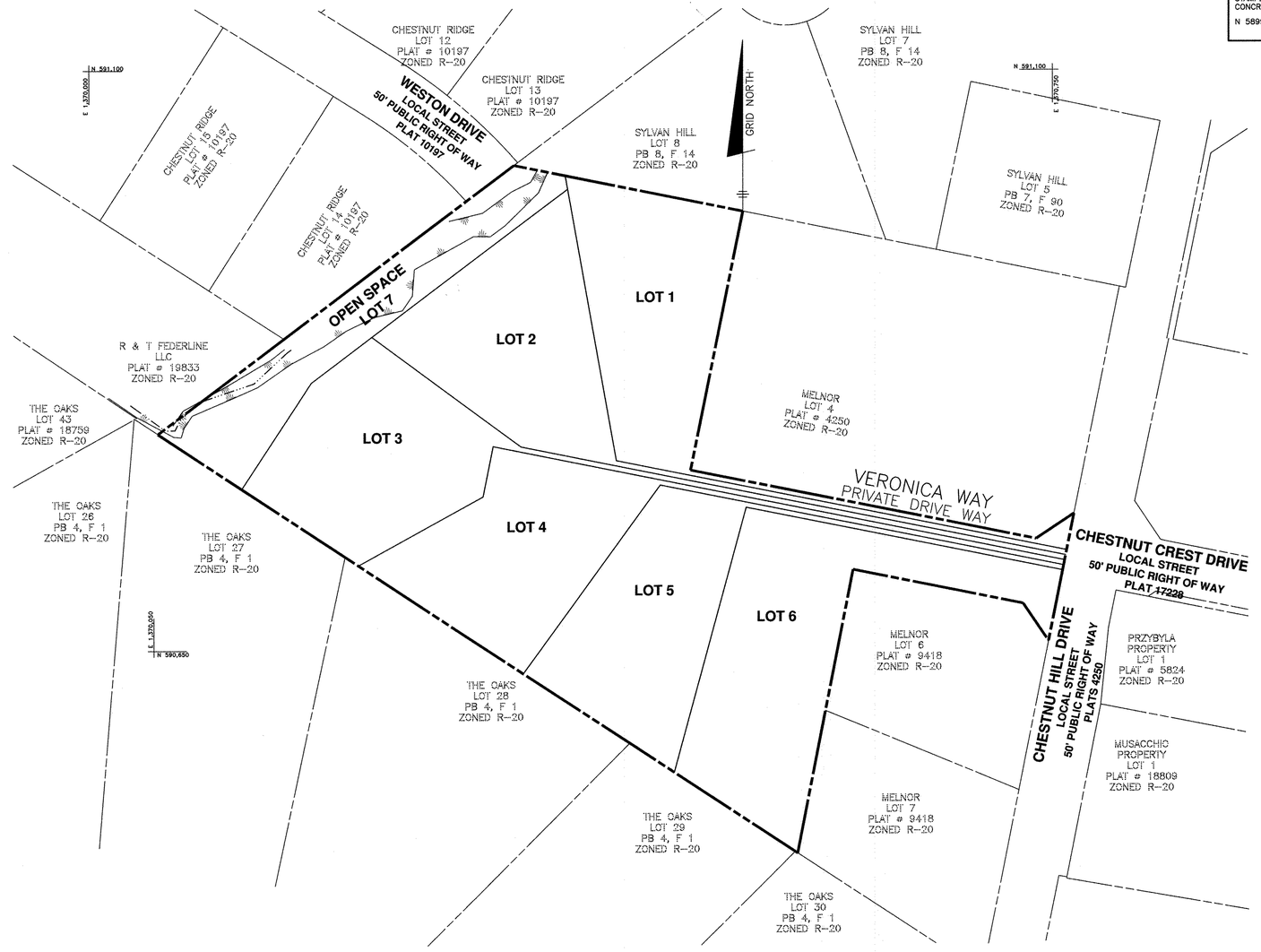

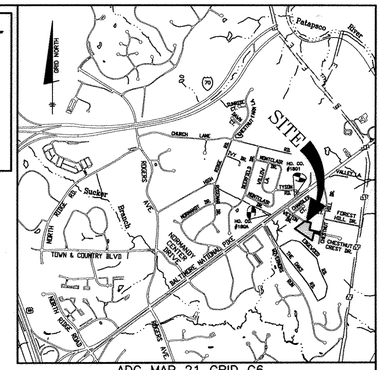

GENERAL NOTES

1.) THIS PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED.

2.) THE SUBJECT PROPERTY IS ZONED R–20 PER THE 2–2–2004 COMPREHENSIVE ZONING PLAN AND THE "COMP LITE" ZONING AMENDMENTS EFFECTIVE 7–28–2006.

3.) COORDINATES BASED ON NAD '83, MARYLAND COORDINATE SYSTEM AS PROJECTED BY GPS RECEIVERS SET BY BENCHMARK ENGINEERING, INC.

4.) TRACT BOUNDARY IS BASED ON A FIELD RUN BOUNDARY SURVEY PERFORMED ON OR ABOUT SEPTEMBER, 2012 BY BENCHMARK ENGINEERING, INC.

5.) THE EXISTING TOPOGRAPHY ON–SITE IS BASED ON FIELD RUN TOPO BY BENCHMARK ENGINEERING, INC. IN NOVEMBER, 2012.

6.) THE EXISTING UTILITIES SHOWN HEREON ARE BASED ON FIELD SURVEY LOCATIONS BY BENCHMARK ENGINEERING, INC., AND HOWARD COUNTY GIS. IT IS THE CONTRACTORS RESPONSIBILITY FOR VERIFYING THESE UTILITIES IN THE FIELD AT TIME OF CONSTRUCTION.

7.) A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.

8.) THE WETLAND DELINEATION REPORT WAS PREPARED BY ECO–SCIENCE PROFESSIONALS, INC ON MARCH 27, 2013.

9.) THE FOREST STAND DELINEATION REPORT WAS PREPARED BY JOHN CHRIS OGLE IN NOVEMBER, 2012.

10.) THE TRAFFIC STUDY FOR THIS PROJECT WAS PREPARED BY MARS GROUP DATED APRIL, 2013 AND WAS APPROVED ON OCTOBER 14, 2013.

11.) THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT.

12.) WATER IS PUBLIC. THE CONTRACT NUMBER IS 24–4796–D.

13.) SEWER IS PUBLIC. THE CONTRACT NUMBER IS 24–4796–D

14.) THIS SUBDIVISION IS SUBJECT TO SECTION 18.122B OF THE HOWARD COUNTY CODE. PUBLIC WATER AND/OR SEWER ALLOCATIONS WILL BE GRANTED AT THE TIME OF ISSUANCE OF THE BUILDING PERMIT IF CAPACITY IS AVAILABLE AT THAT TIME.

15.) NO GRADING, REMOVAL OR VEGETATIVE COVER AND TREES, AND PAVING ARE NOT PERMITTED IN WETLANDS, STREAMS, AND WETLAND AND STREAM BUFFERS EXCEPT AS APPROVED BY THE DEPARTMENT ON PLANNING AND ZONING. THE EXTENSION OF SEWER LINES AND THE DRAINAGE OUTFALL WITHIN THE ENVIRONMENTAL AREAS ARE PERMITTED AS NECESSARY DISTURBANCES.

16.) TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO CEMETERY LOCATIONS ON–SITE.

17.) TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO HISTORIC SITES/FEATURES LOCATED ON THIS SITE.

18.) DRIVEWAYS SHALL BE PROVIDED PRIOR TO RESIDENTIAL OCCUPANCY TO INSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:

- a) WIDTH – 12' (16' SERVING MORE THAN ONE RESIDENCE).
- b) SURFACE – 6" OF COMPACT CRUSHER RUN BASE WITH TAR AND CHIP COATING (1–1/2" MIN.)
- c) GEOMETRY – MAXIMUM 15% GRADE, MAXIMUM 10% GRADE CHANGE AND MINIMUM 45' TURNING RADIUS.
- d) STRUCTURES (CULVERTS/BRIDGES) – CAPABLE OF SUPPORTING 25 GROSS TONS (H25 LOADING).
- e) DRAINAGE ELEMENTS – CAPABLE OF SAFELY PASSING 100 YEAR FLOODPLAIN WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVEWAY.
- f) STRUCTURE CLEARANCES – MINIMUM 12 FEET.
- g) MAINTENANCE – SUFFICIENT TO INSURE ALL WEATHER USE.

19.) STORMWATER MANAGEMENT FOR THESE LOTS IS PROVIDED IN ACCORDANCE WITH THE STORMWATER MANAGEMENT ACT OF 2007. ENVIRONMENTAL SITE DESIGN (ESD) HAS BEEN IMPLEMENTED TO THE MAXIMUM EXTENT PRACTICAL (MEP) BY THE USE OF TWO (M–3) LANDSCAPE INFILTRATION PRACTICES, FOUR (M–6) MICRO–BIORETENTION PRACTICES AND ONE (M–8 GRASSED SWALE. ALL ESD PRACTICES SHALL BE PRIVATELY OWNED AND MAINTAINED. ALL ROOF DRAINS SHALL BE CONVEYED TO EACH ON LOT ESD PRACTICE VIA OVERLAND SWALES OR PIPE MANIFOLD.

20.) THE TOTAL FOREST CONSERVATION OBLIGATION FOR THIS PROJECT SHALL BE MET BY THE ON–SITE RETENTION OF 0.25 ACRES OF FOREST WITHIN A FOREST CONSERVATION EASEMENT AND THE OFFSITE REFORESTATION OF 0.54 ACRES LOCATED IN THE CATTAIL CREEK, SDP–14–031, SUBDIVISION. THERE IS NO SURETY FOR THE ONSITE RETENTION.

21.) LANDSCAPING IS PROVIDED IN ACCORDANCE WITH A SUPPLEMENTAL CERTIFIED LANDSCAPE PLAN IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL. FINANCIAL SURETY IN THE AMOUNT OF $7,650.00 FOR THE REQUIRED PERIMETER TREES SHALL BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT.

22.) THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT 410–313–1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF ANY WORK.

23.) THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1–800–257–7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.

24.) ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.

25.) ANY DAMAGE TO THE COUNTY'S RIGHT–OF–WAY SHALL BE CORRECTED AT THE OWNER'S EXPENSE.

26.) THE GEO–TECHNICAL REPORT FOR THIS PROJECT WAS PREPARED BY GEOLABS, INC. DATED JULY, 2013.

27.) THE REQUIRED OPEN SPACE ASSOCIATED WITH THIS SUBDIVISION IS TO BE DEDICATED TO THE HOMEOWNERS ASSOCIATION, IT SHALL BE PRIVATELY OWNED AND MAINTAINED THE THE HOME OWNERS ASSOCIATION. FOR LOTS THAT ARE 20,000 SQUARE FEET OR GREATER, A 6% OPEN SPACE AREA IS REQUIRED AND THIS SUBDIVISION IS PROVIDING 0.37 ACRES.

28.) THERE IS NO FLOODPLAIN ON THIS SITE.

29.) THE COMMUNITY MEETING FOR THIS SUBDIVISION WAS HELD ON FEBRUARY 20, 2013.

30.) THE MODERATE INCOME HOUSING UNIT REQUIREMENT (COUNCIL BILL 35–2013) SHALL BE FULFILLED BY PAYMENT OF A FEE–IN–LIEU IN AN AMOUNT THAT IS TO BE CALCULATED BY THE DEPARTMENT OF INSPECTIONS LICENSES AND PERMITS AT THE TIME OF BUILDING PERMIT. THE FEE–IN–LIEU SHALL BE PAID FOR LOTS/RESIDENTIAL UNITS 1 THROUGH 6 WITHIN THIS SUBDIVISION AT TIME OF BUILDING PERMIT ISSUANCE.

31.) BGE APPROVED THE LANDSCAPING AND FOREST CONSERVATION FOR THIS PROJECT ON SEPTEMBER 9, 2013.

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 1.4 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 (n–2) Disconeectionof non–rooftop area(M–3) Landscape Infiltration, (M–6) Micro–bioretention and (M–8) Grassed Swale.

This site contains a stream, which converge near the southwest corner. This area has an associated wetland. Only the wetland areas contained within the effective site area are described on this plan. The site has no areas of steep slopes in excess of 25%.

Conceptual treatment has been designated based on preliminary grading, the site topography and the driveway. The shared driveway is treated by the (M–8) Grassed swale. Some private driveway areas may be treated by disconnection and/or on–lot micro–bioretention. Some driveway areas will be treated in on the individual lots and within an easement area. Rooftop runoff will be piped to on–site micro–bioretention facilities or a landscape infiltration facility. Multiple outfalls are provided to generally release runoff in natural drainage patterns for the site.

Sediment and erosion controls have been designed based on the 2011 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 1.4 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, treatment of the target Pe of 1.4 will be achieved to the maximum extend practicable.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

8·23·17

CHIEF, DEVELOPMENT ENGINEERING DIVISION N-Y DATE

8·25·17

CHIEF, DIVISION OF LAND DEVELOPMENT DJ DATE

STORMWATER MANAGEMENT PRACTICES

LOT NUMBER	ADDRESS	MICRO-BIORETENTION (M-6) (NUMBER)	GRASS SWALE (M-8) (NUMBER)	LANDSCAPE INFILTRATION (M-3) (NUMBER)	NON-ROOFTOP DISCONNECT (N-2) (NUMBER)
LOT 1	VERONICA WAY	0	1	1	1
LOT 2	VERONICA WAY	1	1	0	0
LOT 3	VERONICA WAY	1	1	0	0
LOT 4	VERONICA WAY	1	2	0	0
LOT 5	VERONICA WAY	1	1	0	0
LOT 6	VERONICA WAY	0	1	1	0

(IN FEET)
1 inch = 50 ft.

ESD PRACTICE SUMMARY TABLE

Pe=	1.4	inches						Qe=	0.32	inches	ESDv=	3545	cf for site		
Practice			Lot	Ref.	Address	DA to practice	Imp Area to practice	Af			ESDv			Rev	
								Required	Provided	2% DA?	Req. for DA	Provided	ESDv Req.?	Area	Volume
(N-2) Non-rooftop	N-2	#1	1	FS Lot 1	Veronica Way	1,858	784				93	67	not fully met	0.018	
(M-8) Grass Swale	M-8	#1	1-6	GS 1	Veronica Way	12,417	5,824	248	1300	PASS	684	684	PASS		127
(M-8) Grass Swale	M-8	#2	4	GS 2	Veronica Way	7,695	2,579	154	478	PASS	316	316	PASS		59
(M-3) Landscape Infiltration	M-3	#1	1	LSI 1	Veronica Way	3,363	2,200	67	208	PASS	251	507	PASS		507
(M-6) Micro-Bioretention	M-6	#2	2	MBR 2	Veronica Way	6,633	3,217	133	359	PASS	376	592	PASS		0
(M-6) Micro-Bioretention	M-6	#3	3	MBR 3	Veronica Way	6,828	3,628	137	328	PASS	421	584	PASS		0
(M-6) Micro-Bioretention	M-6	#4	4	MBR 4	Veronica Way	3,142	2,200	63	223	PASS	249	393	PASS		0
(M-6) Micro-Bioretention	M-6	#5	5	MBR 5	Veronica Way	5,203	2,860	104	362	PASS	331	583	PASS		0
(M-3) Landscape Infiltration	M-3	#6	6	LSI 6	Veronica Way	8,175	3,038	164	335	PASS	367	779	PASS		0
							26330 TOTAL =				3087	4504		0.018	693
											Rev Required =			0.13	543
											Percent of Requirement =			14%	128%
											Rev requirement met?				True

Non-Rooftop Disconnection Credit

Credit Designation	Lot	Address	Impervious Area (SF)	Contrib. Length Impervious (FT)	Contrib. Length Pervious (FT)	Disconnection Length (FT)	Pe (in.) Treated	Pe (in.) Remaining	Rev Provided (Ac.)
FS #1	1	Chestnut Hill Dr.	784	23	0	25	1.0	0.4	0.018
Target Pe =			1.4 inches				1	0.4	0.018

THE MODERATE INCOME HOUSING UNIT REQUIREMENT (COUNCIL BILL 35–2013) SHALL BE FULFILLED BY PAYMENT OF A FEE–IN–LIEU IN AN AMOUNT THAT IS TO BE CALCULATED BY THE DEPARTMENT OF INSPECTIONS LICENSES AND PERMITS AT THE TIME OF BUILDING PERMIT. THE FEE–IN–LIEU SHALL BE PAID FOR LOTS/RESIDENTIAL UNITS 1 THROUGH 6 WITHIN THIS SUBDIVISION AT TIME OF BUILDING PERMIT ISSUANCE.

BENCHMARKS NAD'83 HORIZONTAL

HO. CO. #18GA
STAMPED DISK SET ON TOP OF CONCRETE BASE.
N 591872.0034' E 1370380.4297'
ELEVATION: 445.769'

HO. CO. #18G1
STAMPED DISK SET ON TOP OF CONCRETE BASE
N 589985.0097' E 1367750.2346'
ELEVATION: 407.734'

ADC MAP 21 GRID C6

VICINITY MAP

SCALE: 1" = 2000'

SITE ANALYSIS DATA/TABULATION

A) TOTAL PROJECT AREA.................................... 3.55± AC.
B) AREA OF WETLANDS AND BUFFER................. 0.40± AC.
C) AREA OF 100–YR. FLOODPLAIN..................... 0.00 AC.
D) AREA OF FOREST.. 0.51± AC.
E) AREA OF STEEP SLOPES 25% OF GREATER... 0.00 AC.
F) AREA OF DEDICATION...................................... 0.00 AC.
G) HIGHLY ERODIBLE SOILS (K > 0.35) .... 0.00 AC.
H) NUMBER OF UNITS ALLOWED 6
I) NUMBER OF RESIDENTIAL UNITS PROPOSED... 6
J) AREA OF PLAN SUBMISSION.......................... 3.55± AC.
K) LIMIT OF DISTURBED AREA............................ 1.4± AC.
L) OPEN SPACE REQUIRED................................. 0.21± AC.
M) OPEN SPACE PROVIDED................................ 0.37± AC.
N) PRESENT ZONING DESIGNATION...................... R–20
O) PROPOSED USE: SINGLE FAMILY DETACHED DWELLINGS
P) IMPERVIOUS COVER.. 0.60± AC.

	SHEET INDEX
NO.	DESCRIPTION
1	TITLE SHEET
2	CONCEPT LANDSCAPE PLAN
3	GRADING, SEDIMENT & EROSION CONTROL PLAN
4	SEDIMENT & EROSION CONTROL NOTES AND DETAILS
5	FOREST STAND DELINEATION AND FOREST CONSERVATION PLAN
6	STORM DRAIN AND STORMWATER MANAGEMENT NOTES & DETAILS
7	SOIL BORING LOGS & GRASS SWALE DETAILS
8	STORMWATER MANAGEMENT DRAINAGE AREA MAP
9	STORM DRAIN DRAINAGE AREA MAP

NO.	DATE	REVISION

BENCHMARK
ENGINEERS LAND SURVEYORS PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410–465–6105 (F) 410–465–6644
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. 45577, Expiration Date: 06-08-2018.

JOHN M. CAREY

7/30/17

OWNER:

VERA JEANNE MELVIN
3010 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:

HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
CLARKSVILLE, MARYLAND 21029
410–365–0414

MELVIN PROPERTY

LOTS 1 thru 6 and OPEN SPACE LOT 7

A RESUBDIVISION OF MELNOR PROPERTY LOT 5
RECORDED AS PLAT NO. 4250

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R–20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

TITLE SHEET

DESIGN: JMC	DRAWN: JMC/DBT	DATE: JULY, 2017	BEI PROJECT NO: 2515
		SCALE: AS SHOWN	SHEET 1 OF 9

F-13-106

SCHEDULE A
PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO PERIMETER PROPERTY (1)	ADJACENT TO PERIMETER PROPERTY (2)	ADJACENT TO ROADS (3)	ADJACENT TO ROADS (4)	TOTAL
LANDSCAPE TYPE	A 1:60 shade	A 1:60 shade	C 1:40 shade 1:20 evergreen	D 1:60 shade 1:10 evergreen	
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	447 LF	1290 LF	47 LF	249 LF	
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	YES 40 LF*	YES 835 LF* 352 LF**	YES 47 LF*	NO	
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	
NUMBER OF PLANTS REQUIRED	407 LF	103 LF	0 LF	249 LF	
SHADE TREES	7	2	0	4	13
EVERGREEN TREES	0	0	0	25	25
OTHER TREES (2:1 SUBSTITUTE)	0	0	0	0	0
SHRUBS	0	0	0	0	0
NUMBER OF PLANTS PROVIDED					
SHADE TREES	7	2	0	4	13
EVERGREEN TREES	0	0	0	25	25
OTHER TREES (2:1 SUBSTITUTE)	0	0	0	0	0
SHRUBS (10:1 SUBSTITUTE)	0	0	0	0	0

* CREDIT BASED ON EXISTING LANDSCAPING/VEGETATION 20' OR GREATER IN WIDTH ALONG PROPERTY BOUNDARY TO REMAIN.

** CREDIT BASED ON EXISTING LINE OF MATURE PINE TREES TO BE RETAINED

PERIMETER LANDSCAPE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS	DESCRIPTION
	11	ACER RUBRUM 'RED SUNSET' (Red Sunset Red Maple)	2.5" – 3"cal.	SHADE TREES ALONG PERIMETER TO BE PROVIDED BY THE BUILDER
	2	ACER PALMATUM (Japanese Red Maple)	2.5" – 3"cal.	SHADE TREES ALONG PERIMETER WITHIN BGE GREEN ZONE TO BE PROVIDED BY THE BUILDER
	25	THUJA OCCIDENTALIS 'SMARAGD' (emerald arborvitae)	2' – 2.5' height	EVERGREEN PLANTING ALONG PERIMETER WHERE DRIVEWAY IS LESS THAN 10' TO BOUNDARY LINE TO BE PROVIDED BY THE BUILDER

LEGEND

- LIMIT OF SUBMISSION
- WETLAND LIMITS
- EXISTING TREELINE
- PROPOSED TREELINE
- FOREST CONSERVATION EASEMENT
- BGE GREEN ZONE NO TREES OVER 25 ft
- BGE YELLOW ZONE NO TREES OVER 40 ft
- P-2 LANDSCAPE PERIMETER DESIGNATION

DEVELOPER'S/BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION OF A LETTER OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE-YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

DEVELOPER — DATE 8-3-17

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8.23.17

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8.25.17

LANDSCAPE NOTES:

1. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL.
2. AT THE TIME OF INSTALLMENT, ALL SHRUBS AND OTHER PLANTINGS HEREWITH LISTED AND APPROVED FOR THIS SITE, SHALL BE OF THE PROPER HEIGHT REQUIREMENTS IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELOCATION OF REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THIS APPROVED LANDSCAPE PLAN MAY RESULT IN DENIAL OR DELAY IN RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO APPLICABLE PLANS AND CERTIFICATIONS.
3. THE OWNER, TENANTS AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION, AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.
4. FINANCIAL SURETY IN THE AMOUNT OF $7,650.00 FOR THE REQUIRED PERIMETER LANDSCAPING SHALL BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT.

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

TREE PLANTING DETAIL
NOT TO SCALE

NO.	DATE	REVISION

BENCHMARK
ENGINEERS LAND SURVEYORS PLANNERS
ENGINEERING, INC.
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(P) 410-465-6105 (F) 410-465-6644
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. 45572, Expiration Date: 06-06-2018.

7/31/17

OWNER:
VERA JEANNE MELVIN
3010 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:
HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
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410-365-0414

MELVIN PROPERTY
LOTS 1 thru 6 and OPEN SPACE LOT 7
A RESUBDIVISION OF MELNOR PROPERTY LOT 5
RECORDED AS PLAT NO. 4250

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

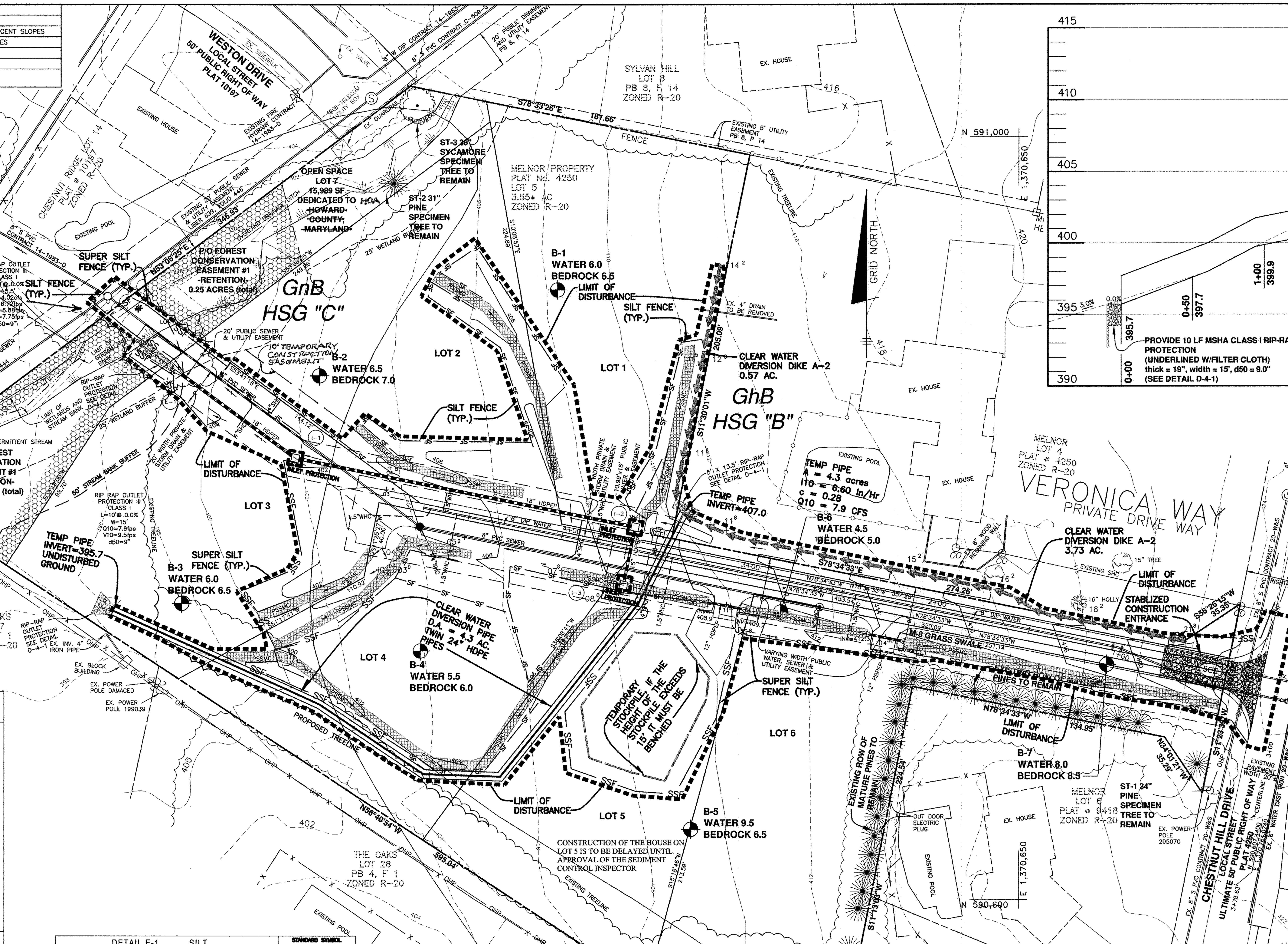
CONCEPT LANDSCAPE PLAN

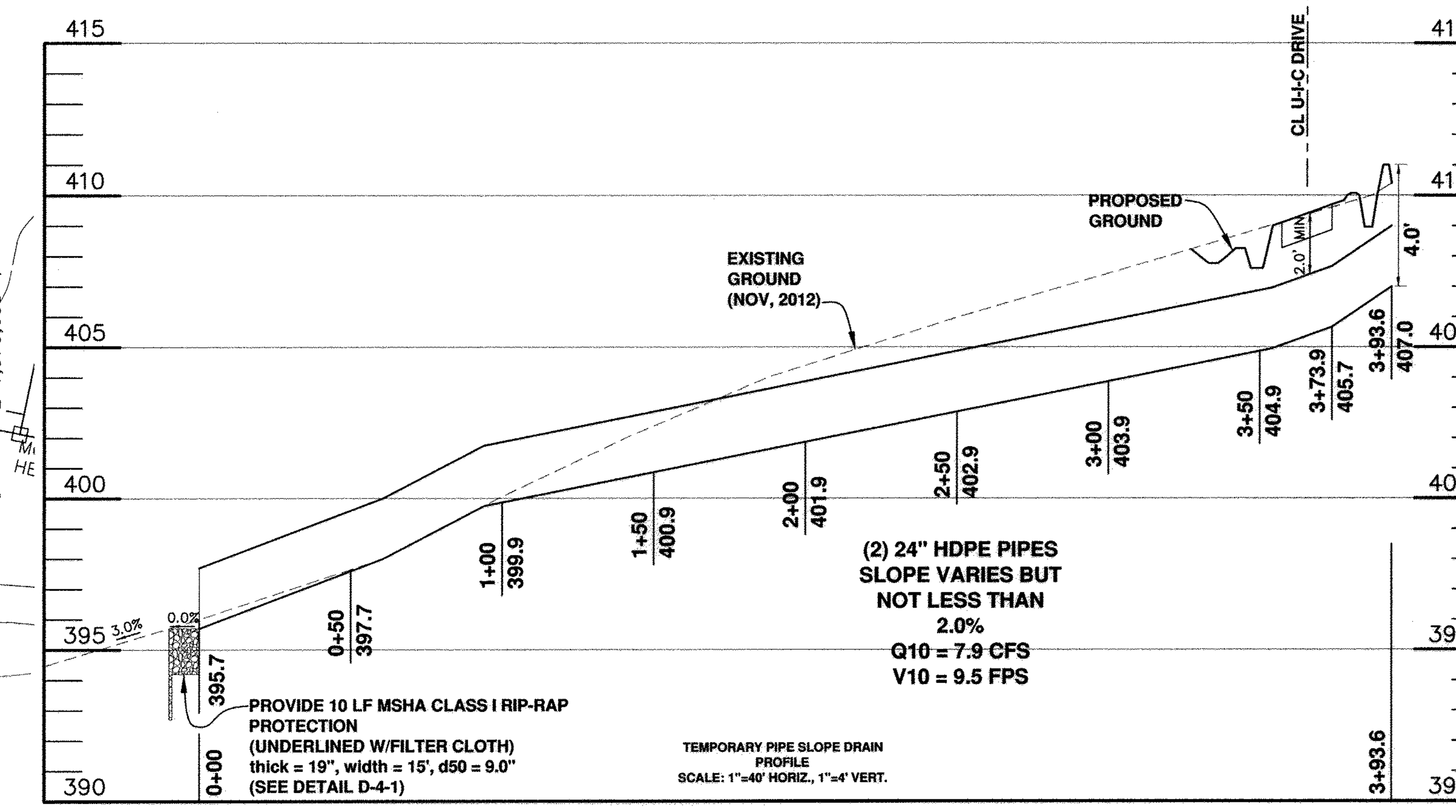
DESIGN: JMC	DRAWN: JMC/DBT	SCALE: AS SHOWN	SHEET 2 OF 9
		DATE: JULY, 2017	BEI PROJECT NO: 2515

F-13-106

SOILS LEGEND		
MAP SYMBOL	SOIL GROUP	SOIL TYPE
GhB	B	GLENELG–URBAN LAND COMPLEX LOAM, 0 TO 8 PERCENT SLOPES
GnB*	C	GLENVILLE–BAILE SILT LOAM, 0 TO 8 PERCENT SLOPES
JaB	D	SILT LOAM, 3 TO 8 PERCENT SLOPES

FROM NATURAL RESOURCES CONSERVATION SERVICES WEB SOIL SURVEY 2.0
* HYDRIC SOILS





DETAIL E-9-1 STANDARD INLET PROTECTION

STANDARD SYMBOL SIP

CONSTRUCTION SPECIFICATIONS

1. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
2. EXCAVATE COMPLETELY AROUND THE INLET TO A DEPTH OF 18 INCHES BELOW THE NOTCH ELEVATION.
3. FOR TYPE A, USE NOMINAL 2 INCH X 4 INCH CONSTRUCTION GRADE LUMBER POSTS, DRIVEN 1 FOOT INTO THE GROUND AT EACH CORNER OF THE INLET. PLACE NAIL STRIPS BETWEEN THE POSTS ON THE ENDS OF THE INLET. ASSEMBLE THE TOP PORTION OF THE 2X4 FRAME AS SHOWN. STRETCH ½ INCH GALVANIZED HARDWARE CLOTH TIGHTLY AROUND THE FRAME AND FASTEN SECURELY. FASTEN GEOTEXTILE SECURELY TO THE HARDWARE CLOTH WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND HARDWARE CLOTH A MINIMUM OF 18 INCHES BELOW THE WEIR CREST. THE ENDS OF THE GEOTEXTILE MUST MEET AT A POST, BE OVERLAPPED AND FOLDED, THEN FASTENED TO THE POST.

   FOR TYPE B, USE 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND 6 FOOT LENGTH, DRIVEN A MINIMUM OF 36 INCHES BELOW THE WEIR CREST AT EACH CORNER OF THE STRUCTURE. FASTEN 9 GAUGE OR HEAVIER CHAIN LINK FENCE, 42 INCHES IN HEIGHT, SECURELY TO THE FENCE POSTS WITH WIRE TIES. FASTEN GEOTEXTILE SECURELY TO THE CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 18 INCHES BELOW THE WEIR CREST.
4. BACKFILL AROUND THE INLET IN LOOSE 4 INCH LIFTS AND COMPACT UNTIL SOIL IS LEVEL WITH THE NOTCH ELEVATION ON THE ENDS AND TOP ELEVATION ON THE SIDES.
5. STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS CLOGGED. WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN, OR REPLACE GEOTEXTILE AND STONE.

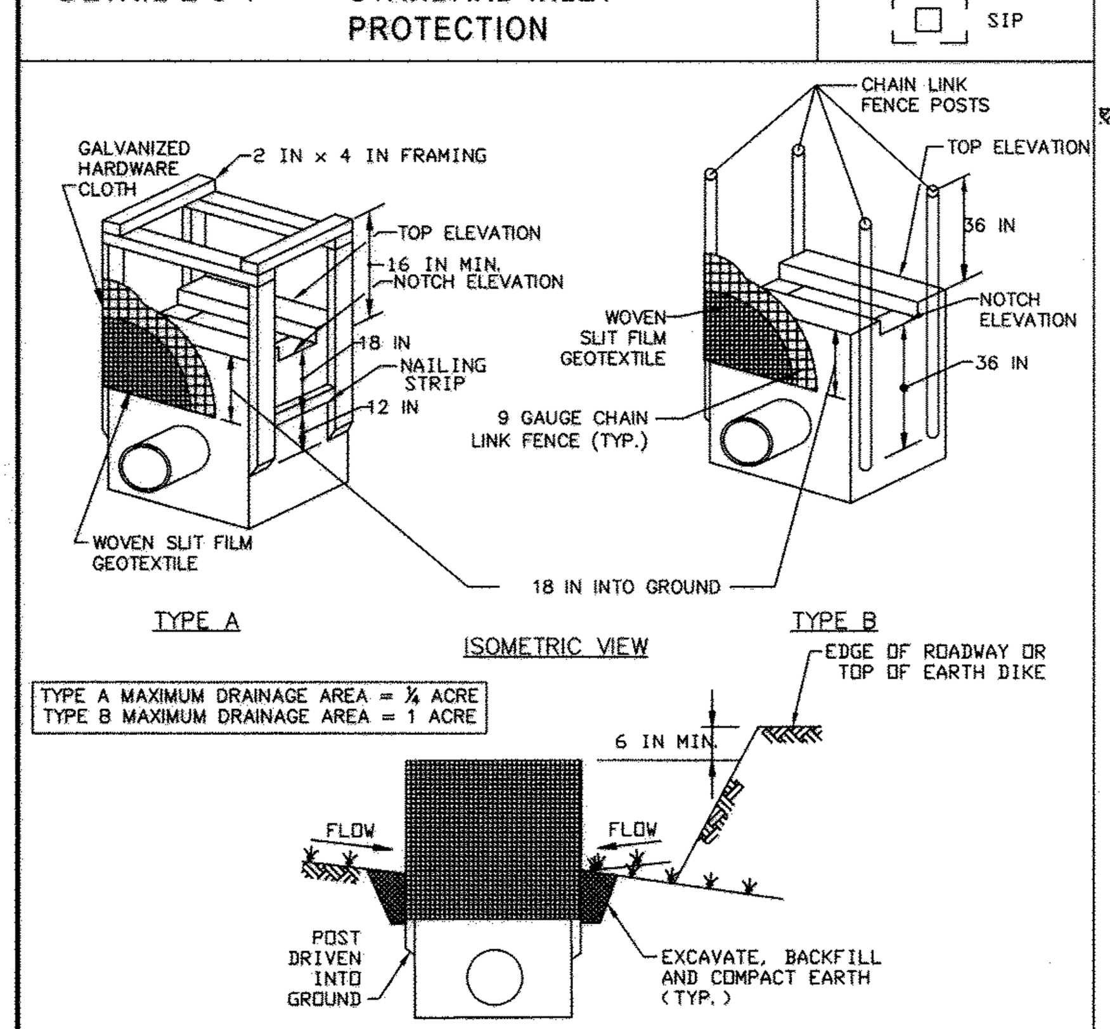
2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-9-1 STANDARD INLET PROTECTION

STANDARD SYMBOL SIP



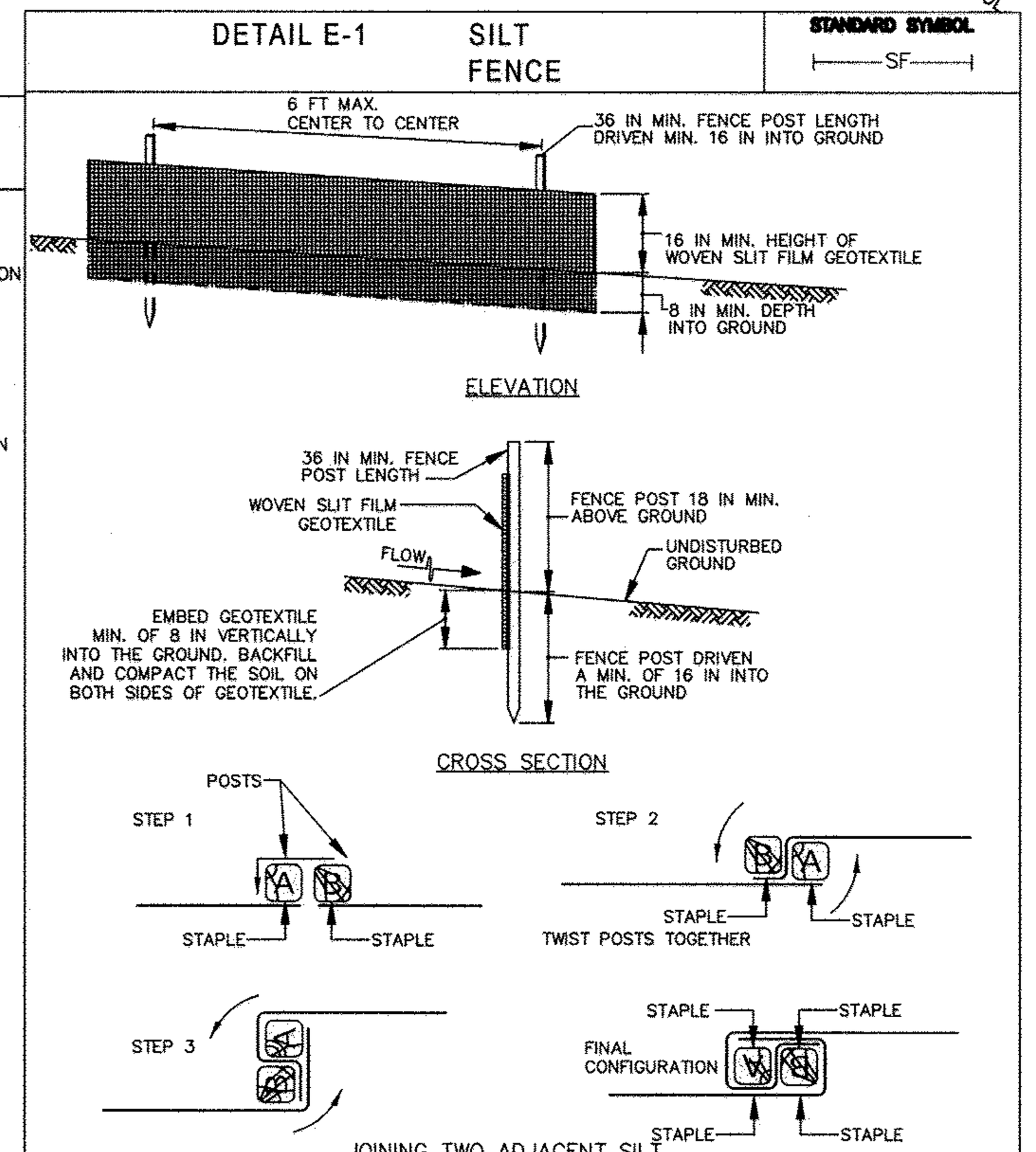
1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE

STANDARD SYMBOL —SF—



1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

LEGEND

- LIMIT OF SUBMISSION
- EXISTING CONTOUR
- WETLAND LIMITS
- EXISTING TREELINE
- LIMIT OF DISTURBANCE
- SSF — SUPER SILT FENCE
- DF — DIVERSION FENCE
- CLEAR WATER DIVERSION PIPE
- EARTH DIKE
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- PSSMC — EROSION CONTROL MATTING
- SOILS DELINEATION

ENGINEER'S CERTIFICATE

"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

[signature] 7/30/17
JOHN M. CARNEY, P.E. LICENSE #45577 — DATE

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL 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 ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT."

[signature] 8-3-17
HIGHLAND DEVELOPMENT CORP. — DATE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

[signature] 8/9/17
HOWARD SOIL CONSERVATION DISTRICT — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 8-23-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 8-25-17
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

NO.	DATE	REVISION

BENCHMARK
ENGINEERS LAND SURVEYORS PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
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. 45577, Expiration Date: 06-08-2018.

[seal: STATE OF MARYLAND, JOHN M. CARNEY, No. 45577, PROFESSIONAL ENGINEER] 7/30/17

OWNER:
VERA JEANNE MELVIN
3010 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:
HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
CLARKSVILLE, MARYLAND 21029
410-365-0414

MELVIN PROPERTY
LOTS 1 thru 6 and OPEN SPACE LOT 7
A RESUBDIVISION OF MELNOR PROPERTY LOT 5
RECORDED AS PLAT NO. 4250

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

GRADING, SEDIMENT & EROSION CONTROL PLAN

DESIGN: JMC	DRAWN: JMC/DBT	DATE: JULY, 2017	BEI PROJECT NO: 2515
		SCALE: AS SHOWN	SHEET 3 OF 9

B-4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

Definition: Using vegetation as cover to protect exposed soil from erosion.
Purpose: To promote the establishment of vegetation on exposed soil.

Conditions Where Practice Applies

On all disturbed areas not stabilized by other methods. This specification is divided into sections on incremental stabilization; soil preparation, soil amendments and topsoiling; seeding and mulching; temporary stabilization; and permanent stabilization.

Effects on Water Quality and Quantity

Stabilization practices are used to promote the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas.

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, percolation, and groundwater recharge. Over time, vegetation will increase organic matter content and improve the water holding capacity of the soil and subsequent plant growth. Vegetation will help reduce the movement of sediment, nutrients, and other chemicals carried by runoff to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances present within the root zone.

Sediment control practices must remain in place during grading, seedbed preparation, seeding, mulching, and vegetative establishment.

Adequate Vegetative Establishment

Inspect seeded areas for vegetative establishment and make necessary repairs, replacements, and reseedings within the planting season.

1. Adequate vegetative stabilization requires 95 percent groundcover.
2. If an area has less than 40 percent groundcover, restabilize following the original recommendations for lime, fertilizer, seedbed preparation, and seeding.
3. If an area has between 40 and 94 percent groundcover, over-seed and fertilize using half of the rates originally specified.
4. Maintenance fertilizer rates for permanent seeding are shown in Table B.6.

B-4-1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION

Definition: Establishment of vegetative cover on cut and fill slopes.
Purpose: To provide timely vegetative cover on cut and fill slopes as work progresses.

Conditions Where Practice Applies

Any cut or fill slope greater than 15 feet in height. This practice also applies to stockpiles.

Criteria

A. Incremental Stabilization - Cut Slopes
  1. Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.
  2. Construction sequence example (Refer to Figure B.1):
    a. Construct and stabilize all temporary swales or dikes that will be used to convey runoff around the excavation.
    b. Perform Phase 1 excavation, prepare seedbed, and stabilize.
    c. Perform Phase 2 excavation, prepare seedbed, and stabilize. Overseed Phase 1 areas as necessary.
    d. Perform final phase excavation, prepare seedbed, and stabilize. Overseed previously seeded areas as necessary.

Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

B. Incremental Stabilization - Fill Slopes
  1. Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all slopes as the work progresses.
  2. Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.
  3. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
  4. Construction sequence example (Refer to Figure B.2):
    a. Construct and stabilize all temporary swales or dikes that will be used to divert runoff around the fill. Construct silt fence on low side of fill unless other methods shown on the plans address this area.
    b. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
    c. Place Phase 1 fill, prepare seedbed, and stabilize.
    d. Place Phase 2 fill, prepare seedbed, and stabilize.
    e. Place final phase fill, prepare seedbed, and stabilize. Overseed previously seeded areas as necessary.

Note: Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

Figure B.

B-4-8 STANDARDS AND SPECIFICATIONS FOR STOCKPILE AREA

Definition: A mound or pile of soil protected by appropriately designed erosion and sediment control measures.
Purpose: To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.

Conditions Where Practice Applies

Stockpile areas are utilized when it is necessary to salvage and store soil for later use.

Criteria

1. The stockpile location and all related sediment control practices must be clearly indicated on the erosion and sediment control plan.
2. The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading.
3. Runoff from the stockpile area must drain to a suitable sediment control practice.
4. Access the stockpile area from the upgrade side.
5. Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner.
6. Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.
7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.
8. If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.

Maintenance

The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

H-5 STANDARDS AND SPECIFICATIONS FOR DUST CONTROL

Definition: Controlling the suspension of dust particles from construction activities.
Purpose: To prevent blowing and movement of dust from exposed soil surfaces to reduce on and off-site damage including health and traffic hazards.

Conditions Where Practice Applies

Areas subject to dust blowing and movement where on and off-site damage is likely without treatment.

Specifications

1. Mulches: See Section B-4-2 Soil Preparation, Topsoiling, and Soil Amendments, Section B-4-3 Seeding and Mulching, and Section B-4-4 Temporary Stabilization. Mulch must be anchored to
2. Vegetative Cover: See Section B-4-4 Temporary Stabilization.
3. Tillage: Till to roughen surface and bring clods to the surface. Begin plowing on windward side of site. Chisel-type plows spaced about 12 inches apart, spring-toothed harrows, and similar plows are examples of equipment that may produce the desired effect.
4. Irrigation: Sprinkle site with water until the surface is moist. Repeat as needed. The site must not be irrigated to the point that runoff occurs.
5. Barriers: Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing.
6. Chemical Treatment: Use of chemical treatment requires approval by the appropriate plan review authority.

B-4-2 STANDARDS AND SPECIFICATIONS FOR SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

Definition: The process of preparing the soils to sustain adequate vegetative stabilization.
Purpose: To provide a suitable soil medium for vegetative growth.

Conditions Where Practice Applies

Where vegetative stabilization is to be established.

Criteria

A. Soil Preparation
  1. Temporary Stabilization
    a. Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
    b. Apply fertilizer and lime as prescribed on the plans.
    c. Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means.
  2. Permanent Stabilization
    a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
      i. Soil pH between 6.0 and 7.0.
      ii. Soluble salts less than 500 parts per million (ppm).
      iii. Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay) would be acceptable.
      iv. Soil contains 1.5 percent minimum organic matter by weight.
      v. Soil contains sufficient pore space to permit adequate root penetration.
    b. Application of amendments or topsoil is required if on-site soils do not meet the above conditions.
    c. Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
    d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test.
    e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas.

B. Topsoiling
  1. Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.
  2. Topsoil salvaged from an existing site may be used provided it meets the 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-NRCS.
  3. Topsoiling is limited to areas having 2:1 or flatter slopes where:
    a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
    b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
    c. The original soil to be vegetated contains material toxic to plant growth.
    d. The soil is so acidic that treatment with limestone is not feasible.
  4. Areas having slopes steeper than 2:1 require special consideration and design.
  5. Topsoil Specifications: Soil to be used as topsoil must meet the following criteria:
    a. Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1½ inches in diameter.
    b. Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sedge, poison ivy, thistle, or others as specified.
    c. 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.
  6. Topsoil Application
    a. Erosion and sediment control practices must be maintained when applying topsoil.
    b. Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to 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 must be corrected in order to prevent the formation of depressions or water pockets.
    c. Topsoil must not be placed if 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.

C. Soil Amendments (Fertilizer and Lime Specifications)
  1. Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses.
  2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
  3. Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve.
  4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
  5. Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABLIZATION

Definition: To stabilize disturbed soils with vegetation for up to 6 months.
Purpose: To use fast growing vegetation that provides cover on disturbed soils.

Conditions Where Practice Applies

Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time, permanent stabilization practices are required.

Criteria

1. Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.
2. For sites having soil tests performed, use and show the recommended rates by the testing agency. Soil tests are not required for Temporary Seeding.
3. When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone as prescribed in Section B-4-3.A.1.b and maintain until the next seeding season.

B-4-3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING

Definition: The application of seed and mulch to establish vegetative cover.
Purpose: To protect disturbed soils from erosion during and at the end of construction.
Conditions Where Practice Applies: To the surface of all perimeter controls, slopes, and any disturbed area not under active grading.

Criteria

A. Seeding
  1. Specifications
    a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 regarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate.
    b. Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.
    c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can weaken bacteria and make the inoculant less effective.
    d. Sod or seed must not 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.
  2. Application
    a. Dry Seeding: This includes use of conventional drop or broadcast spreaders.
      i. Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1, Permanent Seeding Table B.3, or site-specific seeding summaries.
      ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact.
    b. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil.
      i. Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.
      ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.
    c. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer).
      i. If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; P2O5 (phosphorous), 200 pounds per acre; K2O (potassium), 200 pounds per acre.
      ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
      iii. Mix seed and fertilizer on site and seed immediately and without interruption.
      iv. When hydroseeding do not incorporate seed into the soil.

B. Mulching
  1. Mulch Materials (in order of preference)
    a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dusty. Note: Use only sterile straw mulch in areas where one species of grass is desired.
    b. Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.
      i. WCFM is to be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
      ii. WCFM, including dye, must contain no germination or growth inhibiting factors.
      iii. WCFM materials are to be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
      iv. WCFM material must not contain elements or compounds at concentration levels that will be phyto-toxic.
      v. WCFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum.
  2. Application
    a. Apply mulch to all seeded areas immediately after seeding.
    b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the application rate to 2.5 tons per acre.
    c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
  3. Anchoring
    a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard:
      i. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice should follow the contour.
      ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
      iii. Synthetic binders such as Acrylic DLR (Agro-Tack), DCA-70, Petroset, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. Use of asphalt binders is strictly prohibited.
      iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet long.

B-4-5 STANDARDS AND SPECIFICATIONS FOR PERMANENT STABILIZATION

Definition: To stabilize disturbed soils with permanent vegetation.
Purpose: To use long-lived perennial grasses and legumes to establish permanent ground cover on disturbed soils.
Conditions Where Practice Applies: Exposed soils where ground cover is needed for 6 months or more.

Criteria

A. Seed Mixtures
1. General Use
  a Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant Hardiness Zone (from Figure B.3) and based on the site condition or purpose found on Table B.2. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The Summary is to be placed on the plan.
  b Additional planting specifications for exceptional sites such as shorelines, stream banks, or dunes or for special purposes such as wildlife or aesthetic treatment may be found in USDA-NRCS Technical Field Office Guild, Section 342 - Critical Area Planting.
  c For sites having disturbed areas over 5 acres, use and show the rates recommended by the soil testing agency.
  d For areas receiving low maintenance, apply urea form fertilizer (46-0-0) at 3 ½ pounds per 1000 square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments shown in the Permanent Seeding Summary.
2. Turfgrass Mixtures
  a. Areas where turfgrass may be desired include lawns, parks, playgrounds, and commercial sites which will receive a medium to high level of maintenance.
  b. Select one or more of the species or mixtures listed below based on the site conditions or purpose. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.
  i. Kentucky Bluegrass: Full sun Mixture: For use in areas that receive intensive management. Irrigation required in the areas of central Maryland and Eastern Shore. Recommended Certified Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1000 square feet. Choose a minimum of three Kentucky Bluegrass Cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
  ii. Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where rapid establishment is necessary and when turf will receive medium to intensive management. Certified Perennial Ryegrass Cultivars/Certified Kentucky Bluegrass Seeding Rate: 2 pounds mixture per 1000 square feet. Choose a minimum of three Kentucky Bluegrass Cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
  iii. Tall Fescue/Kentucky Bluegrass: Full Sun Mixture: For use in drought prone areas and/or for areas receiving low to medium management in full sun to medium shade. Recommended mixture includes; Certified Tall Fescue Cultivars 95 to 100 percent, Certified Kentucky Bluegrass Cultivars 0 to 5 percent. Seeding Rate: 5 to 8 pounds per 1000 square feet. One or more cultivars may be blended.
  iv. Kentucky Bluegrass/Fine Fescue: Shade Mixture: For use in areas with shade in Bluegrass lawns. For establishment in high quality, intensively managed turf area. Mixture includes Certified Kentucky Bluegrass Cultivars 30 to 40 percent and Certified Fine Fescue and 60 to 70 percent. Seeding Rate: 1 ½ to 3 pounds per 1000 square feet.
  Notes:Select turfgrass varieties from those listed in the most current University of Maryland Publication, Agronomy Memo #77, "Turfgrass Cultivar Recommendations for Maryland" Choose certified material. Certified material is the best guarantee of cultivar purity. The certification program of the Maryland Department of Agriculture, Turf and Seed Section, provides a reliable means of consumer protection and assures a pure genetic line.
  c. Ideal Times of Seeding for Turf Grass Mixtures
  Western MD: March 15 to June 1, August 1 to October 1 (Hardiness Zones: 5b, 6a)
  Central MD:March 1 to May 15, August 15 to October 15 (Hardiness Zone: 6b)
  Southern MD, Eastern Shore: March 1 to May 15, August 15 to October 15 (Hardiness Zones: 7a, 7b)
  d. Till areas to receive seed by disking or other approved methods to a depth of 2 to 4 inches, level and rake the areas to prepare a proper seedbed. Remove stones and debris over 1 ½ inches in diameter. The resulting seedbed must be in such condition that future mowing of grasses will pose no difficulty.
  e. If soil moisture is deficient, supply new seedings with adequate water for plant growth (½ to 1 inch every 3 to 4 days depending on soil texture) until they are firmly established. This is not especially true when seedings are made late in the planting season, in abnormally dry or hot seasons, or on adverse sites.

B. Sod: to provide quick cover on disturbed areas (2:1 grade or flatter).
1. General Specifications
  a. Class of turfgrass must be Maryland State Certified. Sod labels must be made available to the job foreman and inspector.
  b. Sod must be machine cut at a uniform soil thickness of ¾ inch, plus or minus ¼ inch, at the time of cutting. Measurement for thickness must exclude top growth and thatch. Broken pads and torn or uneven ends will not be acceptable.
  c. Standard size sections of sod must be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section.
  d. Sod must not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.
  e. Sod must be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period must be approved by an agronomist or soil scientist prior to its installation.
2. Sod Installation
  a. During periods of excessively high temperature or in areas having dry subsoil, lightly irrigate the subsoil immediately prior to laying the sod.
  b. Lay the first row of sod in a straight line with subsequent rows placed parallel to it and tightly wedged against each other. Stagger lateral joints to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots.
  c. Wherever possible, lay sod with the long edges parallel to the contour and with staggering joints. Roll and tamp, peg or otherwise secure the sod to prevent slippage on slopes. Ensure solid contact exists between sod roots and the underlying soil surface.
  d. Water the sod immediately following rolling and tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Complete the operations of laying, tamping and irrigating for any piece of sod within eight hours.
3. Sod Maintenance
  a. In the absence of adequate rainfall, water daily during the first week or as often and sufficiently as necessary to maintain moist soil to a depth of 4 inches. Water sod during the heat of the day to prevent wilting.
  b. After the first week, sod watering is required as necessary to maintain adequate moisture content.
  c. Do not mow until the sod is firmly rooted. No more than 1/3 of the grass leaf must be removed by the initial cutting or subsequent cuttings. Maintain a grass height of at least 3 inches unless otherwise specified.

HOWARD SOIL CONSERVATION DISTRICT (HSCD)
STANDARD SEDIMENT CONTROL NOTES

1. A pre-construction meeting must occur with the Howard County Department of Public Works, Construction Inspection Division (CID), 410-3133-1855 after the future LOD and protected areas are marked clearly in the field. A minimum of 48 hours notice to CID must be given at the following stages:
  a. Prior to the start of earth disturbance,
  b. Upon completion of the installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading,
  c. Prior to the start of another phase of construction or opening of another grading unit,
  d. Prior to the removal or modification of sediment control practices Other building or grading inspection approvals may not be authorized until the initial approval by the inspection agency is made. Other related state and federal permits shall be referenced, to ensure coordination and to avoid conflicts with this plan.
2. All vegetative and structural practices are to be installed according to the provisions of 2011 MARYLAND STANDARDS and this plan and are to be in conformance with the SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL , and revisions thereto.
3. Following initial soil disturbance or re-disturbance, permanent or temporary stabilization is required within three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and seven (7) calendar days as to all other disturbed areas on the project site except for those areas under active grading.
4. All disturbed areas must be stabilized within the time period specified above in accordance with the 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for topsoil (Sec. B-4-2), permanent seeding (Sec. B-4-5), temporary seeding (Sec. B-4-4) and mulching (Sec. B-4-3). Temporary stabilization with mulch alone can only be applied between the fall and spring seeding dates if the ground is frozen. Incremental stabilization (Sec. B-4-1) specifications shall be enforced in areas with >15' of cut and/or fill. Stockpiles (Sec. B-4-8) in excess of 20 feet must be benched with stable outlet. All concentrated flow, steep slope, and highly erodible areas shall receive soil stabilization matting (Sec. B-4-6).
5. 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 CID. 6. Site Analysis:

Total Area of Site: 3.55 Acres
Area Disturbed: 1.4 Acres
Area to be roofed or paved: 0.2 Acres
Area to be vegetatively stabilized: 1.2 Acres
Total cut: 2,750* Cu Yds
Total fill: 2,750* Cu Yds
Off-site waste/borrow area location: N/A

*CUT/FILL NUMBERS ARE FOR SEDIMENT CONTROL PURPOSES ONLY. CONTRACTOR TO VERIFY.

7. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
8. Additional sediment control must be provided, if deemed necessary by the CID. The site and all controls shall be inspected by the contractor weekly; and the next day after each rain event. A written report by the contractor, made available upon request, is part of every inspection and should include:
Inspection date
Inspection type (routine, pre-storm event, during rain event)
Name and title of inspector
Weather information (current conditions as well as time and an amount of last recorded precipitation
Brief description of project's status (e.g. percent complete) and/or current activities
Evidence of sediment discharges Identification of plan deficiencies
Identification of sediment controls that require maintenance
Identification of missing or improperly installed sediment controls
Compliance status regarding the sequence of construction and stabilization requirements
Photographs
Monitoring/sampling
Maintenance and/or corrective action performed
Other inspection items as required by the General Permit for Stormwater Associated with Construction Activities (NPDES, MDE).
9. Trenches for the construction of utilities is limited to three pipe lengths or that which can and shall be back filled and stabilized by the end of each work day, whichever is shorter.
10. Any major changes or revisions to the plan or sequence of construction must be reviewed and approved by the HSCD prior to proceeding with construction. Minor revisions may be allowed by the CID per the list of HSCD-approved field changes.
11. Disturbance shall not occur outside the L.O.D. A project is to be sequenced so that grading activities begin on one grading unit (maximum acreage of 20 ac. per grading unit) at a time. Work may proceed to a subsequent grading unit when at least 50 percent of the disturbed area in the preceding grading unit has been stabilized and approved by the CID. Unless otherwise specified and approved by the Howard Soil Conservation District, no more than 30 acres cumulatively may be disturbed at a given time.
12. Wash water from any equipment, vehicles, wheels, pavement, and other sources must be treated in a sediment basin or other approved washout structure.
13. Topsoil shall be stockpiled and preserved on-site for redistribution onto final grade.
14. All silt fence and super silt fence shall be placed on-the-contour, and be imbricated at 25' minimum intervals, with lower ends curled uphill by 2' in elevation.
15. Stream channels must not be disturbed during the following restricted time periods (inclusive):
Use I and IP March 1 – June 15
Use III and IIIP October 1 – April 30
Use IV March 1 – May 31
16. A copy of this plan, the 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, and associated permits shall be on-site and available when the site is active.

DETAIL D-1 PIPE SLOPE DRAIN

STANDARD SYMBOL
PSD – 12
DESIGNATION PSD-12 REFERS TO 12 IN PIPE SLOPE DRAIN.

CONSTRUCTION SPECIFICATIONS

1. THE HEIGHT OF THE EARTH DIKE MUST BE AT LEAST 2 TIMES THE PIPE DIAMETER MEASURED FROM THE INVERT OF THE PIPE. EXTEND THE TOP ELEVATION OF DIKE AT ZERO PERCENT GRADE UNTIL IT INTERCEPTS THE TOP OF THE ADJOINING EARTH DIKE.
2. FLEXIBLE PIPE IS PREFERRED. HOWEVER, CORRUGATED METAL PIPE OR EQUIVALENT PVC PIPE CAN BE USED. ALL CONNECTIONS MUST BE WATERTIGHT.
3. ATTACH A FLARED END SECTION TO THE INLET END OF PIPE WITH A WATERTIGHT CONNECTION. AT THE INLET OF THE PIPE SLOPE DRAIN, INSTALL 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PLACED 12 INCHES IN DEPTH ON NONWOVEN GEOTEXTILE AND EXTEND OUT 5 FEET FROM THE INLET IN ALL DIRECTIONS.
4. PROVIDE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND ALONG SIDES OF ALL RIPRAP.
5. SECURELY ANCHOR THE PIPE SLOPE DRAIN (PSD) TO THE SLOPE. SPACE THE ANCHORS EVERY 10 FEET.
6. HAND TAMP THE SOIL AROUND AND UNDER THE PIPE AND END SECTION IN 4 INCH LIFTS TO THE TOP OF THE EARTH DIKE.
7. UPON COMPLETING INSTALLATION OF THE PSD, STABILIZE ASSOCIATED DISTURBANCES WITH SEED, MULCH, AND TACK.
8. INSTALL OUTLET PROTECTION AS SPECIFIED ON APPROVED PLAN.
9. KEEP POINTS OF INFLOW AND OUTFLOW FREE OF EROSION. MAINTAIN WATER TIGHT CONNECTIONS AND POSITIVE DRAINAGE. REMOVE ACCUMULATED SEDIMENT AND DEBRIS.

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MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AG. NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL D-1 PIPE SLOPE DRAIN

STANDARD SYMBOL
PSD – 12
DESIGNATION PSD-12 REFERS TO 12 IN PIPE SLOPE DRAIN.

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MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Table B.1: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate 1/		Seeding Depth 2/ (inches)	Recommended Seeding Dates by Plant Hardiness Zone 3/		
	lb/ac	lb/1000 ft²		5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass (*Lolium perenne ssp. multiflorum*)	40	1.0	0.5	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Barley (*Hordeum vulgare*)	96	2.2	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Oats (*Avena sativa*)	72	1.7	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Wheat (*Triticum aestivum*)	120	2.8	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Cereal Rye (*Secale cereale*)	112	2.8	1.0	Mar 15 to May 31; Aug 1 to Oct 31	Mar 1 to May 15; Aug 1 to Nov 15	Feb 15 to Apr 30; Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet (*Setaria italica*)	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet (*Pennisetum glaucum*)	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

NOTES:

1/ Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses.

Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5% (by weight) of the overall permanent seeding mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.

Oats are the recommended nurse crop for warm-season grasses.

2/ For sandy soils, plant seeds at twice the depth listed above.

3/ The planting dates listed are averages for each Zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF WORK

1. Obtain grading permit. Duration 1 day.
2. On-site Pre-Construction meeting. Duration 1 day.
3. Clear and Grub as necessary to install stabilized construction entrance and perimeter controls (cleanwater diversion dikes, temporary pipe, silt fence, super silt fences, and stabilized construction entrance). Duration 3 days.
4. Upon approval from the Howard County sediment control inspector, proceed to clear and grub within the LOD perimeter. Duration 3 day.
5. Install the water, sewer and storm drain from E-1 to I-3. Upon completion of the inlets install the standard inlet protection. Duration 30 days.
6. Install water & sewer house connections. Duration 3 day.
7. Grade the swale on the south side of the use-in-common drive and stabilize. Duration 2 day.
8. Upon approval from the Howard County sediment control inspector, remove the earth dike on the north side of the use-in-common drive and the temporary pipe. Duration 1 day.
9. Install shared driveway and driveway culverts for lots 5 and 6. Duration 5 days.
10. Final grade and stabilize in accordance with the permanent seedbed notes including erosion control matting within all swales as shown on the plan. Duration 3 days.
11. Install required perimeter trees. Duration 3 days.
12. Upon approval from the Howard County sediment control inspector, remove sediment control devices and stabilize any remaining disturbed areas. Duration 1 day.

ENGINEER'S CERTIFICATE

"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

7/30/17
JOHN M. CARNEY, P.E. LICENSE #45577 DATE

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL 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 ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT."

8-3-17
HIGHLAND DEVELOPMENT CORPORATION DATE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

8/9/17
HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

8-23-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION NY DATE

8-28-17
CHIEF, DIVISION OF LAND DEVELOPMENT DJ DATE

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL
SCE

CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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DETAIL B-4-6-C PERMANENT SOIL STABILIZATION MATTING CHANNEL APPLICATION

STANDARD SYMBOL
PSSMC – * lb/ft²
(* INCLUDE SHEAR STRESS)

CONSTRUCTION SPECIFICATIONS

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE PERMANENT SOIL STABILIZATION MATTING MADE OF OPEN WEAVE SYNTHETIC, NON-DEGRADABLE FIBERS OR ELEMENTS OF UNIFORM THICKNESS AND DISTRIBUTION THROUGHOUT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES OR WOOD STAKES. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1 ½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPE AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS, UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
5. UNROLL MATTING IN DIRECTION OF WATER FLOW, CENTERING THE FIRST ROLL ON THE CHANNEL CENTER LINE. WORK FROM CENTER OF CHANNEL OUTWARD WHEN PLACING ROLLS. LAY MATTING SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT EDGES OF MATTING ROLLS PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSTREAM MAT OVERLAPPING ON TOP OF THE NEXT DOWNSTREAM MAT.
7. KEY IN THE TOP OF SLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. IF SPECIFIED BY THE DESIGNER OR MANUFACTURER AND DEPENDING ON THE TYPE OF MAT BEING INSTALLED, ONCE THE MATTING IS KEYED AND STAPLED IN PLACE, FILL THE MAT VOIDS WITH TOP SOIL OR GRANULAR MATERIAL AND LIGHTLY COMPACT OR ROLL TO MAXIMIZE SOIL/MAT CONTACT WITHOUT CRUSHING MAT.
10. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

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DETAIL C-1 EARTH DIKE

STANDARD SYMBOL
A-1
PLACE DESIGNATION A-1 ON FLOW CHANNEL SIDE OF DIKE.

	DIKE TYPE A	DIKE TYPE B
a – DIKE HEIGHT	18 IN MIN.	30 IN MIN.
b – DIKE WIDTH	24 IN MIN.	36 IN MIN.
c – FLOW WIDTH	4 FT MIN.	6 FT MIN.
d – FLOW DEPTH	12 IN MIN.	24 IN MIN.

FLOW CHANNEL STABILIZATION

A-1 SEED WITH STRAW MULCH AND TACK. (NOT ALLOWED FOR CLEAR WATER DIVERSION.)
A-2/B-2 SEED WITH SOIL STABILIZATION MATTING OR LINE WITH SOD.
A-3/B-3 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PRESSED INTO SOIL A MINIMUM OF 7 INCHES AND FLUSH WITH GROUND.

CONSTRUCTION SPECIFICATIONS

1. REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF EARTHDIKE.
2. EXCAVATE OR SHAPE EARTH DIKE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
3. COMPACT FILL.
4. CONSTRUCT FLOW CHANNEL ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
5. PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
6. STABILIZE EARTH DIKE WITHIN THREE DAYS OF INSTALLATION. STABILIZE FLOW CHANNEL FOR CLEAR WATER DIVERSION WITHIN 24 HOURS OF INSTALLATION.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS, AND MAINTAIN POSITIVE DRAINAGE. KEEP EARTH DIKE AND POINT OF DISCHARGE FREE OF EROSION, AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
8. UPON REMOVAL OF EARTH DIKE, GRADE AREA FLUSH WITH EXISTING GROUND. WITHIN 24 HOURS OF REMOVAL STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, AND MULCH, OR AS SPECIFIED ON APPROVED PLAN.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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DETAIL E-3 SUPER SILT FENCE

STANDARD SYMBOL
SSF

CONSTRUCTION SPECIFICATIONS

1. INSTALL 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2⅜ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

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DETAIL C-6 CLEAR WATER DIVERSION PIPE

STANDARD SYMBOL
CWD – 12
DESIGNATION CWD-12 REFERS TO 12 INCH CLEAR WATER DIVERSION.

CONSTRUCTION SPECIFICATIONS

1. FLEXIBLE PIPE IS PREFERRED. HOWEVER, CORRUGATED METAL PIPE OR EQUIVALENT PVC PIPE CAN BE USED. MAKE ALL JOINTS WATERTIGHT.
2. FOR SANDBAGS USE MATERIALS THAT ARE RESISTANT TO ULTRA-VIOLENT RADIATION, TEARING, AND PUNCTURE AND WOVEN TIGHTLY ENOUGH TO PREVENT LEAKAGE OF FILL MATERIAL.
3. USE 10 MIL OR THICKER, UV RESISTANT, IMPERMEABLE SHEETING OR OTHER APPROVED MATERIAL THAT IS IMPERMEABLE AND RESISTANT TO PUNTURING AND TEARING.
4. PLACE IMPERMEABLE SHEETING SUCH THAT UPGRADE PORTION OVERLAPS DOWNGRADE PORTION BY A MINIMUM OF 18 INCHES.
5. SET HEIGHT OF SANDBAG DIKE AT TWICE THE PIPE DIAMETER. MAINTAIN HEIGHT ALONG LENGTH OF SANDBAG DIKE. PLACE DOUBLE ROW OF SANDBAGS.
6. AT A MINIMUM, SECURELY ANCHOR DIVERSION PIPE AT EACH DOWNGRADE JOINT.
7. SET OUTLET END OF DIVERSION PIPE LOWER THAN INLET END.
8. PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
9. DEWATER WORK AREA USING AN APPROVED EROSION AND SEDIMENT CONTROL PRACTICE AS SPECIFIED ON APPROVED PLAN.
10. KEEP POINT OF DISCHARGE FREE OF EROSION. MAINTAIN WATER TIGHT CONNECTIONS AND POSITIVE DRAINAGE. REPLACE SANDBAGS AND IMPERMEABLE SHEETING IF TORN.

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U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

NO.	DATE	REVISION

BENCHMARK
ENGINEERS LAND SURVEYORS PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
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. 45577, Expiration Date: 06-08-2018.

JOHN M. CARNEY
No. 45577
7/30/17

OWNER:
VERA JEANNE MELVIN
3010 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:
HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
CLARKSVILLE, MARYLAND 21029
410-365-0414

MELVIN PROPERTY
LOTS 1 thru 6 and OPEN SPACE LOT 7
A RESUBDIVISION OF MELNOR PROPERTY LOT 5
RECORDED AS PLAT NO. 4250

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

SEDIMENT & EROSION CONTROL NOTES AND DETAILS

DATE: JULY, 2017
BEI PROJECT NO: 2515
DESIGN: JMC
DRAWN: JMC/DBT
SCALE: AS SHOWN
SHEET 4 OF 9

F-13-106

FOREST CONSERVATION WORKSHEET
MELVIN PROPERTY 2515

5-Aug-02

NET TRACT AREA:

A.	Total tract area ...	3.55
B.	Land dedication acres (parks, county facility, etc.) ...	0.00
C.	Land dedication for roads or utilities (not being constructed by this plan) ...	0.00
D.	Area to remain in commercial agricultural production/use ...	0.00
E.	Other deductions (specify)	0.00
F.	Net Tract Area ..... =	3.55

LAND USE CATEGORY: (from *Trees Technical Manual*)
Input the number "1" under the appropriate land use, limit to only one entry.

ARA	MDR	IDA	HDR	MPD	CIA
0	0	0	1	0	0

G.	Afforestation Threshold ...	15%	x F =	0.53
H.	Conservation Threshold ...	20%	x F =	0.71

EXISTING FOREST COVER:

I.	Existing forest cover ..... =	0.51
J.	Area of forest above afforestation threshold ..... =	0.00
K.	Area of forest above conservation threshold ..... =	0.00

BREAK EVEN POINT:

L.	Forest retention above threshold with no mitigation .... =	0.00
M.	Clearing permitted without mitigation ..... =	0.00

PROPOSED FOREST CLEARING:

N.	Total area of forest to be cleared ..... =	0.26
O.	Total area of forest to be retained ..... =	0.25

PLANTING REQUIREMENTS:

P.	Reforestation for clearing above conservation threshold .... =	0.00
Q.	Reforestation for clearing below conservation threshold .... =	0.52
R.	Credit for retention above conservation threshold ..... =	0.00
S.	Total reforestation required ..... =	0.52
T.	Total afforestation required ..... =	0.02
U.	Credit for landscaping (may not exceed 20% of "S") ..... =	0.00
V.	Total reforestation and afforestation required ..... =	0.54

LEGEND

- LIMIT OF SUBMISSION
- EXISTING CONTOUR
- WETLAND LIMITS
- EXISTING TREELINE
- PROPOSED TREELINE
- LIMIT OF DISTURBANCE
- FOREST CONSERVATION EASEMENT
- SOILS DELINEATION

NOTE:
THE TOTAL FOREST CONSERVATION OBLIGATION FOR THIS PROJECT SHALL BE MET BY THE ON-SITE RETENTION OF 0.25 ACRES OF FOREST WITHIN A FOREST CONSERVATION EASEMENT AND THE OFFSITE REFORESTATION OF 0.54 ACRES LOCATED IN THE CATTAIL CREEK, SDP-14-031, SUBDIVISION. THERE IS NO SURETY FOR THE ONSITE RETENTION.

SPECIMEN TREE CHART

NUMBER	DBH(INCHES)	COMMON NAME	CONDITION	NOTES
ST-1	34	PINE	FAIR	TO REMAIN
ST-2	31	PINE	FAIR	TO REMAIN
ST-3	38	SYCAMORE	GOOD	TO REMAIN

FOREST STAND ANALYSIS TABLE

KEY	A. TYPE OF COMMUNITY	B. AREA	C. SOILS INFORMATION 1. SOILS TYPES	2. TYPICAL FOREST COVER FOR SOILS TYPE	3. WOODLAND SUITABILITY INDEX	D. EXISTING VEGETATION	E. STAND CHARACTERISTICS 1. SIZE (DIA)	2. AGE (YRS)	3. GENERAL CONDITION	F. FOREST AREA IN SEN. ENV	G. HABITAT VALUE
F-1	MIXED HARDWOODS	0.51 AC.	GhB GnB JaB	HARDWOODS	70-90	OAKS, MAPLES	6"-9"	15-25	GOOD	N/A	GOOD
AF	GRASS	3.04 AC.	GhB GnB	N/A		GRASS					

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8.23.17

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8.25.17

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

J. CHRIS OGLE
DNR QUALIFIED PROFESSIONAL

NO.	DATE	REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS LAND SURVEYORS PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
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. 15277, Expiration Date: 06-08-2018.

7/30/17

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TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

FOREST STAND DELINEATION AND FOREST CONSERVATION PLAN

DATE: JULY, 2017 BEI PROJECT NO: 2515
DESIGN: JMC DRAWN: JMC/DBT SCALE: AS SHOWN SHEET 5 OF 9

F-13-106

CONSTRUCTION SPECIFICATIONS

B.4.C Specifications for Micro-Bioretention. Rain Gardens, Landscape Infiltration & Infiltration Berms

1. Material Specifications

The allowable materials to be used in these practices are detailed in Table B.4.1.

2. Filtering Media or Planting Soil

The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the micro-bioretention practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

The planting soil shall be tested and shall meet the following criteria:

- Soil Component - Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
- Organic Content - Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy sand (60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%), and compost (40%).
- Clay Content - Media shall have a clay content of less than 5%.
- pH Range – Should be between 5.5 - 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed into the soil to increase or decrease pH.

There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the topsoil was excavated.

3. Compaction

It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoes to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.

Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.

When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

4. Plant Material

Recommended plant material for micro-bioretention practices can be found in Appendix A, Section A.2.3.

5. Plant Installation

Compost is a better organic material source, is less likely to float, and should be placed in the invert and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

Rootstock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.

The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.

6. Underdrains

Underdrains should meet the following criteria:

- Pipe- Should be 4" to 6" diameter, slotted or perforated rigid plastic pipe (ASTMF 758, Type PS 28, or AASHTO-M-278) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC or HDPE).
- Perforations - If perforated pipe is used, perforations should be ¾" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a ¼" (No. 4 or 4x4) galvanized hardware cloth.
- Gravel – The gravel layer (No. 57 stone preferred) shall be at least 3" thick above and below the underdrain.
- The main collector pipe shall be at a minimum 0.5% slope.
- A rigid, non-perforated observation well must be provided (one per every 1,0000 square feet) to provide a clean-out port and monitor performance of the filter.
- A 4" layer of pea gravel (¼" to ⅜" stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 24".

The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).

7. Miscellaneous

These practices may not be constructed until all contributing drainage area has been stabilized

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8.23.17

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8.25.17

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED (M-3) LANDSCAPE INFILTRATION (M-6) MICRO-BIORETENTION (M-8) SWALES

a. The Owner shall maintain the plant material, mulch layer and soil layer annually. Maintenance of mulch and soil is limited to correcting areas of erosion or wash out. Any mulch replacement shall be done in the spring. Plant material shall be checked for disease and insect infestation and maintenance will address dead material and pruning. Acceptable replacement plant material is limited to the following: 2000 Maryland Stormwater Design Manual Volume II, Table A.4.1 and 2.

b. The Owner shall perform a plant inspection in the spring and in the fall of each year. During the inspection, the Owner shall remove dead and diseased vegetation considered beyond treatment, replace dead plant material with acceptable replacement plant material, treat diseased trees and shrubs, and replace all deficient stakes and wires.

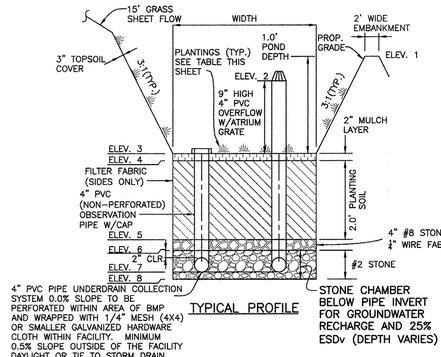
c. The Owner shall inspect the mulch each spring. The mulch shall be replaced every two to three years. The previous mulch layer shall be removed the new layer is applied.

d. The Owner shall correct soil erosion on an as needed basis, with a minimum of once per month and after each heavy storm.

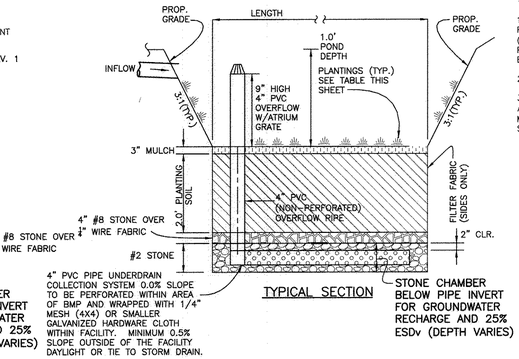
Appendix B.4. Construction Specifications for Environmental Site Design Practices

Table B.4.1 Materials Specifications for Micro-Bioretention, Rain Gardens & Landscape Infiltration-

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil (2' to 4' deep)	loamy sand (60 - 65%) & compost (35 – 40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with ¼-inch galvanized hardware cloth
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 Maryland - 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	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (**AASHTO**) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.



TYPICAL PROFILE



TYPICAL SECTION

TYPICAL MICRO-BIORETENTION DETAILS

NOT TO SCALE

UNDERDRAIN, OVERFLOW AND OUTFALL NOTES

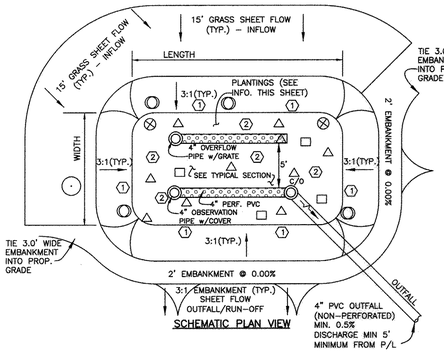
1. THE LAST CLEAN-OUT LOCATION WITHIN EACH MICRO-BIORETENTION FACILITY SHALL BE FITTED WITH A NON-CLOGGING SURFACE DRAIN (EXAMPLE: 4" ABS ROOF DRAIN W/CAST ALUMINUM DOME) AT THE POND SURFACE ELEVATION INDICATED IN THE CORRESPONDING TABLE ELEV. 2.

2. THE PVC WITHIN THE FACILITY SHALL BE PERFORATED.

3. THE UNDER-DRAIN AND PIPE TO OUTFALL SHALL BE INSTALLED TO A MINIMUM DEPTH OF 2' BELOW FINISHED GRADE AND SHALL MAINTAIN A MINIMUM 1% SLOPE AND MAINTAIN A MINIMUM OF 1' OF SEPARATION AT ALL CROSSINGS.

PLANTING LEGEND

SYMBOL	NAME
①	AJUGA REPTANS (CREEPING BUGLEWEED)
②	IRIS VERSICOLOR (IRIS)
□	Lobelia cardinalis (CARDINAL FLOWER)
△	ELYMUS VIRGINICUS (VIRGINIA WILD RYE)
◎	VACCINIUM ATROCOCCUM (HIGHBUSH BLUEBERRY)
·	BETULA NIGRA (RIVER BIRCH)



SCHEMATIC PLAN VIEW

CONSTRUCTION SPECIFICATIONS

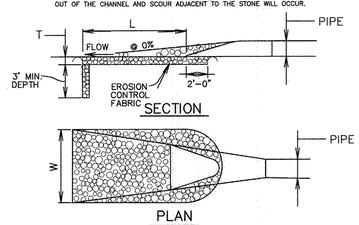
1. THE SUBGRADE FOR THE FILTER, RIP-RAP, OR GABION SHALL BE PREPARED TO THE REQUIRED LINES AND GRADES. ANY FILL REQUIRED IN THE SUBGRADE SHALL BE COMPACTED TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.

2. THE ROCK OR GRAVEL SHALL CONFORM TO THE SPECIFIED GRADING LIMITS WHEN INSTALLED RESPECTIVELY IN THE RIP-RAP OR FILTER.

3. GEOTEXTILE CLASS C2B OR BETTER SHALL BE PROTECTED FROM PUNCHING, CUTTING, OR TEARING. ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE SHALL BE PREPARED BY PLACING ANOTHER PIECE OF GEOTEXTILE FABRIC OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE FABRIC. ALL OVERLAPS WHETHER FOR REPAIRS OR FOR JOINING TWO PIECES OF GEOTEXTILE FABRIC SHALL BE A MINIMUM OF ONE FOOT.

4. STONE FOR THE RIP-RAP OR GABION OUTLETS MAY BE PLACED BY EQUIPMENT. THEY SHALL BE CONSTRUCTED TO THE FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. THE STONE FOR HE RIP-RAP OR GABION OUTLETS SHALL BE DELIVERED AND PLACED IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. RIP-RAP SHALL BE PLACED IN A MANNER TO PREVENT DAMAGE TO THE FILTER BLANKET OR GEOTEXTILE FABRIC. HAND PLACEMENT WILL BE REQUIRED TO THE EXTENT NECESSARY TO PREVENT DAMAGE TO THE PERMANENT WORKS.

5. THE STONE SHALL BE PLACED SO THAT IT BLENDS IN WITH THE EXISTING GROUND. IF THE STONE IS PLACED TOO HIGH THEN THE FLOW WILL BE FORCED OUT OF THE CHANNEL AND SCOUR ADJACENT TO THE STONE WILL OCCUR.



STRUCTURE	D-50	LENGTH (L)	WIDTH (W)	THICKNESS (T)	SHA CLASS
E-1	9.0"	19'	5.5'	18"	I

OUTLET PROTECTION DETAIL

NOT TO SCALE

STRUCTURE SCHEDULE

NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
E-1	18" HDPE END SECT.	N 590,875.5915 E 1,370,210.7485	--	396.50	--	SEE MANUFACTURER SPECIFICATIONS
I-1	'D' INLET	N 590831.7254 E 1370270.4397	397.50	397.30	402.33	SD – 4.11 OR 4.39 OPEN 4 SIDES
I-2	'D' INLET	N 590795.6852 E 1370448.7907	401.14	401.39	409.33	SD – 4.11 OR 4.39 OPEN 4 SIDES
I-3	'D' INLET	N 590765.3004 E 1370442.6453	--	402.02	408.22	SD – 4.11 OR 4.39 OPEN 4 SIDES

1) STRUCTURE ELEVATION AND LOCATION FOR MANHOLES IS AT THE TOP AND CENTER OF RIM.
2) STRUCTURE ELEVATION AND LOCATION FOR INLETS IS AT THE TOP OF CURB AT MIDPOINT OF THE INLET OR AT THE CENTER OF SLAB FOR "D" INLETS.
3) STRUCTURE ELEVATION AND LOCATION FOR ENDSECTIONS IS AT THE CONNECTION OF PIPE AND END SECTION.
4) PRECAST STRUCTURES MEETING HS-20 LOADING MAY BE USED.
5) ALL STORM DRAINS SHALL BE SMOOTH CORE HIGH DENSITY POLYETHYLENE PIPE.

STORM DRAIN DATA

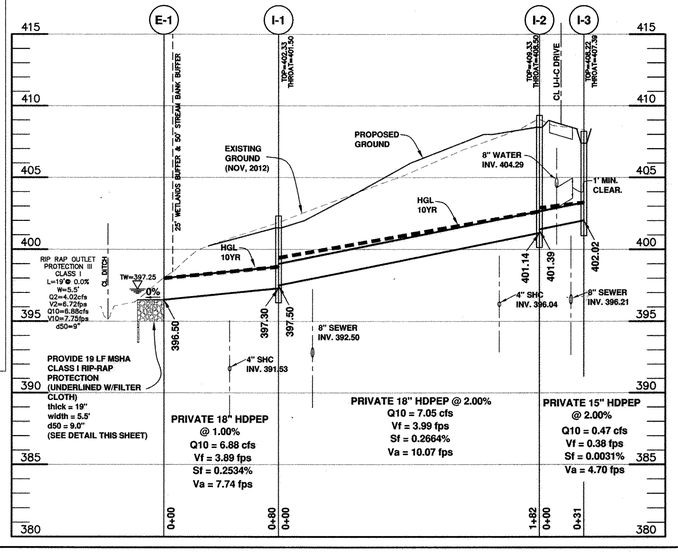
INLET NO.	ZONING	AREA (AC)	'C' FACTOR	% IMPERVIOUS	Q2	Q10
I-1	R-20	0.03	0.26	25	0.03	0.05
I-2	R-20	4.06	0.23	25	4.20	6.16
I-3	R-20	0.27	0.23	25	0.28	0.41

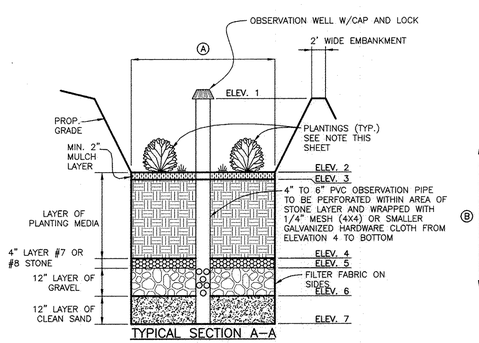
PIPE SCHEDULE

RUN	LENGTH	DIAMETER	MATERIAL	NOTES
E-1 TO I-1	80'	18"	HDPEP	PRIVATE
I-1 TO I-2	193'	18"	HDPEP	PRIVATE
I-2 TO I-3	31'	15"	HDPEP	PRIVATE

MATERIAL SCHEDULE

DIAMETER	MATERIAL	LENGTH
15"	HDPEP	31'
18"	HDPEP	262'
--	--	--

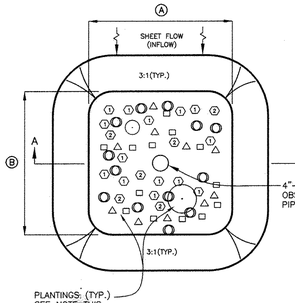




TYPICAL SECTION A-A

TYPICAL M-3 LANDSCAPE FILTRATION DETAILS

NOT TO SCALE



PLAN VIEW

(M-6) MICRO-BIORETENTION DESIGN TABLES

M-6 Micro-Bioretention #2

Elev.	Description	Elevation	Dimensions	
1	top of embankment	404.50	Length	
2	recharge pipe inlet	404.25	Length	
3	top of mulch	403.50	Total SF	359
4	top of soil	403.33	**Outlet Pipe**	
5	top of stone layer	401.33	Size (inches)	4
6	top of stone chamber	401.00	Length (feet)	53
7	outlet pipe invert	400.50	Slope (%)	1.6%
8	bottom of stone chamber	399.27	daylight invert	399.00

M-6 Micro-Bioretention #3

Elev.	Description	Elevation	Dimensions	
1	top of embankment	400.00	Length	
2	recharge pipe inlet	399.75	Total SF	328
3	top of mulch	399.00		
4	top of soil	398.83	**Outlet Pipe**	
5	top of stone layer	396.83	Size (inches)	4
6	top of stone chamber	396.50	Length (feet)	89
7	outlet pipe invert	396.00	Slope (%)	0.8%
8	bottom of stone chamber	395.17	daylight invert	394.50

M-6 Micro-Bioretention #4

Elev.	Description	Elevation	Dimensions	
1	top of embankment	406.20	Length	
2	recharge pipe inlet	405.95	Total SF	223
3	top of mulch	405.20		
4	top of soil	405.03	**Outlet Pipe**	
5	top of stone layer	403.03	Size (inches)	4
6	top of stone chamber	402.70	Length (feet)	79
7	outlet pipe invert	402.20	Slope (%)	1.3%
8	bottom of stone chamber	401.27	daylight invert	400.50

M-6 Micro-Bioretention #5

Elev.	Description	Elevation	Dimensions	
1	top of embankment	409.30	Length	
2	recharge pipe inlet	409.05	Total SF	382
3	top of mulch	408.30		
4	top of soil	408.13	**Outlet Pipe**	
5	top of stone layer	406.13	Size (inches)	4
6	top of stone chamber	405.80	Length (feet)	92
7	outlet pipe invert	405.30	Slope (%)	0.7%
8	bottom of stone chamber	404.47	daylight invert	404.10

(M-3) LANDSCAPE INFILTRATION DESIGN TABLES

M-3 Landscape Infiltration #1

Elev.	Description	Elevation	Dimensions	
1	top of embankment	410.50	Length	
2	top of mulch	409.50	Total SF	208
3	top of soil	409.33		
4	top of gravel layer	408.33		
5	top of stone chamber	408.00		
6	top of sand layer	407.00		
7	bottom of facility	406.00		

M-3 Landscape Infiltration #6

Elev.	Description	Elevation	Dimensions	
1	top of embankment	410.80	Length	
2	top of mulch	409.80	Total SF	335
3	top of soil	409.63		
4	top of gravel layer	408.63		
5	top of stone chamber	408.30		
6	top of sand layer	407.30		
7	bottom of facility	406.30		

SWM PRACTICE INTERNAL LANSCAPING CHART

				LF #1	MB #2	MB #3	MB #4	MB #5	LF#6
Facility square footage			→	208	359	328	223	362	335
PLANT NAME	COMMON NAME	TYPE	SIZE	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY
Betula nigra	RIVER BIRCH	tree	5' height	1	1	1	1	1	1
Clethra	COMMON PERIWNKLE	herbaceous	quart bulb	26	45	41	28	45	42
Ajuga reptans	CREEPING BUGLEWEED	herbaceous	quart bulb	26	45	41	28	45	42
Iris versicolor	IRIS	herbaceous	quart bulb	26	45	41	28	45	42
Elymus virginicus	VIRGINIA WILD RYE	herbaceous	quart bulb	26	45	41	28	45	42
Vaccinium atrococcum	HIGHBUSH BLUEBERRY	shrub	2.5'-3' ht	3	4	4	3	4	4

NO.	DATE	REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS LAND SURVEYORS PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
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. 45977, Expiration Date: 06-08-2018.

STATE OF MARYLAND — JOHN M. CARNEY — No. 45977 — PROFESSIONAL ENGINEER — 7/20/17

OWNER:
VERA JEANNE MELVIN
3010 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:
HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
CLARKSVILLE, MARYLAND 21029
410-365-0414

MELVIN PROPERTY

LOTS 1 thru 6 and OPEN SPACE LOT 7
A RESUBDIVISION OF MELNOR PROPERTY LOT 5
RECORDED AS PLAT NO. 4250

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

STORM DRAIN AND STORMWATER MANAGEMENT NOTES & DETAILS

DESIGN: JMC	DRAWN: JMC/DBT	DATE: JULY, 2017	BEI PROJECT NO: 2515
		SCALE: AS SHOWN	SHEET 6 OF 9

F-13-106

BORING LOG — GEOLAB, INC.

Report No. — Date: 7/5/2013
Client: Benchmark Engineering
Project: Melvin Property — Project No. 113-053
Boring No. B-1 (1 of 1) Total Depth 7.5 Elev. 408.5 — Location: See Boring Location Plan
Type of Boring: Hand Auger — Started: 7/1/2013 — Completed: 7/1/2013 — Driller: J Roth & D Rockwood

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
408.5	0.0	Sod with root (organic) matter and organic soil		0.5		Groundwater was encountered at a depth of 6.0 feet.
408	0.5	Brown silty fine to medium SAND, wet (SM)		1		
					25.4	
						Standpipe was installed at a depth of 2.0 feet.
404.5	4.0	Dark brown micaceous fine to medium SAND with little silt, wet to saturated (SM)		4.0		
				4.5	27.2	
401	7.5	End of Boring				

*Number of blows required for a 13 lb hammer dropping 20" on an S-rod slide drive. For testing, the cone point is seated 2 inches into the soil boring floor and then driven three consecutive 1-3/4 inches increments. The number of blows required to drive each increment are counted and recorded. These blows furnish a relative indication of the in-place consistency or density of the tested soil stratum.

BORING LOG — GEOLAB, INC.

Report No. — Date: 7/5/2013
Client: Benchmark Engineering
Project: Melvin Property — Project No. 113-053
Boring No. B-2 (1 of 1) Total Depth 8 Elev. 402.5 — Location: See Boring Location Plan
Type of Boring: Hand Auger — Started: 7/1/2013 — Completed: 7/1/2013 — Driller: J Roth & D Rockwood

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
402.5	0.0	Sod with root (organic) matter and organic soil		0.5		Groundwater was encountered at a depth of 6.5 feet.
402	0.5	Dark brown to brown silty fine to medium SAND, wet (SM)		1		
					26.1	
						Standpipe was installed at a depth of 3.0 feet.
397.5	5.0	Gray and brown micaceous fine to medium SAND with little silt, moist (SM)		5.0		
				5.5	26.9	
394.5	8.0	End of Boring				

*Number of blows required for a 13 lb hammer dropping 20" on an S-rod slide drive. For testing, the cone point is seated 2 inches into the soil boring floor and then driven three consecutive 1-3/4 inches increments. The number of blows required to drive each increment are counted and recorded. These blows furnish a relative indication of the in-place consistency or density of the tested soil stratum.

BORING LOG — GEOLAB, INC.

Report No. — Date: 7/5/2013
Client: Benchmark Engineering
Project: Melvin Property — Project No. 113-053
Boring No. B-3 (1 of 1) Total Depth 7.5 Elev. 397.5 — Location: See Boring Location Plan
Type of Boring: Hand Auger — Started: 7/1/2013 — Completed: 7/1/2013 — Driller: J Roth & D Rockwood

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
397.5	0.0	Sod with root (organic) matter and organic soil		0.5		Groundwater was encountered at a depth of 6.0 feet.
397	0.5	Brown clayey fine to medium sandy SILT, moist (ML)		1		
					19.6	
						Standpipe was installed at a depth of 3.0 feet.
393.5	4.0	Tan/off-white micaceous fine to medium SAND with some silt, moist to saturated (SM)		4.0		
				4.5	14.9	
390	7.5	End of Boring				

*Number of blows required for a 13 lb hammer dropping 20" on an S-rod slide drive. For testing, the cone point is seated 2 inches into the soil boring floor and then driven three consecutive 1-3/4 inches increments. The number of blows required to drive each increment are counted and recorded. These blows furnish a relative indication of the in-place consistency or density of the tested soil stratum.

BORING LOG — GEOLAB, INC.

Report No. — Date: 7/5/2013
Client: Benchmark Engineering
Project: Melvin Property — Project No. 113-053
Boring No. B-4 (1 of 1) Total Depth 7 Elev. 404.0 — Location: See Boring Location Plan
Type of Boring: Hand Auger — Started: 7/1/2013 — Completed: 7/1/2013 — Driller: J Roth & D Rockwood

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
404	0.0	Sod with root (organic) matter and organic soil		0.5		groundwater was encountered at a depth of 5.5 feet.
403.5	0.5	Brown fine to medium SAND with little silt and trace gravel, moist (SM)		1		
					23.8	
399	5.0	Gray micaceous fine to coarse SAND with little silt, wet to saturated (SM)		5.0		
				5.5	23.4	
397	7.0	End of Boring				

*Number of blows required for a 13 lb hammer dropping 20" on an S-rod slide drive. For testing, the cone point is seated 2 inches into the soil boring floor and then driven three consecutive 1-3/4 inches increments. The number of blows required to drive each increment are counted and recorded. These blows furnish a relative indication of the in-place consistency or density of the tested soil stratum.

BORING LOG — GEOLAB, INC.

Report No. — Date: 7/5/2013
Client: Benchmark Engineering
Project: Melvin Property — Project No. 113-053
Boring No. B-5 (1 of 1) Total Depth 11 Elev. 409.0 — Location: See Boring Location Plan
Type of Boring: Hand Auger — Started: 7/1/2013 — Completed: 7/1/2013 — Driller: J Roth & D Rockwood

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
409	0.0	Sod with root (organic) matter and organic soil		0.5		Groundwater was encountered at a depth of 9.5 feet.
408.5	0.5	Brown silty fine to medium SAND, wet (SM)		1		
					27.2	
						Standpipe was installed at a depth of 3.0 feet.
404	5.0	Brown micaceous fine to medium SAND with some silt, wet to saturated (SM)		5.0		
				5.5	20.6	
398	11.0	End of Boring				

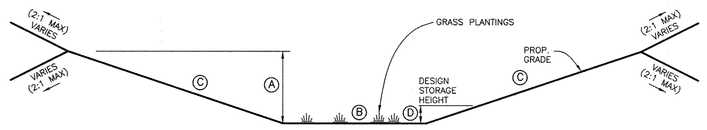
*Number of blows required for a 13 lb hammer dropping 20" on an S-rod slide drive. For testing, the cone point is seated 2 inches into the soil boring floor and then driven three consecutive 1-3/4 inches increments. The number of blows required to drive each increment are counted and recorded. These blows furnish a relative indication of the in-place consistency or density of the tested soil stratum.

BORING LOG — GEOLAB, INC.

Report No. — Date: 7/5/2013
Client: Benchmark Engineering
Project: Melvin Property — Project No. 113-053
Boring No. B-6 (1 of 1) Total Depth 6.5 Elev. 411.0 — Location: See Boring Location Plan
Type of Boring: Hand Auger — Started: 7/1/2013 — Completed: 7/1/2013 — Driller: J Roth & D Rockwood

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
411	0.0	Sod with root (organic) matter and organic soil		0.5		Groundwater was encountered at a depth of 4.5 feet.
410.5	0.5	Gray and brown clayey SILT with some fine to medium sand, moist (ML)		1		
					23.7	
407	4.0	Dark brown micaceous fine to medium sandy SILT, wet to saturated (ML)		4.0		
				4.5	28.0	
404.5	6.5	End of Boring				

*Number of blows required for a 13 lb hammer dropping 20" on an S-rod slide drive. For testing, the cone point is seated 2 inches into the soil boring floor and then driven three consecutive 1-3/4 inches increments. The number of blows required to drive each increment are counted and recorded. These blows furnish a relative indication of the in-place consistency or density of the tested soil stratum.



(M-8) GRASS SWALE TYPICAL SECTION DETAIL
NOT TO SCALE

SWALE #1	
A	1.0'
B	4.0'
C	3:1
D	0.22'
SLOPE	4.0%
BOTTOM DIMS	
LENGTH	325'
WIDTH	4.0'
TOTAL SF	1,300

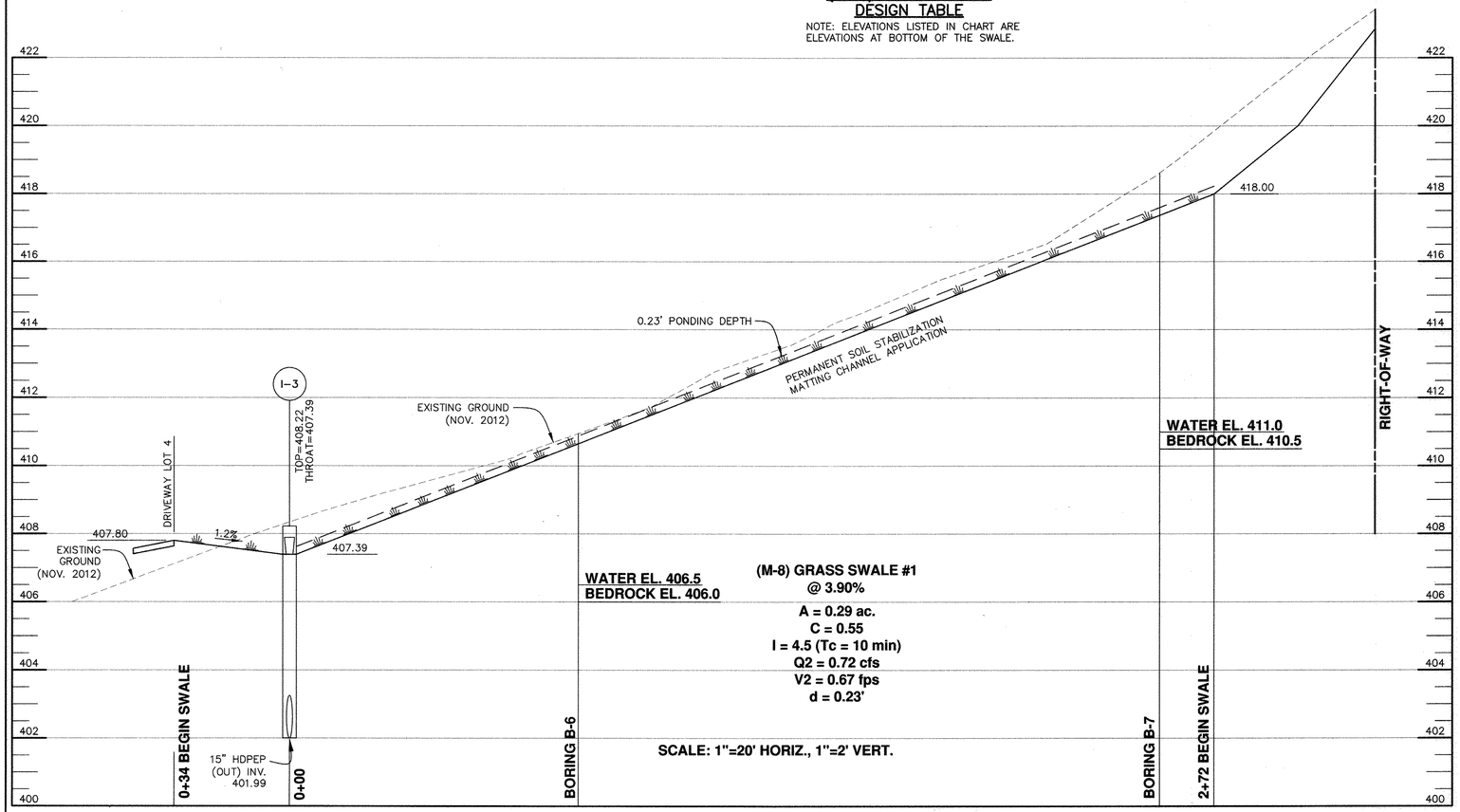
STORM Q (RUNOFF) VELOCITY
2YR 0.71 CFS 0.67 FPS
10YR 1.05 CFS 0.76 FPS

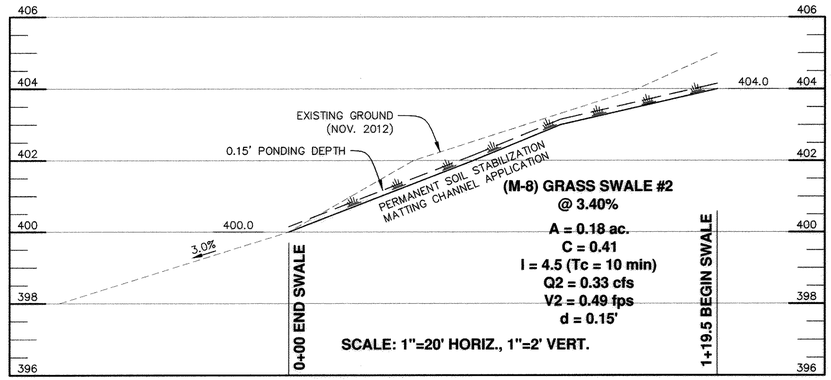
SWALE #2	
A	1.0'
B	4.0'
C	3:1
D	0.15'
SLOPE	3.4%
BOTTOM DIMS	
LENGTH	119.5'
WIDTH	4.0'
TOTAL SF	478

STORM Q (RUNOFF) VELOCITY
2YR 0.33 CFS 0.49 FPS
10YR 0.49 CFS 0.56 FPS

(M-8) GRASS SWALE DESIGN TABLE

NOTE: ELEVATIONS LISTED IN CHART ARE ELEVATIONS AT BOTTOM OF THE SWALE.





Melvin Property, F-13-109, Proposed swale calculations - Swale #1
A = 0.29 acres
I = 6.6 (based on 10-year storm)
C = 0.55 (based on 'B' soils for 1/2 acre lots and Impervious
Q = C I A
Q = 0.55 (6.6) 0.29 = **1.05 cfs**

Channel Calculator

Given Input Data:	
Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	**1.0500 cfs**
Slope	0.0400 ft/ft
Manning's n	0.1500
Height	18.0000 in
Bottom width	48.0000 in
Left slope	0.3333 ft/ft (V/H)
Right slope	0.3333 ft/ft (V/H)
Computed Results:	
Depth	3.4121 in
Velocity	**0.7609 fps**
Full Flowrate	24.3344 cfs
Flow area	1.3800 ft2
Flow perimeter	69.5822 in
Hydraulic radius	2.8558 in
Top width	68.4749 in
Area	12.7507 ft2
Perimeter	161.8522 in
Percent full	18.9563 %

Shear Stress Calc:

t = y (R)Sw, where y = 62.4, R = 0.28, Sw = 0.04
t = 0.71
Since velocity < 2.5 fps and t < 2lbs/ft^2 permanent matting is not required per B-4-6. However, erosion control matting is being provided.

Melvin Property, F-13-109, Proposed swale calculations - Swale #2
A = 0.18 acres
I = 6.6 (based on 10-year storm)
C = 0.41 (based on 'B' soils for 1/2 acre lots and Impervious
Q = C I A
Q = 0.41 (6.6) 0.18 = **0.49 cfs**

Channel Calculator

Given Input Data:	
Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.4900 cfs
Slope	0.0340 ft/ft
Manning's n	0.1500
Height	12.0000 in
Bottom width	48.0000 in
Left slope	0.3333 ft/ft (V/H)
Right slope	0.3333 ft/ft (V/H)
Computed Results:	
Depth	2.3051 in
Velocity	0.5574 fps
Full Flowrate	9.8698 cfs
Flow area	0.8791 ft2
Flow perimeter	62.5798 in
Hydraulic radius	2.0228 in
Top width	61.8318 in
Area	7.0003 ft2
Perimeter	123.9015 in
Percent full	19.2089 %

Shear Stress Calc:

t = y(R)Sw, where y = 62.4, R = 0.19, Sw = 0.034
t = 0.41
Since velocity < 2.5 fps and t < 2lbs/ft^2 permanent matting is not required per B-4-6. However, erosion control matting is being provided.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8.23.17
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8.25.17

NO.	DATE	REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS LAND SURVEYORS PLANNERS
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(P) 410-465-6105 (F) 410-465-6644
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. 45577, Expiration Date: 06-08-2018.
STATE OF MARYLAND — JOHN M. CARMEAN — No. 45577 — PROFESSIONAL ENGINEER
7/20/17

OWNER:
VERA JEANNE MELVIN
3010 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:
HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
CLARKSVILLE, MARYLAND 21029
410-365-0414

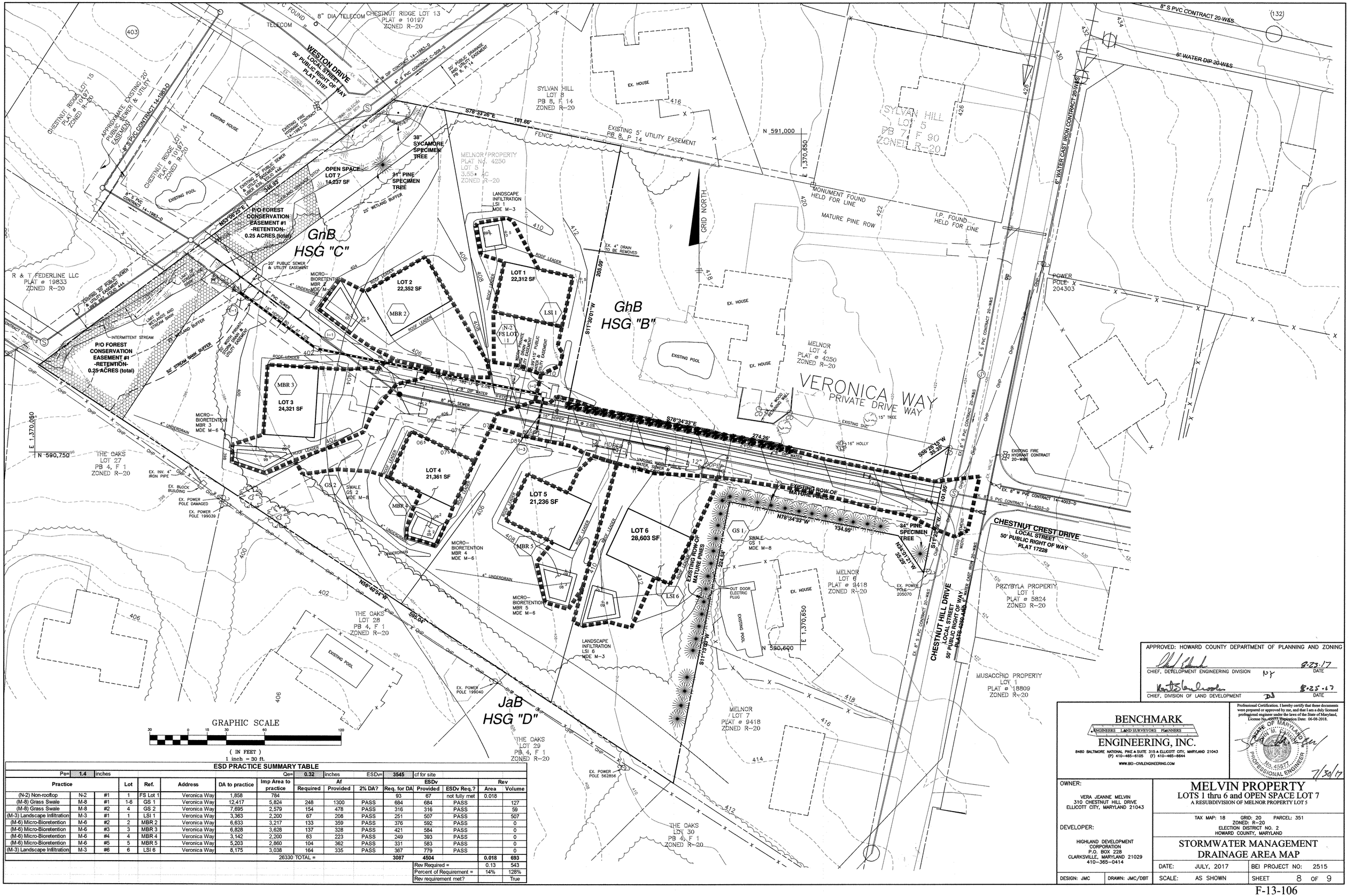
MELVIN PROPERTY
LOTS 1 thru 6 and OPEN SPACE LOT 7
A RESUBDIVISION OF MELNOR PROPERTY LOT 5
RECORDED AS PLAT NO. 4250

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

SOIL BORING LOGS & GRASS SWALE DETAILS

DESIGN: JMC DRAWN: JMC/DBT
DATE: JULY, 2017 BEI PROJECT NO: 2515
SCALE: AS SHOWN SHEET 7 OF 9

F-13-106



ESD PRACTICE SUMMARY TABLE

Pe= 1.4 inches | Qe= 0.32 inches | ESDv= 3545 cf for site

Practice		Lot	Ref.	Address	DA to practice	Imp Area to practice	Af Required	Af Provided	2% DA?	ESDv Req. for DA	ESDv Provided	ESDv Req.?	Rev Area	Rev Volume
(N-2) Non-rooftop	N-2	#1	1	FS Lot 1	Veronica Way	1,858	784				93	67	not fully met	0.018	
(M-8) Grass Swale	M-8	#1	1-6	GS 1	Veronica Way	12,417	5,824	248	1300	PASS	684	684	PASS		127
(M-8) Grass Swale	M-8	#2	4	GS 2	Veronica Way	7,695	2,579	154	478	PASS	316	316	PASS		59
(M-3) Landscape Infiltration	M-3	#1	1	LSI 1	Veronica Way	3,363	2,200	67	208	PASS	251	507	PASS		507
(M-6) Micro-Bioretention	M-6	#2	2	MBR 2	Veronica Way	6,633	3,217	133	359	PASS	376	592	PASS		0
(M-6) Micro-Bioretention	M-6	#3	3	MBR 3	Veronica Way	6,828	3,628	137	328	PASS	421	584	PASS		0
(M-6) Micro-Bioretention	M-6	#4	4	MBR 4	Veronica Way	3,142	2,200	63	223	PASS	249	393	PASS		0
(M-6) Micro-Bioretention	M-6	#5	5	MBR 5	Veronica Way	5,203	2,860	104	362	PASS	331	583	PASS		0
(M-3) Landscape Infiltration	M-3	#6	6	LSI 6	Veronica Way	8,175	3,038	164	335	PASS	367	779	PASS		0
						26330 TOTAL =					3087	4504		0.018	693

Rev Required =	0.13	543
Percent of Requirement =	14%	128%
Rev requirement met?		True

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8.23.17

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8.25.17

BENCHMARK ENGINEERING, INC.
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STATE OF MARYLAND — JOHN M. BEAN — NO. 45577 — PROFESSIONAL ENGINEER — 7/30/17

OWNER:
VERA JEANNE MELVIN
310 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:
HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
CLARKSVILLE, MARYLAND 21029
410-365-0414

MELVIN PROPERTY
LOTS 1 thru 6 and OPEN SPACE LOT 7
A RESUBDIVISION OF MELNOR PROPERTY LOT 5

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

STORMWATER MANAGEMENT DRAINAGE AREA MAP

DESIGN: JMC | DRAWN: JMC/DBT | DATE: JULY, 2017 | SCALE: AS SHOWN | BEI PROJECT NO: 2515 | SHEET 8 OF 9

F-13-106

AREA AND "C" FACTOR TABULATION

PROJECT: DATE : 5/24/2013 BY: DBT

PHASE	INLET #	ZONING (Z)	SUBAREA (B)	AREA (Ac) (A)	"C" FACTOR (C)<25		% IMPERVIOUS (P)<25
	I-1	R-SC		0.03	0.26		25.0
	I-2	R-SC		4.06	0.23		25.0
	I-3	R-SC		0.27	0.23		25.0

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

SOILS LEGEND

MAP SYMBOL	SOIL GROUP	SOIL TYPE
GhB	B	GLENELG-URBAN LAND COMPLEX LOAM, 0 TO 8 PERCENT SLOPES
GnB*	C	GLENVILLE-BAILE SILT LOAM, 0 TO 8 PERCENT SLOPES
JoB	D	SILT LOAM, 3 TO 8 PERCENT SLOPES

FROM NATURAL RESOURCES CONSERVATION SERVICES WEB SOIL SURVEY 2.0
* HYDRIC SOILS

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7/30/17

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION JY 8-23-17 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT DS 8-25-17 DATE

OWNER:
VERA JEANNE MELVIN
310 CHESTNUT HILL DRIVE
ELLICOTT CITY, MARYLAND 21043

DEVELOPER:
HIGHLAND DEVELOPMENT CORPORATION
P.O. BOX 228
CLARKSVILLE, MARYLAND 21029
410-365-0414

MELVIN PROPERTY
LOTS 1 thru 6 and OPEN SPACE LOT 7
A RESUBDIVISION OF MELNOR PROPERTY LOT 5

TAX MAP: 18 GRID: 20 PARCEL: 351
ZONED: R-20
ELECTION DISTRICT NO. 2
HOWARD COUNTY, MARYLAND

STORM DRAIN DRAINAGE AREA MAP

DATE: JULY, 2017	BEI PROJECT NO: 2515
SCALE: AS SHOWN	SHEET 9 OF 9

DESIGN: JMC DRAWN: JMC/DBT

F-13-106