

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

MAP SYMBOL	SOIL GROUP	SOIL TYPE
B0	D	BAILE SILT LOAM
CyC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
EKA	B	ELIOAK SILT LOAM, 0 TO 3 % SLOPES
ENB2	B	ELIOAK SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GnB2	C	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
Myc2	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		

BY THE DEVELOPER:
 I, Robert C. Clark, DATE: 2/13/04
 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.

BY THE ENGINEER:
 I, Donald Mason, DATE: 2/5/04
 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.

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

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

APPROVED HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Chris Hamilton, DATE: 2/27/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

David G. Leffler, DATE: 7/1/04
 CHIEF, DIVISION OF LAND DEVELOPMENT

David G. Leffler, DATE: 3/2/04
 DIRECTOR (PLANNING)

INLET #	AGT, INC. POLYDRAIN TYPE SIZE AF WITH POLYWALL	N 563060.44	E 1329521.18	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
2				461.03	462.00		SEE MANUFACTURER'S DETAILS

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
4"	68'	PVC SCHEDULE 40

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

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

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
4-8-04			ADD TRENCH DRAIN AND 4" PVC		ENGINEERING
5-26-04			ADD RETAINING WALL & REV. SHT #8		DAM

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

GRADING, EROSION AND SEDIMENT CONTROL PLAN

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

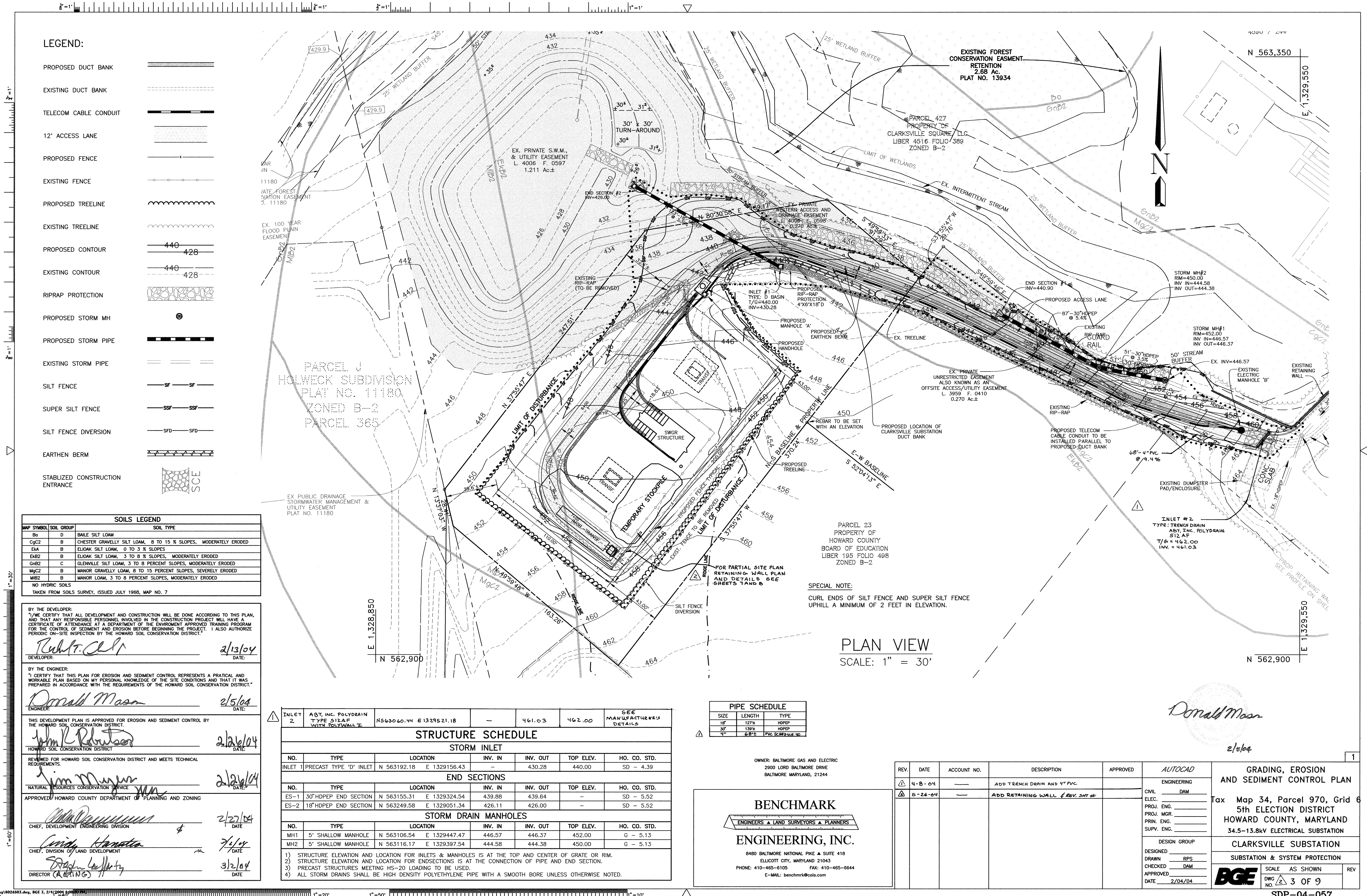
CLARKSVILLE SUBSTATION
 SUBSTATION & SYSTEM PROTECTION

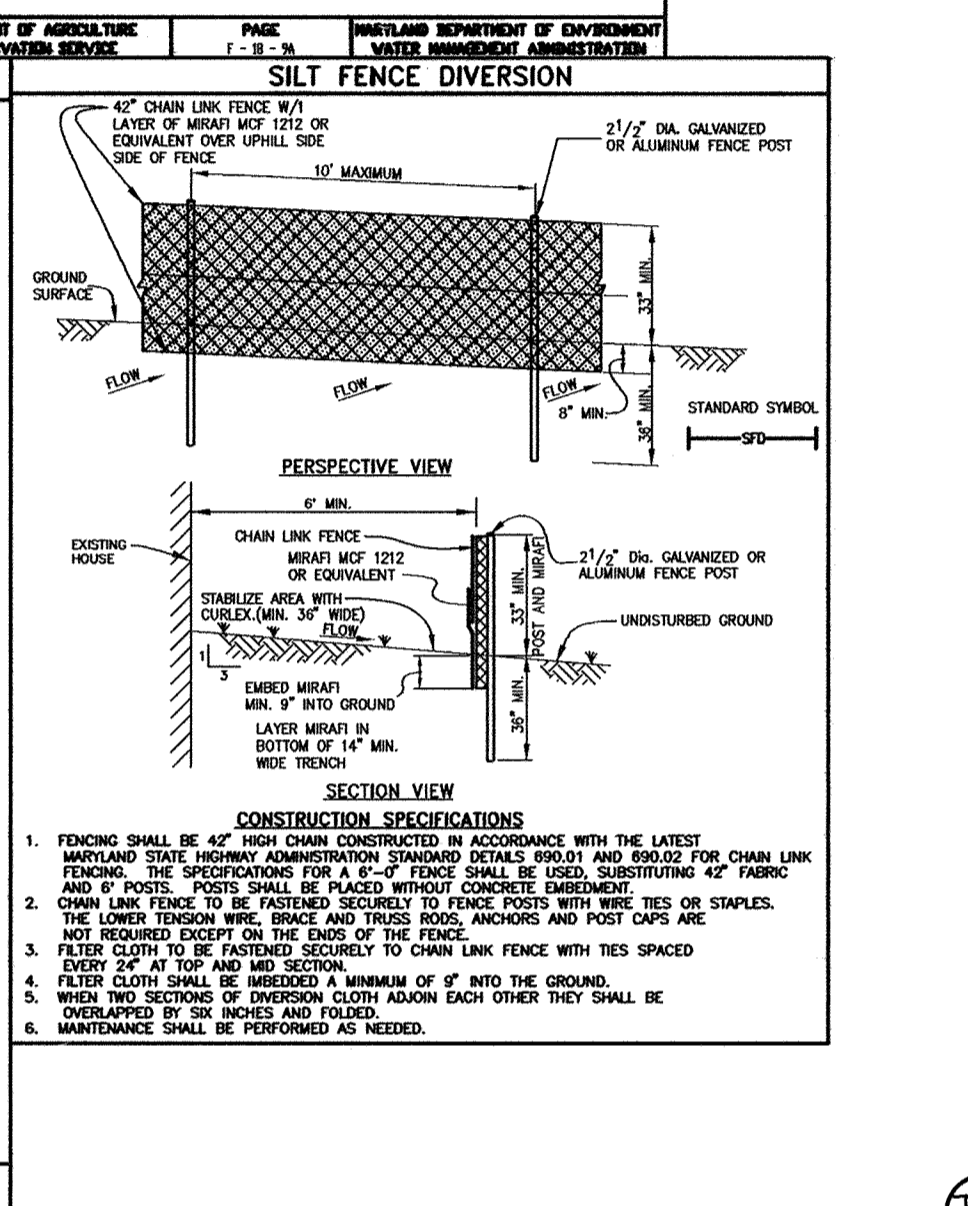
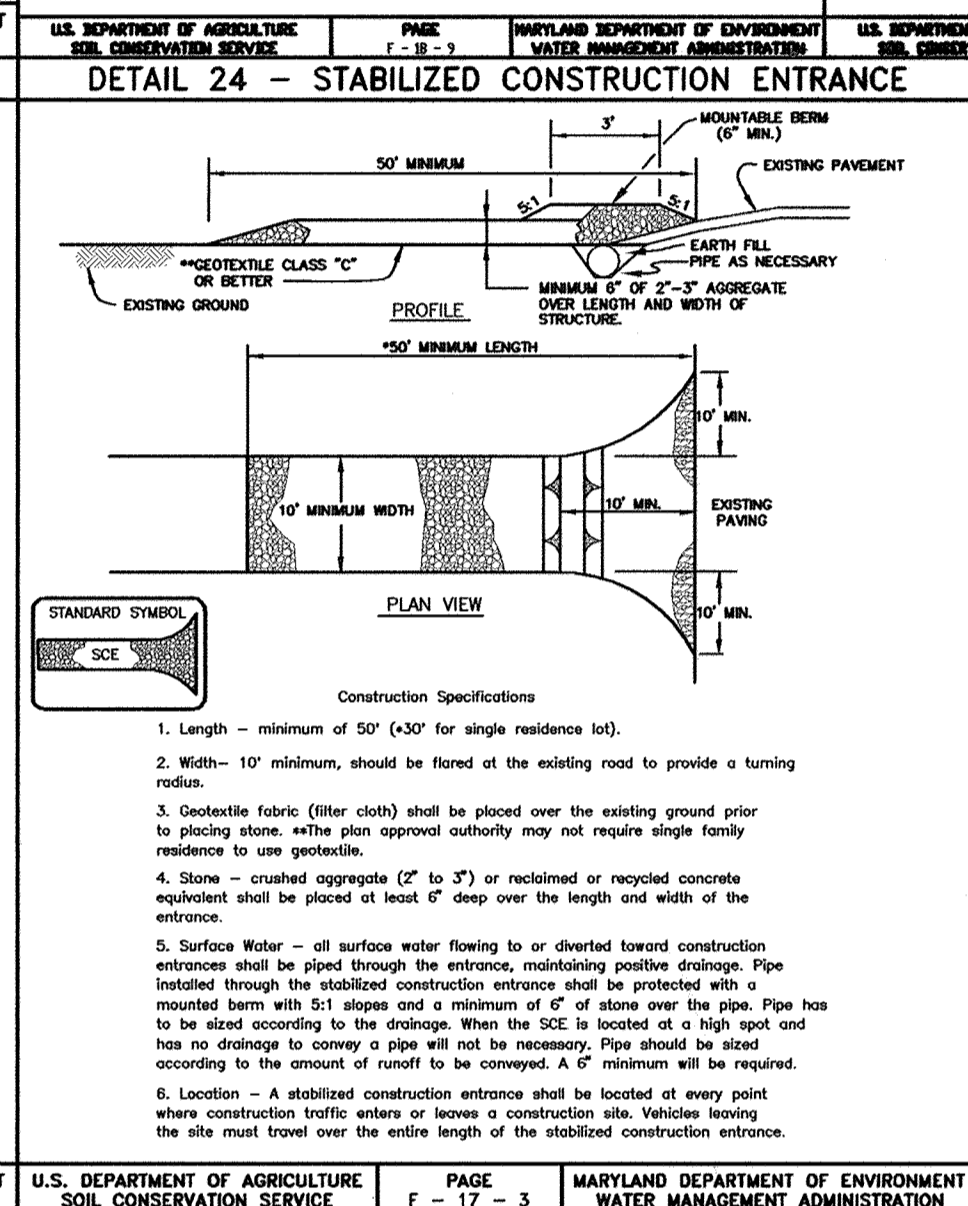
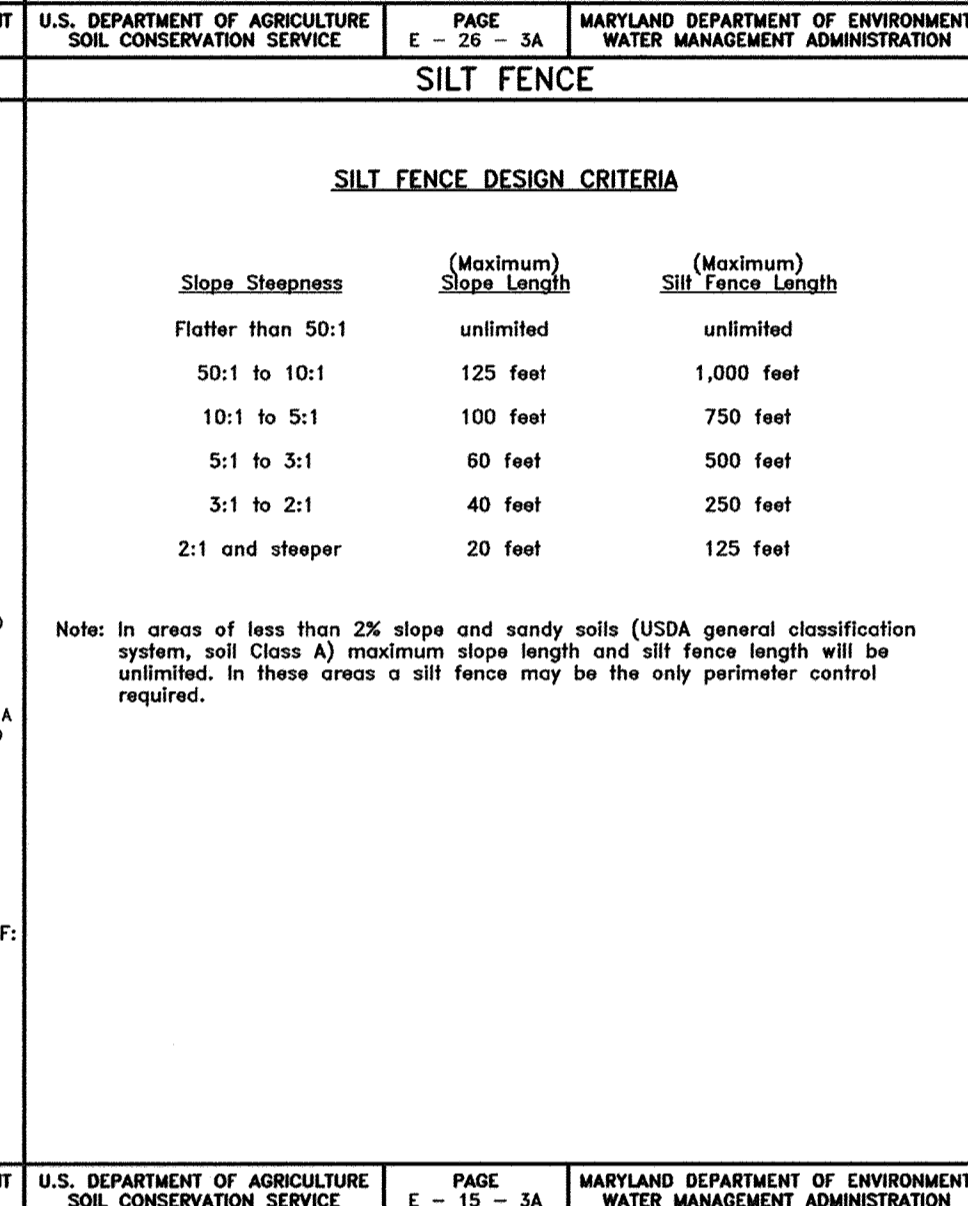
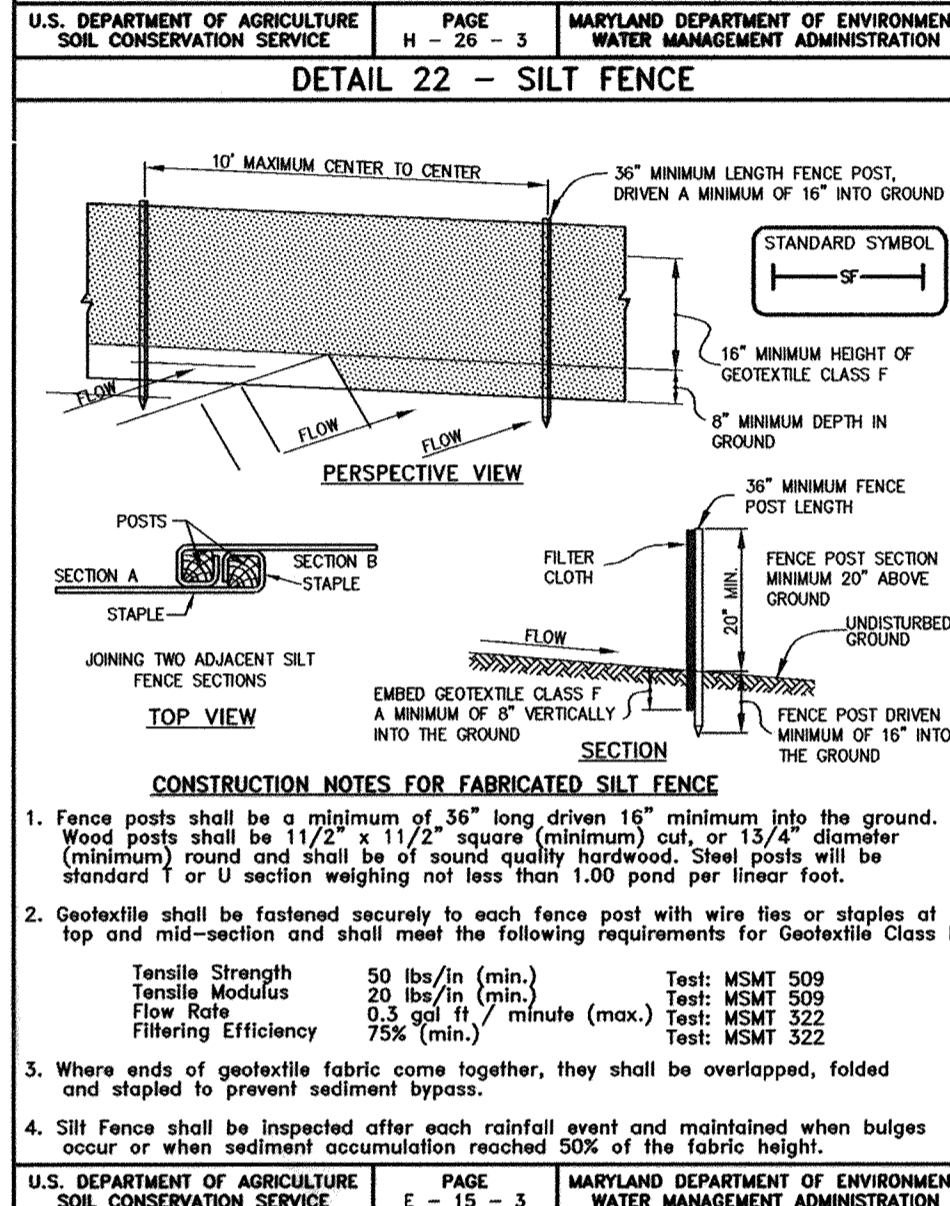
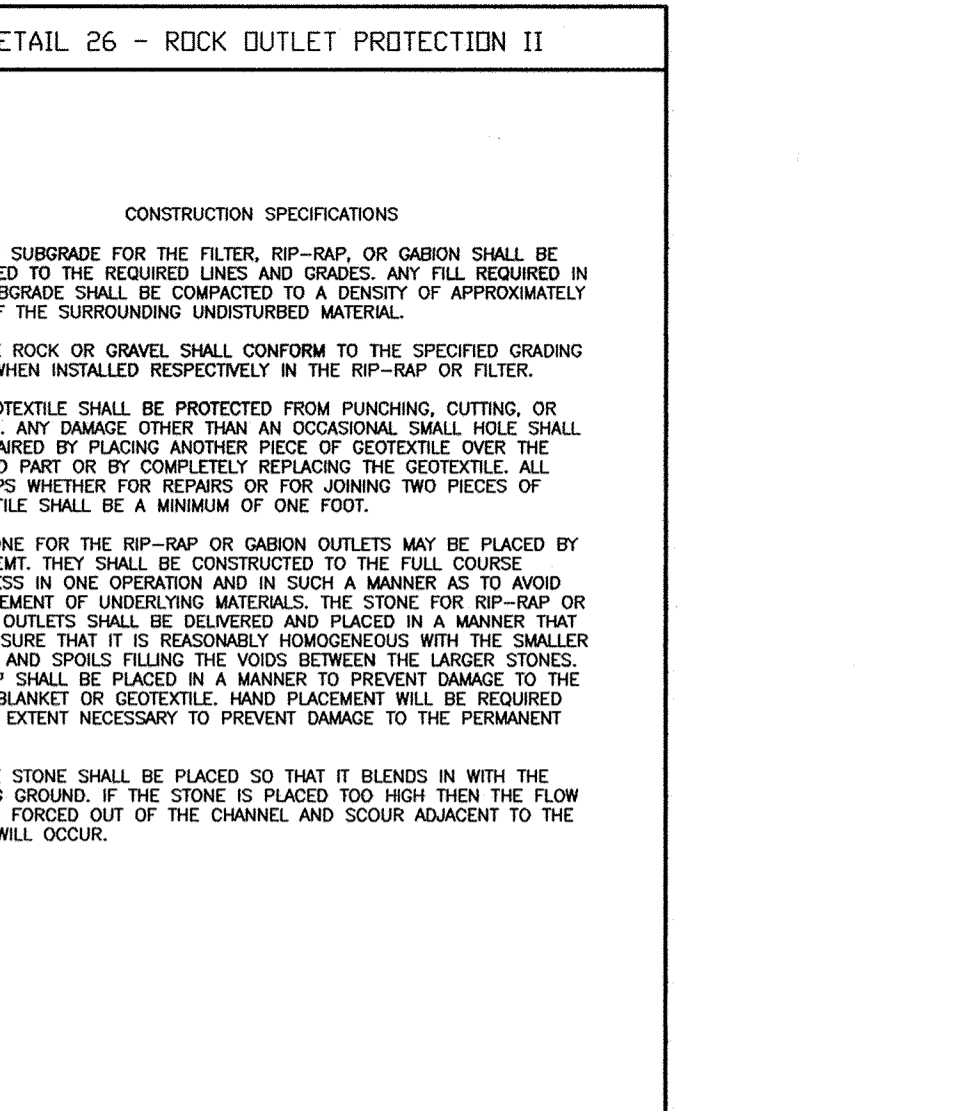
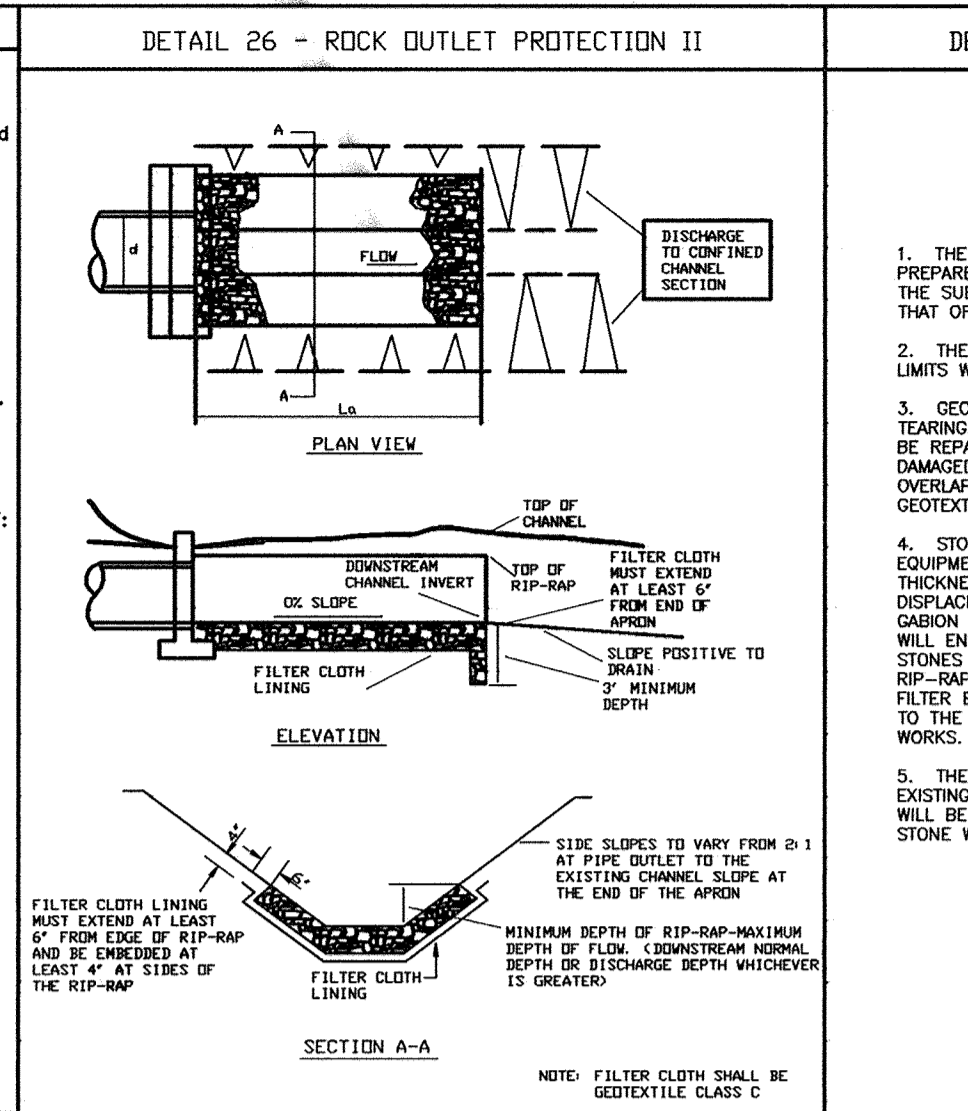
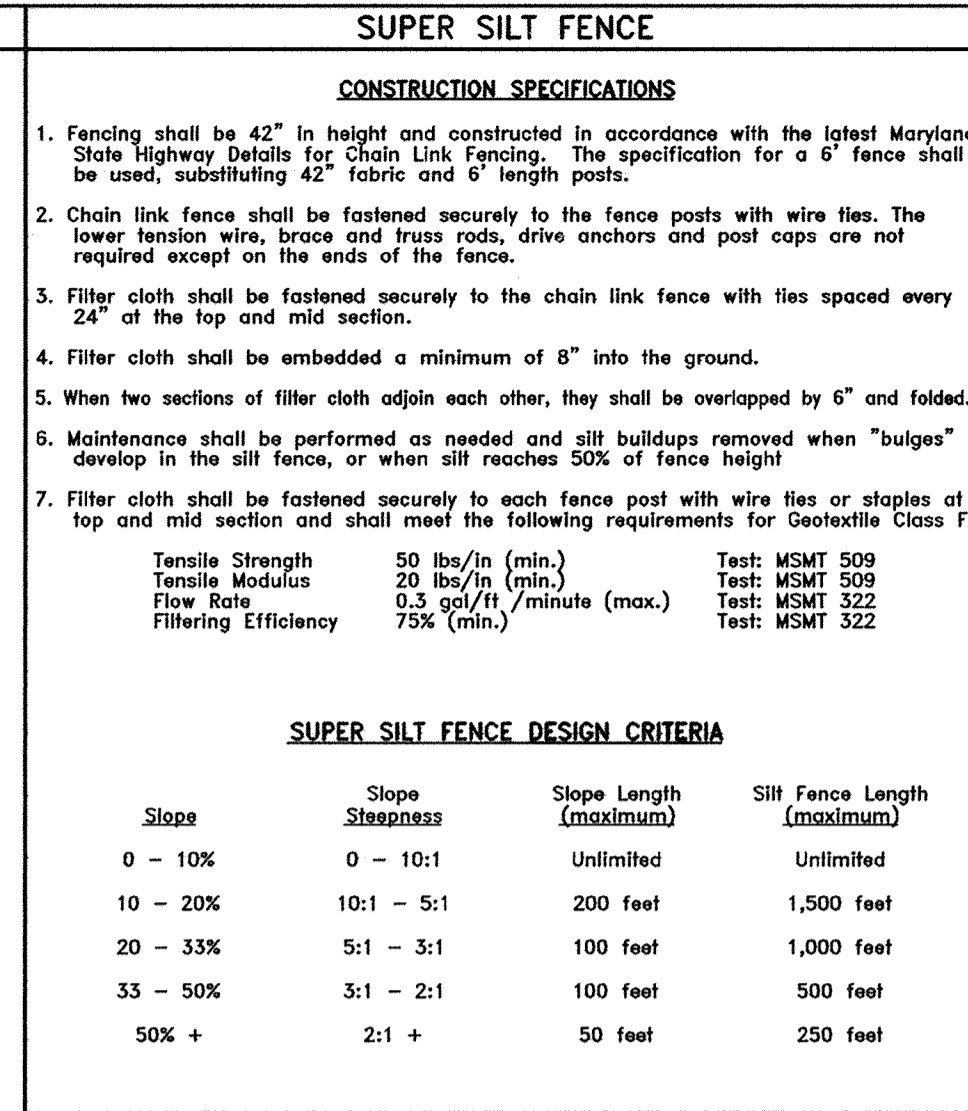
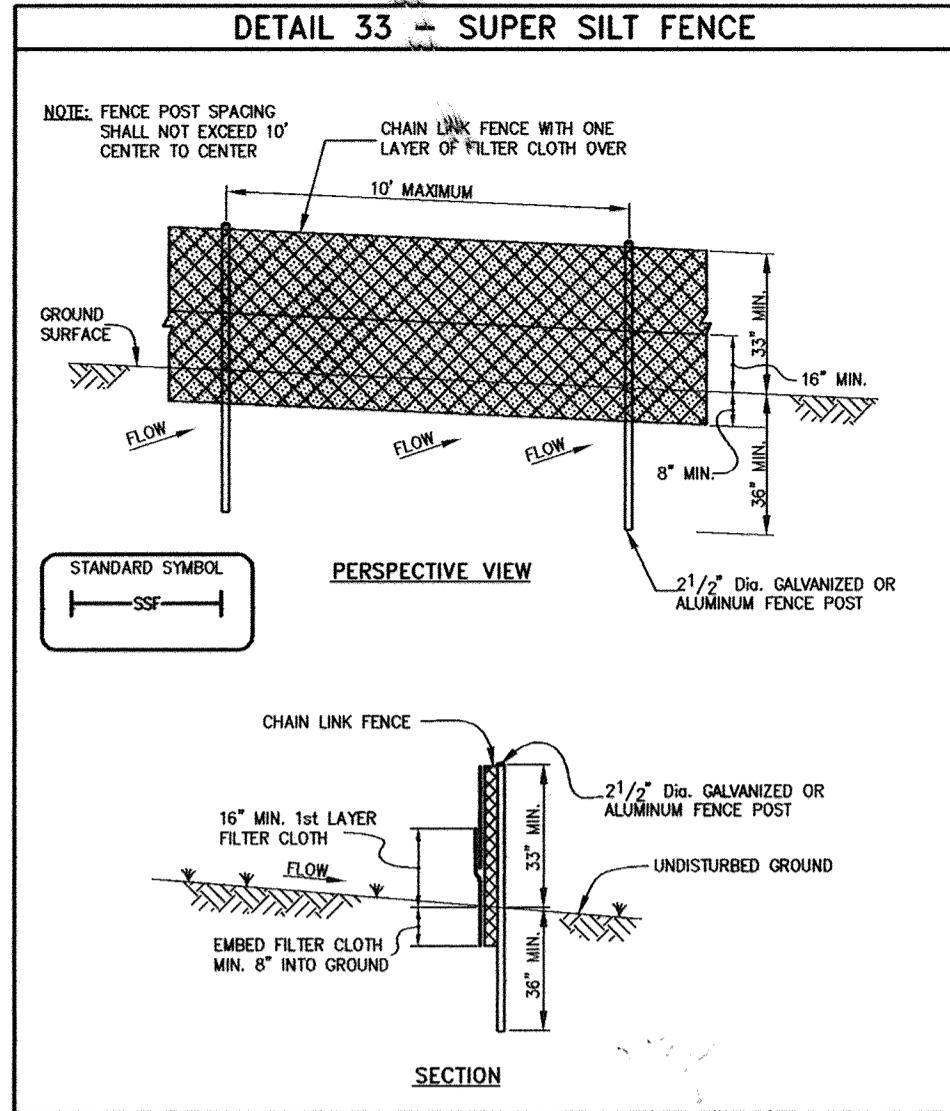
SCALE AS SHOWN
 DWG NO. **3 OF 9**

REV

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

PLAN VIEW
 SCALE: 1" = 30'





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 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. 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

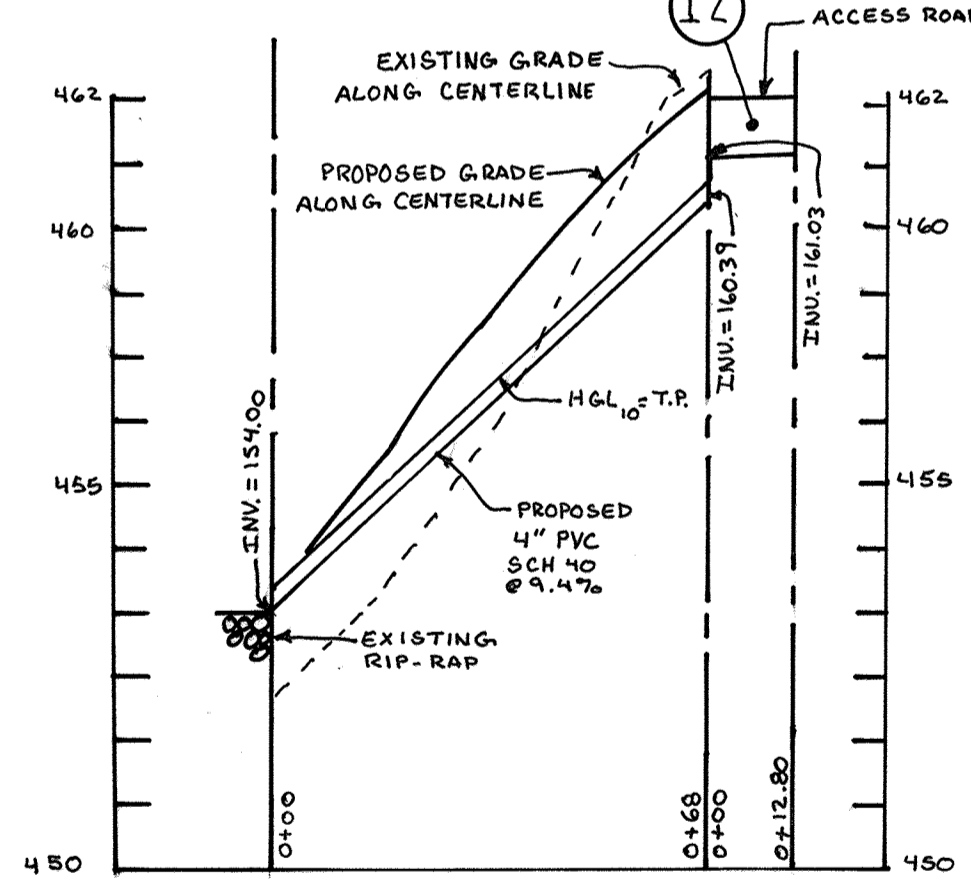
- A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION, (313-1850).
- ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT "MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS 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 REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF CONSTRUCTION

- | | |
|-------------|---|
| 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" HOPEP 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. |



TRENCH DRAIN NOTES

- TRENCH DRAIN TO BE 48" INCH 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.

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: *Nicholas 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 Mason* 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 P. Reinhart* DATE: 2/26/04

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.
NATURAL RESOURCES CONSERVATION SERVICE: *Jim M. Meyer* DATE: 2/22/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION: *John P. Reinhart* DATE: 2/27/04

CHIEF, DIVISION OF LAND DEVELOPMENT: *Cindy Hammett* DATE: 3/2/04

DIRECTOR (REGULATORY): *Debra Calhoun* DATE: 3/2/04

Donald Mason
2/5/04

BENCHMARK
ENGINEERS & LAND SURVEYORS & PLANNERS
ENGINEERING, INC.

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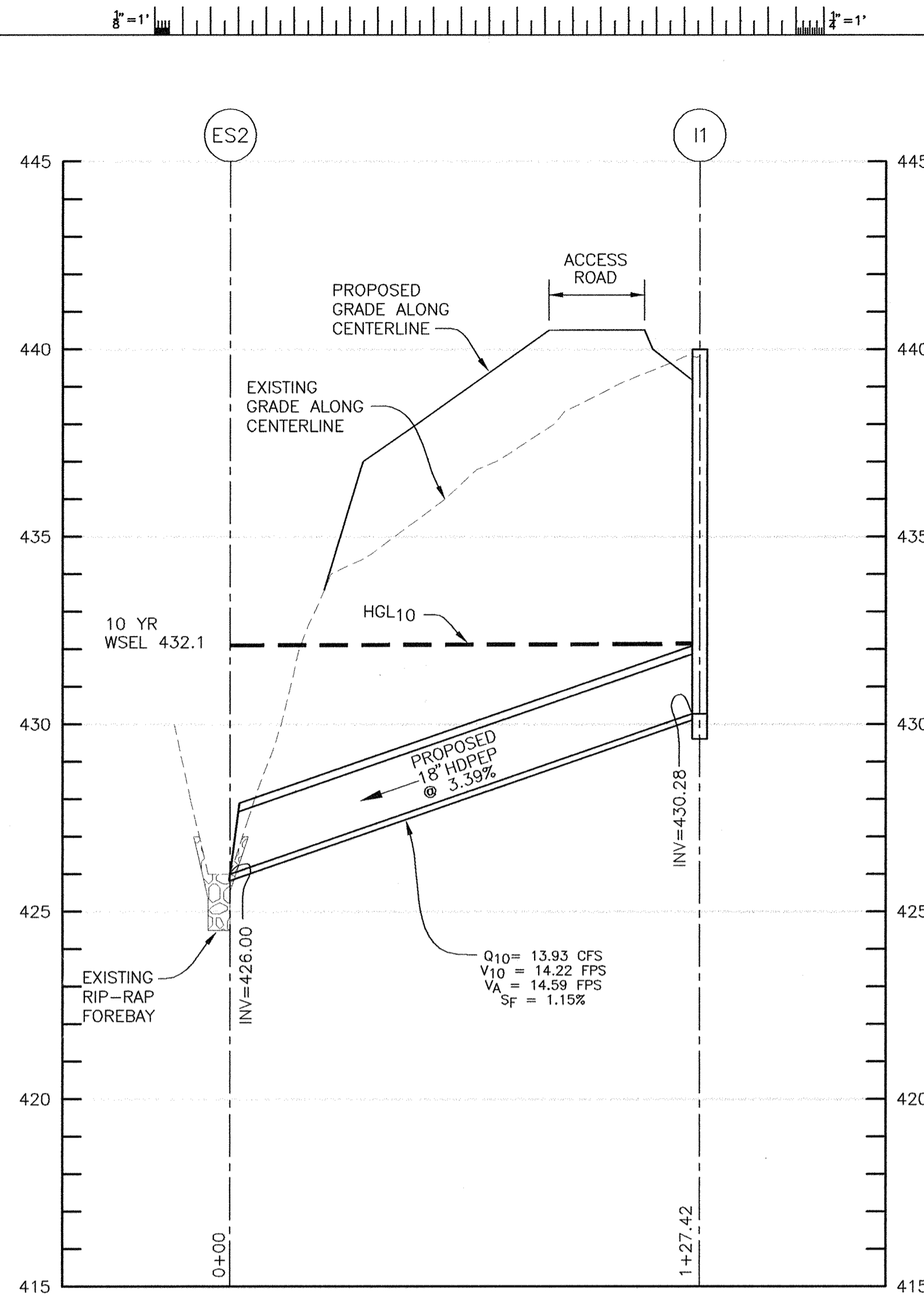
REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED
Δ	4-8-04		ADD TRENCH DRAIN PROFILE AND NOTES	
Δ	5-26-04		REVISED SHT #2	

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

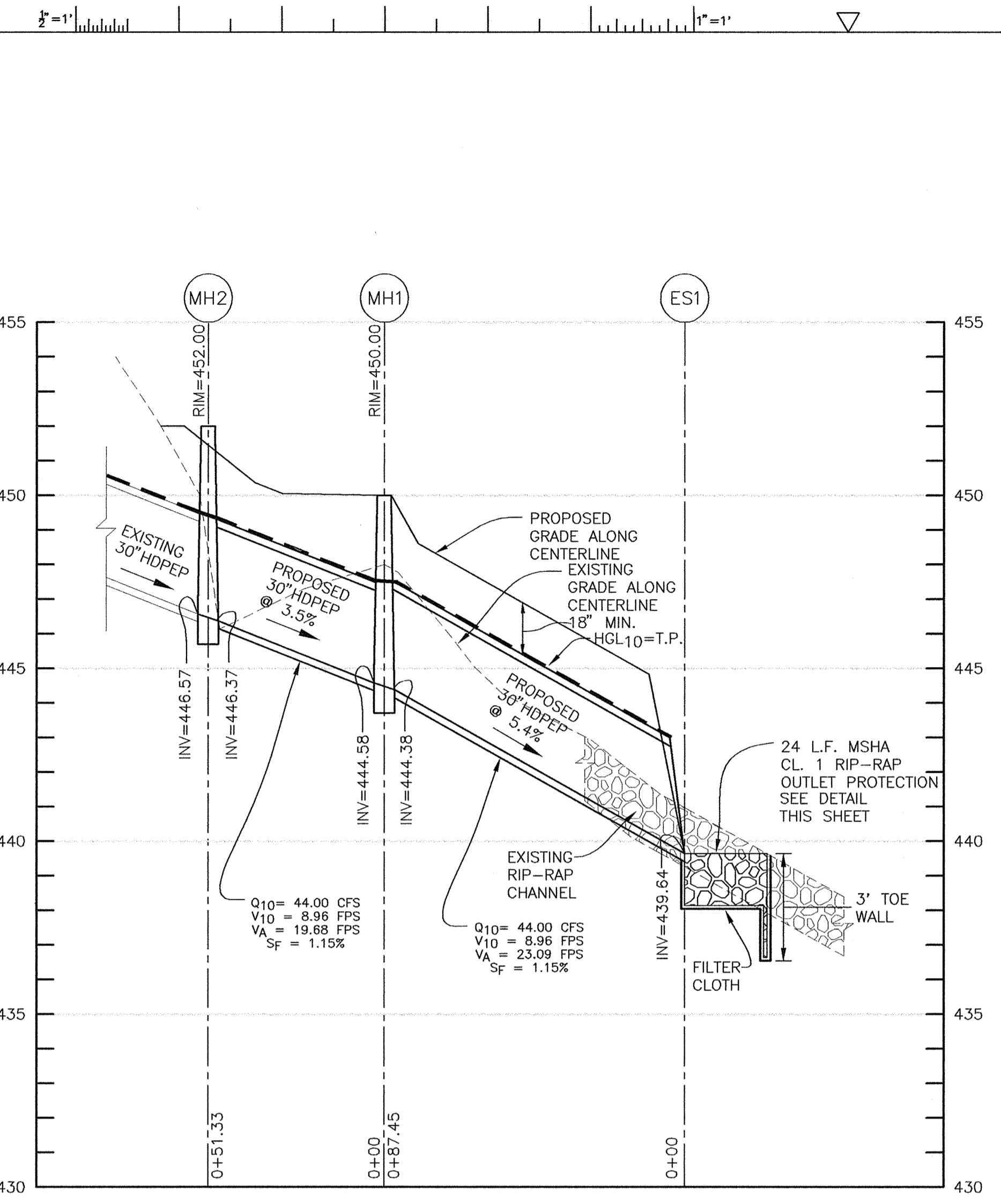
Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION
SUBSTATION & SYSTEM PROTECTION

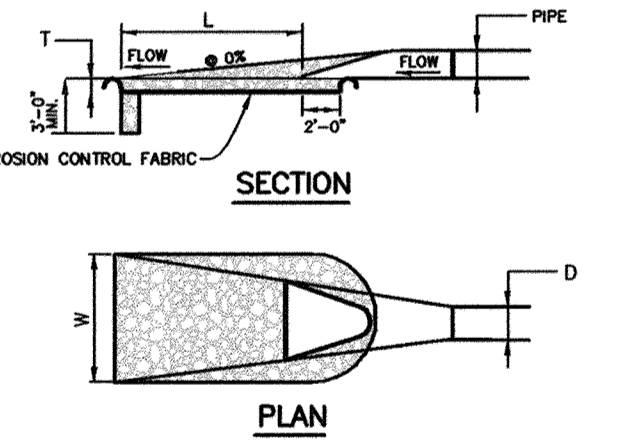
SCALE AS SHOWN
DWG NO. 4 OF 9
REV



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



STORM DRAIN PROFILE
SCALE: HORZ.: 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 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.
- Gabionets shall be protected from snagging, cutting, or tearing. Any damage other than on construction travel shall be repaired by placing another piece of gabionets over the damaged panel or by completely replacing the gabionets. All openings whether for repairs or for joining two pieces of gabionets 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 entire stones and spots filling the voids 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 stands 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

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

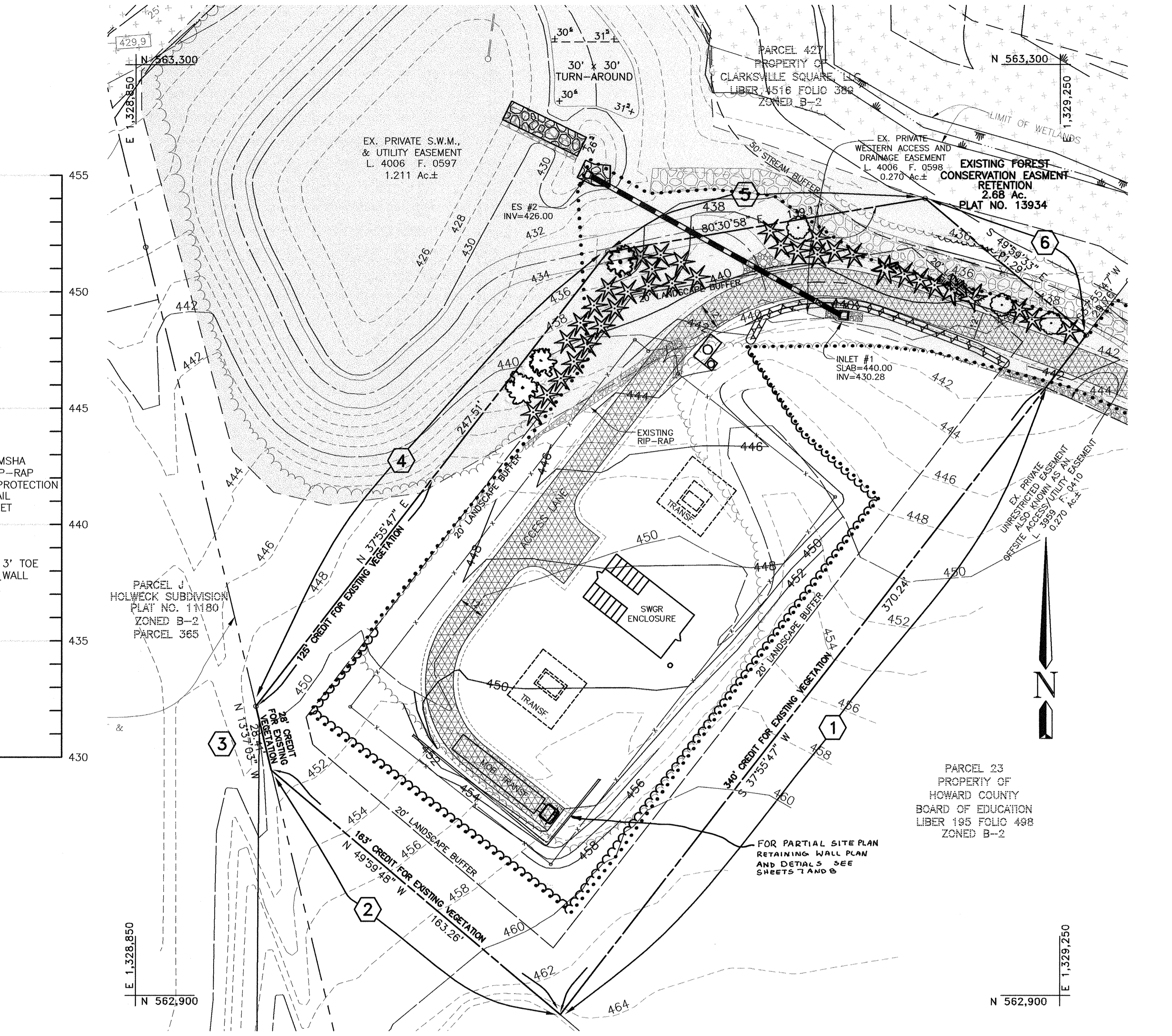
Cinda ... 7/1/04
CHIEF, DIVISION OF LAND DEVELOPMENT

Stephen ... 3/2/04
DIRECTOR

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'
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)	-	-	-	-	-	-

* EXISTING VEGETATION TO REMAIN

SYMBOL	QUANTITY	NAME	REMARKS
○	3	ACER RUBUM RED MAPLE ARNISTEMUS	2.5"-3" CALIPER
⊙	3	ACER RUBUM MAPLE "REDSUNSET"	2.5"-3" CALIPER
★	35	XOPRESSOCYPARIS - LELAND CYPRESS	5'-6" HT.



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 DEVELOPER'S 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
2/15/04

LEGEND:

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

BENCHMARK ENGINEERING, INC.
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E-MAIL: benchmark@ceis.com

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
Δ	5-26-04		ADD RETAINING WALL AND REV. SHT #		ENGINEERING
Δ	3-1-05		REVISE PLANTING LIST AND RELOCATE 3 LELAND CYPRESS TREES ADJACENT TO ACCESS DRIVE		DAM

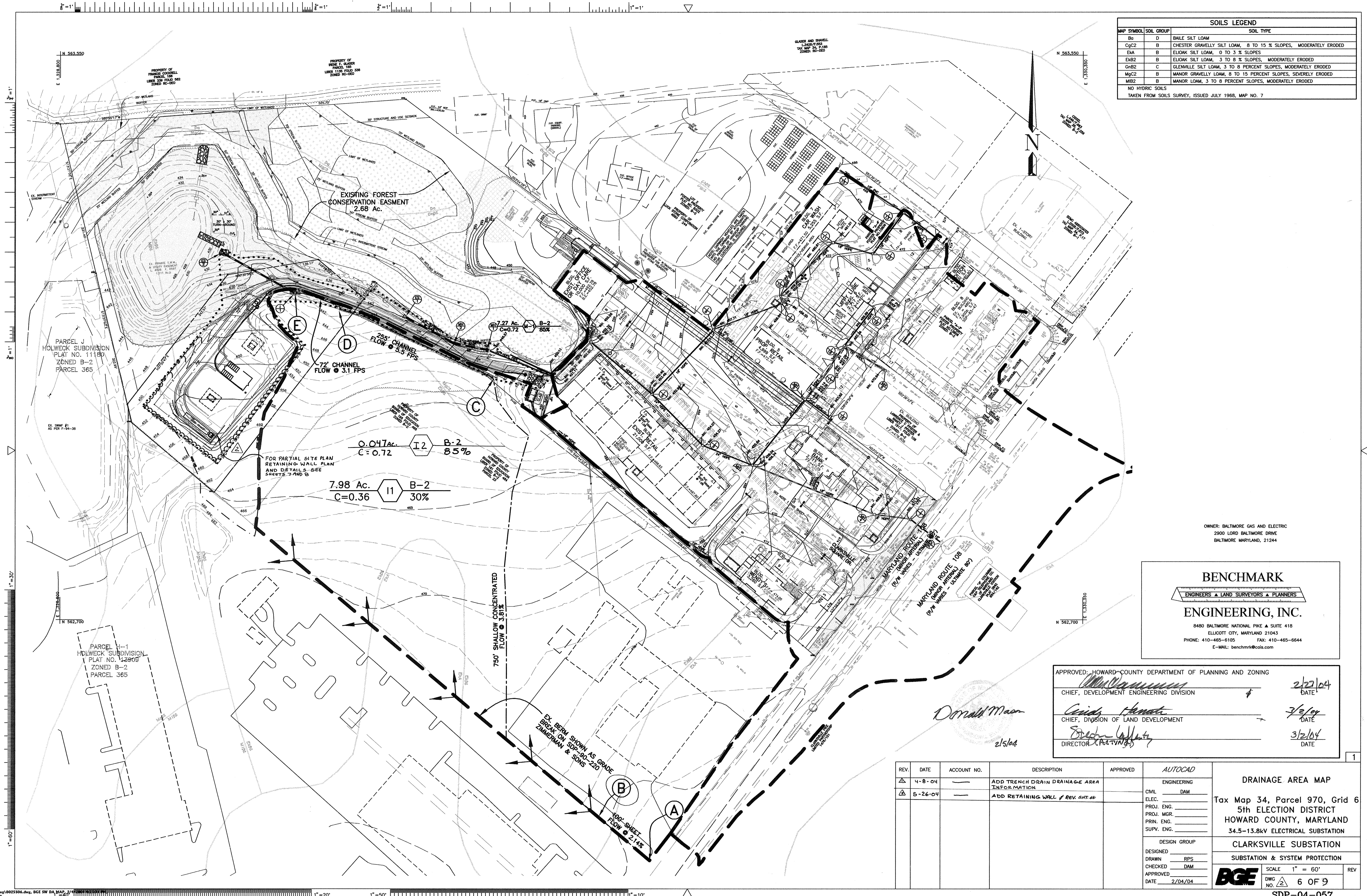
DESIGN GROUP: RPS
DRAWN: RPS
CHECKED: DAM
APPROVED: [Signature]
DATE: 2/04/04

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. Δ 5 OF 9
REV



SOILS LEGEND		
MAP SYMBOL	SOIL GROUP	SOIL TYPE
Bs	D	BALILE SILT LOAM
CgC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED
EhA	B	ELIOAK SILT LOAM, 0 TO 3 % SLOPES
EXB2	B	ELIOAK SILT LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED
GhB2	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		

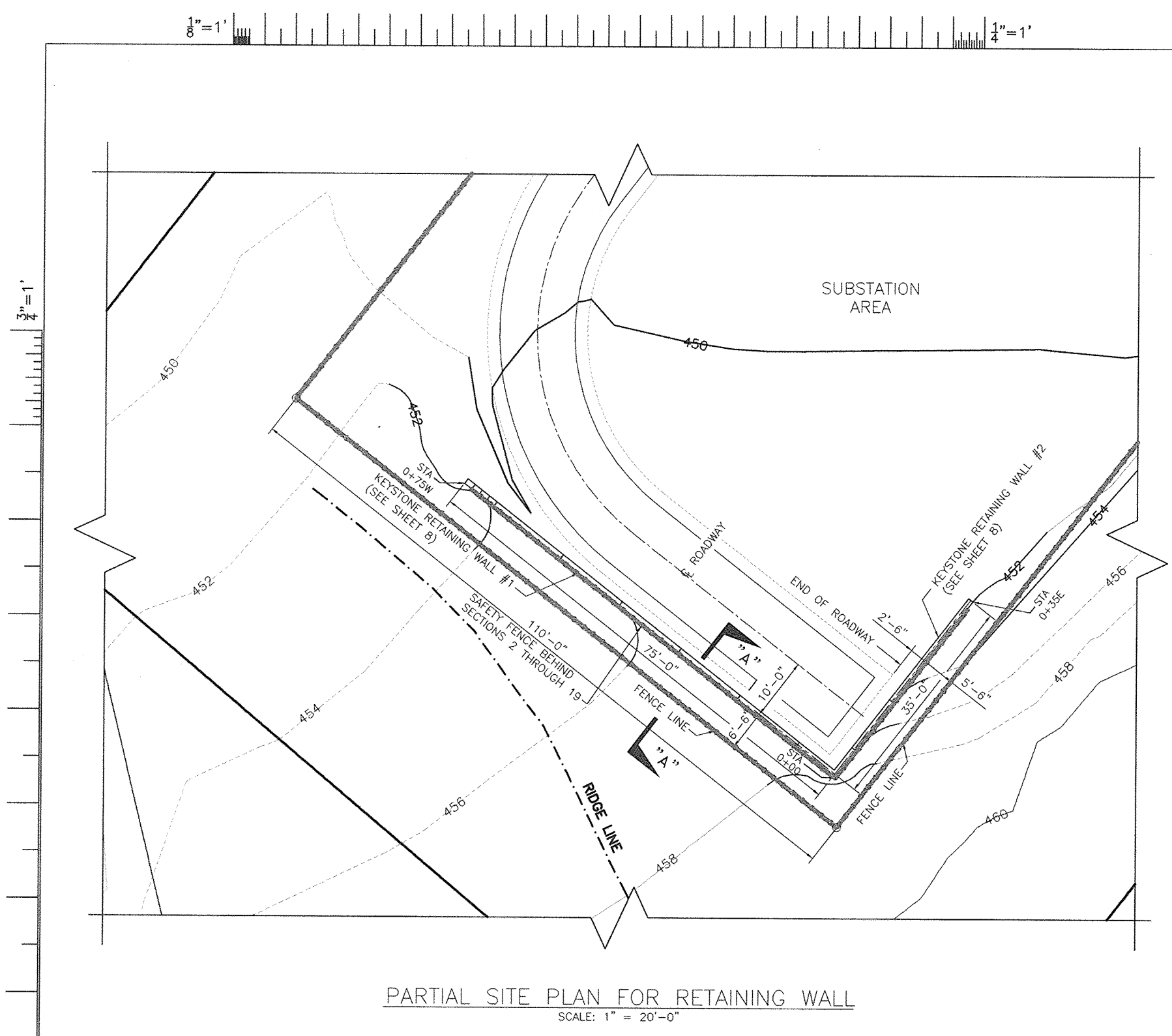
OWNER: BALTIMORE GAS AND ELECTRIC
 2900 LORD BALTIMORE DRIVE
 BALTIMORE MARYLAND, 21244

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@cois.com

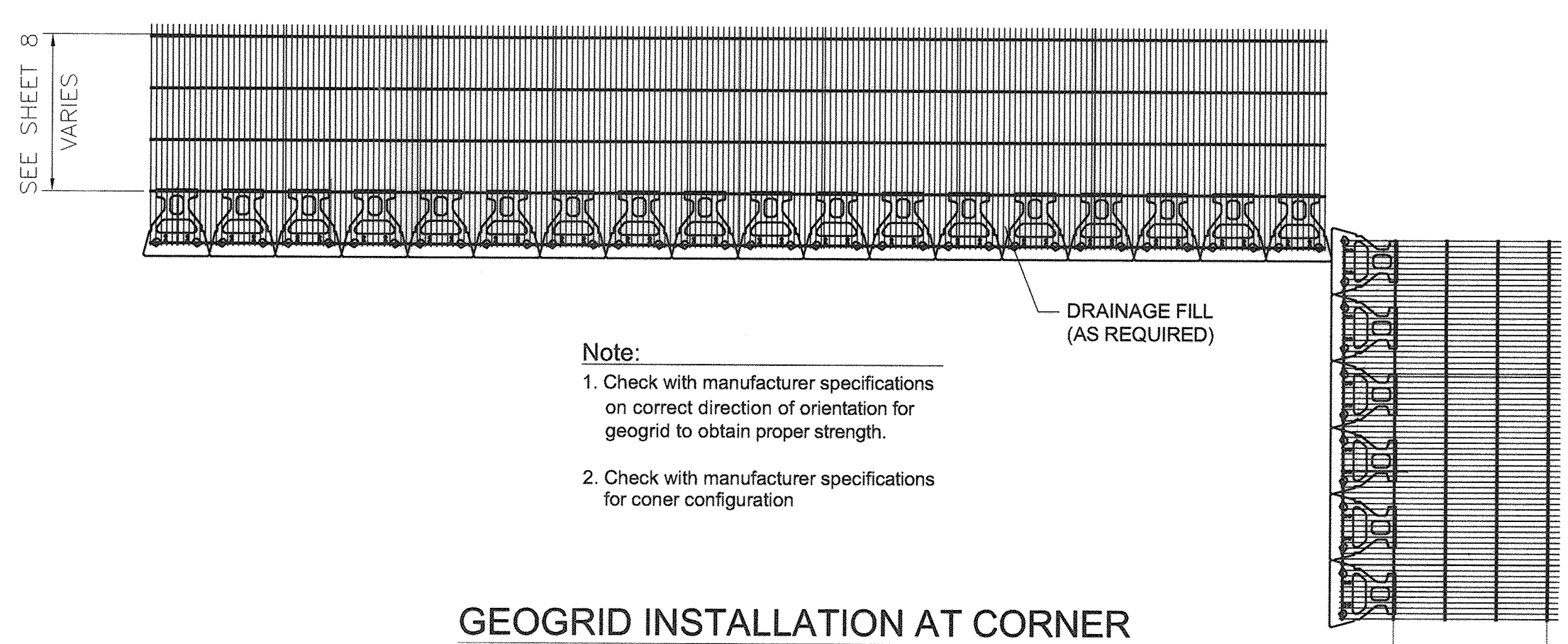
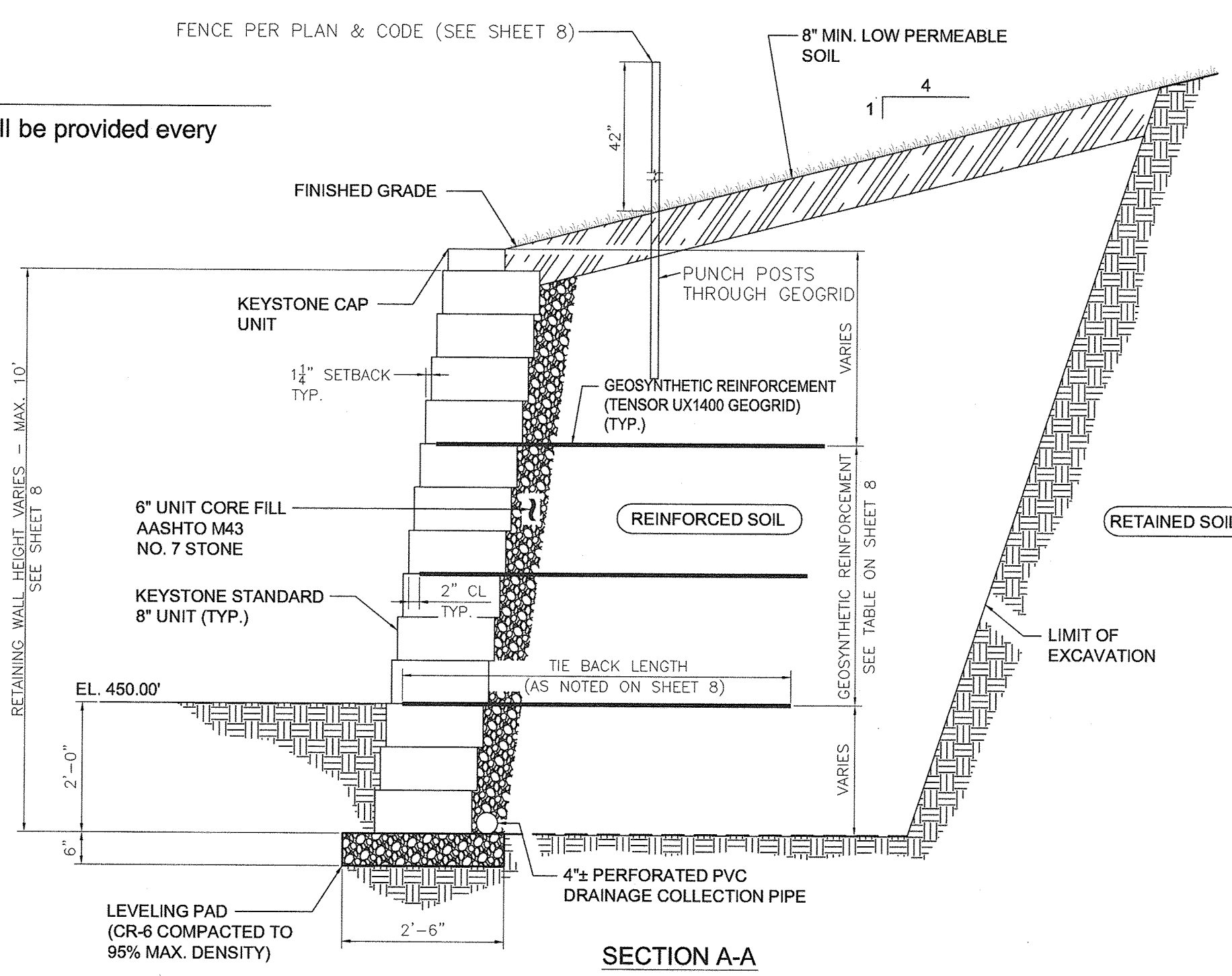
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING		
<i>[Signature]</i>	CHIEF, DEVELOPMENT ENGINEERING DIVISION	2/27/04 DATE
<i>[Signature]</i>	CHIEF, DIVISION OF LAND DEVELOPMENT	3/2/04 DATE
<i>[Signature]</i>	DIRECTOR	3/2/04 DATE

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
△	4-8-04		ADD TRENCH DRAIN DRAINAGE AREA INFORMATION		ENGINEERING
△	5-26-04		ADD RETAINING WALL # REV. SHT. #		CIVIL DAM ELEC. PROJ. ENG. 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 9
 DATE 2/04/04



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



GEOGRID INSTALLATION AT CORNER
N.T.S.

GENERAL KEYSTONE INSTALLATION PROCEDURE

- 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 TOP OF EXISTING MATERIAL, IT 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 TRENCH. THE TOP OF LEVELING PAD MUST BE A MINIMUM OF 24" (610 mm) BELOW FINISHED GRADE. SCOUR MAY REQUIRE THE WALL EXTEND DEEPER OR THAT SCOUR PROTECTION BE INSTALLED. THE BASE TRENCH SHOULD BE WIDE ENOUGH TO ALLOW FOR THE KEYSTONE UNIT AND DRAINAGE FILL ZONE. THE BASE TRENCH SHOULD BE A MINIMUM OF 36" (914 mm) WIDE FOR STANDARD UNITS. THE BASE TRENCH SHOULD BE 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. THERE ARE THREE EXCEPTIONS TO THIS RULE FOR DETERMINING THE DEPTH OF THE BASE TRENCH:
1. POOR SOIL CONDITIONS MAY REQUIRE A MUCH LARGER DEPTH OF BASE LEVELING PAD MATERIAL OR SOIL REINFORCEMENT. THIS EXTRA MATERIAL SHOULD BE USED TO IMPROVE THE BEARING CAPACITY OF THE SUBGRADE TO FULLY SUPPORT THE WEIGHT OF THE RETAINING WALL. A GEOTECHNICAL ENGINEER SHOULD EVALUATE SUCH CONCERNS.
2. 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.
3. STEPPING UNITS UP ALONG A SLOPING GRADE, WHEN THE GRADE RUNNING PARALLEL WITH THE WALL IS NOT LEVEL WITH 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 GRANULAR BASE (I.E. CLASS II, BURNED ROAD BASE), THE MAXIMUM PARTICLE SIZE IS 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 (8" THICK).
3. A 2000 PSI (14 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.

- 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.
- FOLLOW THE INSTRUCTIONS IN THE PREVIOUS INSTALLATION NOTES UNTIL YOU HAVE REACHED THE LOWEST WALL ELEVATION WHERE A GEOGRID LAYER WILL BE PLACED. THIS ELEVATION, ALONG WITH THE ELEVATION OF ANY ADDITIONAL GEOGRID LAYERS, WILL BE SPECIFIED IN THE ENGINEERING DESIGN FOR THE WALL. AT THIS POINT, THE BASE TRENCH WILL HAVE BEEN EXCAVATED, THE BASE LEVELING PAD WILL HAVE BEEN PLACED, THE INITIAL COURSES OF KEYSTONE UNITS WILL HAVE BEEN INSTALLED AND THE UNIT DRAINAGE FILL AND RETAINED BACKFILL WILL HAVE BEEN PLACED AND COMPACTED UP TO THE FIRST ELEVATION WHERE A GEOGRID LAYER IS SPECIFIED.
 - MEASURE AND CUT THE GEOGRID MATERIAL TO THE SPECIFIED LENGTH. REFER TO SITE SPECIFIC ENGINEERING DOCUMENTS FOR LENGTH OF GEOGRID LAYERS AND TYPE OF GEOGRID MATERIAL. FOR INFORMATION ON PROPER PLACEMENT OF GEOGRID ALONG CURVES OR CORNERS, CONSULT ONE LENGTH FOR THE GEOGRID LAYERS. IT IS CRITICAL TO CONFIRM THIS INFORMATION BEFORE PROCEEDING. IF MULTIPLE TYPES AND/OR LENGTHS OF GEOGRID WILL BE USED, PRECUTTING AND MARKING EACH GEOGRID PIECE (FOR EXAMPLE WITH COLORED SPRAY PAINT) WILL MAKE IDENTIFICATION EASIER AND REDUCE THE CHANCE OF MISPLACEMENT. IN ADDITION, VERIFY THE PROPER ORIENTATION OF THE GEOGRID TO THE WALL FACE. THE DIRECTION OF MOST GEOTEXTILE STRENGTH ALONG ONE DIRECTION OF THE MATERIAL, THESE ARE CALLED UNIAXIAL GEOGRIDS. THE DIRECTION OF CUT OR PRECUT USING A VARIETY OF TOOLS. THE TYPE OF GEOGRID BEING USED WILL DETERMINE CUTTING PROCEDURES. FOR LARGE INSTALLATIONS, THE GEOGRID IS MOST EFFICIENTLY CUT OFF SITE IN A CONTROLLED SETTING. IN ALL CASES, CUT THE GEOGRID IN SUCH A WAY SO THAT THE END OF THE LAYER THAT IS NEAREST THE FRONT OF THE WALL IS TRIMMED CLOSE TO THE TRANSVERSE BAR. THIS WILL PREVENT UNSIGHTLY PIECES OF GEOGRID FROM PROTRUDING OUT OF THE WALL FACE.
 - KEYSTONE PINS SHOULD BE PLACED INTO ALL UNITS. HOOK THE GEOGRID OVER THE KEYSTONE PINS. LAY THE GEOGRID OUT FLAT ON COMPACTED BACKFILL. FOLLOW THE ENGINEERING DESIGN FOR GEOGRID PLACEMENT. IT WILL SPECIFY BOTH THE HORIZONTAL AND VERTICAL START /STOP LOCATIONS. IN GENERAL, GEOGRID WILL BE PLACED IN PILES SIDE BY SIDE IN A CONTINUOUS LAYER ALONG THE LENGTH OF THE WALL UNLESS A CHANGE IN ELEVATION IS SPECIFIED IN THE DESIGN. CHECK ENGINEERING DOCUMENTATION FOR DETAILS.
 - TENSION THE GEOGRID BY PULLING IT TOWARDS THE EXCAVATION. PLACE A STAKE THROUGH THE GEOGRID AND INTO THE GROUND, WHILE USING THE STAKE AS A LEVER AND TENSIONING THE GEOGRID, DRIVE THE STAKE INTO THE GROUND TO HOLD THE POSITION. DO NOT EXCESSIVELY TENSION THE GEOGRID. THIS MAY FULL UNITS OUT OF THEIR PROPER ALIGNMENT. INSTALL AN ADDITIONAL COURSE OF KEYSTONE UNITS OVER THE GEOGRID, AND PLACE PINS IN THIS COURSE.
 - PROCEED WITH PLACEMENT OF THE UNIT FILL/DRAINAGE ZONE CRUSHED STONE MATERIAL AND THE BACKFILL IN THE REINFORCED ZONE. SPECIFICATIONS FOR MATERIAL USED IN THE REINFORCED ZONE ARE DEFINED. BEGIN PLACEMENT OF THIS MATERIAL NEAR THE KEYSTONE UNITS, MOVING PROGRESSIVELY TOWARD THE CUT EXCAVATION. THIS PROCEDURE WILL KEEP THE GEOGRID UNDER TENSION. AFTER COMPLETING THIS BACKFILL PROCESS, THE TENSION STAKES MAY BE REMOVED FOR DEUSE. COMPACT THE BACKFILL MATERIAL TO 95% STANDARD PROCTOR. CONTINUE WITH CONSTRUCTION ACCORDING TO THE PREVIOUS INSTALLATION NOTES UNTIL REACHING THE NEXT WALL ELEVATION WHERE A GEOGRID LAYER IS TO BE PLACED. REPEAT STEPS 3-6.
- THE CHARTS REQUIRED USE THE TENSAR GEOGRID:
UX1400SB OR UX1500SB BY TENSAR CORPORATION
ALL GEOGRID LENGTHS SHOWN ARE THE ACTUAL LENGTHS OF GEOGRID REQUIRED AS MEASURED FROM THE CONNECTION PINS TO THE END OF THE GEOGRID.

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. AVAILABILITY OF THESE UNITS WILL VARY FROM REGION TO REGION. FOR CAP UNIT DESCRIPTIONS AND PLACEMENT VARIATIONS, SEE THE SECTION ON "WALL CAP: USING KEYSTONE UNITS" IN THE DESIGN AND CONSTRUCTION MANUAL.

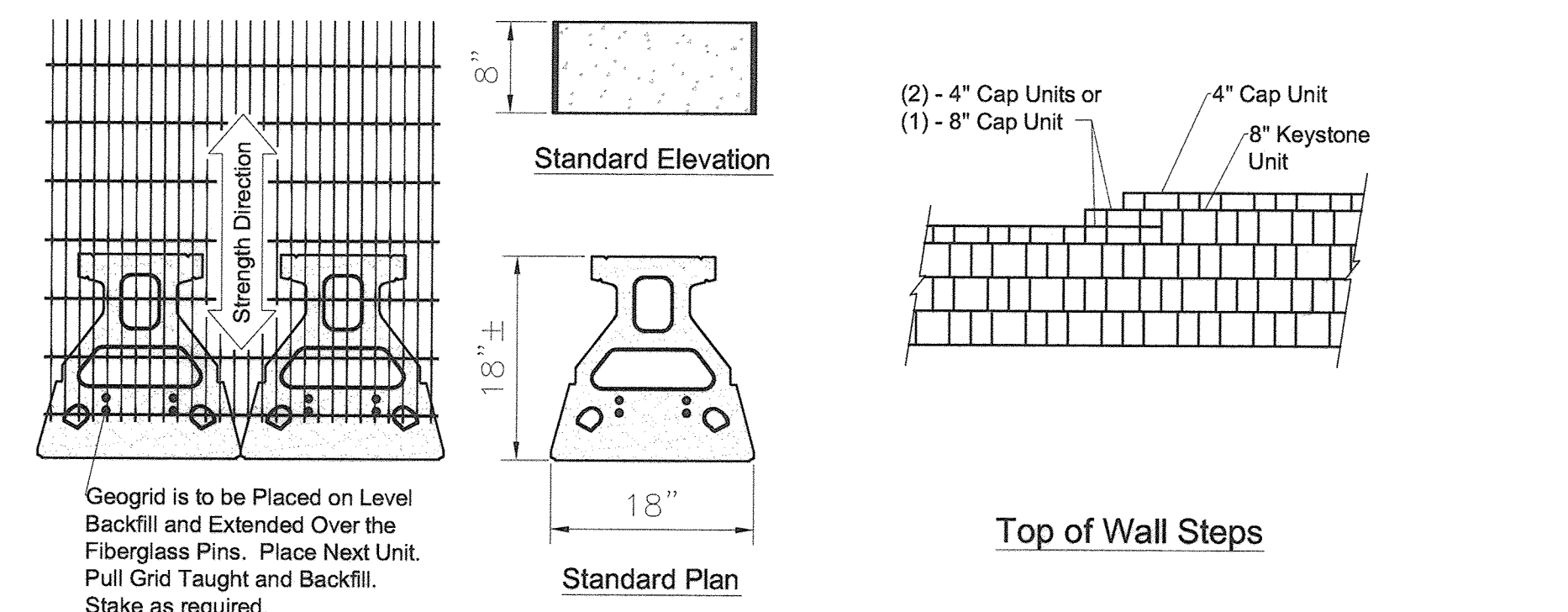
CAP UNITS WILL BE SECURED WITH A BONDING MATERIAL TO PREVENT THEIR REMOVAL. FINAL ALIGNMENT AT THE TOP OF THE WALL MAY ALSO REQUIRE THIS SAME PROCEDURE. IF DUE TO FINAL ALIGNMENT REPOSITIONED CAP UNITS DO NOT PROPERLY MEET PIN CONNECTIONS, THEN REMOVE THE PINS AND SECURE THESE CAP UNITS WITH THE BONDING MATERIAL. DUE TO THE FLEXIBILITY OR NON-RIGID QUALITIES 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 AND MOISTURE EXTREMES. IF THIS MATERIAL IS UNAVAILABLE, OTHER FLEXIBLE EPOXY BASED ADHESIVES DESIGNED TO BOND MASONRY TO MASONRY MAY BE USED. REFER TO MANUFACTURER'S INSTRUCTIONS FOR COMPLETE DETAILS.

SPECIFICATION GUIDELINES

- PART 1: GENERAL**
- DESCRIPTION
 - WORK INCLUDES FURNISHING AND INSTALLING A KEYSTONE RETAINING WALL WITH THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS AND SPECIFIED HEREIN.
 - WORK INCLUDES PREPARING FOUNDATION SOIL, FURNISHING AND INSTALLING LEVELING PAD, UNIT FILL AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS.
 - WORK INCLUDES FURNISHING AND INSTALLING ALL RELATED MATERIALS REQUIRED FOR CONSTRUCTION OF THE RETAINING WALL AS SHOWN ON THE CONSTRUCTION DRAWINGS.
 - REFERENCE STANDARDS
 - ASTM 1372 - GEOTECHNICAL RETAINING WALL UNITS.
 - ASTM D448 - SIZES OF AGGREGATE FOR ROAD AND BRIDGE CONSTRUCTION.
 - ASTM D698 - LABORATORY COMPACTION CHARACTERISTICS USING STANDARD EFFORT.
 - QUALITY ASSURANCE
 - OWNER WILL BE RESPONSIBLE FOR SOIL TESTING AND INSPECTION QUALITY CONTROL DURING EARTHWORK OPERATIONS.
- PART 2: MATERIALS**
- DEFINITIONS
 - CONCRETE UNITS - A KEYSTONE MODULAR CONCRETE FACING UNIT, MACHINE MADE FROM PORTLAND CEMENT, WATER AND MINERAL AGGREGATE.
 - STRUCTURAL GEOGRID - A STRUCTURAL GEOGRID FORMED BY A REGULAR PATTERN OF INTEGRALLY CONNECTED FLEXIBLE ELEMENTS WITH APERTURES OF SUFFICIENT SIZE TO ALLOW INTERLOCKING WITH SURROUNDING SOIL. ROCK OR EARTH AND FUNCTION PRIMARILY AS REINFORCEMENT.
 - UNIT FILL - DRAINAGE AGGREGATE WHICH IS WITHIN AND IMMEDIATELY BEHIND THE MODULAR CONCRETE UNITS.
 - REINFORCED BACKFILL - COMPACTED SOIL WHICH IS WITHIN THE REINFORCED SOIL VOLUME AS SHOWN ON THE PLANS.
 - KEYSTONE UNITS
 - KEYSTONE WALL UNITS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI (20 MPa) STANDARD TEST SPECIMEN. PORTLAND CEMENT SHALL HAVE A MAXIMUM MOISTURE ABSORPTION OF 8%.
 - FIBERGLASS CONNECTING PINS
 - CONNECTING PINS SHALL BE 1/2" DIAMETER THERMOSET EPOXY/PHALIC POLYESTER RESIN-FULFURATED FIBERGLASS PINS SUPPLIED BY THE MANUFACTURER.
 - KEYSTONE KAPSEALTM CONSTRUCTION ADHESIVE
 - MATERIAL SHALL CONFORM TO ASTM 2139 AND SHALL BE SUPPLIED BY THE KEYSTONE UNIT SUPPLIER.
 - GEOGRID
 - 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.
 - BASE LEVELING AND PAD MATERIAL
 - MATERIAL SHALL CONSIST OF COMPACTED CRUSHED STONE OR UNREINFORCED CONCRETE AS SHOWN ON THE CONSTRUCTION DRAWING.
 - UNIT DRAINAGE FILL
 - UNIT DRAINAGE FILL SHALL CONSIST OF CLEAN 1" MINUS CRUSHED STONE OR CRUSHED GRAVEL MEETING THE FOLLOWING GRADATIONS:

SIEVE SIZE	PERCENT PASSING
NO. 10	100
NO. 20	100
NO. 40	75-100
NO. 60	75-100
NO. 80	75-100
 - REINFORCED BACKFILL
 - REINFORCED BACKFILL SHALL BE FREE OF DEBRIS OR ORGANIC MATERIAL MEETING THE FOLLOWING GRADATIONS:

SIEVE SIZE	PERCENT PASSING
NO. 10	100
NO. 20	100
NO. 40	75-100
NO. 60	75-100
NO. 80	75-100
 - PLASTICITY INDEX (PI) SHALL NOT EXCEED 4.0 PER ASTM D-4318. THE MAXIMUM AGGREGATE SIZE SHALL BE LIMITED TO 2" UNLESS FIELD TESTS HAVE BEEN CONDUCTED TO EVALUATE POTENTIAL STRENGTH REDUCTION TO INSTALLATION.
 - MATERIAL CAN BE SITE EXCAVATED MATERIAL WHEN THE ABOVE REQUIREMENTS ARE MET. UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWING, THE REQUIRED TEST PROCEDURES SHALL BE THE DYNAMIC CONE PENETROMETER TEST TO ASTM 519-99.



Grid & Pin Connection
SCALE: N.T.S.

Standard Unit
* Dimensions May Vary by Region
SCALE: N.T.S.

Top of Wall Steps

Cap Unit Elevation
SCALE: N.T.S.

Cap Unit Plan
SCALE: N.T.S.

Universal Cap Unit Option
* Dimensions & Availability Will Vary by Region
SCALE: N.T.S.

Straight Split Cap Unit Option
* Dimensions & Availability Will Vary by Region
SCALE: N.T.S.

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

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
DATE: 8/29/04
DATE: 8/25/04
DATE: 8/26/04

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

REFERENCE DRAWINGS:
SHEET 8 RETAINING WALL PROFILE AND SAFETY FENCE

- 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 NOTES ON "CURVES" FOR RELATED INFORMATION). BE SURE ALL UNITS ARE SET TOP SIDE UP. THE TOP SIDE HAS 4 PIN HOLES CENTRED BETWEEN TWO KIDNEY RECEIVING HOLES. ALL UNITS SHOULD CONTACT WITH THIS SURFACE. IF ANY ROCKING MOTION OCCURS, ADJUST BASE LEVELING PAD MATERIAL OR UNITS TO ACHIEVE SOLID CONTACT WITH THIS SURFACE.
- CHECK AND ADJUST THE LEVEL AND ALIGNMENT OF ALL UNITS. THE POSITION OF THE BASE COURSE DETERMINES THE ALIGNMENT OF ALL SUCCEEDING COURSES. ADJUSTMENTS TO ALIGNMENT MUST BE MECHANICALLY CONTROLLED BY THE PIN POSITION. UNITS WITH FOUR PIN HOLES APPEARING IN THE TOP OF THE KEYSTONE UNIT HAVE THREE BATTER OPTIONS: 8.8° (1-1/4" (30 mm)), 4.4° (5/8" (15 mm)), OR NEAR VERTICAL. STRESS FRACTURES. PLACEMENT OF MORE THAN 3/4" (20 mm) OF LOOSE MATERIAL COULD LEAD TO UNACCEPTABLE MOVEMENT.
- ALL BASE COURSE UNITS CAN BE PLACED FOR AN ENTIRE WALL LENGTH OR FOR A SMALL SEGMENT 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 GRADE, SET ALL UNITS AT THE LOWEST GRADE ELEVATION FIRST. SECURE THE POSITION OF THESE UNITS (AS DESCRIBED IN THE PREPARATION, EXCAVATION, BACKFILL, AND GEOGRID PLACEMENT) BEFORE PLACING 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 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 DEPENDENT ON THE TYPE OF SOILS AND COMPACTION EQUIPMENT BEING USED. FOR EXAMPLE, CRUSHED STONE (USED FOR UNIT/DRAINAGE) MAY BE PLACED IN MAXIMUM LIFTS AND WILL COMPACT WITH MINIMAL EFFORT. MOST INORGANIC SITE SOILS, EASILY INFLUENCED BY MOISTURE LEVELS, MUST BE PLACED IN SHORTER LIFTS AND WILL REQUIRE GREATER COMPACTION EFFORT.
- FOR COMPACTION, THE BACKFILL SOILS NEED TO BE COMPACTED TO A MINIMUM 95% STANDARD PROCTOR (95% OF THE SOIL'S MAXIMUM DENSITY). BOTH THE TYPE OF MATERIAL AND THE COMPACTION EQUIPMENT USED TO BE CONSIDERED WHEN ADDRESSING THIS ISSUE. SOILS COMPACTED WITH WALK BEHIND EQUIPMENT WILL REQUIRE THE PLACEMENT OF LARGER VOLUMES OF MATERIAL. USING ROLL-ON MECHANICAL EQUIPMENT WILL ALLOW PLACEMENT OF THICKER LIFTS OF MATERIAL. CONSULT AN ENGINEER FOR SPECIFIC RECOMMENDATIONS. THE FOLLOWING ARE BASIC GUIDELINES:
- BACKFILL MATERIAL MUST HAVE THE PROPER MOISTURE CONTENT FOR OPTIMUM PERFORMANCE WHEN COMPACTING.
 - ORGANIC OR HEAVY CLAY MATERIAL SHOULD NOT BE USED. THESE MATERIALS HOLD MOISTURE AND DO NOT COMPACT PROPERLY.
 - WALK BEHIND MECHANICAL COMPACTION EQUIPMENT MAY BE USED TO COMPACT ANY SOILS PLACED BEHIND THE UNIT/DRAINAGE ZONE.
 - RIDE-ON MECHANICAL COMPACTION EQUIPMENT SHOULD BE OPERATED NO CLOSER THAN WITHIN 3' (1 m) OF THE KEYSTONE UNIT BACK SURFACE.
 - 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 OUT OF LEVEL. IF THIS CONTINUES, THE WALL MAY BEGIN TO LEAN FORWARD.
 - 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.
 - BACKFILL MATERIAL IN THE PIPE ZONE MUST BE AS SHOWN ON THE SITE SPECIFIC PLANS AND SPECIFICATIONS.
 - 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 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 EXCAVATION BEHIND. BATTERS SHOULD BE MECHANICALLY CONTROLLED BY THE PIN POSITION. UNITS WITH FOUR PIN HOLES APPEARING IN THE TOP OF THE KEYSTONE UNIT HAVE THREE BATTER OPTIONS: 8.8° (1-1/4" (30 mm)), 4.4° (5/8" (15 mm)), OR NEAR VERTICAL. STRESS FRACTURES. PLACEMENT OF MORE THAN 3/4" (20 mm) OF LOOSE MATERIAL COULD LEAD TO UNACCEPTABLE MOVEMENT.

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 SMALL STONES BECOME SANDWICHED BETWEEN UNITS, POINT LOADING MAY OCCUR RESULTING IN STRESS FRACTURES. THIS MATERIAL WILL ALSO LEAVE UNITS OUT OF LEVEL, CREATING VISUAL DISTORTION. IF DUE TO THE MANUFACTURING PROCESS, RIDGES OR SLAT MATERIAL ARE PRESENT, REMOVE BY USING A TOOL, OR USE THE NEXT COURSE UNIT BEING PLACED TO RUB THE HIGH SPOT OFF.

STEP 7: PLACE UNIT/DRAINAGE MATERIAL

FILL 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 THE OPENINGS AND SPACES BETWEEN UNITS. THE DRAINAGE ZONE IS THE DRAINAGE AREA OF THE UNIT VOIDS AND/OR ADDITIONAL AREA BEHIND THE UNIT. THE WIDTH OF UNIT/DRAINAGE MATERIAL SHOULD BE A MINIMUM OF 24" (610 mm), MEASURED FROM THE WALL FACE. CERTAIN SITE CONDITIONS MAY REQUIRE A GREATER WIDTH. PLACE MATERIAL INTO THE SPECIFIED AREA. A CLEAN CRUSHED STONE MATERIAL WILL CONSOLIDATE NATURALLY. DO NOT OPERATE ANY AUTOMATED COMPACTION EQUIPMENT DIRECTLY OVER THE KEYSTONE UNITS IN AN ATTEMPT TO COMPACT THIS MATERIAL. THIS MAY RESULT IN DAMAGE TO THE UNITS.

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:

- LIFT EACH KEYSTONE UNIT BY ITS BACK TAIL SECTION TO MOVE IT INTO POSITION.
- CENTER THE UNIT IN FRONT OF THE POINT WHERE THE TWO UNITS BELOW MEET.
- SET THE FACE OF THE UNIT ONTO THE FRONT EDGE OF THE TWO UNITS BELOW.
- WITH THE KEYSTONE UNIT IN THIS POSITION, SLOWLY LOWER IT TO CONTACT THE TWO UNITS BELOW. WHILE LOWERING THE UNIT, THE TWO KIDNEY RECEIVING HOLES SHOULD SLIP OVER ONE FIBERGLASS PIN IN THE UNITS BELOW (OPEN KIDNEY). THE TWO KIDNEY RECEIVING HOLES SHOULD SLIP OVER ONE FIBERGLASS PIN IN THE UNITS BELOW (OPEN KIDNEY).
- 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.

HOWARD COUNTY SPECIFICATION

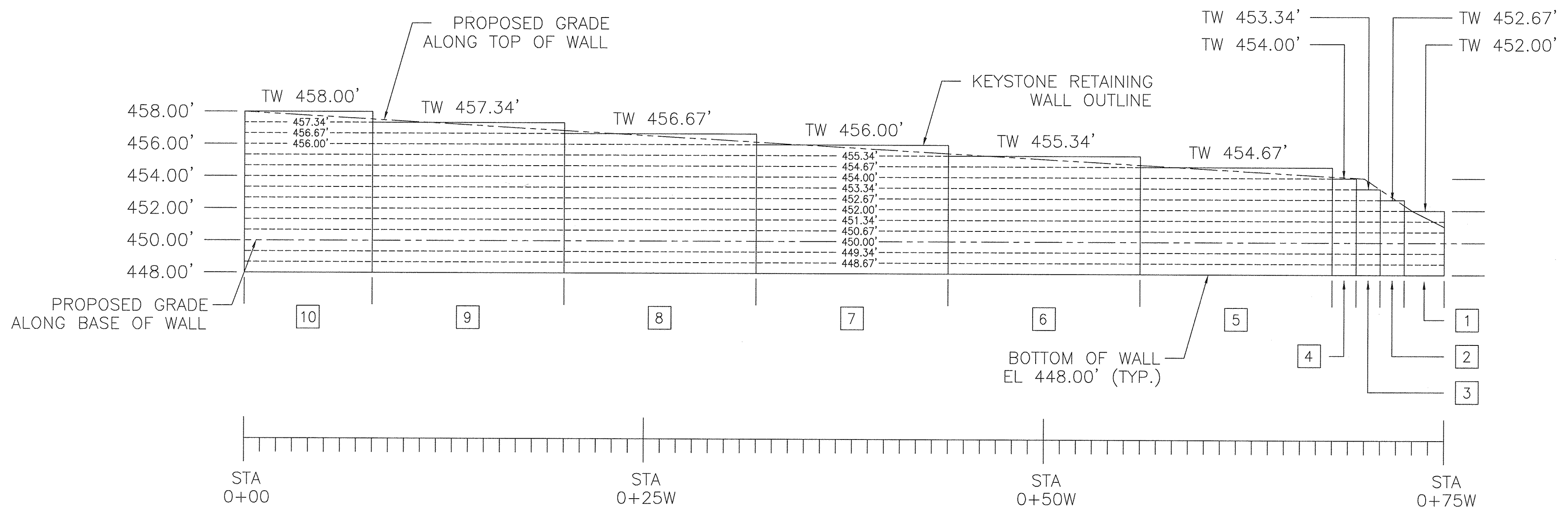
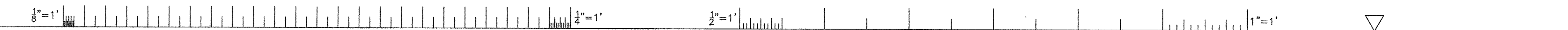
- RETAINING WALLS SHALL ONLY BE CONSTRUCTED UNDER THE OBSERVATION OF A REGISTERED PROFESSIONAL ENGINEER AND A (MCEI, WACEI, OR EQUIVALENT) CERTIFIED SOILS TECHNICIAN.
- THE REQUIRED BEARING PRESSURE BENEATH THE FOOTING OF THE WALL SHALL BE VERIFIED IN THE FIELD BY A CERTIFIED SOILS TECHNICIAN. TESTING DOCUMENTATION SHALL BE PROVIDED TO THE HOWARD COUNTY INSPECTOR PRIOR TO THE START OF CONSTRUCTION. THE REQUIRED TEST PROCEDURES SHALL BE THE DYNAMIC CONE PENETROMETER TEST TO ASTM 519-99.
- THE SUFFICIENCY OF THE FINAL MATERIAL SHALL BE CONFIRMED BY THE ON-SITE SOILS TECHNICIAN. EACH EIGHT INCH LIFT MUST BE COMPACTED TO 95% STANDARD PROCTOR DENSITY AND THE TESTING REPORT SHALL BE MADE AVAILABLE TO THE HOWARD COUNTY INSPECTOR UPON COMPLETION OF CONSTRUCTION.

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED	AUTOCAD
					ENGINEERING
					CIVIL - BFC
					ELEC. - BFC
					PROJ. ENG. - DAM
					PROJ. MGR. - DAM
					PRIN. ENG. - DAM
					SUPV. ENG. - DAM
					DESIGN GROUP
					DESIGNED - BFC
					DRAWN - BFC
					CHECKED - DAM
					APPROVED - DAM
					DATE: 28MAY2004

REVISED SITE DEVELOPMENT PLAN
KEYSTONE RETAINING WALL PLAN,
DETAILS AND SPECIFICATIONS
Tax Map 34, Parcel 970, Grid 6
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
34.5-13.8KV ELECTRICAL SUBSTATION

CLARKSVILLE SUBSTATION
SUBSTATION & SYSTEM PROTECTION

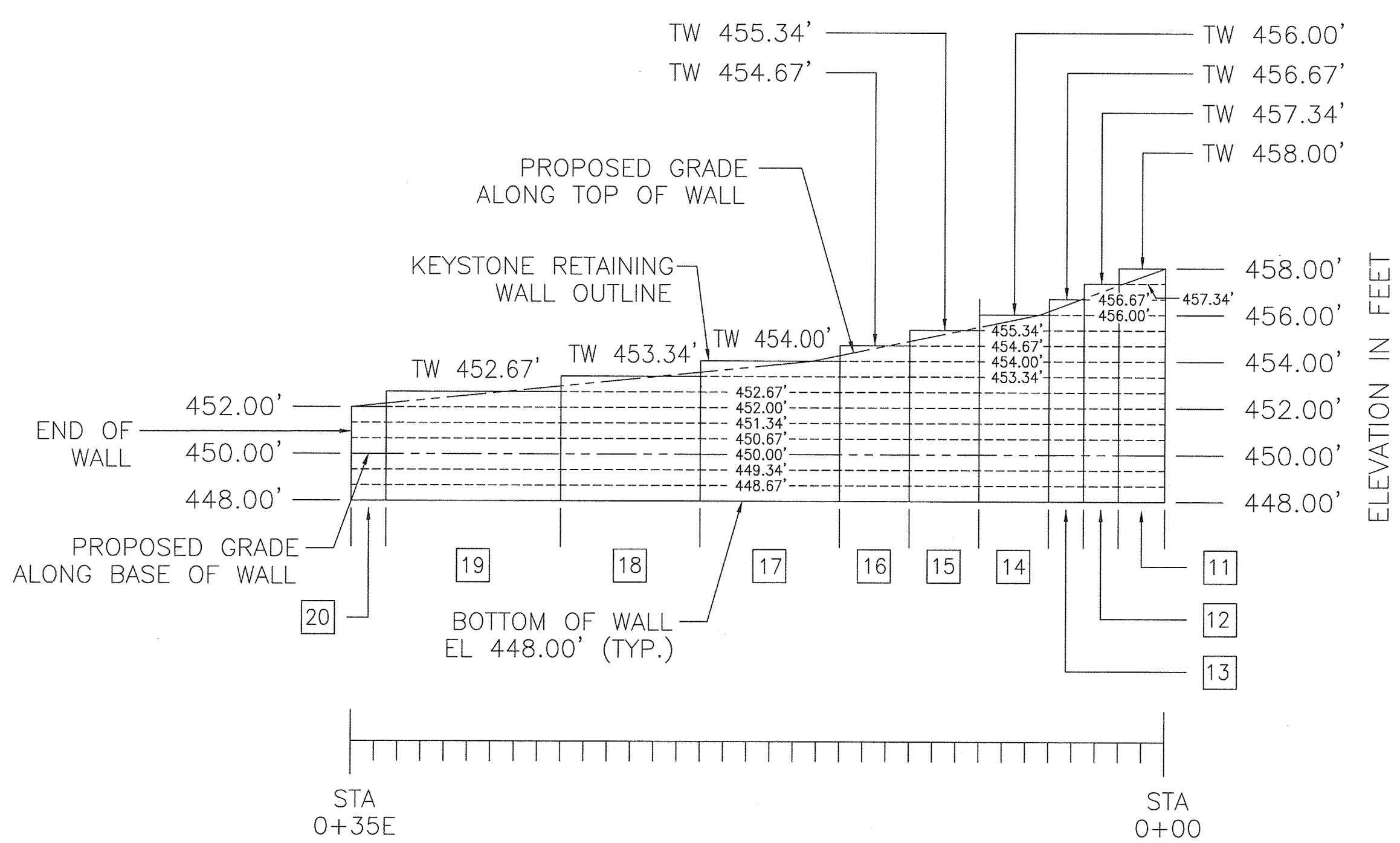
SCALE AS SHOWN
DWG NO. SUPPLEMENTAL SHEET
7 OF 9
SDP-04-057



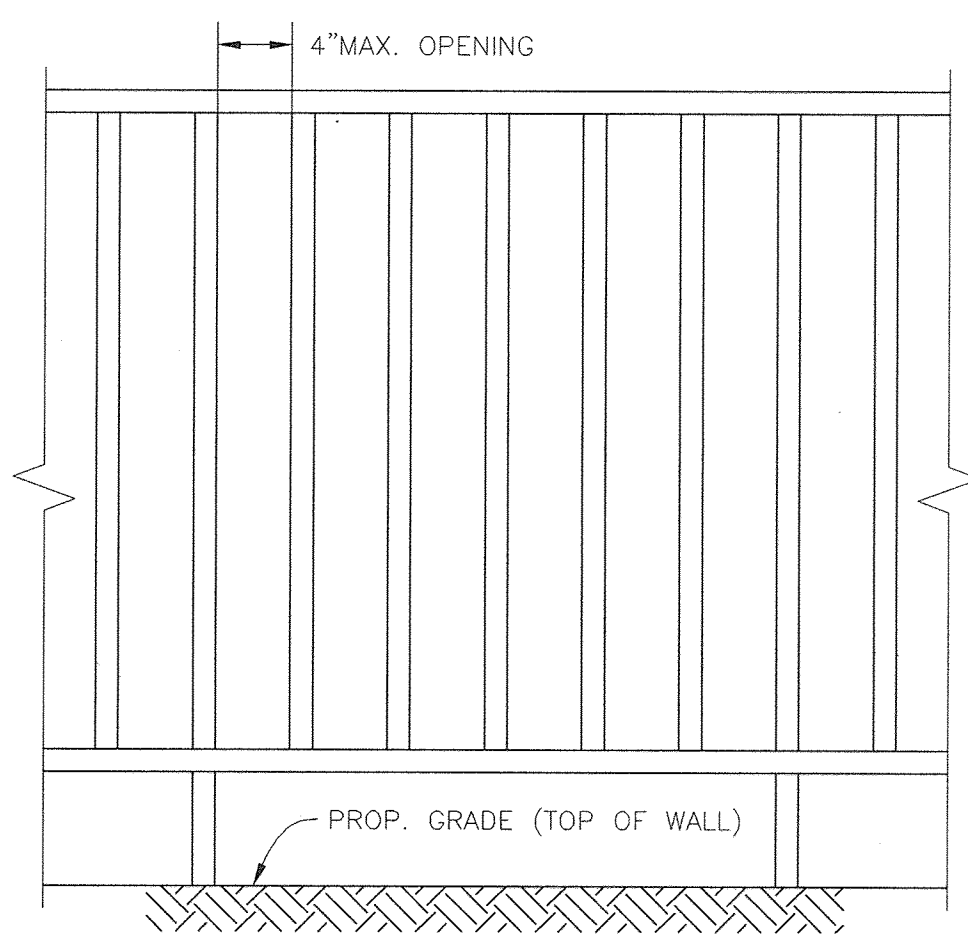
KEYSTONE WALL #1 PROFILE
LOOKING SOUTHWEST

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'-0"	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 SOUTHEAST



SECTION 1021.0 GUARDS

1021.1 General: Where required by the provisions of Sections 406.5, 408.3.2, 1005.5, 1014.7, 1016.5 and 1825.5, guards shall be designed and constructed in accordance with the requirements of this section and Section 1615.6. 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-1, I-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 ladder 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: BALTIMORE GAS AND ELECTRIC
2900 LORD BALTIMORE DRIVE
BALTIMORE 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: 410-465-6105 FAX: 410-465-6644
www.bei-civilengineering.com

Donald M. Mason
Professional Engineer
01/20/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
[Signature]
CHIEF, DEVELOPMENT ENGINEERING DIVISION
DATE: 8/25/04

[Signature]
CHIEF, DIVISION OF LAND DEVELOPMENT
DATE: 8/25/04

[Signature]
DIRECTOR
DATE: 8/25/04

REV.	DATE	ACCOUNT NO.	DESCRIPTION	APPROVED

CIVIL	BFC
ELEC.	
PROJ. ENG.	
PRIN. ENG.	DAM
SUPV. ENG.	

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
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SCALE AS SHOWN	DWG NO. 8 OF 9
NO. SUPPLEMENTARY SHEETS	SDP-04-057

MONOPOLE NOTES

- CODES**
- ANSI/AIA-222-9-2-2014 'STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS', AND ALL SUBSEQUENT SUPPLEMENTS
 - INTERNATIONAL BUILDING CODE (IBC-2015)
 - IN ADDITION, ALL CONSTRUCTION SHALL CONFORM WITH THE GOVERNING LOCAL BUILDING CODE
- DESIGN LOADS**
- THE EMBEDDED STEEL MONOPOLE HAS BEEN DESIGNED TO SUPPORT THE APPURTENANCES LISTED IN THE MONOPOLE ANALYSIS REPORT BY MORRIS & RITCHIE ASSOCIATES, JOB NO. 16208198, DATED JULY 25, 2019.
 - WIND LOAD DESIGN DATA

ULTIMATE WIND SPEED (NO ICE)	V _{ult} = 120 MPH
BASIC WIND SPEED (WITH ICE)	V _b = 40 MPH
DESIGN RACIAL ICE THICKNESS	3/4" (ICE THICKNESS INCREASES WITH HEIGHT)
RISK CATEGORY	III/IV
EXPOSURE CATEGORY	C
TOPOGRAPHIC CATEGORY	I
 - EARTHQUAKE LOAD DESIGN DATA

NOT APPLICABLE	S _e = 1.00
----------------	-----------------------
 - THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACING AS REQUIRED DURING ERECTION AND CONSTRUCTION. DESIGN OF TEMPORARY BRACING IS THE RESPONSIBILITY OF THE CONTRACTOR. SEE CONTROLLED LOW-STRENGTH MATERIAL SECTION OF NOTES FOR ADDITIONAL INFORMATION.
- MISCELLANEOUS**
- THE CONTRACTOR SHALL INSTALL THE EMBEDDED STEEL MONOPOLE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS, IN ADDITION TO THE SPECIFICATIONS ON THESE DRAWINGS.
 - THE CONTRACTOR SHALL LOCATE ALL UTILITIES IN THE AREA OF CONSTRUCTION AND PREVENT DAMAGE TO THEM. SHOULD DAMAGE OCCUR TO ANY UTILITIES, THE CONTRACTOR IS REQUIRED TO REPAIR THE DAMAGE TO THE SATISFACTION OF THE OWNER AT HIS OWN EXPENSE.
 - IN CASES OF CONFLICT BETWEEN THE DRAWINGS AND/OR SPECIFICATIONS OR EXISTING CONDITIONS, CONTRACTOR SHALL NOTIFY THE DESIGN PROFESSIONALS AND OBTAIN CLARIFICATION PRIOR TO BIDDING AND PROCEEDING WITH WORK.
 - THE CONTRACTOR SHALL NOT SUBMIT REPRODUCTIONS OF THE STRUCTURAL CONTRACT DOCUMENTS AS SHOP DRAWINGS.
 - SCALES SHOWN ON THE STRUCTURAL CONTRACT DRAWINGS ARE FOR GENERAL INFORMATION ONLY. DIMENSIONAL INFORMATION SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
 - APPLY DETAILS, SECTIONS AND NOTES ON THE DRAWINGS WHERE CONDITIONS ARE SIMILAR TO THOSE INDICATED BY DETAIL, DETAIL TITLE OR NOTE.
 - PROVIDE SHORING AND PROTECTION FOR EXCAVATION AS NECESSARY TO PREVENT CAVING AND COMPLY WITH ALL APPLICABLE OSHA RULES AND REGULATIONS.
 - SHOP DRAWINGS FOR ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS MUST BE SUBMITTED BY THE CONTRACTOR OR OWNER FOR REVIEW BY THE ENGINEER. IF THE CONTRACTOR OR OWNER FAILS TO SUBMIT THE SHOP DRAWINGS, THE ENGINEER WILL NOT BE RESPONSIBLE FOR STRUCTURAL CERTIFICATION AND DESIGN OF THE PROJECT. THE SHOP DRAWINGS SHALL INDICATE ANY DEVIATIONS OR OMISSIONS FROM THE CONTRACT DOCUMENTS. THE GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION AND MAKE ALL CORRECTIONS DEEMED NECESSARY.
- EMBEDDED STEEL MONOPOLE**
- STEEL MONOPOLE SPECIFICATIONS

MANUFACTURER	VALMONT
DESIGNATION	CLASS H8, RUS 5-04.0 (12-SIDED)
POLE TYPE	THREE-PIECE WITH SLIP JOINTS
TOTAL POLE LENGTH	SEE DRAWINGS
TOP SECTION THICKNESS	0.214 IN
MIDDLE SECTION THICKNESS	0.250 IN
BOTTOM SECTION THICKNESS	0.281 IN
BASE DIA & BEARING PLATE	32.39 IN
GROUNDLINE MOMENT CAPACITY	1,064.9 K-FT
APPROXIMATE POLE WEIGHT	5,242 LBS
EMBEDMENT LENGTH	SEE DRAWINGS
 - MISCELLANEOUS SPECIFICATIONS

STEEL FINISH	GALVANIZED
CORROSION	1'-6" ABOVE GRADE TO BOTTOM OF POLE
CLIMBING HARDWARE	STEP-BOLTS 10' ABOVE GRADE TO TOP OF POLE

STRUCTURAL AND MISCELLANEOUS STEEL

- ALL STEEL CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE AISC STEEL CONSTRUCTION MANUAL, 'SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS' (ANSI/AISC 360) AND THE AISC 'CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES'
- ALL PIPE SHALL CONFORM TO ASTM A53, GRADE B (P_y = 35 KSI).
- ALL U-BOLTS SHALL CONFORM TO ASTM A307 (F_u = 60 KSI).
- ALL NUTS SHALL CONFORM TO ASTM A563.
- ALL WASHERS SHALL CONFORM TO ASTM F436.
- FIELD WELDING IS NOT PERMITTED.
- THE CONTRACTOR SHALL NOT SPlice OR CUT OPENINGS IN STEEL MEMBERS NOT SHOWN ON CONTRACT DRAWINGS WITHOUT THE PERMISSION OF THE STRUCTURAL ENGINEER.
- ALL STEEL MEMBERS, FABRICATIONS AND ASSEMBLIES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123. AFTER FABRICATION, ALL BOLTS, WASHERS & NUTS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM F2324.
- DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
- AN INDEPENDENT INSPECTION AGENCY SHALL INSPECT ALL STRUCTURAL STEEL AND VERIFY THAT IT CONFORMS TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. FIELD INSPECTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN 5 DAYS OF THE INSPECTION. THE CONTRACTOR SHALL NOTIFY THE INSPECTION AGENCY OF ALL PHASES OF STEEL CONSTRUCTION AND WELDING.

STRUCTURAL BACKFILL

- CRUSHED STONE**
- STONE SHALL BE 1" DIAMETER OR SMALLER MEETING THE GRADATION REQUIREMENTS OF SIZE NO. 57 PER COARSE AGGREGATE OF ASTM C230.
 - STONE SHALL BE DEPOSITED IN 6 INCH MAXIMUM LOOSE LIFTS AND COMPACTED TO THE SPECIFIED FINISHED GRADE.
- CONTROLLED LOW-STRENGTH MATERIAL (CLSM)**
- ALL CLSM CONSTRUCTION SHALL CONFORM TO THE LATEST STANDARD FOR CONTROLLED LOW-STRENGTH MATERIAL (ACI 224).
 - CLSM MATERIAL SPECIFICATIONS
 - AGGREGATE SHALL CONFORM TO ASTM C883. COARSE AGGREGATE SHALL CONSIST OF A WELL-GRADED MIXTURE OF CRUSHED ROCK OR SAND WITH A MAXIMUM SIZE AGGREGATE OF 3/4". 100% SHALL PASS THE 1/2" SIEVE. NOT MORE THAN 30% SHALL BE RETAINED BY THE 3/4" SIEVE AND NOT MORE THAN 10% SHALL PASS THE NUMBER 200 SIEVE. ALL MATERIAL SHALL BE FREE FROM ORGANIC MATTER AND NOT CONTAIN MORE ALKALI, SULFATES, OR SALTS THAN THE NATIVE MATERIAL AT THE SITE.
 - THE ENTRAINED AIR CONTENT SHALL BE A MINIMUM OF 8% AND A MAXIMUM OF 20%.
 - AIR ENTRAINING ADMIXTURE AND/OR WATER REDUCING AGENT MAY BE ADDED TO IMPROVE THE WORKABILITY AND SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C260 AND ASTM C444, RESPECTIVELY.
 - WATER SHALL BE POTABLE, CLEAN AND FREE FROM OBJECTIONABLE QUANTITY OF SILTY ORGANIC MATTER, ALKALI, SALTS, AND OTHER IMPURITIES.

CLSM PERFORMANCE SPECIFICATIONS

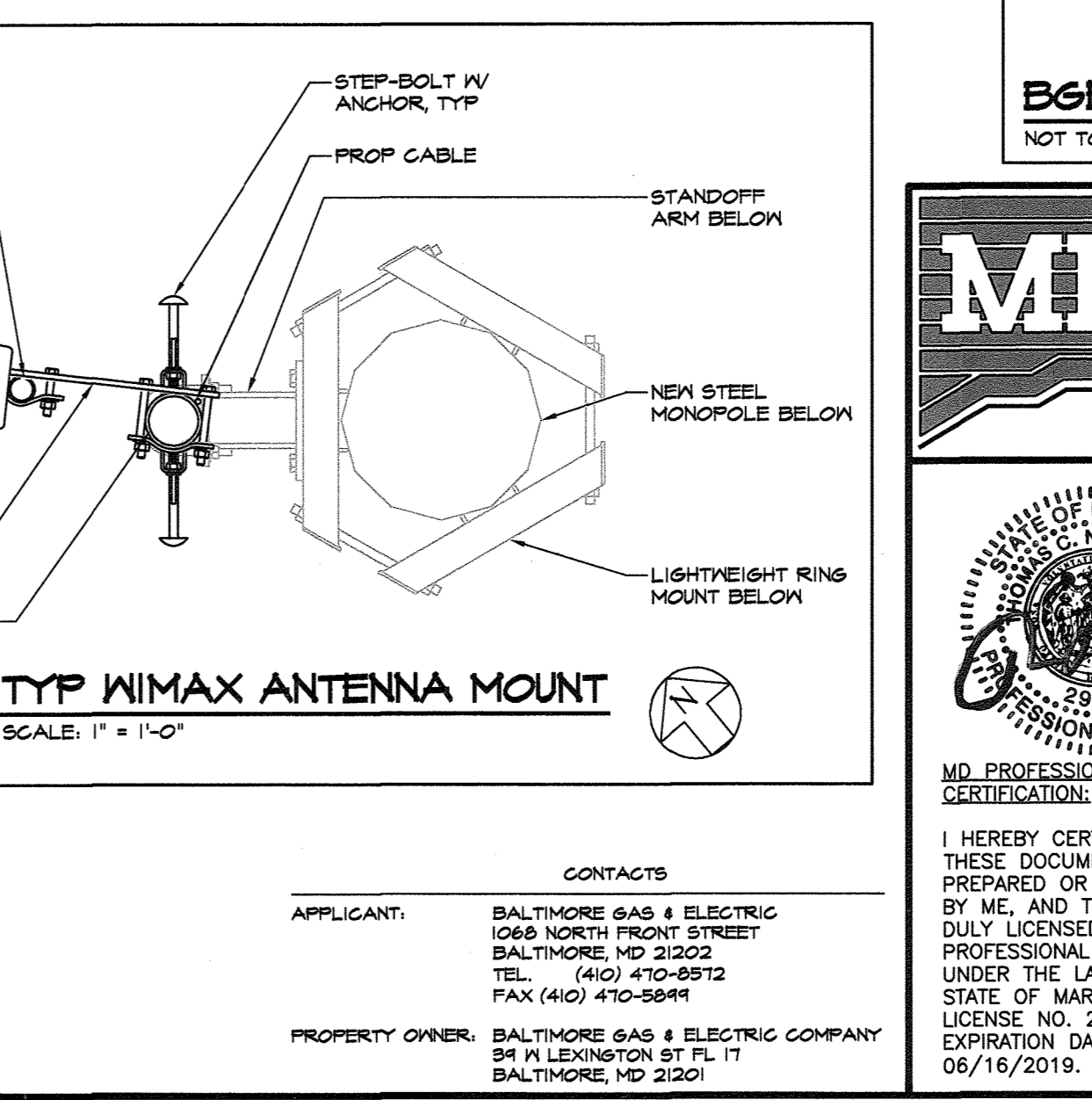
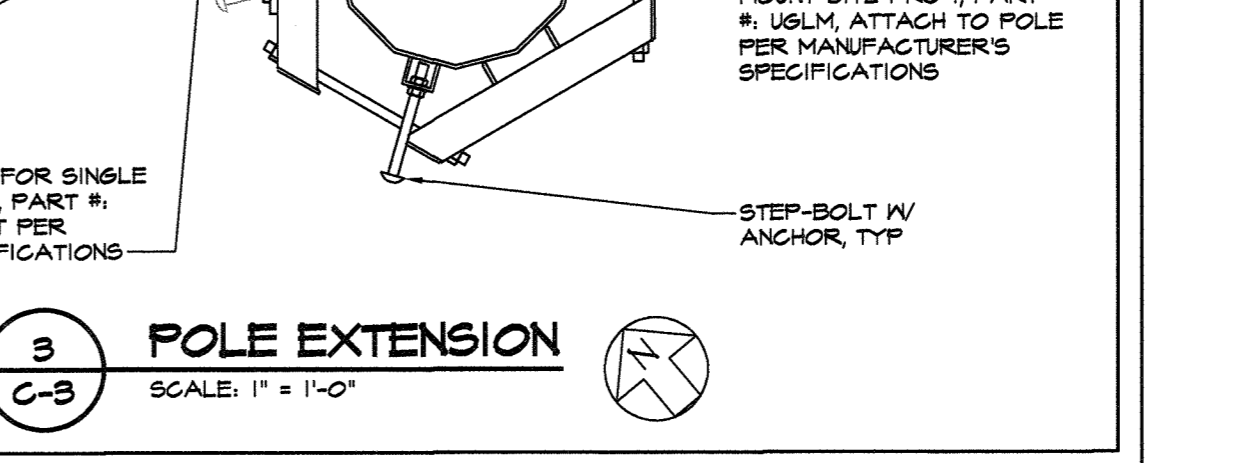
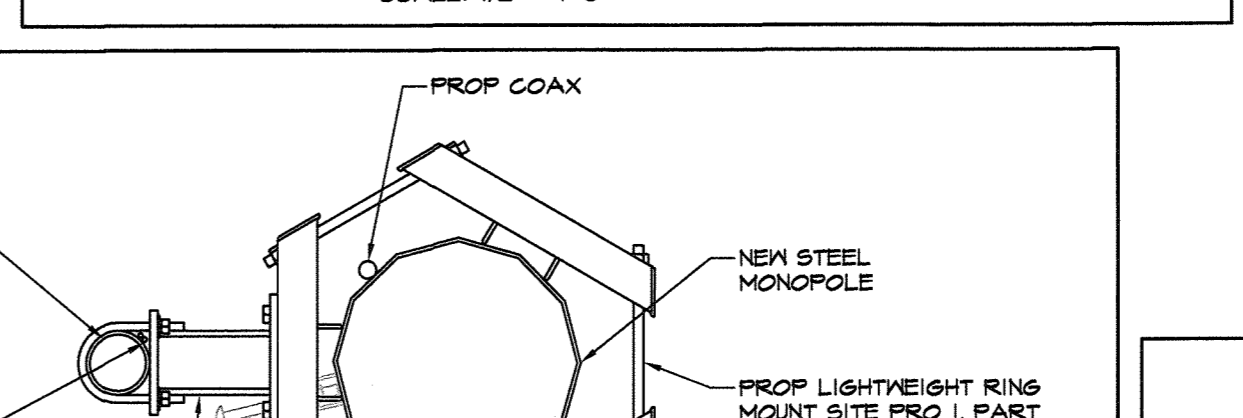
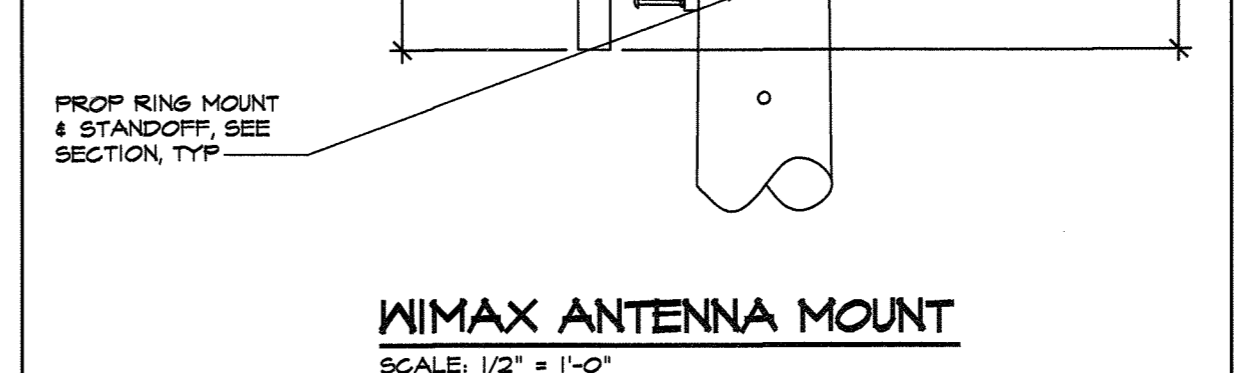
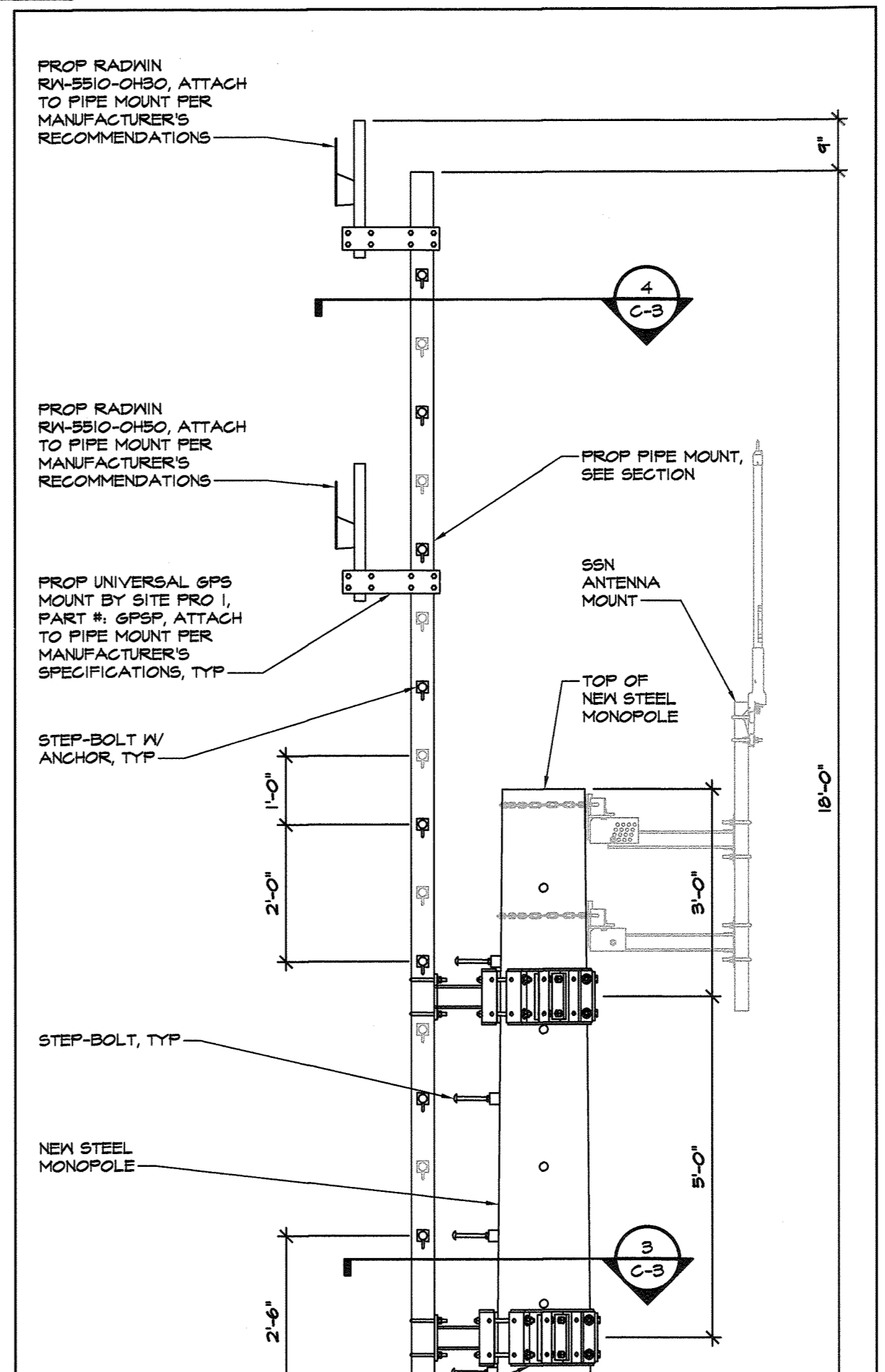
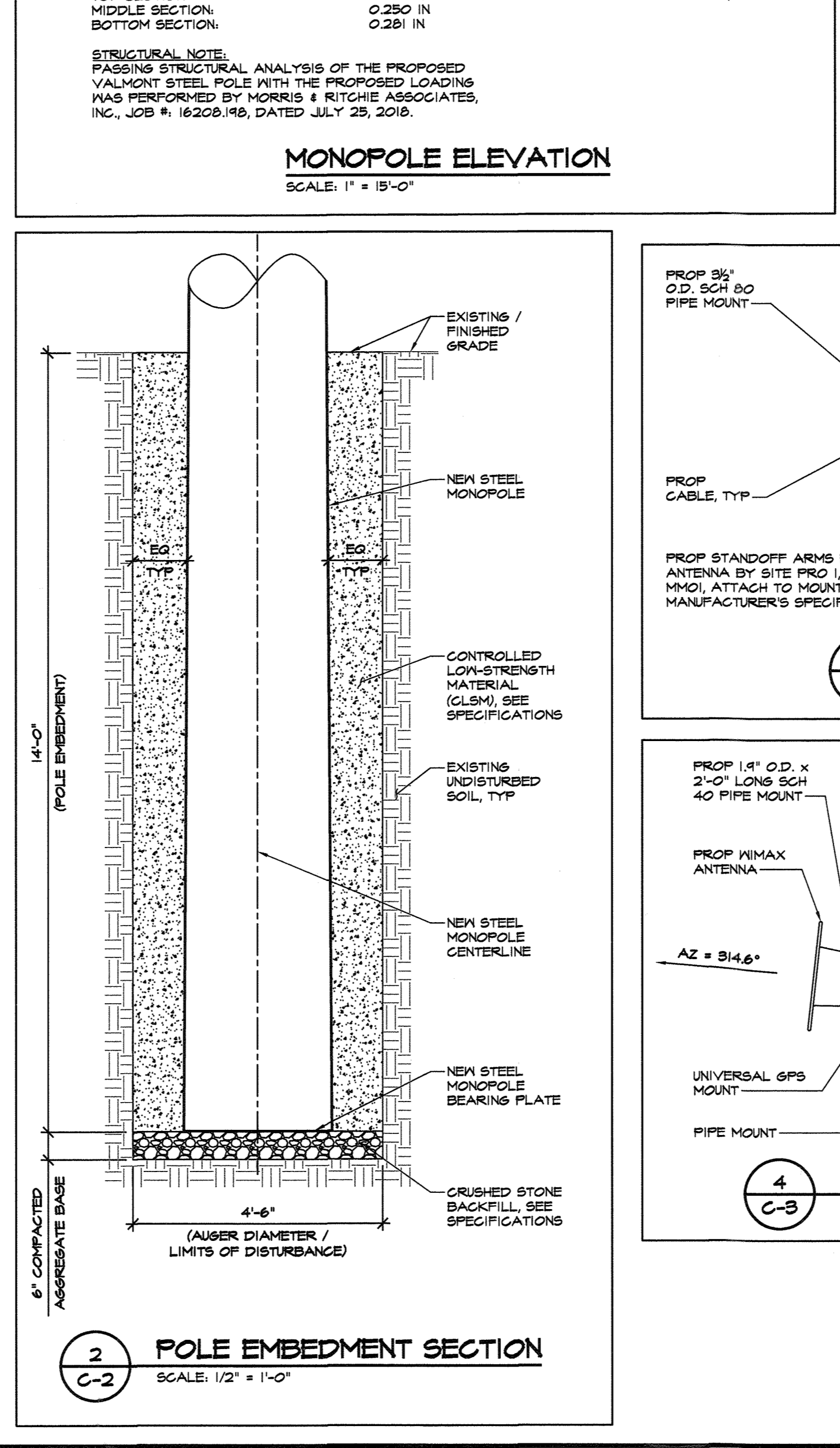
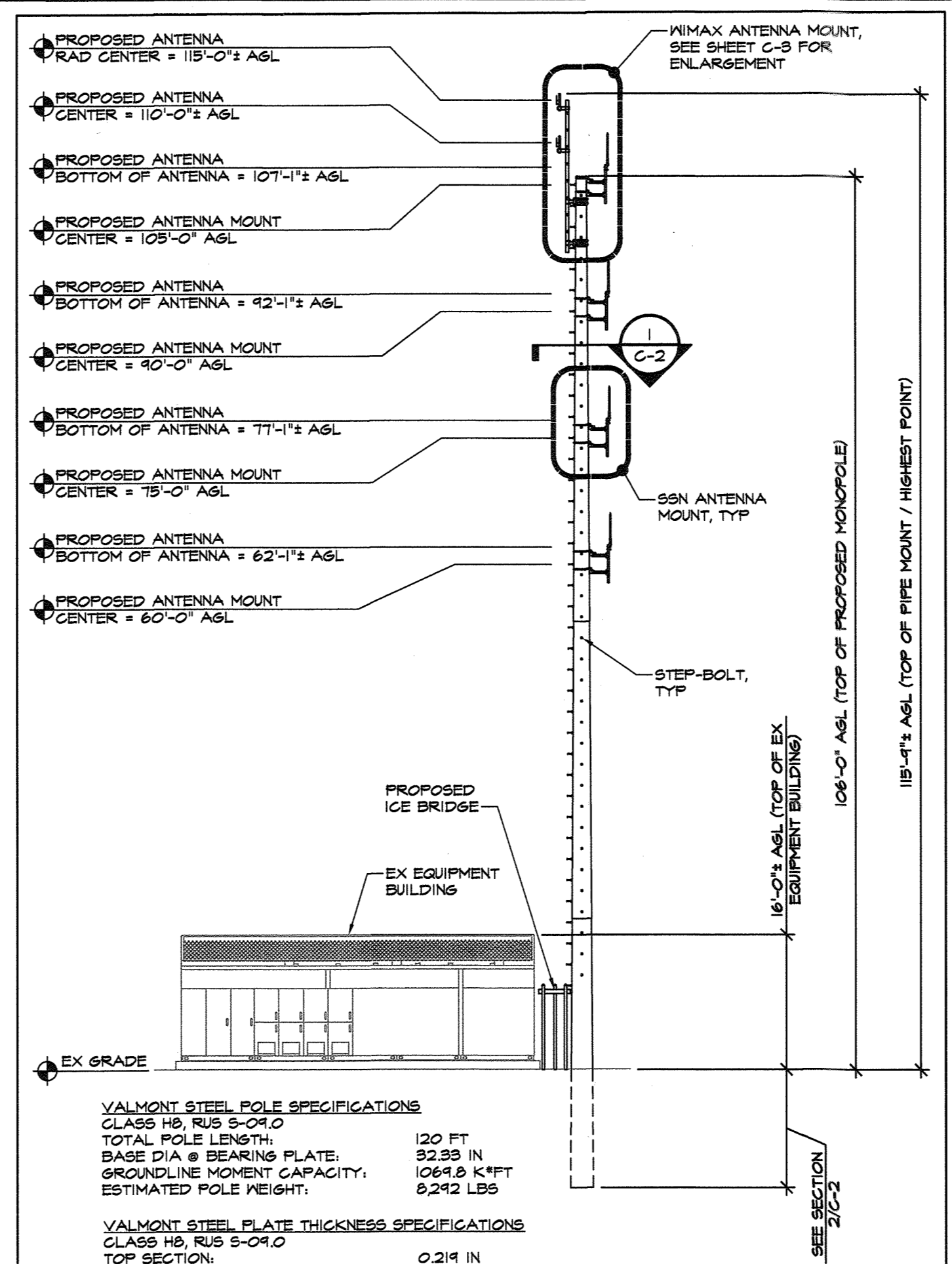
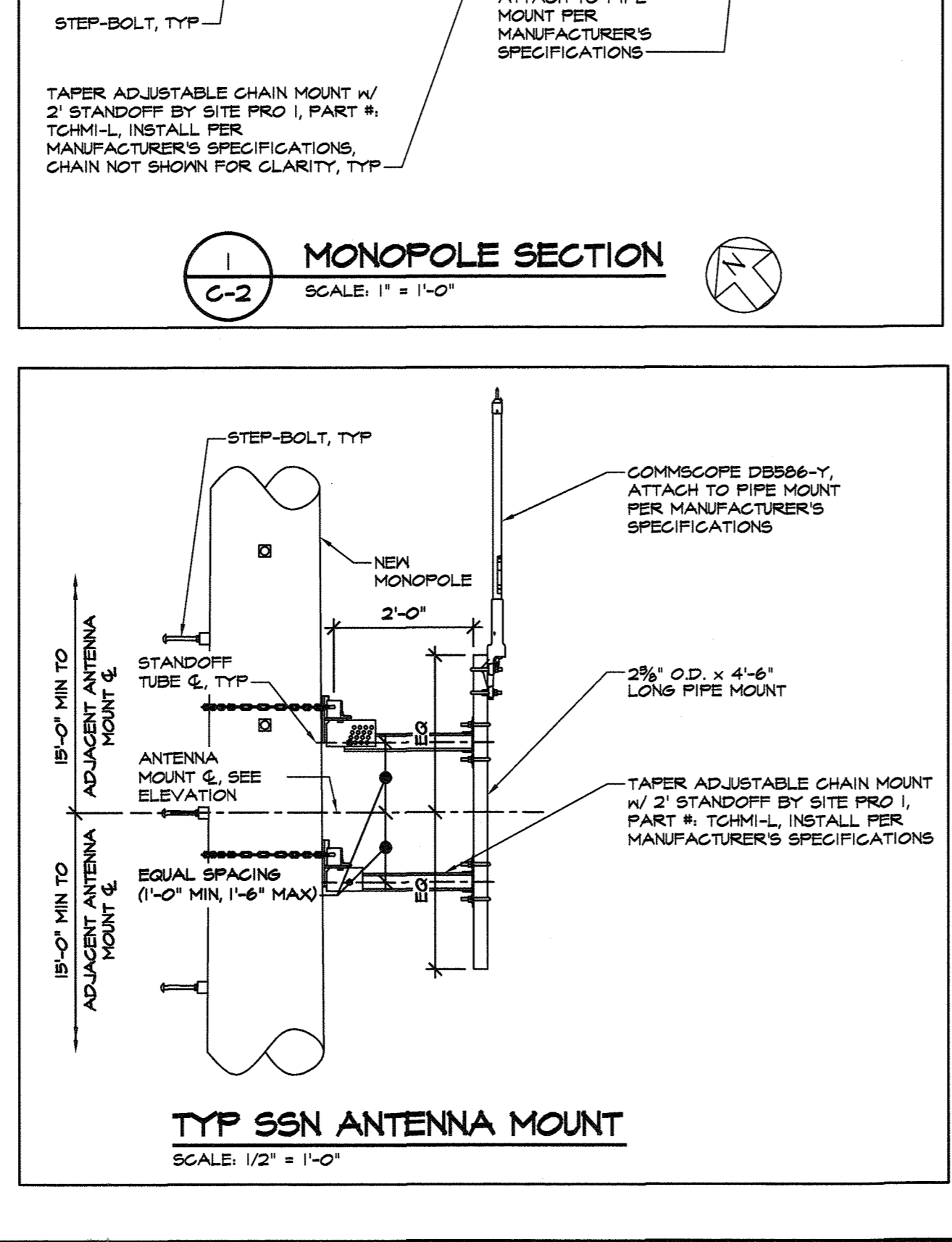
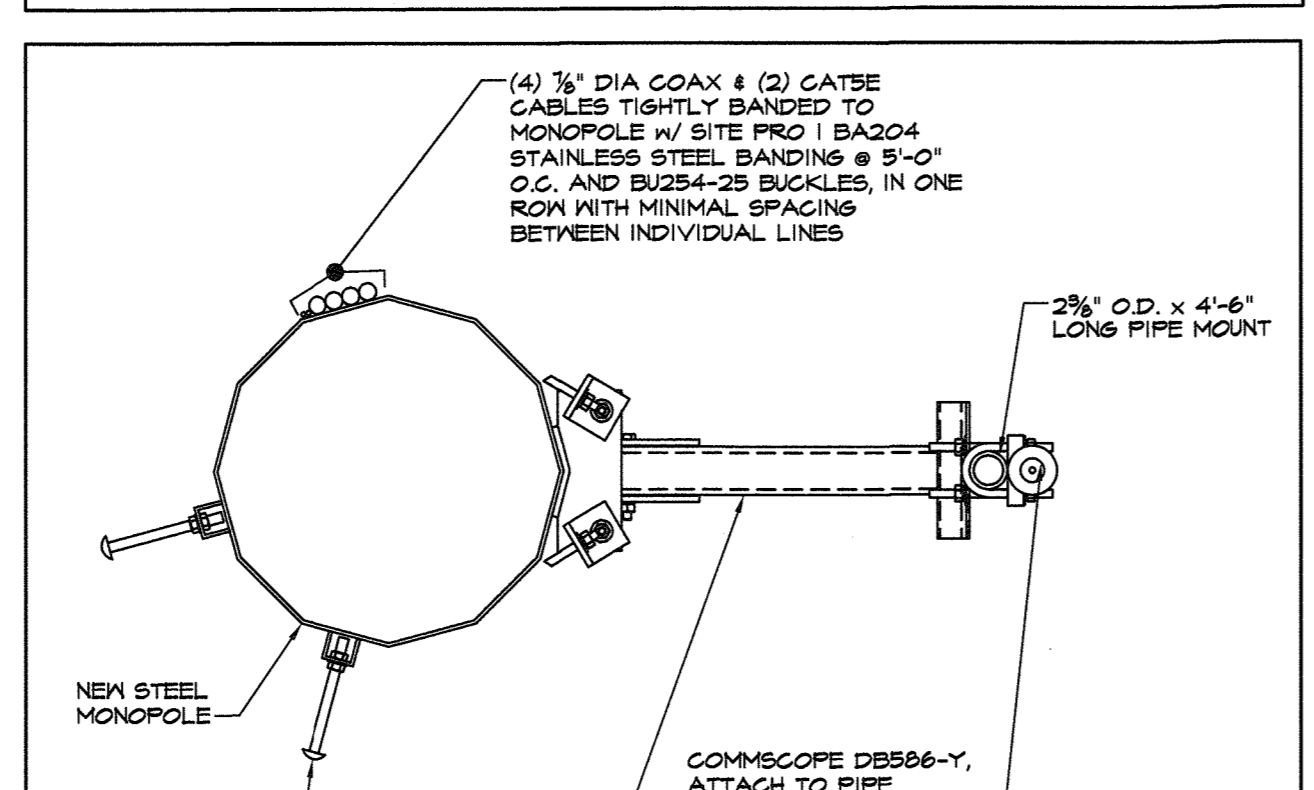
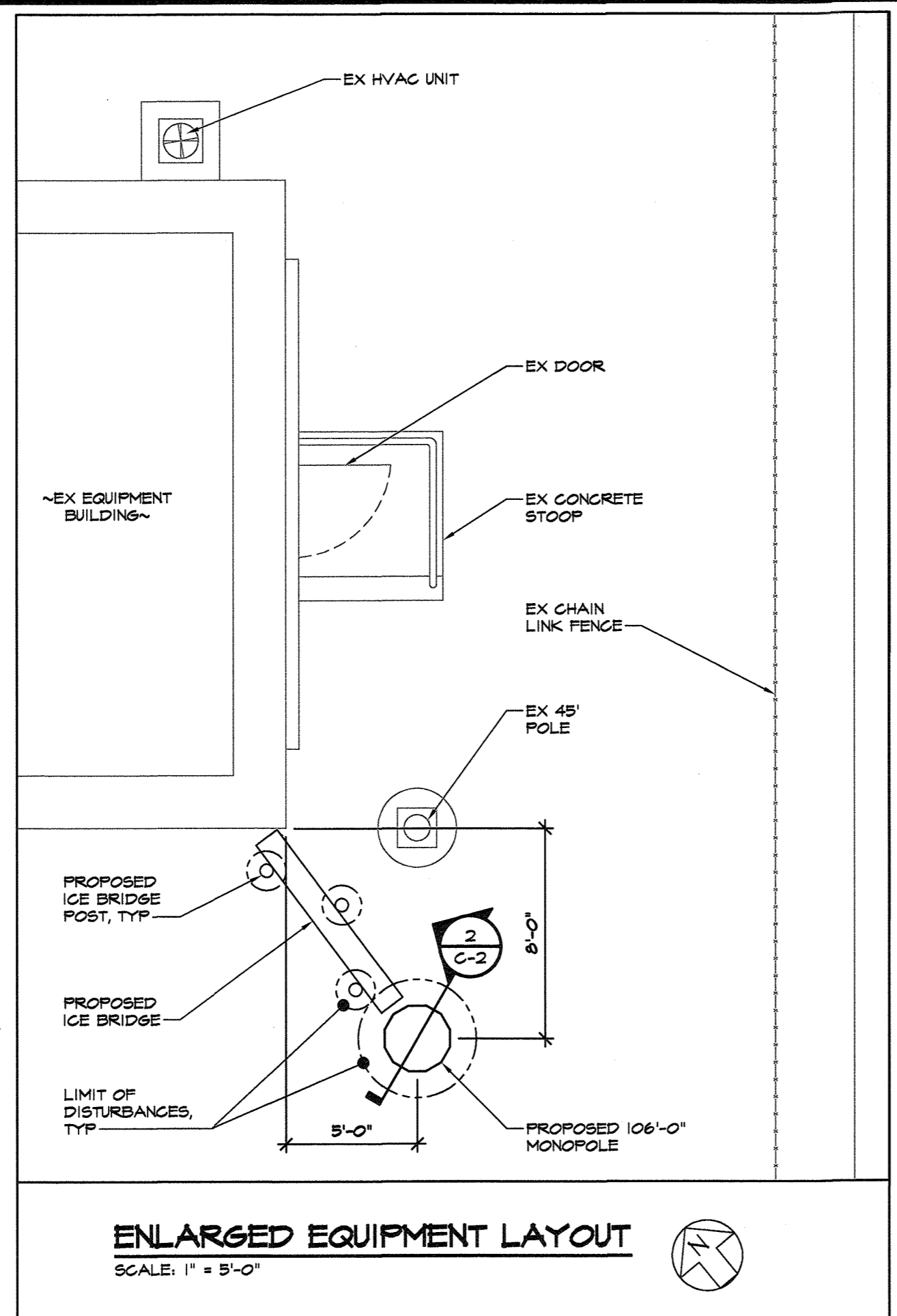
- THE MINIMUM 28 DAY COMPRESSIVE STRENGTH SHALL BE 500 PSI.
- THE MINIMUM UNCONFINED COMPRESSIVE STRENGTH AT 6 HOURS SHALL BE 50 PSI. THE STEEL MONOPOLE SHALL BE TEMPORARILY SUPPORTED DURING THE CLEM 6 HOURS SETTING PERIOD TO ALLOW THE CLSM TO PROPERLY CURE.
- THE MINIMUM FLOW (SLUMP) SHALL BE 8 INCHES WHEN TESTED IN ACCORDANCE WITH ASTM D6103.
- ALL CLSM MIX DESIGNS, INCLUDING CEMENT CONTENT, WATER CEMENT RATIO, FINE AND COARSE AGGREGATE CONTENT AND ALL ADMIXTURES, SHALL BE REVIEWED BY ENGINEER PRIOR TO PLACING FIRST CLSM.
- ALL CLSM SHALL BE SAMPLED AND TESTED BY THE TESTING AGENCY. THE CONTRACTOR SHALL NOTIFY THE TESTING AGENCY WITHIN 24 HOURS PRIOR TO THE PLACING OF ANY CLSM. TESTING SHALL BE IN ACCORDANCE WITH ASTM C44.
- THE CLSM SHALL NOT BE REQUIRED TO SUPPORT WIND LOADINGS FOR A MINIMUM OF 6 HOURS AND ALL TEMPORARY BRACING REQUIRED TO SUPPORT THE MONOPOLE STRUCTURE DURING CONSTRUCTION SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR. SHOP DRAWINGS, SIGNED AND SEALED BY A REGISTERED ENGINEER IN THE STATE OF MARYLAND, SHALL BE SUBMITTED FOR REVIEW. SHOP DRAWINGS SHALL INDICATE THE TYPE, EXTENT, SIZE, AND LOCATION OF ALL TEMPORARY BRACING, AS WELL AS THE SEQUENCE OF CONSTRUCTION.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

11.30.18 DATE

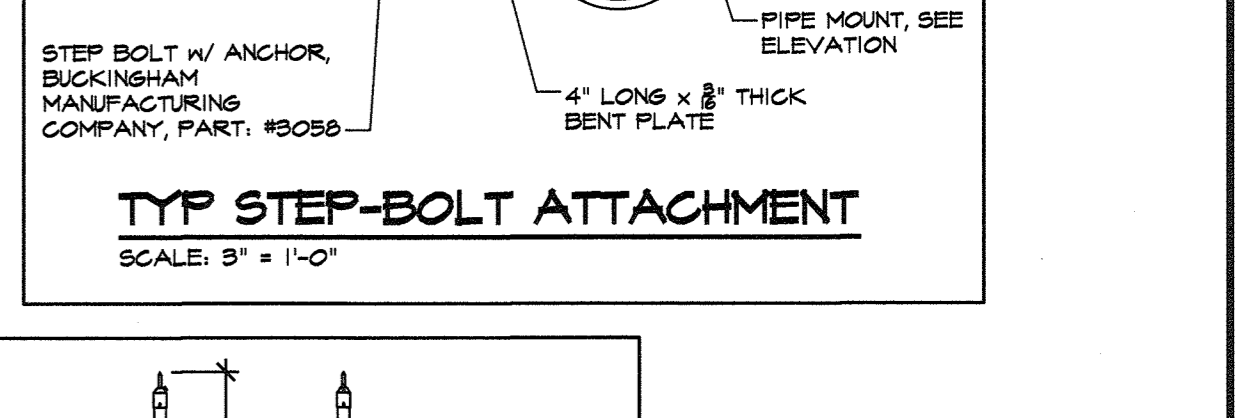
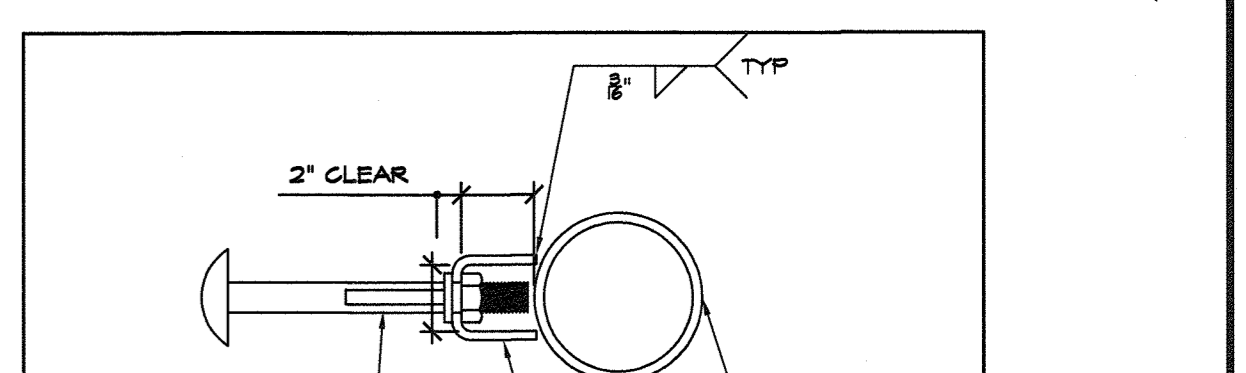
12.3.18 DATE

12.3.18 DATE



- SITE NOTES**
- SITE DATA: DEEP BOOK 04006 PAGE: 00580, PARCEL ID: 428800, TRACT AREA: 14500 AC, DISTRICT: 05, ADDRESS: 3600 BLOCK ROUTE 108, CLARKSVILLE, MD 21024, HOWARD COUNTY, EXISTING USE: UTILITY SUBSTATION.
 - ZONING: B-2
 - TOTAL DISTURBED AREA = ((1/4) * (4.5 FT^2) + (3 * ((1/4) * (1.5 FT^2))) = ~21 SF
 - TOTAL DISTURBED VOLUME = (14.5 FT * (1/4) * (4.5 FT^2) + (3 * (3.5 FT * (1/4) * (1.5 FT^2))) = ~244 CF = ~4 CY
 - APPROXIMATE HORIZONTAL AND VERTICAL CONTROL:

LATITUDE:	N84° 12' 48.95"	GROUND ELEVATION:	480.0' AMSL (AVG)
LONGITUDE:	W76° 56' 27.25"	TOP OF PROPOSED MONOPOLE:	106'-0" ASL
		HIGHEST APPURTENANCE ON MONOPOLE:	115'-8" ASL
		TOTAL ELEVATION (AMSL):	565.8' AMSL
 - THE PROPOSED FACILITIES WILL CONSIST OF FOUR (4) OMNI-DIRECTIONAL ANTENNAS AND (2) PANEL ANTENNAS MOUNTED ON A NEW 106'-0" MONOPOLE FOR THE RECEIPT OF BALTIMORE GAS & ELECTRIC TELECOMMUNICATIONS.
 - THE STRUCTURE WILL NOT SUPPORT LIGHTS OR SIGNS UNLESS REQUIRED FOR AIRCRAFT WARNINGS OR OTHER SAFETY RECORDS.
 - THE APPLICANT WILL PROVIDE A CERTIFICATION FROM A REGISTERED ENGINEER THAT THE STRUCTURE WILL MEET THE APPLICABLE DESIGN STANDARDS FOR WIND LOADS PER THE REQUIREMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION.
 - IF THE ANTENNAS ARE NO LONGER USED FOR TELECOMMUNICATIONS PURPOSES FOR A CONTINUOUS PERIOD OF ONE (1) YEAR, THEY SHALL BE REMOVED BY THE ANTENNA OWNER AT OWNER'S EXPENSE.
 - NO WATER OR SANITARY UTILITIES ARE REQUIRED FOR THE OPERATION OF THIS FACILITY.
 - STORMWATER MANAGEMENT NOTE: NO STORMWATER MANAGEMENT IS REQUIRED FOR THIS SITE.
 - BOUNDARY SHOWN PER JURISDICTIONAL RECORDS.
 - THIS PLAN PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT. PLAN IS SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.
 - ALL DETAILS SHOWN ARE 'STANDARD' OR 'TYPICAL' FOR REFERENCE ONLY. FOR ACTUAL DETAILS, SEE ARCHITECTURAL, STRUCTURAL, OR CONSTRUCTION PLANS BY OTHERS.
 - STRUCTURAL ANALYSIS/DESIGN TO BE PERFORMED BY OTHERS AT CLIENT AND/OR OWNER'S DISCRETION PRIOR TO COMMENCEMENT OF ANY WORK.
- GENERAL NOTES**
- CONTRACTOR SHALL NOTIFY 'MSS UTILITY' (1-800-251-7777) 48 HOURS PRIOR TO DOING ANY EXCAVATION IN THIS AREA. CONTRACTOR SHALL CONTACT A SUBSURFACE UTILITY LOCATOR FOR LOCATION OF EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS BY TEST PIT AS NECESSARY. LOCATION OF UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE AND FOR PLANNING PURPOSES ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. DAMAGE TO UTILITIES OR PROPERTY OF OTHER BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE REPAIRED TO PRECONSTRUCTION CONDITIONS BY THE CONTRACTOR.
 - ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL STATE AND LOCAL CODES AND ORDINANCES, THE LATEST EDITION THEREOF.
 - BUILDING PERMIT WILL BE OBTAINED BY BALTIMORE GAS & ELECTRIC. GENERAL CONTRACTOR SHALL SECURE ELECTRICAL PERMIT FOR THIS PROJECT FROM ALL APPLICABLE GOVERNMENTAL AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
 - CONTRACTOR SHALL COORDINATE ALL UTILITY CONNECTIONS WITH APPROPRIATE UTILITY OWNERS.
 - THESE PLANS ARE NOT FOR RECONSTRUCTION OR CONVEYANCE.
 - EXISTING PAVEMENT AND OTHER SURFACES DISTURBED BY CONTRACTOR (WHICH ARE NOT TO BE REMOVED) SHALL BE REPAIRED TO PRECONSTRUCTION CONDITIONS BY THE CONTRACTOR.



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Know what's below. Call before you dig.

PROTECT YOURSELF, ONE THREE HOURS DATE NOTE

THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THERE TO APPURTENANCE.

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS

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CLARKSVILLE SUBSTATION - BGE
SDP-04-057
ESSENTIAL TELECOMMUNICATION STRUCTURE

CONSTRUCTION DETAILS AND NOTES

COUNCIL DISTRICT 5, ZONE B-2 (BUSINESS GENERAL)
CLARKSVILLE, MD 21029 - HOWARD COUNTY

DATE	REVISIONS	JOB NO.:
11/16/2018	REVISED SITE DEVELOPMENT PLAN FOR TELECOM STRUCTURE AND NEW SHEET 9 MONOPOLE DETAILS	16208198
		SCALE: SEE DETAILS
		DATE: 11/16/20
		DRAWN BY: MAM
		DESIGN BY: MAM
		REVIEW BY: TM
		SHEET: 9 OF 9

MD PROFESSIONAL ENGINEER CERTIFICATION: 11-27-15

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 29203, EXPIRATION DATE: 06/16/2019.