

ALL COSTS GIVEN ARE COMPLETE IN PLACE				
DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CLEARING & GRUBBING	LS		\$	\$
EXCAVATION	CY			
EMBANKMENT	CY			
FENCING	LF			
STRUCTURES				
ACCESS ROAD				
AS-BUILTS				
SUB-TOTAL				\$
10% CONTINGENCY				\$
TOTAL PROJECT COST				\$

1. DESIGN OF DETENTION BASINS SHALL CONFORM TO THE REQUIREMENTS OF THE COUNTY OF ROANOKE DRAINAGE STANDARDS (REF. SECTIONS 503.02, 503.03, AND 505.02). 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 WILL IN ANY WAY POSE A HAZARD TO THE PUBLIC, FENCING MAY BE REQUIRED. FENCING SHALL BE A MINIMUM OF SIX (6) FEET HIGH, A MINIMUM OF STANDARD NINE GAUGE NAIL FENCE, AND MUST HAVE ONE OR MORE LOCKING DOUBLE GATES (MINIMUM TEN FEET WIDE) FOR ACCESS.
4. DETENTION PONDS SHALL BE BONDED IN ACCORDANCE WITH THE ROANOKE COUNTY BONDING 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 SHALL BE REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION.

1. SITE PREPARATION SHALL BE IN ACCORDANCE WITH THE COUNTY OF ROCKHIDE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION POND LATEST EDITION.
2. SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCH OR STEPPED PRIOR TO PLACING FILL ON THEM.
3. ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED. 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 (15.2 CM) SHALL NOT HAVE ANY ROCK, THE UPPERMOST TWO (2) FEET (61 CM) SHALL NOT HAVE ANY ROCK LARGER THAN TWO (2) INCHES (5.1 CM) IN DIAMETER.
5. 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 $\pm 5\%$ 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 ROCKHIDE 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.
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 SEED.
10. THE MINIMUM SLOPE OF THE BASIN "FLOOR" SHALL BE ONE (1) PERCENT GRADED TO DRAIN TO THE PRINCIPAL SPILLWAY.

DESIGN HIGH WATER (25-YR. STORM ELEV.)

0.5'

MIN. 1.0'

MIN. 1.0'

CREST OF EMERGENCY SPILLWAY

67 C.Y./AC. "DRY" STORAGE

67 C.Y./AC. "WET" STORAGE

RISER CREST

DEWATERING DEVICE

SEDIMENT CLEANUP POINT (WET STORAGE ADDED TO 34 C.Y./ACRES)

DESIGN ELEVATIONS WITH EMERGENCY SPILLWAY

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

A cross-sectional diagram of a gravel trench. On the left, a sloped surface is labeled 'RUNOFF WATER WITH SEDIMENT'. Below this, a layer is labeled 'SEDIMENT'. A horizontal line indicates a depth of '18" MIN.'. The trench is filled with 'GRAVEL (1/2" MIN. DEPTH)'. Below the gravel, there is a layer of material with a brick-like pattern, labeled 'WIRP MFSH' on the right. The trench is shown as a rectangular pit dug into the ground.

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.

IP GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER

1	PER 1ST REVIEW	01/23/06
2		
3		
4		
5		
6		
NO.	REVISIONS	DATE

NO.	TITLE	KEY	SYMBOL	NO.	TITLE	KEY	SYMBOL
3.01	SAFETY FENCE	(SAF)		3.20	ROCK CHECK DAMS	(CD)	
3.02	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE	(CE)		3.21	LEVEL SPREADER	(LS)	
3.03	CONSTRUCTION ROAD STABILIZATION	(CRS)		3.22	VEGETATIVE STREAMBANK STABILIZATION	(VSS)	
3.04	STRAW BALE BARRIER	(STB)		3.23	STRUCTURAL STREAMBANK STABILIZATION	(SSS)	
3.05	SILT FENCE	(SF)		3.24	TEMPORARY VEHICULAR STREAM CROSSING	(VSC)	
3.06	BRUSH BARRIER	(BB)		3.25	UTILITY STREAM CROSSING	(USC)	
3.07	STORM DRAIN INLET PROTECTION	(IP)		3.26	DEWATERING STRUCTURE	(DS)	
3.08	CULVERT INLET PROTECTION	(CIP)		3.27	TURBIDITY CURTAIN	(TC)	
3.09	TEMPORARY DIVERSION DIKE	(DD)		3.28	SUBSURFACE DRAIN	(SD)	
3.10	TEMPORARY FILL DIVERSION	(FD)		3.29	SURFACE ROUGHENING	(SR)	
3.11	TEMPORARY RIGHT-OF-WAY DIVERSION	(RWD)		3.30	TOPSOILING	(TO)	
3.12	DIVERSION	(DV)		3.31	TEMPORARY SEEDING	(TS)	
3.13	TEMPORARY SEDIMENT TRAP	(ST)		3.32	PERMANENT SEEDING	(PS)	
3.14	TEMPORARY SEDIMENT BASIN	(SB)		3.33	SODDING	(SO)	
3.15	TEMPORARY SLOPE DRAIN	(TSD)		3.34	BERMUDA GRASS AND ZOYSIA GRASS ESTABLISHMENT	(BS/ZS)	
3.16	PAVED FLUME	(PF)		3.35	MULCHING	(MU)	
3.17	STORMWATER CONVEYANCE CHANNEL	(SCC)		3.36	SOIL STABILIZATION BLANKETS AND MATTING	(B/M)	
3.18	OUTLET PROTECTION	(OP)		3.37	TREES, SHRUBS, VINES AND GROUND COVERS	(VEG)	
3.19	RIPRAP	(RR)		3.38	TREE PRESERVATION AND PROTECTION	(TP)	
				3.39	DUST CONTROL	(DC)	

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 DEPARTMENT OF TRANSPORTATION, EROSION AND SEDIMENT CONTROL HANDBOOK, REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS.

ES-2: THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION 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: PRIOR TO ISSUANCE OF A LAND DISTURBANCE PERMIT BY ROANOKE COUNTY, THE OWNER SHALL PROVIDE DOCUMENTATION OF AN EXISTING LAND DISTURBING PERMIT(S) THAT WOULD BE ASSOCIATED OR REQUIRED FOR ANY OFF-SITE BORROW OR WASTE AREAS; WHETHER LOCATED WITHIN THE COUNTY LIMITS OR NOT.

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 DEVEE.

ES-9: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUN-OFF PRODUCING RAINFALL EVENT, ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

BAL-1: ALL ASPHALT AREAS WILL BE STABILIZED WITH BASE STONE WITHIN 30 DAYS OF FINAL GRADING.

BAL-2: PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE, BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER PERIODS OF TIME. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

ITEM	QUANTITY	UNIT COST	TOTAL
	LF	\$3.00 per LF	
CONSTRUCTION ENTRANCE	EA	\$1,200.00 per EA	
SILT FENCE	1275 LF	\$3.00 per LF	\$3,825.00
DIVERSION	520 LF	\$3.00 per LF	\$1,560.00
INLET PROTECTION	7 EA	\$150.00 per EA	\$1,050.00
SEDIMENT TRAP	EA	\$1500.00 per CY	
RIP-RAP	Lump Sum		\$250.00
CHECK DAM	1 EA	\$250.00 per EA	\$250.00
TEMPORARY SLOPE DRAIN	35 LF	\$36.00 per LF	\$1,260.00
TEMPORARY SEEDING	3.7 AC	\$500.00 per AC	\$1,850.00
PERMANENT SEEDING	3.7 AC	\$1,000.00 per AC	\$3,700.00
MULCHING	3.7 AC	\$250.00 per CY	\$1,100.00
SOIL STABILIZATION MATTING	6,570 SY	\$1.50 per SY	\$925.00
DUST CONTROL	Lump Sum		\$500.00
CONSTRUCTION ROAD STABILIZATION	6,000 S.Y.	\$1.50 per SY	\$9,000.00
SUB-TOTAL			\$25,270.00
10% CONTINGENCY			\$2,530.00
ESTIMATED TOTAL =			\$27,800.00

THIS ESTIMATE IS FOR BONDING PURPOSES ONLY. ACTUAL QUANTITIES AND COSTS MAY VARY, BASED ON ACTUAL FIELD CONDITIONS AND CURRENT ECONOMIC CONDITIONS.

(CD) ROCK CHECK DAM

SPECIFIC APPLICATION

This method of inlet protection is applicable to curb inlets where ponding in front of the structure is not likely to cause inconvenience or damage to adjacent structures and unprotected areas.

Gravel shall be VDOT #5, #37, or 5 coarse aggregate.

(IP) GRAVEL CURB INLET SEDIMENT FILTER

The diagram illustrates a stormwater infiltration system. At the top, a plan view shows runoff flowing from three directions into a central infiltration area. The main cross-section shows sediment-laden runoff entering from the left. A vertical line indicates the 'AS REQUIRED' depth. The 'DEPTH BELOW TOP OF INLET' is specified as 'MIN. 1'-MAX. 2''. The system features 'WEEP HOLES FOR DEWATERING' and a 'DRAIN INLET' for 'STORM WATER WITH LARGER PARTICLES REMOVED'. A note states 'LARGER PARTICLES WILL SETTLE'. The 'MAX. SLOPE 2:1' is indicated for the side slopes. The bottom layer is labeled 'DRAIN INLET'.

IP EXCAVATED DROP INLET SEDIMENT TRAP

DD TEMPORARY DIVERSION DIKE

TEMPORARY FILL DIVERSION

TEMPORARY RIGHT-OF-WAY
DIVERSION

(DV)
DIVERSION

(SF) CONSTRUCTION OF A SILT FENCE

(OP) OUTLET PROTECTION

NOTES

1. Apron lining may be rip-rap, grouted rip-rap, or concrete.
2. L is the length of the rip-rap apron as calculated using plates 1.36d and 1.36e.
3. d = 1.5 times the maximum stone diameter, but not less than 6".

A cross-sectional diagram of a roadside ditch. At the top, a sloped line represents the 'HARD SURFACE' of a 'PUBLIC ROAD'. Below the road surface, a layer of small circles represents gravel, with a dimension of '10' min.' indicated. Below the gravel is a layer of larger, irregular shapes representing stones, with a dimension of '6" Min.' indicated. The ditch itself is a V-shaped excavation with a bottom width of '70' Min.' and a depth of '10' min.' indicated on the left side. A dashed line at the bottom of the ditch is labeled 'Ditch to Sediment Basin or Trap'.

CONSTRUCT A WASHBOARD OR
WASH RACK IF REQUIRED.

Filter Cloth
Ref. Table 3.02-

* MUST EXTEND FULL WIDTH OF INGRESS
& EGRESS OPERATION.

12' MIN.

3'

3'

FILTER CLOTH

Reinforced Concrete

Drain Space

WASH RACK DETAIL (IF REQUIRED)

CE TEMPORARY GRAVEL
CONSTRUCTION ENTRANCE

DEPARTMENT
OF
ENGINEERING AND INSPECTIONS

COUNTY OF ROANOKE

DATE: 11/02/93
SCALE: NO SCALE
DRAWING BY: CLN,AF (G:\CAD\DETAILS\EROS)
DESIGNED BY:
APPROVED BY: GWS,III

TILL OFFICE PARK

EROSION & SEDIMENT CONTROL STORMWATER MANAGEMENT DETAILS

Sheet
C-11