

Scale bars: 1"=100', 1"=200', 1"=500', 1"=1000'

SHEET INDEX	
NO.	DESCRIPTION
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2	SITE DEVELOPMENT PLAN AND ACCESS ROAD PROFILE
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5	LANDSCAPE PLAN AND STORM DRAIN PROFILES
6	STORM DRAINAGE AREA MAP

CLARKSVILLE SUBSTATION

5th ELECTION DISTRICT HOWARD COUNTY, MARYLAND

SITE DEVELOPMENT PLAN

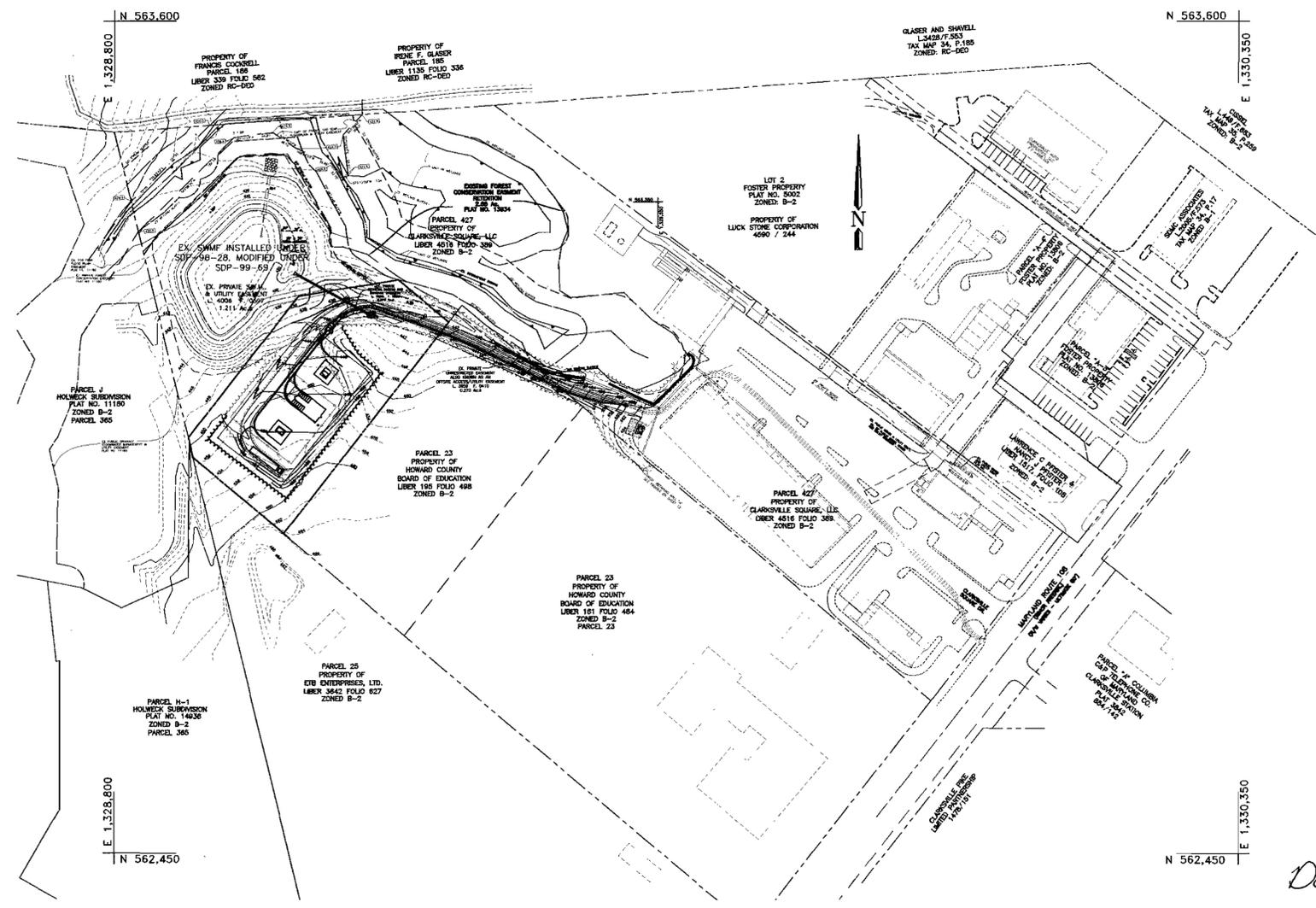
BENCH MARKS (NAD83)

HO. CO. No. 3488 ELEV. 485.254
STAMPED BRASS DISK SET ON
TOP OF CONCRETE (3 DEEP) COLUMN
1.3' EAST OF THE EDGE OF PAVEMENT OF
ROUTE 106, 87.5' NORTH OF THE SOUTHERN WALL
LINE OF GENEAL HANDMADE PROJECTED AND 112'
NORTH OF BOE POLE #53720 E 1,329,641.876'
N 262,174.607'

HO. CO. No. 3542 ELEV. 486.644
STAMPED BRASS DISK SET ON
TOP OF CONCRETE (3 DEEP) CIRCULAR BASE
2.8' WEST OF THE EDGE OF ROUTE 106,
214.52' SOUTH OF THE CONTINUE OF
SHEPPARD LANE AND 3.9' EAST OF A FENCE
N 564,154.607' E 1,331,201.112'

VICINITY MAP
SCALE: 1"=2000'

- GENERAL NOTES**
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY, PLUS MSHA STANDARDS AND SPECIFICATIONS, IF APPLICABLE.
 - THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION INSPECTION DIVISION AT 410-313-1880 AT LEAST FIVE(5) WORKING DAYS PRIOR TO THE START OF WORK.
 - THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
 - PROPOSED FENCE IS TO BE EIGHT (8) FEET OVERALL HEIGHT, CONSISTING OF SEVEN (7) FEET OF CHAIN LINK FABRIC AND THREE (3) STRANDS OF BARBED WIRE (TURNED OUT).
 - ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
 - THE CONTOURS SHOWN HEREON HAVE BEEN TAKEN FROM FIELD RUN TOPOGRAPHIC SURVEYS AT 2' INTERVALS. THE TOPOGRAPHY WAS PREPARED BY BENCHMARK ENGINEERING, INC., ON OR ABOUT MARCH 13, 2003.
 - VERTICAL CONTROL BASED UPON HOWARD COUNTY NAD '27 CONTROL STATION No.2637003. HORIZONTAL CONTROL BASED UPON HOWARD COUNTY NAD '83 CONTROL STATIONS No.3488 & No.3542
 - WATER AND SEWER IS NOT REQUIRED FOR THIS SITE - NO BUILDINGS ARE PROPOSED.
 - STORMWATER MANAGEMENT IS PROVIDED BY A RETENTION TYPE FACILITY FOR WATER QUANTITY AND QUALITY CONTROL. THIS FACILITY IS PRIVATELY OWNED AND MAINTAINED, AND WAS CONSTRUCTED UNDER SDP-96-28 AND MODIFIED UNDER SDP-99-69.
 - WETLANDS DELINEATION PREPARED BY ECO-SCIENCE PROFESSIONALS, INC. DATED NOVEMBER 14, 1994 AND APPROVED ON FEBRUARY 21, 1996
 - 100-YEAR FLOODPLAIN STUDY PREPARED BY TSA GROUP, INC. DATED OCTOBER 31, 1995. AND APPROVED ON FEBRUARY 21, 1996
 - THE FOREST CONSERVATION EASEMENT WAS ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1206 OF THE HOWARD COUNTY CODE. FOREST CONSERVATION ACT. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT. FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.
 - FOREST CONSERVATION FOR PARCELS 970 AND 427 WAS PROVIDED UNDER SDP-96-28 BY RETENTION OF EXISTING FOREST WITHIN A FOREST CONSERVATION EASEMENT SHOWN ON THESE PLANS.
 - EXISTING UTILITIES SHOWN WERE LOCATED BY RECORD DRAWINGS AND FIELD LOCATIONS.
 - UNLESS NOTED AS "PRIVATE", ALL EASEMENTS ARE PUBLIC.
 - PREVIOUS DPZ REFERENCE NUMBERS INCLUDE: BA 96-80E, SDP-96-28, BA 03-44C, SDP-99-69
 - CONTRACTOR SHALL ADJUST ALL UTILITIES AND RM ELEVATIONS AS NEEDED TO MATCH THIS PLAN.
 - CLARKSVILLE SUB-STATION IS AN UNATTENDED STATION AND NO PERMANENT EMPLOYEES ARE TO BE LOCATED ON THE PREMISES. AVERAGE DAILY TRIPS: 1/WEEK
 - NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS AND FOREST CONSERVATION EASEMENT AREAS.
 - ACCESS TO THIS SITE IS PROVIDED BY A 16' WIDE EASEMENT RECORDED AMONG THE LAND RECORDS IN LIBER 4006, FOLIO 0581 CROSSING PARCEL 427.
 - BA CASE NO. 96-80E WAS APPROVED APRIL 24, 1997 TO ALLOW A SPECIAL EXCEPTION FOR A PUBLIC UTILITY USE, FOR THE CONSTRUCTION, INSTALLATION, OPERATION AND MAINTENANCE OF AN OUTDOOR ELECTRIC UTILITY SUBSTATION IN A B-2 ZONING DISTRICT SUBJECT TO THE CONDITIONS OUTLINED IN THE DECISION AND ORDER. AFTER APPROVAL OF THIS SPECIAL EXCEPTION, GRADING AND THE INSTALLATION OF A FENCE WAS COMPLETED.
 - BA CASE NO. 03-44C WAS APPROVED JANUARY 22, 2004 TO ALLOW A CONDITIONAL USE FOR A PUBLIC UTILITY USE, FOR THE CONSTRUCTION, INSTALLATION, OPERATION AND MAINTENANCE OF AN OUTDOOR ELECTRIC UTILITY SUBSTATION IN A B-2 ZONING DISTRICT SUBJECT TO THE CONDITIONS OUTLINED IN THE DECISION AND ORDER. THIS CONDITIONAL USE WAS APPLIED FOR AS THE LIMIT OF THE FENCED AREA WAS EXPANDED BEYOND THE AREA PREVIOUSLY APPROVED.
 - ALL COMPACTION IN FILL AREAS SHALL BE 95% COMPACTION IN ACCORDANCE WITH ASHTO T-180 SPECIFICATIONS.
 - ALL OUTDOOR LIGHTING SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 134 OF THE HOWARD COUNTY ZONING REGULATIONS.



SITE DATA TABULATION

GENERAL SITE DATA

- PRESENT ZONING: B-2
- APPLICABLE DPZ FILE REFERENCES: BA 96-80E, SDP-96-28, SDP-99-69, BA-03-44C
- PROPOSED USE OF SITE: ELECTRICAL SUBSTATION
- PROPOSED WATER: NONE
PROPOSED SEWER: NONE

AREA TABULATION

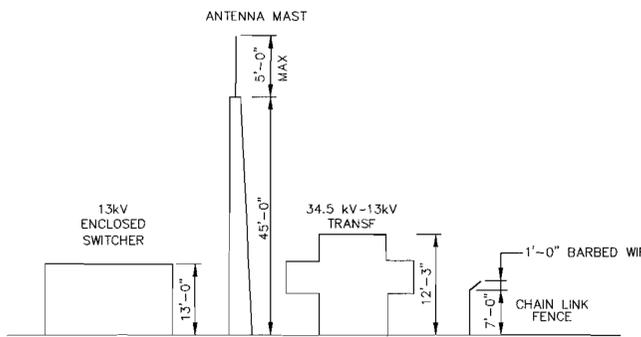
- TOTAL PROJECT AREA: 1.46 AC.
- AREA OF 100 YR. FLOODPLAIN: 0.00 AC.
- NET AREA OF SITE: 1.46 AC.
- AREA OF THIS PLAN SUBMISSION: 1.46 AC.
- APPROXIMATE LIMIT OF DISTURBANCE: 1.20 AC.
- BUILDING COVERAGE OF SITE (PERMITTED): N/A
- BUILDING COVERAGE OF SITE (PROPOSED): 0

OPEN SPACE DATA

- OPEN SPACE ON SITE(0.0%): N/A
- AREA OF RECREATION OPEN SPACE REQUIRED BY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS: N/A
ACRES REQUIRED: N/A
ACRES PROVIDED: N/A

PARKING SPACE DATA

- FLOOR SPACE ON EACH LEVEL PER BUILDING(S) PER USE: N/A
- MAXIMUM NUMBER OF EMPLOYEES, TENANTS ON-SITE PER USE: N/A
- NUMBER OF PARKING SPACES REQUIRED BY ZONING REGULATIONS AND/OR FDP CRITERIA: N/A
- TOTAL NUMBER OF PARKING SPACES PROVIDED ON-SITE: N/A
- TOTAL NUMBER OF SERVICE PARKING SPACES PROVIDED ON-SITE: N/A
- NUMBER OF HANDICAPPED PARKING SPACES PROVIDED ON-SITE: N/A



PLAN VIEW
SCALE: 1" = 100'

Donald Mason
2/2/04

BENCHMARK
ENGINEERS • LAND SURVEYORS • PLANNERS

ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-8644
E-MAIL: benchmark@ccis.com

OWNER: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE MARYLAND, 21244

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Michael J. ... 2/2/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Clayton ... 3/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Stephen ... 3/2/04
DIRECTOR (ACTING) DATE

ADDRESS CHART

PAR. 970	5803 CLARKSVILLE SQUARE
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PERMIT INFORMATION CHART

SUBDIVISION NAME		SECTION/AREA	LOT/PARCEL#
CLARKSVILLE SUBSTATION		N/A	970
DEED No. L. 4006 F. 580	BLOCK No. 6	ZONE B-2	TAX MAP 34
WATER CODE N/A		ELEC. DIST. 5th	CENSUS 6051.01
SEWER CODE N/A			

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED

<p>AUTOCAD</p> <p>ENGINEERING _____</p> <p>CIVIL DAM _____</p> <p>ELEC. _____</p> <p>PROJ. ENG. _____</p> <p>PRIN. MGR. _____</p> <p>SUPV. ENG. _____</p>	<p>TITLE SHEET</p> <p>Tax Map 34, Parcel 970, Grid 6 Deed Ref: L. 4006, F. 580 5th Election District Howard County, Maryland</p> <p style="text-align: center;">34.5 - 13.8 kV ELECTRICAL SUBSTATION</p> <p style="text-align: center;">CLARKSVILLE SUBSTATION</p> <p style="text-align: center;">SUBSTATION & SYSTEM PROTECTION</p>	<p>DESIGNED GROUP _____</p> <p>DESIGNED _____</p> <p>DRAWN RPS _____</p> <p>CHECKED DAM _____</p> <p>APPROVED _____</p> <p>DATE 2/04/04</p>
<p>SCALE 1" = 100'</p> <p>DWG NO. 1 OF 6</p> <p>REV _____</p>		

LEGEND:

- PROPOSED DUCT BANK
- EXISTING DUCT BANK
- TELECOM CABLE CONDUIT
- 12' ACCESS LANE
- PROPOSED FENCE
- EXISTING FENCE
- PROPOSED TREELINE
- EXISTING TREELINE
- PROPOSED CONTOUR
- EXISTING CONTOUR
- RIPRAP PROTECTION
- PROPOSED STORM MH
- PROPOSED STORM PIPE
- EXISTING STORM PIPE
- SILT FENCE
- SUPER SILT FENCE
- SILT FENCE DIVERSION
- EARTHEN BERM
- STABILIZED CONSTRUCTION ENTRANCE

SOILS LEGEND	
MAP SYMBOL	SOIL TYPE
Ba	D BAILE SILT LOAM
CgC2	B CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
EKA	B ELOAK SILT LOAM, 0 TO 3 % SLOPES
EXB2	B ELOAK SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GnB2	C GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
MW2	B MANOR LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
NO HYDRIC SOILS	
TAKEN FROM SOILS SURVEY, ISSUED JULY 1988, MAP NO. 7	

BY THE DEVELOPER:
I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

Robert Clark 2/13/04
DEVELOPER: DATE:

BY THE ENGINEER:
I 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.

Donald Mason 2/5/04
ENGINEER: DATE:

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

John L. Robertson 2/26/04
HOWARD SOIL CONSERVATION DISTRICT

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.

Jim Murray 2/26/04
NATURAL RESOURCES CONSERVATION SERVICE

APPROVED HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Mark P. Williams 2/27/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION

Chris Hanata 7/1/04
CHIEF, DIVISION OF LAND DEVELOPMENT

Stephen L. Smith 3/2/04
DIRECTOR (PLANNING)

STRUCTURE SCHEDULE						
STORM INLET						
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
INLET 1	PRECAST TYPE 'D' INLET	N 563192.18 E 1329156.43	-	430.28	440.00	SD - 4.39
END SECTIONS						
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
ES-1	30" HDPEP END SECTION	N 563155.31 E 1329324.54	439.88	439.64	-	SD - 5.52
ES-2	18" HDPEP END SECTION	N 563249.58 E 1329051.34	426.11	426.00	-	SD - 5.52
STORM DRAIN MANHOLES						
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
MH1	5' SHALLOW MANHOLE	N 563106.54 E 1329447.47	446.57	446.37	452.00	G - 5.13
MH2	5' SHALLOW MANHOLE	N 563116.17 E 1329397.54	444.58	444.38	450.00	G - 5.13
1) STRUCTURE ELEVATION AND LOCATION FOR INLETS & MANHOLES IS AT THE TOP AND CENTER OF GRATE OR RIM. 2) STRUCTURE ELEVATION AND LOCATION FOR ENDSECTIONS IS AT THE CONNECTION OF PIPE AND END SECTION. 3) PRECAST STRUCTURES MEETING HS-20 LOADING TO BE USED. 4) ALL STORM DRAINS SHALL BE HIGH DENSITY POLYETHYLENE PIPE WITH A SMOOTH BORE UNLESS OTHERWISE NOTED.						

PIPE SCHEDULE		
SIZE	LENGTH	TYPE
18"	127'	HDPEP
30"	139'	HDPEP

OWNER: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE MARYLAND, 21244

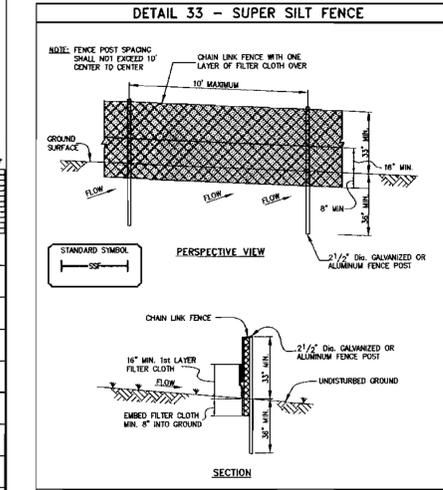
BENCHMARK
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PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmrk@bcis.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD	GRADING, EROSION AND SEDIMENT CONTROL PLAN
					ENGINEERING CIVIL _____ ELEC. _____ PROJ. ENG. _____ PROJ. MGR. _____ PRIN. ENG. _____ SUPV. ENG. _____	Tax Map 34, Parcel 970, Grid 6 5th ELECTION DISTRICT HOWARD COUNTY, MARYLAND 34.5-13.8KV ELECTRICAL SUBSTATION
					DESIGN GROUP DESIGNED _____ DRAWN RPS CHECKED DAM APPROVED _____ DATE 2/04/04	CLARKSVILLE SUBSTATION SUBSTATION & SYSTEM PROTECTION SCALE AS SHOWN 3 OF 6

SPECIAL NOTE:
CURL ENDS OF SILT FENCE AND SUPER SILT FENCE UPHILL A MINIMUM OF 2 FEET IN ELEVATION.

PLAN VIEW
SCALE: 1" = 30'

Donald Mason 2/5/04



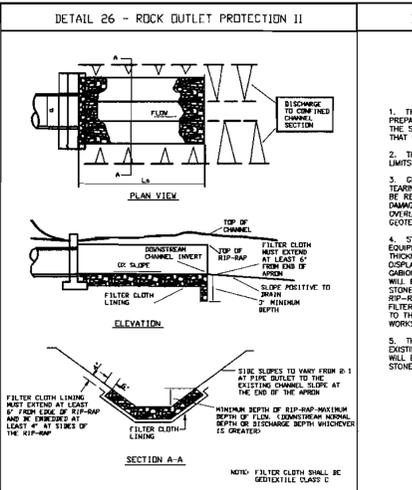
CONSTRUCTION SPECIFICATIONS

- Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
- Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, braces and truss rods, drive anchors and post caps are not required except on the ends of the fence.
- Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
- Filter cloth shall be embedded a minimum of 6" into the ground.
- When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
- Maintenance shall be performed as needed and all bulges removed when "bulges" develop or by completely replacing the geotextile. All overlaps whether for repairs or for joining two pieces of geotextile shall be a minimum of one foot.
- Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft/minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

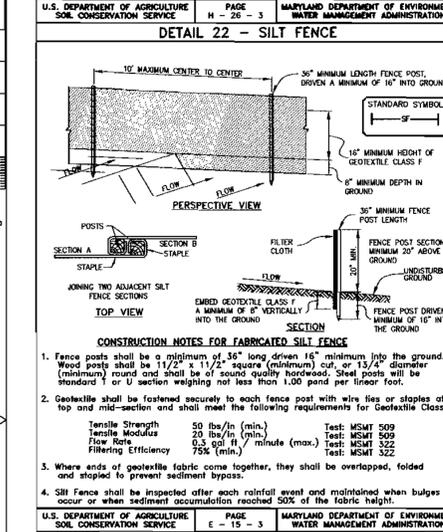
SUPER SILT FENCE DESIGN CRITERIA

Slope	Slope Steepness (Maximum)	Slope Length (Maximum)	Silt Fence Length (Maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 35%	5:1 - 3:1	100 feet	1,000 feet
35 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	250 feet



CONSTRUCTION SPECIFICATIONS

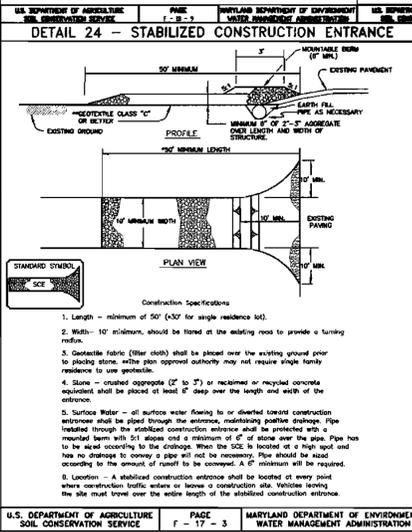
- THE SUBGRADE FOR THE FILTER RIP-RAP OR CARBON SHALL BE PREPARED TO THE REQUIRED LINES AND GRADES. ANY FILL REQUIRED IN THE SUBGRADE SHALL BE COMPACTED TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
- THE ROCK OR GRAVEL SHALL CONFORM TO THE SPECIFIED GRADING LIMITS WHEN INSTALLED RESPECTIVELY IN THE RIP-RAP OR FILTER.
- GEOTEXTILE SHALL BE PROTECTED FROM PUNCHING, CUTTING, OR TEARING. ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE SHALL BE REPAIRED BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. ALL OVERLAPS WHETHER FOR REPAIRS OR FOR JOINING TWO PIECES OF GEOTEXTILE SHALL BE A MINIMUM OF ONE FOOT.
- STONE FOR THE RIP-RAP OR CARBON OUTLETS MAY BE PLACED BY EQUIPMENT. THEY SHALL BE CONSTRUCTED TO THE FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIAL. THE STONE FOR RIP-RAP OR CARBON OUTLETS SHALL BE DELIVERED AND PLACED IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENEOUS WITH THE SMALLER STONES AND SPOOLS FILLING THE VOIDS BETWEEN THE LARGER STONES. RIP-RAP SHALL BE PLACED IN A MANNER TO PREVENT DAMAGE TO THE FILTER FABRIC OR GEOTEXTILE. HAND PLACEMENT WILL BE REQUIRED TO THE EXTENT NECESSARY TO PREVENT DAMAGE TO THE PERMANENT WORKS.
- THE STONE SHALL BE PLACED SO THAT IT BLENDS IN WITH THE EXISTING GROUND. IF THE STONE IS PLACED TOO HIGH THEN THE FLOW WILL BE FORCED OUT OF THE CHANNEL AND SCOUR ADJACENT TO THE STONE WILL OCCUR.



SILT FENCE DESIGN CRITERIA

Slope Steepness	(Maximum) Slope Length	(Maximum) Silt Fence Length
Flatter than 50:1	unlimited	unlimited
50:1 to 10:1	125 feet	1,000 feet
10:1 to 5:1	100 feet	750 feet
5:1 to 3:1	60 feet	500 feet
3:1 to 2:1	40 feet	250 feet
2:1 and steeper	20 feet	125 feet

Note: In areas of less than 2X slope and sandy soils (USDA general classification system, soil Class A) maximum slope length and silt fence length will be unlimited. In these areas a silt fence may be the only perimeter control required.



CONSTRUCTION SPECIFICATIONS

- Length - minimum of 50' (40' for single residence lots).
- Width - 10' minimum, should be flared at the existing road to provide a turning radius.
- Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. The plan approval authority may not require single family residence to use geotextile.
- Slope - crushed aggregate (2" to 3") or recycled or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
- Surface Water - All surface water flowing to or through the construction entrance shall be placed through the entrance, utilizing positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a metal beam with 2x4 angles and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SUE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
- Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Without leaving the site must travel over the entire length of the stabilized construction entrance.

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 WHEEDING 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 SOD.

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

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

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. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE 30-0-0-0-UREAFOR FERTILIZER (9 LBS/1000 SQ FT).
- ACCEPTABLE - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 1000 LBS PER ACRE 10-10-10 FERTILIZER (23 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR 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 (1.4 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (.05 LBS/1000 SQ FT) OF WHEEDING LOVEGRASS DURING THE PERIOD OF OCTOBER 16 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 SOD. OPTION (3) SEED WITH 60 LBS PER ACRE OF KENTUCKY 31 TALL FESCUE AND MULCH WITH 2 TONS PER ACRE OF WELL ANCHORED STRAW.

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

SEDIMENT CONTROL NOTES

- A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION. (313-1850).
- ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT "MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS 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, DIKES, 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) SOD (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 PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- SITE ANALYSIS:

TOTAL AREA OF SITE	1.46	ACRES
AREA DISTURBED	1.20	ACRES
AREA TO BE ROOFED OR PAVED	0.62	ACRES
AREA TO BE VEGETATIVELY STABILIZED	0.58	ACRES
TOTAL CUT	2,600	CY
TOTAL FILL	2,600	CY
OFFSITE WASTE/BORROW AREA LOCATION	N/A	
- 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 CONTROL, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF CONSTRUCTION

DAY	ACTIVITY
DAY 1	OBTAIN GRADING PERMIT.
DAY 2-8	INSTALL STABILIZED CONSTRUCTION ENTRANCES, TREE PROTECTION FENCES, SILT FENCES, SUPER SILT FENCES, TEMPORARY SILT FENCE DIVERSION.
DAY 8-10	INSTALL INLET #1, 123 LF, 18" HDPE TO END SECTION #2, AND EARTHEN BERM AS SHOWN.
DAY 11-16	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, BRING ROAD BED TO SUBGRADE AND THEN MASS GRADE SITE AND STABILIZE IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES.
DAY 17-19	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL STORM DRAINS, FROM PROPOSED MH#1 TO ES#1, AND STABILIZE IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES.
DAY 20-22	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL PAVING.
DAY 23-26	COMPLETE GRADING OF SITE, AND INSTALL CHAIN LINK FENCING PER PLAN, AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.
DAY 154-161	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE EARTHEN BERM NEAR INLET #1 AND REMAINING SEDIMENT CONTROL DEVICES AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

BY THE DEVELOPER:

DATE: 2/13/04

DEVELOPER: Robert Clark

BY THE ENGINEER:

DATE: 2/5/04

ENGINEER: Donald Mason

THIS DEVELOPMENT PLAN IS APPROVED FOR EROSION AND SEDIMENT CONTROL BY THE HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING.

DATE: 2/26/04

DATE: 2/26/04

DATE: 2/27/04

DATE: 3/2/04

DATE: 3/2/04

BENCHMARK
ENGINEERS • LAND SURVEYORS • PLANNERS

ENGINEERING, INC.

OWNER: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE MARYLAND, 21244

8480 BALTIMORE NATIONAL PIKE # SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmark@cois.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

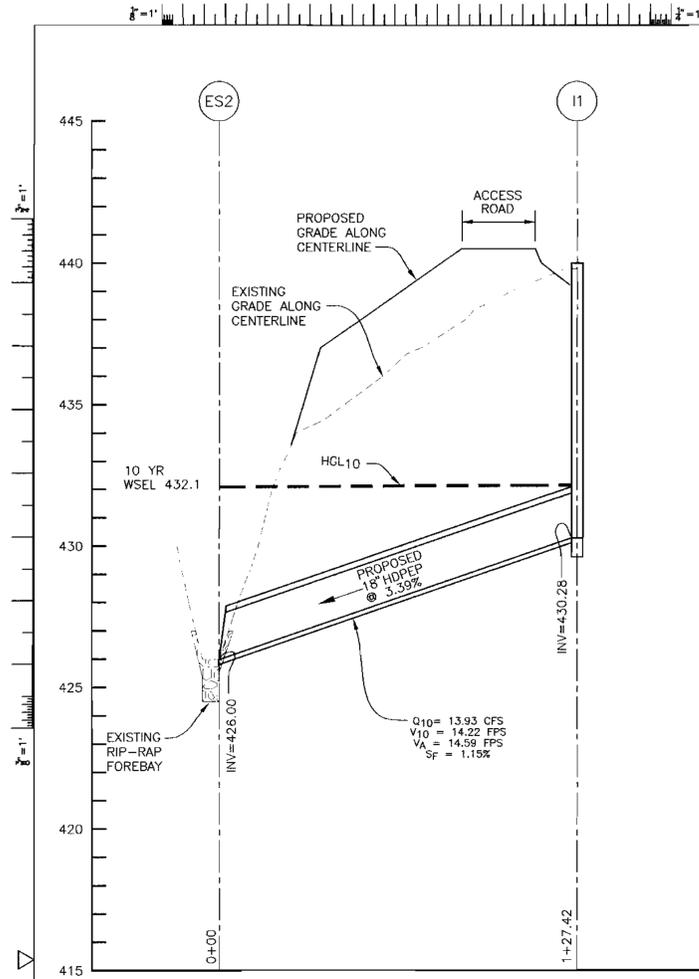
CLARKSVILLE SUBSTATION

DESIGNED: RPS
DRAWN: DAM
CHECKED: DAM
APPROVED: DAM
DATE: 2/04/04

SCALE: AS SHOWN
DWG NO.: 4 OF 6
REV

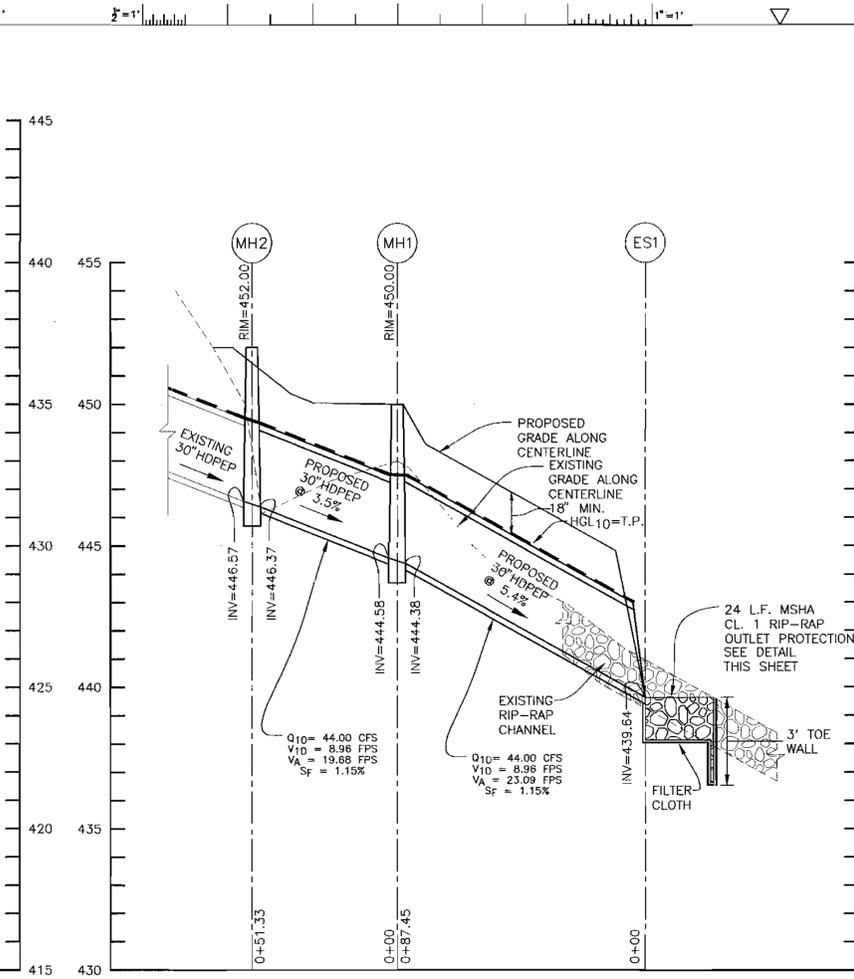
BGE

SDP-04-057



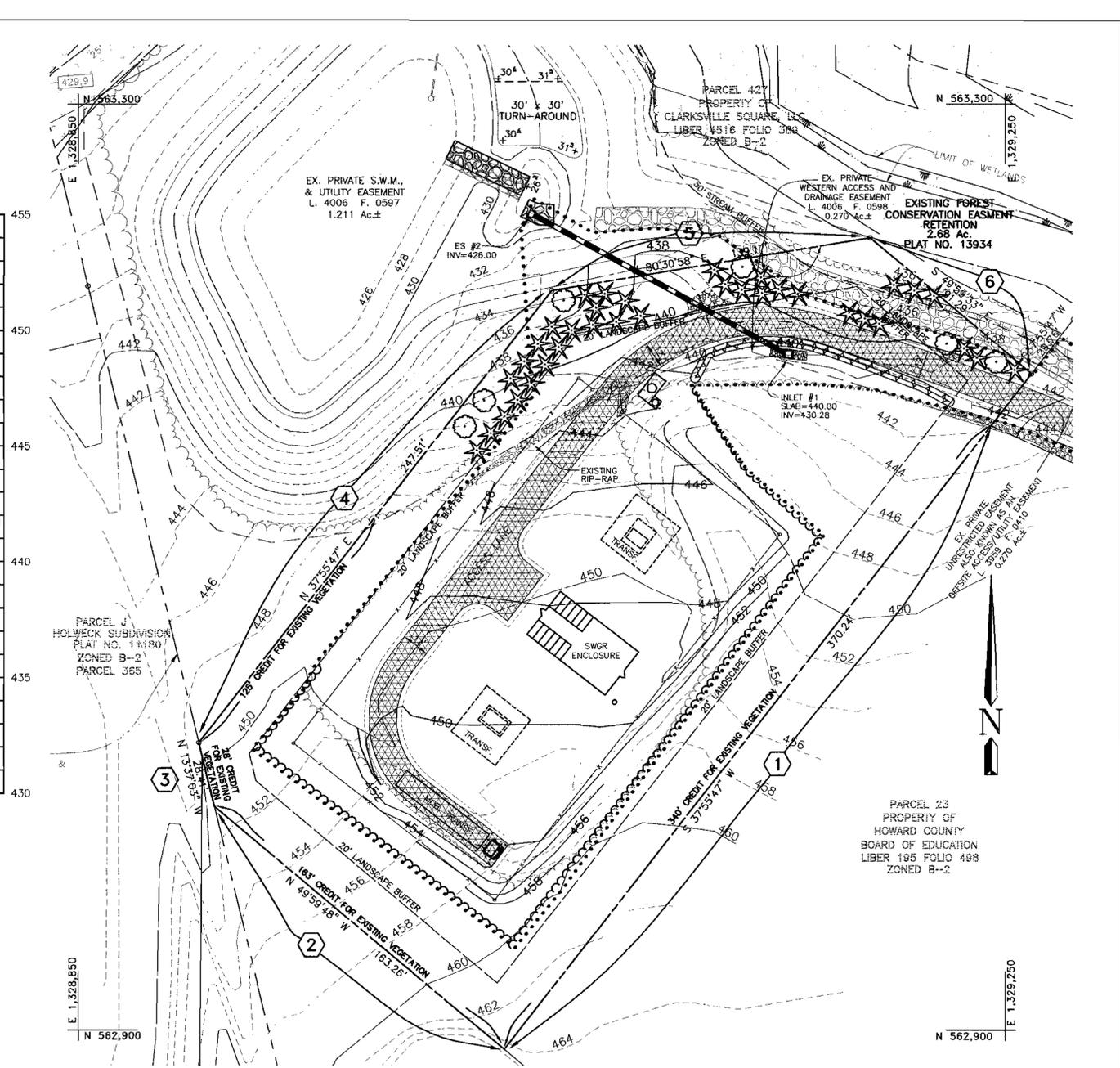
STORM DRAIN PROFILE

SCALE: HORZ.: 1" = 30', VERT.: 1" = 3'



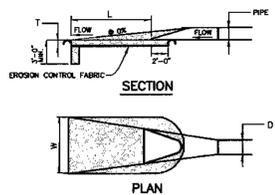
STORM DRAIN PROFILE

SCALE: HORZ.: 1" = 30', VERT.: 1" = 3'



PLAN VIEW

SCALE: 1" = 30'



STRUCTURE	d-SO	LENGTH (L)	WIDTH (W)	THICKNESS (T)
ES-1	9.5'	24.0'	12.0'	19"

OUTLET PROTECTION DETAIL
NOT TO SCALE

- The subgrade for the filter, rip-rap, or geotextile shall be prepared to the required finish and grade. Any fill required in the required shall be compacted to a density of approximately that of the surrounding undisturbed material.
- The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.
- Geotextiles shall be protected from puncturing, cutting, or tearing. Any damage other than on geotextile itself shall be repaired by placing a course equal of geotextile over the damaged part or by completely replacing the geotextile. All overlaps shall be staggered or for joining two pieces of geotextile shall be a minimum of one foot.
- Stones for the rip-rap or geotextile outlets may be placed by equipment. They shall be compacted to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or geotextile outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogeneous with the similar stone and spots filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter fabric or geotextile. Hand placement will be required to the extent necessary to prevent damage to the permanent work.
- The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced out of the channel and scour adjacent to the stone will occur.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 2/27/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION

[Signature] 7/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT

[Signature] 3/2/04
DIRECTOR (S&T/M)

CATEGORY	ADJACENT TO PERIMETER PROPERTIES					
	(1) D	(2) D	(3) D	(4) D	(5) D	(6) D
LANDSCAPE BUFFER TYPE						
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	340'	163'	28'	248'	139'	91'
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	*YES 340'	**YES 163'	*YES 28'	*YES 125'	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED						
SHADE TREES (1:60)	6	3	1	4	2	2
EVERGREEN TREES (1:10)	34	16	3	25	14	9
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-
NUMBER OF PLANTS PROVIDED						
SHADE TREES	-	-	-	2	2	2
EVERGREEN TREES	-	-	-	12	14	9
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-

SYMBOL	QUANTITY	NAME	REMARKS
○	6	ACER SACCHARUM (Sugar Maple)	2 1/2" MIN. CAL. B&B FULL HEAD
★	35	PINUS STROBUS (Eastern White Pine)	5'-6" ht. UNSHARED

LANDSCAPING NOTES

- PERIMETER LANDSCAPING SHALL BE PROVIDED BY THE EXISTING VEGETATION TO REMAIN AND BY THE PLANTINGS AS SHOWN ON THESE PLANS.
- THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PRESERVATION OF THE PERIMETER VEGETATION AND FOR THE PERIMETER PLANTINGS AS SHOWN ON THESE PLANS. BONDING FOR PLANTINGS IS THE OBLIGATION OF THE DEVELOPER AS PART OF THE DEVELOPERS AGREEMENT.
- TREES MUST BE A MINIMUM OF FIVE (5) FEET FROM ANY STORM DRAIN.
- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SEC.-16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL BE POSTED AS PART OF THE GRADING PERMIT IN THE AMOUNT OF \$7,050.00.

BENCHMARK
ENGINEERS LAND SURVEYORS PLANNERS

ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE SUITE 418
ELICOTT CITY, MARYLAND 21043
PHONE: 410-485-8105 FAX: 410-485-6644
E-MAIL: benchmark@ccis.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
					ENGINEERING
					DAM
					CIVIL
					ELEC.
					PROJ. ENG.
					PRIN. MGR.
					SUPV. ENG.

- LEGEND:**
- 12' ACCESS LANE
 - PROPOSED FENCE
 - PROPOSED TREELINE
 - EXISTING TREELINE
 - PROPOSED CONTOUR
 - EXISTING CONTOUR
 - EXISTING RIPRAP

LANDSCAPING PLAN AND STORM DRAIN PROFILE

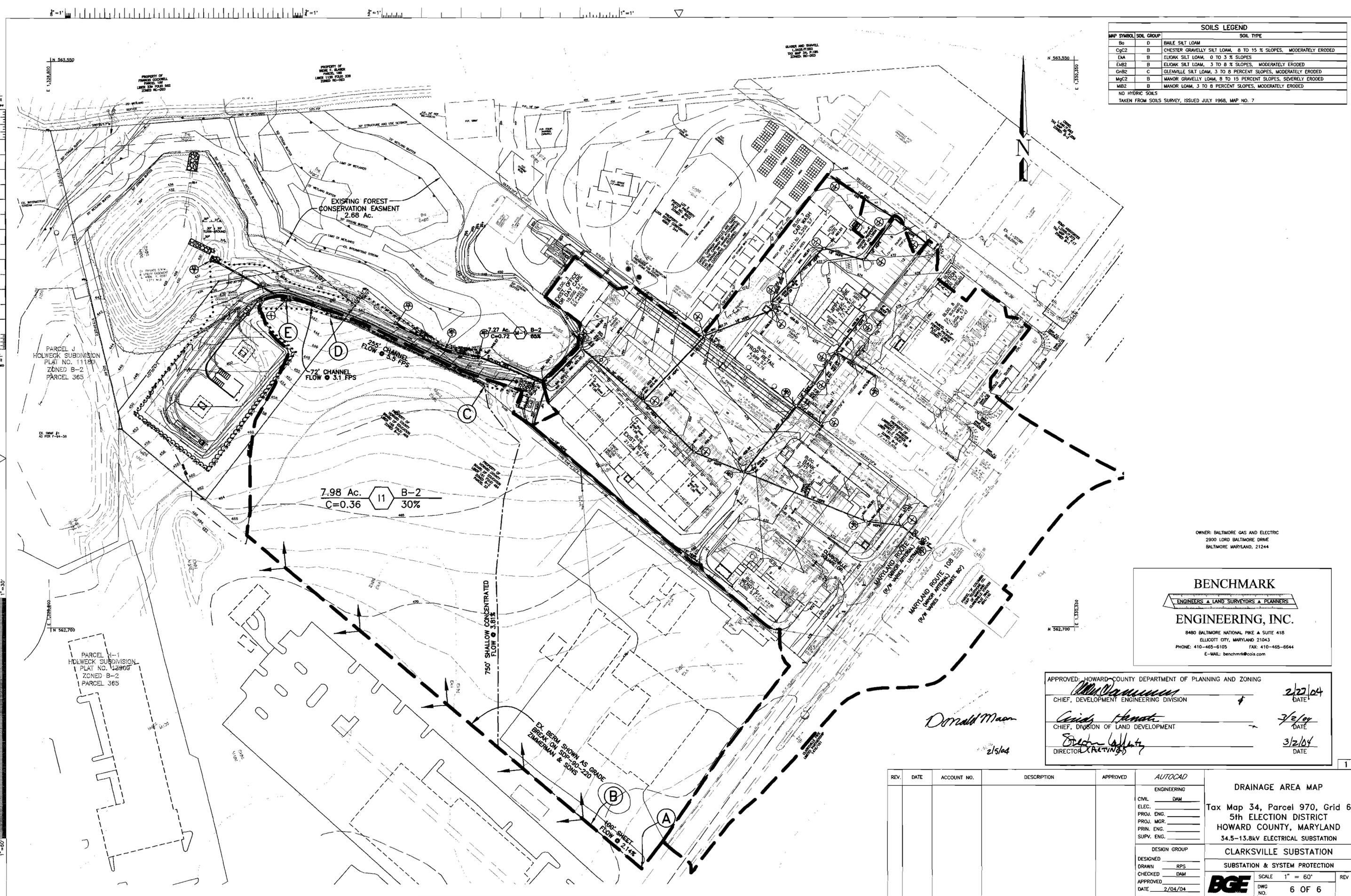
Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8kv ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION

SUBSTATION & SYSTEM PROTECTION

DESIGNED BY: **BGE**
DRAWN: RPS
CHECKED: DAM
APPROVED: **BGE**
DATE: 2/04/04

SCALE AS SHOWN
DWG NO. 5 OF 6
REV



SOILS LEGEND		
MAP SYMBOL	SOIL GROUP	SOIL TYPE
Ba	D	BAILE SILT LOAM
CgC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
Eka	B	ELIQUAK SILT LOAM, 0 TO 3 % SLOPES
EkB2	B	ELIQUAK SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GnB2	C	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
Mb2	B	MANOR LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
NO HYDRIC SOILS		
TAKEN FROM SOILS SURVEY, ISSUED JULY 1968, MAP NO. 7		

OWNER: BALTIMORE GAS AND ELECTRIC
 2900 LORD BALTIMORE DRIVE
 BALTIMORE MARYLAND, 21244

BENCHMARK
 ENGINEERS & LAND SURVEYORS & PLANNERS
ENGINEERING, INC.
 8480 BALTIMORE NATIONAL PIKE & SUITE 418
 ELICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644
 E-MAIL: benchmark@cois.com

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Howard
 CHIEF, DEVELOPMENT ENGINEERING DIVISION 4 2/22/04 DATE
David
 CHIEF, DIVISION OF LAND DEVELOPMENT 7/2/04 DATE
Steven
 DIRECTOR (ACTING) 3/2/04 DATE

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
					ENGINEERING
					CIVIL DAM
					ELEC.
					PROJ. ENG.
					PRIN. ENG.
					SUPV. ENG.
					DESIGN GROUP
					DESIGNED
					DRAWN RPS
					CHECKED DAM
					APPROVED
					DATE 2/04/04

DRAINAGE AREA MAP
 Tax Map 34, Parcel 970, Grid 6
 5th ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND
 34.5-13.8KV ELECTRICAL SUBSTATION
CLARKSVILLE SUBSTATION
 SUBSTATION & SYSTEM PROTECTION
 SCALE 1" = 60'
 DWG NO. 6 OF 6
 REV

LEGEND:

- PROPOSED DUCT BANK
- EXISTING DUCT BANK
- TELECOM CABLE CONDUIT
- 12' ACCESS LANE
- PROPOSED FENCE
- EXISTING FENCE
- PROPOSED TREELINE
- EXISTING TREELINE
- PROPOSED CONTOUR
- EXISTING CONTOUR
- RIPRAP PROTECTION
- PROPOSED STORM MH
- PROPOSED STORM PIPE
- EXISTING STORM PIPE
- SILT FENCE
- SUPER SILT FENCE
- SILT FENCE DIVERSION
- EARTHEN BERM
- STABILIZED CONSTRUCTION ENTRANCE

SOILS LEGEND

MAP SYMBOL	SOIL GROUP	SOIL TYPE
Bx	D	BANK SILT LOAM
CyCz	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
EnA	B	ELDOMK SILT LOAM, 0 TO 3 % SLOPES
ExB2	B	ELDOMK SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GnB2	C	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
MIB2	B	MANOR LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED

NO HYDRIC SOILS
TAKEN FROM SOILS SURVEY, ISSUED JULY 1968, MAP NO. 7

BY THE DEVELOPER:
I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

DEVELOPER: *Richard Clark* DATE: 2/13/04

BY THE ENGINEER:
I 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.

ENGINEER: *Donald Maas* DATE: 2/5/04

THIS DEVELOPMENT PLAN IS APPROVED FOR EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
HOWARD SOIL CONSERVATION DISTRICT
John K. Robertson DATE: 2/26/04

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.
NATURAL RESOURCES CONSERVATION SERVICE
Jim Meyer DATE: 2/26/04

APPROVED HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, DEVELOPMENT ENGINEERING DIVISION
John P. Williams DATE: 2/27/04

CHIEF, DIVISION OF LAND DEVELOPMENT
Conrad Hamilton DATE: 7/1/04
DIRECTOR (PLANNING)
Debra L. Kelly DATE: 3/2/04

INLET	ABT, INC. POLYDRAIN TYPE 512AF WITH POLYWALL T	N 563060.44	E 1329156.18	461.03	462.00	SEE MANUFACTURER'S DETAILS
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STRUCTURE SCHEDULE

STORM INLET						
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
INLET 1	PRECAST TYPE 'D' INLET	N 563192.18 E 1329156.43	-	430.28	440.00	SD - 4.39
END SECTIONS						
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
ES-1	30" HDPEP END SECTION	N 563155.31 E 1329324.54	439.88	439.84	-	SD - 5.52
ES-2	18" HDPEP END SECTION	N 563249.58 E 1329051.34	426.11	426.00	-	SD - 5.52
STORM DRAIN MANHOLES						
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
MH1	5" SHALLOW MANHOLE	N 563106.54 E 1329447.47	446.57	446.37	452.00	G - 5.13
MH2	5" SHALLOW MANHOLE	N 563116.17 E 1329397.54	444.58	444.38	450.00	G - 5.13

1) STRUCTURE ELEVATION AND LOCATION FOR INLETS & MANHOLES IS AT THE TOP AND CENTER OF GRATE OR RIM.
2) STRUCTURE ELEVATION AND LOCATION FOR ENDSECTIONS IS AT THE CONNECTION OF PIPE AND END SECTION.
3) PRECAST STRUCTURES MEETING HS-20 LOADING TO BE USED.
4) ALL STORM DRAINS SHALL BE HIGH DENSITY POLYETHYLENE PIPE WITH A SMOOTH BORE UNLESS OTHERWISE NOTED.

PIPE SCHEDULE		
SIZE	LENGTH	TYPE
18"	127'	HDPEP
30"	139'	HDPEP
4"	68'	PVC SCHEDULE 40

OWNER: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE MARYLAND, 21244

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmark@cois.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
1	4-8-04		ADD TRENCH DRAIN AND 4" PVC		ENGINEERING DAM

GRADING, EROSION AND SEDIMENT CONTROL PLAN	
CIVIL	DAM
ELEC.	
PROJ. ENG.	
PROJ. MGR.	
PRIN. ENG.	
SUPV. ENG.	

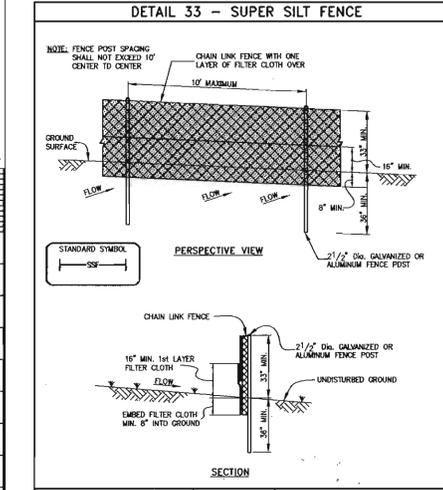
Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8kV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION
SUBSTATION & SYSTEM PROTECTION
SCALE AS SHOWN
DWG NO. 3 OF 6
DATE 2/04/04

SPECIAL NOTE:
CURL ENDS OF SILT FENCE AND SUPER SILT FENCE UPHILL A MINIMUM OF 2 FEET IN ELEVATION.

PLAN VIEW
SCALE: 1" = 30'

Donald Maas
2/5/04



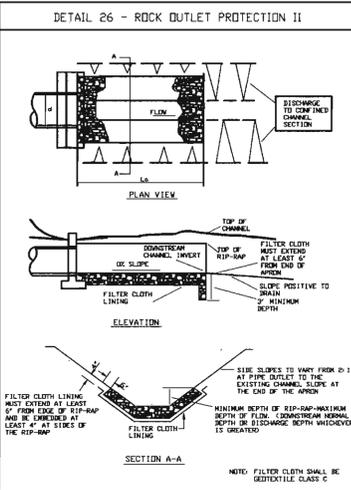
SUPER SILT FENCE CONSTRUCTION SPECIFICATIONS

- Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6" fence shall be used, substituting 42" fabric and 6" length posts.
- Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and trust rods, drive anchors and post caps are not required except on the ends of the fence.
- Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
- Filter cloth shall be embedded a minimum of 6" into the ground.
- When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
- Maintenance shall be performed as needed and all buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height.
- Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/ft (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/ft (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft ² /minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

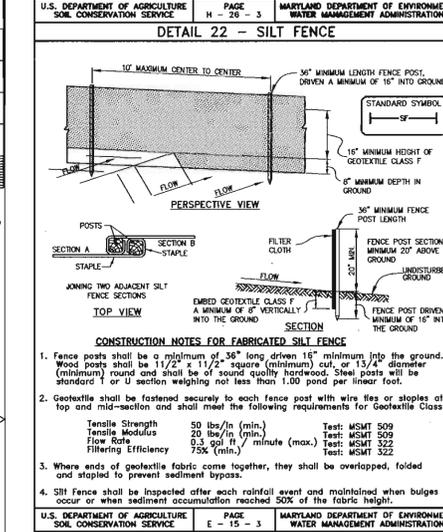
SUPER SILT FENCE DESIGN CRITERIA

Slope	Slope Steepness	Slope Length (Maximum)	Silt Fence Length (Maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 33%	5:1 - 3:1	100 feet	1,000 feet
33 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	50 feet



CONSTRUCTION SPECIFICATIONS

- The subgrade for the filter, rip-rap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
- The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.
- Geotextile shall be protected from puncturing, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of geotextile over the damaged part or by completely replacing the geotextile. All overlaps whether for repairs or for joining two pieces of geotextile shall be a minimum of one foot.
- Stones for the rip-rap or gabion outlets may be placed by equipment. They shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or gabion outlets shall be selected and placed in a manner that will ensure that it is reasonably homogeneous with the smaller stones and spalls filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter blanket or geotextile. Hand placement will be required to the extent necessary to prevent damage to the permanent works.
- The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced out of the channel and scour adjacent to the stone will occur.



SILT FENCE CONSTRUCTION SPECIFICATIONS

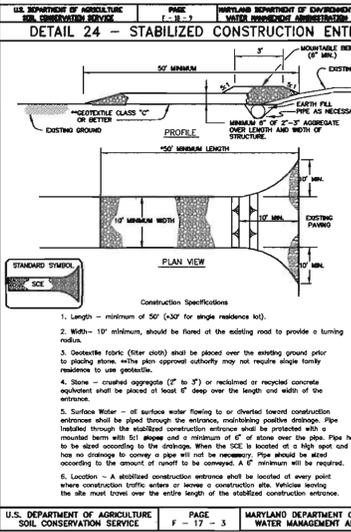
- Fence posts shall be a minimum of 36" long driven 15" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum) cut, or 1 1/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard I or U section weighing not less than 1.00 pound per linear foot.
- Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/ft (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/ft (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft ² /minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322
- Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
- Silt fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reaches 50% of the fence height.

SILT FENCE DESIGN CRITERIA

Slope Steepness	(Maximum) Slope Length	(Maximum) Silt Fence Length
Flatter than 50:1	unlimited	unlimited
50:1 to 10:1	125 feet	1,000 feet
10:1 to 5:1	100 feet	750 feet
5:1 to 3:1	60 feet	500 feet
3:1 to 2:1	40 feet	250 feet
2:1 and steeper	20 feet	125 feet

Note: In areas of less than 2% slope and sandy soils (USDA general classification system, soil Class A) maximum slope length and silt fence length will be unlimited. In these areas a silt fence may be the only perimeter control required.



CONSTRUCTION SPECIFICATIONS

- Length - minimum of 50' (+30' for angle residence lots).
- Width - 10' minimum, should be flared at the existing road to provide a turning radius.
- Geotextile fabric (if used) shall be placed over the existing ground prior to placing stone. With plan approval authority may not require single family residence to use geotextile.
- Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
- Surface Water - All surface water flowing to or diverted toward construction entrance shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mulched berm with 5:1 slope and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be placed according to the amount of runoff to be conveyed. A 6" minimum will be required.
- Location - A stabilized construction entrance shall be located at every spot where construction traffic enters or leaves a construction site. Vehicle leaving the site must travel over the entire length of the stabilized construction entrance.

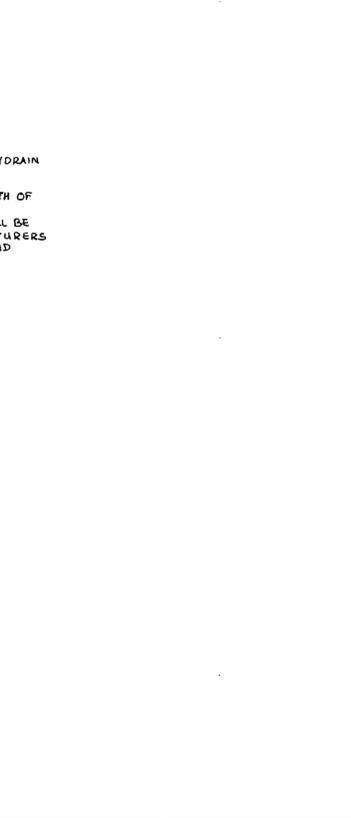
CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

- Fence posts shall be a minimum of 36" long driven 15" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum) cut, or 1 1/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard I or U section weighing not less than 1.00 pound per linear foot.
- Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/ft (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/ft (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft ² /minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322
- Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
- Silt fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reaches 50% of the fence height.

TRENCH DRAIN NOTES

- TRENCH DRAIN TO BE ABS. INC. POLYDRAIN TYPE 3/2 AF WITH POLYWALL I OR EQUIVALENT.
- TRENCH DRAIN TO SPAN FULL WIDTH OF SUBSTATION ACCESS ROAD.
- TRENCH DRAIN INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS INSTALLATION INSTRUCTIONS AND SPECIFICATIONS.



SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF CONSTRUCTION

DAY	ACTIVITY
DAY 1	OBTAIN GRADING PERMIT.
DAY 2-8	INSTALL STABILIZED CONSTRUCTION ENTRANCES, TREE PROTECTION FENCES, SILT FENCES, SUPER SILT FENCES, TEMPORARY SILT FENCE DIVERSION.
DAY 8-10	INSTALL INLET #1, 123 L.F. 18" HDPE TO END SECTION #2, AND EARTHEN BERM AS SHOWN.
DAY 11-16	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, BRING ROAD BED TO SUBGRADE AND THEN MASS GRADE SITE AND STABILIZE IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES.
DAY 17-19	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL STORM DRAINS, FROM PROPOSED MH#1 TO ES#1, AND STABILIZE IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES.
DAY 20-22	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL PAVING.
DAY 23-26	COMPLETE GRADING OF SITE, AND INSTALL CHAIN LINK FENCING PER PLAN, AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.
DAY 154-161	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE EARTHEN BERM NEAR INLET #1 AND REMAINING SEDIMENT CONTROL DEVICES AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

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 WHEEDING 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 SOD.

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

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

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 ONE OF THE FOLLOWING SCHEDULES:

- PREFERRED - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE 30-0-0-0 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. HARROW 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 (1.4 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (.05 LBS/1000 SQ FT) OF WHEEDING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 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 SOD. 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 GRAM 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

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. (513-1850).
- ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT "MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS THEREO.
- FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, 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) SOD (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 PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- SITE ANALYSIS:

TOTAL AREA OF SITE	1.46	ACRES
AREA DISTURBED	1.20	ACRES
AREA TO BE ROOFED OR PAVED	0.62	ACRES
AREA TO BE VEGETATIVELY STABILIZED	0.58	ACRES
TOTAL CUT	2,600	CY
TOTAL FILL	2,600	CY
OFFSITE WASTE/BORROW AREA LOCATION	N/A	
- ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
- ADDITIONAL SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUIRED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROL, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

BY THE DEVELOPER:
I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

Robert Clark 2/13/04
DEVELOPER: _____ DATE: _____

BY THE ENGINEER:
I 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.

Donald Mason 2/15/04
ENGINEER: _____ DATE: _____

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

John P. Roberts 2/22/04
HOWARD SOIL CONSERVATION DISTRICT: _____ DATE: _____

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.

Jim M. ... 2/22/04
NATURAL RESOURCES CONSERVATION SERVICE: _____ DATE: _____

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad ... 2/27/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION: _____ DATE: _____

Cand ... 3/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT: _____ DATE: _____

Regina ... 3/2/04
DIRECTOR (ACTING): _____ DATE: _____

Donald Mason
2/15/04

BENCHMARK
ENGINEERS • LAND SURVEYORS • PLANNERS

ENGINEERING, INC.

OWNER: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE MARYLAND, 21244

8480 BALTIMORE NATIONAL PIKE # SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmark@cois.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED
Δ	4-8-04		ADD TRENCH DRAIN PROFILE AND NOTES.	

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

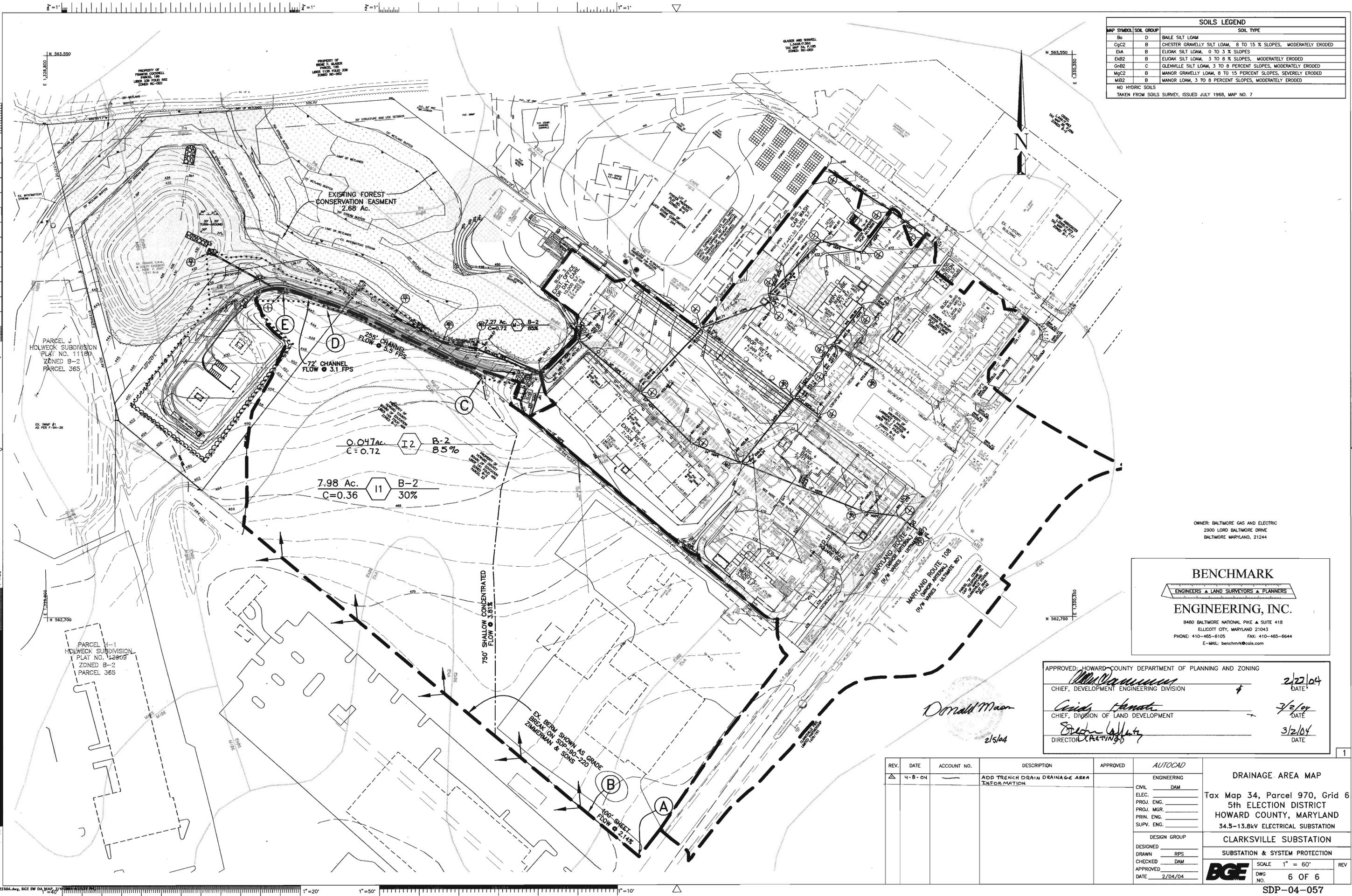
CLARKSVILLE SUBSTATION

SUBSTATION & SYSTEM PROTECTION

DESIGNED: RPS
DRAWN: DAM
CHECKED: DAM
APPROVED: _____
DATE: 2/04/04

SCALE: AS SHOWN
DWG NO.: 4 OF 6
REV

BGE



SOILS LEGEND		
MAP SYMBOL	SOIL GROUP	SOIL TYPE
Ba	D	BAILE SILT LOAM
CgC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
EaA	B	ELIOLAK SILT LOAM, 0 TO 3 % SLOPES
EB2	B	ELIOLAK SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GaB2	C	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
MB2	B	MANOR LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
NO HYDRIC SOILS		
TAKEN FROM SOILS SURVEY, ISSUED JULY 1968, MAP NO. 7		

OWNER: BALTIMORE GAS AND ELECTRIC
 2900 LORD BALTIMORE DRIVE
 BALTIMORE MARYLAND, 21244

BENCHMARK
 ENGINEERS • LAND SURVEYORS • PLANNERS
ENGINEERING, INC.
 8480 BALTIMORE NATIONAL PIKE • SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644
 E-MAIL: benchmark@comcast.com

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Donald Maon
 CHIEF, DEVELOPMENT ENGINEERING DIVISION 2/22/04
 DATE

Chris Hanrahan
 CHIEF, DIVISION OF LAND DEVELOPMENT 7/8/04
 DATE

Stephen Galt
 DIRECTOR (ACTING) 3/2/04
 DATE

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
Δ	4-8-04		ADD TRENCH DRAIN DRAINAGE AREA INFORMATION		ENGINEERING CIVIL _____ ELEC. _____ PROJ. ENG. _____ PROJ. MGR. _____ PRIN. ENG. _____ SUPV. ENG. _____
					DESIGN GROUP DESIGNED _____ DRAWN RPS CHECKED DAM APPROVED _____ DATE 2/04/04

DRAINAGE AREA MAP

Tax Map 34, Parcel 970, Grid 6
 5th ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND
 34.5-13.8KV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION
 SUBSTATION & SYSTEM PROTECTION

SCALE 1" = 60'
 DWG NO. 6 OF 6
 REV

1"=100' 1"=50' 1"=20'

SHEET INDEX	
NO.	DESCRIPTION
1	TITLE SHEET
2	SITE DEVELOPMENT PLAN AND ACCESS ROAD PROFILE
3	GRADING, EROSION AND SEDIMENT CONTROL
4	SEDIMENT & EROSION CONTROL NOTES AND DETAILS
5	LANDSCAPE PLAN AND STORM DRAIN PROFILES
6	STORM DRAINAGE AREA MAP
7	RETAINING WALL DETAIL
8	RETAINING WALL PROFILE

- GENERAL NOTES**
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY, PLUS MSHA STANDARDS AND SPECIFICATIONS, IF APPLICABLE.
 - THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION INSPECTION DIVISION AT 410-313-1880 AT LEAST FIVE(5) WORKING DAYS PRIOR TO THE START OF WORK.
 - THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
 - PROPOSED FENCE IS TO BE EIGHT (8) FEET OVERALL HEIGHT, CONSISTING OF SEVEN (7) FEET OF CHAIN LINK FABRIC AND THREE (3) STRANDS OF BARBED WIRE (TURNED OUT).
 - ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
 - THE CONTOURS SHOWN HEREON HAVE BEEN TAKEN FROM FIELD RUN TOPOGRAPHIC SURVEYS AT 2' INTERVALS. THE TOPOGRAPHY WAS PREPARED BY BENCHMARK ENGINEERING, INC., ON OR ABOUT MARCH 13, 2003.
 - VERTICAL CONTROL BASED UPON HOWARD COUNTY NAD '27 CONTROL STATION No.2637003. HORIZONTAL CONTROL BASED UPON HOWARD COUNTY NAD '83 CONTROL STATIONS No.348B & No.354Z.
 - WATER AND SEWER IS NOT REQUIRED FOR THIS SITE - NO BUILDINGS ARE PROPOSED.
 - STORMWATER MANAGEMENT IS PROVIDED BY A RETENTION TYPE FACILITY FOR WATER QUANTITY AND QUALITY CONTROL. THIS FACILITY IS PRIVATELY OWNED AND MAINTAINED, AND WAS CONSTRUCTED UNDER SDP-96-28 AND MODIFIED UNDER SDP-99-69.
 - WETLANDS DELINEATION PREPARED BY ECO-SCIENCE PROFESSIONALS, INC. DATED NOVEMBER 14, 1994 AND APPROVED ON FEBRUARY 21, 1996.
 - 100-YEAR FLOODPLAIN STUDY PREPARED BY TSA GROUP, INC. DATED OCTOBER 31, 1995. AND APPROVED ON FEBRUARY 21, 1996.
 - THE FOREST CONSERVATION EASEMENT WAS ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CODE: FOREST CONSERVATION ACT. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENTS. FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.
 - FOREST CONSERVATION FOR PARCELS 970 AND 427 WAS PROVIDED UNDER SDP-96-28 BY RETENTION OF EXISTING FOREST WITHIN A FOREST CONSERVATION EASEMENT SHOWN ON THESE PLANS.
 - EXISTING UTILITIES SHOWN WERE LOCATED BY RECORD DRAWINGS AND FIELD LOCATIONS.
 - UNLESS NOTED AS "PRIVATE", ALL EASEMENTS ARE PUBLIC.
 - PREVIOUS DPZ REFERENCE NUMBERS INCLUDE: BA 96-60E, SDP-96-28, BA 03-44C, SDP-99-69.
 - CONTRACTOR SHALL ADJUST ALL UTILITIES AND RIM ELEVATIONS AS NEEDED TO MATCH THIS PLAN.
 - CLARKSVILLE SUB-STATION IS AN UNATTENDED STATION AND NO PERMANENT EMPLOYEES ARE TO BE LOCATED ON THE PREMISES. AVERAGE DAILY TRIPS: 1/WEEK.
 - NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS AND FOREST CONSERVATION EASEMENT AREAS.
 - ACCESS TO THIS SITE IS PROVIDED BY A 16' WIDE EASEMENT RECORDED AMONG THE LAND RECORDS IN LIBER 4006, FOLIO 0561 CROSSING PARCEL 427.
 - BA CASE NO. 96-60E WAS APPROVED APRIL 24, 1997 TO ALLOW A SPECIAL EXCEPTION FOR A PUBLIC UTILITY USE, FOR THE CONSTRUCTION, INSTALLATION, OPERATION AND MAINTENANCE OF AN OUTDOOR ELECTRIC UTILITY SUBSTATION IN A B-2 ZONING DISTRICT SUBJECT TO THE CONDITIONS OUTLINED IN THE DECISION AND ORDER. AFTER APPROVAL OF THIS SPECIAL EXCEPTION, GRADING AND THE INSTALLATION OF A FENCE WAS COMPLETED.
 - BA CASE NO. 03-44C WAS APPROVED JANUARY 22, 2004 TO ALLOW A CONDITIONAL USE FOR A PUBLIC UTILITY USE, FOR THE CONSTRUCTION, INSTALLATION, OPERATION AND MAINTENANCE OF AN OUTDOOR ELECTRIC UTILITY SUBSTATION IN A B-2 ZONING DISTRICT SUBJECT TO THE CONDITIONS OUTLINED IN THE DECISION AND ORDER. THIS CONDITIONAL USE WAS APPLIED FOR AS THE LIMIT OF THE FENCED AREA WAS EXPANDED BEYOND THE AREA PREVIOUSLY APPROVED.
 - ALL COMPACTION IN FILL AREAS SHALL BE 95% COMPACTION IN ACCORDANCE WITH ASHTO T-180 SPECIFICATIONS.
 - ALL OUTDOOR LIGHTING SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 134 OF THE HOWARD COUNTY ZONING REGULATIONS.

CLARKSVILLE SUBSTATION

5th ELECTION DISTRICT

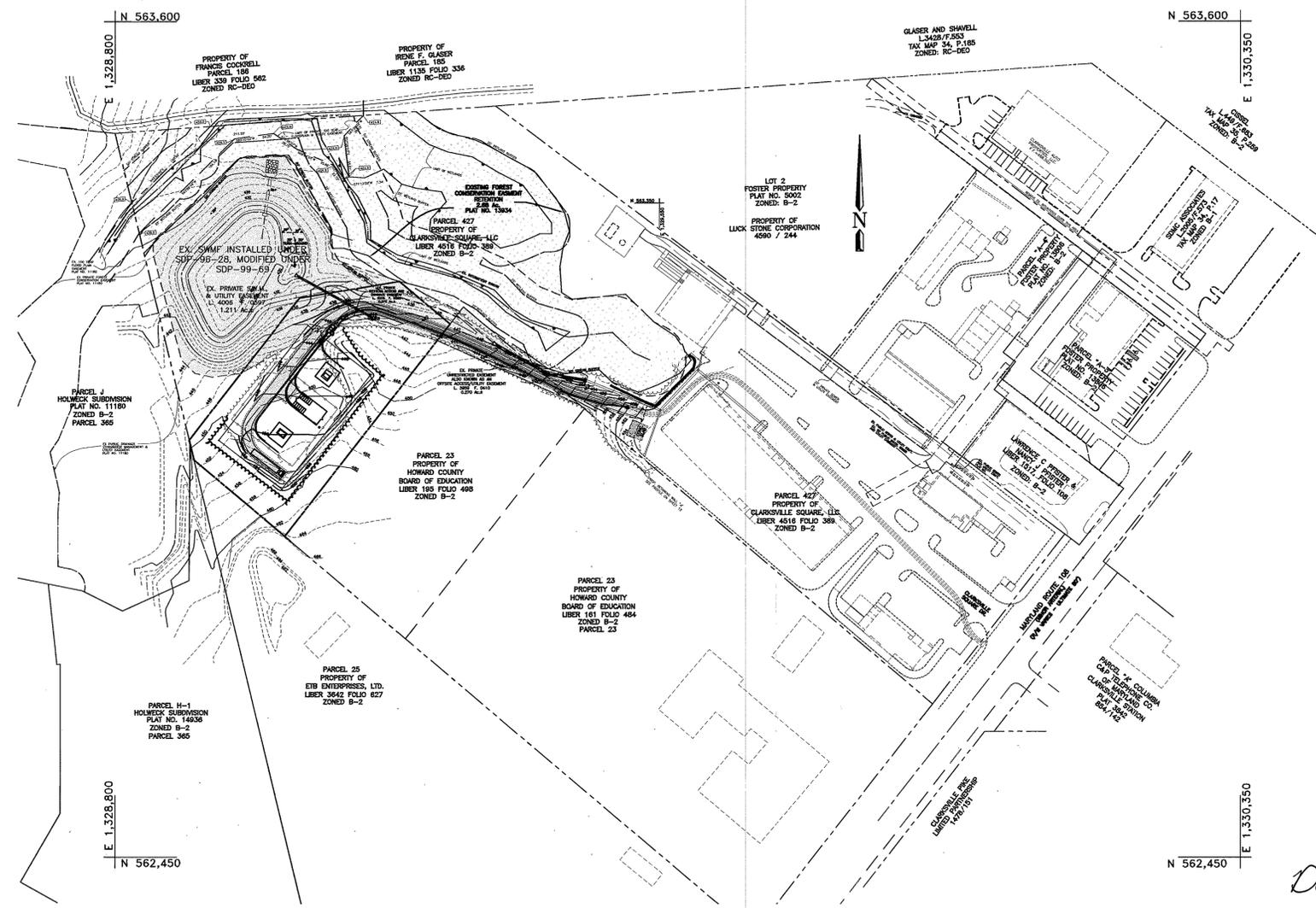
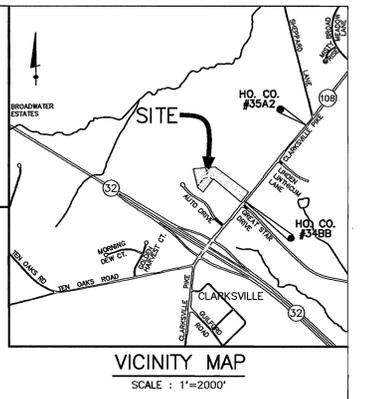
HOWARD COUNTY, MARYLAND

SITE DEVELOPMENT PLAN

BENCH MARKS (NAD83)

HO. CO. No. 348B ELEV. 485.254
 STAMPED BRASS DISK SET ON
 TOP OF CONCRETE (3" DEEP) COLUMN
 1.3' EAST OF THE EDGE OF PAVEMENT OF
 ROUTE 106. 97.5' NORTH OF THE SOUTHERN WALL
 LINE OF KENDALL HARDWARE PROJECTED AND 112'
 NORTH OF BUS POLE #51726.
 N 262,176.450' E 1,329,641.876'

HO. CO. No. 354Z ELEV. 488.644
 STAMPED BRASS DISK SET ON
 TOP OF CONCRETE (3" DEEP) CIRCULAR BASE
 2.6' WEST OF THE EDGE OF ROUTE 106.
 214.2' SOUTH OF THE CENTERLINE OF
 SHEPPARD LANE AND 3.9' EAST OF A FENCE.
 N 264,164.600' E 1,339,209.112'



SITE DATA TABULATION

GENERAL SITE DATA

- PRESENT ZONING: B-2
- APPLICABLE DPZ FILE REFERENCES: BA 96-60E, SDP-96-28, SDP-99-69, BA 03-44C
- PROPOSED USE OF SITE: ELECTRICAL SUBSTATION
- PROPOSED WATER: NONE
PROPOSED SEWER: NONE

AREA TABULATION

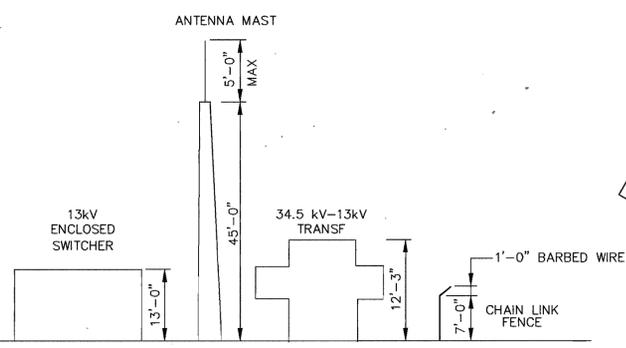
- TOTAL PROJECT AREA..... 1.46 AC.
- AREA OF 100 YR. FLOODPLAIN..... 0.00 AC.
- NET AREA OF SITE..... 1.46 AC.
- AREA OF THIS PLAN SUBMISSION..... 1.46 AC.
- APPROXIMATE LIMIT OF DISTURBANCE..... 1.20 AC.
- BUILDING COVERAGE OF SITE (PERMITTED)..... N/A
- BUILDING COVERAGE OF SITE (PROPOSED)..... 0

OPEN SPACE DATA

- OPEN SPACE ON SITE(0.0%)..... N/A
- AREA OF RECREATION OPEN SPACE REQUIRED BY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS
ACRES REQUIRED..... N/A
ACRES PROVIDED..... N/A

PARKING SPACE DATA

- FLOOR SPACE ON EACH LEVEL PER BUILDING(S) PER USE..... N/A
- MAXIMUM NUMBER OF EMPLOYEES, TENANTS ON-SITE PER USE..... N/A
- NUMBER OF PARKING SPACES REQUIRED BY ZONING REGULATIONS AND/OR FDP CRITERIA..... N/A
- TOTAL NUMBER OF PARKING SPACES PROVIDED ON-SITE..... N/A
- TOTAL NUMBER OF SERVICE PARKING SPACES PROVIDED ON-SITE..... N/A
- NUMBER OF HANDICAPPED PARKING SPACES PROVIDED ON-SITE..... N/A



PLAN VIEW
SCALE: 1" = 100'

Donald Mason
2/5/04

BENCHMARK
ENGINEERS • LAND SURVEYORS • PLANNERS

ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE # SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644
 E-MAIL: benchmark@coia.com

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Michael... 2/27/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Chris... 3/2/04
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Stephen... 3/2/04
 DIRECTOR (ACTING) DATE

ADDRESS CHART

PAR. 970	5803 CLARKSVILLE SQUARE
----------	-------------------------

PERMIT INFORMATION CHART

SUBDIVISION NAME	SECTION/AREA	LOT/PARCEL#			
CLARKSVILLE SUBSTATION	N/A	970			
DEED No.	BLOCK No.	ZONE	TAX MAP	ELEC. DIST.	CENSUS
L. 4006 F. 580	6	B-2	34	5th	6051.01
WATER CODE	SEWER CODE				
N/A	N/A				

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED
Δ	5-26-04		REVISED SHT # & SHT INDEX	

TITLE SHEET

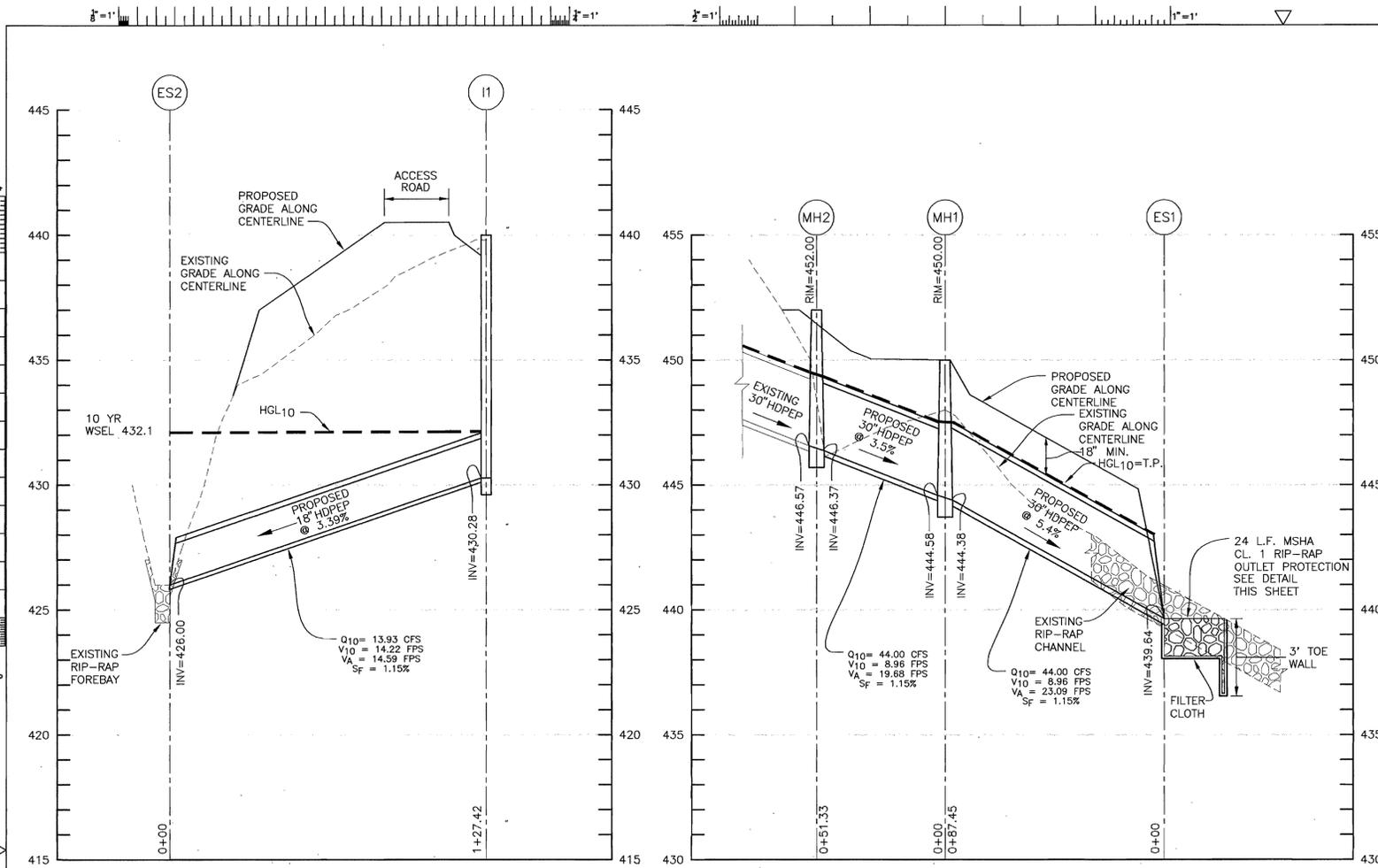
Tax Map 34, Parcel 970, Grid 6
 Deed Ref: L. 4006, F. 580
 5th Election District
 Howard County, Maryland

34.5 - 13.8 kV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION
 SUBSTATION & SYSTEM PROTECTION

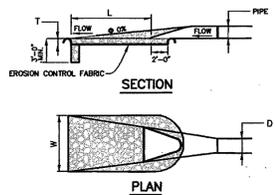
DESIGNED: _____
 DRAWN: RPS
 CHECKED: DAM
 APPROVED: _____
 DATE: 2/04/04

SCALE 1" = 100'
 DWG NO. Δ 1 OF 8
 REV



STORM DRAIN PROFILE
SCALE: HORIZ.: 1" = 30', VERT.: 1" = 3'

STORM DRAIN PROFILE
SCALE: HORIZ.: 1" = 30', VERT.: 1" = 3'



OUTLET PROTECTION DETAIL
NOT TO SCALE

- The subgrade for the filter, rip-rap, or gabion shall be prepared to the required firm and grade. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
- The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.
- Gabionets shall be protected from punching, cutting, or tearing. Any damage other than on occasional small holes shall be repaired by placing another piece of gabionets over the damaged part or by completely replacing the gabionets. All overlaps whether for repairs or for joining two pieces of gabionets shall be a minimum of one foot.
- Stones for the rip-rap or gabion outlets may be placed by equipment. They shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or gabion outlets shall be delivered and placed in a manner that will insure that it is reasonably homogeneous with the interior section and rigid fitting the stone between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter blanket or gabionets. Hand placement will be required to the extent necessary to prevent damage to the permanent works.
- The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced out of the channel and scour adjacent to the stone will occur.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 2/27/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION

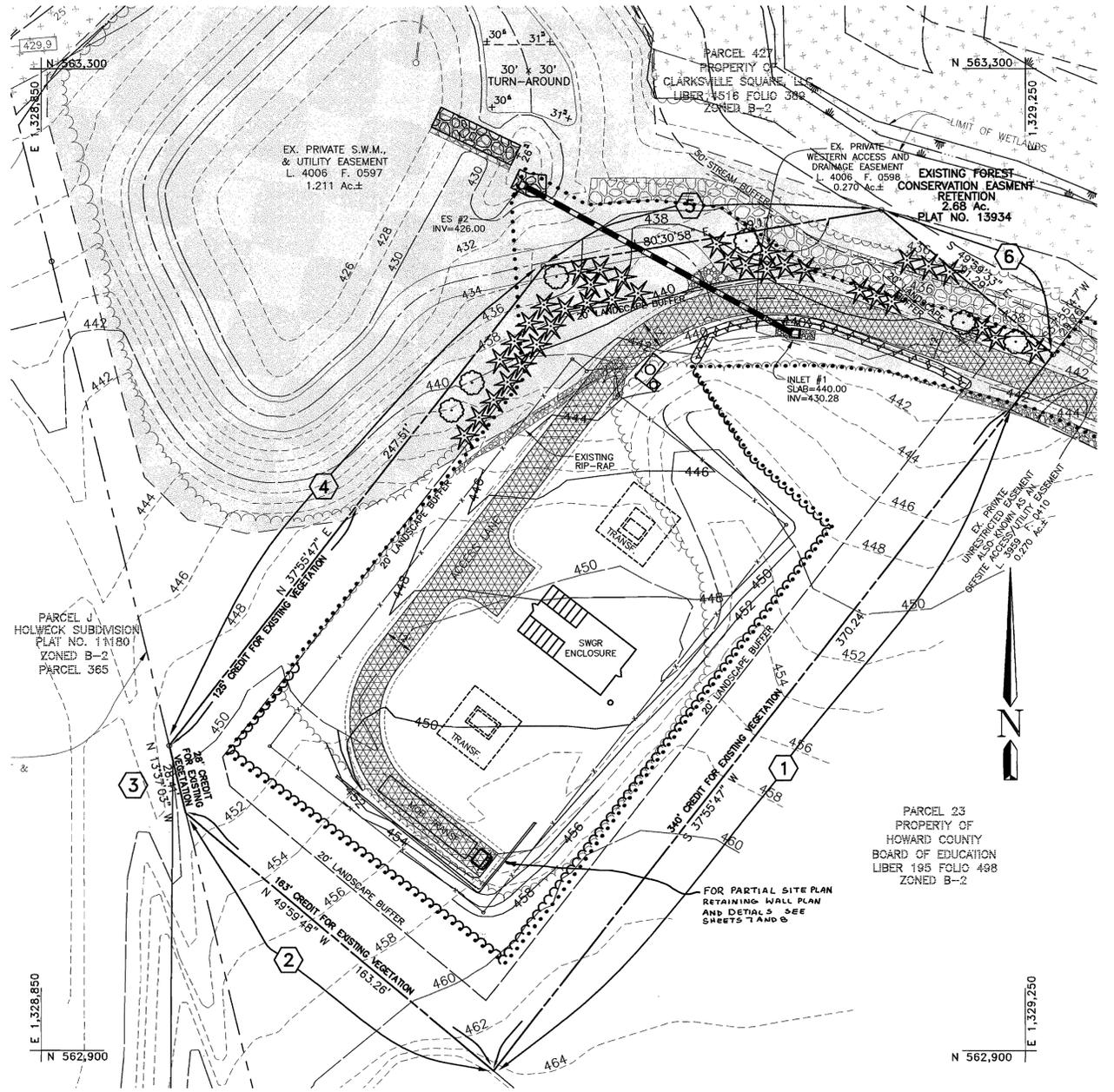
[Signature] 7/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT

[Signature] 3/2/04
DIRECTOR (BCTN6)

CATEGORY	ADJACENT TO PERIMETER PROPERTIES					
	(1) D	(2) D	(3) D	(4) D	(5) D	(6) D
LANDSCAPE BUFFER TYPE	340'	163'	28'	248'	139'	91'
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER						
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	**YES 340'	**YES 163'	**YES 28'	**YES 125'	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED						
SHADE TREES (1:60)	6	3	1	4	2	2
EVERGREEN TREES (1:10)	34	16	3	25	14	9
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-
NUMBER OF PLANTS PROVIDED						
SHADE TREES	-	-	-	2	2	2
EVERGREEN TREES	-	-	-	12	14	9
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-

SYMBOL	QUANTITY	NAME	REMARKS
○	6	ACER SACCHARUM (Sugar Maple)	2 1/2" MIN. CAL. B&B FULL HEAD
★	35	PINUS STROBUS (Eastern White Pine)	5'-8" H. UNSHEARED

* EXISTING VEGETATION TO REMAIN



PLAN VIEW
SCALE: 1" = 30'

LANDSCAPING NOTES

- PERIMETER LANDSCAPING SHALL BE PROVIDED BY THE EXISTING VEGETATION TO REMAIN AND BY THE PLANTINGS AS SHOWN ON THESE PLANS.
- THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PRESERVATION OF THE PERIMETER VEGETATION AND FOR THE PERIMETER PLANTINGS AS SHOWN ON THESE PLANS. BONDING FOR PLANTINGS IS THE OBLIGATION OF THE DEVELOPER AS PART OF THE DEVELOPERS AGREEMENT.
- TREES MUST BE A MINIMUM OF FIVE (5) FEET FROM ANY STORM DRAIN.
- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SEC.-16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL BE POSTED AS PART OF THE GRADING PERMIT IN THE AMOUNT OF \$7,050.00.

Donald Mason
2/5/04

LEGEND:

12' ACCESS LANE	
PROPOSED FENCE	
PROPOSED TREELINE	
EXISTING TREELINE	
PROPOSED CONTOUR	
EXISTING CONTOUR	
EXISTING RIPRAP	

BENCHMARK ENGINEERS, LAND SURVEYORS, PLANNERS

8480 BALTIMORE NATIONAL PIKE SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmark@ccs.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED
Δ	5-26-04		ADD RETAINING WALL AND REV. SHT #	

LANDSCAPING PLAN AND STORM DRAIN PROFILE

Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION

DESIGNED BY: RPS
DRAWN BY: DAM
CHECKED BY: DAM
APPROVED BY: [Signature]
DATE: 2/04/04

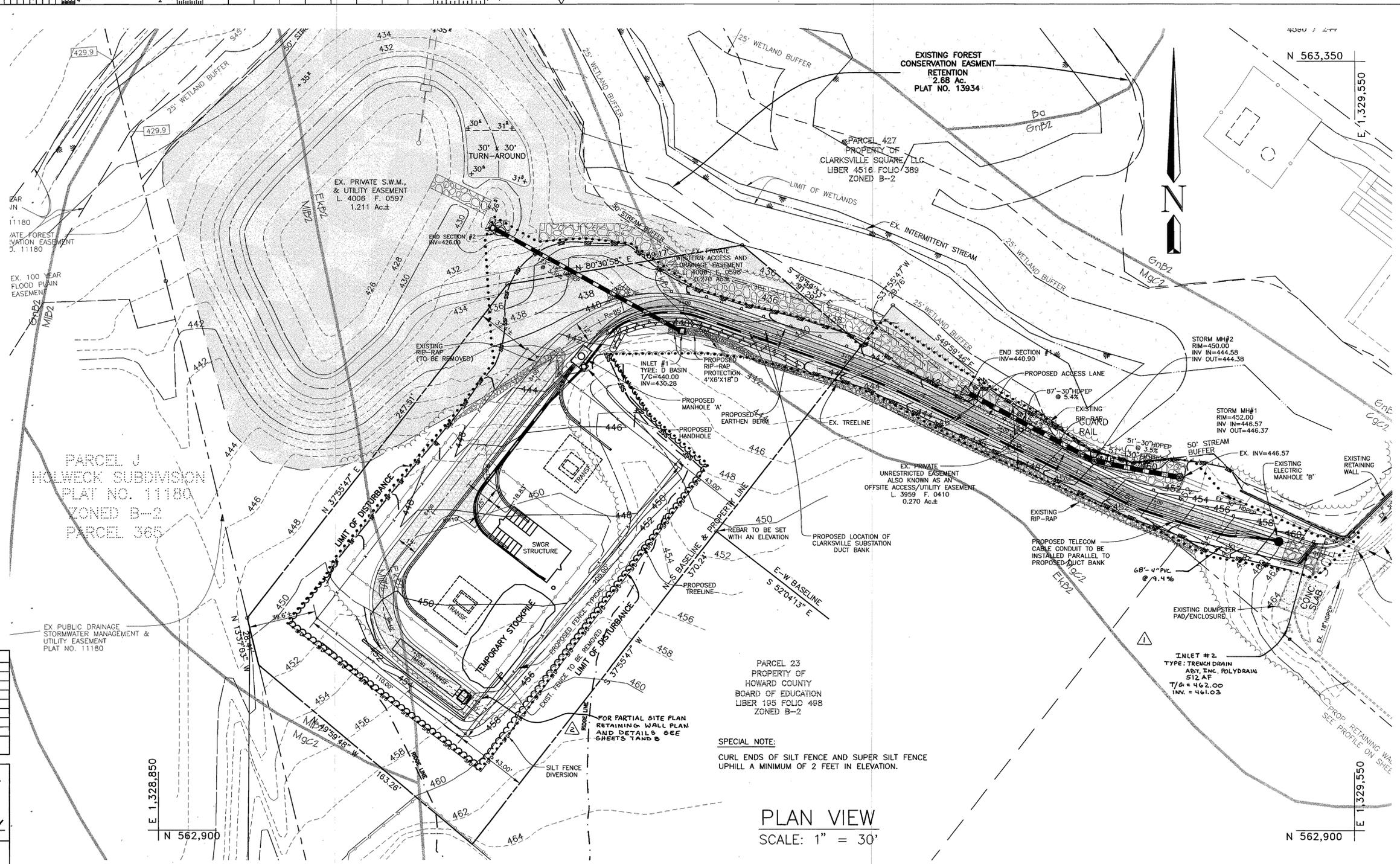
SCALE: AS SHOWN
DWG NO: 5 OF 8
REV



SDP-04-057

LEGEND:

- PROPOSED DUCT BANK
- EXISTING DUCT BANK
- TELECOM CABLE CONDUIT
- 12' ACCESS LANE
- PROPOSED FENCE
- EXISTING FENCE
- PROPOSED TREELINE
- EXISTING TREELINE
- PROPOSED CONTOUR
- EXISTING CONTOUR
- RIPRAP PROTECTION
- PROPOSED STORM MH
- PROPOSED STORM PIPE
- EXISTING STORM PIPE
- SILT FENCE
- SUPER SILT FENCE
- SILT FENCE DIVERSION
- EARTHEN BERM
- STABILIZED CONSTRUCTION ENTRANCE



SOILS LEGEND

MAP SYMBOL	SOIL GROUP	SOIL TYPE
Bo	D	BAILE SILT LOAM
CgC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
EKA	B	ELIJAH SILT LOAM, 0 TO 3 % SLOPES
ENB2	B	ELIJAH SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GhB2	C	GLENNVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
MhB2	B	MANOR LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED

NO HYDRIC SOILS
TAKEN FROM SOILS SURVEY, ISSUED JULY 1968, MAP NO. 7

BY THE DEVELOPER:
I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

Robert Clark 2/13/04
DEVELOPER: DATE:

BY THE ENGINEER:
I 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.

Donald Mason 2/5/04
ENGINEER: DATE:

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

John K. Robertson 2/26/04
HOWARD SOIL CONSERVATION DISTRICT DATE:

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.

Jim Meyer 2/26/04
NATURAL RESOURCES CONSERVATION SERVICE DATE:

APPROVED HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Mark P. ... 2/27/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE:

Chris Hanania 7/1/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE:

Stephen ... 3/2/04
DIRECTOR (PLANNING) DATE:

STRUCTURE SCHEDULE

INLET	ABT. INC. POLYDRAIN TYPE S12AF WITH POLYWALL T	N 563040.44	E 1329521.18	-	461.03	462.00	SEE MANUFACTURER'S DETAILS
STORM INLET							
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.	
INLET 1	PRECAST TYPE 'D' INLET	N 563192.18 E 1329156.43	-	430.28	440.00	SD - 4.39	
END SECTIONS							
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.	
ES-1	30"HDPEP END SECTION	N 563155.31 E 1329324.54	439.88	439.64	-	SD - 5.52	
ES-2	18"HDPEP END SECTION	N 563249.58 E 1329051.34	426.11	426.00	-	SD - 5.52	
STORM DRAIN MANHOLES							
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.	
MH1	5' SHALLOW MANHOLE	N 563106.54 E 1329447.47	446.57	446.37	452.00	G - 5.13	
MH2	5' SHALLOW MANHOLE	N 563116.17 E 1329397.54	444.58	444.38	450.00	G - 5.13	

1) STRUCTURE ELEVATION AND LOCATION FOR INLETS & MANHOLES IS AT THE TOP AND CENTER OF GRATE OR RIM.
2) STRUCTURE ELEVATION AND LOCATION FOR ENDSECTIONS IS AT THE CONNECTION OF PIPE AND END SECTION.
3) PRECAST STRUCTURES MEETING HS-20 LOADING TO BE USED.
4) ALL STORM DRAINS SHALL BE HIGH DENSITY POLYETHYLENE PIPE WITH A SMOOTH BORE UNLESS OTHERWISE NOTED.

PIPE SCHEDULE

SIZE	LENGTH	TYPE
18"	127'	HDPEP
30"	139'	HDPEP
4"	68'	PVC SCHEDULE 40

OWNER: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE MARYLAND, 21244

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLIOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmkr@coia.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
4-B-04			ADD TRENCH DRAIN AND 4" PVC		ENGINEERING
5-26-04			ADD RETAINING WALL & REV. SHI		CIVIL DAM

DESIGNED: RPS
DRAWN: RPS
CHECKED: DAM
APPROVED: DAM
DATE: 2/04/04

GRADING, EROSION AND SEDIMENT CONTROL PLAN

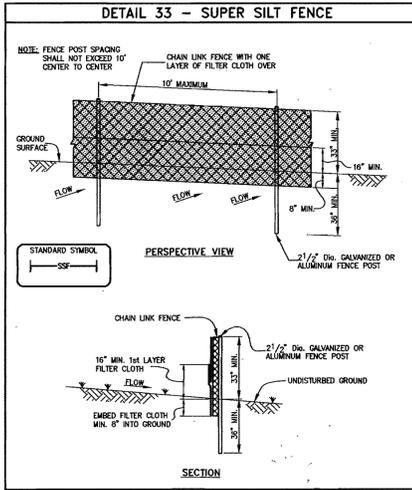
Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION

SUBSTATION & SYSTEM PROTECTION

SCALE AS SHOWN
DWG NO. 3 OF 8
REV

BGE



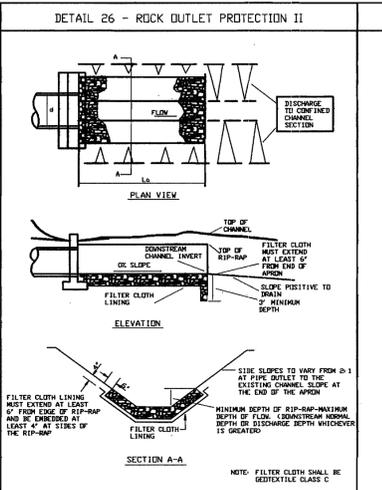
CONSTRUCTION SPECIFICATIONS

- Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
- Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and truss rods, drive anchors and post caps are not required except on the ends of the fence.
- Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
- Filter cloth shall be embedded a minimum of 8" into the ground.
- When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
- Maintenance shall be performed as needed and all bulges removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height.
- Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft / minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

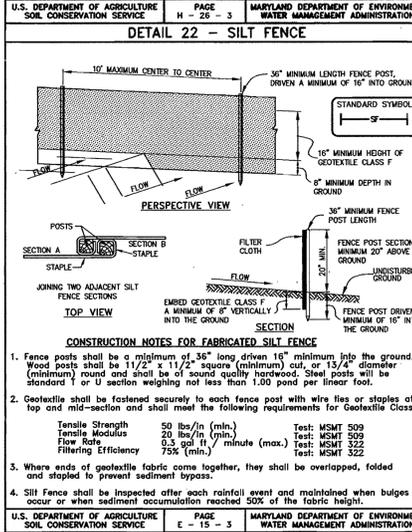
SUPER SILT FENCE DESIGN CRITERIA

Slope	Slope Steepness	Slope Length (Maximum)	Sill Fence Length (Maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 35%	5:1 - 3:1	100 feet	1,000 feet
35 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	250 feet



CONSTRUCTION SPECIFICATIONS

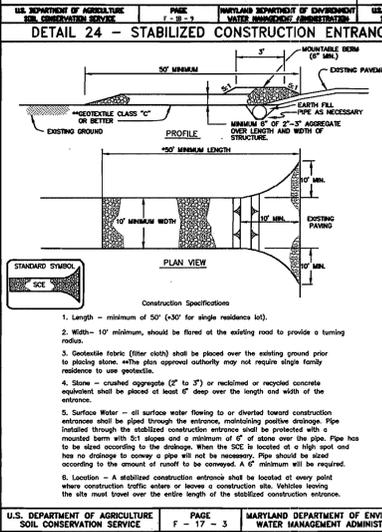
- The subgrade for the filter, rip-rap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
- The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.
- Geotextile shall be protected from puncturing, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of geotextile over the damaged part or by completely replacing the geotextile. All overlaps whether for repairs or for joining two pieces of geotextile shall be a minimum of one foot.
- Stone for the rip-rap or gabion outlets may be placed by equipment. They shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogeneous with the smaller stones and spools filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter blanket or geotextile. Hand placement will be required to the extent necessary to prevent damage to the permanent works.
- The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced out of the channel and scour adjacent to the stone will occur.



SILT FENCE DESIGN CRITERIA

Slope Steepness	(Maximum) Slope Length	(Maximum) Sill Fence Length
Flatter than 50:1	unlimited	unlimited
50:1 to 10:1	125 feet	1,000 feet
10:1 to 5:1	100 feet	750 feet
5:1 to 3:1	60 feet	500 feet
3:1 to 2:1	40 feet	250 feet
2:1 and steeper	20 feet	125 feet

Note: In areas of less than 2X slope and sandy soils (USDA general classification system, soil Class A) maximum slope length and sill fence length will be unlimited. In these areas a silt fence may be the only perimeter control required.



CONSTRUCTION SPECIFICATIONS

- Length - minimum of 50' (+50' for single residence lots).
- Width - 10' minimum, should be flared at the existing road to provide a turning radius.
- Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. The plan approval authority may not require single family residences to use geotextile.
- Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
- Surface Water - all surface water flowing to or diverted toward construction entrance shall be piped through the entrance, utilizing positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mounted berm with 2:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the size is limited or a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
- Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicle leaving the site must travel over the entire length of the stabilized construction entrance.

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

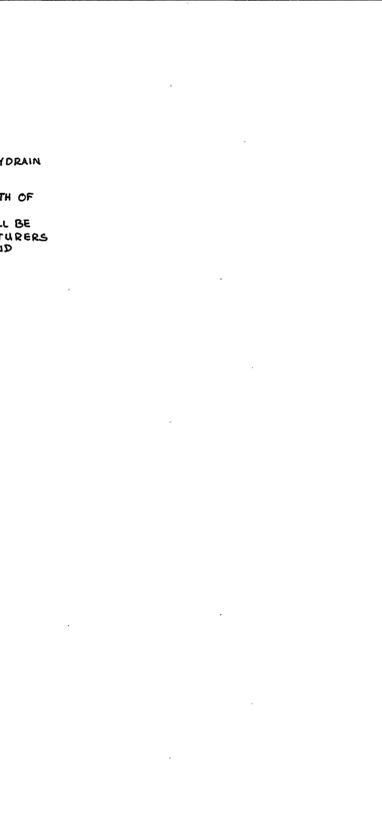
- Fence posts shall be a minimum of 3/4" long driven 18" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum) cut, or 1 3/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard 1" or 1 1/2" section weighing not less than 1.00 pound per linear foot.
- Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft / minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

- Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
- Silt fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reaches 50% of the fabric height.

TRENCH DRAIN NOTES

- TRENCH DRAIN TO BE ABS. TMC POLYDRAIN TYPE 3/2 AF WITH POLYWALL Z OR EQUIVALENT.
- TRENCH DRAIN TO SPAN FULL WIDTH OF SUBSTATION ACCESS ROAD.
- TRENCH DRAIN INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS INSTALLATION INSTRUCTIONS AND SPECIFICATIONS.



SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF CONSTRUCTION

DAY	ACTIVITY
DAY 1	OBTAIN GRADING PERMIT.
DAY 2-8	INSTALL STABILIZED CONSTRUCTION ENTRANCES, TREE PROTECTION FENCES, SILT FENCES, SUPER SILT FENCES, TEMPORARY SILT FENCE DIVERSION.
DAY 8-10	INSTALL INLET #1, 123 L.F. 18" HDPE TO END SECTION #2, AND EARTHEN BERM AS SHOWN.
DAY 11-16	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, BRING ROAD BED TO SUBGRADE AND THEN MASS GRADE SITE AND STABILIZE IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES.
DAY 17-19	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL STORM DRAINS, FROM PROPOSED MH#1 TO ES#1, AND STABILIZE IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES.
DAY 20-22	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL PAVING.
DAY 23-26	COMPLETE GRADING OF SITE, AND INSTALL CHAIN LINK FENCING PER PLAN, AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.
DAY 154-161	UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE EARTHEN BERM NEAR INLET #1 AND REMAINING SEDIMENT CONTROL DEVICES AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

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 (.07 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 SOD.

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

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

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. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE 30-0-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ FT).
- ACCEPTABLE - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 1000 LBS PER ACRE 10-10-10 FERTILIZER (23 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR 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 (1.4 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (.05 LBS/1000 SQ FT) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 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 SOD. OPTION (3) SEED WITH 60 LBS PER ACRE OF KENTUCKY 31 TALL FESCUE AND MULCH WITH 2 TONS PER ACRE OF WELL ANCHORED STRAW.

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

SEDIMENT CONTROL NOTES

- A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION, (313-1850).
- ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT "MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS THEREOF.
- FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, 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) SOD (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 PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- SITE ANALYSIS:

TOTAL AREA OF SITE	1.46	ACRES
AREA DISTURBED	1.20	ACRES
AREA TO BE ROOFED OR PAVED	0.62	ACRES
AREA TO BE VEGETATIVELY STABILIZED	0.58	ACRES
TOTAL CUT	2,600	CY
TOTAL FILL	2,600	CY
OFFSITE WASTE/BORROW AREA LOCATION	N/A	
- 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 CONTROL, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

BY THE DEVELOPER: Robert Clark 2/13/04

BY THE ENGINEER: Donald Mason 2/5/04

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

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION: Chris Domonico 2/27/04

CHIEF, DIVISION OF LAND DEVELOPMENT: Cindy Hamilton 3/2/04

DIRECTOR (ACTING): Stephen LaPorte 3/2/04

Donald Mason

BENCHMARK
ENGINEERS • LAND SURVEYORS • PLANNERS

ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE # SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmark@cais.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED
4	8-04		ADD TRENCH DRAIN PROFILE AND NOTES	
5	26-04		REVISED SHT #	

DESIGNED	RPS
DRAWN	DAM
CHECKED	DAM
APPROVED	
DATE	2/04/04

ENGINEERING	AUTOCAD
CIVIL	DAM
ELEC.	
PROJ. ENG.	
PROJ. MGR.	
PRIN. ENG.	
SUPV. ENG.	

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

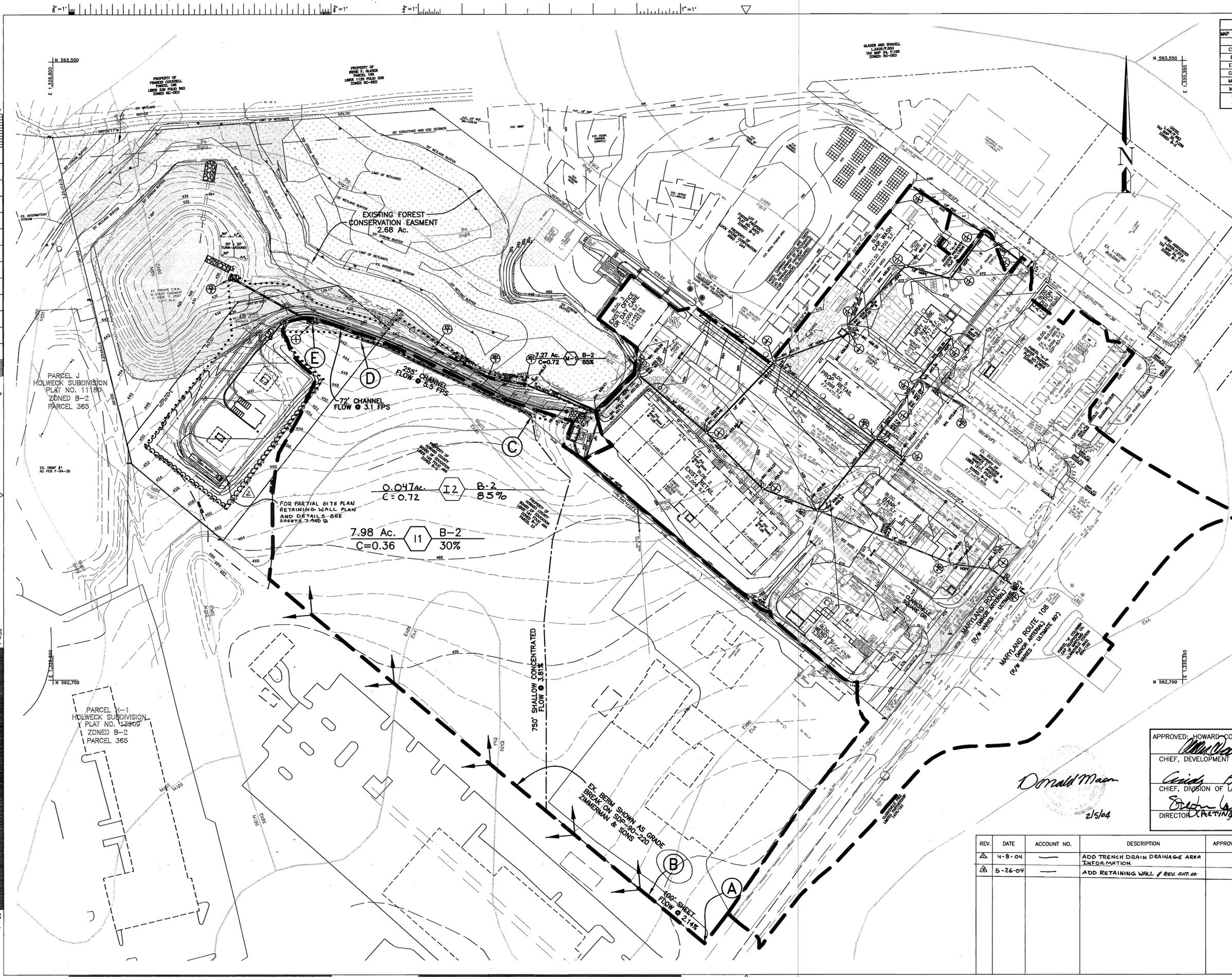
Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION

SUBSTATION & SYSTEM PROTECTION

SCALE AS SHOWN
DWG NO. 4 OF 8
REV

SOILS LEGEND		
MAP SYMBOL	SOIL GROUP	SOIL TYPE
D	D	BAILE SILT LOAM
CcC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
EaA	B	ELIQUAK SILT LOAM, 0 TO 3 % SLOPES
EaB2	B	ELIQUAK SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GaB2	C	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
MIB2	B	MANOR LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
NO HYDRIC SOILS		
TAKEN FROM SOILS SURVEY, ISSUED JULY 1988, MAP NO. 7		



OWNER: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE MARYLAND, 21244

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ENGINEERS • LAND SURVEYORS • PLANNERS
ENGINEERING, INC.
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PHONE: 410-465-6105 FAX: 410-465-6644
E-MAIL: benchmark@comcast.com

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Donald Macon
CHIEF, DEVELOPMENT ENGINEERING DIVISION 2/22/04
DATE

Chris Hanon
CHIEF, DIVISION OF LAND DEVELOPMENT 7/2/04
DATE

Stephen Galt
DIRECTOR (ACTING) 3/2/04
DATE

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
△	4-8-04		ADD TRENCH DRAIN DRAINAGE AREA INFORMATION		ENGINEERING CIVIL DAM
△	5-26-04		ADD RETAINING WALL # REV. SHEET #		ELEC. PROJ. ENG. PROJ. MGR. PRIN. ENG. SUPV. ENG.

DRAINAGE AREA MAP

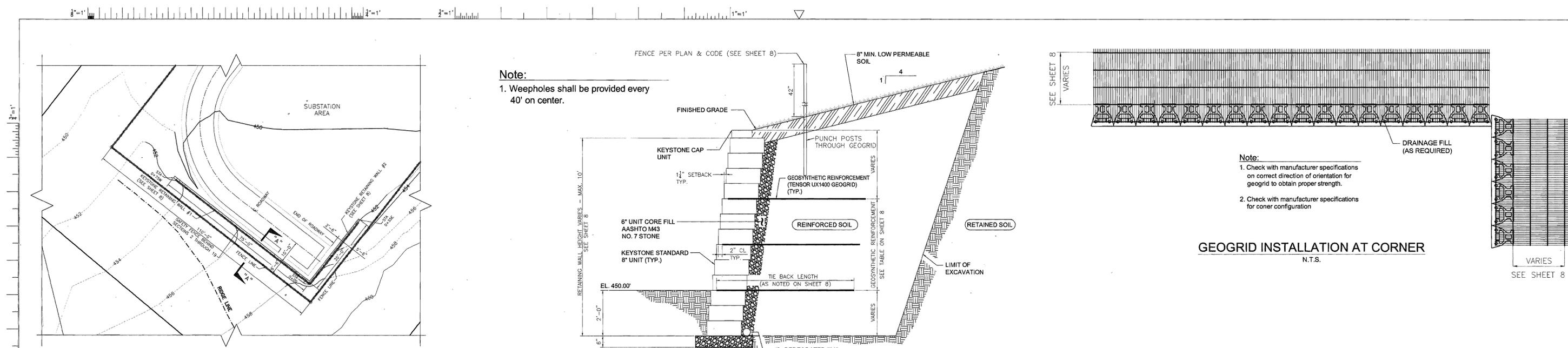
Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION
SUBSTATION & SYSTEM PROTECTION

SCALE 1" = 60'
DWG NO. 6 OF 8
REV



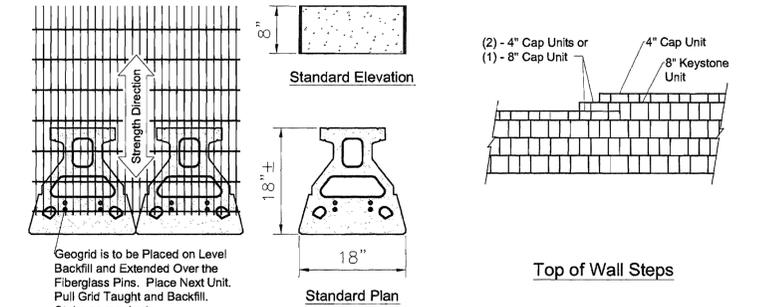
SDP-04-057



Note:
1. Weepholes shall be provided every 40' on center.

Note:
1. Check with manufacturer specifications on correct direction of orientation for geogrid to obtain proper strength.
2. Check with manufacturer specifications for corner configuration

GEOGRID INSTALLATION AT CORNER
N.T.S.



THE PURPOSE OF THIS SHEET IS TO DETAIL THE ADDED RETAINING WALL TO THE PREVIOUSLY APPROVED SDP-04-057

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Donald Mean
 CHIEF, DEVELOPMENT ENGINEERING DIVISION & DATE 5/25/04
Chris Hamilton
 CHIEF, DIVISION OF LAND DEVELOPMENT & DATE 5/20/04
 DIRECTOR

OWNER: BALTIMORE GAS AND ELECTRIC
 2900 LORD BALTIMORE DRIVE
 BALTIMORE, MARYLAND, 21244

REFERENCE DRAWINGS:
 SHEET 8 RETAINING WALL PROFILE AND SAFETY FENCE

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STEP 1: PREPARE SITE

REMOVE ALL SURFACE VEGETATION, DEBRIS, AND ORGANIC MATERIAL. THIS MATERIAL SHOULD NOT BE USED AS STRUCTURAL BACKFILL. AS REQUIRED, EXCAVATE SITE SOILS TO ALLOW FOR PLACEMENT OF THE KEYSTONE UNITS AND SOIL REINFORCEMENT. IF A WALL IS BEING BUILT ON FILL, THIS STEP MAY NOT BE NECESSARY.

STEP 2: INSTALL ARCH CULVERT PER SITE PLANS AND CONTECH PLATE ASSEMBLY INSTRUCTIONS

STEP 3: EXCAVATE BASE TRENCH/DESIGN AND CONSTRUCTION PROCEDURES

AFTER SELECTING THE LOCATION AND LENGTH OF THE WALL, EXCAVATE THE BASE LEVELING PAD. THE TOP OF LEVELING PAD MUST BE A MINIMUM OF 24" (610 mm) BELOW FINISHED GRADE. SCOUR MAY REQUIRE THE WALL EXTENDS DEEPLY OR THAT SCOUR PROTECTION BE USED. THE BASE TRENCH SHOULD BE WIDE ENOUGH TO ALLOW FOR THE KEYSTONE UNIT AND UNIT DRAINAGE FILL ZONE. THE BASE TRENCH SHOULD BE A MINIMUM OF 36" (914 mm) WIDE FOR STANDARD UNITS. THE BASE TRENCH MUST BE DUG DEEP ENOUGH TO ALLOW FOR PLACEMENT OF THE BASE LEVELING PAD AND THE BURIED KEYSTONE UNITS. LEVEL AND COMPACT SOILS IN THE BASE TRENCH PRIOR TO INSTALLATION OF THE LEVELING PAD. NOTE: THE NUMBER OF BURIED COURSES IS TYPICALLY THREE UNITS FOR THESE APPLICATIONS UNLESS OTHERWISE SPECIFIED BY THE ENGINEER. THE COMBINED DEPTHS OF THE BASE LEVELING PAD AND BURIED UNITS IS THE TOTAL DEPTH OF THE BASE TRENCH. FROM SOIL CONDITIONS MAY REQUIRE A MINOR DEPTH OF BASE LEVELING PAD MATERIAL OR SOIL REINFORCEMENT. THIS EXTRA MATERIAL WOULD BE USED TO IMPROVE THE BEARING CAPACITY OF THE SUBGRADE TO FULLY SUPPORT THE WEIGHT OF THE RETAINING WALL. A GEOTECHNICAL ENGINEER SHOULD CALIBRATE SUCH CONCERNS.

STEP 4: CONSTRUCT BASE LEVELING PAD

CONSTRUCTION OF A WALL ON A STEEP SLOPE. WHEN USING THE STANDARD BASE TRENCH GUIDELINES, THE AMOUNT OF PASSIVE SOIL IN FRONT OF A WALL CONSTRUCTED ON A SLOPE IS REDUCED SIGNIFICANTLY. THIS REQUIRES AN INCREASE IN THE BASE TRENCH TO MEET MINIMUM REQUIREMENTS, AS DETERMINED BY THE ENGINEER.

STEPING UNITS UP ALONG A SLOPING GRADE. WHEN THE GRADE RUNNING PARALLEL WITH THE WALL IS NOT LEVEL AND THE TOP OR BOTTOM OF THE KEYSTONE UNITS, THE DEPTH OF THE BASE TRENCH AND DEPTH OF THE UNITS BELOW GRADE WILL VARY. MAINTAIN THE MINIMUM DEPTH OF BURIED KEYSTONE UNITS.

STEP 4: CONSTRUCT BASE LEVELING PAD
 BEGIN FIRST BY SELECTING THE PROPER BASE LEVELING PAD MATERIAL. A REINFORCED CONCRETE PAD IS TYPICALLY UTILIZED WHERE SCOUR POTENTIAL EXISTS, OTHERWISE A 6" MIN. DEPTH CRUSHED STONE BASE IS USED. (I.E. CLASS #0, BURMA, ROAD BASE). THE MAXIMUM PARTICLE SIZE IS 1" (25 mm). THE MINIMUM PARTICLE SIZE IS NO MORE THAN 15% OF THE VOLUME PASSING A NO. 200 SIEVE. LARGER MATERIAL WILL MAKE LEVELING MORE DIFFICULT. THE FOLLOWING ARE OPTIONS:

- 1. 3/8" TO 3/4" (10 - 20 mm) CLEAN CRUSHED STONE IN AREAS WITH HIGHER MOISTURE LEVELS.
- 2. A 2000 PSI (14 MPa) NON-REINFORCED CONCRETE LEVELING PAD (4" THICK).
- 3. A 3500 PSI (24 MPa) REINFORCED CONCRETE FOOTING. THIS OPTION IS USED ONLY IN CRITICAL APPLICATIONS AS RECOMMENDED BY THE ENGINEER.

NOTE: DO NOT USE PEA ROCK OR ROUNDED AGGREGATE FOR THE BASE LEVELING PAD.
 PLACE CRUSHED STONE BASE LEVELING PAD MATERIAL AND COMPACT WITH APPROPRIATE EQUIPMENT TO ACHIEVE PROPER DENSITY. COMPACT BASE MATERIALS TO 95% STANDARD PROCTOR OR 90% MODIFIED PROCTOR (SOIL TESTING STANDARDS TO DETERMINE % OF MAXIMUM SOIL DENSITY). CRUSHED STONE SHOULD BE COMPACTED TO YIELD OF PROCTOR TESTING NOT BE PERFORMED ON CRUSHED STONE. THE LEVELING AND ADJUSTMENT OF THESE UNITS IS COMPLETE. PLACE AND COMPACT THE BASE LEVELING PAD FOR THE NEXT STEP IN GRADE. WHILE DOING SO, PLACE THE SAME MATERIAL AROUND THE UNITS CLOSEST TO THE STEP IN GRADE TO STABILIZE THEIR POSITION. THE TOP OF THE LAST KEYSTONE UNIT BECOMES THE GRADE LEVEL FOR THE TOP OF THE BASE LEVELING PAD. THIS UNIT RETAINS THE BASE LEVELING PAD MATERIAL FOR THE NEXT STEP IN GRADE.

STEP 5: SET AND ALIGN THE BASE COURSE

BEGIN AT THE LOWEST WALL ELEVATION. PLACE ALL UNITS PARALLEL TO THE ALIGNMENT LINE. THE MACHINED EDGES OF ADJOINING UNITS SHOULD CONTACT EACH OTHER. THIS PROCEDURE APPLIES TO STRAIGHT WALLS (SEE CONSTRUCTION MANUAL ON "CURVES" FOR RELATED INFORMATION). BE SURE ALL UNITS ARE SET TOP SIDE UP. THE TOP SIDE HAS 4 PIN HOLES CENTERED BETWEEN TWO KIDNEY RECESSED HOLES. ALL UNITS SHOULD REST FIRMLY ON THE BASE LEVELING PAD. IF ANY ROCKING MOTION OCCURS, ADJUST BASE LEVELING PAD MATERIAL OR UNITS TO ACHIEVE SOLID CONTACT WITH THIS TOP SIDE.

CHECK AND ADJUST THE LEVEL AND ALIGNMENT OF ALL UNITS. THE POSITION OF THE BASE COURSE DETERMINES THE ALIGNMENT OF ALL SUBSEQUENT COURSES. ADJUSTMENTS TO ALIGNMENT MUST BE MADE AT THIS TIME. DO NOT ALIGN THE UNITS USING THE SPLIT FACE SURFACE. INSTEAD, VERIFY THE PROPER POSITION OF ALL KEYSTONE UNITS BY EXAMINING A STRAIGHT LINE ACROSS THE BACK OF THE UNITS OR OVER THE TOP OF THE UNITS HOLES.

LEVEL KEYSTONE UNITS SIDE TO SIDE USING A 48" (1.2 m) OR LONGER LEVEL. UNITS CAN BE LEVELED FRONT TO BACK USING A MINIMUM 24" (610 mm) LEVEL. IF A LEVEL TRANSIT IS USED, SPLIT CHECK EVERY OTHER UNIT. THE TOP SURFACE OF TWO ADJOINING UNITS SHOULD ALIGN (LEVEL) 1/4" (6 mm). MINOR HEIGHT ADJUSTMENTS CAN BE MADE BY TAPPING THE UNIT WITH A RUBBER Mallet OR BY PLACING SMALL AMOUNTS OF LEVING SAND OR FINE GRANULAR MATERIAL FOR MINOR ADJUSTMENTS. WHEN CONCRETE (NON-REINFORCED) LEVELING PAD IS BEING USED, SET BATTER BOARDS, POUR CONCRETE AND SCREED LEVEL.

ALL BASE COURSE UNITS CAN BE PLACED FOR AN ENTIRE WALL LENGTH OR FOR A SMALL SECTION OF THE FULL LENGTH. TO REDUCE THE MOVEMENT OF BASE UNITS FROM CONSTRUCTION EQUIPMENT, PLACE UNIT DRAINAGE FILL MATERIAL AFTER PLACEMENT AND LEVELING OF EACH TEN UNITS. WHEN PLACING THE BASE COURSE FOR A WALL WITH A STEPPING COURSE, SET ALL UNITS AT THE LOWEST ELEVATION FIRST. THE POSITION OF THESE UNITS (AS DESCRIBED IN THE "PREPARATION, EDUCATION, BLOCK OVERLAPPING NOTES"), PLACEMENT OF THE BASE COURSE FOR THE NEXT STEP IN GRADE SHOULD BEGIN BY PLACING A MINIMUM OF 1-1/2 OVERLAPPING UNITS. THIS WILL ENSURE PROPER INTERLOCK POSITION FOR ADDITIONAL UNITS.

STEP 6: INSERT FIBERGLASS CONNECTING PINS

BEFORE INSTALLING THE PINS SELECT A BATTER OPTION. "BATTER" IS THE SLOPE OF THE FACE OF THE WALL UPWARD AND BACKWARD SO THAT THE WALL LEANS INTO THE EMBANKMENT BEING RETAINED. BATTER IS MECHANICALLY CONTROLLED BY THE PIN POSITION. UNITS WITH FOUR PIN HOLES APPEARING AT THE TOP OF THE UNIT HAVE THREE BATTER OPTIONS: 8:8 (1-1/4" (30 mm)), 4:4 (5/8" (13 mm)), OR NEAR VERTICAL. A 8:8 OR 4:4 BATTER MAY BE USED FOR SOME INSTALLATIONS. STRAIGHT WALLS ARE WELL SUITED FOR THIS BATTER OPTION. A NEAR VERTICAL BATTER WORKS WELL FOR TALL GEOGRID REINFORCED WALLS WITH TIGHT RADIUS CURVES, CORNERS AND WORKING AROUND CULVERTS AND HEADWALLS. PLACE TWO KEYSTONE PINS INTO TWO OF THE PREFORMED HOLES IN THE TOP OF EACH KEYSTONE UNIT. IN SOME CASES A LIGHT SLAG FILM MAY COVER PART OR ALL OF THE HOLE. IN THESE CONDITIONS USE A HAMMER TO TAP THE PIN THROUGH THE CONCRETE SLAG AND INTO THE OPENING. ONCE IN POSITION, A MINIMUM 1-1/4" (30 mm) SEGMENT OF THE PIN SHOULD PROTRUDE OUT OF THE OPENING ABOVE THE TOP SURFACE OF THE UNIT.

STEP 7: PLACE UNIT DRAINAGE MATERIAL

PLACE THE KEYSTONE UNIT VOIDS AND DRAINAGE ZONE WITH 3/8" (10 mm) TO 3/4" (20 mm) UNIT DRAINAGE FILL MATERIAL. THE UNITS VOIDS ARE COVERED PART OR ALL OF THE HOLE. IN THESE CONDITIONS USE A HAMMER TO TAP THE PIN THROUGH THE CONCRETE SLAG AND INTO THE OPENING. ONCE IN POSITION, A MINIMUM 1-1/4" (30 mm) SEGMENT OF THE PIN SHOULD PROTRUDE OUT OF THE OPENING ABOVE THE TOP SURFACE OF THE UNIT.

STEP 8: GEOGRID INSTALLATION

THE BASIC INSTALLATION TECHNIQUES FOR USE OF A TENSAR GEOGRID WITH A KEYSTONE RETAINING WALL ARE OUTLINED IN THE FOLLOWING STEPS. CONSULT THE GEOGRID MANUFACTURER FOR ADDITIONAL INSTALLATION DETAILS.

STEP 9: BACKFILL AND COMPACT SOILS

THE DEPTH OF THIS AREA WILL VARY DEPENDING ON THE SITE CONDITIONS AND CONSTRUCTION PROCEDURES USED. WALLS CONSTRUCTED IN A FILL CONDITION WILL REQUIRE THE PLACEMENT OF LARGE VOLUMES OF THIS MATERIAL. WALLS BUILT INTO CUT CONDITIONS WILL REQUIRE VARYING QUANTITIES OF MATERIAL DEPENDING ON THE AMOUNT OF OVER EXCAVATION.

THE SAME PLACEMENT RULES APPLY FOR EACH CONDITION. IN GENERAL, ALL SOILS SHOULD BE PLACED IN NO MORE THAN 8" (200 mm) THICK LIFTS, THE HEIGHT OF A SINGLE KEYSTONE UNIT. MORE SPECIFICALLY, THE PROPER THICKNESS OF MATERIAL PLACED IN A SINGLE LIFT IS DETERMINED ON THE TYPE OF SOILS AND COMPACTION EQUIPMENT BEING USED. FOR EXAMPLE, CRUSHED STONE SOILS FOR UNIT DRAINAGE MAY BE PLACED IN MAXIMUM LIFTS AND WILL COMPACT WITH MANUAL EQUIPMENT. MOST ORGANIC SITE SOILS EASILY INFLUENCED BY MOISTURE LEVELS, MUST BE PLACED IN SHORTER LIFTS AND WILL REQUIRE GREATER COMPACTION EFFORT.

FOR FOUNDATION, THE BACKFILL SOILS NEED TO BE COMPACTED TO A MINIMUM 90% STANDARD PROCTOR (BASE OF THE SOILS MAXIMUM DENSITY). BOTH THE TYPE OF MATERIAL AND THE COMPACTION EQUIPMENT NEED TO BE CONSIDERED WHEN ADDRESSING THIS ISSUE. SOILS COMPACTED WITH MALL BEHIND EQUIPMENT WILL REQUIRE THE PLACEMENT OF THIN LAYERS OF MATERIAL USING ROPE-ON MECHANICAL EQUIPMENT WILL ALLOW PLACEMENT OF THICKER LIFTS OF MATERIAL. THE FOLLOWING ARE BASIC GUIDELINES:

- 1. BACKFILL MATERIAL MUST HAVE THE PROPER MOISTURE CONTENT FOR OPTIMUM PERFORMANCE WHEN COMPACTING.
- 2. ORGANIC OR HEAVY CLAY MATERIAL SHALL NOT BE USED. THESE MATERIALS HOLD MOISTURE AND DO NOT COMPACT PROPERLY.
- 3. WALL BEHIND MECHANICAL COMPACTION EQUIPMENT MAY BE USED TO COMPACT ANY SOILS PLACED BEHIND THE UNIT/DRAINAGE ZONE.
- 4. ROPE-ON MECHANICAL COMPACTION EQUIPMENT SHOULD BE OPERATED NO CLOSER THAN WITHIN 3' (1 m) OF THE KEYSTONE UNIT BACK SURFACE.
- 5. DO NOT OVER COMPACT OR COMPACT SOILS NEXT TO THE BACK OF THE UNIT IN AN UNCONTROLLED MANNER. THIS MAY DRIVE DRAINAGE MATERIAL UNDER THE UNIT, FORCING THE UNITS OF LEVEL. IF THIS CONTINUES, THE WALL MAY BEGON TO LEAN FORWARD.
- 6. ALL SOIL TESTING SHOULD BE PERFORMED BY A QUALIFIED ENGINEER. SOIL TEST SHOULD BE TAKEN NO CLOSER THAN 3' FROM THE BACK SURFACE OF THE KEYSTONE UNIT.
- 7. BACKFILL MATERIAL IN THE PIPE ZONE MUST BE AS SHOWN ON THE SITE SPECIFIC PLANS AND SPECIFICATIONS.
- 8. GEOTEXTILE SEPARATORS BETWEEN UNIT FILL AND BACKFILL MUST BE PLACED WHILE BACKFILLING.

WHILE PLACING BACKFILL MATERIAL BEHIND THE FIRST COURSE OF KEYSTONE UNITS, REPLACE THE PASSIVE SOIL WEDGE AT THE FRONT OF THE UNITS. THIS WILL SECURE THE PROPER ALIGNMENT OF ALL UNITS.

STEP 10: SWEEP TOP OF UNITS CLEAN

REMOVE ALL EXCESS UNIT DRAINAGE MATERIAL FROM THE TOP SURFACE OF ALL UNITS. THIS ALLOWS A SMOOTH SURFACE FOR PLACEMENT OF THE NEXT COURSE OF KEYSTONE UNITS. IF THE EXCESS MATERIAL IS NOT REMOVED, IT MAY BECOME LOOSE AND CAUSE POTENTIAL STRESS FRACTURES. THIS MATERIAL MAY ALSO LEAVE UNITS OUT OF LEVEL, CREATING VISUAL DISTORTION. IF DUE TO THE MANUFACTURING PROCESS, RIDGES OR SLAG MATERIAL ARE PRESENT, REMOVE BY USING A TOOL OR USE THE NEXT COURSE UNIT BEING PLACED TO RUB THE HIGH SPOT OFF.

STEP 11: INSTALL ADDITIONAL COURSES OF KEYSTONE UNITS

PLACE ADDITIONAL COURSES OF KEYSTONE UNITS. EACH UNIT WILL BE PLACED OVER TWO UNITS BELOW CREATING A RUNNING BOND FACE PATTERN. EARLIEST PLACEMENT OF THE KEYSTONE UNITS IS ACCOMPLISHED IN THE FOLLOWING STEPS:

- 1. LIFT EACH KEYSTONE UNIT BY ITS BACK TAIL SECTION TO MOVE IT INTO POSITION.
- 2. CENTER THE UNIT IN FRONT OF THE POINT WHERE THE TWO UNITS BELOW MEET.
- 3. SET THE FACE OF THE UNIT ONTO THE FRONT EDGE OF THE TWO UNITS BELOW.
- 4. WITH THE KEYSTONE UNIT IN THIS POSITION, Slightly LOWER IT TO CONTACT THE TWO UNITS BELOW. WHILE LOWERING THE UNIT, THE TWO KIDNEY RECESSED HOLES SHOULD SLIP OVER THE FIBERGLASS PIN IN THE UNITS BELOW (OPEN KIDNEY WILL ALLOW A VISUAL CHECK).
- 5. PULL THE UNIT FORWARD TO ENGAGE PINS. THE UNIT WILL BE LOCKED INTO A BATTER POSITION. VISUALLY CHECK TO SEE THAT THE UNIT IS PARALLEL TO THE UNITS BELOW. AFTER SETTING A LENGTH OF KEYSTONE UNITS, VISUALLY CHECK THE OVERALL ALIGNMENT. MAKE MINOR ADJUSTMENTS AS NECESSARY.

STEP 12: CUTTING AND FITTING UNITS AROUND CULVERTS

KEYSTONE UNITS SHALL BE CAREFULLY CUT AND FITTED AROUND HEADWALLS AND CULVERT SECTIONS. THE UNITS SHALL FIT TIGHTLY WITH NO GAPS WIDER THAN 3/4" (20 mm) AND ANY LARGER GAPS OR SPACES SHALL BE GROUTED OR MORTARED PRIOR TO BACKFILLING.

LEVELING CONCRETE MAY BE REQUIRED WHEN THE WALL UNITS ARE PLACED OVER THE TOP OF HEADWALL OR ARCH TO MAINTAIN THE PROPER ELEVATION OF THE UNIT COURSES. THE THICKNESS OF LEVELING CONCRETE SHALL NOT EXCEED THE THICKNESS OF THE BLOCK (8" (200 mm)) UNLESS SPECIAL ANALYSIS REQUIRES A THICKER SECTION.

GEOTEXTILE FILTER FABRIC AND DRAINAGE AGGREGATE SHALL BE PLACED BEHIND ALL KEYSTONE UNIT AND CULVERT INTERFACE JOINTS AS INDICATED IN THE TYPICAL SECTIONS.

STEP 13: POSITION AND SECURE CAP UNITS

FOLLOW THE SAME PROCEDURES DESCRIBED IN STEP 11 FOR PROPER PLACEMENT AND POSITIONING OF THE KEYSTONE CAP UNITS. A VARIETY OF SIZES AND SHAPES, INCLUDING 4" (100 mm) AND 8" (200 mm) HIGH UNITS, HAVE BEEN DESIGNED TO SATISFY MOST INSTALLATION NEEDS. AVAILABLE CAP UNITS WILL VARY FROM 20 TO 100' FOR CAP UNIT DESCRIPTIONS AND PLACEMENT VARIATIONS, SEE THE SECTION ON WALL CAP USING KEYSTONE UNITS IN THE DESIGN AND CONSTRUCTION MANUAL.

CAP UNITS MAY BE SECURED WITH A BONDING MATERIAL TO PREVENT THEIR REMOVAL. FINAL ALIGNMENT AT THE TOP OF THE WALL MAY ALSO REQUIRE THIS SAME PROCEDURE. DUE TO FINAL ALIGNMENT REPOSITIONED CAP UNITS DO NOT PROPERLY MEET PIN CONNECTIONS. WHEN REMOVE THE PINS AND SECURE THESE CAP UNITS WITH THE BONDING MATERIAL, DUE TO THE FLEXIBILITY OR NON-SOLID QUALITY OF THE KEYSTONE SYSTEM, THE BONDING MATERIAL MUST BE ABLE TO TOLERATE SOME MOVEMENT. KEYSTONE KAPSEALM ADHESIVE IS DESIGNED FOR THIS USE WITH A SPECIAL FORMULATION TO WITHSTAND TEMPERATURE FLUCTUATIONS. IF THIS MATERIAL IS UNAVAILABLE OTHER FLEXIBLE EPDM BASED ADHESIVES DESIGNED TO BOND MASONRY TO MASONRY MAY BE USED. REFER TO MANUFACTURER'S INSTRUCTIONS FOR COMPLETE DETAILS.

SPECIFICATION GUIDELINES

PART 1: GENERAL

1.01 DESCRIPTION
 A. WORK INCLUDES FURNISHING AND INSTALLING A KEYSTONE RETAINING WALL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS AND AS SHOWN ON THE CONSTRUCTION DRAWINGS.
 B. WORK INCLUDES PREPARING FOUNDATION SOIL, FURNISHING AND INSTALLING LEVELING PAD, AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS.
 C. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL RELATED MATERIALS REQUIRED FOR CONSTRUCTION OF THE RETAINING WALL AS SHOWN ON THE CONSTRUCTION DRAWINGS.

1.02 REFERENCE STANDARDS
 A. ASTM 1372 SEGMENTAL RETAINING WALL UNITS.
 B. ASTM D488 SIZES OF AGGREGATE FOR ROAD AND BRIDGE CONSTRUCTION.
 C. ASTM D698 PROCTOR COMPACTION CHARACTERISTICS USING STANDARD EFFORT.

1.03 QUALITY ASSURANCE
 A. OWNER WILL BE RESPONSIBLE FOR SOIL TESTING AND INSPECTION QUALITY CONTROL DURING EARTHWORK OPERATIONS.

PART 2: MATERIALS

2.01 DEFINITIONS
 A. CONCRETE UNITS - A KEYSTONE MODULAR CONCRETE FINISH UNIT, MACHINE MADE FROM PORTLAND CEMENT, WATER AND MINERAL AGGREGATES.
 B. STRUCTURAL GEOGRID - A STRUCTURAL GEOTEXTILE FORMED BY A REGULAR NETWORK OF INTEGRALLY CONNECTED TENSILE ELEMENTS WITH APERTURES OF SUFFICIENT SIZE TO ALLOW INTERLOCKING WITH SURROUNDING SOIL, ROCK, OR EARTH AND FUNCTION PRIMARILY AS REINFORCEMENT.
 C. UNIT FILL - DRAINAGE AGGREGATE WHICH IS PLACED WITHIN AND IMMEDIATELY BEHIND THE MODULAR CONCRETE UNITS.
 D. REINFORCED BACKFILL - COMPACTED SOIL WHICH IS PLACED WITHIN THE REINFORCED SOIL VOLUME AS SHOWN ON THE PLANS.

2.02 KEYSTONE UNITS
 A. KEYSTONE WALL UNITS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI (20 MPa). LIGHT WEIGHT CONCRETE SHALL HAVE A MAXIMUM MOISTURE ABSORPTION OF 8%.

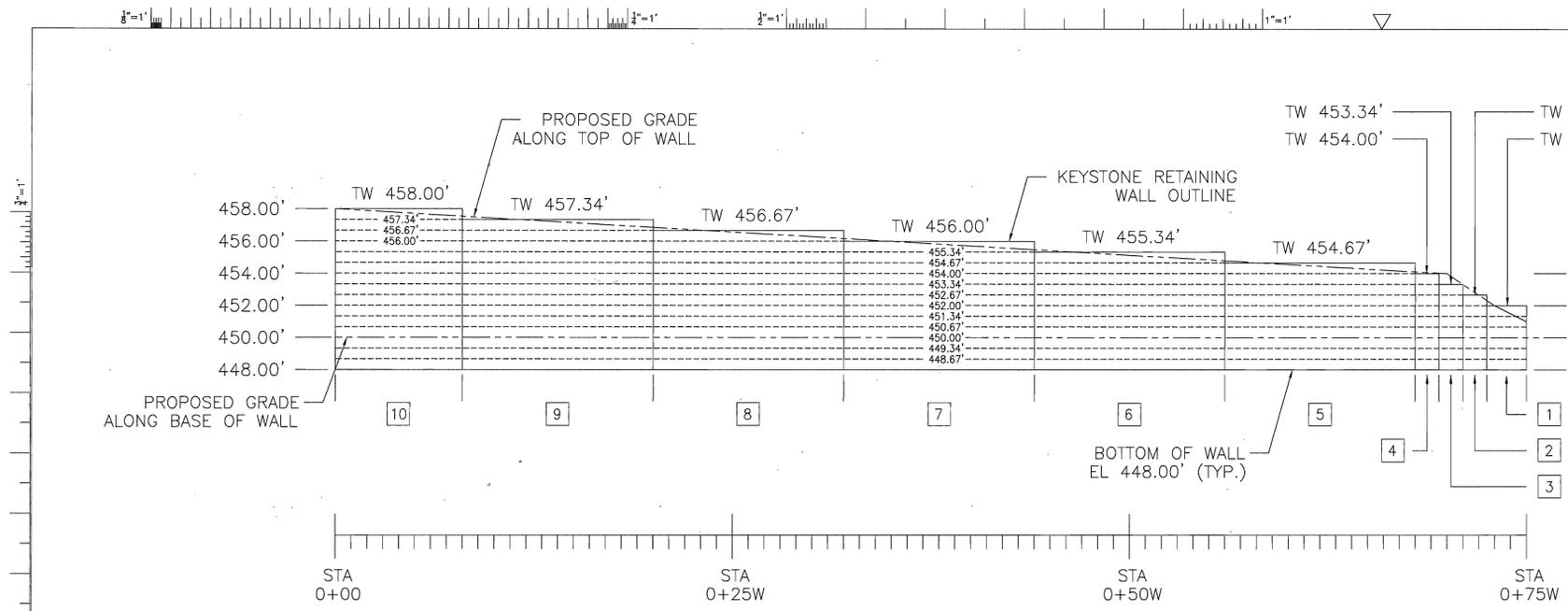
2.03 FIBERGLASS CONNECTING PINS
 A. CONNECTING PINS SHALL BE 1/2" DIAMETER THERMOSET ISOPHthalic POLYESTER RESIN-FILTRATED FIBERGLASS PINS SUPPLIED BY THE MANUFACTURER.

2.04 KEYSTONE KAPSEALTM CONSTRUCTION ADHESIVE
 A. MATERIAL SHALL CONFORM TO ASTM 2339 AND SHALL BE SUPPLIED BY THE MANUFACTURER.

2.05 GEOGRID
 A. GEOGRID SHALL BE THE TYPE AS SHOWN ON THE DRAWINGS HAVING THE PROPERTY REQUIREMENTS DESCRIBED WITHIN THE MANUFACTURER'S SPECIFICATIONS AND REQUIRED BY THE DESIGN.

2.06 BASE LEVELING AND PAD MATERIAL
 A. MATERIAL SHALL CONSIST OF COMPACTED CRUSHED STONE OR UNREINFORCED CONCRETE AS SHOWN ON THE CONSTRUCTION DRAWING.

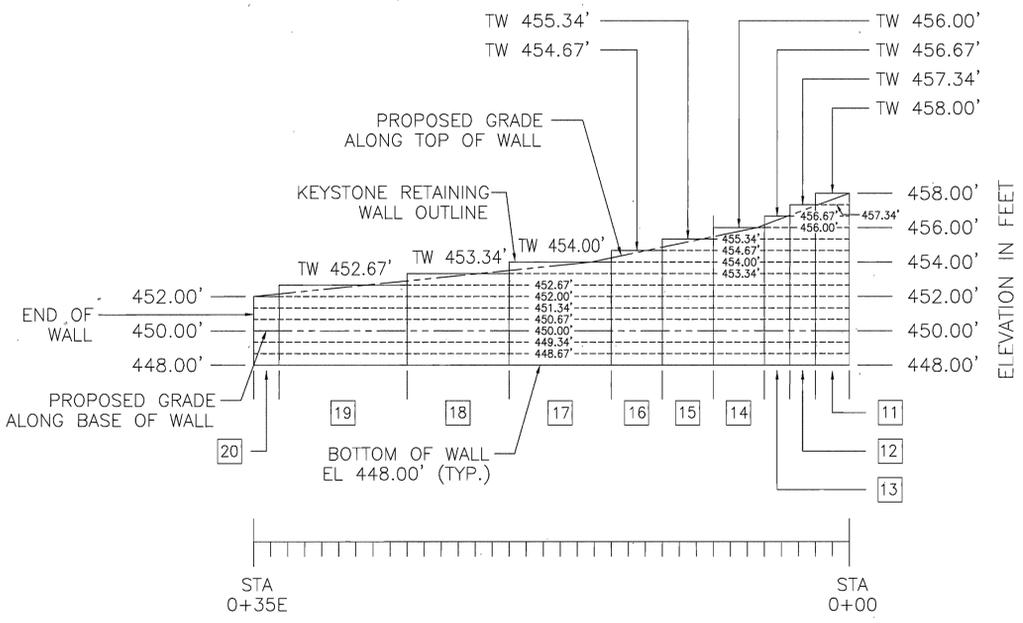
2.07 UNIT DRAINAGE FILL
 A. UNIT FILL SHALL CONSIST OF CLEAN 1" MINUS CRUSHED STONE OR CRUSHED GRAVEL MEETING THE FOLLOWING GRADATION:
 SIEVE SIZE: 100, 20, 10, NO. 4, NO. 10, NO. 20, NO. 40, NO. 60, NO. 100, NO. 200, NO. 425, NO. 600, NO. 840, NO. 1060, NO. 1490, NO. 2000, NO. 2800, NO. 3540, NO. 4750, NO. 6000, NO. 7500, NO. 9500, NO. 11900, NO. 15000, NO. 19000, NO. 24000, NO. 30000, NO. 37500, NO. 47500, NO. 60000, NO. 75000, NO. 95000, NO. 120000, NO. 150000, NO. 190000, NO. 240000, NO. 300000, NO. 375000, NO. 475000, NO. 600000, NO. 750000, NO. 950000, NO. 1200000, NO. 1500000, NO. 1900000, NO. 2400000, NO. 3000000, NO. 3750000, NO. 4750000, NO. 6000000, NO. 7500000, NO. 9500000, NO. 12000000, NO. 15000000, NO. 19000000, NO. 24000000, NO. 30000000, NO. 37500000, NO. 47500000, NO. 60000000, NO. 75000000, NO. 95000000, NO. 120000000, NO. 150000000, NO. 190000000, NO. 240000000, NO. 300000000, NO. 375000000, NO. 475000000, NO. 600000000, NO. 750000000, NO. 950000000, NO. 1200000000, NO. 1500000000, NO. 1900000000, NO. 2400000000, NO. 3000000000, NO. 3750000000, NO. 4750000000, NO. 6000000000, NO. 7500000000, NO. 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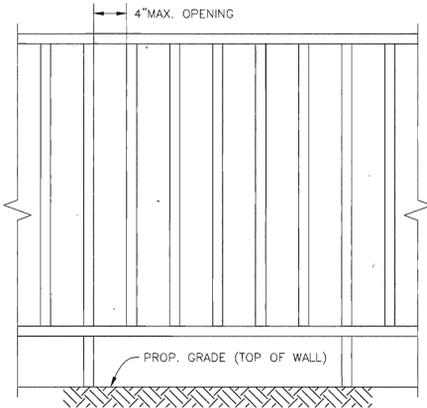
KEYSTONE WALL #1 PROFILE
LOOKING SW

WALL SECTION DESIGNATION	LENGTH OF WALL SECTION	HEIGHT OF WALL	TOP OF WALL ELEVATION	GEOGRID TIE LENGTH	GEOTEXTILE TIE BACK LOCATION					SOIL BEARING CAPACITY (PFS)
					1	2	3	4	5	
1	2'-6"	4'-0"	452.00'	6'-0"	0.67'	2.67'	-	-	-	1,500
2	1'-6"	4'-8"	452.67'	6'-0"	1.33'	3.33'	-	-	-	1,500
3	1'-6"	5'-4"	453.34'	6'-0"	2.00'	4.00'	-	-	-	1,500
4	1'-6"	6'-0"	454.00'	6'-0"	0.67'	2.67'	4.67'	-	-	2,000
5	12'-0"	6'-8"	454.67'	6'-0"	1.33'	3.33'	5.33'	-	-	2,000
6	12'-0"	7'-4"	455.34'	6'-0"	0.67'	2.00'	4.00'	6.00'	-	2,000
7	12'-0"	8'-0"	456.00'	8'-0"	0.67'	2.67'	4.67'	6.67'	-	2,000
8	12'-0"	8'-8"	456.67'	8'-0"	1.33'	3.33'	5.33'	7.33'	-	2,500
9	12'-0"	9'-4"	457.34'	8'-0"	0.67'	2.00'	4.00'	6.00'	8.00'	2,500
10	8'-0"	10'-0"	458.00'	8'-0"	0.67'	2.67'	4.67'	6.67'	8.67'	2,500
11	2'-0"	10'-0"	458.00'	8'-0"	0.67'	2.67'	4.67'	6.67'	8.67'	2,500
12	1'-6"	9'-4"	457.34'	8'-0"	0.67'	2.00'	4.00'	6.00'	8.00'	2,500
13	1'-6"	8'-8"	456.67'	8'-0"	1.33'	3.33'	5.33'	7.33'	-	2,500
14	3'-0"	8'-8"	456.00'	8'-0"	0.67'	2.67'	4.67'	6.67'	-	2,000
15	3'-0"	7'-4"	455.34'	6'-0"	0.67'	2.00'	4.00'	6.00'	-	2,000
16	3'-0"	6'-8"	454.67'	6'-0"	1.33'	3.33'	5.33'	-	-	2,000
17	6'-0"	6'-0"	454.00'	6'-0"	0.67'	2.67'	4.67'	-	-	2,000
18	6'-0"	5'-4"	453.34'	6'-0"	2.00'	4.00'	-	-	-	1,500
19	7'-6"	4'-8"	452.67'	6'-0"	1.33'	3.33'	-	-	-	1,500
20	1'-6"	4'-0"	452.00'	6'-0"	0.67'	2.67'	-	-	-	1,500

1. PROVIDE GEOGRID TIEBACK PER SECTION "A-A" (SHEET 7)
2. ADJUST WALL HEIGHT BASED UPON FIELD CONDITIONS.
3. CONTRACTOR TO ENSURE THAT TOP GEOGRID TIEBACK HAS A MINIMUM AVERAGE COVER OF 2' ALONG THE LENGTH OF THE TIEBACK.
4. TIE BACK LOCATIONS RELATIVE TO THE BOTTOM OF THE WALL.
5. THE SAFETY FENCE SHALL BE INSTALLED BEHIND THE RETAINING WALL 1 FROM SECTION 2 TO 10 (STA. 0 THROUGH STA 0+72.5W) AND BEHIND WALL 2 FROM SECTION 11 TO 19 (STA. 0 THROUGH STA 0+33.5E).



KEYSTONE WALL #2 PROFILE
LOOKING SE



SECTION 1021.0 GUARDS

1021.1 General: Where required by the provisions of Sections 406.5, 408.3.2, 1005.5, 1014.7, 1018.5 and 1825.5, guards shall be designed and constructed in accordance with the requirements of this section and Section 1815.8. A guardrail system is a system of building components located near the open sides of elevated walking surfaces for the purpose of minimizing the possibility of an accidental fall from the walking surface to the lower level.

1021.2 Height: The guards shall be at least 42 inches (1067 mm) in height measured vertically above the leading edge of the tread or adjacent walking surface.

Exceptions

1. In other than occupancies in Use Group E, guards shall not be less than 34 inches (864 mm) in height above the leading edge of the tread along stairs which are not more than 20 feet (6096 mm) in height or which reverse direction at an intermediate landing with 12 inches (305 mm) or less measured horizontally between successive flights.

2. Guards along open-sided floor areas, mezzanines and landings in occupancies in Use Group R-3 shall not be less than 36 inches (914 mm) in height.

1021.3 Opening limitations: In occupancies in Use Groups A, B, E, H-4, I, L-2, M and R, and in public garages and open material such that a sphere with a diameter of 4 inches (102 mm) cannot pass through any opening. Guards shall not have an ornamental pattern that would provide a looser effect.

TYPICAL SAFETY FENCE
NOT TO SCALE

THE PURPOSE OF THIS SHEET IS TO DETAIL THE ADDED RETAINING WALL TO THE PREVIOUSLY APPROVED SDP-04-057

OWNER: BALTIC GAS AND ELECTRIC
2900 LORD BALTIC DRIVE
BALTIC MARYLAND, 21244

LEGEND:
ELEVATION TOP OF KEYSTONE STANDARD UNIT

REFERENCE DRAWINGS:
SHEET 7 RETAINING WALL PLAN, DETAILS & SPECIFICATIONS



BENCHMARK
ENGINEERS & LAND SURVEYORS & PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-485-8105 FAX: 410-485-8644
www.bei-civilengineering.com

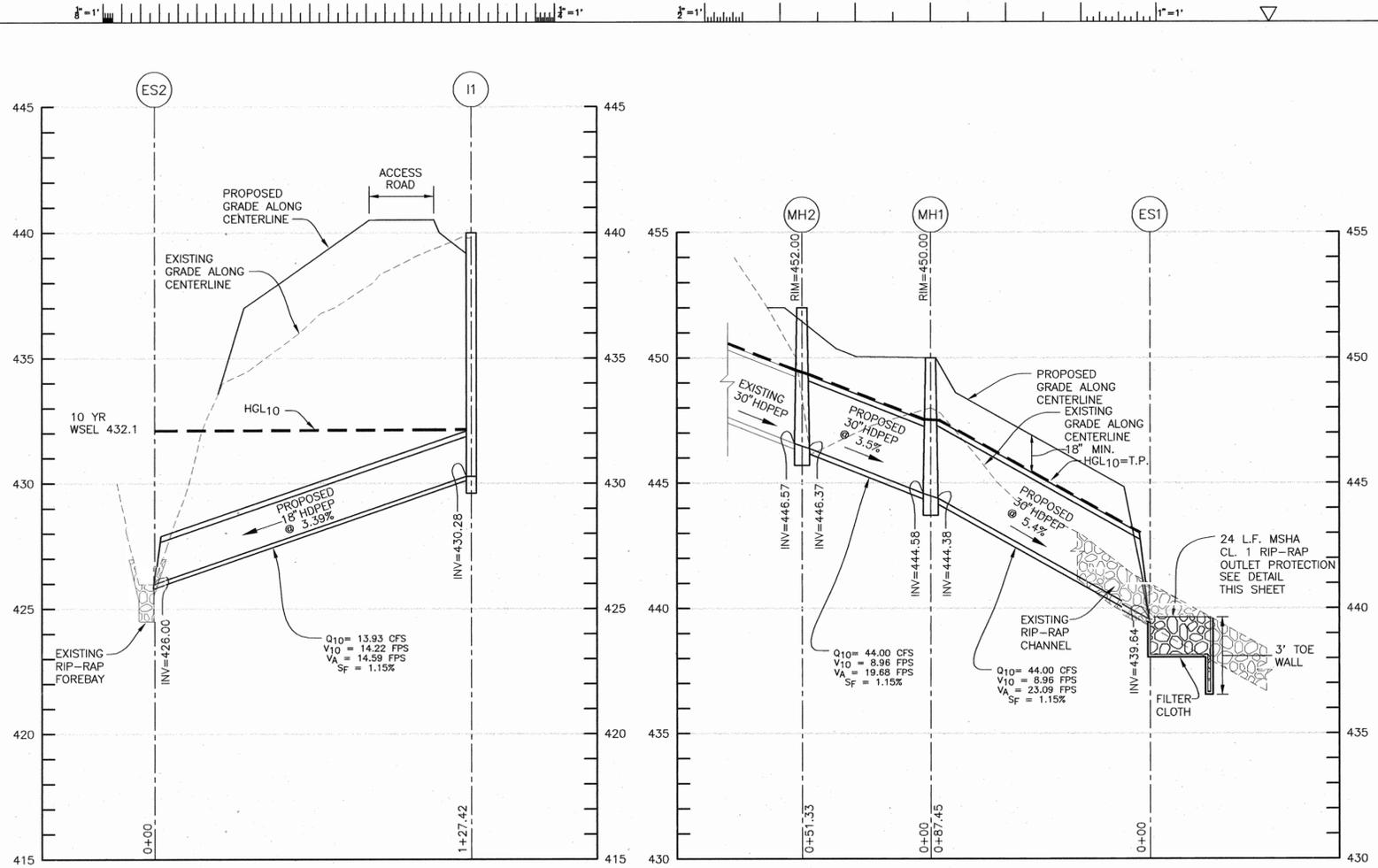
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Michael J. ...
CHIEF DEVELOPMENT ENGINEERING DIVISION 4/21/04 DATE

Cindy ...
CHIEF DIVISION OF LAND DEVELOPMENT 8/25/04 DATE

Frank ...
DIRECTOR 9/2/04 DATE

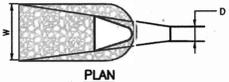
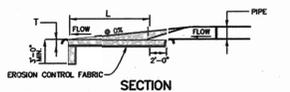
REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED

AUTOCAD ENGINEERING CIVIL _____ BFC ELEC. _____ PROJ. ENG. _____ DAM PRIN. ENG. _____ SUPV. ENG. _____	DESIGN GROUP DESIGNED _____ DRAWN _____ BFC CHECKED _____ DAM APPROVED _____ DATE 28MAY2004	REVISED SITE DEVELOPMENT PLAN KEYSTONE RETAINING WALL PLAN, PROFILES AND SAFETY FENCE Tax Map 34, Parcel 970, Grid 6 5th ELECTION DISTRICT HOWARD COUNTY, MARYLAND 34.5-13.8KV ELECTRICAL SUBSTATION CLARKSVILLE SUBSTATION SUBSTATION & SYSTEM PROTECTION SCALE AS SHOWN DWG NO. 8 OF 8 SUPPLEMENTAL SHEET SDP-04-057
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STORM DRAIN PROFILE
SCALE: HORIZ.: 1" = 30', VERT.: 1" = 3'

STORM DRAIN PROFILE
SCALE: HORIZ.: 1" = 30', VERT.: 1" = 3'



STRUCTURE	d-50	LENGTH (L)	WIDTH (W)	THICKNESS (T)
ES-1	9.5'	24.0'	12.0'	19"

OUTLET PROTECTION DETAIL
NOT TO SCALE

- The subgrade for the filter, rip-rap, or gabion shall be prepared to the required line and grade. Any fill required in the subgrade shall be compacted to a density of approximately 90% of the maximum undisturbed material.
- The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.
- Geotextile shall be protected from puncturing, cutting, or tearing. Any damage shall be repaired by the contractor by placing another piece of geotextile over the damaged part or by completely replacing the geotextile. All overlap shall be secured and placed in a manner that will ensure that it is reasonably homogeneous with the smaller stones and spalls filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter fabric or geotextile. Head protection shall be required to the extent necessary to prevent damage to the permanent work.
- Stones for the rip-rap or gabion outlets may be placed by equipment. They shall be considered to be a full stone thickness in one operation and in such a manner as to avoid dislodging or underlying materials. The stone for rip-rap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogeneous with the smaller stones and spalls filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter fabric or geotextile. Head protection shall be required to the extent necessary to prevent damage to the permanent work.
- The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced over the channel and occur adjacent to the stone wall.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 2/27/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION

[Signature] 7/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT

[Signature] 3/2/04
DIRECTOR (ACTING)

CATEGORY	ADJACENT TO PERIMETER PROPERTIES					
	(1) D	(2) D	(3) D	(4) D	(5) D	(6) D
LANDSCAPE BUFFER TYPE						
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	340'	163'	28'	248'	139'	91'
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	**YES 340'	**YES 163'	**YES 28'	**YES 125'	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED						
SHADE TREES (1:60)	6	3	1	4	2	2
EVERGREEN TREES (1:10)	34	16	3	25	14	9
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-
NUMBER OF PLANTS PROVIDED						
SHADE TREES	-	-	-	2	2	2
EVERGREEN TREES	-	-	-	12	14	9
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-

SYMBOL	QUANTITY	NAME	REMARKS
	3	ACER RUBUM RED MAPLE ARMSTRONG	2.5'-3' CALIPER
	3	ACER RUBUM MAPLE 'RED SUNSET'	2.5'-3' CALIPER
	35	XYPHOSOCYPARIS L-FLYANDLI -LYLAND CYPRESS	5'-6' HT.

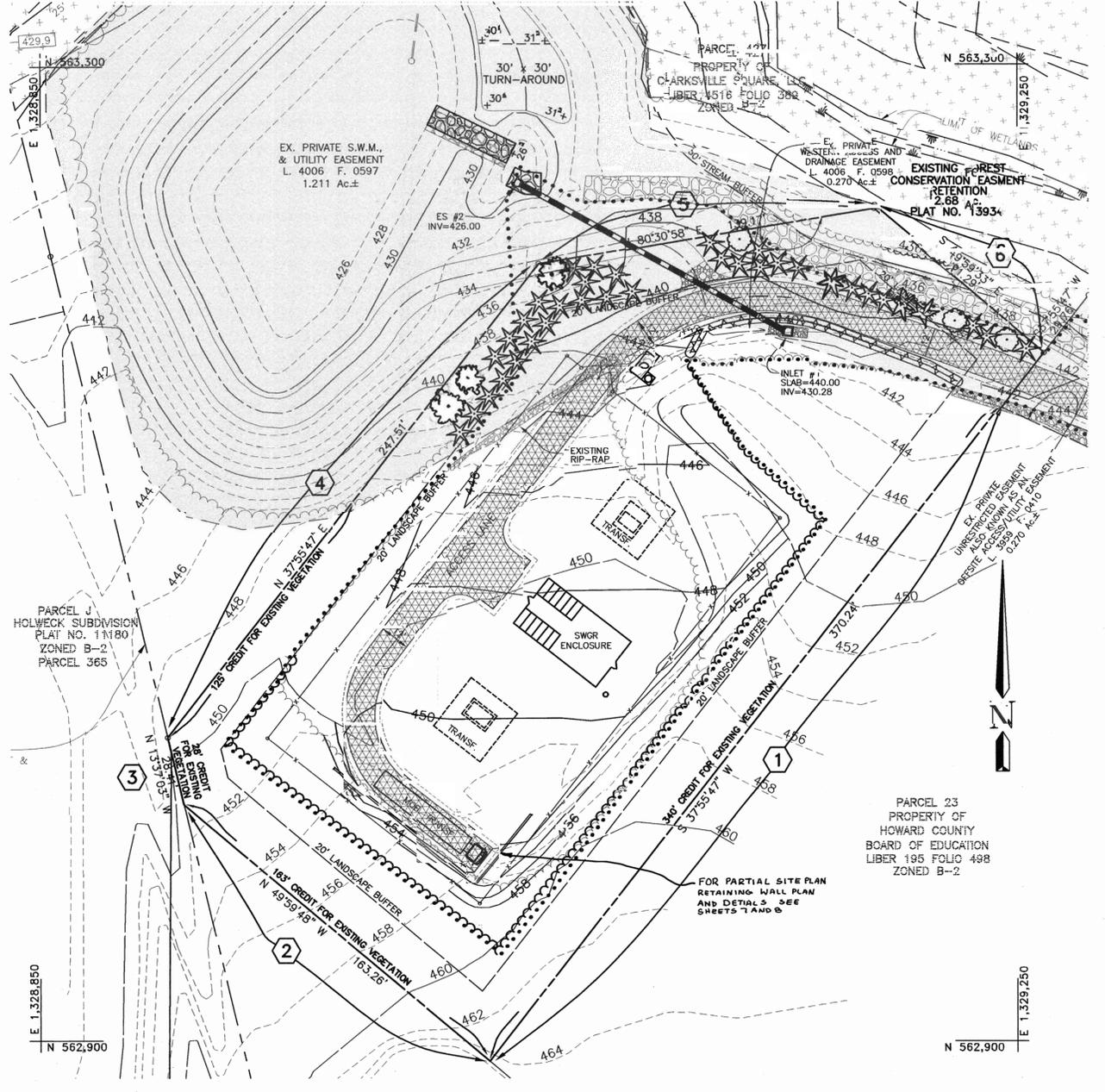
LANDSCAPING NOTES

- PERIMETER LANDSCAPING SHALL BE PROVIDED BY THE EXISTING VEGETATION TO REMAIN AND BY THE PLANTINGS AS SHOWN ON THESE PLANS.
- THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PRESERVATION OF THE PERIMETER VEGETATION AND FOR THE PERIMETER PLANTINGS AS SHOWN ON THESE PLANS. BONDING FOR PLANTINGS IS THE OBLIGATION OF THE DEVELOPER AS PART OF THE DEVELOPERS AGREEMENT.
- TREES MUST BE A MINIMUM OF FIVE (5) FEET FROM ANY STORM DRAIN.
- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SEC.-16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL BE POSTED AS PART OF THE GRADING PERMIT IN THE AMOUNT OF \$7,050.00.

BENCHMARK
ENGINEERS LAND SURVEYORS PLANNERS

ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE SUITE 418
ELICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6844
E-MAIL: benchmark@comcast.com



PLAN VIEW
SCALE: 1" = 30'

- LEGEND:**
- 12' ACCESS LANE
 - PROPOSED FENCE
 - PROPOSED TREELINE
 - EXISTING TREELINE
 - PROPOSED CONTOUR
 - EXISTING CONTOUR
 - EXISTING RIPRAP

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED
1	5-26-04		ADD RETAINING WALL AND REV. SHT #	
2	3-4-05		REVISE VEGETATION LIST AND BENCHMARK'S VEGETATION CATEGORIES TREES ADJACENT TO ACCESS DRIVE	

DESIGNED	CHECKED	APPROVED	DATE
DESIGNED	RPS		
DRAWN	DAM		
APPROVED			
DATE	2/04/04		

GROUP	STATUS
CIVIL	DAM
ELEC.	
PROJ. ENG.	
PROJ. MGR.	
PRIN. ENG.	
SUPV. ENG.	

GROUP	STATUS
DESIGNED	RPS
DRAWN	DAM
APPROVED	
DATE	2/04/04

LANDSCAPING PLAN AND STORM DRAIN PROFILE	
Tax Map 34, Parcel 970, Grid 6 5th ELECTION DISTRICT HOWARD COUNTY, MARYLAND 34.5-13.8kv ELECTRICAL SUBSTATION	
CLARKSVILLE SUBSTATION	
SUBSTATION & SYSTEM PROTECTION	
SCALE	AS SHOWN
DWG. NO.	5 OF 8
REV	