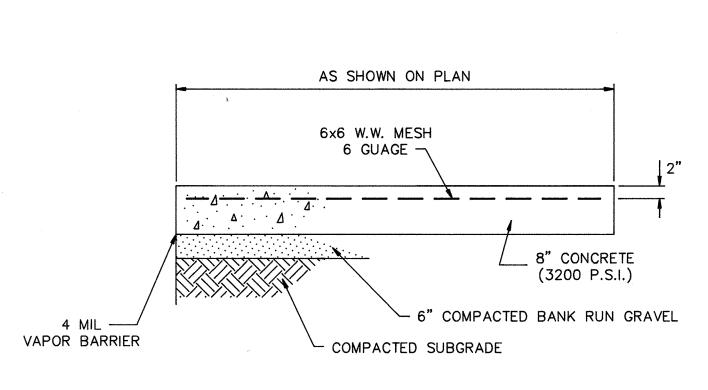
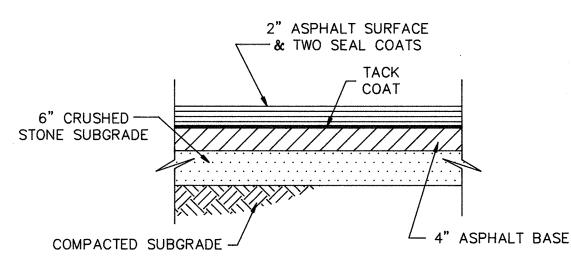


- 2. LENGTH- AS REQUIRED, BUT NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY)
- 3. THICKNESS- NOT LESS THAN SIX (6) INCHES.
- 4. WIDTH- TEN (10) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
- 5. FILTER CLOTH- WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
- SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
- 7. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST
- 8. WASHING- WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE
- 9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ENTRANCE



NEW CONCRETE SECTION



NEW PAVEMENT SECTION



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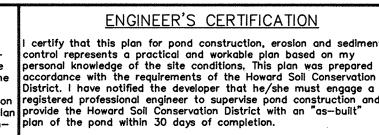
GEORGE WILLIAM STEPHENS, JR. and ASSOCIATES, INC

ENGINEERS · PLANNERS · SURVEYORS · TRANSPORTATION WATERS EDGE CORPORATE CAMPUS 4692 MILENIUM DR. SLITE 100

OWNER/DEVELOPER

BELCAMO MARYLAND 21017-1543 http://www.gwstephens.com

Fax: (410) 297-2345 (2/03/2019 **DEVELOPER'S CERTIFICATION**



APPROVED: For public water, sewer, storm drain system, and public roads Howard County Department of Public Works

SITE DEVELOPMENT PLAN - ADDITION TO SDP 73-32 CAROLINA FREIGHT CARRIERS — INDUSTRIAL BUILDING ADDITION

technical requirements.

SEDIMENT CONTROL

DETAILS AND NOTES

HOWARD COUNTY, MARYLAND

SDP-95-10

HIGH STRENGTH POLYPROPYLENE NETTING OR - WOVEN WIRE FENCE (MIN. 14 1/2 GA. - 36" MIN. FENCE POSTS. 8' MAX C. TO C DRIVEN MIN. 16" INTO GROUND HEAVY DUTY DRAW CORD WITH - H.S. POLYPROPYLENE NETTING PERSPECTIVE VIEW 36" MIN. FENCE POSTS FILTER CLOTH -UNDISTURBED GROUND FLOW

SECTION

EMBED FILTER CLOTH

8" MIN. INTO GROUND

d. ON 10 FOOT MAXIMUM CENTERS, AND

e. DRIVEN AT LEAST 16 INCHES INTO THE GROUND.

2" X 4" SPACER

SAND BAG OR ALTERNATE WEIGHT

NORTH ELEVATION of BUILDING ADDITION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. SILT FENCES MUST BE EMBEDDED, OR KEYED IN, AT LEAST 8 INCHES INTO THE GROUND. LAYING THE LOWER EDGE OF THE FILTER FABRIC ON THE GROUND AND COVERING IT WITH SOIL IS NOT AN ACCEPTABLE METHOD OF KEYING IN. THE KEY-IN TRENCH CAN BE EXCA-VATED BY HAND OR BY DITCHING EQUIPMENT. AFTER THE SILT FENCE IS CONSTRUCTED, THE TRENCH MUST BE BACKFILLED AND COMPACTED.

STANDARD SYMBOL

____ s ____ s ___

- 2. FENCE POSTS MUST BE: a. AT LEAST 36 INCHES LONG, AND b. HAVE A CROSS SECTIONAL AREA OF AT LEAST 3 SQUARE INCHES IF WOODEN OR c. WEIGH AT LEAST 1 POUND PER LINEAR FOOT IF STEEL T OR U TYPE, AND
- 3. THE FILTER FABRIC MUST BE FASTENED SECURELY TO THE FENCE POSTS.
- 4. WHEN TWO SECTIONS OF FILTER FABRIC ARE JOINED TOGETHER, THE JOINT MUST OCCUR AT A FENCE POST. THE ENDS OF THE FILTER FABRIC SHOULD BE OVERLAPPED BY AT LEAST 6 INCHES, FOLDED, AND FASTENED TO THE FENCE POST SO THAT NO GAPS IN THE FENCE OCCUR. MANUFACTURER'S RECOMMENDATIONS FOR JOINING FABRIC SECTIONS MAY BE FOLLOWED AS LONG AS THE RESULTING JOINT DOES NOT CREATE GAPS IN THE SILT FENCE.
- 5. SILT FENCES MUST BE INSPECTED PERIODICALLY AND AFTER EACH RAIN EVENT AND MAINTENANCE PERFORMED AS NECESSARY.

SILT FENCE

-TIP BARS BY CAROLINA

FREIGHT (TYP)

DETAILS AND SPECIFICATIONS FOR VEGETATIVE ESTABLISHMENT

SITE PREPARATION

- 1. Temporary perimeter dikes and silt traps, etc., are to be provided as per this plan prior to grading operations with location adjustments to be made in the field as necessary and to be maintained at the end of the working day. The minimum area practical shall be disturbed for the minimum amount of time possible.
- 2. Permanent seeding:
- a. Seedbed preparation: Area to be seeded shall be loose and friable to a depth of at least 3 inches. The top layer shall be loosened by raking, disking, or other acceptable means before seeding occurs. In lieu of soil test results, apply 50 lbs. of dolomitic limestone and 25 lbs. of 10-10-10- fertilizer per 1,000 square feet. Harrow or disk lime and fertilizer into the soil to a depth of at least 3 inches on slopes flatter than 3:1. No attempt should be made to drag any disked area to make the soil surface smooth after disking.
- b. Seeding: Apply 5-6 lbs. per 1,000 square feet of Kentucky 31 Tall Fescue between February 1 and April 30 or between August 15 and October 31. Apply seed uniformly with a cyclone seeded drill, cultipacker seeder or hydroseeder (slurry includes seeds and fertilizer, recommended on steep slopes only) on a moist, firm seedbed. Maximum seed depth should be 1/4 inch on clayey soils and 1/2 inch in sandy soils when using other than the hydroseeder method. Irrigate if soil moisture is deficient to support adequate growth, until vegetation is
- c. Mulching: Mulch shall be unchopped, unrotted, small grain straw applied at a rate of 70 to 90 lbs. per 1,000 square feet. Mulch materials shall be relatively free of all kinds of weeks and shall be free of prohibited noxious weeds which are: Canada Thistle, Johnsongrass, and Quackgrass. Spread mulch mechanically or uniformly by hand; mulch anchoring shall be accomplished immediately after mulch placement to minimize loss by wind or water. This may be done by peg and twine method, mulch anchoring tool, netting, or liquid mulch binders.

3. Temporary seeding:

- Lime: 50 lbs. of dolomitic limestone per 1,000 square feet Fertilizer: 15 lbs. of 10-10-10 per 1,000 square feet Perennial Rye, Italian Rye - 0.92 lbs. per 1,000 square feet (Feb. 1 through April 30 or Aug. 15 through Nov. 1) Millet -0.92 lbs. per 1,000 square feet (May 1 - Aug. 15) Same as above. (Nov. 2 through Jan. 31, use mulch
- 4. No fills may be placed on frozen ground. All fill to be placed in approximately horizontal layers, each layer having a loose thickness of not more than 8 inches. All fill in roadways and parking areas is to be classified Type 2 and compacted to 90 percent density; compaction to be determined by ASIM D-1557 (Modified Proctor). Any fill within building area to be compacted to a minimum of 95% as determined by methods previously mentioned. All other fills shall be compacted sufficiently so as to be stable and prevent erosion and slippage.

SEDIMENT CONTROL NOTES

- 1. A minimum of 24 hours notice must be given to the Howard County Office of Inspection and Permits prior to the start of any construction. (992-2437) 313-1355
- 2. All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 1983 MARYLAND STANDARDS AND
- 3. Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed within: a) 7 calendar days for all perimeter sediment control structures, dikes, perimeter slopes and all slopes greater than 3:1, b) 14 days as to all other disturbed or graded areas on the project

SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.

- All sediment traps/basins shown must be fenced and warning signs posted around their perimeter in accordance with Vol. 1, Chapter 12, of the HOWARD COUNTY DESIGN MANUAL, Storm
- 5. All disturbed areas must be stabilized within the time period specified above in accordance with the 1983 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seedings (Sec. 51) sod (Sec. 54), temporary seeding (Sec. 50) and mulching (Sec. 52). Temporary stabilization with mulch alone can only be done when recommended seeding dates do not allow for proper germination and establishment of
- 6. All sediment control structures are to remain in place and are to be maintained in operative condition until permission for their removal has been obtained from the Howard County Sediment Control Inspector
- 7. Site Analysis: Total Area of Site 14.47± Acres Area to be vegetatively stabilized ..
- 8. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
- 9. Additional sediment controls must be provided, if deemed necessary by the Howard County DPW sediment control inspector.
- 10. On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made.
- * OFF-SITE DISPOSAL ARRAS MUST HAVE AH OPFILL GRADING PERMIT

CONSTRUCTION SPECIFICATIONS CURB INLET PROTECTION DETAIL

- 1. ATTACH A CONTINUOUS PIECE OF WIRE MESH (30" MINIMUM WIDTH BY THROAT LENGTH PLUS 4') TO THE 2" X 4" WEIR (MEASURING THROAT LENGTH PLUS 2') AS SHOWN ON THE STANDARD
- 2. PLACE A CONTINUOUS PIECE OF GEOTEXTILE CLASS E THE SAME DIMENSIONS AS THE WIRE MESH OVER THE WIRE MESH AND SECURELY ATTACH IT TO THE 2" X 4" WEIR.
- 3. SECURELY NAIL THE 2" X 4" WEIR TO A 9" LONG VERTICAL SPACER TO BE LOCATED BETWEEN THE WEIR AND THE INLET FACE (MAX. 4' APART).
- 4. PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL (MINIMUM 2' LENGTHS OF 2" X 4" TO THE TOP OF THE WEIR AT SPACER LOCATIONS). THESE 2" X 4" ANCHORS SHALL EXTEND ACROSS THE INLET TOP AND BE HELD IN PLACE BY SANDBAGS OR ALTERNATE WEIGHT.
- BOTH ENDS OF THE THROAT OPENING. 6. FORM THE 1/2 " X 1/2 " WIRE MESH AND THE GEOTEXTILE FABRIC TO THE CONCRETE

5. THE ASSEMBLY SHALL BE PLACED SO THAT THE END SPACERS ARE A MINIMUM 1' BEYOND

- GUTTER AND AGAINST THE FACE OF THE CURB ON BOTH SIDES OF THE INLET. PLACE CLEAN 3/4 " X 1 1/2" STONE OVER THE WIRE MESH AND GEOTEXTILE IN SUCH A MANNER TO PREVENT WATER FROM ENTERING THE INLET UNDER OR AROUND THE GEOTEXTILE.
- 7. THIS TYPE OF PROTECTION MUST BE INSPECTED FREQUENTLY AND THE FILTER CLOTH AND STONE REPLACED WHEN CLOGGED WITH SEDIMENT.
- 8. ASSURE THAT STORM FLOW DOES NOT BYPASS THE INLET BY INSTALLING A TEMPORARY EARTH OR ASPHALT DIKE TO DIRECT THE FLOW TO THE INLET.

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REV # REVISION

ADDITION TO SUP-95-101 I) ADDED SURPACE SAND FILTER TO MEET MOE REQUIREMENTS FOR 12 SW DISCHARGE PERMIT; 2) CHANGED SHEET NUMBER; 3) ADDED PLANNUMBER LINDER TITLE BLOCK.

DATE APPROVE

ion, soil erosion and sediment control uirements of the Howard Soil Conservation District.

Reviewed for Howard Soil Conservation District and meets

SHEET DES : GDT/CTM DRAWN : REC

CHK: RHB PLAN SCALE: PROFILE SCALES:

3 OF -

REVISION & | SDP - 95-101

CONSULTING ENGINEERS AND LAND SURVEYORS

1029 NORTH CALVERT STREET

BALTIMORE, MARYLAND 21202 TEL:(410)837-0194 FAX:(410)837-3431

CAROLINA FREIGH CARRIERS CORP.

HIGHWAY 50 - P.O. BOX 697 CAROLINA FREIGHT CARRIERS CORP CHERRYVILLE, NC 28021

I/We hereby certify that all development and/or construction will be done according to these plans, and that any responsible personnel involved in the construction project will have a Certificate of Attendance at a Department of the Environment Approved Training Program for the Control of Sediment and Erosion before beginning the project. I shall engage a registered professional engineer to supervise pond construction and provide the Howard Soil Conservation District with an "as—built" plan of the pond within 30 days of completion. I also authorize periodic onsite inspections by the Howard Soil Conservation District.

FILTER CLOTH-

WIRE MESH

2' MINIMUM LENGTH

OF 2" X 4"

2" STONE

FILTER CLOTH

2" X 4" WEIR

PERSPECTIVE VIEW

CROSS SECTION

CURB INLET PROTECTION DETAIL

INLET

TO PIPE

APPROVED: Howard County Department of Planning and Zoning

ENGINEERING 057/10/45

FAX MAP 38 1st ELECTION DISTRICT DATE: JUNE 19, 1995

PARCEL 845

SITE PREPARATION

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENT, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS AND SHARP BREAKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH, AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORM WATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

MATERIAL - THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUT OFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE CONSTRUCTION SUPERVISED BY A GEOTECHNICAL ENGINEER.

MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE CAPABILITY TO SUPPORT VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

PLACEMENT - AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

COMPACTION - THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPSFOOT, RUBBER TIRED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT

MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

WHEN REQUIRED BY THE REVIEWING AGENCY THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95 % OF MAXIMUM DRY DENSITY WITH A MOISTURE % OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED CONTENT WITHIN +2 AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99 (STANDARD PROCTOR).

CUT OFF TRENCH - THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION, WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

EMBANKMENT CARE - THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES, SHALL BE 1 TO 1, OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITIONAL, THE CORE SHALL BE PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TEMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE, UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI; 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM PH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM-CM. MATERIAL SHALL BE PLACED SUCH THAT A MINIMUM OF 6"(MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE UNDER (BEDDING), OVER AND, ON THE SIDES OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OF OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A STRUCTURE OF PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OF PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURAL BACKFILL (FLOWABLE FILL) ZONE SHALL BE OF THE TYPE AND QUALITY, CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

PIPE CONDUITS

ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION

CORRUGATED METAL PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR CORRUGATED METAL PIPE.

MATERIALS - (POLYMER COATED STEEL PIPE) - STEEL PIPES WITH POLYMER COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF 0.01 INCH (10 MIL) ON BOTH SIDES OF THE PIPE. THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATIONS M-245 & M-246 WITH WATERTIGHT COUPLING BANDS OR FLANGES.

MATERIALS - (ALUMINUM COATED STEEL PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-274 WITH WATERTIGHT COUPLING BANDS OR FLANGES, ALUMINUM COATED STEEL PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT.

MATERIALS - (ALUMINUM PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-196 OR M-211 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT HOT DIP GALVANIZED BOLTS MAY BE USED FOR CONNECTIONS. THE PH OF THE SURROUNDING SOILS SHALL BE BETWEEN 4 AND 9.

2. COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC., MUST COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. METALS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT LEAST 24 MILS IN

3. CONNECTIONS - ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATERTIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ANTI-SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATERTIGHT. DIMPLE BANDS ARE NOT CONSIDERED TO BE WATERTIGHT.

ALL CONNECTIONS SHALL USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE-ROLLED AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BANDWIDTH. THE FOLLOWING TYPE CONNECTIONS ARE ACCEPTABLE FOR PIPES LESS THAN 24 INCHES IN DIAMETER: FLANGES ON BOTH ENDS OF THE PIPE WITH A CIRCULAR 3/8 INCH CLOSED CELL NEOPRENE GASKET, PREPUNCHED TO THE FLANGE BOLT CIRCLE, SANDWICHED BETWEEN ADJACENT FLANGES; A 12-INCH WIDE STANDARD LAP TYPE BAND WITH 12 INCH WIDE BY 3/8 INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET; AND A 12 INCH WIDE HUGGER TYPE BAND INCH GREATER THAN THE 1½ WITH O-RING GASKETS HAVING A MINIMUM DIAMETER OF CORRUGATION DEPTH. PIPES 24 INCHES IN DIAMETER AND LARGER SHALL BE CONNECTED BY A 24 INCH LONG ANNULAR CORRUGATED BAND USING A MINIMUM OF 4 (FOUR) RODS AND LUGS, 2 ON EACH CONNECTING PIPE END. A 24-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET WILL BE INSTALLED WITH 12 INCHES ON THE END OF EACH PIPE. FLANGED JOINTS WITH 3/8 INCH CLOSED CELL GASKETS THE FULL WIDTH OF THE FLANGE IS ALSO ACCEPTABLE.

HELICALLY, CORRUGATED PIPE SHALL HAVE EITHER CONTINUOUSLY WELDED SEAMS OR HAVE LOCK SEAMS WITH INTERNAL CAULKING OR A NEOPRENE BEAD.

4. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGH ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED. ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

6. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE

REINFORCED CONCRETE PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR REINFORCED CONCRETE PIPE:

MATERIALS - REINFORCED CONCRETE PIPE SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM C-361 IN 378 STRUCTURES. CLASS IV REINFORCED CONCRETE PIPE SHALL BE USED IN ALL NON 378 STRUCTURES UNLESS SPECIFIED

2. BEDDING IN 378 STRUCTURES - REINFORCED CONCRETE PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING/CRADLE FOR THEIR ENTIRE LENGTH. THIS BEDDING/CRADLE SHALL CONSIST OF HIGH % SLUMP CONCRETE PLACED UNDER THE PIPE AND UP THE SIDES OF THE PIPE AT LEAST 50 OF ITS OUTSIDE DIAMETER WITH A MINIMUM THICKNESS OF 6 INCHES. WHERE A CONCRETE CRADLE IS NOT NEEDED FOR STRUCTURAL REASONS. FLOWABLE FILL MAY BE USED AS DESCRIBED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

BEDDING IN NON 378 STRUCTURES - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGH ITS ENTIRE LENGTH. WHERE ROCK OR SOFT. SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT. NO STONE IS TO BE PLACED UNDER PIPE.

3. LAYING PIPE - BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL. AFTER THE JOINTS ARE SEALED FOR THE ENTIRE LINE, THE BEDDING SHALL BE PLACED SO THAT ALL SPACES UNDER THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO STRUCTURE BACKFILL"

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS OWN ON THE DRAWINGS.

PLASTIC PIPE - THE FOLLOWING CRITERIA SHALL APPLY FOR PLASTIC PIPE:

1. MATERIALS - PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORM INTO ASTM D-1785 OR ASTM D-2241. CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, COUPLINGS AND FITTINGS SHALL CONFORM TO THE FOLLOWING: 4" - 10" INCH PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M252 TYPE S. AND 12" THROUGH 24" INCH SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S.

2. JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLY WATERTIGHT.

BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGH ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

4. BACKFILLING SHALL CONFORM TO STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN THE DRAWINGS.

DRAINAGE DIAPHRAGMS - WHEN A DRAINAGE DIAPHRAGM IS USED, A REGISTERED PROFESSIONAL ENGINEER WILL SUPERVISE THE DESIGN AND CONSTRUCTION INSPECTION.

CONCRETE

ROCK RIPRAP

CONCRETE SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 414, MIX NO. 3.

ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION. STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 311.

GEOTEXTILE SHALL BE PLACED UNDER ALL RIPRAP AND SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 921.09, CLASS C.

CARE OF WATER DURING CONSTRUCTION

ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE AREAS TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER IS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE WHATSOEVER OF THE FLOW OF WATER TO THE SPILLMAY OR OUTLET MORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OF MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL THE FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM REQUIRED EXCAVATIONS AND WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRED DRAINING THE WATER SUMPS FROM WHICH THE WATER SHALL BE

STABILIZATION

ALL BORROW AREAS SHALL BE GRADED TO PROVIDE PROPER DRAINAGE AND LEFT IN A SIGHTLY CONDITION. ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLMAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED USING SOIL STABILIZATION MATTING AND SEEDING, LIMING, FERTILIZING AND MULCHING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

SAND FILTER CONSTRUCTION SPECIFICATIONS

PROVIDE SUFFICIENT MAINTENANCE ACCESS (I.E., 12-FOOT-WIDE ROAD WITH LEGALLY RECORDED EASEMENT). VEGETATED ACCESS SLOPES ARE TO BE A MAXIMUM OF 10%; GRAVEL SLOPES TO 15%; PAVED SLOPES TO 25%.

ABSOLUTELY NO RUNOFF IS TO ENTER THE FILTER UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED. SURFACE OF FILTER BED IS TO BE LEVEL.

INSPECTION REQUIREMENTS DURING CONSTRUCTION

THE DEVELOPER SHALL NOTIFY THE COUNTY AT LEAST 48 HOURS BEFORE COMMENCING ANY MORK IN CONJUNCTION WITH THE STORMWATER MANAGEMENT PLAN AND UPON COMPLETION OF THE PROJECT WHEN A FINAL INSPECTION WILL BE CONDUCTED.

REGULAR INSPECTIONS SHALL BE MADE AND DOCUMENTED FOR THE SURFACE SAND FILTER AT THE STAGES OF CONSTRUCTION SPECIFIED IN THE DESIGN MANUAL BY HOWARD COUNTY, ITS AUTHORIZED REPRESENTATIVE, OR CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MARYLAND. AT A MINIMUM, THE SURFACE SAND FILTER SHALL BE INSPECTED UPON COMPLETION OF FINAL GRADING, THE ESTABLISHMENT OF PERMANENT STABILIZATION, AND BEFORE ISSUANCE OF USE AND OCCUPANCY APPROVAL.

WRITTEN INSPECTION REPORTS SHALL INCLUDE: (A) DATE AND LOCATION OF THE INSPECTION;

(B) WHETHER CONSTRUCTION WAS IN COMPLIANCE WITH THE APPROVED STORMWATER MANAGEMENT PLAN:

(C) ANY VARIATIONS FROM THE APPROVED CONSTRUCTION SPECIFICATIONS; AND

(D) ANY VIOLATIONS THAT EXIST.

THE OWNER/DEVELOPER AND ON-SITE PERSONNEL SHALL BE NOTIFIED IN WRITING WHENVIOLATIONS ARE OBSERVED. WRITTEN NOTIFICATION SHALL DESCRIBE THE NATURE OF THEVIOLATION AND THE REQUIRED CORRECTIVE

NO WORK SHALL PROCEED UNTIL THE COUNTY INSPECTS AND APPROVES THE WORK PREVIOUSLY COMPLETED AND FURNISHES THE DEVELOPER WITH THE RESULTS OF THE INSPECTION REPORTS AFTER COMPLETION OF EACH REQUIRED INSPECTION. AT A MINIMUM, REGULAR INSPECTIONS SHALL BE MADE AND DOCUMENTED

AT THE FOLLOWING SPECIFIED STAGES OF CONSTRUCTION: FILTERING SYSTEMS

(I) DURING EXCAVATION TO SUBGRADE;

(II) DURING PLACEMENT AND BACKFILL OF UNDERDRAIN SYSTEM: (III) DURING PLACEMENT OF GEOTEXTILES AND ALL FILTER MEDIA: (IV) DURING CONSTRUCTION OF APPURTENANT CONVEYANCE SYSTEMS SUCH AS DIVERSION STRUCTURES, PRE-FILTERS, FILTERS, OUTLETS AND FLOW DISTRIBUTION STRUCTURES: AND (V) UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF

PERMANENT STABILIZATION.

ONCE CONSTRUCTION IS COMPLETE, AN AS-BUILT PLAN CERTIFICATION SHALL BE SUBMITTED BY THE APPROPRIATE DESIGN PROFESSIONAL LICENSED IN THE STATE OF MARYLAND TO ENSURE THAT CONSTRUCTED STORMWATER MANAGEMENT PRACTICES AND CONVEYANCE SYSTEMS COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE APPROVED PLANS. AT A MINIMUM, AS-BUILT CERTIFICATION SHALL INCLUDE A SET OF DRAWINGS COMPARING THE APPROVED STORMWATER MANAGEMENT PLAN WITH WHAT WAS CONSTRUCTED. THE COUNTY RESERVES THE RIGHT TO REQUIRE ADDITIONAL INFORMATION IT DEEMS NECESSARY TO ENSURE COMPLIANCEWITH THE APPROVED PLANS.

PLANTING SPECIFICATIONS FOR SAND FILTER BED

PROVIDE GRASS COVER TO AID IN POLLUTANT ADSORPTION. THE GRASS SHOULD BE CAPABLE OF WITHSTANDING FREQUENT PERIODS OF INUNDATION AND DROUGHT. (SEE MARYLAND STORMWATER DESIGN MANUAL, APPENDIX A, TABLE A.4.2 STORMWATER PLANT LIST-HERBACEOUS VEGETATION FOR GRASS SPECIES SELECTION GUIDE).

SAND FILTER INSPECTION AND MAINTENANCE SCHEDULE

THE FACILITY SHALL BE INSPECTED TWICE ANNUALLY - MARCH AND SEPTEMBER. VISUAL INSPECTION OF ALL COMPONENTS SHALL BE COMPLETED BY THE OWNER. ALL DRAINS SHALL BE OPENED BY THE OWNER ONCE A YEAR. THE OWNER SHALL KEEP NOTES OF EACH INSPECTION.

GRASS AREAS SHALL BE MOMED ANYTIME THE GRASS IS OVER TMELVE (12) INCHES TALL

VEGETATIVE COVER SHALL BE MAINTAINED BY MOWING, LIMING, AND FERTILIZING. AS A MINIMUM REQUIREMENT, THE LIME AND FERTILIZER SHALL BE APPLIED ONE (1) TIME EVERY TWO (2) YEARS. NO TREES OR WOODY VEGETATION SHALL BE ALLOWED ON THE EMBANKMENT OR WITHIN FIFTEEN (15) FEET OF THE TOE OF THE EMBANKMENT.

ALL APPURTENANCES SHALL BE KEPT FREE OF TRASH.

BENEFICIAL USER'S EXPENSE.

CORRECTIVE MAINTENANCE IS REQUIRED ANYTIME A FACILITY DOES NOT DRAIN WITHIN SEVENTY-TWO (72) HOURS.

CORRECTIVE MAINTENANCE IS REQUIRED ANYTIME THE SEDIMENT CHAMBER DOES NOT DRAIN WITHIN THIRTY-SIX (36) HOURS.

ALL REQUIRED MAINTENANCE SHALL BE PERFORMED BY THE OWNER. THE OWNER'S REPRESENTATIVE OR BENEFICIAL USERS AT THE OWNER'S OR

Table B.3.1 Material Specifications for Sand Filters

Material	Specification/Test Method	Size	Notes		
sand	clean AASHTO-M-6 or ASTM-C- 33 concrete sand	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.		
peat .	ash content: < 15% pH range: 5.2 to 4.9 loose bulk density 0.12 to 0.15 g/cc	11/2	The material must be reed-sedge hemic peat, shredded, uncompacted, uniform, and clean.		
leaf compost		n/a			
underdrain gravel	AASHTO-M-43	0.375" to 0.75"			
geotextile fabric (if required)	ASTM-D-4833 (puncture strength - 125 lb.) ASTM-D-4632 (Tensile Strength - 300 lb.)	0.08" thick equivalent opening size of #80 sieve	Must maintain 125 gpm per sq. ft. flow rate. Note: a 4" pea gravel layer may be substituted for geotextiles meant to "separate" sand filter layers.		
impermeable liner (if required)	ASTM-D-4833 (thickness) ASTM-D-412 (tensile strength 1,100 lb., clongation 200%) ASTM-D-624 (Tear resistance - 150 lb./in) ASTM-D-471 (water adsorption: +8 to -2% mass)	30 mil thickness	Liner to be ultraviolet resistant. A geotextile fabric should be used to protect the liner from puncture.		
underdrain piping	F 758, Type PS 28 or AASHTO-M- 278	4" - 6" rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes		
concrete (cast-in-place) MSHA Standards and Specs. Section 902, Mix No. 3, $\Gamma_c=3500$ psi, normal weight, air-entrained; re-inforcing to meet Λ STM-615-60		n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre- cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland		
concrete (pre-cast)	per pre-cast manufacturer	ı√a	SEE ABOVE NOTE		
non-rebar steel	ASTM A-36	n/a	structural steel to be hot-dipped galvanized ASTM-A-123		

Table B.3.2 Materials Specifications for Bioretention

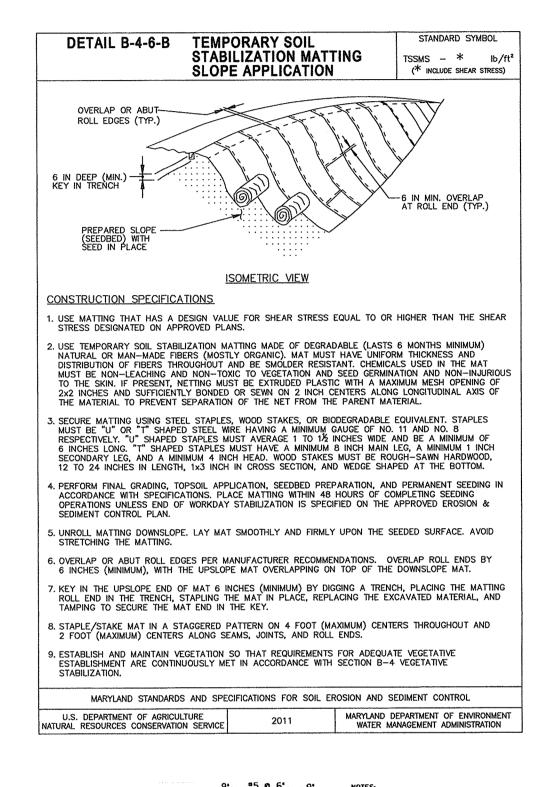
Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
planting soil [2.5' to 4' deep]	sand 35 - 60% silt 30 - 55% clay 10 - 25%	n/a	USDA soil types loamy sand, sandy loam or loam
mulch	shredded hardwood		aged 6 months, minimum
pea gravel diaphragm and curtain drain	pea gravel: ASTM-D-448 ornamental stone: washed cobbles	pea gravel: No. 6 stone: 2" to 5"	
geotextile	Class "C" - apparent opening size (ASTM-D-4751), grab tensile strength (ASTM-D- 4632), puncture resistance (ASTM-D-4833)	n/a	for use as necessary beneath underdrains only
underdrain gravel	AASHTO M-43	0.375" to 0.75"	
underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes
poured in place concrete (if required)	MSHA Mix No. 3; f'c = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Marylan design to include meeting ACI Code 350.R/89; vertical loading [H-10 or H-20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
sand [1' deep]	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

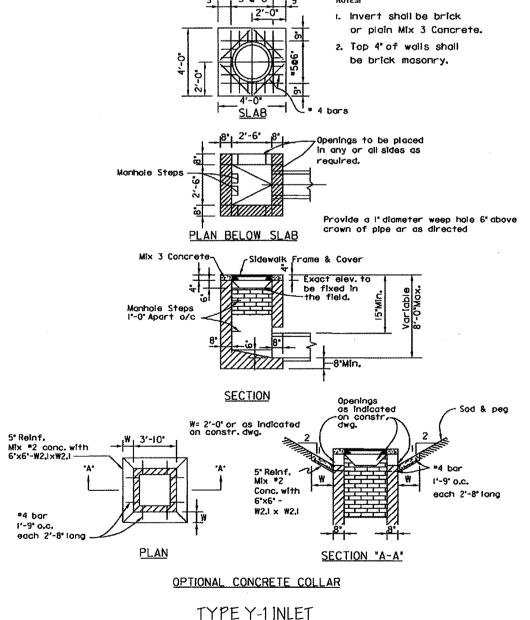
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in (mm) (737) (737) (889) (1143) (1600) (1600) uct detail may differ slightly from actual product appearance	in (mm)	(635)	(635)	(813)	(914)	(1473)	(1473)
uct detail may differ slightly from actual product appearance	W	29.0	29.0	35.0	45.0	63.0	63.0
uct detail may differ slightly from actual product appearance							
	in (mm)	(737)	(737)	(889)	(1143)	(1600)	(1600)

HDPE FLARED END SECTION

PIPE SCHEDULE								
FROM	ТО	SIZE (IN)	LENGTH (FT)	MATERIAL	INVERT ELEVATION OUT	INVERT ELEVATION OUTFALL	OWNER	
I 1	OUTFALL (SSF)	24	27	HDPE	167.00	164.50	ABF FREIGHT SYSTEM	
12	OUTFALL (SSF)	18	28	HDPE	165.10	164.50	ABF FREIGHT SYSTEM	

STRUCTURE SCHEDULE						
ID	TYPE	TOP OF GRATE	INLET ELEV. OUT	OMNER		
l1	Y-1 INLET	172.38	167.00	ABF FREIGHT SYSTEM		
l2	Y-1 INLET	168.43	165.10	ABF FREIGHT SYSTEM		
E1	24" HDPE END SECTION	-	164.50	ABF FREIGHT SYSTEM		
E2	18" HDPE END SECTION		164.50	ABF FREIGHT SYSTEM		





SWM FACILITY CONSTRUCTION NOTES

APPROVED: Howard County Department of Planning and Zoning HIEF, DEVELOPMENT ENGINEERING DIVISION /

ADDITION TO SDP-95-101: 1) ADDED SHEET FOR CONSTRUCTION OF A SURFACE SAND FILTER TO MEET MDE REQUIREMENTS FOR 12 SW DISCHARGE PERMIT 11.2.18 DATE

1-0878

Revisions

HOWARD COUNTY, MARYLAND SITE DEVELOPMENT PLAN - ADDITION TO SDP 73-32 CAROLINA FREIGHT CARRIERS - INDUSTRIAL BUILDING ADDITION

W.J.K. Drawn By: Proiect No.: Plot Date: 31-OCT-18 Designed B C.W.C. Reviewed E

Ph: (410) 297-2340

GEORGE WILLIAM STEPHENS, JR. and ASSOCIATES, INC

ENGINEERS ♦ PLANNERS ♦ SURVEYORS ♦ TRANSPORTATION WATERS EDGE CORPORATE CAMPUS 4692 MILLENNIUM DRIVE, SUITE 100 BELCAMP, MARYLAND 21017-1543

http://www.gwstephens.com

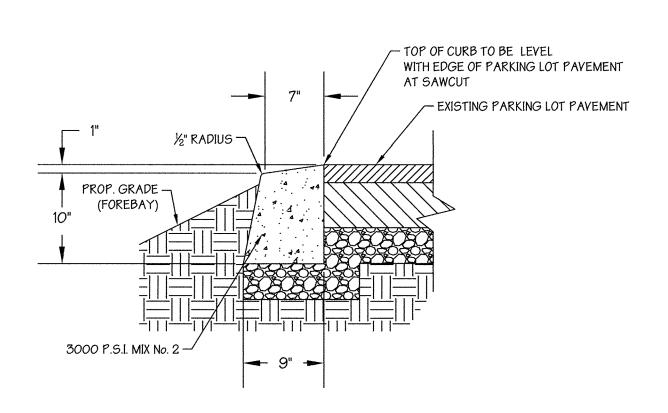
Fax: (410) 297-2345

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am duly licensed professional engineer under the laws of the State of Maryland, License No. 13741, Expiration Date: 12/08/2019"

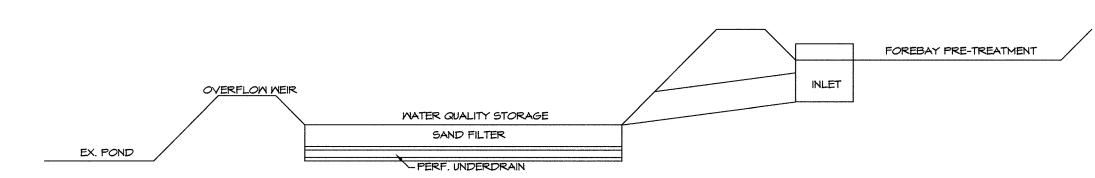
C:\projects\11821\scad\design\plans\swm\11821_sand_filter_w_forebay(10-8-18) combined ponds.DW

SDP-95-101

PRE-TREATMENT FOREBAY FOR SURFACE SAND FILTER SCALE: HORIZ. : 1" = 20' VERT. : 1" = 2'



CONCRETE CURB DETAIL (ALONG PAVEMENT SAWCUT AT FOREBAY) NOT TO SCALE



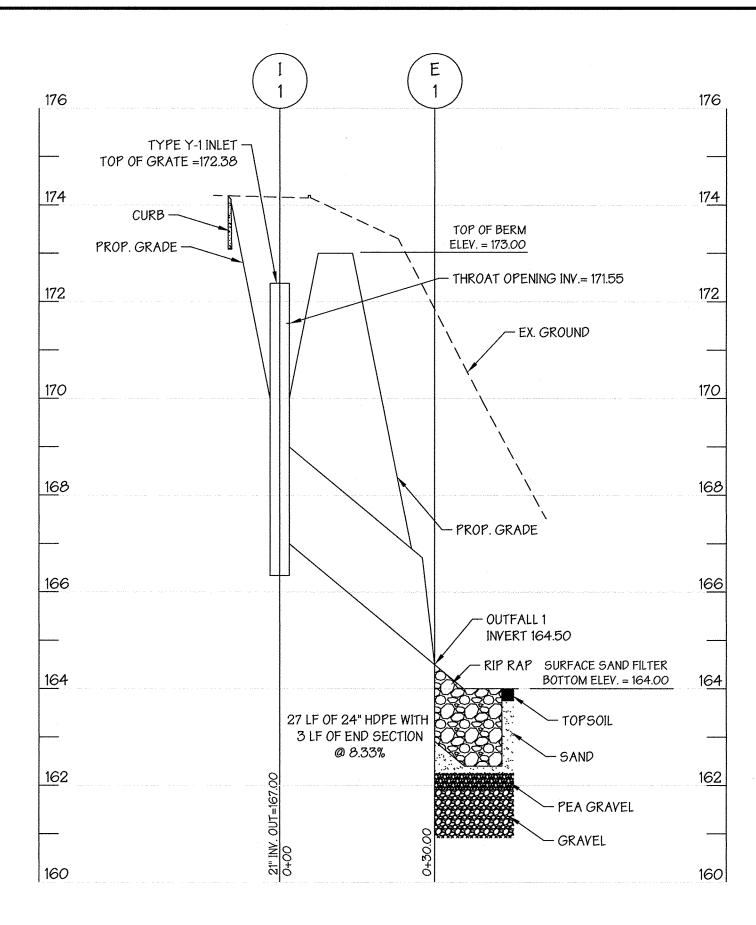
SURFACE SAND FILTER SCHEMATIC NOT TO SCALE



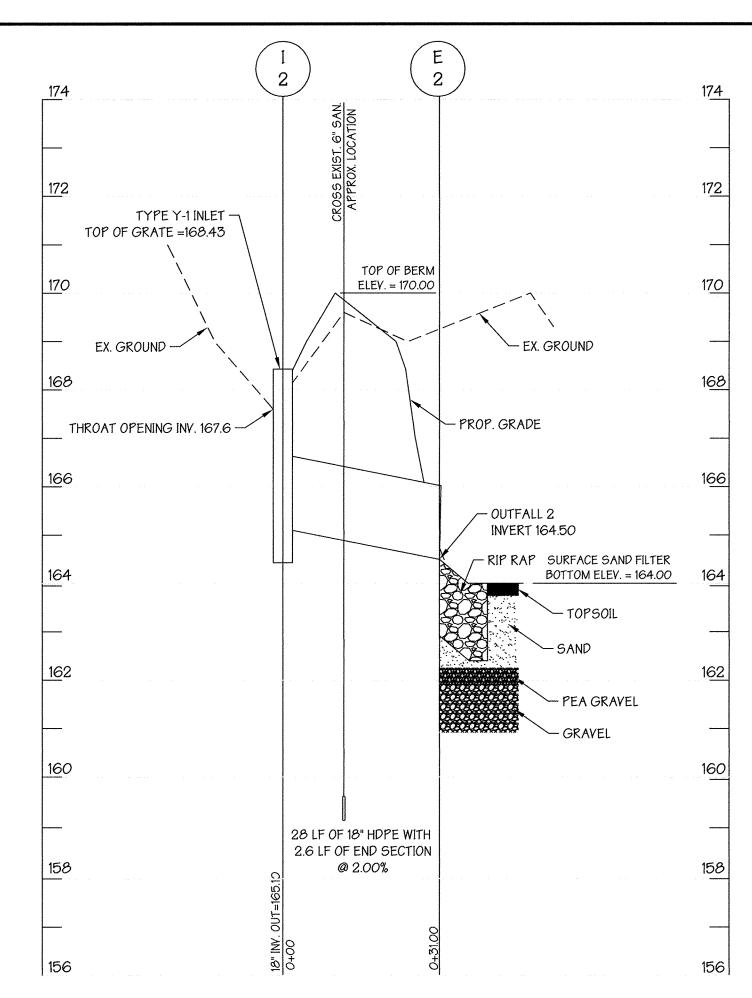
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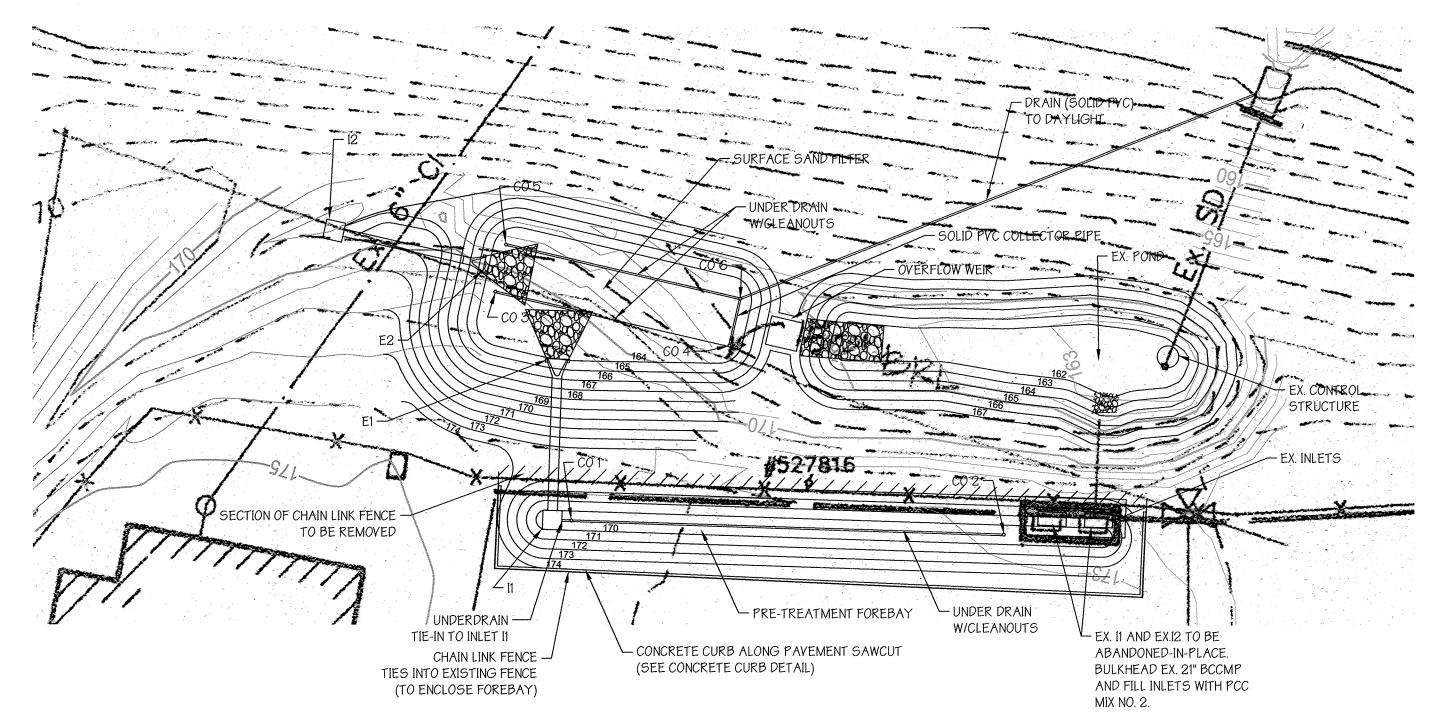
"Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am duly licensed professional engineer under the laws of the State of Maryland, License No. 13741, Expiration Date: 12/08/2019"



II TO EI AT SURFACE SAND FILTER SCALE: HORIZ. : 1" = 20' VERT. : 1" = 2'

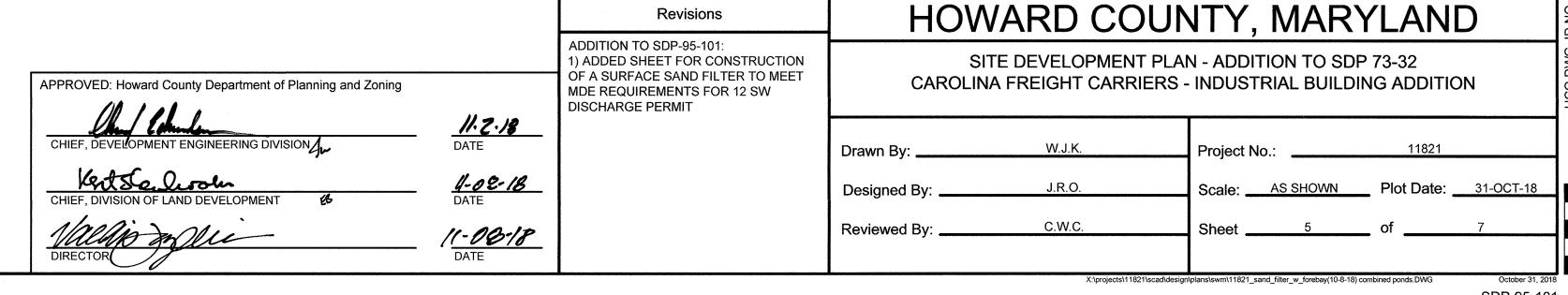


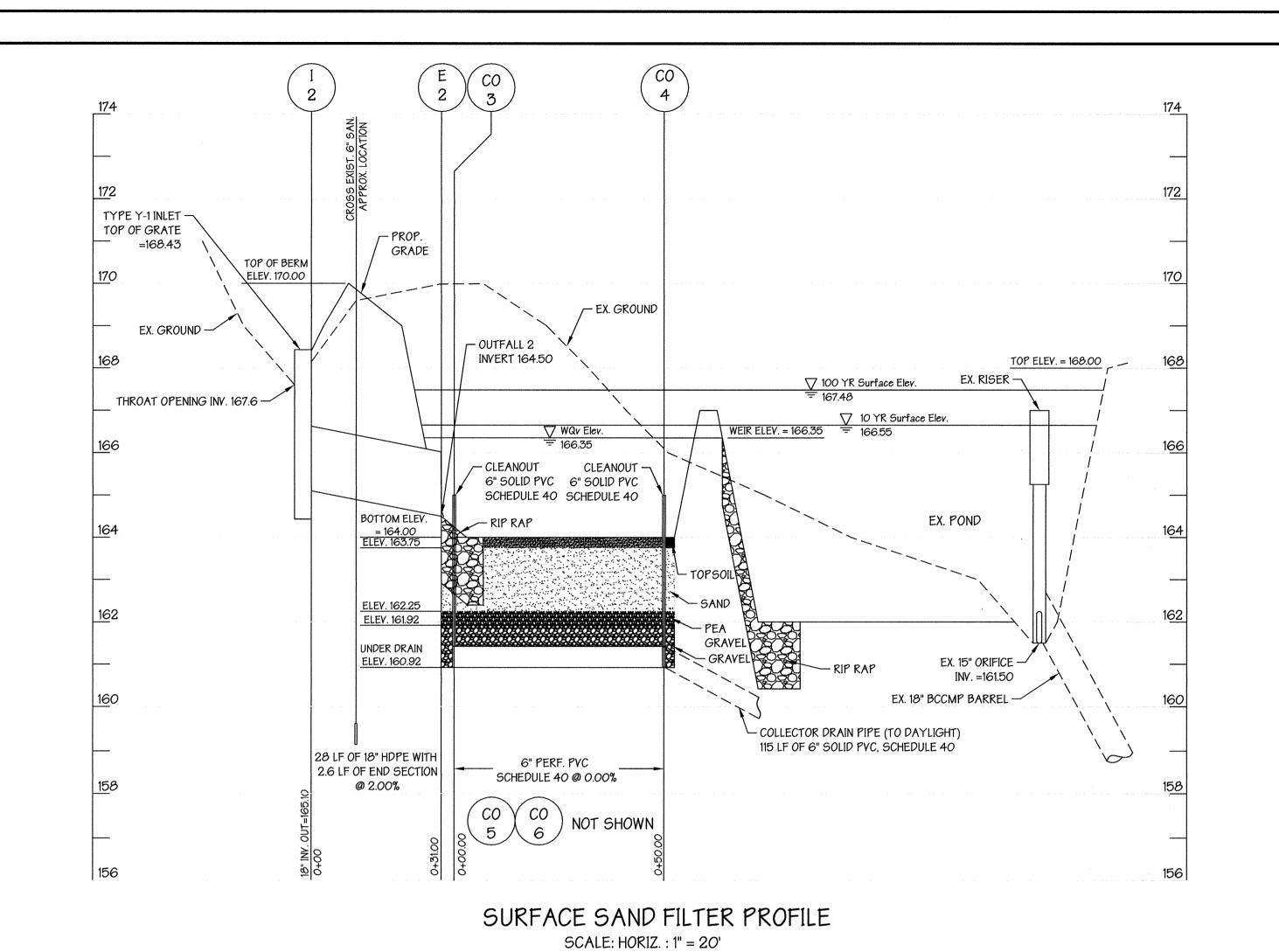
12 TO E2 AT SURFACE SAND FILTER SCALE: HORIZ. : 1" = 20' VERT. : 1" = 2'

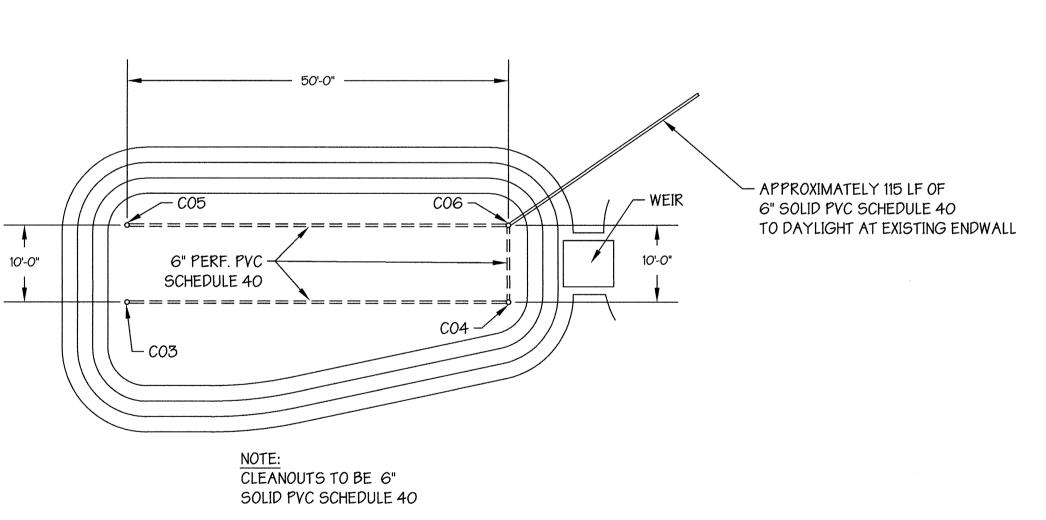


SURFACE SAND FILTER WITH FOREBAY SCALE: 1'=20'

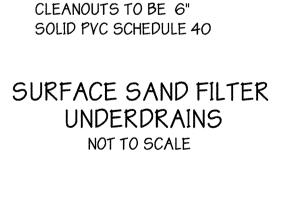
PROFILES - 1 OF 2

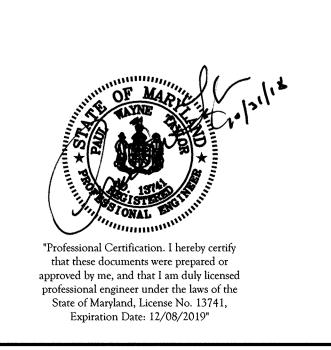


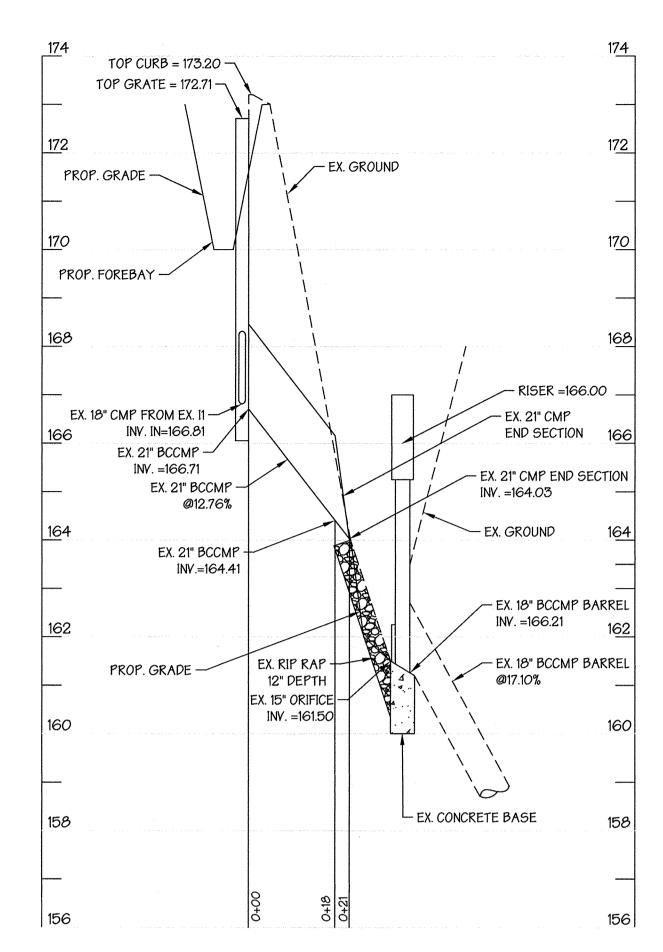




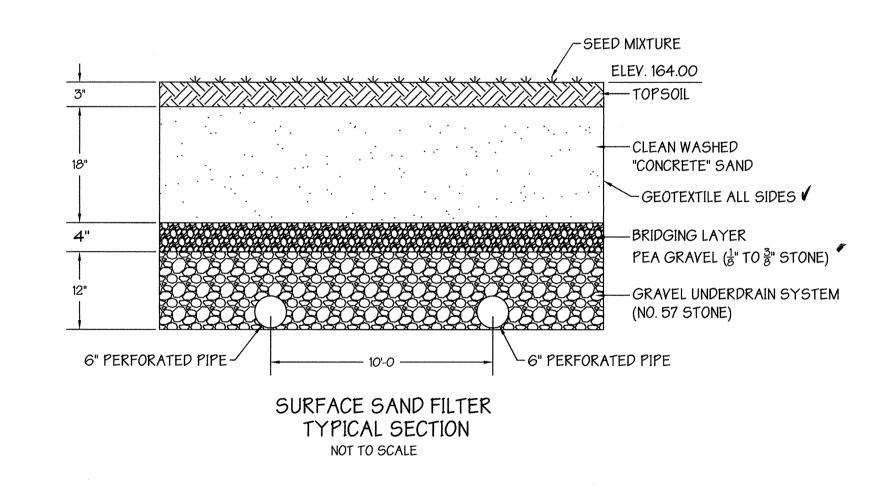
VERT. : 1" = 2"

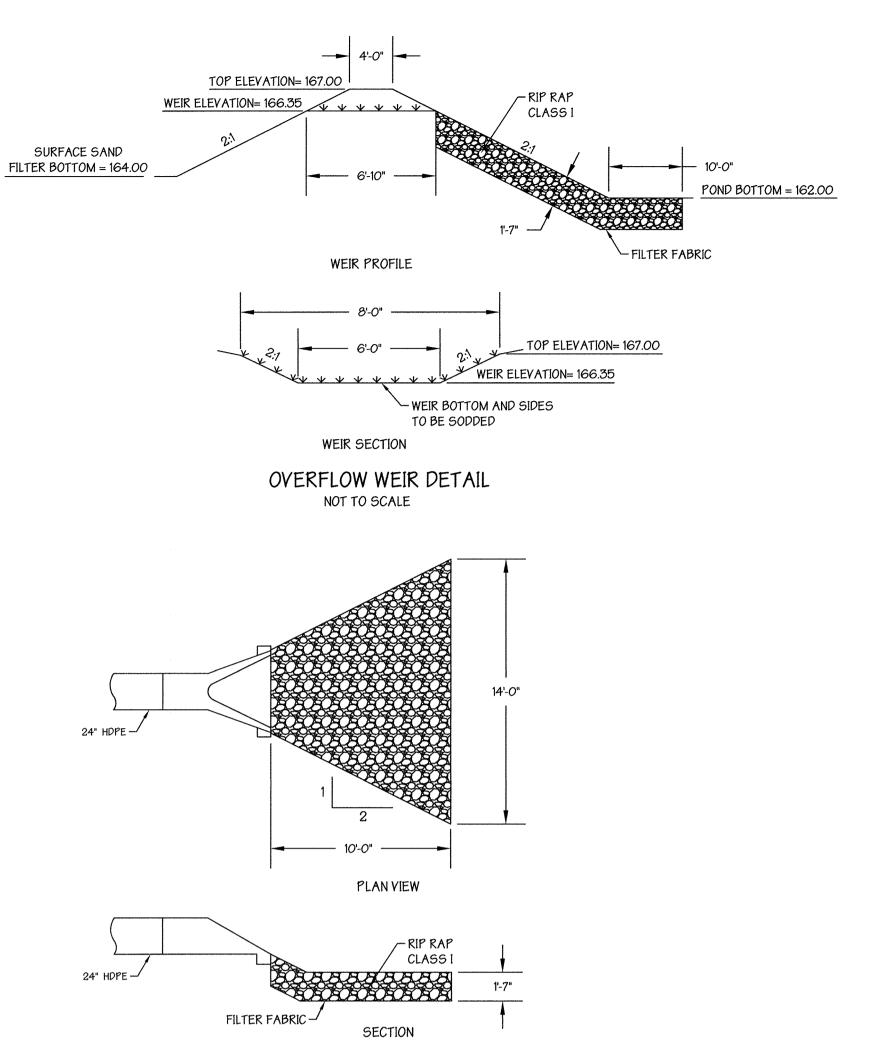




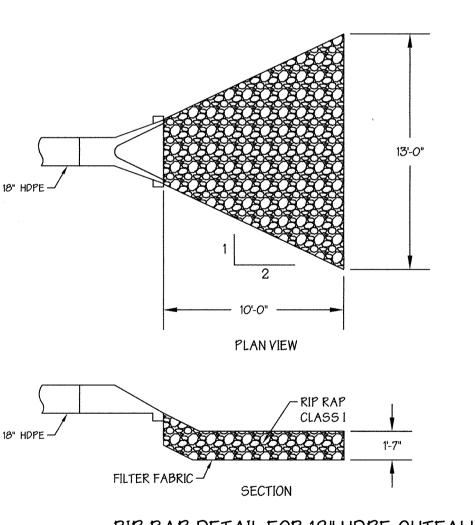


EX. 12 TO OUTFALL INTO EXISTING POND SCALE: HORIZ. : 1" = 20' VERT. : 1" = 2'





RIP RAP DETAIL FOR 24" HDPE OUTFALL



RIP RAP DETAIL FOR 18" HDPE OUTFALL NOT TO SCALE

PROFILES - 2 OF 2

	Revisions	HOWARD COUNTY, MARYLAND					
APPROVED: Howard County Department of Planning and Zoning	ADDITION TO SDP-95-101: 1) ADDED SHEET FOR CONSTRUCTION OF A SURFACE SAND FILTER TO MEET MDE REQUIREMENTS FOR 12 SW DISCHARGE PERMIT		SITE DEVELOPMENT PLA INA FREIGHT CARRIERS				
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE	-	Drawn By:	W.J.K.	Project No.:	11821		
CHIEF, DIVISION OF LAND DEVELOPMENT & DATE		Designed By:	J.R.O.	Scale: <u>AS SHOWN</u>	Plot Date: 31-OCT-18		
Maldis Jallie 11-00-18 DIRECTOR DATE	_	Reviewed By:	C.W.C.	Sheet6	of		
			X:\projects\11821\scad\desig	n\plans\swm\11821_sand_filter_w_forebay(10	0-8-18) combined ponds.DWG October 31, 20		



GEORGE WILLIAM STEPHENS, JR. and ASSOCIATES, INC.

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SDP-95-101

