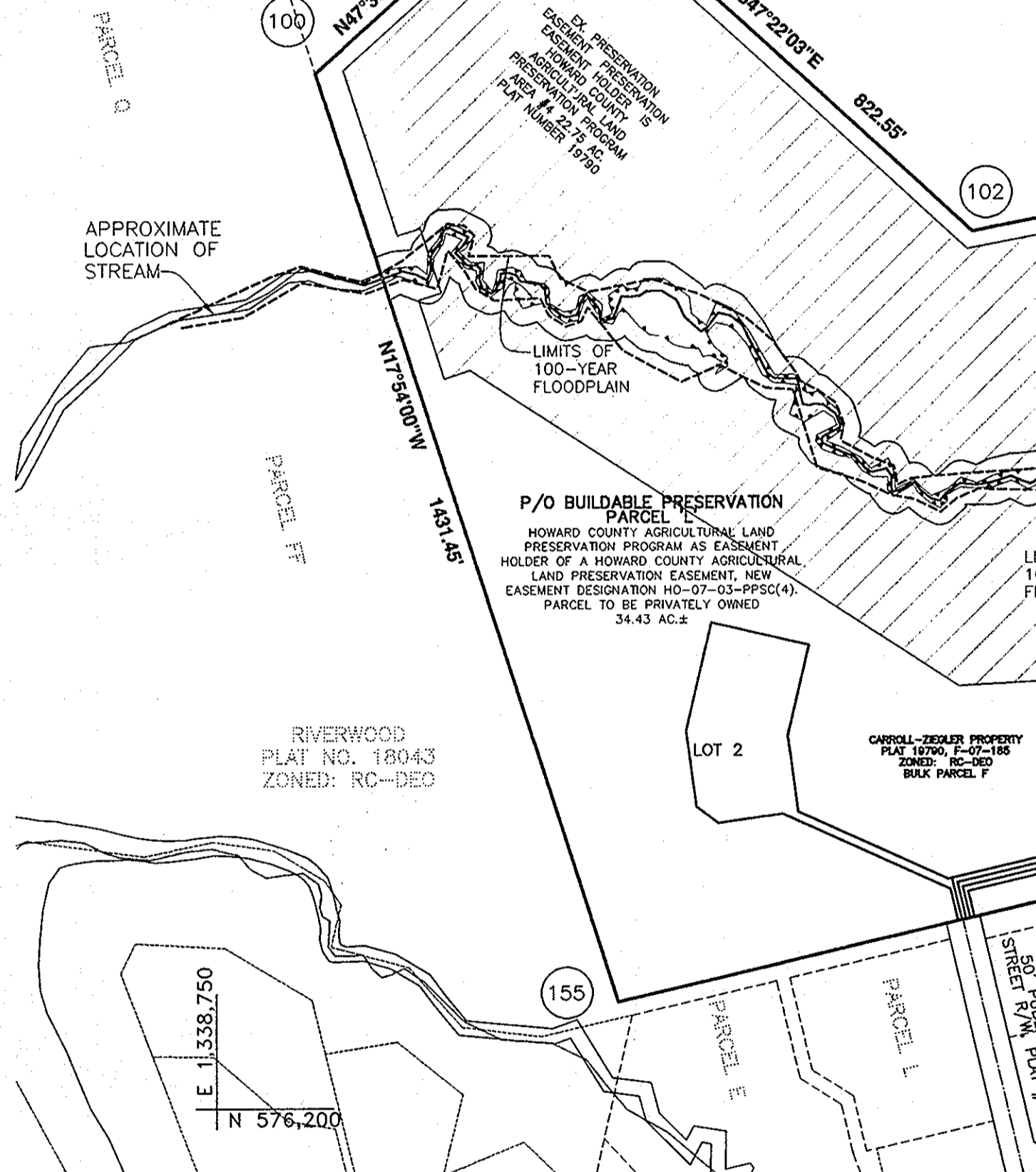


GENERAL NOTES  
 1) THE PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED.  
 2) THIS PROJECT IS SUBJECT TO THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS PER COUNCIL BILL NO. 45-2008 AND THE ZONING REGULATIONS AS AMENDED BY COUNCIL BILL NO. 75-2003. DEVELOPMENT OR CONSTRUCTION ON THESE LOTS MUST COMPLY WITH SETBACK AND BUFFER REQUIREMENTS IN EFFECT AT THE TIME OF SUBMISSION OF THE BUILDING OR GRADING PERMIT APPLICATION.  
 3) THE SUBJECT PROPERTY IS ZONED RC-DEO PER THE 2004 COMPREHENSIVE ZONING PLAN AND THE COMPLETE ZONING REGULATION AMENDMENTS EFFECTIVE 7/2006.  
 4) TOPOGRAPHY TAKEN FROM FIELD RUN TOPOGRAPHIC SURVEY PREPARED BY BENCHMARK ENGINEERING, INC. DATED APRIL 2008 AT 2' CONTOUR INTERVALS SUPPLEMENTED WITH INFORMATION PURCHASED FROM THE HOWARD COUNTY DEPARTMENT OF GEOGRAPHICAL INFORMATION SYSTEMS.  
 5) THE COORDINATES BASED ON NAD 83 MAPHAND AND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS 29CA AND 29A.  
 6) WATER "X" PRIVATE FOR THIS PROJECT.  
 7) SEWER "X" PRIVATE FOR THIS PROJECT.  
 8) THERE ARE NO EXISTING STRUCTURES LOCATED ON THIS SITE.  
 9) THERE ARE NO BURIAL GROUNDS, CEMETERIES OR HISTORICAL STRUCTURES LOCATED ON THE SUBJECT PROPERTY, TO THE BEST OF OUR KNOWLEDGE.  
 10) THE TRAFFIC STUDY FOR THIS PROJECT WAS PREPARED BY MARS GROUP, INC., DATED NOVEMBER, 2006 AND WAS SUBMITTED AS PART OF THE PLAN. STUDY WAS SUBMITTED AND APPROVED UNDER SP-07-05.  
 11) THIS PROJECT NOT BE LOCATED WITHIN THE METROPOLITAN DISTRICT.  
 12) A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.  
 13) THE GEOTECHNICAL REPORT FOR THIS PROJECT WAS PREPARED BY GEOA DATED JULY 3, 2007.  
 14) THE FOREST CONSERVATION EASEMENTS HAVE BEEN ESTABLISHED TO "F" ALL THE REQUIREMENTS OF SECTION 16.100 OF THE HOWARD COUNTY CODE AND FOREST CONSERVATION ACT. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT. HOWEVER, FOREST MANAGEMENT PRACTICES, AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT, ARE ALLOWED. FOREST CONSERVATION ACT REQUIREMENTS FOR THIS PROJECT WILL REQUIRE 14.8 ACRES OF FORESTATION WITHIN AN EASEMENT. THIS PLAN IS PROVIDING 8.15 ACRES OF FOREST CONSERVATION, 6.42 ACRES OF FOREST CONSERVATION EASEMENT WAS PROVIDED ON PARCEL "P" FOR THIS SUBDIVISION UNDER F-22. THIS SUBDIVISION IS SATISFYING ITS FOREST CONSERVATION OBLIGATION BY MEETING THE "BREAK-EVEN POINT" WITH THE 14.8 ACRES OF FOREST RETENTION. SURETY IN THE AMOUNT OF \$176,324.00 IS PROVIDED WITH THE DPW, DEVELOPERS' AGREEMENT.

GENERAL NOTES CONT:  
 15.) LANDSCAPING FOR LOTS 2-7 AND PARCEL 'L' IS PROVIDED IN ACCORDANCE WITH A CERTIFIED LANDSCAPE PLAN ON FILE WITH THIS PLAT IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. LANDSCAPE SURETY FOR THE SHADE TREES WILL BE POSTED AS PART OF THE GRADING PERMIT APPLICATION. THE INSTALLATION AND COLLECTION OF FEES FOR EACH INDIVIDUAL LOT LOCATED WITH THIS SUBDIVISION AS AGREED UPON ON 12-11-08 ARE AS FOLLOWS:  
 LOT 2 - NO SURETY  
 LOT 3 - \$3,300 FOR 11 SHADE TREES  
 LOT 4 - \$3,300 FOR 8 SHADE TREES  
 LOT 5 - \$3,300 FOR 11 SHADE TREES  
 LOT 6 - \$4,500 FOR 15 SHADE TREES  
 LOT 7 - \$4,500 FOR 15 SHADE TREES  
 TOTALING \$17,000 FOR 57 SHADE TREES

16.) STORMWATER MANAGEMENT SHALL BE PROVIDED FOR THIS PROJECT BASED ON GUIDELINES ESTABLISHED BY THE 2004 MARYLAND STORMWATER DESIGN MANUAL, VOLUMES I & II. SWM IS PROVIDED FOR THIS PLAN BY NON-ROOFTOP DISCONNECTION AND THE USE OF RAIN GARDENS AND SURFACE SAND FILTERS FOR WOV AND PEV. C/PV IS PROVIDED BY RDN CONTROL AND LAND USE. ALL FACILITIES ARE TO BE CLASS "B" STRUCTURES. THESE FACILITIES WILL BE PRIVATELY OWNED AND THE STORMWATER MANAGEMENT FACILITIES WILL BE PRIVATELY MAINTAINED BY THE HOMEOWNERS ASSOCIATION.  
 17) STREET LIGHTS ARE NOT REQUIRED WITHIN THIS DEVELOPMENT.  
 18) MINIMUM BUILDABLE LOT SIZE SHALL BE 40,000 SQ. FT. FEET.  
 19) FOR FLAG OR PIPE STEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE BENEFIT OF THE FLAG OR PIPE STEM AND ROAD RIGHT-OF-WAY. LINE AND NOT ONTO THE FLAG OR PIPE STEM LOT DRIVEWAY.  
 20) TRUCKS SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE "X" NO OCCUPANCY PERMIT FOR ANY NEW DWELLINGS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:  
 A) WIDTH - 12' (10' SERVING MORE THAN ONE RESIDENCE).  
 B) SURFACE - 4" OF COMPACT GRANULAR BASE WITH TAR AND CHIP COATING.  
 C) GEOMETRY - MAX. 1% GRADE, MAX. 10% GRADE CHANGE & MIN. 45' TURNING RADII.  
 D) STRUCTURES (CAPABLE OF SUPPORTING 25 GROSS TONS (LOAD).  
 E) DRAINAGE ELEMENTS - CAPABLE OF SAFELY PASSING 100 YEAR FLOODPLAIN WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVE.  
 F) STRUCTURE CLEARANCES - MINIMUM 12 FEET.  
 G) MAINTENANCE - SUFFICIENT TO INSURE ALL WEATHER USE.  
 21.) ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.  
 22.) THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 518-8000 PRIOR TO THE START OF WORK.  
 23.) THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.  
 24.) TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY ASPHALT.  
 25.) ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL PERFORATED SQUARE TUBE POST (14 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL PERFORATED SQUARE TUBE SLEEVE (1/2" LONG, A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON EACH POST).  
 26.) A WETLAND DELINEATION FOR THIS PROJECT IS PROVIDED BY ECO-SCIENCE PROFESSIONALS, INC. AS PART OF THIS SUBMISSION. AREAS NOT NEAR POTENTIAL DISTURBANCES WERE NOT DELINEATED IN ACCORDANCE SECTION 16.116(A)(4) OF THE HOWARD COUNTY SUBDIVISION REGULATIONS. ENVIRONMENTAL DISTURBANCE DETERMINATION AND STUDIES WERE SUBMITTED AND APPROVED UNDER SP-07-05.  
 27.) A FLOODPLAIN STUDY IS PROVIDED FOR THIS PROJECT. IT IS PREPARED BY BENCHMARK ENGINEERING, INC. AND DATED AUGUST 2006. THERE ARE NO DISTURBANCES PROPOSED NEAR THE FLOODPLAIN ELEVATIONS. THE TOP OF THE EXISTING ABUTMENTS TO BE USED BY RIVERWOOD PARCEL "Q" ARE AT 367.1, AND THE 100 YEAR FLOODPLAIN ELEVATION IS 363.6. EXISTING ABUTMENTS ARE TO BE REHABILITATED WITH MINIMAL DISTURBANCE TO WETLANDS, STREAMS, AND THEIR BUFFERS AND HAS BEEN DETERMINED TO BE NEARLY ESSENTIAL. IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION REGULATIONS. ENVIRONMENTAL DISTURBANCE DETERMINATION AND STUDIES WERE SUBMITTED AND APPROVED UNDER SP-07-05.  
 28.) THE PRINCIPAL INTENTION OF BUILDABLE PRESERVATION PARCEL "L" IS AGRICULTURAL PRESERVATION. THIS PARCEL HAS NO FURTHER DEVELOPMENT POTENTIAL IN ACCORDANCE WITH THE ZONING AND SUBDIVISION REGULATIONS. THIS PARCEL WILL BE PRIVATELY OWNED AND BUILT UPON BY THE HOWARD COUNTY AGRICULTURAL LAND PRESERVATION PROGRAM WILL BE THE EASEMENT HOLDER.  
 29.) THE PRINCIPAL INTENTION OF NON-BUILDABLE PRESERVATION PARCELS "M" AND "N" IS AGRICULTURAL PRESERVATION. PARCELS "M" AND "N" WILL BE PRIVATELY OWNED WITH HOWARD COUNTY AGRICULTURAL LAND PRESERVATION PROGRAM EASEMENTS HELD BY HOWARD COUNTY AGRICULTURAL LAND PRESERVATION PROGRAM. THESE PARCELS HAVE NO FURTHER DEVELOPMENT POTENTIAL IN ACCORDANCE WITH THE ZONING AND SUBDIVISION REGULATIONS.  
 30.) FOREST STAND DELINEATION IS PROVIDED BY ECO-SCIENCE PROFESSIONALS, INC. AND IS DATED OCTOBER, 2006. STUDY WAS SUBMITTED AND APPROVED UNDER SP-07-05.  
 31.) THE EXISTING DRIVEWAY ON LOT 4 IS TO BE UPHSALED IN ACCORDANCE WITH THE COUNTY MINIMUM STANDARDS. A 16' PAVING SECTION IS TO BE CONSTRUCTED WHERE THE DRIVEWAY IS SHARED WITHIN THE LIMITS OF LOT 2 AND PARCEL "U" TO THE PRIVATE DRIVEWAY FOR PARCEL "L". WITHIN THE LIMITS OF LOTS 3, 4, 5 AND UP TO THE PRIVATE DRIVEWAY OF LOT 3 WITHIN THE LIMITS OF LOTS 6 AND 7 UP TO THE END OF THE EASEMENT, 12' PAVING SECTION IS ACCEPTABLE FOR DR. Y. THE PORTION OF THE DRIVEWAY THAT IS NOT SHARED WITH ANY OTHER UNITS.  
 32.) WP-06-08 WAS APPROVED ON JUNE 26, 2006 BY THE DIRECTOR OF PLANNING AND ZONING. WP-06-08 WAS A REQUEST TO WAIVE THE FOLLOWING:  
 SECTION 16.115 - WHICH REQUIRES FLOODPLAIN DELINEATION TO BE SHOWN ON THE FINAL PLAT.  
 SECTION 16.116 - WHICH REQUIRES THE PROTECTION OF WETLANDS, STREAMS AND STEEP SLOPES BE SHOWN ON THE FINAL PLAT.  
 SECTION 16.116(A)(4) - WHICH GOVERNS LOT DESIGN, LOT ACCESS, AND MINIMUM PUBLIC ROAD FRONTAGE. THE CONDITIONS OF THIS WAIVER APPROVAL ARE: COMPLIANCE WITH ALL SUBDIVISION REVIEW COMMITTEE COMMENTS IN THE DEPARTMENT OF PLANNING AND ZONING LETTER DATED JUNE 26, 2006. ANY FURTHER SUBDIVISION OF PROPOSED PARCEL "M" MUST COMPLY WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS INCLUDING THE REQUIREMENTS FOR ENVIRONMENTAL ANALYSES, STREET TREES, MINIMUM PUBLIC ROAD FRONTAGE, ACCESS, FOREST CONSERVATION AND LANDSCAPING, AND NON-BUILDABLE PRESERVATION PARCEL "M" CANNOT BE RESUBDIVIDED, HOWEVER, UPON ITS CONVERSION TO BUILDABLE STATUS, ALL CONCERNING ENVIRONMENTAL ANALYSES AND FOREST CONSERVATION MUST BE ADDRESSED. ADDITIONALLY, PRESERVATION PARCEL "M" SHALL HAVE A 20' PRIVATE ACCESS EASEMENT TO THE FARM ROAD.  
 33.) WP-07-03 WAS APPROVED ON NOVEMBER 28, 2006 BY THE DIRECTOR OF PLANNING AND ZONING. WP-07-03 WAS A REQUEST TO WAIVE THE FOLLOWING:  
 SECTION 16.115 - WHICH REQUIRES FLOODPLAIN DELINEATION ON THE PRELIMINARY EQUIVALENT SKETCH PLAN AND FINAL PLAT FOR A BULK PARCEL SUBDIVISION.  
 SECTION 16.116(A)(4) - WHICH GOVERNS LOT DESIGN, LOT ACCESS, AND MINIMUM PUBLIC ROAD FRONTAGE. COMPLIANCE WITH ALL SUBDIVISION REVIEW COMMITTEE COMMENTS IN THE DEPARTMENT OF PLANNING AND ZONING LETTER DATED JUNE 26, 2006. ANY FURTHER SUBDIVISION OF PROPOSED PARCEL "L" MUST COMPLY WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS INCLUDING THE REQUIREMENTS FOR ENVIRONMENTAL ANALYSES, STREET TREES, MINIMUM PUBLIC ROAD FRONTAGE, ACCESS, FOREST CONSERVATION AND LANDSCAPING, AND NON-BUILDABLE PRESERVATION PARCEL "L" CANNOT BE RESUBDIVIDED, HOWEVER, UPON ITS CONVERSION TO BUILDABLE STATUS, ALL CONCERNING ENVIRONMENTAL ANALYSES AND FOREST CONSERVATION MUST BE ADDRESSED. ADDITIONALLY, PRESERVATION PARCEL "L" SHALL HAVE A 20' PRIVATE ACCESS EASEMENT TO THE FARM ROAD.  
 34.) WP-08-12 WAS APPROVED ON JULY 10, 2008 BY THE DIRECTOR OF PLANNING AND ZONING. WP-08-12 WAS A REQUEST TO WAIVE THE FOLLOWING:  
 SECTION 16.120(B)(1)(ii) - LENGTH OF PIPESTEM LOT. THE LENGTH OF THE PIPESTEM LOT SHALL NOT EXCEED 1500 FEET FOR NON-CLUSTER SUBDIVISION LOTS IN THE RC OR RR ZONING DISTRICTS. FOR CLUSTER SUBDIVISIONS, THE DEPARTMENT OF PLANNING AND ZONING MAY APPROVE A GREATER PIPESTEM LENGTH IF THIS PERMITS LOTS TO BE BETTER LOCATED WITH RESPECT TO PRESERVATION PARCELS.  
 SECTION 16.120(C) - ALL LOTS, PRESERVATION PARCELS, OR BULK PARCELS FOR SINGLE-FAMILY DETACHED DWELLINGS SHALL HAVE MINIMUM LOT FRONTS ON APPROVED STREETS WITHIN A PUBLIC RIGHT-OF-WAY WHICH PROVIDES ACCESS TO THE PROPERTY WITHIN 20 FEET FOR SINGLE-FAMILY DETACHED DWELLINGS AND PRESERVATION PARCELS WHICH CANNOT BE FURTHER DIVIDED UNDER CURRENT ZONING AND SHALL HAVE SUFFICIENT FRONTAGE COLLECTIVELY TO MEET THE DRIVEWAY EASEMENT REQUIREMENTS IN THE DESIGN MANUAL.  
 35.) ON JUNE 16, 2008 THE CHIEF OF THE DEVELOPMENT ENGINEERING DIVISION APPROVED A DESIGN MANUAL WAIVER TO DESIGN MANUAL, VOLUME III, ROADS AND BRIDGES, SECTION 2.3.A, GRANTING MORE THAN SIX (6) USERS ON A SINGLE USE-IN-COMMON DRIVEWAY.



**SITE DATA TABULATION**

1) GENERAL SITE DATA  
 a. PRESENT ZONING: RC-DEO  
 b. APPLICABLE DPZ FILE REFERENCES: RE-06-10, WP-06-06, F-06-228, F-07-022, WP-07-033, F-07-185, F-08-109  
 c. DEED REFERENCE: L 9110 / F. 0118  
 d. PROPOSED USE OF SITE: 6 CLUSTER LOTS, 1 BUILDABLE PRESERVATION PARCEL, AND 2 NON-BUILDABLE PRESERVATION PARCELS

2) THE FOLLOWING STANDARD SIGN DESIGN SPECIFICATION SHALL APPLY:  
 1. 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.

3) LOT TABULATION  
 a. ALLOWABLE RESIDENTIAL LOTS AT 1 UNIT PER 4.25 ACRES (75.63 AC.-45.50 AC.) / 4.25 AC. = 7 UNITS  
 b. ALLOWABLE RESIDENTIAL LOTS USING THE DEO/CEO DENSITY EXCHANGE OPTION AT 1 UNIT PER 2.0 ACRES (73.57-45.50) AC./2.0 AC. = 14 UNITS  
 c. NUMBER OF DEO/CEO UNITS REQUIRED = 0 UNITS  
 d. TOTAL NUMBER OF RESIDENTIAL UNITS PROPOSED = 7 UNITS  
 e. TOTAL NUMBER OF BUILDABLE PRESERVATION PARCELS = 1  
 f. TOTAL NUMBER OF NON-BUILDABLE PRESERVATION PARCELS = 2  
 g. TOTAL NUMBER OF CLUSTER LOTS = 6

4) OPEN SPACE DATA  
 a. MINIMUM RESIDENTIAL BUILDABLE BULK PARCEL SIZE: N/A  
 b. OPEN SPACE REQUIRED (0%): N/A  
 c. TOTAL AREA OF PROPOSED OPEN SPACE LOTS: N/A  
 d. TOTAL AREA OF NON-CREDITED OPEN SPACE: N/A  
 e. TOTAL CREDITED OPEN SPACE PROVIDED: N/A  
 f. (OPEN SPACE AREA MINUS AREAS LESS THAN 35' IN WIDTH)  
 g. AREA OF RECREATIONAL OPEN SPACE REQUIRED: N/A  
 h. AREA OF RECREATIONAL OPEN SPACE PROVIDED: N/A

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 10-28-08  
 CHIEF, BUREAU OF HIGHWAYS

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

[Signature] 10/16/08  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

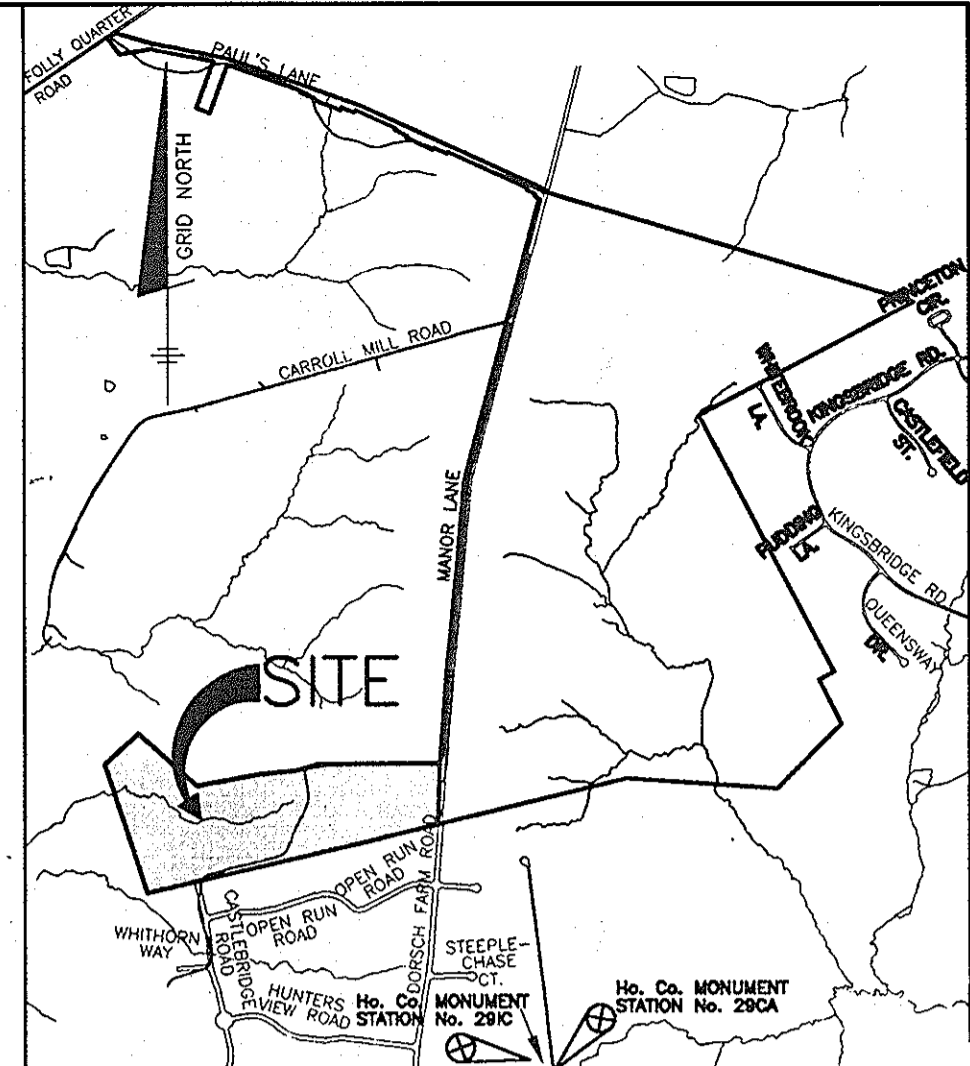
NO.	DATE	RECONFIGURATION OF LOTS 6 AND 7	REVISION
1	10-27-10		

**MINIMUM LOT SIZE CHART**

LOT NO.	GROSS AREA	PIPESTEM AREA	MINIMUM LOT SIZE
2	43,434	3,430	40,004
3	50,760	1,805	48,955
4	53,330	3,496	49,834
5	66,753	16,970	49,783
6	62,167	23,233	59,944
7	60,661	684	59,977

**COORDINATE CHART (NAD '83) FEET**

BOUNDARY COORDINATES	NORTHING	EASTING
100	577718.6552	1338896.0200
101	578042.0910	1339249.1566
102	577484.9827	1339854.3176
103	577607.5702	1340482.6349
104	577655.2641	1340893.5115
105	577716.1887	1341125.4209
106	577719.2659	1341212.3317
107	577729.4269	1342387.1127
108	576893.8698	1341616.3025
109	576356.4903	1339335.9859
110	577718.1301	1342415.8553
111	577074.2174	1342353.2036
112	577141.1009	1342374.0943
113	577194.9259	1342369.6669
114	577495.1897	1342394.1550
115	577149.7182	1342409.3047



**LEGEND**

- (15) COORDINATE POINT
- STREAM
- PRESERVATION EASEMENT
- SEWER EASEMENT
- TREELINE

**BENCHMARKS - NAD'83 HORIZONTAL**  
 HO. CO. #29C  
 3/4" REBAR W/ CAP STAMPED ALUMINUM DISK SET ON  
 N 574426.138"  
 E 1344533.820"  
 ELEV. = 421.53  
 E 1344112.295"  
 ELEV. = 416.79

**SHEET INDEX**

NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL FINAL STORMWATER MANAGEMENT FILTER STRIP AND RAINGARDEN PLANS, NOTES AND DETAILS
3-4	SUPPLEMENTAL FINAL STORMWATER MANAGEMENT RAINGARDEN PLAN
5	SUPPLEMENTAL FINAL STORMWATER MANAGEMENT SAND FILTER PLAN, NOTES AND DETAILS & SEDIMENT AND EROSION CONTROL PLAN
6	SUPPLEMENTAL FINAL STORMWATER MANAGEMENT BORING LOGS, STORM DRAIN SCHEDULES, DETAILS AND PROFILE, GEOTECHNICAL RECOMMENDATIONS & SEDIMENT CONTROL NOTES
7-8	SUPPLEMENTAL FINAL LANDSCAPE PLAN
9-10	SUPPLEMENTAL FINAL FOREST CONSERVATION PLAN
11	NOTES AND DETAIL SHEET

**BENCHMARK ENGINEERING, INC.**  
 ENGINEERS • LAND SURVEYORS • PLANNERS

8480 BALTIMORE NATIONAL PIKE & SUITE 418  
 ELLICOTT CITY, MARYLAND 21043  
 phone: 410-465-8105 • fax: 410-465-8644  
 email: beb@bem-benchmarkengineering.com

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer in the State of Maryland, License No. 21443, Expiration Date: 12-31-2010.  
 [Signature] 10/16/08

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

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

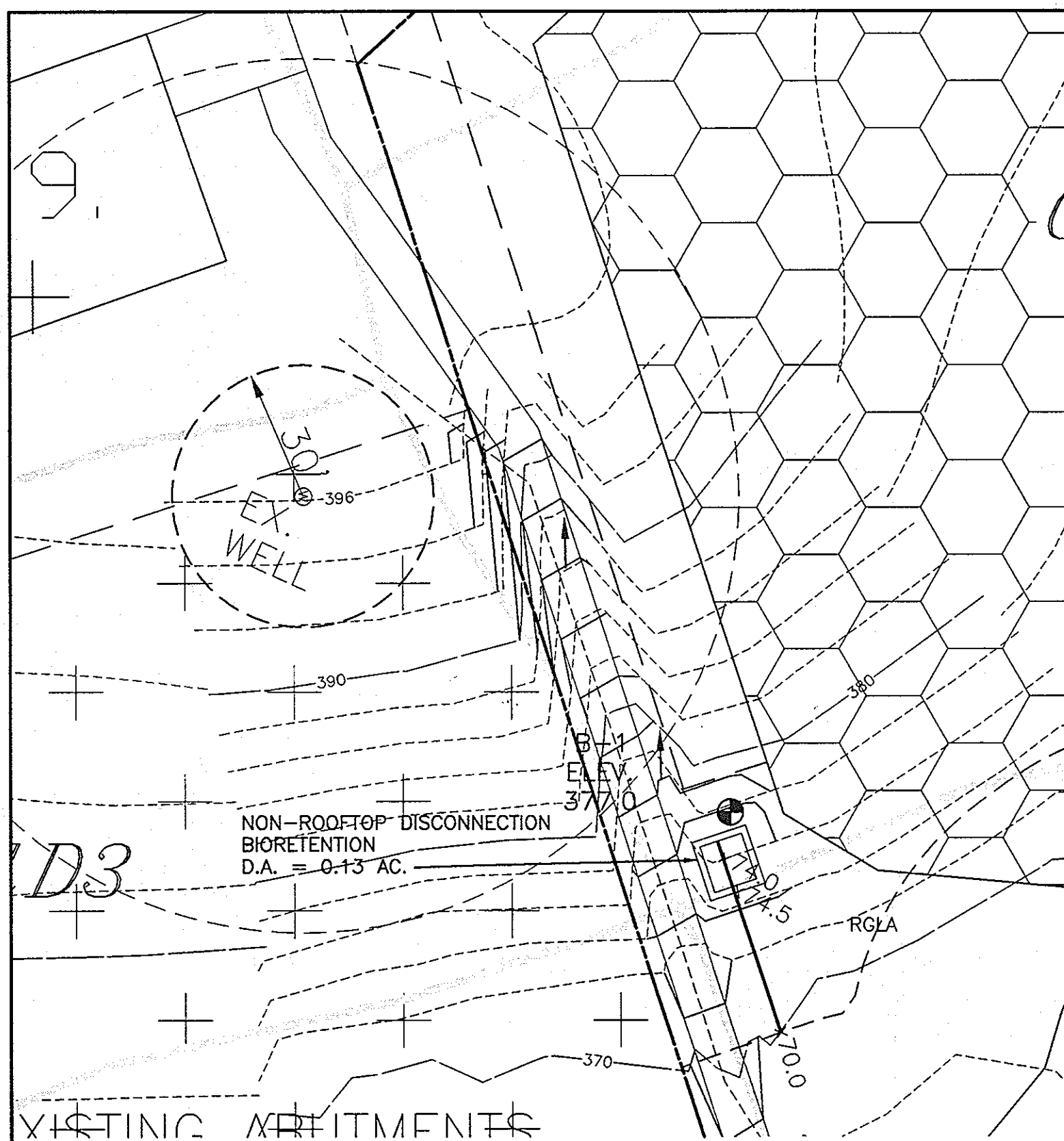
LOCATION: TAX MAP: 23, GRID: 10  
 P/O PARCEL: 130  
 THIRD ELECTION DISTRICTS  
 HOWARD COUNTY, MARYLAND

TITLE: TITLE SHEET

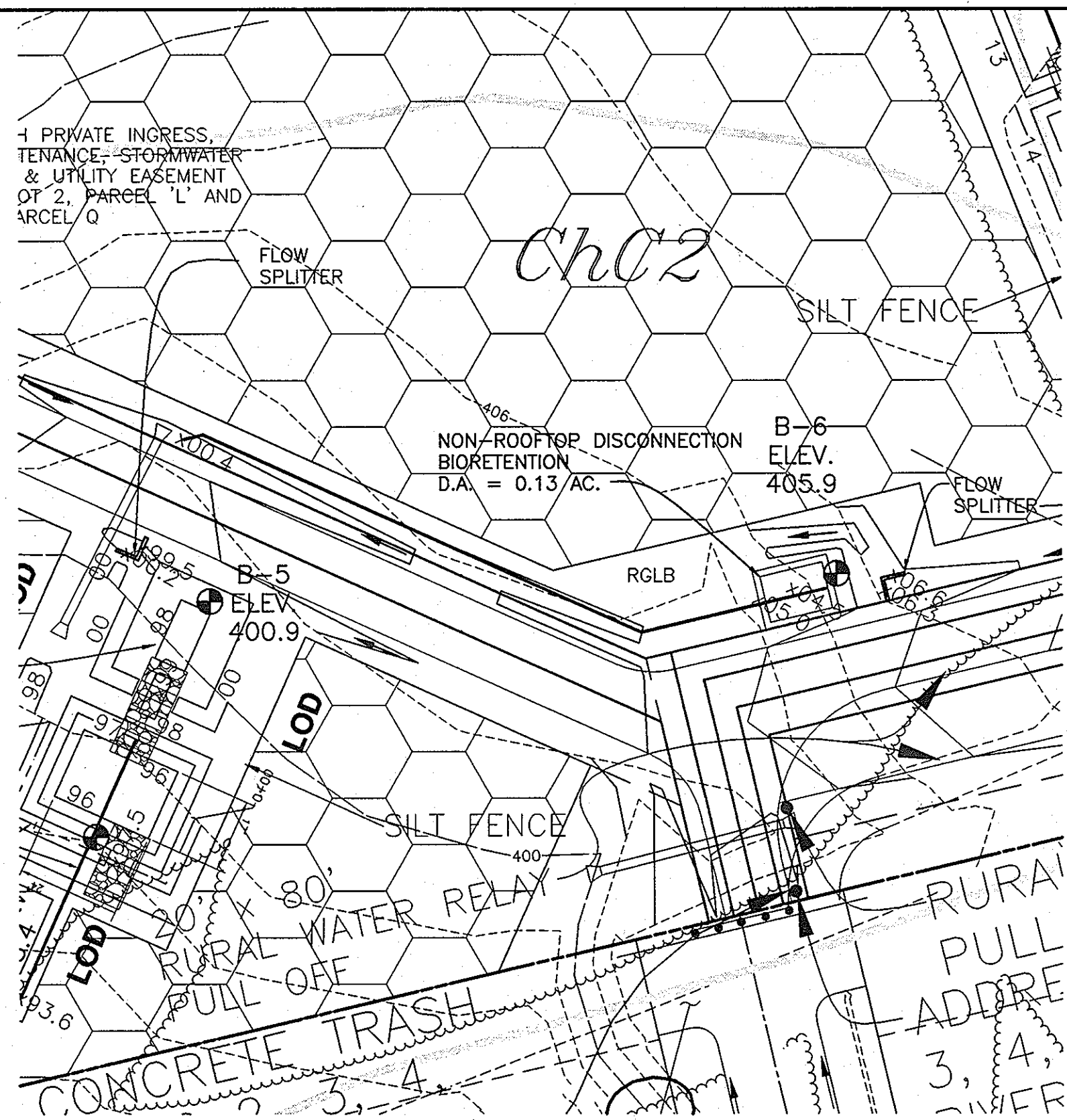
DATE: OCTOBER, 2008 PROJECT NO: 1939

DES: JC DRAFT: JC CHECK: DAM SCALE: 1" = 200' SHEET 1 OF 11

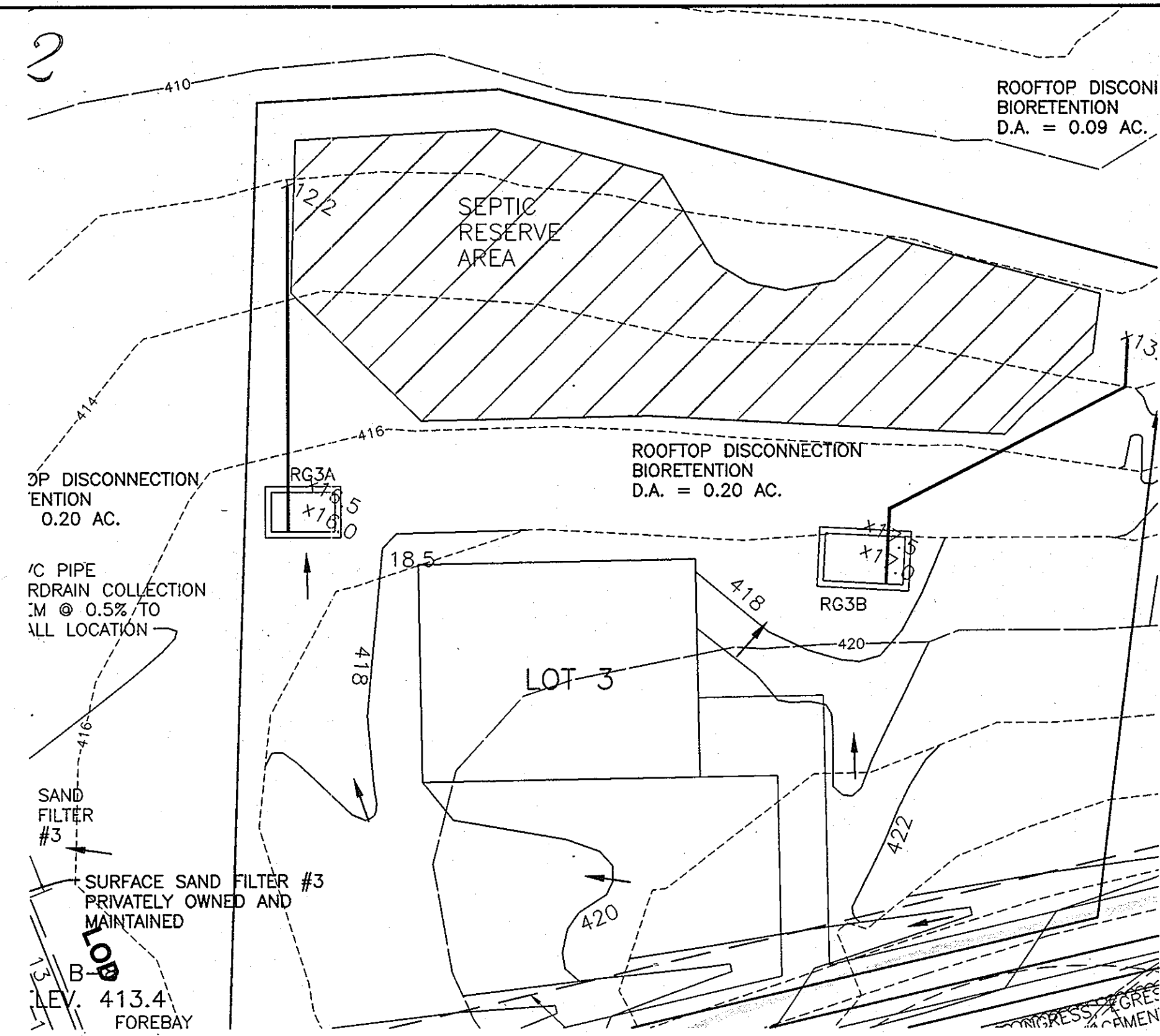




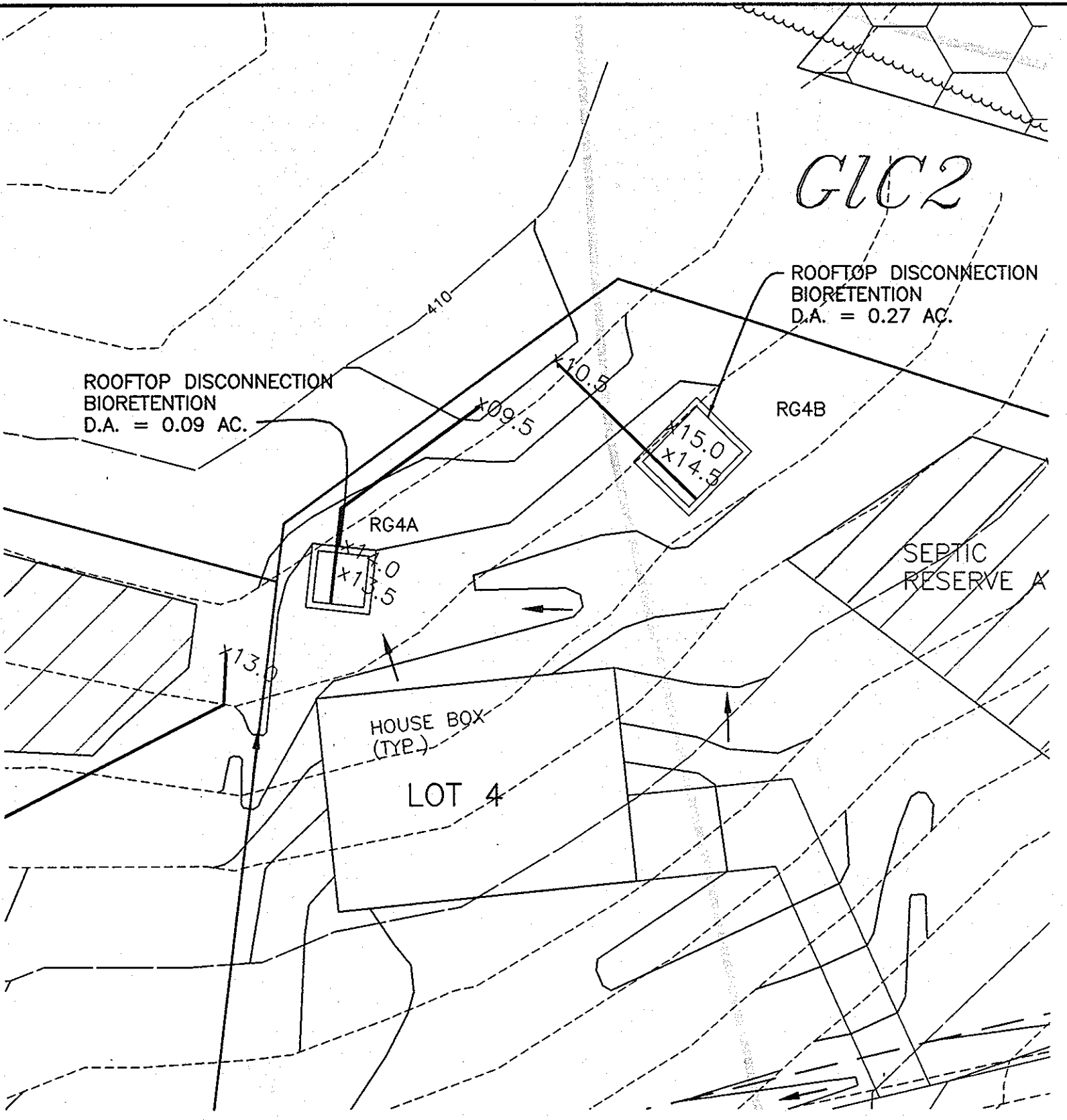
**RAINGARDEN LA**  
SCALE: 1" = 30'



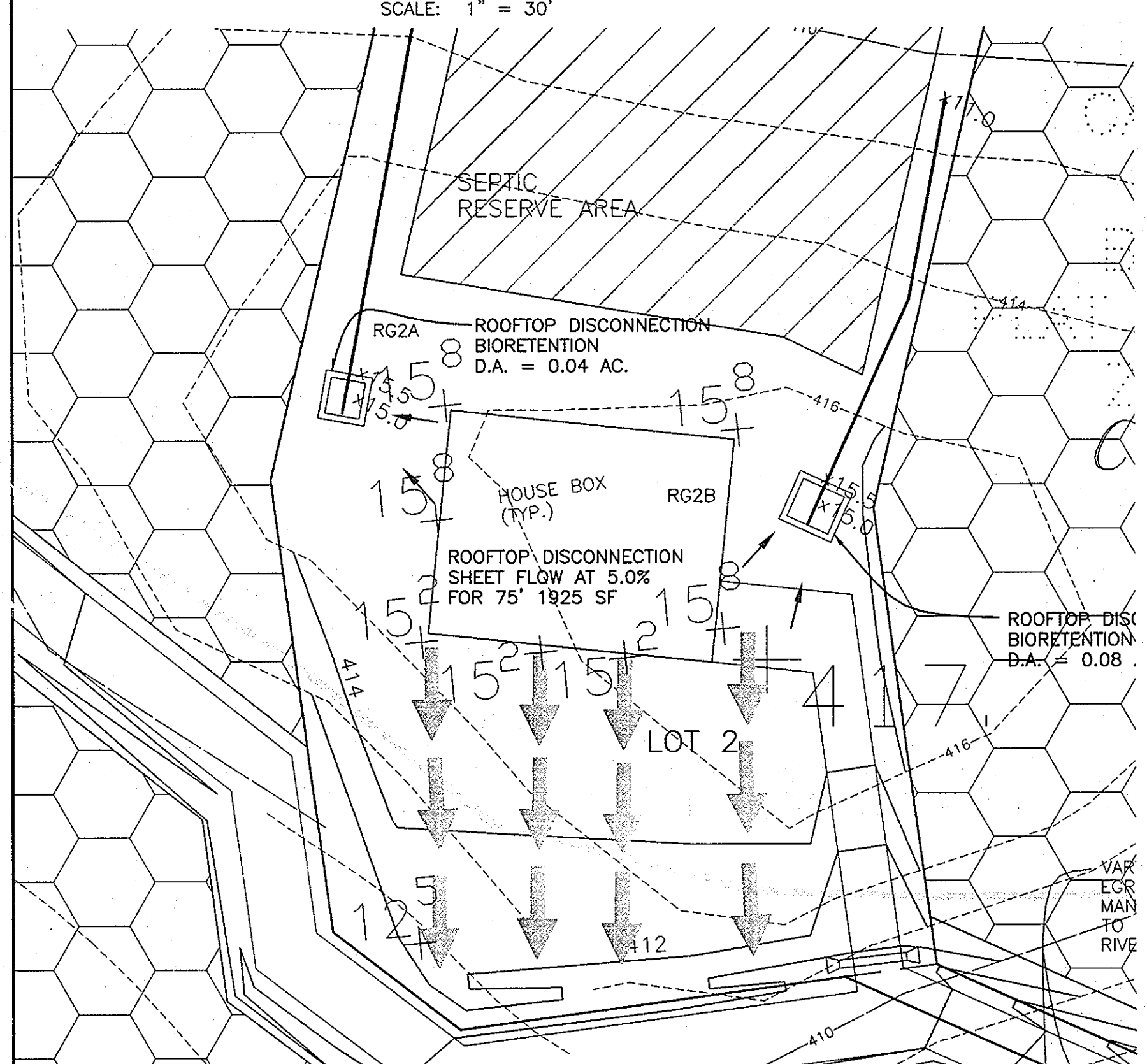
**RAINGARDEN LB**  
SCALE: 1" = 30'



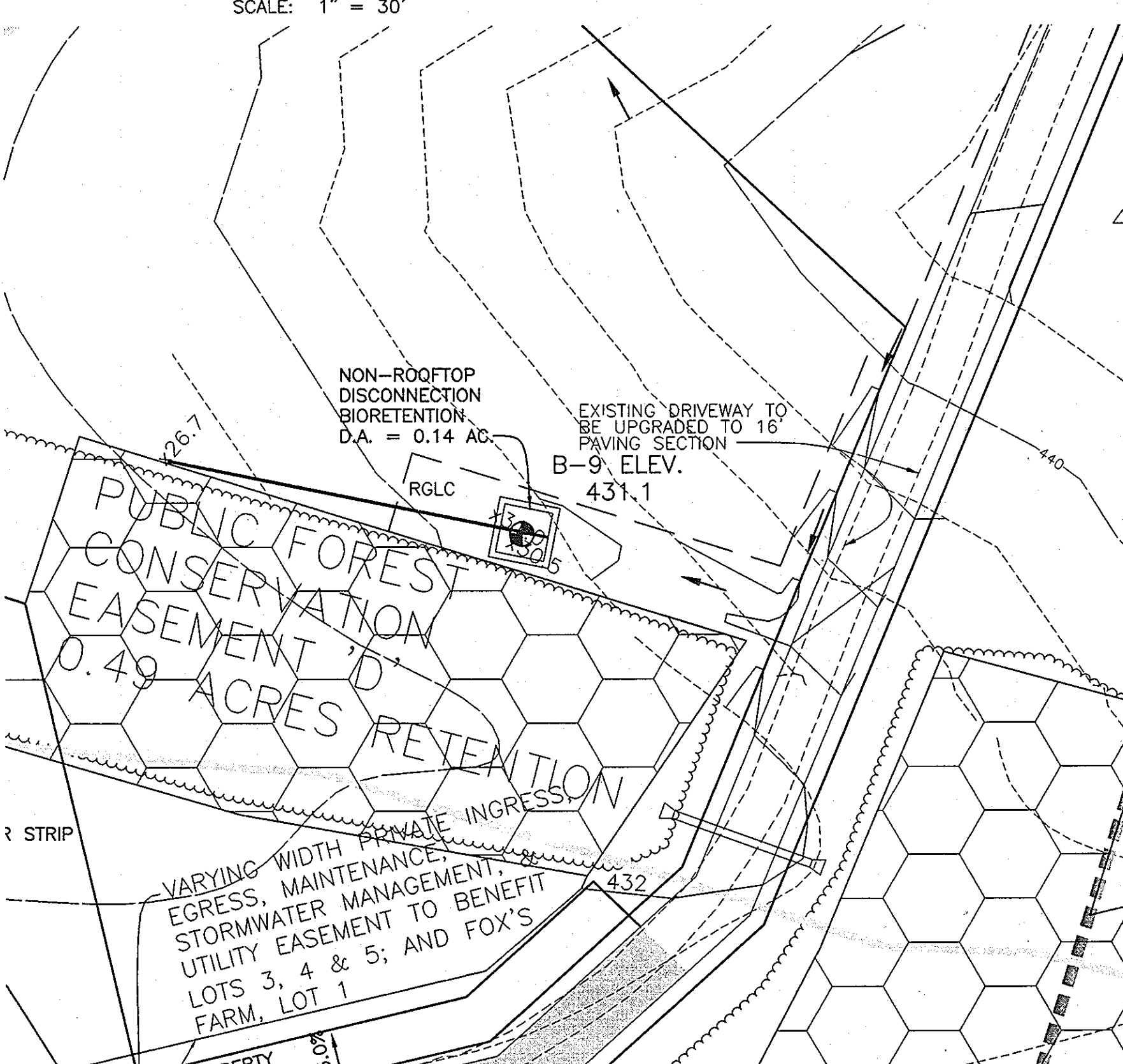
**RAINGARDENS 3A AND 3B**  
SCALE: 1" = 30'



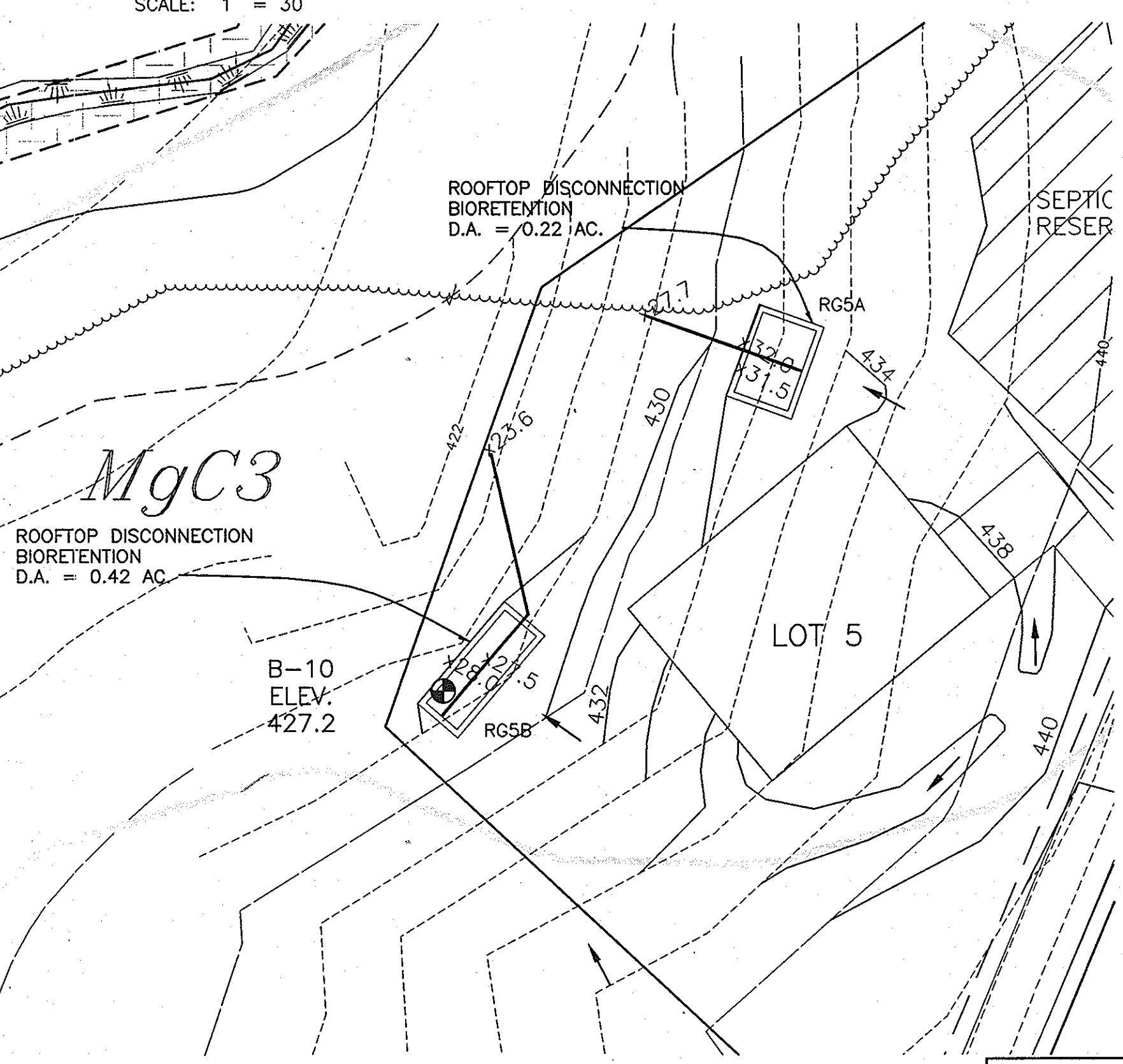
**RAINGARDENS 4A AND 4B**  
SCALE: 1" = 30'



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



**RAINGARDEN LC**  
SCALE: 1" = 30'



**RAINGARDENS 5A, 5B AND 5C**  
SCALE: 1" = 30'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*William J. ...* 10-28-08  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING  
*Cindy Hunt* 11/3/08  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 APPROVED: 10/31/08  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

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.

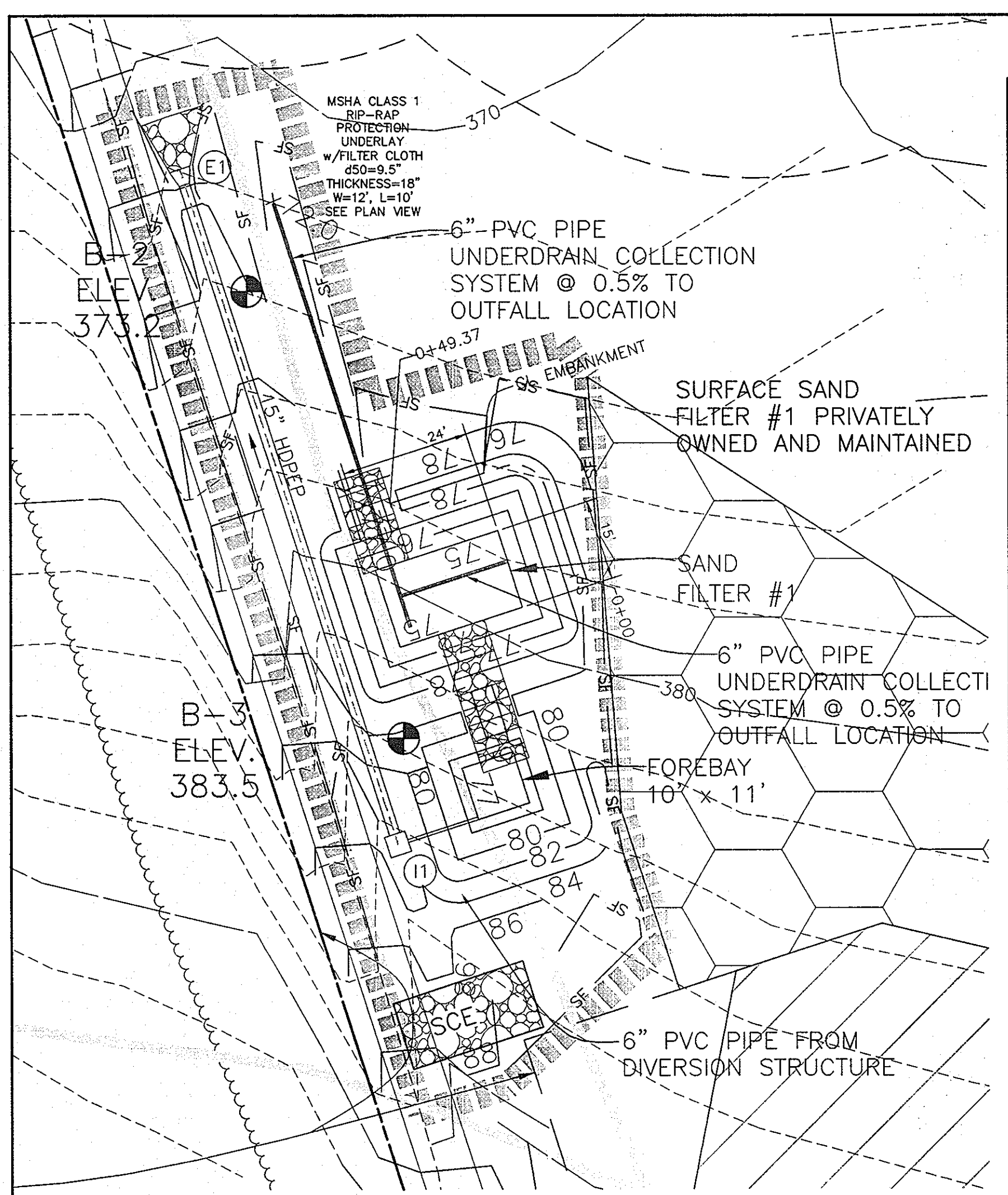
**BENCHMARK ENGINEERING, INC.**  
 ENGINEERS & LAND SURVEYORS & PLANNERS  
 8480 BALTIMORE NATIONAL PIKE & SUITE 418  
 ELLICOTT CITY, MARYLAND 21043  
 phone: 410-465-6105 & fax: 410-465-6844  
 email: Benchmark@ccis.com

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: 12-31-2009

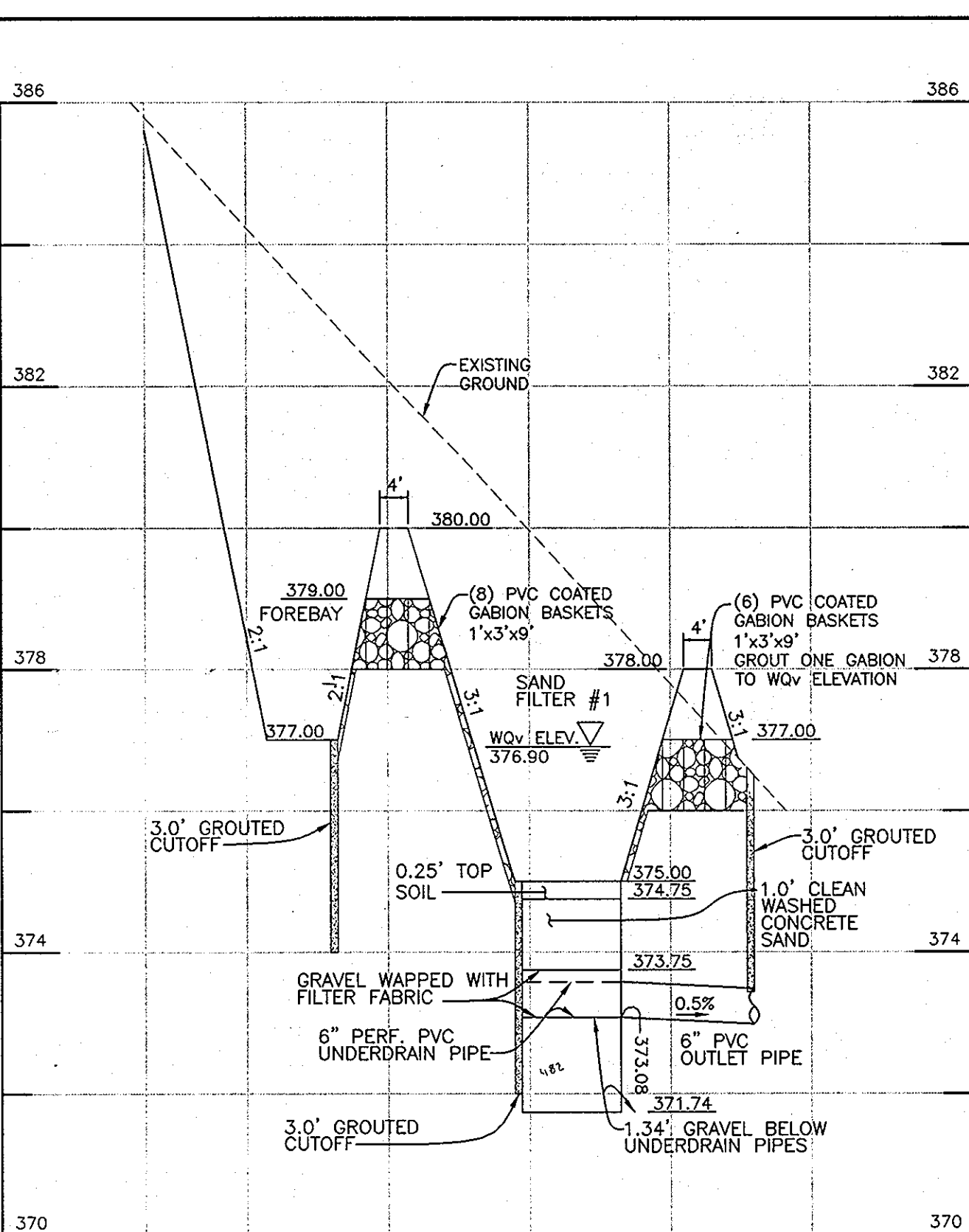
Professional Engineer Seal: *David Alan ...* 10-16-08

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "M" AND "N", 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 5/0 PARCEL: 130 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	

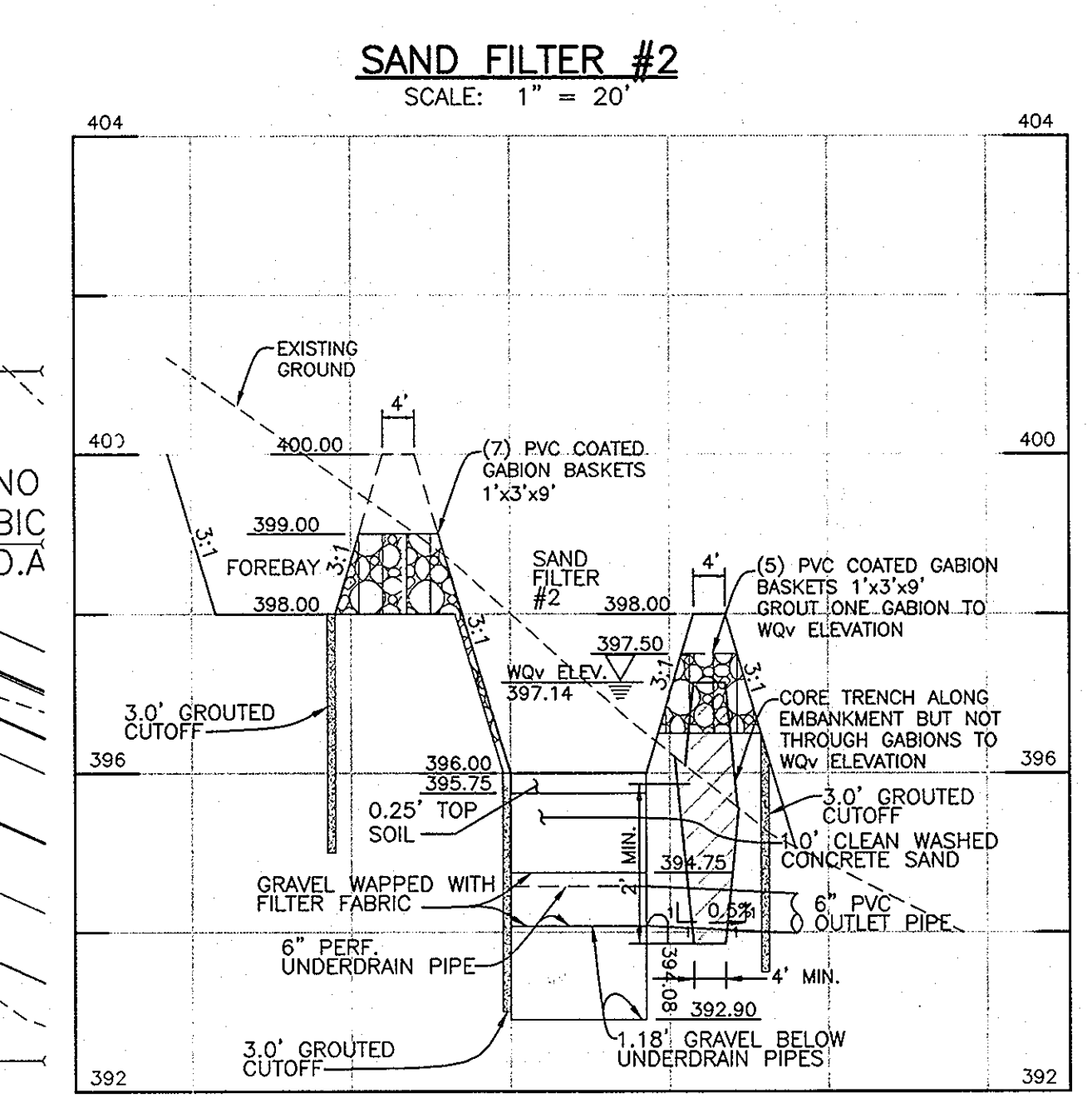




**SAND FILTER #1**  
SCALE: 1" = 20'

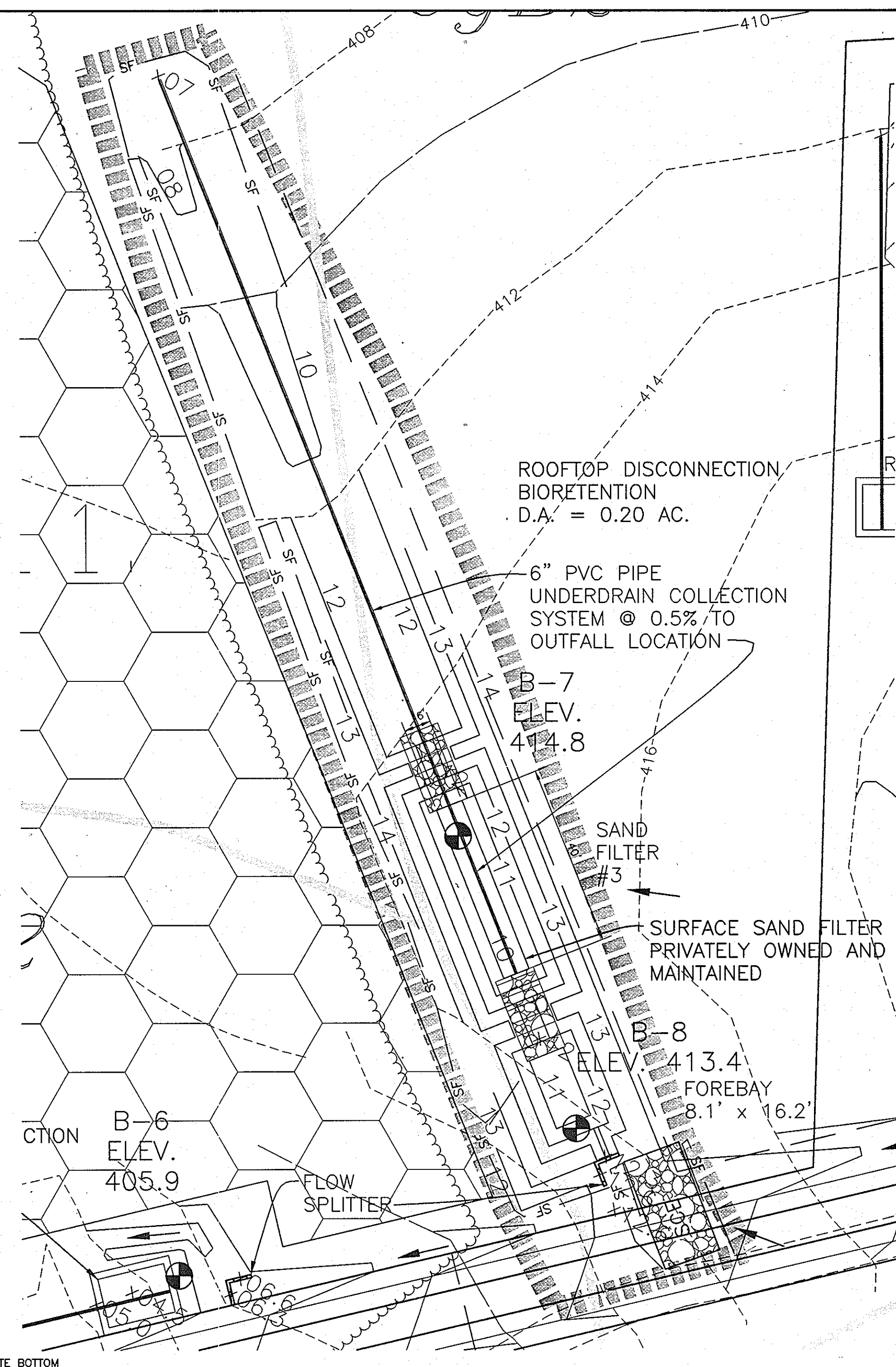


**SECTION THROUGH FACILITY SAND FILTER #1**  
SCALE: 1"=20' HORIZ., 1"=2' VERT.



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

\* APPROXIMATE BOTTOM OF CORE TRENCH IS SHOWN (CONSTRUCTION ELEVATION IS TO BE DETERMINED BY THE ENGINEER IN THE FIELD). CORE TRENCH MATERIAL MUST BE CL OR CH ONLY

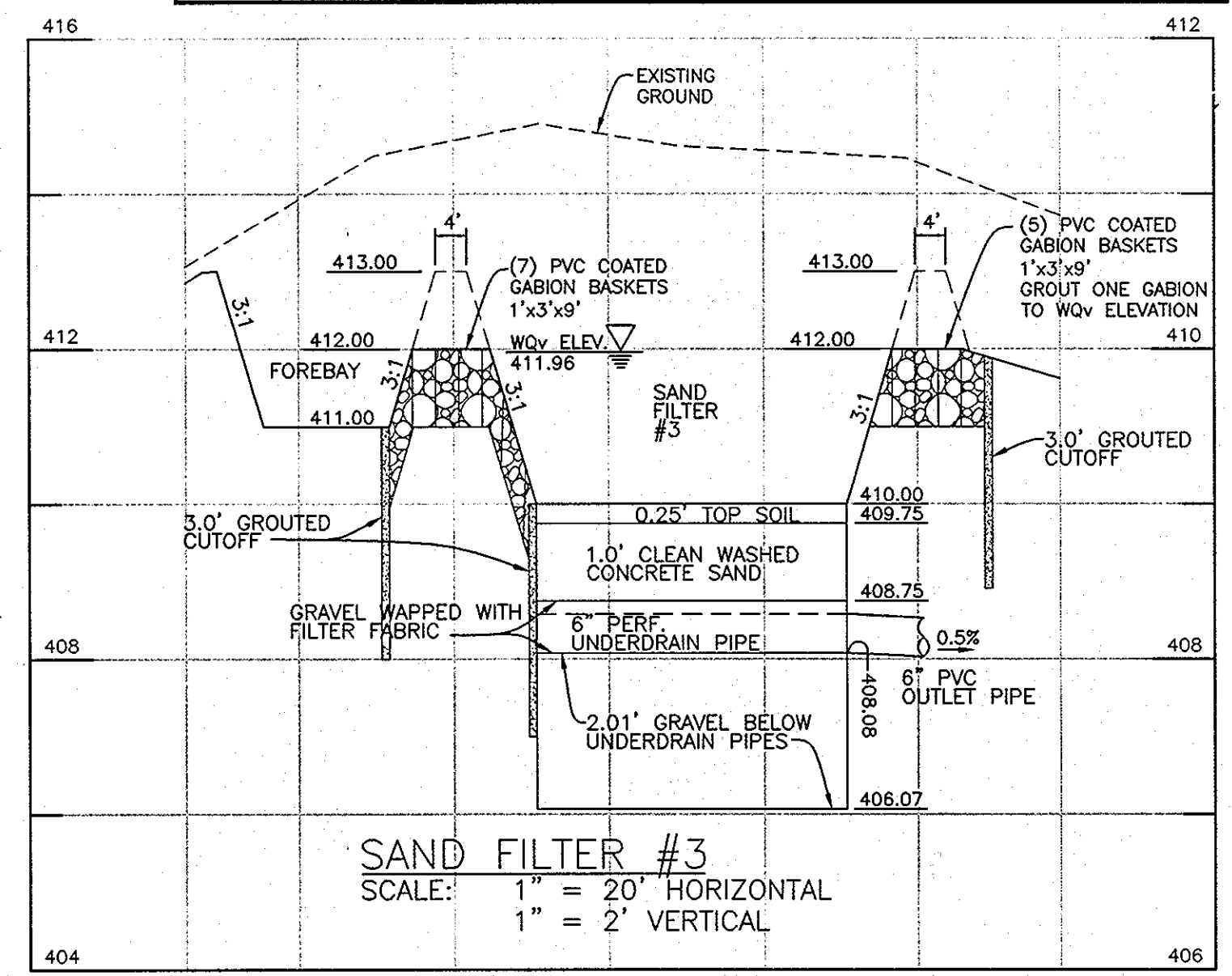


**SAND FILTER #3**  
SCALE: 1" = 20'

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-448	2" TO 5"	MUST MAINTAIN 125 GPM / SQ. FT. FLOW RATE. NOTE: A PEA GRAVEL LAYER MAY BE SUBSTITUTED FOR GEOTEXTILES MEANT TO "SEPERATE" SAND FILTER LAYERS
ORNAMENTAL STONE	WASHED COBBLES	2" TO 5"	
GEOTEXTILE (CLASS "C")	APPARENT OPENING SIZE: (ASTM D-4751) TENSILE STRENGTH: (ASTM D-4633) PUNCTURE RESISTANCE: (ASTM D-4833)	0.87 THICK EQUIVALENT OPENING SIZE OF #80 SIEVE	
UNDERDRAIN GRAVEL	ASTM M-443	0.375" TO 0.750"	
UNDERDRAIN PIPING	7758, TYPE PS28 OR AASHTO M-278	4" TO 6" RIGID SCH.40 PVC OR SDR35	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 GRANITESTONE ARE NOT ACCEPTABLE. NO CALCIUM CARBONATED OR OLIGOMIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND

FILTER NUMBER	LENGTH FEET	WIDTH FEET	SURFACE REQ. SF	SURFACE PRO. SF	VOLUME CUBIC FT.	FILTER DEPTH FEET	INLET ELEV.	OUTLET ELEV.
1	15	24	109	380	1454	1	375.00	373.08
2	17	24	81	408	815	1	396.00	394.08
3	40	6	76	240	789	1	410.00	408.08



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

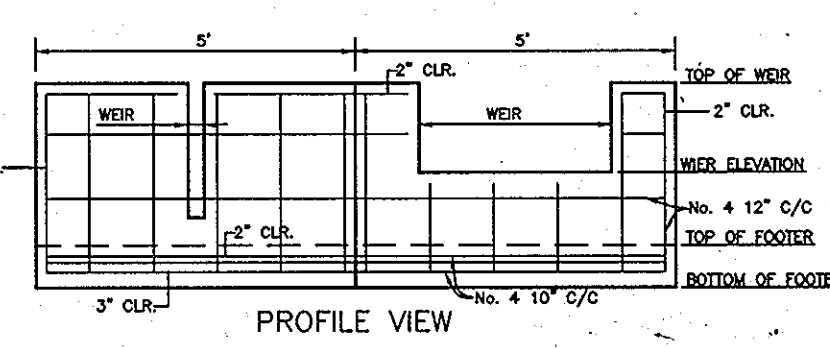
AS-BUILT CERTIFICATION  
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

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 DEEMED SUFFICIENT 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.

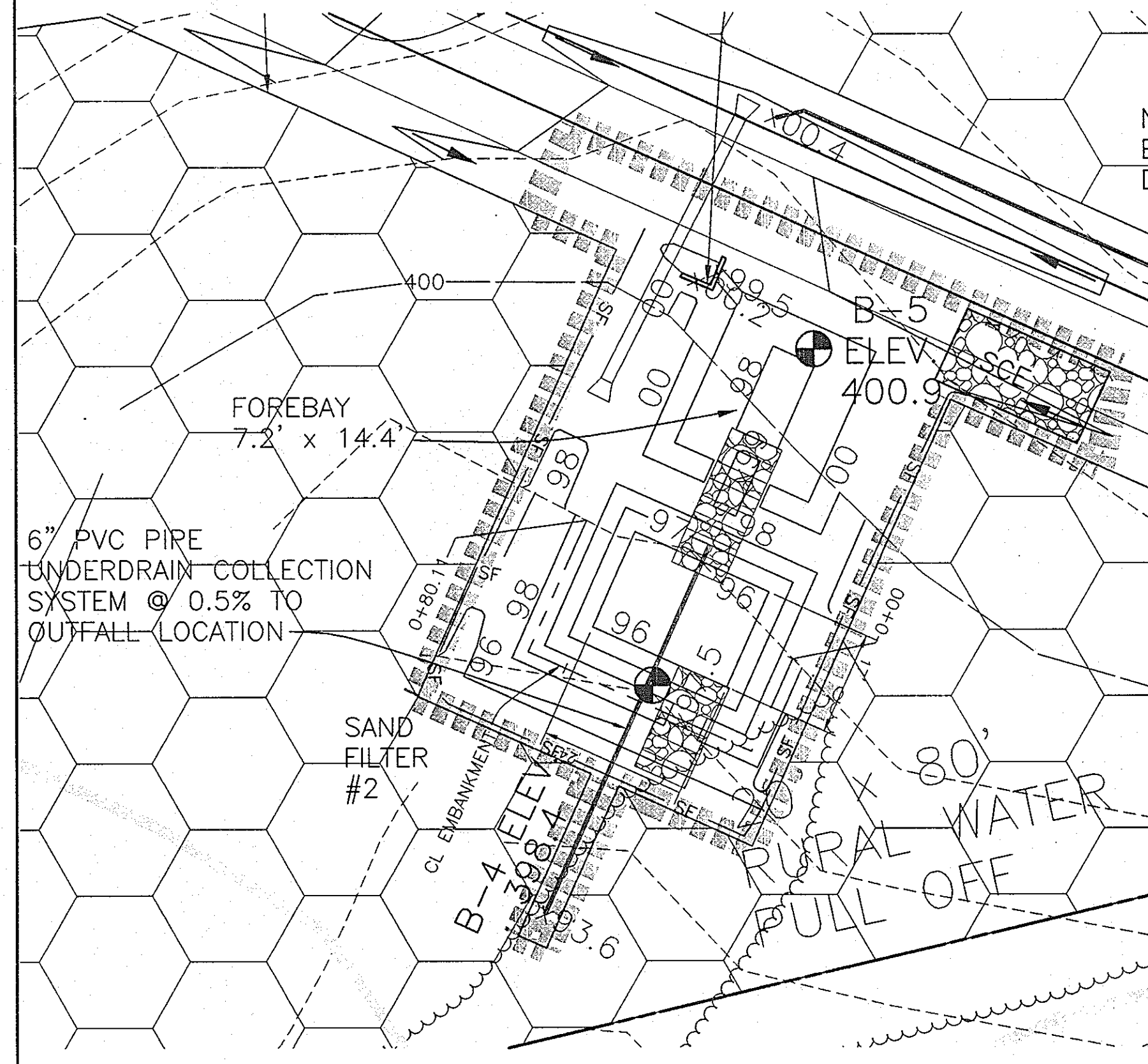
APPROVED: THIS DEVELOPMENT IS APPROVED FOR EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
Signature: [Signature] DATE: 10/23/08  
HOWARD SOIL CONSERVATION DISTRICT

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: [Signature] DATE: 10/16/08

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 onsite inspection by the Howard Soil Conservation District or their authorized agents, as are deemed necessary.  
Signature: [Signature] DATE: 10/17/08



TYPICAL REINFORCING  
SCALE: 1" = 20'



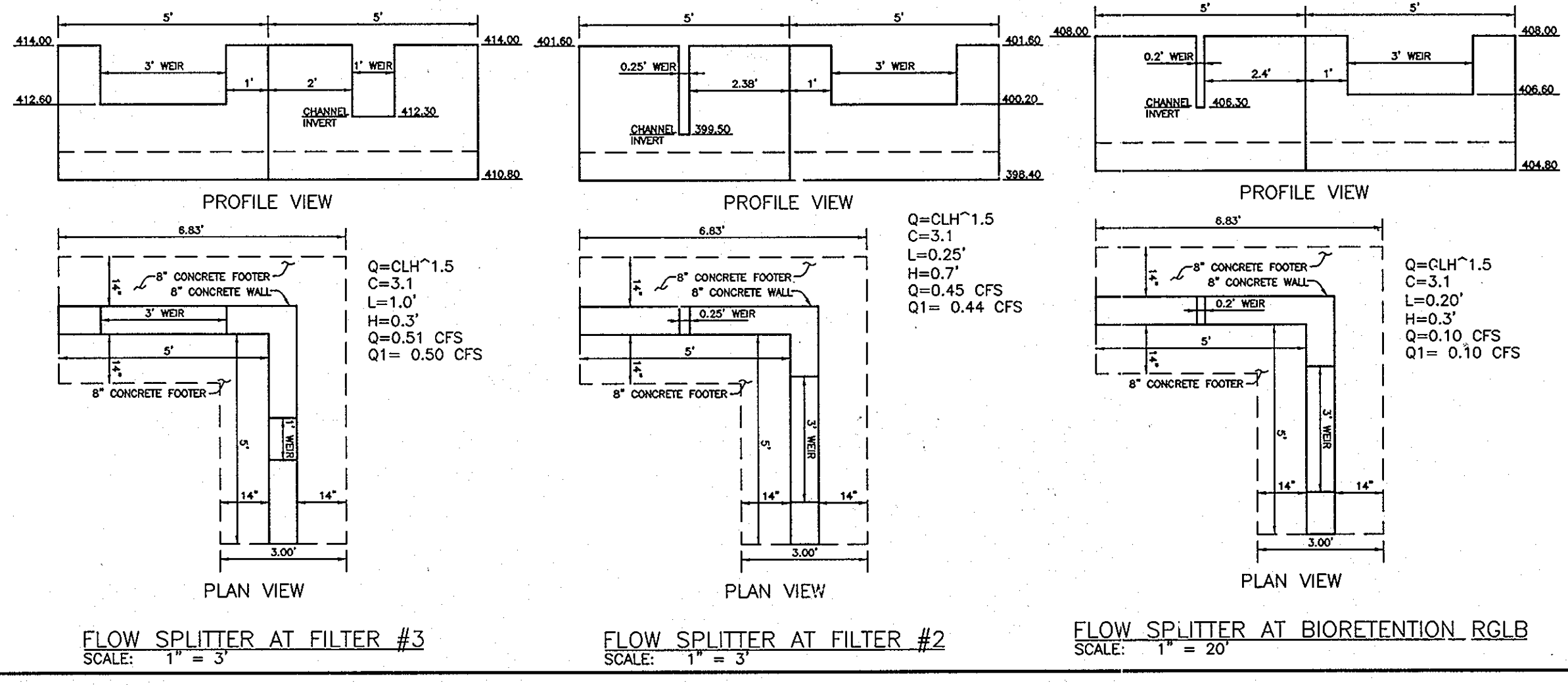
OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED F-1 SURFACE STORMWATER FILTER

- 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 MAINTAINED TO A MINIMUM OF ONCE PER YEAR, WHEN VEGETATION REACHES 18" IN HEIGHT OR AS NEEDED.
- FILTERS THAT HAVE A GRASS COVER SHALL BE MAINTAINED TO 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 INCHES DEEP IN THE FOREBAY.
- WHEN WATER POUNDS 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 LOGBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
- THE MAINTENANCE LOGBOOK 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.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
Signature: [Signature] DATE: 10-22-08  
CHIEF, BUREAU OF HIGHWAYS

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

APPROVED: [Signature] DATE: 10/16/08  
CHIEF, DEVELOPMENT ENGINEERING DIVISION



FLOW SPLITTER AT FILTER #2 SCALE: 1" = 3'  
FLOW SPLITTER AT FILTER #3 SCALE: 1" = 3'  
FLOW SPLITTER AT BIORETENTION RGLB SCALE: 1" = 20'

**BENCHMARK ENGINEERING, INC.**  
8480 BALTIMORE NATIONAL PIKE & SUITE 418  
ELLCOTT CITY, MARYLAND 21043  
phone: 410-465-6105 & fax: 410-465-6644  
email: Benchmark@ccis.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: [Signature] DATE: 10/16/08

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "M" AND "N", 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/0 PARCEL: 130  
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  
DES: JC DRAFT: JC CHECK: DAM SCALE: NA SHEET 5 OF 11

**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 SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS THERETO.
- 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, PERIMETER 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) SOO (SEC. 54), TEMPORARY SEEDING (SEC. 50) 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 THE 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 REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, 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 WITH 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 as 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, clay 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. Reported topsoil shall not be a mixture of contrasting texture subsoils and shall contain less than 5% by volume of cinders, stones, logs, coarse fragments, gravel, sticks, roots, trash, or other materials deleterious to plant growth.
  - Topsoil must be free of plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nutgrass, poison ivy, thistle, or others as specified.
  - Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-6 tons/acre (200-600 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas 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 Vegetative Stabilization - Section 1 - Vegetative Stabilization Methods and Materials.
    - 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 6.5 or higher.
      - Organic content or topsoil shall be not less than 1.5 percent by weight.
    - Topsoil having soluble salt content greater than 500 parts per million shall not be used.
    - No soil 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.
  - For sites having disturbed areas over 5 acres:
    - Place topsoil (if required) and apply soil amendments as specified in 2.0 Vegetative Stabilization - Section 1 - Vegetative Stabilization Methods and Materials.
- Topsoil Application
  - When topsoiling, maintain needed erosion and sediment control practices such as diversions, grids stabilization structures, earth dikes, slope silt fence and sediment traps and basins.
  - Grades on the area 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". Seeding 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 seeding operations shall be corrected in order to prevent the formation of depressions or wet spots.
  - Topsoil shall not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed 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 distributed areas over 5 acres shall be tested to prescribe amendments and for sites having distributed 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 acquisition of the compost) by the Maryland Department of the Environment under COMAR 26.04.06.
      - 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 Seeding, MD-VA, Pub. #1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institute, Revised 1973.

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Stormwater Management Structures  
Carroll/Ziegler Subdivision  
July 2007  
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Assumption rate of the representative data. In our view, the best (fourth hour) readings will probably more material during the year-round typical precipitation rates of these soils.

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

Location No.	Infiltration Rate (inches per hour)
B-3	0.6 to 15.0"
B-4	6.0 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	0.8 to 15.0"

**RECOMMENDATIONS**

The following recommendations are based upon our understanding of the proposed construction, information supplied by Benchmark Engineering, Inc., data obtained from the test/precipitation borings and our experience with similar projects. If 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 received at the exposed 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 ten test borings performed for this study before or between the following depths (to the exposed depth of 15.0 feet):

Boring No.	Suitable Soil Classification (to depth)
B-1	0.5 to 13.0"
B-2	4.0 to 15.0"

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Stormwater Management Structures  
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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-1), aggr 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 (aggr refusal) and groundwater were not encountered in the borings performed for this study. On this basis, infiltration appears to be feasible at all the exposed locations at the field percolation and USDA infiltration rates. With respect to the various test boring profiles, 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.

**BORING LOG** **geolab**

DATE: 7/26/07  
BY: Mr. Natalie Ziegler c/o Benchmark Engineering  
FOR: SVM Structures, Carroll/Ziegler Subdivision

Location: B-1 (1 of 11) 15' 16' 17' 18' 19' 20' 21' 22' 23' 24' 25' 26' 27' 28' 29' 30'

DESCRIPTION OF MATERIALS

DEPTH (FEET)	DESCRIPTION OF MATERIALS	REMARKS
0.0 - 1.0	Forest floor with root (organic) matter and organic soil	Boring dry during drilling and at completion.
1.0 - 2.0	Light brown to yellow micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	Cave-in depth at 7.5 feet.
2.0 - 3.0	Dark brown and olive-brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
3.0 - 4.0	Light yellow and dark olive-brown micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	After 24 hours, boring again dry to cave-in depth.
4.0 - 5.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
5.0 - 6.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
6.0 - 7.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
7.0 - 8.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
8.0 - 9.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
9.0 - 10.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
10.0 - 11.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
11.0 - 12.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
12.0 - 13.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
13.0 - 14.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
14.0 - 15.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.

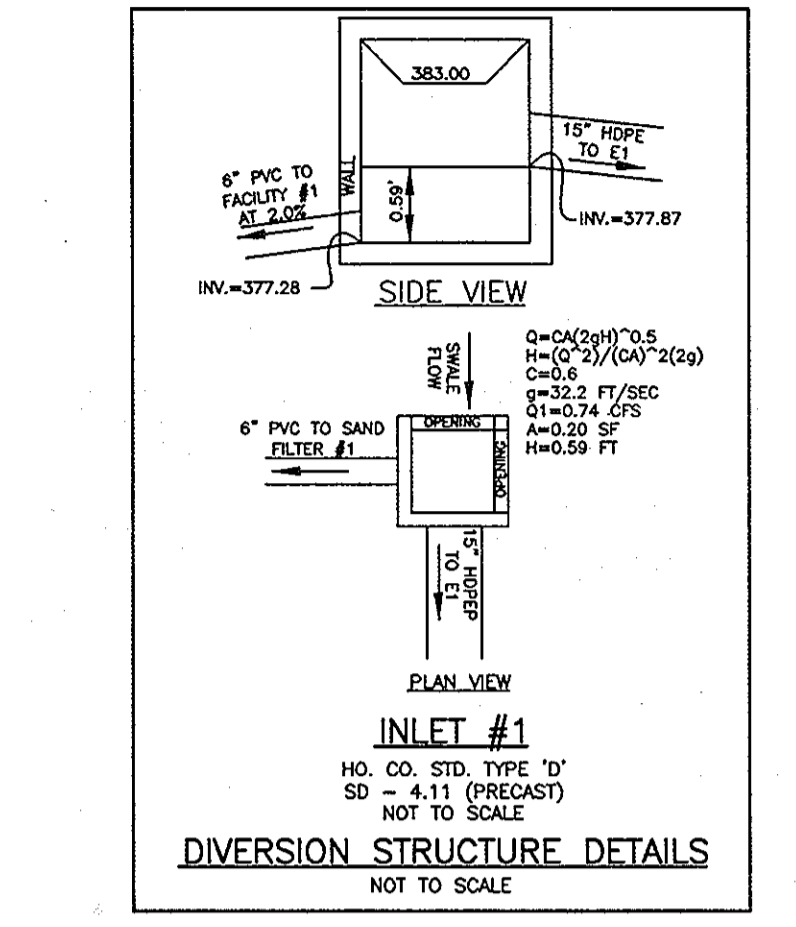
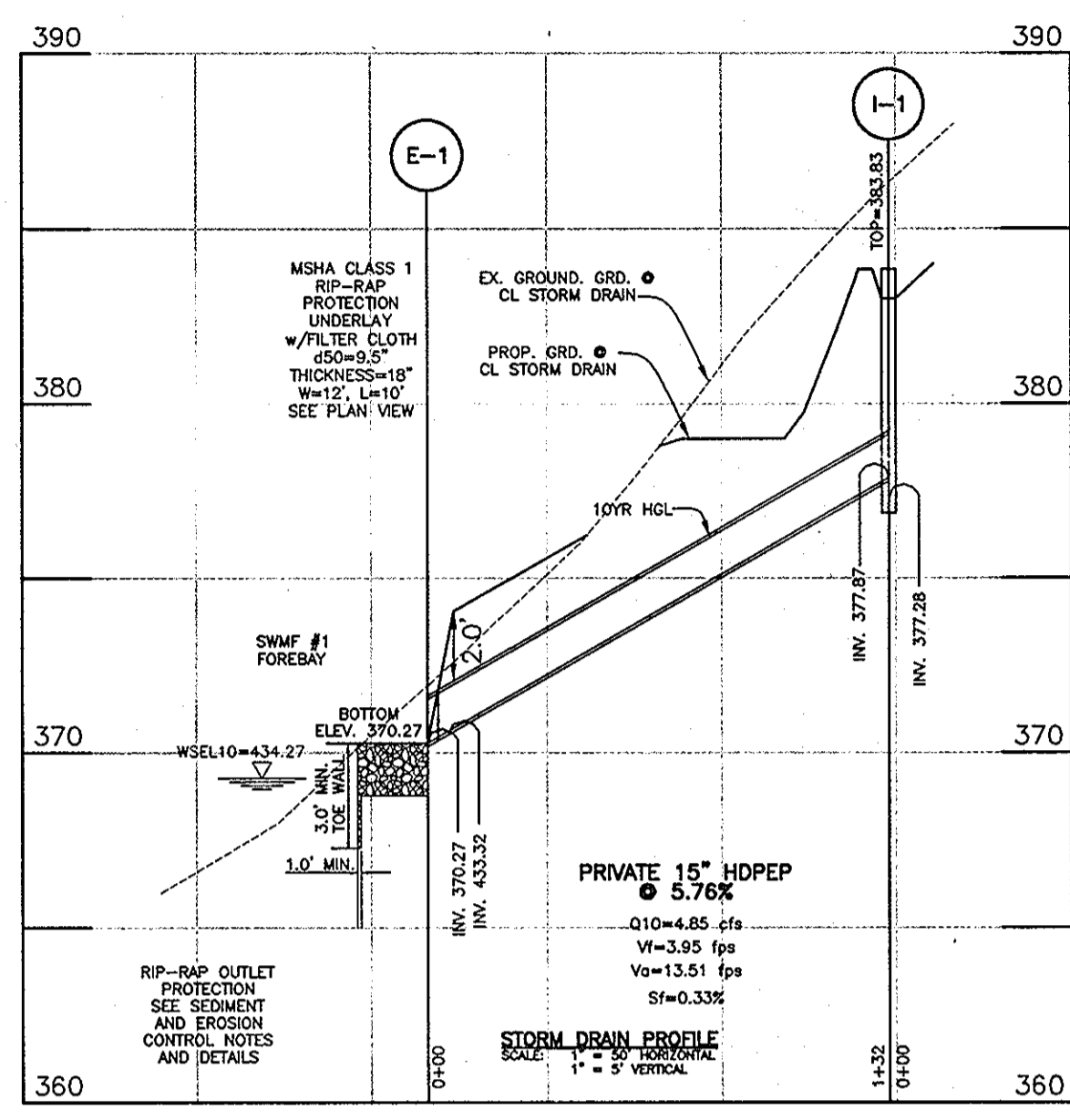
**BORING LOG** **geolab**

DATE: 7/26/07  
BY: Mr. Natalie Ziegler c/o Benchmark Engineering  
FOR: SVM Structures, Carroll/Ziegler Subdivision

Location: B-2 (1 of 11) 15' 16' 17' 18' 19' 20' 21' 22' 23' 24' 25' 26' 27' 28' 29' 30'

DESCRIPTION OF MATERIALS

DEPTH (FEET)	DESCRIPTION OF MATERIALS	REMARKS
0.0 - 1.0	Forest floor with root (organic) matter and organic soil	Boring dry during drilling and at completion.
1.0 - 2.0	Light brown to yellow micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	Cave-in depth at 8.8 feet.
2.0 - 3.0	Dark brown and olive-brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
3.0 - 4.0	Light yellow and dark olive-brown micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	After 24 hours, boring again dry to cave-in depth.
4.0 - 5.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
5.0 - 6.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
6.0 - 7.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
7.0 - 8.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
8.0 - 9.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
9.0 - 10.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
10.0 - 11.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
11.0 - 12.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
12.0 - 13.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
13.0 - 14.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
14.0 - 15.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.



**PIPE SCHEDULE**

SIZE	TYPE	LENGTH	MAINTENANCE
15"	HDPE	127	PRIVATE

**AREA AND "C" FACTOR TABULATION**  
CARROLL-ZIEGLER DATE: 4/24/08 1530-F  
BULK PARCEL "F" ZONE: RC-COE

INLET #	ZONING	AREA (A)	"C" FACTOR	% IMPERVIOUS (P)
1	RC-COE	1.70	0.38	38

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

*[Signature]*  
HOWARD SOIL CONSERVATION DISTRICT  
10/23/08  
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 onsite inspection by the Howard Soil Conservation District or their authorized agents, as are deemed necessary.

*[Signature]*  
10/17/08  
Date

**BENCHMARK ENGINEERING, INC.**  
ENGINEERS & LAND SURVEYORS & PLANNERS

8480 BALTIMORE NATIONAL PIKE & SUITE 418  
ELLICOTT CITY, MARYLAND 21043  
PHONE: 410-465-6105 A 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. 21443, Expiration Date: 12-31-2008.

*[Signature]*  
10/16/08

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

OWNER/DEVELOPER: NATALIE ZIEGLER ET AL  
4268 MANOR LANE  
ELLICOTT CITY, MARYLAND 21042  
410-740-6880

LOCATION: TAX MAP: 23, GRID: 10  
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

**TEMPORARY SEEDBED PREPARATIONS**

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

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING 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 WEEPING LOVEGRASS (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 SOO.

MULCHING: APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ FT) OF UNROTTED SMALL GRASS 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 (6 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.

**PERMANENT SEEDBED PREPARATIONS**

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING 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. NARROW OR DISC INTO UPPER THREE INCHES OF SOIL AT TIME OF SEEDING. APPLY 400 LBS PER ACRE 30-0-0- UREA/FORM 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. NARROW OR DISC INTO UPPER THREE INCHES OF SOIL.

SEEDING: FOR THE PERIODS MARCH 1 THROUGH APRIL 30 AND AUGUST 1 THROUGH OCTOBER 15, SEED WITH 60 LBS PER ACRE (0.5 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (1.4 LBS/1000 SQ FT) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 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 SOO. 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 GRASS 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 (6 GAL/1000 SQ FT) FOR ANCHORING.

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

**BORING LOG** **geolab**

DATE: 7/26/07  
BY: Mr. Natalie Ziegler c/o Benchmark Engineering  
FOR: SVM Structures, Carroll/Ziegler Subdivision

Location: B-3 (1 of 11) 15' 16' 17' 18' 19' 20' 21' 22' 23' 24' 25' 26' 27' 28' 29' 30'

DESCRIPTION OF MATERIALS

DEPTH (FEET)	DESCRIPTION OF MATERIALS	REMARKS
0.0 - 1.0	Forest floor with root (organic) matter and organic soil	Boring dry during drilling and at completion.
1.0 - 2.0	Light brown to yellow micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	Cave-in depth at 8.2 feet.
2.0 - 3.0	Dark brown and olive-brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
3.0 - 4.0	Light yellow and dark olive-brown micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	After 24 hours, boring again dry to cave-in depth.
4.0 - 5.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
5.0 - 6.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
6.0 - 7.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
7.0 - 8.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
8.0 - 9.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
9.0 - 10.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
10.0 - 11.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
11.0 - 12.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
12.0 - 13.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
13.0 - 14.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
14.0 - 15.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.

**BORING LOG** **geolab**

DATE: 7/26/07  
BY: Mr. Natalie Ziegler c/o Benchmark Engineering  
FOR: SVM Structures, Carroll/Ziegler Subdivision

Location: B-4 (1 of 11) 15' 16' 17' 18' 19' 20' 21' 22' 23' 24' 25' 26' 27' 28' 29' 30'

DESCRIPTION OF MATERIALS

DEPTH (FEET)	DESCRIPTION OF MATERIALS	REMARKS
0.0 - 1.0	Forest floor with root (organic) matter and organic soil	Boring dry during drilling and at completion.
1.0 - 2.0	Light brown to yellow micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	Cave-in depth at 8.2 feet.
2.0 - 3.0	Dark brown and olive-brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
3.0 - 4.0	Light yellow and dark olive-brown micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	After 24 hours, boring again dry to cave-in depth.
4.0 - 5.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
5.0 - 6.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
6.0 - 7.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
7.0 - 8.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
8.0 - 9.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
9.0 - 10.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
10.0 - 11.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
11.0 - 12.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
12.0 - 13.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
13.0 - 14.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
14.0 - 15.0	Light brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.

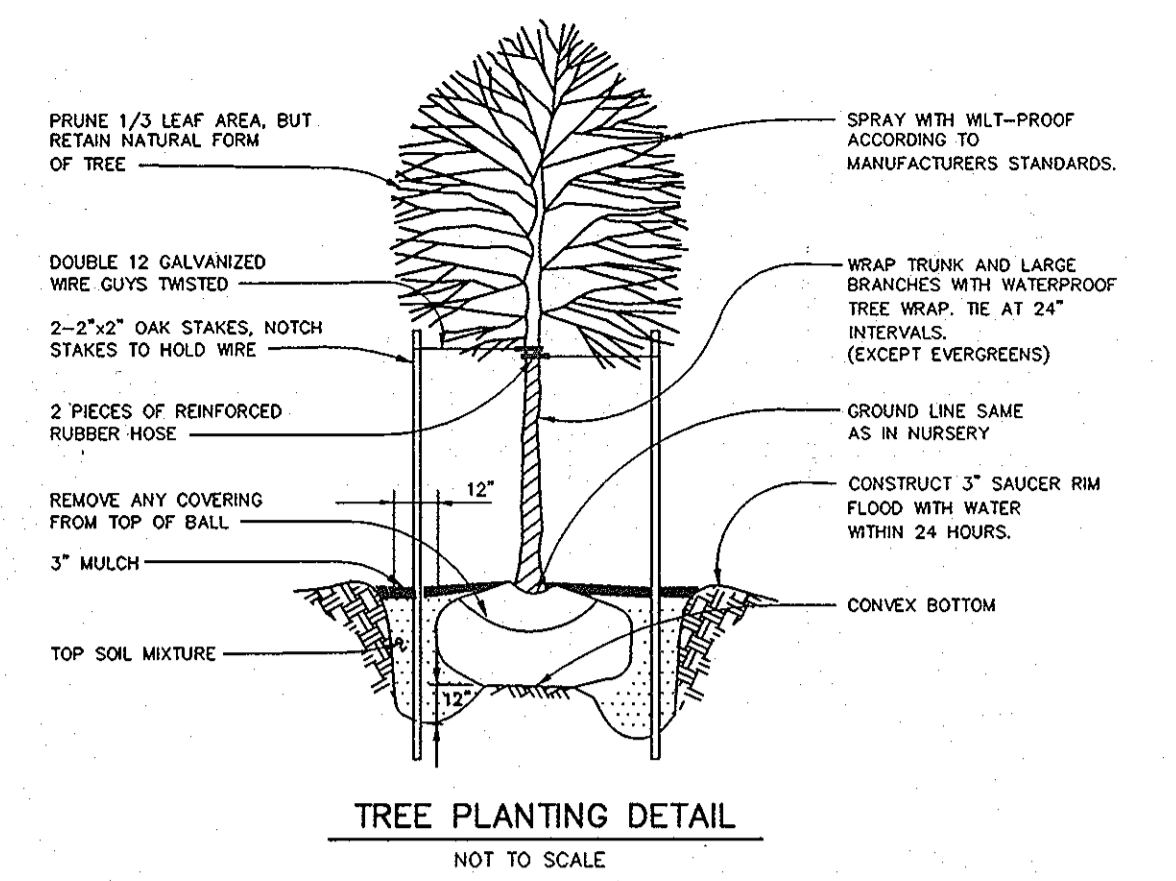
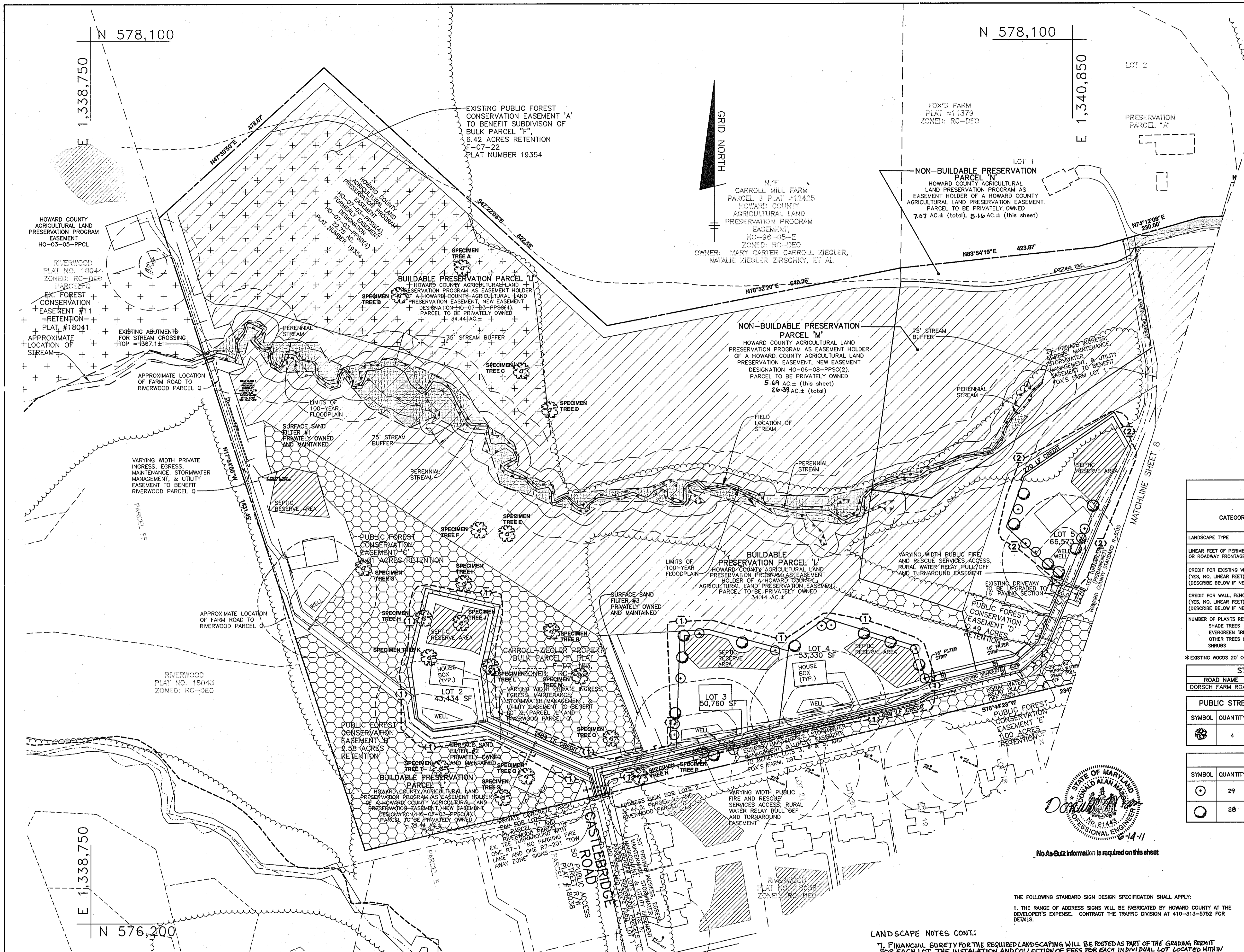
**BORING LOG** **geolab**

DATE: 7/26/07  
BY: Mr. Natalie Ziegler c/o Benchmark Engineering  
FOR: SVM Structures, Carroll/Ziegler Subdivision

Location: B-5 (1 of 11) 15' 16' 17' 18' 19' 20' 21' 22' 23' 24' 25' 26' 27' 28' 29' 30'

DESCRIPTION OF MATERIALS

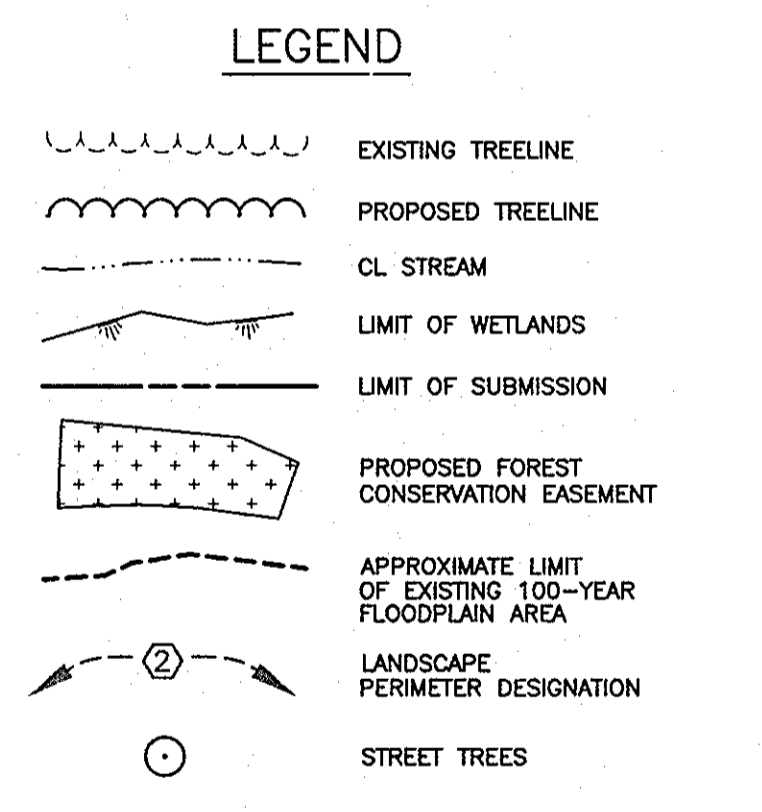
DEPTH (FEET)	DESCRIPTION OF MATERIALS	REMARKS
0.0 - 1.0	Forest floor with root (organic) matter and organic soil	Boring dry during drilling and at completion.
1.0 - 2.0	Light brown to yellow micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	Cave-in depth at 6.0 feet.
2.0 - 3.0	Dark brown and olive-brown micaceous silty fine to medium SAND, moist, loose (SM) (SANDY LOAM)	After 24 hours, boring again dry to cave-in depth.
3.0 - 4.0	Light yellow and dark olive-brown micaceous silty fine to medium SAND with some silt, moist, loose (SM) (LOAMY SAND)	After 24 hours, boring again dry to cave-in depth.
4.0 - 5.0	Light brown micaceous silty fine to	



- LANDSCAPE NOTES:**
- TREES SHOULD BE PLANTED A MINIMUM OF 4 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 SIDEWALK 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.	ADJ. TO PERIMETER PROP.	ADJ. TO PERIMETER PROP.	TOTAL
	(1)	(2)	(3)	
LANDSCAPE TYPE	A	A	A	
LINEAR FEET OF PERIMETER OR ROADWAY FRONTAGE	3280'	935'	1617'	5832'
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	2162'	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	1118'	665'	1617'	3400'
SHADE TREES	19	11	27	57
EVERGREEN TREES	-	-	-	-
OTHER TREES (2:1 SUBSTITUTE) SHRUBS	-	-	-	-



**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
(Tree Symbol)	4	PRUNUS SERRULATA (Kwanzan Cherry)	1 1/2" MIN. CAL B&B FULL HEAD STREET TREES TO BE PROVIDED BY THE DEVELOPER

**LANDSCAPE PLANTING LIST**

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



No As-Built information is required on this sheet

THE FOLLOWING STANDARD SIGN DESIGN SPECIFICATION SHALL APPLY:  
 1. 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 AGREED UPON ON 12-11-08 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  
 [Signature] 10-28-08  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING  
 [Signature] 11/08/08  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 [Signature] 12/21/08  
 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.  
 [Signature] 10/17/08  
 NATALIE ZIEGLER  
 OWNER

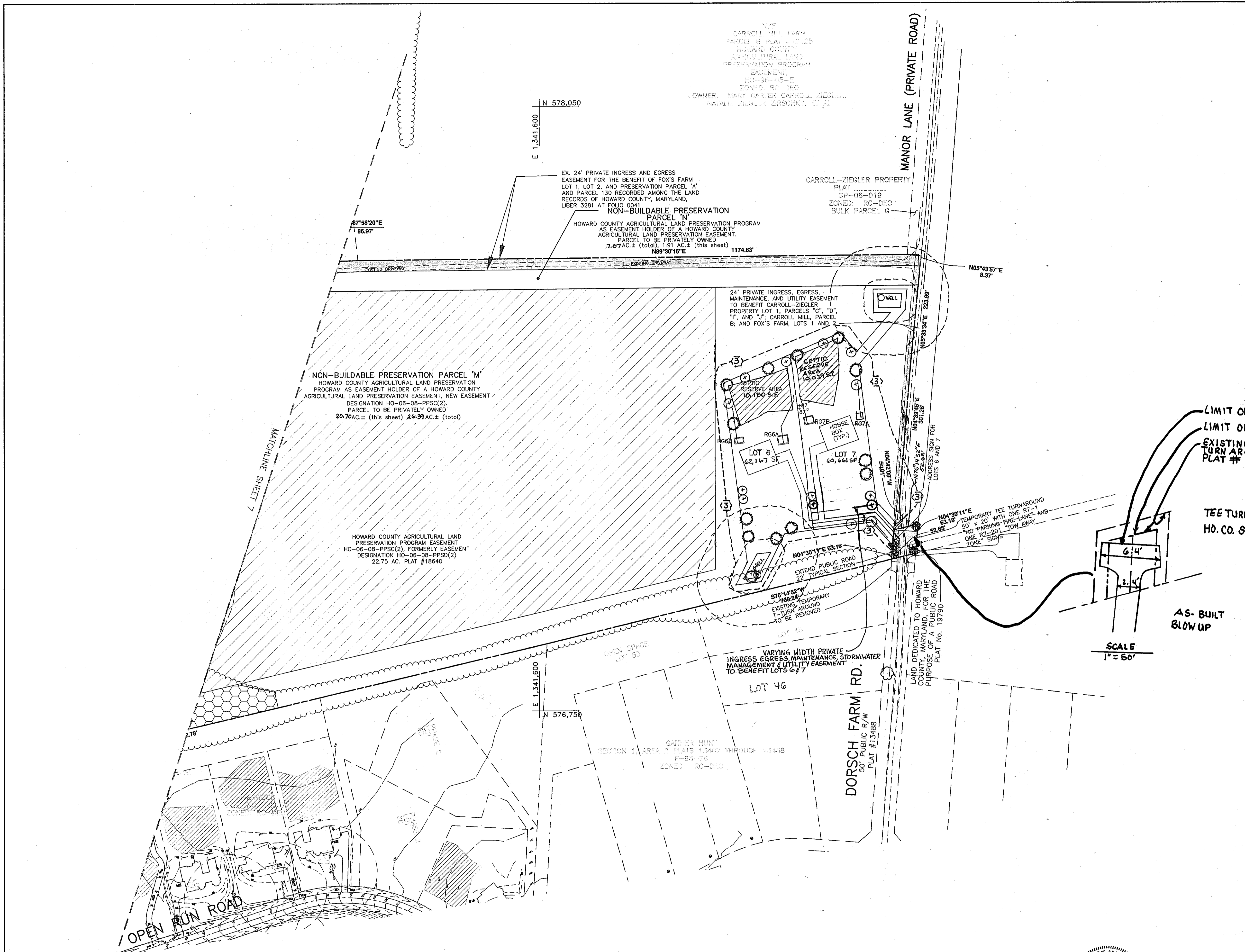
NO.	DATE	REVISION
10-26-10	RECONFIGURATION OF LOTS 6+7	

**BENCHMARK ENGINEERING, INC.**  
 ENGINEERS • LAND SURVEYORS • PLANNERS  
 8480 BALTIMORE NATIONAL PIKE • SUITE 418  
 ELLICOTT CITY, MARYLAND 21043  
 phone: 410-465-8105 • fax: 410-465-6844  
 email: Benchmark@ceia.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: 12/31/2011  
 [Signature] 10/16/08  
 DONALD A. ZIEGLER  
 PROFESSIONAL ENGINEER  
 License No. 21443

**PROJECT:** CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "M" AND "N", 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/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 7 OF 11	



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

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

AS-BUILT BLOW UP

SCALE  
 1" = 50'

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

NO.	DATE	REVISION
1	10-27-10	RECONFIGURATION OF LOTS 6+7

**BENCHMARK**  
 ENGINEERS • LAND SURVEYORS • PLANNERS  
**ENGINEERING, INC.**  
 8480 BALTIMORE NATIONAL PIKE • SUITE 418  
 ELLICOTT CITY, MARYLAND 21043  
 phone: 410-455-8105 • fax: 410-465-6644  
 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.

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "M" AND "N", 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/O PARCEL: 130 THIRD ELECTION DISTRICTS HOWARD COUNTY, MARYLAND
TITLE: SUPPLEMENTAL FINAL LANDSCAPE PLAN	DATE: OCTOBER, 2008
DES: JC	DRAFT: JC
CHECK: DAM	SCALE: 1" = 100'
SHEET 8	OF 11

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

*William Z. Mahall*  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 10-27-08

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

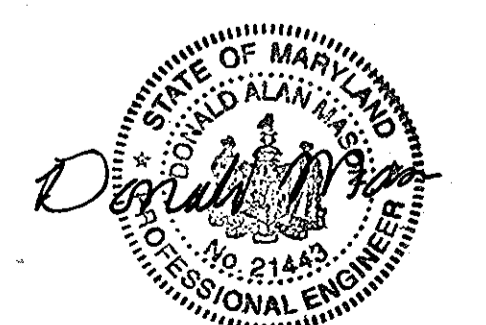
*Cindy Hammett*  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 11/9/08

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

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  
 DATE: 10/17/08



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





Specimen Trees			
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, 36" dbh	Good	Yes
F	Liriodendron tulipifera, 36" dbh	Good	Yes
G	Liriodendron tulipifera, 36" dbh	Good	Yes
H	Carya glabra, 42" dbh	Good	No
I	Liriodendron tulipifera, 52" dbh	Poor	Yes
J	Liriodendron tulipifera, 38" dbh	Good	Maybe
K	Liriodendron tulipifera, 38" dbh	Good	No
L	Liriodendron tulipifera, 34" dbh	Good	Yes
M	Liriodendron tulipifera, 46" dbh	Good	Yes
N	Liriodendron tulipifera, 62" dbh	Good	Yes
O	Liriodendron tulipifera, 56" dbh	Good	Yes
P	Liriodendron tulipifera, 48" 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, 36" dbh	Good	Yes

- ECP NOTES**
- Any Forest Conservation Easement (FCE) area shown hereon is subject to protective covenants which may be found in the Land Records of Howard County which restrict the disturbance and use of those areas.
  - Forested areas occurring outside of the FCE shall not be considered part of the FCE and shall not be subject to protective land coverages.
  - 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 8.15 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 survey 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**

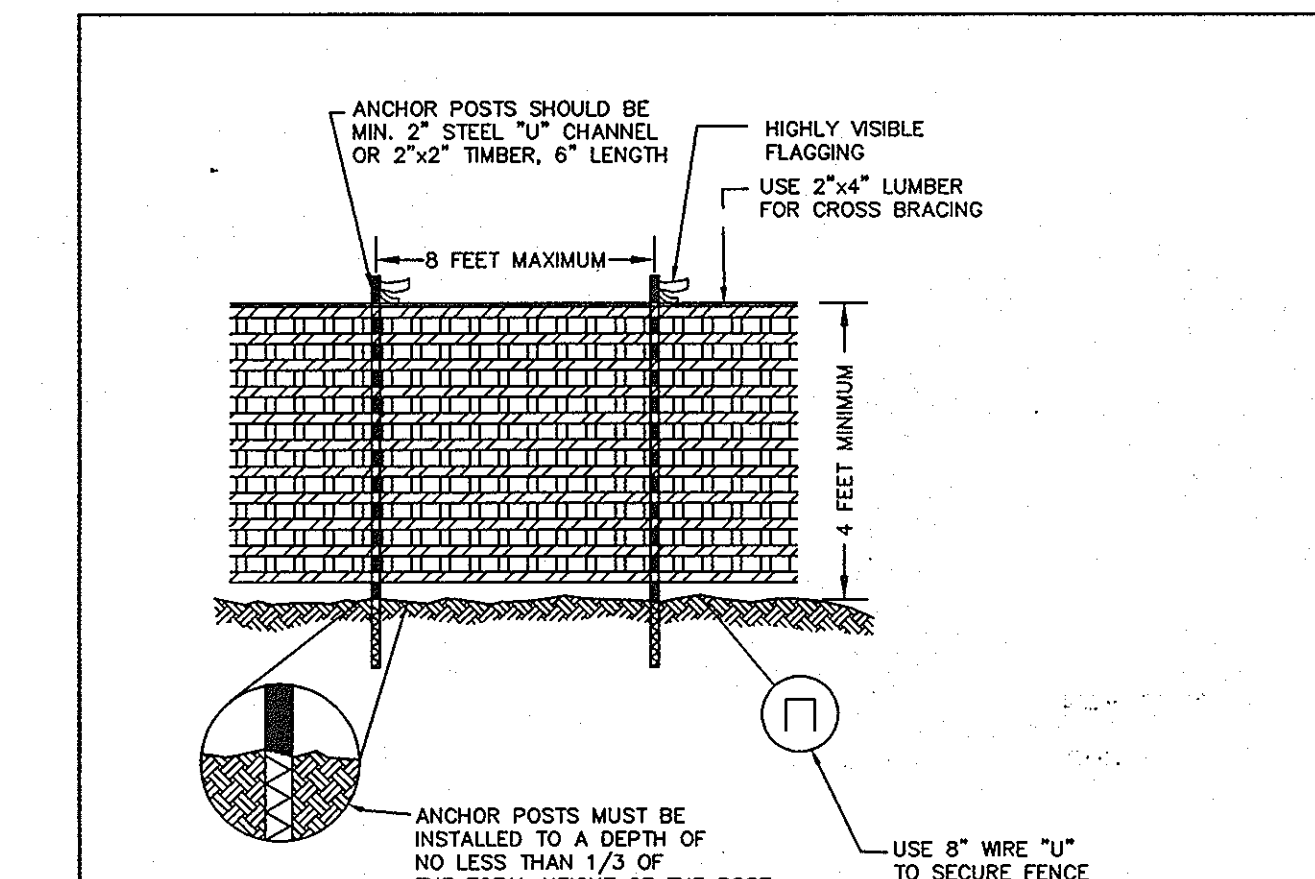
**MACHINERY, DUMPING OR STORAGE OF ANY MATERIALS IS PROHIBITED**

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

**SIGNAGE**  
NOT TO SCALE

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

\*\*SEE SHEET 10 FOR FOREST CONSERVATION CALCULATIONS\*\*



- 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**



No As-Built information is required on this sheet

**LEGEND**

- (111) 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

*Wade J. M... 10-28-08*  
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

*Cindy... 11/3/08*  
CHIEF, DIVISION OF LAND DEVELOPMENT

*... 10/16/08*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

**Eco-Science Professionals, Inc.**

CONSULTING ECOLOGISTS

MD DNR Qualified Professional  
USACE Wetland Designer  
Certification No. W000154423

D.O. Box 5006 Glen Arm, MD 21037 (410) 592-4752

**BENCHMARK ENGINEERING, INC.**

ENGINEERS • LAND SURVEYORS • PLANNERS

8480 BALTIMORE NATIONAL PIKE • SUITE 418  
ELLICOTT CITY, MARYLAND 21043  
phone: 410-465-8105 • 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. 21443, Expiration Date: 12-21-2008.

*David Alan Mink*  
PROFESSIONAL ENGINEER  
10/16/08

PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "M" AND "N", A RESUBDIVISION OF NON-BUILDABLE BULK PARCEL "F"		LOCATION: TAX MAP: 23, GRID: 10 P/O PARCEL: 130 THIRD ELECTION DISTRICTS HOWARD COUNTY, MARYLAND
OWNER/DEVELOPER: NATALIE ZIEGLER ET AL 4288 MANOR LANE ELLICOTT CITY, MARYLAND 21042 410-740-6880	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'	RETENTION	2.58 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.
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	MDR	IDA HDR MPD CIA
X		
E. 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 14.5

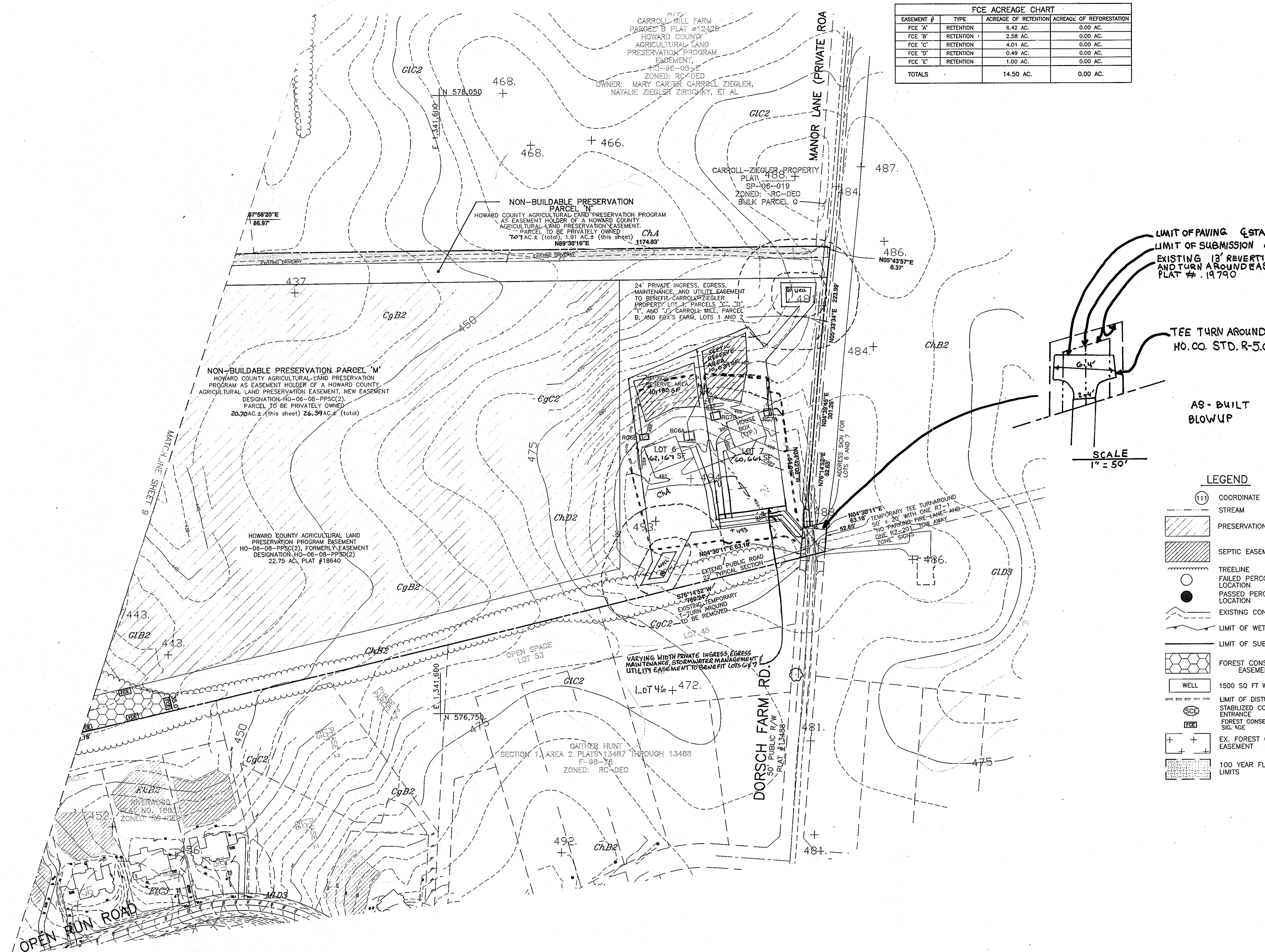
  

PROPOSED FOREST CLEARING	
L. Total area of forest to be Cleared or Retained Outside FCE	14.5
M. Total area of forest to be Retained in FCE	14.5

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 reforestation required	0
T. Total reforestation and afforestation required	0

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



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

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

AS-BUILT  
BLOWUP

SCALE  
1" = 50'

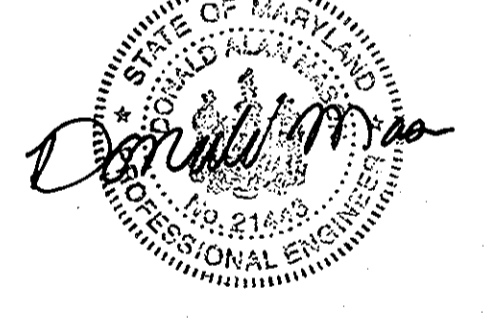
- LEGEND**
- (11) COORDINATE POINT
  - STREAM
  - PRESERVATION EASEMENT
  - SEPTIC EASEMENT
  - TREELINE
  - FAILED PERCOLATION TEST LOCATION
  - PASSED PERCOLATION TEST LOCATION
  - EXISTING CONTOURS
  - LIMIT OF WETLANDS
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  - FOREST CONSERVATION EASEMENT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

\*\*SEE THE FINAL RECORD PLAT FOR FOREST\*\*  
CONSERVATION EASEMENT BEARINGS AND DISTA. "ES."

\*\*SEE SHEET 9 FOR FOREST CONSERVATION NOTES AND SIGNAGE DETAIL\*\*

**SITE ANALYSIS DATA CHART**

- GENERAL SITE DATA
- PRESENT ZONING: RC-DEG
  - APPLICABLE DPZ FILE REFERENCES: F-07-022, SP-06-019, SFD
  - PROPOSED USE OF SITE: SFD
  - PROPOSED WATER AND SEWER SYSTEMS: PRIVATE
- AREA TABULATION
- GROSS TRACT AREA: 75.7 AC.±
  - AREA WITHIN 100-YEAR FLOODPLAIN: 2.06 AC.±\*\*
  - UNFORESTED AG. LAND: 30.31 AC.±\*\*
  - NET TRACT AREA: 43.3 AC.±
- \* 0.18 acres of this total is within the limits of Parcel 'N'  
\*\* Area to remain in agricultural production within Parcel 'N' but outside of the limits of the floodplain.



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

**Eco-Science Professionals, Inc.**  
CONSULTING ECOLOGISTS

MD DNR Qualified Professional  
USACE Wetland Delimiter  
Certification # WDC0803MD06192403

P.O. Box 5006 Glen Arm, MD 21057 (410) 592-6752

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8480 BALTIMORE NATIONAL PIKE • SUITE 418  
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phone: 410-465-6105 • fax: 410-465-6644  
email: ben-hmri@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: 12-21-2009.

10/16/08

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
10-27-08

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING  
11/30/08

10/31/08

NO.	DATE	REVISION
1	10-27-10	RECONFIGURATION OF LOTS 6 & 7
		REVISION

DES: JC	DRAFT: JC	CHECK: DAM	SCALE: 1" = 100'	PROJECT NO. 1939-F
			SHEET 10	OF 11

AS-BUILT

F-08-140

**CONSTRUCTION SPECIFICATIONS**

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All references to ASTM and AASHTO 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 slumps, water 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 8 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 downstream 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 tread 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 the equipment used. The fill material shall contain sufficient moisture so that if water is turned into a boil 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 is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO 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, rammers, 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 topsoil to 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, rammers, 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. Under 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 assure flowability of the material. Adequate measures shall be taken (sand bags, etc.) to prevent flooding 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 (mil) on both sides of the pipe. This pipe and its appurtenances shall conform to the requirements of AASHTO 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 AASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipe, 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 AASHTO 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 AASHTO Specification M-196 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 AASHTO 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 of 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 bonds 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 on 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; prepunched to the flange both circles, 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-301.

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 up the sides of the pipe 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 AASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of AASHTO 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.

**Care 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 refilled 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**

1. Mutes - See standards for vegetative stabilization with mutes only. Mute shall be crimped or tracked to prevent blowing.
2. Vegetative Cover - See standards for temporary vegetative cover.
3. 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.
4. Irrigation - This is generally done as 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.
5. 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 at intervals of about 10 times their height are effective in controlling soil blowing.
6. Calcium Chloride - Apply at rates that will keep surface moist. May need retreatment.

**Permanent Methods**

1. 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.
2. Topsoiling - Covering with less erodible soil materials. See standards for topsoiling.
3. Stone - Cover surface with crushed stone or coarse gravel.


**References**

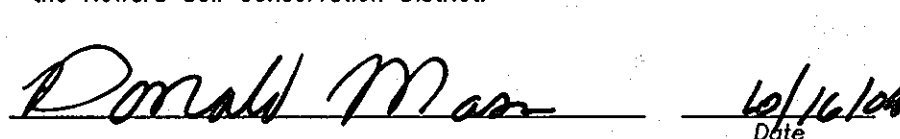
1. Agriculture Handbook 346. Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss.
2. Agriculture Information Bulletin 354. How to Control Wind Erosion, USDA-ARS.

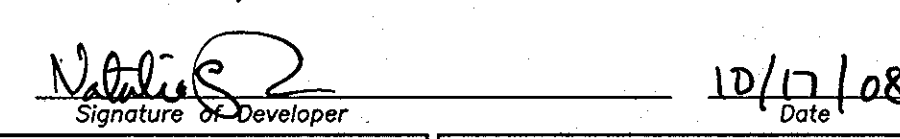
**SEQUENCE OF CONSTRUCTION**

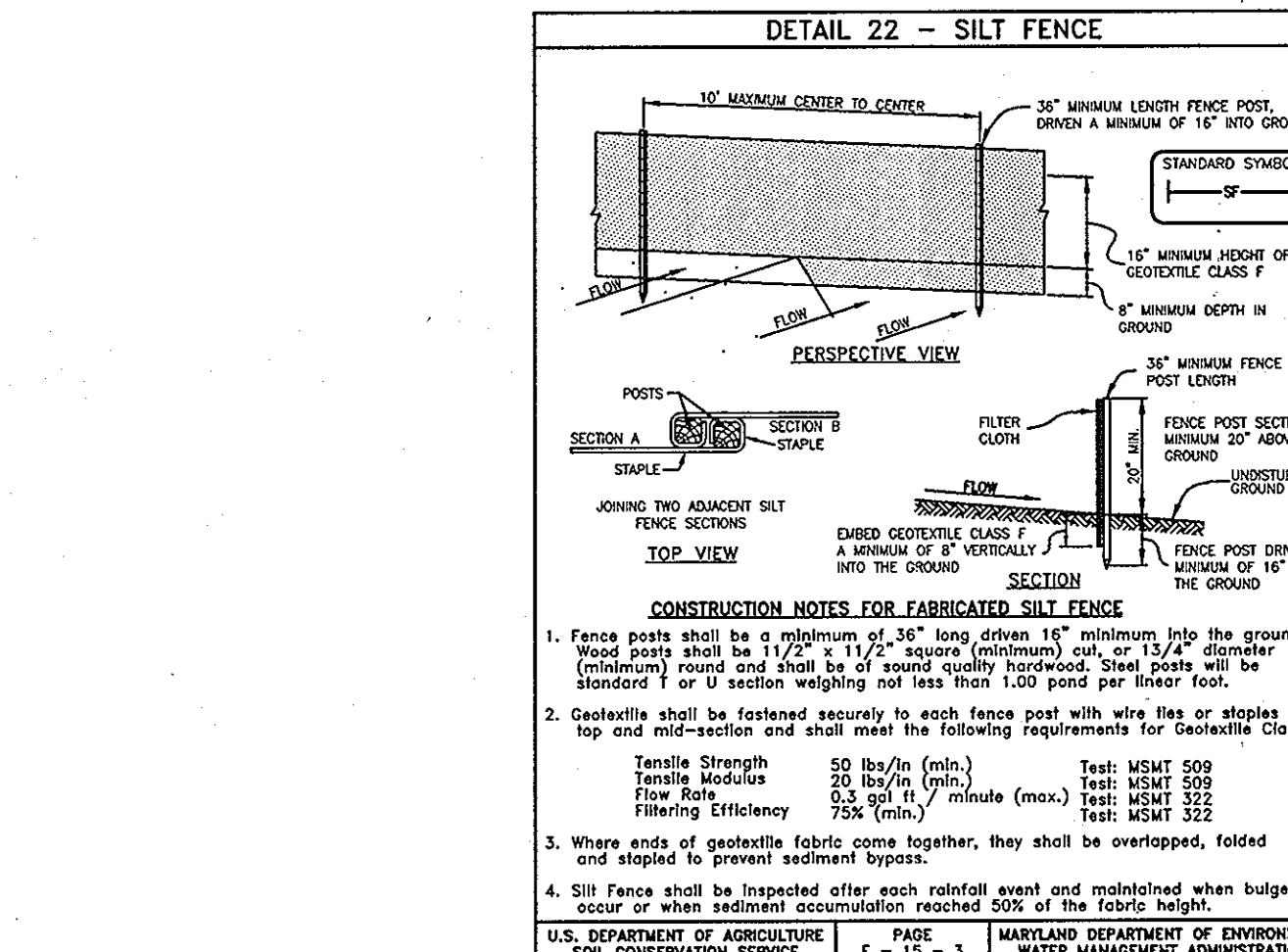
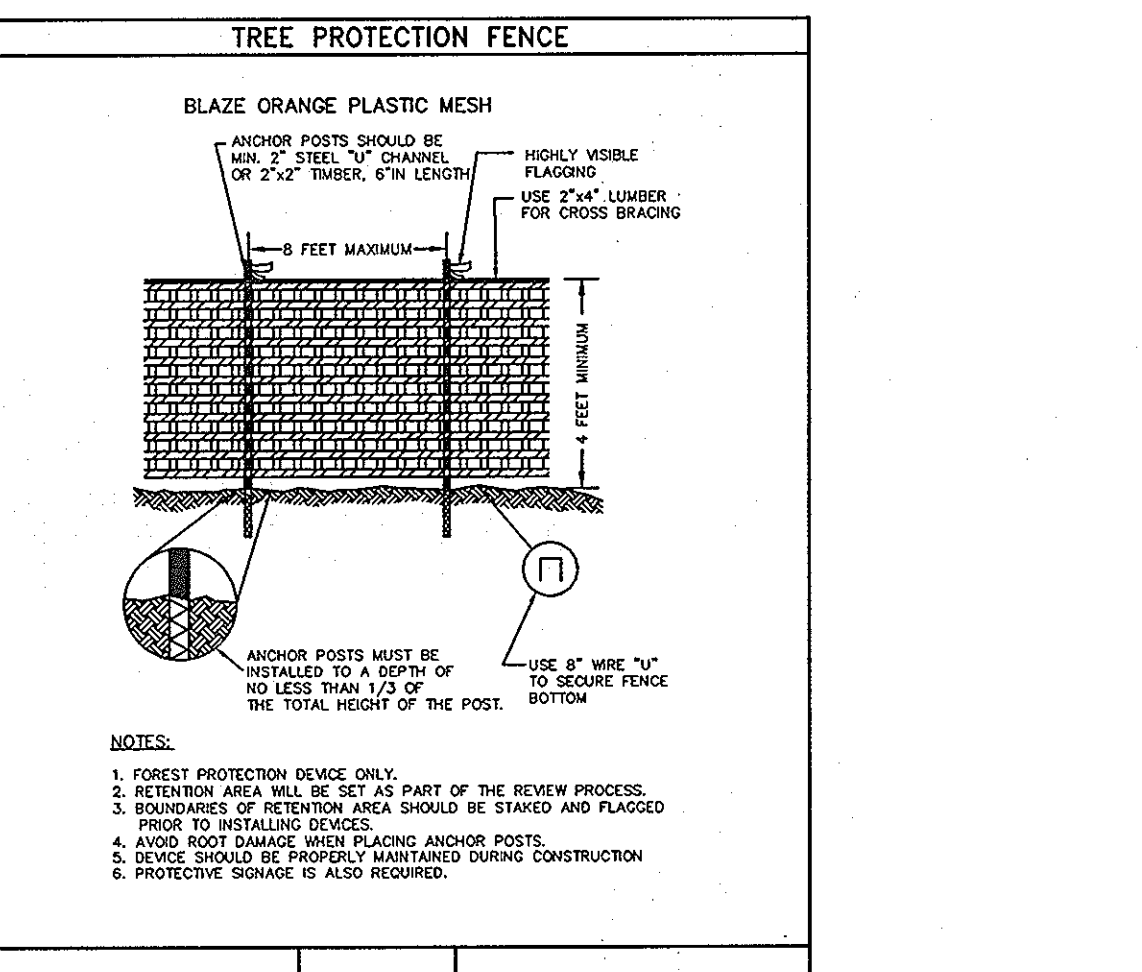
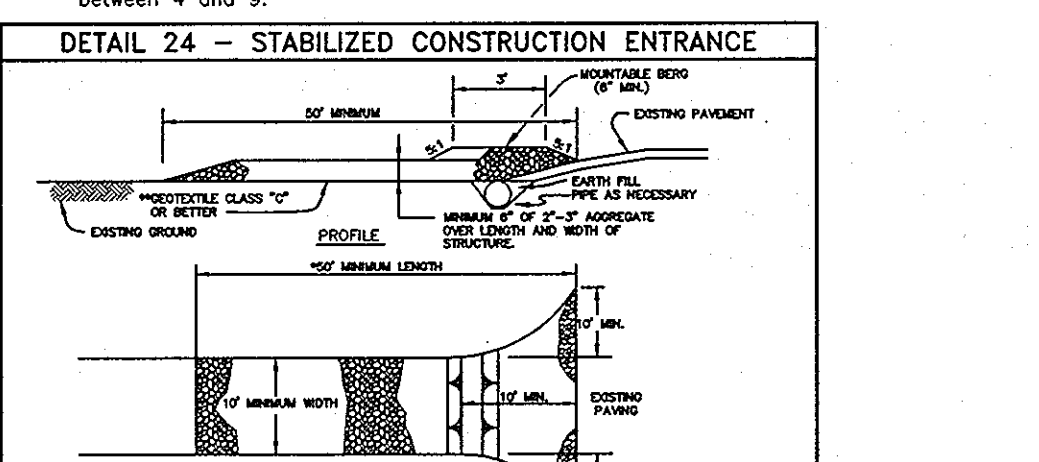
NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF CONSTRUCTION

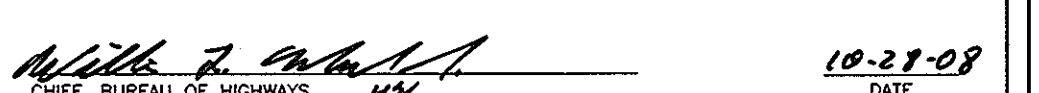
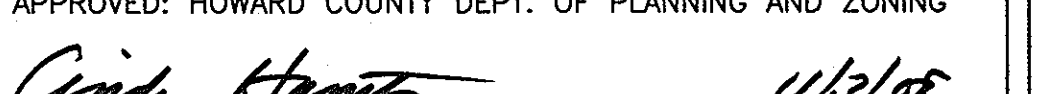
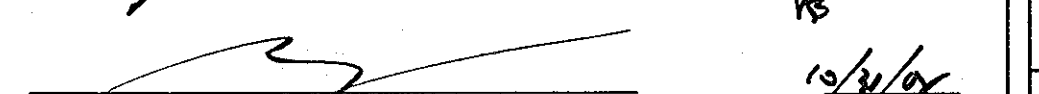
1. OBTAIN GRADING PERMIT. (DAY 1)
2. INSTALL SILT FENCES. (DAY 2-8)
3. UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL STORM DRAINS AND SWALES. (DAY 9-15)
4. UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, CONSTRUCT SAND FILTERS, STABILIZE DISTURBED AREAS IN ACCORDANCE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

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

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.  
  
 DATE: 10/16/08

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 onsite inspection by the Howard Soil Conservation District or their authorized agents, as are deemed necessary.  
  
 DATE: 10/17/08

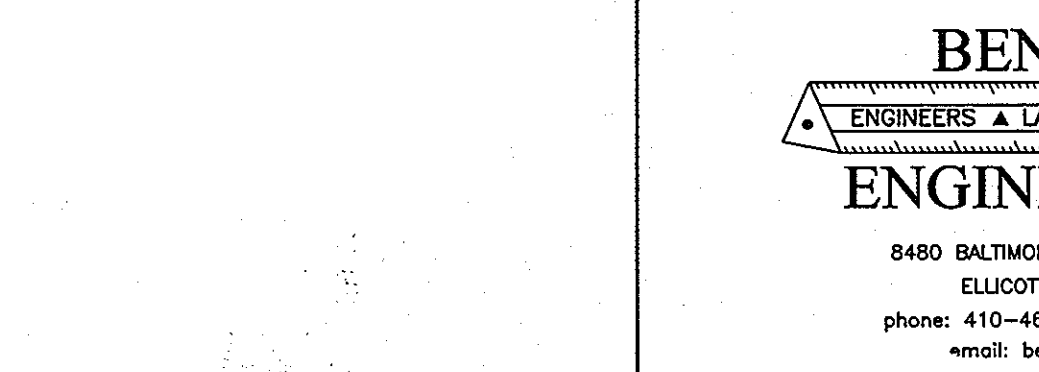


U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 17 OF 33 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
  
 DATE: 10-23-08  
 APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING  
  
 DATE: 11/3/08  
  
 DATE: 10/24/08

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE  
 1. Fence posts shall be a minimum of 10" long driven 1/4" minimum into the ground. Posts shall be 1 1/2" x 1 1/2" square (minimum) and 10" x 10" diameter (minimum) round and shall be of sound quality hardwood. Posts shall be standard V or U section weighing not less than 1,200 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/in (min.)	Test MSMT 509
Flow Rate	0.3 gal / min (max.)	Test MSMT 322
Filtration 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 mobilized when bulges occur or when sediment accumulation reaches 20% of the fabric height.  
 U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 18 OF 33 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

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.  
  
 DATE: 10/16/08  
 BENCHMARK ENGINEERING, INC.  
 8480 BALTIMORE NATIONAL PIKE # SUITE 418  
 ELLICOTT CITY, MARYLAND 21043  
 phone: 410-465-6105 # fax: 410-465-6644  
 email: bel@ben-civilengineering.com  
 PROJECT: CARROLL/ZIEGLER SUBDIVISION, LOTS 2 THRU 7, BUILDABLE PRESERVATION PARCEL "L" AND NON-BUILDABLE PRESERVATION PARCELS "M" AND "N", 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/O PARCELS: 130, 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