

SITE DATA

LOCATION: TAX MAP 35, BLOCK 14
 PARCEL: 64
 5TH ELECTION DISTRICT
 PRESENT ZONING: R-ED
 GROSS AREA OF PROJECT: 5.88 AC.
 AREA OF RIGHT-OF-WAY DEDICATION: 0.74 AC.
 LIMIT OF DISTURBANCE: 2.62 AC.
 PROPOSED USE OF SITE: RESIDENTIAL (SFD)
 NUMBER OF RESIDENTIAL LOTS PROPOSED: 8 LOTS
 AREA OF RESIDENTIAL LOTS PROPOSED: 2.02 AC.
 OPEN SPACE REQUIRED: 2.94 AC.
 OPEN SPACE PROVIDED: 3.12 AC.
 CREDITED OPEN SPACE PROVIDED: 2.98 AC.
 NON-CREDITED OPEN SPACE PROVIDED: 0.14 AC.
 IMPERVIOUS AREA: 0.84 AC.
 AREA OF STREAM/BUFFER: 1.51 AC.
 AREA OF WETLANDS/BUFFER: 0.39 AC.
 AREA OF MODERATE SLOPES (15% - 24.99%): 1.97 AC.
 AREA OF STEEP SLOPES (25% OR GREATER): 1.14 AC.
 AREA OF FLOOD PLAIN: 0.20 AC.
 NET PROJECT AREA: 4.54 AC.
 AREA OF EXISTING FOREST COVER: 4.40 AC.
 AREA OF ERODIBLE SOILS: 3.57 AC.
 AREA MANAGED BY ESDV (THIS PLAN): 2.62 AC.
 *IMPERVIOUS AREA: 0.84 AC.
 *GREEN AREA: 1.78 AC.

GENERAL NOTES

- STORM WATER MANAGEMENT TO BE PROVIDED FOR THIS DEVELOPMENT BY ENVIRONMENTAL SITE DESIGN UTILIZING MICRO-BIORETENTION FACILITIES (M-6), ROOFTOP DISCONNECTS (N-1), SHEETFLOW TO LEVEL SPREADERS (N-3), AND DRY WELLS (M-5). ON LOT LEVEL SPREADERS, DRY WELLS, AND MBR-3 THROUGH MBR-9 ARE TO BE PRIVATELY OWNED AND MAINTAINED BY THE HOMEOWNERS THEMSELVES. MICRO-BIORETENTION FACILITIES MBR-1, MBR-2, AND MBR-10 ARE TO BE PRIVATELY OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION. REFERENCE 2010 MDE STORMWATER DESIGN MANUAL (CHAPTER 5).
- THE SUBJECT PROPERTY IS ZONED "R-ED" IN ACCORDANCE WITH THE OCTOBER 6, 2013 COMPREHENSIVE ZONING PLAN.
- THIS SITE IS NOT LOCATED IN A HISTORIC DISTRICT.
- THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 350A AND 350B WERE USED FOR THIS PROJECT.
- NO RARE, THREATENED OR ENDANGERED SPECIES OR THEIR HABITATS WERE OBSERVED ON THE PROPERTY.
- THERE IS APPROXIMATELY 0.20 ACRES OF 100-YR FLOODPLAIN LOCATED WITHIN THE LIMITS OF THIS SITE.
- SEDIMENT AND EROSION CONTROL WILL BE PROVIDED FOR THIS SITE.
- WETLANDS SHOWN ON-SITE ARE BASED ON A FIELD INVESTIGATION PERFORMED BY JOHN CANOLES OF ECO-SCIENCE PROFESSIONALS, INC. DATED MAY, 2014. THERE ARE NO PROPOSED DISTURBANCES TO THE WETLANDS OR ASSOCIATED BUFFERS.
- A SIMPLIFIED FOREST STAND DELINEATION AND ENVIRONMENTAL RESOURCES ASSESSMENT WAS PERFORMED BY JOHN CANOLES OF ECO-SCIENCE PROFESSIONALS, INC., DATED MAY 2014.
- A TOTAL OF 11 LOTS ARE PROPOSED UNDER THIS PLAN.
- WETLANDS AND THEIR BUFFERS WILL NOT BE IMPACTED BY THE CONSTRUCTION OF THE SITE.
- APPROVAL OF THIS ECP DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PLAN. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN STAGES AND/OR RED-LINE REVISION PROCESS. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
- SITE DEVELOPMENT PLAN APPROVED BY THE DEPARTMENT OF PLANNING AND ZONING IS REQUIRED PRIOR TO BUILDING PERMITS BEING ISSUED FOR THE CONSTRUCTION OF RESIDENTIAL DWELLINGS ON THESE LOTS.
- PUBLIC WATER AVAILABLE THROUGH CONTRACT NO. 34-4275-D AND PUBLIC SEWER AVAILABLE THROUGH CONTRACT NO. 30-3096-D. WATER AND SEWER SERVICE WILL BE GRANTED UNDER THE PROVISIONS OF SECTION 18.1228 OF THE HOWARD COUNTY CODE.
- A PRE-SUBMISSION COMMUNITY MEETING WAS HELD ON APRIL 28, 2014 AT 6:00 PM AT THE MEETING ROOM AT RIVER HILL POOL.

THE PRESERVE AT RIVERHILL ENVIRONMENTAL CONCEPT PLAN STORMWATER MANAGEMENT REPORT

INTRODUCTION

The subject property is located on the east side and south side of Trotter Road (inside the 90° curve) and north of Summer Sunrise Drive in Columbia, Maryland. The street address is 6281 Trotter Road and the site contains one residential single family detached residence. The site boundary is 1.81 acres and the site contains some steep slopes (25% slope), an intermittent stream, various specimen trees and wetlands. The soils are predominantly Mastic-Banneworth Sandy Loam (M8) and Gladstone Loam (G8) and (G9) which are classified as Hydrologic Soil Group "B". The site is adjacent to the recently constructed Cricket Creek subdivision and a proposed subdivision which is currently in process (south).

The proposed on-site stormwater management generally follows the existing driveway alignment in order to minimize excessive clearing and grading. The proposed site layout and grading is configured to conform with the existing grades and contours. The lots have been reduced in size to encourage the preservation of the environmental features and specifically to retain a substantial portion of the wooded resources. Trotter Road is classified as a scenic road so all efforts have been made to retain the woods adjacent to the road.

The plan proposes the removal of 6 specimen trees (ST-1, ST-2, ST-3, ST-14 and ST-15). The development will also require limited clearing of wooded resources. The site was designed to utilize the non-wooded portion of the property to the greatest extent possible and to limit grading activities.

The wooded resources in the high priority area (steep slopes, wetlands and buffers) have been retained.

METHODOLOGY

The site is proposed to be developed in accordance with the R-ED Regulations as 8 single family detached lots utilizing a use-in-common driveway. Environmental Site Design (ESD) has been utilized for the stormwater management design. The ESD was prepared for the development area (2.50 ac) as 1.77".

The site is proposed to be developed in accordance with the Residential - Environmental District regulations. Environmental Site Design has been utilized for the stormwater management design. The ESD was prepared for the developable area as 1.77". For this project the wetland/buffer, stream/buffer, forest conservation and other areas outside the limit of disturbance were removed from the gross site area. Subareas were established based on the proposed limits of disturbance and proposed drainage patterns. The impervious areas (approximately 34,900 sf) including houses, driveways and use-in-common driveway are predominantly treated to the maximum extent possible by micro-bioretention facilities, dry wells, sheet flow to buffer (with level spreaders) and rooftop disconnects.

Generally the ESD requirement for each subarea is satisfied by detaching the rooftop disconnect (N-1) and sheet flow to buffer (N-3) credits from the sub area requirement. The balance of the ESD is provided by the micro-bioretention facilities (M-6) and dry wells (M-5). The ESDs provided in the micro-bioretention facilities is 75% of the required ESD volume above the mulch. The various practices are designed to provide a minimum of 1.0" and less than 2.6" storage for the contributing impervious areas.

The existing drainage patterns have been preserved which will continue to provide hydrology to the existing drainage features. The 2011 Sediment and Erosion Control Standards will be utilized to protect existing environmental features which will be predominantly achieved through the use of silt fence and other acceptable techniques. The site drains to Cricket Creek which is a tributary to the Middle Patuxent River.

CONCLUSION

The preliminary Environmental Site Design computations illustrate that ESD can be adequately accomplished to the maximum extent possible for the proposed project. Currently, there are no disturbances proposed to environmental features. The natural drainage patterns have been preserved with the site draining to the swale which runs north to the property line and Trotter Road. Ultimately the site discharges to Cricket Creek and the Middle Patuxent River which is designated as Stream Use III and IV. Soils tests will be performed in conjunction with the Preliminary Equivalent Sketch Plan to verify that rock and groundwater are not present at the proposed micro-bioretention locations.

LOT AREA TABULATION			
LOT	GROSS AREA	PIPESTEM AREA	NET AREA
1	10,620 SF	1,001 SF	9,619 SF
2	11,488 SF	1,965 SF	9,523 SF
3	14,576 SF	2,641 SF	11,935 SF
4	11,206 SF	656 SF	10,550 SF
5	10,306 SF	919 SF	9,387 SF
6	10,427 SF	896 SF	9,531 SF
7	10,955 SF	678 SF	9,387 SF
8	9,271 SF	440 SF	8,831 SF

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division
 Chief, Division of Land Development

SHEET INDEX		
DESCRIPTION	SHEET NO.	
LAYOUT PLAN	1 OF 3	
SOILS MAP, GRADING, EROSION AND SEDIMENT CONTROL PLAN	2 OF 3	
DRAINAGE AREA MAP	3 OF 3	

ENVIRONMENTAL CONCEPT PLAN

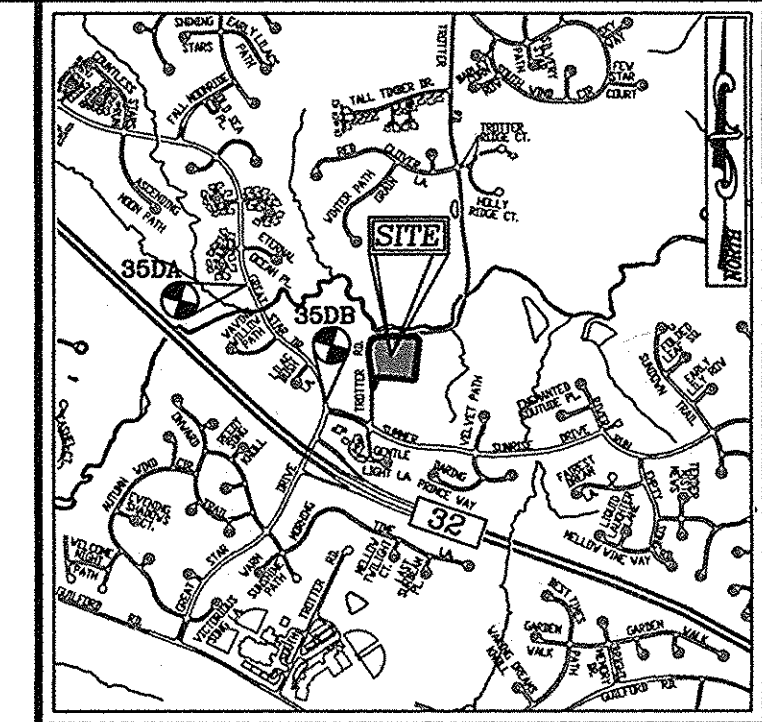
THE PRESERVE AT RIVER HILL

LOTS 1-8 AND OPEN SPACE LOTS 9-11

PARCEL 64 (L. 2326 / F. 517)
 6281 TROTTER ROAD
 CLARKSVILLE, MD 21029

BENCHMARKS

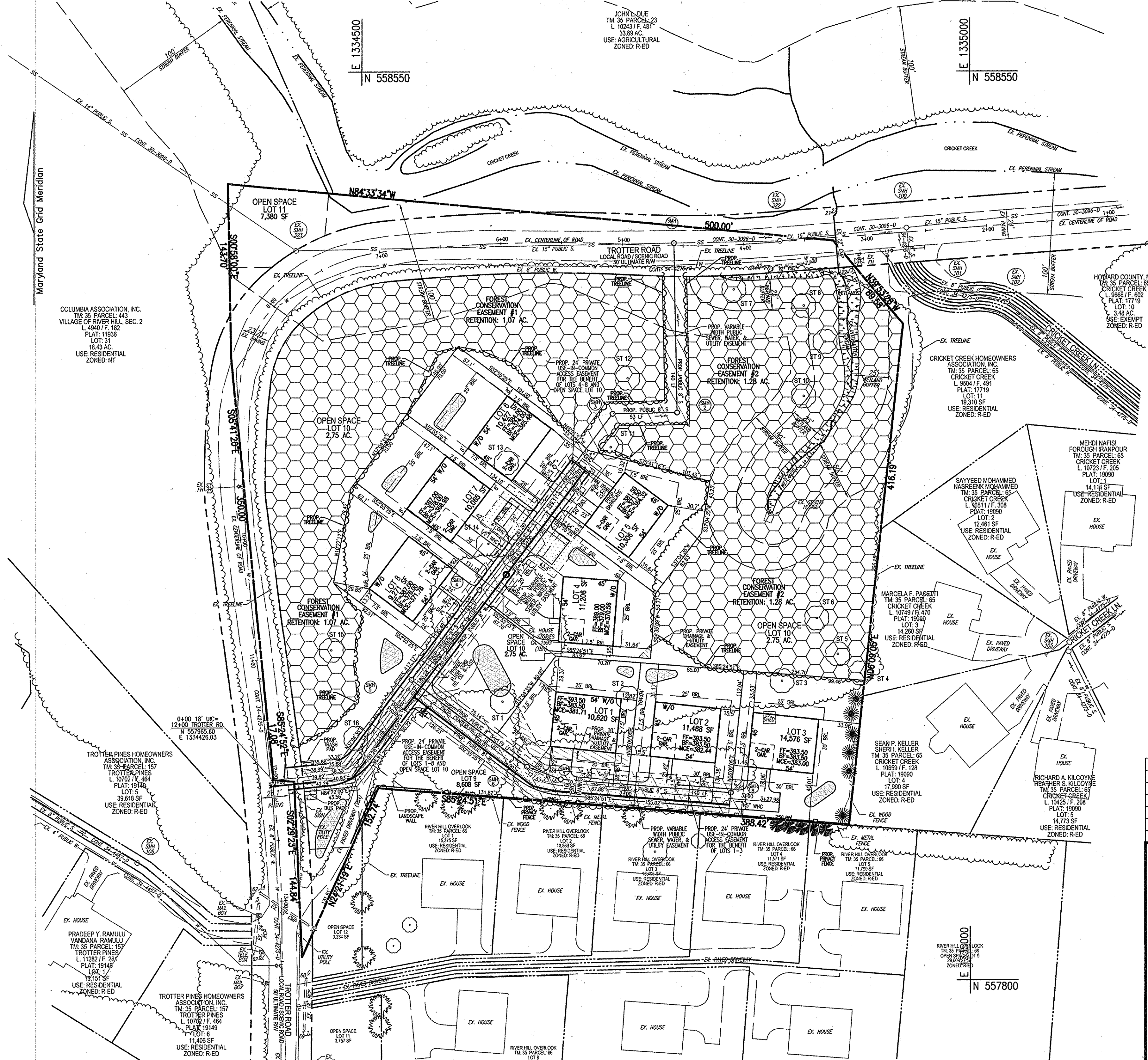
HOWARD COUNTY BENCHMARK 350A (CONC. MON.)
 N 558918.62 E 1333137.33 ELEV. 350.98
 LOCATION: 420' SOUTH OF TIDES TERRACE
 HOWARD COUNTY BENCHMARK 350B (CONC. MON.)
 N 557696.15 E 1333974.58 ELEV. 400.99
 LOCATION: CORNER OF GREAT STAR DR. & SUMMER SUNRISE DR.



VICINITY MAP
 SCALE: 1"=2,000'
 ADC MAP COORDINATE: MAP: 31, GRID: F3

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING CURB AND GUTTER
- EXISTING EDGE OF PAVING
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EXISTING STREAM BUFFER
- EXISTING STREAM
- 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 TREELINE
- EXISTING TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- PROPOSED TREELINE
- PROP. PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PROP. FOREST CONSERVATION EASEMENT (RETENTION)
- PROP. VARIABLE WIDTH PUBLIC SEWER, WATER, & UTILITY EASEMENT
- PROP. 10' PRIVATE DRAINAGE & UTILITY EASEMENT



OWNER
 PETER D. CONGEDO
 CHERIE B. CONGEDO
 6281 TROTTER RD,
 CLARKSVILLE, MD 21029
 (410) 480-0023

DEVELOPER
 TRINITY QUALITY HOMES, INC.
 3675 PARK AVE., SUITE 301
 ELLICOTT CITY, MD 21043
 (410) 480-0023

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN
LAYOUT PLAN
THE PRESERVE AT RIVER HILL
LOTS 1-8 AND OPEN SPACE LOTS 9-11
 PARCEL 64 (L. 2326 / F. 517)
 6281 TROTTER ROAD
 CLARKSVILLE, MD 21029

TAX MAP: 35 GRID: 14
 5TH ELECTION DISTRICT
 PARCELS: 64
 ZONED: R-ED
 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

DESIGN BY: RHV
 DRAWN BY: JMR
 CHECKED BY: RHY
 DATE: SEPTEMBER 2014
 SCALE: AS SHOWN
 W.O. NO.: 13-38

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

1 SHEET OF 3

SPECIMEN TREE CHART				
NO.	SIZE (DBH/FEET RADII)	COMMON NAME	CONDITION	COMMENTS
ST 1	36.5" / 54.75'	TULIP POPLAR	GOOD CONDITION	TO BE REMOVED
ST 2	45" / 67.5'	TULIP POPLAR	TWIN STEMS	TO BE REMOVED
ST 3	34" / 51'	TULIP POPLAR	GOOD CONDITION	TO BE REMOVED
ST 4	48" / 72'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 5	33.5" / 50.25'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 6	30" / 45'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 7	37" / 55.5'	TULIP POPLAR	GOOD CONDITION	TO REMAIN
ST 8	33" / 49.5'	TULIP POPLAR	GOOD CONDITION	TO REMAIN



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

2. INFILTRATION BEDS
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 COMPOUND WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE 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.
 THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:
 * SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURE CLASSIFICATION)
 * ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-85%) AND COMPOST (35% TO 40% OR SANDY LOAM (50%), 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 INTO THE SOIL TO INCREASE OR DECREASE PH.
 THERE SHALL BE AT LEAST ONE SOIL TEST PER PRACTICE. 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 LOADERS, THE CONTRACTOR SHOULD USE WIDE TRACK OR WASH TRUCK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TIRE 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 AVOIDED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS CHISEL, FLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACURE 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 BIORETENTION 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". SHREDED 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. SHREDED 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 GROUND 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 BRANDED 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 PLOTS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.
 THE TOPSOIL SPECIFICATIONS PROVIDE DUGHAN ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY, ADDING FERTILIZERS, DEFOLIATES, OR AT A MINIMUM, INSECTS 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 (ASTM F 758, TYPE PS 28, OR AHS10-M-278) IN A GRAVEL LAYER. THE PERFORATED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OF HOPE).
 * PERFORATIONS - 4" PERFORATED PIPES TO BE 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 4A) GALVANIZED HARDWARE CLOTH.
 * GRAVEL - THE GRAVEL LAYER (NO. 57 STONE PERFECTION) 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 PORT AND MONITOR PERFORMANCE OF THE FILTER.
 * A 1" 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 2".
 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.

N-1. DISCONNECTION OF ROOFTOP RUNOFF

CONSTRUCTION CRITERIA:
 THE FOLLOWING ITEMS SHOULD BE ADDRESSED DURING THE CONSTRUCTION OF PROJECTS WITH PLANNED ROOFTOP DISCONNECTIONS:
 - EROSION AND SEDIMENT CONTROL: EROSION AND SEDIMENT CONTROL PRACTICES (E.G., SEDIMENT TRAPS) SHALL NOT BE LOCATED IN VEGETATED AREAS RECEIVING DISCONNECTED RUNOFF
 - SITE DISTURBANCE: CONSTRUCTION VEHICLES AND EQUIPMENT SHOULD AVOID AREAS RECEIVING DISCONNECTED RUNOFF TO MINIMIZE DISTURBANCE AND COMPACTION. SHOULD AREAS RECEIVING DISCONNECTED RUNOFF BECOME COMPACTED, SCARIFYING THE SURFACE OR ROTOTILLING THE SOIL TO A DEPTH OF FOUR TO SIX INCHES SHALL BE PERFORMED TO ENSURE PERMEABILITY.
 ADDITIONALLY, AMENDMENTS MAY BE NEEDED FOR TIGHT, CLAYEY SOILS.

INSPECTION:
 A FINAL INSPECTION SHALL BE CONDUCTED BEFORE USE AND OCCUPANCY APPROVAL TO ENSURE THAT SIZING FOR TREATMENT AREAS HAVE BEEN MET AND PERMANENT STABILIZATION HAS BEEN ESTABLISHED.

MAINTENANCE CRITERIA:
 MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE AREAS RECEIVING RUNOFF SHOULD BE PROTECTED FROM FUTURE COMPACTION (E.G., BY PLANTING TREES OR SHRUBS ALONG THE PERIMETER). IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SHEETFLOW TO CONSERVATION AREA (N-3)
 CONSERVATION AREAS SHALL REMAIN UNDISTURBED AND UNMANAGED OTHER THAN ROUTINE DEBRIS REMOVAL AND REPAIRING AREA OF CONCENTRATED FLOW. INVASIVE AND NOXIOUS PLANT REMOVAL AND BI-ANNUAL MOWING FOR MEADOW AREAS MAY BE NEEDED. SIGNS DELINEATING THE LIMITS OF THE CONSERVATION AREA SHOULD BE MAINTAINED AND SUPPLEMENTAL PLANTINGS PERFORMED AS NEEDED.



LEGEND:

	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING CURB AND GUTTER
	EXISTING EDGE OF PAVING
	EXISTING WETLAND
	EXISTING WETLAND BUFFER
	EXISTING STREAM BUFFER
	EXISTING STREAM
	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 TREE LINE
	EXISTING TREES
	EXISTING WOOD FENCE
	EXISTING METAL FENCE
	PROPOSED TREE LINE
	PRIVATE USE-IN-COMMON ACCESS EASEMENT
	PROP. FOREST CONSERVATION EASEMENT (RETENTION)
	PROP. VARIABLE WIDTH PUBLIC SEWER, WATER, & UTILITY EASEMENT
	PROP. 10' PRIVATE DRAINAGE & UTILITY EASEMENT
	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
	SOILS
	PROPOSED 10' CONTOUR
	PROPOSED 2' CONTOUR
	PROPOSED SPOT ELEVATION
	EXISTING STEEP SLOPES
	EXISTING MODERATE SLOPES
	PROPOSED SUPER SILT FENCE
	PROPOSED DIVERSION FENCE
	PROPOSED LIMIT OF DISTURBANCE
	PROPOSED EROSION CONTROL MATTING
	PROPOSED STABILIZED CONSTRUCTION ENTRANCE
	PROPOSED TREE PROTECTION FENCE
	PROPOSED MICRO-BIORETENTION FACILITY (M-6)
	PROPOSED DRY WELL (M-5)

OWNER
 PETER D. CONGEDO
 CHESTER B. CONGEDO
 6281 TROTTER RD.
 CLARKSVILLE, MD 21029
 (410) 480-0023

DEVELOPER
 TRINITY QUALITY HOMES, INC.
 3675 PARK AVE., SUITE 301
 ELLICOTT CITY, MD 21043
 (410) 480-0023

NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN
 SOILS MAP, GRADING, EROSION, AND
 SEDIMENT CONTROL PLAN**
THE PRESERVE AT RIVER HILL
 LOTS 1-8 AND OPEN SPACE LOTS 9-11
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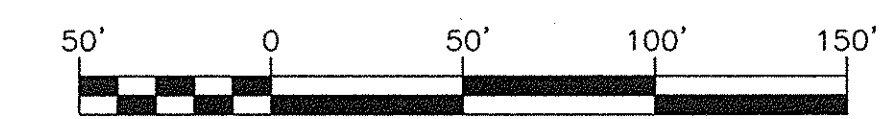
**ROBERT H. VOGEL
 ENGINEERING, INC.**
 ENGINEERS • SURVEYORS • PLANNERS
 8407 MAIN STREET
 ELLICOTT CITY, MD 21043
 TEL: 410.461.7666
 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE

DESIGN BY: RHY
 DRAWN BY: JMR
 CHECKED BY: RHY
 DATE: SEPTEMBER 2014
 SCALE: AS SHOWN
 W.O. NO.: 13-38

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

2 OF 3



SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
Gsb	GLAUCOSE LOAM, 3 TO 8 PERCENT SLOPES	B	.20	NO
Gsc	GLAUCOSE LOAM, 8 TO 15 PERCENT SLOPES	B	.20	NO
Gmc	GLENNVILLE SILT LOAM, 8 TO 15 PERCENT SLOPES	C	.37	YES
Hs	HATBORO-CODORIUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	D	.37	NO
Md0	MANOR-BANNERTOWN SANDY LOAMS, 15 TO 25 PERCENT SLOPES, ROCKY	B	.24	YES

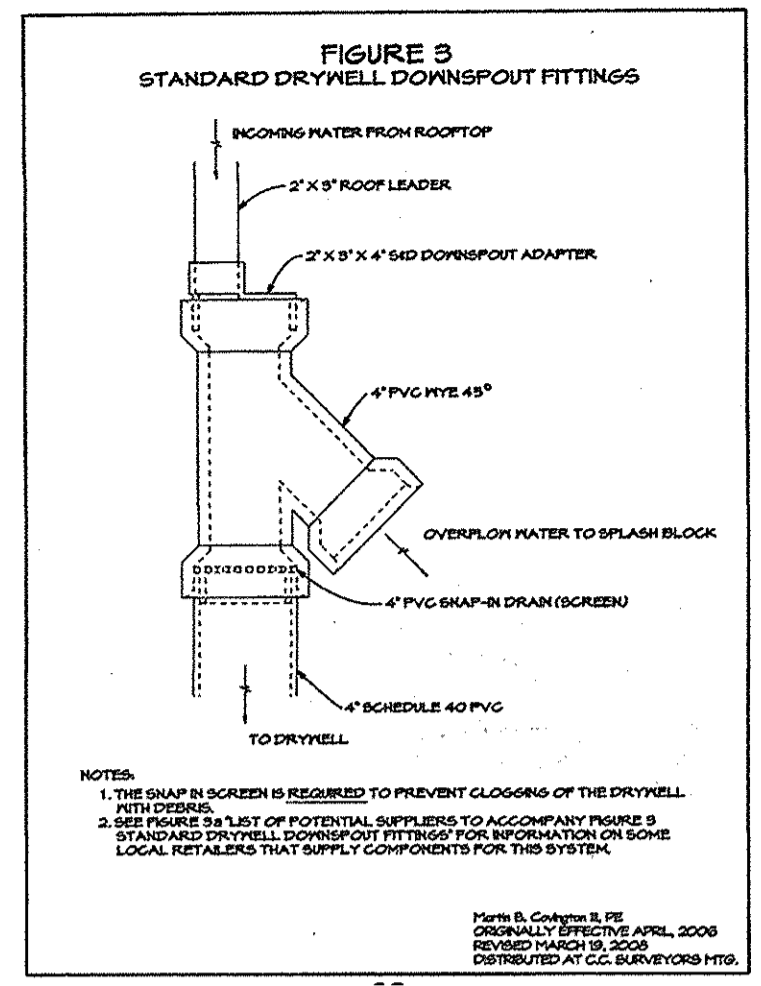
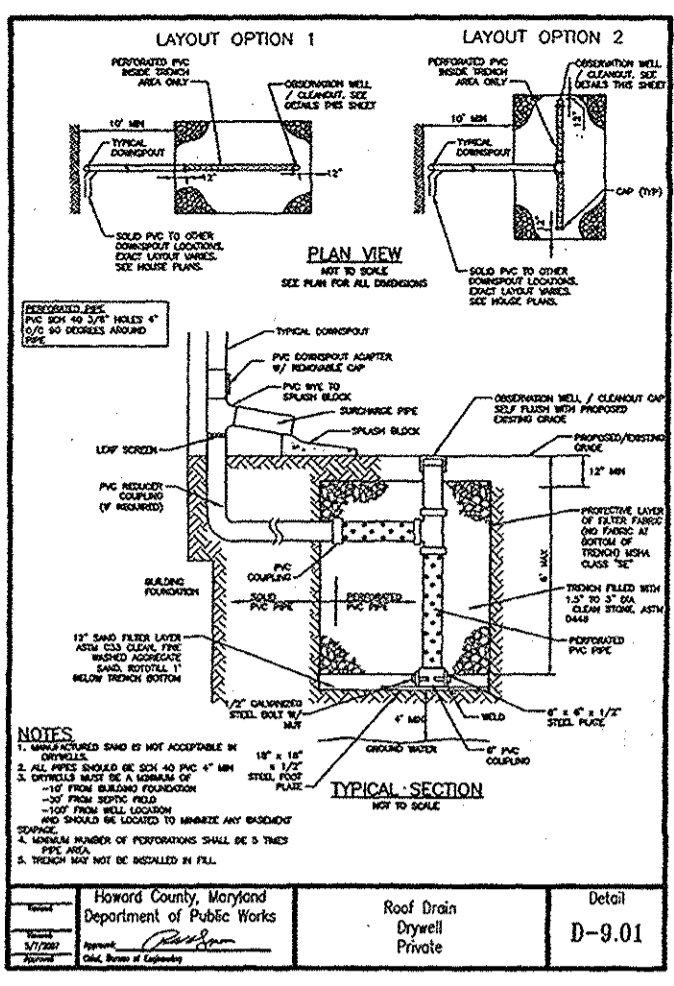
NOTE:
 HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad Church 11-18-14
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Ket Slebocka 11-18-14
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

GRADING PLAN
 SCALE: 1"=50'



HOWARD COUNTY - OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DRYWELL (M-5)

A. THE OWNER SHALL INSPECT & CLEAN ANNUALLY, INCLUDING PIPES, GUTTERS, DOWNSPOUTS AND FILTERS.

B. PONDING STANDING WATER OR ALGAL GROWTH ON THE TOP OF A DRYWELL MAY INDICATE FAILURE DUE TO SEDIMENTATION IN THE GRAVEL MEDIA. IF WATER PONDING FOR MORE THAN 48 HOURS AFTER A MAJOR STORM OR MORE THAN SIX INCHES OF SEDIMENT HAS ACCUMULATED, THE GRAVEL MEDIA SHOULD BE EXCAVATED AND REPLACED.

PROJECT CONGEDO PROPERTY DESIGNER RHV DATE 05/23/14 ROBERT H. VOGEL ENGINEERING, INC.

ENVIRONMENTAL SITE DESIGN PRACTICE

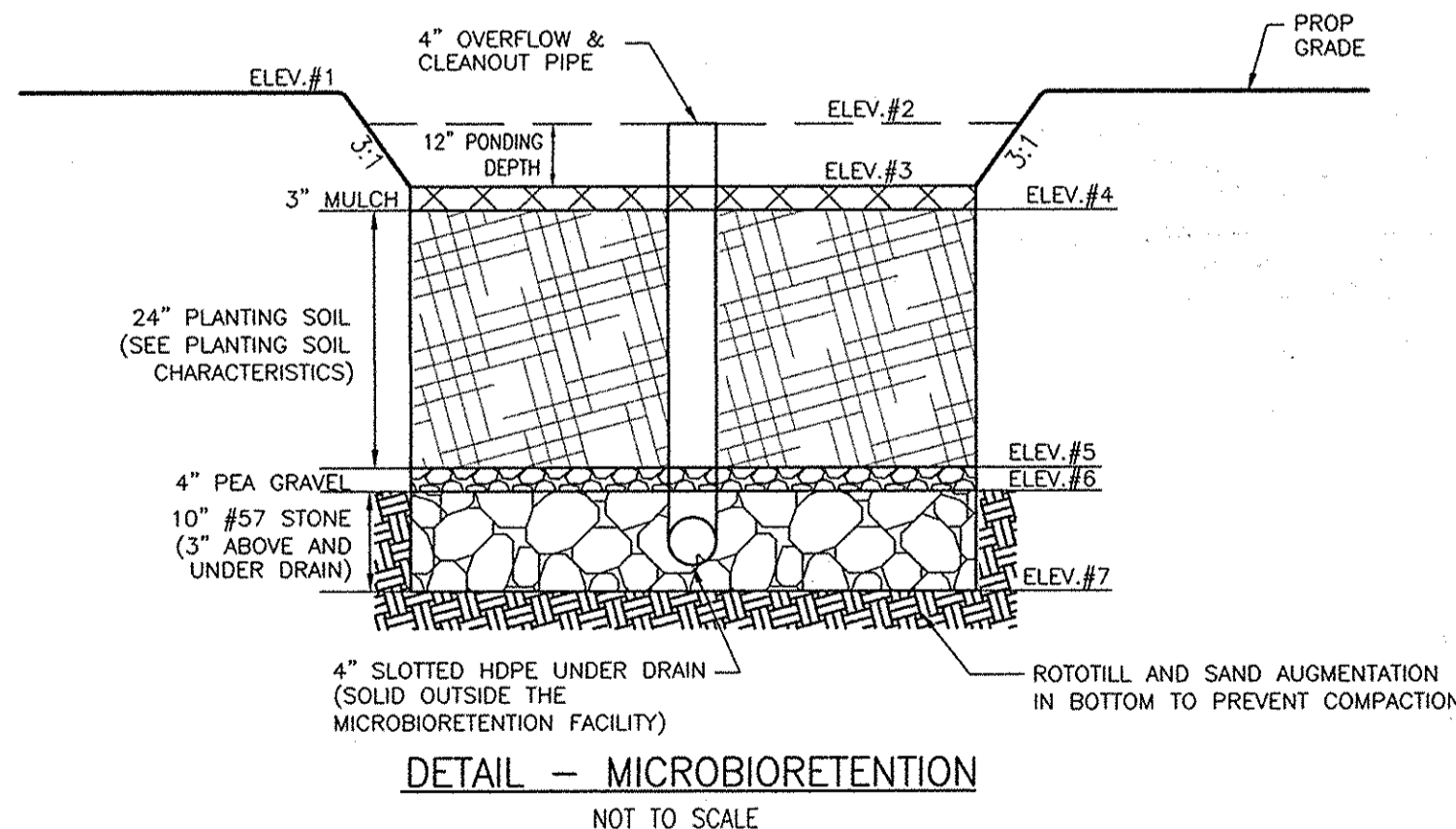
AREA #	TREATED	AREA	FACILITY	PERMEABLE PAVEMENT	MICRO BIO SHEET FLOW	DRY WELL	ROOFTOP DISCONNECT	X	X	X	ESDv
DA-A	16590	MBR-1	0	0	0	0	0	0	0	0	689
DA-B	17442	MBR-2	0	0	0	0	0	0	0	0	1029
DA-C	15929	MBR-4	0	125	0	0	0	0	0	0	125
		LEVEL SPREADER	0	96	0	0	0	0	0	0	96
		MBR-5	0	296	0	0	0	0	0	0	296
DA-D	14188	MBR-6	0	264	0	0	0	0	0	0	264
		LEVEL SPREADER	0	96	0	0	0	0	0	0	96
		DRY WELL LOT 4	0	0	135	0	0	0	0	0	135
		DRY WELL LOT 5A	0	0	135	0	0	0	0	0	135
		DRY WELL LOT 5B	0	0	270	0	0	0	0	0	270
DA-E	26259	MBR-7	0	432	0	0	0	0	0	0	432
		MBR-8	0	288	0	0	0	0	0	0	288
		MBR-9	0	144	0	0	0	0	0	0	144
		DRY WELL LOT 6	0	0	125	0	0	0	0	0	125
		DRY WELL LOT 7	0	0	625	0	0	0	0	0	625
		DISCONNECTS	0	0	0	39	0	0	0	0	39
DA-F	9271	MBR-10	0	465	0	0	0	0	0	0	465
DA-G	4857	MBR-3	0	288	0	0	0	0	0	0	288

TOTAL AREA: 104646 SF TOTAL ESDv PROVIDED: 5541
2.40 AC

NOTE: MICRO BIORETENTION VOLUMES ARE BASED FULL ESDv AND DO NOT REPRESENT THE REQUIRED STORAGE RATIO OF 75%

MICRO BIO-RETENTION (M-6) ELEVATIONS

LOT #	FACILITY #	1	2	3	4	5	6	7	4" INV. 4" INCH OUTFALL
LOT 9	MBR-1	366.00	365.60	364.60	364.35	362.35	362.02	361.19	361.00
LOT 10	MBR-2	382.00	381.60	380.60	380.35	378.35	378.02	377.19	377.22
LOT 3	MBR-3	390.00	389.60	388.60	388.35	386.35	386.02	385.19	385.14
LOT 2	MBR-4	380.00	379.60	378.60	378.35	376.35	376.02	375.19	375.30
LOT 1	MBR-5	380.00	379.60	378.60	378.35	376.35	376.02	375.19	375.28
LOT 4	MBR-6	382.00	381.60	380.60	380.35	378.35	378.02	377.19	377.19
LOT 6	MBR-7	372.00	371.60	370.60	370.35	368.35	368.02	367.19	367.33
LOT 7	MBR-8	376.00	375.60	374.60	374.35	372.35	372.02	371.19	371.33
LOT 8	MBR-9	376.00	375.60	374.60	374.35	372.35	372.02	371.19	371.32
LOT 10	MBR-10	377.40	377.00	376.00	375.75	373.75	373.42	372.59	372.68



MICROBIORETENTION NOTES:

- ONLY THE SIDES OF MICROBIORETENTION ARE TO BE WRAPPED IN FILTER FABRIC. FILTER FABRIC BETWEEN LAYER OR THE BOTTOM OF THE MICROBIORETENTION WILL CAUSE THE MBR TO FAIL AND THEREFORE SHALL NOT BE INSTALLED.
- WRAP THE PERFORATED MBR UNDERDRAIN PIPE WITH 1/4" MESH (4x4) OR SMALLER GALVANIZED HARDWARE CLOTH.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division DATE 11-18-14

Chief, Division of Land Development DATE 11-18-14



SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
C8B	GLAUSTONE LOAM, 3 TO 8 PERCENT SLOPES	B	.20	NO
C8C	GLAUSTONE LOAM, 8 TO 15 PERCENT SLOPES	B	.20	NO
GmC	GLENVILLE SILT LOAM, 8 TO 15 PERCENT SLOPES	C	.37	YES
Hs	HARBORO-CODORUS SILT LOAMS, 0 TO 3 PERCENT SLOPES	D	.37	NO
MdD	MANOR-BANNERTOWN SANDY LOAMS, 15 TO 25 PERCENT SLOPES, ROCKY	B	.24	YES

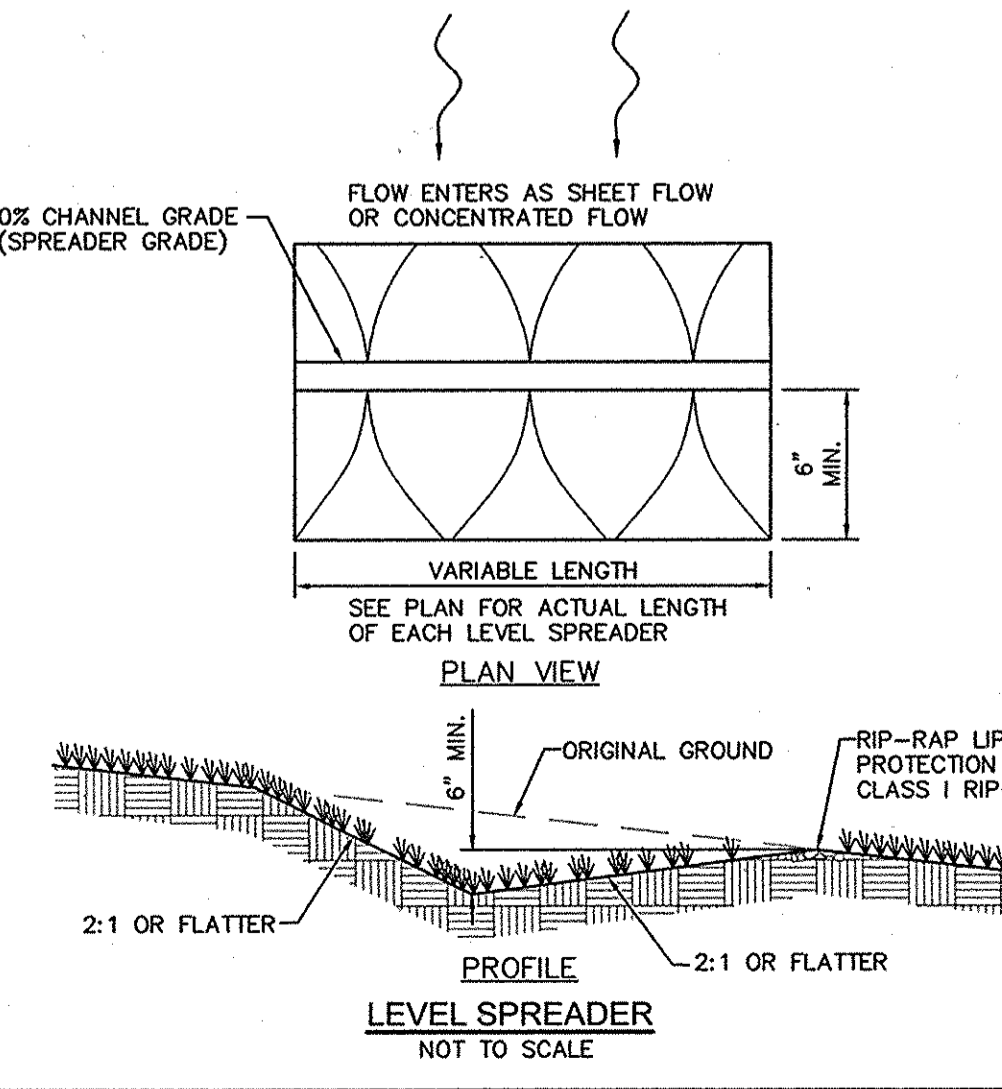
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SWM PRACTICE CHART ESD PRACTICES BY LOT

LOT #	ESD PRACTICE
#1	MICRO BIO-RETENTIONS (M-6)
#2	MICRO BIO-RETENTIONS (M-6)
#3	SHEETFLOW TO LEVEL SPREADER (N-3) AND MICRO-BIORETENTIONS (M-6) AND DRY WELL (M-5)
#4	SHEETFLOW TO LEVEL SPREADER (N-3) AND DRY WELLS (M-5)
#5	SHEETFLOW TO LEVEL SPREADER (N-3) AND DRY WELLS (M-5)
#6	DISCONNECT ROOFTOP RUNOFF (N-1), MICRO BIO-RETENTION (M-6), AND DRY WELL (M-5)
#7	DISCONNECT ROOFTOP RUNOFF (N-1), MICRO BIO-RETENTION (M-6), AND DRY WELL (M-5)
#8	DISCONNECT ROOFTOP RUNOFF (N-1), MICRO BIO-RETENTIONS (M-6), UIC DRIVE

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

Material	Specification	Note
Planting	see Appendix A, Table A.4	planting are site-specific
Permeable soil (2' to 4' deep)	heavy sand (80-60%) & compost (20-40%)	USDA soil types heavy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight	
Mulch	divided hardwood	aged 6 months, minimum no pine or wood chips
Pee gravel diaphragm	see ASTM D-448	N.O. 4 OR N.O. 9 (1/4" TO 3/4")
Curb/drain	conventional stone, washed cobblets	stone: 3" to 5"
Grasscrete		FS Type 1 minimum
Gravel (conduits and infiltration berms)	AASHTO M-41	N.O. 57 OR N.O. 6 APPROXIMATE (3/8" TO 3/4")
Underdrain piping	1.50" Type PS 28 or AASHTO M-278	1/2" or 3/4" rigid schedule 40 PVC or HDPE
Formed in place concrete (if required)	MESA Mix No. 3, F _c = 3500 psi @ 28 days, normal weight, air-entrained, conforming to meet ASTM C-616-00	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 Slab or Road material requires design development and approval by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 19.4.3.2C vertical loading (F _v 10 to 14.20); allowable horizontal loading based on soil parameters and methods of potential cracking.
Sand	AASHTO M-6 or ASTM C-33	Sand substitutions such as Daxos and Cristoson (AASHTO #1) are not approved for use unless substitution test data and substitutions are acceptable. No "rock dust" can be used for sand.



LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING CURB AND GUTTER
- EXISTING EDGE OF PAVING
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EXISTING STREAM BUFFER
- EXISTING STREAM
- 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 TREE LINE
- EXISTING TREES
- EXISTING WOOD FENCE
- EXISTING METAL FENCE
- PROPOSED TREELINE
- PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PROP. FOREST CONSERVATION EASEMENT (RETENTION)
- PROP. VARIABLE WIDTH PUBLIC SEWER WATER & UTILITY EASEMENT
- PROP. 10' PRIVATE DRAINAGE & UTILITY EASEMENT
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- SOILS
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED SPOT ELEVATION
- EXISTING STEEP SLOPES
- DRAINAGE AREA DIVIDE
- EXISTING MODERATE SLOPES
- PROPOSED MICRO-BIORETENTION FACILITY (M-6)
- PROPOSED DRY WELL (M-5)
- AREA OF ROOFTOP DRAINAGE TO GO TO DRY WELL (M-5)
- AREA OF ROOFTOP DRAINAGE TO SHEETFLOW TO LEVEL SPREADER (N-3)
- AREA OF ROOFTOP DRAINAGE TO GO TO MICRO BIO-RETENTION FACILITY (M-6)
- AREA OF ROOFTOP DRAINAGE TO GO TO MICRO BIO-RETENTION FACILITY (M-6) AND ROOFTOP DISCONNECT (N-1)
- ROOFTOP DISCONNECT (N-1)

OWNER: PETER D. CONGEDO, CHERIE B. CONGEDO, 6281 TROTTER RD, CLARKSVILLE, MD 21029, (410) 480-0023

DEVELOPER: TRINITY QUALITY HOMES, INC., 3575 PARK AVE SUITE 301, ELLICOTT CITY, MD 21043, (410) 480-0023

ENVIRONMENTAL CONCEPT PLAN

DRAINAGE AREA MAP

THE PRESERVE AT RIVER HILL

LOTS 1-8 AND OPEN SPACE LOTS 9-11

PARCEL 64 (L. 2326 / F. 517)
6281 TROTTER ROAD
CLARKSVILLE, MD 21029

TAX MAP: 35 GRID: 14
5TH ELECTION DISTRICT

PARCELS: 64
ZONED: R-ED
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET, ELLICOTT CITY, MD 21043
TEL: 410-461-7666
FAX: 410-461-1896

PROFESSIONAL CERTIFICATE

DESIGN BY: RHV
DRAWN BY: JMR
CHECKED BY: RHV
DATE: SEPTEMBER 2014
SCALE: AS SHOWN
W.O. NO.: 13-38

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, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2014.

3 SHEET OF 3