

GENERAL NOTES

1. THE EXISTING TOPOGRAPHY SHOWN HEREON IS TAKEN FROM A FIELD RUN TOPOGRAPHIC SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED JULY 2005 AND SITE DEVELOPMENT PLAN 06-102.
2. COORDINATES AND ELEVATIONS ARE BASED ON MARYLAND COORDINATE SYSTEM - NAD83(1991) AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS 3511 AND 3512.
3. THE PROPERTY LINES SHOWN HEREON IS BASED ON A FIELD-RUN BOUNDARY SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. DATED MAY 2005.
4. THE SUBJECT PROPERTY IS ZONED "POR" PER THE 10/05/2013 COMPREHENSIVE ZONING.
5. THERE ARE NO BURIAL GROUNDS, CEMETERIES, OR HISTORIC STRUCTURES LOCATED ON THIS PROPERTY.
6. THERE ARE NO WETLAND OR FLOODPLAINS ON SITE. THERE IS 0.07 ACRES OF 15% STEEP SLOPES ON SITE.
7. THE FOREST CONSERVATION OBLIGATIONS HAS BEEN PREVIOUSLY FULFILLED BY THE RETENTION OF 0.81 ACRES OF FOREST, BY THE REFORESTATION OF 0.38 ACRES OF FOREST, AND BY A FEE-IN-LIEU PAYMENT IN THE AMOUNT OF \$22,215.60 FOR THE REMAINING 0.68 ACRES OF FOREST REQUIRED UNDER SDP-06-102. FINANCIAL SURETY FOR THE REQUIRED FOREST CONSERVATION IN THE AMOUNT OF \$13,808.82 WAS POSTED AS PART OF THE DEVELOPERS AGREEMENT UNDER SDP-06-102. THE FOREST CONSERVATION BOND FROM SDP-06-102 (NOW VOID), WAS TRANSFERRED TO SDP-15-078. THE DEVELOPER OF THE CURRENT PROJECT/DESIGN WILL BE REQUIRED TO TRANSFER THE FOREST CONSERVATION BOND FROM SDP-06-102 TO THE NEW SDP AND COMPENSATE FOR ANY FOREST CONSERVATION ADJUSTMENT, IF NEEDED.
8. 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, ALTERNATIVE COMPLIANCE REQUESTS PETITION APPLICATION OR BUILDING/GRADING PERMIT APPLICATIONS.
9. STORMWATER MANAGEMENT IS PROVIDED BY AN EXISTING UNDERGROUND DETENTION FACILITY (SDP-06-102), BIORETENTION FACILITIES AND PERVIOUS PAVING.
10. THERE ARE NO SPECIMEN OR CHAMPION TREES WITHIN THE LOD.
11. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS, FOREST CONSERVATION AREAS AND 100-YEAR FLOODPLAIN.
12. CURRENT ZONING IS POR. THE LAYOUT AND SETBACK REQUIREMENTS ARE BASED ON THE MOST RESTRICTIVE BETWEEN THE BULK ZONING REQUIREMENTS FOR POR (SECTION 115.0.B.) AND SUPPLEMENTARY ZONING DISTRICT REGULATIONS (SECTION 128.0.J.-HOUSING COMMISSION HOUSING DEVELOPMENT OF THE ZONING REGULATIONS).
13. REFERENCE SDP-06-102, BALTIMORE KOREAN SEVENTH DAY ADVENTIST CHURCH. THE SUBJECT SITE WAS PARTIALLY CONSTRUCTED IN ACCORDANCE WITH THE APPROVED SITE DEVELOPMENT PLAN. ALSO REFERENCE SDP-15-078 (FIND VINO). SDP-15-078 WAS APPROVED BUT NOT CONSTRUCTED.
14. REFERENCE PUBLIC WATER AND SEWER CONTRACT 34-4410-D WHICH HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND IS IN SERVICE.
15. THE EXISTING 3 - 3 FT. TIRED RETAINING WALLS ARE NOT CONSIDERED STRUCTURES (SDP-06-102). ALSO SIGN UNDER SDP-15-078.
16. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) BY THE HOWARD SOIL CONSERVATION DISTRICT DOES NOT GRANT APPROVAL OF THE PROPOSED SEDIMENT CONTROL SCHEME. THE FINAL PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION WHICH SHALL DETAIL SEDIMENT & EROSION CONTROLS AND PHASING AND ADDRESS THE PROJECT TEMPORARY STORMWATER MANAGEMENT REQUIREMENTS.

ENVIRONMENTAL SITE DESIGN NARRATIVE

1. THE SITE HAS BEEN PREVIOUSLY MASS GRADED, PUBLIC WATER AND SEWER INSTALLED, UNDERGROUND STORMWATER MANAGEMENT PIPE STORAGE INSTALLED, ON-SITE STORM DRAINAGE INSTALLED AND RETAINING WALLS CONSTRUCTED (REFERENCE VOIDED SDP-06-102, BALTIMORE KOREAN SEVENTH DAY ADVENTIST CHURCH). NO ADDITIONAL IMPROVEMENTS WERE COMPLETED AND PROJECT WAS NEVER FINISHED PER SDP-06-102. THE PREVIOUSLY MENTIONED EXISTING INFRASTRUCTURE WAS INCORPORATED INTO THE DESIGN UNDER SDP-15-078 (FIND VINO). NONE OF THE IMPROVEMENTS PROPOSED UNDER SDP-15-078 WERE CONSTRUCTED. THIS PLAN DOES NOT PROPOSE ANY DISTURBANCE BEYOND THE ORIGINAL LIMIT OF DISTURBANCE ESTABLISHED FOR SDP-06-102.
2. THE SITE WAS PREVIOUSLY CLEARED UNDER SDP-06-102 (VOIDED) AND ALL FOREST CONSERVATION OBLIGATIONS WERE PREVIOUSLY FULFILLED. NO ADDITIONAL FOREST IMPACTS ARE PROPOSED. THERE ARE NO ENVIRONMENTAL FEATURES INCLUDING STREAMS, STREAM BUFFERS, WETLANDS, WETLAND BUFFERS, 100-YEAR FLOODPLAIN, FOREST OR WOODED RESOURCES PRESENT WITHIN THE LIMITS OF DISTURBANCE.
3. THE ORIGINALLY APPROVED AND CONSTRUCTED DRAINAGE OUTFALL WILL BE RETAINED. THE INTENT OF THIS PLAN IS TO UTILIZE THE PREVIOUSLY CONSTRUCTED GRADES AND FEATURES AND TO MINIMIZE FUTURE EARTHWORK AND DISTURBANCE. THE SITE SLOPES NATURALLY FROM EAST TO WEST AND THE SITE IS GRADED TO MAINTAIN THESE NATURAL FLOW PATTERNS.
4. ENVIRONMENTAL SITE DESIGN (ESD) IS PROVIDED TO THE MAXIMUM EXTENT PRACTICABLE (MEP) BY THE REDUCTION OF IMPERVIOUS SURFACES THROUGH BETTER SITE DESIGN, ALTERNATIVE SURFACES AND NON-STRUCTURAL PRACTICES, INCLUDING THE USE OF FOUR MICRO-BIORETENTION FACILITIES (M-6), STORM FILTERS WATER QUALITY DEVICE AND 4 AREAS OF PERVIOUS PAVING (A-2). THE MBRs (M-6) AND PERVIOUS PAVING (A-2) WILL DISCHARGE TO THE STORM DRAIN SYSTEM WHICH OUTFALLS AT THE EAST SIDE OF THE SITE. THE PROPOSED ESD PRACTICES SHALL BE PRIVATELY OWNED AND MAINTAINED. IN ADDITION, AN EXISTING UNDERGROUND FACILITY WILL PROVIDE THE 100-YR PEAK MANAGEMENT RUNOFF CONTROL TO THE ADJACENT PROPERTY.
5. SEDIMENT CONTROL FOR THIS SPECIFIC SITE PLAN WILL BE PROVIDED THROUGH THE USE OF PERIMETER CONTROLS, SUPER SILT FENCE AND INLET PROTECTION. SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH THE CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT.
6. AS STATED IN #4 ABOVE, STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET THROUGH THE USE OF MICRO BIORETENTION FACILITIES (M-6), PERVIOUS PAVING (A-2), STORMFILTER WATER QUALITY DEVICE AND AN UNDERGROUND PIPE SYSTEM. BECAUSE THIS SITE IS MANAGING THE 100-YR STORM EVENT, THE PE REQUIREMENT IS 1-INCH.
7. AN ALTERNATIVE COMPLIANCE WILL BE PROVIDED FOR DISTURBANCE TO THE STEEP SLOPES LOCATED ALONG THE REAR OF THE SITE. THE EXISTING STEEP SLOPES WERE CREATED WHEN THE SITE WAS MASS GRADED UNDER SDP-06-102.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad Church 3-19-19
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Kevin DeLoach 3-11-19
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

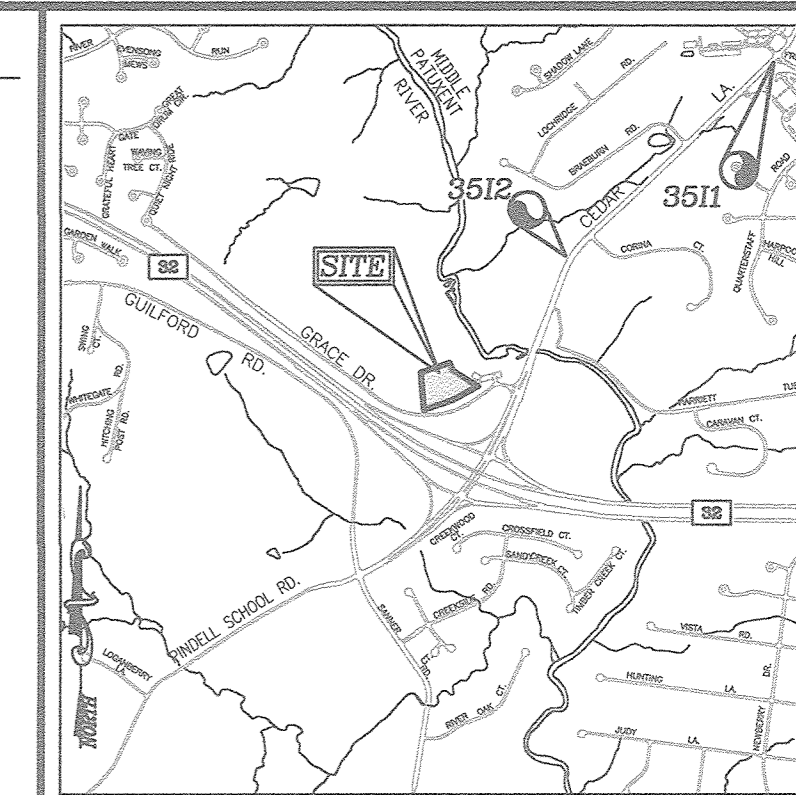
ROBINSON OVERLOOK

COLUMBIA, MD. 21045

PARCEL 86

ENVIRONMENTAL CONCEPT PLAN (ECP-19-005)

BENCHMARKS
 HOWARD COUNTY BENCHMARK 3511
 N 557,110.367 E 1,344,893.647 ELEV. 400.068
 HOWARD COUNTY BENCHMARK 3512
 N 555,100.814 E 1,342,733.092 ELEV. 329.743



VICINITY MAP
 SCALE: 1"=2000'
 ADC MAP COORDINATE: PG. 32, GRID C4

LEGEND

	EXISTING CONTOUR		SOILS BOUNDARY
	PROPOSED CONTOUR		PROPOSED SIDEWALK
	EXISTING CURB AND GUTTER		EXISTING TREELINE
	PROPOSED CURB AND GUTTER		PROPOSED TREELINE
	EXISTING UTILITY POLE		PROPOSED STORM DRAIN
	EXISTING LIGHT POLE		STORM DRAIN INLET
	EXISTING MAILBOX		SILT FENCE
	EXISTING SIGN		SUPER SILT FENCE
	EXISTING SANITARY MANHOLE		LIMIT OF DISTURBANCE
	EXISTING SANITARY LINE		CURB INLET PROTECTION
	EXISTING CLEANOUT		AT GRADE INLET PROTECTION
	EXISTING FIRE HYDRANT		PROPOSED PERMEABLE PAVEMENT
	EXISTING WATER LINE		PROPOSED DIVERSION DIKE
	EXISTING FENCE		FOREST CONSERVATION EASEMENT
	PROPERTY LINE		PROPOSED AMENITY OPEN SPACE
	RIGHT-OF-WAY LINE		
	EX. STEEP SLOPES (>25%)		
	EX. STEEP SLOPE		



OWNER/DEVELOPER
 WODA GROUP, LLC
 500 S. FROST STREET, 10TH FLOOR
 COLUMBUS, OH 43215
 (410) 721-7939

NO.	REVISION	DATE
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ENVIRONMENTAL CONCEPT PLAN
COVER SHEET
ROBINSON OVERLOOK
 HOUSING COMMISSION HOUSING DEVELOPMENT: 48 # APARTMENTS
 7410 GRACE DRIVE COLUMBIA, MD. 21045
 ZONED: POR
 L 08684/F. 0005

TAX MAP 35 BLOCK 22 5TH ELECTION DISTRICT PARCEL 86 HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS
 3300 N. RISE ROAD, SUITE 110, ELLICOTT CITY, MD 21043
 TEL: 410.461.7666 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
 EXPIRATION DATE: 08-21-2020

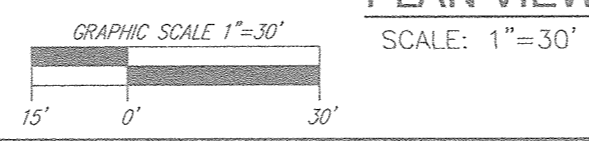
DESIGN BY: RHV
 DRAWN BY: LRC
 CHECKED BY: RHV
 DATE: FEB 2019
 SCALE: AS SHOWN
 W.O. NO.: 04-06

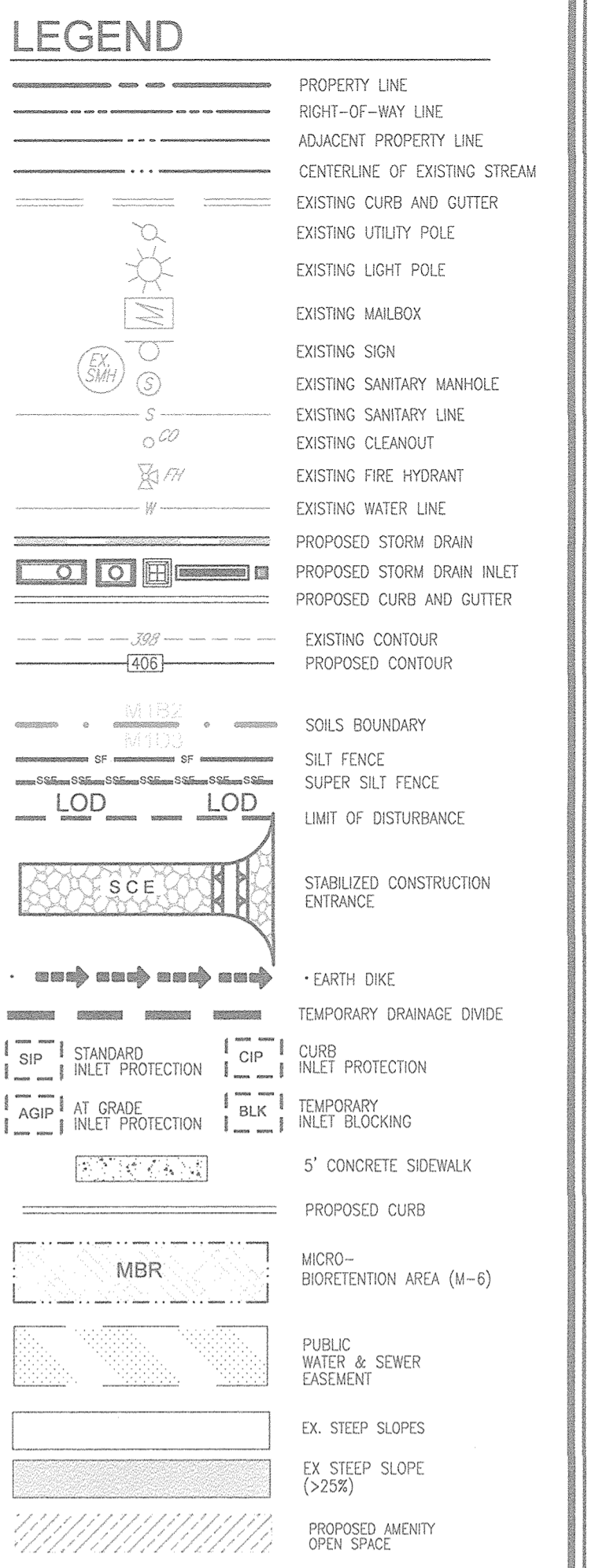
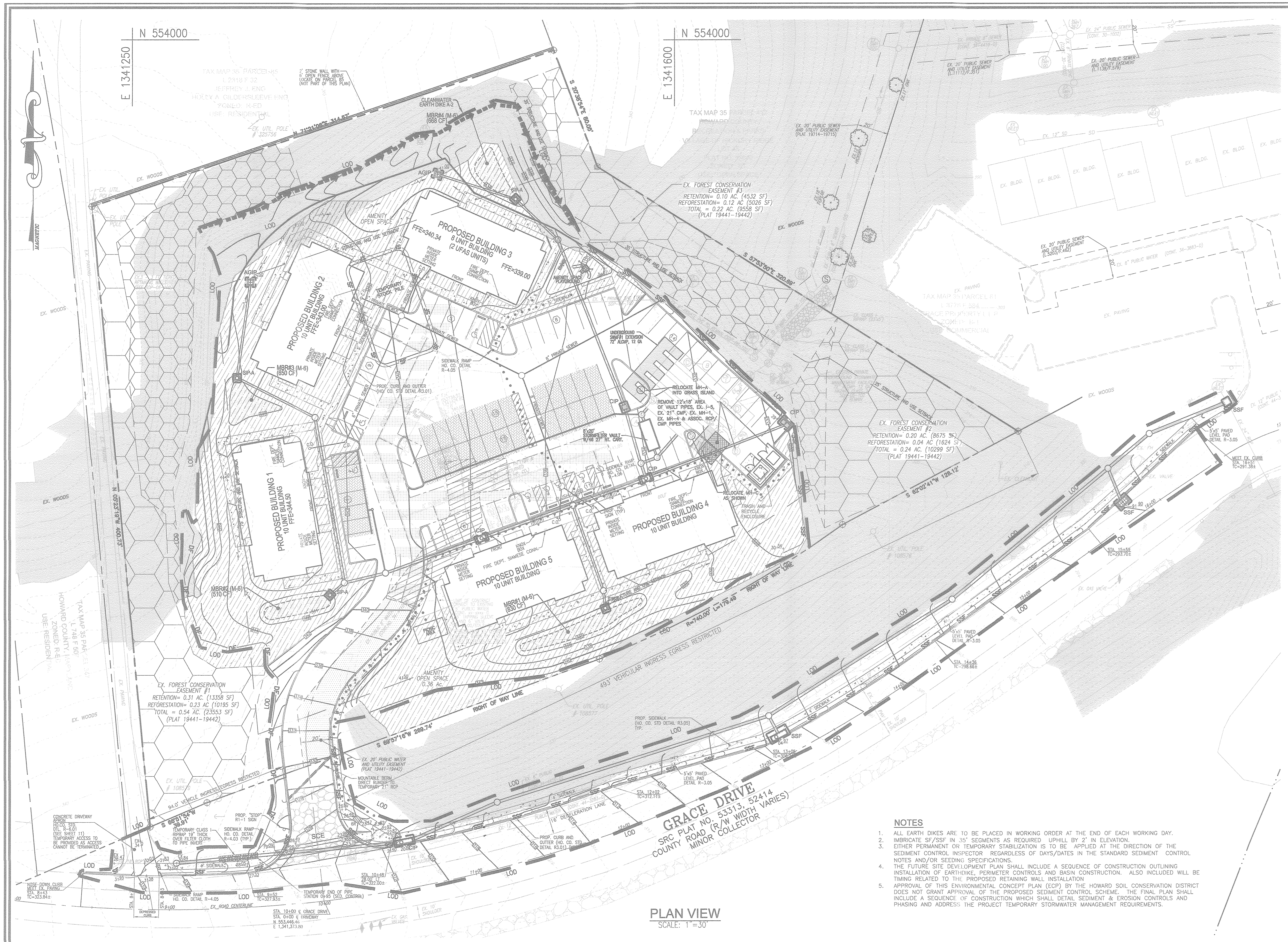
1 SHEET OF 3

SITE DATA
 LOCATION: COLUMBIA, MD.; TAX MAP 35, BLOCK 22, PARCEL 86
 5TH ELECTION DISTRICT
 PRESENT ZONING: POR
 PARCEL AREA: 3.83 AC
 DPZ REFERENCES: SDP-06-102, SDP-15-078, F-07-092 (PLAT 19441-19442), ECP-15-046, BA-14-016, WP-16-040, WP-17-004, BA-04-02724V
 USE OF STRUCTURES: FOUR - TEN UNIT BUILDINGS
 TOTAL PARKING LOT AND BUILDING COVERAGE: 78,409 SF (1.80 AC) OR 46.99% OF GROSS AREA
 AREA OF LANDSCAPE ISLAND: 2,815.21 SF (0.06 AC, OR 1.68% OF GROSS AREA)
 LIMIT OF DISTURBED AREA: 109,363 SF/2.51 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: 0.81 AC
 AREA OF STEEP SLOPES (15% OR GREATER): 0.07 AC
 AREA OF ERODIBLE SOILS: 0.0 AC
 AREA MANAGED BY ESOV (*THIS PLAN*): 2.51 AC
 *IMPERVIOUS AREA: 1.68 AC
 *GREEN AREA: 0.83 AC
 MIHU = 10% OF TOTAL 48 DWELLING UNITS = 4.8 UNITS (5 PROPOSED)
 AMENITY OPEN SPACE REQUIRED: 3.83 AC x 25% = 0.96 AC
 AMENITY OPEN SPACE PROVIDED: 0.95 AC
 *COMMUNITY CENTER REQUIREMENT: 20 SF/DWELLING UNITS = 960 SF
 *COMMUNITY CENTER WILL BE LOCATED IN BUILDING #3
 UNIFORM FEDERAL ACCESSIBILITY STANDARDS (UFAS): 2 UNITS

SHEET INDEX

DESCRIPTION	SHEET NO.
COVER SHEET, ECP PLAN	1 OF 3
GRADING AND LAYOUT PLAN	2 OF 3
SWM DRAINAGE AREA MAP	3 OF 3





OWNER/DEVELOPER
 WODA GROUP, LLC
 500 S. FROST STREET, 10TH FLOOR
 COLUMBUS, OH 43215
 (410) 721-7939

NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN
 GRADING, SOIL EROSION
 AND SEDIMENT CONTROL PLAN
 ROBINSON OVERLOOK**
 HOUSING COMMISSION HOUSING DEVELOPMENT: **48** # APARTMENTS
 7410 GRACE DRIVE COLUMBIA, MD. 21045
 ZONED: POR
 L. 08684.F. 0005

TAX MAP 35 BLOCK 22
 5TH ELECTION DISTRICT

PARCEL B6
 HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS
 3300 N. RIDGE ROAD, SUITE 110, ELICOTT CITY, MD 21043
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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. 116183 EXPIRATION DATE: 08-27-2020

DESIGN BY: R.H.V.
 DRAWN BY: L.R.C.
 CHECKED BY: R.H.V.
 DATE: FEB 2019
 SCALE: AS SHOWN
 W.O. NO.: 04-06

2 SHEET OF 3

- NOTES**
- ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.
 - IMBRICATE SF/SSF IN 35' SEGMENTS AS REQUIRED UPHILL BY 2" IN ELEVATION.
 - EITHER PERMANENT OR TEMPORARY STABILIZATION IS TO BE APPLIED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR REGARDLESS OF DAYS/DATES IN THE STANDARD SEDIMENT CONTROL NOTES AND/OR SEEDING SPECIFICATIONS.
 - THE FUTURE SITE DEVELOPMENT PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION OUTLINING INSTALLATION OF EARTHDIKE, PERIMETER CONTROLS AND BASIN CONSTRUCTION. ALSO INCLUDED WILL BE TIMING RELATED TO THE PROPOSED RETAINING WALL INSTALLATION.
 - APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) BY THE HOWARD SOIL CONSERVATION DISTRICT DOES NOT GRANT APPROVAL OF THE PROPOSED SEDIMENT CONTROL SCHEME. THE FINAL PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION WHICH SHALL DETAIL SEDIMENT & EROSION CONTROLS AND PHASING AND ADDRESS THE PROJECT TEMPORARY STORMWATER MANAGEMENT REQUIREMENTS.

PLAN VIEW
 SCALE: 1"=30'

SOILS LEGEND
 HOWARD COUNTY SOILS MAP #17

SYMBOL	NAME / DESCRIPTION	GROUP	K FACTOR	ERODIBLE	HYDRIC
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	.28	NO	NO
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	.28	YES	YES
MbF	MANOR BRINKLOW COMPLEX, 25 TO 65 PERCENT SLOPES, VERY ROCKY	B	.32	YES	YES

SOILS NOTE:
 HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT.

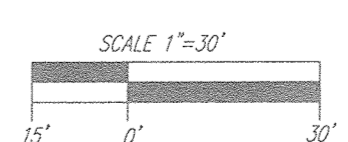
NOTE:
 - SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.
 - SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 35 FEET APART
 - DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

NOTE: LOCATE STOCKPILE AS SHOWN HEREON OR AS DIRECTED BY THE SEDIMENT CONTROL INSPECTOR. STOCKPILES EXCEEDING 15 FEET IN HEIGHT SHALL BE BENCHED. STOCKPILES SHALL BE IN ACCORDANCE WITH SECTION B.4.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] **3-19-19**
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] **3-1-19**
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE





APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIOTRETENTION, 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. ANY OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DAMPED WITHIN THE MICRO-BIOTRETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDERANCE TO THE PLANTING OR MAINTENANCE. THE PLANTING SOIL SHALL BE FREE OF BERBERIS 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 COMPONENTS - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION)
 - ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (30%), COARSE SAND (20%), 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.
- COMPACTION**
IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIOTRETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOSES TO REMOVE TOPSOIL. IF PRACTICES ARE EXCAVATED USING A LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH WIDE TIRE TYPE 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 BIOTRETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS CHISEL PLOW, DISHER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO RESTRUCTURE THE SOIL PROFILE THROUGHOUT THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROLLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.
ROTTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIOTRETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDING WATER BEFORE PREPARING (ROTTILLING) BASE. WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE. WHEN BACKFILLING THE BIOTRETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIOTRETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIOTRETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.
- PLANT MATERIAL**
RECOMMENDED PLANT MATERIAL FOR MICRO-BIOTRETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.
- 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 ACCEPTABLE MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIOTRETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/3RD 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 PLANTS 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 BIOTRETENTION FACILITY IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS, DEFECTS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.
- UNDERDRAINS**
UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:
 - PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM F 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 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 FABRIC.
 - 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 BEST PRACTICES ARE USED.
 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-BIOTRETENTION (M-6), RAIN GARDENS (M-7), BIOTRETENTION 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 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.
- 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.
- THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.

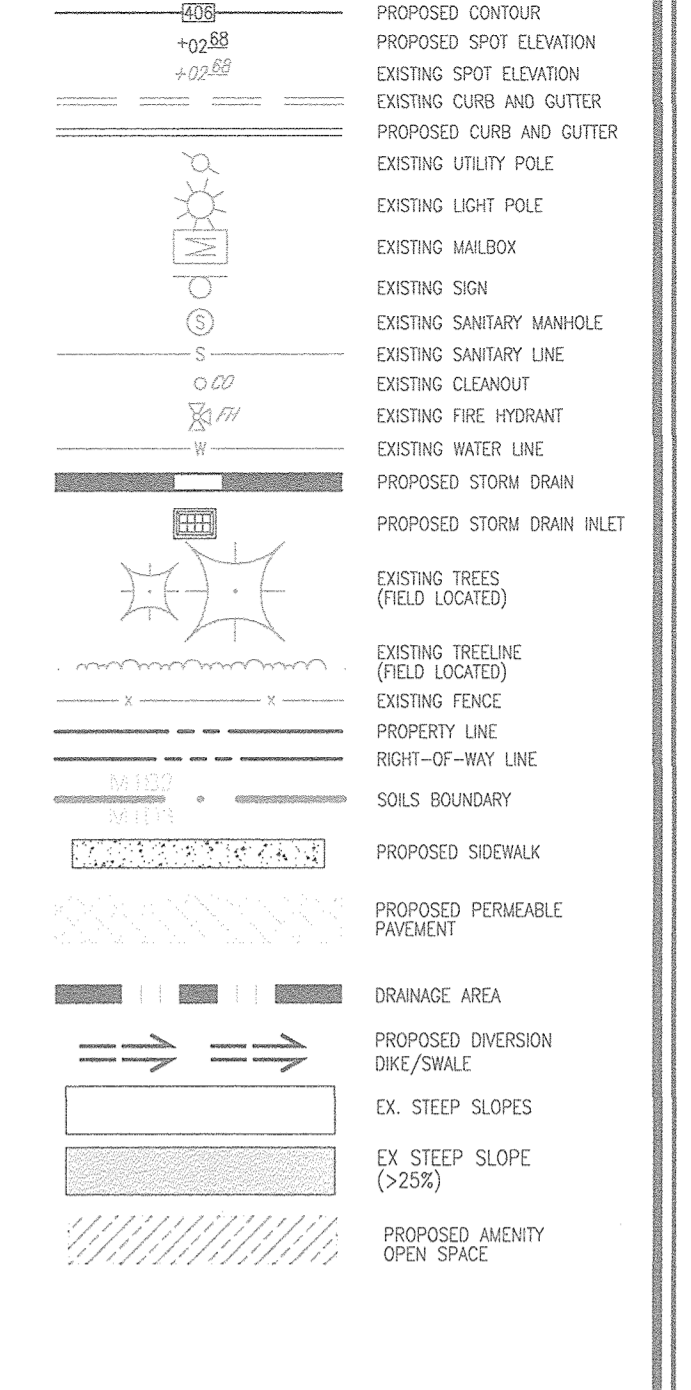
NOTES:

- 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 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.
- THERE IS A CLASS R2 EPHEMERAL STREAM WHICH CROSSES THE NORTHWEST CORNER OF THE SITE AND HAS A 100' STREAM BUFFER. A WETLAND ASSESSMENT FOUND NO WETLANDS ON SITE. THE TOPOGRAPHY DOES NOT RESULT IN ANY STEEP SLOPES. ACCORDING TO CURRENT DTPM APPROVED BY FEMA AND HOWARD COUNTY, THERE IS NO 100' FLOODPLAIN LOCATED ON THIS PROPERTY.

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

- THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM POROUS CONCRETE PAVEMENT) THE 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 DEFICERS IN MODERATION. DEFICERS SHOULD BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PREFRETTED 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.

LEGEND:



B.4.B SPECIFICATIONS FOR PERMEABLE PAVEMENTS & REINFORCED TURF

THESE SPECIFICATIONS INCLUDE INFORMATION ON ACCEPTABLE MATERIALS FOR TYPICAL APPLICATIONS AND ARE NOT EXCLUSIVE OR LIMITING. THE DESIGNER IS RESPONSIBLE FOR DEVELOPING SPECIFICATIONS FOR INDIVIDUAL PROJECTS AND SPECIFIC CONDITIONS.

1. PERVIOUS CONCRETE SPECIFICATIONS

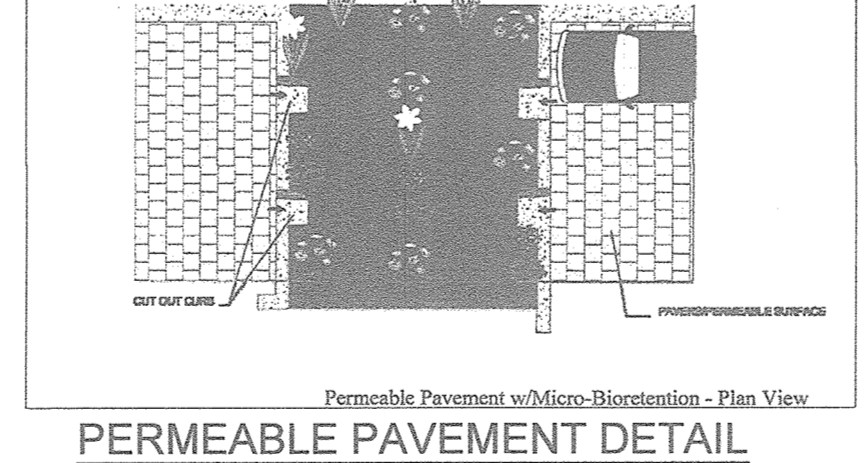
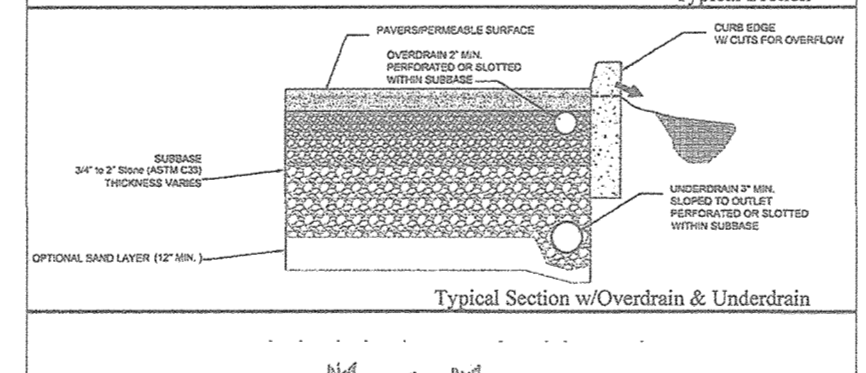
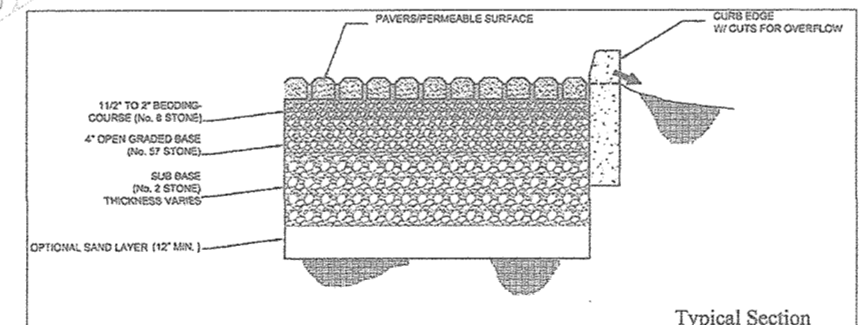
DESIGN THICKNESS - PERVIOUS CONCRETE APPLICATIONS SHALL BE DESIGNED SO THAT THE THICKNESS OF THE CONCRETE SLAB SHALL SUPPORT THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED. APPLICATIONS MAY BE DESIGNED USING EITHER STANDARD PAVEMENT PROCEDURES (E.G., AASHTO, ACI 325.0R, ACI 330.0R) OR USING STRUCTURAL VALUES DERIVED FROM PERVIOUS PAVEMENT DESIGN PROCEDURES.
MIX & INSTALLATION - TRADITIONAL PORTLAND CEMENTS (ASTM C 150, C 1157) MAY BE USED IN PERVIOUS CONCRETE APPLICATIONS. PHOSPHORUS ADMIXTURES MAY ALSO BE USED. MATERIALS SHOULD BE TESTED (E.G., TRIAL BATCHING) PRIOR TO CONSTRUCTION SO THAT CRITICAL PROPERTIES (E.G., SETTLING TIME, RATE OF STRENGTH DEVELOPMENT, POROSITY, PERMEABILITY) CAN BE DETERMINED.
AGGREGATE - PERVIOUS CONCRETE CONTAINS A LIMITED FINE AGGREGATE CONTENT. COMMONLY USED GRADATIONS INCLUDE ASTM C 33 NO. 67 (3/4 IN. TO NO. 4), NO. 8 (3/8 IN. TO NO.16) AND NO. 89 (3/8 IN. TO NO.10) SIEVES. SINGLE-SIZED AGGREGATE (UP TO 1 INCH) MAY ALSO BE USED.
WATER CONTENT - WATER-TO-CEMENT RATIOS BETWEEN 0.27 AND 0.30 ARE USED ROUTINELY WITH PROPER INCLUSION OF CHEMICAL ADMIXTURES. WATER QUALITY SHOULD MEET A.I. 304. AS A GENERAL RULE, POTABLE WATER SHOULD BE USED ALTHOUGH RECYCLED CONCRETE PRODUCTION WATER MEETING ASTM C 94 OR AASHTO M 157 MAY ALSO BE USED.
ADMIXTURES - CHEMICAL ADMIXTURES (E.G., RETARDERS OR HYDRATION-STABILIZERS) ARE USED TO OBTAIN SPECIAL PROPERTIES IN PERVIOUS CONCRETE. USE OF ADMIXTURES SHOULD MEET ASTM C 494 (CHEMICAL ADMIXTURES) AND ASTM C 260 (AIR ENTRAINING ADMIXTURES) AND CLOSELY FOLLOW MANUFACTURER'S RECOMMENDATIONS. BASE COURSE - THE BASE COURSE SHALL BE AASHTO NO. 3 OR 4 COURSE AGGREGATE WITH AN ASSUMED OPEN PORE SPACE OF 30% (±0.50).

2. PERMEABLE INTERLOCKING CONCRETE PAVEMENTS (PICP)

PAPER BLOCKS - BLOCKS SHOULD BE EITHER 37 IN. OR 4 IN. THICK, AND MEET ASTM C 936 OR CSA A231.2 REQUIREMENTS. APPLICATIONS SHOULD HAVE 20% OR MORE (40% PREFERRED) OF THE SURFACE AREA OPEN. INSTALLATION SHOULD FOLLOW MANUFACTURER'S INSTRUCTIONS, EXCEPT THAT INFILL AND BASE COURSE MATERIALS AND DIMENSIONS SPECIFIED IN THIS APPENDIX SHALL BE FOLLOWED.
INFILL MATERIALS AND LEVELING COURSE - OPENINGS SHALL BE FILLED WITH ASTM C-33 GRADED SAND OR SANDY LOAM. PICP BLOCKS SHALL BE PLACED ON A ONE-INCH THICK LEVELING COURSE OF ASTM C-33 SAND.
BASE COURSE - THE BASE COURSE SHALL BE AASHTO NO. 3 OR 4 COURSE AGGREGATE WITH AN ASSUMED OPEN PORE SPACE OF 30% (±0.50).

3. REINFORCED TURF

REINFORCED GRASS PAVEMENT (RGP) - WHETHER USED WITH GRASS OR GRAVEL, THE RGP THICKNESS SHALL BE AT LEAST 11-3/4" THICK WITH A LOAD CAPACITY CAPABLE OF SUPPORTING THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED.



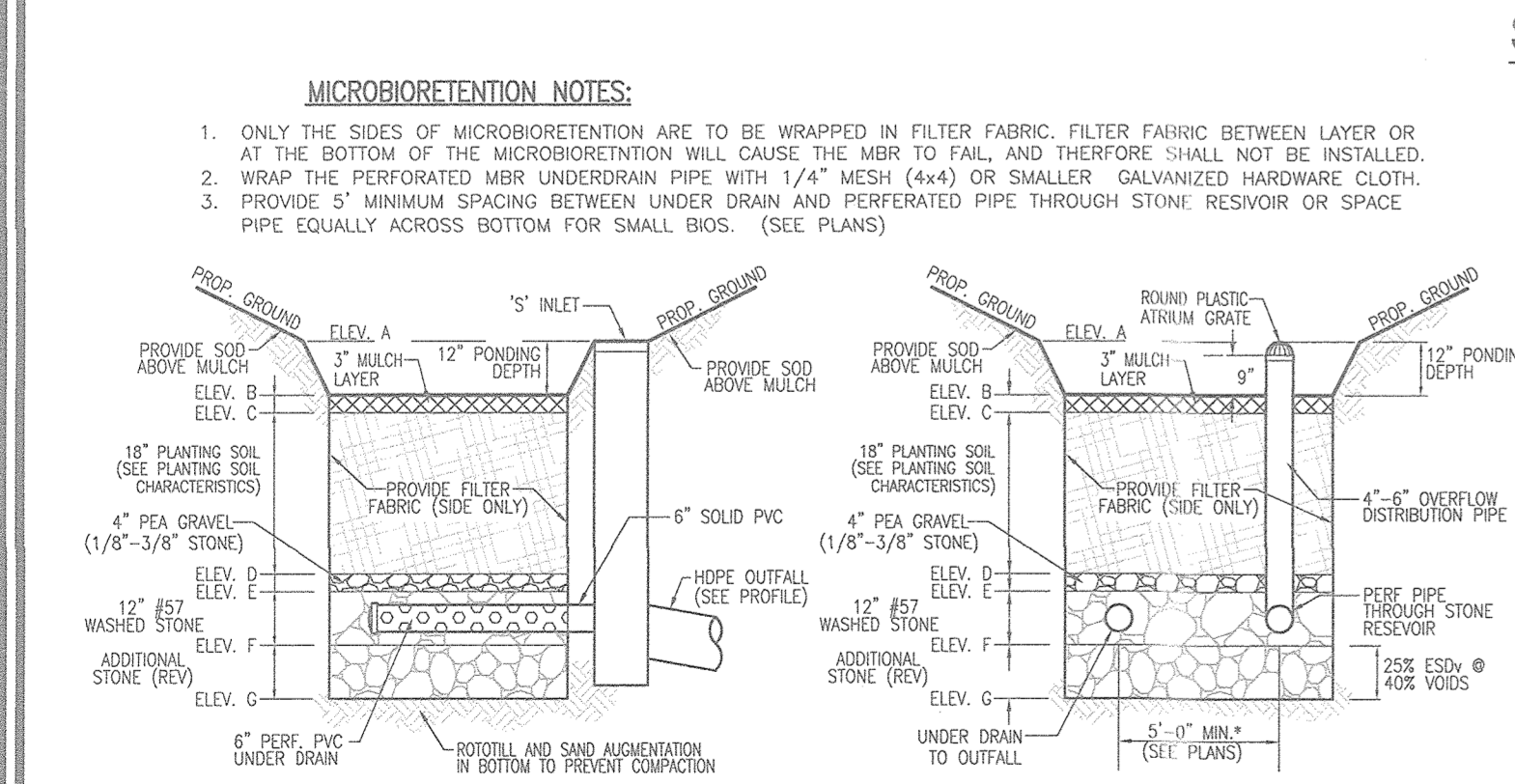
PERMEABLE PAVEMENT DETAIL
NOT TO SCALE

DA	% IMPERVY	Rt	Rd	ESD ¹ FEET	MINIMUM VOLUME (CUBIC FEET)	MAXIMUM VOLUME (CUBIC FEET)	VOLUME PROVIDED (CUBIC FEET)	AREA FT	PERV AREA	IMP AREA
1	34.48	0.36	0.25	577	321	434	650	10678	6996	3682
2	29.23	0.31	0.17	353	196	509	510	7510	5315	2195
3	24.46	0.27	0.26	459	292	655	690	11116	8877	2239
4	18.66	0.19	0.29	384	202	526	325	3708	1078	1390
5	100.00	0.95	0.09	531	255	767	765	3726	0	3726
6	100.00	0.95	0.05	617	354	910	918	4471	0	4471
7	100.00	0.95	0.06	319	177	460	450	2236	0	2236
8	100.00	0.95	0.05	319	177	460	459	2236	0	2236
9	73.38	0.73	1.20	5021	2696	3377	3374	32272	13913	20359
TOTAL ESD BY SUBAREA					5068	3377	3374	3369	45319	6364
TOTAL AREA TREATED					2.46					

SOILS LEGEND
HOWARD COUNTY SOILS MAP #17

SYMBOL	NAME / DESCRIPTION	GROUP	K FACTOR	ERODIBLE	HYDRIC
MoC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	.74	NO	NO
MoD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	.74	YES	NO
MmF	MANOR BRINKLOW COMPLEX, 25 TO 65 PERCENT SLOPES, VERY ROCKY	B	.52	YES	NO

SOILS NOTE:
HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT.



SWM PRE-POST DEVELOPMENT PEAK FLOW ANALYSIS

DRAINAGE AREA	AREA	100-YR
EXISTING DA#1	3.32 AC.	15.25 CFS
PROPOSED DA#1	3.11 AC.	27.15 CFS
UNDERGROUND FACILITY POST RELEASE RATE	---	14.09 CFS
EXISTING DA#2	12.62 AC.	64.45 CFS
PROPOSED DA#2	12.42 AC.	64.84 CFS
UNMANAGED	---	0.39 CFS
EXISTING DA#3	0.18 AC.	0.77 CFS
PROPOSED DA#3	0.18 AC.	0.77 CFS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad Clark 3-19-19
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Robert H. Vogel 3-11-19
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

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

Material	Specification	Note
Plantings	see Appendix A, Table A.4	selecting as site-specific
Filtering soil (2" max depth)	loamy sand (60-65%) and compost (35-40%) or sandy loam (30%), coarse sand (20%), and compost (40%)	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 (diameter)	pea gravel ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")
Curbs and drains	ornamental stone, washed cobble	stone: 2" to 5"
Geotextile	n/a	FE Type 1 nonwoven
Gravel (underdrain and infiltration berm)	AASHTO M-43	NO. 57 OR NO. 6
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or HDPE
Perforated pipe (if required)	MSHA Min No. 3, F1 = 3500 psi @ 28 days, normal weight, air-entrained, conforming to most ASTM-A615-60	4" to 6" rigid schedule 40 PVC or HDPE
Sand	AASHTO M-6 or ASTM-C-33	0.075 to 0.04"

OWNER/DEVELOPER
WODA GROUP, LLC
500 S. FROST STREET, 10TH FLOOR
COLUMBUS, OH 43215
(410) 721-7939

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN
STORMWATER MANAGEMENT
DRAINAGE AREA MAP: SWM DETAILS
ROBINSON OVERLOOK
HOUSING COMMISSION HOUSING DEVELOPMENT: 48 # APARTMENTS
7410 GRACE DRIVE COLUMBIA, MD. 21045
ZONED: POR L, 08864IF, 0005

TAX MAP 35 BLOCK 22
5TH ELECTION DISTRICT

PARCEL 86
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043
TEL: 410.461.7666 FAX: 410.461.8961

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. EXPIRATION DATE: 08-27-2020

DESIGN BY: RHV
DRAWN BY: LRC
CHECKED BY: RHV
DATE: FEB 2019
SCALE: AS SHOWN
W.O. NO.: 04-06

3 SHEET OF 3