7410 GRACE DRIVE
COLUMBIA, MD. 21045
PARCEL 86
ENVIRONMENTAL CONCEPT PLAN

GENERAL NOTES

1. THE EXISTING TOPOGRAPHY SHOWN HEREON IS TAKEN FROM AN FIELD RUN TOPOGRAPHIC SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC; DATED JULY 2005 AND SITE DEVELOPMENT PLAN SDP-06-102.
2. COORDINATES AND ELEVATIONS ARE BASED ON MARYLAND COORDINATE SYSTEM – NAD83(1991) AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS 35I1 AND 35I2.
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 10/13/2014 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. PER SDP-06-102 THE FOREST CONSERVATION OBLIGATIONS IS FULFILLED BY THE RETENTION OF 0.61 ACRES OF FOREST, BY THE REFORESTATION OF 0.39 ACRES OF FOREST, AND BY A FEE-IN-LIEU PAYMENT IN THE AMOUNT OF $22,215.60 FOR THE REMAINING 0.68 ACERS OF FOREST REQUIRED. FINANCIAL SURETY FOR THE REQUIRED FOREST CONSERVATION IN THE AMOUNT OF $13,808.52 HAS BE PAID AS PART OF THE DEVELOPERS AGREEMENT UNDER SDP-06-102. NO FURTHER OBLIGATIONS REQUIRED WITH THIS PLAN.
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, WAIVER PETITION APPLICATION OR BUILDING/ GRADING PERMIT APPLICATIONS.
9. STORMWATER MANAGEMENT IS PROVIDED BY AN EXISTING UNDERGROUND DETENTION FACILITY (SDP-06-102), BIORETENTION FACILITIES (2), PERVIOUS PAVING (4) AND A STORM FILTER (STRUCTURAL PRACTICE) DEVICE.
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. REFERENCE BA-04-027CAV, A CONDITIONAL USE FOR A STRUCTURE USED PRIMARILY FOR RELIGIOUS ACTIVITIES, AND A VARIANCE TO REDUCE THE REQUIRED 75' USE SETBACK FROM AN EXTERNAL PUBLIC STREET RIGHT-OF-WAY TO ZERO FEET FOR A PROPOSED PARKING LOT IN AN R-ED (RESIDENTIAL: ENVIRONMENTAL DEVELOPMENT) ZONING DISTRICT, FILED PURSUANT TO SECTIONS 131.N.38 AND 130.B.2 OF THE HOWARD COUNTY ZONING REGULATIONS, APPROVED FEB 01, 2005. APPROVAL SUBJECT TO THE FOLLOWING CONDITIONS:
    A. THE PETITIONER WILL INSTALL A DECELERATION LANE TO THE EAST OF THE PROPOSED DRIVEWAY. BUILDING PERMIT MUST BE OBTAINING WITHIN 2 YEARS (FEBRUARY 1, 2007) AND SUBSTANTIAL CONSTRUCTION COMPLETED WITHIN THREE YEARS (FEBRUARY 1, 2008) FROM THE DATE OF THE APPROVAL OF THE CONDITIONAL USE.* ON JANUARY 1, 2007, THE TWO-YEAR TIME PERIOD FOR OBTAINING A BUILDING PERMIT WAS EXTENDED TO 2/1/2010 AND THE THREE-YEAR TIME PERIOD FOR COMPLETION OF SUBSTANTIAL CONSTRUCTION HAS BEEN EXTENDED TO FEBRUARY 1, 2011.
13. REFERENCE SDP-06-02, BALTIMORE KOREAN SEVENTH DAY ADVENTIST CHURCH. THE SUBJECT SITE WAS PARTIALLY CONSTRUCTED IN ACCORDANCE WITH THE APPROVED SITE DEVELOPMENT PLAN.
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. BUILDING HEIGHT COMPUTATION: LOWEST GRADE ELEVATION ADJACENT TO EXTERIOR WALL: 335.09 HIGHEST GRADE ELEVATION ADJACENT TO EXTERIOR WALL: 346.26 MEAN EXISTING GRADE ELEVATION: 340.68 ROOF ELEVATION: 390.25 BUILDING HEIGHT: 49.57
16. THE EXISTING 3 – 3 FT. TIERED RETAINING WALLS ARE NOT CONSIDERED STRUCTURES (SDP-06-102).
17. 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.
18. REFERENCE BA-14-016V, APPROVED 07/24/14, FOR SIX VARIENCE FOR A RESTAURANT STRUCTURE, RETAINING WALL, AND PARKING IN A POR ZONING DISTRICT, PURSUANT TO SECTION 130.0.B.2 OF THE HOWARD COUNTY ZONING REGULATIONS.
    THESE VARIANCES INCLUDE:
    FROM THE NORTHERN PROPERTY LINE (ADJACENT TO A RESIDENTIAL ZONING DISTRICT):
    1. A REDUCTION IN THE 100-FOOT STRUCTURE AND USE SETBACK TO 52.56 FEET FOR THE PROPOSED BUILDING.
    2. A REDUCTION IN THE 100-FOOT STRUCTURE AND USE SETBACK TO 51.17 FEET FOR PARKING AREA.
    3. A REDUCTION IN THE 75-FOOT STRUCTURE AND USE SETBACK TO 42.90 FOR A PROPOSED RETAINING WALL.
    FROM THE WESTERN PROPERTY LINE (ADJACENT TO A RESIDENTIAL ZONING DISTRICT):
    4. A REDUCTION IN THE 100-FOOT STRUCTURE AND USE SETBACK TO 78.67 FOR THE PROPOSED BUILDING.
    5. A REDUCTION IN THE 100-FOOT STRUCTURE AND USE SETBACK TO 51.46 FOR A PARKING AREA.
    FROM THE SOUTHERN PROPERTY LINE (ADJACENT TO A PUBLIC STREE ROW):
    6. A REDUCTION IN THE 30-FOOT STRUCTURE AND USE SETBACK TO 6.97 FOR A PARKING AREA.
    APPROVAL SUBJECT TO:
    A. THE VARIANCES SHALL APPLY ONLY TO THE USES AND STRUCTURES AS DESCRIBED IN THE PETITION AS DIPICTED ON THE VARIANCE PLAN AND NOT TO ANY OTHER ACTIVITIES, USES, STRUCTURES, OR ADDITIONS ON THE PROPERTY.

ENVIRONMENTAL SITE DESIGN NARRATIVE

1. THIS PLAN DOES NOT PROPOSE ANY DISTURBANCE BEYOND THE ORIGINAL LIMIT OF DISTURBANCE FOR SDP-06-102. THE SITE HAS BEEN MASS GRADED, PUBLIC WATER AND SEWER INSTALLED, UNDERGROUND STORMWATER MANAGEMENT PIPE STORAGE INSTALLED, ON-SITE STORM DRAINAGE INSTALLED AND RETAINING WALLS CONSTRUCTED UNDER SDP-06-102.

2. THERE ARE NO ENVIRONMENTAL FEATURES INCLUDING, STREAMS, STREAM BUFFERS, WETLANDS, WETLAND BUFFERS, 100-YEAR FLOODPLAIN, STEEP SLOPES OR WOODED RESOURCES PRESENT ON SITE, THEREFORE NO NATURAL RESOURCES EXIST WHICH REQUIRE PROTECTION.

3. THE ORIGINALLY APPROVED AND CONSTRUCTED DRAINAGE OUTFALL WILL BE RETAINED. THE INTENT OF THIS PLAN IS TO UTILIZE THE PREVOUSLY CONTRUCTED GRADES AND FEATURES AND TO MINIMIZE FUTURE EARTHWORK AND DISTURBANCE. THE SITE SLOPES NAURALLY 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 TWO 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 RETAIN CPV VOLUME TO PROVIDED 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 EXTENDED DETENTION FACILITY.

7. NO WAIVERS ARE ANTICIPATED TO FULFILL THIS CONCEPT.

8. With the development of the Site Development Plans, additional stormwater management volume will be considered to mitigate potential downstream impacts.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

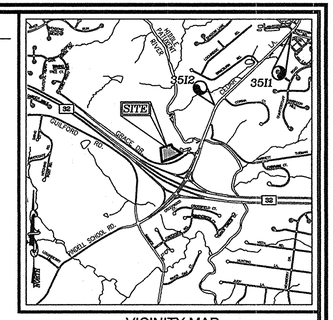
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5.8.15

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4-28-15

BENCHMARKS

HOWARD COUNTY BENCHMARK 35I1
N 557,110.367 E 1,344,893.647 ELEV. 400.068

HOWARD COUNTY BENCHMARK 35I2
N 555,100.814 E 1,342,733.092 ELEV. 329.743



VICINITY MAP

SCALE: 1"=2000'
ADC MAP COORDINATE: PG. 5052-G1

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- PROPOSED SIDEWALK
- EXISTING TREELINE
- PROPOSED TREELINE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN INLET
- SILT FENCE
- SUPER SILT FENCE
- LIMIT OF DISTURBANCE
- CURB INLET PROTECTION
- AT GRADE INLET PROTECTION
- PROPOSED PERMEABLE PAVEMENT
- PROPOSED DIVERSION DIKE/SWALE
- FOREST CONSERVATION EASEMENT

PROPOSED BUILDING

GARAGE AND 4 STORY

GARAGE: 335.09 ±
LEVEL 1: (GROUND): 346.26±
LEVEL 2: 363.58±
LEVEL 3: 376.92±
ROOF: 390.25±
TOP OF PARAPET: 394.25±

TAX MAP 35 PARCEL 85
L 2318 F 32
JEFFREY J. ENG
HOLLY A. GILDERSLEEVE ENG
ZONED: R-ED
USE: RESIDENTIAL

TAX MAP 35 PARCEL 412
HOWARD COUNTY
RECREATION & PARKS
VILLAGE OF HICKORY RIDGE
LOT 45
PLAT NO. 13640
ZONED: NT
USE: OPEN SPACE

TAX MAP 35 PARCEL 81
L 3778 F 584
GRACE PROPERTY L.L.P.
ZONED: B-1
USE: COMMERCIAL

TAX MAP 35 PARCEL 347
L 748 F 507
HOWARD COUNTY, MARYLAND
ZONED: R-ED
USE: RESIDENTIAL

Maryland State Grid Meridian

GRACE DRIVE
SRC PLAT NO. 53315, 52414
COUNTY ROAD (R/W WIDTH VARIES)
MINOR COLLECTOR

PLAN VIEW

SCALE: 1"=30'

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

SHEET INDEX

DESCRIPTION	SHEET NO.
COVER SHEET, ECP PLAN	1 OF 4
SWM DRAINAGE AREA MAP, SWM DETAILS	2 OF 4
QPv EXISTING DRAINAGE AREA MAP	3 OF 4
QPv PROPOSED DRAINAGE AREA MAP	4 OF 4

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
USE OF STRUCTURES: OFFICE BUILDING AND RESTAURANT
TOTAL PARKING LOT AND BUILDING COVERAGE: 78,408 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: 118,483.20 SF/2.72 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: 0.61 AC.
AREA OF STEEP SLOPES (15% OR GREATER): 0.07 AC
AREA OF ERODIBLE SOILS: 0.0 AC
AREA MANAGED BY ESDV (THIS PLAN): 2.72 AC.
*IMPERVIOUS AREA : 1.80 AC.
*GREEN AREA: 0.92 AC.

OWNER/DEVELOPER

7410 GRACE DRIVE, LLC
7410 GRACE DRIVE
COLUMBIA, MD 21045

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN
COVER SHEET
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
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — No. 16193 — REGISTERED PROFESSIONAL ENGINEER

ROBERT H. VOGEL, PE No.16193

DESIGN BY:	RHV
DRAWN BY:	DZ/GH/KG
CHECKED BY:	RHV
DATE:	APRIL 2015
SCALE:	AS SHOWN
W.O. NO.:	04-06

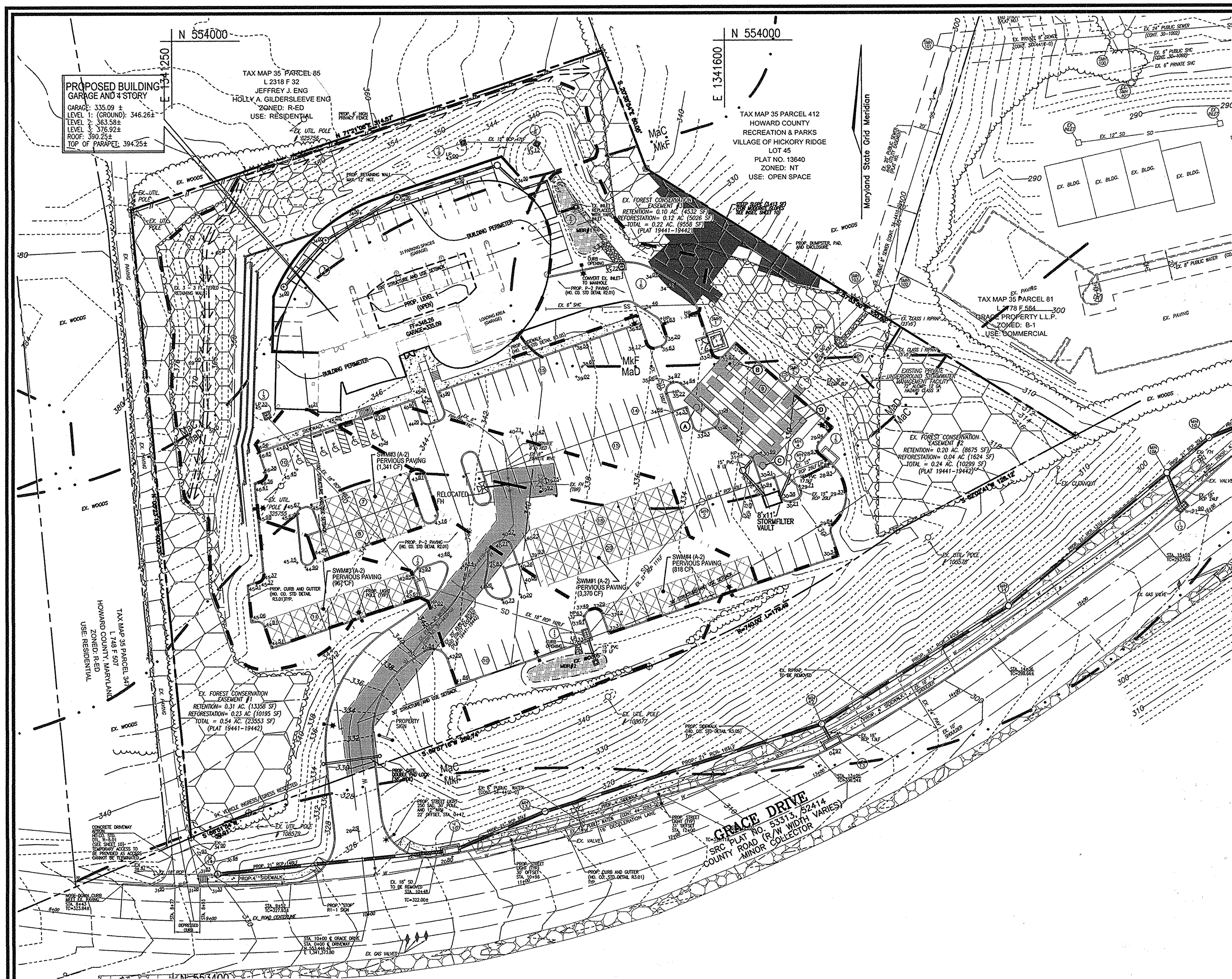
PROFESSIONAL CERTIFICATE

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: 09-27-2016

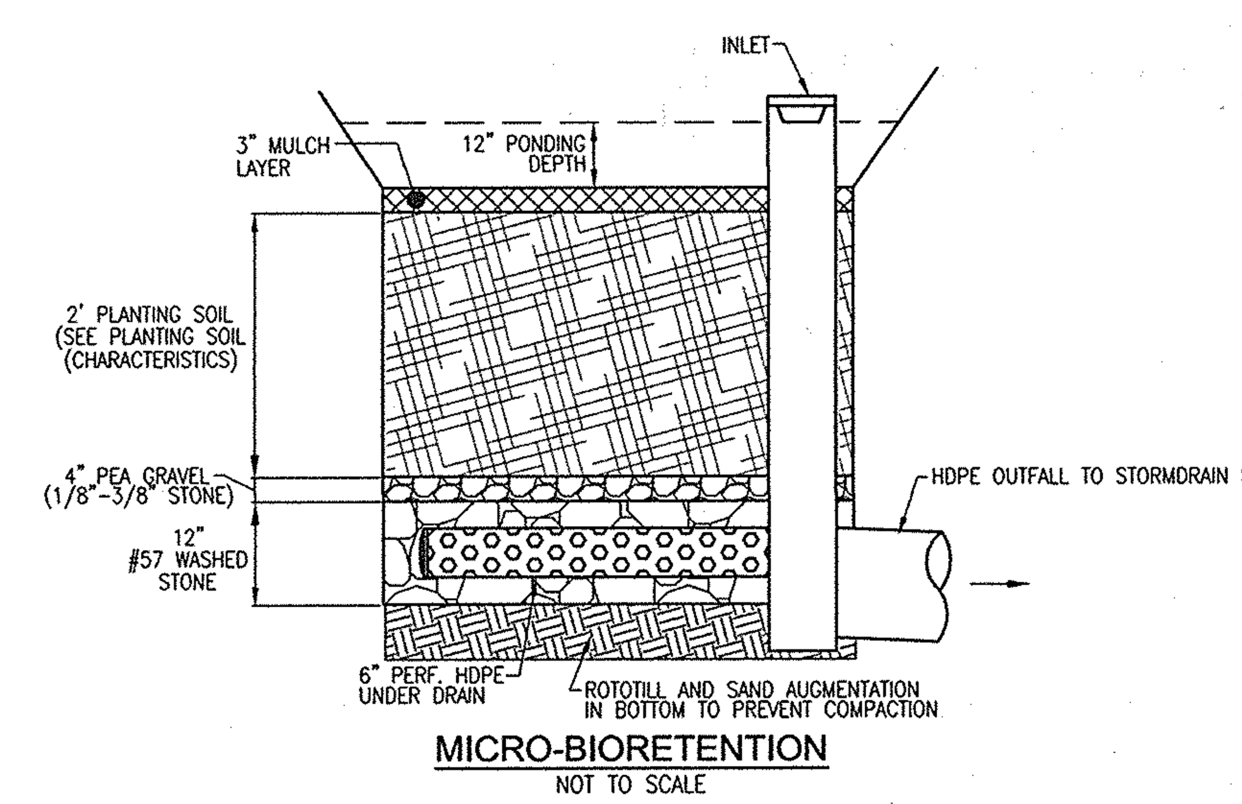
SHEET 1 OF 4

ECP-15-046

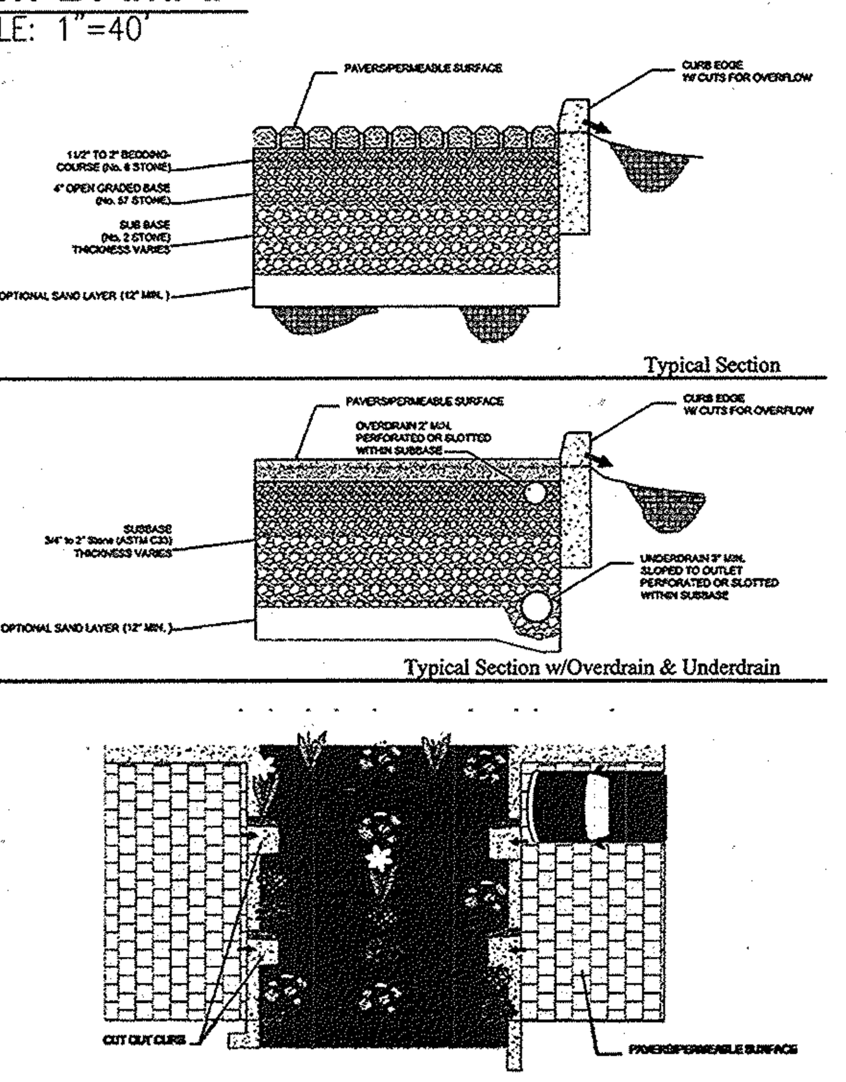
K:\Projects\04-06\ENGR\dwg\ECP\ECP_01-COVER.dwg, 4/22/2015 10:42:39 AM



SWM DAMAP
SCALE: 1"=40'



MICRO-BIORETENTION
NOT TO SCALE



PERMEABLE PAVEMENT DETAIL
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 5.8.15
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 4-23-15
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

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.

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 325.9R, ACI 330R) OR USING STRUCTURAL VALUES DERIVED FROM FLEXIBLE 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.50) 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 ACI 30A. 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% (n=0.30).

2. PERMEABLE INTERLOCKING CONCRETE PAVEMENTS (PICP)
PAVER BLOCKS – BLOCKS SHOULD BE EITHER 3? 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% (n=0.30).

3. REINFORCED TURF
REINFORCED GRASS PAVEMENT (RGP) – WHETHER USED WITH GRASS OR GRAVEL, THE RGP THICKNESS SHALL BE AT LEAST 1-3/4" THICK WITH A LOAD CAPACITY CAPABLE OF SUPPORTING THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED.

DRAINAGE AREA	IMPERVIOUS AREA	GRASS AREA	TOTAL AREA	PERCENT IMPERVIOUS	RV	ESDv MIN	ESDv MAX	ESDv PROVIDED
1	16680	0	16680	1.00	0.95	1321	3433	3370
2	6630	0	6630	1.00	0.95	525	1365	1341
3	4782	0	4782	1.00	0.95	379	984	967
4	4062	0	4062	1.00	0.95	322	836	818
5	3050	7500	10550	0.29	0.31	273	709	683
6	2000	3750	5750	0.35	0.36	174	452	431
7	25949	44183	70132	0.37	0.38	2238	5820	4043
	TOTAL AREA TREATED		118586 SF					11653
			2.72 AC					

PROJECT 7410 GRACE DRIVE
DESIGNER RHV
DATE 12/04/14
ROBERT H. VOGEL ENGINEERING, INC.

DRAINAGE AREA #	AREA TREATED	FACILITY NUMBER	PERMEABLE PAVEMENT	MICRO BIO RETENTION	LANDSCAPE INFILTRATION	GREEN ROOF	BIO SWALE	GRAVEL TRENCH	STORM FILTER	X	ESDv VOLUME
			ENVIRONMENTAL SITE DESIGN PRACTICE (CF)								
1	16680	PP1	3370	0	0	0	0	0	0	0	3370
2	6630	PP2	1341	0	0	0	0	0	0	0	1341
3	4782	PP3	967	0	0	0	0	0	0	0	967
4	4062	PP4	818	0	0	0	0	0	0	0	818
5	10550	MBR1	0	683	0	0	0	0	0	0	683
6	5750	MBR2	0	431	0	0	0	0	0	0	431
7	70132	STORMFILTER	0	0	0	0	0	0	4043	0	4043

TOTAL AREA TREATED 118586 SF, 2.72 AC — TOTAL ESDv PROVIDED 11653

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
MoD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	.28	YES	NO
MkF	MANOR BRINKLOW COMPLEX, 25 TO 65 PERCENT SLOPES, VERY ROCKY	B	.32	YES	NO

SOILS NOTE:
HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT.

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.

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.
3. 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 DFIRM APPROVED BY FEMA AND HOWARD COUNTY, THERE IS NO 100YR FLOODPLAIN LOCATED ON THIS PROPERTY.

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

1. 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.

2. THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SUBBASE.

3. THE OWNER SHALL USE DEICERS IN MODERATION. DEICERS SHOULD BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PRETREATED SALT.

4. 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:
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN INLET
- EXISTING TREES (FIELD LOCATED)
- EXISTING TREELINE (FIELD LOCATED)
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY (M1B2 / M1D3)
- PROPOSED SIDEWALK
- PROPOSED PERMEABLE PAVEMENT
- DRAINAGE AREA
- PROPOSED DIVERSION DIKE/SWALE

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.

GRAPHIC SCALE 1"=40'
20' 0' 40'

OWNER/DEVELOPER
7410 GRACE DRIVE, LLC
7410 GRACE DRIVE
COLUMBIA, MD 21045

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN
STORMWATER MANAGEMENT DRAINAGE AREA MAP; SWM DETAILS
7410 GRACE DRIVE
COLUMBIA, MD. 21045
ZONED: POR
L. 08684/F. 0005

TAX MAP 35 BLOCK 22 — PARCEL 86
5TH ELECTION DISTRICT — 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

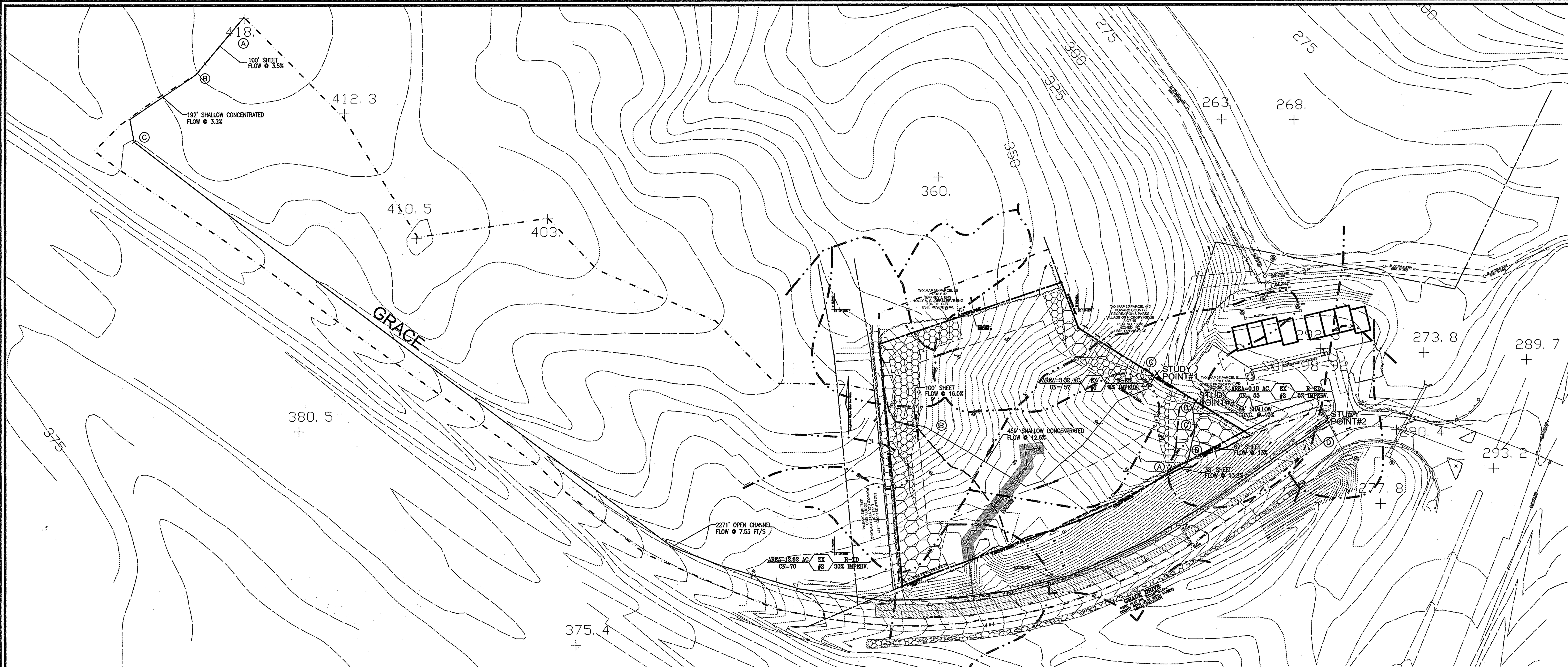
STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — REGISTERED PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV
DRAWN BY: DZ/GH/KG
CHECKED BY: RHV
DATE: APRIL 2015
SCALE: AS SHOWN
W.O. NO.: 04-06

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: 09-27-2016

ECP-15-046

K:\Projects\04-06\ENGR\dwg\ECP\ECP_02-SWMDAMAP&DETAILS.dwg, 4/8/2015 3:11:58 PM



NOTE:

QPv DRAINAGE MAPS AND PEAK MANAGEMENT CALCULATIONS FOR SWM WERE PEVIOUSLY APPROVED AND EXISTING FACILITY CONSTRUCTED UNDER SDP-06-102. THIS SHEET INCLUDED FOR INFORMATIONAL PURPOSES ONLY.

STORMWATER MANAGEMENT FACILITY PRIVATELY OWNED AND MAINTAINED

SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	GROUP
M1A	MANOR LOAM, 0 TO 3 % SLOPES	B
M1B2	MANOR LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED	B
M1C2	MANOR LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED	B
M1D2	MANOR LOAM, 15 TO 25 % SLOPES, MODERATELY ERODED	B
MgC2	MANOR GRAVELLY LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED	B

* NOTE: SOILS BASED ON OLD HOWARD SOIL SURVEY IN EFFECT AT TIME OF SDP-06-102 APPROVAL SEE SHEET 2 OF 4 FOR CURRENT SOILS FROM WEB SOIL SURVEY.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5.8.15

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4-23-15

OWNER/DEVELOPER
7410 GRACE DRIVE, LLC
7410 GRACE DRIVE
COLUMBIA, MD 21045

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

QPv EXISTING DRAINAGE AREA MAP

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
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

STATE OF MARYLAND ROBERT HARRIS VOGEL No. 16193 PROFESSIONAL ENGINEER

ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV
DRAWN BY: DZ/GH/KG
CHECKED BY: RHV
DATE: MARCH 2015
SCALE:
W.O. NO.: 04-06

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: 09-27-2016

ECP-15-046

NOTE:

QPv DRAINAGE MAPS AND PEAK MANAGEMENT CALCULATIONS FOR SWM WERE PEVIOUSLY APPROVED AND EXISTING FACILITY CONSTRUCTED UNDER SDP-06-102. SEE SHEET 1 AND 2 FOR REVISED LAYOUT. THE REVISED LAYOUT DOES NOT EXPAND THE LOD ORIGINALLY CONSIDERED FOR PEAK FLOW ANALYSIS. LAYOUT SHOWN ON THIS SHEET IS VOID AND FOR INFORMATIONAL PURPOSES ONLY.

SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	GROUP
M1A	MANOR LOAM, 0 TO 3 % SLOPES	B
M1B2	MANOR LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED	B
M1C2	MANOR LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED	b
M1D2	MANOR LOAM, 15 TO 25 % SLOPES, MODERATELY ERODED	B
MgC2	MANOR GRAVELLY LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED	B

* NOTE: SOILS BASED ON OLD HOWARD SOIL SURVEY IN EFFECT AT TIME OF SDP-06-102 APPROVAL SEE SHEET 2 OF 4 FOR CURRENT SOILS FROM WEB SOIL SURVEY.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5-8-15

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4-28-15

STORMWATER RUNOFF SUMMARY

LOCATION	AREA	Q1(cfs)	Q10(cfs)
STUDY POINT#1 (INCL.SITE, BYPASS, AND UNMANAGED)			
EXISTING CONDITION -ON-SITE CPv ALLOWED	3.32	0.14 0.16	4.46
DEVELOPED CONDITION	3.08 (ON-SITE) 0.46 (UNMANAGED) 3.54 (TOTAL)	0.10 0.21 (TR-20 OF ALL AREAS)	9.23 10.14 (TR-20 OF ALL AREAS)
STUDY POINT#2			
EXISTING CONDITION	12.62	0.54	2.63
DEVELOPED CONDITION	12.39	0.52	2.50
STUDY POINT#3			
EXISTING CONDITION	0.18	0.01	0.21
DEVELOPED CONDITION	0.18	0.01	0.21

NOTE:

1- THE EXISTING 1 YEAR RUNOFF IS LESS THAN THE ALLOWABLE CPv PER THE MDE REGULATIONS. THE 1 YR PROPOSED RUNOFF FROM THE CONTROL STRUCTURE OF 0.10cfs IS LESS THAN THE REQUIRED 0.16 cfs. HOWEVER THE 1 YR RUNOFF, INCLUDING THE UNMANAGED AREA, OF 0.21 cfs EXCEEDS THE EXISTING BY 0.07 cfs THE NEGLIBLE INCREASE WILL NOT HAVE ANY ADVERSE IMPORT DOUNSTREAM OR ADJACENT PROPERTIES.
2- STUDY POINT #2 IS THE EXISTING ENDPOINT OF THE EXISTING ROADSIDE SWALE. THIS SWALE IS PIPED TO AN EXISTING EXTENDED DETENTION FACILITY ACROSS GRACE DRIVE. THE POST DEVELOPMENT RUNOFF DOES NOT EXCEED THE PRE DEVELOPMENT RUNOFF.
3- STUDY POINT #3 ANALYZED AN EXISTING WOODS CONDITION THAT IS BEING PLACED WITHIN A FOREST CONSERVATION EASMENT. RUNOFF DOES NOT EXCEED THE PRE DEVELOPMENT RUNOFF.

SUMMARY TABLE

SP#3 0.18 AC.	REQUIREMENT	VOLUME REQUIREMENT W/O CREDITS	CREDITS	VOLUME REQUIREMENT AFTER CREDITS	NOTES
1	WATER QUALITY VOLUME WQV	N/A	N/A	N/A	SEE NOTE BELOW
2	RECHARGE VOLUME REV	N/A	N/A	N/A	
3	CHANNEL PROTECTION VOLUME CPV	N/A	N/A	N/A	
4	OVERHEAD FLOOD PROTECTION, Q10P	N/A	N/A	N/A	
5	EXTREME FLOOD VOLUME, Q100P	N/A	N/A	N/A	

SWM PROVIDED BY: NO STORM WATER MANAGEMENT IS PROPOSED FOR THIS AREA SINCE THE EXISTING AND PROPOSED CONDITIONS ARE TO RETURN AS WOODS.

SP#2 12.39 AC.	REQUIREMENT	VOLUME REQUIREMENT W/O CREDITS	CREDITS	VOLUME REQUIREMENT AFTER CREDITS	NOTES
1	WATER QUALITY VOLUME WQV	N/A	N/A	N/A	SEE NOTE BELOW
2	RECHARGE VOLUME REV	N/A	N/A	N/A	
3	CHANNEL PROTECTION VOLUME CPV	N/A	N/A	N/A	
4	OVERHEAD FLOOD PROTECTION, Q10P	N/A	N/A	N/A	
5	EXTREME FLOOD VOLUME, Q100P	N/A	N/A	N/A	

NOTE: SWM PROVIDED BY: EX. EXTENDED DETENTION FACILITY ON THE SOUTHWEST CORNER OF THE INTERSECTION OF GRACE DRIVE AND CEDAR LANE. SEE STORMWATER RUNOFF SUMMARY TABLE THIS SHEET.

SUMMARY TABLE

SP#1 3.08AC.	REQUIREMENT	VOLUME REQUIREMENT W/O CREDITS	CREDITS	VOLUME REQUIREMENT AFTER CREDITS	NOTES
1	WATER QUALITY VOLUME WQV	0.20 AC.FT.	N/A	0.20 AC.FT.	PROVIDED IN 3 UNDERGROUND SANDFILTERS
2	RECHARGE VOLUME REV	0.05 AC.FT. OR 0.30 AC.	N/A	0.05 AC.FT. OR 0.30 AC.	PROVIDED IN REV TRENCH UNDER ALL SANDFILTERS 0.06 AC.FT. PROVIDED
3	CHANNEL PROTECTION VOLUME CPV	0.20	N/A	0.19 AC.FT. OR 8105 CV.FT	CPV PROVIDED IN 372 LF OF 72", 12 GA AL-CMP UNDERGROUND STORAGE
4	OVERHEAD FLOOD PROTECTION, Q10P	N/A	N/A	N/A	NOT REQUIRED
5	EXTREME FLOOD VOLUME, Q100P	N/A	N/A	N/A	NOT REQUIRED

SWM PROVIDED BY: WQV PROVIDED IN 3 UNDERGROUND SANDFILTERS
REV PROVIDED IN GRAVEL TRENCH UNDERNEATH SANDFILTERS
CPV PROVIDED IN 72" AL-CMP UNDERGROUND STORAGE FACILITY.

STORMWATER MANAGEMENT FACILITY PRIVATELY OWNED AND MAINTAINED

OWNER/DEVELOPER
7410 GRACE DRIVE, LLC
7410 GRACE DRIVE
COLUMBIA, MD 21045

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

QPv PROPOSED DRAINAGE AREA MAP

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
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — No. 16193 — PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE No.16193

DESIGN BY:	RHV
DRAWN BY:	DZ/GH/KG
CHECKED BY:	RHV
DATE:	MARCH 2015
SCALE:	
W.O. NO.:	04-06

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: 09-27-2016

SHEET 4 OF 4

ECP-15-046

K:\Projects\04-06\ENGR\dwg\ECP\ECP_03-04-SWM_DAMA.dwg, 4/8/2015 3:13:40 PM