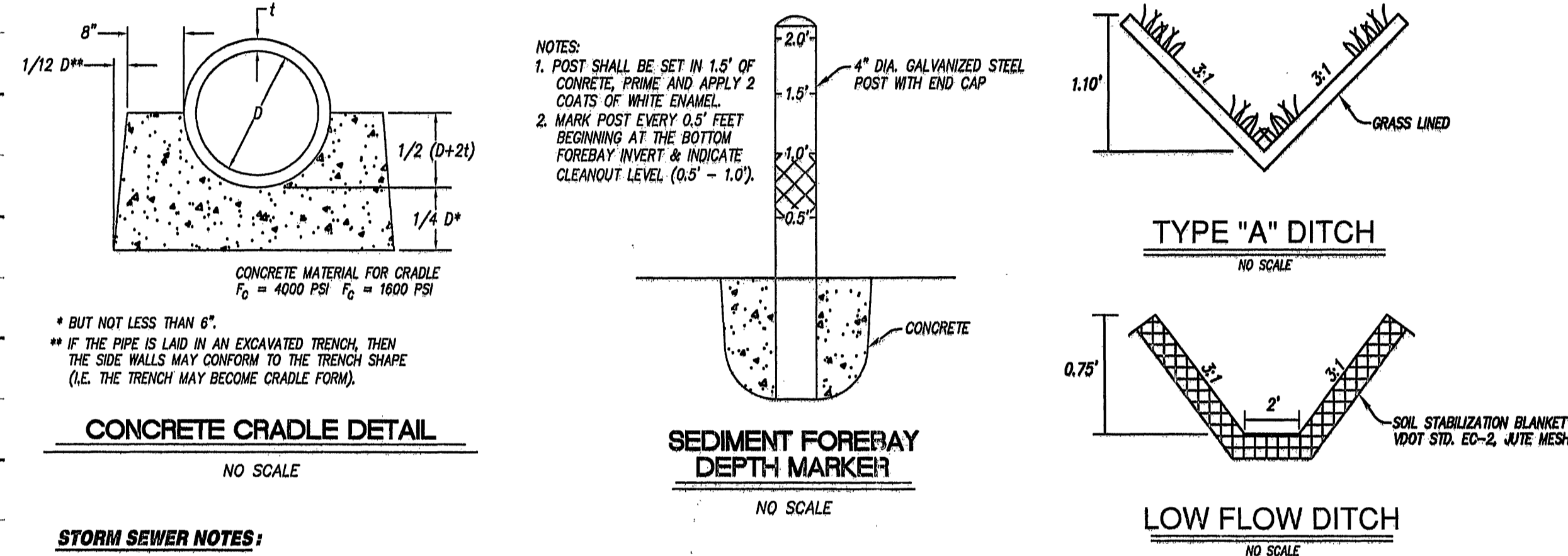
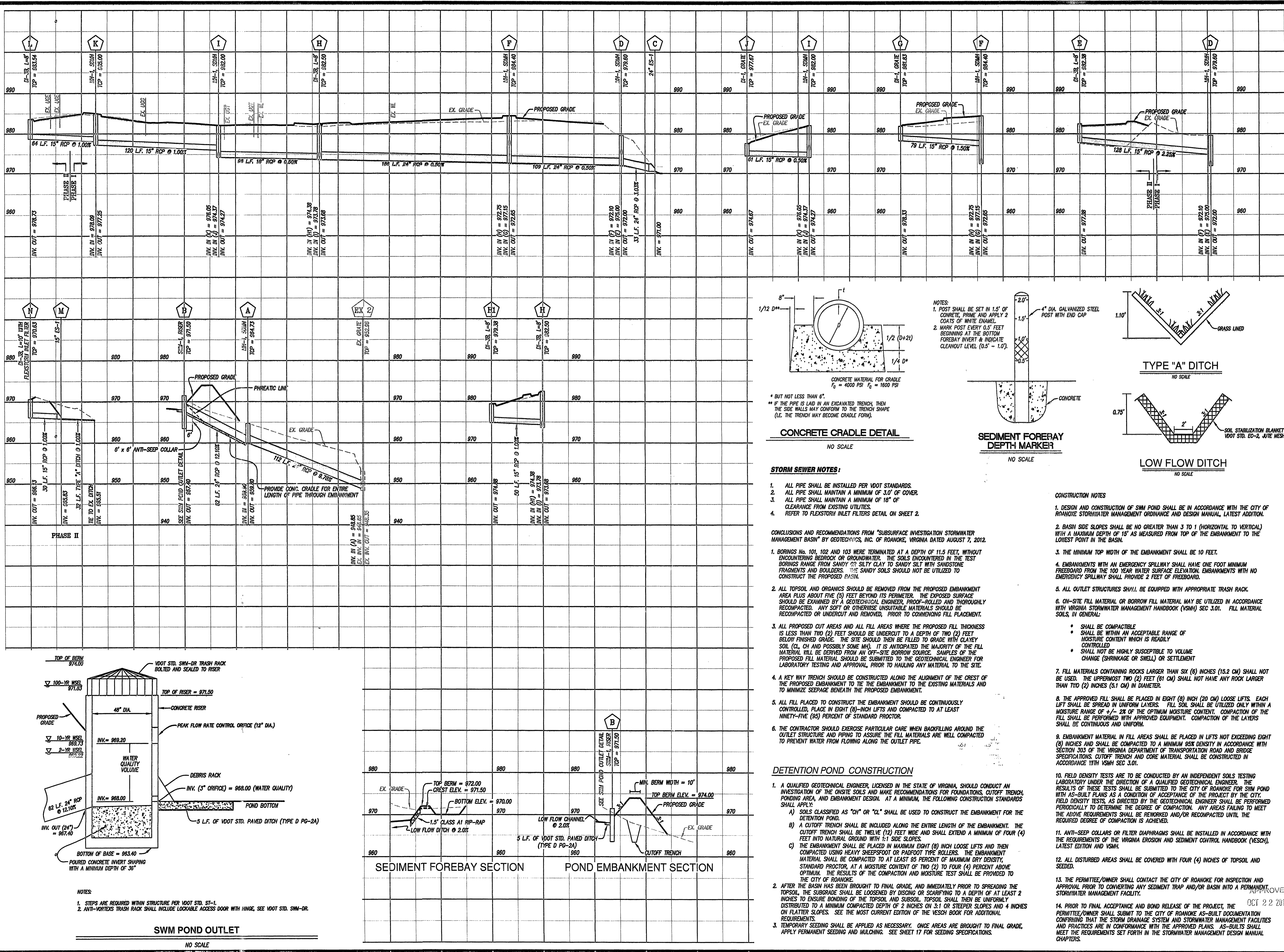


1258comp2-06-pr01.plt  
w:\drawings\2011\1258comp2.dwg  
1258comp2-06-pr01.plt



**STORM SEWER NOTES:**

- ALL PIPE SHALL BE INSTALLED PER VDOT STANDARDS.
- ALL PIPE SHALL MAINTAIN A MINIMUM OF 3.0' OF COVER.
- ALL PIPE SHALL MAINTAIN A MINIMUM OF 18" OF CLEARANCE FROM EXISTING UTILITIES.
- REFER TO FLEET/INLET FILTERS DETAIL ON SHEET 2.

**CONCLUSIONS AND RECOMMENDATIONS FROM "SUBSURFACE INVESTIGATION STORMWATER MANAGEMENT BASIN" BY GEOTECHNICS, INC. OF ROANOKE, VIRGINIA DATED AUGUST 7, 2012.**

- BORINGS No. 101, 102 AND 103 WERE TERMINATED AT A DEPTH OF 11.5 FEET, WITHOUT ENCOUNTERING BEDROCK OR GROUNDWATER. THE SOILS ENCOUNTERED IN THE TEST BORINGS RANGE FROM SANDY OR SILTY CLAY TO SANDY SILT WITH SANDSTONE FRAGMENTS AND BOULDERS. THE SANDY SOILS SHOULD NOT BE UTILIZED TO CONSTRUCT THE PROPOSED BASIN.
- ALL TOPSOIL AND ORGANICS SHOULD BE REMOVED FROM THE PROPOSED EMBANKMENT AREA PLUS ABOUT FIVE (5) FEET BEYOND ITS PERIMETER. THE EXPOSED SURFACE SHOULD BE EXAMINED BY A GEOTECHNICAL ENGINEER, PROOF-ROLLED AND THOROUGHLY RECOMPACTED. ANY SOFT OR OTHERWISE UNSUITABLE MATERIALS SHOULD BE RECOMPACTED OR UNDERCUT AND REMOVED, PRIOR TO COMMENCING FILL PLACEMENT.
- ALL PROPOSED CUT AREAS AND ALL FILL AREAS WHERE THE PROPOSED FILL THICKNESS IS LESS THAN TWO (2) FEET SHOULD BE UNDERCUT TO A DEPTH OF TWO (2) FEET BELOW FINISHED GRADE. THE SITE SHOULD THEN BE FILLED TO GRADE WITH CLAYEY SOIL (CL, CH AND POSSIBLY SOME MH). IT IS ANTICIPATED THE MAJORITY OF THE FILL MATERIAL WILL BE DERIVED FROM AN OFF-SITE BORROW SOURCE. SAMPLES OF THE PROPOSED FILL MATERIAL SHOULD BE SUBMITTED TO THE GEOTECHNICAL ENGINEER FOR LABORATORY TESTING AND APPROVAL, PRIOR TO HAULING ANY MATERIAL TO THE SITE.
- A KEY WAY TRENCH SHOULD BE CONSTRUCTED ALONG THE ALIGNMENT OF THE CREST OF THE PROPOSED EMBANKMENT TO TIE THE EMBANKMENT TO THE EXISTING MATERIALS AND TO MINIMIZE SEEPAGE BENEATH THE PROPOSED EMBANKMENT.
- ALL FILL PLACED TO CONSTRUCT THE EMBANKMENT SHOULD BE CONTINUOUSLY CONTROLLED, PLACED IN EIGHT (8) INCH LIFTS AND COMPACTED TO AT LEAST NINETY-FIVE (95) PERCENT OF STANDARD PROCTOR.
- THE CONTRACTOR SHOULD EXERCISE PARTICULAR CARE WHEN BACKFILLING AROUND THE OUTLET STRUCTURE AND PIPING TO ASSURE THE FILL MATERIALS ARE WELL COMPACTED TO PREVENT WATER FROM FLOWING ALONG THE OUTLET PIPE.

**DETENTION POND CONSTRUCTION**

- A QUALIFIED GEOTECHNICAL ENGINEER, LICENSED IN THE STATE OF VIRGINIA, SHOULD CONDUCT AN INVESTIGATION OF THE ON-SITE SOILS AND MAKE RECOMMENDATIONS FOR FOUNDATIONS, CUTOFF TRENCH, PONDING AREA, AND EMBANKMENT DESIGN. AT A MINIMUM, THE FOLLOWING CONSTRUCTION STANDARDS SHALL APPLY:
  - SOILS CLASSIFIED AS "CH" OR "CL" SHALL BE USED TO CONSTRUCT THE EMBANKMENT FOR THE DETENTION POND.
  - A CUTOFF TRENCH SHALL BE INCLUDED ALONG THE ENTIRE LENGTH OF THE EMBANKMENT. THE CUTOFF TRENCH SHALL BE TWELVE (12) FEET WIDE AND SHALL EXTEND A MINIMUM OF FOUR (4) FEET INTO NATURAL GROUND WITH 1:1 SIDE SLOPES.
  - THE EMBANKMENT SHALL BE PLACED IN MAXIMUM EIGHT (8) INCH LOOSE LIFTS AND THEN COMPACTED USING HEAVY SHEEPSFOOT OR PADFOOT TYPE ROLLERS. THE EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY, STANDARD PROCTOR, AT A MOISTURE CONTENT OF TWO (2) TO FOUR (4) PERCENT ABOVE OPTIMUM. THE RESULTS OF THE COMPACTION AND MOISTURE TEST SHALL BE PROVIDED TO THE CITY OF ROANOKE.
- AFTER THE BASIN HAS BEEN BROUGHT TO FINAL GRADE, AND IMMEDIATELY PRIOR TO SPREADING THE TOPSOIL, THE SUBGRADE SHALL BE LOOSENEED BY DISCING OR SCARIFYING TO A DEPTH OF AT LEAST 2 INCHES TO ENSURE BONDING OF THE TOPSOIL AND SUBSOIL. TOPSOIL SHALL THEN BE UNIFORMLY DISTRIBUTED TO A MINIMUM COMPACTED DEPTH OF 2 INCHES ON 3:1 OR STEEPER SLOPES AND 4 INCHES ON FLATTER SLOPES. SEE THE MOST CURRENT EDITION OF THE VESCH BOOK FOR ADDITIONAL REQUIREMENTS.
- TEMPORARY SEEDING SHALL BE APPLIED AS NECESSARY. ONCE AREAS ARE BROUGHT TO FINAL GRADE, APPLY PERMANENT SEEDING AND MULCHING. SEE SHEET 17 FOR SEEDING SPECIFICATIONS.

**CONSTRUCTION NOTES**

- DESIGN AND CONSTRUCTION OF SWM POND SHALL BE IN ACCORDANCE WITH THE CITY OF ROANOKE STORMWATER MANAGEMENT GUIDANCE AND DESIGN MANUAL, LATEST EDITION.
- BASIN SIDE SLOPES SHALL BE NO GREATER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) WITH A MAXIMUM DEPTH OF 15' AS MEASURED FROM TOP OF THE EMBANKMENT TO THE LOWEST POINT IN THE BASIN.
- THE MINIMUM TOP WIDTH OF THE EMBANKMENT SHALL BE 10 FEET.
- EMBANKMENTS WITH AN EMERGENCY SPILLWAY SHALL HAVE ONE FOOT MINIMUM FREEBOARD FROM THE 100 YEAR WATER SURFACE ELEVATION. EMBANKMENTS WITH NO EMERGENCY SPILLWAY SHALL PROVIDE 2 FEET OF FREEBOARD.
- ALL OUTLET STRUCTURES SHALL BE EQUIPPED WITH APPROPRIATE TRASH RACK.
- ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED IN ACCORDANCE WITH VIRGINIA STORMWATER MANAGEMENT HANDBOOK (VSMH) SEC 3.01. FILL MATERIAL SOILS, IN GENERAL:
  - SHALL BE COMPACTIBLE
  - 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 +/- 2% 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. CUTOFF TRENCH AND CORE MATERIAL SHALL BE CONSTRUCTED IN ACCORDANCE WITH VSMH SEC 3.01.
- 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 CITY OF ROANOKE FOR SWM POND WITH AS-BUILT PLANS AS A CONDITION OF ACCEPTANCE OF THE PROJECT BY THE CITY. FIELD DENSITY TESTS, AS DIRECTED BY THE GEOTECHNICAL 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 OR FILTER DIAPHRAGMS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), LATEST EDITION AND VSMH.
- ALL DISTURBED AREAS SHALL BE COVERED WITH FOUR (4) INCHES OF TOPSOIL AND SEED.
- THE PERMITTEE/OWNER SHALL CONTACT THE CITY OF ROANOKE FOR INSPECTION AND APPROVAL PRIOR TO CONVERTING ANY SEDIMENT TRAP AND/OR BASIN INTO A PERMANENT STORMWATER MANAGEMENT FACILITY.
- ANTI-SEEP COLLARS OR FILTER DIAPHRAGMS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), LATEST EDITION AND VSMH.
- PRIOR TO FINAL ACCEPTANCE AND BOND RELEASE OF THE PROJECT, THE PERMITTEE/OWNER SHALL SUBMIT TO THE CITY OF ROANOKE AS-BUILT DOCUMENTATION CONFIRMING THAT THE STORM DRAINAGE SYSTEM AND STORMWATER MANAGEMENT FACILITIES AND PRACTICES ARE IN CONFORMANCE WITH THE APPROVED PLANS. AS-BUILTS SHALL MEET THE REQUIREMENTS SET FORTH IN THE STORMWATER MANAGEMENT DESIGN MANUAL CHAPTERS.

LUMSDEN ASSOCIATES, P.C.  
ENGINEERS-SURVEYORS-PLANNERS  
ROANOKE, VIRGINIA

4664 BRAMBLETON AVENUE  
P.O. BOX 20669  
ROANOKE, VIRGINIA 24018  
PHONE (540) 774-4411  
FAX (540) 772-9445  
E-MAIL: MAIL@LUMSDENPC.COM

COMMONWEALTH OF VIRGINIA  
THOMAS C. DALE  
Lic. No. 033002  
9/19/12  
PROFESSIONAL ENGINEER

STORM DRAIN PROFILES  
AND STORMWATER  
MANAGEMENT DETAILS

DEVELOPMENT PLAN SHOWING  
PARKING LOT IMPROVEMENTS  
FOR  
WESTERN VIRGINIA WATER AUTHORITY  
SITUATED AT  
3322 HOLLINS ROAD  
THE CITY OF ROANOKE, VIRGINIA

REVISIONS	NO.	DATE	DESCRIPTION
	1		
	2		
	3		
	4		
	5		

DATE: September 19, 2012  
SCALE: 1" = 40' (H); 1" = 10' (V)  
COMMISSION NO: 11-258  
SHEET 6 OF 10