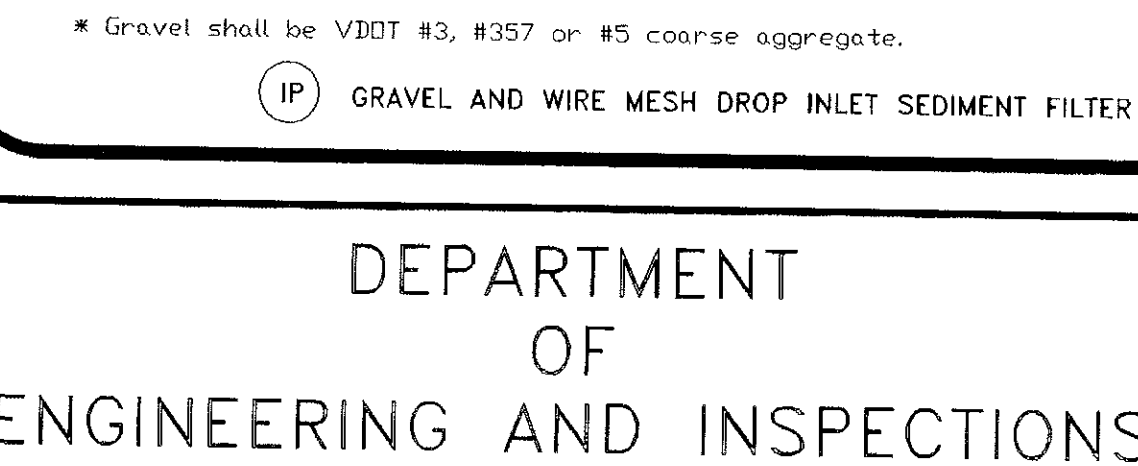
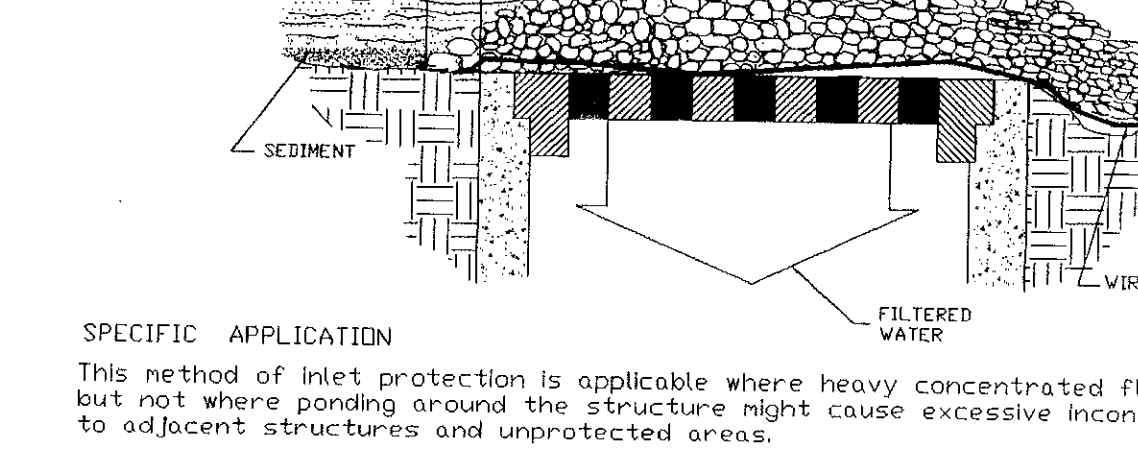
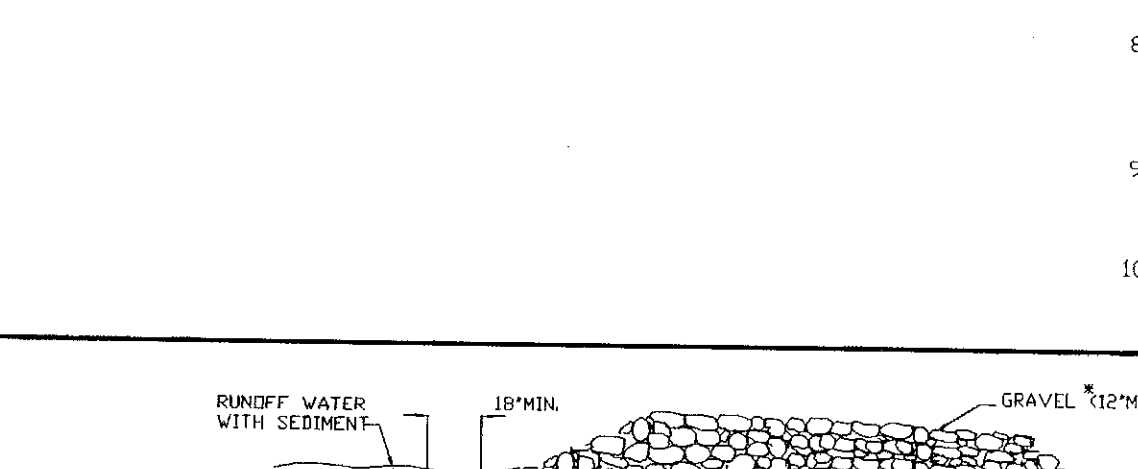
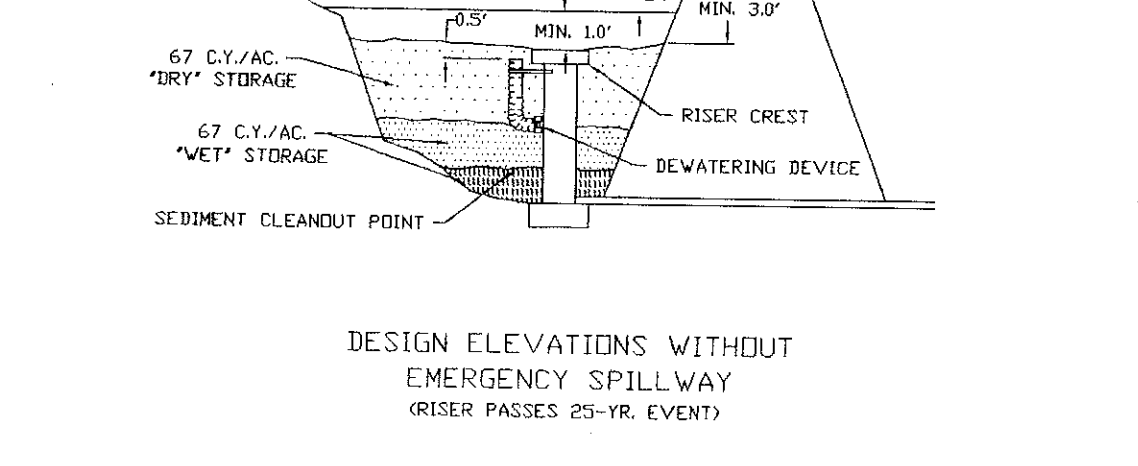
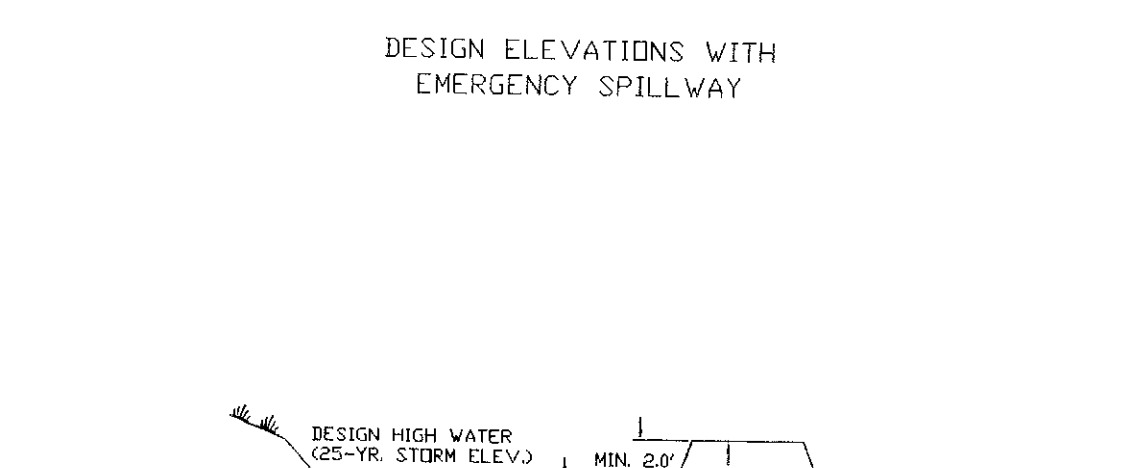
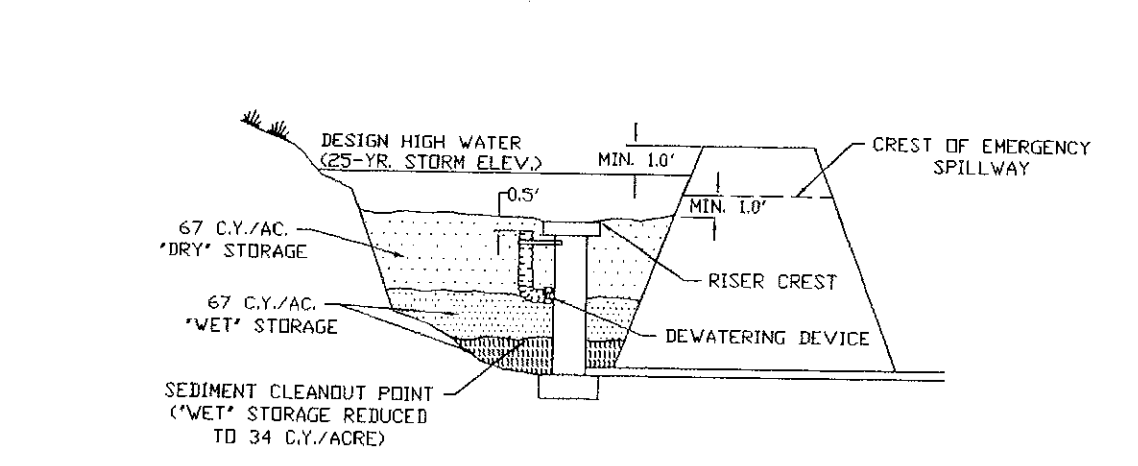


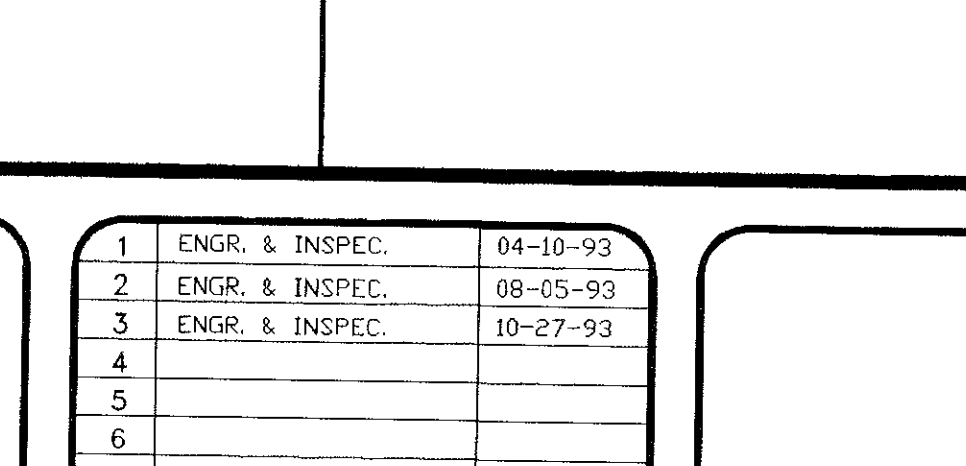
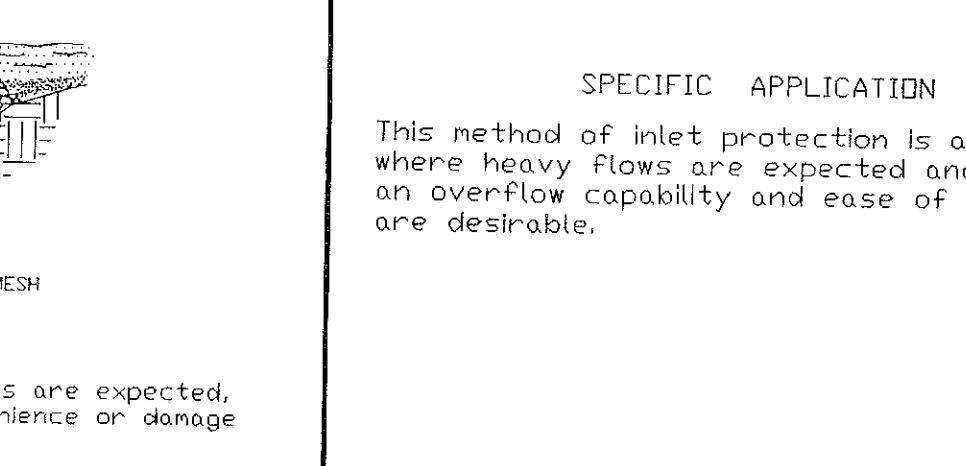
STORMWATER MANAGEMENT COST ESTIMATE				
ALL COSTS GIVEN ARE COMPLETE IN PLACE				
DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CLEARING & GRUBBING	LS	1	\$500.00	\$500.00
EXCAVATION	LS	1	\$2000.00	\$2000.00
EMBANKMENT	LS	1	\$4000.00	\$4000.00
FENCING	LF	510	\$5.00	\$2550.00
STRUCTURES	LF	1	\$1500.00	\$1500.00
ACCESS ROAD	LS	1	\$500.00	\$650.00
AS-BUILTS	LS	1	\$500.00	\$500.00
SUB-TOTAL				\$11,700
10% CONTINGENCY				\$1,170
TOTAL PROJECT COST				\$13,000

SEDIMENT BASIN SCHEMATIC ELEVATIONS				
DESIGN ELEVATIONS WITH EMERGENCY SPILLWAY				
DESIGN ELEVATIONS WITHOUT EMERGENCY SPILLWAY				

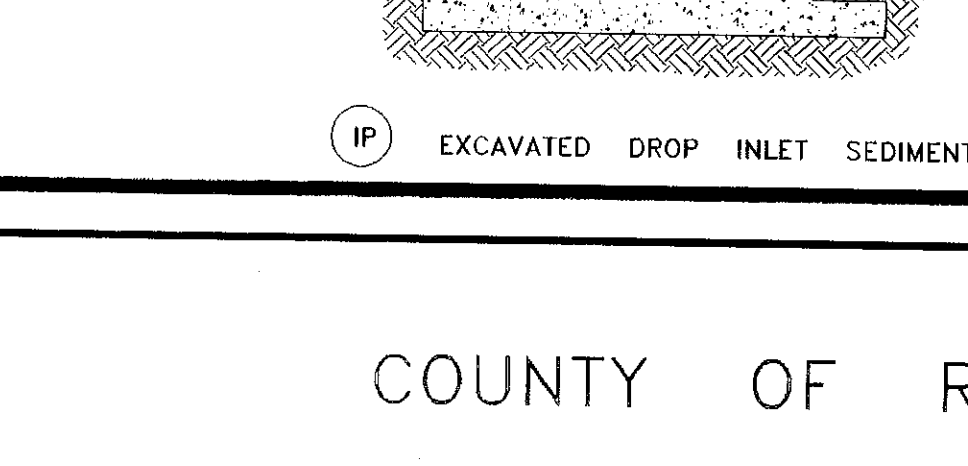
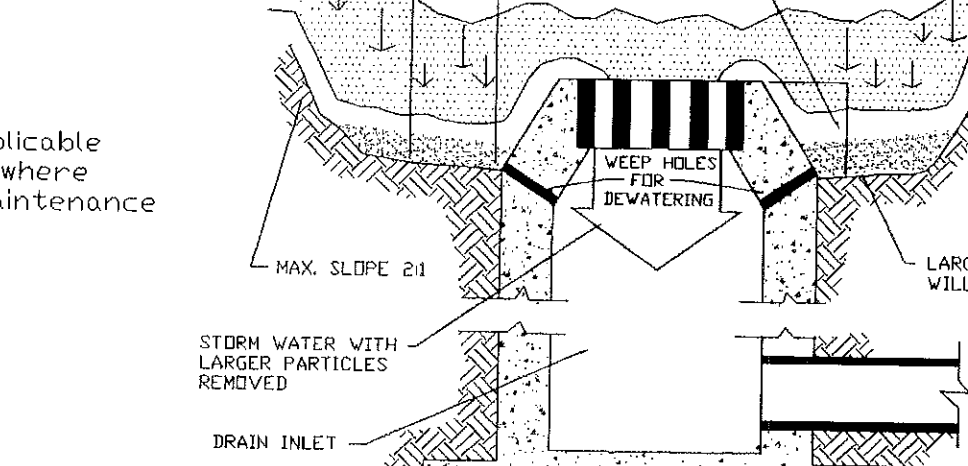
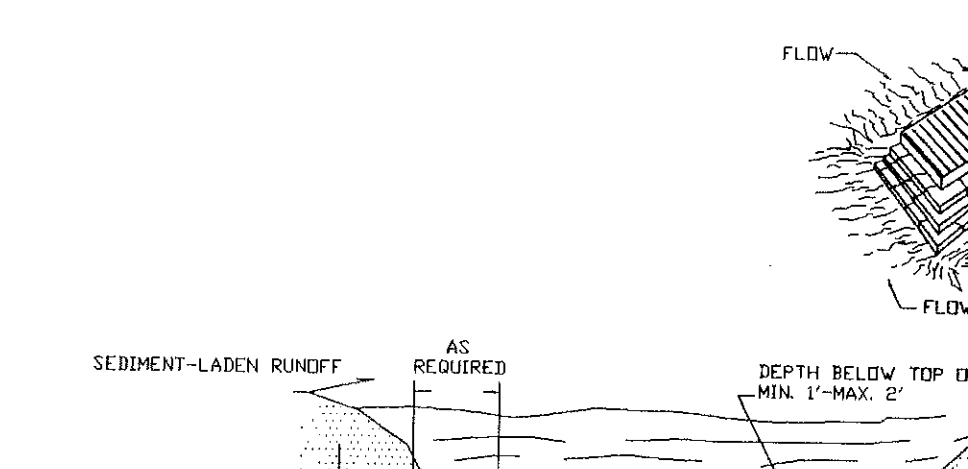
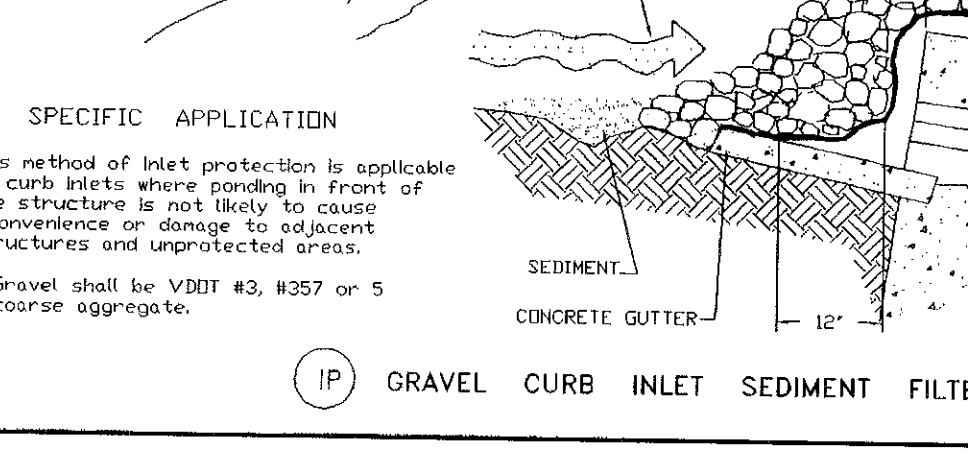
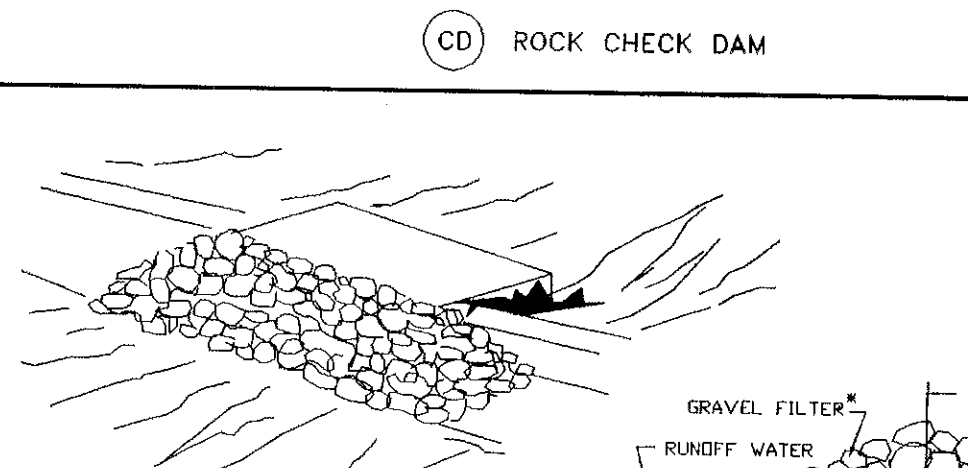
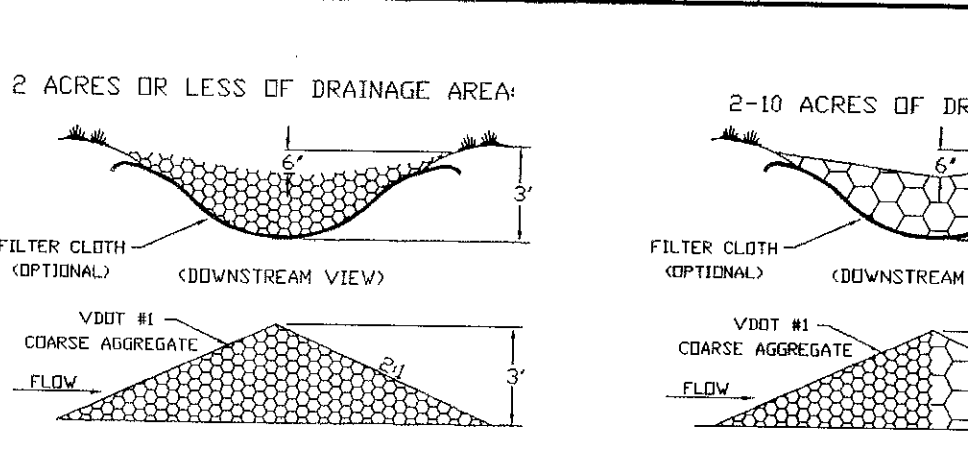


- GENERAL NOTES
- DESIGN OF DETENTION BASINS SHALL CONFORM TO THE REQUIREMENTS OF THE COUNTY OF ROANOKE DRAINAGE STANDARDS (REF. SECTIONS 502.05, 502.05.1, AND 502.05.2). THE DESIGN OF THE FACILITY AND PREPARATION OF AS-BUILT PLANS SHALL BE BY A CERTIFIED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE COMMONWEALTH OF VIRGINIA.
  - ACCESS TO THE FACILITY MUST BE PROVIDED IN ACCORDANCE WITH THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.
  - 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 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.
  - 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.
  - 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:
    - DIMENSIONS OF THE FACILITY
    - VOLUME @ MAXIMUM DEPTH
    - ELEVATIONS OF STRUCTURES, SPILLWAYS, AND TOP
    - MATERIALS VERIFICATION INCLUDING RESULTS OF DENSITY TESTS CONDUCTED BY AN INDEPENDENT SOIL TESTING LABORATORY
    - LOCATION AND ELEVATION OF BENCHMARK
  - ONE FOOT MINIMUM FREEBOARD REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION.

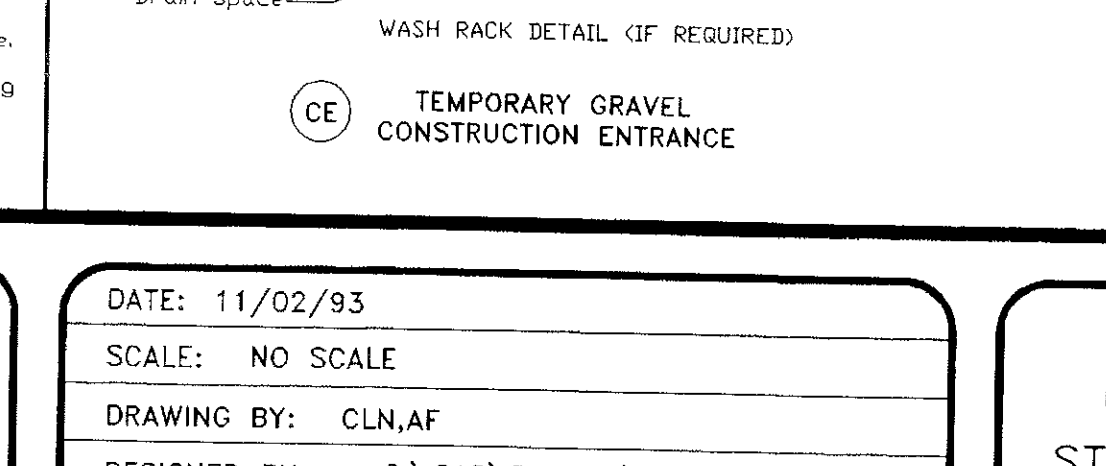
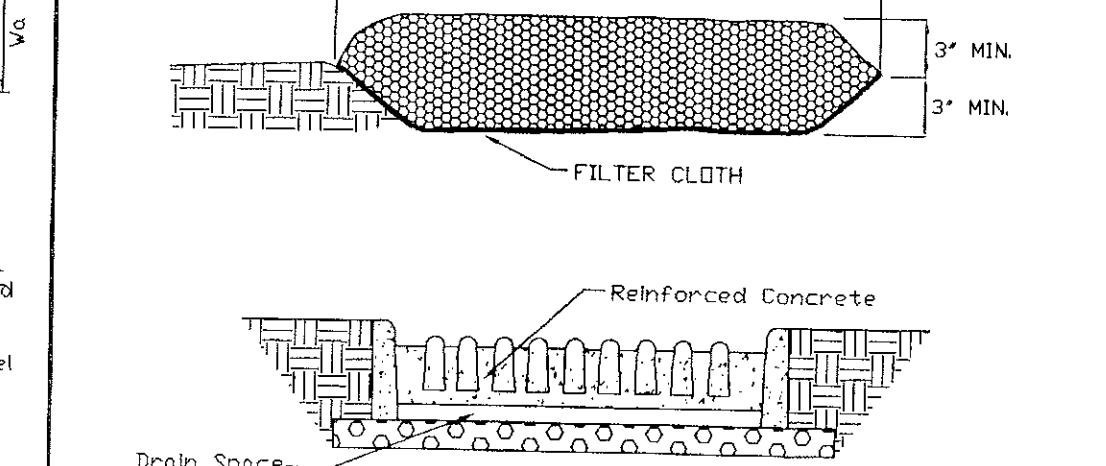
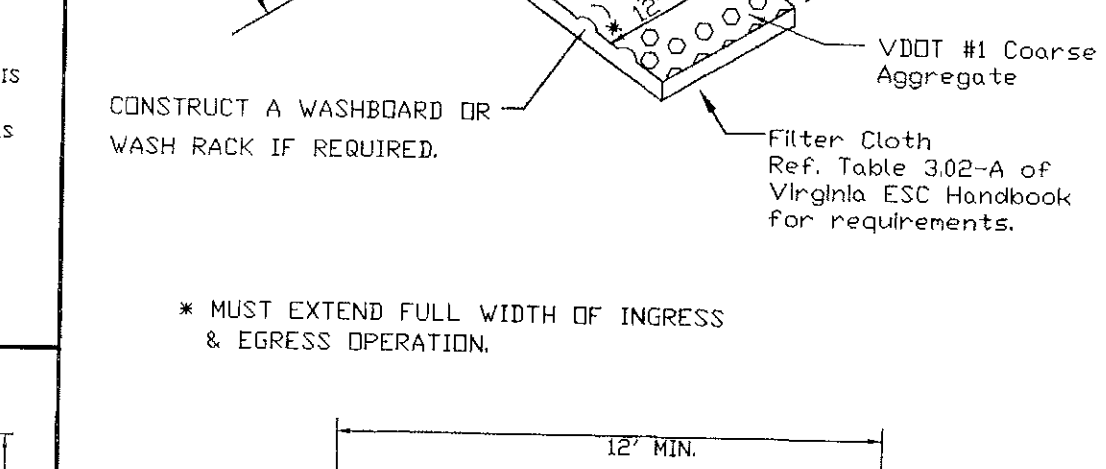
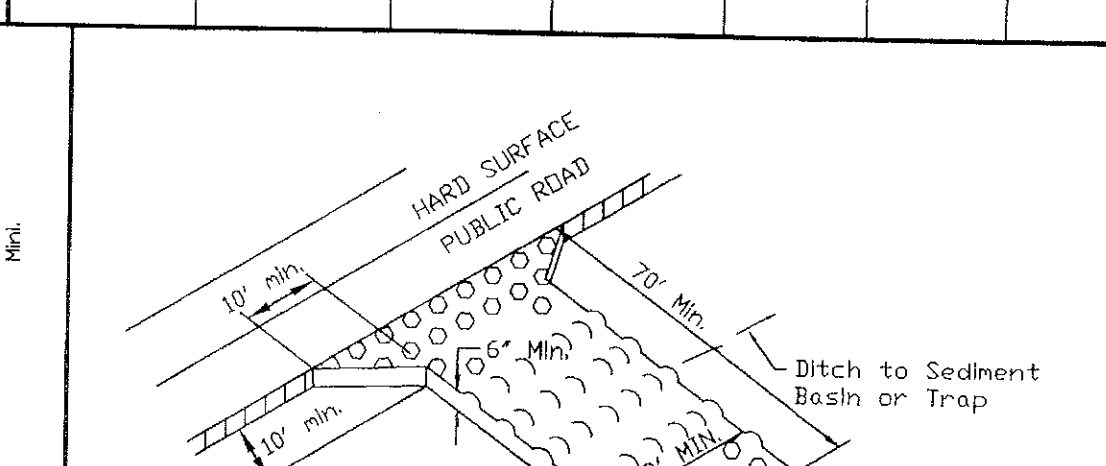
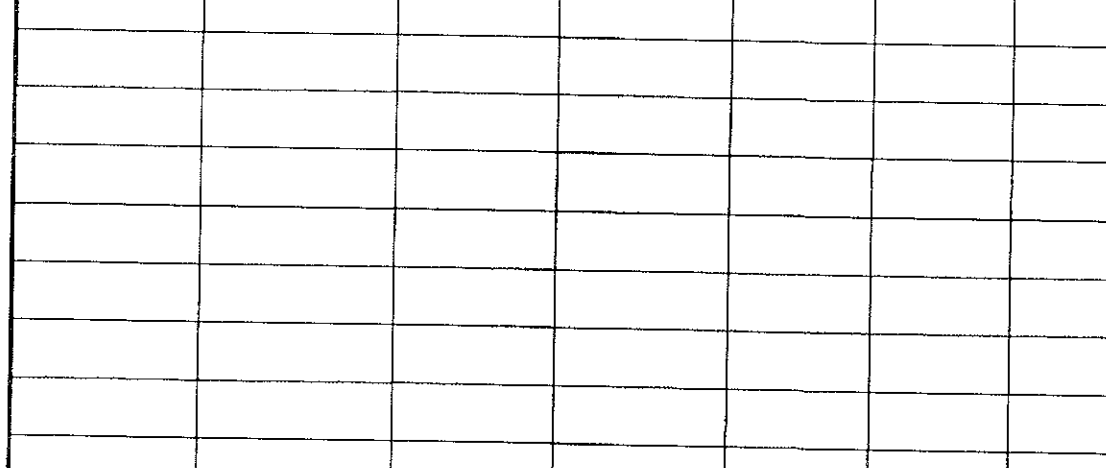
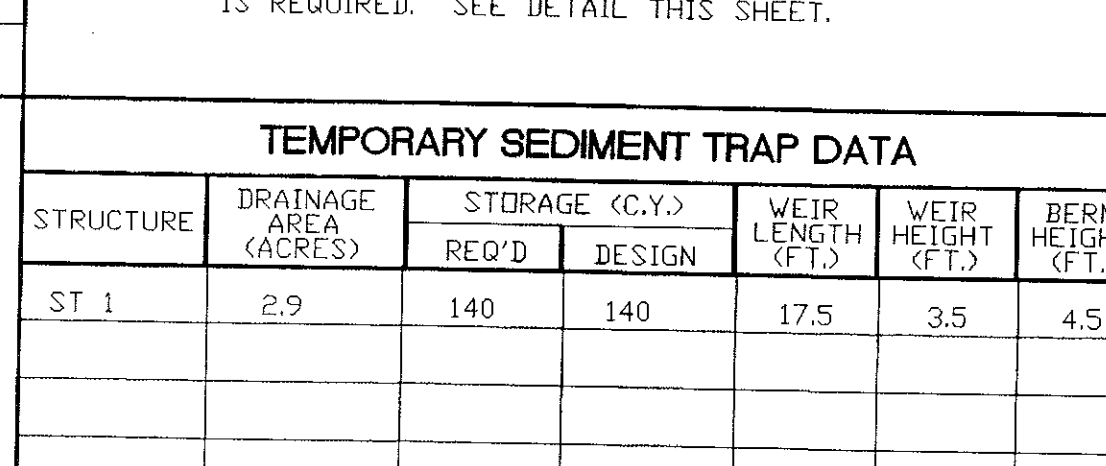
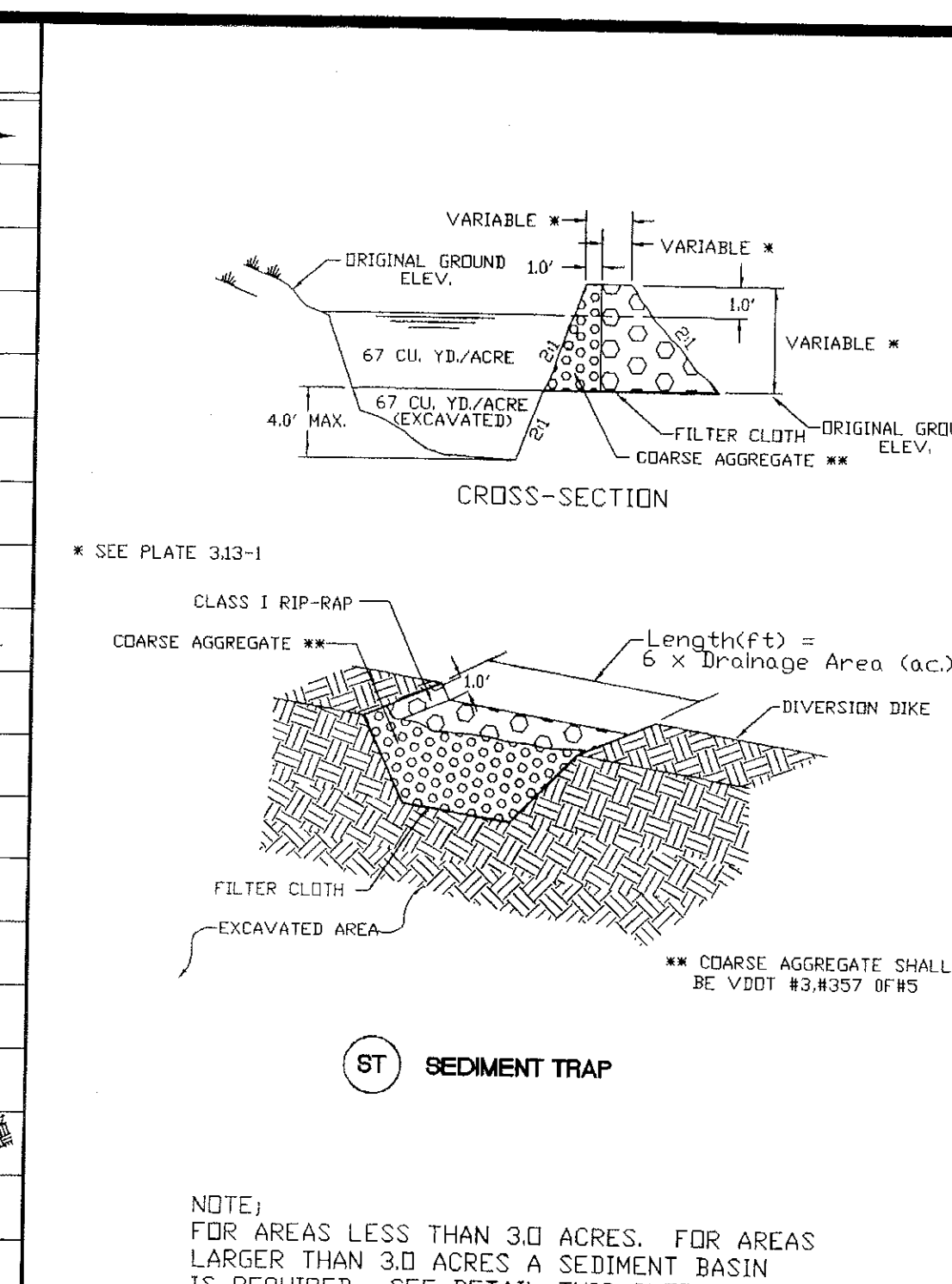
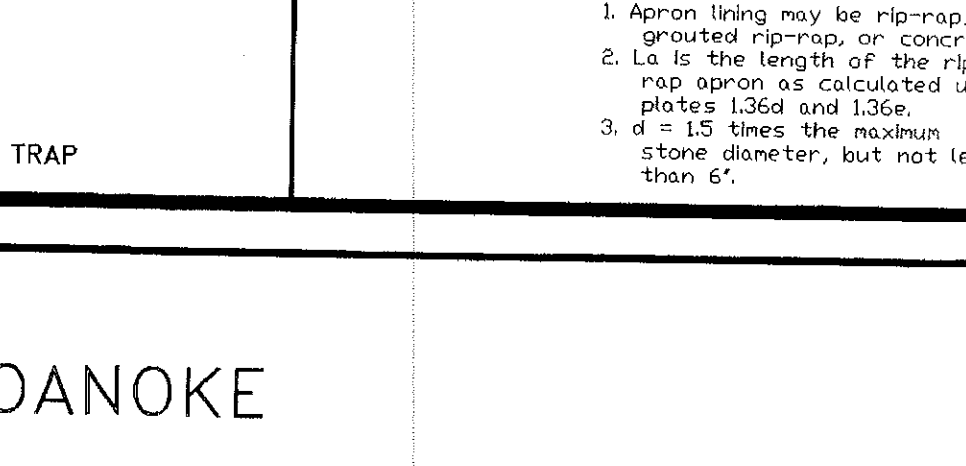
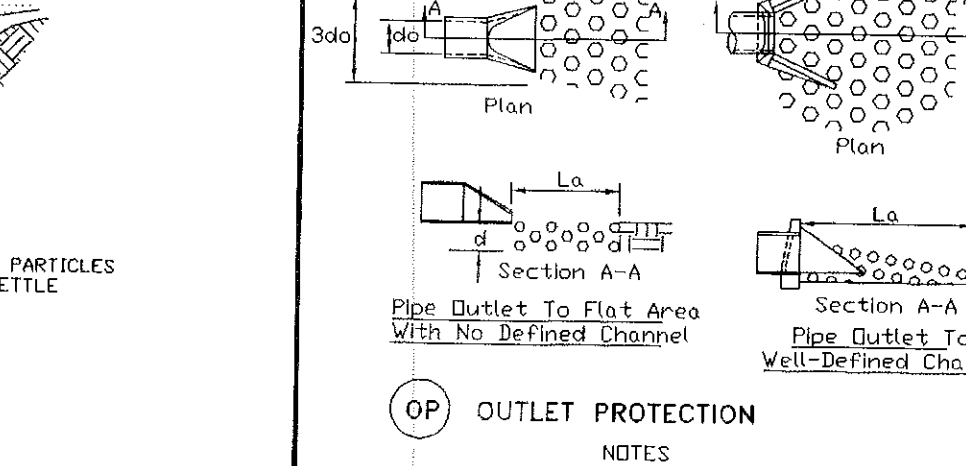
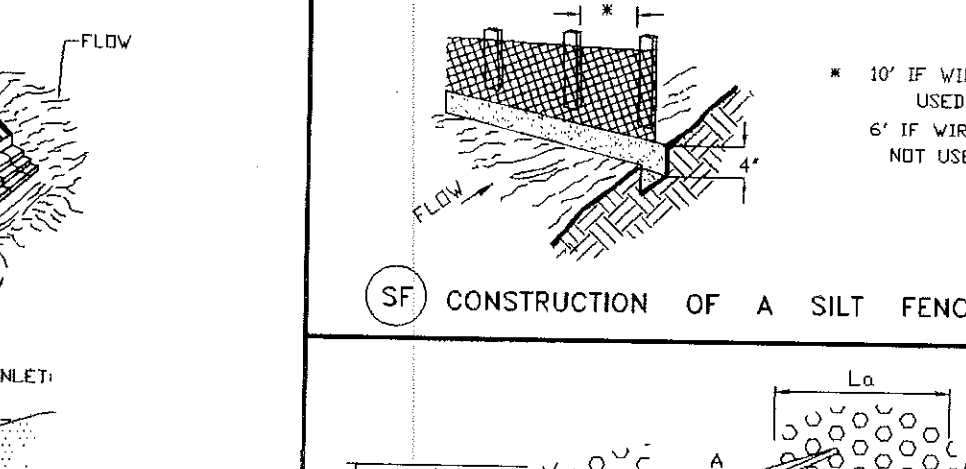
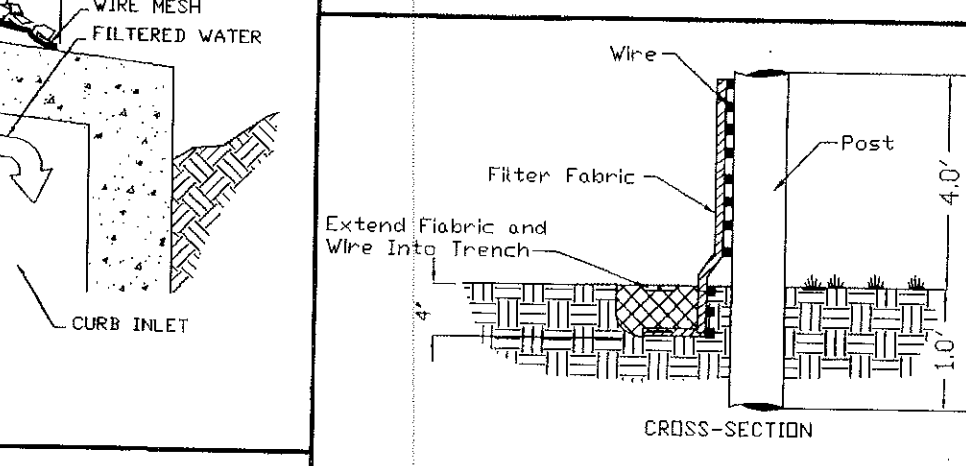
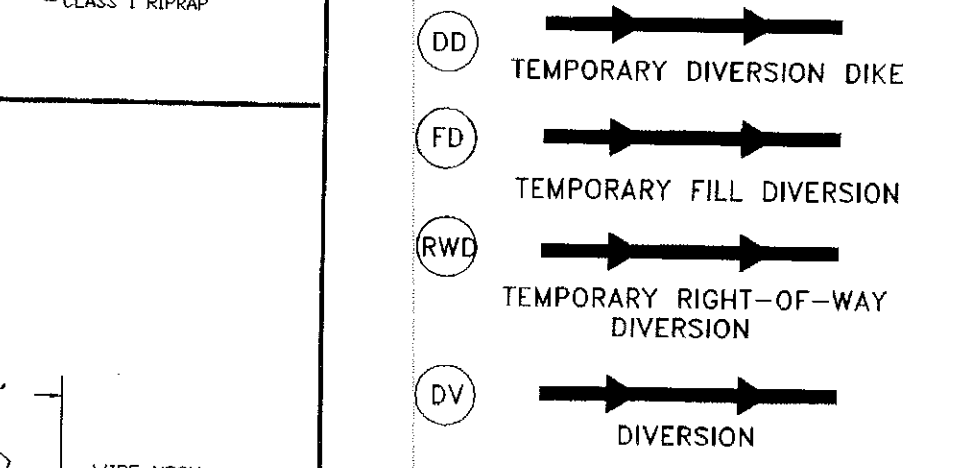
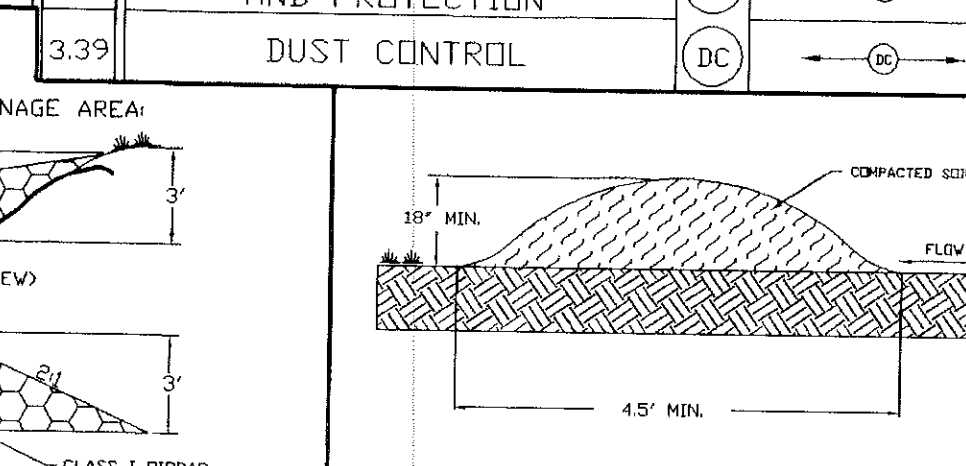
- CONSTRUCTION NOTES
- SITE PREPARATION SHALL BE IN ACCORDANCE WITH THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.
  - SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCH OR STEPPED PRIOR TO PLACING FILL ON THEM.
  - ON-SITE FILL MATERIAL OR 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 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 REWORKED AND/OR RECOMPACTED UNTIL THE REQUIRED DEGREE OF COMPACTION IS ACHIEVED.
  - ANTI-SEEP COLLARS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
  - ALL DISTURBED AREAS SHALL BE COVERED WITH FOUR (4) INCHES OF TOPSOIL AND SEED.
  - THE MINIMUM SLOPE OF THE BASIN FLOOR SHALL BE ONE (1) PERCENT GRADED TO DRAIN TO THE PRINCIPAL SPILLWAY.



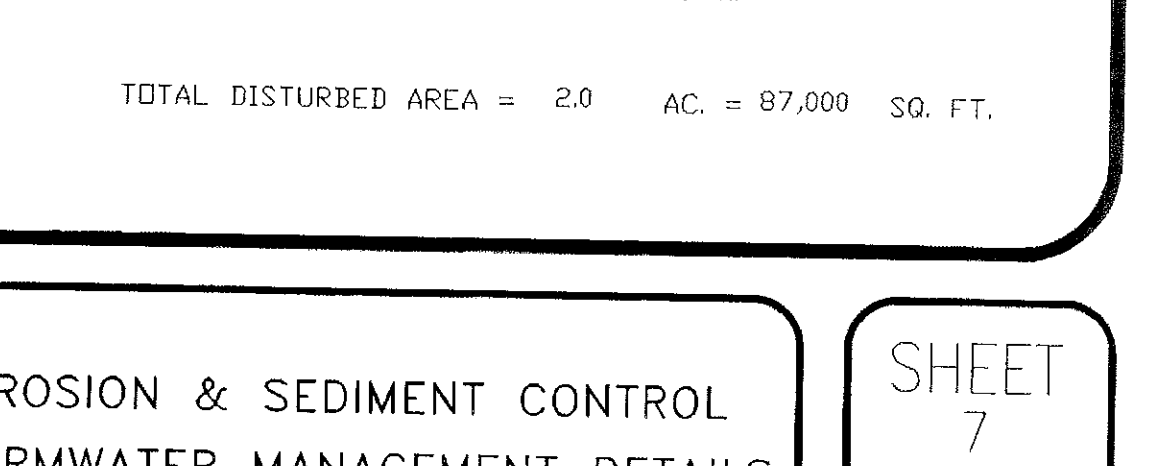
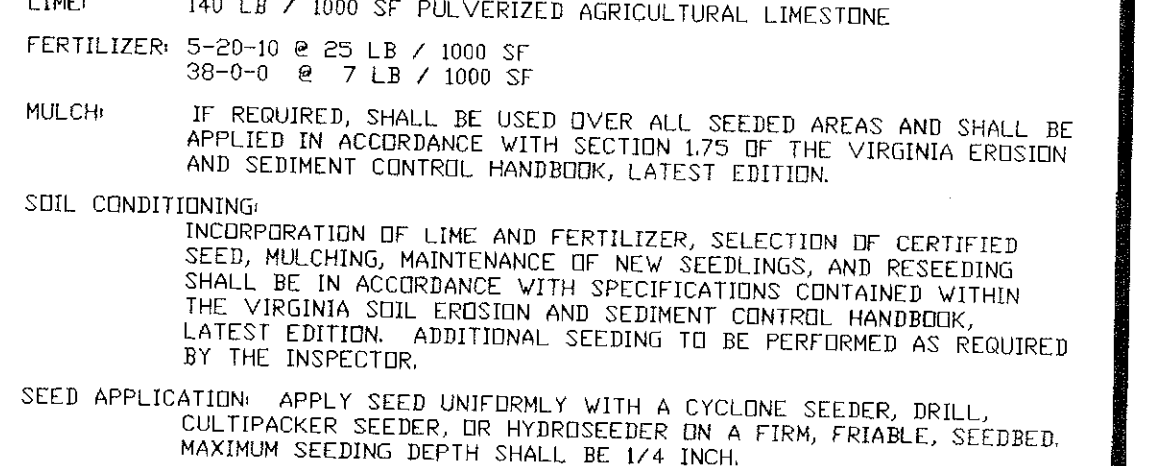
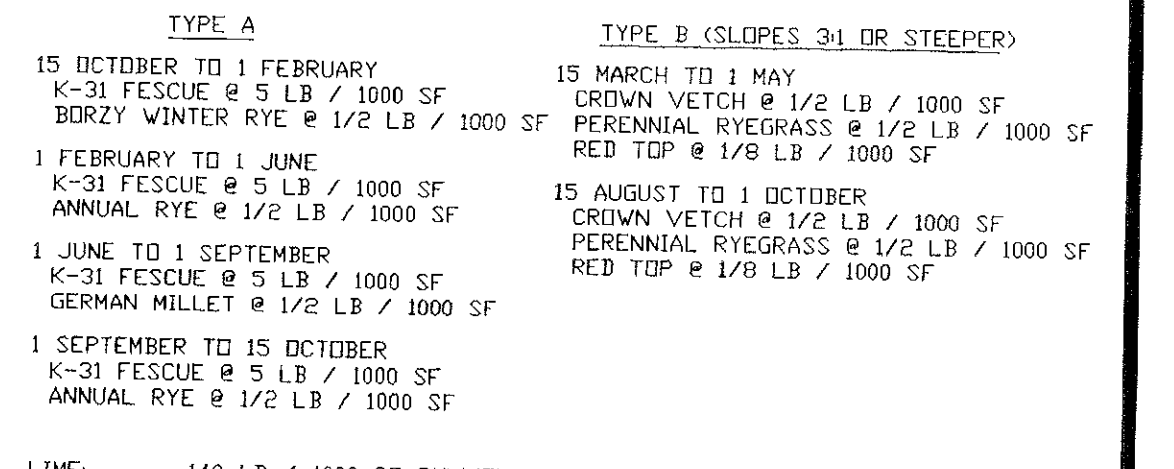
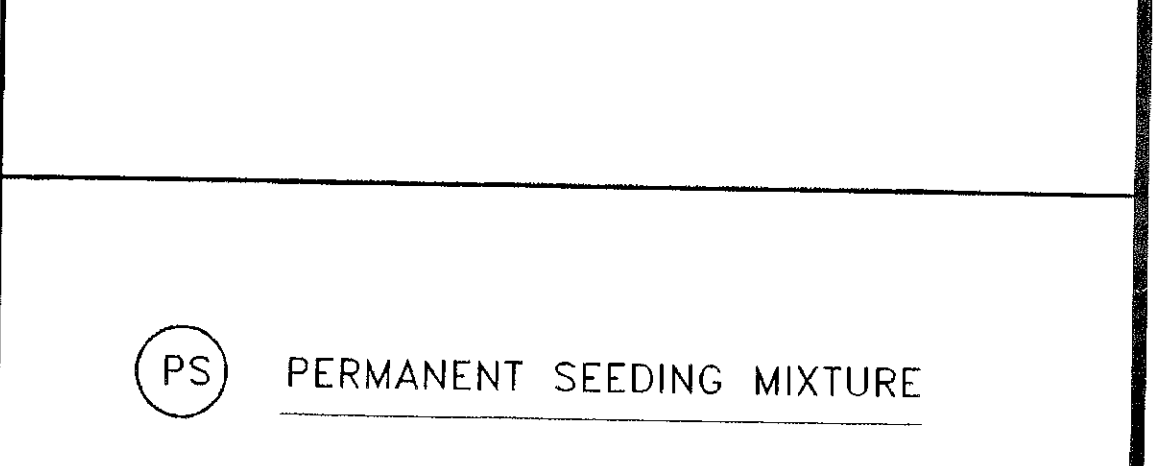
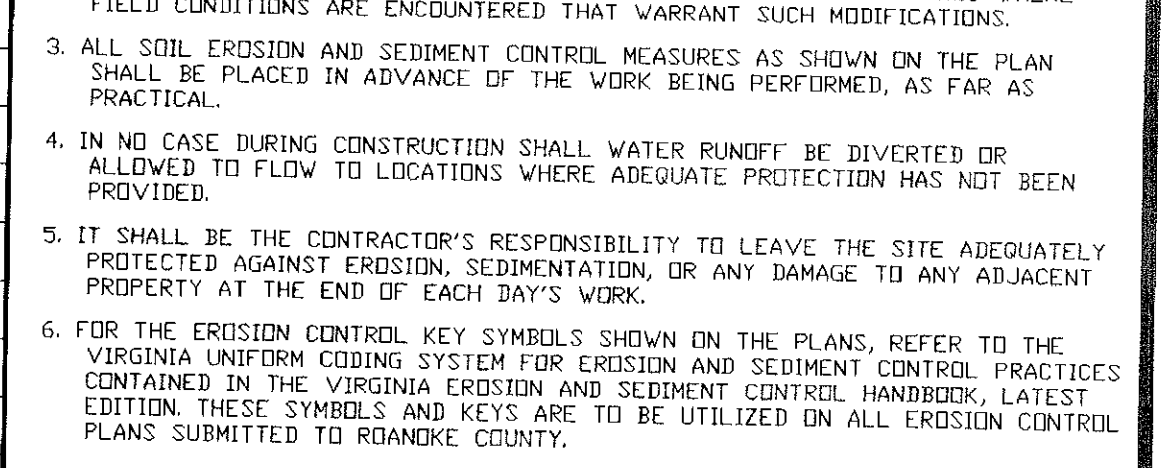
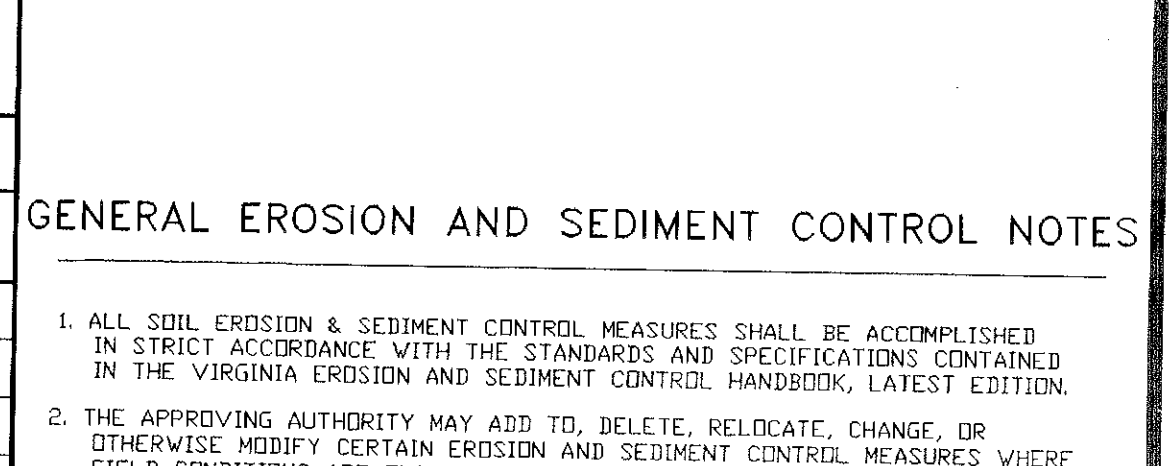
NO.	TITLE	KEY	SYMBOL	NO.	TITLE	KEY	SYMBOL
3.01	SAFETY FENCE	SAF	[Symbol]	3.20	ROCK CHECK DAMS	CD	[Symbol]
3.02	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE STABILIZATION	CE	[Symbol]	3.21	LEVEL SPREADER	LS	[Symbol]
3.03	STRAW BALE BARRIER	STB	[Symbol]	3.22	VEGETATIVE STREAMBANK STABILIZATION	VSS	[Symbol]
3.04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



NO.	TITLE	KEY	SYMBOL	NO.	TITLE	KEY	SYMBOL
3.20	ROCK CHECK DAMS	CD	[Symbol]	3.37	TREES, SHRUBS, VINES AND GROUND COVERS	VEG	[Symbol]
3.21	LEVEL SPREADER	LS	[Symbol]	3.38	TREE PRESERVATION AND PROTECTION	TP	[Symbol]
3.22	VEGETATIVE STREAMBANK STABILIZATION	VSS	[Symbol]	3.39	DUST CONTROL	DC	[Symbol]
3.23	STRUCTURAL STREAMBANK STABILIZATION	SSS	[Symbol]				
3.24	TEMPORARY VEHICULAR STREAM CROSSING	VSC	[Symbol]				
3.25	UTILITY STREAM CROSSING	USC	[Symbol]				
3.26	DEWATERING STRUCTURE	DS	[Symbol]				
3.27	TURBIDITY CURTAIN	TC	[Symbol]				
3.28	SUBSURFACE DRAIN	SD	[Symbol]				
3.29	SURFACE ROUGHENING	SR	[Symbol]				
3.30	TOPSOILING	TO	[Symbol]				
3.31	TEMPORARY SEEDING	TS	[Symbol]				
3.32	PERMANENT SEEDING	PS	[Symbol]				
3.33	SODDING	SD	[Symbol]				
3.34	BERMUDA GRASS AND ZOYSIAURASS ESTABLISHMENT	B/Z	[Symbol]				
3.35	MULCHING	MU	[Symbol]				
3.36	SOIL STABILIZATION BLANKETS AND MATTING	SB	[Symbol]				
3.37	TREES, SHRUBS, VINES AND GROUND COVERS	VEG	[Symbol]				
3.38	TREE PRESERVATION AND PROTECTION	TP	[Symbol]				
3.39	DUST CONTROL	DC	[Symbol]				



EROSION-SILTATION CONTROL COST ESTIMATE				
ALL COSTS GIVEN ARE COMPLETE IN PLACE				
DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CONSTRUCTION ENTRANCE	EA	1	\$700	\$700
SILT FENCE	LF	1025	\$3/ft	\$3075.00
INLET PROTECTION	EA	8	\$100	\$800.00
TEMPORARY DIVERSION DIKE	LF	470	\$3/ft	\$1410
TEMPORARY FILL DIVERSION	LF			
SEDIMENT TRAP	EA	2	\$500	\$1000.00
CONST. ROAD STAB.	LS			
PERMANENT SEEDING	1000/SF	50	\$40/1000 sF	\$2000.00
OUTLET PROTECTION	EA	2	\$500	\$1000.00
TEMP SLOPE DRAIN	LF		\$12/ft	
ROCK CHECK DAMS	EA		\$100	
BANK STAB. EC-2	SF	800	\$0.75/SF	\$600.00
SUB-TOTAL				10,585
10% CONTINGENCY				\$1060
TOTAL PROJECT COST				\$11,645



DEPARTMENT OF ENGINEERING AND INSPECTIONS

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

COUNTY OF ROANOKE

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

EROSION & SEDIMENT CONTROL STORMWATER MANAGEMENT DETAILS

SHEET 7

RC-010143