

Erosion Control Narrative

PROJECT DESCRIPTION
The purpose of the project is the construction of a new subdivision and small business area. The project will be undertaken in multiple phases with Phase 1 being dedicated solely to the construction of single family and multi-family dwellings. The total disturbed area for Phase 1 is approximately 9.74 acres. All areas not covered by asphalt or concrete pavement will be permanently seeded with grass or mulch & other vegetation until the houses are constructed on the individual lots. A portion of the property will remain dedicated for use as open green space in accordance with the original rezoning application.

EXISTING CONDITIONS

The existing site consists of 15+ acres of land situated along SR Route 654 in Botetourt County. The land generally slopes downward towards a small stream towards the north (towards Rte 654). The lots along the eastern property boundary drain towards the northeast. The stream that bisects the property will be conveyed below the future state maintained main road that connects Rte 654 with Teresa Lane. An existing sediment pond is located near the northeast corner of the property. The primary flow control structure is an open ended 48" diameter culvert that passes through the earthen embankment. The secondary control structure is an emergency spillway at the eastern corner of the embankment.

The existing ground cover on the property ranges from weeds and shrubs to tree covered area. The slopes range from 5% near the northern boundary to almost 30% at a majority of the proposed developed area.

ADJACENT PROPERTY

Various subdivisions bound the parcel on the south and western boundaries. Refer to the dimensional layout plan for listings. The northeast corner of the property is bounded by Schueler Wellness Center, LLC and INUA of Polans LLC. The Read Mountain Swim Club pool and parking bounds the proposed subdivision on the western boundary along with Mini-World Child Care center owned by Keith Bradshaw. SR Route 654 bounds the property on the north side.

OFFSITE AREAS

No offsite areas are required by the grading on this project. In the event that fill material is necessary from offsite sources, a borrow source erosion control plan shall be submitted for those areas under separate cover.

SOILS

The soils that will be disturbed by development construction primarily consist of sandy to cobbly loams. A majority of the onsite soils belong to hydrologic soil group B or C. The majority of the soils possess moderate to high erosion potential and are compatible with the anticipated vegetative cover to be established.

STRUCTURAL PRACTICES

- TEMPORARY CONSTRUCTION ENTRANCE- 3.02**
Temporary construction entrances shall be installed where the proposed entrances intersect with the existing paved area along Rte 654. Once the Phase 1 road grading is complete and the house construction begins, an additional construction entrance will be installed along the edge of Teresa Lane. During wet and muddy conditions, drivers of construction vehicles may be required to wash their wheels before entering State maintained roads.
- SILT FENCE BARRIER- 3.05**
Silt fence barriers will be installed downslope of disturbed areas to filter sediment laden runoff from sheet flow.
- STORM DRAIN INLET PROTECTION- 3.07**
Inlet protection is to be installed at all storm drain inlets.
- CULVERT INLET PROTECTION - 3.08**
Culvert inlet protection is to be installed at the inlet side of culvert pipe.
- DIVERSION - 3.12**
A diversion shall be installed along the eastern boundary adjacent to the Mountain Crest Subdivision as shown plans.
- TEMPORARY SEDIMENT BASIN- 3.14**
Sediment Basin shall be install as shown plans.
- OUTLET PROTECTION - 3.18**
Riprap outlet protection is to be placed at the discharge end of culvert pipes.

VEGETATIVE PRACTICES

- TEMPORARY SEEDING - 3.31**
All denuded areas, which are not to be fine graded within 30 days, shall be seeded with fast germinating temporary vegetation immediately following grading.
- PERMANENT SEEDING - 3.32**
All final-graded areas where permanent cover is desired or rough-graded areas that will not be brought to final grade for a year or more shall be seeded with perennial vegetation within seven days. High maintenance areas (low level grassed areas) will be limed and fertilized regularly and mowed frequently similar to home lawns. Low maintenance areas will be mowed infrequently or not at all, and lime and fertilized only periodically. These areas will not be subjected to intense use, nor required to have a uniform appearance.
- MULCHING - 3.35**
Mulch (straw or fiber) will be used on relatively flat areas and will be applied as the second step in the seeding operation at a rate of 2 tons per acre.
- SOIL STABILIZATION BLANKETS & MATTING - 3.36**
Soil stabilization blankets (treatment 1- degradable) will be applied to all disturbed slopes steeper than 2.5:1 and on certain sections ditches and/or diversions to assist in establishing adequate ground cover.

MANAGEMENT STRATEGIES/SCHEDULING

- Construction will be sequenced so that grading operations can begin and end as quickly as possible. The rough grading for the site improvements will be accomplished as indicated on the grading plan.
- All erosion control & sediment trapping measures will be installed as a first step in grading plan and will be seeded and mulched immediately following installation.
- Temporary seeding or other stabilization will follow immediately following grading.
- The job superintendent shall be responsible for the installation and maintenance of all erosion & sediment control practices. Within 48hrs after every rainfall event, the contractor shall inspect all erosion control measures. All damaged measures shall be repaired and sediment trapping devices cleaned out immediately following the inspection.
- After achieving adequate stabilization, the temporary E&S controls will be cleaned out (by the contractor) or converted to permanent stormwater management control structures.
- No more than 500 feet of open trench at any one time. Excavated material shall be placed on uphill side of trench. Trench effluent from dewatering systems must be filtered prior to discharge. Proper backfill and compaction is required in all earthwork and grading operations. Re-stabilize immediately.
- Erosion & sediment control measures shall be removed and properly disposed of upon adequate stabilization of site.

CRITICAL AREAS

Critical erosion areas include all of the out and fill slopes on the site, especially those adjacent to the eastern boundary and along the stream and detention pond. These areas shall be closely monitored to insure the seeding techniques are effective in establishing a permanent stabilized vegetative surface. Should conventional seeding techniques fail, then soil stabilization blankets may be required for adequate stabilization.

PERMANENT STABILIZATION

The site will be seeded with ordinary seeding techniques or hydro-seeding, using a mixture of annual rye and fescue grasses. All permanent seeding is to be covered with mulch to minimize the adverse effects of wind and rain on the seedbed. Seeding is to be done immediately upon completion of grading to minimize vulnerability to erosion.

STORMWATER RUNOFF CONSIDERATIONS

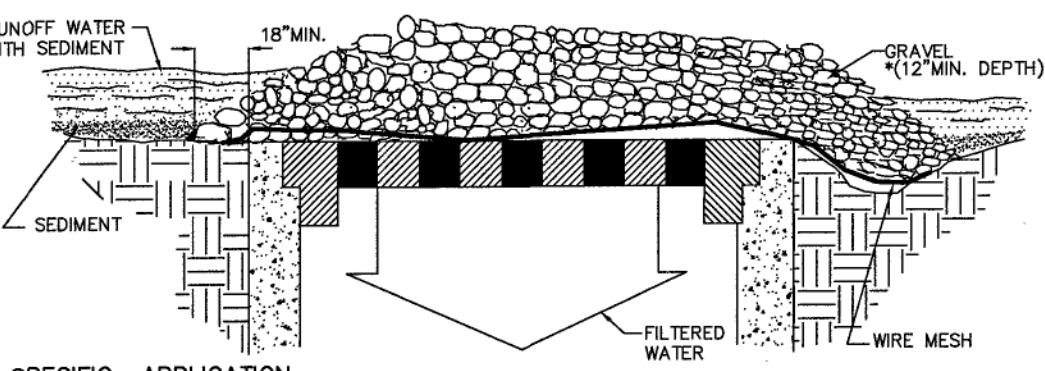
The runoff from this project is being conveyed to the modified pond that is being converted to an enhanced extended detention pond. Storm sewer was designed to collect and convey the a majority of the runoff from this site to this new pond. Portions of the runoff that are not captured and managed have been calculated and deducted from the allowable release rates from the pond. Due to the site disturbance being greater than 1 acre, the DCR stormwater quality regulations are in effect. Calculations have been performed in accordance with the 1999 Stormwater Management Handbook to determine the amount of treatment required. The results of the calculations indicate that water quality treatment is required since the site's post development impervious percentage is greater than the existing drainage basin's impervious percentage. As a result, the pond has been designed as an enhanced extended detention pond in accordance with the State criteria for such ponds. The 2 and 10 year storm peak discharge from the site to the existing stream has been reduced below predevelopment levels as a result of this management structure. In addition, other BMPs including a Contech Stormfilter water quality structure and a bioretention basin have been strategically located to provide the additional treatment required by the State requirements. Please refer to the plans and calculations for additional information.

CALCULATIONS

Please refer to the hydrology and runoff calculations submitted with these plans.

CONSTRUCTION NOTES - DETENTION POND

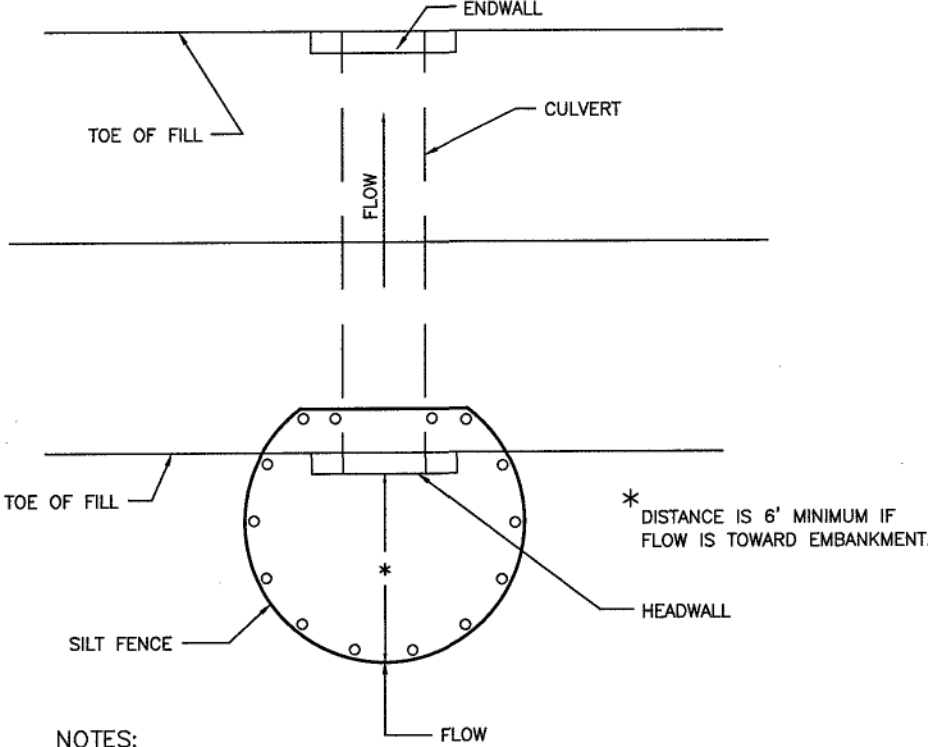
- SLOPES STEEPER THAN 2.5 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCHES OR STEPPED PRIOR TO PLACING FILL ON THEM.
- ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED. FILL MATERIAL SOILS, IN GENERAL:
 - SHALL BE COMPACTABLE.
 - SHALL BE WITHIN AN ACCEPTABLE RANGE OF MOISTURE CONTENT WHICH IS READILY CONTROLLED
 - SHALL NOT BE HIGHLY SUSCEPTIBLE TO VOLUME CHANGE (SHRINKAGE OR SWELL) OR SETTLEMENT
- FILL MATERIALS CONTAINING ROCKS LARGER THAN SIX (6) INCHES (15.2 CM) SHALL NOT BE USED. THE UPPERMOST TWO (2) FEET (61 CM) SHALL NOT HAVE ANY ROCK LARGER THAN TWO (2) INCHES (5.1 CM) IN DIAMETER.
- THE APPROVED FILL SHALL BE PLACED IN EIGHT (8) INCH (20 CM) LOOSE LIFTS. EACH LIFT SHALL BE SPREAD IN UNIFORM LAYERS. FILL SOIL SHALL BE UTILIZED ONLY WITHIN A MOISTURE RANGE OF +/- .5% OF THE OPTIMUM MOISTURE CONTENT. COMPACTION OF THE FILL SHALL BE PERFORMED WITH APPROVED EQUIPMENT. COMPACTION OF THE LAYERS SHALL BE CONTINUOUS AND UNIFORM.
- EMBANKMENT MATERIAL IN FILL AREAS SHALL BE PLACED IN LIFTS NOT EXCEEDING EIGHT (8) INCHES AND SHALL BE COMPACTED TO A MINIMUM 95% DENSITY IN ACCORDANCE WITH SECTION 303 OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS.
- FIELD DENSITY TESTS ARE TO BE CONDUCTED BY AN INDEPENDENT SOILS TESTING LABORATORY UNDER THE DIRECTION OF A QUALIFIED GEOTECHNICAL ENGINEER. THE RESULTS OF THESE TESTS SHALL BE SUBMITTED TO THE COUNTY OF BOTETOURT WITH AS-BUILT PLANS AS A CONDITION OF ACCEPTANCE OF THE FACILITY BY THE COUNTY. FIELD DENSITY TESTS, AS DIRECTED BY THE ENGINEER SHALL BE PERFORMED PERIODICALLY TO DETERMINE THE DEGREE OF COMPACTION. ANY AREAS FAILING TO MEET THE ABOVE REQUIREMENTS SHALL BE REWORKED AND/OR RECOMPACTED UNTIL THE REQUIRED DEGREE OF COMPACTION IS ACHIEVED.
- ALL DISTURBED AREAS SHALL BE COVERED WITH FOUR (4) INCHES OF TOPSOIL AND SEEDED.
- THE MINIMUM SLOPE OF THE BASIN FLOOR SHALL BE ONE (1) PERCENT GRADED TO DRAIN TO THE PRINCIPAL SPILLWAY.
- NO CONSTRUCTION/FIELD CHANGES ARE ALLOWED WITHOUT THE APPROVAL OF THE CONSULTING ENGINEER AND BOTETOURT COUNTY.
- ANY NEW ALIGNMENTS, CHANGES IN GRADE, ALTERNATIVE PIPE SIZES OR MANHOLES WITHIN STORM DRAIN SYSTEM WILL REQUIRE A NEW SET OF PLANS STAMPED BY THE CONSULTING ENGINEER. COUNTY ENGINEERS WILL REVIEW PLANS WITHIN ONE DAY OF SUBMITTAL. PLAN SHEETS CAN BE 8.5" x 11" IF THE INFORMATION IS LEGIBLE.



SPECIFIC APPLICATION

This method of inlet protection is applicable where heavy concentrated flows are expected, but not where ponding around the structure might cause excessive inconvenience or damage to adjacent structures and unprotected areas. * Gravel shall be VDOT #3, #357 or #5 coarse aggregate.

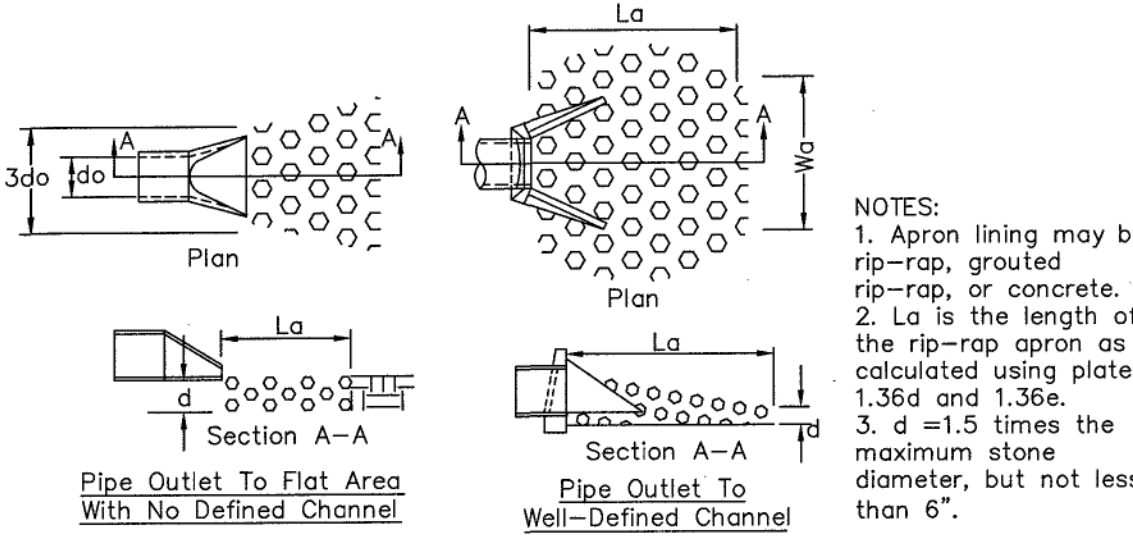
IP GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER



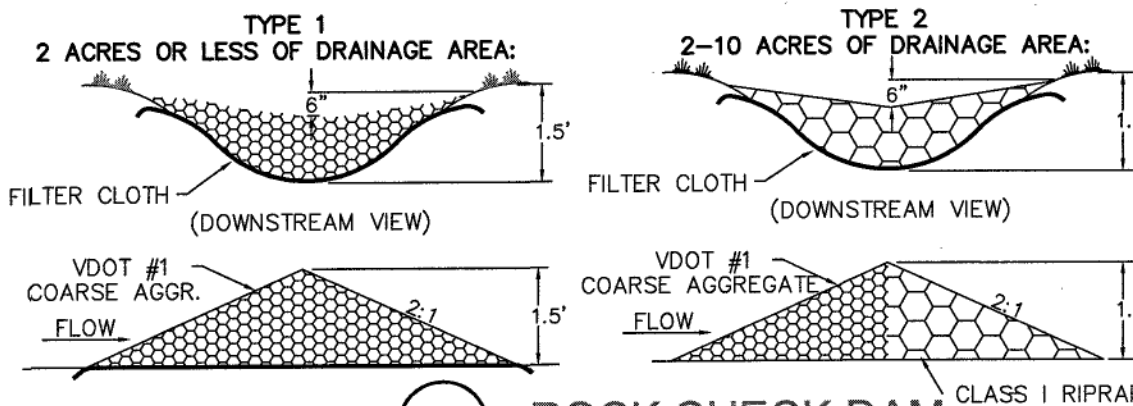
NOTES:

If silt fence culvert inlet protection is not sufficient due to expected high velocity of flow, contractor shall install optional stone and inlet sediment trap protection per STD. & SPEC. 3.08.

CIP SILT FENCE CULVERT INLET PROTECTION



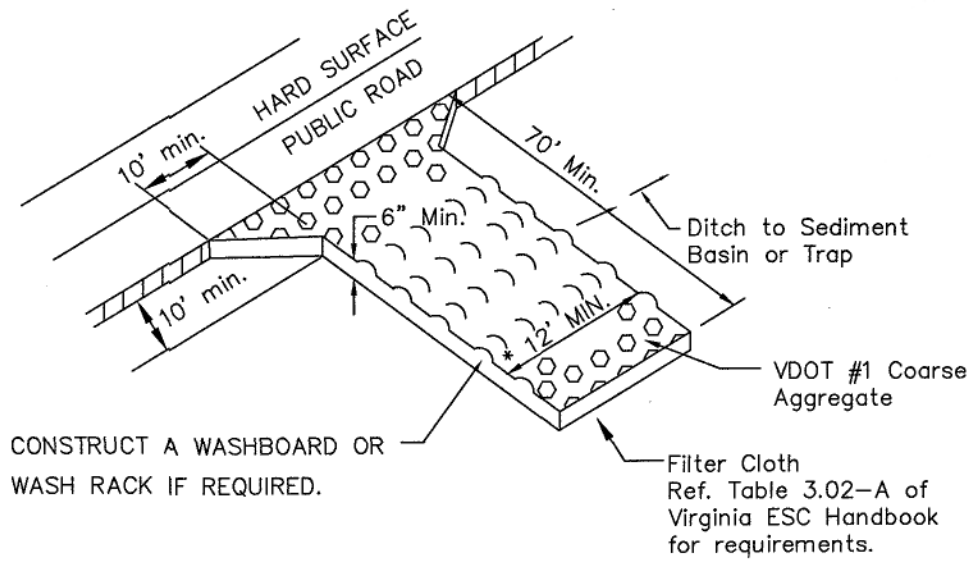
OP OUTLET PROTECTION



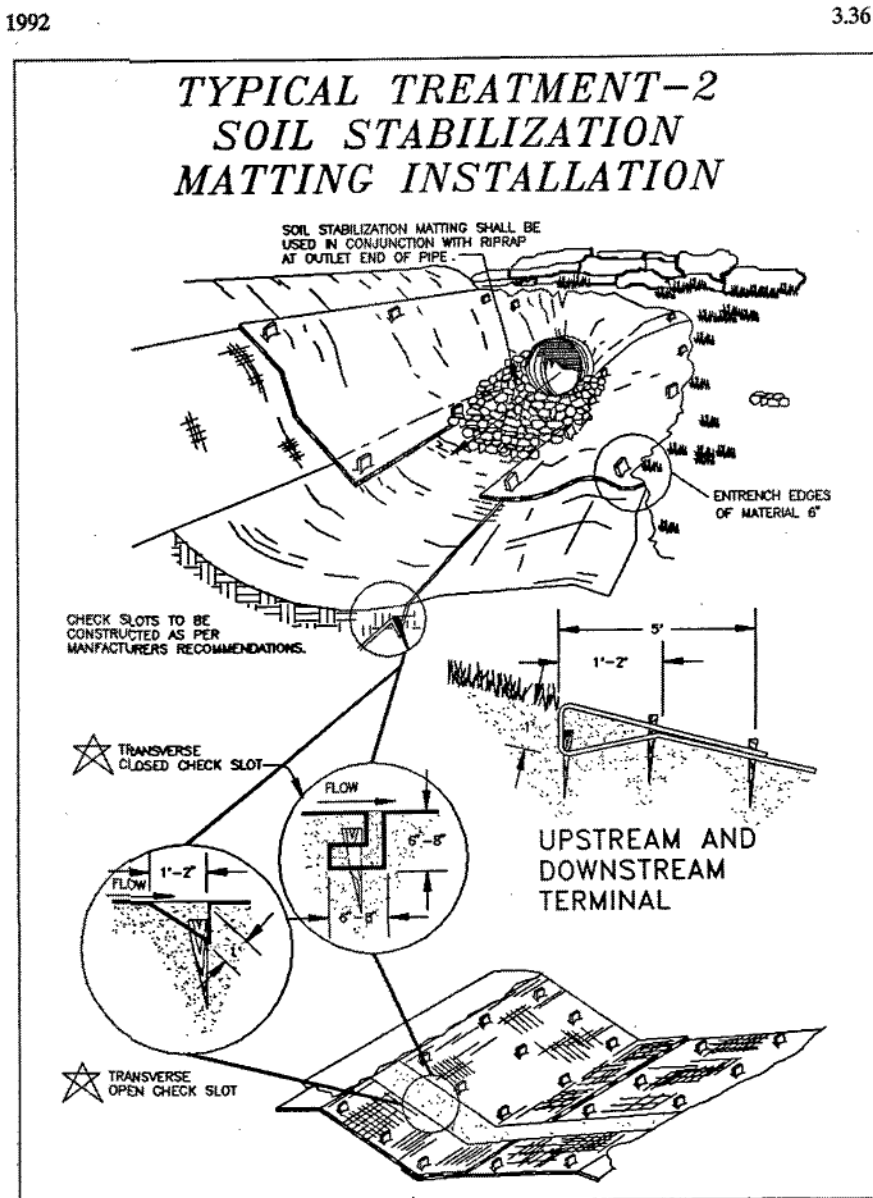
CD ROCK CHECK DAM

MINIMUM STANDARDS CHECKLIST

- | | | | |
|--------------------|---|------------|--|
| N/A | MS-1: Temporary and permanent stabilization of denuded areas (Permanent within 7 days for areas at final grade, Temporary for areas not to final for 30 days). | N/A | MS-13: Temporary vehicular stream crossings for more than 2 trips in 6 months. (No temporary crossings) |
| YES | a) Are practices shown on the plan? YES
b) Are the limits of clearing and grading shown on the plan? YES
c) Seed Specifications? YES | YES | MS-14: Other federal, state and local regulations must be met when working in live watercourses. |
| N/A | MS-2: Protection or stabilization of on-site and off-site stockpiles and borrow areas. (Onsite material to be reused) | YES | MS-15: The bed and banks of disturbed watercourses must be stabilized immediately. |
| YES | MS-3: Permanent Stabilization of denuded areas not otherwise stabilized. (Permanent seeding shown on plans) | YES | MS-16: Utility installations.
a) No more than 500 feet of open trench at any one time.
b) Excavated material shall be placed on uphill side of trench.
c) Effluent of dewatering system must be filtered.
d) Proper backfill and compaction.
e) Re-stabilize immediately. |
| YES | MS-4: Install E&S Measures as first step in land-disturbing activity. (Called out in narrative) | YES | MS-17: Keep paved or public areas clean (Construction Entrances) |
| YES | MS-5: Earthen controls and structures stabilized immediately upon installation. (Called out in narrative) | YES | MS-18: Temporary measures should be removed with 30 days when no longer needed.
a) Schedule for maintenance (Noted in narrative) |
| YES | MS-6: Sediment Traps (less than 3 acres drainage) and basins (greater than 3 acres of drainage).
a) Are traps/basins properly sized?
b) Are the details shown on the plans?
c) Are the calculations included in the narrative or plan? | YES | MS-19: Address increases in stormwater volume, velocity, and peak runoff. SEE STORMWATER MANAGEMENT DESIGN CALCULATIONS.
a) Are offsite, contributing areas accounted for? YES
b) Are offsite, receiving areas and channels described and adequate? YES
c) Are calculations included in the narrative or plan and adequate? YES |
| YES | MS-7: Design and construction of cut and fill slopes to minimize erosion. (Most are 3:1. All slopes shall be seeded and mulched) | | |
| YES | MS-8: Concentrated flow down cut and fill must be in adequate channel, flume, or slope drain. (Rip rap lined ditches indicated to pond) | | |
| N/A (noted) | MS-9: Slopes protected from seepage. (No groundwater problems) | | |
| YES | MS-10: Storm sewer inlets must have adequate inlet protection. | | |
| YES | MS-11: Outlet protection and channel lining is required prior to operation storm sewer system. (Outlet protection indicated at outfall of culverts) | | |
| YES | MS-12: Minimize impacts when working in and around live watercourse.
a) DEQ and/or Army Corps of Engineers permits may be required. | | |

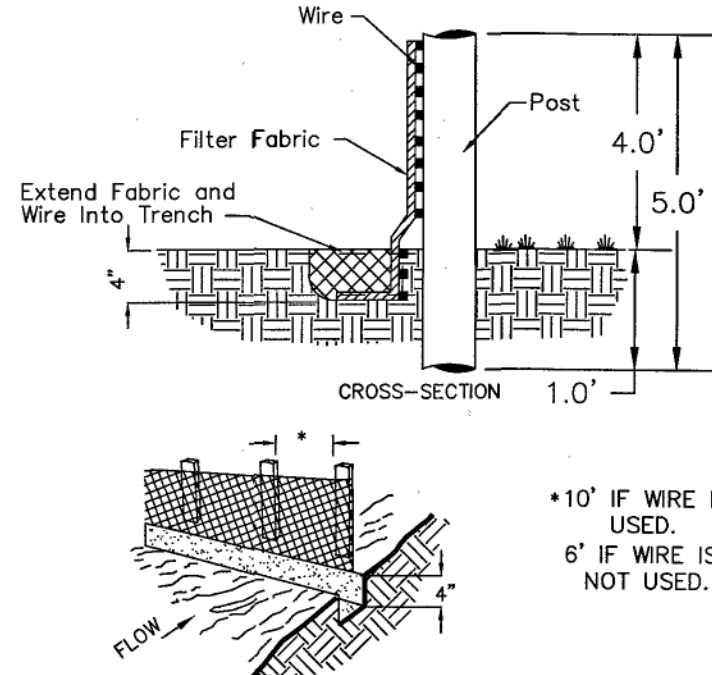


CE TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

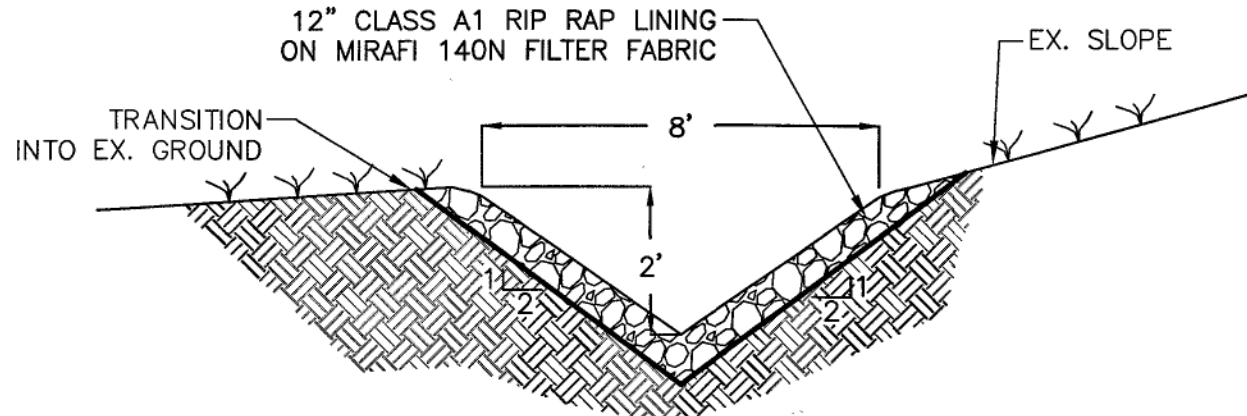


Source: VDOT Road and Bridge Standards Plate 3.36-4
NOTE: MATTING SHALL BE INSTALLED AND ANCHORED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

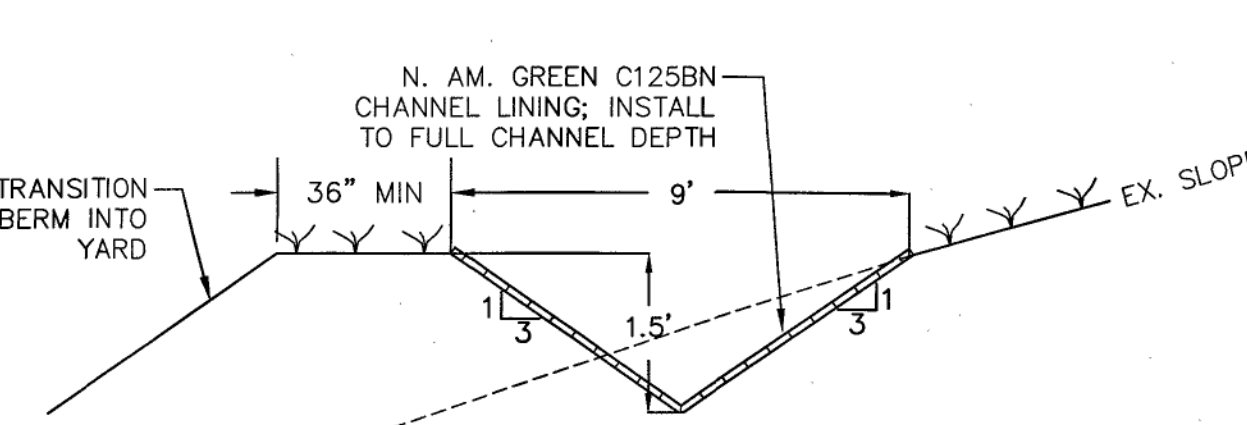
NO.	TITLE	KEY	SYMBOL
3.02	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE	CE	
3.04	CONSTRUCTION ROAD STABILIZATION	CRS	
3.05	SILT FENCE	SF	
3.07	STORM DRAIN INLET PROTECTION	IP	
3.18	OUTLET PROTECTION	OP	
3.19	RIPRAP	RR	
3.30	TOPSOILING	TO	
3.31	TEMPORARY SEEDING	TS	
3.32	PERMANENT SEEDING	PS	
3.35	MULCHING	MU	
3.36	SOIL STABILIZATION BLANKETS & MATTING	B/M	
3.20	ROCK CHECK DAMS	CD	



SF CONSTRUCTION OF SILT FENCE



RIP RAP LINED DITCH DETAIL (Pipe 1 To Pond)



DV DIVERSION DETAIL

EROSION-SILTATION CONTROL COST ESTIMATE

ALL COSTS GIVEN ARE COMPLETE IN PLACE

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CONSTRUCTION ENTRANCE	EA	1	\$ 500.00	\$ 500.00
SILT FENCE	LF	1435	\$ 4.00	\$ 5740.00
CULVERT INLET PROTECTION	EA	1	\$ 350.00	\$ 350.00
OUTLET PROTECTION	EA	1	\$ 500.00	\$ 500.00
TEMPORARY SEEDING	AC	8.24	\$ 500.00	\$ 4120.00
PERMANENT SEEDING	AC	8.24	\$ 1000.00	\$ 8240.00
MULCHING	AC	8.24	\$ 100.00	\$ 824.00
BLANKETS/MATTING	LF	538	\$ 8.00	\$ 4304.00
RIP RAP	CU. YD.	385	\$ 50.00	\$ 19250.00
INLET PROTECTION	EA	17	\$ 200.00	\$ 3400.00
DIVERSION	LF	780	\$ 3.00	\$ 2340.00
CHECK DAM	EA	6	\$ 75.00	\$ 450.00
CONSTR. ROAD STAB.	LF	653	\$ 10.00	\$ 6530.00
SEDIMENT BASIN	EA	1	\$ 6000.00	\$ 6000.00
SUB-TOTAL				\$ 62548.00
10% CONTINGENCY				\$ 6254.80
TOTAL PROJECT COST				\$ 68802.80

GENERAL EROSION AND SEDIMENT CONTROL NOTES

- UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS VR 625-02-00 AND BOTETOURT COUNTY EROSION AND SEDIMENT CONTROL ORDINANCE.
- 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.
- 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 PROVIDED.
- IN NO CASE DURING CONSTRUCTION SHALL WATER RUNOFF BE DIVERTED OR ALLOWED TO FLOW TO LOCATIONS WHERE ADEQUATE PROTECTION HAS NOT BEEN PRACTICAL.
- 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.
- 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 BOTETOURT COUNTY.

PLANTING DATES	SPECIES	RATE (LBS./ACRE)
SEPT.1-FEB.15	50/50 MIX OF ANNUAL RYEGRASS (LOLIUM MULTI-FLOSUM) AND CEREAL (WINTER) RYE (SECALE CEREALE)	50-100
FEB.16-APR.30	ANNUAL RYEGRASS (LOLIUM MULTI-FLOSUM)	60-100
MAY1-AUG.31	GERMAN MILLET (SETARIA ITALICA)	50

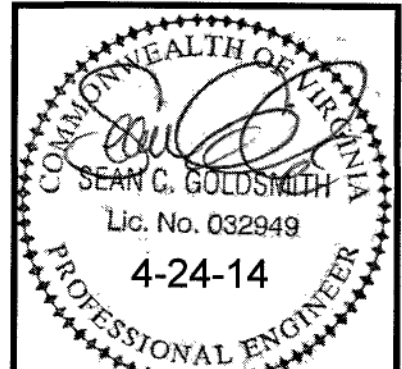
REF: 1992 VESC HANDBOOK, TABLE 3.31-B

TS ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS

TYPE A	TYPE B (SLOPES 3:1 OR STEEPER)
15 OCTOBER TO 1 FEBRUARY K-31 FESCUE @ 5 LB / 1000 SF BORZY WINTER RYE @ 1/2 LB / 1000 SF	15 MARCH TO 1 MAY CROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF RED TOP @ 1/8 LB / 1000 SF
1 FEBRUARY TO 1 JUNE K-31 FESCUE @ 5 LB / 1000 SF ANNUAL RYE @ 1/2 LB / 1000 SF	15 AUGUST TO 1 OCTOBER CROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF RED TOP @ 1/8 LB / 1000 SF
1 JUNE TO 1 SEPTEMBER K-31 FESCUE @ 5 LB / 1000 SF GERMAN MILLET @ 1/2 LB / 1000 SF	
1 SEPTEMBER TO 15 OCTOBER K-31 FESCUE @ 5 LB / 1000 SF ANNUAL RYE @ 1/2 LB / 1000 SF	

- LIME: 140 LB / 1000 SF PULVERIZED AGRICULTURAL LIMESTONE
FERTILIZER: 5-20-10 @ 25 LB / 1000 SF
38-0-0 @ 7 LB / 1000 SF
- MULCH: 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 SEEDINGS, 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.
- TOTAL AREA TO BE SEEDDED= 8.24 AC.
TOTAL DISTURBED AREA= 9.3 AC.

PS PERMANENT SEEDING MIXTURE



Revisions By Date

INTEGRITY ENGINEERING

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EROSION & SEDIMENT CONTROL DETAILS PHASE 1

COTTAGES OF STEEPLECHASE
BOTETOURT COUNTY, VIRGINIA

Scale: AS SHOWN
Date: 4-24-14
Design By: SCG
CAD By: SCG
Checked By:
Project No.: 12052

Sheet No.

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