FINAL ROAD CONSTRUCTION PLANS

ROCKBURN ESTATES

LOT 1 thru 11 & OPEN SPACE LOTS 12 thru 16

1ST ELECTION DISTRICT

HOWARD COUNTY, MARYLAND

GENERAL NOTES

1. THE SUBJECT PROPERTY IS ZONED R-20 PER THE OCTOBER 6, 2013 COMPREHNSIVE ZONING PLAN. IT WILL BE DEVELOPED UNDER R-ED REGULATIONS PER SECTION 108.0(G)(3) OF THESE ZONING REGULATIONS.

2. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENTS NO. 31GD AND 31R1 WERE USED FOR THIS PROJECT.

3. TRACT BOUNDARY IS BASED ON A FIELD SURVEY PREPARED BY BENCHMARK ENGINEERING, INC. IN SEPTEMBER, 2015.

4. THE EXISTING TOPOGRAPHY SHOWN ONSITE IS BASED ON FIELD SURVEY BY BENCHMARK ENGINEERING, INC. PERFORMED IN SEPTEMBER, 2015.

5. BA CASE NUMBER 15-045V, A PETITION TO REDUCE THE 75' STRUCTURE SETBACK FROM A PROJECT BOUNDARY TO 40.9' FOR THE EXISTING HISTORIC STRUCTURE LOCATED ON LOT 6 WAS GRANTED ON FEBRUARY 18, 2016 WITH THE FOLLOWING PROVISIONS:
   A. THE PETITION SHALL APPLY TO ONLY THE USES AND STRUCTURES AS DESCRIBED IN THE PETITION AND DEPICTED ON THE VARIANCE AND NOT TO ANY OTHER ACTIVITIES, USES, STRUCTURES, OR ADDITIONS TO THE PROPERTY.
   B. PETITIONER SHALL OBTAIN ALL PERMITS.

6. THIS PROJECT IS SUBJECT TO THE LATEST HOWARD COUNTY STANDARDS AND THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE ZONING REGULATIONS EFFECTIVE OCTOBER 6, 2013 UNLESS WAIVERS OR ALTERNATE COMPLIANCES HAVE BEEN APPROVED.

7. THE EXISTING UTILITIES SHOWN ON THESE PLANS HAVE BEEN TAKEN FROM APPROVED CONTRACT DRAWINGS AND FIELD SURVEYED LOCATIONS. IF NECESSARY, THE CONTRACTOR SHALL ADJUST ANY OR ALL STRUCTURE TOP ELEVATIONS TO MATCH PROPOSED GRADES.

8. THERE ARE NO WETLANDS, STREAMS, THEIR REQUIRED BUFFERS, 100 YEAR-FLOODPLAINS, OR STEEP SLOPES 25% OR GREATER THAT ARE MORE THAN 20,000 SF OF CONTIGUOUS AREA LOCATED ON THIS SITE.

9. THE WILDLIFE AND HERITAGE PROGRAM OF THE DEPARTMENT OF NATURAL RESOURCES, IN A LETTER DATED, OCTOBER 8, 2015, HAS DETERMINED THAT THERE ARE NO STATE OR FEDERAL RECORDS FOR RARE, THREATENED OR ENDANGERED SPECIES ON-SITE. THIS STATEMENT HOWEVER SHALL NOT BE INTERPRETED AS MEANING THAT RARE, THREATENED OR ENDANGERED SPECIES ARE NOT IN FACT PRESENT.

10. THE WETLAND DELINEATION LETTER WAS PREPARED BY ECO-SCIENCE PROFESSIONALS, INC. ON MAY 3, 2016 SHOWING THE ABSENCE OF WETLANDS , STREAMS AND THEIR BUFFERS.

11. THE FOREST STAND DELINEATION WAS PREPARED BY BENCHMARK ENGINEERING, INC. IN SEPTEMBER, 2015. THERE ARE NO FOREST RESOURCES ON THIS SITE. THERE IS ONE SPECIMEN TREE LOCATED ON THIS SITE ON LOT 6 AND IS TO REMAIN.

12. THERE ARE EXISTING STRUCTURES LOCATED ON THIS SITE THAT ARE LISTED IN THE HISTORIC INVENTORY UNDER HO-865. THE EXISTING HOUSE LOCATED ON PROPOSED LOT 6 OF THIS SUBDIVISION IS TO REMAIN. THE OTHER STRUCTURES, WAGON HOUSE, OUTHOUSE, SHED AND BARN ARE ALL PROPOSED TO BE REMOVED. A REVIEW OF THE SITE BY THE HOWARD COUNTY HISTORICAL PRESERVATION COMMITTEE ON OCTOBER 1, 2015, RECOMMENDED THE HOUSE BE RETAINED AND DECONSTRUCTION OF THE OTHER STRUCTURES. NO NEW BUILDINGS, EXTENSIONS, OR ADDITIONS TO THE EXISTING DWELLING ARE TO BE CONSTRUCTED AT A DISTANCE LESS THAN THE ZONING REGULATION REQUIREMENTS.

13. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO CEMETERIES LOCATED ON THE SUBJECT PROPERTY.

14. A NOISE STUDY IS NOT REQUIRED FOR THIS DEVELOPMENT AS IT IS MORE THAN 250 FEET FROM ANY MINOR ARTERIAL.

15. A TRAFFIC STUDY WAS PREPARED BY MARS GROUP, INC. IN FEBRUARY, 2016 AND APPROVED UNDER SP-16-012.

16. THIS SITE IS WITHIN THE METROPOLITAN DISTRICT.

17. WATER & SEWER IS PUBLIC. THE CONTRACT NO. IS 14-3309-D.

18. THE EXISTING ON-SITE WELL AND SEPTIC SHALL BE ABANDONED IN ACCORDANCE WITH THE HEALTH DEPARTMENT REQUIREMENTS PRIOR TO ISSUANCE OF BUILDING PERMIT.

19. THE FOREST CONSERVATION OBLIGATION AMOUNT OF 0.77 ACRES SHALL BE MET BY THE ON-SITE PLANTING OF 0.77 ACRES OF NET TRACT AREA FOREST WITHIN AN ESTABLISHED FOREST CONSERVATION EASEMENT. FINANCIAL SURETY IN THE AMOUNT OF $16,770.60 SHALL BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT. THE FOREST CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CODE AND FOREST CONSERVATION ACT. NO CLEARING, GRADING, OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT, HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.

20. LANDSCAPING IS PROVIDED BY A CERTIFIED LANDSCAPE PLAN AS PART OF THIS PLAN SET IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. FINANCIAL SURETY IN THE AMOUNT OF $9,000.00 FOR THE REQUIRED PERIMETER LANDSCAPING SHALL BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT.

21. THE GEOTECHNICAL REPORT WAS PREPARED BY HILLIS-CARNES ENGINEERING ASSOCIATES, INC. DATED APRIL 29, 2016.

22. THE REQUIRED PRE-SUBMISSION COMMUNITY MEETING WAS HELD ON OCTOBER 8, 2015 IN COMPLIANCE WITH SECTION 16.128 OF THE AMENDED 5th EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

23. STORMWATER MANAGEMENT ENVIRONMENTAL SITE DESIGN (ESD) HAS BEEN PROVIDED IN ACCORDANCE WITH "MARYLAND DEPARTMENT OF THE ENVIRONMENT STORMWATER MANAGEMENT ACT OF 2007" AND THE "HOWARD COUNTY DESIGN MANUAL, VOLUME I, CHAPTER 5" TO THE MAXIMUM EXTENT PRACTICAL (MEP). MICRO BIO-RETENTION PRACTICES 1 thru 7 SHALL BE PRIVATELY OWNED AND PRIVATELY MAINTAINED. MICRO BIO-RETENTION #8 SHALL BE OWNED AND MAINTAINED BY HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS. THE (F-1) SURFACE SAND FILTER SHALL BE PRIVATELY OWNED AND PRIVATELY MAINTAINED.

24. THE ARTICLES OF INCORPORATION FOR THE HOMEOWNERS ASSOCIATION SHALL BE ACCEPTED BY THE STATE DEPARTMENT OF ASSESSMENTS AND TAXATION PRIOR TO THE RECORDATION OF THE SUBDIVISION PLAT.

25. THE PURPOSE OF OPEN SPACE LOT 12 IS FOR THE PROTECTION OF THE ESABLISHED FOREST CONSERVATION EASEMENT, FOR PROVIDING THE REQUIRED RECREATIONAL OPEN SPACE AND TO PROVIDE A BUFFER FROM THE EXISTING RESIDENTIAL PROPERTIES. IT SHALL BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION.

    THE PURPOSE OF OPEN SPACE LOT 13 IS FOR ACCESS TO THE ROCKBURN BRANCH PARK. IT SHALL BE OWNED AND MAINTAINED BY HOWARD COUNTY.

    THE PURPOSE OF OPEN SPACE LOT 14 IS TO PROVIDE A BUFFER FROM ADJACENT PROPERTIES. IT SHALL CONTAIN SWM PRACTICES. IT SHALL BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION.

    THE ESTABLISHMENT OF OPEN SPACE LOT 15 WAS FOR THE EXISTING FLAG STEM OF THE INITIAL PROPERTY WHICH PROVIDED THIS SITE WITH PUBLIC ROAD FRONTAGE PRIOR TO BRIAR OAK COURT'S CONSTRUCTION. IT SHALL BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION.

26. RECREATIONAL OPEN SPACE OBLIGATION IS BEING MET BY THE ESTABLISHMENT OF A 3,300 SF RECTANGULAR AREA ON OPEN SPACE LOT 13.

27. THIS PROJECT SHALL RECEIVE ONE (1) DENSITY UNIT FROM THE PROPERTY OF HOWARD COUNTY, MARYLAND BELMONT MANOR AND HISTORIC PARK. LIBER 14129 FOLIO 538. TAX MAP 32 GRID 19 PARCEL 2.

28. 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 PERMITES AT THE TIME OF BUILDING PERMIT. THE FEE-IN-LIEU SHALL BE PAID FOR ALL LOTS/RESIDENTIAL UNITS WITHIN THIS SUBDIVISION AT THE TIME OF BUILDING PERMIT ISSUANCE.

29. STREET LIGHT PLACEMENT AND TYPE OF FIXTURES AND POLES SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME III (2006), SECTION 5.5.A. A MINIMUM OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT ANDANY TREE.

30. TRAFFIC CONTROL DEVICES:
    A) THE R1-1 "STOP" SIGN AND STREET NAME SIGN (SNS) ASSEMBLY FOR THIS DEVELOPMENT MUST BE INSTALLED BEFORE THE BASE PAVING IS COMPETED.

    B) THE TRAFFIC CONTROL DEVICE LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND MUST BE FIELD APPROVED BY HOWARD COUNTY TRAFFIC DIVISION (410-313-2430) PRIOR TO THE INSTALLATION OF ANY OF THE TRAFFIC CONTROL DEVICES.

    C)ALL TRAFFIC CONTROL DEVICES AND THEIR LOCATIONS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MdMUTCD).

    D) ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED "QUICK PUNCH", SQUARE TUBE POST (14 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (12 GAUGE) -- 3' LONG. THE ANCHOR SHALL NOT EXTEND MORE THAN TWO "QUICK PUNCH" HOLES ABOVE GROUND LEVEL. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.

31. 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 WORK.

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

33. APPLICABLE DPZ FILE REFERENCES:

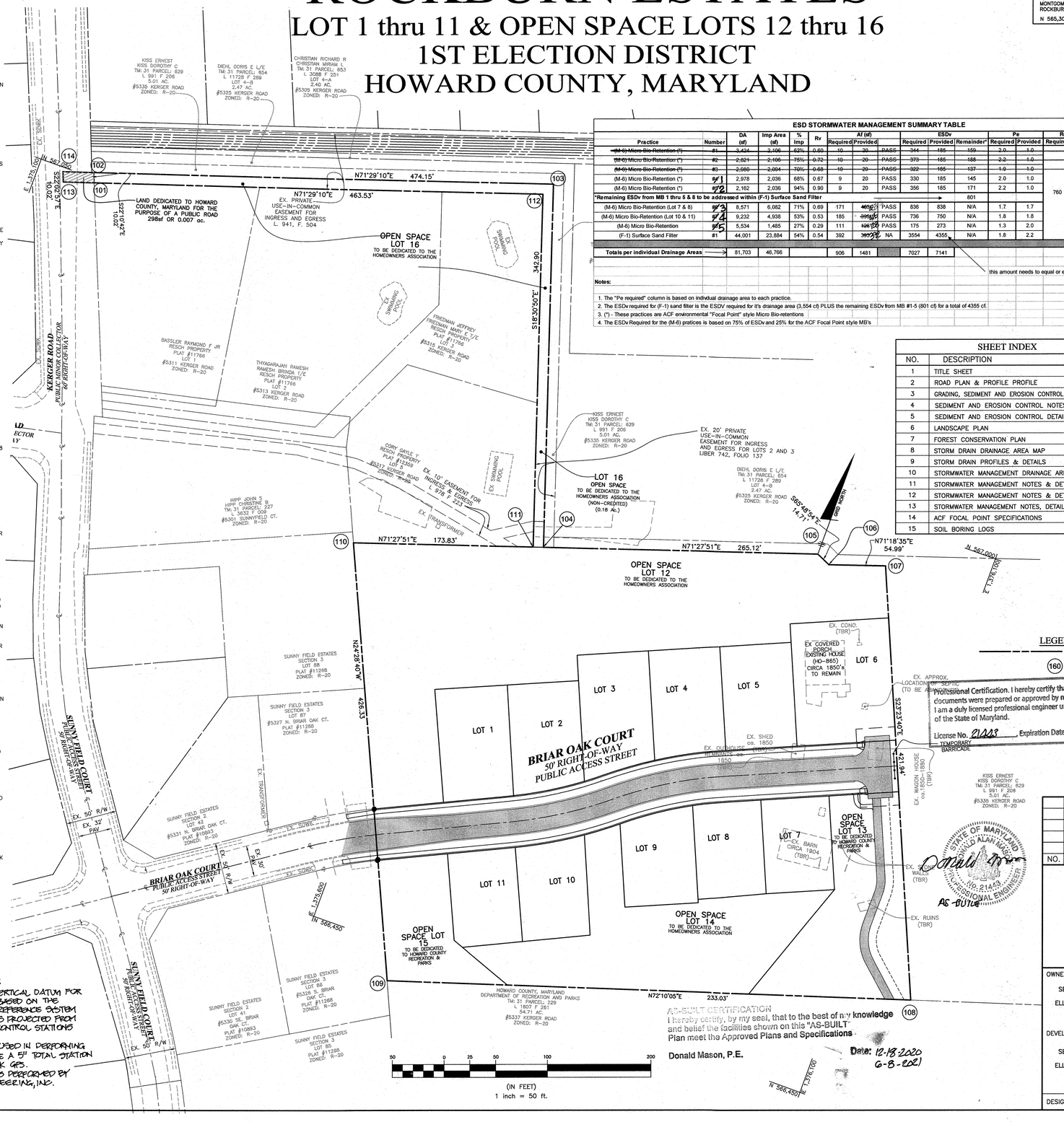
    ECP-16-022, SP-16-012, BA-15-045V, PB CASE NO. 425, F-17-097S, CONTRACT NO. 14-4983-D.

34. 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:

    A) WIDTH -- 12' (16' SERVING MORE THAN ONE RESIDENCE).
    B) SURFACE -- 6" OF CRUSHER RUN BASE WITH TAR AND CHIP COATING (1.5" MIN)
    C) GEOMETRY -- MAX 15% GRADE, MAX 10% GRADE CHANGE & MIN. 45' TURNING RADIUS.
    D) STRUCTURES (CULVERTS/BRIDGES) -- CAPABLE OF SUPPORTING 25 GROSS TONS (H25 LOAD)
    E) DRAINAGE ELEMENTS -- CAPABLE OF SAFELY PASSING 100 YEAR FLOODPLAI WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVEWAY.
    F) STRUCTURE CLEARANCES -- MINIMUM 12 FEET
    G) MAINTENANCE -- SUFFICIENT TO ENSURE ALL WEATHER USE

APPROVED: DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 10/17/2017
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 11-09-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 10.31.17

AS-BUILT NOTES:
1.) HORIZONTAL AND VERTICAL DATUM FOR THIS AS-BUILT IS BASED ON THE MARYLAND STATE REFERENCE SYSTEM NAD 83/ ADJ OTAS PROJECTED FROM HO.CO. GEODETIC CONTROL STATIONS 31GD AND 31R1.
2.) THE INSTRUMENTS USED IN PERFORMING THE AS-BUILT WERE A 5" TOTAL STATION AND PRISM AND RTK GPS.
3.) THIS AS-BUILT WAS PERFORMED BY BENCHMARK ENGINEERING, INC.



ESD STORMWATER MANAGEMENT SUMMARY TABLE

Practice	Number	DA (sf)	Imp Area (sf)	% Imp	Rv	Af (sf) Required	Af (sf) Provided		ESDv Required	ESDv Provided	ESDv Remainder*	Pe Required	Pe Provided	Rev (CF) Required	Rev (CF) Provided	Ownership	Maintenance
~~(M-6) Micro Bio-Retention (*)~~	~~#1~~	~~3,454~~	~~2,166~~	~~63%~~	~~0.60~~	~~10~~	~~20~~	~~PASS~~	~~344~~	~~185~~	~~159~~	~~2.0~~	~~1.0~~			~~Private~~	~~Private~~
~~(M-6) Micro Bio-Retention (*)~~	~~#2~~	~~2,621~~	~~2,166~~	~~75%~~	~~0.72~~	~~10~~	~~20~~	~~PASS~~	~~373~~	~~185~~	~~188~~	~~2.2~~	~~1.0~~			~~Private~~	~~Private~~
~~(M-6) Micro Bio-Retention (*)~~	~~#3~~	~~2,680~~	~~2,094~~	~~70%~~	~~0.68~~	~~10~~	~~20~~	~~PASS~~	~~322~~	~~185~~	~~137~~	~~1.9~~	~~1.0~~			~~Private~~	~~Private~~
(M-6) Micro Bio-Retention (*)	#1	2,978	2,036	68%	0.67	9	20	PASS	330	185	145	2.0	1.0			Private	Private
(M-6) Micro Bio-Retention (*)	#2	2,162	2,036	94%	0.90	9	20	PASS	356	185	171	2.2	1.0			Private	Private
*Remaining ESDv from MB 1 thru 5 & 8 to be addressed within (F-1) Surface Sand Filter											801			760	met via the 1.9" stone chamber in F-1 Practice plus other MB facilities		
(M-6) Micro Bio-Retention (Lot 7 & 8)	#3	8,571	6,082	71%	0.69	171	462	PASS	836	838	N/A	1.7	1.7			Private	Private
(M-6) Micro Bio-Retention (Lot 10 & 11)	#4	9,232	4,938	53%	0.53	185	395	PASS	736	750	N/A	1.8	1.8			Private	Private
(M-6) Micro Bio-Retention	#5	5,534	1,485	27%	0.29	111	126	PASS	175	273	N/A	1.3	2.0			Public	Public
(F-1) Surface Sand Filter	#1	44,001	23,884	54%	0.54	392	3527	NA	3554	4355	N/A	1.8	2.2			Private	Jointly
Totals per individual Drainage Areas	→	81,703	46,766			906	1481		7027	7141							

this amount needs to equal or exceed 4355. see note 2.

Notes:

1. The "Pe required" column is based on individual drainage area to each practice.
2. The ESDv required for (F-1) sand filter is the ESDV required for it's drainage area (3,554 cf) PLUS the remaining ESDv from MB #1-5 (801 cf) for a total of 4355 cf.
3. (*) - These practices are ACF environmental "Focal Point" style Micro Bio-retentions
4. The ESDv Required for the (M-6) pratices is based on 75% of ESDv and 25% for the ACF Focal Point style MB's

SHEET INDEX

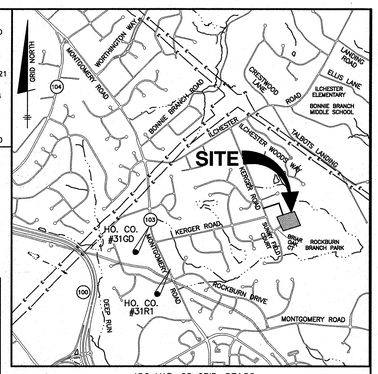
LEGEND

PROJECT BOUNDARY

(160) BOUNDARY COORDINATE

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. 21043 Expiration Date: 12-21-2018

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: 12-18-2020 6-8-2021



ADC MAP: 28 GRID: D7&D8

VICINITY MAP
SCALE : 1"=2000'

STORMWATER MANAGEMENT PRACTICES

LOT NUMBER	ADDRESS	MICRO-BIO RETENTION M-6 (QUANTITY)	SURFACE SAND FILTER (F-1) (QUANTITY)
LOT 1	BRIAR OAK COURT	1	0
LOT 2	BRIAR OAK COURT	1	0
LOT 3	BRIAR OAK COURT	1	0
LOT 4	BRIAR OAK COURT	1	0
LOT 5	BRIAR OAK COURT	1	0
LOT 6	BRIAR OAK COURT	0	0
LOT 7	BRIAR OAK COURT	0	0
LOT 8	BRIAR OAK COURT	0	0
LOT 9	BRIAR OAK COURT	0	0
LOT 10	BRIAR OAK COURT	0	0
LOT 11	BRIAR OAK COURT	0	0
O/S LOT 13	N/A	1	0
O/S LOT 14	N/A	2	1

Site Analysis Data Chart

Zoned: R-20		
* Project being developed under R-ED requirements per Section 108.0.G.2 as this project w ill be receiving density		
Gross Area	**5.17**	**ac.**
100yr Floodplain	0.00	ac.
Steep Slopes 25% or >(outside floodplain)	0.04	ac.
Highw ay Widening	0.01	ac.
Net Area	**5.12**	**ac.**
Number of lots/unit allowed (2 per net acre + 10%)	11	
Number of lots/units proposed	11	
Area of buildable SFD lots	1.82	ac.
Area of public right-of-w ay	0.59	ac.
Open Space Calculations		
Area of Open Space Required (50% of Gross)	2.59	ac.
Area of Open Space Provided		
credited	2.60	ac.
non-credited	0.18	ac.
total	2.78	ac.
Recreational Open Space Required		
300sf/unit	0.08 ac. Or 3,300	sf
Recreational Open Space Provided	0.08 ac. Or 3,300	sf

NOTE:
USING THE NEIGHBORHOOD PRESERVATION DENSITY EXCHANGE OPTION DESCRIBED IN SECTION 128.0.K OF THE ZONING REGULATIONS, THE DEVELOPMENT RIGHTS FOR ONE (1) OF THE RESIDENTIAL UNITS/LOTS SHOWN ON THE SUBDIVISION PLAN FOR ROCKBURN ESTATES, F-17-097, HAS BEEN TRANSFERRED FROM BELMONT MANOR AND HISTORIC PARK, TAX MAP 31, PARCEL 2.

NO.	DATE	REVISION

STATE OF MARYLAND — DONALD ALAN MASON — NO. 21043 — PROFESSIONAL ENGINEER

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. 22390, Expiration Date: 6-30-2019

STATE OF MARYLAND — CHRISTOPHER ALAN MILLER — NO. 22390 — PROFESSIONAL ENGINEER

OWNER:	SECURITY DEVELOPMENT, LLC P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
DEVELOPER:	SECURITY DEVELOPMENT, LLC P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 - GRID: 22 - PARCEL: 628 - ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

TITLE SHEET

DESIGN: DBT/NAF	DRAWN: DBT/NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 1 OF 15

AS-BUILT

F-17-097

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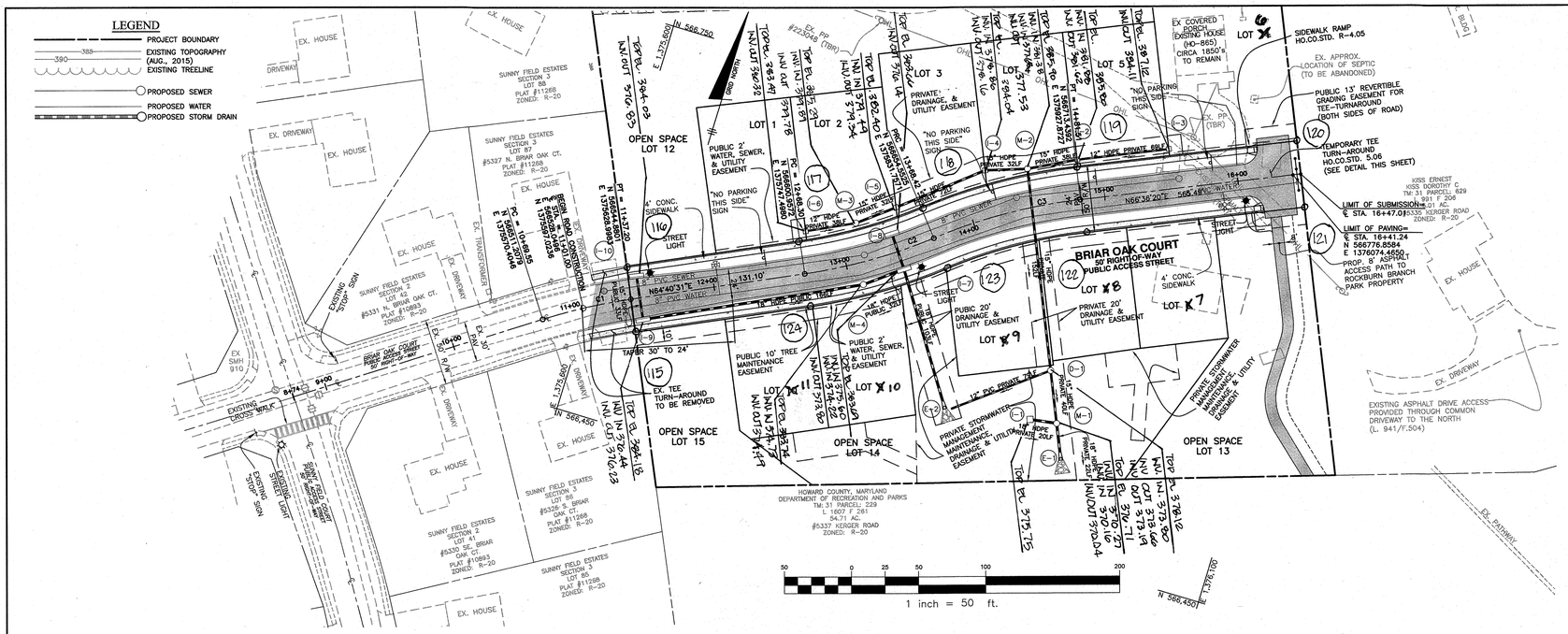

CENTER LINE CURVE DATA

CURVE	ALIGNMENT	STATION	RADIUS	ARC	DELTA	TANGENT	CHORD DIRECTION	CHORD LENGTH
C1	BRIAR OAK COURT	10+69.55 TO 11+37.20	425.00'	67.65'	9°07'13"	33.90'	N60° 06' 55"E	67.58'
C2	BRIAR OAK COURT	12+68.30 TO 13+68.42	402.00'	100.12'	14°16'11"	50.32'	N57° 32' 26"E	99.86'
C3	BRIAR OAK COURT	13+68.42 TO 14+81.51	400.00'	113.10'	16°12'00"	56.93'	N58° 30' 20"E	112.72'

PUBLIC STREET LIGHT SCHEDULE

SYMBOL	LOCATION	DESCRIPTION
✹	CL STA: 11+54 LEFT CL STA: 14+06 RIGHT CL STA: 16+05 RIGHT	LED-100 COLONIAL POST-TOP FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE

RIGHT OF WAY ELEVATION CHART

R/W PT.NO.	DESCRIPTION	ELEVATION
115	REBAR & CAP	388.66
116	REBAR & CAP	384.29
117	REBAR & CAP	384.62
118	REBAR & CAP	384.38
119	REBAR & CAP	386.16
120	REBAR & CAP	390.15
121	REBAR & CAP	389.31
122	REBAR & CAP	386.41
123	REBAR & CAP	381.30
124	REBAR & CAP	384.51

TEE-TURNAROUND DETAIL
SCALE: 1" = 20'

PUBLIC ACCESS STREET
DESIGN SPEED: 30 MPH
BRIAR OAK COURT
SCALE: HORIZ. : 1"=50'
VERT. : 1"=5'

TYPICAL ROADWAY SECTION
BRIAR OAK COURT
(PUBLIC ACCESS STREET – 500 ADT OR LESS)
DESIGN SPEED: 30 MPH
STA. 12+12.21 TO END
NOT TO SCALE

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: 12-18-2020

Donald Mason
No. 21443
AS-BUILT

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: 12-21-2022

SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BEARING RATIO (CBR)	3 TO <5	5 TO <7	≥7	3 TO <5	5 TO <7	≥7
		PAVEMENT MATERIAL (INCHES)	MIN HMA WITH GAB			HMA WITH CONSTANT GAB		
P-2	PARKING DRIVE AISLES: RESIDENTIAL AND NON-RESIDENTIAL WITH NO MORE THAN 10 HEAVY TRUCKS PER DAY LOCAL ROADS: ACCESS PLACE, ACCESS STREET CUL-DE-SAC: RESIDENTIAL	HMA SUPERPAVE FINAL SURFACE 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		HMA SUPERPAVE INTERMEDIATE SURFACE 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.0	1.0	1.0	1.0	1.0	1.0
		HMA SUPERPAVE BASE 19.0 MM PG 64-22, LEVEL 1 (LOW ESAL)	2.0	2.0	2.0	3.5	2.0	2.0
		GRADED AGGREGATE BASE (GAB)	8.0	4.0	3.0	4.0	4.0	4.0

P-2 PAVING DETAIL

APPROVED: DEPARTMENT OF PUBLIC WORKS

10/23/2017
CHIEF, BUREAU OF HIGHWAYS MS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

11-09-17
CHIEF, DIVISION OF LAND DEVELOPMENT DJ DATE

Chad Edmondson 10.31.17
CHIEF, DEVELOPMENT ENGINEERING DIVISION NY 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. 32390, Expiration Date: 6-30-2019

Christopher Alan Malagari
No. 32390
C Malaga 10-19-17

OWNER:

SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:

SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

ROAD PLAN & PROFILE

DESIGN: DBT/NAF	DRAWN: DBT/NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 2 OF 15

AS-BUILT

F-17-097

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NRCS SOILS CHART - HoCo Soils Map No. 19				
SYMBOL	HYDRIC	GROUP	Kw	MAP UNIT NAME
Fa*	YES	D	0.20	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT
RsB		C	0.37	RUSSETT FINE SANDY LOAM, 2 TO 5 PERCENT SLOPES
RsC		C	0.37	RUSSETT FINE SANDY LOAM, 5 TO 10 PERCENT SLOPES
SaB		B	0.37	SASSAFRAS LOAM, 2 TO 5 PERCENT SLOPE
SrB		B	0.24	SASSAFRAS GRAVELLY SAND LOAM, 2 TO 5 PERCENT SLOPES

PLEASE NOTE: HIGHLY ERODIBLE, K>0.35, AND/OR 15% OR GREATER SLOPES
TAKEN FROM THE NRCS WEB SOIL SURVEY, AUGUST 2014. SHEET 19

SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF WORK

PHASE 1

1. (DAY 1) OBTAIN GRADING PERMIT.

2. (DAY 2) HOLD ON-SITE PRE-CONSTRUCTION MEETING.

3. (DAY 3-5) CLEAR AND GRUB AS NECESSARY TO INSTALL STABILIZED CONSTRUCTION ENTRANCE AND PERIMETER CONTROLS (FENCING, ETC.). DO NOT INSTALL EARTH DIKES AT THIS TIME

4. (DAY 6-13) CONSTRUCT SOST #1. ONCE COMPLETED, CONSTRUCT THE EARTH DIKES.

5. (DAY 14-15) UPON APPROVAL FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, PROCEED TO CLEAR, GRUB, AND GRADE WITHIN THE PERIMETER.

6. (DAY 16-60) BRING ROAD BED UP TO SUBGRADE AND AT SAME TIME INSTALL THE WATER, SEWER, AND STORM DRAIN SYSTEM. DO NOT INSTALL 12" PVC FROM D-1 TO SAND FILTER AT THIS TIME. BLOCK I-5 AND UTILIZE INLET PROTECTION FOR I-2 THRU I-6

7. (DAY 61-65) INSTALL CURB AND GUTTER.

8. (DAY 66-70) BASE PAVE THE ROAD, INSTALL SIDEWALKS AND 8' ASPHALT PATH.

9. (DAY 71-80) COMPLETE MASS GRADING AND STABILIZE IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

10. (DAY 81-95) UPON APPROVAL FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, PROCEED TO REMOVE SOST #1 AND CONSTRUCT THE SURFACE SAND FILTER. REMOVE EARTH DIKES AND REPLACE WITH SILT FENCE. RELOCATE E-2 TO PERMANENT LOCATION EXTEND PIPE TO FOREBAY. INSTALL THE 12" PVC FROM D-1 TO FOREBAY. UTILIZE CIP ON INLETS I-7 THRU I-10. PLACE FILTER CLOTH OVER SURFACE AREA AND INSIDE SIDE SLOPES OF SAND FILTER.

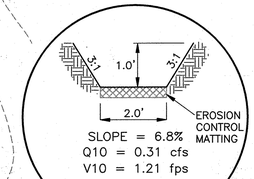
11. (DAY 96-99) FINAL PAVE ROADWAY.

12. (DAY 100-105) UPON APPROVAL FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE ALL SEDIMENT CONTROL DEVICES AND STABILIZE ANY REMAINING DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

NOTE: ALL (M-6) DEVICES SHALL BE DEFERRED UNTIL HOUSE CONSTRUCTION AS THESE DEVICES ONLY TREAT ROOFTOP RUNOFF AND SHALL BE THE RESPONSIBILITY OF THE BUILDER.

LEGEND

- PROJECT BOUNDARY
- EXISTING TOPOGRAPHY (AUG., 2015)
- EXISTING TREELINE
- EXISTING FENCE
- SOILS DELINEATION
- RsB SOILS TYPE
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED STORM DRAIN
- +20% SLOPES
- LIMIT OF DISTURBANCE
- SEDIMENT CONTROL DRAINAGE AREA DIVIDE
- SF SILT FENCE
- SSF SUPER SILT FENCE
- DF DIVERSION FENCE
- EARTH DIKE
- CIP CURB INLET PROTECTION
- SIP STANDARD INLET PROTECTION
- PSSMC EROSION CONTROL MATTING/PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE



NOTE: ALL SUPER SILT FENCES TO BE CHECKED DAILY TO ENSURE COMPLIANCE AND REPAIRED IMMEDIATELY AS REQUIRED

NOTE: THE AREAS OF ESD IMPLEMENTATION SHALL HAVE LIMITED ACCESS FROM HEAVY CONSTRUCTION EQUIPMENT TO AVOID UNNECESSARY COMPACTION WHEN PRACTICAL.

NOTE: TEMPORARY OR PERMANENT SEEDING AND STABILIZATION IS TO BE PERFORMED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE TIME FRAME REQUESTED BY THE 2011 MARYLAND STANDARDS & SPECIFICATIONS, SOIL EROSION AND SEDIMENT CONTROL WHICH EVER IS MORE STRINGENT.

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.

Chris Malagari — 10/19/17 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."

Security Development LLC

DEVELOPER James R. Moxley III Member — 10/19/17 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 11/7/17 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 10/23/2017 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — 11-09-17 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 10.31.17 DATE

SOST #1

STONE/RIPRAP OUTLET SEDIMENT TRAP ST-II, TRAP NO. 1		
DRAINAGE AREA - INITIAL	3.5	ACRES
DRAINAGE AREA - INTERIM	3.5	ACRES
DRAINAGE AREA - FINAL	NA	ACRES
TOTAL STORAGE REQUIRED	23,318	CF
TOTAL STORAGE PROVIDED	23,319	CF
WET STORAGE REQUIRED	11,159	CF
WET STORAGE PROVIDED	11,159	CF
DRY STORAGE REQUIRED	11,159	CF
DRY STORAGE PROVIDED	11,150	CF
EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION)	372.44	FT
TRAP BOTTOM ELEVATION	369.00	FT
TRAP BOTTOM DIMENSIONS	48' X 43'	FT x FT
WEIR LENGTH	14	FT
WEIR CREST (DRY STORAGE) ELEVATION	374.56	FT
CLEANOUT ELEVATION	370.01	FT
TOP OF EMBANKMENT ELEVATION	375.56	FT
SIDE SLOPE	3:1	H:V RATIO
EMBANKMENT TOP WIDTH	4	FT
OUTLET PROTECTION - LENGTH	15	FT
OUTLET PROTECTION - DEPTH	19	IN

NOTE:
TEMPORARY STORMWATER MANAGEMENT IS BEING PROVIDED VIA STORAGE OF THE 1-YEAR STORM EVENT WITHIN THE STONE OUTLET SEDIMENT TRAPS

1 inch = 30 ft.

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: 12-21-2020

AS-BUILT 12-18-2020

NOTE:
THIS PLAN IS FOR SEDIMENT AND EROSION CONTROL ONLY.

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

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. 21443, Expiration Date: 6-30-2019
10-19-17

OWNER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 - GRID: 22 - PARCEL: 628 - ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

GRADING, SEDIMENT AND EROSION CONTROL PLAN AND SOILS MAP

DESIGN: DBT/NAF	DRAWN: DBT/NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 3 OF 15

AS-BUILT

F-17-097

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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-4-2 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-4-3 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; P_2O_5 (phosphorous), 200 pounds per acre; K_2O (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.

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-4-8 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 prevent blowing.
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.

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.

2. All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 2011 MARYLAND STANDARDS AND 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: 5.17 Acres
Area Disturbed: 3.7 Acres
Area to be roofed or paved: 0.9 Acres
Area to be vegetatively stabilized: 2.8 Acres
Total cut: 6,833* Cu Yds
Total fill: 8,150* Cu Yds
Off-site waste/borrow area location: SITE WITH AN ACTIVE GRADING PERMIT

*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=mount 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 HSCD, 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.

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

Permanent Seeding Summary

Hardiness Zone (from Figure B.3): 6b
Seed Misture (from Table B.3): Tall Fescue/Kentucky Bluegrass

					Fertilizer Rate (10-20-20)			Lime Rate
No.	Species	Application Rate (lb/ac.)	Seeding Dates	Seeding Depths	N	P_2O_5	K_2O	
9	Fescue, Tall	60	Mar 1 to May 15 Aug 1 to Oct 15	1/4 - 1/2 in	45 pounds per acre (1.0 lb/ 100 sf)	90 lb/ac (2 lb/ 1000 sf)	90 lb/ac 2 lb/ 1000 sf)	2 tons/ac (90lb/ 1000 sf)
	Bluegrass, Kentucky	40	Mar 1 to May 15 Aug 1 to Oct 15	1/4 - 1/2 in				
				1/4 - 1/2 in				

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		6b
Cool-Season Grasses				
Annual Ryegrass (Lolium perenne ssp. Multiflorum	40	1.0	0.5	**Mar 1 to May 15; Aug 1 to Oct 31**
Barley (Hordeum vulgare)	96	2.2	1.0	**Mar 1 to May 15; Aug 1 to Oct 31**
Oats (Avena sativa)	72	1.7	1.0	**Mar 1 to May 15; Aug 1 to Oct 31**
Wheat (Triticum aestivum)	120	2.8	1.0	**Mar 1 to May 15; Aug 1 to Oct 31**
Cereal Rye (Secale cereale)	112	2.8	1.0	**Mar 1 to May 15; Aug 1 to Nov 15**
Warm-Season Grasses				
Foxtail Millet (Setaria italica)	30	0.7	0.5	**May 16 to Jul 31**
Pearl Millet (Pennisetum glaucum	20	0.5	0.5	**May 16 to Jul 31**

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, astested. 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 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

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.

Cl Malagari 10-3-17
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."

SECURITY DEVELOPMENT LLC
By: MEMBER 10/2/17
DEVELOPER STEVEN K BREEDEN DATE

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

John R Robertson 4/7/17
HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

10/17/2017
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

11-09-17
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

10.31.17
CHIEF, DEVELOPMENT ENGINEERING DIVISION NY DATE

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 12-21-2022

No. 21443

AS-BUILT 12-19-2020

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. 22390, Expiration Date 6-30-2019

No. 22390

10-3-17

OWNER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

SEDIMENT AND EROSION CONTROL NOTES

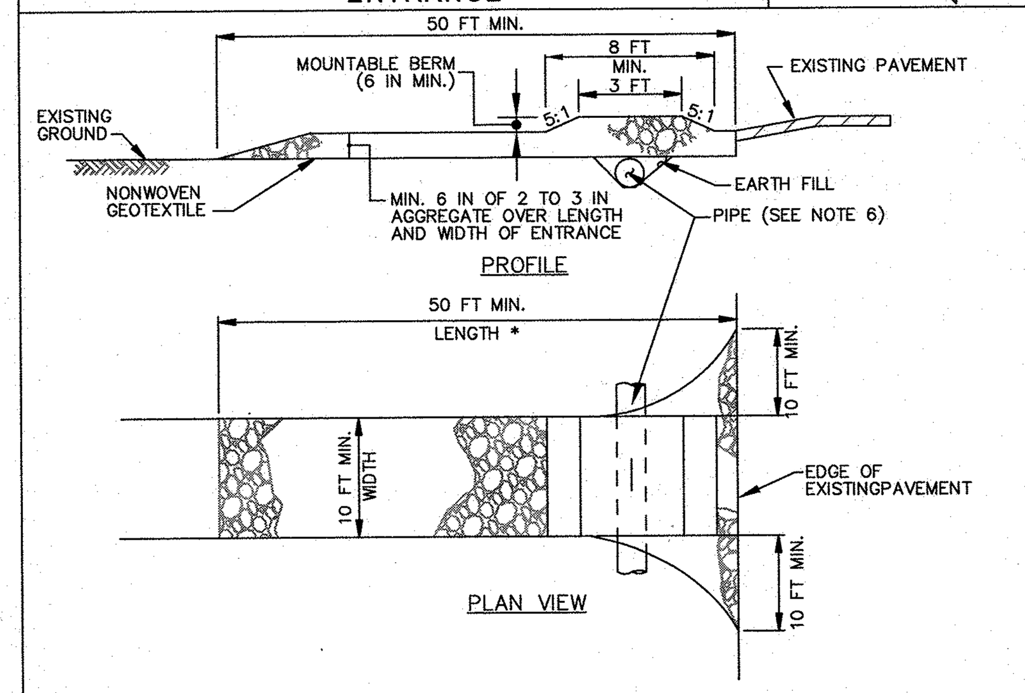
DATE: OCTOBER 2, 2017
BEI PROJECT NO: 2706
DESIGN: DBT/NAF
DRAWN: DBT/NAF
SCALE: AS SHOWN
SHEET 4 OF 15

AS-BUILT

F-17-097

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL: SCE



CONSTRUCTION SPECIFICATIONS

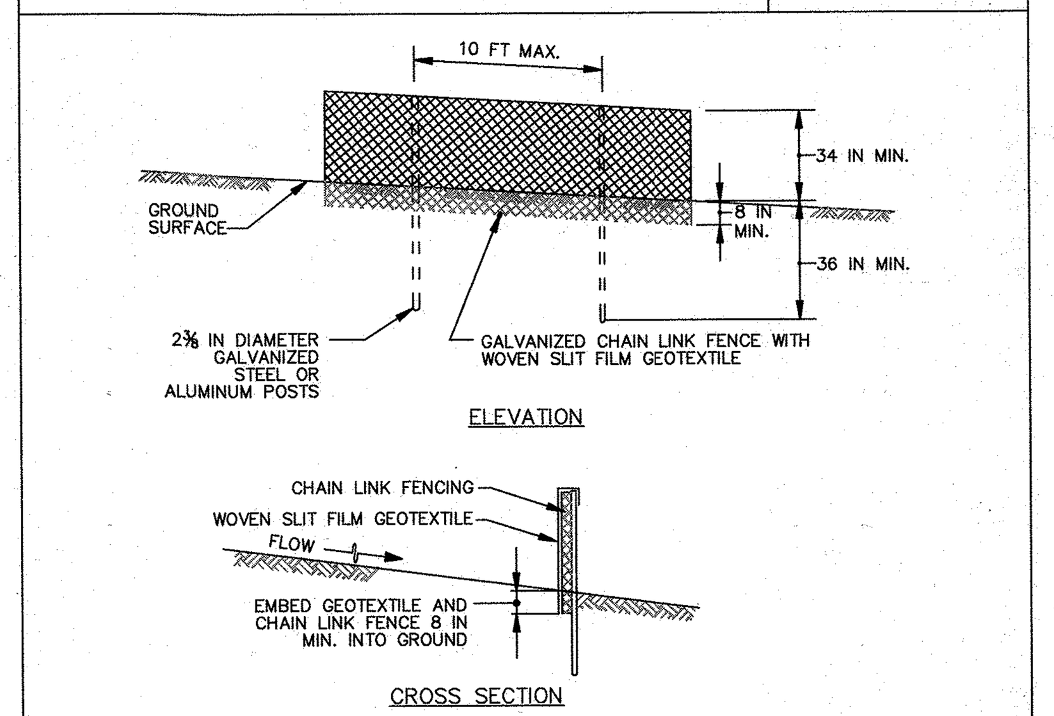
1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING 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

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

DETAIL E-3 SUPER SILT FENCE

STANDARD SYMBOL: SSF



CONSTRUCTION SPECIFICATIONS

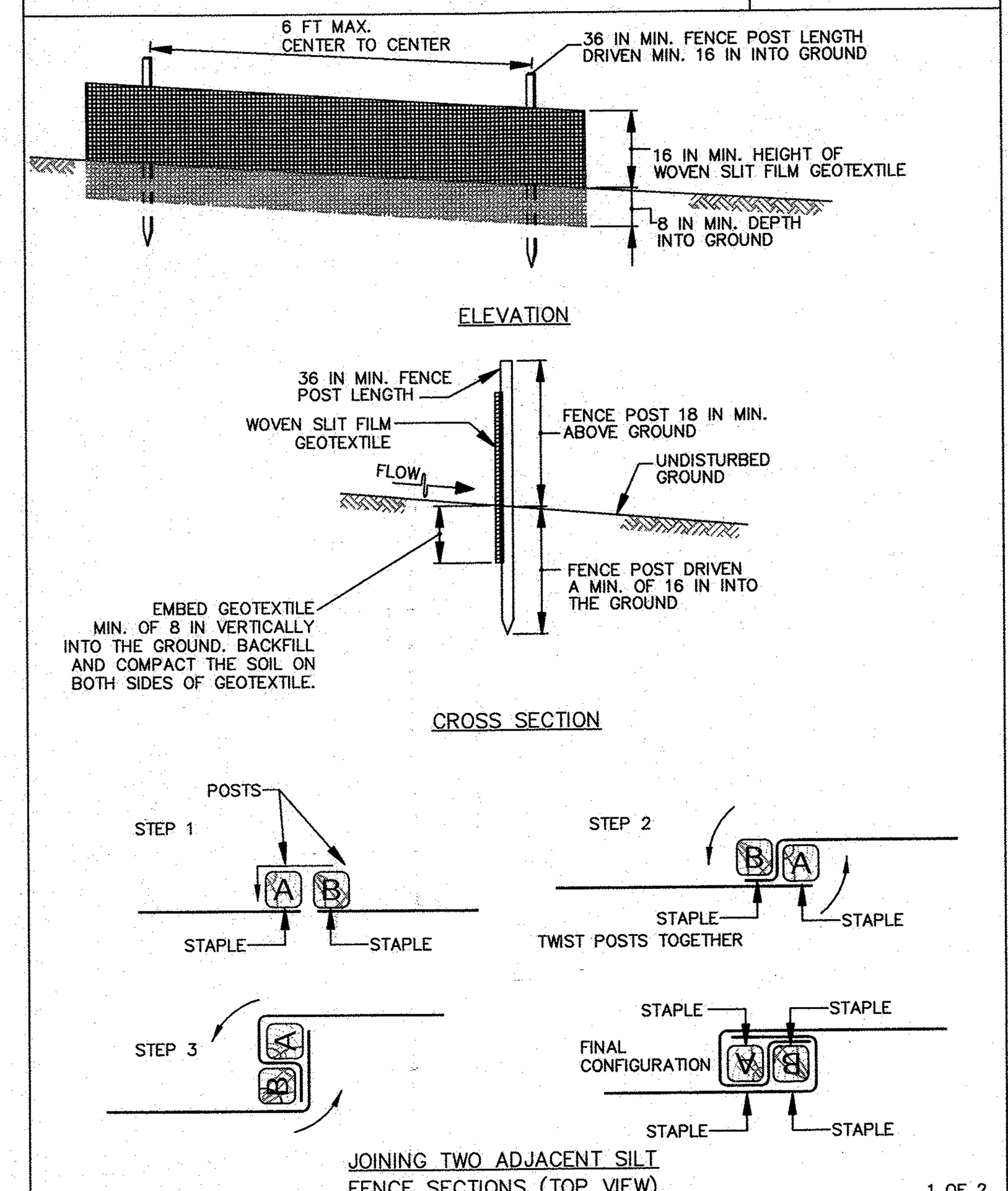
1. INSTALL 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2⅜ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY 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.

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



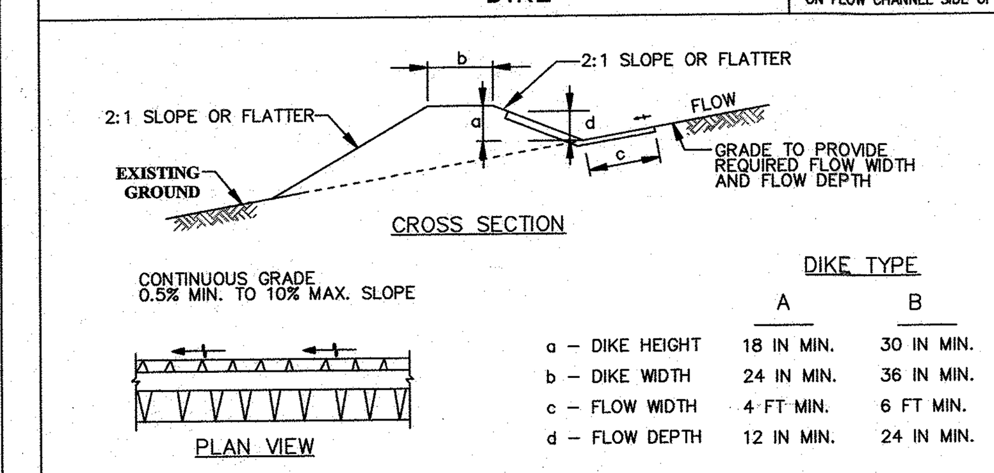
1 OF 2

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

DETAIL C-1 EARTH DIKE

STANDARD SYMBOL: A-1 (PLACE DESIGNATION (A-1, A-2) 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

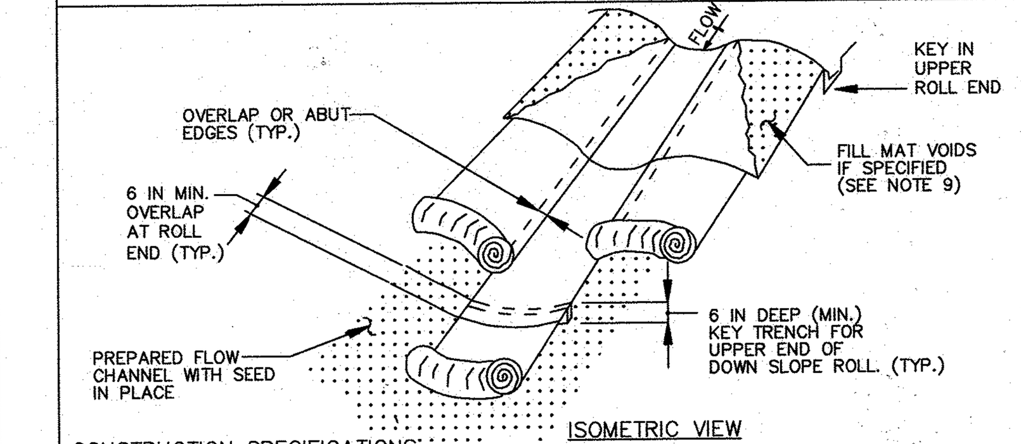
1. REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF EARTHDIKE.
2. EXCAVATE OR SHAPE EARTH DIKE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
3. COMPACT 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

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

DETAIL B-4-6-C PERMANENT SOIL STABILIZATION MATTING CHANNEL APPLICATION

STANDARD SYMBOL: PSSMC – *0.47lb/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.

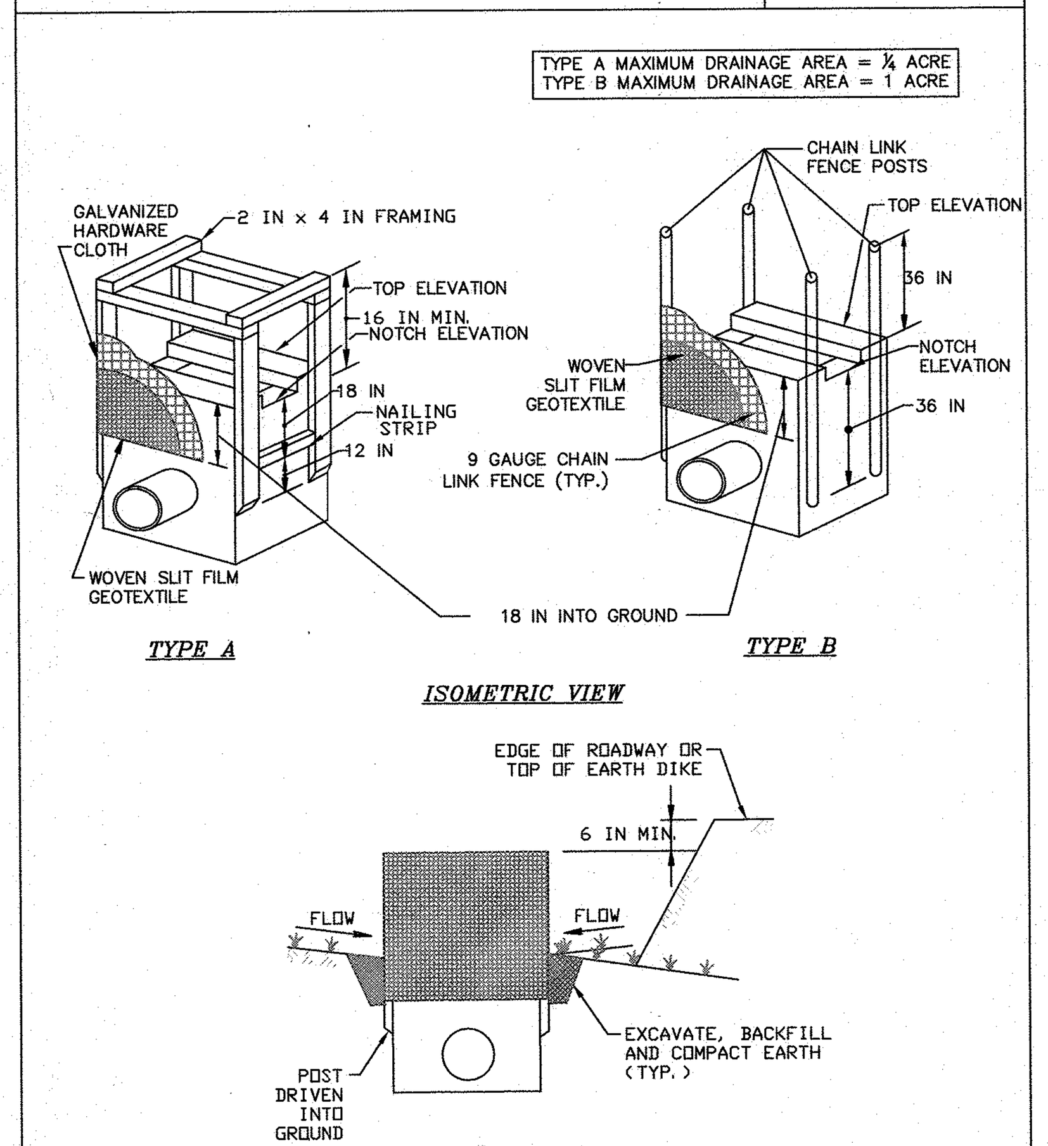
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

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

TYPE A MAXIMUM DRAINAGE AREA = ¼ ACRE
TYPE B MAXIMUM DRAINAGE AREA = 1 ACRE



1 OF 2

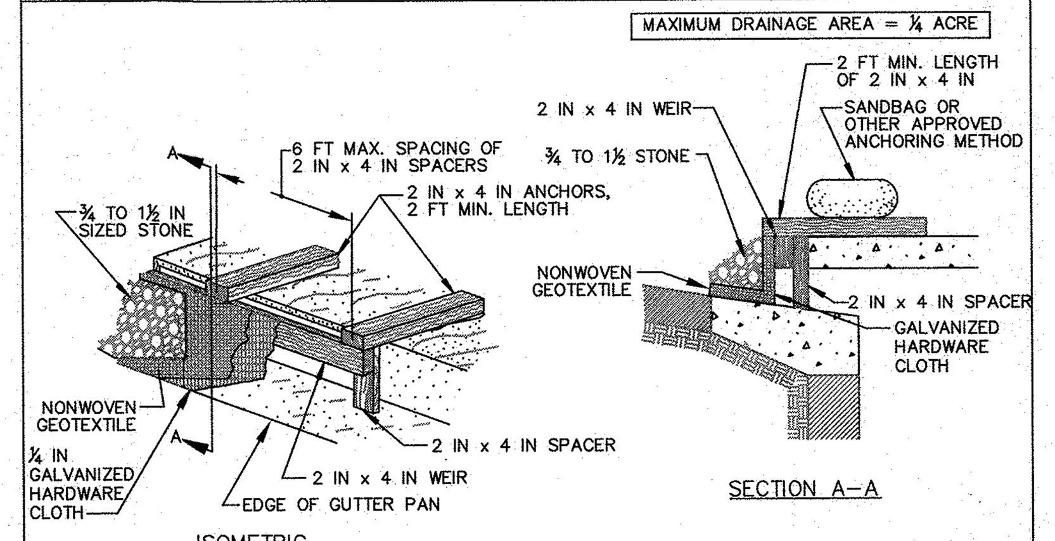
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

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

DETAIL E-9-3 CURB INLET PROTECTION

STANDARD SYMBOL: CIP

MAXIMUM DRAINAGE AREA = ¼ ACRE



CONSTRUCTION SPECIFICATIONS

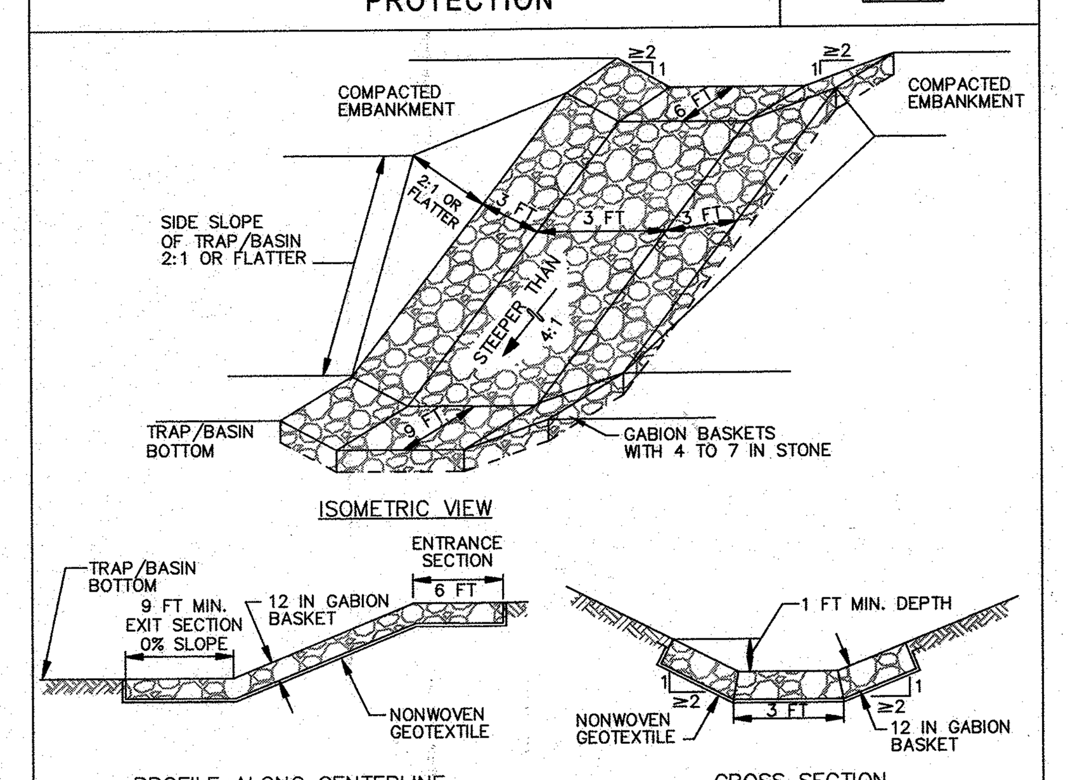
1. USE NOMINAL 2 INCH x 4 INCH LUMBER
2. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
3. NAIL THE 2x4 WEIR TO 9 INCH LONG VERTICAL SPACERS (MAXIMUM 6 FEET APART).
4. ATTACH A CONTINUOUS PIECE OF ¼ INCH GALVANIZED HARDWARE CLOTH, WITH A MINIMUM WIDTH OF 30 INCHES AND A MINIMUM LENGTH OF 4 FEET LONGER THAN THE THROAT OPENING, TO THE 2x4 WEIR, EXTENDING IT 2 FEET BEYOND THROAT ON EACH SIDE.
5. PLACE A CONTINUOUS PIECE OF NONWOVEN GEOTEXTILE OF THE SAME DIMENSIONS AS THE HARDWARE CLOTH OVER THE HARDWARE CLOTH AND SECURELY ATTACH TO THE 2x4 WEIR.
6. PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL TO 2x4 ANCHORS (MINIMUM 2 FEET LENGTH). EXTEND THE ANCHORS ACROSS THE INLET TOP AND HOLD IN PLACE BY SANDBAGS OR OTHER APPROVED ANCHORING METHOD.
7. INSTALL END SPACERS A MINIMUM OF 1 FOOT BEYOND THE ENDS OF THE THROAT OPENING.
8. FORM THE HARDWARE CLOTH AND THE GEOTEXTILE TO THE CONCRETE GUTTER AND FACE OF CURB TO SPAN THE INLET OPENING. COVER THE HARDWARE CLOTH AND GEOTEXTILE WITH CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE.
9. AT NON-SUMP LOCATIONS, INSTALL A TEMPORARY SANDBAG OR ASPHALT BERM TO PREVENT INLET BYPASS.
10. 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.

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 D-3-2 GABION INFLOW PROTECTION

STANDARD SYMBOL: GP



CONSTRUCTION SPECIFICATIONS

1. PROVIDE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND ALONG SIDES OF ALL GABION BASKETS.
2. USE BASKETS MADE OF MINIMUM 11 GAUGE WIRE.
3. CONSTRUCT GABION INFLOW PROTECTION BY ARRANGING 9 X 3 X 1 FOOT GABION BASKETS TO FORM A TRAPEZOIDAL SECTION WITH A 3 FOOT BOTTOM WIDTH, 1 FOOT MINIMUM DEPTH, 3 FOOT SIDE WALLS, AND 2:1 OR FLATTER SIDE SLOPES. FILL GABION BASKETS WITH 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE WITHOUT REBAR OR WEIR MESH.
4. INSTALL ENTRANCE AND EXIT SECTIONS AS SHOWN ON THE PROFILE.
5. INSTALL GABIONS IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
6. BLEND GABIONS INTO EXISTING GROUND.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. KEEP POINTS OF INFLOW AND OUTFLOW FREE OF EROSION

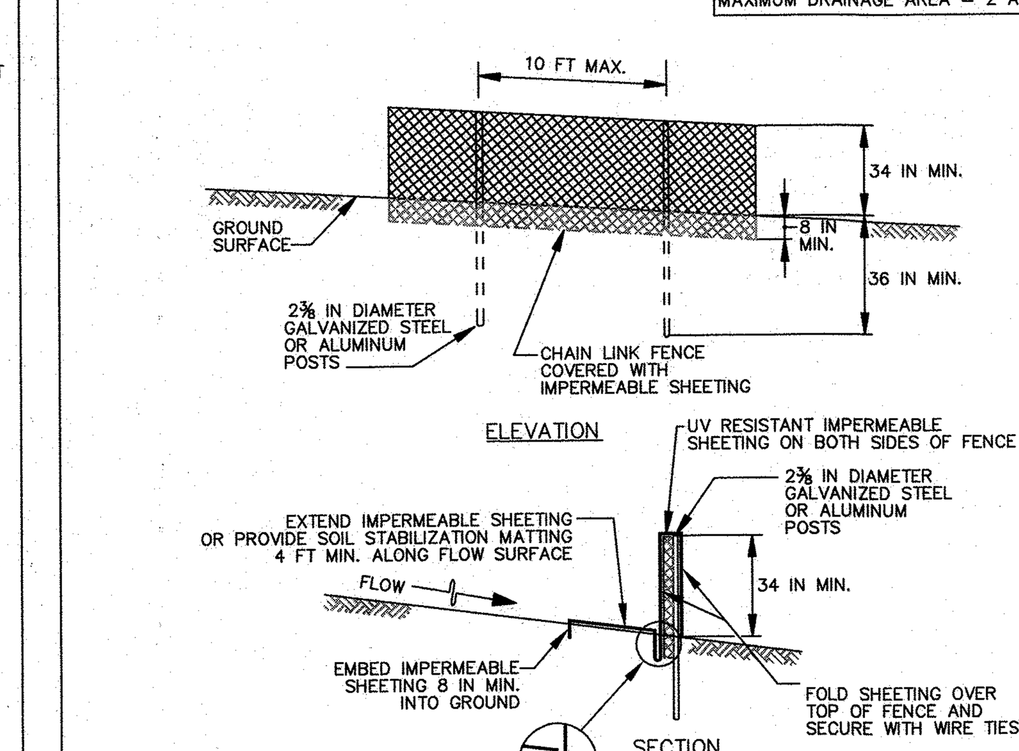
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

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

DETAIL C-9 DIVERSION FENCE

STANDARD SYMBOL: DF

MAXIMUM DRAINAGE AREA = 2 ACRES



CONSTRUCTION SPECIFICATIONS

1. USE 42 INCH HIGH, 9 GAUGE OR THICKER CHAIN LINK FENCING (2⅜ INCH MAXIMUM OPENING).
2. USE 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. THE POSTS DO NOT NEED TO BE SET IN CONCRETE.
3. FASTEN CHAIN LINK FENCE SECURELY TO THE FENCE POSTS WITH WIRE TIES.
4. SECURE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING TO CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT TOP, MID SECTION, AND BELOW GROUND SURFACE.
5. EXTEND SHEETING A MINIMUM OF 4 FEET ALONG FLOW SURFACE AND EMBED END A MINIMUM OF 8 INCHES INTO GROUND. SOIL STABILIZATION MATTING MAY BE USED IN LIEU OF IMPERMEABLE SHEETING ALONG FLOW SURFACE.
6. WHEN TWO SECTIONS OF SHEETING ADJOIN EACH OTHER, OVERLAP BY 6 INCHES AND FOLD WITH SEAM FACING DOWNGRADE.
7. KEEP FLOW SURFACE ALONG DIVERSION FENCE AND POINT OF DISCHARGE FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. MAINTAIN POSITIVE DRAINAGE. REPLACE IMPERMEABLE SHEETING IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

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

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

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

AS-BUILT 12-18-2020

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: 12-21-2022

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] 10-3-17
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."

SECURITY DEVELOPMENT LLC
BY: [signature] MEMBER 10/2/17
DEVELOPER STEVEN K BREEDEN DATE

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

[signature] 4/7/17
HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

[signature] 10/17/2017
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 11-09-17
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[signature] 10-31-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION NY 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. 22390, Expiration Date: 6-30-2019

STATE OF MARYLAND — CHRISTOPHER M. MALAGARI — No. 22390 — PROFESSIONAL ENGINEER
[signature] 10-3-17

OWNER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

SEDIMENT AND EROSION CONTROL DETAILS

DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
SCALE: AS SHOWN	SHEET 5 OF 15

DESIGN: DBT/NAF DRAWN: DBT/NAF

AS-BUILT

F-17-097

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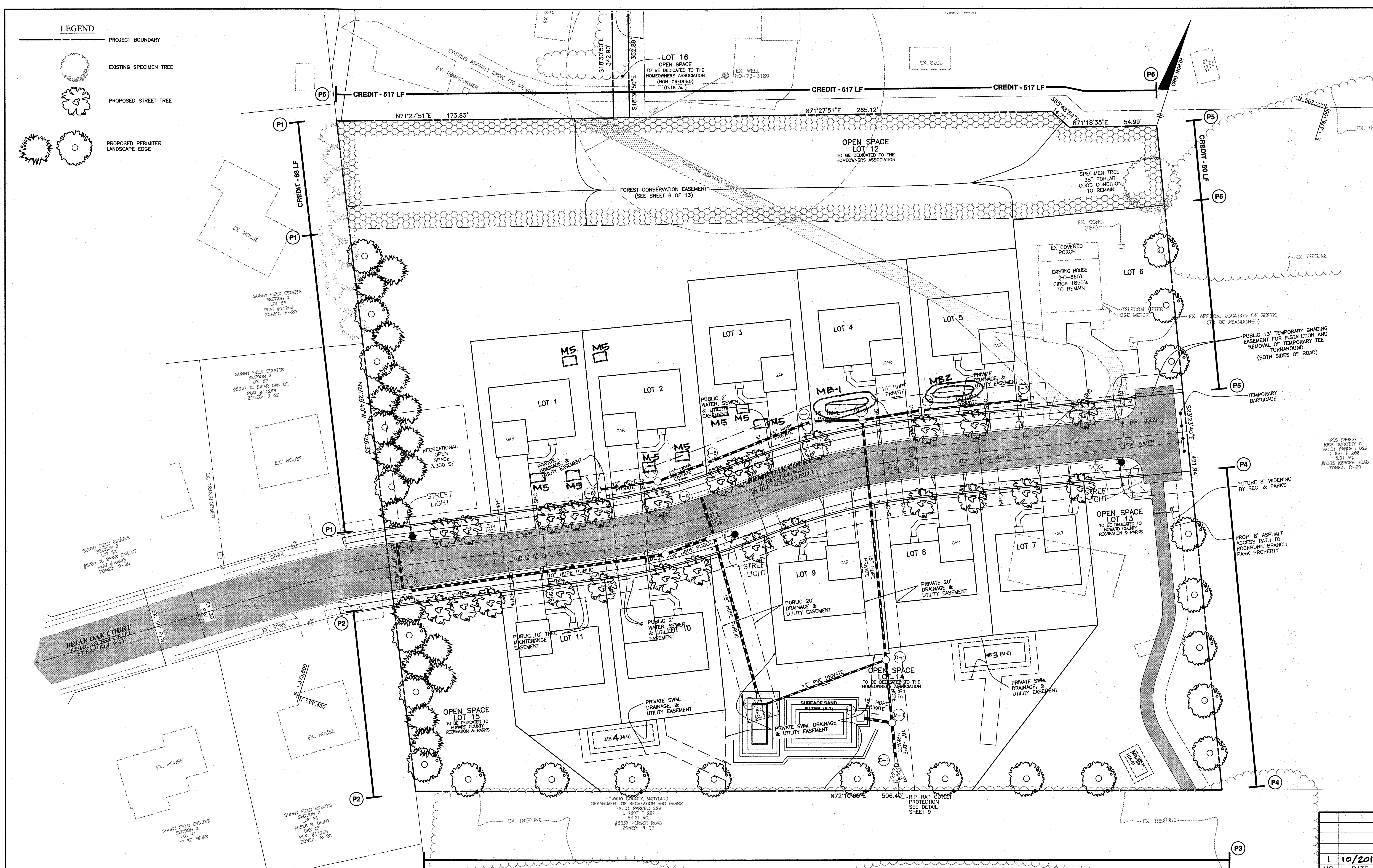
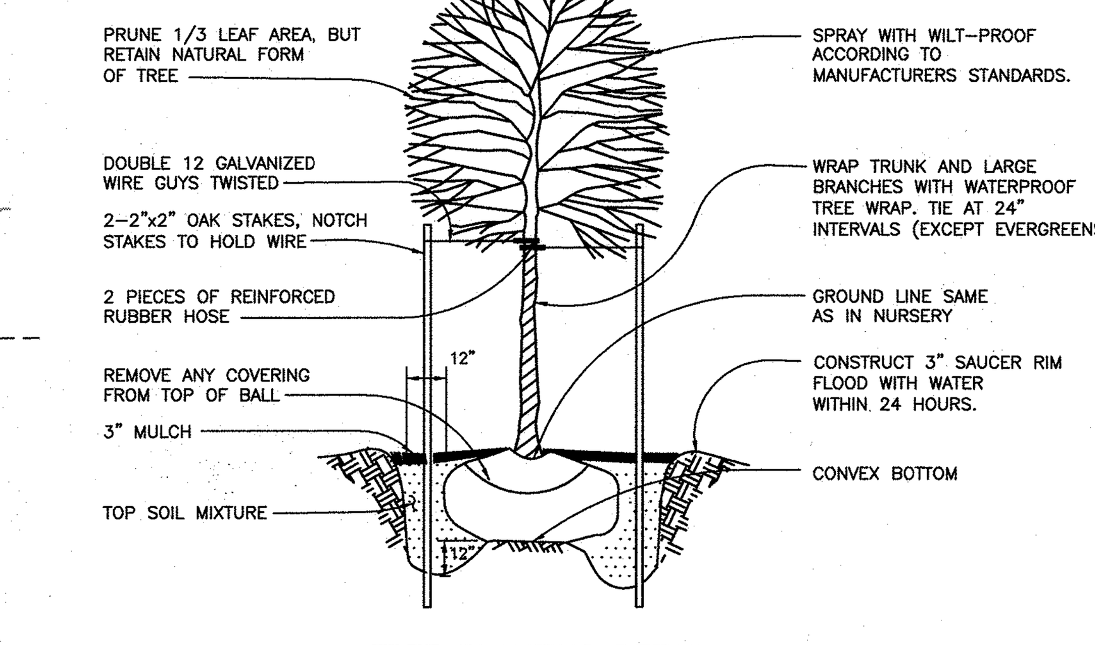
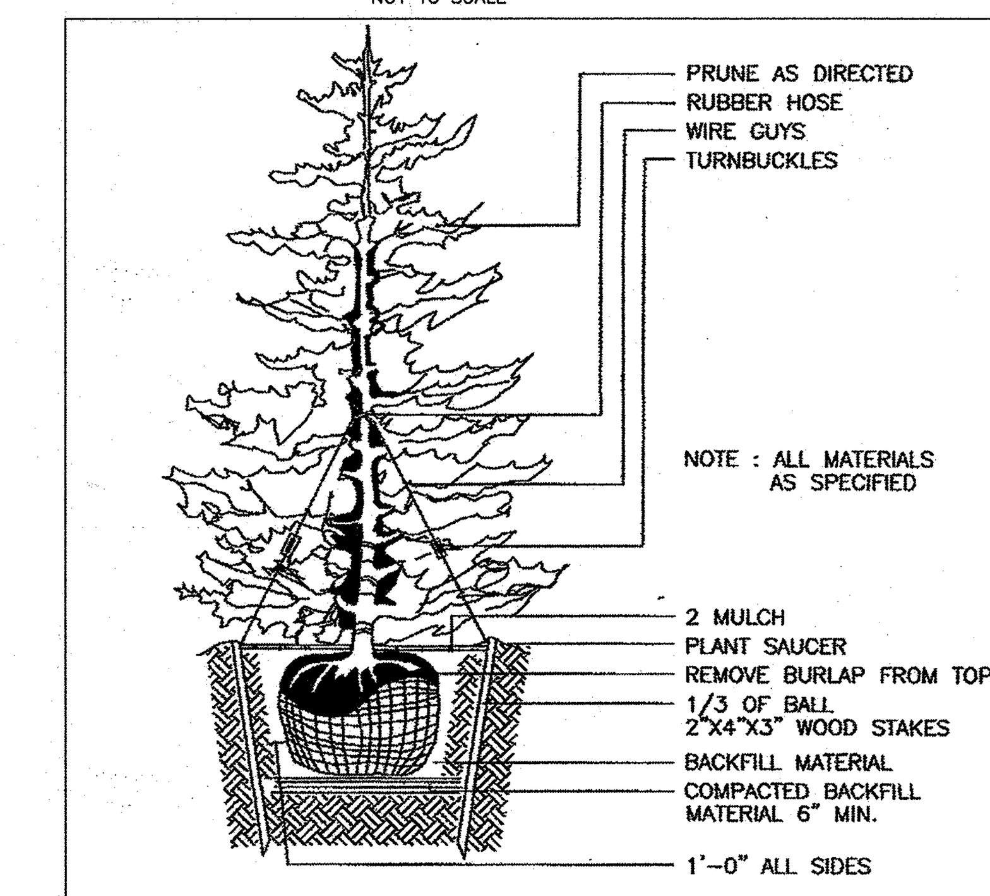


"NO AS-BUILT INFORMATION IS SHOWN ON THIS SHEET"



TREE PLANTING DETAIL

NOT TO SCALE



TYPICAL EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE

LANDSCAPING NOTES

1. THE PROPOSED LANDSCAPING SHALL BE PROVIDED BY THE PLANTINGS AS SHOWN ON THESE PLANS. THE FINAL LANDSCAPE PLAN WILL BE APPROVED WITH THE FINAL SUBDIVISION PLAN.
2. THE DEVELOPER SHALL BE RESPONSIBLE FOR ALL INTERNAL PLANTINGS; THE PRESERVATION OF THE EXISTING PERIMETER VEGETATION; AND FOR THE PERIMETER PLANTINGS. LANDSCAPE PLANS WILL BE FINALIZED AND BONDED WITH THE FINAL PLAN SUBMISSION.
3. A MINIMUM DISTANCE OF TWENTY (20) FEET MUST BE MAINTAINED BETWEEN ANY TREES LOCATED ALONG THE CURB LINE AND FROM STREET LIGHTS.
4. TREES MUST BE PLANTED A MINIMUM OF FIVE (5) FEET FROM AN OPEN SPACE ACCESS STRIP, TEN (10) FEET FROM A DRIVEWAY AND FIVE (5) FEET FROM A STORM DRAIN.
5. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.
6. STREET TREES SHALL BE PLANTED SIX (6) FEET BEHIND FACE OF CURB WHEN THERE ARE NO SIDEWALKS
7. ALL LANDSCAPING PLANT TYPES SHOWN ON THESE PLANS ARE RECOMMENDATIONS AND MAY BE SUBSTITUTED WITH APPROVED EQUIVALENTS FROM THE HOWARD COUNTY LANDSCAPE MANUAL.
8. NO TREES SHALL BE PLACED WITHIN 10' BEHIND A RETAINING WALL OR WITHIN A RELATED MAINTENANCE EASEMENT, WHICHEVER IS GREATER.
9. SHOULD ANY TREE DESIGNATED FOR PRESERVATION FOR WHICH LANDSCAPING CREDIT IS GIVEN, DIE PRIOR TO RELEASE OF BONDS, THE OWNER WILL BE REQUIRED TO REPLACE THE 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.
10. THE OWNER, TENANT 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.
11. 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 LANDSCAPING 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 THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO APPLICABLE PLANS AND CERTIFICATES.
12. FINANCIAL SURETY IN THE AMOUNT OF $9,000.00 FOR THE REQUIRED PERIMETER LANDSCAPING A & C (22 SHADE TREES & 16 EVERGREEN TREES) SHALL BE POSTED BY THE DEVELOPER AS PART OF THE DPW DEVELOPER'S AGREEMENT.
13. 26 PUBLIC STREET TREES FOR BRIAR OAK COURT SHALL BE ADDRESSED WITH DEVELOPMENT ENGINEERING DIVISION'S COST ESTIMATE IN THE AMOUNT OF $7,800.

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.

Security Development LLC

[signature] 10/19/17

DEVELOPER James R. Moxley, III DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

[signature] 10/23/2017

CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 11-09-17

CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[signature] 10-31-17

CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

SCHEDULE A
PERIMETER LANDSCAPE EDGE

CATEGORY								
CATEGORY	ADJACENT TO ROADWAY	NO	NO	NO	NO	NO	NO	TOTAL
	ADJACENT TO PERIMETER PROPERTIES	YES	YES	YES	YES	YES	YES	
PERIMETER NO. / LANDSCAPE TYPE		① C	② C	③ A	④ A	⑤ A	⑥ A	
LINEAR FEET OF PERIMETER (FRONTAGE/ROADWAY)		258	117	506	203	169	517 LF	
CREDIT FOR EXISTING VEGETATION: NO OR YES (w/LINEAR FEET) (DESCRIBE BELOW IF NEEDED)		YES *68 LF	NO –	NO –	NO –	YES *50 LF	YES *517 LF	
LINEAR FEET OF REQUIRED PERIMETER LANDSCAPING		190	117	506	203	119	0 LF	
CREDIT FOR WALL, FENCE OR BERM: NO OR YES (w/LINEAR FEET) (DESCRIBE BELOW IF NEEDED)		NO –	NO –	NO –	NO –	NO –	NO –	
NUMBER OF PLANTS REQUIRED:	SHADE TREES	5	3	8	4	2	–	22
	EVERGREEN TREES	10	6	–	–	–	–	16
	OTHER TREES (2:1 SUBSTITUTE)	–	–	–	–	–	–	–
		–	–	–	–	–	–	–
NUMBER OF PLANTS PROVIDED:	SHADE TREES	5	3	8	5	3	–	24
	EVERGREEN TREES	10	6	–	–	–	–	16
	OTHER TREES (2:1 SUBSTITUTE)	–	–	–	–	–	–	–
	SHRUBS (10:1 SUBSTITUTE)	–	–	–	–	–	–	–
	(DESCRIBE PLANT SUBSTITUTION	–	–	–	–	–	–	–
	CREDITS BELOW IF NEEDED)	–	–	–	–	–	–	–

* CREDIT FOR FOREST CONSERVATION EASEMENT

SPECIMEN TREES

COMMON NAME	SCIENTIFIC NAME	DBH	VIGOR	COMMENTS	IMPACT
TULIP POPLAR	Liriodendron tulipifera	38"	GOOD	GOOD	REMAIN ON-SITE

STREET TREE REQUIREMENTS

ROADWAY NAME:	BRIAR OAK COURT	TOTAL
LINEAR FEET OF ROAD FRONTAGE	1020	1020
LINEAR FEET OF CREDIT	–	–
LINEAR FEET OF OBLIGATION	1020	1020
STREET TREES REQUIRED (1:40)	26	26
NUMBER OF STREET TREES PROVIDED:	26	26

STREET TREE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS	DESCRIPTION
(symbol)	26	Tilia cordata 'GREENSPIRE' (Greenspire Littleleaf Linden)	2.5" – 3"cal.	TO BE PLANTED ALONG BRIAR OAK COURT (PROVIDED BY THE DEVELOPER)

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: 12-21-2022

STATE OF MARYLAND DONALD ALAN MASON No. 21443 PROFESSIONAL ENGINEER

AS-BUILT 12-18-2020

PERIMETER LANSCAPE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS	DESCRIPTION
(symbol)	24	Acer rubrum 'RED SUNSET' (Red Sunset Red Maple)	2.5" –3" cal.	SHADE TREES ALONG PERIMETER EDGES TO BE PROVIDED BY THE BUILDER.
(symbol)	16	Cuprocyparis leylandii 'LEYLAND CYPRESS'	5' – 6' hgt	EVERGREEN TREES ALONG PERIMETER EDGES TO BE PROVIDED BY THE BUILDER.

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH SDP

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. 22390, Expiration Date: 6-30-2019

STATE OF MARYLAND CHRISTOPHER ALAN MALAGARI No. 22390 PROFESSIONAL ENGINEER

[signature] 10-19-17

OWNER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

PERIMETER LANDSCAPE AND STREET TREE PLAN

DATE:	OCTOBER 2, 2017	BEI PROJECT NO:	2706
SCALE:	AS SHOWN	SHEET	6 OF 15

DESIGN: DBT/NAF DRAWN: DBT/NAF

AS-BUILT

F-17-097

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PLANTING SPECIFICATIONS

GENERAL

1. The Contractor shall notify Ecotone, Inc. and the land owner's representative at least two (2) weeks prior to start of planting within the project area so that planting zones may be marked in the field and the land owner can make any necessary preparations related to the agricultural activities on the areas surrounding the project site.
2. The Contractor is responsible for the location of all underground utilities prior to the start of construction. Any damages to utilities as a result of planting or other activities will be the sole responsibility of the Contractor and shall be repaired at the Contractors expense.

STANDARDS

1. Planting material will conform to the current issue of the "American Standards for Nursery Stock", published by the American Association of Nurseryman.
2. The root system of container-grown plant material shall be white, well-developed, and well-distributed throughout the growing media, with the roots extending to the inside face of the container, and the container size must conform to the size specified. Plants not meeting these criteria will be rejected.
3. Foliage of non-dormant plants shall appear healthy, with no leaf spots, damage, discoloration, or wilting, and no evidence of insects on the plant. Plants not meeting these criteria will be rejected.
4. Planting materials may be substituted upon written approval from Howard County Department of Planning and Zoning Division of Land Development.

STORAGE AND DELIVERY

1. Seed shall be delivered in containers having labels reporting the origin, purity, and germination percentage of the seed, and the date of germination testing of the seed.
2. All container-grown plants shall be clearly and correctly labeled to allow confirmation of species and quantities. At least 25% of each species in every shipment shall have legible labels securely attached prior to delivery to the site.
3. All plants delivered to the project site must have thoroughly moist soil/root masses. Dry or light-weight plants shall be rejected.
4. All rejected material shall be immediately removed from the project site.
5. All plants delivered to the project site shall be stored in a cool, shaded location, and watered regularly so that roots are kept moist until time of planting.

PRODUCTS

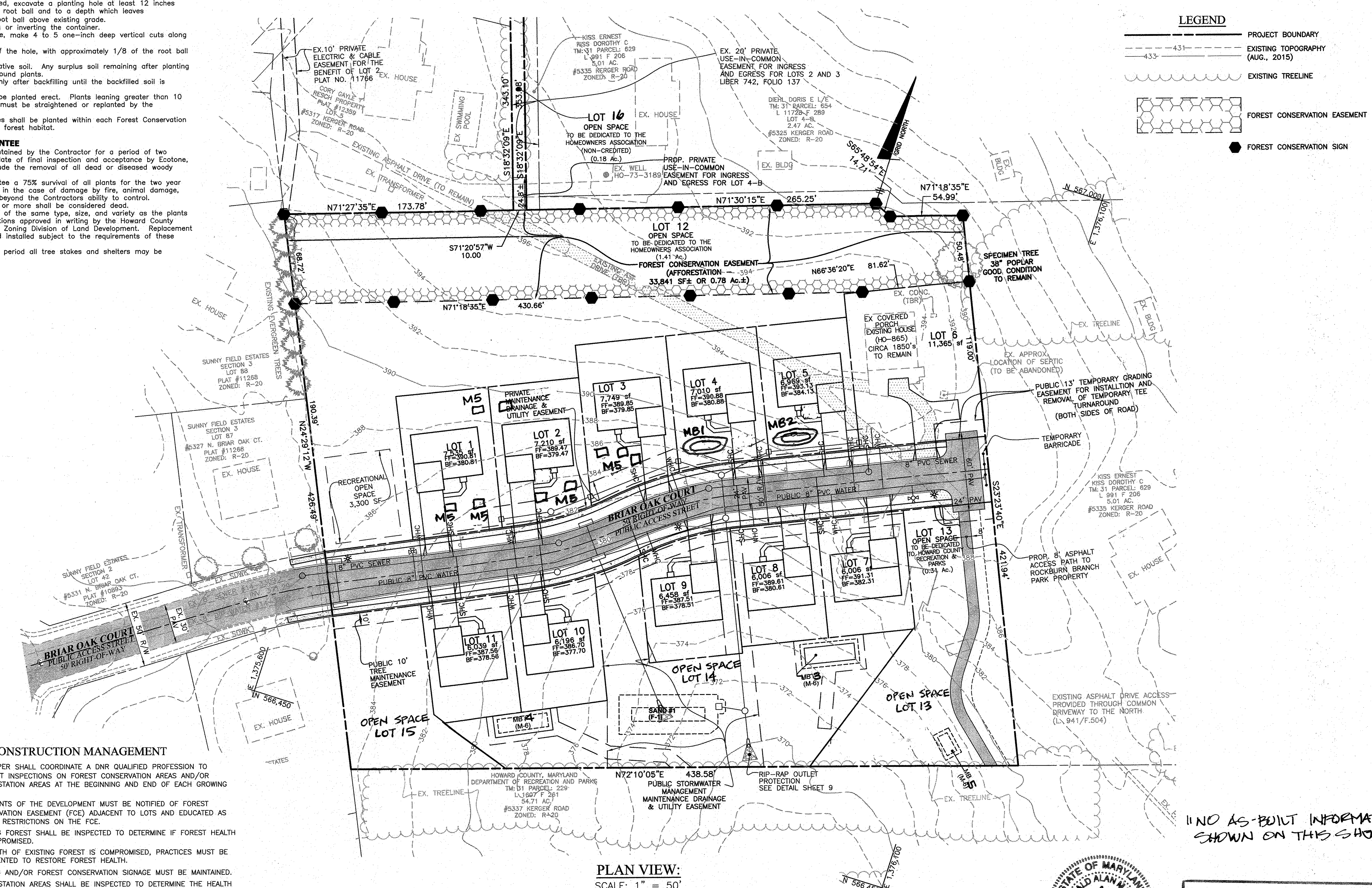
1. Straw shall be from small grain species such as wheat or barley, and shall be free of rot, mildew, and noxious weed seeds.

PLANTING PROCEDURES

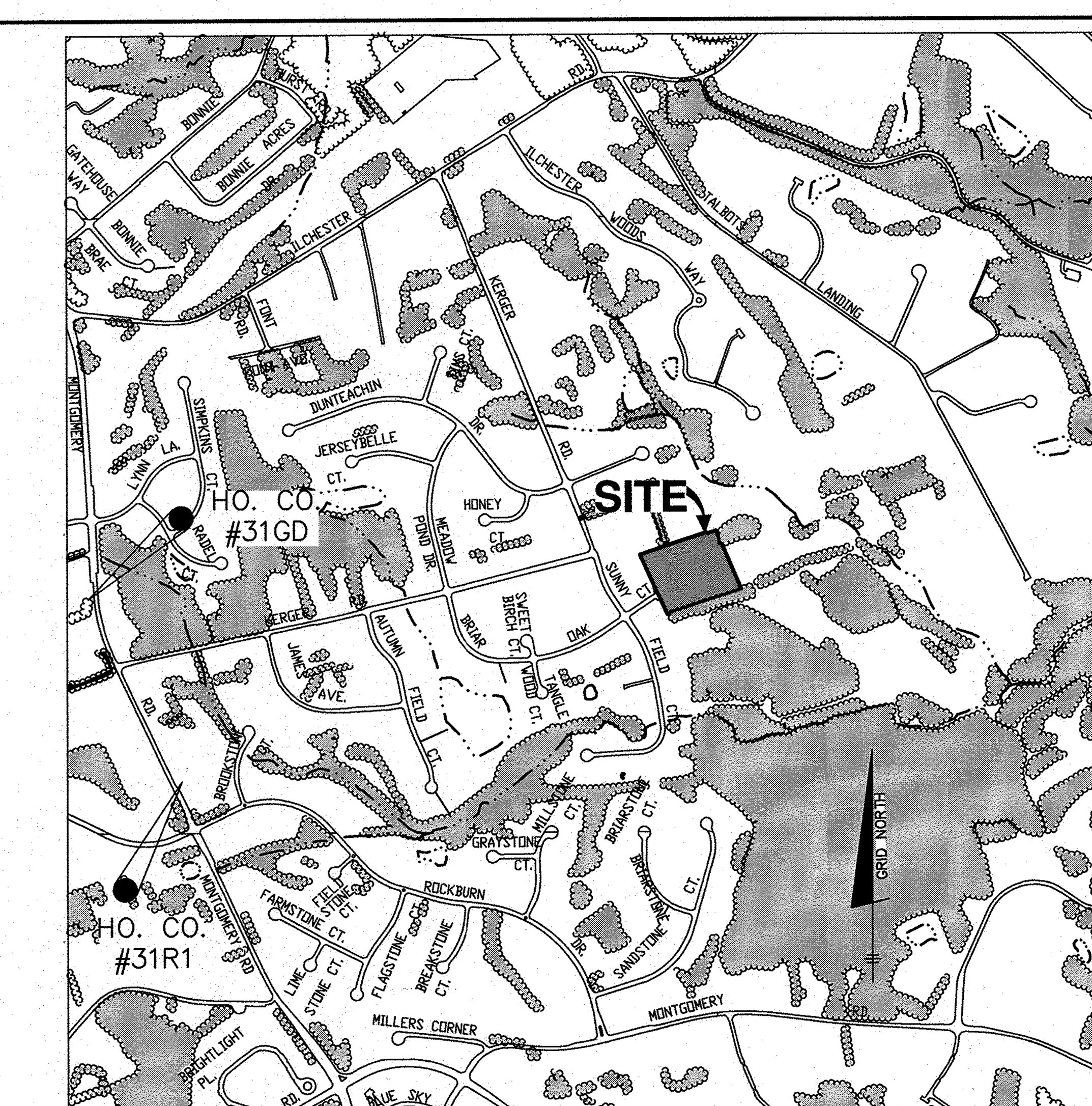
1. Planting shall be performed in accordance with the current edition of the Landscape Contractors Association "Landscape Specification Guidelines" and as specified below.
2. Plants shall be randomly installed within the planting area, using the plant spacing specified in the plant schedule as a guide.
3. Container-grown stock shall be planted during the periods of September 1 – November 15 or April 1 – May 15. Planting outside of these specified dates is not permissible without approval from Ecotone, Inc.
4. Planting shall not occur during periods of sub-freezing temperatures, when the ground is frozen or excessively wet or dry, or when other conditions not generally accepted as suitable for planting persist.
5. For each plant to be installed, excavate a planting hole at least 12 inches wider than the width of the root ball and to a depth which leaves approximately 1/8 of the root ball above existing grade.
6. Remove the plant by cutting or inverting the container.
7. Using a knife or sharp blade, make 4 to 5 one-inch deep vertical cuts along the root ball.
8. Install plant in the center of the hole, with approximately 1/8 of the root ball above surrounding grade.
9. Backfill planting hole with native soil. Any surplus soil remaining after planting shall be evenly scattered around plants.
10. Water each plant thoroughly after backfilling until the backfilled soil is saturated.
11. All woody material must be planted erect. Plants leaning greater than 10 degrees from perpendicular must be straightened or replanted by the Contractor.
12. A minimum of five species shall be planted within each Forest Conservation Easement to provide diverse forest habitat.

MAINTENANCE AND GUARANTEE

1. Plant material shall be maintained by the Contractor for a period of two growing seasons from the date of final inspection and acceptance by Ecotone, Inc. Maintenance shall include the removal of all dead or diseased woody vegetation.
2. The Contractor shall guarantee a 75% survival of all plants for the two year period stated above, except in the case of damage by fire, animal damage, vandalism, or other events beyond the Contractors ability to control.
3. Plants which are 25% dead or more shall be considered dead.
4. Replacement plants shall be of the same type, size, and variety as the plants specified herein, or substitutions approved in writing by the Howard County Department of Planning and Zoning Division of Land Development. Replacement plants shall be provided and installed subject to the requirements of these plans and specifications.
5. At the end of the two year period all tree stakes and shelters may be removed from plantings.



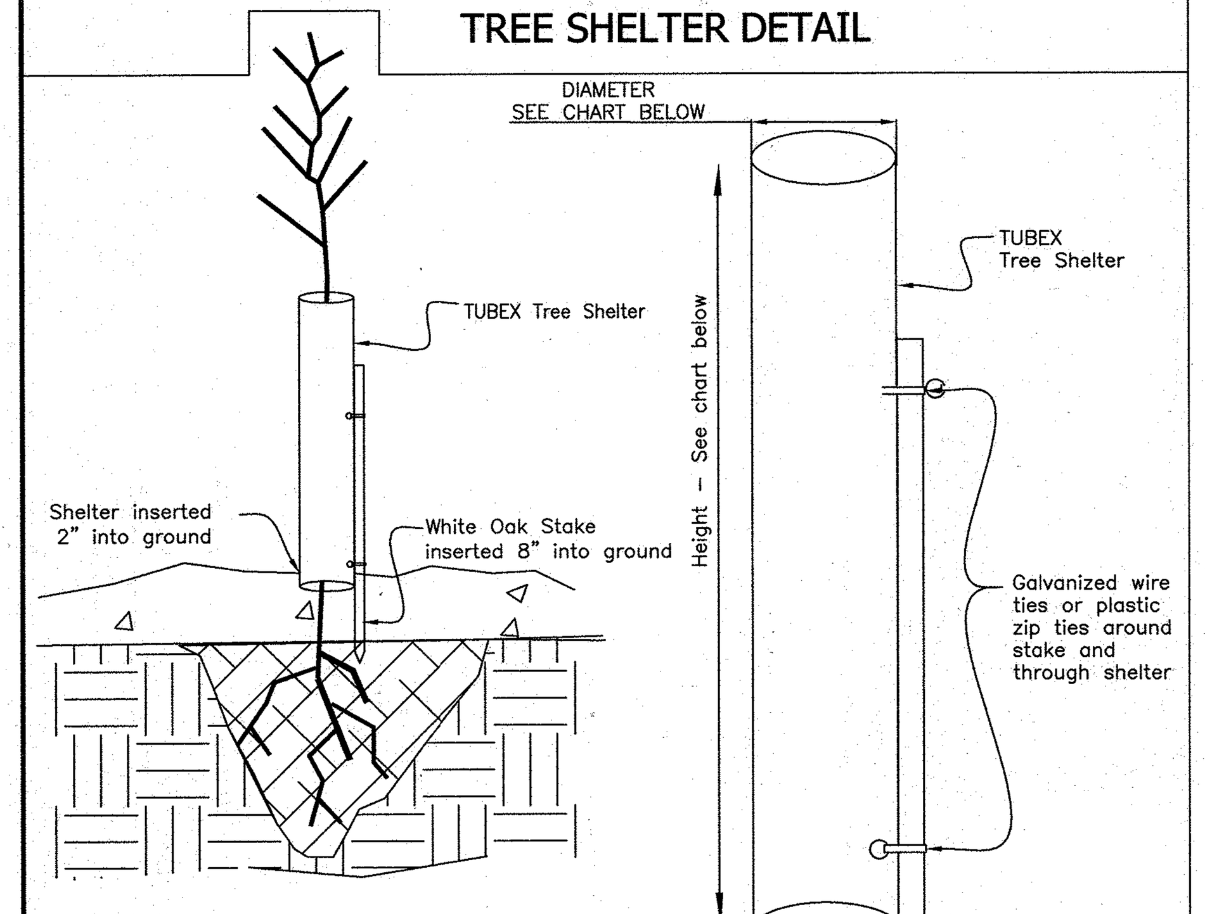
PLAN VIEW:
SCALE: 1" = 50'
(IN FEET)
1 inch = 50 ft.



- FORESTED AREA

VICINITY MAP
SCALE: 1" = 1000'
ADC MAP: 28 GRID: D7&D8

TREE SHELTER DETAIL



NOTES:

1. Always install stake before planting tree to prevent damaging the roots
2. Do not fasten ties too tightly, heaving of the tube caused by frost may damage tree if ties are not loose enough
3. Substitutions in materials only with approval from the Project Engineer.

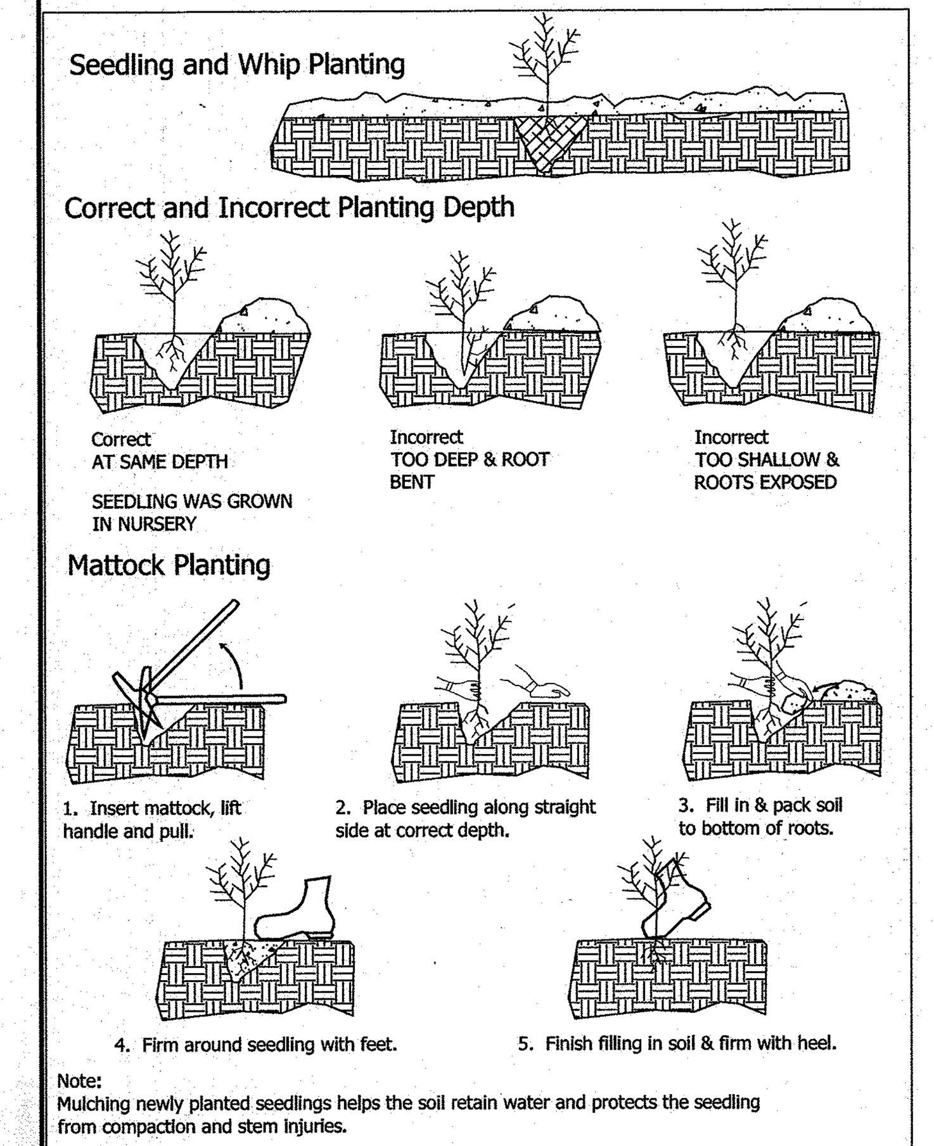
Stock Type:	Shelter Height:	Shelter Width:	Stake Height
Tree	48 inches	4 inches (avg.)	48 inches
Shrub	24 inches	5 inches (min.)	30 inches

INSTALLATION SEQUENCE:

1. Drive wooden stake 8 inches into the ground on the windward side of proposed tree location.
2. Plant tree as shown in TREE PLANTING DETAIL.
3. Place the tree shelter tube over tree and insert it 2 inches into the ground.
4. Fasten the tree shelter tube to the stake with galvanized wire or plastic zip ties.

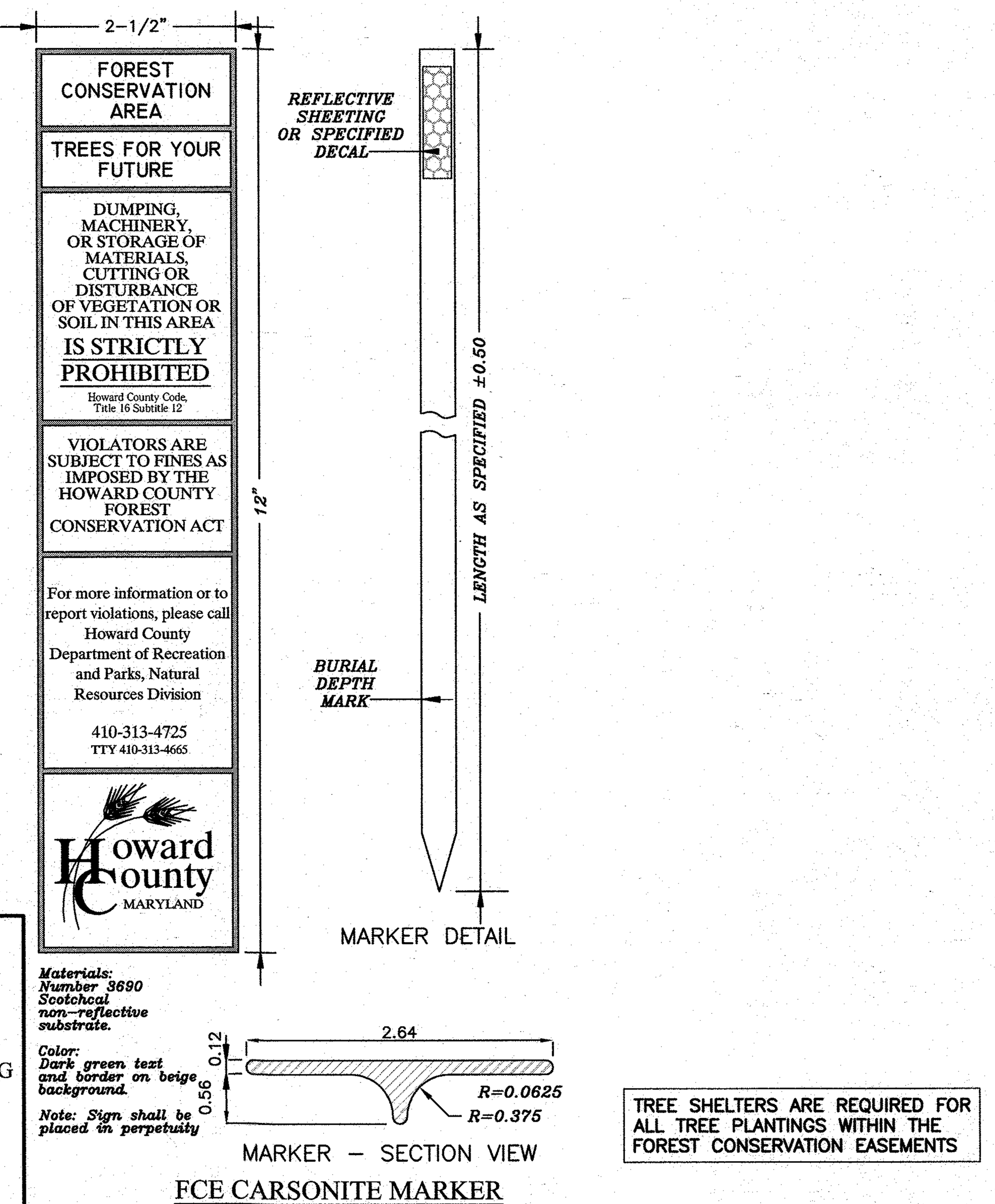
POST CONSTRUCTION MANAGEMENT

1. DEVELOPER SHALL COORDINATE A DNR QUALIFIED PROFESSION TO CONDUCT INSPECTIONS ON FOREST CONSERVATION AREAS AND/OR REFORESTATION AREAS AT THE BEGINNING AND END OF EACH GROWING SEASON.
2. OCCUPANTS OF THE DEVELOPMENT MUST BE NOTIFIED OF FOREST CONSERVATION EASEMENT (FCE) ADJACENT TO LOTS AND EDUCATED AS TO THE RESTRICTIONS ON THE FCE.
3. EXISTING FOREST SHALL BE INSPECTED TO DETERMINE IF FOREST HEALTH IS COMPROMISED.
4. IF HEALTH OF EXISTING FOREST IS COMPROMISED, PRACTICES MUST BE IMPLEMENTED TO RESTORE FOREST HEALTH.
5. FENCING AND/OR FOREST CONSERVATION SIGNAGE MUST BE MAINTAINED.
6. REFORESTATION AREAS SHALL BE INSPECTED TO DETERMINE THE HEALTH AND SURVIVABILITY OF PLANTED TREES AND IF MAINTENANCE IS REQUIRED TO MANAGE COMPETING VEGETATION. IF TREES HAVE A SURVIVABILITY OF LESS THAN 75%, PLANTING MUST OCCUR TO MEET THE REQUIREMENT. MAINTENANCE AND INSPECTION MUST BE DONE FOR A PERIOD OF TWO YEARS.
7. AT THE COMPLETION OF THE POST CONSTRUCTION MAINTENANCE PERIOD, THE DEVELOPER MUST HAVE THE EASEMENT AREA INSPECTED AND CERTIFIED BY COUNTY STAFF.



Note:
Mulching newly planted seedlings helps the soil retain water and protects the seedling from compaction and stem injuries.
Source: Adapted from Forest Conservation Manual, 1991

Seedling and Whip Planting Techniques



Materials: Number 3690 Scotchcal non-reflective substrate.
Color: Dark green text and border on beige background.
Note: Sign shall be placed in perpetuity

FCE CARSONITE MARKER
NOT TO SCALE

TREE SHELTERS ARE REQUIRED FOR ALL TREE PLANTINGS WITHIN THE FOREST CONSERVATION EASEMENTS

APPROVED: DEPARTMENT OF PUBLIC WORKS
[signature] 10/17/2017
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
[signature] 11-09-17
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[signature] 10.31.17
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

PLANTING SCHEDULE

FCE # 1 - 0.78 acres
Planting units Required: 546
Planting units Provided: 547

Qty	Species	Size	Spacing	Total FCA Units
10	Acer rubrum - Red maple	1" cal.	15' o.c.	
10	Liriodendron tulipifera - Tulip poplar	1" cal.	15' o.c.	
10	Quercus alba - White oak	1" cal.	15' o.c.	
30	Total 1" caliper trees x 3.5 units/tree= FCA unit credit			105
40	Acer rubrum - Red maple	2-3' whip	11' o.c.	
11	Diospyros virginiana - Persimmon	2-3' whip	11' o.c.	
60	Liriodendron tulipifera - Tulip poplar	2-3' whip	11' o.c.	
40	Nyssa sylvatica - Black gum	2-3' whip	11' o.c.	
25	Prunus serotina - Black cherry	2-3' whip	11' o.c.	
25	Quercus alba - White oak	2-3' whip	11' o.c.	
20	Viburnum prunifolium - Blackhaw	2-3' whip	11' o.c.	
221	Total whip plantings x 2 units /tree = FCA unit credit			442
	Total Unit Credit			547

Planting Notes:

- **Planting density based on 700 planting units per acre. 2" caliper trees = 7 planting units, 1" caliper trees = 3.5 planting units, whips with shelter = 2 planting units.**
- **1" caliper trees should be staggered along the outer perimeter of the planting area to serve as demarcation of the boundary. The trees should be no closer than 15 foot spacing.**
- **Planting shall be made in a curvilinear fashion along contour. The planting should avoid a grid appearance but should be spaced to facilitate maintenance**
- **All whips are required to be installed with tree shelters per Howard County FCA requirements.**

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

[Seal: STATE OF MARYLAND, DONALD ALAN MASON, No. 21443, PROFESSIONAL ENGINEER] [signature]
AS-BUILT 12-18-2020

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: 12-21-2022

FOREST CONSERVATION WORKSHEET

FOREST CONSERVATION WORKSHEET

5-Aug-02

NET TRACT AREA:

A. Total tract area ...	5.18
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) .... (Steep Slope 0.04 ac. Hghwy widen 0.01 ac	0.05
F. Net Tract Area ....=	5.13

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 =	0.77
H. Conservation Threshold ...	20%	x F =	1.03

EXISTING FOREST COVER:

I. Existing forest cover ....=	0.00
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 ....=	0.00
O. Total area of forest to be retained ....=	0.00

PLANTING REQUIREMENTS:

P. Reforestation for clearing above conservation threshold ....=	0.00
Q. Reforestation for clearing below conservation threshold ....=	0.00
R. Credit for retention above conservation threshold ....=	0.00
S. Total reforestation required ....=	0.00
T. Total afforestation required ....=	0.77
U. Credit for landscaping (may not exceed 20% of "S") ....=	0.00
V. Total reforestation and afforestation required ....=	0.77

GENERAL NOTES

1. PROPERTY CONSISTS OF ONE PARCEL TOTALING ±5.18 ACRES, IDENTIFIED AS TAX MAP 31, GRID 22, PARCEL 628. THE ENTIRE PROPERTY IS ZONED R-20.
2. BASE MAP INFORMATION PROVIDED BY BENCHMARK ENGINEERING AND HOWARD COUNTY GIS.
3. THERE ARE NO STREAMS OR NON-TIDAL WETLANDS ON-SITE.
4. THESE PLANS SHALL BE CONSIDERED PRELIMINARY UNTIL APPROVED AT FINAL FCP.
5. FOREST STAND DELINEATION WAS PERFORMED BY BENCHMARK ENGINEERING AND APPROVED UNDER THE ENVIRONMENTAL CONCEPT PLAN.
6. THERE ARE NO 100-YR FLOODPLAINS ON-SITE.
7. IN A LETTER DATED OCTOBER 8, 2015 BY THE MARYLAND DEPARTMENT OF NATURAL RESOURCES IT HAS BEEN DETERMINED NO RARE, THREATENED, OR ENDANGERED SPECIES ARE KNOWN TO OCCUR ON OR NEAR THE SITE. AS A RESULT, THERE ARE NO REQUIRED PROTECTIVE MEASUREMENTS AT THIS TIME.
8. THERE IS NO FOREST CLEARING ON-SITE.

FOREST CONSERVATION EASEMENT #1 CHART

TYPE	NON-CREDITED	CREDITED	TOTAL AREA
AFFORESTATION	0.78 Ac.	0.00 Ac.	0.78 Ac.
RETENTION	0.00 Ac.	0.00 Ac.	0.00 Ac.
TOTAL	0.78 Ac.	0.00 Ac.	0.78 Ac.

RESOURCE TABULATION

a. TOTAL AREA OF SITE	5.18 Ac.±
b. AREA OF 100 YEAR FLOODPLAIN	0.00 Ac.
c. AREA OF STEEP SLOPES (25% OR GREATER)	0.04 Ac.±
e. SPECIMEN TREES	1
f. CHAMPION TREES	0.00 Ac.
g. STREAM BUFFER	0.00 LF
h. STREAM	0.00 Ac.±
i. WETLANDS	0.00 Ac.±
j. WETLANDS BUFFER	0.00 Ac. ±

SPECIMEN TREE

COMMOM NAME	SCIENTIFIC NAME	DBH	VIGOR	COMMENTS	IMPACT
TULIP POPLAR	Liriodendron tulipifera	38"	GOOD	GOOD	REMAIN ON-SITE

Eco-Science Professionals, Inc.
CONSULTING ECOLOGISTS
P.O. BOX 5006 GLEN ARM, MARYLAND 21057 TELEPHONE (410) 832-2480 FAX (410) 832-2488

PLAN PREPARED BY:
[signature] 10/4/17
JOHN CANOLES
MD DNR FCA QUALIFIED PROFESSIONAL

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH F-PLAN

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. 22390, Expiration Date: 6-30-2019
[Seal: STATE OF MARYLAND, CHRISTOPHER ALAN MALAGARI, No. 22390, PROFESSIONAL ENGINEER] [signature] 10-3-17

OWNER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES

LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
A SUBDIVISION OF PARCEL 628

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

FOREST CONSERVATION PLAN

DESIGN: DBT/NAF	DRAWN: NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 7 OF 15

AS-BUILT

F-17-097

NRCS SOILS CHART - HoCo Soils Map No. 19				
SYMBOL	HYDRIC	GROUP	Kw	MAP UNIT NAME
Fa*	YES	D	0.20	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT
RsB		C	0.37	RUSSETT FINE SANDY LOAM, 2 TO 5 PERCENT SLOPES
RsC		C	0.37	RUSSETT FINE SANDY LOAM, 5 TO 10 PERCENT SLOPES
SaB		B	0.37	SASSAFRAS LOAM, 2 TO 5 PERCENT SLOPE
SfB		B	0.24	SASSAFRAS GRAVELLY SAND LOAM, 2 TO 5 PERCENT SLOPES

PLEASE NOTE: HIGHLY ERODIBLE, K>0.35, AND/OR 15% OR GREATER SLOPES
TAKEN FROM THE NRCS WEB SOIL SURVEY, AUGUST 2014. SHEET 19

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: 12-21-2022

AS-BUILT 12-18-2020

AREA AND "C" FACTOR TABULATION						
PROJECT:	Rockburn Estates		DATE : 4/27/2017		BY: NAF	BEI JOB # 2706
INLET #	ZONING (Z)	SUBAREA (B)	AREA (Ac) (A)	"C" FACTOR (C)<25	"C" FACTOR (C)>25	% IMPERVIOUS
I-1	R-20		0.14	0.22	0.27	0
I-2	R-20		0.17	0.31	0.49	56
I-3	R-20		0.09	0.33	0.96	65
I-4	R-20		0.18	0.30	0.52	53
I-5	R-20		0.45	0.25	0.32	37
I-6	R-20		0.26	0.25	0.66	40
I-7	R-20		0.22	0.86	0.95	100
I-8	R-20		0.32	0.86	0.34	100
I-9	R-20		0.04	0.86	0.34	100
I-10	R-20		0.31	0.23	0.42	13

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH SDP

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. 22390, Expiration Date: 6-30-2019
10-19-17

OWNER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

STORM DRAIN DRAINAGE AREA MAP

DESIGN: DBT/NAF	DRAWN: DBT/NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 8 OF 15

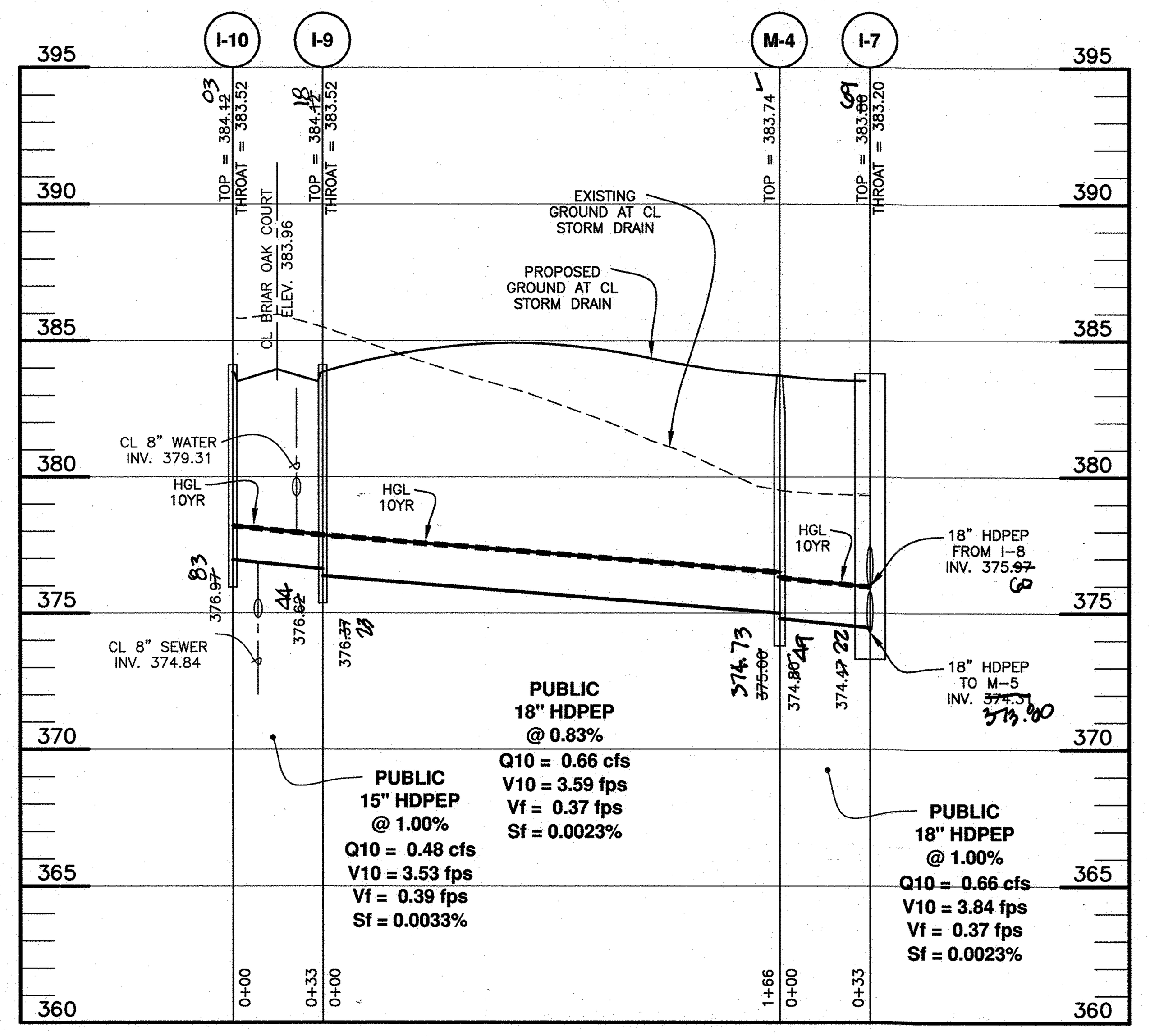
APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 10/23/2017
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 11-09-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10-31-17

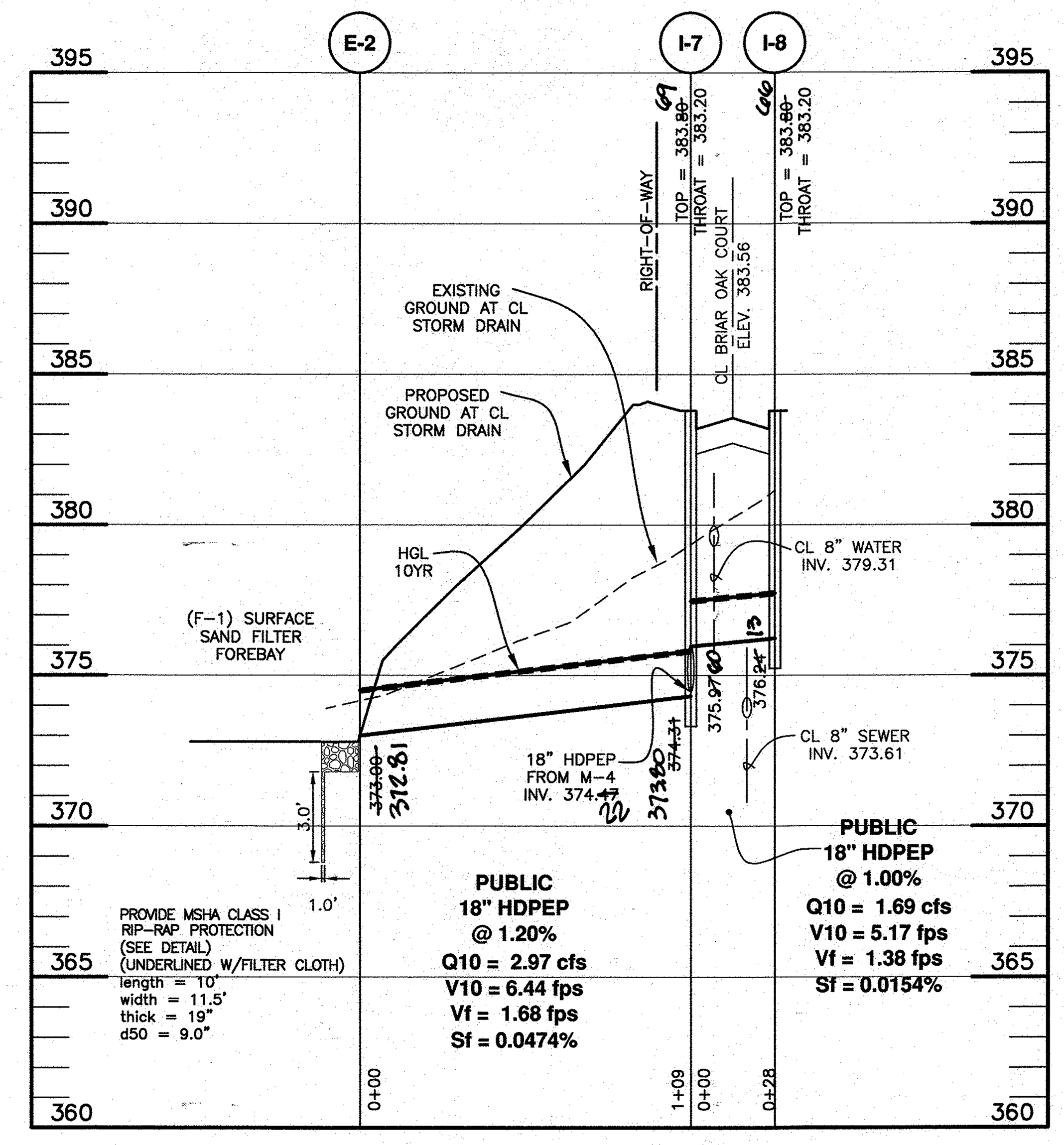
(IN FEET)
1 inch = 30 ft.

AS-BUILT

F-17-097

J:\2706 FRANCIS-KISS\dwg\7044.dwg 10/19/2017 3:00:45 PM



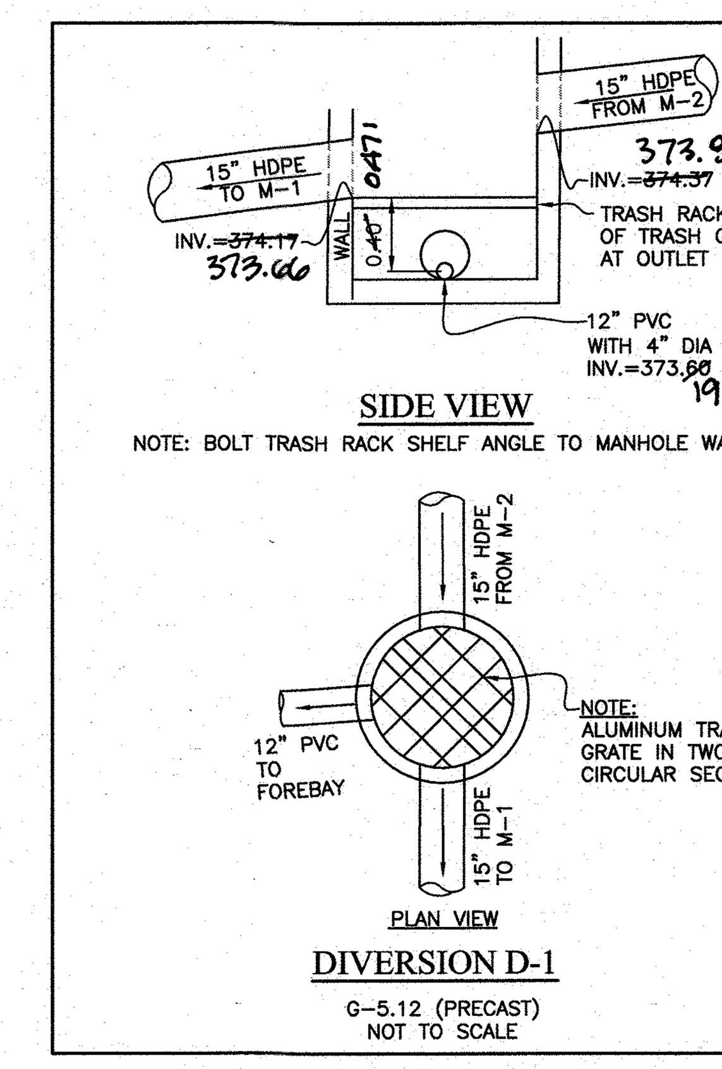


STORM DRAIN PROFILE

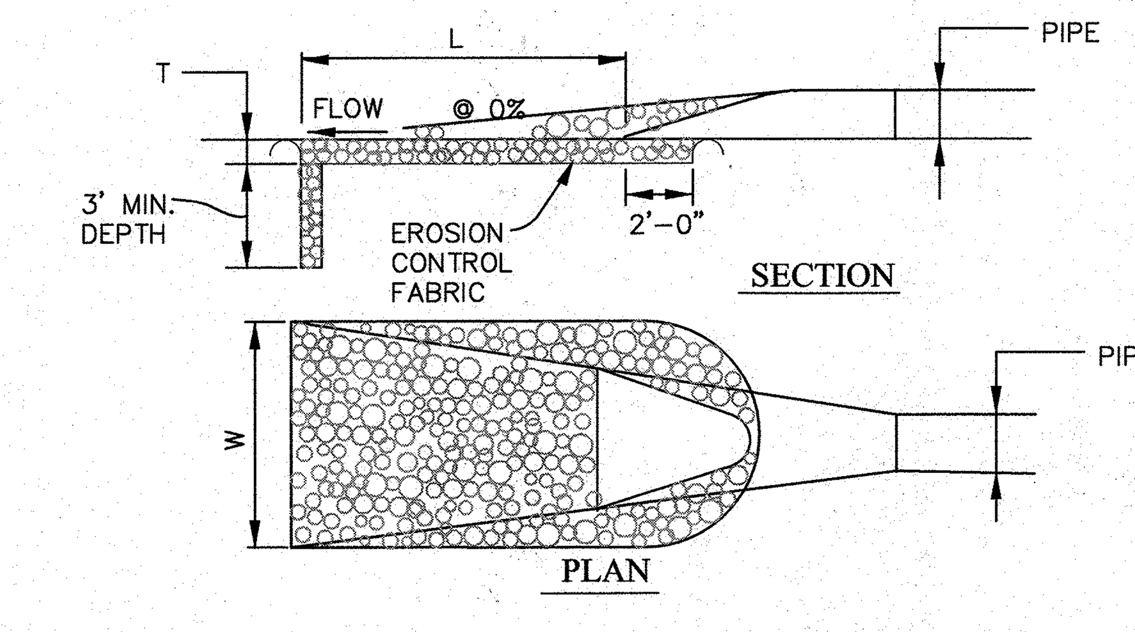
SCALE: 1" = 50' HORZ., 1" = 5' VERT.

STORM DRAIN PROFILE

SCALE: 1" = 50' HORZ., 1" = 5' VERT.



DIVERSION STRUCTURE DETAIL



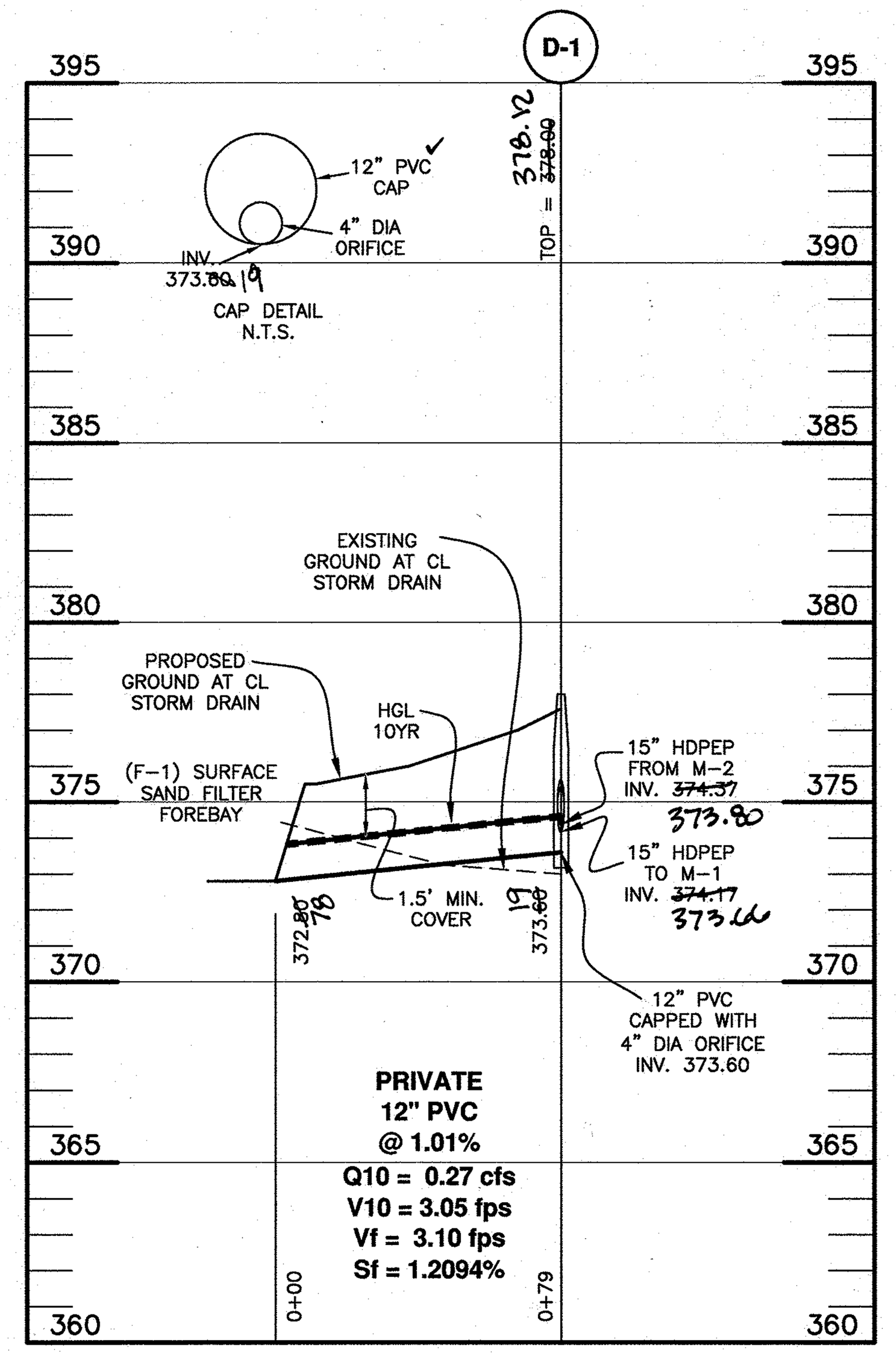
STRUCTURE	V_{10}	D_{10}	D-50	LENGTH (L)	WIDTH (W)	THICKNESS (T)	SHA CLASS
E-1	9.68	0.62	9.5"	13'	11.5'	19"	I
E-2	6.23	0.45	9.5"	10'	11.5'	19"	I

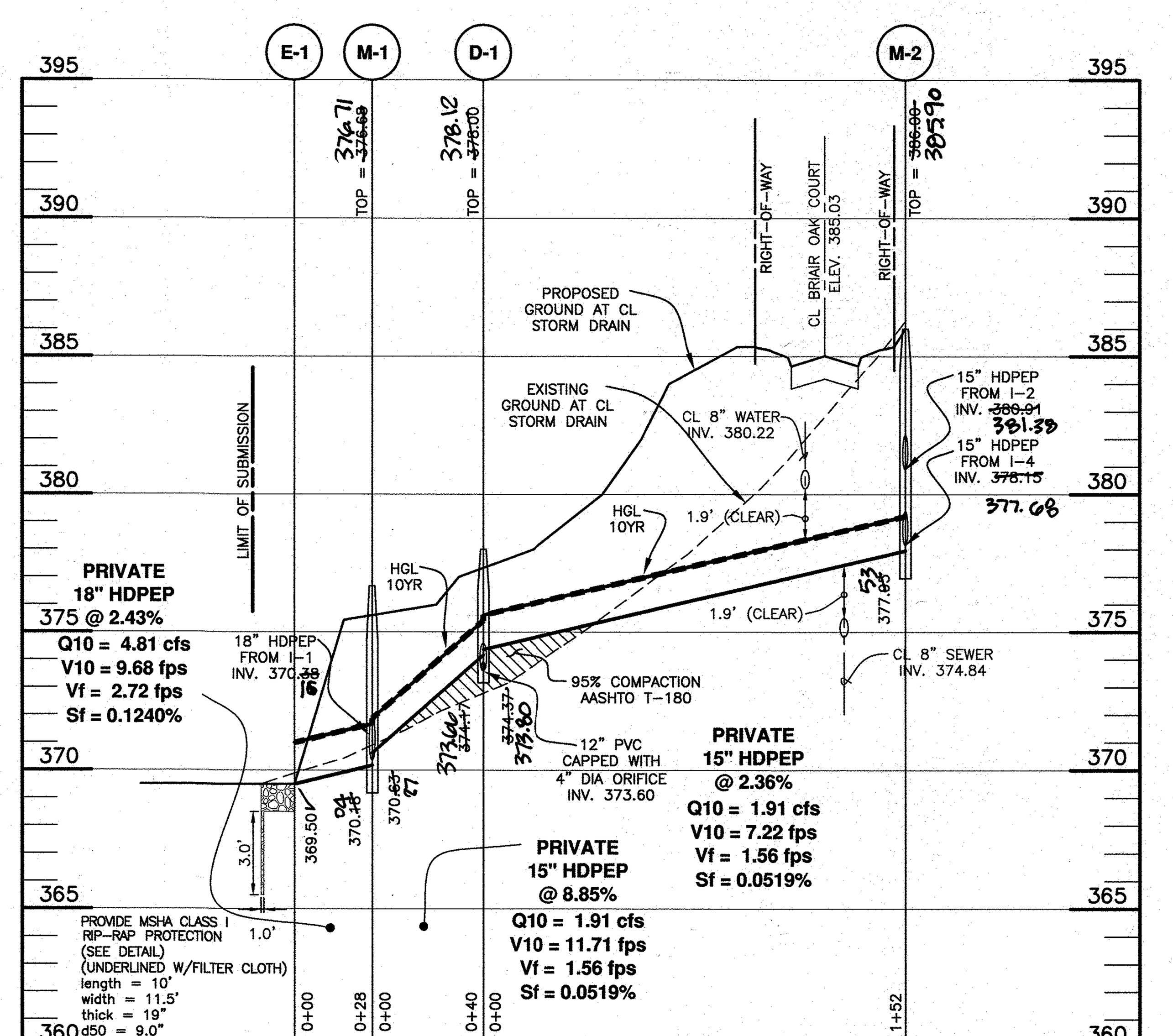
OUTLET PROTECTION DETAIL

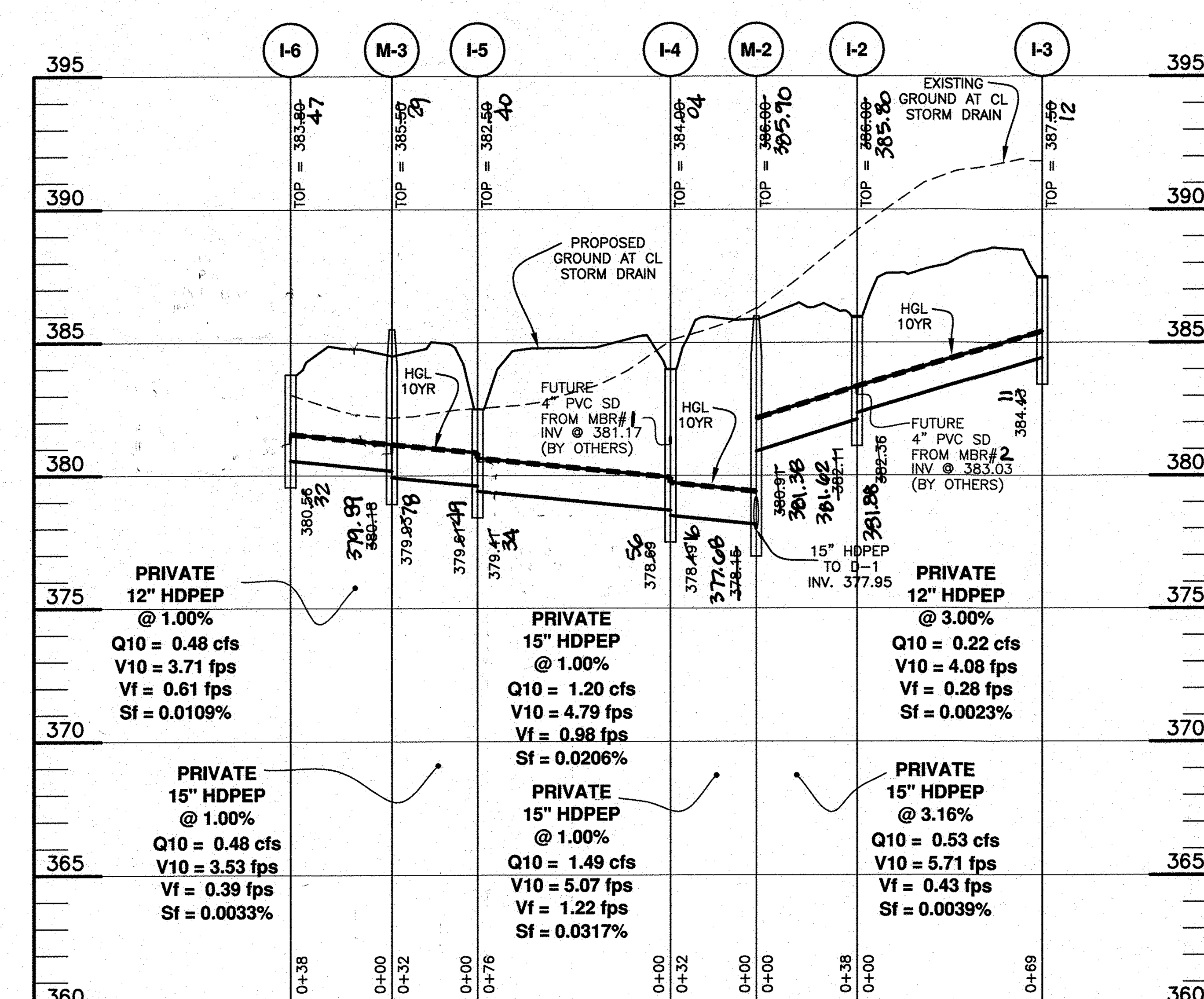
NOT TO SCALE

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 C28 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.







STORM DRAIN PROFILE

SCALE: 1" = 50' HORZ., 1" = 5' VERT.

STORM DRAIN PROFILE

SCALE: 1" = 50' HORZ., 1" = 5' VERT.

STORM DRAIN PROFILE

SCALE: 1" = 50' HORZ., 1" = 5' VERT.

PIPE SCHEDULE

SIZE	MATERIAL	LENGTH	MAINTENANCE
12"	PVC	79'	PRIVATE
12"	HDPE	186'	PRIVATE
15"	HDPE	370'	PRIVATE
15"	HDPE	33'	PUBLIC
18"	HDPE	336'	PUBLIC
18"	HDPE	48'	PRIVATE

ALL PIPES SHALL BE SMOOTH WALLED, NO INTERIOR CORRUGATIONS

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: 12-14-2020

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: 12-21-2022

AS-BUILT

STORM DRAIN STRUCTURE SCHEDULE

STRUCT NO.	TYPE	HO.CO. STD. DETAIL	LOCATION Road Name	CL Station	Offset	INVERT IN		INVERT OUT	TOP ELEVATION	THROAT ELEVATION	MAINTENANCE
INLETS											
I-1	D inlet modified	see sheet 11	N 566,541.51 E 1,375,939.37			-	381.62	370.82 (18") 76	375.83 77	375.00 374.97	PRIVATE
I-2	YARD	D-4.14	Briar Oak Court	14+82.53	29.96' LEFT	383.03 4"	382.36 (12")	382.11 (15") 381.38	386.00 385.80	-	PRIVATE
I-3	YARD	D-4.14	Briar Oak Court	15+51.51	29.94' LEFT	-	56	384.48 (12") 11	387.50 12	-	PRIVATE
I-4	YARD	D-4.14	Briar Oak Court	14+18.76	35.29' LEFT	381.17 4"	378.69 (15")	378.48 (15") 16	384.00 04	-	PRIVATE
I-5	YARD	D-4.14	Briar Oak Court	13+49.78	31.61' LEFT		379.61 (15") 49	379.41 (15") 34	382.50 40	-	PRIVATE
I-6	YARD	D-4.14	Briar Oak Court	12+74.01	31.42' LEFT	60	32	380.56 (12") 32	383.80 47	-	PRIVATE
I-7	A-10 (2.5' wide)	D-4.03	Briar Oak Court	13+39.82	12.43' RIGHT	375.97 (18")	374.37 (18")	374.31 (18") 373.80	383.80 69	383.20	PUBLIC
I-8	A-10 (2.5' wide)	D-4.03	Briar Oak Court	13+39.82	12.43' LEFT	-	41	376.24 (18") 18	383.80 66	383.20	PUBLIC
I-9	A-10 (2.5' wide)	D-4.03	Briar Oak Court	11+43.94	15.15' RIGHT	-	376.62 (15")	376.37 (18") 23	384.12 18	383.52	PUBLIC
I-10	A-10 (2.5' wide)	D-4.03	Briar Oak Court	11+43.94	15.15' LEFT	-	-	376.97 (15") 83	384.12 03	383.52	PUBLIC
MANHOLES											
M-1	4' Diameter Pre-Cast	G-5.12	N 566,547.66 E 1,375,959,77			370.63 (15") 27	370.28 (18") 16	370.18 (18") 04	376.68 71		PRIVATE
M-2	4' Diameter Pre-Cast	G-5.12	Briar Oak Court	14+47.43	28.99' LEFT	380.91 (15")	378.15 (15") 379.68	377.98 (15") 53	386.00 385.90		PRIVATE
M-3	4' Diameter Pre-Cast	G-5.12	Briar Oak Court	13+14.99	29.48' LEFT	381.38 379.91	380.18 (12")	379.93 (15") 78	385.50 29		PRIVATE
M-4	4' Diameter Pre-Cast	G-5.12	Briar Oak Court	13+08.70	16.48' RIGHT	374.73	375.00 (18")	374.80 (18") 49	383.74 ✓		PUBLIC
D-1	4' Diameter Pre-Cast	G-5.12	Briar Oak Court	14+42.09	28.98' RIGHT	-	374.37 (15") 373.80	373.66 374.17 (15") 373.60 (12") 19	378.00 12		PRIVATE
END SECTIONS											
E-1	18" HDPEP	NA	N 566,522.21 E 1,375,970.82			-	-	369.50 (18") ✓	-		PRIVATE
E-2	18" HDPEP	NA	N 566,534.19 E 1,375,876.82			-	-	373.00 (18") 372.78	-		PUBLIC

STRUCTURE LOCATION FOR MANHOLES IS AT THE CENTER OF THE MANHOLE
STRUCTURE LOCATION FOR TYPE 'A' INLETS IS AT THE MIDPOINT ALONG THE GUTTER PAN
STRUCTURE LOCATION FOR TYPE 'S' INLETS IS AT THE CENTER OF THE GRATE.
STRUCTURE LOCATION FOR END SECTIONS IS AT THE MIDPOINT OF THE END OF THE STRUCTURE
PRECAST STRUCTURES MEETING HS-20 LOADING MAY BE USED.

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 10/23/2017

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 11-09-17

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10-31-17

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH SDP

BENCHMARK ENGINEERING, INC.

ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS

8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
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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. 22390, Expiration Date: 6-30-2019

10-19-17

OWNER:

SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:

SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES

LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 - GRID: 22 - PARCEL: 628 - ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

STORM DRAIN PROFILES

DATE: OCTOBER 2, 2017 | BEI PROJECT NO: 2706

DESIGN: DBT/NAF | DRAWN: DBT/NAF | SCALE: AS SHOWN | SHEET 9 OF 15

AS-BUILT

F-17-097

NRCS SOILS CHART - HoCo Soils Map No. 19				
SYMBOL	HYDRIC	GROUP	Kw	MAP UNIT NAME
Fa*	YES	D	0.20	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT
RsB		C	0.37	RUSSETT FINE SANDY LOAM, 2 TO 5 PERCENT SLOPES
RsC		C	0.37	RUSSETT FINE SANDY LOAM, 5 TO 10 PERCENT SLOPES
SaB		B	0.37	SASSAFRAS LOAM, 2 TO 5 PERCENT SLOPE
SfB		B	0.24	SASSAFRAS GRAVELLY SAND LOAM, 2 TO 5 PERCENT SLOPES

PLEASE NOTE: HIGHLY ERODIBLE, K>0.35, AND/OR 15% OR GREATER SLOPES TAKEN FROM THE NRCS WEB SOIL SURVEY, AUGUST 2014. SHEET 19

LEGEND

- PROJECT BOUNDARY
- 388 — EXISTING TOPOGRAPHY (AUG., 2015)
- 390 — EXISTING TREELINE
- SOILS DELINEATION
- RsB — SOILS TYPE
- PROPOSED STORM DRAIN
- DRAINAGE AREA DIVISION
- 15-24.99% SLOPES
- +25% SLOPES
- PROPOSED SIDEWALK
- FOREST CONSERVATION EASEMENT
- PROPOSED IMPERVIOUS

* Roof Drains shall be directed to a stormwater device.

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

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

AS-BUILT 12/1/2020

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: 12-21-2022

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 10/23/2017

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 11-09-17

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10-31-17

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH SDP

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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. 22390, Expiration Date: 6-30-2019

STATE OF MARYLAND — CHRISTOPHER ALAN BENCHARSKI — No. 22390 — PROFESSIONAL ENGINEER

10-19-17

OWNER:
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410-465-4244

DEVELOPER:
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ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES

LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

STORMWATER MANAGEMENT DRAINAGE AREA MAP

DESIGN: DBT/NAF	DRAWN: DBT/NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 10 OF 15

AS-BUILT

F-17-097

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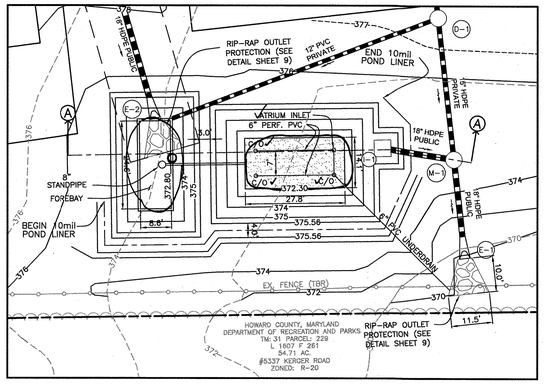
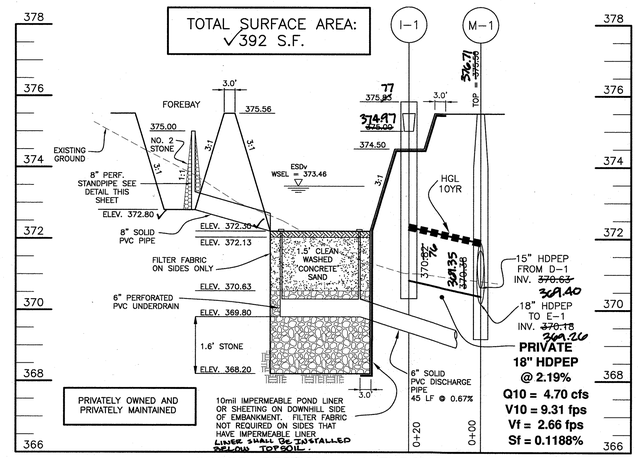
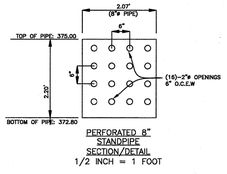


PLAN VIEW
(F-1) SURFACE SAND FILTER
SCALE: 1"=20'



CROSS-SECTION A-A THROUGH
(F-1) SURFACE SAND FILTER
SCALE: 1"=10' HORZ., 1"=1' VERT.



PERFORATED 8" STANDPIPE
SECTION/DETAIL
1/2 INCH = 1 FOOT

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND PRIVATELY MAINTAINED (F-1) SURFACE SAND FILTER

ROUTINE MAINTENANCE (BY HOA)

1. THE STORMWATER WETLAND FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE FACILITY IS FUNCTIONING PROPERLY.
2. THE TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF ONCE PER YEAR, WHEN VEGETATION REACHES 18" IN HEIGHT OR AS NEEDED.
3. FILTERS THAT HAVE A GRASS COVER SHALL BE MOWED A MINIMUM OF THREE (3) TIMES PER GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 12 INCHES.
4. DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
5. VISIBLE SIGNS OF EROSION IN THE FACILITY SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
6. REMOVE SILT WHEN IT EXCEEDS FOUR (4) INCHES DEEP IN THE FOREBAY, IF APPLICABLE.
7. WHEN WATER PONDS ON THE SURFACE OF THE FILTER BED FOR MORE THAN 72 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REPLACED WITH FRESH MATERIAL. PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIALS AND LIQUID MUST BE FOLLOWED BY THE OWNER.
8. A LOGBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
9. THE MAINTENANCE LOGBOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
10. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION SYSTEM HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

NON-ROUTINE MAINTENANCE (BY HOA)

1. STRUCTURAL COMPONENTS OF THE POND SUCH AS THE EMBANKMENT, THE RISER STRUCTURE AND TRASH RACK, AND PIPES SHALL BE REPAIRED UPON THE DETECTION OF ANY DAMAGE. THESE COMPONENTS SHALL BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.

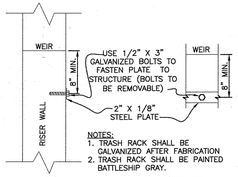
APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 10/23/2017

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

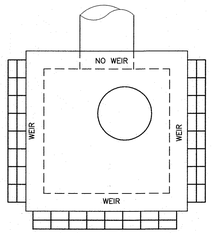
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4-09-17

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10.31.17

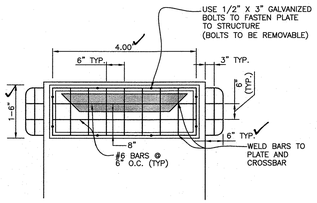


NOTES:
1. TRASH RACK SHALL BE GALVANIZED AFTER FABRICATION
2. TRASH RACK SHALL BE PAINTED BATTLESHIP GRAY.

TRASH RACK ANCHOR DETAIL
NOT TO SCALE

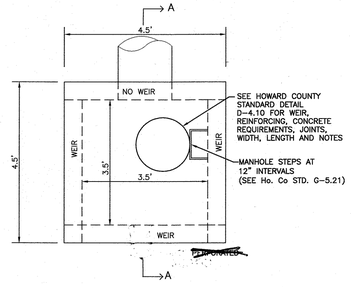


PLAN VIEW

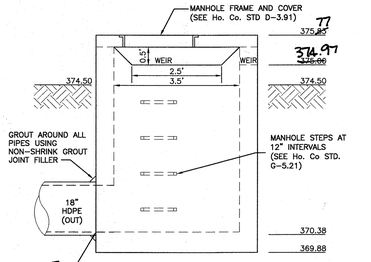


ELEVATION VIEW

I-1 TRASH RACK
SCALE: 1" = 2'



PLAN VIEW



SECTION A-A
ELEVATION VIEW

I-1 DETAIL
SCALE: 1" = 2'

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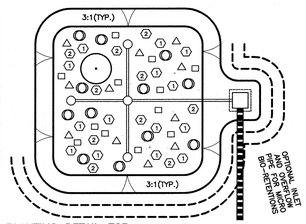
(M-6) MICRO-BIORETENTION PRACTICE INTERNAL LANSCAPING CHART											
Facility square footage				MB #1 10	MB #2 10	MB #3 10	MB # 1	MB # 2	MB # 3 463	MB # 4 399	MB # 5 126	TOTAL 1006
PLANT NAME	COMMON NAME	TYPE	SIZE	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY
Ilex verticillata	Common Winterberry	shrub	2.5'-3' ht	1	1	1	1	1	5	4	1	12
Lobelia cardinalis	Cardinal flower	perennial herbaceous plant	quart bulb	3	3	3	3	3	31	27	8	84
Lobelia siphilitica	Great Blue Lobelia	perennial herbaceous plant	quart bulb	3	3	3	3	3	31	27	8	84
Carex stricta	Upright Sedge	grass	quart bulb	3	3	3	3	3	31	27	8	84
Iris versicolor	Blue Water Iris	perennial herbaceous plant	quart bulb	3	3	3	3	3	31	27	8	84
Liatris spicata	Prairie Gay Feather	perennial herbaceous plant	quart bulb	3	3	3	3	3	31	27	8	84

PLANTING LEGEND	
SYMBOL	NAME
①	LOBELIA CARDINALIS
②	LOBELIA SIPHILITICA
□	CAREX STRICTA
△	IRIS VERSICOLOR
◯	LIATRIS SPICATA
⊙	ILEX VERTICILLATA



SCHEMATIC PLANTING DETAIL FOR (M-6) PRACTICES
NOT TO SCALE

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

1. 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 A.4.2.
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.
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.

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: 12-21-2022

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

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: 12-19-2020

Table B.3.1 Material Specifications for Sand Filters

Material	Specification/Test Method	Size	Notes
sand	clean AASHTO-M-6 or ASTM-C-33 concrete sand	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.
peat	ash content: < 15% pH range: 5.2 to 4.9 loose bulk density 0.12 to 0.15 g/cc	n/a	The material must be reed-sedge hemic peat, shredded, uncompacted, uniform, and clean.
leaf compost		n/a	
underdrain gravel	AASHTO-M-43	0.375" to 0.75"	
geotextile fabric (if required)	ASTM-D-4833 (puncture strength - 125 lb.) ASTM-D-4632 (Tensile Strength - 300 lb.)	0.08" thick equivalent opening size of #80 sieve	Must maintain 125 gpm per sq. ft. flow rate. Note: a 4" pea gravel layer may be substituted for geotextiles meant to "separate" sand filter layers.
impermeable liner (if required)	ASTM-D-4833 (thickness) ASTM-D-412 (tensile strength 1,100 lb., elongation 200%) ASTM-D-624 (Tear resistance - 150 lb./in) ASTM-D-471 (water adsorption: +/- 8 to +/- 25% max)	30 mil thickness	Liner to be ultraviolet resistant. A geotextile fabric should be used to protect the liner from puncture.
underdrain piping	F 758, Type PS 28 or AASHTO-M-278	4" - 6" rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes
concrete (cast-in-place)	MSHA Standards and Specs. Section 903, Min No. 3, f'c = 3500 psi, normal weight, air-entrained; re-inforcing 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
concrete (pre-cast)	per pre-cast manufacturer	n/a	SEE ABOVE NOTE
non-rebar steel	ASTM A-36	n/a	structural steel to be hot-dipped galvanized ASTM-A-123

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 or cobbles	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed	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 ½-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.

NOTE: SEE ACF FOCAL POINT SPECIFICATIONS FOR PLANTING SOILS FOR MICRO BIO-RETENTIONS #1 THRU 5.

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 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 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 (⅛" 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

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH SDP

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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 Number: 21390 Expiration Date: 6-30-2019

STATE OF MARYLAND — CHRISTOPHER ALAN KISS — No. 21390 — PROFESSIONAL ENGINEER — 10-09-17

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ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

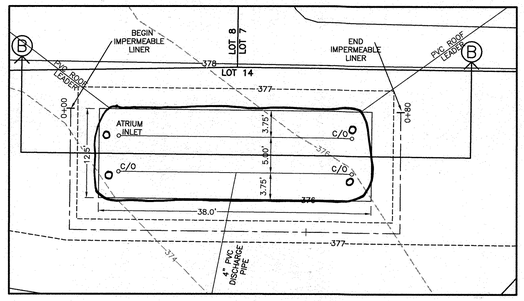
TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

STORMWATER MANAGEMENT SAND FILTER DETAILS AND MB NOTES

DESIGN: DBT/NAF	DRAWN: DBT/NAF	SCALE: AS SHOWN	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706	SHEET 11 OF 15

AS-BUILT

F-17-097



PLAN VIEW
(M-6) MICRO BIO-RETENTION #4
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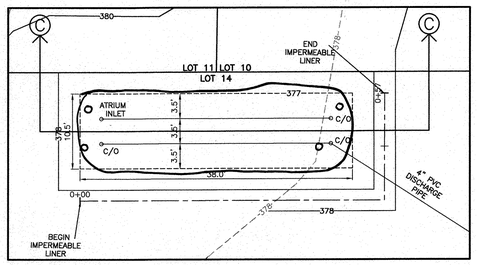

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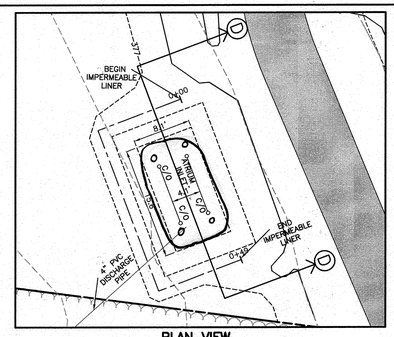

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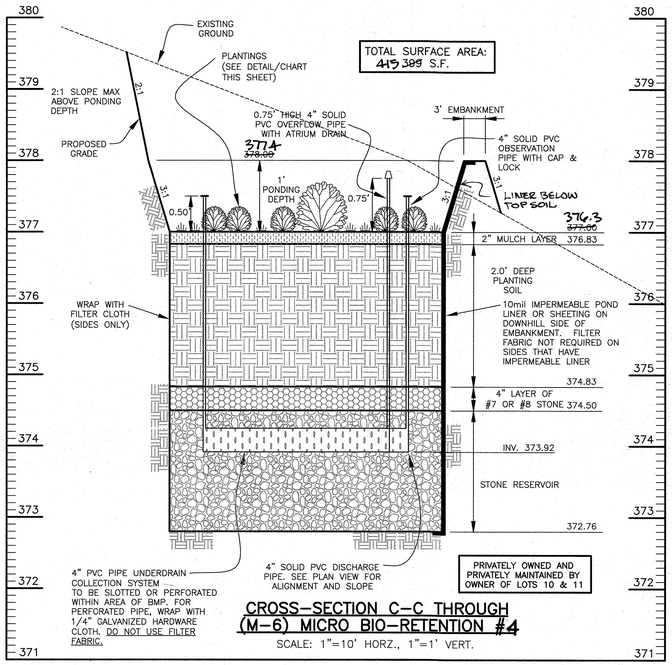

CROSS-SECTION C-C THROUGH
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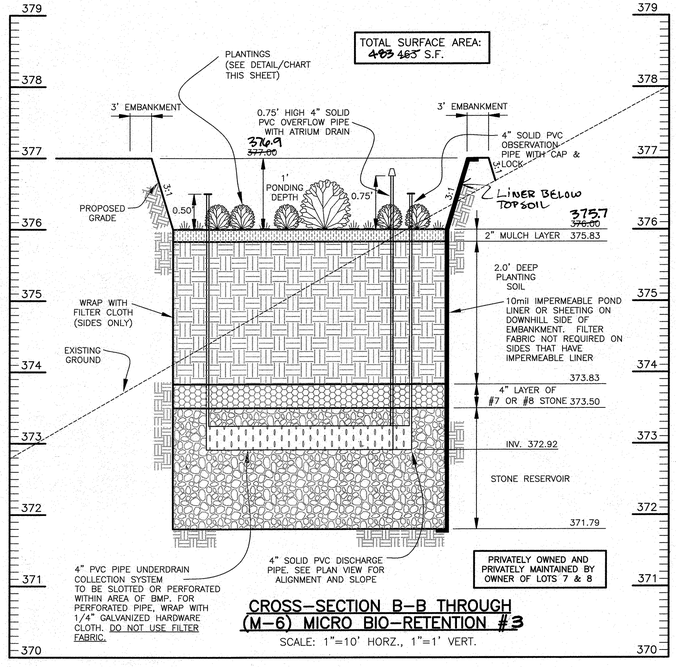
SCALE: 1"=10' HORZ., 1"=1' VERT.



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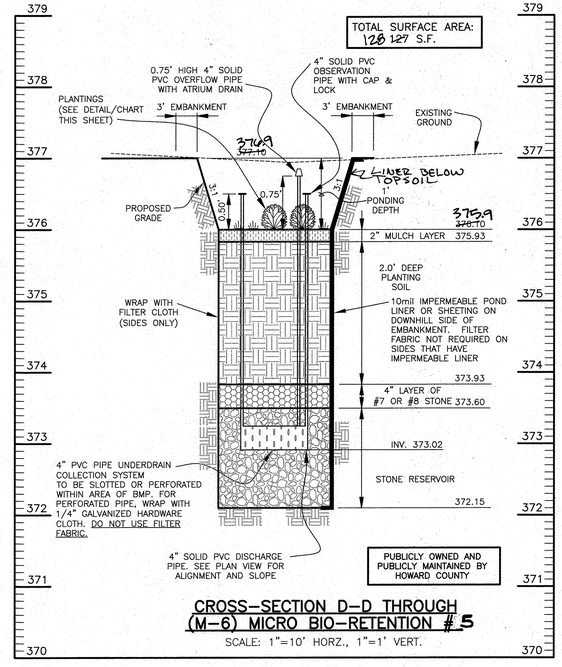


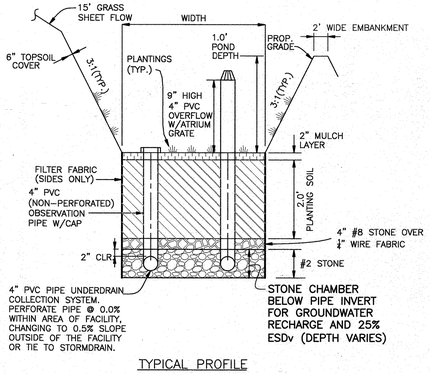
CROSS-SECTION D-D THROUGH
(M-6) MICRO BIO-RETENTION #5
SCALE: 1"=10' HORZ., 1"=1' VERT.

UNDERDRAIN, OVERFLOW AND OUTFALL NOTES

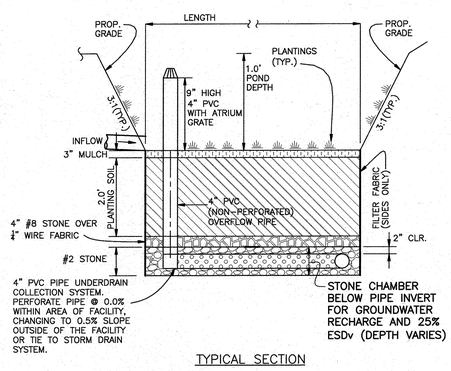
1. THE LAST CLEAN-OUT LOCATION WITHIN EACH MICRO-BIORETENTION FACILITY SHALL BE FITTED WITH A NON-CLOGGING SURFACE DRAIN (EXAMPLE: 4" ABS ROOF DRAIN W/CAST ALUMINUM DOME) AT THE POND SURFACE ELEVATION INDICATED IN THE CORRESPONDING TABLE ELEV. 2.

2. THE PVC WITHIN THE FACILITY SHALL BE PERFORATED.

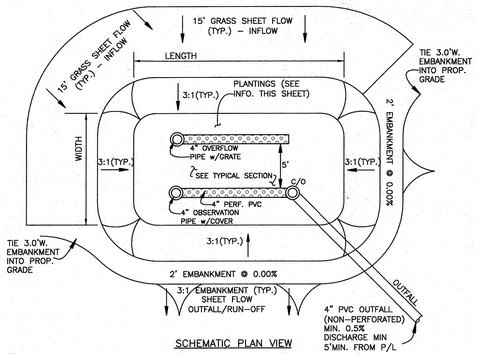
3. THE UNDER-DRAIN AND PIPE TO OUTFALL SHALL BE INSTALLED TO A MINIMUM DEPTH OF 2' BELOW FINISHED GRADE AND SHALL MAINTAIN A MINIMUM 1% SLOPE AND MAINTAIN A MINIMUM OF 1' OF SEPARATION AT ALL CROSSINGS.



TYPICAL PROFILE



TYPICAL SECTION



SCHEMATIC PLAN VIEW

TYPICAL MICRO-BIORETENTION DETAILS FOR MB #3 #4 AND #5
NOT TO SCALE

NOTE: SEE SHEET 11 FOR PLANTING CHART

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 10/17/2017

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 11-09-17

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10-31-17

AS-BUILT

STATE OF MARYLAND · DONALD ALAN MASON · No. 21449 · PROFESSIONAL ENGINEER

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: 12-19-2020

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. 21449 Expiration Date: 12-21-2022

NO.	DATE	REVISION
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10-3-19

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ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
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TAX MAP: 31 - GRID: 22 - PARCEL: 628 - ZONED: R-20
5333 KERGER ROAD
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HOWARD COUNTY, MARYLAND

STORMWATER MANAGEMENT DETAILS FOR STANDARD MICRO-BIO PRACTICES

DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
DESIGN: DBT/NAF · DRAWN: DBT/NAF	SCALE: AS SHOWN · SHEET 12 OF 15

AS-BUILT

F-17-097

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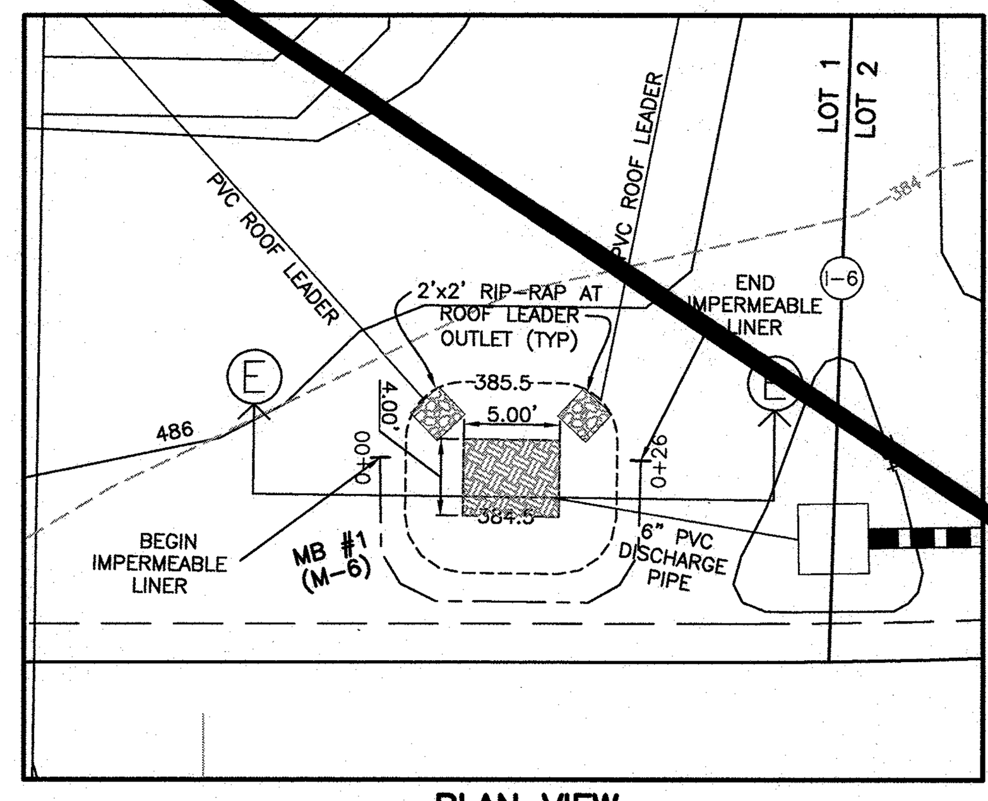
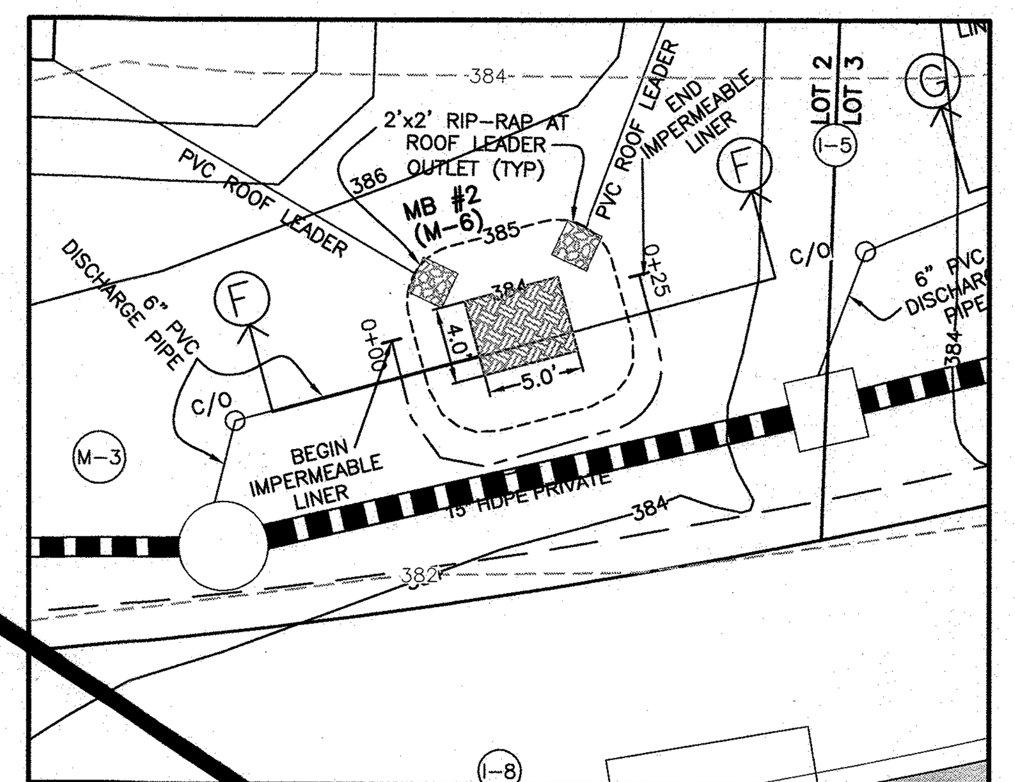


PLAN VIEW
(M-6) MICRO BIO-RETENTION #1
ACF FOCAL POINT
SCALE: 1" = 10'



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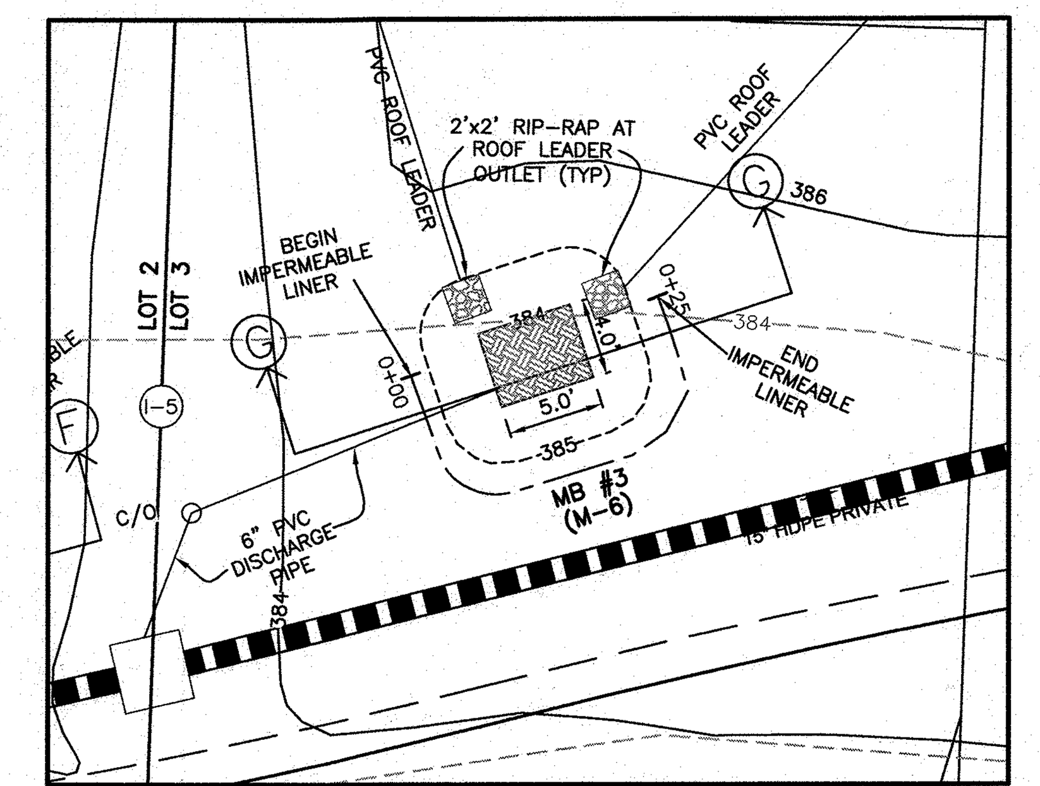
(M-6) MICRO BIO-RETENTION #2
ACF FOCAL POINT
SCALE: 1" = 10'



PLAN VIEW
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ACF FOCAL POINT
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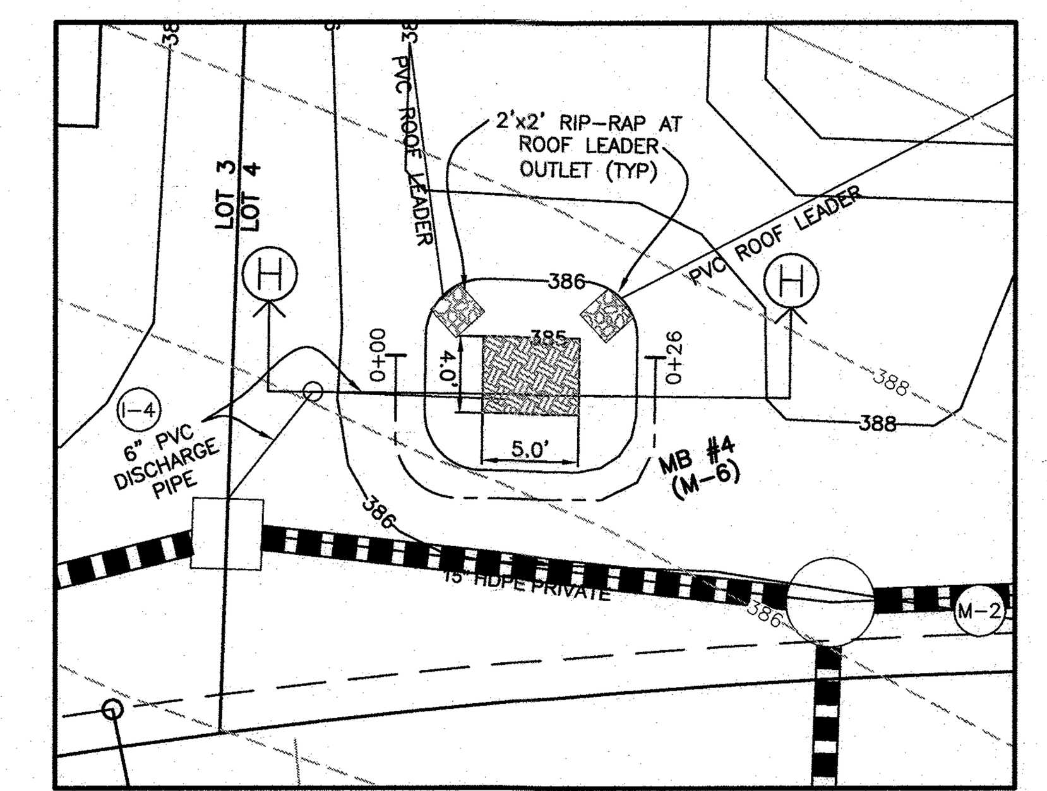
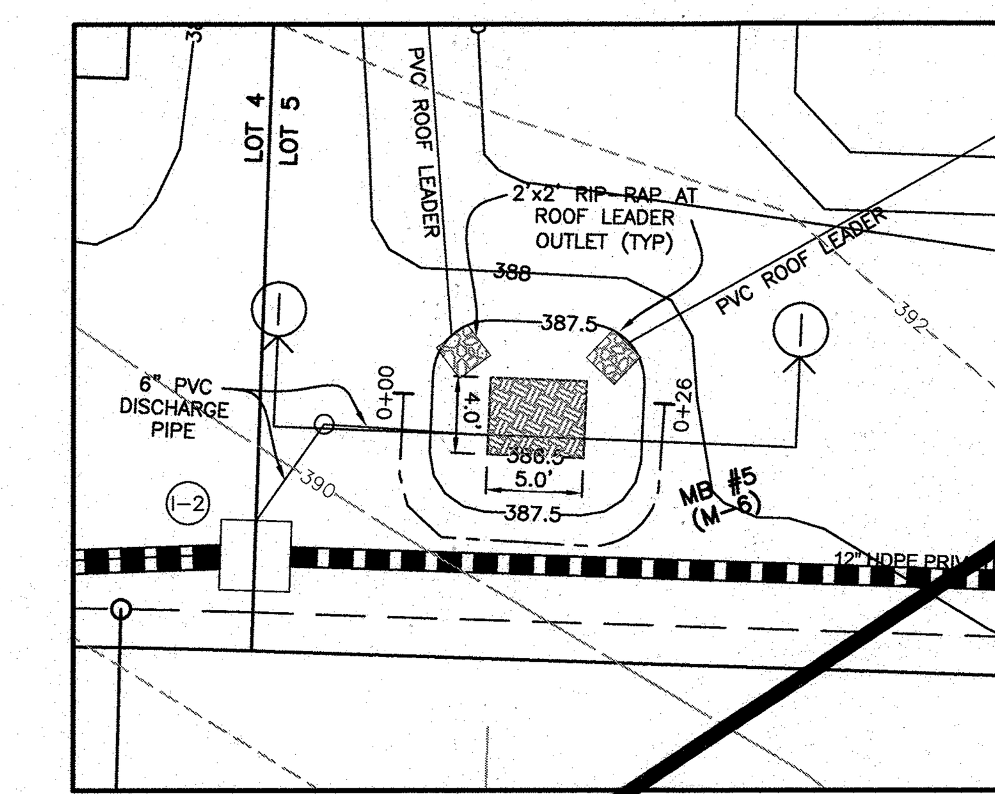
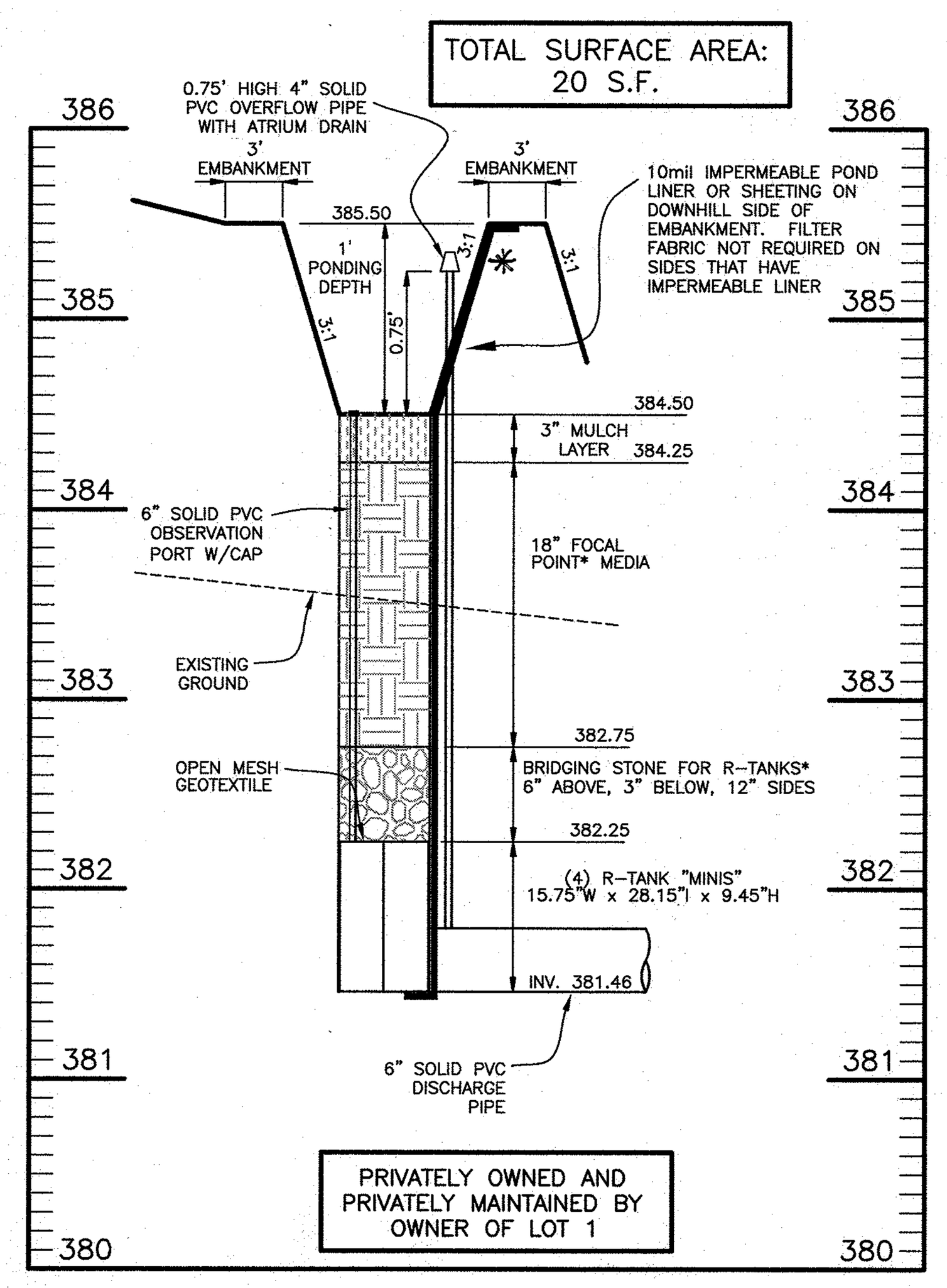


PLAN VIEW
(M-6) MICRO BIO-RETENTION #4
ACF FOCAL POINT
SCALE: 1" = 10'

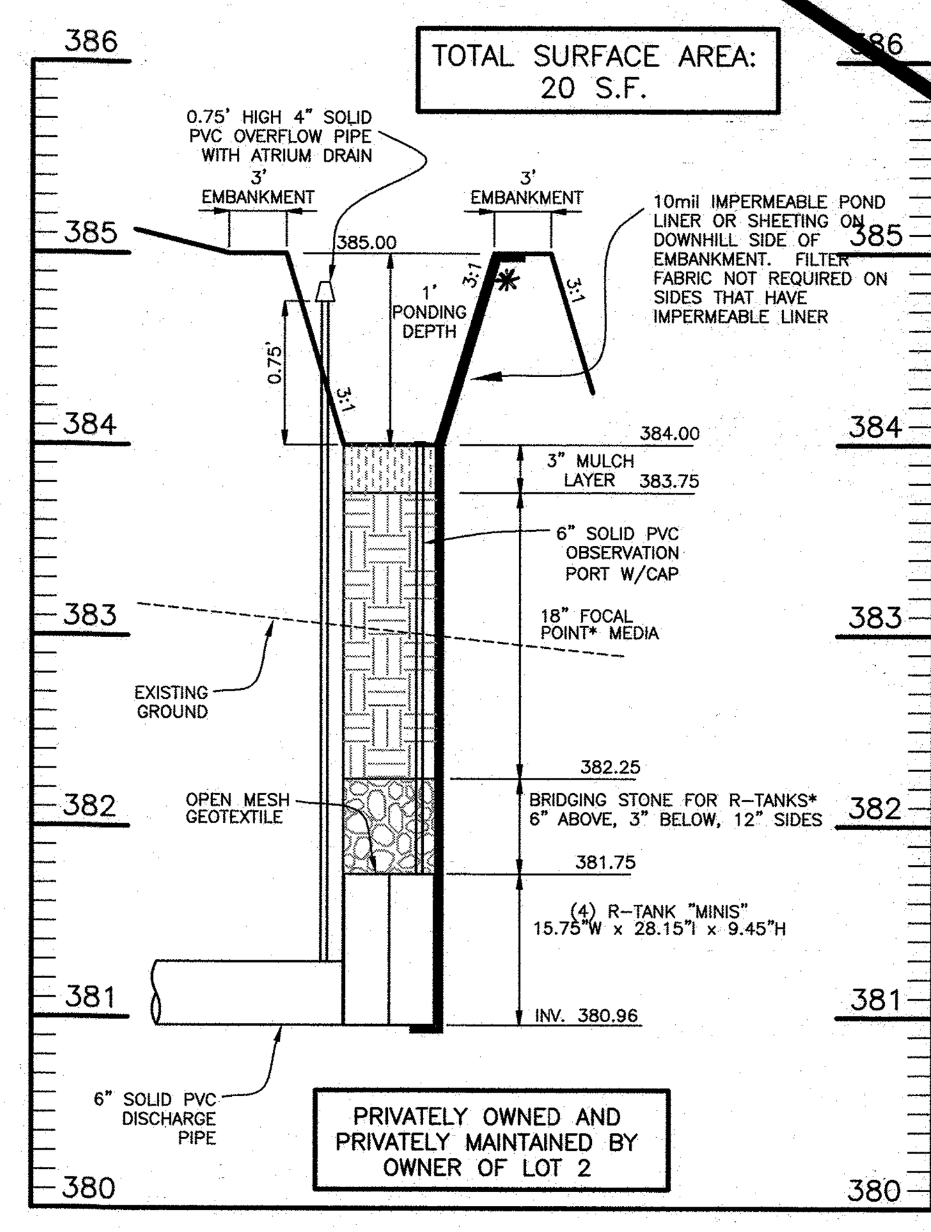


PLAN VIEW
(M-6) MICRO BIO-RETENTION #5
ACF FOCAL POINT
SCALE: 1" = 10'



CROSS-SECTION E-E THROUGH
(M-6) MICRO BIO-RETENTION #1
ACF FOCAL POINT
SCALE: 1"=10' HORZ., 1"=1' VERT.

* LINER INSTALLED BELOW TOPSOIL



CROSS-SECTION F-F THROUGH
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ACF FOCAL POINT
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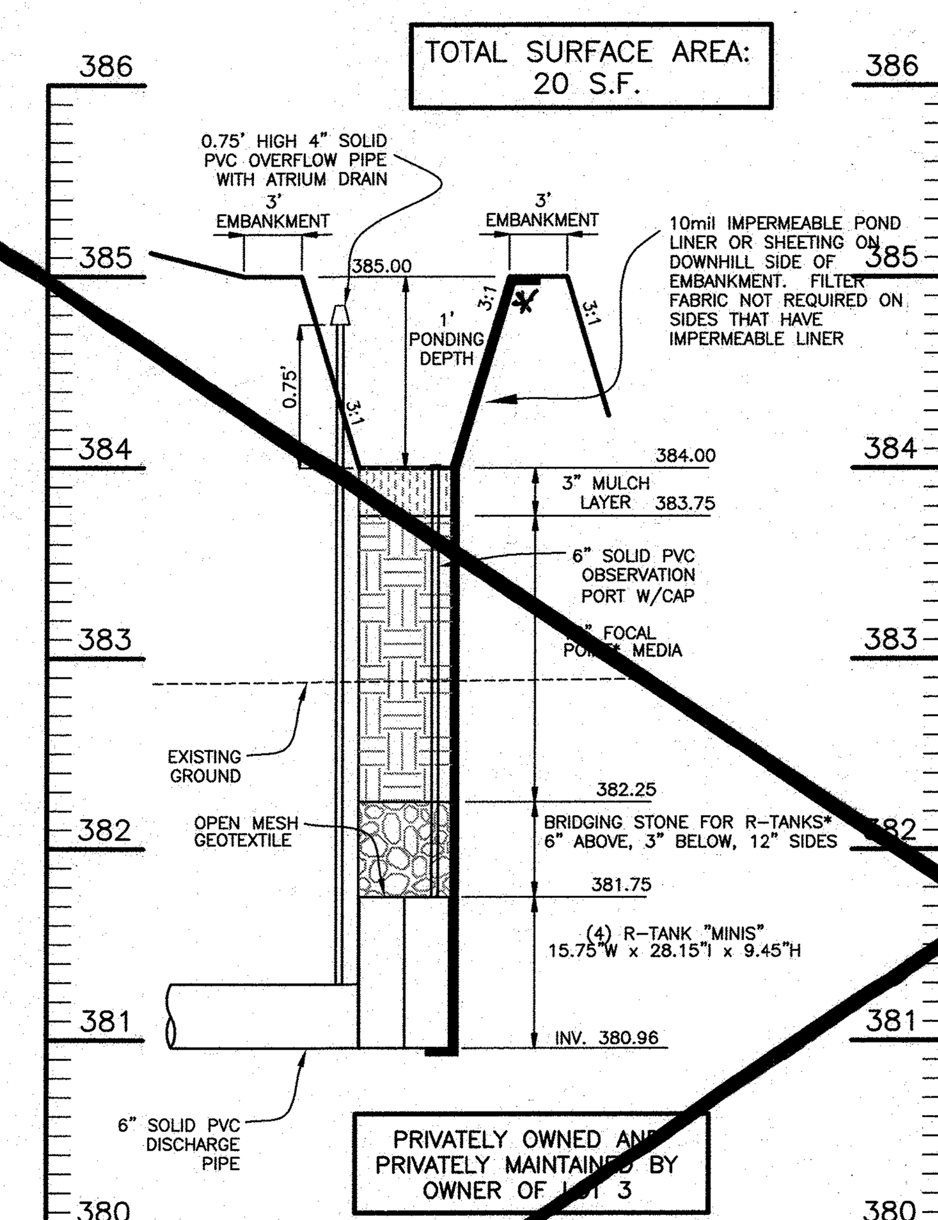

CROSS-SECTION G-G THROUGH
(M-6) MICRO BIO-RETENTION #3
ACF FOCAL POINT
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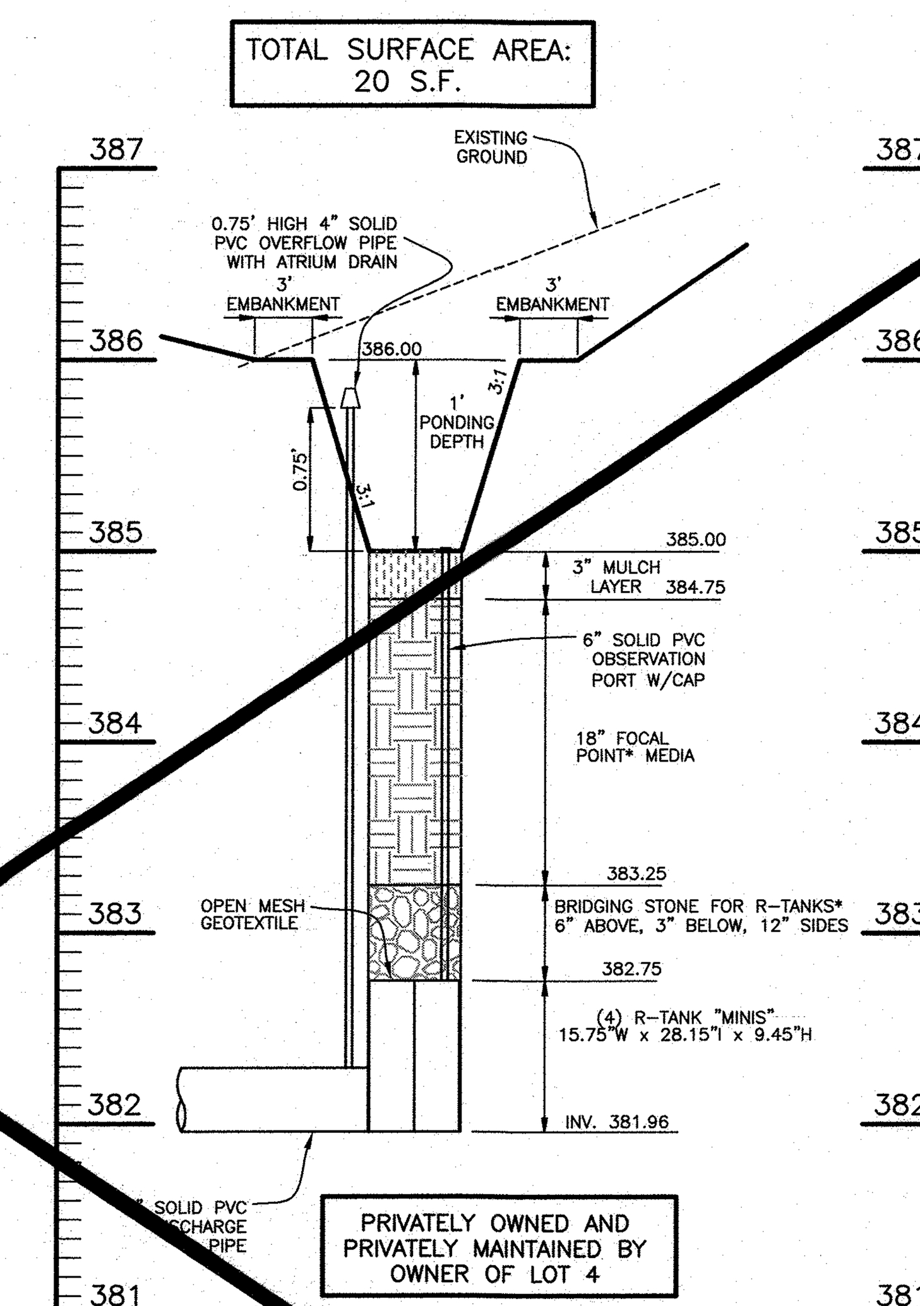

CROSS-SECTION H-H THROUGH
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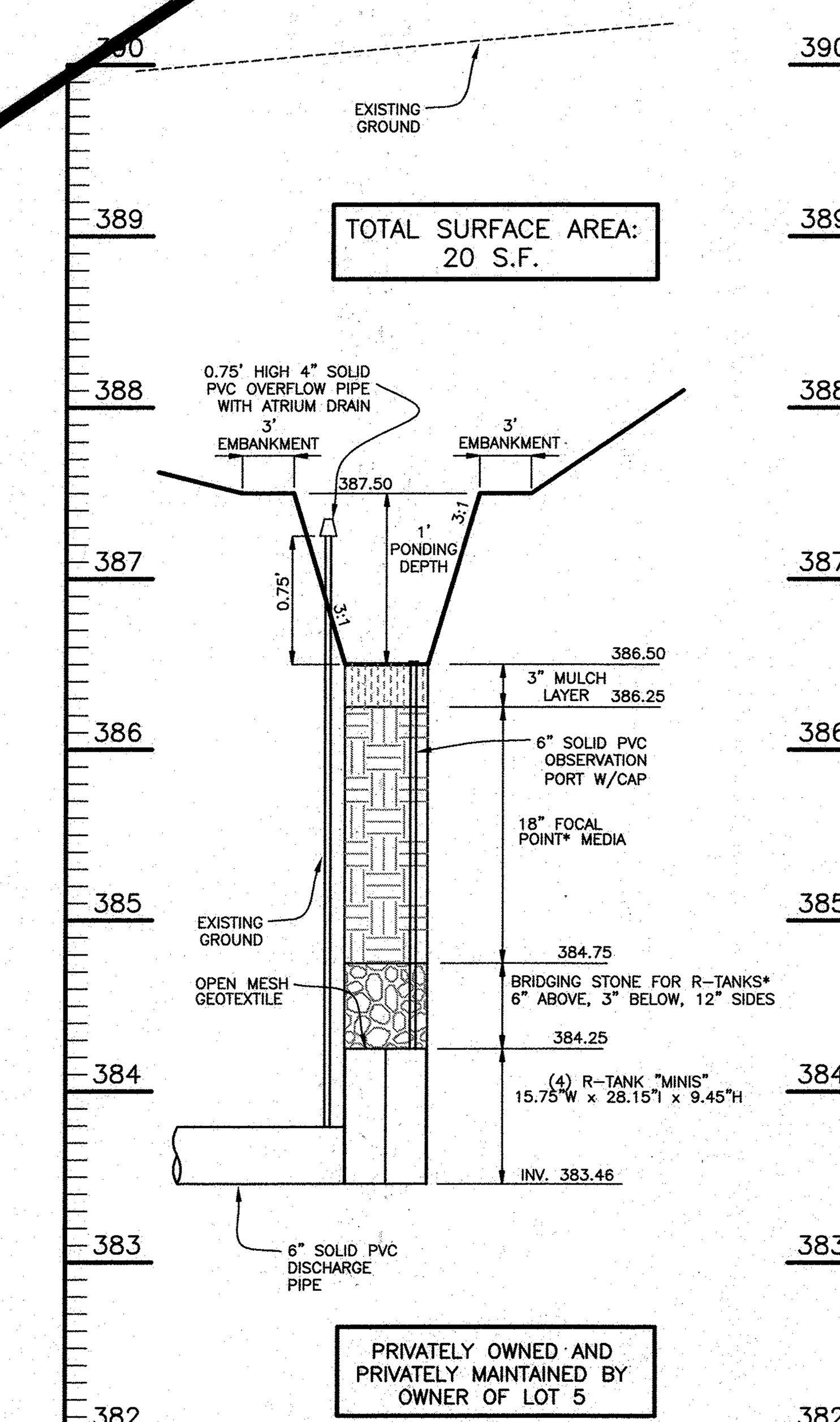


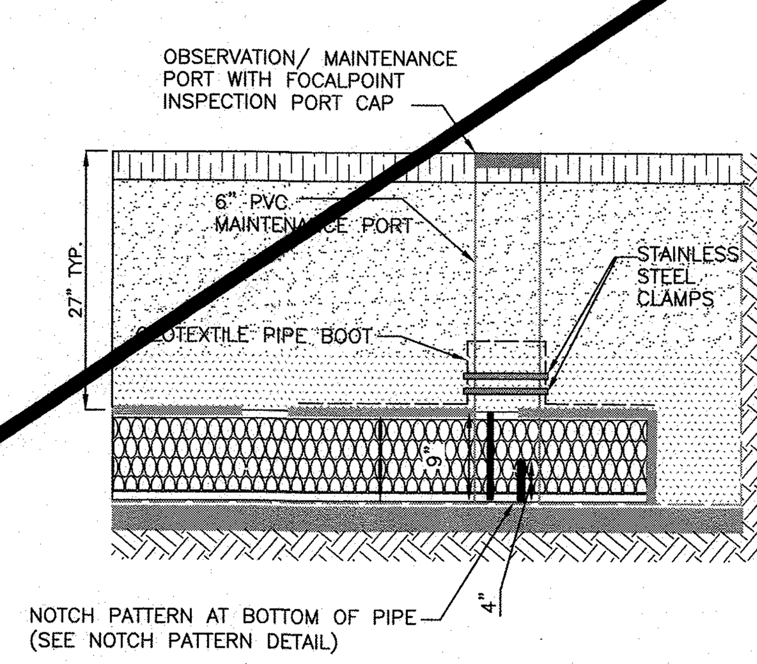
CROSS-SECTION I-I THROUGH
(M-6) MICRO BIO-RETENTION #5
ACF FOCAL POINT
SCALE: 1"=10' HORZ., 1"=1' VERT.

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

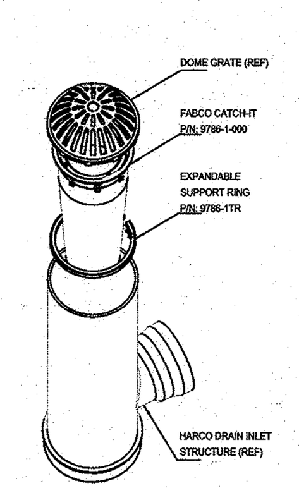
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 21443, Expiration Date: 12-21-2022

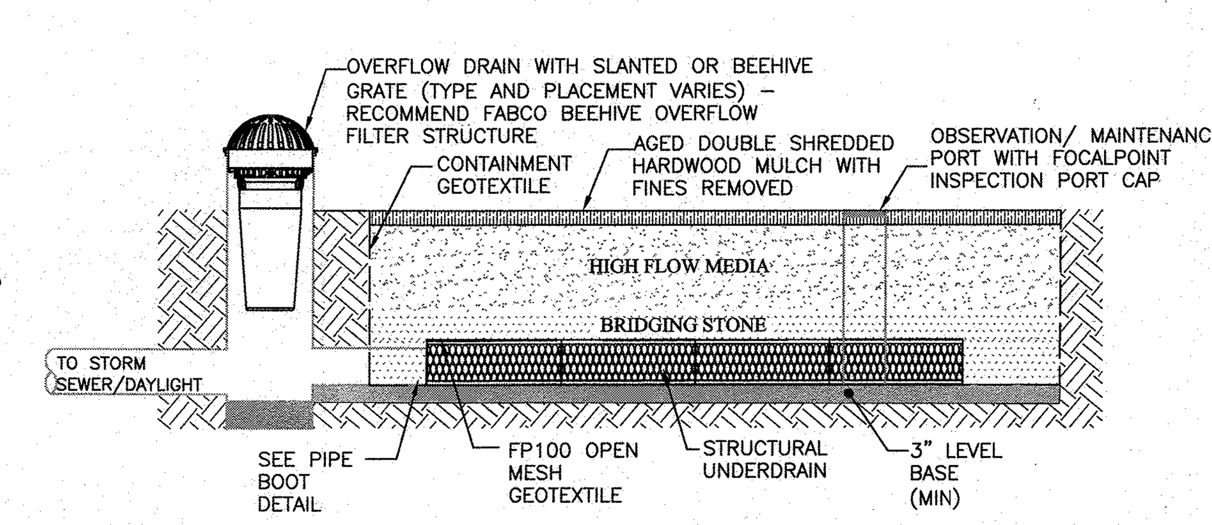
AS-BUILT 12-18-2020

*FOCAL POINT AND R-TANKS ARE PRODUCTS OF ACF ENVIRONMENTAL, 800-448-3636

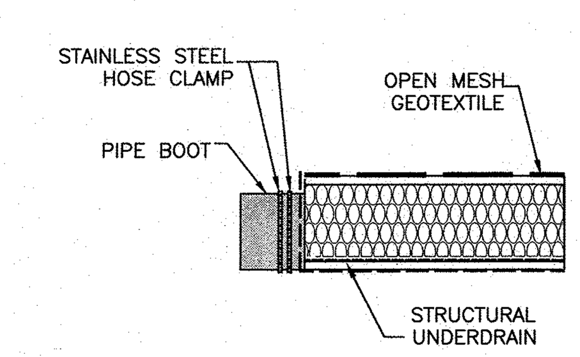


OBSERVATION/ MAINTENANCE PORT

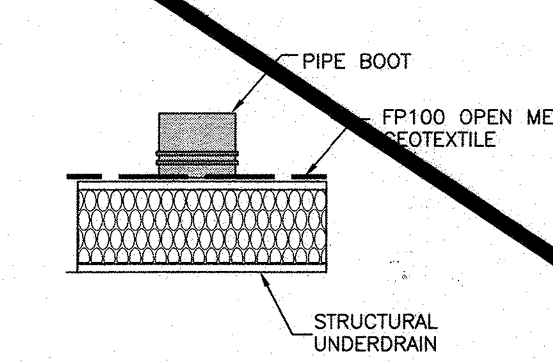




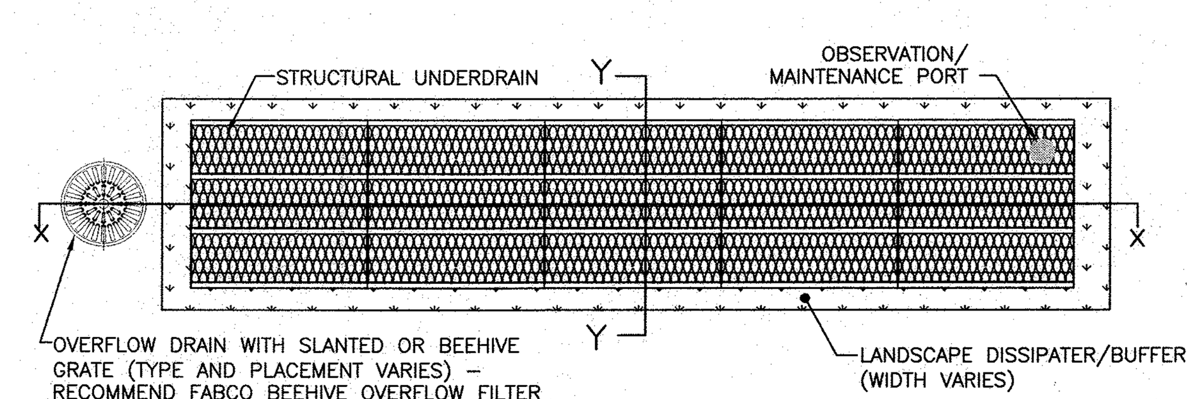
SECTION X-X



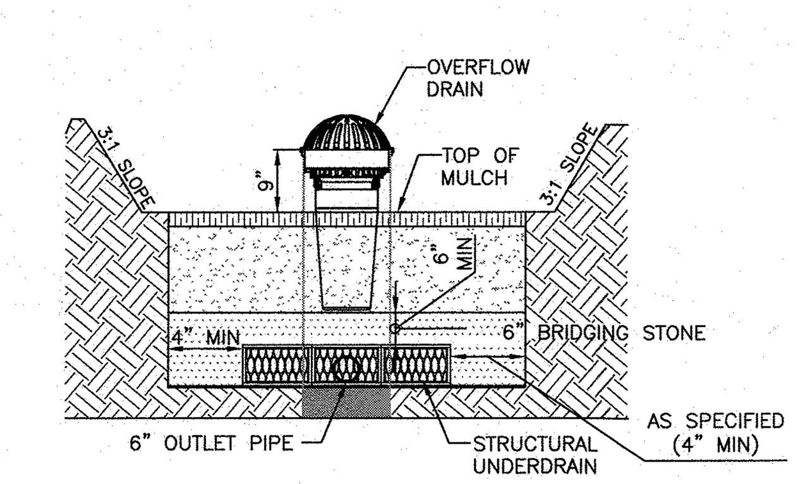
OUTLET/ INLET PIPE CONNECTION



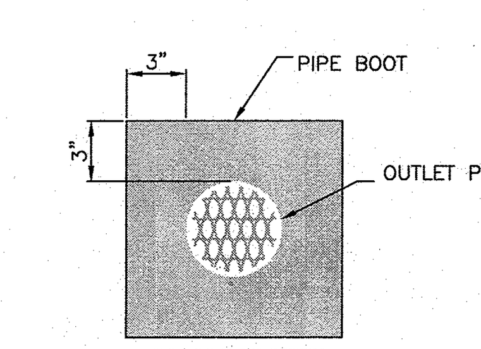
OBSERVATION/ MAINTENANCE PORT CONNECTION



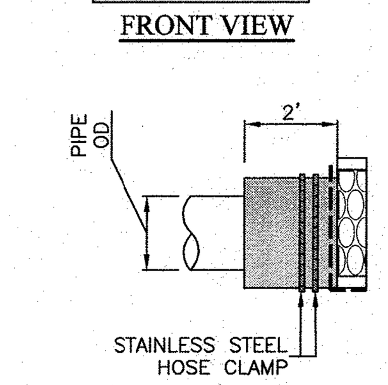
PLAN VIEW



SECTION Y-Y



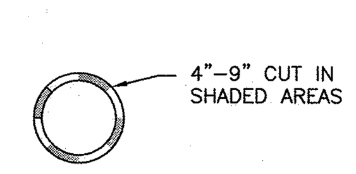
FRONT VIEW



SIDE VIEW

PIPE BOOT DETAIL

TYPICAL FOCAL POINT - MICRO-BIORETENTION DETAILS
N.T.S.



PIPE NOTCH DETAIL

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 10/17/2017
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 11-09-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10-31-17

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH SDP

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10-3-17

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DEVELOPER:
SECURITY DEVELOPMENT, LLC
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ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 - GRID: 2 - PARCEL: 628 - ZONED: R-20
5333 KRUGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

STORMWATER MANAGEMENT DETAILS FOR ACF FOCAL POINT MICRO-BIO PRACTICES

DATE: OCTOBER 2, 2017 | BEI PROJECT NO: 2706
SCALE: AS SHOWN | SHEET 13 OF 15
DESIGN: DBT/NAF | DRAWN: DBT/NAF

AS-BUILT

F-17-097

SPECIFICATION

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS)

Material, Performance, and Installation Specification

I. Summary

The following general specifications describe the components and installation requirements for a volume based High Performance Modular Biofiltration System (HPMBS) that utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban storm water runoff. The modular treatment system in which the biologically active biofiltration media is contained shall be a complete, integrated system designed to be placed in Square Foot or Linear Foot increments per the approved drawings to treat contaminated runoff from impervious surfaces.

The High Performance Modular Biofiltration System (HPMBS) is comprised of the following components:

A. Plant Component

1. Manufacturer shall provide a regionalized list of acceptable plants.
2. Plants, as specified in the approved drawings/manufacturer's plant list, shall be installed at the time the HPMBS is commissioned for use.
3. Plants and planting are typically included in landscape contract.

B. Biofilter Component

1. This component employs a high performance cross-section in which each element is highly dependent on the others to meet the performance specification for the complete system. It is important that this entire cross-section be provided as a complete system, and installed as such.
2. As indicated in the approved drawings, the elements of the Biofilter include:
   A. *A mulch protective layer (if specified).*
   B. *An advanced high infiltration rate biofiltration planting media bed which utilizes physical, chemical and biological mechanisms of the soil, plant, and microbe complex, to remove pollutants found in storm water runoff.*
   C. *A separation layer which utilizes the concept of 'bridging' to separate the biofiltration media from the underdrain without the use of geotextile fabrics.*
   D. *A wide aperture mesh layer utilized to prevent bridging stone from entering the underdrain/storage element.*
   E. *A modular, high filtration rate 'flat pipe' style underdrain/storage system which is designed to directly infiltrate or exfiltrate water through its surface. The modular underdrain must provide a minimum of 95% void space.*

II. Quality Assurance and Performance Specifications

The quality and composition of all system components and all other appurtenances and their assembly process shall be subject to inspection upon delivery of the system to the work site.

Installation is to be performed only by skilled work people with satisfactory record of performance on earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.

A. Plants

1. Plants must be compatible with the HPMBS media and the associated highly variable hydrologic regime. Plants are typically facultative with fibrous roots systems such as native grasses and shrubs.
2. Manufacturer shall provide a regionalized list of acceptable plants.
3. All plant material shall comply with the type and size required by the approved drawings and shall be alive and free of obvious signs of disease.

A. Mulch

1. Mulch, typically double shredded hardwood (non-floatable), shall comply with the type and size required by the approved drawings, and shall be screened to minimize fines.

B. Biofiltration Media

1. Biologically active biofiltration media shall be visually inspected to ensure appropriate volume, texture and consistency with the approved drawings, and must bear a batch number marking from the manufacturer which certifies performance testing of the batch to meet or exceed the required infiltration (100 in/hr). A third party laboratory test must be provided to certify the 100 in/hr rate.
2. Within 90 days after project completion, the infiltration rate shall be confirmed at the manufacturer's expense, by a wetted condition hydraulic conductivity test.
   a. *Failure to pass this test will result in removal and replacement of all media in the system at no cost to the project owner/operator.*
   b. *Test must utilize the equipment and follow the standard operating procedures found in the Harris County Texas manual entitled, Low Impact Development & Green Infrastructure Design Criteria for Storm Water Management (2011).*
   c. *Replacement media, if required, must be taken from a different batch than the original.*
3. Manufacturer shall provide, at no additional cost to the project owner/operator, maintenance of the biofiltration system for a period of one year.
4. Pollutant Removal performance, composition and characteristics of the Biofiltration Media must meet or exceed the following minimum standards as demonstrated by testing acceptable to the project engineer:

Pollutant	Removal Efficiency
TSS	91%
Phosphorus	65%
Nitrogen	48%
Composition and Characteristics	
Sand – Fine	< 5%
Sand – Medium	10% - 15%
Sand – Coarse	15% - 25%
Sand – Very Coarse	40% - 45%
Gravel	10% - 20%
Infiltration Rate	> 100 inches per hour
Peat Moss*	5% - 15%
*** Peat Moss Specification**	
Listed by Organic Materials Review Institute 100% natural peat (no composted, sludge, yard or leaf waste) Total Carbon >85% Carbon to Nitrogen Ratio 15:1 to 23:1 Lignin Content 49% to 52% Humic Acid >18% pH 6.0 to 7.0 Moisture Content 30% to 50% 95% to 100% passing 2.0mm sieve > 80% passing 1.0mm sieve	

C. Underdrain/Storage System

1. Underdrain/storage components shall be manufactured in an ISO certified facility and be manufactured from at least 90% post-consumer recycled materials.
2. Underdrain/storage components shall meet or exceed the following characteristics:

Property	Value
Surface Void Area	≥ 85%
Unit Weight	3.25 lbs/cf
Service Temperature	-14° to 167°
Unconfined Crush Strength	32.48 psi
180 Day Creep Test	
Load Applied – Initial and Sustained	11.16 psi
• Creep Sustained – After 180 Days	0.20 inches
• Creep Sustained – After 180 Days	1.13%
• Projected Creep – 40 years	1.72%

A. Separation Mesh

1. Separation Mesh shall be composed of high-tenacity monofilament polypropylene yarns that are woven together to produce an open mesh geotextile which shall be inert to biological degradation and resistant to naturally encountered chemicals, alkalis and acids. The mesh shall meet or exceed the following characteristics:

Properties	Test Method	Unit	Min Ave Roll Value	
			MD	CD
Tensile Strength	ASTM D4595	kN/m (lbs/ft)	21 (1440)	25.3 (1733)
Creep Reduced Strength	ASTM D5262	kN/m (lbs/ft)	6.9 (471)	8.3 (566)
Long Term Allowable Design Load	GRI GG-4	kN/m (lbs/ft)	5.9 (407)	7.2 (490)
UV Resistance (at 500 hours)	-	% strength retained	90	
Aperture Size (machine direction)	-	mm (in)	2 (0.08)	
Aperture Size (cross machine direction)	-	mm (in)	2 (0.08)	
Mass/Unit Area	ASTM D5261	g/m² (oz/yd²)	197 (5.8)	

B. Bridging Stone

1. Bridging Stone shall be 3/8" pea gravel, or other diameter sized to prevent migration of filter media, as specified by manufacturer.
2. Stone must be washed and free from sediment, soil and contaminants.

I. Delivery, Storage and Handling

A. Protect all materials from damage during delivery and store UV sensitive materials under tarp to protect from sunlight including all plastics, when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud, and debris.

B. Biofiltration media shall be segregated from any other aggregate materials and shall be protected against contamination, including contamination from any stormwater runoff from areas of the site which are not stabilized.

II. Submittals

A. Product Data

1. Submit manufacturer's product data and approved Installation Manual as well as manufacturer's Operations and Maintenance Manual for the system. It will be the responsibility of the system owner/operator or their contractor to ensure the system is operated and maintained in accordance with the manual.

B. Certification

1. must bear a batch number marking from the manufacturer which matches a letter from the manufacturer certifying performance testing of the batch to meet or exceed the required infiltration rate.

A. Drawings

1. Manufacturer shall provide dimensional drawings including details for construction, materials, specifications and pipe connections.

B. Manufacturer's Warranty

1. Manufacturer shall provide a warranty for all components of the HPMBS for a period of one year provided the unit is installed, operated and maintained in accordance with the manual. Improper operation, maintenance or accidental or illegal activities (i.e. dumping of pollutants, vandalism, etc.) will void the warranty. Biofiltration media shall be warranted to pass the post-installation infiltration test described in this document.

C. Design Computations

1. The HPMBS must be sized using a volume based sizing criteria and demonstrate, using a SCS stormwater modelling software/spreadsheet calculator that the required water quality volume (defined by the Engineer of Record) passes through the HPMBS prior to activation of the overflow device (set at elevation shown on design plans). Design computations must be provided as part of the submittal process. If local regulations have the system approved based on an alternative sizing criteria, the larger of the two computed sizes will govern.

D. Substitutions

1. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data for both flow rate and pollutant removal of biofiltration media. Pollutant removal data must follow specified protocols. All components must meet or exceed Quality Assurance and Performance Criteria indicated herein.

I. Project Conditions

A. Review manufacturer's recommended installation procedures and coordinate installation with other work affected, such as grading, excavation, utilities, construction access and erosion control to prevent all non-installation related construction traffic over the completed HPMBS.

B. Cold Weather

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen ground or wet, saturated or muddy subgrade.
3. Care must be taken when handling plastics when air temperature is at 40 degrees or below as plastic becomes brittle.

C. Protected partially completed installation against damage from other construction traffic when work is in progress and following completion of backfilling by establishing a perimeter with highly visible construction tape, fencing or other means until construction is complete.

D. Soil stabilization of the surrounding site must be complete before the Biofiltration System can be brought online. Soil stabilization occurs when 90% of the site has been paved and vegetated. Temporary erosion control and/or sedimentation prevention measures shall be implemented to reduce the possibility of sediments being transported into the Biofiltration System prior to full stabilization of the site. Significant sediment loads can damage the HPMBS and lead to failure if not prevented or remediated promptly.

II. Products

A. Acceptable HPBMS

FocalPoint High Performance Biofiltration System

B. Acceptable Beehive Overflow Grate Structure (Optional)

Beehive Overflow Grate Structure with removable StormSack

C. Acceptable Manufacturer

Manufacturer:

Convergent Water Technologies, Inc.
(800) 711-5428
www.convergentwater.com

D. Authorized Value Added Reseller

ACF Environmental
(800) 448-3636
www.acfenvironmental.com

I. Execution

A. Excavation and Backfill

1. Base of excavation shall be smooth, level and free of lumps or debris, and compacted unless infiltration of storm water into subgrade is desired. A thin layer (2") of compacted base material is recommended to establish a level working platform (may not be needed in sandy soils). If the base of the excavation is irregular or appears excessively soft, a geotechnical engineer should be consulted for advice. In many cases, a stabilization geotextile and 6" of compactable material that drains well will be sufficient to amend the bearing capacity of the soil.
2. Most applications require 8 oz Non-Woven Geotextile or equivalent nonwoven geotextile with a nominal weight of 8 oz per square yard to line the excavation to separate in situ soils and the HPMBS. (Applications requiring water to infiltrate the in situ sub-soils should use a bridging stone rather than geotextile to provide a separation layer between the HPMBS and the in situ soils). Geotextile, when utilized, should be placed on the bottom and up the sides of the excavation. Absolutely no geotextile should be used in the water column. If an impermeable liner is specified, it should be installed according to manufacturer's instructions and recommendations.
3. Specified backfill material must be free from lumps, debris and any sharp objects that could penetrate the geotextile. Material is used for backfill along the sides of the system as indicated in engineering detail drawings.

B. Inspection

1. Examine prepared excavation for smoothness, compaction and level. Check for presence of high water table, which must be kept at levels below the bottom of the under drain structure at all times. If the base is pumping or appears excessively soft, a geotechnical engineer should be consulted for advice.
2. Installation commencement constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found to be unsatisfactory contact Project Manager or Engineer for resolution prior to installation.

II. Cleanup and Protection during Ongoing Construction Activity

A. Perform cleaning during the installation and upon completion of the work

B. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation.

C. If surrounding drainage area is not fully stabilized, a protective covering of geotextile fabric should be securely placed to protect the Biofiltration Media.

A. Construction phase erosion and sedimentation control shall be placed to protect the inlet(s) to the Biofiltration System. Excessive sedimentation, particularly prior to establishment of plants may damage the HPMBS.

B. Strictly follow manufacturer's guidelines with respect to protection of the HPMBS between Installation and Commissioning phases.

I. Commissioning

A. Commissioning should only be carried out once the contributing drainage area is fully stabilized. If Commissioning must be carried out sooner, it is imperative that appropriate erosion and sediment controls be placed to prevent the entry of excessive sediment/pollutant loads into the system.

B. Commissioning entails removing the protective covering from the Biofiltration Media, planting the plant material in accordance with the approved drawings, and placing mulch if specified.

1. Dig planting holes the depth of the root ball and two to three times as wide as the root ball. Wide holes encourage horizontal root growth that plants naturally produce.
2. With trees, you must ensure you are not planting too deep. Don't dig holes deeper than root balls. The media should be placed at the root collar, not above the root collar. Otherwise, the stem will be vulnerable to disease.
3. Strictly follow manufacturer's planting guidance.

C. Cover the exposed root ball top with mulch. Mulch should not touch the plant base because it can hold too much moisture and invite disease and insects. Evenly place 3 inches of double-shredded hardwood mulch (if specified) on the surface of the media.

D. Plantings shall be watered-in at installation and temporary irrigations shall be provided, if specified.

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 10/17/2017

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 11-09-17

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10-31-17

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

STATE OF MARYLAND · DONALD ALAN WASCOM · No. 21443 · PROFESSIONAL ENGINEER

AS-BUILT 12-19-2019

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: 12-21-2020

NO.	DATE	REVISION
1	10/2019	REVISE SWM TO MATCH SDP

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. 22390, Expiration Date: 6-30-2019

STATE OF MARYLAND · CHRISTOPHER ALAN MARTIN · No. 22390 · PROFESSIONAL ENGINEER

10-3-17

OWNER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:
SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES

LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 23 – PARCEL: 628 – ZONED: R-20
5333 ROCKER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

ACF FOCAL POINT SPECIFICATIONS

DESIGN: DBT/NAF	DRAWN: DBT/NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 14 OF 15

AS-BUILT

F-17-097

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HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-1
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown with Red-Brown to Light Brown, moist, soft to stiff clayey SILT with sand and fine gravel (CL-ML; Possible FILL)	3" of Topsoil	18		2-2-1	3
D			18		2-3-2	5
D		No Groundwater encountered while drilling	18		4-5-7	12
D			18		4-5-7	12
D	Tan/Red-Brown, moist, very stiff CLAY (CL)		18		6-9-10	19
	Bottom of boring at 11.0 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	8.6 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-2
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Red-Brown, moist, soft clayey SILT with sand and fine gravel (CL-ML; Possible FILL)	2" of Topsoil	18		1-2-3	5
D	Tan/Red-Brown, moist, stiff CLAY (CL)		18		4-6-9	15
D		No Groundwater encountered while drilling	18		4-7-9	16
D	Red-Brown, moist, medium stiff to stiff SILT with clay (ML)		18		2-3-3	6
D			18		2-3-6	9
D			18		3-6-9	15
	Bottom of boring at 14.5 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	12.5 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-3
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/30/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/30/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown, moist, soft to very stiff clayey SILT with sand and fine gravel (CL-ML; Possible FILL)	4" of Topsoil	18		1-2-2	4
D			18		6-9-13	19
D	Tan, moist, stiff to medium stiff SILT with clay (ML)	No Groundwater encountered while drilling	18		7-6-7	13
D			18		3-3-3	6
D	Tan, moist, medium stiff sandy CLAY with fine gravel (SC/CL)		24		3-3-4-4	7
	Bottom of boring at 12.0 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	9.5 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-4
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/30/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/30/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown, moist, soft clayey SILT with sand and fine gravel (CL-ML; Possible FILL)	3" of Topsoil	18		1-2-2	4
D	Brown, moist, stiff clayey SILT with sand and fine gravel (CL-ML)		18		2-6-6	12
D	Red-Brown to Brown, moist, stiff to very stiff SILT with clay (ML)	No Groundwater encountered while drilling	18		4-5-7	12
D			18		3-5-6	11
D			24		4-7-10	17
	Bottom of boring at 11.5 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	9.3 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-5
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/30/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/30/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Red-Brown, moist, loose to medium dense silty SAND (SM)	2" of Topsoil	18		2-3-3	6
D			18		3-6-8	14
D	Red-Brown, moist, medium dense silty GRAVEL and SAND (GM-SM)	No Groundwater encountered while drilling	18		6-9-8	17
D	Red-Brown, moist, medium dense silty SAND (SM)		18		4-5-6	11
D	Red-Brown, moist, medium dense clayey SAND with fine gravel (SC)		18		6-6-5	11
D	Gray with Tan, moist, medium stiff sandy SILT (SM-ML)		18		3-3-5	8
D			18		4-5-5	10
	Bottom of boring at 17.5 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	15.0 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-6
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/30/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/30/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown with Red-Brown, moist, very soft clayey SILT with sand and fine gravel (CL-ML; FILL)	2" of Topsoil	18		1-1-1	2
D	Red-Brown, moist, medium dense clayey SAND with fine gravel (SC)		18		4-6-8	14
D	Tan, moist, very stiff CLAY (CL)	No Groundwater encountered while drilling	18		8-7-9	16
D			18		7-7-11	18
D	Tan, moist, stiff sandy SILT (SM-ML)		18		4-4-8	12
D	Tan, moist, very stiff CLAY with silt (CL)		18		7-7-9	16
D			18		6-8-13	21
	Bottom of boring at 17.5 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	14.3 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-12
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown, moist, very loose silty SAND with gravel and organics (SM; FILL)	4" of Topsoil	18		1-2-2	4
D	Tan/Red-Brown, moist, stiff CLAY (CL)	No Groundwater encountered while drilling	24		5-6-8-11	14
	Bottom of boring at 5.5 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	3.0 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-13
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown, moist, very loose sandy SILT with gravel and organics (SM-ML; FILL)	4" of Topsoil	18		1-2-2	4
D	Orange-Brown, moist, stiff sandy CLAY with fine gravel (SC/CL)		18		4-5-6	11
D	Orange-Brown, moist, stiff CLAY (CL)	No Groundwater encountered while drilling	18		6-6-7	13
D	Gray with Tan, moist, medium stiff SILT (ML)		18		2-2-5	7
	Bottom of boring at 9.5 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	7.0 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-14
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Mottled Brown, Grayish-Brown with Red-Brown, moist, soft sandy SILT with gravel and organics (SM; FILL)	4" of Topsoil	18		2-2-2	4
D	Orange-Brown, moist, medium dense clayey SAND with fine gravel (SC)		18		6-6-11	17
D	Red-Brown, moist, stiff to medium stiff CLAY with sand (CL)	No Groundwater encountered while drilling	18		6-6-8	14
D			18		2-4-5	9
	Bottom of boring at 9.0 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	7.0 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-10
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Light Brown with Red-Brown, moist, soft to stiff clayey SILT with sand and fine gravel (CL-ML; Possible FILL)	3" of Topsoil	18		1-1-2	3
D			18		5-7-8	15
D	Tan/Red-Brown, moist, stiff CLAY (CL)	No Groundwater encountered while drilling	18		5-5-6	11
D	Yellow-Brown with Red-Brown, moist, stiff SILT (ML)		18		4-4-7	11
	Bottom of boring at 9.0 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	10.7 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-11
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Dark Brown with Red-Brown, moist, soft to medium stiff clayey SILT with sand and fine gravel (CL-ML; Possible FILL)	3" of Topsoil	18		2-2-2	4
D			18		3-4-3	7
D	Brown, moist, medium dense silty SAND (SM)	No Groundwater encountered while drilling	18		4-7-9	16
D	Tan with Red-Brown, moist, medium dense SILT (ML)		18		3-5-7	12
	Bottom of boring at 10.0 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	8.0 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-7
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/30/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/30/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown with Red-Brown, moist, soft clayey SILT with sand and fine gravel (CL-ML; Possible FILL)	4" of Topsoil	18		2-2-2	4
D	Tan/Red-Brown, moist, stiff CLAY (CL)		18		3-5-8	13
D	Red-Brown, moist, medium dense to loose clayey SAND with fine gravel (SC)	No Groundwater encountered while drilling	18		5-7-9	16
D			18		4-9-14	23
D			18		7-4-4	8
	Bottom of boring at 11.5 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	9.0 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-8
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/30/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/30/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Mottled Brown, Grayish-Brown with Red-Brown, moist, very loose silty SAND with gravel and organics (SM; FILL)	3" of Topsoil	18		1-1-2	3
D	Light Brown with Red-Brown, moist, medium stiff clayey SILT with sand and fine gravel (CL-ML; Possible FILL)		18		2-3-4	7
D	Orange-Brown, moist, very loose clayey SAND with fine gravel (SC)	No Groundwater encountered while drilling	18		2-3-2	5
D	Tan, moist, stiff SILT (ML)		18		5-6-5	11
	Bottom of boring at 9.0 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	7.6 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.
RECORD OF SOIL EXPLORATION

Project Name Francis Property SWM Boring No. B-9
Location Ellicott City, MD Job # 16172A

SAMPLER
Datum ____ Hammer Wt. 140 lbs. Hole Diameter 6" Foreman J. Russel
Surf. Elev. ____ ft Hammer Drop 30 in. Rock Core Diameter N/A Inspector ____
Date Started 3/29/16 Pipe Size 2.0 in. Boring Method HSA Date Completed 3/29/16

Sample Conditions	Description	Boring and Sampling Notes	Rec.	NM%	SPT Blows	N
D	Brown with Red-Brown, moist, soft silty CLAY with sand and fine gravel (CL-ML; Possible FILL)	3" of Topsoil	18		2-2-1	3
D	Red-Brown, moist, loose clayey SAND with fine gravel (SC)		18		3-3-3	6
D	Light Brown with Red-Brown, moist, medium stiff clayey SILT with sand and fine gravel (CL-ML)	No Groundwater encountered while drilling	18		4-4-5	9
D	Brown, moist, medium dense clayey SAND with fine to coarse gravel (SC)		18		5-6-6	12
	Bottom of boring at 9.0 feet	Boring backfilled after 24 hours				

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

	GROUND WATER	CAVE IN DEPTH
AT COMPLETION	Dry ft.	7.0 ft.
AFTER 24 HRS.	ft.	ft.
AFTER ___ HRS.	ft.	ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS.

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

No. 21443
AS-BUILT 12-18-2020

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: 12-21-2022

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. 22390, Expiration Date: 6-30-2019

CHRISTOPHER ALAN MALAGARI
No. 22390
10-3-17

OWNER:

SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

DEVELOPER:

SECURITY DEVELOPMENT, LLC
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

ROCKBURN ESTATES
LOTS 1 thru 11 AND OPEN SPACE LOTS 12 thru 16
(A SUBDIVISION OF PARCEL 628)

TAX MAP: 31 – GRID: 22 – PARCEL: 628 – ZONED: R-20
5333 KERGER ROAD
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

SOIL BORING LOGS

DESIGN: DBT/NAF	DRAWN: DBT/NAF	DATE: OCTOBER 2, 2017	BEI PROJECT NO: 2706
		SCALE: AS SHOWN	SHEET 15 OF 15

AS-BUILT

F-17-097

APPROVED: DEPARTMENT OF PUBLIC WORKS

10/17/2017
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

11-09-17
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

10-31-17
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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