ENVIRONMENTAL CONCEPT PLAN

BETHANY MARKETPLACE

ELLICOTT INVESTMENTS, LLC SUBDIVISION - PARCEL B

3240 BETHANY LANE
ELLICOTT CITY, MD
RETAIL SHOPPING CENTER

SITE DATA

LOCATION: ELLICOTT CITY, MD.; TAX MAP 24, BLOCK 2, PARCEL 993
2ND ELECTION DISTRICT
PRESENT ZONING: B-1
PARCEL AREA: 1.59 AC.
DPZ REFERENCES: PLAT 22168
USE OF STRUCTURES: RETAIL
TOTAL BUILDING COVERAGE: 15,000 SF (0.34 AC. OR 21.63% OF GROSS AREA)
PAVED PARKING LOT/AREA ON SITE: 23,057 SF (0.53 AC. OR 33.33% OF GROSS AREA)
AREA OF LANDSCAPE ISLAND: 621 SF (0.01 AC. OR 0.63% OF GROSS AREA)
LIMIT OF DISTURBED AREA: 55,246 SF/1.27 AC
WETLANDS ON SITE: 0.06 AC.
WETLAND BUFFERS ON SITE: 0.19 AC.
STREAMS AND THEIR BUFFERS ON SITE: 0.34 AC.
AREA OF ON-SITE 100 YEAR FLOODPLAIN: 0.00 AC.
AREA OF EXISTING FOREST ON SITE: 0.60 AC.
AREA OF STEEP SLOPES: 0.00 AC
AREA OF ERODIBLE SOILS: 0.37 AC.
AREA MANAGED BY ESDV (*THIS PLAN): 1.27 AC.
*IMPERVIOUS AREA: 0.78 AC.
*GREEN AREA: 0.49 AC.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST HOWARD COUNTY STANDARDS AND SPECIFICATIONS. ALL WORK AND MATERIALS SHALL COMPLY WITH O.S.H.A. STANDARDS.
2. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
3. 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 START OF WORK.
4. ANY DAMAGE TO PUBLIC RIGHT-OF-WAY, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
5. EXISTING UTILITIES LOCATED FROM ROAD CONSTRUCTION PLANS, FIELD SURVEYS, PUBLIC WATER AND SEWER EXTENSION PLANS AND AVAILABLE RECORD DRAWINGS. APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN FOR THE CONTRACTORS INFORMATION. CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION ACTIVITIES AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
6. THE EXISTING TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON FIELD RUN TOPOGRAPHICAL SURVEY BY ROBERT H. VOGEL ENGINEERING, INC., DATED JUNE 2012, AND HOWARD COUNTY GIS.
7. THE PROJECT BOUNDARY SHOWN HEREON IS BASED ON A BOUNDARY SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED JUNE 2012.
8. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 24AA AND 24B5 WERE USED FOR THIS PROJECT.
9. THE SUBJECT PROPERTY IS ZONED "B-1" IN ACCORDANCE WITH THE 02/02/04 COMPREHENSIVE ZONING PLAN AND THE COMP. LITE ZONING REGULATIONS EFFECTIVE ON 07/28/06.
10. THIS PROJECT IS SUBJECT TO COMPLIANCE WITH THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS. DEVELOPMENT OR CONSTRUCTION ON THIS PROPERTY MUST COMPLY WITH SETBACK AND BUFFER REGULATIONS IN EFFECT AT THE TIME OF SUBMISSION OF THE SITE DEVELOPMENT PLAN, WAIVER PETITION APPLICATION OR BUILDING/GRADING PERMIT APPLICATIONS.
11. THIS SITE IS NOT LOCATED IN A HISTORIC DISTRICT.
12. PUBLIC WATER AVAILABLE THROUGH CONTRACT NO. 71-W.
PUBLIC SEWER AVAILABLE THROUGH CONTRACT NO. 411-S.
13. THERE ARE NO BURIAL GROUNDS, CEMETERIES, OR HISTORIC STRUCTURES LOCATED ON THIS PROPERTY.
14. SEDIMENT AND EROSION CONTROL WILL BE PROVIDED FOR THIS SITE.
15. STORMWATER MANAGEMENT FOR THIS PROJECT IS BEING PROVIDED BY ENVIRONMENTAL SITE DESIGN UTILIZING MICRO-BIORETENTION FACILITIES (M-6) AND DRY WELLS (M-5) TO ACCOMMODATE THE TOTAL ESD VOLUME REQUIRED. SWM FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED.
16. THERE IS ONE SPECIMEN TREE LOCATED ON THE SUBJECT PROPERTY. ITS LOCATION IS SHOWN ON THE PLAN. A WAIVER WILL BE REQUIRED IN CONJUNCTION WITH THE SITE DEVELOPMENT PLAN TO REMOVE THE SPECIMEN TREE.
17. NO RARE, THREATENED OR ENDANGERED SPECIES WERE OBSERVED ON THE PROPERTY.
18. FOREST STAND DELINEATION PLAN WAS PREPARED BY ECO-SCIENCE PROFESSIONALS, INC., DATED AUGUST 21, 2013.
19. WETLANDS SHOWN ON-SITE ARE BASED ON A FIELD INVESTIGATION PREPARED BY ECO-SCIENCE PROFESSIONALS, INC., DATED AUGUST 21, 2013. THERE ARE NO PROPOSED DISTURBANCES TO THE WETLANDS OR ASSOCIATED BUFFERS.
20. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE LIMITS OF WETLANDS, STREAM(S), OR THEIR REQUIRED BUFFERS, FLOODPLAIN AND FOREST CONSERVATION EASEMENT AREAS.
21. EXISTING ENVIRONMENTAL FEATURES AND THEIR BUFFERS WILL NOT BE IMPACTED BY THE CONSTRUCTION OF THE SITE
22. THERE IS NO 100-YR FLOODPLAIN WITHIN THE LIMITS OF THIS SITE.
23. APPROVAL OF THIS ECP DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PLAN. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN STAGES AND/OR RED-LINE REVISION PROCESS. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
24. REFERENCE GEOTECHNICAL REPORT PREPARED BY ECS MID-ATLANTIC, LLC DATED DECEMBER 13, 2013 FOR SUBSURFACE EXPLORATION TESTING AT BORINGS B-1 THROUGH B-4.

ENVIRONMENTAL SITE DESIGN NARRATIVE

BETHANY MARKET PLACE
ENVIRONMENTAL CONCEPT PLAN

INTRODUCTION

The subject property is zoned B-1 and is located on the west side of Bethany Lane north of Route 40 (Baltimore National Pike) in Ellicott City, Maryland. The entire site is 1.59 acres and is vacant. A portion of the property is cleared and was used by the previous owner as construction material and equipment storage. The balance of the parcel is wooded. A perennial stream is contained within the property for approximately 75' and a 50' stream buffer has been applied (non-residential).

The site soils consist of Urban Land (UuB), Manor Loam (MeC) and Glenville Urban Land (GuB). A Report of Subsurface Exploration has been prepared by ECS, Mid-Atlantic, LLC dated December 13, 2013. This report confirmed that the Urban Land designation is due to the 3'-4' of fill which was placed over the existing ground during the construction of the original site. The site slopes at approximately 12% from southeast to northwest. There is a very small area of manmade steep slopes located at the northwest corner.

The property is bordered on the north by existing development (proposed Race Pace Bicycles redevelopment), on the south by an office condominium building and on the west the undeveloped parcel which is also zoned B-1.

There is no 100-year floodplain located on the subject property and the site discharges to a tributary of the Little Patuxent River which is Use IV-P. A forest conservation easement will be established over the environmental areas. Any remaining forest debt will be accommodated within an offsite forest bank or payment of a fee if it is not feasible to participate in a forest bank.

METHODOLOGY

The site is proposed to be developed in accordance with the B-1 Zoning Regulations. Environmental Site Design has been utilized for the stormwater management design. The P_E was computed for the developable area. There is 0.35 acres of undevelopable area which includes wetlands, stream and associated buffers. The weighted P_E for the developable area is 2.06".

The site was divided into four individual drainage areas. Two areas were delineated for the building and each area was directed to a micro-bioretention facility. A test pit was performed at each facility. Test Pit #1 (MBR1) was excavated to 8' and no groundwater or solid rock was encountered. Groundwater was encountered at a depth of 7' at Test Pit #2 (MBR2). Since the bottom of the proposed facility is 4' above the observed groundwater the facility is acceptable.

For the purpose of this ECP we have not assumed that the actual ESDv provided can be reduced to 75% of the ESDv required for micro-bioretention facilities. The final computations may utilize this reduction if required.

CONCLUSION

The preliminary equivalent sketch plan computations illustrate that ESD can be adequately accomplished to the maximum extent possible for the proposed project. Currently, there are no disturbances proposed to environmental features. The natural drainage patterns have been preserved with the site drainage discharging to the stream and wetland located at the west side of the site. Test pits were performed and no groundwater or rock were encountered in the holes with the exception of Test Pit #2 (water at 7'). The ECS report provided infiltration rates and confirmed that rock and groundwater are not present.

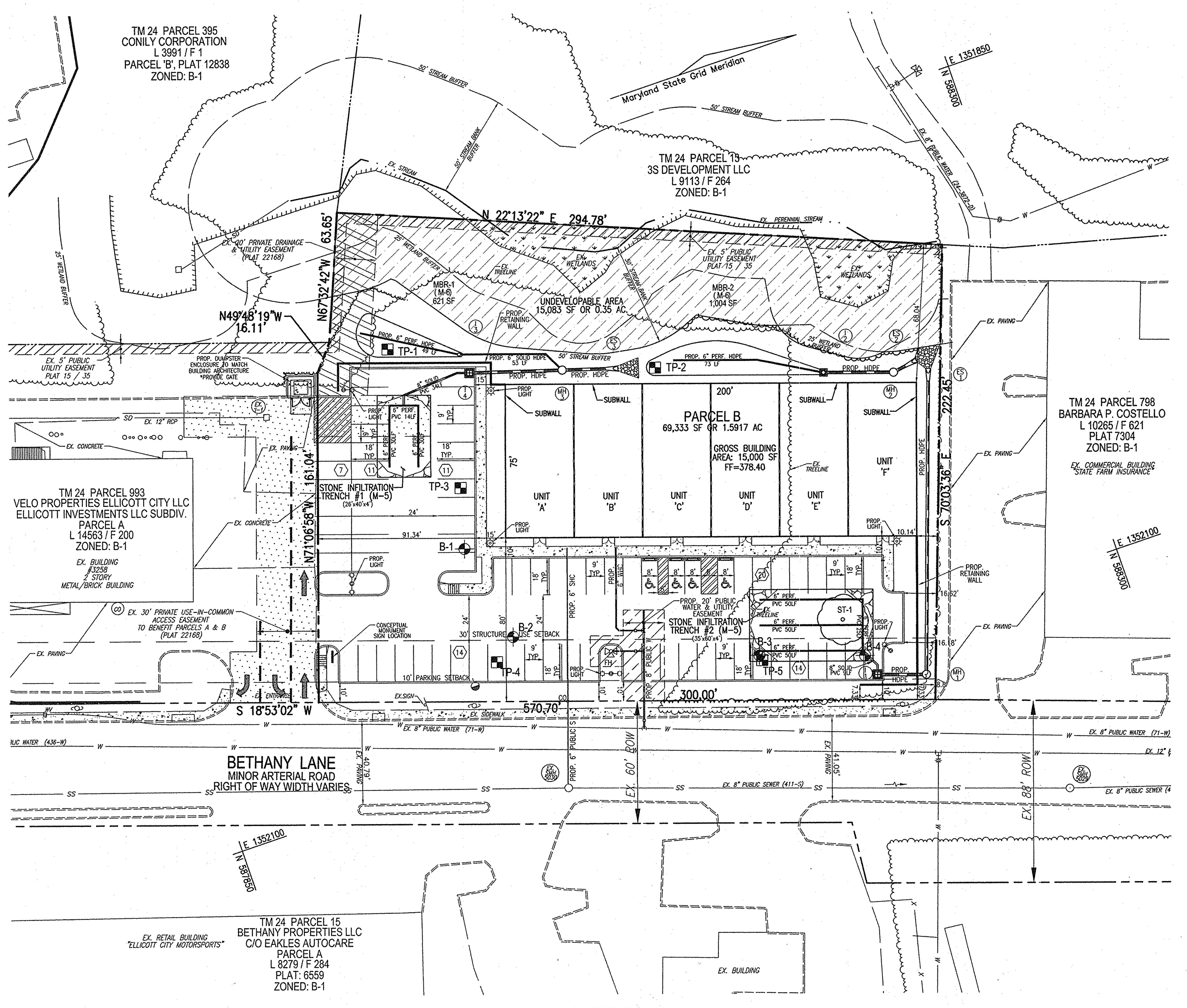
The facilities proposed for this project will be privately owned and maintained. There are no existing drainage easements located on site. There are no floodplains located within the subject property (no drainage areas exceeding 30 acres). The development of the subject property will not create any adverse impacts to adjacent properties. This project is proposing the utilization of ESD practices.

This project is designed to minimize earthwork and the site will be balanced. The existing public water and sewer system will serve the subject project. The site ultimately discharges to the Little Patuxent River and this area is designated as Stream Use I.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION JP — DATE 5.15.14

CHIEF, DIVISION OF LAND DEVELOPMENT BB — DATE 5/13/14



LAYOUT PLAN
SCALE: 1"=30'

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

SHEET INDEX

DESCRIPTION	SHEET NO.
COVER SHEET	1 OF 3
GRADING, SEDIMENT, AND EROSION CONTROL PLAN AND SOILS MAP	2 OF 3
SWM DRAINAGE AREA MAP; SWM NOTES AND DETAILS	3 OF 3

SPECIMEN TREE CHART

NO.	SIZE	COMMON NAME	CONDITION	COMMENTS
ST-1	30.5" DBH	TULIP POPLAR	GOOD	TO BE REMOVED

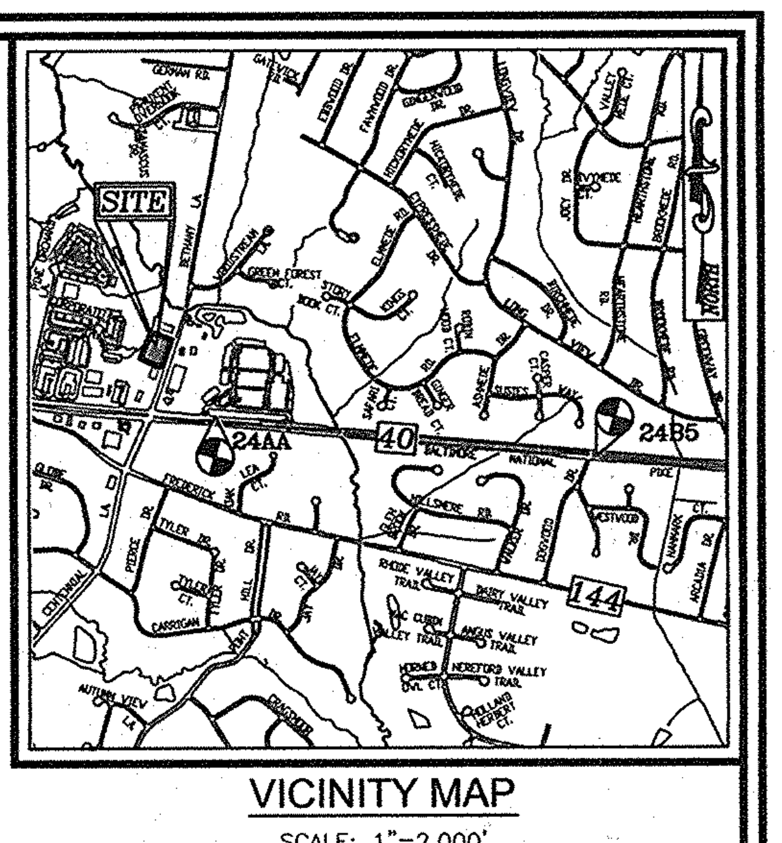
OWNER/DEVELOPER

BETHANY MARKETPLACE, LLC
8808-C PEAR TREE COURT
ALEXANDRIA, VA 22309
C/O CHARLES FAIRCHILD
(703) 926-1812

BENCHMARKS

HOWARD COUNTY STATION 24B5
N 586,956.2257 E 1,356,570.8028
ELEVATION 390.25

HOWARD COUNTY STATION 24AA
N 587,380.458 E 1,352,603.488
ELEVATION 387.27



VICINITY MAP

SCALE: 1"=2,000'
ADC MAP : 4815 C-6

LEGEND:

━ ━ ━	PROPERTY LINE
— — —	RIGHT-OF-WAY LINE
—··—	ADJACENT PROPERTY LINE
═ ═ ═	EXISTING CURB AND GUTTER
○	EXISTING UTILITY POLE
☼	EXISTING LIGHT POLE
▭	EXISTING MAILBOX
○	EXISTING SIGN
SMH 2 ○	EXISTING SANITARY MANHOLE
—SS—	EXISTING SANITARY LINE
○CO	EXISTING CLEANOUT
FH	EXISTING FIRE HYDRANT
—W—	EXISTING WATER LINE
⌒⌒⌒	EXISTING TREELINE
—//—	EXISTING FENCE
—···—	CENTERLINE OF EXISTING STREAM
☼	PROPOSED DECORATIVE PEDESTRIAN LIGHTING
□-◎-□	PROPOSED PARKING LOT LIGHTING
▬	PROPOSED STORMDRAIN
▦	PROPOSED STORMDRAIN INLET
░	PROPOSED SIDEWALK
⌒⌒⌒	PROPOSED TREELINE
═	PROPOSED CURB
▨	EXISTING 5' PUBLIC UTILITY EASEMENT (PLAT 15/35)
▨	EXISTING 20' PRIVATE DRAINAGE & UTILITY EASEMENT (PLAT 22168)
░	EXISTING 30' PRIVATE USE-IN-COMMON ACCESS EASEMENT TO BENEFIT PARCELS A & B (PLAT 22168)
▨	PROPOSED 20' PUBLIC WATER & UTILITY EASEMENT
▨	UNDEVELOPABLE AREA
B-1 ⊕	BORING LOCATIONS
TP-3 ▚	TEST PIT LOCATIONS

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

COVER SHEET

BETHANY MARKETPLACE
ELLICOTT INVESTMENTS, LLC SUBDIVISION - PARCEL B
3240 BETHANY LANE
ELLICOTT CITY, MD
RETAIL SHOPPING CENTER

ZONED: B-1
TAX MAP: 24 BLOCK: 2
2ND ELECTION DISTRICT

PARCEL: 993
PLAT: 22168
HOWARD COUNTY, MARYLAND

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

ROBERT HARRIS VOGEL No. 16193

ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV
DRAWN BY: JMR
CHECKED BY: RHV
DATE: MAY, 2014
SCALE: AS SHOWN
W.O. NO.: 12-08

PROFESSIONAL CERTIFICATE

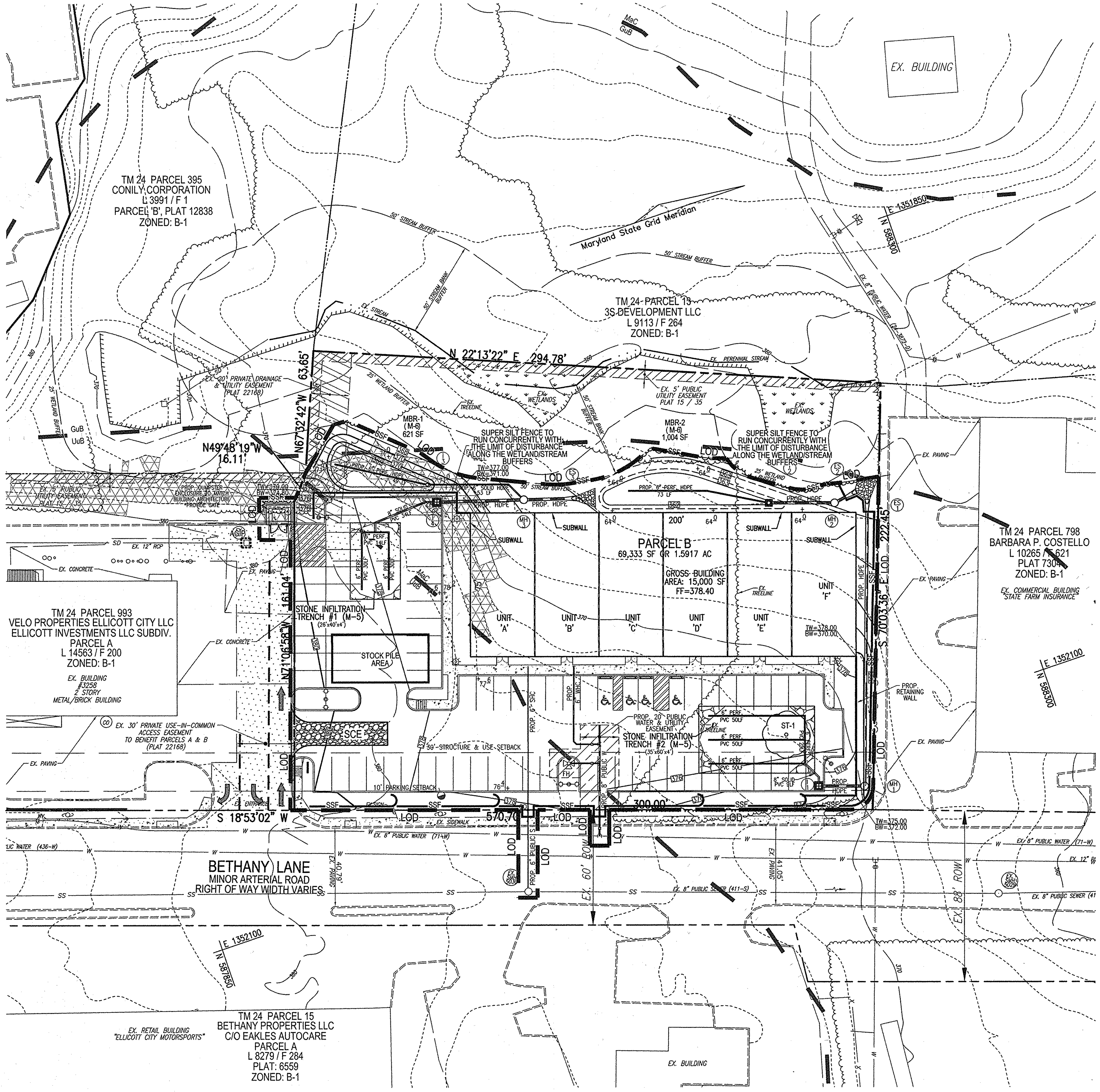
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE: 09-27-2014

1 SHEET OF 3

ECP-14-021

LEGEND:

— — —	PROPERTY LINE
— — —	RIGHT-OF-WAY LINE
——···——	ADJACENT PROPERTY LINE
= = =	EXISTING CURB AND GUTTER
○	EXISTING UTILITY POLE
☼	EXISTING LIGHT POLE
M	EXISTING MAILBOX
○	EXISTING SIGN
SMH 2 ○	EXISTING SANITARY MANHOLE
——SS——	EXISTING SANITARY LINE
○ CO	EXISTING CLEANOUT
FH	EXISTING FIRE HYDRANT
——W——	EXISTING WATER LINE
⌒⌒⌒	EXISTING TREELINE
——//——//——	EXISTING FENCE
——330——	EXISTING 10' CONTOUR
- - -328- - -	EXISTING 2' CONTOUR
SsE SfC2	SOILS
—— · · · ——	CENTERLINE OF EXISTING STREAM
☼	PROPOSED DECORATIVE PEDESTRIAN LIGHTING
◎	PROPOSED PARKING LOT LIGHTING
▬	PROPOSED STORMDRAIN
▦	PROPOSED STORMDRAIN INLET
▨	PROPOSED SIDEWALK
——330——	PROPOSED 10' CONTOUR
——328——	PROPOSED 2' CONTOUR
+328 28	PROPOSED SPOT ELEVATION
⌒⌒⌒	PROPOSED TREELINE
═	PROPOSED CURB
▨	EXISTING 5' PUBLIC UTILITY EASEMENT (PLAT 15/35)
▨	EXISTING 20' PRIVATE DRAINAGE & UTILITY EASEMENT (PLAT 22168)
▨	EXISTING 30' PRIVATE USE-IN-COMMON ACCESS EASEMENT TO BENEFIT PARCELS A & B (PLAT 22168)
▨	PROPOSED 20' PUBLIC WATER & UTILITY EASEMENT
▨	EXISTING STEEP SLOPES
——SSF——	SUPER SILT FENCE
— LOD —	LIMIT OF DISTURBANCE
AGIP	AT GRADE INLET PROTECTION
SCE	STABILIZED CONSTRUCTION ENTRANCE



GRADING PLAN AND SOILS MAP
SCALE: 1"=30'

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

ECS REPORT OF SUBSURFACE EXPLORATION DATED DECEMBER 13, 2013

Stormwater Management (SWM) Facility

Based on the provided information, we understand that management of stormwater will be necessary for the project and that SWM bio-retention facilities are being considered for this site. Specific details regarding the SWM facilities were not provided at the time this report was prepared; however, we understand that facility bottoms will be less than 10 ft below existing grades and that infiltration is desirable for the planned SWM facilities.

Field infiltration tests were performed adjacent to all four borings at a depth of about 10 feet below the existing ground surface. Based on the soil test boring results, the soil at the level of the infiltration test should consists of micaceous Silty SAND (SM). In addition to the field infiltration test, gradation analysis by hydrometer was performed on samples recovered at a depth of approximately 10 feet from each boring. A summary of infiltration test results are shown in the following table.

Infiltration Test Results for SWM facilities

Boring #	Anticipated Soil (5' to 10' below existing grade)	Min. Infiltration Rate (in/hr)	
		Field	Soil Lab.
B-1	Sandy Loam	4.56	1.02
B-2	Loamy Sand	5.76	2.41
B-3	Loamy Sand	0.84	2.41
B-4	Loamy Sand	0.60	2.41

Soil borings indicated that relatively well draining Sands at the planned inverts SWM facilities should be encountered. Based on the soil test boring results, the soils at and below the anticipated SWM facility inverts should generally consist of Sandy Loam and Sandy Loam. Based on the USDA criteria such material should exhibit minimum infiltration rates ranging above 1.02 inches per hour (in/hr). Measured field infiltration rates ranged between 0.6 and 5.76 in/hr. Groundwater was not encountered in any of the SWM borings to the explored depths. In addition, bedrock was not encountered to the depth drilled in borings and is not anticipated to impact the construction of the SWM facilities in that location. Therefore, based on the soil test boring results and field infiltration test results, infiltration at the planned SWM locations is considered feasible.

SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	GROUP
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B
UuB	URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	D

NOTE: BASED ON USDA NATURAL REASOURCES CONSERVATION SURVEY WEB SOIL SURVEY
NOTE: SOIL MAP NUMBER USED – 13

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

GRADING, SEDIMENT, AND EROSION CONTROL PLAN, AND SOILS MAP
BETHANY MARKETPLACE

ELLICOTT INVESTMENTS, LLC SUBDIVISION - PARCEL B
3240 BETHANY LANE
ELLICOTT CITY, MD
RETAIL SHOPPING CENTER

ZONED: B-1
TAX MAP: 24 BLOCK: 2
2ND ELECTION DISTRICT

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2 SHEET OF 3

ECP-14-021

OWNER/DEVELOPER
BETHANY MARKETPLACE, LLC
8808-C PEAR TREE COURT
ALEXANDRIA, VA 22309
C/O CHARLES FAIRCHILD
(703) 926-1812

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION J.P. — DATE 5.15.14

CHIEF, DIVISION OF LAND DEVELOPMENT BB — DATE 5/13/14

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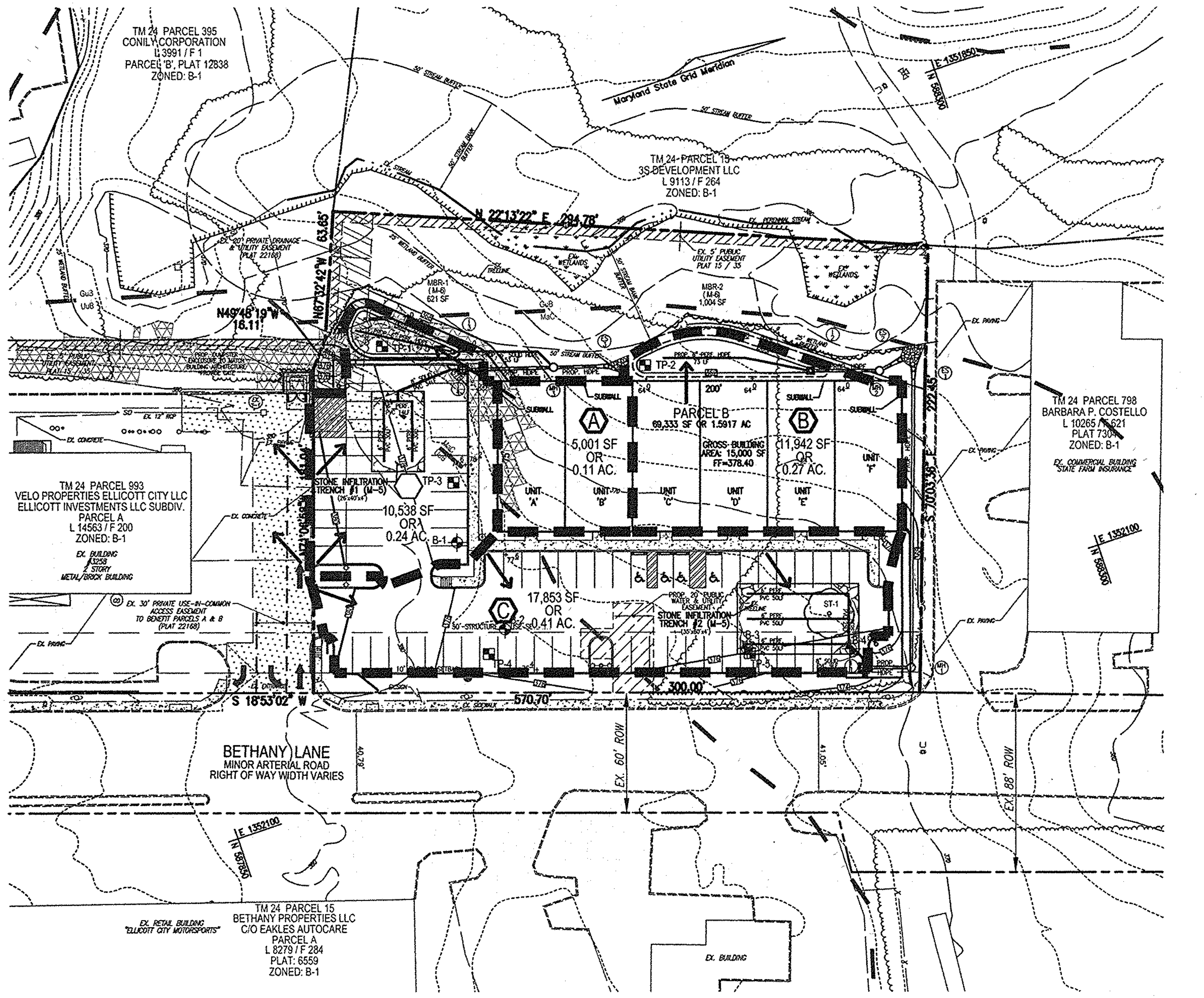

SWM DRAINAGE AREA MAP

SCALE: 1"=50'

SOILS LEGEND		
SYMBOL	NAME / DESCRIPTION	GROUP
GuB	GLENVILLE–URBAN LAND–UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C
MoC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B
UuB	URBAN LAND–UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	D

NOTE: BASED ON USDA NATURAL REASOURCES CONSERVATION SURVEY WEB SOIL SURVEY
NOTE: SOIL MAP NUMBER USED – 13

LEGEND:

━━ ━ ━ ━━	PROPERTY LINE
—— — — — ——	RIGHT-OF-WAY LINE
——···——	ADJACENT PROPERTY LINE
═ ═ ═ ═	EXISTING CURB AND GUTTER
○	EXISTING UTILITY POLE
☼	EXISTING LIGHT POLE
▭	EXISTING MAILBOX
○	EXISTING SIGN
SMH 2 ○	EXISTING SANITARY MANHOLE
——SS——	EXISTING SANITARY LINE
○ CO	EXISTING CLEANOUT
FH	EXISTING FIRE HYDRANT
——W——	EXISTING WATER LINE
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SsE SfC2	SOILS
—— · · · ——	CENTERLINE OF EXISTING STREAM
☼	PROPOSED DECORATIVE PEDESTRIAN LIGHTING
□—◎—□ ◎—□	PROPOSED PARKING LOT LIGHTING
▬ ▬ ▬	PROPOSED STORMDRAIN
▦	PROPOSED STORMDRAIN INLET
▒	PROPOSED SIDEWALK
——330——	PROPOSED 10' CONTOUR
——328——	PROPOSED 2' CONTOUR
+328 28	PROPOSED SPOT ELEVATION
⌒⌒⌒	PROPOSED TREELINE
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░	EXISTING 30' PRIVATE USE-IN-COMMON ACCESS EASEMENT TO BENEFIT PARCELS A & B (PLAT 22168)
▨	PROPOSED 20' PUBLIC WATER & UTILITY EASEMENT
▩	PROPOSED PERVIOUS CONCRETE (A-2)
▩	EXISTING STEEP SLOPES
▬ ▬ ▬	PROPOSED DRAINAGE AREA
B-1 ⊕	BORING LOCATIONS
TP-3 ▚	TEST PIT LOCATIONS

APPENDIX B.2. CONSTRUCTION SPECIFICATIONS FOR INFILTRATION PRACTICES

B.2.A INFILTRATION TRENCH GENERAL NOTES AND SPECIFICATIONS

AN INFILTRATION TRENCH MAY NOT RECEIVE RUN-OFF UNTIL THE ENTIRE CONTRIBUTING DRAINAGE AREA TO THE INFILTRATION TRENCH

1. HEAVY EQUIPMENT AND TRAFFIC SHALL BE RESTRICTED FROM TRAVELING OVER THE PROPOSED LOCATION OF THE INFILTRATION TRENCH OT MINIMIZE COMPACTION OF THE SOIL.
2. EXCAVATE THE INFILTRATION TRENCH TO THE DESIGN DEMENSIONS. EXCAVATED MATERIALS SHALL BE PLACED AWAY FROM THE TRENCH SIDES TO ENHANCE TRENCH WALL STABILITY. LARGE TREE ROOTS MUST BE TRIMMED FLUSH WITH THE TRENCH SIDES IN ORDER TO PREVENT FABRIC PUNCTURING OR TEARING OF THE FILTER FABRIC DURING SUBSEQUENT INSTALLATION PROCEDURES. THE SIDE WALLS OF THE TRENCH SHALL BE ROUGHENED WHERE SHEARED AND SEALED BY HEAVY EQUIPMENT.
3. A CLASS "C" GEOTEXTILE OR BETTER (SEE SECTION 24.0 , MATERIAL SPECIFICATIONS, 1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, MDE, 1994) SHALL INTERFACE BETWEEN THE TRENCH SIDE WALLS AND BETWEEN THE STONE RESERVOIR AND GRAVEL FILTER LAYERS. A PARTIAL LIST OF NON-WOVEN FILTER FABRICS THAT MEET THE CLASS "C" CRITERIA FOLLOWS. ANY ALTERNATIVE FILTER FABRIC MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.

AMOCO 4552	CARTHAGE FX-80S
GEOLON N70	MIRAFI 180-N
WEBTEC NO7	

   THE WIDTH OF THE GEOTEXTILE MUST INCLUDE SUFFICIENT MATERIAL TO CONFORM TO TRENCH PERIMETER IRREGULARITIES AND FOR A 6-INCH MINIMUM TOP OVERLAP. THE FILTER FABRIC SHALL BE TUCKED UNDER THE SAND LAYER ON THE BOTTOM OF THE INFILTRATION TRENCH FOR A DISTANCE OF 6 TO 12 INCHES. STONES OR OTHER ANCHORING OBJECTS SHOULD BE PLACED ON THE FABRIC AT THE EDGE OF THE TRENCH TO KEEP THE TRENCH OPEN DURING WINDY PERIODS. WHEN OVERLAPS ARE REQUIRED BETWEEN ROLLS, THE UPHILL SHOULD LAP A MINIMUM OF 2 FEET OVER THE DOWNHILL ROLL IN ORDER TO PROVIDE A SHINGLED EFFECT.
4. IF A 6 INCH SAND FILTER LAYER IS PLACED ON THE BOTTOM OF THE INFILTRATION TRENCH, THE SAND FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET AASHTO-M-43, SIZE NO. 9 OR NO. 10. ANY ALTERNATIVE SAND GRADATION MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.
5. THE STONE AGGREGATE SHOULD BE PLACED IN A MAXIMUM LOOSE LIFT THICKNESS OF 12 INCHES. THE GRAVEL (ROUNDED "BANK RUN" GRAVEL IS PREFERRED) FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET ON OF THE FOLLOWING AASHTO-M-43, SIZE NO. 2 OR NO. 3.
6. FOLLOWING THE STONE AGGREGATE PLACEMENT, THE FILTER FABRIC SHALL BE FOLDED OVER THE STONE AGGREGATE TO FORM A 6-INCH MINIMUM LONGITUDINAL LAP. THE DESIRED FILL SOIL OR STONE AGGREGATE SHALL BE PLACED OVER THE LAP AT SUFFICIENT INTERVALS TO MAINTAIN THE LAP DURING SUBSEQUENT BACKFILLING.
7. CARE SHALL BE EXERCISED TO PREVENT NATURAL OR FILL SOILS FROM INTERMIXING WITH THE STONE AGGREGATE. ALL CONTAMINATED STONE AGGREGATE SHALL BE REMOVED AND REPLACED WITH UNCONTAMINATED STONE AGGREGATE.
8. VOIDS MAY OCCUR BETWEEN THE FAVRIC AND THE EXCAVATION SIDES SHALL BE AVOIDED. REMOVING BOULDERS OR OTHER OBSTACLES FROM THE TRENCH WALLS IS ONE SOURCE OF SUCH VOIDS. THEREFORE, NATURAL SOILS SHOULD BE PLACED IN THESE VOIDS AT THE MOST CONVENIENT TIME DURING CONSTRUCTION TO ENSURE FABRIC CONFORMITY TO THE EXCAVATION SIDES.
9. VERTICALLY EXCAVATED WALLS MAY BE DIFFICULT TO MAINTAIN IN AREAS WHERE SOIL MOISTURE IS HIGH OR WHERE SOFT COHESIVE OR COHESIONLESS SOILS ARE DOMINANT. THESE CONDITIONS MAY REQUIRE LAYING BACK OF THE SIDE SLOPE TO MAINTAIN STABILITY.
10. PVC DISTRIBUTION PIPES ASHALL BE SCHEDULE 40 AND MEET ASTM-D-1785. ALL FITTINGS SHALL MEET ASTM-D-2729. PERFORATIONS SHALL BE 3/8 INCH IN DIAMETER. A PERFORATED PIPE SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. THE END OF THE PVC PIPE SHALL BE CAPPED. NOTE: PVC PIPE WITH A WALL THICKNESS CLASSIFICATION OF SDR-35 MEETING ASTM-D-3034 IS AN ACCEPTABLE SUBSTITUTE FOR THE SCHEDULE 40 PIPE.
11. THE OBSERVATION WELL IS TO CONSIST OF 6-INCH DIAMETER PERFORATED PVC SCHEDULE 40 PIPE (M 278 OR F758, TYPE PS 28) WITH A CAP SET 6 INCHES ABOVE GROUND LEVEL AND IS TO BE LOCATED NEAR THE LONGITUDINAL CENTER F THE INFILTRATION TRENCH. THE PIPE SHALL HAVE A PLASTIC COLLAR WITH RIBS TO PREVENT ROTATION WHEN REMOVING THE CAP. THE SCREW TOP LID SHALL BE A CLEANOUT WITH A LOCKING MECHANISM OR SPECIAL BOLT TO DISCOURAGE VANDALISM. THE DEPTH TO THE INVERT SHALL BE MARKED ON THE LID. THE PIPE SHALL BE PLACED VERTICALLY WITHIN THE GRAVEL PORTION OF THE INFILTRATION TRENCH AND A COP PROVIDED AT THE BOTTOM OF THE PIPE. THE BOTTOM OF THE CAP SHALL REST ON THE INFILTRATION TRENCH BOTTOM
12. CORRUGATED METAL DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, AND SHALL BE ALUMINIZED IN ACCORDANCE WITH AASHTO-M-274. ALUMINIZED PIPE CONTACT WITH CONCRETE SHALL BE COATED WITH AND INERT COMPOUND CAPABLE OF PREVENTING THE DELETERIOUS EFFECT OF THE ALUMINUM ON THE CONCRETE. PERFORATED DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, CLASS 2 AND SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. AN ALUMINIZED METAL PLATE SHALL BE WELDED TO THE END OF THE PIPE.
13. IF A DISTRIBUTION STRUCTURE WITH A WET WELLIS USED, A 4-INCH DRAIN PIPE SHALL BE PROVIDED AT OPPOSITE ENDS OF THE INFILTRATION TRENCH DISTRIBUTION STRUCTURE. TWO (2) CUBIC FEET OF POROUS BACKFILL MEETING AASHTO-M-43, SIZE NO. 57 SHALL BE PROVIDED AT EACH DRAIN.
14. IF A DISTRIBUTION STRUCTURE IS USED, THE MANHOLE COVER SHALL BE BOLTED TO THE FRAME.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER INFILTRATION TRENCHES

1. THE MONITORING WELLS AND STRUCTURES SHALL BE INSPECTED ON A QUARTERLY BASIS AND AFTER EVERY LARGE STORM EVENT.
2. WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS SHALL BE RECORDED OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.
3. A LOGBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
4. WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN THE xxx HOUR TIME PERIOD, CORRECTIVE ACTION SHALL BE TAKEN.
5. THE MAINTENANCE LOGBOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
6. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION FACILITY 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.

APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION. RAIN GARDEN, LANDSCAPE INFILTRATION & INFILTRATION BERMS

1. MATERIAL SPECIFICATIONS

THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

2. FILTERING MEDIA OR PLANTING SOIL

THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.

THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

- SOIL COMPONENT – LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION).
- ORGANIC CONTEN – MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (30%), COARSE SAND (30%), AND COMPOST (40%).
- CLAY CONTENT – MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.
- PH RANGE – SHOULD BE BETWEEN 5.5 – 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED IN TO THE SOIL TO INCREASE OR DECREASE PH.

THERE SHALL BE AT LEAST ONE SOIL TEST PER PROJECT. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH, AND ADDITIONAL TESTS OF ORGANIC MATTER, AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

3. COMPACTION

IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE EXCAVATED USING LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE.

WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.

WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

4. PLANT MATERIAL

RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

5. PLANT INSTALLATION

COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.

ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.

GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS DEFEATS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

6. UNDERDRAINS

UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:

- PIPE – SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTMF 758, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OF HDPE).
- PERFORATIONS – IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A 1/4" (NO. 4 OR 4x4) GALVANIZED HARDWARE CLOTH.
- GRAVEL – THE GRAVEL LAYER (NO. 57 STONE PREFERRED) SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.
- THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.
- A RIGID, NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,0000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.
- A 4" LAYER OF PEA GRAVEL (1/8" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES IN TO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".

THIS MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

7. MISCELLANEOUS

THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

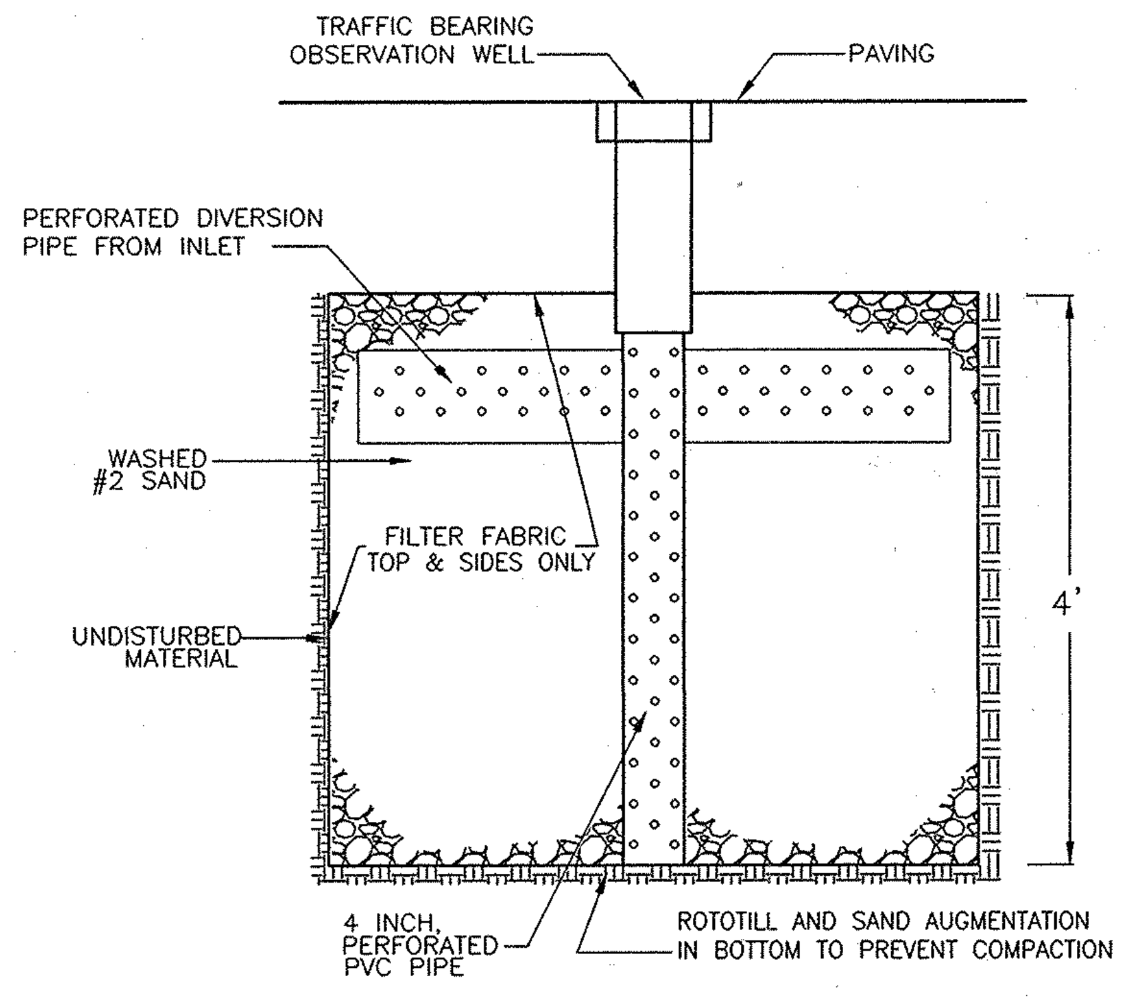
OPERATION AND MAINTENANCE SCHEDULE FOR LANSCAPE INFILTRATION (M-3), MICRO-BIORETENTION (M-6), RAIN GARDENS (M-7), BIORETENTION SWALE (M-8), AND ENHANCED FILTERS (M-9)

1. THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULTCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II, TABLE A.4.1 AND 2.
2. THE OWNER SHALL PERFORM A PLANT IN THE SPRING AND IN THE FALL OF EACH YEAR. DURING THE INSPECTION, THE OWNER SHALL REMOVE DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT PLANT MATERIAL, TREAT DISEASED TREES AND SHRUBS, AND REPLACE ALL DEFICIENT STAKES AND WIRES.
3. THE OWNER SHALL INSPECT THE MULCH EACH SPRING. THE MULCH SHALL BE REPLACED EVERY TWO TO THREE YEARS. THE PREVIOUS MULCH LAYER SHALL BE REMOVED BEFORE THE NEW LAYER IS APPLIED.
4. THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.

Appendix B.4. Construction Specifications for Environmental Site Design Practices

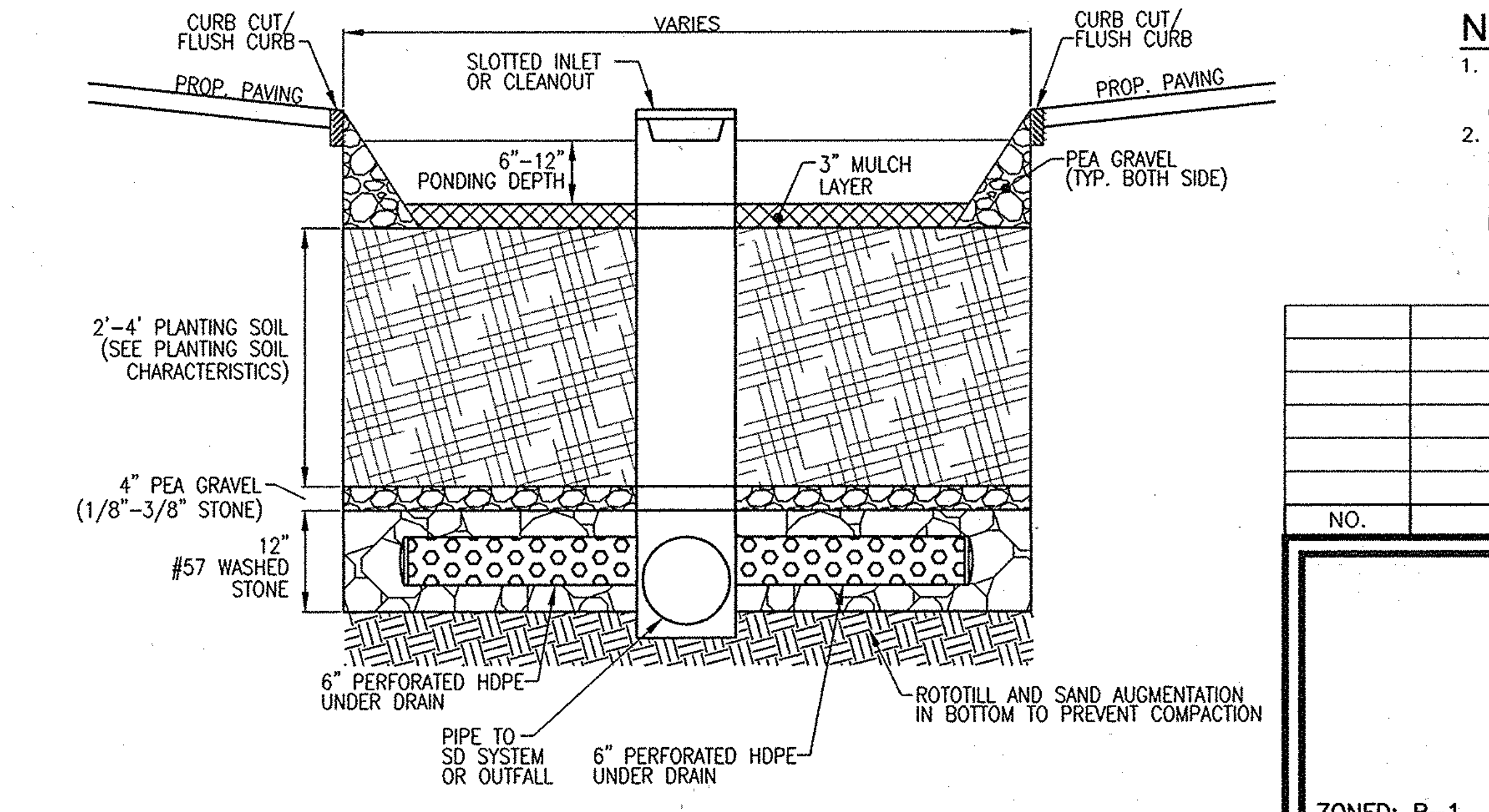
Table B.4.1 Materials Specifications for Micro-Bioretention, Rain Gardens & Landscape Infiltration-

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil [2' to 4' deep]	loamy sand (60 - 65%) & compost (35 – 40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with ¼-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; f'_c = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) *not using previously approved State or local standards* requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/89; vertical loading [H-10 or H-20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.



GENERAL INFILTRATION (M-5) TRENCH DETAIL

NOT TO SCALE



MICRO-BIORETENTION (M-6) DETAIL

NOT TO SCALE

NOTES:

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

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

SWM DRAINAGE AREA MAP; SWM NOTES AND DETAILS BETHANY MARKETPLACE

ELLICOTT INVESTMENTS, LLC SUBDIVISION - PARCEL B
3240 BETHANY LANE
ELLICOTT CITY, MD
RETAIL SHOPPING CENTER

ZONED: B-1
TAX MAP: 24 BLOCK: 2
2ND ELECTION DISTRICT

PARCEL: 993
PLAT: 22168
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
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No. 16193

ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV
DRAWN BY: JMR
CHECKED BY: RHV
DATE: MAY, 2014
SCALE: AS SHOWN
W.O. NO.: 12-08

PROFESSIONAL CERTIFICATE

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE: 09-27-2014

SHEET 3 OF 3

OWNER/DEVELOPER

BETHANY MARKETPLACE, LLC
8808-C PEAR TREE COURT
ALEXANDRIA, VA 22309
C/O CHARLES FAIRCHILD
(703) 926-1812

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 5.15.14 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — 5/13/14 DATE

ECP-14-021