

STORMWATER MANAGEMENT  
COST ESTIMATE

L COSTS GIVEN ARE COMPLETE IN PLACE

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
EARING & GRUBBING	LS		\$	\$
EXCAVATION	CY			
EMBANKMENT	CY			
FENCING	LF			
STRUCTURES				
ACCESS ROAD				
AS-BUILTS				
SUB-TOTAL				\$
10% CONTINGENCY				\$
TOTAL PROJECT COST				\$

GENERAL NOTES

1. DESIGN OF DETENTION BASINS SHALL CONFORM TO THE REQUIREMENTS OF THE COUNTY OF ROANOKE BRAINARD STANDARDS (REF. SECTIONS 503.02, 503.03, AND 503.05). THE DESIGN OF THE FACILITY AND PREPARATION OF AS-BUILT PLANS SHALL BE BY A CERTIFIED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE COMMONWEALTH OF VIRGINIA.

2. ACCESS TO THE FACILITY MUST BE PROVIDED IN ACCORDANCE WITH THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.

3. IF THE FACILITY IS OVER FOUR (4) FEET DEEP, TAKES OVER TWO (2) HOURS TO DRAIN, OR THE INTERIOR SLOPE EXCEEDS 3 (H) : 1 (V), PERMANENT FENCING MAY BE REQUIRED. ADDITIONALLY, IF THE FACILITY IS IN A CONGESTED AREA OR VULNERABLE TO ANY VANDALISM OR HAZARD TO THE GENERAL PUBLIC, FENCING MAY BE REQUIRED. FENCING SHALL BE A MINIMUM OF SIX (6) FEET HIGH, A MINIMUM OF STANDARD NINE GAUGE LINK FENCE, AND MUST HAVE ONE OR MORE LOCKING DOUBLE GATES (MINIMUM TEN FEET WIDE) FOR ACCESS.

4. DETENTION PONDS SHALL BE BENCHMARKED IN ACCORDANCE WITH THE ROANOKE COUNTY BENCHMARKING POLICY FOR SUBDIVISION AND SITE DEVELOPMENT. A SEPARATE BOND FOR THE DETENTION FACILITY WILL BE REQUIRED AND ADMINISTERED APART FROM THE SUBDIVISION DEVELOPMENT BOND. REFERENCE ESTIMATE - THIS SHEET.

5. REFERENCE THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION, FOR ACCEPTANCE AND MAINTENANCE OF THE FACILITY. CERTIFIED AS-BUILTS ARE REQUIRED AND MUST INCLUDE:  
A. DIMENSIONS OF THE FACILITY  
B. VOLUME & MAXIMUM DEPTH  
C. ELEVATIONS OF STRUCTURES, SPILLWAYS, AND TOP  
D. MATERIALS VERIFICATION, INCLUDING RESULTS OF DENSITY TESTS CONDUCTED BY AN INDEPENDENT SOIL TESTING LABORATORY  
E. LOCATION AND ELEVATION OF BENCHMARK

6. ONE FOOT MINIMUM FREEBOARD REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION.

SEDIMENT BASIN SCHEMATIC  
ELEVATIONS

DESIGN ELEVATIONS WITH EMERGENCY SPILLWAY

DESIGN ELEVATIONS WITHOUT EMERGENCY SPILLWAY (RISER PASSES 25-YR EVENT)

CONSTRUCTION NOTES

1. SITE PREPARATION SHALL BE IN ACCORDANCE WITH THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.

2. SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCHMARKED OR STEPPED PRIOR TO PLACING FILL ON THEM.

3. ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED FOR FILL MATERIAL SOILS, IN GENERAL:  
A. SHALL BE COMPACTABLE  
B. SHALL BE WITHIN AN ACCEPTABLE RANGE OF MOISTURE CONTENT WHICH IS READILY CONTROLLED  
C. SHALL NOT BE HIGHLY SUSCEPTIBLE TO VOLUME CHANGE (SHRINKAGE OR SWELL) OR SETTLEMENT

4. FILL MATERIALS CONTAINING ROCKS LARGER THAN SIX (6) INCHES (152 CM) SHALL NOT BE USED. THE UPPERMOST TWO (2) FEET (61 CM) SHALL NOT HAVE ANY ROCK LARGER THAN TWO (2) INCHES (51 CM) IN DIAMETER.

5. THE APPROVED FILL SHALL BE PLACED IN EIGHT (8) INCH (20 CM) LIFT 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.

6. 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.

7. 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 ROANOKE 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 REMODELED AND/OR RECOMPACTED UNTIL THE REQUIRED DEGREE OF COMPACTION IS ACHIEVED.

8. ANTI-SLEEP COLLARS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

9. ALL DISTURBED AREAS SHALL BE COVERED WITH FOUR (4) INCHES OF TOPSOIL AND SEEDED.

10. THE MINIMUM SLOPE OF THE BASIN FLOOR SHALL BE ONE (1) PERCENT GRADED TO DRAIN TO THE PRINCIPAL SPILLWAY.

NO. TITLE KEY SYMBOL

301 SAFETY FENCE (SAF) [Symbol]

302 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE (CE) [Symbol]

303 CONSTRUCTION ROAD STABILIZATION (CRS) [Symbol]

304 STRAW BALE BARRIER (STB) [Symbol]

305 SILT FENCE (SF) [Symbol]

306 BRUSH BARRIER (BB) [Symbol]

307 STORM DRAIN INLET PROTECTION (IP) [Symbol]

308 CULVERT INLET PROTECTION (CIP) [Symbol]

309 TEMPORARY DIVERSION DIKE (DD) [Symbol]

310 TEMPORARY FILL DIVERSION (FD) [Symbol]

311 TEMPORARY RIGHT-OF-WAY DIVERSION (RWI) [Symbol]

312 DIVERSION (DV) [Symbol]

313 TEMPORARY SEDIMENT TRAP (ST) [Symbol]

314 TEMPORARY SEDIMENT BASIN (SB) [Symbol]

315 TEMPORARY SLOPE DRAIN (SD) [Symbol]

316 PAVED FLOW (PF) [Symbol]

317 STORMWATER CONVEYANCE CHANNEL (SC) [Symbol]

318 OUTLET PROTECTION (OP) [Symbol]

319 RIPRAP (RR) [Symbol]

320 ROCK CHECK DAMS (CD) [Symbol]

321 LEVEL SPREADER (LS) [Symbol]

322 VEGETATIVE STREAMBANK STABILIZATION (VSS) [Symbol]

323 STRUCTURAL STREAMBANK STABILIZATION (SSS) [Symbol]

324 TEMPORARY VEHICULAR STREAM CROSSING (VSC) [Symbol]

325 UTILITY STREAM CROSSING (USC) [Symbol]

326 DEWATERING STRUCTURE (DS) [Symbol]

327 TURBIDITY CURTAIN (TC) [Symbol]

328 SUBSURFACE DRAIN (SD) [Symbol]

329 SURFACE ROUGHENING (SR) [Symbol]

330 TOPSOILING (TO) [Symbol]

331 TEMPORARY SEEDING (TS) [Symbol]

332 PERMANENT SEEDING (PS) [Symbol]

333 SEEDING (SO) [Symbol]

334 BERMUDA GRASS AND CYSTHAURASS ESTABLISHMENT (BG) [Symbol]

335 MULCHING (MU) [Symbol]

336 SOIL STABILIZATION, BLANKETS, AND MATTING (SZ) [Symbol]

337 TREES, SHRUBS, VINES AND GRUND COVERS (VED) [Symbol]

338 TREE PRESERVATION AND PROTECTION (TP) [Symbol]

339 DUST CONTROL (DC) [Symbol]

CROSS-SECTION

NOTE: FOR AREAS LESS THAN 3.0 ACRES, FOR AREAS LARGER THAN 3.0 ACRES A SEDIMENT BASIN IS REQUIRED. SEE DETAIL THIS SHEET.

EROSION-SILTATION CONTROL  
COST ESTIMATE

L COSTS GIVEN ARE COMPLETE IN PLACE

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CONSTRUCTION ENTRANCE	EA		\$	\$
SILT FENCE	LF			
INLET PROTECTION	EA			
TEMPORARY DIVERSION DIKE	LF			
TEMPORARY FILL DIVERSION	LF			
TEMPORARY RIGHT-OF-WAY DIVERSION	EA			
HECK DAM	EA			
PERMANENT SEEDING	1000 SF			
OUTLET PROTECTION	EA			
SEDIMENT BASIN	EA			
SUB-TOTAL				\$
10% CONTINGENCY				\$
TOTAL PROJECT COST				\$

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 PRACTICABLE.

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.

TEMPORARY SEDIMENT TRAP DATA

STRUCTURE	DRAINAGE AREA (ACRES)	STORAGE (C.Y.)		WEIR LENGTH (FT)	WEIR HEIGHT (FT)	BERM HEIGHT (FT)
		REQ'D	DESIGN			

PERMANENT SEEDING MIXTURE

TYPE A

15 OCTOBER TO 1 FEBRUARY  
K-31 FESCUE @ 5 LB / 1000 SF  
BIRDY WINTER RYE @ 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  
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

TYPE B (SLOPES 3:1 OR STEEPER)  
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  
50-0-0 @ 7 LB / 1000 SF  
MULCH: IF REQUIRED, SHALL BE USED OVER ALL SEEDING AREAS AND SHALL BE APPLIED IN ACCORDANCE WITH SECTION 175 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 EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. ADDITIONAL SEEDING TO BE PERFORMED AS REQUIRED BY THE INSPECTOR.  
SEED APPLICATION: APPLY SEED UNIFORMLY WITH A CYCLOPNE SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER ON A FIRM, FRABLE, SEDDED MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.

TOTAL DISTURBED AREA = AC. = SQ. FT.

2 ACRES OR LESS OF DRAINAGE AREA

CD ROCK CHECK DAM

2-10 ACRES OF DRAINAGE AREA

IP GRAVEL CURB INLET SEDIMENT FILTER

IP EXCAVATED DROP INLET SEDIMENT TRAP

SF CONSTRUCTION OF A SILT FENCE

OP OUTLET PROTECTION

CE TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

DEPARTMENT OF  
ENGINEERING  
AND INSPECTIONS

1	ENGR & INSP.	04-10-93
2	ENGR & INSP.	08-05-93
3	ENGR & INSP.	10-27-93
4		
5		
6		
NO.	REVISIONS	DATE

MUDLICK CREEK SEWER  
INTERCEPTOR REPLACEMENT

DATE: 1/20/95  
SCALE: NO SCALE  
DRAWING BY: CLN,AF  
DESIGNED BY:  
APPROVED BY: GWS,III

EROSION & SEDIMENT CONTROL  
STORMWATER MANAGEMENT DETAILS

SHEET  
10  
OF  
10  
SI-0731