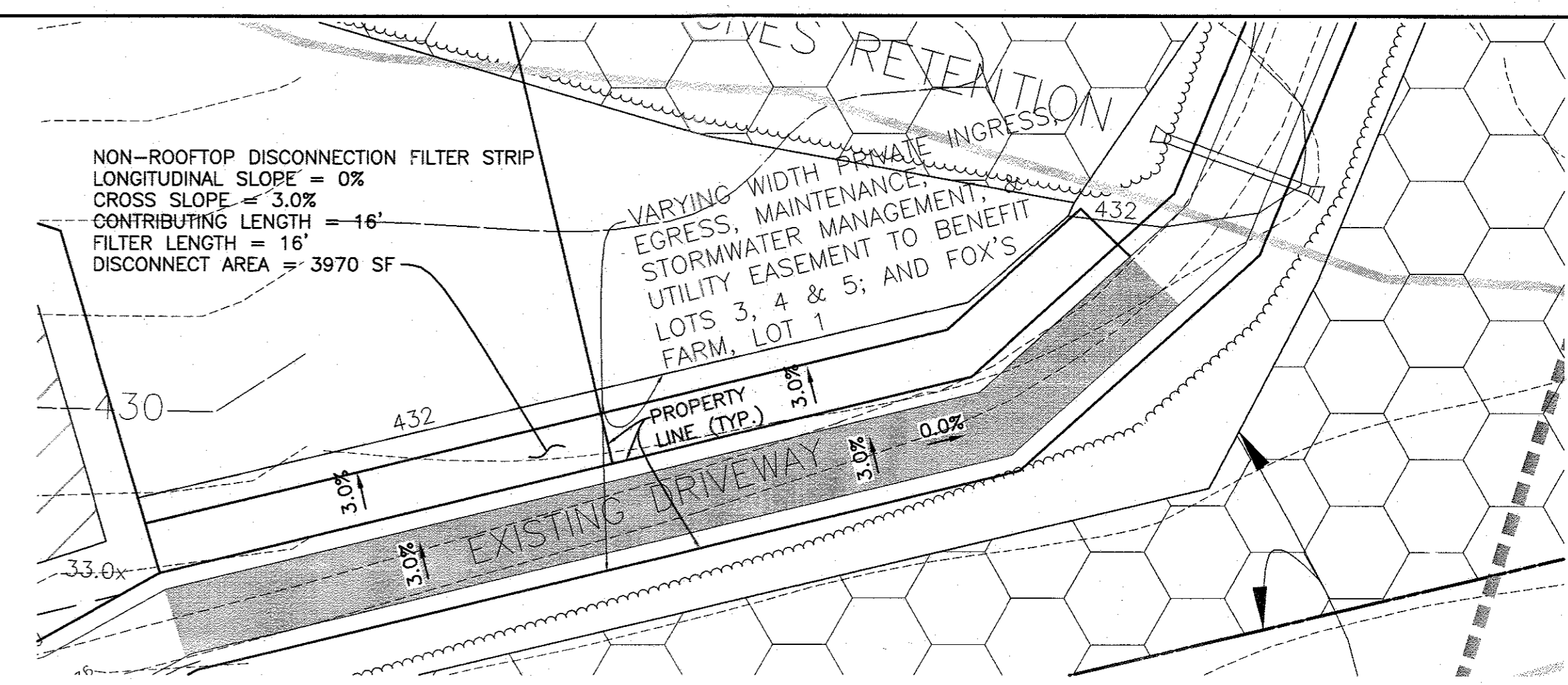
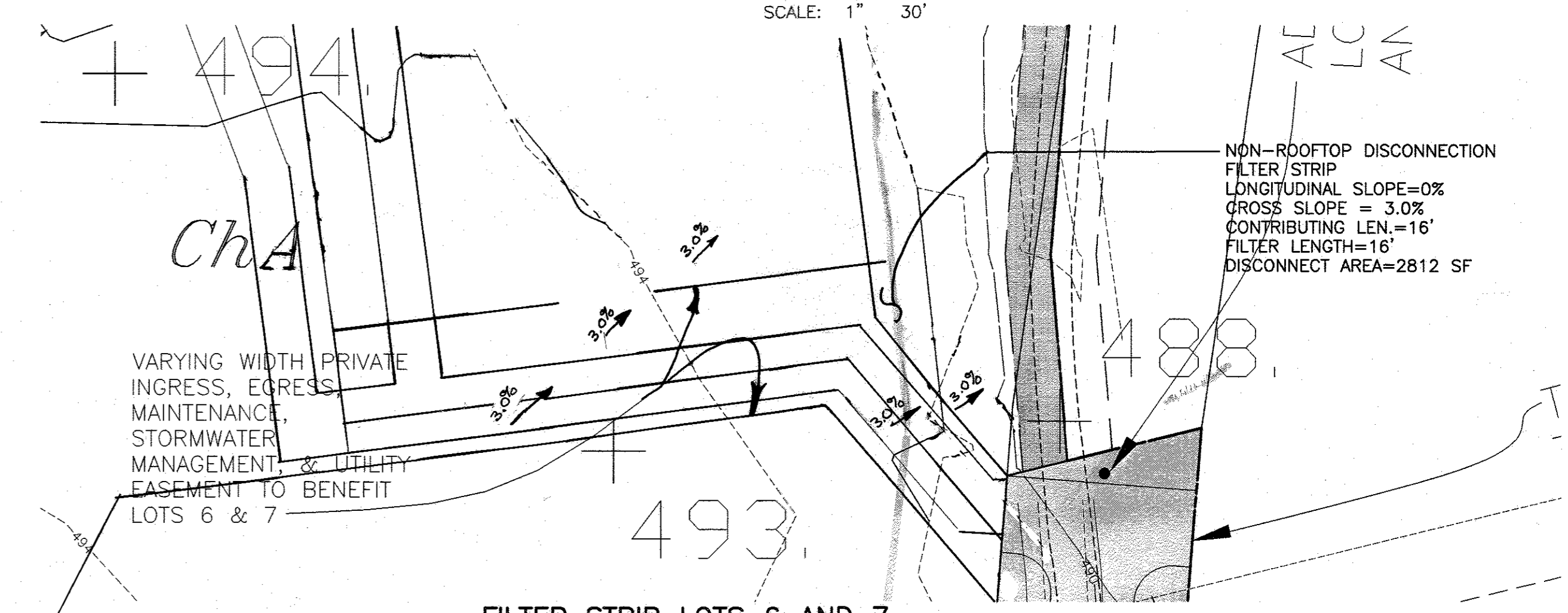


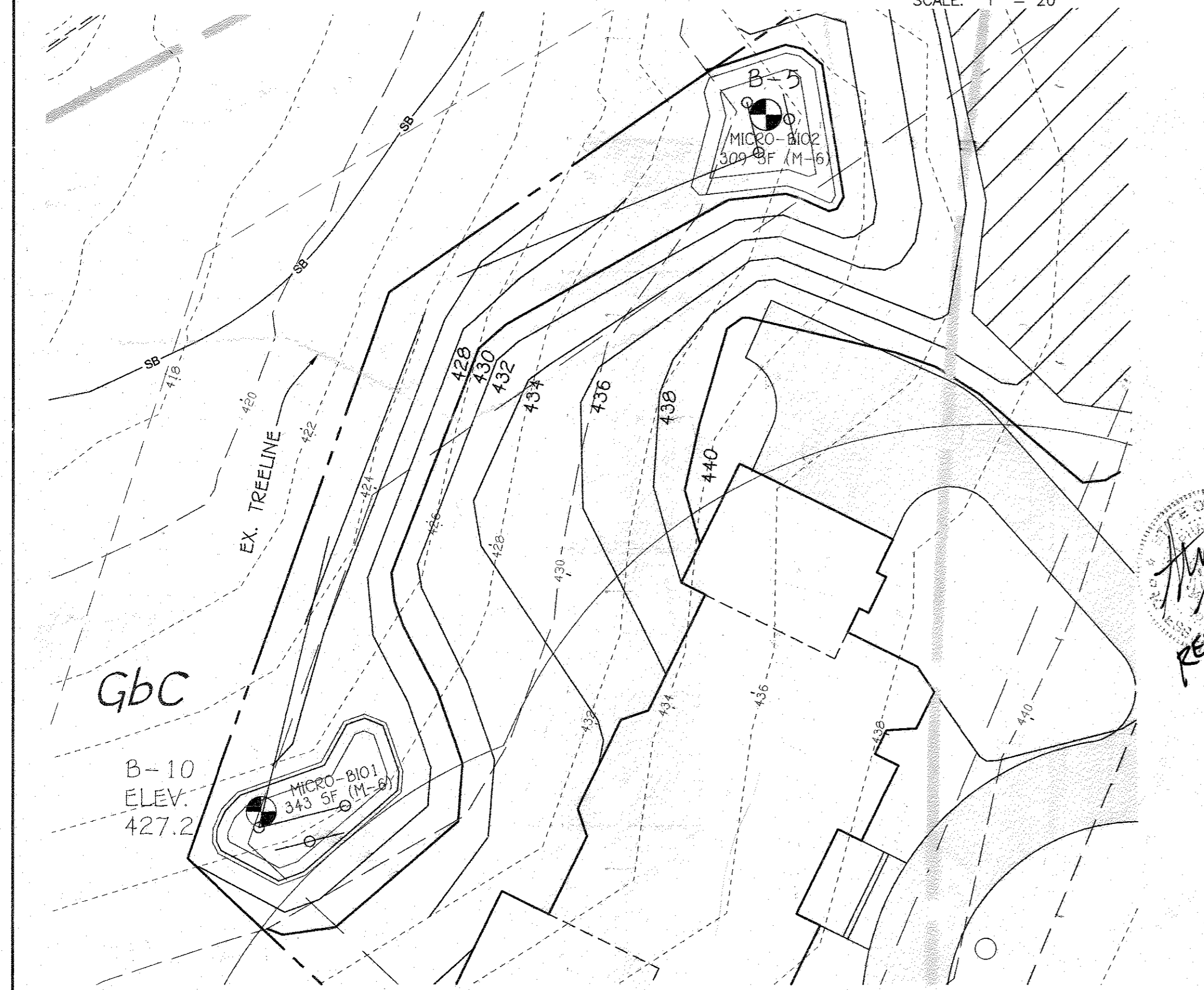
RAINGARDENS 6A, 6B, 7A AND 7B
SCALE: 1" = 20'



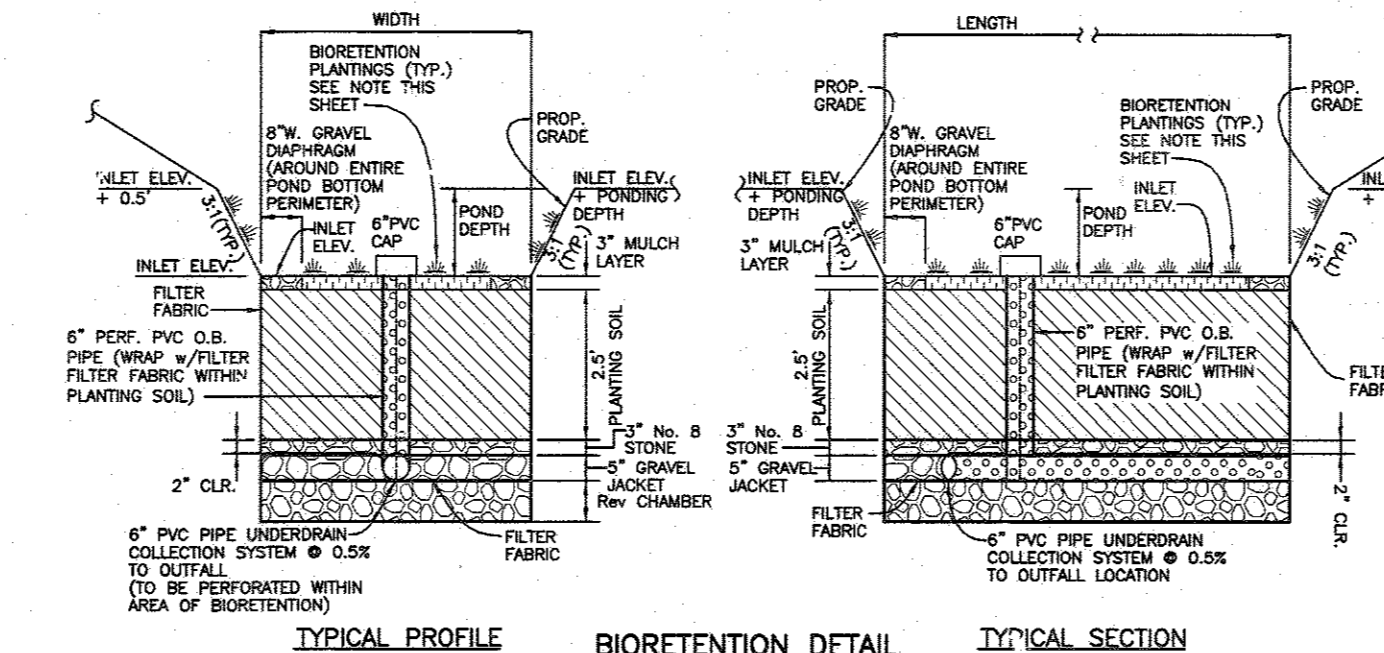
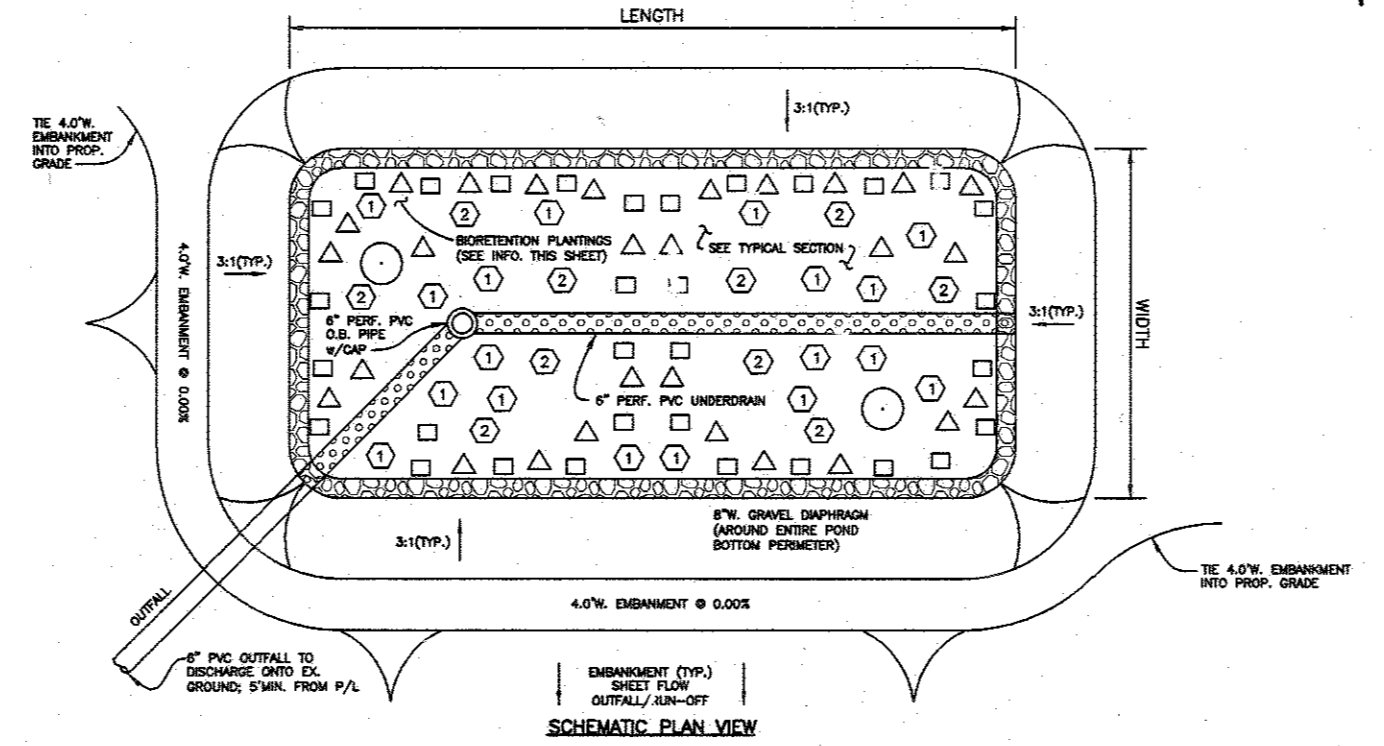
FILTER STRIP PARCELS L AND N
SCALE: 1" = 30'



FILTER STRIP LOTS 6 AND 7
SCALE: 1" = 30'



MICROBIORETENTIONS LOT 5
SCALE: 1" = 20'



MATERIAL	SPECIFICATION	SIZE	NOTES
PLANTINGS	SEE APPENDIX A, TABLE A.1	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL	USDA TYPE 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	N/A	USDA SOIL TYPES: LOAMY SAND, SANDY 1" W/ OR LOAM
MULCH	SHRUBBED HARDWOOD	N/A	APPROX. 8 MONTHS MINIMUM
GEOTEXTILE	APPARENT OPENING SIZE: 0.075" (2-100) GRAIN TENSILE STRENGTH: 120 LB (53.3) PUNCTURE RESISTANCE: 100 LB (45.3)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAIN ONLY
STONE	ASHFO M-43	0.375" TO 0.750"	3/4" PERFT @ 6" O/C, 4 HOLES PER ROW, MINIMUM OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES

OPERATION & MAINTENANCE SCHEDULE FOR BIORETENTION	PLANTING SCHEDULE
1. ANNUAL MAINTENANCE OF PLANT MATERIAL AND MULCH LAYER IS REQUIRED. MAINTENANCE OF MULCH IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH-OUT. ANY REPLACEMENT OF MULCH SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE & INSECT INFESTATION AND MAINTENANCE WILL INCLUDE REMOVAL OF DEAD & DISEASED VEGETATION CONSIDERED BEYOND TREATMENT. 2. ALL DISEASED TREES & SHRUBS AND REPLACEMENT OF ALL DISEASED STRAINS & SPECIES. 3. MULCH SHALL BE INSPECTED EACH SPRING. REMOVE THE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER. 4. SOIL EROSION TO BE ADDRESSED ON AN AS-NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.	1. PLANTINGS WITHIN THE FORMING AREA OF THE RAIN GARDEN USE TO BE OF A MEDIUM TO TALL. SUGGESTED SPECIES: CREeping BULGWOOD (ALBA REPENS) COMMON PERNNIALE (VINCA MINOR) LILY-TURTLE (SOLANUM) 2. PLANTINGS ALONG THE PERIMETER (BETW A GA OF THE RAIN GARDEN ARE TO BE OF A LOW TO MEDIUM TOLERANCE. SUGGESTED SPECIES: PERENNIALS/ANNUALS: IRIS (IRIS VERSICOLOR) DAYLILY (HEMEROCALLIS SP.) WHITE GLOZY ASTER (A. SP.) 3. ANNUAL PLANTINGS WITHIN THE FORMING AREA OF THE RAIN GARDEN NEAR 0.5" PVC PIPE AND UNDERDRAIN.

BIORETENTION DESIGN SUMMARY											
FILTER NUMBER	LENGTH FEET	WIDTH FEET	PONDING DEPTH	SURFACE REQ. SF	SURFACE PRO. SF	VOLUME CUBIC FT	FILTER DEPTH FEET	INLET ELEV.	OUTLET ELEV.	RECHARGE CHAMBER FEET	BOTTOM ELEV.
RGLA	11	10	0.5	107	110	253	2.5	374	370.58	0.69	369.89
RGLB	15	11	0.5	159	165	378	2.5	404.5	401.08	0.69	400.40
RGLC	12	12	0.5	139	144	331	2.5	430.5	427.08	0.69	426.39
RG2A	9	8.5	0.5	73	77	175	2.5	415	411.58	0.68	410.90
RG2B	10	11	0.5	103	110	250	2.5	415	411.58	0.67	410.91
RG3A	10	16	0.5	164	160	375	2.5	416	412.58	0.73	411.85
RG3B	12	20	0.5	237	240	556	2.5	417	413.58	0.71	412.88
RG4A	12	12	0.5	133	144	326	2.5	413.5	410.08	0.66	409.42
RG4B	15	18	0.5	261	270	620	2.5	414.5	411.08	0.69	410.39
M.B.1	30	10	1.0	288	343	637	1.5	426.25	423.00	1.17	425.25
M.B.2	16	18	1.0	307	307	580	1.5	421.50	423.00	1.17	426.50
RG6A	20	16	0.5	303	320	730	2.5	488.5	485.08	0.68	484.41
RG6B	10	17	0.5	165	170	391	2.5	487.5	484.08	0.69	483.39
RG7A	12.6	12.5	0.5	155	157	364	2.5	485.5	482.08	0.71	481.38
RG7B	14	18	0.5	238	252	575	2.5	488	484.58	0.68	483.91

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Willie J. Wall
CHIEF, BUREAU OF HIGHWAYS
10-28-08
DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING
Candy Hunt
CHIEF, DIVISION OF LAND DEVELOPMENT
11/3/08
DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION
A

ALL RAINGARDENS ARE TO BE PRIVATELY OWNED AND MAINTAINED AND ARE TO BE CONSTRUCTED UNDER A GRADING PLAN THAT WILL BE PROCESSED WITH HOWARD COUNTY SOIL CONSERVATION DISTRICT.

3	5/22/18	REVISE SWM DETAIL LOT 5 ENTIRELY & DESIGN SUMMARY
2	1-2-15	REVISE TITLE BLOCK
1	10-26-10	RECONFIGURATION OF LOTS 6+7
NO.	DATE	REVISION

BENCHMARK ENGINEERS, INC.
8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELICOTT CITY, MARYLAND 21043
phone: 410-465-6105 & fax: 410-465-6644
email: Benchmark@cais.com

Professional Certification. 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. 21443, Expiration Date: 12-31-2018

Professional Engineer
10-16-08

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

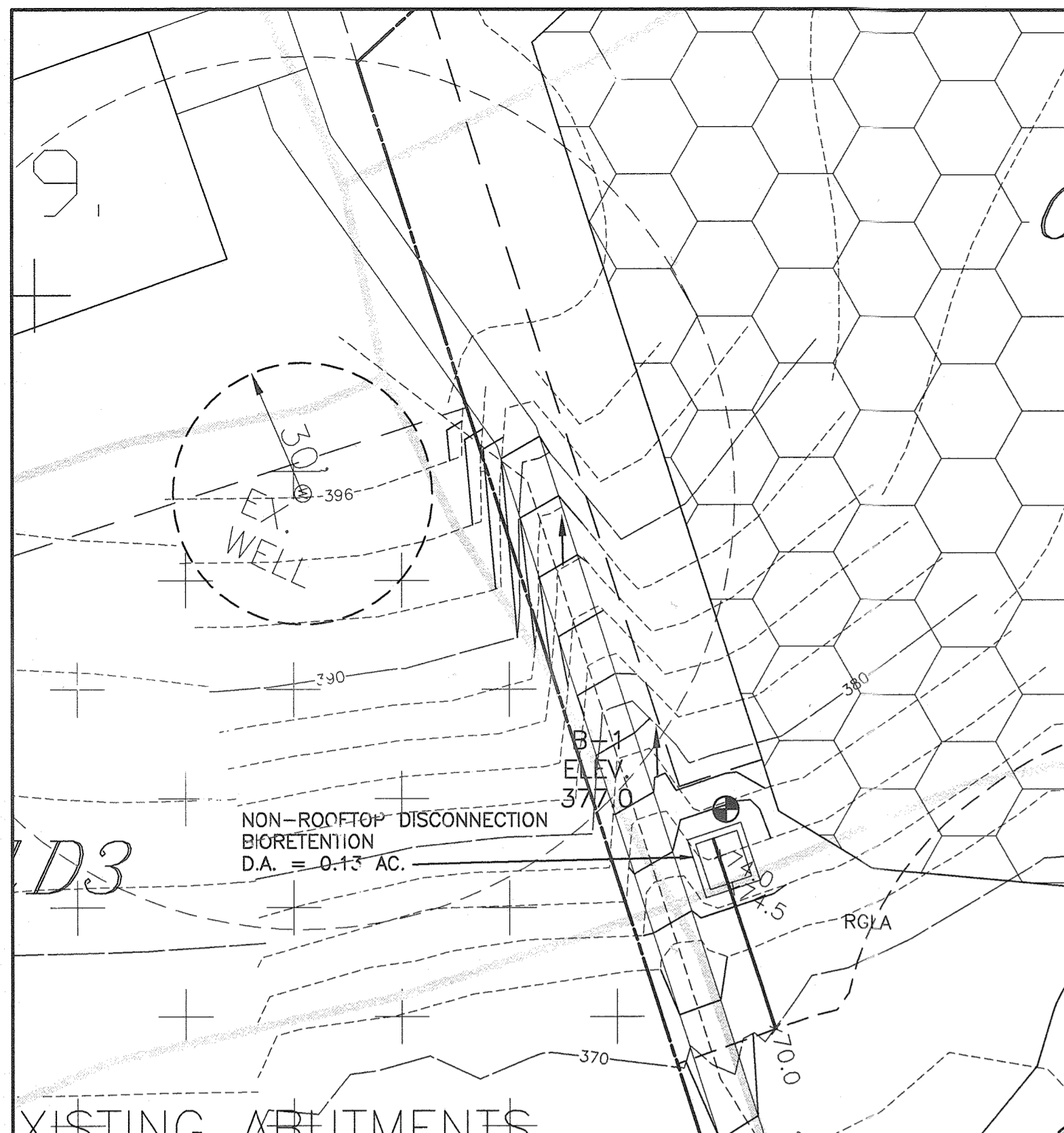
OWNER/DEVELOPER: NATALIE ZIEGLER LT AL
2288 MANOR LANE
ELICOTT CITY, MARYLAND 21042
410-741-6880

LOCATION: TAX MAP: 23, GRID: 10
THIRD ELECTION DISTRICTS
HOWARD COUNTY, MARYLAND

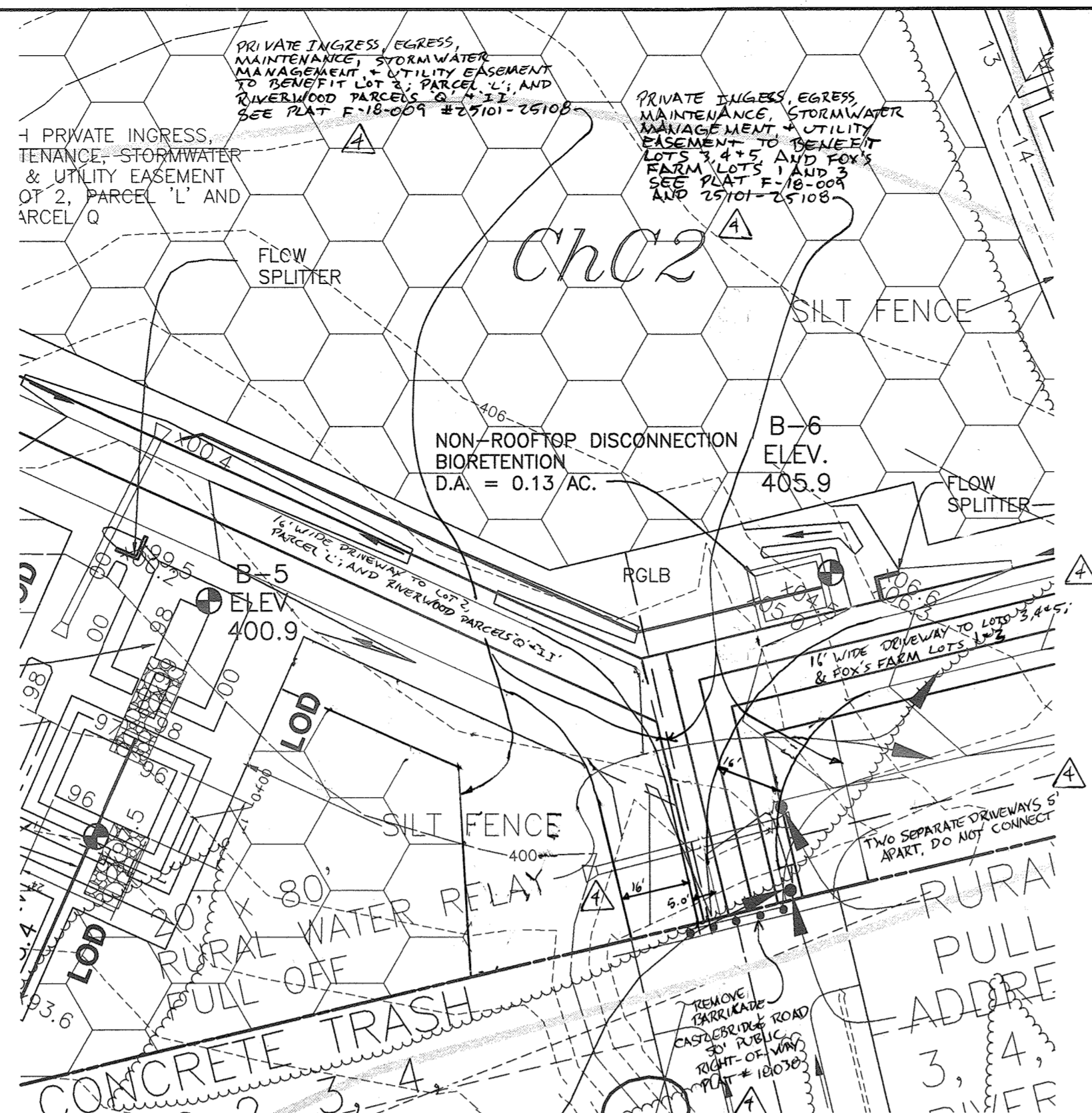
TITLE: SUPPLEMENTAL FINAL STORMWATER MANAGEMENT FILTER STRIP AND RAINGARDEN PLANS, NOTES AND DETAILS

DATE: OCTOBER, 2008 PROJECT NO. 1939

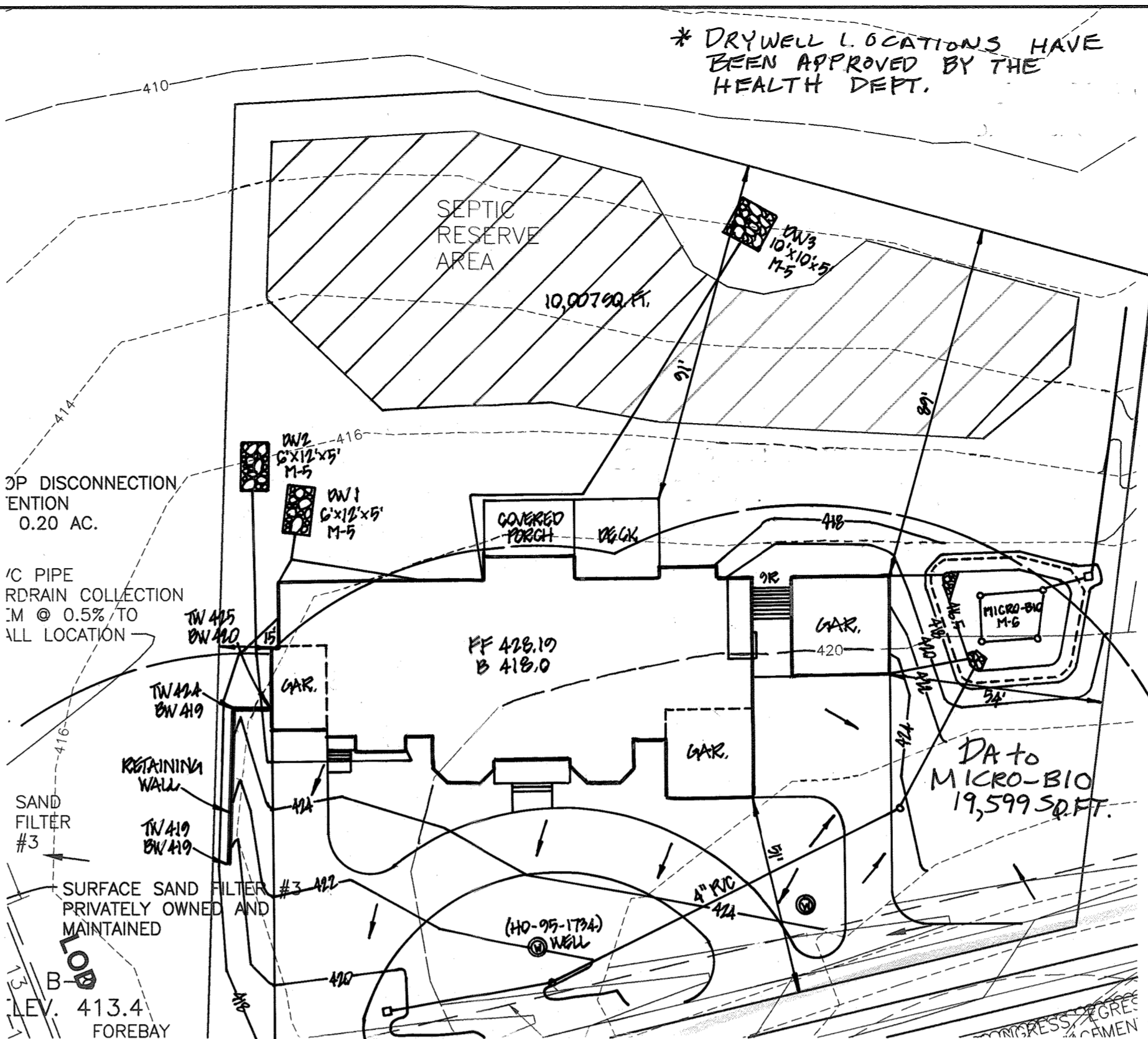
DES: JC DRAFT: JC CHECK: DAM SCALE: NA SHEET 2 OF 11



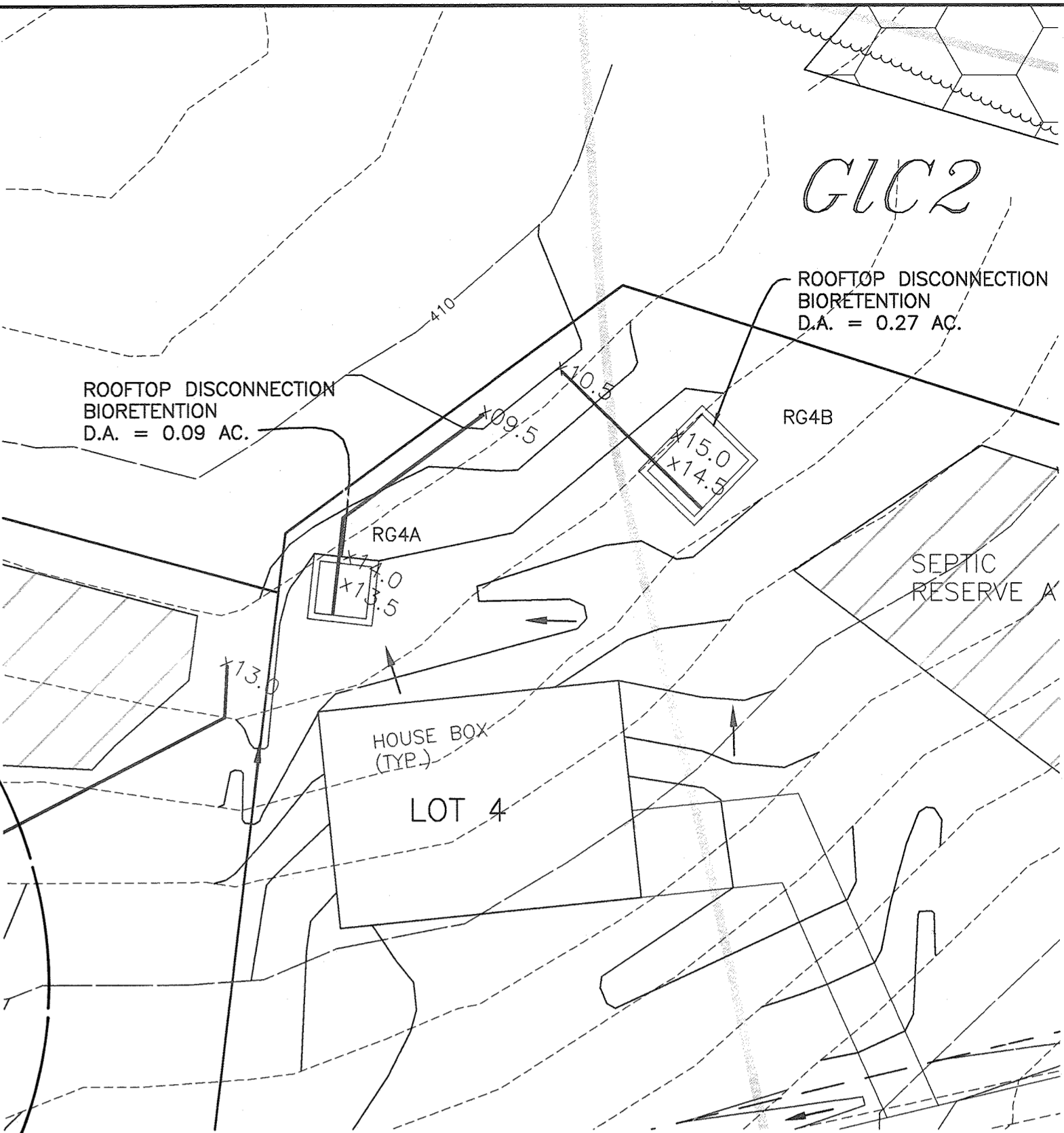
RAINGARDEN LA
SCALE: 1" = 30'



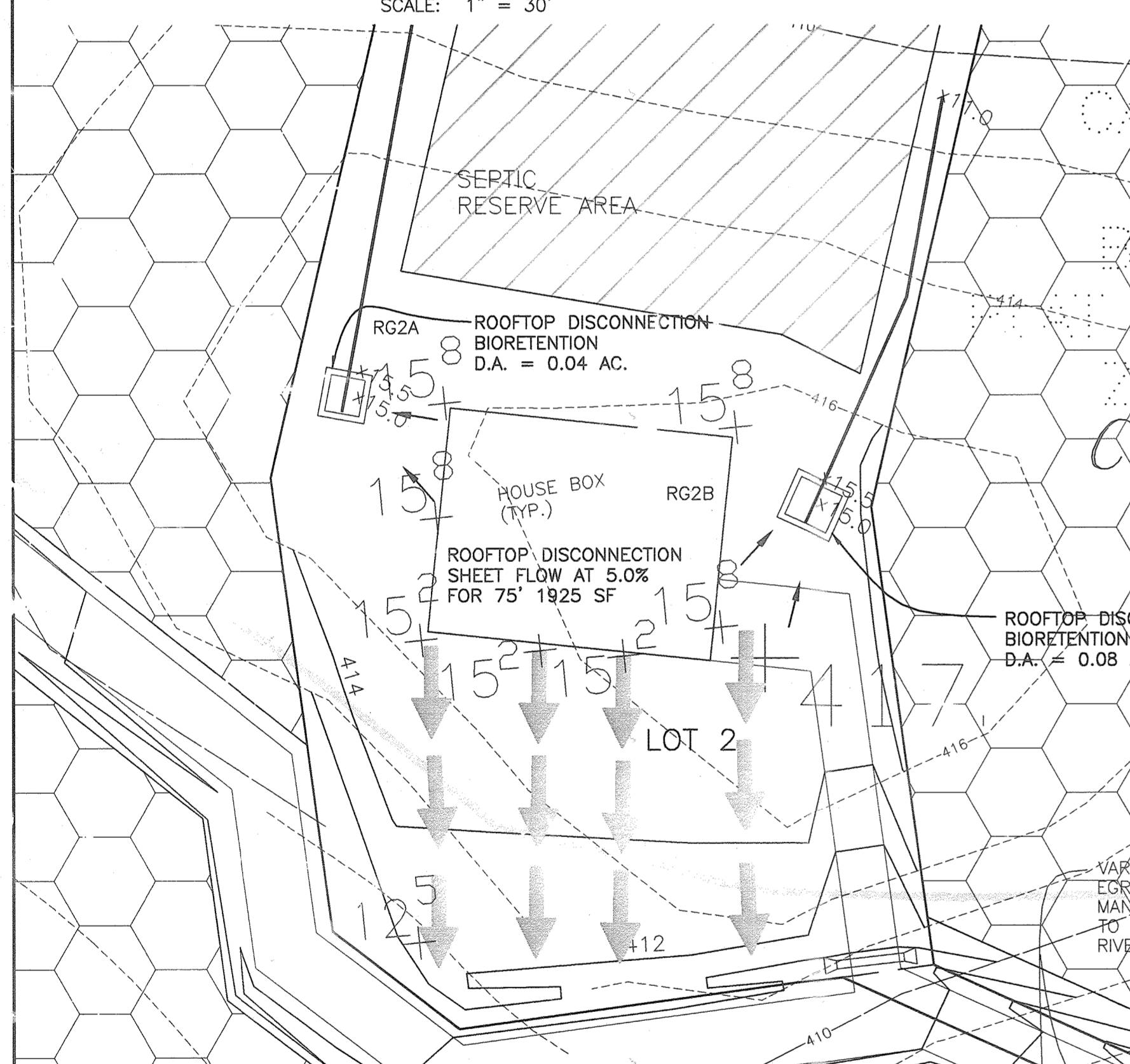
RAINGARDEN LB
SCALE: 1" = 30'



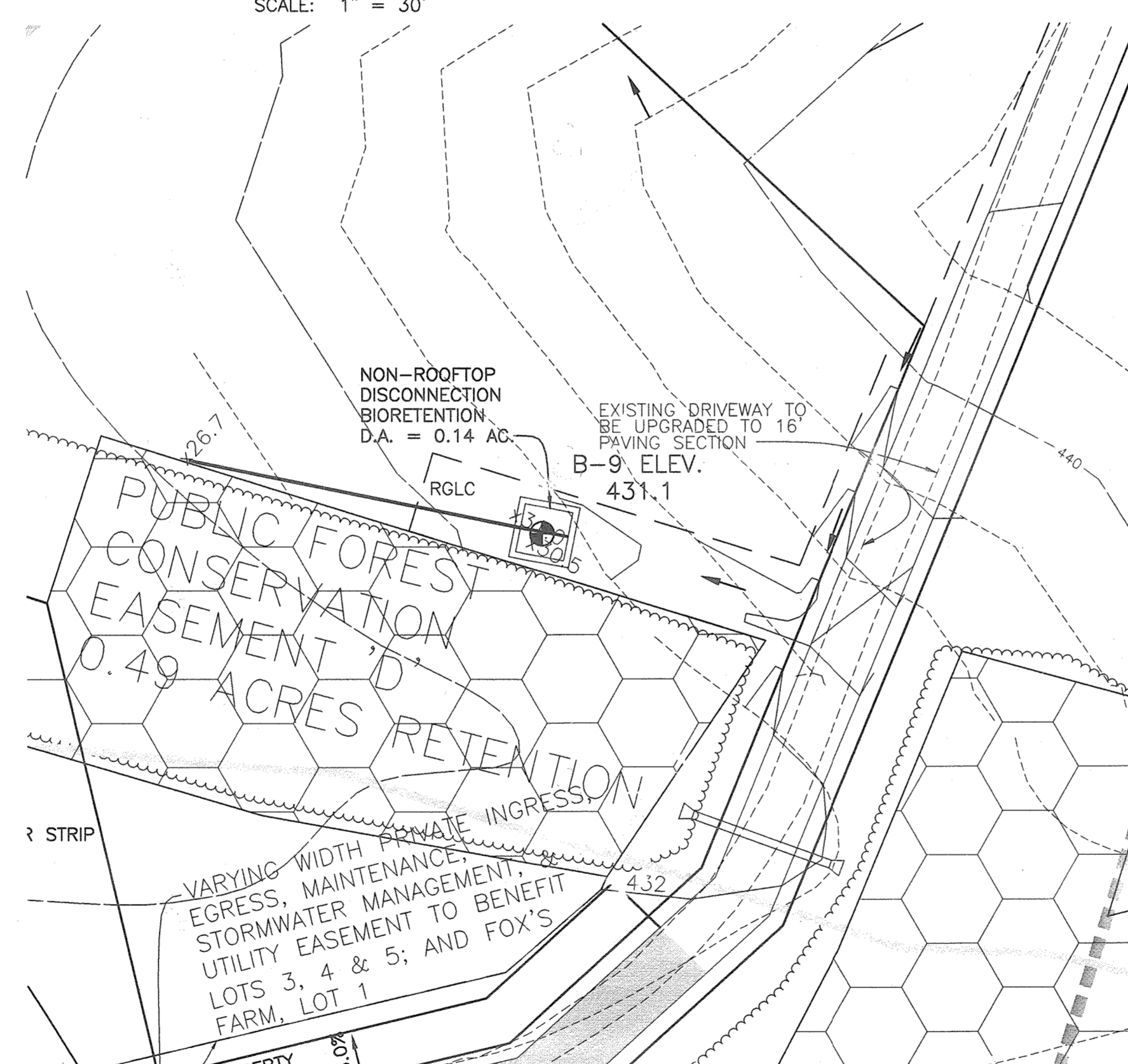
MICRO-BIO 1 & DW 1, DW 2 & DW 3
SCALE: 1" = 30'



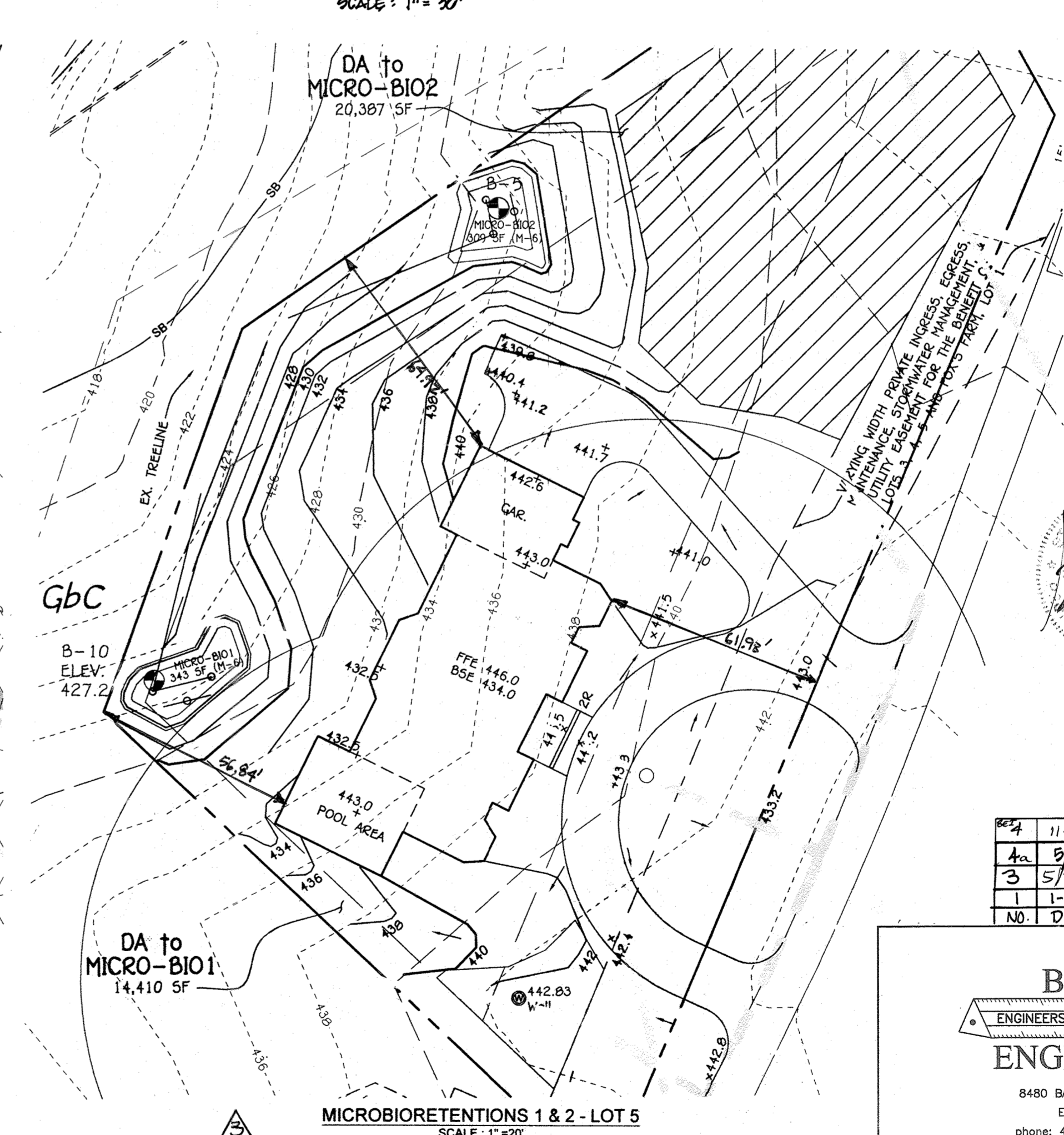
RAINGARDENS 4A AND 4B
SCALE: 1" = 30'



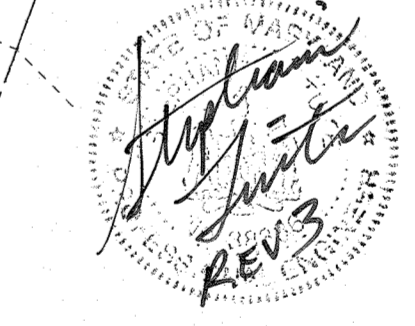
RAINGARDENS 2A AND 2B
SCALE: 1" = 30'



RAINGARDEN LC
SCALE: 1" = 30'



MICROBIORETENTIONS 1 & 2 - LOT 5
SCALE: 1" = 20'



NO.	DATE	REVISION
1	11-11-19	REVISE DRIVEWAYS & EASEMENTS PER E-18-001 AND ADD INFORMATION, ELEVATIONS FOR CLARITY.
2	5/9/10	REVISE HWS & C&D LOT 3 AND CHANGE C&D TO MICRO-BIO AND 3 DRYWELLS
3	5/21/18	REVISE ENTIRE DETAIL FOR LOT 5
4	11-2-19	REVISE TITLE BLOCK

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLCOTT CITY, MARYLAND 21043
phone: 410-465-6105 • fax: 410-465-6844
email: Benchmark@ceis.com

Professional Certification. 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. 21443, Expiration Date: 12-31-2019.

Stephen J. Ziegler
Professional Engineer
No. 21443
10-16-09

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William R. ...
CHIEF, BUREAU OF HIGHWAYS
DATE: 10-28-08

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING
Cindy Hunter
CHIEF, DIVISION OF LAND DEVELOPMENT
DATE: 11/20/08

CHIEF, DEVELOPMENT ENGINEERING DIVISION
DATE: 10/16/08

ALL RAINGARDENS ARE TO BE PRIVATELY OWNED AND MAINTAINED AND ARE TO BE CONSTRUCTED UNDER A GRADING PLAN THAT WILL BE PROCESSED WITH HOWARD COUNTY SOIL CONSERVATION DISTRICT.

Professional Certification. 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. 45577, Expiration Date: 06-08-2020

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

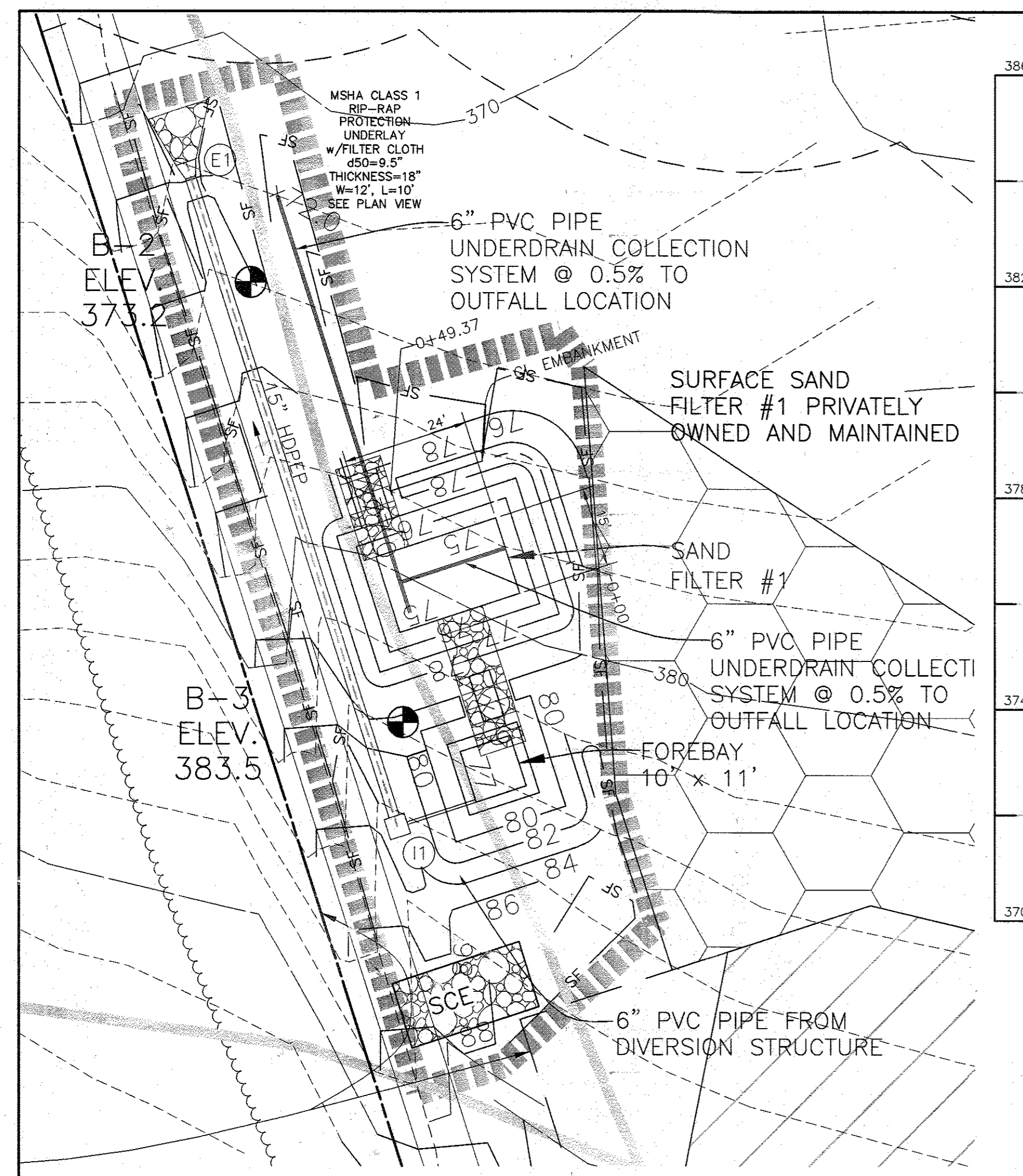
OWNER/DEVELOPER: NATALIE ZIEGLER ET AL
4288 MANOR LANE
ELLCOTT CITY, MARYLAND 21042
410-740-6880

LOCATION: TAX MAP: 23, GRID: 10
THIRD ELECTION DISTRICTS
HOWARD COUNTY, MARYLAND

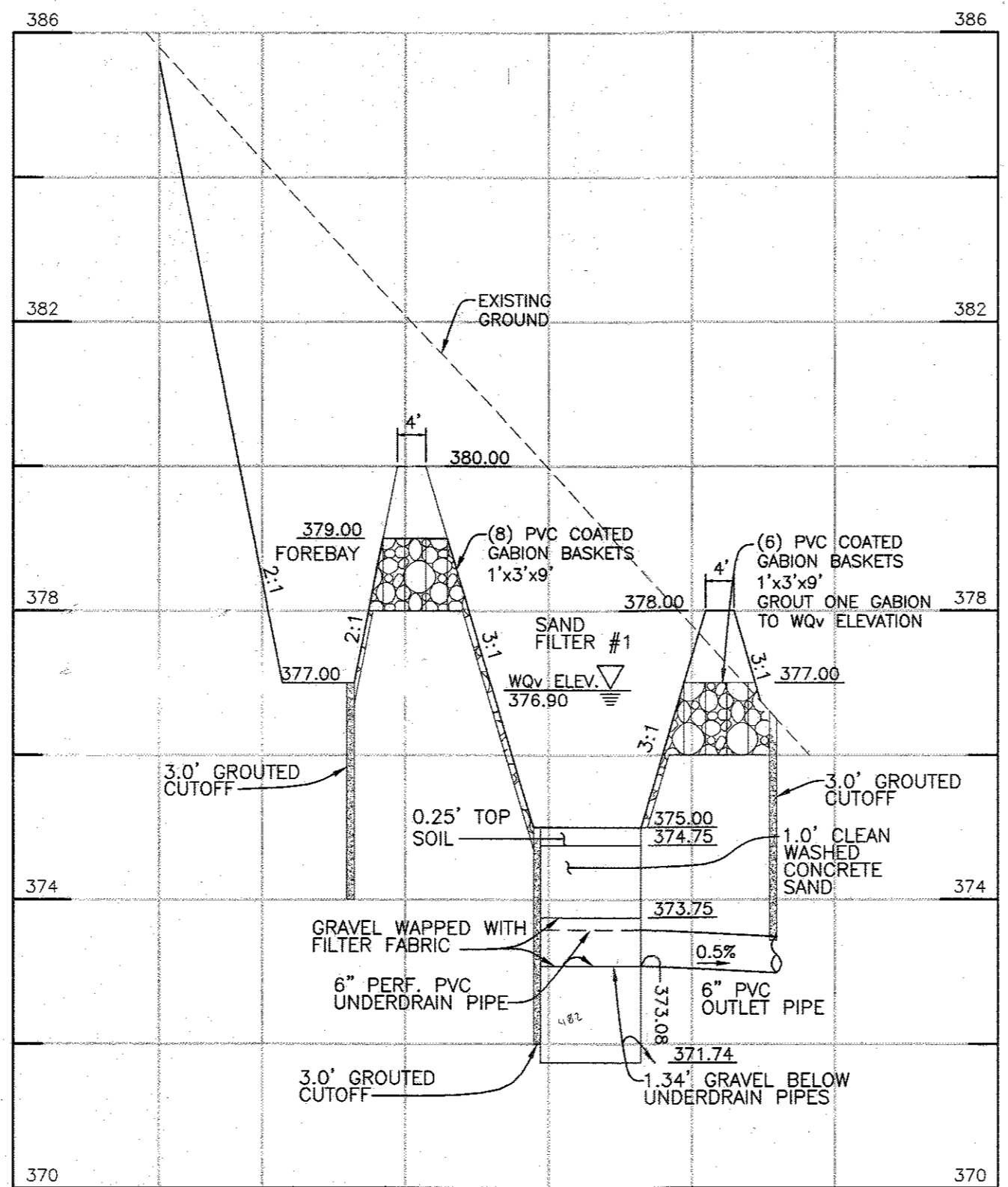
TITLE: SUPPLEMENTAL FINAL STORMWATER MANAGEMENT RAINGARDEN PLANS

DATE: OCTOBER, 2008 PROJECT NO. 1939

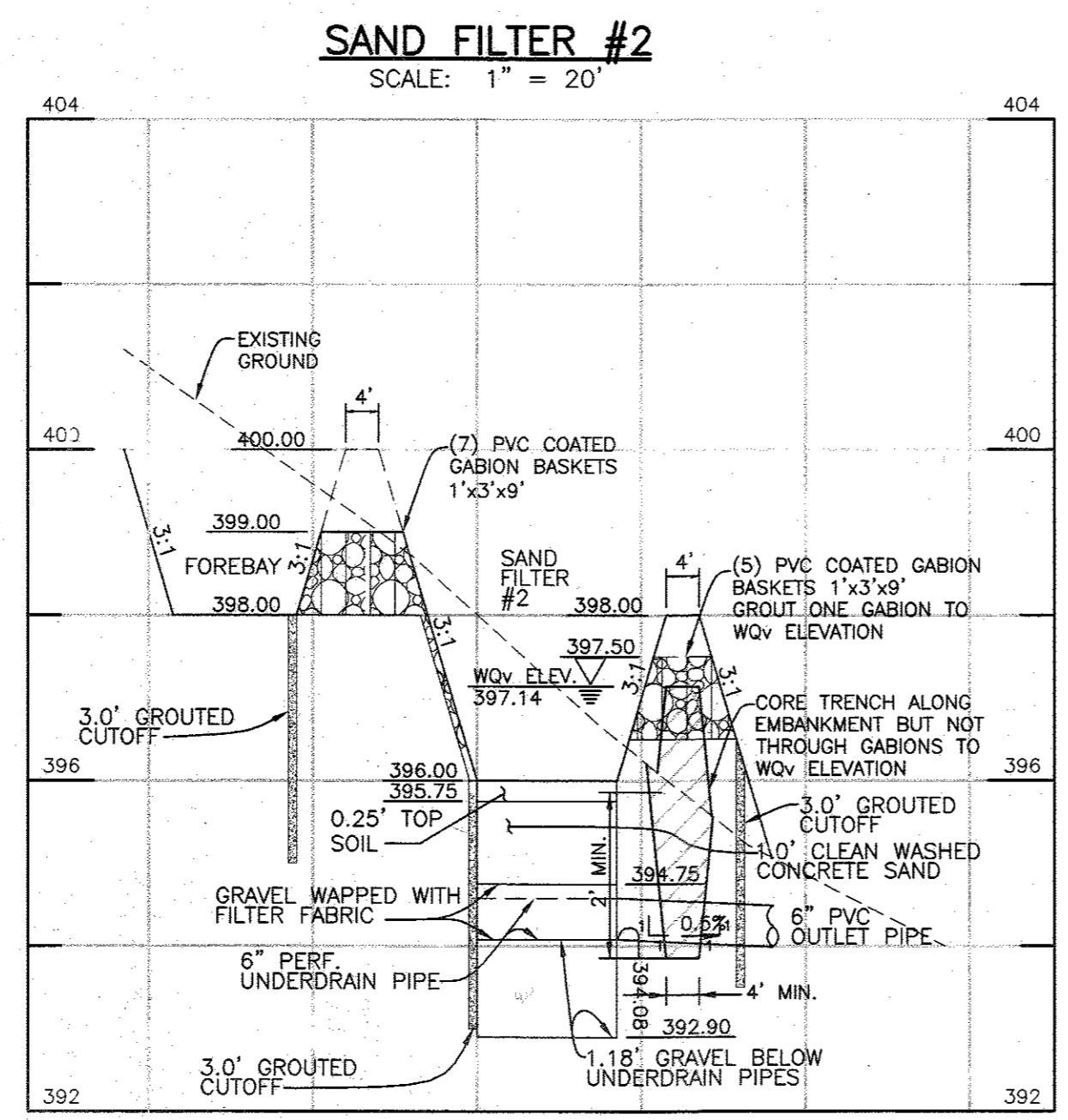
DES: JC DRAFT: JC CHECK: DAM SCALE: NA SHEET 3 OF 11



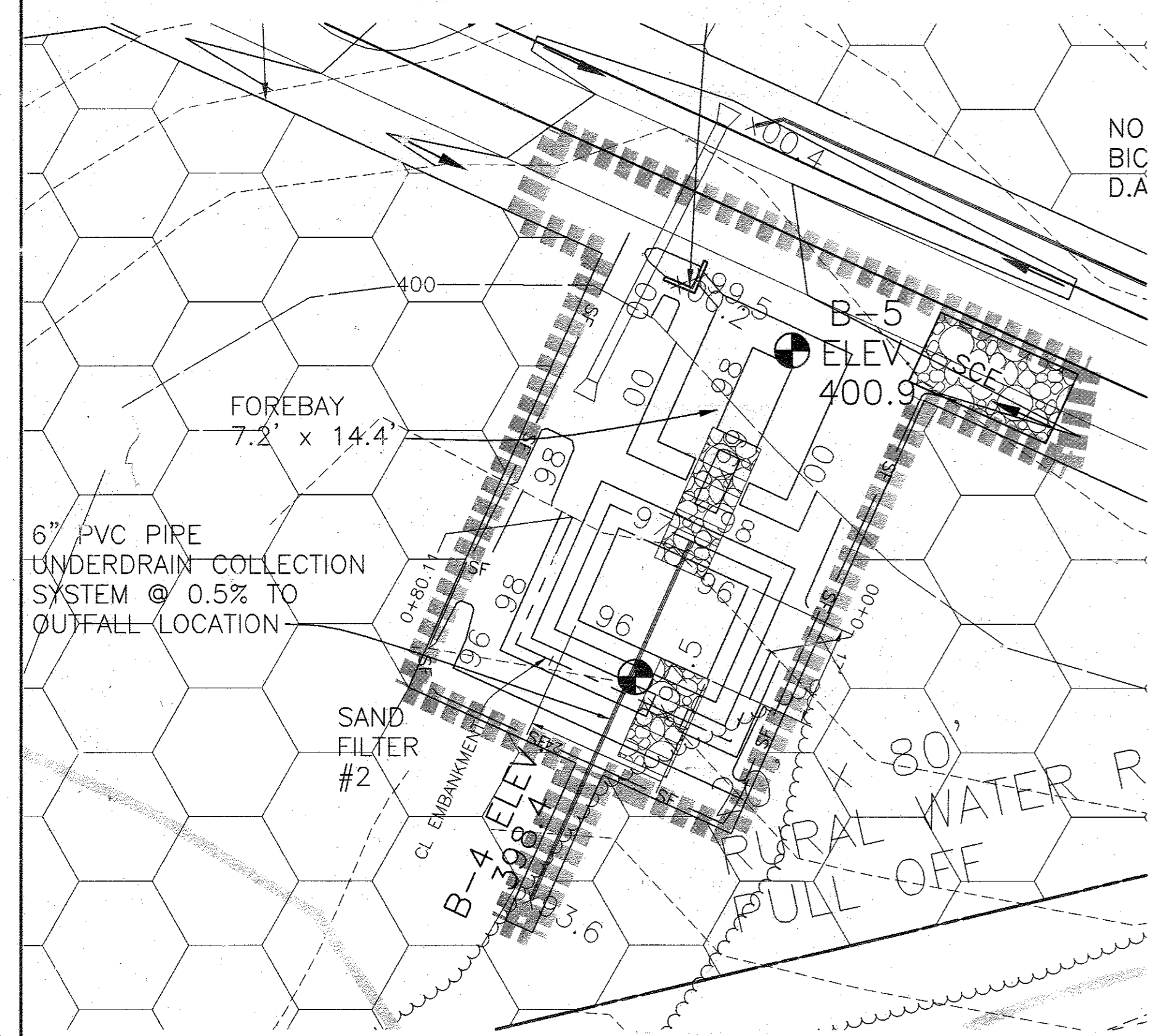
SAND FILTER #1
SCALE: 1" = 20'



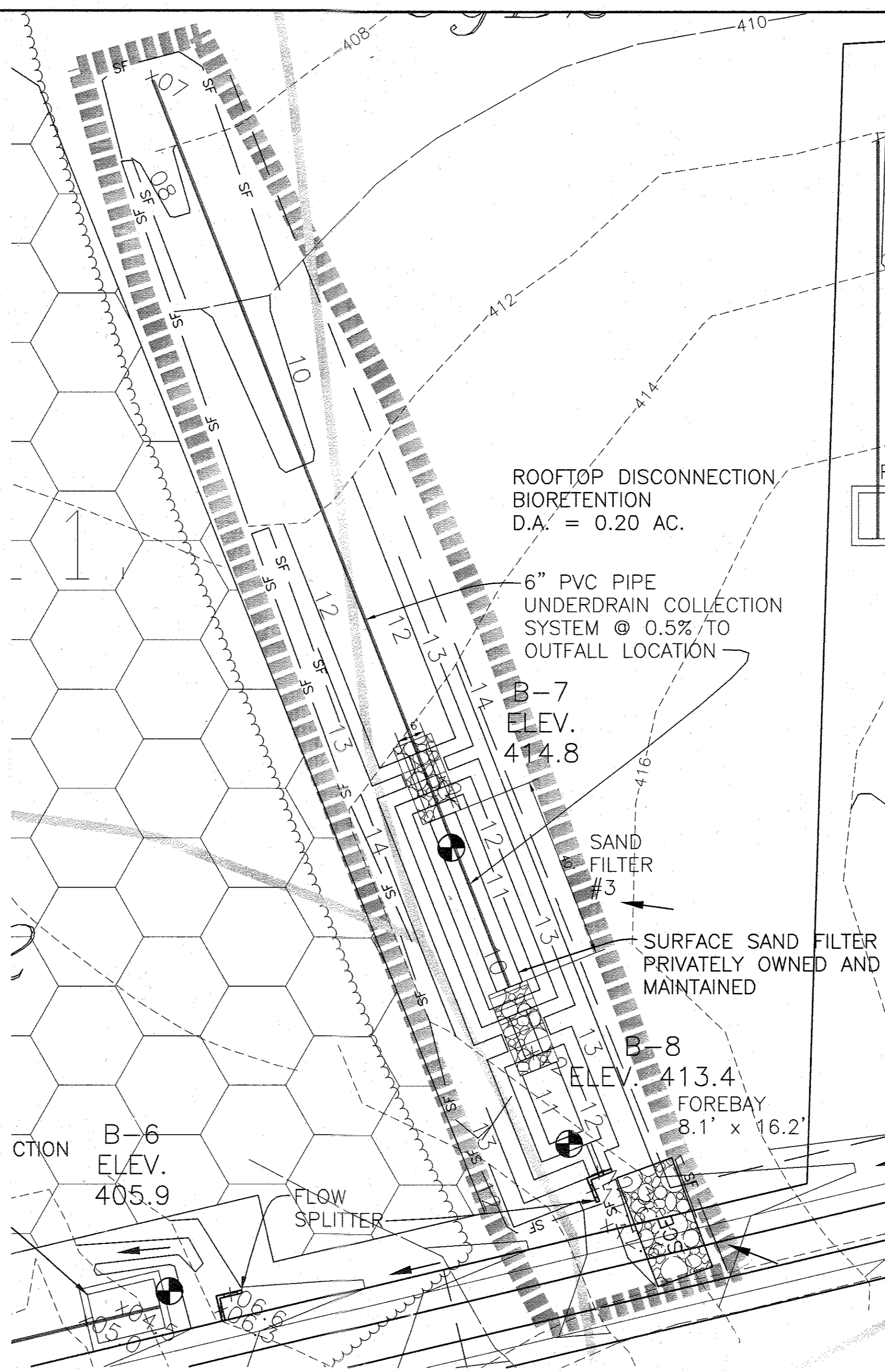
SECTION THROUGH FACILITY SAND FILTER #1
SCALE: 1" = 20' HORIZ., 1" = 2' VERT.



SECTION THROUGH FACILITY SAND FILTER #2
SCALE: 1" = 20' HORIZ., 1" = 2' VERT.



SAND FILTER #2
SCALE: 1" = 20'

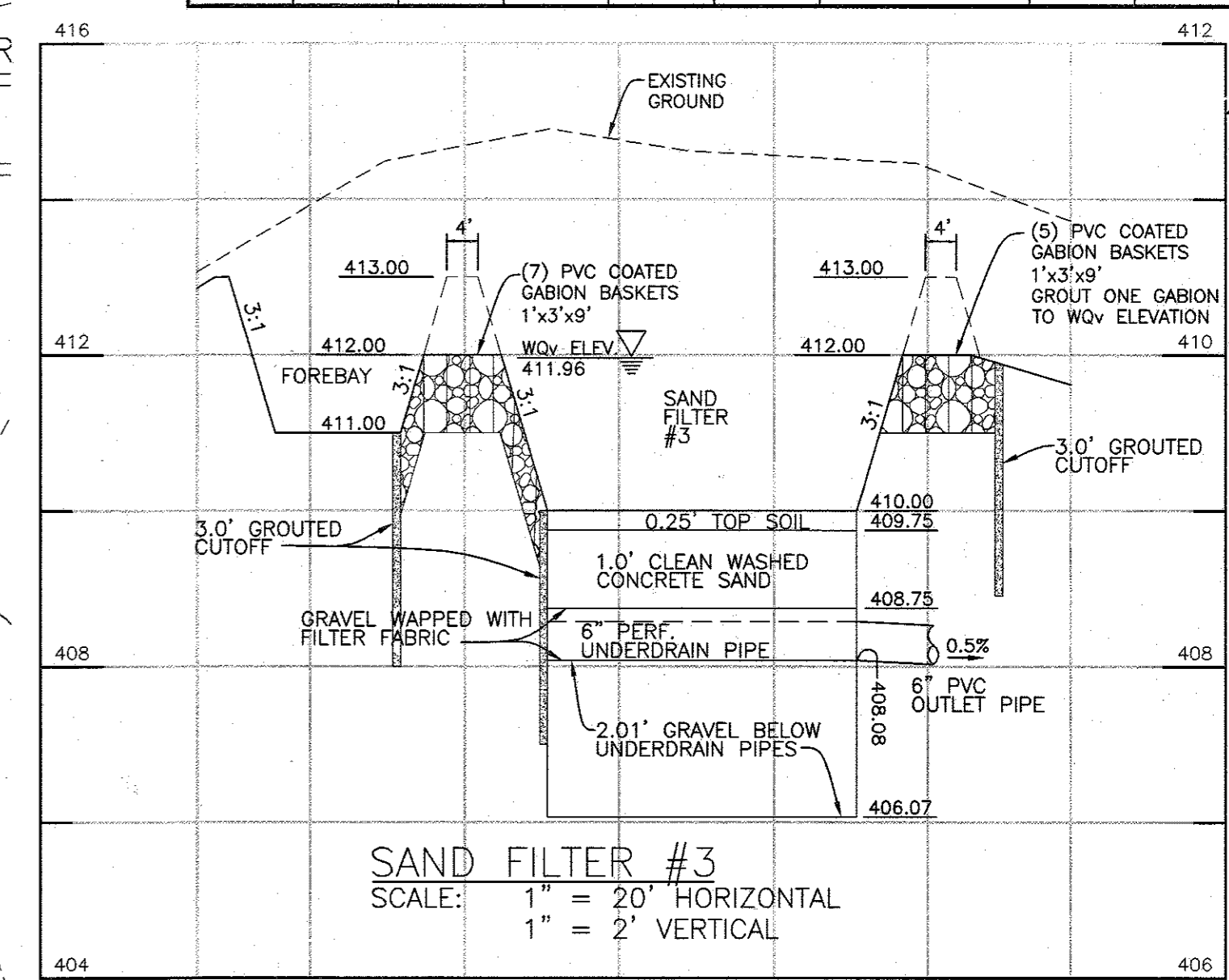


SAND FILTER #3
SCALE: 1" = 20'

ALL SAND FILTERS ARE TO BE PRIVATELY OWNED AND MAINTAINED

MATERIAL	SPECIFICATION	SIZE	NOTES:
NON-REBAR STEEL	ASTM A-36	N/A	STRUCTURAL STEEL TO BE HOT-DIPPED GALVANIZED ASTM A-123
PEA GRAVEL	ASTM D-442	NO. 6	
ORNAMENTAL STONE	ASTM D-442	2" TO 5"	
WASHED COBBLES	ASTM D-442	2" TO 5"	
GEOTEXTILE (CLASS "C")	APPARENT OPENING SIZE: (ASTM D-4751) TENSILE STRENGTH: (ASTM D-4632) PUNCTURE RESISTANCE: (ASTM D-4833)	0.8" THK EQUVALENT OPENING SIZE OF #60 SIEVE	MUST MAINTAIN 125 GPM / SQ. FT. FLOW RATE. NOTE: A PEA GRAVEL LAYER MAY BE SUBSTITUTED FOR GEOTEXTILES MEANT TO "SEPERATE" SAND FILTER LAYERS
UNDERDRAIN GRAVEL	ASTM M-43	0.375" TO 0.750"	
UNDERDRAIN PIPING	FTS, TYPE PS28 OR AASHTO M-278	4" TO 6" RIGID	3/8" PERF. @ 6" O/C, 4 HOLES PER ROW, MINIMUM OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES
SAND (1.0' DEEP)	AASHTO M-6 OR ASTM C-33	0.02" TO 0.04"	SAND SUBSTITUTIONS SUCH AS DIABASE AND GRANITONITE ARE NOT ACCEPTABLE. NO CALCIUM CARBONATE OR DOLOMITIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND

FILTER NUMBER	LENGTH FEET	WIDTH FEET	SURFACE REQ. SF	SURFACE VOLUME CUBIC FT	FILTER DEPTH FEET	INLET ELEV.	OUTLET ELEV.
1	15	24	109	360	1454	1	375.00
2	17	24	81	408	815	1	396.00
3	40	6	76	240	789	1	410.00



SECTION THROUGH FACILITY SAND FILTER #3
SCALE: 1" = 20' HORIZ., 1" = 2' VERT.

AS-BUILT CERTIFICATION
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

DATE: 10/23/08
PE NO. _____
CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED UPON ON-SITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE "ON-SITE" INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEMAND APPROPRIATE AND APPROPRIATE BY COMMONLY ACCEPTED ENGINEERING STANDARDS. CERTIFY DOES NOT MEAN OR IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

APPROVED: THIS DEVELOPMENT IS APPROVED FOR EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
[Signature] 10/23/08
HOWARD SOIL CONSERVATION DISTRICT DATE

ENGINEER'S CERTIFICATE
I hereby certify that this plan for erosion and sediment control represents a practical and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation District.
[Signature] 10/16/08
Date

DEVELOPER'S CERTIFICATE
I/We certify that all development and construction will be done in accordance with this plan of development and plan for erosion and sediment control and that all responsible personnel involved in the construction of this project will have a certificate of attendance at a Department of the Environment approved training program for the control of sediment and erosion before beginning the project. I also authorize periodic on-site inspection by the Howard Soil Conservation District or their authorized agents, as are deemed necessary.
[Signature] 10/17/08
Signature Developer Date

BENCHMARK ENGINEERS, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELICOTT CITY, MARYLAND 21043
phone: 410-465-6105 • fax: 410-465-6644
email: Benchmark@cois.com

Professional Certification. 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. 21443, Expiration Date: 12-31-2010.
[Signature] 10/16/08
PROFESSIONAL ENGINEER

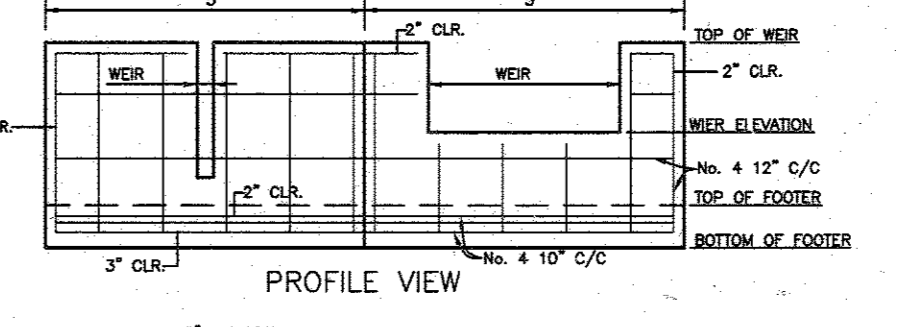
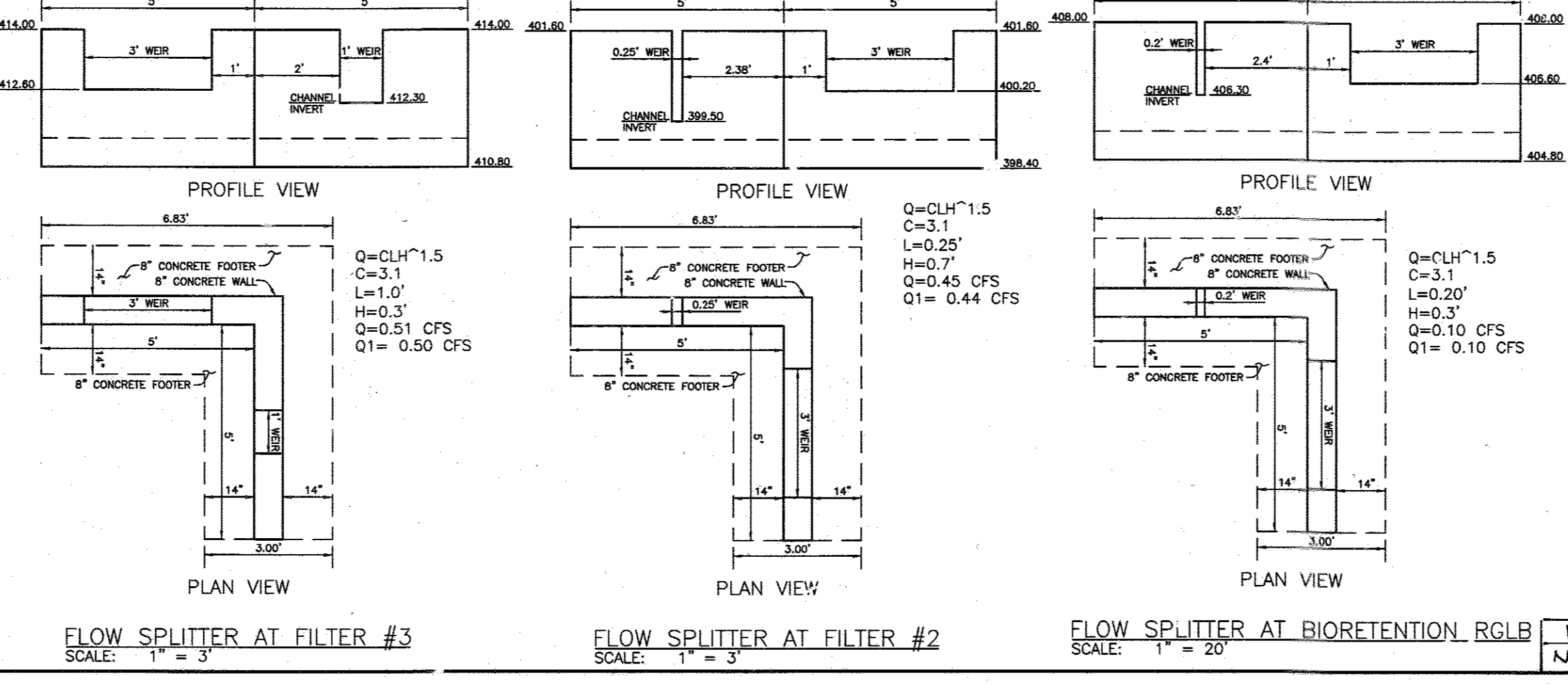
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
[Signature] 10-27-08
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING
[Signature] 11/3/08
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

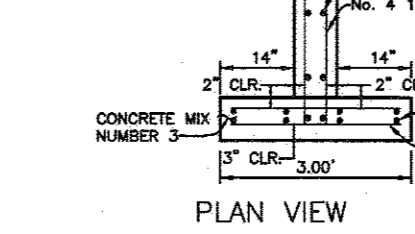
[Signature] 11/3/08
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED F-1 SURFACE STORMWATER FILTER

- THE STORMWATER WETLAND FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE FACILITY IS FUNCTIONING PROPERLY.
- THE TOP AND SIDE OF SLOPES OF THE EMBANKMENT SHALL BE MOVED A MINIMUM OF ONCE PER YEAR, WHEN VEGETATION REACHES 18" IN HEIGHT OR AS NEEDED.
- FILTERS THAT HAVE A GRASS COVER SHALL BE MOVED A MINIMUM OF THREE (3) TIMES PER GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 12 INCHES.
- DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MAINTENANCE OPERATIONS AND AS NEEDED.
- VISIBLE SIGNS OF EROSION IN THE FACILITY SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
- REMOVED SILT WHEN IT EXCEEDS FOUR (4) INCHES DEEP IN THE FOREBAY.
- WHEN WATER PONDING ON THE SURFACE OF THE FILTER BED FOR MORE THAN 72 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIALS SHALL BE REPLACED WITH FRESH MATERIAL. PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIALS AND LIQUID MUST BE FOLLOWED BY THE OWNER.
- A LOOKBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
- THE MAINTENANCE LOOKBOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
- ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION SYSTEM HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.



PROFILE VIEW



PLAN VIEW

TYPICAL REINFORCING
SCALE: 1" = 20'

FLOW SPLITTER AT FILTER #3
SCALE: 1" = 3'

FLOW SPLITTER AT FILTER #2
SCALE: 1" = 3'

FLOW SPLITTER AT BIORETENTION RGLB
SCALE: 1" = 20'

NO	DATE	REVISION
1	1-2-10	REVISE TITLE BLOCK

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCEL "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL
4288 MANOR LANE
ELICOTT CITY, MARYLAND 21042
410-740-6880

LOCATION: TAX MAP: 23, GRID: 10
THIRD ELECTION DISTRICTS
HOWARD COUNTY, MARYLAND

TITLE: SUPPLEMENTAL FINAL STORMWATER MANAGEMENT SAND FILTER PLAN, NOTES AND DETAILS & SEDIMENT AND EROSION CONTROL PLAN

DATE: OCTOBER, 2008 PROJECT NO. 1939
SCALE: NA SHEET 5 OF 11

DES: JC DRAFT: JC CHECK: DAM

SEDIMENT CONTROL NOTES

- A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION, (313-1850).
- ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT "MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS THEREOF.
- FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DICES, PERMETER SLOPES AND ALL SLOPES GREATER THAN 3:1, B) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
- ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 12, OF THE HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE.
- ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDINGS (SEC. 51) AND TEMPORARY SEEDING (SEC. 52) AND MULCHING (SEC. 52). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND ESTABLISHMENT OF GRASSES.
- ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMITTED FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- SITE ANALYSIS:**

TOTAL AREA OF SITE	0.72	ACRES
AREA DISTURBED	0.7	ACRES
AREA TO BE ROOFED OR PAVED	0.6	ACRES
AREA TO BE VEGETATIVELY STABILIZED	0.1	ACRES
TOTAL CUT	370	CY
TOTAL FILL	20	CY

OFFSITE WASTE/BORROW AREA LOCATION: SEE NOTE #12
- ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
- ADDITIONAL SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUIRED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROL, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.
- WASTE WILL BE HAULED TO AN APPROVED WASTE DISPOSAL SITE, WITH A ACTIVE GRADING PERMIT.

TOPSOIL SPECIFICATIONS

- Topsoil salvaged from the existing site may be used provided that it meets that standards set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-NRCS in cooperation with Maryland Agricultural Experiment Station.
 - Topsoil Specifications - Soil to be used as topsoil must meet the following:
 - Topsoil shall be a loam, sandy loam, loam, silt loam, sandy clay loam, loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate authority. Redisturbed topsoil shall not be a mixture of contrasting texture subsoils and shall contain less than 5% by volume of clinders and gravel, sticks, rocks, twigs, or other materials larger than 1-1/2" in diameter.
 - Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures:
 - For sites having disturbed areas under 5 acres:
 - Place topsoil (if required) and apply soil amendments as specified in 2.0.0. Vegetative Stabilization - Section 1 - Vegetative Stabilization Methods and Materials.
 - For sites having disturbed areas over 5 acres:
 - On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
 - pH for topsoil shall be between 6.0 and 7.5. If the tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise the pH to .5 or higher.
 - Organic content or topsoil shall be not less than 1.5 percent by weight.
 - Topsoil having soluble soil content greater than 500 parts per million shall not be used.
 - No seed or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phytotoxic materials.
 - Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.
 - Place topsoil (if required) and apply soil amendments as specified in 2.0.0. Vegetative Stabilization - Section 1 - Vegetative Stabilization Methods and Materials.
- Topsoil Application**
 - When topsoiling, maintain needed erosion and sediment control practices such as diversions, grade stabilization structures, earth dikes, slope silt fences and sediment traps and basins.
 - Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.
 - Topsoil shall be uniformly distributed in a 4" - 8" layer and lightly compacted to a minimum thickness of 4". Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or sodding operations shall be corrected in order to prevent the formation of depressions or water pooling areas.
 - Topsoil shall not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the grading is excessively wet or in a condition that may otherwise be detrimental to proper grading and seeded preparation.
- Alternative for Permanent Seeding** - Instead of applying the full amounts of lime and commercial fertilizer, composted sludge and amendments may be applied as specified below:
 - Composted Sludge Material for use as a soil conditioner for sites having disturbed areas over 5 acres shall be used to provide amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:
 - Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of application of the compost) by the Maryland Department of the Environment under COMAR 26.04.05.
 - Composted sludge shall contain at least 1 percent nitrogen, 1.5 percent phosphorus, and 0.2 percent potassium and have a pH of 7.0 TO 8.0. If compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.
 - Composted sludge shall be applied at a rate of 1 ton/1,000 square feet.
 - Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1,000 square feet, and 1/3 the normal lime application rate.

References: Guidelines Specifications, Soil Preparation and Soddng, MD-VA, Pub. #1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institute, Revised 1975.

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 July 2007
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Observation rate of the materials dropped. In view, the last (fourth) four readings are probably more representative of the year-round typical percolation rates of these soils.

On this basis, the advised infiltration rates from the tests are as follows:

Boring No.	Infiltration Rate (inches per hour)
B-1	2.0
B-2	1.25

RECOMMENDATIONS

The following recommendations are based upon our understanding of the proposed construction, information supplied by Benchmark Engineering, Inc., data obtained from the test borings and our experience with similar projects. There are any significant changes to the location of the SVM areas, etc., we request that we be advised so the recommendations of this report may be reevaluated.

The following hydrologic soil properties and infiltration rates are assigned to the USDA soil types reported at the explored locations:

Texture Class	Effective Water Capacity (inches/hour)	Minimum Infiltration Rate (inches/hour)	Hydrologic Soil Group
SILT LOAM	0.17	0.27	C
LOAM	0.19	0.52	B
SANDY LOAM	0.25	1.02	B
LOAMY SAND	0.31	2.41	A
SAND	0.35	8.27	A

The soils that classify as SANDY LOAM, LOAMY SAND and SAND are considered suitable for infiltration purposes based upon the requirements for dry wells by the Howard County, Maryland Department of Planning and Zoning. These types of soils or soil classifications were encountered in all test borings performed for this study below or between the following depths to the explored depth of 15.0 feet:

Boring No.	Soil Classification	Depth (feet)
B-1	SAND	0.5 to 13.0"
B-2	SAND	4.0 to 15.0"

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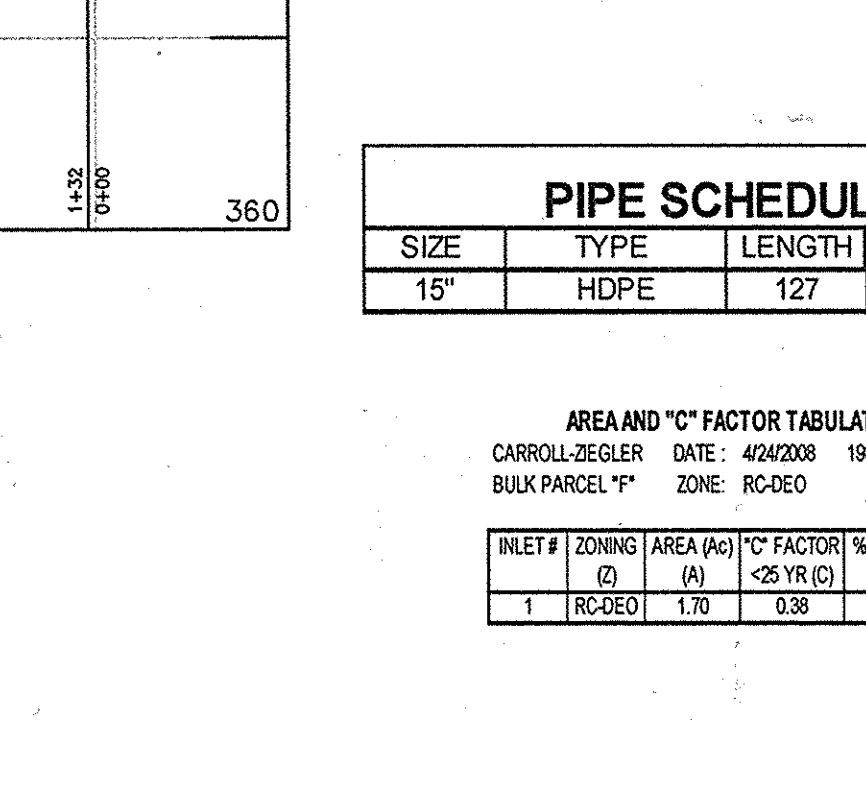
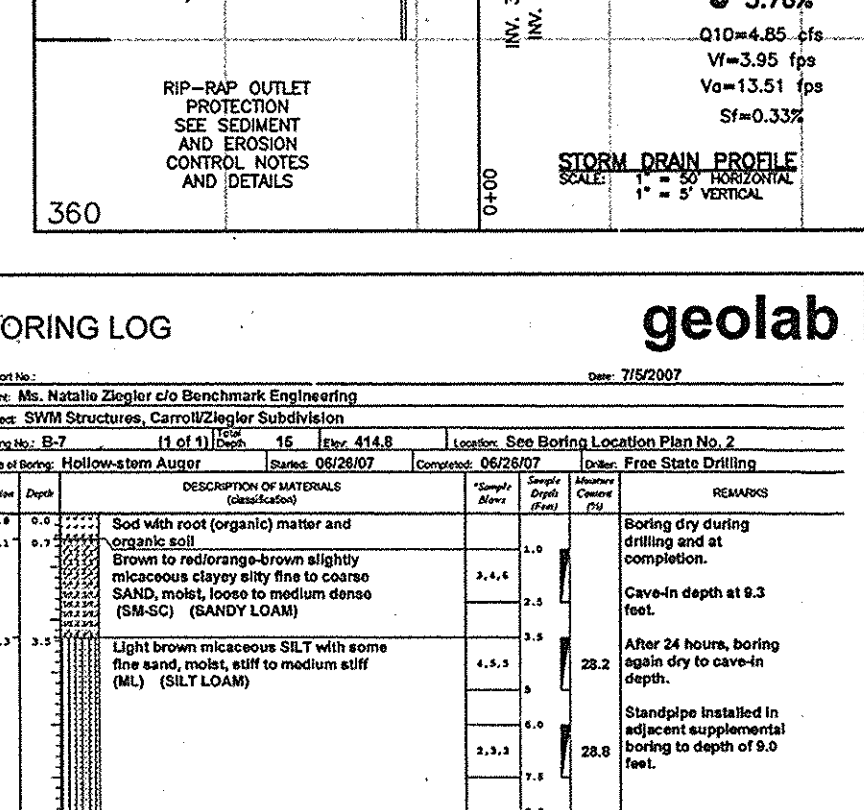
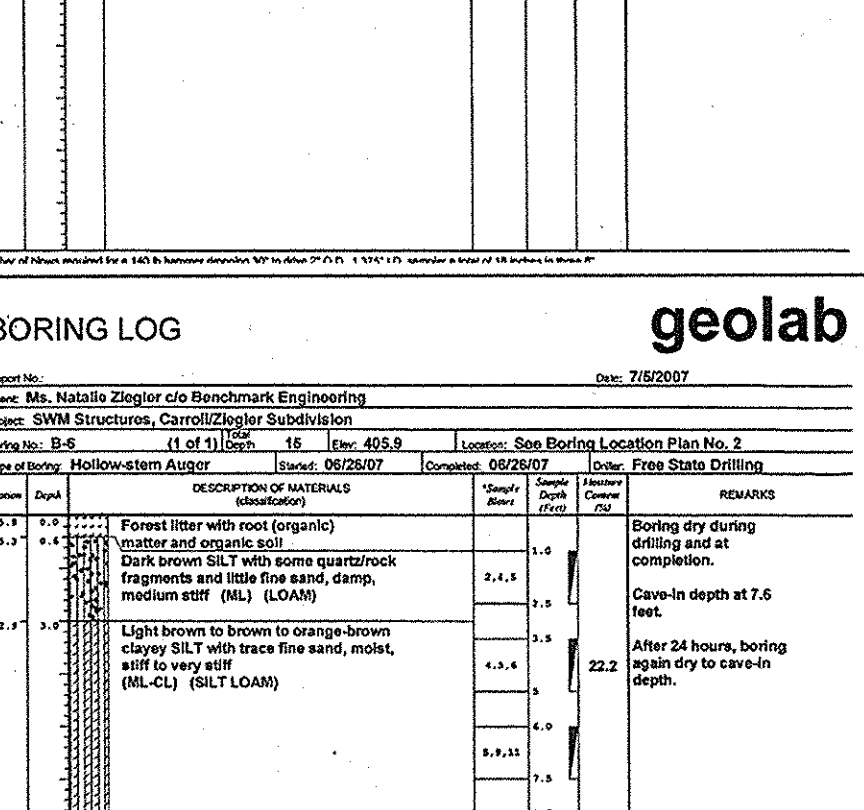
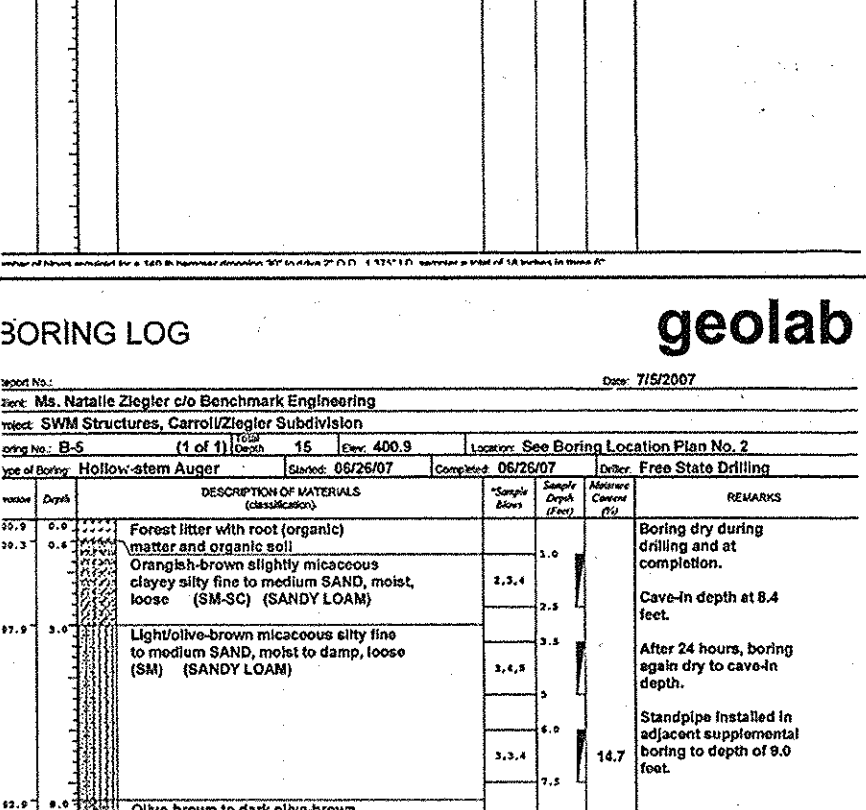
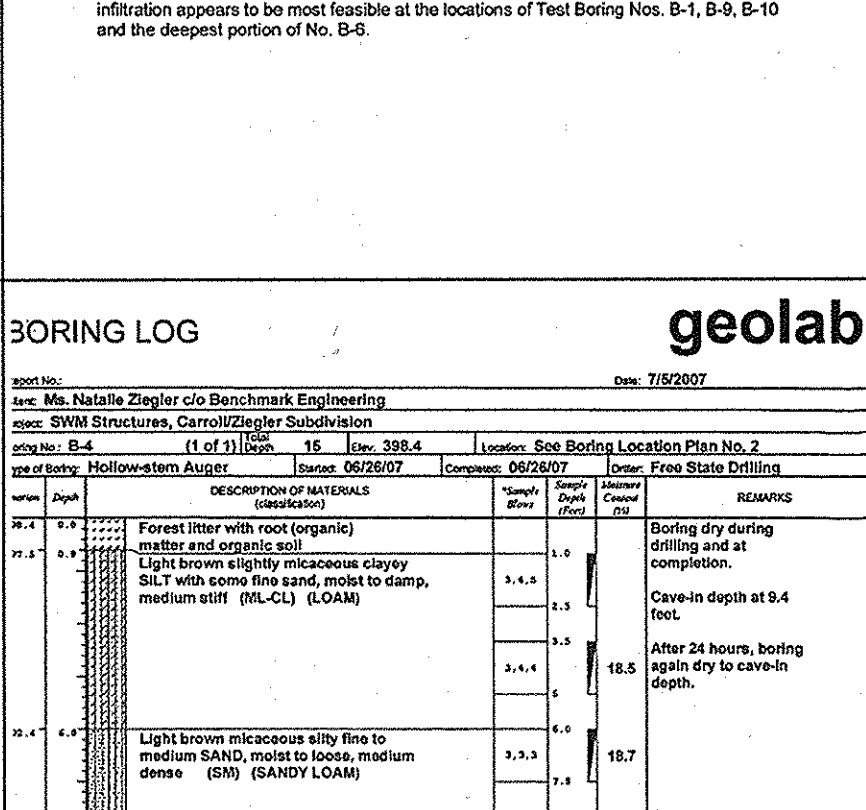
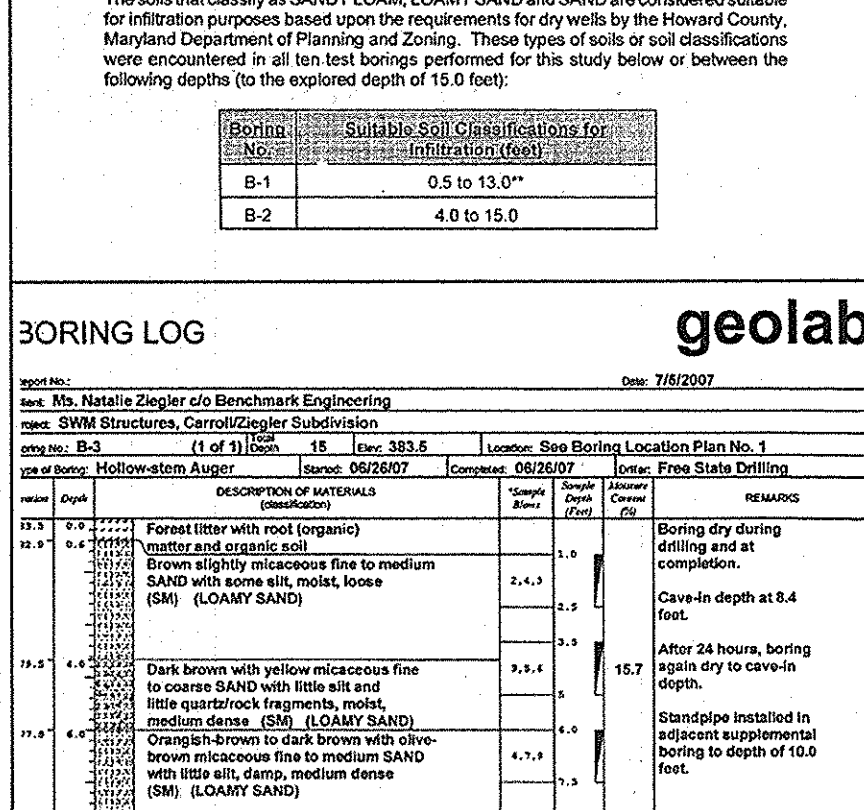
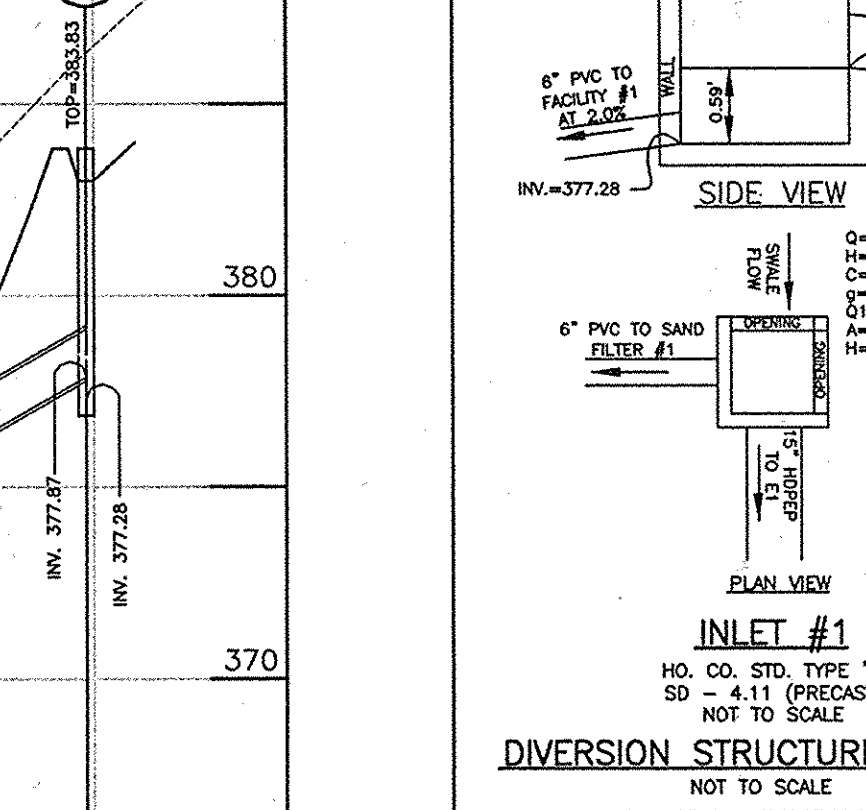
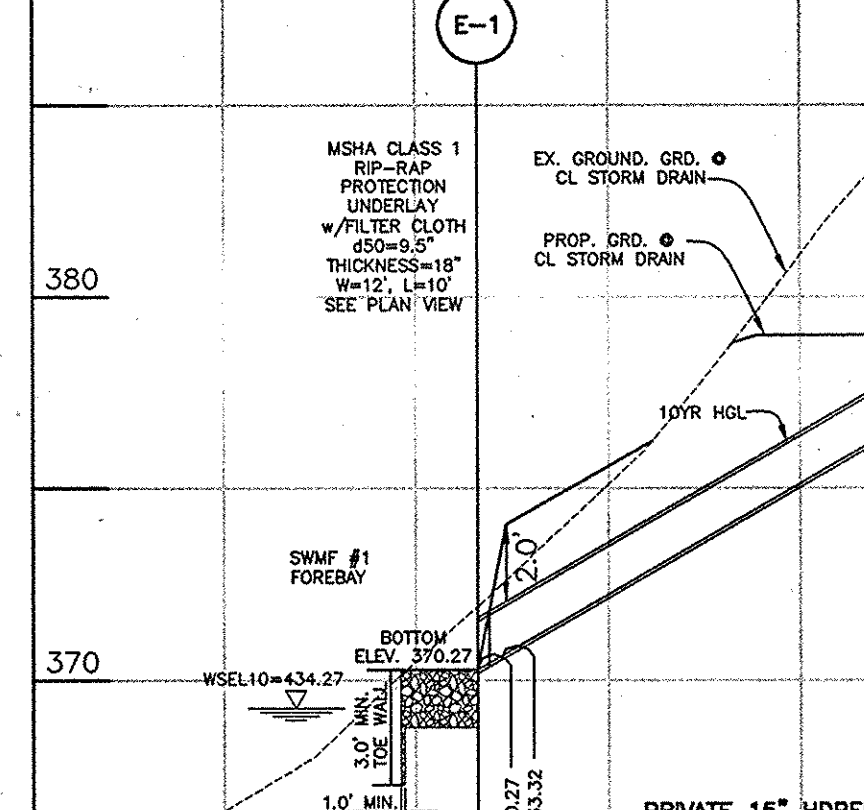
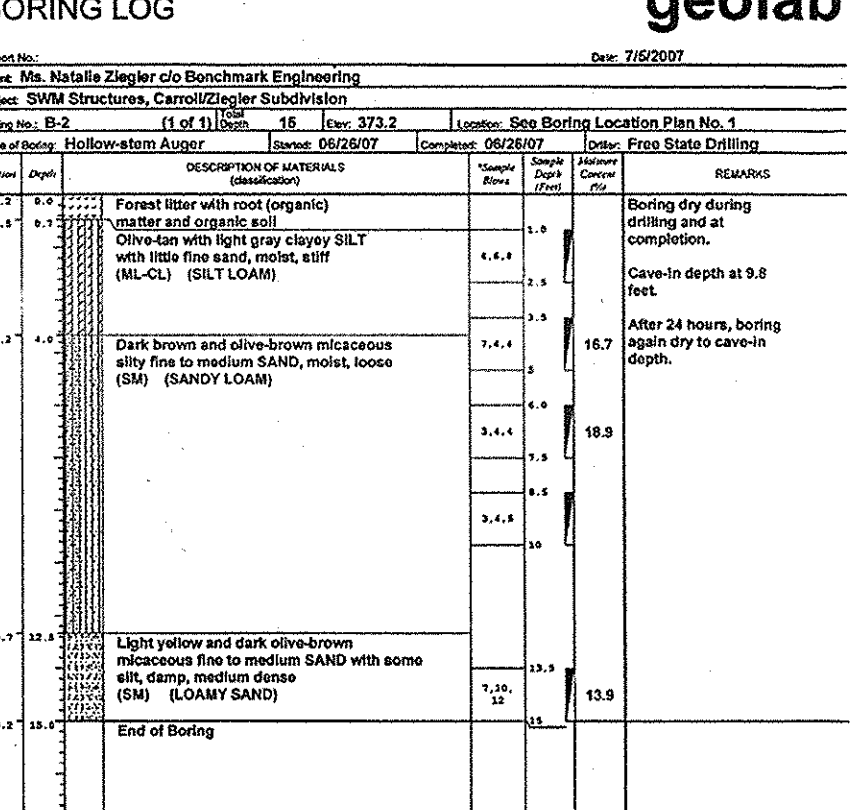
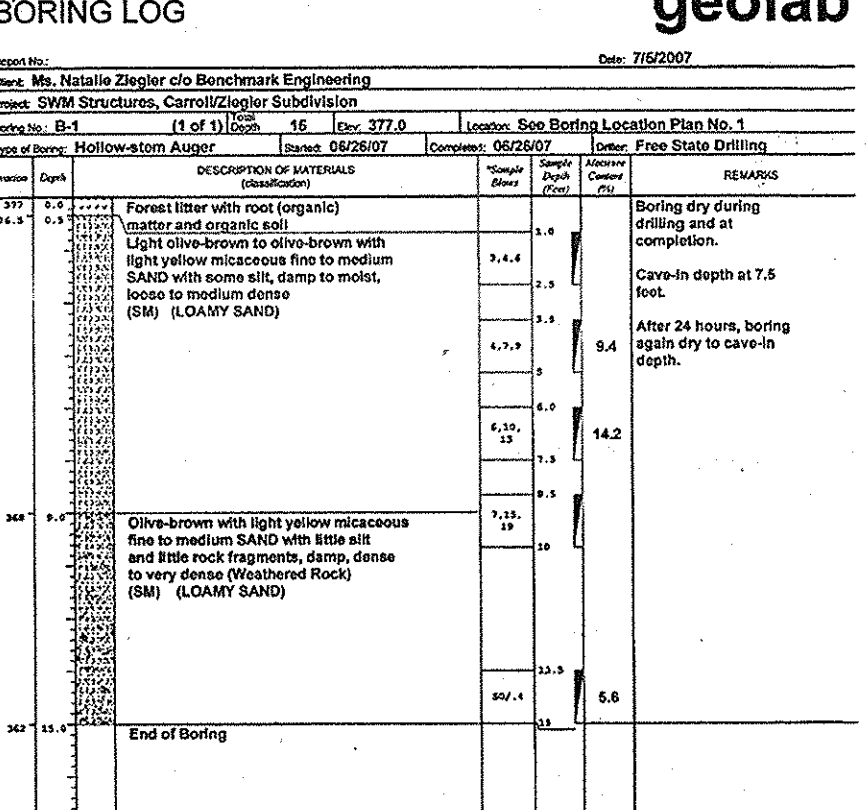
Boring No.	Soil Classification	Depth (feet)
B-3	0.6 to 15.0"	
B-4	8.0 to 12.0"	
B-5	3.0 to 15.0"	
B-6	12.5 to 15.0"	
B-7	8.5 to 15.0"	
B-8	5.5 to 15.0"	
B-9	6.0 to 15.0"	
B-10	0.6 to 15.0"	

* Although the shallow stratum at these boring locations classifies as SANDY LOAM, it is our opinion that these soils may, due to the presence of clayey silt, be somewhat less permeable than the corresponding infiltration. For this reason, they are discounted.

** Infiltration may be restricted by the presence of the top of bedrock. Considering the results of this boring (No. B-10), auger refusal may be present within 2 to 4 feet of the terminated drilling depth of 15.0 feet.

The above-listed USDA infiltration rates appear to be somewhat lower than the recorded field percolation/infiltration rates. The differences may be due to variations in the overall subsurface profile not revealed by the test borings performed for this study. In our experience, the field rates provide a more accurate assessment of the actual infiltration characteristics of the native soils.

It should also be mentioned that, with the exception of Test Boring No. B-1, bedrock (auger refusal) and groundwater were not encountered in the borings performed for this study. On this basis, infiltration appears to be feasible at all the explored locations at the field percolation and USDA infiltration rates. With respect to the various test borings, infiltration appears to be most feasible at the locations of Test Boring Nos. B-1, B-9, B-10 and the deepest portion of No. B-6.



TEMPORARY SEEDBED PREPARATIONS

APPLY TO GRADED OR LEAVED AREAS LIKELY TO BE REDISTURBED WHERE A SHORT-TERM VEGETATIVE COVER IS NEEDED.

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

SOIL AMENDMENTS: APPLY 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ FT), SEEDING: FOR PERIOD MARCH 1 THROUGH APRIL 30 AND FROM AUGUST 15 THROUGH NOVEMBER 15, SEED WITH 2-1/2 BUSHELS PER ACRE OF ANNUAL RYE (3.2 LBS/1000 SQ FT). FOR THE PERIOD MAY 1 THROUGH AUGUST 14, SEED WITH 3 LBS PER ACRE OF REPERNO LOWGRASS (0.7 LBS/1000 SQ FT). FOR THE PERIOD NOVEMBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SO.

MULCHING: APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ FT) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS, ON SLOPES, 8 FT. OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ FT) FOR ANCHORING.

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED.

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

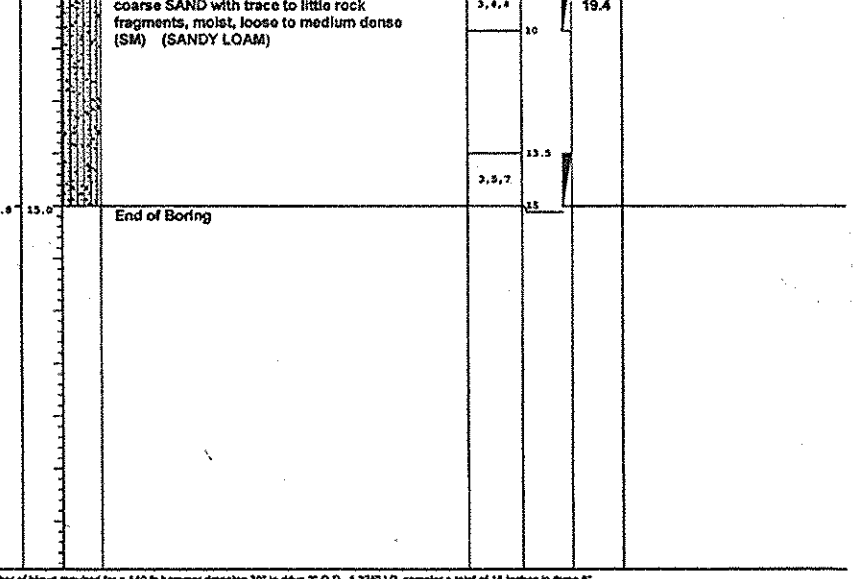
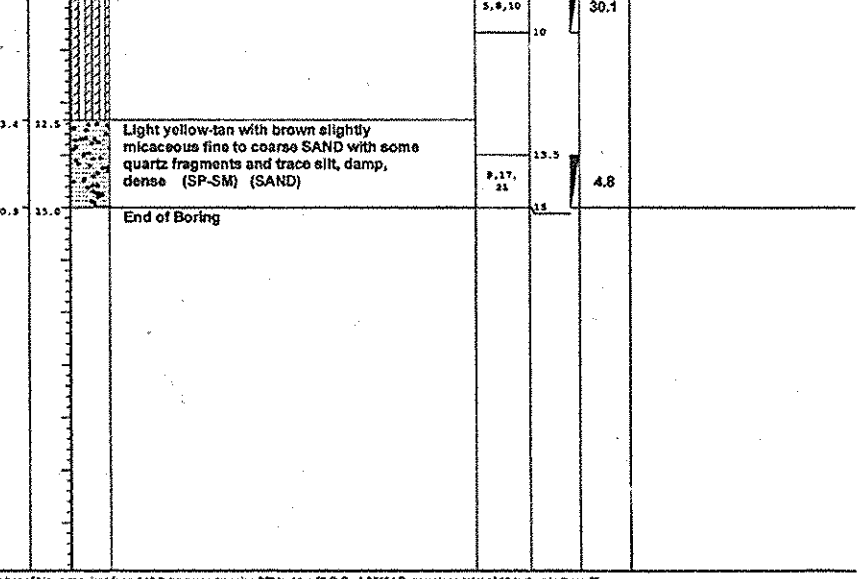
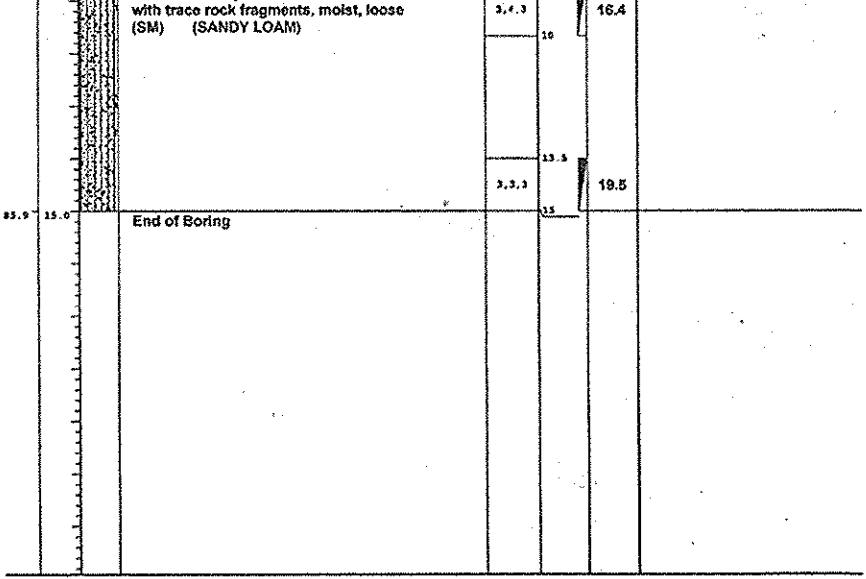
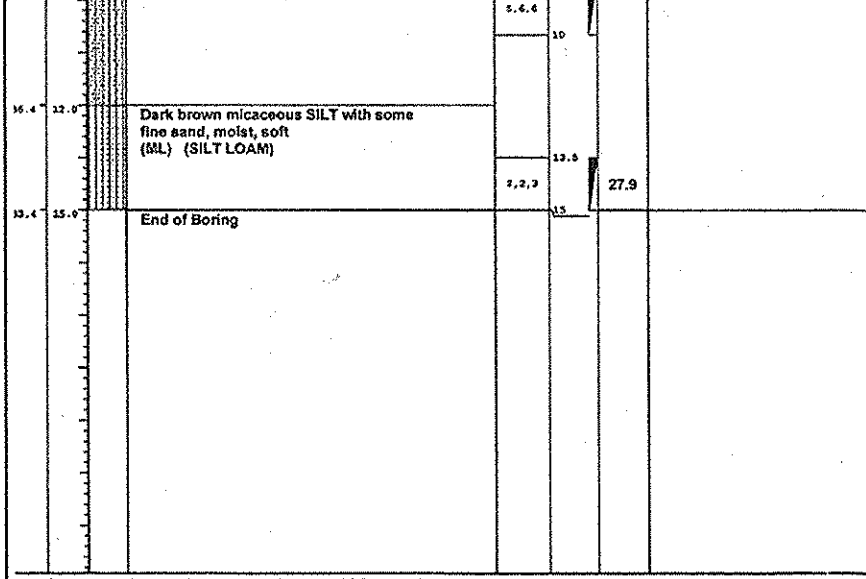
SOIL AMENDMENTS: IN LIEU OF SOIL TEST RECOMMENDATIONS, USE ON OF THE FOLLOWING SCHEDULES:

- PREFERRED - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR DISK INTO UPPER THREE INCHES OF SOIL AT TIME OF SEEDING. APPLY 400 LBS PER ACRE 30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ FT).
- ACCEPTABLE - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 1000 LBS PER ACRE 10-10-10 FERTILIZER (23 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR DISK INTO UPPER THREE INCHES OF SOIL AT TIME OF SEEDING. APPLY 400 LBS PER ACRE 30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ FT).

SEEDING: FOR THE PERIODS MARCH 1 THROUGH APRIL 30 AND AUGUST 1 THROUGH OCTOBER 15, SEED WITH 60 LBS PER ACRE (1.4 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (0.5 LBS/1000 SQ FT) OF WEEPER LOWGRASS. DURING THE PERIOD FEBRUARY 28 THROUGH FEBRUARY 28, PROTECT SITE BY OPTION (1) 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) USE SO, OPTION (3) SEED WITH 60 LBS PER ACRE OF KENTUCKY 31 TALL FESCUE AND MULCH WITH 2 TONS PER ACRE OF WELL ANCHORED STRAW.

MULCHING: APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ FT) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS, ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ FT) FOR ANCHORING.

MAINTENANCE: INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDINGS.



APPROVED: THIS DEVELOPMENT IS APPROVED FOR EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

[Signature] 10/23/08
 HOWARD SOIL CONSERVATION DISTRICT
 DATE

ENGINEER'S CERTIFICATE

I hereby certify that this plan for erosion and sediment control represents a practical and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation District.

[Signature] 10/16/08
 DATE

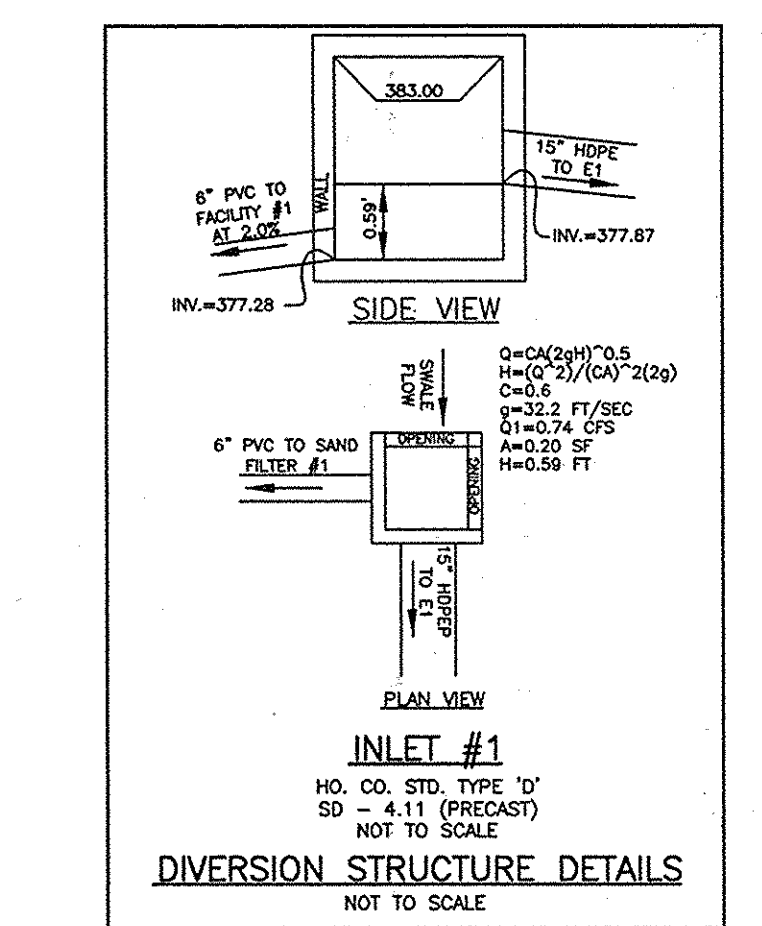
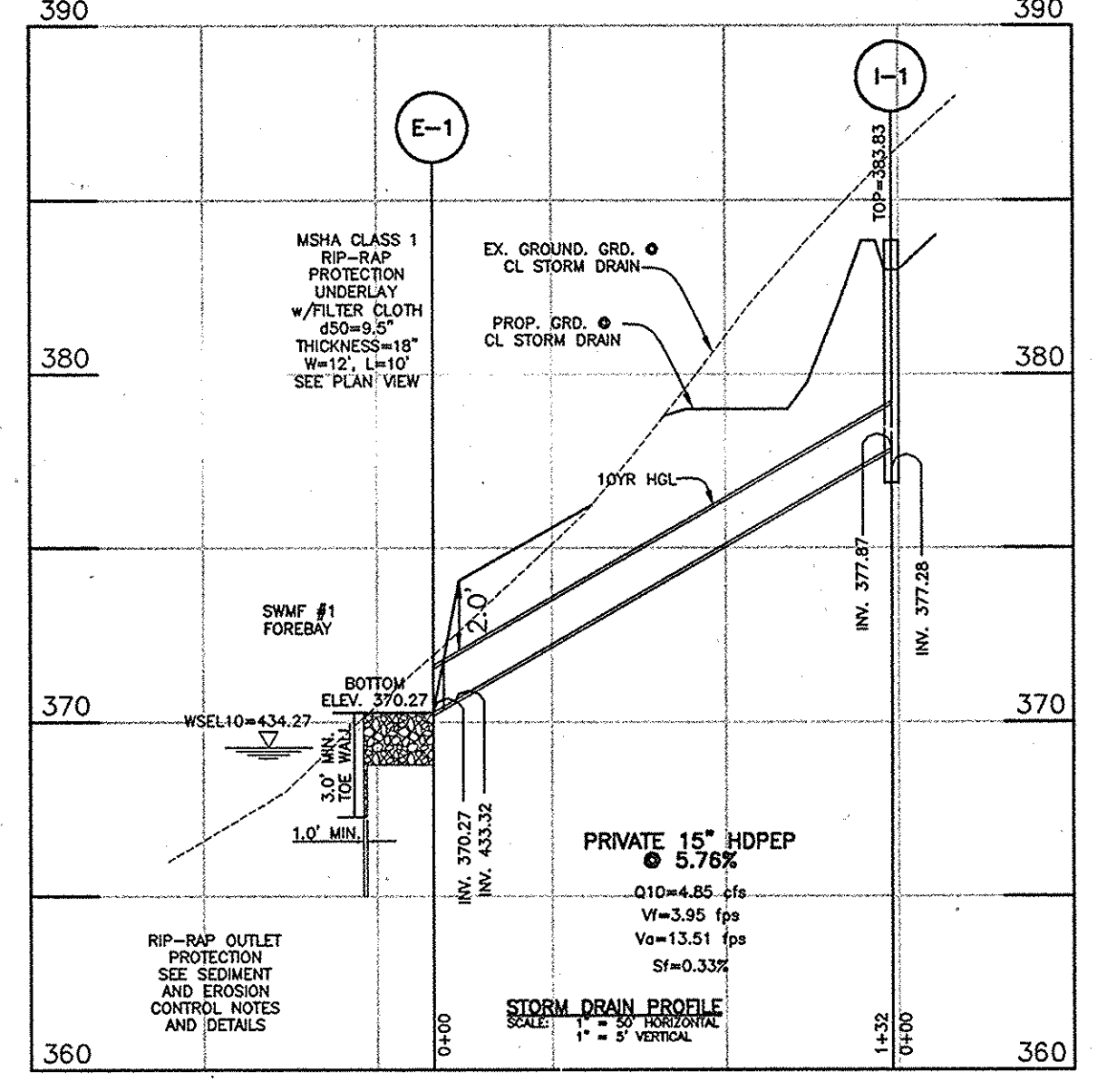
DEVELOPER'S CERTIFICATE

I/We certify that all development and construction will be done in accordance with this plan of development and plan for erosion and sediment control and that all responsible personnel involved in the construction of this project will have a certificate of attendance at a Department of the Environment approved training program for the control of sediment and erosion before beginning the project. I also authorize periodic on-site inspection by the Howard Soil Conservation District or their authorized agents, as are deemed necessary.

[Signature] 10/16/08
 Signature of Developer
 DATE

STRUCTURE TABLE

NUMBER	TYPE	LOCATION	INVERT IN	INVERT OUT	TOP ELEV.	STANDARD NUMBER	MAINTENANCE
INLETS							
H-1	D	N 577, 196.2364	E 1,339,084.6483		377.28/377.87	383.83	D-4.10 OR 4.11 OPEN 2 SIDES PRIVATE
END SECTIONS							
E-1	15" HDPE	N 577,321.8019	E 1,339,044.0819		370.27		SEE MANUFACTURE SPECS PRIVATE



PIPE SCHEDULE

SIZE	TYPE	LENGTH	MAINTENANCE
15"	HDPE	127	PRIVATE

AREA AND "C" FACTOR TABULATION

CARROLL/ZIEGLER DATE: 4/24/08 1936F
 BULK PARCEL "F" ZONE: RC-DEO

INLET #	ZONING	AREA (AC)	"C" FACTOR	% IMPERVIOUS
1	RC-DEO	1.0	0.28	35

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

[Signature] 10-28-08
 CHEF, BUREAU OF HIGHWAYS
 DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

[Signature] 11/9/08
 CHEF, DIVISION OF LAND DEVELOPMENT
 DATE

[Signature] 10/21/08
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 DATE

BENCHMARK ENGINEERING, INC.

ENGINEERS • LAND SURVEYORS • PLANNERS

8480 BALTIMORE NATIONAL PIKE & SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 phone: 410-465-6105 • fax: 410-465-6644
 *email: Benchmark@cois.com

PROFESSIONAL ENGINEER
 No. 21443
 10/16/08

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL
 4288 MANOR LANE
 ELLICOTT CITY, MARYLAND 21042
 410-740-6880

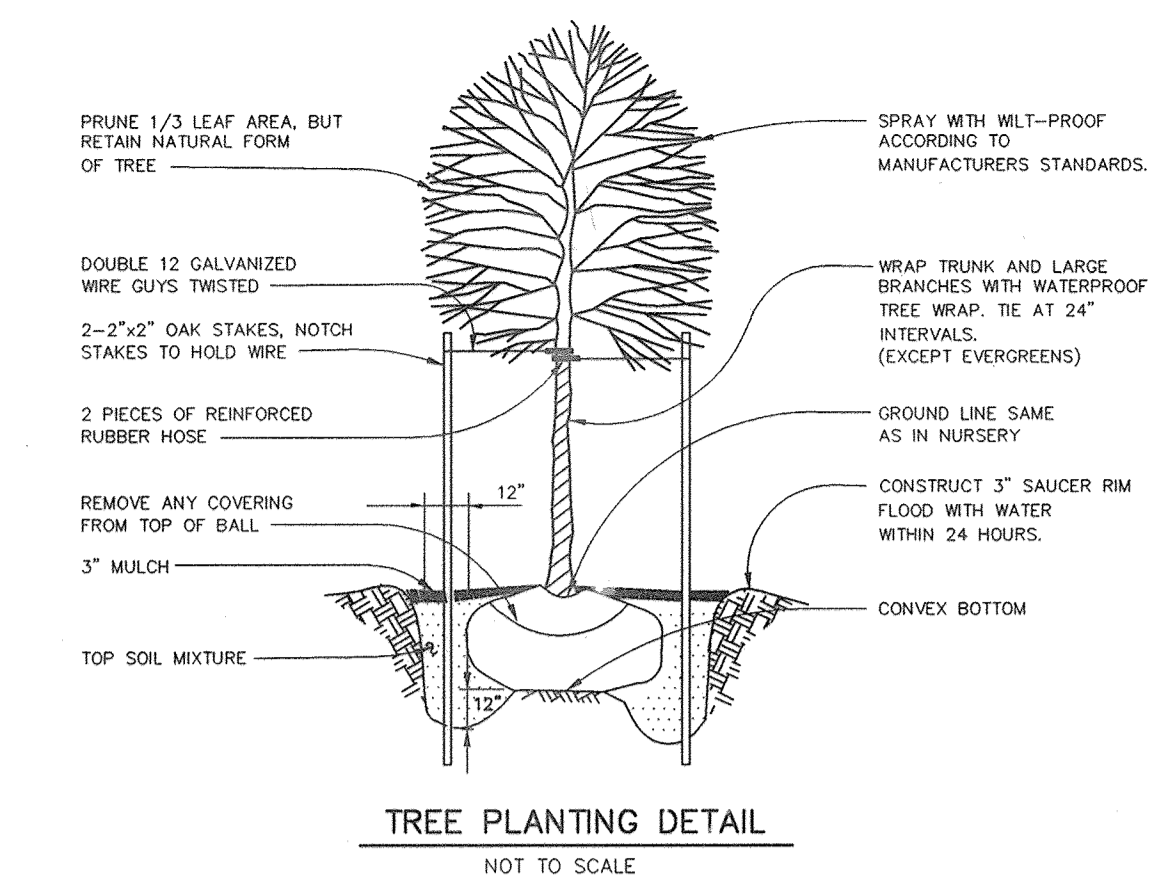
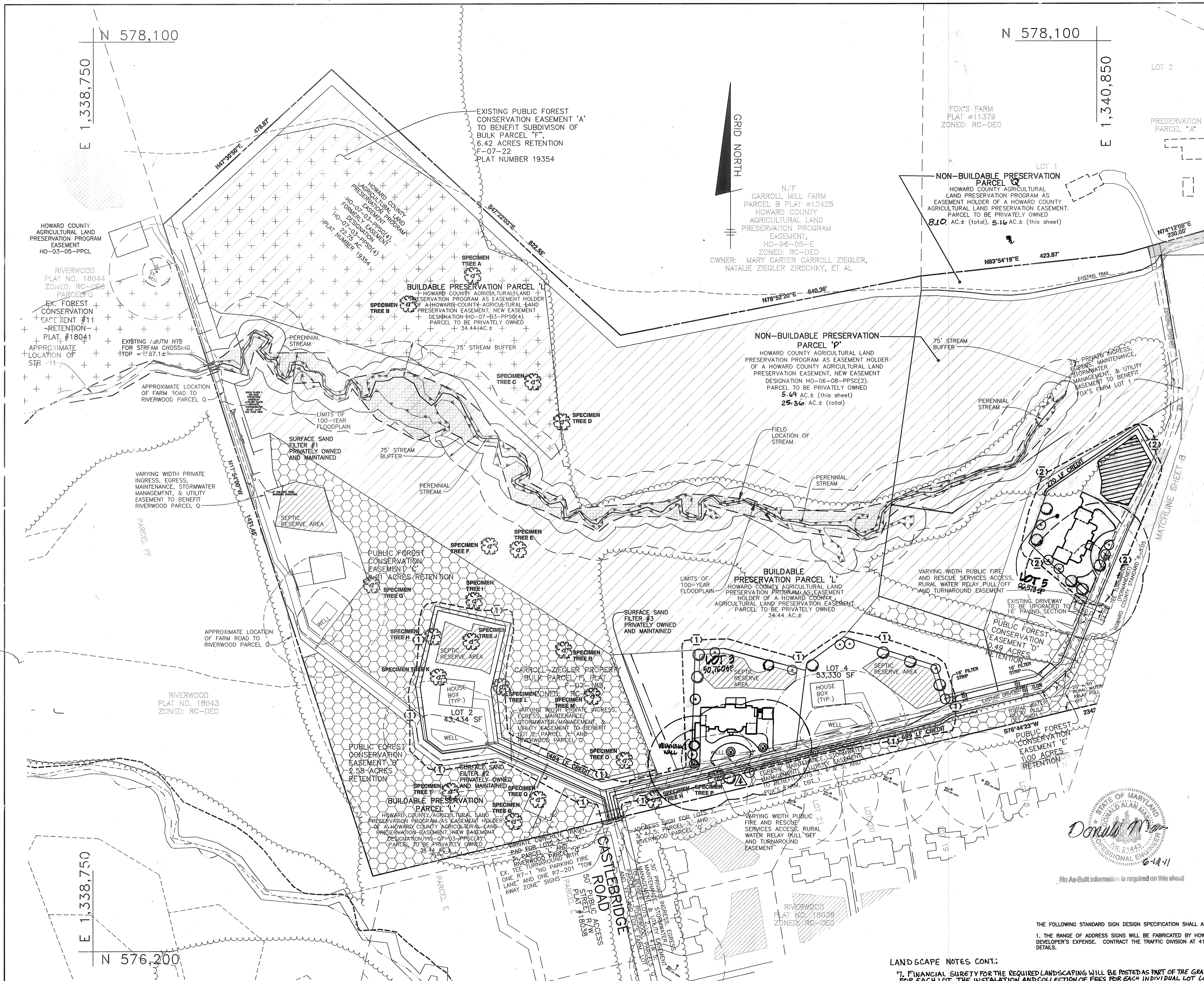
LOCATION: TAX MAP: 23, GRID: 10
 4288 MANOR LANE
 THIRD ELECTION DISTRICTS
 HOWARD COUNTY, MARYLAND

TITLE: SUPPLEMENTAL FINAL STORMWATER MANAGEMENT BORING LOGS, STORM DRAIN SCHEDULES, DETAILS AND PROFILE, GEOTECHNICAL RECOMMENDATIONS & SEDIMENT CONTROL NOTES

DATE: OCTOBER, 2008 **PROJECT NO.:** 1939

DES: JC **DRAFT:** JC **CHECK:** DAM **SCALE:** NA **SHEET:** 6 **OF:** 11

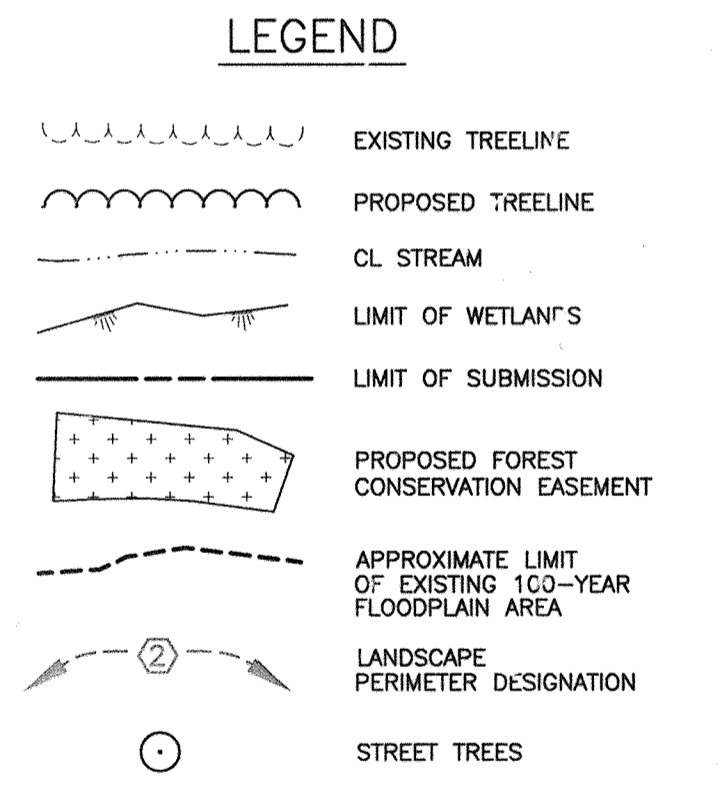
REVISION:
 1 | 1-2-15 REVISE TITLE BLOCK
 NO DATE



- LANDSCAPE NOTES:**
- TREES SHOULD BE PLANTED A MINIMUM OF 5 FEET FROM THE EDGE OF PAVING 5 FEET FROM ANY STORM DRAIN, 20 FEET FROM A STREET LIGHT AND OUTSIDE OF THE 6' PUBLIC STORM DRAIN AND UTILITY EASEMENT THAT RUNS PARALLEL TO THE RIGHT-OF-WAY.
 - TREES MUST BE PLANTED A MINIMUM OF 5 FEET FROM AN OPEN SPACE ACCESS STRIP AND 10 FEET FROM A DRIVEWAY.
 - SEE TREE PLANTING DETAIL - THIS SHEET.
 - THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL.
 - THE DEVELOPER SHALL BE RESPONSIBLE FOR STREET TREES, THE BUILDER SHALL BE RESPONSIBLE FOR STORMWATER MANAGEMENT FACILITY PERIMETER PLANTING AND PRESERVATION OF THE PERIMETER VEGETATION AS SHOWN ON THESE PLANS.
 - ALL VEGETATION IS TO BE REMOVED WITHIN 15' OF THE TOE OF THE SLOPE OF THE PROPOSED EMBANKMENT.
 - AT THE TIME OF PLANT INSTALLATION, ALL SHADE AND EVERGREEN TREES LISTED AND APPROVED ON THE LANDSCAPE PLANS, SHALL COMPLY WITH THE PROPER HEIGHT REQUIREMENTS IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION NO SUBSTITUTIONS OR RELOCATIONS OF THE REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THE APPROVED LANDSCAPE PLANS MAY RESULT IN DENIAL OR DELAY IN THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND / OR REVISIONS ARE MADE TO THE APPLICABLE PLANS.
 - THE OWNERS, TENANTS AND / OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALLS. ALL PLANTS MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION, AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.

PHASE 1 - SCHEDULE A PERIMETER LANDSCAPE EDGE

CATEGORY	ADJ. TO PERIMETER PROP. (1)	ADJ. TO PERIMETER PROP. (2)	ADJ. TO PERIMETER PROP. (3)	TOTAL
LANDSCAPE TYPE	A	A	A	
LINEAR FEET OF PERIMETER OR ROADWAY FRONTAGE	3280'	935'	1617'	5667'
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	YES* 2162'	YES* 270'	NO	2432'
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	
NUMBER OF PLANTS REQUIRED/PROVIDED (SHADE TREES, EVERGREEN TREES, OTHER TREES (2:1 SUBSTITUTE) SHRUBS)	1118'	665'	1617'	2400'
	19	11	27	57
	-	-	-	-
	-	-	-	-



STREET TREE SCHEDULE

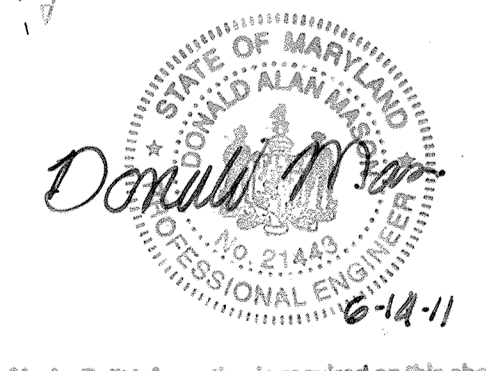
ROAD NAME	PERIMETER	TREES SIZE	TREES REQ.
DORSCH FARM ROAD	126'	SMALL	4

PUBLIC STREET TREE PLANTING LIST - DORSCH FARM ROAD WAY

SYMBOL	QUANTITY	NAME	REMARKS	STREET TREES TO BE PROVIDED BY THE DEVELOPER
(Symbol)	4	PRUNUS SERRULATA 'KWANZAN' (Kwanzan Cherry)	1 1/2" MIN. CAL. 80% FULL HEAD	

LANDSCAPE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS	DESCRIPTION
(Symbol)	29	QUERUS RUBRA (Red Oak)	2-1/2" - 3" cal.	SHADE TREES ALONG PERIMETER TO BE PROVIDED BY THE DEVELOPER
(Symbol)	28	TILIA CORDATA (Greenspire)	2-1/2" - 3" cal.	SHADE TREES ALONG PERIMETER TO BE PROVIDED BY THE DEVELOPER



THE FOLLOWING STANDARD SIGN DESIGN SPECIFICATION SHALL APPLY:

- THE RANGE OF ADDRESS SIGNS WILL BE FABRICATED BY HOWARD COUNTY AT THE DEVELOPER'S EXPENSE. CONTRACT THE TRAFFIC DIVISION AT 410-313-5752 FOR DETAILS.

- LANDSCAPE NOTES CONT.:**
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL BE POSTED AS PART OF THE GRADING PERMIT FOR EACH LOT. THE INSTALLATION AND COLLECTION OF FEES FOR EACH INDIVIDUAL LOT LOCATED WITHIN THIS SUBDIVISION AS A RESULT OF THE 11-11-08 ARE AS FOLLOWS:
 - LOT 2 - NO SURETY
 - LOT 3 - \$3,300 FOR 11 SHADE TREES
 - LOT 4 - \$2,400 FOR 8 SHADE TREES
 - LOT 5 - \$3,300 FOR 11 SHADE TREES
 - LOT 6 - \$4,500 FOR 15 SHADE TREES
 - LOT 7 - \$3,600 FOR 12 SHADE TREES
 - TOTALING \$17,100 FOR 57 SHADE TREES

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William R. ... 10-28-08
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

Andy ... 11/26/08
CHIEF, DIVISION OF LAND DEVELOPMENT

... 10/21/08
CHIEF, DEVELOPMENT ENGINEERING DIVISION

DEVELOPER'S/BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION OF A LETTER OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE-YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

Natalie Ziegler 10/17/08
NATALIE ZIEGLER
OWNER

NO.	DATE	REVISION
4	6/10/10	REVISED PER PLAN ON LOT 3 AND REVISED SIGN TO 1 MICRO-DIG AND 3 DRIVELANDS
3	9/22/10	REVISED PER PLAN ON LOT 3 AND REVISED SIGN TO 1 MICRO-DIG AND 3 DRIVELANDS
2	12-2-10	REVISE ADDRESS ON PARCELS P & Q, REVISE TITLE BLOCK
1	10-26-10	RECONFIGURATION OF LOTS 6 & 7
		REVISION

BENCHMARK ENGINEERS, LAND SURVEYORS & PLANNERS, INC.

8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLCOTT CITY, MARYLAND 21043
phone: 410-465-6105 • fax: 410-465-6844
email: Benchmark@ccils.com

Professional Certification. 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. 21443, Expiration Date: 12-31-2008

Donald M. ... 10/16/08

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL
4288 MANOR LANE
ELLCOTT CITY, MARYLAND 21042
410-740-6880

LOCATION: TAX MAP: 23, Grid: 10
P.O. BOX 130
THIRD ELECTION DISTRICTS
HOWARD COUNTY, MARYLAND

TITLE: SUPPLEMENTAL FINAL LANDSCAPE PLAN

DATE: OCTOBER, 2008 PROJECT NO. 1939-F

DES: JC DRAFT: JC CHECK: DAM SCALE: 1" = 100' SHEET 7 OF 11



- LEGEND**
- EXISTING TREELINE
 - PROPOSED TREELINE
 - CL. STREAM
 - LIMIT OF WETLANDS
 - LIMIT OF SUBMISSION
 - PROPOSED FOREST CONSERVATION EASEMENT
 - APPROXIMATE LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
 - LANDSCAPE PERIMETER DESIGNATION
 - STREET TREES

4	11/11/09	REVISE DRIVEWAYS & EASEMENTS PER F-18-005 AND ADD INFORMATION FROM F-18-005 FOR CLARITY
2	1-2-10	REVISE LOT LINE CREATING PARCELS P, Q, R, REVISE TITLE BLOCK
1	10-27-10	RECONFIGURATION OF LOTS 6 & 7
NO.	DATE	REVISION

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS
 8480 BALTIMORE NATIONAL PIKE & SUITE 418
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 phone: 410-455-6105 & fax: 410-465-6644
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Professional Certification. 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. 21443, Expiration Date: 12-31-2009.

Donald Mason
 DONALD MASON
 PROFESSIONAL ENGINEER
 No. 21443
 10/16/08

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William J. Marshall
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

Cindy Hamblin
 CHIEF, DIVISION OF LAND DEVELOPMENT

DATE: 10-29-08
 DATE: 11/3/08
 DATE: 10/17/08

DEVELOPER'S/BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION OF A LETTER OF LANDSCAPE INSTALLATION ACCOMPANIED BY AN EXECUTED ONE-YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

Natalie Ziegler
 NATALIE ZIEGLER
 OWNER

Professional Certification. 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. 45577, Expiration Date: 06/08/2020

11/1/09
 FOR REV. 4 ONLY

Donald Mason
 DONALD MASON
 PROFESSIONAL ENGINEER
 No. 21443
 6-14-11

AS-BUILT CERTIFICATION

I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.

Donald Mason, P.E. No. 21443
 Date: 6-14-11

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL 425B MANOR LANE ELLICOTT CITY, MARYLAND 21042 410-740-6880	LOCATION: TAX MAP: 23, GRID: 10 P/O PARCEL: 130 THIRD ELECTION DISTRICTS HOWARD COUNTY, MARYLAND
TITLE: SUPPLEMENTAL FINAL LANDSCAPE PLAN	DATE: OCTOBER, 2008 PROJECT NO. 1939-F
DES: JC DRAFT: JC CHECK: DAM	SCALE: 1" = 100' SHEET 8 OF 11



Key	Species, Size	Condition	Retained
A	Liriodendron tulipifera, 30" dbh	Good	Yes
B	Liriodendron tulipifera, 42" dbh	Good	Yes
C	Liriodendron tulipifera, 58" dbh	Good	Yes
D	Liriodendron tulipifera, 48" dbh	Good	Yes
E	Liriodendron tulipifera, 30" dbh	Good	Yes
F	Liriodendron tulipifera, 30" dbh	Good	Yes
G	Liriodendron tulipifera, 30" dbh	Good	Yes
H	Carya glabra, 42" dbh	Good	No
I	Liriodendron tulipifera, 52" dbh	Fair	Yes
J	Liriodendron tulipifera, 30" dbh	Good	Maybe
K	Liriodendron tulipifera, 30" dbh	Good	No
L	Liriodendron tulipifera, 34" dbh	Good	Yes
M	Liriodendron tulipifera, 40" dbh	Good	Yes
N	Liriodendron tulipifera, 40" dbh	Good	Yes
O	Liriodendron tulipifera, 50" dbh	Good	Yes
P	Liriodendron tulipifera, 40" dbh	Good	Maybe
Q	Liriodendron tulipifera, 44" dbh	Good	Yes
R	Liriodendron tulipifera, 54" dbh	Good	Yes
S	Liriodendron tulipifera, 32" dbh	Good	Yes
T	Liriodendron tulipifera, 30" dbh	Good	Yes

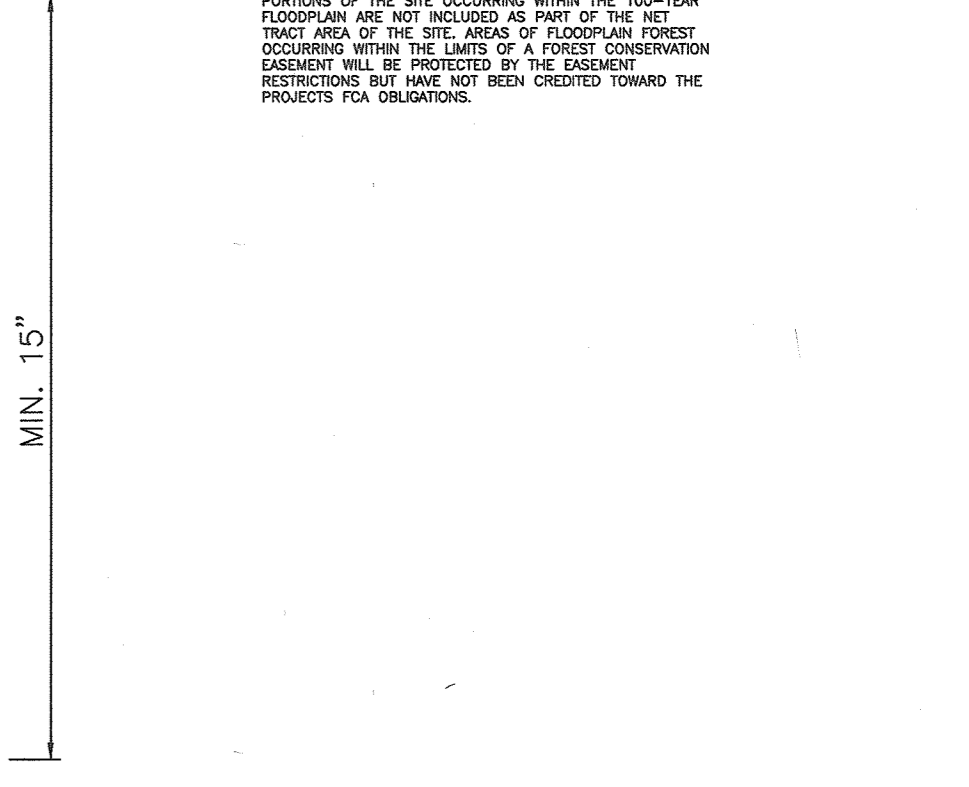
FCP NOTES

- Any Forest Conservation Easement (FCE) area shown herein is subject to protective covenants which may be found in the Land Records of Howard County which restrict the disturbance and use of these areas.
- Forensic areas occurring outside of the FCE shall not be considered part of the FCE and shall not be subject to protective land covenants.
- Limits of disturbance shall be restricted to areas outside the limit of temporary fencing or the FCE boundary, whichever is greater.
- There shall be no clearing, grading, construction or disturbance of vegetation in the Forest Conservation Easement, except as permitted by Howard County DPZ.
- No stockpiles, parking areas, equipment cleaning areas, etc. shall occur within areas designated as Forest Conservation Easements.
- Temporary fencing shall be used to protect forest resources during construction. Fencing shall be installed along limits of disturbance occurring within 50 feet of the proposed forest retention limits.
- Forest Conservation Act requirements for this project will require 14.5 acres of retention within an easement. This plan is providing 6.18 acres of forest conservation, 6.42 acres of forest retention was provided on Parcel "F" for this subdivision under F-07-22. This subdivision is satisfying its forest conservation obligation by meeting the "Break-Even Point" with the 14.5 acres of forest retention. Financial surety for the required forest conservation in the amount of \$126,324.00 shall be paid as part of the DPW's developer's agreement.

FOREST RETENTION AREA

MACHINERY, DUMPING OR STORAGE OF ANY MATERIALS IS PROHIBITED

VIOLATORS ARE SUBJECT TO FINES AS IMPOSED BY THE HOWARD COUNTY FOREST CONSERVATION ACT OF 1992



SIGNAGE

NOT TO SCALE

MIN. 11"

ANCHOR POSTS SHOULD BE MIN. 2" STEEL "U" CHANNEL OR 2"x2" TIMBER, 6' LENGTH

HIGHLY VISIBLE FLAGGING

USE 2"x4" LUMBER FOR CROSS BRACING

ANCHOR POSTS MUST BE INSTALLED TO A DEPTH OF NO LESS THAN 1/3 OF THE TOTAL HEIGHT OF THE POST.

USE 8" WIRE "U" TO SECURE FENCE BOTTOM

NOTES:

- BLAZE ORANGE OF BLUE PLASTIC MESH FENCE FOR FOREST PROTECTION DEVICE ONLY.
- BOUNDARIES OF RETENTION AREA WILL BE ESTABLISHED AS PART OF THE FOREST CONSERVATION PLAN REVIEW PROCESS.
- BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICE.
- AVOID DAMAGE TO CRITICAL ROOT ZONE. DO NOT DAMAGE OF SEVER LARGE ROOTS WHEN INSTALLING POSTS.
- PROTECTIVE SIGNS ARE REQUIRED.
- DEVICE SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION.

ADAPTED FROM PRINCE GEORGE'S COUNTY, MARYLAND, WOODLAND CONSERVATION MANUAL AND FOREST CONSERVATION MANUAL, 1991.

PLASTIC MESH TREE PROTECTION FENCE



LEGEND

- (11) COORDINATE POINT
- STREAM
- PRESERVATION EASEMENT
- SEPTIC EASEMENT
- TREELINE
- FAILED PERCOLATION TEST LOCATION
- PASSED PERCOLATION TEST LOCATION
- EXISTING CONTOURS
- LIMIT OF WETLANDS
- LIMIT OF SUBMISSION
- FOREST CONSERVATION EASEMENT
- WELL
- 1500 SQ FT WELL
- LIMIT OF DISTURBANCE
- STABILIZED CONSTRUCTION ENTRANCE
- FOREST CONSERVATION SIGNAGE
- EX. FOREST CONSERVATION EASEMENT
- 100 YEAR FLOODPLAIN LIMITS

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

W. J. ... 10-28-08
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

Cindy ... 11/2/08
CHIEF, DIVISION OF LAND DEVELOPMENT

... 10/26/10
CHIEF, DEVELOPMENT, ENGINEERING DIVISION

No.	DATE	REVISION
1	11-11-11	REVISE DRIVEWAYS AND CHANGING FROM F-18-009 AND ADD INFORMATION FROM F-18-001 FOR CLARITY
2	5/19/10	REMOVE HATCH AND LOT 2, AND CHANGING FROM 1 MICRO BIO AND 3 VIBRATORY
3	5/12/10	DATE HATCH ON LOT 2, HOOPY DRIVEWAY, PERMIT CONTROL, SEPTIC SYSTEM, BOX & ADD CHANGING FOR PERCOLATION FROM TO NON-BUILDABLE PRESERVATION PARCEL
4	1-7-15	REVISE ACE EDGE ON PARCELS 4 & 7, REVISE TITLE BLOCK
5	10-26-10	REVISE PARCEL M BOUNDARY PER PLAT

Professional Certification. 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. 45577 Expiration Date: 08-08-2020

Eco-Science Professionals, Inc.

CONSULTING ECOLOGISTS

MD DNR Qualified Professional
USACE Wetland Deliberator
Certificate # 3707972/020109-012

P.O. Box 5026 Glen Artn, MD 21057 (410) 592-6752

BENCHMARK ENGINEERING, INC.

ENGINEERS • LAND SURVEYORS • PLANNERS

8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 • fax: 410-465-6644
email: Benchmark@ecis.com

Professional Certification. 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. 2,443, Expiration Date: 12-21-2008

David M. ... 10/16/08

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL
4228B MANOR LANE
ELLICOTT CITY, MARYLAND 21042
410-740-6880

LOCATION: TAX MAP 23, GRID: 10
3/0 PARCELS: 130
THIRD ELECTION DISTRICTS
HOWARD COUNTY, MARYLAND

TITLE: SUPPLEMENTAL FINAL FOREST CONSERVATION PLAN

DATE: OCTOBER, 2008 PROJECT NO. 1939-F

DES: JC DRAFT: JC CHECK: DAM SCALE: 1" = 100' SHEET 9 OF 11

FCE ACREAGE CHART			
EASEMENT #	TYPE	ACREAGE OF RETENTION	ACREAGE OF REFORESTATION
FCE 'A'	RETENTION	6.42 AC.	0.00 AC.
FCE 'B-1'	RETENTION	2.54 AC.	0.00 AC.
FCE 'C'	RETENTION	4.01 AC.	0.00 AC.
FCE 'D'	RETENTION	0.49 AC.	0.00 AC.
FCE 'E'	RETENTION	1.00 AC.	0.00 AC.
FCE 'F'	RETENTION	0.98 AC.	0.00 AC.
TOTALS		14.50 AC.	0.00 AC.

FOREST CONSERVATION WORKSHEET
Version 1.0

Project: Carroll/Ziegler
Date: September 12, 2008

NET TRACT AREA	Acres
A. Total tract area	75.7
B. Area within 100 Year Floodplain	2.1*
C. Area to remain in agricultural production - unreforested ag pres.	30.3**
D. Net Tract Area	43.3

LAND USE CATEGORY: (from table 3.2.1, page 40, Manual)	ARA	MOR	IDA	HDR	MPD	CIA
A. Afforestation Threshold (percentage)	0.20					8.7
F. Conservation Threshold (percentage)	0.25					10.8

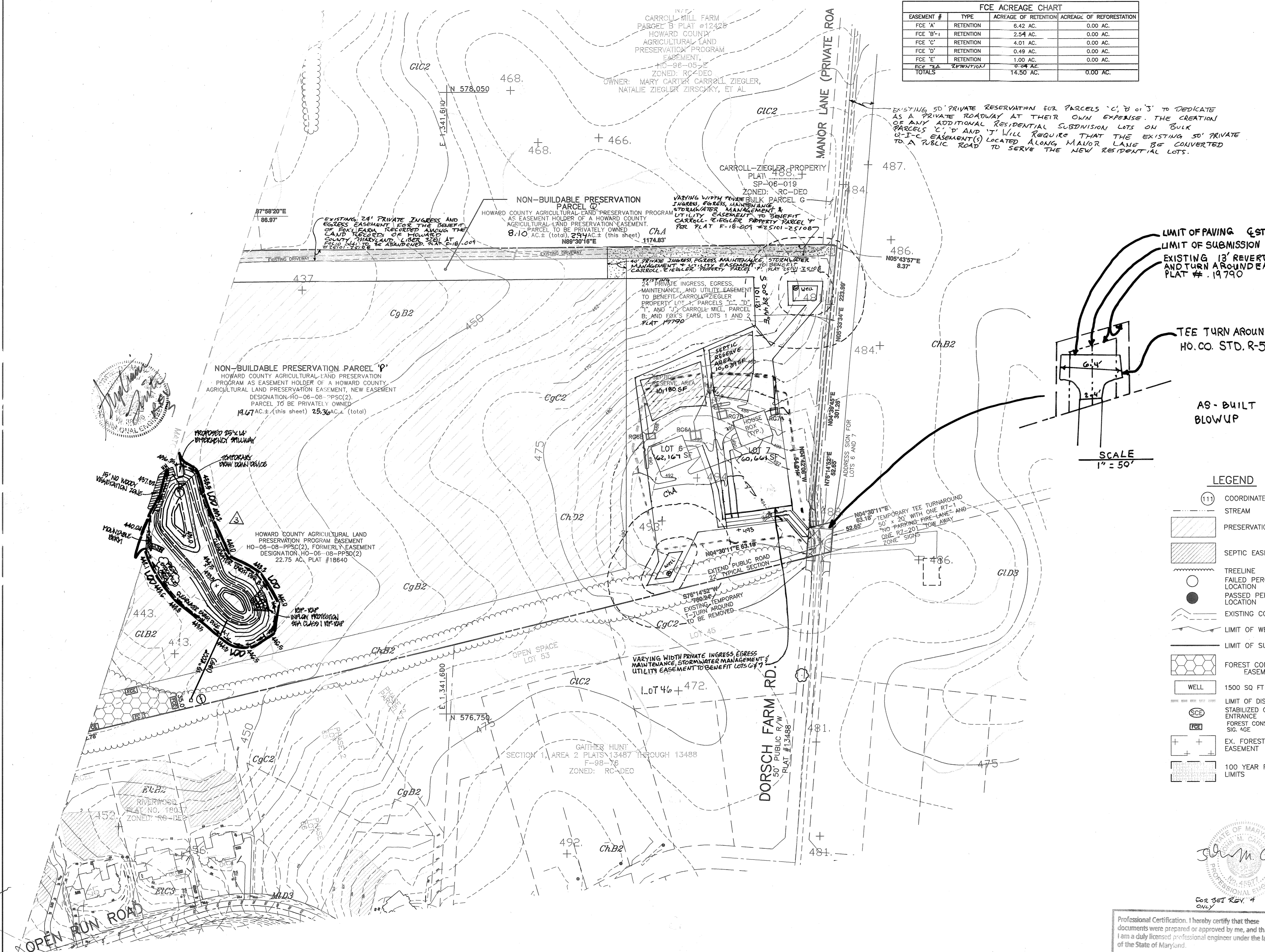
EXISTING FOREST COVER:	
G. Existing forest cover (excluding floodplain)	29.0
H. Area of forest above afforestation threshold	20.3
I. Area of forest above conservation threshold	18.2

BREAK EVEN POINT:	
J. Forest retention above threshold with no mitigation	14.4
K. Clearing permitted without mitigation	Break-Even Point
	14.6

PROPOSED FOREST CLEARING	
L. Total area of forest to be cleared or retained outside FCE	14.5
M. Total area of forest to be retained in FCE	14.5

PLANTING REQUIREMENTS	
N. Reforestation for clearing above Conservation Threshold	3.6
P. Reforestation for clearing below Conservation Threshold	0
Q. Credit for retention above conservation threshold	3.7
R. Total reforestation required	0
S. Total afforestation required	0
T. Total reforestation and afforestation required	0

* 0.18 acres of this total is within the limits of Parcel 'G' but outside of the limits of the floodplain.
** Area to remain in agricultural production within Parcel 'G' but outside of the limits of the floodplain.



EXISTING 50' PRIVATE ROADWAY RESERVATION FOR PARCELS 'C', 'D' or 'J' TO DEDICATE AS A PRIVATE ROADWAY AT THEIR OWN EXPENSE. THE CREATION OF ANY ADDITIONAL RESIDENTIAL SUBDIVISION LOTS ON BULK PARCELS 'C', 'D' AND 'J' WILL REQUIRE THAT THE EXISTING 50' PRIVATE U-I-C EASEMENT(S) LOCATED ALONG MANOR LANE BE CONVERTED TO A PUBLIC ROAD TO SERVE THE NEW RESIDENTIAL LOTS.

LIMIT OF PAVING @ STA. 48+31
LIMIT OF SUBMISSION @ STA. 48+41
EXISTING 13' REVERSIBLE GRADING AND TURN AROUND EASEMENT PLAT # 19790

TEE TURN AROUND HO. CO. STD. R-5.06

AS-BUILT BLOWUP

SCALE 1" = 50'

- LEGEND**
- (11) COORDINATE POINT
 - STREAM
 - PRESERVATION EASEMENT
 - SEPTIC EASEMENT
 - TREELINE
 - FAILED PERCOLATION TEST LOCATION
 - PASSED PERCOLATION TEST LOCATION
 - EXISTING CONTOURS
 - LIMIT OF WETLANDS
 - LIMIT OF SUBMISSION
 - FOREST CONSERVATION EASEMENT
 - WELL
 - LIMIT OF DISTURBANCE
 - ENTRANCE
 - EX. FOREST CONSERVATION EASEMENT
 - 100 YEAR FLOODPLAIN LIMITS

**SEE THE FINAL RECORD PLAT FOR FOREST CONSERVATION EASEMENT BEARINGS AND DISTANCES.

SEE SHEET 9 FOR FOREST CONSERVATION NOTES AND SIGNAGE DETAIL

SITE ANALYSIS DATA CHART

- GENERAL SITE DATA
- PRESENT ZONING: RC-DEO
 - APPLICABLE DPZ FILE REFERENCES: F-07-022, SP-06-019, STD
 - PROPOSED USE OF SITE: [Blank]
 - PROPOSED WATER AND SEWER SYSTEMS: PRIVATE

- AREA TABULATION
- GROSS TRACT AREA: 75.7 AC.±
 - AREA WITHIN 100-YEAR FLOODPLAIN: 2.06 AC.±*
 - UNREFORESTED AG. LAND: 30.31 AC.±**
 - NET TRACT AREA: 43.3 AC.±

* 0.18 acres of this total is within the limits of Parcel 'G' but outside of the limits of the floodplain.
** Area to remain in agricultural production within Parcel 'G' but outside of the limits of the floodplain.

This subdivision is using the Rural Cluster Option C from Appendix L of the Forest Conservation Manual to calculate its forest conservation obligation which allows evaluation, inclusion or exclusion of individual preservation parcels from the net tract area.

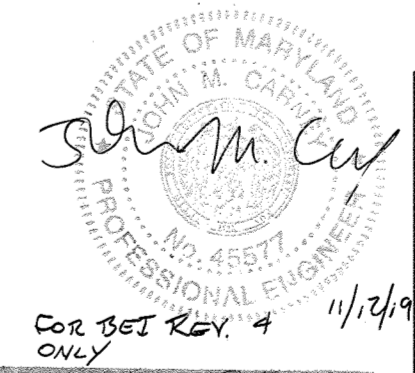


AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donal Mason, P.E. No. 21443 Date 6-14-11

Eco-Science Professionals, Inc.
CONSULTING ECOLOGISTS

MD DNR Qualified Professional
USACOE Wetland Deliberator
Certification # WDC0000010442

P.O. Box 7006 Glen Arm, MD 21057 (410) 592-6752



Professional Certification. 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. 15527 Expiration Date: 06/08/2020

BENCHMARK ENGINEERING, INC.
ENGINEERS & LAND SURVEYORS & PLANNERS

8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 & fax: 410-465-6644
email: ben.hmrk@bca.com

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL 'L' AND NON-BUILDABLE PRESERVATION PARCELS 'P' AND 'Q', A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL 'F'

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL, 4289 MANOR LANE, ELLICOTT CITY, MARYLAND 21042, 410-740-6880

LOCATION: TAX MAP 23, GRID-10, 5/0 PARCEL, THIRD ELECTION DISTRICTS, HOWARD COUNTY, MARYLAND

TITLE: SUPPLEMENTAL FINAL FOREST CONSERVATION PLAN

DATE: OCTOBER, 2008 PROJECT NO. 1939-F

SCALE: 1" = 100' SHEET 10 OF 11

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
10-28-08
DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING
11/20/08
DATE

APPROVED: [Signature]
10/14/08
DATE

NO.	DATE	REVISION
4	11-12-19	REVISE DRIVEWAY AND EASEMENTS PER F-18-009 AND ADD INFORMATION FROM F-18-009 FOR CLARITY
5	6/22/10	ADD OPEN SPACE LOT 53, PERMANENT CONTROL STRIP, PER RETENTION ROAD TO NON-BUILDABLE PRESERVATION PARCEL 'P'
6	1-2-15	REVISE LOT LINES CREATING PARCELS 'P', 'Q', 'R', REVISE TITLE BLOCK
7	10-27-10	RECONFIGURATION OF LOTS G, H, I

CONSTRUCTION SPECIFICATIONS

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All references to ASTM and ASHTO specifications apply to the most recent version.

Site Preparation

Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped to topsoil. All trees, vegetation, roots and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All trees shall be cleared and grubbed within 15 feet of the toe of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management ponds, a minimum of a 25-foot radius around the inlet structure shall be cleared.

All cleared and grubbed material shall be disposed of outside and below the limits of the dam and reservoir as directed by the owner or his representative. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.

Earth Fill
Material - The fill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, wood, rubbish, stones greater than 6" frozen or other objectionable material. Fill material for the center of the embankment, and cut off trench shall conform to Unified Soil Classification GC, SC, CH, or CL and must have at least 30% passing the #200 sieve. Consideration may be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer.

Materials used in the outer shell of the embankment must have the capability to support vegetation of the quality required to prevent erosion of the embankment.

Placement - Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum 3 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the down-slope portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

Compaction - The movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each lift shall be traversed by not less than one track of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with ten equipment uses. The fill material shall contain sufficient moisture so that if formed into a box it will not crumble, yet not be so wet that water can be squeezed out.

When required by the reviewing agency the minimum required density shall not be less than 95% of maximum dry density with a moisture content within ± 2% of the optimum. Each layer of fill shall be compacted to obtain that density, and to be certified by the Engineer at the time of construction. All compaction is to be determined by ASHTO Method T-99 (Standard Proctor).

Cut Off Trench - The cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being four feet. The depth shall be at least four feet below existing grade or as shown on the plans. The side slopes of the trench shall be 1 to 1 or flatter. The backfill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability.

Embankment Core - The core shall be parallel to the centerline of the embankment as shown on the plans. The core shall be a minimum of four feet. The height shall extend up to at least the 10 year water elevation or as shown on the plans. The side slopes shall be 1 to 1 or flatter. The core shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability. In addition, the core shall be placed concurrently with the outer shell of the embankment.

Structure Backfill
Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material needs to fill completely all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure unless no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" or greater over the structure or pipe.

Structure backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 313 as modified. The mixture shall have a 100-200 psi, 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistivity of 2,000 ohm-cm. Material shall be placed such that a minimum of 6" (measured perpendicular to the outside of the pipe) of flowable fill shall be under (bedding) over, and on the sides of the pipe. It only needs to extend up to the spring line for rigid conduits. Average slump of the fill shall be 7" to ensure flowability. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill material outside the structural backfill (flowable fill) zone shall be of the type and quality conforming to that specified for the core of the embankment or other embankment materials.

Pipe Conduits
All pipes shall be circular in cross section.
Corrugated Metal Pipe - all of the following criteria shall apply for corrugated metal pipe:
1. Materials - (Polymer Coated steel pipe) - Steel pipes with polymeric coatings shall have a minimum coating thickness of 0.01 inch (10 mil) on both sides of the pipe. The pipe and its appurtenances shall conform to the requirements of ASHTO Specifications M-245 & M-246 with watertight coupling bands or flanges.
Materials - (Aluminum Coated Steel Pipe) - This pipe and its appurtenances shall conform to the requirements of ASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipes, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bituminous coated per requirements of ASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt.

Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of ASHTO Specification M-195 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of ASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

2. Coupling bands, anti-seep collars, and sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at least 24 mils in thickness.

3. Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

All connection shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be re-rolled an adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24 inches in diameter: Flanges on both ends of the pipe with a circular 3/8 inch closed cell neoprene gasket pre-punched to the flange bolt circle, sandwiched between adjacent flanges; a 12-inch wide standard lap type band with 12-inch wide by 3/8-inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4 (four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8 inch closed cell gaskets the full width of the flange is also acceptable.

Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or a neoprene bead.

4. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

5. Backfilling shall conform to "Structure Backfill".

6. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Reinforced Concrete Pipe - All of the following criteria shall apply for reinforced concrete pipe:
1. Materials - Reinforced concrete pipe shall have bell and spigot joints with rubber gaskets and shall equal or exceed ASTM C-351.
2. Bedding - Reinforced concrete pipe conduits shall be laid in a concrete bedding/cradle for their entire length. This bedding/cradle shall consist of high slump concrete placed under the pipe and on the sides of the pipe to a depth of at least 50% of its outside diameter with a minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the "Structure Backfill" section of this standard. Gravel bedding is not permitted.

3. Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, the bedding shall be placed so that all spaces under the pipe are filled. Care shall be exercised to prevent any deviation from the original line and grade of the pipe. The first joint must be located within 4 feet from the riser.

4. Backfilling shall conform to "Structure Backfill".

5. Other details (anti-seep collars, valves, etc.) shall be shown on the drawings.

Plastic Pipe - The following criteria shall apply for plastic pipe:
1. Materials - PVC pipe shall be PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Corrugated High Density Polyethylene (HDPE) pipe, couplings and fittings shall conform to the following: 4" - 10" inch pipe shall meet the requirements of ASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of ASHTO M294 Type S.
2. Joints and connections to anti-seep collars shall be completely watertight.

3. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

4. Backfilling shall conform to "Structure Backfill".

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Drainage Diaphragms - When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection.

Concrete
Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 414, Mix No. 3.

Rock Riprap
Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 311.

Geotextile shall be placed under all riprap and shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 921.09, Class C.

Core of Water during Construction
All work on permanent structures shall be carried out in areas free from water. The contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the location being filled shall be maintained below the bottom of the excavation at such locations which may require draining the water pumps from which the water shall be pumped.

Stabilization
All borrow areas shall be graded to provide proper drainage and left in a slightly condition. All exposed surfaces of the embankment, spillway, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing and mulching in accordance with the Natural Resources Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

Erosion and Sediment Control
Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures.

30.0 DUST CONTROL

Definition

Controlling dust blowing and movement on construction sites and roads.

Purpose

To prevent blowing and movement of dust from exposed soil surfaces, reduce on and off-site damage, health hazards, and improve traffic safety.

Conditions Where Practice Applies

This practice is applicable to areas subject to dust blowing and movement where on and off-site damage is likely without treatment.

Specifications

Temporary Methods

- Mulches - See standards for vegetative stabilization with mulches only. Mulch should be crimped or tacked to prevent blowing.
- Vegetative Cover - See standards for temporary vegetative cover.
- Tillage - To roughen surface and bring clods to the surface. This is an emergency measure which should be used before soil blowing starts. Begin plowing on windward side of site. Chisel-type plows spaced about 12' apart, spring-toothed harrows, and similar plows are examples of equipment which may produce the desired effect.
- Irrigation - This is generally done on an emergency treatment. Site is sprinkled with water until the surface is moist. Repeat as needed. At no time should the site be irrigated to the point that runoff begins to flow.
- Barriers - Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing. Barriers placed at right angles to prevailing currents of intervals of about 10 times their height are effective in controlling soil blowing.
- Calcium Chloride - Apply at rates that will keep surface moist. May need retreatment.

Permanent Methods

- Permanent Vegetation - See standards for permanent vegetative cover, and permanent stabilization with sod. Existing trees or large shrubs may afford valuable protection if left in place.
- Topping - Covering with less erosive soil materials. See standards for topsoiling.
- Stone - Cover surface with crushed stone or coarse gravel.

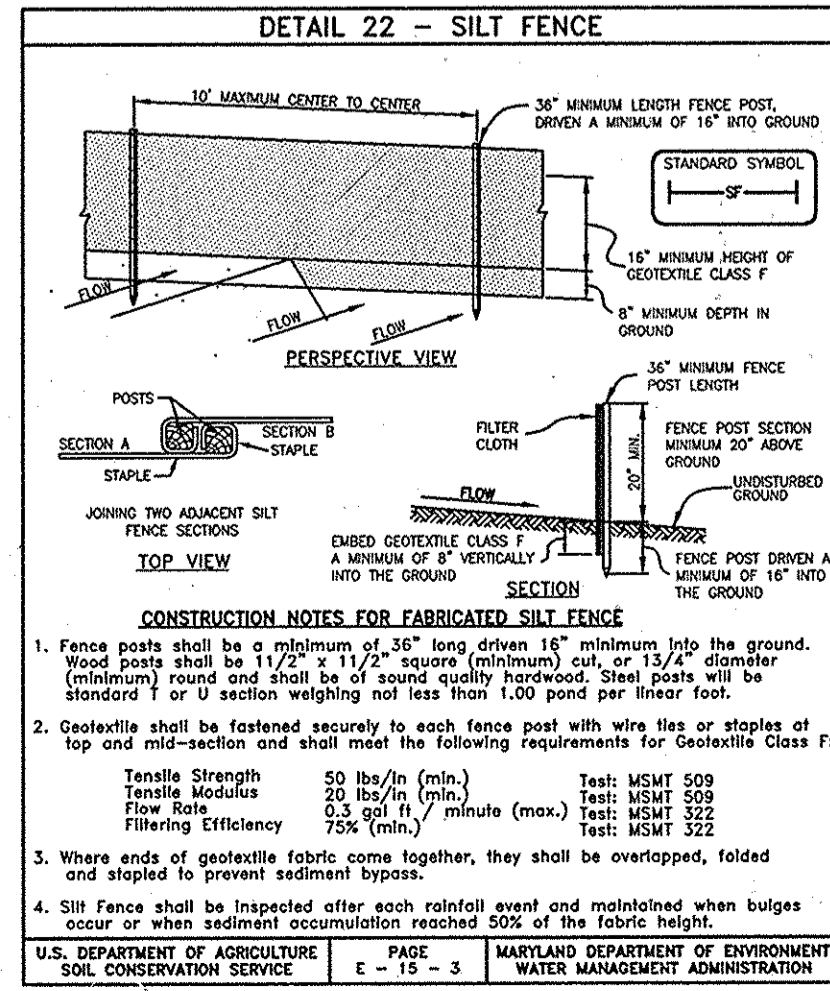
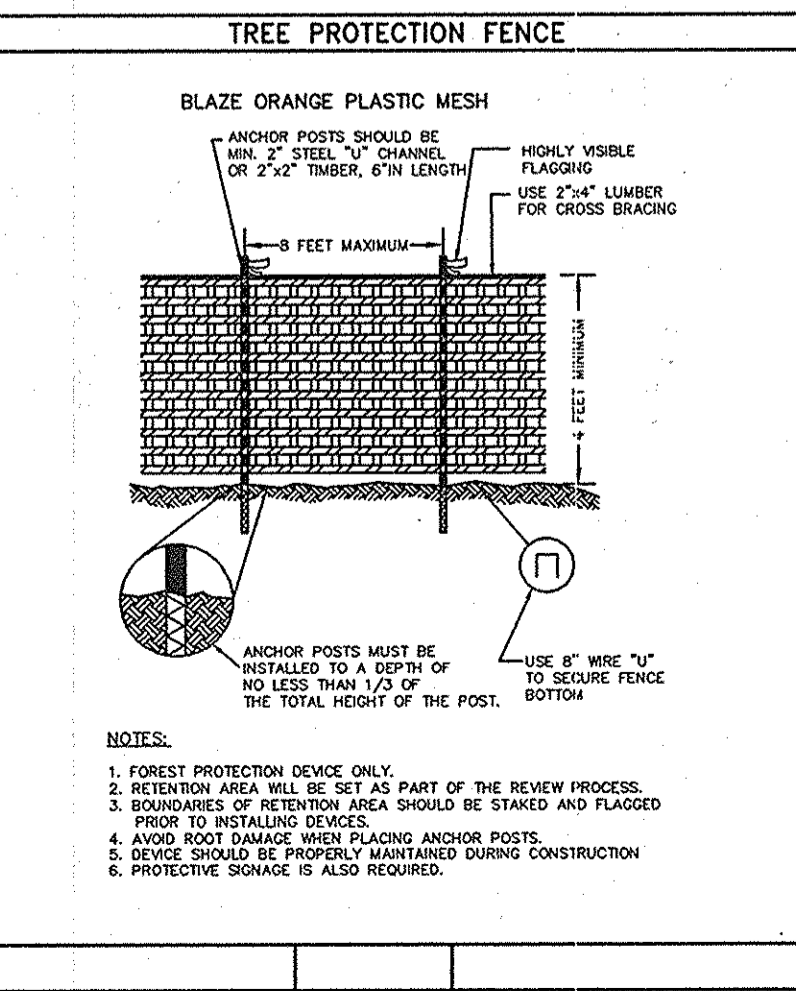
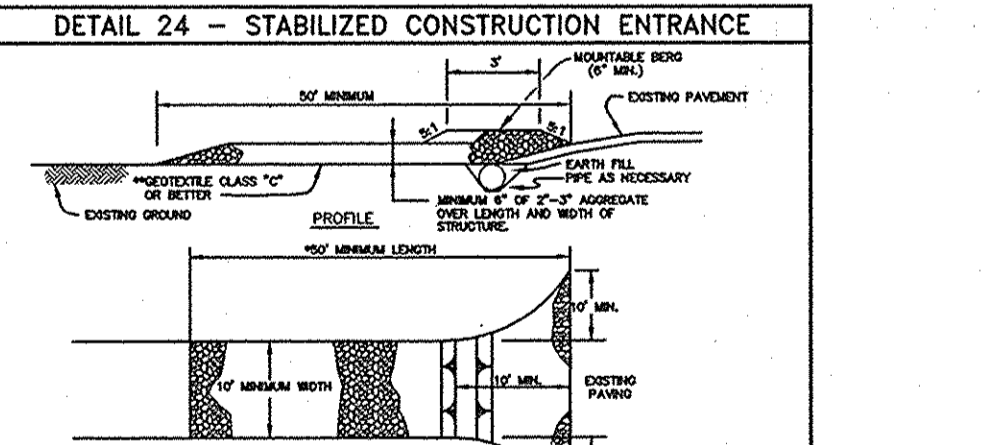
References

- Agriculture Handbook 346. Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss.
- Agriculture Information Bulletin 354. How to Control Wind Erosion. USDA-ARS.

SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF CONSTRUCTION

- OBTAIN GRADING PERMIT. (DAY 1)
- INSTALL SILT FENCES. (DAY 2-8)
- UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL STORM DRAINS AND SWALES. (DAY 9-15)
- UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, CONSTRUCT SAND FILTERS, STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES. (DAY 16-25)
- UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE REMAINING SEDIMENT CONTROL DEVICES, AND STABILIZED DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES. (DAY 26-40)



Construction Specifications
1. Length - minimum of 20' (30' for slope retention).
2. Width - 12' minimum, should be fixed at the existing road to provide a turning radius.
3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to any other construction. The geotextile fabric shall be placed over the existing ground prior to any other construction.
4. Stone - crushed aggregate (3" to 3/4") or natural or recycled concrete aggregate and be placed at least 6" over the geotextile fabric.
5. Surface water - all surface water flowing to or diverted toward construction activities shall be piped through the structure, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a 12" diameter pipe. The pipe shall be installed in a trench 12" deep and 12" wide. The pipe shall be installed in a trench 12" deep and 12" wide.
6. Location - A stabilized construction entrance shall be located at every point where construction activities are to be conducted. The entrance shall be located at every point where construction activities are to be conducted.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
10/27/08
DATE
11/13/08
DATE
12/14/08
DATE

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE
1. Fence posts shall be a minimum of 3/4" long driven 18" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum) or 2" x 2" round (minimum) and shall be of sound quality hardwood. Steel posts will be standard I or U section weighing not less than 1.00 pound per linear foot.
2. Geotextile shall be fastened securely to each fence post with wire ties or staples of top and mid-section and shall meet the following requirements for Geotextile Class F:
Tensile Strength 50 lbs/ft (min.) Test: MSMT 509
Tensile Modulus 20 lbs/ft (min.) Test: MSMT 509
Flow Rate 100 l/minute (max.) Test: MSMT 509
Filtering Efficiency 75% (min.) Test: MSMT 322
3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reaches 20% of the height of the fence.
U.S. DEPARTMENT OF AGRICULTURE PAGE MARYLAND DEPARTMENT OF ENVIRONMENT
SOIL CONSERVATION SERVICE E-15-3 WATER MANAGEMENT ADMINISTRATION

No As-Built information is required on this sheet
1-2-15 REVISE TITLE BLOCK
NO. DATE REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 • fax: 410-465-6844
email: bal@be-cvilingeering.com

Professional Certification. 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. 21443, Expiration Date: 12-21-2008.

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "P" AND "Q", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL
4288 MANOR LANE
ELLICOTT CITY, MARYLAND 21042
410-740-6880

LOCATION: TAX MAP: 23, GRID: 10
P-0 PARCELS: 134
THIRD ELECTION DISTRICTS
HOWARD COUNTY, MARYLAND

TITLE: NOTES AND DETAIL SHEET

DATE: OCTOBER, 2008 PROJECT NO. 1939

DES: JC DRAFT: JC CHECK: DAM SCALE: N/A SHEET 11 OF 11

AS-BUILT F-08-140