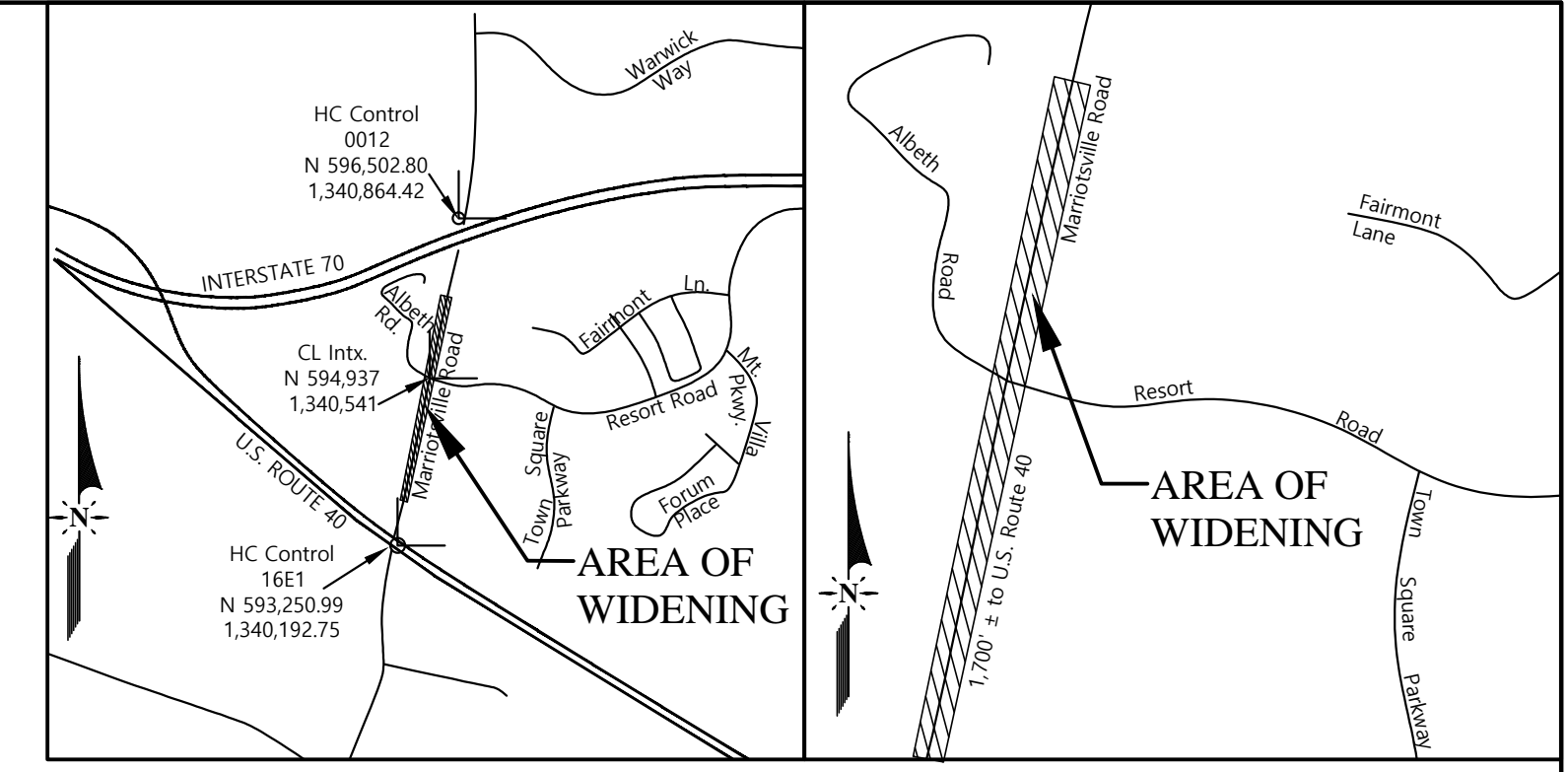


SHEET INDEX

Table with columns: TITLE, SHEET No. Includes entries like COVER SHEET (1 OF 60), EXISTING CONDITIONS PLAN (2 OF 60), GEOMETRY & PAVEMENT PLAN (3 OF 60), etc.

APFO MITIGATION PLANS
F-21-033
MARRIOTTSVILLE ROAD WIDENING
STA. 230+82 TO 251+00
HOWARD COUNTY, MARYLAND



LOCATION MAP
SCALE: 1"=2,000'
ADC MAP 19/B3

VICINITY MAP
SCALE: 1"=600'

GENERAL NOTES

- 1. SUBJECT PROPERTY IS PART OF TAX MAP 16, BLOCK 10, MARRIOTTSVILLE ROAD RIGHT-OF-WAY. DEDICATION OF ADDITIONAL RIGHT-OF-WAY WILL OCCUR PRIOR TO CONSTRUCTION.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
3. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF WORK.
4. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
5. EXISTING TOPOGRAPHY FROM 230+50 TO 251+00 IS TAKEN FROM A FIELD RUN SURVEY AT 2' CONTOUR INTERVALS PERFORMED BY BENCHMARK ENGINEERING, INC. DATED MAY 2019, SUPPLEMENTED WITH HOWARD COUNTY GIS AND WINGS AERIAL MAPPING DATED MARCH 2007.
6. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 16E1 AND 16H3 WERE USED FOR HORIZONTAL DATUM, AND 16EM3 WAS USED FOR VERTICAL DATUM FOR THIS PROJECT.
7. THE EXISTING UTILITIES ARE BASED ON FIELD RUN TOPOGRAPHY AND HOWARD COUNTY GIS AS WELL AS AS-BUILT DRAWINGS. THE EXISTING WATER CONTRACT IS #44-3480 AND THE EXISTING SEWER CONTRACT IS #24-3447.
8. TRAFFIC CONTROL DEVICES, MARKINGS, AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MM/UTCDC). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ASPHALT.
9. THIS PROPERTY IS WITHIN THE METROPOLITAN DISTRICT. WATER IS PUBLIC UNDER CONTRACT NUMBER 44-3480, SEWER IS PUBLIC UNDER CONTRACT NUMBER 24-3447.
10. STORMWATER MANAGEMENT FOR THE PUBLIC PORTION OF THIS DEVELOPMENT WILL BE BY GRASS SWALES, A SUBMERGED GRAVEL WETLAND (M-2), AND A SURFACE SAND FILTER (F-1). THESE FACILITIES WILL BE PUBLICLY OWNED AND MAINTAINED BY HOWARD COUNTY.
11. THE ORIGINAL FLOODPLAIN WAS FROM DIGITAL FLOOD INSURANCE RATE MAP (DFIRM) 24027C00700 (EFFECTIVE 11/6/13). THE FLOODPLAIN SHOWN ON THIS PLAN, AS WELL AS ON THE PLANS FOR PROJECT F-21-011, IS FROM CHAPEL GATE WOODS PROJECT. THE FLOODPLAIN STUDY FOR THE CHAPEL GATE WOODS PROJECT, F-21-011, WAS PREPARED BY VOGEL ENGINEERING + TIMMONS GROUP, DATED SEPTEMBER 2019 (AS REVISED), AND WAS APPROVED ON JUNE 7, 2021. ANOTHER REPORT WAS PREPARED BY JOHNSON, MIRRAH, & THOMPSON (JMT) TO ANALYZE THE HEADWATER IMPACTS OF THE PROPOSED BOX CULVERT AND USED FOR HYDRAULIC ANALYSIS. THE REPORT IS A HYDROLOGIC AND HYDRAULIC ANALYSIS OF THE CULVERT AND NOT AN AMENDMENT TO THE FLOODPLAIN.
12. WETLANDS AND STREAMS SHOWN ON-SITE ARE BASED ON A WETLAND REPORT APPROVED ON APRIL 10, 2019, UNDER EOP-18-062. (REFERENCE MDE TRACKING NUMBER 201861481)
13. PER SECTION 16.1202(b)(2)(v) OF THE COUNTY CODE, LINEAR PROJECTS THAT IMPACT LESS THAN 20,000 SF OF FOREST ARE EXEMPT FROM THE FOREST CONSERVATION PLAN REQUIREMENTS WITH THE CONDITION THAT A DECLARATION OF INTENT IS FILED FOR THE PROJECT. GIVEN THAT THIS ROAD PROJECT WILL HAVE UNIQUE IMPACTS TO ONLY 14,020 SF OF EXISTING FOREST, THE PROJECT QUALIFIES FOR THAT EXEMPTION. THE OWNER SHALL SIGN AND SUBMIT A DECLARATION OF INTENT PRIOR TO RECEIVING SIGNATURE APPROVAL OF THIS PLAN.
14. NO SPECIMEN TREES ARE IMPACTED. FOR FURTHER DETAIL, SEE UTILITY NARRATIVE ON THIS SHEET.
15. THERE ARE NO IMPACTS TO STEEP SLOPES OF GREATER THAN 20,000 CONTIGUOUS SF.
16. NO HISTORIC DISTRICTS ARE ADJACENT TO THIS SITE. SITE IS NOT ADJACENT TO A DESIGNATED SCENIC ROAD.
17. SOILS ON-SITE ARE BASED ON THE ONLINE SOIL SURVEY, EFFECTIVE JUNE 12, 2020.
18. PROPOSED RELOCATION OF FIRE HYDRANTS, WATERLINE LINE AND MINOR SEWER REVISIONS ARE SHOWN ON FINAL PUBLIC WATER AND SEWER PLANS (24-5192-D) BEING REVIEWED CONCURRENTLY. ALL WATER VALVE BOXES AND SEWER MANHOLE COVERS WITHIN THE LIMITS OF DISTURBANCE WILL BE REQUIRED TO BE ADJUSTED (RAISED OR LOWERED) TO MATCH PROPOSED GRADES.
19. THE WIDENING INVOLVES RETENTION AND REMOVAL OF A PORTIONS OF THE EXISTING ROADWAY, WEDGE AND LEVEL IN AREAS AND PROPOSED FULL-SECTION WIDENING.
20. CONSTRUCTION WITH THIS PLAN WILL BE COORDINATED WITH CHAPEL GATE WOODS (F-21-011) AND CAPITAL IMPROVEMENT PLAN CIP-J-4215, WITH PORTIONS TO BE CONSTRUCTED CONCURRENTLY. BOTH PLANS INVOLVE ROAD WIDENING AND STORM DRAINAGE THAT WILL REQUIRE COORDINATION DURING DESIGN AND DURING CONSTRUCTION. PLEASE SEE PLAN FOR ADDITIONAL NOTES.
21. THE NECESSARY MDE/CORP PERMITS SHALL BE OBTAINED PRIOR FINAL APPROVAL OF THE GRADING PERMIT. A MDE NON-TIDAL WETLANDS AND WATERWAYS APPLICATION HAS SUBMITTED (NUMBER 21-NT-3111/20210606).
22. A LETTER FOR NECESSARY DISTURBANCE WAS SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING DATED DECEMBER 7, 2021 AND WAS APPROVED ON JANUARY 28, 2022. THE DISTURBANCE SHALL BE THE MINIMUM NECESSARY TO ADDRESS THE APFO ROAD MITIGATION REQUIREMENTS AND TO UPGRADE THE EXISTING CULVERT TO PROPERLY CONVEY THE 100-YEAR STORM. THE DISTURBANCES ARE REQUIRED TO FOLLOW THE MITIGATION METHOD THAT ANY AREA OF VEGETATION NOT PERMANENTLY IMPROVED WITH THE ROAD WIDENING AND CULVERT SHALL BE RE-VEGETATED AS REQUIRED THROUGH THE MDE PERMIT TO MEET BEST PRACTICES FOR ECOLOGICAL RESTORATION AND WATER QUALITY ENHANCEMENT.
23. STREET LIGHTS WILL BE REQUIRED IN ACCORDANCE WITH THE DESIGN MANUAL. STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURE AND POLE SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME III (1993) AND AS MODIFIED BY "GUIDELINES FOR STREET LIGHTS IN RESIDENTIAL DEVELOPMENT (JUNE 1993)". A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE. FINAL LOCATIONS OF STREET LIGHTS TO BE DETERMINED IN THE FIELD AND COORDINATED WITH THE US 40 PROJECT, CIP-J-4215. PLEASE SEE SHEETS 34 & 35 FOR APPROXIMATE LOCATIONS.
24. THESE PROPOSED ROAD IMPROVEMENTS SHALL SATISFY ALL OF THE TURF VALLEY APFO REQUIREMENTS PER PB CASE 368. THE TURF VALLEY APFO TRAFFIC STUDY WAS PREPARED BY THE TRAFFIC GROUP ON 1/7/05 AND UPDATED ON 8/1/06 AND APPROVED UNDER THE 4TH AMENDED CSP, S-86-013.
25. TURF VALLEY WILL CONTRIBUTE \$125,000 TO THE COST OF THE TRAFFIC SIGNAL MODIFICATION WORK PROPOSED AT THE INTERSECTION OF U.S. ROUTE 40 AND MARRIOTTSVILLE ROAD. THIS AMOUNT WILL BE PAID DURING THE EXECUTION OF THE DEVELOPER'S AGREEMENT.
26. THERE SHALL BE TWO (2) PERFORMANCE BONDS FOR THESE PROPOSED IMPROVEMENTS. THE FIRST BOND SHALL BE FOR THE CONSTRUCTION OF THE ROAD WIDENING AND THE SECOND BOND SHALL BE FOR THE REPLACEMENT OF THE BOX CULVERT.
27. ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE POST (14 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (12 GAUGE) - 3' LONG. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.

SITE DATA

DEED REFERENCE: SHA PLATS 31492, 31494, 31498, 31499
PARCEL INFO: TAX MAP 16, GRID 10, ROAD RIGHT-OF-WAY
ELECTION DISTRICT: 3RD
LOCATION: MARRIOTTSVILLE ROAD / US ROUTE 40 / US ROUTE 70
EXISTING USE OF SITE: PUBLIC ROADWAY
PROPOSED USE OF SITE: PUBLIC ROADWAY
DPZ REFERENCES:

DESIGN NARRATIVE

THE WIDENING ALONG MARRIOTTSVILLE ROAD REQUIRES ENVIRONMENTAL SITE DESIGN (ESD) STRATEGIES TO MEET THE STORMWATER REQUIREMENTS OF HOWARD COUNTY AS WELL AS THE MARYLAND DEPARTMENT OF THE ENVIRONMENT. THE WIDENING AND ASSOCIATED GRADING IS LIMITED TO BE AS LIGHT AS POSSIBLE TO THE EXISTING ROADWAY AND ATTEMPTING TO STAY WITHIN THE CLEARED MARRIOTTSVILLE ROAD RIGHT-OF-WAY. THE EXISTING DRAINAGE AREAS ARE GENERALLY HONORED IN THE PROPOSED DESIGN. THE WIDENING OCCURS PRIMARILY ON THE WEST SIDE OF THE ROADWAY, WHICH AVOIDS IMPACTING THE CONSTRUCTED WETLAND MITIGATION TO THE EAST (SDP-10-056). THE EXISTING IMPERVIOUSNESS WITHIN THE RIGHT-OF-WAY IS OVER 40%, THEREFORE IS CONSIDERED REDEVELOPMENT.

EXISTING PAVEMENT AND SIDEWALK AREA: 2.48 ACRES
RIGHT-OF-WAY AREA: 6.51 ACRES
SUBTRACT ENV. BUFFER AREAS (FLOODPLAIN): 0.44 ACRES
2.48 / (6.51 - 0.44) = 41%

SOME OF THE EXISTING PAVEMENT WILL BE WEDGE AND LEVELED, WHICH WILL BE CONSIDERED REDEVELOPMENT, AND ONLY REQUIRE 50% OF THE AREA TO BE TREATED TO A P=11". THE PROPOSED WIDENING (FURTHER DEVELOPMENT) WILL REQUIRE TREATMENT OF AN AVERAGE P=2.34", AS WELL AS RECHARGE VOLUME. EACH OF THESE STUDY FRONTS REACH THE MINIMUM P=11". THE OVERALL LOD REQUIRES A P=1.44" AND THE COMBINED PRACTICES PROVIDE 1.66", HOWEVER, 1,256 CF OF VOLUME IS RESERVED FOR THE FUTURE ROUTE 70 OVERPASS PROJECT, THEREFORE THE BALANCE OF THE VOLUME PROVIDED IS 1.55", WHICH IS STILL IN EXCESS OF 1.44".

SP#1- THE NORTH SWALES (UPPER AND LOWER) ARE 4' AND 3'-WIDE GRASS SWALES, RESPECTIVELY AND PROVIDE SOME STORAGE USING GABION CHECK DAMS. INLETS ARE LOCATED AT THE OUTFALLS TO CONVEY THE STORMWATER TO THE FOREBAY OF A SURFACE SAND FILTER. ADDITIONAL RUNOFF SHEET FLOWS DIRECTLY INTO THE SURFACE SAND FILTER AND FOREBAY. THE TREATMENT TRAIN PROVIDES A P=2.3".

SP#2- FOUR FLOW-THROUGH INLETS DRAIN TO A SUBMERGED GRAVEL WETLAND (SGW) FACILITY. THE SGW PROVIDES A P=2.6".

SP#3- THE RUNOFF TO THE SOUTH SWALE IS TREATED IN AN VARIABLE-WIDTH GRASS SWALE (AVERAGE 7") WITH GABION CHECK DAMS. AN INLET (I-11) INTERCEPTS THE RUNOFF AND TIES INTO A STORM DRAIN TRUNKLINE (AS PART OF F-21-011) CROSSING MARRIOTTSVILLE ROAD. THE SWALE PROVIDES A P=1.2".

SP#4- THE RUNOFF TO THE FIRE ROAD SWALE IS TREATED IN A 6'-WIDE GRASS SWALE WITH GABION CHECK DAMS. THE RUNOFF FLOWS TO A CULVERT BEING DESIGNED BY OTHERS (AS PART OF J-4215). THE SWALE PROVIDES A P=1.1".

NOTE THAT THERE ARE SOME DRAINAGE AREAS BYPASSING THE TREATMENT. HOWEVER, GREATER AREAS OF EXISTING IMPERVIOUS ARE BEING TREATED THROUGH OVER-COMPENSATION.
EROSION AND SEDIMENT CONTROL WILL BE PROVIDED BY A TYPE I SEDIMENT TRAP (ST-1), GABION OUTLET STRUCTURE, STONE OUTLET STRUCTURE, AND INLET PROTECTION. THE EROSION CONTROL OF THE SAND FILTER AND SUBMERGED GRAVEL WETLAND WILL BE CONSTRUCTED LAST, IF POSSIBLE, WITH THE SAND, STONE, WETLAND SOIL, AND BIO-MEDIA INSTALLED ONLY AFTER UPHILL AREAS HAVE BEEN STABILIZED.

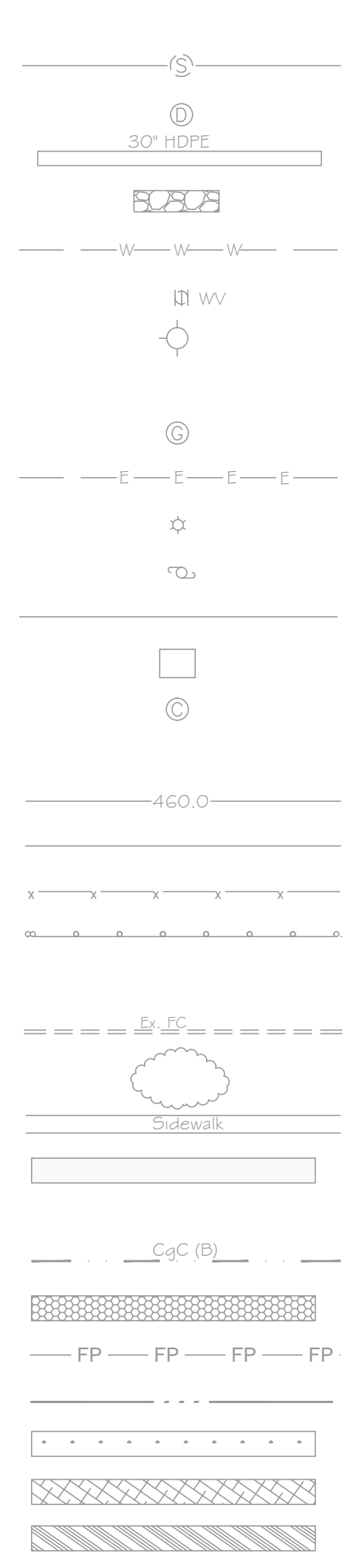
THE CHAPEL GATE PLANS (F-21-011) OVERLAP WITH THESE PLANS, WITH ONLY A PORTION OF THE TOTAL LIMIT OF DISTURBANCE BEING UNIQUE TO THESE PLANS. PLEASE SEE THE FOREST STAND DELINEATION AND FOREST CONSERVATION EXEMPTION PLAN FOR A GRAPHICAL SUMMARY OF THE AREAS. A LETTER DATED FEBRUARY 18, 2021 BY ECO-SCIENCE PROFESSIONALS, INC. ADDS ADDITIONAL DETAIL.

THE OVERALL DISTURBED AREA IMPACTS WETLANDS, FLOODPLAIN AND TREES. THE TOTAL LIMIT OF DISTURBANCE ALSO IMPACTS A STREAM (BRANCH OFF OF LITTLE PATUXENT RIVER). THERE ARE NO CONTIGUOUS AREAS GREATER THAN 20,000 SF OF STEEP SLOPES IMPACTED, BUT SMALLER AREAS ARE SHOWN ON THE PLAN. PER THE ABOVE REPORT, NO SPECIMEN TREES ARE LOCATED IN THE LIMIT-OF-DISTURBANCE. FINAL IMPACTS TO ENVIRONMENTAL FEATURES HAS BEEN DETERMINED AND WARNERS OR PERMITS HAVE BEEN PURSUED. A JOINT PERMIT APPLICATION (LISTED ABOVE) IS REQUIRED FOR IMPACTS TO THE FLOODPLAIN, WETLANDS, AND STREAM AND HAS BEEN APPLIED FOR UNDER MDE TRACKING NUMBER 21-NT-3111/20210606.

TOTAL LIMIT OF DISTURBANCE- 5.71 ACRES
EX. IMPERVIOUS AREA WITHIN LOD- 1.64 ACRES
PROP. IMPERVIOUS AREA WITHIN LOD- 4.07 ACRES
SUBTRACT OVERLAP W/ CHAPEL GATE (F-21-011)- 2.4 ACRES
REMAINING LIMIT OF DISTURBANCE- 3.3 ACRES

(BELOW ARE WITHIN THE REMAINING LOD)
WETLANDS IMPACTED- 0.19 ACRES
FLOODPLAIN IMPACTED- 0.18 ACRES
STREAM CHANNEL IMPACTED- 1.02 ACRES
FOREST IMPACTED- 369 LINEAR FEET
STREAM CHANNEL IMPACTED- 0.09 ACRES
FOREST IMPACTED- 0.32 ACRES
SLOPES >15%-25% IMPACTED 0.46 ACRES
SLOPES >25% IMPACTED 0.20 ACRES

LEGEND EXISTING CONDITIONS



SEWER, STORM DRAIN AND WATERLINE

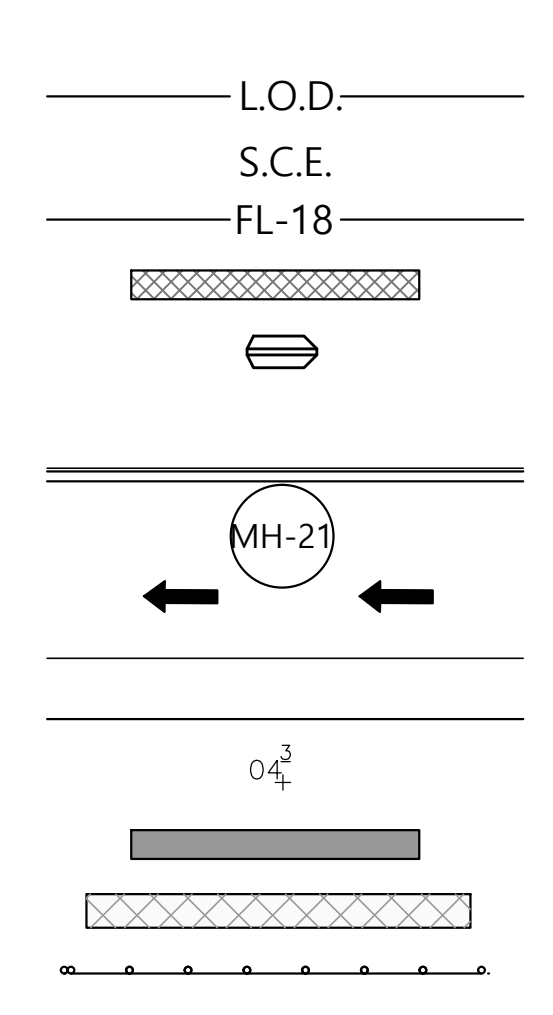
- Ex. Sanitary Manhole
Ex. Storm Drain Manhole
Ex. Storm Drain Pipe
Ex. Stone Rip-Rap
Ex. Waterline
Ex. Water Valve
Ex. Fire Hydrant
Ex. Gas Manhole/Meter
Ex. Electric Lines
Ex. Light Pole
Ex. Utility Pole
Ex. Overhead Utility Lines
Ex. Conc. Vault Box
Ex. Telecomm MH
Ex. Major Contour (10')
Ex. Minor Contour (2')
Ex. Fenceline
Ex. Guard Rail
Ex. Sign
Existing Concrete Curb and Gutter
Existing Tree/Vegetation

EXISTING TREE/VEGETATION

ENVIRONMENTAL

- Ex. Soils/Soil Types
Ex. Forest Conservation Easement
Ex. Floodplain
Ex. Stream
Ex. Wetlands
Ex. Steep Slopes- >15%-25%
Ex. Steep Slopes- >25%
(steep slopes shown are less than 20,000 sf contiguous and therefore may be disturbed)

LEGEND PROPOSED CONDITIONS



SEDIMENT CONTROL

- Prop. Limits of Disturbance
Prop. Stabilized Construction Entrance
Proposed Filter Log
Prop. Temporary Soil Stabilization Matting
Prop. Stone Check Dam

IMPROVEMENTS/UTILITIES/FEATURES

- Prop. 7" Standard Curb and Gutter
Prop. Storm Drain Structure
Prop. Painted Traffic Direction Arrow
Prop. Minor Contour
Prop. Major Contour
Prop. Spot Elevation
Prop. Paving
Prop. Wedge and Level over Ex. Paving
Prop. Guard Rail

Stormwater Management Information table with columns: Lot/Parcel Number, Facility Name & Number, Practice Type (Quantity), Public, Private, Maintenance, Misc.

STORMWATER MANAGEMENT SUMMARY TABLE with columns: Practice, DA (sf), Imp Area (sf), % Imp, Rv, Pe, Total ESDV Required, 75% ESDV Provided, 25% ESDV Provided, Total ESDV Provided, Pe Prov., Outfall Study Point, Rev (sf) Required, Rev (sf) Provided, Ownership.

Note: The North Grass Swales empty into the Surface Sand Filter where they are further treated as part of a treatment train. The overall Pe Requirement for the DA is 1.36 inches and the provided for the LOD is 1.57 inches. ESDV values in the Sand Filter provides treatment for the Route 70 overpass (1,256 cf). Subtracting that volume, the provided Pe for the LOD is 1.46 inches.

APPROVED: DEPARTMENT OF PUBLIC WORKS (Signature) 5/4/2023
CHIEF, BUREAU OF HIGHWAYS
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING (Signature) 4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT (Signature) 4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION

BENCHMARKS

HO. CO. #16EM3 (NAD '83) ELEV. 473.980
BEGIN RAMP FROM MARRIOTTSVILLE ROAD TO RT-70 EBL = 3/4" REBAR
HO. CO. #16H3 (NAD '83) ELEV. 469.648
STANDARD DISC ON CONCRETE MONUMENT ISLE AT CORNER RT-40 & MARRIOTTSVILLE RD. N 592408.074 E 1341524.016
HO. CO. #16E1 (NAD '83) ELEV. 463.834
STANDARD DISC ON CONCRETE MONUMENT ISLE AT CORNER RT-40 & MARRIOTTSVILLE RD. N 593250.989 E 1340192.746

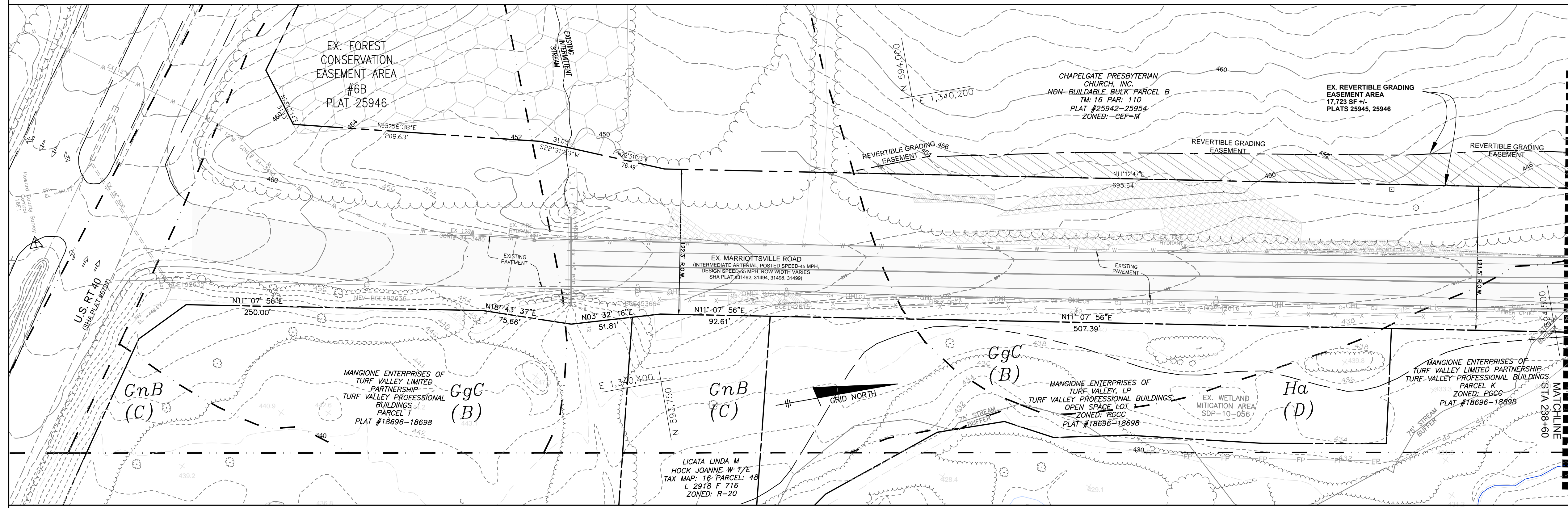
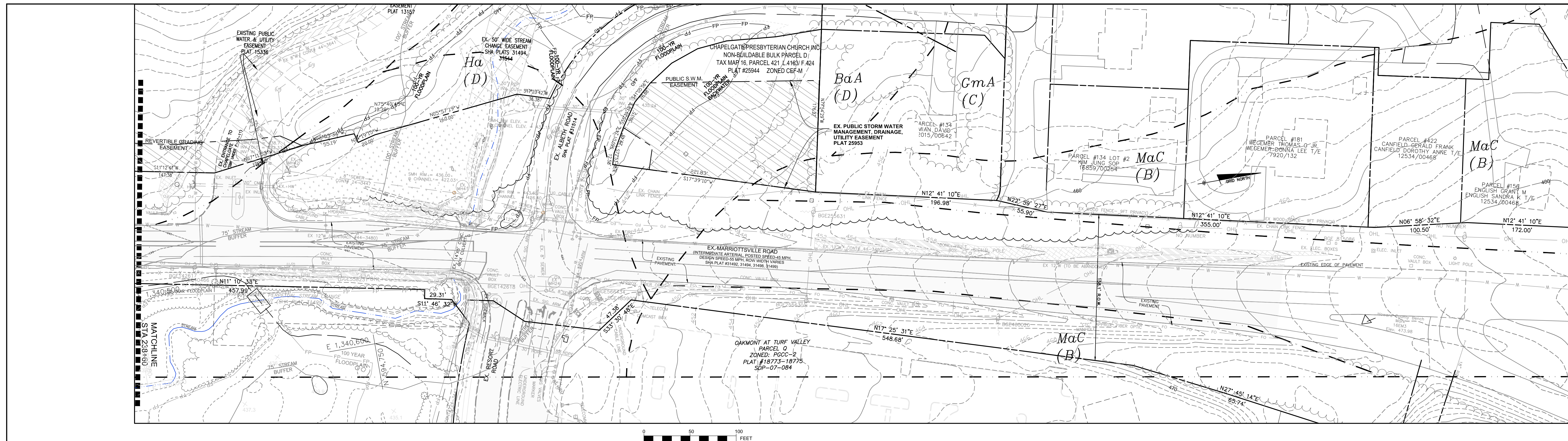
Table with columns: NO., DATE, REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

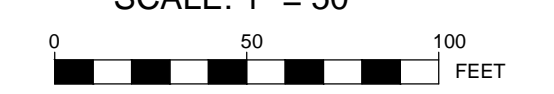
BENCHMARK ENGINEERS & LAND SURVEYORS & PLANNERS
ENGINEERING, INC.
3300 NORTH RIDGE ROAD SUITE 110A ELLICOTT CITY, MARYLAND 21043
410-465-6105 (P) 410-465-6644
WWW.BEI-ONLINEENGINEERING.COM
Professional Engineer Seal: PHILIP L. EDWARDS, No. 30736, Exp. 03.07.2023

OWNER: HOWARD COUNTY MARYLAND
MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP
DATE: MARCH 2023 BEI PROJECT NO. 2769
SCALE: AS SHOWN SHEET 1 OF 60





**EXISTING CONDITIONS PLAN**  
SCALE: 1" = 50'



**SOILS TABLE**

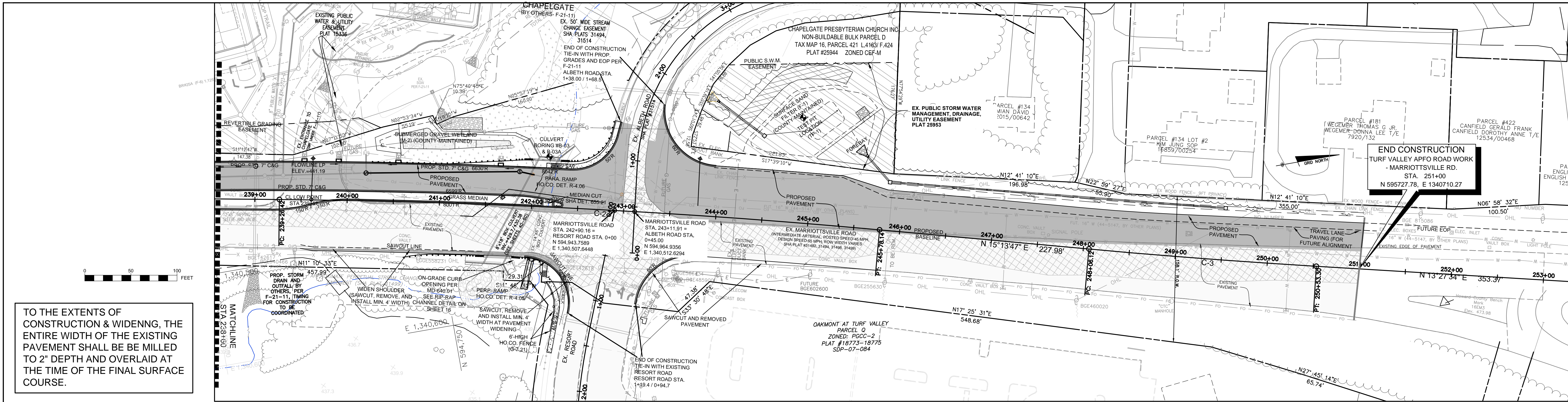
SYMBOL	SOIL TYPE	HSG	K FACTOR (WHOLE)
BaA	Baile silt loam, 0% to 3%	C/D	0.37 **
GgC	Glenelg loam, 8% to 15%	B	0.24
GmA	Glenville silt loam, 0% to 3%	C	0.43 **
GnB	Glenville-Baile silt loams, 0% to 8%	C	0.43 **
Ha	Hatboro-Codorus silt loams, 0% to 3%	B/D	0.37 **
MaC	Manor loam 8% to 15% slope	B	0.28
MaD	Manor loam 15% to 25% slope	B	0.28
UaF	Udorthents, Highway, 0% to 65%		

\*\* Soils over 0.35 are considered highly erodible and will need additional areas stabilized with soil stabilization matting.

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

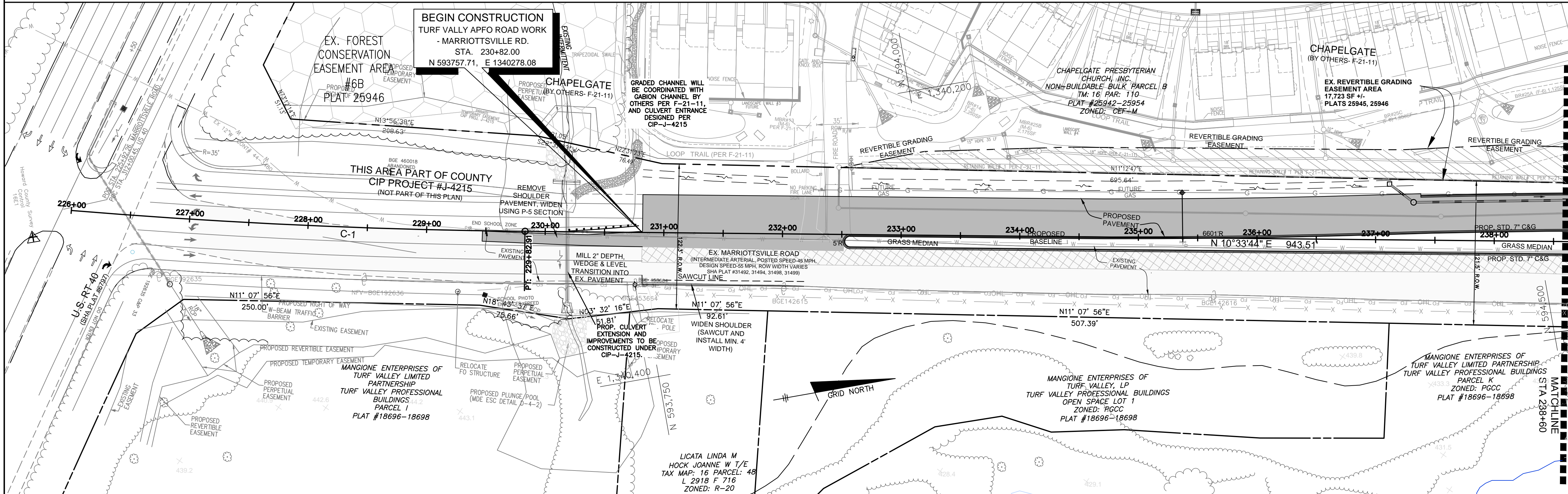
NO.		DATE		REVISION	
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.					
<b>BENCHMARK</b> ENGINEERS & LAND SURVEYORS & PLANNERS <b>ENGINEERING, INC.</b> 3300 NORTH RIDGE ROAD SUITE 140 ELLICOTT CITY, MARYLAND 21043 (P) 410-465-6105 (F) 410-465-6644 WWW.BEI-CIVILENGINEERING.COM					
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401			<b>MARRIOTTVILLE ROAD WIDENING                  APFO MITIGATION PLANS                  F-21-033</b>		
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND					
<b>EXISTING CONDITIONS PLAN</b>					
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400			DATE: MARCH 2023 BEI PROJECT NO. 2769		
DESIGN: MLS DRAFT: MLS			SCALE: 1" = 50' SHEET 2 OF 60		





TO THE EXTENTS OF CONSTRUCTION & WIDENING, THE ENTIRE WIDTH OF THE EXISTING PAVEMENT SHALL BE MILLED TO 2" DEPTH AND OVERLAID AT THE TIME OF THE FINAL SURFACE COURSE.

END CONSTRUCTION TURF VALLEY AFFO ROAD WORK - MARRIOTTVILLE RD. STA. 251+00 N 595727.78, E 1340710.27

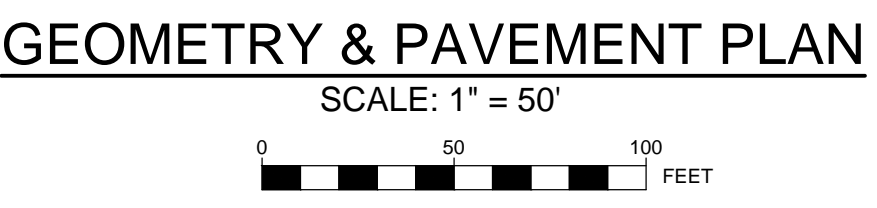


- REFERENCE NOTES:
- FOR STORM DRAIN PIPE SIZES AND TYPES, SEE PLAN ON SHEETS 7-8 AND PROFILES ON SHEETS 16-17. SEE SPECIFICATIONS, PIPE SCHEDULE AND NOTES ON SHEET 21.
  - FOR STORM STRUCTURE NUMBERS SEE PLAN ON SHEETS 7-8. SEE DETAILS ON SHEET 20 AND A SCHEDULE ON SHEET 21.
  - SEE CURB OPENING AND RIP-RAP FLUME DETAIL ON SHEET 20.
  - FOR GUARD RAIL, SIDEWALK, ADA RAMP DETAILS, SEE SHEET 6, HOWEVER FOR THE BARRIER OVER THE CULVERT SEE THE PLAN ON SHEET 43 AND DETAILS ON SHEETS 44 AND 51-53.
  - THE BOX CULVERT PLAN AND DETAILS ARE WITHIN SHEETS 40-60. THE PLUNGE POOL DESIGN IS ON SHEET 40. THE HEADWALL AND ENDWALL DESIGNS ARE ON SHEETS 45, 49-51, AND 54.
  - SEE SHEET 14 FOR PLAN LABELS FOR THE EXISTING WATER, SEWER, ELECTRICAL, AND COMMUNICATIONS. PLEASE NOTE THE WATER AND SEWER RELOCATION IS FURTHER DETAILED ON THE FINAL PUBLIC WATER AND SEWER PLANS, CONTRACT #24-5192-D.

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

BASELINE GEOMETRIC TABLE

STATION	NORTHING	EASTING	STATION	NORTHING	EASTING
226+00 (BEGIN)	593,286.7372	1,340,176.2007	C-3		
C-1			R = 8,000.00'		
L = 5,300.00'			L = 247.18'		
T = 191.54'			T = 123.60'		
DELTA = 4°08'22"			DELTA = 1°46'13"		
CB = N 12°37'55" E			CB = N 14°20'40" E		
C = 383.83'			C = 247.17'		
229+82.91 (PT)	593,660.2970	1,340,259.9193	250+53.30 (PT)	595,682.3689	1,340,699.4032
N 10°33'44" E 943.51'			N 13°27'34" E 353.37'		
239+26.42 (PC)	594,587.8239	1,340,432.8668	254+07.00 (END)	596,026.0295	1,340,781.6512
C-2					
R = 8,000.00'					
L = 651.72'					
T = 326.04'					
DELTA = 4°40'03"					
CB = N 12°53'45" E					
C = 651.54'					
245+78.14 (PT)	595,222.9248	1,340,578.2766			
N 15°13'47" E 227.98'					
248+06.12 (PC)	595,442.9035	1,340,638.1659			



FOR PAVEMENT MARKING AND SIGNING, PLEASE SEE PLANS "PAVEMENT MARKING AND SIGNING PLANS", SHEETS 28-39

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERING, INC.**  
 ENGINEERS & LAND SURVEYORS & PLANNERS  
 3300 NORTH RIDGE ROAD SUITE 100 ELLICOTT CITY, MARYLAND 21043  
 (P) 410-465-6105 (F) 410-465-6644  
 WWW.BE-CIVILENGINEERING.COM

Professional Engineer  
 M. L. Anderson  
 03.07.2023

OWNER: HOWARD COUNTY MARYLAND  
 DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS  
 3430 COURTHOUSE DRIVE  
 ELLICOTT CITY, MD 21043  
 410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
 1205 YORK ROAD, PENTHOUSE  
 LUTHERVILLE, MARYLAND 21093  
 410-825-8400

DESIGN: MLS DRAFT: MLS

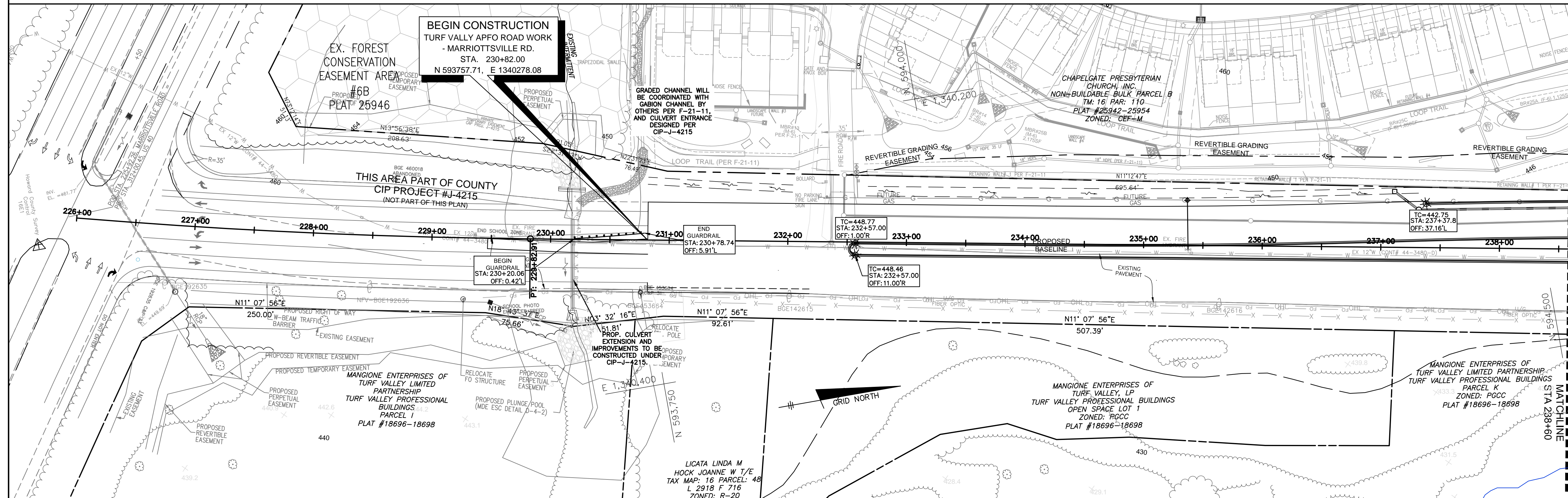
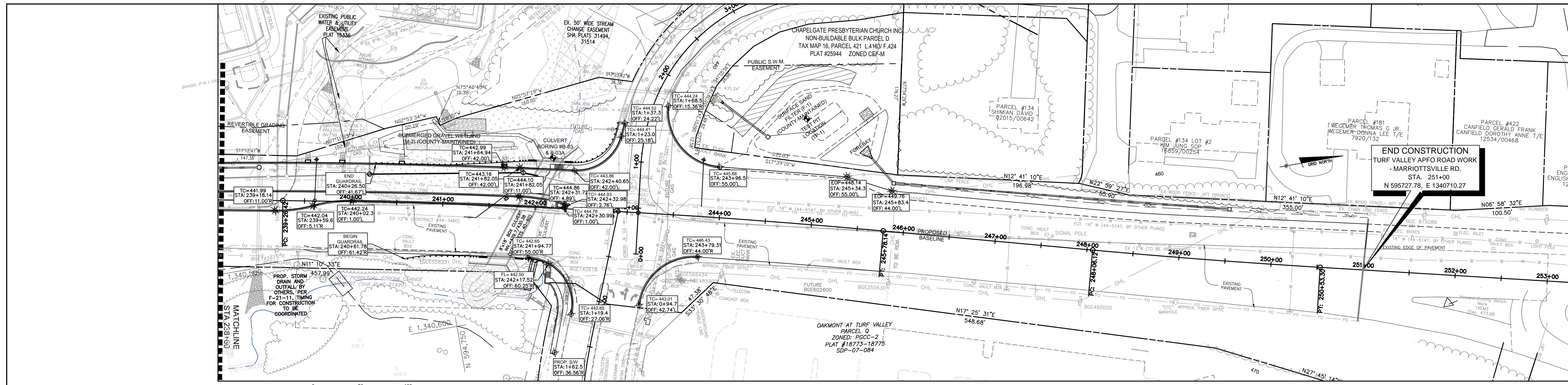
**MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
 ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

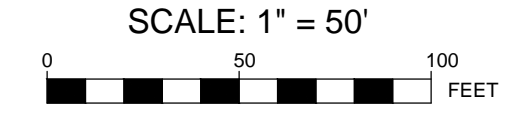
**GEOMETRY & PAVEMENT PLAN**

DATE: MARCH 2023 BEI PROJECT NO. 2769  
 SCALE: 1" = 50' SHEET 3 OF 60





LAYOUT PLAN SCALE: 1" = 50'



NO.	DATE	REVISION

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

FOR PAVEMENT MARKING AND SIGNING, PLEASE SEE PLANS "PAVEMENT MARKING AND SIGNING PLANS", SHEETS 28-39

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERING, INC.**  
 ENGINEERS & LAND SURVEYORS & PLANNERS  
 3300 NORTH RIDGE ROAD, SUITE 100, ELLICOTT CITY, MARYLAND 21043  
 (P) 410-465-6105 (F) 410-465-6644  
 WWW.BE-CIVILENGINEERING.COM

**MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
 ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**LAYOUT PLAN**

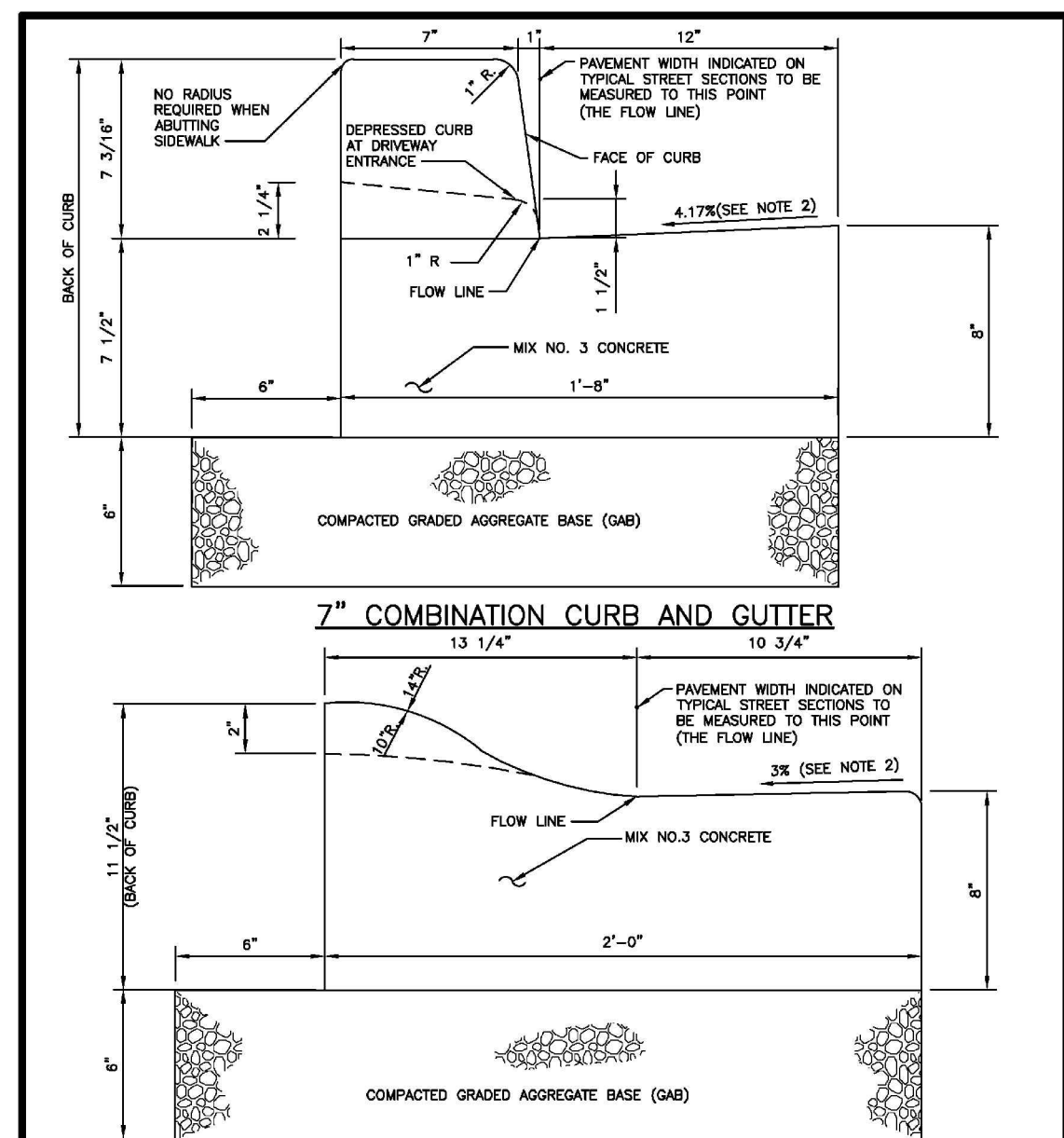
OWNER: HOWARD COUNTY MARYLAND  
 DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS  
 3430 COURTHOUSE DRIVE  
 ELLICOTT CITY, MD 21043  
 410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
 1205 YORK ROAD, PENTHOUSE  
 LUTHERVILLE, MARYLAND 21093  
 410-825-8400

DESIGN: MLS DRAFT: MLS

DATE: MARCH 2023 BEI PROJECT NO. 2769  
 SCALE: 1" = 50' SHEET 4 OF 60

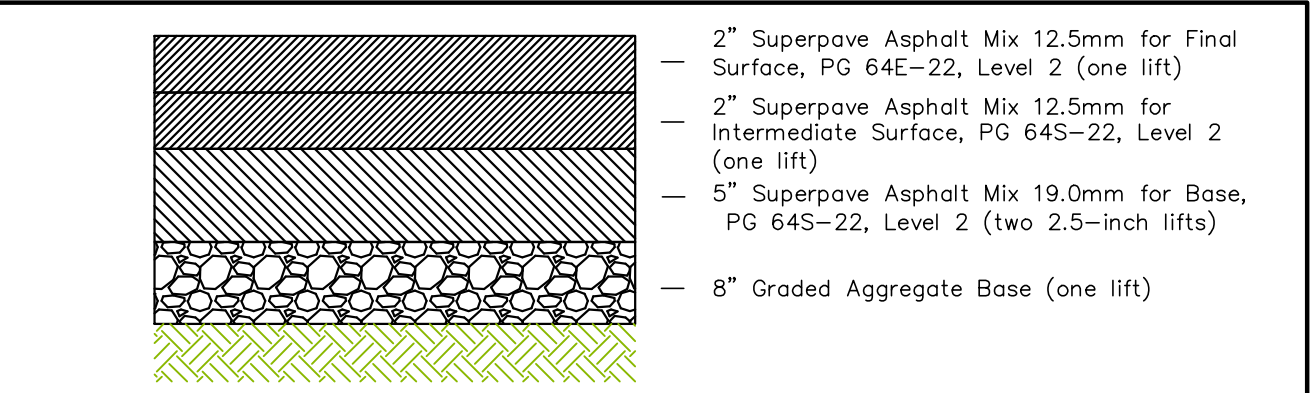
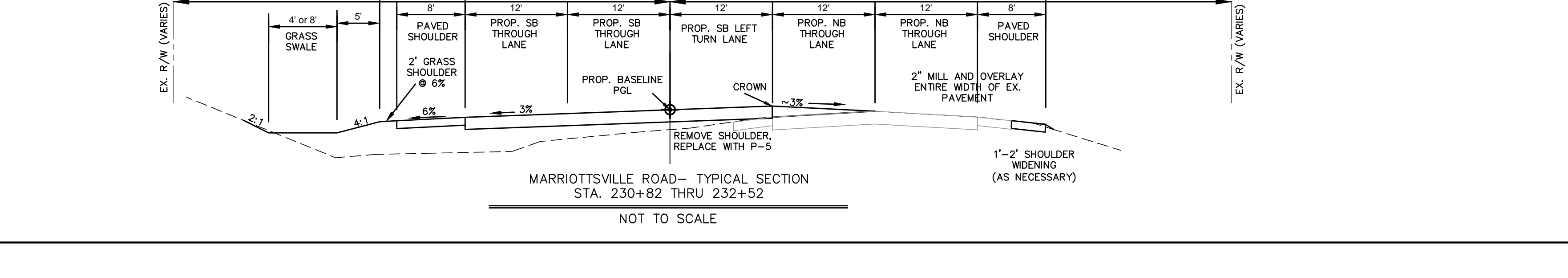
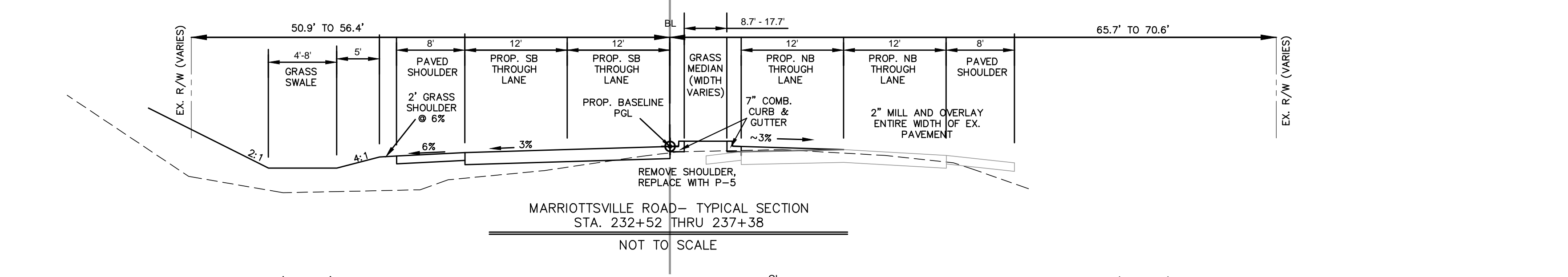
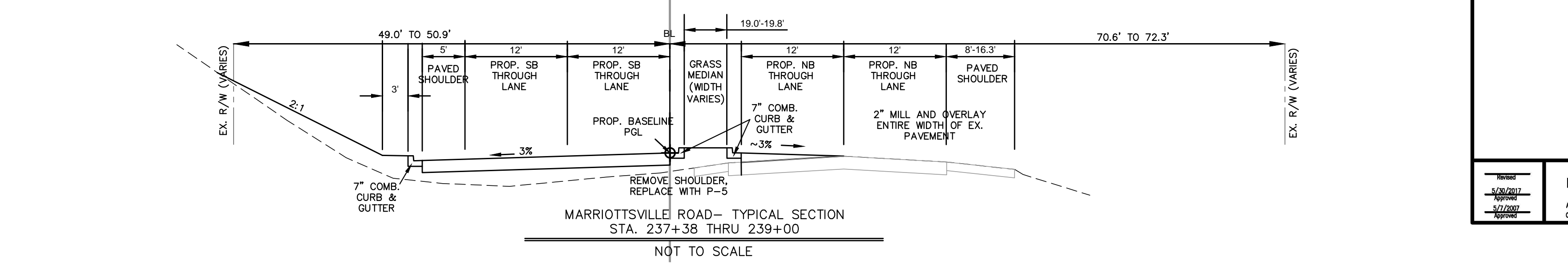
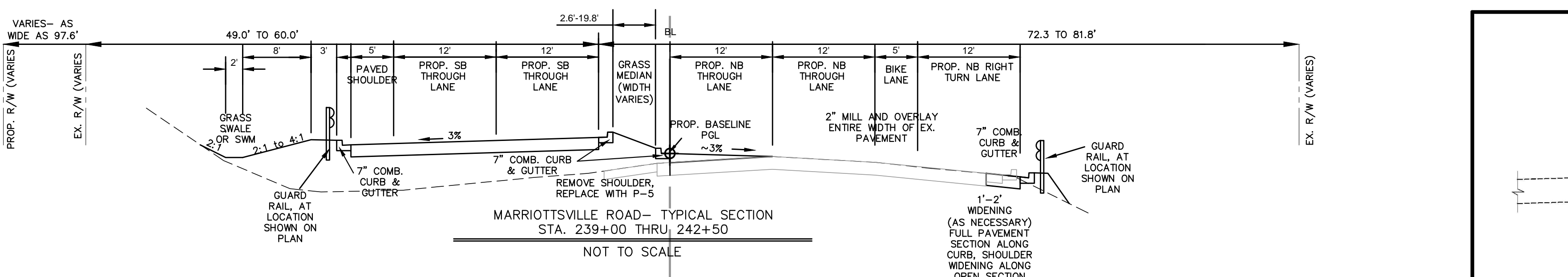
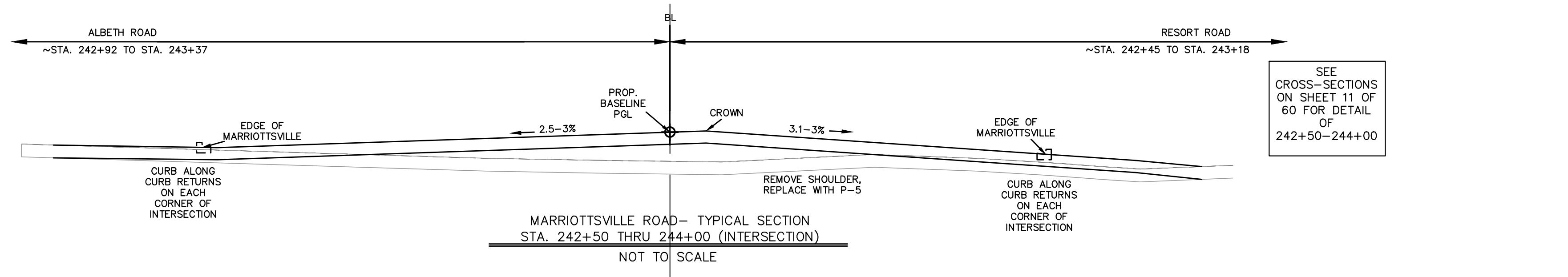
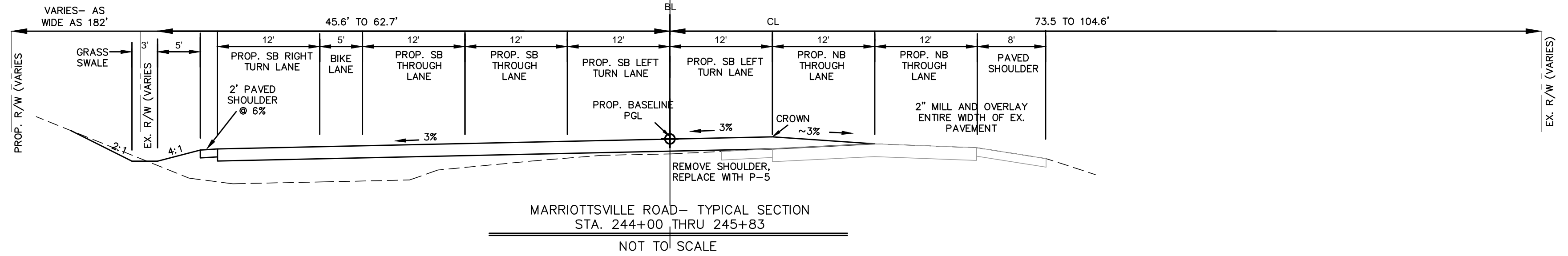
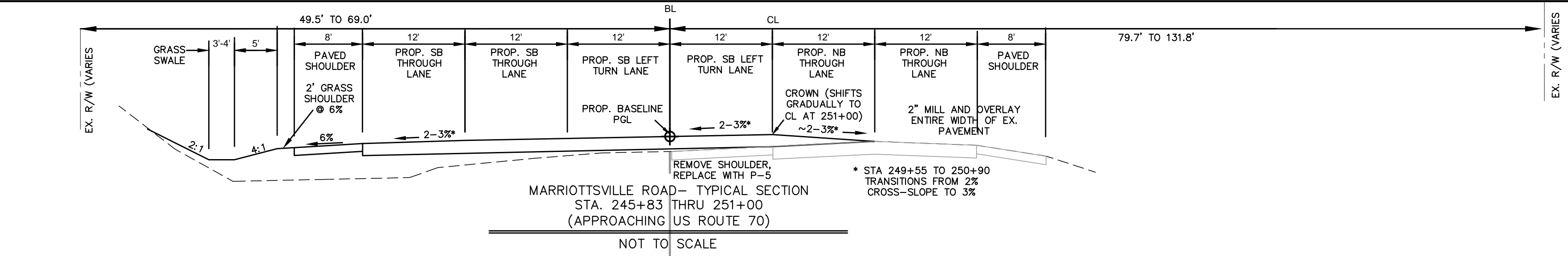




**NOTE: MODIFIED COMBINATION CURB AND GUTTER**

1. A REVERSE GUTTER PAN SHALL HAVE A GUTTER SLOPE OF 4.17% AWAY FROM THE FLOW LINE, AND SHALL NOT BE USED WHERE THIS DRAINAGE CREATES A HAZARDOUS CONDITION.
2. GUTTER PAN AT THE MEDIAN EDGE OF INTERMEDIATE ARTERIALS ON THE HIGH SIDE OF SUPERELEVATED SECTIONS SHALL BE SLOPED AT THE SAME RATE AND IN THE SAME DIRECTION AS THE ADJACENT MATCH PAVEMENT CROSS SLOPE WHEN CURB IS LOCATED ON THE LOW SIDE OF SUPERELEVATED SECTIONS AND THE RATE OF SUPERELEVATION IS GREATER THAN 3% FOR MODIFIED CURB & GUTTER.
3. A MINIMUM OF TWO (2) FEET OF COMPACTED STABILIZED EARTH, OR EQUIVALENT, SHALL SUPPORT THE ENTIRE BACK OF CURB.
4. POSITIVE DRAINAGE SHALL BE PROVIDED BOTH BEHIND THE CURB AND ALONG THE GUTTER AND FLOW LINE.

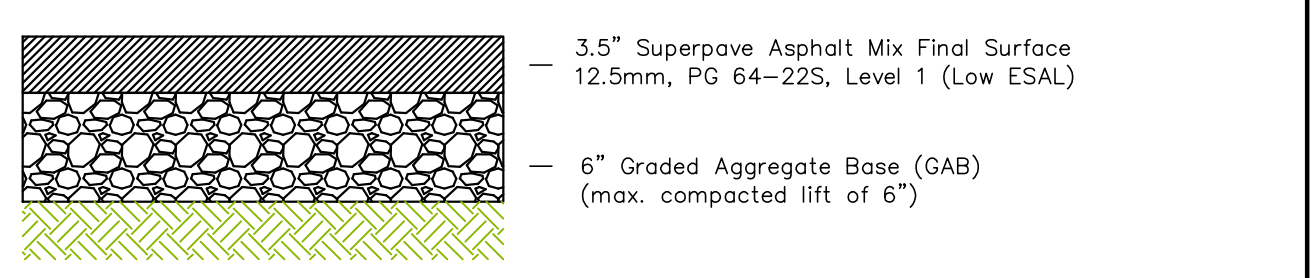
ISSUED	HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS	CURB AND GUTTER	Detail
REVISED	APPROVED: <i>Thomas R. South</i> Chief, Bureau of Engineering	7" & Modified	R-3.01



**MARRIOTTVILLE FULL ROAD PAVEMENT SECTION**  
N.T.S.  
\*\* FINAL PAVING DESIGN PER A PAVEMENT EVALUATION REPORT, BY J.M.T. DATED NOVEMBER 10, 2020 \*\* PAVEMENT SECTION PER HOWARD COUNTY STD. R-2.02 FOR MINOR ARTERIAL (P-5).

ALL TRAVEL LANES SHOULD USE THIS SECTION, AS WELL AS CLOSED SECTION SHOULDER, TO THE GUTTER PAN, WHERE AN EXISTING SHOULDER EXISTS WITHIN A TRAVEL LANE, THE EXISTING SHOULDER PAVEMENT SHALL BE REMOVED AND THIS PROPOSED FULL-DEPTH SECTION USED. THE WEDGE AND LEVEL SHALL NOT BE PERFORMED OVER THE EXISTING SHOULDER.

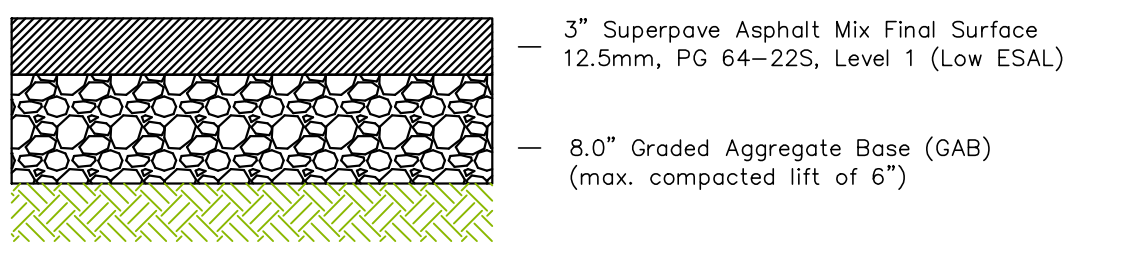
SEE SHA SPECIFICATIONS FOR PAVEMENT, AGGREGATE AND SUBGRADE REQUIREMENTS.  
EXISTING PAVEMENT SHALL BE CLEANED AND TACK-COATED PRIOR TO PLACEMENT OF THE PROPOSED PAVEMENT.  
THE INTERMEDIATE SURFACE COURSE MUST BE PLACED WITHIN 2 WEEKS OF PLACEMENT OF THE BASE COURSE



**WEST SIDE MARRIOTTVILLE ROAD PAVED SHOULDER SECTION (OPEN-SECTION ONLY)**  
N.T.S.

\*\* FINAL PAVING DESIGN TO BE DETERMINED BY GEOTECH BASED ON CBR'S OF IN-SITU SUB-GRADE MATERIAL, CONSTRUCTION TRAFFIC LOADS, TRAFFIC VOLUME AND COMPOSITION, ETC.\*\* PAVEMENT SECTION PER HOWARD COUNTY STD. R-2.02 PAVED SHOULDER FOR INTERMEDIATE ARTERIAL (P-8) AND ASSUMES A MIN. CBR OF 5 AND CONSTANT GAB.

SEE SHA SPECIFICATIONS FOR PAVEMENT, AGGREGATE AND SUBGRADE REQUIREMENTS.  
EXISTING PAVEMENT SHALL BE CLEANED AND TACK-COATED PRIOR TO PLACEMENT OF THE PROPOSED PAVEMENT.



**EAST SIDE MARRIOTTVILLE ROAD PAVED SHOULDER SECTION (OPEN-SECTION ONLY)**  
N.T.S.

\*\* FINAL PAVING DESIGN TO BE DETERMINED BY GEOTECH BASED ON CBR'S OF IN-SITU SUB-GRADE MATERIAL, CONSTRUCTION TRAFFIC LOADS, TRAFFIC VOLUME AND COMPOSITION, ETC.\*\* PAVEMENT SECTION PER HOWARD COUNTY STD. R-2.02 PAVED SHOULDER FOR INTERMEDIATE ARTERIAL (P-8) AND ASSUMES A MIN. CBR OF 5 AND TIE INTO EXISTING PAVEMENT.

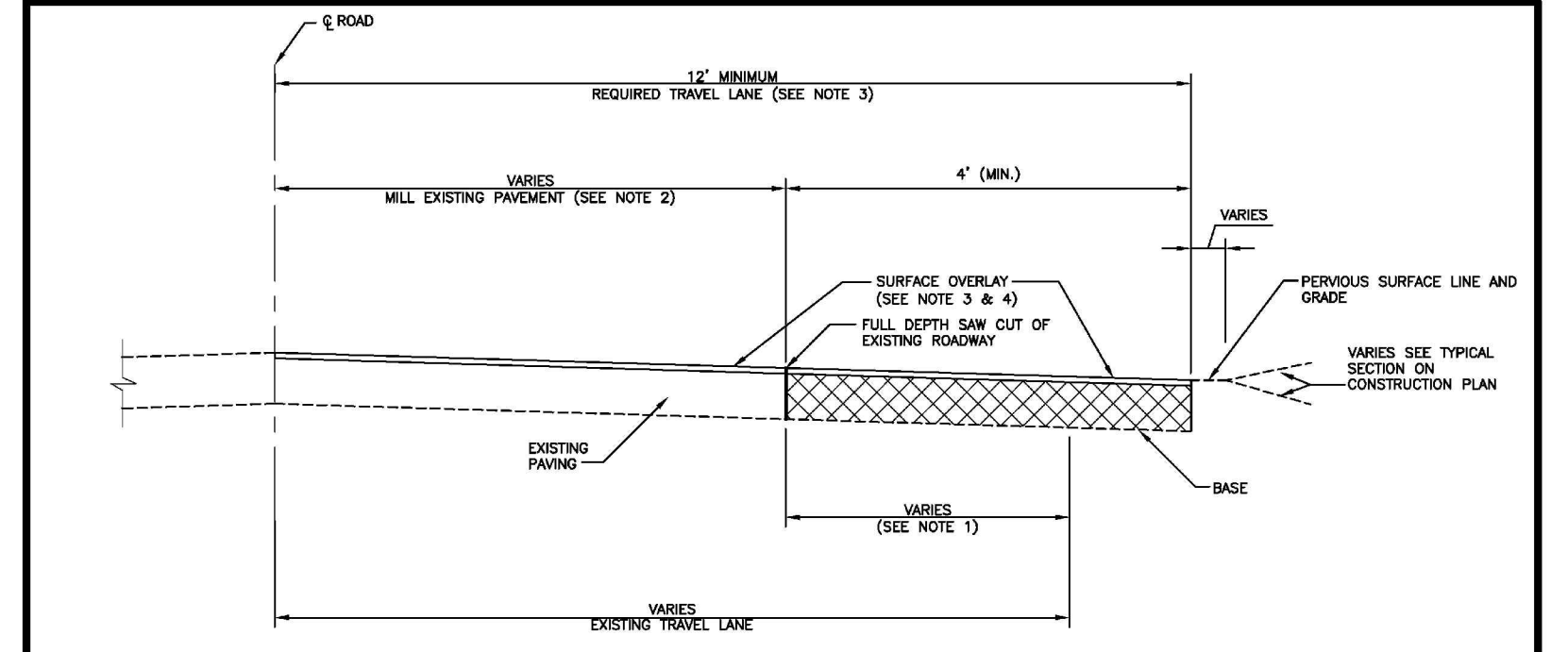
SEE SHA SPECIFICATIONS FOR PAVEMENT, AGGREGATE AND SUBGRADE REQUIREMENTS.  
EXISTING PAVEMENT SHALL BE CLEANED AND TACK-COATED PRIOR TO PLACEMENT OF THE PROPOSED PAVEMENT.

**OVERLAY, WEDGE/LEVEL, AND PATCHING NOTES**  
**Pavement Mill and HMA Overlay**  
Perform full-depth or partial depth patching where existing pavement exhibit structural distress. Following pavement patching, perform 2.0-inch milling of the remaining pavement after removal of the shoulder pavements for widening. Following milling, it is recommended that the surface be observed by a qualified pavement engineer to verify the surface is acceptable for overlay placement. If delaminated pavement is observed after milling it should be removed to suitable asphalt surface and be replaced in kind. After preoverlay treatment of the pavement surface, as described above, place the following:  
2" Superpave Asphalt Mix 12.5 mm for Final Surface, PG 64E-22, Level 2 (one Lift)

**Wedge/Level**  
For wedges/leveling requiring the placement of between 1" and 2" of material, use the following material:  
- Superpave Asphalt Mix 9.5 mm for Wedge/Level, PG 64S-22, Level 2  
For wedge/leveling requiring the placement of 2" or more of material, use the following material:  
- Superpave Asphalt Mix 19.0 mm for Wedge/Level, PG 64S-22, Level 2 (2-inch Minimum Lift Thickness and 4-inch Maximum Lift Thickness)

**Partial-Depth Patching**  
The estimated depth of partial-depth patching for mainline pavement is 4 inches. Use the following for partial depth patching operation for the mainline pavement:  
4" Superpave Asphalt Mix 19.0 mm for Partial-Depth Patching, PG 64S-22, Level 2 (One 4-inch lift)

**Full-Depth Patching**  
The estimated depth of full-depth patching for mainline pavement is 8 inches. Use the following 8" Superpave Asphalt Mix 19.0 mm for Full-Depth Patching, PG 64S-22, Level 2 (Two 4-inch lifts)



**NOTES:**  
1. WHEN EXISTING TRAVEL LANE IS LESS THAN THE REQUIRED 12' LANE CONTRACTOR SHALL REMOVE A MINIMUM OF 1" FULL DEPTH OF THE EXISTING ROADWAY. IF CURB AND GUTTER IS INSTALLED, PROVIDE A MINIMUM OF 4" OF WIDENING FROM FACE OF GUTTER PAN.  
2. THE EXISTING PAVEMENT TO BE RESURFACED SHALL BE MILLED AT DEPTH OF 1-4/2" (MINIMUM) - 2" (MINIMUM)  
3. THE RESURFACING SHALL BE PLACED TO THE CENTERLINE OF THE ROADWAY.  
4. RESURFACING COURSE TO BE EQUAL TO THE SURFACE COURSE OF THE TYPICAL PAVEMENT SECTION.

ISSUED	HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS	Existing Roadway Widening Strip	Detail
REVISED	APPROVED: <i>Thomas R. South</i> Chief, Bureau of Engineering		R-1.08

NO.	DATE	REVISION
 BENCHMARK ENGINEERS & LAND SURVEYORS & PLANNERS ENGINEERING, INC. 3300 NORTH RIDGE ROAD SUITE 100 ELLICOTT CITY, MARYLAND 21043 (P) 410-465-6105 (F) 410-465-6644 WWW.BE-CIVILENGINEERING.COM		
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.		
03.07.2023		
<b>OWNER:</b> HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		
<b>DEVELOPER:</b> MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400		
<b>DESIGN:</b> MLS <b>DRAFT:</b> MLS		
<b>MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033</b> TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND		
<b>ROADWAY TYPICAL DETAILS</b>		
DATE:	MARCH 2023	BEI PROJECT NO. 2769
SCALE:	NO SCALE	SHEET 5 OF 60

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE



**Notes:**

- ALL RAMP SHALL HAVE DETECTABLE WARNING SURFACES. SEE DETAIL R-4.07.
- GRASS AREA ADJACENT TO SIDEWALK MUST BE SLOPED TO MEET RAMP.

APPROVED: <i>K.R.G. McCall</i>	HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS	SIDEWALK RAMP Layout & Grading Parallel to Curb & Thru Median	Detail R-4.06
--------------------------------	---	---	------------------

**Notes:**

- ALL RAMP SHALL HAVE A WARNING TEXTURE EXTENDING THE FULL WIDTH OF RAMP. SEE DETAIL R-4.07.
- GRASS AREA ADJACENT TO SIDEWALK MUST BE SLOPED TO MEET RAMP.
- 4" SIDEWALK REQUIRES PAVING AREA (SEE DETAIL R-4.01).

APPROVED: <i>K.R.G. McCall</i>	HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS	SIDEWALK RAMP Layout & Grading Perpendicular to Curb	Detail R-4.05
--------------------------------	---	--	------------------

**Notes:**

- TO BE USED WHERE A STREET-LEVEL PROSTRACTION CROSSING IS REQUIRED THROUGH RAISED MEDIANS OR RAISED ISLANDS AND THERE IS INSUFFICIENT WIDTH TO PROVIDE A 4 FT. MEDIAN. A 4 FT. MEDIAN WIDTH IS ACCEPTABLE.
- WHERE PHYSICAL CONSTRAINTS PRECLUDE USE OF A 4 FT. MEDIAN, A 4 FT. MEDIAN WIDTH IS ACCEPTABLE.
- EXPANSION JOINT MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD MD 605.01.
- CUT-THROUGH MEDIAN AND ISLAND OPENINGS SHALL BE INCLUDED IN PRICE BID FOR MONOLITHIC CONCRETE MEDIAN. DETECTABLE WARNING SURFACE SHALL BE PAID FOR IN ACCORDANCE WITH SECTION 611 OF THE SPECIFICATIONS.
- CUT-THROUGH MEDIAN AND ISLAND OPENINGS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE OPENING AND TO A STANDARD CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED OPENING VARIES FROM STANDARD METHODS.

APPROVED: <i>K.R.G. McCall</i>	MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES CUT-THROUGH MEDIAN AND ISLAND OPENINGS	STANDARD NO. MD 655.21
--------------------------------	---	---	------------------------

**Notes:**

- 6:1 MAX GRADING IS ALLOWABLE WHEN THE BARRIER IS LOCATED 12 FT. OR MORE FROM THE OUTSIDE EDGE OF SHOULDER.
- END TREATMENT DELINEATION SHALL BE PLACED IN ACCORDANCE WITH STD. NO 605.02-01
- 4" FLARE REQUIRED
- TYPE B TERMINAL SHALL ONLY BE USED WHEN THE GRADING AS SHOWN AND THE REQUIRED LENGTH OF NEED IS PROVIDED.

APPROVED: <i>K.R.G. McCall</i>	MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES TYPE B TRAFFIC BARRIER END TREATMENT	STANDARD NO. MD 605.02
--------------------------------	---	--	------------------------

**Notes:**

- 6:1 MAX GRADING IS ALLOWABLE WHEN THE BARRIER IS LOCATED 12 FT. OR MORE FROM THE OUTSIDE EDGE OF SHOULDER.
- WHEN THE TRAFFIC BARRIER POST IS PLACED LESS THAN 4" FROM THE EDGE OF SHOULDER/PAVEMENT THE END TREATMENT SHALL BE PLACED AT A RATE OF 50:1
- GRADING SHALL BE AS SHOWN ABOVE.
- SYSTEM MUST BE INSTALLED AT 30 INCHES.
- END TREATMENT DELINEATION SHALL BE PLACED IN ACCORDANCE WITH STD. NO 605.02-01.

APPROVED: <i>K.R.G. McCall</i>	MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES TYPE C TRAFFIC BARRIER END TREATMENT	STANDARD NO. MD 605.03
--------------------------------	---	--	------------------------

**Notes:**

- THREE BEAM TERMINAL CONNECTOR, THREE BEAM SECTIONS AND W BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
- THE WOOD POSTS AND BLOCKS SHALL HAVE A STRESS GRADE OF 1200 PSI OR MORE.
- SEE STD'S. MD 605.29 & MD 605.41-52 FOR DETAILS OF THREE BEAM, SPLICE, TERMINAL CONNECTOR, TRANSITION SECTION, AND RECTANGULAR PLATE WASHERS.
- THE CONTRACTOR SHALL FURNISH AND INSTALL FIVE (5) 1/4" DIA. HEAVY DUTY GALV. THREADED ANCHOR RODS WITH HEX HEAD BUSHINGS AND RECTANGULAR PLATE WASHERS. ANCHOR RODS SHALL BE ANCHORED WITH PROVED GROUT AS SPECIFIED IN SPEC. 502.
- ALTERNATE ANCHORAGE METHOD "CAST IN CONCRETE" SHOWN ON STD. NO 605.44.

APPROVED: <i>K.R.G. McCall</i>	MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES TRAFFIC BARRIER THREE BEAM ANCHORAGE TO VERTICAL FACE (WOOD POST)	STANDARD NO. MD 605.41
--------------------------------	---	---	------------------------

**Notes:**

- NOTES ON STD. NO 605.10 APPLY TO OPTION 2 & 3. 1/2" THICK
- IF THE FOUNDATION TUBE AND SOIL PLATE (OPTION 3) ARE DRIVEN INTO THE SOIL, PROPER CARE SHOULD BE TAKEN TO ENSURE THAT THE SOIL PLATE FASTENERS ARE NOT BROKEN DURING THE DRIVING PROCESS.
- SECURE BEARING PLATE WITH 16 PENNY GALVANIZED NAIL TO PREVENT ROTATION OF PLATE.
- SAME AS MD 605.41 NOTE 4.

APPROVED: <i>K.R.G. McCall</i>	MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES TRAFFIC BARRIER THREE BEAM ANCHORAGE TO VERTICAL FACE OPTION 2 & 3 ANCHORAGE	STANDARD NO. MD 605.10-01
--------------------------------	---	--	---------------------------

**Notes:**

- ALL POSTS SHALL BE W X 8 AS SHOWN ON STANDARD NO 605.29.
- WOOD OFFSET BLOCKS SHALL BE AS SHOWN ON STANDARD NO 605.29.
- THE TRAFFIC BARRIER W-BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
- WAVE SPAN 5", 10" & 15" COG OR COG TALETS: LOW FILL BOX CURVE OR OTHER OBJECT WHICH INTERFERES WITH NORMAL PLACEMENT OF POSTS.
- THE SPLICE ON BOTH RAILS MUST BE COINCIDENT.

APPROVED: <i>K.R.G. McCall</i>	MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES TRAFFIC BARRIER W BEAM POST PLACEMENT DETAILS FOR SPANNING 12" TO 18" OPENINGS	STANDARD NO. MD 605.26
--------------------------------	---	--	------------------------

**Notes:**

- THREE BEAM TERMINAL CONNECTOR, THREE BEAM SECTIONS AND W BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
- THE WOOD POSTS AND BLOCKS SHALL HAVE A STRESS GRADE OF 1200 PSI OR MORE.
- RECTANGULAR WASHERS SHALL BE USED AT THE THREE BEAM TERMINAL CONNECTOR.
- SEE STD. NO 605.51-01 FOR DETAILS OF THREE BEAM, SPLICE, TERMINAL CONNECTOR, TRANSITION SECTION, SQUARE PLATE AND RECTANGULAR WASHERS.
- THE 12" X 8" CONCRETE SINGLE FACE END IS PAID FOR PER EACH FOR JERSEY SHAPE TO VERTICAL CONCRETE TRAFFIC BARRIER SINGLE FACE TERMINAL END.

APPROVED: <i>K.R.G. McCall</i>	MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES TRAFFIC BARRIER THREE BEAM ANCHORAGE TO VERTICAL FACE CONCRETE JERSEY	STANDARD NO. MD 605.44
--------------------------------	---	---	------------------------

NO.	DATE	REVISION

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: *[Signature]* 5/4/2023

CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: *[Signature]* 4/19/2023

CHIEF, DIVISION OF LAND DEVELOPMENT

DocuSigned by: *[Signature]* 4/21/2023

CHIEF, DEVELOPMENT ENGINEERING DIVISION

APPROVED: *K.R.G. McCall*

HOWARD COUNTY, MARYLAND  
DEPARTMENT OF PUBLIC WORKS

SIDEWALK RAMP  
Layout & Grading  
Parallel to Curb & Thru Median

Detail  
R-4.06

APPROVED: *K.R.G. McCall*

MARYLAND DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES  
TRAFFIC BARRIER THREE BEAM  
ANCHORAGE TO VERTICAL FACE  
CONCRETE JERSEY

STANDARD NO. MD 605.44

APPROVED: *K.R.G. McCall*

MARYLAND DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES  
TRAFFIC BARRIER W BEAM  
POST PLACEMENT DETAILS  
FOR SPANNING 12" TO 18" OPENINGS

STANDARD NO. MD 605.26

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 100 ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BE-CIVILENGINEERING.COM

OWNER: HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF  
DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY  
LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE  
LUTHERVILLE, MARYLAND 21093  
410-825-8400

DESIGN: MLS DRAFT: MLS

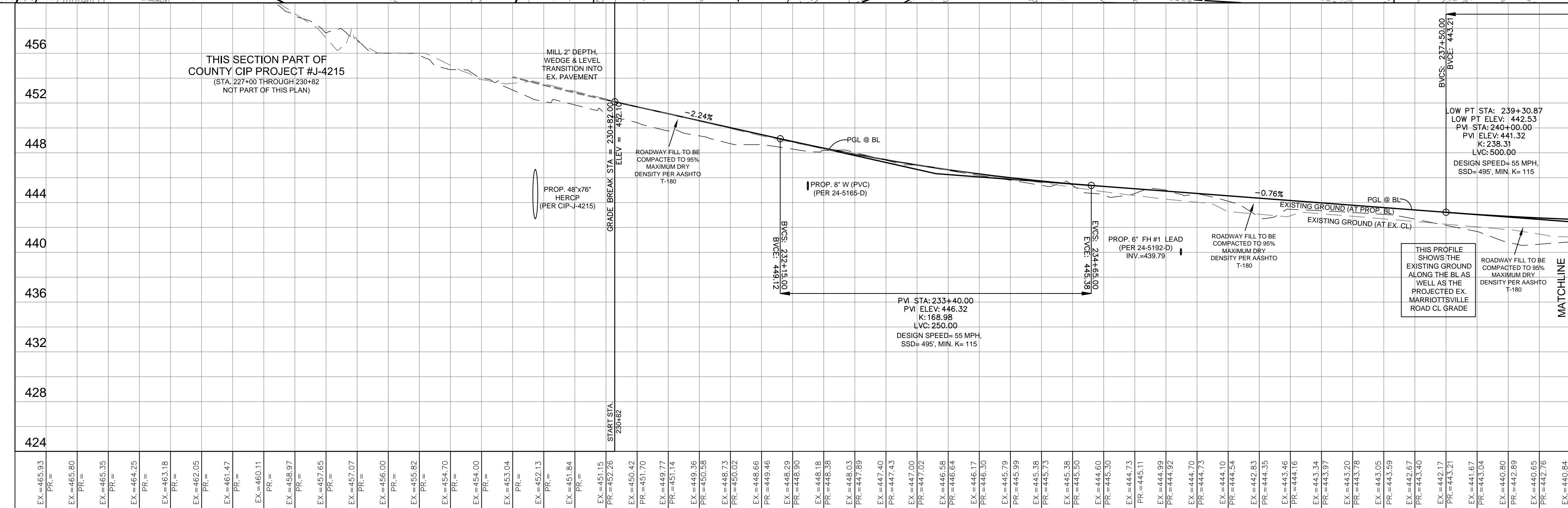
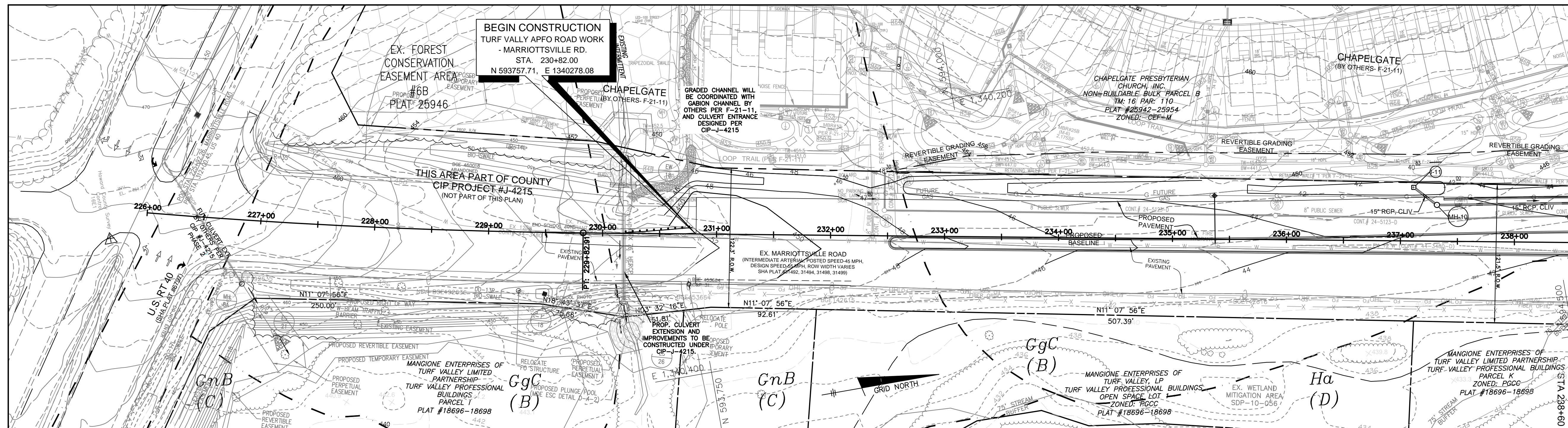
**MARRIOTTVILLE ROAD WIDENING  
APFO MITIGATION PLANS  
F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

ROADWAY TYPICAL DETAILS

DATE: MARCH 2023 BEI PROJECT NO. 2769  
SCALE: NO SCALE SHEET 6 OF 60





226+25 226+50 226+75 227+00 227+25 227+50 227+75 228+00 228+25 228+50 228+75 229+00 229+25 229+50 229+75 230+00 230+25 230+50 230+75 231+00 231+25 231+50 231+75 232+00 232+25 232+50 232+75 233+00 233+25 233+50 233+75 234+00 234+25 234+50 234+75 235+00 235+25 235+50 235+75 236+00 236+25 236+50 236+75 237+00 237+25 237+50 237+75 238+00 238+25 238+50:

### GRADING PLAN AND ROAD PROFILE

STATION 230+82 TO 238+60  
 SCALE: HORIZ.: 1" = 50'  
 VERT.: 1" = 5'



APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: <i>[Signature]</i>	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DocuSigned by: <i>[Signature]</i>	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: <i>[Signature]</i>	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DocuSigned by: <i>[Signature]</i>	4/21/2023
		DATE

NO.	DATE	REVISION

**BENCHMARK**  
 ENGINEERS & LAND SURVEYORS & PLANNERS  
**ENGINEERING, INC.**  
 3300 NORTH RIDGE ROAD SUITE 140 ELLICOTT CITY, MARYLAND 21043  
 (P) 410-465-6105 (F) 410-465-6644  
 WWW.BEI-CIVILENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

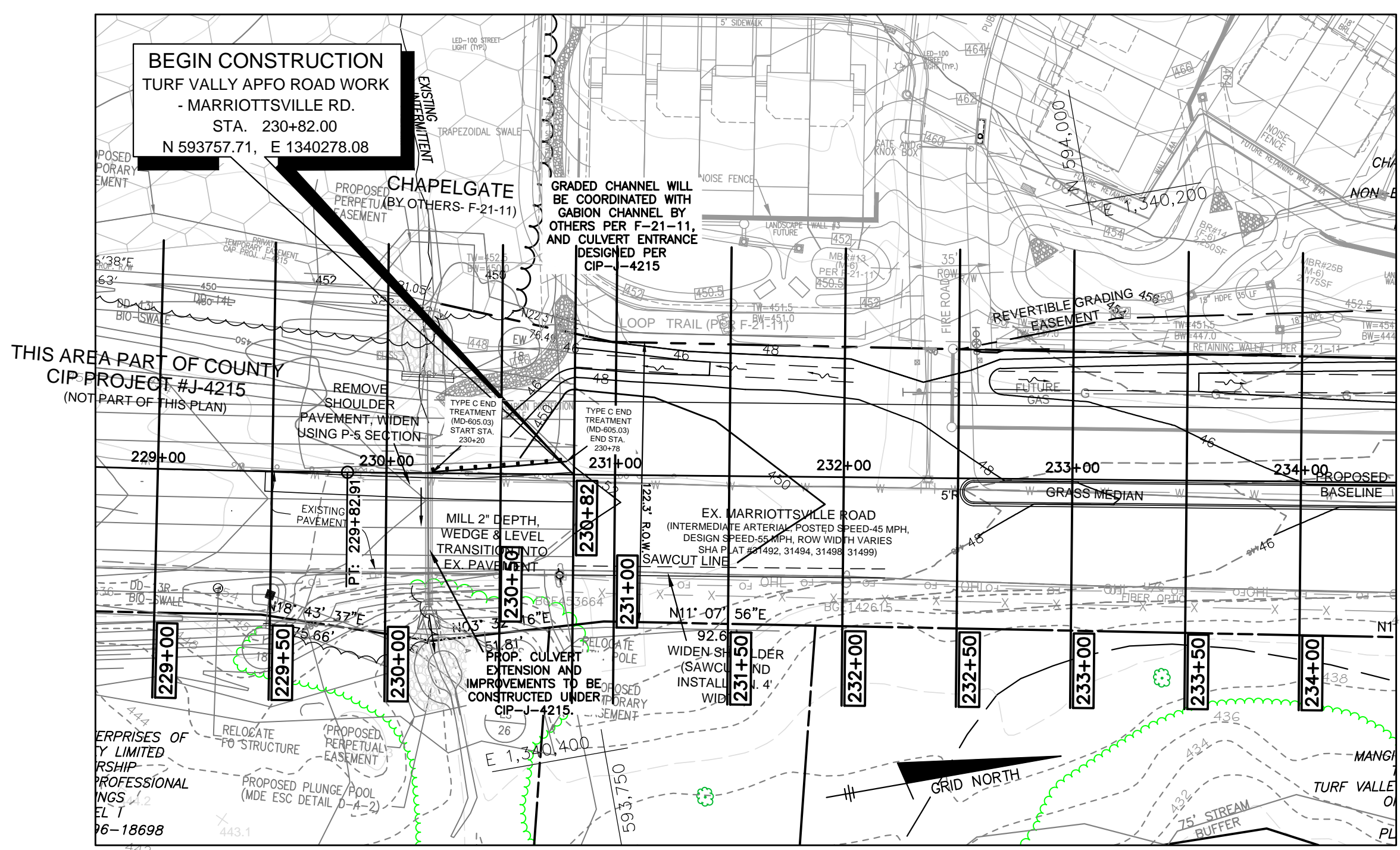
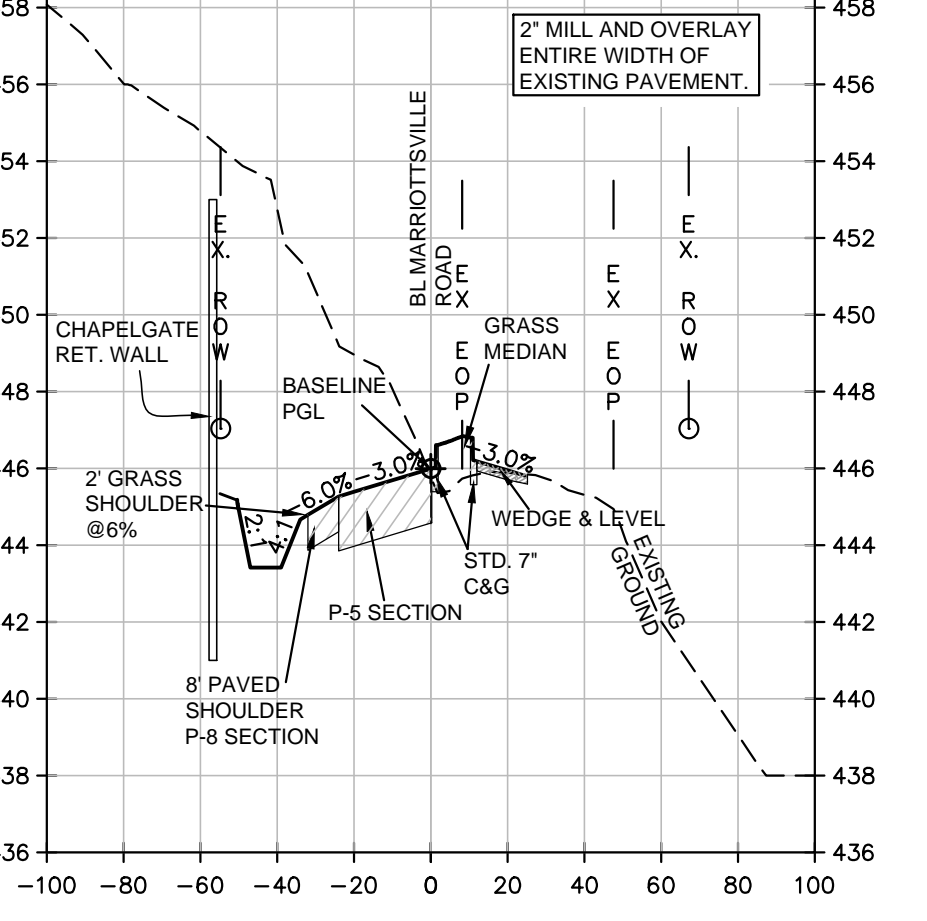
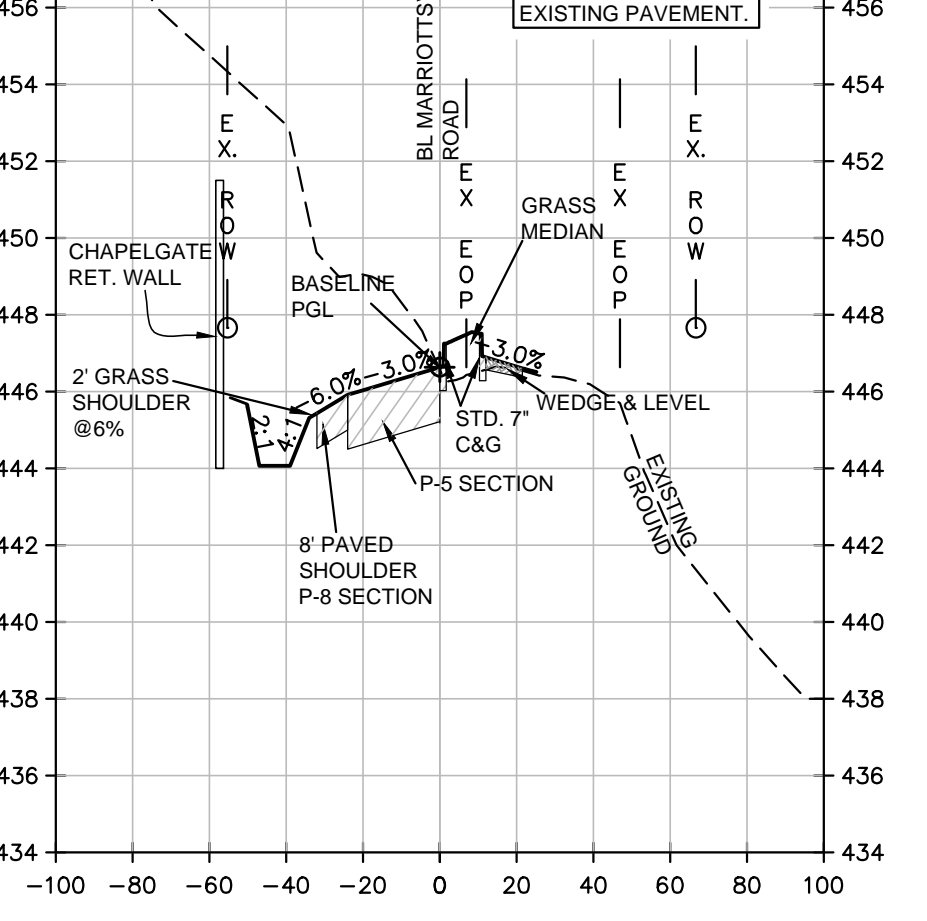
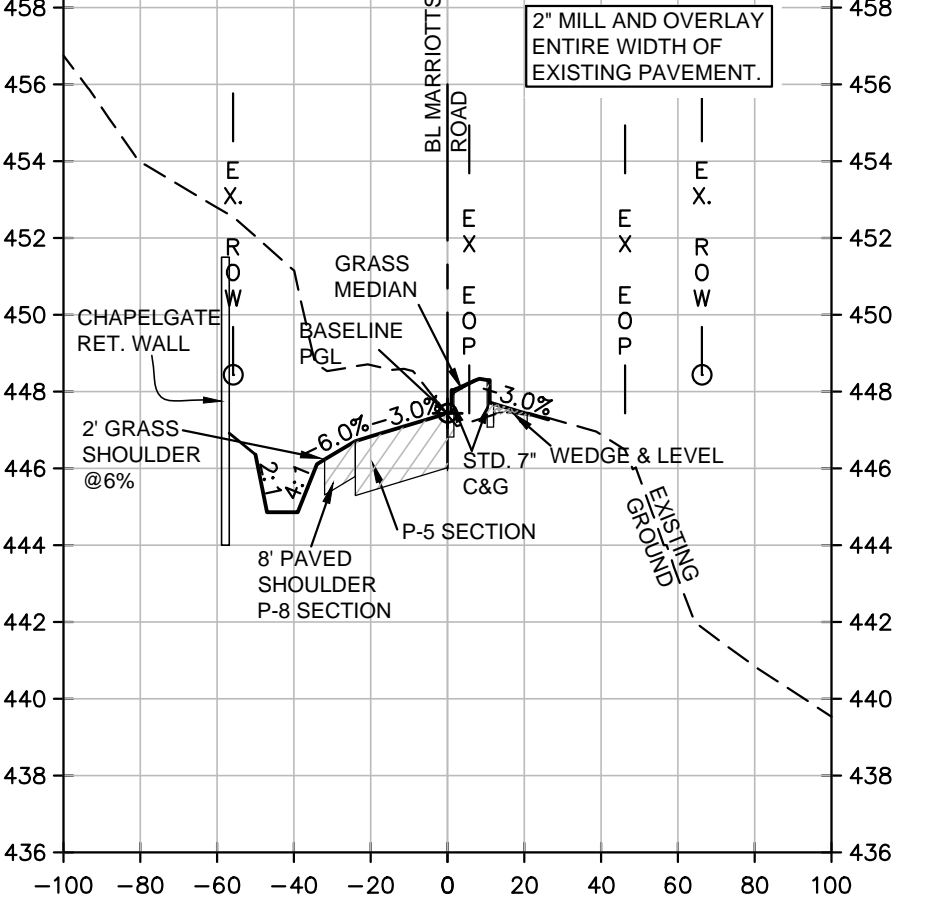
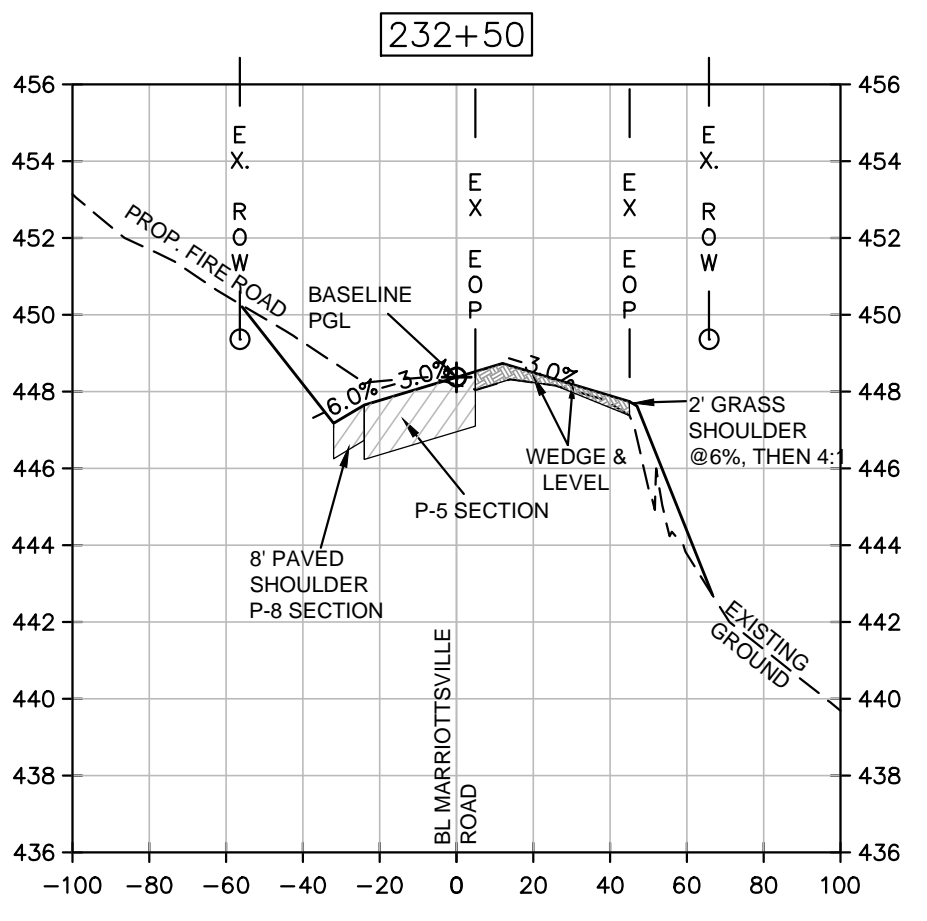
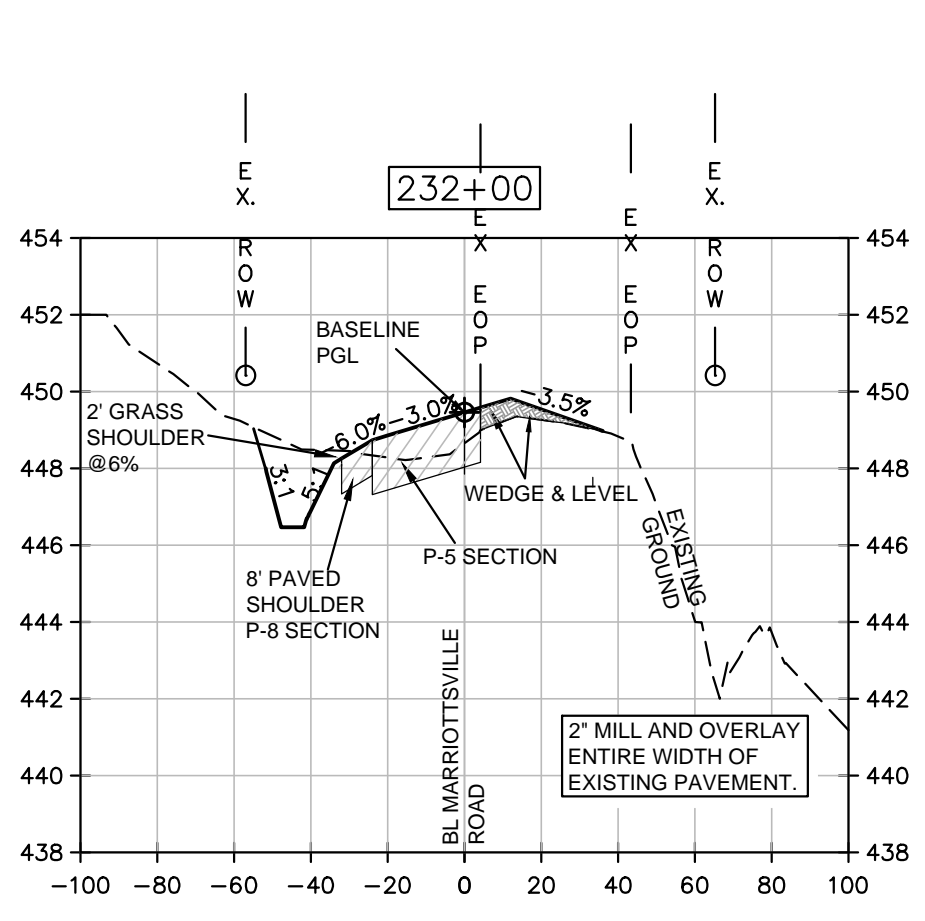
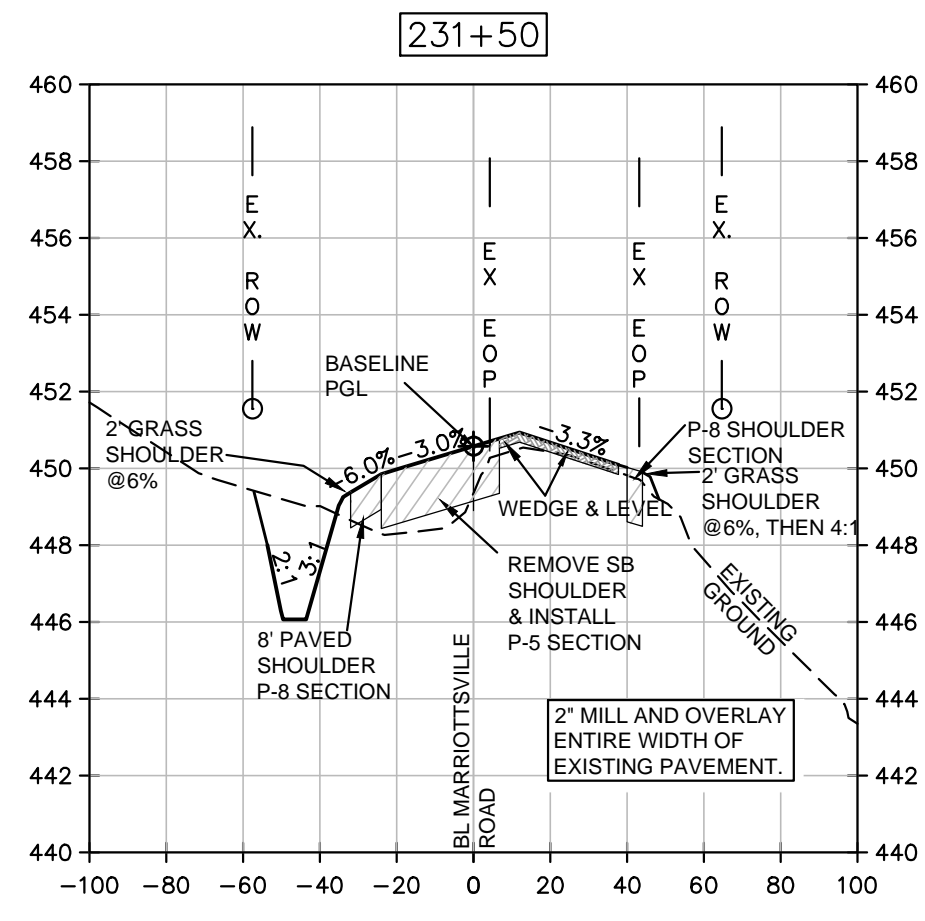
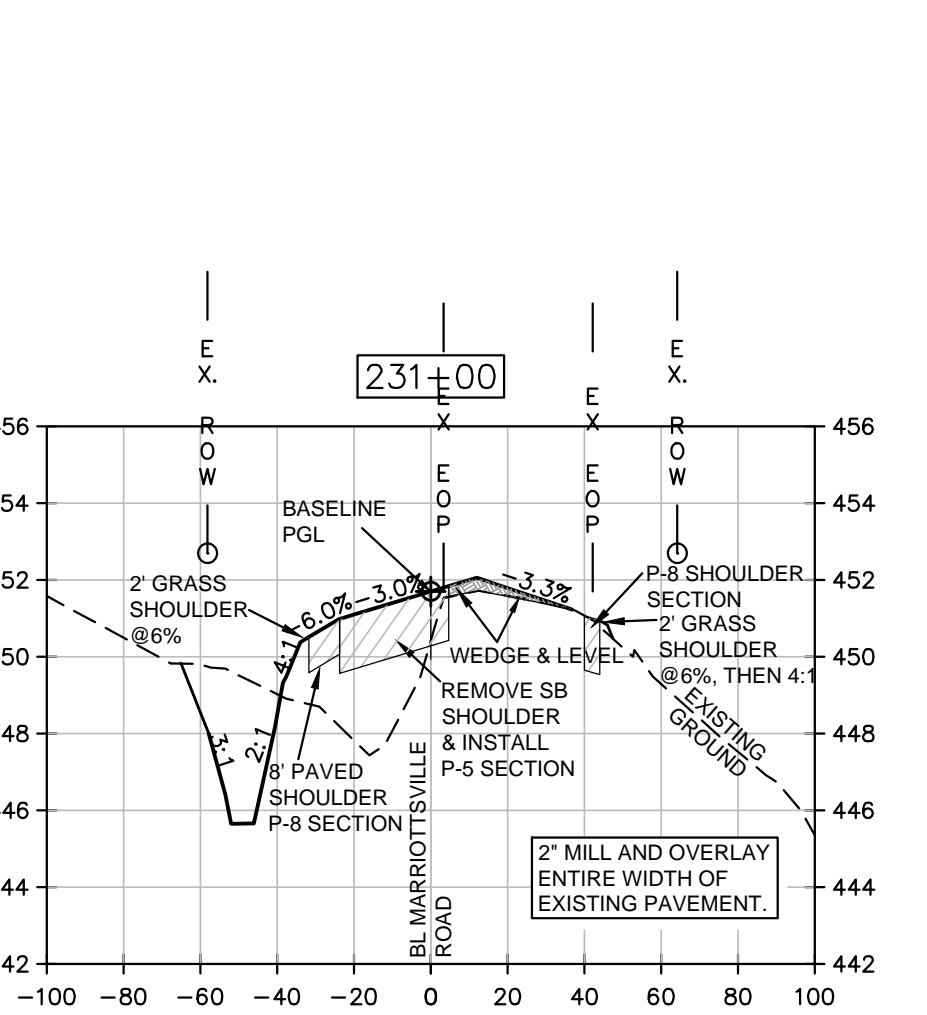
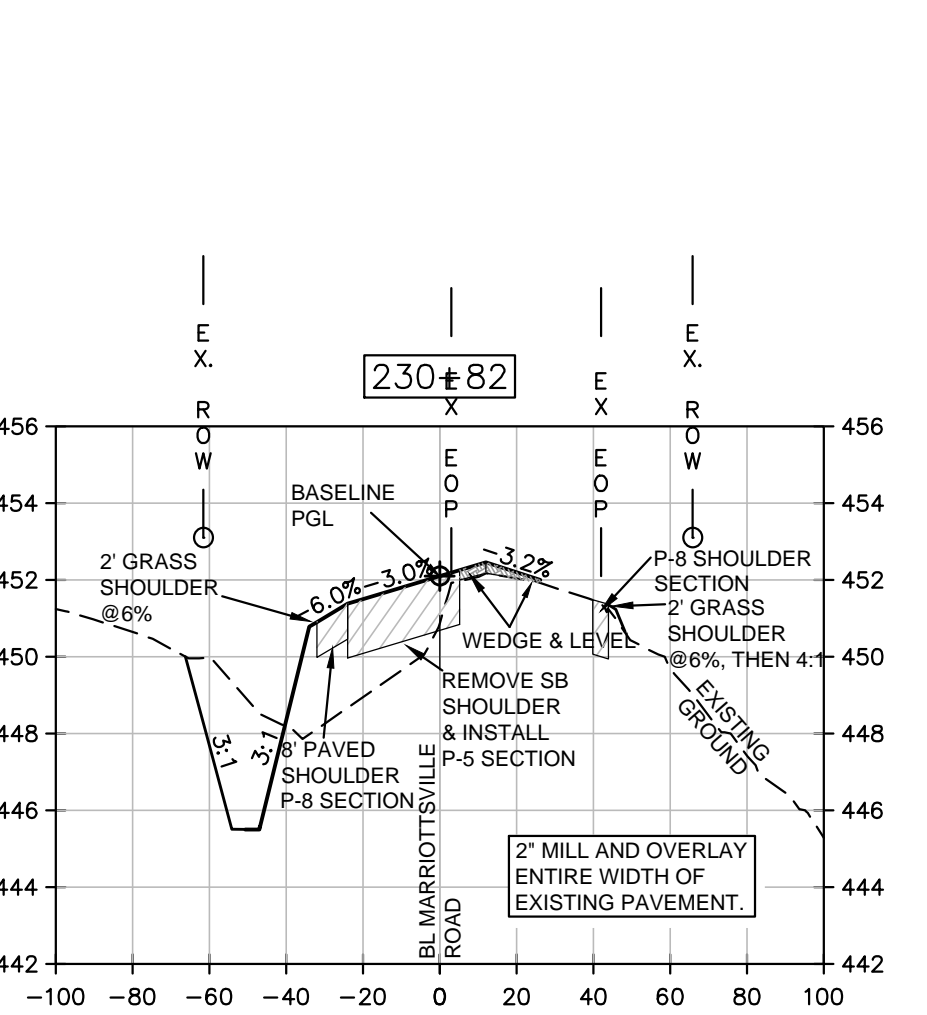
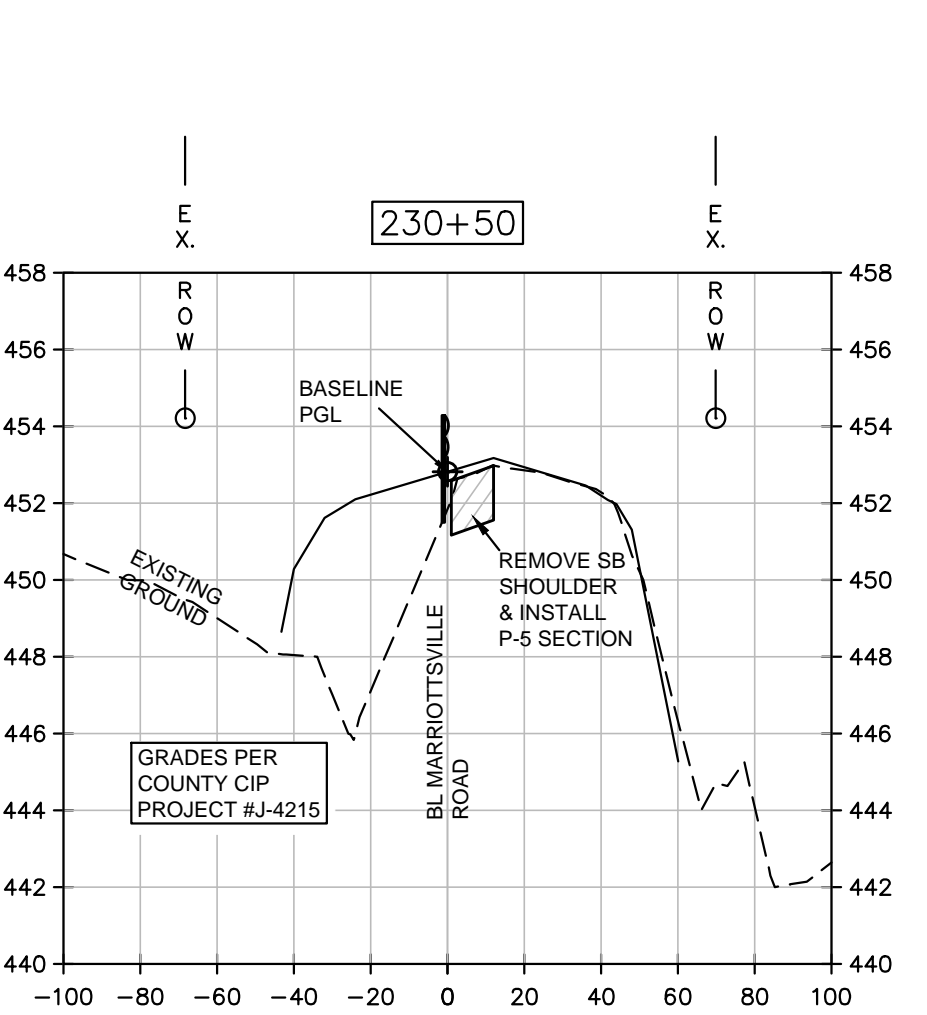
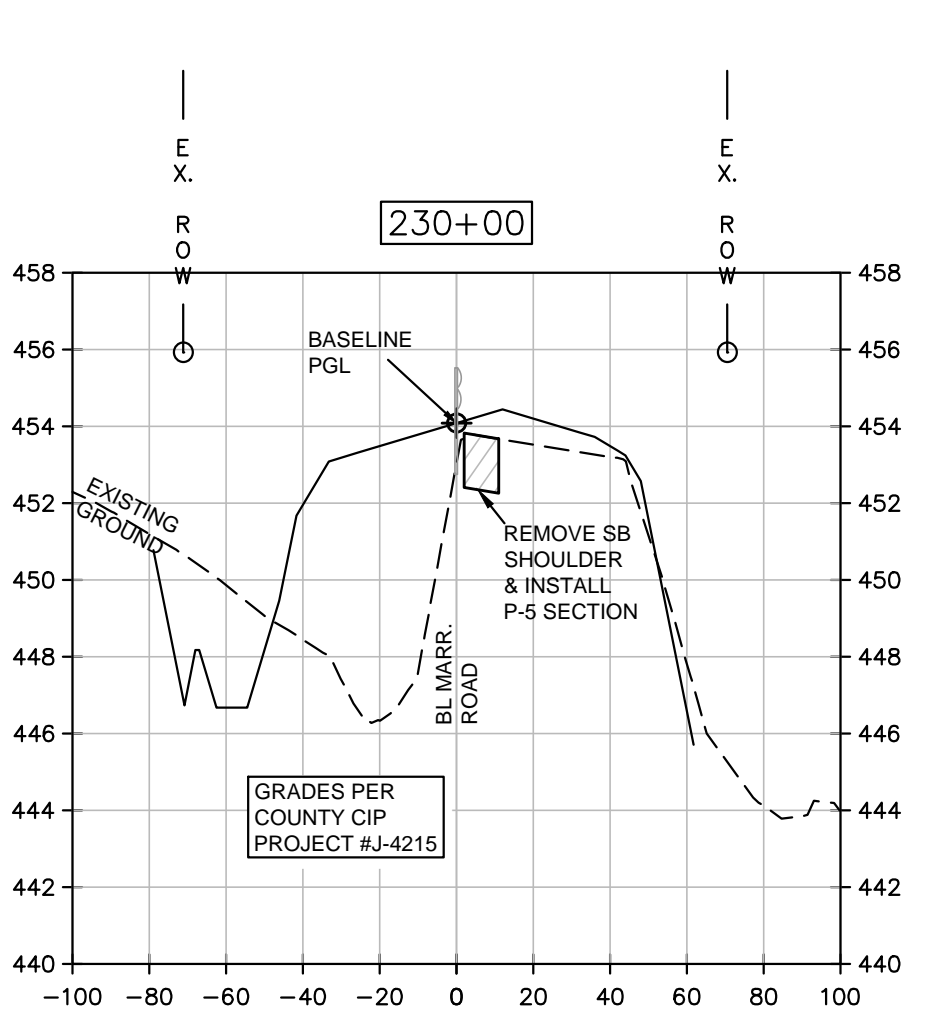
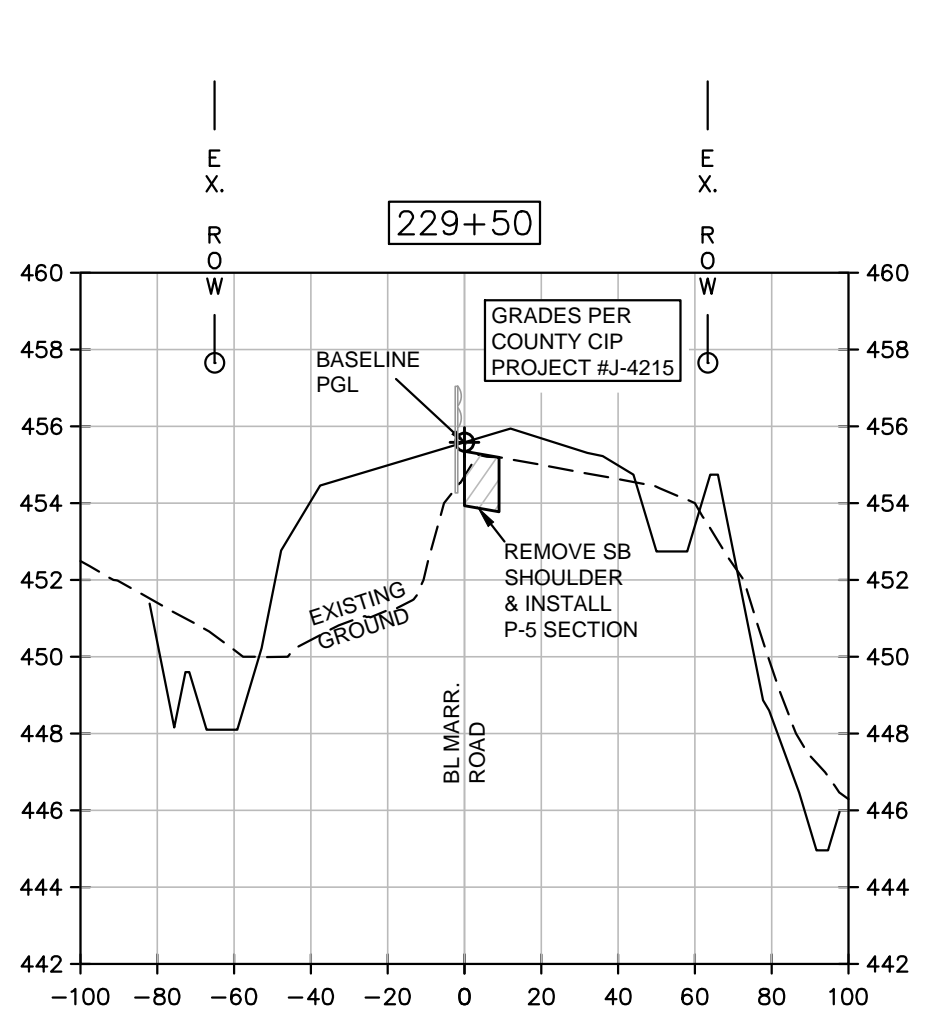
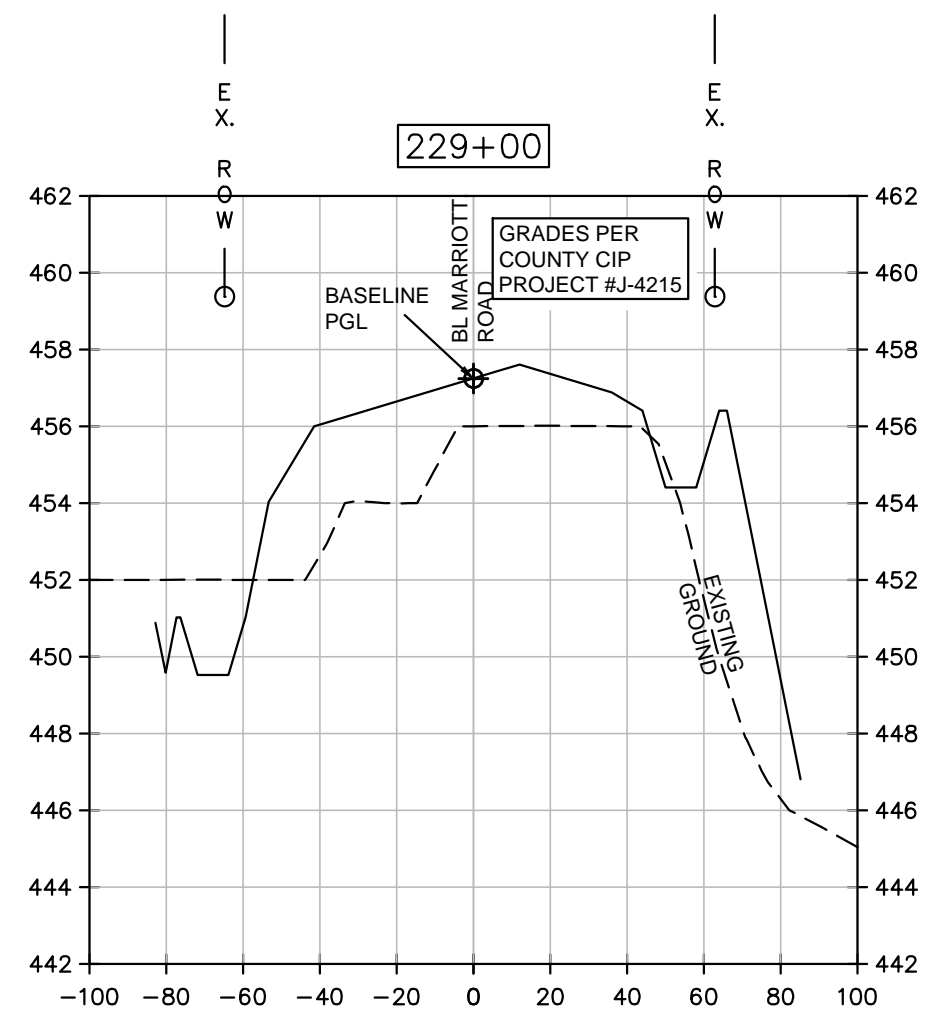
*Michael L. Anderson* 03.07.2023

OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401	<b>MARRIOTTSVILLE ROAD WIDENING                  APFO MITIGATION PLANS                  F-21-033</b>
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400	<b>GRADING PLAN AND ROAD PROFILE                  STA. 230+82 TO STA. 238+60</b>
DESIGN: MLS    DRAFT: MLS	DATE: MARCH 2023    BEI PROJECT NO. 2769 SCALE: 1" = 50'    SHEET 7 OF 60

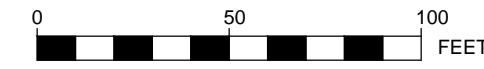








**CROSS-SECTIONS PLAN-1**  
SCALE: 1" = 50'



SCALE:  
(H) - 1" = 50'  
(V) - 1" = 5'

THE EXISTING SOUTHBOUND SHOULDER IS INADEQUATE FOR FULL TRAFFIC. IT SHALL BE REMOVED AND REPLACED WITH A FULL P-5 SECTION PER DETAILS SHOWN ON SHEET 5

ROADWAY FILL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER AASHTO T-180

APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: <i>[Signature]</i>	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE	
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: <i>[Signature]</i>	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE	
DocuSigned by: <i>[Signature]</i>	4/21/2023	
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE	

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736. Expiration Date: 08-03-24.

**BENCHMARK**  
ENGINEERS & LAND SURVEYORS & PLANNERS  
**ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 100 ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BE-CIVILENGINEERING.COM

03.07.2023

**MARRIOTTSVILLE ROAD WIDENING  
APFO MITIGATION PLANS  
F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**MARRIOTTSVILLE ROAD  
CROSS-SECTIONS**

OWNER:  
HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF  
DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

DEVELOPER:  
MANGIONE ENTERPRISES OF TURF VALLEY  
LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE  
LUTHERVILLE, MARYLAND 21093  
410-825-8400

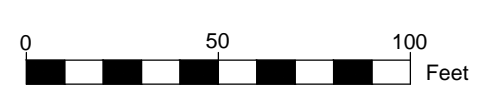
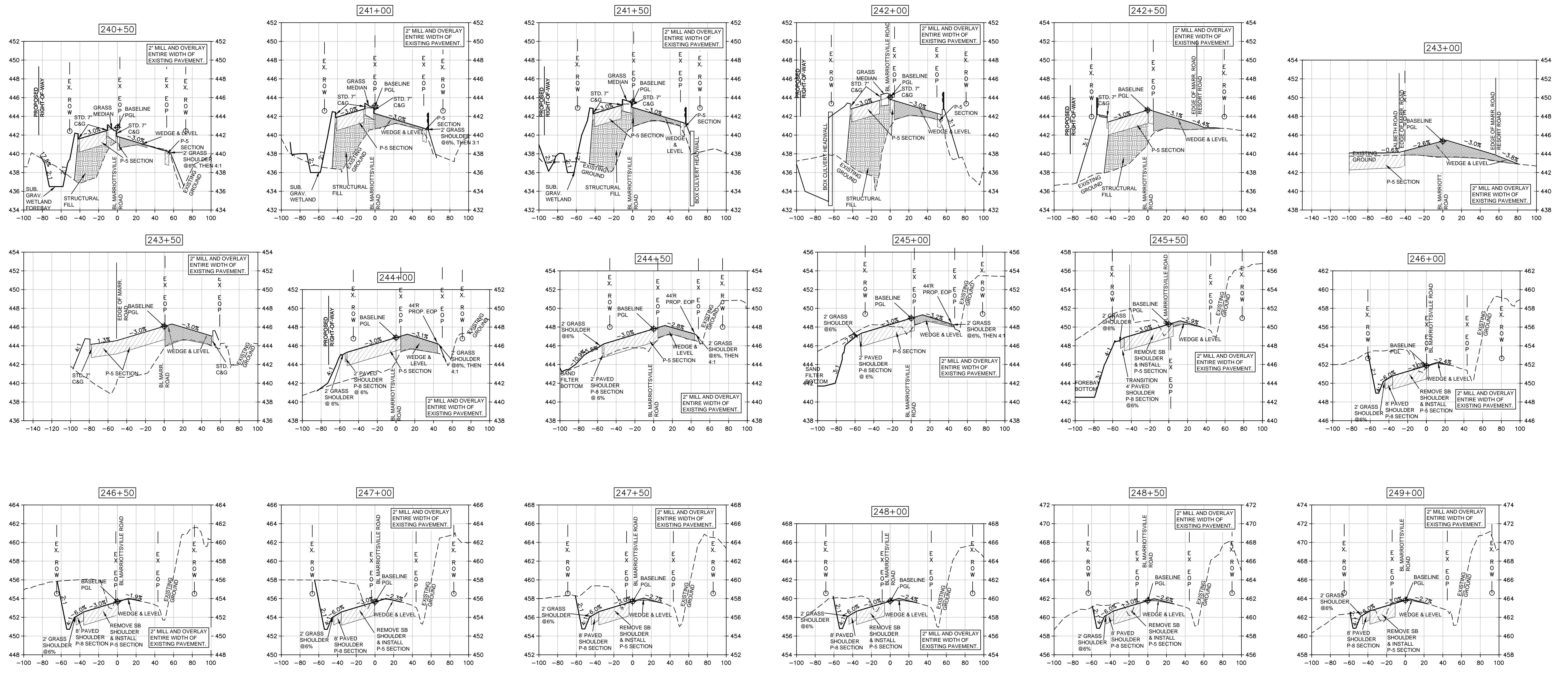
DESIGN: MLS    DRAFT: MLS

DATE: MARCH 2023	BEI PROJECT NO. 2769
SCALE: 1" = 50'	SHEET 9 OF 60





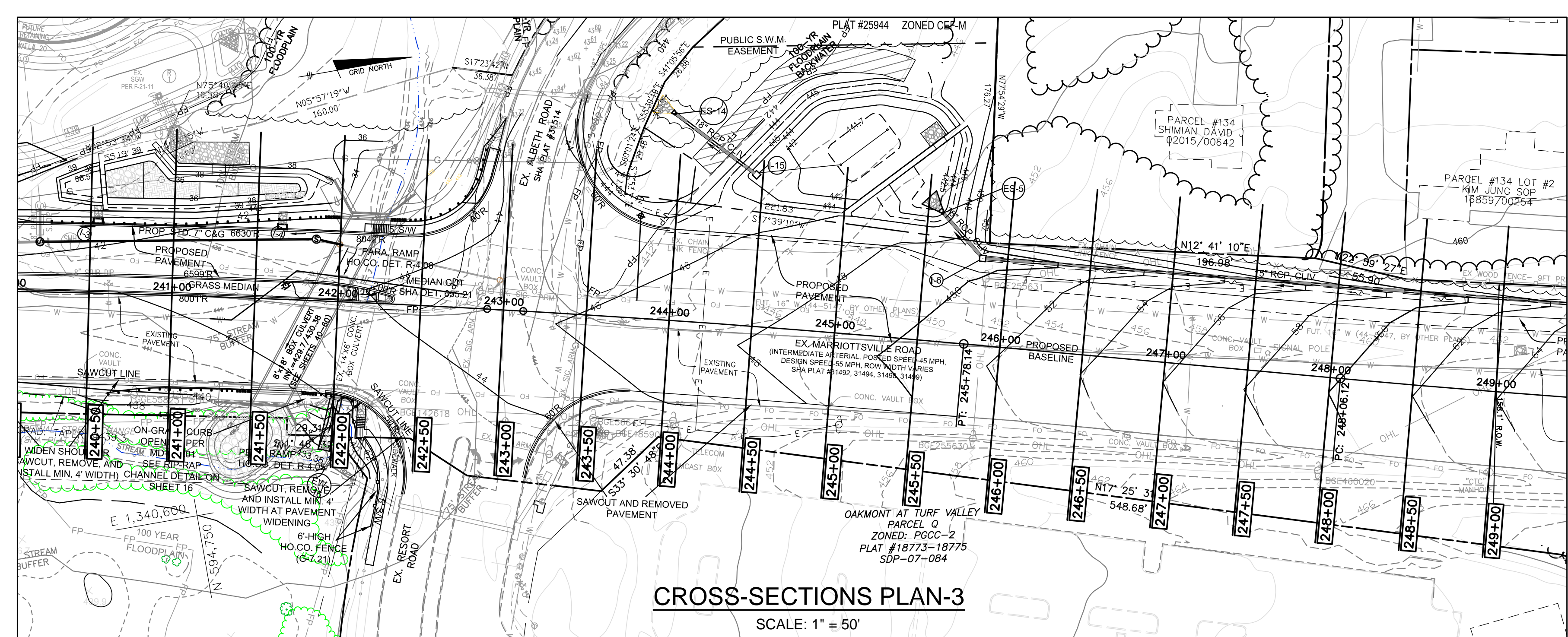




SCALE:  
 (H) - 1" = 50'  
 (V) - 1" = 5'

THE EXISTING SOUTHBOUND SHOULDER IS INADEQUATE FOR FULL TRAFFIC. IT SHALL BE REMOVED AND REPLACED WITH A FULL P-5 SECTION PER DETAILS SHOWN ON SHEET 5

ROADWAY FILL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER AASHTO T-180



**CROSS-SECTIONS PLAN-3**  
 SCALE: 1" = 50'

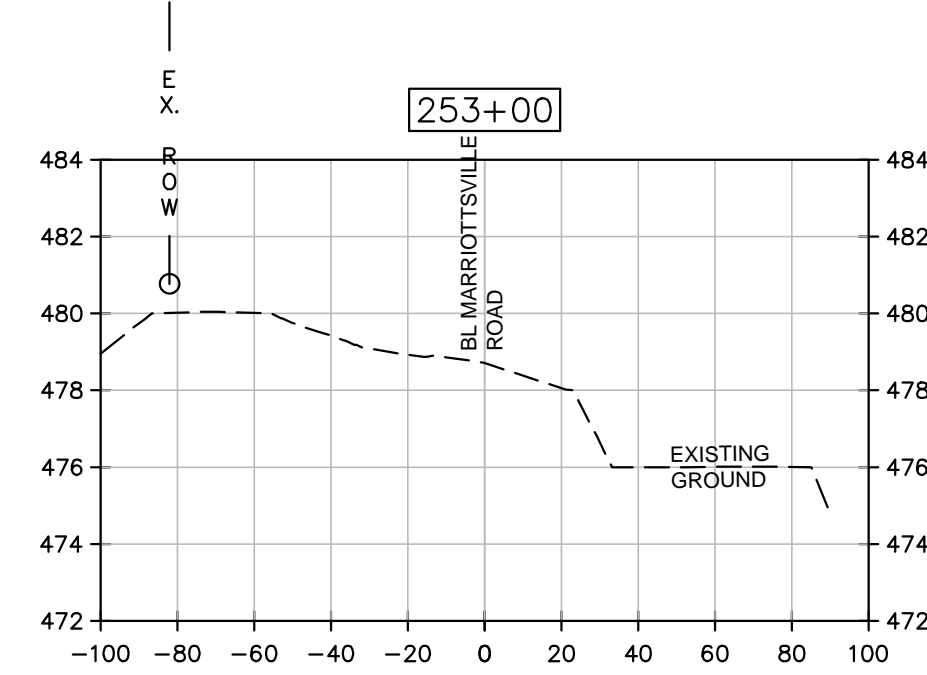
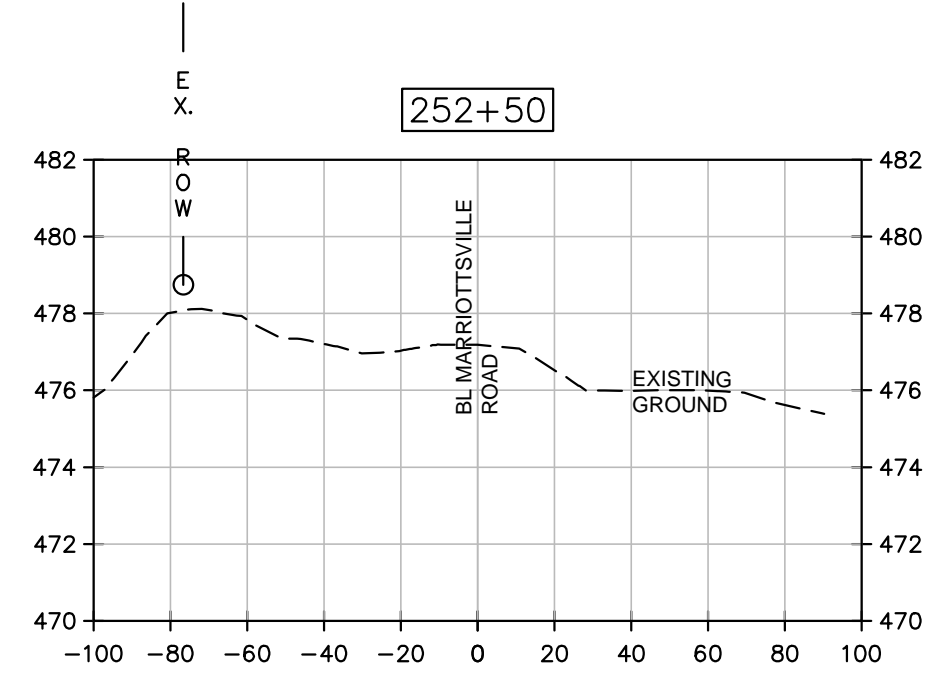
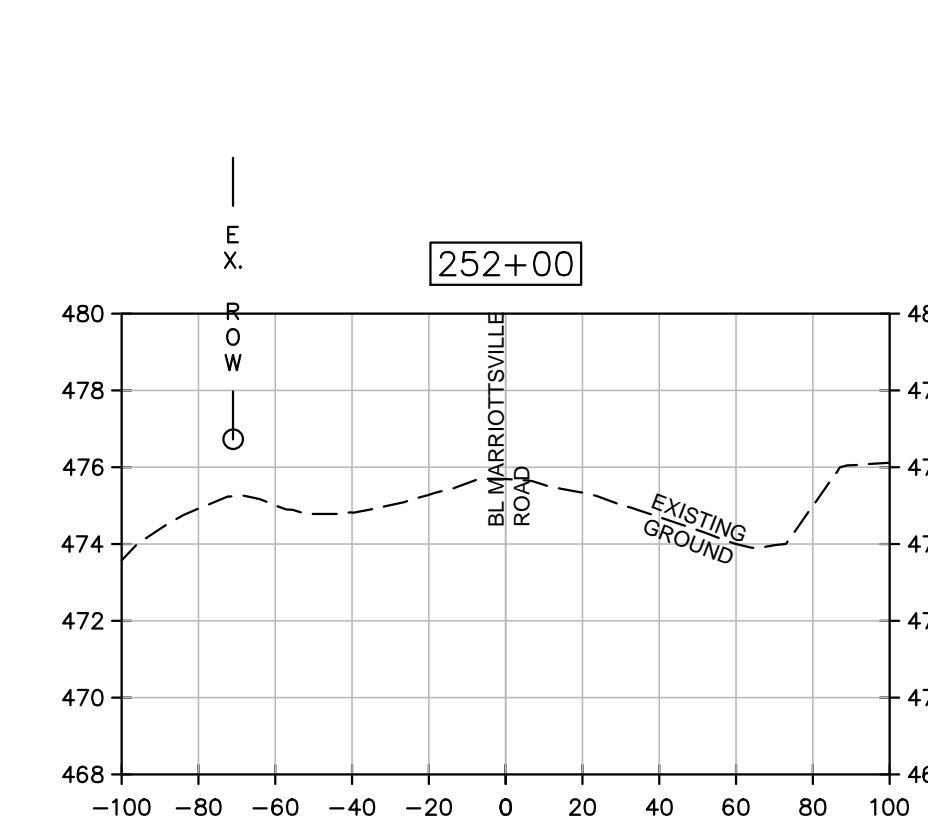
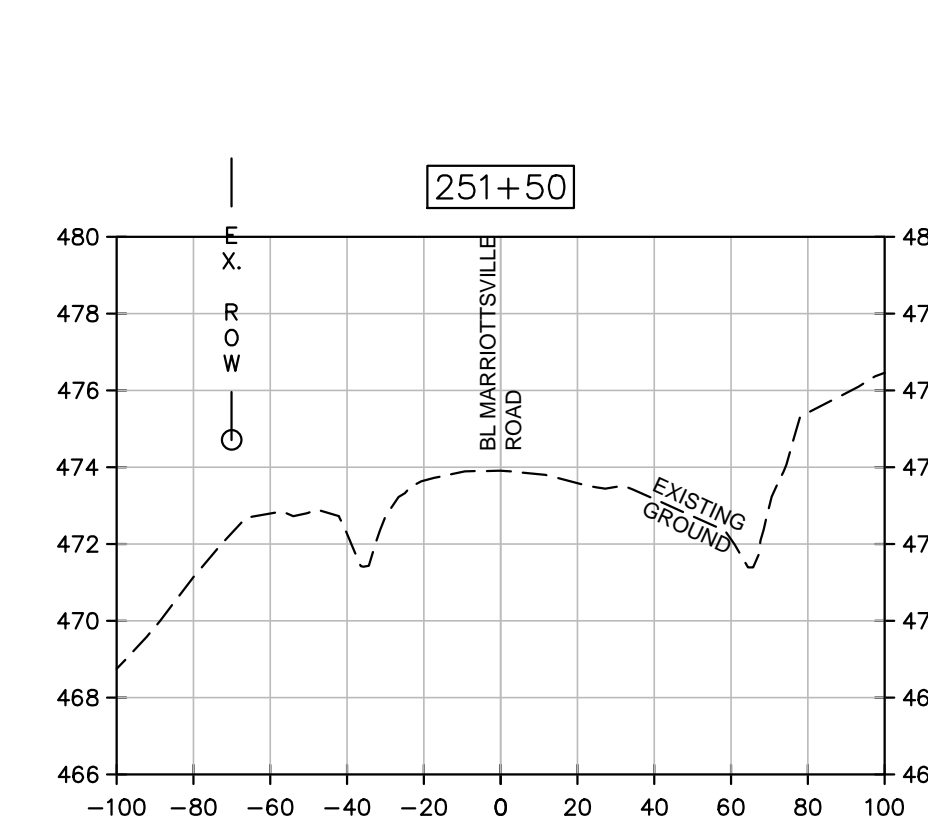
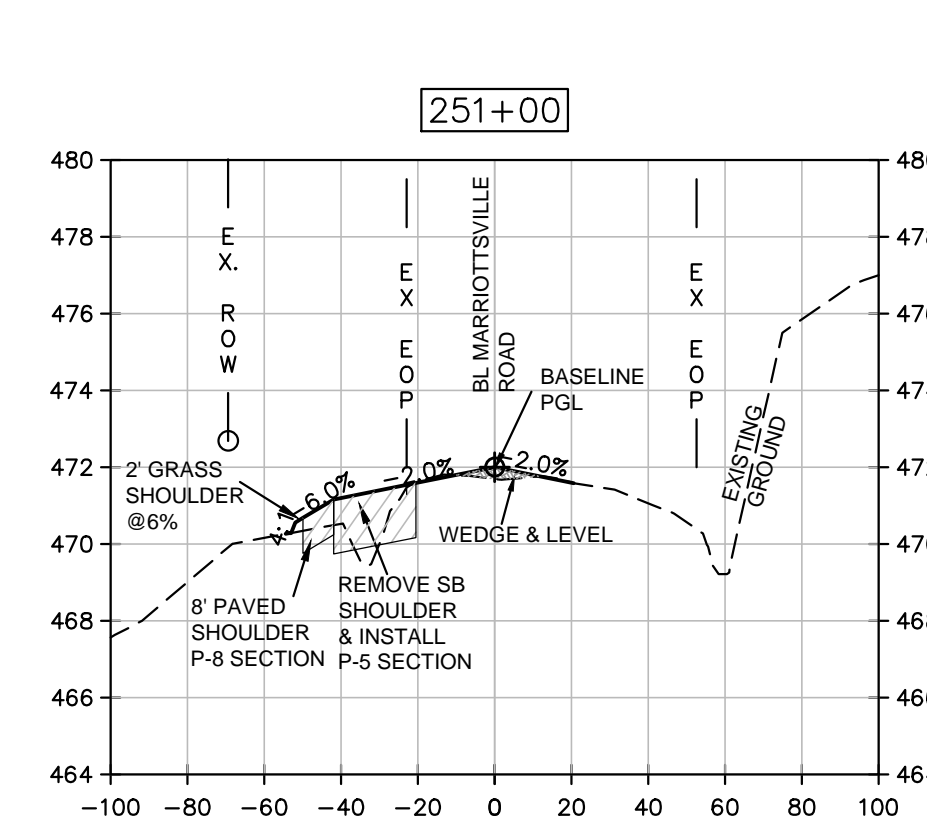
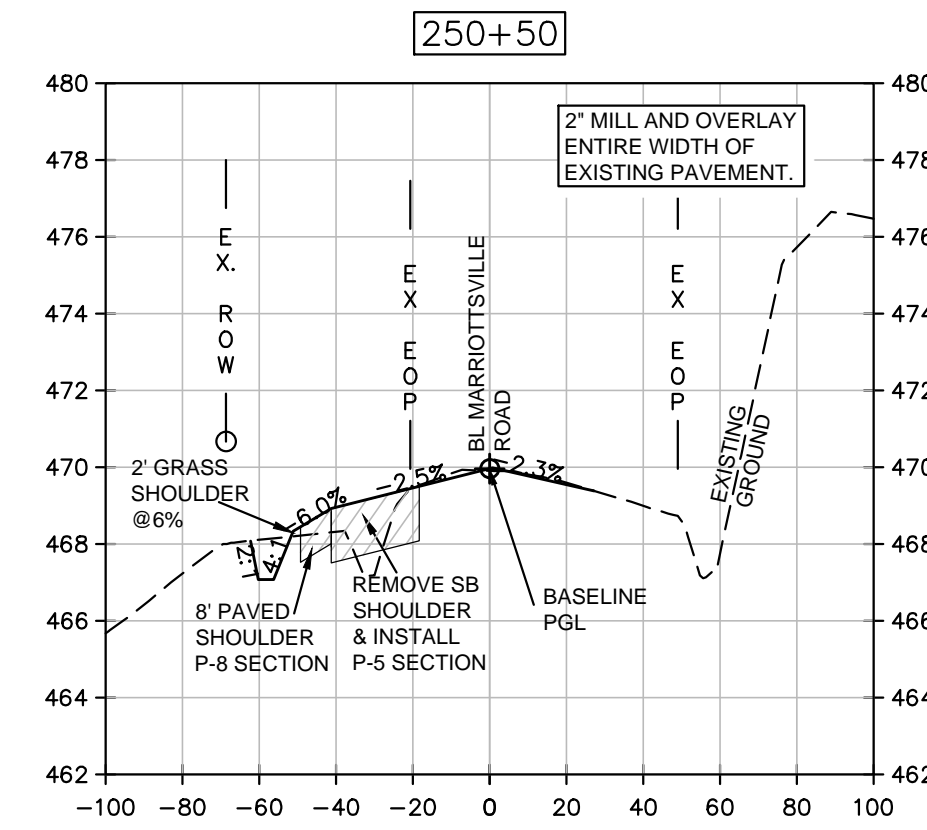
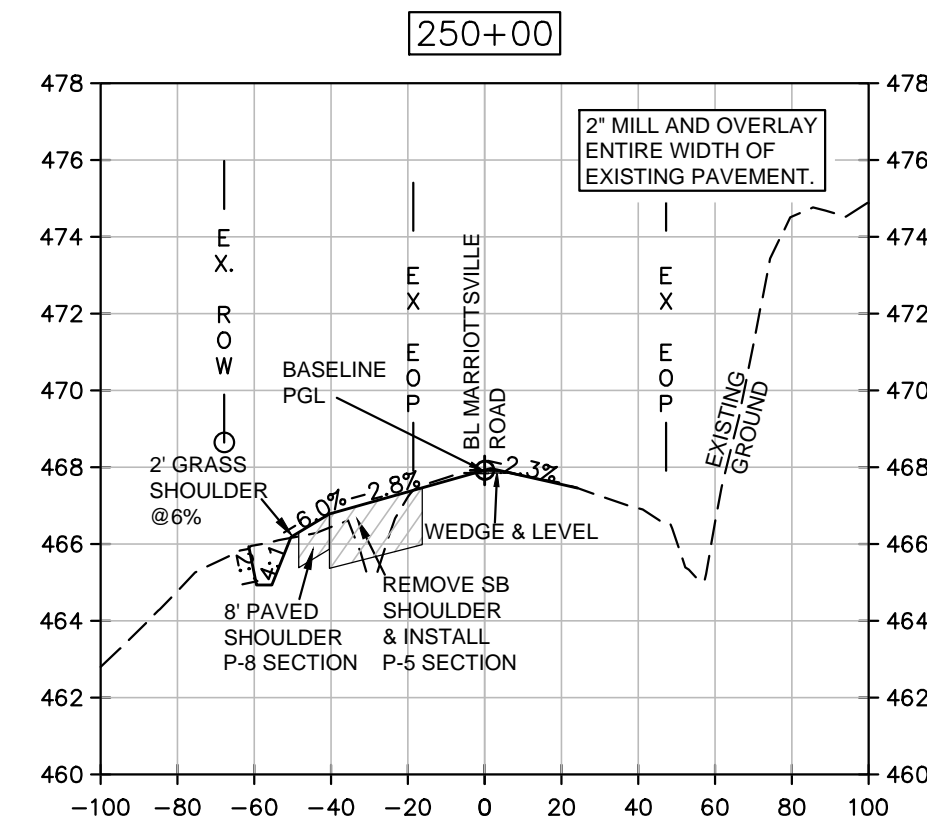
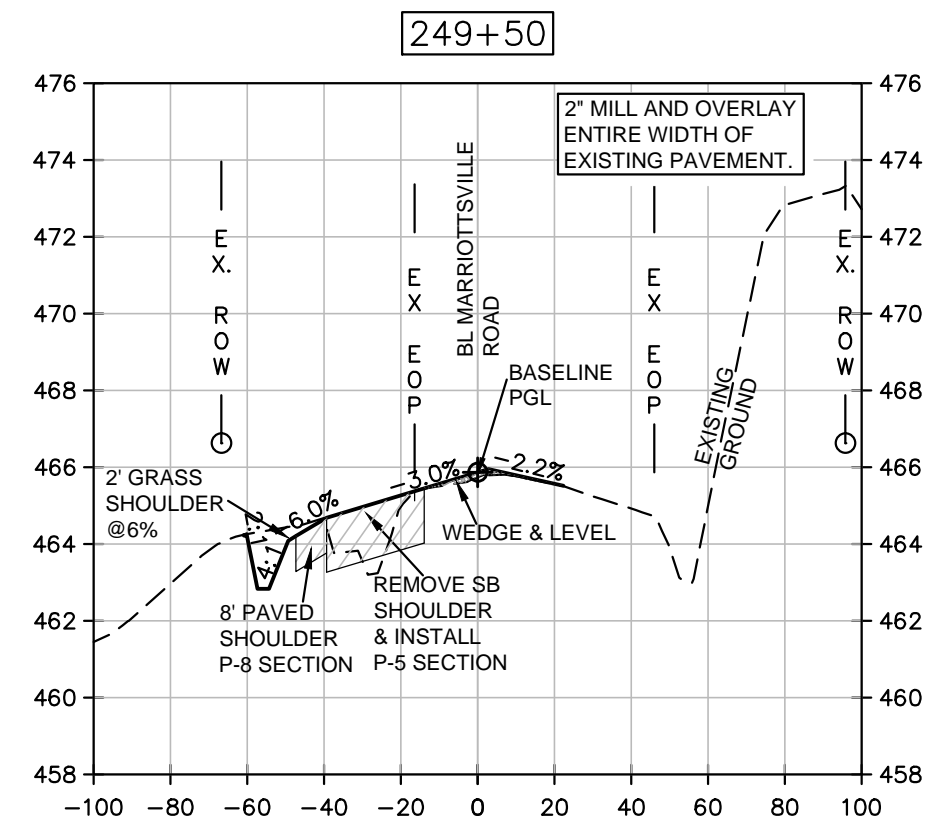
NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.	
<b>BENCHMARK</b> ENGINEERS & LAND SURVEYORS & PLANNERS <b>ENGINEERING, INC.</b> 3300 NORTH RIDGE ROAD SUITE 100 ELLICOTT CITY, MARYLAND 21043 (P) 410-465-6105 (F) 410-465-6644 WWW.BEI-CIVILENGINEERING.COM	
03.07.2023	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401	<b>MARRIOTTVILLE ROAD WIDENING                  APFO MITIGATION PLANS                  F-21-033</b> TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400	<b>MARRIOTTVILLE ROAD                  CROSS-SECTIONS</b>
DESIGN: MLS    DRAFT: MLS	DATE: MARCH 2023    BEI PROJECT NO. 2769 SCALE: 1" = 50'    SHEET 11 OF 60

APPROVED: DEPARTMENT OF PUBLIC WORKS 5/4/2023
CHIEF, BUREAU OF HIGHWAYS
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT
APPROVED:                                  4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION

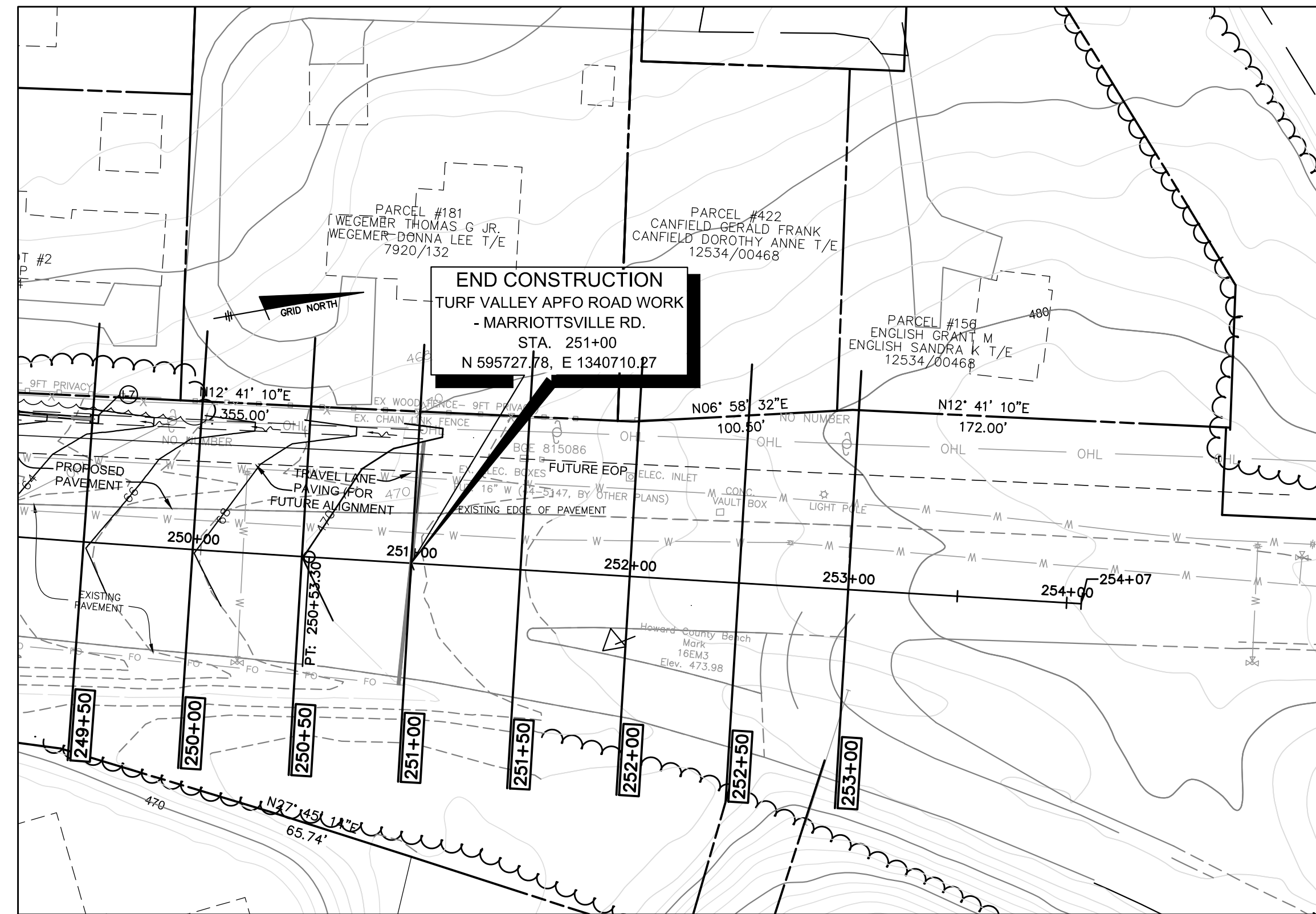




0 50 100 Feet  
 SCALE:  
 (H) - 1" = 50'  
 (V) - 1" = 5'

THE EXISTING SOUTHBOUND SHOULDER IS INADEQUATE FOR FULL TRAFFIC. IT SHALL BE REMOVED AND REPLACED WITH A FULL P-5 SECTION PER DETAILS SHOWN ON SHEET 5

ROADWAY FILL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER AASHTO T-180



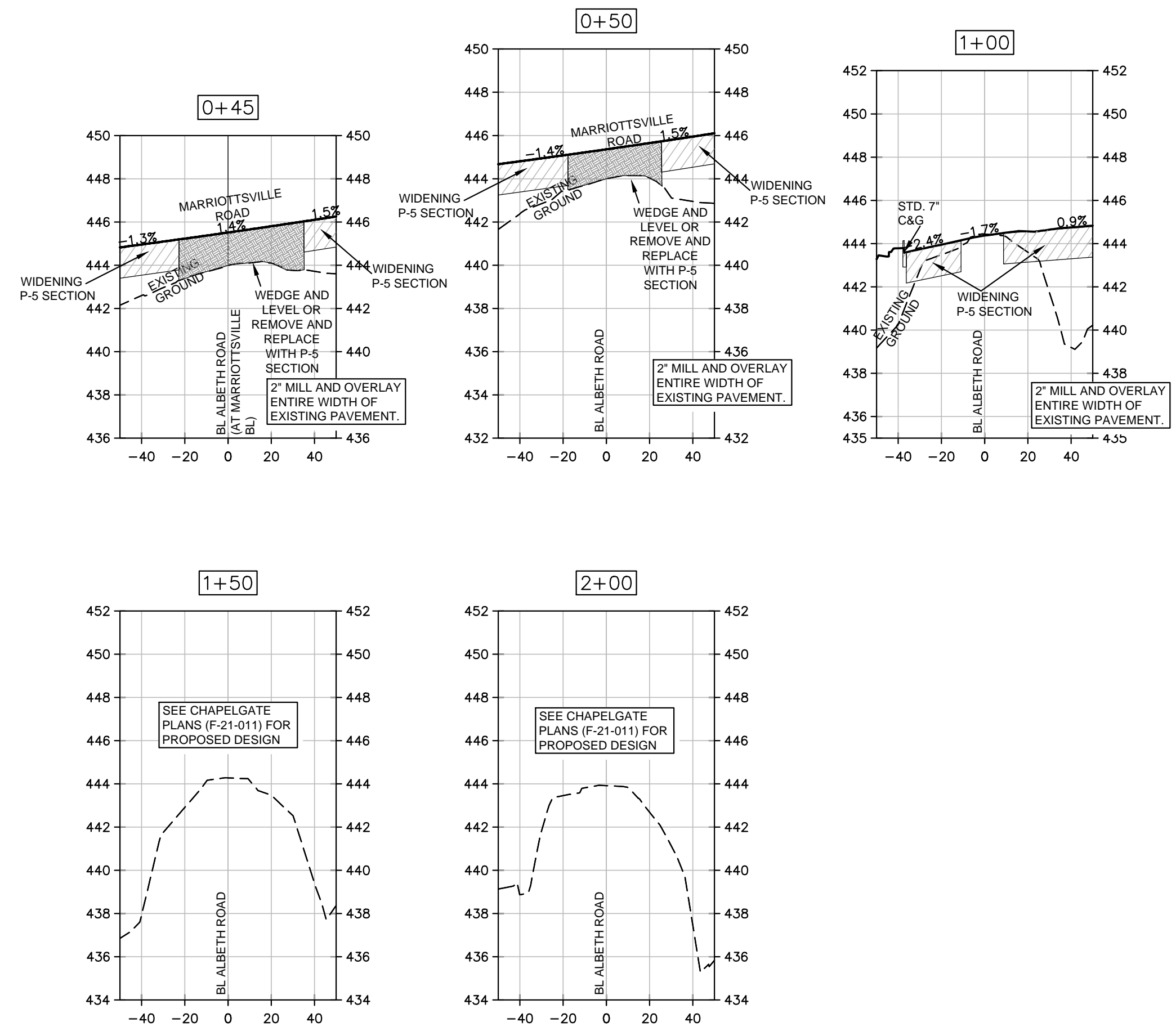
**CROSS-SECTIONS PLAN-4**  
 SCALE: 1" = 50'

APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: <i>[Signature]</i>	5/4/2023
CHIEF, BUREAU OF HIGHWAYS		DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: <i>[Signature]</i>	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT		DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	<i>[Signature]</i>	4/21/2023
		DATE

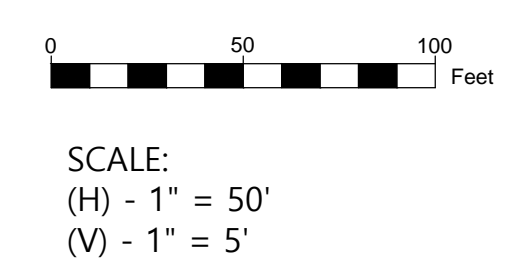
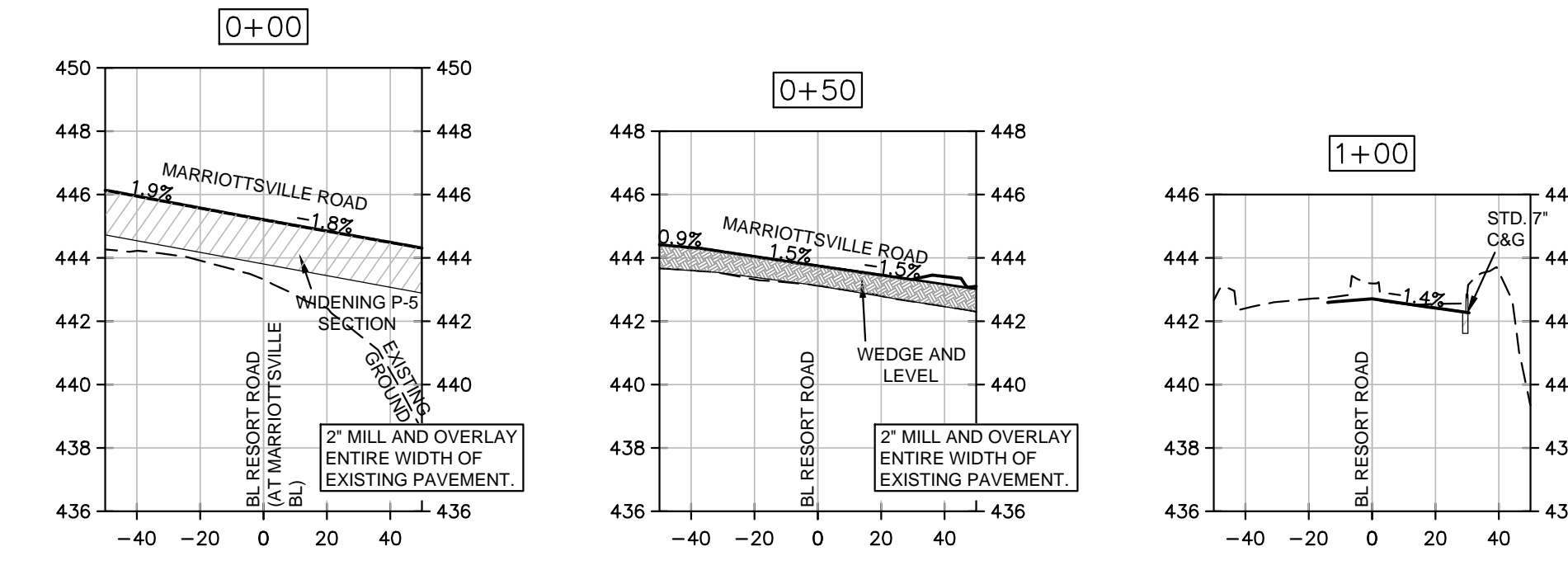
NO.	DATE	REVISION
 BENCHMARK ENGINEERS & LAND SURVEYORS & PLANNERS ENGINEERING, INC. 3300 NORTH RIDGE ROAD SUITE 140 ELLICOTT CITY, MARYLAND 21043 (P) 410-465-6105 (F) 410-465-6644 WWW.BEI-CIVILENGINEERING.COM		
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.  <i>[Signature]</i> 03.07.2023		
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400		MARRIOTTSVILLE ROAD CROSS-SECTIONS
DESIGN: MLS	DRAFT: MLS	DATE: MARCH 2023
SCALE: 1" = 50'	SHEET 12 OF 60	BEI PROJECT NO. 2769



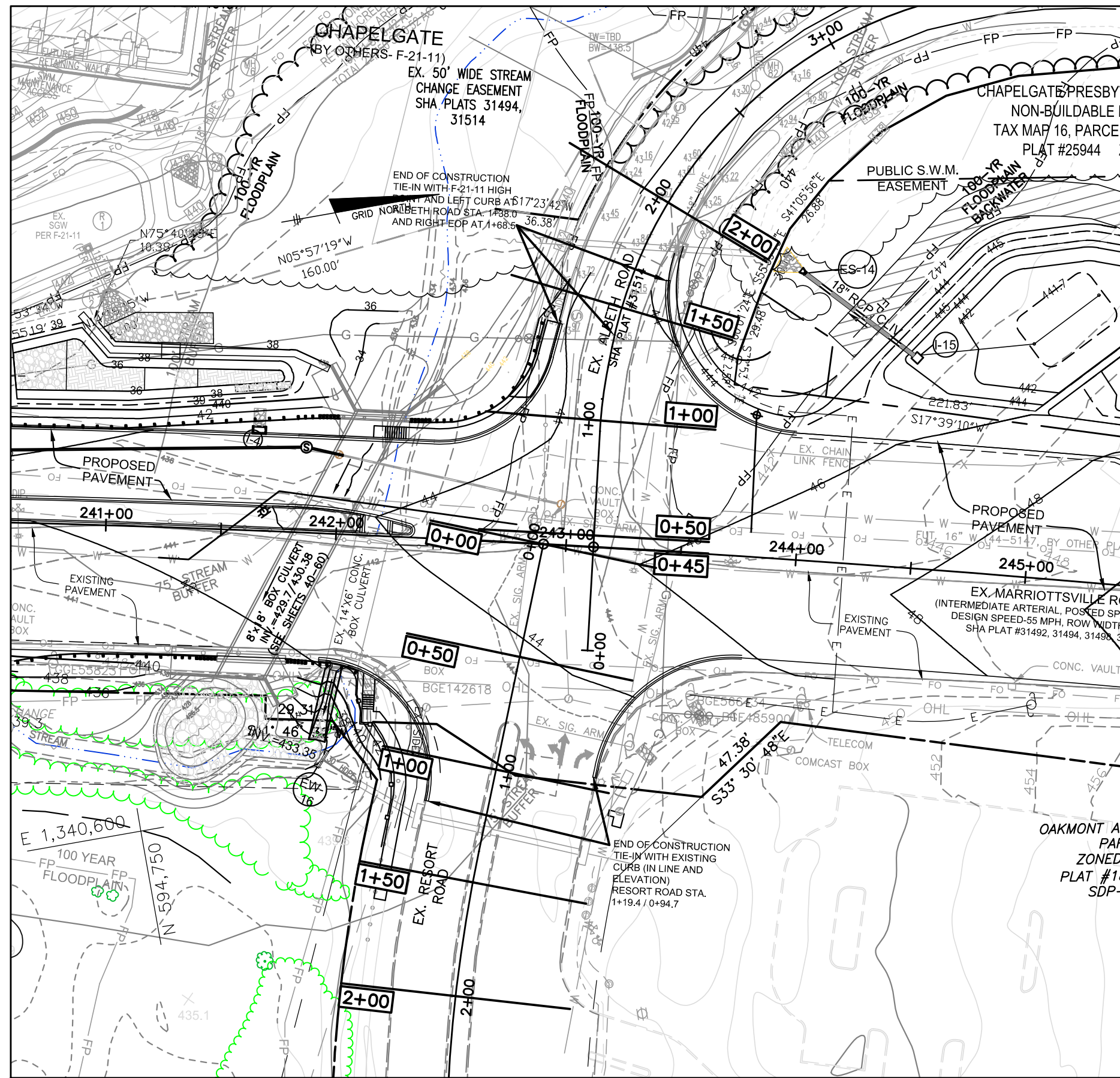
# ALBETH ROAD



# RESORT ROAD



ROADWAY FILL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER AASHTO T-180



CROSS-SECTIONS PLAN-ALBETH ROAD-RESORT ROAD  
SCALE: 1" = 50'

APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: <i>[Signature]</i>	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DocuSigned by: <i>[Signature]</i>	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: <i>[Signature]</i>	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DocuSigned by: <i>[Signature]</i>	4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DocuSigned by: <i>[Signature]</i>	DATE

NO.	DATE	REVISION

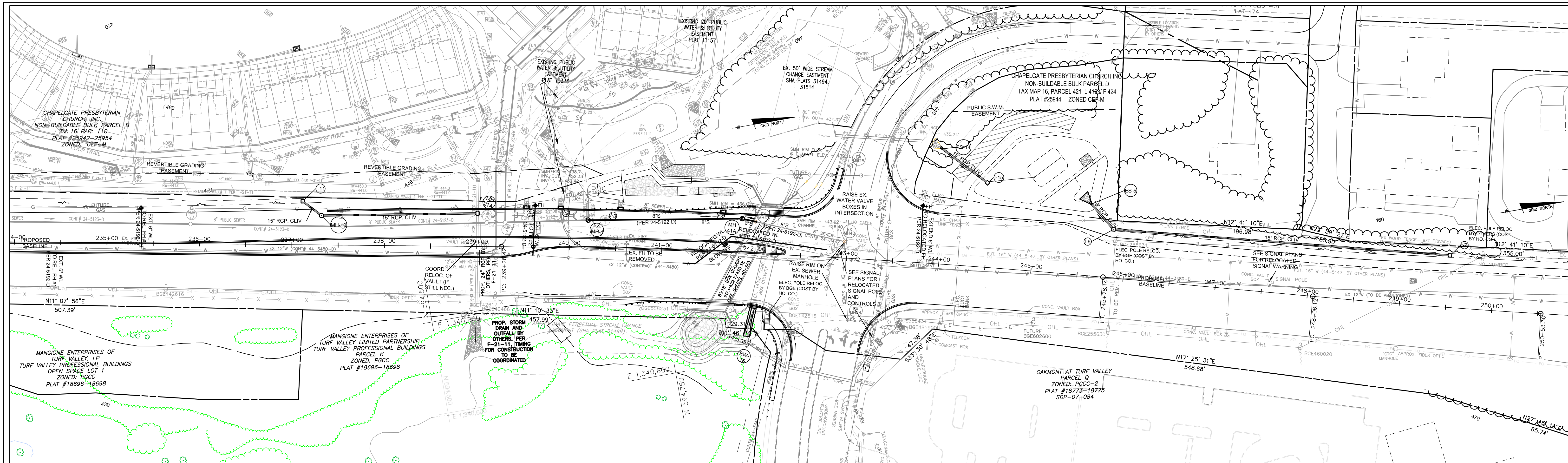
**BENCHMARK**  
ENGINEERS & LAND SURVEYORS & PLANNERS  
**ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 140 ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BEI-CIVILENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

*Michael L. Anderson* 03.07.2023

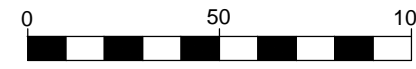
<p><b>OWNER:</b> HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401</p>	<p><b>MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033</b></p> <p>TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND</p>
<p><b>DEVELOPER:</b> MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400</p>	<p><b>ALBETH ROAD &amp; RESORT ROAD CROSS-SECTIONS</b></p>
<p>DESIGN: MLS    DRAFT: MLS</p>	<p>DATE: MARCH 2023    BEI PROJECT NO. 2769</p> <p>SCALE: 1" = 50'    SHEET 13 OF 60</p>



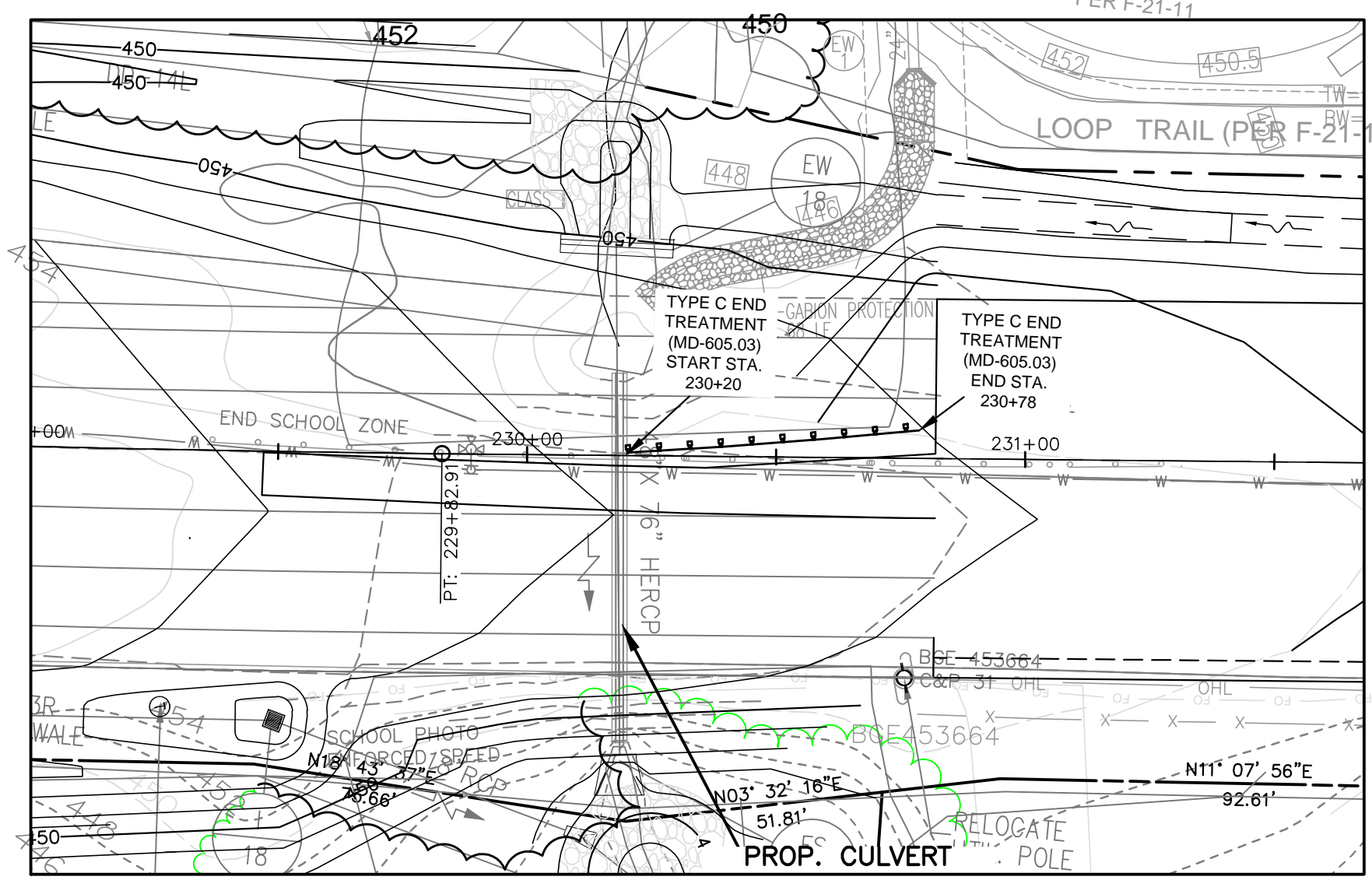


**UTILITY PLAN**

SCALE: 1" = 50'

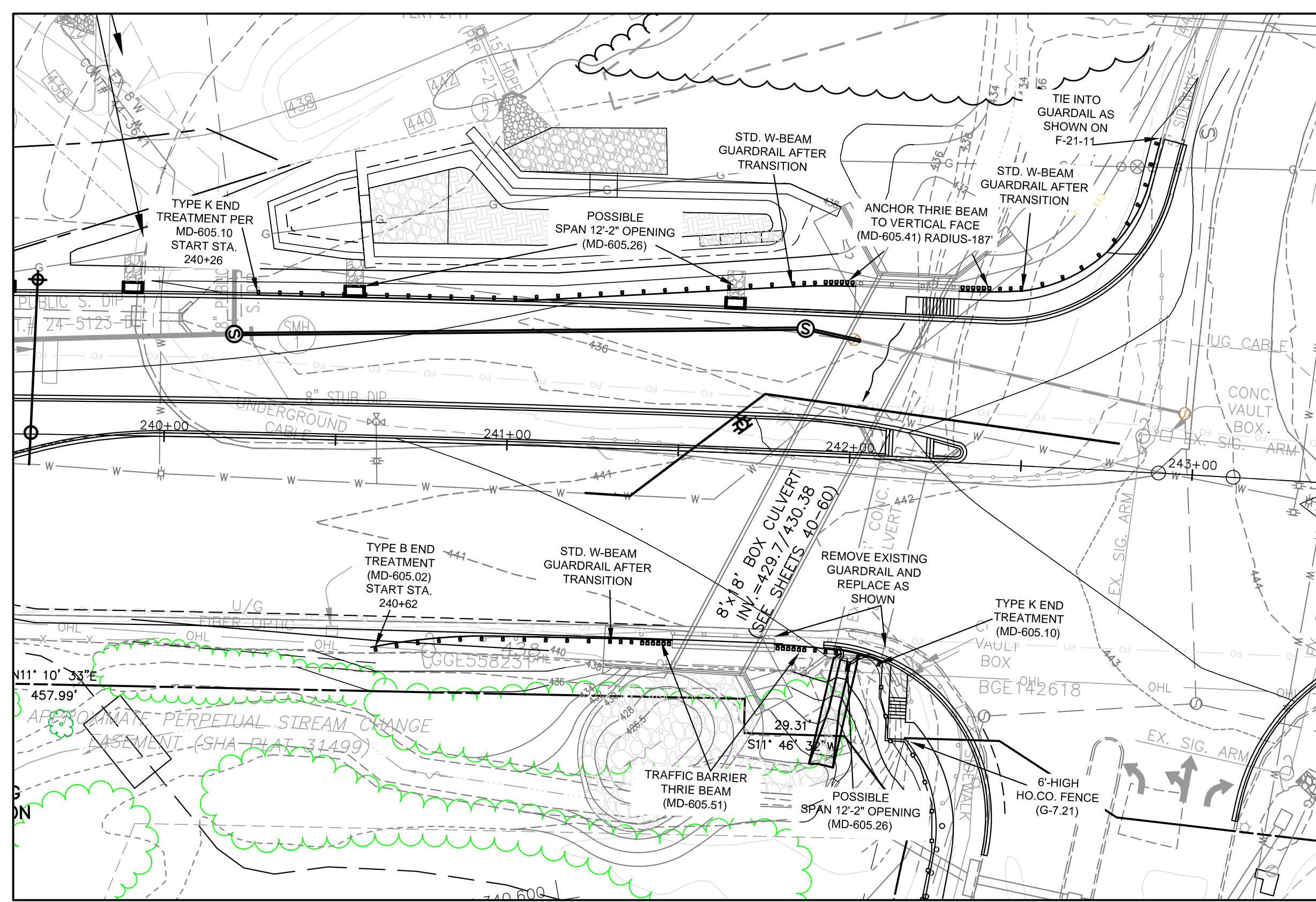


FOR FINAL DESIGN AND DETAILS OF THE LATEST WATER AND SEWER DESIGN, PLEASE SEE PLANS "FINAL PUBLIC WATER AND SEWER PLAN, MARRIOTTVILLE ROAD", CONTRACT #24-5192-D



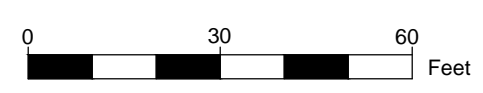
**GUARDRAIL PLAN- SOUTH END**

SCALE: 1" = 30'



**GUARDRAIL PLAN- INTERSECTION**

SCALE: 1" = 30'



APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

NO.	DATE	REVISION

**BENCHMARK**  
ENGINEERS & LAND SURVEYORS & PLANNERS  
**ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 114A ELLICOTT CITY, MARYLAND 21043  
(P) 410-485-6105 (F) 410-485-6644  
WWW.BEI-CIVLENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

03.07.2023

**OWNER:**  
HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF  
DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

**MARRIOTTVILLE ROAD WIDENING  
APFO MITIGATION PLANS  
F-21-033**

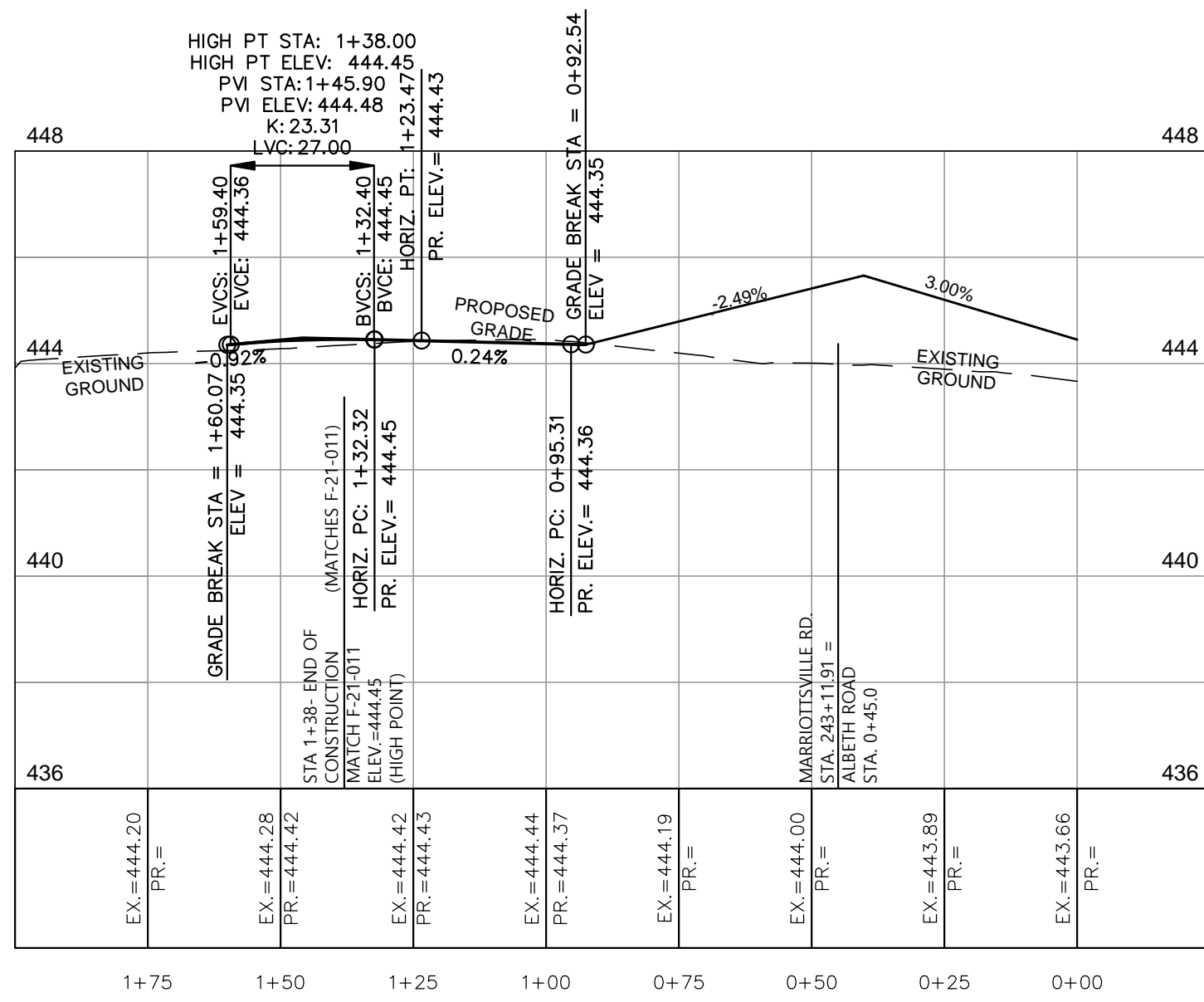
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**DEVELOPER:**  
MANGIONE ENTERPRISES OF TURF VALLEY  
LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE  
LUTHERVILLE, MARYLAND 21093  
410-825-8400

**UTILITY PLAN & GUARDRAIL PLAN**

DATE: MARCH 2023 BEI PROJECT NO. 2769  
SCALE: 1" = 50' SHEET 14 OF 60

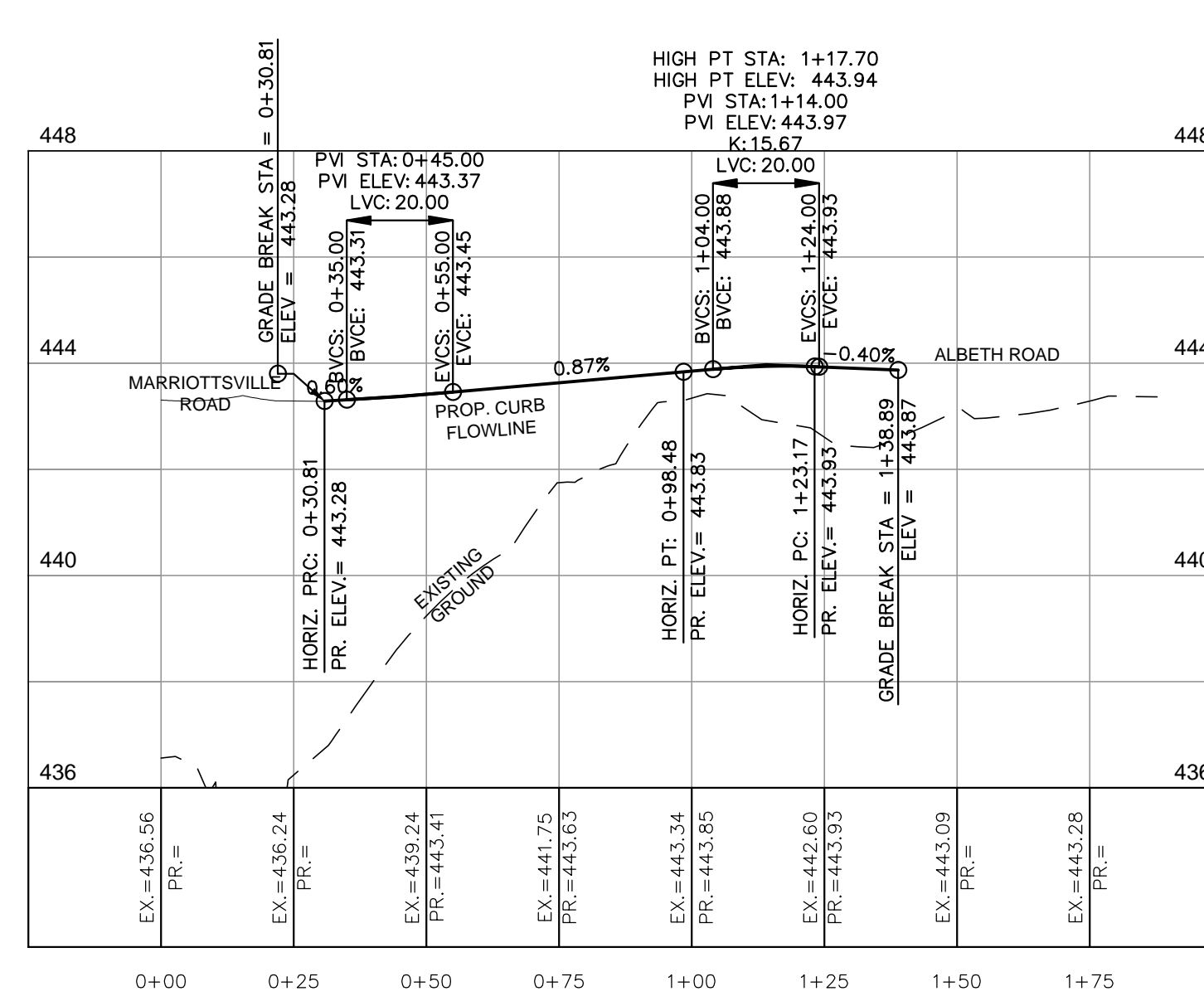




ALBETH ROAD CL PROFILE

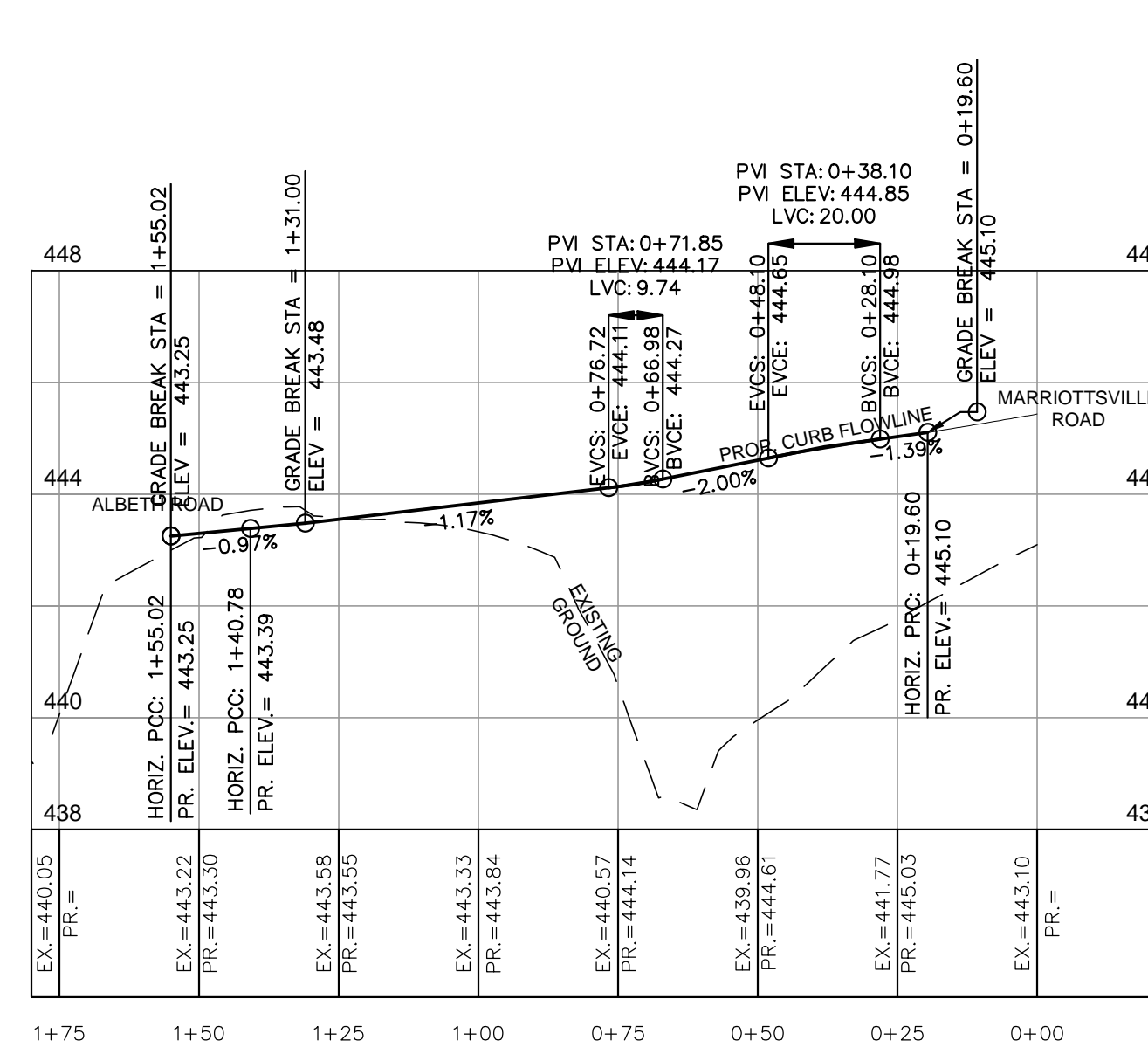
SCALE: HORI.- 1" = 30'  
VERT.- 1" = 3'

# ALBETH CL



SOUTHWEST CURB FLOWLINE PROFILE (ALBETH/MARRIOTTVILLE)

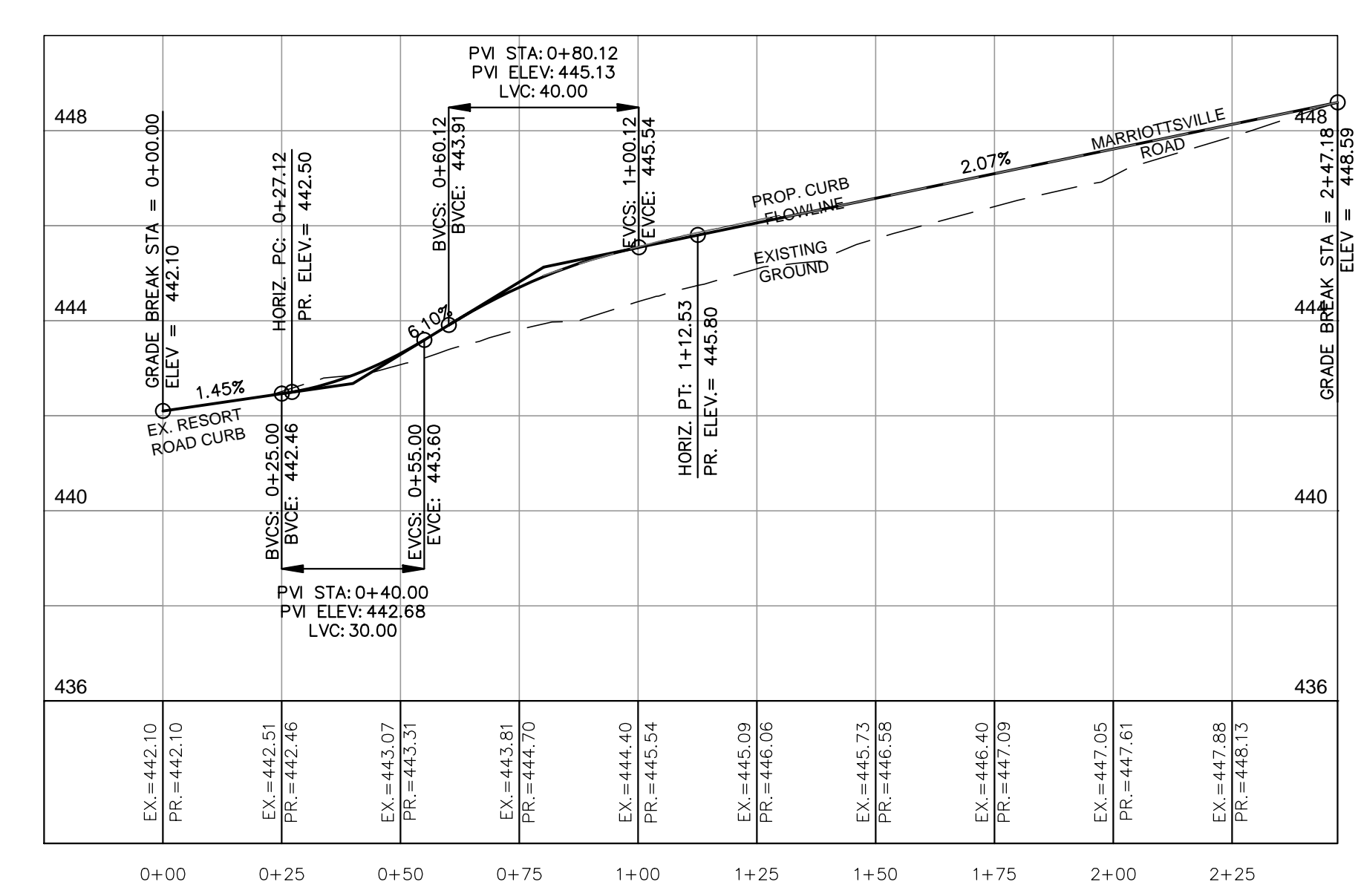
SCALE: HORI.- 1" = 30'  
VERT.- 1" = 3'



NORTHWEST CURB FLOWLINE PROFILE (ALBETH/MARRIOTTVILLE)

SCALE: HORI.- 1" = 30'  
VERT.- 1" = 3'

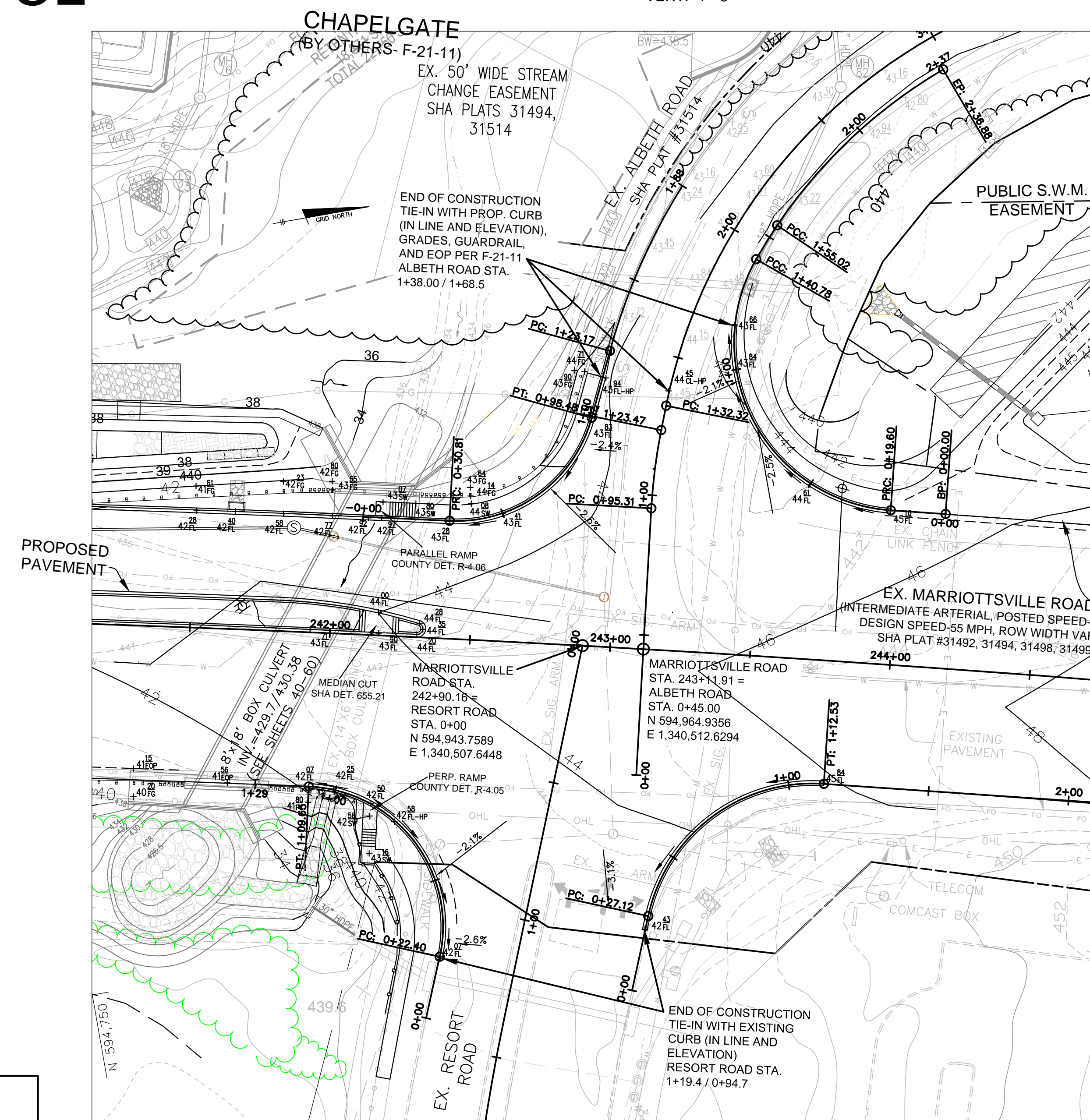
# NW CURB ALBETH



NORTHEAST CURB FLOWLINE PROFILE (RESORT/MARRIOTTVILLE)

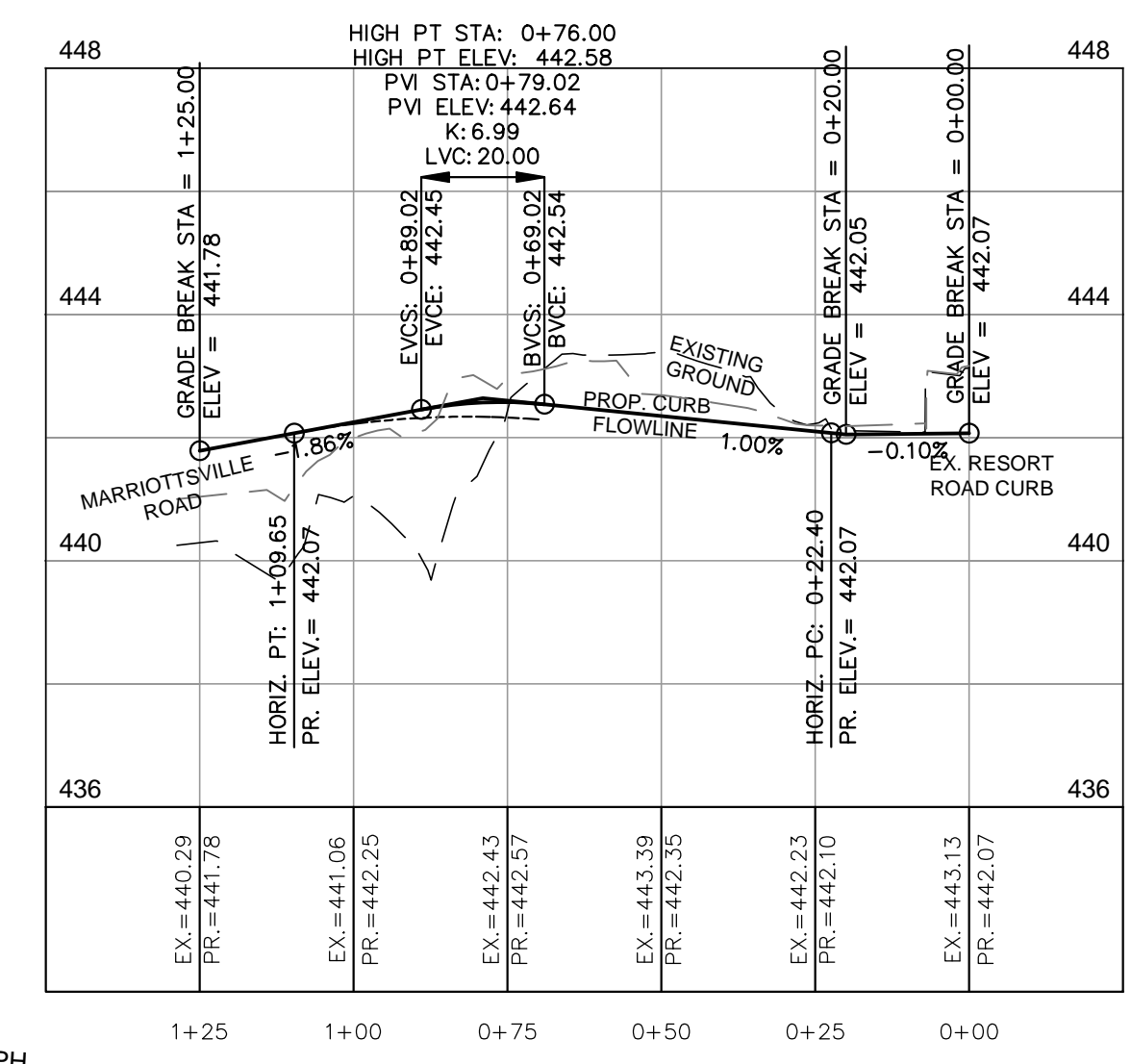
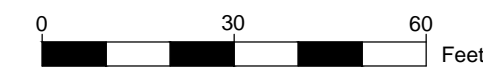
SCALE: HORI.- 1" = 30'  
VERT.- 1" = 3'

# NE CURB RESORT



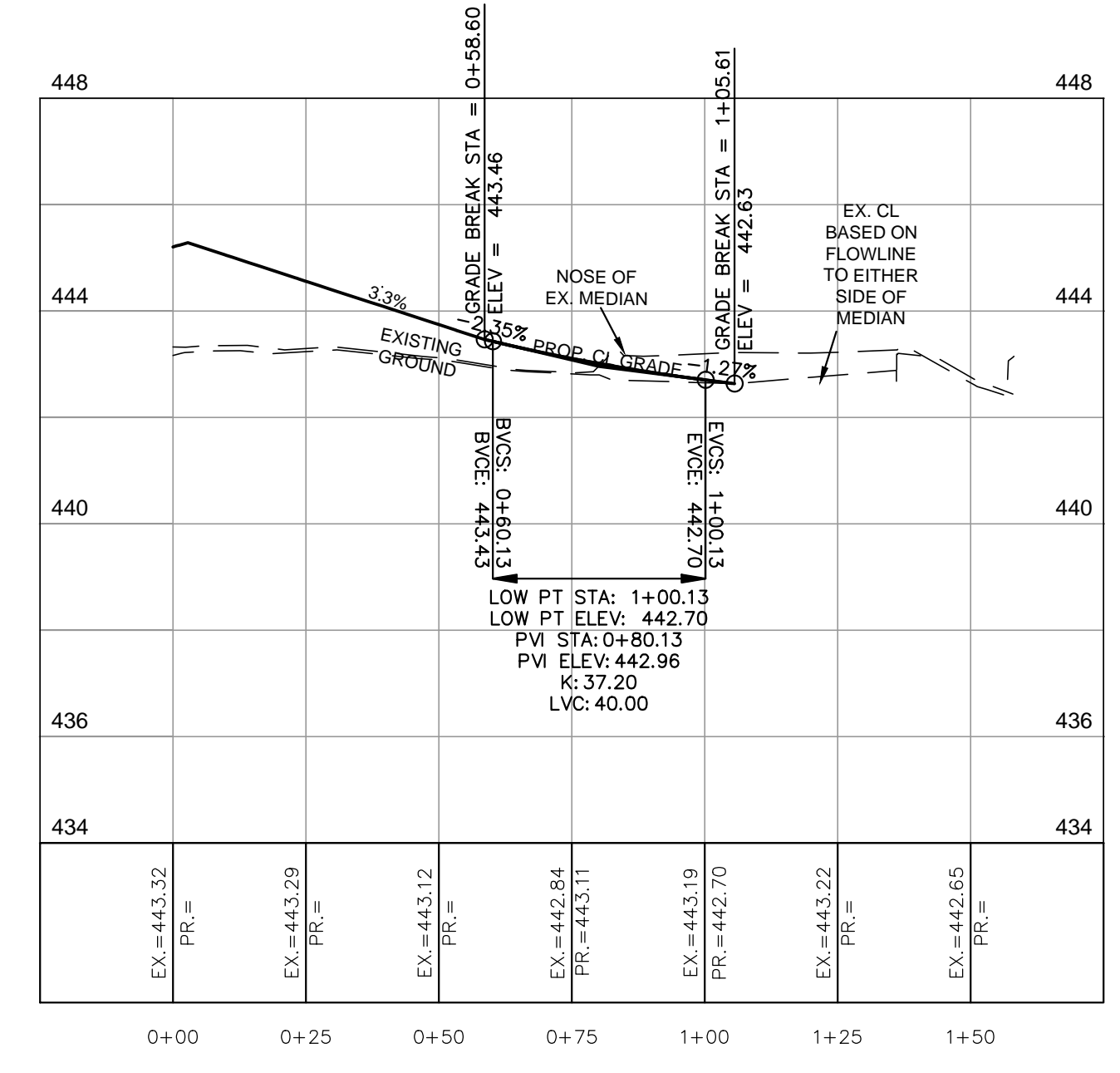
ALBETH ROAD/ RESORT ROAD INTERSECTION PLAN

SCALE: 1" = 30'



SOUTHEAST CURB FLOWLINE PROFILE (RESORT/MARRIOTTVILLE)

# SE CURB RESORT



RESORT ROAD CL PROFILE

SCALE: HORI.- 1" = 30'  
VERT.- 1" = 3'

# RESORT CL

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERS, INC.**  
3300 NORTH RIDGE ROAD, SUITE 100, ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BE-CIVILENGINEERING.COM

3/07/2023

**MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**ALBETH ROAD/ RESORT ROAD INTERSECTION PLAN AND PROFILES**

DATE: MARCH 2023 BEI PROJECT NO. 2769  
SCALE: 1" = 30' SHEET 15 OF 60

OWNER: HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE  
LUTHERVILLE, MARYLAND 21093  
410-825-8400

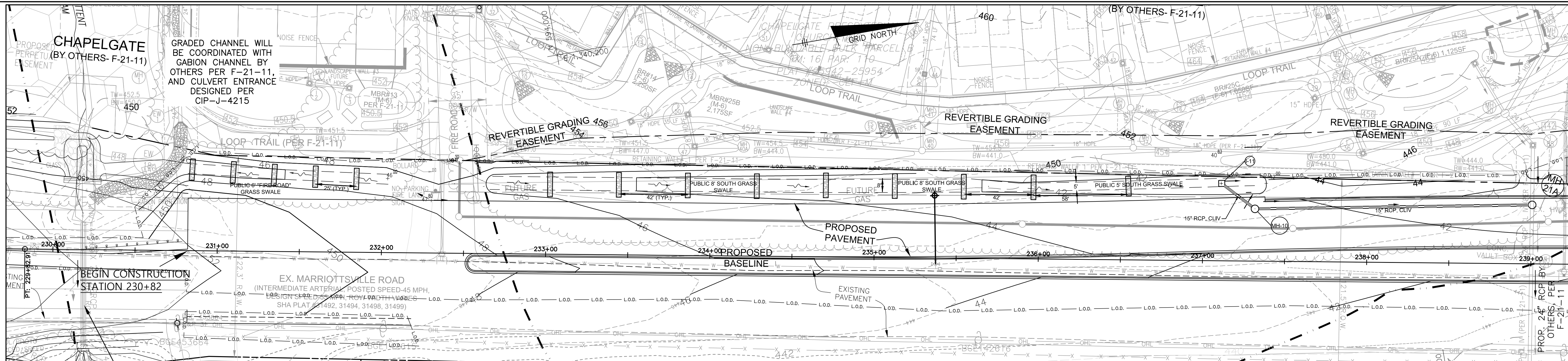
DESIGN: MLS DRAFT: MLS

OWNER: HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE  
LUTHERVILLE, MARYLAND 21093  
410-825-8400

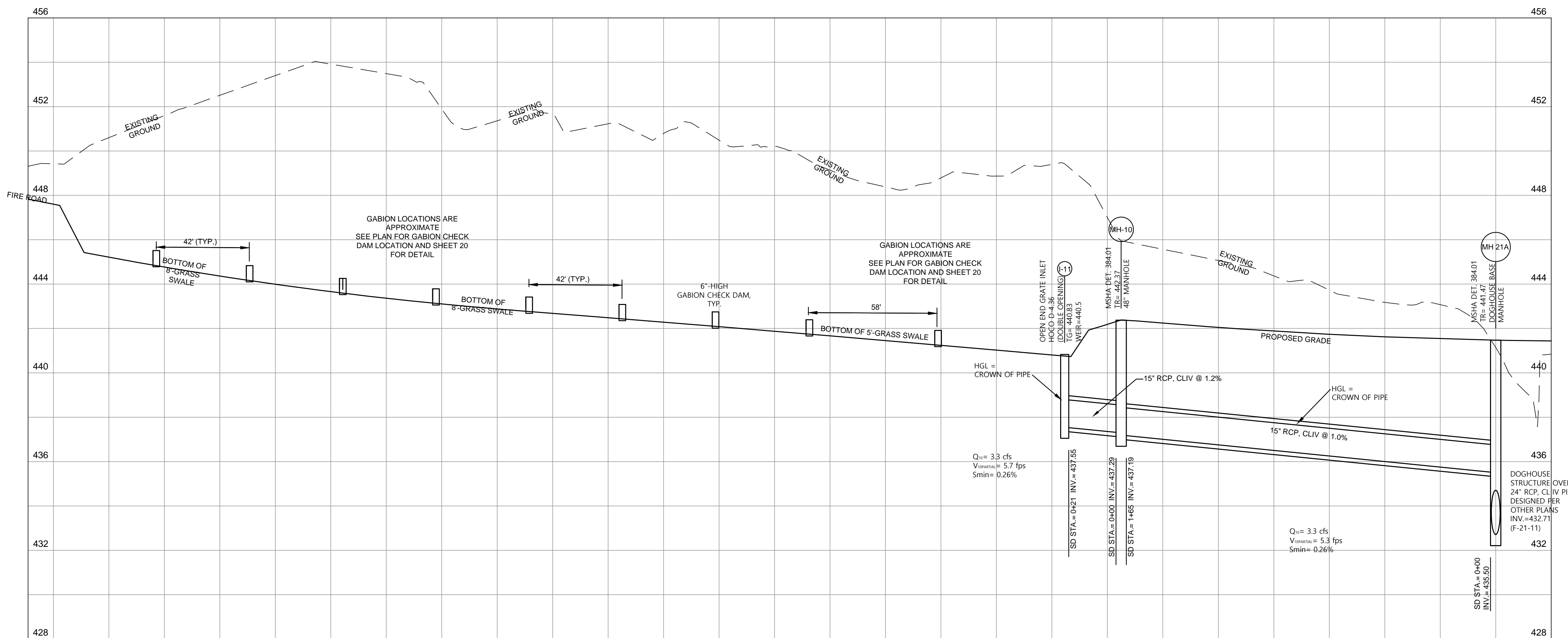
DESIGN: MLS DRAFT: MLS





**SOUTH GRASS SWALE (M-8)  
AND FIRE ROAD GRASS SWALE (M-8)**

SCALE: 1" = 30'  
0 30 60 Feet



**SOUTH GRASS SWALE (M-8) STORM DRAIN PROFILE**

SCALE: HORI: 1" = 30'  
VERT: 1" = 3'

**SWM OPERATION AND MAINTENANCE (O&M) NOTES- GRASS SWALE (M-8)**

1. During the first year of operation, inspections should be conducted after every major storm event (>1") and poorly established areas re-vegetated. Thereafter, annual inspections should be performed once a year.
2. Remove sediment from the check dams when it accumulates to a depth of more than 2".
3. Mow the swale at least bi-annually.
4. Remove trash and debris as necessary.

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, DIVISION OF LAND DEVELOPMENT	4/21/2023
DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

NO.	DATE	REVISION

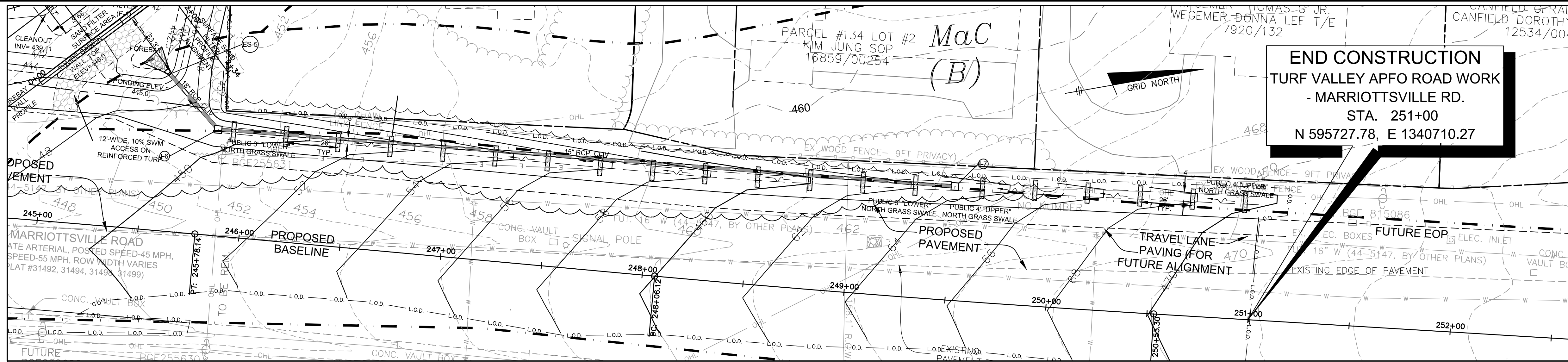
**BENCHMARK**  
ENGINEERS & LAND SURVEYORS & PLANNERS  
**ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 100 ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BEI-CIVILENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

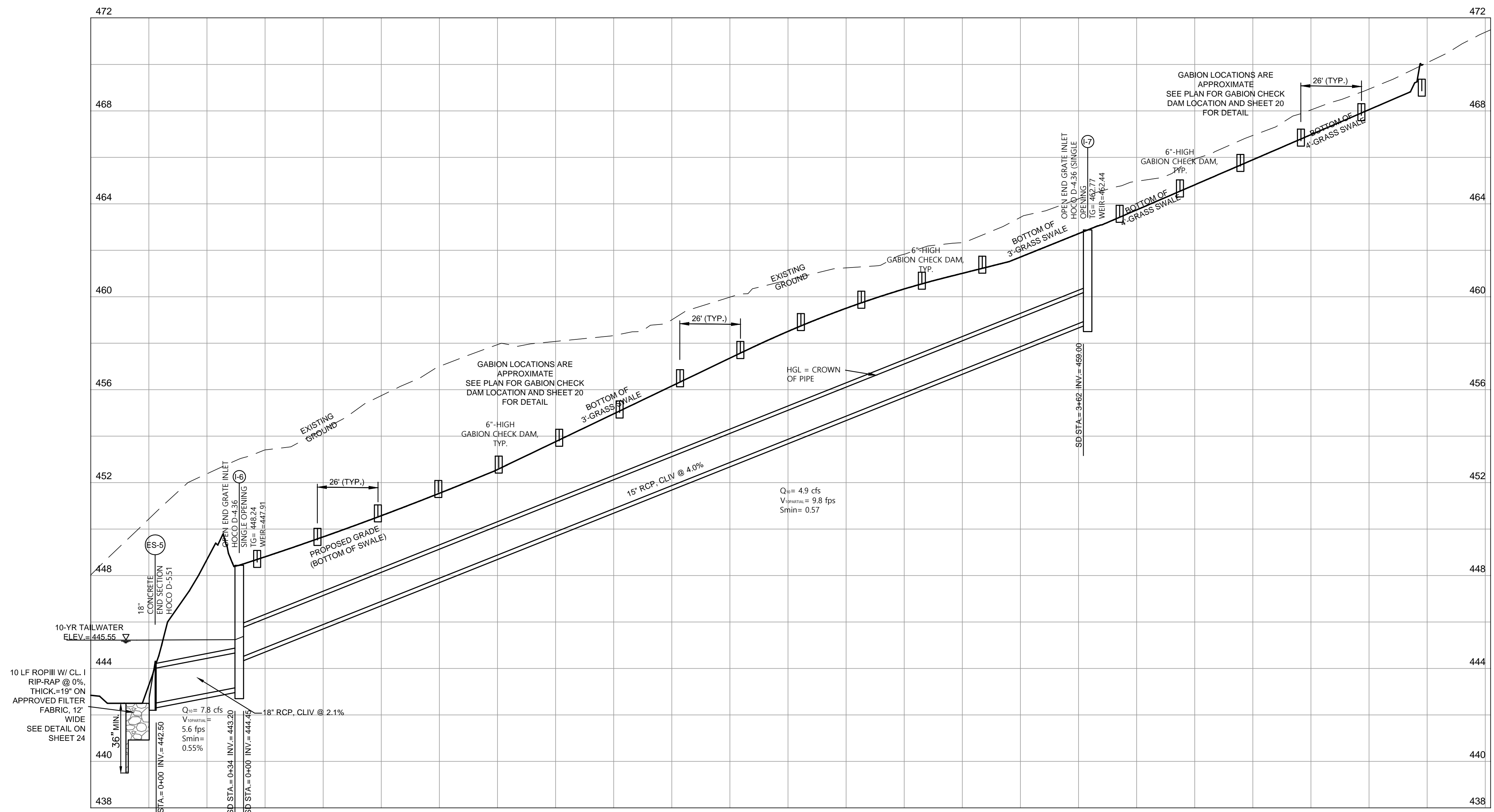
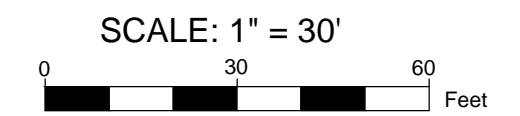
*Michael L. Anderson* 03.07.2023

<p><b>OWNER:</b> HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401</p>	<p><b>MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033</b></p> <p>TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND</p> <p><b>DEVELOPER:</b> MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400</p>
<p><b>DESIGN:</b> MLS    <b>DRAFT:</b> MLS</p>	<p><b>STORMWATER MANAGEMENT PLAN- GRASS SWALE (M-8) AND STORM DRAIN PROFILES- 1</b></p> <p>DATE: MARCH 2023    BEI PROJECT NO. 2769 SCALE: 1" = 30'    SHEET 16 OF 60</p>





NORTH GRASS SWALES (M-8) (UPPER AND LOWER)



NORTH GRASS SWALES (M-8) STORM DRAIN PROFILE



APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: <i>[Signature]</i>	5/4/2023
CHIEF, BUREAU OF HIGHWAYS		DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: <i>[Signature]</i>	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT		DATE
DocuSigned by: <i>[Signature]</i>		4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION		DATE

NO.	DATE	REVISION

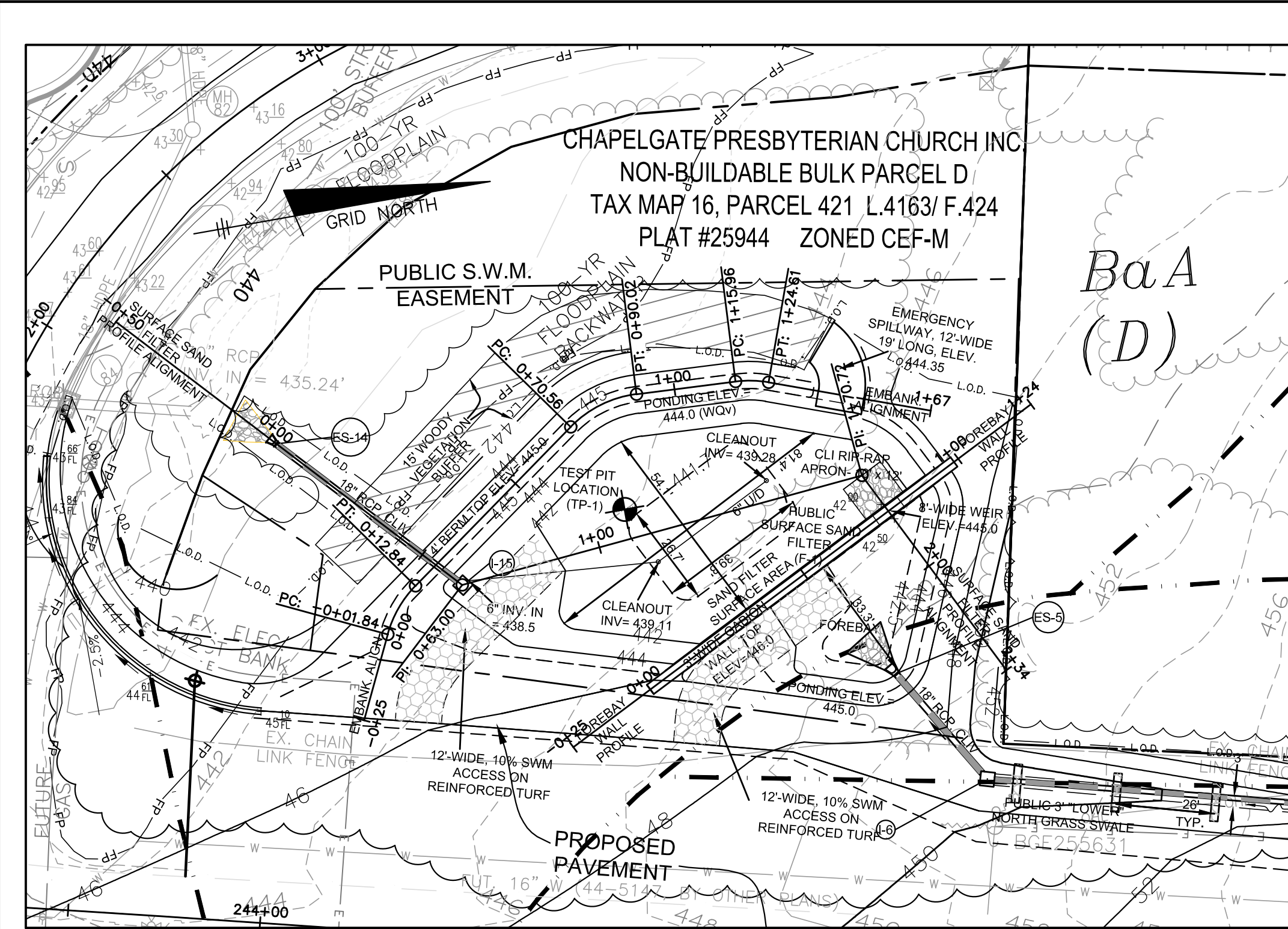
**BENCHMARK**  
ENGINEERS & LAND SURVEYORS & PLANNERS  
**ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 140 ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BEI-CIVILENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

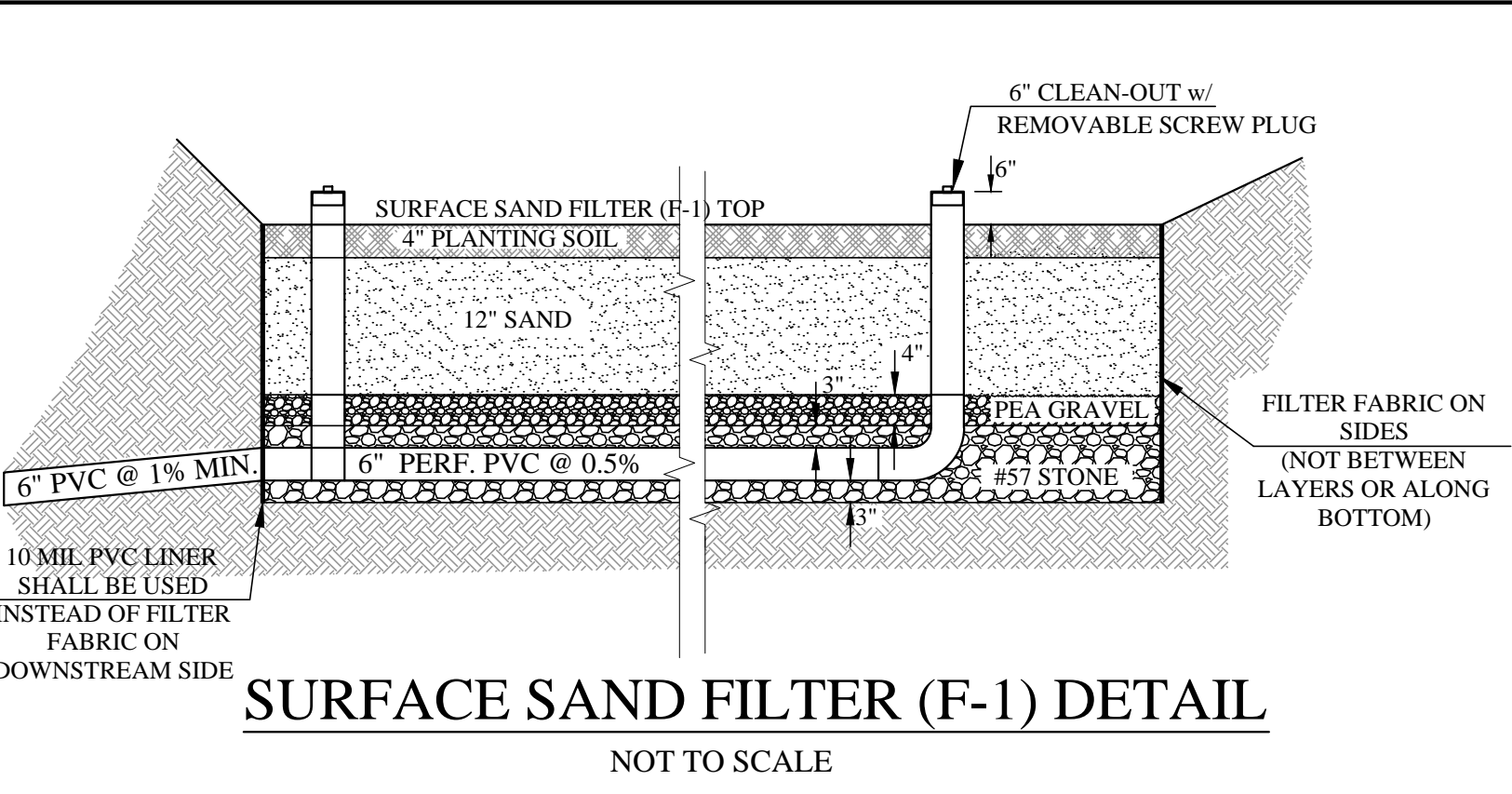
*Michael L. Anderson* 03.07.2023

<p>OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401</p>	<p><b>MARIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033</b></p> <p>TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND</p>		
<p>DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400</p>	<p><b>STORMWATER MANAGEMENT PLAN- GRASS SWALE (M-8) AND STORM DRAIN PROFILES- 2</b></p>		
DESIGN: MLS	DRAFT: MLS	DATE: MARCH 2023	BEI PROJECT NO. 2769
SCALE: 1" = 30'	SHEET 17 OF 60		

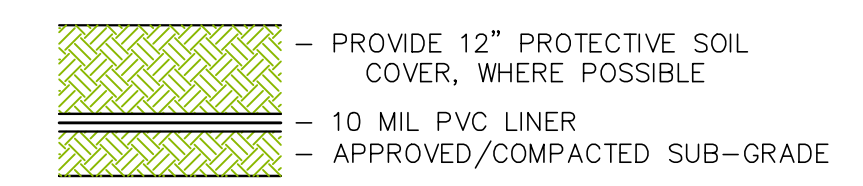




**SURFACE SAND FILTER (F-1) AND FOREBAY**  
SCALE: 1" = 30'



**SURFACE SAND FILTER (F-1) DETAIL**  
NOT TO SCALE



**PVC LINER NOTES**

1. Provide 12" of soil cover wherever possible. Provide as much cover as feasible in other locations.
2. Liner can be similar to SCD Diversion Fence Detail C-9, which calls for a 10 mil or thicker LV resistant, impermeable sheeting.
3. Where pipes pass through the liner, an acceptable solution is to cut the sheeting in an "X" pattern to allow the pipe to pass through the opening. Overlap the pipe with the sheeting an additional 6" and secure the sheeting to the underdrain with an aluminum or stainless steel pipe mounting strap.

**SWM OPERATION AND MAINTENANCE (O&M) NOTES- SURFACE SAND FILTER (F-1)**

1. During the first year of operation, inspections should be conducted after every major storm event (>1") and poorly established areas revegetated.
2. Remove silt from the filter surface when it exceeds 1". Remove sediment from forebay when it accumulates to a depth of more than 6".
3. Vegetation within the forebay should be limited to a height of 18". The filtration bay should be mowed a minimum of 3 times per growing season to maintain a grass height of less than 12".
4. Remove trash and debris as necessary.
5. The Surface Sand Filter (F-1) should drain within 12-36 hours. If water remains ponded for more than 36 hours, maintenance may be required. Check the outflow pipes for clogs. Replace the soil layer within Surface Sand Filter (F-1) and reseed. If ponding remains for more than 72 hours, the top 2" of sand (or to the depth of discoloration) may need to be removed and disposed of properly.
6. Replace dead plants in all facility. If a re-occurring problem, consult a landscaping expert for alternative species.

**Table B.3.1 Material Specifications for Sand Filters**

Material	Specification/Test Method	Size	Notes
sand	clean AASHTO-M-6 or ASTM-C-33 concrete sand	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "Rock dust" can be used for sand.
peat	ash content: < 15% pH range: 5.2 to 4.9 loose bulk density: 0.12 to 0.15 g/cc	0.02" to 0.04"	The material must be weed-free, hemic peat, shredded, uncompacted, uniform, and clean.
leaf compost	-	n/a	-
underdrain gravel	AASHTO-M-43	0.375" to 0.75"	-
geotextile fabric (if required)	ASTM-D-4833 (puncture strength = 125 lb.) ASTM-D-4632 (tensile strength = 300 lb.)	0.08" thick equivalent opening size of #60 sieve	Must maintain 125 gpm per sq. ft. flow rate. Note: a 4" pea gravel layer may be substituted for geotextiles meant to "separate" sand filter layers.
impermeable liner	SEE DETAIL ON SHEET 2	SEE SHEET 2	SEE SHEET 2
underdrain piping	F 758, Type PS 28 or AASHTO-M-278	4" - 6" rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" gravel over pipes; stone depth underneath pipes can vary depending groundwater recharge volume requirements.
concrete (cast-in-place)	MSHA Standards and Specs, Section 902, Mix No. 3, f <sub>c</sub> =3,500 psi, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the state of Maryland.
concrete (pre-cast)	per pre-cast manufacturer	n/a	SEE ABOVE NOTE
non-rebar steel	ASTM A-36	n/a	structural steel to be hot-dipped galvanized ASTM-A-123

	SAND FILTER
FOREBAY BOTTOM ELEV.	442.0
FOREBAY BERM TOP ELEV.	446.0
FOREBAY WEIR ELEV.	445.0
SAND FILTER BERM TOP ELEV.	445.0
EMERGENCY SPILLWAY WEIR ELEV.	444.35
TOP OF SAND FILTER ELEV.	441.7
OUTLET YARD INLET GRATE ELEV. (TOP OF WATER QUALITY VOLUME)	444.0
6" UNDERDRAIN INVERT ELEV.	439.28
BOTTOM OF STONE ELEV.	439.03
GROUNDWATER ELEV. (434.7 IN REPORT, BUT ADJUSTED FOR FIELD-SURVEYED ELEV.)	434.50 (>4' BELOW 439.03)

AREA FOR PLANTING (sf)*	No. OF COLUMN A (SHRUBS) -1 PER 40 sf **	No. OF COLUMN B (HERB.) -1 PER 20 sf **
2,233	56	112

\*THE AREA OVER THE SURFACE SAND FILTER (F-1) SHALL BE GRASS. THE SURFACE SAND FILTER (F-1) AREA IS NOT INCLUDED, NOR IS THE ACCESS ROAD, ONLY THE REST OF THE BASIN.  
\*\* THREE VARIETIES OF EACH TYPE (A AND B) SHALL BE CHOSEN. (SO EACH FACILITY SHALL HAVE SIX DIFFERENT VARIETIES OF PLANTINGS). SEE BELOW FOR LIST OF ACCEPTABLE PLANTINGS.

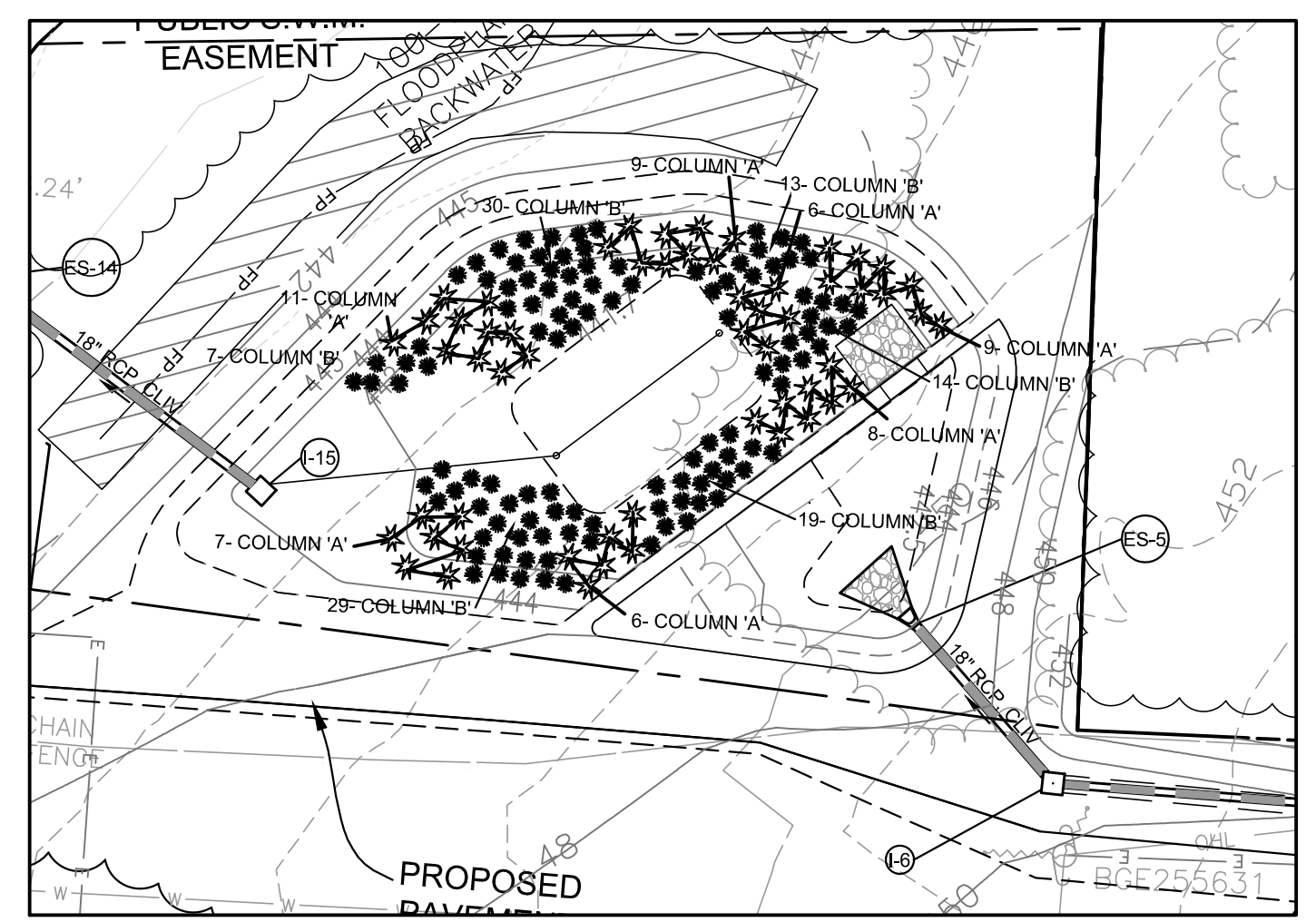
NOTE: SEE APPENDIX A IN THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II. FOR MORE INFORMATION. EACH SWMESD FACILITY SHALL HAVE SIX DIFFERENT VARIETIES, THREE FROM EACH COLUMN. SUBSTITUTIONS MAY BE ALLOWED AFTER ENGINEER REVIEW.

**COLUMN A- SHRUB OPTIONS IN No. 3 (3 GALLON) CONTAINER:**

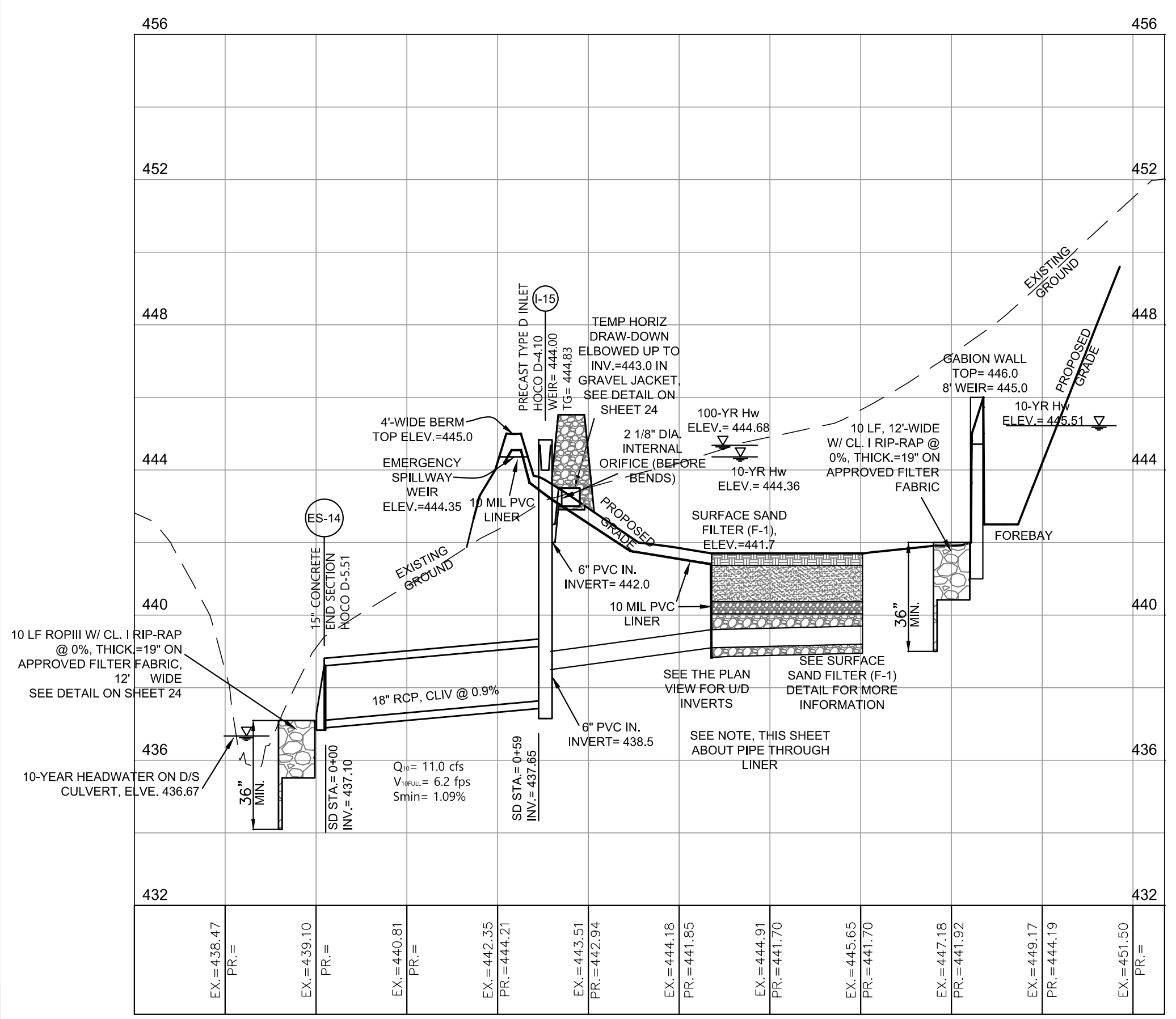
- BOTTLEBRUSH BUCKEYE
- BRITTONISH
- HIGHBUSH BLUEBERRY
- INKBERRY
- WINTERBERRY
- ARROWWOOD
- SPEARBUSH
- BAYBERRY

**COLUMN B- HERBACEOUS OPTIONS IN No. 1 (1 GALLON) CONTAINER:**

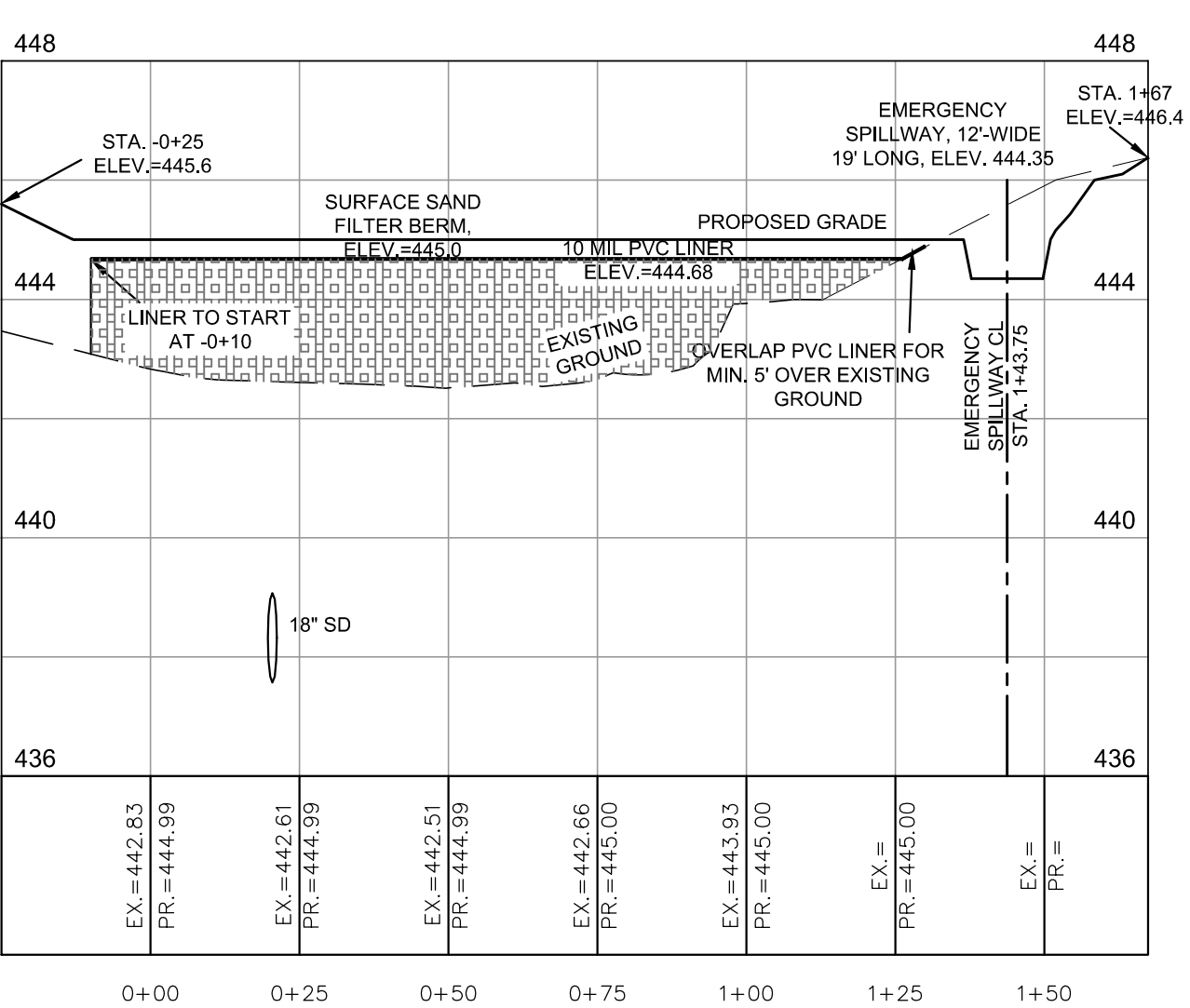
- BROOMSEDGE
- JOE PYE WEED
- THREE SQUARE BULRUSH
- CARDINAL FLOWER
- SWITCHGRASS
- BROOM PANIC GRASS
- TALL CONEFLOWER
- WOOLGRASS
- NEW YORK IRONWEED



**SURFACE SAND FILTER (F-1)- PLANTING PLAN**  
SCALE: 1" = 30'

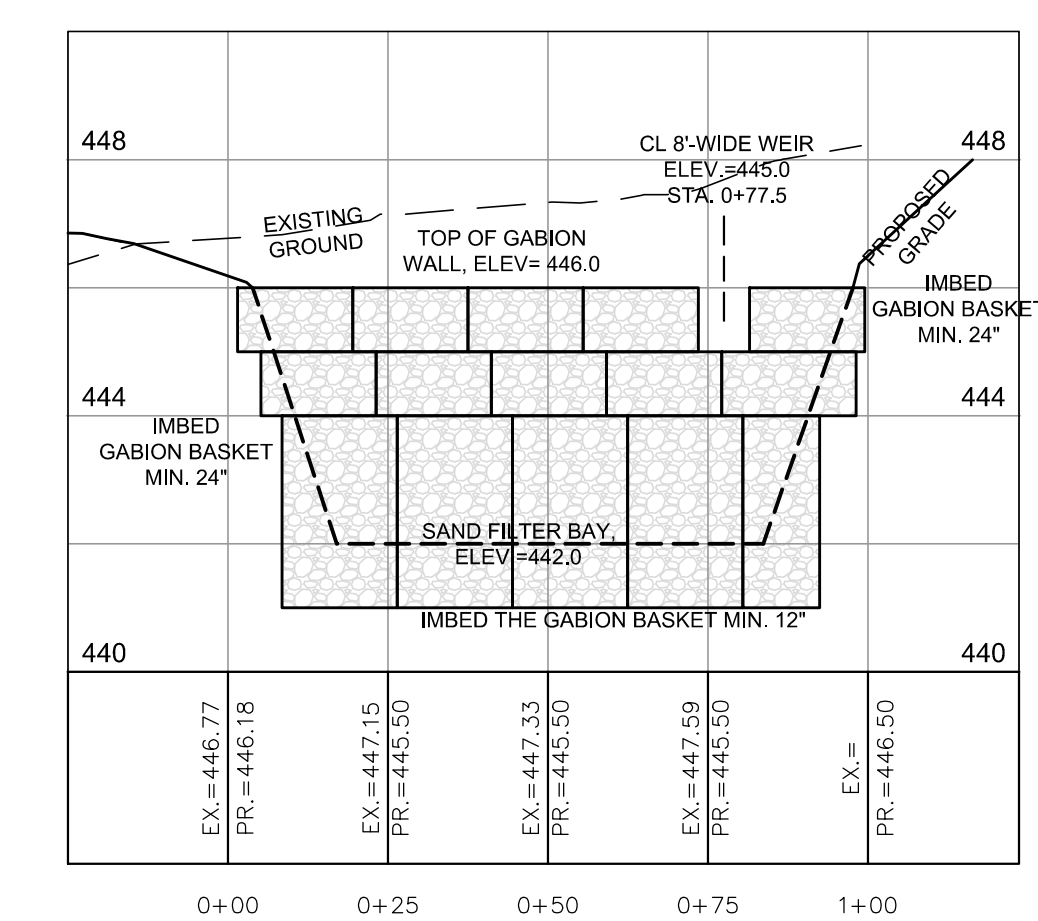


**SURFACE SAND FILTER (F-1) PROFILE**  
SCALE: HORI. 1" = 30'  
VERT. 1" = 3'



**SURFACE SAND FILTER (F-1) CENTERLINE PROFILE- EARTHEN EMBANKMENT**  
SCALE: HORI. 1" = 30'  
VERT. 1" = 3'

**SURFACE SAND FILTER (F-1) LANDSCAPING LIST**



**SURFACE SAND FILTER (F-1) CENTERLINE PROFILE- FOREBAY GABION WALL**  
SCALE: HORI. 1" = 30'  
VERT. 1" = 3'

TEST PIT LOG		Test Pit No.: 1			
PROJECT	Albeth Road Test Pit	PROJECT NO.			
CLIENT	Mangione Family Enterprises	DATE	11/9/2020		
LOCATION	2535 Albeth Rd, Ellicott City, MD	ELEV.	444.2		
EXCAVATION METHOD	Bobcat E35	LOGGER	N. Payer		
DEPTH TO - Water:	9.5	When checked:	30 minutes		
		Caving:	N/A		
ELEVATION/DEPTH	SOIL SYMBOLS AND SAMPLERS	USCS	DESCRIPTION	DENSITY	MOISTURE
0		ML	topsoil		
442.5		ML	Beige, sandy SILT, fine sand, trace clay (ML)		
			Orange-tan, clayey, sandy SILT (ML/CL)		
2.5			Cobbles with sandy SILT		
440		ML	Orange-brown, SILT, some sand, trace clay, gravel and mica (ML) appears as saprolite or soft weathered rock		
437.5		SM	Tan with gray-brown, very moist to wet, silty SAND, with coarse sand and fine gravel, some mica (SM)		
435			Pit terminated at 9'8"		
432.5					
12.5					

Notes: Descriptions are based on test pit observations on this date and hand auger observations conducted on 10/29/2020

HILLIS-CARNES ENGINEERING ASSOCIATES, INC.

**SURFACE SAND FILTER (F-1) TEST PIT**  
NOT TO SCALE

**STORMWATER MANAGEMENT BORING/TEST PIT NOTES:**

1. TEST PIT NUMBER 1 RESULTS ARE SHOWN ON THIS SHEET AND ARE IN SUPPORT OF THE SURFACE SAND FILTER (F-1). THE TEST PIT DEMONSTRATES GROUNDWATER ELEVATIONS GREATER THAN 4' BELOW THE BOTTOM OF THE UNDERDRAIN BEDDING STONE.
2. THE WATER ELEVATION IS ADJUSTED FROM 434.7 TO 434.5 SINCE A FIELD SURVEY PERFORMED SETS THE ACTUAL SURFACE ELEVATION AT 444.0 (VERSUS 444.2)

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD, SUITE 100, ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BEI-CIVILENGINEERING.COM

OWNER: HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE  
LUTHERVILLE, MARYLAND 21093  
410-825-8400

DESIGN: MLS DRAFT: MLS

**MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**  
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**STORMWATER MANAGEMENT PLAN- SURFACE SAND FILTER (F-1)**  
DATE: MARCH 2023 BEI PROJECT NO. 2769  
SCALE: 1" = 30' SHEET 18 OF 60

APPROVED: DEPARTMENT OF PUBLIC WORKS  
5/4/2023

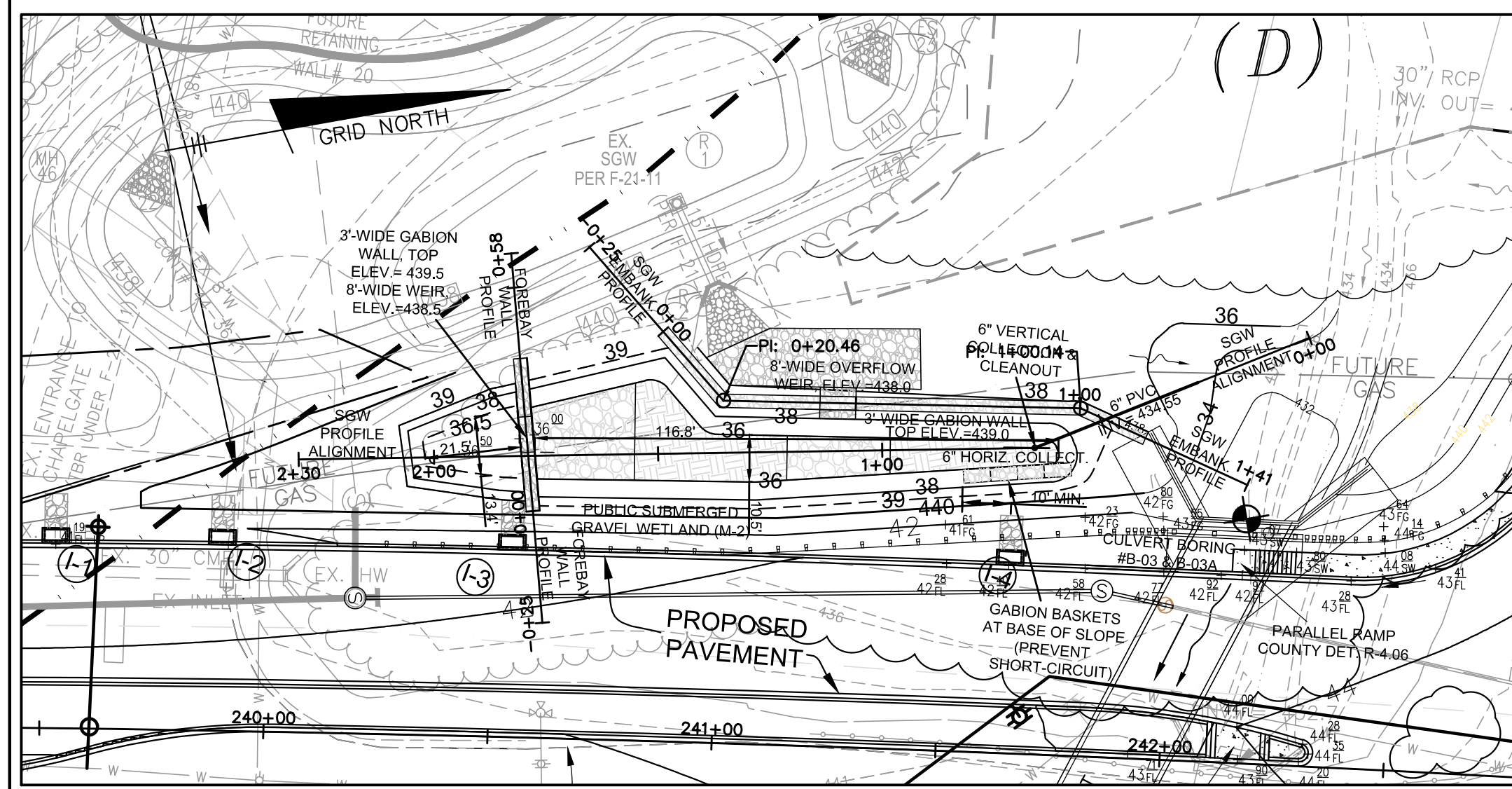
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
4/19/2023

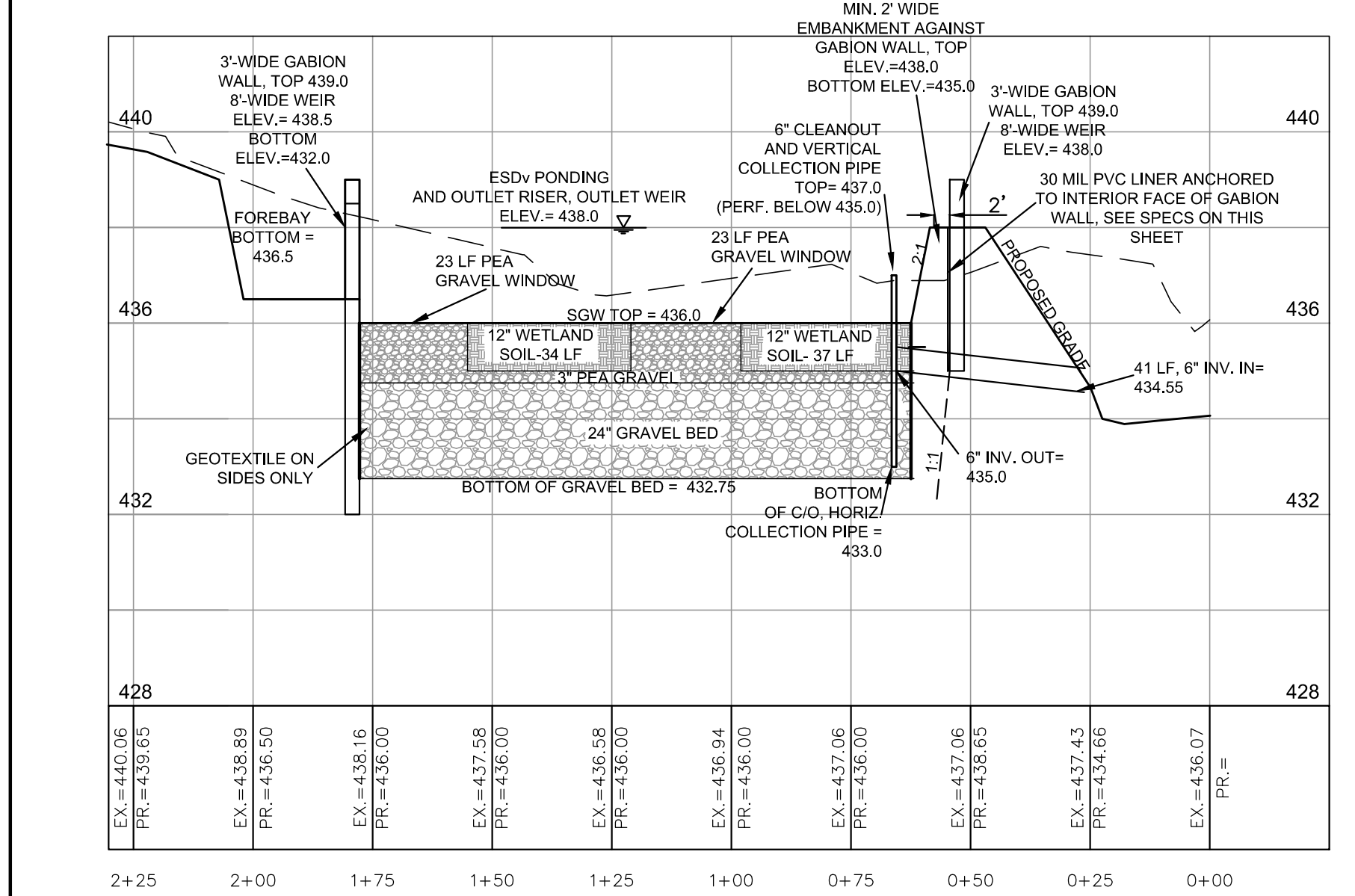
CHIEF, DIVISION OF LAND DEVELOPMENT  
4/21/2023

CHIEF, DEVELOPMENT ENGINEERING DIVISION





**SUBMERGED GRAVEL WETLAND (M-2)**  
SCALE: 1" = 30'



**SUBMERGED GRAVEL WETLAND (M-2) PROFILE**  
SCALE: HORI. 1" = 30'  
VERT. 1" = 3'

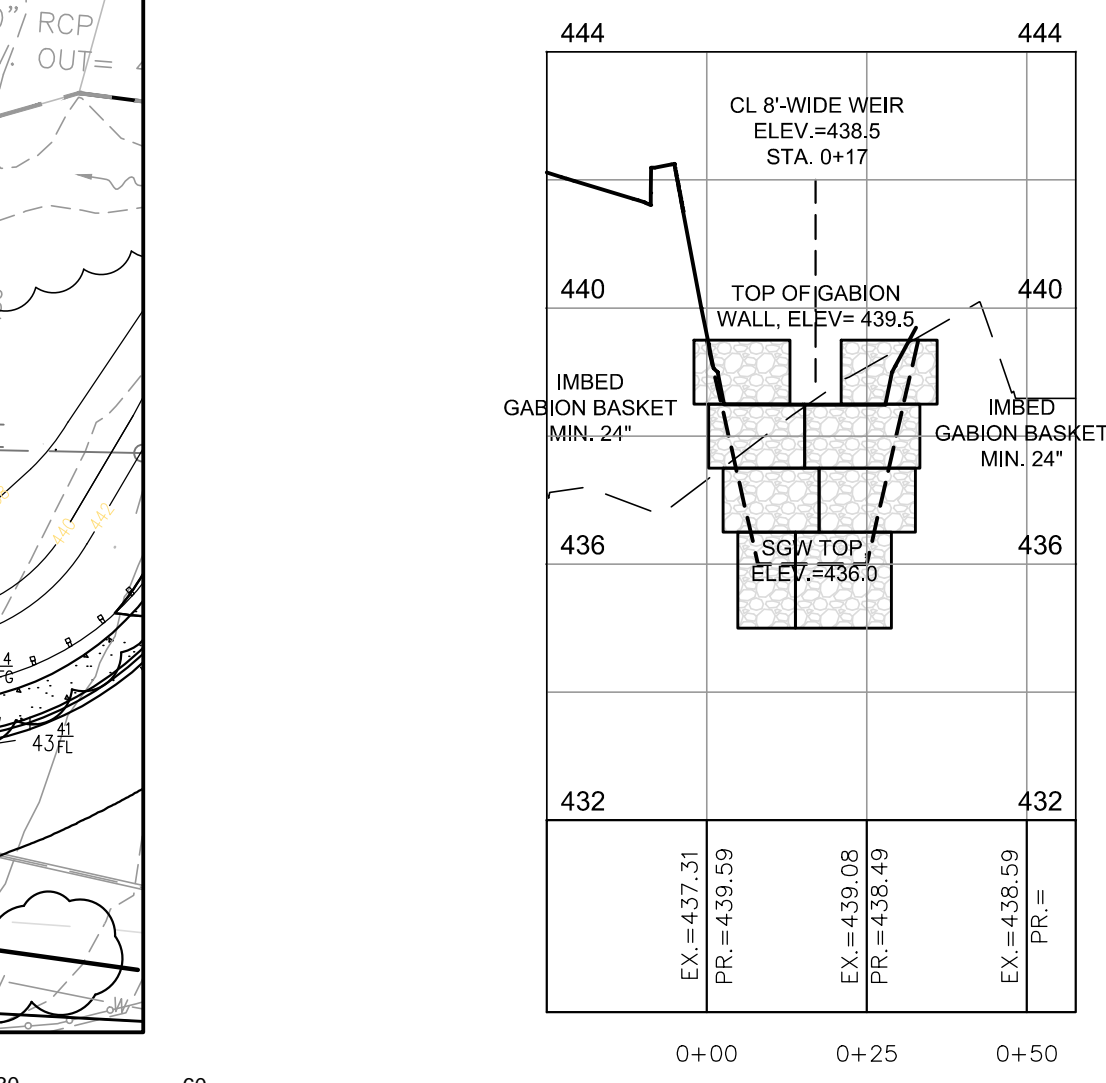
- SUBMERGED GRAVEL WETLAND (M-2) NOTES:**
1. PEA GRAVEL SHOULD BE WASHED #8 OR #9.
  2. GRAVEL BED SHALL BE WASHED #57 OR #67.
  3. SEE TABLE B.4.1 (THIS SHEET) FOR MORE STONE SPECIFICATIONS
  4. "WETLAND SOIL" SHOULD BE A MIX OF 50% PLANTING SOIL AND 50% NATIVE SOIL EXCAVATED FOR THE FACILITY (OR NEARBY)

**SWM OPERATION AND MAINTENANCE (O&M) NOTES- SUBMERGED GRAVEL WETLAND (M-2)**

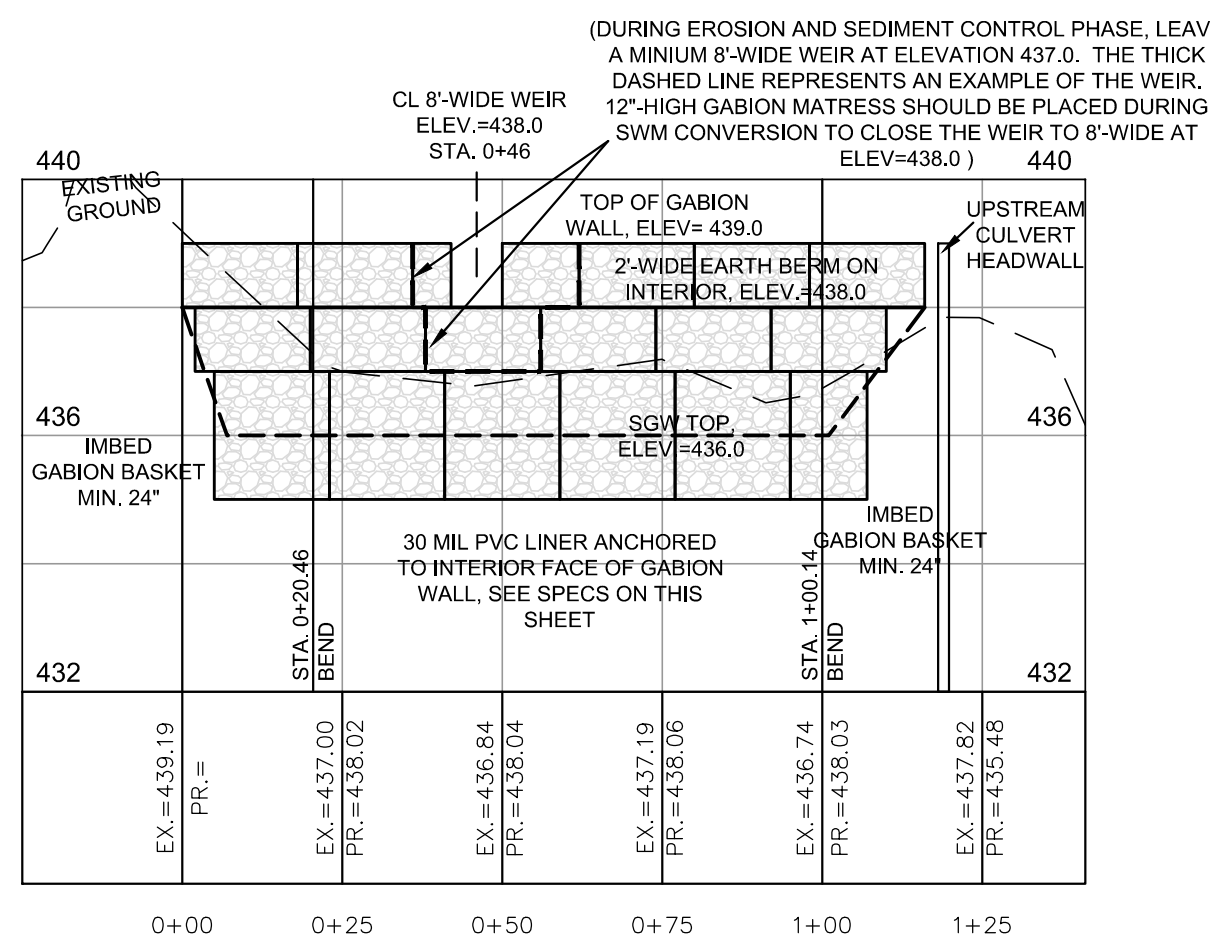
1. During the first year of operation, inspections should be conducted after every major storm event (>1") and poorly established areas revegetated.
2. Remove sediment from forebay when it accumulates to a depth of more than 6".
3. Vegetation within the forebay should be limited to a height of 18".
4. Remove trash and debris as necessary.
5. Check the outflow pipes for clogs.
6. The Submerged Gravel Wetland (M-2) facilities should drain within 24-48 hours. If water remains ponded in either of the ESD facilities for more than 48 hours, maintenance is required. Signs of uneven flow may mean the gravel or underdrain is clogged. The gravel and/or underdrain may need to be removed, cleaned, and replaced.
7. Replace dead plants in the Submerged Gravel Wetland (M-2). If this is a re-occurring problem, consult a landscaping expert for alternative species.

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

	SUBMERGED GRAVEL WETLAND (M-2)
FOREBAY BOTTOM ELEV.	436.5
FOREBAY BERM TOP ELEV.	439.0
FOREBAY WEIR ELEV.	438.5
SOW BERM TOP ELEV.	439.0
OVERFLOW WEIR ELEV.	438.0
TOP OF SOW ELEV.	436.0
VERT. COLLECTION TOP ELEV.	437.0
VERT. COLLECTION PERF. ELEV.	435.0 (TO BOTTOM)
VERT. COLLECTION BOTTOM ELEV.	433.0



**SUBMERGED GRAVEL WETLAND (M-2) CENTERLINE PROFILE- FOREBAY GABION WALL**  
SCALE: HORI. 1" = 30'  
VERT. 1" = 3'



**SUBMERGED GRAVEL WETLAND (M-2) CENTERLINE PROFILE- EMBANKMENT**  
SCALE: HORI. 1" = 30'  
VERT. 1" = 3'

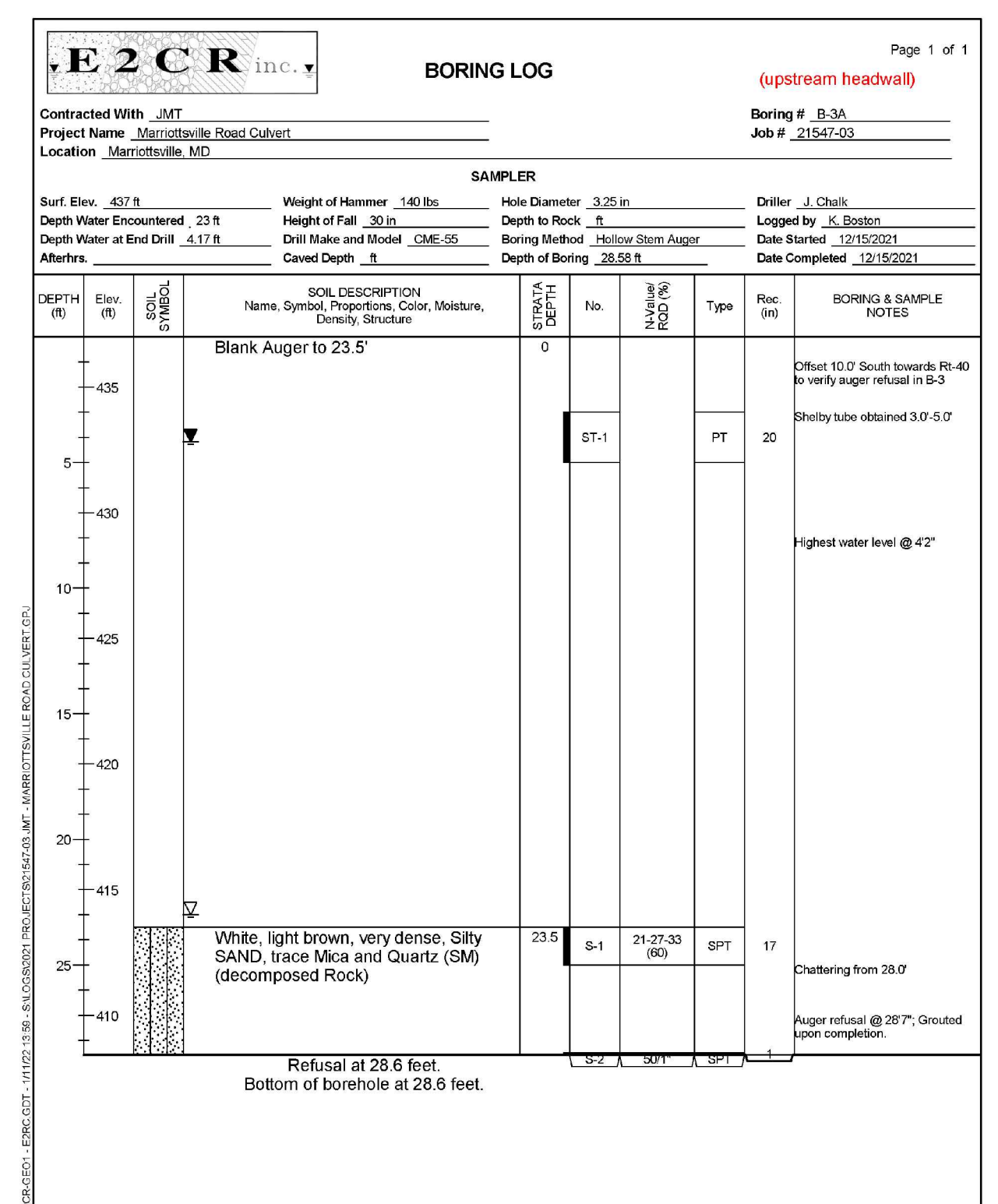
AREA FOR PLANTING (sf)*	No. OF COLUMN A (SHRUBS) ~1 PER 40 sf **	No. OF COLUMN B (HERB.) ~1 PER 20 sf **
715	18	36

\*ONLY THE WETLAND SOIL AREAS ARE INCLUDED.  
 \*\*THREE VARIETIES OF EACH TYPE (A AND B) SHALL BE CHOSEN. (SO EACH FACILITY SHALL HAVE SIX DIFFERENT VARIETIES OF PLANTINGS). SEE BELOW FOR LIST OF ACCEPTABLE PLANTINGS.

NOTE: SEE APPENDIX A IN THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II FOR MORE INFORMATION. EACH SWM/ESD FACILITY SHALL HAVE SIX DIFFERENT VARIETIES, THREE FROM EACH COLUMN. SUBSTITUTIONS MAY BE ALLOWED AFTER ENGINEER REVIEW.

- COLUMN A- SHRUB OPTIONS IN No. 3 (3 GALLON) CONTAINER:**
- MARSH ELDER
  - SWAMP AZALEA
  - BOG BLUEBERRY
  - COMMON BUTTONBUSH
  - FETTER BUSH
  - WINTERBERRY HOLLY
  - INK-BERRY
  - MALE BERRY
  - BOG ROSEMARY
- COLUMN B- HERBACEOUS OPTIONS IN No. 1 (1 GALLON) CONTAINER:**
- PERENNIAL SALT MARSH
  - ASTER
  - ALKALI BULRUSH
  - BIG CORDGRASS
  - PAIRIE CORDGRASS
  - SALT MARSH CORDGRASS
  - SALT MEADOW CORDGRASS
  - FEL GRASS
  - VIRGINIA SEASHORE MALLOW
  - NEEDLEGRASS RUSH
  - SEASHORE SALTGRASS

**SUBMERGED GRAVEL WETLAND (M-2) LANDSCAPING LIST**



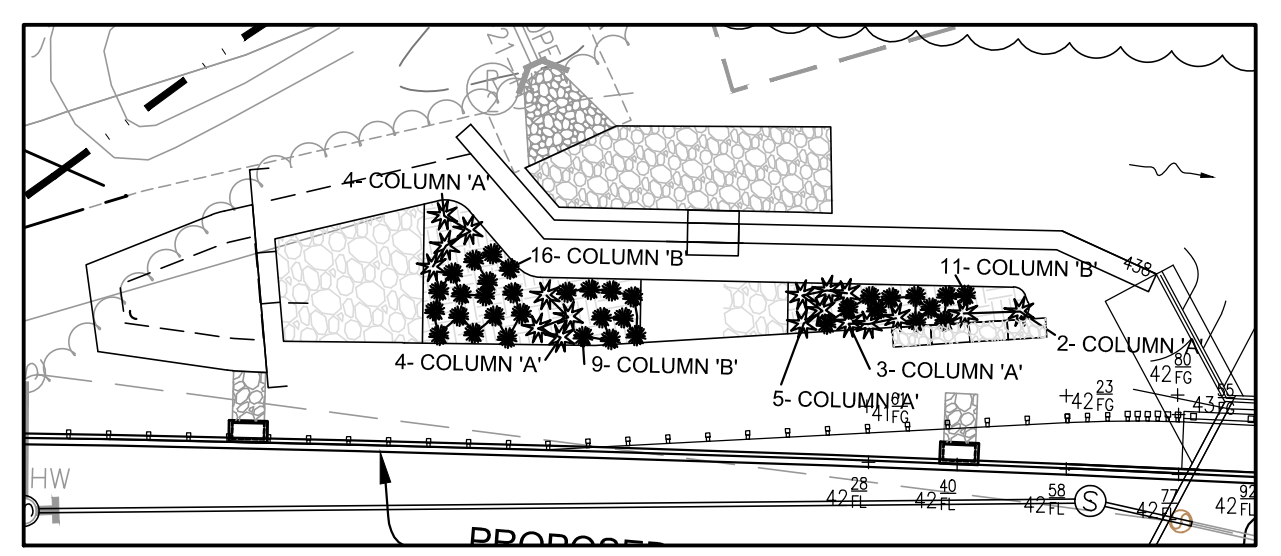
**CULVERT HEADWALL BORING (IN SUPPORT OF SUBMERGED GRAVEL WETLAND (M-2))**  
NOT TO SCALE

**STORMWATER MANAGEMENT BORING/TEST PIT NOTES:**

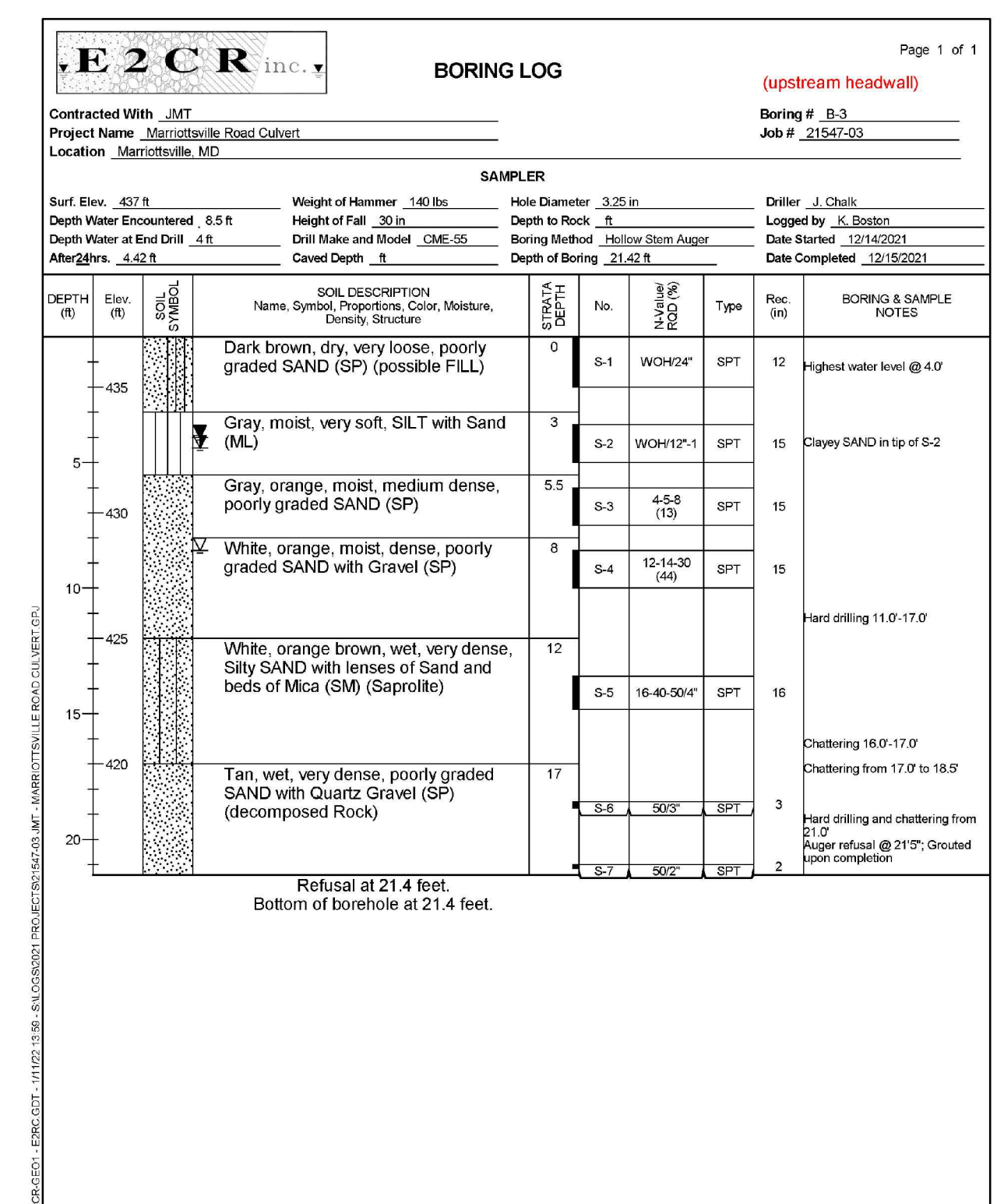
1. SWM BORINGS 1 AND 3 WERE PERFORMED FOR A FORMER BIOSWALE AND FOUND HIGH GROUNDWATER THAT WOULD NOT SUPPORT BIOSWALE DESIGN IN THAT AREA. THE RESULTS ARE NOT INCLUDED WITHIN THIS PLAN.
2. STRUCTURAL BORINGS 3 AND 3A CAN ALSO BE FOUND WITHIN THE BOX CULVERT SHEETS (IN MORE DETAIL). THEY ARE IN CLOSE PROXIMITY TO THE SUBMERGED GRAVEL WETLAND (M-2). THE BORINGS REFLECT DEEP BED ROCK AND SHALLOW GROUNDWATER THAT INTERCEPTS THE BOTTOM OF THE SUBMERGED GRAVEL WETLAND (M-2).

**Appendix B.4. Construction Specifications for Environmental Site Design Practices**

Material	Specification	Size	Notes
Planting soil [2' to 4' deep]	see Appendix A, Table A.4	n/a	plantings are site-specific
USDA soil types loamy sand or sandy loam; clay content <5%			
Organic content	Min 10% by dry weight		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1.8" TO 3.8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe, 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with 1/4-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; f <sub>c</sub> = 3500 psi @ 28 days, normal weight, air-entrained, reinforcing to meet ASTM-G15-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 309 R.99; vertical loading (H-10 or H-20); allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.



**SUBMERGED GRAVEL WETLAND (M-2)- PLANTING PLAN**  
SCALE: 1" = 30'



**SWM/ESD LINER SPECIFICATIONS**

Material	Specification/Test Method	Liner Thickness	Notes
PVC liner	ASTM-D7176- Non-reinforced PVC Geomembranes ASTM-D882 (Seam shear strength: 58 lb/in, Seam peel strength: 15 lb/in)	30 mil thickness	Installation of flexible membrane shall be in accordance with the manufacturer recommendations and references listed below.

NOTES: See NRCS Practice Standard 521A "Pond Sealing or Lining- Flexible Membrane" for installation of Geomembranes and alternatives.  
 See NRCS National Standard Materials Specifications, Material Specification 594- Geomembrane Liner for more specifications

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERS, INC.**  
 ENGINEERS & LAND SURVEYORS & PLANNERS  
 3300 NORTH RIDGE ROAD SUITE 110A ELLICOTT CITY, MARYLAND 21043  
 (P) 410-465-6105 (F) 410-465-6644  
 WWW.BEI-CIVILENGINEERING.COM

Michael L. ... 03.07.2023

**OWNER:**  
 HOWARD COUNTY MARYLAND  
 DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS  
 3430 COURTHOUSE DRIVE  
 ELLICOTT CITY, MD 21043  
 410-313-4401

**DEVELOPER:**  
 MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
 1205 YORK ROAD, PENTHOUSE  
 LUTHERVILLE, MARYLAND 21093  
 410-825-8400

**DESIGN:** MLS **DRAFT:** MLS

**MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
 ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**STORMWATER MANAGEMENT PLAN- SUBMERGED GRAVEL WETLAND (M-2)**

DATE: MARCH 2023 BEI PROJECT NO. 2769  
 SCALE: 1" = 30' SHEET 19 OF 60



**NOTES**

- SEE DETAIL D-4.01 FOR GENERAL NOTES APPLICABLE TO ALL STORM DRAIN INLETS.
- CONCRETE TO BE MIX #6 (4000PSI).
- REINFORCING:
  - WALLS - 3 LAYERS OF #4-#6 DOUBLE WELDED WIRE FABRIC.
  - THREADED PLASTIC INSERTS TO BE PROVIDED FOR HANDLING.
- PIPE OPENINGS TO BE PROVIDED AS REQUIRED. FOR SIZE, LOCATION, AND HEIGHT ELEVATIONS, REFER TO CONSTRUCTION PLANS.
- GATE TO BE SHOWN AND DIMENSIONED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123.
- THE INLET SHALL BE KEPT AT ALL TIMES OPEN AND FREE FROM OBSTRUCTION. THE INLET SHALL BE KEPT OPEN TO THE FULL DEPTH OF THE INLET.

**SECTION A-A**  
**SECTION B-B SINGLE OPENING**  
**SECTION B-B DOUBLE OPENING**  
**SECTION C-C**

Howard County, Maryland  
Department of Public Works  
Precast  
Detail  
D-4.36

**PRECAST CONCRETE TOP SLAB**  
**SECTION A-A**  
**SECTION B-B**  
**SECTION C-C**

Howard County, Maryland  
Department of Public Works  
Inlet Flow Through  
Detail  
D-4.35

**ON GRADE**  
**AT LOW POINT**  
**SECTION A-A**  
**SECTION B-B**

Howard County, Maryland  
Department of Public Works  
Type 'D' Inlet Precast  
Detail  
D-4.10

**PLAN - BELOW SLAB**  
**SECTION A-A**  
**SECTION B-B**

Howard County, Maryland  
Department of Public Works  
Type 'D' Inlet Precast  
Detail  
D-4.10

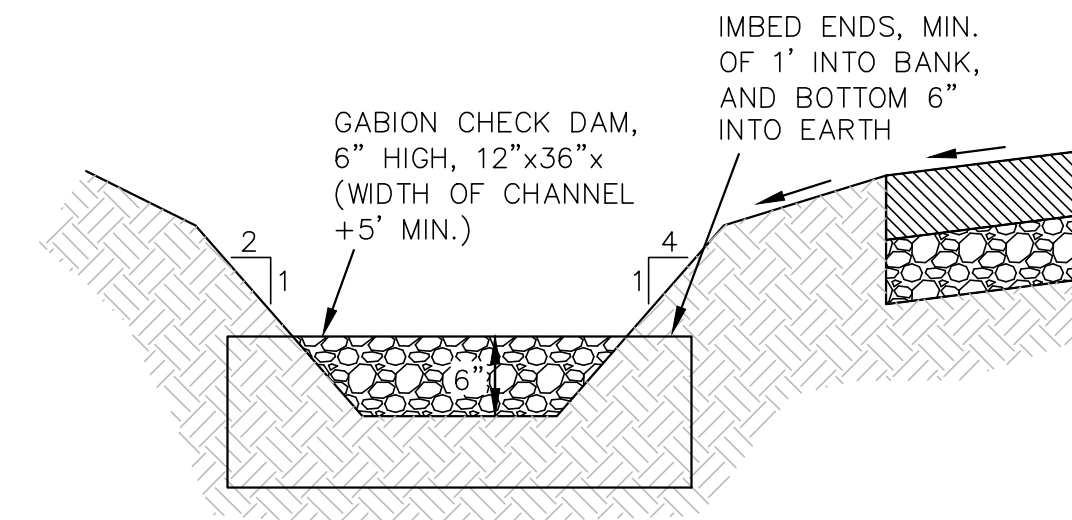
**ISOMETRIC VIEW**  
**CROSS SECTION (AT TOP)**

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

Professional Engineer  
03.07.2023

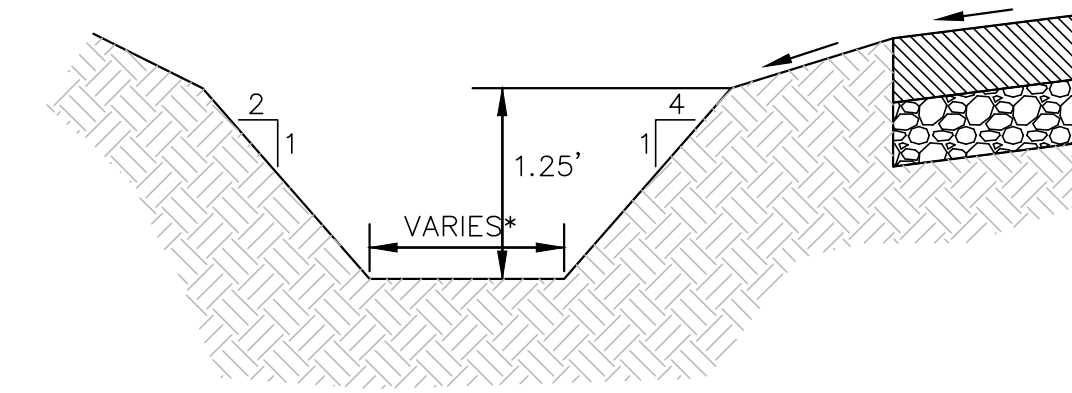
**STORM DRAIN PIPE NOTES:**

- HDPE pipe shall meet the requirements of M 294 (Standard Specification for Corrugated Polyethylene Pipe 12- to 60-in diameter).
- HDPE pipe shall have connections limited to bell and spigot or bell/bell couplings with gaskets.
- Couplings must be interchangeable with different manufacturer's pipe and provide a soil tight connection.
- Installation shall conform to ASTM D2321 and current Howard County Design Manual IV requirements.
- Corrugated HDPE pipe may be used for perforated underdrain and underdrain outlet pipes, except for underdrains in stormwater facilities (use MDE specs).
- HDPE end sections shall conform to the same material qualities as the HDPE pipe.



**GABION CHECK DAM SECTION IN GRASS SWALE (M-8)**

- NOTE:
- GABION CHECK DAM TO BE PROVIDED WITHIN SWALE WITH SPACING AS SHOWN ON SHEETS 16 AND 17.
  - THE CHANNEL BOTTOM WIDTH VARIES FROM 3', 4', 5', 6', OR 8' FOR THE GRASS CHANNEL.

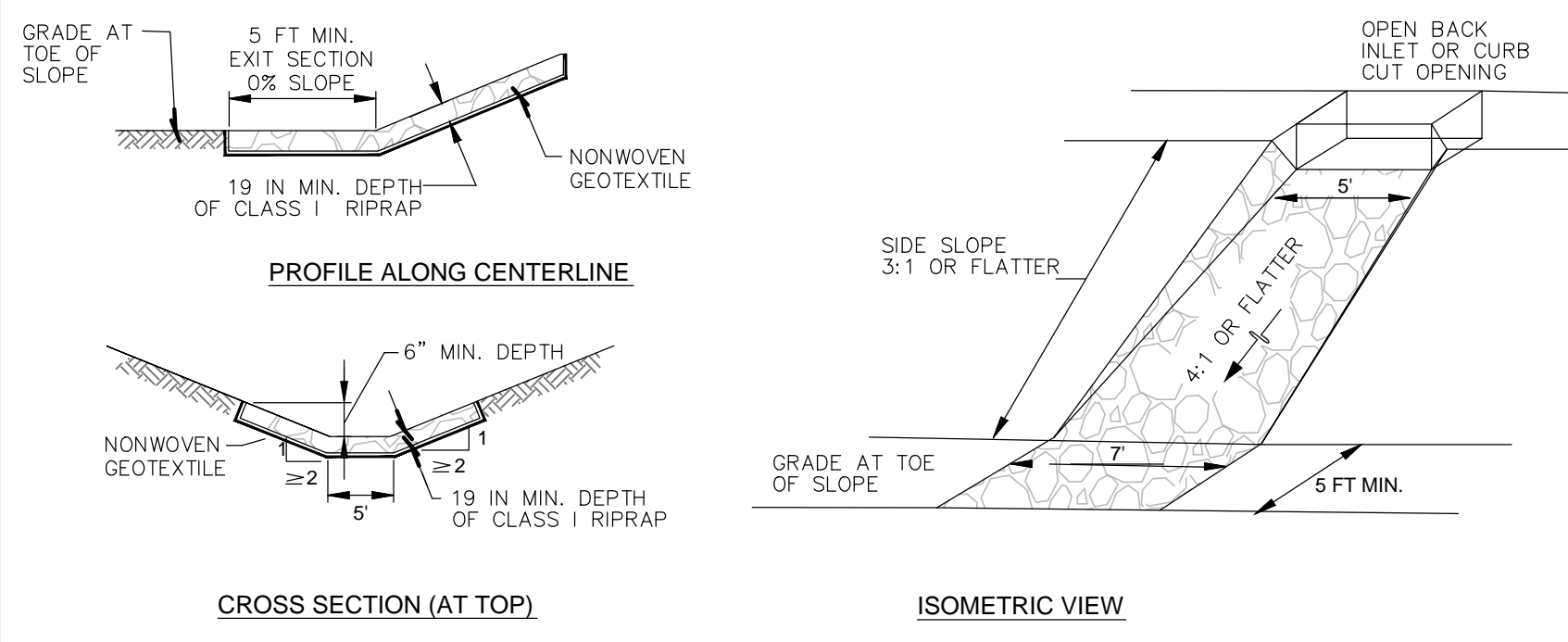


**GRASS CHANNEL SECTION (M-8)**

- NOTE:
- THE GRASS CHANNEL BOTTOM IS EITHER 3', 4', 5', 6', OR 8'-WIDE. PLEASE SHEETS 16 AND 17 PLAN VIEWS.

**SWM OPERATION AND MAINTENANCE (O&M) NOTES- GRASS SWALE**

- During the first year of operation, inspections should be conducted after every major storm event (>1") and poorly established areas re-vegetated. Thereafter, annual inspections should be performed once a year.
- Remove sediment from the check dams when it accumulates to a depth of more than 2".
- Mow the swale at least bi-annually.
- Remove trash and debris as necessary.



**OPEN-BACK INLET RIP-RAP APRON**

**DETAIL**

N.T.S.

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

**PLAN**  
**DISPOSITION OF BARS - DETAIL**  
**SECTION A-A**

DIAMETER	A	B	C	E	F	H	L	CONC. STEEL
12	10.70	8"	8"	11-5/8"	3"	11-5/8"	8"	0.81
15	12.3	8"	8"	13-5/8"	3"	13-5/8"	8"	0.77
18	13.7	8"	8"	15-5/8"	3"	15-5/8"	8"	0.66
21	14.9	8"	8"	17-5/8"	3"	17-5/8"	8"	0.56
24	15.9	8"	8"	19-5/8"	3"	19-5/8"	8"	0.48
27	16.8	8"	8"	21-5/8"	3"	21-5/8"	8"	0.41
30	17.6	8"	8"	23-5/8"	3"	23-5/8"	8"	0.35
33	18.3	8"	8"	25-5/8"	3"	25-5/8"	8"	0.30
36	18.9	8"	8"	27-5/8"	3"	27-5/8"	8"	0.26
42	20.2	12"	12"	31-5/8"	3"	31-5/8"	8"	0.20
48	21.3	12"	12"	35-5/8"	3"	35-5/8"	8"	0.16
54	22.3	12"	12"	39-5/8"	3"	39-5/8"	8"	0.13
60	23.2	12"	12"	43-5/8"	3"	43-5/8"	8"	0.10
72	25.1	12"	12"	51-5/8"	3"	51-5/8"	8"	0.07

Howard County, Maryland  
Department of Public Works  
Type 'C' Endwall Circular Pipe  
Detail  
D-5.21

NO.	DATE	REVISION

**BENCHMARK ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 100A ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BE-CVLENGINEERING.COM

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

Professional Engineer  
03.07.2023

**MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**STORMWATER MANAGEMENT NOTES AND DETAILS- 1**

OWNER: HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

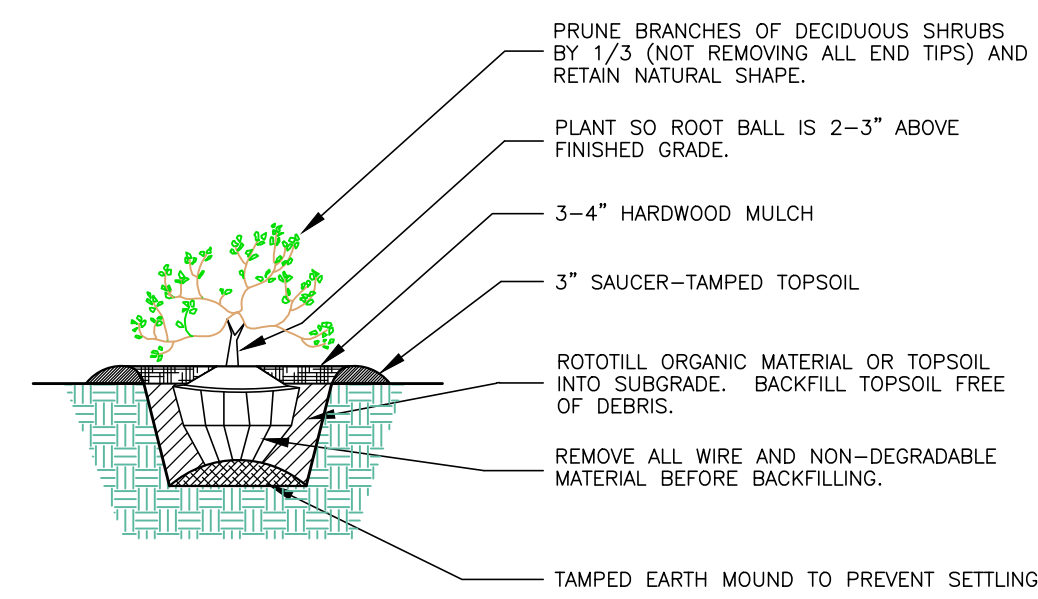
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093  
410-825-8400

DESIGN: MLS DRAFT: MLS

DATE: MARCH 2023  
SCALE: 1" = 30'

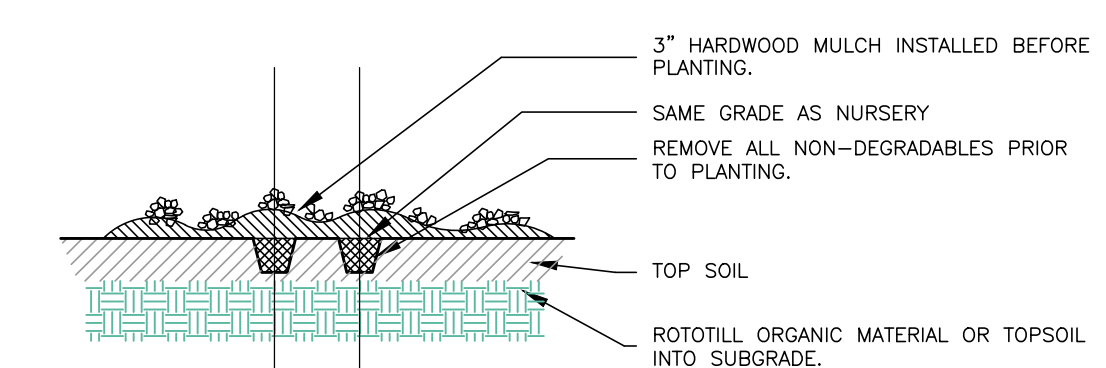
BEI PROJECT NO. 2769  
SHEET 20 OF 60





TYPICAL SHRUB PLANTING DETAIL

N.T.S.



TYPICAL GROUND COVER PLANTING DETAIL

N.T.S.

**SOILS & PLANTING SPECIFICATIONS**

1. The Contractor shall provide all necessary materials, labor and equipment required for the completion of the work shown herein. The Contractor will be responsible for obtaining a source of supply for all materials listed at the specified size and variety. If the Contractor is unable to locate a source for the specified material, then proof must be submitted in writing that it is not obtainable. The proposed plant material must fall within the same general functional characteristics for plants (i.e. shade tree, ornamental tree, etc.) and have the same design characteristics such as height and spread, as the plant material being replaced. No significant change in size or location of plant material is permitted, nor a reduction in plant quantities.

2. Unless otherwise specified, the Contractor shall comply with all standards set forth in the "Landscape Specification Guidelines", Current Edition, by the Landscape Contractors Association.

All plant materials shall be well established, well branched, full sized and shall conform to the Specifications of the latest edition of American Standard for Nursery Stock, sponsored by the American Association of Nurserymen, Inc. (AAN).

3. Soil Preparation: In the areas to be planted or seeded/sodded, the Contractor shall spread 6" of topsoil. The topsoil is to be worked into the existing soil, then raked, leaving the surface uniform and free of depressions. All stones over 1" in diameter and debris over 1/2" in diameter shall be removed prior to seeding, sodding or planting. The Contractor will provide topsoil meeting the following requirements: (a) It shall be fertile, friable, free of rocks, roots and foreign debris, representative of local soils and capable of sustaining vigorous plant growth. It shall also be free of plants, plant parts or weedy material. (b) Acidity range of between pH 5.0 and 6.5. Organic content not less than 5% and not greater than 30%. Clay content not to exceed 20%. Soluble salts not to exceed 900 ppm (in soil). Once complete, a 3" layer of Compro (or other organic material) shall be worked into the topsoil, prior to planting.

4. Turf areas are to be seeded or sodded, at the owner's direction. If turf areas are to be seeded, then it shall be of the following mix: Fescue Mix: 90% (Georgetown, Suffolk, Loft, Princeton, Apache, Rebel 2, Arid, Bonanza or equivalent) and Vantage Bluegrass: 10% (or equivalent). Apply 10/10/10 fertilizer at rate of 1,000 lbs./acre. Seed by dry application or through the hydroseed method. Apply according to the "Landscape Specification Guidelines", Current Edition, by the Landscape Contractors Association. After seeding apply straw mulch @ 60-80 bales/acre (1/2" - 1" thick). Stabilize the mulch using a mulch anchoring tool, cellulose fiber or liquid mulch binders.

If the Owner elects turf areas to be sodded: Prior to laying sod apply 10/10/10 fertilizer @ 1,000 lbs./acre. Work thoroughly into the top 2" of soil. Sod to be State Certified, turf type tall fescue: Apache: 30%, Monarch 30%, Bonanza 30% and Bluegrass 10% or equivalent. Sod to be machine cut, uniform thickness of 3/4" excluding top growth. Sod to be harvested and installed within 36 hours. Lightly irrigate prior to laying sod. Lay straight, butt rows tightly and stagger lateral joints. Tamp or roll with approved equipment. A true or even surface shall be provided. Pie/lock slopes > 3:1. Filled area greater than 1 square foot shall be re-sodded.

5. Plants shall be nursery grown and shall have grown under the same climatic conditions as the location of the subject site for at least two years before planting. All plants shall conform to the measurement specified in the plant labelation. All plant sizes specified in the plans shall generally be the median for the size ranges indicated in the AAN standards. Plants are to be installed, backfilled and fertilized as specified in the "Landscape Specification Guidelines", Current Edition, by the Landscape Contractors Association, installation is to be per the attached Details.

6. ACCEPTANCE: Upon completion of all work under this Contract and upon written notice of same, the Landscape Architect or the Owner, a site inspection will be conducted by all concerned parties. All discrepancies will be noted and it will be the Contractor's obligation to remedy same, prior to the final acceptance of those areas. Upon final acceptance, the Plant Replacement Guarantee period shall commence.

STRUCTURE SCHEDULE							
STR. #	TYPE	DETAIL	INV. IN.	INV. OUT	TOP ELEV.	NOTES	PRIVATE/PUBLIC
I-1	6" INLET- FLOW THROUGH	D-4.35	N/A	N/A	TC=441.87/ 441.87	IN SUMP	PUBLIC
I-2	6" INLET- FLOW THROUGH	D-4.35	N/A	N/A	TC=441.93/ 441.92	FLANKING FOR I-1 SUMP	PUBLIC
I-3	6" INLET- FLOW THROUGH	D-4.35	N/A	N/A	TC=442.18/ 442.15	ON GRADE	PUBLIC
I-4	6" INLET- FLOW THROUGH	D-4.35	N/A	N/A	TC=443.02/ 442.96	ON GRADE	PUBLIC
ES-5	18" CONC. END-SECTION	D-5.51	N/A	442.50	N/A		PUBLIC
I-6	OPEN END GRATE INLET	D-4.36	444.45	443.20	TG= 448.24/ WEIR= 447.91	SINGLE OPENING	PUBLIC
I-7	OPEN END GRATE INLET	D-4.36	N/A	459.00	TG= 462.77/ WEIR= 462.44	SINGLE OPENING	PUBLIC
MH-21A	48" PRECAST MANHOLE	MSHA 384.01	435.50 (15"-S), 432.70 (24"-W)	432.68	TR=441.47	DOGHOUSE MANHOLE BASE OVER EX. 24" STORM DRAIN	PUBLIC
MH-10	48" PRECAST MANHOLE	MSHA 384.01	437.29	437.19	TR=442.37		PUBLIC
I-11	OPEN END GRATE INLET	D-4.36	N/A	437.55	TG= 440.83/ WEIR= 440.5	DOUBLE OPENING	PUBLIC
ES-14	15" CONC. END-SECTION	D-5.51	N/A	437.10	N/A	SURFACE SAND FILTER OUTFALL	PUBLIC
I-15	PRECAST TYPE 'D' INLET	D-4.10	438.5 (TEMP. 6"-442.0)	437.65	WIER= 444.0, TG=444.83	SURFACE SAND FILTER OUTFALL	PUBLIC
EW-16	30" TYPE 'C' ENDWALL	D-5.21	-	433.35	TW=436.85	SE OF RESORT/MARRIOTT. INT. MIDDLE FACE- N594,832.6907 E1,340,582.5683	PUBLIC

STORM DRAIN- PIPE SCHEDULE			
PIPE TYPE/SIZE	LENGTH		
15" RCP, CL IV	548	AASHTO M170 & ASTM C76 AND C361	
18" RCP, CL IV	93	AASHTO M170 & ASTM C76 AND C361	
30" HDPE	18	AASHTO M294 & AWWA C906	

NOTE: The high density polyethylene pipe and fittings shall be made of Extra High Molecular Weight (EHMW) high density polyethylene with a standard thermoplastic material designation code of PE 3408/3608. The pipe shall conform to ASTM 3350 with a cell classification of 345464C. The manufacturer shall certify that all materials used to manufacture the pipe and fittings have been evaluated, tested and certified for conformance in accordance with NSF 61.

SAND FILTER	LENGTH	
6" SOLID PVC	50	AWWA C900
6" PERF. PVC	35	AWWA C900
SUB. GRAVEL WETLAND	LENGTH	
6" SOLID PVC	25	AWWA C900
6" PERF. PVC	12	AWWA C900

APPROVED: DEPARTMENT OF PUBLIC WORKS	
DocuSigned by:	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD C. EDMONDSON, DEPARTMENT OF PLANNING AND ZONING	
DocuSigned by:	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
DocuSigned by:	4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

NO.		DATE		REVISION	
 ENGINEERS & LAND SURVEYORS & PLANNERS 3300 NORTH RIDGE ROAD SUITE 100 ELLICOTT CITY, MARYLAND 21043 (P) 410-465-6105 (F) 410-465-6644 WWW.BE-CIVILENGINEERING.COM				Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.  Michael L. Edmondson 03.07.2023	
OWNER:		<b>MARRIOTTVILLE ROAD WIDENING</b> <b>APFO MITIGATION PLANS</b> <b>F-21-033</b>			
DEVELOPER:		TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND <b>STORMWATER MANAGEMENT NOTES</b> <b>AND DETAILS- 2</b>			
DESIGN: MLS		DRAFT: MLS		DATE: MARCH 2023	BEI PROJECT NO. 2769
		SCALE: 1" = 30'		SHEET 21 OF 60	



**Project: Marriottsville Road Widening**  
**Temporary Stone Outlet Structure- Proposed Grading**  
 (near fire road)

Type:	TSOS
Proposed Drainage Area:	11,914 sf
Required Proposed Storage:	492 cf = DA (acres)*1800
Provided Proposed Storage:	984 cf
Top Storage = Weir:	447.00

**Stage Storage Tabulation Worksheet**

W.S. Elev. ft.	Area sq. ft.	Avg. Area sq. ft.	H ft.	%Volume	Total Volume cu. ft.	ac. ft.
445.50	0	181	0.50	91	0	0.0000
446.00	362	894	1.00	894	91	0.0021
447.00	1,425	PROPOSED GRADING AND TOP OF WEIR		984	0.0226	
448.00	2,088	TOP OF DITCH				

**Project: Marriottsville Road Widening**  
**Temporary Gabion Outlet Structure- Proposed Grading**  
 (full roadway fill, box culvert installed)

Type:	TGOS
Proposed Drainage Area:	38,984 sf
Required Proposed Storage:	1,611 cf = DA (acres)*1800
Provided Proposed Storage:	2,331 cf
Top Storage = Temp Weir:	437.00

**Stage Storage Tabulation Worksheet**

W.S. Elev. ft.	Area sq. ft.	Avg. Area sq. ft.	H ft.	%Volume	Total Volume cu. ft.	ac. ft.
436.00	1,897	2,331	1.00	2,331	0	0.0000
437.00	2,765	PROPOSED GRADING AND TEMP WEIR		2,331	0.0535	
438.00	3,232	2,999	1.00	2,999	5,330	0.1223
439.00		TOP OF GABION WALL				

**Project: Marriottsville Road Widening**  
**Temporary Gabion Outlet Structure- Interim Grading**  
 (box culvert started, some in wetland for positive drainage)

Type:	TGOS
Interim Drainage Area:	25,120 sf
Required Interim Storage:	1,038 cf = DA (acres)*1800
Provided Interim Storage:	4,817 cf
Top Storage = Temp Weir:	437.00

**Stage Storage Tabulation Worksheet**

W.S. Elev. ft.	Area sq. ft.	Avg. Area sq. ft.	H ft.	%Volume	Total Volume cu. ft.	ac. ft.
436.00	1,897	4,817	1.00	4,817	0	0.0000
437.00	7,737	INTERIM GRADING & TEMP WEIR		4,817	0.1106	
438.00	8,501	8,119	1.00	8,119	12,936	0.2970
439.00		TOP OF GABION WALL AND TEMP BERM				

**Project: Marriottsville Road Widening**  
**Sediment Trap Horizontal Draw-down Device**

Trap #: Trap #1  
 Drainage Area to Trap: 90,005 sf  
 2.07 acres

$A_0 = Qd-d / C \times \text{sqr}(2g \times hd-d)$   
 $C = 0.6$  Orifice coefficient  
 $hd-d = 0.66$  ft- head b/w dry and wet elev \* 2/3 (1" \* 2/3)  
 $Qd-d = 0.10$  cfs (1800 cf \* DA in ac.) / (10 hrs 3600 sec/hr)

$A_0 = 0.03$  sf- internal orifice area  
 $d = 0.18$  ft- maximum orifice diameter  
 $d = 2.20$  inches say 2 1/8"

$A_0$  = Total Area of Perforations > 4  $A_0$   
 $A_0 > 0.11$  sf  
 1" perf = 0.0055 sf  
 min. # 1" perf. = 19.2  
 recommend 3 longitudinal rows  
 say 3 rows, 8 perf each row = 24 perf

DEVELOPER'S CERTIFICATE

I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL 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.

**Louis Mangione** 2023-03-07  
 DEVELOPER DATE

ENGINEER'S CERTIFICATE

I, CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION 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.

**Michael L. Swanson** 2023-03-07  
 ENGINEER-MICHAEL L. SWANSON DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

Declassified by: **Alexander Bratchie** 4/20/2023

APPROVED: DEPARTMENT OF PUBLIC WORKS

Declassified by: **[Signature]** 5/4/2023

CHIEF, BUREAU OF HIGHWAYS DATE

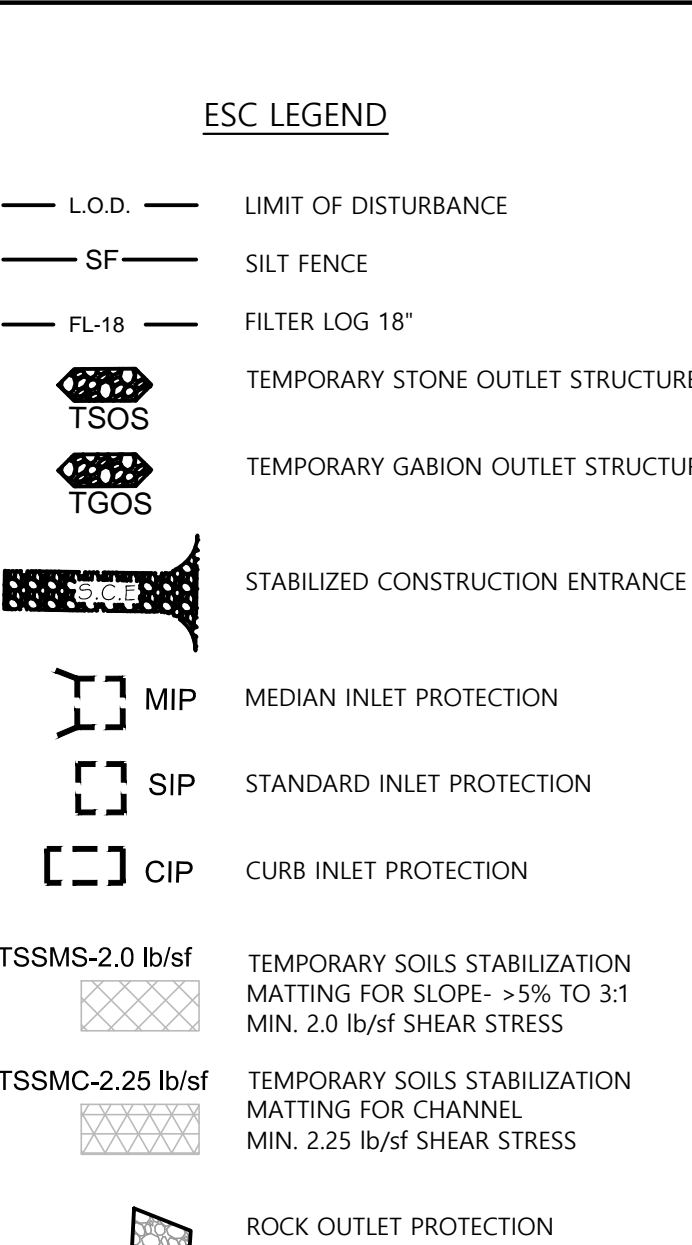
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/19/2023

Declassified by: **[Signature]** DATE

CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Declassified by: **[Signature]** 4/21/2023

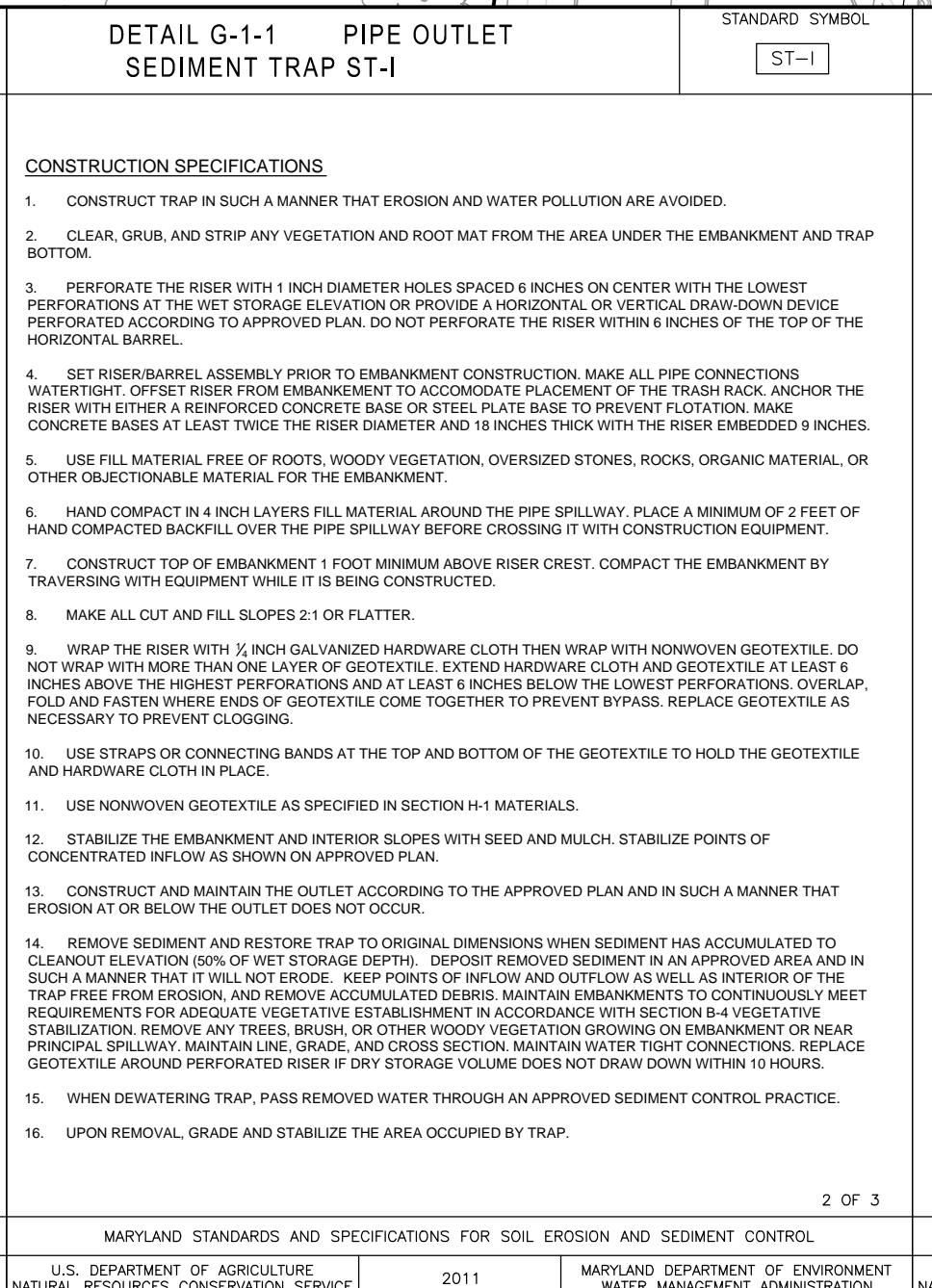
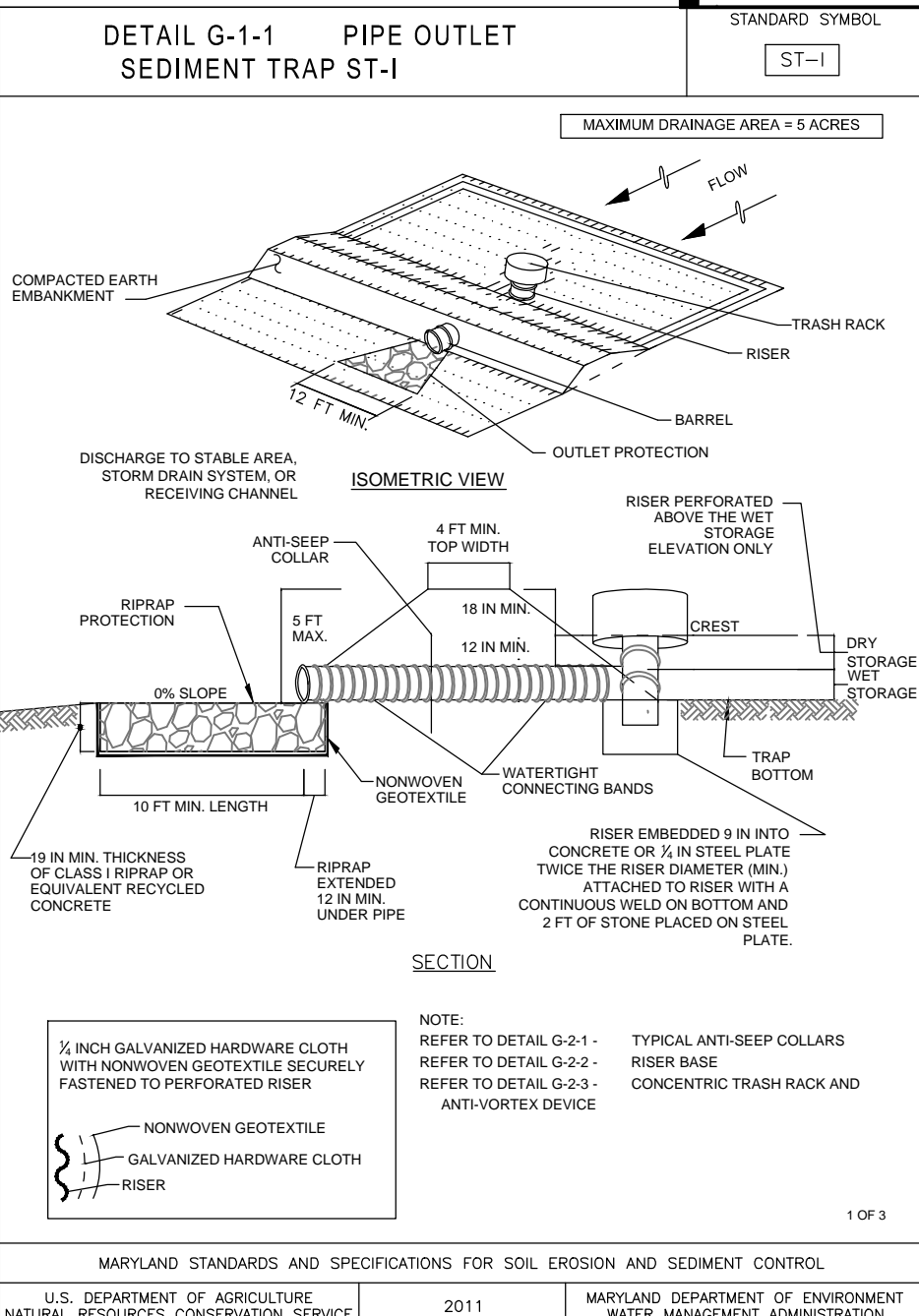
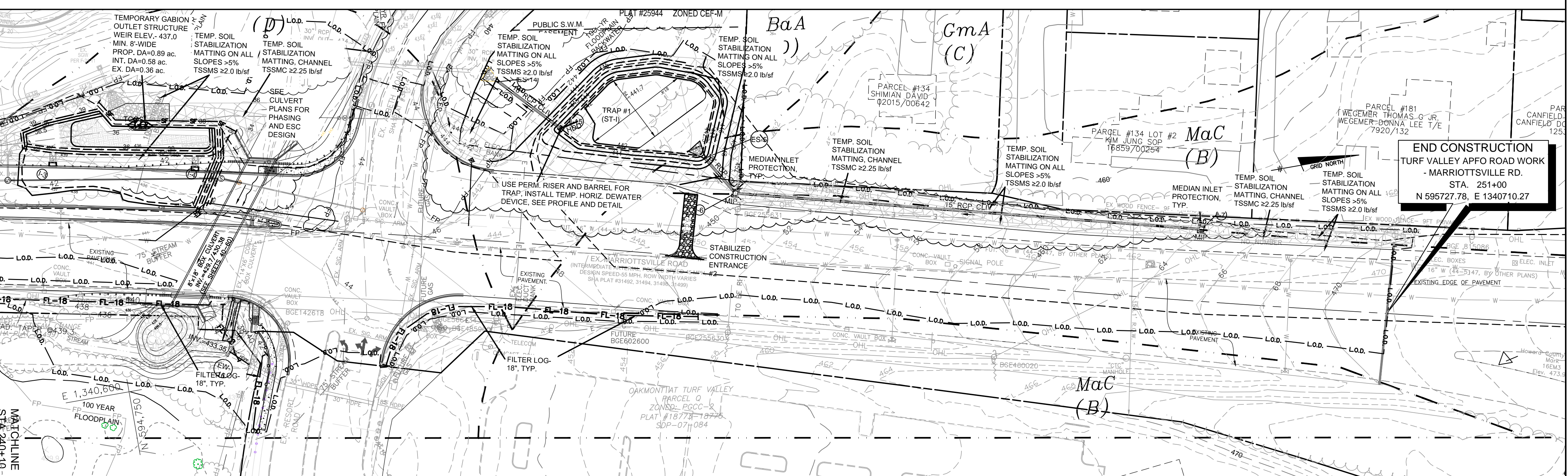
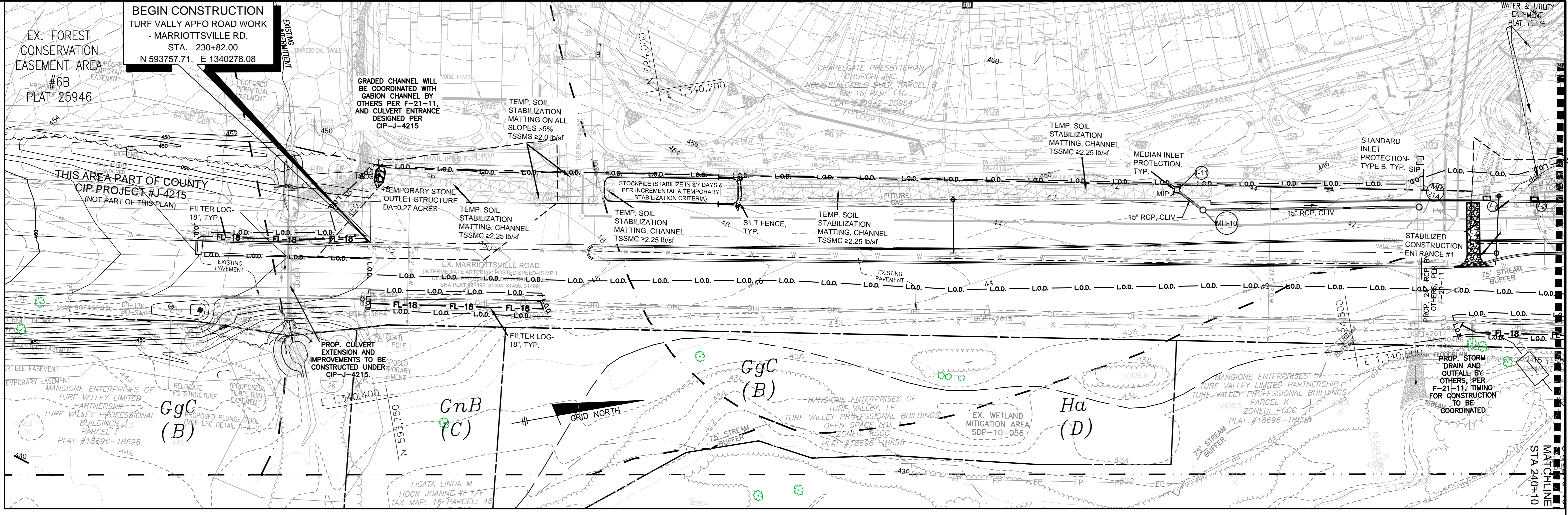
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE



NOTE: TEMPORARY OR PERMANENT SEEDING AND STABILIZATION IS TO BE PERFORMED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE TIME FRAME REQUESTED BY THE 2011 MARYLAND STANDARDS & SPECIFICATIONS, SOIL EROSION AND SEDIMENT CONTROL WHICH EVER IS MORE STRINGENT.

NOTE: NO CHANGES ARE ALLOWED TO THE SEQUENCE OF CONSTRUCTION WITHOUT PRIOR HOWARD SCD APPROVAL

NOTE: THE AREAS OF ESD IMPLEMENTATION SHALL HAVE LIMITED ACCESS FROM HEAVY CONSTRUCTION EQUIPMENT TO AVOID UNNECESSARY COMPACTION WHEN PRACTICAL.



**PIPE OUTLET SEDIMENT TRAP ST-1, TRAP NO. 1**

PIPE OUTLET SEDIMENT TRAP ST-1, TRAP NO. 1	ACRES
DRAINAGE AREA - INITIAL	0.97
DRAINAGE AREA - FINAL	2.07
TOTAL STORAGE REQUIRED	7,438 CF
TOTAL STORAGE PROVIDED	11,653 CF
WET STORAGE REQUIRED	3,719 CF
WET STORAGE PROVIDED	5,173 CF
DRY STORAGE REQUIRED	3,719 CF
DRY STORAGE PROVIDED	6,480 CF
TRAP BOTTOM ELEVATION	442 FT
TRAP BOTTOM DIMENSIONS	81.4' x 54.1' FT x FT
RISER CREST DRY STORAGE ELEVATION	444.0 FT
OUTLET (WET STORAGE) ELEVATION	443.0 FT
CLEANOUT ELEVATION	442.5 FT
TOP OF EMBANKMENT ELEVATION	445.0 FT
SIDE SLOPE	3:1 IN/3:1 OUT HV RATIO
EMBANKMENT TOP WIDTH	4 FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	PERM. D' INLET AND RCP PIPE
RISER DIAMETER	24"x24" IN
BARREL DIAMETER	18 IN
TRASH RACK DIAMETER	GRATE
ANTI-SEEP COLLAR DIMENSIONS	EXCAVATED
OUTLET PROTECTION- LENGTH	10 FT
OUTLET PROTECTION- WIDTH	12 FT
OUTLET PROTECTION- DEPTH	19 IN

**Project: Marriottsville Road Widening**  
**Sediment Trap**

By: MLS  
 Date: 12/27/2022

Trap #:	Trap #1
Trap Type:	ST-1
Drainage Area to Trap:	90,005 sf = 2.07 acres
Required Wet Storage:	3,719 cf = DA (acres)*1800
Provided Wet Storage:	5,173 cf
Required Dry Storage:	3,719 cf = DA (acres)*1800
Provided Dry Storage:	6,480 cf
Top of Dry Storage:	444.00

**Stage Storage Tabulation Worksheet - TRAP #1**

W.S. Elev. ft.	Area sq. ft.	Avg. Area sq. ft.	H ft.	%Volume	Total Volume cu. ft.	ac. ft.
442.00	3,602		0.50	2,287	0	0.0025
442.50	5,544	4,573	0.50	2,886	5,173	0.1187
443.00	6,000	5,772	1.00	6,480	0	
444.00	6,959	TOP OF WET STORAGE		6,480	0.1487	
444.35	7,307	7,133	0.35	2,497	8,978	0.2061
444.50	7,459	7,383	0.15	1,107	10,084	0.2315
445.00	8,144	TOP OF DRY STORAGE		3,901	13,984	0.3210

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERS, INC.**  
 ENGINEERS & LAND SURVEYORS & PLANNERS  
 3300 NORTH RIDGE ROAD SUITE 110A ELLICOTT CITY, MARYLAND 21043  
 (P) 410-485-6105 (F) 410-485-6644  
 WWW.BE-CIVILENGINEERING.COM

**MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
 ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**EROSION AND SEDIMENT CONTROL PLAN**

OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400

DESIGN: MLS DRAFT: MLS

DATE: MARCH 2023 BEI PROJECT NO. 2769  
 SCALE: 1" = 50' SHEET 22 OF 60







Table B.1: Temporary Seeding for Site Stabilization

Table with columns: Plant Species, Seeding Rate 1/ (lb/ac), Seeding Rate 2/ (lb/1000 ft2), Seeding Depth 2/ (inches), Recommended Seeding Dates by Plant Hardiness Zone 3/ (5b and 6a, 6b, 7a and 7b).

Notes: 1/ Seeding rates for the warm season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses.

Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat.

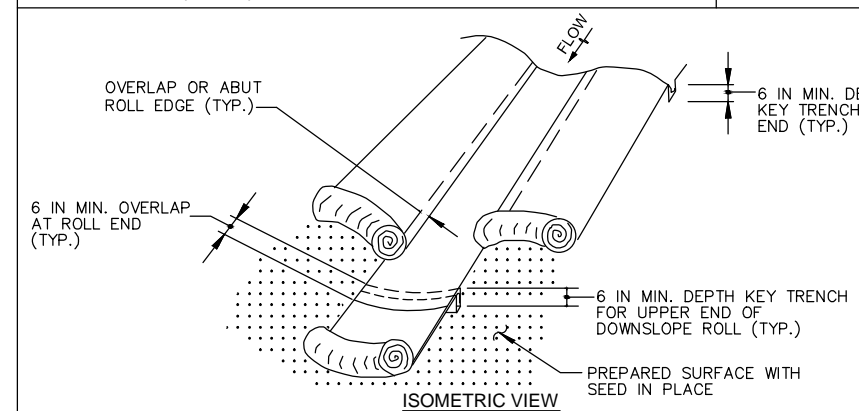
Oats are the recommended nurse crop for warm-season grasses.

For sandy soils, plant seeds at twice the depth listed above. The planting dates listed are averages for each zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

Permanent Seeding Summary

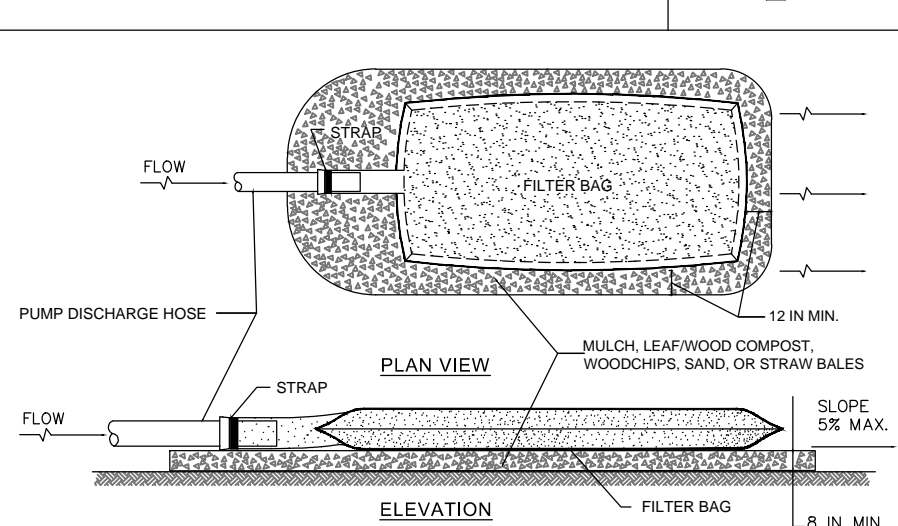
Table with columns: Hardiness Zone, Species, Application Rate, Seeding Dates, Seeding Depths, Fertilizer Rate (N, P2O5, K2O), Lime Rate.

DETAIL B-4-6-A TEMPORARY SOIL STABILIZATION MATTING CHANNEL APPLICATION



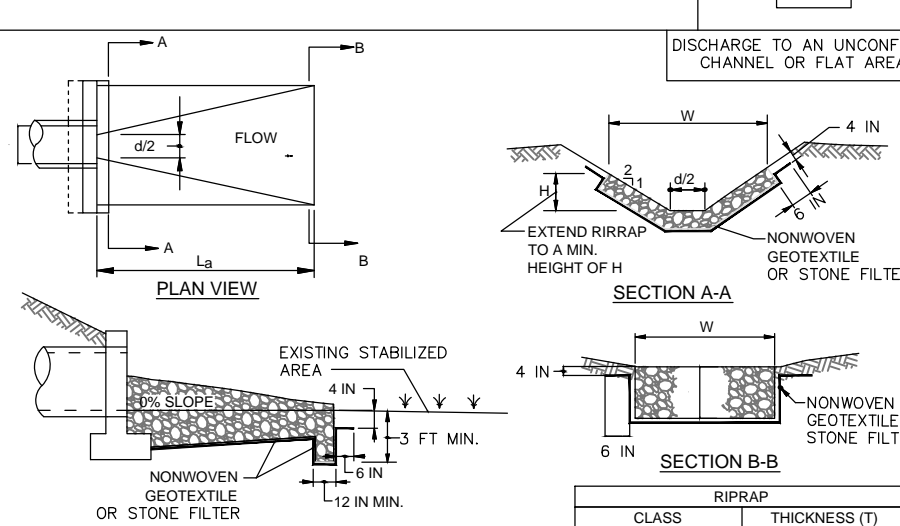
CONSTRUCTION SPECIFICATIONS: 1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.

DETAIL F-4 FILTER BAG



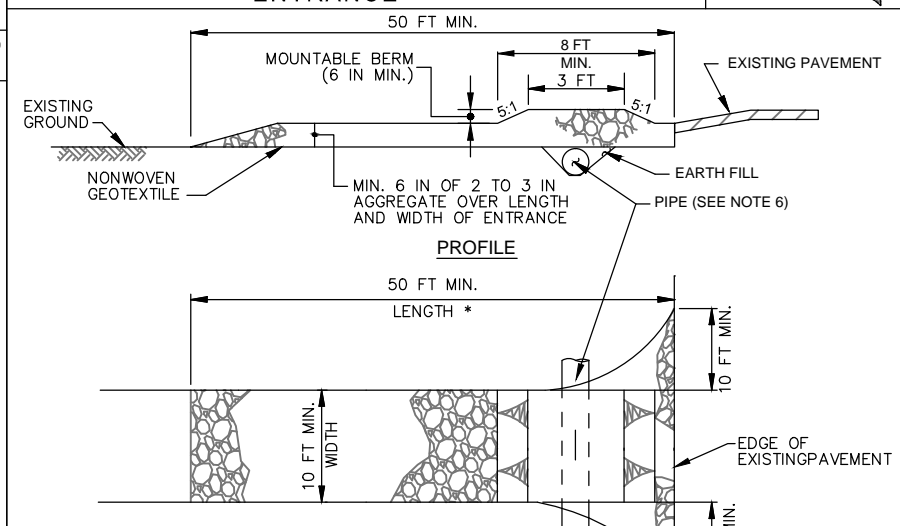
CONSTRUCTION SPECIFICATIONS: 1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.

DETAIL D-4-1-C ROCK OUTLET PROTECTION III



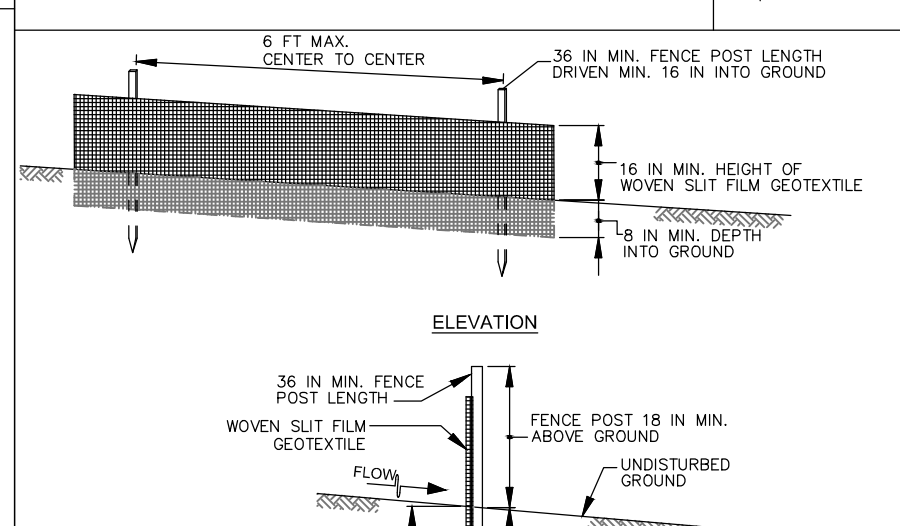
CONSTRUCTION SPECIFICATIONS: 1. RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE



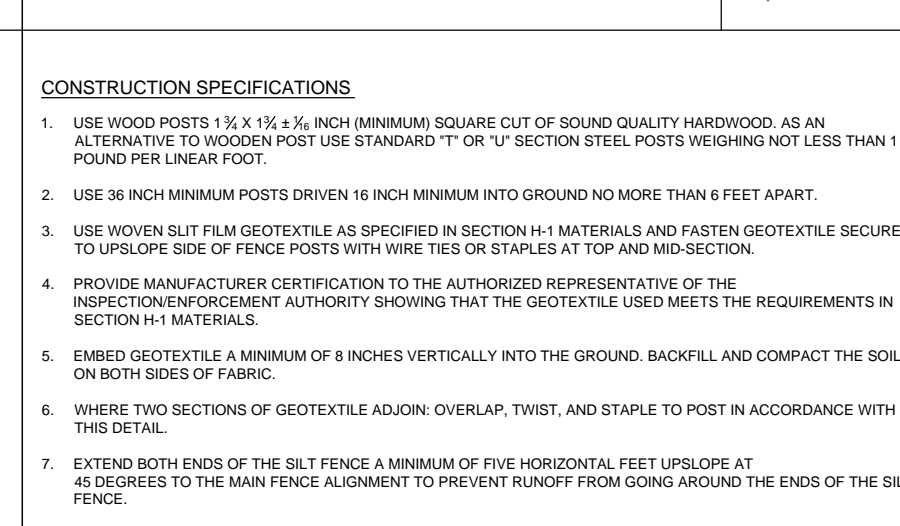
CONSTRUCTION SPECIFICATIONS: 1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SUE.

DETAIL E-1 SILT FENCE



CONSTRUCTION SPECIFICATIONS: 1. USE WOOD POSTS 1 1/2 X 1 1/2 INCH MINIMUM SQUARE CUT OF SOUND QUALITY HARDWOOD AS AN ALTERNATIVE TO WOODEN POST USE STANDARD TYP.

DETAIL E-1 SILT FENCE

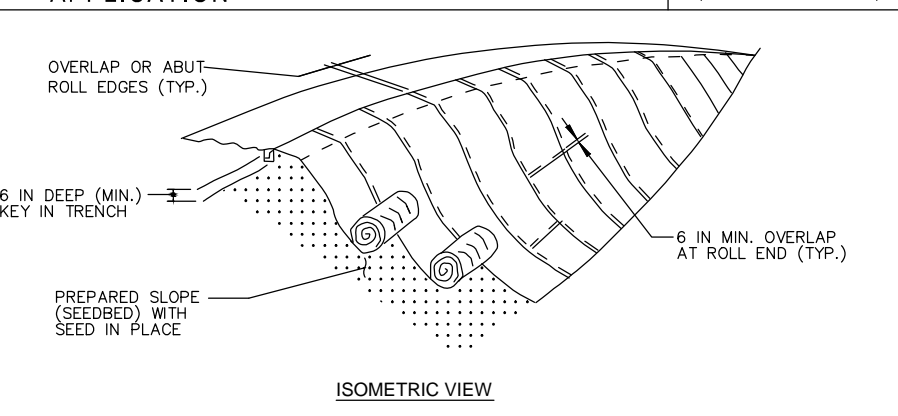


CONSTRUCTION SPECIFICATIONS: 1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLOUDS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL B-4-6-B TEMPORARY SOIL STABILIZATION MATTING SLOPE APPLICATION

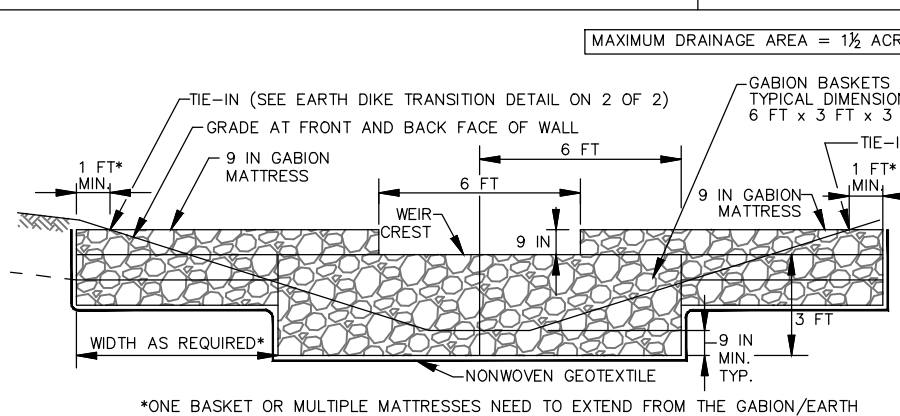


CONSTRUCTION SPECIFICATIONS: 1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-8 TEMPORARY GABION OUTLET STRUCTURE

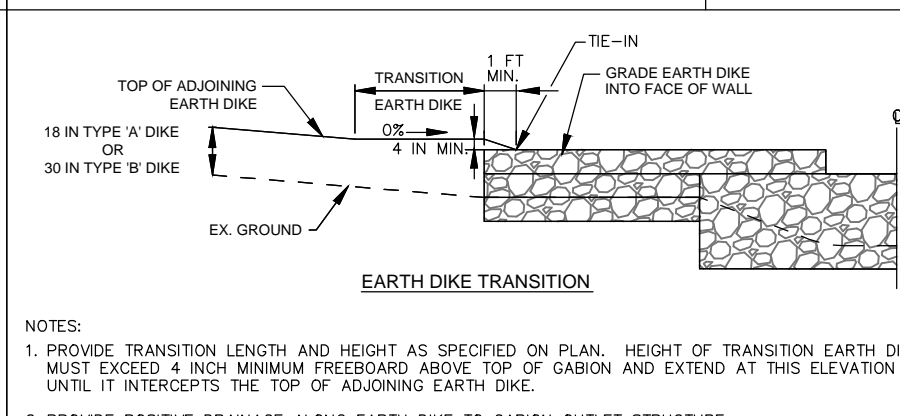


CONSTRUCTION SPECIFICATIONS: 1. PROVIDE STORAGE VOLUME AS SPECIFIED ON APPROVED PLANS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-8 TEMPORARY GABION OUTLET STRUCTURE

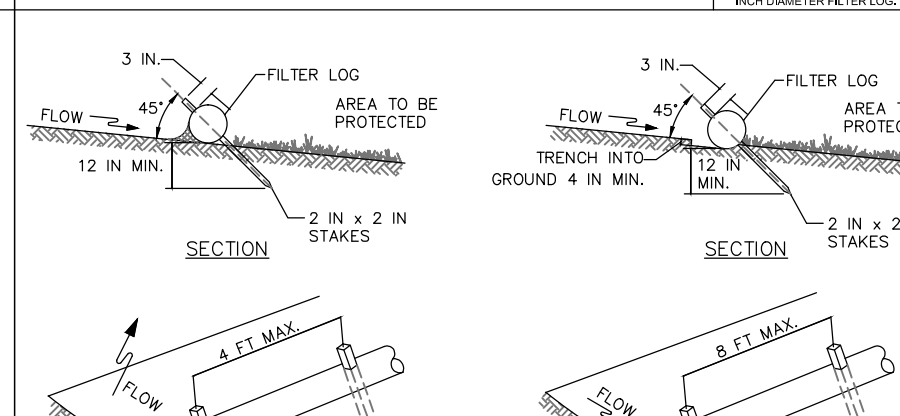


CONSTRUCTION SPECIFICATIONS: 1. PROVIDE STORAGE VOLUME AS SPECIFIED ON APPROVED PLANS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-6 FILTER LOG

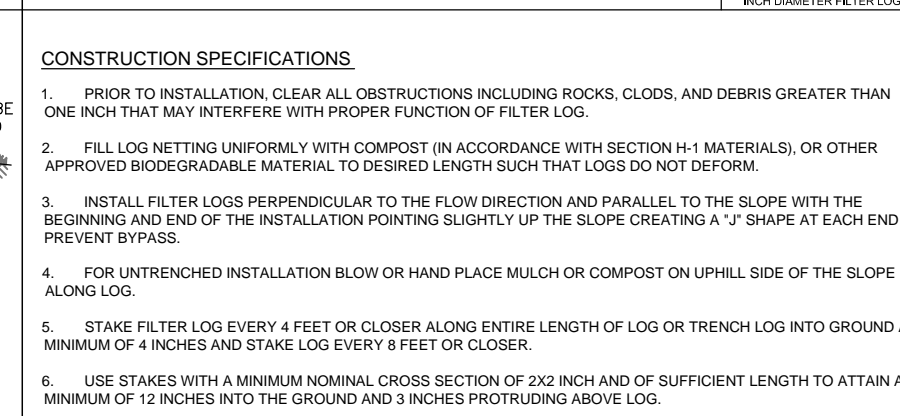


CONSTRUCTION SPECIFICATIONS: 1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLOUDS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-6 FILTER LOG

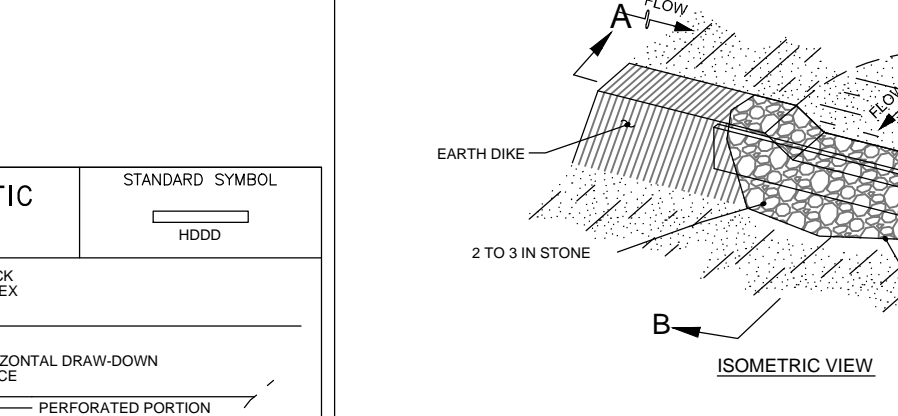


CONSTRUCTION SPECIFICATIONS: 1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLOUDS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-7 TEMPORARY STONE OUTLET STRUCTURE

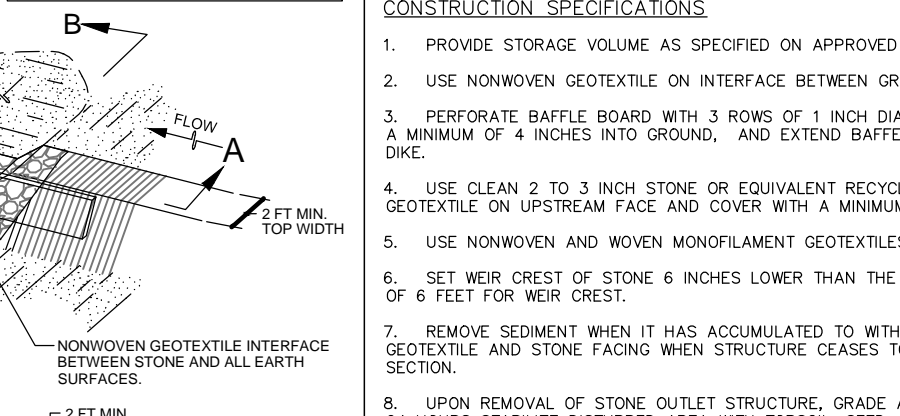


CONSTRUCTION SPECIFICATIONS: 1. PROVIDE STORAGE VOLUME AS SPECIFIED ON APPROVED PLANS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-7 TEMPORARY STONE OUTLET STRUCTURE

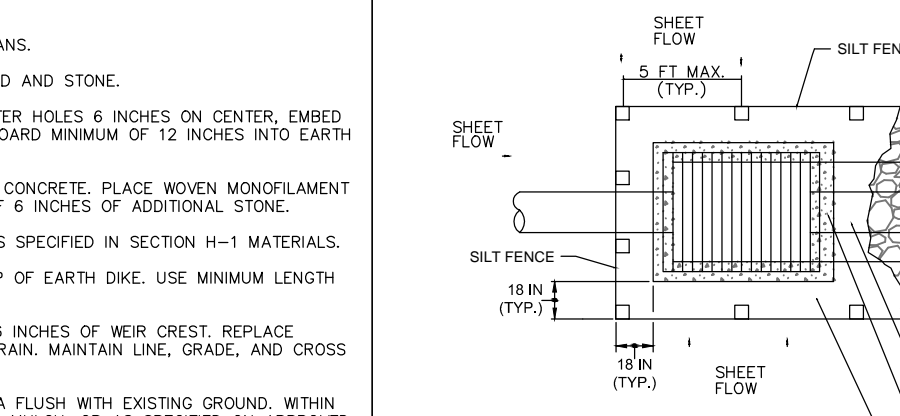


CONSTRUCTION SPECIFICATIONS: 1. PROVIDE STORAGE VOLUME AS SPECIFIED ON APPROVED PLANS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-9-4 MEDIAN INLET PROTECTION

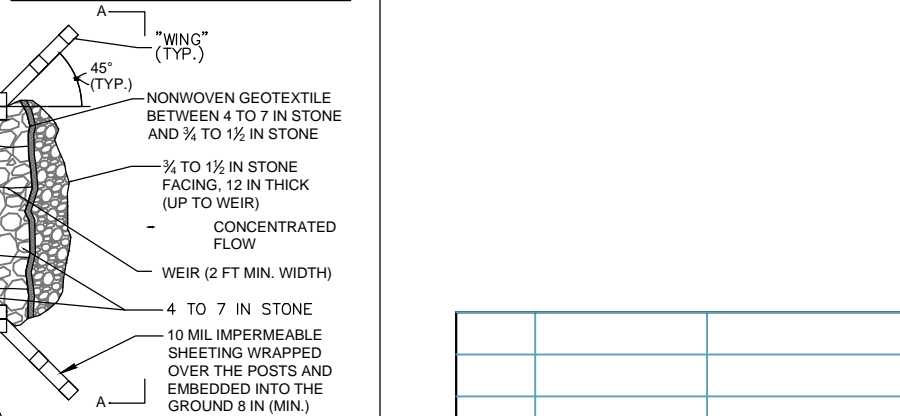


CONSTRUCTION SPECIFICATIONS: 1. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-9-4 MEDIAN INLET PROTECTION

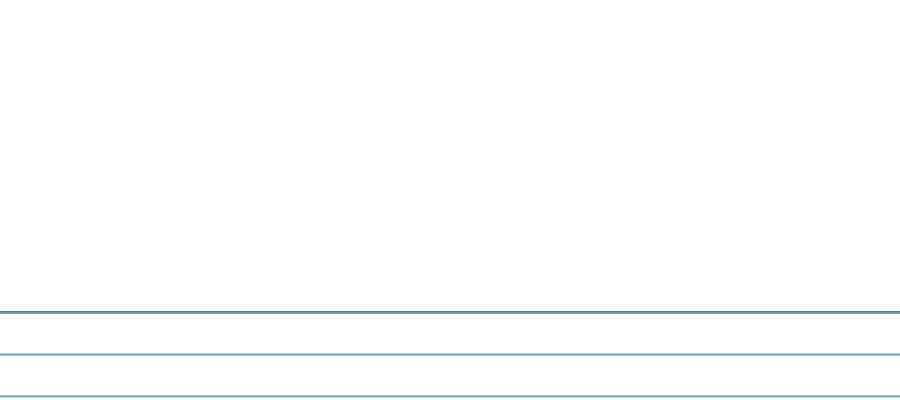


CONSTRUCTION SPECIFICATIONS: 1. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL E-9-4 MEDIAN INLET PROTECTION

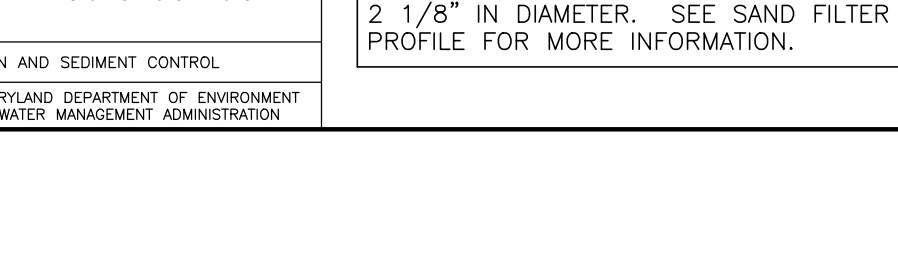


CONSTRUCTION SPECIFICATIONS: 1. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

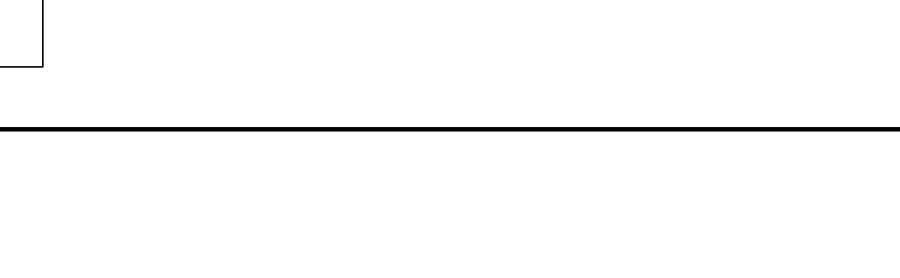
DETAIL G-2-6 SEDIMENT BASIN SCHEMATIC HORIZONTAL DRAW-DOWN DEVICE



MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

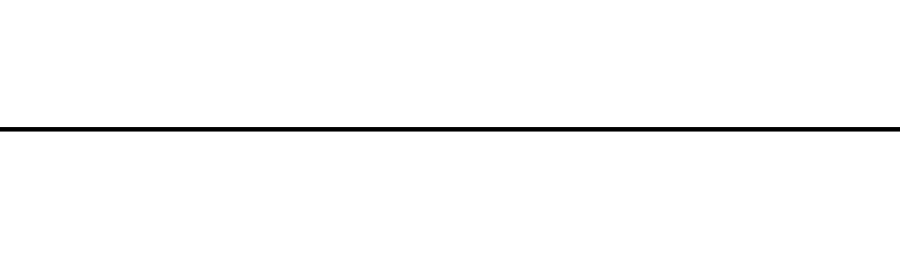
DETAIL G-2-6 SEDIMENT BASIN SCHEMATIC HORIZONTAL DRAW-DOWN DEVICE



MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

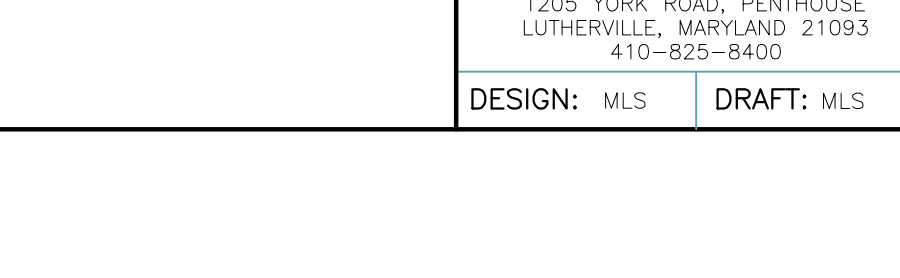
DETAIL G-2-6 SEDIMENT BASIN SCHEMATIC HORIZONTAL DRAW-DOWN DEVICE



MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

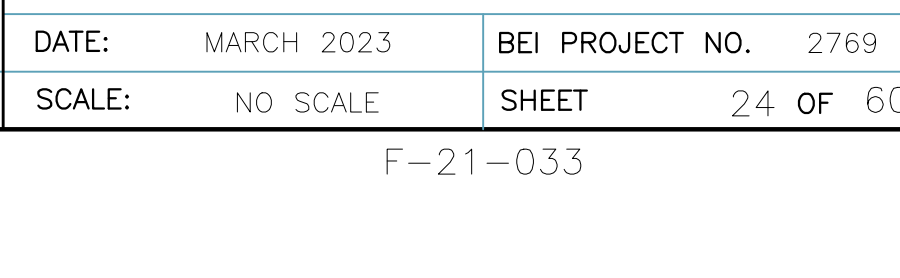
DETAIL G-2-6 SEDIMENT BASIN SCHEMATIC HORIZONTAL DRAW-DOWN DEVICE



MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, 2011

DETAIL G-2-6 SEDIMENT BASIN SCHEMATIC HORIZONTAL DRAW-DOWN DEVICE



CONSTRUCTION SPECIFICATIONS: 1. PERFORATE PIPE WITH 1/2 INCH DIAMETER PERFORATIONS SPACED 6 INCHES APART LONGITUDINALLY AND RADIALLY OR IN ACCORDANCE WITH APPROVED PLAN.

CONSTRUCTION SPECIFICATIONS: 1. PERFORATE PIPE WITH 1/2 INCH DIAMETER PERFORATIONS SPACED 6 INCHES APART LONGITUDINALLY AND RADIALLY OR IN ACCORDANCE WITH APPROVED PLAN.

CONSTRUCTION SPECIFICATIONS: 1. PERFORATE PIPE WITH 1/2 INCH DIAMETER PERFORATIONS SPACED 6 INCHES APART LONGITUDINALLY AND RADIALLY OR IN ACCORDANCE WITH APPROVED PLAN.

CONSTRUCTION SPECIFICATIONS: 1. PERFORATE PIPE WITH 1/2 INCH DIAMETER PERFORATIONS SPACED 6 INCHES APART LONGITUDINALLY AND RADIALLY OR IN ACCORDANCE WITH APPROVED PLAN.

CONSTRUCTION SPECIFICATIONS: 1. PERFORATE PIPE WITH 1/2 INCH DIAMETER PERFORATIONS SPACED 6 INCHES APART LONGITUDINALLY AND RADIALLY OR IN ACCORDANCE WITH APPROVED PLAN.

NOTES: THE DRAW-DOWN DEVICE SHALL BE 6" PVC, WITH THREE LONGITUDINAL ROWS, WITH EIGHT 1" DIA. PERFORATIONS IN EACH ROW. THE INTERNAL ORIFICE SHALL BE 2 1/8" IN DIAMETER. USE SAND FILTER PROFILE FOR MORE INFORMATION.

NOTES: THE DRAW-DOWN DEVICE SHALL BE 6" PVC, WITH THREE LONGITUDINAL ROWS, WITH EIGHT 1" DIA. PERFORATIONS IN EACH ROW. THE INTERNAL ORIFICE SHALL BE 2 1/8" IN DIAMETER. USE SAND FILTER PROFILE FOR MORE INFORMATION.

NOTES: THE DRAW-DOWN DEVICE SHALL BE 6" PVC, WITH THREE LONGITUDINAL ROWS, WITH EIGHT 1" DIA. PERFORATIONS IN EACH ROW. THE INTERNAL ORIFICE SHALL BE 2 1/8" IN DIAMETER. USE SAND FILTER PROFILE FOR MORE INFORMATION.

NOTES: THE DRAW-DOWN DEVICE SHALL BE 6" PVC, WITH THREE LONGITUDINAL ROWS, WITH EIGHT 1" DIA. PERFORATIONS IN EACH ROW. THE INTERNAL ORIFICE SHALL BE 2 1/8" IN DIAMETER. USE SAND FILTER PROFILE FOR MORE INFORMATION.

NOTES: THE DRAW-DOWN DEVICE SHALL BE 6" PVC, WITH THREE LONGITUDINAL ROWS, WITH EIGHT 1" DIA. PERFORATIONS IN EACH ROW. THE INTERNAL ORIFICE SHALL BE 2 1/8" IN DIAMETER. USE SAND FILTER PROFILE FOR MORE INFORMATION.

DEVELOPER'S CERTIFICATE: Luis Mangione, 2023-03-07. ENGINEER'S CERTIFICATE: Michael L. Swanson, 2023-03-07. APPROVED: DEPARTMENT OF PUBLIC WORKS, 5/4/2023. CHIEF, BUREAU OF HIGHWAYS, 4/19/2023. CHIEF, DIVISION OF LAND DEVELOPMENT, 4/21/2023. CHIEF, DEVELOPMENT ENGINEERING DIVISION.

DEVELOPER: Luis Mangione, 2023-03-07. DATE: 4/20/2023. APPROVED: DEPARTMENT OF PUBLIC WORKS, 5/4/2023. CHIEF, BUREAU OF HIGHWAYS, 4/19/2023. CHIEF, DIVISION OF LAND DEVELOPMENT, 4/21/2023. CHIEF, DEVELOPMENT ENGINEERING DIVISION.

DEVELOPER: Luis Mangione, 2023-03-07. DATE: 4/20/2023. APPROVED: DEPARTMENT OF PUBLIC WORKS, 5/4/2023. CHIEF, BUREAU OF HIGHWAYS, 4/19/2023. CHIEF, DIVISION OF LAND DEVELOPMENT, 4/21/2023. CHIEF, DEVELOPMENT ENGINEERING DIVISION.

DEVELOPER: Luis Mangione, 2023-03-07. DATE: 4/20/2023. APPROVED: DEPARTMENT OF PUBLIC WORKS, 5/4/2023. CHIEF, BUREAU OF HIGHWAYS, 4/19/2023. CHIEF, DIVISION OF LAND DEVELOPMENT, 4/21/2023. CHIEF, DEVELOPMENT ENGINEERING DIVISION.

DEVELOPER: Luis Mangione, 2023-03-07. DATE: 4/20/2023. APPROVED: DEPARTMENT OF PUBLIC WORKS, 5/4/2023. CHIEF, BUREAU OF HIGHWAYS, 4/19/2023. CHIEF, DIVISION OF LAND DEVELOPMENT, 4/21/2023. CHIEF, DEVELOPMENT ENGINEERING DIVISION.

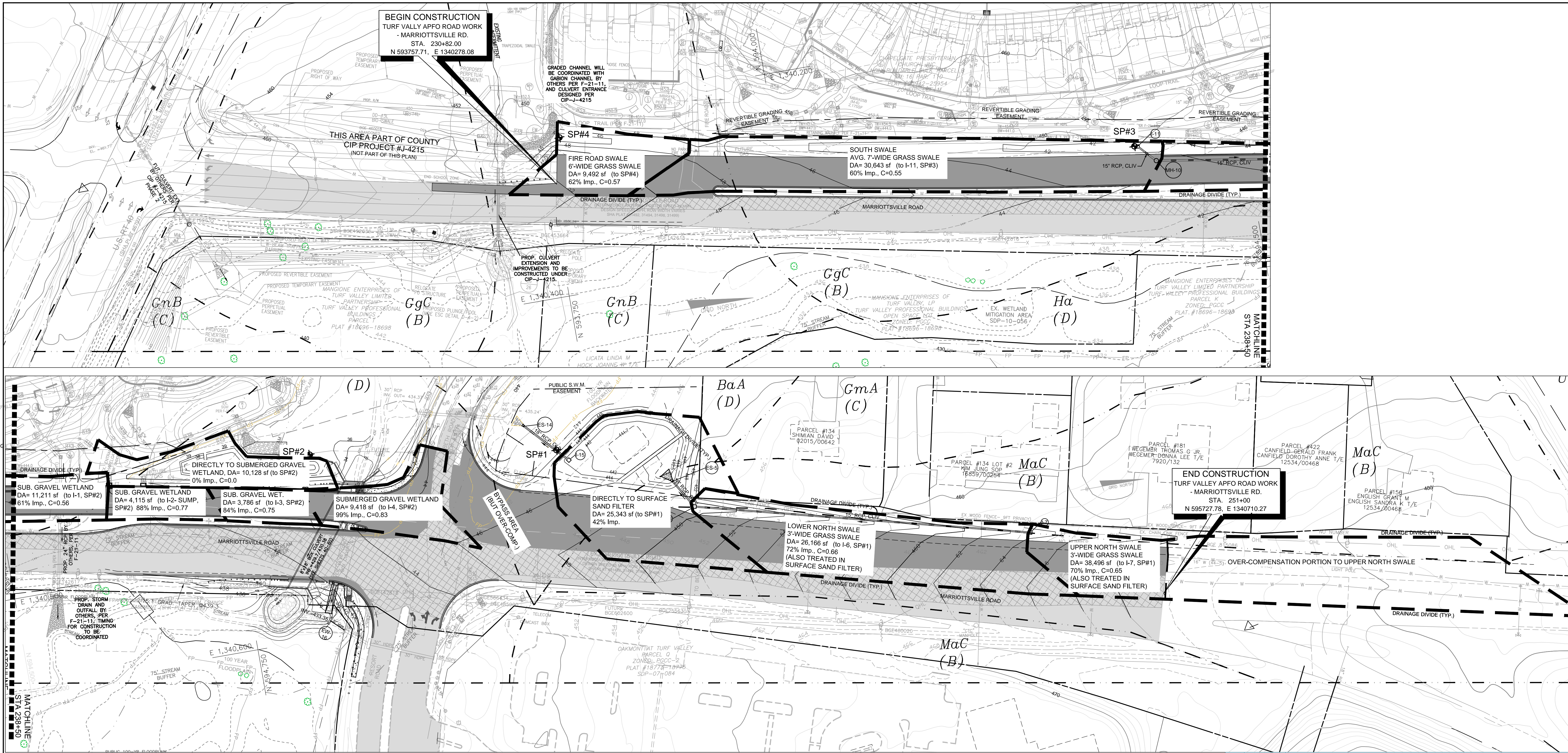
DEVELOPER: Luis Mangione, 2023-03-07. DATE: 4/20/2023. APPROVED: DEPARTMENT OF PUBLIC WORKS, 5/4/2023. CHIEF, BUREAU OF HIGHWAYS, 4/19/2023. CHIEF, DIVISION OF LAND DEVELOPMENT, 4/21/2023. CHIEF, DEVELOPMENT ENGINEERING DIVISION.

DEVELOPER: Luis Mangione, 2023-03-07. DATE: 4/20/2023. APPROVED: DEPARTMENT OF PUBLIC WORKS, 5/4/2023. CHIEF, BUREAU OF HIGHWAYS, 4/19/2023. CHIEF, DIVISION OF LAND DEVELOPMENT, 4/21/2023. CHIEF, DEVELOPMENT ENGINEERING DIVISION.





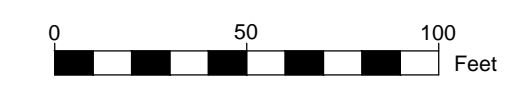




STRUCTURE	CONTRIBUTING AREA	A AREA ACRES	IMP. AREA ACRES	C RUNOFF COEF.
6' FIRE ROAD SWALE		0.22	0.13	0.57
AVG. 7' SOUTH SWALE-UPPER		0.70	0.42	0.55
I-11	MH-10	0.00	0.00	0.00
MH-10	MH-21A	0.00	0.00	0.00
I-7	I-6	0.88	0.62	0.65
I-6	ES-5	0.60	0.43	0.66
surface only	I-6	0.60	0.43	0.66
I-4		0.23	0.22	0.84
I-3		0.09	0.07	0.75
sump	I-2	0.09	0.08	0.77
	I-1	0.26	0.16	0.56
Resort Curb Opening		0.20	0.20	0.85

Practice	DA (sf)	Imp Area (sf)	% Imp	Rv	Pe Req.	Total ESDv Required	Total ESDv Provided	Pe Prov.	Outfall Study Point	REV (cf) Required	REV (cf) Provided	
North Grass Swale (M-8)-Upper	38,496	26,802	70%	0.68	1.00	2,171	367	0.2		618	367	
North Grass Swale (M-8)-Lower	26,166	18,738	72%	0.69	1.00	1,514	708	0.5			708	
Surface Sand Filter (F-1)-direct	25,527	10,640	42%	0.43	1.00	904	9,526	2.6			0	
Treatment Train- includes above	90,189	56,180	62%	0.61	1.00	4,589	10,601	2.3	SP#1		0	
South Grass Swale (M-8)	30,643	18,273	60%	0.59	1.00	1,498	1,785	1.2	SP#3		1785	
Fire Road Swale (M-8)	9,492	5,869	62%	0.61	1.00	480	543	1.1	SP#4		543	
Submerged Gravel Wetland (M-2)	38,658	22,793	59%	0.58	1.00	1,871	4,863	2.6	SP#2		0	
<b>Totals</b>						<b>8,438</b>	<b>17,792</b>	<b>cf</b>			<b>618</b>	<b>3403</b>

Note: The North Grass Swales empty into the Surface Sand Filter where they are further treated as part of a treatment train. The overall Pe Requirement for the DA is 1.39 inches and the provided for the LOD is 1.57 inches. ESD volume in the Sand Filter provides treatment for the Route 70 overpass (1,256 cf). Subtracting that volume, the provided Pe for the LOD is 1.46 inches.



APPROVED: DEPARTMENT OF PUBLIC WORKS  
 Date: 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Date: 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 Date: 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK ENGINEERING, INC.**  
 ENGINEERS & LAND SURVEYORS & PLANNERS  
 3300 NORTH RIDGE ROAD SUITE 140A ELLICOTT CITY, MARYLAND 21043  
 (P) 410-465-6105 (F) 410-465-6644  
 WWW.BE-CIVILENGINEERING.COM

03.07.2023

**OWNER:**  
 HOWARD COUNTY MARYLAND  
 DIRECTOR'S OFFICE OF  
 DEPARTMENT OF PUBLIC WORKS  
 3430 COURTHOUSE DRIVE  
 ELLICOTT CITY, MD 21043  
 410-313-4401

**DEVELOPER:**  
 MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP  
 1205 YORK ROAD, PENTHOUSE  
 LUTHERVILLE, MARYLAND 21093  
 410-825-8400

**DESIGN:** MLS **DRAFT:** MLS

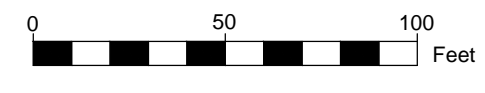
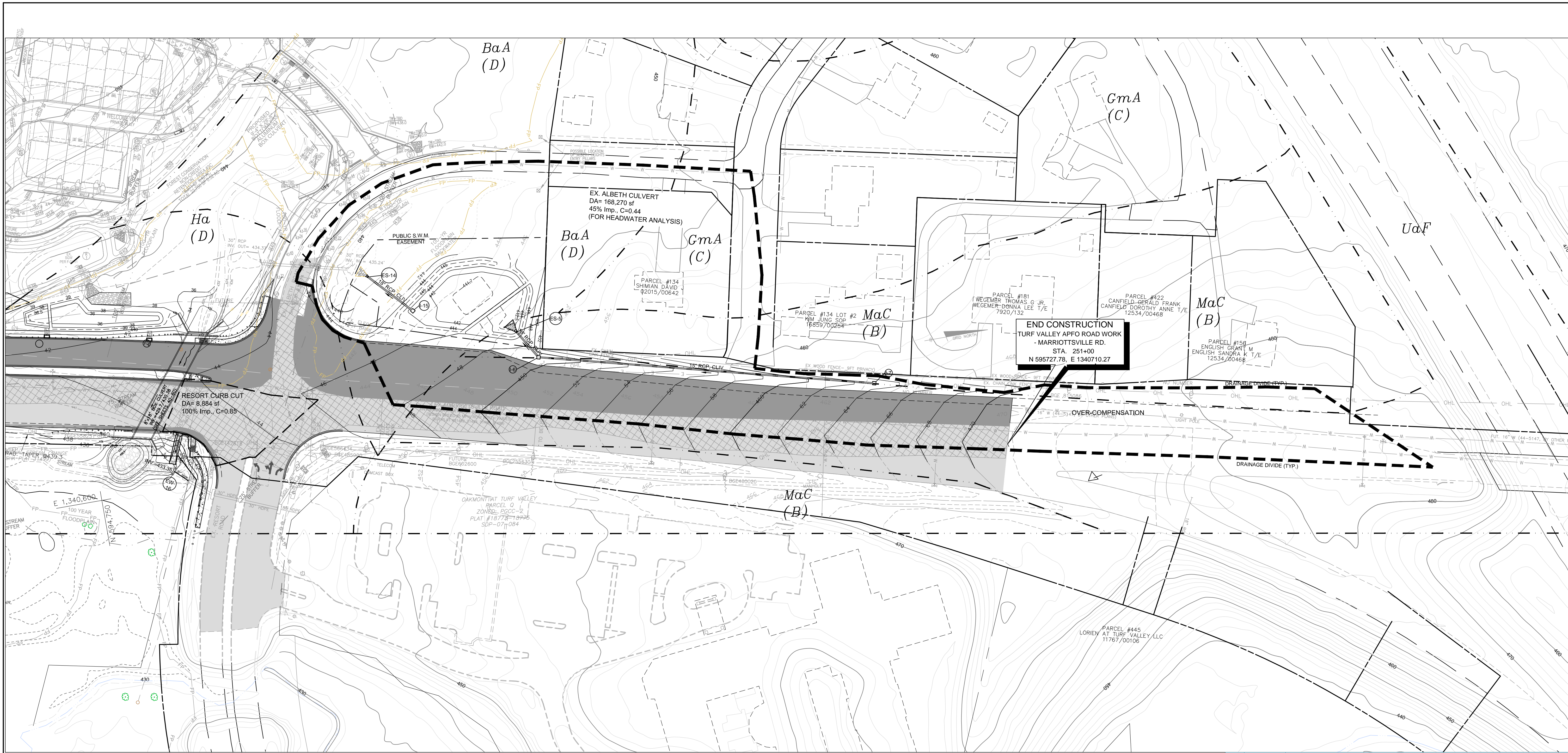
**MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
 ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**DRAINAGE AREA MAP ESD AND STORM DRAIN**

DATE: MARCH 2023 BEI PROJECT NO. 2769  
 SCALE: 1" = 50' SHEET 26 OF 60





STRUCTURE		CONTRIBUTING AREA		
FROM	TO	A. AREA ACRES	IMP. AREA ACRES	C. RUNOFF COEF.
Ex Albeth Culvert		3.86	1.72	0.44

APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, BUREAU OF HIGHWAYS		5/4/2023
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, DIVISION OF LAND DEVELOPMENT		4/19/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DocuSigned by: <i>[Signature]</i>	DATE
		4/21/2023

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 30736, Expiration Date: 08-03-24.

**BENCHMARK**  
ENGINEERS & LAND SURVEYORS & PLANNERS  
**ENGINEERING, INC.**  
3300 NORTH RIDGE ROAD SUITE 140 ELLICOTT CITY, MARYLAND 21043  
(P) 410-465-6105 (F) 410-465-6644  
WWW.BE-CIVILENGINEERING.COM

*[Signature]* 03.07.2023

**OWNER:**  
HOWARD COUNTY MARYLAND  
DIRECTOR'S OFFICE OF  
DEPARTMENT OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLICOTT CITY, MD 21043  
410-313-4401

**DEVELOPER:**  
MANGIONE ENTERPRISES OF TURF VALLEY  
LIMITED PARTNERSHIP  
1205 YORK ROAD, PENTHOUSE  
LUTHERVILLE, MARYLAND 21093  
410-825-8400

**DESIGN:** MLS    **DRAFT:** MLS

**MARRIOTTSVILLE ROAD WIDENING  
APFO MITIGATION PLANS  
F-21-033**

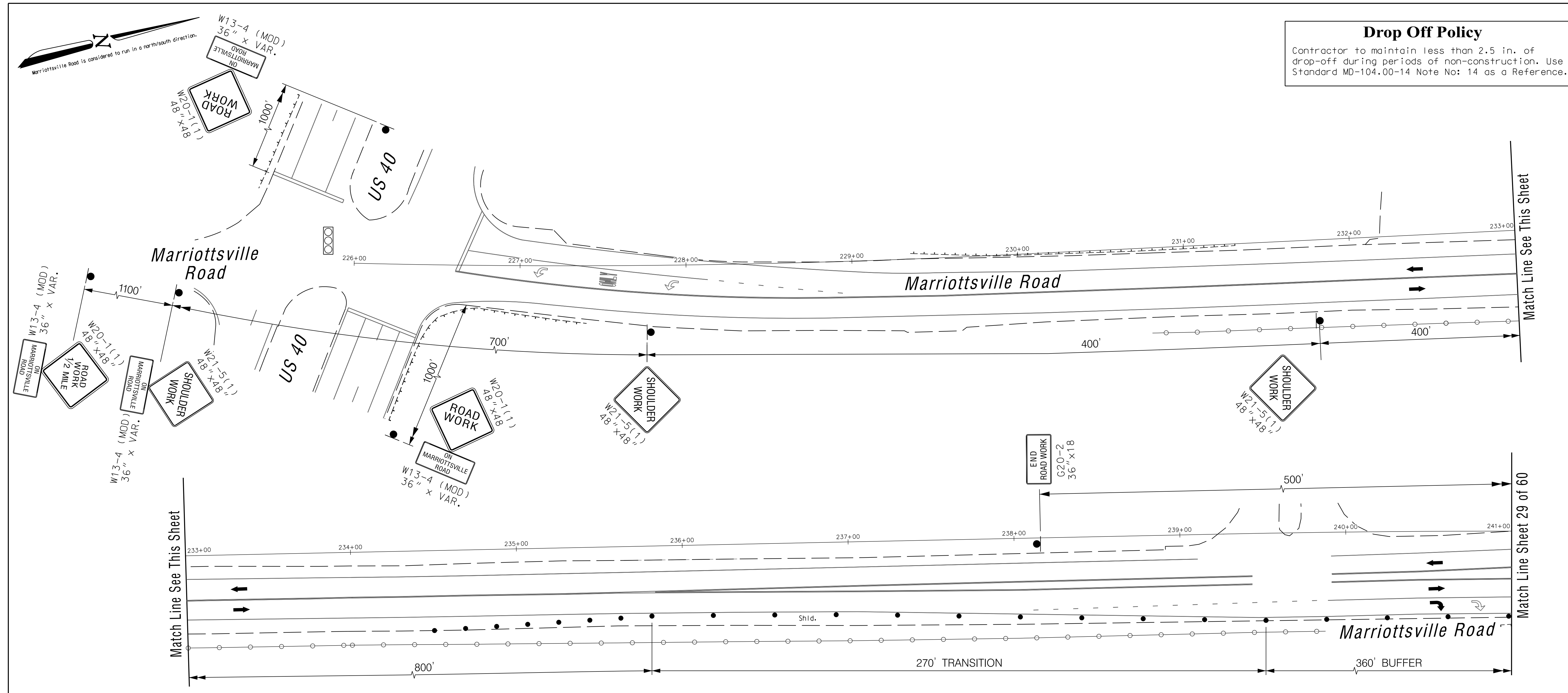
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**DRAINAGE AREA MAP  
CURB CUT AND EX. ALBETH CULVERT**

DATE: MARCH 2023    BEI PROJECT NO. 2769  
SCALE: 1" = 50'    SHEET 27 OF 60



**Drop Off Policy**  
 Contractor to maintain less than 2.5 in. of drop-off during periods of non-construction. Use Standard MD-104.00-14 Note No: 14 as a Reference.



**SEQUENCE OF OPERATION PHASE 1**  
 SEE PAGE 23 OF 60 (EROSION AND SEDIMENT CONTROL NOTES) FOR SPECIFIC SEQUENCE AND DURATION

- INSTALL ADVANCE WARNING SIGNS AND CHANNELIZING DEVICES (DRUMS) THE DESIGN SPEED IS 45 MPH FOR MARRIOTTVILLE ROAD AND 35 MPH FOR RESORT ROAD. TRAFFIC CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL THEY ARE NO LONGER NEEDED.
- CONSTRUCT ROADWAY IMPROVEMENTS AS PER ROADWAY PLANS. INSTALL PROPOSED CURB AND GUTTER ALONG RESORT ROAD AND MARRIOTTVILLE RD INTERSECTION.

**NOTE:**  
 The following standards are required for this project:  
 MD 104.02-09 Flagging Operation /2-Lane, 2 Way Greater than 40 MPH  
 MD 104.03-01 Shoulder Work/Multilane Undiv. Greater than 40 MPH  
 MD 104.03-03 Left Lane Closure/Multilane Undiv. Greater than 40 MPH  
 MD 104.03-05 Right Lane Closure/Multilane Undiv. Greater than 40 MPH  
 For all standards referred to on the plans the contractor must go to the Book of Standards which will have the most current version. The Book of Standards can be accessed at:  
<http://apps.roads.maryland.gov/businesswithshabizstdsspecs/desmanualstdpub/publicationsonline/bhd/bookstd/index.asp>  
 All items are to be constructed in accordance with the current version of the referenced standard at the time of construction.

**MOT GENERAL NOTES**

- CONTRACTOR SHALL CONSULT THE MD-SHA BOOK OF STANDARDS FOR THE CURRENT TYPICALS AND NOTES FOR IMPLEMENTING TEMPORARY TRAFFIC CONTROL. PLANS DETAIL TRAFFIC CONTROL FOR PEAK-HOUR HOUR MOVEMENTS EXCEPT WHERE NOTED. UTILIZE TYPICALS AS NOTED FOR NON-PEAK HOUR WORK ZONES AS NECESSARY.
- ANY WORK WITHIN THE TRAVELED PORTION OF THE ROADWAY SHALL BE RESTRICTED TO THE HOURS BETWEEN 9:00 AM AND 3:00 PM MONDAY THROUGH FRIDAY.
- CONTRACTOR SHALL RESTORE CONSTRUCTION AREA BACK TO EXISTING GRADE AT THE END OF THE WORK DAY IN ACCORDANCE TO THE MD-SHA DROP-OFF POLICY.
- THE ROADWAY SHALL REMAIN OPEN AND UNOBSTRUCTED BY ANY CHANNELIZING DEVICES DURING PERIODS OF NON-CONSTRUCTION.
- CONTRACTOR TO INSTALL BASE COURSE ASPHALT SURFACE ONLY DURING ALL MOT CONSTRUCTION PHASES. FINAL PAVING SHALL BE INSTALLED UPON COMPLETION OF MOT PHASE 4.
- ADVANCE WARNING DEVICES, TAPERS AND TRANSITIONS SET PER DESIGN SPEED: 45 MPH FOR MARRIOTTVILLE ROAD.

**LEGEND**

- DRUM
- I POST SIGN
- ▬ CONCRETE TRAFFIC BARRIER
- ▷ GENERAL CRASH ATTENUATOR
- CURRENT PHASE WORK AREA
- ➔ TRAFFIC FLOW ARROW
- 50 MPH CRASH CUSHION



EXISTING SIGN



PROPOSED SIGN



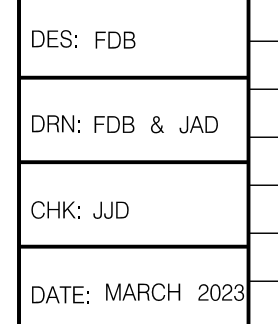
PHASE 1

APPROVED: DEPARTMENT OF PUBLIC WORKS DocuSigned by: <i>[Signature]</i> 5/4/2023
CHIEF, PUBLIC WORKS
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING DocuSigned by: <i>[Signature]</i> 4/19/2023
CHIEF, DIVISION OF DEVELOPMENT
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING DocuSigned by: <i>[Signature]</i> 4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION



**Ming-Yu Chien** 04.12.2023  
 PROFESSIONAL CERTIFICATION -  
 I HEREBY CERTIFY THAT THESE PLANS 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.: 33316  
 EXPIRATION DATE: 7-13-24

The Traffic Group  
 Suite H  
 9900 Franklin Square Dr.  
 Baltimore, Maryland  
 410-931-6600  
 1-800-583-8411  
 Fax: 410-931-6601



DES: FDB	BY	NO.	REVISION	DATE
DRN: FDB & JAD				
CHK: JJD				
DATE: MARCH 2023				

MARRIOTTVILLE ROAD WIDENING  
 APFO MITIGATION PLAN  
**F-21-033**

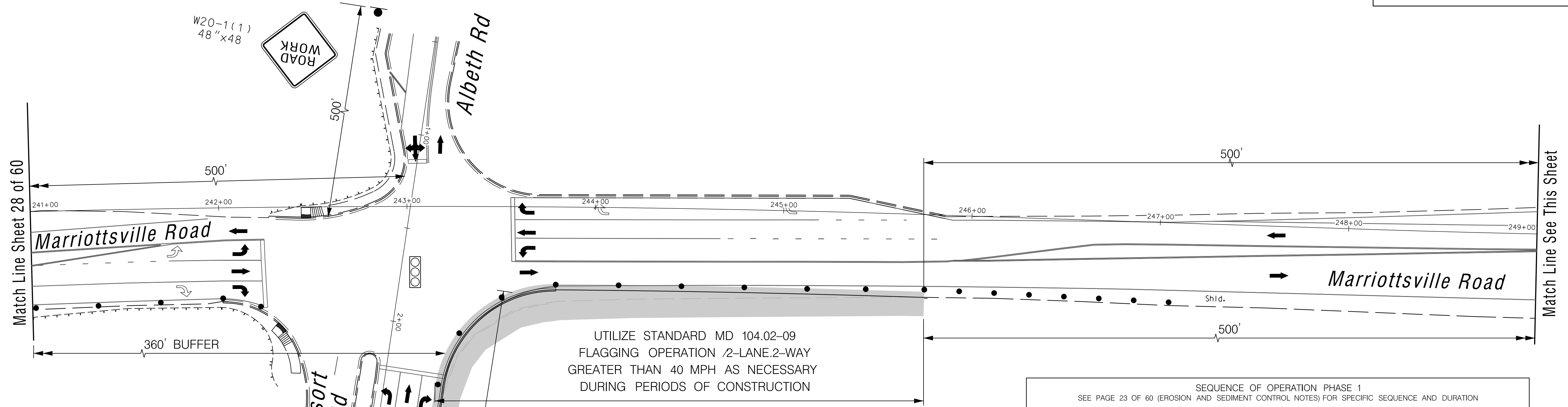
MAINTENANCE OF TRAFFIC PLAN  
**MARRIOTTVILLE ROAD  
 AT  
 RESORT ROAD/ALBETH ROAD**

SCALE:  
 1" = 30'  
 SHEET  
 28 OF 60



Marriottsville Road is considered to run in a north/south direction.

**Drop Off Policy**  
 Contractor to maintain less than 2.5 in. of drop-off during periods of non-construction. Use Standard MD-104.00-14 Note No: 14 as a Reference.

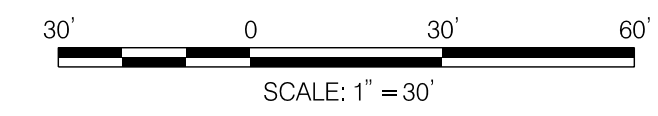
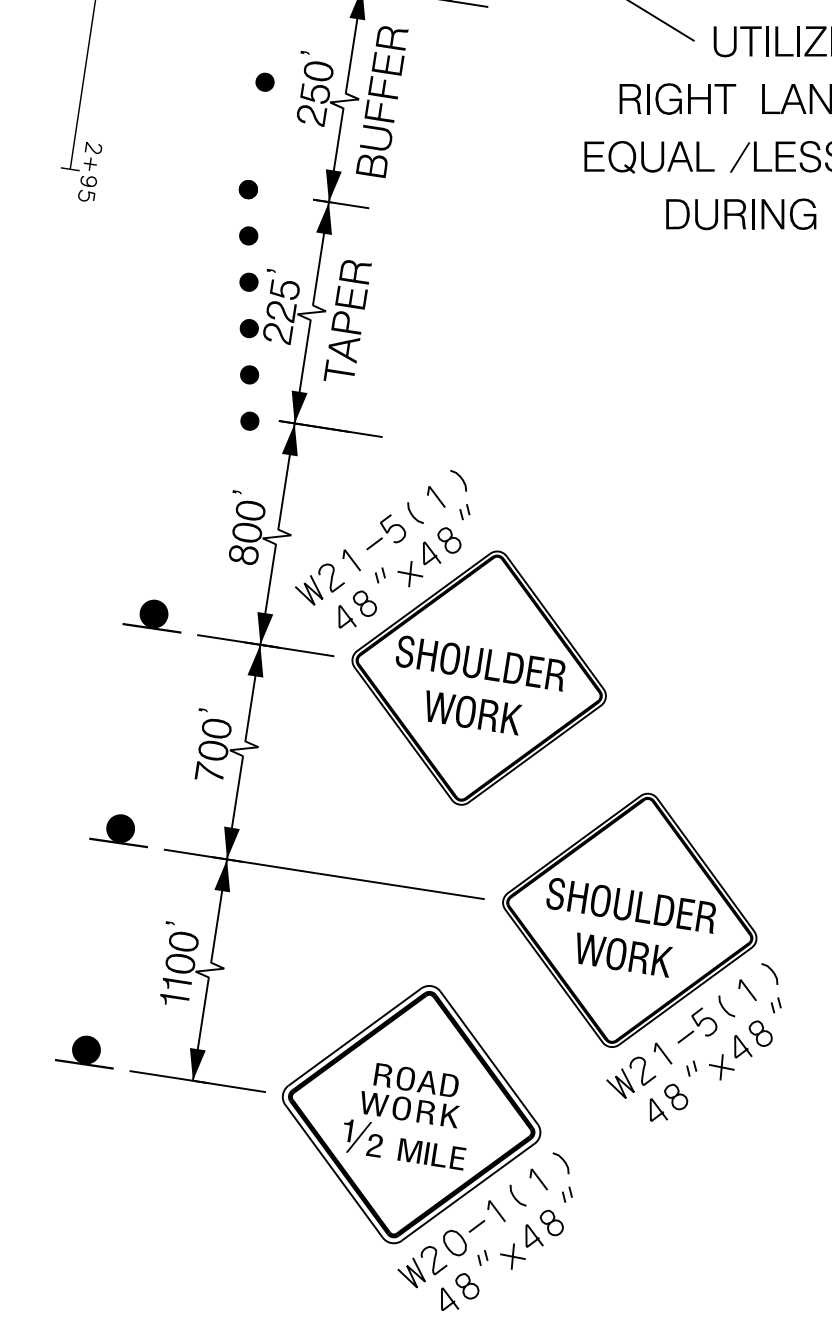


**SEQUENCE OF OPERATION PHASE 1**  
 SEE PAGE 23 OF 60 (EROSION AND SEDIMENT CONTROL NOTES) FOR SPECIFIC SEQUENCE AND DURATION

1. INSTALL ADVANCE WARNING SIGNS AND CHANNELIZING DEVICES (DRUMS) THE DESIGN SPEED IS 45 MPH FOR MARRIOTTVILLE ROAD AND 35 MPH FOR RESORT ROAD. TRAFFIC CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL THEY ARE NO LONGER NEEDED.
2. CONSTRUCT ROADWAY IMPROVEMENTS AS PER ROADWAY PLANS. INSTALL PROPOSED CURB AND GUTTER ALONG RESORT ROAD AND MARRIOTTVILLE RD INTERSECTION.

**LEGEND**

- DRUM
- I POST SIGN
- ▬ CONCRETE TRAFFIC BARRIER
- ▷ GENERAL CRASH ATTENUATOR
- CURRENT PHASE WORK AREA
- ➔ TRAFFIC FLOW ARROW
- 50 MPH CRASH CUSHION
- ◇ ROAD WORK (with dots) EXISTING SIGN
- ◇ ROAD WORK (with border) PROPOSED SIGN



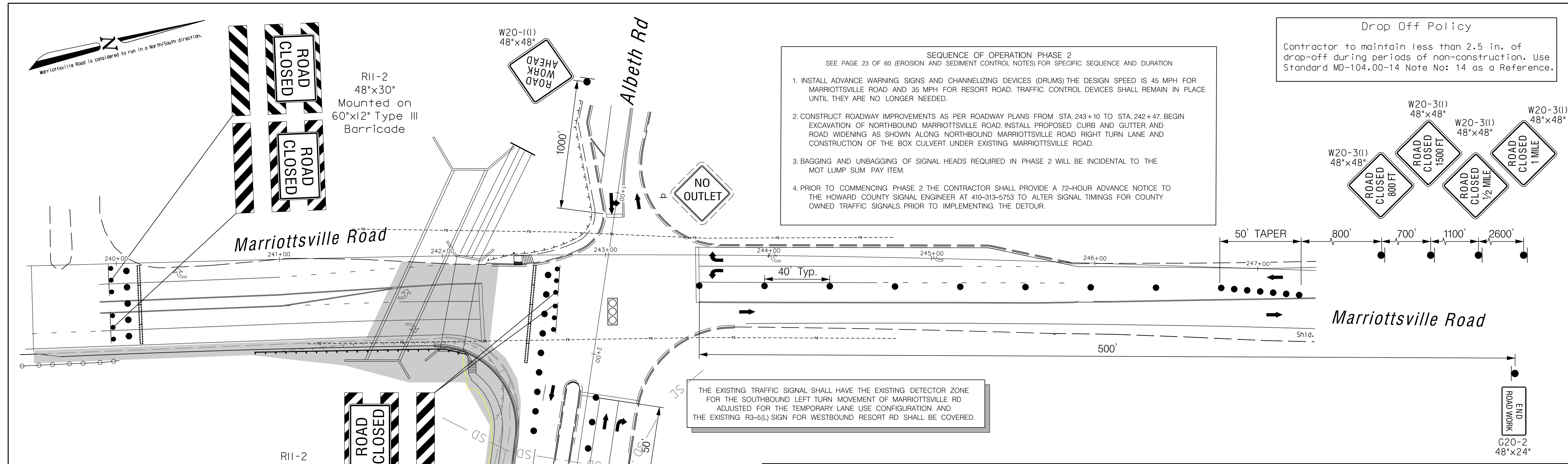
PHASE 1

APPROVED: DEPARTMENT OF PUBLIC WORKS 5/4/2023 CHIEF, BUREAU OF PUBLIC WORKS			The Traffic Group Suite H 9900 Franklin Square Dr. Baltimore, Maryland 410-931-6600 1-800-585-8411 Fax: 410-931-6601		DES: FDB DRN: FDB & JAD CHK: JJD DATE: MARCH 2023	MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLAN F-21-033	MAINTENANCE OF TRAFFIC PLAN MARRIOTTVILLE ROAD AT RESORT ROAD/ALBETH ROAD		SCALE: 1" = 30' SHEET 29 OF 60	
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/19/2023 CHIEF, DIVISION OF PLANNING AND ZONING					BY: NO. REVISION DATE		600' SCALE MAP NO. DATE:			
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/21/2023 CHIEF, DIVISION OF PLANNING AND ZONING										
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/21/2023 CHIEF, DEVELOPMENT AND ENGINEERING DIVISION										

PLOTTED: 4/12/2023

FILE: F:\2020\2020-0619\_Marriottsville Road at Resort Road\DES\TDD\Ultimate Design\TCP-1-Marriottsville-Resort.dgn



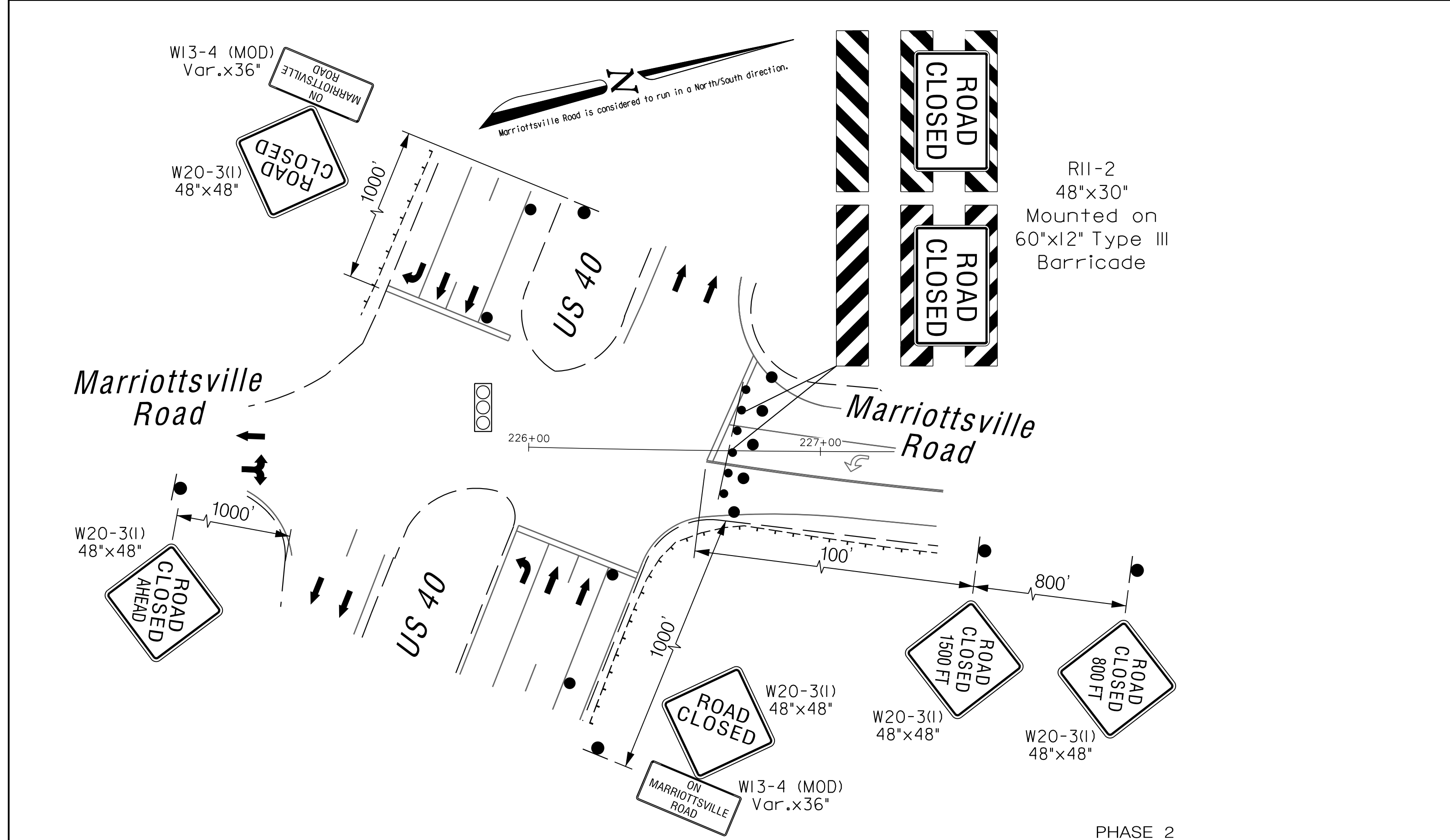
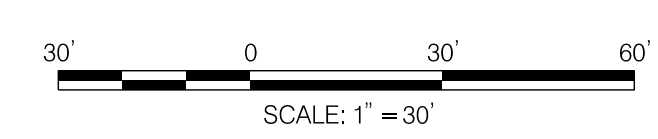


THE EXISTING TRAFFIC SIGNAL SHALL HAVE THE EXISTING DETECTOR ZONE FOR THE SOUTHBOUND LEFT TURN MOVEMENT OF MARIOTTSSVILLE RD. ADJUSTED FOR THE TEMPORARY LANE USE CONFIGURATION AND THE EXISTING R3-5(L) SIGN FOR WESTBOUND RESORT RD SHALL BE COVERED.

**LEGEND**

- DRUM
- I POST SIGN
- CONCRETE TRAFFIC BARRIER
- CURRENT PHASE WORK AREA
- TRAFFIC FLOW ARROW
- TRAFFIC SIGNAL
- PROPOSED SIGN
- EXISTING SIGN

**Special Notes:**  
 1) Type III Barricades, Road Closed Signage, and Drums are also required at Sta. 233+00.  
 2) Howard County - Traffic Engineering may require additional traffic control devices (i.e. variable message boards, arrow panels, signage, drums, cones, etc.) to insure safe and orderly traffic operation beyond what is shown on these plans.



APPROVED: DEPARTMENT OF PUBLIC WORKS DocuSigned by: <i>[Signature]</i> 5/4/2023	
CHIEF, BUREAU OF PUBLIC WORKS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING DocuSigned by: <i>[Signature]</i> 4/19/2023	
CHIEF, DIVISION OF DEVELOPMENT	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

**Ming-Yu Chien** 04.12.2023  
 PROFESSIONAL CERTIFICATION - I HEREBY CERTIFY THAT THESE PLANS 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.: 33316  
 EXPIRATION DATE: 7-13-24

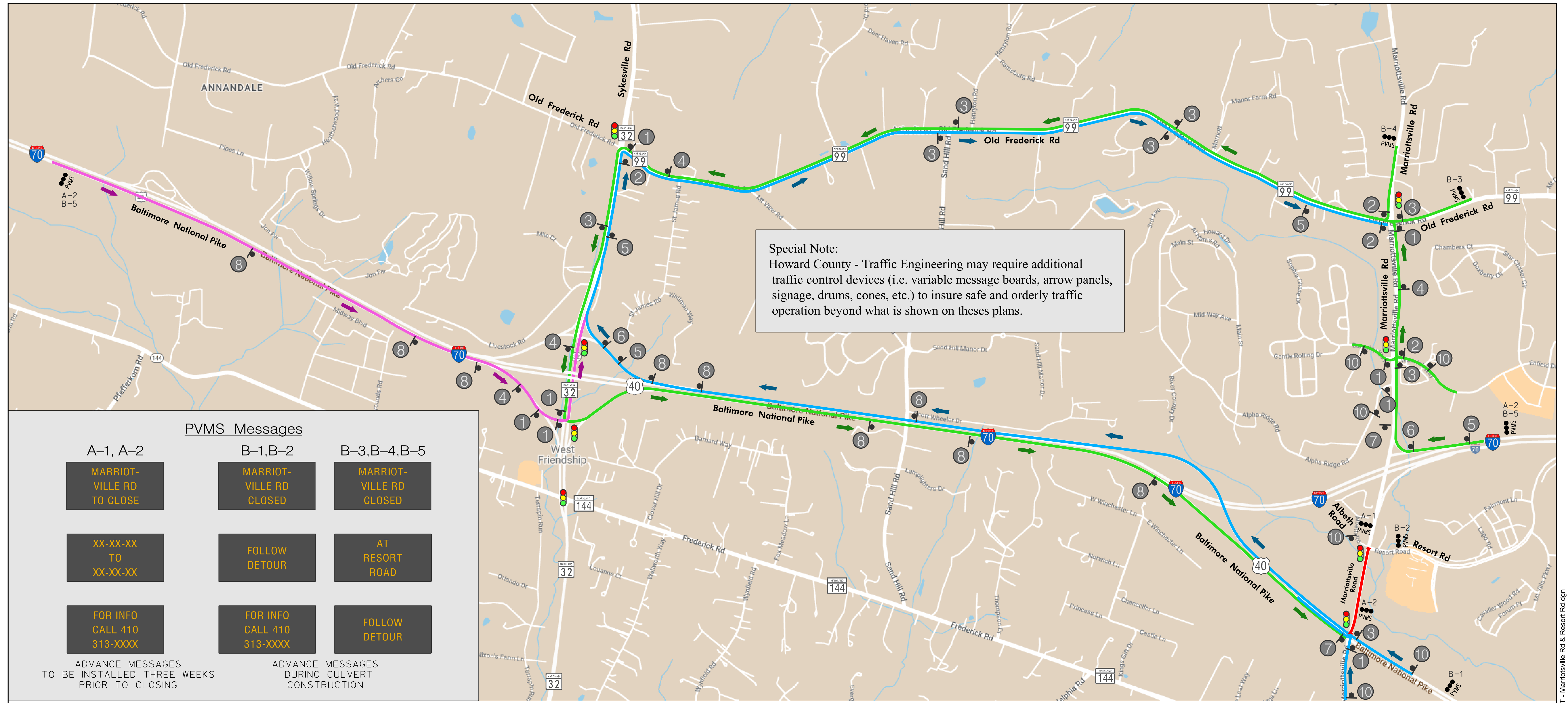
The Traffic Group  
 Suite H  
 9900 Franklin Square Dr.  
 Baltimore, Maryland  
 410-931-6600  
 1-800-583-8411  
 Fax: 410-931-6601

DES: FDB				
DRN: FDB & JAD				
CHK: JJD				
DATE: MARCH 2023	BY	NO.	REVISION	DATE

MARIOTTSSVILLE ROAD WIDENING  
 APFO MITIGATION PLAN  
**F-21-033**

MAINTENANCE OF TRAFFIC PLAN  
**MARIOTTSSVILLE ROAD AT RESORT ROAD/ALBETH ROAD**  
 SCALE: 1" = 30'  
 SHEET 30 OF 60





**Special Note:**  
Howard County - Traffic Engineering may require additional traffic control devices (i.e. variable message boards, arrow panels, signage, drums, cones, etc.) to insure safe and orderly traffic operation beyond what is shown on these plans.

PVMS Messages		
A-1, A-2	B-1, B-2	B-3, B-4, B-5
MARRIOTTVILLE RD TO CLOSE	MARRIOTTVILLE RD CLOSED	MARRIOTTVILLE RD CLOSED
XX-XX-XX TO XX-XX-XX	FOLLOW DETOUR	AT RESORT ROAD
FOR INFO CALL 410 313-XXXX	FOR INFO CALL 410 313-XXXX	FOLLOW DETOUR
ADVANCE MESSAGES TO BE INSTALLED THREE WEEKS PRIOR TO CLOSING	ADVANCE MESSAGES DURING CULVERT CONSTRUCTION	

1 Mariottsville Rd DETOUR M 4-9(I) 30" x 12" M 4-9L 30" x 24"	2 Mariottsville Rd DETOUR M 4-9(I) 30" x 12" M 4-9R 30" x 24"	3 Mariottsville Rd DETOUR M 4-9(I) 30" x 12" M 4-9 MOD 30" x 24"	4 Mariottsville Rd DETOUR M 4-9(I) 30" x 12" M 4-9L MOD 30" x 24"	5 Mariottsville Rd DETOUR M 4-9(I) 30" x 12" M 4-9R MOD 30" x 24"	6 Mariottsville Rd DETOUR M 4-9(I) 30" x 12" M 4-9R MOD 30" x 24"	7 Mariottsville Rd END DETOUR M 4-9(I) 30" x 12" M 4-8a 24" x 18"	8 Mariottsville Rd DETOUR M 4-9(I) 48" x 12" M 4-9R MOD 48" x 36"
---	---	--	---	---	---	---	---

SIGN #8 IS TO BE LOCATED BY GUIDE SIGNS FOR EXIT

10

**NOTICE**

MARRIOTTVILLE ROAD CLOSED

FOLLOW DETOUR

R 11-2(6) 78" x 84"

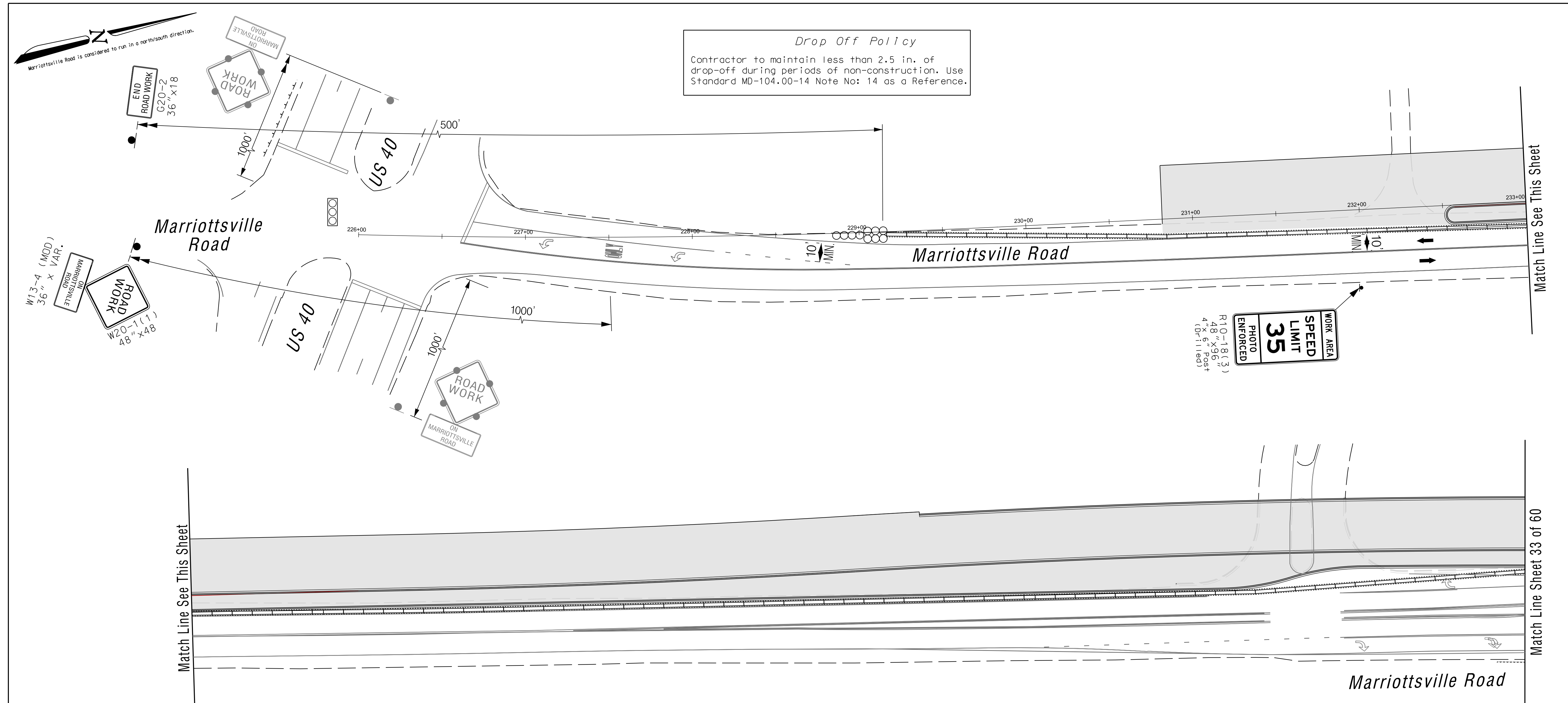
TO BE PLACED AT TIME OF CLOSURE. SIGN SHALL REMAIN IN PLACE DURING THE CLOSURE

**LEGEND**

- Portable Variable Message Sign
- ⊖ Temp. Traffic Sign
- ◊ Temp. Traffic Sign Face
- 🚦 Traffic Signal
- ➡ WB Detour Route Direction of Traffic
- ➡ EB Detour Route Direction of Traffic
- ➡ EB Detour Route Direction of Traffic
- Area of Road Closure

APPROVED: DEPARTMENT OF PUBLIC WORKS 5/4/2023 CHIEF, BUREAU OF PUBLIC WORKS APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/19/2023 CHIEF, DIVISION OF DEVELOPMENT 4/21/2023 CHIEF, DEVELOPMENT ENGINEERING DIVISION		The Traffic Group Suite H 9900 Franklin Square Dr. Baltimore, Maryland 410-931-6600 1-800-583-8411 Fax: 410-931-6601	DES: JAD DRN: JAD CHK: JJD DATE: MARCH 2023	<b>MARRIOTTVILLE ROAD WIDENING APPO MITIGATION PLAN</b> <b>F-21-033</b>	<b>MAINTENANCE OF TRAFFIC PLAN</b> <b>MARRIOTTVILLE ROAD AT RESORT ROAD/ALBETH ROAD</b>	SCALE: NOT TO SCALE SHEET 31 OF 60
---	--	--	--	--	--	---





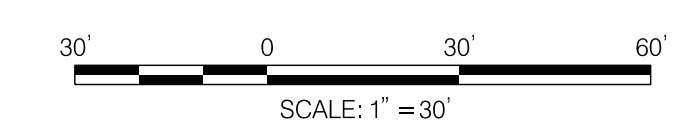
**SEQUENCE OF OPERATION PHASE 3**  
SEE PAGE 23 OF 60 (EROSION AND SEDIMENT CONTROL NOTES) FOR SPECIFIC SEQUENCE AND DURATION

1. INSTALL ADVANCE WARNING SIGNS AND CHANNELIZING DEVICES (DRUMS) THE DESIGN SPEED IS 45 MPH FOR MARRIOTTVILLE ROAD. TRAFFIC CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL THEY ARE NO LONGER NEEDED.
2. THE EXISTING TRAFFIC SIGNAL AT MARRIOTTVILLE RD AND RESORT RD WILL BE RECONSTRUCTED DURING THIS PHASE. TRAFFIC SIGNAL RECONSTRUCTION AND MOT PHASING MUST BE COORDINATED WITH TRAFFIC ENGINEERING. PRIOR TO BEGINNING WORK, PLEASE CONTACT SUBIN GEORGE (TRAFFIC ENGINEER) AT (410) 313-2430.
3. CONSTRUCT ROADWAY IMPROVEMENTS ALONG WESTERN SIDE OF EXISTING MARRIOTTVILLE ROAD, AS PER ROADWAY PLANS FROM STA. 230+82 TO STA. 251+00.
4. CONSTRUCT REMAINING PORTION OF THE NEW BOX CULVERT.

**NOTE:**  
The following standards are required for this project:  
MD 104.02-09 Shoulder Work/Flagging Operation /2-Lane, 2 Way Greater than 40 MPH  
MD 104.03-01 Shoulder Work/Multilane Undiv. Greater than 40 MPH  
MD 104.03-03 Left Lane Closure/Multilane Undiv. Greater than 40 MPH  
MD 104.03-05 Right Lane Closure/Multilane Undiv. Greater than 40 MPH  
For all standards referred to on the plans the contractor must go to the Book of Standards which will have the most current version. The Book of Standards can be accessed at:  
<http://apps.roads.maryland.gov/businesswithshabizstdsspecsdesmanualstdpub/publicationsonline/ohdbookstd/index.asp>  
All items are to be constructed in accordance with the current version of the referenced standard at the time of construction.

**LEGEND**

- DRUM
- I POST SIGN
- ▬ CONCRETE TRAFFIC BARRIER
- ▷ GENERAL CRASH ATTENUATOR
- CURRENT PHASE WORK AREA
- ➔ TRAFFIC FLOW ARROW
- ➔ 50 MPH CRASH CUSHION
- ◊ ROAD WORK EXISTING SIGN
- ◊ ROAD WORK PROPOSED SIGN



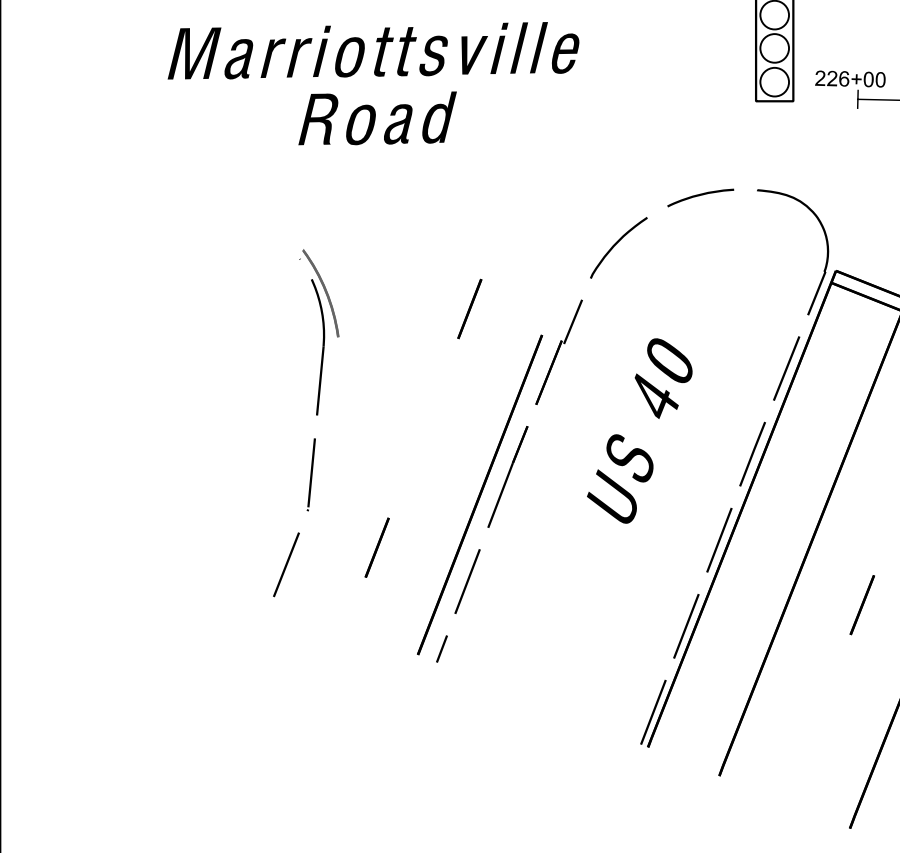
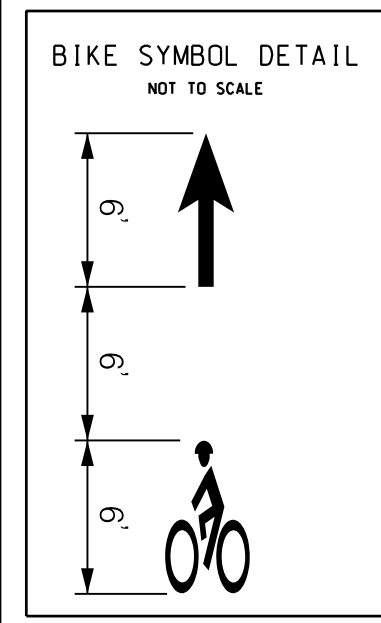
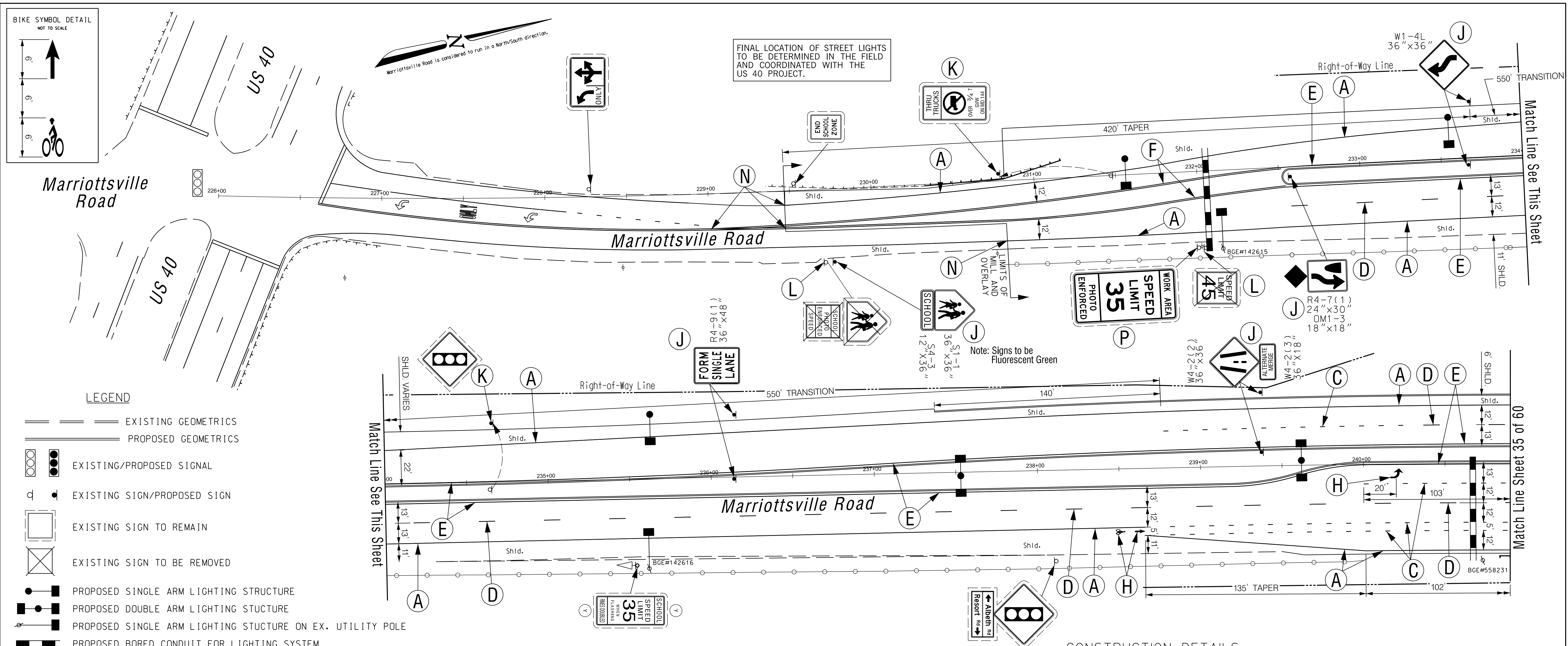
PHASE 3

APPROVED: DEPARTMENT OF PUBLIC WORKS 5/4/2023 CHIEF, BUREAU OF HIGHWAYS			The Traffic Group Suite H 9900 Franklin Square Dr. Baltimore, Maryland 410-931-6600 1-800-583-8411 Fax: 410-931-6601	DES: FDB		MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLAN F-21-033	MAINTENANCE OF TRAFFIC PLAN MARRIOTTVILLE ROAD AT RESORT ROAD/ALBETH ROAD	SCALE: 1" = 30'
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/19/2023 CHIEF, DIVISION OF DEVELOPMENT				DRN: FDB				SHEET 32 OF 60
BY: jfarringer CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE: 4/21/2023				CHK: JJD				
PLOTTED: 4/12/2023				DATE: MARCH 2023	BY NO. REVISION DATE	600' SCALE MAP NO. DATE		









**MATERIAL LIST**

Equipment to be furnished and installed by the Contractor. All equipment in this list shall have catalog cuts submitted for approval prior to installation.

- Point quantities reflect the required two coats of paint.

QUANTITY	UNITS	DESCRIPTION
*15000	LF	5 IN. WIDE PAINT PAVEMENT MARKING - WHITE
*13000	LF	5 IN. WIDE PAINT PAVEMENT MARKING - YELLOW
*1500	LF	10 IN. WIDE PAINT PAVEMENT MARKING - WHITE
4	EA	12 IN. WIDE HEAT APPLIED THERMOPLASTIC YIELD PAVEMENT MARKING - WHITE
8	EA	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (LEFT ARROW) - WHITE
2	EA	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (THROUGH LEFT ARROW) - WHITE
6	EA	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (RIGHT ARROW) - WHITE
2	EA	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (THROUGH RIGHT ARROW) - WHITE
4	EA	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (BIKE & ARROW) - WHITE
2	EA	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (ONLY) - WHITE
1	EA	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (YIELD) - WHITE
2	EA	18 IN. X 18 IN. OMI-3 SIGN FOR GROUND MOUNTING
2	EA	48 IN. X 96 IN. R10-18(3) SIGN FOR GROUND MOUNTING
2	EA	30 IN. X 30 IN. R3-7R SIGN FOR GROUND MOUNTING
2	EA	24 IN. X 30 IN. R4-7(1) SIGN FOR GROUND MOUNTING
2	EA	36 IN. X 48 IN. R4-9(1) SIGN FOR GROUND MOUNTING
2	EA	36 IN. X 36 IN. S1-1 SIGN FOR GROUND MOUNTING (Fluorescent Green)
2	EA	12 IN. X 36 IN. S4-3 SIGN FOR GROUND MOUNTING (Fluorescent Green)
1	EA	36 IN. X 36 IN. W1-4L SIGN FOR GROUND MOUNTING
2	EA	36 IN. X 36 IN. W4-2(2) SIGN FOR GROUND MOUNTING
2	EA	36 IN. X 18 IN. W4-2(3) SIGN FOR GROUND MOUNTING
220	LF	U-CHANNEL STEEL SIGN SUPPORT
72	LF	4 IN. X 6 IN. WOOD SIGN SUPPORT
4	EA	REMOVE GROUND MOUNTED SIGN
4	EA	RELOCATE GROUND MOUNTED SIGN
1	EA	RELOCATE EXISTING SOLAR POWER SCHOOL FLASHING BEACON ON NEW FOUNDATION
0.7	CY	CONCRETE FOUNDATION FOR BEACON

**LIGHTING DETAILS AND NOTES**

STREETLIGHTING TO BE INSTALLED BY OTHERS.  
 FINAL LOCATION OF STREET LIGHTS TO BE DETERMINED IN THE FIELD AND COORDINATED WITH THE US 40 PROJECT.

STA. 231+56 (3 FT. LT): LED 250 COBRAHEAD FIXTURE ON A 30 FT. BRONZE FIBERGLASS POLE USING A 12 FT. ARM.  
 STA. 232+14 (48 FT. RT): EXISTING BGE POLE #142615 - LED 250 COBRAHEAD FIXTURE (1) USING A 20 FT. ARM.  
 STA. 233+55 (20 FT. LT): LED 250 COBRAHEAD FIXTURE ON A 30 FT. BRONZE FIBERGLASS POLE USING A 12 FT. ARM.  
 STA. 235+61 (55 FT. RT): EXISTING BGE POLE #142616 - LED 250 COBRAHEAD FIXTURE (1) USING A 20 FT. ARM.  
 STA. 235+63 (35 FT. LT): LED 250 COBRAHEAD FIXTURE ON A 30 FT. BRONZE FIBERGLASS POLE USING A 12 FT. ARM.  
 STA. 237+53 (MEDIAN) - LED 250 COBRAHEAD FIXTURES (2) USING A TWIN MAST ARM (6 FT.) ON A 30 FT. BRONZE FIBERGLASS POLE.  
 STA. 239+62 (MEDIAN) - LED 250 COBRAHEAD FIXTURES (2) USING A TWIN MAST ARM (6 FT.) ON A 30 FT. BRONZE FIBERGLASS POLE.

STA. 232+05 & STA 240+67 - UNDERGROUND CONDUIT (4 INCH PVC SCHEDULE 40) BURIED AT A MINIMUM 24 IN. DEPTH.

**CONSTRUCTION DETAILS**

NOTE: PAVEMENT MARKINGS AND SIGN LOCATIONS MUST BE FIELD REVIEWED AND APPROVED BY TRAFFIC ENGINEERING (410-313-2430) PRIOR TO INSTALLATION. TWO COATS OF PAINT ARE REQUIRED.

- INSTALL 5 IN. SOLID WHITE PAINT PAVEMENT MARKING FOR LANE LINE/ EDGE LINE.
- INSTALL 5 IN. DOTTED (3 FT. SEGMENT, 3 FT. GAP) WHITE PAINT PAVEMENT MARKING FOR LANE LINE.
- INSTALL 5 IN. DOTTED (3 FT. SEGMENT, 9 FT. GAP) WHITE PAINT PAVEMENT MARKING FOR LANE LINE.
- INSTALL 5 IN. DASHED (10 FT. SEGMENT, 30 FT. GAP) WHITE PAINT PAVEMENT MARKING FOR LANE LINE.
- INSTALL 5 IN. SOLID YELLOW PAINT PAVEMENT MARKING FOR CENTER EDGE LINE.
- INSTALL 5 IN. SOLID DOUBLE YELLOW PAINT PAVEMENT MARKING FOR CENTER LINE.
- INSTALL 10 IN. SOLID WHITE PAINT PAVEMENT MARKING FOR EDGE LINE.
- INSTALL WHITE THERMOPLASTIC PAVEMENT MARKING SYMBOL.
- INSTALL GROUND MOUNTED SIGN.
- RELOCATE EXISTING GROUND MOUNTED SIGN. INSTALL ON NEW U-CHANNEL SIGN SUPPORTS.
- EXISTING GROUND MOUNTED SIGN TO BE REMOVED.
- INSTALLED AS PART OF THE SIGNAL PLAN.
- TIE TO EXISTING PAVEMENT MARKING.
- EXISTING GROUND MOUNTED SIGN, INSTALLED AS PART OF MOT PHASE 3.

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, PUBLIC WORKS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF DEVELOPMENT	DATE
CHIEF, ENGINEERING DIVISION	4/21/2023
DATE	

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF DEVELOPMENT	DATE
CHIEF, ENGINEERING DIVISION	4/21/2023
DATE	

**Ming-Yu Chien** 04.12.2023

PROFESSIONAL CERTIFICATION - I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

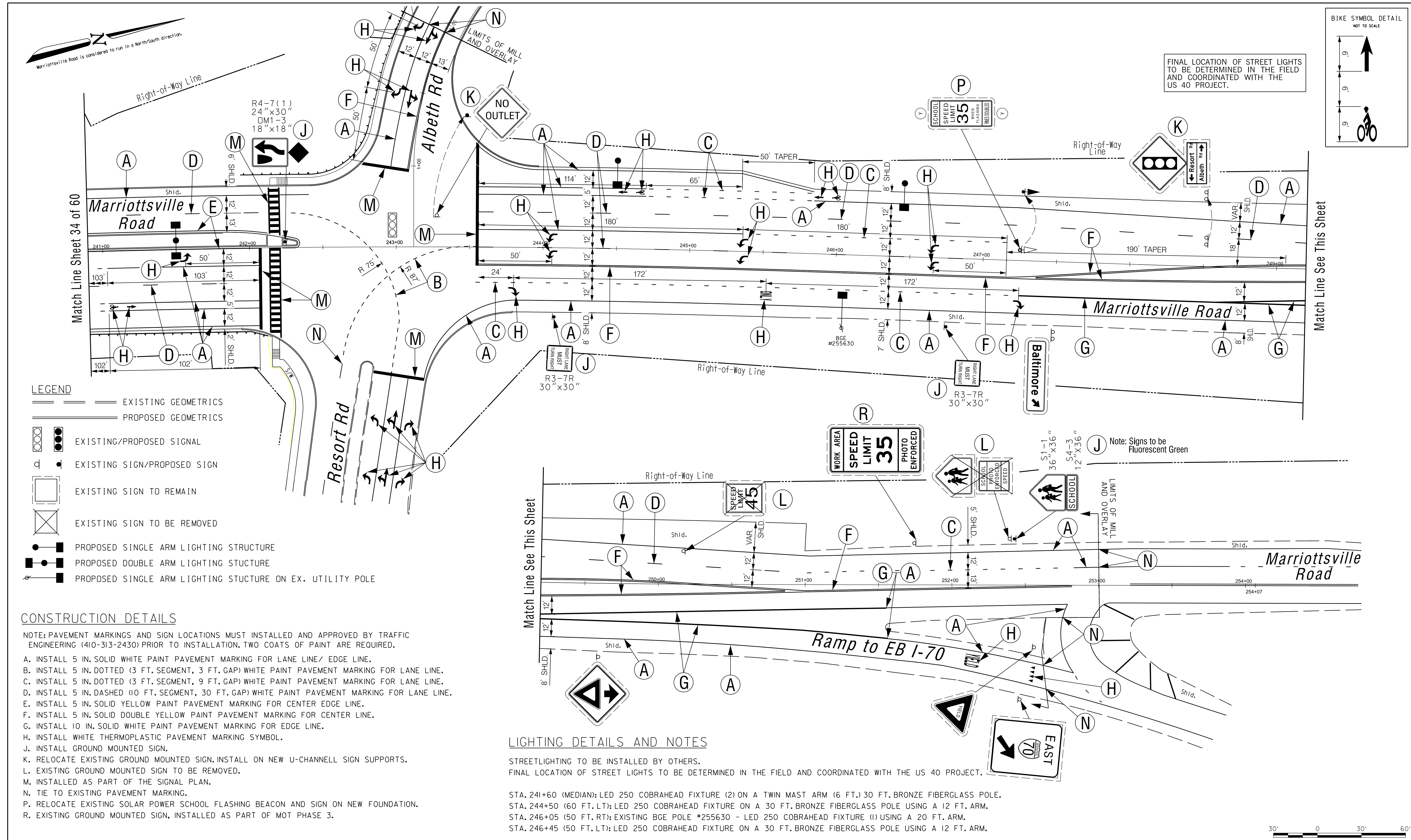
LICENSE NO.: 33316  
 EXPIRATION DATE: 7-13-24

DES: FDB	
DRN: JADJES	
CHK: J.J.D.	
DATE: MARCH 2023	
BY	NO.
REVISION	DATE

MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033

PAVEMENT MARKING, SIGNING AND STREET LIGHTING PLAN	SCALE: 1" = 30'
MARRIOTTVILLE ROAD AT RESORT ROAD/ALBETH ROAD	SHEET 34 OF 60





LEGEND

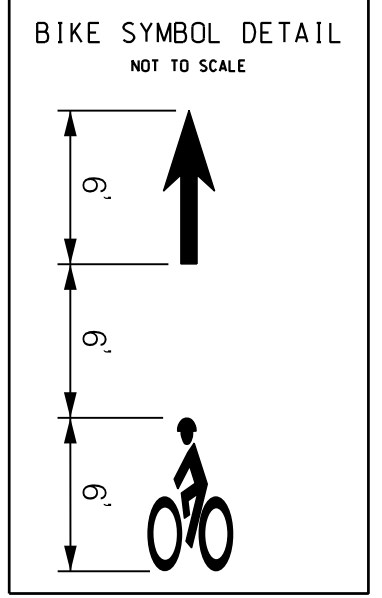
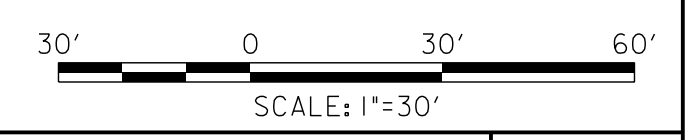
- EXISTING GEOMETRICS
- PROPOSED GEOMETRICS
- EXISTING/PROPOSED SIGNAL
- EXISTING SIGN/PROPOSED SIGN
- EXISTING SIGN TO REMAIN
- EXISTING SIGN TO BE REMOVED
- PROPOSED SINGLE ARM LIGHTING STRUCTURE
- PROPOSED DOUBLE ARM LIGHTING STRUCTURE
- PROPOSED SINGLE ARM LIGHTING STRUCTURE ON EX. UTILITY POLE

CONSTRUCTION DETAILS

- NOTE: PAVEMENT MARKINGS AND SIGN LOCATIONS MUST BE INSTALLED AND APPROVED BY TRAFFIC ENGINEERING (410-313-2430) PRIOR TO INSTALLATION. TWO COATS OF PAINT ARE REQUIRED.
- A. INSTALL 5 IN. SOLID WHITE PAINT PAVEMENT MARKING FOR LANE LINE/ EDGE LINE.
  - B. INSTALL 5 IN. DOTTED (3 FT. SEGMENT, 3 FT. GAP) WHITE PAINT PAVEMENT MARKING FOR LANE LINE.
  - C. INSTALL 5 IN. DOTTED (3 FT. SEGMENT, 9 FT. GAP) WHITE PAINT PAVEMENT MARKING FOR LANE LINE.
  - D. INSTALL 5 IN. DASHED (10 FT. SEGMENT, 30 FT. GAP) WHITE PAINT PAVEMENT MARKING FOR LANE LINE.
  - E. INSTALL 5 IN. SOLID YELLOW PAINT PAVEMENT MARKING FOR CENTER EDGE LINE.
  - F. INSTALL 5 IN. SOLID DOUBLE YELLOW PAINT PAVEMENT MARKING FOR CENTER LINE.
  - G. INSTALL 10 IN. SOLID WHITE PAINT PAVEMENT MARKING FOR EDGE LINE.
  - H. INSTALL WHITE THERMOPLASTIC PAVEMENT MARKING SYMBOL.
  - J. INSTALL GROUND MOUNTED SIGN.
  - K. RELOCATE EXISTING GROUND MOUNTED SIGN, INSTALL ON NEW U-CHANNELL SIGN SUPPORTS.
  - L. EXISTING GROUND MOUNTED SIGN TO BE REMOVED.
  - M. INSTALLED AS PART OF THE SIGNAL PLAN.
  - N. TIE TO EXISTING PAVEMENT MARKING.
  - P. RELOCATE EXISTING SOLAR POWER SCHOOL FLASHING BEACON AND SIGN ON NEW FOUNDATION.
  - R. EXISTING GROUND MOUNTED SIGN, INSTALLED AS PART OF MOT PHASE 3.

LIGHTING DETAILS AND NOTES

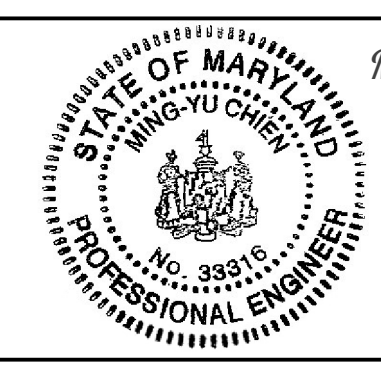
- STREETLIGHTING TO BE INSTALLED BY OTHERS.  
FINAL LOCATION OF STREET LIGHTS TO BE DETERMINED IN THE FIELD AND COORDINATED WITH THE US 40 PROJECT.
- STA. 241+60 (MEDIAN): LED 250 COBRAHEAD FIXTURE (2) ON A TWIN MAST ARM (6 FT.) 30 FT. BRONZE FIBERGLASS POLE.  
STA. 244+50 (60 FT. LT): LED 250 COBRAHEAD FIXTURE ON A 30 FT. BRONZE FIBERGLASS POLE USING A 12 FT. ARM.  
STA. 246+05 (50 FT. RT): EXISTING BGE POLE #255630 - LED 250 COBRAHEAD FIXTURE (1) USING A 20 FT. ARM.  
STA. 246+45 (50 FT. LT): LED 250 COBRAHEAD FIXTURE ON A 30 FT. BRONZE FIBERGLASS POLE USING A 12 FT. ARM.



FINAL LOCATION OF STREET LIGHTS TO BE DETERMINED IN THE FIELD AND COORDINATED WITH THE US 40 PROJECT.

Note: Signs to be Fluorescent Green

APPROVED: DEPARTMENT OF PUBLIC WORKS 5/4/2023	
CHIEF, PUBLIC WORKS	
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/19/2023	
CHIEF, DIVISION OF DEVELOPMENT	
4/21/2023	
CHIEF, DEVELOPMENT ENGINEERING DIVISION	



**Ming-Yu Chien** 04.12.2023  
PROFESSIONAL CERTIFICATION - I HEREBY CERTIFY THAT THESE PLANS 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.: 33316  
EXPIRATION DATE: 7-13-24

The Traffic Group  
Suite H  
9900 Franklin Square Dr.  
Baltimore, Maryland  
410-931-6600  
1-800-583-6411  
Fax: 410-931-6601

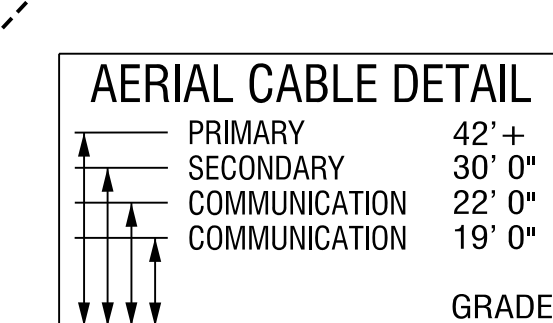
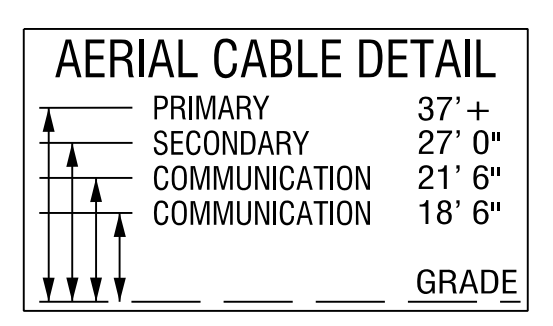
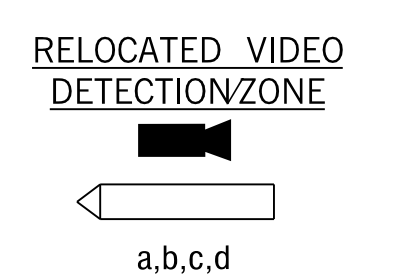
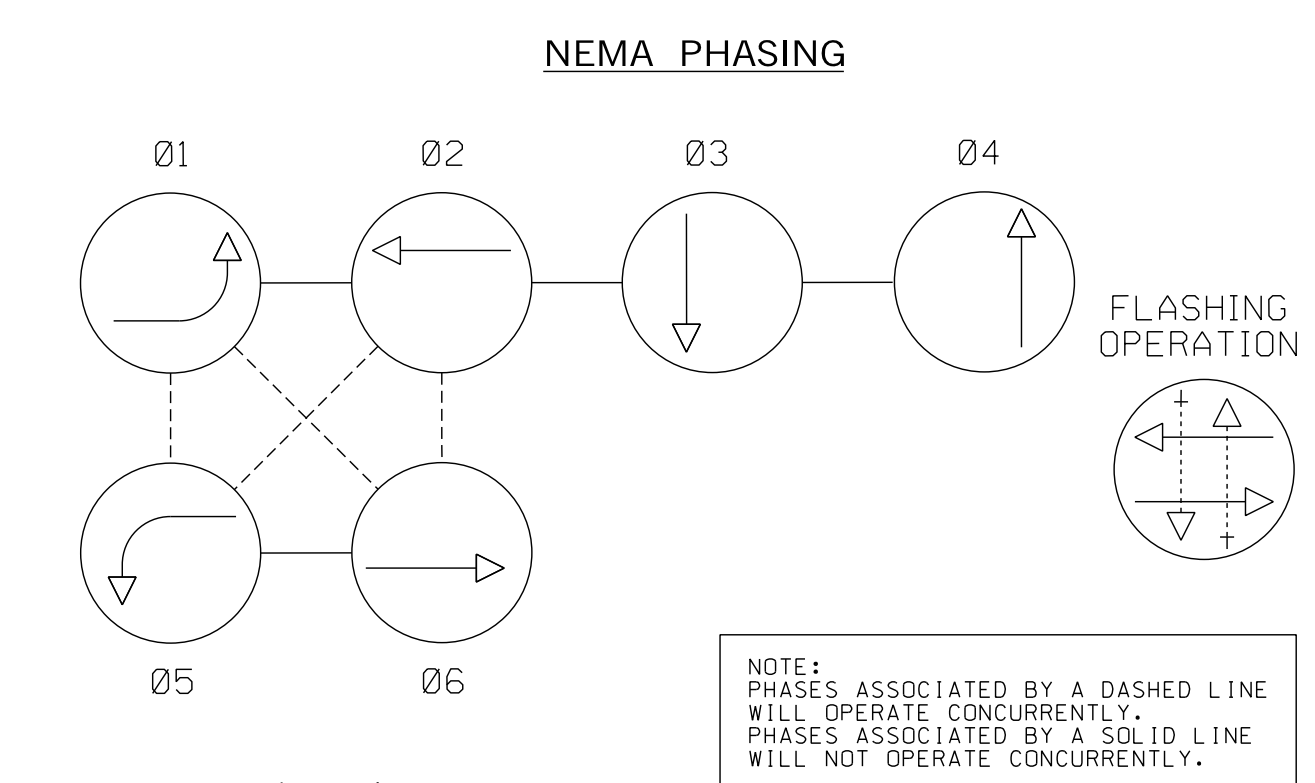
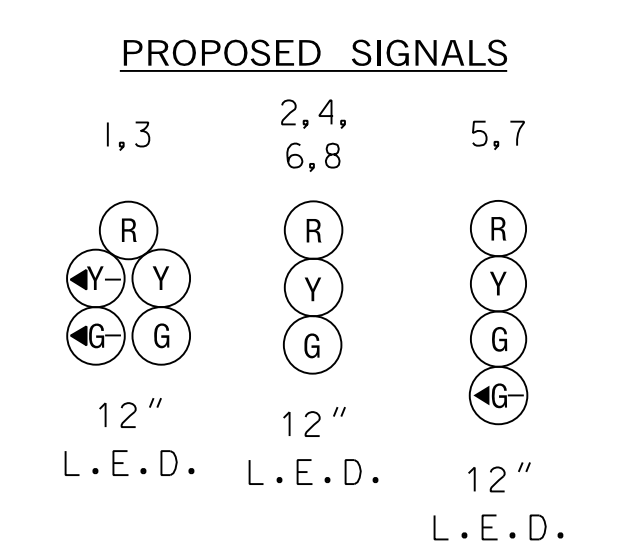
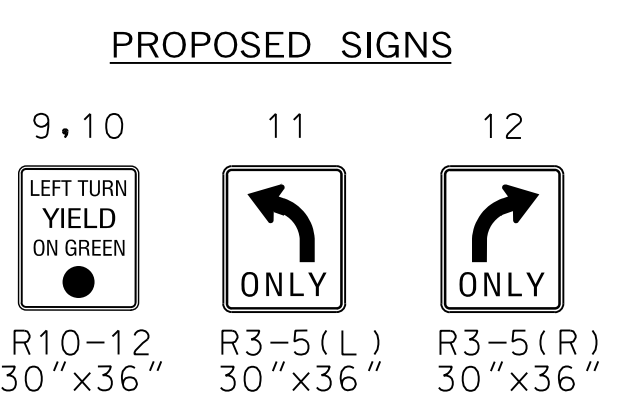
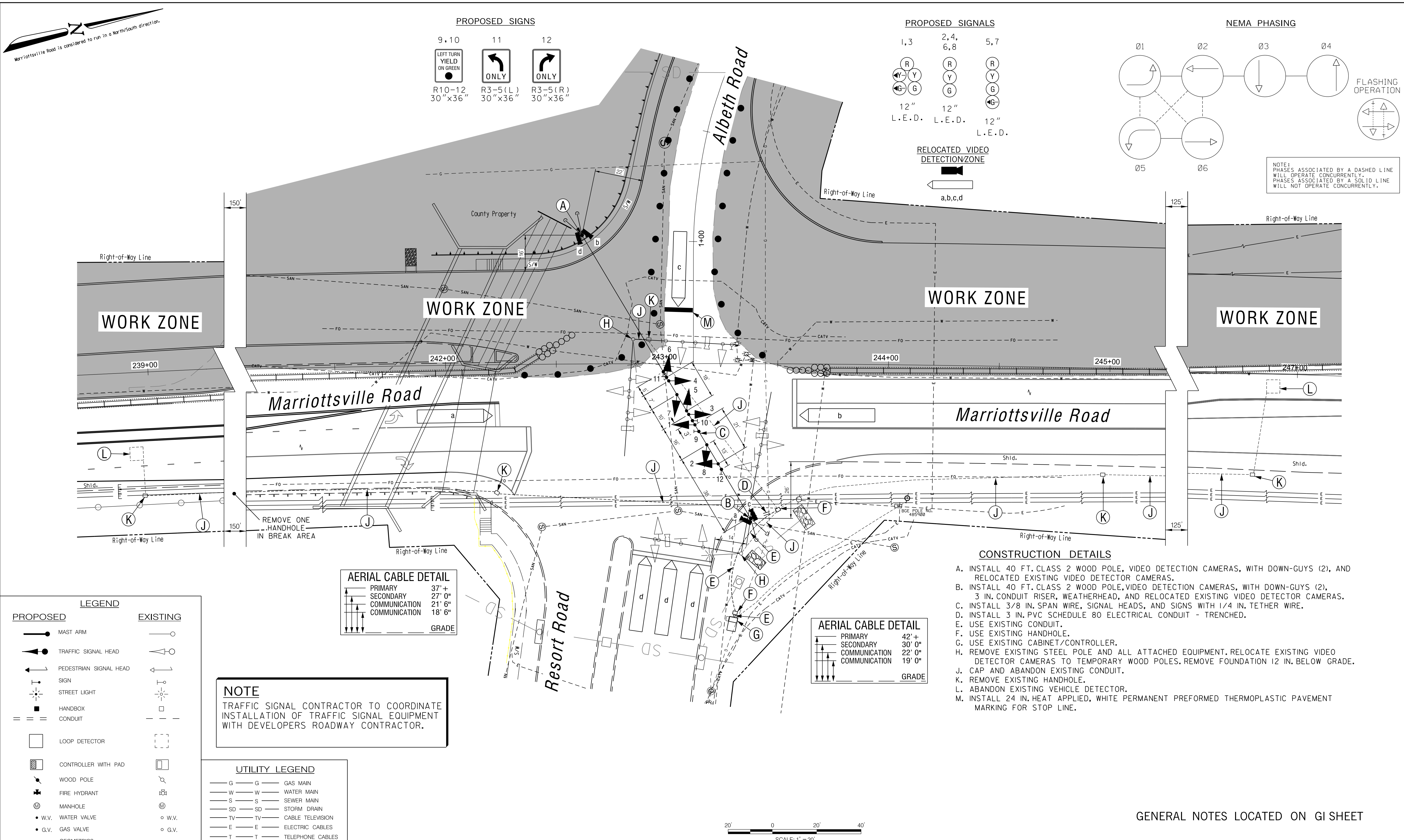
DES: FDB			
DRN: JAD/JES			
CHK: J.J.D.			
DATE: MARCH 2023	BY	NO.	REVISION

MARRIOTTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033

PAVEMENT MARKING, SIGNING AND STREET LIGHTING PLAN  
**MARRIOTTVILLE ROAD AT RESORT ROAD/ALBETH ROAD**

SCALE: 1"=30'  
SHEET 35 OF 60





**NOTE**  
TRAFFIC SIGNAL CONTRACTOR TO COORDINATE  
INSTALLATION OF TRAFFIC SIGNAL EQUIPMENT  
WITH DEVELOPERS ROADWAY CONTRACTOR.

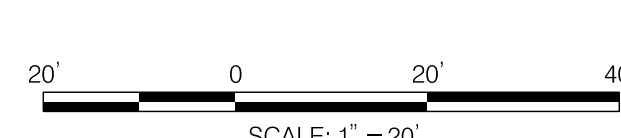
- CONSTRUCTION DETAILS**
- INSTALL 40 FT. CLASS 2 WOOD POLE, VIDEO DETECTION CAMERAS, WITH DOWN-GUYS (2), AND RELOCATED EXISTING VIDEO DETECTOR CAMERAS.
  - INSTALL 40 FT. CLASS 2 WOOD POLE, VIDEO DETECTION CAMERAS, WITH DOWN-GUYS (2), 3 IN. CONDUIT RISER, WEATHERHEAD, AND RELOCATED EXISTING VIDEO DETECTOR CAMERAS.
  - INSTALL 3/8 IN. SPAN WIRE, SIGNAL HEADS, AND SIGNS WITH 1/4 IN. TETHER WIRE.
  - INSTALL 3 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - TRENCHED.
  - USE EXISTING CONDUIT.
  - USE EXISTING HANDHOLE.
  - USE EXISTING CABINET/CONTROLLER.
  - REMOVE EXISTING STEEL POLE AND ALL ATTACHED EQUIPMENT. RELOCATE EXISTING VIDEO DETECTOR CAMERAS TO TEMPORARY WOOD POLES. REMOVE FOUNDATION 12 IN. BELOW GRADE.
  - CAP AND ABANDON EXISTING CONDUIT.
  - REMOVE EXISTING HANDHOLE.
  - ABANDON EXISTING VEHICLE DETECTOR.
  - INSTALL 24 IN. HEAT APPLIED, WHITE PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING FOR STOP LINE.

**LEGEND**

PROPOSED	EXISTING
MAST ARM	
TRAFFIC SIGNAL HEAD	
PEDESTRIAN SIGNAL HEAD	
SIGN	
STREET LIGHT	
HANDBOX	
CONDUIT	
LOOP DETECTOR	
CONTROLLER WITH PAD	
WOOD POLE	
FIRE HYDRANT	
MANHOLE	
W.V. WATER VALVE	W.V.
G.V. GAS VALVE	G.V.
GEOMETRICS	

**UTILITY LEGEND**

G	GAS MAIN
W	WATER MAIN
S	SEWER MAIN
SD	STORM DRAIN
TV	CABLE TELEVISION
E	ELECTRIC CABLES
T	TELEPHONE CABLES
A	AERIAL CABLES



GENERAL NOTES LOCATED ON GI SHEET

<p>APPROVED: DEPARTMENT OF PUBLIC WORKS                  5/4/2023</p> <p>CHEF BUREAU OF PUBLIC WORKS</p>	<p>APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING                  4/19/2023</p> <p>CHEF DIVISION OF PLANNING AND ZONING</p>	<p>APPROVED: MING-YU CHIEN                  04.12.2023</p> <p>PROFESSIONAL CERTIFICATION -                  I HEREBY CERTIFY THAT THESE PLANS 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.: 33316                  EXPIRATION DATE: 7-13-24</p>	<p>The Traffic Group                  Suite H                  9900 Franklin Square Dr.                  Baltimore, Maryland                  410-931-6900                  1-800-563-8411                  Fax: 410-931-6901</p>	<p>DES: [ ]                  DRN: JJD                  CHK: JJD                  DATE: MARCH 2023</p>	<p>MARIOTTVILLE ROAD WIDENING                  APFO MITIGATION PLAN                  F-21-033</p>	<p>MAINTENANCE OF TRAFFIC - PHASE 3                  TEMPORARY TRAFFIC SIGNAL PLAN                  MARIOTTVILLE ROAD                  AT                  RESORT ROAD/ALBETH ROAD</p>	<p>SCALE:                  1" = 20'                  SHEET                  36 OF 60</p>
--	---	--	---	---	---	--	--



**PROJECT DESCRIPTION**  
**GENERAL**

THIS PORTION OF THE PROJECT INVOLVES THE REPLACEMENT OF THE EXISTING TRAFFIC SIGNAL AT THE INTERSECTION OF MARIOTTSVILLE ROAD AT RESORT ROAD/ALBETH ROAD WITH A TEMPORARY TRAFFIC CONTROL SIGNAL UTILIZING WOODPOLES FOR PHASE 3 OF THE MARIOTTSVILLE ROAD WIDENING PROJECT.

MARIOTTSVILLE ROAD IS CONSIDERED TO RUN IN A NORTH/SOUTH DIRECTION.

**INTERSECTION OPERATION**

THE EXISTING CONTROLLER HOUSED IN A BASE MOUNTED CABINET SHALL BE UTILIZED. THE EXISTING INTERSECTION PHASING WILL REMAIN UNCHANGED.

**EQUIPMENT LIST**

A. EQUIPMENT TO BE FURNISHED BY THE COUNTY AND INSTALLED BY THE TRAFFIC SIGNAL CONTRACTOR.

QUANTITY	UNITS	DESCRIPTION
4	EA	12 IN. ONE-WAY, THREE SECTION L.E.D. (R,Y,G) ADJUSTABLE YELLOW FACED TRAFFIC SIGNAL HEAD WITH SPAN WIRE MOUNTING HARDWARE AND TUNNEL VISORS.
2	EA	12 IN. ONE-WAY, FOUR SECTION L.E.D. (R,Y,G,G) ADJUSTABLE YELLOW FACED TRAFFIC SIGNAL HEAD WITH SPAN WIRE MOUNTING HARDWARE AND TUNNEL VISORS.
2	EA	12 IN. ONE-WAY, FIVE SECTION L.E.D. (R,Y,YA,G,G) ADJUSTABLE YELLOW FACED TRAFFIC SIGNAL HEAD WITH SPAN WIRE MOUNTING HARDWARE AND TUNNEL VISORS.
1	EA	30 IN. x 36 IN. R3-5(L) SIGN WITH SPAN WIRE MOUNTING HARDWARE.
1	EA	30 IN. x 36 IN. R3-5(R) SIGN WITH SPAN WIRE MOUNTING HARDWARE.
2	EA	30 IN. x 36 IN. R10-12 SIGN WITH SPAN WIRE MOUNTING HARDWARE.
800	LF	VIDEO DETECTION CABLE

**EQUIPMENT LIST CONT.**

B. EQUIPMENT TO BE FURNISHED AND/OR INSTALLED BY THE TRAFFIC SIGNAL CONTRACTOR.

QUANTITY	UNITS	DESCRIPTION
LUMP SUM	LS	MOT - HWY
0.5	CY	TEST PIT EXCAVATION
2	EA	40 FOOT CLASS II WOOD POLE WITH 2 DOWN GUYS AND ANCHORS
120	LF	5-COND. No.14 AWG IMSA 19-1
700	LF	7-COND. No.14 AWG IMSA 19-1
45	LF	NO.6 AWG STRANDED BARE COPPER GROUND WIRE
200	LF	STEEL SPAN WIRE 3/8 IN. DIAMETER
200	LF	STEEL SPAN WIRE 1/4 IN. DIAMETER
1	EA	3 IN. WEATHERHEAD
30	LF	3 IN. SCHEDULE 80 RIGID PVC RISER
15	LF	3 IN. SCHEDULE 80 RIGID PVC CONDUIT - TRENCHED
12	LF	24 IN. HEAT APPLIED, WHITE PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING FOR STOP LINE
8	EA	INSTALL SIGNAL HEAD - SPAN WIRE
4	EA	INSTALL SIGN - SPAN WIRE
800	LF	INSTALL VIDEO DETECTION CABLE
4	EA	RELOCATE VIDEO DETECTION CAMERA
2	EA	REMOVE EXISTING FOUNDATION 12 INCHES BELOW GRADE
LUMP SUM	LS	REMOVE AND DISPOSE OF EXISTING SIGNAL EQUIPMENT

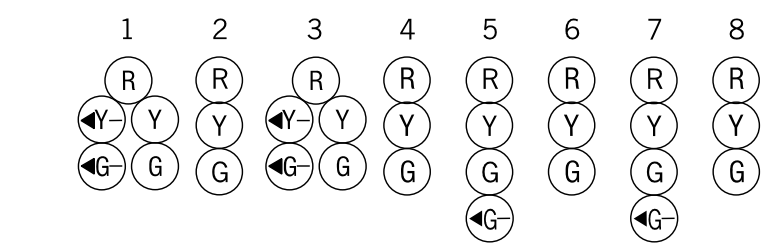
C. EQUIPMENT TO BE RETURNED TO HOWARD COUNTY SIGNAL SHOP.

QUANTITY	UNITS	DESCRIPTION
2	EA	27 FT. STEEL TWIN MAST ARM POLE AND MAST ARMS.
2	EA	20 FT. LUMINAIRE ARM AND LUMINAIRE.

**GENERAL NOTES**

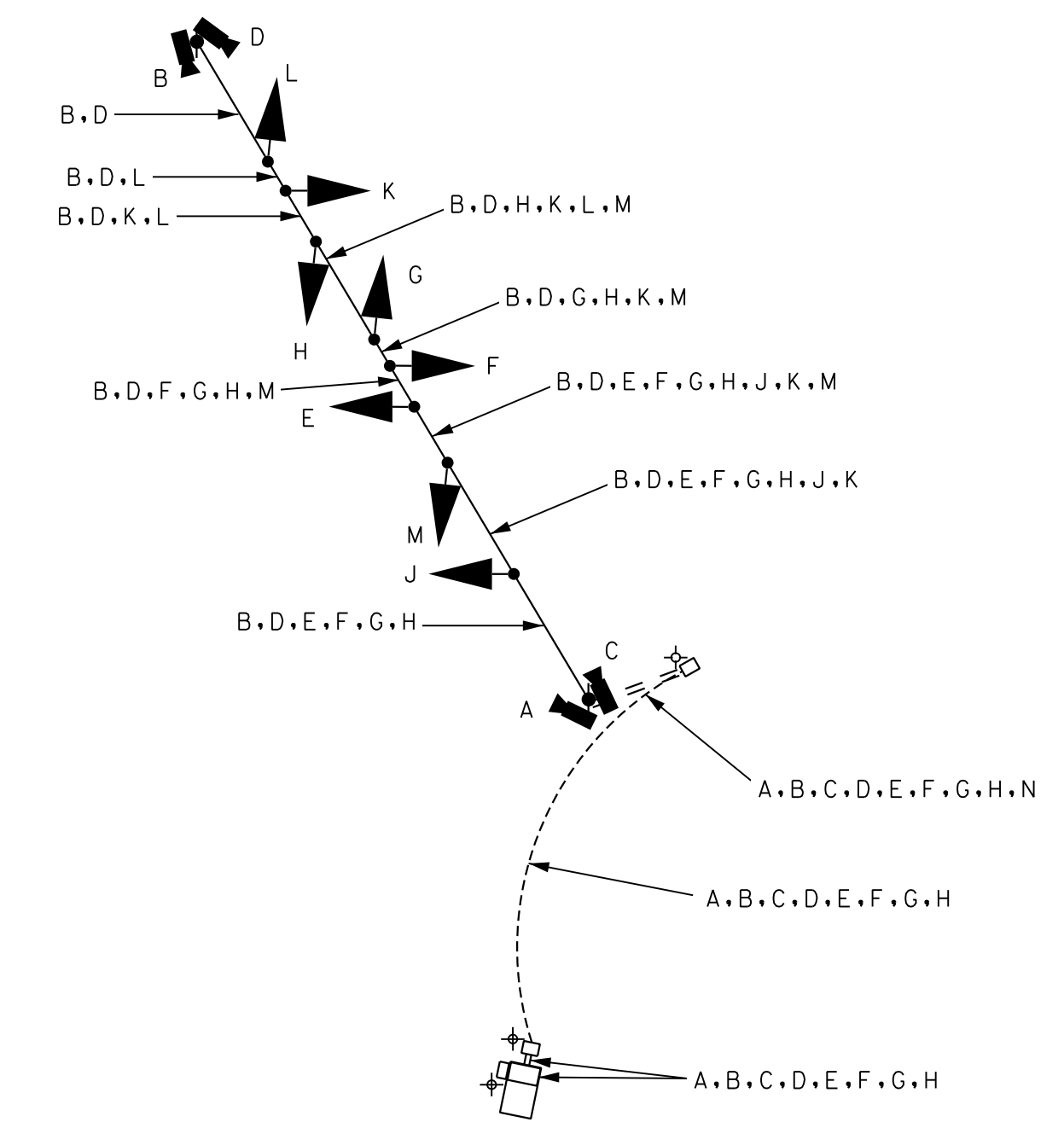
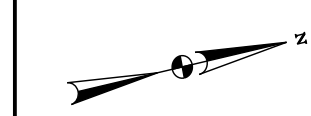
1. MAINTENANCE OF TRAFFIC WILL BE HANDLED BY THE CONTRACTOR UTILIZING MD SHA STANDARD TYPICALS FOR TRAFFIC CONTROL.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING ALL SIGNAL CABLE TO THE APPROPRIATE TERMINALS AND PROPERLY LABELING EACH CABLE. TAGS SHALL BE INSTALLED ON EACH CABLE IN THE CONTROLLER CABINET AS WELL AS THE HANDHOLE.
3. ALL UNUSED CABLE SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
4. VIDEO CAMERA LOCATION/ALIGNING SHALL BE COORDINATED WITH THE COUNTY ENGINEER.
5. THE CONTRACTOR SHALL VERIFY ALL PROPOSED POLE LOCATIONS WITH THE COUNTY ENGINEER PRIOR TO INSTALLATION. CONTACT SUBIN GEORGE AT (410) 313-5753.
6. ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH COUNTY STANDARDS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING ALL SIGNAL CABLE TO THE APPROPRIATE TERMINALS AND PROPERLY LABEL EACH CABLE.
8. THE CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED SIGNAL EQUIPMENT. IF ANY UTILITY CONFLICTS SHOULD ARISE THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER.
9. THE CONTRACTOR SHALL COORDINATE WITH THE COUNTY ENGINEER 48 HOURS PRIOR TO INSTALLING FOUNDATIONS.
10. CONTRACTOR SHALL CONTACT HOWARD COUNTY'S UNDERGROUND UTILITY PERMIT DIVISION AT 410-313-4207 AT LEAST FIVE BUSINESS DAY PRIOR TO STARTING ANY WORK WITHIN THE PUBLIC RIGHT- OF WAY.

**Phase Chart**



PHASE 1 AND 5	←GR	R	←GR	R	R	R	R	R	R
PHASE 1 AND 5 CHANGE TO 1 AND 6, 2 AND 5, OR 2 AND 6									
PHASE 1 AND 6	←GR	G	R	R	R	R	R	R	R
1 CHANGE	←YG	G	R	R	R	R	R	R	R
PHASE 2 AND 5	R	R	←GG	G	R	R	R	R	R
5 CHANGE	R	R	←YG	G	R	R	R	R	R
PHASE 2 AND 6	G	G	G	G	R	R	R	R	R
2 AND 6 CHANGE	Y	Y	Y	Y	R	R	R	R	R
PHASE 3	R	R	R	R	←GG	G	R	R	R
3 CHANGE	R	R	R	R	Y	Y	R	R	R
PHASE 4	R	R	R	R	R	R	←GG	G	
4 CHANGE	R	R	R	R	R	R	Y	Y	
FLASHING OPERATION	FL/Y	FL/Y	FL/Y	FL/Y	FL/R	FL/R	FL/R	FL/R	

**Wiring Diagram**



- KEY**
- A, B, C, D } VIDEO DETECTOR CABLE
  - E, F, G, H } 5-CONDUCTOR ELECTRICAL CABLE (NO. 14 A.W.G.)
  - J, K, L, M } 7-CONDUCTOR ELECTRICAL CABLE (NO. 14 A.W.G.)
  - N } THWN GREEN COPPER GROUND WIRE (NO. 6 A.W.G.)
  - ⊕ - EXISTING GROUND ROD

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 Date: 5/4/2023  
 CHIEF BUREAU ENGINEER: [Signature]  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Date: 4/19/2023  
 CHIEF DIVISION ENGINEER: [Signature]  
 Date: 4/21/2023  
 CHIEF DEVELOPMENT ENGINEERING DIVISION: [Signature]

**Ming-Yu Chien** 04.12.2023  
 PROFESSIONAL CERTIFICATION - I HEREBY CERTIFY THAT THESE PLANS 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.: 33316  
 EXPIRATION DATE: 7-13-24

The Traffic Group, Inc.  
 Suite H  
 9900 Franklin Square Dr  
 Baltimore, Maryland  
 410-931-6600  
 1-800-563-6411  
 Fax: 410-931-6601

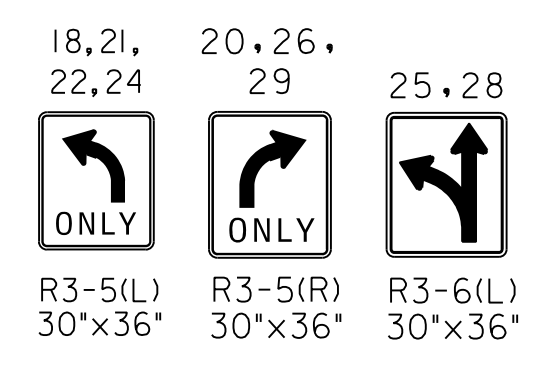
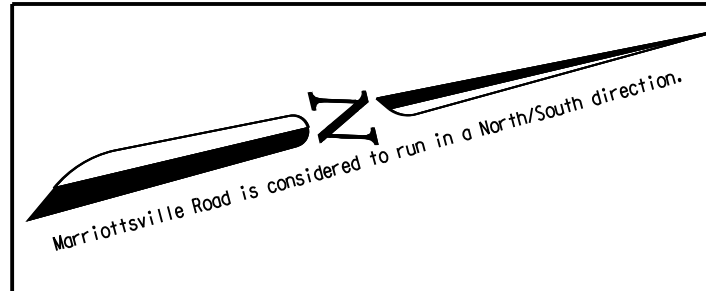
DES:	
DRN: JJD	
CHK: JJD	
DATE: MARCH 2023	
BY	NO.
REVISION	DATE

MARIOTTSVILLE ROAD WIDENING  
 APFO MITIGATION PLAN  
**F-21-033**

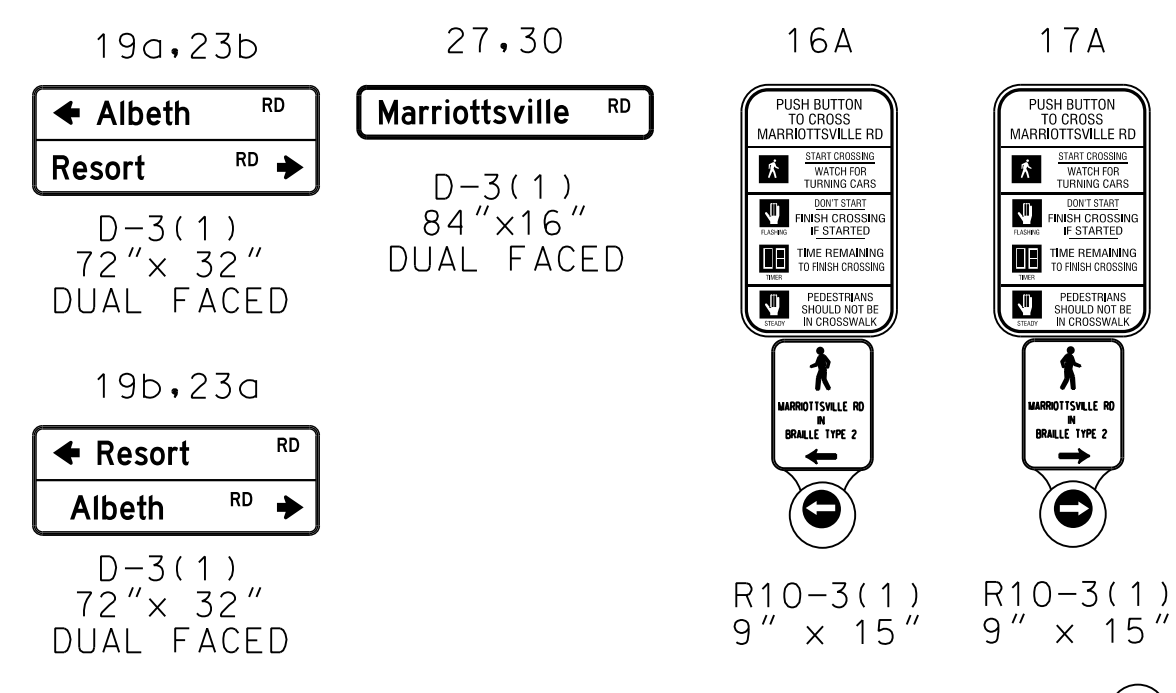
MAINTENANCE OF TRAFFIC - PHASE 3  
 TEMPORARY TRAFFIC SIGNAL PLAN  
 GENERAL INFORMATION SHEET  
**MARIOTTSVILLE ROAD**  
 AT  
**RESORT ROAD/ALBETH ROAD**

SCALE:	NA
SHEET	37 OF 60

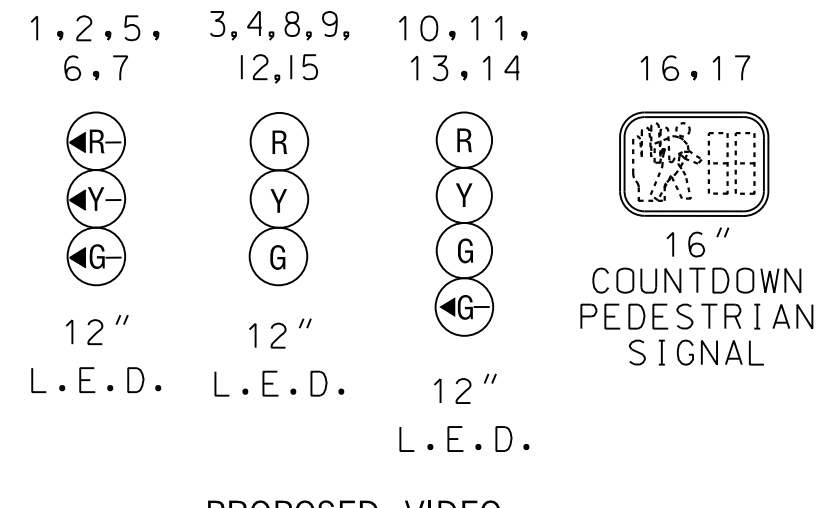




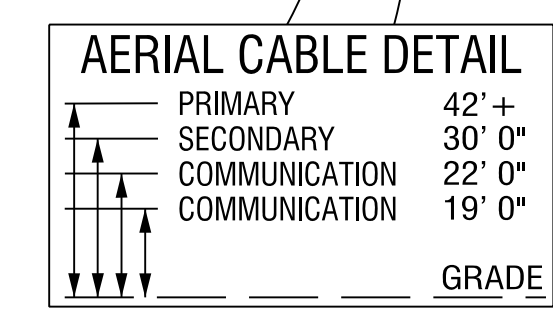
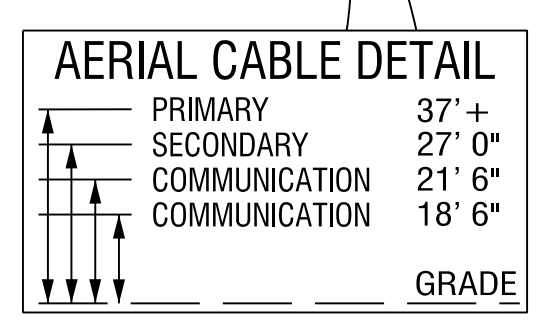
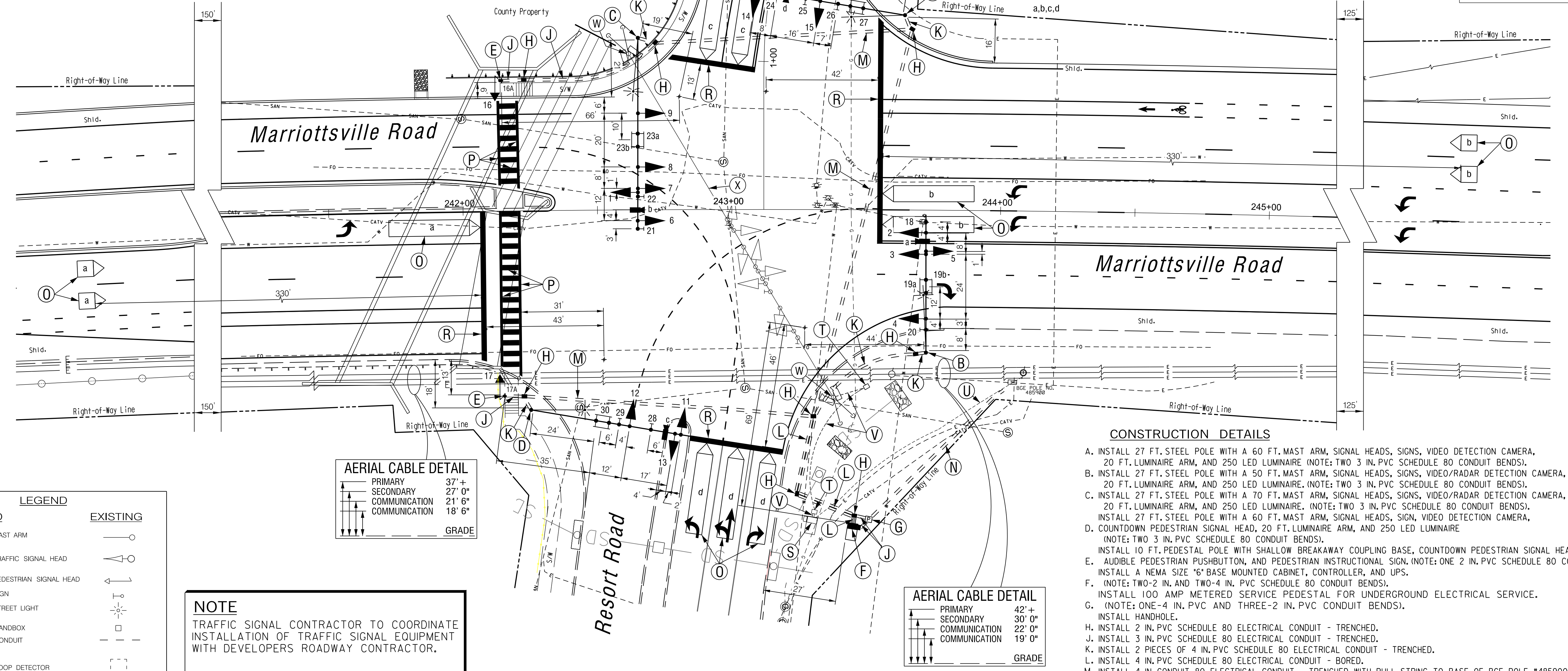
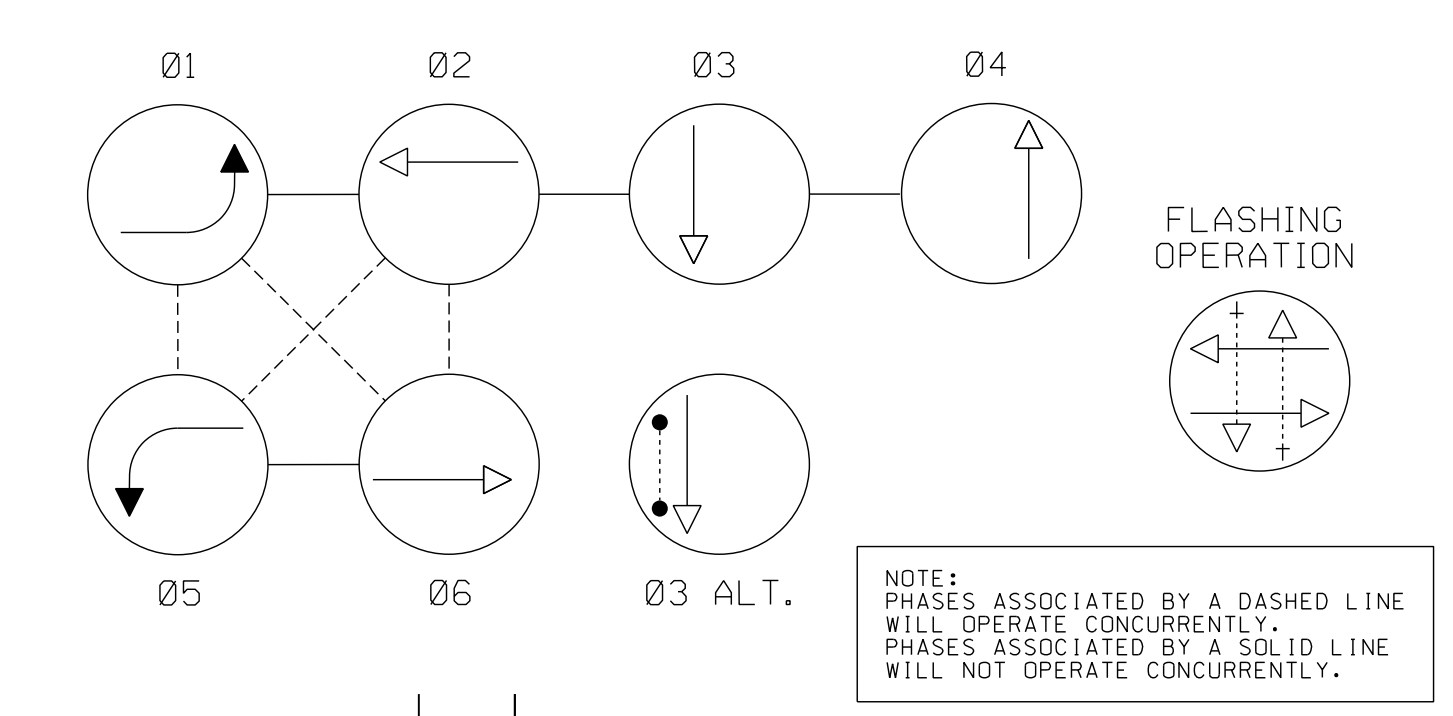
PROPOSED SIGNS



PROPOSED SIGNALS



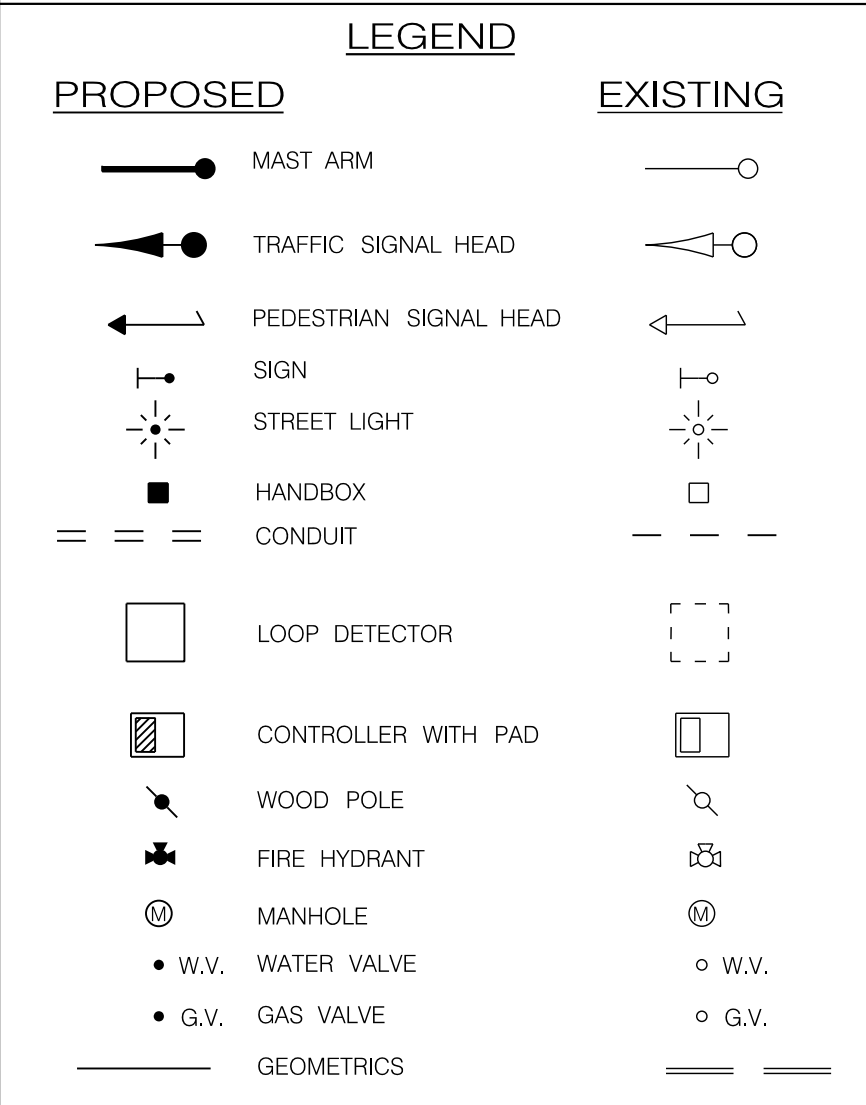
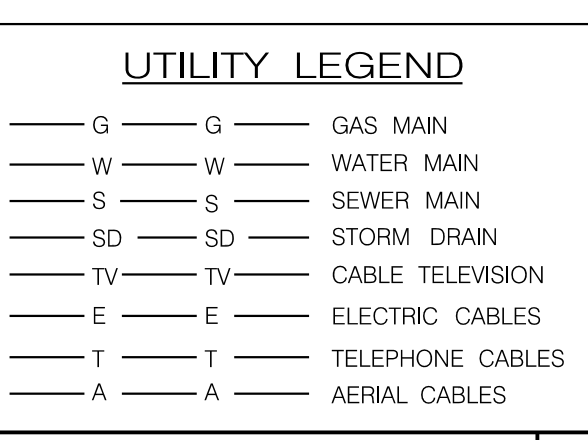
NEMA PHASING



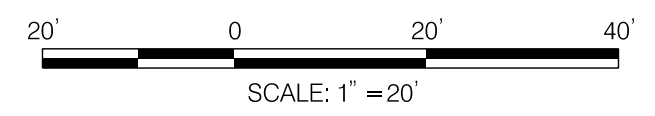
CONSTRUCTION DETAILS

- A. INSTALL 27 FT. STEEL POLE WITH A 60 FT. MAST ARM, SIGNAL HEADS, SIGNS, VIDEO DETECTION CAMERA, 20 FT. LUMINAIRE ARM, AND 250 LED LUMINAIRE (NOTE: TWO 3 IN. PVC SCHEDULE 80 CONDUIT BENDS).
B. INSTALL 27 FT. STEEL POLE WITH A 50 FT. MAST ARM, SIGNAL HEADS, SIGNS, VIDEO/RADAR DETECTION CAMERA, 20 FT. LUMINAIRE ARM, AND 250 LED LUMINAIRE (NOTE: TWO 3 IN. PVC SCHEDULE 80 CONDUIT BENDS).
C. INSTALL 27 FT. STEEL POLE WITH A 70 FT. MAST ARM, SIGNAL HEADS, SIGNS, VIDEO/RADAR DETECTION CAMERA, 20 FT. LUMINAIRE ARM, AND 250 LED LUMINAIRE (NOTE: TWO 3 IN. PVC SCHEDULE 80 CONDUIT BENDS).
D. COUNTDOWN PEDESTRIAN SIGNAL HEAD, 20 FT. LUMINAIRE ARM, AND 250 LED LUMINAIRE (NOTE: TWO 3 IN. PVC SCHEDULE 80 CONDUIT BENDS).
E. AUDIBLE PEDESTRIAN PUSHBUTTON, AND PEDESTRIAN INSTRUCTIONAL SIGN (NOTE: ONE 2 IN. PVC SCHEDULE 80 CONDUIT BEND).
F. (NOTE: TWO-2 IN. AND TWO-4 IN. PVC SCHEDULE 80 CONDUIT BENDS).
G. (NOTE: ONE-4 IN. PVC AND THREE-2 IN. PVC CONDUIT BENDS).
H. INSTALL 2 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - TRENCHED.
I. INSTALL 3 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - TRENCHED.
J. INSTALL 2 PIECES OF 4 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - TRENCHED.
K. INSTALL 4 IN. PVC SCHEDULE 80 ELECTRICAL CONDUIT - BORED.
L. INSTALL 4 IN. CONDUIT 80 ELECTRICAL CONDUIT - TRENCHED WITH PULL-STRING TO BASE OF BGE POLE #485900
M. FOR AN UNDERGROUND ELECTRICAL SERVICE BY BGE.
N. PROPOSED VIDEO DETECTION ZONE.
O. INSTALL 12 INCH/24 INCH WHITE THERMOPLASTIC PAVEMENT MARKING FOR CROSSWALK LINE.
P. INSTALL 24 INCH WHITE THERMOPLASTIC PAVEMENT MARKING FOR STOP LINE.
R. REMOVE EXISTING CABINET/CONTROLLER.
S. REMOVE EXISTING HANDHOLE.
T. EXISTING ELECTRICAL SERVICE TO BE ABANDONED.
U. CAP AND ABANDON EXISTING CONDUIT.
V. REMOVE EXISTING TEMPORARY WOOD POLE INSTALLED DURING MOT PHASE 3.
W. REMOVE EXISTING STEEL SPAN WIRE AND ALL ATTACHED EQUIPMENT INSTALLED DURING MOT PHASE 3.

NOTE
TRAFFIC SIGNAL CONTRACTOR TO COORDINATE INSTALLATION OF TRAFFIC SIGNAL EQUIPMENT WITH DEVELOPERS ROADWAY CONTRACTOR.



GENERAL NOTES LOCATED ON SHEET 2 OF 2



APPROVED: DEPARTMENT OF PUBLIC WORKS
5/4/2023
CHIEF, BUREAU OF PUBLIC WORKS
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
4/19/2023
CHIEF, DIVISION OF PLANNING AND DEVELOPMENT
4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION

Ming-Yu Chien 04.12.2023
PROFESSIONAL CERTIFICATION - I HEREBY CERTIFY THAT THESE PLANS 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.: 33316
EXPIRATION DATE: 7-13-24

The Traffic Group
Suite H
9900 Franklin Square Dr.
Baltimore, Maryland
410-931-6600
1-800-583-8411
Fax: 410-931-6601

Table with columns: DES, DRN, CHK, DATE, BY, NO., REVISION, DATE. Contains project details and revision history.

MARRIOTTVILLE ROAD WIDENING
APFO MITIGATION PLAN
F-21-033

TRAFFIC SIGNAL PLAN
MARRIOTTVILLE ROAD
AT
RESORT ROAD/ALBETH ROAD

SCALE:
1" = 20'
SHEET
38 OF 60



**PROJECT DESCRIPTION**  
GENERAL

THIS PORTION OF THE PROJECT INVOLVES THE RECONSTRUCTION OF THE TRAFFIC SIGNAL AT THE INTERSECTION OF MARRIOTTSVILLE ROAD AT RESORT ROAD/ALBETH ROAD IN HOWARD COUNTY, MARYLAND. MARRIOTTSVILLE ROAD IS CONSIDERED TO RUN IN A NORTH/SOUTH DIRECTION.

**INTERSECTION OPERATION**

A NEW CONTROLLER HOUSED IN A BASE MOUNTED NEMA '6' CABINET WITH UPS SHALL BE INSTALLED AT THIS LOCATION.

THE INTERSECTION WILL OPERATE IN A NEMA SIX PHASE FULLY ACTUATED MODE. THERE WILL BE EXCLUSIVE LEFT TURN PHASES FOR BOTH THE NORTHBOUND AND SOUTHBOUND MOVEMENTS OF MARRIOTTSVILLE ROAD. THE RESORT ROAD/ALBETH ROAD MOVEMENTS WILL OPERATE IN A SPLIT PHASE OPERATION WITH AN ACTUATED PEDESTRIAN MOVEMENT ACROSS THE SOUTH LEG OF THE INTERSECTION.

**APS WILL FUNCTION AS FOLLOWS:**

- FOR MARRIOTTSVILLE ROAD AT RESORT ROAD/ALBETH ROAD
- A. WHEN PEDESTRIAN LOCATES AND PRESSES PUSHBUTTON FOR AN EXTENDED TIME, THE PUSHBUTTON MESSAGE WILL BE "WAIT TO CROSS MARRIOTTSVILLE AT RESORT AND ALBETH. WAIT."
- B. WHEN WALK PHASE BEGINS, THE AUDIBLE SOUND WILL BE A RAPID TICK, WHICH WILL LAST FOR THE DURATION OF THE WALK PHASE.

**EQUIPMENT LIST**

A. EQUIPMENT TO BE FURNISHED BY THE COUNTY AND INSTALLED BY THE TRAFFIC SIGNAL CONTRACTOR.

QUANTITY	UNITS	DESCRIPTION
6	EA	12 IN. ONE-WAY, THREE SECTION L.E.D. (R,Y,G) ADJUSTABLE YELLOW FACED TRAFFIC SIGNAL HEAD WITH MAST ARM MOUNTING HARDWARE AND TUNNEL VISORS.
5	EA	12 IN. ONE-WAY, THREE SECTION L.E.D. (R,A,Y,G) ADJUSTABLE YELLOW FACED TRAFFIC SIGNAL HEAD WITH MAST ARM MOUNTING HARDWARE AND TUNNEL VISORS.
4	EA	12 IN. ONE-WAY, FOUR SECTION L.E.D. (R,Y,G,G) ADJUSTABLE YELLOW FACED TRAFFIC SIGNAL HEAD WITH MAST ARM MOUNTING HARDWARE AND TUNNEL VISORS.
2	EA	16 IN. ONE-WAY, ONE SECTION L.E.D. (COUNTDOWN INDICATIONS) ADJUSTABLE PEDESTRIAN SIGNAL HEAD WITH POST TOP MOUNTING HARDWARE AND CUT-AWAY VISORS.
1300	LF	VIDEO DETECTION CABLE.
2	EA	AUDIBLE PEDESTRIAN PUSHBUTTON ASSEMBLY WITH PUSHBUTTON SIGN.
1	EA	APS 2-WIRE CENTRAL CONTROL UNIT.
4	EA	250 L.E.D. LAMP AND LUMINAIRE.
2	EA	72 IN. x 32 IN. D-3(I) DUAL FACED SIGN WITH MAST ARM MOUNTING HARDWARE.
2	EA	84 IN. x 16 IN. D-3(I) DUAL FACED SIGN WITH MAST ARM MOUNTING HARDWARE.
4	EA	30 IN. x 36 IN. R3-5(L) SIGN WITH MAST ARM MOUNTING HARDWARE.
3	EA	30 IN. x 36 IN. R3-5(R) SIGN WITH MAST ARM MOUNTING HARDWARE.
2	EA	30 IN. x 36 IN. R3-6(L) SIGN WITH MAST ARM MOUNTING HARDWARE.
2	EA	HD IP-BASED VIDEO DETECTION CAMERA.
2	EA	HD IP-BASED VIDEO/RADAR DETECTION CAMERA.
1	EA	CELLULAR MODEM.
1	EA	EAGLE 8-PHASE, FULL-TRAFFIC-ACTUATED CONTROLLER HOUSED IN A NEMA '6" BASE MOUNTED CABINET PER HOWARD COUNTY SPECIFICATIONS WITH UPS CABINET MOUNTED ON THE RIGHT SIDE OF THE CABINET).

**EQUIPMENT LIST CONT.**

B. EQUIPMENT TO BE FURNISHED AND/OR INSTALLED BY THE TRAFFIC SIGNAL CONTRACTOR.

QUANTITY	UNITS	DESCRIPTION
LUMP SUM	LS	MOT - HWY.
LUMP SUM	LS	REMOVE/SALVAGE EXISTING SIGNAL EQUIPMENT
5	CY	TEST PIT EXCAVATION.
20.9	CY	CONCRETE FOUNDATION.
90	LF	2 IN. CONDUIT PVC SCHED 80 - TRENCHED.
90	LF	3 IN. CONDUIT PVC SCHED 80 - TRENCHED.
200	LF	4 IN. CONDUIT PVC SCHED 80 - TRENCHED.
375	LF	4 IN. CONDUIT PVC SCHED 80 - BORED/PUSHED.
10	EA	GROUND ROD WITH CLAMP.
650	LF	2- COND. NO.14 AWG IMSA 19-1.
2350	LF	5- COND. NO.14 AWG IMSA 19-1.
3100	LF	7- COND. NO.14 AWG IMSA 19-1.
650	LF	1- COND. NO. 8 AWG (THHN/THWN)
60	LF	1- COND. NO. 6 AWG - SOLID BARE COPPER.
1600	LF	3- COND. NO.12 AWG COPPER TYPE TC.
7	EA	TRAFFIC SIGNAL HANDBOX.
1	EA	* 27 FT. STEEL MAST ARM POLE WITH 50 FT. MAST ARM.
2	EA	* 27 FT. STEEL MAST ARM POLE WITH 60 FT. MAST ARM.
1	EA	* 27 FT. STEEL MAST ARM POLE WITH 70 FT. MAST ARM.
2	EA	10 FT. STEEL PEDESTAL POLE WITH BREAKAWAY COUPLING BASE.
4	EA	20 FT. LUMINAIRE ARM.
400	LF	24 IN. WHITE THERMOPLASTIC PAVEMENT MARKING - CROSSWALK/STOP LINE.
240	LF	12 IN. WHITE THERMOPLASTIC PAVEMENT MARKING - CROSSWALK.
1	EA	100 AMP METERED SERVICE PEDESTAL
1	EA	INSTALL BASE MOUNTED CABINET/UPS.
17	EA	INSTALL SIGN - MAST ARM.
15	EA	INSTALL SIGNAL HEAD - MAST ARM.
2	EA	INSTALL PEDESTRIAN SIGNAL HEAD.
2	EA	INSTALL PEDESTRIAN PUSHBUTTON & SIGN.
4	EA	INSTALL VIDEO CAMERA/RADAR DETECTOR AND CABLE WITH COUNTY SUPPLIED CLAMP.
LUMP SUM	LS	REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT.

\* NOTE: SIGNAL POLES ARE TO BE ACCORDING TO PRE 2019-MD-SHA SPECIFICATIONS

C. EQUIPMENT TO BE RETURNED TO HOWARD COUNTY SIGNAL SHOP.

QUANTITY	UNITS	DESCRIPTION
4	EA	VIDEO CAMERA DETECTOR.

**GENERAL NOTES**

1. VIDEO CAMERA LOCATION/ALIGNING SHALL BE COORDINATED WITH THE COUNTY ENGINEER.
2. THE CONTRACTOR SHALL VERIFY ALL PROPOSED POLE AND CABINET LOCATIONS WITH THE COUNTY ENGINEER PRIOR TO INSTALLATION. CONTACT SUBIN GEORGE AT (410) 313-5753.
3. ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH COUNTY STANDARDS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TERMINATING ALL SIGNAL CABLE TO THE APPROPRIATE TERMINALS AND PROPERLY LABEL EACH CABLE.
5. THE CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED SIGNAL EQUIPMENT. IF ANY UTILITY CONFLICTS SHOULD ARISE THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER.
6. ALL TRAFFIC SIGNAL FOUNDATIONS SHALL BE INSTALLED AT THE FINAL SIDEWALK OR CURB GRADE FOR CLOSED SECTIONS. HIGHEST ROADWAY PROFILE GRADE FOR OPEN SECTIONS. TO MEET CLEARANCES AS SPECIFIED IN MD 816.03, MD 818.04. THE CONTRACTOR SHALL VERIFY ULTIMATE GRADES PRIOR TO THE INSTALLATION OF ALL SIGNAL EQUIPMENT.
7. PUSHBUTTONS ARE TO BE LOCATED SO THAT THEY CAN BE ACTIVATED BY A PERSON IN A WHEELCHAIR REACHING LESS THAN 18 IN. FROM A 60 IN. x 60 IN. LEVEL LANDING AREA WITH A CROSS SLOPE OF LESS THAN OR EQUAL TO 2%.
8. THE 10 FT. SEPARATION BETWEEN PUSHBUTTONS IS TO BE MEASURED FROM FACE OF PUSHBUTTON TO FACE OF PUSHBUTTON, NOT CENTER TO CENTER OF POLE.
9. PUSHBUTTON ARROWS ARE TO BE PARALLEL TO THE CROSSING FOR WHICH THEY ARE INTENDED.
10. THE LOCATION OF ACCESSIBLE PEDESTRIAN SIGNAL PUSHBUTTONS MUST MEET LOCATION REQUIREMENTS OF MUTCD SEC. 4E.08; 4E.10; FIG 4E-3; FIG 4E-4 AND THE NCHRP PUBLICATION, "ACCESSIBLE PEDESTRIAN SIGNALS: GUIDE TO BEST PRACTICE". IF NOT MET, THE CONTRACTOR IS TO STOP WORK ON PUSHBUTTON LOCATIONS UNTIL A DESIGN WAIVER IS OBTAINED, APPROVED BY THE COUNTY.
11. THE CONTRACTOR SHALL COORDINATE WITH THE COUNTY ENGINEER 48 HOURS PRIOR TO INSTALLING FOUNDATIONS.
12. CONTRACTOR SHALL CONTACT HOWARD COUNTY'S UNDERGROUND UTILITY PERMIT DIVISION AT 410-313-4207 AT LEAST FIVE BUSINESS DAY PRIOR TO STARTING ANY WORK WITHIN THE PUBLIC RIGHT- OF WAY.

APPROVED: DEPARTMENT OF PUBLIC WORKS Documented by: <i>[Signature]</i> DATE: 5/4/2023	APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING Documented by: <i>[Signature]</i> DATE: 4/19/2023
CHIEF, DIVISION OF ENGINEERING	CHIEF, DIVISION OF PLANNING AND ZONING
APPROVED: <i>[Signature]</i> DATE: 4/21/2023	
CHIEF, DEVELOPMENT	



**Ming-Yu Chien** 04.12.2023  
PROFESSIONAL CERTIFICATION - I HEREBY CERTIFY THAT THESE PLANS 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.: 33916 EXPIRATION DATE: 7-13-24

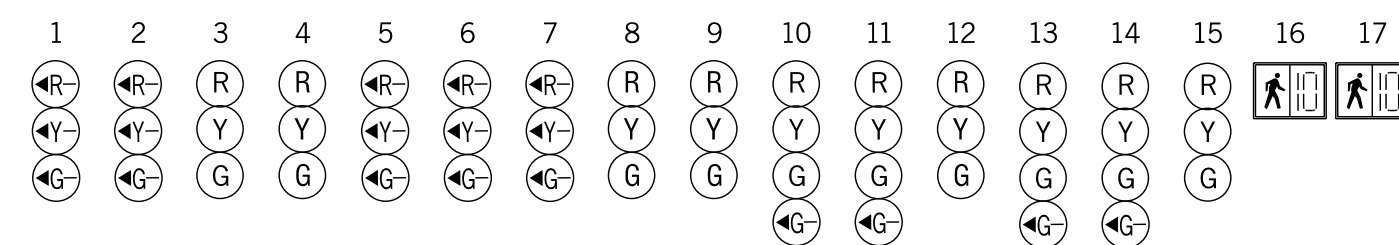
The Traffic Group, Inc.  
Suite H  
9900 Franklin Square Cr.  
Baltimore, Maryland  
410-931-6600  
1-800-563-8411  
Fax: 410-931-6601

DES:	
DRN: JJD	
CHK: JJD	
DATE: MARCH 2023	
BY NO.	REVISION
	DATE

MARRIOTTSVILLE ROAD WIDENING  
APFO MITIGATION PLAN  
F-21-033  
600' SCALE MAP NO. \_\_\_\_\_ DATE: \_\_\_\_\_

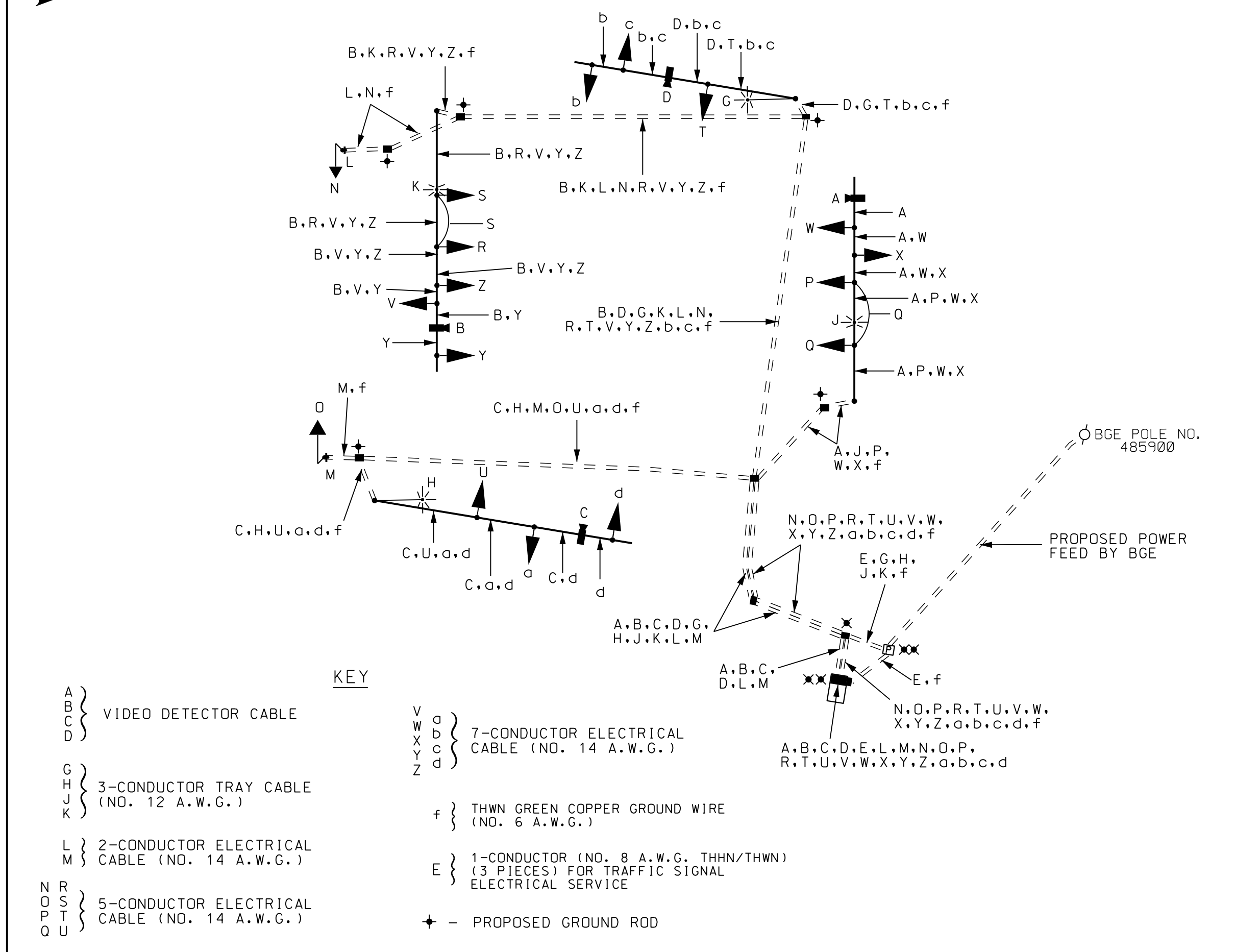
TRAFFIC SIGNAL  
GENERAL INFORMATION SHEET  
MARRIOTTSVILLE ROAD  
AT  
RESORT ROAD/ALBETH ROAD  
SCALE: NA  
SHEET 39 OF 60

**Phase Chart**

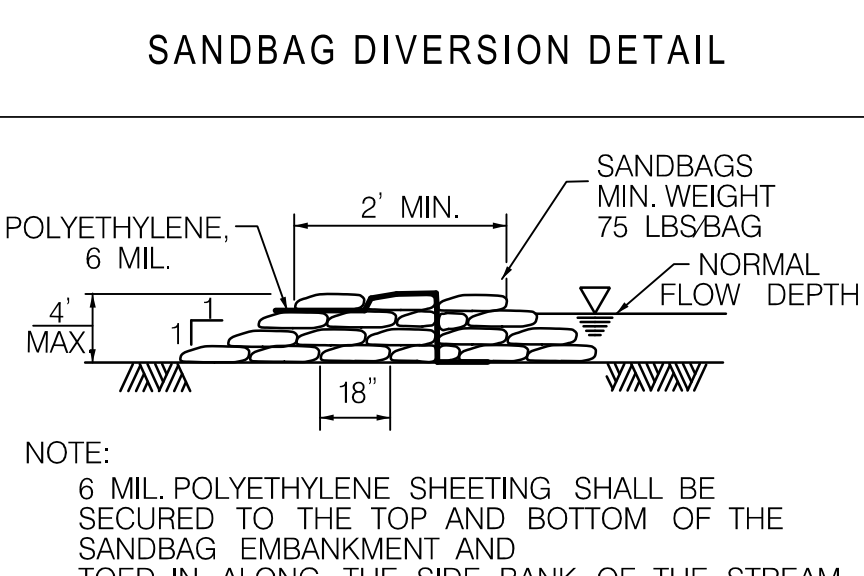
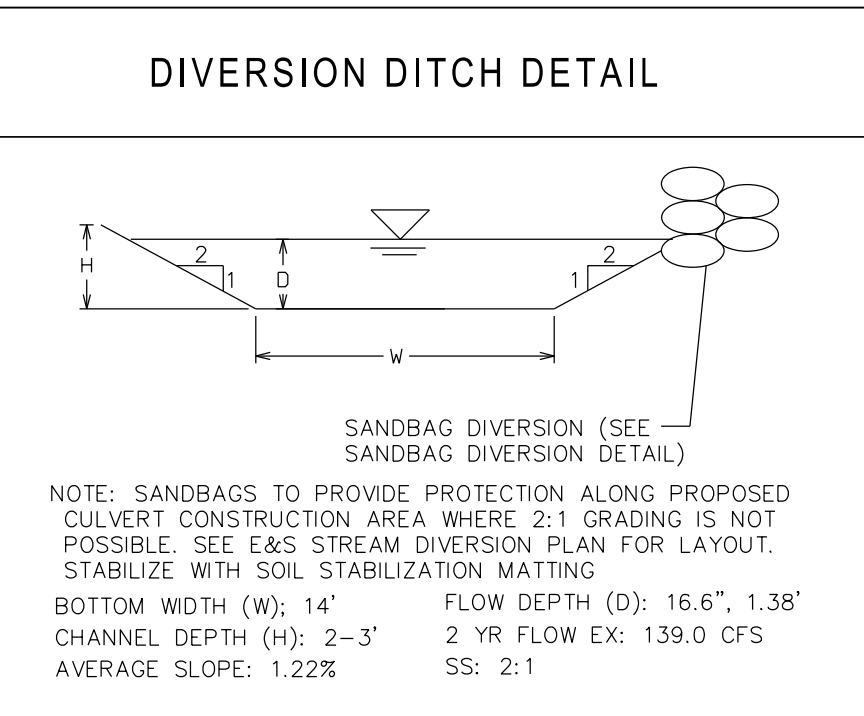
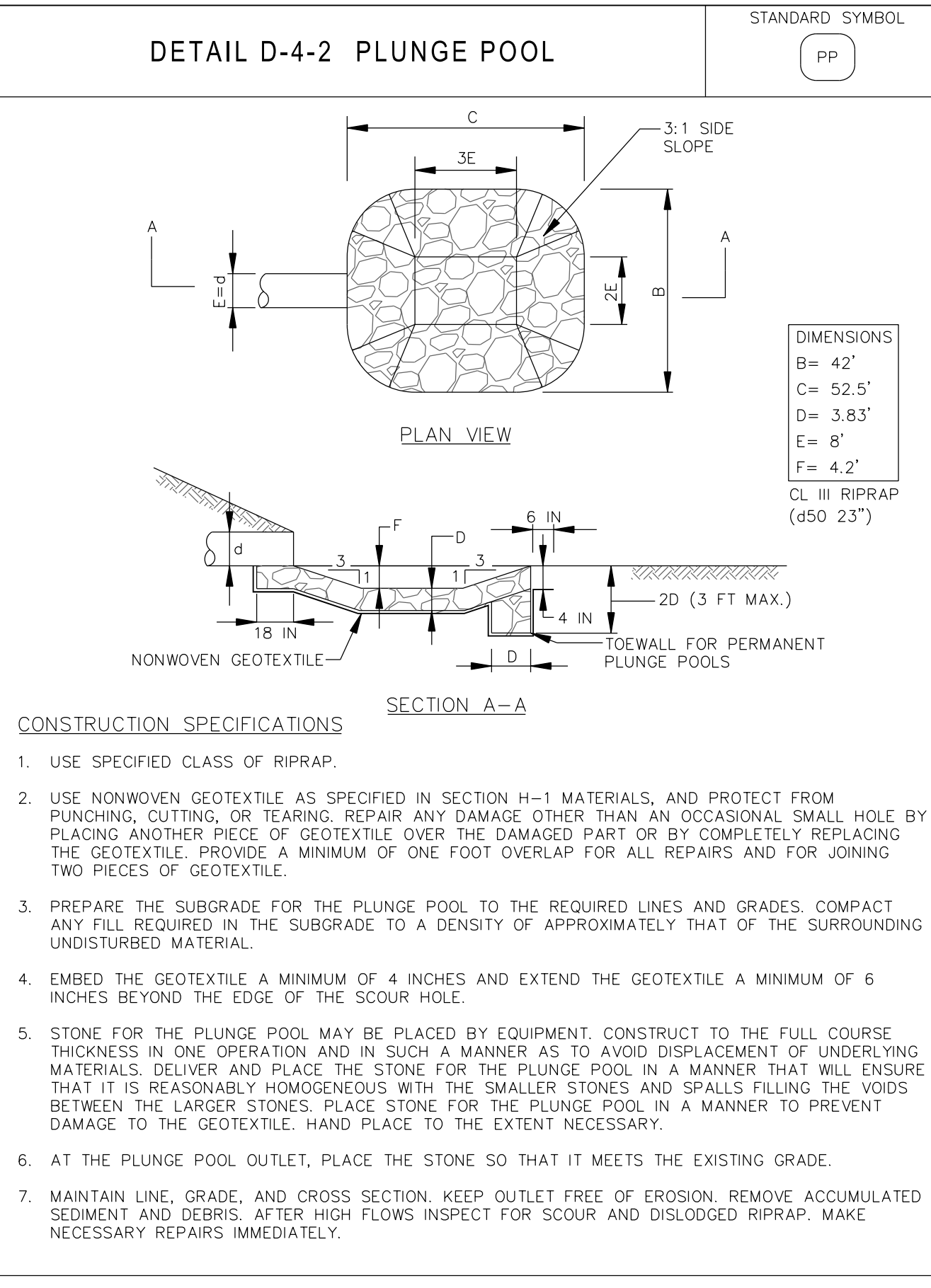
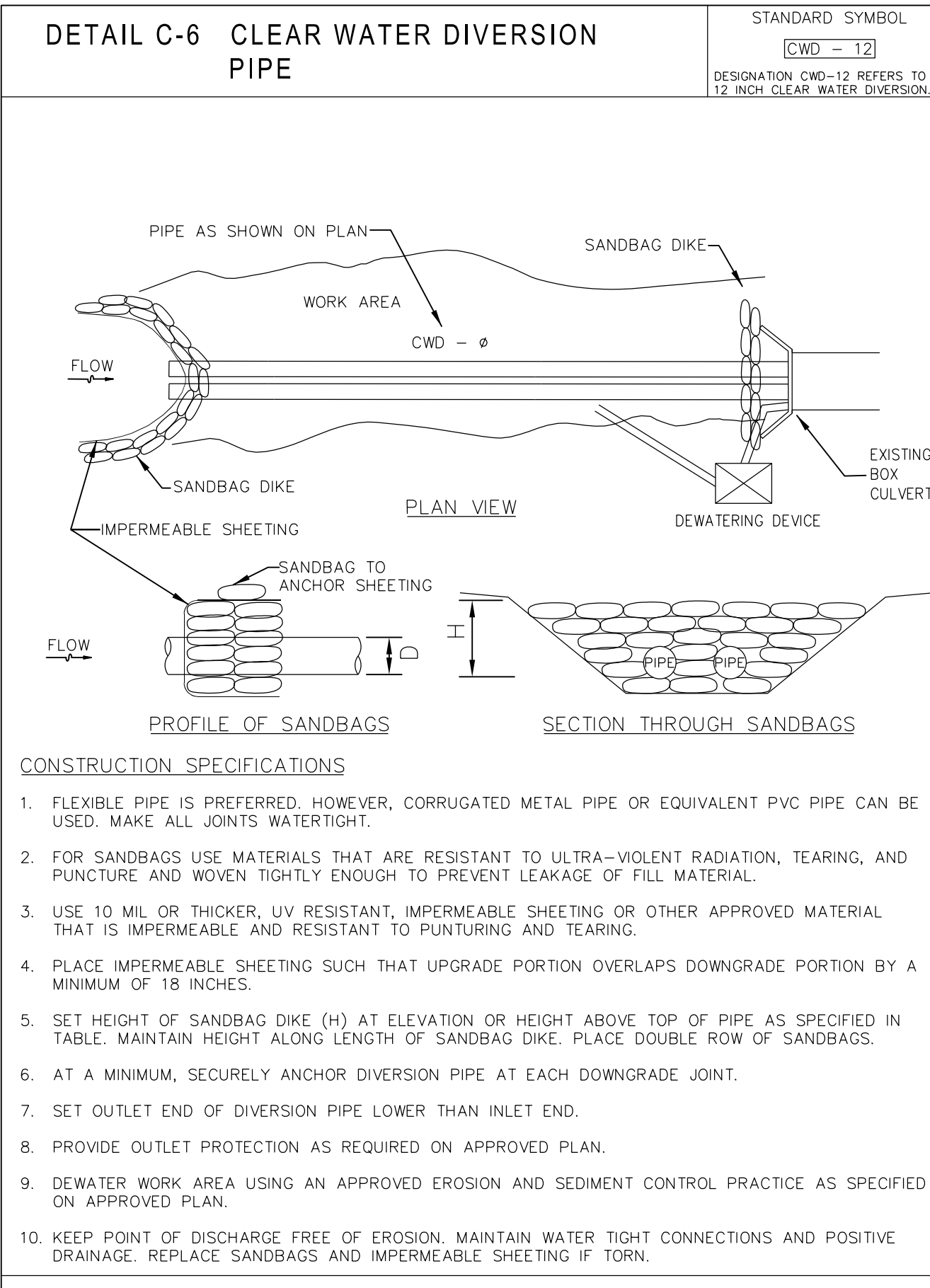


PHASE 1 AND 5	←G-	←G-	R	R	←G-	←G-	←G-	R	R	R	R	R	R	R	R	R	DW	DW
1 AND 5 CHANGE TO 1 AND 6, 2 AND 5, OR 2 AND 6																		
PHASE 1 AND 6	←G-	←G-	G	G	←R-	←R-	←R-	R	R	R	R	R	R	R	R	R	DW	DW
1 CHANGE	←Y-	←Y-	G	G	←R-	←R-	←R-	R	R	R	R	R	R	R	R	R	DW	DW
PHASE 2 AND 5	←R-	←R-	R	R	←G-	←G-	←G-	G	G	R	R	R	R	R	R	R	DW	DW
5 CHANGE	←R-	←R-	R	R	←Y-	←Y-	←Y-	G	G	R	R	R	R	R	R	R	DW	DW
PHASE 2 AND 6	←R-	←R-	G	G	←R-	←R-	←R-	G	G	R	R	R	R	R	R	R	DW	DW
2 AND 6 CHANGE	←R-	←R-	Y	Y	←R-	←R-	←R-	Y	Y	R	R	R	R	R	R	R	DW	DW
PHASE 3	←R-	←R-	R	R	←R-	←R-	←R-	R	R	←G-	←G-	G	R	R	R	R	DW	DW
3 CHANGE	←R-	←R-	R	R	←R-	←R-	←R-	R	R	Y	Y	Y	R	R	R	R	DW	DW
PHASE 3 ALT	←R-	←R-	R	R	←R-	←R-	←R-	R	R	←G-	←G-	G	R	R	R	R	WK	WK
PED CLEARANCE	←R-	←R-	R	R	←R-	←R-	←R-	R	R	←G-	←G-	G	R	R	R	R	FLDW	FLDW
3 ALT CHANGE	←R-	←R-	R	R	←R-	←R-	←R-	R	R	Y	Y	Y	R	R	R	R	DW	DW
PHASE 4	←R-	←R-	R	R	←R-	←R-	←R-	R	R	R	R	R	←G-	←G-	G	DW	DW	
4 CHANGE	←R-	←R-	R	R	←R-	←R-	←R-	R	R	R	R	R	Y	Y	Y	DW	DW	
FLASHING OPERATION	FL/←R-	FL/←R-	FL/Y	FL/Y	FL/←R-	FL/←R-	FL/←R-	FL/Y	FL/Y	FL/R	FL/R	FL/R	FL/R	FL/R	FL/R	FL/R	DARK	DARK

**Wiring Diagram**

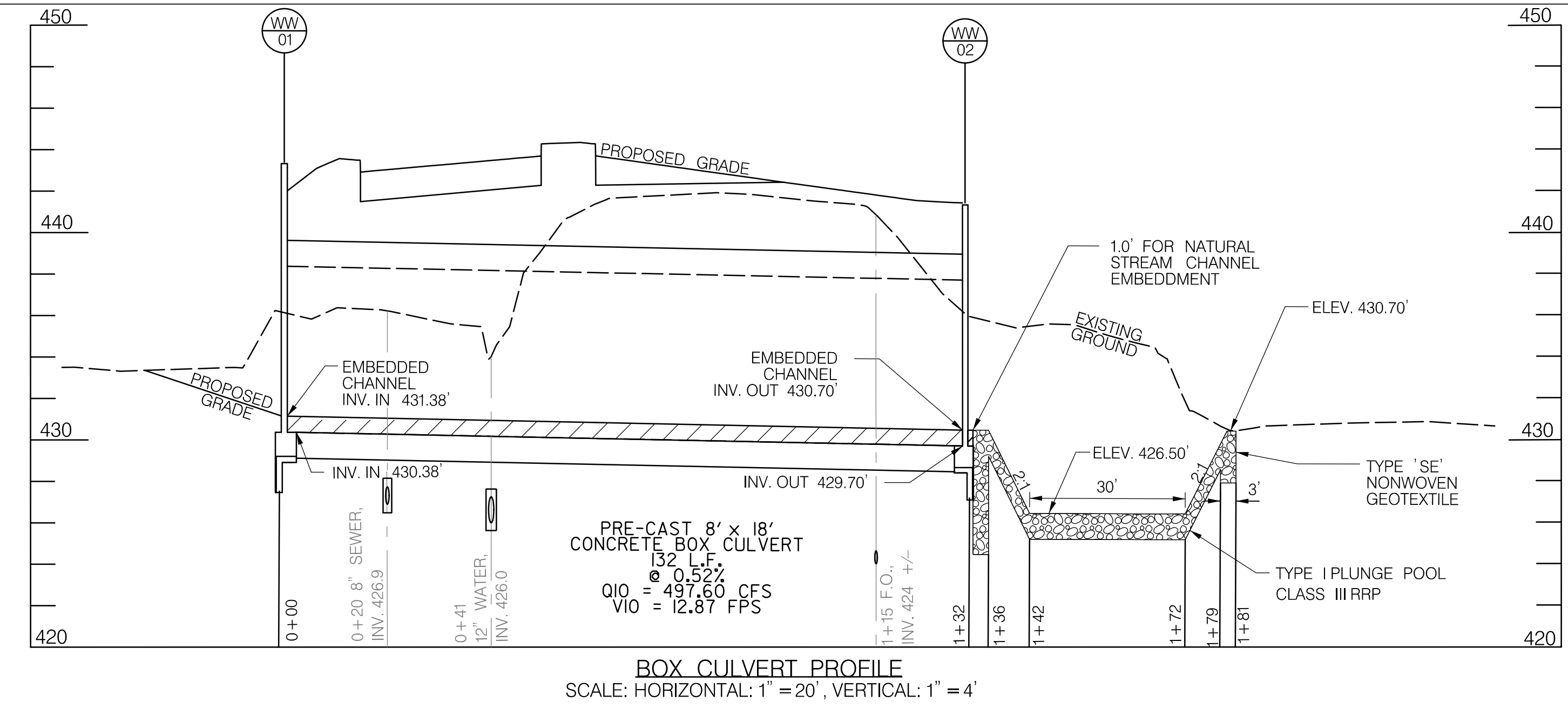




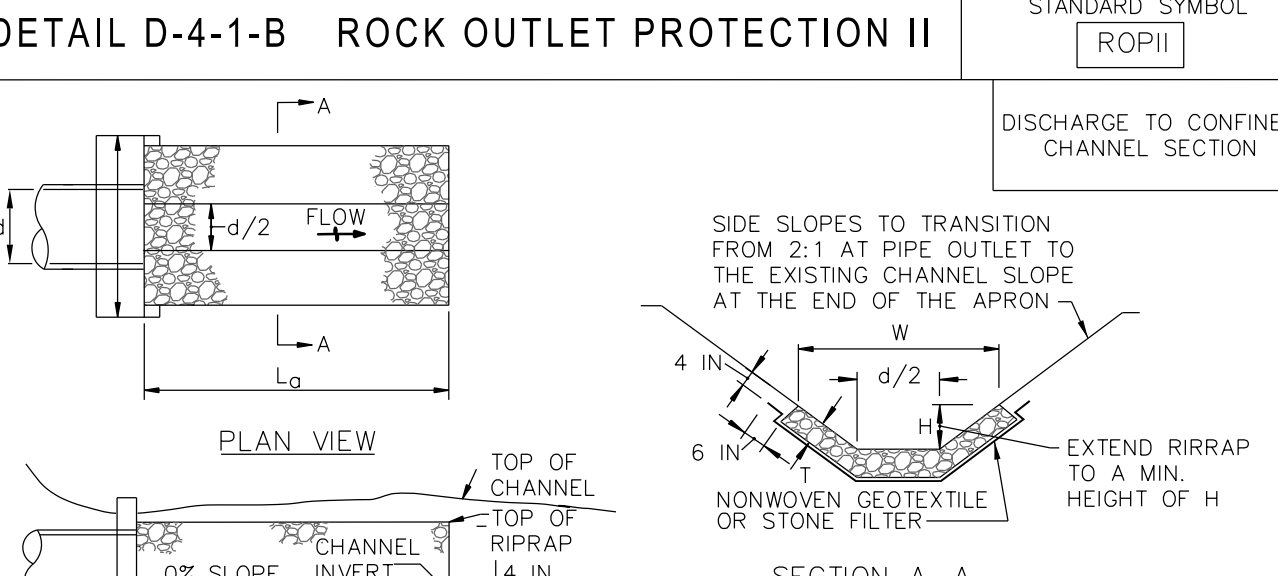


### SANDBAG DIVERSION DETAIL (SBD) NOT TO SCALE

SBD	ELEV	'H FEET
CWD-1	439	-
CWD-2	437	-
SBD-1	-	3
SBD-2	-	3
SBD-3	436	-

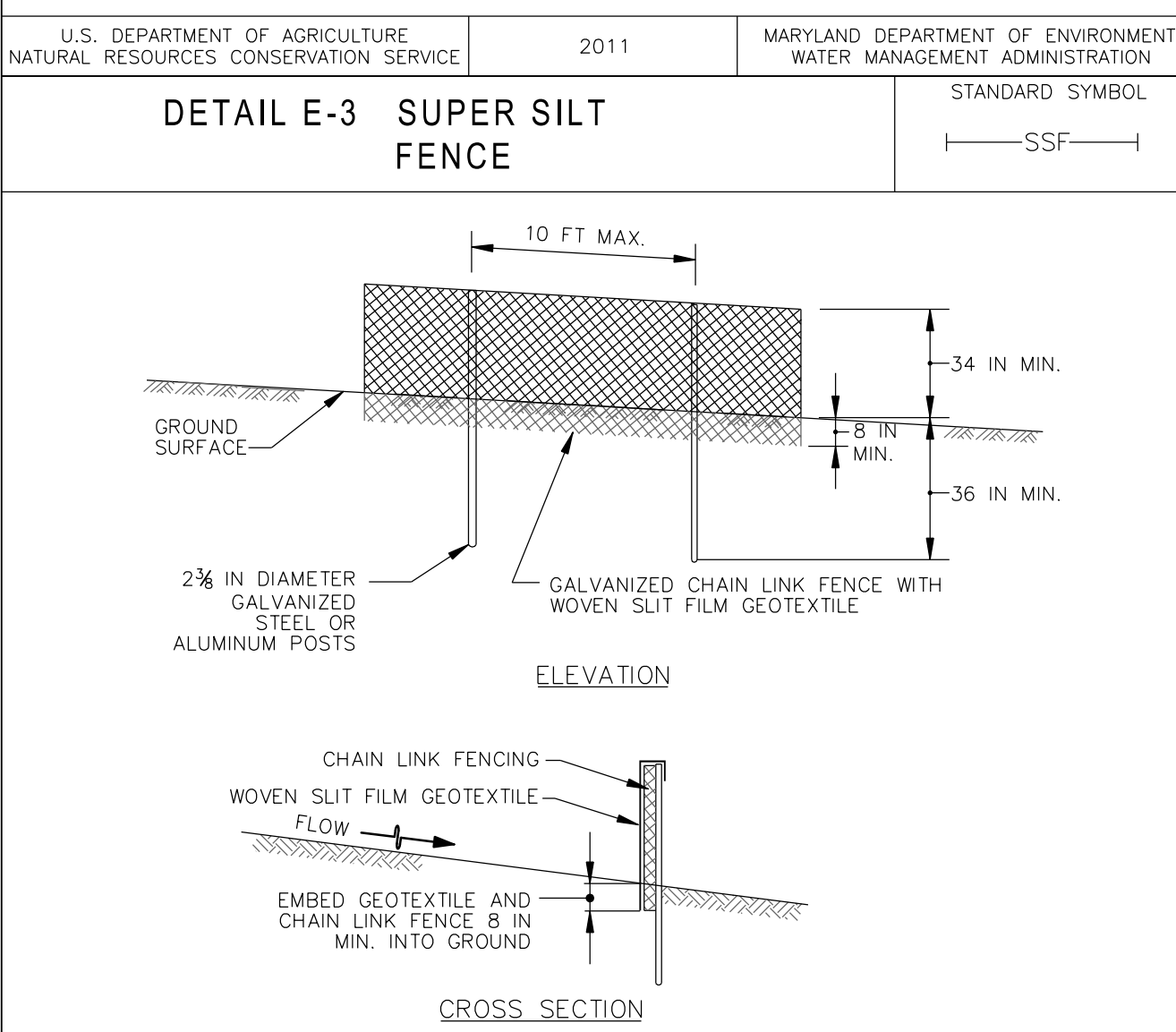


- ### STREAM DIVERSION SEQUENCE OF CONSTRUCTION
- THE CONTRACTOR SHALL NOTIFY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE), WATER MANAGEMENT ADMINISTRATION (WMA) AT (410) -537-3510 A MINIMUM OF SEVEN (7) WORKING DAYS PRIOR TO ANY EARTH DISTURBANCE TO SET UP A PRE-CONSTRUCTION MEETING.
  - NO DISTURBED AREA SHALL BE LEFT STABILIZED OVERNIGHT UNLESS THE RUNOFF IS DIRECTED TO AN MDE APPROVED SEDIMENT CONTROL DEVICE.
  - DEMARCATÉ THE LIMIT OF DISTURBANCE AND PROTECTED RESOURCES INCLUDING WETLANDS, WETLAND BUFFERS, WATERS OF THE UNITED STATES (WUS), FLOODPLAINS AND TREE PRESERVATION.
  - MAINTAIN ALL EROSION AND SEDIMENT CONTROLS THROUGHOUT THE DURATION OF STREAM DIVERSION.
  - INSTALL SCE-1 AND SCE-2 AS SHOWN ON THE PLANS.
  - INSTALL CWD-2 TO ELEVATION OF 437.00, SBD-2, P-2, PST AS SHOWN PROVIDING OUTFALL PROTECTION AS SHOWN ON THE PLANS.
  - WORKING DOWNSTREAM TO UPSTREAM, SAWCUT AND REMOVE EXISTING PAVEMENT AND ROADWAY SUBBASE NECESSARY TO INSTALL THE PROPOSED 8' X 18' BOX CULVERT FROM STATION 1+32 TO STATION 0+61.
  - CONSTRUCT THE FINAL SECTION OF THE PROPOSED 8' X 18' BOX CULVERT AND DOWNSTREAM WINGWALL AT STATION 1+32 AND AS DIRECTED ON THE STRUCTURAL PLANS.
  - INSTALL TYPE I PLUNGE POOL CLASS III RRP AS SHOWN.
  - REMOVE EXISTING UPSTREAM WINGWALLS AND CONSTRUCT A SECTION OF DIVERSION DITCH UPSTREAM OF THE EXISTING CULVERT (LARGE ENOUGH TO ALLOW FOR THE INSTALLATION OF SBD-1 AS SHOWN IN THE PLANS). STABILIZE WITH SOIL STABILIZATION MATTING.
  - INSTALL CWD-1 AND SBD-1, STABILIZING WITH OUTFALL PROTECTION AS SHOWN IN THE PLANS.
  - WORKING DOWNSTREAM TO UPSTREAM, CONSTRUCT DIVERSION DITCH WHILE MAINTAINING CWD-1. STABILIZE THE DIVERSION DITCH WITH SOIL STABILIZATION MATTING AS CONSTRUCTION PROGRESSES.
  - UPON WRITTEN APPROVAL BY THE SEDIMENT CONTROL INSPECTOR, INSTALL SBD-3 TO AN ELEVATION OF 436.00 AS SHOWN IN THE PLANS, REMOVE CWD-1 AND SBD-1 WHILE SIMULTANEOUSLY CONSTRUCTING AND STABILIZING THE PERIMETER DIKE/SWALE PDS-2.
  - UPON COMPLETION AND STABILIZATION OF PDS-2 AND THE REMOVAL OF SBD-1 AND CWD-1, AND WITH THE WRITTEN PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, DIVERT THE EXISTING STREAM CHANNEL INTO THE STABILIZED DIVERSION DITCH.
  - BEGIN CONSTRUCTION OF THE PROPOSED 8' X 18' BOX CULVERT WORKING DOWNSTREAM TO UPSTREAM FROM STATION 0+61 TO 0+00 AND CONSTRUCT PROPOSED UPSTREAM WINGWALLS AS SHOWN IN THE STRUCTURAL PLANS.
  - CONTRACTOR SHALL ONLY WORK IN SEGMENTS THAT MAY BE STABILIZED AT THE END OF EACH WORK DAY.
  - THE CONTRACTOR SHALL UTILIZE AN MDE APPROVED DEWATERING DEVICE TO DEWATER THE ACTIVE WORK ZONE AS NECESSARY DURING CONSTRUCTION.
  - UPON COMPLETION OF THE PROPOSED CULVERT AND WINGWALLS, CONSTRUCT THE 30" HDPE PIPE EXTENSION, PROPOSED ENDWALL, AND EXTEND THE RIPRAP OUTLET PROTECTION AS SHOWN IN THE PLANS.
  - REMOVE THE DIVERSION DITCH AND ESTABLISH FINAL GRADES TO THE EXISTING CHANNEL AND STREAM BED AT THE UPSTREAM AND DOWNSTREAM WINGWALLS OF THE PROPOSED CULVERT AS SHOWN IN THE ROADWAY GRADING PLANS.
  - REMOVE ALL REMAINING CWD AND SBD AND STABILIZE THESE AREAS.
  - BACKFILL THE EXISTING 6' X 14' BOX CULVERT WITH FLOWABLE FILL.
  - WITH WRITTEN APPROVAL FROM THE SEDIMENT CONTROL INSPECTOR, DIVERT CHANNEL FLOW INTO PROPOSED CULVERT.
  - UPON COMPLETION OF PROPOSED WORK, BACKFILL AND STABILIZE ANY REMAINING DISTURBED AREAS AND WITH THE PERMISSION OF THE MDE INSPECTOR REMOVE ALL PERIMETER CONTROLS AND STABILIZE THESE AREAS.
  - UPON FINAL STABILIZATION OF THE PROPOSED BOX CULVERT WORK AREA AND STREAM DIVERSION, BEGIN ROADWAY CONSTRUCTION ACTIVITIES AS INDICATED ON THE ROADWAY PLANS AND FOLLOWING THE PHASING AS DESCRIBED WITHIN THE MAINTENANCE OF TRAFFIC PLANS.

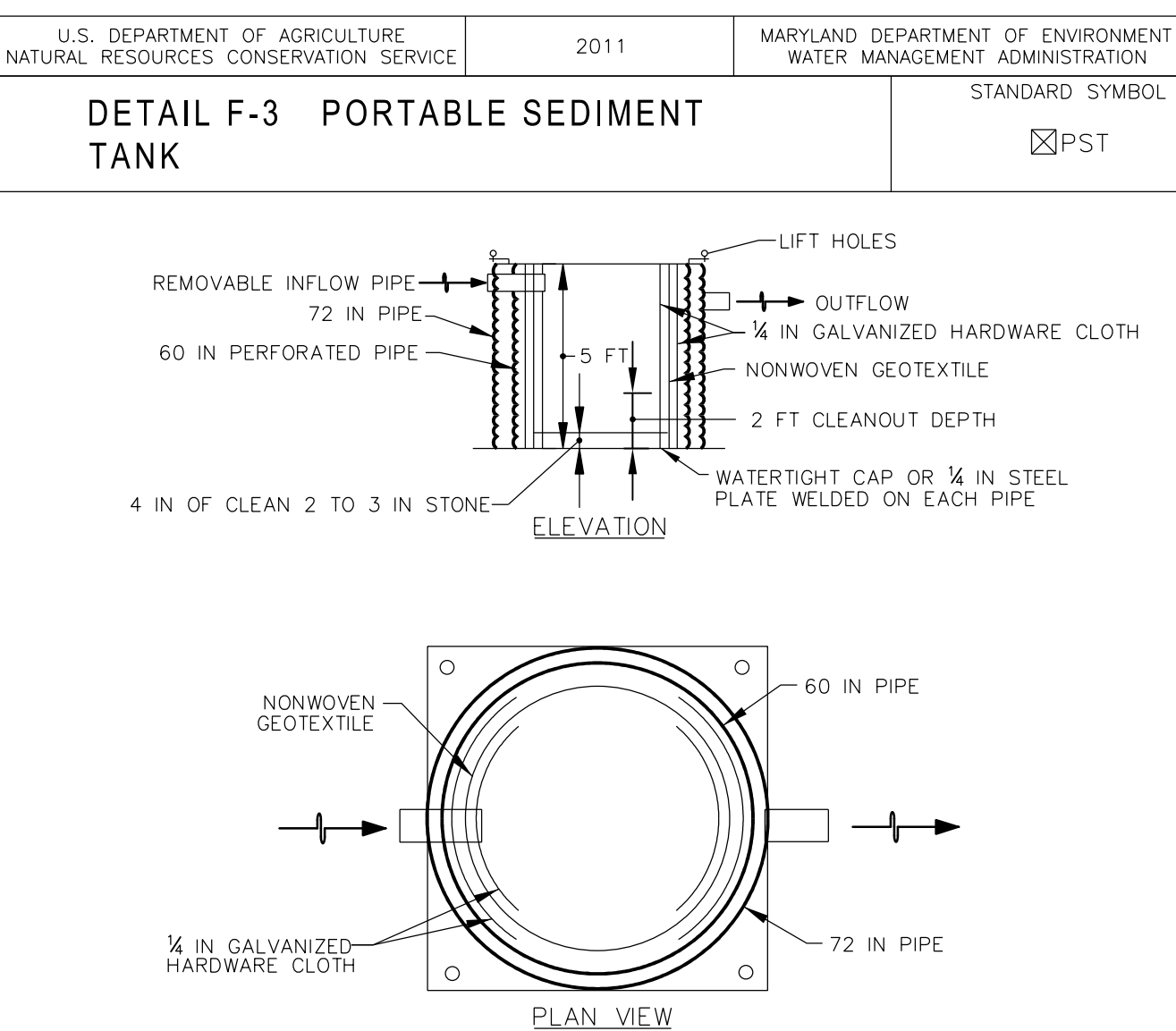


CLASS	THICKNESS (T)
I	19 IN
II	32 IN
III	46 IN

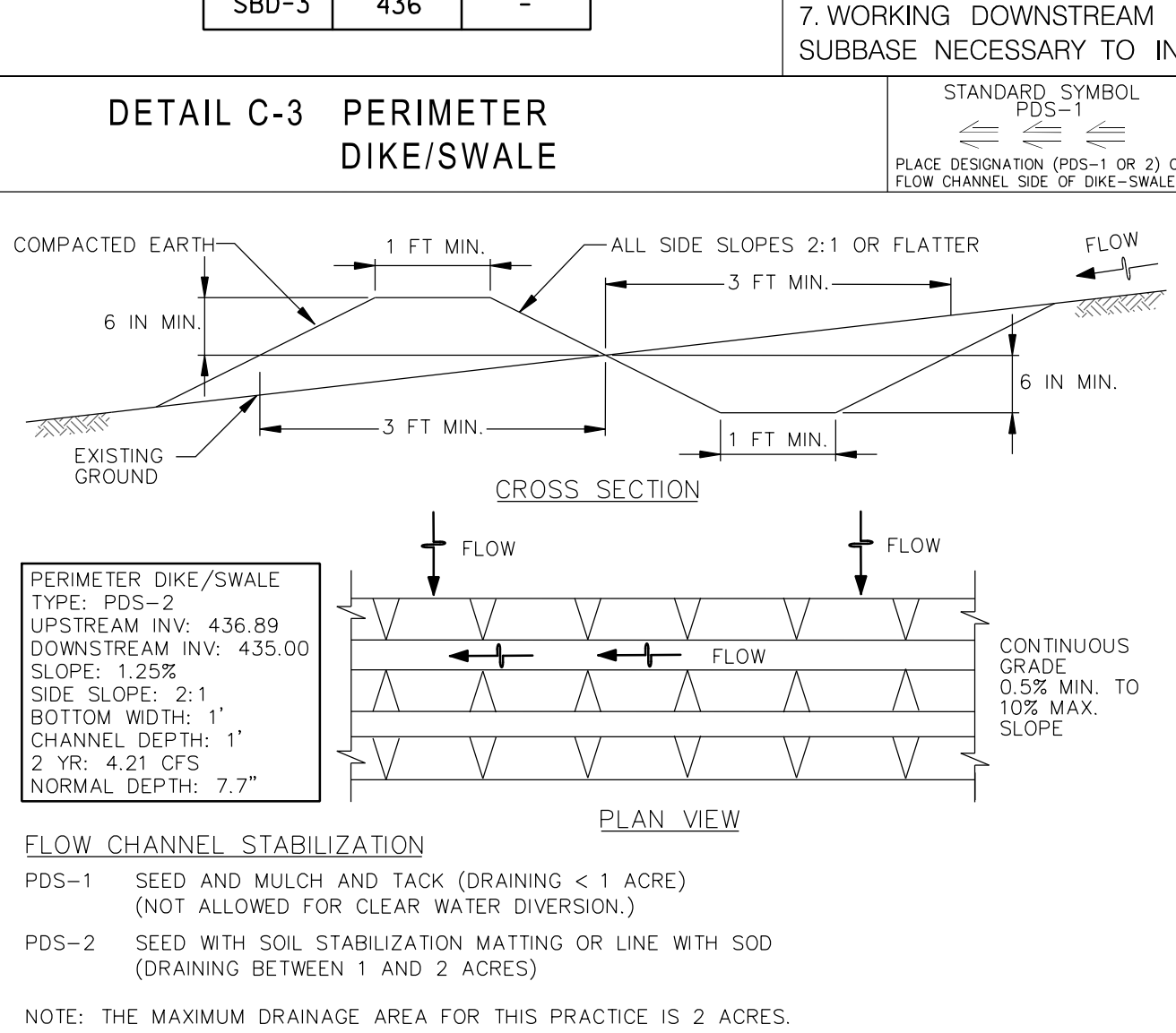
- ### CONSTRUCTION SPECIFICATIONS
- RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.
  - USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, AND PROTECT FROM PUNCTURING, CUTTING OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE TOGETHER.
  - PREPARE THE SUBGRADE FOR GEOTEXTILE OR STONE FILTER (3/4 TO 1 1/2 INCH STONE FOR 6 INCH MINIMUM DEPTH) AND RIPRAP TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
  - EXTEND GEOTEXTILE AT LEAST 6 INCHES BEYOND EDGES OF RIPRAP AND EMBED AT LEAST 4 INCHES AT SIDES OF RIPRAP.
  - CONSTRUCT RIPRAP OUTLET TO FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. PLACE STONE FOR RIPRAP OUTLET IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENEOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. PLACE RIPRAP IN A MANNER TO PREVENT DAMAGE TO THE STONE FILTER BLANKET OR GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY.
  - WHERE NO ENDWALL IS USED, CONSTRUCT THE UPSTREAM END OF THE APRON SO THAT THE WIDTH IS TWO TIMES THE DIAMETER OF THE OUTLET PIPE, AND EXTEND THE STONE UNDER THE OUTLET BY A MINIMUM OF 18 INCHES.
  - CONSTRUCT APRON WITH 0% SLOPE ALONG ITS LENGTH AND WITHOUT OBSTRUCTIONS. PLACE STONE SO THAT IT BLENDS IN WITH EXISTING GROUND.
  - MAINTAIN LINE, GRADE, AND CROSS SECTION. KEEP OUTLET FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. AFTER HIGH FLOWS INSPECT FOR SCOUR AND DISLODGED RIPRAP. MAKE NECESSARY REPAIRS IMMEDIATELY.



- ### CONSTRUCTION SPECIFICATIONS
- INSTALL 2 1/2 INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
  - FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (3/8 INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
  - FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
  - WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
  - EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
  - PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
  - REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.



- ### CONSTRUCTION SPECIFICATIONS
- PROVIDE 1 CUBIC FOOT OF STORAGE FOR EACH GALLON PER MINUTE OF PUMP CAPACITY. REQUIRED STORAGE VOLUME MAY BE ATTAINED BY PLACEMENT OF TANKS IN PARALLEL WITH INFLOW EVENLY DISTRIBUTED AMONG TANKS. OVERTOPPING OF TANKS IS NOT PERMITTED.
  - USE 60 INCH CORRUGATED METAL OR PLASTIC PIPE WITH 1 INCH DIAMETER PERFORATIONS, 6 INCHES ON CENTER FOR THE INNER PIPE. LINE PIPE WITH NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, SANDWICHED BETWEEN, AND ATTACHED TO, 1/4 INCH HARDWARE CLOTH.
  - OVERLAP GEOTEXTILE 8 INCHES MINIMUM AT VERTICAL SEAM AND AT THE BOTTOM PLATE.
  - ANCHOR GEOTEXTILE AT BOTTOM OF TANK WITH 4 INCHES OF 2 TO 3 INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE.
  - USE 72 INCH CORRUGATED METAL OR PLASTIC OUTER PIPE WITH PERMANENT OUTFLOW PIPE WITH INVERT LOWER THAN INFLOW PIPE.
  - INFLOW PIPE MUST DISCHARGE INTO INNER PIPE AND BE REMOVABLE.
  - PLACE TANK ON LEVEL SURFACE AND DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
  - A PORTABLE SEDIMENT TANK REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT FROM INNER PIPE WHEN IT REACHES TWO FEET IN DEPTH. IF SYSTEM CLOGS, PULL OUT INNER PIPE, REMOVE ACCUMULATED SEDIMENT, AND REPLACE GEOTEXTILE. KEEP POINT OF DISCHARGE FREE OF EROSION.



- ### CONSTRUCTION SPECIFICATIONS
- REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF DIKE/SWALE.
  - EXCAVATE OR SHAPE DIKE/SWALE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
  - COMPACT FILL.
  - CONSTRUCT DIKE/SWALE ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
  - PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
  - STABILIZE DIKE/SWALE WITHIN 24 HOURS OF INSTALLATION. STABILIZE DIKE/SWALES USED FOR CLEAR WATER DIVERSION WITHIN 24 HOURS OF INSTALLATION.
  - MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS, AND MAINTAIN POSITIVE DRAINAGE. KEEP PERIMETER DIKE/SWALE AND POINT OF DISCHARGE FREE OF EROSION AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
  - UPON REMOVAL OF DIKE/SWALE, GRADE AREA FLUSH WITH EXISTING GROUND. WITHIN 24 HOURS OF REMOVAL STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, MULCH, OR AS SPECIFIED ON APPROVED PLAN.

- ### CONSTRUCTION SPECIFICATIONS
- REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF DIKE/SWALE.
  - EXCAVATE OR SHAPE DIKE/SWALE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
  - COMPACT FILL.
  - CONSTRUCT DIKE/SWALE ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
  - PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
  - STABILIZE DIKE/SWALE WITHIN 24 HOURS OF INSTALLATION. STABILIZE DIKE/SWALES USED FOR CLEAR WATER DIVERSION WITHIN 24 HOURS OF INSTALLATION.
  - MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS, AND MAINTAIN POSITIVE DRAINAGE. KEEP PERIMETER DIKE/SWALE AND POINT OF DISCHARGE FREE OF EROSION AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
  - UPON REMOVAL OF DIKE/SWALE, GRADE AREA FLUSH WITH EXISTING GROUND. WITHIN 24 HOURS OF REMOVAL STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, MULCH, OR AS SPECIFIED ON APPROVED PLAN.

APPROVED: DEPARTMENT OF PUBLIC WORKS  
5/4/2023

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
4/19/2023

APPROVED: CHIEF, DIVISION OF LAND DEVELOPMENT  
4/21/2023

APPROVED: CHIEF, DEVELOPMENT ENGINEERING DIVISION

OWNER/DEVELOPER CERTIFICATION  
I/WE CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

OWNER/DEVELOPER SIGNATURE: Louis Mangione  
DATE: 2023-03-30

DESIGN CERTIFICATION  
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, THAT IT REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

DESIGNED BY: Matthew T. Smith, PE  
DATE: 4/3/2023

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

DESIGNED BY: Alexander Brathie  
DATE: 4/20/2023

HOWARD S.C.D. DATE

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 40784, Expiration Date: 11-08-23.

4/3/2023

OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400

DESIGN: MTS DRAFT: MTS

MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033

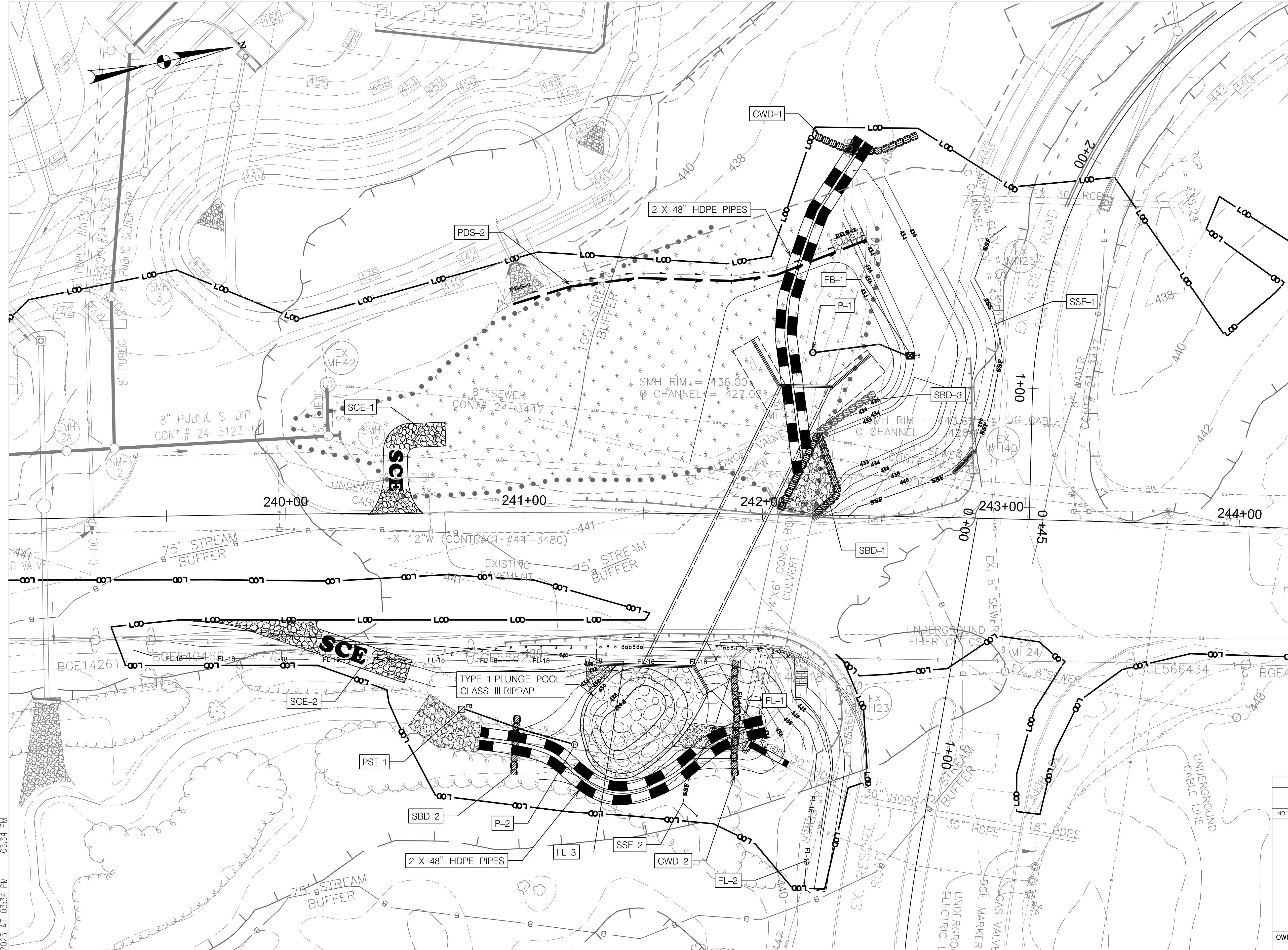
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

E&S STREAM DIVERSION NOTES, DETAILS, AND PROFILE

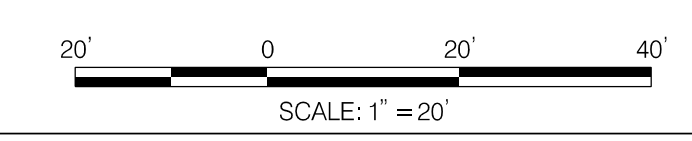
DATE: NOV 2022 BEI PROJECT NO. 2769  
SCALE: 1" = 20' SHEET 40 OF 60

G:\SMD\092356\_04\Marriott+sville.us\_40\CADD\Box\_Culvert+Design\pDD-0001.Morrto+sville.dgn  
Thur 3/30/23 10:35:35 AM  
03:33 PM  
03:33 PM

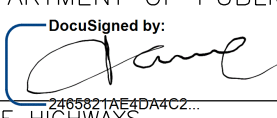
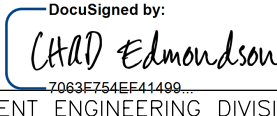




CLEAR WATER DIVERSION (CWD)	
ILS	CWD-1 - 2x48" HDPE (150' EA) 46' SANDBAG DIVERSION STA. 242+06 TO STA. 242+63 LT MARRIOTTSVILLE RD
ILS	CWD-2 - 2x48" HDPE (134' EA) 50' SANDBAG DIVERSION STA. 240+85 TO STA. 242+00 RT MARRIOTTSVILLE RD
FILTER BAG (FB)	
IEA	FB-1 TO BE PLACED IN THE FIELD AS NEEDED
REMOVABLE PUMPING STATION (P)	
IEA	P-1 TO BE PLACED IN THE FIELD AS NEEDED
IEA	P-2 TO BE PLACED IN THE FIELD AS NEEDED
FILTER LOG 18" (FL)	
370 LF	FL-1, STA. 241+92.52 TO 242+07.59 RT 86.51' OFF MARRIOTTSVILLE RD FL-2, STA. 242+24.14 TO 242+28.79 RT 132.08' OFF MARRIOTTSVILLE RD FL-3, STA. 239+36.31 TO 241+83.51 RT 64.10' OFF MARRIOTTSVILLE RD
ROCK OUTLET PROTECTION (ROPI), CL I	
128 SY	STA. 241+64.95 TO 241+99.84 RT 97' OFF MARRIOTTSVILLE RD STA. 241+28.20 TO 241+40.75 RT 71' OFF MARRIOTTSVILLE RD STA. 242+29.12 TO 242+43.77 LT 109' OFF MARRIOTTSVILLE RD STA. 240+50.90 TO 240+81.86 RT 90' OFF MARRIOTTSVILLE RD STA. 242+09.30 TO 242+29.94 LT 20' OFF MARRIOTTSVILLE RD
STABILIZED CONSTRUCTION ENTRANCE (SCE)	
IEA	SCE 1, MARRIOTTSVILLE RD - STA. 240+36 TO STA. 240+69 LT
IEA	SCE 2, MARRIOTTSVILLE RD - STA. 239+62 TO STA. 240+54 RT
SAND BAG DIVERSION (SBD)	
76 LF	SBD-1, STA. 242+06.99 TO STA. 242+32.95 LT MARRIOTTSVILLE RD
25 LF	SBD-2, STA. 240+97.27 TO STA. 240+98.82 RT MARRIOTTSVILLE RD
66 LF	SBD-3, STA. 242+07.38 TO STA. 242+46.68 LT MARRIOTTSVILLE RD
PORTABLE SEDIMENT TANK (PST)	
IEA	PST-1 TO BE PLACED IN THE FIELD AS NEEDED
TYPE I PLUNGE POOL	
240 SY	CLASS III RRP STA 241+30 TO STA. 241+85 RT, MARRIOTTSVILLE RD
SUPER SILT FENCE (SSF)	
164 LF	SSF-1, STA. 242+38 TO STA. 243+00 LT MARRIOTTSVILLE RD
60 LF	SSF-2, STA. 241+69 TO STA. 241+89 RT MARRIOTTSVILLE RD
PERIMETER DIKE/SWALE (PDS)	
255 LF	PDS-2, STA. 240+98.00 TO STA. 242+41.63 LT, MARRIOTTSVILLE RD
36" HDPE PIPE	
18 LF	STA. 241+95.79 TO STA. 242+12.15 RT, MARRIOTTSVILLE RD
STANDARD TYPE 'C' ENDWALL MD NO. 354.01	
1 EA	STA. 241+95.79 RT, MARRIOTTSVILLE RD



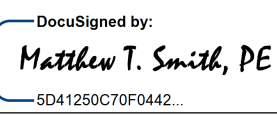
G:\SMD\092356\_04\Marriottsville, US 40\CADD\Box\_Culvert\_Design\PSD-P100\_Marriottsville.dgn  
 Thursday, March 30, 2023 AT 03:34 PM  
 FILE: G:\SMD\092356\_04\Marriottsville, US 40\CADD\Box\_Culvert\_Design\PSD-P100\_Marriottsville.dgn  
 DATE: Thursday, March 30, 2023 AT 03:34 PM

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 DocuSigned by:  
  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 DocuSigned by:  
  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE


**OWNER/DEVELOPER CERTIFICATION**  
 I/WE CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

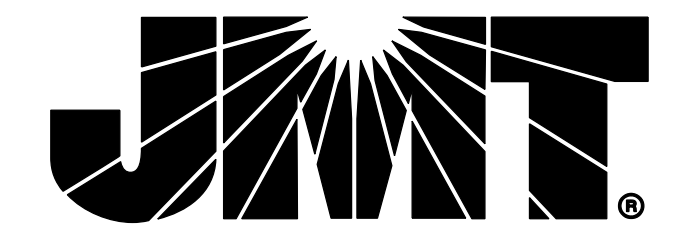
Louis Mangione  
 2023-03-30  
 OWNER/DEVELOPER SIGNATURE  
 Louis Mangione  
 PRINTED NAME & TITLE  
 DATE

**DESIGN CERTIFICATION**  
 I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, THAT IT REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

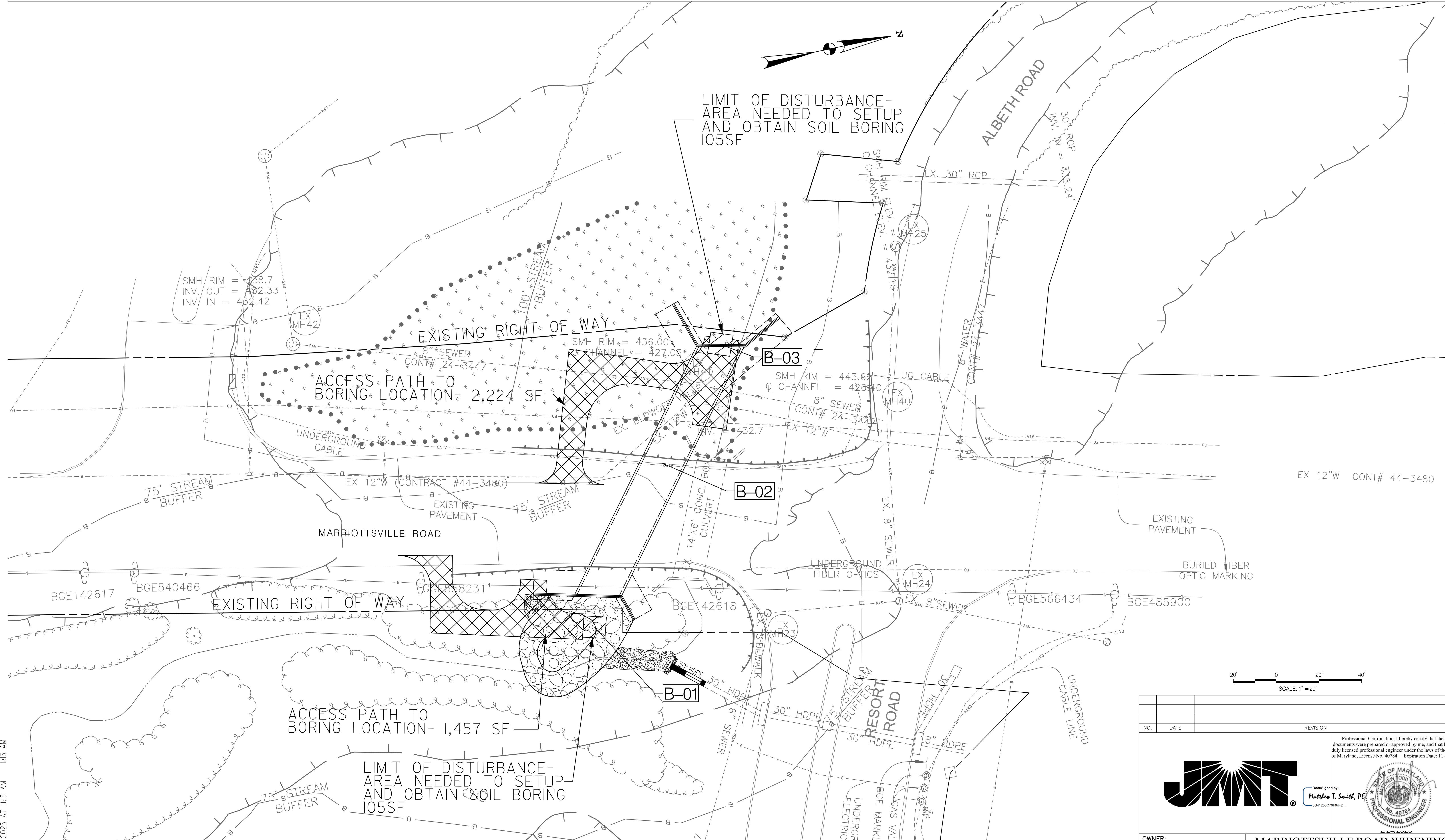
Matthew T. Smith, PE  
 4/3/2023  
 DocuSigned by:  
  
 DESIGNER'S SIGNATURE  
 MATTHEW T. SMITH  
 PRINTED NAME  
 MD REGISTRATION NO. 40784  
 (P.E.) R.L.S., OR R.L.A. (circle one)  
 DATE  
 HOWARD S.C.D.

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

DocuSigned by:  
  
 4/20/2023  
 HOWARD S.C.D.

		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 40784. Expiration Date: 11-08-23.	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		E&S STREAM DIVERSION DATE: NOV 2022 BEI PROJECT NO. 2769 SCALE: 1" = 20' SHEET 41 OF 60	
DESIGN: MTS	DRAFT: MTS	4/3/2023	

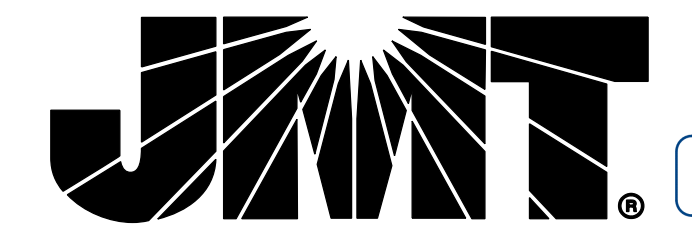




PROPOSED BORING LOCATIONS FOR 8'x18' RCBC

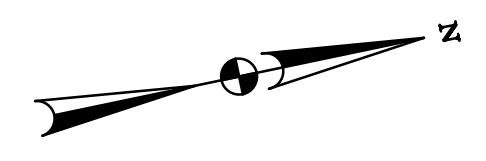
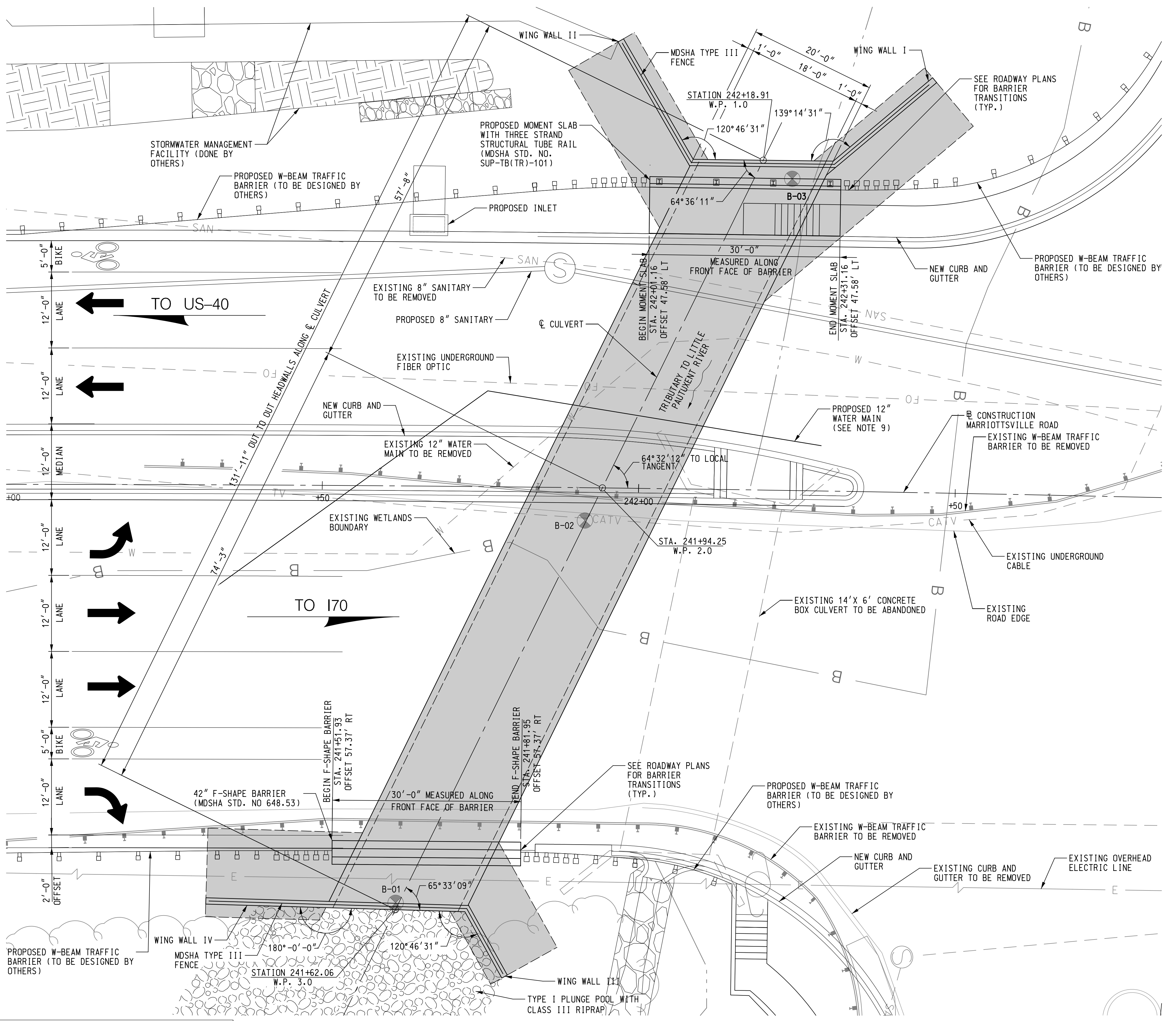
APPROVED: DEPARTMENT OF PUBLIC WORKS  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

BORING NO.	TERRAIN AT BORING LOCATION	MICROSTATION NORTHING	MICROSTATION EASTING	MD STATE PLANE LATITUDE	MD STATE PLANE LONGITUDE	MINIMUM DEPTH OF BORING (FT)	NOTES
B-01	VEGETATION	594799.4581	1340555.6973	39°17'59.3540"	-076°54'00.9837"	50	
B-02	ASPHALT	594846.4017	1340487.1519	39°17'59.8187"	-076°54'01.8550"	50	
B-03	VEGETATION	594884.2684	1340438.1011	39°18'00.1935"	-076°54'02.4785"	50	

 Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 40784, Expiration Date: 11-08-23. DocuSigned by: Matthew T. Smith, PE 3041250C7F6442	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401	MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-625-8400	E&S SOIL BORING ACCESS PLAN SHEETS DATE: NOV 2022   BEI PROJECT NO. 2769 SCALE: 1" = 20'   SHEET 42 OF 60
DESIGN: MTS   DRAFT: MTS	F-21-033

FILE: G:\SMD\092356\_04\Marriottsville.us\_40\CADD\Box\_Culvert Design\pDD-000-Marrriottsville.dgn  
 DATE: Thursday, February 09, 2023 11:13:53 AM





- NOTES:**
- FOR GENERAL NOTES, SEE SHEET NO. 44.
  - FOR LONGITUDINAL SECTION, SEE SHEET NO. 44.
  - FOR WORKING POINTS, SEE SHEET NO. 45.
  - FOR CULVERT TYPICAL SECTIONS, SEE SHEET NOS. 46 AND 47.
  - FOR UPSTREAM AND DOWNSTREAM HEADWALLS, SEE SHEET NOS. 49 AND 50.
  - FOR WING WALL TYPICAL SECTION, SEE SHEET NO. 51.
  - PROPOSED CULVERT WILL BE INSTALLED EITHER CAST-IN-PLACE OR PRECAST USING A FULL TRAFFIC DETOUR IN PHASE 2.
  - THE DEVELOPER SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF EXISTING UTILITIES AND MAKING FIELD ADJUSTMENTS AS NECESSARY TO AVOID CONFLICTS. CONTRACTOR'S PROPOSED REVISIONS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO BEGINNING WORK IN THE VICINITY OF POSSIBLE CONFLICTS.
  - FOR EXISTING AND PROPOSED UTILITY DISPOSITIONS, SEE PROPOSED UTILITY PLANS (DONE BY OTHERS).

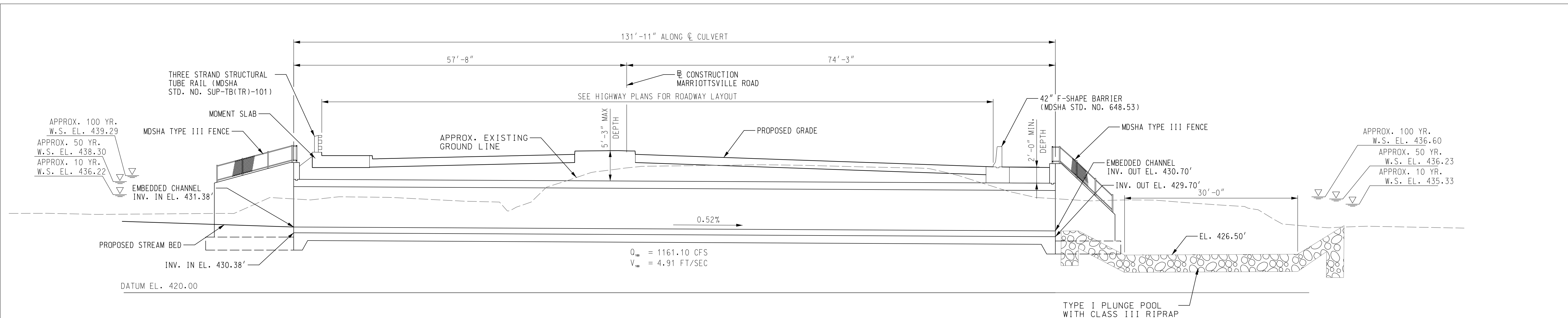
FILE: G:\SMD\092356\_04\Marriottsville US 40\CAADD\Box Culvert Design\DR-CP\_Marriottsville.dgn  
 DATE: Thursday, February 23, 2023 AT 01:26 AM 07:26 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	4/21/2023
DATE	DATE

**PLAN**  
SCALE: 1/8" = 1'-0"

		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24. DocuSigned by: 	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
DEVELOPER: MANGIONE ENTERPRISES OF TURF SHELLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400		PROPOSED CULVERT GENERAL PLAN DATE: NOVEMBER 2022   BEI PROJECT NO. 2769 DESIGN: GGN   DRAFT: AJV   SCALE: 1/8" = 1'-0"   SHEET 43 OF 60	





LONGITUDINAL SECTION AT CULVERT  
SCALE: 1/8" = 1'-0"

GENERAL NOTES

**SPECIFICATIONS:** MDOT SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, DATED JULY, 2022

**DESIGN:** AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, DATED 2017

**LOADING:** HL-93

**LOAD RESTRICTIONS:** THERE ARE RESTRICTIONS FOR PLACING EQUIPMENT AND MATERIALS ON EXISTING AND NEW STRUCTURE(S). REFER TO SECTION TC 6.14.

**CONCRETE:** CONCRETE COMPRESSIVE STRENGTH FOR MIX DESIGN SHALL BE:  
 $f'c = 3000$  psi FOR ELEMENTS USING MIX NO. 3  
 $f'c = 4000$  psi FOR ELEMENTS USING MIX NO. 6

CONCRETE FOR PRECAST CULVERT AND MOMENT SLABS SHALL BE MIX NO.6.

ALL OTHER CONCRETE SHALL BE MIX NO. 3 (3500 psi)

**REINFORCING STEEL:** REINFORCING STEEL SHALL CONFORM TO ASTM A 615 GRADE 60, WITH A YIELD STRENGTH FOR DESIGN OF  $f_y = 60000$  psi.

ALL SPLICES, NOT SHOWN, SHALL BE LAPPED AS PER BAR LAP CHARTS.

REINFORCING STEEL SHALL BE EPOXY COATED WHEN NOTED WITH AN EP IN THE PLANS.

MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE 2" EXCEPT FOR THE FOLLOWING LOCATIONS:

LOCATION	CLEAR COVER
Bottom and sides of all footings.	3"

FOR TIES AND STIRRUPS, STANDARD ACI BENDING TOLERANCES ARE MODIFIED TO PLUS (+) ZERO INCHES, MINUS (-) NORMAL ACI BENDING TOLERANCES.

**KEYS:** ALL CONCRETE CONSTRUCTION KEYS ARE NORMAL SIZE.

CONSTRUCTION NOTES

- EXISTING STRUCTURE:** ALL DIMENSIONS AFFECTED BY THE GEOMETRY AND/OR LOCATION OF THE STRUCTURE(S): EXISTING STRUCTURE(S) SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR BEFORE ANY MATERIAL IS ORDERED OR FABRICATED OR CONSTRUCTION BEGINS.
- CULVERT/PIPE COVER:** NO CONSTRUCTION EQUIPMENT, WITH THE EXCEPTION OF PAVING EQUIPMENT, SHALL BE PERMITTED TO PASS OVER THE CULVERT/PIPE UNTIL THE ROADWAY PAVING HAS BEEN COMPLETED.
- SEQUENCE OF CONSTRUCTION:** THE CULVERT WILL BE CONSTRUCTED UNDER A FULL ROAD CLOSURE AND DETOUR (PROVIDED BY OTHERS).
- NOTES:**
- FOR GENERAL PLAN, SEE SHEET NO. 43.
  - FOR WORKING POINTS, SEE SHEET NO. 45.
  - FOR CULVERT TYPICAL SECTIONS, SEE SHEET NOS. 46 AND 47.
  - FOR UPSTREAM AND DOWNSTREAM HEADWALLS, SEE SHEET NOS. 49 AND 50.
  - FOR WING WALL TYPICAL SECTION, SEE SHEET NO. 51.
  - FOR HORIZONTAL CURVE AND VERTICAL CURVE INFORMATION SEE PROPOSED ROADWAY PLANS (DONE BY OTHERS).
  - THE DEVELOPER SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF EXISTING UTILITIES AND MAKING FIELD ADJUSTMENTS AS NECESSARY TO AVOID CONFLICTS. CONTRACTOR'S PROPOSED REVISIONS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO BEGINNING WORK IN THE VICINITY OF POSSIBLE CONFLICTS.
  - FOR UTILITY LOCATIONS AND DISPOSITIONS, SEE PROPOSED UTILITY PLANS (DONE BY OTHERS).

NO.	DATE	REVISION

G:\SMD\092356-041\_Marriontsville\_US\_40\CA001\Box\_Culvert\_Design\DRR-EL\_Marriontsville.dgn

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
APPROVED: CHAD Edmondson	4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

**OWNER:**  
 HOWARD COUNTY MARYLAND  
 DIRECTOR'S OFFICE OF  
 DEPARTMENT OF PUBLIC WORKS  
 3430 COURTHOUSE DRIVE  
 ELLICOTT CITY, MD 21043  
 410-313-4401

**DEVELOPER:**  
 MANGIONE ENTERPRISES OF TURF VILLY  
 LIMITED PARTNERSHIP  
 1205 YORK ROAD, PENTHOUSE  
 LUTHERVILLE, MARYLAND 21093  
 410-925-8400

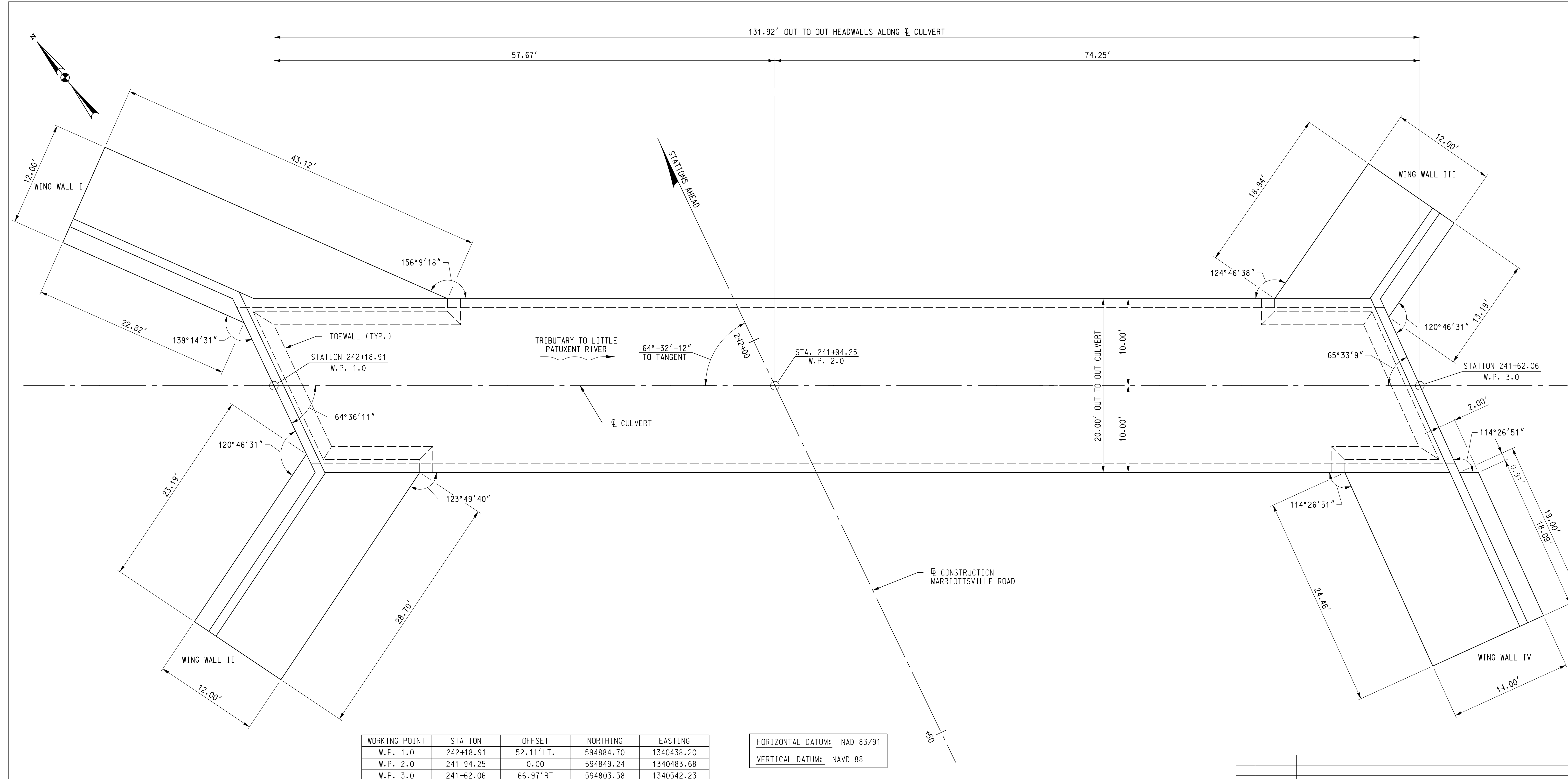
**MARRIOTTSVILLE ROAD WIDENING  
 APFO MITIGATION PLANS  
 F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
 ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**SECTION AT CULVERT**

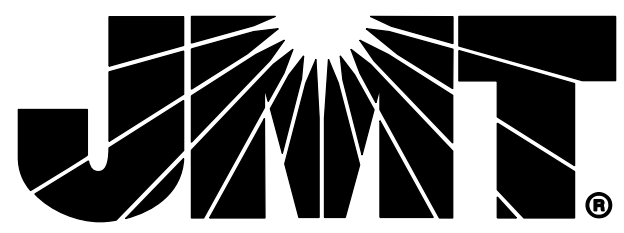

DATE: NOVEMBER 2022 | BEI PROJECT NO. 2769  
 DESIGN: GGN | DRAFT: AJV | SCALE: 1/8" = 1'-0" | SHEET 44 OF 60



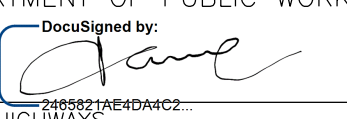
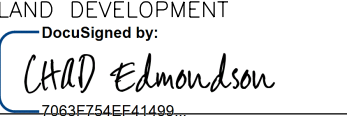
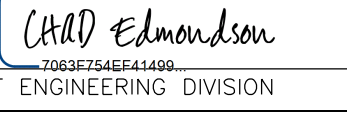


**GEOMETRIC AND FOOTING LAYOUT PLAN**  
SCALE: 3/16" = 1' - 0"

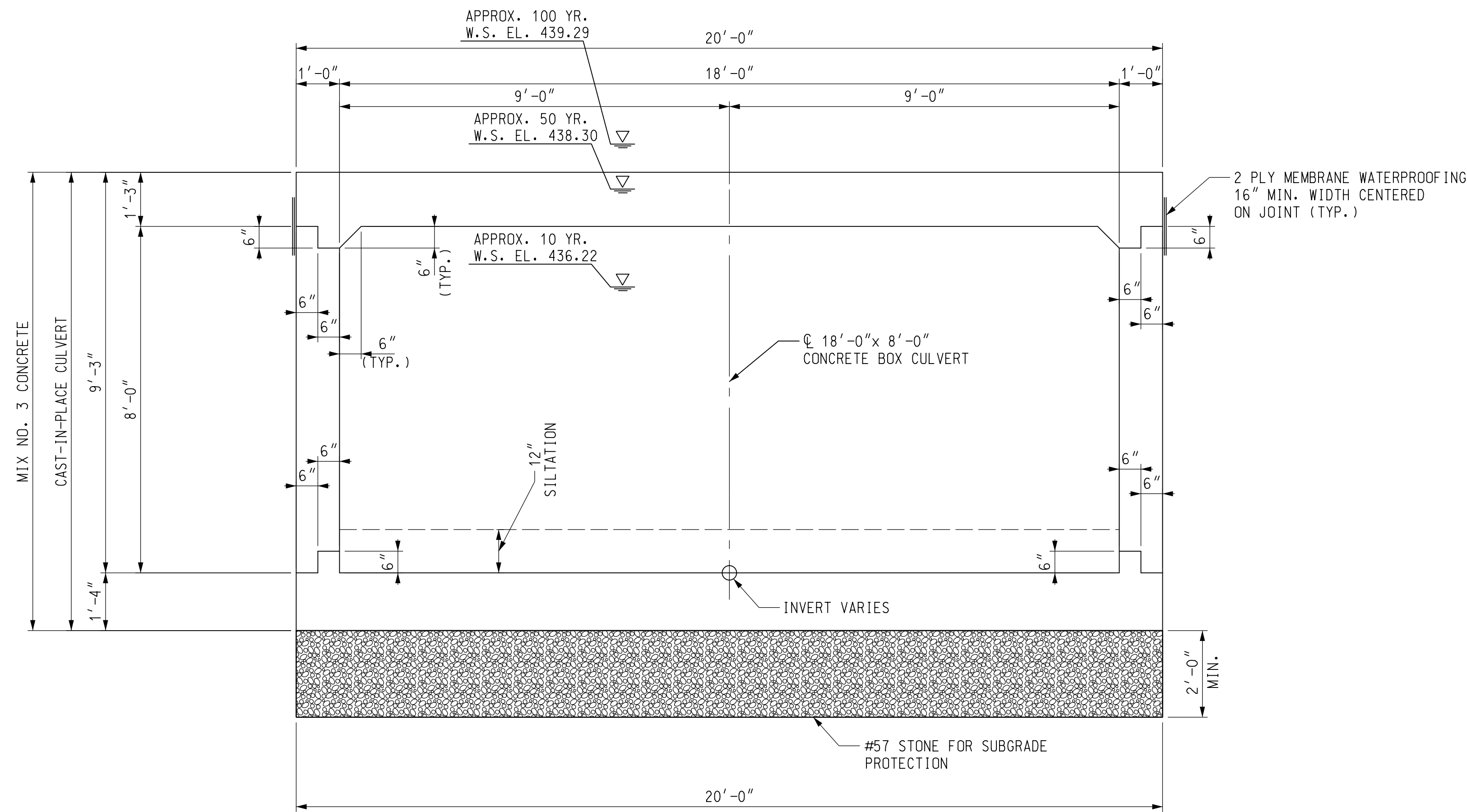
- NOTES:**
- FOR GENERAL NOTES, SEE SHEET NO. 44.
  - FOR LONGITUDINAL SECTION, SEE SHEET NO. 44.
  - FOR CULVERT TYPICAL SECTIONS, SEE SHEET NOS. 46 AND 47.
  - FOR UPSTREAM AND DOWNSTREAM HEADWALLS, SEE SHEET NOS. 49 AND 50.
  - FOR WING WALL TYPICAL SECTION, SEE SHEET NO. 51.

NO.		DATE		REVISION
				
Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.				
				
<b>OWNER:</b> HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		<b>MARRIOTTVILLE ROAD WIDENING                  APFO MITIGATION PLANS                  F-21-033</b>		
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND				
<b>DEVELOPER:</b> MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400				
<b>DATE:</b> NOVEMBER 2022		<b>BEI PROJECT NO.</b> 2769		
<b>DESIGN:</b> GGN	<b>DRAFT:</b> AJV	<b>SCALE:</b> 3/16" = 1' - 0"	<b>SHEET</b> 45 OF 60	

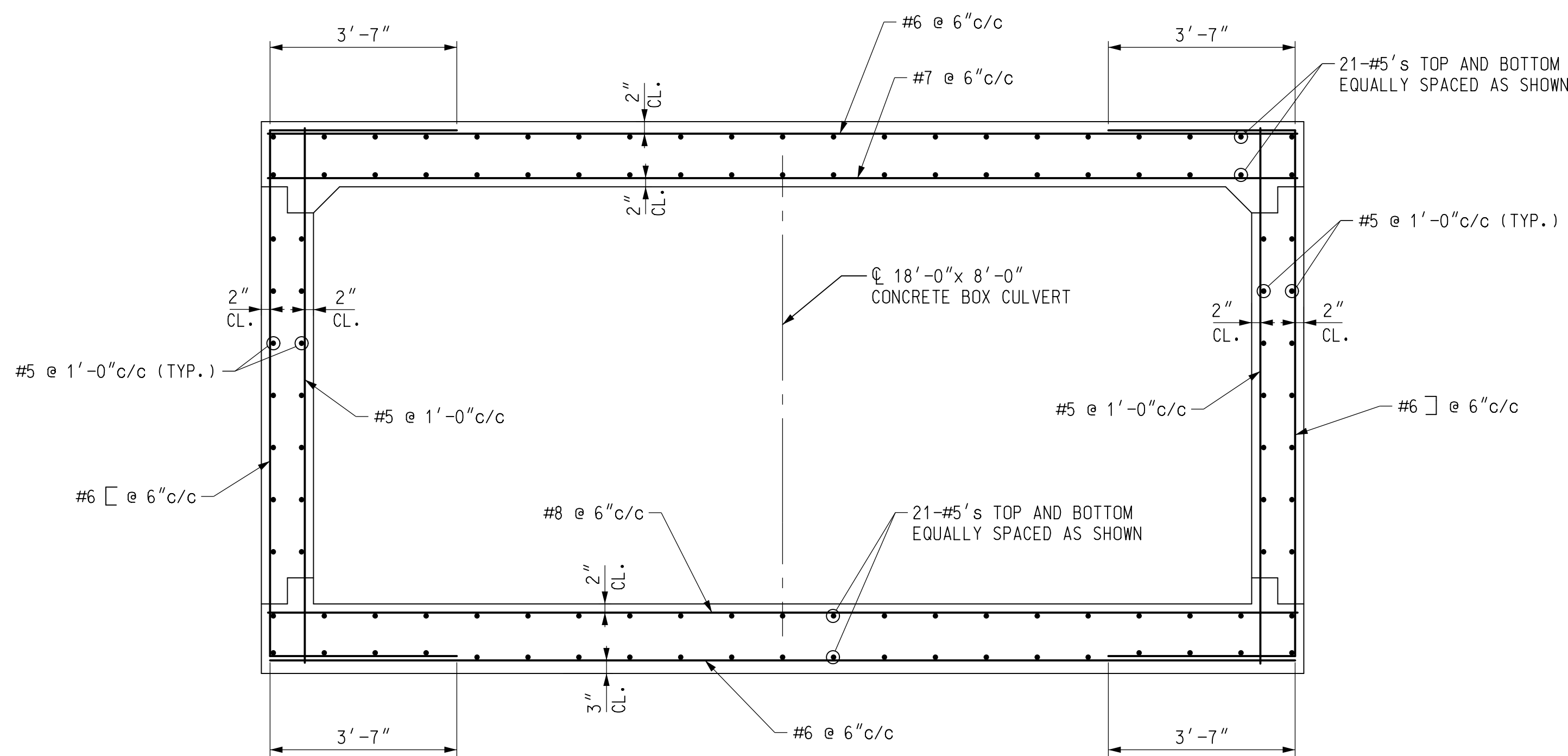
FILE: G:\SMD\092356\_041\_Mariottsville\_US\_40\CA001\Box\_Culvert\_Design\DR-CL\_Mariottsville.dgn  
 DATE: Thursday, February 23, 2023 AT 07:26 AM 07:26 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 4/21/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 APPROVED: DEPARTMENT OF PUBLIC WORKS  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION





SECTION A-A  
CULVERT TYPICAL SECTION - CAST-IN-PLACE  
SCALE: 1/2" = 1'-0"



SECTION A-A  
CULVERT TYPICAL SECTION REINFORCING - CAST-IN-PLACE  
SCALE: 1/2" = 1'-0"

NOTES:

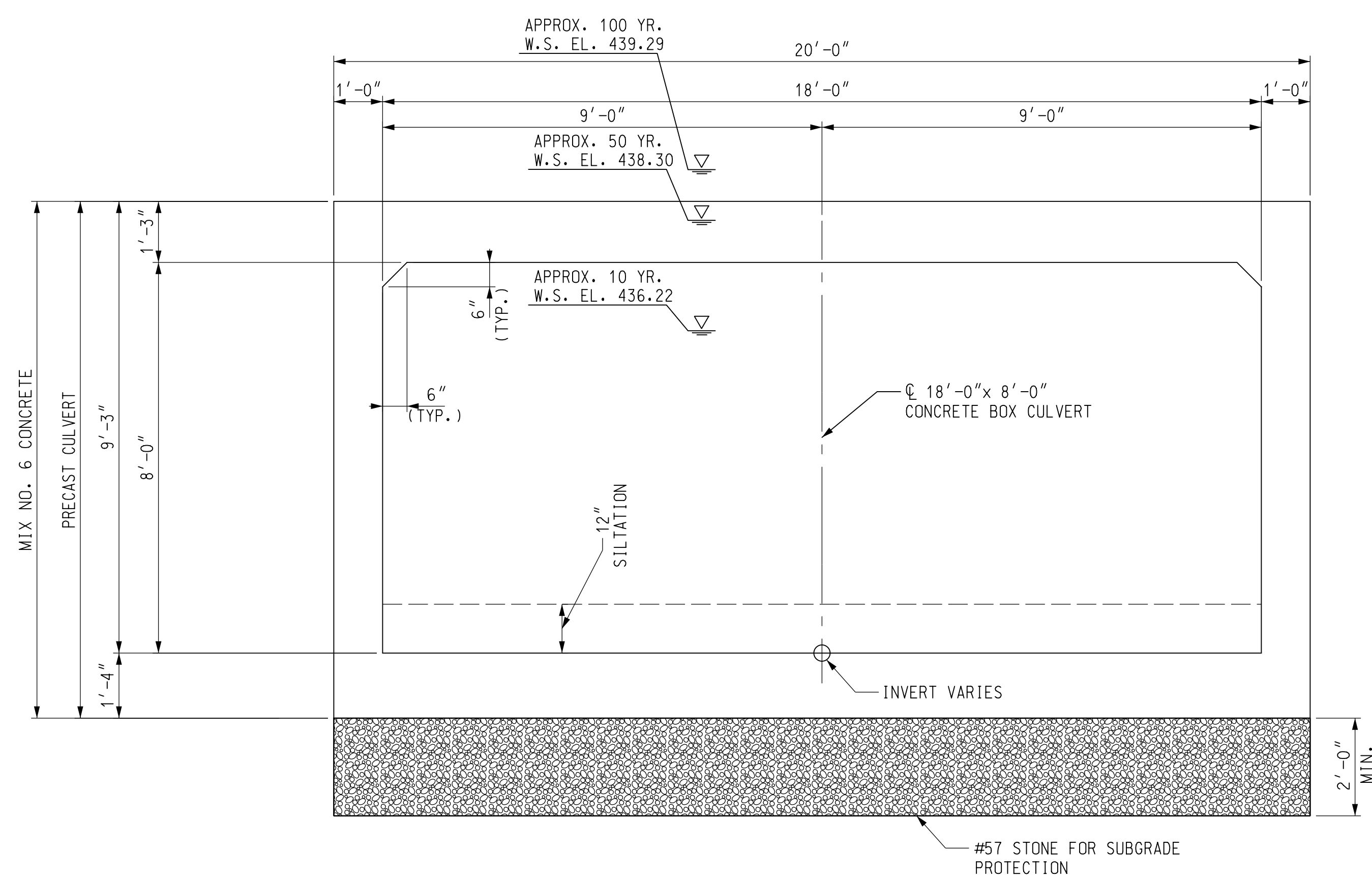
1. FOR GENERAL NOTES, SEE SHEET NO. 44.
2. FOR LONGITUDINAL SECTION, SEE SHEET NO. 44.
3. FOR WORKING POINTS, SEE SHEET NO. 45.
4. FOR UPSTREAM AND DOWNSTREAM HEADWALLS, SEE SHEET NOS. 49 AND 50.
5. FOR WING WALL TYPICAL SECTION, SEE SHEET NO. 51.
6. THE CONTRACTOR MAY SUBMIT AN ALTERNATE DESIGN WITH CALCULATIONS APPROVED BY THE ENGINEER. THE ALTERNATE DESIGN MUST MATCH THE PROPOSED OPENING DIMENSIONS AND SHALL BE COMPLETED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND.
7. THE BOX CULVERT END SECTIONS AND ALL WING WALLS, HEADWALLS AND TOE WALLS SHALL BE CAST-IN-PLACE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME III.

FILE: G:\SMD\092356-041\_Marriotttsville US 40\CA001\Box Culvert Design\DR-TS\_CIP\_Marriotttsville.dgn  
 DATE: Thursday, February 23, 2023 AT 07:26 AM 07:26 AM

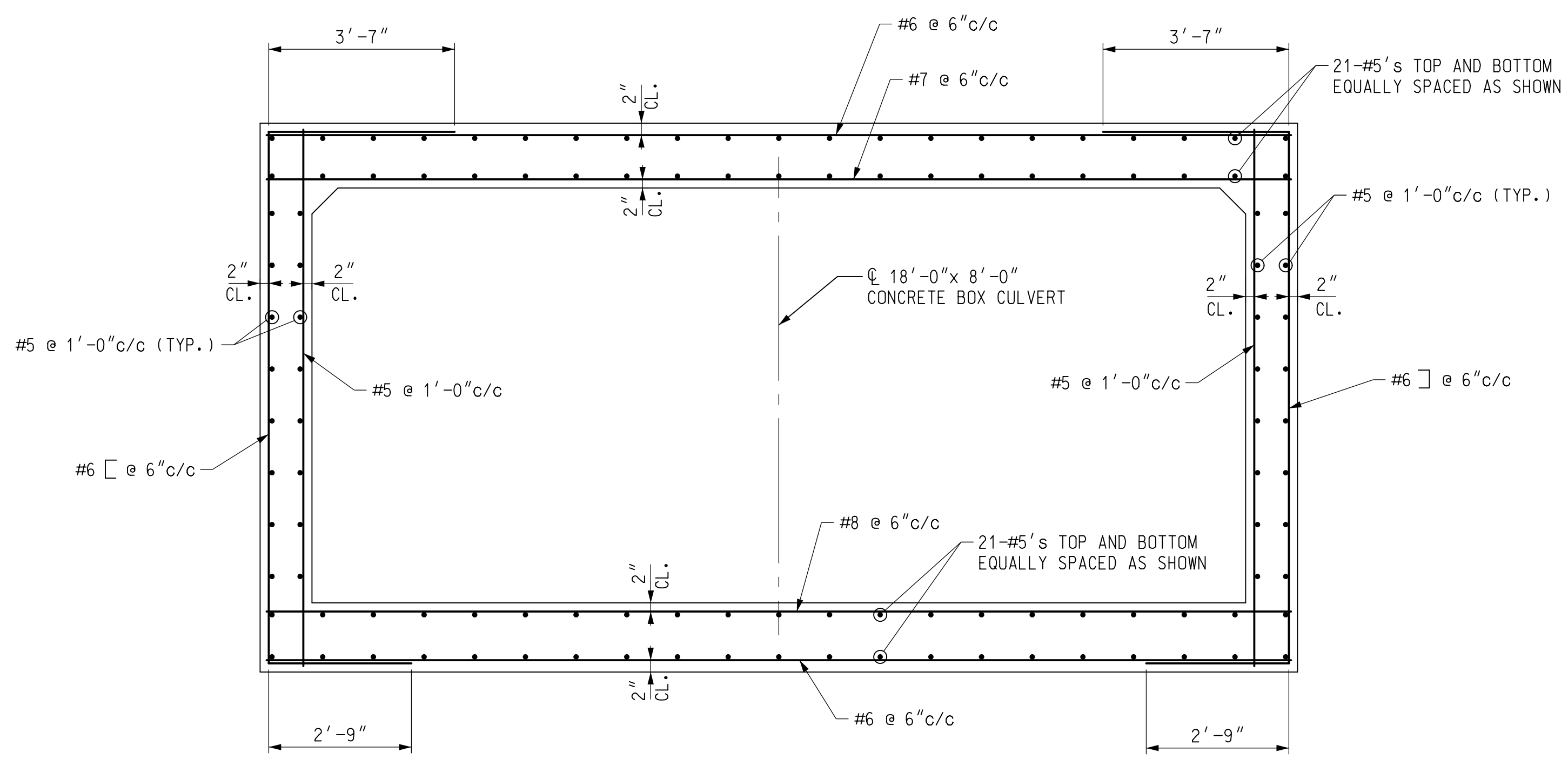
APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by:	DATE: 5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DocuSigned by:	DATE: 4/19/2023
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by:	DATE: 4/21/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DocuSigned by:	DATE: 4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DocuSigned by:	DATE: 4/21/2023

		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24. DocuSigned by: JOHN A. SMITH PROFESSIONAL ENGINEER 2/20/23	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		MARRIOTTSTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
DEVELOPER: MANGIONE ENTERPRISES OF TURF RAYLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		CULVERT TYPICAL SECTION CAST-IN-PLACE DATE: NOVEMBER 2022   BEI PROJECT NO. 2769 DESIGN: GGN   DRAFT: AJV   SCALE: 1/2" = 1'-0"   SHEET 46 OF 60	





SECTION A-A  
CULVERT TYPICAL SECTION - PRECAST  
SCALE: 1/2" = 1'-0"



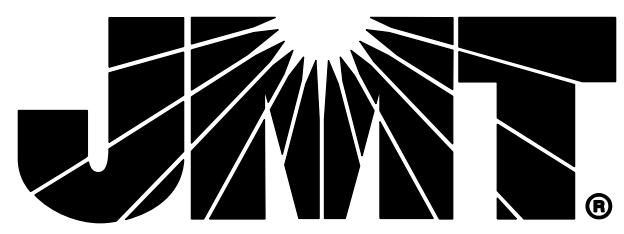
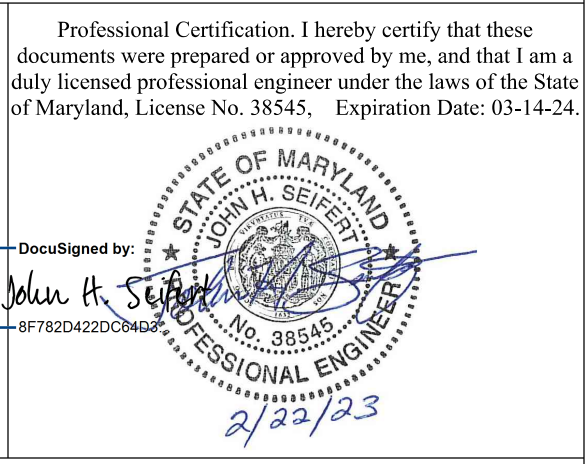
SECTION A-A  
CULVERT TYPICAL SECTION REINFORCING - PRECAST  
SCALE: 1/2" = 1'-0"

NOTES:

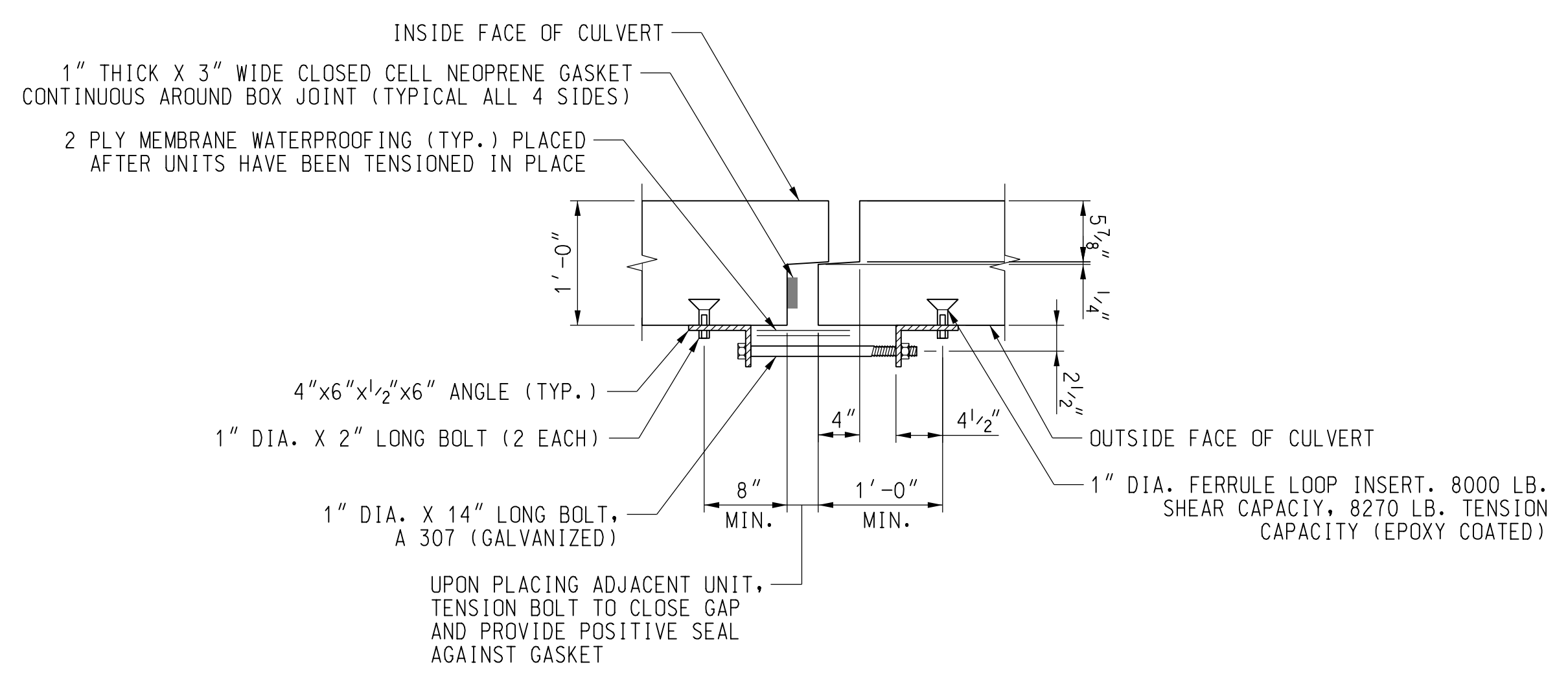
1. FOR GENERAL NOTES, SEE SHEET NO. 44.
2. FOR LONGITUDINAL SECTION, SEE SHEET NO. 44.
3. FOR WORKING POINTS, SEE SHEET NO. 45.
4. FOR UPSTREAM AND DOWNSTREAM HEADWALLS, SEE SHEET NOS. 49 AND 50.
5. FOR WING WALL TYPICAL SECTION, SEE SHEET NO. 51.
6. THE CONTRACTOR MAY SUBMIT AN ALTERNATE DESIGN WITH CALCULATIONS APPROVED BY THE ENGINEER. THE ALTERNATE DESIGN MUST MATCH THE PROPOSED OPENING DIMENSIONS AND SHALL BE COMPLETED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND.
7. THE BOX CULVERT END SECTIONS AND ALL WING WALLS, HEADWALLS AND TIE WALLS SHALL BE CAST-IN-PLACE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME III.

FILE: G:\SMD\092356\_041\_Marriotttsville.US.40\CA00\Box\_Culvert\_Design\DR-TS\_Precast\_Marriotttsville.dgn  
 DATE: Thursday, February 23, 2023 AT 07:26 AM 07:26 AM

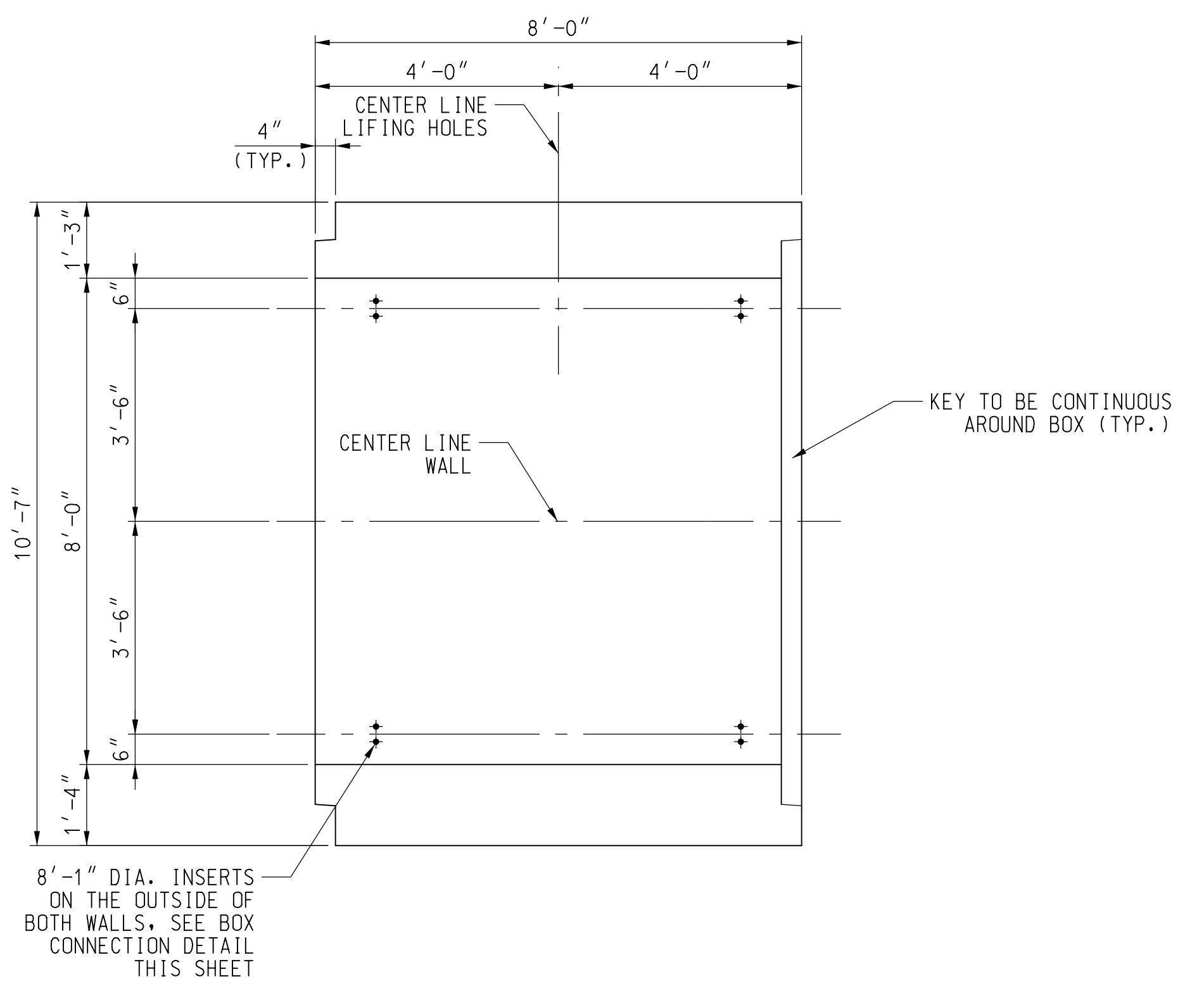
APPROVED: DEPARTMENT OF PUBLIC WORKS	
<i>[Signature]</i>	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
<i>[Signature]</i>	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
<i>[Signature]</i>	4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24. 	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		MARRIOTTSTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		CULVERT TYPICAL SECTION PRECAST DATE: NOVEMBER 2022   BEI PROJECT NO. 2769 DESIGN: GGN   DRAFT: AJV   SCALE: 1/2" = 1'-0"   SHEET 47 OF 60	



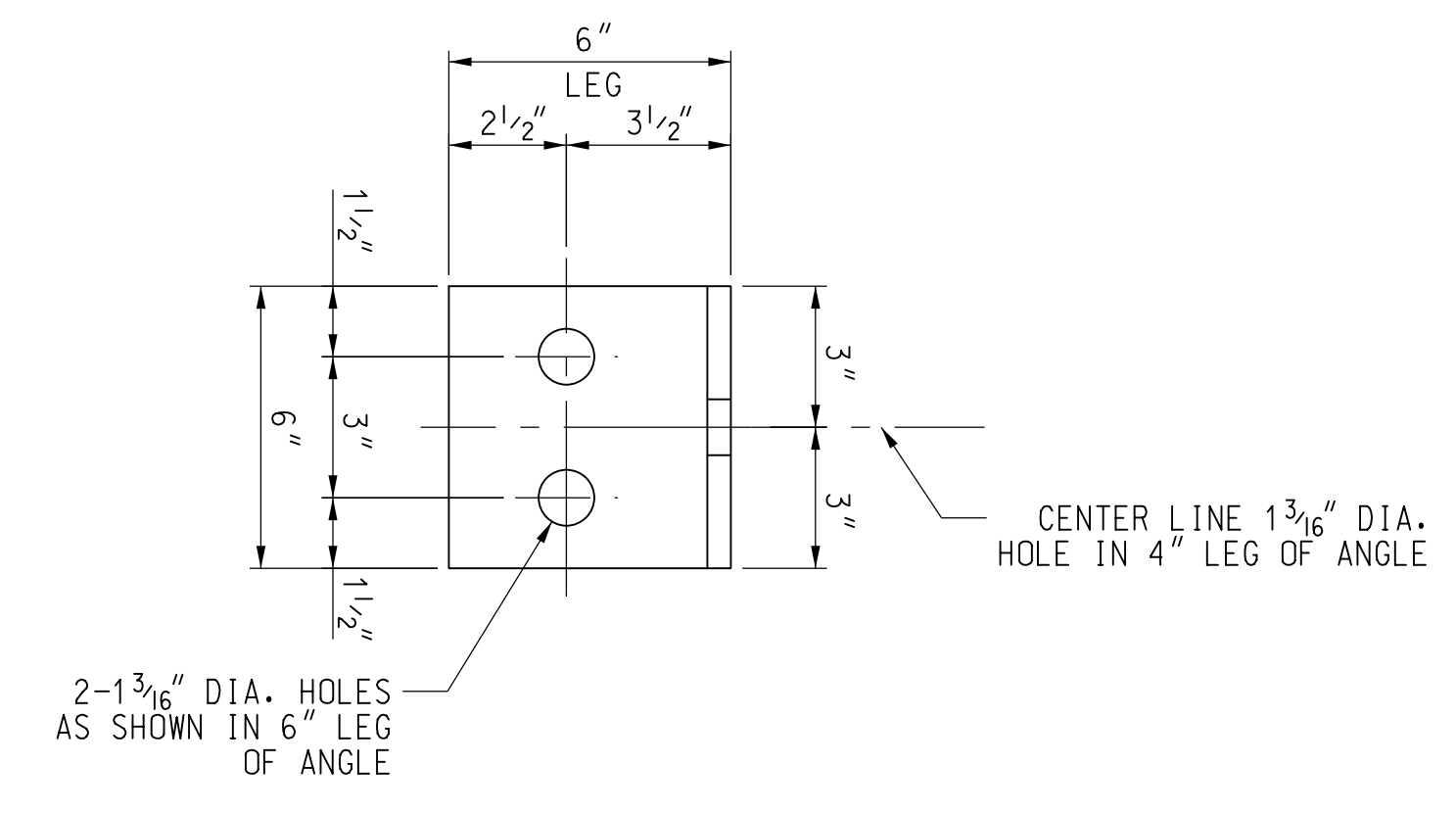


**BOX CONNECTION DETAIL FOR PRECAST UNITS**  
SCALE: 1" = 1'-0"

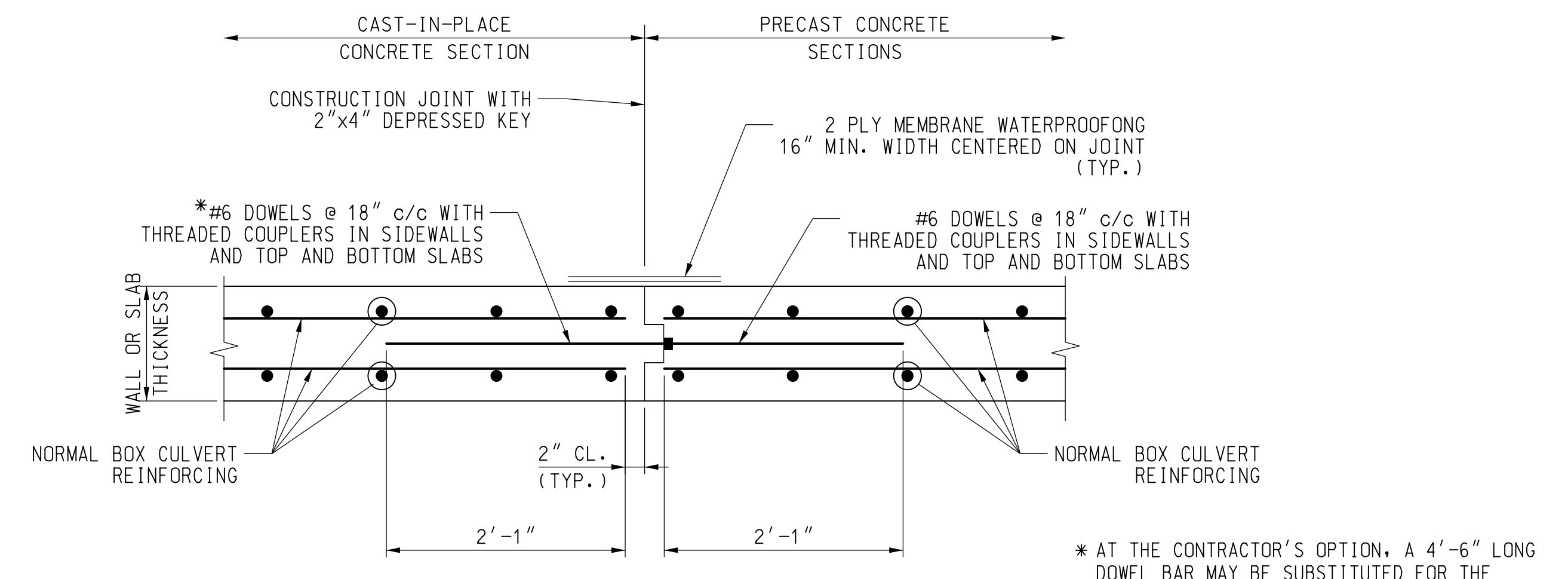


**TYPICAL LONGITUDINAL SECTION THRU BOX**  
SCALE: 1/2" = 1'-0"

- NOTES:**
1. ALL BOX CONNECTION HARDWARE TO BE A709, GRADE 36 GALVANIZED STEEL AND SHALL BE LEFT IN PLACE AS THE UNITS ARE PLACED. ALL GALVANIZING OF HARDWARE SHALL BE IN ACCORDANCE WITH A 153.
  2. 2 SETS OF CONNECTION HARDWARE TO BE PROVIDED ON EACH VERTICAL WALL ON EACH SIDE OF CULVERT AT A JOINT (4 TOTAL AT EACH JOINT).
  3. CONNECTION HARDWARE TO BE LEFT IN PLACE.



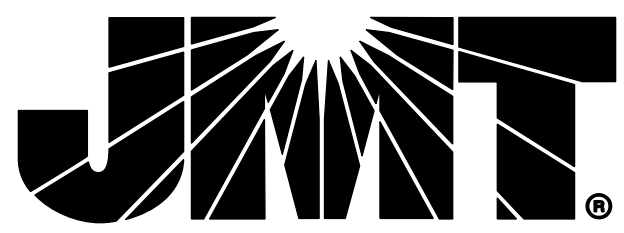
**ELEVATION CONNECTION ANGLE DETAIL**  
SCALE: 3" = 1'-0"



**CONNECTION DETAIL AT CAST-IN-PLACE AND PRECAST UNITS**  
SCALE: 1" = 1'-0"

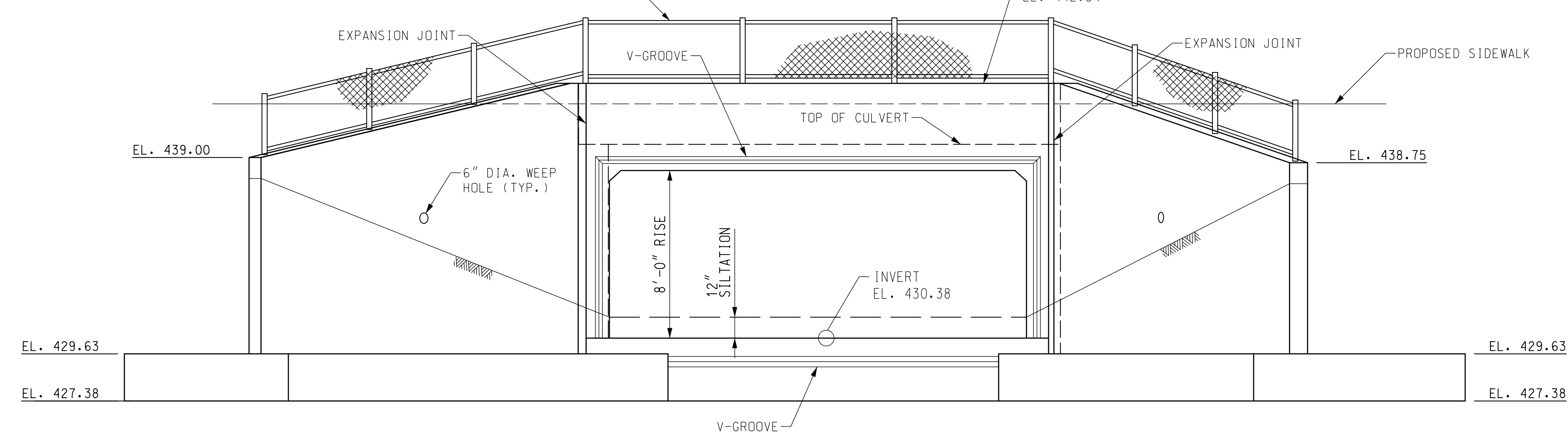
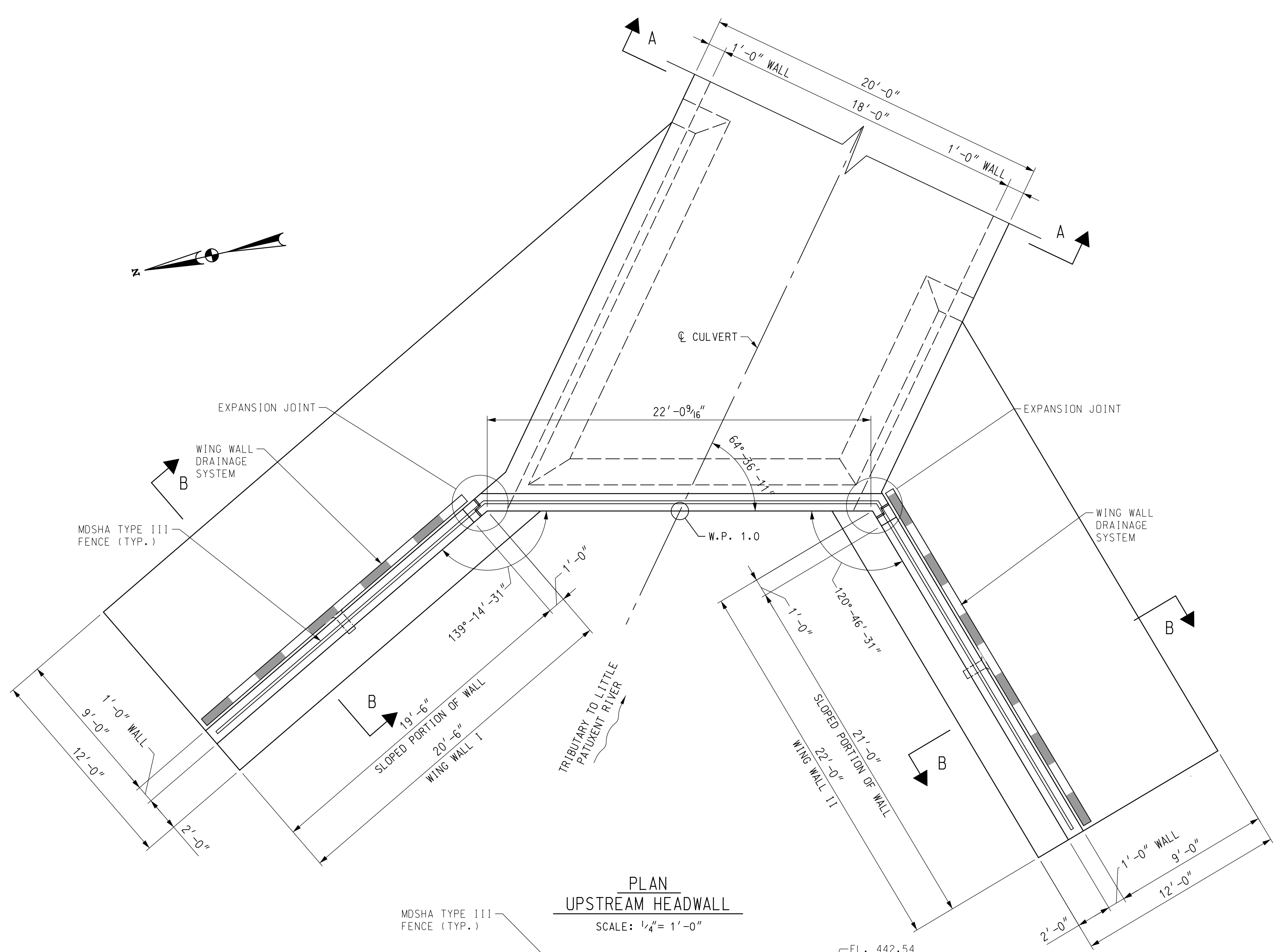
FILE: G:\SMD\092356\_041\_Marriottsville\_US\_40\CA00\Box\_Culvert\_Design\DR-TS\_Precast\_Details\_Marriottsville.dgn  
 DATE: Thursday, February 23, 2023 AT 07:26 AM 07:26 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: [Signature]	DATE: 5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DocuSigned by: [Signature]	DATE: 4/19/2023
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: [Signature]	DATE: 4/21/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DocuSigned by: [Signature]	DATE: 4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DocuSigned by: [Signature]	DATE: 4/21/2023

NO.		DATE		REVISION
				
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.				
DocuSigned by: [Signature] No. 89545 PROFESSIONAL ENGINEER 2/22/23				
<b>OWNER:</b> HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		<b>MARRIOTTSVILLE ROAD WIDENING</b> <b>APFO MITIGATION PLANS</b> <b>F-21-033</b>		
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND				
<b>DEVELOPER:</b> MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400				
<b>DESIGN:</b> GGN   <b>DRAFT:</b> AJV		<b>DATE:</b> NOVEMBER 2022   <b>BEI PROJECT NO.:</b> 2769		
<b>SCALE:</b> AS SHOWN		<b>SHEET:</b> 48 OF 60		



FILE: G:\SMD\092356\_041\_Marriottsville\_US\_40\CA00\Box\_Culvert Design\BPR-CP\_Marriottsville\_Upstream\_Headwall.dgn  
 DATE: Thursday, February 23, 2023 AT 07:26 AM 07:26 AM

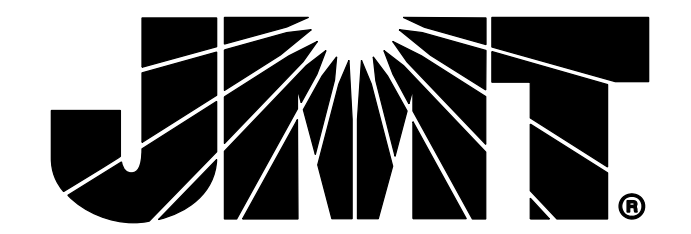
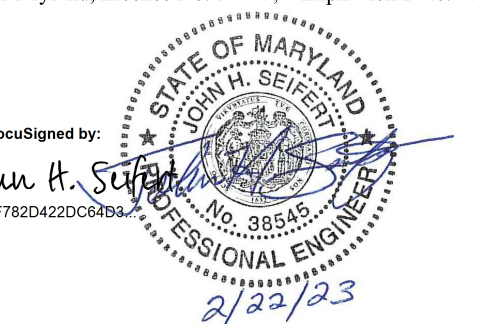


- NOTES:**
1. FOR GENERAL NOTES, SEE SHEET NO. 44.
  2. FOR LONGITUDINAL SECTION, SEE SHEET NO. 44.
  3. FOR WORKING POINTS, SEE SHEET NO. 45.
  4. FOR CULVERT TYPICAL SECTIONS, SEE SHEET NOS. 46 AND 47.
  5. FOR DOWNSTREAM HEADWALL, SEE SHEET NO. 50.
  6. FOR WING WALL TYPICAL SECTION, SEE SHEET NO. 51.

APPROVED: DEPARTMENT OF PUBLIC WORKS	DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, BUREAU OF HIGHWAYS		5/4/2023
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, DIVISION OF LAND DEVELOPMENT		4/19/2023
APPROVED: CHAD EDMONDSON	DocuSigned by: <i>[Signature]</i>	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION		4/21/2023

DATUM  
EL. 420.00

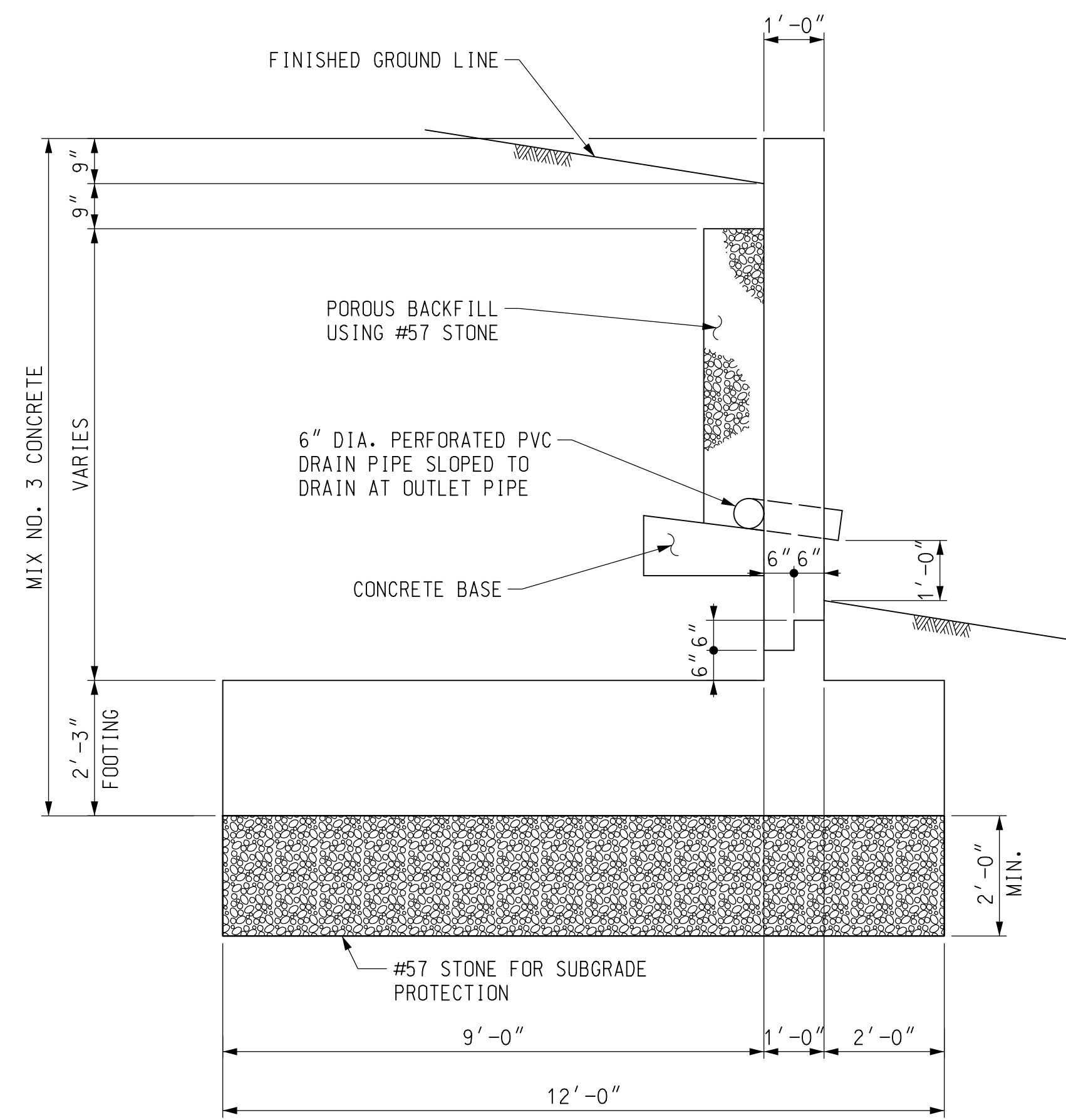
**ELEVATION  
UPSTREAM HEADWALL**  
SCALE: 1/4" = 1'-0"

		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24. 	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		<b>MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033</b>	
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
DESIGN: GGN   DRAFT: AJV		DATE: NOVEMBER 2022	BEI PROJECT NO. 2769
SCALE: 1/4" = 1'-0"		SHEET 49 OF 60	

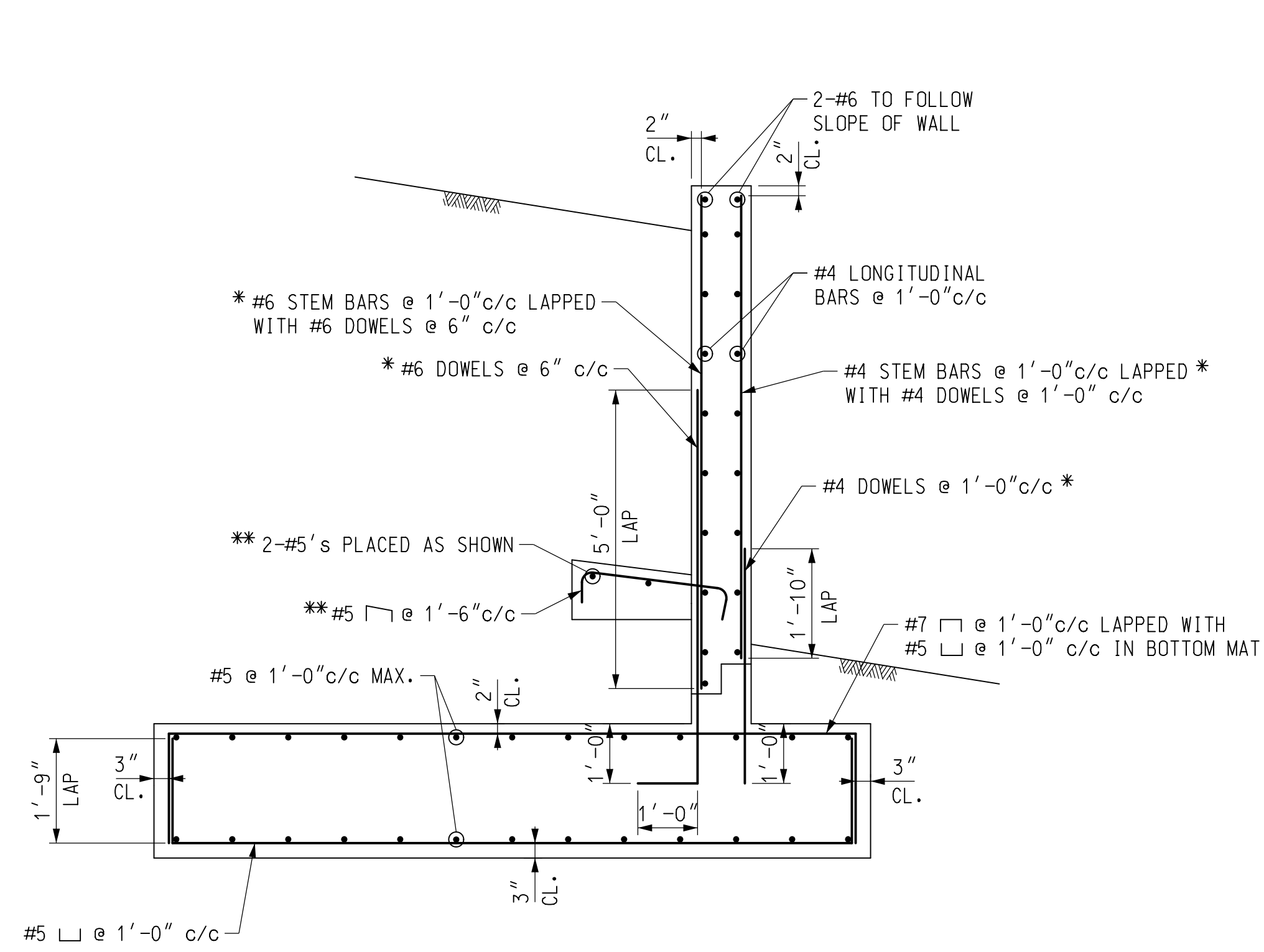








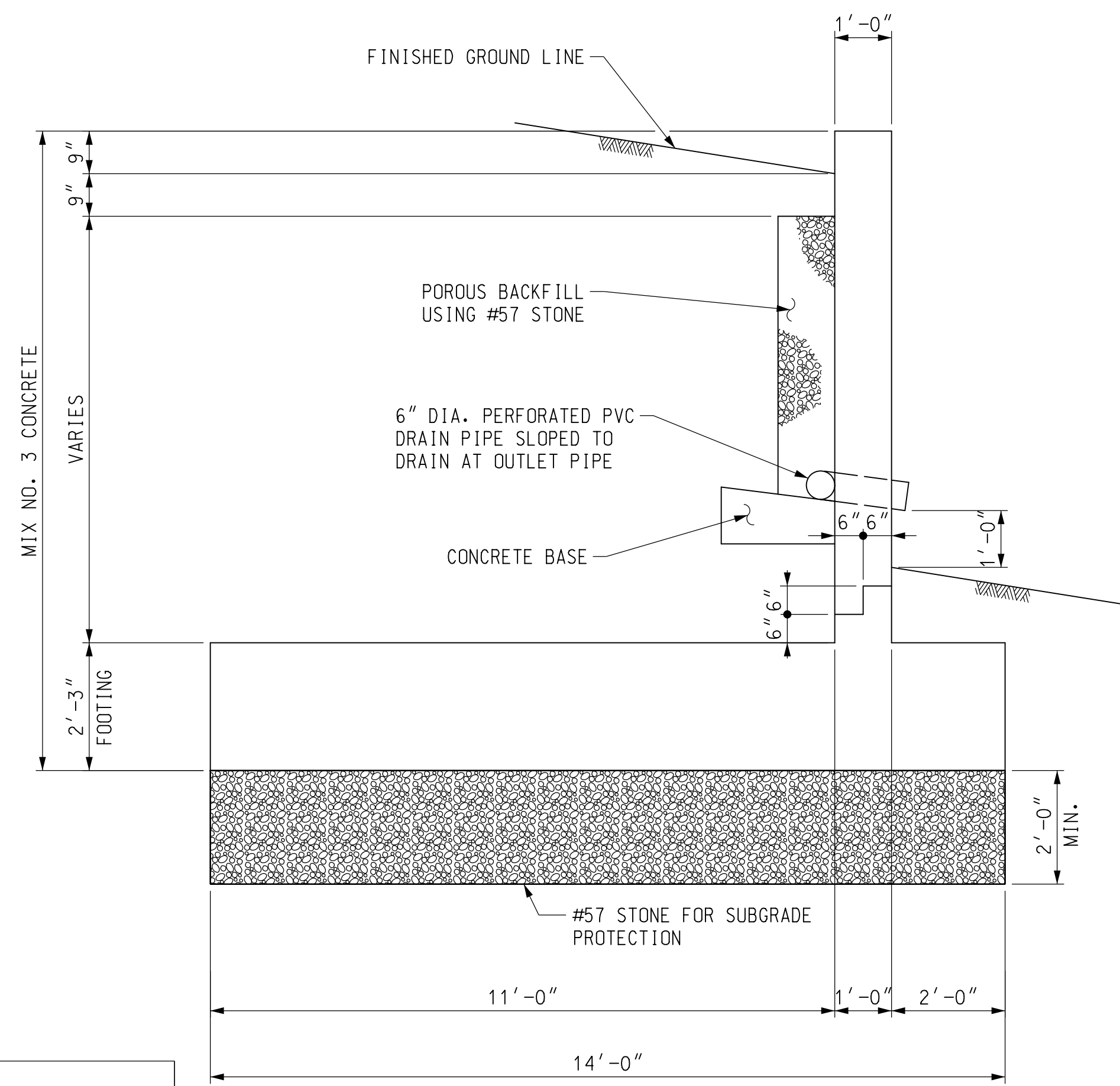
SECTION B-B - WING WALL GEOMETRY  
SCALE: 1/2" = 1'-0"



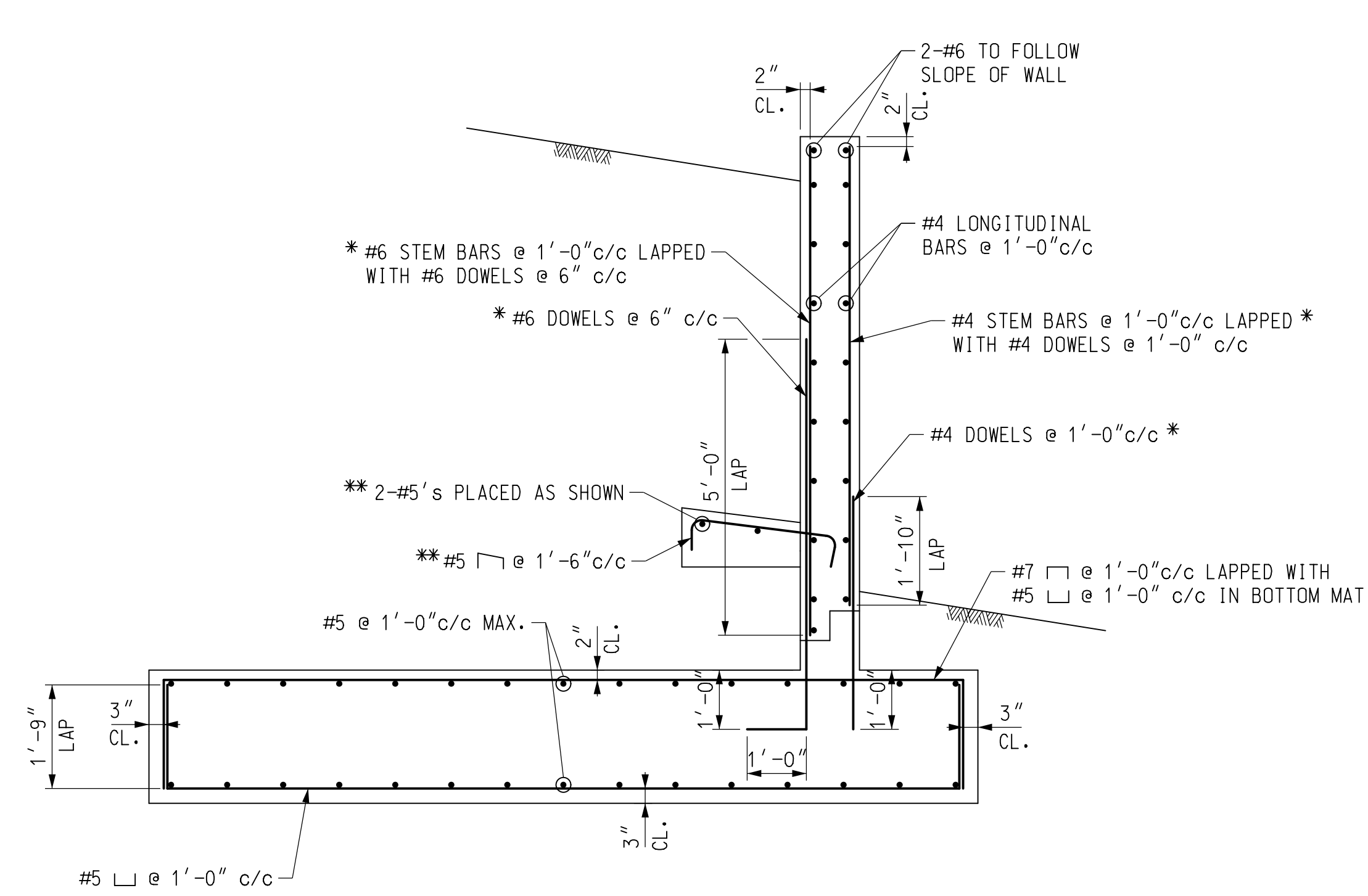
SECTION B-B - WING WALL REINFORCING  
SCALE: 1/2" = 1'-0"

\* AT THE CONTRACTOR'S OPTION, THE DOWEL AND STEM BARS MAY BE PLACED AS ONE CONTINUOUS BAR. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR THIS OPTION.

\*\* IF THE CONCRETE BASE IS POURED TO REST ON TOP OF THE FOOTING, THE REINFORCING MAY BE ELIMINATED. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR THIS OPTION.



SECTION C-C - WING WALL GEOMETRY  
SCALE: 1/2" = 1'-0"



SECTION C-C - WING WALL REINFORCING  
SCALE: 1/2" = 1'-0"

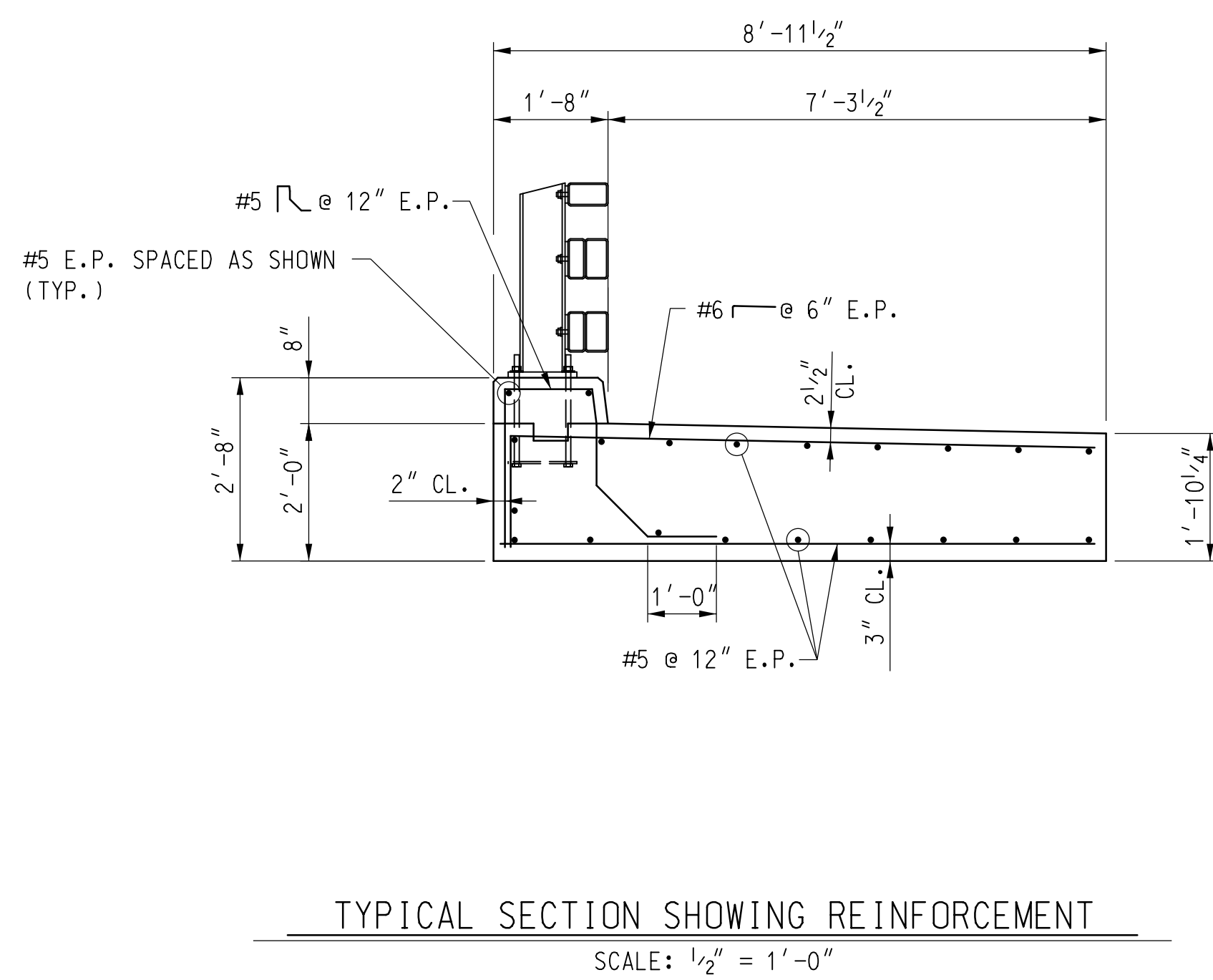
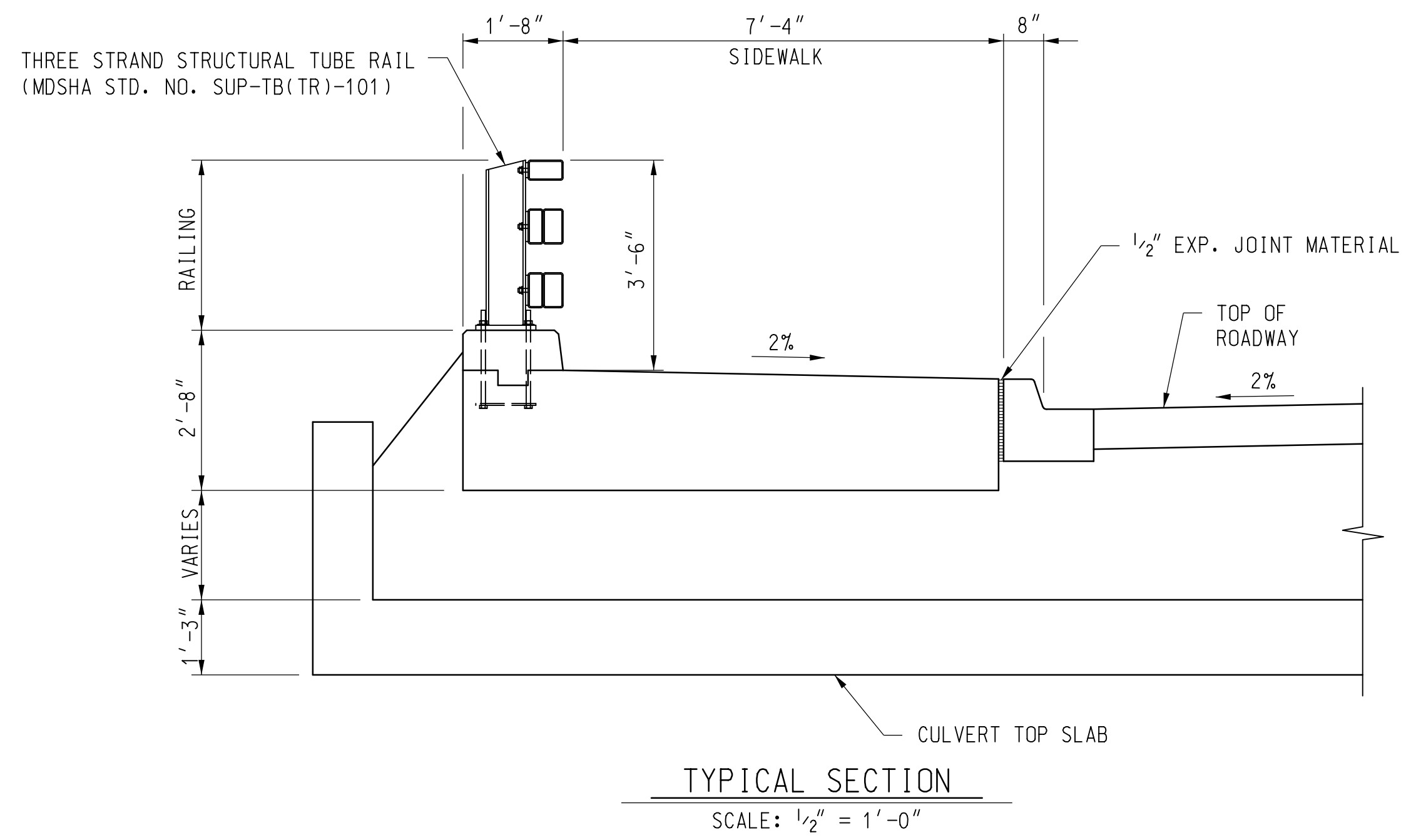
NOTES:  
1. FOR LOCATIONS OF SECTIONS B-B AND C-C, SEE SHEET NOS. 49 AND 50.

FILE: G:\SMD\092356\_041\_Marriottsville US\_40\CA00\Box\_Culvert Design\DRR-WW\_Marriottsville.dgn  
 Thursday, February 23, 2023 AT 07:27 AM 07:27 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
APPROVED: CHAD Edmondson	4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24. 	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
DEVELOPER: MANGIONE ENTERPRISES OF TURF RAVEL LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		SECTION B-B WING WALL DETAILS DATE: NOVEMBER 2022   BEI PROJECT NO. 2769 DESIGN: GGN   DRAFT: AJV   SCALE: 1/2" = 1'-0"   SHEET 51 OF 60	



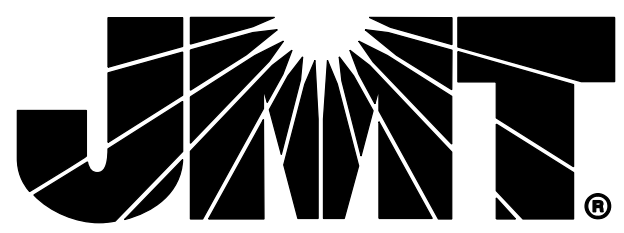
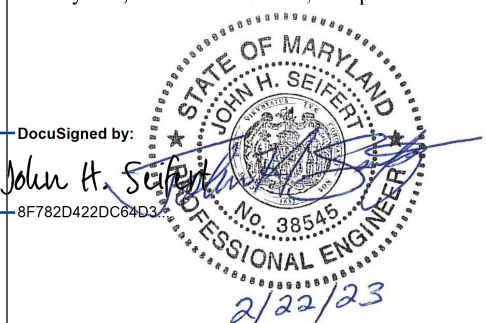


**NOTES:**

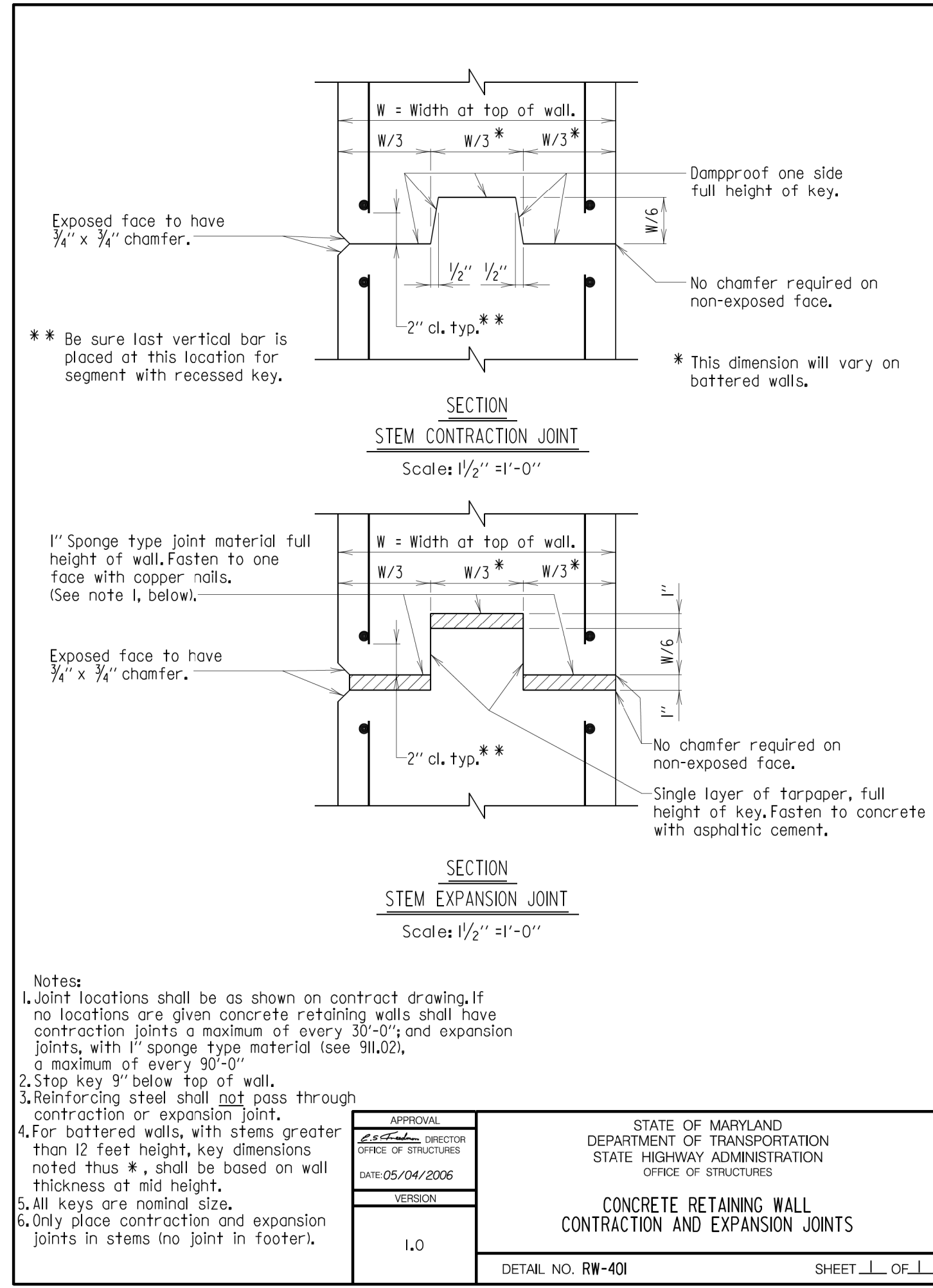
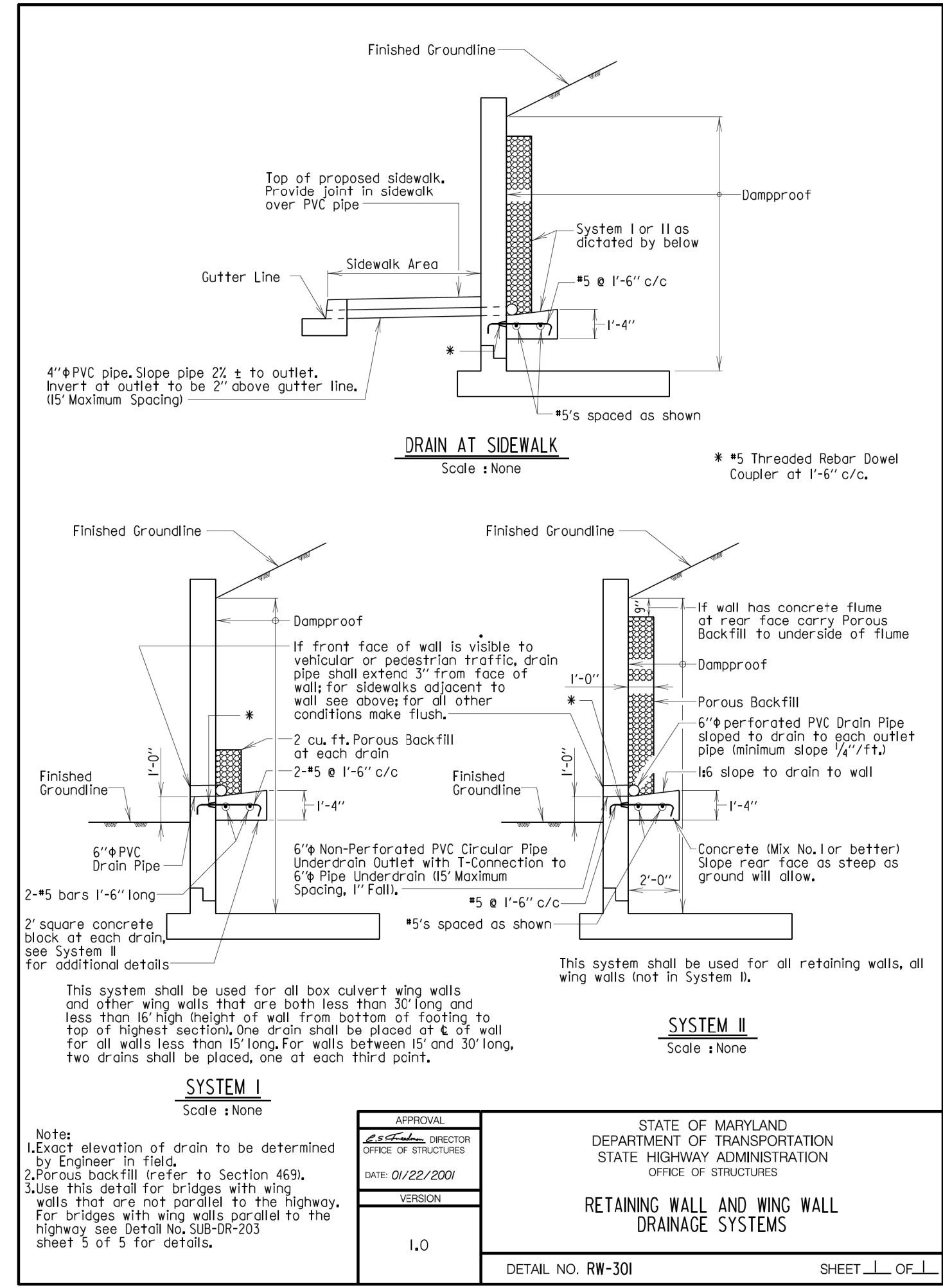
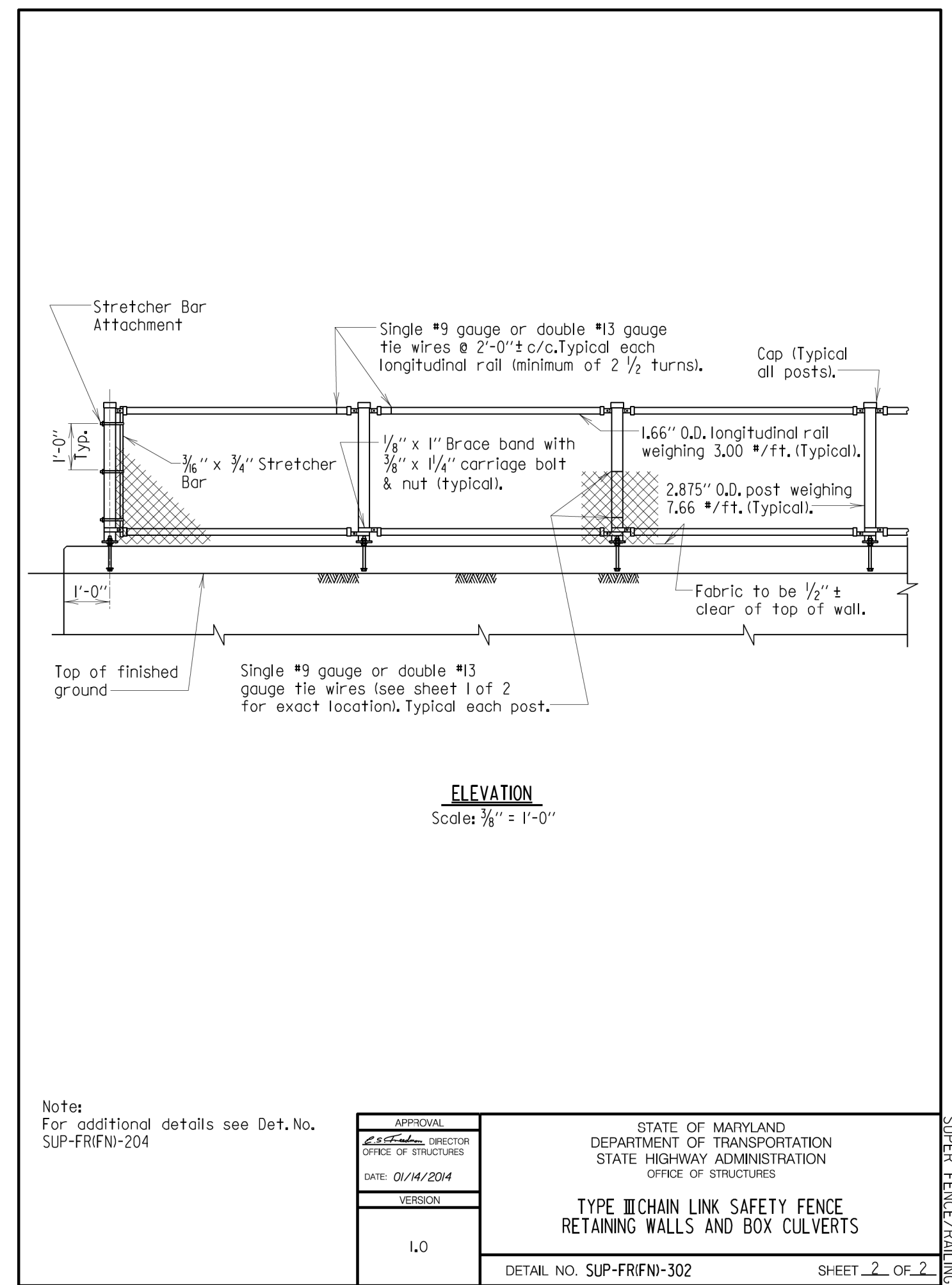
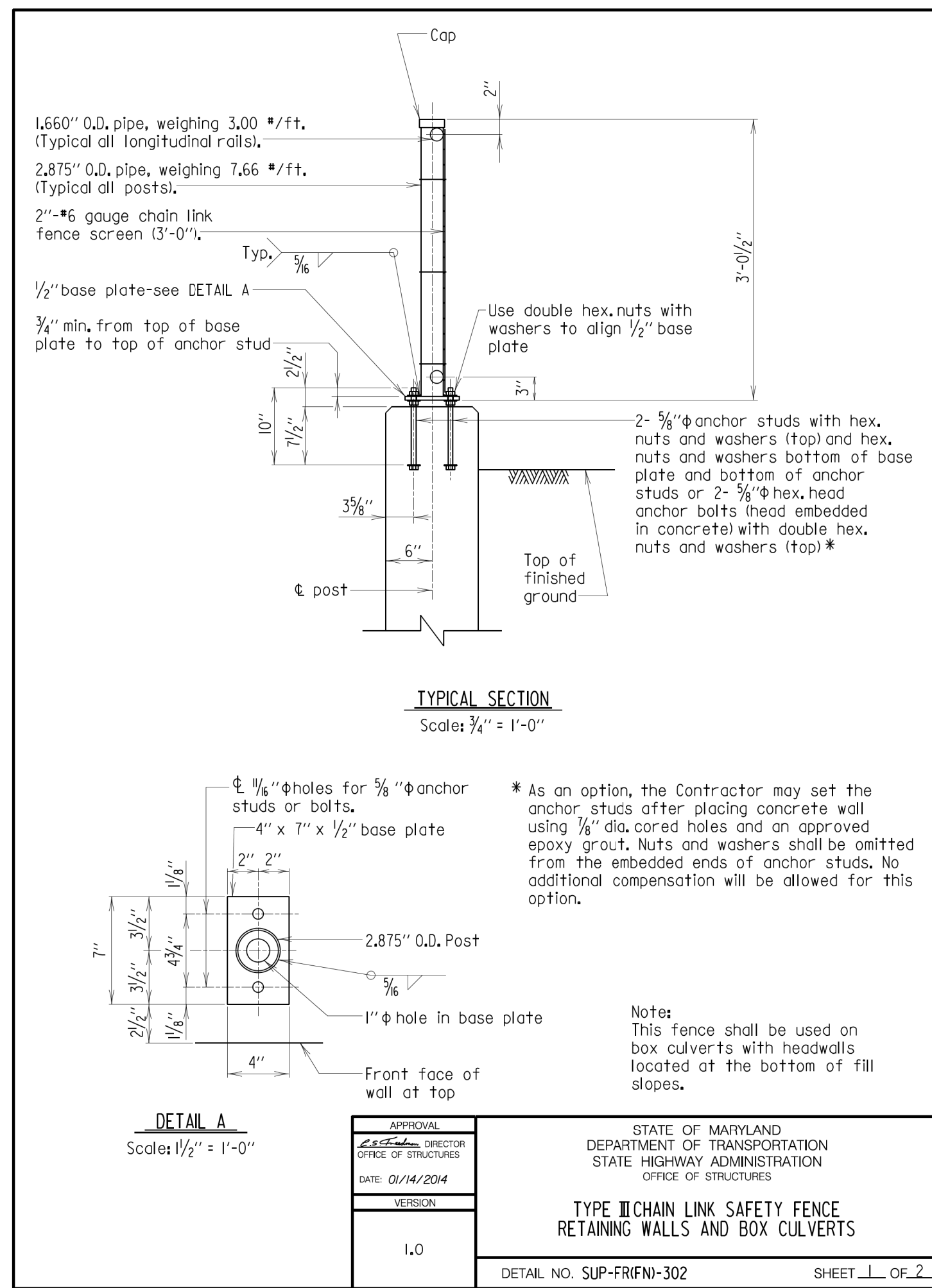
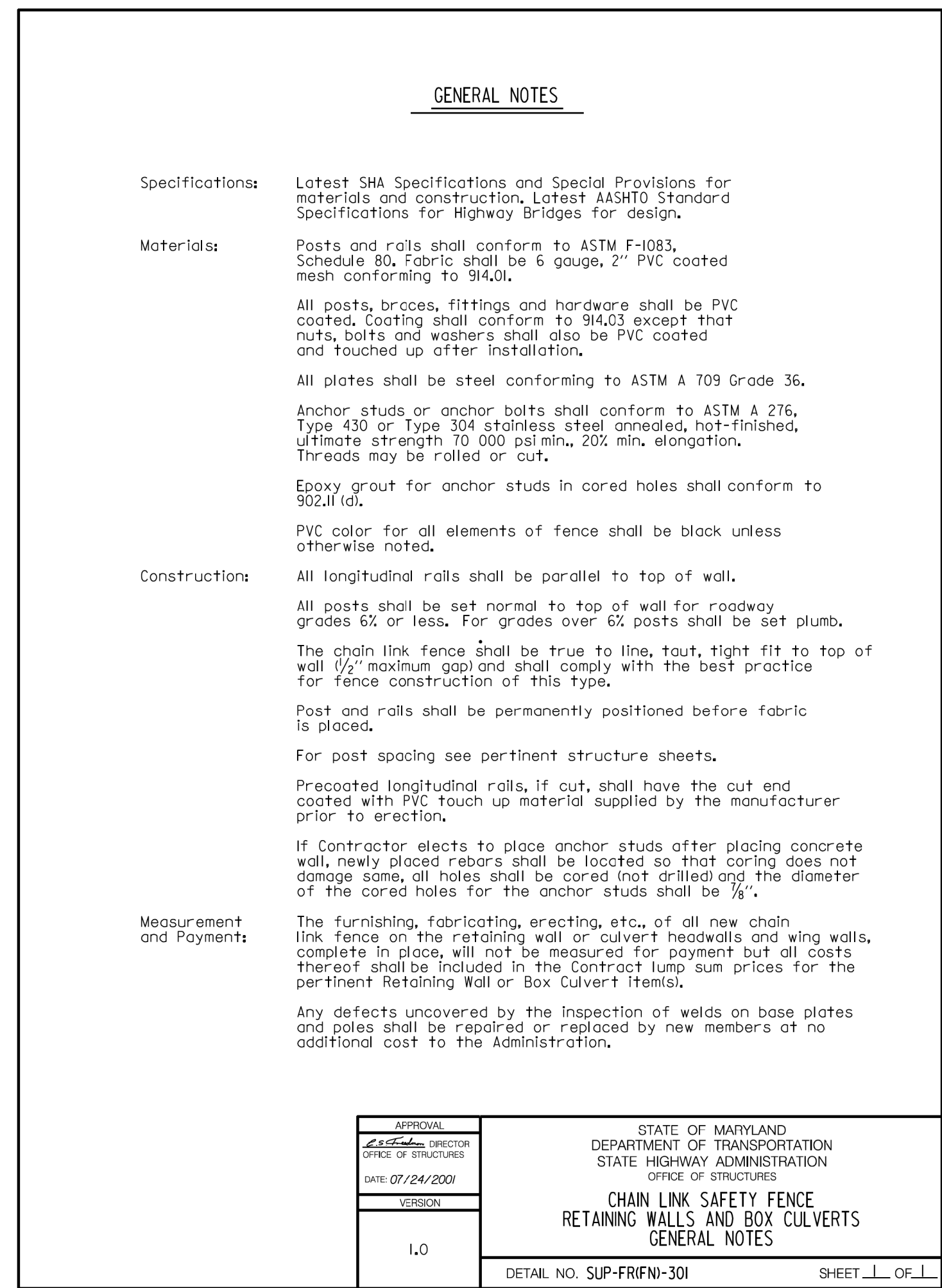
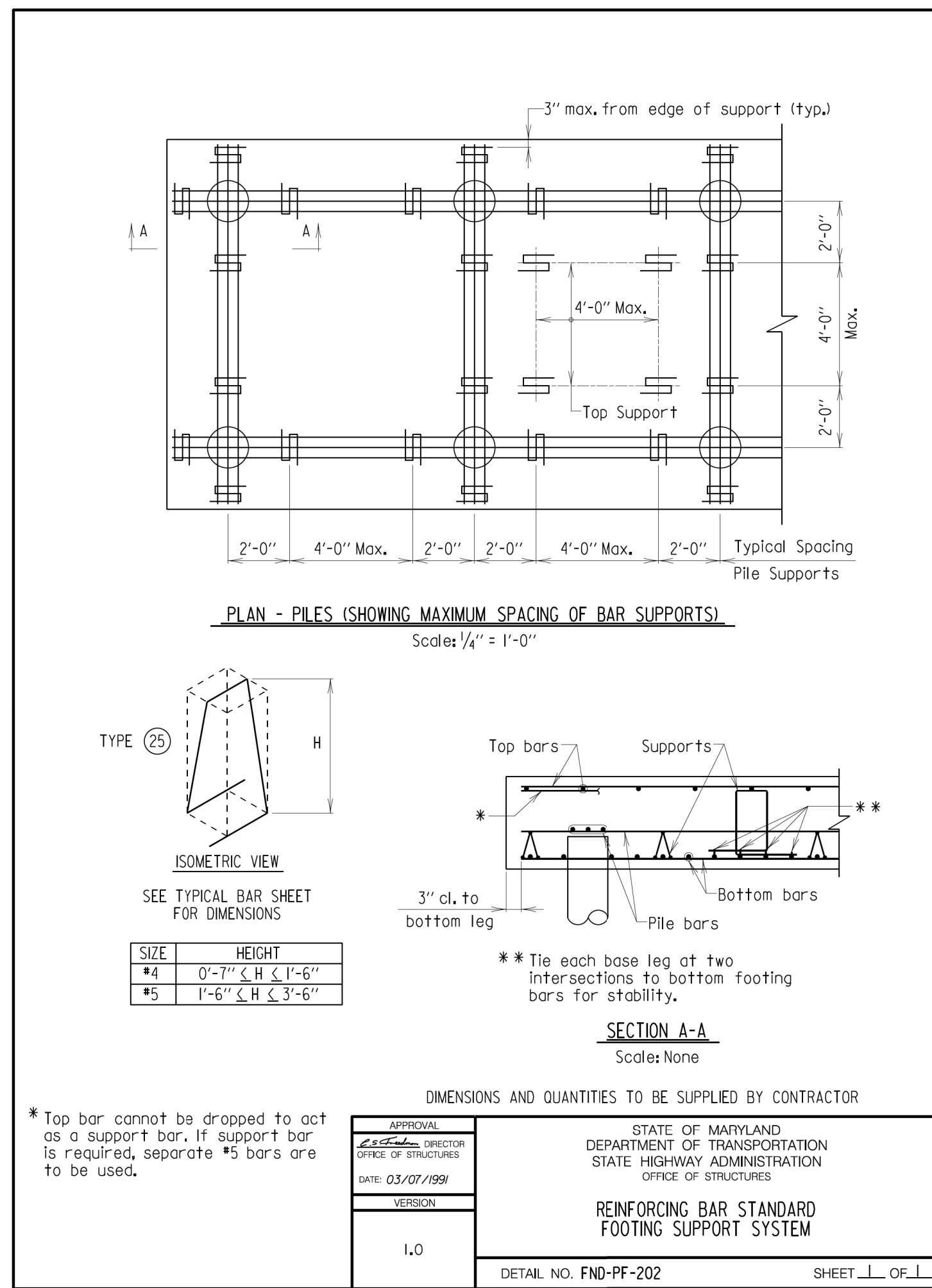
1. CONCRETE FOR MOMENT SLAB SHALL BE MIX NO.6 (4500 PSI).
2. COST FOR THE THREE STRAND STRUCTURAL TUBE RAIL WILL NOT BE MEASURED FOR PAYMENT, BUT SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE "MOMENT SLAB" PAY ITEM.
3. FOR PLAN VIEW OF MOMENT SLAB, SEE SHEET NO. 43.

FILE: G:\SMD\092356-04\Marriottsville US 40\CA00\Box Culvert Design\DR-60\_Marriottsville.dgn  
 DATE: Thursday, February 23, 2023 AT 07:27 AM 07:27 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS	
<i>[Signature]</i>	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
<i>[Signature]</i>	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
<i>[Signature]</i>	4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24. 	
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		<b>MARRIOTTSVILLE ROAD WIDENING</b> <b>APFO MITIGATION PLANS</b> <b>F-21-033</b> TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		<b>BARRIER AND MOMENT SLAB</b> <b>DETAILS</b> DATE: NOVEMBER 2022   BEI PROJECT NO. 2769 SCALE: 1/2" = 1'-0"   SHEET 52 OF 60	
DESIGN: GGN	DRAFT: AJV		





G:\SMD\092356-041\_Marriotttsville US 40VCA00A\Box Culvert Design\DR-S001\_Marriotttsville.dgn  
Thurs 02/23/2023 11:23:23 AM 07:27 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS	DATE: 5/4/2023
CHIEF, BUREAU OF HIGHWAYS	
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	DATE: 4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	
APPROVED: CHAD Edmondson	DATE: 4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	

NO. DATE REVISION	
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.	
	
DocuSigned by:  No. 38545 PROFESSIONAL ENGINEER 2/22/23	
OWNER:	HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4441
<b>MARRIOTTSTVILLE ROAD WIDENING                  APFO MITIGATION PLANS                  F-21-033</b>	
TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND	
<b>STANDARD DETAILS - 1</b>	
DEVELOPER:	MANGIONE ENTERPRISES OF TURF RAVELLY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400
DESIGN: GGN	DRAFT: AJV
DATE: NOVEMBER 2022	BEI PROJECT NO. 2769
SCALE: 1/2" = 1'-0"	SHEET 53 OF 60



**HEADWALL SECTION**  
Scale: 1/2" = 1'-0"

**TOE WALL SECTION**  
Scale: 1/2" = 1'-0"

**TRIANGULAR KEY DETAIL**

**SKIEW ANGLE**

S or T	Key Size
a	a/2
Less than 12"	3" 1 1/2"
12" to 18"	4" 2"
18" and over	6" 3"

**Notes:**  
 1. When skew angle of box culvert is less than 70° see main box culvert sheets for additional reinforcing steel. (See Above)  
 2. Normal box culvert reinforcing steel not shown.  
 3. Maximum height of headwall is 4'-6" see main box culvert sheets for added reinforcing steel if this height is exceeded.  
 4. All keys are nominal size.  
 5. Design is valid for live load surcharge.

APPROVAL: [Signature] DATE: 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT

DocuSigned by: CHAD Edmondson 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  
**BOX CULVERT HEADWALL AND TOEWALL DETAILS**  
 DETAIL NO. BC-101 SHEET 1 OF 1

**SECTION A-A**  
Scale: None

**ELEVATION**  
Scale: None

**PLAN**  
Scale: 1/2" = 1'-0"

M, N, S, T	Key Size	ELEVATION VERTICAL LOCATION OF KEY WHEN PILES ARE USED	PLAN HORIZONTAL LOCATION OF KEY WHEN PILES ARE USED
a	a/2		
Less than 12"	3" 1 1/2"		
12" to 18"	4" 2"		
18" or over	6" 3"		

**Notes:**  
 1. Reinforcing steel not to pass through contraction joint.  
 2. Full face of contraction joint to be dampproofed.  
 3. When piles are utilized, key in bottom shall be placed midway between top of bottom slab and top of pile vertically, and between rows of piles horizontally. (See Above)

APPROVAL: [Signature] DATE: 11/11/1997  
 CHIEF, OFFICE OF STRUCTURES

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  
**CONTRACTION JOINT FOR BOX CULVERT BARREL**  
 DETAIL NO. BX-201 SHEET 1 OF 1

**SECTION A-A**  
Scale: None

**ELEVATION**  
Scale: None

**PLAN**  
Scale: 1/2" = 1'-0"

M or P	Triangular Key Size	Wing Wall Key Size
a	b	
Less than 12"	3" 1 1/2"	3" x 1 1/2"
12" to 18"	4" 2"	4" x 2"
18" or over	6" 3"	6" x 3"

**Notes:**  
 1. Normal reinforcing steel not shown.  
 2. All keys are nominal size.  
 3. This joint detail to be used for all walls less than 15' in length.

APPROVAL: [Signature] DATE: 10/09/2007  
 CHIEF, OFFICE OF STRUCTURES

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  
**BOX CULVERT WING WALL CONSTRUCTION JOINT**  
 DETAIL NO. BC-202 SHEET 1 OF 1

**SECTION A-A**  
Scale: None

**ELEVATION**  
Scale: None

**PLAN**  
Scale: None

M, N, S, T	Key Size	ELEVATION VERTICAL LOCATION OF KEY WHEN PILES ARE USED	PLAN HORIZONTAL LOCATION OF KEY WHEN PILES ARE USED
a	a/2		
Less than 12"	3" 1 1/2"		
12" to 18"	4" 2"		
18" or over	6" 3"		

**Notes:**  
 1. Reinforcing steel not to pass through joint.  
 2. When piles are utilized, key in bottom shall be placed midway between top of bottom slab and top of pile vertically, and between rows of piles horizontally. (See Above)  
 3. All keys are nominal size.

APPROVAL: [Signature] DATE: 03/22/2006  
 CHIEF, OFFICE OF STRUCTURES

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  
**EXPANSION JOINT FOR BOX CULVERT BARREL**  
 DETAIL NO. BC-301 SHEET 1 OF 1

**SECTION A-A**  
Scale: None

**ELEVATION**  
Scale: None

**PLAN**  
Scale: 1/2" = 1'-0"

M or P	Triangular Key Size
a	b
Less than 12"	3" 1 1/2"
12" to 18"	4" 2"
18" or over	6" 3"

**Notes:**  
 1. Reinforcing steel not to pass through joint.  
 2. All keys are nominal size.  
 3. Expansion joint to extend from top of footing to top of wall.  
 4. This joint detail to be used for all walls greater than 15' in length.

APPROVAL: [Signature] DATE: 10/09/2007  
 CHIEF, OFFICE OF STRUCTURES

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  
**BOX CULVERT WING WALL EXPANSION JOINT**  
 DETAIL NO. BC-302 SHEET 1 OF 1

**SECTION A-A**  
Scale: None

**ELEVATION**  
Scale: None

**PLAN (OPTION)**  
Scale: 1/2" = 1'-0"

**Notes:**  
 1. When the distance measured along the outside face of culvert, between the back of headwall/wing wall and the rear face of wing wall footing (shown as D), exceeds 15 ft, the contractor has the option of installing the footing as shown in Option.  
 2. Culvert and toe wall reinforcing steel not shown.

APPROVAL: [Signature] DATE: 10/09/2007  
 CHIEF, OFFICE OF STRUCTURES

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  
**TIE-IN DETAIL FOR BOX CULVERT BOTTOM SLAB AND WING WALL FOOTING**  
 DETAIL NO. BC-501 SHEET 1 OF 1

FILE: G:\SMD\092356\_041\_Marrriotttsville\_US\_40\CA00A\Box Culvert Design\DR-002-Marrriotttsville.dgn  
 Thursday, February 23, 2023 AT 07:27 AM 07:27 AM

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.

DocuSigned by: John A. Saffell No. 88545 PROFESSIONAL ENGINEER 2/22/23

**JMT**

**MARRIOTTSVILLE ROAD WIDENING  
 APFO MITIGATION PLANS  
 F-21-033**

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
 ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

**STANDARD DETAILS - 2**

OWNER: HOWARD COUNTY MARYLAND  
 DIRECTOR'S OFFICE OF  
 DEPARTMENT OF PUBLIC WORKS  
 3430 COURTHOUSE DRIVE  
 ELLICOTT CITY, MD 21043  
 410-313-4401

DEVELOPER: MANGIONE ENTERPRISES OF TURF RAVELLY LIMITED PARTNERSHIP  
 1205 YORK ROAD, PENTHOUSE  
 LUTHERVILLE, MARYLAND 21093  
 410-825-8400

DESIGN: GGN DRAFT: AJV

DATE: NOVEMBER 2022 BEI PROJECT NO. 2769  
 SCALE: 1/2" = 1'-0" SHEET 54 OF 60



LOCATION CATEGORY A							
BAR SIZE	CENTER TO CENTER SPACING						
	3"	4"	5"	≥ 6"			
#4	2'-5"	3'-1"	2'-5"	2'-10"	2'-5"	2'-10"	2'-5"
#5	3'-1"	4'-0"	3'-0"	3'-10"	3'-0"	3'-7"	3'-0"
#6	4'-5"	5'-9"	3'-7"	4'-8"	3'-7"	4'-8"	4'-8"
#7	6'-0"	7'-10"	4'-6"	5'-11"	4'-2"	5'-5"	4'-2"
#8	7'-10"	10'-3"	5'-11"	7'-8"	4'-9"	6'-2"	4'-9"
#9	10'-0"	13'-0"	7'-6"	9'-9"	6'-0"	7'-10"	5'-10"
#10	-	-	9'-6"	12'-5"	7'-7"	9'-11"	7'-2"
#11	-	-	11'-8"	15'-3"	9'-4"	12'-3"	8'-8"

Location Category A - Bars in horizontal layers in top of pour with 12" or more of concrete below them such as in footings, pier caps, etc.

LOCATION CATEGORY B							
BAR SIZE	CENTER TO CENTER SPACING						
	3"	4"	5"	≥ 6"			
#4	1'-10"	2'-9"	1'-10"	2'-2"	1'-10"	2'-2"	1'-10"
#5	2'-5"	3'-7"	2'-4"	3'-5"	2'-4"	2'-9"	2'-4"
#6	3'-5"	5'-1"	2'-9"	4'-1"	2'-9"	2'-9"	4'-1"
#7	4'-8"	6'-11"	3'-6"	5'-3"	3'-2"	4'-9"	3'-2"
#8	6'-1"	9'-1"	4'-7"	6'-10"	3'-8"	5'-5"	3'-8"
#9	7'-8"	11'-6"	5'-9"	8'-8"	4'-8"	6'-11"	4'-6"
#10	-	-	7'-4"	10'-11"	5'-10"	8'-9"	5'-7"
#11	-	-	9'-0"	13'-6"	7'-2"	10'-9"	6'-8"

Location Category B - All bars not in Location Category A.

Legend:  = Non-epoxy coated     = Epoxy coated

**Note:**

- When bar lap is not specified on the Plans, the above dimensions shall be used.
- These bar laps do not apply when bar is in lightweight concrete. Greater lengths are required for this material.
- These bar laps only apply where the General Notes indicate Reinforcing Steel Design,  $f_c = 60$  ksi, and Concrete Design,  $f_c = 3000$  psi.
- These bar laps assume cover of 2". Greater lap lengths will be required for cover less than 2".
- These bar laps are Class B splices based on the development lengths in Det. No. REBAR-DL-101. Class B splices are 1.3 times the development length.
- Class A splices may be used when the area of reinforcement provided is at least twice that required by analysis over the entire length of the lap splice and (b) one-half or less of the total reinforcement is spliced within the required lap splice length. Class A splices are 1.0 times the development length.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 03/21/2017	
VERSION	BAR LAP DIMENSIONS FOR GRADE 60 REINFORCING STEEL IN MIX NO.3 (3500 P.S.J) CONCRETE
I.O.	DETAIL NO. REBAR-BL-101    SHEET <u>  </u> OF <u>  </u>

LOCATION CATEGORY A							
BAR SIZE	CENTER TO CENTER SPACING						
	3"	4"	5"	≥ 6"			
#4	1'-10"	2'-5"	1'-10"	2'-2"	1'-10"	2'-2"	1'-10"
#5	2'-5"	3'-1"	2'-4"	3'-5"	2'-4"	2'-9"	2'-4"
#6	3'-5"	5'-1"	2'-9"	4'-1"	2'-9"	2'-9"	4'-1"
#7	4'-8"	6'-11"	3'-6"	5'-3"	3'-2"	4'-9"	3'-2"
#8	6'-1"	9'-1"	4'-7"	6'-10"	3'-8"	5'-5"	3'-8"
#9	7'-8"	11'-6"	5'-9"	8'-8"	4'-8"	6'-11"	4'-6"
#10	-	-	7'-4"	10'-11"	5'-10"	8'-9"	5'-7"
#11	-	-	9'-0"	13'-6"	7'-2"	10'-9"	6'-8"

Location Category A - Bars in horizontal layers in top of pour with 12" or more of concrete below them such as in footings, pier caps, etc.

LOCATION CATEGORY B							
BAR SIZE	CENTER TO CENTER SPACING						
	3"	4"	5"	≥ 6"			
#4	1'-5"	2'-1"	1'-5"	1'-8"	1'-5"	1'-8"	1'-5"
#5	1'-10"	2'-9"	1'-9"	2'-8"	1'-9"	2'-1"	1'-9"
#6	2'-8"	3'-11"	2'-1"	3'-2"	2'-1"	3'-2"	2'-1"
#7	3'-7"	5'-4"	2'-8"	4'-0"	2'-6"	3'-8"	2'-6"
#8	4'-8"	7'-0"	3'-6"	5'-3"	2'-10"	4'-2"	2'-10"
#9	5'-11"	8'-10"	4'-5"	6'-8"	3'-7"	5'-4"	3'-6"
#10	-	-	5'-8"	8'-5"	4'-6"	6'-9"	4'-3"
#11	-	-	6'-11"	10'-4"	5'-7"	8'-4"	5'-2"

Location Category B - All bars not in Location Category A.

Legend:  = Non-epoxy coated     = Epoxy coated

**Note:**

- When development length is not specified on the Plans, the above dimensions shall be used.
- These development lengths do not apply when bar is in lightweight concrete. Greater lengths are required for this material.
- These development lengths only apply where the General Notes indicate Reinforcing Steel Design,  $f_c = 60$  ksi, and Concrete Design,  $f_c = 3000$  psi.
- These development lengths assume cover of 2". Greater development lengths will be required for cover less than 2".
- The Excess Reinforcement Factor was assumed to be 1.0 when calculating these dimensions.
- Afr was assumed to be 0 when calculating the Reinforcement Confinement Factor.
- If depth of member does not allow bar development length indicated in Location Categories A and B; then hooks shall be added to all bars not conforming, as per D, E, and F per Det. No. REBAR-DL-201.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 03/21/2017	
VERSION	DEVELOPMENT LENGTH DIMENSIONS FOR GRADE 60 REINFORCING STEEL IN MIX NO.3 (3500 P.S.J) CONCRETE
I.O.	DETAIL NO. REBAR-DL-101    SHEET <u>  </u> OF <u>  </u>

STANDARD 90° HOOK

STANDARD 180° HOOK

BAR SIZE	LOCATION CATEGORY		
	D	E	F
#4	8"	11"	9"
#5	10"	1'-2"	11"
#6	1'-0"	1'-5"	1'-2"
#7	1'-2"	1'-8"	1'-4"
#8	1'-4"	1'-10"	1'-6"
#9	1'-6"	2'-1"	1'-8"
#10	1'-8"	2'-4"	1'-11"
#11	1'-0"	2'-7"	2'-1"

**Note:** For Hook Dimensions and Bends, see Detail No. REBAR-BB-102.

**LOCATION CATEGORY:**

- D- All bars terminating with a standard 180° hook with side cover (normal to plane of hook) not less than 2d/3, and for 90° deg. hook, cover on bar extension beyond hook not less than 2".
- E- All bars cast in Category D.
- F- All bars with hook enclosed vertically or horizontally within ties or stirrup-ties spaced along the full development length not greater than 3d where d is the diameter of the hooked bar.

**Note:**

- When development length is not specified on the Plans, the above dimensions shall be used.
- These development lengths do not apply when bar is in lightweight concrete or any other strength of concrete.
- These development lengths only apply where the General Notes indicate Reinforcing Steel Design,  $f_y = 60$  ksi, and Concrete Design,  $f_c = 3000$  psi.
- If depth of member does not allow bar development length indicated in Categories A, B, and C; Detail No. REBAR-DL-101; then hook shall be added to all bars not conforming, as per D, E & F.

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 03/21/2017	
VERSION	DEVELOPMENT LENGTH DIMENSIONS OF HOOKED BARS FOR GRADE 60 REINFORCING STEEL IN MIX NO.3 (3500 P.S.J) CONCRETE NON-EPOXY COATED REINFORCING
I.O.	DETAIL NO. REBAR-DL-201    SHEET <u>  </u> OF <u>  </u>

## TYPICAL BAR BENDS

### DETAILS AND NOTES

SPIRAL

Types SPI, SP2, SP3  
SPI - 1/2 EXTRA TURNS T & B  
SP2 - 2 EXTRA TURNS T & B  
SP3 - 3 EXTRA TURNS T & B  
LENGTH = LIN. FT. WIRE

ENLARGED VIEW SHOWING BAR BENDING DETAILS

Unless otherwise noted diameter D is the same for all bends and hooks on a bar.

Where slope differs from 45° dimensions 'H' and 'K' must be shown.

**Notes:**

- All dimensions are out-to-out of bar or to tangent points for 135° and 180° hooks.
- Dimensions on 180° hooks to be shown only where necessary to restrict hook size. Otherwise standard hooks are to be used.
- Where 'L' is not shown, 'L' will be kept equal to or less than 'H' on truss bars, where 'L' can exceed 'H' it should be shown.
- If dimension on stirrups to be shown where necessary to fit within concrete.
- Where bars are to be bent more accurately than standard bending tolerances, bending dimensions which require closer fabrication should have limits indicated.

**NOTE TO FABRICATOR**

BENDING TOLERANCE NOTE  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (+0") MINUS (-) NORMAL ACI BENDING TOLERANCES

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 02/10/2014	
VERSION	BAR BEND TYPES GENERAL NOTES
I.O.	DETAIL NO. REBAR-BB-101    SHEET <u>  </u> OF <u>  </u>

G:\SMD\092356\_041\_Marriontsville\_US\_40VCA00A\Box\_Culvert\_Design\DR-S003\_Marriontsville.dgn  
Thurs, 23 February 2017 10:27 AM 07:27 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS

5/4/2023

CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

4/19/2023

CHIEF, DIVISION OF LAND DEVELOPMENT

4/21/2023

CHIEF, DEVELOPMENT ENGINEERING DIVISION

## ACI TYPICAL BAR BENDS

### STANDARD PIN BENDING

**NOTE TO FABRICATOR**

BENDING TOLERANCE NOTE  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (+0") MINUS (-) NORMAL ACI BENDING TOLERANCES

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 02/10/2014	
VERSION	BAR BEND TYPES STANDARD PIN BENDING
I.O.	DETAIL NO. REBAR-BB-101    SHEET <u>  </u> OF <u>  </u>

## ACI TYPICAL BAR BENDS

### TIES AND STIRRUPS

**NOTE TO FABRICATOR**

BENDING TOLERANCE NOTE  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (+0") MINUS (-) NORMAL ACI BENDING TOLERANCES

APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 02/10/2014	
VERSION	BAR BEND TYPES ACI - TIES A
I.O.	DETAIL NO. REBAR-BB-101    SHEET <u>  </u> OF <u>  </u>

NO.	DATE	REVISION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.

DocuSigned by:  
*John A. Saffell*  
No. 38545  
PROFESSIONAL ENGINEER  
2/22/23

### MARRIOTTSTVILLE ROAD WIDENING

### APFO MITIGATION PLANS

### F-21-033

TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY  
ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND

### STANDARD DETAILS - 3

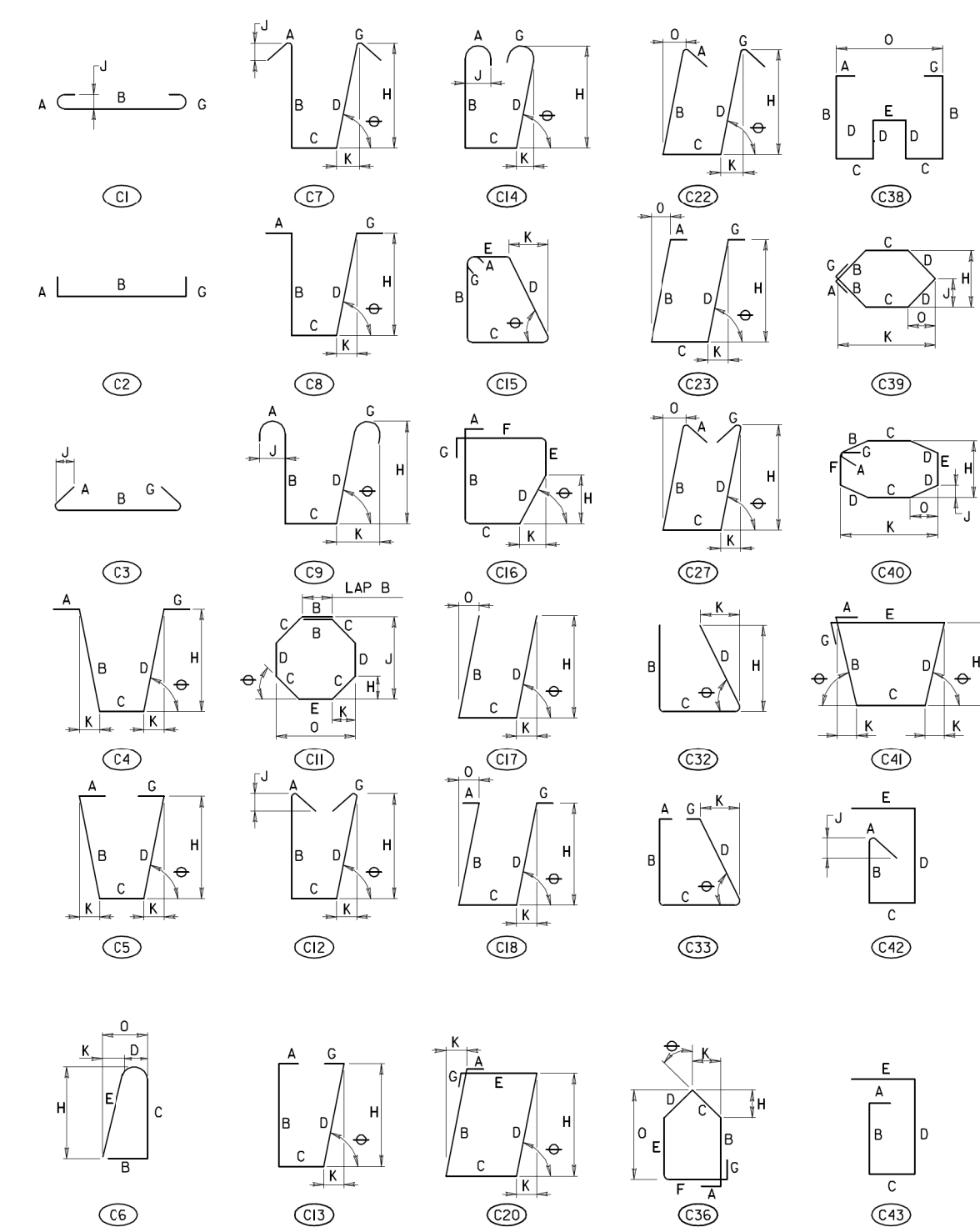
DATE: NOVEMBER 2022    BEI PROJECT NO. 2769  
SCALE: 1/2" = 1'-0"    SHEET 55 OF 60

OWNER:	HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLCOTT CITY, MD 21043 410-313-4401
DEVELOPER:	MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400
DESIGN:	GGN
DRAFT:	AJV



### SHA TYPICAL BAR BENDS

TIES AND STIRRUPS

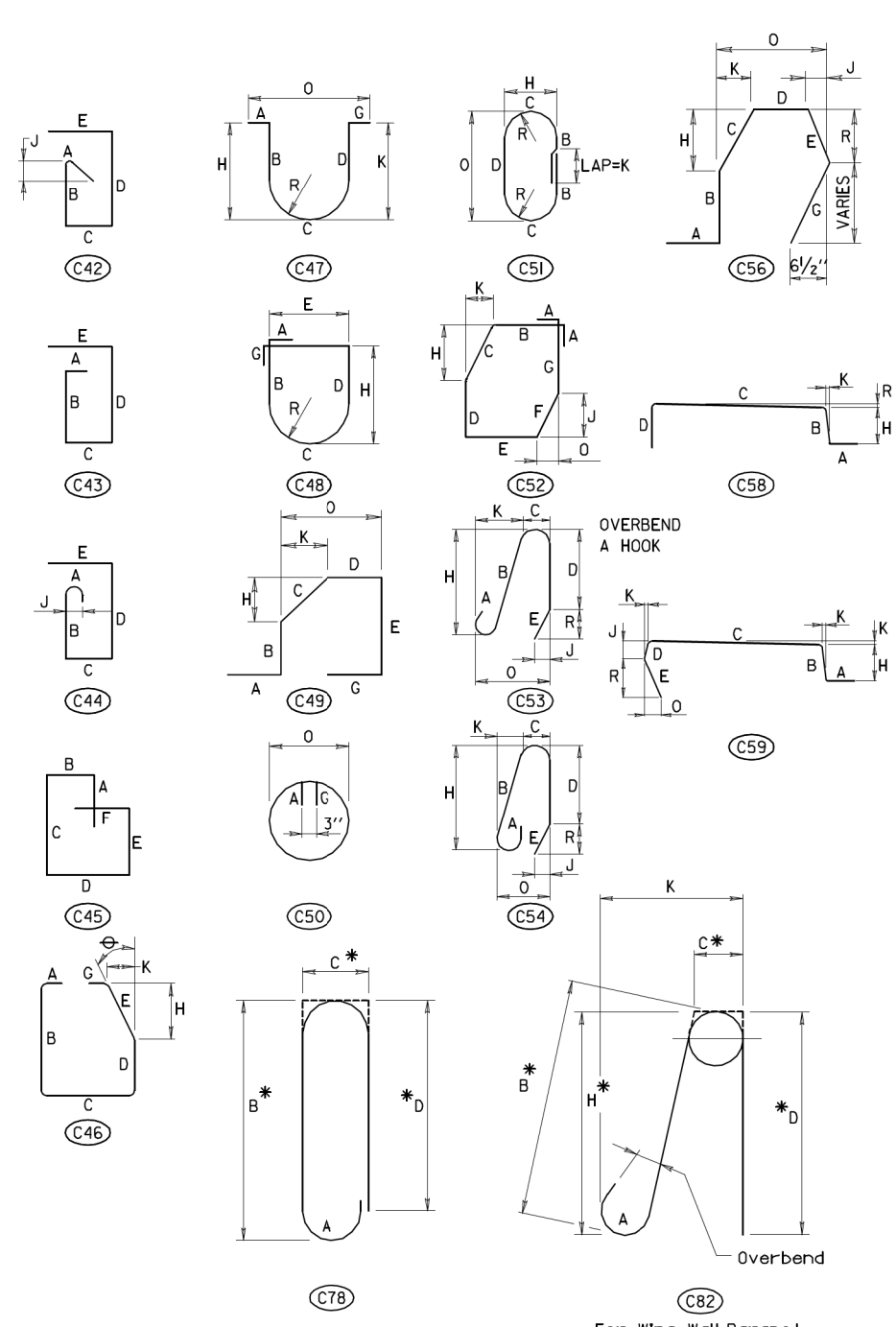


**NOTE TO FABRICATOR**  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (1+0) MINUS (1) NORMAL ACI BENDING TOLERANCES

APPROVAL <i>[Signature]</i> DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/1994	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
VERSION 1.0	BAR BEND TYPES SHA - TIES AND STIRRUPS
DETAIL NO. REBAR-BB-101 SHEET 4 OF 8	

### SHA TYPICAL BAR BENDS

TIES AND STIRRUPS

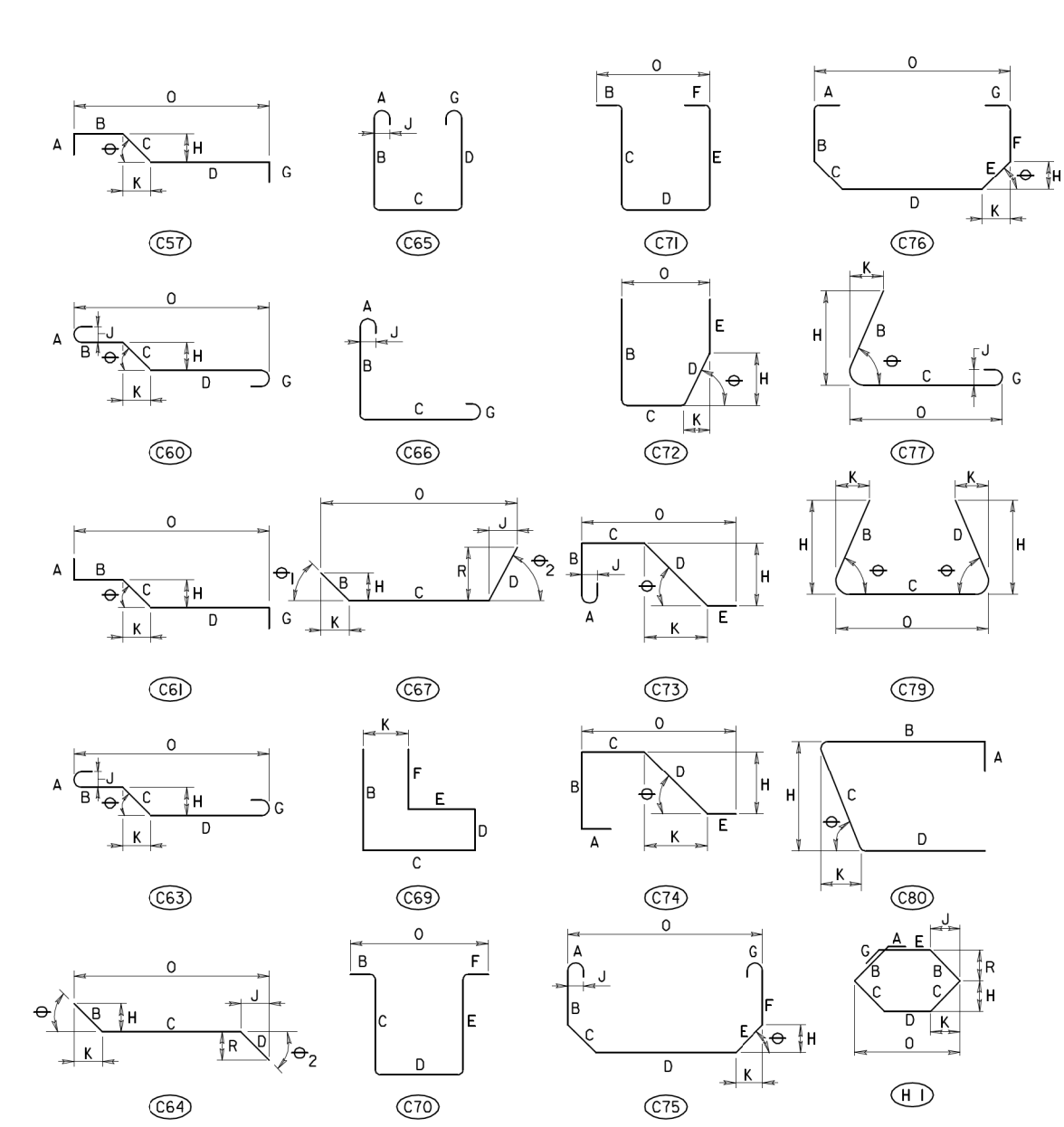


**NOTE TO FABRICATOR**  
BENDING TOLERANCE NOTE  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (1+0) MINUS (1) NORMAL ACI BENDING TOLERANCES

APPROVAL <i>[Signature]</i> DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/1994	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
VERSION 1.0	BAR BEND TYPES SHA - TIES AND STIRRUPS
DETAIL NO. REBAR-BB-101 SHEET 5 OF 8	

### SHA TYPICAL BAR BENDS

STANDARD PIN BENDING

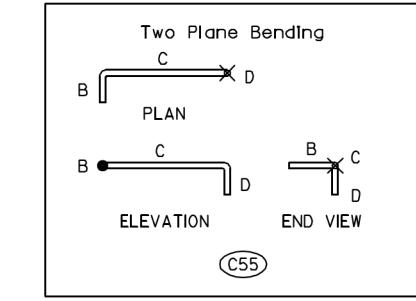
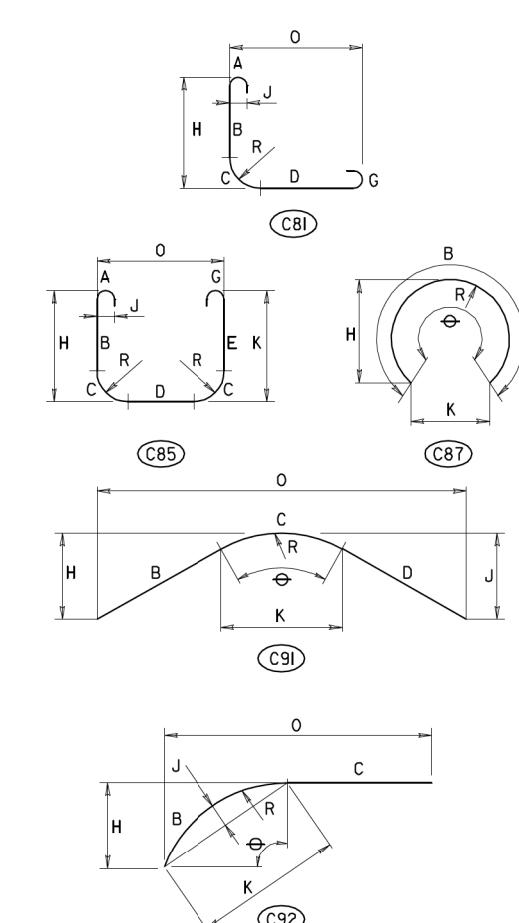


**NOTE TO FABRICATOR**  
BENDING TOLERANCE NOTE  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (1+0) MINUS (1) NORMAL ACI BENDING TOLERANCES

APPROVAL <i>[Signature]</i> DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/1994	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
VERSION 1.0	BAR BEND TYPES SHA - STANDARD PIN BENDING
DETAIL NO. REBAR-BB-101 SHEET 6 OF 8	

### SHA TYPICAL BAR BENDS

RADIUS BENDING

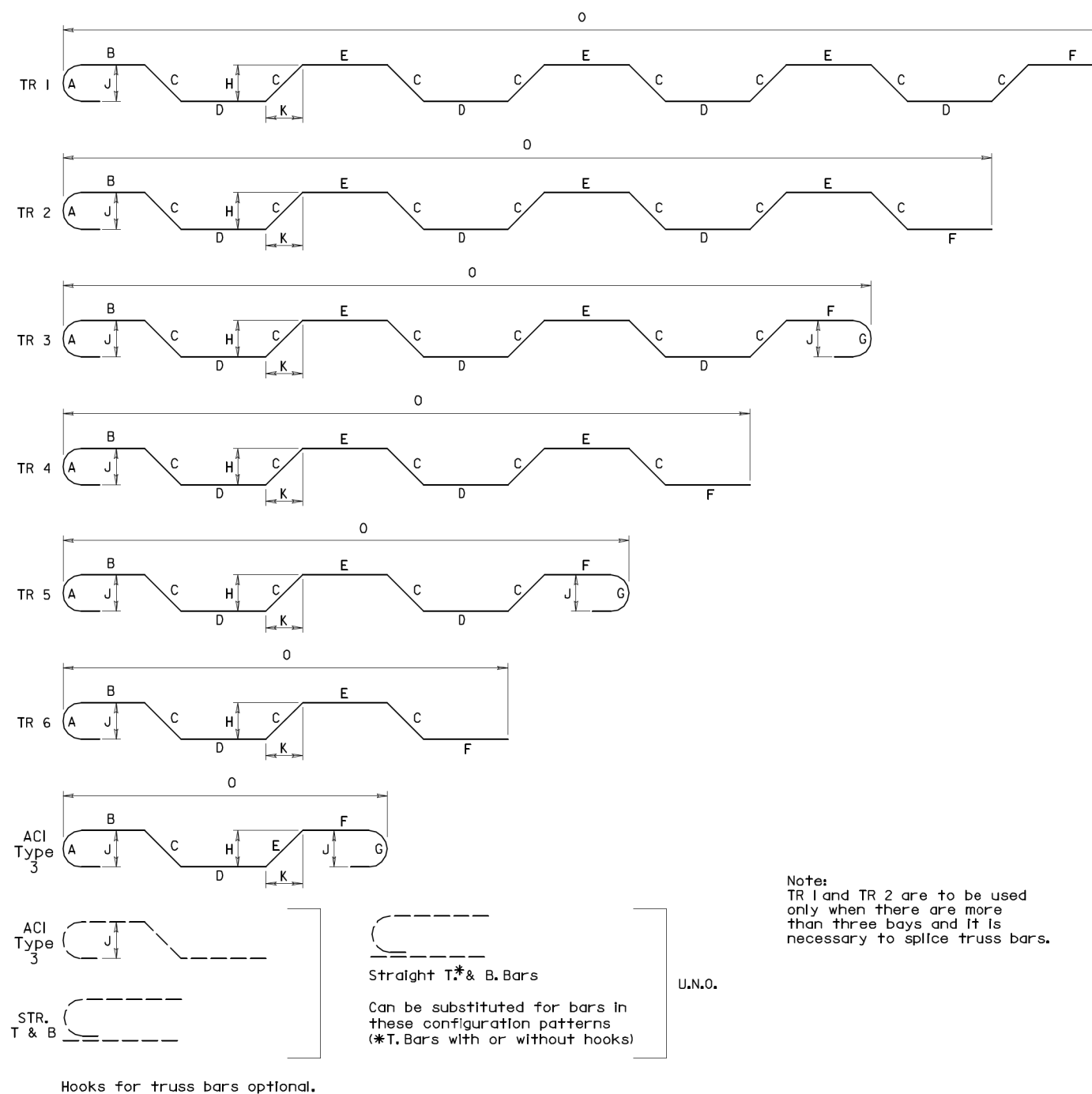


**NOTE TO FABRICATOR**  
BENDING TOLERANCE NOTE  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (1+0) MINUS (1) NORMAL ACI BENDING TOLERANCES

APPROVAL <i>[Signature]</i> DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/1994	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
VERSION 1.0	BAR BEND TYPES SHA - RADIUS BENDING
DETAIL NO. REBAR-BB-101 SHEET 7 OF 8	

### SHA TYPICAL BAR BENDS

TRUSS BAR CONFIGURATIONS

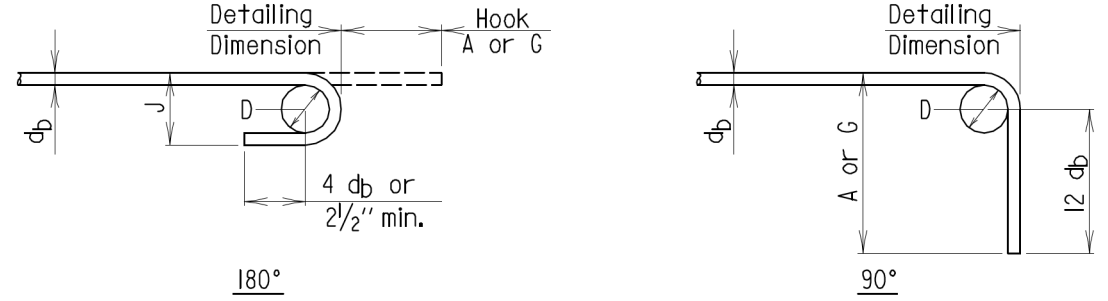


**NOTE TO FABRICATOR**  
BENDING TOLERANCE NOTE  
TIES AND STIRRUPS SHALL BE BENT WITH A PLUS ZERO INCH (1+0) MINUS (1) NORMAL ACI BENDING TOLERANCES

APPROVAL <i>[Signature]</i> DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/1994	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
VERSION 1.0	BAR BEND TYPES TRUSS BAR CONFIGURATIONS
DETAIL NO. REBAR-BB-101 SHEET 8 OF 8	

#### HOOKS TABLE REFERENCES

- ACI Types 1 thru 26
- SHA Standard Pin Bending
- SHA Radius Bending



BAR SIZE	Finished bend diameter	180 - deg hook		90 - deg hook	
		A or G in	J, in.	A or G in	J, in.
#3	2 1/4	5	3	6	4
#4	3	6	4	8	5
#5	3 3/4	7	5	10	6
#6	4 1/2	8	6	12	7
#7	5 1/4	10	7	14	8
#8	6	11	8	16	9
#9	6 3/4	12	9	18	10
#10	7 1/2	13	10	20	11
#11	8 1/4	14	11	22	12
#14	10 1/4	17	13	26	15
#18	13 1/4	21	16	32	19

APPROVAL <i>[Signature]</i> DIRECTOR OFFICE OF STRUCTURES DATE: 02/10/1994	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
VERSION 1.0	REINFORCING STEEL HOOK TABLES AND DIAGRAMS
DETAIL NO. REBAR-BB-102 SHEET 1 OF 2	

G:\SMD\092356-041\_Marriottttsville\_US\_40VCA00A\Box\_Culvert\_Design\DR-S004\_Marriottttsville.dgn

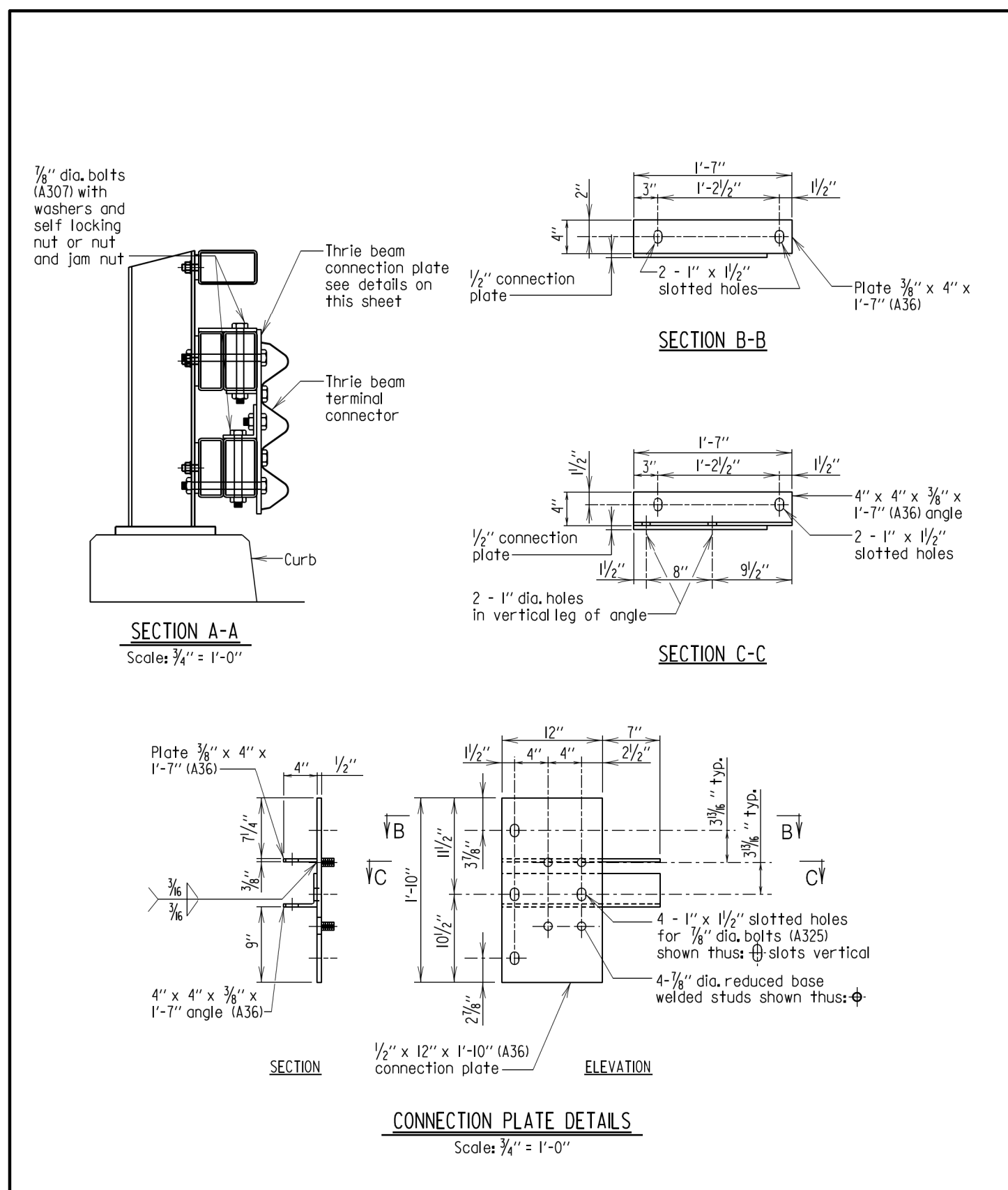
APPROVED: DEPARTMENT OF PUBLIC WORKS <i>[Signature]</i> CHIEF, BUREAU OF HIGHWAYS DATE: 5/4/2023	APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING <i>[Signature]</i> CHIEF, DIVISION OF LAND DEVELOPMENT DATE: 4/19/2023
APPROVED: DEPARTMENT OF PUBLIC WORKS <i>[Signature]</i> CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE: 4/21/2023	

NO.	DATE	REVISION
		
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.		
Designated by: <i>[Signature]</i> PROFESSIONAL ENGINEER 2/22/23		
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4441		MARIOTTSTVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND
DEVELOPER: MANGIONE ENTERPRISES OF TURF RAVEL LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		STANDARD DETAILS - 4 DATE: NOVEMBER 2022 BEI PROJECT NO. 2769 SCALE: 1/2" = 1'-0" SHEET 56 OF 60

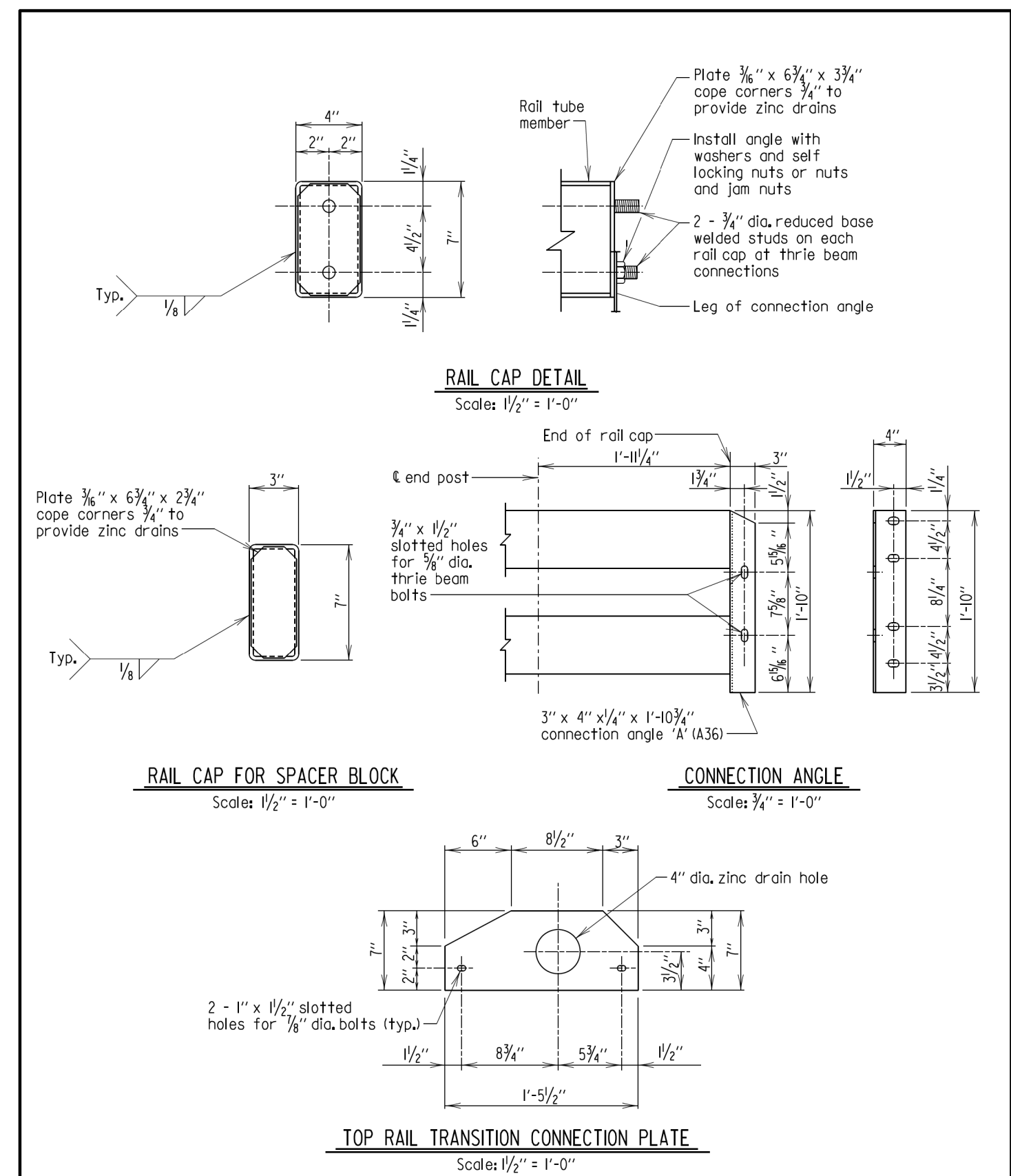








APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 02/10/2017	
VERSION	
I.0	
THREE STRAND STRUCTURAL TUBE RAIL THREE BEAM CONNECTION PLATE	
DETAIL NO. SUP-TBTR-102	SHEET 2 OF 3



APPROVAL	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
DATE: 02/10/2017	
VERSION	
I.0	
THREE STRAND STRUCTURAL TUBE RAIL THREE BEAM CONNECTION PLATE	
DETAIL NO. SUP-TBTR-102	SHEET 3 OF 3

SUPER TRAFFIC BARBER

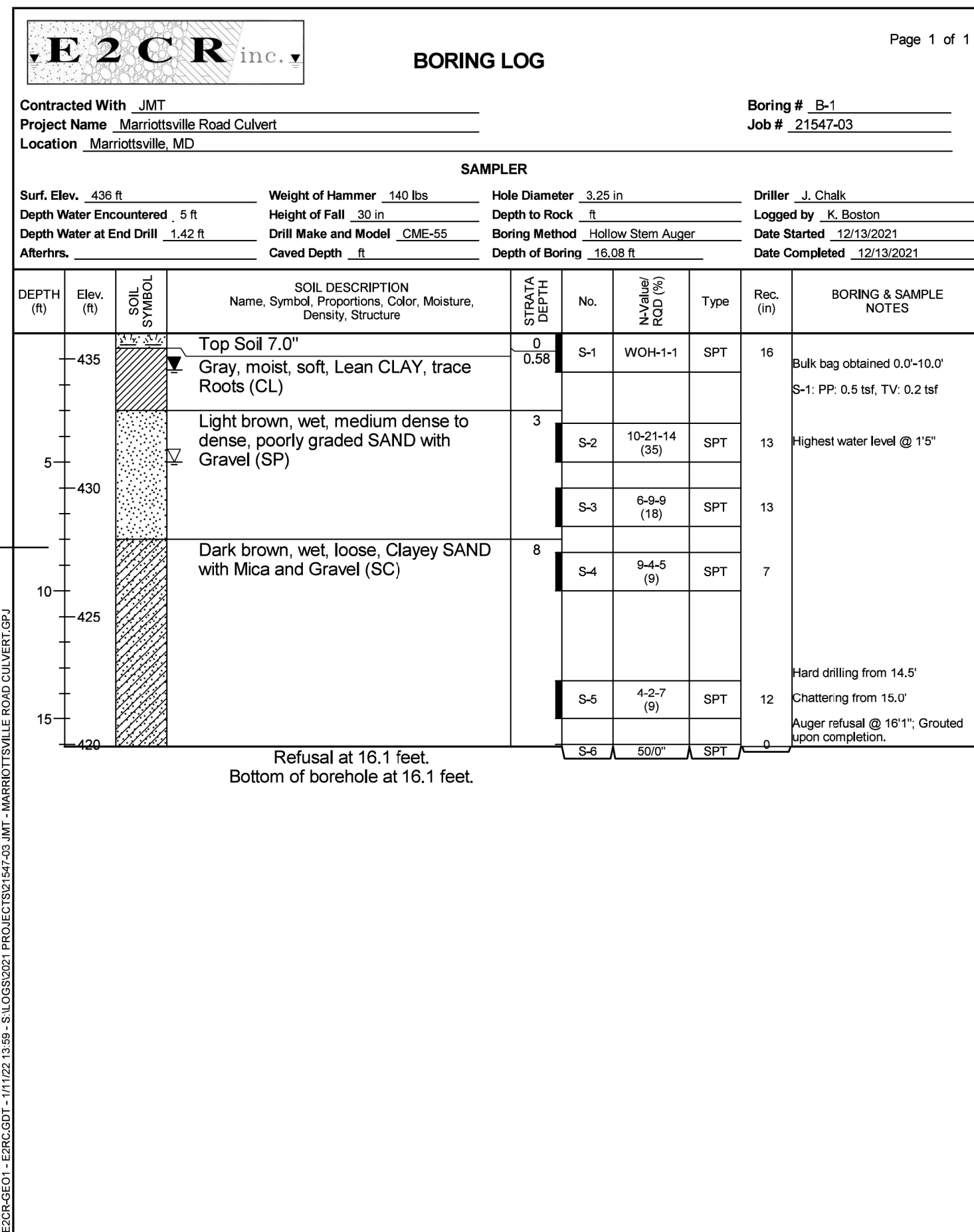
SUPER TRAFFIC BARBER

G:\SMD\092356-041\_Marriottsville\_US\_40\CA001\Box\_Culvert\_Design\DR-S006\_Marriottsville.dgn  
DATE: Thursday, February 23, 2023 AT 07:28 AM 07:28 AM

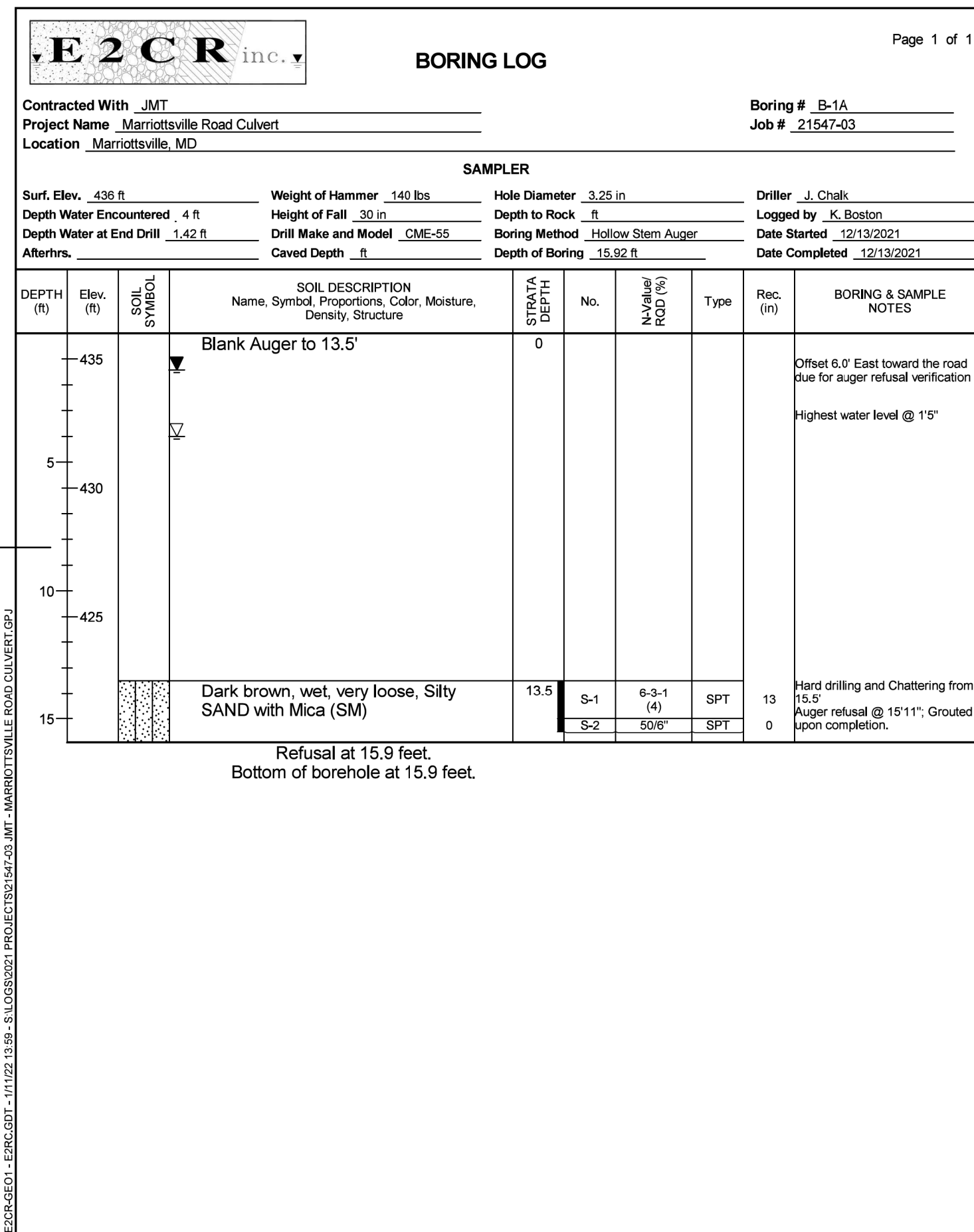
APPROVED: DEPARTMENT OF PUBLIC WORKS	
DocuSigned by:	5/4/2023
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
DocuSigned by:	4/19/2023
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
DocuSigned by:	4/21/2023
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

NO.		DATE		REVISION
		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.		
		DocuSigned by: No. 38545 PROFESSIONAL ENGINEER 2/22/23		
OWNER:		MARRIOTTVILLE ROAD WIDENING		
HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		APFO MITIGATION PLANS F-21-033		
DEVELOPER:		STANDARD DETAILS - 6		
MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-825-8400		TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND		
DESIGN: GGN	DRAFT: AJV	DATE: NOVEMBER 2022	BEI PROJECT NO. 2769	SHEET 58 OF 60
SCALE: NOT TO SCALE		SHEET 58 OF 60		

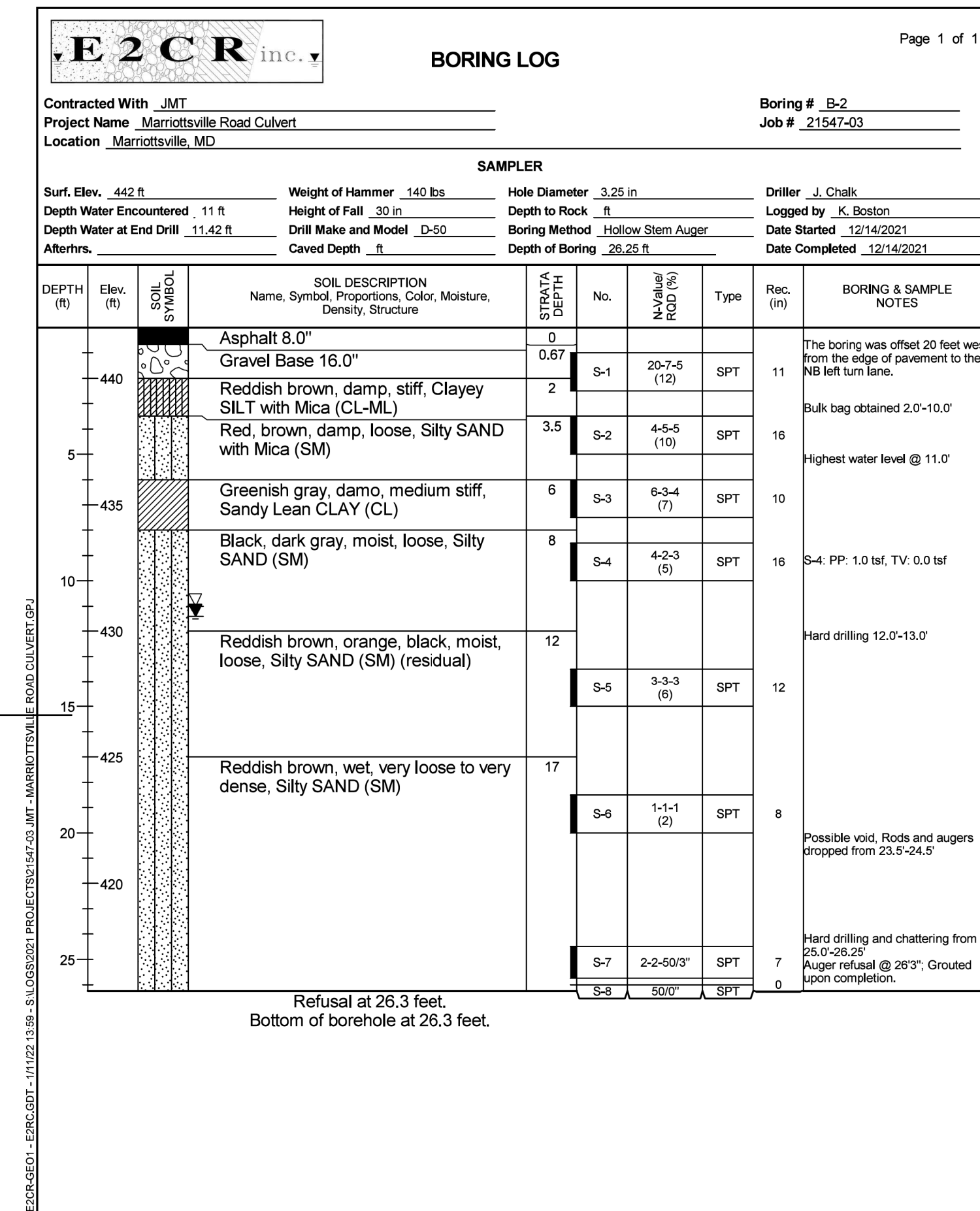




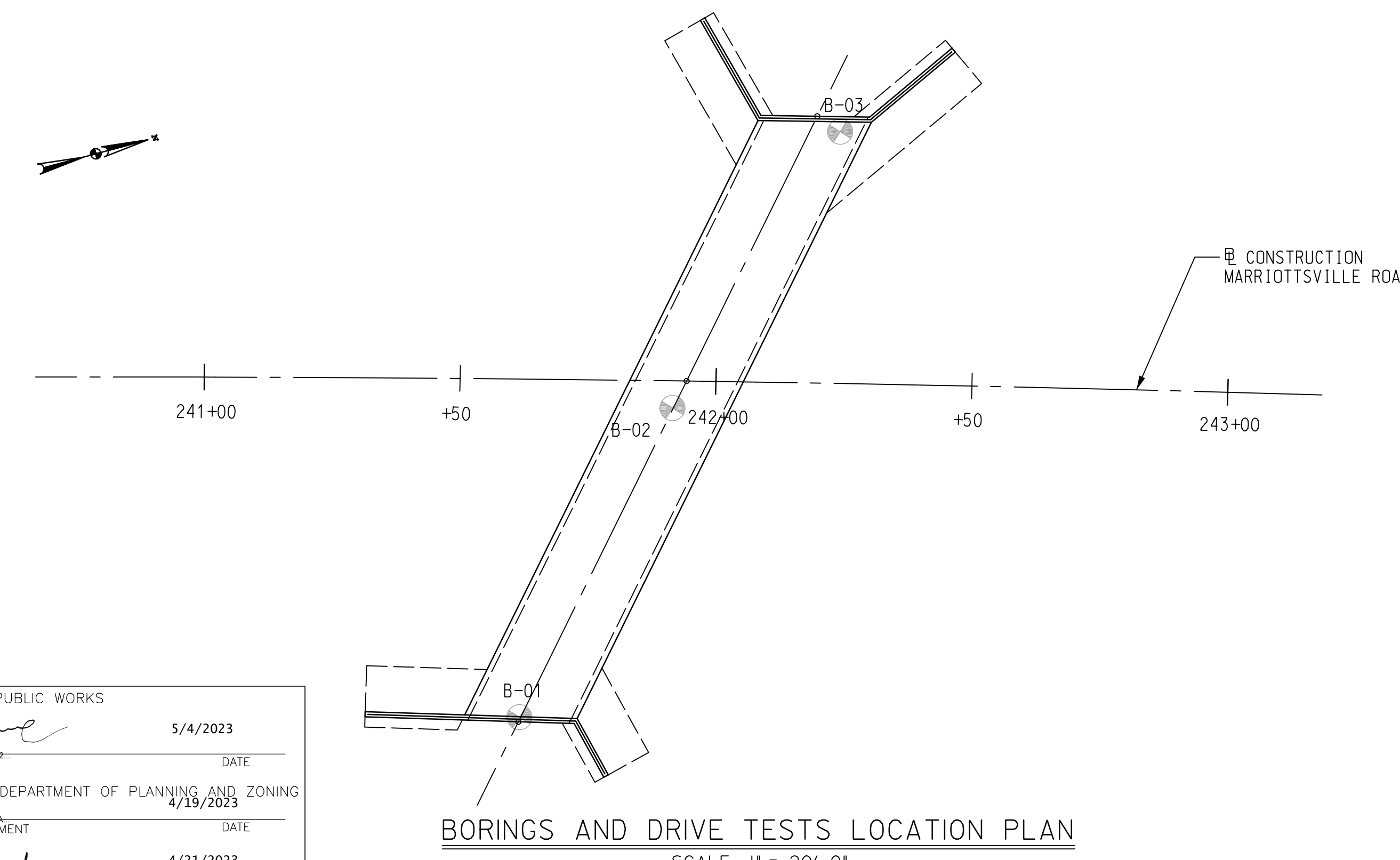
B.F.E. 426.70



B.F.E. 426.70



B.F.E. 426.70



BORINGS AND DRIVE TESTS LOCATION PLAN  
SCALE: 1" = 20'-0"

NOTES:

- BORING AND DRIVE TESTS WERE TAKEN IN DECEMBER, 2021 BY E2CR, INC.
- THE BORING LOG SOIL SYMBOLS REFLECT ONLY THE MAJOR SOIL CONSTITUENT. FOR MORE COMPLETE SOIL CHARACTERISTICS REFER TO SOIL DESCRIPTIVE TEXT.
- N = BLOWS ON 2 INCH SAMPLING SPOON BY 140 LB. DRIVE-WEIGHT FALLING 30 INCHES INDICATING SUCCESSIVE 6 INCH INCREMENTS OF PENETRATION IN LIEU OF BLOWS PER FOOT.
- C = DEPTH OF CONTINUOUS FLIGHT HOLLOW-STEM AUGERS.
- ▼ = WATER LEVEL
- B.F.E. = BOTTOM OF FOOTING ELEVATION
- BORINGS AND SAMPLINGS CONFORM TO AASHTO DESIGNATION T-206 AND T-306.
- SOIL HAS BEEN CLASSIFIED VISUALLY BY THE DRILLER.

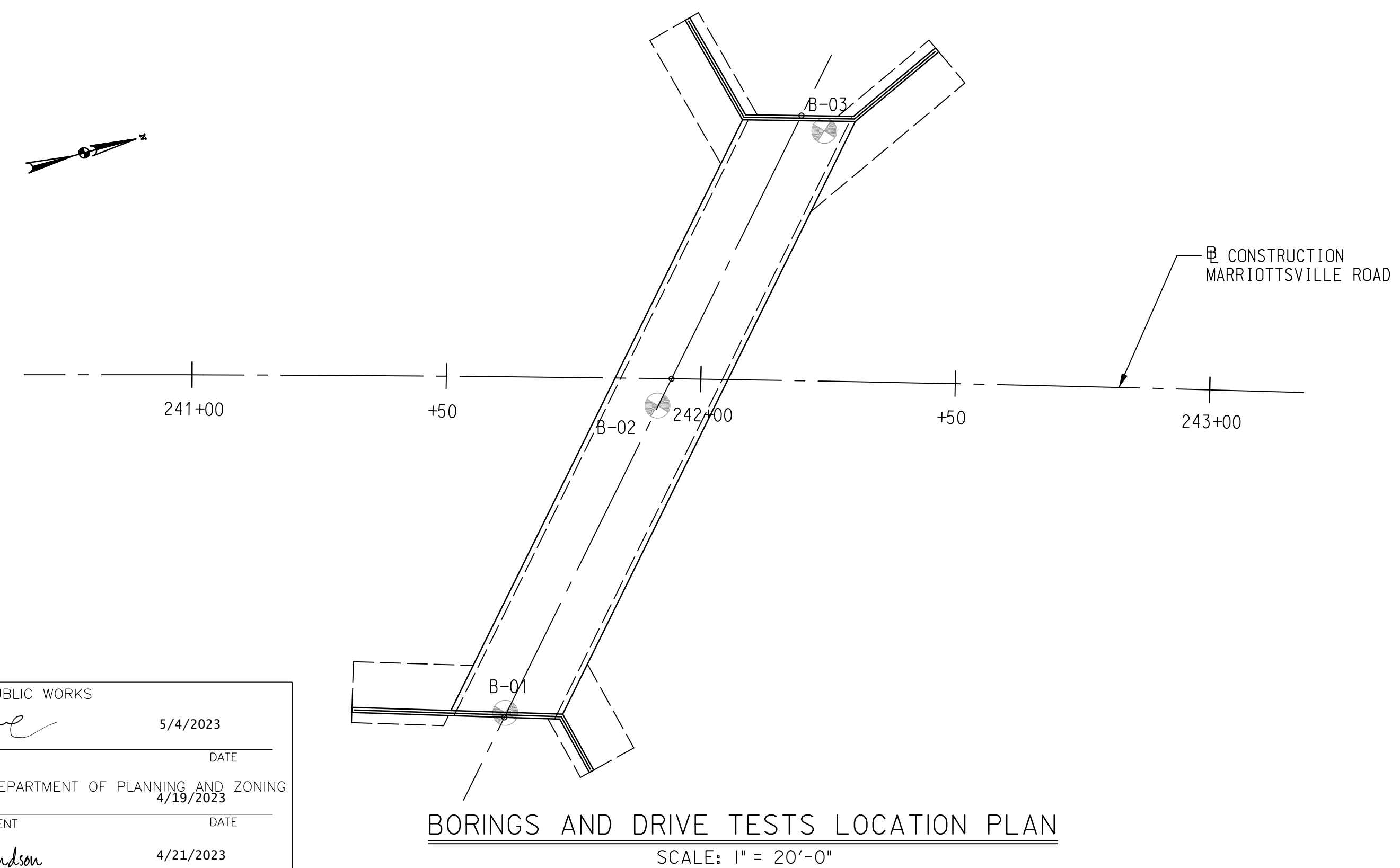
APPROVED: DEPARTMENT OF PUBLIC WORKS  
 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 4/21/2023  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

NO.		DATE		REVISION	
		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24. DocuSigned by: 			
		OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401			
DEVELOPER: MANGIONE ENTERPRISES OF TURF VILLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND			
		BORING AND DRIVE TESTS DATE: NOVEMBER 2022 BEI PROJECT NO. 2769 SCALE: AS SHOWN SHEET 59 OF 60			
DESIGN: GGN		DRAFT: AJV			



DEPTH (ft)		Elev. (ft)	SOIL SYMBOL	SOIL DESCRIPTION Name, Symbol, Proportions, Color, Moisture, Density, Structure	STRATA DEPTH	No.	WATER TABLE DEPTH (ft)	Type	Rec. (in)	BORING & SAMPLE NOTES	
435				Dark brown, dry, very loose, poorly graded SAND (SP) (possible FILL)	0	S-1	WOH24"	SPT	12	Highest water level @ 4.0'	
5				Gray, moist, very soft, SILT with Sand (ML)	3	S-2	WOH12"-1	SPT	15	Clayey SAND in tip of S-2	
430				Gray, orange, moist, medium dense, poorly graded SAND (SP)	5.5	S-3	4-5-8 (13)	SPT	15		
10		B.F.E. 427.38		White, orange, moist, dense, poorly graded SAND with Gravel (SP)	8	S-4	12-14-30 (44)	SPT	15		
15				White, orange brown, wet, very dense, Silty SAND with lenses of Sand and beds of Mica (SM) (Saprolite)	12	S-5	16-40-50/4"	SPT	16	Hard drilling 11.0'-17.0'	
20				Tan, wet, very dense, poorly graded SAND with Quartz Gravel (SP) (decomposed Rock)	17	S-6	50/3"	SPT	3	Chattering 16.0'-17.0'	
21.4				Refusal at 21.4 feet. Bottom of borehole at 21.4 feet.							

DEPTH (ft)		Elev. (ft)	SOIL SYMBOL	SOIL DESCRIPTION Name, Symbol, Proportions, Color, Moisture, Density, Structure	STRATA DEPTH	No.	WATER TABLE DEPTH (ft)	Type	Rec. (in)	BORING & SAMPLE NOTES
0				Blank Auger to 23.5'						
5						ST-1		PT	20	Offset 10.0' South towards R1-40 to verify auger refusal in B-3 Shelby tube obtained 3.0'-5.0'
10										Highest water level @ 4.2'
25				White, light brown, very dense, Silty SAND, trace Mica and Quartz (SM) (decomposed Rock)	23.5	S-1	21-27-33 (65)	SPT	17	Chattering from 28.0'
28.6				Refusal at 28.6 feet. Bottom of borehole at 28.6 feet.						



- NOTES:**
- BORING AND DRIVE TESTS WERE TAKEN IN DECEMBER, 2021 BY E2CR, INC.
  - THE BORING LOG SOIL SYMBOLS REFLECT ONLY THE MAJOR SOIL CONSTITUENT. FOR MORE COMPLETE SOIL CHARACTERISTICS REFER TO SOIL DESCRIPTIVE TEXT.
  - N = BLOWS ON 2 INCH SAMPLING SPOON BY 140 LB. DRIVE-WEIGHT FALLING 30 INCHES INDICATING SUCCESSIVE 6 INCH INCREMENTS OF PENETRATION IN LIEU OF BLOWS PER FOOT.
  - C = DEPTH OF CONTINUOUS FLIGHT HOLLOW-STEM AUGERS.
  - ▼ = WATER LEVEL
  - B.F.E = BOTTOM OF FOOTING ELEVATION
  - BORINGS AND SAMPLINGS CONFORM TO AASHTO DESIGNATION T-206 AND T-306.
  - SOIL HAS BEEN CLASSIFIED VISUALLY BY THE DRILLER.

G:\SMD\092356-041\_Marriottsville US 40\CAD\Box Culvert Design\DR-02\_Marriottsville.dgn  
Thurs, 23 February 2023 10:29 AM 07:29 AM

APPROVED: DEPARTMENT OF PUBLIC WORKS  
 \_\_\_\_\_ DATE 5/4/2023  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 \_\_\_\_\_ DATE 4/19/2023  
 CHIEF, DIVISION OF LAND DEVELOPMENT

APPROVED: \_\_\_\_\_ DATE 4/21/2023  
 \_\_\_\_\_  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

NO.		DATE		REVISION	
		Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 38545, Expiration Date: 03-14-24.			
		DocuSigned by: 2/22/23			
OWNER: HOWARD COUNTY MARYLAND DIRECTOR'S OFFICE OF DEPARTMENT OF PUBLIC WORKS 3430 COURTHOUSE DRIVE ELLICOTT CITY, MD 21043 410-313-4401		MARRIOTTSVILLE ROAD WIDENING APFO MITIGATION PLANS F-21-033 TAX MAP: 16 - GRID: 10 - ROAD RIGHT-OF-WAY ELECTION DISTRICT NO. 3 - HOWARD COUNTY, MARYLAND			
DEVELOPER: MANGIONE ENTERPRISES OF TURF VALLEY LIMITED PARTNERSHIP 1205 YORK ROAD, PENTHOUSE LUTHERVILLE, MARYLAND 21093 410-925-8400		BORING AND DRIVE TESTS DATE: NOVEMBER 2022   BEI PROJECT NO. 2769 SCALE: AS SHOWN   SHEET 60 OF 60			
DESIGN: GGN	DRAFT: AJV				