

## EROSION & SEDIMENT CONTROL NARRATIVE

### PROJECT DESCRIPTION

The following project will involve improvements along Fairhope Road in Roanoke, VA. The project includes water line replacement and sanitary sewer installation for the Fairhope District including existing streets and urban yards. The total area of disturbance is 0.19 acres or 8,180 SF.

### EXISTING SITE CONDITIONS

Existing site conditions include suburban street scapes and yard scapes reflective of city streets and urban yards. The site contains standard vegetation that would occur in a residential area. The topography of the site is relatively flat with slopes at approximately 5%. The site drains generally in the southern direction.

### ADJACENT AREAS

Areas adjacent to the project corridor include undeveloped and residential properties and roadways. The terrain adjacent to the project corridor is a mix of grassy, paved and wooded areas. It is mostly adjacent to streets surrounded by existing residential properties.

### OFF-SITE AREAS

No off-site areas will be disturbed as part of this project except for access and staging.

### CRITICAL AREAS

Some portions of the work will traverse steep slopes for short distances.

### SOILS

Soils data taken from NRCS Soil Survey of Roanoke County and the Cities of Roanoke and Salem

Unit	Soil Name	Slope	Erodibility	Permeability	Depth	Texture
18C	Frederick Silt Loam	7-15%	High	Moderate	0 to 72"	Silt Loam
21C	Frederick Urban Land Complex	2-15%	High	Moderate	0 to 72"	Variable
48B	Timberville Silt Loam	2-7%	Medium	Moderate	0 to 62"	Silt Loam

### EROSION AND SEDIMENT CONTROL MEASURES

- Silt Fence** (Section 3.05) Temporary silt fence shall be installed along the peripheries of the areas disturbed for the sewer system.
- Culvert Inlet Protection** (Section 3.08) In order to prevent sediment-laden runoff from clogging the culvert during construction, culvert inlet protection shall be used on the proposed culvert until upland areas are stabilized.
- Permanent Seeding** (Section 3.32) All areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Erosion control blankets will be installed over fill slopes which have been brought to final grade and have been seeded to protect the slopes from rill and gully erosion and to allow seed to germinate properly. Mulch (straw or fiber) will be used on relatively flat areas. In all seeding operations, seed, fertilizer and lime will be applied prior to mulching.
- Mulching** (Section 3.35) Mulch shall be used over all seeded areas and shall be applied in accordance with Standard and Specification 3.35 of the Virginia Erosion and Sediment Control Handbook, latest edition.

### PERMANENT STABILIZATION

Permanent stabilization will be accomplished by establishment of turf.

### CALCULATIONS

No Design Calculations are required.



KEY	NAME	SYMBOL	VESCH No.
(BM)	Soil Stabilization Blankets and Matting		3.36
(CE)	Temporary Gravel Construction Entrance		3.02
(CIP)	Culvert Inlet Protection		3.08
(CRS)	Construction Road Stabilization		3.03
(DD)	Temporary Diversion Dike		3.09
(BS-I)	Silt Fence Break		
(IP)	Storm Drain Inlet Protection		3.07
(ML)	Mulching		3.35
(OP)	Outlet Protection		3.18
(PS)	Permanent Seeding		3.32
(SAP)	Construction Safety Fencing		3.01
(SF)	Silt Fence		3.05
(SR)	Surface Roughening		3.29
(ST)	Temporary Sediment Trap		3.13
(TP)	Tree Preservation and Protection		3.38
(TS)	Temporary Seeding		3.31

NOTE: The E&S Plan is schematic. E&S measures are represented on the Plan with symbols that might or might not approximate their actual size. Refer to the details, other drawing notes, and the VESCH for complete information.

### GENERAL EROSION AND SEDIMENT CONTROL NOTES

- ES-1: 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, latest edition and Virginia Regulations 4VAC50-30, Erosion and Sediment Control Regulations.
- ES-2: The plan approving authority must be notified one week prior to the preconstruction conference, one week prior to the commencement of land disturbing activity, and one week prior to the final inspection.
- ES-3: All erosion and sediment control measures are to be placed prior to or as the first step in clearing.
- ES-4: A copy of the approved erosion and sediment control plan shall be maintained on the site at all times.
- ES-5: Limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the owner for review and approval by the plan approving authority.
- ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.
- ES-7: All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.
- ES-8: During dewatering operations, water will be pumped into an approved filtering device.
- ES-9: The contractor shall inspect all erosion control measures periodically and after each runoff-producing rainfall event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately.

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### EROSION CONTROL LEGEND AND GENERAL NOTES

Refer to and comply with the Standards and Specifications of the Virginia Erosion & Sediment Control Handbook, latest edition. This information is based on and modeled after it and is provided as a quick reference.

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EROSION SEDIMENT CONTROL MINIMUM STANDARDS		
MS #	MINIMUM STANDARDS	MEASURE APPLIED FOR EACH MINIMUM STANDARD
MS #1	PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENuded AREAS WITHIN 30 DAYS OF THE DATE THE TEMPORARY SOIL STABILIZATION IS REQUIRED. ANY FURTHER DELAY OF THE DATE THE TEMPORARY SOIL STABILIZATION SHALL BE APPLIED SHALL BE AT FINAL OWNERS RISK. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT SOONEST FOR MORE THAN ONE (1) YEAR.	PERMANENT SEEDING HAS BEEN SPECIFIED FOR ALL DENuded AREAS ALONG WITH APPLICABLE MULCH, LIME AND FERTILIZATION.
MS #2	DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE.	THERE ARE NO SOIL STOCKPILES PROPOSED. IF SOIL IS TO BE STORED ON SITE, IT SHALL HAVE SILT FENCE INSTALLED AROUND THE CORNERS AND SIDE OF THE PILE TO INSURE PROTECTION FROM SEDIMENT LADEN RUN-OFF FROM LEAVING THE SITE.
MS #3	A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENuded AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT SEEDING SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT SOONEST FOR MORE THAN ONE (1) YEAR. SEEDING SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT SOONEST FOR MORE THAN ONE (1) YEAR. SEEDING SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT SOONEST FOR MORE THAN ONE (1) YEAR.	PERMANENT SEEDING HAS BEEN SPECIFIED FOR ALL DENuded AREAS ALONG WITH APPLICABLE MULCH, LIME AND FERTILIZATION.
MS #4	SEEDING BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN THE LAND DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPLAND LAND DISTURBANCE OCCURS.	SILT FENCE WILL BE INSTALLED AT AREAS DISTURBED FOR THE SEWER SYSTEM.
MS #9	STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, Dikes, AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.	NOT APPLICABLE
MS #6	SEDIMENT TRAPS AND SEDIMENT BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN AND THE TRAP SHALL ONLY BE USED TO TRAP SEDIMENT FROM A DRAINAGE AREA LESS THAN 3 ACRES. IF FLOW GREATER THAN THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT BASIN SHALL BE 124 CUBIC YARDS PER ACRE OF DRAINAGE AREA.	NOT APPLICABLE
MS #7	CUT AND FILL SLOPES SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE EXCESSIVELY STEEP WITHIN ONE (1) YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZATION MEASURES UNTIL THE PROBLEM IS CORRECTED.	NOT APPLICABLE
MS #8	CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.	NOT APPLICABLE
MS #9	WHENEVER WATER SHEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.	NOT APPLICABLE
MS #10	ALL STORM SEWER TRENCHES 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.	NOT APPLICABLE
MS #11	BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LININGS SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.	NOT APPLICABLE
MS #12	WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE EROSION. MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFEINBANKS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF APPROVED BY NONDESTRUCTIBLE COVER.	NOT APPLICABLE
MS #13	WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY STREAM CROSSING CONSTRUCTED OF NONDESTRUCTIBLE MATERIAL SHALL BE PROVIDED.	NOT APPLICABLE
MS #14	ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.	NOT APPLICABLE
MS #15	THE BED AND BANKS OF ANY WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.	NOT APPLICABLE
MS #16	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 THE TRENCH. C. OFFICIAL ROAD MAINTENANCE OPERATIONS SHALL BE IN PLACE OR PASSED THRU AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT INTERFERE WITH 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 ACCORDING TO WITH THESE REGULATIONS. F. APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.	THE EXISTING PAVED ENTRANCE SHALL SERVE AS THE CONSTRUCTION ENTRANCE AND CONSTRUCTION VEHICLES WILL REMAIN ON PAVED SURFACES DURING THE POTENTIAL FOR THE TRANSPORT OF SEDIMENT TO THE PUBLIC ROAD.
MS #17	WHEN NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LININGS SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.	REMOVAL OF TEMPORARY EROSION CONTROL MEASURES ARE SPECIFIED IN THE DETAILS SHOWN OR WHEN THE CITY DEEMS THE SITE FULLY STABILIZED.
MS #18	ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN THIRTY (30) DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED. UNLESS OTHERWISE APPROVED BY THE LOCAL JURISDICTION AUTHORITY, TRAPPED SEDIMENT AND THE EROSION AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY EROSION CONTROL MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.	THERE IS NO INCREASE IN STORMWATER VOLUME OR VELOCITY DUE TO THE PROPOSED WORK. THE PROPOSED EROSION CONTROL MEASURES WILL ELIMINATE ANY POTENTIAL OF DOWNSTREAM EROSION OR DAMAGE.
MS #19	PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITE SHALL BE PROTECTED FROM SEDIMENT EXPOSITION, EROSION, A SLAMMING OR INCREASES IN VOLUME, VELOCITY & PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24 HOUR DURATION.	

ORGANIC MULCH MATERIALS AND APPLICATION RATES			
Mulches	Rate per acre	Rate per 1000SF	NOTES
Straw or hay	1½ - 2 tons (min. 2 upslope 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	35 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 CY	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.			
<b>NOTES</b>			
1. Before mulching, complete required grading and install needed sediment control practices.			
2. Lime and fertilizer should be incorporated and surface roughening accomplished as needed. Seed should be applied before mulching except in the following cases: a. Where seed is to be applied as part of a hydroseeder slurry containing fiber mulch. b. Where seed is to be applied following a straw mulch spread during winter months.			
3. Application. Mulch material shall be spread uniformly, by hand or machine. When spreading straw by hand, divide the area to be mulched into approximately 1,000 SF sections and place 70-90 lbs. (1-1/2 to 2 bales) of straw in each section to facilitate uniform distribution.			
4. Mulch anchoring. Straw mulch must be anchored immediately after spreading to prevent displacement. Other organic mulches listed in table do not require anchoring. The following methods of anchoring straw may be used: a. Mulch anchoring tool (often referred to as a kripmer or kripmer tool). This is a tractor-drawn implement designed to punch mulch into the soil surface. This method provides good erosion control with straw. It is limited to use on slopes no steeper than 3:1 where equipment can operate safely. Machinery shall be operated along the contours. Fiber mulch. Apply fiber mulch by means of a hydroseeder at a rate of 500-750 lbs./ acre over top of straw mulch or hay. It has an added benefit of providing additional mulch to the newly seeded area. c. Liquid mulch binders. Application of liquid mulch binders and tackifiers should be heaviest at the edges of areas and at crests of ridges and banks, to prevent displacement. The remainder of the area should have binder applied uniformly. Binder may be applied after mulch is spread or may be sprayed into mulch as it is being blown onto the soil.			
5. Mulch nettings. Lightweight plastic, cotton, or paper nets may be stapled over the mulch according to manufacturer's recommendations.			
6. Peg and twine. Because it is labor-intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8-10 inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square. Turn twine 2 or more times around each peg.			
7. Chemical mulches, synthetic binders, and asphalt binders may be used in situations as described in VESCH, latest edition.			
8. Maintenance. All mulches and soil coverings should be inspected periodically (particularly after rainstorms) to check for erosion. Where erosion is observed in mulched areas, additional mulch should be applied. Nets and mats should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, re-install netting or matting as necessary after repairing damage to the slope or ditch. Inspections should take place up until grasses are firmly established. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.			

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### MU - MULCHING

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### TYPE A SEED MIX SELECTION

SEEDING DATE	SEED MIX
15 October to 1 February	KY-31 fescue @ 5 lb / 1000 SF winter rye @ 1/2 lb / 1000 SF
1 February to 1 June	KY-31 fescue @ 5 lb / 1000 SF annual rye @ 1/2 lb / 1000 SF
1 June to 1 September	KY-31 fescue @ 5 lb / 1000 SF German millet @ 1/2 lb / 1000 SF
1 September to 15 October	KY-31 fescue @ 5 lb / 1000 SF annual rye @ 1/2 lb / 1000 SF

### TYPE B (SLOPES 3:1 OR STEEPER) SEED MIX SELECTION

SEEDING DATE	SEED MIX
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
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

### 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 Standard and Specification 3.35 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 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.

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### PS - PERMANENT SEEDING

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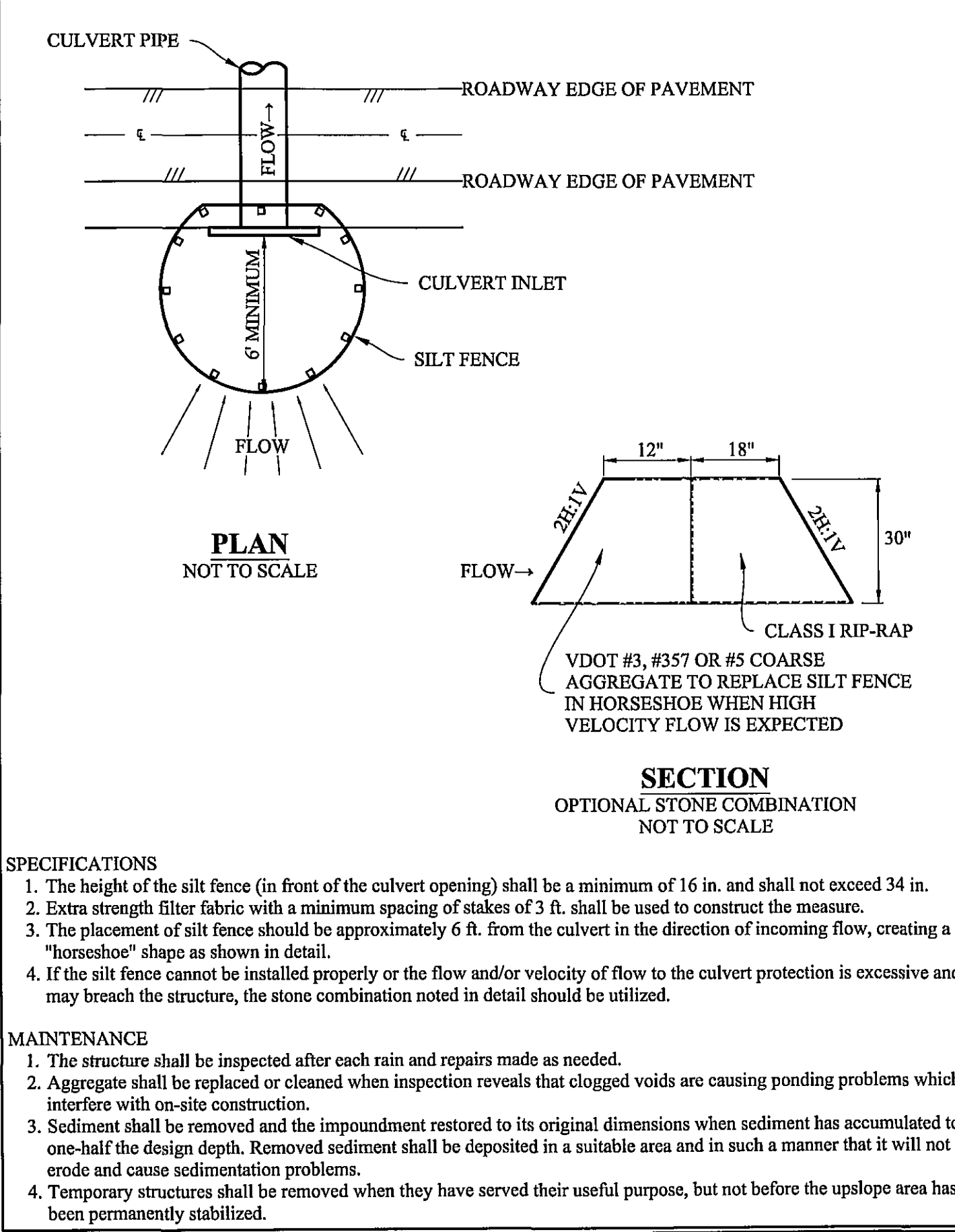
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### SF - SILT FENCE BARRIER

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### SPECIFICATIONS

- The height of the silt fence (in front of the culvert opening) shall be a minimum of 16 in. and shall not exceed 34 in.
- Extra strength filter fabric with a minimum spacing of stakes of 3 ft. shall be used to construct the measure.
- The placement of silt fence should be approximately 6 ft. from the culvert in the direction of incoming flow, creating a "horseshoe" shape as shown in detail.
- If the silt fence cannot be installed properly or the flow and/or velocity of flow to the culvert protection is excessive and may breach the structure, the stone combination noted in detail should be utilized.

### MAINTENANCE

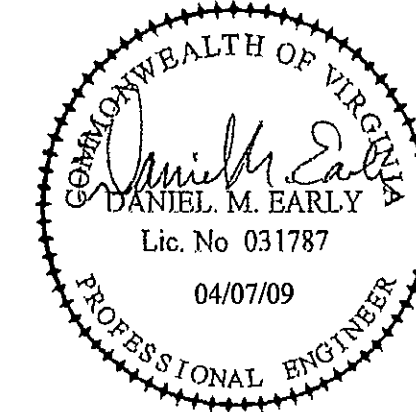
- The structure shall be inspected after each rain and repairs made as needed.
- Aggregate shall be replaced or cleaned when inspection reveals that clogged voids are causing ponding problems which interfere with on-site construction.
- Sediment shall be removed and the impoundment restored to its original dimensions when sediment has accumulated to one-half the design depth. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems.
- Temporary structures shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

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### CIP1 - SILT FENCE CULVERT INLET PROTECTION

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REVISIONS:  
No. 1 04/07/2009 City of Roanoke Comments  
No. 2  
No. 3  
No. 4

SHEET NO:  
C5

EROSION CONTROL  
NOTES AND  
DETAILS