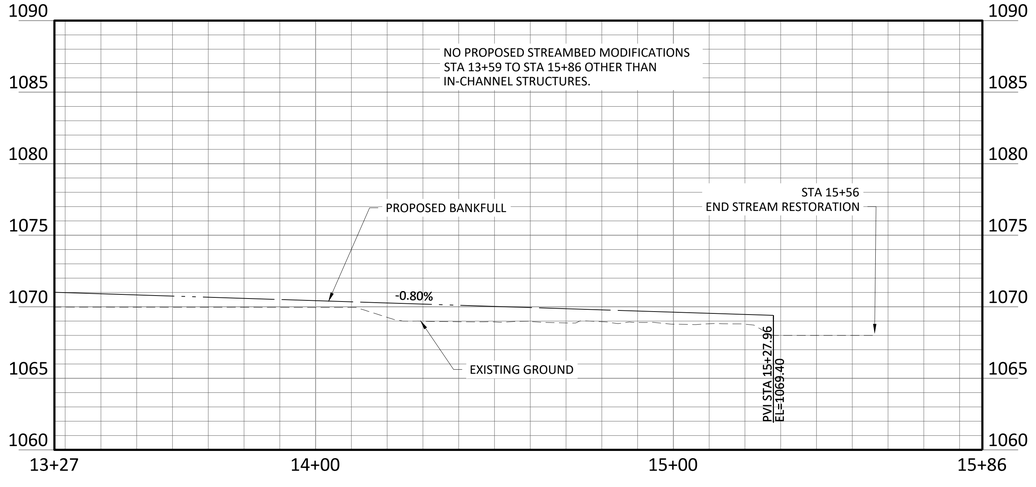

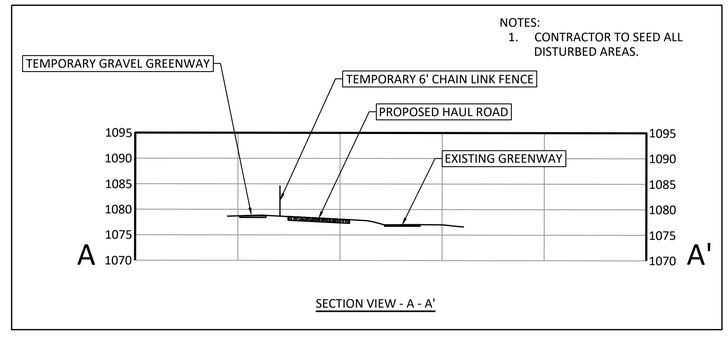

SECTION VIEW - A - A'

0 20' 40'

SCALE IN FEET

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

PLAN AND PROFILE
STA 13+50 TO END

FAN JOB NO. RNC19591
DATE 2/8/2023
DESIGNED LRW
DRAWN LRW
CHECKED BMD
FILE NAME STREAM-PP.dwg

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SHEET C-4

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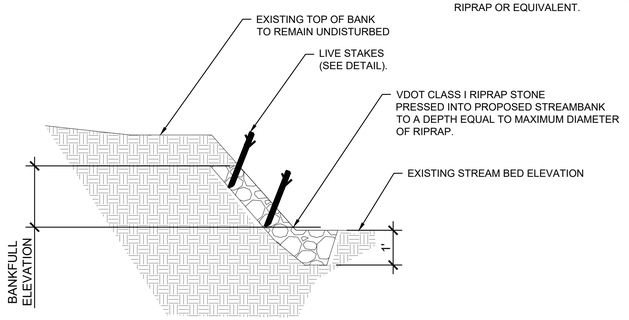
NOTES:

1. STONE SIZE SHALL BE VDOT CLASS I RIPRAP OR EQUIVALENT.

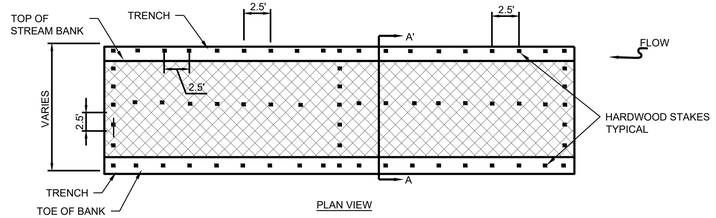


IMBRICATED ROCK TOE - PROFILE VIEW

IMBRICATED ROCK TOE
SCALE: NTS

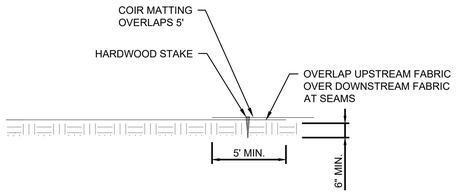
NOTES:

1. MAXIMUM SINGLE LENGTH OF MATTING/MESH IS 100'.
2. TOP AND BOTTOM EDGES OF MATTING/MESH SHALL BE KEYED IN.
3. COIR MATTING DETAIL SHOWN IS FOR PERMANENT INSTALLATION. TEMPORARY INSTALLATION FOR EROSION CONTROL PROTECTION AS STIPULATED SHALL BE TO THE EXTENT THAT THE PROJECT SITE NEEDS TO BE PROTECTED FOR EROSION AND SEDIMENT CONTROL DURING NON-WORKING HOURS.

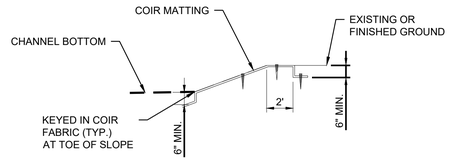


PLAN VIEW

STAKE DETAIL

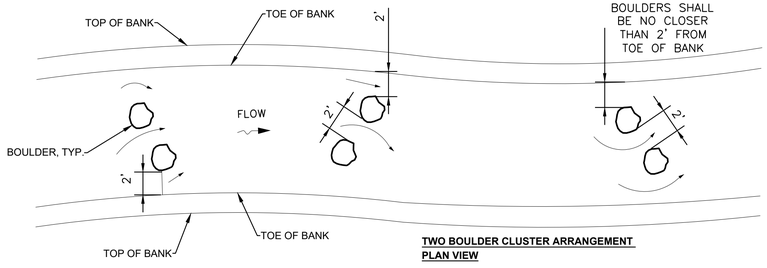


PROFILE VIEW



SECTION A-A'

COIR MATTING
SCALE: NTS

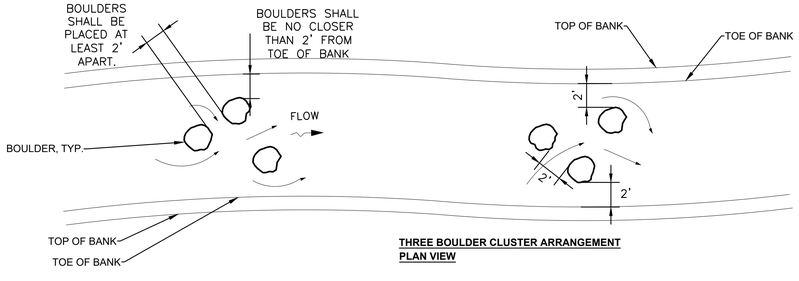


TWO BOULDER CLUSTER ARRANGEMENT PLAN VIEW

PROFILE VIEW

NOTES:

1. BOULDER CLUSTERS SHALL BE PLACED IN THE LOCATIONS AND ORIENTATION SHOWN ON PLANS.
2. CLUSTERS SHALL NOT BE PLACED CLOSER THAN 2 FEET FROM THE TOE OF BANK.
3. DISTANCE BETWEEN BOULDERS SHALL BE 2 FEET.
4. NO BOULDER DIMENSION SHALL BE SMALLER THAN 16 INCHES OR GREATER THAN 24 INCHES.
5. BOULDERS SHALL BE PRESSED TO AN 8 INCH PROTRUSION ABOVE STREAMBED.

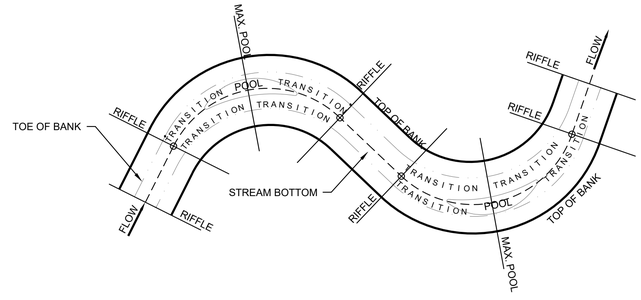


THREE BOULDER CLUSTER ARRANGEMENT PLAN VIEW

BOULDER CLUSTER
SCALE: NTS

NOTES:

1. AREAS IN BETWEEN LABELED FEATURES ARE TRANSITION AREAS.
2. SEE DETAILED CROSS-SECTIONS



CROSS SECTION TRANSITION LOCATIONS
SCALE: NTS

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILS

GENERAL DETAILS

NO.	ISSUE	BY	DATE	FILE NAME
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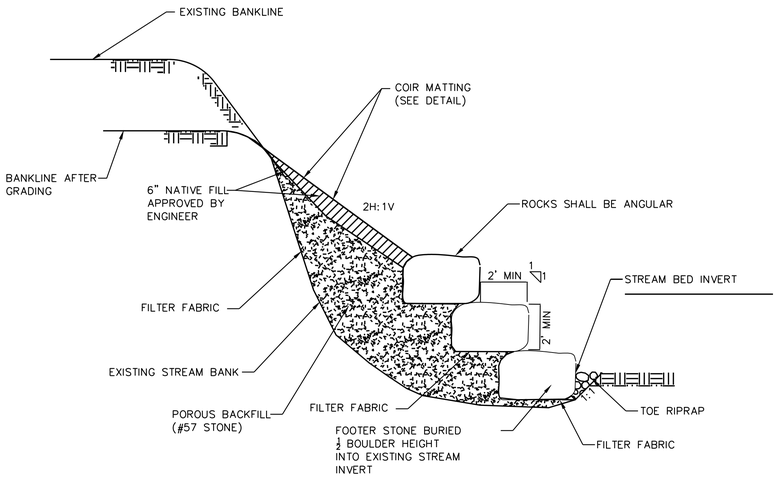
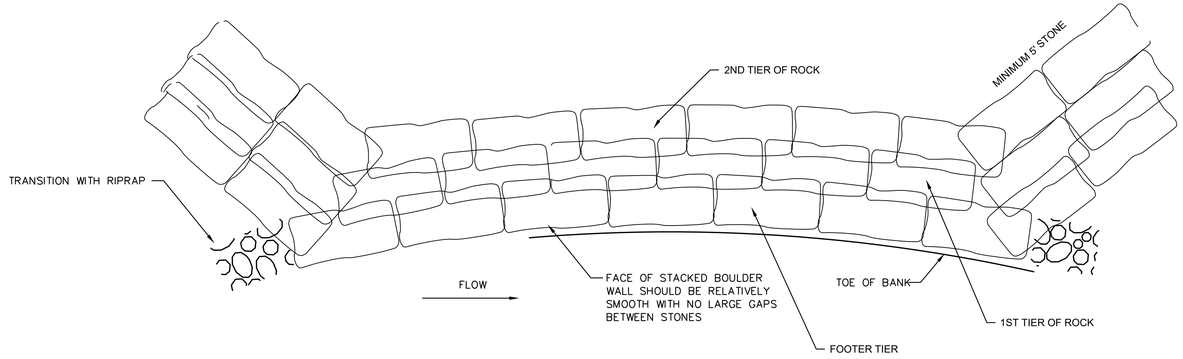


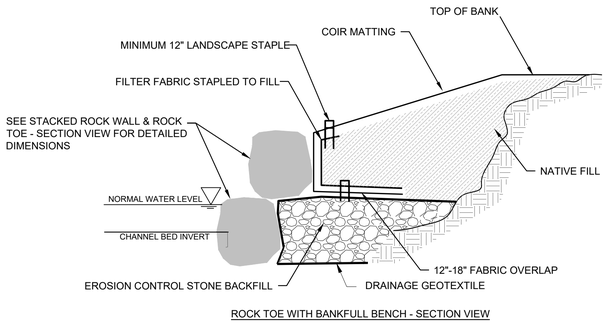
STACKED ROCK WALL & ROCK TOE - SECTION VIEW

NOTES:

1. STACKED ROCK WALL SHALL HAVE 2 TIERS ABOVE THE FOOTER TIER AND ROCK TOE SHALL HAVE 1 TIER ABOVE THE FOOTER TIER.
2. STACKED ROCK WALL CAN BE STACKED WITH A SLOPE BETWEEN 0.5:1 (H:V) AND 2:1 (H:V) STEEP.
3. STANDARD BOULDER SIZE IS 4'(L) X 3'(W) X 2'(H)
4. BANKS SHALL NOT BE OVER-EXCAVATED FOR CONSTRUCTION OF ROCK TOEOR ROCK WALL. ROCK TOE AND ROCK WALL SHALL BE INSTALLED ON FACE OF BANK.

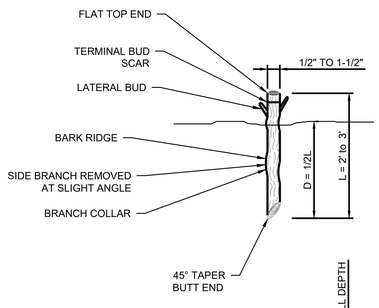


STACKED ROCK WALL & ROCK TOE - PLAN VIEW



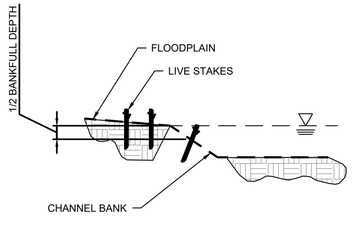
ROCK TOE WITH BANKFULL BENCH - SECTION VIEW

STACKED ROCK WALL & ROCK TOE PROTECTION
SCALE: NTS



NOTES:

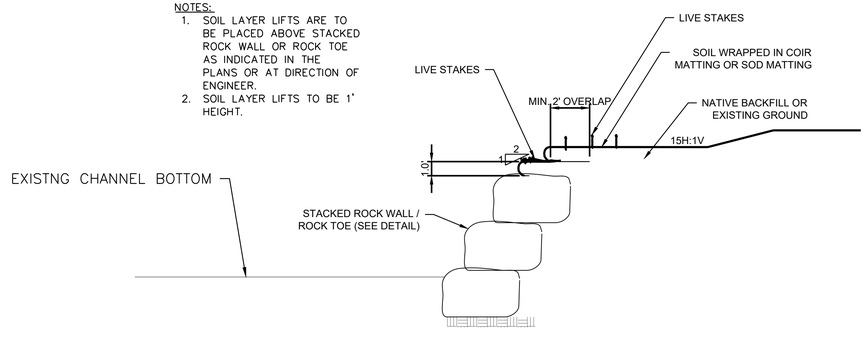
1. ALL LATERAL BRANCHES SHALL BE TRIMMED TO AVOID DAMAGE TO THE BARK RIDGE AND BRANCH COLLAR.
2. A MINIMUM OF TWO BUDS (ONE LATERAL PLUS ONE TERMINAL OR TWO TERMINAL) SHALL BE ABOVE THE PLANTING DEPTH.



LIVE STAKE
SCALE: NTS

NOTES:

1. SOIL LAYER LIFTS ARE TO BE PLACED ABOVE STACKED ROCK WALL OR ROCK TOE AS INDICATED IN THE PLANS OR AT DIRECTION OF ENGINEER.
2. SOIL LAYER LIFTS TO BE 1' HEIGHT.



SOIL LAYER LIFTS
SCALE: NTS

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129

COMMONWEALTH OF VIRGINIA
Emily D Brown
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04.05.2023
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILS

GENERAL DETAILS

FAN JOB NO.	DATE	BY	NO	ISSUE
RNC19591				
DATE 2/8/2023				
DESIGNED LRW				
DRAWN LRW				
REVISED				
CHECKED BMD				
FILE NAME DETAILS.dwg				

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0 1"

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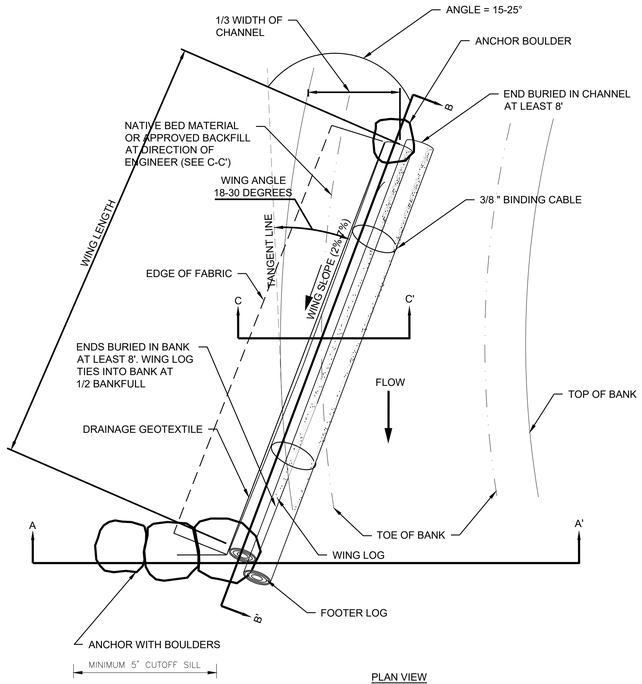

PLAN VIEW

NOTES:

1) VANE ARMS BACKFILLED WITH NATIVE BED MATERIAL OR APPROVED BACKFILL AT DIRECTION OF ENGINEER.
2) BANKFULL CHANNEL WIDTH INDICATES THE WIDTH OF THE PROPOSED CHANNEL AT THE SPECIFIC STRUCTURE LOCATION. THIS WIDTH MAY NOT NECESSARILY BE THE SAME AS THE TYPICAL CROSS-SECTION WIDTH SHOWN IN THE DETAILS.
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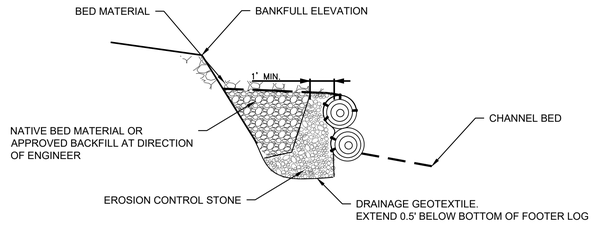
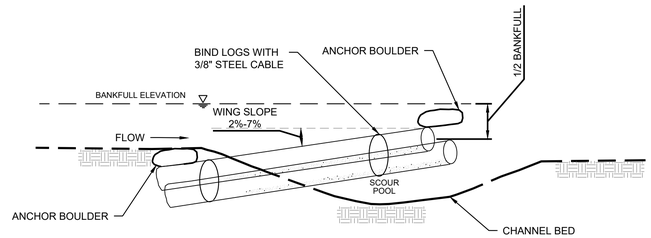
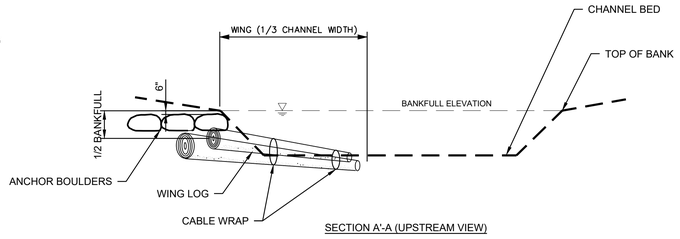


SECTION C-C'



SECTION B-B' (PROFILE VIEW)

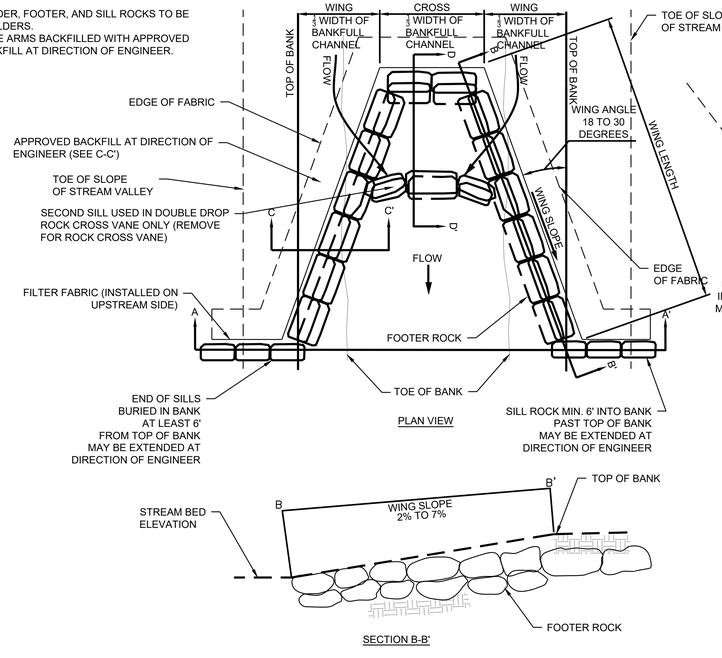


SECTION A'-A (UPSTREAM VIEW)

LOG OR ROCK VANE
SCALE: NTS

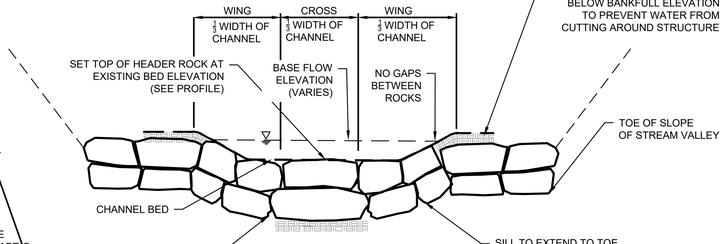
NOTE:

1. HEADER, FOOTER, AND SILL ROCKS TO BE BOULDERS.
2. VANE ARMS BACKFILLED WITH APPROVED BACKFILL AT DIRECTION OF ENGINEER.

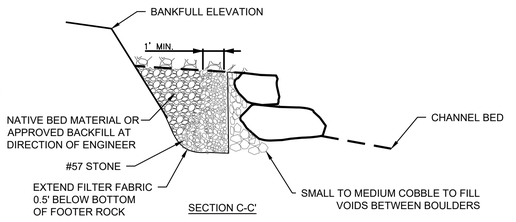


PLAN VIEW

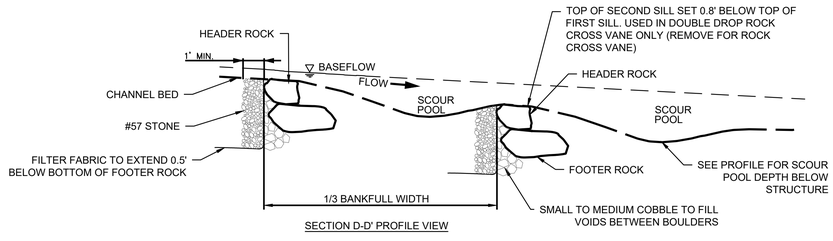
SECTION B-B'



SECTION A-A' (UPSTREAM VIEW)



SECTION C-C'



SECTION D-D' PROFILE VIEW

DOUBLE DROP ROCK CROSS OR ROCK CROSS VANE
SCALE: NTS

ISSUED FOR BID

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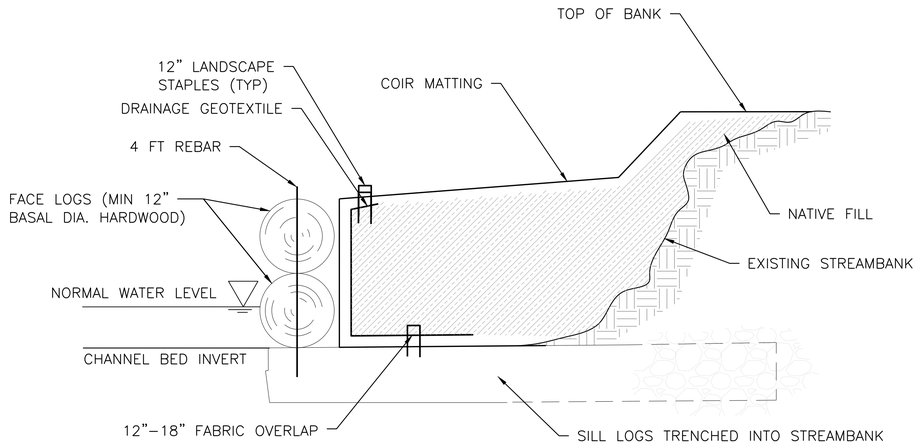
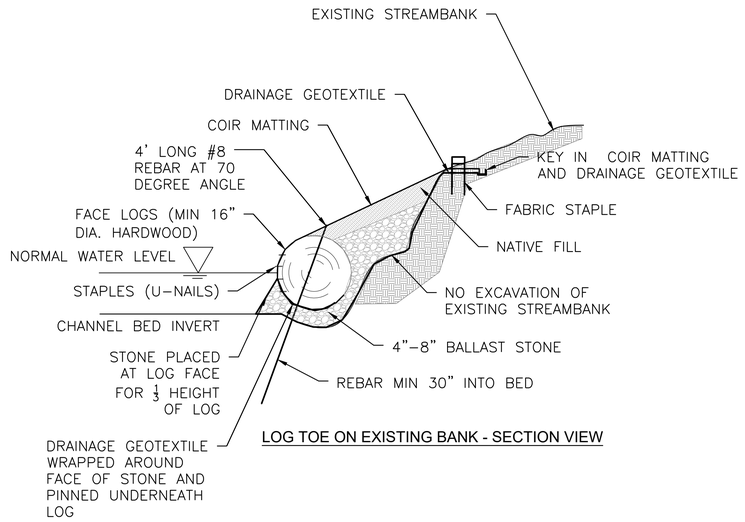
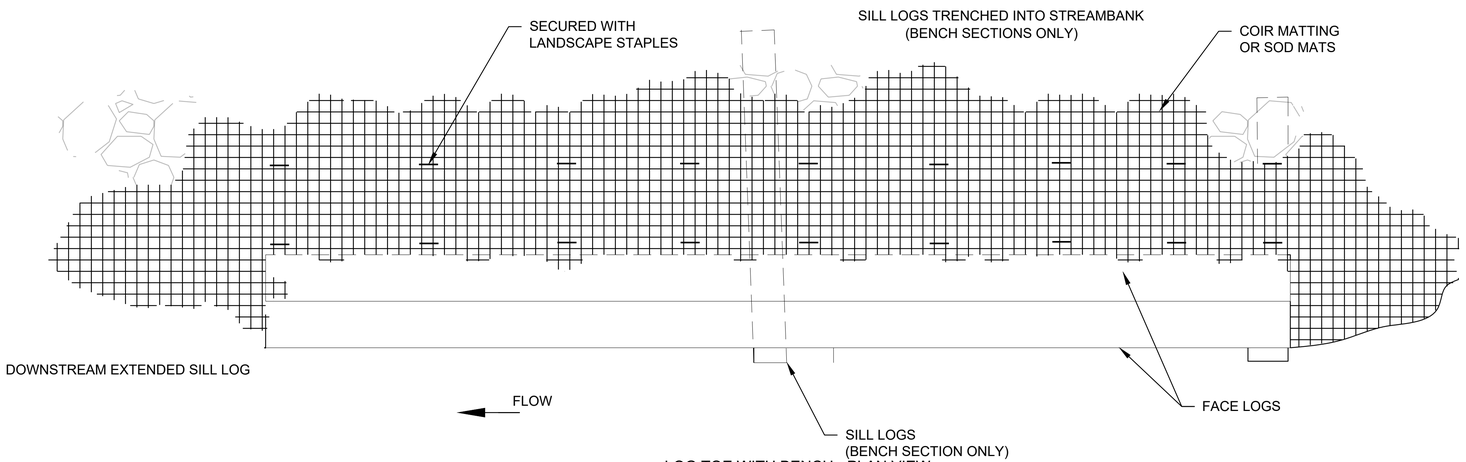


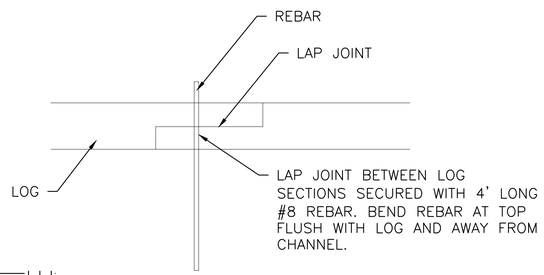
LOG TOE WITH BENCH - SECTION VIEW



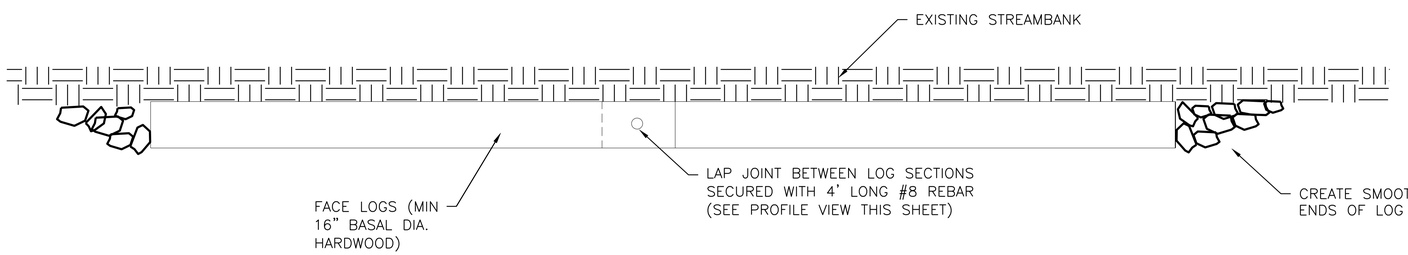
LOG TOE ON EXISTING BANK - SECTION VIEW



LOG TOE WITH BENCH - PLAN VIEW



LOG TOE ON EXISITING BANK - LAP JOINT PROFILE VIEW



NOTES:

1.SILL LOGS SHALL BE PLACED EVERY 15 FT FOR BENCH SECTIONS.

LOG TOE ON EXISITING BANK - PLAN VIEW

ISSUED FOR BID

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Virginia Registered Engineering Firm #0407007129

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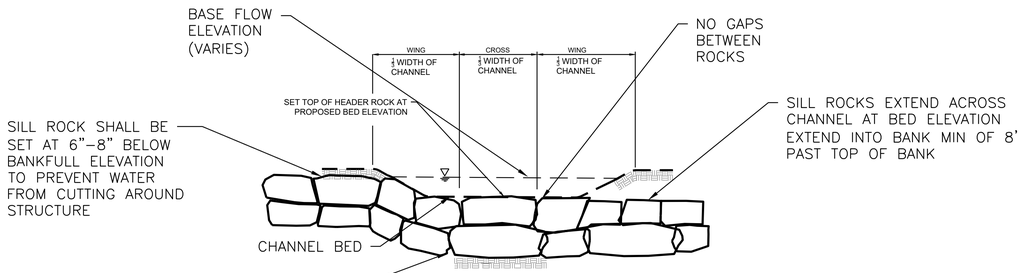
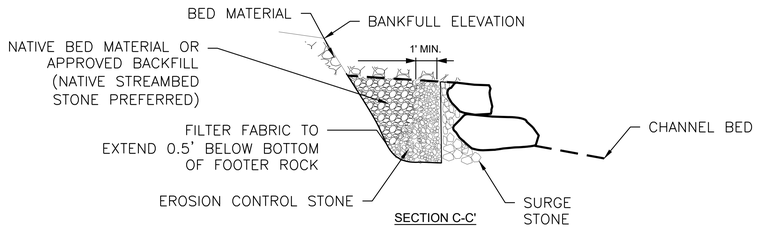
NOTE:

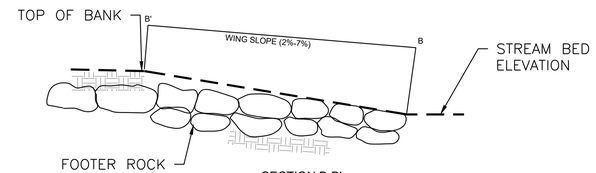
1. VANE ARMS BACKFILLED WITH NATIVE BED MATERIAL OR APPROVED BACKFILL AT DIRECTION OF ENGINEER.



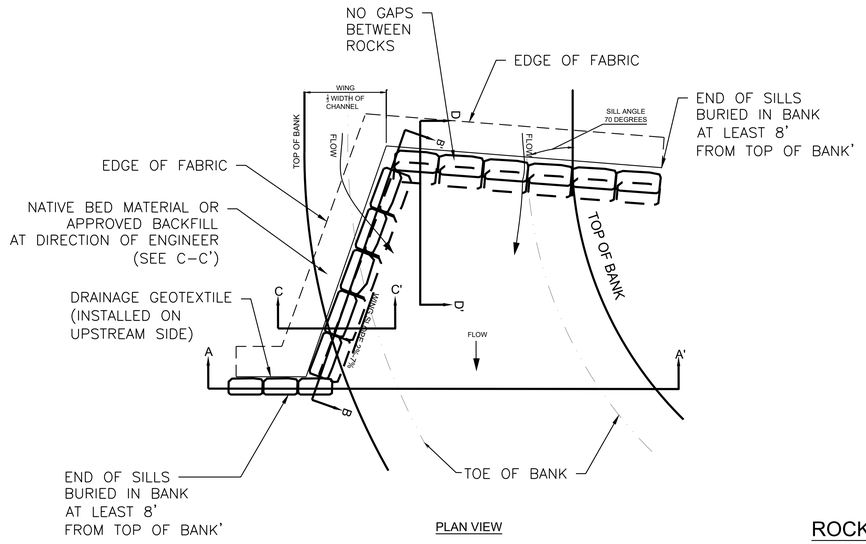
SECTION A-A' (UPSTREAM VIEW)



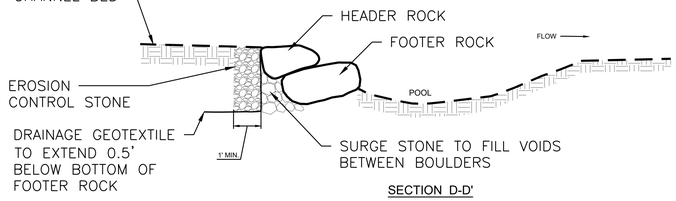
SECTION C-C'



SECTION B-B'



PLAN VIEW



SECTION D-D'

ROCK GRADE CONTROL VANE
SCALE: NTS

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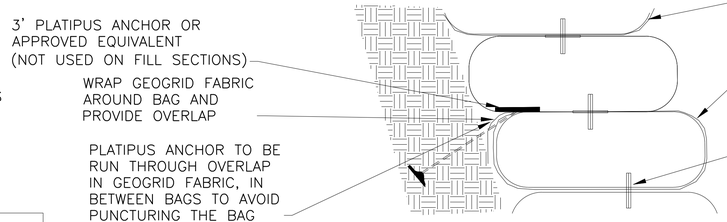
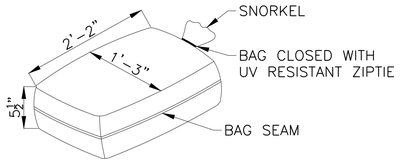
NOTES:

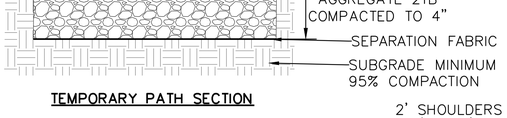
1. GRADE AREA OF INSTALLATION AS SHOWN ON PLANS. REMOVE ALL ROCKS AND OTHER OBSTRUCTIONS SO THE MATERIAL WILL HAVE DIRECT CONTACT WITH SOIL.
2. BAGS ARE TO BE FILLED ONSITE WITH MODERATE DRAINED MATERIAL TO BE APPROVED BY ENGINEER. FOLLOW BAG FILLING PROCEDURE FROM ENVIROLOK, FLEX MSE, DELTALOK OR APPROVED EQUIVALENT.
3. GEOBAG WALL LAYERS SHOULD BE SOLID AND UNIFORM. FLATTEN GEOBAGS WITH HAND TAMPER OR EQUIVALENT AFTER PLACEMENT AND BEFORE PROCEEDING WITH CINCHING, TWINING, AND STAKING.
4. APPLY VERTICAL BAG STABILIZER ACCORDING TO INSTALLATION INSTRUCTIONS FROM ENVIROLOK, FLEX MSE, DELTALOK OR APPROVED EQUIVALENT.
5. TIGHTEN VERTICAL BAG STABILIZER THROUGHOUT THE CINCHING AND TWINING PROCESS. REFER TO MANUFACTURER INSTALLATION INSTRUCTIONS.
6. APPLY SEED AND VEGETATION ACCORDING TO WALL SYSTEM MANUFACTURER'S INSTRUCTIONS.
7. GEOBAGS WILL BE BUILT IN A MANNER THAT BLENDS WITH EXISTING BACKSLOPE. A MINIMUM OF 6 LIFTS (~3FT ABOVE ROCK WALL) AT ~1.5:1 (H:V) SLOPE UNLESS OTHERWISE SPECIFIED ON PLANS. MORE BAG LAYERS MAY BE USED AT DIRECTION OF ENGINEER.



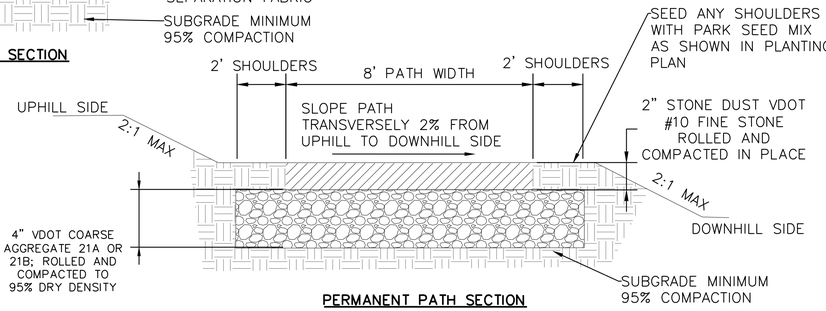
GEOBAG ANCHORING AND WRAPPING DETAIL



TYPICAL GEOBAG



TEMPORARY PATH SECTION



PERMANENT PATH SECTION

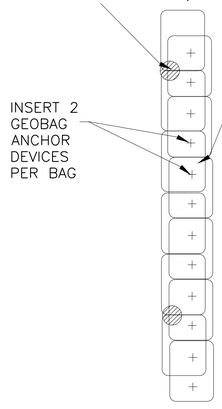
STANDARD PATH SECTION NOTES:
1. STONE BASE SHALL BE PLACED IN TWO LIFTS OF NO MORE THAN 3" EACH.
2. CONTRACTOR TO ENSURE A MINIMUM OF 95% COMPACTION OF THE SUB-GRADE PRIOR TO STONE PLACEMENT.
3. CONTRACTOR TO PROVIDE CROSS SLOPE IN DIRECTION OF NATURAL GRADE TO MAINTAIN SHEET FLOW ACROSS PATH.

TEMPORARY GREENWAY NOTES:
1. SKIM GRASS AND PLACE SEPARATION FABRIC.
2. PLACE 6" OF VDOT 21 B STONE, COMPACT TO 4".
3. AT END OF PROJECT, REMOVE TEMPORARY STONE AND MATTING. REWORK TO FINISHED GRADE AND SEED WHERE PERMANENT SEEDING MIX IS REQUIRED.

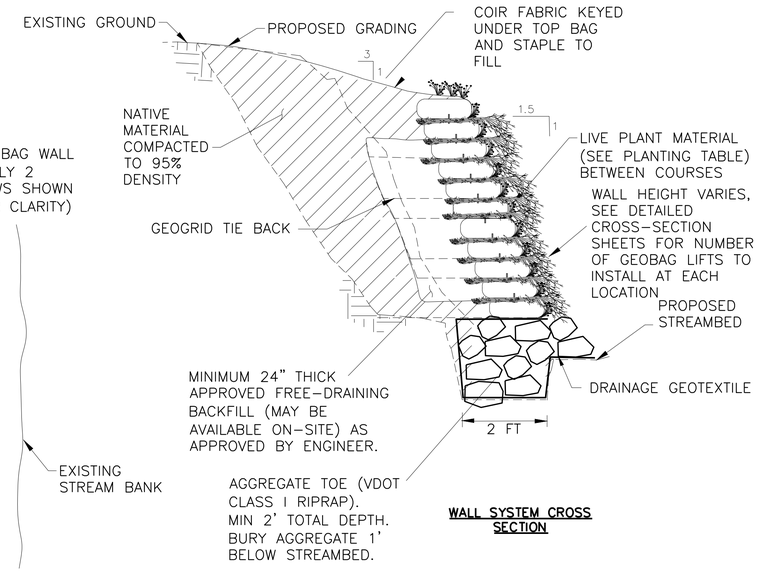
PERMANENT GREENWAY NOTES:
1. TRAIL SHOULD BE EXCAVATED PRIOR TO INSTALLATION OF STONE SO THAT FINAL TRAIL SURFACE GRADE MATCHES ORIGINAL GRADE. FINAL TRAIL SHALL NOT BE LOWER THAN GRADE.
2. PLACE 4" OF GRADED COARSE AGGREGATE VDOT 21A OR 21B, ROLLED AND COMPACTED TO 95% MAX. DRY DENSITY. COVER WITH 2" OF FINE #10 STONE, ROLLED AND COMPACTED. AT LEAST 6% OF SURFACE STONE MUST BE ABLE TO PASS THROUGH A #200 SIEVE.
3. THE TRAIL SHALL BE CROWNED TO DRAIN WATER AT 2% OR OUTSLOPED AT 2%.
4. EXCAVATED MATERIAL MAY BE USED TO BACKFILL EDGES AND DRESS SMOOTH.
5. MAXIMUM TRAIL GRADE SHALL BE 5%.

GREENWAY STANDARD PATH SECTION PERMANENT AND TEMPORARY PATHS

NOT TO SCALE



WALL SYSTEM PLAN VIEW



WALL SYSTEM CROSS SECTION

GEOBAG WALL SYSTEM – FILL SECTIONS ENVIROLOK, FLEX MSE, DELTALOK OR EQUIVALENT

NOT TO SCALE

ISSUED FOR BID

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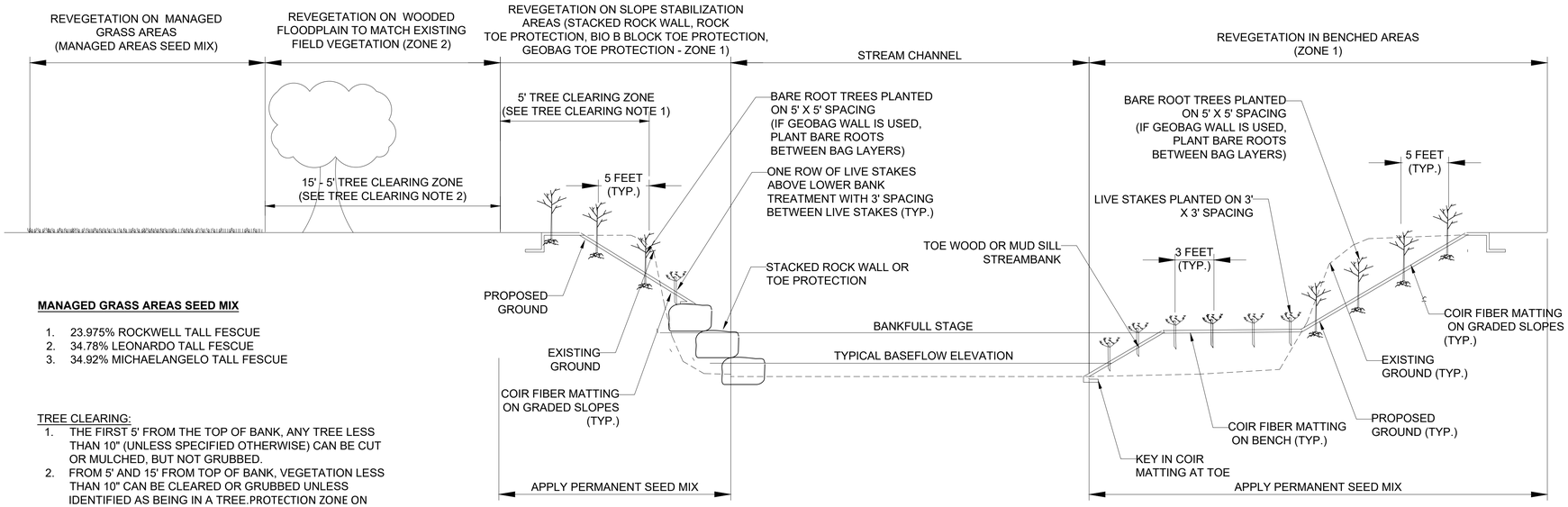


MANAGED GRASS AREAS SEED MIX

1. 23.975% ROCKWELL TALL FESCUE
2. 34.78% LEONARDO TALL FESCUE
3. 34.92% MICHAELANGELO TALL FESCUE

TREE CLEARING:

1. THE FIRST 5' FROM THE TOP OF BANK, ANY TREE LESS THAN 10" (UNLESS SPECIFIED OTHERWISE) CAN BE CUT OR MULCHED, BUT NOT GRUBBED.
2. FROM 5' AND 15' FROM TOP OF BANK, VEGETATION LESS THAN 10" CAN BE CLEARED OR GRUBBED UNLESS IDENTIFIED AS BEING IN A TREE.PROTECTION ZONE ON THE PLANS.

REVEGETATION SECTION

SCALE: NTS

NOTES:

1. THE LEFT SIDE OF THIS SECTION SHOWS PLANTING APPROACH TO BE APPLIED FOR STREAMBANKS WHERE TOE PROTECTION OR STACKED ROCK WALL ARE TO BE USED ON THE LOWER BANK WITH GRADING OR GEOBAG WALL ON THE UPPER BANK.

2. THE RIGHT SIDE OF THIS SECTION SHOWS PLANTING APPROACH TO BE APPLIED WHERE A BENCH OR POINT TO CREATE A BENCH WITH GRADING

3. IF CROSS-SECTIONS SHOW NO GRADING OR OTHER TREATMENT ON PARTS OF THE EXISTING STREAMBANKS (UPPER BANK, LOWER BANK OR BOTH) THEN EXISTING VEGETATION IS TO REMAIN UNDISTURBED.

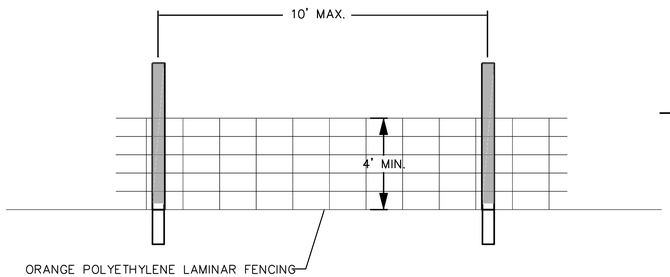
4. SEE PLANT LIST FOR SPECIES AND SIZE.

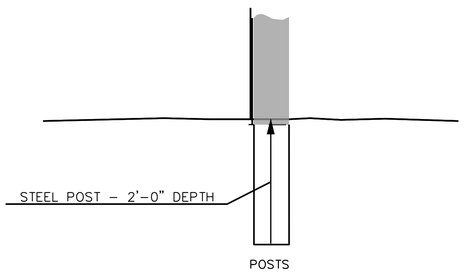
5. CONTRACTOR MUST ACHIEVE 80% SURVIVAL AFTER ONE GROWING SEASON.

6. IF REPLANTING IS REQUIRED, WARRANTY SHALL EXTEND BY ANOTHER YEAR FROM DATE OF PLANTING.

NOTES:

1. STEEL POSTS SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.
2. WOOD POST SHALL BE 6'-0" IN HEIGHT AND 3" MINIMUM IN DIAMETER.





CONSTRUCTION SAFETY FENCE/TREE PROTECTION FENCE

SCALE: NTS

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129
COMMONWEALTH OF VIRGINIA
Emily D Brown
EMILY DARR BROWN
Lic. No. 0402065407
PROFESSIONAL ENGINEER
04.05.2023
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531 North Liberty Street
Winston-Salem, NC 27101
Phone – (336) 790-6744
Web – www.freese.com

ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILS

PLANTING PLAN

FAN JOB NO. RNC19591
DATE 2/8/2023
DESIGNED LRW
DRAWN LRW
REVISED
CHECKED BMD
FILE NAME DETAILS.dwg

NO. | ISSUE | BY | DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET DT-7
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WOODY PLANTING							
Zone 1 - Imbricated Rock (78.0 linear feet)							
Planting Stock	**Scientific Name**	**Common Name**	**Stratum**	**Wetland Indicator Status***	**Base Bid**	**Additive Bid #1**	**Remarks**
LIVE STAKES	*Salix sericea*	Silky willow	Shrub	OBL	5	5	Live stakes, minimum of 4-ft long, planted on 2-ft centers through the face and top of each block, species randomly distributed.
	Cornus amomum	Silky dogwood	Shrub	FACW	5	5	
Zone 1 - Toe Protection Areas (710.0 linear feet)							
Planting Stock	**Scientific Name**	**Common Name**	**Stratum**	**Wetland Indicator Status***	**Base Bid**	**Additive Bid #1**	**Remarks**
LIVE STAKES	*Alnus serrulata*	Smooth alder	Shrub	OBL	501	293	Live stakes, minimum of 4-ft long, placed 1 stem per geobag, alternating between geobag rows and with species randomly distributed.
	Salix sericea	Silky willow	Shrub	OBL	559	351	
	Cephalanthus occidentalis	Buttonbush	Shrub	OBL	466	258	
	Cornus amomum	Silky dogwood	Shrub	FACW	477	269	
Zone 2 - Riparian Area (23427.0 square feet, 0.54 acres)							
Planting Stock	**Scientific Name**	**Common Name**	**Stratum**	**Wetland Indicator Status***	**Base Bid**	**Additive Bid #1**	**Remarks**
BARE ROOT	*Liriodendron tulipifera*	Yellow Poplar	Overstory	FACU	60	60	Planted on 8-ft centers, with species randomly distributed.
	Betula nigra	River Birch	Overstory	FACW	60	60	
	Carpinus caroliniana	American Hornbeam	Shrub	FAC	40	40	
	Celtis occidentalis	Common Hackberry	Overstory	FACU	60	60	
	Diospyros virginiana	Common Persimmon	Shrub	FAC	40	40	
	Platanus occidentalis	American Sycamore	Overstory	FACW	81	81	
	Virburnum dentatum	Southern arrowwood	Shrub	FAC	60	60	

*2020 National Wetland Plant List v3.5, Eastern Mountains and Piedmont

WOODY PLANT LIST

HERBACEOUS PLANTING				
Zone 1 and Zone 2 Area (51435.0 square feet, 1.18 acres)				
TEMPORARY SEEDING	Warm Season (May 1 - Aug 15) - German Millet			Apply at 40 lbs/acre to all disturbed areas
	Cool Season (Aug 15 - May 1) - Virginia Rye			
PERMANENT SEEDING	**Scientific Name**	**Common Name**	**% by Weight**	
	Andropogon gerardii	Big bluestem	18	Apply at 25 lb/acre to disturbed areas
	Bidens aristosa	Bidens	3	
	Carex vulpinoidea	Fox sedge	11	
	Chamaecrista fasciculata	Partridge pea	14	
	Desmodium canadense	Showy tick trefoil	5	
	Elymus virginicus	Virginia wildrye	35	
	Schizachyrium scoparium	Little bluestem	14	
Managed Grass Areas (21698.6 square feet, 0.50 acres)				
TEMPORARY SEEDING	Warm Season (May 1 - Aug 15) - German Millet			Apply at 40 lbs/acre to all disturbed areas
	Cool Season (Aug 15 - May 1) - Virginia Rye			
PERMANENT SEEDING	**23.975% Rockwell Tall Fescue, 34.78% Leonardo Tall Fescue, 34.92% Michaelangelo Tall Fescue** (requires approval from Roanoke County Department of Parks, Recreation and Tourism)			Apply at recommended rate

HERBACEOUS PLANT LIST

NOTES:

1. THIS PLANTING SCHEDULE ONLY APPLIES TO RESTORED STREAM BANK, BENCHES, AND OTHER RESTORED AREAS OF STREAM.
2. FOR PERMANENT SEEDING IN OTHER DISTURBED AREAS, SEE "MANAGED GRASS AREAS" PLANTING MIX.

MANAGED GRASS AREAS

1. 23.975% ROCKWELL TALL FESCUE
2. 34.78% LEONARDO TALL FESCUE
3. 34.92% MICHAELANGELO TALL FESCUE

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILS

PLANTING PLAN

FWA JOB NO. RNC19591
DATE 2/8/2023
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REVISED
CHECKED BMD

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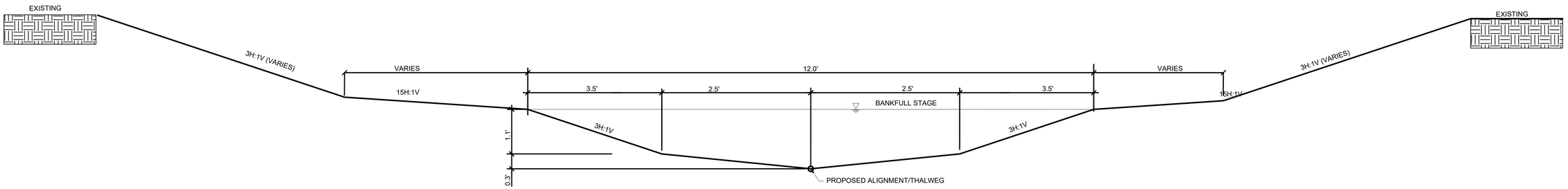
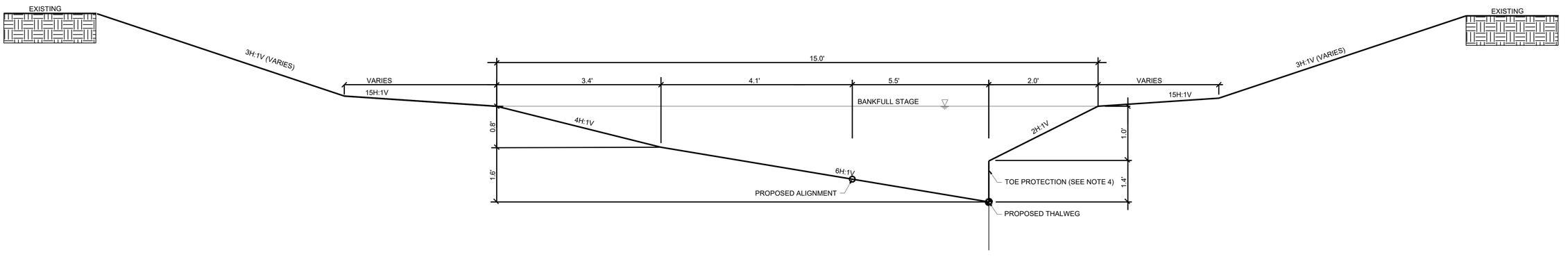


NOTES:

1. POOL TYPICAL FOR RIGHT MEANDER SHOWN. MIRROR SECTION FOR LEFT MEANDERS.
2. RIFFLE CROSS-SECTION TYPICALLY OCCURS AT MID-RIFFLE AND POOL CROSS-SECTION AT THE MID-POOL. CHANNEL DEPTH AND SIDE SLOPES WILL VARY ALONG TRANSITION FROM POOL CROSS-SECTION TO RIFFLE CROSS-SECTION. REFER TO PROPOSED PROFILE FOR DEPTHS FROM BANKFULL ELEVATION TO THALWEG ELEVATION.
3. SEE DETAILED CROSS-SECTION SHEETS FOR VARIATION IN SLOPES AND WIDTHS.
3. SEE DETAILED CROSS-SECTION SHEETS FOR TOE PROTECTION TYPES AND EXTENT.

TYPICAL RIFFLE CROSS-SECTION
SCALE: NTS



TYPICAL POOL CROSS-SECTION
SCALE: NTS

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

TYPICAL X-SECTIONS

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CHECKED BMD
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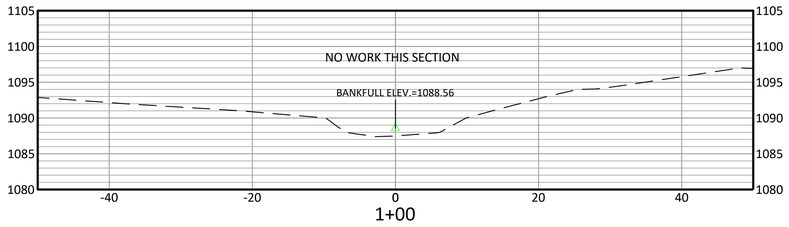

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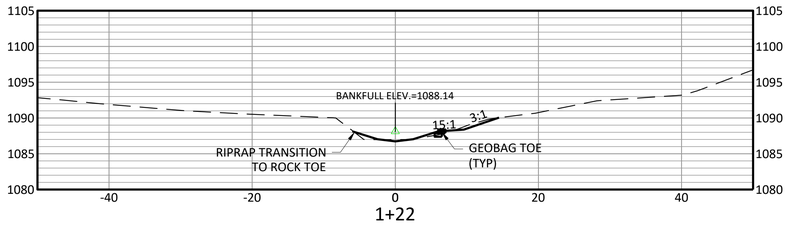

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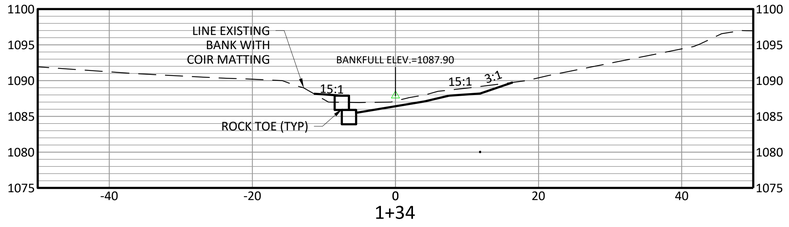

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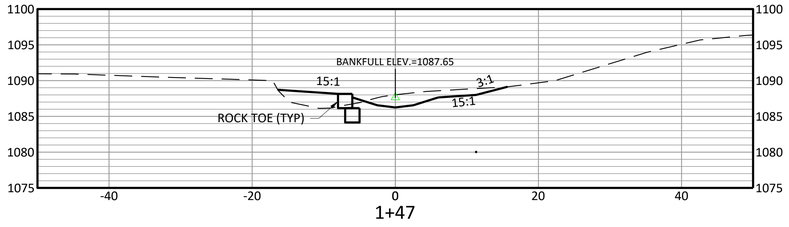

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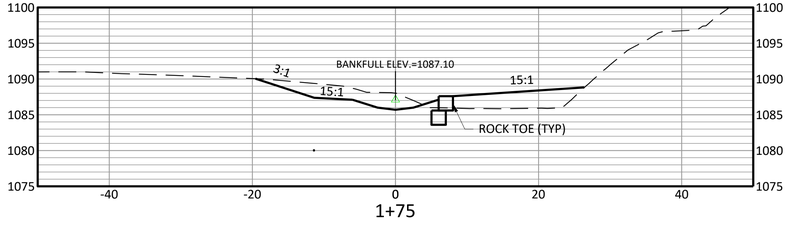

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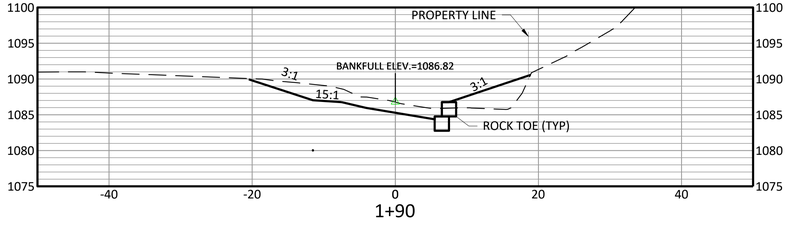

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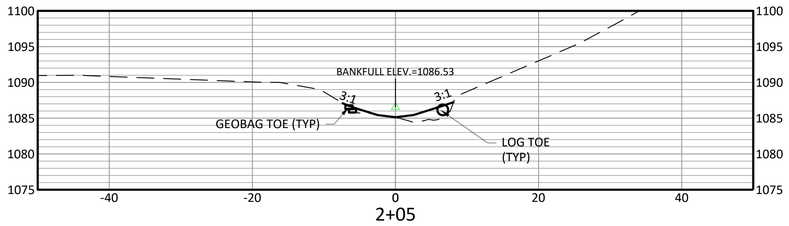

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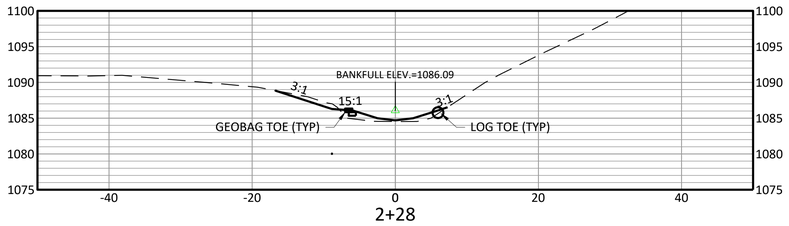

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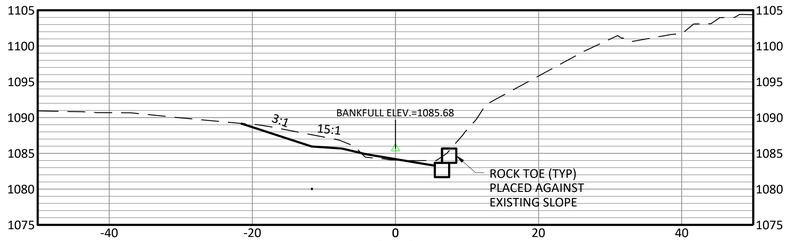

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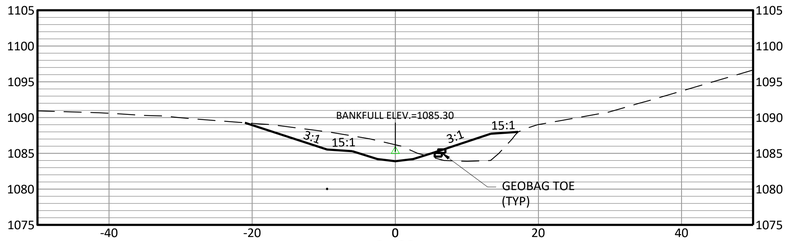

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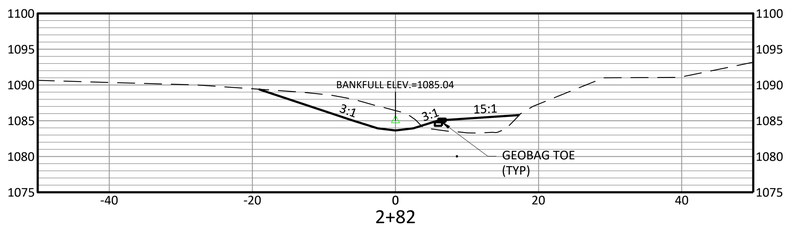

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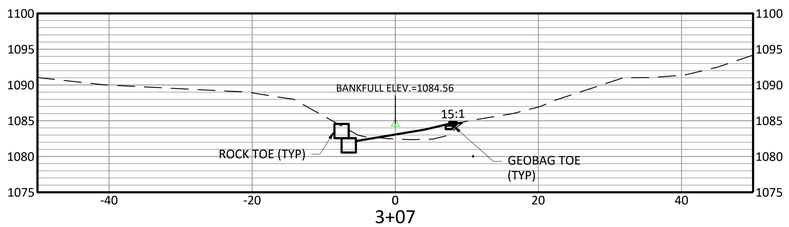

3+07

LEGEND

- EXISTING GROUND PROFILE ALONG ALIGNMENT
- PROPOSED GROUND

NOTE:

1. ALL GRADED SLOPES SHALL BE LINED WITH COIR MATTING PER THE DETAIL.
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3. PLACE SINGLE COIR WRAPPED LIFT ABOVE STACKED ROCK WALL AS REQUIRED.
4. SEE PLAN VIEW SHEETS FOR PROPOSED BENCH WIDTHS AND BLENDING.

0 10' 20'
SCALE IN FEET

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILS

DETAILED CROSS SECTIONS STA 1+00 TO STA 3+07

FNN JOB NO.	RNC19591
DATE	2/8/2023
DESIGNED	LRW
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REVISED	
CHECKED	BMD
FILE NAME	CROSS SECTIONS.dwg

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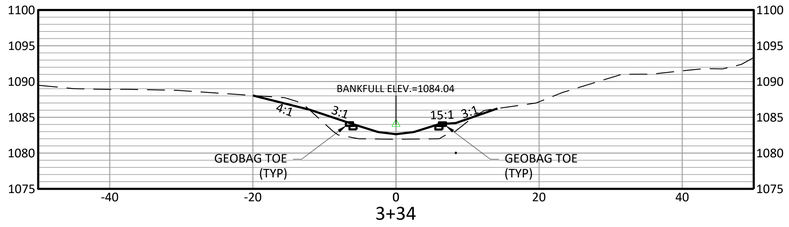

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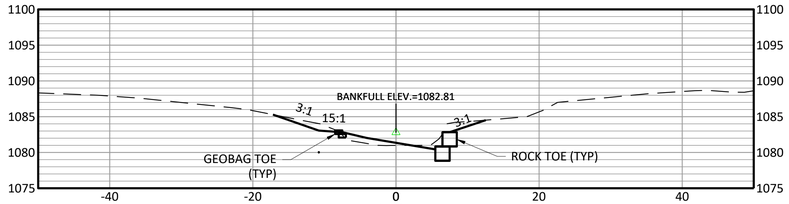

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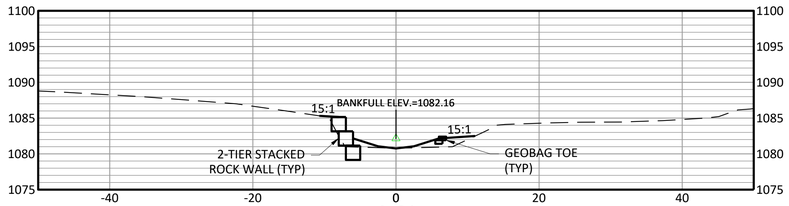

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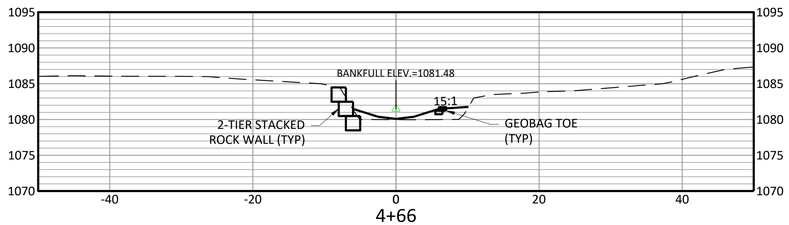

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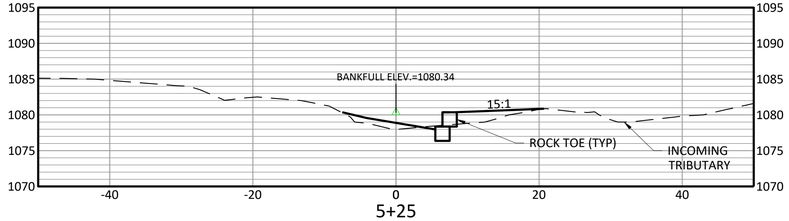

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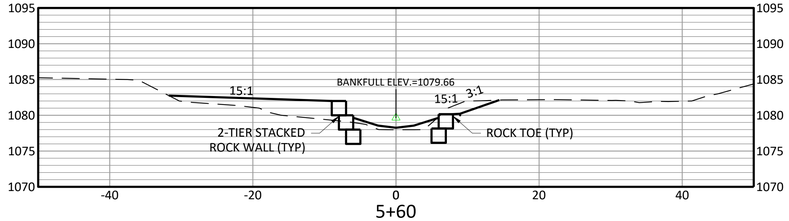

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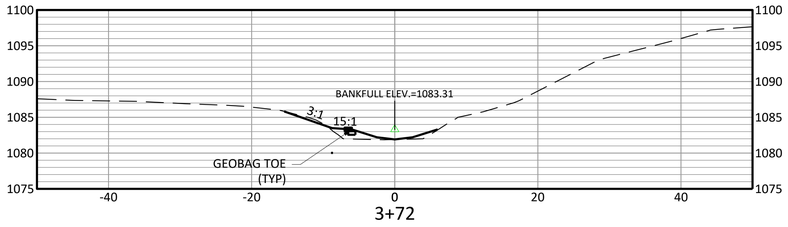

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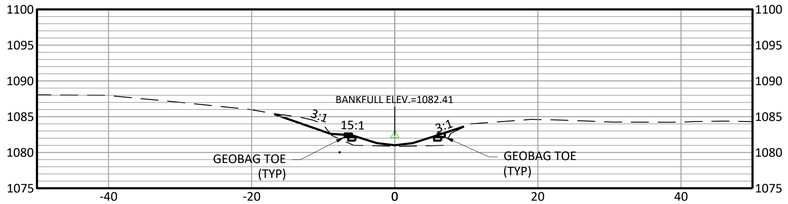

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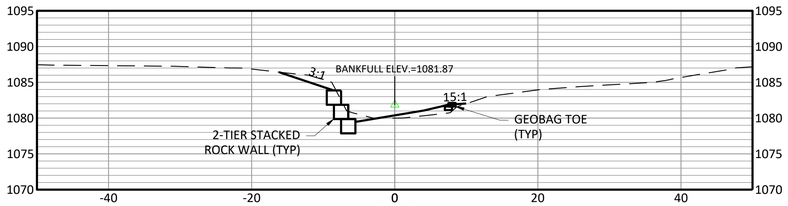

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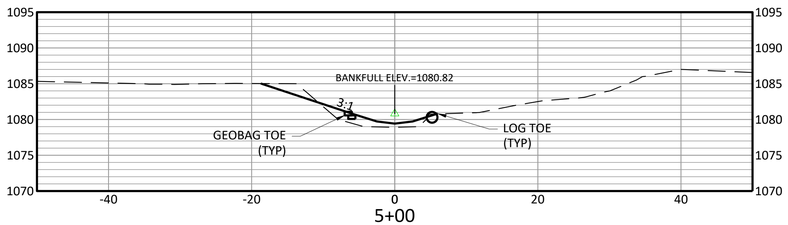

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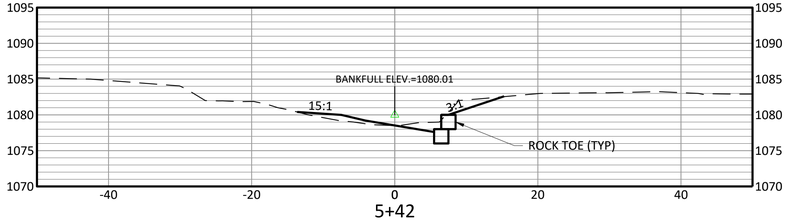

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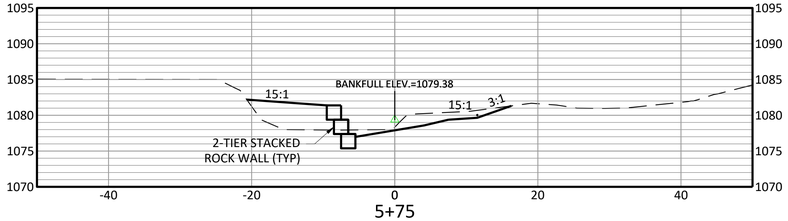

5+75

LEGEND

EXISTING GROUND PROFILE ALONG ALIGNMENT

PROPOSED GROUND

NOTE:

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0 10' 20'
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILED CROSS SECTIONS STA 3+34 TO STA 5+75

DETAILS

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DATE 2/8/2023
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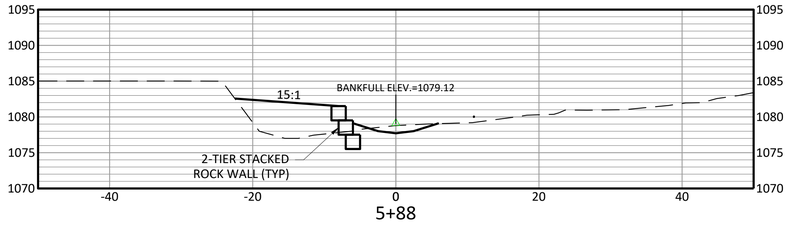

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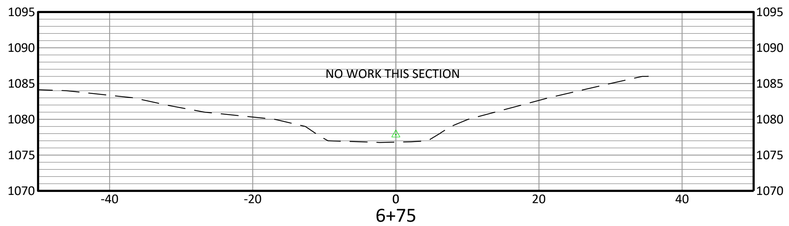

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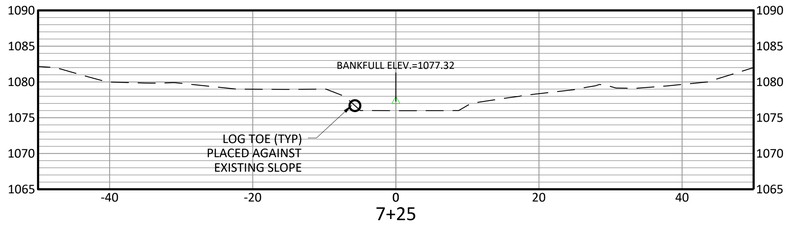

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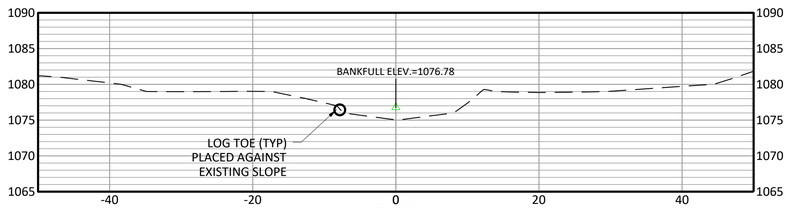

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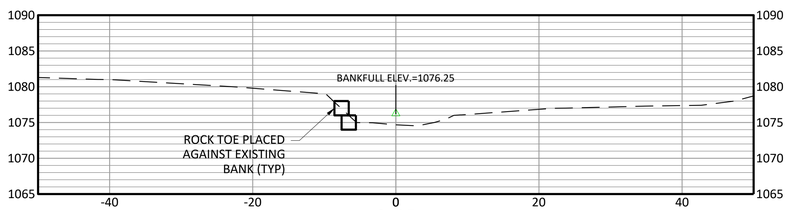

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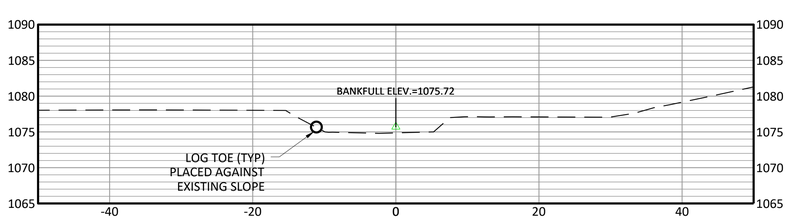

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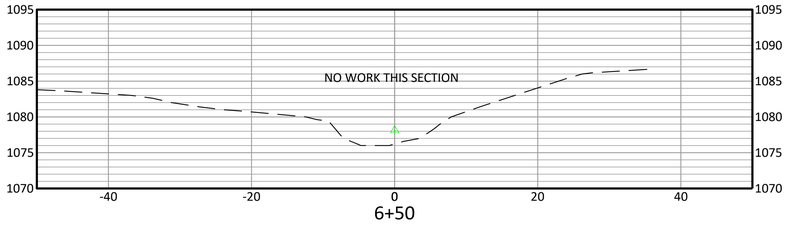

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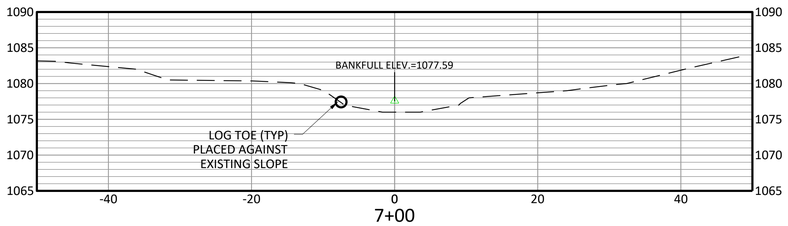

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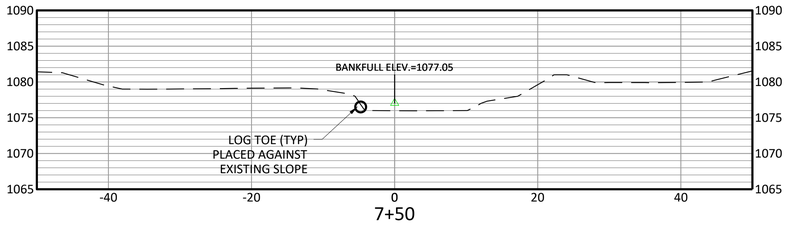

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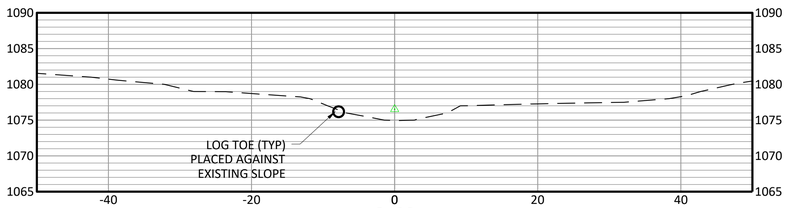

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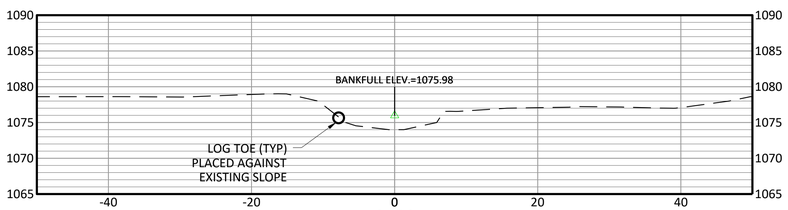

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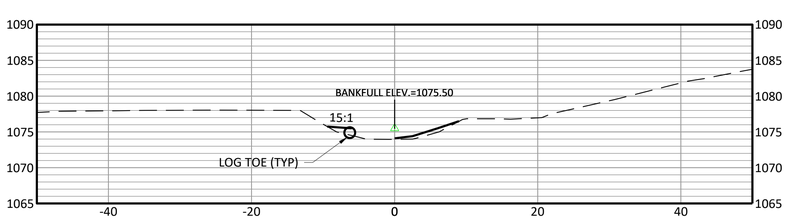

8+95

LEGEND

EXISTING GROUND PROFILE ALONG ALIGNMENT

PROPOSED GROUND

NOTE:

1. ALL GRADED SLOPES SHALL BE LINED WITH COIR MATTING PER THE DETAIL.
2. ALL STACKED ROCK WALL AND ROCK TOE SHALL BE BLENDED TO EXISTING GROUND AT TOP OF ROCK TO LIMIT EROSION AT TOP OF WALL.
3. PLACE SINGLE COIR WRAPPED LIFT ABOVE STACKED ROCK WALL AS REQUIRED.
4. SEE PLAN VIEW SHEETS FOR PROPOSED BENCH WIDTHS AND BLENDING.

0 10' 20'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129

COMMONWEALTH OF VIRGINIA
Emily D Brown
EMILY DARR BROWN
Lic. No. 0402065407
04.05.2023
PROFESSIONAL ENGINEER

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531 North Liberty Street
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Web - www.freese.com

ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILED CROSS SECTIONS STA 5+88 TO STA 8+95

DETAILS

FWA JOB NO.	RNC19591
DATE	2/8/2023
DESIGNED	LRW
DRAWN	LRW
PROVED	
CHECKED	BMD
FILE NAME	CROSS SECTIONS.dwg

NO.	ISSUE	BY	DATE

VERIFY SCALE
Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET
CS-3

SEQ.

ACAD Rel: 24.2s (LMS Tech)
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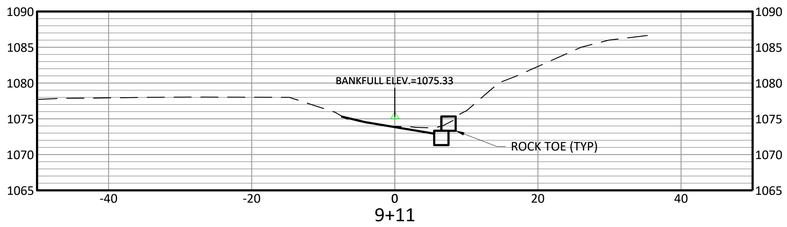
Last Saved: 3/10/2023 9:43 AM Saved By: 02298

Plot Date: 4/3/2023 1:55 PM Plot By: 02298 Filename: N:\SW\Drawings\CROSS SECTIONS.dwg



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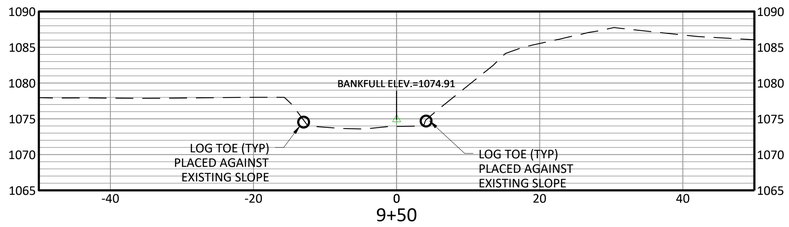

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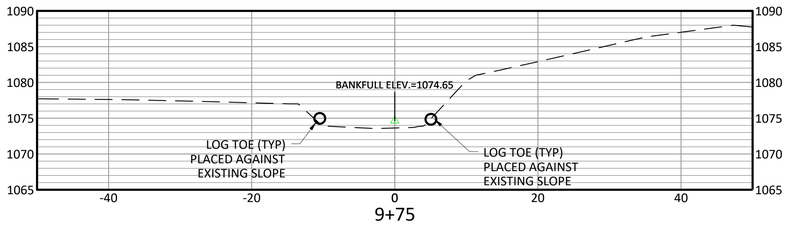

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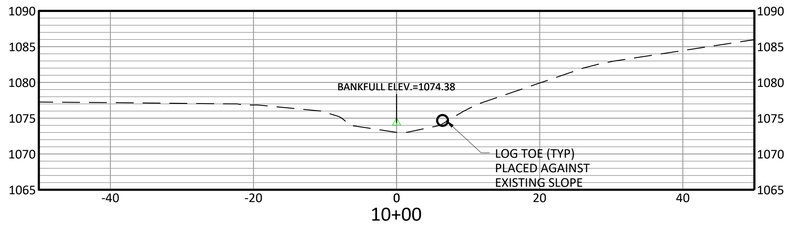

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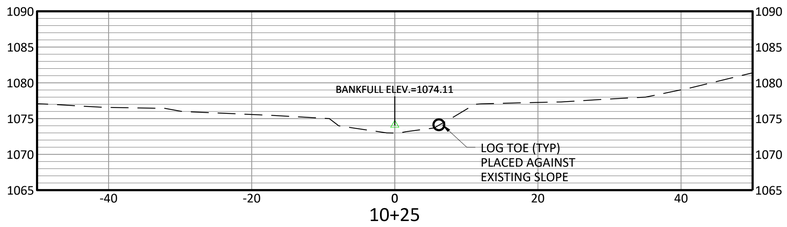

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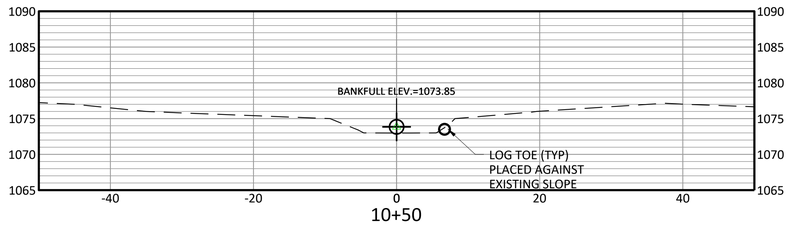

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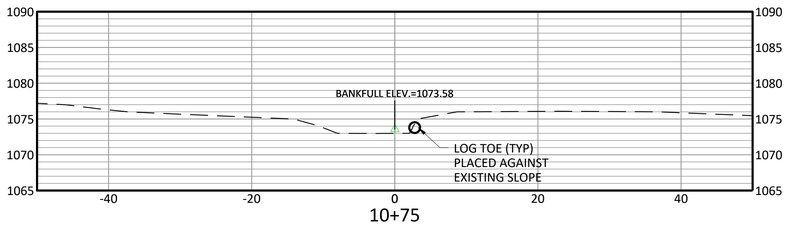

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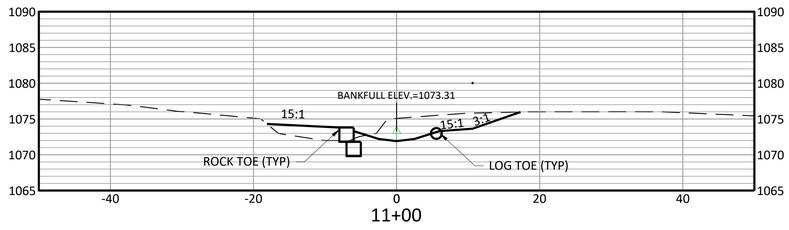

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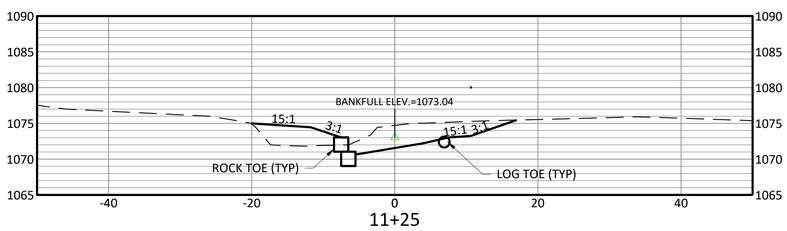

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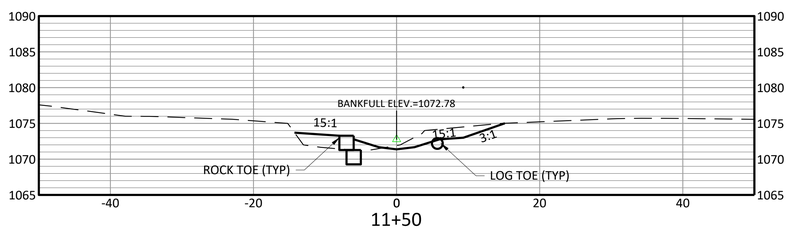

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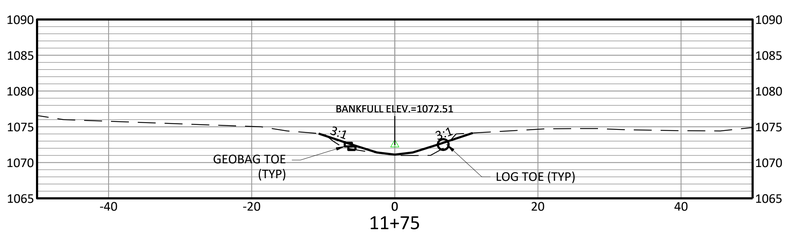

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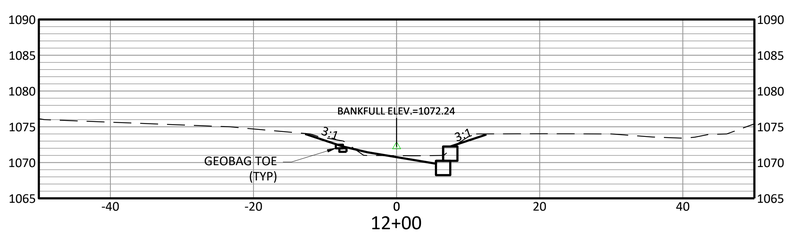

12+00

LEGEND

EXISTING GROUND PROFILE ALONG ALIGNMENT

PROPOSED GROUND

NOTE:

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2. ALL STACKED ROCK WALL AND ROCK TOE SHALL BE BLENDED TO EXISTING GROUND AT TOP OF ROCK TO LIMIT EROSION AT TOP OF WALL.
3. PLACE SINGLE COIR WRAPPED LIFT ABOVE STACKED ROCK WALL AS REQUIRED.
4. SEE PLAN VIEW SHEETS FOR PROPOSED BENCH WIDTHS AND BLENDING.

0 10' 20'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129

COMMONWEALTH OF VIRGINIA
Emily D. Brown
EMILY DARR BROWN
Lic. No. 0402065407
04.05.2023
PROFESSIONAL ENGINEER

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Winston-Salem, NC 27101
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILS

DETAILED CROSS SECTIONS STA 9+11 TO STA 12+00

NO.	ISSUE	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

FILE NAME: CROSS SECTIONS.dwg
DRAWN: LRW
DESIGNED: LRW
DATE: 2/8/2023
FAN JOB NO. RNC19591
CHECKED: BMD
REVISED:

SHEET CS-4
SEQ.

ACAD Rel: 24.2s (LMS Tech)
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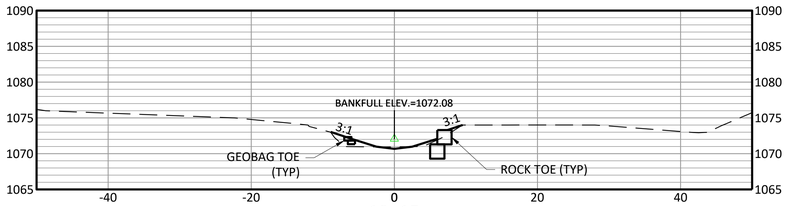
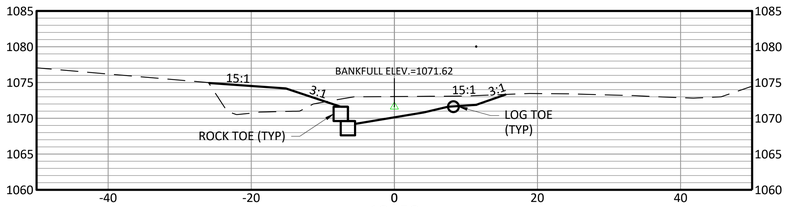
Last Saved: 3/10/2023 9:43 AM Saved By: 02298

Plot Date: 4/3/2023 1:56 PM Plot By: 02298 Filename: N:\SW\Drawings\CROSS SECTIONS.dwg



12+15



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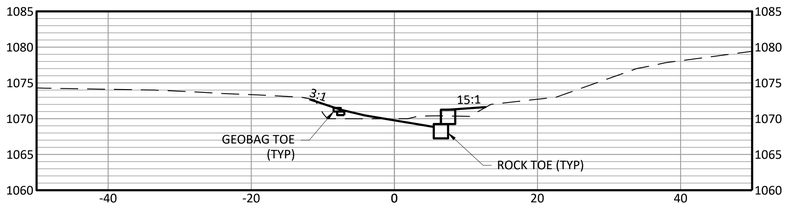

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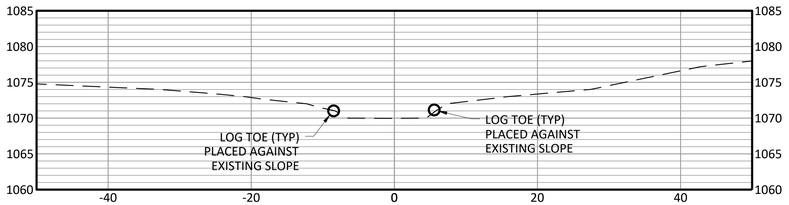

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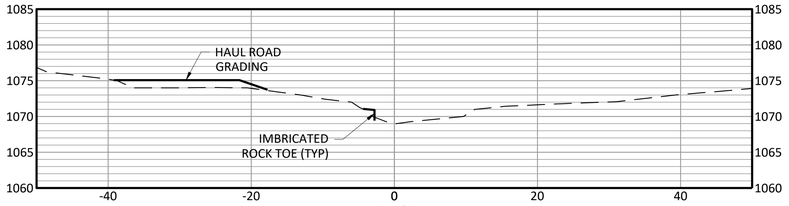

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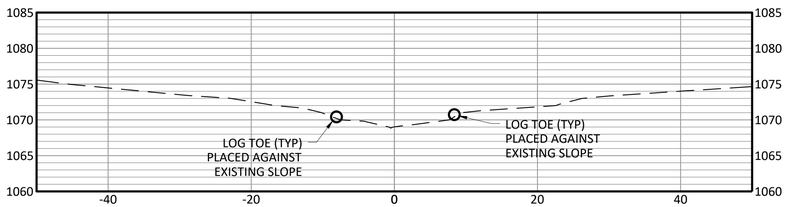

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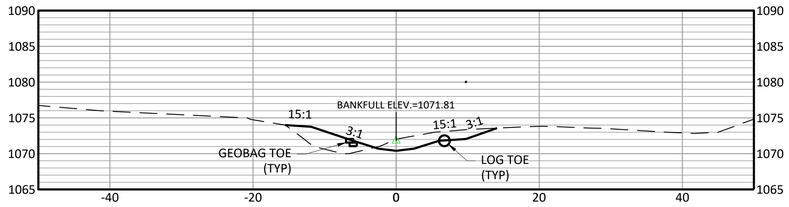

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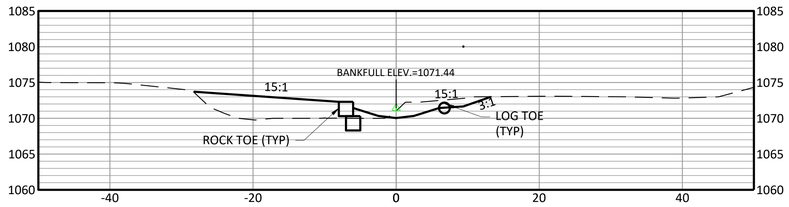

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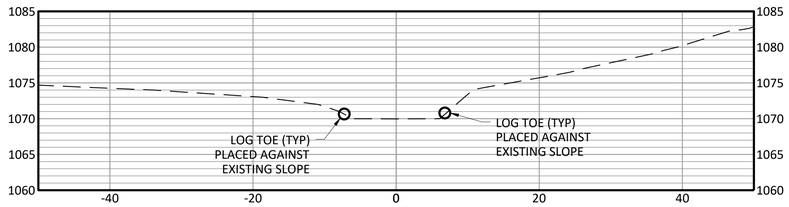

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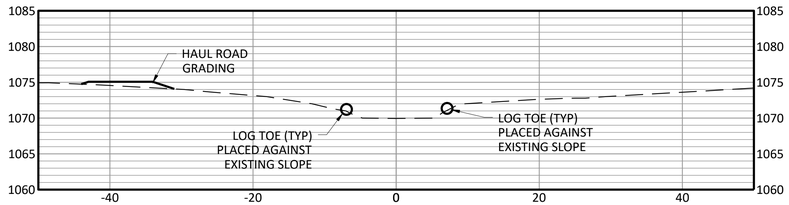

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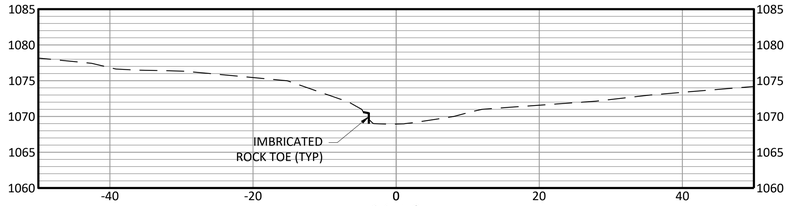

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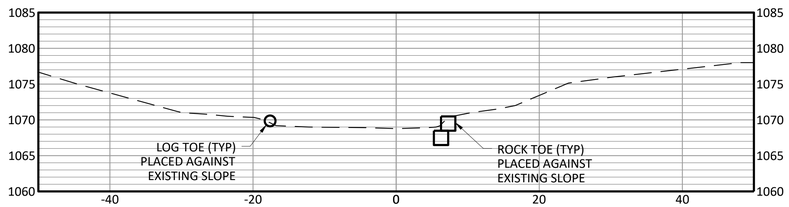

15+00

LEGEND

EXISTING GROUND PROFILE ALONG ALIGNMENT

PROPOSED GROUND

NOTE:

1. ALL GRADED SLOPES SHALL BE LINED WITH COIR MATTING PER THE DETAIL.
2. ALL STACKED ROCK WALL AND ROCK TOE SHALL BE BLENDED TO EXISTING GROUND AT TOP OF ROCK TO LIMIT EROSION AT TOP OF WALL.
3. PLACE SINGLE COIR WRAPPED LIFT ABOVE STACKED ROCK WALL AS REQUIRED.
4. SEE PLAN VIEW SHEETS FOR PROPOSED BENCH WIDTHS AND BLENDING.

0 10' 20'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129

COMMONWEALTH OF VIRGINIA
Emily D Brown
EMILY DARR BROWN
Lic. No. 0402065407
04.05.2023
PROFESSIONAL ENGINEER

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531 North Liberty Street
Winston-Salem, NC 27101
Phone - (336) 790-6744
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILED CROSS SECTIONS STA 12+15 TO STA 15+00

DETAILS

FAN JOB NO.	RNC19591
DATE	2/8/2023
DESIGNED	LRW
DRAWN	LRW
REVISED	
CHECKED	BMD
FILE NAME	CROSS SECTIONS.dwg

NO.	ISSUE	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET CS-5
SEQ.

ACAD Rel: 24.2s (LMS Tech)
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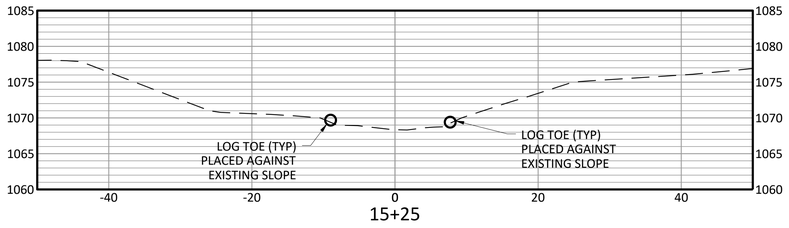
Last Saved: 3/10/2023 9:43 AM Saved By: 02298

Plot Date: 4/3/2023 1:56 PM Plot By: 02298 Filename: N:\SW\Drawings\CROSS SECTIONS.dwg



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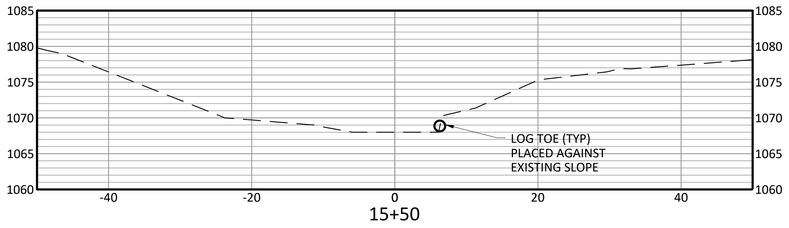

15+50

LEGEND

EXISTING GROUND PROFILE ALONG ALIGNMENT

PROPOSED GROUND

NOTE:

1. ALL GRADED SLOPES SHALL BE LINED WITH COIR MATTING PER THE DETAIL.
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4. SEE PLAN VIEW SHEETS FOR PROPOSED BENCH WIDTHS AND BLENDING.

0 10' 20'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129

COMMONWEALTH OF VIRGINIA
Emily D Brown
EMILY DARR BROWN
Lic. No. 0402065407
04.05.2023
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

DETAILS

DETAILED CROSS SECTIONS STA 15+25 TO STA 15+50

NO	ISSUE	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

FAN JOB NO. RNC19591
DATE 2/8/2023
DESIGNED LRW
DRAWN LRW
REVISED
CHECKED BMD
FILE NAME CROSS SECTIONS.dwg

SHEET CS-6
SEQ.

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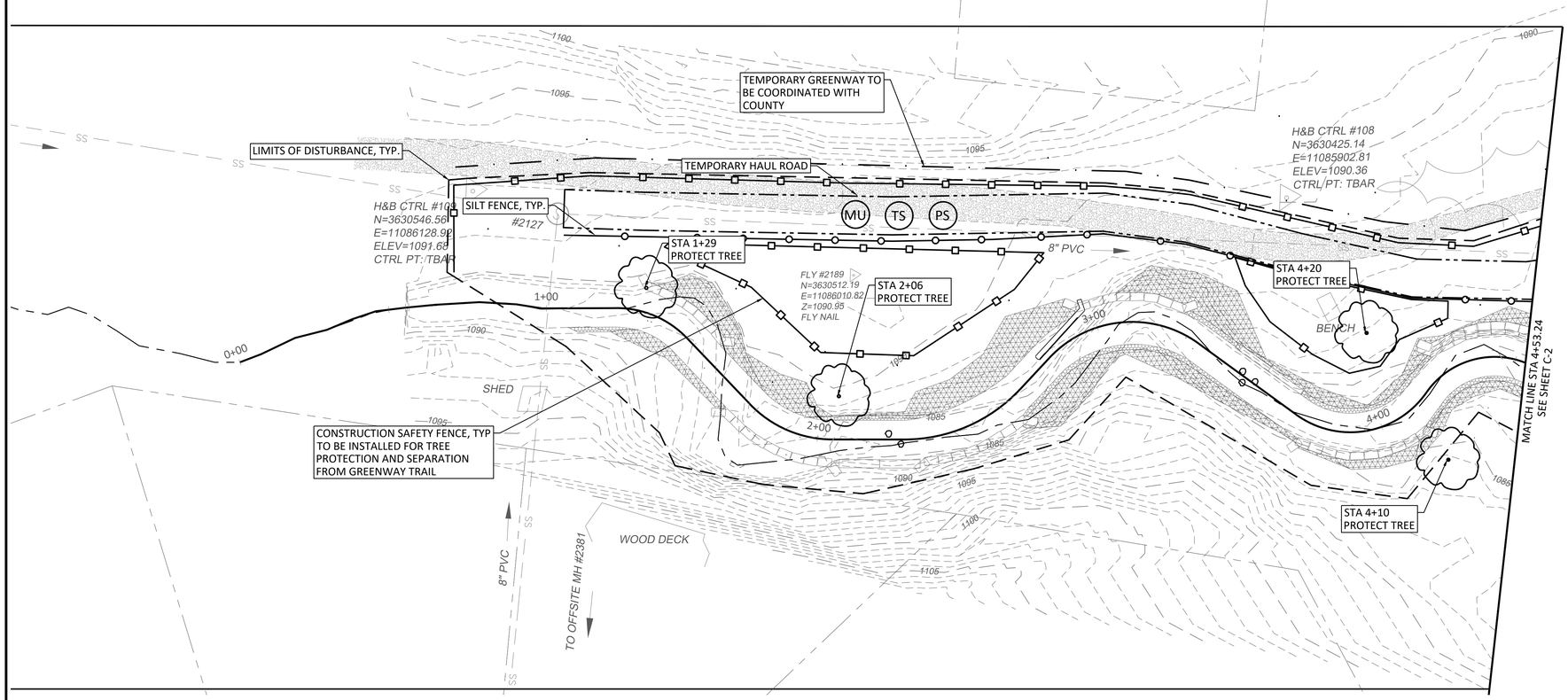

EROSION AND SEDIMENT CONTROL LEGEND

LINE	DESCRIPTION	SYMBOL
	LIMITS OF DISTURBANCE	
	SILT FENCE	SF
	CONSTRUCTION FENCE	
	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
TO	TOPSOILING	TO
TS	TEMPORARY SEEDING	TS
PS	PERMANENT SEEDING	PS
MU	MULCHING	MU
	CONSTRUCTION INLET PROTECTION	CIP
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	
	TEMPORARY HAUL ROAD FILL	
	TEMPORARY HAUL ROAD	
	TEMPORARY STREAM CONSTRUCTION CROSSING	SC
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	CC
	TEMPORARY CULVERT CROSSING	
	TREE PROTECTION AREA	
	TEMPORARY GRAVEL GREENWAY	

NOTES:

1. SEE SHEET EC-6 FOR EROSION AND SEDIMENT CONTROL NOTES AND LEGEND.
2. CONSTRUCTION FENCING SHALL BE PLACED AROUND ALL TREES TO BE PROTECTED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
3. DISTURB ONLY THE ACCESS AREAS NOTED ON THE PLANS TO ACCESS THE STREAM AND DO NOT REMOVE ANY TREES WITHIN THE TREE PROTECTION AREAS OR FLAGGED FOR PROTECTION UNLESS INSTRUCTED BY THE ENGINEER.
4. ALL CONSTRUCTION ACTIVITIES TO STAY WITHIN LIMITS OF DISTURBANCE AND COORDINATES.
5. C-700 OR EQUIVALENT COIR MATTING IS REQUIRED ON ALL EXPOSED STREAMBANK SURFACES NOT PROTECTED BY OTHER MEASURES.
6. WHERE GRADING IS REQUIRED, GRADE TO DRAIN AND TRANSITION TO EXISTING GRADE.

N

0 20' 40'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407001129

COMMONWEALTH OF VIRGINIA
Emily D. Brown
EMILY DARR BROWN
Lic. No. 0402065407
04.05.2023
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Web – www.freese.com

ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

EROSION CONTROL PLAN
BEGIN TO STA 4+50

NO.	ISSUE	BY	DATE

FILE NAME: ESC.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

FNN JOB NO.	RNC19591
DATE	2/8/2023
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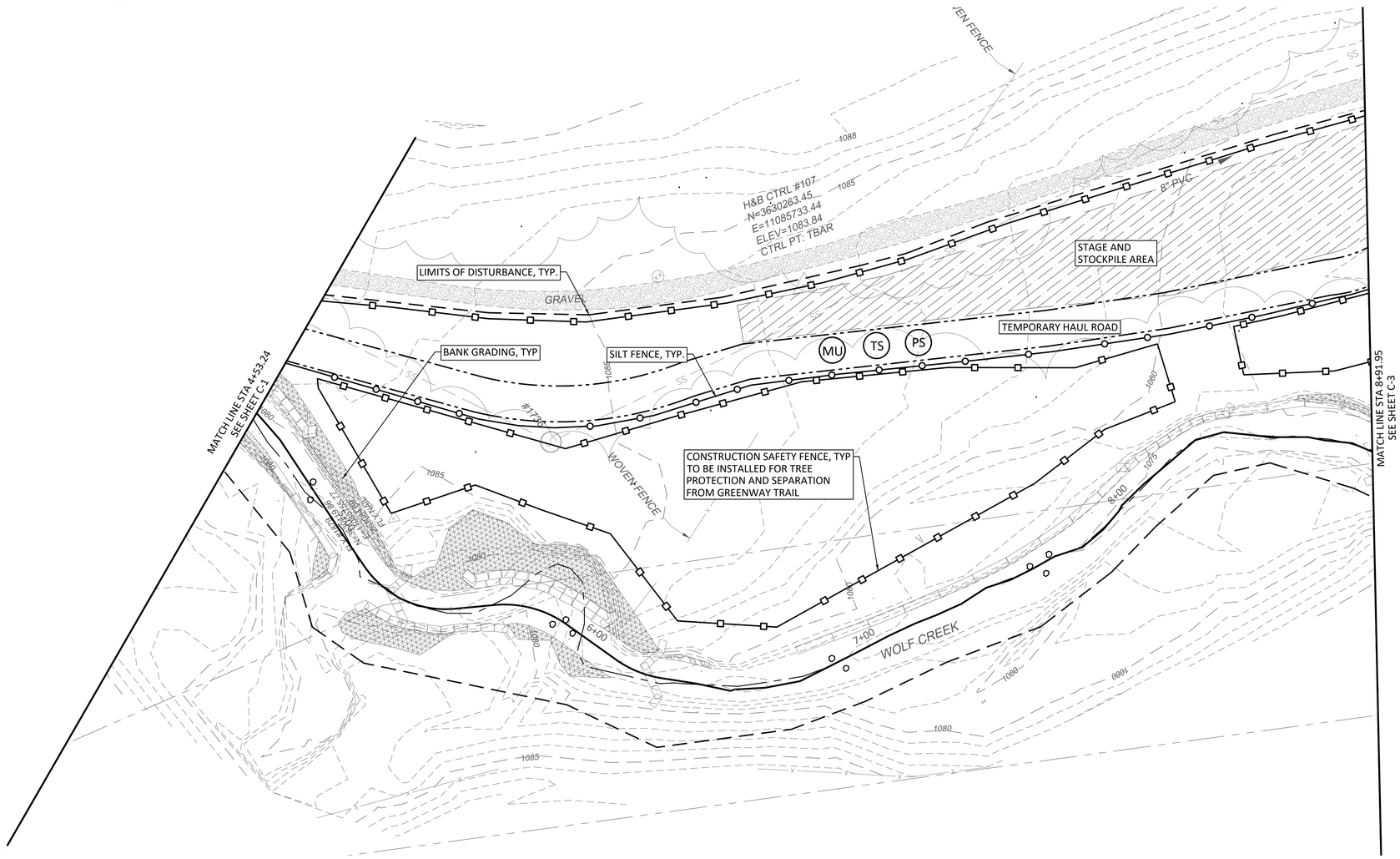

EROSION AND SEDIMENT CONTROL LEGEND

LINE	DESCRIPTION	SYMBOL
	LIMITS OF DISTURBANCE	
	SILT FENCE	SF
	CONSTRUCTION FENCE	
	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
TO	TOPSOILING	TO
TS	TEMPORARY SEEDING	TS
PS	PERMANENT SEEDING	PS
MU	MULCHING	MU
	CONSTRUCTION INLET PROTECTION	CIP
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	
	TEMPORARY HAUL ROAD FILL	
	TEMPORARY HAUL ROAD	
	TEMPORARY STREAM CONSTRUCTION CROSSING	SC
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	CC
	TEMPORARY CULVERT CROSSING	
	TREE PROTECTION AREA	
	TEMPORARY GRAVEL GREENWAY	

NOTES:

1. SEE SHEET EC-6 FOR EROSION AND SEDIMENT CONTROL NOTES AND LEGEND.
2. CONSTRUCTION FENCING SHALL BE PLACED AROUND ALL TREES TO BE PROTECTED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
3. DISTURB ONLY THE ACCESS AREAS NOTED ON THE PLANS TO ACCESS THE STREAM AND DO NOT REMOVE ANY TREES WITHIN THE TREE PROTECTION AREAS OR FLAGGED FOR PROTECTION UNLESS INSTRUCTED BY THE ENGINEER.
4. ALL CONSTRUCTION ACTIVITIES TO STAY WITHIN LIMITS OF DISTURBANCE AND COORDINATES.
5. C-700 OR EQUIVALENT COIR MATTING IS REQUIRED ON ALL EXPOSED STREAMBANK SURFACES NOT PROTECTED BY OTHER MEASURES.
6. WHERE GRADING IS REQUIRED, GRADE TO DRAIN AND TRANSITION TO EXISTING GRADE.

0 20' 40'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407001129

COMMONWEALTH OF VIRGINIA
Emily D Brown
EMILY DARR BROWN
Lic. No. 0402065407
PROFESSIONAL ENGINEER
04.05.2023

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

EROSION CONTROL PLAN STA 4+50 TO STA 9+00

FAN JOB NO. RNC19591
DATE 2/8/2023
DESIGNED LRW
DRAWN LRW
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CHECKED BMD

NO.	ISSUE	BY	DATE

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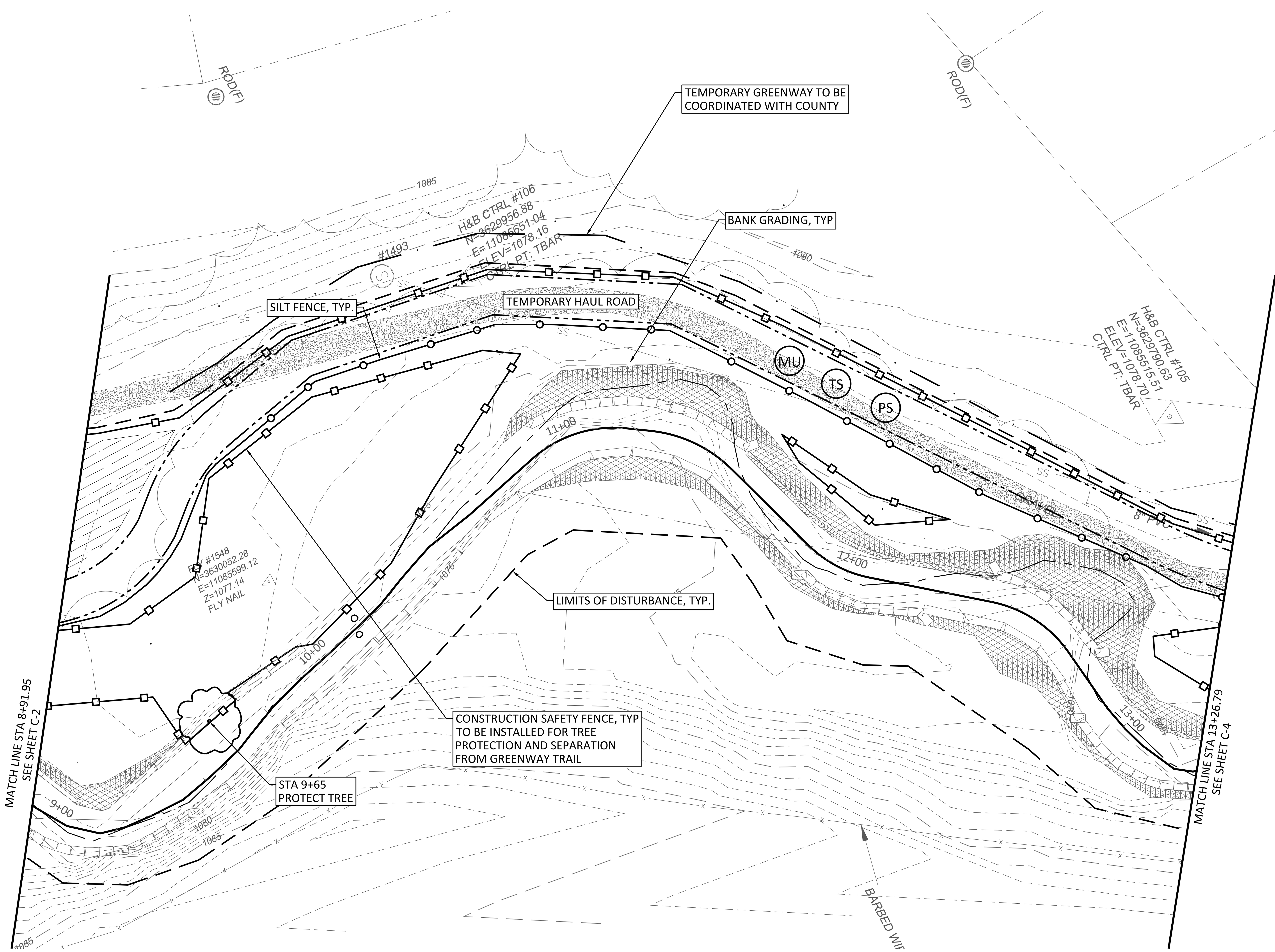

EROSION AND SEDIMENT CONTROL LEGEND

LINE	DESCRIPTION	SYMBOL
	LIMITS OF DISTURBANCE	
	SILT FENCE	SF
	CONSTRUCTION FENCE	
	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
TO	TOPSOILING	TO
TS	TEMPORARY SEEDING	TS
PS	PERMANENT SEEDING	PS
MU	MULCHING	MU
	CONSTRUCTION INLET PROTECTION	CIP
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	
	TEMPORARY HAUL ROAD FILL	
	TEMPORARY HAUL ROAD	
	TEMPORARY STREAM CONSTRUCTION CROSSING	SC
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	CC
	TEMPORARY CULVERT CROSSING	
	TREE PROTECTION AREA	
	TEMPORARY GRAVEL GREENWAY	

NOTES:

1. SEE SHEET EC-6 FOR EROSION AND SEDIMENT CONTROL NOTES AND LEGEND.
2. CONSTRUCTION FENCING SHALL BE PLACED AROUND ALL TREES TO BE PROTECTED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
3. DISTURB ONLY THE ACCESS AREAS NOTED ON THE PLANS TO ACCESS THE STREAM AND DO NOT REMOVE ANY TREES WITHIN THE TREE PROTECTION AREAS OR FLAGGED FOR PROTECTION UNLESS INSTRUCTED BY THE ENGINEER.
4. ALL CONSTRUCTION ACTIVITIES TO STAY WITHIN LIMITS OF DISTURBANCE AND COORDINATES.
5. C-700 OR EQUIVALENT COIR MATTING IS REQUIRED ON ALL EXPOSED STREAMBANK SURFACES NOT PROTECTED BY OTHER MEASURES.
6. WHERE GRADING IS REQUIRED, GRADE TO DRAIN AND TRANSITION TO EXISTING GRADE.

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0 20' 40'
SCALE IN FEET

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129

COMMONWEALTH OF VIRGINIA
Emily D. Brown
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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

EROSION CONTROL PLAN STA 9+00 TO STA 13+50

NO.	ISSUE	BY	DATE

F&N JOB NO. RNC19591
DATE 2/8/2023
DESIGNED LRW
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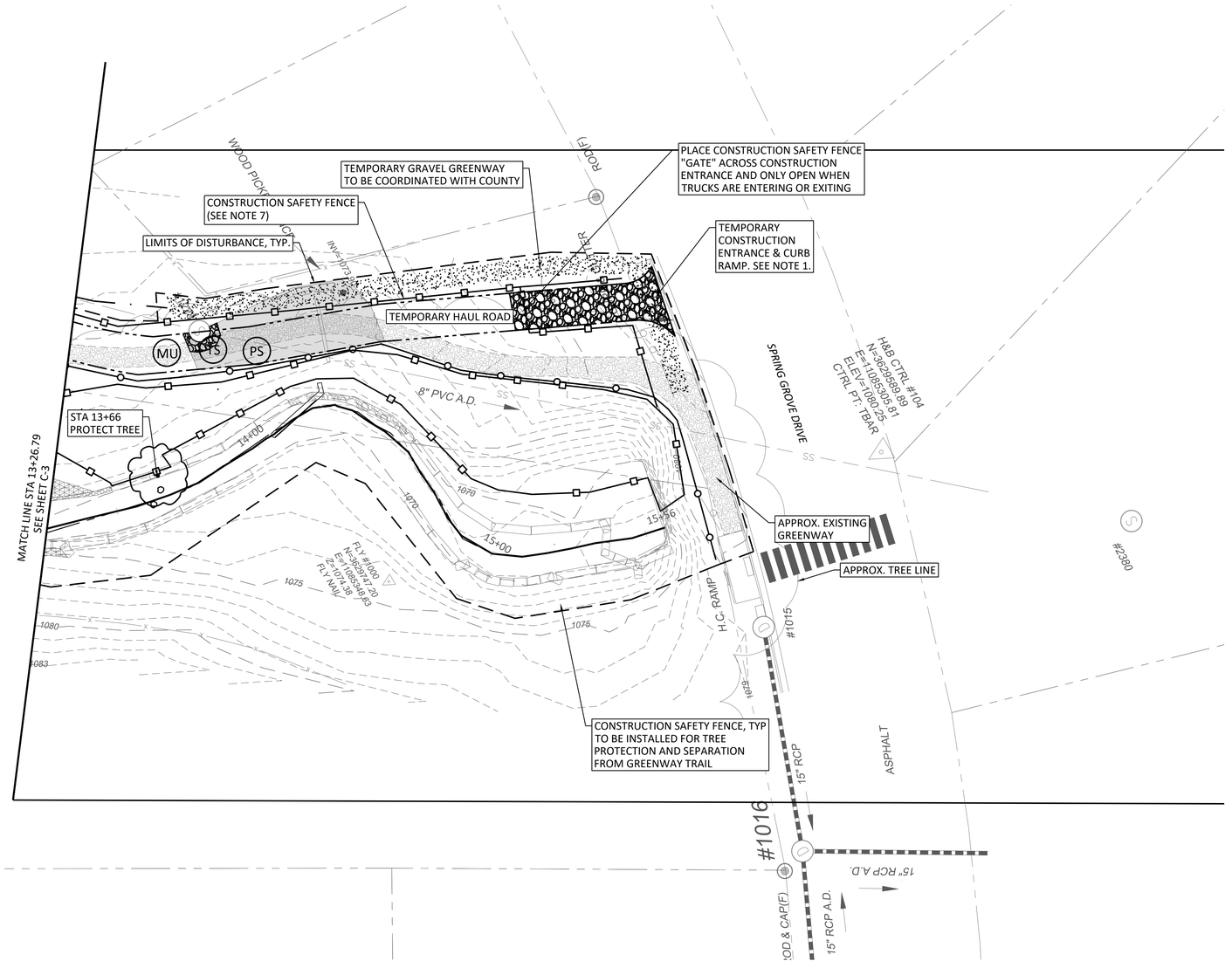

EROSION AND SEDIMENT CONTROL LEGEND

LINE	DESCRIPTION	SYMBOL
	LIMITS OF DISTURBANCE	
	SILT FENCE	SF
	CONSTRUCTION FENCE	
	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
TO	TOPSOILING	TO
TS	TEMPORARY SEEDING	TS
PS	PERMANENT SEEDING	PS
MU	MULCHING	MU
	CONSTRUCTION INLET PROTECTION	CIP
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	
	TEMPORARY HAUL ROAD FILL	
	TEMPORARY HAUL ROAD	
	TEMPORARY STREAM CONSTRUCTION CROSSING	SC
	TEMPORARY PEDESTRIAN CONSTRUCTION CROSSING	CC
	TEMPORARY CULVERT CROSSING	
	TREE PROTECTION AREA	
	TEMPORARY GRAVEL GREENWAY	

NOTES:

1. SEE SHEET EC-6 FOR EROSION AND SEDIMENT CONTROL NOTES AND LEGEND.
2. CONSTRUCTION FENCING SHALL BE PLACED AROUND ALL TREES TO BE PROTECTED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
3. DISTURB ONLY THE ACCESS AREAS NOTED ON THE PLANS TO ACCESS THE STREAM AND DO NOT REMOVE ANY TREES WITHIN THE TREE PROTECTION AREAS OR FLAGGED FOR PROTECTION UNLESS INSTRUCTED BY THE ENGINEER.
4. ALL CONSTRUCTION ACTIVITIES TO STAY WITHIN LIMITS OF DISTURBANCE AND COORDINATES.
5. C-700 OR EQUIVALENT COIR MATTING IS REQUIRED ON ALL EXPOSED STREAMBANK SURFACES NOT PROTECTED BY OTHER MEASURES.
6. WHERE GRADING IS REQUIRED, GRADE TO DRAIN AND TRANSITION TO EXISTING GRADE.
7. 6' CHAIN LINK FENCE SHALL BE CONSTRUCTED FROM SPRING GROVE DRIVE TO SANITARY SEWER MANHOLE (STA 13+94, LT 57.66) AS SHOWN ON THE PLANS. FROM STA 13+94, LT 57.66 TO STA 0+71 , CONSTRUCTION SAFETY FENCE SHALL BE CONSTRUCTED TO SEPARATE PEDESTRIAN AREA FROM CONSTRUCTION AREA.

N

0 20' 40'
SCALE IN FEET

ISSUED FOR BID

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Virginia Registered Corporation Firm #0407001129

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Emily D Brown
EMILY DARR BROWN
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04.05.2023

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

EROSION CONTROL PLAN STA 13+50 TO END

FAN JOB NO.	RNC19591
DATE	2/8/2023
DESIGNED	LRW
DRAWN	LRW
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CHECKED	BMD

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EROSION AND SEDIMENT CONTROL NOTES:

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES.

1. PLAN APPROVAL IN NO WAY RELIEVES THE CONTRACTOR OF THE RESPONSIBILITIES CONTAINED WITHIN THE EROSION AND SEDIMENT CONTROL POLICIES.
2. ALL SOIL EROSION & SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
3. FOR THE EROSION CONTROL KEY SYMBOLS SHOWN ON THE PLANS, REFER TO THE VIRGINIA UNIFORM CODING SYSTEM FOR EROSION AND SEDIMENT CONTROL PRACTICES CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.
4. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS.
5. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLAN, NOT LOCATED IN PROPOSED FILL OR EXCAVATION AREAS, SHALL BE CONSTRUCTED PRIOR TO ALL OTHER LAND DISTURBANCE. THE CONTRACTOR SHALL ARRANGE AN ONSITE PRECONSTRUCTION CONFERENCE WITH THE ROANOKE COUNTY DEVELOPMENT INSPECTOR.
6. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH PROCEDURES APPROVED BY THE STATE OF VIRGINIA. MAINTENANCE WILL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR, INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES. AT THE PRECONSTRUCTION MEETING, THE CONTRACTOR WILL SUPPLY THE COUNTY OF ROANOKE WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LEAVE THE SITE ADEQUATELY PROTECTED AGAINST EROSION, SEDIMENTATION, OR ANY DAMAGE TO ANY ADJACENT PROPERTY AT THE END OF EACH DAY'S WORK.
7. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. IN NO CASE DURING CONSTRUCTION SHALL WATER RUNOFF BE DIVERTED OR ALLOWED TO FLOW TO LOCATIONS WHERE ADEQUATE PROTECTION HAS NOT BEEN PROVIDED.
8. THE APPROVING AUTHORITY MAY ADD TO, DELETE, RELOCATE, CHANGE, OR OTHERWISE MODIFY CERTAIN EROSION AND SEDIMENT CONTROL MEASURES WHERE FIELD CONDITIONS ARE ENCOUNTERED THAT WARRANT SUCH MODIFICATIONS.
9. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT THE TIME OF CONSTRUCTION TO ENSURE THEIR INTENDED PURPOSE ARE ACCOMPLISHED. APPROVAL FROM CONSULTING ENGINEER AND ROANOKE COUNTY WILL BE REQUIRED FOR ALL DEVIATIONS FROM THE APPROVED PLANS.
10. ALL STOCKPILE AND BORROW AREAS SHALL BE STABILIZED USING TEMPORARY OR PERMANENT SEEDING. SILT FENCE SHALL BE INSTALLED ALONG DOWNHILL TOE OF SLOPE.
11. TEMPORARY VEGETATIVE COVER SHALL BE PROVIDED IN ALL AREAS WHICH ARE NOT DESIGNATED FOR PAVING, UNDERGROUND UTILITIES OR STRUCTURAL USES. SUCH AREAS SHALL NOT BE EXPOSED FOR PERIODS EXCEEDING 14 DAYS. TEMPORARY VEGETAL COVER MAY BE ELIMINATED IN FAVOR OF FINAL VEGETAL COVER IF CONSTRUCTION AND SEASONAL CONDITIONS PERMIT.
12. ALL AREAS DESIGNATED FOR PAVING SHALL BE STABILIZED WITH A 6-INCH COURSE OF VDOT #1 COARSE AGGREGATE IMMEDIATELY AFTER GRADING OR THE COMPLETION OF UTILITY INSTALLATION.
13. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO INSURE ESTABLISHMENT OF GRASS COVER.
14. ALL SLOPES 3:1 OR STEEPER THAN 3:1 SHALL REQUIRE MATTING TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH MULCHING AND MANUFACTURER'S INSTRUCTIONS AND THE VA E&S HANDBOOK.
15. OUTLET PROTECTION AND ANY TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED FOR PIPES AND CHANNELS BEFORE THEY ARE OPERATIONAL.
16. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.
17. THE LOCATION OF ALL OFF-SITE FILL OR BORROW AREAS ASSOCIATED WITH THE CONSTRUCTION PROJECT WILL BE PROVIDED TO THE ROANOKE COUNTY DEPARTMENT OF COMMUNITY DEVELOPMENT. AN EROSION CONTROL PLAN OR MEASURES MAY BE REQUIRED FOR THIS AREA.
18. ALL EARTHEN CONTROLS AND STRUCTURES SHALL BE STABILIZED IMMEDIATELY UPON INSTALLATION.

EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION - THE PURPOSE OF THIS PROJECT IS FOR THE CONSTRUCTION OF THE RESTORATION OF WOLF CREEK ALONG THE WOLF CREEK GREENWAY. WOLF CREEK WILL BE IMPROVED TO DECREASE THE AMOUNT OF STREAM BANK EROSION AND NUTRIENT LOADING OCCURRING IN THE CREEK AND PROTECT THE ADJACENT PARK. THE LIMIT OF DISTURBANCE IS 2.968 ACRES AND A VSMP PERMIT AND SWPP HAVE BEEN PREPARED FOR THE PROJECT.

EXISTING SITE CONDITIONS - THE EXISTING SITE IS A STREAM THAT RUNS ALONG WOLF CREEK GREENWAY. THE CREEK SHOWS SIGNS OF EXTREME EROSION ALONG THE BANKS BORDERING THE GREENWAY. THE CREEK FLOWS SOUTHWEST WHERE IT FLOWS INTO ROANOKE RIVER DOWNSTREAM. THE ADJACENT GREENWAY DRAINAGE FLOWS INTO THE CREEK BY SHEET FLOW ALONG THE PROJECT.

ADJACENT PROPERTY - THE CREEK FLOWS ALONG WOLF CREEK GREENWAY, AND IS BORDERED BY RESIDENTIAL PROPERTIES, TO THE NORTH AND SOUTH. THE CREEK FLOWS TO THE SOUTHWEST THROUGH THE END OF THE PROJECT.

OFF-SITE AREAS - THE G.C SHALL NOTIFY ROANOKE COUNTY OF ANY FILL OR BORROW AREAS ASSOCIATED WITH THE PROJECT PRIOR TO TRANSPORT OF ANY MATERIAL. AN ESC PLAN OR MEASURES MAY BE REQUIRED FOR THESE AREAS.

SOILS - THE "SOIL SURVEY OF ROANOKE COUNTY AND THE CITIES OF ROANOKE AND SALEM, VIRGINIA" AS PREPARED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE IDENTIFIES THE ON-SITE SOILS AS SINDION LOAM CLASS A, HAYESVILLE-URBAN LAND COMPLEX CLASS C, AND HAYESVILLE FINE SANDY LOAM CLASS D.

CRITICAL EROSION AREAS - THE ENTIRE SITE IS A CRITICAL EROSION AREA. THE G.C. SHALL ENSURE THAT SEDIMENT SHOULD BE HAULED OFF-SITE.

EROSION AND SEDIMENT CONTROL MEASURES - UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION" (VESCH). THE MINIMUM STANDARDS OF THE VESCH SHALL BE ADHERED TO UNLESS OTHERWISE DIRECTED BY THE LOCAL PROGRAM ADMINISTRATOR.

STRUCTURAL

CONSTRUCTION ENTRANCE-STD. 3.02.... A STONE PAD, LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS TO THE CONSTRUCTION SITE, TO REDUCE THE SOIL TRANSPORTED ONTO PUBLIC ROADS AND OTHER PAVED AREAS.

SILT FENCE-STD. 3.05.... A TEMPORARY BARRIER CONSTRUCTED ALONG THE PERIMETER OF THE DISTURBED AREA AS REQUIRED TO INTERCEPT AND DETAIN SEDIMENT.

CULVERT INLET PROTECTION-STD. 3.08.... A SEDIMENT FILTER LOCATED AT THE INLET TO STORM SEWER CULVERTS TO PREVENT SEDIMENT FROM ENTERING, ACCUMULATING IN AND BEING TRANSFERRED BY A CULVERT.

TEMPORARY CULVERT CROSSING STD. 3.24....A TEMPORARY STRUCTURAL SPAN INSTALLED ACROSS A FLOWING WATERCOURSE FOR USE BY CONSTRUCTION TRAFFIC. STRUCTURES MAY INCLUDE BRIDGES, ROUND PIPES, PIPE ARCHES, OR OVAL PIPES TO PREVENT SEDIMENT GENERATED BY CONSTRUCTION TRAFFIC FROM GETTING SEDIMENT IN RUNOFF.

SPECIAL SEDIMENT BAG.... A TEMPORARY SETTLING AND FILTERING DEVICE FOR WATER WHICH IS DISCHARGED FOR DEWATERING ACTIVITIES TO FILTER SEDIMENT-LADEN WATER PRIOR TO THE WATER BEING DISCHARGED OFF-SITE.

PUMP-AROUND/DIVERSION....A TEMPORARY PUMPING SETUP TO DIVERT WATER AROUND IN-CHANNEL WORK TO PREVENT WATER FROM BECOMING SEDIMENT-LADEN.

VEGETATIVE

TEMPORARY SEEDING-STD. 3.31.... ESTABLISHMENT OF A TEMPORARY VEGETATIVE COVER BY PLANTING SEED ON DISTURBED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR PERIODS OF 14 DAYS TO 1-YEAR BY SEEDING WITH AN APPROPRIATE RAPIDLY GROWING SEED MIXTURE.

PERMANENT SEEDING-STD. 3.32.... ESTABLISHMENT OF A VEGETATIVE COVER BY PLANTING A SEED ON ALL FINAL GRADED AREAS THAT WILL NOT RECEIVE AN IMPERVIOUS COVER OR RECEIVE TOPSOIL MATERIAL TO PROVIDE A STABILIZED SITE AFTER THE PROJECT IS COMPLETE.

MULCHING-STD. 3.35.... MULCH SHALL BE APPLIED TO ALL TEMPORARY AND PERMANENT SEEDING OPERATIONS TO PROMOTE THE GROWTH OF VEGETATION AND TO PROTECT THE SOIL SURFACE FROM RAINDROP IMPACTS.

SOIL STABILIZATION BLANKETS AND MATTING-STD. 3.36.... THE INSTALLATION OF A PROTECTIVE COVERING (BLANKET) OR A SOIL STABILIZATION MAT ON A PREPARED PLANTING AREA OF A STEEP SLOPE.

MANAGEMENT STRATEGIES:

A.) CONSTRUCTION WILL BE SEQUENCED SO THAT GRADING OPERATIONS CAN BEGIN AND END AS QUICKLY AS POSSIBLE.
B.) SEDIMENT TRAPPING MEASURES WILL BE INSTALLED AS A FIRST STEP IN GRADING.
C.) THE LOCAL PROGRAM ADMINISTRATOR RESERVES THE RIGHT TO ADD TO, DELETE OR OTHERWISE CHANGE THE EROSION CONTROL MEASURES AS DEEMED NECESSARY DUE TO ACTUAL FIELD CONDITIONS BY WRITTEN NOTIFICATION TO THE CONTRACTOR.
D.) ALL FILL AND CUT SLOPES SHALL BE SEEDED WITHIN SEVEN (7) DAYS OF ACHIEVING FINAL GRADE.
E.) ONLY AFTER INSPECTION AND APPROVAL FROM THE LOCAL PROGRAM ADMINISTRATOR MAY ITEMS BE REMOVED FOLLOWING THE STABILIZATION OF THE CONTRIBUTING AREAS.

INSPECTIONS:

THE GENERAL CONTRACTOR SHALL INSPECT DISTURBED AREAS OF THE SITE THAT HAVE NOT BE FINALLY STABILIZED, AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION, STRUCTURAL CONTROL MEASURES, AND THE AREA OF CONSTRUCTION VEHICLE ACCESS AT LEAST EVERY FOURTEEN (14) CALENDAR DAYS, AND WITHIN 48 HOURS OF THE END OF A STORM EVENT PRODUCING ½" OR GREATER OF PRECIPITATION. WHERE AREAS HAVE BEEN FINALLY OR TEMPORARILY STABILIZED OR RUNOFF IS UNLIKELY DUE TO WINTER CONDITIONS (SITE IS COVERED WITH SNOW, ICE, OR FROZEN GROUND EXISTS) SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY MONTH.

A.) INSPECT DISTURBED AREAS AND AREAS OF MATERIAL STORAGE THAT ARE EXPOSED TO PRECIPITATION FOR EVIDENCE OF, OR THE POTENTIAL FOR SEDIMENT ENTERING THE STORM DRAIN SYSTEM. INSPECT E&S CONTROLS IN ACCORDANCE WITH REQUIREMENTS STATED HEREIN, AND INSPECT POINTS OF STORM DRAIN DISCHARGE FOR EXCESSIVE SEDIMENTATION. CORRECT SITE CONTROLS AS REQUIRED TO REDUCE SEDIMENTATION OF STORM DRAINS, CULVERTS, AND RECEIVING CHANNELS.
B.) IF CONTROLS OR SEDIMENT PREVENTION AREAS ARE FOUND TO BE IN NEED OF REPAIR OR MODIFICATION, THE G.C. SHALL PROVIDE ADDITIONAL MEASURES OR MODIFICATIONS TO EXISTING MEASURES AS REQUIRED. ANY ADDITIONAL MEASURES OR MODIFICATIONS TO EXISTING MEASURES SHALL BE RECORDED AS FIELD REVISIONS TO THESE PLANS. IN THE EVENT THAT ADDITIONAL CONTROLS ARE FOUND TO BE REQUIRED, THE G.C. SHALL BE RESPONSIBLE FOR IMPLEMENTING THESE CONTROLS BEFORE THE NEXT ANTICIPATED STORM EVENT. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICAL, THEY SHALL BE IMPLEMENTED AS SOON AS PRACTICAL.
C.) A REPORT SUMMARIZING THE SCOPE OF INSPECTIONS, NAME OF INSPECTOR, INSPECTOR'S QUALIFICATIONS, DATES OF INSPECTIONS, MAJOR OBSERVATIONS PERTAINING TO THE IMPLEMENTATION OF THESE EROSION CONTROL PLANS, AND ACTIONS TAKEN SHALL BE MADE AND RETAINED AS PART OF THESE PLANS. MAJOR OBSERVATIONS OF THESE REPORTS SHALL INCLUDE: THE LOCATIONS OF EXCESSIVE SEDIMENTATION FROM THE SITE; LOCATIONS OF CONTROLS IN NEED OF REPAIR; LOCATIONS OF RAILED OR INADEQUATE CONTROLS; AND LOCATIONS WHERE ADDITIONAL CONTROLS ARE NEEDED.

EROSION AND SEDIMENT CONTROL MAINTENANCE SCHEDULE:

IN GENERAL, ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR:

1. THE CONSTRUCTION ENTRANCE WILL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAY. THIS WILL REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR THE WASHING AND REWORKING OF EXISTING STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY STRUCTURES USED TO TRAP SEDIMENT. ALL MATERIAL SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS WILL BE REMOVED IMMEDIATELY.
2. THE SILT FENCE BARRIER WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER.
3. GRATE AND CURB INLET PROTECTIONS SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED. SEDIMENT SHALL BE REMOVED AND THE INLET PROTECTIONS SHALL BE RESTORED TO ITS ORIGINAL DIMENSIONS. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT WILL NOT ERODE. INLET PROTECTION SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
4. OUTLET PROTECTION SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. ALL SOIL STABILIZATION BLANKETS AND MATTING SHALL BE INSPECTED PERIODICALLY FOLLOWING INSTALLATION, PARTICULARLY AFTER RAINSTORMS TO CHECK FOR EROSION AND UNDERMINING. ANY DISLOCATION OR FAILURE SHOULD BE REPAIRED IMMEDIATELY. IF WASHOUTS OR BREAKAGE OCCURS, REINSTALL THE MATERIAL AFTER REPAIRING DAMAGE TO THE SLOPE OR DITCH. CONTINUE TO MONITOR THESE AREAS UNTIL WHICH TIME THEY BECOME PERMANENTLY STABILIZED; AT THAT TIME AN ANNUAL INSPECTION SHALL BE ADEQUATE.
6. TEMPORARY AND PERMANENT SEEDING AREAS SHALL BE INSPECTED TO DETERMINE IF AREAS ARE PRESENT WHERE PLANTS HAVE NOT GERMINATED OR HAVE DIED. THESE AREAS MUST BE RESEEDED IMMEDIATELY TO PREVENT EROSION DAMAGE.
7. ALL MULCHES AND SOIL COVERINGS SHALL BE INSPECTED PERIODICALLY (PARTICULARLY AFTER RAINSTORMS) TO CHECK FOR EROSION. WHERE EROSION IS OBSERVED IN MULCHED AREAS, ADDITIONAL MULCH SHOULD BE APPLIED. INSPECTIONS SHALL TAKE PLACE UP UNTIL GRASSES ARE FIRMLY ESTABLISHED.

DISTURBED AREA TABULATION

AREA.	ACRES
1. LIMITS OF DISTURBANCE , AS DRAWN	2.967

EROSION AND SEDIMENT CONTROL LEGEND

SECT.	KEY	LINE	DESCRIPTION
3.24	SC		TEMPORARY CULVERT CROSSING OR TEMPORARY STREAM CONSTRUCTION CROSSING
3.08	CP		CULVERT INLET PROTECTION OR CONSTRUCTION INLET PROTECTION
3.30	TO	TO	TOPSOILING
3.31	TS	TS	TEMPORARY SEEDING
3.32	PS	PS	PERMANENT SEEDING
3.35	MU	MU	MULCHING

EROSION AND SEDIMENT CONTROL LEGEND

SECT.	KEY	LINE	DESCRIPTION
3.02	CE		TEMPORARY STONE CONSTRUCTION ENTRANCE
3.05	SF		SILT FENCE
			LIMITS OF DISTURBANCE
			CONSTRUCTION FENCE

Virginia Erosion and Sediment Control Plan Minimum Standards (MS) Checklist

Yes	N/A	4VAC50-30-40 Minimum Standards	Describe how MS is addressed on plan
X		**MS1:** Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.	**SHOWN ON SHEETS EC-1, EC-2, EC-3 AND EC-4**
X		**MS2:** During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.	**SHOWN ON SHEETS EC-1, EC-2, EC-3 AND EC-4**
X		**MS3:** A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.	**SHOWN ON SHEETS EC-1, EC-2, EC-3, EC-4 AND EC-6**
X		**MS4:** Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.	**SHOWN ON SHEETS EC-1, EC-2, EC-3 AND EC-4**
X		**MS5:** Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.	**N/A**
	X	**MS6:** Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin. a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres. b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.	**N/A**
X		**MS7:** Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.	**N/A**
	X	**MS8:** Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.	**N/A**
	X	**MS9:** Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.	**N/A**
	X	**MS10:** All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.	**N/A**
	X	**MS11:** Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.	**N/A**
X		**MS12:** When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.	**SHOWN ON SHEETS C-1 THRU C-9 AND EC-7**
X		**MS13:** When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.	**N/A**
X		**MS14:** All applicable federal, state and local chapters pertaining to working in or crossing live watercourses shall be met.	**SHOWN ON SHEETS C-1 THRU C-9**
X		**MS15:** The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.	**SHOWN ON SHEETS C-1 THRU C-9**

Virginia Erosion and Sediment Control Plan Minimum Standards (MS) Checklist

Yes	N/A	4VAC50-30-40 Minimum Standards	Describe how MS is addressed on plan
	X	**MS16:** Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria: a. No more than 500 linear feet of trench may be opened at one time. b. Excavated material shall be placed on the uphill side of trenches. c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property. d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization. e. Restabilization shall be accomplished in accordance with this chapter. f. Applicable safety chapters shall be complied with.	**N/A**
X		**MS17:** Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land- disturbing activities.	**SHOWN ON SHEETS EC-1, EC-3 AND EC-4**
X		**MS18:** All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.	**ADDRESSED IN THE EROSION AND SEDIMENT CONTROL NARRATIVE AND NOTES THIS SHEET**
	X	**MS19**: Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels: a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed. b. Adequacy of all channels and pipes shall be verified in the following manner: 1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or 2) (a) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks. (b) All previously constructed man-made channels shall be analyzed by the use of a ten-year storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and (c) Pipes and storm sewer systems shall be analyzed by the use of a ten-year storm to verify that stormwater will be contained within the pipe or system. c. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall: 1) Improve the channels to a condition where a ten-year storm will not overtop the banks and a two-year storm will not cause erosion to channel the bed or banks; or 2) Improve the pipe or pipe system to a condition where the ten-year storm is contained within the appurtenances; 3) Develop a site design that will not cause the pre-development peak runoff rate from a twoyear storm to increase when runoff outfalls into a natural channel or will not cause the predevelopment peak runoff rate from a ten-year storm to increase when runoff outfalls into a manmade channel; or 4) Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion. d. The applicant shall provide evidence of permission to make the improvements. e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project. f. If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the VESCP of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance. g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel. h. All on-site channels must be verified to be adequate. i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility. j. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations. k. All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state. l. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made channels shall satisfy the flow rate capacity and velocity requirements for natural or man-made channels if the practices are designed to i. detain the water quality volume and to release it over 48 hours; ii. detain and release over a 24-hour period the expected rainfall resulting from the one year, 24- hour storm; and iii. reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to § 10.1-562 or 10.1-570 of the Act. m. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 10.1-561 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 10.1-603.2 et seq. of the Code of Virginia) and attendant regulations, unless such land- disturbing activities are in accordance with 4VAC50-60-48 of the Virginia Stormwater Management Program (VSMP) Permit Regulations. n. Compliance with the water quantity minimum standards set out in 4VAC50-60-66 of the Virginia Stormwater Management Program (VSMP) Permit Regulations shall be deemed to satisfy the requirements of Minimum Standard 19.	**N/A**

ISSUED FOR BID

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ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

EROSION CONTROL NOTES AND LEGEND

NO.	ISSUE	BY	DATE

FAN JOB NO. RNC19591
DATE 2/8/2023
DESIGNED BMD
DRAWN EMD
REVISED
CHECKED BMD
FILE NAME EC NOTES_LEGEND.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET EC-5
SEQ.

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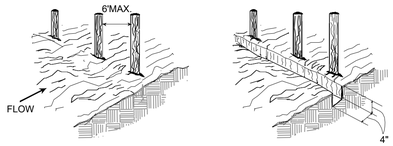
Last Saved: 1/16/2023 3:20 PM Saved By: 02298

Plot Date: 4/3/2023 1:58 PM Plot By: 02298 Filename: N:\SW\Drawings\EC NOTES_LEGEND.dwg

(SF) CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

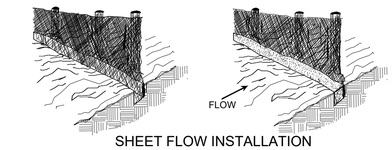
1. SET THE STAKES.

2. EXCAVATE A 4"X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.

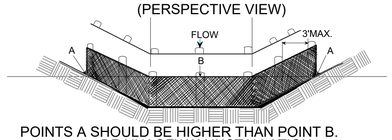


3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.

4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)



POINTS A SHOULD BE HIGHER THAN POINT B.
DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

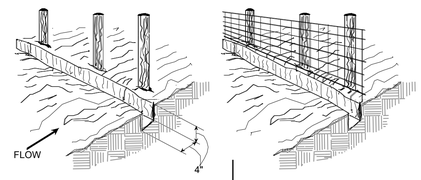
SOURCE: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, VA. DSWC Sherwood and Wyant

PLATE. 3.05-2

(SF) CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)

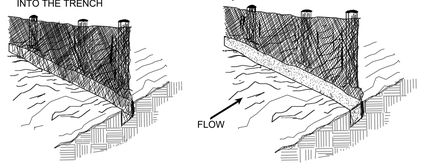
1. SET POSTS AND EXCAVATE A 4"X4" TRENCH UPSLOPE ALONG THE LINE OF POSTS.

2. STAPLE WIRE FENCING TO THE POSTS.

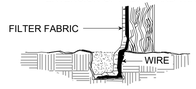


3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND IT INTO THE TRENCH

4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



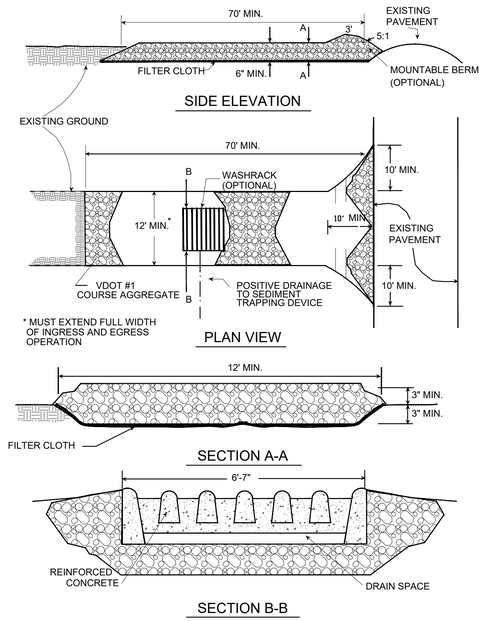
EXTENSION OF FABRIC AND WIRE INTO THE TRENCH.



SOURCE: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood & Wyant

PLATE. 3.05-1

STONE CONSTRUCTION ENTRANCE (CE)



SOURCE: ADAPTED from 1983 Maryland Standards for Soil erosion and Sediment Control, and Va. DSWC

Plate 3.02-1

GENERAL EROSION AND SEDIMENT CONTROL NOTES

1. ALL SOIL EROSION & SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

2. THE APPROVING AUTHORITY MAY ADD TO, DELETE, RELOCATE, CHANGE, OR OTHERWISE MODIFY CERTAIN EROSION AND SEDIMENT CONTROL MEASURES WHERE FIELD CONDITIONS ARE ENCOUNTERED THAT WARRANT SUCH MODIFICATIONS.

3. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLAN SHALL BE PLACED IN ADVANCE OF THE WORK BEING PERFORMED, AS FAR AS PRACTICAL.

4. IN NO CASE DURING CONSTRUCTION SHALL WATER RUNOFF BE DIVERTED OR ALLOWED TO FLOW TO LOCATIONS WHERE ADEQUATE PROTECTION HAS NOT BEEN PROVIDED.

5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LEAVE THE SITE ADEQUATELY PROTECTED AGAINST EROSION, SEDIMENTATION, OR ANY DAMAGE TO ANY ADJACENT PROPERTY AT THE END OF EACH DAY'S WORK.

6. FOR THE EROSION CONTROL KEY SYMBOLS SHOWN ON THE PLANS, REFER TO THE VIRGINIA UNIFORM CODING SYSTEM FOR EROSION AND SEDIMENT CONTROL PRACTICES CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. THESE SYMBOLS AND KEYS ARE TO BE UTILIZED ON ALL EROSION CONTROL PLANS SUBMITTED TO ROANOKE COUNTY.

(PS) PERMANENT SEEDING MIXTURE

REFER TO THE HERBACEOUS PLANTING TABLE ON DT-8

LIME: 140 LB / 1000 SF PULVERIZED AGRICULTURAL LIMESTONE

FERTILIZER: 5-20-10 @ 25 LB / 1000 SF
38-0-0 @ 7 LB / 1000 SF

MULCH: IF REQUIRED, SHALL BE USED OVER ALL SEEDED AREAS AND SHALL BE APPLIED IN ACCORDANCE WITH SECTION 1.75 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

SOIL CONDITIONING:
INCORPORATION OF LIME AND FERTILIZER, SELECTION OF CERTIFIED SEED, MULCHING, MAINTENANCE OF NEW SEEDLINGS, AND RESEEDING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS CONTAINED WITHIN THE VIRGINIA SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. ADDITIONAL SEEDING TO BE PERFORMED AS REQUIRED BY THE INSPECTOR.

SEED APPLICATION: APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER ON A FIRM, FRIABLE, SEEDBED. MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.

DISTURBED AREA TO BE PLANTED = 2.968 AC. = 129,286 SQ. FT.

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CIVIL

EROSION CONTROL
EROSION CONTROL DETAILS

NO	ISSUE	BY	DATE

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0 1"

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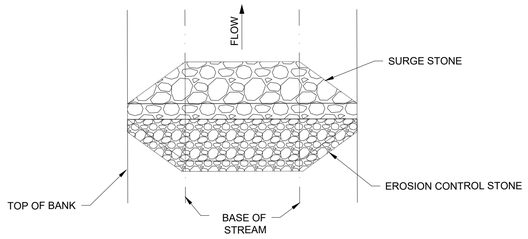
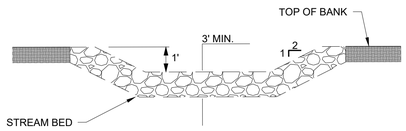
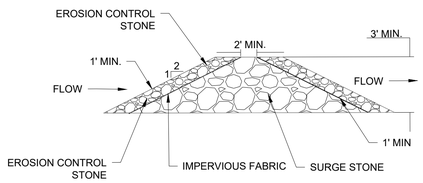


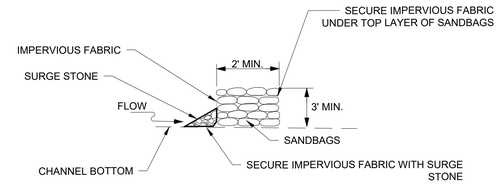
STONE IMPERVIOUS DIKE
PLAN VIEW



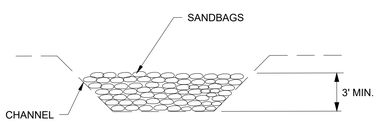
STONE IMPERVIOUS DIKE
CROSS SECTION



STONE IMPERVIOUS DIKE
PROFILE



SANDBAG IMPERVIOUS
DIKE PROFILE

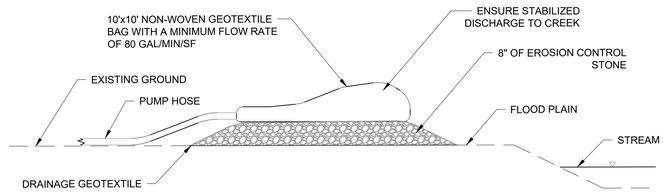


SANDBAG IMPERVIOUS DIKE
CROSS SECTION

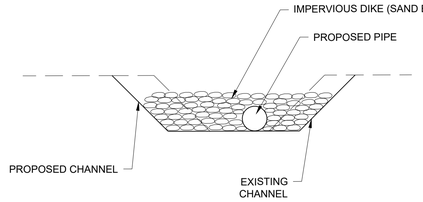
NOTE:

1. THE STRUCTURE SHALL BE USED FOR DIVERTING AND PUMPING ONLY. THE STRUCTURE SHALL BE RELOCATED OR REMOVED ONCE PUMPING/DIVERTING IS COMPLETE.
2. EITHER TYPE OF IMPERVIOUS DIKE (SANDBAG OR STONE) MAY BE USED.
3. PUMPS SHALL BE TURNED OFF DURING NON-WORKING HOURS OR AT DUSK, WHICHEVER OCCURS FIRST.

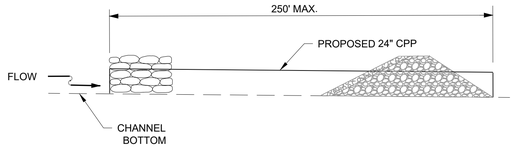
IMPERVIOUS DIKE
SCALE: NTS



SPECIAL STILLING BASIN
SCALE: NTS



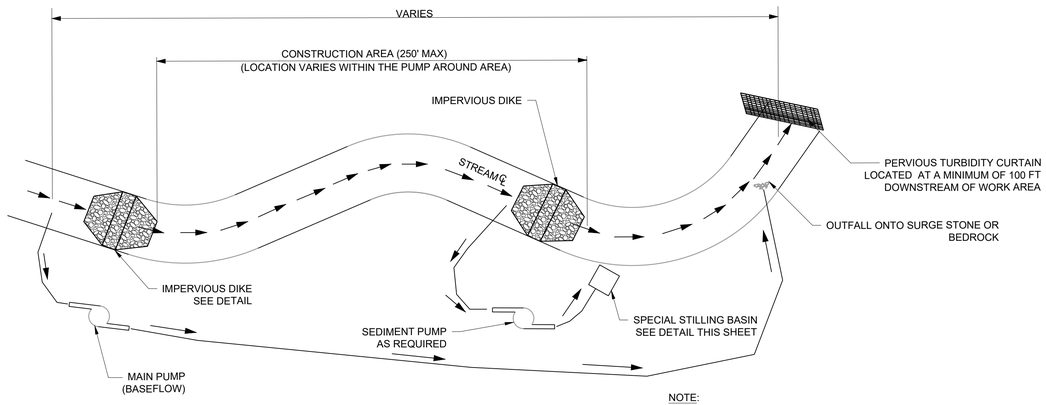
PIPE DIVERSION CROSS SECTION



PIPE DIVERSION PROFILE

NOTE:

1. PIPE MUST HAVE POSITIVE DRAINAGE WHEN USING DIVERSION (0.3% TO 2.0% PIPE SLOPE IS RECOMMENDED)



PUMP-AROUND DIVERSION PLANVIEW

NOTE:

1. CHANNEL SHALL BE MATTED WITH COIR FIBER MATTING PRIOR TO THE CLOSE OF EACH WORK DAY.
2. IF FINAL CHANNEL GRADING HAS NOT BEEN PERFORMED, TEMPORARILY SECURE COIR MATTING WITH STAKES OR ROCK
3. THE MAIN PUMP SHALL BE ADEQUATE TO REDIRECT STREAM BASE FLOW AROUND CONSTRUCTION ACTIVITIES.
4. SEDIMENT PUMPS SHALL BE ADEQUATE TO PUMP WATER THAT HAS INFILTRATED INTO THE CONSTRUCTION AREA WHILE CONSTRUCTION ACTIVITIES ARE ON GOING.
5. DURING ANTICIPATED LARGER STORM EVENTS, CHANNEL CONSTRUCTION SHALL BE STABILIZED TO REDUCE EROSION.
6. BANKFULL FLOW = APPROXIMATELY 35 CFS.

PUMP-AROUND/PIPE DIVERSION
SCALE: NTS

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VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET EC-7
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TABLE 3.35-A

ORGANIC MULCH MATERIALS AND APPLICATION RATES

MULCHES:	RATES: Per Acre	RATES: Per 1000 sq. ft.	NOTES:
Straw or Hay	1½ - 2 tons (Minimum 2 tons for winter cover)	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	Minimum 1500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods.* Apply as slurry.
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 - 275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 - 70 cu. yds.	1-2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. or 45 lbs./1000 sq. ft.

Source: Va. DSWC

1 MULCHING MIX TABLE
FROM VEQ STD AND SPEC 3.35
NOT TO SCALE

Fencing and Armoring (Plate 3.38-2): Any device may be used which will effectively protect the roots, trunk and tops of trees retained on the site. However, trees to be retained within 40 feet of a proposed building or excavation shall be protected by fencing. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained.

a. Snow Fence - Standard 40-inch high snow fence shall be placed at the limits of clearing on standard steel posts set 6 feet apart.

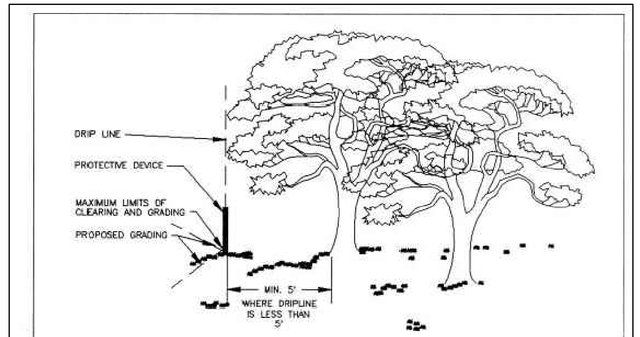
b. Board Fence - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards between posts. If it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.

c. Cord Fence - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.

d. Plastic Fencing - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:

Tensile yield:	Average 2,000 lbs. per 4-foot width (ASTM D638)
Ultimate tensile yield:	Average 2,900 lbs. per 4-foot width (ASTM D638)
Elongation at break (%):	Greater than 1000% (ASTM D638)
Chemical resistance:	Inert to most chemicals and acids

e. Earth Berms - Temporary earth berms shall be constructed according to specifications for a TEMPORARY DIVERSION DIKE (Std. & Spec. 3.9) with the base of the berm on the tree side located along the limits of clearing. Earth berms may not be used for this purpose if their presence will conflict with drainage patterns.



CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES

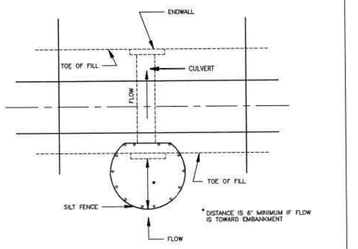
f. Additional Trees - Additional trees may be left standing as protection between the trunks of the trees to be retained and the limits of clearing. However, in order for this alternative to be used, the trunks of the trees in the buffer must be no more than 6 feet apart to prevent passage of equipment and material through the buffer. These additional trees shall be reexamined prior to the completion of construction and either be given sufficient treatment to ensure survival or be removed.

g. Trunk Armoring - As a last resort, a tree trunk can be armored with burlap wrapping and 2-inch studs wired vertically no more than 2 inches apart to a height of 5 feet encircling the trunk. If this alternative is used, the root zone within the drip line will still require protection. Nothing should ever be nailed to a tree.

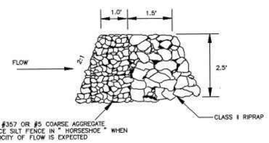
1 TREE PROTECTION
FROM VEQ STD AND SPEC 3.38
NOT TO SCALE

1992 3.08

SILT FENCE CULVERT INLET PROTECTION



OPTIONAL STONE COMBINATION **



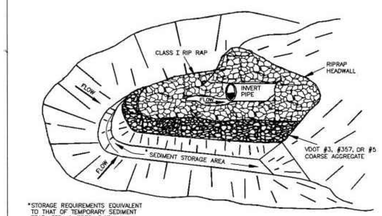
** VDOT #3, #357, OR #5 COARSE AGGREGATE, TO REPLACE SILT FENCE IN " HORSESHOE " WHEN HIGH VELOCITY OF FLOW IS EXPECTED

Source: Adapted from VDOT Standard Sheets and Va. DSWC

Plate 3.08-1

1992 3.08

CULVERT INLET SEDIMENT TRAP

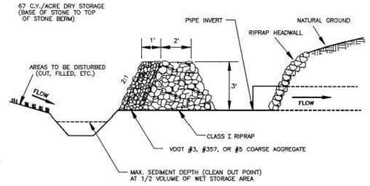


*STORAGE REQUIREMENTS EQUIVALENT TO THAT OF TEMPORARY SEDIMENT TRAP, STD. & SPEC. 3.13

67 C.Y./ACRE WET STORAGE (BELOW BASE OF STONE)

67 C.Y./ACRE DRY STORAGE (BASE OF STONE TO TOP OF STONE BERM)

PERSPECTIVE VIEW



ELEVATION

Source: North Carolina Sediment Control Commission

Plate 3.08-2

3 CULVERT INLET PROTECTION
FROM VEQ STD AND SPEC 3.08
NOT TO SCALE

TABLE 3.31-C

TEMPORARY SEEDING PLANT MATERIALS, SEEDING RATES, AND DATES

1992

SPECIES	SEEDING RATE: Acre	SEEDING RATE: 1000 ft²	NORTH[a]: 3/1 to 4/30	NORTH[a]: 5/1 to 8/15	NORTH[a]: 8/15 to 11/1	SOUTH[b]: 2/15 to 4/30	SOUTH[b]: 5/1 to 9/1	SOUTH[b]: 9/1 to 11/15	PLANT CHARACTERISTICS
OATS (Avena sativa)	3 bu. (up to 100 lbs., not less than 50 lbs.)	2 lbs.	X	-	-	X	-	-	Use spring varieties (e.g., Noble).
RYE[d] (Secale cereale)	2 bu. (up to 110 lbs., not less than 50 lbs.)	2.5 lbs.	X	-	X	X	-	X	Use for late fall seedings, winter cover. Tolerates cold and low moisture.
GERMAN MILLET (Setaria italica)	50 lbs.	approx. 1 lb.	-	X	-	-	X	-	Warm-season annual. Dies at first frost. May be added to summer mixes.
ANNUAL RYEGRASS[c] (Lolium multi-florum)	60 lbs.	1½ lbs.	X	-	X	X	-	X	May be added in mixes. Will mow out of most stands.
WEEPING LOVEGRASS (Eragrostis curvula)	15 lbs.	5½ ozs.	-	X	-	-	X	-	Warm-season perennial. May bunch. Tolerates hot, dry slopes and acid, infertile soils. May be added to mixes.
KOREAN LESPEDEZA[c] (Lespedeza stipulacea)	25 lbs.	approx. 1½ lbs.	X	X	-	X	X	-	Warm season annual legume. Tolerates acid soils. May be added to mixes.

[a] Northern Piedmont and Mountain region. See Plates 3.22-1 and 3.22-2.
[b] Southern Piedmont and Coastal Plain.
[c] May be used as a cover crop with spring seeding.
[d] May be used as a cover crop with fall seeding.
X May be planted between these dates.
- May not be planted between these dates.

3.31

NOTES:
1. THE PROJECT AREA IS LOCATED IN THE MOUNTAIN REGION OF VIRGINIA.

1 TEMPORARY SEEDING TABLE
FROM VEQ STD AND SPEC 3.35
NOT TO SCALE

ISSUED FOR BID

Freese and Nichols, Inc.
Virginia Registered Engineering Firm #0407007129
COMMONWEALTH OF VIRGINIA
Emily D. Brown
EMILY DARR BROWN
Lic. No. 0402065407
PROFESSIONAL ENGINEER
04.05.2023
FREESE AND NICHOLS
531 North Liberty Street
Winston-Salem, NC 27101
Phone - (336) 790-6744
Web - www.freese.com

ROANOKE COUNTY, VIRGINIA

RESTORATION OF WOLF CREEK PHASE II

CIVIL

EROSION CONTROL
EROSION CONTROL DETAILS

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				EC NOTES_LEGEND.dwg

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DATE 2/8/2023
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DRAWN AMB
REVISED
CHECKED BMD

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
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