SHEET INDEX	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	ENVIRONMENTAL CONCEPT PLAN

ENVIRONMENTAL CONCEPT PLAN
CHOUDHARY PROPERTY
LOTS 1 AND 2
TAX MAP No. 38 GRID No. 04 PARCEL NO. 619
FIRST ELECTION DISTRICT HOWARD COUNTY, MARYLAND

STORMWATER MANAGEMENT SUMMARY			
AREA ID.	ESDv REQUIRED CU.FT.	ESDv PROVIDED CU.FT.	REMARKS
SITE	639	1,071	MICRO-BIORETENTION (M-6) & STONE TRENCH
TOTAL	639	1,071	

GROSS AREA = 0.69 ACRES
LOD = 0.46 ACRES (SITE)
RCN = 77
TARGET Pe = 1.2"

DESIGN NARRATIVE

Introduction:
This report will demonstrate how the criteria set forth in the Maryland Stormwater Design Manual, Volumes I and II (effective October 2000, revised May 2009) will be satisfied on this project. The goal of creating hydrology similar to that of "Woods in Good Condition" will be accomplished through the use of the practices contained within Chapter 5 of said manual. The achievement of this goal will remove the requirement of providing Channel Protection Volume.

General Site Conditions:
5642 Furnace Ave is zoned R-12 and is located on Tax Map 38, Parcel No.619 of the Howard County, Maryland Tax Map Database System. The property is a deeded parcel of land. The property has an existing house to remain. The parcel has a number of individual trees but is not forested. Since the subdivision is a single lot subdivision with no further subdivision potential, it is exempt from forest conservation requirements. The proposed house will be served by public water and sewer. The runoff from the lots is mostly from southwest to northeast toward Furnace Ave. Micro-Bioretention (M-6) and a stone trench will be utilized to treat majority rooftop and driveway runoff. Per the 2004 Web Soil Survey, soils on-site consist of "UsB", Urban Land - Sassafras - Beltsville Complex,Type D soil.

I. Natural Resource Protection:
Environmentally sensitive features such as wetlands, streams, their buffers, steep slopes, floodplain and forested areas do not exist on-site.

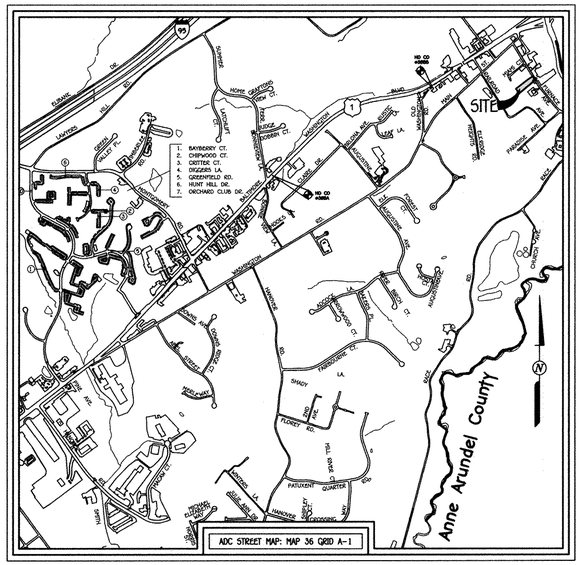
II. Maintenance of Natural Flow Patterns:
Nature flow patterns will be maintained. Existing and proposed runoff flows northward toward Furnace Ave.

III. Reduction of impervious areas through better site design, alternative surfaces and Nonstructural Practices
A single driveway is proposed to provide access to the proposed house and the existing house. The design will make use of stone trench to treat the majority of runoff from the new driveway.

IV. Integration of Erosion and Sediment Controls into Stormwater Strategy:
Silt Fence and Permanent Soil Stabilization Matting will be utilized to provide the majority of erosion and sediment control.

V. Implementation of ESD Planning Techniques and practices to the Maximum Extent Practicable (MEP)
The full required ESD volume is being provided.

VI. Request for a Design Manual Waiver:
No waivers related to stormwater management are required.



VICINITY MAP
SCALE: 1" = 1200'

BENCHMARK INFORMATION

B.M.#1 - HOWARD COUNTY CONTROL STATION #38BA - HORIZONTAL - NAD '83
(LOCATED ALONG US ROUTE 1 NEAR BONNIE VIEW LANE)
N 562,553.295
E 1,390,967.900
ELEVATION = 166.26 - VERTICAL - (NAVD '88)

B.M.#2 - HOWARD COUNTY CONTROL STATION #38BB - HORIZONTAL - (NAD '83)
(LOCATED ALONG SOUTH SIDE OF US ROUTE 1 NORTHEAST OF THE INTERSECTION OF US ROUTE 1 AND OLD WASHINGTON ROAD)
N 564,007.669
E 1,393,649.990
ELEVATION = 63.67 - VERTICAL - (NAVD '88)

GENERAL NOTES

1. PROPERTY ZONED R-12 PER 10/6/13 COMPREHENSIVE ZONING PLAN.
2. AREA TABULATION:
   A. TOTAL TRACT AREA = 0.69 Ac±
   B. AREA OF PROPOSED ROAD R/W = 0.05 Ac±
   C. AREA OF PROPOSED BUILDABLE LOTS = 0.64 Ac±
   D. AREA OF PROPOSED OPEN SPACE LOTS = 0.00 Ac±
3. NUMBER OF LOTS/PARCELS PROPOSED
   A. BUILDABLE LOTS = 2, INCLUDING ONE EXISTING
   B. OPEN SPACE LOTS = 0
4. SOILS INFORMATION TAKEN FROM NRCS WEB SOIL SURVEY AND HOWARD COUNTY SOIL MAP #20.
5. NO FOREST STAND OR WETLANDS EXIST ON-SITE PER LETTER DATED FEBRUARY 17, 2017 FROM ECO-SCIENCE PROFESSIONAL, INC.
6. THERE ARE NO STEEP SLOPES OF 25% OR GREATER ON SITE.
7. NO CEMETERIES EXIST ON SITE BY VISUAL OBSERVATION OR LISTED IN AVAILABLE HOWARD COUNTY CEMETERY INVENTORY MAP.
8. THERE IS A HISTORIC HOUSE (STRUCTURE OVER 50 YEARS OLD) ON-SITE, EXISTING HOUSE WAS BUILT AROUND 1890 WHICH IS NOT ON THE REGISTER.
9. SINCE THIS IS A MINOR SUBDIVISION, A TRAFFIC STUDY IS NOT REQUIRED.
10. THERE IS ONE EXISTING STRUCTURE LOCATED ON-SITE TO REMAIN ON PROPOSED LOT No. 2.
11. ALL LOTS AREAS ARE MORE OR LESS.
12. DRIVEWAYS SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLINGS TO ENSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
   A) WIDTH - 12 FEET (16 FEET) SERVING MORE THAN ONE RESIDENCE);
   B) SURFACE - SIX (6") INCHES OF COMPACTED CRUSHER RUN BASE WITH TAR AND CHIP COATING. (1 - 1/2" MINIMUM);
   C) GEOMETRY - MAXIMUM 15% GRADE, MAXIMUM 10% GRADE CHANGE AND 45-FOOT TURNING RADIUS;
   D) STRUCTURES (CULVERTS/BRIDGES) - CAPABLE OF SUPPORTING 25 GROSS TONS (H25-LOADING);
   E) DRAINAGE ELEMENTS - CAPABLE OF SAFELY PASSING 100 YEAR FLOOD WITH NO MORE THAN 1 FOOT DEPTH OVER SURFACE;
   F) STRUCTURE CLEARANCES - MINIMUM 12 FEET;
   G) MAINTENANCE - SUFFICIENT TO ENSURE ALL WEATHER USE.
13. FOR FLAG OR PIPESTEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPESTEM AND ROAD RIGHT-OF-WAY LINE AND NOT TO THE PIPESTEM LOT DRIVEWAY.
14. A NOISE STUDY IS NOT REQUIRED FOR THIS SUBDIVISION.
15. THE LOTS SHOWN HEREON COMPLY WITH THE MINIMUM OWNERSHIP WIDTH AND LOT AREA AS REQUIRED BY THE MARYLAND STATE DEPARTMENT OF THE ENVIRONMENT.
16. NO WETLANDS, STREAM(S), THEIR REQUIRED BUFFERS, STEEP SLOPES, NOR FLOODPLAIN EXIST ON-SITE.
17. BOUNDARY OUTLINE BASED ON A FIELD RUN SURVEY PERFORMED BY FISHER, COLLINS & CARTER, INC. DATED ON OR ABOUT FEBRUARY, 2017.
18. THE EXISTING TOPOGRAPHY INFORMATION SHOWN IS BASED ON FIELD RUN TOPOGRAPHIC SURVEY PERFORMED ON OR ABOUT FEBRUARY, 2017 BY FISHER, COLLINS & CARTER, INC. AND SUPPLEMENTED WITH HOWARD COUNTY AERIAL CONTOURS.
19. THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT.
20. THE PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED.
21. COORDINATES BASED ON NAD'83 MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 38BA AND NO. 38BB.
22. STORM WATER MANAGEMENT IS IN ACCORDANCE WITH THE M.D.E. STORM WATER DESIGN MANUAL, VOLUMES I & II, REVISED 2009. STORMWATER MANAGEMENT IS BEING PROVIDED BY THE USE OF ONE MICRO-BIORETENTION (M-6) AND STONE TRENCH TO MEET AND EXCEED THE REQUIRED ESD VOLUME.
23. SINCE THE SUBDIVISION IS A SINGLE LOT SUBDIVISION WITH NO FURTHER SUBDIVISION POTENTIAL, IT IS EXEMPT FROM FOREST CONSERVATION REQUIREMENTS.

SITE ANALYSIS DATA CHART

A. TOTAL AREA OF THIS SUBMISSION = 0.69 AC.±.
B. LIMIT OF DISTURBED AREA = 0.46 Ac.±
C. PRESENT ZONING DESIGNATION: R-12
   (PER 10/06/2013 COMPREHENSIVE ZONING PLAN)
D. PROPOSED USE: RESIDENTIAL
E. PREVIOUS HOWARD COUNTY FILES: N/A
F. TOTAL AREA OF FLOODPLAIN LOCATED ON SITE = 0.00 AC.
G. TOTAL AREA OF SLOPES IN EXCESS OF 15% = 0.00 AC.
H. TOTAL AREA OF WETLANDS (INCLUDING BUFFER) = 0.00 AC.
I. TOTAL AREA OF EXISTING FOREST = 0.00 AC.±
J. TOTAL GREEN OPEN AREA = 0.51 AC.±
K. TOTAL IMPERVIOUS AREA = 0.13 AC.±
L. AREA OF ERODIBLE SOILS = 0.69 AC.
M. AREA OF ROAD DEDICATION = 0.05 AC.
N. DENSITY PERMITTED = 0.69 AC x 4 LOTS/ACRE = 2 LOTS
O. PROPOSED NUMBER OF LOTS = 2 LOTS

FISHER, COLLINS & CARTER, INC.
CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS
CENTENNIAL SQUARE OFFICE PARK - 10272 BALTIMORE NATIONAL PIKE
ELLICOTT CITY, MARYLAND 21042
(410) 461 - 2855

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8/17/17

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8.18.17

OWNER/DEVELOPER
RAHIM CHOUDHARY
12719 HILLMEADE STATON DRIVE
BOWIE, MARYLAND 20720
301-775-9555

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. 38386, EXPIRATION DATE: 01/12/2018.

Signature of Professional Engineer — Date 8/10/17

STATE OF MARYLAND · STEPHANIE FISHER · NO. 38386 · PROFESSIONAL ENGINEER

CHOUDHARY PROPERTY
LOTS 1 AND 2
5642 FURNACE AVE
ZONED R-12
TAX MAP No. 38 GRID No. 04 PARCEL No. 619
FIRST ELECTION DISTRICT HOWARD COUNTY, MARYLAND
SCALE: AS SHOWN DATE: JULY, 2017
SHEET 1 OF 2 ECP-17-045

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LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
492	EXISTING 2' CONTOURS	492	PROPOSED CONTOUR
490	EXISTING 10' CONTOURS	+362.5	SPOT ELEVATION
LOD	SOILS LINES AND TYPE	LOD	LIMITS OF DISTURBANCE
	EXISTING TREELINE		DRAINAGE AREA DIVIDE
	INDIVIDUAL TREES & SHRUBS	SF	SILT FENCE
	EXISTING FENCE LINE	ECM	EROSION CONTROL MATTING
	EXISTING & PROPOSED PAVING		
H.P.	HIGH POINT	T.B.R.	TO BE REMOVED OR RELOCATED

MICRO-BIORETENTION PLANT MATERIAL			
MICRO-BIO 1 QUANTITY	MICRO-BIO 2 QUANTITY	NAME	MAXIMUM SPACING (FT.)
45	25	MIXED PERENNIALS	1.5 TO 3.0 FT.
2	1	SILKY DOGWOOD	PLANT AWAY FROM INFLOW LOCATION

MIXED PERENNIALS
CUT-LEAF CONEFLOWER (1.5' SP.)
BEEBALM (1.5' SP.)
JOE-PYE-WEED (3' SP.)

SILKY DOGWOOD

* SEE PLANT MATERIAL CHARTS FOR QUANTITIES AND SPACING

NOTE:
PLANT MATERIAL MUST COVER AT LEAST 50% OF THE SURFACE AREA OF THE MICRO-BIORETENTION

MICRO-BIORETENTION					
BIO-RETENTION FILTER	A	B	C	D	E
#1	41.00	39.50	39.17	38.50	37.50
#2	37.70	36.20	35.87	35.20	34.20

Infiltration and Filter System Construction Specifications

Infiltration and filter systems either take advantage of existing permeable soils or create a permeable medium such as sand for WC), and Re v. In some instances where permeability is great, these facilities may be used for Qp as well. The most common systems include infiltration trenches, infiltration basins, sand filters, and organic filters.

When properly planted, vegetation will thrive and enhance the functioning of these systems. For example, pre-treatment buffers will trap sediments that often are bound with phosphorous and metals. Vegetation planted in the facility will aid in nutrient uptake and water storage. Additionally, plant roots will provide arteries for stormwater to permeate soil for groundwater recharge. Finally, successful plantings provide aesthetic value and wildlife habitat making these facilities more desirable to the public.

Design Constraints:

> Planting buffer strips of at least 20 feet will cause sediments to settle out before reaching the facility, thereby reducing the possibility of clogging.
> Determine areas that will be saturated with water and water table depth so that appropriate plants may be selected (hydrology will be similar to bioretention facilities, see figure A.5 and Table A.4 for planting material guidance).
> Plants known to send down deep taproots should be avoided in systems where filter fabric is used as part of facility design.
> Test soil conditions to determine if soil amendments are necessary.
> Plants shall be located so that access is possible for structure maintenance.
> Stabilize heavy flow areas with erosion control mats or sod.
> Temporarily divert flows from seeded areas until vegetation is established.
> See Table A.5 for additional design considerations.

Bio-retention

Soil Bed Characteristics

The characteristics of the soil for the bioretention facility are perhaps as important as the facility location, size, and treatment volume. The soil must be permeable enough to allow runoff to filter through the media, while having characteristics suitable to promote and sustain a robust vegetative cover crop. In addition, much of the nutrient pollutant uptake (nitrogen and phosphorus) is accomplished through absorption and microbial activity within the soil profile. Therefore, soils must balance their chemical and physical properties to support biotic communities above and below ground.

The planting soil should be a sandy loam, loamy sand, loam (USDA), or a loam/sand mix (should contain a minimum 35 to 60% sand, by volume). The clay content for these soils should be less than 25% by volume (Environmental Quality Resources (EQR), 1996; Engineering Technology Inc. and Biohabitats, Inc. (ETAB), 1993). Soils should fall within the SM, ML, SC classifications or the Unified Soil Classification System (USCS). A permeability of at least 1.0 feet per day (0.5"/hr) is required (a conservative value of 0.5 feet per day is used for design). The soil should be free of stones, stumps, roots, or other woody material over 1" in diameter. Brush or seeds from noxious weeds (e.g., Johnson Grass, Mugwort, Nutsedge, and Canada Thistle or other noxious weeds as specified under COMAR 15.08.01.05.) should not be present in the soils. Placement of the planting soil should be in 12 to 18 lifts that are loosely compacted (tamped lightly with a backhoe bucket or traversed by dozer tracks). The specific characteristics are presented in Table A.3.

Table A.3 Planting Soil Characteristics

Parameter	Value
pH range	5.2 to 7.00
Organic matter	1.5 to 4.0% (by weight)
Magnesium	35 lbs. per acre, minimum
Phosphorus (phosphate - P2O5)	75 lbs. per acre, minimum
Potassium (potash - K2O)	85 lbs. per acre, minimum
Soluble salts	500 ppm
Clay	0 to 5%
Silt	30 to 55%
Sand	35 to 60%

Mulch Layer

The mulch layer plays an important role in the performance of the bioretention system. The mulch layer helps maintain soil moisture and avoids surface sealing, which reduces permeability. Mulch helps prevent erosion, and provides a microenvironment suitable for soil biota at the mulch/soil interface. It also serves as a pretreatment layer, trapping the finer sediments, which remain suspended after the primary pretreatment.

The mulch layer should be standard landscape style, single or double shredded hardwood mulch or chips. The mulch layer should be well aged (stockpiled or stored for at least 12 months), uniform in color, and free of other materials, such as weed seeds, soil, roots, etc. The mulch should be applied to a maximum depth of three inches. Grass clippings should not be used as a mulch material.

Planting Guidance

Plant material selection should be based on the goal of simulating a terrestrial forested community of native species. Bioretention simulates an upland-species ecosystem. The community should be dominated by trees, but have a distinct community of understory trees, shrubs and herbaceous materials. By creating a diverse, dense plant cover, a bioretention facility will be able to treat stormwater runoff and withstand urban stresses from insects, disease, drought, temperature, wind, and exposure.

The proper selection and installation of plant materials is key to a successful system. There are essentially three zones within a bioretention facility (Figure A.5). The lowest elevation supports plant species adapted to standing and fluctuating water levels. The middle elevation supports plants that like drier soil conditions, but can still tolerate occasional inundation by water. The outer edge is the highest elevation and generally supports plants adapted to dryer conditions. A sample of appropriate plant materials for bioretention facilities are included in Table A.4. The layout of plant material should be flexible, but should follow the general principals described in Table A.5. The objective is to have a system, which resembles a random, and natural plant layout, while maintaining optimal conditions for plant establishment and growth. For a more extensive bioretention plan, consult ETAB, 1993 or Claytor and Schueler, 1997.

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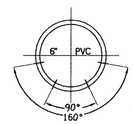
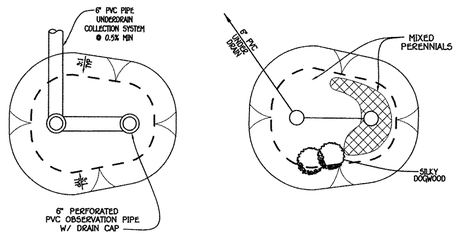


PIPE SIZE: 6"
HOLE SIZE: 3/8"
CENTER TO CENTER: 3"
ROWS OF HOLES: 2 @ 90°
2 @ 160° (+/-3°)

5CH 40 PVC PERFORATED UNDERDRAIN PIPE DETAIL FOR HORIZONTAL DRAIN PIPE

NO SCALE



MICRO BIO-RETENTION PLANTING DETAIL

NOT TO SCALE

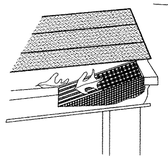
OPERATION AND MAINTENANCE SCHEDULE FOR BIO-RETENTION AREAS (M-6)

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 2.

2. The owner shall perform a plant in the spring and in the fall 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.

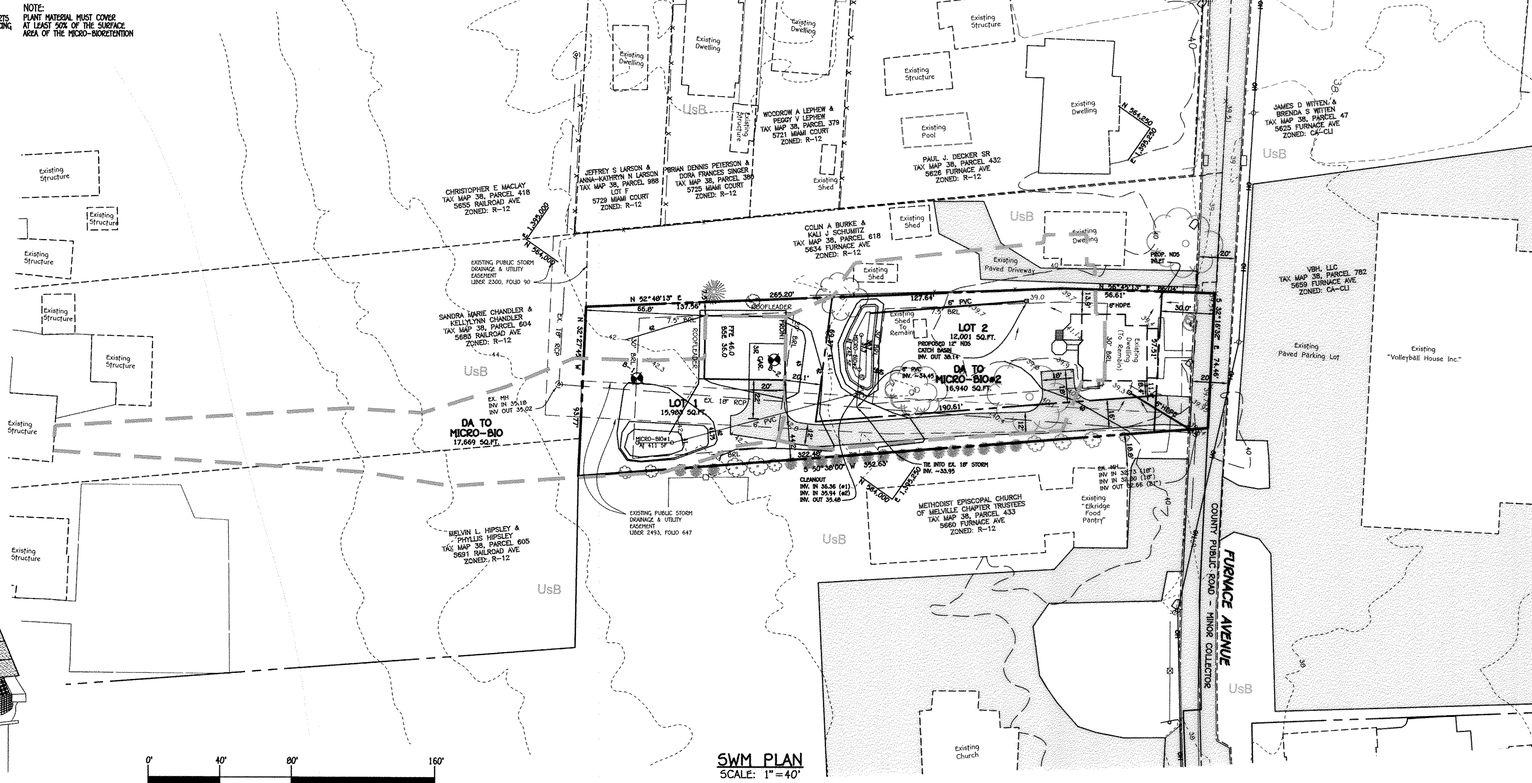
3. The owner shall inspect the mulch each spring. The mulch shall be replaced every two to three years. The previous mulch layer shall be removed before the new layer is applied.

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



GUTTER DRAIN FILTER DETAIL

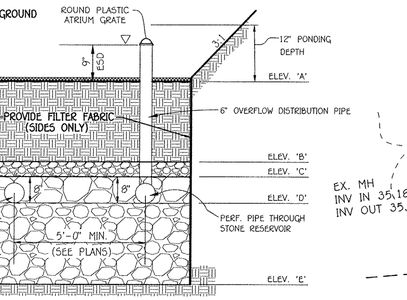
NOT TO SCALE



SWM PLAN

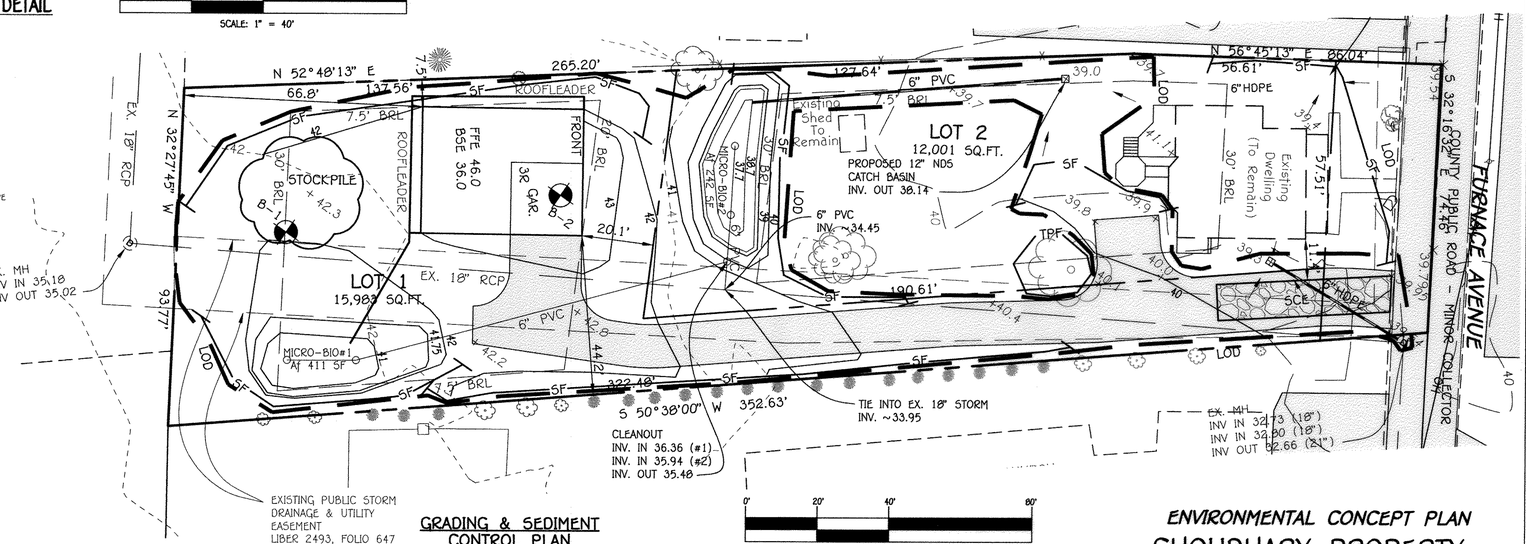
SCALE: 1"=40'

SCALE: 1" = 40'



MICRO BIO-RETENTION SECTION WITH 6" OVERFLOW DISTRIBUTION PIPE

NO SCALE



GRADING & SEDIMENT CONTROL PLAN

SCALE: 1"=20'

SCALE: 1" = 20'

SOILS LEGEND

SOIL	NAME	CLASS	K FACTOR
UsB	Urban Land-Sassafras-Beltsville Complex, 0 to 5 percent slope	D	0.37
Soil Map Number: 20 (Relay, NW)			

STORMWATER MANAGEMENT PRACTICES

LOT NO.	DISCONNECTION OF ROOFTOP RUNOFF (N-1) Y/N, NUMBER	DISCONNECTION OF NON-ROOFTOP RUNOFF (N-2) Y/N	DRY WELLS (M-5) Y/N, NUMBER	MICRO-BIORETENTION (M-6) Y/N, NUMBER
2	-	-	-	-
1	NO	NO	NO	YES (2)

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8/17/17

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8.18.17

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. 36366, EXPIRATION DATE: 01/12/2018.

Signature of Professional Engineer — Date 8/10/17

STATE OF MARYLAND — STEPHANIE J. FOSTER — No. 36366 — PROFESSIONAL ENGINEER

OWNER/DEVELOPER

RAHIM CHOUDHARY
12719 HILLMEADE STATON DRIVE
BOWIE, MARYLAND 20720
301-775-9555

ENVIRONMENTAL CONCEPT PLAN
CHOUDHARY PROPERTY

LOTS 1 AND 2
5642 FURNACE AVE
ZONED R-12
TAX MAP No. 38 GRID No. 04 PARCEL No. 619
FIRST ELECTION DISTRICT HOWARD COUNTY, MARYLAND
SCALE: AS SHOWN DATE: JULY, 2017
SHEET 2 OF 2 **ECP-17-045**