ENVIRONMENTAL CONCEPT PLAN
O'DONNELL PROPERTIES
6718 & 6728 BINDER LANE

GENERAL NOTES

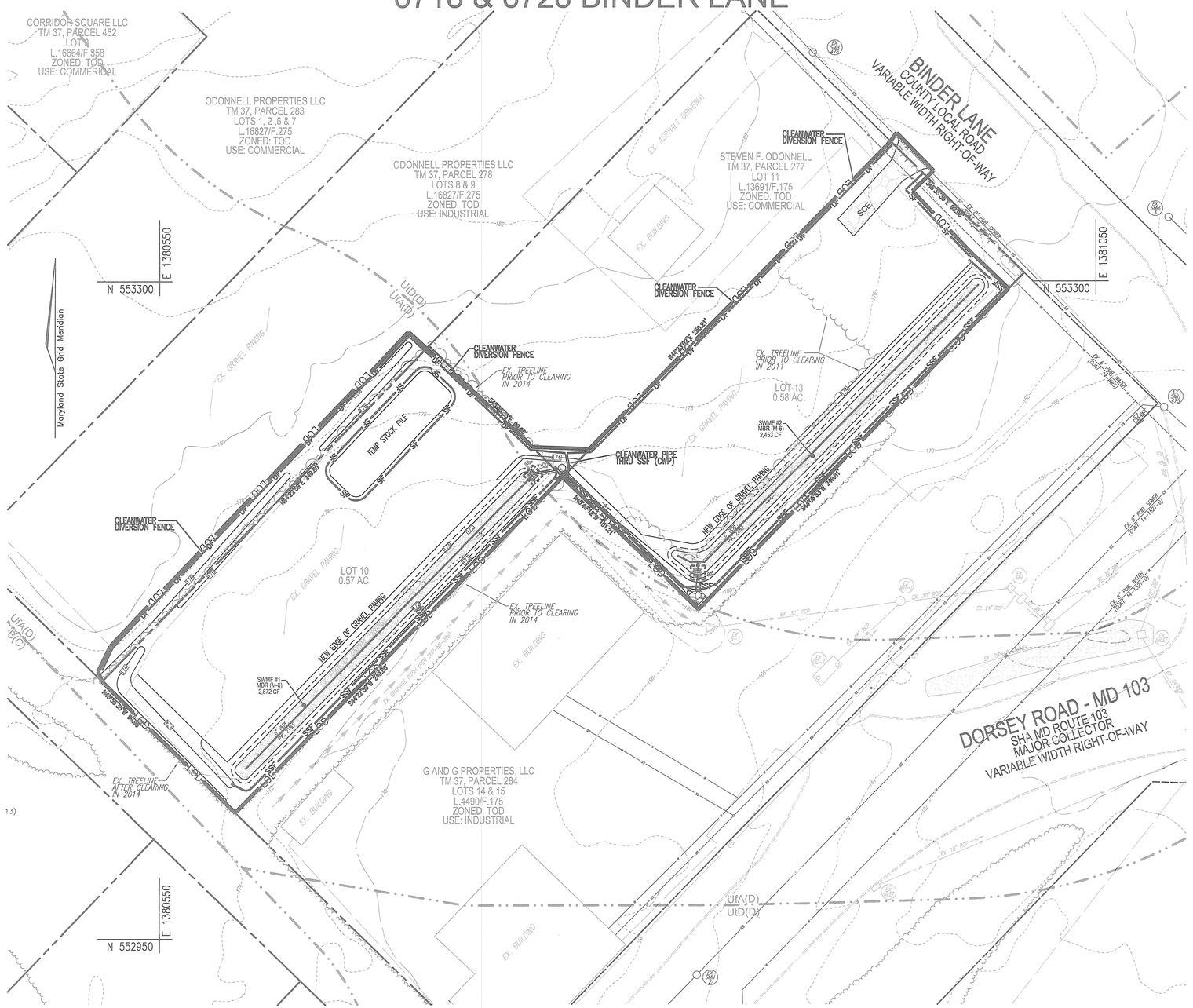
1. THE PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED.
2. THE EXISTING TOPOGRAPHY SHOWN HEREON IS BASED ON HOWARD COUNTY GIS.
3. THE PROJECT BOUNDARY IS BASED ON HOWARD COUNTY GIS.
4. THE SUBJECT PROPERTY IS ZONED "TOD" IN ACCORDANCE WITH THE OCTOBER 6, 2013 COMPREHENSIVE ZONING PLAN.
5. THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT.
6. PUBLIC WATER IS PROVIDED BY CONTRACT 24-W&S. PUBLIC SEWER IS PROVIDED BY CONTRACT 24-W&S.
7. THERE IS NO 100-YEAR FLOODPLAIN ON-SITE.
8. THERE ARE NO STEEP SLOPES WITH A CONTIGUOUS AREA OF 20,000SF LOCATED ONSITE.
9. THERE ARE NO WETLANDS, STREAMS OR BUFFERS, OR SPECIMEN TREES WITHIN ON-SITE.
10. ENVIRONMENTAL AND FOREST STAND DELINEATION REPORTS FOR LOT 10 AND LOT 13 PREPARED BY BY ECO-SCIENCE PROFESSIONALS, INC.; BOTH DATED 12/05/17.
11. LOT 10 AND LOT 13 ARE BOTH EXEMPT FROM FOREST CONSERVATION ACT REQUIREMENTS BECAUSE EACH LOT IS LESS THAN 40,000 SQ.FT IN SIZE.
12. A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
13. BINDER LANE IS CLASSIFIED AS A LOCAL ROAD.
14. TO THE BEST OF THE OWNERS KNOWLEDGE, THERE ARE NO BURIAL GROUNDS OR CEMETERIES ON THIS PROPERTY. THERE ARE NO HISTORIC HOUSES LOCATED ON THIS PROPERTY.
15. STORMWATER MANAGEMENT FOR THE PROJECT IS PROVIDED BY TWO MICRO-BIORETENTION FACILITIES (M-6). THIS FACILITIES SHALL BE PRIVATELY OWNED AND MAINTAINED.
16. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR REDLINE REVISION PLAN. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR REDLINE REVISION PROCESS. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
17. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) BY THE HOWARD SOIL CONSERVATION DISTRICT DOES NOT GRANT APPROVAL OF THE PROPOSED SEDIMENT CONTROL SCHEME. THE FINAL PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION WHICH SHALL DETAIL SEDIMENT & EROSION CONTROLS AND PHASING AND ADDRESS THE PROJECT TEMPORARY STORMWATER MANAGEMENT REQUIREMENTS.

ENVIRONMENTAL SITE DESIGN NARRATIVE:

1. THE SITE NATURALLY SLOPES FROM NORTH TO SOUTH. THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERNS, WITH NO DRAMATIC CHANGES TO THE NATURAL DRAINAGE.
2. THE CONCEPTUAL REDUCTION IN IMPERVIOUS AREA THROUGH BETTER SITE DESIGN IS ACHIEVED THROUGH THE ENVIRONMENTAL SITE DESIGN (ESD) FOR THE PROJECT TO THE MAXIMUM EXTENT PRACTICABLE (MEP). THE RESULTS OF THE ENVIRONMENTAL SITE DESIGN FOR THIS PROJECT WILL REFLECT "WOODS IN GOOD CONDITION". THE ESD CONCEPT INCLUDES THE USE OF TWO MICRO-BIORETENSION FACILITIES (M-6). THE TARGET Pe=1.8" AND THE TARGET SITE ESDv REQUIRED IS 5,112 CF. THIS PLAN PROVIDES 5,125 CF ESDv.
3. SEDIMENT CONTROL FOR THIS SPECIFIC SITE PLAN WILL BE PROVIDED THROUGH THE USE OF DIVERSION FENCE, SILT FENCE AND SUPER SILT FENCE. SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT DURING THE FUTURE SITE DEVELOPMENT PLAN PHASE OF THE PROJECT.
4. STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET THROUGH THE USE OF TWO MICRO-BIORETENTION FACILITIES (M-6). THE PROPOSED PRACTICES HAVE BEEN MAXIMIZED TO THE EXTENT PRACTICAL.
5. WE DO NOT ANTICIPATE ANY ALTERNATIVE COMPLIANCE PETITIONS BEING REQUIRED FOR THE ESSENTIAL ENVIRONMENTAL DISTURBANCES OF THIS PLAN.

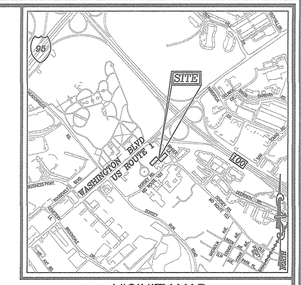
SITE DATA:

LOCATION: COLUMBIA, MD.; TAX MAP 37, BLOCK 23, PARCEL 278 (LOT 10) & PARCEL 280 (LOT 13)
1ST ELECTION DISTRICT
PRESENT ZONING: TOD
PROJECT AREA: 1.15 (0.57 LOT 10 AND 0.58 LOT 13)
DPZ REFERENCES: L.9167/F.536, L.13691/F.175
USE OF STRUCTURE: NO STRUCTURE, INDUSTRIAL USE
TOTAL BUILDING COVERAGE: 0 SF (0.00 AC. OR 0% OF GROSS AREA)
PAVED PARKING LOT/AREA ON SITE: 18,785 SF (0.43 AC. OR 15.75% OF GROSS AREA)
AREA OF LANDSCAPE ISLAND: 0 SF (0.00 AC. OR 0% OF GROSS AREA)
LIMIT OF DISTURBED AREA: 1.15 AC
WETLANDS WITHIN LOD: 0.00 AC.
WETLAND BUFFERS WITHIN LOD: 0.00 AC.
STREAMS AND THEIR BUFFERS WITHIN LOD: 0.00 AC
AREA OF ON-SITE 100 YEAR FLOODPLAIN WITHIN LOD: 0.00 AC
AREA OF EXISTING FOREST WITHIN LOD: 0.00 AC.
AREA OF ON-SITE NRCS/MDE/HSCD STEEP SLOPES (20% OR GREATER): 0.00 AC
AREA OF ON-SITE STEEP SLOPES (25% OR GREATER): 0.00 AC
AREA OF ERODIBLE SOILS: 0.00 AC.
AREA MANAGED BY ESDV (THIS PLAN): 1.35 AC.
IMPERVIOUS AREA (MANAGED BY ESDv): 1.12 AC.
GREEN AREA (MANAGED BY ESDv): 0.24 AC.



ESDv CONCEPT PLAN
SCALE: 1"=30'

SCALE 1"=30'
15' 0' 30'



VICINITY MAP
SCALE: 1"=2000'
ADC MAP COORDINATE: 35-A5

LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING TREELINE
- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING FENCE
- PROPOSED STORMDRAIN
- PROPOSED STORMDRAIN INLET
- PROPOSED CURB
- MICRO-BIORETENTION
- LIMIT OF DISTURBANCE
- SILT FENCE
- SUPER SILT FENCE
- DIVERSION FENCE
- STANDARD INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4.2.19

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 3/27/19

SHEET INDEX

DESCRIPTION	SHEET NO.
COVER SHEET AND ESDv CONCEPT PLAN	1 OF 2
STORMWATER MANAGEMENT DRAINAGE AREA MAP & DETAILS	2 OF 2

OWNER
STEVEN F. O'DONNELL
6724 BINDER LANE
ELKRIDGE, MD. 21075
(410) 796-7968

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

COVER SHEET AND ESDv CONCEPT PLAN

O'DONNELL PROPERTIES
6718 & 6728 BINDER LANE
ZONED: TOD
L.9167/F.536 & L.13691/F.175

TAX MAP 37 GRID 23 — PARCEL 276, LOT 10
1ST ELECTION DISTRICT — PARCEL 280, LOT 13
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — REGISTERED PROFESSIONAL ENGINEER — 3/27/19

ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV/DZE
DRAWN BY: DZE
CHECKED BY: RHV
DATE: MARCH 2019
SCALE: AS SHOWN
W.O. NO.: 40908

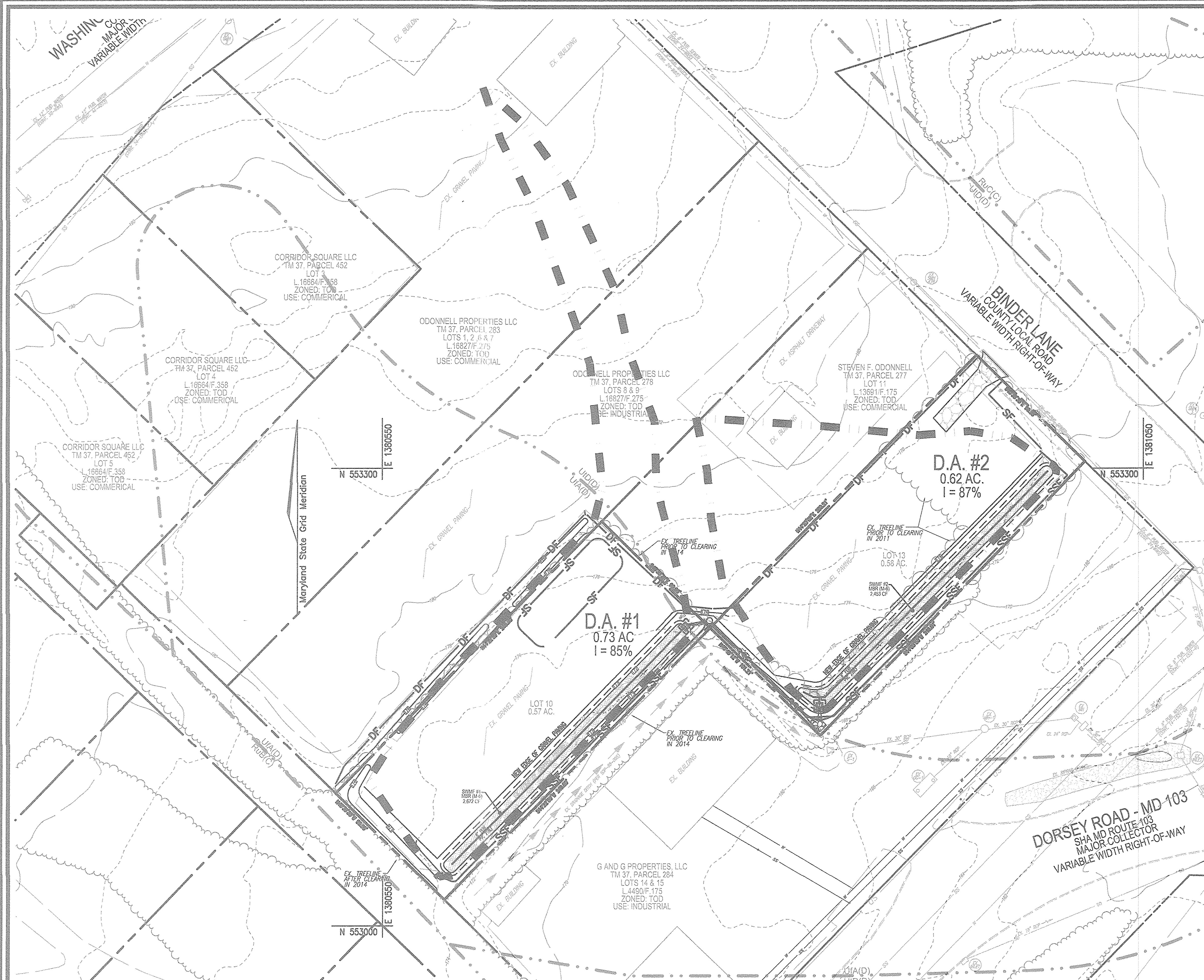
PROFESSIONAL CERTIFICATE

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. 16193 EXPIRATION DATE: 09-27-2020

SHEET 1 OF 2

ECP-18-020

K:\Projects\40908 - BINDER O'DONNELL\ENGR\dwg\ESDV\01-COVER.dwg, 3/27/2019 1:27:35 PM



PLAN VIEW
SCALE: 1"=50'

SCALE 1"=50' 25' 0' 50'

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.

OPERATION AND MAINTENANCE SCHEDULE FOR LANSCAPE INFILTRATION (M-3), MICRO-BIORETENTION (M-6), RAIN GARDENS (M-7), BIORETENTION SWALE (M-8), AND ENHANCED FILTERS (M-9)

1. THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULTCH 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 PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II, TABLE A.4.1 AND 2.

2. THE OWNER SHALL PERFORM A PLANT 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.

3. 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.

4. THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.

ENVIRONMENTAL CONCEPT PLAN NOTES:

1. APPROVAL OF THIS SIMPLIFIED ECP DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED BUILDING AND/OR GRADING PERMIT
2. REVIEW OF THIS PLAN FOR COMPLETE COMPLIANCE WITH ZONING AND SUBDIVISION AND LAND DEVELOPMENT REGULATIONS SHALL OCCUR AT THE SITE DEVELOPMENT STAGE AND THEREFORE, THIS PLAN IS SUBJECT TO ADDITIONAL AND MORE DETAILED COMMENTS AS THE PLAN PROGRESSES THROUGH THE SITE DEVELOPMENT PROCESS.

APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION. RAIN GARDEN, 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 CONTEN – 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 IN TO 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 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 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 BIORETENION 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 OF HDPE).
* PERFORATIONS – IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A 1/4" (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 (1/8" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES IN TO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".

THIS 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.

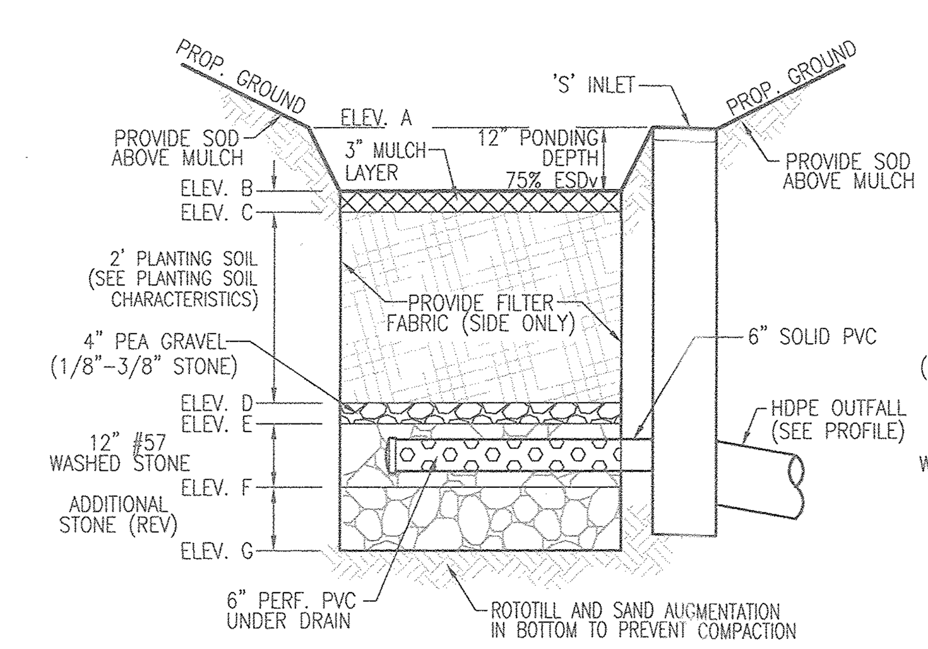
LEGEND:

- EXISTING CONTOUR (398)
- PROPOSED CONTOUR (406)
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING TREELINE
- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE (SMH 2)
- EXISTING SANITARY LINE (SS)
- EXISTING CLEANOUT (CO)
- EXISTING FIRE HYDRANT (FH)
- EXISTING WATER LINE (W)
- EXISTING FENCE
- PROPOSED STORMDRAIN
- PROPOSED STORMDRAIN INLET
- PROPOSED CURB
- MICRO-BIORETENTION
- DRAINAGE AREA

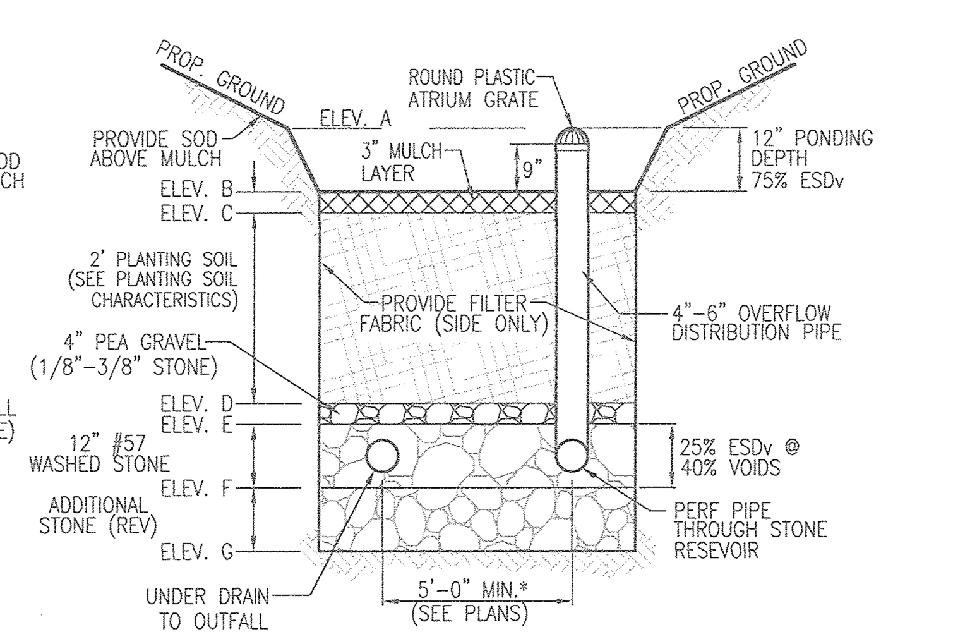
SOILS LEGEND
HOWARD COUNTY SOILS MAP #25

SYMBOL	NAME / DESCRIPTION	GROUP	K FACTOR	ERODIBLE
UfA	URBAN LAND –FALLSINGTON COMPLEX, 0 TO 2 PERCENT SLOPES	D	–	NO
UtD	URBAN LAND – UDORTHENTS COMPLEX, 0 TO 15 PERCENT SLOPES	D	0.28	NO

SOILS NOTE:
HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT.



MICRO-BIORETENTION (UNDERDRAIN)
NOT TO SCALE



MICRO-BIORETENTION (OVERFLOW)
NOT TO SCALE

MICROBIORETENTION NOTES:
1. ONLY THE SIDES OF MICROBIORETENTION ARE TO BE WRAPPED IN FILTER FABRIC. FILTER FABRIC BETWEEN LAYER OR AT THE BOTTOM OF THE MICROBIORETNTION WILL CAUSE THE MBR TO FAIL, AND THERFORE SHALL NOT BE INSTALLED.
2. WRAP THE PERFORATED MBR UNDERDRAIN PIPE WITH 1/4" MESH (4x4) OR SMALLER GALVANIZED HARDWARE CLOTH.
3. PROVIDE 5' MINIMUM SPACING BETWEEN UNDER DRAIN AND PERFERATED PIPE THROUGH STONE RESIVOIR OR SPACE PIPE EQUALLY ACROSS BOTTOM FOR SMALL BIOS. (SEE PLANS)

OWNER
STEVEN F. O'DONNELL
6724 BINDER LANE
ELKRIDGE, MD. 21075
(410) 796-7968

Total Site ESDv Required : 5,112 c.f.

DRAINAGE AREA #	AREA TREATED	FACILITY NUMBER	PERMEABLE PAVEMENT	ADD STONE BELOW MICRO	LANDSCAPE INFILTRATION	PERVIOUS SIDEWALK	BIO SWALE	GRAVEL TRENCH	MICRO BIO RETENTION	ADD STONE BELOW MICRO	ESDv VOLUME
			ENVIRONMENTAL SITE DESIGN PRACTICE								
1	31,907	SWM#1	0	0	0	0	0	0	2,672	0	2,672
2	26,998	SWM#2	0	0	0	0	0	0	2,453	0	2,453
		TOTALS:	0	0	0	0	0	0	5,125	0	5,125

TOTAL AREA 58,905 SF
1.35 AC

TOTAL ESDv PROVIDED: 5,125

Target Site P_E: 1.80
Total Site ESDv Required : 5,112 c.f.
ESDv=(PexRvxA)/12
Rv=0.05+0.009xI
Vmin=1.0" rainfall (1.0x0.95xA)/12
Vmax= 1yr rainfall=2.6" (2.6x0.95xA)/12

PRACTICE DA #	PRACTICE DA (SF)	PRACTICE DA (AC)	IMPERV (SF)	IMPERV (AC)	PERV (SF)	PERV AREA	PRACTICE % IMPERV	PRACTICE Rv	MIN PRACTICE VOLUME (1")	TARGET SITE P_E VOLUME (1.8")	MAX PRACTICE VOLUME (2.6")	TOTAL PRACTICE VOLUME PROVIDED	REMARKS CF	SF		depth		porosity
SWMF#1 MBR (M-6)	31,907	0.73	27,183	0.62	4,724	0.11	85	0.82	2,172	3,909	5,646	2,672	MICROSCALE MICRO-BIO RETENTION (M-6)					
													2,004	2,004	Surface Area of MBR @ 1.0 ponding (75% above)			
												P_E Provided: 1.23	668	2,004	Stone Below Underdrain (25%)*	0.83	x	0.4
															(*includes REV requirement)			
													0	2,004	ADDITIONAL STONE	0.00	x	0.3
SWMF#1 MBR (M-6)	26,998	0.62	21,462	0.49	5,536	0.13	79	0.77	1,722	3,100	4,478	2,453	MICROSCALE MICRO-BIO RETENTION (M-6)					
													1,840	1,840	Surface Area of MBR @ 1.0 ponding (75% above)			
												P_E Provided: 1.42	613	1,840	Stone Below Underdrain (25%)*	0.83	x	0.4
															(*includes REV requirement)			
													0	1,840	ADDITIONAL STONE	0.00	x	0.3
TOTALS	58,905	1.35	48,645	1.12	10,260	0.24	82				TOTALS :	5,125						

Note: Each individual practice ESDv provided must be between the minimum of 1" rainfall and up to the maximum of 2.6" rainfall (1-year rainfall)

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 4.2.19
CHIEF, DEVELOPMENT ENGINEERING DIVISION JP — DATE

[signature] 3/27/19
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

STORMWATER MANAGEMENT DRAINAGE AREA MAP; SWM DETAILS

O'DONNELL PROPERTIES
6718 & 6728 BINDER LANE
ZONED: TOD
L.9167/F.536 & L.13691/F.175

TAX MAP 37 GRID 23
1ST ELECTION DISTRICT

PARCEL 276, LOT 10
PARCEL 280, LOT 13
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — REGISTERED PROFESSIONAL ENGINEER — 3/21/19

ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV/DZE
DRAWN BY: DZE
CHECKED BY: RHV
DATE: MARCH 2019
SCALE: AS SHOWN
W.O. NO.: 40908

PROFESSIONAL CERTIFICATE
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. 16193 EXPIRATION DATE: 09-27-2020

ECP-18-020

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