

SHEET INDEX	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	EXISTING CONDITIONS & DEMOLITION PLAN
3	ENVIRONMENTAL CONCEPT PLAN
4	PRELIMINARY EROSION/SEDIMENT CONTROL PLAN AND STORMWATER MANAGEMENT NOTES AND DETAILS

SOILS LEGEND				
SOIL	NAME	CLASS	"K" VALUE	
UCb	Urban land-Chillum-Beltville complex, 0 to 3 percent slopes	D	0.21	

HOWARD COUNTY WEBSOILS SURVEY 05/06/19

STORMWATER MANAGEMENT PRACTICES BY LOT		
AREA ID.	MICRO-BIO (M-6) NUMBER	REMARKS
LOT 1	1	HOUSE AND PORTION OF UIC DRIVEWAY DRAINS TO BIO ON LOT
LOT 2	2	HOUSE AND PORTION OF UIC DRIVEWAY DRAINS TO BIO ON LOT
LOT 3	3	HOUSE AND PORTION OF UIC DRIVEWAY DRAINS TO BIO ON LOT

STORMWATER MANAGEMENT PRACTICES						
AREA ID	LOCATION	DRAINAGE AREA SF.	% IMPERVIOUS	ESDV REQUIRED Cuft.	ESDV PROVIDED Cuft.	MICRO-BIO RETENTION (Y/N)
1	LOT 1	10,083	46.0%	352.70	356	Y
2	LOT 2	14,996	27.0%	329.48	356	Y
3	LOT 3	21,738	39.8%	756.11	1,212	Y

GROSS AREA = 1.99 ACRES  
 LOD = 1.79 ACRES  
 RCN = 77.0  
 TARGET Pe = 1.2'

# ENVIRONMENTAL CONCEPT PLAN GROVE ANGLE PROPERTY

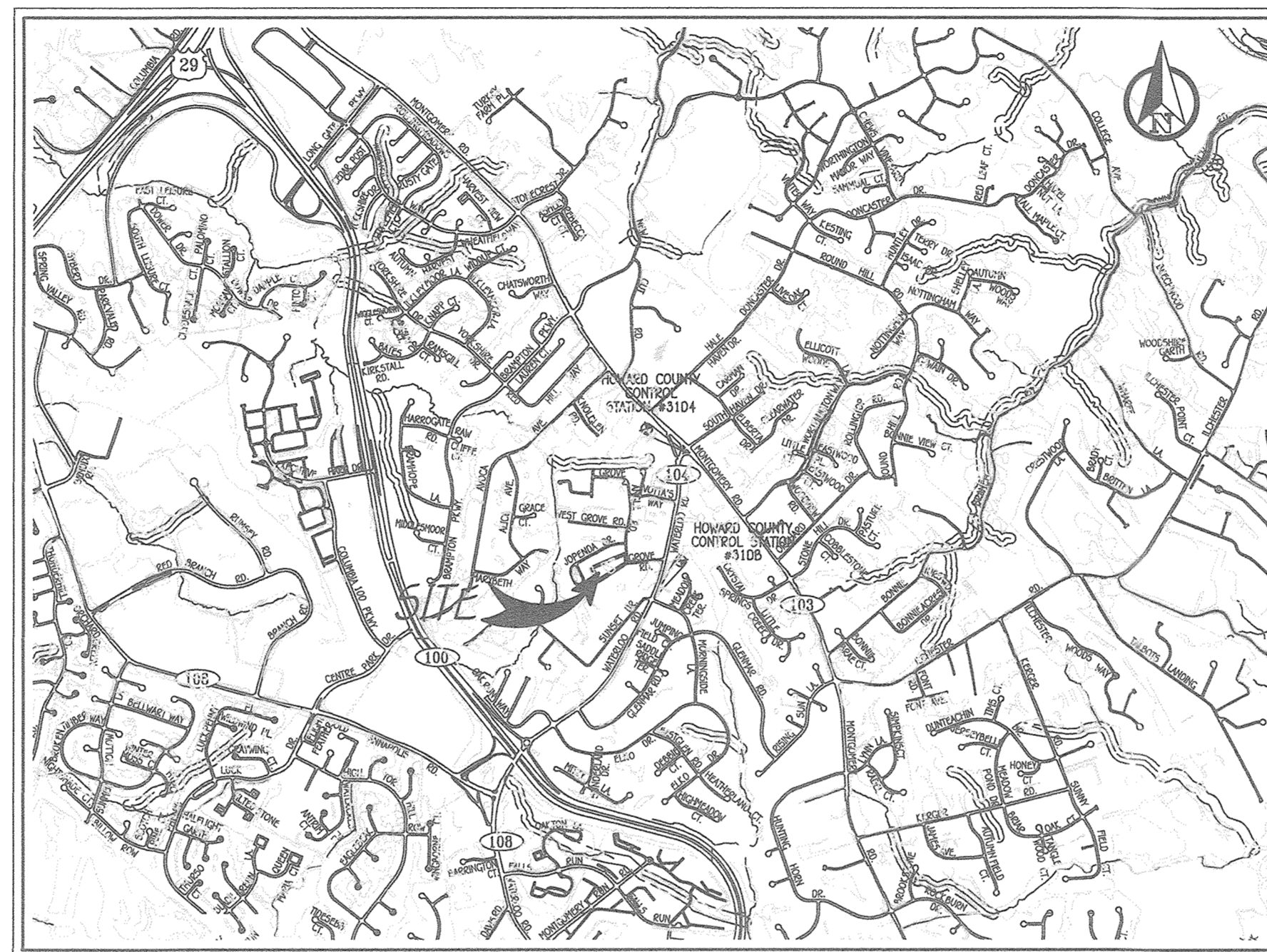
## LOTS 1 THRU 3 R-20 (RESIDENTIAL: SINGLE) DISTRICT TAX MAP No. 31 GRID No. 13 PARCEL NO. 35 SECOND ELECTION DISTRICT HOWARD COUNTY, MARYLAND

### GENERAL NOTES

- THE SUBJECT PROPERTY IS ZONED R-20 (PER 10/06/13 COMPREHENSIVE ZONING PLAN.)
- BOUNDARY IS BASED ON A FIELD RUN SURVEY PERFORMED BY FISHER, COLLINS & CARTER IN OR ABOUT MARCH, 2019.
- CONTOURS ARE BASED ON A TOPOGRAPHIC FIELD RUN SURVEY PERFORMED BY FISHER, COLLINS & CARTER, ON OR ABOUT JANUARY, 2019.
- COORDINATES BASED ON NAD83 MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 31D4 AND NO. 31D8:  
 HOWARD COUNTY MONUMENT NO. 31D4 N 571,700.664 E 1,369,606.417 ELEV. 494.445'  
 HOWARD COUNTY MONUMENT NO. 31D8 N 569,583.589 E 1,359,155.211 ELEV. 429.348'
- STORM WATER MANAGEMENT IS IN ACCORDANCE WITH THE M.D.E. STORM WATER DESIGN MANUAL, VOLUMES I & II, REVISED 2009. THIS PLAN PROPOSES THE USE OF THREE (3) M-6 MICRO-BIORETENTION FACILITIES.
- THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT. PUBLIC WATER AND SEWER WILL BE UTILIZED FOR THIS PROJECT.
- ANY DAMAGE TO THE COUNTY'S RIGHT-OF-WAY SHALL BE CORRECTED AT THE DEVELOPER'S EXPENSE.
- 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 EASEMENT AREAS AND 100 YEAR FLOODPLAIN.
- THERE ARE NO WETLANDS, STREAMS OR THEIR BUFFERS LOCATED WITHIN THE BOUNDARY OF THIS SITE.
- LANDSCAPING WILL BE PROVIDED AT THE FINAL PLAN STAGE OF THIS PROJECT.
- FOREST CONSERVATION REQUIREMENTS FOR THIS PROPOSED SUBDIVISION WILL BE PROVIDED AT THE FINAL PLAN STAGE OF THIS PROJECT IN ACCORDANCE WITH SECTION 16.1200 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION ACT. IT IS ANTICIPATED THAT A FEE-IN-LIEU OF AFFORESTATION WILL BE REQUESTED.
- SOIL BORING INFORMATION WILL BE PROVIDED AT THE NEXT PLAN STAGE OF THIS PROJECT.
- APPROVAL OF THIS ECP DOES NOT CONSTITUTE APPROVAL OF SUBSEQUENT OR ASSOCIATED SUBDIVISION OR SITE DEVELOPMENT PLANS OR RED-LINE REVISIONS. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN, SITE DEVELOPMENT PLAN, OR RED-LINE REVISION PROCESSES. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THE PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.

### SITE ANALYSIS DATA CHART

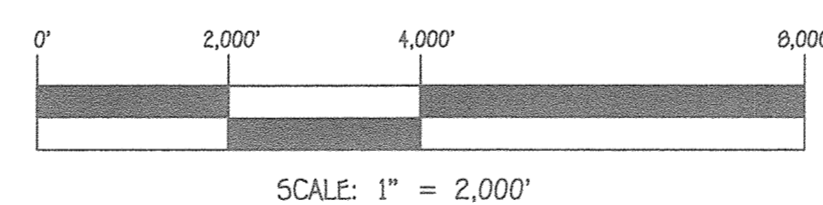
- TOTAL AREA OF THIS SUBMISSION = 1.99 AC.
- LIMIT OF DISTURBED AREA = 1.79 AC.
- (SWM BASED ON LOD)
- PRESENT ZONING DESIGNATION = R-20 (PER 10/06/2013 COMPREHENSIVE ZONING PLAN)
- PROPOSED USE: RESIDENTIAL SINGLE FAMILY DETACHED
- PREVIOUS HOWARD COUNTY FILES: N/A
- TOTAL AREA OF FLOODPLAIN LOCATED ON-SITE = 0 AC
- TOTAL AREA OF SLOPES IN EXCESS OF 25% = 0 AC
- TOTAL AREA OF WETLANDS (INCLUDING BUFFER) = 0 AC
- TOTAL AREA OF STREAM (INCLUDING BUFFER) = 0 AC
- TOTAL AREA OF EXISTING FOREST = 0 AC
- TOTAL AREA OF FOREST TO BE RETAINED = 0 AC
- TOTAL AREA OF LOTS / BUILDABLE PARCELS = 1.99 AC
- TOTAL GREEN OPEN AREA (PREVIOUS) = 1.92 AC
- N. TOTAL IMPERVIOUS AREA (WITHIN LOD, EXCLUDES EXISTING IMPERVIOUS) = 0.47 AC
- O. TOTAL AREA OF ERODIBLE SOILS = 0 AC



HOWARD COUNTY GEODETIC SURVEY CONTROL NO. 31D4  
 N 571,700.664 E 1,369,606.417 ELEVATION: 494.445'  
 HOWARD COUNTY GEODETIC SURVEY CONTROL NO. 31D8  
 N 569,583.589 E 1,359,155.211 ELEVATION: 429.348'  
 REFER TO HOWARD CO. ADC MAP 28-A6

### VICINITY MAP

SCALE: 1" = 2,000'



### STORMWATER MANAGEMENT DESIGN NARRATIVE

**INTRODUCTION:**  
 THIS REPORT WILL DEMONSTRATE HOW THE CRITERIA SET FORTH IN THE MARYLAND STORMWATER DESIGN MANUAL, VOLUMES I AND II (EFFECTIVE OCTOBER 2000, REVISED MAY 2009) WILL BE SATISFIED FOR THIS PROJECT. THE GOAL OF CREATING HYDROLOGY SIMILAR TO THAT OF "WOODS IN GOOD CONDITION" WILL BE ACCOMPLISHED THROUGH THE USE OF DRY WELLS, MICRO BIO-RETENTION, BIO-RETENTION, NON-ROOFTOP RUNOFF, AND GRASS SWALES AS SUGGESTED WITHIN CHAPTER 5 OF PREVIOUSLY MENTIONED MANUAL. THE ACHIEVEMENT OF THIS GOAL WILL REMOVE THE REQUIREMENT OF PROVIDING CHANNEL PROTECTION VOLUME.

#### GENERAL SITE CONDITIONS:

THE GROVE ANGLE PROPERTY IS ZONED R-20 AND LOCATED ON TAX MAP 31, PARCEL NO. 35 OF THE HOWARD COUNTY, MARYLAND TAX MAP DATABASE SYSTEM. IT IS LOCATED IN THE ELICOTT CITY AREA OF HOWARD COUNTY. THIS PROPERTY CONSISTS OF 1.99 ACRES AND IS RELATIVELY RECTANGULAR IN SHAPE. THE GROVE ANGLE PROPERTY PROJECT IS BORDERED BY RESIDENTIAL LOTS TO THE NORTH, WEST (P806-037) AND SOUTH. GROVE ANGLE ROAD BORDERS THIS PROPERTY TO THE EAST. THIS PROJECT PROPOSES THREE (3) LOTS INCLUDING TWO (2) PIPE STEM LOTS USING ONE SHARED DRIVEWAY FOR ALL THREE (3) LOTS. THE EXISTING BUILDINGS AND DRIVEWAY ON THIS PROPERTY WILL BE REMOVED. THE PROPERTY IS LOCATED WITHIN THE LITTLE PATUXENT RIVER WATERSHED (02131105), THE SITE CURRENTLY DRAINS TO THE NORTH. THE RUNOFF FROM THE ROOFS AND DRIVEWAYS OF THE PROPOSED HOUSES WILL BE TREATED BY THREE MICRO BIORETENTION (M-6) FACILITIES. THE WEB SOIL SURVEY SHOWS SOILS ON THE SITE CONSIST OF URBAN LAND-CHILLUM-BELTVILLE COMPLEX (UCB), TYPE "D" SOILS.

#### I. NATURAL RESOURCE PROTECTION:

NO WETLANDS, STREAMS, THEIR BUFFERS, STEEP SLOPES, FLOODPLAIN, OR FOREST EXIST ON-SITE. NO SPECIAL PROTECTION IS REQUIRED.

#### II. MAINTENANCE OF NATURAL FLOW PATTERNS:

ENVIRONMENTALLY SENSITIVE AREAS DO NOT EXIST ON-SITE.

#### III. REDUCTION OF IMPERVIOUS AREAS THROUGH BETTER SITE DESIGN, ALTERNATIVE SURFACES AND NONSTRUCTURAL PRACTICES:

ONLY THE MINIMUM IMPERVIOUS AREAS HAVE BEEN PROPOSED TO ALLOW ADEQUATE ACCESS TO THE PROPOSED LOTS. THIS DESIGN PROVIDES ONLY A SINGLE SHARED DRIVEWAY FOR ACCESS TO EACH OF THE THREE LOTS.

#### IV. INTEGRATION OF EROSION AND SEDIMENT CONTROLS INTO STORMWATER STRATEGY:

THIS PROJECT UTILIZES BIO-RETENTION FACILITIES IN LOCATIONS THAT COULD WORK IN CONCERT WITH SEDIMENT TRAPPING IF REQUIRED.

#### V. IMPLEMENTATION OF ESD PLANNING TECHNIQUES AND PRACTICES TO THE MAXIMUM EXTENT PRACTICABLE (MEP):

THIS SUBMISSION WILL PROPOSE SEVERAL CHAPTER 5 DEVICES TO MEET AND EXCEED ENVIRONMENTAL SITE DESIGN TO THE MAXIMUM EXTENT PRACTICABLE (ESD TO THE MEP). ALL IMPERVIOUS AREAS WILL RECEIVE FULL TREATMENT.

#### VI. REQUEST FOR DESIGN MANUAL WAIVER:

NO WAIVERS ARE EXPECTED TO BE REQUESTED ON THIS PROJECT RELATING TO SWM REQUIREMENTS.

### STORMWATER MANAGEMENT NOTES

- STORMWATER MANAGEMENT IS PROVIDED IN ACCORDANCE WITH CHAPTER 5, "ENVIRONMENTAL SITE DESIGN" OF THE 2007 MARYLAND STORMWATER MANAGEMENT DESIGN MANUAL, EFFECTIVE MAY 4, 2010.
- MAXIMUM CONTRIBUTING ROOF TOP AREA TO EACH DOWNSPOUT SHALL BE 500 SQ. FT. OR LESS.
- FINAL GRADING SHALL BE PROVIDED WITH THE SITE DEVELOPMENT PLAN.

APPROVED: DEPARTMENT OF PLANNING AND ZONING

*Chad Edmund*  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION 16P 11/7/19 DATE  
*Steve J. Morris for LKS*  
 CHIEF, DIVISION OF LAND DEVELOPMENT 16 11/11/19 DATE

**FISHER, COLLINS & CARTER, INC.**  
 CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS  
 CENTENNIAL SQUARE OFFICE PARK - 10272 BALTIMORE NATIONAL PK. ELLICOTT CITY, MARYLAND 21042 (410) 461-2855



### PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21476, EXPIRATION DATE: 7/14/21.

*Frank Mavalansan, II*  
 FRANK MAVALANSAN, II

10/30/19 DATE

### OWNER/DEVELOPER

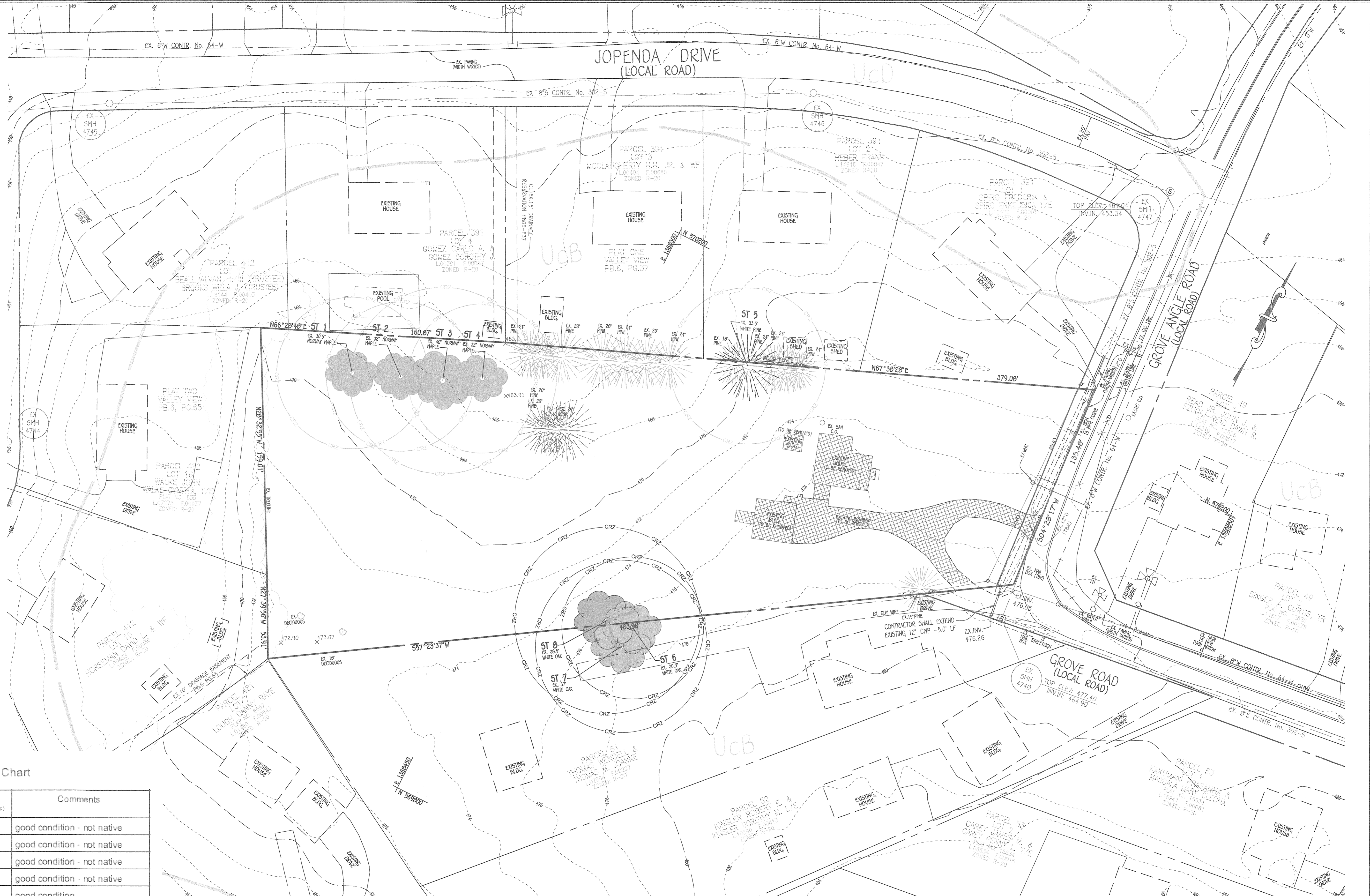
WILLIAM MITCHELL  
 8611 HAYSHED LANE  
 COLUMBIA, MARYLAND 21045  
 410-641-1506

### TITLE SHEET GROVE ANGLE PROPERTY

LOTS 1 THRU 3  
 8325 GROVE ANGLE ROAD  
 TAX MAP NO.: 31 GRID NO.: 13 PARCEL NO.: 35  
 ZONED R-20  
 SECOND ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
 SCALE: AS SHOWN DATE: OCTOBER, 2019  
 SHEET 1 OF 4 ECP-19-059



LEGEND	
SYMBOL	DESCRIPTION
	EXISTING CONTOUR 2' INTERVAL
	EXISTING CONTOUR 10' INTERVAL
	EXISTING FENCE
	EXISTING STORM DRAIN
	EXISTING WELL
	EXISTING WATER LINE
	EXISTING SEWER LINE
	EXISTING FENCE LINE
	EXISTING OVERHEAD WIRE
	BUILDING AND DRIVES TO BE REMOVED
	EXISTING PAVING
	EXISTING TREE LINE
	SOIL LINES AND TYPES
	DENOTES EXISTING TREES TO BE REMOVED
	DENOTES EXISTING TREES TO REMAIN
	SPECIMEN TREE
	CRITICAL ROOT ZONE



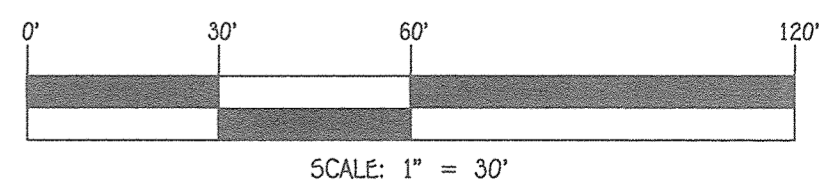
Specimen Tree Chart

Key (X#)	Species	Size (in dbh)	CRZ (feet radius)	Comments
1	Norway maple	30.5	45.75	good condition - not native
2	Norway maple	32	48	good condition - not native
3	Norway maple	40	60	good condition - not native
4	Norway maple	32	48	good condition - not native
5	White pine	33.5	50.25	good condition
6	White oak	30.5	45.75	fair condition, limb dieback
7	White oak	37	55.5	fair condition, limb dieback
8	White oak	38.5	57.75	fair condition, limb dieback

SOILS LEGEND			
SOIL	NAME	CLASS	K'VALUE
UcB	Urban land-Chillum-Beltsville complex, 0 to 5 percent slopes	D	0.37

HOWARD COUNTY WEBSOILS SURVEY 05/06/19

PLAN VIEW  
SCALE: 1" = 30'



APPROVED: DEPARTMENT OF PLANNING AND ZONING  
  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 11/7/19

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 ELICOTT CITY, MARYLAND 21042  
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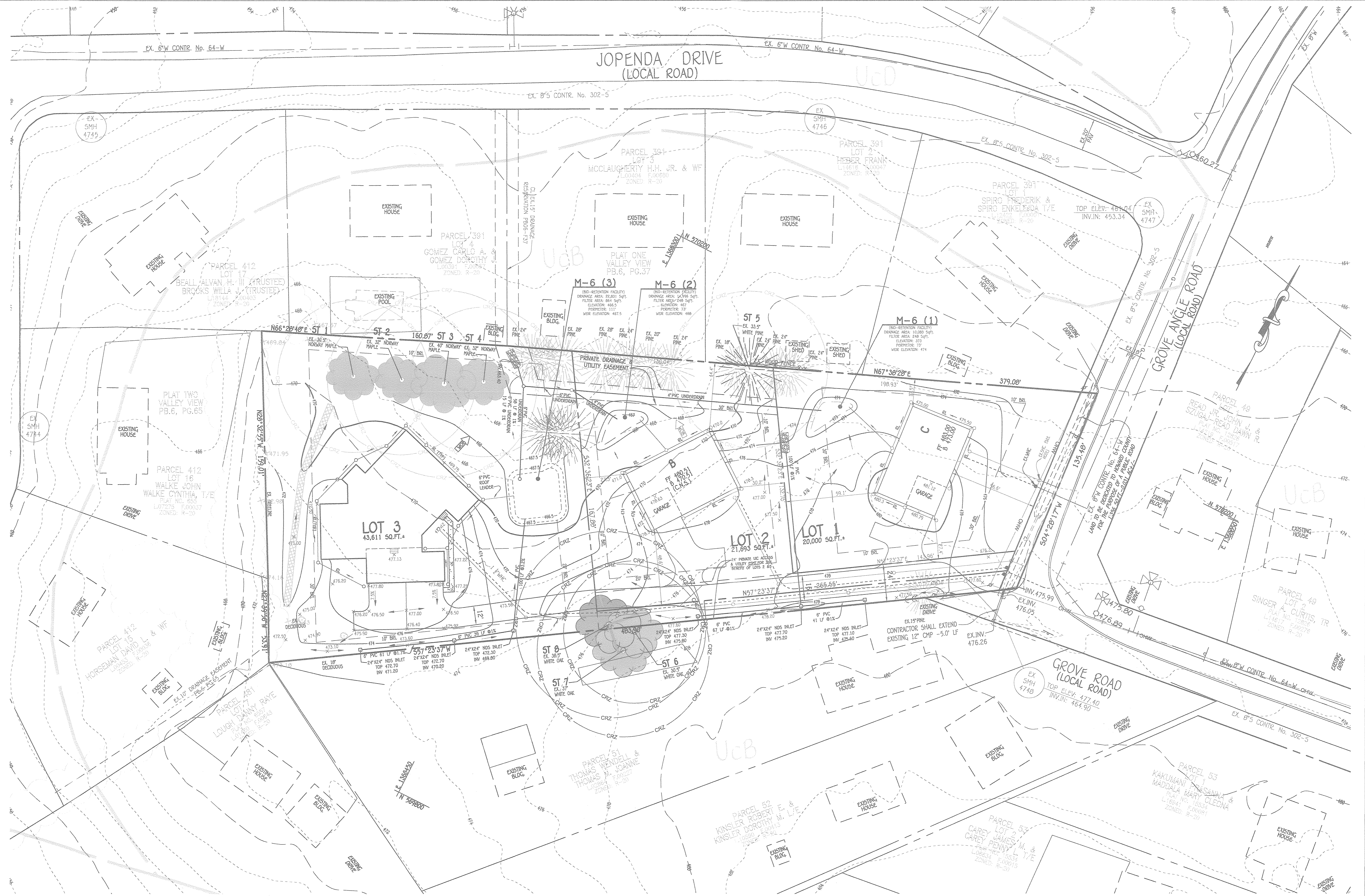
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 FRANK MANALANSAN, II  
 DATE: 10/30/19

**OWNER/DEVELOPER**  
 WILLIAM MITCHELL  
 8611 HAYSHED LANE  
 COLUMBIA MARYLAND 21045  
 410-641-1506

**EXISTING CONDITIONS & DEMOLITION PLAN**  
**GROVE ANGLE PROPERTY**  
 LOTS 1 THRU 3  
 8325 GROVE ANGLE ROAD  
 TAX MAP NO.: 31 GRID NO.: 13 PARCEL NO.: 35  
 ZONED R-20  
 SECOND ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
 SCALE: AS SHOWN DATE: OCTOBER, 2019  
 SHEET 2 OF 4 ECP-19-059



LEGEND	
SYMBOL	DESCRIPTION
	EXISTING CONTOUR 2' INTERVAL
	EXISTING CONTOUR 10' INTERVAL
	PROPOSED CONTOUR 10' INTERVAL
	PROPOSED CONTOUR 2' INTERVAL
	EXISTING FENCE
	X 448.5 SPOT ELEVATION
	18" 50' EXISTING STORM DRAIN
	EXISTING WATER LINE
	EXISTING SEWER LINE
	EXISTING OVERHEAD WIRE
	EXISTING FENCE LINE
	PROPOSED PAVING
	PRIVATE UIC EASEMENT
	PRIVATE DRAINAGE & UTILITY EASEMENT
	LIMIT OF DISTURBANCE
	SSF/TP SUPER SILT FENCE/TREE PROTECTION FENCE
	DF/TP DIVERSION FENCE/TREE PROTECTION FENCE
	EXISTING TREE LINE
	PROPOSED TREE LINE
	DRAINAGE DIVIDE
	PERMANENT SOIL STABILIZATION CONTROL MATTING
	SOIL LINES AND TYPES
	BIO RETENTION FACILITY (F-6) OR (M-6) AS NOTED
	PROPOSED ROOF LEADER
	DENOTES EXISTING TREES TO BE REMOVED
	DENOTES EXISTING TREES TO REMAIN
	ST 3 SPECIMEN TREE
	CRITICAL ROOT ZONE

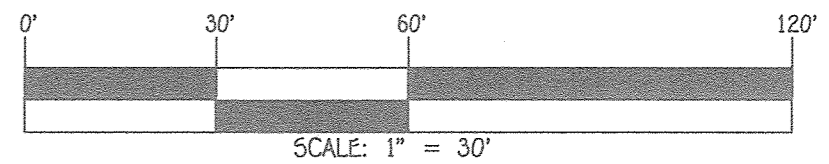


LOT No.	GROSS AREA	PIPESTEM AREA	MINIMUM LOT SIZE
2	21,693 Sq.ft.	1,609 Sq.ft.	20,004 Sq.ft.
3	43,611 Sq.ft.	3,148 Sq.ft.	40,463 Sq.ft.

SOIL	NAME	CLASS	K'VALUE
UcB	Urban land-Chillum-Beltville complex, 0 to 5 percent slopes	0	0.37

HOWARD COUNTY WEBSOILS SURVEY 05/06/19

PLAN VIEW  
SCALE: 1" = 30'



APPROVED: DEPARTMENT OF PLANNING AND ZONING  
*David Clark*  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 11-7-19  
*David Clark*  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 11/1/19

**FISHER, COLLINS & CARTER, INC.**  
 CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS  
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 SUITE 100, GAITHERSBURG, MARYLAND 20878  
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*Frank Mavalansan, II*  
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**OWNER/DEVELOPER**  
 WILLIAM MITCHELL  
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**ENVIRONMENTAL CONCEPT PLAN**  
**GROVE ANGLE PROPERTY**  
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 SHEET 3 OF 4 ECP-19-059



**INFILTRATION AND FILTER SYSTEM CONSTRUCTION SPECIFICATIONS**

INFILTRATION AND FILTER SYSTEMS EITHER TAKE ADVANTAGE OF EXISTING PERMEABLE SOILS OR CREATE A PERMEABLE MEDIUM SUCH AS SAND FOR WC), AND RE V. IN SOME INSTANCES WHERE PERMEABILITY IS GREAT, THESE FACILITIES MAY BE USED FOR QP AS WELL. THE MOST COMMON SYSTEMS INCLUDE INFILTRATION TRENCHES, INFILTRATION BASINS, SAND FILTERS, AND ORGANIC FILTERS.

WHEN PROPERLY PLANTED, VEGETATION WILL THRIVE AND ENHANCE THE FUNCTIONING OF THESE SYSTEMS. FOR EXAMPLE, PRE-TREATMENT BUFFERS WILL TRAP SEDIMENTS THAT OFTEN ARE BOUND WITH PHOSPHORUS AND METALS. VEGETATION PLANTED IN THE FACILITY WILL AID IN NUTRIENT UPTAKE AND WATER STORAGE. ADDITIONALLY, PLANT ROOTS WILL PROVIDE ARTERIES FOR STORMWATER TO PERMEATE SOIL FOR GROUNDWATER RECHARGE. FINALLY, SUCCESSFUL PLANTINGS PROVIDE AESTHETIC VALUE AND WILDLIFE HABITAT MAKING THESE FACILITIES MORE DESIRABLE TO THE PUBLIC.

**DESIGN CONSTRAINTS:**

- > PLANTING BUFFER STRIPS OF AT LEAST 20 FEET WILL CAUSE SEDIMENTS TO SETTLE OUT BEFORE REACHING THE FACILITY, THEREBY REDUCING THE POSSIBILITY OF CLOGGING.
- > DETERMINE AREAS THAT WILL BE SATURATED WITH WATER AND WATER TABLE DEPTH SO THAT APPROPRIATE PLANTS MAY BE SELECTED (HYDROLOGY WILL BE SIMILAR TO BIORETENTION FACILITIES, SEE FIGURE A.5 AND TABLE A.4 FOR PLANTING MATERIAL GUIDANCE).
- > PLANTS KNOWN TO SEND DOWN DEEP TAPROOTS SHOULD BE AVOIDED IN SYSTEMS WHERE FILTER FABRIC IS USED AS PART OF FACILITY DESIGN.
- > TEST SOIL CONDITIONS TO DETERMINE IF SOIL AMENDMENTS ARE NECESSARY.
- > PLANTS SHALL BE LOCATED SO THAT ACCESS IS POSSIBLE FOR STRUCTURE MAINTENANCE.
- > STABILIZE HEAVY FLOW AREAS WITH EROSION CONTROL MATS OR SOO.
- > TEMPORARILY INVERT FLOWS FROM SEDED AREAS UNTIL VEGETATION IS ESTABLISHED.
- > SEE TABLE A.5 FOR ADDITIONAL DESIGN CONSIDERATIONS.

**BIO-RETENTION**

**SOIL BED CHARACTERISTICS**  
THE CHARACTERISTICS OF THE SOIL FOR THE BIORETENTION FACILITY ARE PERHAPS AS IMPORTANT AS THE FACILITY LOCATION, SIZE, AND TREATMENT VOLUME. THE SOIL MUST BE PERMEABLE ENOUGH TO ALLOW RUNOFF TO FILTER THROUGH THE MEDIA, WHILE HAVING CHARACTERISTICS SUITABLE TO PROMOTE AND SUSTAIN A ROBUST VEGETATIVE COVER COOP. IN ADDITION, MUCH OF THIS NUTRIENT POLLUTANT UPTAKE (NITROGEN AND PHOSPHORUS) IS ACCOMPLISHED THROUGH ADSORPTION AND MICROBIAL ACTIVITY WITHIN THE SOIL PROFILE. THEREFORE, SOILS MUST BALANCE THEIR CHEMICAL AND PHYSICAL PROPERTIES TO SUPPORT BIOTIC COMMUNITIES ABOVE AND BELOW GROUND.

THE PLANTING SOIL SHOULD BE A SANDY LOAM, LOAMY SAND, LOAM (USDA), OR A LOAM/SAND MIX (SHOULD CONTAIN A MINIMUM 35 TO 60% SAND, BY VOLUME). THE CLAY CONTENT FOR THESE SOILS SHOULD BE LESS THAN 25% BY VOLUME (ENVIRONMENTAL QUALITY RESOURCES (EQ), 1996; ENGINEERING TECHNOLOGY INC. AND BIOHABITATS, INC. (ETAB), 1993). SOILS SHOULD FALL WITHIN THE SM, ML, SC CLASSIFICATIONS OR THE UNIFIED SOIL CLASSIFICATION SYSTEM (USCS). A PERMEABILITY OF AT LEAST 1.0 FEET PER DAY (0.5"/HR) IS REQUIRED (A CONSERVATIVE VALUE OF 0.5 FEET PER DAY IS USED FOR DESIGN). THE SOIL SHOULD BE FREE OF STONES, STUMPS, ROOTS, OR OTHER WOODY MATERIAL OVER 1" IN DIAMETER. BRUSH OR SEEDS FROM NOXIOUS WEEDS (E.G., JOHNSON GRASS, MIGNONNET, MUTSUGO, AND CANADA THISTLE OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.) SHOULD NOT BE PRESENT IN THE SOILS. PLACEMENT OF THE PLANTING SOIL SHOULD BE IN 12 TO 18 LIFTS THAT ARE LOOSELY COMPACTED (TAMPED LIGHTLY WITH A BACKHOLE BUCKET OR TRAVERSED BY DOZER TRACKS). THE SPECIFIC CHARACTERISTICS ARE PRESENTED IN TABLE A.3.

**TABLE A.3 PLANTING SOIL CHARACTERISTICS**

PARAMETER	VALUE
PH RANGE	5.2 TO 7.00
ORGANIC MATTER	1.5 TO 4.0% (BY WEIGHT)
MAGNESIUM	35 LBS. PER ACRE, MINIMUM
PHOSPHORUS (PHOSPHATE - P2O5)	75 LBS. PER ACRE, MINIMUM
POTASSIUM (POTASH - K2O)	85 LBS. PER ACRE, MINIMUM
SOLUBLE SALTS	500 PPM
CLAY	10 TO 25 %
SILT	30 TO 55 %
SAND	35 TO 60%

**MULCH LAYER**  
THE MULCH LAYER PLAYS AN IMPORTANT ROLE IN THE PERFORMANCE OF THE BIORETENTION SYSTEM. THE MULCH LAYER HELPS MAINTAIN SOIL MOISTURE AND AVOIDS SURFACE SEALING, WHICH REDUCES PERMEABILITY. MULCH HELPS PREVENT EROSION, AND PROVIDES A MICROENVIRONMENT SUITABLE FOR SOIL BIOTA AT THE MULCH/SOIL INTERFACE. IT ALSO SERVES AS A PRETREATMENT LAYER, TRAPPING THE FINER SEDIMENTS, WHICH REMAIN SUSPENDED AFTER THE PRIMARY PRETREATMENT.

THE MULCH LAYER SHOULD BE STANDARD LANDSCAPE STYLE, SINGLE OR DOUBLE SHREDED HARDWOOD MULCH OR CHIPS. THE MULCH LAYER SHOULD BE WELL AGED (STOCKPILED OR STORED FOR AT LEAST 12 MONTHS), UNIFORM IN COLOR, AND FREE OF OTHER MATERIALS, SUCH AS WEED SEEDS, SOIL, ROOTS, ETC. THE MULCH SHOULD BE APPLIED TO A MAXIMUM DEPTH OF THREE INCHES. GRASS CLIPPINGS SHOULD NOT BE USED AS A MULCH MATERIAL.

**PLANTING GUIDANCE**  
PLANT MATERIAL SELECTION SHOULD BE BASED ON THE GOAL OF SIMULATING A TERRESTRIAL FORESTED COMMUNITY OF NATIVE SPECIES. BIORETENTION SIMULATES AN UPLAND-SPECIES ECOSYSTEM. THE COMMUNITY SHOULD BE DOMINATED BY TREES, BUT HAVE A DISTINCT COMMUNITY OF UNDERSTORY TREES, SHRUBS AND HERBACEOUS MATERIALS. BY CREATING A DIVERSE, DENSE PLANT COVER, A BIORETENTION FACILITY WILL BE ABLE TO TREAT STORMWATER RUNOFF AND WITHSTAND URBAN STRESSORS FROM INSECTS, DISEASE, DROUGHT, TEMPERATURE, WIND, AND EXPOSURE.

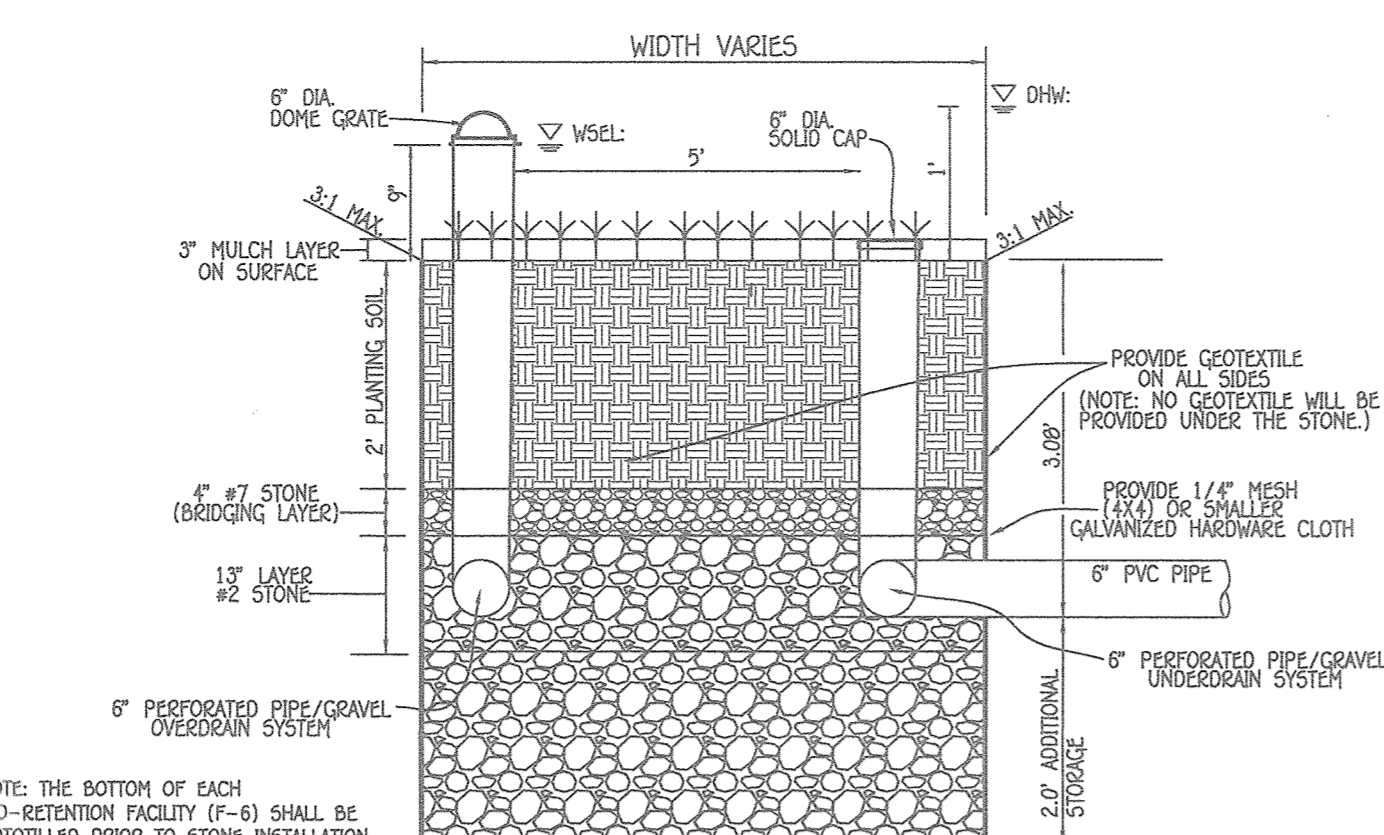
THE PROPER SELECTION AND INSTALLATION OF PLANT MATERIALS IS KEY TO A SUCCESSFUL SYSTEM. THERE ARE ESSENTIALLY THREE ZONES WITHIN A BIORETENTION FACILITY (FIGURE A.5). THE LOWEST ELEVATION SUPPORTS PLANT SPECIES ADAPTED TO STANDING AND FLUCTUATING WATER LEVELS. THE MIDDLE ELEVATION SUPPORTS PLANTS THAT LIKE DRIER SOIL CONDITIONS, BUT CAN STILL TOLERATE OCCASIONAL INUNDATION BY WATER. THE OUTER EDGE IS THE HIGHEST ELEVATION AND GENERALLY SUPPORTS PLANTS ADAPTED TO DRYER CONDITIONS. A LAYOUT OF APPROPRIATE PLANT MATERIALS FOR BIORETENTION FACILITIES ARE INCLUDED IN TABLE A.4. THE LAYOUT OF PLANT MATERIAL SHOULD BE FLEXIBLE, BUT SHOULD FOLLOW THE GENERAL PRINCIPALS DESCRIBED IN TABLE A.5. THE OBJECTIVE IS TO HAVE A SYSTEM, WHICH RESEMBLES A RANDOM, AND NATURAL PLANT LAYOUT, WHILE MAINTAINING OPTIMAL CONDITIONS FOR PLANT ESTABLISHMENT AND GROWTH. FOR A MORE EXTENSIVE BIORETENTION PLAN, CONSULT ETAB, 1993 OR CLAYTON AND SCHUELER, 1997.

**Table B.4. Materials Specifications for Micro-Bioretenion, Rain Gardens & Landscape Infiltration**

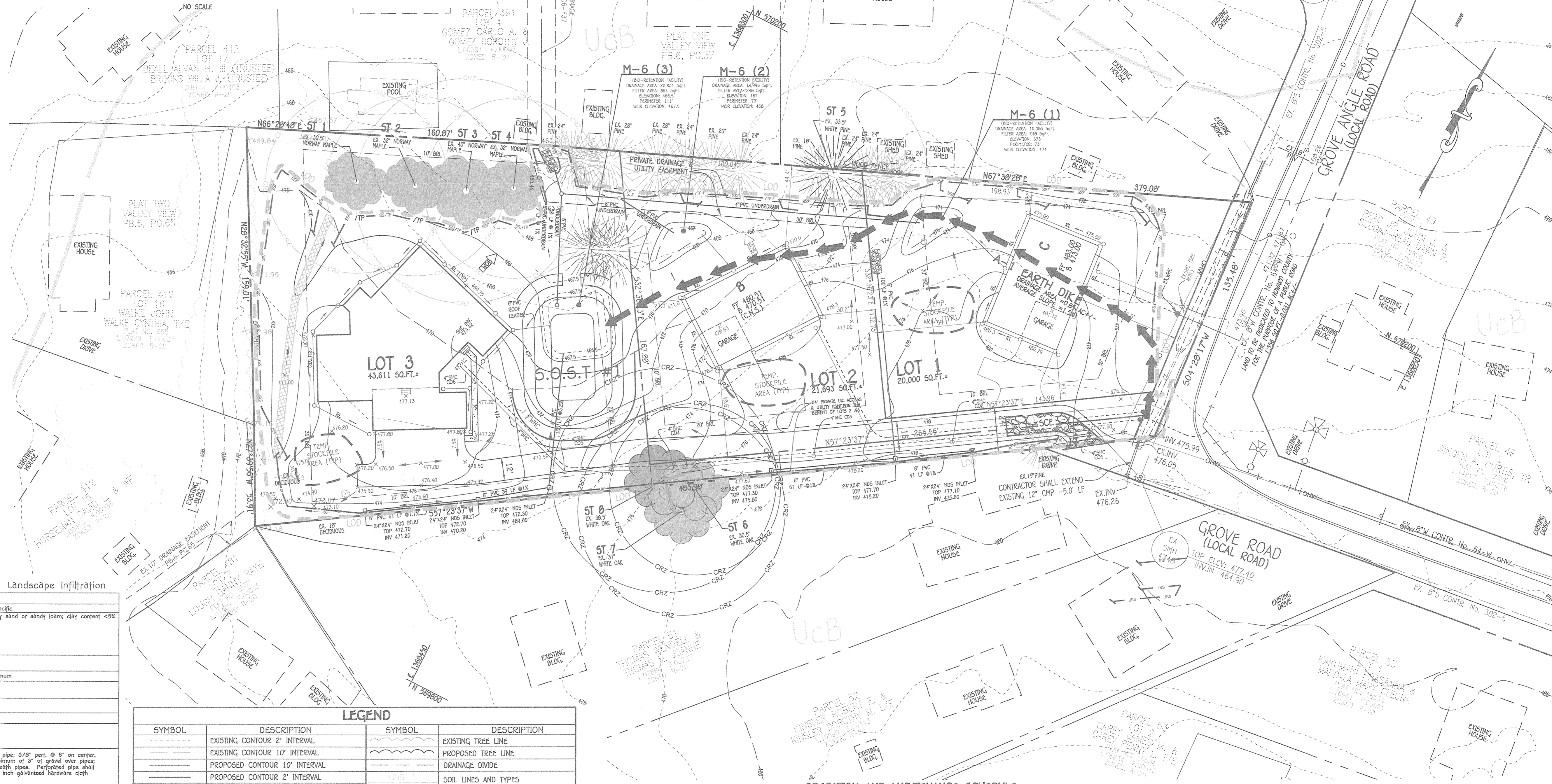
Material	Specification	Size	Notes
Plantings	see Appendix A; Table A.4	n/a	shrubs are site-specific
Planting soil (2' to 4' deep)	loamy sand 60-65% compost 35-40% or sandy loam 50% coarse sand 30% compost 40%		USDA soil types loamy sand or sandy loam; clay content <5%
Organic Content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum
Pea gravel diaphragm	pea gravel: ASTM-D-448	No. 8 or No. 9 (1/2" to 3/8")	
Curbin drain	ornamental stone; washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (Underdrains and infiltration basins)	ASHTO M-43	No. 57 or No. Aggregates (3/8" to 3/4")	
Underdrain piping	F 756, Type PS 2B or ASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	slotted or perforated pipe; 3/8" port, @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with 1/4 inch galvanized hardware cloth
Poured in place concrete (if required)	MOMA Mix No. 3, f = 3500 psi at 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 pre-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 MD Code 55.02.07; vertical loading 0-10 or 0-15-20; allowable horizontal loading (based on soil pressure); and analysis of potential cracking
Sand	ASHTO-M-6 or ASTM-C-33	0.075" to 0.04"	Sand substitutions such as Diabase and Gneiss (ASHTO) #10 are not acceptable. No calcium chlorinated or domestic sand substitutions are acceptable. No "rock dust" can be used for sand.

APPROVED: DEPARTMENT OF PLANNING AND ZONING  
 Chief, Engineering Division  
 DATE: 11/7/19  
 DATE: 11/1/19

**FISHER, COLLINS & CARTER, INC.**  
 CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS  
 CENTRAL SQUARE OFFICE PARK - 10272 BALTIMORE NATIONAL PIKE  
 ELICOTT CITY, MARYLAND 21042  
 (410) 461-2955



**TYPICAL SECTION MICRO BIO-RETENTION FACILITY (F-6) WITH ADDITIONAL STORAGE TO MANAGE 1YR STORM EVENT**



**LEGEND**

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
---	EXISTING CONTOUR 2' INTERVAL	---	EXISTING TREE LINE
---	EXISTING CONTOUR 10' INTERVAL	---	PROPOSED TREE LINE
---	PROPOSED CONTOUR 10' INTERVAL	---	DRAINAGE DIVIDE
---	PROPOSED CONTOUR 2' INTERVAL	---	SOIL LINES AND TYPES
---	EXISTING FENCE	---	PERMANENT SOIL STABILIZATION CONTROL MATTING
X 448.5	SPOT ELEVATION	---	BIO RETENTION FACILITY (F-6) OR (M-6) AS NOTED
IP 50	EXISTING STORM DRAIN	---	PROPOSED ROOF LEADER
---	EXISTING WATER LINE	---	DENOTES EXISTING TREES TO BE REMOVED
---	EXISTING FENCE LINE	---	DENOTES EXISTING TREES TO REMAIN
---	EXISTING SEWER LINE	---	ST 3
---	EXISTING OVERHEAD WIRE	---	SPECIMEN TREE
---	PROPOSED PAVING	---	CRITICAL ROOT ZONE
---	PRIVATE UIC EASEMENT	---	
---	PRIVATE DRAINAGE & UTILITY EASEMENT	---	
---	LIMIT OF DISTURBANCE	---	
---	SUPER SILT FENCE/TREE PROTECTION FENCE	---	
---	DIVERSION FENCE/TREE PROTECTION FENCE	---	
---	DENOTES MBR OVERLAND FLOWPATH	---	

PLAN VIEW  
SCALE: 1" = 30'



**OPERATION AND MAINTENANCE SCHEDULE FOR BIO-RETENTION AREAS (M-6) AND (F-6)**

- ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. 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 AND PRUNING.
- SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN SPRING AND FALL. THIS INSPECTION WILL INCLUDE REMOVAL OF DEAD AND DISAPPEARING VEGETATION CONSIDER BEYOND TREATMENT. TREATMENT OF ALL DISAPPEARING TREES AND SHRUBS AND REPLACEMENT OF ALL DEFICIENT STAKES AND WIRES.
- MULCH SHALL BE INSPECTED EACH SPRING. REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
- SOIL EROSION TO BE ADDRESSED ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

**PROFESSIONAL CERTIFICATION**

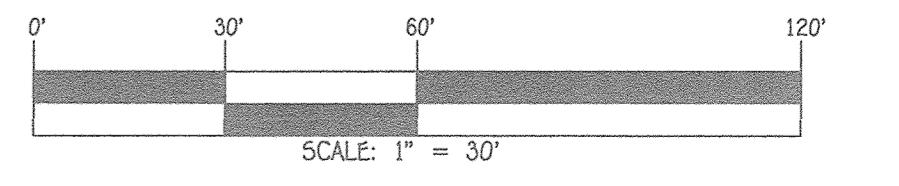
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21476, EXPIRATION DATE: 7/11/21.

Frank Manalansan, II  
DATE: 10/30/19

**OWNER/DEVELOPER**

WILLIAM MITCHELL  
8611 HAYSHED LANE  
COLUMBIA, MARYLAND 21045  
410-641-1506

PRELIMINARY EROSION/SEDIMENT CONTROL PLAN AND STORMWATER MANAGEMENT NOTES AND DETAILS  
**GROVE ANGLE PROPERTY**  
 LOTS 1 THRU 3  
 8325 GROVE ANGLE ROAD  
 TAX MAP NO.: 31 GRID NO.: 13 PARCEL NO.: 35  
 ZONED R-20  
 SECOND ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
 SCALE: AS SHOWN DATE: OCTOBER, 2019  
 SHEET 4 OF 4 ECP-19-059



**SOILS LEGEND**

SOIL	NAME	CLASS	Kc VALUE
UcB	Urban land-Chillum-Beltsville complex, 0 to 5 percent slopes	D	0.37

HOWARD COUNTY WEBSOILS SURVEY 05/06/19