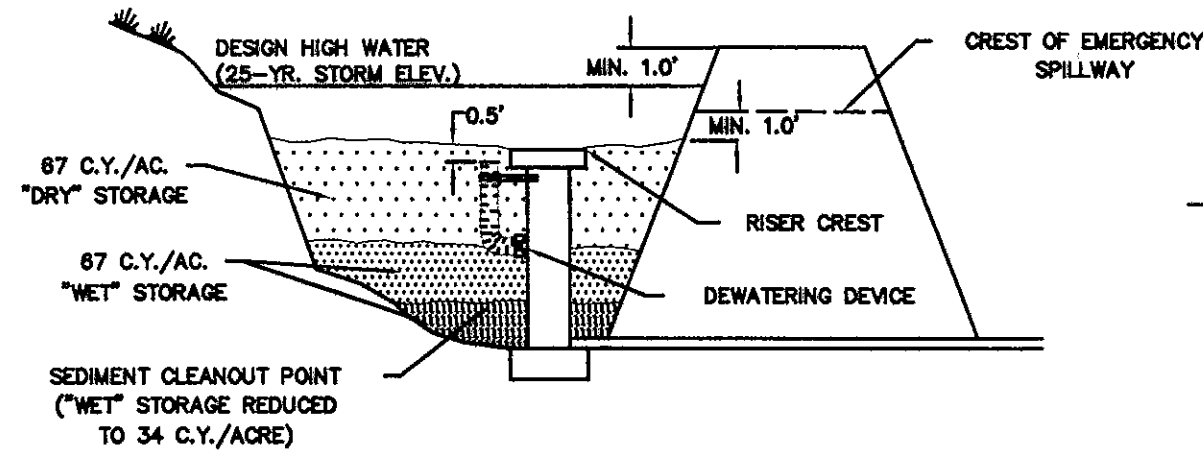
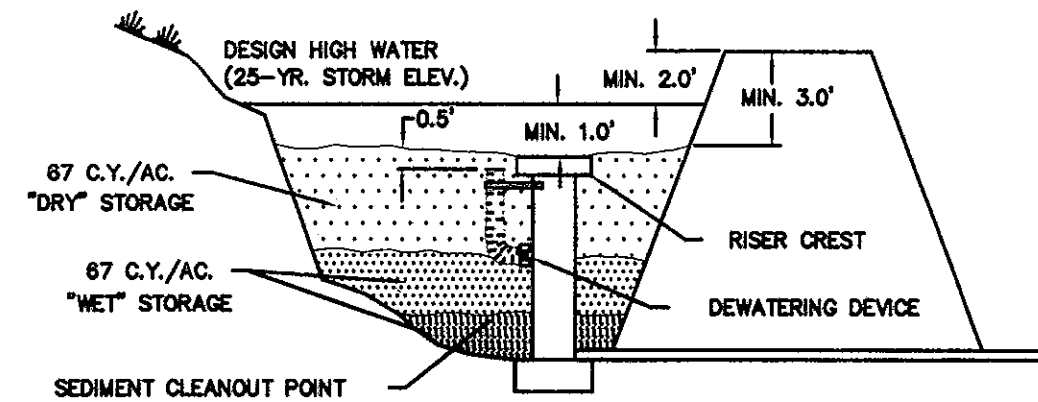


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## SEDIMENT BASIN SCHEMATIC ELEVATIONS

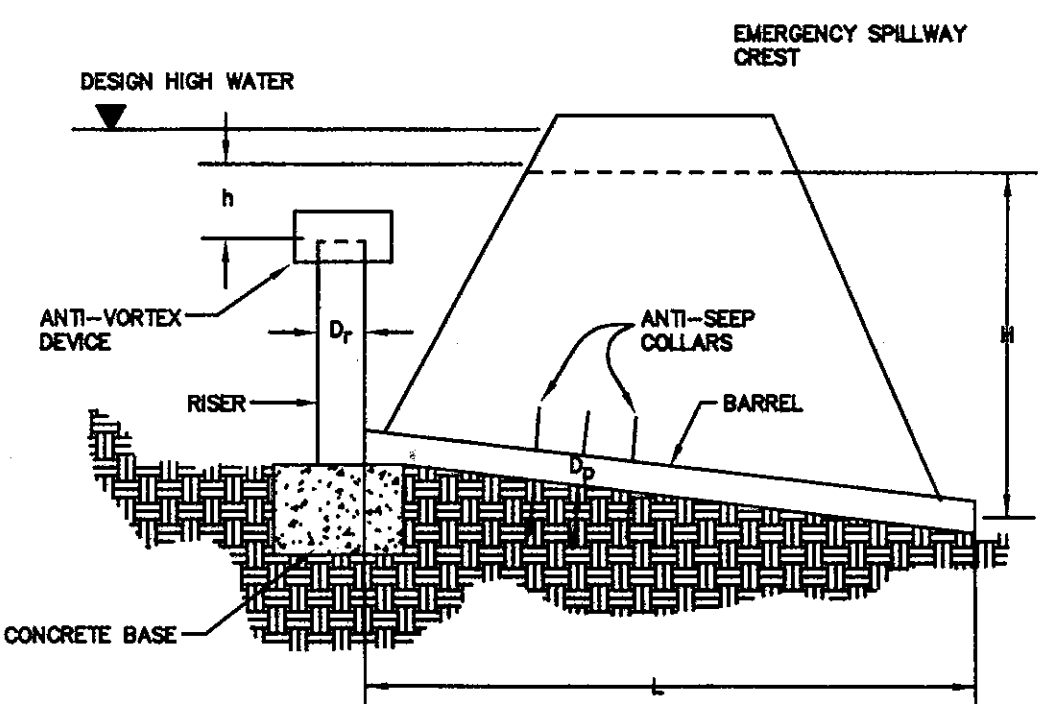


### DESIGN ELEVATIONS WITH EMERGENCY SPILLWAY



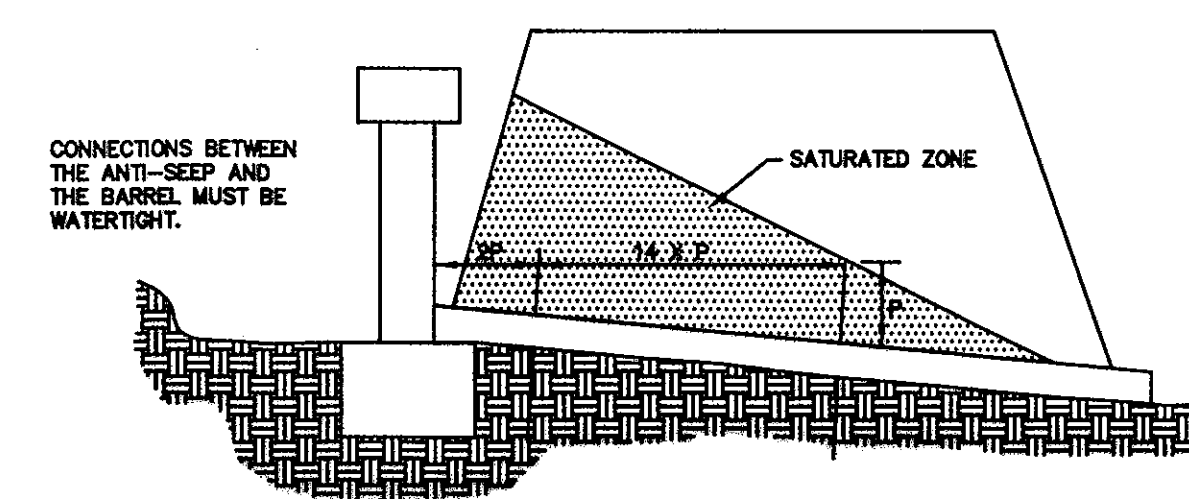
### DESIGN ELEVATIONS WITHOUT EMERGENCY SPILLWAY (RISER PASSES 25-YR. EVENT)

## PRINCIPAL SPILLWAY DESIGN



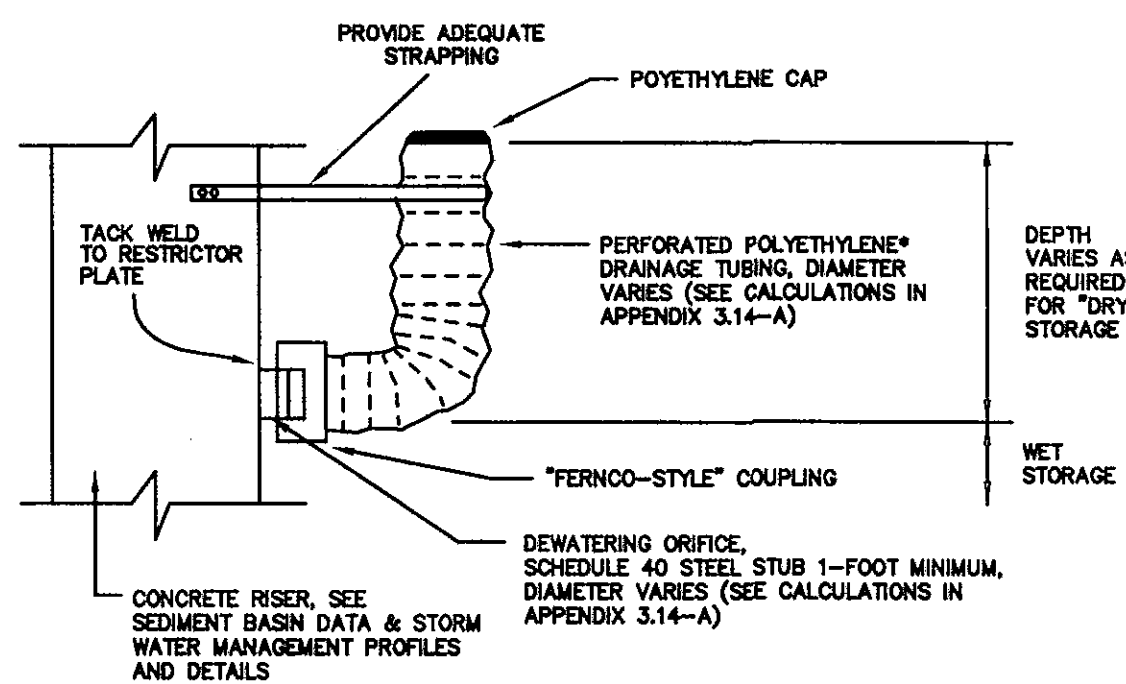
H = HEAD ON PIPE THROUGH EMBANKMENT  
h = HEAD OVER RISER CREST  
L = LENGTH OF PIPE THROUGH EMBANKMENT  
D<sub>p</sub> = DIAMETER OF PIPE THROUGH EMBANKMENT  
D<sub>r</sub> = DIAMETER OF RISER

## ANTI-SEEP COLLAR



NOTE: ANTI-SEEP COLLARS SHALL BE CONCRETE, SIX INCHES THICK FORMED AROUND THE PIPE WITH #3 REBAR SPACED 15" VERTICALLY AND HORIZONTALLY.

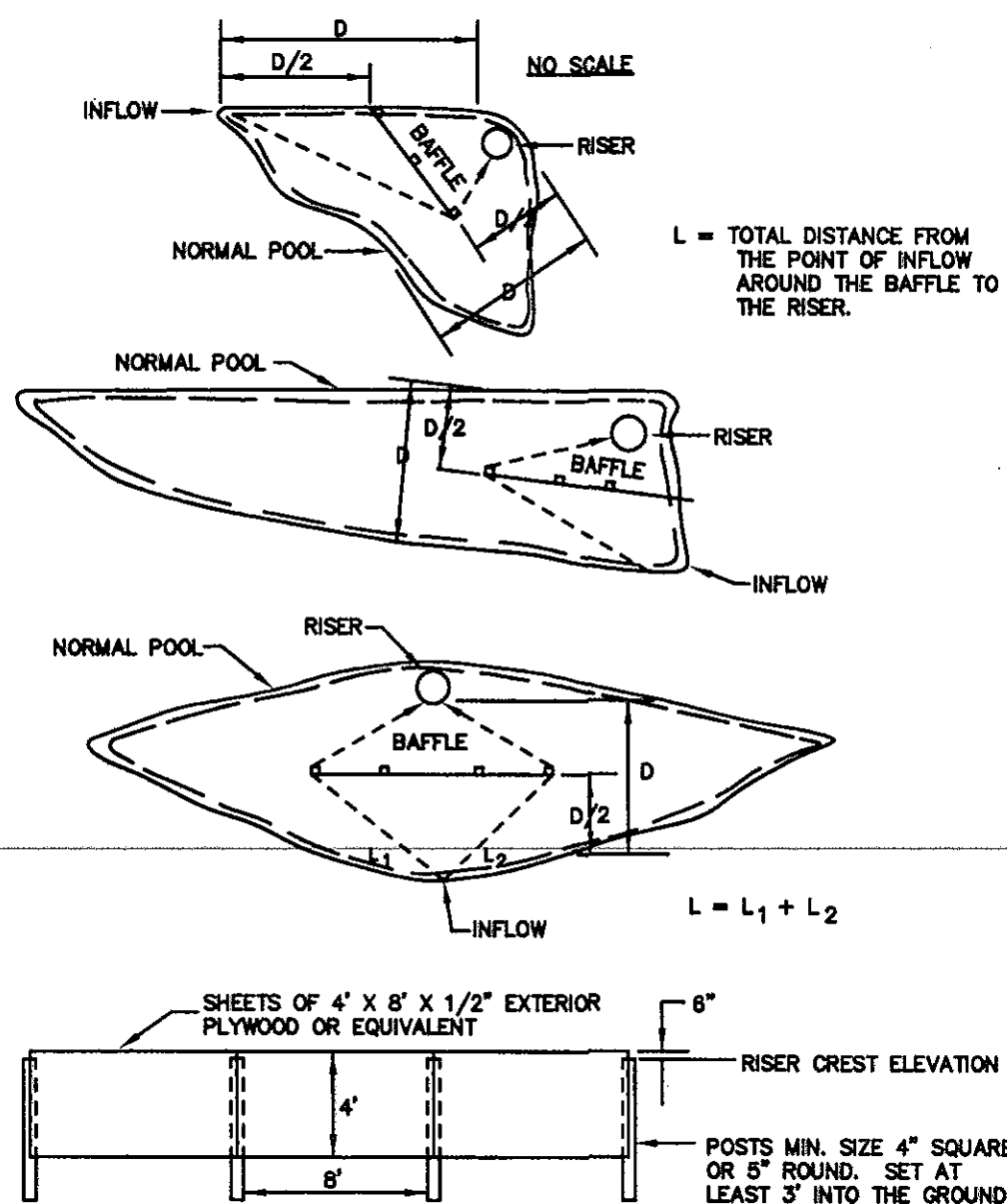
## RECOMMENDED DEWATERING SYSTEM FOR SEDIMENT BASINS



NOTE: DEWATERING ORIFICE TO BE PROVIDED TACK WELDED TO A RESTRICTOR PLATE OVER THE WATER QUALITY ORIFICE IN THE CONCRETE RISER FOR EACH BASIN.

\*DRAINAGE TUBING SHALL COMPLY WITH ASTM F667 AND AASHTO M294

## EXAMPLE PLAN VIEWS OF BAFFLE LOCATIONS IN SEDIMENT BASINS



## ROANOKE COUNTY GENERAL NOTES

- DESIGN OF DETENTION BASINS SHALL CONFORM TO THE REQUIREMENTS OF THE COUNTY OF ROANOKE DRAINAGE STANDARDS (REF. SECTIONS 505.02, 505.03, 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.
- 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. TWO FEET MINIMUM FREEBOARD REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION REQUIRED IF A RISER PIPE IS USED WITHOUT AN EMBANKMENT CUT EMERGENCY SPILLWAY.

## CONSTRUCTION NOTES

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

IN GENERAL:  
AREAS UNDER THE EMBANKMENT OR ANY STRUCTURAL WORKS RELATED TO ANY BASIN/POND SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL IN ORDER TO FACILITATE CLEANOUT AND RESTORATION. THE AREA OF MOST FREQUENT INUNDATION MEASURED FROM THE TOP OF THE PRINCIPAL SPILLWAY WILL BE CLEARED OF ALL BRUSH, TREES AND DEBRIS.
- SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCHMARKED OR STEPPED PRIOR TO PLACING FILL ON THEM.
- ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED. FILL MATERIAL SHALL, 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) 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.
- 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.

## ADDITIONAL SITE CONSTRUCTION NOTES & SPECIFICATIONS

IN ADDITION TO THE "GENERAL NOTES" GIVEN ON THIS SHEET THE FOLLOWING CONSTRUCTION SPECIFICATIONS APPLY. IN THE EVENT OF DUPLICATION OF STANDARD OR SPECIFICATION THE MORE STRINGENT SHALL APPLY IN ALL CASES.

### CUTOFF TRENCH

FOR EARTH-FILL EMBANKMENTS, A CUTOFF TRENCH SHALL BE EXCAVATED ALONG THE CENTERLINE OF THE DAM. THE TRENCH MUST EXTEND AT LEAST 1 FOOT INTO A STABLE, IMPERVIOUS LAYER OF SOIL AND HAVE A MINIMUM DEPTH OF 2 FEET. THE CUTOFF TRENCH SHALL EXTEND UP BOTH ABUTMENTS TO THE RISER CREST ELEVATION. THE MINIMUM BOTTOM WIDTH SHALL BE 4 FEET, BUT ALSO MUST BE WIDE ENOUGH TO PERMIT OPERATION OF COMPACTION EQUIPMENT. THE SIDE SLOPES SHALL BE NO STEEPER THAN 1:1.

COMPACTION REQUIREMENTS SHALL BE THE SAME AS THOSE FOR THE EMBANKMENT. THE TRENCH SHALL BE DRAINED DURING THE BACKFILLING/COMPACTION OPERATIONS.

### EMBANKMENT

THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED BORROW AREAS. IT SHALL BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOODY VEGETATION, STUMPS, SOD, OVERSIZED STONES, ROCKS, OR OTHER PERISHABLE OR OBJECTIONABLE MATERIAL. THE MATERIAL SELECTED MUST HAVE ENOUGH STRENGTH FOR THE DAM TO REMAIN STABLE AND BE TIGHT ENOUGH, WHEN PROPERLY COMPACTED, TO PREVENT EXCESSIVE PERCOLATION OF WATER THROUGH THE DAM. FILL CONTAINING PARTICLES RANGING FROM SMALL GRAVEL OR COARSE SAND TO FINE SAND AND CLAY IN DESIRED PROPORTION IS APPROPRIATE. ANY EMBANKMENT MATERIAL SHOULD CONTAIN APPROXIMATELY 20% CLAY PARTICLES BY WEIGHT. USING THE UNITED SOIL CLASSIFICATION SYSTEM, SC (CLAYEY SAND), GC (CLAYEY GRAVEL) AND CL ("LOW LIQUID LIMIT" CLAY) ARE AMONG THE PREFERRED TYPES OF EMBANKMENT SOILS. AREA ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. ALL FILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH ROANOKE COUNTY STANDARDS AND SPECIFICATIONS. FILL MATERIAL WILL BE PLACED IN 8-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL. COMPACTION SHALL BE OBTAINED BY ROANOKE COUNTY APPROVED EQUIPMENT AND METHODS.

SPECIAL CARE SHALL BE TAKEN IN COMPACTING AROUND THE ANTI-SEEP COLLARS (COMPACT BY HAND, IF NECESSARY) TO AVOID DAMAGE AND ACHIEVE DESIRED COMPACTION. THE EMBANKMENT SHALL BE CONSTRUCTED TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLEMENT IF COMPACTION IS OBTAINED WITH HAULING EQUIPMENT. IF COMPACTORS ARE USED FOR COMPACTION, THE OVERBUILT MAY BE REDUCED TO NOT LESS THAN 5%.

### PRINCIPAL SPILLWAY

THE RISER OF THE PRINCIPAL SPILLWAY SHALL BE SECURELY ATTACHED TO THE BARREL BY A WATERTIGHT CONNECTION. THE BARREL AND RISER SHALL BE PLACED ON A FIRMLY ANCHORED SOIL FOUNDATION. THE BASE OF THE RISER SHALL BE FIRMLY ANCHORED ACCORDING TO DESIGN CRITERIA TO PREVENT ITS FLOATING. PERVIOUS MATERIALS SUCH AS SAND, GRAVEL, OR CRUSHED STONE SHALL NOT BE USED AS BACKFILL AROUND THE BARREL OR ANTI-SEEP COLLARS. SPECIAL CARE SHALL BE TAKEN IN COMPACTING AROUND THE ANTI-SEEP COLLARS (COMPACT BY HAND, IF NECESSARY). FILL MATERIAL SHALL BE PLACED AROUND THE PIPE IN 4-INCH LAYERS AND COMPACTED UNTIL 95% COMPACTION IS ACHIEVED. A MINIMUM OF TWO FEET OF FILL SHALL BE HAND-COMPACTED OVER THE BARREL BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.

### VEGETATION STABILIZATION

THE EMBANKMENT OF THE SEDIMENT BASIN SHALL BE STABILIZED WITH TEMPORARY OR PERMANENT VEGETATION IMMEDIATELY AFTER INSTALLATION OF THE BASIN SEE TEMPORARY SEEDING, (V.E.S.C.H. STD. & SPEC. 3.31 OR PERMANENT SEEDING, STD. & SPEC. 3.32).

### EROSION AND SEDIMENT CONTROL

THE CONSTRUCTION OF THE SEDIMENT BASIN SHALL BE CARRIED OUT IN A MANNER SUCH THAT IT DOES NOT RESULT IN SEDIMENT PROBLEMS DOWNSTREAM.

### SAFETY

ALL STATE AND LOCAL REQUIREMENTS SHALL BE MET CONCERNING FENCING AND SIGNS WARNING THE PUBLIC OF THE HAZARDS OF SOFT, SATURATED SEDIMENT AND FLOOD WATERS (REFER TO V.E.S.C.H. STD. & SPEC. 3.01, "SAFETY FENCE" AND ROANOKE COUNTY STANDARDS AND SPECIFICATIONS.).

### MAINTENANCE

THE BASIN EMBANKMENT SHOULD BE CHECKED REGULARLY TO ENSURE THAT IT IS STRUCTURALLY SOUND AND HAS NOT BEEN DAMAGED BY EROSION OR CONSTRUCTION EQUIPMENT.

THE BASIN SHOULD BE CHECKED AFTER EACH RUNOFF-PRODUCING RAINFALL FOR SEDIMENT CLEANOUT. WHEN THE SEDIMENT REACHES THE CLEAN-OUT LEVEL, IT SHALL BE REMOVED AND PROPERLY DISPOSED OF.

SEDIMENT BASIN DATA				
	BASIN 1	BASIN 2	BASIN 3	BASIN 4
<b>BARREL</b>				
Barrel Diameter	24"	24"	36"	24"
Barrel Length	99'	92'	75'	130'
Barrel Inlet Invert	1142.00	1127.50	1141.50	1144.00
Barrel Outlet Invert	1139.80	1125.10	1140.75	1142.70
Barrel Slope	2.42%	2.81%	1.00%	1.00%
Riprap Class at Outlet	BELOW "A"	BELOW "G"	I	BELOW "M"
<b>RISER</b>				
Riser Diameter	48"	48"	60"	48"
Riser Top Elevation	1153.00	1135.75	1151.00	1152.00
Barrel Inlet Invert	1142.00	1127.50	1141.50	1144.00
Dewatering Device Diameter	10"	8"	8"	10"
Dewatering Device Invert	1149.00	1133.80	1148.25	1149.80
Dewatering Device Tubing Dia.	12"	10"	10"	12"
Anti-Vortex Diameter (D)	VDOT STD.	VDOT STD.	VDOT STD.	VDOT STD.
Anti-Vortex Height (H)	SWM-DR	SWM-DR	SWM-DR	SWM-DR
<b>ANTI-SEEP COLLARS</b>				
Number	2	2	2	2
Size	6' X 6'	6' X 6'	6.3' X 6.3'	5' X 5'
Spacing	28'	28'	23'	21'
<b>BAFFLES</b>				
Length	N/A	40'	90'	50'
<b>EMERGENCY SPILLWAY</b>				
Bottom Elevation	1155.50	1138.25	N/A	N/A
Bottom Width	15'	15'		
Exit Channel Slope	33.3%	11.5%		
Exit Channel Length	20'	70'		
<b>EMBANKMENT</b>				
Basin Bottom Elevation	1143.00	1128.00	1142.00	1144.50
Embarkment Top Elevation	1157.00	1140.00	1154.00	1155.00
Interior Slope	3:1	3:1	3:1	3:1
Exterior Slope	3:1	3:1	3:1	3:1
Top Width	10'	10'	10'	10'
<b>CUT-OFF TRENCH</b>				
Depth	4'	4'	4'	4'
Width	8'	8'	8'	8'
Slopes	1:1	1:1	1:1	1:1

## SEDIMENT BASIN/STORMWATER MANAGEMENT FACILITY CONSTRUCTION/CONVERSION NOTES:

- WATER QUALITY ORIFICES TO BE PLUGGED WHEN FACILITY IS ACTING AS A TEMPORARY SEDIMENT BASIN.
- EACH RISER SHALL BE CONSTRUCTED WITH PERMANENT ORIFICE HOLE OPEN THROUGH CONCRETE RISER. A RESTRICTOR PLATE SHALL BE BOLTED AND SEALED TO OUTSIDE FACE OF RISER WITH ORIFICE HOLE IN RESTRICTOR PLATE ACCORDING TO DEWATERING DEVICE DIAMETER LISTED ABOVE WHEN FACILITY IS TO ACT AS A TEMPORARY SEDIMENT BASIN.
- RISERS TO BE INSTALLED TO TOP ELEVATIONS LISTED ABOVE WHEN FACILITY IS ACTING AS A TEMPORARY SEDIMENT BASIN.
- ONCE UPSTREAM AREAS ARE STABILIZED, TEMPORARY SEDIMENT BASIN CAN BE CONVERTED TO THE PERMANENT STORMWATER MANAGEMENT FACILITY. CONTACT ROANOKE COUNTY FOR PERMISSION PRIOR TO CONVERTING BASIN. AFTER GAINING ROANOKE COUNTY APPROVAL, THE FOLLOWING STEPS ARE REQUIRED FOR CONVERSION:
  - DRAIN POND AND GRADE FACILITY BOTTOM PER GRADING PLAN DETAILS. DISPOSE OF SEDIMENT LADEN RUNOFF FROM DRAINING OPERATIONS PER VA ESC STANDARDS AND REGULATIONS.
  - ADD GRADE RINGS TO RISERS FOR STORMWATER MANAGEMENT FACILITIES 2, 3, AND 4 TO FINAL TOP ELEVATIONS AS SHOWN ON PLANS. ADJUST TRASH RACKS.
  - CONSTRUCT SEDIMENT FOREBAYS AND OUTLET PROTECTION FOR INFLOW PIPES INTO FACILITY PER PLAN.
  - STABILIZE FACILITY IN ACCORDANCE WITH SPECIFICATIONS LISTED ON LANDSCAPE PLAN.
  - REMOVE TEMPORARY RESTRICTOR PLATES FROM PRINCIPAL ORIFICE HOLES. REPAIR/PATCH RISER AS NECESSARY. INSTALL PERMANENT RESTRICTOR PLATE FOR STORMWATER MANAGEMENT FACILITY 2 PRINCIPAL ORIFICE.
  - REMOVE PLUGS FROM WATER QUALITY ORIFICES.

LUMSDEN ASSOCIATES, P.C.  
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ROANOKE, VIRGINIA

COMMONWEALTH OF VIRGINIA  
THOMAS C. DALE  
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PROFESSIONAL ENGINEER

SEDIMENT BASIN  
NOTES AND  
DETAILS

OVERALL SITE INFRASTRUCTURE AND  
MASS GRADING DEVELOPMENT PLANS FOR  
THE OPPIDAN RETAIL CENTER  
PREPARED FOR  
OPPIDAN INVESTMENT COMPANY  
HOLLINS MAGISTERIAL DISTRICT  
ROANOKE COUNTY, VIRGINIA

REVISIONS	NO.	DATE	DESCRIPTION
	1	9/7/07	DEVELOPER REVISIONS
	2		
	3		
	4		
	5		

DATE: June 5, 2007

SCALE: NONE

COMMISSION NO. 2006-2240

SHEET 20 OF 23

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