

SHEET INDEX	
NO.	DESCRIPTION
1	COVER SHEET/EXISTING CONDITIONS
2	SITE LAYOUT PLAN AND SOILS MAP
3	STORMWATER MANAGEMENT DETAILS

STORMWATER MANAGEMENT PRACTICES CHART			
LOT NO.	ADDRESS	MICRO-BIORETENTION FACILITY (M-6)	DRY-WELLS (M-5)
2	14174 TRIADLPHIA MILL ROAD	1	2
3	14176 TRIADLPHIA MILL ROAD	1	2

SPECIMEN TREE CHART			
KEY	SPECIES	SIZE (IN DBH)	CRZ (FT RADII)
1	WHITE PINE	31	47
2	WHITE PINE	33	50
3	WHITE PINE	32.5	49
4	WHITE PINE	30.5	46
5	WHITE OAK	33	50
6	SYCAMORE	47	70.5

GENERAL NOTES

- SUBJECT PROPERTY ZONED RR-DEO PER THE COMPREHENSIVE ZONING PLAN EFFECTIVE 10-6-2013.
- THIS PROJECT IS SUBJECT TO THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE ZONING REGULATIONS EFFECTIVE APRIL 13, 2004.
- PROJECT BOUNDARY AND TOPOGRAPHY WITHIN THE SUBDIVISION AREA ARE BASED ON FIELD BOUNDARY SURVEY (APRIL, 2016) AND TOPO (JULY, 2016) PERFORMED BY BENCHMARK ENGINEERING, INC.
- THERE ARE STEEP SLOPES (25% OR GREATER) ON THE SITE, UNDER 20,000 SF CONTIGUOUS. AS SUCH, DEVELOPMENT OF THE AREA IS NOT REGULATED.
- A FOREST STAND DELINEATION AND ENVIRONMENTAL FINDINGS LETTER DATED JANUARY 2017 WAS PREPARED BY ECO-SCIENCE PROFESSIONALS, INC.
- PREVIOUS DPZ FILES: EOP-17-037, WP-17-094.
- THE 100-YEAR FLOODPLAIN PORTRAYED ON THE SITE IS BASED ON A FLOOD STUDY PERFORMED BY BENCHMARK ENGINEERING, INC. DATED FEBRUARY, 2017.
- STORMWATER MANAGEMENT FOR THESE LOTS IS PROVIDED IN ACCORDANCE WITH THE STORMWATER MANAGEMENT ACT OF 2007. ENVIRONMENTAL SITE DESIGN HAS BEEN IMPLEMENTED TO THE MAXIMUM EXTENT PRACTICAL BY THE USE OF ESD FACILITIES INCLUDING NON-ROOFTOP DISCONNECTIONS (N-2) AND MICRO-BIORETENTION (M-6). ALL ESD FACILITIES SHALL BE PRIVATELY OWNED AND MAINTAINED BY THE LOT OWNER, AND SHALL BE SUBJECT TO THE REQUIREMENTS AND RESTRICTION OF A RECORDED DECLARATION OF GOVERNMENT.
- WATER AND SEWER IS PRIVATE. THIS SITE IS NOT IN THE METROPOLITAN DISTRICT.
- THE TWO NEW LOTS ARE EACH SUBJECT TO A \$1500 FEE-IN-LIEU FOR OPEN SPACE (\$3,000 TOTAL).
- A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
- THE EXISTING HOUSE IS GREATER THAN 50 YEARS OLD, BUT IS NOT ON THE HISTORIC SITE INVENTORY.
- AN APP TRAFFIC STUDY IS NOT REQUIRED FOR THIS PROJECT BECAUSE IT IS A MINOR SUBDIVISION.
- A SPEED STUDY HAS BEEN PREPARED BY MARS GROUP, INC. DATED OCTOBER, 2016.
- TO THE BEST OF OUR KNOWLEDGE THERE ARE NO CEMETERIES ON THIS PROPERTY.
- THERE IS AN EXISTING STREAM, STREAM BUFFERS AND FLOODPLAIN LOCATED ON-SITE. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING OR NEW STRUCTURES SHALL BE PERMITTED WITHIN THE REQUIRED WETLANDS, STREAMS, THEIR BUFFERS, FOREST CONSERVATION EASEMENT AREA OR 100 YEAR FLOODPLAIN.
- THIS PROJECT COMPLIES WITH THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CODE FOR FOREST CONSERVATION WITH OFF-SITE BANKING. 1.9 ACRES WILL MET WITH A FOREST BANK AT THE PROPERTY OF CAPITAL MANAGEMENT, LLC, 5001 W. 24th ST. A \$200K OF RETAINMENT SHALL BE UTILIZED.
- MHI REQUIREMENTS WILL BE ADRESSED BY FEE-IN-LIEU.
- THE LANDSCAPING FOR THIS PROJECT IS SHOWN WITHIN THESE SUPPLEMENTAL PLANS, AND HAS BEEN DESIGNED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. SURETY SHALL BE PROVIDED WITH THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$5,400 FOR 16 SHADE TREES AND TWO MITIGATION TREES. THE OWNER/DEVELOPERS WILL BE RESPONSIBLE FOR PLANTING TREES.
- THERE IS AN EXISTING HOUSE (CIRCA 1958) TO REMAIN ON LOT 1, AND AN EXISTING SHED (CIRCA 1970) TO REMAIN ON LOT 2. NO NEW BUILDINGS, EXTENSIONS OR ADDITIONS TO THE EXISTING DWELLINGS OR STRUCTURES ARE TO BE CONSTRUCTED AT A DISTANCE LESS THAN THE ZONING REGULATIONS REQUIRE.
- THE SUBJECT PROPERTY IS A THREE LOT MINOR SUBDIVISION AND IS LOCATED WITHIN THE COUNTY'S DESIGNATED GROWTH TIER III AND IN ACCORDANCE WITH PLAN HOWARD 2030 AND IS SUBJECT TO STATE LAW SB-236, "THE SUSTAINABLE GROWTH AND AGRICULTURAL PRESERVATION ACT OF 2012." THEREFORE, NONE OF THE THREE LOTS MAY BE RESUBDIVIDED OR FURTHER SUBDIVIDED IN ACCORDANCE WITH SB-236.
- DRIVEWAYS SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLINGS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
 - WIDTH - 12' (16' SERVING MORE THAN ONE RESIDENCE).
 - SURFACE - 6" OF COMPACT CRUSHER RUN BASE WITH TAR AND CHIP COATING. (1-1/2" MIN.)
 - GEOMETRY - MAX. 15% GRADE, MAX. 10% GRADE CHANGE & MIN. 45" TURNING RADIIUS.
 - STRUCTURES (CULVERTS/BRIDGES) - CAPABLE OF SUPPORTING 25 GROSS TONS (425,000 LB)
 - DRAINAGE ELEMENTS - CAPABLE OF SAFELY PASSING 100 YEAR FLOODPLAIN WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVEWAY.
 - MAINTENANCE - SUFFICIENT TO INSURE ALL WEATHER USE.
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
- THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF WORKING DAYS PRIOR TO THE START OF ANY WORK.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
- THE PRE-SUBMISSION MEETING WAS HELD FOR THIS PROJECT AT NOVEMBER 16, 2016, 7:00 P.M. AT CLARKVILLE FIRE STATION NO. 5, 5000 SIGNAL BELL LANE, CLARKVILLE, MD.
- THIS PROJECT DEDICATES LAND TO HOWARD COUNTY, MARYLAND, FOR THE PURPOSES OF A PUBLIC ROAD, IN THE AMOUNT OF 0.35 ACRES.
- THIS AREA DESIGNATES A PRIVATE SEWAGE AREA OF AT LEAST 10,000 SQUARE FEET AS REQUIRED BY THE MARYLAND STATE DEPARTMENT OF THE ENVIRONMENT FOR INDIVIDUAL SEWAGE DISPOSAL (COMAR 26.04.03). IMPROVEMENTS OF ANY NATURE IN THIS AREA ARE RESTRICTED UNTIL PUBLIC SEWAGE IS AVAILABLE. THESE AREAS SHALL BECOME NULL AND VOID UPON CONNECTION TO A PUBLIC SEWAGE SYSTEM. THE COUNTY HEALTH OFFICER SHALL HAVE THE AUTHORITY TO GRANT VARIANCES FOR ENCROACHMENTS INTO THE PRIVATE SEWAGE AREA, RECONSTRUCTION OF A MODIFIED SEWAGE AREA SHALL NOT BE NECESSARY.
- FLAG AND PIPESTEM LOTS: REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF PIPESTEM AND ROAD RIGHT OF WAY LINE, AND NOT ON THE PIPESTEM LOT DRIVEWAY.

SITE DATA TABULATION

1. GENERAL SITE DATA

- PRESSENT ZONING: RR-DEO
- LOCATION; TAX MAP: 27, GRID 24, PARCEL 68
- APPLICABLE DPZ FILE REFERENCES: EOP-17-037, W-17-094
- PROPOSED USE OF SITE: SINGLE FAMILY DETACHED RESIDENTIAL
- PROPOSED WATER AND SEWER SYSTEMS: PRIVATE

2. AREA TABULATION

	TOTAL
a.) TOTAL AREA OF SITE.....	9.98± AC.
b.) APPROXIMATE AREA OF 100 YEAR FLOODPLAIN.....	0.59± AC.
c.) APPROX. AREA OF STEEP SLOPES (25% OR MORE).....	0.13± AC.
d.) NET AREA OF SITE.....	9.39± AC.
e.) AREA OF THIS PLAN SUBMISSION.....	9.98± AC.
f.) AREA OF PROPOSED BUILDABLE LOTS.....	9.49± AC.
g.) AREA OF PROPOSED PUBLIC ROAD RIGHT-OF-WAY.....	0.35± AC.
h.) APPROXIMATE AREA OF LIMIT OF DISTURBANCE.....	2.44± AC.
i.) AREA OF PROPOSED OPEN SPACE LOTS.....	0.00 AC.
j.) AREA OF PROPOSED NON-CREDIT OPEN SPACE.....	0.00 AC.

3. UNIT/LOT TABULATION

- TOTAL NUMBER OF RESIDENTIAL UNITS/LOTS
- PROPOSED ON THIS SUBMISSION..... 3
- TOTAL NUMBER OF OPEN SPACE LOTS PROPOSED..... 0
- TOTAL NUMBER OF NON-BUILDABLE PARCELS PROPOSED..... 0

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

Meloni 7/5/2017
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kurt Schwab 9-19-17
CHIEF, DIVISION OF LAND DEVELOPMENT

Ed Plunk 9-18-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION

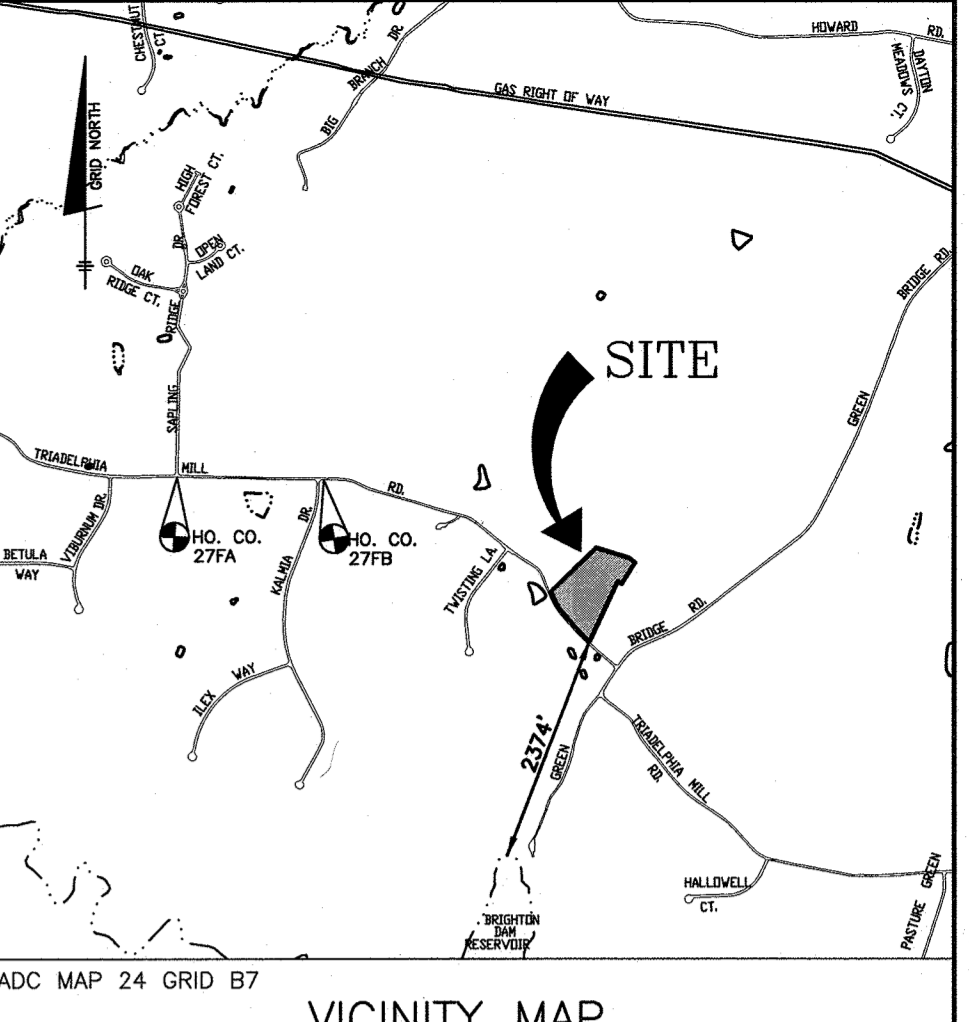
MINOR SUBDIVISION - SUPPLEMENTAL PLAN

THE VAWTER PROPERTY

5th ELECTION DISTRICT

HOWARD COUNTY, MARYLAND

- EXISTING CONTOURS** 450, 478
- EXISTING WOODS LINE**
- EXISTING WELL**
- PROPOSED WELL**
- EXISTING STRUCTURE**
- 15-19.99% SLOPES**
- 20% OR GREATER SLOPES**
- 25% OR GREATER SLOPES**
- 10' OR GREATER VERTICAL ERODIBLE SOILS**



LANDSCAPING NOTES

- PERIMETER LANDSCAPING SHALL BE PROVIDED BY THE DEVELOPER AS SHOWN ON THESE PLANS.
- TREES MUST BE A MINIMUM OF FOUR(4) FEET FROM PAVEMENT AND MUST BE A MINIMUM OF FIVE(5) FEET FROM ANY STORM DRAIN, IF APPLICABLE.
- TREES MUST BE PLANTED A MINIMUM OF TEN (10) FEET FROM A DRIVEWAY APRON.
- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SEC-16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.
- THIS LANDSCAPE PLAN IS IN ACCORDANCE WITH SECTION 16.124 OF HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. SURETY IN THE AMOUNT OF \$5,400 FOR 16 SHADE TREES AND 2 MITIGATION TREES IS REQUIRED TO BE POSTED WITH THE DEVELOPER'S AGREEMENT.
- ONE SPECIMEN TREE HAS BEEN IDENTIFIED FOR REMOVAL ON THIS PLAN (E-4). IF ANY CONSTRUCTION IS EXPECTED TO IMPACT THE CRITICAL ROOT ZONE OF ANY SPECIMEN TREES, ROOT PRUNING ALONG THE PROPOSED LIMITS OF DISTURBANCE SHALL BE PROVIDED TO REDUCE IMPACTS.
- SHOULD ANY TREE DESIGNATED FOR PRESERVATION FOR WHICH LANDSCAPING CREDIT IS GIVEN, BE BROKE, THE OWNER SHALL BE REQUIRED TO REPLACE THE REPLACEMENT TREE WITH THE EQUIVALENT SPECIES OR WITH A TREE WHICH WILL OBTAIN THE SAME HEIGHT, SPREAD AND GROWTH CHARACTERISTICS. THE REPLACEMENT TREE MUST BE A MINIMUM OF 3 INCHES IN CALIPER AND INSTALLED AS REQUIRED IN THE HOWARD COUNTY LANDSCAPE MANUAL.
- THE OWNER, TENANT AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERM, 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.
- AT THE TIME OF INSTALLMENT, ALL SHRUBS AND OTHER PLANTINGS HEREWITH LISTED AND APPROVED FOR THIS SITE, SHALL BE OF THE REQUIRED PLANTING REQUIREMENTS IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR REPLACEMENTS OF THE 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 THE RELEASE OF LANDSCAPE SURETY UNIT. SUCH SHALL BE AS REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO APPLICABLE PLANS AND CERTIFICATES.

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 SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION 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.

Ellen M. Vawter 8/31/2017
ELLEN M. VAWTER DATE

FOREST CONSERVATION WORKSHEET
Version 1.0

NET TRACT AREA		Acres
A. Total tract area		10.0
B. Area within 100 Year Floodplain		0.6
C. Area of existing impervious surface/unchanged use		0.4
D. Net Tract Area		9.4

LAND USE CATEGORY: (from table 3.2.1, page 40, Manual)

ARA	IDR	IDA	HDR	MPD	CIA
RR	DEO				
E. Afforestation Threshold (percentage)	20	1.9			
F. Conservation Threshold (percentage)	25	2.4			

EXISTING FOREST COVER:

G. Existing forest cover (excluding floodplain)	0
H. Area of forest above afforestation threshold	0
I. Area of forest above conservation threshold	0

BREAK-EVEN POINT: NA

J. Forest retention above threshold with no mitigation Break-Even Point

K. Clearing permitted without mitigation Break-Even Point

PROPOSED FOREST CLEARING

L. Total area of forest to be Cleared or Retained Outside FCE	0
M. Total area of forest to be Retained in FCE	0

PLANTING REQUIREMENTS

N. Reforestation for clearing above Conservation Threshold	0
P. Reforestation for clearing below Conservation Threshold	0
Q. Credit for retention above conservation threshold	0
R. Total reforestation required	0
S. Total afforestation required	1.9
T. Total reforestation and afforestation required	0

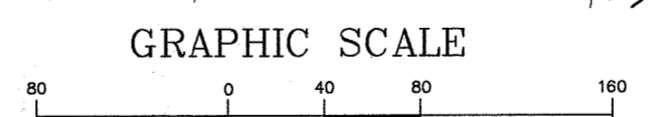
STORMWATER MANAGEMENT SUMMARY TABLE

BIORETENTION FACILITIES (M-6)		Pe: 1.0 inches	
FACILITY	Drainage Area	Impervious	I (%)
MB-A*	1222.3	2045	17%
MB-B*	2277.3	3744	16%
MB-2	1247.7	5429	44%
MB-3	1844.4	9547	52%
TOTAL:		25170 cf	3546 cf

*Jointly Maintained by all lots, in accordance with a use in common and maintenance agreement recorded simultaneously with the plat.

DRIVEWAY TREATMENT			
	Area Treated	Pe	Converted to ESDv
Non-rooftop Disconnection (N-2):	5355	1.000	446

DRYWELL FACILITIES (M-5)										
FACILITY	Drainage Area	Impervious	I (%)	Rv	ESDv (cf)	Depth	Porosity	Width	Length	Volume Stored
DW-2A	453	453	100%	0.950	35.9	5.0	0.40	5	5	50
DW-2B	919	919	100%	0.950	72.8	5.0	0.40	6	6	96
TOTAL:										146 cf

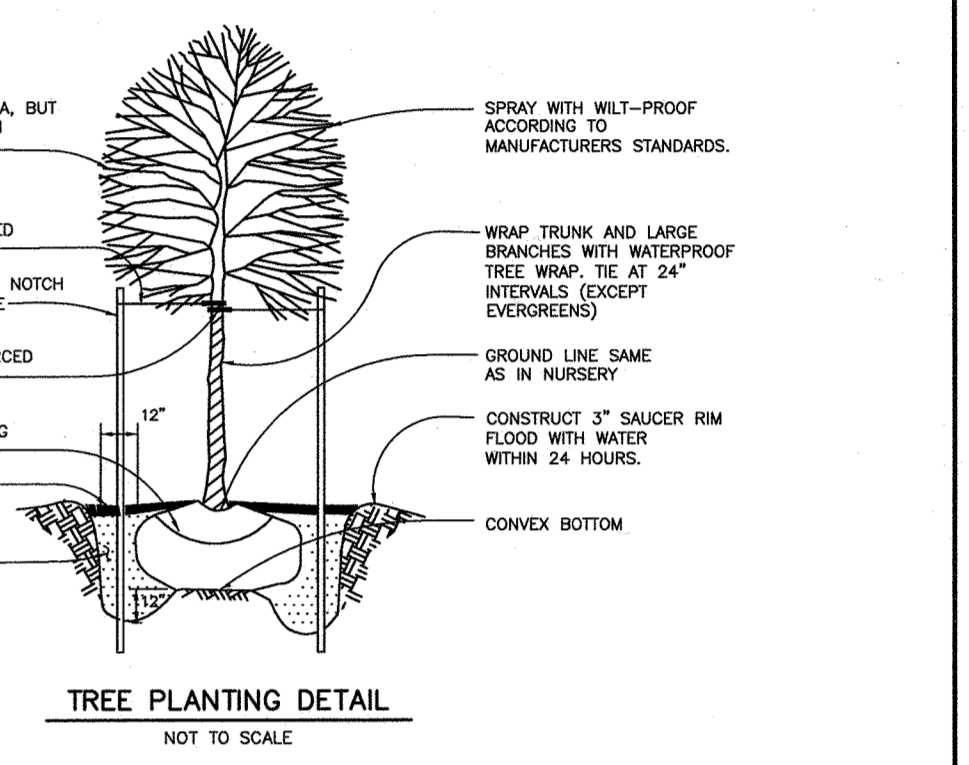


"NO AS-BUILT INFORMATION" IS PROVIDED ON THIS SHEET

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. 21443 Expiration Date: 12-21-20

AS-BUILT 12-21-19



LANDSCAPE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS
(A)	9	PLATANUS ACERIFOLIA 'BLOODGOOD'	2 1/2" MIN. CAL. B&B FULL HEAD
(B)	9	QUERCUS COCCINEA SCARLET LEAF	2 1/2" MIN. CAL. B&B FULL HEAD

SCHEDULE A PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO:	FRONT TO ROW	PERIMETER PROPERTY	PERIMETER PROPERTY	PERIMETER PROPERTY	TOTAL
		(1) NONE	(2) A	(3) A	(4) A	
LINEAR FEET OF PERIMETER		663'	637'	457'	983'	
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	YES 394'	YES 60'	YES 674'		
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO		
NUMBER OF PLANTS REQUIRED		4	7	5	16	
SHADE TREES		-	-	-	-	
EVERGREEN TREES		-	-	-	-	
OTHER TREES (2:1 SUBSTITUTE)		-	-	-	-	
SHRUBS		-	-	-	-	
NUMBER OF PLANTS PROVIDED		6*	7	5	18	
SHADE TREES		-	-	-	-	
EVERGREEN TREES		-	-	-	-	
OTHER TREES (2:1 SUBSTITUTE)		-	-	-	-	
SHRUBS (10:1 SUBSTITUTE)		-	-	-	-	

* 2 MITIGATION TREES REQUIRED IN ACCORDANCE WITH NOTE #30.

BENCHMARK ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE SUITE 315 • ELLOTT CITY, MARYLAND 21043
(P) 410-465-8105 (F) 410-465-8644
WWW.BE-ENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 28376, Expiration Date: 1-1-2019.

OWNER/DEVELOPERS: ELLEN M. VAWTER, MICHAEL A. VAWTER, NANCY J. VAWTER, LAURA J. LEONARD, DREW B. LEONARD, 14170 TRIADLPHIA MILL ROAD, DAYTON, MARYLAND 21036, 301-706-6044

PROJECT: VAWTER PROPERTY LOTS 1, 2 AND 3

LOCATION: 14170 TRIADLPHIA MILL ROAD, TAX MAP 27 - GRID 24 - PARCEL: 68, ZONED: RR-DEO RURAL RESIDENTIAL, ELECTION DISTRICT NO. 5 - HOWARD COUNTY, MARYLAND

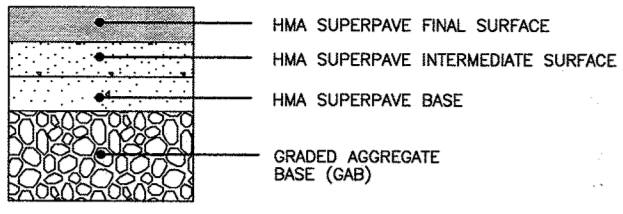
TITLE: EXISTING CONDITIONS, LANDSCAPE AND FOREST CONSERVATION PLAN

DATE: AUGUST, 2017 **PROJECT NO.:** 2766

DESIGN: AAM **DRAFT:** AAM **CHECK:** CAM **SCALE:** AS SHOWN **SHEET:** 1 OF 3

SECTION NUMBER	CALIFORNIA BEARING RATIO (CBR)	3 TO <5 TO <7			>7		
		MIN HMA WITH GAB	HMA WITH CONSTANT GAB	HMA WITH CONSTANT GAB	HMA WITH CONSTANT GAB	HMA WITH CONSTANT GAB	HMA WITH CONSTANT GAB
P-2	HMA SUPERPAVE FINAL SURFACE	1.5	1.5	1.5	1.5	1.5	1.5
	9.5 MM PG 64-22 LEVEL 1 (LOW ESAL)	1.0	1.0	1.0	1.0	1.0	1.0
	HMA SUPERPAVE INTERMEDIATE SURFACE	2.0	2.0	2.0	3.5	2.0	2.0
	9.5 MM PG 64-22 LEVEL 1 (LOW ESAL)	2.0	2.0	2.0	3.5	2.0	2.0
	HMA SUPERPAVE BASE	8.0	4.0	3.0	4.0	4.0	4.0
	GRADED AGGREGATE BASE (GAB)	8.0	4.0	3.0	4.0	4.0	4.0

PAVING DETAILS



CONSTRUCTION SPECIFICATIONS

3.4.C Specifications for Micro-Bioretenment, 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-bioretenment practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operation. 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 and (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 textual 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 hoses 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 filling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to restructure 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-bioretenment 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 clipped 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, fertilizers, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Fertilizer use 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 (ASTM F 798, 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 1/2" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a 1/2" (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 1,000 square feet) to provide a clean-out port and monitor performance of the filter.
- A 4" layer of pea gravel (1/2" to 3/4" 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).

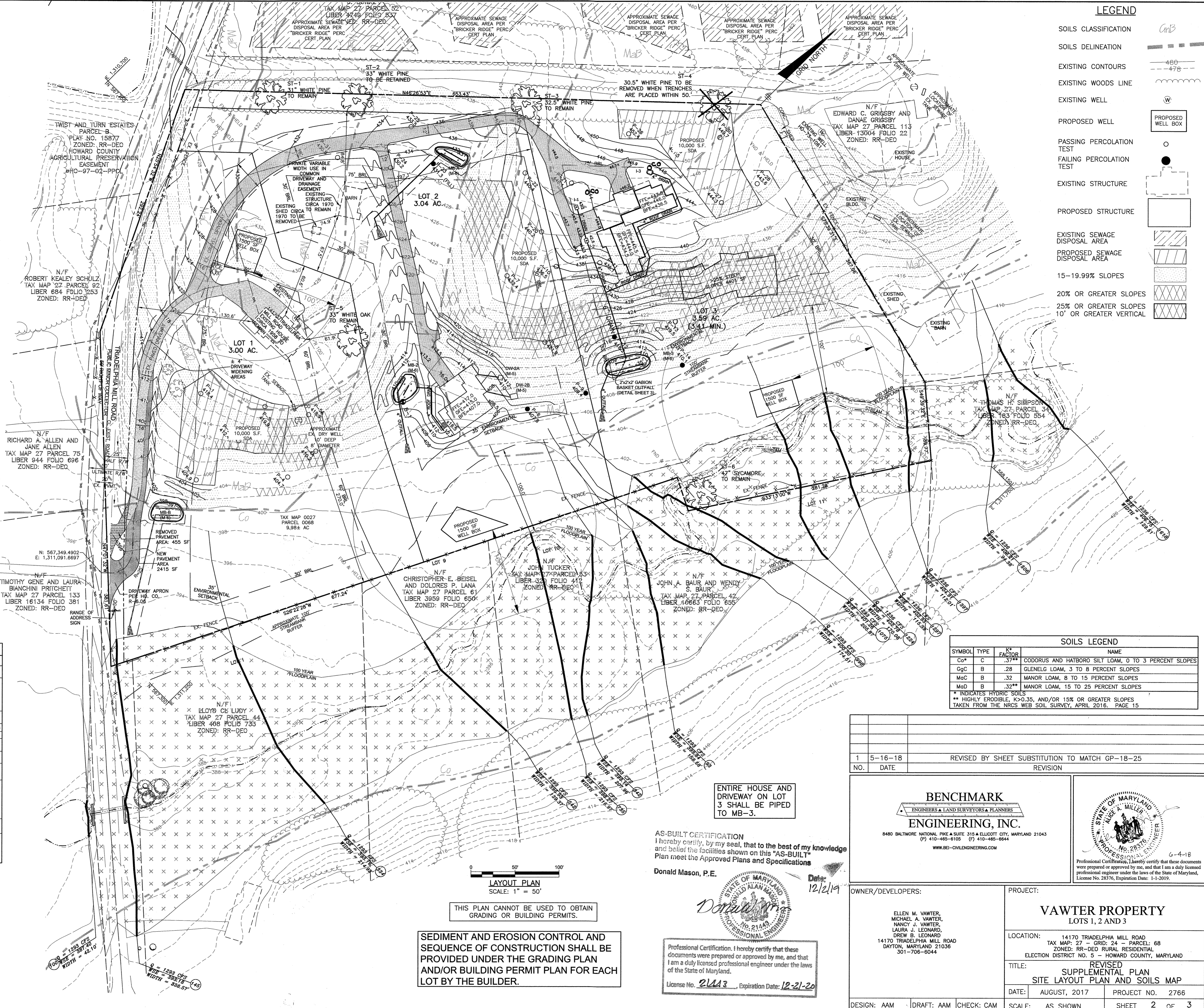
7. Miscellaneous:
These practices may not be constructed until all contributing drainage area has been stabilized.

MATERIAL	SPECIFICATION	SIZE	NOTES:
PLANTINGS	SEE APPENDIX A, TABLE A.4	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL (2.0' TO 4.0' 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	N/A	
MULCH	SHREDDED HARDWOOD	N/A	AGED 6 MONTHS, MINIMUM, NO PINE OR WOOD CHIPS
GEOTEXTILE (CLASS "C")	N/A	N/A	PE TYPE 1 NONWOVEN
GEOTEXTILE (1/4" WIRE MESH)	N/A	N/A	1/4" WIRE MESH
UNDERDRAIN GRAVEL	AASHTO M-43	NO. 57 OR NO. 6 0.375" TO 0.750"	
UNDERDRAIN PIPING	F 798, TYPE PS 28 OR AASHTO M-278	4" TO 6" RIGID SCH 40 PVC, SDR35 OR HDPE	3/8" PERF @ 6" O/C, 4 HOLES PER ROW; MINIMUM OF 2" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERDRAIN PIPES.
IMPERVIOUS LINER	ASTM-D-4833 (THICKNESS) ASTM-D-412 (TENSILE STRENGTH 1,100 LB, ELONGATION 200%) ASTM-D-624 (TEAR RESISTANCE - 150 LB/IN) ASTM-D-471 (WATER ADSORPTION: +8 TO -2% MASS)	30 MIL THICK	LINER TO BE ULTRAVIOLET RESISTANT, A GEOTEXTILE FABRIC SHOULD BE USED TO PROTECT THE LINER FROM PUNCTURE.
GEOTEXTILE (BELOW IMPERV. LINER)	ASTM-D-4833 (PUNCTURE STRENGTH 125LB) ASTM-D-4832 (TENSILE STRENGTH 300 LB)		
SAND	AASHTO M-6 OR ASTM-C-33	.02" TO .04"	SAND SUBSTITUTIONS SUCH AS DIABASE AND GRANITONE (AASHTO) #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATE OR VOLCANIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NT ROCK DUST CAN BE USED FOR SAND.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
[Signature] 6/15/2018
 CHIEF, BUREAU OF HIGHWAYS DATE:

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
[Signature] 6-20-18
 CHIEF, DIVISION OF LAND DEVELOPMENT, DATE:

[Signature] 6-20-18
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE:



LEGEND

SOILS CLASSIFICATION: *[Symbol]* *[Symbol]*

SOILS DELINEATION: *[Symbol]*

EXISTING CONTOURS: *[Symbol]* 466, *[Symbol]* 476

EXISTING WOODS LINE: *[Symbol]*

EXISTING WELL: *[Symbol]*

PROPOSED WELL: *[Symbol]* PROPOSED WELL BOX

PASSING PERCOLATION TEST: *[Symbol]*

FAILING PERCOLATION TEST: *[Symbol]*

EXISTING STRUCTURE: *[Symbol]*

PROPOSED STRUCTURE: *[Symbol]*

EXISTING SEWAGE DISPOSAL AREA: *[Symbol]*

PROPOSED SEWAGE DISPOSAL AREA: *[Symbol]*

15-19.99% SLOPES: *[Symbol]*

20% OR GREATER SLOPES: *[Symbol]*

25% OR GREATER SLOPES 10' OR GREATER VERTICAL: *[Symbol]*

SOILS LEGEND

SYMBOL	TYPE	K ^z FACTOR	NAME
<i>[Symbol]</i>	C	.37**	CODORUS AND HATBORO SILT LOAM, 0 TO 3 PERCENT SLOPES
<i>[Symbol]</i>	B	.28	GLENELG LOAM, 3 TO 8 PERCENT SLOPES
<i>[Symbol]</i>	B	.32	MANOR LOAM, 8 TO 15 PERCENT SLOPES
<i>[Symbol]</i>	B	.32**	MANOR LOAM, 15 TO 25 PERCENT SLOPES

** INDICATES HYDRIC SOILS
 ** HIGHLY ERODIBLE, K=0.35, AND/OR 15% OR GREATER SLOPES
 TAKEN FROM THE NRCS WEB SOIL SURVEY, APRIL 2016. PAGE 15

NO.	DATE	REVISION
1	5-16-18	REVISED BY SHEET SUBSTITUTION TO MATCH GP-18-25

BENCHMARK ENGINEERING, INC.
 ENGINEERS & LAND SURVEYORS & PLANNERS
 8480 BALTIMORE NATIONAL PIKE & SUITE 315 ELICOTT CITY, MARYLAND 21043
 (P) 410-468-6108 (F) 410-468-6944
 WWW.BE-CIVILENGINEERING.COM

[Professional Engineer Seal: Donald Mason, P.E., State of Maryland, License No. 21443, Exp. 12-21-20]

AS-BUILT CERTIFICATION
 I hereby certify, by my seal, that to the best of my knowledge and belief the facilities shown on this "AS-BUILT" Plan meet the Approved Plans and Specifications.
 Donald Mason, P.E.
 Date: 12/2/19

OWNER/DEVELOPERS:
 ELLEN M. VAWTER, MICHAEL A. VAWTER, NANCY J. VAWTER, LAURA J. LEONARD, DREW B. LEONARD
 14170 TRIADDELPHIA MILL ROAD DAYTON, MARYLAND 21036 301-708-6044

PROJECT:
VAWTER PROPERTY
 LOTS 1, 2 AND 3

LOCATION:
 14170 TRIADDELPHIA MILL ROAD
 TAX MAP: 27 - GRID: 24 - PARCEL: 68
 ZONED: RR-DEO RURAL RESIDENTIAL
 ELECTION DISTRICT NO. 5 - HOWARD COUNTY, MARYLAND

TITLE:
 REVISED SUPPLEMENTAL PLAN SITE LAYOUT PLAN AND SOILS MAP

DATE: AUGUST, 2017 PROJECT NO. 2766

SCALE: AS SHOWN SHEET 2 OF 3

DESIGN: AAM DRAFT: AAM CHECK: CAM

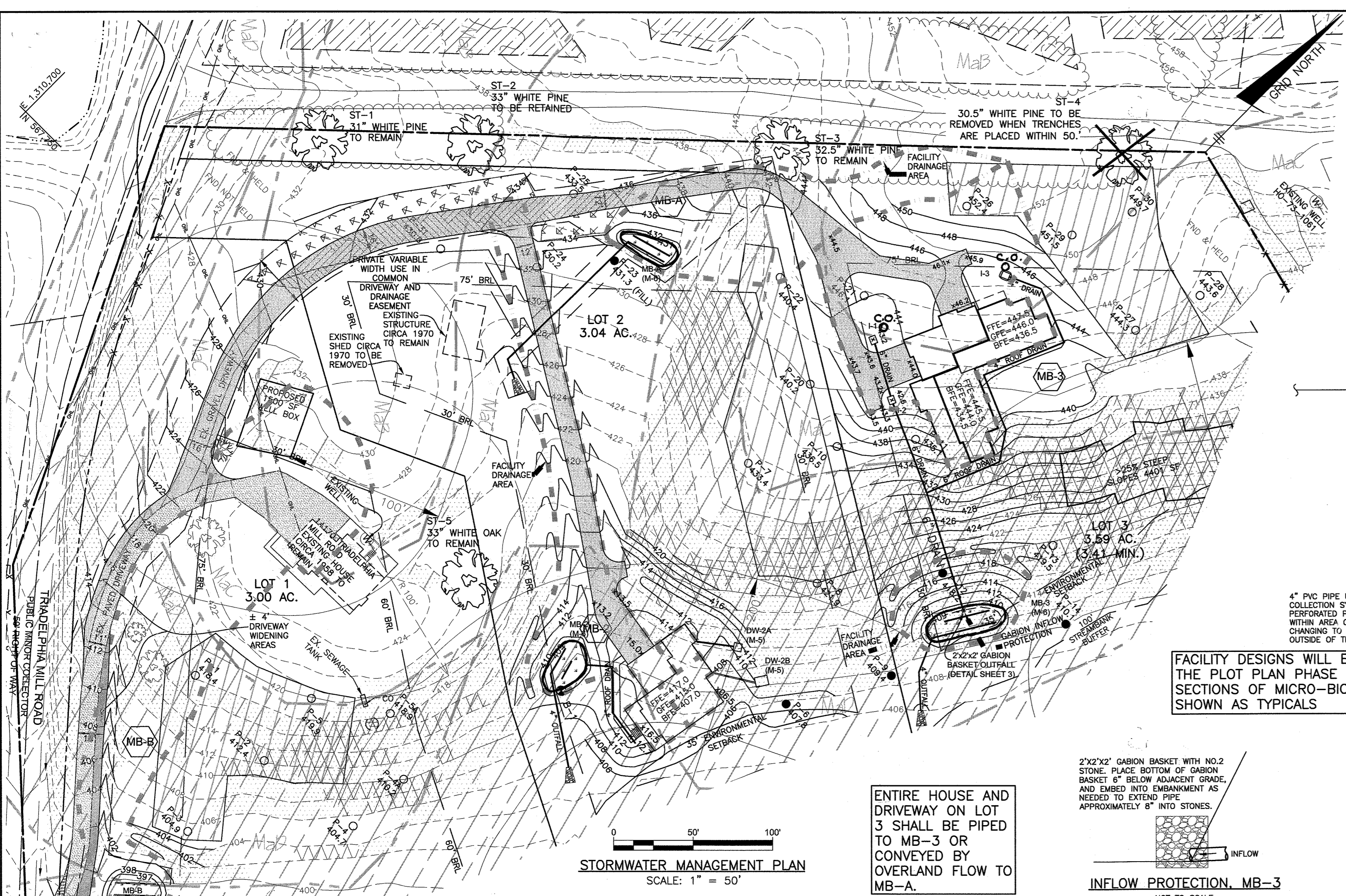
LAYOUT PLAN SCALE: 1" = 50'

THIS PLAN CANNOT BE USED TO OBTAIN GRADING OR BUILDING PERMITS.

SEDIMENT AND EROSION CONTROL AND SEQUENCE OF CONSTRUCTION SHALL BE PROVIDED UNDER THE GRADING PLAN AND/OR BUILDING PERMIT PLAN FOR EACH LOT BY THE BUILDER.

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. 21443, Expiration Date: 12-21-20

ENTIRE HOUSE AND DRIVEWAY ON LOT 3 SHALL BE PIPED TO MB-3.



STORMWATER MANAGEMENT SUMMARY TABLE
Pe: 1.0 inches

BIORETENTION FACILITIES (M-6)

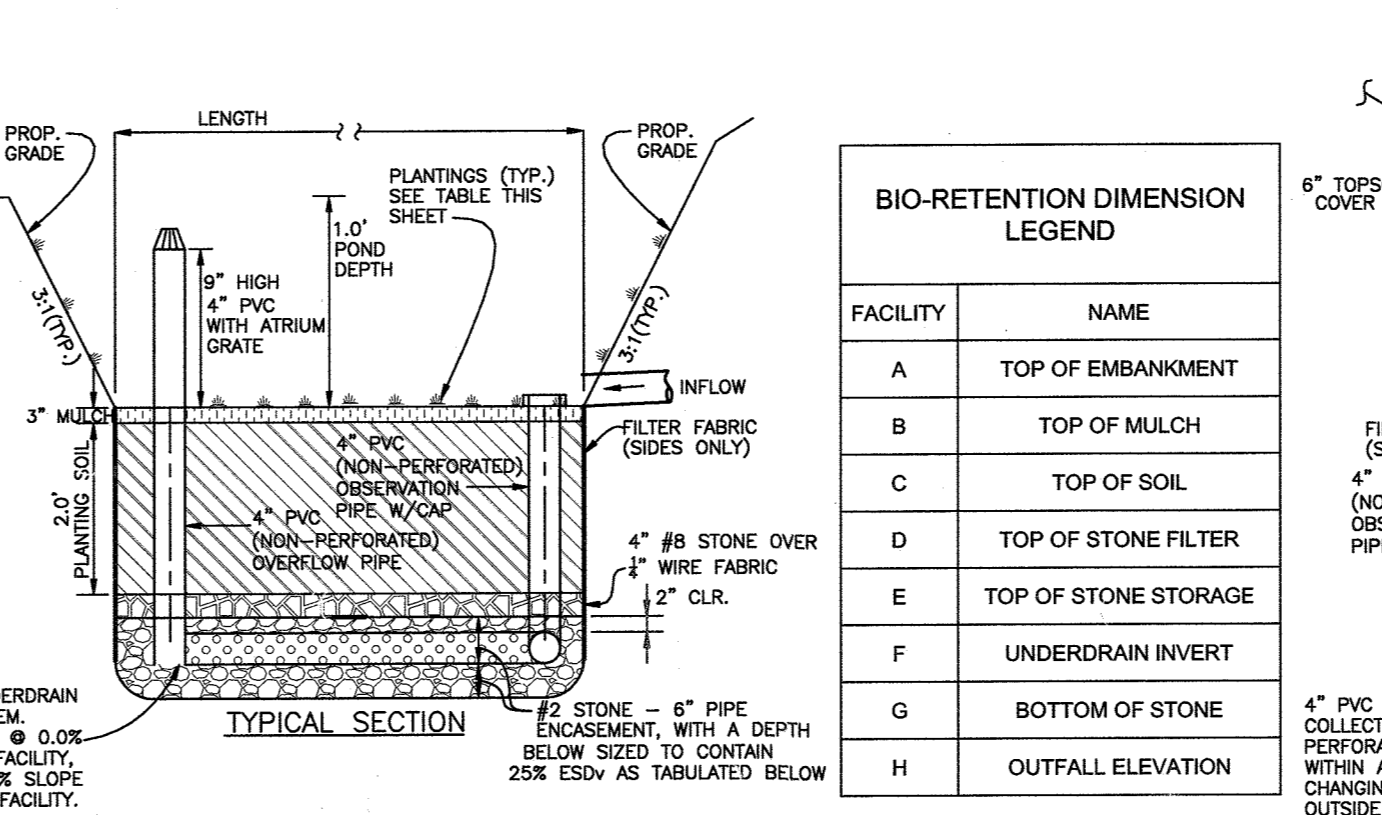
FACILITY	Drainage Area	Impervious	I (%)	Rv	ESDV (cf)	75% ESDV (cf)	Volume Stored	Volume treated (V/O 75)	Pe Treated
MB-A	2228	2045	17%	0.201	204.3	153.2	326cf	435cf	2.13
MB-B	2273	3744	16%	0.198	375.2	281.6	624cf	832cf	2.21
MB-2	12474	5429	44%	0.442	459.2	344.4	680cf	906cf	1.97
MB-3	18444	9541	52%	0.518	792.4	594.3	880cf	1173cf	1.48
TOTAL:							2509 cf	3345 cf	

DRIVEWAY TREATMENT

Non-rooftop Disconnection (N-2)	Area Treated	Pe	Converted to ESDV
	5355	1.000	446

DRYWELL FACILITIES (M-5)

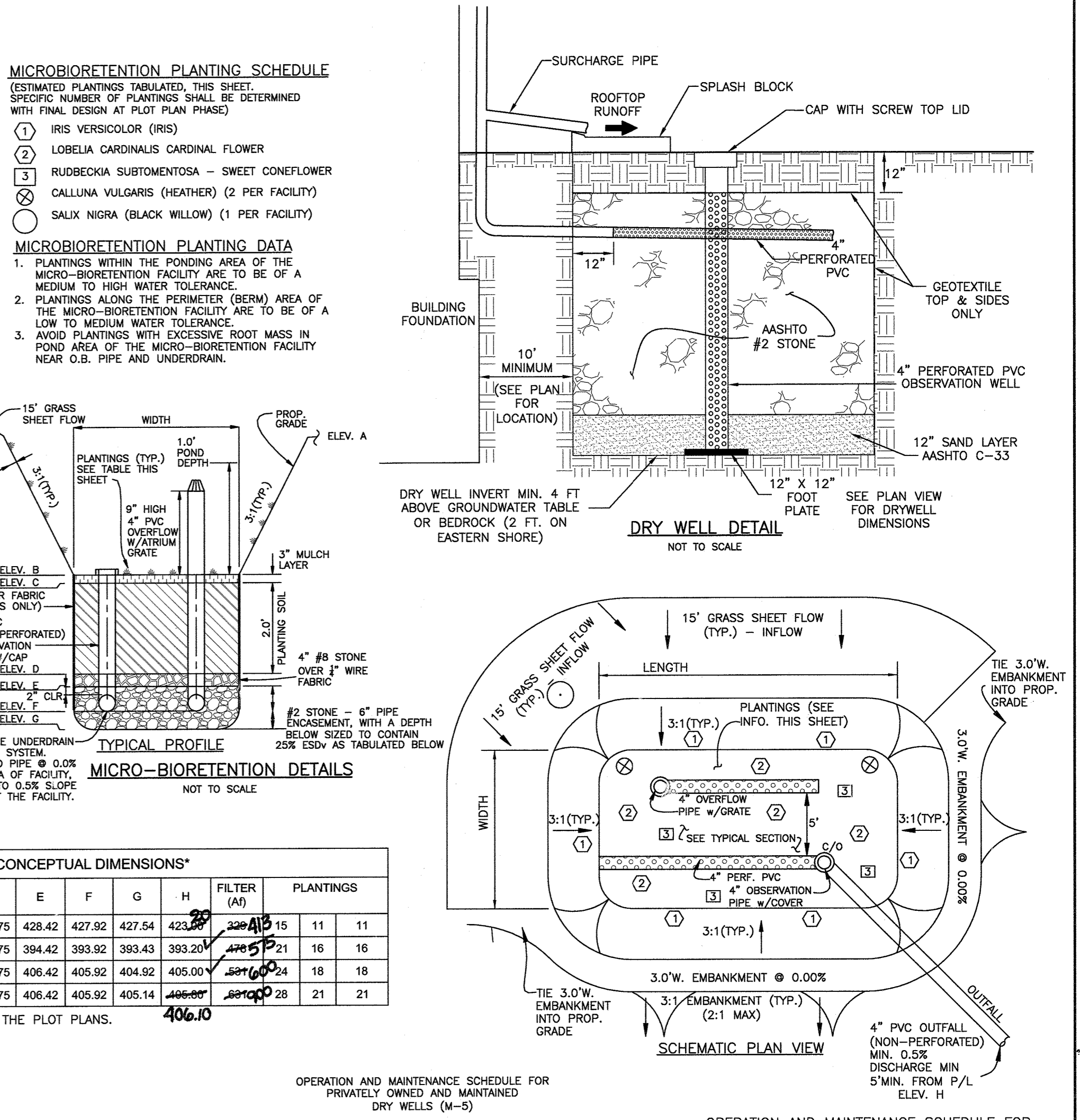
FACILITY	Drainage Area	Impervious	I (%)	Rv	ESDV (cf)	Depth	Porosity	Width	Length	Volume Stored	Pe Treated
DW-2A	453	453	100%	0.950	35.9	5.0	0.40	5	5	50	1.39
DW-2B	919	919	100%	0.950	72.8	5.0	0.40	6	8	96	1.32
TOTAL:										146 cf	



ON-LOT BIORETENTION CONCEPTUAL DIMENSIONS*

FACILITY	LENGTH (FT)	WIDTH (FT)	A	B	C	D	E	F	G	H	FILTER (A)	PLANTINGS
MB-A	2125	112	432.00	431.00	430.75	428.75	428.42	427.92	427.54	423.28	28	15 11 11
MB-B	2125	117	398.00	397.00	396.75	394.75	394.42	393.92	393.43	393.20	28	15 16 16
MB-2	2125	117	410.00	409.00	408.75	406.75	406.42	405.92	405.43	405.00	28	18 18 18
MB-3	149	119	410.00	409.00	408.75	406.75	406.42	405.92	405.43	405.14	28	21 21 21
TOTAL:												406.10

* FINAL DESIGN DIMENSIONS AND DETAILS AS SHOWN ON THE PLOT PLANS.



SEDIMENT AND EROSION CONTROL AND SEQUENCE OF CONSTRUCTION SHALL BE PROVIDED UNDER THE GRADING PLAN AND/OR BUILDING PERMIT PLAN FOR EACH LOT BY THE BUILDER.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DRY WELLS (M-5)

- THE MONITORING WELLS AND STRUCTURES SHALL BE INSPECTED ON A QUARTERLY BASIS AND AFTER EVERY LARGE STORM EVENT.
- WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS SHALL BE RECORDED OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.
- A LOG BOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
- WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN THE 72 HOUR TIME PERIOD, CORRECTIVE ACTION SHALL BE TAKEN.
- THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
- ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION FACILITY HAS BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DISCONNECTION OF NON-ROOFTOP RUNOFF (N-2)

- MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE AREAS RECEIVING RUNOFF SHOULD BE PROTECTED FROM FUTURE COMPACTION OR DEVELOPMENT OF IMPERVIOUS AREA. IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.

OPERATION AND MAINTENANCE SCHEDULE FOR MICRO-BIORETENTION (M-6)

- 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.
- 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.
- 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 BEFORE THE NEW LAYER IS APPLIED.
- THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.

Percolation Test Log - Lot 1

DATE	TEST #	DEPTH	START	BREAK	STOP	TIME OF INFILTRATION	PERM
7/16/10	P-3	48"	9:30	9:35	9:39	4	H
7/16/10	P-2	48"	9:57	9:57	9:57	5	P
7/16/10	P-1	48"	10:26	10:28	10:18	5	P
7/16/10	P-5	48"	10:20	10:22	10:26	5	P
7/16/10	P-4	48"	10:49	10:50	11:00	10	H

Percolation Test Log - Lot 2

DATE	TEST #	DEPTH	START	BREAK	STOP	TIME OF INFILTRATION	PERM
7/16/10	P-21	48"	1:05	1:11	1:15	4	P
7/16/10	P-22	48"	1:28	1:30	1:33	3	P
7/16/10	P-23	48"	1:58	1:58	1:58	3	F
7/16/10	P-24	48"	1:44	1:46	1:49	3	P

Percolation Test Log - Lot 3

DATE	TEST #	DEPTH	START	BREAK	STOP	TIME OF INFILTRATION	PERM
7/16/10	P-9	48"	1:18	1:17	1:17	6	H
7/16/10	P-10	48"	1:25	1:22	1:24	3	F
7/16/10	P-11	48"	1:51	1:53	1:56	3	P
7/16/10	P-12	48"	2:02	2:02	2:02	1.9	F
7/16/10	P-13	48"	2:18	2:18	2:18	1.3	F
7/16/10	P-14	48"	2:44	2:44	2:44	1.7	F

BORING LOG **GEOLAB, INC.**

Client: Mr. Michael A. Vawter
Project No. 117-037
Location: See boring location plan
Date: 2/24/2017

Elevations	Depth	DESCRIPTION OF MATERIALS	Remarks
410.0	0.0	Topsoil with root matter and some gravel.	
408.75	1.25	Orange-brown fine sandy SILT with some clay and little gravel, moist. (ML, USGS: Clay Loam)	
406.75	4.5	Light brown to gray micaceous fine SAND with some silt and little clay, moist. (SM, USGS: Sandy Loam)	
398.0	12.0	End of boring	

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
6/15/2018

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
6-21-18

APPROVED: DEVELOPMENT ENGINEERING DIVISION
6-20-18

PERCOLATION TESTS ALSO USED FOR SWM BORINGS: P-3, P-23, P-9, P-12, P-14

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. 21447, Expiration Date: 12/31/20

AS-BUILT CERTIFICATION
I hereby certify, by my seal, that to the best of my knowledge and belief the facilities shown on this "AS-BUILT" Plan meet the Approved Plans and Specifications
Donald Mason, P.E. Date: 12/12/19

BENCHMARK ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE & SUITE 315 & ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
WWW.BE-ENGINEERING.COM

ENGINEERING, INC.
14170 TRADELPHIA MILL ROAD
DAYTON, MARYLAND 21036
301-706-6044

OWNER/DEVELOPERS:
ELLEN M. VAWTER, MICHAEL A. VAWTER, NANCY J. VAWTER, LAURA J. LEONARD, DREW B. LEONARD

PROJECT:
VAWTER PROPERTY LOTS 1, 2 AND 3

LOCATION:
14170 TRADELPHIA MILL ROAD
TAX MAP: 27 - GRID: 24 - PARCEL: 68
ZONED: RR-DEO RURAL RESIDENTIAL
ELECTION DISTRICT NO. 5 - HOWARD COUNTY, MARYLAND

TITLE:
REVISED SUPPLEMENTAL PLAN
STORMWATER MANAGEMENT DETAILS

DATE: AUGUST, 2017
PROJECT NO.: 2766

DESIGN: AAM **DRAFT:** AAM **CHECK:** CAM
SCALE: AS SHOWN **SHEET:** 3 OF 3