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Our Site Set on the Future.

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REVISIONS	DATE
DRT RESPONSE	12/20/24
DRT RESPONSE	3/7/25

Gateway
Lakeforest
9TH ELECTION DISTRICT
MONTGOMERY COUNTY,
MARYLAND
WSSC GRID: 224NW10
TAX MAP: FT42

PRELIMINARY
STORMWATER
MANAGEMENT
PLAN

PROFESSIONAL SEAL

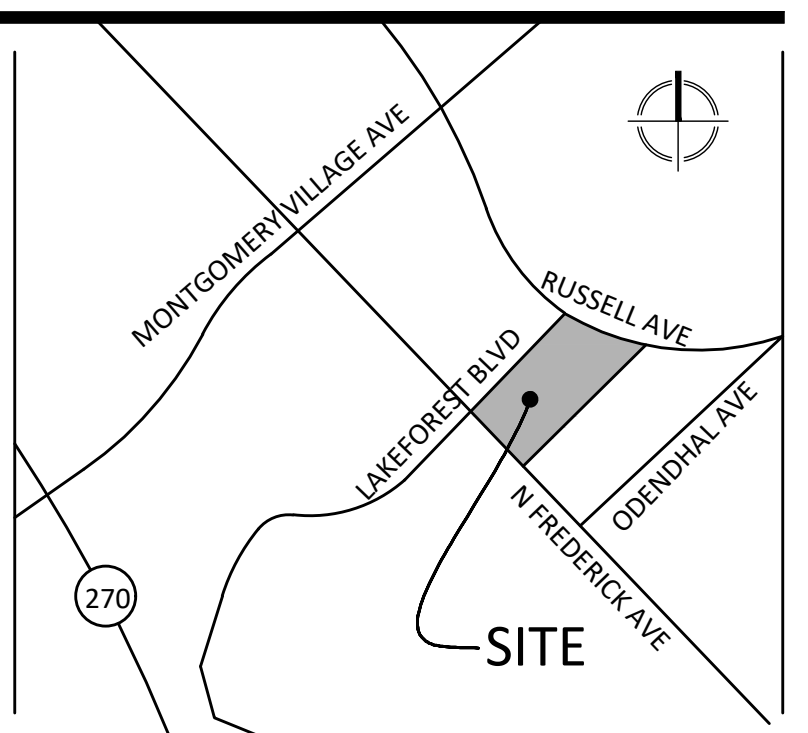


I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR REVIEWED BY ME AND THAT I AM A QUALIFIED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
IAN P. DUKE, LICENSE NO. 12022
EXPIRES DATE: JANUARY 16, 2025

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DRAWN BY: AD
DESIGNED BY: ID
DATE ISSUED: 7/16/2024
VIKA PROJECT: VM50089
DRAWING NO.

SHEET NO. PSWM - 2



VICINITY MAP
SCALE: 1" = 1000'



MICRO-BIORETENTION
The Micro-Bioretenion methods described in the following section are based on the Micro-Bioretenion design found in Chapter 5 of the Maryland Storm Water Design Manual and the ESD Process & Computations Supplement dated July 2016. Where deemed appropriate, the design specifications have been modified by the Montgomery County Department of Permitting Services (DPS). DPS requires that all Micro-Bioretenion devices shall include a PVC pipe underdrain system.

A. Facility Description

Micro-Bioretenion is a filtration system that treats runoff by passing it through a filter bed mixture of sand, soil, and organic matter. Principal components of the system include: a) surface planting with woody and herbaceous plant species, b) a surface 3 inch thick mulch layer, c) a 2-4 inch planting medium, d) a 2-4 inch sand layer, and e) perforated PVC pipe underdrain within a gravel bed. The facilities should be well landscaped to enhance their function and appearance. When providing additional storage for recharge below the underdrain, refer to the enhanced filter design specifications for additional requirements.

B. System Design Considerations

- 1. Applicability**
The Micro-Bioretenion device is appropriate for both new and redevelopment applications. The entire system fits into a relatively small space, making it applicable to concrete parking or stands, linear walkways or median lanes, landscaped slope facilities, and urban planter boxes. Currently, Micro-Bioretenion devices are not permitted in residential or on-site landscape areas for fire truck access concerns. The total drainage area to the facility, including pervious and impervious areas, is limited to 20,000 square feet. Micro-Bioretenion facilities should not be located in areas which contain mature trees or other environmentally sensitive site features, or where existing slopes exceed 15 percent.
- 2. Conveyance**
Micro-Bioretenion facilities should be designed offline whenever possible. A flow splitter should be used to safely convey flows in excess of the design treatment volume around the facility. If bypassing the facility is impractical, an internal overflow device must be used to safely convey the runoff to a stable outlet while providing adequate headroom within the facility, as discussed in section C.3. (Overflow Design Criteria). Runoff shall enter, flow through, and exit the facility in a non-erosive manner. All Micro-Bioretenion facilities shall include a PVC underdrain system to convey treated flows to a suitable outlet location.
- 3. Groundwater**
Micro-Bioretenion facilities shall not be located where the water table is within 2 feet of the bottom of the facility. If the 2 ft. clearance requirement cannot be met, an alternative stormwater practice must be proposed. An impervious liner may be used in some cases.
- 4. Setbacks**
Micro-Bioretenion practices shall be located at least 30 feet from water supply wells and 25 feet from septic systems. Practices should be located down gradient and setback at least 10 feet from building foundations. Micro-Bioretenion systems (e.g., planter boxes) that must be located within 10 ft of building foundations must include an impervious liner and shall not be a structural component of the building. Structural design of concrete planter boxes enclosures is required.

C. Specifications and Details

- 1. Siting**
The facility shall be sized to capture and store 100% of the target treatment volume. A minimum of 6" and maximum of 12" of surface planting shall be provided above the filter media. The surface area of a Micro-Bioretenion practice shall be at least 2% of the contributing drainage area. Planting media shall be between 24 and 48 inches deep. The total storage provided in the facility shall be computed as the storage provided in the temporary ponding area and the storage provided in the planting media and sand layers. Computations account for the porosity in the planting media and sand. Storage provided in excess of that required to treat the runoff for the 1 year, 24 hour design storm shall not be counted towards the total ESDv provided.
See "Enhanced Filter" design guidelines if additional storage is proposed below the underdrain pipe.
To the extent possible, facilities should have irregular outlines to blend naturally into the environment. Rectangular is not natural.
- 2. Inflow Design Criteria**
Runoff shall enter the Micro-Bioretenion facility in a non-erosive manner (less than 2 fps). Inflow may be through depressed curbs with wheel stops, curb cuts, level sprayers, bollards, or conveyed directly using downspouts, covered drains, catch basins, over grass, or other acceptable conveyance methods. Particular care must be taken to prevent erosion of the surface mulch layer.
- 3. Overflow Design Criteria**
If an internal overflow device is needed, a yard inlet or dome cap inlet may be used. Dome inlet caps may be stacked or top of clean-outs to serve as the overflow device. When this method is used, the overflow invert of the dome cap must be set at the design storage level. Overflow devices cannot feed into perforated pipe sections.
A non-erosive outlet below the runoff must be provided. Safe conveyance of the developed 10-year storm through the facility must be demonstrated.
- 4. Underdrain Pipe**
The underdrain pipe consists of 6 inch diameter schedule 40 or stronger perforated PVC pipe at 0.00% slope. The underdrain pipe will be placed within the gravel layer. A minimum of three inches of gravel must be placed under the pipe, with a minimum of 6 inches of gravel over the pipe. Perforations must be 3/8 inch in diameter and must be located 4 inches on center, every 90 degrees around the pipe. Perforated pipe must begin at least 12" inside the filter media. If this cannot be achieved, then sides of the filter media must be lined with filter fabric. Filter fabric must be wrapped around the pipe. Acceptable alternatives to perforated pipe is 6" diameter schedule 40 slotted PVC pipe with 0.125 inch slots. Slots shall be 0.125 inches wide and a minimum of 1.9 inches in length, with a minimum of 4 slots per row and 4 rows per linear foot of pipe.

Access for cleaning all underdrain piping is needed. Wastight clean-outs for each pipe shall be level with the top of the mulch. All cleanouts shall have a removable waterproof cap. Cleanouts must be capped immediately after the filter medium is in place.

The required number of perforated underdrain pipes is proportional to the surface area of the Micro-Bioretenion facility. The length of perforated pipe shall be 0.05 times the surface area of the facility, rounded to the nearest foot. In no case shall less than 2 ft. of perforated pipe be provided.

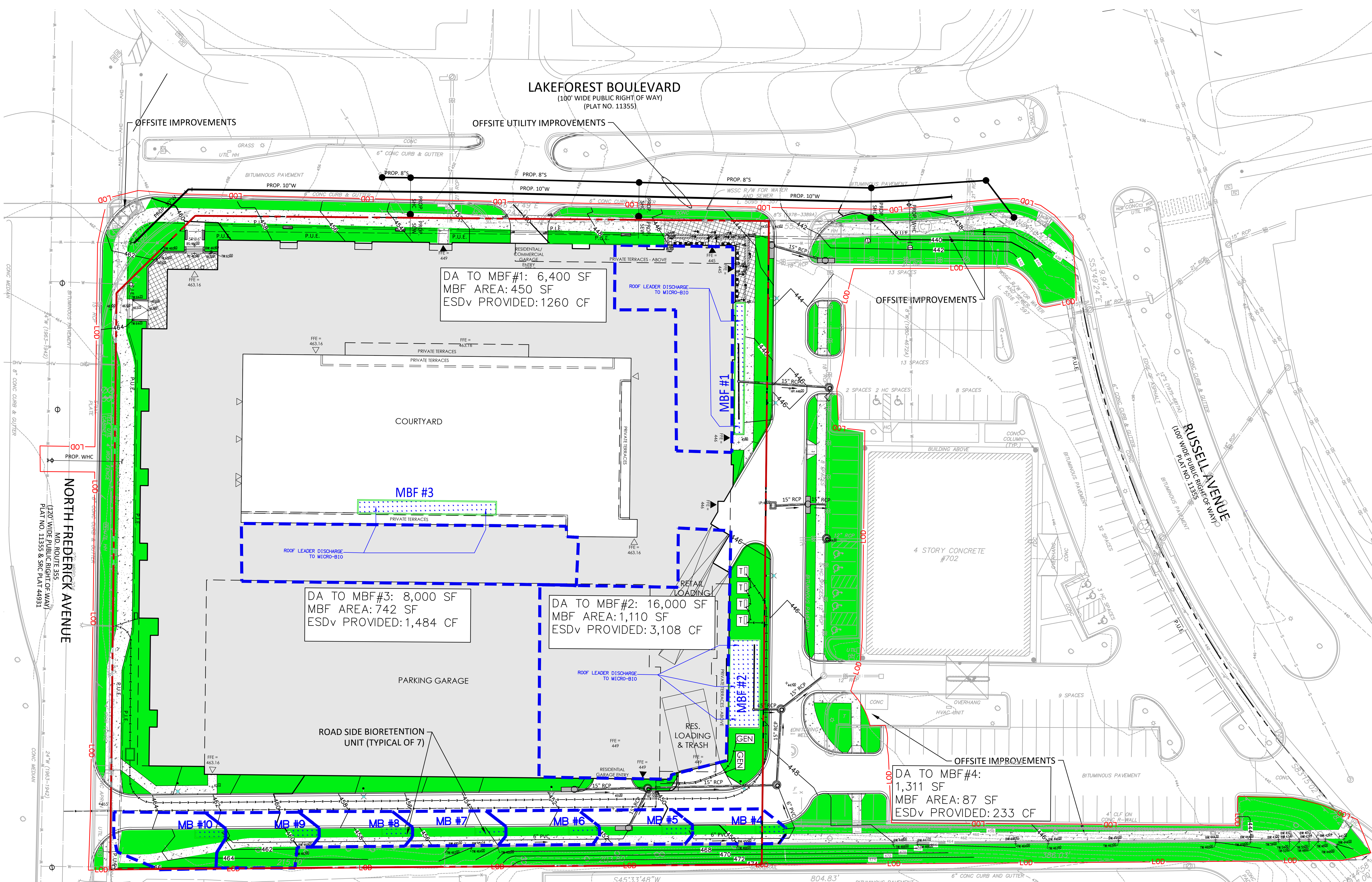
- 5. Gravel Bed**
The gravel layer surrounding the underdrain pipe(s) must meet MSHA size #7 (Table 901A), and must provide a minimum of 6 inches cover over the pipe(s), and extend 3 inches under the pipe. No geotextile or filter fabric is allowed to be placed horizontally anywhere within the filter media. The gravel must be clean and must be stored and installed in such a manner that it does not become contaminated with sediment before or after installation.
- 6. Sand Bed**
A minimum 6 inch fine aggregate sand layer shall be provided below the planting medium. ASTM C333 or AASHTO M6 Fine Aggregate Concrete Sand is required per Montgomery County sand specifications.
- 7. Planting Medium**
The planting medium shall be 24"-48" thick and shall consist of 1/3 peat or Sphagnum, 1/3 compost and 1/3 topsoil. The peat shall be coarse grade horticultural peat. The compost shall be high grade compost free of stones and partially composted woody material. The topsoil component shall meet the following criteria: contain no more than 10% clay, 10-25% silt and 60-70% sand and be free of stones, stumps, roots or other similar objects larger than 2 inches.
The first layer of the planting medium shall be lightly tilled to mix it into the 6-inch sand layer, so as not to create a diffusive boundary. The planting bed shall be flooded after placement. Any settlement that occurs shall be filled back to the design elevation.
- 8. Mulch**
The mulch layer is an important part of the Micro-Bioretenion device. Much of the pollutant removal capacity of the Micro-Bioretenion system is within the mulch layer. The surface mulch layer will consist of standard double-stranded ager hardwood mulch. The mulch should be applied uniformly to a depth of 3 inches. Yearly replenishing may be necessary. Pine bark is not acceptable.
- 9. Plant Materials**
Plants, through their pollutant uptake and evapo-transpiration of stormwater runoff, play a key role in the overall effectiveness of the Micro-Bioretenion facility. Both the number and type of tree and shrub plantings for the system may vary, especially where aesthetics or other considerations are critical to site development. Where native plants are encouraged, they are not always available. When no hard planting rule exists, the plants should be a mix of trees, shrubs and herbaceous materials. However, there should be 2 to 3 shrubs planted per tree and herbaceous plantings shall make up 40% of the total number of plants. There shall be a minimum of 1 1/2 inch in caliper, shrubs shall be minimum 2 gal. size and herbaceous plants shall be a minimum 1 gal. size. Mature plant density should cover 85% of the Micro-Bioretenion device. Alternative planting schemes, including use of grasses, may be considered in some situations, so long as the planting plan is designed by a Registered Landscape Architect registered in the State of Maryland. However, lawn grasses are not appropriate for these facilities. All landscape plans shall be in accordance with the Montgomery County landscape guidelines. All landscape plans must be sealed by a registered landscape architect. Since

Page 3 of 6 Revised 8/5/2014

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301-777-5930

**CITY OF GAITHERSBURG
DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT**

APPLICATION NO. SWM-9941-2024
CONCEPT PLAN PRELIMINARY PLAN
APPROVAL DATE 03/26/25
BY



DA TO MBF#1: 6,400 SF
MBF AREA: 450 SF
ESDv PROVIDED: 1260 CF

DA TO MBF#3: 8,000 SF
MBF AREA: 742 SF
ESDv PROVIDED: 1,484 CF

DA TO MBF#2: 16,000 SF
MBF AREA: 1,110 SF
ESDv PROVIDED: 3,108 CF

DA TO MBF#4: 1,311 SF
MBF AREA: 87 SF
ESDv PROVIDED: 233 CF

DA TO MBF#10: 2,251 SF
MBF AREA: 87 SF
ESDv PROVIDED: 244 CF

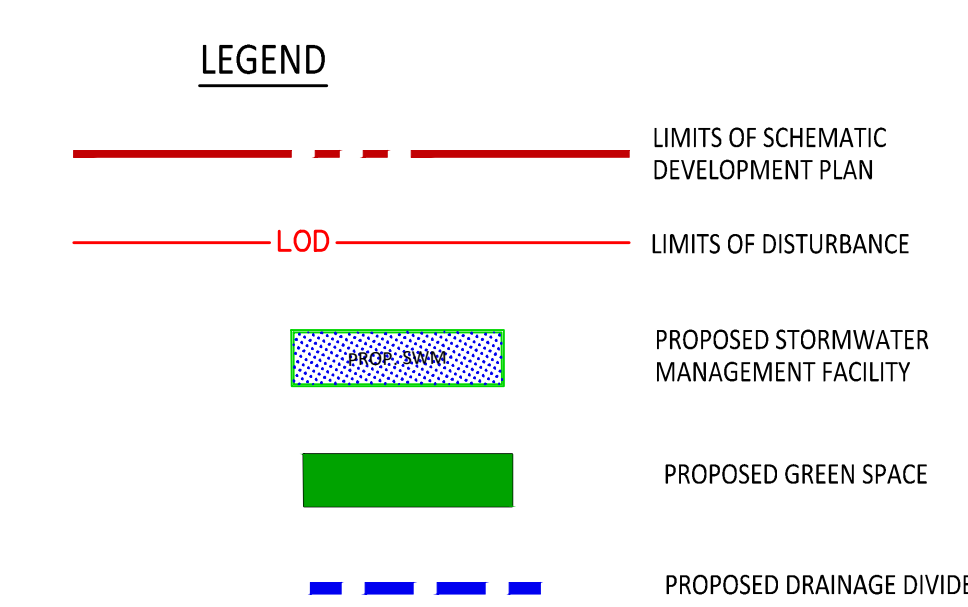
DA TO MBF#9: 2,017 SF
MBF AREA: 87 SF
ESDv PROVIDED: 244 CF

DA TO MBF#8: 1,360 SF
MBF AREA: 87 SF
ESDv PROVIDED: 236 CF

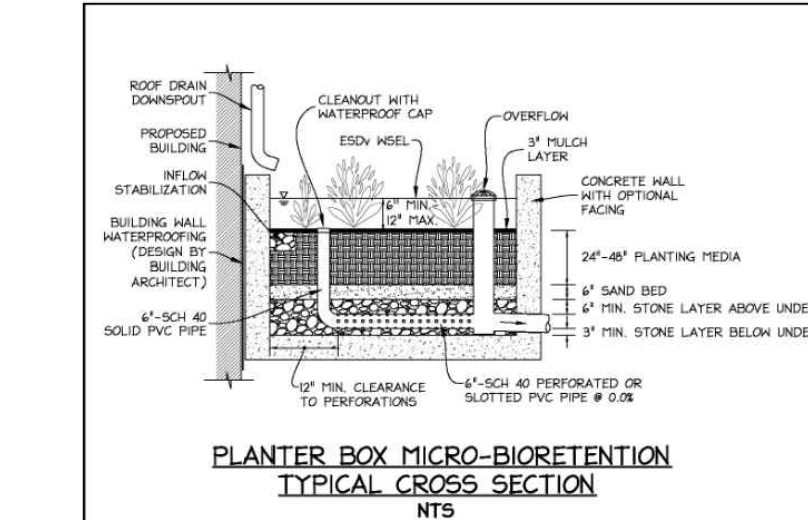
DA TO MBF#7: 1,333 SF
MBF AREA: 87 SF
ESDv PROVIDED: 236 CF

DA TO MBF#6: 1,326 SF
MBF AREA: 87 SF
ESDv PROVIDED: 236 CF

DA TO MBF#5: 1,332 SF
MBF AREA: 87 SF
ESDv PROVIDED: 236 CF



NOTE:
ALL SOILS ARE HSG 'D' SOILS
ALL MBF FACILITIES ARE CLOSED-BOTTOM



SDP SUMMARY TABLE SITE COMPUTATIONS		TOTAL
Total Site Area (LOD)	4.95 AC	4.95 AC
Project Site Area (DPP Property Limit)	4.12 AC	4.12 AC
Disturbed Area	4.95 AC	4.95 AC
Existing Impervious Area for Site	4.05 AC	4.05 AC
Proposed Impervious Area for Site	4.18 AC	4.18 AC
Existing Impervious Area for Project Site	3.51 AC	3.51 AC
Proposed Impervious Area for Project Site	3.64 AC	3.64 AC
ESDv Required	6,869 C.F.	6,869 C.F.
Target PE	1.87	1.87
ESDv Provided (Micro-Bioretenion)	7,516 C.F.	7,516 C.F.
PE Achieved	1.87	1.87

	TW	WSL	TOP OF MEDIA	MEDIA DEPTH (FT)	INV
MB1	446.7	446.2	445.2	4	438.7
MB2	448.4	447.9	446.9	4	441.4
MB3	463.66	463.16	461.91	2	458.41
MB4	449.3	448.5	447.5	4	442
MB5	450.5	449.7	448.7	4	443.2
MB6	452.5	451.5	450.5	4	445
MB7	454.5	453	452	4	446.5
MB8	457.5	455.8	454.8	4	449.3
MB9	460	458.8	457.8	4	452.3
MB10	463.5	461.7	460.7	4	455.2

NOT FOR CONSTRUCTION

"FOR LOCATION OF UTILITIES CALL 8-1-1 or 1-800-257-7777 OR LOG ON TO www.call811.com or http://www.missutility.net 48 HOURS IN ADVANCE OF ANY WORK IN THIS VICINITY"
The viewer must notify all public utility companies with underground facilities in the area of proposed excavation and have those facilities located by the utility companies prior to commencing excavation. The excavator is responsible for compliance with requirements of Chapter 36A of the Montgomery County Code.

