

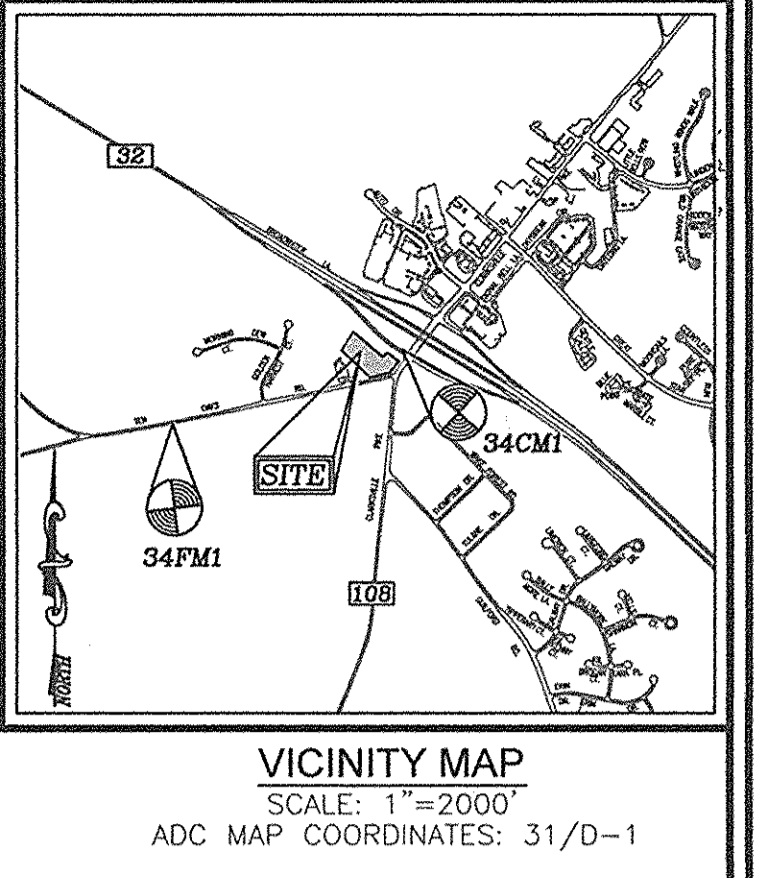
GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY STANDARDS AND SPECIFICATIONS. ALL WORK AND MATERIALS SHALL COMPLY WITH O.S.H.A. STANDARDS.
2. EXISTING UTILITIES LOCATED FROM ROAD CONSTRUCTION PLANS, FIELD SURVEYS, PUBLIC WATER AND AND SEWER EXTENSION PLANS AND AVAILABLE RECORD DRAWINGS APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN FOR THE CONTRACTOR'S INFORMATION. CONTRACTOR SHALL 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.
3. THE EXISTING TOPOGRAPHY SHOWN HEREON IS TAKEN FROM A FIELD RUN TOPOGRAPHIC SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC. DATED APRIL 17, 2015.
4. COORDINATES AND ELEVATIONS ARE BASED ON MARYLAND COORDINATE SYSTEM (NAD83) AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS 34CM1 AND 34FM1.
5. THE PROPERTY LINES SHOWN HEREON IS BASED ON A FIELD-RUN BOUNDARY SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. DATED MARCH 13, 2015.
6. ALL ELEVATIONS ARE TO FLOWLINE/BOTTOM OF CURB UNLESS OTHERWISE NOTED.
7. THE GEOTECHNICAL ENGINEER TO CONFIRM PAVING SECTION PRIOR TO CONSTRUCTION. ALL PAVING TO BE PAVING PER GEOTECHNICAL RECOMMENDATIONS.
8. THE SUBJECT PROPERTY IS ZONED B-1 / B-2 IN ACCORDANCE WITH THE OCTOBER 6, 2013 COMPREHENSIVE ZONING PLAN.
9. PUBLIC WATER CONNECTIONS AVAILABLE THROUGH CONTRACT 30-3770. PUBLIC SEWER CONNECTION AVAILABLE THROUGH CONTRACT 44-3483.
10. THERE ARE NO WOODED AREAS, 100-YEAR FLOODPLAIN, WETLANDS OR STREAMS LOCATED ON THIS PROPERTY. THERE ARE NO BURIAL GROUNDS, CEMETERIES, OR HISTORIC STRUCTURES LOCATED ON THIS PROPERTY.
11. ANY EXISTING STREET TREES DAMAGED OR DESTROYED DURING CONSTRUCTION WILL BE REPLACED BY THE CONTRACTOR.
12. THE FOREST CONSERVATION OBLIGATION FOR PARCEL 361 (PARCELS A, B-1 AND C-1) HAVE BEEN PREVIOUSLY ADDRESSED UNDER SDP-03-097 AS A FEE-IN-LIEU PAYMENT IN THE AMOUNT OF \$7,840.40, AND UNDER SDP-06-006 AS A FEE-IN-LIEU PAYMENT IN THE AMOUNT OF \$2,905.80. THE FOREST CONSERVATION OBLIGATION FOR PARCEL 161 SHALL BE ADDRESSED UNDER THE SDP.
13. 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.
14. A KNOX BOX IS REQUIRED TO BE PLACED ON THE FRONT OF EACH BUILDING. IT SHALL BE PLACED TO THE RIGHT OF THE MAIN ENTRANCE AT A RANGE OF 4'-5' IN HEIGHT AND NO MORE THAN 6' LATERALLY FROM THE DOOR. ITS LOCATION IS SHOWN ON THESE PLANS. THE BOX SHALL BE ELECTRONICALLY SUPERVISED TO NOTIFY THE OWNER THAT IT IS BEING ACCESSSED (INTEGRATED WITH THE FIRE ALARM SYSTEM).
15. LANDSCAPING NOT PERMITTED WITHIN 7'-1/2' OF EACH SIDE OF THE FIRE DEPARTMENT CONNECTION. PROVIDE A CLEAR UNOBSTRUCTED ACCESS PATH TO THE FIRE DEPARTMENT CONNECTION. WIDTH=11'-13'-1/4'.
16. FIRE LANES SHOULD BE PROVIDED IN THIS SITE TO ALLOW EMERGENCY VEHICLE ACCESS. EITHER FIRE LANE SIGNAGE SHOULD BE INSTALLED, OR THE CURBS SHOULD BE PAINTED IN RED AND STICKLED TO IDENTIFY THE ROAD AS A FIRE LANE.
17. ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE POST (1/4 GAUGE) INSERTED INTO A 2"-1/2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (1/2 GAUGE) - 3' LONG. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.
18. ALL EXTERIOR LIGHTING TO COMPLY WITH THE REQUIREMENTS FOUND IN ZONING SECTION 134 OF THE HOWARD COUNTY ZONING REGULATIONS. (DETAILS ON SHEET 2 AND 3)
19. STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURE AND POLE SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME II (2008), SECTION 5.5.A. A MINIMUM OF 20" SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
20. STORMWATER MANAGEMENT FOR THIS PROJECT IS BEING PROVIDED BY ENVIRONMENTAL SITE DESIGN UTILIZING MICRO-BIORETENTION FACILITIES (M-6) AND PERVIOUS PAVING (A-2) (WITH ADDITIONAL STONE DEPTH) TO ACCOMMODATE THE TOTAL ESDV REQUIRED. SWM FACILITIES TO BE PRIVATELY OWNED AND MAINTAINED.
21. TRASH AND RECYCLING COLLECTION TO BE PRIVATE.
22. THE PROPOSED BUILDINGS WILL HAVE AN AUTOMATIC FIRE PROTECTION SPRINKLER SYSTEM. SIGNAGE SHALL BE PROVIDED ON EACH BUILDING IDENTIFYING THE BUILDING ADDRESS AND EACH SUITE SEPARATED BY LETTER.
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 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.

ANTWERPEN PROPERTIES TEN OAKS ROAD AND MD ROUTE 108 ENVIRONMENTAL CONCEPT PLAN

BENCHMARKS

HOWARD COUNTY BENCHMARK 34FM1	N 551,654.993	E 1,378,176.951	ELEV.: 209.601'
HOWARD COUNTY BENCHMARK 34CM1	N 550,601.597	E 1,376,866.072	ELEV.: 210.559'



TAX MAP 34, PARCEL 398
LOT 5
SANDRA A SELBY
DANNY W SELBY BY T/E
CLARKSVILLE MANOR
L 5181/F 406
PLAT 8501
ZONED: RR-DEO
USE: RESIDENTIAL

TAX MAP 34, PARCEL 398
LOT 4
GIRISHBH A PATEL
SHARMILA G PATEL
CLARKSVILLE MANOR
L 3445/F 75
PLAT 8501
ZONED: RR-DEO
USE: RESIDENTIAL

TAX MAP 34, PARCEL 398
LOT 2
LEWIS FAMILY LLC
C/O MARY AGNES LEWIS
CLARKSVILLE MANOR
L 3471/F 657
PLAT 15546
ZONED: B-1
USE: COMMERCIAL

MR. TIRE
FF=477.50

DRUG STORE
FF=479.50

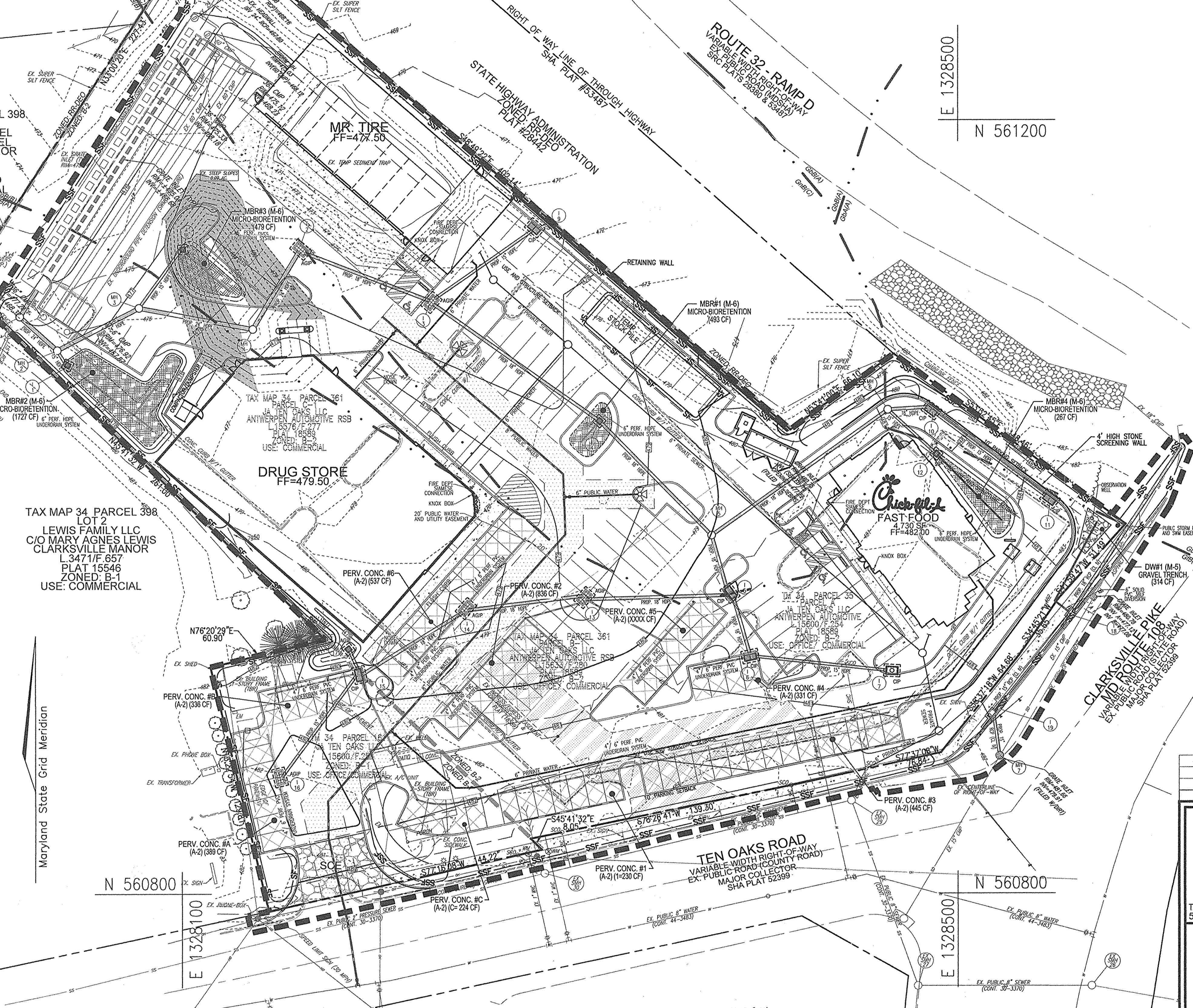
Chick-fil-ee
FAST FOOD
4,730 SF
FF=482.00

- SEDIMENT CONTROL NOTES:**
1. SEDIMENT CONTROLS INTERRUPTED BY THE INSTALLATION OF STORM DRAINS ARE TO BE REPAIRED IMMEDIATELY.
 2. A DOUBLE ROW "SUPER" SILT FENCE IS TO BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.
 3. STOCKPILES EXCEEDING 15 FEET IN HEIGHT SHALL BE BENCHED.
 4. SILT FENCE SHALL BE CURLED UPWIND WHEREVER IT RUNS DOWNHILL.
 5. EITHER TEMPORARY OR PERMANENT SEEDING AND STABILIZATION IS TO BE PERFORMED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS PROVIDED IN THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, WHICHEVER IS MORE STRINGENT.

LEGEND

--- 300 ---	EXISTING CONTOUR	M1B2	SOILS BOUNDARY
--- 400 ---	PROPOSED CONTOUR	M1D3	PROPOSED SIDEWALK
=====	EXISTING CURB AND GUTTER	-----	PROPOSED STORM DRAIN
-----	PROPOSED CURB AND GUTTER	-----	PROPOSED STORM DRAIN INLET
○	EXISTING UTILITY POLE	SF	SILT FENCE
○	EXISTING LIGHT POLE	SSF	SUPER SILT FENCE
○	EXISTING MAILBOX	-----	LIMIT OF DISTURBANCE
○	EXISTING SIGN	-----	CURB INLET PROTECTION
○	EXISTING SANITARY MANHOLE	-----	AT GRADE INLET PROTECTION
○	EXISTING SANITARY LINE	-----	STABILIZED CONSTRUCTION ENTRANCE
○	EXISTING CLEANOUT	-----	PROPOSED PERMEABLE PAVEMENT
○	EXISTING FIRE HYDRANT	-----	PROPOSED MICRO-BIORETENTION FACILITY
○	EXISTING WATER LINE	-----	
○	EXISTING PROPERTY LINE	-----	
○	RIGHT-OF-WAY LINE	-----	

Maryland State Grid Meridian



SITE DATA:
LOCATION: TAX MAP 34, BLOCK 12
PARCEL 35/LOT A
PARCEL 161
PARCEL 361/LOT B1
PARCEL 361/LOT C1
TOTAL PARCEL AREA: 3.34 AC.
PARCEL 35/LOT A: 0.735 AC.
PARCEL 161: 0.307 AC.
PARCEL 361/LOT B1: 0.438 AC.
PARCEL 361/LOT C1: 1.987 AC.
5TH ELECTION DISTRICT
PRESENT ZONING: B-1 / B-2
DEED REFERENCES: L15600/F 254, L15633/F 280, L15576/F 277
DPZ REFERENCES: F-78-01, SDP-03-097, F-03-173, SDP-01-040, F-06-192, WP-03-131, WP-06-061, BA-14-027V
USE OF STRUCTURES: RETAIL, FAST FOOD, AUTOMOTIVE MAINTENANCE
TOTAL BUILDING COVERAGE: 24,818 SF (0.56 AC. OR 16.92% OF GROSS AREA)
RETAIL BUILDING COVERAGE: 13,281 SF (0.30 AC.)
FAST FOOD BUILDING COVERAGE: 4,737 SF (0.11 AC.)
AUTOMOTIVE MAINTENANCE COVERAGE: 6,600 SF (0.15 AC.)
PAVED PARKING LOT/AREA ON SITE: 81,033 SF (1.86 AC. OR 55.69% OF GROSS AREA)
AREA OF LANDSCAPE ISLAND: 5,391 SF (0.12 AC. OR 3.59% OF GROSS AREA)
LIMIT OF DISTURBED AREA (CONSTRUCTION): 3.44 AC.
LIMIT OF DISTURBED AREA (SWM CALCULATION): 3.44 AC.
WETLANDS ON SITE: 0.00 AC.
WETLAND BUFFERS ON SITE: 0.00 AC.
STREAMS AND THEIR BUFFERS ON SITE: 0.00 AC.
AREA OF ON-SITE 100 YEAR FLOODPLAIN: 0.00 AC.
AREA OF EXISTING FOREST ON SITE: 0.00 AC.
AREA OF STEEP SLOPES (25% OR GREATER): 0.09 AC.
AREA OF ERODIBLE SOILS: 1.05 AC.
AREA MANAGED BY ESDV: 1.11 AC.
IMPERVIOUS AREA: 1.08 AC.
GREEN AREA: 0.02 AC.

ENVIRONMENTAL SITE DESIGN NARRATIVE:

1. THERE ARE NO WOODED AREAS, 100-YEAR FLOODPLAIN, WETLANDS OR STREAMS LOCATED ON THIS PROPERTY. THE SITE CONSISTS OF GLADSTONE (HS6 'A'), GLENELG (HS6 'B') AND GLENVILLE (HS6 'C') SOILS AND THERE ARE NO STEEP SLOPES. THE PROPERTY DOES NOT CONTAIN SPECIEN TREES. NATURAL RESOURCES DO NOT EXIST ON THIS SITE AND THEREFORE WILL NOT REQUIRE PROTECTION.
2. THE SITE NATURALLY SLOPES FROM SOUTHEAST TO NORTHWEST. THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERNS.
3. THE CONCEPTUAL REDUCTION IN IMPERVIOUS AREA THROUGH BETTER SITE DESIGN IS ACHIEVED THROUGH THE ENVIRONMENTAL SITE DESIGN (ESD) FOR THE PROJECT. THE RESULTS OF THE ENVIRONMENTAL SITE DESIGN FOR THIS PROJECT WILL REFLECT "WOODS IN GOOD CONDITION". THIS PLAN UTILIZES MICRO-BIORETENTION AREAS (M-6), PERVIOUS PAVING (A-2), AND THE EXISTING SANDFILTER TO ACCOMMODATE THE TOTAL ESDV VOLUME REQUIRED ON-SITE FOR THE PROJECT. THE ACTUAL ESDV PROVIDED FOR THE SITE IS 12,379 CF. THE ACTUAL ESDV REQUIRED FOR THE SITE BASED ON NEW DEVELOPMENT CRITERIA IS 16,927 CF. ESDV HAS BEEN PROVIDED FOR THE SITE TO THE MAXIMUM EXTENT POSSIBLE (MEP). THE ESDV PRACTICES PROVIDE AN ADDITIONAL 5,311 CF OF WATER QUALITY NOT PROVIDED WITH THE ORIGINAL DESIGN UNDER SDP-06-006 (EXCLUDING THE REDEVELOPMENT OF PARCEL 161). ESDV IS ALSO PROVIDED FOR THE ADDITIONAL PAVING PROPOSED ON TEN OAKS ROAD AND ROUTE 108. THIS IS ACCOMPLISHED BY DIVERTING THE FLOW ASSOCIATED WITH PE#1 FROM THE SHA INLET TO A GRAVEL TRENCH (M-5) LOCATED ON-SITE WITH A PROPOSED EASEMENT.
4. SEDIMENT CONTROL FOR THIS SPECIFIC SITE PLAN WILL BE PROVIDED THROUGH THE USE OF PERIMETER CONTROLS (SILT FENCE, SUPER SILT FENCE & EARTH DIKES) AND INLET PROTECTION. SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH THE CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT.
5. STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET ON-SITE THROUGH THE USE OF MICRO-BIORETENTION AREAS (M-6), PERVIOUS PAVING (A-2), A GRAVEL TRENCH (M-5), AND THE EXISTING SANDFILTER.
6. NO WAIVERS ARE ANTICIPATED TO FULFILL THIS CONCEPT.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad Chinn 8-21-15
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Ved Sandbrook 8-20-15
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

ESDv CONCEPT PLAN
SCALE: 1"=30'

SHEET INDEX

DESCRIPTION	SHEET NO.
COVER SHEET & ESDv CONCEPT PLAN	1 OF 2
SWM DRAINAGE AREA MAP; SWM DETAILS	2 OF 2

DEVELOPER/OWNER
JA TEN OAKS LLC
C/O ANTWERPEN AUTOMOTIVE
6440 BALTIMORE NATIONAL PIKE
BALTIMORE, MD 21228
410-938-5000

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN
COVER SHEET & ESDv CONCEPT PLAN
ANTWERPEN PROPERTIES
TEN OAKS ROAD AND MD ROUTE 108
TAX MAP 34 GRID 12 PARCEL 161
5TH ELECTION DISTRICT PARCEL 361, LOTS B-1 & C-1
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET TEL: 410.461.7866
ELLIOTT CITY, MD 21043 FAX: 410.461.8961

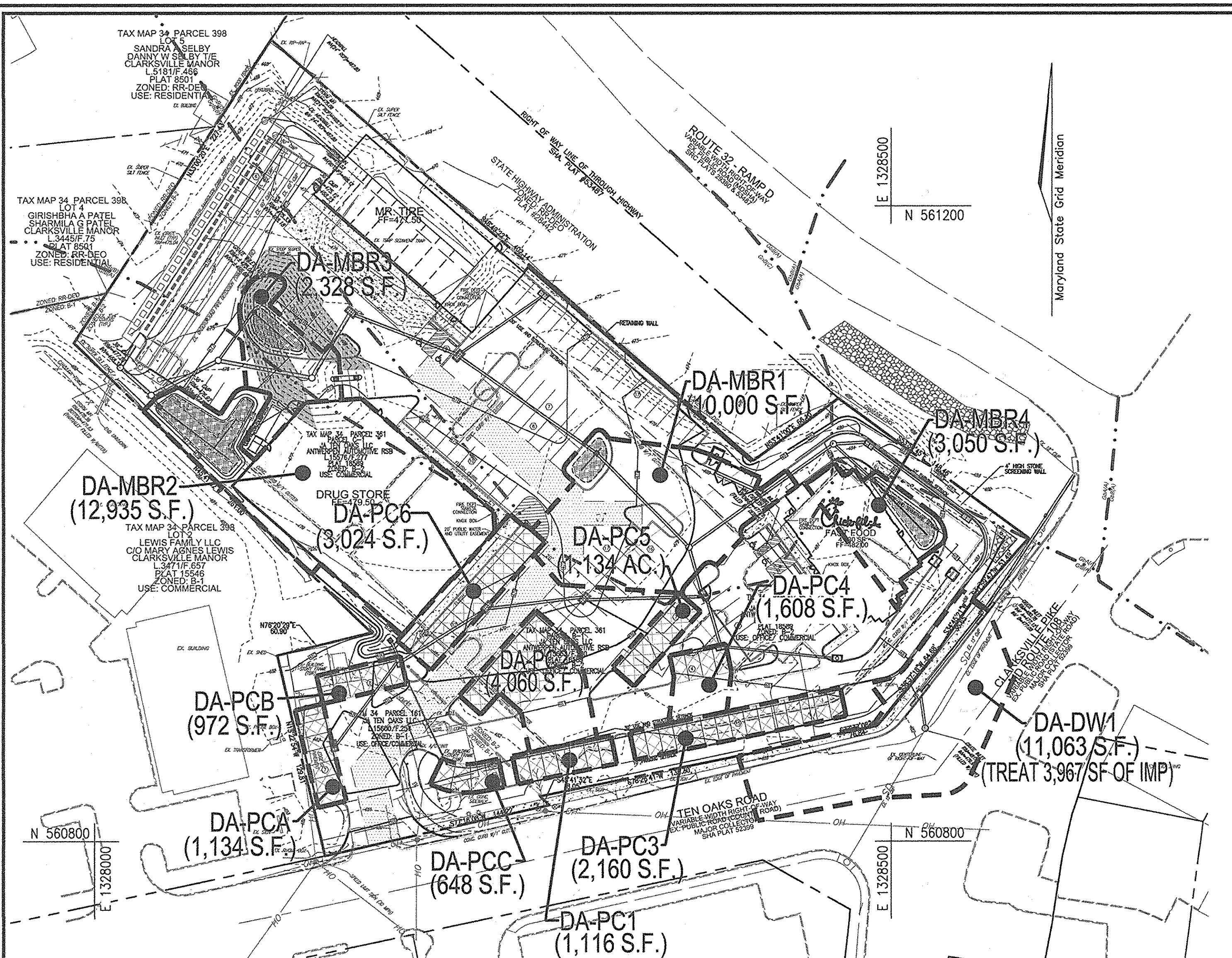
PROFESSIONAL CERTIFICATE

STATE OF MARYLAND
ROBERT H. VOGEL
REGISTERED PROFESSIONAL ENGINEER
EXPIRES: 07-31-2016

DESIGN BY: RHV
DRAWN BY: DZE/MR
CHECKED BY: RHV
DATE: AUGUST 2015
SCALE: AS SHOWN
W.O. NO.: 07-10

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. 16933 EXPIRATION DATE: 07-31-2016

1 SHEET OF 2

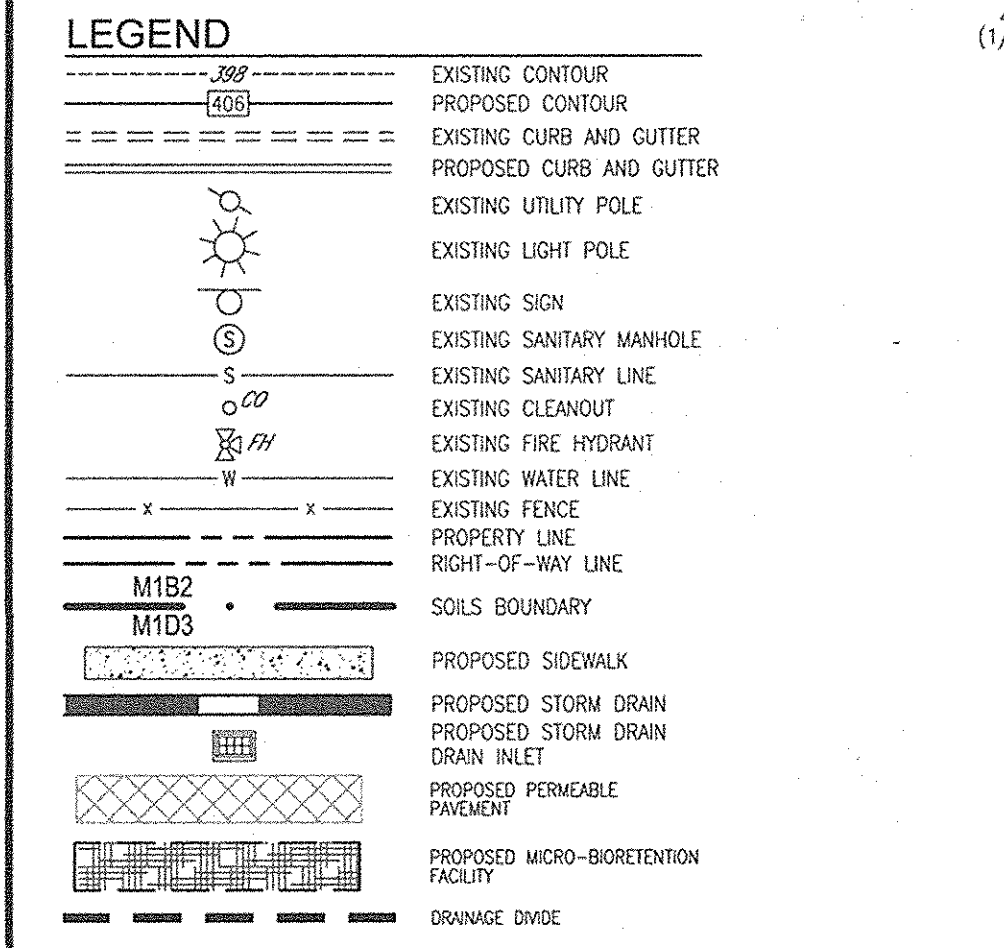


SOILS LEGEND
HOWARD COUNTY SOILS MAP #16

SYMBOL	NAME / DESCRIPTION	GROUP	ERODIBLE	KFACTOR
GNA	GLADSTONE LOAM, 0 TO 3 PERCENT SLOPES	A	NO	.28
GIB	GLADSTONE-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	A	NO	.28
GCD	GLENNVILLE LOAM, 3 TO 8 PERCENT SLOPES	B	NO	.28
GGB	GLENNVILLE-BAILE SILT LOAM, 0 TO 8 PERCENT SLOPES	C	YES	.43

ENVIRONMENTAL CONCEPT PLAN NOTES:

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



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad Edwards 8-21-15
CHIEF, DEVELOPMENT ENGINEERING DIVISION

W. J. Schaefer 8-20-15
CHIEF, DIVISION OF LAND DEVELOPMENT

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

- MATERIAL SPECIFICATIONS**
THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.
- 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 PROMOTE OR INHIBIT PLANT GROWTH OR PROVIDE AN OBSTACLE 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.
 - ORGANIC CONTENT - 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 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 TEXTURAL ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.
- 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 LOADERS, CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TIRE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LOGS, 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 RESTRUCTURE THE SOIL PROFILE THROUGHOUT THE 12 INCH COMPACTION ZONE. SUBSTITUTES MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.
 ROTILL TO 3 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY WATER BEFORE PREPARING (ROTILLING) BASE. WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL 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.
- PLANT MATERIAL**
RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.
- PLANT INSTALLATION**
COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLUD, 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". SHREDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND NOT BE EFFECTIVE. MULCH SHOULD BE PLACED WITHIN 6 TO 12 MONTHS OF ACCEPTANCE.
 ROTILLING MATERIAL SHALL BE KEPT MOST 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 STRAGUT 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. THE TREE SHALL HAVE A PLASTIC COLLAR WITH RISBS 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.
- UNDERDRAINS**
UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:
 - PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM F 756, 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 1" ON CENTER WITH A MINIMUM OF FOUR HOLES PER FOOT. 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 1,000 SQUARE FEET) TO PROVIDE A CLEAN-OUT POINT AND MONITOR PERFORMANCE OF THE FILTER.
 - A 4" LAYER OF PEA GRAVEL (1/8" TO 3/8" STONES) 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".
 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).
- MISCELLANEOUS**
THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

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

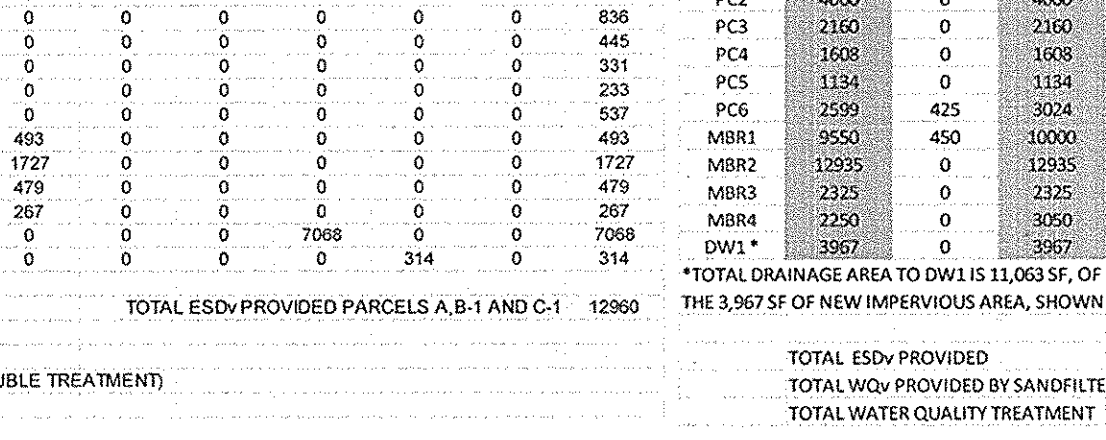
- THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II, TABLE A.4.1 AND 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 DISEASED VEGETATION RECALCULATED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT PLANT MATERIAL, TREAT DISEASED TREES AND SHRUBS, AND REPLACE ALL DEFUNCT STAKES AND WIRES.
- 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. THE NEW LAYER IS APPLIED.
- THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.



OPERATION AND MAINTENANCE SCHEDULE FOR PERMEABLE PAVEMENT (A-2)

- THE OWNER SHALL PERIODICALLY SWEEP OR VACUUM POROUS CONCRETE PAVEMENT SURFACES TO REDUCE SEDIMENT ACCUMULATION AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING OR COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.
- THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SUBBASE.
- THE OWNER SHALL USE DICERS IN MODERATION. DICERS SHOULD BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PRETREATED SALT.
- THE OWNER SHALL ENSURE SNOW PLOWING IS PERFORMED CAREFULLY WITH BLADES SET ONE INCH ABOVE THE SURFACE. PLOWED SNOW PILES AND SNOWMELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

PERMEABLE PAVEMENT (A-2) TRENCH DETAIL

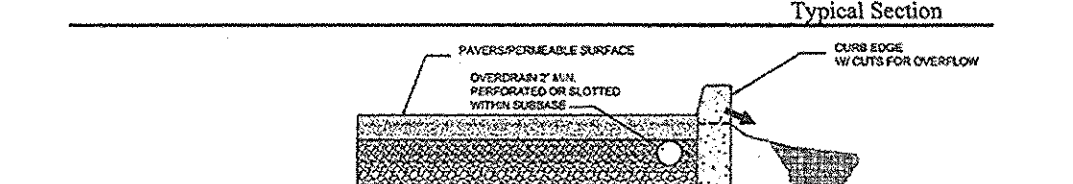
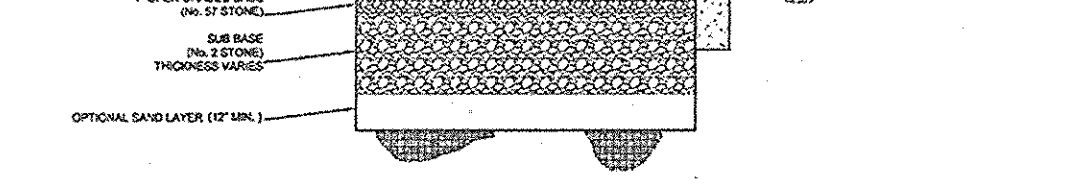


APPENDIX B.2. CONSTRUCTION SPECIFICATIONS FOR INFILTRATION PRACTICES B.2.A INFILTRATION TRENCH GENERAL NOTES AND SPECIFICATIONS

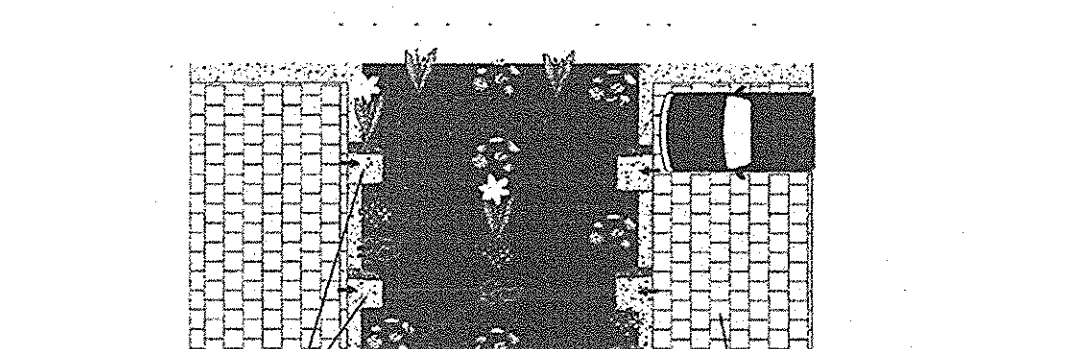
- HEAVY EQUIPMENT AND TRAFFIC SHALL BE RESTRICTED FROM TRAVELING OVER THE PROPOSED LOCATION OF THE INFILTRATION TRENCH TO MINIMIZE COMPACTION OF THE SOIL.
- EXCAVATE THE INFILTRATION TRENCH TO THE DESIGN DIMENSIONS. EXCAVATED MATERIALS SHALL BE PLACED AWAY FROM THE TRENCH SIDES TO ENHANCE TRENCH WALL STABILITY. LARGE TREE ROOTS MUST BE TRIMMED FLUSH WITH THE TRENCH SIDES IN ORDER TO PREVENT FUNDIC PUNCTURING OR TEAR OF THE FILTER FABRIC DURING SUBSEQUENT INSTALLATION PROCEDURES. THE WALLS OF THE TRENCH SHALL BE ROUGHENED WHERE SHEARED AND SEALED BY HEAVY EQUIPMENT.
- 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.
 ANCOO 458A
 GEOLON N70
 WETBEC N07
 WIRAFI 180-N
- 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 8 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 ROLL SHOULD LAP A MINIMUM OF 2 FEET OVER THE DOWNHILL ROLL IN ORDER TO PROVIDE A SHINGLED EFFECT.
- 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.
- 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.
- 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.
- 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.
- VOIDS MAY OCCUR BETWEEN THE FABRIC AND THE EXCAVATION SIDES SHALL BE AVOIDED. REMOVING BOLLIDERS 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.
- 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 LEACHING BACK OF THE SIDE SLOPE TO MAINTAIN STABILITY.
- PVC DISTRIBUTION PIPES SHALL 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.
- 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 OF THE INFILTRATION TRENCH. THE PIPE SHALL HAVE A PLASTIC COLLAR WITH RISBS 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.
- 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.
- IF A DISTRIBUTION STRUCTURE WITH A WELDED LID, 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.
- IF A DISTRIBUTION STRUCTURE IS USED, THE MANHOLE COVER SHALL BE BOLTED TO THE FRAME.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED PERMEABLE PAVEMENT (A-2)

- THE OWNER SHALL PERIODICALLY SWEEP OR VACUUM POROUS CONCRETE PAVEMENT SURFACES TO REDUCE SEDIMENT ACCUMULATION AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING OR COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.
- THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SUBBASE.
- THE OWNER SHALL USE DICERS IN MODERATION. DICERS SHOULD BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PRETREATED SALT.
- THE OWNER SHALL ENSURE SNOW PLOWING IS PERFORMED CAREFULLY WITH BLADES SET ONE INCH ABOVE THE SURFACE. PLOWED SNOW PILES AND SNOWMELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.



OPERATION AND MAINTENANCE SCHEDULE FOR PERMEABLE PAVEMENT (A-2) TRENCH DETAIL



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

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

Material	Specifications	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Filtering 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)	n/a	
Mulch	shredded hardwood	NO. 8 OR NO. 9 (1 1/8" TO 3/8")	aged 6 months, minimums no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1 1/8" TO 3/8")	
Certain drain	ornamental stone: washed cobble	stone: 2" to 5"	
Geotextile	n/a	n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 (3/8" TO 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or HDPE	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per foot; minimum of 1" of gravel over pipe; not necessary underdrain pipes. Perforated pipe shall be wrapped with 1/4-inch polyethylene hardware cloth
Precast in place concrete (if required)	MSHA Mix No. 3, F _c = 3500 psi @ 28 days, normal weight, air-entrained; conforming to meet ASTM-A15-60	n/a	on-site testing of precast in-place concrete required; 28 day strength and slump test; all concrete design (cast-in-place or precast) 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 309.8(R); vertical loading (H-10 or H-20); allowable horizontal loading based on soil properties; and analysis of potential cracking.
Sand	AASHTO-M-6 or ASTM-C-33	0.075 to 0.04"	Sand substitutions such as Diabase and Gneiss (AASHTO #10 are not acceptable. No columnar or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

PROJECT: ANTWERPEN PLAZA

DRAINAGE AREA #	AREA TREATED	FACILITY NUMBER	PERMEABLE PAVEMENT	GRAVEL MICRO BIORETENTION	SAND FILTER	X	ESDV
PC1	1116	PC1	250	0	0	0	230
PC2	4000	PC2	407	969	0	0	636
PC3	2100	PC3	445	0	0	0	445
PC4	1800	PC4	133	198	0	0	331
PC5	1134	PC5	233	0	0	0	233
PC6	3024	PC6	400	137	0	0	537
MBR1	10000	MBR1	0	0	0	0	463
MBR2	12955	MBR2	0	0	0	0	1727
MBR3	769	MBR3	0	0	0	0	479
MBR4	509	MBR4	0	0	0	0	267
SANDELFILTER	131651	SF1	0	0	0	0	7048
DWV1	3967	DWV1	0	0	0	0	314

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DWV1	3967	DWV1	0	0	0	0	314

NO. REVISION DATE

ENVIRONMENTAL CONCEPT PLAN

STORMWATER MANAGEMENT DRAINAGE AREA MAP; SWM DETAILS

ANTWERPEN PROPERTIES

TEN OAKS ROAD AND MD ROUTE 108

TAX MAP 34 GRID 12

5TH ELECTION DISTRICT