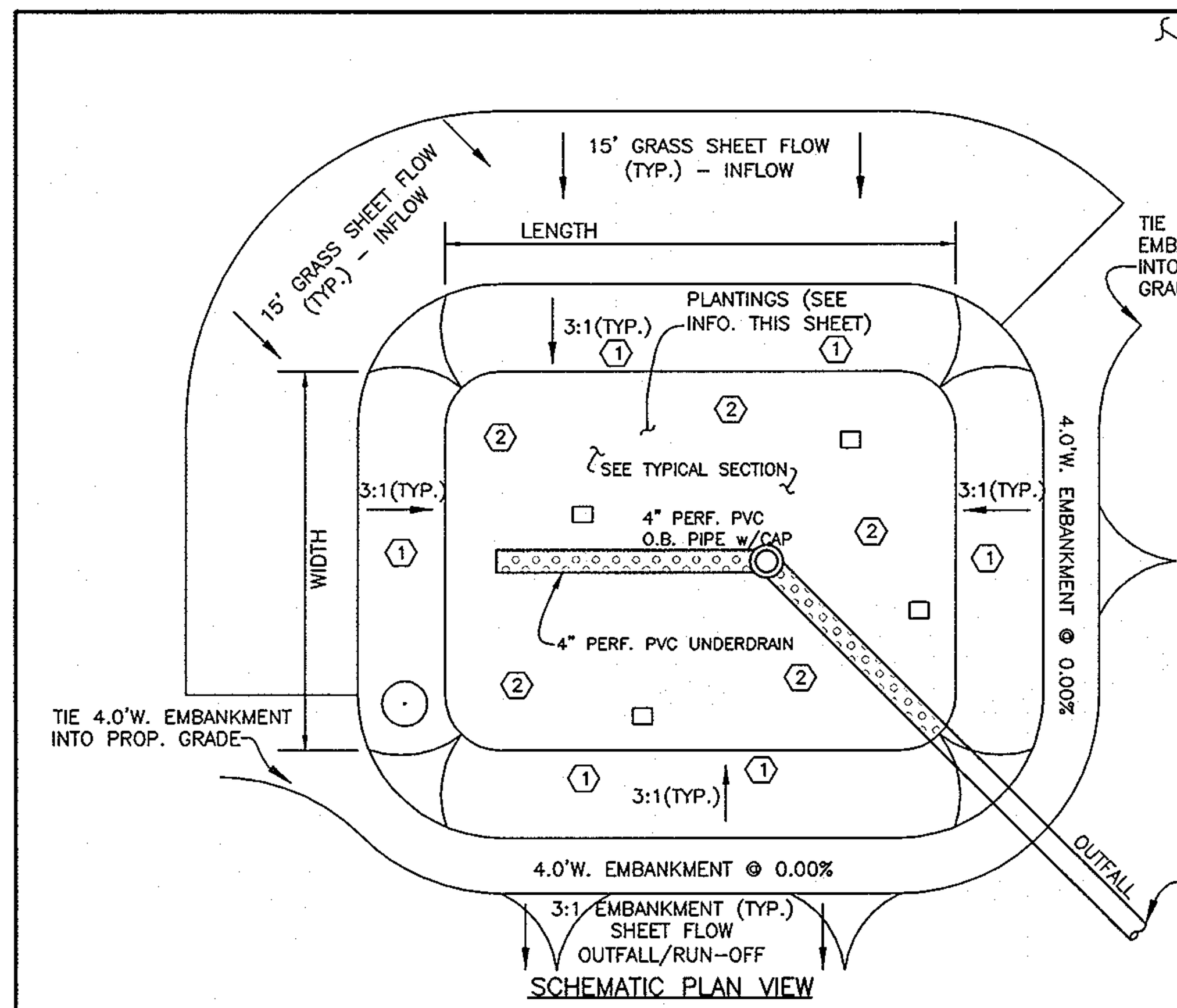
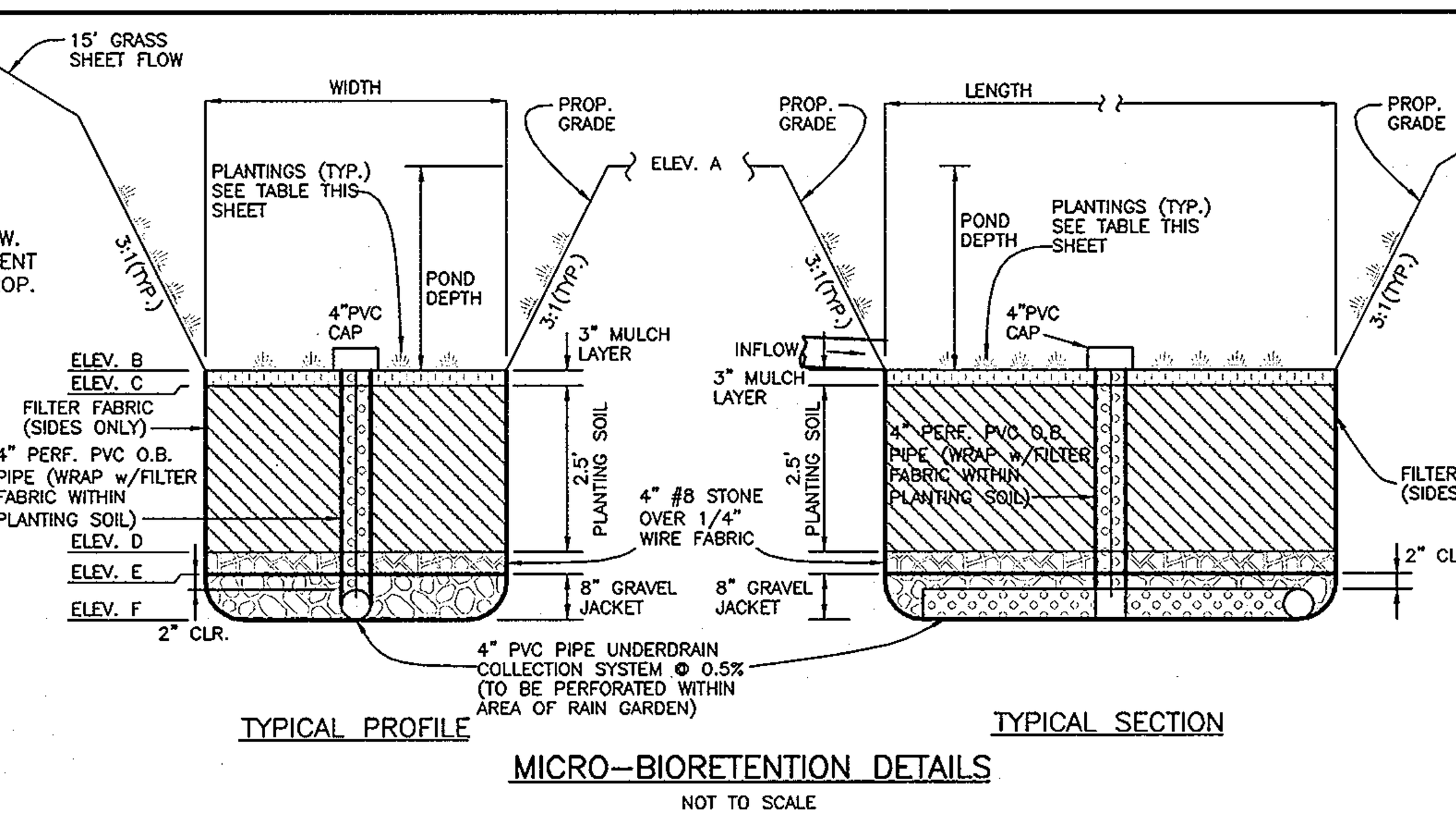




MICRO–BIORETENTION GEOMETRY

LOT	LENGTH	WIDTH	DEPTH	A	B	C	D	E	F
1	44.0'	4.5'	1.0'	754.0	753.0	752.75	750.25	749.92	749.25
2	40.0'	3.3'	1.0'	744.3	743.3	743.05	740.55	740.22	739.55

RAINGARDEN PLANTING SCHEDULE

- ⟨1⟩ IRIS VERSICOLOR (IRIS)
- □ NYMPHOIDES PELTATA FLOATING–HEART YELLOW
- ⟨2⟩ LOBELIA CARDINALIS CARDINAL FLOWER
- ⊙ ACER RUBRUM (RED MAPLE)

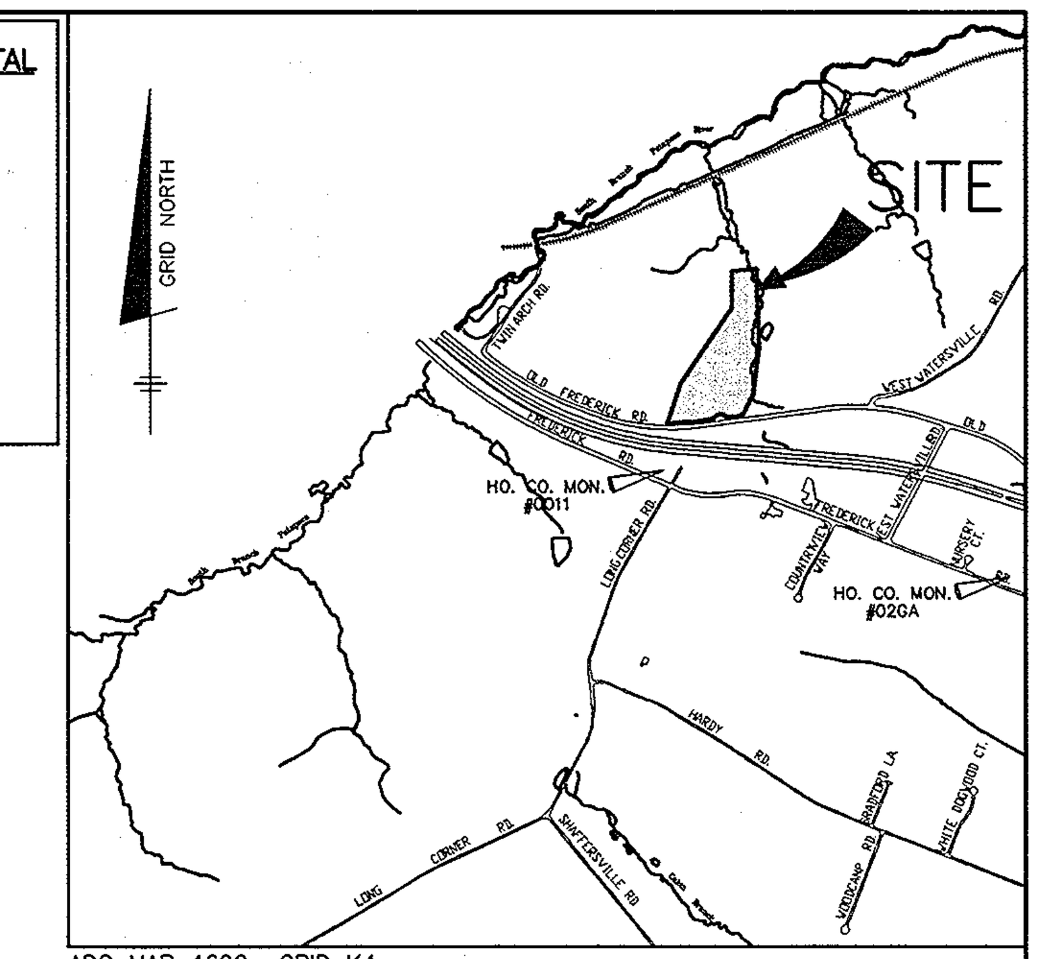
RAINGARDEN PLANTING DATA

1. PLANTINGS WITHIN THE PONDING AREA OF THE RAIN GARDEN ARE TO BE OF A MEDIUM TO HIGH WATER TOLERANCE
2. PLANTINGS ALONG THE PERIMETER (BERM) AREA OF THE RAIN GARDEN ARE TO BE OF A LOW TO MEDIUM WATER TOLERANCE
3. AVOID PLANTINGS WITH EXCESSIVE ROOT MASS IN POND AREA OF THE RAIN GARDEN NEAR O.B. PIPE AND UNDERDRAIN.

BENCHMARKS NAD'83 HORIZONTAL

HO. CO. #0011
STAMPED BRASS DISK SET ON TOP OF CONCRETE BASE.
N 614192.383' E 1275272.715'
ELEVATION: 796.134'

HO. CO. #02GA
STAMPED BRASS DISK SET ON TOP OF CONCRETE BASE
N 612999.867' E 1279074.833'
ELEVATION: 713.771'



ADC MAP 4690 GRID K4

VICINITY MAP

SCALE: 1" = 2000'

LEGEND

- 700 — EXISTING CONTOURS
- EXISTING TREELINE
- EXISTING CL STREAM
- APPROXIMATE 100'YEAR FLOODPLAIN
- 100' STREAM BUFFER
- N00°00'00"W 00.00' — PROPERTY BOUNDARY
- PROPOSED FOREST CONSERVATION EASEMENT
- PROPOSED SEPTIC AREA
- EXISTING SEPTIC AREA
- OcC — SOILS DELINEATION
- 15%–25% SLOPES
- STEEP SLOPES 25% AND GREATER
- EXISTING WELL
- PROPOSED WELL
- FACILITY DRAINAGE AREA
- NON-ROOFTOP DISCONNECT
- DISCONNECT RECEIVING AREA

SOILS LEGEND

MAP SYMBOL	SOIL GROUP	SOIL TYPE
BrD	B	BRINKLOW CHANNERY LOAM, 15 TO 25 PERCENT
*GnB	C	GLENVILLE–BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES
OcB	B	OCCOQUAN LOAM, 3 TO 8 PERCENT
OcC	B	OCCOQUAN LOAM, 8 TO 15 PERCENT SLOPES
UaF	B	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES

* INDICATES HYDRIC SOILS
HOWARD COUNTY, MD (MD027) NRCS WEB SOIL SURVEY 2.0

MATERIALS & SPECIFICATIONS FOR ON–LOT RAINGARDENS

MATERIAL	SPECIFICATION	SIZE	NOTES:
PLANTINGS	SEE APPENDIX A; TABLE A.4	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL (2.5' TO 4.0' DEEP)	SAND: 30–60% SILT: 30–55% CLAY: 0–25%	N/A	USDA SOIL TYPES: LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDDED HARDWOOD	N/A	AGED 6 MONTHS, MINIMUM
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
GEOTEXTILE (1/4" WIRE MESH)	– – –	1/4" WIRE MESH	1/4" WIRE MESH
DRAIN STONE	–	#8 STONE	#8 STONE
UNDERDRAIN GRAVEL	AASHTO M–43	0.375" TO 0.750"	
UNDERDRAIN PIPING	F758, TYPE PS28 OR AASHTO M–278	4" TO 6" RIGID SCH.40 PVC, SDR35 OR HDPE	3/8" PERF. @ 6" O/C, 4 HOLES PER ROW; MINIMUM OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES

OPERATION & MAINTENANCE SCHEDULE FOR RAINGARDENS

1. ANNUAL MAINTENANCE OF PLANT MATERIAL AND MULCH LAYER IS REQUIRED. MAINTENANCE OF MULCH IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH–OUT. ANY REPLACEMENT OF MULCH SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE & INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL & PRUNING.
2. SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN THE SPRING AND FALL. THIS INSPECTION WILL INCLUDE; REMOVAL OF DEAD & DISEASED VEGETATION CONSIDERED BEYOND TREATMENT; TREATMENT OF ALL DISEASED TREES & SHRUBS; AND REPLACEMENT OF ALL DEFICIENT STAKES & WIRES.
3. MULCH SHALL BE INSPECTED EACH SPRING. REMOVE THE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
4. SOIL EROSION TO BE ADDRESSED ON AN AS–NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

STORMWATER MANAGEMENT PRACTICES

LOT NUMBER	ADDRESS	DISCONNECTION OF ROOFTOP RUNOFF N-1 (NUMBER)	DISCONNECTION OF NON-ROOFTOP RUNOFF N-2 (NUMBER)	MICRO-BIORETENTION M-6 (NUMBER)	SWALES M-8 (NUMBER)
LOT 1	OLD FREDERICK ROAD		1*	1	
LOT 2	OLD FREDERICK ROAD	2	1*	1	1

* NON-ROOFTOP DISCONNECT IS FOR THE SHARED ACCESS/MAINTENANCE DRIVEWAY.

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

DESIGN NARRATIVE:

The site was analyzed as woods in good condition and a target RCN was determined. A target rainfall depth treatment (Pe) was determined based on the measured impervious areas and HSG soil types. The target Pe for this site is 1.0 inches. The target Pe was treated using Environmental Site Design practices as outlined in Chapter 5 of the 2000 Maryland Stormwater Design Manual, as amended by Maryland's Stormwater Management Act of 2007. The selected methods include Rooftop and Non–Rooftop disconnects, a Grass Swale and Micro–bioretention facilities.

This site is bounded to the east by a stream, with associated wetlands confined to the streambed area. In addition, this site has some significant areas of steep slopes. To protect these natural resources, it is important to delay release of stormwater runoff from new impervious areas to avoid increasing peak runoffs, and to adequately treat the stormwater to avoid damage to sensitive species. The design incorporates moderately sized houses with minimum width driveways in order to create the least possible stormwater runoff. In addition, steep slope areas are not included on the lots.

The majority of common driveway will be treated by Non–Rooftop disconnect. Two small areas will not be treated, as grading is not possible in those areas, and capture for treatment is not practicable (a small amount of excess storage in the Micro–Bioretention facilities will provide offset hydraulic 'delay' to reduce immediate runoff in compensation for these small areas). The driveway on Lot 2 is too steep for disconnect, and will be conveyed in a parallel swale to a grass swale within the more moderate slopes, which will treat the runoff and release the water into the micro–bioretention behind the house. A small portion of the roof can be partially treated by Rooftop disconnect, and the remainder will be piped to the Micro–Bioretention facility. Outfalls generally correspond with the natural drainage patterns for the site.

Sediment and erosion controls have been designed based on the 1994 Maryland Specifications for Soil Erosion and Sediment Control. Erosion control matting and super silt fence will be used to prevent runoff containing unacceptable levels of TSS from leaving the site and entering the adjacent wetlands during the construction. It will be the obligation of the contractor to install, inspect and maintain these practices.

The target Pe for this site is 1.0 inches. By using Environmental Site Design practices as outlined in Chapter 5 of the 2000 Maryland Stormwater Design Manual as amended by Maryland Stormwater Management Act of 2007, full treatment of the target Pe of 1.0 was achieved, fully addressing the stormwater management requirements.

No Design Manual waivers are anticipated at this time.

Practices and Sizing

Pe: 1.0 inches

Drainage Area MB-1:		Treated by Micro-Bioretention
Total Drainage Area:	11498	
Impervious Area:	3850	
Impervious:	33%	
Rv =	0.351	
ESDV =	336.7	c.f

Storage Computation:

Elevation (ft)	Area (sf)	Average Area (sf)	Contour Interval (ft)	Incremental Volume (ft^3)	Total Volume (ft^3)
753.0	192				0
		347.5	1.0	347.5	
754.0	503				348

Drainage Area GS-2:		Treated by Grass Swale
Total Drainage Area:	19511	
Impervious Area:	4433	
Impervious:	23%	
Rv =	0.254	
ESDV =	413.8	c.f

Swale Sizing/Storage Computations

Swale length:	200	ft		
Bottom width:	3			
Side Slopes:	3	:1		
Depth:	0.5	ft. or	6	inches
Cross Sec. Area:	2.25			
ESDv Provided:	450			

Drainage Area MB-2:		Treated by Micro-Bioretention
Total Drainage Area:	6680	
Impervious Area:	3850	
Impervious:	58%	
Rv =	0.569	
ESDV (before reduct.)=	316.6	c.f

Pe reductions:

D and Type	Impervious Area	Distance or ratio	Pe Treated	Weighted Treatment
D-1 (rooftop)	500	45	0.6	0.078
D-2 (rooftop)	500	30	0.4	0.052
Remainder	2850	-	0.0	0.000
Total:	3850			0.130

Remainder to be treated in MB-2:
1 inches - 0.13 inches 0.87 inches
ESDV (after reductions) = 275.5 c.f
Provided in MB-2

Storage Computation:

Elevation (ft)	Area (sf)	Average Area (sf)	Contour Interval (ft)	Incremental Volume (ft^3)	Total Volume (ft^3)
753.0	149				0
		296.0	1.0	296.0	
754.0	443				296

Porter Property — **Project Number 2323**

Determine ESD Implementation Goals

Soil Conditions for "Woods in Good Condition"

HSG	RCN	Area (ft2)	Percent
A	38		
B	55	147804	100%
C	70		
D	77		
Target RCN	55	147804	

Determine Target Pe Using Table 5.3

Soil Conditions Developed Condition

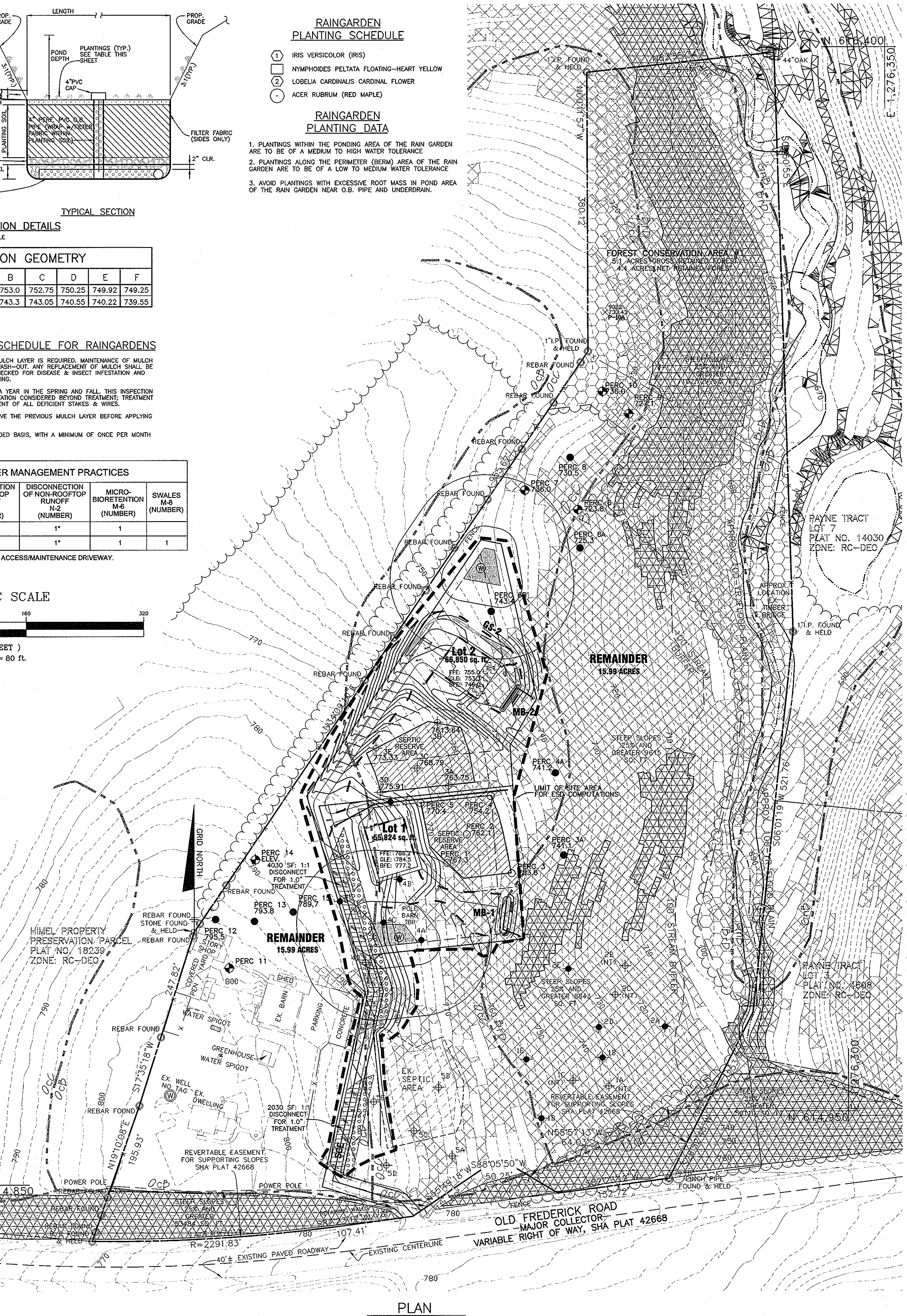
HSG	Area (ft2)	Impervious	Percent	Target Pe
A				
B	147804	20995		
C	0	0		
D	0	0		
Weighted Pe	147804	20995	14%	1.0

* See graphical determination in SWM report.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7-13-11

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/13/11



PLAN

SCALE: 1" = 80'

SITE ANALYSIS DATA/TABULATION

A) TOTAL PROJECT AREA........ 18.8± AC.
B) AREA OF WETLANDS AND BUFFER........ 1.47± AC.
C) AREA OF 100–YR. FLOODPLAIN........ 0.72± AC.
D) AREA OF FOREST........ 5.05± AC.
E) AREA OF STEEP SLOPES 25% OF GREATER... 3.02 AC.
F) AREA OF DEDICATION........ 0.00 AC.
G) HIGHLY ERODIBLE SOILS (K> 0.35) .... 0.00± AC.
H) NUMBER OF UNITS ALLOWED 4
I) NUMBER OF RESIDENTIAL UNITS PROPOSED... 3
J) AREA OF PLAN SUBMISSION........ 3.41± AC.
K) LIMIT OF DISTURBED AREA........ 2.85± AC.
L) OPEN SPACE REQUIRED........ N/A
M) OPEN SPACE PROVIDED........ N/A
N) PRESENT ZONING DESIGNATION........ RC–DEO
O) PROPOSED USE: SINGLE FAMILY DETACHED DWELLINGS
P) IMPERVIOUS COVER........ 0.28± AC.

GENERAL NOTES

1. SUBJECT PROPERTY ZONED RC–DEO PER THE 2–2–04 COMPREHENSIVE ZONING PLAN AND THE COMP LITE ZONING AMENDMENTS EFFECTIVE 7–28–06.
2. THIS PROJECT IS SUBJECT TO THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE ZONING REGULATIONS EFFECTIVE APRIL 13, 2004.
3. PROJECT BOUNDARY AND TOPOGRAPHY WITHIN THE SUBDIVISION AREA ARE BASED ON FIELD RUN BOUNDARY SURVEY AND TOPO PERFORMED BY BENCHMARK ENGINEERING INC. DATED JANUARY, 2011.
4. EXISTING TOPOGRAPHY OUTSIDE OF THE SUBDIVISION AREA AND OFFSITE SHOWN HEREON IS BASED ON HOWARD COUNTY GIS.
5. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. #0011 AND #02GA WERE USED FOR THIS PROJECT.
6. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE LIMITS OF WETLANDS, STREAM, OR THEIR REQUIRED BUFFERS UNLESS DEEMED NECESSARY BY THE DEPARTMENT OF PLANNING AND ZONING.
7. NO WETLANDS OR THEIR BUFFERS ARE LOCATED WITHIN THE LIMIT OF DISTURBANCE, SO A COMPLETE WETLAND DELINEATION WAS NOT PERFORMED. A CERTIFICATION LETTER TO THIS EFFECT DATED APRIL, 2011 BY ECO–SCIENCE PROFESSIONALS, INC. HAS BEEN PROVIDED.
8. A SIMPLIFIED FOREST STAND DELINEATION WAS PREPARED BY ECO–SCIENCE PROFESSIONALS, INC., APRIL 2011.
9. AN APPROXIMATE 100–YEAR FLOODPLAIN HAS BEEN DELINEATED FOR USE IN FOREST CONSERVATION COMPUTATIONS; HOWEVER, A DETAILED FLOODPLAIN WAS NOT DEVELOPED, AS IT IS 'NON–CRITICAL' FOR THIS PROJECT. NO DEVELOPMENT IS PROPOSED IN OR NEAR THE STREAM BUFFER.
10. THERE ARE NO CEMETERIES LOCATED ON THIS SITE.
11. A NOISE STUDY IS NOT REQUIRED FOR THIS DEVELOPMENT.
12. THIS SITE IS NOT LOCATED WITHIN THE METROPOLITAN DISTRICT. WATER AND SEWER WILL BE PRIVATE ON–SITE FACILITIES.
13. THE FOREST CONSERVATION ACT OBLIGATION FOR THIS PROJECT WILL BE MET BY THE ON–SITE RETENTION OF FOREST.
14. THERE ARE NO PREVIOUS DPZ FILES FOR THIS SITE.

NO.	DATE	REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410–465–6105 (F) 410–465–6644
60 THOMAS JOHNSON DRIVE ▲ FREDERICK, MARYLAND 21702
(P) 301–371–3505 (F) 301–371–3506
WWW.BEI–CIVILENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 28376, Expiration Date: 1-1-2013.

STATE OF MARYLAND — ALICE A. MILLER — No. 28376 — PROFESSIONAL ENGINEER

11 July 2011

OWNER:
ROBERT AND MARY PORTER
17706 OLD FREDERICK ROAD
MOUNT AIRY, MARYLAND 21771
(410) 552–6210

PORTER PROPERTY

LOCATION: TAX MAP: 1, GRID: 24
PARCEL: 41, ZONED RC–DEO
ELECTION DISTRICT NO. 4
HOWARD COUNTY, MARYLAND

TITLE: ENVIRONMENTAL CONCEPT PLAN

DATE: MAY, 2010	BEI PROJ. NO. 2323
SCALE: AS SHOWN	SHEET 1 OF 2

DESIGN: AAM | DRAFT: AAM | CHECK: CAM

ECP–11–059

SEDIMENT CONTROL NOTES

1. A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION, (313-1850).
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 MOST CURRENT "MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS THERETO.
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 SITE.
4. 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 DRAINAGE.
5. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1994 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 GRASSES.
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	18.8	ACRES
AREA DISTURBED	2.85	ACRES
AREA TO BE ROOFED OR PAVED	0.28	ACRES
AREA TO BE VEGETATIVELY STABILIZED	2.57	ACRES
TOTAL CUT	5018	CY
TOTAL FILL	3648	CY
OFFSITE WASTE AREA LOCATION	A SITE WITH AN ACTIVE GRADING PERMIT	

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 CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY 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.
11. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

TEMPORARY SEEDBED PREPARATIONS

APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE REDISTURBED WHERE A SHORT-TERM VEGETATIVE COVER IS NEEDED.

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

SOIL AMENDMENTS: APPLY 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ FT).

SEEDING: FOR PERIOD MARCH 1 THROUGH APRIL 30 AND FROM AUGUST 15 THROUGH NOVEMBER 15, SEED WITH 2-1/2 BUSHELS PER ACRE OF ANNUAL RYE (3.2 LBS/1000 SQ FT). FOR THE PERIOD MAY 1 THROUGH AUGUST 14, SEED WITH 3 LBS PER ACRE OF WEEPING LOVEGRASS (.07 LBS/1000 SQ FT). FOR THE PERIOD NOVEMBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SOD.

MULCHING: APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ FT) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES, 8 FT. OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ FT) FOR ANCHORING.

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED.

30.0 DUST CONTROL

Definition

Controlling dust blowing and movement on construction sites and roads.

Purpose

To prevent blowing and movement of dust from exposed soil surfaces, reduce on and off-site damage, health hazards, and improve traffic safety.

Conditions Where Practice Applies

This practice is applicable to areas subject to dust blowing and movement where on and off-site damage is likely without treatment.

Specifications

Temporary Methods

1. Mulches – See standards for vegetative stabilization with mulches only. Mulch should be crimped or tracked to prevent blowing.
2. Vegetative Cover – See standards for temporary vegetative cover.
3. Tillage – To roughen surface and bring clods to the surface. This is an emergency measure which should be used before soil blowing starts. Begin plowing on windward side of site. Chisel-type plows spaced about 12" apart, spring-toothed harrows, and similiar plows are examples of equipment which may produce the desired effect.
4. Irrigation – This is generally done as an emergency treatment. Site is sprinkled with water until the surface is moist. Repeat as needed. At no time should the site be irrigated to the point that runoff begins to flow.
5. Barriers – Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similiar material can be used to control air currents and soil blowing. Barriers placed at right angles to prevailing currents at intervals of about 10 times their height are effective in controlling soil blowing.
6. Calcium Chloride – Apply at rates that will keep surface moist. May need retreatment.

Permanent Methods

1. Permanent Vegetation – See standards for permanent vegetative cover, and permanent stabilization with sod. Existing trees or large shrubs may afford valuable protection if left in place.
2. Topsoiling – Covering with less erosive soil materials. See standards for topsoiling.
3. Stone – Cover surface with crushed stone or coarse gravel.

References

1. Agriculture Handbook 346. Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss.
2. Agriculture Information Bulletin 354. How to Control Wind Erosion, USDA-ARS.

TOPSOIL SPECIFICATIONS

I. Topsoil salvaged from the existing site may be used provided that it meets that standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-SCS in cooperation with Maryland Agricultural Experimental Station.

II. Topsoil Specifications – Soil to be used as topsoil must meet the following:

i. Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting texture subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1-1/2" in diameter.

ii. Topsoil must be free of plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nutsedge, poison ivy, thistle, or others as specified.

iii. Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

III. For sites having disturbed areas under 5 acres:

i. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization – Section I – Vegetative Stabilization Methods and Materials.

IV. For sites having disturbed areas over 5 acres:

i. On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:

a. pH for topsoil shall be between 6.0 and 7.5. If the tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.

b. Organic content or topsoil shall be not less than 1.5 percent by weight.

c. Topsoil having soluble salt content greater than 500 parts per million shall not be used.

d. No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.

Note: Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.

ii. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization – Section I – Vegetative Stabilization Methods and Materials.

V. Topsoil Application

i. When topsoiling, maintain needed erosion and sediment control practices such as diversions, grade stabilization structures, earth dikes, slope silt fence and sediment traps and basins.

ii. Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.

iii. Topsoil shall be uniformly distributed in a 4" - 8" layer and lightly compacted to a minimum thickness of 4". Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets.

iv. Topsoil shall not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

VI. Alternative for Permanent Seeding – Instead of applying the full amounts of lime and commercial fertilizer, composted sludge and amendments may be applied as specified below:

i. Composted Sludge Material for use as a soil conditioner for sites having distributed areas over 5 acres shall be tested to prescribe amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:

a. Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of acquisition of the compost) by the Maryland Department of the Environment under COMAR 26.04.06.

b. Composted sludge shall contain at least 1 percent nitrogen, 1.5 percent phosphorus, and 0.2 percent potassium and have a pH of 7.0 to 8.0. If compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.

c. Composted sludge shall be applied at a rate of 1 ton/1,000 square feet.

iv. Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1,000 square feet, and 1/3 the normal lime application rate.

References: Guidelines Specifications, Soil Preparation and Sodding. MD-VA, Pub. #1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institutes, Revised 1973.

PERMANENT SEEDBED PREPARATIONS

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

SOIL AMENDMENTS: IN LIEU OF SOIL TEST RECOMMENDATIONS, USE ON OF THE FOLLOWING SCHEDULES:

1. PREFERRED – APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE 30-0-0- UREAFORM FERTILIZER (9 LBS/1000 SQ FT).
2. ACCEPTABLE – APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 1000 LBS PER ACRE 10-10-10 FERTILIZER (23 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL.

SEEDING: FOR THE PERIODS MARCH 1 THROUGH APRIL 30 AND AUGUST 1 THROUGH OCTOBER 15, SEED WITH 60 LBS PER ACRE (1.4 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (.05 LBS/1000 SQ FT) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY: OPTION (1) 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) USE SOD. OPTION (3) SEED WITH 60 LBS PER ACRE OF KENTUCKY 31 TALL FESCUE AND MULCH WITH 2 TONS PER ACRE OF WELL ANCHORED STRAW.

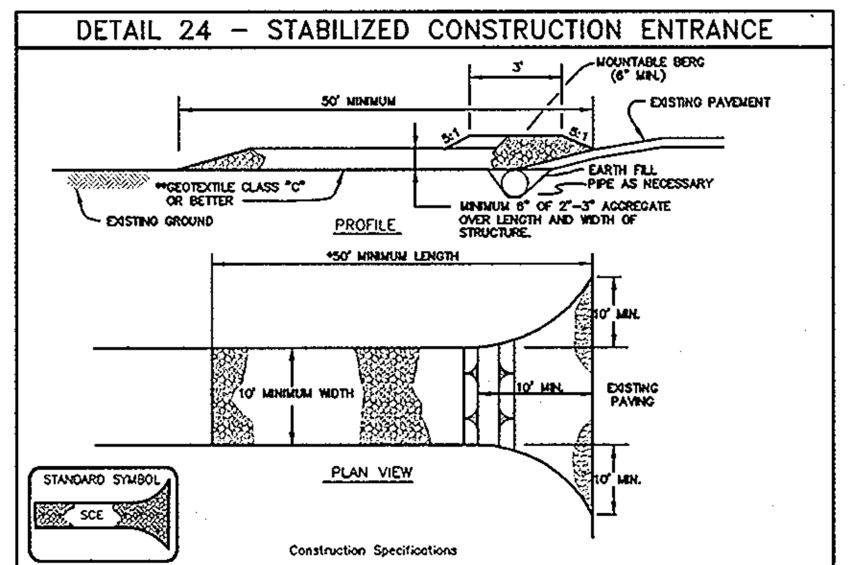
MULCHING: APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ FT) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ FT) FOR ANCHORING.

MAINTENANCE: INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDINGS.

Construction Specifications – Pipe Slope Drain

1. The Pipe Slope Drain (PSD) shall have a slope of 3 percent or steeper.
2. The top of the earth dike over the inlet pipe shall be at least 2 times the pipe diameter measured at the invert of the pipe.
3. Flexible tubing is preferred. However, corrugated metal pipe or equivalent PVC pipe can be used. All connections shall be watertight. pipe.
4. A flared end section shall be attached to the inlet end of pipe with a watertight connection. Filter cloth shall be placed under the inlet of the pipe slope drain and shall extend out 5' from the inlet. The filter cloth shall be "keyed in" on all sides. pipe.
5. The Pipe Slope Drain shall be securely anchored to the slope by staking at the grommets provided. Spacing for anchors shall be as provided by manufacturer's specification. In no case shall less than two (2) anchors be provided, equally spaced along the length of pipe. These details should be provided by pipe suppliers. pipe.
6. The soil around and under the pipe and end section shall be hand tamped in 4 inch lifts to the top of the earth dike.
7. All pipe connections shall be watertight.
8. Whenever possible where a PSD drains on unstabilized area, it shall outlet into a sediment trap or basin. If this is not possible then the slope drain will discharge into a stable conveyance that leads to a sediment trap or basin. When discharging into a trap or basin the PSD shall discharge at the same elevation as the wet pool elevation. The discharge from the PSD must be as far away from the sediment control outlet as possible.
9. When the drainage area is stabilized, the PSD shall discharge onto a stabilized area at a non-erosive velocity.
10. Inspection and any required maintenance shall be performed periodically and after each rain event.
11. The inlet must be kept open at all times.

DETAIL 24 – STABILIZED CONSTRUCTION ENTRANCE



Construction Specifications

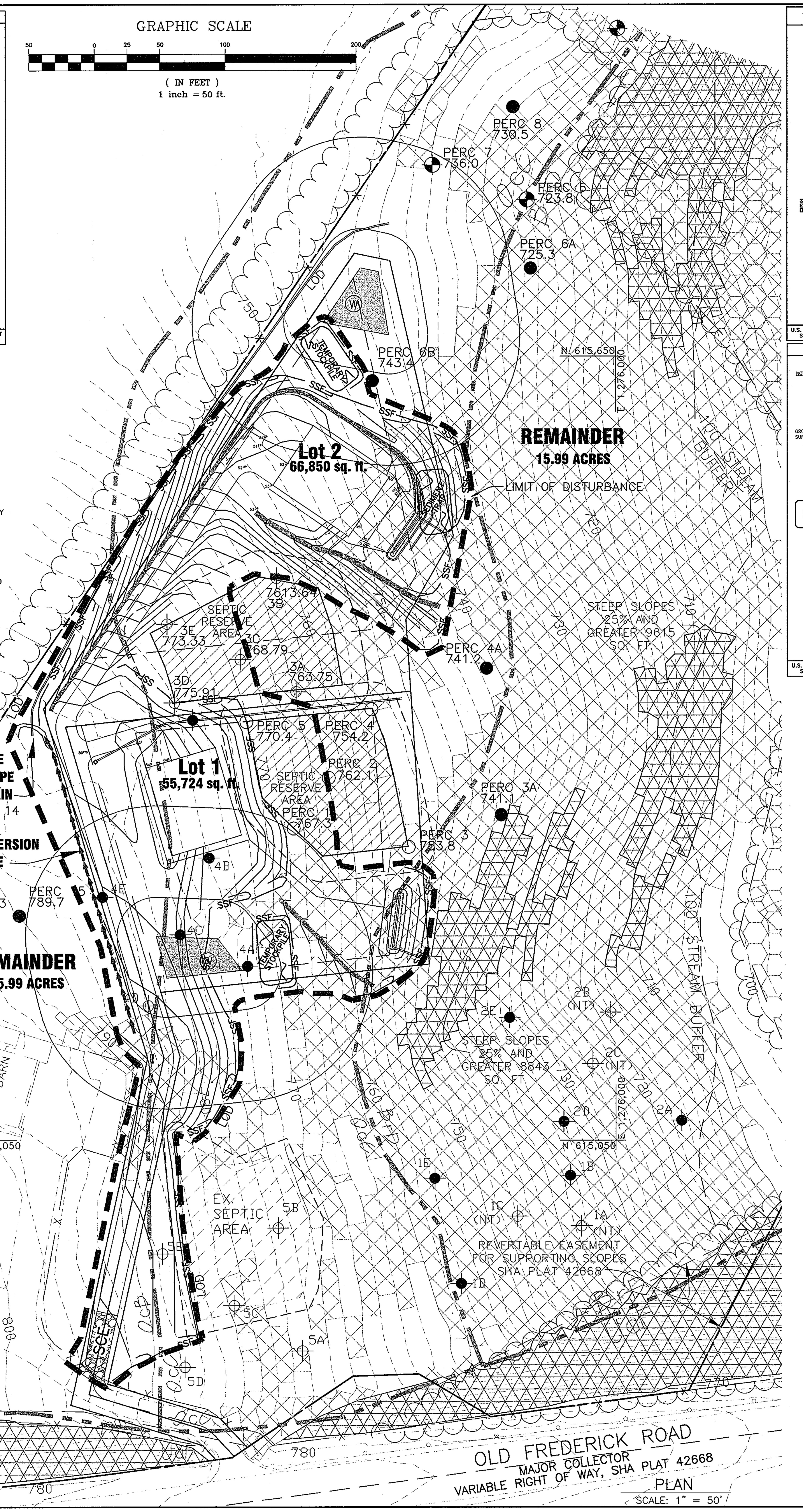
1. Length – minimum of 50' (*30' for single residence lot).
2. Width– 10' minimum, should be flared at the existing road to provide a turning radius.
3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. **The plan approval authority may not require single family residence to use geotextile.
4. Stone – crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
5. Surface Water – all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mounted berg with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
6. Location – A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 17 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION
48 HOURS PRIOR TO START OF CONSTRUCTION

1. OBTAIN GRADING PERMIT. (DAY 1)
2. INSTALL CLEAN WATER DIVERSION DIKE AND PIPE SLOPE DRAIN, STABILIZED CONSTRUCTION ENTRANCE, SEDIMENT TRAP AND SUPER SILT FENCES. (DAY 2-4)
3. UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, BRING SITE TO GRADE AND STABILIZE SWALES IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES. UTILIZE DUST CONTROL METHODS. (DAY 5-20)
4. INSTALL UTILITIES, FINAL GRADE AND PAVE DRIVEWAY. PERMANENTLY STABILIZE SWALES AND REMOVE PIPE SLOPE DRAIN. (DAY 21-34)
5. WHEN CONTRIBUTING AREAS TO MICRO-BIORETENTION AREAS ARE STABILIZED, INSTALL PLANTING SOIL AND PLANTINGS. (DAY 35-40)
6. UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL DEVICES, AND STABILIZED DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES. (DAY 40-44)



LEGEND

Symbol	Description
700	EXISTING CONTOURS
	EXISTING TREELINE
	EXISTING CL STREAM
	APPROXIMATE 100'YEAR FLOODPLAIN
	100' STREAM BUFFER
N00°00'00"W 00.00'	PROPERTY BOUNDARY
	PROPOSED FOREST CONSERVATION EASEMENT
	PROPOSED SEPTIC AREA
	15%-25% SLOPES
	STEEP SLOPES 25% AND GREATER
	LIMIT OF DISTURBANCE
SSF	SUPER SILT FENCE
SCE	STABILIZED CONSTRUCTION ENTRANCE
	EROSION CONTROL MATTING

DETAIL 4 – PIPE SLOPE DRAIN

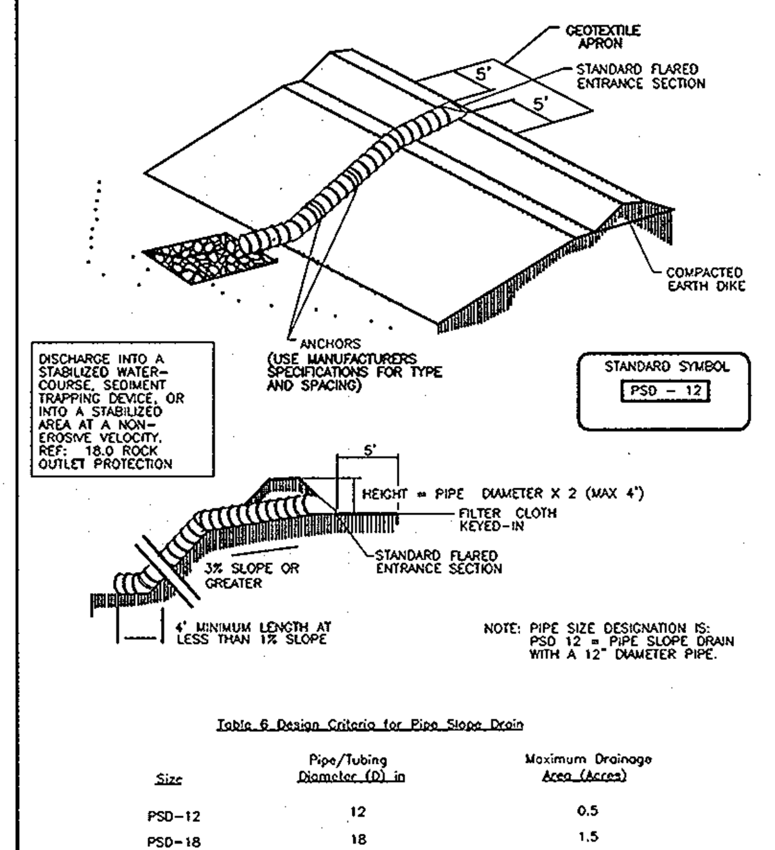


Table 6 Design Criteria for Pipe Slope Drain

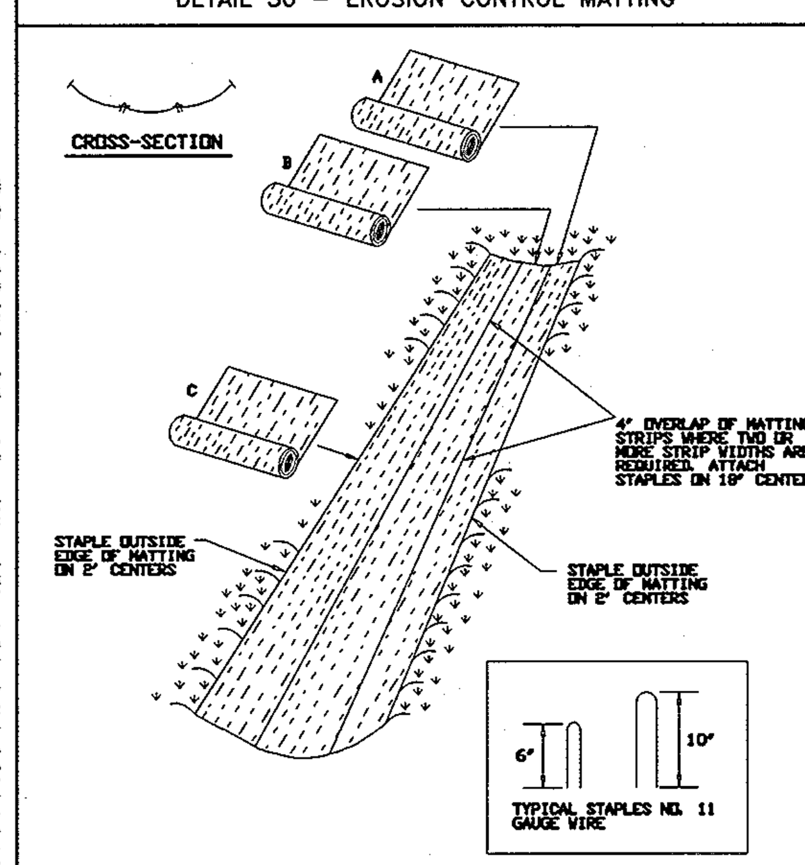
Size	Pipe/Tubing Diameter (D) in	Maximum Drainage Area (Acres)
PSD-12	12	0.5
PSD-18	18	1.5
PSD-21	21	2.5
PSD-24	24	3.5
PSD-24 (2)	24	5.0

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE B - 5 - 4	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION	7.13.11 DATE
CHIEF, DIVISION OF LAND DEVELOPMENT	7/13/11 DATE

DETAIL 30 – EROSION CONTROL MATTING



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE G - 22 - 2	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 30 – EROSION CONTROL MATTING

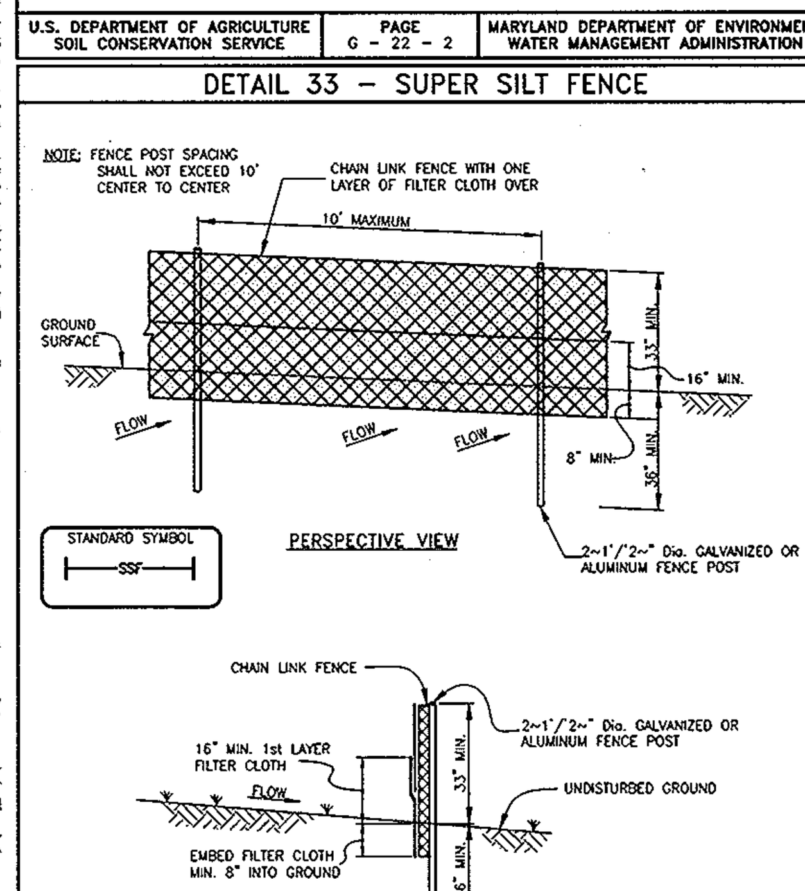
Construction Specifications

1. Key-in the matting by placing the top ends of the matting in a narrow trench, 6" in depth. Backfill the trench and tamp firmly to conform to the channel cross-section. Secure with a row of staples about 4" down slope from the trench. Spacing between staples is 6".
2. Staple the 4" overlap in the channel center using an 18" spacing between staples.
3. Before stapling the outer edges of the matting, make sure the matting is smooth and in firm contact with the soil.
4. Staples shall be placed 2' apart with 4 rows for each strip, 2 outer rows, and 2 alternating rows down the center.
5. Where one roll of matting ends and another begins, the end of the top strip shall overlap the upper end of the lower strip by 4", shiplap fashion. Reinforce the overlap with a double row of staples spaced 6" apart in a staggered pattern on either side.
6. The discharge end of the matting liner should be similarly secured with 2 double rows of staples.

Note: If flow will enter from the edge of the matting then the area effected by the flow must be keyed-in.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE G - 22 - 2A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 33 – SUPER SILT FENCE



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE H - 26 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

SUPER SILT FENCE

CONSTRUCTION SPECIFICATIONS

1. Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
2. Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and truss rods, drive anchors and post caps are not required except on the ends of the fence.
3. Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
4. Filter cloth shall be embedded a minimum of 8" into the ground.
5. When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
6. Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height
7. Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:

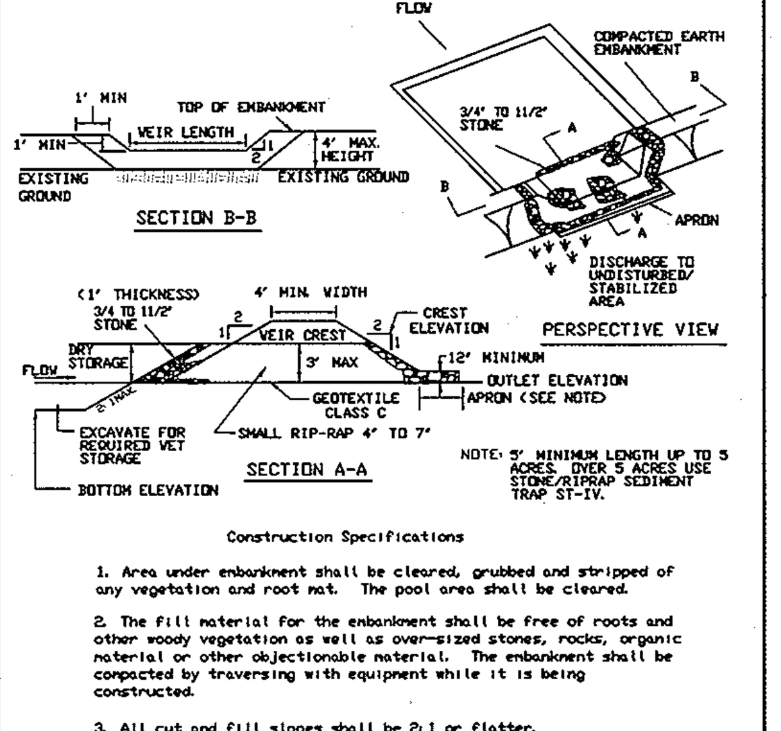
Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft /minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

SUPER SILT FENCE DESIGN CRITERIA

Slope	Slope Steepness	Slope Length (maximum)	Silt Fence Length (maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 33%	5:1 - 3:1	100 feet	1,000 feet
33 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	250 feet

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E - 26 - 3A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 9 – STONE OUTLET SEDIMENT TRAP – ST II



Construction Specifications

1. Area under embankment shall be cleared, grubbed and stripped of any vegetation and root mat. The pool area shall be cleared.
2. The fill material for the embankment shall be free of roots and other woody vegetation as well as over-sized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed.
3. All cut and fill slopes shall be 2:1 or flatter.
4. The stone used in the outlet shall be small rip-rap 4" to 7" in size with a 1' thick layer of 3/4" to 11/2" washed aggregate placed on the upstream face of the outlet. Stone facing shall be as necessary to prevent clogging. Geotextile Class C may be substituted for the stone facing by placing it on the inside face of the stone outlet.
5. Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to one half of the wet storage depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE C - 9 - 10	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

STONE OUTLET SEDIMENT TRAP – ST II

6. The strcture shall be inspected periodically and after each rain and repairs made as needed.
7. Construction of traps shall be carried out in such a manner that sediment pollution is abated. Once constructed, the top and outside face of the embankment shall be stabilized with seed and mulch. Points of concentration inflow shall be protected in accordance with Grade Stabilization Structure criteria. The remainder of the interior slopes should be stabilized (one time) with seed and mulch upon trap completion and monitored and maintained erosion free during the life of the trap.
8. The structure shall be dewatered by approved methods, removed and the area stabilized when the drainage area has been properly stabilized.
9. Refer to Section D for specifications concerning trap dewatering.
10. Minimum trap depth shall be measured from the weir elevation.
11. The elevation of the top of any dike directing water into the trap must equal or exceed the elevation of the trap embankment.
12. Geotextile Class C shall be placed over the bottom and sides of the outlet channel prior to the placement of stone. Sections of filter cloth must overlap at least 1' with the section nearest the entrance placed on top. The filter cloth shall be embedded at least 6" into existing ground at the entrance of the outlet channel.
13. Outlet – An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE C - 9 - 10A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

NO.	DATE	REVISION

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
60 THOMAS JOHNSON DRIVE ▲ FREDERICK, MARYLAND 21702
(P) 301-371-3505 (F) 301-371-3506
WWW.BEI-CIVILENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 28376, Expiration Date: 1-1-2013.

11 July 2011

OWNER:
ROBERT AND MARY PORTER
17706 OLD FREDERICK ROAD
MOUNT AIRY, MARYLAND 21771

PORTER PROPERTY

LOCATION: TAX MAP: 1, GRID: 24
PARCEL: 41, ZONED RC-DEO
ELECTION DISTRICT NO. 4
HOWARD COUNTY, MARYLAND

TITLE: SEDIMENT AND EROSION CONTROL PLAN, NOTES AND DETAILS

DATE: MAY, 2010			BEI PROJ. NO. 2323	
DESIGN: AAM	DRAFT: AAM	CHECK: CAM	SCALE: AS SHOWN	SHEET 2 OF 2

ECP-11-059

C:\Projects\2323 PORTER PROPERTY\dwg\7023-ECP-11-59 Sheet 2.dwg, 7/11/2011 2:27:58 PM