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FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH SOUTH COMMUNITY NEIGHBORHOODS C, D, & E LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168

LOCATION OF SITE
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

OPEN SPACE CHART

LOT No.	OWNER	OPEN SPACE AREA (AC)	NON CREDITED OPEN SPACE AREA (AC)	CREDITED OPEN SPACE (AC)
NORTH COMMUNITY OPEN SPACE			(SDP-22-021)	
156	HOMEOWNERS ASSOCIATION	8.09	1.03	7.06
157	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	7.43	0	7.43
SOUTH COMMUNITY OPEN SPACE			(F-22-033)	
158	HOMEOWNERS ASSOCIATION	3.33	0.24	3.09
159	HOMEOWNERS ASSOCIATION	1.92	0.37	1.55
160	HOMEOWNERS ASSOCIATION	1.62	0.05	1.57
161	HOMEOWNERS ASSOCIATION	0.79	0	0.79
162	HOMEOWNERS ASSOCIATION	0.52	0	0.52
163	HOMEOWNERS ASSOCIATION	1.14	0.02	1.12
164	HOMEOWNERS ASSOCIATION	1.73	0.29	1.44
165	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	2.41	0.02	2.39
166	HOMEOWNERS ASSOCIATION	7.13	1.70	5.43
167	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	10.96	0	10.96
168	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	0.20	0	0.20
		47.27	3.72	43.55

RECREATIONAL OPEN SPACE

North Section Recreational Open Space	(SDP-22-021)		
Unit Type	# of Units	Open Space Calculation	Open Space Requirement
Single Family Detached Units	0	200 s.f./unit	0 s.f.
Single Family Attached/Semi-Detached Units	38	400 s.f./unit	15,200 S.F.
Total Required			15,200 S.F.
Total Provided			30,627 S.F

South Section Recreation Open Space	(F-22-033)		
Unit Type	# of Units	Open Space Calculation	Open Space Requirement
Single Family Detached Units	19	200 s.f./unit	3,800 S.F.
Single Family Attached/Semi-Detached Units	97	400 s.f./unit	38,800 S.F.
Total Required			42,600 S.F.
Total Provided			48,767 S.F.

NOTE:
THIS PLAN SHALL SATISFY THE SOUTH COMMUNITY RECREATION OPEN SPACE AS SHOWN IN THE ABOVE CHART. THE NORTH COMMUNITY OPEN SPACE IS SHOWN FOR INFORMATIONAL PURPOSES ONLY AND SHALL BE PROVIDED UNDER A SEPARATE PLAN FOR THE NORTH COMMUNITY.

LOT SIZE & DWELLING TYPE CHART

LOT #	GROSS AREA (SF)	DWELLING TYPE
1	2,800 (SF)	SINGLE FAMILY ATTACHED
2	2,800 (SF)	SINGLE FAMILY ATTACHED
3	2,800 (SF)	SINGLE FAMILY ATTACHED
4	2,800 (SF)	SINGLE FAMILY ATTACHED
5	2,800 (SF)	SINGLE FAMILY ATTACHED
6	2,800 (SF)	SINGLE FAMILY ATTACHED
7	2,800 (SF)	SINGLE FAMILY ATTACHED
8	2,800 (SF)	SINGLE FAMILY ATTACHED
9	2,800 (SF)	SINGLE FAMILY ATTACHED
10	2,800 (SF)	SINGLE FAMILY ATTACHED
11	2,800 (SF)	SINGLE FAMILY ATTACHED
12	2,800 (SF)	SINGLE FAMILY ATTACHED
13	2,800 (SF)	SINGLE FAMILY ATTACHED
14	2,800 (SF)	SINGLE FAMILY ATTACHED
15	2,800 (SF)	SINGLE FAMILY ATTACHED
16	2,800 (SF)	SINGLE FAMILY ATTACHED
17	2,800 (SF)	SINGLE FAMILY ATTACHED
18	2,800 (SF)	SINGLE FAMILY ATTACHED
19	8,778 (SF)	SINGLE FAMILY DETACHED
20	8,792 (SF)	SINGLE FAMILY DETACHED
21	8,792 (SF)	SINGLE FAMILY DETACHED
22	8,792 (SF)	SINGLE FAMILY DETACHED
23	8,792 (SF)	SINGLE FAMILY DETACHED
24	8,792 (SF)	SINGLE FAMILY DETACHED
25	11,732 (SF)	SINGLE FAMILY DETACHED
26	9,927 (SF)	SINGLE FAMILY DETACHED
27	8,691 (SF)	SINGLE FAMILY DETACHED
28	8,702 (SF)	SINGLE FAMILY DETACHED
29	8,699 (SF)	SINGLE FAMILY DETACHED
30	8,701 (SF)	SINGLE FAMILY DETACHED
31	8,699 (SF)	SINGLE FAMILY DETACHED
32	8,831 (SF)	SINGLE FAMILY DETACHED
33	8,426 (SF)	SINGLE FAMILY DETACHED
34	8,307 (SF)	SINGLE FAMILY DETACHED
35	8,608 (SF)	SINGLE FAMILY DETACHED
36	8,762 (SF)	SINGLE FAMILY DETACHED

LOT SIZE & DWELLING TYPE CHART

LOT #	GROSS AREA (SF)	DWELLING TYPE
37	9,175 (SF)	SINGLE FAMILY DETACHED
38	3,342 (SF)	SINGLE FAMILY ATTACHED
39	3,380 (SF)	SINGLE FAMILY ATTACHED
40	3,379 (SF)	SINGLE FAMILY ATTACHED
41	3,340 (SF)	SINGLE FAMILY ATTACHED
42	3,304 (SF)	SINGLE FAMILY ATTACHED
43	3,259 (SF)	SINGLE FAMILY ATTACHED
44	3,191 (SF)	SINGLE FAMILY ATTACHED
45	3,209 (SF)	SINGLE FAMILY ATTACHED
46	3,174 (SF)	SINGLE FAMILY ATTACHED
47	3,078 (SF)	SINGLE FAMILY ATTACHED
48	3,219 (SF)	SINGLE FAMILY ATTACHED
49	3,025 (SF)	SINGLE FAMILY ATTACHED
50	3,199 (SF)	SINGLE FAMILY ATTACHED
51	3,492 (SF)	SINGLE FAMILY ATTACHED
52	3,880 (SF)	SINGLE FAMILY ATTACHED
53	3,043 (SF)	SINGLE FAMILY ATTACHED
54	3,083 (SF)	SINGLE FAMILY ATTACHED
55	3,113 (SF)	SINGLE FAMILY ATTACHED
56	3,091 (SF)	SINGLE FAMILY ATTACHED
57	3,127 (SF)	SINGLE FAMILY ATTACHED
58	3,181 (SF)	SINGLE FAMILY ATTACHED
59	3,168 (SF)	SINGLE FAMILY ATTACHED
60	3,086 (SF)	SINGLE FAMILY ATTACHED
61	3,024 (SF)	SINGLE FAMILY ATTACHED
62	3,024 (SF)	SINGLE FAMILY ATTACHED
63	3,024 (SF)	SINGLE FAMILY ATTACHED
64	3,024 (SF)	SINGLE FAMILY ATTACHED
65	3,079 (SF)	SINGLE FAMILY ATTACHED
66	3,090 (SF)	SINGLE FAMILY ATTACHED
67	3,079 (SF)	SINGLE FAMILY ATTACHED
68	3,066 (SF)	SINGLE FAMILY ATTACHED
69	3,066 (SF)	SINGLE FAMILY ATTACHED
70	3,066 (SF)	SINGLE FAMILY ATTACHED
71	3,066 (SF)	SINGLE FAMILY ATTACHED
72	3,066 (SF)	SINGLE FAMILY ATTACHED

LOT SIZE & DWELLING TYPE CHART

LOT #	GROSS AREA (SF)	DWELLING TYPE
73	3,066 (SF)	SINGLE FAMILY ATTACHED
74	3,066 (SF)	SINGLE FAMILY ATTACHED
75	3,066 (SF)	SINGLE FAMILY ATTACHED
76	3,066 (SF)	SINGLE FAMILY ATTACHED
77	3,066 (SF)	SINGLE FAMILY ATTACHED
78	3,066 (SF)	SINGLE FAMILY ATTACHED
79	3,066 (SF)	SINGLE FAMILY ATTACHED
80	3,066 (SF)	SINGLE FAMILY ATTACHED
81	3,101 (SF)	SINGLE FAMILY ATTACHED
82	2,800 (SF)	SINGLE FAMILY ATTACHED
83	2,800 (SF)	SINGLE FAMILY ATTACHED
84	2,800 (SF)	SINGLE FAMILY ATTACHED
85	2,800 (SF)	SINGLE FAMILY ATTACHED
86	2,800 (SF)	SINGLE FAMILY ATTACHED
87	2,800 (SF)	SINGLE FAMILY ATTACHED
88	2,802 (SF)	SINGLE FAMILY ATTACHED
89	2,800 (SF)	SINGLE FAMILY ATTACHED
90	2,800 (SF)	SINGLE FAMILY ATTACHED
91	3,382 (SF)	SINGLE FAMILY ATTACHED
92	3,278 (SF)	SINGLE FAMILY ATTACHED
93	2,800 (SF)	SINGLE FAMILY ATTACHED
94	2,800 (SF)	SINGLE FAMILY ATTACHED
95	2,800 (SF)	SINGLE FAMILY ATTACHED
96	2,800 (SF)	SINGLE FAMILY ATTACHED
97	2,800 (SF)	SINGLE FAMILY ATTACHED
98	2,800 (SF)	SINGLE FAMILY ATTACHED
99	2,800 (SF)	SINGLE FAMILY ATTACHED
100	2,800 (SF)	SINGLE FAMILY ATTACHED
101	2,798 (SF)	SINGLE FAMILY ATTACHED
102	2,800 (SF)	SINGLE FAMILY ATTACHED
103	2,800 (SF)	SINGLE FAMILY ATTACHED
104	2,800 (SF)	SINGLE FAMILY ATTACHED
105	3,065 (SF)	SINGLE FAMILY ATTACHED
106	3,066 (SF)	SINGLE FAMILY ATTACHED
107	3,066 (SF)	SINGLE FAMILY ATTACHED
108	3,066 (SF)	SINGLE FAMILY ATTACHED

LOT SIZE & DWELLING TYPE CHART

LOT #	GROSS AREA (SF)	DWELLING TYPE
109	3,066 (SF)	SINGLE FAMILY ATTACHED
110	3,066 (SF)	SINGLE FAMILY ATTACHED
111	3,066 (SF)	SINGLE FAMILY ATTACHED
112	3,066 (SF)	SINGLE FAMILY ATTACHED
113	3,066 (SF)	SINGLE FAMILY ATTACHED
114	3,066 (SF)	SINGLE FAMILY ATTACHED
115	3,066 (SF)	SINGLE FAMILY ATTACHED
116	3,019 (SF)	SINGLE FAMILY ATTACHED

UNIT & PARKING SCHEDULE TABLE

NEIGHBORHOOD	TOTAL UNITS	SINGLE FAMILY ATTACHED VILLAS	SINGLE FAMILY SEMI-DETACHED VILLAS	SINGLE-FAMILY DETACHED UNITS	REQUIRED PARKING SPACES FOR DWELLING UNITS (2 SPACES/DWELLING UNIT)	OFF-STREET PARKING SPACES FOR DWELLING UNITS *	REQUIRED PARKING SPACES FOR GUEST (0.3 SPACES/DWELLING UNIT)	OFF-STREET PARKING SPACES FOR GUESTS **	COMMUNITY BUILDING PARKING ***	EXCESS GUEST PARKING SPACES IN COMMON AREAS	TOTAL PARKING SPACES
NORTH COMMUNITY											
A	38	34	4		76	76	12	76	8	17	177
NORTH COMMUNITY TOTAL	38	34	4			76		76	8	17	177
SOUTH COMMUNITY											
C	18	18	0		36	36	6	36	0	13	85
D	62	56	0	6	124	124	19	124	22	21	291
E	36	23	0	13	72	72	11	72	0	0	144
SOUTH COMMUNITY TOTAL	116	97	0	19		232		232	22	34	520
TOTAL UNITS	154	131	4	19	308	308	48	308	30	51	697

NOTE:
PARKING FOR THIS PROJECT IS IN ACCORDANCE WITH SECTION 131.0.B.3.C. AND 133.0.D.2. OF THE ZONING REGULATIONS

* TWO SPACES IN GARAGE
** TWO SPACES DRIVEWAY
*** 10 SPACES/1,000 SF

OVERALL SITE ANALYSIS DATA / TABULATION
(F-22-033 AND SDP-22-021)

TOTAL PROJECT AREA	68.56 AC., 35.76 AC. (THIS PLAN)
AREA OF WETLANDS AND BUFFER	2.56 AC.
AREA OF 100-YR FLOODPLAIN	2.10 AC.
AREA OF FOREST	27.60 AC.
AREA OF STEEP SLOPES (25% OR GREATER)	0.44 AC.
AREA OF PUBLIC ROAD DEDICATION (ROAD R/W)	7.09 AC.
INTERMITTENT STREAM & 50' BUFFER	11.44 AC.
HIGHLY ERODIBLE SOILS (K> 0.35)	14.37 AC.
NUMBER OF RESIDENTIAL UNITS TO REMAIN	1
NUMBER OF RESIDENTIAL UNITS PROPOSED	154
LIMIT OF DISTURBED AREA	48.77 AC., 35.76 AC. (THIS PLAN)
PRESENT ZONING DESIGNATION	R-20
PROPOSED USE:	AGE RESTRICTED ADULT HOUSING
IMPERVIOUS COVER	17.24 AC.

NOTE: THE TOTAL PROPERTY AREA IS 68.56 ACRES. 100-YR FLOODPLAINS, FORESTED AREAS, AREAS OF STEEP SLOPES, AND ERODIBLE SOILS HAVE BEEN IDENTIFIED WITHIN THE PROJECT AREA.

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: [signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: Chad Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

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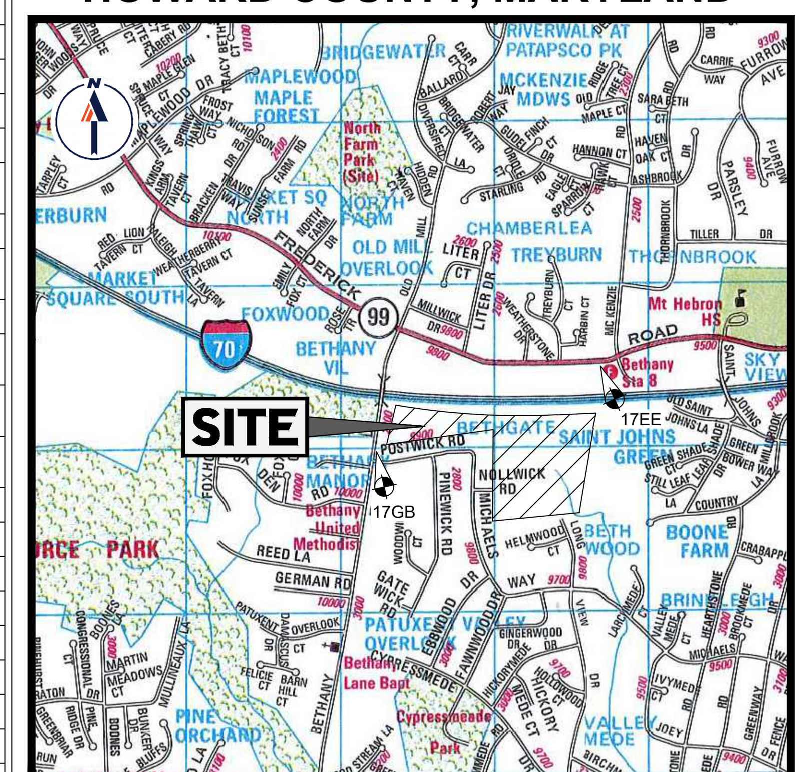

LOCATION MAP
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PERMIT USE NO. 20602153-5
SCALE: 1"=2000'
ADC MAP COORDINATES: 24/B5

VICINITY MAP

ROADWAY INFORMATION CHART

ROAD NAME	CLASSIFICATION	DESIGN SPEED	R/W WIDTH (PUBLIC) ACCESS EASEMENT WIDTH (PRIVATE)
BLUE IVY WAY	PUBLIC ACCESS STREET	30 MPH	50 FT.
BAKER LANE	PUBLIC ACCESS STREET	30 MPH	50 FT.
LONGVIEW DRIVE	PUBLIC ACCESS PLACE	25 MPH	50 FT.
CALMING COURT	PRIVATE ACCESS PLACE	25 MPH	50 FT.
HOPE PLACE	PRIVATE ACCESS PLACE	25 MPH	50 FT.
WISTERIA LANE	PRIVATE ACCESS PLACE	25 MPH	50 FT.
STONE WELL WAY	PRIVATE ACCESS PLACE	25 MPH	50 FT.
WISHING WELL LANE	PRIVATE ACCESS PLACE	25 MPH	50 FT.

ESD SUMMARY TABLE

"SITE AREA"	48.77 AC.
ESDv	114,627.51 C.F. (REQUIRED), 119,720.36 C.F. (PROVIDED)
Rev	15,195.10 C.F. (REQUIRED), 17,126.95 C.F. (PROVIDED)
CPv	INCLUDED IN ESDv
$QP_{(10)}$	EX: 242.23 CFS, PROP. 236.09 CFS
$QP_{(100)}$	EX: 629.92 CFS, PROP. 578.32 CFS
$QP_{(6.6)}$	EX: 645.84 CFS, PROP. 599.55 CFS

PREPARED BY

BOHLER

CONTACT: BRANDON ROWE, P.E.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST HOWARD COUNTY AND MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE,UNLESS WAIVERS HAVE BEEN APPROVED.
2. THE PROPERTY BOUNDARY AND ON-SITE EXISTING TOPOGRAPHY IS BASED ON A BOUNDARY & TOPOGRAPHIC SURVEY BY BOHLER ENGINEERING, TITLED "BOUNDARY & TOPOGRAPHIC SURVEY, HARBIN PROPERTY, 9891 OLD FREDERICK ROAD - ROUTE 99 , 2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND", FILE NO. SD152018, DATED 03/04/16; LAST REVISED 03/28/16.
3. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATES SYSTEM. HOWARD COUNTY MONUMENT Nos. 17GB AND 17EE WERE USED FOR THIS PROJECT.
4. WATER IS PUBLIC. CONT. # 71 W, 463-D-W, 436-W (ACP), 25-5109-D, 688-D-W & S
5. SEWER IS PUBLIC. CONT. # 2738-S-A, 409 W & S, 738-S-A, 25-5109-D
6. EXISTING UTILITIES ARE BASED ON FIELD RUN SURVEY PERFORMED BY BOHLER ENGINEERING, DATED 03/04/16 AND HOWARD COUNTY RECORDED PLANS.
7. SUBJECT PROPERTY ZONED R-20 PER THE 10/06/13 COMPREHENSIVE ZONING REGULATIONS. AN AGE RESTRICTED CONDITIONAL USE COMMUNITY IS PROPOSED UNDER SECTION 131.O.N.1 AND AS APPROVED PER BA-17-018C. THE DECISION AND ORDER FOR THE CONDITIONAL USE WAS SIGNED BY THE HEARINGS EXAMINER ON SEPT. 2, 2020.
8. PROPERTY INFORMATION:
   a. GROSS AREA OF TRACT = 68.56 AC., 35.76 AC. (THIS PLAN)
   b. AREA OF FLOODPLAIN = 2.10 AC.
   c. AREA OF 25% OR GREATER SLOPES = 0.44 AC.
   d. NET TRACT AREA OF = 64.9 AC.*
      *NET TRACT OF DEVELOPMENT LISTED EXCLUDES THE AREA OF EXISTING HOUSE ON PROPOSED LOT 155 (1.2 AC.). NET TRACT AREA NOTED ABOVE MATCHES THE DEVELOPEMENT'S CONDITIONAL DECISION AND ORDER.
   e. AREA OF PROPOSED R/W DEDICATION = 7.09 AC. (TOTAL)
   f. NUMBER OF LOTS/PARCELS PROPOSED = 168 (TOTAL), 127 (THIS PLAN)
   g. AREA OF PROPOSED LOTS = 13.82 AC. (TOTAL), 11.34 AC. (THIS PLAN)
   h. BUILDABLE LOTS = 155 (TOTAL), 116 (THIS PLAN)
   i. OPEN SPACE LOT(S) = 13 (TOTAL), 11 (THIS PLAN)
   j. OPEN SPACE REQUIRED : 24.00 AC. (35% OF GROSS AREA) (TOTAL)
   k. OPEN SPACE PROVIDED : 47.27 AC. - 3.72 AC. (NON-CREDITED) = 43.55 AC. (57.9%) OPEN SPACE (CREDITED) (TOTAL)
   l. COMMUNITY CENTER FLOOR AREA REQUIRED: 2,910 SF (TOTAL)
   m. COMMUNITY CENTER FLOOR AREA PROVIDED (TOTAL): 2,910 SF. THIS PROJECT IS TO PROVIDE 2 COMMUNITY CENTERS - ONE IN NEIGHBORHOOD A AND ONE IN NEIGHBORHOOD D.
9. LOTS 1-116 WILL HAVE UNITS THAT WILL BE AGE RESTRICTED ADULT HOUSING. THE 116 AGE-RESTRICTED UNITS SHALL CONSISTS OF 97 SINGLE-FAMILY ATTACHED UNITS, AND 19 SINGLE-FAMILY DETACHED UNITS.
10. A WETLAND DELINEATION REPORT WAS COMPLETED FOR THIS PROJECT BY FORENVICON INC. ON 04/12/16 AND A FOREST STAND DELINEATION REPORT WAS COMPLETED BY FORENVICON INC. ON 04/12/16, REVISED 01/25/20.
11. THE ADEQUATE ROAD FACILITIES TEST EVALUATION FOR THIS PROJECT (ARAH) WAS PREPARED BY THE TRAFFIC GROUP, DATED 11/20/2020.
12. THIS PROPERTY IS LOCATED INSIDE OF THE METROPOLITAN DISTRICT.
13. THERE ARE NO KNOWN CEMETERIES OR HISTORICAL FEATURES KNOWN ONSITE.
14. **DESIGN MANUAL WAIVER:**
   1) BETHANY LANE (MINOR ARTERIAL ROAD), TO HAVE A MINIMUM INTERSECTION SPACE OF 330 FEET BETWEEN PROPOSED ROAD "C" AND EXISTING POSTWICK ROAD, MEASURING ALONG BETHANY LANE CENTERLINES OF THE PROPOSED ROAD "C" AND POSTWICK ROAD WAS APPROVED PENDING THE FOLLOWING CONDITIONS:
      a) REQUIRED INTERSECTION AND STOPPING SIGHT DISTANCES ARE MAINTAINED AND THE PROPOSED ROAD IMPROVEMENT (EXCLUSIVE LEFT TURN LANE) ALONG BETHANY IS EXTENDED SOUTHWARD TO POSTWICK ROAD.
   2) FROM HCDM-VOL. 2, SECTION 3.3.B.2.b1 "HORIZONTAL ALIGNMENT - LOCATION" WHICH LIMITS THE NON-LOOPED LENGTH OF 8" WATER MAIN TO 2,000 L.F. OR LENGTH REQUIRED TO PROVIDE THE SERVICE TO 50 UNITS, WHICH IS SHORTER. WAS APPROVED ON 9/13/26 WITHOUT CONDITIONS.
   3) FROM HCDM-VOL. 3, CHAPTER 2.5.B.1, TABLE 2.07 TO REDUCE THE REQUIRED INTERSECTION SPACING FROM 750 FT TO 330 FT WAS APPROVED ON 6/10/21. SUBJECT TO THE IMPROVEMENTS SHOWN ON THE PLANS TO BE CONSTRUCTED.
   4) FROM HCDM-VOL. 3, CHAPTER 5.2.3 APPENDIX A, TO REQUEST 350 FT MIN. CURVE RADIUS ON PUBLIC ACCESS STREETS CLOSED CROSS SECTION WAS APPROVED ON 6/10/21, WITHOUT CONDITIONS.
   5) FROM HCDM-VOL.3, CHAPTER 2.6(A) AND APPENDIX A, WHICH REQUIRE USE-IN-COMMON DRIVEWAY UTILIZED IN RESIDENTIAL USE ONLY AND SHARED BY NO MORE THAN SIX (6) DWELLING UNITS WAS APPROVED ON 9/17/21, SUBJECT TO THE FOLLOWING:
      1. PROVIDING 24 FT. WIDE PAVEMENT FOR THE PROPOSED USE-IN-COMMON DRIVEWAY SEGMENT STA. 10+25 TO 13+50;
      2. EXTENDING ROAD MEDIAN ON INTERNAL ROAD 6 TO 11+25;
      3. THE NORTHERN ENTRANCE OF PROPOSED USE-IN-COMMON DRIVEWAY SHALL BE DESIGNED RIGHT TURN EXIT ONLY;
      4. A SIDEWALK MUST BE PROVIDED ON THE INSIDE RADIUS OF LOOP ROAD/DRIVEWAY AS STATED IN CONDITION No. 7 FOR WP-21-127;
      5. COMPLIANCE WITH STAFF REVIEW COMMENTS FOR SP-21-021 & ROAD FRONTAGE/ROAD DESIGN STANDARDS PER THE REGULATIONS
   6) FROM HCDM VOL. II, SECTION 3.3(B)(5) TO REQUEST THE MAXIMUM GROUND COVER PERMITTED OVER DISTRIBUTION MAINS TO BE INCREASED TO DEPTHS GREATER THAN 8'.
   7) FROM HCDM-VOL IV, SECTION 963.02.01 TO ALLOW 24" STEEL CASING AT (5) UTILITY CROSSINGS.
   8) FROM HCDM VOL. II, SECTION 5.4(B)(4) TO ALLOW MINIMUM VERTICAL CLEARANCES OF LESS THAN 1' FROM OTHER UTILITIES OR LESS THAN 2' FROM STREAM TO CASING PIPE.
   9) FROM HCDM VOL II, SECTION 5.4.B.5 TO ALLOW PERMANENT STRUCTURES WITHIN 10' OF A UTILITY EASEMENT IN (2) LOCATIONS.
   10) FROM HCDM-VOL. 2, SECTION 5.4.B.5, TO ALLOW 760-FOOT LONG PRIVACY SCREEN FENCE TO BE PLACED 5 FEET WITHIN THE EXISTING PUBLIC SEWER AND UTILITY EASEMENT FROM CONTRACT NO. 738-S-A WAS APPROVED ON 2/27/2024 (DMV2-24-013), SUBJECT TO THE FOLLOWING:
      1. AN ADDITIONAL 10 FEET WIDTH BE ADDED TO THE EXISTING EASEMENT ON THE SIDE OPPOSITE THE FENCE (TO THE NORTH BETWEEN EXISTING SEWER MH #738A-123A AND #738A-122, AND TO THE EAST BETWEEN MH #738A-122 AND #738A-120), THEREBY CREATING A 30-FOOT WIDE EASEMENT AS SHOWN ON THE EXHIBIT ATTACHED TO THIS WAIVER REQUEST.
      2. THIS DEVELOPMENT'S HOMEOWNER'S ASSOCIATION (HOA) IS SOLELY RESPONSIBLE FOR THE FENCE IN PERPETUITY, INCLUDING ITS REMOVAL AND REPLACEMENT IF NEEDED IN THE FUTURE BY DPW FOR WORK ON THE SEWER, EASEMENT, OR RELATED NEED.
15. **ALTERNATIVE COMPLIANCE**
   REQUEST WP-21-064: DECISION LETTER DATED 2-11-21
   1. FOR A VARIANCE WITH RESPECT TO SECTION 16.115(C)(2), 16.116(A)(1) AND 16.116(A)(2) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS TO DISTURB STREAMS, STREAM BANK BUFFERS, WETLANDS, WETLAND BUFFERS, AND FLOODPLAINS TO CONSTRUCT TWO (2) PUBLIC ROADS (ROADS A AND B), WATER AND SEWER LINES, STORMWATER MANAGEMENT FACILITIES AND CULVERTS IN NEIGHBORHOODS C, D, AND E OF THE PROPOSED BETHANY GLEN ARAH SUBDIVISION WAS **APPROVED.**
   2. FOR VARIANCE WITH RESPECT TO SECTION 16.1205(A)(3) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS FOR THE PURPOSES OF CONSTRUCTING TWO (2) PUBLIC ROADS (ROADS A AND B), WATER AND SEWER LINES, STORMWATER MANAGEMENT FACILITIES AND CULVERTS IN NEIGHBORHOODS D, AND E OF THE PROPOSED BETHANY GLEN ARAH SUBDIVISION: **APPROVED THE REMOVAL OF 18** AND **DENIED THE REMOVAL OF 1** OF THE PROPOSED SPECIMEN TREES TO BE REMOVED AS INCLUDED IN THE APPLICATION.

   APPROVAL OF THIS ALTERNATE COMPLIANCE IS SUBJECT TO THE FOLLOWING CONDITIONS:
   1. THE DISTURBANCE TO THE STREAMS, WETLANDS, THEIR BUFFERS, AND THE FLOODPLAIN SHALL BE LIMITED TO THE GRADING REQUIRED TO CONSTRUCT PUBLIC ROADS A AND ROAD B, WATER AND SEWER LINES, CULVERTS AND STORM WATER MANAGEMENT FACILITIES AND RELATED INFRASTRUCTURE IN POINTS #1, #2 AND #3 OF THE PLAN EXHIBIT SUBMITTED WITH THIS PETITION.
   2. ANY NATURAL VEGETATION DISTURBED DURING THE GRADING OF THE IMPACTED ENVIRONMENTAL FEATURES MUST BE RESTORED TO ITS NATURAL CONDITION TO THE GREATEST EXTENT POSSIBLE ONCE CONSTRUCTION IS COMPLETED. A PLAN TO DEMONSTRATE HOW THESE IMPACTED AREAS SHALL BE RESTORED TO ITS NATURAL CONDITIONS MUST BE INCLUDED ON THE ROAD CONSTRUCTION PLAN WITH THE FINAL SUBDIVISION PLANS.
   3. A COPY OF THE MARYLAND DEPARTMENT OF ENVIRONMENTAL (MDE) PERMIT FOR THE DISTURBANCE TO THE TWO STREAMS AND FLOODPLAIN MUST BE PROVIDED TO DPZ PRIOR TO THE RECORDATION OF THE FINAL PLAT AND REFERENCED AS A NOTE ON THE PLAT.
   4. INCLUDE THIS ALTERNATIVE COMPLIANCE PETITION DECISION AS A GENERAL NOTE ON THE PRELIMINARY EQUIVALENT SKETCH PLAN, THE PLAT AND SITE DEVELOPMENT PLAN(S). THE NOTE SHALL INCLUDE THE PETITION'S FILE NUMBER, THE REGULATORY SECTIONS, THE DECISION DATE, AND THE CONDITIONS OF APPROVAL.

   REQUEST WP-21-127: DECISION LETTER DATED 08-04-21:
   1. WITH RESPECT TO SECTIONS 16.119(F)(1), 16.120(C)(3), 16.120(C)(4) AND A PORTION OF 16.134(A)(1) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS TO RETAIN THE DRIVEWAY FOR THE EXISTING HOUSE ON LOT 155 FOR INGRESS/EGRESS TO MD ROUTE 99; TO DEVELOP SINGLE-FAMILY ATTACHED LOTS 1-18; 82-104; 117-154 WITHOUT PUBLIC ROAD FRONTAGE TO PROVIDE A SIDEWALK ON ONE SIDE OF PUBLIC ROAD A (NEIGHBORHOOD C) AND PRIVATE ROADS 1, 2, 3, 4, 5, AND 7 WAS **APPROVED.** APPROVAL OF THIS ALTERNATIVE COMPLIANCE IS SUBJECT TO THE FOLLOWING CONDITIONS:
      1. ALL THE PRIVATE ROAD MUST PROVIDE SAFE, ADEQUATE ACCESS TO THE RESIDENTIAL AND OPEN LOTS. THE PRIVATE ROADS ARE TO BE OWNED AND MAINTAINED BY THE COMMUNITY HOA.
      2. THE PRIVATE ROAD DESIGN AND WIDTHS MUST COMPLY WITH DESIGN STANDARDS FOR PUBLIC ROADS AS REQUIRED BY THE DESIGN MANUAL.
      3. COMPLIANCE WITH THE SRC PLAN REVIEW COMMENTS FOR THE PRELIMINARY EQUIVALENT SKETCH PLAN, SP-21-002.
      4. ALL SIDEWALK, CURB RAMPS AND OTHER ROADSIDE IMPROVEMENTS SHOULD BE DESIGNED CONSISTENT WITH THE HOWARD COUNTY DESIGN MANUAL AND US ACCESS BOARD ADA/PROWAG DESIGN SPECIFICATIONS.
      5. SIDEWALK MUST BE PROVIDED ALONG THE LOT FRONTAGE OF THE TOWNHOME UNITS FOR PRIVATE ROAD 1, 2, AND 3 IN THE NEIGHBORHOOD C. NO SIDEWALK IS REQUIRED ALONG THE SIDE OF PRIVATE ROAD 1,2 AND THAT ABUTS THE RECREATIONAL OPEN SPACE AREA; NO SIDEWALK ARE REQUIRED ALONG THE WESTERN SIDE OF PRIVATE ROAD 4 AND 5; AND NO SIDEWALK IS REQUIRED ALONG THE EASTERN SIDE OF PRIVATE ROAD 7. NO SIDEWALK IS REQUIRED ALONG THE SOUTHERN SIDE OF PUBLIC ROAD A IN NEIGHBORHOOD C.
      6. A SIDEWALK MUST BE PROVIDED ALONG THE LOT FRONTAGES OF THE TOWNHOME UNITS FOR THE PRIVATE ROAD 6 IN NEIGHBORHOOD A.
16. **NECESSARY DISTURBANCE**
   SECTION 16.115(C)(2) AND 16.116(C)(1): DECISION LETTER DATED SEPTEMBER 21, 2021
   REQUEST TO ALLOW IMPACTS TO THE STREAM, STREAM BUFFER, WETLANDS, WETLAND BUFFER, AND 100-YEAR FLOODPLAIN WAS **APPROVED** FOR THE CONSTRUCTION OF TWO (2) PUBLIC SEWER LINE INSTALLATIONS FOR THE BETHANY GLEN ARAH PROJECT. THIS REQUEST AND DECISION LETTER REPLACES THE PREVIOUS NECESSARY DISTURBANCE REQUEST THAT WAS APPROVED ON 2-11-21. THE REASON FOR WHY THIS NEW REQUEST REPLACES THE PREVIOUS REQUEST IS DUE TO UTILITY DESIGN CHANGES AND PREFERRED LAYOUT OF PUBLIC UTILITIES BY DPW AND DED. THE APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS AND MITIGATION METHODS:
   1. THE SEWER LINE SHALL ONLY DISTURB THOSE ENVIRONMENTAL AREAS AS STATED IN THE REQUEST AND DELINEATED IN NEIGHBORHOOD D AND E ON THE NECESSARY DISTURBANCE PLAN EXHIBIT; ANY DISTURBANCE TO ENVIRONMENTALLY REGULATED FEATURES BEYOND WHAT HAS BEEN APPROVED ARE NOT PERMITTED UNLESS THE DEVELOPER SUBMITS A FORMAL REQUEST TO DPZ FOR SUCH DISTURBANCE IN ACCORDANCE WITH SECTION 16.115(c)(2) AND 16.116(c)(1).
   2. THE DISTURBED AREA SHALL BE RE-VEGETATED AND RETURNED TO ITS NATURAL CONDITION TO THE GREATEST EXTENT POSSIBLE; ALL STEEP SLOPE DISTURBANCES ARE TO BE STABILIZED UTILIZING METHODS OF BEST PRACTICES.
   3. THE DEVELOPER SHALL OBTAIN AUTHORIZATION FROM THE MARYLAND DEPARTMENT OF THE ENVIRONMENT AND U.S. ARMY CORPS OF ENGINEERS FOR ACTIVITIES IN REGULATED WETLAND AND STREAM AREAS PRIOR TO SUBMISSION OF ANY GRADING PERMIT APPLICATIONS. REFERENCE THE APPLICABLE MDE OR USACE PERMITS OR TRACKING NUMBERS ON ANY ASSOCIATED SUBDIVISION PLANS, SITE DEVELOPMENT PLANS AND BUILDING OR GRADING PERMITS.
17. EXISTING WELL AND SEPTIC SYSTEMS MUST BE PROPERLY ABANDONED AND HOWARD COUNTY HEALTH DEPARTMENT NOTIFIED PRIOR TO THE HEALTH DEPARTMENTS SIGNATURE ON THE FINAL PLAT.
18. A NOISE STUDY HAS BEEN PERFORMED BY FORENVICON, DATED 11/18/2020, REVISED 04/26/2021 AND A COMBINATION OF A PROPOSED EARTH BERMS AND NOISE BARRIERS HAS BEEN PROVIDED FOR NOISE MITIGATION. NOTE, IN AREAS WHERE THERE ARE "GAPS" IN NOISE WALLS PROPOSED, EARTH BERM ELEVATIONS PROVIDE SUFFICIENT HEIGHT FOR MITIGATION.
19. TRAFFIC CONTROL DEVICES:
   A) THE R1-1 ("STOP") SIGN AND THE STREET NAME SIGN (SNS) ASSEMBLY FOR THIS DEVELOPMENT MUST BE INSTALLED BEFORE THE BASE PAVING IS COMPLETED.
   B) THE TRAFFIC CONTROL DEVICE LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND MUST BE FIELD APPROVED BY HOWARD COUNTY TRAFFIC DIVISION (410-313-2430) PRIOR TO THE INSTALLATION OF ANY OF THE TRAFFIC CONTROL DEVICES.
   C) ALL TRAFFIC CONTROL DEVICES AND THEIR LOCATIONS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE "MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MDMUTCD).
   D) ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED ("QUICK PUNCH"), SQUARE TUBE POST (14 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (12 GAUGE) - 3' LONG. THE ANCHOR SHALL NOT EXTEND MORE THAN TWO "QUICK PUNCH" HOLES ABOVE GROUND LEVEL. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.
20. STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURES AND POLES SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME III (2006), SECTION 5.5.A. A MINIMUM OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
21. PRIVATE RANGE OF ADDRESS SIGN ASSEMBLIES SHALL BE FABRICATED AND INSTALLED BY HOWARD COUNTY BUREAU OF HIGHWAYS AT THE DEVELOPERS/OWNERS EXPENSE. CONTACT HOWARD COUNTY TRAFFIC DIVISION AT 410-313-5752 FOR DETAILS AND COST ESTIMATES.
22. ALL TRAFFIC CONTROL SIGNS SHALL BE PLACED IN FRONT OF TREE LOCATIONS FOR MAXIMUM SIGHT VISIBILITY. NO TREE CAN BE INSTALLED WITHIN 30' OF ANY STOP SIGN (APPROACH DIRECTION). WHERE SIGNS NEED TO BE PLACED BEHIND THE SIDEWALK, ADDITIONAL SPACING BETWEEN TREES MAY BE REQUIRED AT THOSE LOCATIONS.
23. THE SITE IS LOCATED WITHIN THE PLUMTREE BRANCH WATERSHED. STORMWATER MANAGEMENT WILL BE PROVIDED IN ACCORDANCE WITH HOWARD COUNTY SPECIFICATIONS. WATER QUALITY AND RECHARGE VOLUMES WILL BE PROVIDED BY MICRO-BIORETENTION FACILITIES, BIORETENTION FACILITIES, SURFACE SAND FILTERS AND DRYWELLS TO MEET MDE REQUIREMENTS.WATER QUANTITY WILL BE PROVIDED BY SURFACE SAND FILTERS TO MEET REQUIREMENTS INCLUDING THE MANAGEMENT OF THE 10-YR, 100-YR, AND 6.6" STORM EVENTS AS DESCRIBED AND REQUIRED BY COUNTY COUNCIL RESOLUTION 123-2019. FACILITIES TREATING ONLY AREAS FROM PRIVATE PROPERTY WILL BE OWNED AND MAINTAINED BY PROPERTY OWNERS AND HOA. FACILITIES TREATING AREAS WITHIN PUBLIC R/W WILL BE PLACED IN EASEMENTS AND WILL BE MAINTAINED BY HOA. HOWARD COUNTY WILL MAINTAIN PIPES AND PROPERTY OWNERS/HOA WILL MAINTAIN FACILITY SURFACES.
24. A TOTAL OF 7.09 ACRES OF LAND SHALL BE DEDICATED TO HOWARD COUNTY MD FOR THE PURPOSES OF PUBLIC ROAD RIGHT OF WAY.
25. THIS PLAN IS SUBJECT TO THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS PER COUNCIL BILL NO. 45-2003 AND THE AMENDED ZONING REGULATIONS PER COUNCIL BILL NO. 32-2013. DEVELOPMENT OR CONSTRUCTION ON THIS PROPERTY MUST COMPLY WITH SETBACK AND BUFFER REGULATIONS IN EFFECT AT THE TIME OF CONDITIONAL USE PLAN APPROVAL.
26. DRIVEWAYS SHALL BE PROVIDED PRIOR TO RESIDENTIAL OCCUPANCY TO ENSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING (MINIMUM) REQUIREMENTS:
   A. WIDTH - 12 FEET (16 FEET SERVING MORE THAN ONE RESIDENCE)
   B. SURFACE - SIX (6") INCHES OF COMPACTED CRUSHER RUN BASE WITH TAR AND CHIP COATING
   C. GEOMETRY - MAXIMUM 15% GRADE, MAXIMUM 10% GRADE CHANGE AND MINIMUM OF 45 TURNING RADIUS
   D. STRUCTURES (CULVERTS/BRIDGES) CAPABLE OF SUPPORTING 25 GROSS TONS (H 25 LOADING)
   E. DRAINAGE ELEMENTS - CAPABLE OF SAFELY PASSING 100 YEAR FLOOD WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVEWAY SURFACE.
   F. STRUCTURE CLEARANCES - MINIMUM 12 FEET
   G. MAINTENANCE - SUFFICIENT TO INSURE ALL WEATHER USE
27. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE LIMITS OF WETLANDS, STREAMS OR THEIR REQUIRED BUFFERS, FLOODPLAIN AND FOREST CONSERVATION EASEMENT AREA EXCEPT AS APPROVED BY AN ALTERNATE COMPLIANCE AND NECESSARY DISTURBANCE JUSTIFICATION.
28. AN APPLICATION FOR THE PROPOSED IMPACTS TO ENVIRONMENTAL FEATURES ON THE SUBJECT PROPERTY HAS BEEN PROCESSED AND APPROVED AUG. 2, 2023 WITH MDE. THE MDE PERMIT NUMBER IS 22-NT-3046/202260325.
29. FOR FLAG OR PIPESTEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPESTEM AND ROAD RIGHT-OF-WAY LINE AND NOT ONTO THE PIPESTEM LOT DRIVEWAY.
30. WATER AND SEWER SERVICE TO THESE LOTS WILL BE GRANTED UNDER THE PROVISIONS OF SECTION 18.122.B OF THE HOWARD COUNTY CODE. WATER AND SEWER TO BE PUBLIC FOR ALL LOTS.
31. THIS PLAN IS SUBJECT TO COUNCIL BILL NO. 61-2019 AND 62-2019, WHICH WENT INTO EFFECT ON FEB. 5, 2020.
32. RESERVATION OF PUBLIC UTILITY AND FOREST CONSERVATION EASEMENTS DEVELOPER RESERVES UNTO ITSELF, ITS SUCCESSORS AND ASSIGNS, ALL EASEMENTS SHOWN ON THIS PLAN FOR WATER, SEWER, STORM DRAINAGE, OTHER PUBLIC UTILITIES AND FOREST CONSERVATION (DESIGNATED AS "FOREST CONSERVATION AREA"), LOCATED IN, ON, OVER AND THROUGH LOTS/PARCELS, ANY CONVEYANCES OF THE AFORESAID LOTS/PARCELS SHALL BE SUBJECT TO THE EASEMENTS HEREIN RESERVED, WHETHER OR NOT EXPRESSLY STATED IN THE DEED(S) CONVEYING SAID LOT(S)/PARCELS. DEVELOPER SHALL EXECUTE AND DELIVER DEEDS FOR THE EASEMENTS HEREIN RESERVED TO HOWARD COUNTY WITH A METES AND BOUNDS DESCRIPTION OF THE FOREST CONSERVATION AREA. UPON COMPLETION OF THE PUBLIC UTILITIES AND THEIR ACCEPTANCE BY HOWARD COUNTY, AND IN THE CASE OF THE FOREST CONSERVATION EASEMENT(S), UPON COMPLETION OF THE DEVELOPER'S OBLIGATIONS UNDER THE FOREST CONSERVATION INSTALLATION AND MAINTENANCE AGREEMENT EXECUTED BY THE DEVELOPER AND THE COUNTY, AND THE RELEASE OF DEVELOPER'S SURETY POSTED WITH SAID AGREEMENT. THE COUNTY SHALL ACCEPT THE EASEMENTS AND RECORD THE DEED(S) OF EASEMENT IN THE LAND RECORDS OF HOWARD COUNTY.
33. GRADING AND DISTURBANCE OF ENVIRONMENTAL FEATURES AS APPLICABLE FOR OUTFALL LOCATIONS AND/OR UTILITY CONSTRUCTION IS CONSIDERED ESSENTIAL DISTURBANCE. NO OTHER GRADING, DISTURBANCE OR VEGETATIVE REMOVAL IS PERMITTED IN WETLANDS, STREAMS, THEIR BUFFERS, FLOOD PLAIN OR FOREST CONSERVATION EASEMENT AREAS.
34. IN ACCORDANCE WITH SECTION 131.0.N.1.A (16) OF THE ZONING REGULATIONS, AT LEAST 10% OF THE DWELLINGS IN EACH R-20 DEVELOPMENT SHALL BE MODERATE INCOME HOUSING UNITS. SIXTEEN (16) MODERATE INCOME HOUSING UNITS FOR THE ENTIRE COMMUNITY (SDP-22-021 AND F-22-033) ARE PROPOSED OR A FEE-IN-LIEU PAYMENT WILL BE PROVIDED.
35. HIGHLY ERODIBLE SOILS EXIST ON SITE. SEDIMENT CONTROL PLANS WILL ADDRESS THE EROSION CONCERNS.
36. A CRITICAL FLOODPLAIN REPORT, DATED NOVEMBER 2020 HAS BEEN PREPARED BY BOHLER FOR THIS PROJECT.
37. A PRE-SUBMISSION COMMUNITY MEETING WAS HELD ON JUNE 30, 2016.
38. NO DECKS, PATIOS, SHEDS OR OTHER IMPERVIOUS STRUCTURES OR SURFACES SHALL EXTEND INTO THE DRAINAGE EASEMENTS AT THE REAR OF THE LOTS.
39. PER SECTION 3.105 OF THE COUNTY CODE, ELECTRIC VEHICLE (EV) CHARGING STATIONS (IF REQUIRED) ARE TO BE LOCATED WITHIN PROPOSED GARAGES AND SPECIFIED BY THE BUILDERS. CONTRACTOR/BUILDER TO CONTACT HOWARD COUNTY CHIEF OF PLAN REVIEW FOR DILP TO CONFIRM REQUIREMENTS.
40. LANDSCAPING FOR THIS SUBDIVISION WILL BE PROVIDED IN ACCORDANCE WITH THIS CERTIFIED LANDSCAPE PLAN AND IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. PERIMETER LANDSCAPE AND STORMWATER MANAGEMENT SURETY IN THE AMOUNT OF $55,010 FOR THE INSTALLATION OF 81 SHADE TREES ($300.00 EACH); AND, 109 EVERGREEN TREES ($150.00 EACH); THE INSTALLATION OF A FENCE TOTALING 1,436 LINEAR FEET ($10 PER LINEAR FOOT); AND FINANCIAL SURETY IN THE AMOUNT OF $5,400 FOR 18 MITIGATION SHADE TREES (WP-21-064); AND FINANCIAL SURETY IN THE AMOUNT OF $29,100 FOR 97 SHADE TREES ($300 EACH) FOR RESIDENTIAL INTERNAL LANDSCAPING, FOR A TOTAL SURETY OF $89,510 SHALL BE POSTED BY THE DEVELOPER AS PART OF THE DPW DEVELOPER'S AGREEMENT, F-22-033 .
41. FINANCIAL SURETY FOR THE REQUIRED 301 LARGE STREET TREES ($300 EACH) WILL BE POSTED FOR THE AMOUNT OF $90,300 WITH THE DEVELOPMENT ENGINEERING DIVISION (DED) COST ESTIMATE UNDER THE FINAL PLAN SUBMISSION.
42. FOREST CONSERVATION REQUIREMENTS PER SECTION 16.1200 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION MANUAL FOR THIS SUBDIVISION WILL BE FULFILLED BY RETENTION OF EXISTING FOREST IN THE AMOUNT OF 9.0 ACRES. THE REFORESTATION OBLIGATION OF 15.8 ACRES WILL BE PROVIDED BY 12.9 ACRES ONSITE, AND 4.4 ACRES AT THE WILLOWSHIRE FOREST CONSERVATION BANK F-18-086. TOTAL REFORESTATION PROVIDED FOR THIS SUBDIVISION IS 17.3 ACRES. SURETY IN THE AMOUNT OF $280,962.00 WILL BE POSTED WITH THE DEVELOPERS AGREEMENT F-22-033.
43. IN AREAS WHERE FOREST CONSERVATION EASEMENTS ARE LESS THAN 35 FEET FROM LOT LINES, A LARGE STOCK (TWO ROWS OF ONE (1) INCH CALIPER) TREES ARE TO BE PLANTED ALONG THE EDGE OF THE FOREST CONSERVATION EASEMENT IN ACCORDANCE WITH SECTION 16.1209(B)(4) OF THE COUNTY CODE.
44. THE AGE-RESTRICTED ADULT HOUSING CONDITIONAL USE PLAN WAS PRESENTED BEFORE THE DESIGN ADVISORY PANEL ON DECEMBER 7, 2016, FOR BUILDING ARCHITECTURAL ADVISORY COMMENTS AS REQUIRED UNDER SECTION 131.0.N.1.A.18 OF THE ZONING REGULATIONS AND AS APPROVED UNDER BA-17-018C. THE CONDITIONAL USE PLAN IS INCLUDED WITH BA-17-018C.
45. PER SECTION 131.0.N.1.(4) OF THE ZONING REGULATIONS, THIS MAXIMUM PERMITTED DENSITY FOR THIS AGE-RESTRICTED PROJECT IS 5 UNITS PER NET ACRE OR 322 DWELLING UNITS.
46. IF THIS DEVELOPMENT IS TO BE CONSTRUCTED IN PHASES, PER THE D&O FOR THE CONDITIONAL USE, OPEN SPACE AREA, RECREATIONAL FACILITIES/COMMUNITY CENTERS SHALL BE PROVIDED IN EACH PHASE TO MEET THE NEEDS OF THE RESIDENTS. THE DEVELOPERS WILL NEED TO PROVIDED A SCHEDULE FOR THE INSTALLATION OF SUCH FACILITIES WITH SDPs.
47. MAINTENANCE OF ON STREET PARKING SHALL BE THE RESPONSIBILITY OF THE HOA.
48. THE PROPOSED 6' HIGH FENCES IN NEIGHBORHOODS C AND D WILL SCREEN THE PROPOSED DEVELOPMENT FROM ADJOINING SUBDIVISIONS TO THE SOUTH AND WEST, AS REQUIRED BY THE CONDITIONAL USE APPROVAL. A 10' MAINTENANCE EASEMENT HAS BEEN ESTABLISHED FOR THE FENCE WHEN THE FENCE IS LOCATED ON PRIVATE LOTS. THIS EASEMENT WILL ALLOW THE HOA TO MAINTAIN THE FENCE ON THESE PRIVATE LOTS. REFER TO GRADING SHEETS FOR FENCE PLACEMENT.
49. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF THE HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
50. 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.
51. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
52. THE PRIVATE ROADS WILL BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION.
53. THE FINAL DESIGN FOR ON-LOT ESD FACILITIES WILL BE PROVIDED WITH THE SITE DEVELOPMENT PLAN.

STORMWATER MANAGEMENT PRACTICES

FACILITY NAME & NUMBER	PRACTICE TYPE (QUALITY)	PUBLIC	PRIVATE	HOA MAINTAINS	HOMEOWNER MAINTAINS	MISC.
8'W X 14'L X 4.67'D DRYWELLS (1,000SF)	MDE M-5		√	√		BETWEEN LOTS 12 & 13
8'W X 14'L X 4.67'D DRYWELLS (1,000SF)	MDE M-5		√		√	(12" MIN, 3' MAX COVER)
7'W X 12'L X 4.67'D DRYWELLS (748 SF)	MDE M-5		√		√	(12" MIN, 3' MAX COVER)
6.5'W X 17'L X 4.67'D DRYWELLS (1000 SF)	MDE M-5		√		√	(12" MIN, 3' MAX COVER)
6.5'W X 17'L X 4.67'D DRYWELLS (1000 SF)	MDE M-5		√	√		BETWEEN LOTS 48 & 49
7'W X 12'L X 3.33'D DRYWELLS (538 SF)	MDE M-5		√	√		COMMUNITY CENTER
SURFACE SAND FILTER WETLAND #C1	MDE F-1		√	√		
SUBMERGED GRAVEL WETLAND #C4	MDE M-2	√				
MICRO-BIORETENTION FACILITY #C5	MDE M-6	√				
SUBMERGED GRAVEL WETLAND #C6	MDE M-2		√	√		
MICRO-BIORETENTION FACILITY #D1	MDE M-6	√				
BIORETENTION FACILITY #D2	MDE F-6		√	√		
MICRO-BIORETENTION FACILITY #D3	MDE M-6		√	√		
BIORETENTION FACILITY #D4	MDE F-6		√	√		
SURFACE SAND FILTER FACILITY #D5	MDE F-1		√	√		
SURFACE SAND FILTER FACILITY #D6	MDE F-1		√	√		
SURFACE SAND FILTER FACILITY #D7	MDE F-1		√	√		
BIORETENTION FACILITY #E1	MDE F-6		√	√		
SURFACE SAND FILTER FACILITY #E2	MDE F-1		√	√		
MICRO-BIORETENTION FACILITY #E5	MDE M-6		√	√		
MICRO-BIORETENTION FACILITY #E6	MDE M-6		√	√		
BIORETENTION FACILITY #E7	MDE F-6		√	√		

BENCHMARK
GEODETIC SURVEY CONTROL - 17GB
ELEV. 441.515'
N 592,656.774
E 1,353,019.981

GEODETIC SURVEY CONTROL - 17EE
ELEV. 453.949'
N 593,815.262
E 1,355,774.821

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TR
DATE:	03/08/24
CAD I.D.:	CNDS-2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
COVER SHEET

SHEET NUMBER:

F-22-033

May 28, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - CNDS - 2---->LAYOUT: 01 - COVER SHEET
MG

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F

GENERAL NOTES:

CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE NOTES AND SPECIFICATIONS CONTAINED HEREIN. CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL SUBCONTRACTORS FULLY AND COMPLETELY CONFORM TO AND COMPLY WITH THESE REQUIREMENTS.

1. THE FOLLOWING DOCUMENTS ARE INCORPORATED BY REFERENCE AS PART OF THIS SITE PLAN:
   - SURVEY - BOUNDARY AND TOPOGRAPHIC SURVEY PERFORM BY BOHLER ENGINNERING ON 9/03/2015 FOR ELM STREET DEVELOPMENT, 5232 GREEN BRIDGE HOWARD COUNTY, MARYLAND 21036.

   "GEOTECHNICAL REPORT - PREPARED BY HILLIS-CARNES ENGINEERING ASSOCIATES, INC., DATED 12/14/2016 AND WAS APPROVED ON 3/6/2017.

   PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST VERIFY THAT HE/SHE HAS THE LATEST EDITION OF THE DOCUMENTS REFERENCED ABOVE. THIS IS CONTRACTOR'S RESPONSIBILITY.
2. ALL ACCESSIBLE (A/K/A ADA) PARKING SPACES MUST BE CONSTRUCTED TO MEET, AT A MINIMUM, THE MORE STRINGENT OF THE REQUIREMENTS OF THE "AMERICANS WITH DISABILITIES ACT" (ADA) CODE (42 U.S.C. § 12101 et seq. AND 42 U.S.C. § 4151 et seq.) OR THE REQUIREMENTS OF THE JURISDICTION WHERE THE PROJECT IS TO BE CONSTRUCTED, AND ANY AND ALL AMENDMENTS TO BOTH WHICH ARE IN EFFECT WHEN THESE PLANS ARE COMPLETED.
3. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED THE COMMENTS TO ALL PLANS AND OTHER DOCUMENTS REVIEWED AND APPROVED BY THE PERMITTING AUTHORITIES AND CONFIRMED THAT ALL NECESSARY OR REQUIRED PERMITS HAVE BEEN OBTAINED. CONTRACTOR MUST HAVE COPIES OF ALL PERMITS AND APPROVALS ON SITE AT ALL TIMES.
4. THE OWNER/CONTRACTOR MUST BE FAMILIAR WITH AND RESPONSIBLE FOR THE PROCUREMENT OF ANY AND ALL CERTIFICATIONS REQUIRED FOR THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
5. ALL WORK MUST BE PERFORMED IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS AND CONDITIONS OF APPROVAL, AND ALL APPLICABLE REQUIREMENTS, RULES, REGULATIONS, STATUTORY REQUIREMENTS, CODES, LAWS AND STANDARDS OF ALL GOVERNMENTAL ENTITIES WITH JURISDICTION OVER THIS PROJECT.
6. THE GEOTECHNICAL REPORT AND RECOMMENDATIONS SET FORTH HEREIN ARE A PART OF THE REQUIRED CONSTRUCTION DOCUMENTS AND, IN CASE OF CONFLICT, DISCREPANCY OR AMBIGUITY, THE MORE STRINGENT REQUIREMENTS AND/OR RECOMMENDATIONS CONTAINED IN THE PLANS AND THE GEOTECHNICAL REPORT AND RECOMMENDATIONS SHALL TAKE PRECEDENCE UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS. THE CONTRACTOR MUST NOTIFY THE ENGINEER, IN WRITING, OF ANY SUCH CONFLICT, DISCREPANCY OR AMBIGUITY BETWEEN THE GEOTECHNICAL REPORTS AND PLANS AND SPECIFICATIONS PRIOR TO PROCEEDING WITH ANY FURTHER WORK.
7. THESE PLANS ARE BASED ON INFORMATION PROVIDED TO BOHLER ENGINEERING BY THE OWNER AND OTHERS PRIOR TO THE TIME OF PLAN PREPARATION. CONTRACTOR MUST FIELD VERIFY EXISTING CONDITIONS AND NOTIFY BOHLER ENGINEERING, IN WRITING, IMMEDIATELY IF ACTUAL SITE CONDITIONS DIFFER FROM THOSE SHOWN ON THE PLAN, OR IF THE PROPOSED WORK CONFLICTS WITH ANY OTHER SITE FEATURES.
8. ALL DIMENSIONS SHOWN ON THE PLANS MUST BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR MUST NOTIFY ENGINEER, IN WRITING, IF ANY CONFLICTS, DISCREPANCIES, OR AMBIGUITIES EXIST PRIOR TO PROCEEDING WITH CONSTRUCTION. NO EXTRA COMPENSATION WILL BE PAID TO THE CONTRACTOR FOR WORK WHICH HAS TO BE REDONE OR REPAIRED DUE TO DIMENSIONS OR GRADES SHOWN INCORRECTLY ON THESE PLANS PRIOR TO CONTRACTOR GIVING ENGINEER WRITTEN NOTIFICATION OF SAME AND ENGINEER, THEREAFTER, PROVIDING CONTRACTOR WITH WRITTEN AUTHORIZATION TO PROCEED WITH SUCH ADDITIONAL WORK.
9. CONTRACTOR MUST REFER TO THE ARCHITECTURAL/BUILDING PLANS "OF RECORD" FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRY/EXIT POINTS, ELEVATIONS, PRECISE BUILDING DIMENSIONS, AND EXACT BUILDING UTILITY LOCATIONS.
10. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST COORDINATE THE BUILDING LAYOUT BY CAREFUL REVIEW OF THE ENTIRE SITE PLAN AND THE LATEST ARCHITECTURAL PLANS (INCLUDING, BUT NOT LIMITED TO, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE SUPPRESSION PLAN, WHERE APPLICABLE). CONTRACTOR MUST IMMEDIATELY NOTIFY OWNER, ARCHITECT AND SITE ENGINEER, IN WRITING, OF ANY CONFLICTS, DISCREPANCIES OR AMBIGUITIES WHICH EXIST.
11. DEBRIS MUST NOT BE BURIED ON THE SUBJECT SITE AND ALL UNSUITABLE EXCAVATED MATERIAL AND DEBRIS (SOLID WASTE) MUST BE DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS OF ANY AND ALL GOVERNMENTAL AUTHORITIES WHICH HAVE JURISDICTION OVER THIS PROJECT OR OVER CONTRACTOR.
12. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING WHEN SHORING IS REQUIRED AND FOR INSTALLING ALL SHORING REQUIRED DURING EXCAVATION (TO BE PERFORMED IN ACCORDANCE WITH CURRENT OSHA STANDARDS) AND ANY ADDITIONAL PRECAUTIONS TO BE TAKEN TO ASSURE THE STABILITY OF ADJACENT, NEARBY AND CONTIGUOUS STRUCTURES AND PROPERTIES.
13. THE CONTRACTOR IS TO EXERCISE EXTREME CARE WHEN PERFORMING ANY WORK ACTIVITIES ADJACENT TO PAVEMENT, STRUCTURES, ETC. WHICH ARE TO REMAIN EITHER FOR AN INITIAL PHASE OF THE PROJECT OR AS PART OF THE FINAL CONDITION. CONTRACTOR IS RESPONSIBLE FOR TAKING ALL APPROPRIATE MEASURES REQUIRED TO ENSURE THE STRUCTURAL STABILITY OF SIDEWALKS AND PAVEMENT, UTILITIES, BUILDINGS, AND INFRASTRUCTURE WHICH ARE TO REMAIN, AND TO PROVIDE A SAFE WORK AREA FOR THIRD PARTIES, PEDESTRIANS AND ANYONE INVOLVED WITH THE PROJECT.
14. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE DONE TO ANY NEW OR EXISTING CONSTRUCTION OR PROPERTY DURING THE COURSE OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO DRAINAGE, UTILITIES, PAVEMENT, STRIPING, CURB, ETC. AND SHALL BEAR ALL COSTS ASSOCIATED WITH SAME TO INCLUDE, BUT NOT BE LIMITED TO, REDESIGN, RE-SURVEY, RE-PERMITTING AND CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR AND MUST REPLACE ALL SIGNAL INTERCONNECTION CABLE, WIRING CONDUITS, AND ANY UNDERGROUND ACCESSORY EQUIPMENT DAMAGED DURING CONSTRUCTION AND MUST BEAR ALL COSTS ASSOCIATED WITH SAME. THE REPAIR OF ANY SUCH NEW OR EXISTING CONSTRUCTION OR PROPERTY MUST RESTORE SUCH CONSTRUCTION OR PROPERTY TO A CONDITION EQUIVALENT TO OR BETTER THAN THE CONDITIONS PRIOR TO COMMENCEMENT OF THE CONSTRUCTION, AND IN CONFORMANCE WITH APPLICABLE CODES, LAWS RULES, REGULATIONS, STATUTORY REQUIREMENTS AND STATUTES. CONTRACTOR MUST BEAR ALL COSTS ASSOCIATED WITH SAME. CONTRACTOR IS RESPONSIBLE TO DOCUMENT ALL EXISTING DAMAGE AND TO NOTIFY THE OWNER AND THE CONSTRUCTION MANAGER PRIOR TO THE START OF CONSTRUCTION.
15. ALL CONCRETE MUST BE AIR ENTRAINED AND HAVE THE MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS UNLESS OTHERWISE NOTED ON THE PLANS, DETAILS AND/OR GEOTECHNICAL REPORT.
16. THE ENGINEER IS NOT RESPONSIBLE FOR CONSTRUCTION METHODS, MEANS, TECHNIQUES OR PROCEDURES, GENERALLY OR FOR THE CONSTRUCTION MEANs, METHODS, TECHNIQUES OR PROCEDURES FOR COMPLETION OF THE WORK DEPICTED BOTH ON THESE PLANS, AND FOR ANY CONFLICTS/SCOPE REVISIONS WHICH RESULT FROM SAME. CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE METHODS/MEANS FOR COMPLETION OF THE WORK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
17. THE ENGINEER OF RECORD IS NOT RESPONSIBLE FOR JOB SITE SAFETY. THE ENGINEER OF RECORD HAS NOT BEEN RETAINED TO PERFORM OR BE RESPONSIBLE FOR JOB SITE SAFETY, SAME BEING WHOLLY OUTSIDE OF ENGINEER'S SERVICES AS RELATED TO THE PROJECT. THE ENGINEER OF RECORD IS NOT RESPONSIBLE TO IDENTIFY OR REPORT ANY JOB SITE SAFETY ISSUES, AT ANY TIME.
18. ALL CONTRACTORS MUST CARRY THE SPECIFIED STATUTORY WORKER'S COMPENSATION INSURANCE, EMPLOYER'S LIABILITY INSURANCE AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE (CGL). ALL CONTRACTORS MUST HAVE THEIR CGL POLICIES ENDORSED TO NAME BOHLER ENGINEERING, AND ITS PAST, PRESENT AND FUTURE OWNERS, OFFICERS, DIRECTORS, PARTNERS, SHAREHOLDERS, MEMBERS, PRINCIPALS, COMMISSIONERS, AGENTS, SERVANTS, EMPLOYEES, AFFILIATES, SUBSIDIARIES, AND RELATED ENTITIES, AND ITS SUBCONTRACTORS AND SUBCONSULTANTS AS ADDITIONAL NAMED INSURED AND TO PROVIDE CONTRACTUAL LIABILITY COVERAGE SUFFICIENT TO INSURE THIS HOLD HARMLESS AND INDEMNITY OBLIGATIONS ASSUMED BY THE CONTRACTORS. ALL CONTRACTORS MUST FURNISH BOHLER ENGINEERING WITH CERTIFICATIONS OF INSURANCE AS EVIDENCE OF THE REQUIRED INSURANCE PRIOR TO COMMENCING WORK AND UPON RENEWAL OF EACH POLICY DURING THE ENTIRE PERIOD OF CONSTRUCTION AND FOR ONE YEAR AFTER THE COMPLETION OF CONSTRUCTION. IN ADDITION, ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED UNDER THE LAW, INDEMNIFY, DEFEND AND HOLD HARMLESS BOHLER ENGINEERING AND ITS PAST, PRESENT AND FUTURE OWNERS, OFFICERS, DIRECTORS, PARTNERS, SHAREHOLDERS, MEMBERS, PRINCIPALS, COMMISSIONERS, AGENTS, SERVANTS, EMPLOYEES, AFFILIATES, SUBSIDIARIES, AND RELATED ENTITIES, AND ITS SUBCONTRACTORS AND SUBCONSULTANTS FROM AND AGAINST ANY DAMAGES, INJURIES, CLAIMS, ACTIONS, PENALTIES, EXPENSES, PUNITIVE DAMAGES, TORT DAMAGES, STATUTORY CLAIMS, STATUTORY CAUSES OF ACTION, LOSSES, CAUSES OF ACTION, LIABILITIES OR COSTS, INCLUDING, BUT NOT LIMITED TO, REASONABLE ATTORNEYS' FEES AND DEFENSE COSTS, ARISING OUT OF OR IN ANY WAY CONNECTED WITH OR TO THE PROJECT, INCLUDING ALL CLAIMS BY EMPLOYEES OF THE CONTRACTORS, ALL CLAIMS BY THIRD PARTIES AND ALL CLAIMS RELATED TO THE PROJECT. CONTRACTOR MUST NOTIFY ENGINEER, IN WRITING, AT LEAST THIRTY (30) DAYS PRIOR TO ANY TERMINATION, SUSPENSION OR CHANGE OF ITS INSURANCE HEREUNDER.
19. BOHLER ENGINEERING WILL REVIEW OR TAKE OTHER APPROPRIATE ACTION ON THE CONTRACTOR SUBMITTALS, SUCH AS SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND OTHER DATA, WHICH THE CONTRACTOR IS REQUIRED TO SUBMIT, BUT ONLY FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH THE DESIGN INTENT AND THE INFORMATION SHOWN IN THE CONSTRUCTION CONTRACT DOCUMENTS. CONSTRUCTION MEANS AND/OR METHODS AND/OR TECHNIQUES OR PROCEDURES, COORDINATION OF THE WORK WITH OTHER TRADES, AND CONSTRUCTION SAFETY PRECAUTIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND BOHLER HAS NO RESPONSIBILITY OR LIABILITY FOR SAME HEREUNDER. BOHLER ENGINEERING'S SHOP DRAWING REVIEW WILL BE CONDUCTED WITH REASONABLE PROMPTNESS WHILE ALLOWING SUFFICIENT TIME TO PERMIT ADEQUATE REVIEW. REVIEW OF A SPECIFIC ITEM MUST NOT INDICATE THAT BOHLER ENGINEERING HAS REVIEWED THE ENTIRE ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. BOHLER ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY DEVIATIONS FROM THE CONSTRUCTION DOCUMENTS NOT PROMPTLY AND IMMEDIATELY BROUGHT TO ITS ATTENTION, IN WRITING, BY THE CONTRACTOR. BOHLER ENGINEERING WILL NOT BE REQUIRED TO REVIEW PARTIAL SUBMISSIONS OR THOSE FOR WHICH SUBMISSIONS OF CORRELATED ITEMS HAVE NOT BEEN RECEIVED.
20. NEITHER THE PROFESSIONAL ACTIVITIES OF BOHLER ENGINEERING, NOR THE PRESENCE OF BOHLER ENGINEERING AND/OR ITS PAST, PRESENT AND FUTURE OWNERS, OFFICERS, DIRECTORS, PARTNERS, SHAREHOLDERS, MEMBERS, PRINCIPALS, COMMISSIONERS, AGENTS, SERVANTS, EMPLOYEES, AFFILIATES, SUBSIDIARIES, AND RELATED ENTITIES, AND ITS SUBCONTRACTORS AND SUBCONSULTANTS AT A CONSTRUCTION/PROJECT SITE, SHALL RELIEVE THE GENERAL CONTRACTOR OF ITS OBLIGATIONS, DUTIES AND RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, OVERSEEING, SUPERINTENDING AND COORDINATING THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND COMPLIANCE ANY HEALTH OR SAFETY PRECAUTIONS REQUIRED BY ANY REGULATORY AGENCIES WITH JURISDICTION OVER THE PROJECT AND/OR PROPERTY. BOHLER ENGINEERING AND ITS PERSONNEL HAVE NO AUTHORITY TO EXERCISE ANY CONTROL OVER ANY CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES IN CONNECTION WITH THEIR WORK OR ANY HEALTH OR SAFETY PROGRAMS OR PROCEDURES. THE GENERAL CONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SITE SAFETY. BOHLER ENGINEERING SHALL BE INDEMNIFIED BY THE GENERAL CONTRACTOR AND MUST BE NAMED AN ADDITIONAL INSURED UNDER THE GENERAL CONTRACTOR'S POLICIES OF GENERAL LIABILITY INSURANCE AS DESCRIBED ABOVE IN NOTE 19 FOR JOB SITE SAFETY.
21. IF THE CONTRACTOR DEVIATES FROM THE PLANS AND SPECIFICATIONS, INCLUDING THE NOTES CONTAINED HEREIN, WITHOUT FIRST OBTAINING THE PRIOR WRITTEN AUTHORIZATION OF THE ENGINEER FOR SUCH DEVIATIONS, THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE PAYMENT OF ALL COSTS INCURRED IN CORRECTING ANY WORK DONE WHICH DEVIATES FROM THE PLANS, ALL FINES AND/OR PENALTIES ASSESSED WITH RESPECT THERETO AND ALL COMPENSATORY OR PUNITIVE DAMAGES RESULTING THEREFROM AND, FURTHER, SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS THE ENGINEER, TO THE FULLEST EXTENT PERMITTED UNDER THE LAW, IN ACCORDANCE WITH PARAGRAPH 19 HEREIN, FOR AND FROM ALL FEES, ATTORNEYS' FEES, DAMAGES, COSTS, JUDGMENTS, PENALTIES AND THE LIKE RELATED TO SAME.
22. CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE AND PROTECTION OF TRAFFIC PLAN FOR ALL WORK THAT AFFECTS PUBLIC TRAVEL EITHER IN THE R.O.W. OR ON SITE. THE COST FOR THIS ITEM MUST BE INCLUDED IN THE CONTRACTOR'S PRICE.
23. ALL SIGNING AND PAVEMENT STRIPING MUST CONFORM TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES OR LOCALLY APPROVED SUPPLEMENT.
24. ENGINEER IS NOT RESPONSIBLE FOR ANY INJURY OR DAMAGES RESULTING FROM CONTRACTOR'S FAILURE TO BUILD OR CONSTRUCT IN STRICT ACCORDANCE WITH THE APPROVED PLANS. IF CONTRACTOR AND/OR OWNER FAIL BUILD OR CONSTRUCT IN STRICT ACCORDANCE WITH APPROVED PLANS, THEY AGREE TO JOINTLY AND SEVERALLY INDEMNIFY AND HOLD ENGINEER HARMLESS FOR ALL INJURIES AND DAMAGES THAT ENGINEER SUFFERS AND COSTS THAT ENGINEER INCURS.
25. OWNER MUST MAINTAIN AND PRESERVE ALL PHYSICAL SITE FEATURES AND DESIGN FEATURES DEPICTED ON THE PLANS AND RELATED DOCUMENTS, IN STRICT ACCORDANCE WITH THE APPROVED PLAN(S) AND DESIGN AND, FURTHER ENGINEER IS NOT RESPONSIBLE FOR ANY FAILURE TO SO MAINTAIN OR PRESERVE SITE AND/OR DESIGN FEATURES. IF OWNER FAILS TO MAINTAIN AND/OR PRESERVE ALL PHYSICAL SITE FEATURES AND/OR DESIGN FEATURES DEPICTED ON THE PLANS AND RELATED DOCUMENTS, OWNER AGREES TO INDEMNIFY AND HOLD ENGINEER HARMLESS FOR ALL INJURIES AND DAMAGES THAT ENGINEER SUFFERS AND COSTS THAT ENGINEER INCURS AS A RESULT OF SAID FAILURE.
26. ALL DIMENSIONS MUST BE TO FACE OF CURB, EDGE OF PAVEMENT, OR EDGE OF BUILDING, UNLESS NOTED OTHERWISE.
27. ALL CONSTRUCTION AND MATERIALS MUST COMPLY WITH AND CONFORM TO APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, LAWS, ORDINANCES, RULES AND CODES, AND ALL APPLICABLE OSHA REQUIREMENTS.
28. CONTRACTOR AND OWNER MUST INSTALL ALL ELEMENTS AND COMPONENTS IN STRICT COMPLIANCE WITH AND ACCORDANCE WITH MANUFACTURER'S STANDARDS AND RECOMMENDED INSTALLATION CRITERIA AND SPECIFICATIONS. IF CONTRACTOR AND/OR OWNER FAIL TO DO SO, THEY AGREE TO JOINTLY AND SEVERALLY INDEMNIFY AND HOLD ENGINEER HARMLESS FOR ALL INJURIES AND DAMAGES THAT ENGINEER SUFFERS AND COSTS THAT ENGINEER INCURS AS A RESULT OF SAID FAILURE.
29. CONTRACTOR IS RESPONSIBLE TO MAINTAIN ON-SITE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IN COMPLIANCE WITH EPA REQUIREMENTS FOR SITES WHERE ONE (1) ACRE OR MORE (UNLESS THE LOCAL JURISDICTION REQUIRES FEWER) IS DISTURBED BY CONSTRUCTION ACTIVITIES. CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL ACTIVITIES, INCLUDING THOSE OF SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE SWPPP, INCLUDING BUT NOT LIMITED TO LOGGING ACTIVITIES (MINIMUM ONCE PER WEEK AND AFTER RAINFALL EVENTS) AND CORRECTIVE MEASURES, AS APPROPRIATE.
30. AS CONTAINED IN THESE DRAWINGS AND ASSOCIATED APPLICATION DOCUMENTS PREPARED BY THE SIGNATORY PROFESSIONAL ENGINEER, THE USE OF THE WORDS CERTIFY OR CERTIFICATION CONSTITUTES AN EXPRESSION OF "PROFESSIONAL OPINION" REGARDING THE INFORMATION WHICH IS THE SUBJECT OF THE UNDERSIGNED PROFESSIONAL KNOWLEDGE OR BELIEF AND IN ACCORDANCE WITH COMMON ACCEPTED PROCEDURE CONSISTENT WITH THE APPLICABLE STANDARDS OF PRACTICE, AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE, EITHER EXPRESSED OR IMPLIED.

ADA INSTRUCTIONS TO CONTRACTOR

CONTRACTORS SHALL EXERCISE APPROPRIATE CARE AND PRECISION IN CONSTRUCTION OF ADA (HANDICAP) ACCESSIBLE COMPONENTS AND ACCESS ROUTES FOR THE SITE. THESE COMPONENTS, AS CONSTRUCTED, MUST COMPLY WITH THE CURRENT ADA STANDARDS AND REGULATIONS' BARRIER FREE ACCESS AND ANY MODIFICATIONS, REVISIONS OR UPDATES TO SAME. FINISHED SURFACES ALONG THE ACCESSIBLE ROUTE OF TRAVEL FROM PARKING SPACE, PUBLIC TRANSPORTATION, PEDESTRIAN ACCESS, INTER-BUILDING ACCESS, TO POINTS OF ACCESSIBLE BUILDING ENTRANCE/EXIT, MUST COMPLY WITH THESE ADA CODE REQUIREMENTS. THESE INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

- PARKING SPACES AND PARKING AISLES - SLOPE SHALL NOT EXCEED 1:50 (2.0%) IN ANY DIRECTION.
- CURB RAMPS - SLOPE SHALL NOT EXCEED 1:12 (8.3%) FOR A MAXIMUM OF SIX (6) FEET.
- LANDINGS - SHALL BE PROVIDED AT EACH END OF RAMPS, MUST PROVIDE POSITIVE DRAINAGE, AND MUST NOT EXCEED 1:50 (2.0%) IN ANY DIRECTION.
- PATH OF TRAVEL ALONG ACCESSIBLE ROUTE - MUST PROVIDE A 36-INCH OR GREATER UNOBSTRUCTED WIDTH OF TRAVEL (CAR OVERHANGS AND/OR HANDRAILS CANNOT REDUCE THIS MINIMUM WIDTH). THE SLOPE MUST BE NO GREATER THAN 1:20 (5.0%) IN THE DIRECTION OF TRAVEL, AND MUST NOT EXCEED 1:50 (2.0%) IN CROSS SLOPE. WHERE PATH OF TRAVEL WILL BE GREATER THAN 1:20 (5.0%), ADA RAMP REQUIREMENTS MUST BE ADHERED TO. A MAXIMUM SLOPE OF 1:12 (8.3%), FOR A MAXIMUM RISE OF 2.5 FEET , SHALL BE PROVIDED. THE RAMP MUST HAVE ADA HAND RAILS AND LEVEL LANDINGS ON EACH END THAT ARE CROSS SLOPED NO MORE THAN 1:50 IN ANY DIRECTION (2.0%) FOR POSITIVE DRAINAGE.
- DOORWAYS - MUST HAVE A "LEVEL" LANDING AREA ON THE EXTERIOR SIDE OF THE DOOR THAT IS SLOPED AWAY FROM THE DOOR NO MORE THAN 1:50 (2.0%) FOR POSITIVE DRAINAGE. THIS LANDING AREA MUST BE NO LESS THAN 60 INCHES (5 FEET) LONG, EXCEPT WHERE OTHERWISE PERMITTED BY ADA STANDARDS FOR ALTERNATIVE DOORWAY OPENING CONDITIONS. (SEE ICC/ANSI A117.1-2009 AND OTHER REFERENCED INCORPORATED BY COD.)
- WHEN THE PROPOSED CONSTRUCTION INVOLVES RECONSTRUCTION, MODIFICATION, REVISION OR EXTENSION OF OR TO ADA COMPONENTS FROM EXISTING DOORWAYS OR SURFACES, CONTRACTOR MUST VERIFY EXISTING ELEVATIONS SHOWN ON THE PLAN. NOTE THAT TABLE 405.2 OF THE DEPARTMENT OF JUSTICE'S ADA STANDARDS FOR ACCESSIBLE DESIGN ALLOWS FOR STEEPER RAMP SLOPES, IN RARE CIRCUMSTANCES. THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES AND/OR FIELD CONDITIONS THAT DIFFER IN ANY WAY OR ANY RESPECT FROM WHAT IS SHOWN ON THE PLANS, IN WRITING, BEFORE COMMENCEMENT OF WORK. CONSTRUCTED IMPROVEMENTS MUST FALL WITHIN THE MAXIMUM AND MINIMUM LIMITATIONS IMPOSED BY THE BARRIER FREE REGULATIONS AND THE ADA REQUIREMENTS.
- THE CONTRACTOR MUST VERIFY THE SLOPES OF CONTRACTOR'S FORMS PRIOR TO POURING CONCRETE. IF ANY NON-CONFORMANCE IS OBSERVED OR EXISTS, CONTRACTOR MUST IMMEDIATELY NOTIFY THE ENGINEER PRIOR TO POURING CONCRETE. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS TO REMOVE, REPAIR AND REPLACE NON-CONFORMING CONCRETE.

IT IS STRONGLY RECOMMENDED THAT THE CONTRACTOR REVIEW THE INTENDED CONSTRUCTION WITH THE LOCAL BUILDING CODE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

GENERAL GRADING & UTILITY NOTES

1. LOCATIONS OF ALL EXISTING AND PROPOSED SERVICES ARE APPROXIMATE AND MUST BE INDEPENDENTLY CONFIRMED WITH LOCAL UTILITY COMPANIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION OR EXCAVATION. SANITARY SEWER AND ALL OTHER UTILITY SERVICE CONNECTION POINTS MUST BE INDEPENDENTLY CONFIRMED BY THE CONTRACTOR IN THE FIELD PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ALL DISCREPANCIES MUST IMMEDIATELY BE REPORTED, IN WRITING, TO THE ENGINEER. CONSTRUCTION MUST COMMENCE BEGINNING AT THE LOWEST INVERT (POINT OF CONNECTION) AND PROGRESS UP GRADIENT. PROPOSED INTERFACE POINTS (CROSSINGS) WITH EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED BY TEST PIT PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. CONTRACTOR MUST VERTICALLY AND HORIZONTALLY LOCATE ALL UTILITIES AND SERVICES INCLUDING, BUT NOT LIMITED TO, GAS, WATER, ELECTRIC, SANITARY AND STORM SEWER, TELEPHONE, CABLE, FIBER OPTIC CABLE, ETC. WITHIN THE LIMITS OF DISTURBANCE OR WORK SPACE, WHICHEVER IS GREATER. THE CONTRACTOR MUST USE, REFER TO, AND COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY NOTIFICATION SYSTEM TO LOCATE ALL THE UNDERGROUND UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL DAMAGE TO ANY EXISTING UTILITIES DURING CONSTRUCTION, AT NO COST TO THE OWNER. CONTRACTOR SHALL BEAR ALL COSTS ASSOCIATED WITH DAMAGE TO ANY EXISTING UTILITIES DURING CONSTRUCTION.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW ALL CONSTRUCTION CONTRACT DOCUMENTS INCLUDING, BUT NOT LIMITED TO, ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE INITIATION AND COMMENCEMENT OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT AND/OR DISCREPANCY BETWEEN THE DOCUMENTS RELATIVE TO THE SPECIFICATIONS OR THE RELATIVE OR APPLICABLE CODES, REGULATIONS, LAWS, RULES, STATUTES AND/OR ORDINANCES, IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD, IN WRITING, OF SAID CONFLICT AND/OR DISCREPANCY PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR'S FAILURE TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE CONTRACTOR'S FULL AND COMPLETE ACCEPTANCE OF ALL RESPONSIBILITY TO COMPLETE THE SCOPE OF WORK AS DEFINED BY THE DRAWINGS AND IN FULL COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, LAWS, STATUTES, ORDINANCES AND CODES AND, FURTHER, CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH SAME.
4. THE CONTRACTOR MUST LOCATE AND CLEARLY AND UNAMBIGUOUSLY DEFINE VERTICALLY AND HORIZONTALLY ALL ACTIVE AND INACTIVE UTILITY AND/OR SERVICE SYSTEMS THAT ARE TO BE REMOVED. THE CONTRACTOR IS RESPONSIBLE TO PROTECT AND MAINTAIN ALL ACTIVE AND INACTIVE SYSTEMS THAT ARE NOT BEING REMOVED/RELOCATED DURING SITE ACTIVITY.
5. THE CONTRACTOR MUST FAMILIARIZE ITSELF WITH THE APPLICABLE UTILITY SERVICE PROVIDER REQUIREMENTS AND IS RESPONSIBLE FOR ALL COORDINATION REGARDING UTILITY DEMOLITION AS IDENTIFIED OR REQUIRED FOR THE PROJECT. THE CONTRACTOR MUST PROVIDE THE OWNER WITH WRITTEN NOTIFICATION THAT THE EXISTING UTILITIES AND SERVICES HAVE BEEN TERMINATED AND ABANDONED IN ACCORDANCE WITH THE JURISDICTION AND UTILITY COMPANY REQUIREMENTS AND ALL OTHER APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES.
6. THE CONTRACTOR MUST INSTALL ALL STORM SEWER AND SANITARY SEWER COMPONENTS WHICH FUNCTION BY GRAVITY PRIOR TO THE INSTALLATION OF ALL OTHER UTILITIES.
7. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF SITE PLAN DOCUMENTS AND ARCHITECTURAL DESIGN FOR EXACT BUILDING UTILITY CONNECTION LOCATIONS, GREASE TRAP REQUIREMENTS/DETAILS, DOOR ACCESS, AND EXTERIOR GRADING. THE ARCHITECT WILL DETERMINE THE UTILITY SERVICE SIZES. THE CONTRACTOR MUST COORDINATE INSTALLATION OF UTILITIES/SERVICES WITH THE INDIVIDUAL COMPANIES, TO AVOID CONFLICTS AND TO ENSURE THAT PROPER DEPTHS ARE ACHIEVED. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT INSTALLATION OF ALL IMPROVEMENTS COMPLIES WITH ALL UTILITY REQUIREMENTS WITH JURISDICTION AND/OR CONTROL OF THE SITE, AND ALL OTHER APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES AND, FURTHER, IS RESPONSIBLE FOR COORDINATING THE UTILITY TIE-INS/CONNECTIONS PRIOR TO CONNECTING TO THE EXISTING UTILITY/SERVICE. WHERE A CONFLICT(S) EXISTS BETWEEN THESE SITE PLANS AND THE ARCHITECTURAL PLANS, OR WHERE ARCHITECTURAL PLAN UTILITY CONNECTION POINTS DIFFER, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE ENGINEER, IN WRITING, AND PRIOR TO CONSTRUCTION, RESOLVE SAME.
8. WATER SERVICE MATERIALS, BURIAL DEPTH, AND COVER REQUIREMENTS MUST BE SPECIFIED BY THE LOCAL UTILITY COMPANY. CONTRACTOR'S PRICE FOR WATER SERVICE MUST INCLUDE ALL FEES, COSTS AND APPURTENANCES REQUIRED BY THE UTILITY TO PROVIDE FULL AND COMPLETE WORKING SERVICE. CONTRACTOR MUST CONTACT THE APPLICABLE MUNICIPALITY TO CONFIRM THE PROPER WATER METER AND VAULT, PRIOR TO COMMENCING CONSTRUCTION.
9. ALL NEW UTILITIES/SERVICES, INCLUDING ELECTRIC, TELEPHONE, CABLE TV, ETC. ARE TO BE INSTALLED UNDERGROUND. ALL NEW UTILITIES/SERVICES MUST BE INSTALLED IN ACCORDANCE WITH THE UTILITY/SERVICE PROVIDER INSTALLATION SPECIFICATIONS AND STANDARDS.
10. SITE GRADING MUST BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT REFERENCED IN THIS PLAN SET. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING AND REPLACING UNSUITABLE MATERIALS WITH SUITABLE MATERIALS AS SPECIFIED IN THE GEOTECHNICAL REPORT. ALL EXCAVATED OR FILLED AREAS MUST BE COMPACTED AS OUTLINED IN THE GEOTECHNICAL REPORT. MOISTURE CONTENT AT TIME OF PLACEMENT MUST BE SUBMITTED IN A COMPACTION REPORT PREPARED BY A QUALIFIED GEOTECHNICAL ENGINEER, REGISTERED WITH THE STATE WHERE THE WORK IS PERFORMED, VERIFYING THAT ALL FILLED AREAS AND SUBGRADE AREAS WITHIN THE BUILDING PAD AREA AND AREAS TO BE PAVED HAVE BEEN COMPACTED IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES. SUBBASE MATERIAL FOR SIDEWALKS, CURB, OR ASPHALT MUST BE FREE OF ORGANICS AND OTHER UNSUITABLE MATERIALS. SHOULD SUBBASE BE DEEMED UNSUITABLE BY OWNER/DEVELOPER, OR OWNER/DEVELOPER'S REPRESENTATIVE, SUBBASE IS TO BE REMOVED AND FILLED WITH APPROVED FILL MATERIAL COMPACTED AS DIRECTED BY THE GEOTECHNICAL REPORT. EARTHWORK ACTIVITIES INCLUDING, BUT NOT LIMITED TO, EXCAVATION, BACKFILL, AND COMPACTING MUST COMPLY WITH THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES. EARTHWORK ACTIVITIES MUST COMPLY WITH THE STANDARD STATE DOT SPECIFICATIONS FOR ROADWAY CONSTRUCTION (LATEST EDITION) AND ANY AMENDMENTS OR REVISIONS THERETO.
11. ALL FILL, COMPACTION, AND BACKFILL MATERIALS REQUIRED FOR UTILITY INSTALLATION MUST BE AS PER THE RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT AND MUST BE COORDINATED WITH THE APPLICABLE UTILITY COMPANY SPECIFICATIONS. WHEN THE PROJECT DOES NOT HAVE GEOTECHNICAL RECOMMENDATIONS, FILL AND COMPACTION MUST, AT A MINIMUM, COMPLY WITH THE STATE DOT REQUIREMENTS AND SPECIFICATIONS AND CONSULTANT SHALL HAVE NO LIABILITY OR RESPONSIBILITY FOR OR AS RELATED TO FILL, COMPACTION AND BACKFILL. FURTHER, CONTRACTOR IS FULLY RESPONSIBLE FOR EARTHWORK BALANCE.
12. THE CONTRACTOR MUST COMPLY, TO THE FULLEST EXTENT, WITH THE LATEST OSHA STANDARDS AND REGULATIONS, AND/OR ANY OTHER AGENCY WITH JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE "MEANS AND METHODS" REQUIRED TO MEET THE INTENT AND PERFORMANCE CRITERIA OF OSHA, AS WELL AS ANY OTHER ENTITY THAT HAS JURISDICTION FOR EXCAVATION AND/OR TRENCHING PROCEDURES AND CONSULTANT SHALL HAVE NO RESPONSIBILITY FOR OR AS RELATED FOR OR AS RELATED TO EXCAVATION AND TRENCHING PROCEDURES.
13. PAVEMENT MUST BE SAW CUT IN STRAIGHT LINES, AND EXCEPT FOR EDGE OF BUTT JOINTS, MUST EXTEND TO THE FULL DEPTH OF THE EXISTING PAVEMENT. ALL DEBRIS FROM REMOVAL OPERATIONS MUST BE REMOVED FROM THE SITE AT THE TIME OF EXCAVATION. STOCKPILING OF DEBRIS WILL NOT BE PERMITTED.
14. THE TOPS OF EXISTING MANHOLES, INLET STRUCTURES, AND SANITARY CLEANOUT TOPS MUST BE ADJUSTED, AS NECESSARY, TO MATCH PROPOSED GRADES IN ACCORDANCE WITH ALL APPLICABLE STANDARDS, REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES.
15. DURING THE INSTALLATION OF STORM SEWER, AND ALL UTILITIES, THE CONTRACTOR MUST MAINTAIN A CONTEMPORANEOUS AND THOROUGH RECORD OF CONSTRUCTION TO IDENTIFY THE AS-INSTALLED LOCATIONS OF ALL UNDERGROUND INFRASTRUCTURE. THE CONTRACTOR MUST CAREFULLY NOTE ANY INSTALLATIONS THAT DEVIATE FROM THE INFORMATION CONTAINED IN THE UTILITY PLAN. THIS RECORD MUST BE KEPT ON A CLEAN COPY OF THE SITE PLAN, WHICH CONTRACTOR MUST PROMPTLY PROVIDE TO THE OWNER AT THE COMPLETION OF WORK.
16. WHEN THE SITE IMPROVEMENT PLANS INVOLVE MULTIPLE BUILDINGS, SOME OF WHICH MAY BE BUILT AT A LATER DATE, THE CONTRACTOR MUST EXTEND ALL LINES, INCLUDING BUT NOT LIMITED TO STORM SEWER, SANITARY SEWER, UTILITIES, AND IRRIGATION LINE, TO A POINT AT LEAST FIVE (5) FEET BEYOND THE PAVED AREAS FOR WHICH THE CONTRACTOR IS RESPONSIBLE. CONTRACTOR MUST CAP ENDS AS APPROPRIATE, MARK LOCATIONS WITH A 2X4, AND MUST NOTE THE LOCATION OF ALL OF THE ABOVE ON A CLEAN COPY OF THE SITE PLAN, WHICH CONTRACTOR MUST PROMPTLY PROVIDE TO THE OWNER UPON COMPLETION OF THE WORK.
17. THE CONTRACTOR IS FULLY RESPONSIBLE FOR VERIFICATION OF EXISTING TOPOGRAPHIC INFORMATION AND UTILITY INVERT ELEVATIONS PRIOR TO COMMENCING ANY CONSTRUCTION. CONTRACTOR MUST CONFIRM AND ENSURE 0.75% MINIMUM SLOPE AGAINST ALL ISLANDS, GUTTERS, AND CURBS; 1.0% ON ALL CONCRETE SURFACES; AND 1.5% MINIMUM ON ASPHALT (EXCEPT WHERE ADA REQUIREMENTS LIMIT GRADES), TO PREVENT PONDING. CONTRACTOR MUST IMMEDIATELY IDENTIFY, IN WRITING TO THE ENGINEER, ANY DISCREPANCIES THAT MAY OR COULD AFFECT THE PUBLIC SAFETY, HEALTH OR GENERAL WELFARE, OR PROJECT COST. IF CONTRACTOR PROCEEDS WITH CONSTRUCTION WITHOUT PROVIDING PROPER NOTIFICATION, MUST BE AT THE CONTRACTOR'S OWN RISK AND, FURTHER, CONTRACTOR SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS THE DESIGN ENGINEER FOR ANY DAMAGES, COSTS, INJURIES, ATTORNEY'S FEES AND THE LIKE WHICH RESULT FROM SAME.
18. PROPOSED TOP OF CURB ELEVATIONS ARE GENERALLY 6" ABOVE EXISTING LOCAL ASPHALT GRADE UNLESS OTHERWISE NOTED. FIELD ADJUST TO CREATE A MINIMUM OF 0.75% GUTTER GRADE ALONG CURB FACE. IT IS CONTRACTOR'S OBLIGATION TO ENSURE THAT DESIGN ENGINEER APPROVES FINAL CURBING CUT SHEETS PRIOR TO INSTALLATION OF SAME.
19. REFER TO SITE PLAN FOR ADDITIONAL NOTES.
20. IN THE EVENT OF DISCREPANCIES AND/OR CONFLICTS BETWEEN PLANS OR RELATIVE TO OTHER PLANS, THE SITE PLAN WILL TAKE PRECEDENCE AND CONTROL. CONTRACTOR MUST IMMEDIATELY NOTIFY THE DESIGN ENGINEER, IN WRITING, OF ANY DISCREPANCIES AND/OR CONFLICTS.
21. CONTRACTOR IS REQUIRED TO SECURE ALL NECESSARY AND/OR REQUIRED PERMITS AND APPROVALS FOR ALL OFF SITE MATERIAL SOURCES AND DISPOSAL FACILITIES. CONTRACTOR MUST SUPPLY A COPY OF APPROVALS TO ENGINEER AND OWNER PRIOR TO INITIATING WORK.
22. WHERE RETAINING WALLS (WHETHER OR NOT THEY MEET THE JURISDICTIONAL DEFINITION) ARE IDENTIFIED ON PLANS, ELEVATIONS IDENTIFIED ARE FOR THE EXPOSED PORTION OF THE WALL. WALL FOOTINGS/FOUNDATION ELEVATIONS ARE NOT IDENTIFIED HEREIN AND ARE TO BE SET/DETERMINED BY THE CONTRACTOR BASED ON FINAL STRUCTURAL DESIGN SHOP DRAWINGS PREPARED BY THE APPROPRIATE PROFESSIONAL LICENSEE IN THE STATE WHERE THE CONSTRUCTION OCCURS.
23. STORM DRAINAGE PIPE:

    UNLESS INDICATED OTHERWISE, ALL STORM SEWER PIPE MUST BE REINFORCED CONCRETE PIPE (RCP) CLASS III WITH SILT TIGHT JOINTS. WHEN HIGH-DENSITY POLYETHYLENE PIPE (HDPE) IS CALLED FOR ON THE PLANS, IT MUST CONFORM TO AASHTO M294 AND TYPE S (SMOOTH INTERIOR WITH ANGULAR CORRUGATIONS) WITH GASKET FOR SILT TIGHT JOINT. PVC PIPE FOR ROOF DRAIN CONNECTION MUST BE SDR 26 OR SCHEDULE 40 UNLESS INDICATED OTHERWISE.
24. STORMWATER ROOF DRAIN LOCATIONS ARE BASED ON PRELIMINARY ARCHITECTURAL PLANS. CONTRACTOR IS RESPONSIBLE TO AND FOR VERIFYING LOCATIONS OF SAME BASED ON FINAL ARCHITECTURAL PLANS.
25. CONTRACTOR MUST ENSURE THAT ALL UTILITY TRENCHES LOCATED IN EXISTING PAVED ROADWAYS INCLUDING SEWER, WATER AND STORM SYSTEMS, MUST BE REPAIRED IN ACCORDANCE WITH REFERENCED MUNICIPAL, COUNTY AND/OR STATE DETAILS AS APPLICABLE. CONTRACTOR MUST COORDINATE INSPECTION AND APPROVAL OF COMPLETED WORK WITH THE AGENCY WITH JURISDICTION OVER SAME.
26. WHERE BASEMENTS ARE TO BE PROVIDED FOR PROPOSED DWELLING UNITS, THE DEVELOPER SHALL, BY BORING OR BY TEST PIT, DETERMINE THE DEPTH TO GROUNDWATER AT THE LOCATION OF THE PROPOSED DWELLINGS. WHERE GROUNDWATER IS ENCOUNTERED IN THE BASEMENT AREA, BASEMENTS WILL NOT BE INSTALLED UNLESS SPECIAL CONSTRUCTION METHODS ARE UTILIZED, TO BE REVIEWED AND APPROVED BY THE MUNICIPAL CONSTRUCTION CODE OFFICIAL. IF AND WHERE SUMP PUMPS ARE INSTALLED, ALL DISCHARGES MUST BE CONNECTED TO THE STORM SEWER. A CLEANOUT MUST BE PROVIDED PRIOR TO THE CONNECTION TO THE STORM DRAIN IN ORDER THAT BLOCKAGES CAN BE ADDRESSED.
27. FOR SINGLE AND TWO-FAMILY RESIDENTIAL PROJECTS, WHERE THE PROPOSED DWELLING AND ADJACENT SPOT ELEVATION(S) ARE SCHEMATIC FOR GENERIC BUILDING FOOTPRINT, GRADES MUST BE ADJUSTED BASED ON FINAL ARCHITECTURAL PLANS TO PROVIDE A MINIMUM OF SIX (6) INCHES BELOW TOP OF BLOCK AND /OR SIX (6) INCHES BELOW SIDING, WHICHEVER IS LOWEST, AND MUST PROVIDE POSITIVE DRAINAGE (2% MIN.) AWAY FROM DWELLING. ALL CONSTRUCTION, INCLUDING GRADING, MUST COMPLY WITH THE LATEST LOCAL AND STATE BUILDING CODE AND ALL OTHER APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES.
28. LOCATION OF PROPOSED UTILITY POLE RELOCATION IS AT THE SOLE DISCRETION OF UTILITY COMPANY.
29. CONSULTANT IS NEITHER LIABLE NOR RESPONSIBLE FOR ANY SUBSURFACE CONDITIONS AND FURTHER, SHALL HAVE NO LIABILITY FOR ANY HAZARDOUS MATERIALS, HAZARDOUS SUBSTANCES, OR POLLUTANTS ON, ABOUT OR UNDER THE PROPERTY.

GENERAL DEMOLITION NOTES:

1. THIS PLAN REFERENCES DOCUMENTS AND INFORMATION BY:

   BOUNDARY & TOPOGRAPHIC SURVEY "ELM STREET DEVELOPMENT"
   9891 OLD FREDERICK ROAD.
   ELLICOTT CITY, HOWARD COUNTY MARYLAND 21042
   DATE: 09-03-2015
   DATE UPDATED:
   JOB#: MD152018
2. CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, (29 U.S.C. 651 et seq.), AS AMENDED AND ANY MODIFICATIONS, AMENDMENTS OR REVISIONS TO SAME.
3. BOHLER ENGINEERING HAS NO CONTRACTUAL, LEGAL, OR OTHER RESPONSIBILITY FOR JOB SITE SAFETY OR JOB SITE SUPERVISION, OR ANYTHING RELATED TO SAME.
4. THE DEMOLITION PLAN IS INTENDED TO PROVIDE GENERAL INFORMATION, ONLY, REGARDING ITEMS TO BE DEMOLISHED AND/OR REMOVED. THE CONTRACTOR MUST ALSO REVIEW THE OTHER SITE PLAN DRAWINGS AND INCLUDE IN DEMOLITION ACTIVITIES ALL INCIDENTAL WORK NECESSARY FOR THE CONSTRUCTION OF THE NEW SITE IMPROVEMENTS.
5. CONTRACTOR MUST RAISE ANY QUESTIONS CONCERNING THE ACCURACY OR INTENT OF THESE PLANS OR SPECIFICATIONS, CONCERNS REGARDING THE APPLICABLE SAFETY STANDARDS, OR THE SAFETY OF THE CONTRACTOR OR THIRD PARTIES IN PERFORMING THE WORK ON THIS PROJECT, WITH BOHLER ENGINEERING, IN WRITING, AND RESPONDED TO BY BOHLER, IN WRITING, PRIOR TO THE INITIATION OF ANY SITE ACTIVITY AND ANY DEMOLITION ACTIVITY. ALL DEMOLITION ACTIVITIES MUST BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THESE PLANS AND SPECIFICATIONS AND ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, RULES, REQUIREMENTS, STATUTES, ORDINANCES AND CODES.
6. PRIOR TO STARTING ANY DEMOLITION, CONTRACTOR IS RESPONSIBLE FOR/TO:

   A. OBTAINING ALL REQUIRED PERMITS AND MAINTAINING THE SAME ON SITE FOR REVIEW BY THE ENGINEER AND OTHER PUBLIC AGENCIES HAVING JURISDICTION THROUGHOUT THE DURATION OF THE PROJECT, SITE WORK AND DEMOLITION WORK.

ADDRESSES & STORMWATER MANAGEMENT PRACTICES

LOT	ADDRESS	FACILITY NAME	PRACTICE TYPE (QUALITY)	QUANTITY	PRIVATE	HOMEOWNER MAINTAINS
1	9997 CALMING COURT					
2	9995 CALMING COURT					
3	9993 CALMING COURT					
4	9991 CALMING COURT					
5	9987 CALMING COURT					
6	9985 CALMING COURT					
7	9983 CALMING COURT					
8	9981 CALMING COURT					
9	9977 HOPE PLACE	8' X 14' DRYWELL	MDE M-5	1	√	√
10	9975 HOPE PLACE	8' X 14' DRYWELL	MDE M-5	1	√	√
11	9973 HOPE PLACE	8' X 14' DRYWELL	MDE M-5	1	√	√
12	9971 HOPE PLACE	8' X 14' DRYWELL	MDE M-5	1	√	√
13	9969 WISTERIA LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
14	9967 WISTERIA LANE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
15	9965 WISTERIA LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
16	9961 WISTERIA LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
17	9959 WISTERIA LANE	8' X 14' DRYWELL	MDE M-5	1	√	√
18	9957 WISTERIA LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
19	9920 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
20	9924 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
21	9928 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
22	9932 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
23	9936 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
24	9940 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
25	9948 BAKER LANE	7' X 12' DRYWELL	MDE M-5	2	√	√
26	9952 BAKER LANE	7' X 12' DRYWELL	MDE M-5	2	√	√
27	9956 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
28	9960 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
29	9964 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
30	9968 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
31	9972 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
32	9976 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
33	9980 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
34	9984 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
35	9988 BAKER LANE	7' X 12' DRYWELL	MDE M-5	3	√	√
36	9856 LONGVIEW DRIVE					
37	9860 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	1	√	√
38	9864 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	1	√	√
39	9866 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
40	9868 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	2	√	√
41	9870 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	2	√	√
42	9874 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
43	9876 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
44	9878 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
45	9880 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
46	9884 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
47	9886 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
48	9888 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	2	√	√
49	9887 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	1	√	√
50	9885 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	1	√	√
51	9883 LONGVIEW DRIVE	8' X 14' DRYWELL	MDE M-5	1	√	√
52	9881 LONGVIEW DRIVE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
53	9983 BAKER LANE					
54	9981 BAKER LANE					
55	9979 BAKER LANE					
56	9977 BAKER LANE					
57	9973 BAKER LANE					
58	9971 BAKER LANE	6.5' X 17' DRYWELL	MDE M-5	1	√	√
59	9969 BAKER LANE					
60	9967 BAKER LANE					
61	9937 BAKER LANE					
62	9935 BAKER LANE					
63	9933 BAKER LANE					
64	9931 BAKER LANE					
65	9810 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
66	9808 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
67	9806 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
68	9802 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
69	9800 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
70	9798 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
71	9794 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
72	9792 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
73	9790 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
74	9788 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
75	9784 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	2	√	√
76	9782 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
77	9780 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
78	9778 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	2	√	√
79	9774 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	2	√	√
80	9772 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1	√	√
81	9770 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	2	√	√
82	9684 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
83	9682 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	1	√	√
84	9680 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
85	9676 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
86	9674 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	1	√	√
87	9672 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	1	√	√
88	9670 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
89	9666 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	2	√	√
90	9664 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	1	√	√
91	9662 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	1	√	√
92	9660 WISHING WELL LANE	8' X 14' DRYWELL	MDE M-5	2	√	√

ADDRESSES & STORMWATER MANAGEMENT PRACTICES

LOT	ADDRESS	FACILITY NAME	PRACTICE TYPE (QUALITY)	QUANTITY	PUBLIC	PRIVATE	HOME-OWNER MAINTAINS
93	9650 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	2		√	√
94	9648 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
95	9646 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
96	9644 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	2		√	√
97	9640 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	2		√	√
98	9638 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
99	9636 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
100	9634 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	2		√	√
101	9639 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	2		√	√
102	9641 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
103	9643 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
104	9645 STONE WELL WAY	8' X 14' DRYWELL	MDE M-5	2		√	√
105	9777BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
106	9779 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
107	9781 9BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
108	9783 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
109	9787 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
110	9789 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
111	9791 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
112	9793 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
113	9797 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
114	9799 BLUE IVY WAY	8' X 14' DRYWELL	MDE M-5	1		√	√
115	9801 BLUE IVY WAY						
116	9803 BLUE IVY WAY						
P/O OPEN SPACE LOT 158		8' X 14' DRYWELL	MDE M-5	5		√	√
P/O OPEN SPACE LOT 158		SURFACE SAND FILTER WETLAND #C1	MDE F-1			√	√
P/O OPEN SPACE LOT 158		SUBMERGED GRAVEL WETLAND #C6	MDE M-2			√	√
P/O OPEN SPACE LOT 159		SUBMERGED GRAVEL WETLAND #C4	MDE M-2		√		
P/O OPEN SPACE LOT 159		MICRO-BIORETENTION FACILITY #C5	MDE M-6		√		
P/O OPEN SPACE LOT 159		MICRO-BIORETENTION FACILITY #D1	MDE M-6		√		
COMMUNITY CENTER (P/O OPEN SPACE LOT 161)	BAKER LANE	7' X 12' DRYWELL	MDE M-5	2		√	√
P/O OPEN SPACE LOT 162		SURFACE SAND FILTER FACILITY #D7	MDE F-1			√	√
P/O OPEN SPACE LOT 164		MICRO-BIORETENTION FACILITY #E5	MDE M-6			√	√
P/O OPEN SPACE LOT 164		MICRO-BIORETENTION FACILITY #E6	MDE M-6			√	√
P/O OPEN SPACE LOT 164		6.5' X 17' DRYWELL	MDE M-5	5		√	√
P/O OPEN SPACE LOT 164		SURFACE SAND FILTER FACILITY #E2	MDE F-1			√	√
P/O OPEN SPACE LOT 164		BIORETENTION FACILITY #E7	MDE F-6			√	√
P/O OPEN SPACE LOT 165		BIORETENTION FACILITY #E1	MDE F-6			√	√
P/O OPEN SPACE LOT 166		SURFACE SAND FILTER FACILITY #D5	MDE F-1			√	√
P/O OPEN SPACE LOT 166		BIORETENTION FACILITY #D4	MDE F-6			√	√
P/O OPEN SPACE LOT 166		BIORETENTION FACILITY #D2	MDE F-6			√	√
P/O OPEN SPACE LOT 166		MICRO-BIORETENTION FACILITY #D3	MDE M-6			√	√
P/O OPEN SPACE LOT 166		SURFACE SAND FILTER FACILITY #D6	MDE F-1			√	√

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: [signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
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25-5109-D, 688-D-W & S, SP-21-002

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5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

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MARYLAND LICENSE No. 40808
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SHEET TITLE:

GENERAL NOTES

SHEET NUMBER:
2 of 117

F-22-033

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F

STANDARD DRAWING LEGEND

FOR ENTIRE PLAN SET

LIMIT OF WORK — LOW — LOW

LIMIT OF DISTURBANCE — LOD — LOD

EXISTING NOTE	TYPICAL NOTE TEXT	PROPOSED NOTE
	ONSITE PROPERTY LINE / R.O.W. LINE	
	NEIGHBORING PROPERTY LINE / INTERIOR PARCEL LINE	
	EASEMENT LINE	
	SETBACK LINE	
	CONCRETE CURB & GUTTER	CURB AND GUTTER; SPILL; TRANSITION; DEPRESSED CURB AND GUTTER
	UTILITY POLE WITH LIGHT	
	POLE LIGHT	
	TRAFFIC LIGHT	
	UTILITY POLE	
	TYPICAL LIGHT	
	ACORN LIGHT	
	TYPICAL SIGN	
X	PARKING COUNTS	X
170 / 169	CONTOUR LINE	190 / 187
TC 516.4 OR 516.4	SPOT ELEVATIONS	TC 516.00; TC 516.00 BC 515.55; MATCH EX 518.02 ±
SAN #	SANITARY LABEL	SAN #
X #	STORM LABEL	X #
SL	SANITARY SEWER LATERAL	SL
W	UNDERGROUND WATER LINE	W
E	UNDERGROUND ELECTRIC LINE	E
G	UNDERGROUND GAS LINE	G
OH	OVERHEAD WIRE	OH
T	UNDERGROUND TELEPHONE LINE	T
C	UNDERGROUND CABLE LINE	C
	STORM SEWER	
S	SANITARY SEWER MAIN	S
	HYDRANT	
S	SANITARY MANHOLE	S
D	STORM MANHOLE	D
WM	WATER METER	
WV	WATER VALVE	
	GAS VALVE	
	GAS METER	
	TYPICAL END SECTION	
	HEADWALL OR ENDWALL	
	GRATE INLET	
	CURB INLET	
	CLEAN OUT	
E	ELECTRIC MANHOLE	E
T	TELEPHONE MANHOLE	T
EB	ELECTRIC BOX	EB
EP	ELECTRIC PEDESTAL	EP
	MONITORING WELL	
	TEST PIT	
	BENCHMARK	
	BORING	

STANDARD ABBREVIATIONS

FOR ENTIRE PLAN SET

AC	ACRES
ADA	AMERICANS WITH DISABILITY ACT
ARCH	ARCHITECTURAL
BC	BOTTOM OF CURB
BF	BASEMENT FLOOR
BK	BLOCK
BL	BASELINE
BLDG	BUILDING
BM	BUILDING BENCHMARK
BRL	BUILDING RESTRICTION LINE
CF	CUBIC FEET
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CONN	CONNECTION
CONC	CONCRETE
CPP	CORRUGATED PLASTIC PIPE
CY	CUBIC YARDS
DEC	DECORATIVE
DEP	DEPRESSED
DIP	DUCTILE IRON PIPE
DOM	DOMESTIC
ELEC	ELECTRIC
ELEV	ELEVATION
EP	EDGE OF PAVEMENT
ES	EDGE OF SHOULDER
EW	END WALL
EX	EXISTING
FES	FLARED END SECTION
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FG	FINISHED GRADE
G	GRADE
GF	GARAGE FLOOR (AT DOOR)
GH	GRADE HIGHER SIDE OF WALL
GL	GRADE LOWER SIDE OF WALL
GRT	GRATE
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HP	HIGH POINT
HOR	HORIZONTAL
HW	HEADWALL
INT	INTERSECTION
INV	INVERT
LF	LINEAR FOOT
LOC	LIMITS OF CLEARING
LOD	LIMITS OF DISTURBANCE
LOS	LINE OF SIGHT
LP	LOW POINT
L/S	LANDSCAPE
MAX	MAXIMUM
MIN	MINIMUM
MH	MANHOLE
MJ	MECHANICAL JOINT
OC	ON CENTER
PA	POINT OF ANALYSIS
PC	POINT CURVATURE
PCCR	POINT OF COMPOUND CURVATURE, CURB RETURN
PI	POINT OF INTERSECTION
POG	POINT OF GRADE
PROP	PROPOSED
PT	POINT OF TANGENCY
PTCR	POINT OF TANGENCY, CURB RETURN
PVC	POLYVINYL CHLORIDE PIPE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RET WALL	RETAINING WALL
R/W	RIGHT OF WAY
S	SLOPE
SAN	SANITARY SEWER
SF	SQUARE FEET
STA	STATION
STM	STORM
S/W	SIDEWALK
TBR	TO BE REMOVED
TBRL	TO BE RELOCATED
TC	TOP OF CURB
TELE	TELEPHONE
TPF	TREE PROTECTION FENCE
TW	TOP OF WALL
TYP	TYPICAL
UG	UNDERGROUND
UP	UTILITY POLE
W	WIDE
W/L	WATER LINE
W/M	WATER METER
±	PLUS OR MINUS
°	DEGREE
Ø	DIAMETER
#	NUMBER

LEGEND:

- 15-25% SLOPE
- 25% OR GREATER SLOPE
- TREES / WOODED CLEARING AREA

EXISTING CONDITIONS PLAN VIEW

SCALE: 1" = 150'

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

APPROVED: DEPARTMENT OF PUBLIC WORKS

Docusigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

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CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

150 75 37.5 0 150

1"=150'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

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CAD I.D.:	CNDS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
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SHEET TITLE:

EXISTING CONDITIONS AND LEGEND

SHEET NUMBER:

3 of 117

F-22-033

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FOR
BETHANY GLEN - ARAH
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OPEN SPACE LOTS 158 THRU 168
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SHEET TITLE:
BUILDING ELEVATIONS

SHEET NUMBER:
4 of 117

F-22-033

Mar 12, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - CNDS - 2----LAYOUT 4 - BUILDING ELEVATIONS
AG

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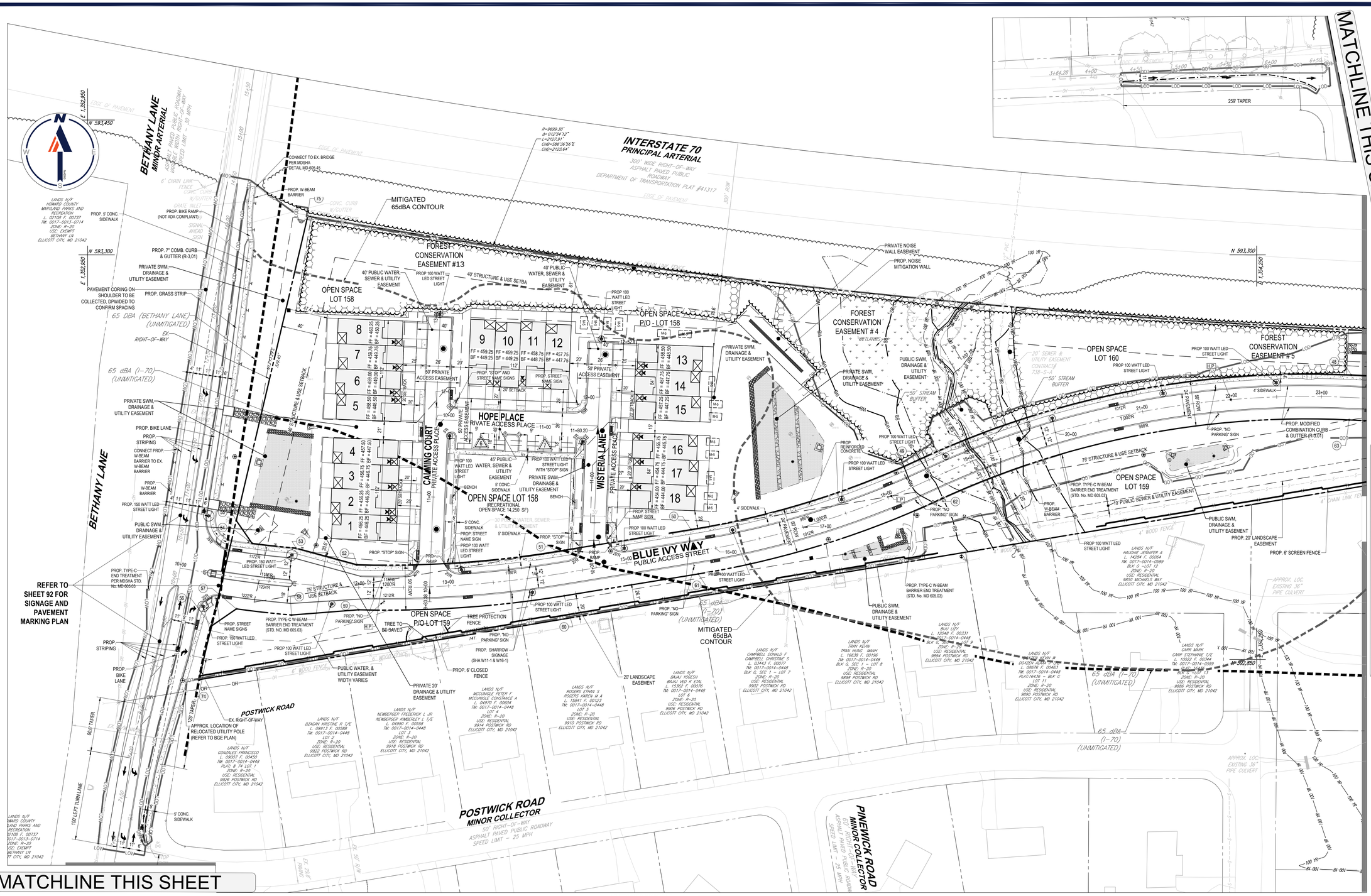

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- EXISTING RIGHT-OF-WAY LINES
- PROPOSED RIGHT-OF-WAY LINES
- WETLAND LIMITS
- LOD LOD — LIMIT OF DISTURBANCE
- WB WB — WETLAND BUFFER
- SB SB — STREAM BUFFER
- EXISTING TREE LINE
- PROPOSED TREE LINE
- EXISTING FLOODPLAIN
- PFP PFP — PROPOSED FLOODPLAIN
- WETLANDS
- FIRE HYDRANT
- STREET LIGHT
- PROPOSED BENCH
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- FOREST CONSERVATION EASEMENT
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- 25% SLOPE OR GREATER
- RIP-RAP
- SWM FACILITIES

STREET LIGHT LEGEND

- 150 WATT, LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE
- 100 WATT, LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

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2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

Mar 15, 2024
H:\19\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SITE - 2---LAYOUT 05 - SITE LAYOUT PLAN

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NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

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SITE LAYOUT PLAN NEIGHBORHOODS C-E

SHEET NUMBER:

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F-22-033

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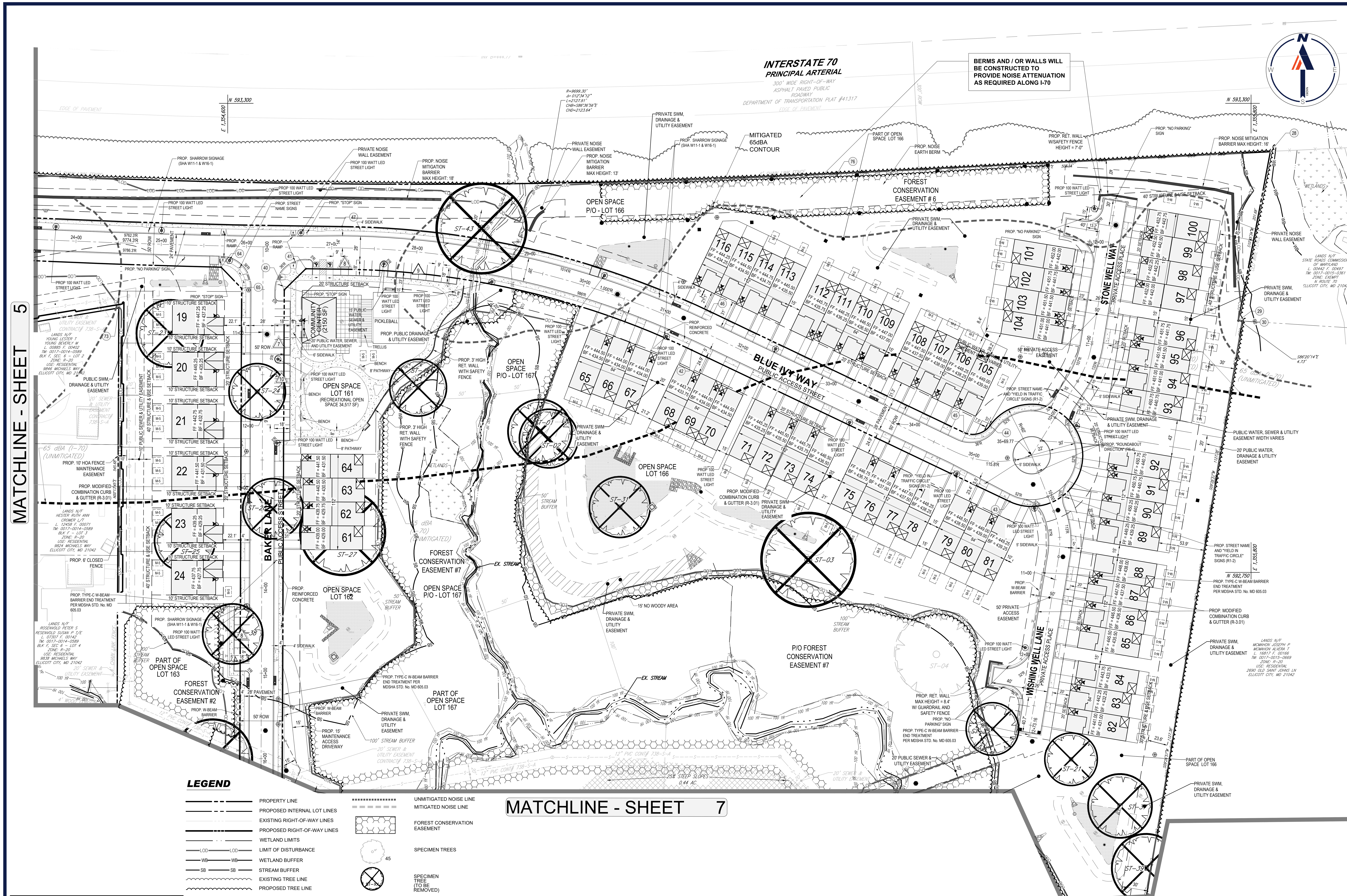

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1"= 50'

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FOR

BETHANY GLEN - ARAH

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SHEET TITLE:

SITE LAYOUT PLAN NEIGHBORHOODS C-E

SHEET NUMBER:

F-22-033

May 08, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SITE ... LAYOUT 06 - SITE LAYOUT PLAN
AG

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F

MATCHLINE - SHEET 6

NOLLWICK ROAD

LONGVIEW DRIVE

BAKER LANE
PUBLIC ACCESS STREET

HELMWOOD CT.

BETH WOOD

OPEN SPACE LOT 164

OPEN SPACE LOT 167

OPEN SPACE LOT 168

OPEN SPACE LOT 165

P/O OPEN SPACE LOT 164

P/O OPEN SPACE LOT 167

FOREST CONSERVATION EASEMENT #1

FOREST CONSERVATION EASEMENT #8

FOREST CONSERVATION EASEMENT #9

FOREST CONSERVATION EASEMENT #10

FOREST CONSERVATION EASEMENT #11

OPEN SPACE LOT 165

PART OF OPEN SPACE LOT 163

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- EXISTING RIGHT-OF-WAY LINES
- PROPOSED RIGHT-OF-WAY LINES
- WETLAND LIMITS
- LIMIT OF DISTURBANCE
- WETLAND BUFFER
- STREAM BUFFER
- EXISTING TREE LINE
- PROPOSED TREE LINE
- EXISTING FLOODPLAIN
- PROPOSED FLOODPLAIN
- WETLANDS
- FIRE HYDRANT
- STREET LIGHT
- PROPOSED BENCH
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- FOREST CONSERVATION EASEMENT
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- 25% SLOPE OR GREATER
- SWM FACILITIES
- RIP-RAP

STREET LIGHT LEGEND

- 150 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE
- 100 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

1" = 50'

APPROVED: DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

Mar 12, 2024
H:\19\MD\19291\DRAWINGS\PLAN SETS\FINAL PLAN\MD19291B - SITE - 2----LAYOUT 07 - SITE LAYOUT PLAN

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SSP-2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SITE LAYOUT PLAN NEIGHBORHOODS C-E

SHEET NUMBER:

7 of 117

F-22-033

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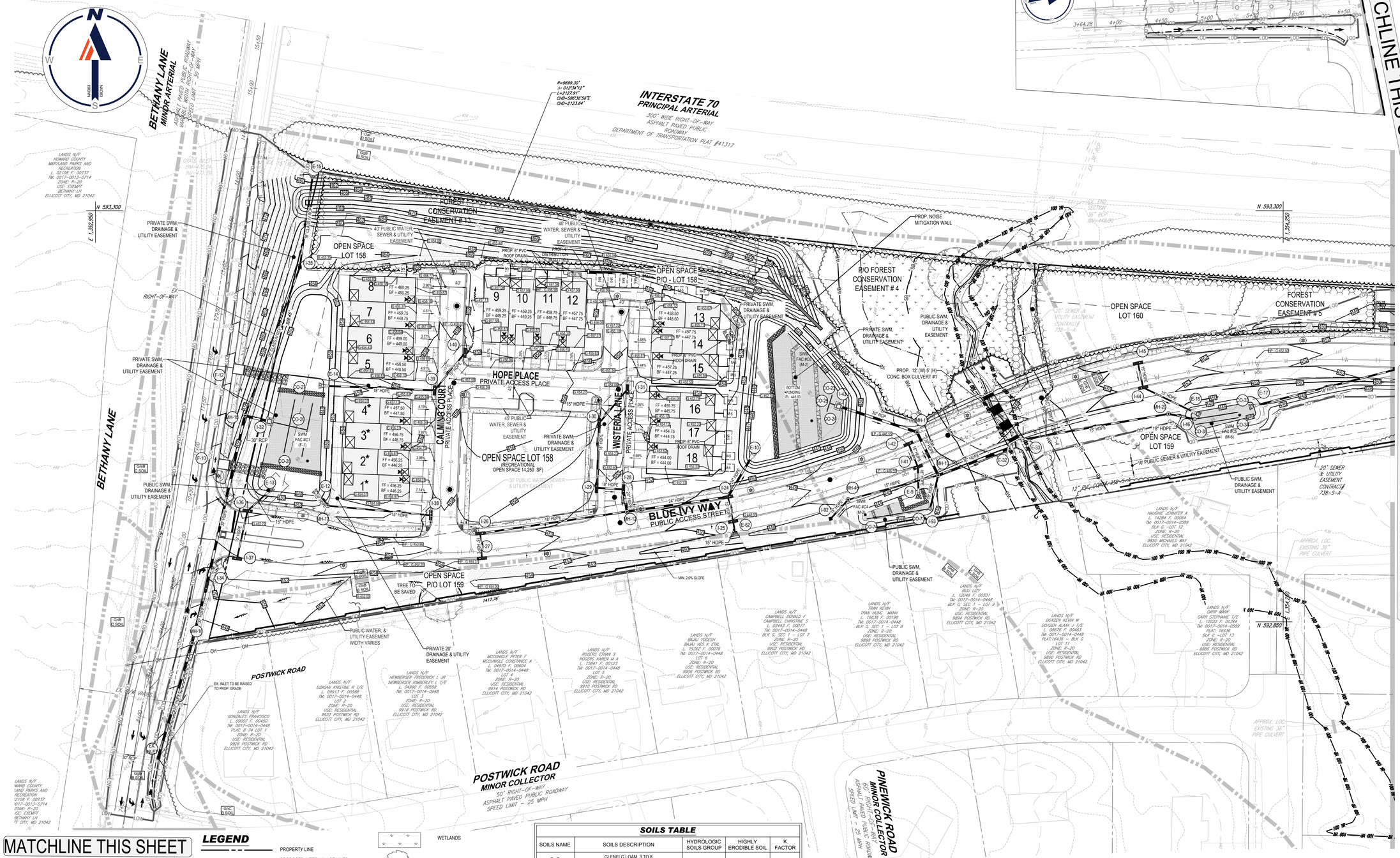

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- LOD LIMIT OF DISTURBANCE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- TPF TREE PROTECTION FENCE
- WETLAND BOUNDARY
- WB WETLAND BUFFER
- SB STREAM BUFFER
- SOILS BOUNDARY
- EXISTING TREE LINE
- PROPOSED TREE LINE
- FP EXISTING FLOODPLAIN
- PFP PROPOSED FLOODPLAIN
- WETLANDS
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- FOREST CONSERVATION EASEMENT
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- SOILS STABILIZATION MATTING
- SWM FACILITIES

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

*NOTE: FOR LOTS 1-4, THE OPENING ELEVATION OF ANY DOORS OR WINDOWS MUST BE NO LOWER THAN ELEVATION 453.72 TO ENSURE A MINIMUM OF 1' OF SEPARATION FROM THE SWM FACILITY C1 OVERFLOW ELEVATION.

50 25 12.5 0 50
1"= 50'

APPROVED: DEPARTMENT OF PUBLIC WORKS	
DocuSigned by: 6/12/2024	
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
DocuSigned by: 6/12/2024	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
DocuSigned by: 6/12/2024	
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

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DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	GRAD-2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
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JASON LANE LICENSE No. 40808
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SHEET TITLE:

GRADING AND STORMWATER MANAGEMENT PLAN NEIGHBORHOODS C-E

SHEET NUMBER:

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F-22-033

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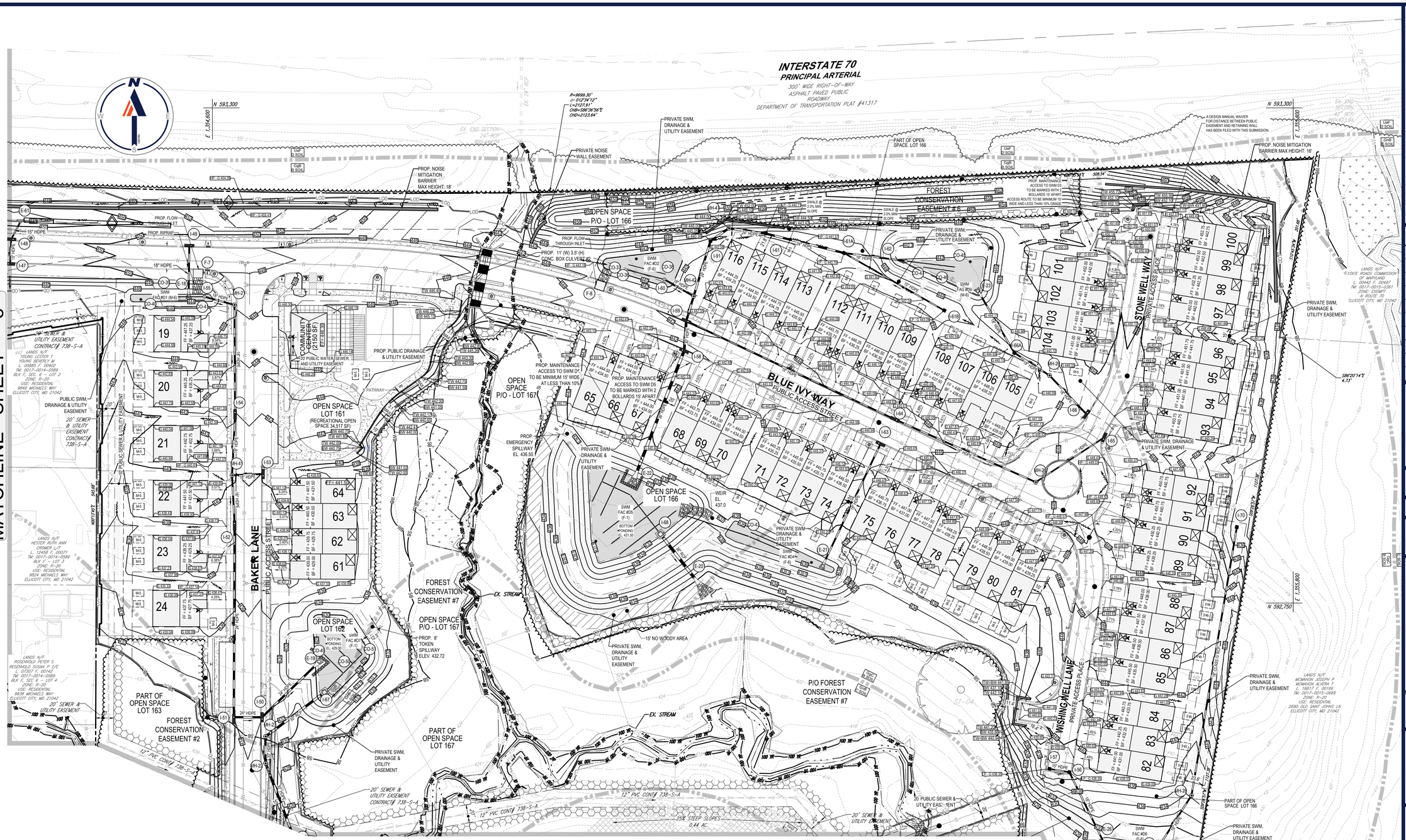

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- PROPOSED INTERNAL LOT LINES
- LIMIT OF DISTURBANCE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- TREE PROTECTION FENCE
- WETLAND BOUNDARY
- WETLAND BUFFER
- STREAM BUFFER
- SOILS BOUNDARY
- EXISTING TREE LINE
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- FOREST CONSERVATION EASEMENT
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- 25% SLOPE OR GREATER
- SOILS STABILIZATION MATTING
- SWM FACILITIES

GRADING NOTES:

1. CONSTRUCTION WILL BE PHASED SUCH THAT NO MORE THAN 20AC OF LAND WILL BE DISTURBED AT ONE TIME. PHASING DESIGN TO BE PROVIDED ON FINAL PLANS

50 25 12.5 0 50
1"= 50'

APPROVED: DEPARTMENT OF PUBLIC WORKS	
DocuSigned by: [signature]	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
DocuSigned by: [signature]	6/12/2024
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THE SEDIMENT CONTROL DESIGN AND CONSTRUCTION OF THESE PLANS MUST BE DONE AS SPECIFIED ON THESE PLANS AND IN ACCORDANCE WITH APPROVED STANDARDS AND SPECIFICATIONS. ANY DEVIATION FROM THESE PLANS SHALL BE APPROVED BY THE SEDIMENT CONTROL AUTHORITIES BEFORE IMPLEMENTATION. ANY DEVIATION FROM THESE PLANS WITHOUT APPROVAL SHALL BE CAUSE FOR A STOP WORK ORDER. IF DOCUMENT IS NOT SIGNED AND SEALED, IT IS NOT APPROVED OR AUTHORIZED FOR CONSTRUCTION PURPOSES.

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PROJECT No.:	MD152018
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PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168
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SHEET TITLE:
GRADING AND STORMWATER MANAGEMENT PLAN NEIGHBORHOODS C-E

SHEET NUMBER:
9 of 117

F-22-033

May 30, 2024
11:12:45 PM
K:\DATA\2018\152018\DRAWINGS\PLAN SET\FINAL PLANS\152018 - GRAD - 2 - LAYOUT 09 - GRADING AND SWM PLAN

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MATCHLINE - SHEET 9

NOLLWICK ROAD
60' RIGHT-OF-WAY
ASPHALT PAVED PUBLIC ROADWAY
25 MPH

MICHAELS WAY
MINOR COLLECTOR
60' RIGHT-OF-WAY
ASPHALT PAVED PUBLIC ROADWAY
SPEED LIMIT = 25 MPH

BAKER LANE
PUBLIC ACCESS STREET

LONGVIEW DRIVE
PUBLIC ACCESS PLACE

LONGVIEW DRIVE
50' RIGHT-OF-WAY
ASPHALT PAVED PUBLIC ROADWAY
SPEED LIMIT = 25 MPH

HELMWOOD CT.
50' RIGHT-OF-WAY
ASPHALT PAVED PUBLIC
SPEED LIMIT = 25 MPH

OPEN SPACE LOT 168
OPEN SPACE LOT 164
OPEN SPACE LOT 165
PART OF OPEN SPACE LOT 163
OPEN SPACE P/O - LOT 167
OPEN SPACE P/O - LOT 107
P/O OPEN SPACE LOT 164
P/O OPEN SPACE LOT 165

PROP. PUBLIC DRAINAGE & UTILITY EASEMENT
PUBLIC SWM, DRAINAGE & UTILITY EASEMENT
PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
PRIVATE 20' DRAINAGE & UTILITY EASEMENT
PUBLIC 20' DRAINAGE & UTILITY EASEMENT
PUBLIC STORMWATER DRAINAGE AND UTILITY EASEMENT
20' PUBLIC SEWER & UTILITY EASEMENT
40' PUBLIC WATER & UTILITY EASEMENT
PUBLIC DRAINAGE & UTILITY EASEMENT
PRIVATE SWM DRAINAGE & UTILITY EASEMENT
PROP. PUBLIC DRAINAGE & UTILITY EASEMENT
PROP. 19' (W) T-TOP CONC. BOX CULVERT #3
PROP. TOKEN SPILLWAY EL. 428.50
PROP. 6" DISTRIBUTION BOX (TYP.)
PROP. 6" P/VC ROOF DRAIN
VARIABLE PUBLIC SEWER & UTILITY EASEMENT
20' SEWER & UTILITY EASEMENT
OVERFLOW PATH
EX. STREAM
EXISTING STAIRS, PATH, AND WALL ENCROACHING IN ROW TO BE REMOVED
ASPHALT DRIVEWAY (TO. REMAIN)
MIN. 2.0% SLOPE FROM HP TO I-80
MIN. 2.0% SLOPE FROM HP TO I-83
MIN. 2.0% SLOPE FROM HP TO I-75
S84°23'51"W 1144.32'
N 592,400
N 592,000
E 1,354,350
E 1,355,200

SWM FAC #E1 (M-5)
SWM FAC #E2 (F-1)
SWM FAC #E3 (M-6)
SWM FAC #E4 (F-6)
SWM FAC #E5 (M-4)
BOTTOM PONDING EL. 433.00
BOTTOM PONDING EL. 431.00

LANDS N/F SAPP DAVID MICHAEL JR. SAPP PATRICK M T/E L. 07403 F. 00358 TM: 0017--0014--0589 BLK F, SEC 3 – LOT 3 ZONE: R–20 USE: RESIDENTIAL 9834 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F LI ZHE L. 17185 F. 00496 TM: 0017--0014--0475 BLK F, SEC. 3 – LOT 6 ZONE: R–20 USE: RESIDENTIAL 9830 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F DOWSON ERIN L. 16965 F. 00200 TM: 0017--0014--0475 BLK F, SEC. 3 – LOT 7 ZONE: R–20 USE: RESIDENTIAL 9826 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F SMITH ROBERT W SMITH KRISTIN T/E L. 09855 F. 00043 TM: 0017--0014--0475 FLAT: 9/78 BLK F, SEC. 3 – LOT 8 ZONE: R–20 USE: RESIDENTIAL 9818 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F APPLER ROBERT HAWK L. 09855 F. 00063 TM: 0017--0014--0475 BLK F, SEC. 3 – LOT 9 ZONE: R–20 USE: RESIDENTIAL 9814 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F MAGDAH ADAM MAGDAH SUSAN T/E L. 10838 F. 00414 TM: 0017--0014--0475 FLAT: 9/78 BLK F, SEC. 3 – LOT 10 ZONE: R–20 USE: RESIDENTIAL 9810 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F THOMPSON MICHAEL W THOMPSON ROBYN S T/E L. 17821 F. 00410 TM: 0017--0014--0475 BLK F, SEC. 3 – LOT 11 ZONE: R–20 USE: RESIDENTIAL 9806 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F MERO PINAR L. 14655 F. 00416 TM: 0017--0014--0475 BLK F, SEC. 3 – LOT 12 ZONE: R–20 USE: RESIDENTIAL 9852 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F MAUSER JAMES M L. 06332 F. 00248 TM: 0017--0014--0475 BLK F, SEC. 3 – LOT 13 ZONE: R–20 USE: RESIDENTIAL 9796 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F SCHAEFER ROBERT CAMPBELL PATRICIA L. 01690 F. 00358 TM: 0017--0021--0637 BLK A, – LOT 21 ZONE: R–20 USE: RESIDENTIAL 9852 HELMWOOD CT. ELLICOTT CITY, MD 21042

LANDS N/F CLOW CHRISTOPHER CLOW ERIN L. 13719 F. 00460 TM: 0017--0021--0637 BLK A, SEC 6 – LOT 20 ZONE: R–20 USE: RESIDENTIAL 9866 HELMWOOD CT ELLICOTT CITY, MD 21042

LANDS N/F RHINEHART SUSAN M L. 09795 F. 00058 TM: 0017--0021--0637 BLK A, SEC 6 – LOT 22 ZONE: R–20 USE: RESIDENTIAL 9858 HELMWOOD CT ELLICOTT CITY, MD 21042

LANDS N/F ALDERSON ARNOLD L. 10855 F. 00478 TM: 0017--0021--0637 BLK A, – LOT 23 ZONE: R–20 USE: RESIDENTIAL 9854 HELMWOOD CT ELLICOTT CITY, MD 21042

LANDS N/F ORNDORFF GREGORY WILLIAM ORNDORFF CAROL NEDDLE L. 01528 F. 00710 TM: 0017--0021--0637 BLK A, SEC 6 – LOT 25 ZONE: R–20 USE: RESIDENTIAL 9847 LONG VIEW DR ELLICOTT CITY, MD 21042

LANDS N/F MARLIYAMA KIMANI L. 02659 F. 00605 TM: 0017--0021--0637 BLK A, SEC 6 – LOT 24 ZONE: R–20 USE: RESIDENTIAL 9850 HELMWOOD CT ELLICOTT CITY, MD 21042

LANDS N/F ROSZKO CLAUDIA SCHED EDWARD P JR T/E L. 03855 F. 00710 TM: 0017--0021--0637 BLK L, SEC 6 – LOT 5 ZONE: R–20 USE: RESIDENTIAL 9846 LONG VIEW DR ELLICOTT CITY, MD 21042

LANDS N/F HOWARD COUNTY MARYLAND DEPT. OF RECREATION & PARKS L. 01486 F. 00514 TM: 0017--0021--0609 PLAT: 6777 – LOT 43 OPEN SPACE ZONE: R–20 USE: EXEMPT N. MICHAELS WAY. ELLICOTT CITY, MD 21042

LANDS N/F HONCHARK JOSEPH & AMY L. 00859 F. 00554 TM: 0017--0021--0637 BLK L – LOT 4 ZONE: R–20 USE: RESIDENTIAL 9842 LONG VIEW DR ELLICOTT CITY, MD 21042

LANDS N/F HOWARD COUNTY MARYLAND DEPT. OF RECREATION & PARKS L. 01486 F. 00514 TM: 0017--0021--0609 PLAT: 6777 – LOT 43 OPEN SPACE ZONE: R–20 USE: EXEMPT N. MICHAELS WAY. ELLICOTT CITY, MD 21042

BETH WOOD

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GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

LEGEND

PROPERTY LINE
PROPOSED INTERNAL LOT LINES
LOD LIMIT OF DISTURBANCE
EXISTING CONTOUR
PROPOSED CONTOUR
TPF TREE PROTECTION FENCE
WETLAND BOUNDARY
WB WETLAND BUFFER
SB STREAM BUFFER
SOILS BOUNDARY
EXISTING TREE LINE
PROPOSED TREE LINE
FP EXISTING FLOODPLAIN
PFP PROPOSED FLOODPLAIN

WETLANDS
SPECIMEN TREES
SPECIMEN TREE (TO BE REMOVED)
FOREST CONSERVATION EASEMENT
UNMITIGATED NOISE LINE
MITIGATED NOISE LINE
25% SLOPE OR GREATER

SOILS STABILIZATION MATTING
SWM FACILITIES

50 25 12.5 0 50
1"= 50'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

DocuSigned by: 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

May 30, 2024
H:\19ARS\B26\10DRAWINGS\PLAN SETS\FINAL PLANS\D152018 - GRAD. 2---LAYOUT 10 - GRADING AND SWM PLAN

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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NOT APPROVED FOR CONSTRUCTION

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: GRAD-2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
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B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND
Jason Lloyd License No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

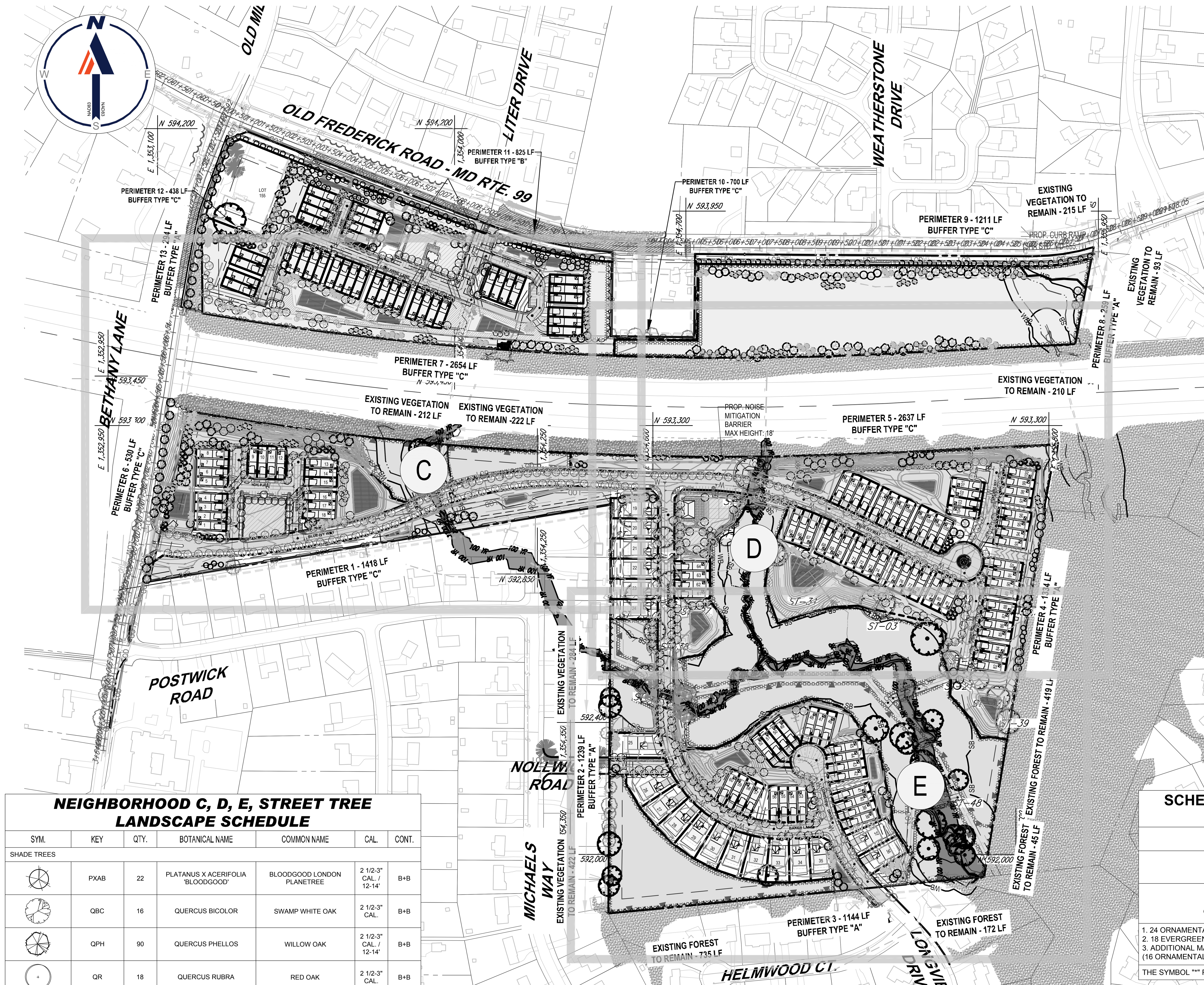
GRADING AND STORMWATER MANAGEMENT PLAN NEIGHBORHOODS C-E

SHEET NUMBER:

10 of 117

F-22-033

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F



NEIGHBORHOOD C, D, E, STREET TREE LANDSCAPE SCHEDULE

SYM.	KEY	QTY.	BOTANICAL NAME	COMMON NAME	CAL.	CONT.
SHADE TREES						
	PXAB	22	PLATANUS X ACERIFOLIA 'BLOODGOOD'	BLOODGOOD LONDON PLANETREE	2 1/2-3" CAL. / 12-14'	B+B
	QBC	16	QUERCUS BICOLOR	SWAMP WHITE OAK	2 1/2-3" CAL.	B+B
	QPH	90	QUERCUS PHELLOS	WILLOW OAK	2 1/2-3" CAL. / 12-14'	B+B
	QR	18	QUERCUS RUBRA	RED OAK	2 1/2-3" CAL.	B+B
	TCG	142	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	2 1/2-3" CAL.	B+B
	UA	13	ULMUS AMERICANA 'DELAWARE'	DELAWARE AMERICAN ELM	2 1/2-3" CAL.	B+B
SUBTOTAL:		301				

NOTE: IF ANY DISCREPANCIES OCCUR BETWEEN THE AMOUNTS SHOWN IN THE PLAN AND THE PLANT LIST, THE PLAN WILL DICTATE.

STREET TREE NOTES

1. FINANCIAL SURETY FOR THE REQUIRED 301 LARGE STREET TREES ($300 EACH) WILL BE POSTED FOR THE AMOUNT OF $90,300 WITH THE DEVELOPMENT ENGINEERING DIVISION (DED) COST ESTIMATE UNDER THE FINAL PLAN SUBMISSION.
2. SHADE TREES MUST BE PLANTED A MINIMUM OF 40 FEET AND ORNAMENTAL TREES MUST BE PLANTED A MINIMUM OF 25 FEET FROM POWER LINES PER B.G.E. PLANTING GUIDE.
3. FINAL PLACEMENT OF STREET TREES WILL OCCUR IN THE FIELD AND BE PLACED A MINIMUM OF 30 FEET FROM ALL SIGNS AND INTERSECTIONS WHEN PLANTED BETWEEN SIDEWALK AND CURB, BE LOCATED WITH CONSIDERATION OF UNDERGROUND UTILITIES AND STRUCTURES AND MAINTAIN A MINIMUM OF 5 FEET DISTANCE ON CENTER FROM A DRAIN INLET STRUCTURE, 5 FEET FROM AN OPEN ACCESS STRIP AND 10 FEET FROM A DRIVEWAY.
4. A MINIMUM OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY STREET TREE.
5. ON THE APPROACH SIDE OF A STOP SIGN, NO STREET TREE CAN BE PLANTED WITHIN 30' OF THE STOP SIGN.
6. WHERE TREES ARE PLANTED CLOSER THAN 3 FEET TO THE SIDEWALK, A BIOLOGIC ROOT INHIBITOR BARRIER IS REQUIRED.

STREET TREE REQUIREMENTS

STREET	LINEAR FEET	SPACING	TREES REQUIRED	TREES PROVIDED
BETHANY LANE (SOUTH)	530 LF - 41 LF (ENTRANCE) = 489 LF	40 L.F.	13 TREES	13 TREES
BLUE IVY WAY	2539 LF - 28 LF (ENTRANCES) = 2511 LF	40 L.F.	63 TREES (x2) = 126 TREES	126 TREES
BAKER LANE	1416 LF	40 L.F.	36 TREES (x2) = 72 TREES	72 TREES
LONGVIEW DRIVE	435 LF - 28 LF (ENTRANCE) = 407 LF	40 L.F.	11 TREES (X2) = 22 TREES	22 TREES
CALMING COURT	295 LF - 26 LF (ENTRANCES) = 269 LF	40 L.F.	7 TREES (X2) = 14 TREES	14 TREES
HOPE PLACE	179 LF	40 L.F.	5 TREES (X2) = 10 TREES	10 TREES
WISTERIA LANE	252 LF - 26 LF (ENTRANCES) = 226 LF	40 L.F.	6 TREES (X2) = 12 TREES	12 TREES
STONE WELL WAY	321 LF	40 L.F.	8 TREES (X2) = 16 TREES	16 TREES
WISHING WELL LANE	304 LF	40 L.F.	8 TREES (X2) = 16 TREES	16 TREES
THE SYMBOL "%" REPRESENTS THE MATERIAL USED TO MEET THIS REQUIREMENT.				

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: [signature] 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: [signature] 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: CHAD Edmondson 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

[signature] 3-12-24

DEVELOPER'S / OWNER'S NAME — DATE

NEIGHBORHOOD C, D, E, LANDSCAPE SCHEDULE

SYM.	KEY	QTY.	BOTANICAL NAME	COMMON NAME	CAL.	CONT.
SHADE TREES						
	AR	69	ACER RUBRUM	RED MAPLE	2 1/2-3" CAL. / 12-14'	B+B
	AR2	8	ACER RUBRUM	RED MAPLE	3-4" CAL. / 12-14'	B+B
	NS	8	NYSSA SYLVATICA	SOURGUM OR TUPELO	3" CAL.	B+B
	QBC	22	QUERCUS BICOLOR	SWAMP WHITE OAK	2 1/2-3" CAL.	B+B
	QBC2	6	QUERCUS BICOLOR	SWAMP WHITE OAK	3-4" CAL.	B+B
	QC	6	QUERCUS COCCINEA	SCARLET OAK	2 1/2-3" CAL.	B+B
	QC2	6	QUERCUS COCCINEA	SCARLET OAK	3-4" CAL.	B+B
	QPH	12	QUERCUS PHELLOS	WILLOW OAK	2 1/2-3" CAL. / 12-14'	B+B
	QR	3	QUERCUS RUBRA	RED OAK	2 1/2-3" CAL.	B+B
	QR2	8	QUERCUS RUBRA	RED OAK	3" CAL.	B+B
	TCG	24	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	2 1/2-3" CAL.	B+B
SUBTOTAL:		172				
ORNAMENTAL TREES						
	AC	11	AMELANCHIER CANADENSIS	MULTI STEM SHADBLOW SERVICEBERRY	1-1 1/2" CAL. / 8-10'	B+B
	CC	20	CERCIS CANADENSIS	EASTERN REDBUD	2-2 1/2" CAL. / 8-10'	B+B
	CMAS	3	CORNUS MAS	CORNELIAN CHERRY	1-1 1/2" CAL. / 8-10'	B+B
	PXO	7	PRUNUS X 'OKAME'	OKAME CHERRY	1-1 1/2" CAL. / 8-10'	B+B
SUBTOTAL:		41				
EVERGREEN TREES						
	PIAB	35	PICEA ABIES	NORWAY SPRUCE	6-7'	B+B
	PS	34	PINUS STROBUS	EASTERN WHITE PINE	6-7'	B+B
	PV	43	PINUS VIRGINIANA	VIRGINIA PINE	7-8'	B+B
	TP	9	THUJA PLICATA	WESTERN RED CEDAR	7-8'	B+B
SUBTOTAL:		121				
DECIDUOUS SHRUBS						
	IV	50	ITEA VIRGINICA 'HENRY'S GARNET'	GARNET SWEETSPIRE	24-30"	#5 CAN
EVERGREEN SHRUBS						
	IGC	50	ILEX GLABRA 'COMPACTA'	DWARF INKBERRY HOLLY	24-30"	#5 CAN
PERENNIALS						
	HHR	382	HEMEROCALLIS 'HAPPY RETURNS'	HAPPY RETURNS DAYLILY	2 GAL.	CONTAINER
ORNAMENTAL GRASSES						
	PAH	47	PENNISETUM ALOPECUROIDES 'HAMELN'	DWARF FOUNTAIN GRASS	2 GAL.	CONTAINER

NOTE: IF ANY DISCREPANCIES OCCUR BETWEEN THE AMOUNTS SHOWN IN THE PLAN AND THE PLANT LIST, THE PLAN WILL DICTATE.

SCHEDULE 'A'
PERIMETER LANDSCAPE EDGE

PERIMETER	LANDSCAPE TYPE	LINEAR FEET OF ROADWAY FRONTAGE/ PERIMETER	CREDIT FOR EX. VEGETATION (YES/NO; LF) (DESCRIBE BELOW IF NEEDED)	CREDIT FOR FENCE/WALL/BERM (YES/NO; LF) (DESCRIBE BELOW IF NEEDED)	TOTAL LINEAR FEET (AFTER CREDITS)	NUMBER OF PLANTS REQUIRED			NUMBER OF PLANTS PROVIDED			
						SHADE TREES	EVERGREEN TREES	SHRUBS	SHADE TREES	EVERGREEN TREES	SHRUBS	ORNAMENTAL TREES
1	C	1418 LF	NO	YES - FENCE (865 LF + 422 LF = 1287 LF)	131 LF	4	7	0	4	0	0	7
2	A	1239 LF	YES (284 LF + 422 LF = 706 LF)	YES - FENCE (483 LF)	50 LF	1	0	0	2	0	0	0
3	A	1144 LF - 25 LF ENTRANCE = 1119 LF	YES (735 LF + 172 LF = 907 LF)	YES - FENCE (136 LF)	76 LF	2	0	0	2	0	0	0
4	A	1334 LF	YES (45 LF + 419 LF = 464 LF)	NO (0)	870 LF	15	0	0	9	12	0	0
5	C	2637 LF	YES (212 LF + 222 LF = 434 LF)	YES - BERM/WALL (1846 LF)	357 LF	9	18	0	9	8	0	10
6	C	530 LF - 42 LF ENTRANCE = 488 LF	NO	NO (0)	488 LF	13	25	0	13	25	0	0
THE SYMBOL "@" REPRESENTS THE MATERIAL USED TO MEET THIS REQUIREMENT												
LOT 1	C	100 LF	NO	NO (0)	100 LF	3	5	0	2	7	0	0
LOTS 8	C	100 LF	NO	NO (0)	100 LF	3	5	0	3	5	0	0
LOTS 9	C	100 LF	NO	NO (0)	100 LF	3	5	0	3	3	20	0
LOT 12	C	100 LF	NO	NO (0)	100 LF	3	5	0	0	5	30	0
LOT 13	C	100 LF	NO	NO (0)	100 LF	3	5	0	3	5	0	0
LOT 18	C	100 LF	NO	NO (0)	100 LF	3	5	0	3	5	0	0
LOT 19	B	145 LF	NO	NO (0)	145 LF	3	4	0	3	4	0	0
LOT 35	B	152 LF	NO	NO (0)	152 LF	4	4	0	4	4	0	0
LOT 53	C	100 LF	NO	NO (0)	100 LF	3	6	0	3	6	0	0
LOT 81	C	100 LF	NO	NO (0)	100 LF	3	5	0	3	5	0	0
LOT 100	C	100 LF	NO	NO (0)	100 LF	3	5	0	3	5	0	0
LOT 105	C	100 LF	NO	NO (0)	100 LF	3	5	0	3	5	0	0
THE SYMBOL "#" REPRESENTS THE MATERIAL USED TO MEET THIS REQUIREMENT												
TOTAL						81	109	0	72	104	50	17

HOWARD COUNTY LANDSCAPE NOTES

1. LANDSCAPING FOR THIS SUBDIVISION WILL BE PROVIDED IN ACCORDANCE WITH THIS CERTIFIED LANDSCAPE PLAN AND IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. PERIMETER LANDSCAPE AND STORMWATER MANAGEMENT SURETY IN THE AMOUNT OF $55,010 FOR THE INSTALLATION OF 81 SHADE TREES ($300.00 EACH); AND, 109 EVERGREEN TREES ($150.00 EACH); THE INSTALLATION OF A FENCE TOTALING 1,436 LINEAR FEET ($10 PER LINEAR FOOT); AND FINANCIAL SURETY IN THE AMOUNT OF $5,400 FOR 18 MITIGATION SHADE TREES (WP-21-064); AND FINANCIAL SURETY IN THE AMOUNT OF $29,100 FOR 97 SHADE TREES ($300 EACH) FOR RESIDENTIAL INTERNAL LANDSCAPING, FOR A TOTAL SURETY OF $89,510 SHALL BE POSTED BY THE DEVELOPER AS PART OF THE DPW DEVELOPER'S AGREEMENT, F-22-033 .
2. NO CLEARING OF EXISTING VEGETATION IS PERMITTED WITHIN A LANDSCAPE EDGE FOR WHICH CREDIT IS BEING TAKEN; HOWEVER, LANDSCAPE MAINTENANCE IS AUTHORIZED.
3. AT THE TIME OF INSTALLMENT, ALL SHRUBS AND OTHER PLANTINGS HEREWITH LISTED AND APPROVED FOR THE SITE SHALL BE OF PROPER HEIGHT REQUIREMENTS IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELOCATION OF REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVED FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THIS APPROVED LANDSCAPE PLAN MAY RESULT IN DENIAL OR DELAY IN THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO APPLICABLE PLANS AND CERTIFICATIONS.
4. SHOULD ANY TREE DESIGNATED FOR PRESERVATION, FOR WHICH CREDIT IS GIVEN, PRIOR TO RELEASE OF BONDS, THE DEVELOPER WILL BE REQUIRED TO REPLACE THE TREE WITH THE EQUIVALENT SPECIES OR WITH A TREE WHICH WILL OBTAIN THE SAME HEIGHT, SPREAD AND GROWTH CHARACTERISTICS. THE REPLACEMENT TREE MUST BE A MINIMUM OF 3 INCHES IN CALIPER AND INSTALLED AS REQUIRED IN THE LANDSCAPE MANUAL.
5. THE OWNER, TENANT, AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING, PLANT MATERIALS, BERMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.
6. UNDER WP-21-064, SECTION 16.1205.(A).(7) - A REQUEST FOR ALTERNATIVE COMPLIANCE HAS BEEN REQUESTED FROM DPZ FOR THE REMOVAL OF EIGHTEEN (18) SPECIMEN TREES (#ST-01,02, 03, 21, 23, 24, 25, 26, 27, 28, 31, 35, 37, 38, 39, 43, 46, AND 48). MITIGATION FOR THE REMOVAL OF THESE EIGHTEEN (18) SPECIMEN TREES IS TO CONSIST OF TWO (2) 3-4" CALIBER TREE FOR EACH ONE (1) REMOVED SIMILAR OR IDENTICAL SPECIES. THESE THIRTY-SIX (36) TREES SHALL BE PLACED WITHIN CLOSE PROXIMITY TO THE LOCATION OF THE ORIGINAL SPECIMEN TREE AND WILL BE IN ADDITION TO THE REQUIRED PERIMETER LANDSCAPING. COSTS TO COVER THE INSTALLATION OF THESE TREES SHALL BE INCLUDED IN THE PERIMETER LANDSCAPING ESTIMATE; INSPECTION FEES SHALL BE POSTED WITH THE DPW DEVELOPER'S AGREEMENT AT THE FINAL PLAN STAGE FOR THIS DEVELOPMENT; SURETY WILL BE ADDRESSED WITH THIS PLAN STAGE FOR THIS DEVELOPMENT. THE SYMBOL "$" REPRESENTS PLANT MATERIAL TO MEET THIS REQUIREMENT.
7. MATERIAL LABELED WITH A "$" SYMBOL DESIGNATES MATERIAL PROPOSED FOR MITIGATION. A SCHEDULE OF SPECIMEN TREES CAN BE FOUND ON THE FOREST CONSERVATION PLAN OF THIS SET.
8. LANDSCAPING REQUIRED FOR NEIGHBORHOODS A AND B SHALL BE PROVIDED WITH SDP-22-021.

RECREATIONAL OPEN SPACE

North Section Recreational Open Space (SDP-22-021)			
Unit Type	# of Units	Open Space Calculation	Open Space Requirement
Single Family Detached Units	0	200 s.f./unit	0 s.f.
Single Family Attached/Semi-Detached Units	38	400 s.f./unit	15,200 S.F.
Total Required			15,200 S.F.
Total Provided			30,627 S.F

South Section Recreation Open Space (F-22-033)			
Unit Type	# of Units	Open Space Calculation	Open Space Requirement
Single Family Detached Units	19	200 s.f./unit	3,800 S.F.
Single Family Attached/Semi-Detached Units	97	400 s.f./unit	38,800 S.F.
Total Required			42,600 S.F.
Total Provided			48,767 S.F.

SCHEDULE C - RESIDENTIAL DEVELOPMENT INTERNAL LANDSCAPING

NUMBER OF DWELLING UNITS:	97 SINGLE FAMILY ATTACHED (SFA) UNITS 19 SINGLE FAMILY DETACHED (SFD) UNITS
NUMBER OF TREES REQUIRED: (1 PER DWELLING UNIT - SFA) (0 PER DWELLING UNIT - SFD)	NUMBER OF TREES REQUIRED: 97
NUMBER OF PLANTS PROVIDED: SHADE TREES OTHER TREES (2:1 SUBSTITUTION)	NUMBER OF PLANTS PROVIDED: 64 SHADE TREES 24 ORNAMENTAL TREES 18 EVERGREEN TREES

1. 24 ORNAMENTAL TREES SUBSTITUTED FOR 12 SHADE TREES
2. 18 EVERGREEN TREES SUBSTITUTED FOR 9 SHADE TREES
3. ADDITIONAL MATERIAL TO SATISFY THIS REQUIREMENT HAS BEEN PROVIDED ON NEIGHBORHOODS A & B (16 ORNAMENTAL TREES & 10 EVERGREENS)

THE SYMBOL "*" REPRESENTS THE MATERIAL USED TO MEET THIS REQUIREMENT

OPEN SPACE CHART

LOT No.	OWNER	OPEN SPACE AREA (AC)	NON CREDITED OPEN SPACE AREA (AC)	CREDITED OPEN SPACE (AC)
NORTH COMMUNITY OPEN SPACE (SDP-22-021)				
156	HOMEOWNERS ASSOCIATION	8.09	1.03	7.06
157	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	7.43	0	7.43
SOUTH COMMUNITY OPEN SPACE (F-22-033)				
158	HOMEOWNERS ASSOCIATION	3.33	0.24	3.09
159	HOMEOWNERS ASSOCIATION	1.92	0.37	1.55
160	HOMEOWNERS ASSOCIATION	1.62	0.05	1.57
161	HOMEOWNERS ASSOCIATION	0.79	0	0.79
162	HOMEOWNERS ASSOCIATION	0.52	0	0.52
163	HOMEOWNERS ASSOCIATION	1.14	0.02	1.12
164	HOMEOWNERS ASSOCIATION	1.73	0.29	1.44
165	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	2.41	0.02	2.39
166	HOMEOWNERS ASSOCIATION	7.13	1.70	5.43
167	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	10.96	0	10.96
168	HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS	0.20	0	0.20
		47.27	3.72	43.55

SYMBOL LEGEND

- FOREST AREA (FOREST TO REMAIN)
- FENCE
- STREAM BUFFER
- FLOOD PLAIN
- CREDITED OPEN SPACE
- RECREATIONAL OPEN SPACE
- STREAM RESTORATION AREA (SEE DETAILS)

NOTE: SYMBOL LEGEND IS APPLICABLE FOR SHEETS 7-12.

FOREST CONSERVATION NOTES:

1. UNDER WP-21-064, SECTION 16.1205.(A).(7) - A REQUEST FOR ALTERNATIVE COMPLIANCE HAS BEEN REQUESTED FROM DPZ FOR THE REMOVAL OF EIGHTEEN (18) SPECIMEN TREES (#ST-01,02, 03, 21, 23, 24, 25, 26, 27, 28, 31, 35, 37, 38, 39, 43, 46, AND 48). MITIGATION FOR THE REMOVAL OF THESE EIGHTEEN (18) SPECIMEN TREES IS TO CONSIST OF TWO (2) 3-4" CALIBER TREE FOR EACH ONE (1) REMOVED SIMILAR OR IDENTICAL SPECIES. THESE THIRTY-SIX (36) TREES SHALL BE PLACED WITHIN CLOSE PROXIMITY TO THE LOCATION OF THE ORIGINAL SPECIMEN TREE AND WILL BE IN ADDITION TO THE REQUIRED PERIMETER LANDSCAPING. COSTS TO COVER THE INSTALLATION OF THESE TREES SHALL BE INCLUDED IN THE PERIMETER LANDSCAPING ESTIMATE; INSPECTION FEES SHALL BE POSTED WITH THE DPW DEVELOPER'S AGREEMENT AT THE FINAL PLAN STAGE FOR THIS DEVELOPMENT; SURETY WILL BE ADDRESSED WITH THIS PLAN STAGE FOR THIS DEVELOPMENT.
2. MATERIAL LABELED WITH A "$" SYMBOL DESIGNATES MATERIAL PROPOSED FOR MITIGATION. A SCHEDULE OF SPECIMEN TREES CAN BE FOUND ON THE FOREST CONSERVATION PLAN, SHEET 76 OF THIS SET.
3. WHEN REFORESTATION IS WITHIN 35 FEET OF THE SIDE OR REAR YARD OF A LOT, TWO (2) ROWS OF 1" CAL. TREES MUST BE PLANTED IN ADDITION TO THE FOREST CONSERVATION REQUIREMENT. THIS AFFECTS THE FOLLOWING LOTS: 29, 30, 34, 35, 42, 43, 44, 45, 49, 50, 51, 54, 55, 56, 76, 77, 78, 79, 80, AND 81.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
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OWNER / DEVELOPER:
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TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

E.R. McWILLIAMS
03/15/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE No. 3697
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

SHEET TITLE:

LANDSCAPE PLAN - OVERALL NEIGHBORHOOD PLAN

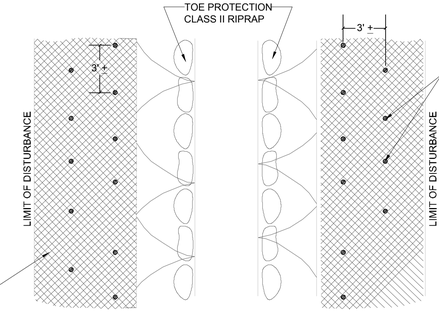
SHEET NUMBER:

F-22-033

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F

STREAMBANK FILL AREAS NOTES AND SPECIFICATIONS

1. FILL MATERIAL TO BE USED IN STREAMBANK CONSTRUCTION SHALL BE SELECT GRANULAR MATERIAL APPROVED BY THE PROJECT GEO-TECHNICAL ENGINEER.
2. PLACEMENT OF SELECT FILL SHALL BE UNDER THE DIRECTION OF THE GEO-TECHNICAL ENGINEER. ALL FILLS SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE STANDARD PROCTOR TEST.
3. ALL PROPOSED MATTING, SEEDING AND STAKES SHALL BE PLACED IMMEDIATELY UPON COMPLETION OF FILL PLACEMENT.



STREAM RESTORATION PLANTING DETAIL FOR PROPOSED CHANNEL

NOT TO SCALE

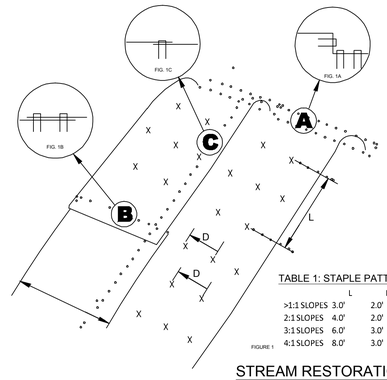


FIGURE 1

TABLE 1: STAPLE PATTERN

	L	D
>1:1 SLOPES	3.0'	2.0'
2:1 SLOPES	4.0'	2.0'
3:1 SLOPES	6.0'	3.0'
4:1 SLOPES	8.0'	3.0'

1. PREPARE SOIL, INCLUDING GRADING, APPLICATION OF LIME, FERTILIZER, AND SEEDS. THE SURFACE OF THE SOIL SHOULD BE SMOOTH AND FREE OF ROCKS, ROOTS AND OTHER OBSTRUCTIONS.
2. START AT THE TOP OF THE SLOP BY ANCHORING BLANKETS IN A 6" DEEP AND 6" WIDE ANCHOR TRENCH. PLACE BLANKETS, STAPLE (8" STAPLES RECOMMENDED), BACKFILL AND COMPACT (FIG. 1A).
3. ROLL THE BLANKETS DOWN THE SLOPE (RECOMMENDED FOR STEEP SLOPES) OR ACROSS THE SLOPE. STAPLE THE OPEN BLANKET EDGE USING ONE ROW OF STAPLES AT 1.5-2 FOOT INTERVALS. THE MIDDLE OF THE BLANKETS SHOULD BE STAPLED USING A PREFERRED STAPLE PATTERN (FIG. 1B). BE SURE TO LAY BLANKETS LOOSELY ON THE SOIL SURFACE ALLOWING A GOOD CONTACT BETWEEN SOIL AND BLANKETS.
4. WHEN BLANKET SPLICING IS NECESSARY, USE AN 8 INCH OVERLAP. USE TWO ROWS OF STAPLES (8" STAPLES RECOMMENDED) STAGGERED AT 4 FEET (FIG. 1B). TWELVE INCH STAPLE SPACING WITH A STAGGERED PATTERN IS RECOMMENDED. OVERLAP SIDES OF BLANKETS AT LEAST 6" AND USE STAPLES (8" STAPLES RECOMMENDED) ALONG THE OVERLAP AT 12" SPACING (FIG. 1C).
5. PROVIDED A 6" DEEP AND 6" WIDE ANCHOR TRENCH AT THE TOP OF THE SLOPE OR STREAMBANK OR SHORELINE (FIG. 1A).
6. USE WIRE STAPLES OF GAUGE 8 OR LOWER. IF WOODEN BEGS ARE USED, THE MINIMUM LENGTH IS 12 INCHES. ANCHORS SHOULD BE LONG ENOUGH TO PROVIDE A STRONG BOND BETWEEN THE BLANKET AND THE GROUND. REQUIRED ANCHOR LENGTH MAY VARY DEPENDING ON THE SOIL CONDITION.
7. THIS PROCEDURE COULD BE ALTERED AT THE DISCRETION OF THE SITE ENGINEER.

STREAM RESTORATION JUTE MATTING INSTALLATION GUIDE

NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

DEVELOPER'S / OWNER'S NAME — DATE 3-18-24

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-019C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
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E.R. McWILLIAMS
03/15/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND CERTIFICATE NO. 1200
PROFESSIONAL CERTIFICATION
I, ERIC R. MCWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3891, EXPIRATION DATE: 9/2024

SHEET TITLE:

LANDSCAPE PLAN NEIGHBORHOODS C-E

SHEET NUMBER:

12 of 117

F-22-033

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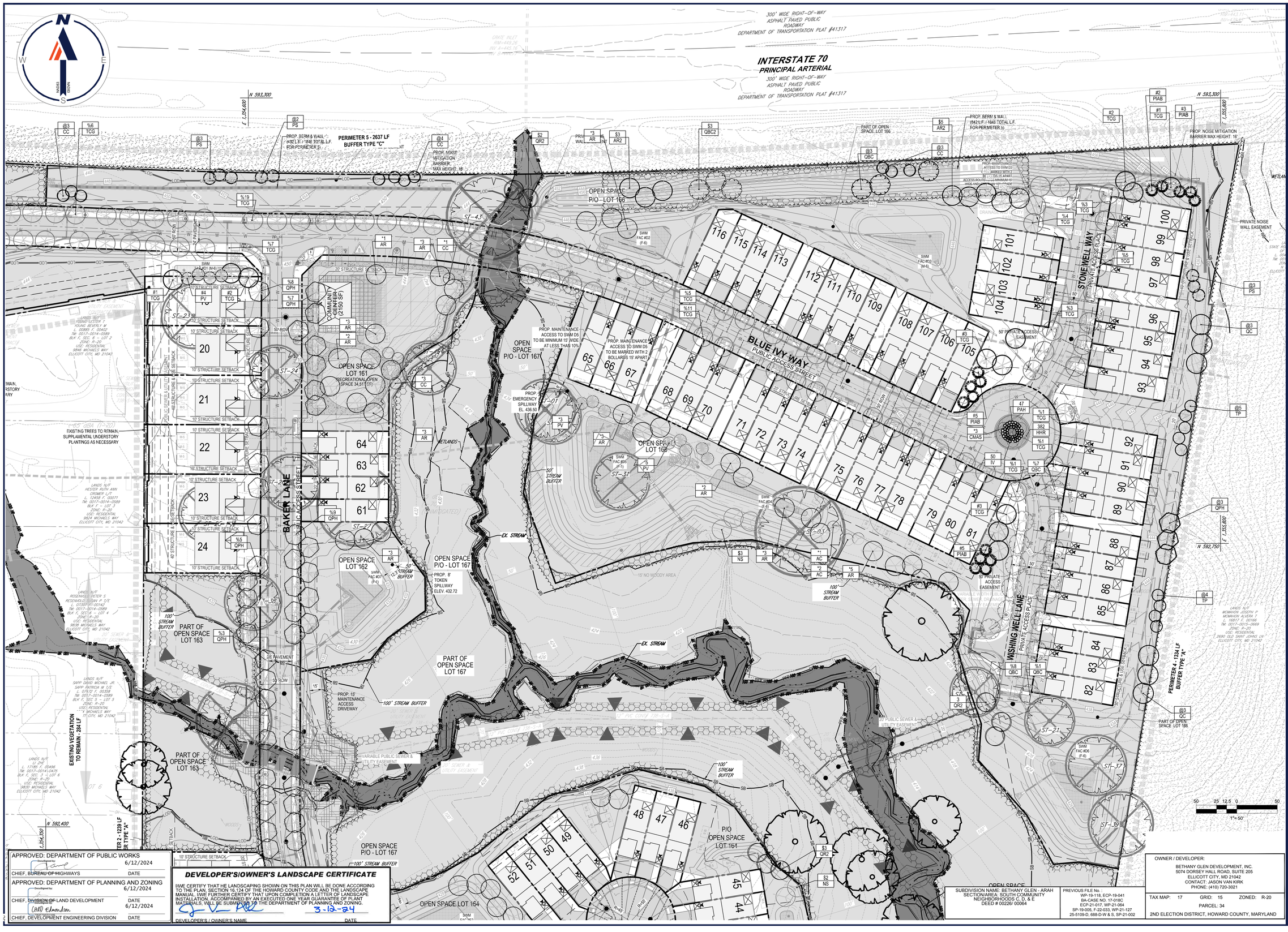

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CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

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DEVELOPER'S / OWNER'S NAME — DATE 3-12-24

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
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TAX MAP: 17 GRID: 15 ZONED: R-20
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03/15/2024
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MARYLAND LICENSE No. 3697
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697. EXPIRATION DATE: 9/20/24

50 25 12.5 0 50
1" = 50'

SHEET TITLE:

LANDSCAPE PLAN NEIGHBORHOODS C-E

SHEET NUMBER:

13 of 117

F-22-033

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LANDSCAPE SPECIFICATIONS

1. SCOPE OF WORK:
THE LANDSCAPE CONTRACTOR SHALL BE REQUIRED TO PERFORM ALL CLEARING, FINISHED GRADING, SOIL PREPARATION, PERMANENT SEEDING OR SODDING, PLANTING AND MULCHING INCLUDING ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT NECESSARY FOR THE COMPLETION OF THIS PROJECT, UNLESS OTHERWISE CONTRACTED BY THE GENERAL CONTRACTOR.

2. MATERIALS
A. GENERAL - ALL HARDSCAPE MATERIALS SHALL MEET OR EXCEED SPECIFICATIONS AS OUTLINED IN THE STATE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.

B. TOPSOIL - NATURAL, FRIABLE, LOAMY SILT SOIL HAVING AN ORGANIC CONTENT NOT LESS THAN 5%, A PH RANGE BETWEEN 4.5-7.0. IT SHALL BE FREE OF DEBRIS, ROCKS LARGER THAN ONE INCH (1"), WOOD, ROOTS, VEGETABLE MATTER AND CLAY CLODS.

C. LAWN - ALL DISTURBED AREAS ARE TO BE TREATED WITH A MINIMUM SIX INCH (6") THICK LAYER OF TOPSOIL, OR AS DIRECTED BY THE LOCAL ORDINANCE OR CLIENT, AND SEEDED OR SODDED IN ACCORDANCE WITH THE PERMANENT STABILIZATION METHODS INDICATED WITHIN THE SOIL EROSION AND SEDIMENT CONTROL NOTES.
1.1. LAWN SEED MIXTURE SHALL BE FRESH, CLEAN NEW CROP SEED.
1.2. SOD SHALL BE STRONGLY ROOTED, WEED AND DISEASE/PEST FREE WITH A UNIFORM THICKNESS.
1.3. SOD INSTALLED ON SLOPES GREATER THAN 4:1 SHALL BE PEGGED TO HOLD SOD IN PLACE.

D. MULCH - THE MULCH AROUND THE PERIMETER OF THE BUILDING SHALL BE A 3" LAYER OF DOUBLE SHREDDED BLACK CEDAR MULCH ONLY. ALL OTHER AREAS SHALL BE MULCHED WITH A 3" LAYER OF DOUBLE SHREDDED DARK BROWN HARDWOOD BARK MULCH, UNLESS OTHERWISE STATED ON THE LANDSCAPE PLAN.

E. FERTILIZER
1.1. FERTILIZER SHALL BE DELIVERED TO THE SITE MIXED AS SPECIFIED IN THE ORIGINAL UNOPENED STANDARD BAGS SHOWING WEIGHT, ANALYSIS AND NAME OF MANUFACTURER. FERTILIZER SHALL BE STORED IN A WEATHERPROOF PLACE SO THAT IT CAN BE KEPT DRY PRIOR TO USE.
1.2. FOR THE PURPOSE OF BIDDING, ASSUME THAT FERTILIZER SHALL BE 10% NITROGEN, 6% PHOSPHORUS AND 4% POTASSIUM BY WEIGHT. A FERTILIZER SHOULD NOT BE SELECTED WITHOUT A SOIL TEST PERFORMED BY A CERTIFIED SOIL LABORATORY.

F. PLANT MATERIAL
1.1. ALL PLANTS SHALL IN ALL CASES CONFORM TO THE REQUIREMENTS OF THE "AMERICAN STANDARD FOR NURSERY STOCK" (ANSI Z60.1), LATEST EDITION, AS PUBLISHED BY THE AMERICAN NURSERY & LANDSCAPE ASSOCIATION.
1.2. IN ALL CASES, BOTANICAL NAMES SHALL TAKE PRECEDENCE OVER COMMON NAMES FOR ANY AND ALL PLANT MATERIAL.
1.3. PLANTS SHALL BE LEGIBLY TAGGED WITH THE PROPER NAME AND SIZE. TAGS ARE TO REMAIN ON AT LEAST ONE PLANT OF EACH SPECIES FOR VERIFICATION PURPOSES DURING THE FINAL INSPECTION.
1.4. TREES WITH ABRASION OF THE BARK, SUN SCALDS, DISFIGURATION OR FRESH CUTS OF LIMBS OVER 1¼", WHICH HAVE NOT BEEN COMPLETELY CALLUSED, SHALL BE REJECTED. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS TO DAMAGE THE BARK OR BREAK BRANCHES.
1.5. ALL PLANTS SHALL BE TYPICAL OF THEIR SPECIES OR VARIETY AND SHALL HAVE A NORMAL HABIT OF GROWTH: WELL DEVELOPED BRANCHES, DENSELY FOLIATED, VIGOROUS ROOT SYSTEMS AND BE FREE OF DISEASE, INSECTS, PESTS, EGGS OR LARVAE.
1.6. CALIPER MEASUREMENTS OF NURSERY GROWN TREES SHALL BE TAKEN AT A POINT ON THE TRUNK SIX INCHES (6") ABOVE THE NATURAL GRADE FOR TREES UP TO AND INCLUDING A FOUR INCH (4") CALIPER SIZE. IF THE CALIPER AT SIX INCHES (6") ABOVE THE GROUND EXCEEDS FOUR INCHES (4") IN CALIPER, THE CALIPER SHALL BE MEASURED AT A POINT 12" ABOVE THE NATURAL GRADE.
1.7. SHRUBS SHALL BE MEASURED TO THE AVERAGE HEIGHT OR SPREAD OF THE SHRUB, AND NOT TO THE LONGEST BRANCH.
1.8. TREES AND SHRUBS SHALL BE HANDLED WITH CARE BY THE ROOT BALL.

3. GENERAL WORK PROCEDURES
A. CONTRACTOR TO UTILIZE WORKMANLIKE INDUSTRY STANDARDS IN PERFORMING ALL LANDSCAPE CONSTRUCTION. THE SITE IS TO BE LEFT IN A CLEAN STATE AT THE END OF EACH WORKDAY. ALL DEBRIS, MATERIALS AND TOOLS SHALL BE PROPERLY STORED, STOCKPILED OR DISPOSED OF.

B. WASTE MATERIALS AND DEBRIS SHALL BE COMPLETELY DISPOSED OF AT THE CONTRACTOR'S EXPENSE. DEBRIS SHALL NOT BE BURIED, INCLUDING ORGANIC MATERIALS, BUT SHALL BE REMOVED COMPLETELY FROM THE SITE.

4. SITE PREPARATIONS
A. BEFORE AND DURING PRELIMINARY GRADING AND FINISHED GRADING, ALL WEEDS AND GRASSES SHALL BE DUG OUT BY THE ROOTS AND DISPOSED OF IN ACCORDANCE WITH GENERAL WORK PROCEDURES OUTLINED HEREIN.

B. ALL EXISTING TREES TO REMAIN SHALL BE PRUNED TO REMOVE ANY DAMAGED BRANCHES. THE ENTIRE LIMB OF ANY DAMAGED BRANCH SHALL BE CUT OFF AT THE TRUNK. CONTRACTOR SHALL ENSURE THAT CUTS ARE SMOOTH AND STRAIGHT. ANY EXPOSED ROOTS SHALL BE CUT BACK WITH CLEAN, SHARP TOOLS AND TOPSOIL SHALL BE PLACED AROUND THE REMAINDER OF THE ROOTS. EXISTING TREES SHALL BE MONITORED ON A REGULAR BASIS FOR ADDITIONAL ROOT OR BRANCH DAMAGE AS A RESULT OF CONSTRUCTION. ROOTS SHALL NOT BE LEFT EXPOSED FOR MORE THAN ONE (1) DAY. CONTRACTOR SHALL WATER EXISTING TREES AS NEEDED TO PREVENT SHOCK OR DECLINE.

C. CONTRACTOR SHALL ARRANGE TO HAVE A UTILITY STAKE-OUT TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY LANDSCAPE MATERIAL. UTILITY COMPANIES SHALL BE CONTACTED THREE (3) DAYS PRIOR TO THE BEGINNING OF WORK.

5. TREE PROTECTION
A. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES TO REMAIN. A TREE PROTECTION ZONE SHALL BE ESTABLISHED AT THE DRIP LINE OR 15 FEET FROM THE TRUNK OR AT THE LIMIT OF CONSTRUCTION DISTURBANCE, WHICHEVER IS GREATER. LOCAL STANDARDS THAT MAY REQUIRE A MORE STRICT TREE PROTECTION ZONE SHALL BE HONORED.

B. A FORTY-EIGHT INCH (48") HIGH WOODEN SNOW FENCE OR ORANGE COLORED HIGH-DENSITY 'VISI-FENCE', OR APPROVED EQUAL, MOUNTED ON STEEL POSTS SHALL BE PLACED ALONG THE BOUNDARY OF THE TREE PROTECTION ZONE. POSTS SHALL BE PLACED AT A MAXIMUM OF EIGHT FEET (8') ON CENTER OR AS INDICATED WITHIN THE TREE PROTECTION DETAIL.

C. WHEN THE TREE PROTECTION FENCING HAS BEEN INSTALLED, IT SHALL BE INSPECTED BY THE APPROVING AGENCY PRIOR TO DEMOLITION, GRADING, TREE CLEARING OR ANY OTHER CONSTRUCTION. THE FENCING ALONG THE TREE PROTECTION ZONE SHALL BE REGULARLY INSPECTED BY THE LANDSCAPE CONTRACTOR AND MAINTAINED UNTIL ALL CONSTRUCTION ACTIVITY HAS BEEN COMPLETED.

D. AT NO TIME SHALL MACHINERY, DEBRIS, FALLEN TREES OR OTHER MATERIALS BE PLACED, STOCKPILED OR LEFT STANDING IN THE TREE PROTECTION ZONE.

6. SOIL MODIFICATIONS
A. CONTRACTOR SHALL ATTAIN A SOIL TEST FOR ALL AREAS OF THE SITE PRIOR TO CONDUCTING ANY PLANTING. SOIL TESTS SHALL BE PERFORMED BY A CERTIFIED SOIL LABORATORY.

B. LANDSCAPE CONTRACTOR SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS CONSIDERED DETRIMENTAL TO THE GROWTH OF PLANT MATERIAL. SOIL MODIFICATIONS, AS SPECIFIED HEREIN, MAY NEED TO BE CONDUCTED BY THE LANDSCAPE CONTRACTOR DEPENDING ON SOIL CONDITIONS.

C. THE FOLLOWING AMENDMENTS AND QUANTITIES ARE APPROXIMATE AND ARE FOR BIDDING PURPOSES ONLY. COMPOSITION OF AMENDMENTS SHOULD BE REVISED DEPENDING ON THE OUTCOME OF A SOIL ANALYSIS PERFORMED BY A CERTIFIED SOIL LABORATORY.
1.1. TO INCREASE A SANDY SOIL'S ABILITY TO RETAIN WATER AND NUTRIENTS, THOROUGHLY TILL ORGANIC MATTER INTO THE TOP 6-12". USE COMPOSTED BARK, COMPOSTED LEAF MULCH OR PEAT MOSS. ALL PRODUCTS SHOULD BE COMPOSTED TO A DARK COLOR AND BE FREE OF PIECES WITH IDENTIFIABLE LEAF OR WOOD STRUCTURE. AVOID MATERIAL WITH A PH HIGHER THAN 7.5.
1.2. TO INCREASE DRAINAGE, MODIFY HEAVY CLAY OR SILT (MORE THAN 40% CLAY OR SILT) BY ADDING COMPOSTED PINE BARK (UP TO 30% BY VOLUME) AND/OR AGRICULTURAL GYPSUM. COARSE SAND MAY BE USED IF ENOUGH IS ADDED TO BRING THE SAND CONTENT TO MORE THAN 60% OF THE TOTAL MIX. SUBSURFACE DRAINAGE LINES MAY NEED TO BE ADDED TO INCREASE DRAINAGE.
1.3. MODIFY EXTREMELY SANDY SOILS (MORE THAN 85%) BY ADDING ORGANIC MATTER AND/OR DRY, SHREDDED CLAY LOAM UP TO 30% OF THE TOTAL MIX.

7. FINISHED GRADING
A. UNLESS OTHERWISE CONTRACTED, THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF TOPSOIL AND THE ESTABLISHMENT OF FINE-GRADING WITHIN THE DISTURBANCE AREA OF THE SITE.

B. LANDSCAPE CONTRACTOR SHALL VERIFY THAT SUBGRADE FOR INSTALLATION OF TOPSOIL HAS BEEN ESTABLISHED. THE SUBGRADE OF THE SITE MUST MEET THE FINISHED GRADE LESS THE REQUIRED TOPSOIL THICKNESS (1"±).

C. ALL LAWN AND PLANTING AREAS SHALL BE GRADED TO A SMOOTH, EVEN AND UNIFORM PLANE WITH NO ABRUPT CHANGE OF SURFACE AS DEPICTED WITHIN THIS SET OF CONSTRUCTION PLANS, UNLESS OTHERWISE DIRECTED BY THE PROJECT ENGINEER OR LANDSCAPE ARCHITECT.

D. ALL PLANTING AREAS SHALL BE GRADED AND MAINTAINED TO ALLOW FREE FLOW OF SURFACE WATER IN AND AROUND THE PLANTING BEDS. STANDING WATER SHALL NOT BE PERMITTED IN PLANTING BEDS.

8. TOPSOILING
A. CONTRACTOR SHALL PROVIDE A SIX INCH (6") THICK MINIMUM LAYER OF TOPSOIL, OR AS DIRECTED BY THE LOCAL ORDINANCE OR CLIENT, IN ALL PLANTING AREAS. TOPSOIL SHOULD BE SPREAD OVER A PREPARED SURFACE IN A UNIFORM LAYER TO ACHIEVE THE DESIRED COMPACTED THICKNESS.

B. ON-SITE TOPSOIL MAY BE USED TO SUPPLEMENT THE TOTAL AMOUNT REQUIRED. TOPSOIL FROM THE SITE MAY BE REJECTED IF IT HAS NOT BEEN PROPERLY REMOVED, STORED AND PROTECTED PRIOR TO CONSTRUCTION.

C. CONTRACTOR SHALL FURNISH TO THE APPROVING AGENCY AN ANALYSIS OF BOTH IMPORTED AND ON-SITE TOPSOIL TO BE UTILIZED IN ALL PLANTING AREAS. THE PH AND NUTRIENT LEVELS MAY NEED TO BE ADJUSTED THROUGH SOIL MODIFICATIONS AS NEEDED TO ACHIEVE THE REQUIRED LEVELS AS SPECIFIED IN THE MATERIALS SECTION ABOVE.

D. ALL PLANTING AND LAWN AREAS ARE TO BE CULTIVATED TO A DEPTH OF SIX INCHES (6"). ALL DEBRIS EXPOSED FROM EXCAVATION AND CULTIVATION SHALL BE DISPOSED OF IN ACCORDANCE WITH GENERAL WORK PROCEDURES SECTION ABOVE. THE FOLLOWING SHALL BE TILLED INTO THE TOP FOUR INCHES (4") IN TWO DIRECTIONS (QUANTITIES BASED ON A 1,000 SQUARE FOOT AREA):
1.1. 20 POUNDS 'GROW POWER' OR APPROVED EQUAL
1.2. 20 POUNDS NITRO-FORM (COURSE) 38-0-0 BLUE CHIP

E. THE SPREADING OF TOPSOIL SHALL NOT BE CONDUCTED UNDER MUDDY OR FROZEN CONDITIONS.

9. PLANTING
A. INSOFAR THAT IT IS FEASIBLE, PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THAT THIS IS NOT POSSIBLE, LANDSCAPE CONTRACTOR SHALL PROTECT UNINSTALLED PLANT MATERIAL. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE DAY PERIOD AFTER DELIVERY. PLANTS THAT WILL NOT BE PLANTED FOR A PERIOD OF TIME GREATER THAN THREE DAYS SHALL BE HEALED IN WITH TOPSOIL OR MULCH TO HELP PRESERVE ROOT MOISTURE.

B. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICE. PLANTS SHALL NOT BE INSTALLED IN TOPSOIL THAT IS IN A MUDDY OR FROZEN CONDITION.

C. ANY INJURED ROOTS OR BRANCHES SHALL BE PRUNED TO MAKE CLEAN-CUT ENDS PRIOR TO PLANTING UTILIZING CLEAN, SHARP TOOLS. ONLY INJURED OR DISEASED BRANCHING SHALL BE REMOVED.

D. ALL PLANTING CONTAINERS AND NON-BIODEGRADABLE MATERIALS SHALL BE REMOVED FROM ROOT BALLS DURING PLANTING. NATURAL FIBER BURLAP MUST BE CUT FROM AROUND THE TRUNK OF THE TREE AND FOLDED DOWN AGAINST THE ROOT BALL PRIOR TO BACKFILLING.

E. POSITION TREES AND SHRUBS AT THEIR INTENDED LOCATIONS AS PER THE PLANS AND SECURE THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO EXCAVATING PITS, MAKING NECESSARY ADJUSTMENTS AS DIRECTED.

F. PRIOR TO THE ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY, THE PROPOSED LANDSCAPE, AS SHOWN ON THE APPROVED LANDSCAPE PLAN, MUST BE INSTALLED, INSPECTED AND APPROVED BY THE APPROVING AGENCY. THE APPROVING AGENCY SHALL TAKE INTO ACCOUNT SEASONAL CONSIDERATIONS IN THIS REGARD AS FOLLOWS. THE PLANTING OF TREES, SHRUBS, VINES OR GROUND COVER SHALL OCCUR ONLY DURING THE FOLLOWING PLANTING SEASONS:
1.1. PLANTS: MARCH 15 TO DECEMBER 15
1.2. LAWN: MARCH 15 TO JUNE 15 OR SEPT. 1 TO DECEMBER 1

G. PLANTINGS REQUIRED FOR A CERTIFICATE OF OCCUPANCY SHALL BE PROVIDED DURING THE NEXT APPROPRIATE SEASON AT THE MUNICIPALITY'S DISCRETION. CONTRACTOR SHOULD CONTACT APPROVING AGENCY FOR POTENTIAL SUBSTITUTIONS.

H. FURTHERMORE, THE FOLLOWING TREE VARIETIES ARE UNUSUALLY SUSCEPTIBLE TO WINTER DAMAGE. WITH TRANSPLANT SHOCK AND THE SEASONAL LACK OF NITROGEN AVAILABILITY, THE RISK OF PLANT DEATH IS GREATLY INCREASED. IT IS NOT RECOMMENDED THAT THESE SPECIES BE PLANTED DURING THE FALL PLANTING SEASON:

ACER RUBRUM	PLATANUS X ACERIFOLIA
BETULA VARIETIES	POPULOUS VARIETIES
CARPINUS VARIETIES	PRUNUS VARIETIES
CRATAEGUS VARIETIES	PYRUS VARIETIES
KOELREUTERIA	QUERCUS VARIETIES
LIQUIDAMBER STYRACIFLUA	TILIA TOMENTOSA
LIRIODENDRON TULIPIFERA	ZELKOVA VARIETIES

I. PLANTING PITS SHALL BE DUG WITH LEVEL BOTTOMS, WITH THE WIDTH TWICE THE DIAMETER OF ROOT BALL. THE ROOT BALL SHALL REST ON UNDISTURBED GRADE. EACH PLANT PIT SHALL BE BACKFILLED IN LAYERS WITH THE FOLLOWING PREPARED SOIL MIXED THOROUGHLY:
- 1 PART PEAT MOSS
- 1 PART COMPOSTED COW MANURE BY VOLUME
- 3 PARTS TOPSOIL BY VOLUME
- 21 GRAMS 'AGRIFORM' PLANTING TABLETS (OR APPROVED EQUAL) AS FOLLOWS:
  - A) 2 TABLETS PER 1 GALLON PLANT
  - B) 3 TABLETS PER 5 GALLON PLANT
  - C) 4 TABLETS PER 15 GALLON PLANT
  - D) LARGER PLANTS: 2 TABLETS PER ½" CALIPER OF TRUNK

J. FILL PREPARED SOIL AROUND BALL OF PLANT HALF-WAY AND INSERT PLANT TABLETS. COMPLETE BACKFILL AND WATER THOROUGHLY.

K. ALL PLANTS SHALL BE PLANTED SO THAT THE TOP OF THE ROOT BALL, THE POINT AT WHICH THE ROOT FLARE BEGINS, IS SET AT GROUND LEVEL AND IN THE CENTER OF THE PIT. NO SOIL IS TO BE PLACED DIRECTLY ON TOP OF THE ROOT BALL.

L. ALL PROPOSED TREES DIRECTLY ADJACENT TO WALKWAYS OR DRIVEWAYS SHALL BE PRUNED AND MAINTAINED TO A MINIMUM BRANCHING HEIGHT OF 7' FROM GRADE.

M. GROUND COVER AREAS SHALL RECEIVE A ¼" LAYER OF HUMUS RAKED INTO THE TOP 1" OF PREPARED SOIL PRIOR TO PLANTING. ALL GROUND COVER AREAS SHALL BE WEEDED AND TREATED WITH A PRE-EMERGENT CHEMICAL AS PER MANUFACTURER'S RECOMMENDATION.

N. NO PLANT, EXCEPT GROUND COVERS, GRASSES OR VINES, SHALL BE PLANTED LESS THAN TWO FEET (2') FROM EXISTING STRUCTURES AND SIDEWALKS.

O. ALL PLANTING AREAS AND PLANTING PITS SHALL BE MULCHED AS SPECIFIED HEREIN TO FILL THE ENTIRE BED AREA OR SAUCER. NO MULCH IS TO TOUCH THE TRUNK OF THE TREE OR SHRUB.

P. ALL PLANTING AREAS SHALL BE WATERED IMMEDIATELY UPON INSTALLATION IN ACCORDANCE WITH THE WATERING SPECIFICATIONS AS LISTED HEREIN.

10. TRANSPLANTING (WHEN REQUIRED)
A. ALL TRANSPLANTS SHALL BE DUG WITH INTACT ROOT BALLS CAPABLE OF SUSTAINING THE PLANT.

B. IF PLANTS ARE TO BE STOCKPILED BEFORE REPLANTING, THEY SHALL BE HEALED IN WITH MULCH OR SOIL, ADEQUATELY WATERED AND PROTECTED FROM EXTREME HEAT, SUN AND WIND.

C. PLANTS SHALL NOT BE DUG FOR TRANSPLANTING BETWEEN APRIL 10 AND JUNE 30.

D. UPON REPLANTING, BACKFILL SOIL SHALL BE AMENDED WITH FERTILIZER AND ROOT GROWTH HORMONE.

E. TRANSPLANTS SHALL BE GUARANTEED FOR THE LENGTH OF THE GUARANTEE PERIOD SPECIFIED HEREIN.

F. IF TRANSPLANTS DIE, SHRUBS AND TREES LESS THAN SIX INCHES (6") DBH SHALL BE REPLACED IN KIND. TREES GREATER THAN SIX INCHES (6") DBH MAY BE REQUIRED TO BE REPLACED IN ACCORDANCE WITH THE MUNICIPALITY'S TREE REPLACEMENT GUIDELINES.

11. WATERING
A. NEW PLANTINGS OR LAWN AREAS SHALL BE ADEQUATELY IRRIGATED BEGINNING IMMEDIATELY AFTER PLANTING. WATER SHALL BE APPLIED TO EACH TREE AND SHRUB IN SUCH MANNER AS NOT TO DISTURB BACKFILL AND TO THE EXTENT THAT ALL MATERIALS IN THE PLANTING HOLE ARE THOROUGHLY SATURATED. WATERING SHALL CONTINUE AT LEAST UNTIL PLANTS ARE ESTABLISHED.

B. SITE OWNER SHALL PROVIDE WATER IF AVAILABLE ON SITE AT TIME OF PLANTING. IF WATER IS NOT AVAILABLE ON SITE, CONTRACTOR SHALL SUPPLY ALL NECESSARY WATER. THE USE OF WATERING BAGS IS RECOMMENDED FOR ALL NEWLY PLANTED TREES.

C. IF AN IRRIGATION SYSTEM HAS BEEN INSTALLED ON THE SITE, IT SHALL BE USED TO WATER PROPOSED PLANT MATERIAL, BUT ANY FAILURE OF THE SYSTEM DOES NOT ELIMINATE THE CONTRACTOR'S RESPONSIBILITY OF MAINTAINING THE DESIRED MOISTURE LEVEL FOR VIGOROUS, HEALTHY GROWTH.

12. GUARANTEE
A. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANTS FOR A PERIOD OF ONE (1) YEAR FROM APPROVAL OF LANDSCAPE INSTALLATION BY THE APPROVING AGENCY. CONTRACTOR SHALL SUPPLY THE OWNER WITH A MAINTENANCE BOND FOR TEN PERCENT (10%) OF THE VALUE OF THE LANDSCAPE INSTALLATION WHICH WILL BE RELEASED AT THE CONCLUSION OF THE GUARANTEE PERIOD AND WHEN A FINAL INSPECTION HAS BEEN COMPLETED AND APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.

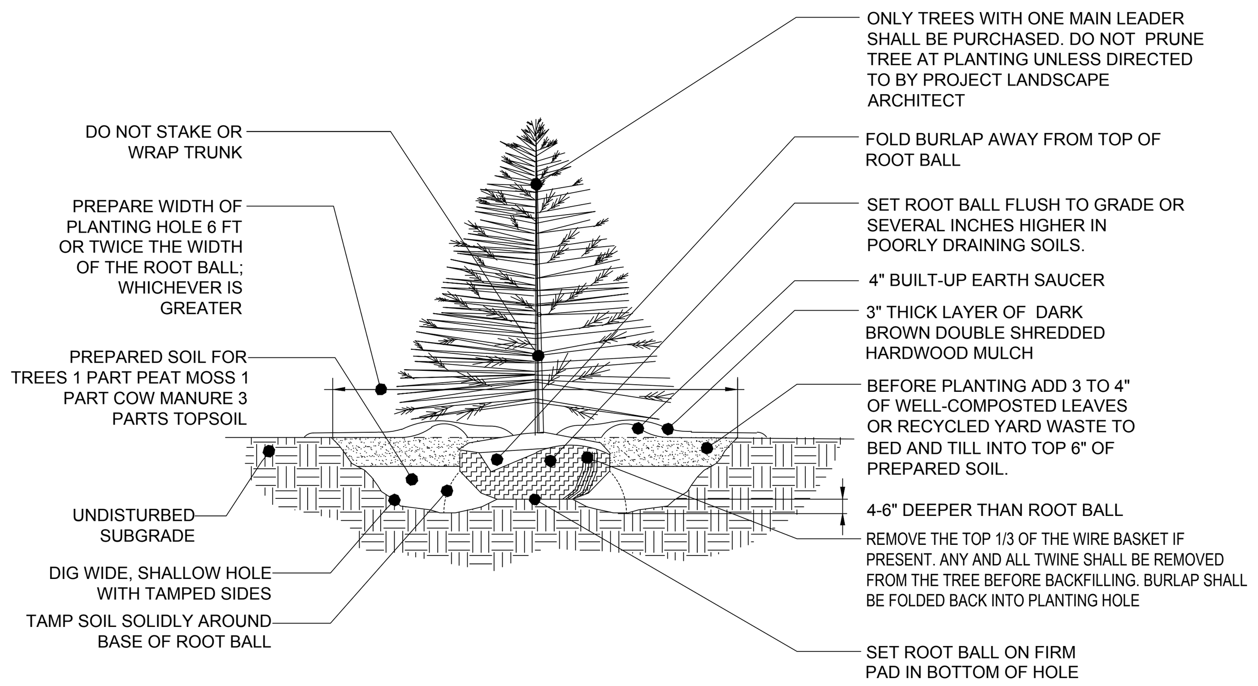
B. ANY DEAD OR DYING PLANT MATERIAL SHALL BE REPLACED FOR THE LENGTH OF THE GUARANTEE PERIOD. REPLACEMENT OF PLANT MATERIAL SHALL BE CONDUCTED AT THE FIRST SUCCEEDING PLANTING SEASON. ANY DEBRIS SHALL BE DISPOSED OF OFF-SITE, WITHOUT EXCEPTION.

C. TREES AND SHRUBS SHALL BE MAINTAINED BY THE CONTRACTOR DURING CONSTRUCTION AND THROUGHOUT THE 90 DAY MAINTENANCE PERIOD AS SPECIFIED HEREIN. CULTIVATION, WEEDING, WATERING AND THE PREVENTATIVE TREATMENTS SHALL BE PERFORMED AS NECESSARY TO KEEP PLANT MATERIAL IN GOOD CONDITION AND FREE OF INSECTS AND DISEASE.

D. LAWNS SHALL BE MAINTAINED THROUGH WATERING, FERTILIZING, WEEDING, MOWING, TRIMMING AND OTHER OPERATIONS SUCH AS ROLLING, REGARDING AND REPLANTING AS REQUIRED TO ESTABLISH A SMOOTH, ACCEPTABLE LAWN, FREE OF ERODED OR BARE AREAS.

13. CLEANUP
A. UPON THE COMPLETION OF ALL LANDSCAPE INSTALLATION AND BEFORE THE FINAL ACCEPTANCE, THE CONTRACTOR SHALL REMOVE ALL UNUSED MATERIALS, EQUIPMENT AND DEBRIS FROM THE SITE. ALL PAVED AREAS ARE TO BE CLEANED.

B. THE SITE SHALL BE CLEANED AND LEFT IN A NEAT AND ACCEPTABLE CONDITION AS APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.

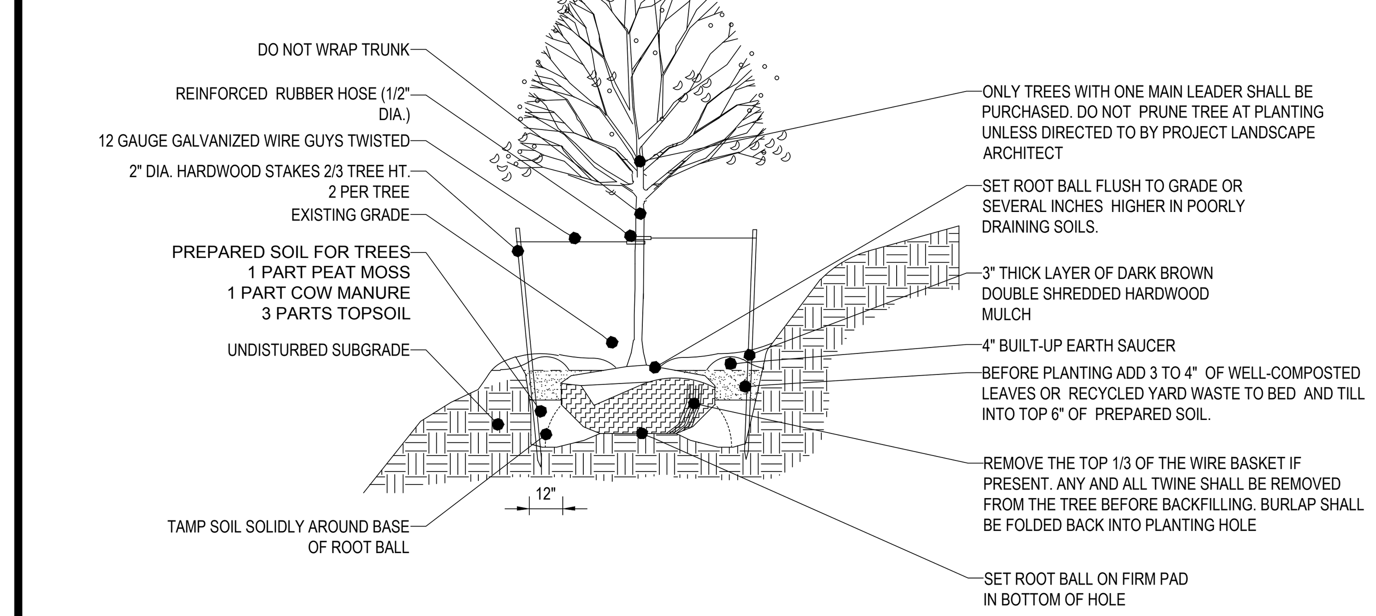


REFERENCE: ARCHITECTURAL GRAPHIC STANDARDS 1998 CUMULATIVE SUPPLEMENT.

EVERGREEN TREE PLANTING DETAIL

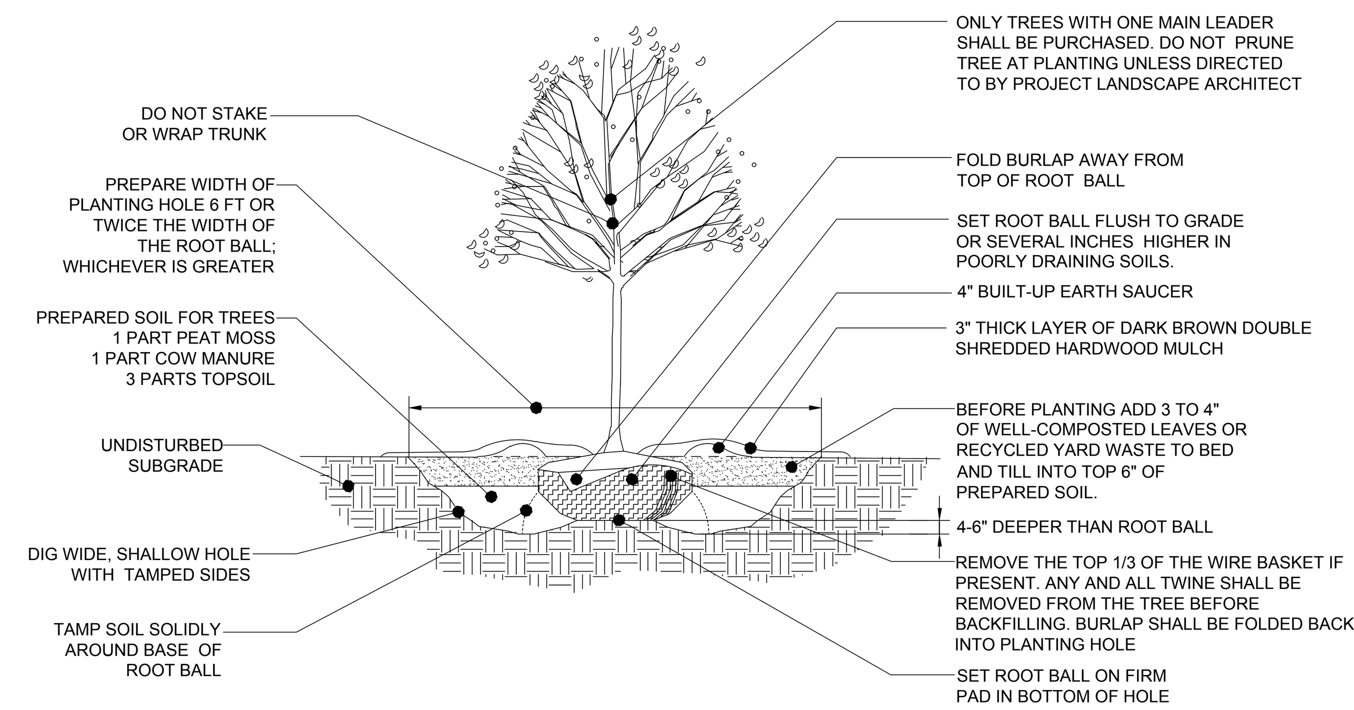
NOT TO SCALE

NOTE: TREE STAKING TO BE REMOVED AFTER 2 GROWING SEASONS



TREE PLANTING ON SLOPE DETAIL

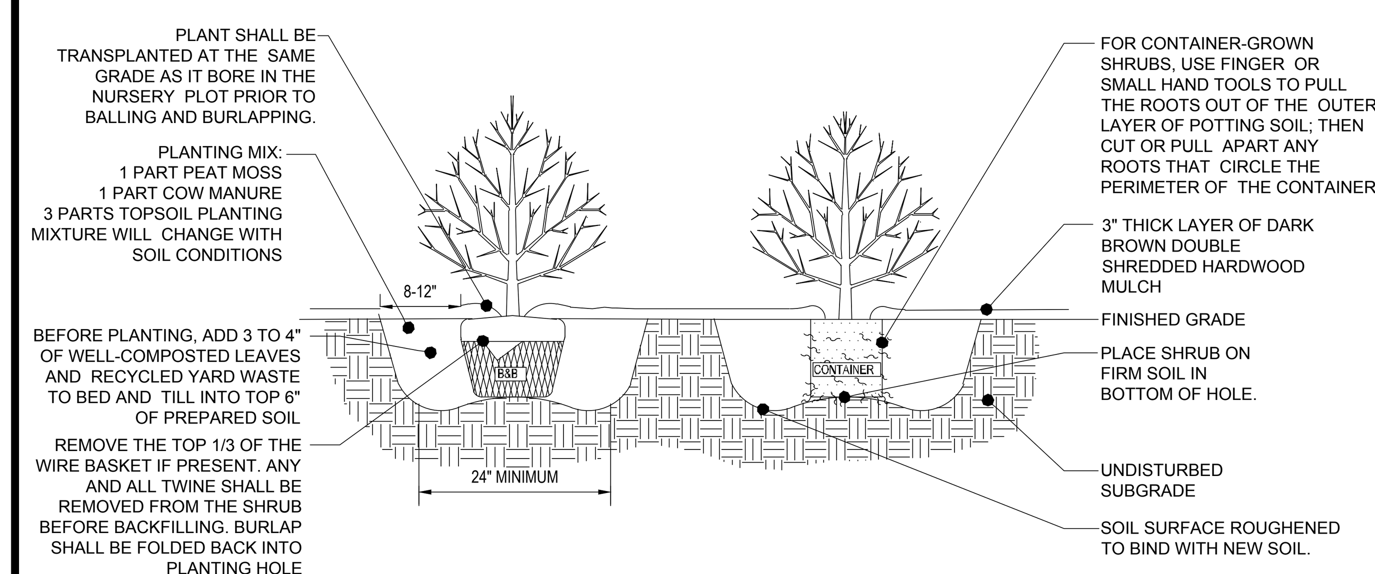
NOT TO SCALE



REFERENCE: ARCHITECTURAL GRAPHIC STANDARDS 1998 CUMULATIVE SUPPLEMENT.

DECIDUOUS TREE PLANTING DETAIL

NOT TO SCALE



REFERENCE: ARCHITECTURAL GRAPHIC STANDARDS 1998 CUMULATIVE SUPPLEMENT

DECIDUOUS AND EVERGREEN SHRUB PLANTING DETAIL

NOT TO SCALE

SEEDING SPECIFICATIONS

1. PRIOR TO SEEDING, AREA IS TO BE TOPSOILED, FINE GRADED, AND RAKED OF ALL DEBRIS LARGER THAN 2" DIAMETER.
2. PRIOR TO SEEDING, CONSULT MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
3. SEEDING RATES:

PERENNIAL RYEGRASS	1/2 LB/1,000 SQ FT
KENTUCKY BLUEGRASS	1 LB/1,000 SQ FT
RED FESCUE	1 1/2 LBS/1,000 SQ FT
SPREADING FESCUE	1 1/2 LBS/1,000 SQ FT
FERTILIZER (20:10:10)	14 LBS/1,000 SQ FT
MULCH	90 LBS/1,000 SQ FT

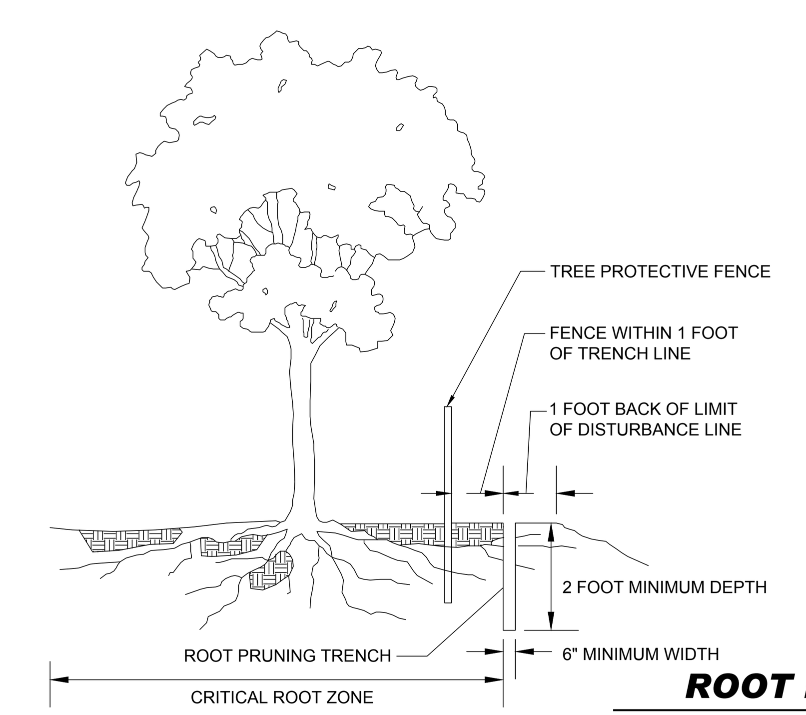
4. GERMINATION RATES WILL VARY AS TO TIME OF YEAR FOR SOWING. CONTRACTOR TO IRRIGATE SEEDED AREA UNTIL AN ACCEPTABLE STAND OF COVER IS ESTABLISHED BY OWNER.

OWNER MAINTENANCE RESPONSIBILITIES

UPON OWNER'S (OR OWNER CONTRACTOR'S) COMPLETION OF LANDSCAPING WORK, THE OWNER IS FULLY RESPONSIBLE FOR ALL FUTURE MAINTENANCE, CARE, UPKEEP, WATERING, AND TRIMMING OF ALL INSTALLED VEGETATION, PLANTS, TREE, BUSHES, SHRUBS, GRASSES, GRASS, ORNAMENTAL PLANTS AND FLOWERS, FLOWERS, GROUND COVER, AND LANDSCAPING, INCLUDING ALL LANDSCAPE ISLANDS AND AREAS ADJACENT OR PART OF THE LANDSCAPED AREAS. THIS RESPONSIBILITY INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:

- TREES ADJACENT TO WALKWAYS AND AREAS OF PEDESTRIAN TRAFFIC MUST BE MAINTAINED TO ASSURE THAT ANY BRANCHES MUST BE LIMBED UP TO A CLEARANCE HEIGHT OF 7 FT. (FROM ALL PEDESTRIAN SURFACES) OR PRUNED BACK TO AVOID ANY INTERFERENCE WITH THE TYPICAL PATH OF TRAVEL.
- TREES WITHIN VEHICULAR SIGHT LINES, AS ILLUSTRATED ON THE LANDSCAPE PLAN, ARE TO BE TRIMMED TO A CLEARANCE HEIGHT OF 7 FT. (FROM ALL PAVED, TRAVELED SURFACES), OR AS OTHERWISE INDICATED ON THE PLANS.
- VEGETATIVE GROUND COVER, SHRUBS AND ORNAMENTAL PLANTS AND GRASSES MUST BE TRIMMED SO THAT NO PORTION OF THE PLANT EXCEEDS 30 INCHES ABOVE GRADE (OF ALL PAVED, TRAVEL SURFACES) ALONG AND WITHIN THE SIGHT LINES OF PARKING LOTS AND INGRESS-EGRESS WAYS.
- FALLEN PLANT FLOWERS, FRUIT, SEEDS AND DEBRIS DROPPINGS ARE TO BE REMOVED IMMEDIATELY FROM VEHICULAR AND PEDESTRIAN TRAFFIC AREAS TO PREVENT TRIPPING, SLIPPING OR ANY OTHER HAZARDS.

THESE REQUIREMENTS DO NOT AFFECT THE PLANT LIFE GUARANTEES THE LANDSCAPE CONTRACTOR IS REQUIRED TO PROVIDE.



NOTES:
1. RETENTION AREAS WILL BE SET AS PART OF THE REVIEW PROCESS.
2. BOUNDARIES OF RETENTION AREAS SHOULD BE STAKED FLAGGED PRIOR TO TRENCHING.
3. EXACT LOCATION OF TRENCH SHOULD BE IDENTIFIED.
4. TRENCH SHOULD BE IMMEDIATELY BACKFILLED WITH SOIL REMOVED OR OTHER HIGH ORGANIC SOIL.
5. ROOTS SHOULD BE CLEANLY CUT USING VIBRATORY KNIFE OR OTHER ACCEPTABLE EQUIPMENT.

ROOT PRUNING DETAIL

NOT TO SCALE

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

[signature] 3-12-24
DEVELOPER'S / OWNER'S NAME DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS
[signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
[signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT DATE
Chad Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES. © BOHLER

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

811
Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

E.R. McWILLIAMS
03/15/2024
REGISTERED LANDSCAPE ARCHITECT
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. [illegible] EXPIRATION DATE: 9/20/24

SHEET TITLE:

LANDSCAPE NOTES & DETAILS

SHEET NUMBER:
15 of 117

F-22-033

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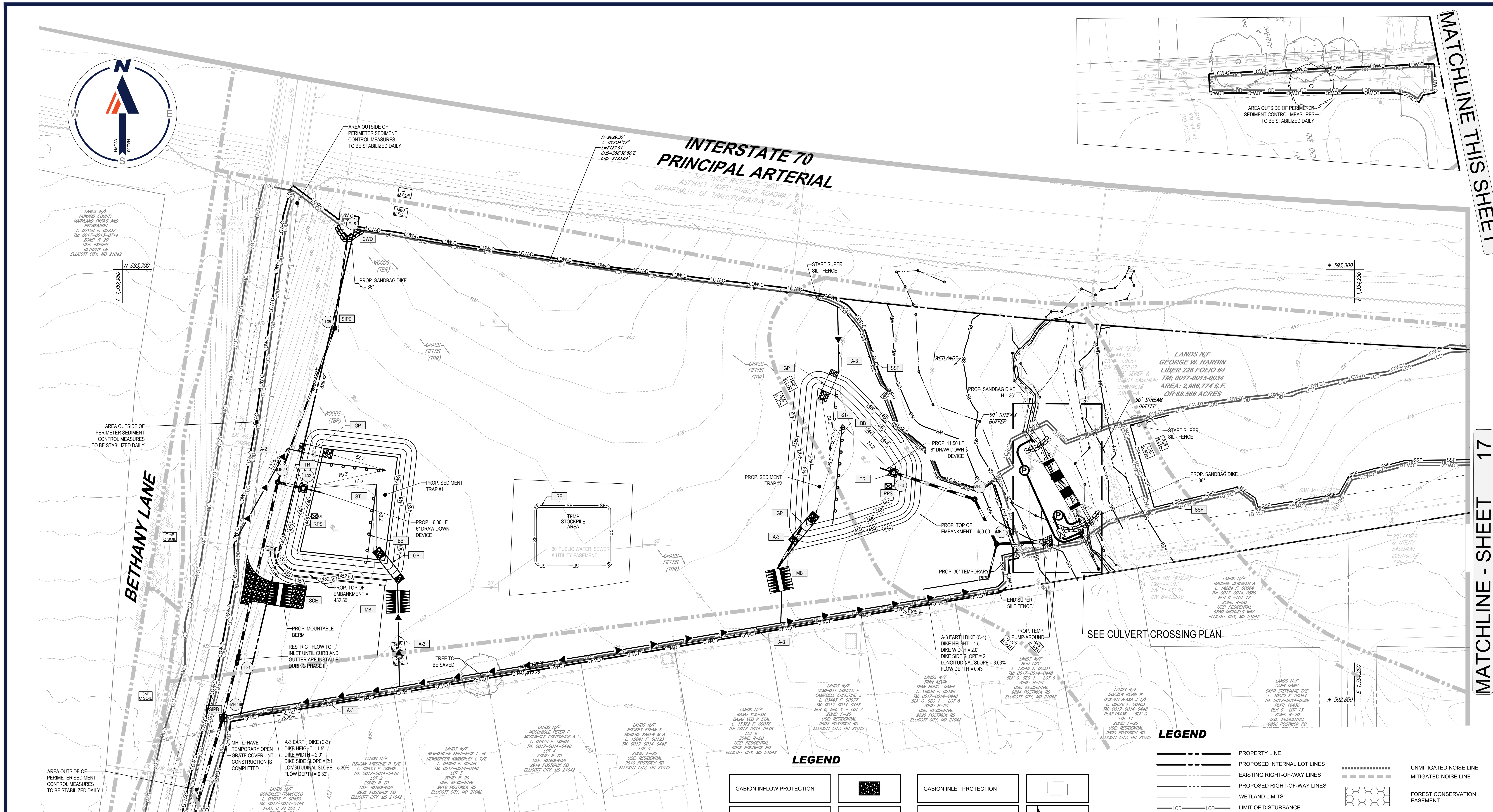

LEGEND

GABION INFLOW PROTECTION	GABION INLET PROTECTION
BAFFLE BOARDS	STABILIZED CONSTRUCTION ENTRANCE
CLEAR WATER DIVERSION PIPE (CWD - 12, CWD - 18, CWD - 24)	STANDARD INLET PROTECTION
EARTH DIKE	REMOVABLE PUMPING STATION
LIMIT OF WORK	SUPER SILT FENCE
LIMIT OF DISTURBANCE	TREE PROTECTION FENCE
MOUNTABLE BERM	CURB INLET PROTECTION
SILT FENCE	TEMPORARY ASPHALT BERM (TAB)
PIPE OUTLET SEDIMENT TRAP ST I (ST-I)	TEMPORARY GABION OUTLET STRUCTURE (TGOS)
	LIMIT OF WORK - NEIGHBORHOODS A-E

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- EXISTING RIGHT-OF-WAY LINES
- PROPOSED RIGHT-OF-WAY LINES
- WETLAND LIMITS
- LIMIT OF DISTURBANCE
- WETLAND BUFFER
- STREAM BUFFER
- EXISTING TREE LINE
- PROPOSED TREE LINE
- EXISTING FLOODPLAIN
- PROPOSED FLOODPLAIN
- A-2 DIVERSION DIKE
- SUPER SILT FENCE
- WETLANDS
- SOILS STABILIZATION MATTING
- 15' NO-WOODY BUFFER
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- FOREST CONSERVATION EASEMENT
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- 25% SLOPE OR GREATER
- PUMP

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

MATCHLINE THIS SHEET

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
HOWARD SOIL CONSERVATION DISTRICT — DATE 6/11/2024

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

SCALE: 1"= 50'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. : WP-19-118, ECP-19-041, BA-CASE NO. 17-018C, ECP-21-017, WP-21-064, SP-19-005, F-22-033, WP-21-127, 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
PHASE I EROSION AND SEDIMENT CONTROL PLAN NEIGHBORHOOD - C

SHEET NUMBER:

F-22-033

Mar 15, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - ERO1 - 2----->LAYOUT: 16 - PHASE I - EROSION AND SEDIMENT CONTROL PLAN AG

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MATCHLINE - SHEET 16

MATCHLINE - SHEET 18

N 593,300

E 1,354,600

N 592,750

E 1,355,800

A-3 EARTH DIKE (D-1)
DIKE HEIGHT = 1.5'
DIKE WIDTH = 2.0'
DIKE SIDE SLOPE = 2:1
LONGITUDINAL SLOPE = 5.57%
FLOW DEPTH = 0.36'

A-3 EARTH DIKE (D-4)
DIKE HEIGHT = 1.5'
DIKE WIDTH = 2.0'
DIKE SIDE SLOPE = 2:1
LONGITUDINAL SLOPE = 4.54%
FLOW DEPTH = 0.28'

A-3 EARTH DIKE (D-6)
DIKE HEIGHT = 1.5'
DIKE WIDTH = 2.0'
DIKE SIDE SLOPE = 2:1
LONGITUDINAL SLOPE = 16.61%
FLOW DEPTH = 0.21'

A-3 EARTH DIKE (D-7)
DIKE HEIGHT = 1.5'
DIKE WIDTH = 2.0'
DIKE SIDE SLOPE = 2:1
LONGITUDINAL SLOPE = 12.31%
FLOW DEPTH = 0.42'

R=9699.30'
Δ= 012°34'12"
L=2127.91'
CHD=S86°36'36"E
CHD=2123.64'

PRIVATE NOISE WALL EASEMENT

PROP. NOISE MITIGATION BARRIER MAX HEIGHT: 18'

PROP. NOISE MITIGATION BARRIER MAX HEIGHT: 16'

CLEAR WATER DIVERSION DIKE

PROP. SANDBAG DIKE H = 36"

PROP. TEMP. PUMP-AROUND

TEMP STOCKPILE AREA

LANDS N/F GEORGE W. HARBIN LIBER 226 FOLIO 64 TM: 0017-0015-0034 AREA; 2,986,774 S.F. OR 68.566 ACRES

PROP. 8' WIDE EMERGENCY SPILLWAY ELEV. 436.50

PROP. SEDIMENT BASIN #1

PROP. 16.50 LF 8" DRAW DOWN DEVICE

50' STREAM BUFFER

100' STREAM BUFFER

EX. STREAM

WETLANDS

15' NO WOODY AREA

61.57' - 36" RCCP PER ASTM C-361 CL B-25 @ 0.81%

PROP. CLASS I RIP RAP Q100=46.27 CFS L= 15' W=19' D = 19"

PROP. SEDIMENT TRAP #3

PROP. 11.50 LF 8" DRAW DOWN DEVICE

PROP. TOP OF EMBANKMENT = 433.50

PROP. 30" TEMPORARY PIPE

AREA OUTSIDE OF PERIMETER SEDIMENT CONTROL MEASURES TO BE STABILIZED DAILY

PROP. SANDBAG DIKE H = 36"

1.54% SLOPES 0.44 AC.

TGOS 1:
WEIR CREST ELEV. AT 436.00
TOTAL STORAGE: 1769 CF

PROP. NOISE MITIGATION BARRIER MAX HEIGHT: 16'

LANDS N/F STATE ROADS COMMISSION OF MARYLAND L. 00442 F. 00497 TM: 0017-0015-0561 ZONE: EXEMPT N. ROUTE 70 ELLICOTT CITY, MD 21042

LANDS N/F GEORGE W. HARBIN LIBER 226 FOLIO 64 TM: 0017-0015-0034 AREA; 2,986,774 S.F. OR 68.566 ACRES

LANDS N/F: YOUNG LESTER T YOUNG BEVERLY M L. 00885 F. 00432 TM: 0017-0014-0589 BLK F, SEC 6 – LOT 2 ZONE: R-20 USE: RESIDENTIAL 9846 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F: HESTER RUTH ANN CROMER L/T L. 12458 F. 00371 TM: 0017-0014-0589 BLK F – LOT 1 ZONE: R-20 USE: RESIDENTIAL 9824 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F: ROSENVOLD PETER S ROSENVOLD SUSAN P T/E L. 07307 F. 00142 TM: 0017-0014-0589 BLK F, SEC 6 – LOT 4 ZONE: R-20 USE: RESIDENTIAL 9838 MICHAELS WAY ELLICOTT CITY, MD 21042

LANDS N/F: MCMAHON JOSEPH P MCMAHON ALYSHA T L. 16817 F. 00166 TM: 0017-0015-3669 ZONE: R-20 USE: RESIDENTIAL 2690 OLD SAINT JOHNS LN ELLICOTT CITY, MD 21042

LANDS N/F: MCMAHON JOSEPH P MCMAHON ALYSHA T L. 16817 F. 00166 TM: 0017-0015-3669 ZONE: R-20 USE: RESIDENTIAL 2690 OLD SAINT JOHNS LN ELLICOTT CITY, MD 21042

SEE SHEET 16 FOR EROSION AND SEDIMENT CONTROL LEGEND

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- LIMIT OF DISTURBANCE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- TREE PROTECTION FENCE
- WETLAND BOUNDARY
- WETLAND BUFFER
- STREAM BUFFER
- SOILS BOUNDARY
- EXISTING TREE LINE
- PROPOSED TREE LINE
- EXISTING FLOODPLAIN
- PROPOSED FLOODPLAIN
- A-2 DIVERSION DIKE
- SUPER SILT FENCE
- PUMP
- SOILS STABILIZATION MATTING
- 15' NO-WOODY BUFFER
- WETLANDS
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- FOREST CONSERVATION EASEMENT
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- 25% SLOPE OR GREATER

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

3/12/24

SIGNATURE OF ENGINEER — DATE
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

APPROVED: DEPARTMENT OF PUBLIC WORKS

Docusigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Docusigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

Docusigned by: 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Docusigned by: 6/11/2024

HOWARD SOIL CONSERVATION DISTRICT — DATE

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SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

50 25 12.5 0 50
1"= 50'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

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25-5109-D, 688-D-W & S, SP-21-002

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PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
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LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

PHASE I EROSION AND SEDIMENT CONTROL PLAN NEIGHBORHOOD - C

SHEET NUMBER:

17 of 117

F-22-033

Mar 15, 2024
H:\1518\D1\SDR\WINGSPLAN SET\FINAL PLANS\MD152018_ERO1_2---LAYOUT 17 - PHASE I - EROSION AND SEDIMENT CONTROL PLAN
AVG

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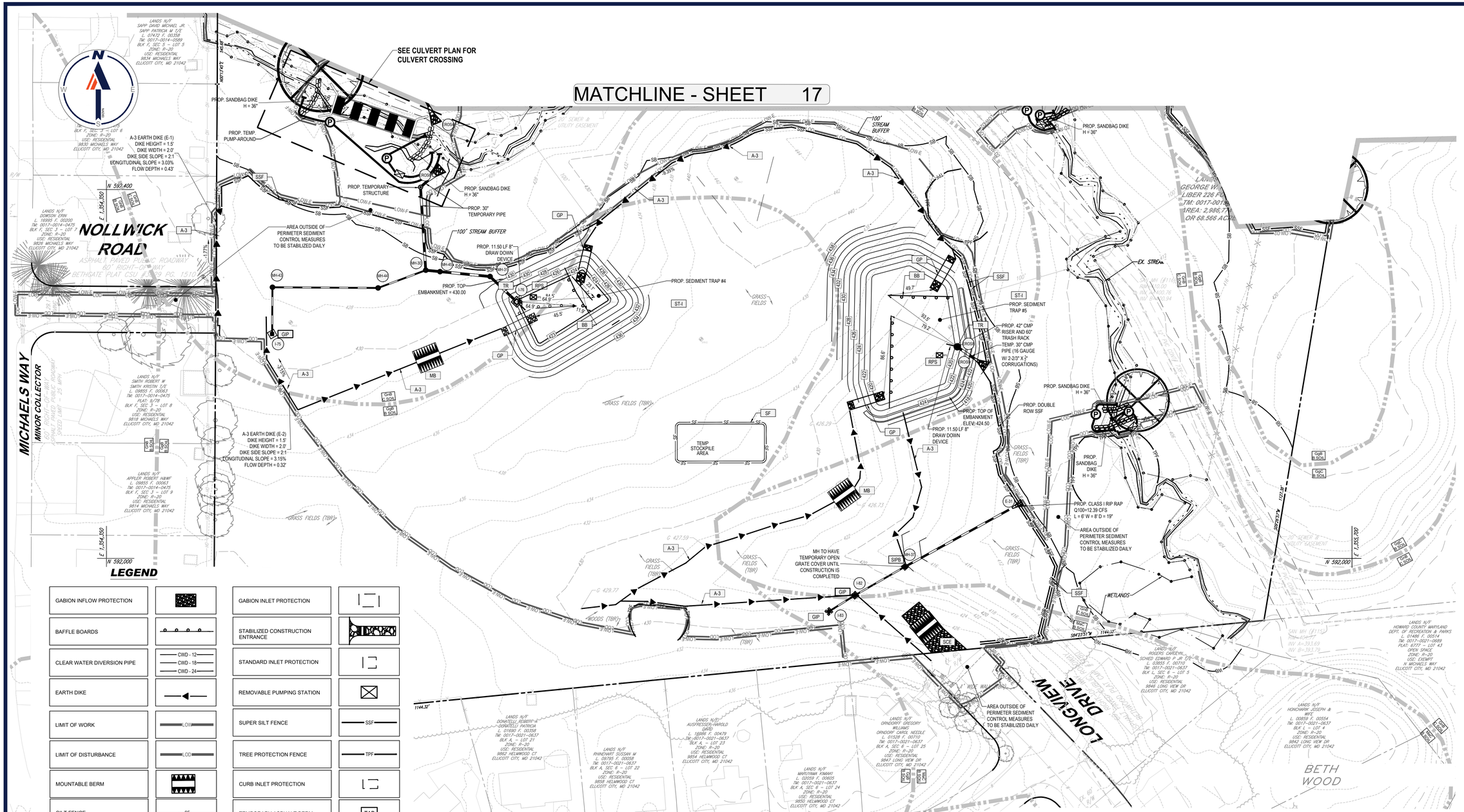

LEGEND

GABION INFLOW PROTECTION		GABION INLET PROTECTION	
BAFFLE BOARDS		STABILIZED CONSTRUCTION ENTRANCE	
CLEAR WATER DIVERSION PIPE	CWD - 12 / CWD - 24	STANDARD INLET PROTECTION	
EARTH DIKE		REMOVABLE PUMPING STATION	
LIMIT OF WORK	LOW	SUPER SILT FENCE	SSF
LIMIT OF DISTURBANCE	LOD	TREE PROTECTION FENCE	TPF
MOUNTABLE BERM		CURB INLET PROTECTION	
SILT FENCE	SF	TEMPORARY ASPHALT BERM	TAB
PIPE OUTLET SEDIMENT TRAP ST I	ST-I	TEMPORARY GABION OUTLET STRUCTURE	TGOS
		LIMIT OF WORK - NEIGHBORHOODS A-E	

LEGEND

PROPERTY LINE	PUMP
PROPOSED INTERNAL LOT LINES	WETLANDS
LIMIT OF DISTURBANCE	SOILS STABILIZATION MATTING
EXISTING CONTOUR	SPECIMEN TREES
PROPOSED CONTOUR	15' NO-WOODY BUFFER
TREE PROTECTION FENCE	SPECIMEN TREE (TO BE REMOVED)
WETLAND BOUNDARY	FOREST CONSERVATION EASEMENT
WETLAND BUFFER	UNMITIGATED NOISE LINE
STREAM BUFFER	MITIGATED NOISE LINE
SOILS BOUNDARY	25% SLOPE OR GREATER
EXISTING TREE LINE	
PROPOSED TREE LINE	
EXISTING FLOODPLAIN	
PROPOSED FLOODPLAIN	

50 25 12.5 0 50
1"= 50'

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
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GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
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APPROVED: DEPARTMENT OF PUBLIC WORKS

Docusigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

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Docusigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

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Docusigned by: 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

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SIGNATURE OF DEVELOPER — DATE 3-12-24
PRINTED NAME & TITLE — Jason Van Kirk, V.P.

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PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
STORMWATER MANAGEMENT DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES
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PROJECT No.: MD152018
DRAWN BY: AVG
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PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

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NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

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SHEET TITLE:

PHASE I EROSION AND SEDIMENT CONTROL PLAN NEIGHBORHOOD - E

SHEET NUMBER:
18 of 117

F-22-033

Mar 15, 2024
H:\SHD\152018\DRAWINGS\PLAN SETS\FINAL PLANS\MD152018 - EROS - 2-----LAYOUT 1 18 - PHASE I - EROSION AND SEDIMENT CONTROL PLAN
AG

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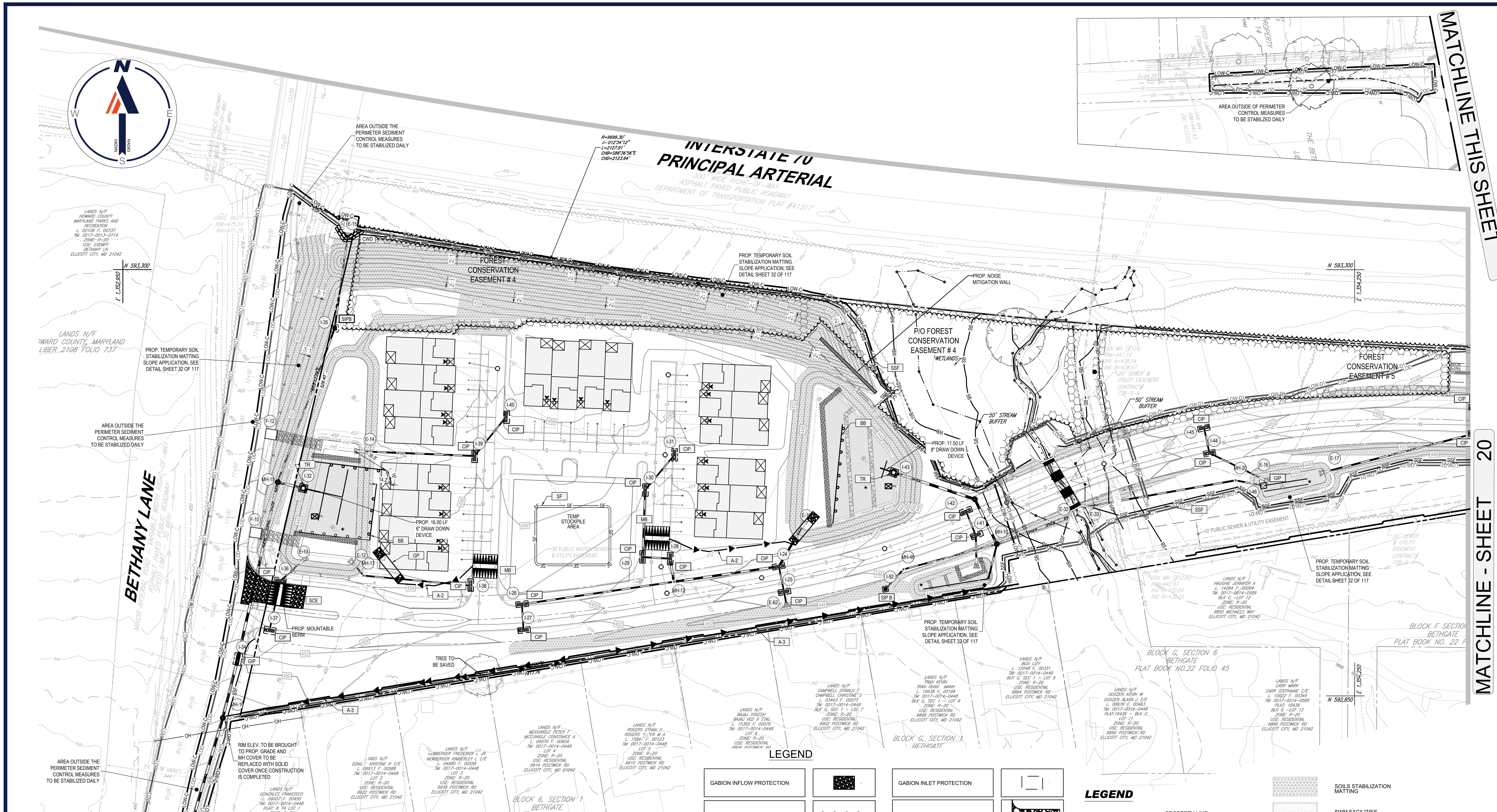

MATCHLINE THIS SHEET

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

LEGEND

- GABION INFLOW PROTECTION
- BAFFLE BOARDS
- CLEAR WATER DIVERSION PIPE (CWD - 12, CWD - 18, CWD - 24)
- EARTH DIKE
- LIMIT OF WORK (LOW)
- LIMIT OF DISTURBANCE (LOD)
- MOUNTABLE BERM
- SILT FENCE (SF)
- PIPE OUTLET SEDIMENT TRAP ST I (ST-I)
- GABION INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE
- STANDARD INLET PROTECTION
- REMOVABLE PUMPING STATION
- SUPER SILT FENCE (SSF)
- TREE PROTECTION FENCE (TPF)
- CURB INLET PROTECTION
- TEMPORARY ASPHALT BERM (TAB)
- TEMPORARY GABION OUTLET STRUCTURE (TGOS)
- LIMIT OF WORK NEIGHBORHOODS A-E (LOW - XX)

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- EXISTING RIGHT-OF-WAY LINES
- PROPOSED RIGHT-OF-WAY LINES
- WETLAND LIMITS
- LIMIT OF DISTURBANCE (LOD)
- WETLAND BUFFER (WB)
- STREAM BUFFER (SB)
- EXISTING TREE LINE
- PROPOSED TREE LINE
- EXISTING FLOODPLAIN (FP)
- PROPOSED FLOODPLAIN (PFP)
- A-2 DIVERSION DIKE
- SUPER SILT FENCE (SSF)
- WETLANDS
- SOILS STABILIZATION MATTING
- SWM FACILITIES
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- FOREST CONSERVATION EASEMENT
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- 25% SLOPE OR GREATER

50 25 12.5 0 50
1"= 50'

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
DocuSigned by: Alexander Bratchie 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
PHASE II EROSION AND SEDIMENT CONTROL PLAN
NEIGHBORHOOD - C

SHEET NUMBER:

F-22-033

Mar 26, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - ERO2 - 2---->LAYOUT: 19 - PHASE II - EROSION AND SEDIMENT CONTROL PLAN
AG

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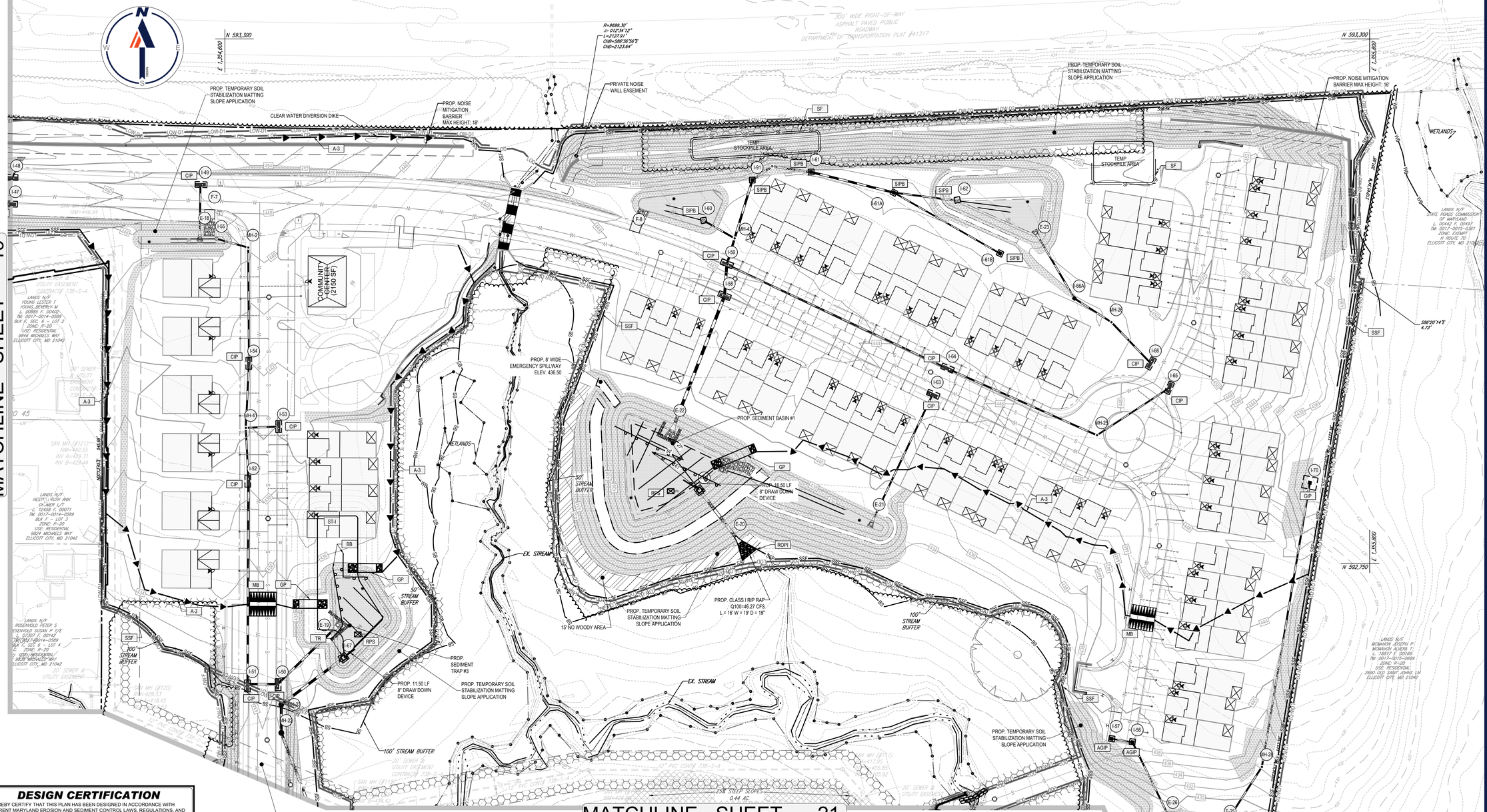

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3/12/24
SIGNATURE OF ENGINEER — DATE
BRANDAN R. ROWE P.E. — MD. PE REGISTRATION No. 40808

APPROVED: DEPARTMENT OF PUBLIC WORKS — 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING — 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

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SIGNATURE OF DEVELOPER — 3-12-24 DATE
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
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MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- LOD — LOD — LIMIT OF DISTURBANCE
- 340 — EXISTING CONTOUR
- 341 — PROPOSED CONTOUR
- TPF — TPF — TREE PROTECTION FENCE
- WETLAND BOUNDARY
- WB — WB — WETLAND BUFFER
- SB — SB — STREAM BUFFER
- SOILS BOUNDARY
- EXISTING TREE LINE
- PROPOSED TREE LINE
- FP — FP — EXISTING FLOODPLAIN
- PFP — PFP — PROPOSED FLOODPLAIN
- A-2 DIVERSION DIKE
- SSF — SSF — SUPER SILT FENCE
- WETLANDS
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- FOREST CONSERVATION EASEMENT
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- 25% SLOPE OR GREATER
- SOILS STABILIZATION MATTING
- SWM FACILITIES

SEE SHEET 19 FOR EROSION AND SEDIMENT CONTROL LEGEND

50 25 12.5 0 50
1"= 50'

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064

PREVIOUS FILE No. : WP-19-118; ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
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PROGRAM MANAGEMENT
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
BRANDAN R. ROWE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

PHASE II EROSION AND SEDIMENT CONTROL PLAN NEIGHBORHOOD - D

SHEET NUMBER:

20 of 117

F-22-033

Mar 15, 2024
I:\1DATA\152018\DRAWINGS\PLAN SETS\FINAL PLANS\152018 - EROS_2 – LAYOUT 20 - PHASE II - EROSION AND SEDIMENT CONTROL PLAN

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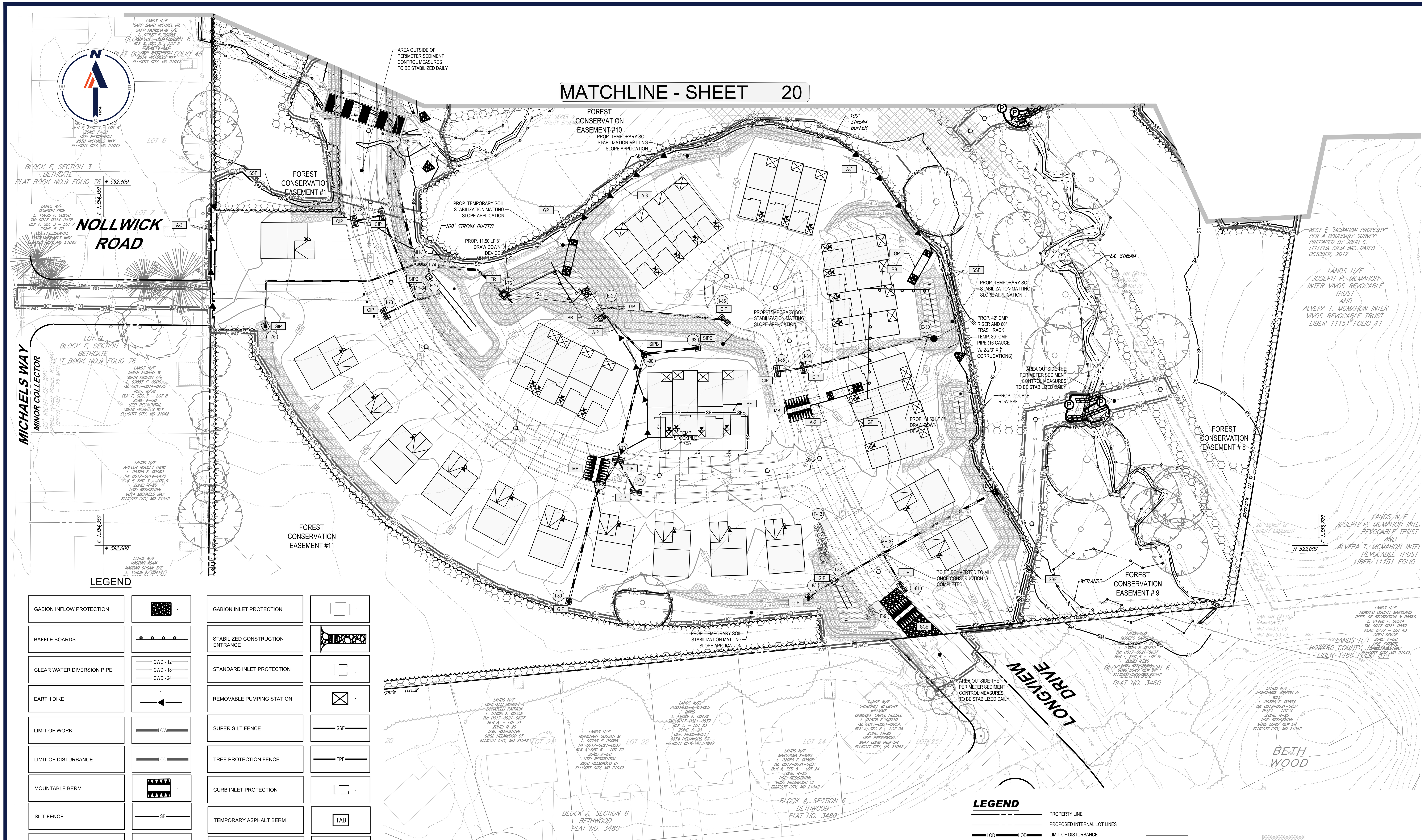

LEGEND

GABION INFLOW PROTECTION	
BAFFLE BOARDS	
CLEAR WATER DIVERSION PIPE	CWD - 12 / CWD - 18 / CWD - 24
EARTH DIKE	
LIMIT OF WORK	LOW
LIMIT OF DISTURBANCE	LOD
MOUNTABLE BERM	
SILT FENCE	SF
PIPE OUTLET SEDIMENT TRAP ST I	ST-I
GABION INLET PROTECTION	
STABILIZED CONSTRUCTION ENTRANCE	
STANDARD INLET PROTECTION	
REMOVABLE PUMPING STATION	
SUPER SILT FENCE	SSF
TREE PROTECTION FENCE	TPF
CURB INLET PROTECTION	
TEMPORARY ASPHALT BERM	TAB
TEMPORARY GABION OUTLET STRUCTURE	TGOS
LIMIT OF WORK NEIGHBORHOODS A-E	LOW - XX

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: [signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
DocuSigned by: Alexander Bratchie 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

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[signature] 3-12-24
SIGNATURE OF DEVELOPER — DATE
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

DESIGN CERTIFICATION

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SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

GRADING NOTES:

1. CONSTRUCTION WILL BE PHASED SUCH THAT NO MORE THAN 20AC OF LAND WILL BE DISTURBED AT ONE TIME. PHASING DESIGN TO BE PROVIDED ON FINAL PLANS

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
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UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- LIMIT OF DISTURBANCE (LOD)
- EXISTING CONTOUR (342, 340)
- PROPOSED CONTOUR (341)
- TREE PROTECTION FENCE (TPF)
- WETLAND BOUNDARY
- WETLAND BUFFER (WB)
- STREAM BUFFER (SB)
- SOILS BOUNDARY
- EXISTING TREE LINE
- PROPOSED TREE LINE
- EXISTING FLOODPLAIN (FP)
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- SPECIMEN TREE (TO BE REMOVED)
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- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- 25% SLOPE OR GREATER
- SOILS STABILIZATION MATTING
- SWM FACILITIES

Scale: 50 25 12.5 0 50 — 1"= 50'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

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TAX MAP: 17 GRID: 15 ZONED: R-20
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DRAWN BY:	AVG
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CAD I.D.:	EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
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SHEET TITLE:

PHASE II EROSION AND SEDIMENT CONTROL PLAN

NEIGHBORHOOD - E

SHEET NUMBER:

F-22-033

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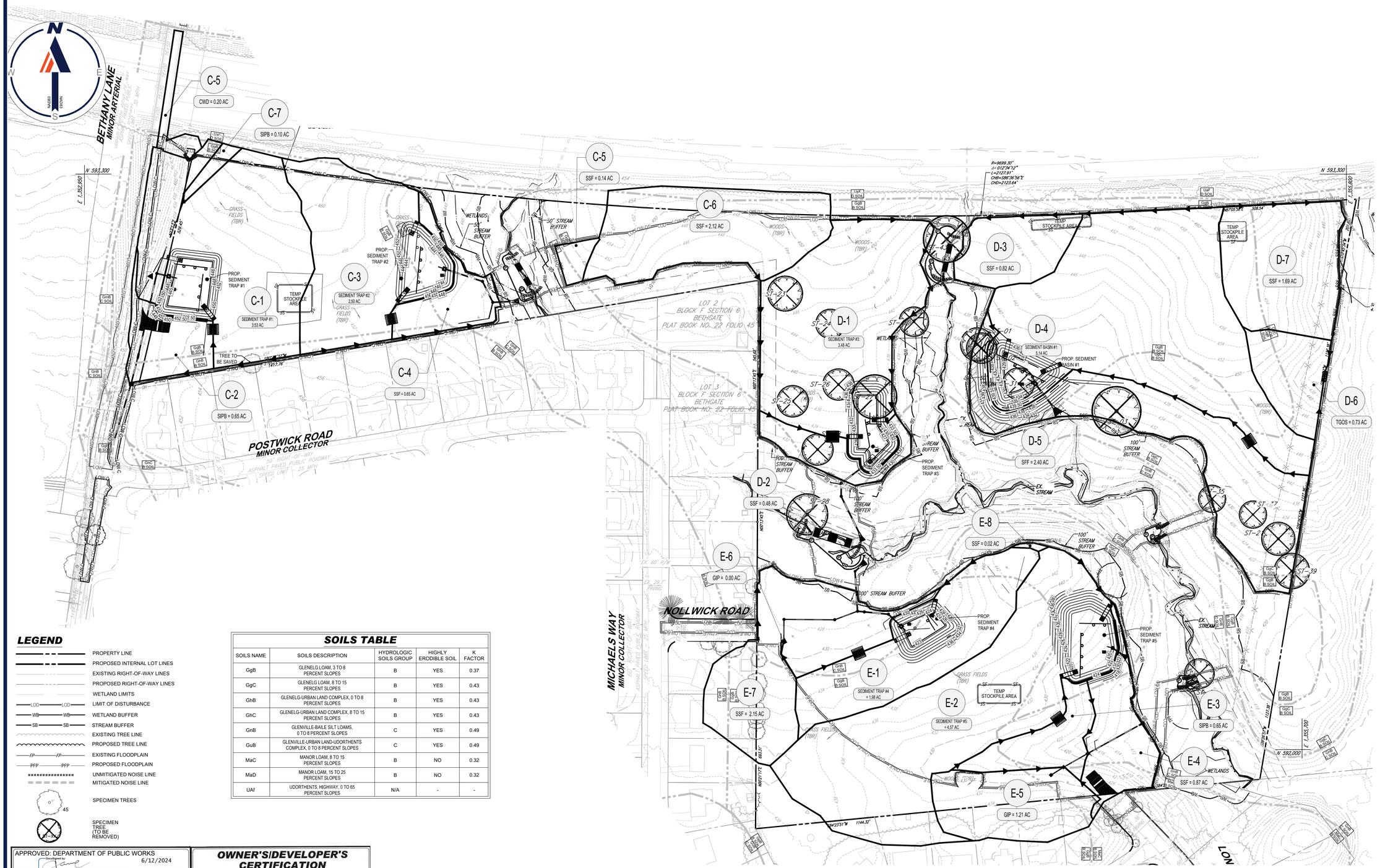

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- EXISTING RIGHT-OF-WAY LINES
- PROPOSED RIGHT-OF-WAY LINES
- WETLAND LIMITS
- LOD — LOD — LIMIT OF DISTURBANCE
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- EXISTING TREE LINE
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- MITIGATED NOISE LINE
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)

SOILS TABLE

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GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

APPROVED: DEPARTMENT OF PUBLIC WORKS

Docusigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Docusigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

Docusigned by: 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Docusigned by: 6/11/2024

HOWARD SOIL CONSERVATION DISTRICT — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE: 3-12-24

Jason Van Kirk, V.P.

PRINTED NAME & TITLE

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE: 3/12/24

BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

100 50 25 0 100

1"= 100'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

Mar 15, 2024
H:\19\MD\19\01\BROWN\05\PLAN SETS\FINAL PLANS\MD19001 - EROS - 2---LAYOUT 22 - PHASE I EROSION AND SEDIMENT CONTROL DRAINAGE AREA MAP

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES
THE WORKING IDEAS AND CONCEPTS OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED FOR ANY PURPOSE, WITHOUT THE WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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NOT APPROVED FOR CONSTRUCTION

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE — STATE OF MARYLAND — No. 40808 — REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

PHASE I EROSION AND SEDIMENT CONTROL DRAINAGE AREAS

SHEET NUMBER:

22 of 117

F-22-033

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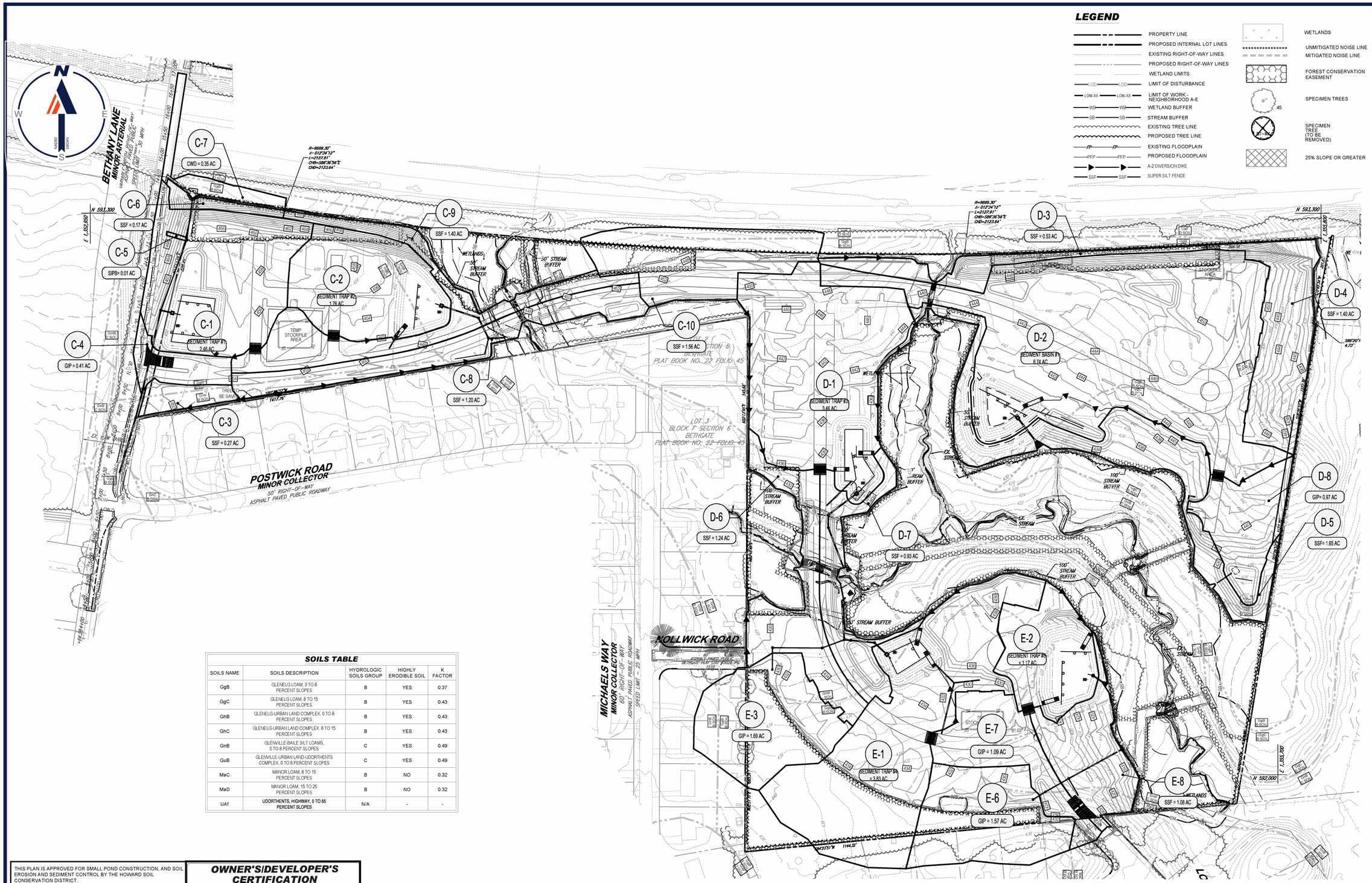

LEGEND

- PROPERTY LINE
- PROPOSED INTERNAL LOT LINES
- EXISTING RIGHT-OF-WAY LINES
- PROPOSED RIGHT-OF-WAY LINES
- WETLAND LIMITS
- LOD — LOD — LIMIT OF DISTURBANCE
- LOW-XX — LOW-XX — LIMIT OF WORK - NEIGHBORHOOD A-E
- WB — WB — WETLAND BUFFER
- SB — SB — STREAM BUFFER
- EXISTING TREE LINE
- PROPOSED TREE LINE
- FP — FP — EXISTING FLOODPLAIN
- PFP — PFP — PROPOSED FLOODPLAIN
- A-2 DIVERSION DIKE
- SSF — SSF — SUPER SILT FENCE
- WETLANDS
- UNMITIGATED NOISE LINE
- MITIGATED NOISE LINE
- FOREST CONSERVATION EASEMENT
- SPECIMEN TREES
- SPECIMEN TREE (TO BE REMOVED)
- 25% SLOPE OR GREATER

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
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MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Docusigned by: Alexander Brattrie 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS
Docusigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
Docusigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
Docusigned by: 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

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 PERSONAL 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

SIGNATURE OF DEVELOPER — DATE 3-12-24
NAME: Jason Van Kirk, Vice President

100 50 25 0 100
1"= 100'

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SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
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OWNER / DEVELOPER:
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CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES
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REVISIONS

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	EROS - DRIN - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
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Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

INTERIM EROSION AND SEDIMENT CONTROL DRAINAGE AREAS

SHEET NUMBER:
23 of 117

F-22-033

Mar 12, 2024
H:\BAD152018\DRAWINGS\PLAN SETS\FINAL PLANS\D152018 - EROS - DRIN - 2 - LAYOUT 23 - INTERIM EROSION AND SEDIMENT CONTROL DRAINAGE AREA MAP

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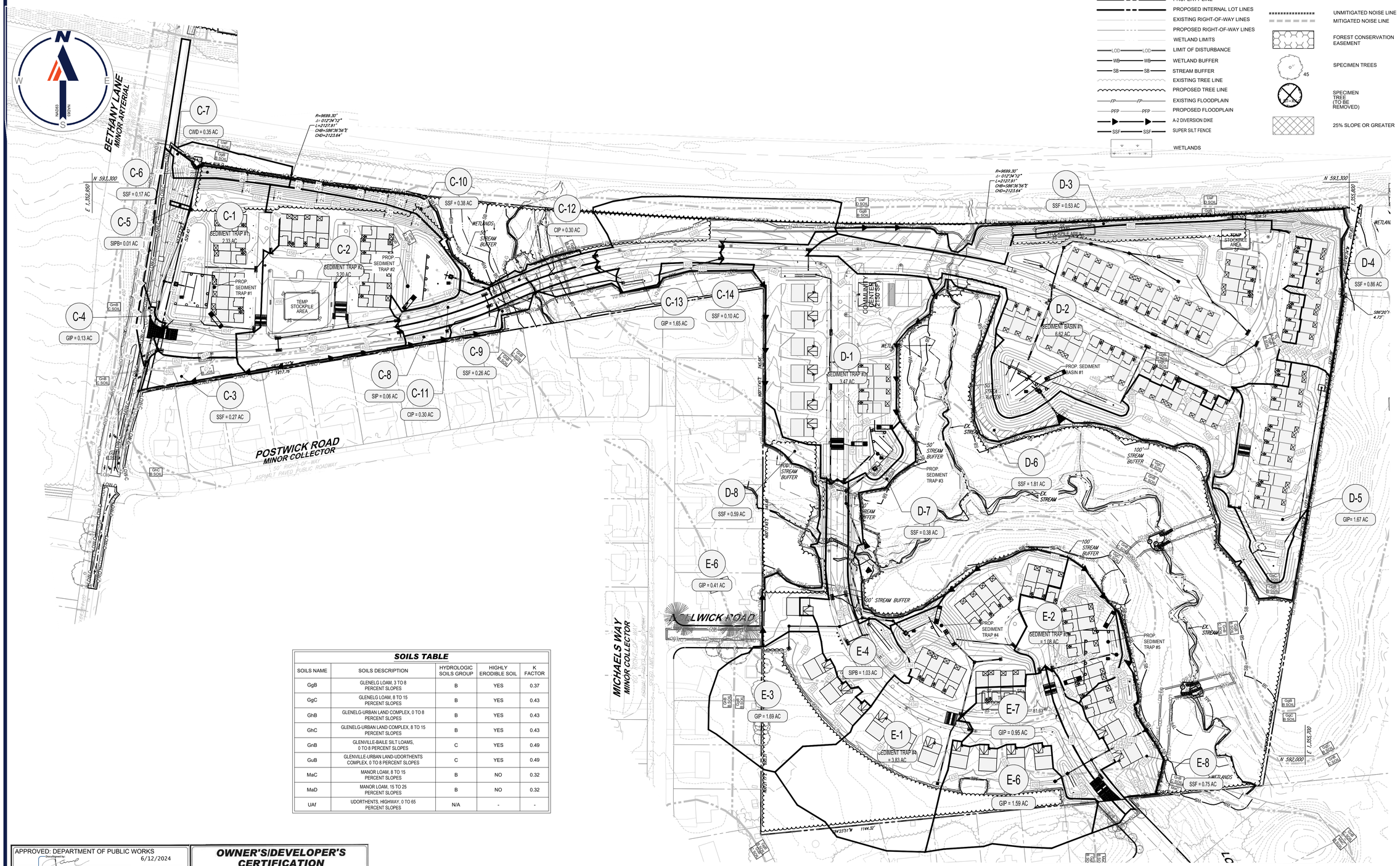

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APPROVED: DEPARTMENT OF PUBLIC WORKS

Docusigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Docusigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Docusigned by: 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Docusigned by: 6/11/2024

HOWARD SOIL CONSERVATION DISTRICT DATE

OWNER'S/DEVELOPER'S CERTIFICATION

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SIGNATURE OF DEVELOPER 3-12-24 DATE

Jason Van Kirk, V.P.

PRINTED NAME & TITLE

DESIGN CERTIFICATION

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3/12/24

SIGNATURE OF ENGINEER DATE

BRANDON J. ROWE P.E. MD. PE REGISTRATION No. 40808

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SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
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OWNER / DEVELOPER:
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PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
LAND PLANNING SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
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Phone: (410) 821-7900
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MD@BohlerEng.com

B.R. ROWE
No. 40808
PROFESSIONAL ENGINEER
STATE OF MARYLAND
PROFESSIONAL CERTIFICATION
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SHEET TITLE:

PHASE II EROSION AND SEDIMENT CONTROL DRAINAGE AREAS

SHEET NUMBER:

24 of 117

F-22-033

Mar 15, 2024
H:\SWO\152018\ERO\WKSP\PLANSETS\FINAL PLANS\D152018 - ERO2_2---LAYOUT 24 - PHASE II EROSION AND SEDIMENT CONTROL DRAINAGE AREAS

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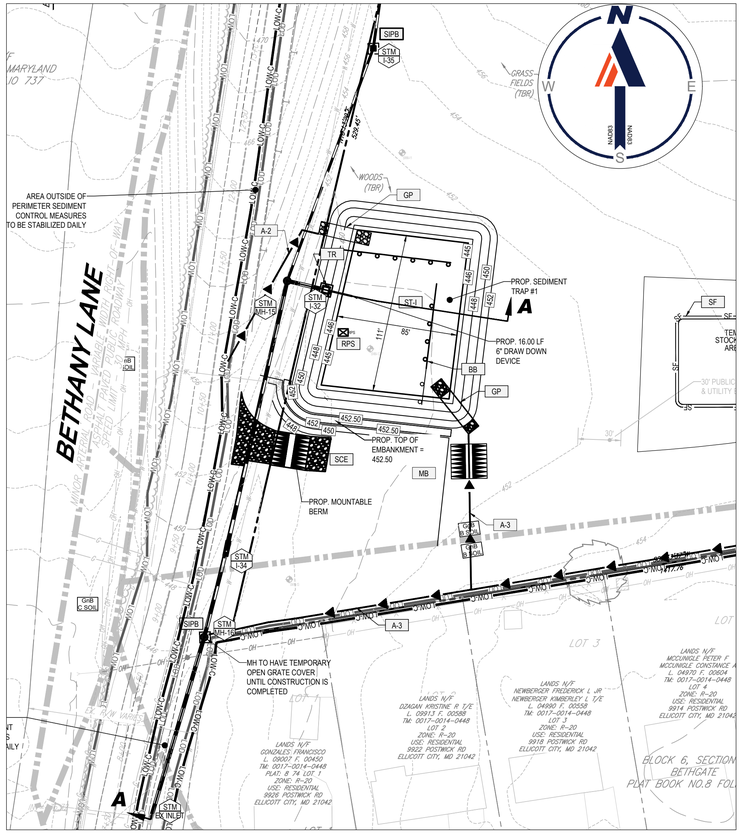
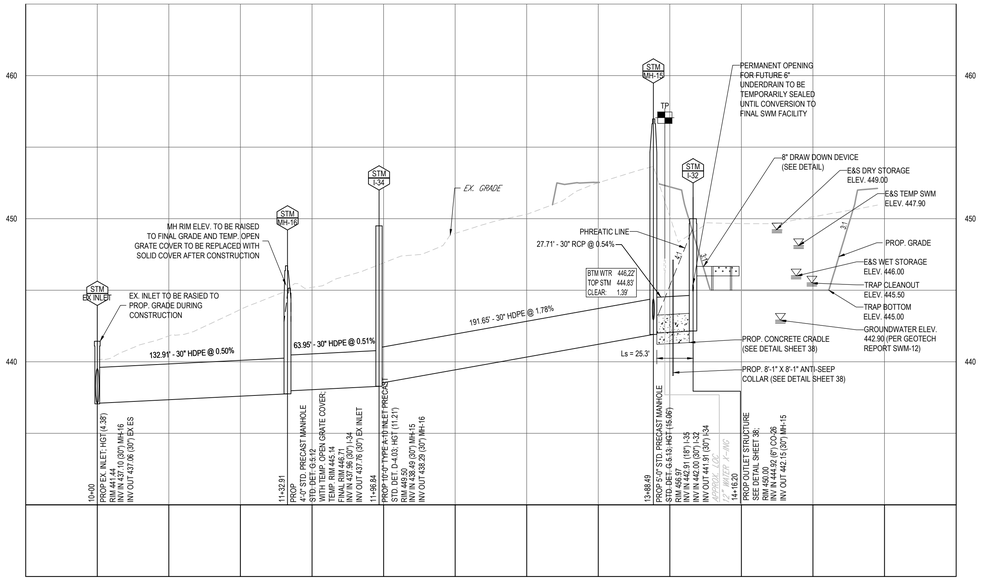


PLAN VIEW - TEMPORARY SEDIMENT TRAP #1 OUTFALL

SCALE: 1 = 50'



SECTION A-A- SEDIMENT TRAP #1- OUTFALL PROFILE

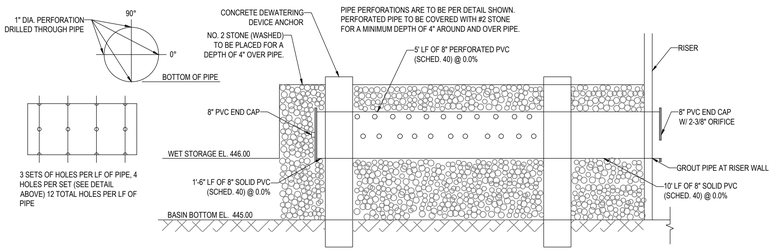
SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

TEMPORARY SEDIMENT TRAP #1 CONVERSION - PLAN

SCALE: 1 = 50'

PIPE OUTLET SEDIMENT TRAP NO. 1 (ST-I)

DRAINAGE AREA - INITIAL	3.45	ACRES
DRAINAGE AREA - INTERIM	2.46	ACRES
DRAINAGE AREA - FINAL	2.33	ACRES
TOTAL STORAGE REQUIRED	12,420	CF
TOTAL STORAGE PROVIDED	47,002	CF
WET STORAGE REQUIRED	6,210	CF
WET STORAGE PROVIDED	9,837	CF
DRY STORAGE REQUIRED	6,210	CF
DRY STORAGE PROVIDED	37,166	CF
TRAP BOTTOM ELEVATION	445.00	FT
TRAP BOTTOM DIMENSIONS	111 X 85	FT X FT
RISER CREST (DRY STORAGE) ELEVATION	449.00	FT
OUTLET (WET STORAGE) ELEVATION	446.00	FT
CLEANOUT ELEVATION	445.50	FT
TOP OF EMBANKMENT ELEVATION	452.50	FT
SIDE SLOPE	3:1	H:V RATIO
EMBANKMENT TOP WIDTH	5	FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CONCRETE	
RISER DIAMETER	SEE DETAIL	IN
BARREL DIAMETER	30	IN
TRASH RACK DIAMETER	SEE DETAIL	IN
TRASH RACK HEIGHT	SEE DETAIL	IN
ANTI-SEEP COLLAR DIMENSIONS	8.5 X 8.5	FT
OUTLET PROTECTION - LENGTH	N/A	FT
OUTLET PROTECTION - WIDTH	N/A	FT
OUTLET PROTECTION - DEPTH	N/A	IN
BAFFLE BOARD ELEVATION	447.50	FT



8" PVC DRAW-DOWN DEVICE DETAIL

NOT TO SCALE

NOTE:

REFER TO SWM NOTES AND DETAILS SHEET FOR FACILITY INSTALLATION DETAILS.

50 25 12.5 0 50
1"= 50'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

APPROVED: DEPARTMENT OF PUBLIC WORKS	
Developed by	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
Developed by	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
Developed by	6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Developed by 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER: 3-12-24
Jason Van Kirk, V.P. — DATE
PRINTED NAME & TITLE

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — 3/12/24 DATE
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

Mar 12, 2024
H:\SMD\152018\DRAWINGS\PLAN SETS\FINAL PLANS\D20218 - SITE - SESC - 2----LAYOUT - 25 - TRAP 1 PLAN SECTION & DETAILS

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

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REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

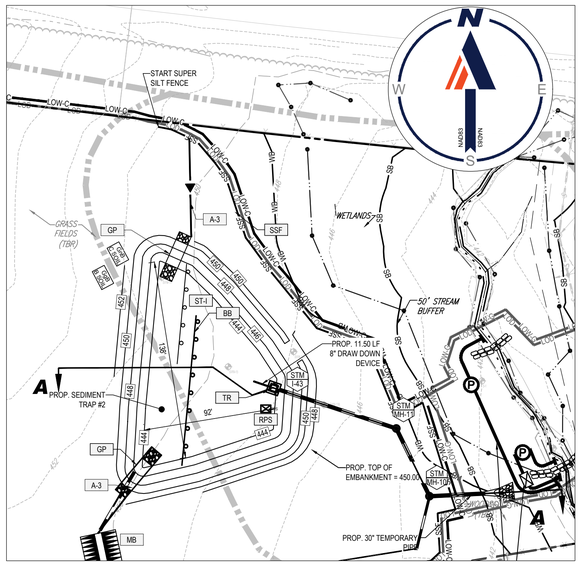
TRAP #1 PLAN, SECTION & DETAILS

SHEET NUMBER:

25 of 117

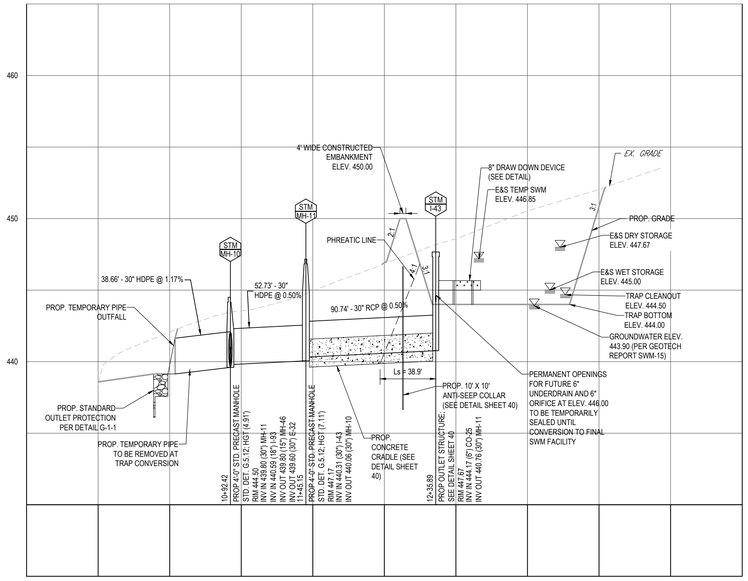
F-22-033

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F



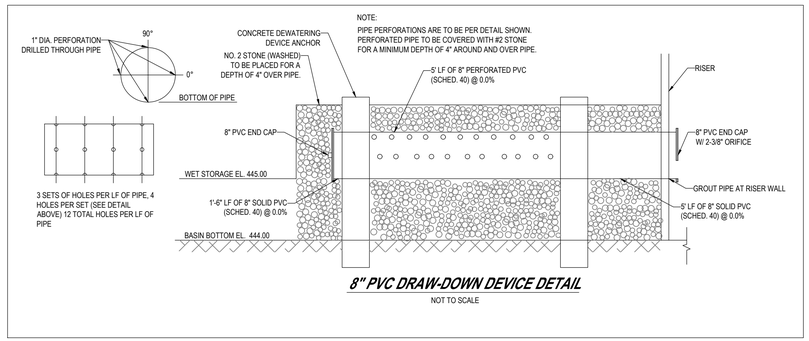
PLAN VIEW - TEMPORARY SEDIMENT TRAP #2 OUTFALL

SCALE: 1 = 50'



SECTION A-A - SEDIMENT TRAP #2 - OUTFALL PROFILE

SCALE: 1"= 50' HORIZONTAL
1"= 5' VERTICAL



8" PVC DRAW-DOWN DEVICE DETAIL

NOT TO SCALE

TEMPORARY SEDIMENT TRAP #2 CONVERSION - PLAN

SCALE: 1 = 50'

PIPE OUTLET SEDIMENT TRAP NO. 2 (ST-I)

DRAINAGE AREA - INITIAL	2.50	ACRES
DRAINAGE AREA - INTERIM	1.76	ACRES
DRAINAGE AREA - FINAL	3.20	ACRES
TOTAL STORAGE REQUIRED	11,520	CF
TOTAL STORAGE PROVIDED	40,849	CF
WET STORAGE REQUIRED	5,760	CF
WET STORAGE PROVIDED	9,462	CF
DRY STORAGE REQUIRED	5,760	CF
DRY STORAGE PROVIDED	31,388	CF
TRAP BOTTOM ELEVATION	444.00	FT
TRAP BOTTOM DIMENSIONS	VARIES	FT X FT
RISER CREST (DRY STORAGE) ELEVATION	447.67	FT
OUTLET (WET STORAGE) ELEVATION	445.00	FT
CLEANOUT ELEVATION	444.50	FT
TOP OF EMBANKMENT ELEVATION	450.00	FT
SIDE SLOPE	3:1	H:V RATIO
EMBANKMENT TOP WIDTH	4	FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CONC.	
RISER DIAMETER	SEE DETAIL	IN
BARREL DIAMETER	30	IN
TRASH RACK DIAMETER	SEE DETAIL	IN
TRASH RACK HEIGHT	SEE DETAIL	IN
ANTI-SEEP COLLAR DIMENSIONS	11.75 X 11.75	FT
OUTLET PROTECTION - LENGTH	10	FT
OUTLET PROTECTION - WIDTH	12	FT
OUTLET PROTECTION - DEPTH	19	IN
BAFFLE BOARD ELEVATION	446.34	FT

NOTE:

REFER TO SWM NOTES AND DETAILS SHEET FOR FACILITY INSTALLATION DETAILS.

50 25 12.5 0 50
1"= 50'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

DocuSigned by: 6/11/2024

HOWARD SOIL CONSERVATION DISTRICT — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24

Jason Van Kirk, V.P.
PRINTED NAME & TITLE

DESIGN CERTIFICATION

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3/12/24

SIGNATURE OF ENGINEER — DATE
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.: WP-19-118, ECP-19-041, BA-CASE NO. 17-018C, ECP-21-017, WP-21-064, SP-19-005, F-22-033, WP-21-127, 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
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5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
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TRANSPORTATION SERVICES

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
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Phone: (410) 821-7900
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MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

TRAP #2 PLAN, SECTION & DETAILS

SHEET NUMBER:

26 of 117

F-22-033

Mar 12, 2024
H:\19\MD152018\ENGINEERING\PLAN SETS\FINAL PLANS\D150918 - SITE - SESC - 2 — LAYOUT 26 - TRAP 2 PLAN SECTION & DETAILS
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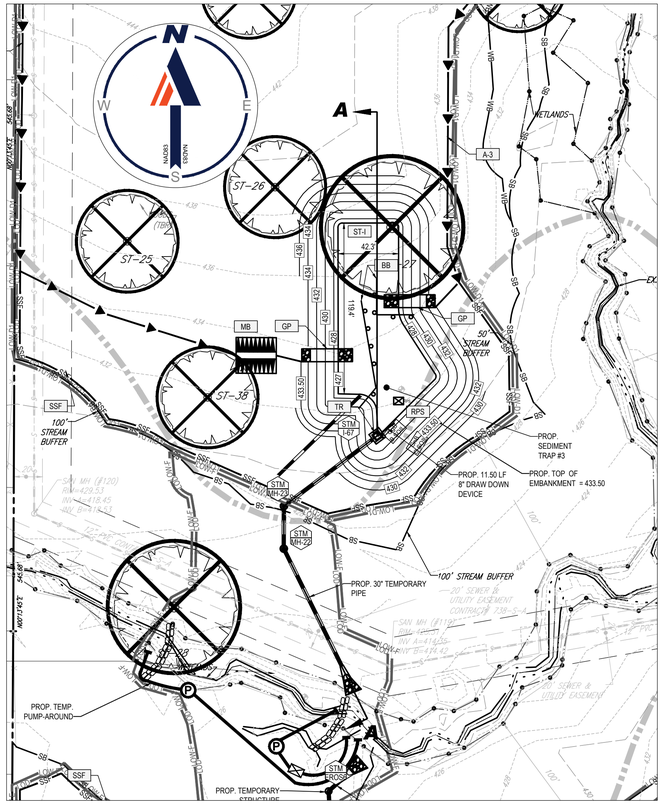
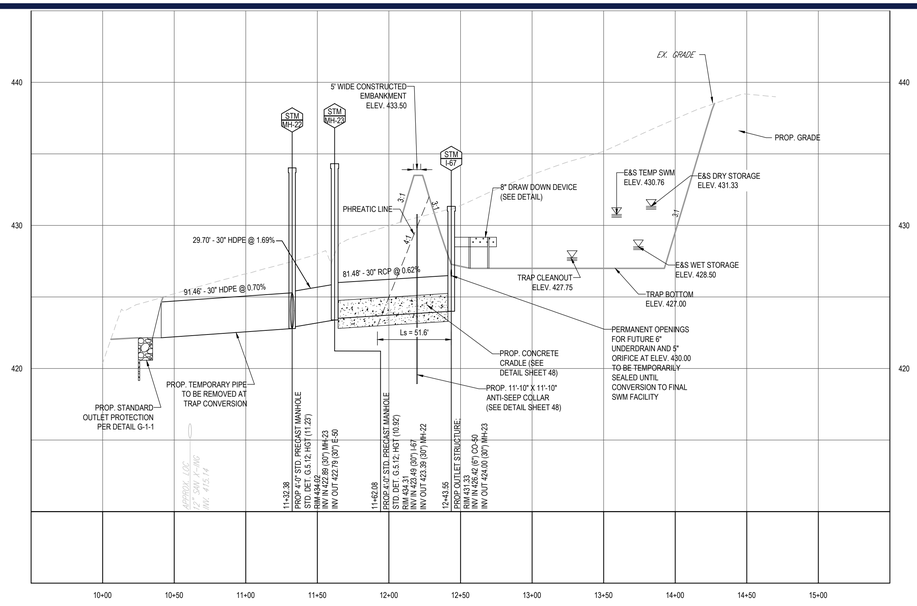


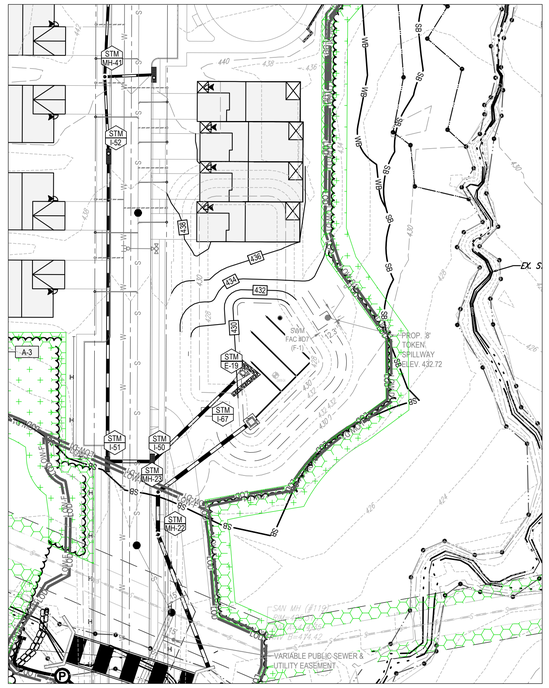
PLAN VIEW - TEMPORARY SEDIMENT TRAP #3 OUTFALL

SCALE: 1 = 50'



SECTION A-A - SEDIMENT TRAP #3 OUTFALL PROFILE

SCALE: 1"= 50' HORIZONTAL
1"= 5' VERTICAL



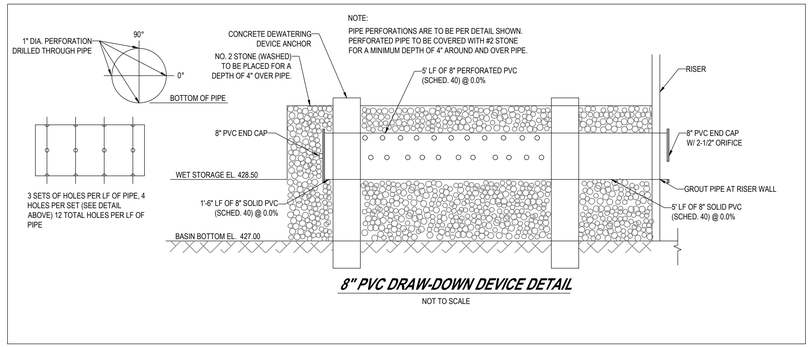
TEMPORARY SEDIMENT TRAP #3 CONVERSION - PLAN

SCALE: 1 = 50'

NOTE:

REFER TO SWM NOTES AND DETAILS SHEET FOR FACILITY INSTALLATION DETAILS.

50 25 12.5 0 50
1"= 50'



8" PVC DRAW-DOWN DEVICE DETAIL

NOT TO SCALE

PIPE OUTLET SEDIMENT TRAP NO. 3 (ST-1)		
DRAINAGE AREA - INITIAL	3.48	ACRES
DRAINAGE AREA - INTERIM	3.44	ACRES
DRAINAGE AREA - FINAL	3.47	ACRES
TOTAL STORAGE REQUIRED	12,528	CF
TOTAL STORAGE PROVIDED	39,145	CF
WET STORAGE REQUIRED	6,264	CF
WET STORAGE PROVIDED	10,860	CF
DRY STORAGE REQUIRED	6,264	CF
DRY STORAGE PROVIDED	28,285	CF
BASIN BOTTOM ELEVATION	427.00	FT
BASIN BOTTOM DIMENSIONS	VARIES	FT X FT
RISER CREST (DRY STORAGE) ELEVATION	431.33	FT
OUTLET (WET STORAGE) ELEVATION	428.50	FT
CLEANOUT ELEVATION	427.75	FT
TOP OF EMBANKMENT ELEVATION	433.50	FT
SIDE SLOPE	3:1	H:V RATIO
EMBANKMENT TOP WIDTH	5	FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CONC.	
RISER DIAMETER	SEE DETAIL	IN
BARREL DIAMETER	30	IN
TRASH RACK DIAMETER	SEE DETAIL	IN
TRASH RACK HEIGHT	SEE DETAIL	IN
ANTI-SEEP COLLAR DIMENSIONS	8.5 X 8.5	FT
OUTLET PROTECTION - LENGTH	10	FT
OUTLET PROTECTION - WIDTH	12	FT
OUTLET PROTECTION - DEPTH	19	IN
BAFFLE BOARD ELEVATION	429.92	FT

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

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SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
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OWNER / DEVELOPER:
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ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

APPROVED: DEPARTMENT OF PUBLIC WORKS
Developed by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
Developed by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
Developed by: 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
Developed by: 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

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SIGNATURE OF DEVELOPER — 3-12-24 DATE
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

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SIGNATURE OF ENGINEER — DATE
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
LAND PLANNING SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES
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REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

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Phone: (410) 821-7900
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MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND No. 40808
PROFESSIONAL CERTIFICATION
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SHEET TITLE:

TRAP #3 PLAN, SECTION & DETAILS

SHEET NUMBER:
27 of 117

F-22-033

Mar 12, 2024
H:\DMD\152018\DRAWINGS\PLAN SET\FINAL PLAN\MD152018 - SITE - SESC - 2 - LAYOUT 27 - TRAP 3 PLAN SECTION & DETAILS

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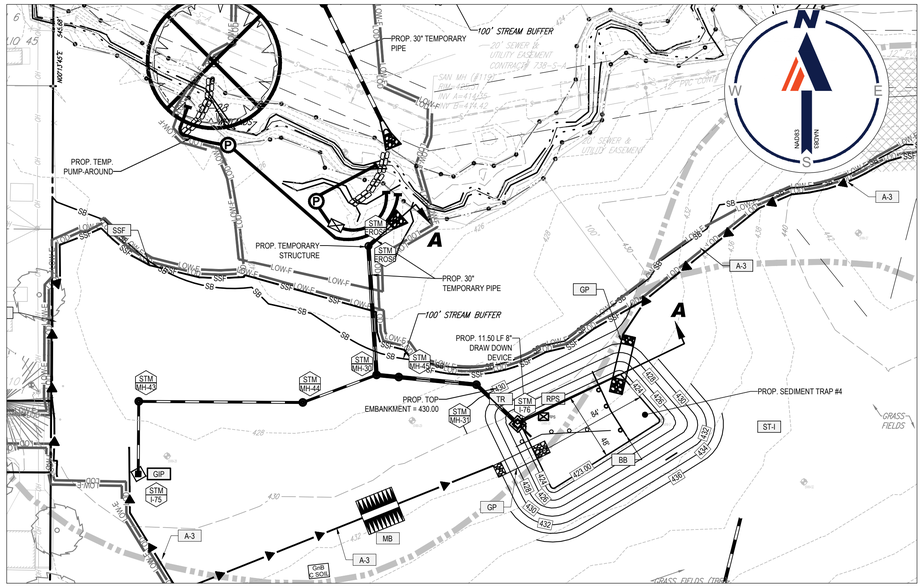
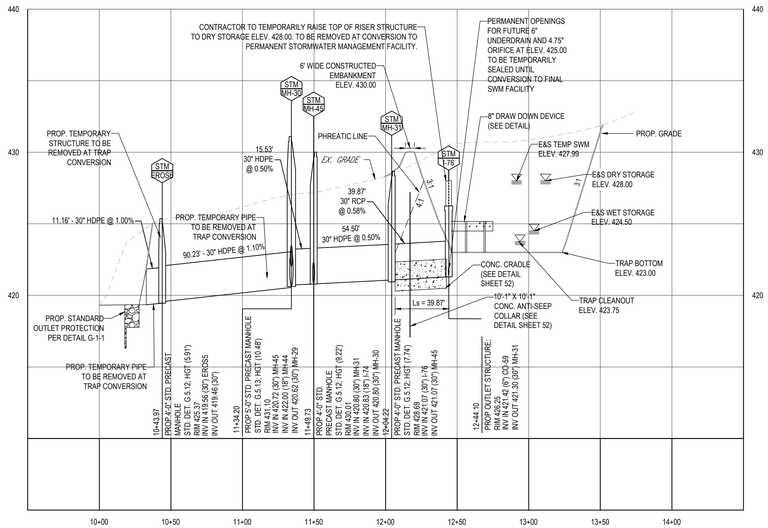


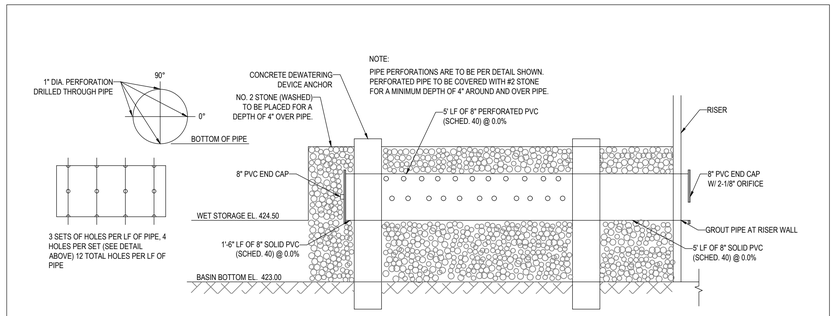
PLAN VIEW - TEMPORARY SEDIMENT TRAP #4 OUTFALL

SCALE: 1 = 50'



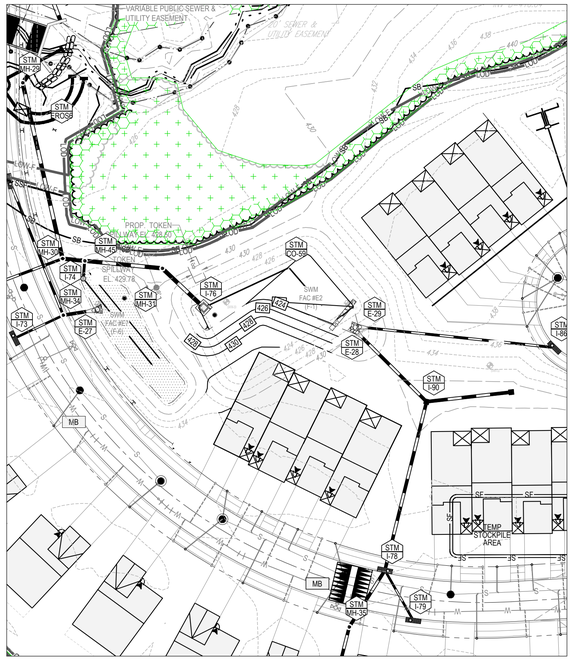
SECTION A-A - SEDIMENT TRAP #4 OUTFALL PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



8" PVC DRAW-DOWN DEVICE DETAIL

NOT TO SCALE



TEMPORARY SEDIMENT TRAP #4 CONVERSION - PLAN

SCALE: 1 = 50'

NOTE:

REFER TO SWM NOTES AND DETAILS SHEET FOR FACILITY INSTALLATION DETAILS.

50 25 12.5 0 50
1"= 50'

PIPE OUTLET SEDIMENT TRAP NO. 4 (ST-1)

DRAINAGE AREA - INITIAL	1.98	ACRES
DRAINAGE AREA - INTERIM	3.83	ACRES
DRAINAGE AREA - FINAL	3.83	ACRES
TOTAL STORAGE REQUIRED	13,788	CF
TOTAL STORAGE PROVIDED	30,998	CF
WET STORAGE REQUIRED	6,894	CF
WET STORAGE PROVIDED	6,905	CF
DRY STORAGE REQUIRED	6,894	CF
DRY STORAGE PROVIDED	24,094	CF
TRAP BOTTOM ELEVATION	423.00	FT
TRAP BOTTOM DIMENSIONS	84 X 48	FT X FT
RISER CREST (DRY STORAGE) ELEVATION	428.00	FT
OUTLET (WET STORAGE) ELEVATION	424.50	FT
CLEANOUT ELEVATION	423.75	FT
TOP OF EMBANKMENT ELEVATION	430.00	FT
SIDE SLOPE	3:1	H:V RATIO
EMBANKMENT TOP WIDTH	6	FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CONC.	
RISER DIAMETER	SEE DETAIL	IN
BARREL DIAMETER	30	IN
TRASH RACK DIAMETER	SEE DETAIL	IN
TRASH RACK HEIGHT	SEE DETAIL	IN
ANTI-SEEP COLLAR DIMENSIONS	10.08 X 10.08	FT
OUTLET PROTECTION - LENGTH	10	FT
OUTLET PROTECTION - WIDTH	12	FT
OUTLET PROTECTION - DEPTH	19	IN
BAFFLE BOARD ELEVATION	426.25	FT

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

APPROVED: DEPARTMENT OF PUBLIC WORKS

Docusigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Docusigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Docusigned by: 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Docusigned by: 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — 3-12-24 DATE
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — 3/12/24 DATE
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
STORMWATER DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES
THE INFORMATION, DESIGN AND CONCEPTS OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED IN ANY MANNER, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER, ONLY APPROVED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE — STATE OF MARYLAND — 40808 — REGISTERED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
STATE OF MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

TRAP #4 PLAN, SECTION & DETAILS

SHEET NUMBER:

28 of 117

F-22-033

Mar 12, 2024
H:\152018\DRAWINGS\PLAN SETS\FINAL PLANS\D152018 - SITE - SESC - 2---LAYOUT 29 - TRAP # PLAN SECTION & DETAILS

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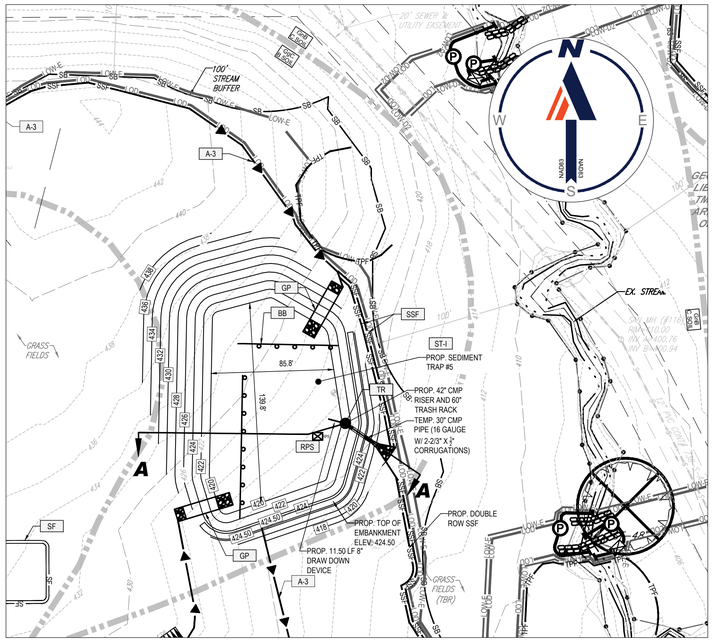
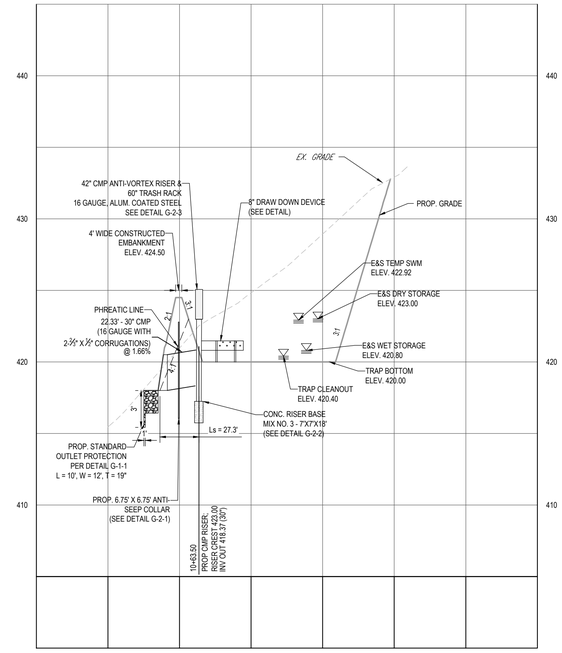


PLAN VIEW - TEMPORARY SEDIMENT TRAP #5 OUTFALL

SCALE: 1 = 50'



SECTION A-A - SEDIMENT TRAP #5 - OUTFALL PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

8" PVC DRAW-DOWN DEVICE DETAIL

NOT TO SCALE

TEMPORARY SEDIMENT TRAP #5 CONVERSION - PLAN

SCALE: 1 = 50'

NOTE:

REFER TO SWM NOTES AND DETAILS SHEET FOR FACILITY INSTALLATION DETAILS.

PIPE OUTLET SEDIMENT TRAP NO. 5 (ST-1)

DRAINAGE AREA - INITIAL	4.57	ACRES
DRAINAGE AREA - INTERIM	1.18	ACRES
DRAINAGE AREA - FINAL	1.08	ACRES
TOTAL STORAGE REQUIRED	16,452	CF
TOTAL STORAGE PROVIDED	39,640	CF
WET STORAGE REQUIRED	8,226	CF
WET STORAGE PROVIDED	9,421	CF
DRY STORAGE REQUIRED	8,226	CF
DRY STORAGE PROVIDED	30,219	CF
TRAP BOTTOM ELEVATION	420.00	FT
TRAP BOTTOM DIMENSIONS	VARIES	FT X FT
RISER CREST (DRY STORAGE) ELEVATION	423.00	FT
OUTLET (WET STORAGE) ELEVATION	420.80	FT
CLEANOUT ELEVATION	420.40	FT
TOP OF EMBANKMENT ELEVATION	424.50	FT
SIDE SLOPE	3:1	H:V RATIO
EMBANKMENT TOP WIDTH	4	FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CMP	
RISER DIAMETER	42	IN
BARREL DIAMETER	30	IN
TRASH RACK DIAMETER	60	IN
TRASH RACK HEIGHT	27	IN
ANTI-SEEP COLLAR DIMENSIONS	6.50 X 6.50	FT
OUTLET PROTECTION - LENGTH	10	FT
OUTLET PROTECTION - WIDTH	12	FT
OUTLET PROTECTION - DEPTH	19	IN
BAFFLE BOARD ELEVATION	421.90	FT

APPROVED: DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

HOWARD SOIL CONSERVATION DISTRICT — DATE 6/11/2024

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
PRINTED NAME & TITLE — Jason Van Kirk, V.P.

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

50 25 12.5 0 50
1"= 50'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN IS FOR EXCLUSIVE USE ON THIS PROJECT ONLY AND SHALL NOT BE EXTENDED OR USED FOR ANY PURPOSE, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES. ©2018 BOHLER

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

TRAP #5 PLAN, SECTION & DETAILS

SHEET NUMBER:

29 of 117

F-22-033

Mar 12, 2024
H:\SITE\152018\DRAWINGS\PLAN SET\FINAL PLANS\152018 - SITE - SEDC - 2---LAYOUT 29 - TRAP 5 PLAN SECTION & DETAILS.dwg

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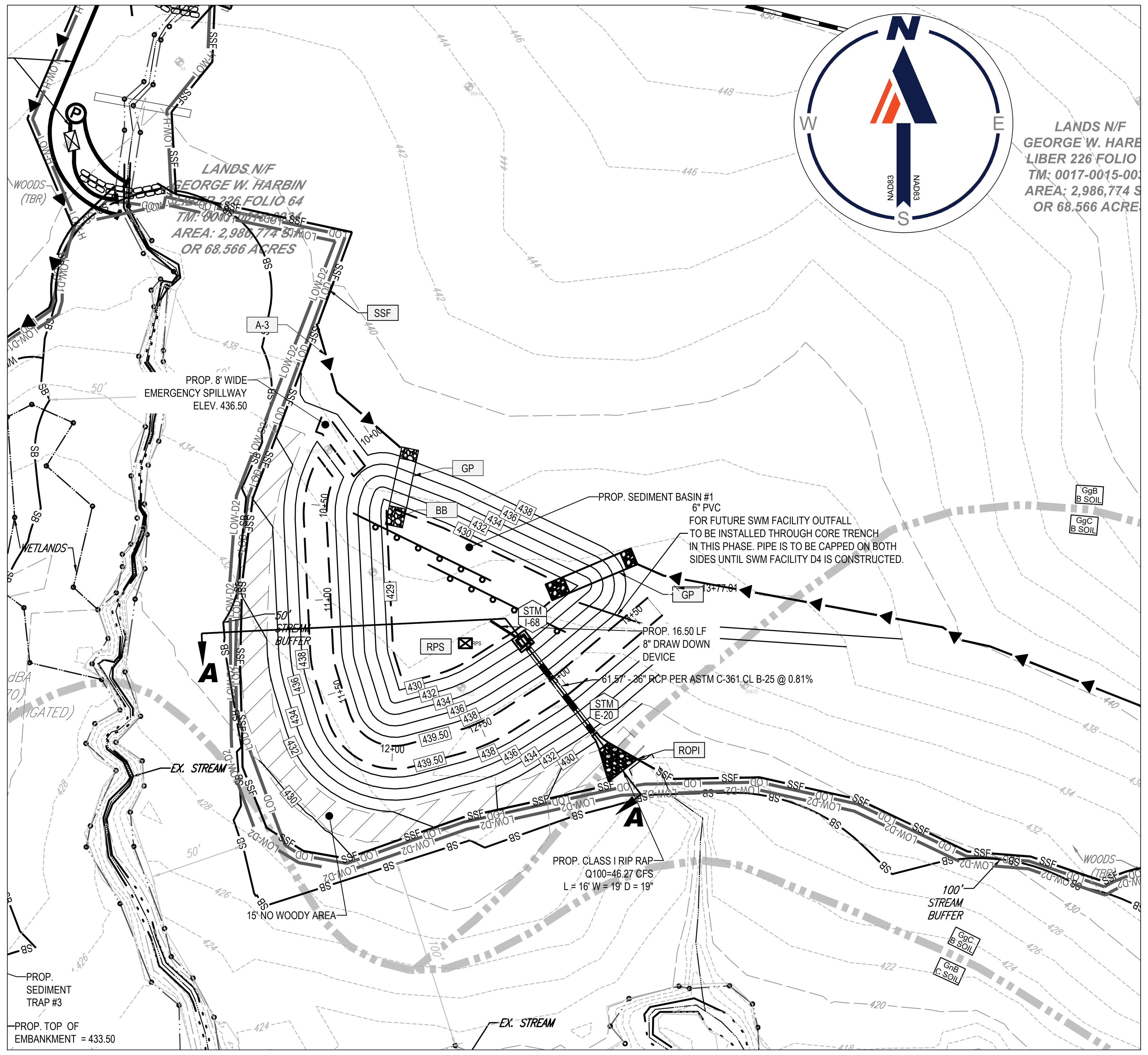
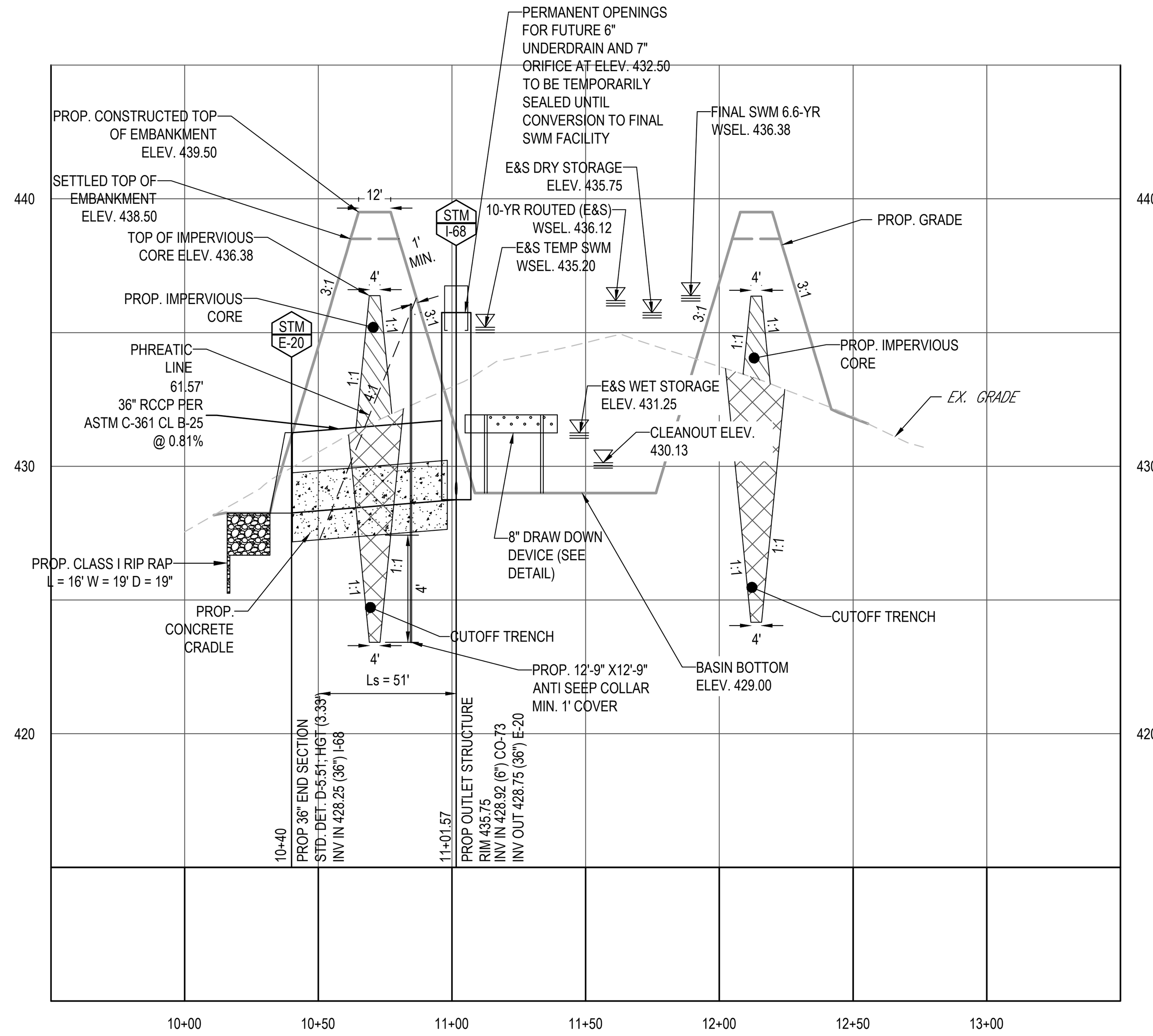


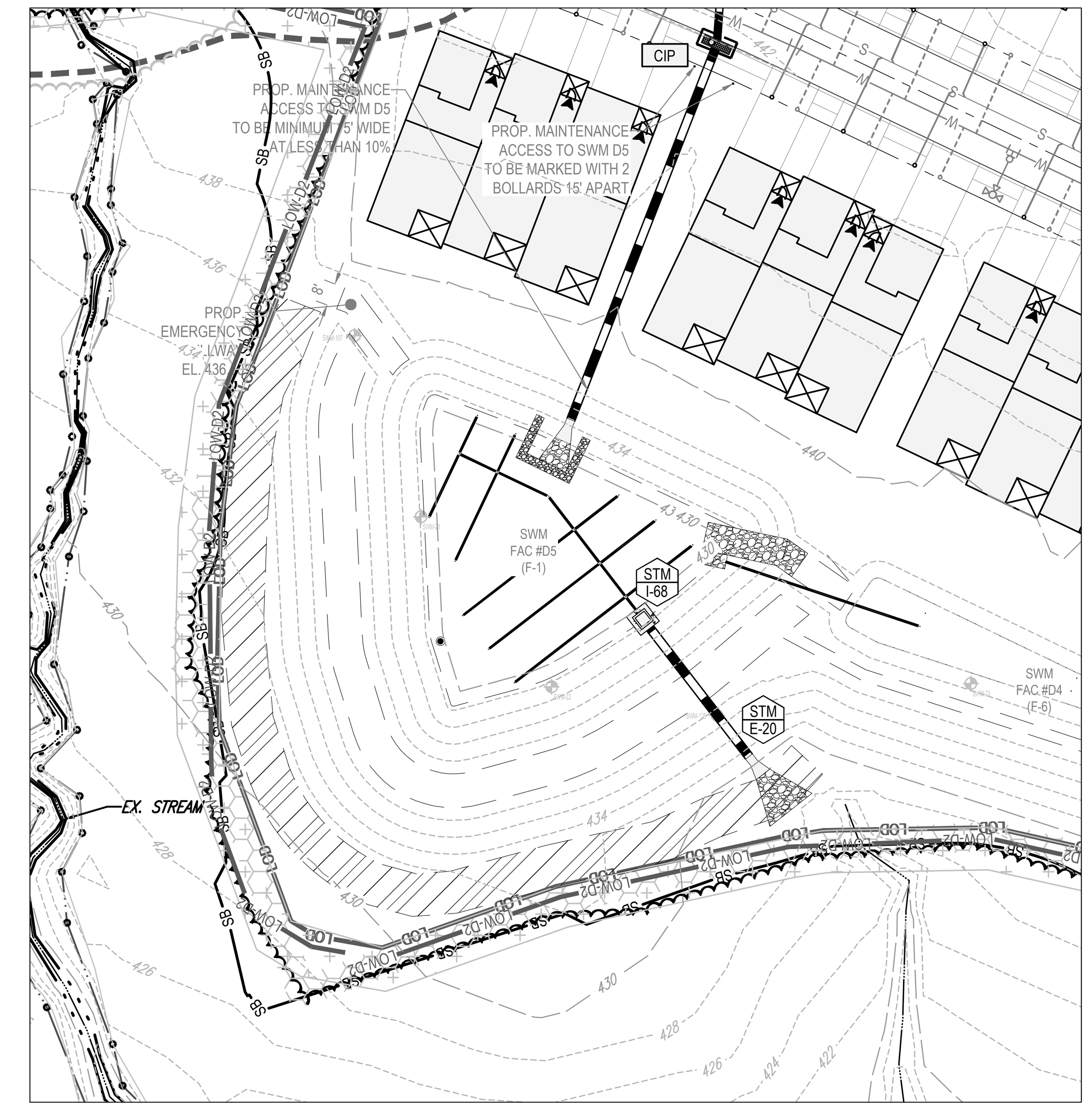
PLAN VIEW - TEMPORARY SEDIMENT BASIN #1 OUTFALL

SCALE: 1 = 50'



SEDIMENT BASIN#1 - OUTFALL PROFILE

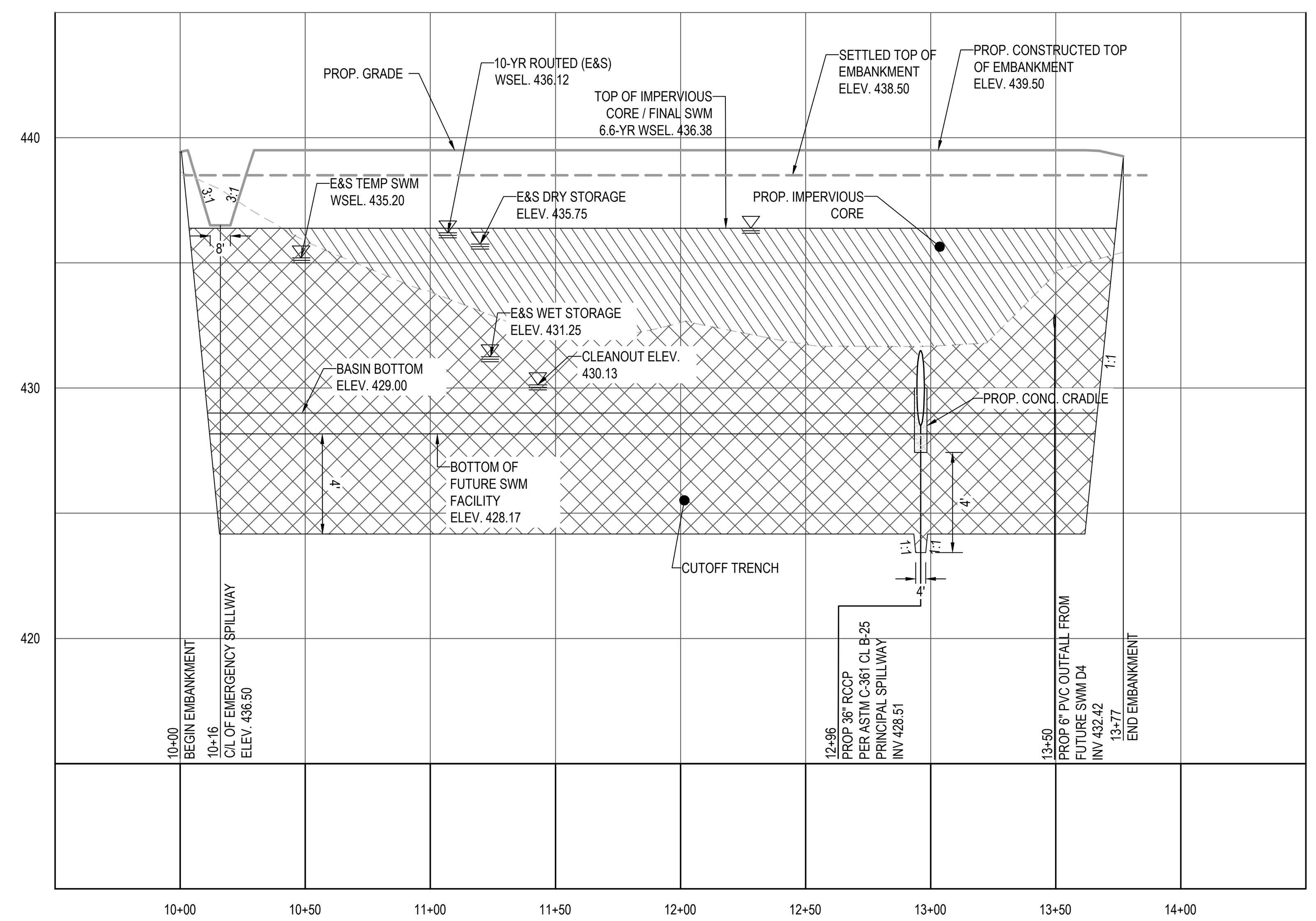
SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



TEMPORARY SEDIMENT BASIN #1 CONVERSION - PLAN

SCALE: 1 = 50'

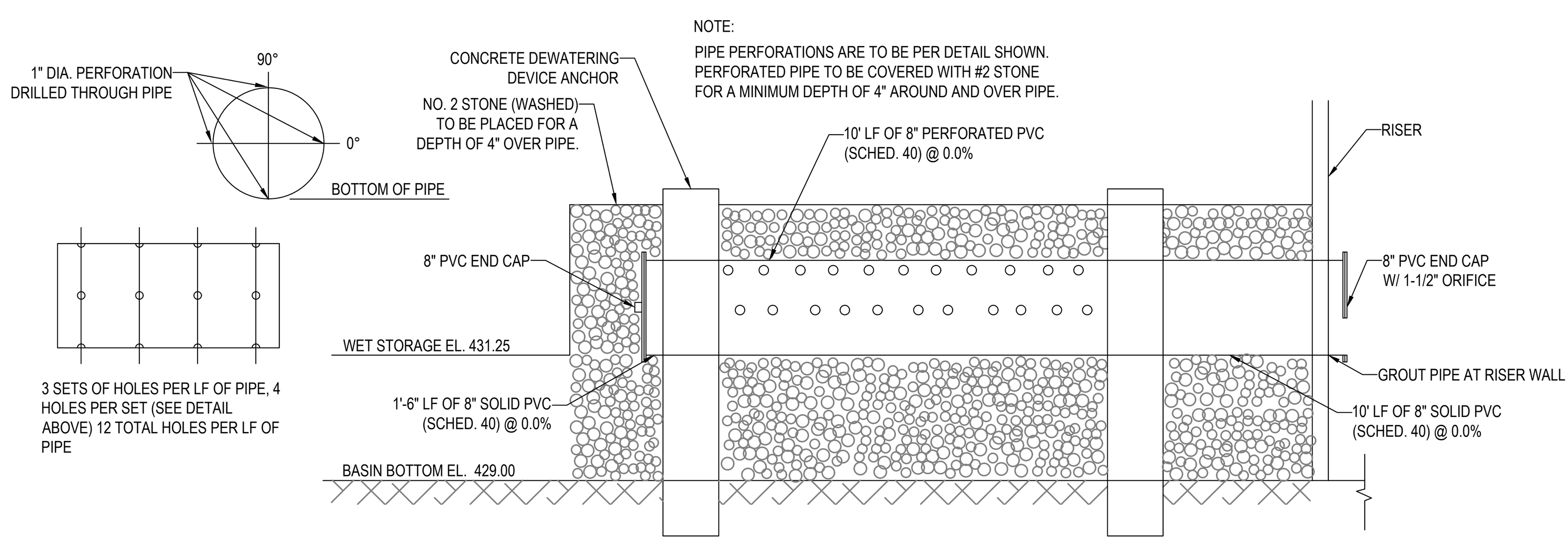
NOTE:
REFER TO SWM NOTES AND DETAILS SHEET FOR FACILITY INSTALLATION DETAILS.



BASIN #1 - EMBANKMENT PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

PIPE OUTLET SEDIMENT BASIN NO. 1		
DRAINAGE AREA - INITIAL	5.11	ACRES
DRAINAGE AREA - INTERIM	6.74	ACRES
DRAINAGE AREA - FINAL	6.62	ACRES
TOTAL STORAGE REQUIRED	24264	CF
TOTAL STORAGE PROVIDED	57222	CF
WET STORAGE REQUIRED	12132	CF
WET STORAGE PROVIDED	13543	CF
DRY STORAGE REQUIRED	12132	CF
DRY STORAGE PROVIDED	43679	CF
BASIN BOTTOM ELEVATION	429.00	FT
BASIN BOTTOM DIMENSIONS	VARIES - SEE PLAN	FT X FT
RISER CREST (DRY STORAGE) ELEVATION	435.75	FT
OUTLET (WET STORAGE) ELEVATION	431.25	FT
CLEANOUT ELEVATION	430.13	FT
TOP OF EMBANKMENT ELEVATION	438.50	FT
SIDE SLOPE	3:1	H:V RATIO
EMBANKMENT TOP WIDTH	12	FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CONC.	
RISER DIAMETER	SEE DETAIL	FT
BARREL DIAMETER	36	IN
TRASH RACK DIAMETER	SEE DETAIL	IN
TRASH RACK HEIGHT	SEE DETAIL	IN
ANTI-SEEP COLLAR DIMENSIONS	11.17 X 11.17	FT
OUTLET PROTECTION - LENGTH	16	FT
OUTLET PROTECTION - WIDTH	19	FT
OUTLET PROTECTION - DEPTH	19	IN



8" PVC DRAW-DOWN DEVICE DETAIL

NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: [signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
DocuSigned by: Alexander Bratchie 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

[signature] 3-12-24
SIGNATURE OF DEVELOPER — DATE
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

DESIGN CERTIFICATION

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SIGNATURE OF ENGINEER — 3/12/24 DATE
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

50 25 12.5 0 50
1"= 50'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
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25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER//
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER//
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SEDIMENT BASIN #1 PLAN, SECTION & DETAILS

SHEET NUMBER:

F-22-033

Mar 12, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SITE - SESC - 2 ---->LAYOUT: 30 - BASIN 1 PLAN SECTION & DETAILS AG

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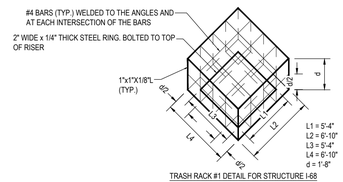


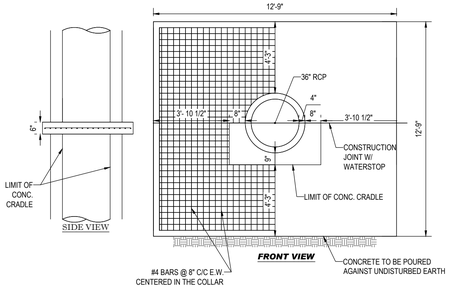
TRASH RACK #1 DETAIL FOR STRUCTURE I-68

NOT TO SCALE

Atb = (6.83' x 6.83') - (5.33' x 5.33') = 18.24 SF

Awf = (435.59' - 434.50') x (4' x 4 SIDES) = 17.44 SF

Atb > Awf

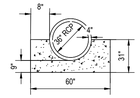


ANTI-SEEP COLLAR DETAIL

NOT TO SCALE

NOTES:

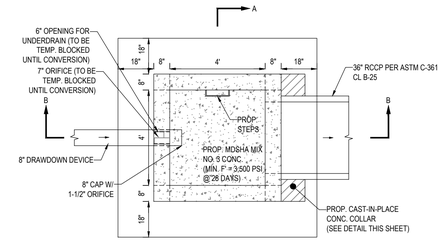
1. CONTRACTOR IS TO CONSTRUCT AND INSTALL ANTI-SEEP COLLAR IN ACCORDANCE WITH ALL APPLICABLE MD-378 REGULATIONS.
2. ANTI-SEEP COLLARS ARE TO BE CONSTRUCTED IN TWO (2) POURS. THE BOTTOM SECTION IS TO BE POURED WITH THE CONCRETE CRADLE. FORM AND POUR THE TOP SECTION OF THE COLLAR.
3. ANTI-SEEP COLLARS ARE TO BE POURED AT LEAST TWO (2) FEET FROM THE NEAREST PIPE JOINT.
4. LOOSE CONCRETE, EARTH, ETC. IS TO BE REMOVED FROM THE PIPE SURFACE.
5. CONCRETE SHALL HAVE A MINIMUM F' = 3,500 PSI (MSHA MIX NO. 3) AT 28 DAYS.
6. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER ENGINEERING TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.



NOTES:
1. CRADLE TO BE CONTINUOUS ALONG PIPE.
2. CONCRETE FOR CRADLE TO BE MDSHA MIX No. 3.

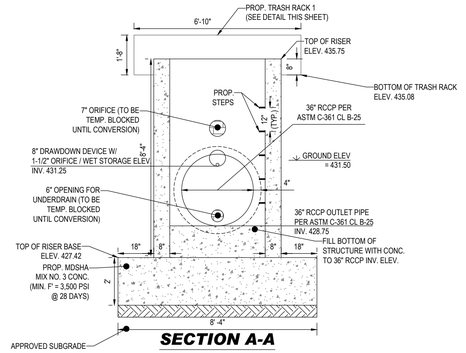
SCS TR-46 A2 CONCRETE CRADLE DETAIL

NOT TO SCALE

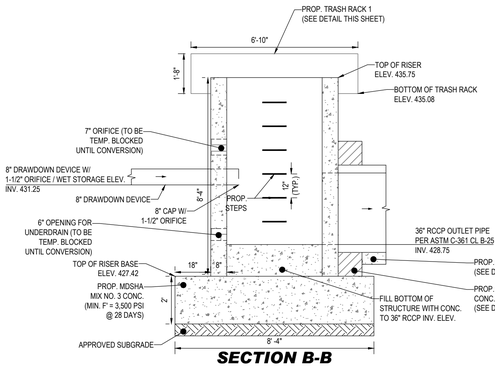


PLAN VIEW

WITHOUT TOP SLAB AND TRASH RACKS



SECTION A-A



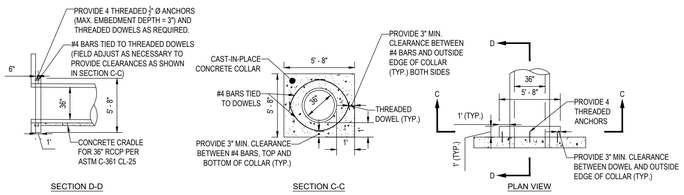
SECTION B-B

TYPICAL RISER STRUCTURE DETAILS (STRUCTURE I-68)

NOT TO SCALE

NOTES:

1. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. STRUCTURES ARE INTENDED TO BE STANDARD PRECAST CONCRETE STRUCTURES. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.



NOTES:

1. PROVIDE 1" MIN CONCRETE COVER AROUND O.D. OF PIPE.
2. Fc = 3,500 PSI AT 28 DAYS
3. TO BE USED WITH PRE-CAST RISERS ONLY
4. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

CAST-IN-PLACE CONCRETE COLLAR DETAILS

NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

DocuSigned by: 6/11/2024

HOWARD SOIL CONSERVATION DISTRICT — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — 3-12-24 DATE

Jason Van Kirk, V.P.

PRINTED NAME & TITLE

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — 3/12/24 DATE

BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
CONSTRUCTION MANAGEMENT
PERMITTING SERVICES
TRANSPORTATION SERVICES
THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED FOR ANY PURPOSE, WITHOUT THE EXPRESS AUTHORIZATION FROM BOHLER. ONLY APPROVED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
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PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
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TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

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SHEET TITLE:

SEDIMENT BASIN #1 PLAN, SECTION & DETAILS

SHEET NUMBER:

31 of 117

F-22-033

Mar 12, 2024
H:\SMD152018\DRAWINGS\PLANSETS\FINAL PLANMD152018 - SITE - SESC - 2---LAYOUT 31- ESC - SED BASIN 1 PLAN SECTION & DETAILS

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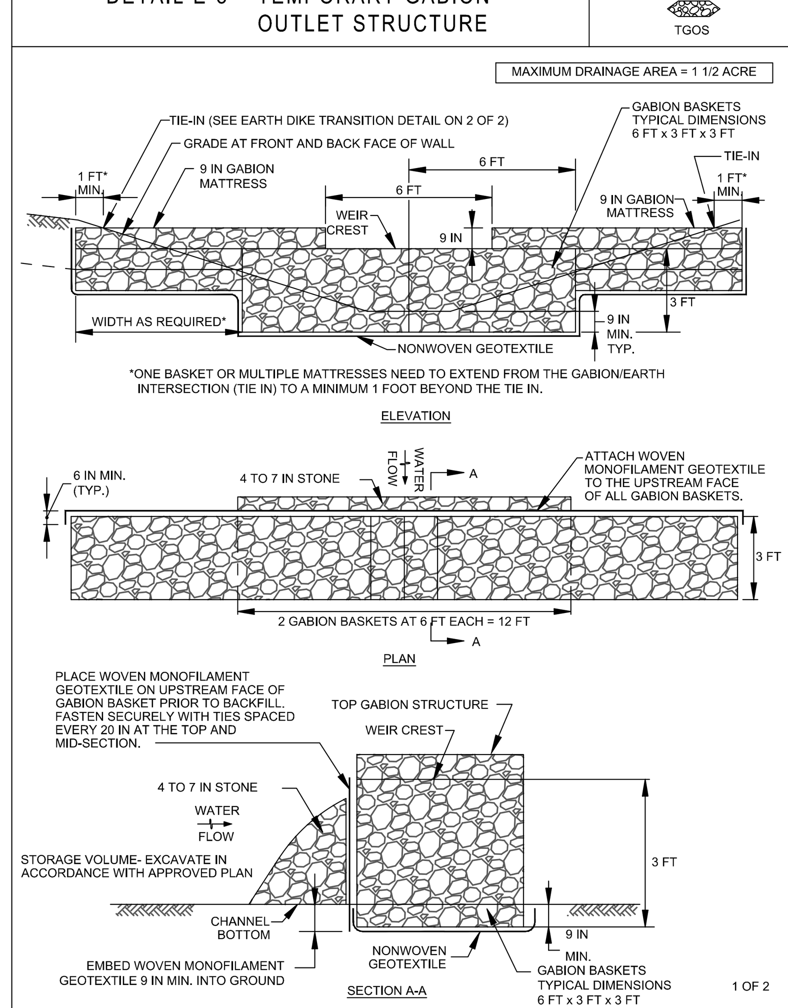
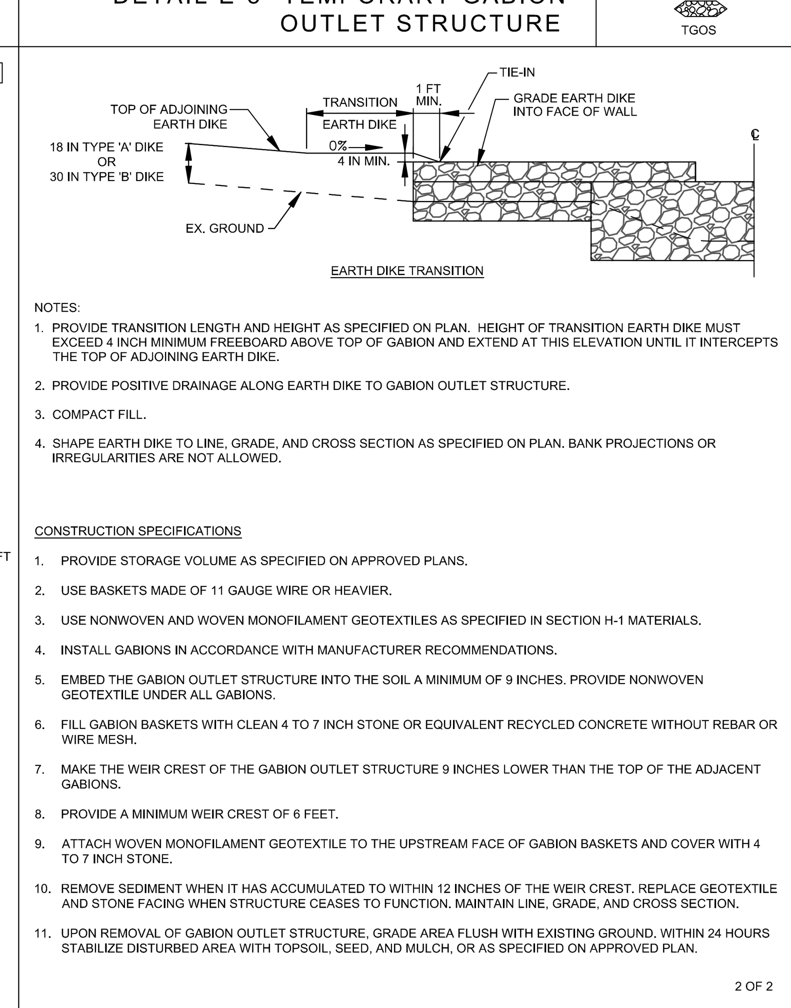
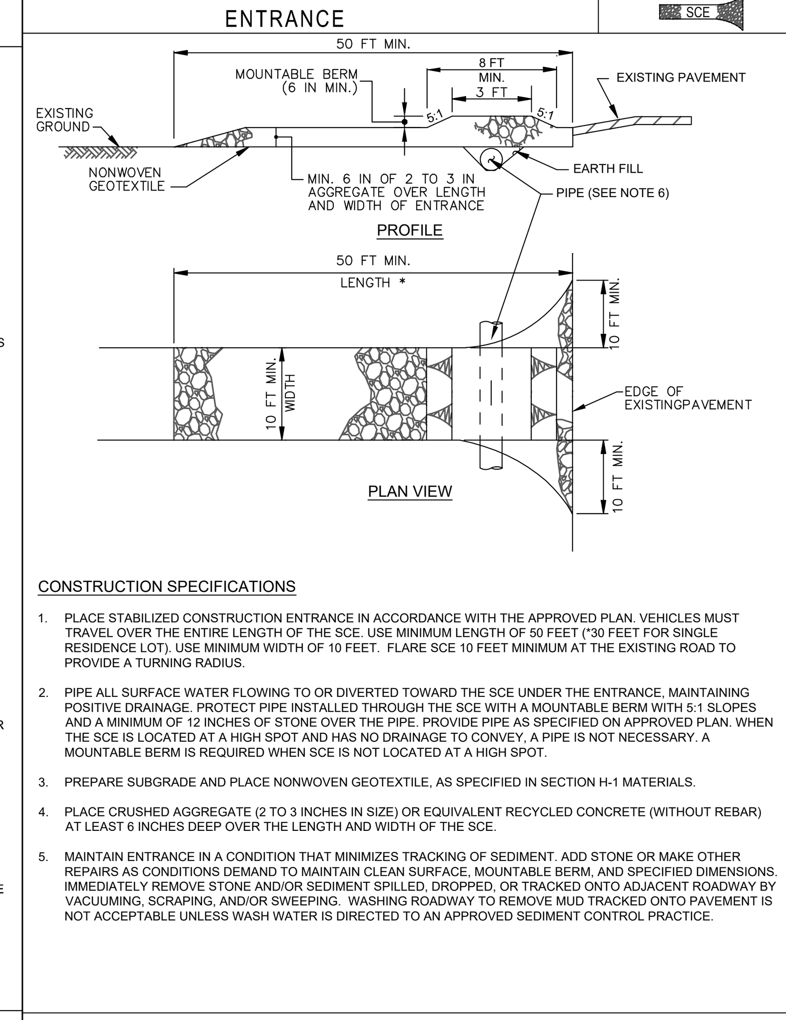
DETAIL E-8 TEMPORARY GABION OUTLET STRUCTURE



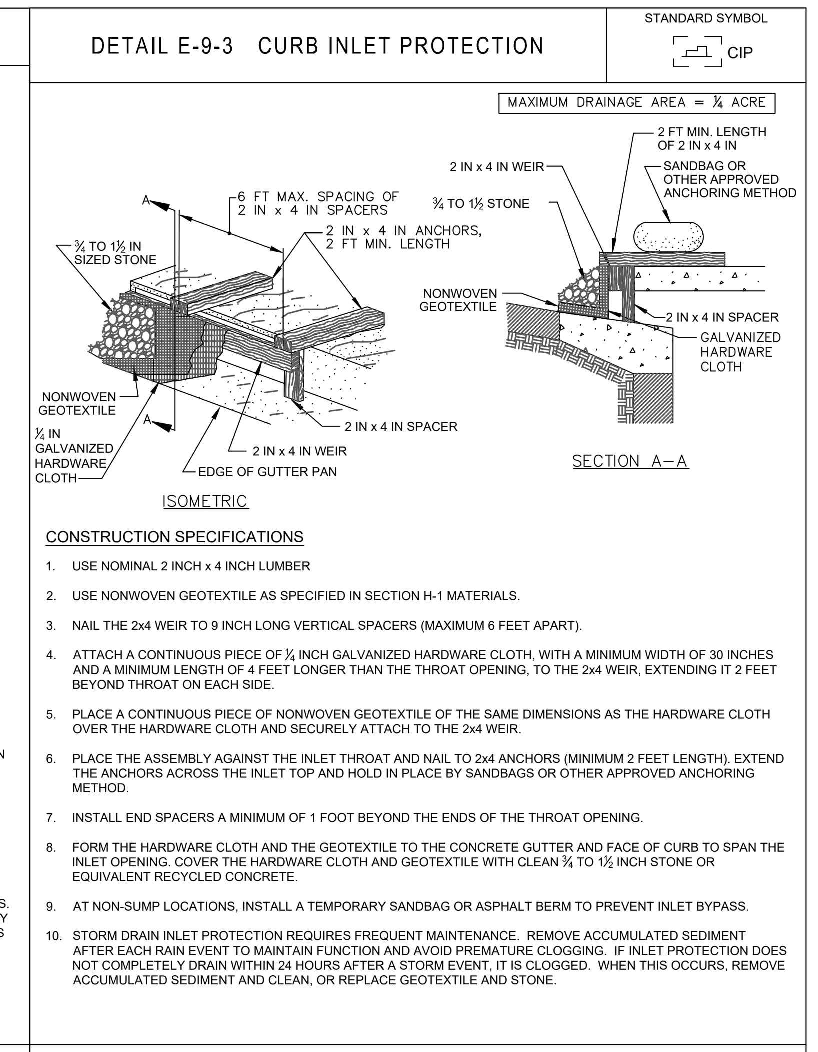
DETAIL E-8 TEMPORARY GABION OUTLET STRUCTURE



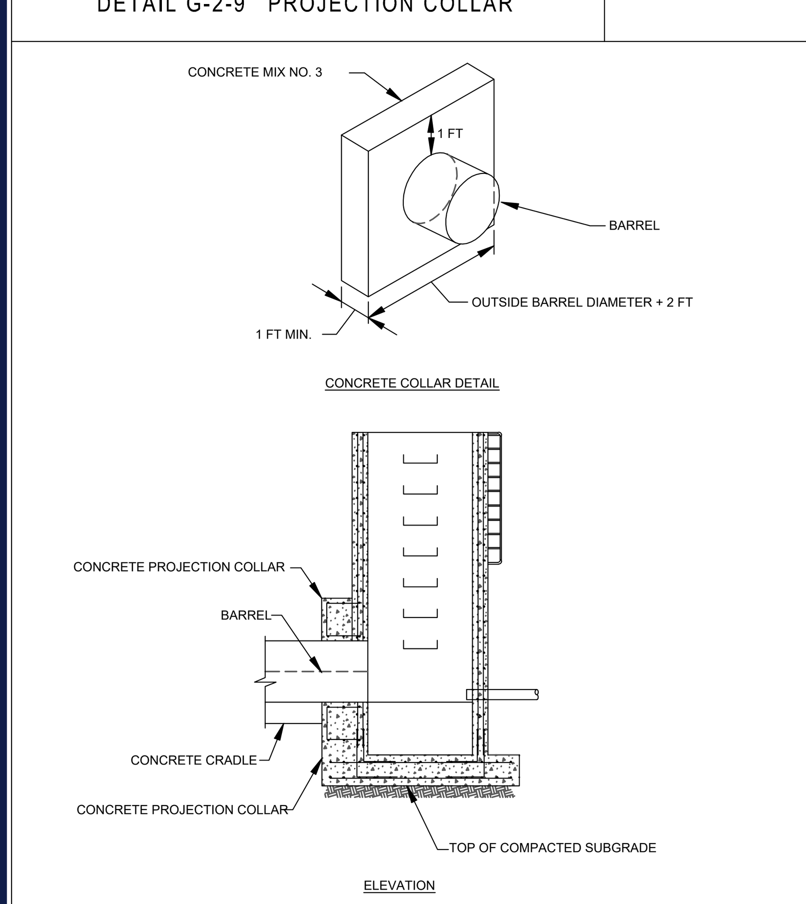
DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE



DETAIL E-9-3 CURB INLET PROTECTION



DETAIL G-2-9 PROJECTION COLLAR



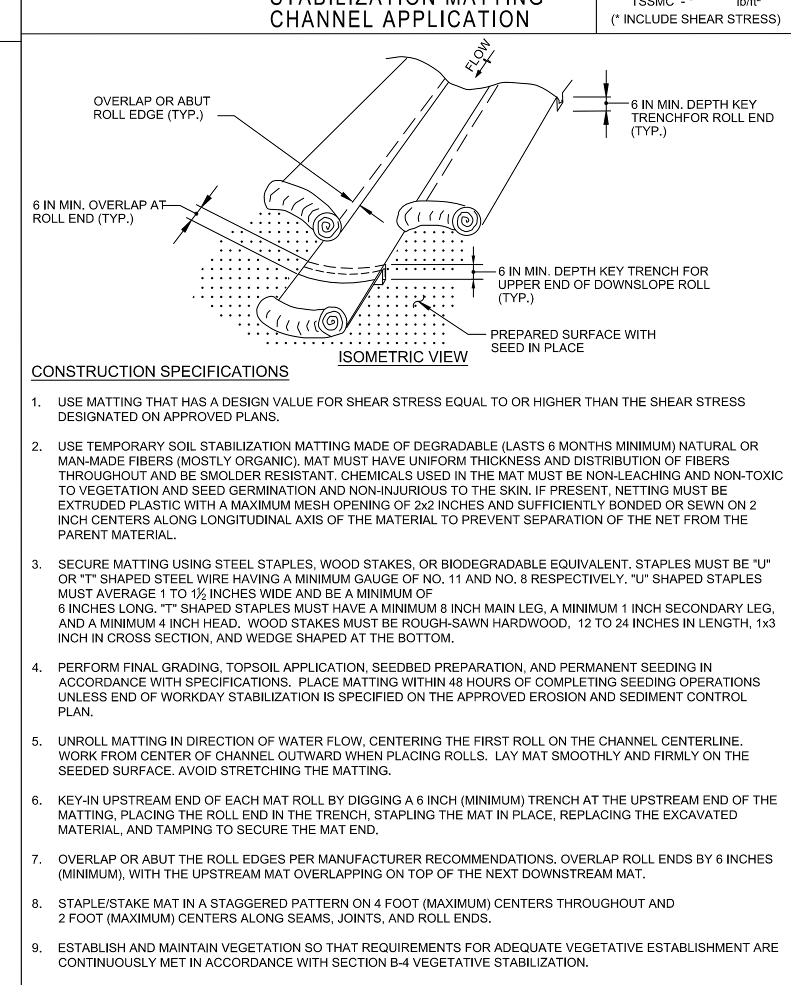
CONSTRUCTION SPECIFICATIONS

1. CAST 1 FOOT THICK CONCRETE COLLAR TO OUTLET STRUCTURE WITH FOUR #4 U-SHAPED REBARS.

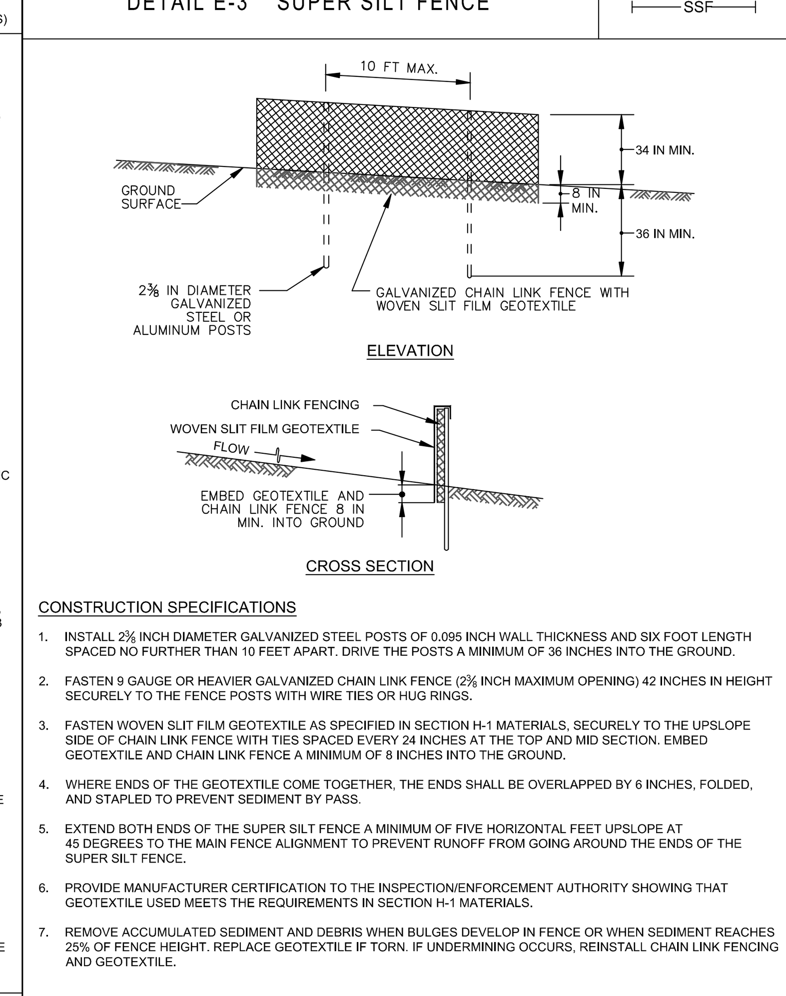
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

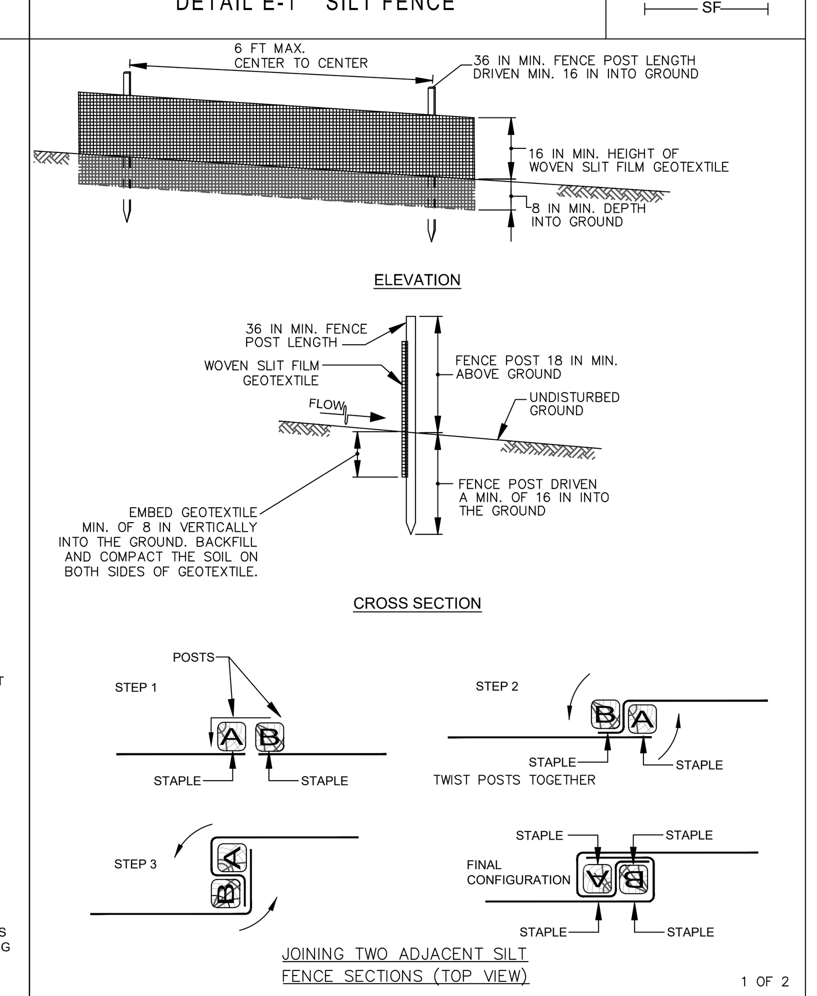
DETAIL B-4-6-A TEMPORARY SOIL STABILIZATION MATTING CHANNEL APPLICATION



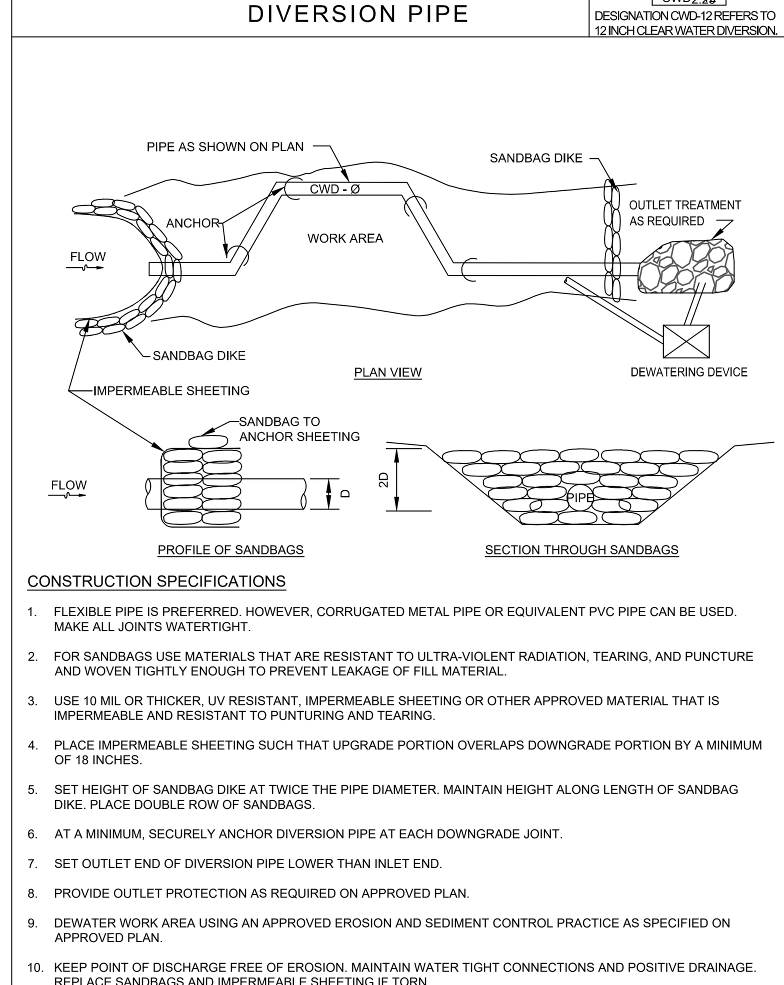
DETAIL E-3 SUPER SILT FENCE



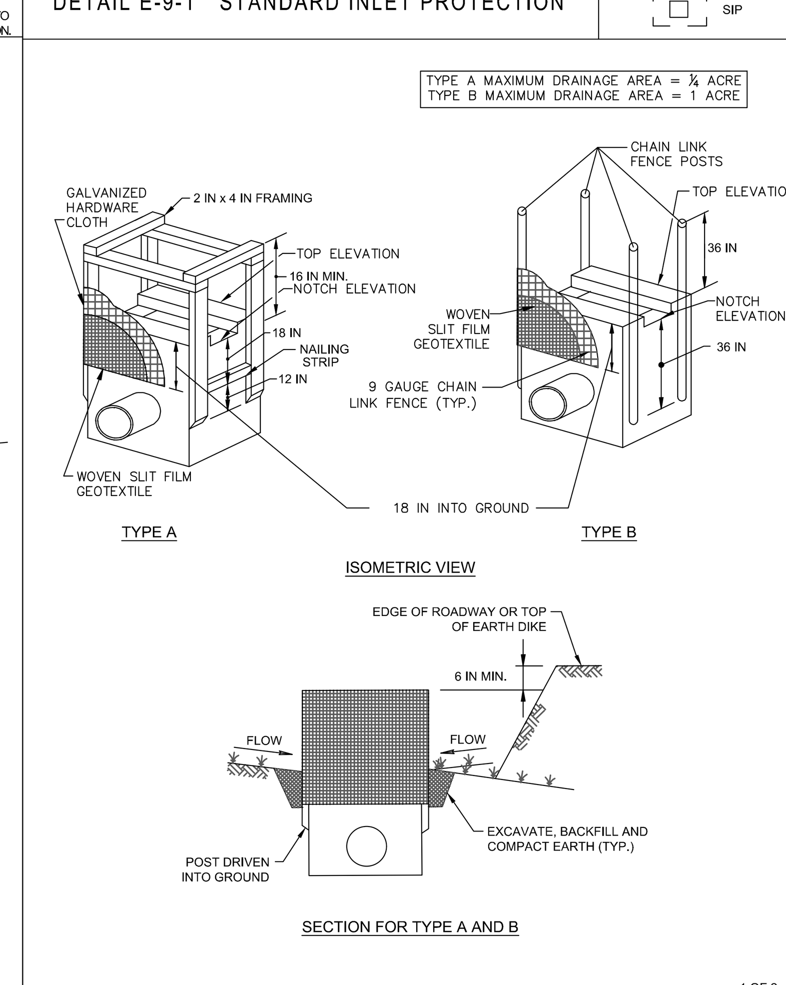
DETAIL E-1 SILT FENCE



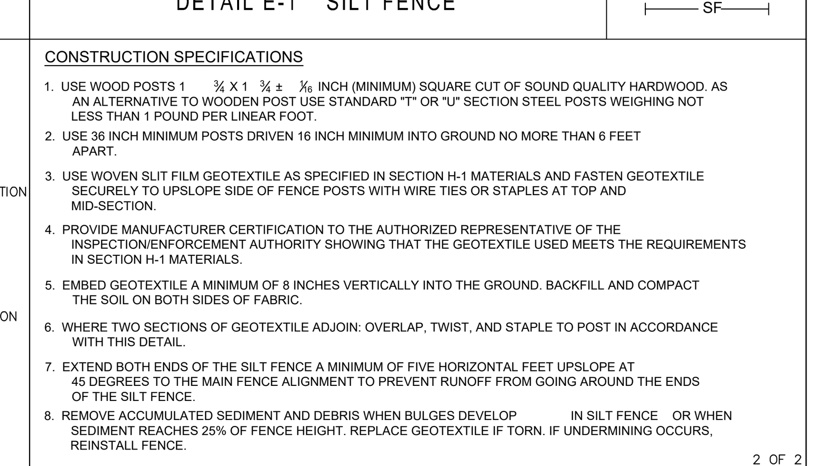
DETAIL C-6 CLEAR WATER DIVERSION PIPE



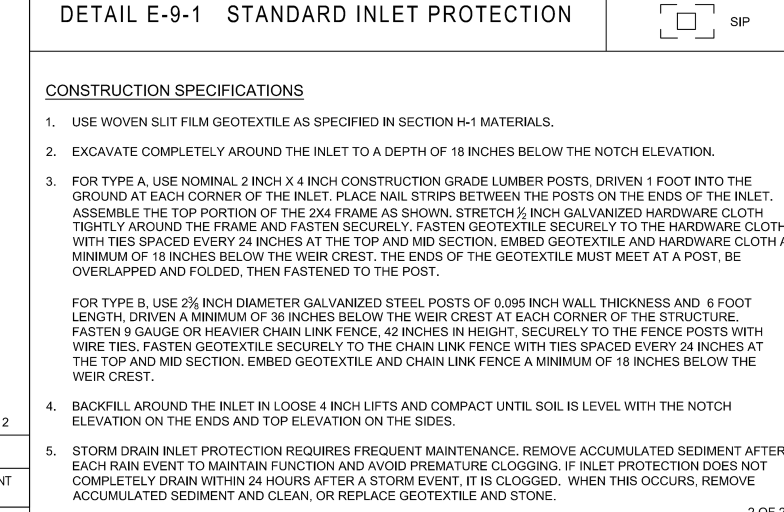
DETAIL E-9-1 STANDARD INLET PROTECTION



DETAIL E-1 SILT FENCE



DETAIL E-9-1 STANDARD INLET PROTECTION



HOWARD COUNTY SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTES

1. A PRE-CONSTRUCTION MEETING MUST OCCUR WITH THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION INSPECTION DIVISION (CID), 410-313-1855 AFTER THE FUTURE LOD AND PROTECTED AREAS ARE MARKED CLEARLY IN THE FIELD. A MINIMUM OF 48 HOUR NOTICE TO CID MUST BE GIVEN AT THE FOLLOWING STAGES:
   A. PRIOR TO THE START OF EARTH DISTURBANCE,
   B. UPON COMPLETION OF THE INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING,
   C. PRIOR TO THE START OF ANOTHER PHASE OF CONSTRUCTION OR OPENING OF ANOTHER GRADING UNIT,
   D. PRIOR TO THE REMOVAL OR MODIFICATION OF SEDIMENT CONTROL PRACTICES. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE. OTHER RELATED STATE AND FEDERAL PERMITS SHALL BE REFERENCED, TO ENSURE COORDINATION AND TO AVOID CONFLICTS WITH THIS PLAN.
2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, AND REVISIONS THERETO.
3. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION IS REQUIRED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED AREAS ON THE PROJECT SITE EXCEPT FOR THOSE AREAS UNDER ACTIVE GRADING.
4. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR TOPSOIL (SEC. B-4-2), PERMANENT SEEDING (SEC. B-4-5), TEMPORARY SEEDING (SEC. B-4-4) AND MULCHING (SEC. B-4-3). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES IF THE GROUND IS FROZEN. INCREMENTAL STABILIZATION (SEC. B-4-1) SPECIFICATIONS SHALL BE ENFORCED IN AREAS WITH >15' OF CUT AND/OR FILL. STOCKPILES (SEC. B-4-8) IN EXCESS OF 20 FT. MUST BE BENCHED WITH STABLE OUTLET. ALL CONCENTRATED FLOW, STEEP SLOPE, AND HIGHLY ERODIBLE AREAS SHALL RECEIVE SOIL STABILIZATION MATTING (SEC. B-4-6).
5. ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE, AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE CID.
6. SITE ANALYSIS:

TOTAL AREA OF SITE:	68.56 ACRES
TOTAL AREA OF DISTURBANCE (LOD):	48.77 AC.
AREA DISTURBED STEPS 1-13 (LOW):	48.77 AC.
AREA TO BE ROOFED OR PAVED:	17.24 ACRES
AREA TO BE VEGETATIVELY STABILIZED:	31.53 ACRES
TOTAL CUT (NEIGHBORHOOD C, D, & E):	65,452 CU. YDS.
TOTAL FILL (NEIGHBORHOOD C, D, & E):	99,411 CU. YDS.
OFFSITE WASTE/BORROW AREA LOCATION:	SITE WITH AN ACTIVE GRADING PERMIT

7. ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
8. ADDITIONAL SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE CID. THE SITE AND ALL CONTROLS SHALL BE INSPECTED BY THE CONTRACTOR WEEKLY; AND THE NEXT DAY AFTER EACH RAIN EVENT. A WRITTEN REPORT BY THE CONTRACTOR, MADE AVAILABLE UPON REQUEST, IS PART OF EVERY INSPECTION AND SHOULD INCLUDE:
   - INSPECTION DATE
   - INSPECTION TYPE (ROUTINE, PRE-STORM EVENT, DURING RAIN EVENT)
   - NAME AND TITLE OF INSPECTOR
   - WEATHER INFORMATION (CURRENT CONDITIONS AS WELL AS TIME AND AMOUNT OF LAST RECORDED PRECIPITATION)
   - BRIEF DESCRIPTION OF PROJECT'S STATUS (E.G., PERCENT COMPLETE) AND/OR CURRENT ACTIVITIES
   - EVIDENCE OF SEDIMENT DISCHARGES
   - IDENTIFICATION OF PLAN DEFICIENCIES
   - IDENTIFICATION OF SEDIMENT CONTROLS THAT REQUIRE MAINTENANCE
   - IDENTIFICATION OF MISSING OR IMPROPERLY INSTALLED SEDIMENT CONTROLS
   - COMPLIANCE STATUS REGARDING THE SEQUENCE OF CONSTRUCTION AND STABILIZATION REQUIREMENTS
   - PHOTOGRAPHS
   - MONITORING/SAMPLING
   - MAINTENANCE AND/OR CORRECTIVE ACTION PERFORMED
   - OTHER INSPECTION ITEMS AS REQUIRED BY THE GENERAL PERMIT FOR STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES (NPDES, MDE).
9. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN AND SHALL BE BACK-FILLED AND STABILIZED BY THE END OF EACH WORKDAY, WHICHEVER IS SHORTER.
10. ANY MAJOR CHANGES OR REVISIONS TO THE PLAN OR SEQUENCE OF CONSTRUCTION MUST BE REVIEWED AND APPROVED BY THE HSCD PRIOR TO PROCEEDING WITH CONSTRUCTION. MINOR REVISIONS MAY ALLOWED BY THE CID PER THE LIST OF HSCD-APPROVED FIELD CHANGES.
11. DISTURBANCE SHALL NOT OCCUR OUTSIDE THE L.O.D. A PROJECT IS TO BE SEQUENCED SO THAT GRADING ACTIVITIES BEGIN ON ONE GRADING UNIT (MAXIMUM ACREAGE OF 20 AC. PER GRADING UNIT) AT A TIME. WORK MAY PROCEED TO A SUBSEQUENT GRADING UNIT WHEN AT LEAST 50 PERCENT OF THE DISTURBED AREA IN THE PRECEDING GRADING UNIT HAS BEEN STABILIZED AND APPROVED BY THE CID. UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE HSCD, NO MORE THAN 30 ACRES CUMULATIVELY MAY BE DISTURBED AT A GIVEN TIME.
12. WASH WATER FROM ANY EQUIPMENT, VEHICLES, WHEELS, PAVEMENT, AND OTHER SOURCES MUST BE TREATED IN A SEDIMENT BASIN OR OTHER APPROVED WASHOUT STRUCTURE.
13. TOPSOIL SHALL BE STOCKPILED AND PRESERVED ON-SITE FOR REDISTRIBUTION ONTO FINAL GRADE.
14. ALL SILT FENCE AND SUPER SILT FENCE SHALL BE PLACED ON-THE-CONTOUR, AND BE IMBRICATED AT 25' MINIMUM INTERVALS, WITH LOWER ENDS CURLED UPHILL BY 2' IN ELEVATION.
15. STREAM CHANNELS MUST NOT BE DISTURBED DURING THE FOLLOWING RESTRICTED TIME PERIODS (INCLUSIVE):
   - USE I AND IP MARCH 1 - JUNE 15
   - USE III AND IIIP OCTOBER 1 - APRIL 30
   - USE IV MARCH 1 - MAY 31
16. A COPY OF THIS PLAN, THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, AND ASSOCIATED PERMITS SHALL BE ON-SITE AND AVAILABLE WHEN THE SITE IS ACTIVE.

B-4-7 STANDARDS AND SPECIFICATIONS FOR HEAVY USE AREA PROTECTION

DEFINITION

THE STABILIZATION OF AREAS FREQUENTLY AND INTENSIVELY USED BY SURFACING WITH SUITABLE MATERIALS (E.G., MULCH AND AGGREGATE).

PURPOSE

TO PROVIDE A STABLE, NON-ERODING SURFACE FOR AREAS FREQUENTLY USED AND TO IMPROVE THE WATER QUALITY FROM THE RUNOFF OF THESE AREAS.

CONDITIONS WHERE PRACTICE APPLIES

THIS PRACTICE APPLIES TO INTENSIVELY USED AREAS (E.G., EQUIPMENT AND MATERIAL STORAGE, STAGING AREAS, HEAVILY USED TRAVEL LANES).

CRITERIA

1. A MINIMUM 4-INCH BASE COURSE OF CRUSHED STONE OR OTHER SUITABLE MATERIALS INCLUDING WOOD CHIPS OVER NONWOVEN GEOTEXTILE SHOULD BE PROVIDED AS SPECIFIED IN SECTION H-1 MATERIALS.
2. SELECT THE STABILIZING MATERIAL BASED ON THE INTENDED USE, DESIRED MAINTENANCE FREQUENCY, AND RUNOFF CONTROL.
3. THE TRANSPORT OF SEDIMENTS, NUTRIENTS, OILS, CHEMICALS, PARTICULATE MATTER ASSOCIATED WITH VEHICULAR TRAFFIC AND EQUIPMENT, AND MATERIAL STORAGE NEEDS TO BE CONSIDERED IN THE SELECTION OF MATERIAL. ADDITIONAL CONTROL MEASURES MAY BE NECESSARY TO CONTROL SOME OF THESE POTENTIAL POLLUTANTS.
4. SURFACE EROSION CAN BE A PROBLEM ON LARGE HEAVY USE AREAS. IN THESE SITUATIONS, MEASURES TO REDUCE THE FLOW LENGTH OF RUNOFF OR EROSIVE VELOCITIES NEED TO BE CONSIDERED.

MAINTENANCE

THE HEAVY USE AREAS MUST BE MAINTAINED IN A CONDITION THAT MINIMIZES EROSION. THIS MAY REQUIRE ADDING SUITABLE MATERIAL, AS SPECIFIED ON THE APPROVED PLANS, TO MAINTAIN A CLEAN SURFACE.

B-4-8 STANDARDS AND SPECIFICATIONS FOR STOCKPILE AREA

DEFINITION

A MOUND OR PILE OF SOIL PROTECTED BY APPROPRIATELY DESIGNED EROSION AND SEDIMENT CONTROL MEASURES.

PURPOSE

TO PROVIDE A DESIGNATED LOCATION FOR THE TEMPORARY STORAGE OF SOIL THAT CONTROLS THE POTENTIAL FOR EROSION, SEDIMENTATION, AND CHANGES TO DRAINAGE PATTERNS.

CONDITIONS WHERE PRACTICE APPLIES

STOCKPILE AREAS ARE UTILIZED WHEN IT IS NECESSARY TO SALVAGE AND STORE SOIL FOR LATER USE.

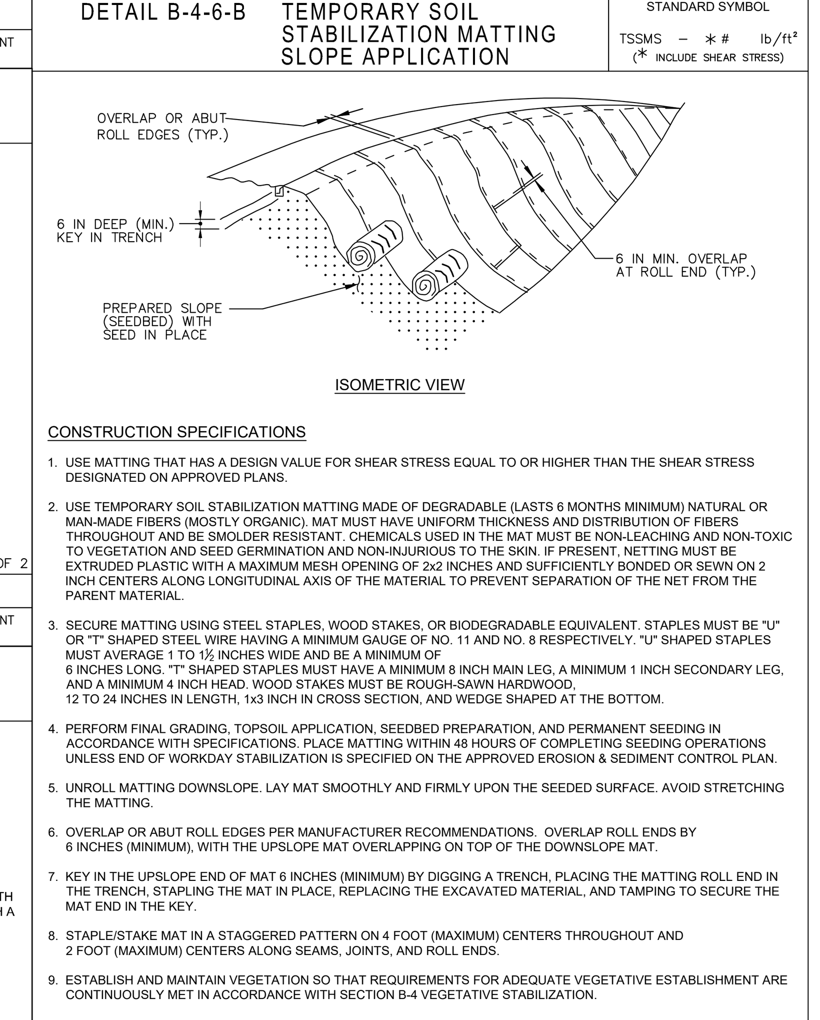
CRITERIA

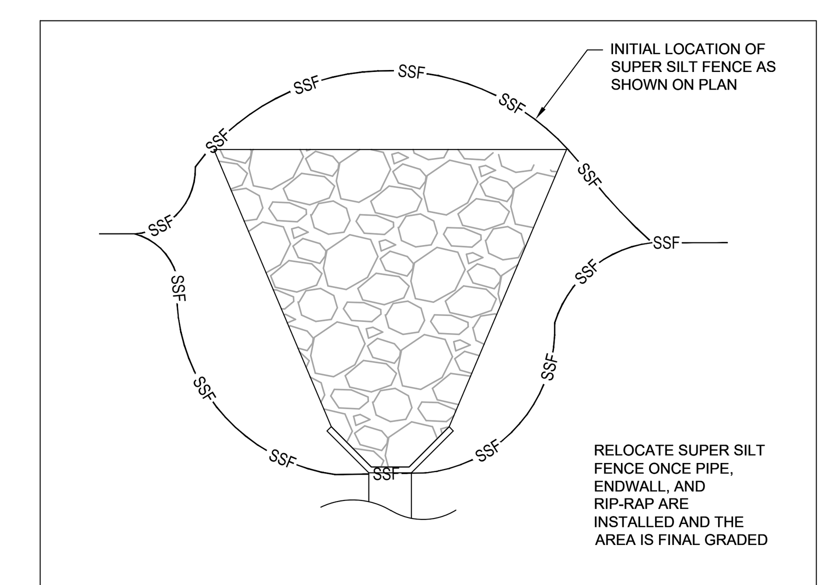
1. THE STOCKPILE LOCATION AND ALL RELATED SEDIMENT CONTROL PRACTICES MUST BE CLEARLY INDICATED ON THE EROSION AND SEDIMENT CONTROL PLAN.
2. THE FOOTPRINT OF THE STOCKPILE MUST BE SIZED TO ACCOMMODATE THE ANTICIPATED VOLUME OF MATERIAL AND BASED ON A SIDE SLOPE RATIO NO STEEPER THAN 2:1. BENCHING MUST BE PROVIDED IN ACCORDANCE WITH SECTION B-3 LAND GRADING.
3. RUNOFF FROM THE STOCKPILE AREA MUST DRAIN TO A SUITABLE SEDIMENT CONTROL PRACTICE.
4. ACCESS THE STOCKPILE AREA FROM THE UPGRADE SIDE.
5. CLEAR WATER RUNOFF INTO THE STOCKPILE AREA MUST BE MINIMIZED BY USE OF A DIVERSION DEVICE SUCH AS AN EARTH DIKE, TEMPORARY SWALE OR DIVERSION FENCE. PROVISIONS MUST BE MADE FOR DISCHARGING CONCENTRATED FLOW IN A NON-EROSIVE MANNER.
6. WHERE RUNOFF CONCENTRATES ALONG THE TOE OF THE STOCKPILE FILL, AN APPROPRIATE EROSION/SEDIMENT CONTROL PRACTICE MUST BE USED TO INTERCEPT THE DISCHARGE.
7. STOCKPILES MUST BE STABILIZED IN ACCORDANCE WITH THE 3/7 DAY STABILIZATION REQUIREMENT AS WELL AS STANDARD B-4-1 INCREMENTAL STABILIZATION AND STANDARD B-4-4 TEMPORARY STABILIZATION.
8. IF THE STOCKPILE IS LOCATED ON AN IMPERVIOUS SURFACE, A LINER SHOULD BE PROVIDED BELOW THE STOCKPILE TO FACILITATE CLEANUP. STOCKPILES CONTAINING CONTAMINATED MATERIAL MUST BE COVERED WITH IMPERMEABLE SHEETING.

MAINTENANCE

THE STOCKPILE AREA MUST CONTINUOUSLY MEET THE REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION. SIDE SLOPES MUST BE MAINTAINED AT NO STEEPER THAN A 2:1 RATIO. THE STOCKPILE AREA MUST BE KEPT FREE OF EROSION. IF THE VERTICAL HEIGHT OF A STOCKPILE EXCEEDS 20 FEET FOR 2:1 SLOPES, 30 FEET FOR 3:1 SLOPES, OR 40 FEET FOR 4:1 SLOPES, BENCHING MUST BE PROVIDED IN ACCORDANCE WITH SECTION B-3 LAND GRADING.

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





TYPICAL SUPER SILT FENCE INSTALLATION DETAIL AT PIPE OUTFALL

NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: [signature] 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: [signature] 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: CHAD Edmondson 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24

BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24

Jason Van Kirk, V.P.

PRINTED NAME & TITLE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

DocuSigned by: Alexander Bratchie 6/11/2024

HOWARD SOIL CONSERVATION DISTRICT — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. : WP-19-118, ECP-19-041, BA-CASE NO. 17-018C, ECP-21-017, WP-21-064, SP-19-005, F-22-033, WP-21-127, 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER — SITE CIVIL AND CONSULTING ENGINEERING, LAND SURVEYING, PROGRAM MANAGEMENT, LANDSCAPE ARCHITECTURE, SUSTAINABLE DESIGN, PERMITTING SERVICES, TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

811 Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	EROS - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

EROSION & SEDIMENT CONTROL NOTES AND DETAILS

SHEET NUMBER:

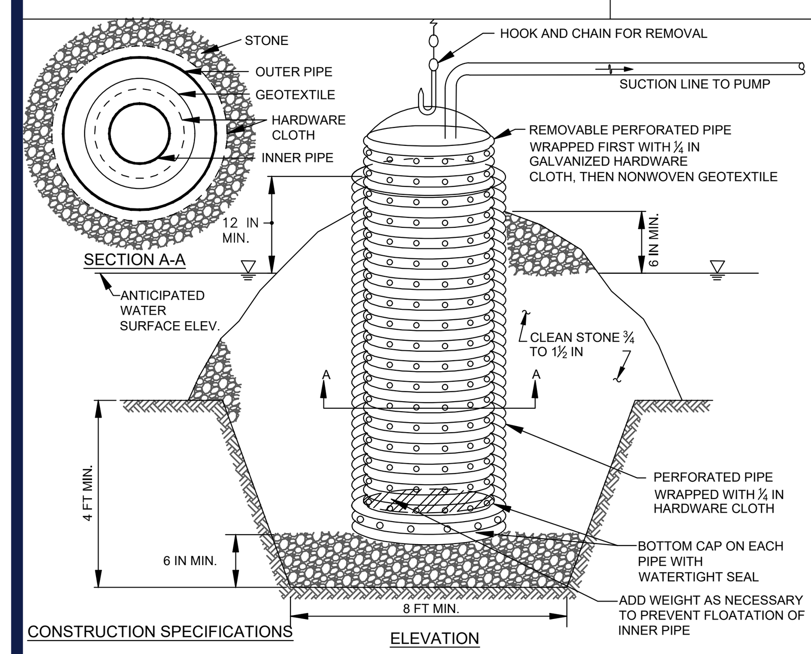
F-22-033

Mar 12, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - ODP - 2----->LAYOUT: 32 - E&S NOTES AND DETAILS AG

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F

DETAIL F-1 REMOVABLE PUMPING STATION

STANDARD SYMBOL: RPS



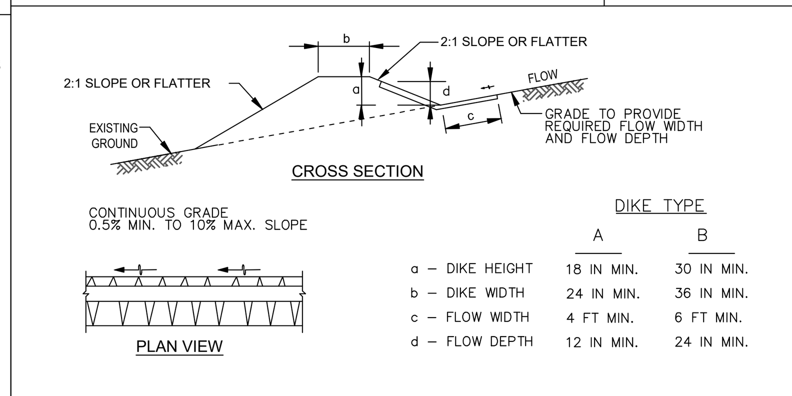
CONSTRUCTION SPECIFICATIONS

1. USE CORRUGATED METAL OR PLASTIC PIPE WITH 1 INCH DIAMETER PERFORATIONS 6 INCHES ON CENTER.
2. USE A MINIMUM 12 INCH DIAMETER INNER PIPE WITH AN OUTER PIPE A MINIMUM 6 INCHES LARGER IN DIAMETER. BOTTOM OF EACH PIPE MUST BE CAPPED WITH WATERTIGHT SEAL.
3. WRAP EACH PIPE WITH ¼ INCH GALVANIZED HARDWARE CLOTH. ON INNER PIPE WRAP NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE HARDWARE CLOTH.
4. EXCAVATE 8 FEET X 8 FEET X 4 FEET DEEP PIT FOR PIPE PLACEMENT. PLACE CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE, 6 INCHES IN DEPTH PRIOR TO PIPE PLACEMENT.
5. SET TOP OF INNER AND OUTER PIPES MINIMUM 12 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION (OR RISER CREST ELEVATION WHEN DEWATERING A BASIN).
6. BACKFILL PIT AROUND THE OUTER PIPE WITH ¾ TO 1½ INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE AND EXTEND STONE A MINIMUM OF 6 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
7. DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
8. A REMOVABLE PUMPING STATION REQUIRES FREQUENT MAINTENANCE. IF SYSTEM CLOGS, PULL OUT INNER PIPE AND REPLACE GEOTEXTILE. KEEP POINT OF DISCHARGE FREE OF EROSION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL C-1 EARTH DIKE

STANDARD SYMBOL: A-1



FLOW CHANNEL STABILIZATION

A-1 SEED WITH STRAW MULCH AND TACK. (NOT ALLOWED FOR CLEAR WATER DIVERSION.)
A-2/B-2 SEED WITH SOIL STABILIZATION MATTING OR LINE WITH SOD.
A-3/B-3 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PRESSED INTO SOIL A MINIMUM OF 7 INCHES AND FLUSH WITH GROUND.

CONSTRUCTION SPECIFICATIONS

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

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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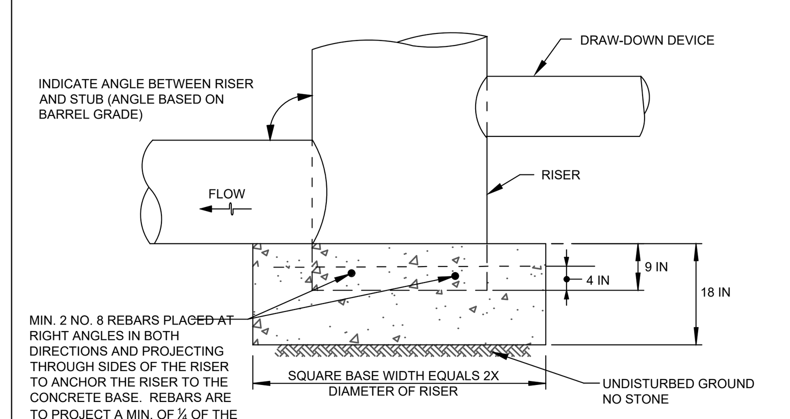
DETAIL G-2-2 CORRUGATED RISER BASE



CONSTRUCTION SPECIFICATIONS

1. BOTTOM OF CONCRETE BASE TO BE PLACED ON UNDISTURBED, NATURAL GROUND.
2. NO STONE IS ALLOWED UNDER BASE. IF NECESSARY, TO ACHIEVE STABILITY INCREASE DEPTH OF CONCRETE BASE.

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DETAIL G-2-3 CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE

STANDARD SYMBOL: TR

TRASH RACK CYLINDER					MINIMUM TOP	
RISER DIAM. (IN)	DIAM. (IN)	THICKNESS (GAUGE)	h (IN)	MINIMUM SIZE SUPPORT BAR	THICKNESS (GAUGE)	STIFFENER
12	18	16	14	#6 REBAR	16	N/A
15	21	16	15	#6 REBAR	16	N/A
18	27	16	16	#6 REBAR	16	N/A
21	30	16	19	#6 REBAR	16	N/A
24	36	16	21	#6 REBAR	14	N/A
27	42	16	21	#6 REBAR	14	N/A
36	54	14	25	#8 REBAR	12	N/A
42	60	14	27	#8 REBAR	12	N/A
48	72	12	29	1¼ IN PIPE OR 1¼ x 1¼ x ¼ ANGLE	10	N/A
54	78	12	33	1¼ IN PIPE OR 1¼ x 1¼ x ¼ ANGLE	10	N/A
60	90	12	37	1½ IN PIPE OR 1½ x 1½ x ¼ ANGLE	8	N/A
66	96	10	41	2 IN PIPE OR 2 x 2 x 3/16 ANGLE	8	2 x 2 x ¼ ANGLE
72	102	10	44	2 IN PIPE OR 2 x 2 x 3/16 ANGLE	8	2½ x 2½ x ¼ ANGLE
78	114	10	47	2½ IN PIPE OR 2 x 2 x ¼ ANGLE	8	2½ x 2½ x ¼ ANGLE
84	120	10	50	2½ IN PIPE OR 2½ x 2½ x ¼ ANGLE	8	2½ x 2½ x 5/16 ANGLE

NOTE:
THE ABOVE TRASH RACK AND ANTI-VORTEX DEVICE INFORMATION IS FOR CORRUGATED METAL PIPE ONLY. CONCRETE RISERS MUST MEET THE REQUIREMENTS OF MD 378.

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MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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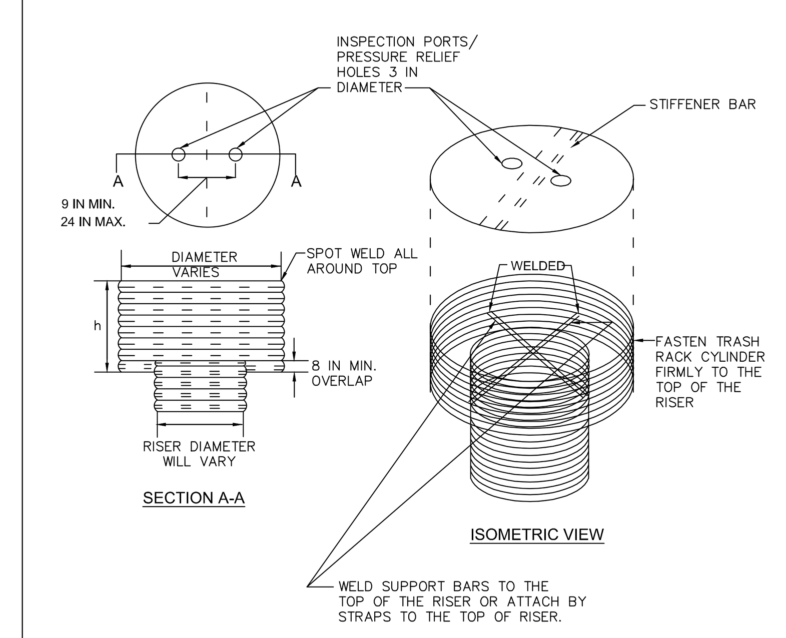
DETAIL G-2-3 CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE

STANDARD SYMBOL: TR



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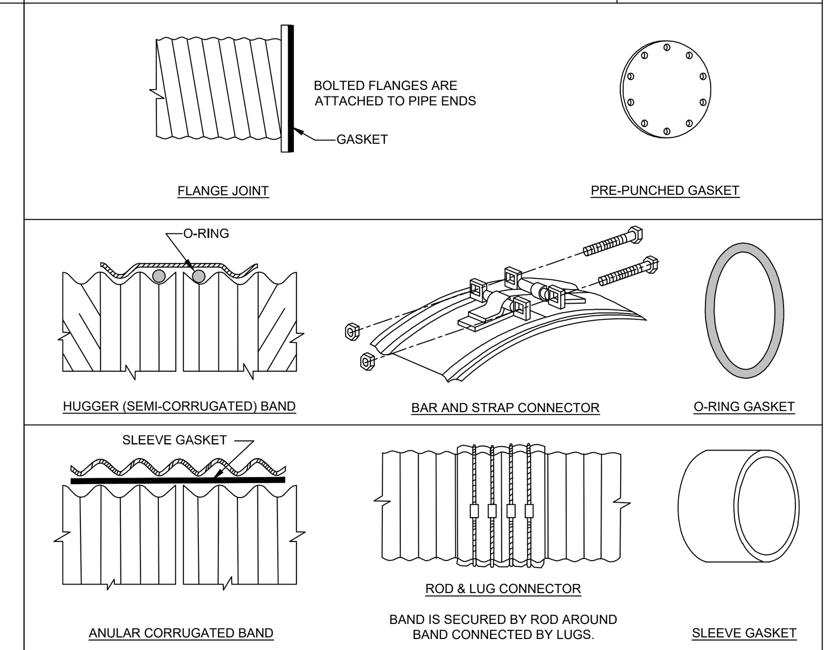
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL G-2-5 TYPES OF COUPLERS FOR CORRUGATED STEEL PIPE



NOTE:
UNDER NO CIRCUMSTANCE IS A DIMPLE (UNIVERSAL) BAND ACCEPTABLE FOR USE IN A SEDIMENT CONTROL OR STORMWATER MANAGEMENT STRUCTURE.

CONSTRUCTION SPECIFICATIONS

1. USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE-ROLLED WITH AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BAND WIDTH.
2. FOR PIPES LESS THAN 24 INCHES IN DIAMETER, PROVIDE ONE OF THE FOLLOWING TYPES OF CONNECTIONS:
   a. FLANGED JOINTS WITH ⅜ INCH CLOSED CELL GASKET THE FULL WIDTH OF THE FLANGE, PRE-PUNCHED TO THE FLANGE BOLT CIRCLES, SANDWICHED BETWEEN ADJACENT FLANGES, OR
   b. 12 INCH WIDE HUGGER TYPE BAND WITH O-RING GASKET HAVING A MINIMIMUM DIAMETER OF ½ INCH GREATER THAN THE CORRUGATION DEPTH.
3. FOR PIPES 24 INCHES IN DIAMETER AND LARGER, PROVIDE ONE OF THE FOLLOWING TYPES OF CONNECTIONS:
   a. 24 INCH WIDE ANNULAR CORRUGATED BAND WITH 24 INCH WIDE BY ⅜ INCH THICK CLOSED CELL CIRCULAR SLEEVE GASKET WITH 12 INCHES ON THE END OF EACH PIPE, CONNECTED WITH A MINIMUM OF 4 RODS AND LUGS, 2 ON EACH CONNECTING PIPE END, OR
   b. FLANGED JOINTS WITH ⅜ INCH CLOSED CELL GASKET THE FULL WIDTH OF THE FLANGE, PRE-PUNCHED TO THE FLANGE BOLT CIRCLES, AND SANDWICHED BETWEEN ADJACENT FLANGES.

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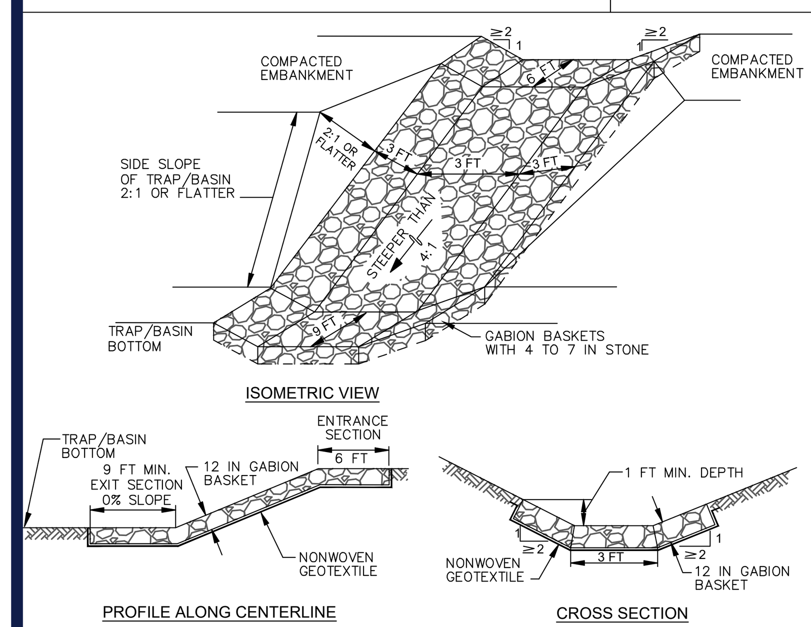
DETAIL D-3-2 GABION INFLOW PROTECTION

STANDARD SYMBOL: GP



CONSTRUCTION SPECIFICATIONS

1. PROVIDE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND ALONG SIDES OF ALL GABION BASKETS.
2. USE BASKETS MADE OF MINIMUM 11 GAUGE WIRE.
3. CONSTRUCT GABION INFLOW PROTECTION BY ARRANGING 9 X 3 X 1 FOOT GABION BASKETS TO FORM A TRAPEZOIDAL SECTION WITH A 3 FOOT BOTTOM WIDTH, 1 FOOT MINIMUM DEPTH, 3 FOOT SIDE WALLS, AND 2:1 OR FLATTER SIDE SLOPES. FILL GABION BASKETS WITH 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE WITHOUT REBAR OR WEIR MESH.
4. INSTALL ENTRANCE AND EXIT SECTIONS AS SHOWN ON THE PROFILE.
5. INSTALL GABIONS IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
6. BLEND GABIONS INTO EXISTING GROUND.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. KEEP POINTS OF INFLOW AND OUTFLOW FREE OF EROSION

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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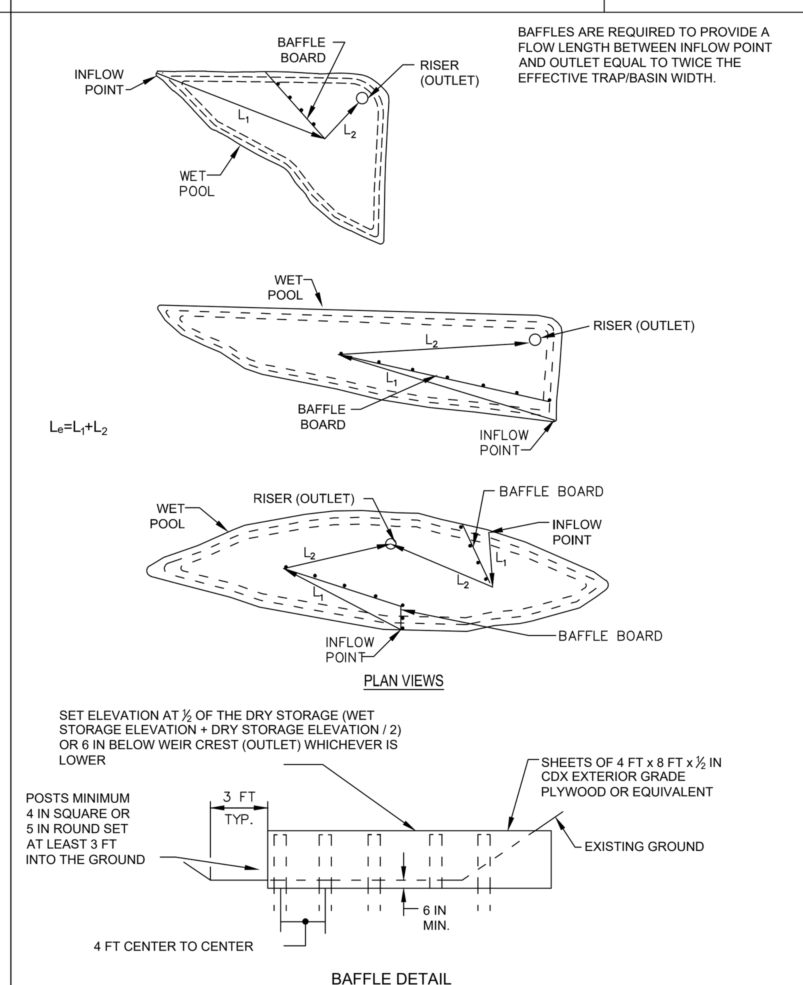
DETAIL G-2-4 BAFFLE BOARDS

STANDARD SYMBOL: BB



MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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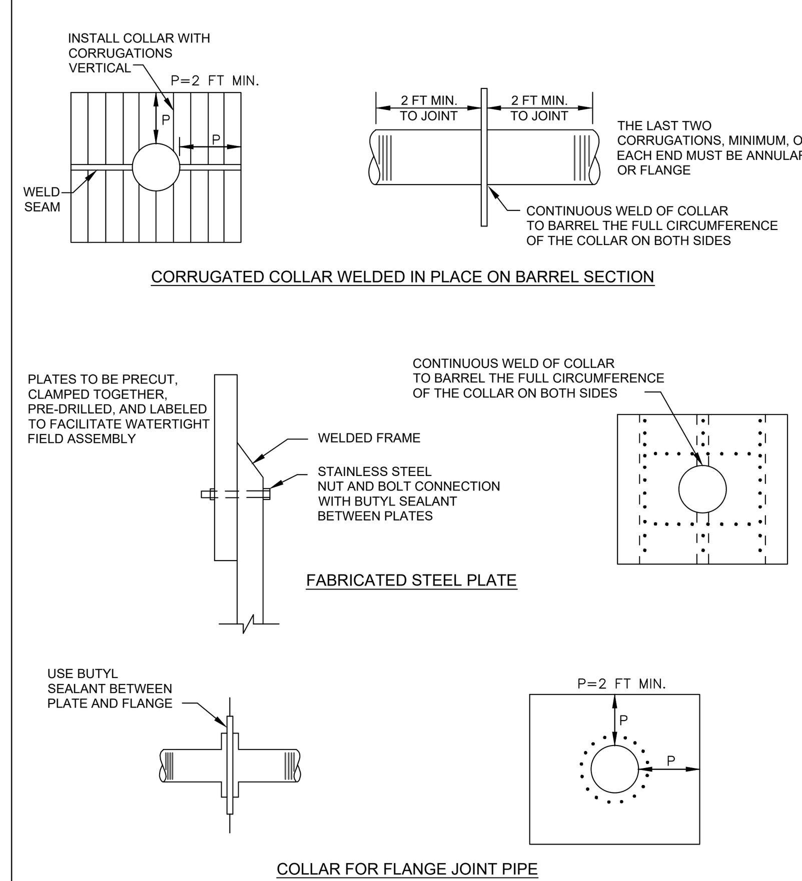
DETAIL G-2-1 TYPICAL ANTI-SEEP COLLARS



MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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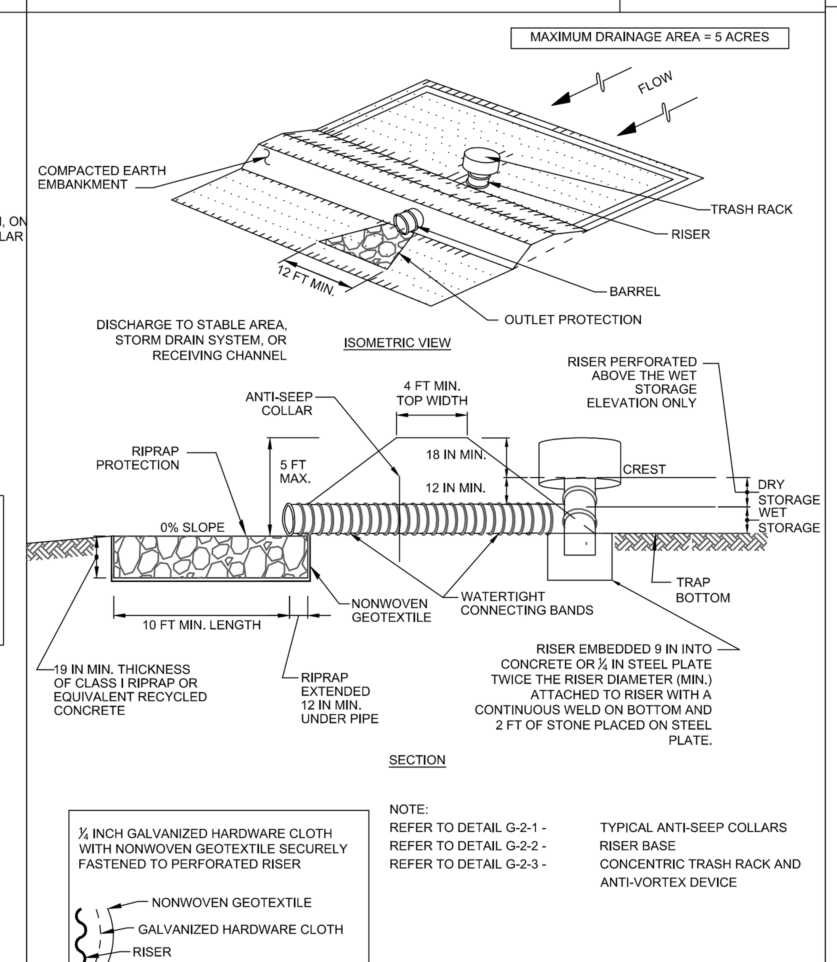
DETAIL G-1-1 PIPE OUTLET SEDIMENT TRAP ST-I

STANDARD SYMBOL: ST-I



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MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL G-1-1 PIPE OUTLET SEDIMENT TRAP ST-I

STANDARD SYMBOL: ST-I

CONSTRUCTION SPECIFICATIONS

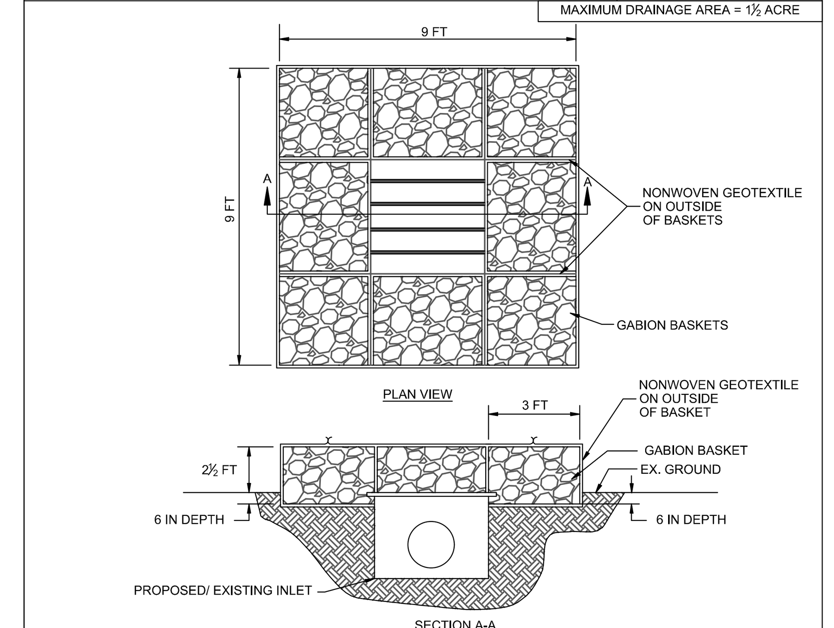
1. CONSTRUCT TRAP IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE AVOIDED.
2. CLEAR, GRUB, AND STRIP ANY VEGETATION AND ROOT MAT FROM THE AREA UNDER THE EMBANKMENT AND TRAP BOTTOM.
3. PERFORATE THE RISER WITH 1 INCH DIAMETER HOLES SPACED 6 INCHES ON CENTER WITH THE LOWEST PERFORATIONS AT THE WET STORAGE ELEVATION OR PROVIDE A HORIZONTAL OR VERTICAL DRAW-DOWN DEVICE PERFORATED ACCORDING TO APPROVED PLAN. DO NOT PERFORATE THE RISER WITHIN 6 INCHES OF THE TOP OF THE HORIZONTAL BARREL.
4. SET RISER/BARREL ASSEMBLY PRIOR TO EMBANKMENT CONSTRUCTION. MAKE ALL PIPE CONNECTIONS WATERTIGHT. OFFSET RISER FROM EMBANKEMENT TO ACCOMODATE PLACEMENT OF THE TRASH RACK. ANCHOR THE RISER WITH EITHER A REINFORCED CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. MAKE CONCRETE BASES AT LEAST TWICE THE RISER DIAMETER AND 18 INCHES THICK WITH THE RISER EMBEDDED 9 INCHES.
5. USE FILL MATERIAL FREE OF ROOTS, WOODY VEGETATION, OVERSIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL FOR THE EMBANKMENT.
6. HAND COMPACT IN 4 INCH LAYERS FILL MATERIAL AROUND THE PIPE SPILLWAY. PLACE A MINIMUM OF 2 FEET OF HAND COMPACTED BACKFILL OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
7. CONSTRUCT TOP OF EMBANKMENT 1 FOOT MINIMUM ABOVE RISER CREST. COMPACT THE EMBANKMENT BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
8. MAKE ALL CUT AND FILL SLOPES 2:1 OR FLATTER.
9. WRAP THE RISER WITH ¼ INCH GALVANIZED HARDWARE CLOTH THEN WRAP WITH NONWOVEN GEOTEXTILE. DO NOT WRAP WITH MORE THAN ONE LAYER OF GEOTEXTILE. EXTEND HARDWARE CLOTH AND GEOTEXTILE AT LEAST 6 INCHES ABOVE THE HIGHEST PERFORATIONS AND AT LEAST 6 INCHES BELOW THE LOWEST PERFORATIONS. OVERLAP, FOLD AND FASTEN WHERE ENDS OF GEOTEXTILE COME TOGETHER TO PREVENT BYPASS. REPLACE GEOTEXTILE AS NECESSARY TO PREVENT CLOGGING.
10. USE STRAPS OR CONNECTING BANDS AT THE TOP AND BOTTOM OF THE GEOTEXTILE TO HOLD THE GEOTEXTILE AND HARDWARE CLOTH IN PLACE.
11. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
12. STABILIZE THE EMBANKMENT AND INTERIOR SLOPES WITH SEED AND MULCH. STABILIZE POINTS OF CONCENTRATED INFLOW AS SHOWN ON APPROVED PLAN.
13. CONSTRUCT AND MAINTAIN THE OUTLET ACCORDING TO THE APPROVED PLAN AND IN SUCH A MANNER THAT EROSION AT OR BELOW THE OUTLET DOES NOT OCCUR.
14. REMOVE SEDIMENT AND RESTORE TRAP TO ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO CLEANOUT ELEVATION (50% OF WET STORAGE DEPTH). DEPOSIT REMOVED SEDIMENT IN AN APPROVED AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE. KEEP POINTS OF INFLOW AND OUTFLOW AS WELL AS INTERIOR OF THE TRAP FREE FROM EROSION, AND REMOVE ACCUMULATED DEBRIS. MAINTAIN EMBANKMENTS TO CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION. REMOVE ANY TREES, BRUSH, OR OTHER WOODY VEGETATION GROWING ON EMBANKMENT OR NEAR PRINCIPAL SPILLWAY. MAINTAIN LINE, GRADE, AND CROSS SECTION. MAINTAIN WATER TIGHT CONNECTIONS. REPLACE GEOTEXTILE AROUND PERFORATED RISER IF DRY STORAGE VOLUME DOES NOT DRAW DOWN WITHIN 10 HOURS.
15. WHEN DEWATERING TRAP, PASS REMOVED WATER THROUGH AN APPROVED SEDIMENT CONTROL PRACTICE.
16. UPON REMOVAL, GRADE AND STABILIZE THE AREA OCCUPIED BY TRAP.

2 OF 3

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-9-7 GABION INLET PROTECTION

STANDARD SYMBOL: GIP



CONSTRUCTION SPECIFICATIONS

1. USE BASKETS MADE OF 11 GAUGE WIRE OR HEAVIER.
2. WRAP 3 FEET x 3 FEET GABION BASKETS (LENGTH VARIABLE) WITH NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVERLAPPING AT THE TOP AND FASTEN THE GEOTEXTILE AT THE TOP OF THE BASKET WITH WIRE FASTENERS (HOG RINGS) AT A MAXIMUM OF 1 FOOT INTERVALS ALONG THE SEAM.
3. AVOID TEARING OR DAMAGING GEOTEXTILE.
4. ENTRENCH GABION BASKETS TO A DEPTH OF 6 INCHES.
5. PLACE AND INTERLOCK GABION BASKETS WITH NO GAPS.
6. FILL GABION BASKETS WITH CLEAN 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE WITHOUT REBAR OR MESH.
7. STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS CLOGGED. WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN, OR REPLACE GEOTEXTILE AND STONE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — 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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

OWNER'S/DEVELOPER'S CERTIFICATION

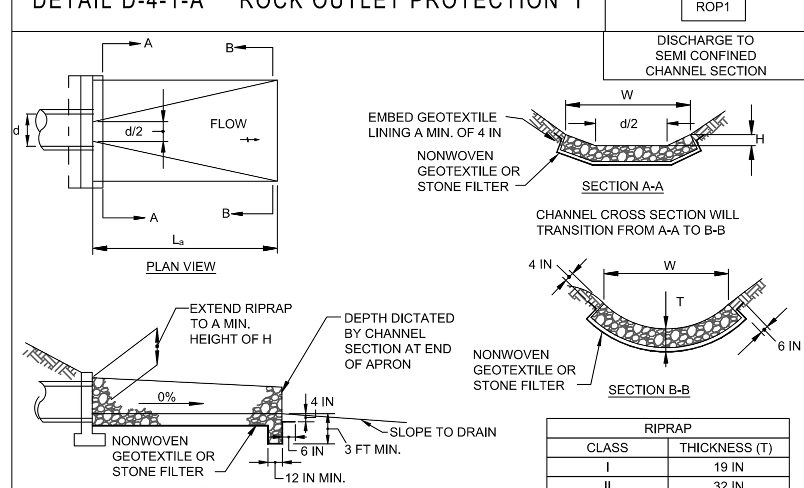
"I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
Alexander Bratchie — 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

DETAIL D-4-1-A ROCK OUTLET PROTECTION I

STANDARD SYMBOL: ROPI



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

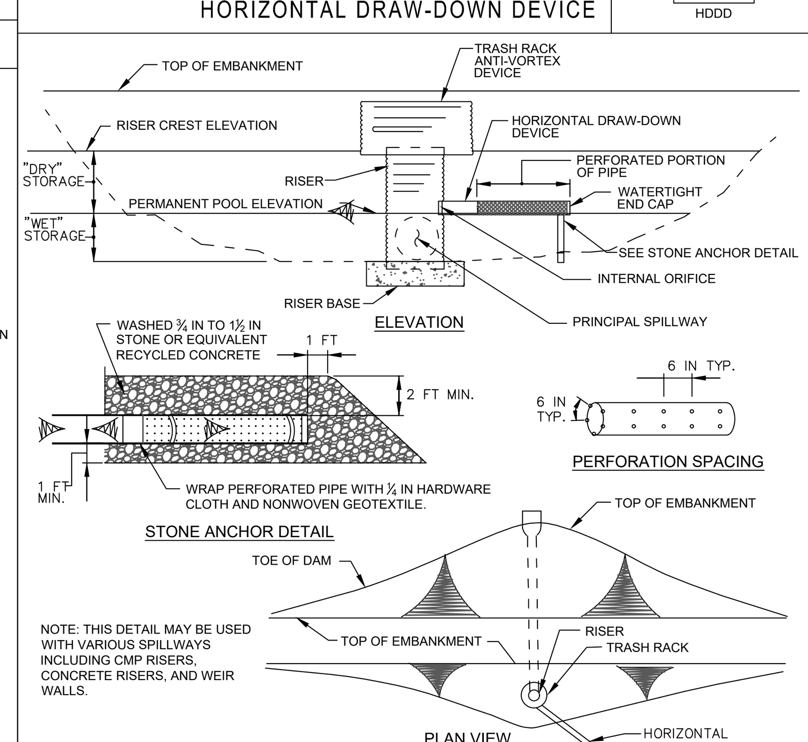
CONSTRUCTION SPECIFICATIONS

1. RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.
2. 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.
3. PREPARE THE SUBGRADE FOR GEOTEXTILE OR STONE FILTER (⅜ TO 1½ 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.
4. EXTEND GEOTEXTILE AT LEAST 6 INCHES BEYOND EDGES OF RIPRAP AND EMBED AT LEAST 4 INCHES AT SIDES OF THE RIPRAP.
5. 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 HOMOGENOUS 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.
6. 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.
7. CONSTRUCT APRON WITH 0% SLOPE ALONG ITS LENGTH AND WITHOUT OBSTRUCTIONS. PLACE STONE SO THAT IT BLENDS IN WITH EXISTING GROUND.
8. 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.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

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

STANDARD SYMBOL: HDDD



NOTE: THIS DETAIL MAY BE USED WITH VARIOUS SPILLWAYS INCLUDING CMP RISERS, CONCRETE RISERS, AND WEIR WALLS.

CONSTRUCTION SPECIFICATIONS

1. PERFORATE PIPE WITH 1 INCH DIAMETER PERFORATIONS SPACED 6 INCHES APART LONGITUDINALLY AND RADIALLY OR IN ACCORDANCE WITH APPROVED PLAN.
2. WRAP THE PERFORATED PORTION OF THE DRAW-DOWN DEVICE FIRST WITH ¼ INCH GALVANIZED HARDWARE CLOTH, THEN WITH NONWOVEN GEOTEXTILE. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS. DO NOT WRAP WITH MORE THAN ONE LAYER OF GEOTEXTILE.
3. AS AN ALTERNATE TO STONE ANCHORING, SECURE DRAW-DOWN DEVICE WITH TWO 1 INCH STEEL ANGLES SET 3 FEET MINIMUM INTO THE GROUND ATTACHED TO DRAW-DOWN DEVICE BY A 1 INCH WIDE GALVANIZED STEEL STRAP OR 12 GAUGE OR HEAVIER WIRE.
4. REMOVE SEDIMENT WHEN IT ACCUMULATES TO CLEANOUT ELEVATION (50% OF THE WET STORAGE DEPTH). DEPOSIT REMOVED SEDIMENT IN AN APPROVED AREA IN A SUCH A MANNER THAT IT WILL NOT ERODE. MAINTAIN WATER TIGHT CONNECTIONS. REPLACE GEOTEXTILE AROUND PERFORATED RISER IF DRY STORAGE VOLUME DOES NOT DRAW DOWN WITHIN 10 HOURS.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
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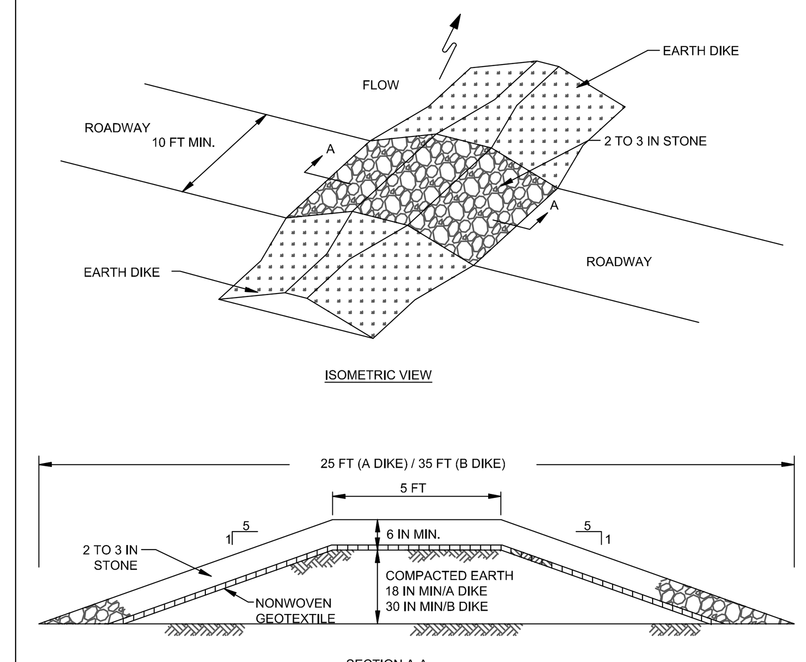
DETAIL C-8 MOUNTABLE BERM

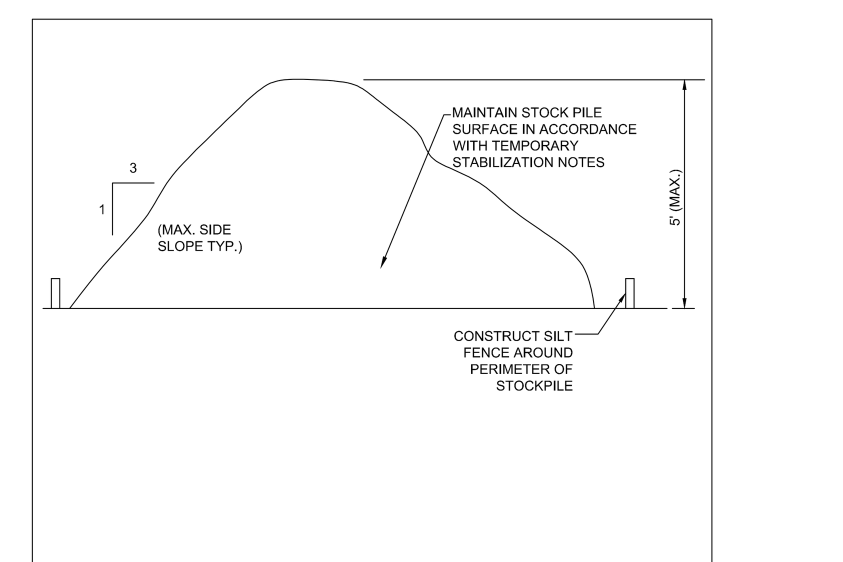
STANDARD SYMBOL: MB



CONSTRUCTION SPECIFICATIONS

1. USE MINIMUM WIDTH OF 10 FEET TO ALLOW FOR VEHICULAR PASSAGE.
2. PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE EARTH MOUND PRIOR TO PLACING STONE.
3. PLACE 2 TO 3 INCH STONE OR EQUIVALENT RECYCLED CONCRETE AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE MOUNTABLE BERM.
4. MAINTAIN LINE, GRADE, AND CROSS SECTION. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN SPECIFIED DIMENSIONS. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. MAINTAIN POSITIVE DRAINAGE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



TEMPORARY STOCKPILE DETAIL

NOT TO SCALE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.: WP-19-118, ECP-19-041, BA-CASE NO. 17-018C, ECP-21-017, WP-21-064, SP-19-005, F-22-033, WP-21-127, 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 — GRID: 15 — ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
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PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: ODP- 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

— FOR —

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

EROSION & SEDIMENT CONTROL NOTES AND DETAILS

SHEET NUMBER:

F-22-033

Mar 12, 2024 H:\152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - ODP - 2----->LAYOUT: 33 - E&S NOTES AND DETAILS

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B-4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

DEFINITION
USING VEGETATION AS COVER TO PROTECT EXPOSED SOIL FROM EROSION.

PURPOSE
TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL.

CONDITIONS WHERE PRACTICE APPLIES
ON ALL DISTURBED AREAS NOT STABILIZED BY OTHER METHODS. THIS SPECIFICATION IS DIVIDED INTO SECTIONS ON INCREMENTAL STABILIZATION; SOIL PREPARATION, SOIL AMENDMENTS AND TOPSOILING; SEEDING AND MULCHING; TEMPORARY STABILIZATION; AND PERMANENT STABILIZATION.

EFFECTS ON WATER QUALITY AND QUANTITY
STABILIZATION PRACTICES ARE USED TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL. WHEN SOIL IS STABILIZED WITH VEGETATION, THE SOIL IS LESS LIKELY TO ERODE AND MORE LIKELY TO ALLOW INFILTRATION OF RAINFALL, THEREBY REDUCING SEDIMENT LOADS AND RUNOFF TO DOWNSTREAM AREAS.
PLANTING VEGETATION IN DISTURBED AREAS WILL HAVE AN EFFECT ON THE WATER BUDGET, ESPECIALLY ON VOLUMES AND RATES OF RUNOFF, INFILTRATION, EVAPORATION, TRANSPIRATION, PERCOLATION, AND GROUNDWATER RECHARGE. OVER TIME, VEGETATION WILL INCREASE ORGANIC MATTER CONTENT AND IMPROVE THE WATER HOLDING CAPACITY OF THE SOIL AND SUBSEQUENT PLANT GROWTH.
VEGETATION WILL HELP REDUCE THE MOVEMENT OF SEDIMENT, NUTRIENTS, AND OTHER CHEMICALS CARRIED BY RUNOFF TO RECEIVING WATERS. PLANTS WILL ALSO HELP PROTECT GROUNDWATER SUPPLIES BY ASSIMILATING THOSE SUBSTANCES PRESENT WITHIN THE ROOT ZONE.
SEDIMENT CONTROL PRACTICES MUST REMAIN IN PLACE DURING GRADING, SEEDBED PREPARATION, SEEDING, MULCHING, AND VEGETATIVE ESTABLISHMENT.

ADEQUATE VEGETATIVE ESTABLISHMENT
INSPECT SEEDED AREAS FOR VEGETATIVE ESTABLISHMENT AND MAKE NECESSARY REPAIRS, REPLACEMENTS, AND RESEEDINGS WITHIN THE PLANTING SEASON.
1. ADEQUATE VEGETATIVE STABILIZATION REQUIRES 95 PERCENT GROUNDCOVER.
2. IF AN AREA HAS LESS THAN 40 PERCENT GROUNDCOVER, RESTABILIZE FOLLOWING THE ORIGINAL RECOMMENDATIONS FOR LIME, FERTILIZER, SEEDBED PREPARATION, AND SEEDING.
3. IF AN AREA HAS BETWEEN 40 AND 94 PERCENT GROUNDCOVER, OVER-SEED AND FERTILIZE USING HALF OF THE RATES ORIGINALLY SPECIFIED.
4. MAINTENANCE FERTILIZER RATES FOR PERMANENT SEEDING ARE SHOWN IN TABLE B.6.

B-4-1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION

DEFINITION
ESTABLISHMENT OF VEGETATIVE COVER ON CUT AND FILL SLOPES.

PURPOSE
TO PROVIDE TIMELY VEGETATIVE COVER ON CUT AND FILL SLOPES AS WORK PROGRESSES.

CONDITIONS WHERE PRACTICE APPLIES
ANY CUT OR FILL SLOPE GREATER THAN 15 FEET IN HEIGHT. THIS PRACTICE ALSO APPLIES TO STOCKPILES.

CRITERIA
A. INCREMENTAL STABILIZATION - CUT SLOPES
1. EXCAVATE AND STABILIZE CUT SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL CUT SLOPES AS THE WORK PROGRESSES.
2. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.1):
   a. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO CONVEY RUNOFF AROUND THE EXCAVATION.
   b. PERFORM PHASE 1 EXCAVATION, PREPARE SEEDBED, AND STABILIZE.
   c. PERFORM PHASE 2 EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PHASE 1 AREAS AS NECESSARY.
   d. PERFORM FINAL PHASE EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE EXCAVATION HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

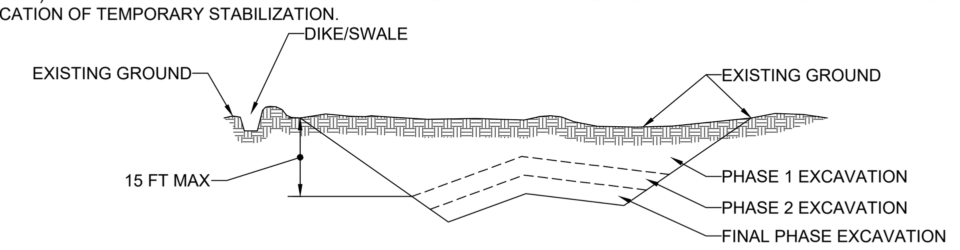

FIGURE B.1: INCREMENTAL STABILIZATION - CUT

B. INCREMENTAL STABILIZATION - FILL SLOPES
1. CONSTRUCT AND STABILIZE FILL SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL SLOPES AS THE WORK PROGRESSES.
2. STABILIZE SLOPES IMMEDIATELY WHEN THE VERTICAL HEIGHT OF A LIFT REACHES 15 FEET, OR WHEN THE GRADING OPERATION CEASES AS PRESCRIBED IN THE PLANS.
3. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
4. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.2):
   a. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO DIVERT RUNOFF AROUND THE FILL. CONSTRUCT SILT FENCE ON LOW SIDE OF FILL UNLESS OTHER METHODS SHOWN ON THE PLANS ADDRESS THIS AREA.
   b. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
   c PLACE PHASE 1 FILL, PREPARE SEEDBED, AND STABILIZE.
   d. PLACE PHASE 2 FILL, PREPARE SEEDBED, AND STABILIZE.
   e. PLACE FINAL PHASE FILL, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE THE PLACEMENT OF FILL HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

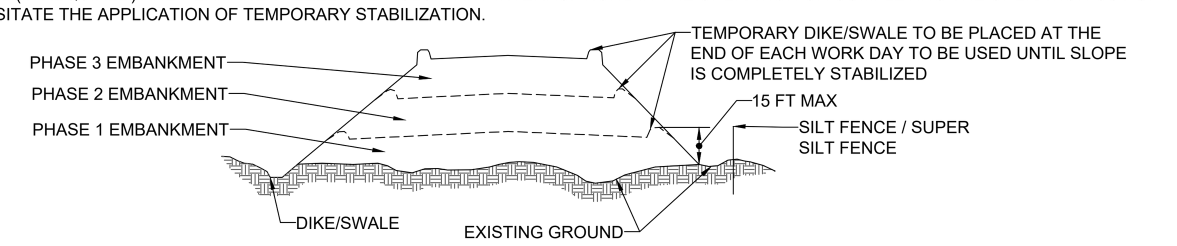

FIGURE B.2: INCREMENTAL STABILIZATION - FILL

B-4-2 STANDARDS AND SPECIFICATIONS FOR FOR SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

DEFINITION
THE PROCESS OF PREPARING THE SOILS TO SUSTAIN ADEQUATE VEGETATIVE STABILIZATION.

PURPOSE
TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH.

CONDITIONS WHERE PRACTICE APPLIES
WHERE VEGETATIVE STABILIZATION IS TO BE ESTABLISHED.

CRITERIA
A. SOIL PREPARATION
1. TEMPORARY STABILIZATION
   a. SEEDBED PREPARATION CONSISTS OF LOOSENING SOIL TO A DEPTH OF 3 TO 5 INCHES BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS OR CHISEL PLOWS OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED, IT MUST NOT BE ROLLED OR DRAGGED SMOOTH BUT LEFT IN THE ROUGHENED CONDITION. SLOPES 3:1 OR FLATTER ARE TO BE TRACKED WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.
   b. APPLY FERTILIZER AND LIME AS PRESCRIBED ON THE PLANS.
   c. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
2. PERMANENT STABILIZATION
   a. A SOIL TEST IS REQUIRED FOR ANY EARTH DISTURBANCE OF 5 ACRES OR MORE. THE MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT ARE:
      i. SOIL PH BETWEEN 6.0 AND 7.0.
      ii. SOLUBLE SALTS LESS THAN 500 PARTS PER MILLION (PPM).
      iii. SOIL CONTAINS LESS THAN 40 PERCENT CLAY BUT ENOUGH FINE GRAINED MATERIAL (GREATER THAN 30 PERCENT SILT PLUS CLAY) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION: IF LOVEGRASS WILL BE PLANTED, THEN A SANDY SOIL (LESS THAN 30 PERCENT SILT PLUS CLAY) WOULD BE ACCEPTABLE.
      iv. SOIL CONTAINS 1.5 PERCENT MINIMUM ORGANIC MATTER BY WEIGHT.
      v. SOIL CONTAINS SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.
   b. APPLICATION OF AMENDMENTS OR TOPSOIL IS REQUIRED IF ON-SITE SOILS DO NOT MEET THE ABOVE CONDITIONS.
   c. GRADED AREAS MUST BE MAINTAINED IN A TRUE AND EVEN GRADE AS SPECIFIED ON THE APPROVED PLAN, THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES.
   d. APPLY SOIL AMENDMENTS AS SPECIFIED ON THE APPROVED PLAN OR AS INDICATED BY THE RESULTS OF A SOIL TEST.
   e. MIX SOIL AMENDMENTS INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS. RAKE LAWN AREAS TO SMOOTH THE SURFACE, REMOVE LARGE OBJECTS LIKE STONES AND BRANCHES, AND READY THE AREA FOR SEED APPLICATION. LOOSEN SURFACE SOIL BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION. TRACK SLOPES 3:1 OR FLATTER WITH TRACKED EQUIPMENT LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. LEAVE THE TOP 1 TO 3 INCHES OF SOIL LOOSE AND FRIABLE. SEEDBED LOOSENING MAY BE UNNECESSARY ON NEWLY DISTURBED AREAS.

B. TOPSOILING
1. TOPSOIL IS PLACED OVER PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION. THE PURPOSE IS TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.
2. TOPSOIL SALVAGED FROM AN EXISTING SITE MAY BE USED PROVIDED IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-NRCS.
3. TOPSOILING IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPES WHERE:
   a. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.
   b. THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.
   c. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.
   d. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT FEASIBLE.
4. AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN.
5. TOPSOIL SPECIFICATIONS: SOIL TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING CRITERIA:
   a. TOPSOIL MUST BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, OR LOAMY SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. TOPSOIL MUST NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND MUST CONTAIN LESS THAN 5 PERCENT BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH, OR OTHER MATERIALS LARGER THAN 1½ INCHES IN DIAMETER.
   b. TOPSOIL MUST BE FREE OF NOXIOUS PLANTS OR PLANT PARTS SUCH AS BERMUDA GRASS, QUACK GRASS, JOHNSON GRASS, NUT SEDGE, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.
   c. TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED BY A QUALIFIED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF NATURAL
6. TOPSOIL APPLICATION
   a. EROSION AND SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED WHEN APPLYING TOPSOIL.
   b. UNIFORMLY DISTRIBUTE TOPSOIL IN A 5 TO 8 INCH LAYER AND LIGHTLY COMPACT TO A MINIMUM THICKNESS OF 4 INCHES. SPREADING IS TO BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL PREPARATION AND TILLAGE. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS MUST BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.
   c. TOPSOIL MUST NOT BE PLACED IF THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.

A. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)
1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OF 5 ACRES OR MORE. SOIL ANALYSIS MAY BE PERFORMED BY A RECOGNIZED PRIVATE OR COMMERCIAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSES.
2. FERTILIZERS MUST BE UNIFORM IN COMPOSITION, FREE FLOWING AND SUITABLE FOR ACCURATE APPLICATION BY APPROPRIATE EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS MUST ALL BE DELIVERED TO THE SITE FULLY LABELED ACCORDING TO THE APPLICABLE LAWS AND MUST BEAR THE NAME, TRADE NAME OR TRADEMARK AND WARRANTY OF THE PRODUCER.
3. LIME MATERIALS MUST BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED EXCEPT WHEN HYDROSEEDING) WHICH CONTAINS AT LEAST 50 PERCENT TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUM OXIDE). LIMESTONE MUST BE GROUND TO SUCH FINENESS THAT AT LEAST 50 PERCENT WILL PASS THROUGH A #100 MESH SIEVE AND 98 TO 100 PERCENT WILL PASS THROUGH A #20 MESH SIEVE.
4. LIME AND FERTILIZER ARE TO BE EVENLY DISTRIBUTED AND INCORPORATED INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
5. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, SPREAD GROUND LIMESTONE AT THE RATE OF 4 TO 8 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL.

B-4-3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING

DEFINITION
THE APPLICATION OF SEED AND MULCH TO ESTABLISH VEGETATIVE COVER.

PURPOSE
TO PROTECT DISTURBED SOILS FROM EROSION DURING AND AT THE END OF CONSTRUCTION.

CONDITIONS WHERE PRACTICE APPLIES
TO THE SURFACE OF ALL PERIMETER CONTROLS, SLOPES, AND ANY DISTURBED AREA NOT UNDER ACTIVE GRADING.

CRITERIA
A. SEEDING
1. SPECIFICATIONS
   a. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED MUST BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED MUST HAVE BEEN TESTED WITHIN THE 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON ANY PROJECT. REFER TO TABLE B.4 REGARDING THE QUALITY OF SEED. SEED TAGS MUST BE AVAILABLE UPON REQUEST TO THE INSPECTOR TO VERIFY TYPE OF SEED AND SEEDING RATE.
   b. MULCH ALONE MAY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES ONLY IF THE GROUND IS FROZEN. THE APPROPRIATE SEEDING MIXTURE MUST BE APPLIED WHEN THE GROUND THAWS.
   c. INOCULANTS: THE INOCULANT FOR TREATING LEGUME SEED IN THE SEED MIXTURES MUST BE A PURE CULTURE OF NITROGEN FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS MUST NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANTS AS DIRECTED ON THE PACKAGE. USE FOUR TIMES THE RECOMMENDED RATE WHEN HYDROSEEDING. NOTE: IT IS VERY IMPORTANT TO KEEP INOCULANT AS COOL AS POSSIBLE UNTIL USED. TEMPERATURES ABOVE 75 TO 80 DEGREES FAHRENHEIT CAN WEAKEN BACTERIA AND MAKE THE INOCULANT LESS EFFECTIVE.
   d. SOD OR SEED MUST NOT BE PLACED ON SOIL WHICH HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL UNTIL SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF PHYTO-TOXIC MATERIALS.
2. APPLICATION
   a. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.
      i. INCORPORATE SEED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON TEMPORARY SEEDING TABLE B.1, PERMANENT SEEDING TABLE B.3, OR SITE-SPECIFIC SEEDING SUMMARIES.
      ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION. ROLL THE SEEDED AREA WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.
   b. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.
      i. CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST 1/4 INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.
      ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
   c. HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER).
      i. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES SHOULD NOT EXCEED THE FOLLOWING: NITROGEN, 100 POUNDS PER ACRE TOTAL OF SOLUBLE NITROGEN; P2O5 (PHOSPHOROUS), 200 POUNDS PER ACRE; K2O (POTASSIUM), 200 POUNDS PER ACRE.
      ii. LIME: USE ONLY GROUND AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE MAY BE APPLIED BY HYDROSEEDING). NORMALLY, NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN HYDROSEEDING.
      iii. MIX SEED AND FERTILIZER ON SITE AND SEED IMMEDIATELY AND WITHOUT INTERRUPTION.
      iv. WHEN HYDROSEEDING DO NOT INCORPORATE SEED INTO THE SOIL.

B. MULCHING
1. MULCH MATERIALS (IN ORDER OF PREFERENCE)
   a. STRAW CONSISTING OF THOROUGHLY THRESHED WHEAT, RYE, OAT, OR BARLEY AND REASONABLY BRIGHT IN COLOR. STRAW IS TO BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW AND NOT MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY. NOTE: USE ONLY STERILE STRAW MULCH IN AREAS WHERE ONE SPECIES OF GRASS IS DESIRED.
   b. WOOD CELLULOSE FIBER MULCH (WFCM) CONSISTING OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
      i. WCFM IS TO BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.
      ii. WCFM, INCLUDING DYE, MUST CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.
      iii. WCFM MATERIALS ARE TO BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER AND OTHER ADDITIVES TO FORM A HOMOGENEOUS SLURRY. THE MULCH MATERIAL MUST FORM A BLOTTER-LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND MUST COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDLINGS.
      iv. WCFM MATERIAL MUST NOT CONTAIN ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO-TOXIC.
      v. WCFM MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH OF APPROXIMATELY 10 MILLIMETERS, DIAMETER APPROXIMATELY 1 MILLIMETER, PH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6 PERCENT MAXIMUM AND WATER HOLDING CAPACITY OF 90 PERCENT MINIMUM.
2. APPLICATION
   a. APPLY MULCH TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.
   b. WHEN STRAW MULCH IS USED, SPREAD IT OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS PER ACRE TO A UNIFORM LOOSE DEPTH OF 1 TO 2 INCHES. APPLY MULCH TO ACHIEVE A UNIFORM DISTRIBUTION AND DEPTH SO THAT THE SOIL SURFACE IS NOT EXPOSED. WHEN USING A MULCH ANCHORING TOOL, INCREASE THE APPLICATION RATE TO 2.5 TONS PER ACRE.
   c. WOOD CELLULOSE FIBER USED AS MULCH MUST BE APPLIED AT A NET DRY WEIGHT OF 1500 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER TO ATTAIN A MIXTURE WITH A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
3. ANCHORING
   a. PERFORM MULCH ANCHORING IMMEDIATELY FOLLOWING APPLICATION OF MULCH TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON THE SIZE OF THE AREA AND EROSION HAZARD:
      i. A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF 2 INCHES. THIS PRACTICE IS MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD FOLLOW THE CONTOUR.
      ii. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. APPLY THE FIBER BINDER AT A NET DRY WEIGHT OF 750 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER AT A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
      iii. SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRO-TACK), DCA-70, PETROSET, TERRA TAX II, TERRA TACK AR OR OTHER APPROVED EQUAL MAY BE USED. FOLLOW APPLICATION RATES AS SPECIFIED BY THE MANUFACTURER. APPLICATION OF LIQUID BINDERS NEEDS TO BE HEAVIER AT THE EDGES WHERE WIND CATCHES MULCH, SUCH AS IN VALLEYS AND ON CRESTS OF BANKS. USE OF ASPHALT BINDERS IS STRICTLY PROHIBITED.
      iv. LIGHTWEIGHT PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4 TO 15 FEET WIDE AND 300 TO 3,000 FEET LONG.

TEMPORARY SEEDING SUMMARY

HARDINESS ZONE (from Figure B.3): ZONE 6B SEED MIXTURE (from Table B.1)					FERTILIZER RATE (10-20-20)	LIME RATE
NO.	SPECIES	APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTHS		
COOL SEASON GRASSES						
1	ANNUAL RYEGRASS	40	3/1 - 5/15 8/1 - 10/15	0.5"	436 LB/AC (10 LB/1000 SF)	2 TONS/AC (90 LB/1000 SF)
2	BARLEY	96	3/1 - 5/15 8/1 - 10/15	1"		
3	OATS	72	3/1 - 5/15 8/1 - 10/15	1"		
4	WHEAT	120	3/1 - 5/15 8/1 - 10/15	1"		
5	CEREAL RYE	112	3/1 - 5/15 8/1 - 11/15	1"		
WARM SEASON GRASSES						
6	FOXTAIL MILLET	30	5/16 - 7/31	0.5"	436 LB/AC (10 LB/1000 SF)	2 TONS/AC (90 LB/1000 SF)
7	PEARL MILLET	20	5/16 - 7/31	0.5"		

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. FOR SMALLER-SEEDED GRASSES (ANNUAL RYEGRASS, PEARL MILLET, FOXTAIL MILLET), DO NOT EXCEED MORE THAN 5% (BY WEIGHT) OF THE OVERALL PERMANENT SEEDING MIX. CEREAL RYE GENERALLY SHOULD NOT BE USED AS A NURSE CROP, UNLESS PLANTING WILL OCCUR IN VERY LATE FALL BEYOND THE SEEDING DATES FOR OTHER TEMPORARY SEEDINGS. CEREAL RYE HAS ALLELOPATHIC PROPERTIES THAT INHIBIT THE GERMINATION AND GROWTH OF OTHER PLANTS. IF IT MUST BE USED AS A NURSE CROP, SEED AT 1/3 OF THE RATE LISTED ABOVE.

   OATS ARE THE RECOMMENDED NURSE CROP FOR WARM-SEASON GRASSES.

2. FOR SANDY SOILS, PLANT SEEDS AT TWICE THE DEPTH LISTED ABOVE.
3. THE PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE AND MAY REQUIRE ADJUSTMENT TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONE.

B-4-4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABILIZATION

DEFINITION
TO STABILIZE DISTURBED SOILS WITH VEGETATION FOR UP TO 6 MONTHS.

PURPOSE
TO USE FAST GROWING VEGETATION THAT PROVIDES COVER ON DISTURBED SOILS.

CONDITIONS WHERE PRACTICE APPLIES
EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR A PERIOD OF 6 MONTHS OR LESS. FOR LONGER DURATION OF TIME, PERMANENT STABILIZATION PRACTICES ARE REQUIRED.

CRITERIA
1. SELECT ONE OR MORE OF THE SPECIES OR SEED MIXTURES LISTED IN TABLE B.1 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE B.3), AND ENTER THEM IN THE TEMPORARY SEEDING SUMMARY BELOW ALONG WITH APPLICATION RATES, SEEDING DATES AND SEEDING DEPTHS. IF THIS SUMMARY IS NOT PUT ON THE PLAN AND COMPLETED, THEN TABLE B.1 PLUS FERTILIZER AND LIME RATES MUST BE PUT ON THE PLAN.
2. FOR SITES HAVING SOIL TESTS PERFORMED, USE AND SHOW THE RECOMMENDED RATES BY THE TESTING AGENCY. SOIL TESTS ARE NOT REQUIRED FOR TEMPORARY SEEDING.
3. WHEN STABILIZATION IS REQUIRED OUTSIDE OF A SEEDING SEASON, APPLY SEED AND MULCH OR STRAW MULCH ALONE AS PRESCRIBED IN SECTION B-4-3.A.1.B AND MAINTAIN UNTIL THE NEXT SEEDING SEASON.

B-4-5 STANDARDS AND SPECIFICATIONS FOR PERMANENT STABILIZATION

DEFINITION
TO STABILIZE DISTURBED SOILS WITH PERMANENT VEGETATION.

PURPOSE
TO USE LONG-LIVED PERENNIAL GRASSES AND LEGUMES TO ESTABLISH PERMANENT GROUND COVER ON DISTURBED SOILS.

CONDITIONS WHERE PRACTICE APPLIES
EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR 6 MONTHS OR MORE.

CRITERIA
A. SEED MIXTURES
1. GENERAL USE
   a. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE B.3 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE B.3) AND BASED ON THE SITE CONDITION OR PURPOSE FOUND ON TABLE B.2. ENTER SELECTED MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.
   b. ADDITIONAL PLANTING SPECIFICATIONS FOR EXCEPTIONAL SITES SUCH AS SHORELINES, STREAM BANKS, OR DUNES OR FOR SPECIAL PURPOSES SUCH AS WILDLIFE OR AESTHETIC TREATMENT MAY BE FOUND IN USDA-NRCS TECHNICAL FIELD OFFICE GUIDE, SECTION 342 - CRITICAL AREA PLANTING.
   c. FOR SITES HAVING DISTURBED AREA OVER 5 ACRES, USE AND SHOW THE RATES RECOMMENDED BY THE SOIL TESTING AGENCY.
   d. FOR AREAS RECEIVING LOW MAINTENANCE, APPLY UREA FORM FERTILIZER (46-0-0) AT 3 ½ POUNDS PER 1000 SQUARE FEET (150 POUNDS PER ACRE) AT THE TIME OF SEEDING IN ADDITION TO THE SOIL AMENDMENTS SHOWN IN THE PERMANENT SEEDING SUMMARY .
2. TURFGRASS MIXTURES
   a. AREAS WHERE TURFGRASS MAY BE DESIRED INCLUDE LAWNS, PARKS, PLAYGROUNDS, AND COMMERCIAL SITES WHICH WILL RECEIVE A MEDIUM TO HIGH LEVEL OF MAINTENANCE.
   b. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED BELOW BASED ON THE SITE CONDITIONS OR PURPOSE. ENTER SELECTED MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.
      i. KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN AREAS THAT RECEIVE INTENSIVE MANAGEMENT. IRRIGATION REQUIRED IN THE AREAS OF CENTRAL MARYLAND AND EASTERN SHORE. RECOMMENDED CERTIFIED KENTUCKY BLUEGRASS CULTIVARS SEEDING RATE: 1.5 TO 2.0 POUNDS PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.
      ii. KENTUCKY BLUEGRASS/PERENNIAL RYE: FULL SUN MIXTURE: FOR USE IN FULL SUN AREAS WHERE RAPID ESTABLISHMENT IS NECESSARY AND WHEN TURF WILL RECEIVE MEDIUM TO INTENSIVE MANAGEMENT. CERTIFIED PERENNIAL RYEGRASS CULTIVARS/CERTIFIED KENTUCKY BLUEGRASS SEEDING RATE: 2 POUNDS MIXTURE PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.
      iii. TALL FESCUE/KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN DROUGHT PRONE AREAS AND/OR FOR AREAS RECEIVING LOW TO MEDIUM MANAGEMENT IN FULL SUN TO MEDIUM SHADE. RECOMMENDED MIXTURE INCLUDES; CERTIFIED TALL FESCUE CULTIVARS 95 TO 100 PERCENT, CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 0 TO 5 PERCENT. SEEDING RATE: 5 TO 8 POUNDS PER 1000 SQUARE FEET. ONE OR MORE CULTIVARS MAY BE BLENDED.
      iv. KENTUCKY BLUEGRASS/FINE FESCUE: SHADE MIXTURE: FOR USE IN AREAS WITH SHADE IN BLUEGRASS LAWNS. FOR ESTABLISHMENT IN HIGH QUALITY, INTENSIVELY MANAGED TURF AREA. MIXTURE INCLUDES; CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 30 TO 40 PERCENT AND CERTIFIED FINE FESCUE AND 60 TO 70 PERCENT. SEEDING RATE: 1½ TO 3 POUNDS PER 1000 SQUARE FEET.

      NOTES:
      SELECT TURFGRASS VARIETIES FROM THOSE LISTED IN THE MOST CURRENT UNIVERSITY OF MARYLAND PUBLICATION, AGRONOMY MEMO #77, "TURFGRASS CULTIVAR RECOMMENDATIONS FOR MARYLAND"
      CHOOSE CERTIFIED MATERIAL. CERTIFIED MATERIAL IS THE BEST GUARANTEE OF CULTIVAR PURITY. THE CERTIFICATION PROGRAM OF THE MARYLAND DEPARTMENT OF AGRICULTURE, TURF AND SEED SECTION, PROVIDES A RELIABLE MEANS OF CONSUMER PROTECTION AND ASSURES A PURE GENETIC LINE
   c. IDEAL TIMES OF SEEDING FOR TURF GRASS MIXTURES
      WESTERN MD: MARCH 15 TO JUNE 1, AUGUST 1 TO OCTOBER 1 (HARDINESS ZONES: 5B, 6A)
      CENTRAL MD: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONE: 6B)
      SOUTHERN MD, EASTERN SHORE: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONES: 7A, 7B)
   d. TILL AREAS TO RECEIVE SEED BY DISKING OR OTHER APPROVED METHODS TO A DEPTH OF 2 TO 4 INCHES, LEVEL AND RAKE THE AREAS TO PREPARE A PROPER SEEDBED. REMOVE STONES AND DEBRIS OVER 1½ INCHES IN DIAMETER. THE RESULTING SEEDBED MUST BE IN SUCH CONDITION THAT FUTURE MOWING OF GRASSES WILL POSE NO DIFFICULTY.
   e. IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER FOR PLANT GROWTH (½ TO 1 INCH EVERY 3 TO 4 DAYS DEPENDING ON SOIL TEXTURE) UNTIL THEY ARE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY OR HOT SEASONS, OR ON ADVERSE SITES.

PERMANENT SEEDING SUMMARY

HARDINESS ZONE (from Figure B.3): ZONE 6B SEED MIXTURE (from Table B.3)					FERTILIZER RATE (10-20-20)			LIME RATE
NO.	SPECIES	APPLICATION RATE (LB/AC)	*SEEDING DATES	SEEDING DEPTHS	N	P2O5	K2O	
9	TALL FESCUE KENTUCKY BLUEGRASS PERENNIAL RYE GRASS	60 40 20	3/1 - 5/15 8/15 - 10/31	1/4" - 1/2"	45 LB/AC (1.0 LB/1000 SF)	90 LB/AC (2 LB/1000 SF)	90 LB/AC (2 LB/1000 SF)	2 TONS/AC (90 LB/1000 SF)
5	HARD FESCUE PERENNIAL RYE GRASS FLAT PEA	20 10 15	3/1 - 5/15 8/1 - 10/15	1/4" - 1/2"				
1	SWITCH GRASS CREEPING RED FESCUE PARTRIDGE PEA	10 15 4	3/1 - 5 /15	1/4" - 1/2"				

NOTES:
1. THE PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE. THESE DATES MAY REQUIRE ADJUSTMENT TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONES. WHEN SEEDING TOWARD THE END OF THE LISTED PLANTING DATES, OR WHEN CONDITIONS ARE EXPECTED TO BE LESS THAN OPTIMAL, SELECT AN APPROPRIATE NURSE CROP FROM TABLE B.1 TEMPORARY SEEDING FOR SITE STABILIZATION AND PLANT TOGETHER WITH THE PERMANENT SEEDING MIX.
2. WHEN PLANTED DURING THE GROWING SEASON, MOST OF THESE MATERIALS MUST BE PURCHASED AND KEPT IN A DORMANT CONDITION UNTIL PLANTING. BARE-ROOT GRASSES ARE THE EXCEPTION—THEY MAY BE SUPPLIED AS GROWING (NON-DORMANT) PLANTS.
♦ ADDITIONAL PLANTING DATES FOR THE LOWER COASTAL PLAIN, DEPENDENT ON ANNUAL RAINFALL AND TEMPERATURE TRENDS. RECOMMEND ADDING A NURSE CROP, AS NOTED ABOVE, IF PLANTING DURING THIS PERIOD.
♦♦WARM-SEASON GRASSES NEED A SOIL TEMPERATURE OF AT LEAST 50 DEGREES F IN ORDER TO GERMINATE. IF SOIL TEMPERATURES ARE COLDER THAN 50 DEGREES, OR MOISTURE IS NOT ADEQUATE, THE SEEDS WILL REMAIN DORMANT UNTIL CONDITIONS ARE FAVORABLE. IN GENERAL, PLANTING DURING THE LATTER PORTION OF THIS PERIOD ALLOWS MORE TIME FOR WEED EMERGENCE AND WEED CONTROL PRIOR TO PLANTING. WHEN SELECTING A PLANTING DATE, CONSIDER THE NEED FOR WEED CONTROL VS. THE LIKELIHOOD OF HAVING SUFFICIENT MOISTURE FOR LATER PLANTINGS, ESPECIALLY ON DROUGHTY SITES.
* ADDITIONAL PLANTING DATES DURING WHICH SUPPLEMENTAL WATERING MAY BE NEEDED TO ENSURE PLANT ESTABLISHMENT.
FREQUENT FREEZING AND THAWING OF WET SOILS MAY RESULT IN FROST-HEAVING OF MATERIALS PLANTED IN LATE FALL, IF PLANTS HAVE NOT SUFFICIENTLY ROOTED IN PLACE.
SOD USUALLY NEEDS 4 TO 6 WEEKS TO BECOME SUFFICIENTLY ROOTED. LARGE CONTAINERIZED AND BALLED-AND-BURLAPPED STOCK MAY BE PLANTED INTO THE WINTER MONTHS AS LONG AS THE GROUND IS NOT FROZEN AND SOIL MOISTURE IS ADEQUATE.
** FOR THE PERIOD 5/1 - 8/14 ADD EITHER FOXTAIL OR PEARL MILLET - 6 LBS/AC. TO MIX NO. 9, 2.25 LBS/AC. TO MIX NO. 5

B. SOD: TO PROVIDE QUICK COVER ON DISTURBED AREAS (2:1 GRADE OR FLATTER).
1. GENERAL SPECIFICATIONS
   a. CLASS OF TURFGRASS SOD MUST BE MARYLAND STATE CERTIFIED. SOD LABELS MUST BE MADE AVAILABLE TO THE JOB FOREMAN AND INSPECTOR.
   b. SOD MUST BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF ¾ INCH, PLUS OR MINUS ¼ INCH, AT THE TIME OF CUTTING. MEASUREMENT FOR THICKNESS MUST EXCLUDE TOP GROWTH AND THATCH. BROKEN PADS AND TORN OR UNEVEN ENDS WILL NOT BE ACCEPTABLE.
   c. STANDARD SIZE SECTIONS OF SOD MUST BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED VERTICALLY WITH A FIRM GRASP ON THE UPPER 10 PERCENT OF THE SECTION.
   d. SOD MUST NOT BE HARVESTED OR TRANSPLANTED WHEN MOISTURE CONTENT (EXCESSIVELY DRY OR WET) MAY ADVERSELY AFFECT ITS SURVIVAL.
   e. SOD MUST BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS. SOD NOT TRANSPLANTED WITHIN THIS PERIOD MUST BE APPROVED BY AN AGRONOMIST OR SOIL SCIENTIST PRIOR TO ITS INSTALLATION.
2. SOD INSTALLATION
   a. DURING PERIODS OF EXCESSIVELY HIGH TEMPERATURE OR IN AREAS HAVING DRY SUBSOIL, LIGHTLY IRRIGATE THE SUBSOIL IMMEDIATELY PRIOR TO LAYING THE SOD.
   b. LAY THE FIRST ROW OF SOD IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO IT AND TIGHTLY WEDGED AGAINST EACH OTHER. STAGGER LATERAL JOINTS TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS.
   c. WHEREVER POSSIBLE, LAY SOD WITH THE LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERING JOINTS. ROLL AND TAMP, PEG OR OTHERWISE SECURE THE SOD TO PREVENT SLIPPAGE ON SLOPES. ENSURE SOLID CONTACT EXISTS BETWEEN SOD ROOTS AND THE UNDERLYING SOIL SURFACE.
   d. WATER THE SOD IMMEDIATELY FOLLOWING ROLLING AND TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOIL SURFACE BELOW THE SOD ARE THOROUGHLY WET. COMPLETE THE OPERATIONS OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD WITHIN EIGHT HOURS.
3. SOD MAINTENANCE
   a. IN THE ABSENCE OF ADEQUATE RAINFALL, WATER DAILY DURING THE FIRST WEEK OR AS OFTEN AND SUFFICIENTLY AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF 4 INCHES. WATER SOD DURING THE HEAT OF THE DAY TO PREVENT WILTING.
   b. AFTER THE FIRST WEEK, SOD WATERING IS REQUIRED AS NECESSARY TO MAINTAIN ADEQUATE MOISTURE CONTENT.
   c. DO NOT MOW UNTIL THE SOD IS FIRMLY ROOTED. NO MORE THAN ⅓ OF THE GRASS LEAF MUST BE REMOVED BY THE INITIAL CUTTING OR SUBSEQUENT CUTTINGS. MAINTAIN A GRASS HEIGHT OF AT LEAST 3 INCHES UNLESS OTHERWISE SPECIFIED.

B-4-6 STANDARDS AND SPECIFICATIONS FOR SOIL STABILIZATION MATTING

DEFINITION
MATERIAL USED TO TEMPORARILY OR PERMANENTLY STABILIZE CHANNELS OR STEEP SLOPES UNTIL GROUNDCOVER IS ESTABLISHED.

PURPOSE
TO PROTECT THE SOILS UNTIL VEGETATION IS ESTABLISHED.

CONDITIONS WHERE PRACTICE APPLIES
ON NEWLY SEEDED SURFACES TO PREVENT THE APPLIED SEED FROM WASHING OUT; IN CHANNELS AND ON STEEP SLOPES WHERE THE FLOW HAS EROSIVE VELOCITIES OR CONVEYS CLEAR WATER; ON TEMPORARY SWALES, EARTH DIKES, AND PERIMETER DIKE SWALES AS REQUIRED BY THE RESPECTIVE DESIGN STANDARD; AND, ON STREAM BANKS WHERE MOVING WATER IS LIKELY TO WASH OUT NEW VEGETATIVE PLANTINGS.

MAINTENANCE
VEGETATION MUST BE ESTABLISHED AND MAINTAINED SO THAT THE REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
DocuSigned by: Alexander Bratchie — 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — 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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."
SIGNATURE OF ENGINEER — BRANDON R. ROWE P.E. — DATE 3/12/24 — MD. PE REGISTRATION No. 40808

OWNER'S/DEVELOPER'S CERTIFICATION
"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."
SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
Chad Edmondson
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER//
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	ODP- 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
— FOR —
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER//
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
EROSION & SEDIMENT CONTROL NOTES AND DETAILS
SHEET NUMBER:
34 of 117

F-22-033

Mar 12, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - ODP - 2----->LAYOUT: 34 - E&S NOTES AND DETAILS
AG

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MGWC 1.5: SANDBAG/STONE CHANNEL DIVERSION

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing sandbag or stone flow diversions for the purpose of erosion control when construction activities occur within the stream channel.

EFFECTIVE USES & LIMITATIONS

Diversions are used to isolate work areas from flow during the construction of in-stream projects. Diversions which have an insufficient flow capacity can fail and severely erode the disturbed channel section under construction. Therefore, in-channel construction activities should occur only during periods of low rainfall. This temporary measure may not be practical in large channels.

MATERIAL SPECIFICATIONS

Materials for sandbag and stone stream diversions should meet the following requirements:

- *Riprap*: Riprap should be washed and have a minimum diameter of 6 inches (0.15 meters).
- *Sandbags*: Sandbags should consist of materials which are resistant to ultra-violet radiation, tearing, and puncture and should be woven tightly enough to prevent leakage of the fill material (i.e., sand, fine gravel, etc.).
- *Sheeting*: Sheeting should consist of polyethylene or other materials which are impervious and resistant to puncture and tearing.

INSTALLATION GUIDELINES

All erosion and sediment control devices, including dewatering basins, should be implemented as the first order of business according to a plan approved by the WMA or local authority. Installation should proceed from upstream to downstream during periods of low flow. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.

Sandbag/stone diversions can be used independently or as components of other stream diversion techniques. Installation of this measure should proceed as follows (refer to Detail 1.5):

1. The diversion structure should be installed from upstream to downstream.
2. The height of the sandbag/stone diversion should be a function of the duration of the project in the stream reach. For projects with a duration less than 2 weeks, the height of the diversion should be one half the streambank height, measured from the channel bed, plus 1 foot (0.3 meters) or bankfull height, whichever is greater. For projects of longer duration, the top of the sandbag or stone diversion should correspond to bankfull height. For diversion structures utilizing sandbags, the stream bed should be hand prepared prior to placement of the base layer of sandbags in order to ensure a water tight fit. Additionally, it may be necessary to prepare the bank in a similar fashion.
3. All excavated material should be deposited and stabilized in an approved area outside the 100-year floodplain unless otherwise authorized by the WMA.
4. Sediment-laden water from the construction area should be pumped to a dewatering basin.

MGWC 1.5: SANDBAG/STONE CHANNEL DIVERSION

5. Sheeting on the diversion should be positioned such that the upstream portion covers the downstream portion with at least a 18-inch (0.45 meters) overlap.
6. Sandbag or stone diversions should not obstruct more than 45% of the stream width. Additionally, bank stabilization measures should be placed in the constricted section if accelerated erosion and bank scour are observed during the construction time or if project time is expected to last more than 2 weeks.
7. Prior to removal of these temporary structures, any accumulated sediment should be removed, deposited and stabilized in an approved area outside the 100-year floodplain unless authorized by the WMA.
8. Sediment control devices are to remain in place until all disturbed areas are stabilized in accordance with an approved sediment and erosion control plan and the inspecting authority approves their removal.

MGWC 1.2: PUMP-AROUND PRACTICE

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing a temporary pump around and supporting measures to divert flow around in-stream construction sites.

IMPLEMENTATION SEQUENCE

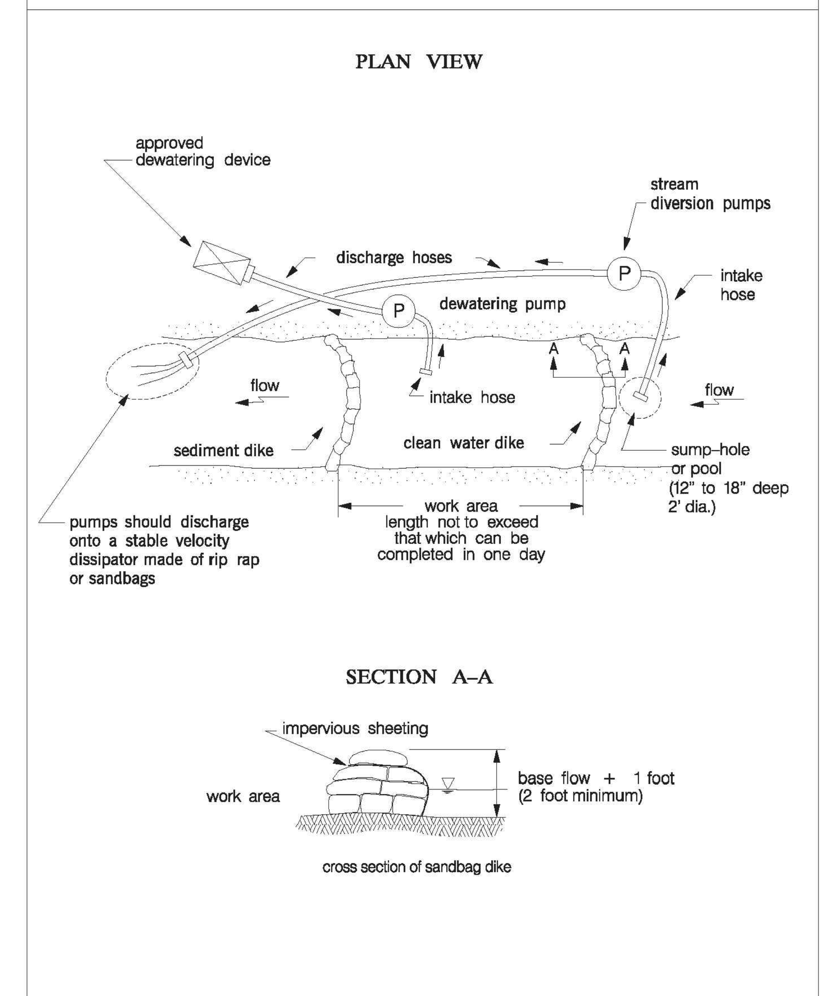
Sediment control measures, pump-around practices, and associated channel and bank construction should be completed in the following sequence (refer to Detail 1.2):

1. Construction activities including the installation of erosion and sediment control measures should not begin until all necessary easements and/or right-of-ways have been acquired. All existing utilities should be marked in the field prior to construction. The contractor is responsible for any damage to existing utilities that may result from construction and should repair the damage at his/her own expense to the county's or utility company's satisfaction.
2. The contractor should notify the Maryland Department of the Environment or WMA sediment control inspector at least 5 days before beginning construction. Additionally, the contractor should inform the local environmental protection and resource management inspection and enforcement division and the provider of local utilities a minimum of 48 hours before starting construction.
3. The contractor should conduct a pre-construction meeting on site with the WMA sediment control inspector, the county project manager, and the engineer to review limits of disturbance, erosion and sediment control requirements, and the sequence of construction. The contractor should stake out all limits of disturbance prior to the pre-construction meeting so they may be reviewed. The participants will also designate the contractor's staging areas and flag all trees within the limit of disturbance which will be removed for construction access. Trees should not be removed within the limit of disturbance without approval from the WMA or local authority.
4. Construction should not begin until all sediment and erosion control measures have been installed and approved by the engineer and the sediment control inspector. The contractor should stay within the limits of the disturbance as shown on the plans and minimize disturbance within the work area whenever possible.
5. Upon installation of all sediment control measures and approval by the sediment control inspector and the local environmental protection and resource management inspection and enforcement division, the contractor should begin work at the upstream section and proceed downstream beginning with the establishment of stabilized construction entrances. In some cases, work may begin downstream if appropriate. The sequence of construction must be followed unless the contractor gets written approval for deviations from the WMA or local authority. The contractor should only begin work in an area which can be completed by the end of the day including grading adjacent to the channel. At the end of each work day, the work area must be stabilized and the pump around removed from the channel. Work should not be conducted in the channel during rain events.
6. Sandbag dikes should be situated at the upstream and downstream ends of the work area as shown on the plans, and stream flow should be pumped around the work area. The pump should discharge onto a stable velocity dissipater made of riprap or sandbags.

MGWC 1.2: PUMP-AROUND PRACTICE

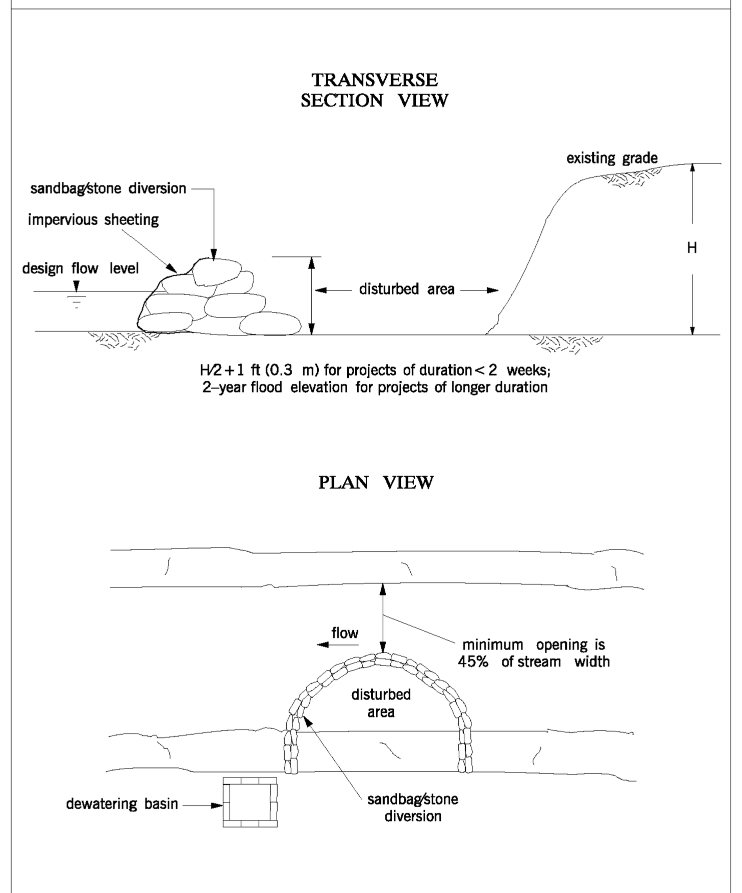
7. Water from the work area should be pumped to a sediment filtering measure such as a dewatering basin, sediment bag, or other approved source. The measure should be located such that the water drains back into the channel below the downstream sandbag dike.
8. Traversing a channel reach with equipment within the work area where no work is proposed should be avoided. If equipment has to traverse such a reach for access to another area, then timber mats or similar measures should be used to minimize disturbance to the channel. Temporary stream crossings should be used only when necessary and only where noted on the plans or specified. (*See Section 4, Stream Crossings, Maryland Guidelines to Waterway Construction*).
9. All stream restoration measures should be installed as indicated by the plans and all banks graded in accordance with the grading plans and typical cross- sections. All grading must be stabilized at the end of each day with seed and mulch or seed and matting as specified on the plans.
10. After an area is completed and stabilized, the clean water dike should be removed. After the first sediment flush, a new clean water dike should be established upstream from the old sediment dike. Finally, upon establishment of a new sediment dike below the old one, the old sediment dike should be removed.
11. A pump around must be installed on any tributary or storm drain outfall which contributes baseflow to the work area. This should be accomplished by locating a sandbag dike at the downstream end of the tributary or storm drain outfall and pumping the stream flow around the work area. This water should discharge onto the same velocity dissipater used for the main stem pump around.
12. If a tributary is to be restored, construction should take place on the tributary before work on the main stem reaches the tributary confluence. Construction in the tributary, including pump around practices, should follow the same sequence as for the main stem of the river or stream. When construction on the tributary is completed, work on the main stem should resume. Water from the tributary should continue to be pumped around the work area in the main stem.
13. The contractor is responsible for providing access to and maintaining all erosion and sediment control devices until the sediment control inspector approves their removal.
14. After construction, all disturbed areas should be regraded and revegetated as per the planting plan.

Maryland's Guidelines To Waterway Construction
DETAIL 1.2: PUMP–AROUND PRACTICE



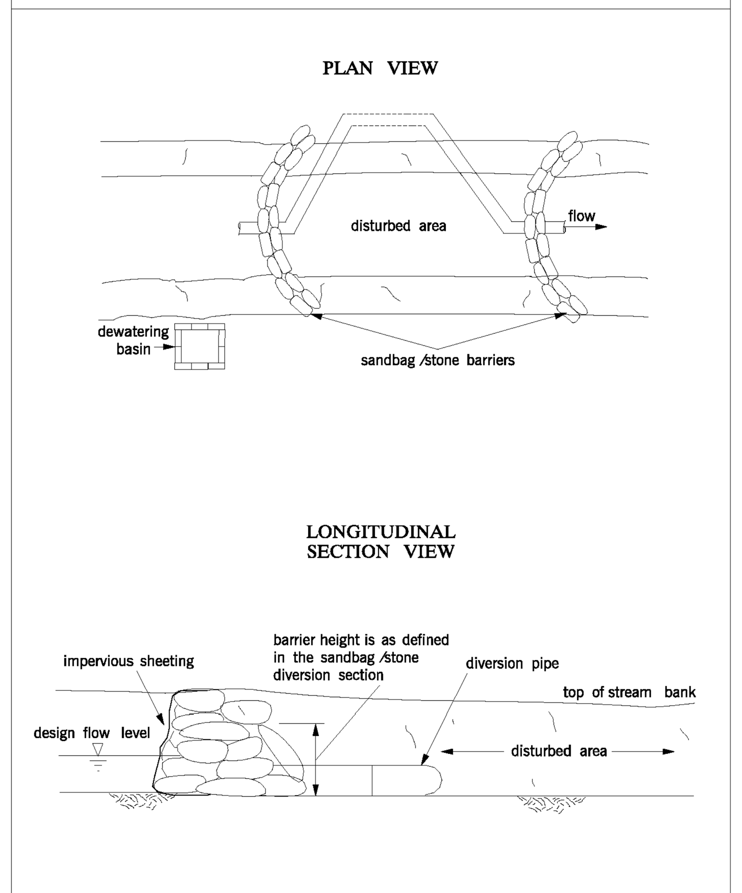
TEMPORARY INSTREAM CONSTRUCTION MEASURES	REVISED NOVEMBER 2000 PAGE 1.2 – 3	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Maryland's Guidelines To Waterway Construction
DETAIL 1.5: SANDBAG/STONE DIVERSION



TEMPORARY INSTREAM CONSTRUCTION MEASURES	REVISED NOVEMBER 2000 PAGE 1.5 – 3	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Maryland's Guidelines To Waterway Construction
DETAIL 1.4: DIVERSION PIPE



TEMPORARY INSTREAM CONSTRUCTION MEASURES	REVISED NOVEMBER 2000 PAGE 1.4 – 2	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

MGWC 4.3: CULVERT INSTALLATION

Proposed installation sequence for culverts

DESCRIPTION

The following is a typical installation sequence for culverts which details the minimum requirements to be incorporated into the project.

EFFECTIVE USES & LIMITATIONS

This method has been chosen in order to illustrate a general sequence of construction and is not suitable for all projects. Therefore, the construction sequence should be reviewed and modified as necessary to meet specific project needs. Consideration of a bridge or bottomless arch should be made prior to selecting a culvert.

CONSTRUCTION SEQUENCE

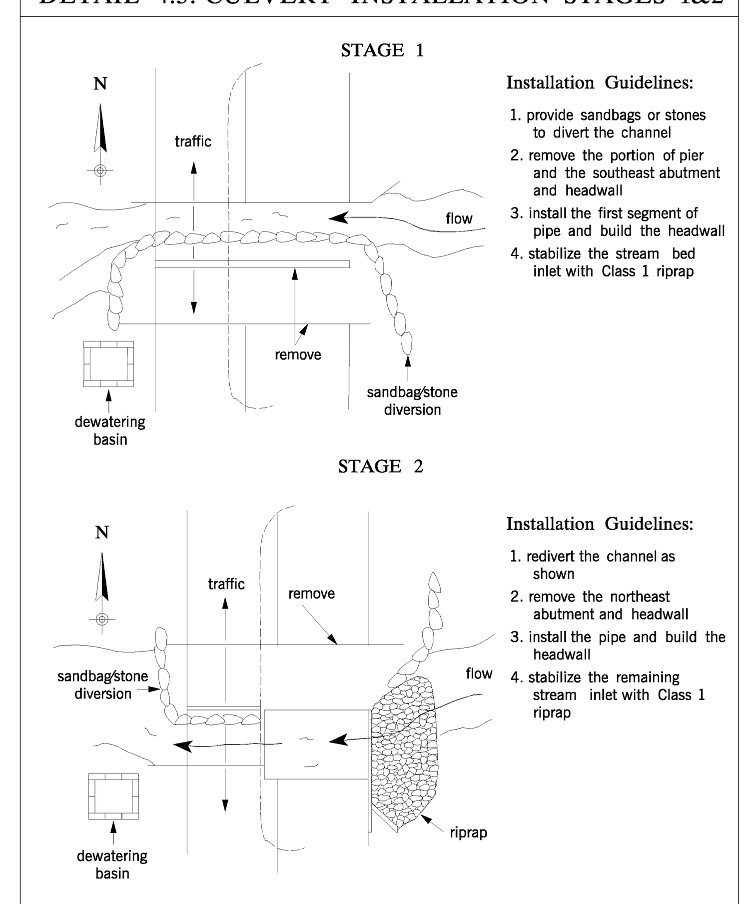
All erosion and sediment control devices, including dewatering basins, should be implemented as the first order of business according to a plan approved by the WMA or local authority. (See the *1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control.*) A construction sequence, such as the proposed one listed below, should then be followed (refer to Detail 4.3.)

1. A diversion pipe as shown in MGWC 1.4: Diversion Pipe or other measure should be installed and a sandbag or stone barrier as shown in MGWC 1.5: Sandbag/Stone Diversion should be constructed according to specifications to divert the streamflow into the diversion.
2. A sandbag or stone barrier should be placed downstream to prevent the flow from backwashing into the construction area.
3. Culverts should be installed such that the following requirements are met.

- The culvert slope should match the streambed slope while not exceeding 3%.
- Culverts should be depressed when possible to encourage siltation for improved fish passage as shown in MGWC 4.5: Depressed Culverts.
- For non-depressed culverts, the outfall height should not exceed 5 inches (12 centimeters), and concrete aprons should be avoided whenever possible.
- The stable width/depth ratio of the bankfull stage stream channel should be maintained with the culvert design. Use of elliptical pipe may help attain the proper channel dimension especially for B, C, and E stream types.
- A low flow channel shall be constructed through the riprap placements across the stream bed.

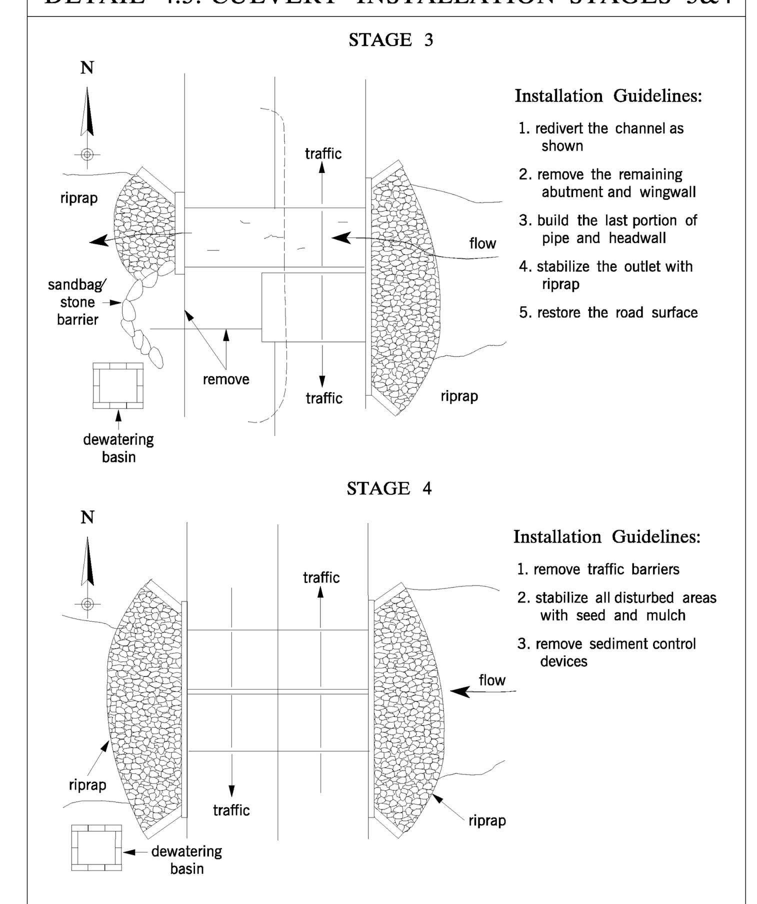
4. The disturbed sections of the channel, including the slopes and streambed, should be stabilized with methods approved by the WMA.
5. The construction area should be dewatered, and the temporary stream diversion removed starting at the downstream section and moving upstream.
6. Finally, the dewatering basin(s) should be restored to the original grade, the silt fence removed, and all disturbed areas seeded and mulched.

Maryland's Guidelines To Waterway Construction
DETAIL 4.3: CULVERT INSTALLATION–STAGES 1&2



STREAM CROSSINGS	PAGE 4.3 – 2	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Maryland's Guidelines To Waterway Construction
DETAIL 4.3: CULVERT INSTALLATION–STAGES 3&4



STREAM CROSSINGS	PAGE 4.3 – 3	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

MGWC 1.4: DIVERSION PIPE

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing flow diversion pipes in combination with sandbag or stone diversions when construction activities occur within the stream channel.

EFFECTIVE USES & LIMITATIONS

Diversion pipes with an insufficient flow capacity can cause the channel diversion to fail thereby resulting in severe erosion of the disturbed channel section under construction. Therefore, in-channel construction activities should occur only during periods of low flow.

MATERIAL SPECIFICATIONS

Materials for stream diversions should meet the following requirements:

- *Riprap*: Stone should be washed and have a minimum diameter of 6 inches (15 centimeters).
- *Sandbags*: Sandbags should consist of materials which are resistant to ultra-violet radiation, tearing, and puncture and should be woven tightly enough to prevent leakage of fill material (i.e., sand, fine gravel, etc.).
- *Sheeting*: Sheeting should consist of polyethylene or other material which is impervious and resistant to puncture and tearing.

INSTALLATION GUIDELINES

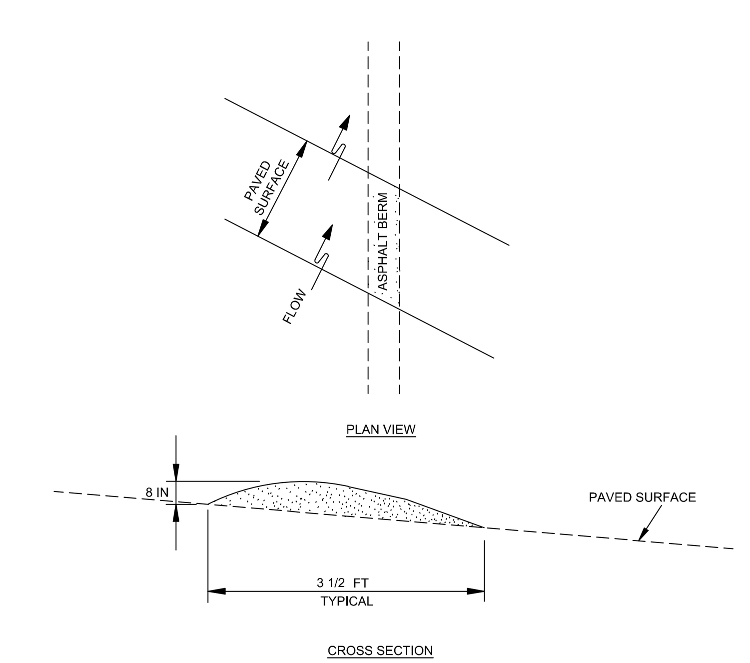
All erosion and sediment control devices including mandatory dewatering basins should be installed as the first order of business according to a plan approved by the WMA or local authority. Installation should proceed from upstream to downstream during low flow conditions. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.

Diversion pipes with sandbag or stone barriers should be completed as follows (refer to Detail 1.4):

1. Sandbag/stone barriers should be sized and installed as detailed in MGWC 1.5: Sandbag/Stone Diversion. The materials should be sized to withstand baseflow velocities.
2. All excavated material should be deposited and stabilized in an approved area outside the 100-year floodplain unless otherwise authorized by the WMA.
3. Sediment-laden water from the construction area should be pumped to a dewatering basin.
4. The diversion pipe should have a minimum capacity sufficient to convey the 2-year flow for projects with a duration of two weeks or greater. For projects of shorter duration, the capacity of the pipe can be reduced accordingly.
5. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.
6. Sediment control devices are to remain in place until all disturbed areas are stabilized and the inspecting authority approves their removal.

DETAIL C-5 TEMPORARY ASPHALT BERM

STANDARD SYMBOL: TAB



CONSTRUCTION SPECIFICATIONS

1. CONSTRUCT BERM ON AN UNINTERRUPTED, CONTINUOUS GRADE.
2. INSTALL BERM TO CONFORM TO CROSS SECTION DIMENSIONS OF A UNIFORM HEIGHT OF 8 INCHES MINIMUM AND APPROXIMATE WIDTH OF 3½ FEET.
3. PROVIDE OUTLET PROTECTION AS REQUIRED ON PLAN.
4. COMPACT ASPHALT BERM.
5. REPAIR DAMAGED ASPHALT. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. MAINTAIN POSITIVE DRAINAGE.
6. UPON REMOVAL OF ASPHALT BERM, RETURN TO ORIGINAL CONDITIONS OR AS SPECIFIED ON APPROVED PLAN.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

STONE SPECIFICATIONS

1. FOOTING OR BURIED STONE SHALL CONSIST OF ANGULAR FLAT ROCK SIMILAR IN COLOR, TEXTURE AND DENSITY TO THAT SUPPLIED BY THE LAFARGE CORPORATION - TEXAS QUARRY (COCKEYSVILLE MARBLE WITH MIGA LAYERS), OR THE LAFARGE CORPORATION CHURCHVLLE QUARRY (AMPHIBOLITE GRAY - BLACK). CONTRACTOR MAY USE, UPON APPROVAL BY THE GEOTECHNICAL ENGINEER, ON-SITE STONE FOR FOOTINGS IF SAID MATERIALS ARE OF APPROPRIATE SIZE AND DURABILITY.
2. EXPOSED STONE SHALL CONSIST OF ANGULAR FLAT ROCK SIMILAR IN COLOR, TEXTURE, AND DENSITY TO THAT SUPPLIED BY THE LAFARGE CORPORATION - CHURCHVILLE QUARRY (AMPHIBOLIET GRAY-BLACK).
3. STONE SHALL BE FREE FROM LAMINATIONS, WEAK CLEAVAGES, AND WILL NOT DISINTEGRATE FROM THE ACTON OF AIR, WATER, OR IN HANDLING AND PLACING.
4. CONTRACTOR SHALL OBTAIN, FROM THE QUARRY, A STONE CLASSIFICATION, WEIGHT PER CUBIC FOOT, AND WEIGHT OF STONE BEING SUPPLIED AND SUBMIT THE INFORMATION TO THE ENGINEER FOR APPROVAL.

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: [signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — 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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
DocuSigned by: Alexander Bratchie 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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NOT APPROVED FOR CONSTRUCTION

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	ODP- 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
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MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
EROSION & SEDIMENT CONTROL NOTES AND DETAILS

SHEET NUMBER:

F-22-033

Mar 12, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - ODP - 2----->LAYOUT: 35 - E&S NOTES AND DETAILS
AG

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SEDIMENT BASIN CONSTRUCTION SPECIFICATIONS

1. INSTALL SEDIMENT CONTROL PRACTICES NECESSARY TO CONSTRUCT BASIN. CLEAR AND GRUB TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL FROM THE AREAS WHERE THE EMBANKMENT IS TO BE PLACED. DO NOT CLEAR THE POOL AREA UNTIL COMPLETION OF THE EMBANKMENT; UNLESS THE POOL AREA IS TO BE USED FOR BORROW. SALVAGE TOPSOIL FOR LATER USE.
2. EXCAVATE CUT-OFF TRENCH ALONG CENTERLINE OF PROPOSED EMBANKMENT A MINIMUM DEPTH OF 4 FEET AND A BOTTOM (MIN. 4 FEET) WIDE ENOUGH TO PERMIT OPERATION OF EXCAVATION AND COMPACTION EQUIPMENT. CONSTRUCT SIDE SLOPES 1:1 OR FLATTER. CUT-OFF TRENCH MUST BE CONTINUOUS AND EXTEND THE ENTIRE LENGTH OF EMBANKMENT. COMPACTION REQUIREMENTS ARE THE SAME AS THOSE FOR THE EMBANKMENT. DEWATER THE TRENCH DURING BACKFILLING COMPACTION OPERATIONS, USING AN APPROVED PRACTICE.
3. CONSTRUCT EMBANKMENT OF CLEAN SOIL FREE OF ROOTS, WOODY VEGETATION, OVERSIZED STONES, ROCKS, OR OTHER OBJECTIONABLE MATERIAL. FILL MATERIAL FOR IMPERVIOUS CORE AND CUT-OFF TRENCH MUST CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30 PERCENT PASSING THE #200 SIEVE. USE FILL MATERIAL CONTAINING SUFFICIENT MOISTURE SO THAT THE SOIL CAN BE FORMED BY HAND INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. PLACE FILL MATERIAL IN SIX-INCH TO EIGHT INCH THICK CONTINUOUS LIFTS OVER THE ENTIRE LENGTH OF THE FILL. OBTAIN COMPACTION BY PASSING CONSTRUCTION EQUIPMENT OR COMPACTOR OVER THE FILL, SO THAT THE ENTIRE SURFACE OF EACH LAYER OF FILL IS TRAVERSED AT LEAST FOUR TIMES. CONSTRUCT THE EMBANKMENT TO AN ELEVATION A MINIMUM OF 10 PERCENT HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLEMENT.
4. INSTALL PRINCIPAL SPILLWAY PRIOR TO, OR CONCURRENTLY WITH, FILL PLACEMENT. DO NOT EXCAVATE EMBANKMENT FOR PLACEMENT OF SPILLWAY. ALL PIPE CONNECTIONS, INCLUDING ANTI-SEEP COLLARS MUST BE COMPLETELY WATERTIGHT. INSTALL FILTER DIAPHRAGM WHEN SPECIFIED ON PLAN. BARREL CONNECTION TO RISER MUST BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ATTACH BARREL STUB TO RISER AT THE SAME PERCENT (SLOPE) OF THE GRADE AS THE BARREL. FOR CONCRETE RISER/BARREL ASSEMBLY, POUR RISER WITH BARREL IN PLACE OR SET PRE-CAST RISER AND INSTALL PROJECTION COLLAR FOR WATERTIGHT CONNECTION. PLACE FILL MATERIAL AROUND THE PIPE SPILLWAY IN FOUR (4) INCH LIFTS AND HAND COMPACT AROUND THE PIPE TO A DEPTH OF 1.5 TIMES THE PIPE DIAMETER (MINIMUM). SECURELY INSTALL ANTI-VORTEX DEVICE AND TRASH RACK AS SHOWN ON PLAN.
5. INSTALL THE EMERGENCY SPILLWAY IN UNDISTURBED NATURAL GROUND. CONSTRUCT SPILLWAY WITHIN A TOLERANCE OF ±0.2 FEET.
6. STABILIZE EMBANKMENT AND ASSOCIATED DISTURBED AREAS WITHIN THREE (3) DAYS OF COMPLETION WITH SEED AND MULCH. MONITOR EMBANKMENT AND MAINTAIN EROSION FREE DURING THE LIFE OF THE BASIN.
7. INSTALL FENCING AND SIGNAGE IN ACCORDANCE WITH THE APPROVED PLAN.
8. REMOVE SEDIMENT WHEN ACCUMULATED MATERIAL HAS REACHED 25 PERCENT OF THE TOTAL STORAGE DEPTH. RESTORE BASIN TO ORIGINAL DESIGN VOLUME. PLACE REMOVED SEDIMENTS IN A CONTROLLED AREA AND STABILIZE. DO NOT DEPOSIT SEDIMENT DOWNSTREAM OF THE EMBANKMENT, ADJACENT TO A STREAM OR FLOODPLAIN.
9. WHEN THE CONTRIBUTING DRAINAGE AREA IS STABLE, THE BASIN CAN BE REMOVED IN ACCORDANCE WITH THE APPROVED SEDIMENT CONTROL PLAN.
10. A SEDIMENT BASIN DESIGNED, BUILT AND CERTIFIED AS A STORMWATER MANAGEMENT STRUCTURE, MAY BE CONVERTED WHEN THE CONTRIBUTORY DRAINAGE AREA IS STABLE. PROPERLY DEWATER BASIN, MODIFY OUTLET STRUCTURE, PERFORM ADDITIONAL GRADING, AND PROVIDE REQUIRED STORAGE VOLUME IN ACCORDANCE WITH APPROVED STORMWATER MANAGEMENT PLANS.

SEQUENCE OF CONSTRUCTION

SEQUENCE FOR NEIGHBORHOOD C,D, AND E:

1. NOTIFY HOWARD COUNTY'S SEDIMENT CONTROL INSPECTOR AT 410-313-1855 AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION. (1 DAY)
2. THE GENERAL CONTRACTOR SHALL NOT COMMENCE ANY LAND DISTURBING ACTIVITIES PRIOR TO OBTAINING A GRADING PERMIT. (1 DAY)
3. THE CONTRACTOR SHALL HOLD A PRE-CONSTRUCTION MEETING WITH THE CONSTRUCTION MANAGER AND THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR PRIOR TO COMMENCING ANY LAND DISTURBING ACTIVITIES. NO CONSTRUCTION TO BEGIN UNTIL ALL MATERIALS NEEDED TO BUILD SEDIMENT TRAPS AND BASIN(S) ARE ON SITE (1 DAY)
4. ALL AREAS WHICH ARE TO BE DISTURBED SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO CONSTRUCTION. DISTURBED AREAS WITHIN THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED SHALL BE PERMANENTLY OR TEMPORARILY STABILIZED WITHIN:
   a. THREE (3) CALENDAR DAYS ON SLOPES GREATER THAN 3:1, ALL WATERWAYS AND TO THE SURFACE OF ALL PERIMETER CONTROLS.
   b. SEVEN (7) CALENDAR DAYS ON ALL OTHER DISTURBED OR GRADED AREAS OF THE PROJECT
5. INSTALL STABILIZED CONSTRUCTION ENTRANCES, CLEAR FOR AND INSTALL CONTRACTOR STAGING AREA AND STOCK PILE AREAS, PERIMETER SUPER SILT FENCE, AND PERIMETER EARTH DIKES AS SHOWN ON THE PHASE I PLANS FOR EACH NEIGHBORHOOD AS CONSTRUCTION BEGINS. ALL HARD SURFACE PUBLIC ROADS SHALL BE CLEANED AT THE END OF EACH WORK DAY. (1 WEEK)
6. **BASED ON FIELD CONDITIONS AND AT THE SEDIMENT INSPECTOR'S DISCRETION, LIMIT OF WORK AREA(S) MUST BE LIMITED TO 20 ACRES OF ACTIVE DISTURBANCE, WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED AREA ALSO PERMITTED (10 MONTHS):**

LOW - C (WORK TO BE LIMITED TO AREA WITHIN LOW-C, AS SHOWN ON PLANS) (7.24 AC. ±):

A. ENSURE ALL PERIMETER CONTROLS ARE INSTALLED INCLUDING STABILIZED CONSTRUCTION ENTRANCE, CLEAR WATER DIVERSION, EARTH DIKES, TREE PROTECTION FENCE AND SUPER SILT FENCE AS SHOWN ON THE PHASE I PLANS.
B. BEGIN INSTALLATION OF STORMDRAIN PIPES AND STRUCTURES THAT PROVIDE OUTFALL TO TRAP #1, TRAP #2. STRUCTURES TO INCLUDE E-15, I-35, I-32, MH-15, I-34, MH-16 (TEMPORARY INLET), MH-10, MH-11, I-43, AND ASSOCIATED PERMANENT AND TEMPORARY PIPES AS SHOWN ON THE PHASE I EROSION AND SEDIMENT CONTROL PLAN. INSTALL INLET PROTECTIONS ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION.
C. DURING CONSTRUCTION, MH-16 TO HAVE GRATE INLET TOP WITH APPROPRIATE INLET PROTECTION AS NOTED ON THE EROSION AND SEDIMENT CONTROL PLANS.
D. INSTALL SEDIMENT TRAP #1, AND SEDIMENT TRAP #2 AS SHOWN ON THE PHASE I PLANS. COMPLETE TEMPORARY GRADING AND ASSOCIATED MEASURES INCLUDING EARTH DIKES, MOUNTABLE BERMS, AND INFLOW PROTECTION AS SHOWN ON PLANS.
E. CLEAR AND GRUB AREAS UPSTREAM OF TRAPS. COMPLETE DEMOLITION AS IDENTIFIED ON THE PHASE I PLANS.
F. BEGIN ROUGH GRADING THE SITE TO PROPOSED SUBGRADE AS IDENTIFIED ON THE PHASE II PLANS WITHIN LOW-C. EACH WORK AREA MUST BE LIMITED TO 20 ACRES OF ACTIVE DISTURBANCE WITH ADDITIONAL 10 ACRES OF RECENTLY STABILIZED AREA PERMITTED. IN AREAS WHERE EARTH DIKES ARE LOCATED IN CUT OR ON FILL, CONTRACTOR SHALL GRADUALLY LOWER OR RAISE DIKES ALONG WITH PROPOSED GRADE TO ENSURE POSITIVE DRAINAGE AT ALL TIMES. ADJUST SUPER SILT FENCES, STOCKPILE AREAS, AND GRADING TO TIE INTO EXISTING SEDIMENT CONTROL.
G. BEGIN INSTALLING UTILITIES AS SHOWN ON THE PHASE II PLANS WITHIN LOW-C. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION. IN AREAS WHERE PIPES OUTLET TO AREAS OF FUTURE SWM FACILITIES, CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE FROM THE INSTALLED END SECTION(S). (2 MONTHS)
H. BEGIN INSTALLATION OF PROPOSED ROAD BASE COURSE AND CURB AND GUTTER FOR SUBDIVISION ROADS AS SHOWN ON THE PHASE II PLANS WITHIN LOW-C AS WELL AS ALONG BETHANY LANE AT POSTWICK ROAD. AREAS OUTSIDE PERIMETER SEDIMENT CONTROL MEASURES TO BE STABILIZED DAILY. (1 MONTH)
I. WITH PERMISSION FROM THE SEDIMENT CONTROL INSPECTOR, COMPLETE PHASE II GRADING AND CONSTRUCTION WITHIN LOW-C.
J. AS THE SITE IS BROUGHT UP TO FINAL GRADES, PERMANENTLY STABILIZE ALL DISTURBED AREAS EXCEPT FOR THE FUTURE BIORETENTION FACILITY AREAS WITHIN SEVEN (7) CALENDAR DAYS. CONVERT TEMPORARY GRATE INLET ON MH-16 TO FINAL MH STRUCTURE AS SHOWN ON THE STORMDRAIN PROFILES.
K. AS UPSTREAM DRAINAGE AREAS ARE STABILIZED AND WITH THE SEDIMENT CONTROL INSPECTOR'S APPROVAL, FLUSH STORM DRAIN PIPES, REMOVE SEDIMENT TRAPS AND BASINS AND CLEARWATER DIVERSION. INSTALL SWM FACILITIES (UNDERDRAINS, STONE , MEDIA, LANDSCAPING) IN ACCORDANCE WITH THE STORMWATER MANAGEMENT DESIGN PLANS. STABILIZE ALL PROPOSED SLOPES. (1 MONTH)
L. INSTALL PERMANENT LANDSCAPING. (2 WEEKS)

LOW - D1 (WORK TO BE LIMITED TO AREA WITHIN LOW-D1, AS SHOWN ON PLANS) (5.71 AC. ±):

A. ENSURE ALL PERIMETER CONTROLS ARE INSTALLED INCLUDING CLEAR WATER DIVERSION, EARTH DIKES, TREE PROTECTION FENCE, AND SUPER SILT FENCE AS SHOWN ON THE PHASE I PLANS.
B. BEGIN INSTALLATION OF STORMDRAIN PIPES AND STRUCTURES THAT PROVIDE OUTFALL TO AND FROM TRAP #3 FOR NEIGHBORHOOD D. STRUCTURES TO INCLUDE I-67, MH-23, MH-22, AND ASSOCIATED PERMANENT AND TEMPORARY PIPES AS SHOWN ON THE PHASE I EROSION AND SEDIMENT CONTROL PLAN FOR NEIGHBORHOOD D. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION.
C. INSTALL SEDIMENT SEDIMENT TRAP #3 AS SHOWN ON THE PHASE I PLANS. COMPLETE TEMPORARY GRADING AND ASSOCIATED MEASURES INCLUDING EARTH DIKES, ASPHALT BERMS, AND INFLOW PROTECTION AS SHOWN ON PLANS.
D. CLEAR AND GRUB AREAS UPSTREAM OF TRAPS. COMPLETE DEMOLITION AS IDENTIFIED ON THE PHASE I PLANS.
E. BEGIN ROUGH GRADING THE SITE TO PROPOSED SUBGRADE AS IDENTIFIED ON THE PHASE II PLANS WITHIN LOW-D1. EACH LIMIT OF WORK AREA MUST BE LIMITED TO 20 ACRES OF ACTIVE DISTURBANCE WITH ADDITIONAL 10 ACRES OF RECENTLY STABILIZED AREA IS PERMITTED. IN AREAS WHERE EARTH DIKES ARE LOCATED IN CUT OR ON FILL, CONTRACTOR SHALL GRADUALLY LOWER OR RAISE DIKES ALONG WITH PROPOSED GRADE TO ENSURE POSITIVE DRAINAGE AT ALL TIMES. ADJUST SUPER SILT FENCES, STOCKPILE AREAS, AND GRADING TO TIE INTO EXISTING SEDIMENT CONTROL.
F. BEGIN INSTALLING UTILITIES AS SHOWN ON THE PHASE II PLANS WITHIN LOW-D1. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION. IN AREAS WHERE PIPES OUTLET TO AREAS OF FUTURE SWM FACILITIES, CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE FROM THE INSTALLED END SECTION(S). (2 MONTHS)
G. BEGIN INSTALLATION OF PROPOSED ROAD BASE COURSE AND CURB AND GUTTER FOR SUBDIVISION ROADS AS SHOWN ON THE PHASE II PLANS WITHIN LOW-D1. (1 MONTH)
H. WITH PERMISSION FROM THE SEDIMENT CONTROL INSPECTOR, COMPLETE PHASE II GRADING AND CONSTRUCTION WITHIN LOW-D1.
I. AS THE SITE IS BROUGHT UP TO FINAL GRADES, PERMANENTLY STABILIZE ALL DISTURBED AREAS EXCEPT FOR THE FUTURE BIORETENTION FACILITY AREAS WITHIN SEVEN (7) CALENDAR DAYS.(1)
J. AS UPSTREAM DRAINAGE AREAS ARE STABILIZED AND WITH THE SEDIMENT CONTROL INSPECTOR'S APPROVAL, FLUSH STORM DRAIN PIPES, REMOVE SEDIMENT TRAPS AND BASINS AND CLEARWATER DIVERSION. INSTALL SWM FACILITIES (UNDERDRAINS, STONE , MEDIA, LANDSCAPING) IN ACCORDANCE WITH THE STORMWATER MANAGEMENT DESIGN PLANS. STABILIZE ALL PROPOSED SLOPES. (1 MONTH)
K. INSTALL PERMANENT LANDSCAPING. (2 WEEKS)

LOW - D2 (WORK TO BE LIMITED TO AREA WITHIN LOW-D2, AS SHOWN ON PLANS) (11.42 AC. ±):

A. ENSURE ALL PERIMETER CONTROLS ARE INSTALLED INCLUDING CLEAR WATER DIVERSION, EARTH DIKES, TREE PROTECTION FENCE, AND SUPER SILT FENCE AS SHOWN ON THE PHASE I PLANS.
B. BEGIN INSTALLATION OF STORMDRAIN PIPES AND STRUCTURES THAT PROVIDE OUTFALL TO BASIN #1, FOR NEIGHBORHOOD D. STRUCTURES TO INCLUDE E-20, I-68, AND ASSOCIATED PERMANENT AND TEMPORARY PIPES AS SHOWN ON THE PHASE I EROSION AND SEDIMENT CONTROL PLAN FOR NEIGHBORHOOD D. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION.
C. INSTALL SEDIMENT BASIN 1 AS SHOWN ON THE PHASE I PLANS. COMPLETE TEMPORARY GRADING AND ASSOCIATED MEASURES INCLUDING EARTH DIKES, MOUNTABLE BERMS, AND INFLOW PROTECTION AS SHOWN ON PLANS.
D. CLEAR AND GRUB AREAS UPSTREAM OF TRAPS. COMPLETE DEMOLITION AS IDENTIFIED ON THE PHASE I PLANS.
E. BEGIN ROUGH GRADING THE SITE TO PROPOSED SUBGRADE AS IDENTIFIED ON THE PHASE II PLANS WITHIN LOW-D2. EACH LIMIT OF WORK AREA MUST BE LIMITED TO 20 ACRES OF ACTIVE DISTURBANCE WITH ADDITIONAL 10 ACRES OF RECENTLY STABILIZED AREA IS PERMITTED. IN AREAS WHERE EARTH DIKES ARE LOCATED IN CUT OR ON FILL, CONTRACTOR SHALL GRADUALLY LOWER OR RAISE DIKES ALONG WITH PROPOSED GRADE TO ENSURE POSITIVE DRAINAGE AT ALL TIMES. ADJUST SUPER SILT FENCES, STOCKPILE AREAS, AND GRADING TO TIE INTO EXISTING SEDIMENT CONTROL.
F. BEGIN INSTALLING UTILITIES AS SHOWN ON THE PHASE II PLANS WITHIN LOW-D2. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION. IN AREAS WHERE PIPES OUTLET TO AREAS OF FUTURE SWM FACILITIES, CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE FROM THE INSTALLED END SECTION(S). (2 MONTHS)
G. BEGIN INSTALLATION OF PROPOSED ROAD BASE COURSE AND CURB AND GUTTER FOR SUBDIVISION ROADS AS SHOWN ON THE PHASE II PLANS WITHIN LOW-D2. (1 MONTH)
H. WITH PERMISSION FROM THE SEDIMENT CONTROL INSPECTOR, COMPLETE PHASE II GRADING AND CONSTRUCTION WITHIN LOW-D2.
I. AS THE SITE IS BROUGHT UP TO FINAL GRADES, PERMANENTLY STABILIZE ALL DISTURBED AREAS EXCEPT FOR THE FUTURE BIORETENTION FACILITY AREAS WITHIN SEVEN (7) CALENDAR DAYS.
J. AS UPSTREAM DRAINAGE AREAS ARE STABILIZED AND WITH THE SEDIMENT CONTROL INSPECTOR'S APPROVAL, FLUSH STORM DRAIN PIPES, REMOVE SEDIMENT TRAPS AND BASINS AND CLEARWATER DIVERSION. INSTALL SWM FACILITIES (UNDERDRAINS, STONE , MEDIA, LANDSCAPING) IN ACCORDANCE WITH THE STORMWATER MANAGEMENT DESIGN PLANS. STABILIZE ALL PROPOSED SLOPES. (1 MONTH)
K. INSTALL PERMANENT LANDSCAPING. (2 WEEKS)

LOW - E (WORK TO BE LIMITED TO AREA WITHIN LOW-E, AS SHOWN ON PLANS) (8.58 AC. ±):

A. ENSURE ALL PERIMETER CONTROLS ARE INSTALLED INCLUDING STABILIZED CONSTRUCTION ENTRANCE, CLEAR WATER DIVERSION, EARTH DIKES, TREE PROTECTION FENCE, AND SUPER SILT FENCE AS SHOWN ON THE PHASE I PLANS.
B. BEGIN INSTALLATION OF STORMDRAIN PIPES AND STRUCTURES THAT PROVIDE OUTFALL TO TRAP #4 AND TRAP #5, FOR NEIGHBORHOOD E. STRUCTURES TO INCLUDE, TEMP. EROS-6, I-76, MH-30, MH-44, MH-43, I-75, MH-45, MH-31, I-76, EROS-8, EROS-9 AND ASSOCIATED PERMANENT AND TEMPORARY PIPES AS SHOWN ON THE PHASE I EROSION AND SEDIMENT CONTROL PLAN FOR NEIGHBORHOOD E. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION.
C. BEGIN INSTALLATION OF STORM DRAIN STRUCTURES I-82, MH-37, E-31 AND PERMANENT PIPES AS SHOWN ON THE PHASE I EROSION AND SEDIMENT CONTROL PLAN FOR NEIGHBORHOOD E. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION. INSTALL ASSOCIATED EARTH BERMS AS SHOWN ON THE PHASE I PLANS.
D. DURING CONSTRUCTION, MH-37 TO HAVE GRATE INLET TOP WITH APPROPRIATE INLET PROTECTION AS NOTED ON THE EROSION AND SEDIMENT CONTROL PLANS.
E. INSTALL SEDIMENT TRAP #4 AND TRAP #5 AS SHOWN ON THE PHASE I PLANS. COMPLETE TEMPORARY GRADING AND ASSOCIATED MEASURES INCLUDING EARTH DIKES, OUTFALL PIPES, MOUNTABLE BERMS, AND INFLOW PROTECTION AS SHOWN ON PLANS.
F. CLEAR AND GRUB AREAS UPSTREAM OF TRAPS. COMPLETE DEMOLITION AS IDENTIFIED ON THE PHASE I PLANS.
G. BEGIN ROUGH GRADING THE SITE TO PROPOSED SUBGRADE AS IDENTIFIED ON THE PHASE II PLANS WITHIN LOW-E EACH LIMIT OF WORK AREA MUST BE LIMITED TO 20 ACRES OF ACTIVE DISTURBANCE WITH ADDITIONAL 10 ACRES OF RECENTLY STABILIZED AREA IS PERMITTED. IN AREAS WHERE EARTH DIKES ARE LOCATED IN CUT OR ON FILL, CONTRACTOR SHALL GRADUALLY LOWER OR RAISE DIKES ALONG WITH PROPOSED GRADE TO ENSURE POSITIVE DRAINAGE AT ALL TIMES. ADJUST SUPER SILT FENCES, STOCKPILE AREAS, AND GRADING TO TIE INTO EXISTING SEDIMENT CONTROL.
H. BEGIN INSTALLING UTILITIES AS SHOWN ON THE PHASE II PLANS WITHIN LOW-E. INSTALL INLET PROTECTION ON ALL PROPOSED INLETS IMMEDIATELY AFTER INSTALLATION. IN AREAS WHERE PIPES OUTLET TO AREAS OF FUTURE SWM FACILITIES, CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE FROM THE INSTALLED END SECTION(S). (2 MONTHS)
I. BEGIN INSTALLATION OF PROPOSED ROAD BASE COURSE AND CURB AND GUTTER FOR SUBDIVISION ROADS AS SHOWN ON THE PHASE II PLANS WITHIN LOW-E AS WELL AS ALONG NOLLWICK ROAD. AREAS OUTSIDE OF PERIMETER SEDIMENT CONTROL MEASURES TO BE STABILIZED DAILY. (1 MONTH)
J. WITH PERMISSION FROM THE SEDIMENT CONTROL INSPECTOR, COMPLETE PHASE II GRADING AND CONSTRUCTION WITHIN LOW-E
K. AS THE SITE IS BROUGHT UP TO FINAL GRADES, PERMANENTLY STABILIZE ALL DISTURBED AREAS EXCEPT FOR THE FUTURE BIORETENTION FACILITY AREAS WITHIN SEVEN (7) CALENDAR DAYS. CONVERT TEMPORARY GRATE INLET ON MH-37 TO FINAL MH STRUCTURE AS SHOWN ON THE STORMDRAIN PROFILES.
L. AS UPSTREAM DRAINAGE AREAS ARE STABILIZED AND WITH THE SEDIMENT CONTROL INSPECTOR'S APPROVAL, FLUSH STORM DRAIN PIPES, REMOVE SEDIMENT TRAPS AND BASINS AND CLEARWATER DIVERSION. INSTALL SWM FACILITIES (UNDERDRAINS, STONE , MEDIA, LANDSCAPING) IN ACCORDANCE WITH THE STORMWATER MANAGEMENT DESIGN PLANS. STABILIZE ALL PROPOSED SLOPES. (1 MONTH)
M. INSTALL PERMANENT LANDSCAPING. (2 WEEKS)

LOW- F (WORK TO BE LIMITED TO AREA WITHIN LOW-F, AS SHOWN ON PLANS): REFER TO CULVERT INSTALLATION PLAN ON SHEET 89.

LOW- G (WORK TO BE LIMITED TO AREA WITHIN LOW-G, AS SHOWN ON PLANS): REFER TO CULVERT INSTALLATION PLAN ON SHEET 87.

LOW- H (WORK TO BE LIMITED TO AREA WITHIN LOW-H, AS SHOWN ON PLANS): REFER TO CULVERT INSTALLATION PLAN ON SHEET 88.

7. AFTER ALL CONSTRUCTIONS HAS BEEN COMPLETED AND UPON APPROVAL FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE ANY REMAINING SEDIMENT CONTROL MEASURES.
8. NOTIFY HOWARD COUNTY OFFICE OF INSPECTIONS AND PERMITS FOR FINAL INSPECTION OF THE COMPLETED PROJECT.

NOTES:

1. THE CONTRACTOR SHALL INSPECT AND PROVIDE NECESSARY MAINTENANCE ON ALL SEDIMENT AND EROSION CONTROL STRUCTURES SHOWN HEREON, AFTER EACH RAINFALL AND ON A DAILY BASIS.
2. ALL OF THE PRIVATE ON-LOT FACILITIES WILL BE CONSTRUCTED AT THE SITE DEVELOPMENT PLAN STAGE.
3. REFER TO THE VICINITY MAP ON THE COVER SHEET FOR THE AREA OF EACH RESPECTIVE LIMIT OF WORK.

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. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

DocuSigned by: Alexander Bratchie — 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: — 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: — 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson — 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002	OWNER / DEVELOPER: BETHANY GLEN DEVELOPMENT, INC. 5074 DORSEY HALL ROAD, SUITE 205 ELLICOTT CITY, MD 21042 CONTACT: JASON VAN KIRK PHONE: (410) 720-3021 TAX MAP: 17 GRID: 15 ZONED: R-20 PARCEL: 34 2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER™
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	ODP- 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

EROSION & SEDIMENT CONTROL NOTES AND DETAILS

F-22-033

Mar 12, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - ODP - 2----->LAYOUT: 36 - E&S NOTES AND DETAILS
AG

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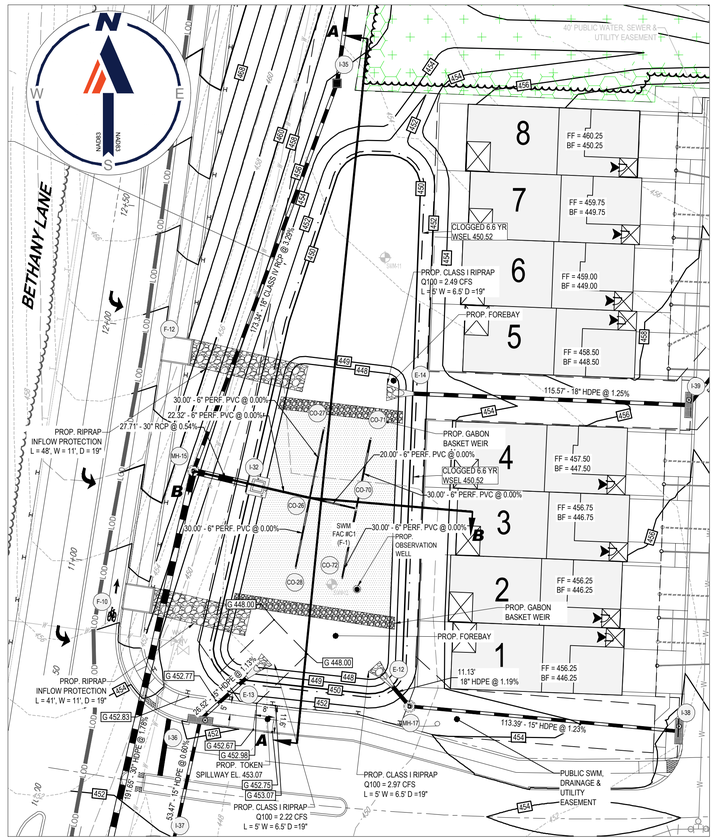


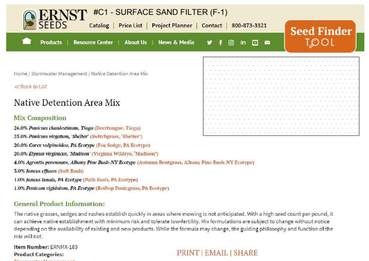
PLAN VIEW - SWM FACILITY #C1 - SURFACE SAND FILTER (F-1)

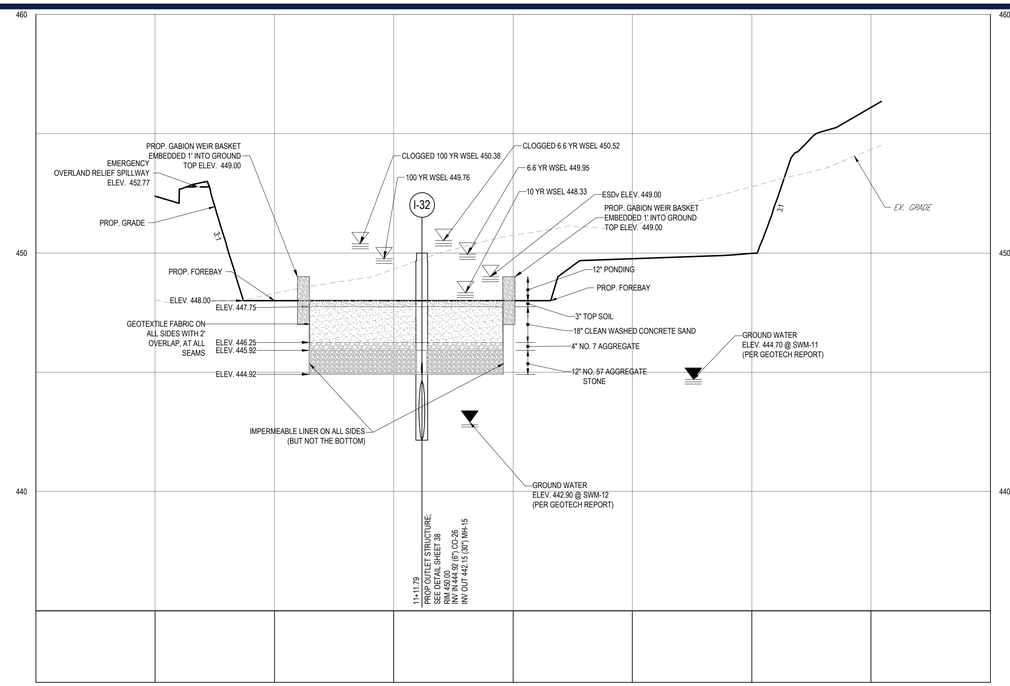
SCALE: 1 = 30'

GENERAL NOTE:

GEOTEXTILE FABRIC TO BE PLACED MINIMUM 6" HIGHER THAN HIGHEST CLOGGED 100-YEAR WSEL ON ALL FACILITIES.

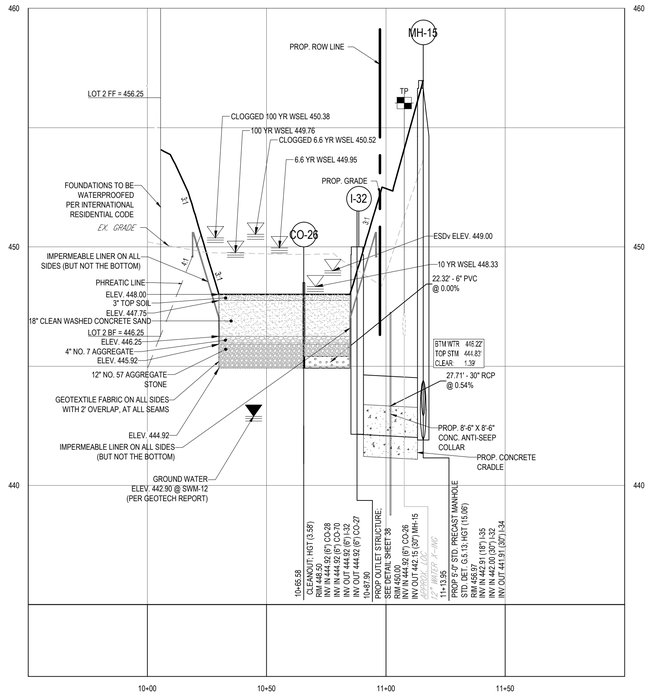
NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)





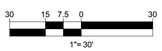
SECTION A-A - SWM FACILITY #C1 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL



SECTION B-B - SWM FACILITY #C1 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
I, MARGARET LUCILLE MC
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

APPROVED: DEPARTMENT OF PUBLIC WORKS	
DocuSigned by: [signature]	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
DocuSigned by: [signature]	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
DocuSigned by: [signature]	6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP- 19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
I, BRANDON R. ROWE, 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. 40858, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
SWM NOTES AND DETAILS

SHEET NUMBER:
37 of 117

F-22-033

Mar 19, 2024
H:\151\MD152018\DRAWINGS\PLAN SET\FINAL PLAN\MD152018 - SWMD - 2 - LAYOUT 37 - SWM NOTES & DETAILS

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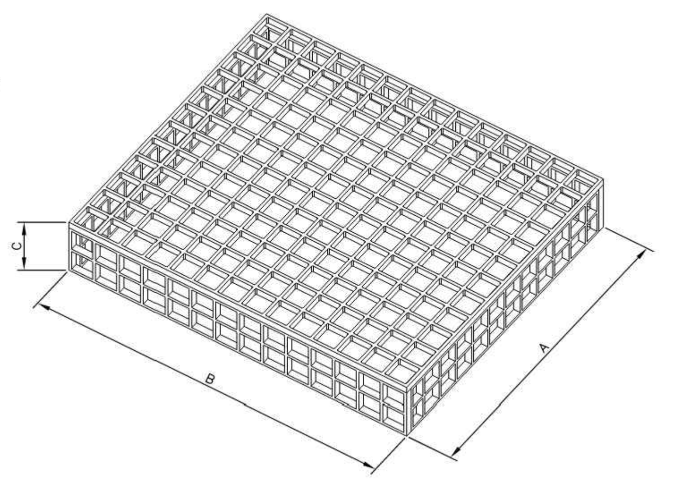
FLAT ROOF RECTANGULAR RACKS/WEIRS
(STANDARD SIZES)
DIMENSIONS IN INCHES TO THE NEAREST 1/4"



HOST STRUCTURE INSIDE DIMENSIONS
4' LENGTH 8" WALL THICKNESS (REQUIRED)
4' WIDTH

AS DISTRIBUTED BY CONTECH CONSTRUCTION PRODUCTS NATIONALLY

WIDTH (A)	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	70 1/2	75 7/8	81 7/8	87 1/4
CODE	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

LENGTH (B)	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	70 1/2	75 7/8	81 7/8	87 1/4
CODE	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

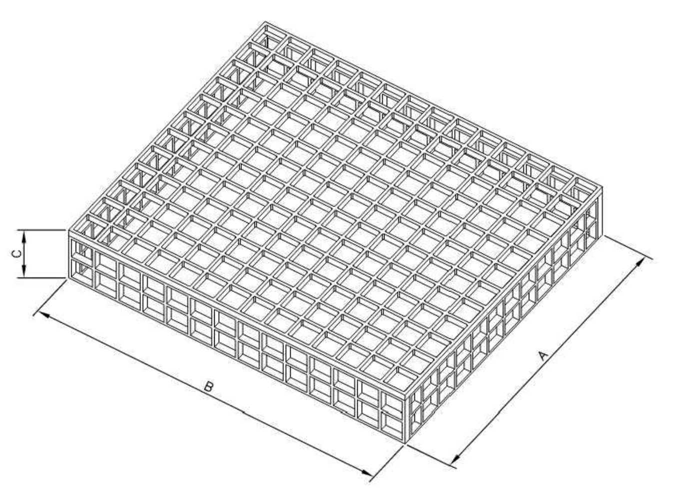
HEIGHT (C)	7 1/2	12 7/8
CODE	01	02
	1 GRID HIGH	2 GRID HIGH

FLAT ROOF (FR) 54 3/8" WIDTH (A) 54 3/8" LENGTH (B) 12 7/8" HEIGHT (C)

CONTECH CONSTRUCTION PRODUCTS INC.
9025 CENTRE POINTE DRIVE, SUITE 400
WEST CHESTER, OHIO 45069
PH: 1.800.338.1122 FAX: 513.645.7399
© COPYRIGHT

CUSTOMER: ELM STREET DEVELOPMENT	DATE:
	DRAWN BY:
PROJECT: BETHANY GLEN - STRUCTURE I-32	APP'D BY:
	DETAIL:

FLAT ROOF RECTANGULAR RACKS/WEIRS
(STANDARD SIZES)
DIMENSIONS IN INCHES TO THE NEAREST 1/4"



HOST STRUCTURE INSIDE DIMENSIONS
____ LENGTH 8" WALL THICKNESS (REQUIRED)
____ WIDTH 6" DIAMETER

AS DISTRIBUTED BY CONTECH CONSTRUCTION PRODUCTS NATIONALLY

WIDTH (A)	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	70 1/2	75 7/8	81 7/8	87 1/4
CODE	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

LENGTH (B)	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	70 1/2	75 7/8	81 7/8	87 1/4
CODE	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

HEIGHT (C)	7 1/2	12 7/8
CODE	01	02
	1 GRID HIGH	2 GRID HIGH

FLAT ROOF (FR) 11 3/8" WIDTH (A) 11 3/8" LENGTH (B) 12 7/8" HEIGHT (C)

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WEST CHESTER, OHIO 45069
PH: 1.800.338.1122 FAX: 513.645.7399
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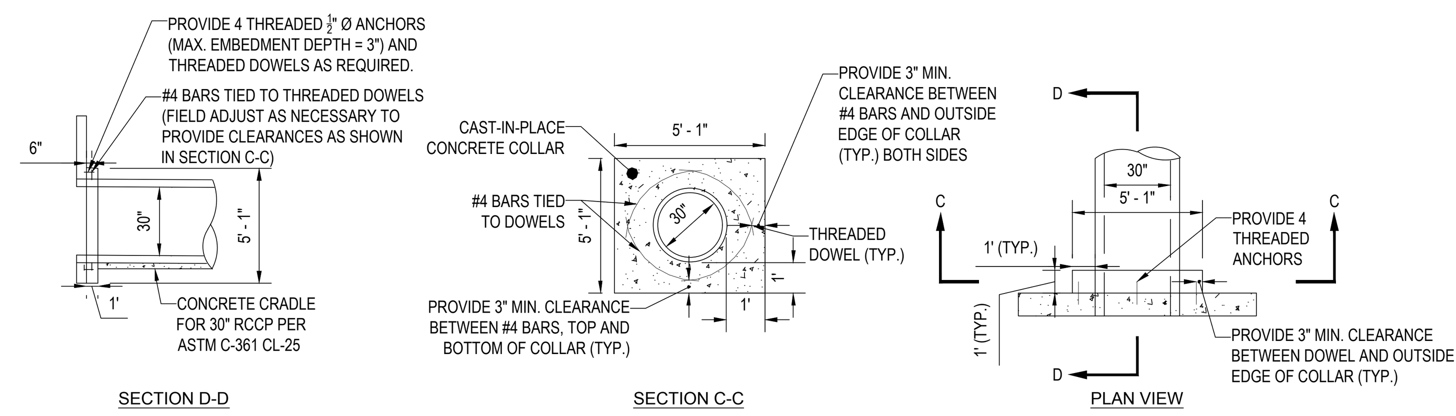
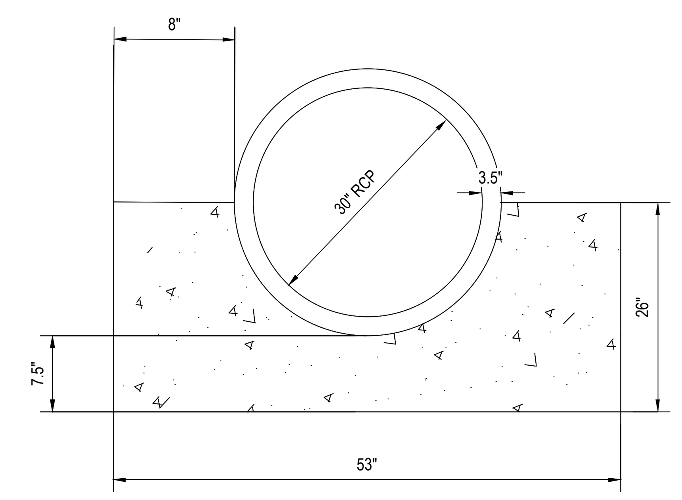
CUSTOMER: ELM STREET DEVELOPMENT	DATE:
	DRAWN BY:
PROJECT: BETHANY GLEN - STRUCTURE I-32	APP'D BY:
	DETAIL:



NOTES:
1. PROVIDE 1' MIN CONCRETE COVER AROUND O.D. OF PIPE.
2. Fc = 3,500 PSI AT 28 DAYS
3. TO BE USED WITH PRE-CAST RISERS ONLY
4. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

CAST-IN-PLACE CONCRETE COLLAR DETAILS

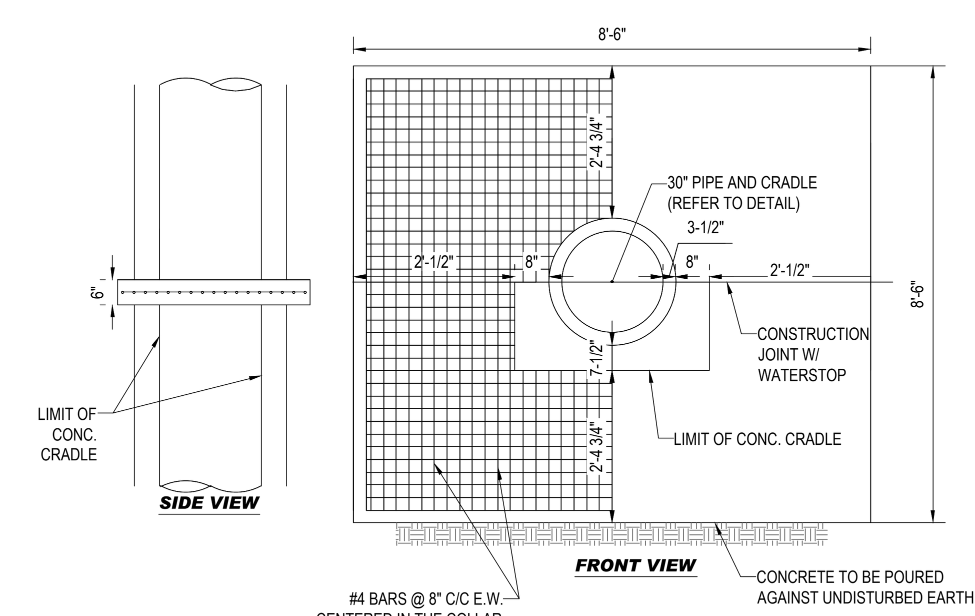
NOT TO SCALE



NOTES:
1. CRADLE TO BE CONTINUOUS ALONG PIPE.
2. CONCRETE FOR CRADLE TO BE MDSHA MIX No. 3

SCS TR-46 A2 CONCRETE CRADLE DETAIL

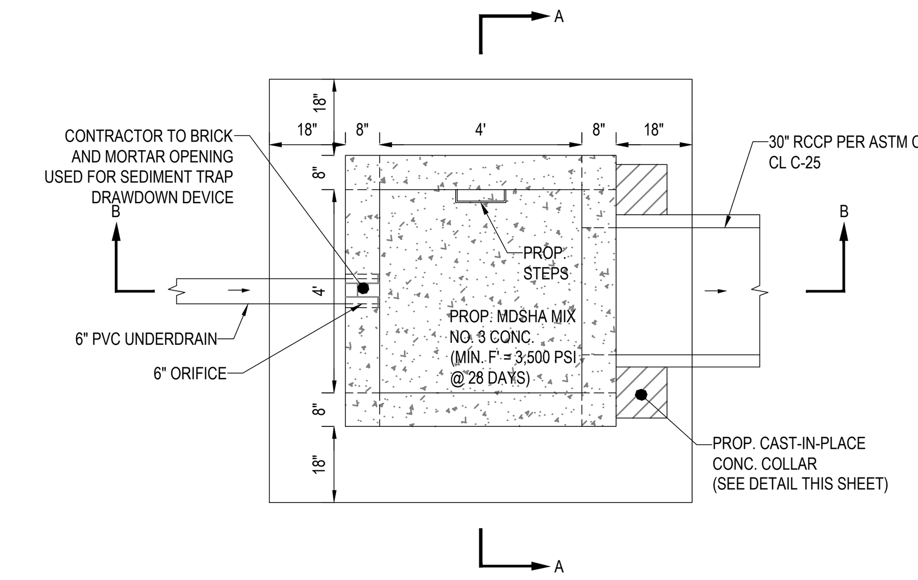
NOT TO SCALE



ANTI-SEEP COLLAR DETAIL

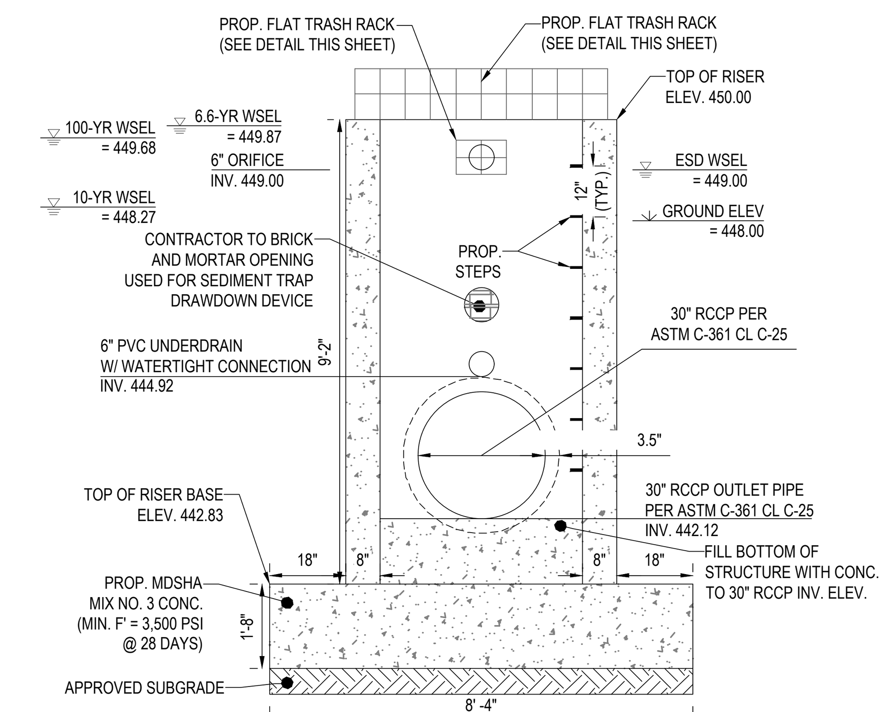
NOT TO SCALE

NOTES:
1. CONTRACTOR IS TO CONSTRUCT AND INSTALL ANTI-SEEP COLLAR IN ACCORDANCE WITH ALL APPLICABLE MD-378 REGULATIONS.
2. ANTI-SEEP COLLARS ARE TO BE CONSTRUCTED IN TWO (2) POURS. THE BOTTOM SECTION IS TO BE POURED WITH THE CONCRETE CRADLE. FORM AND POUR THE TOP SECTION OF THE COLLAR.
3. ANTI-SEEP COLLARS ARE TO BE POURED AT LEAST TWO (2) FEET FROM THE NEAREST PIPE JOINT.
4. LOOSE CONCRETE, EARTH, ETC. IS TO BE REMOVED FROM THE PIPE SURFACE.
5. CONCRETE SHALL HAVE A MINIMUM F' = 3,500 PSI (MSHA MIX NO. 3) AT 28 DAYS.
6. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER ENGINEERING TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

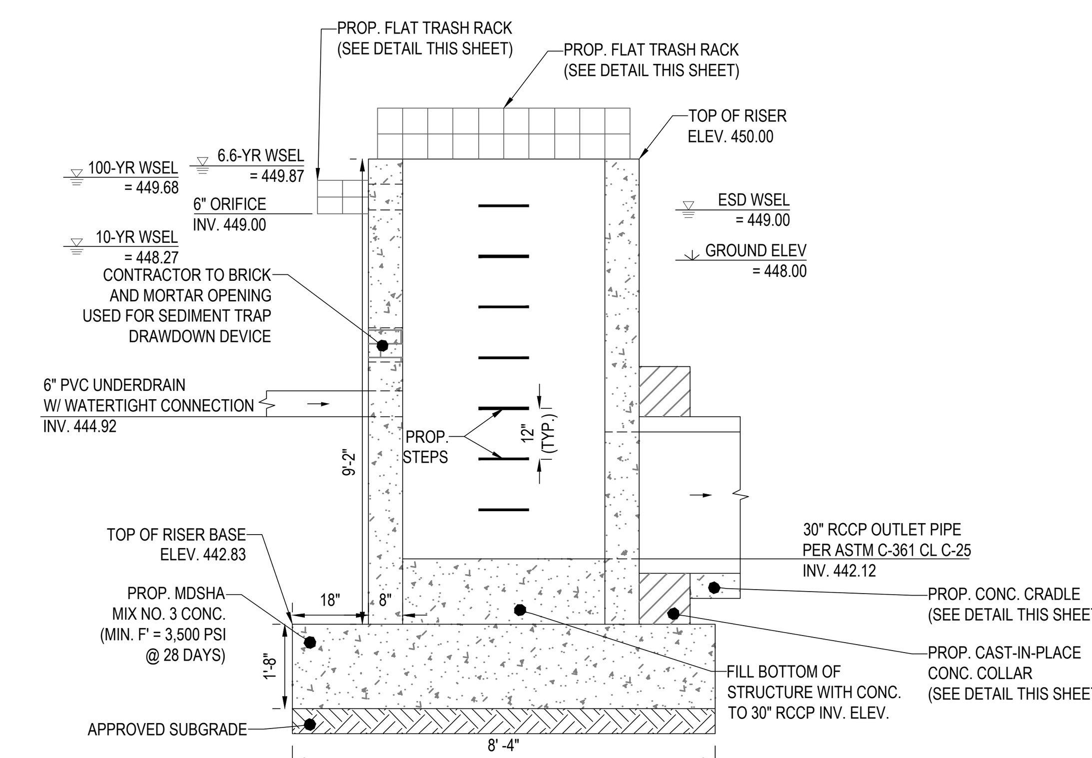


PLAN VIEW

WITHOUT TOP SLAB AND TRASH RACKS



SECTION A-A



SECTION B-B

TYPICAL RISER STRUCTURE DETAILS (STRUCTURE I-32)

NOT TO SCALE

NOTES:
1. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. STRUCTURES ARE INTENDED TO BE STANDARD PRECAST CONCRETE STRUCTURES. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.
2. DETAIL SHOWN IS FOR FINAL CONDITIONS ONLY. ANY TEMPORARY OPENING IN THE STRUCTURE USED FOR SEDIMENT CONTROL IS TO BE PERMANENTLY SEALED WITH BRICK AND MORTAR.

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

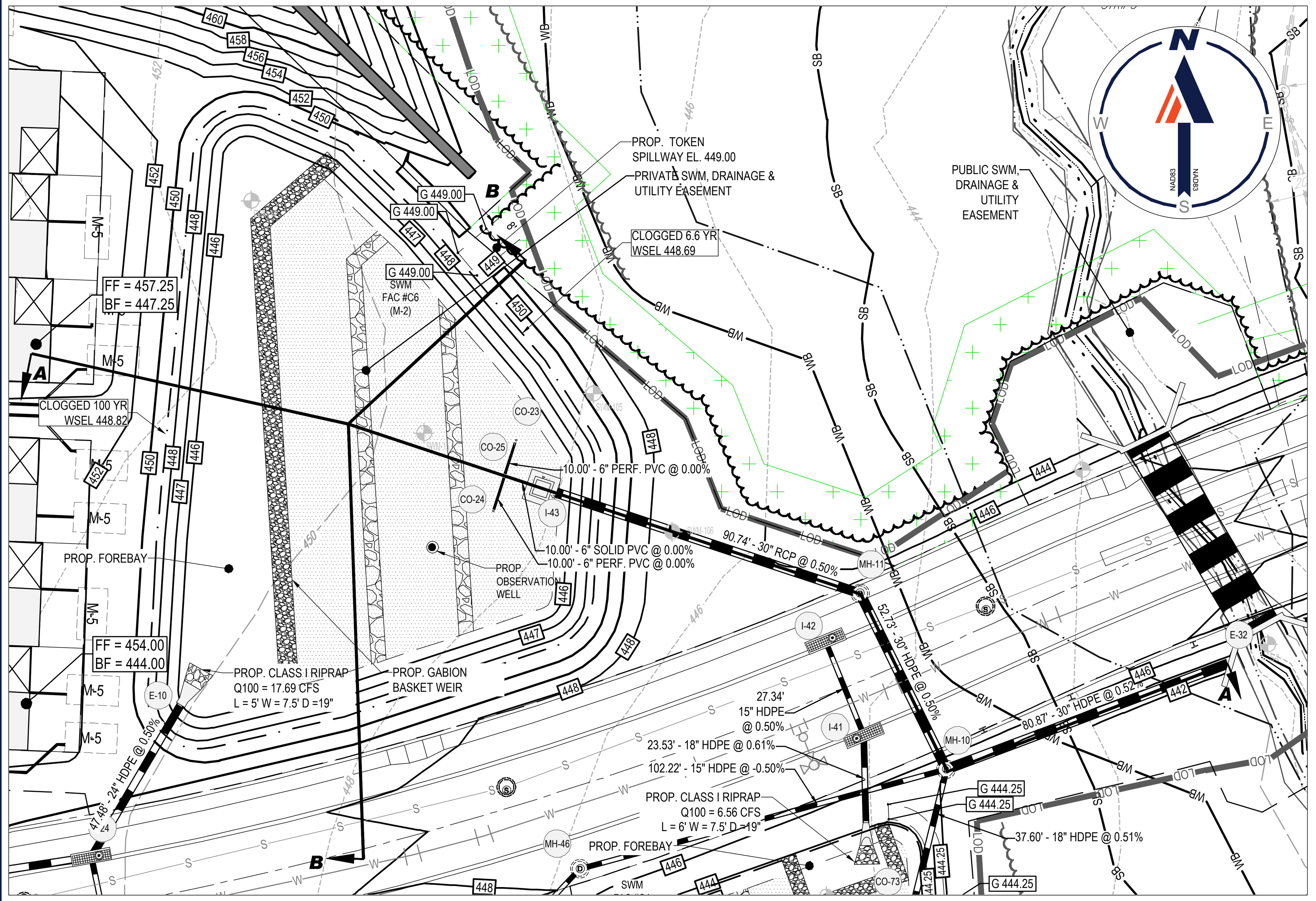
B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SWM NOTES AND DETAILS

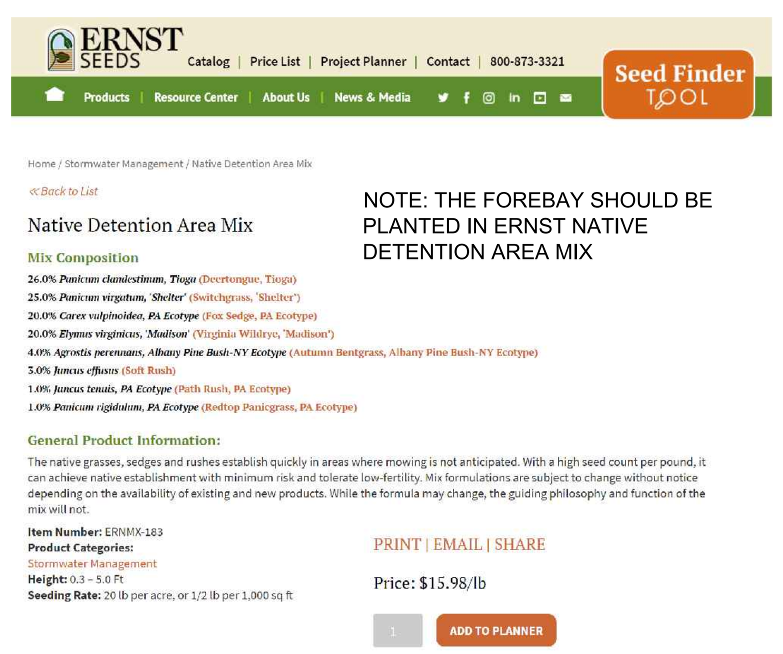
F-22-033

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F



PLAN VIEW - SWM FACILITY #C6 - SUBMERGED GRAVEL WETLAND (M-2)

SCALE: 1 = 30'



NOTE: THE FOREBAY SHOULD BE PLANTED IN ERNST NATIVE DETENTION AREA MIX

BOHLER//

901 Dulaney Valley Road, Suite 801
Towson, MD 21204
410.821.7900

August 3, 2023

Howard County
Department of Planning and Zoning
3430 Courthouse Drive
Ellicott City, MD 21043

Attn: Nicole Yan

RE: Bethany Glen
9891 MD Route 99
Howard County, Maryland
SDP-22-021
BEPC # MD152018
Phase 1

To whom it may concern,

The Submerged Gravel Wetland #C6 pg. 39 of the Bethany Glen SDP set has been designed to tolerate being inundated with water during storm events. This facility was planted with -

- Salix sericea, silky willow
- Ilex laevigata, winterberry
- Ranunculus subrigidus, pond butter-cup
- Aster puniceus, swamp aster
- Iris virginica, Virginia blueflag
- Juncus marginatus, grass- leaf rush
- Scirpus divaricatus, spreading bullrush

All plant species were selected based on their wetland indicator status Obligate or FACW) on the wetland indicator. (Reed, 1988)

We have cross checked the species include in the list with the MDE guidance manual for Storm water BMP's. Each species is tolerant of flooding and inundation. (MSDM, 2009)

This facility has been designed appropriately.

Sincerely,
BOHLER ENGINEERING VA, LLC

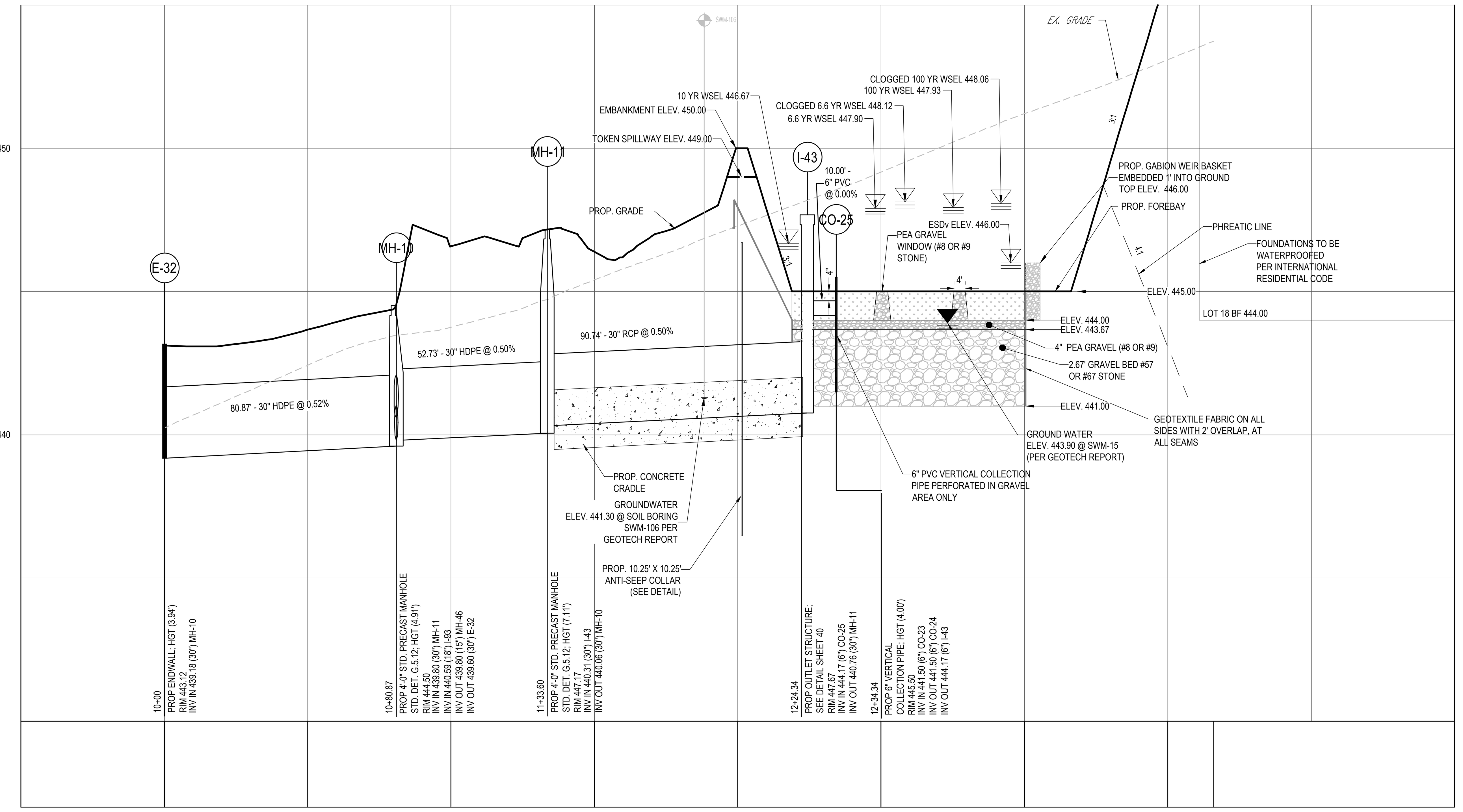
Errin McWilliams, P.L.A.

Sources

Reed, Porter B. Jr. 1988. National List of Plant Species that Occur in Wetlands: Northeast (Region 1). For National Wetlands Inventory. U.S. Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C.

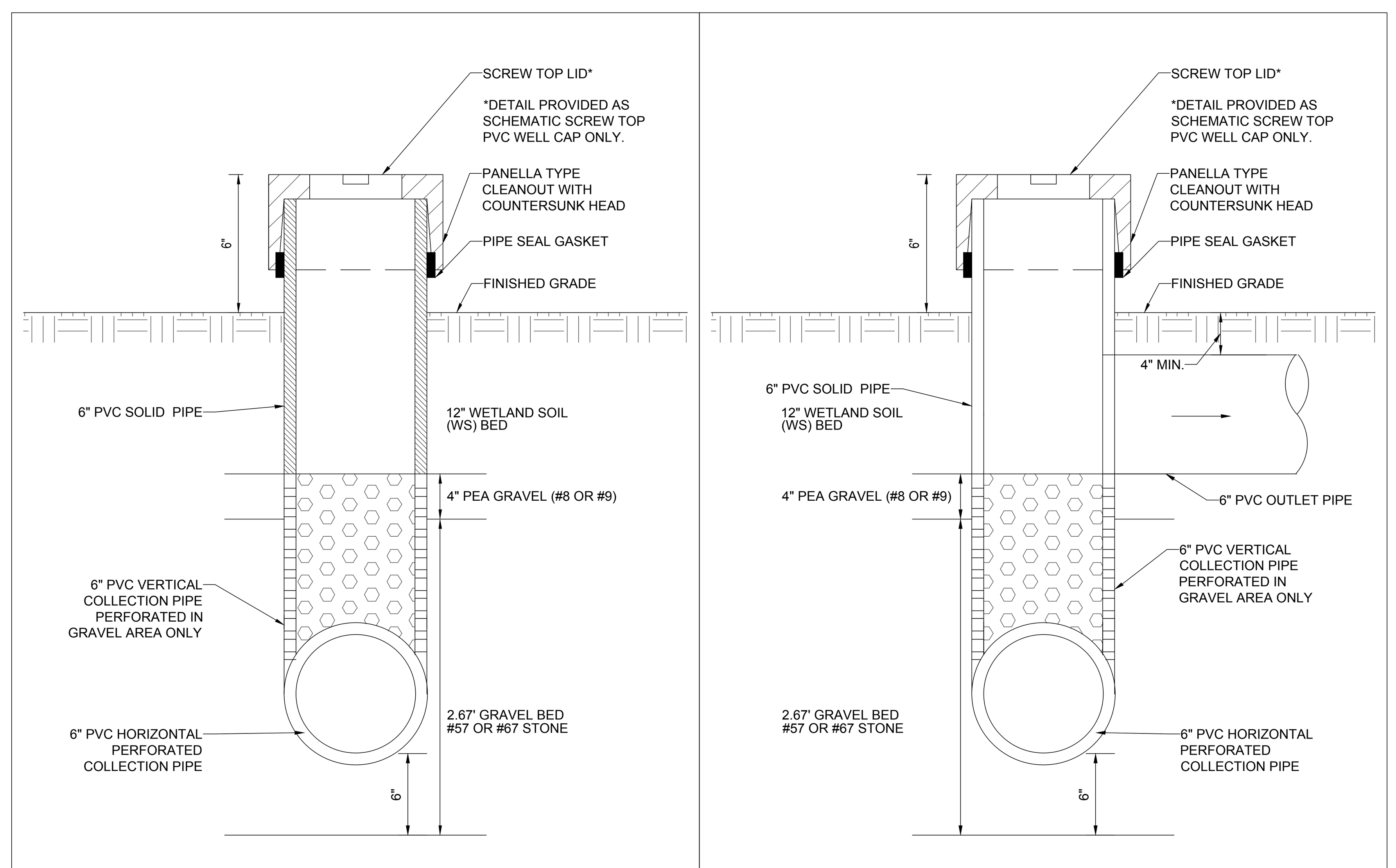
Maryland Stormwater Design Manual, volumes I and II October 2000, revised May 2009

www.BohlerEngineering.com



SECTION A-A - SWM FACILITY #C6 - SUBMERGED GRAVEL WETLAND (M-2)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

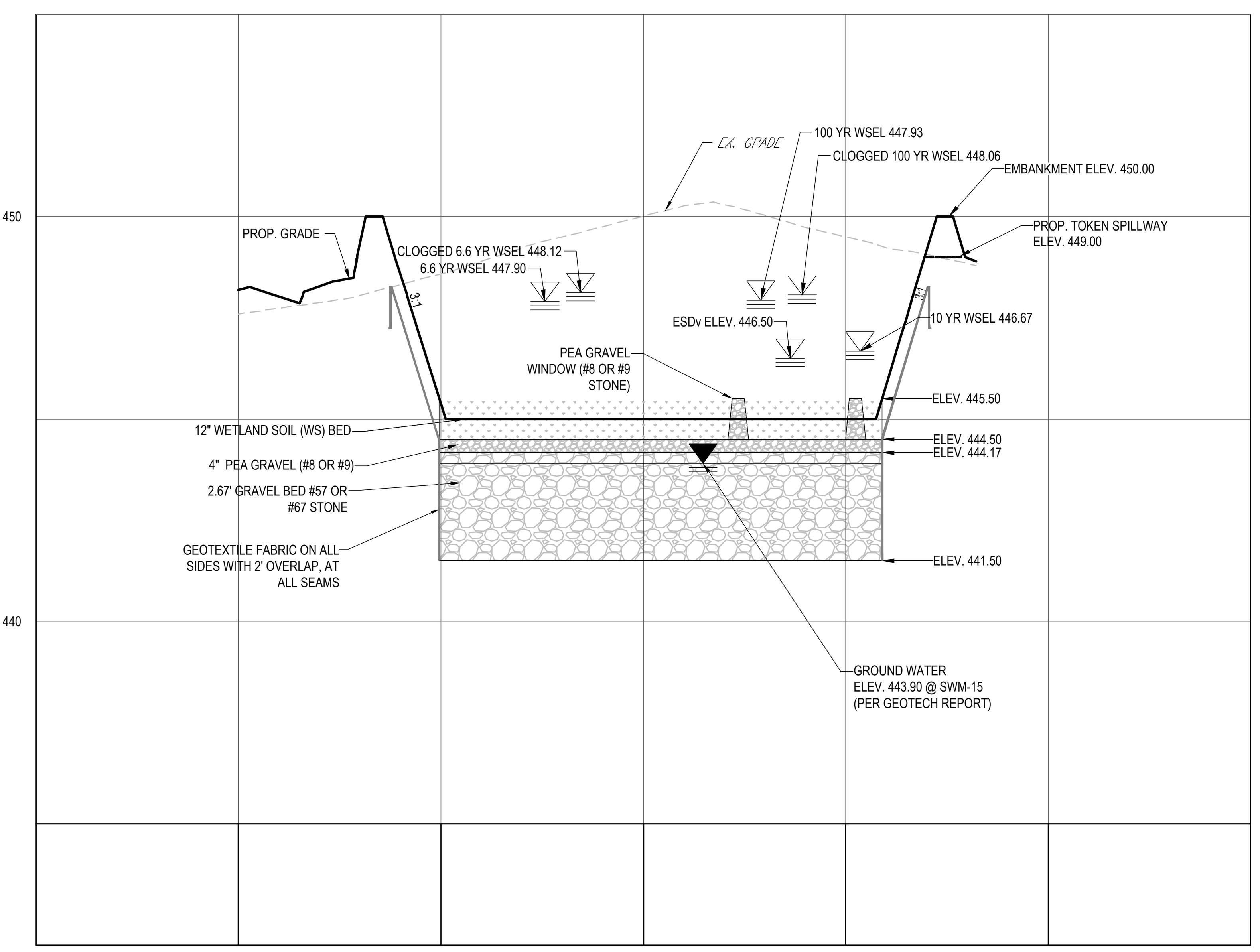


VERTICAL COLLECTION PIPE DETAIL

NOT TO SCALE

VERTICAL COLLECTION OUTLET PIPE DETAIL

NOT TO SCALE



SECTION B-B - SWM FACILTY #C6 - SUBMERGED GRAVEL WETLAND (M-2)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

SUBMERGED GRAVEL WETLAND #C6 PLANTING SCHEDULE

FACILITY C6
(6255 S.F.)

SPECIES		TYPE	VEGETATION TYPE	SPACING	SIZE	QUANTITY
BOTANICAL NAME	COMMON NAME					
SALIX SERICEA	SILKY WILLOW	SHRUB	OBL	30" O.C.	1 GAL. CONT.	357
ILEX LAEVIGATA	WINTERBERRY HOLLY	SHRUB	OBL	30" O.C.	1 GAL. CONT.	357
RANUNCULUS SUBRIGIDUS	POND BUTTER-CUP	PERENNIAL	OBL	12" O.C.	PLUG	893
ASTER PUNICEUS	SWAMP ASTER	PERENNIAL	OBL	12" O.C.	PLUG	893
IRIS VIRGINICA	VIRGINIA BLUEFLAG	PERENNIAL	OBL	12" O.C.	PLUG	893
JUNCUS MARGINATUS	GRASS-LEAF RUSH	GRASS	FACW	12" O.C.	PLUG	893
SCIRPUS DIVARICATUS	SPREADING BULLRUSH	GRASS	OBL	12" O.C.	PLUG	893

NOTES:
1) ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE C SOIL STABILIZATION MATTING (SSM)
2) ALL PROPOSED FOREBAYS TO BE SODDED

NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)

#C6 - SUBMERGED GRAVEL WETLAND (M-2)

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

1"= 30'

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER//
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

811
Know what's below. Call before you dig.
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It's fast. It's free. It's the law.

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER//
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

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PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
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SHEET TITLE:

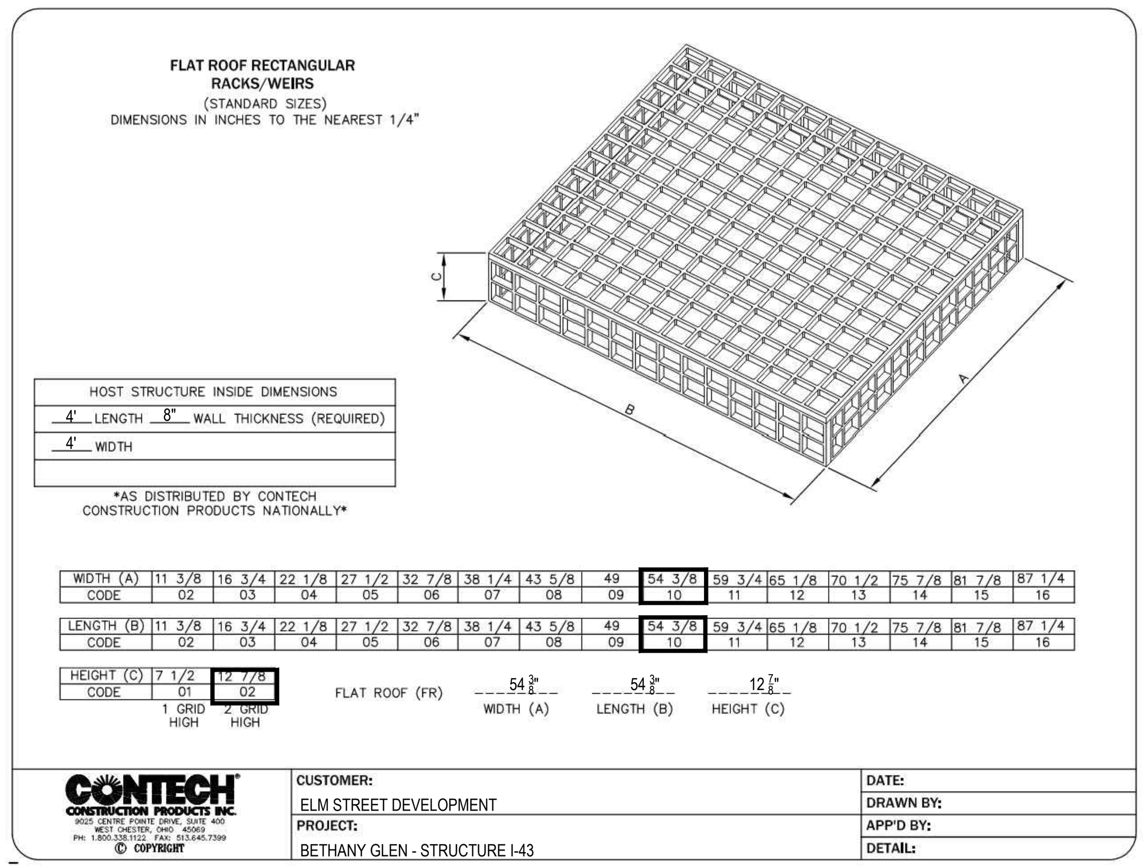
SWM NOTES AND DETAILS

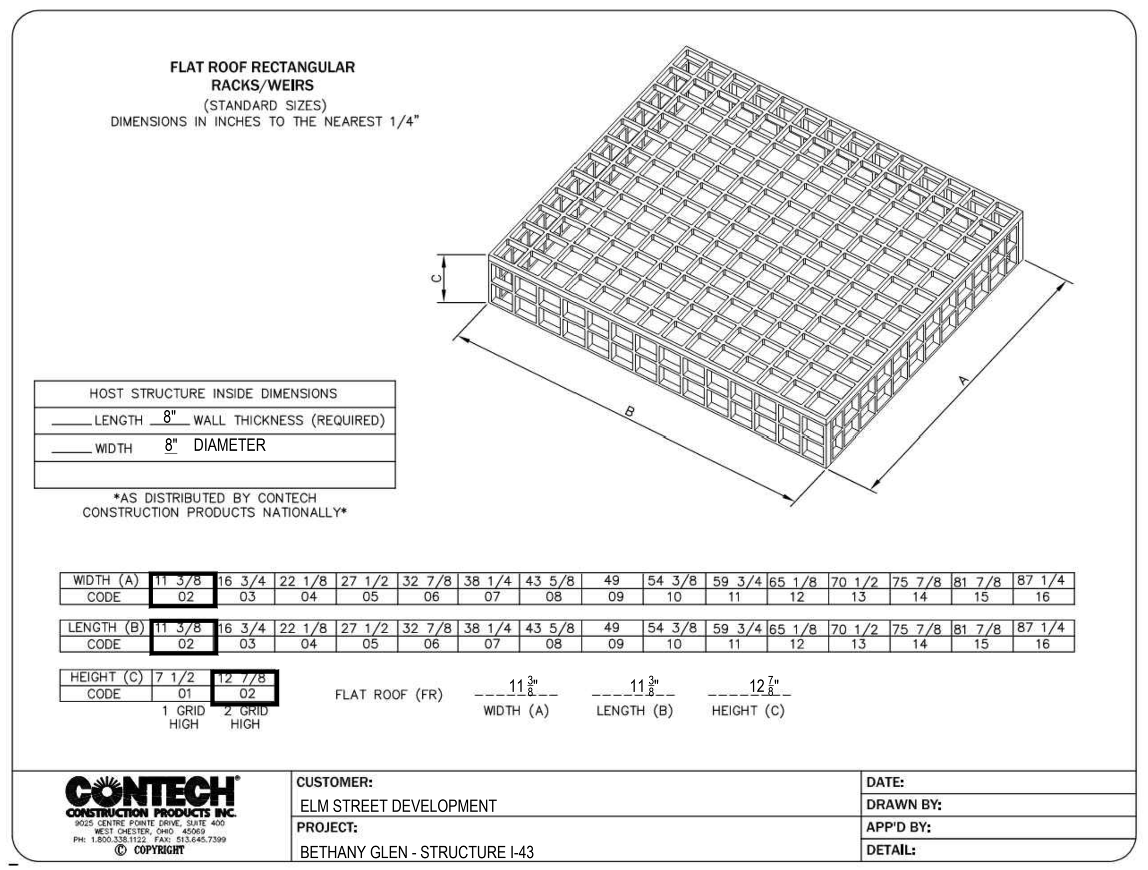
SHEET NUMBER:

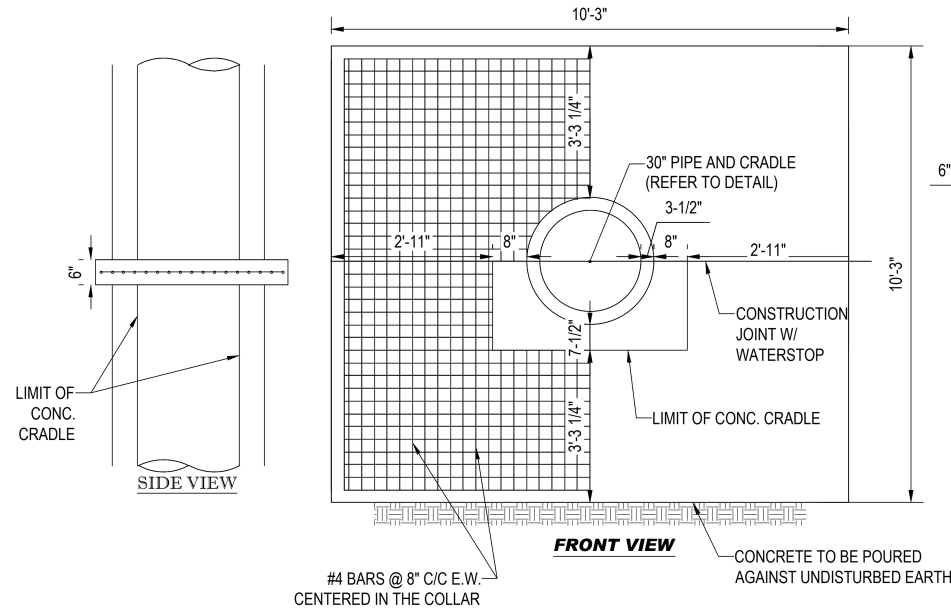
F-22-033

Mar 19, 2024

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F





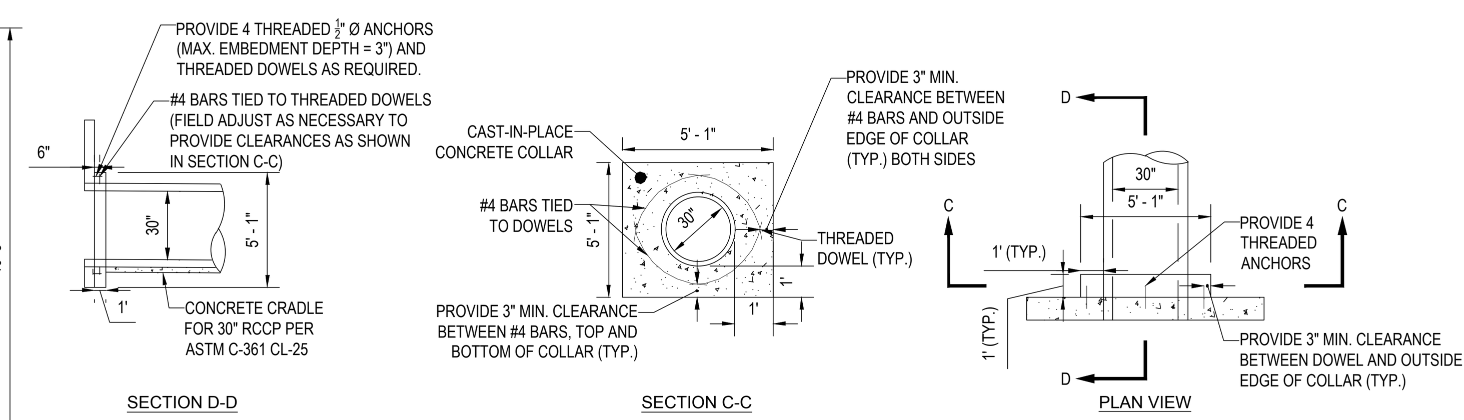


ANTI-SEEP COLLAR DETAIL

NOT TO SCALE

NOTES:

1. CONTRACTOR IS TO CONSTRUCT AND INSTALL ANTI-SEEP COLLAR IN ACCORDANCE WITH ALL APPLICABLE MD-378 REGULATIONS.
2. ANTI-SEEP COLLARS ARE TO BE CONSTRUCTED IN TWO (2) POURS. THE BOTTOM SECTION IS TO BE POURED WITH THE CONCRETE CRADLE. FORM AND POUR THE TOP SECTION OF THE COLLAR.
3. ANTI-SEEP COLLARS ARE TO BE POURED AT LEAST TWO (2) FEET FROM THE NEAREST PIPE JOINT.
4. LOOSE CONCRETE, EARTH, ETC. IS TO BE REMOVED FROM THE PIPE SURFACE.
5. CONCRETE SHALL HAVE A MINIMUM F' = 3,500 PSI (MSHA MIX NO. 3) AT 28 DAYS.
6. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER ENGINEERING TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

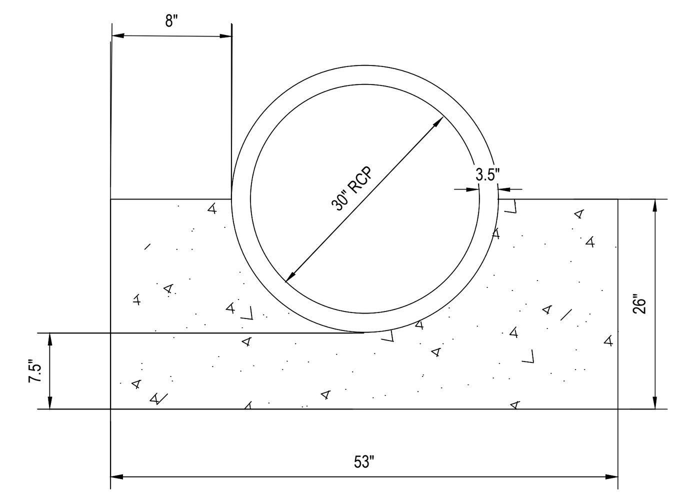


NOTES:

1. PROVIDE 1' MIN CONCRETE COVER AROUND O.D. OF PIPE.
2. Fc = 3,500 PSI AT 28 DAYS
3. TO BE USED WITH PRE-CAST RISERS ONLY
4. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

CAST-IN-PLACE CONCRETE COLLAR DETAILS

NOT TO SCALE

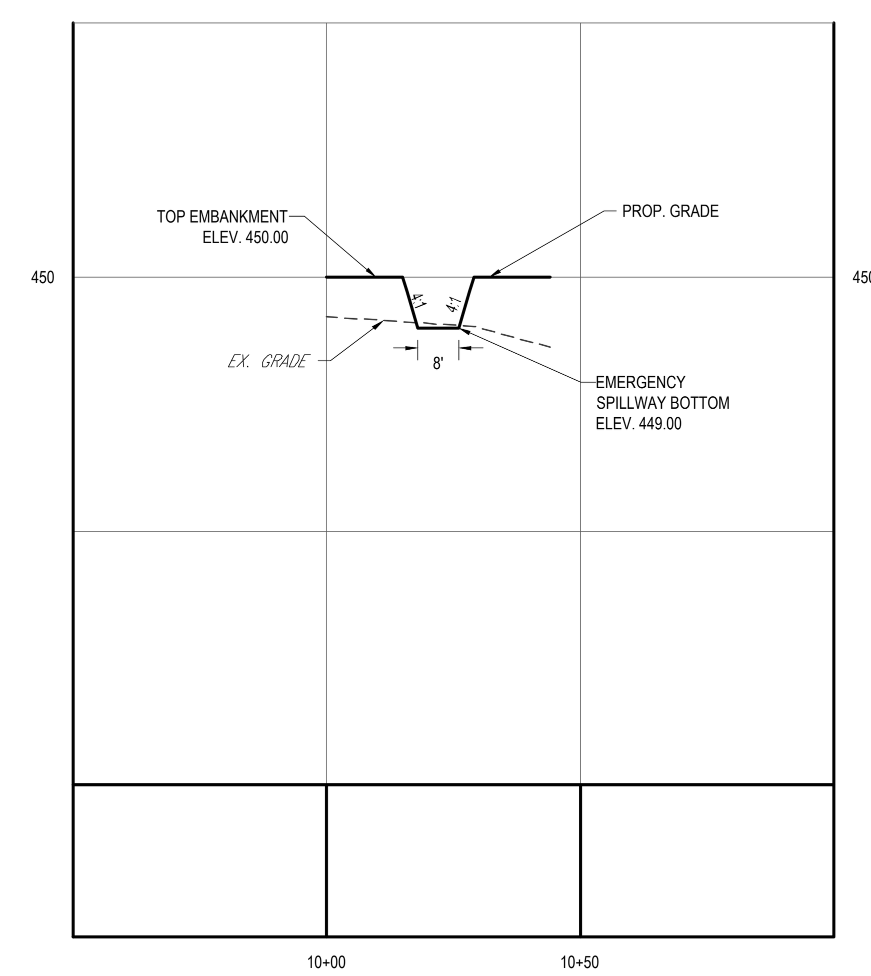


NOTES:

1. CRADLE TO BE CONTINUOUS ALONG PIPE.
2. CONCRETE FOR CRADLE TO BE MDSHA MIX No. 3.

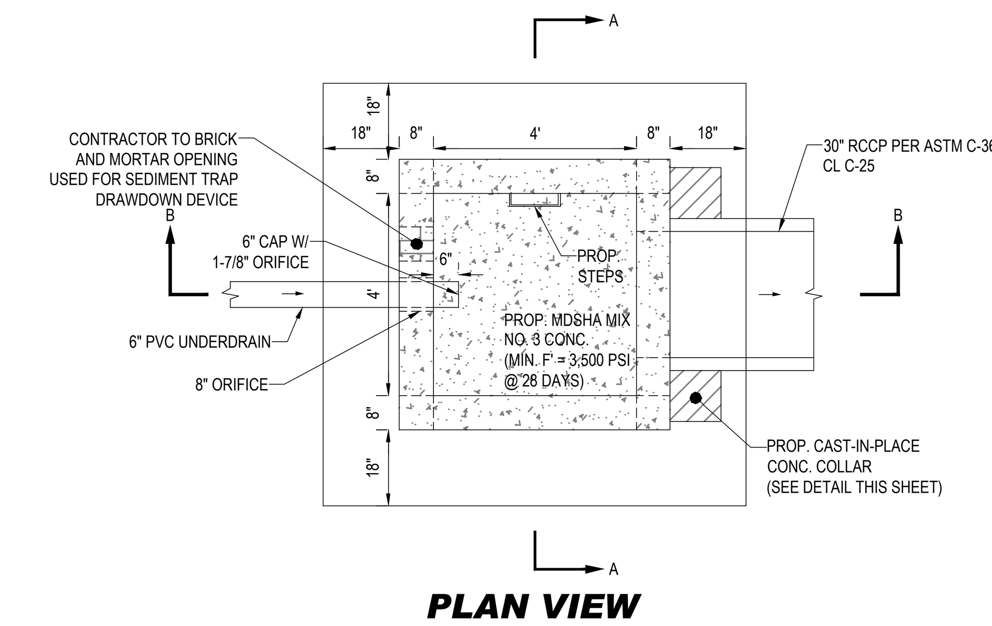
SCS TR-46 A2 CONCRETE CRADLE DETAIL

NOT TO SCALE



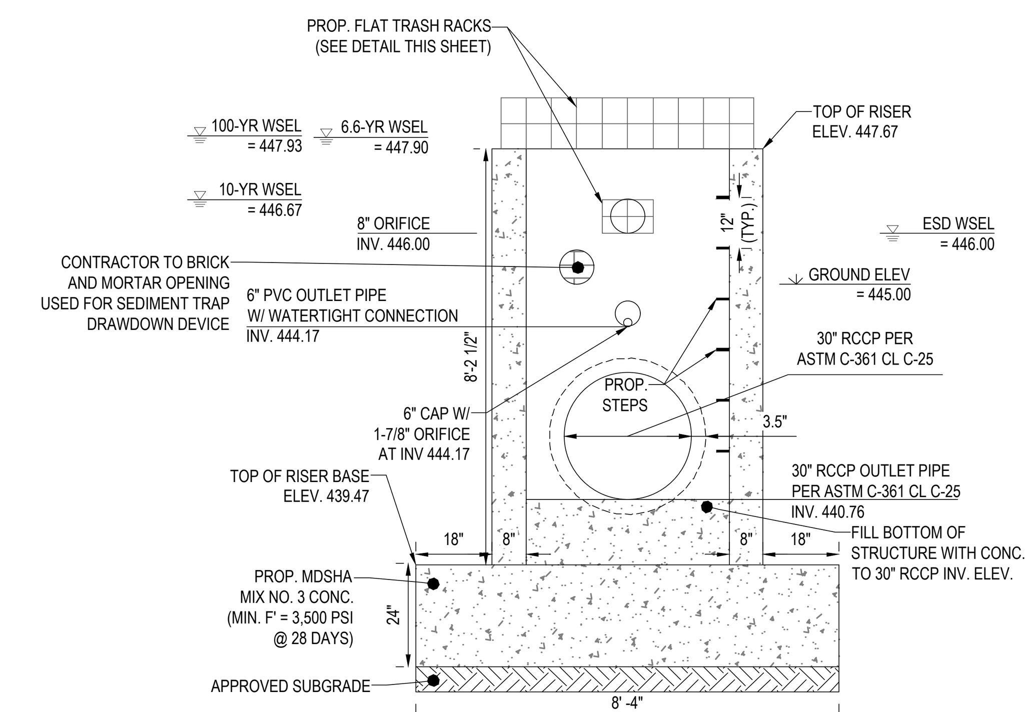
FACILITY #C6 - TOKEN SPILLWAY- TYPICAL SECTION

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

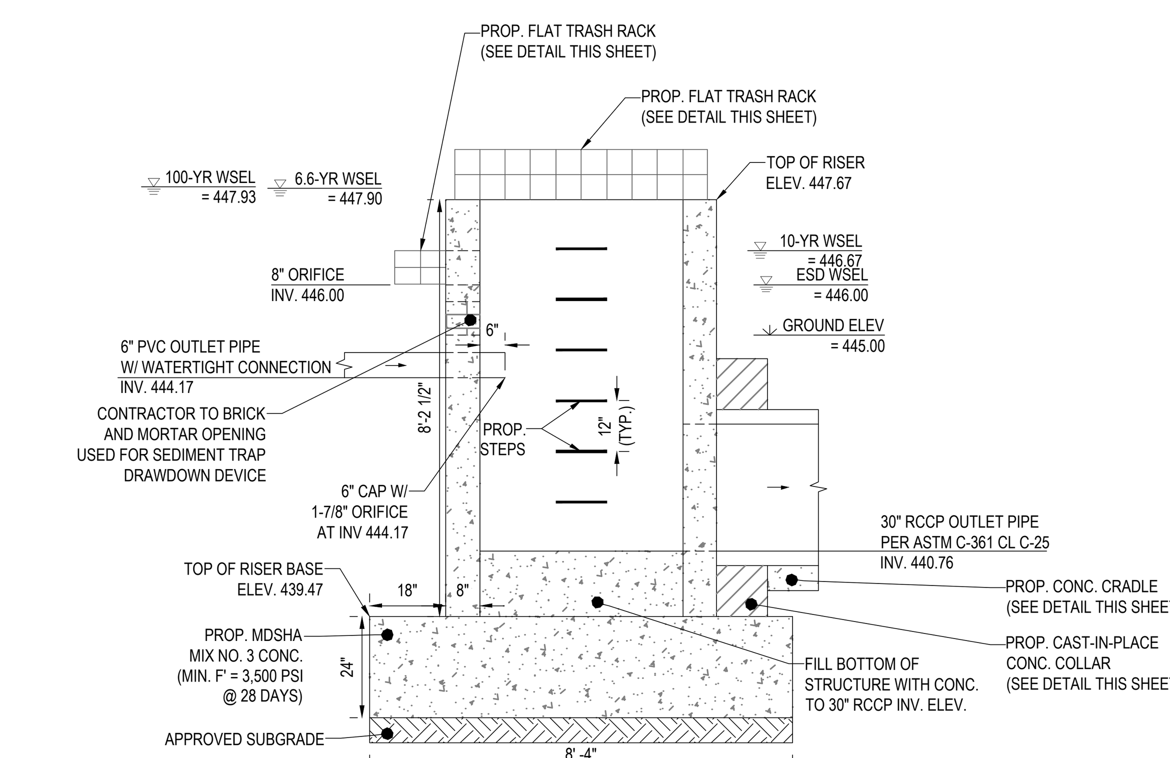


PLAN VIEW

WITHOUT TOP SLAB AND TRASH RACKS



SECTION A-A



SECTION B-B

TYPICAL RISER STRUCTURE DETAILS (STRUCTURE I-43)

NOT TO SCALE

NOTES:

1. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. STRUCTURES ARE INTENDED TO BE STANDARD PRECAST CONCRETE STRUCTURES. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.
2. DETAIL SHOWN IS FOR FINAL CONDITIONS ONLY. ANY TEMPORARY OPENING IN THE STRUCTURE USED FOR SEDIMENT CONTROL IS TO BE PERMANENTLY SEALED WITH BRICK AND MORTAR.

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

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REVISIONS

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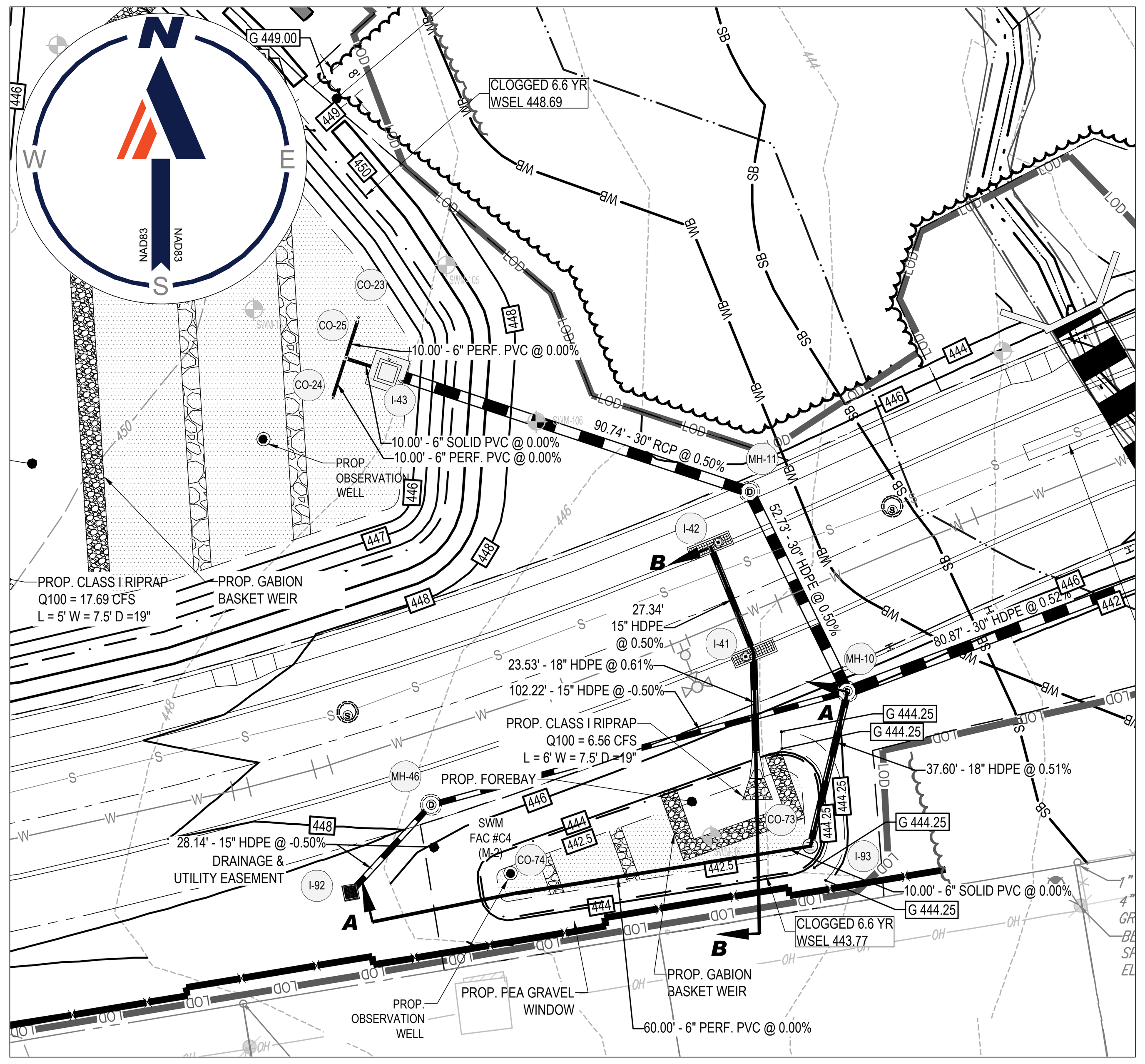
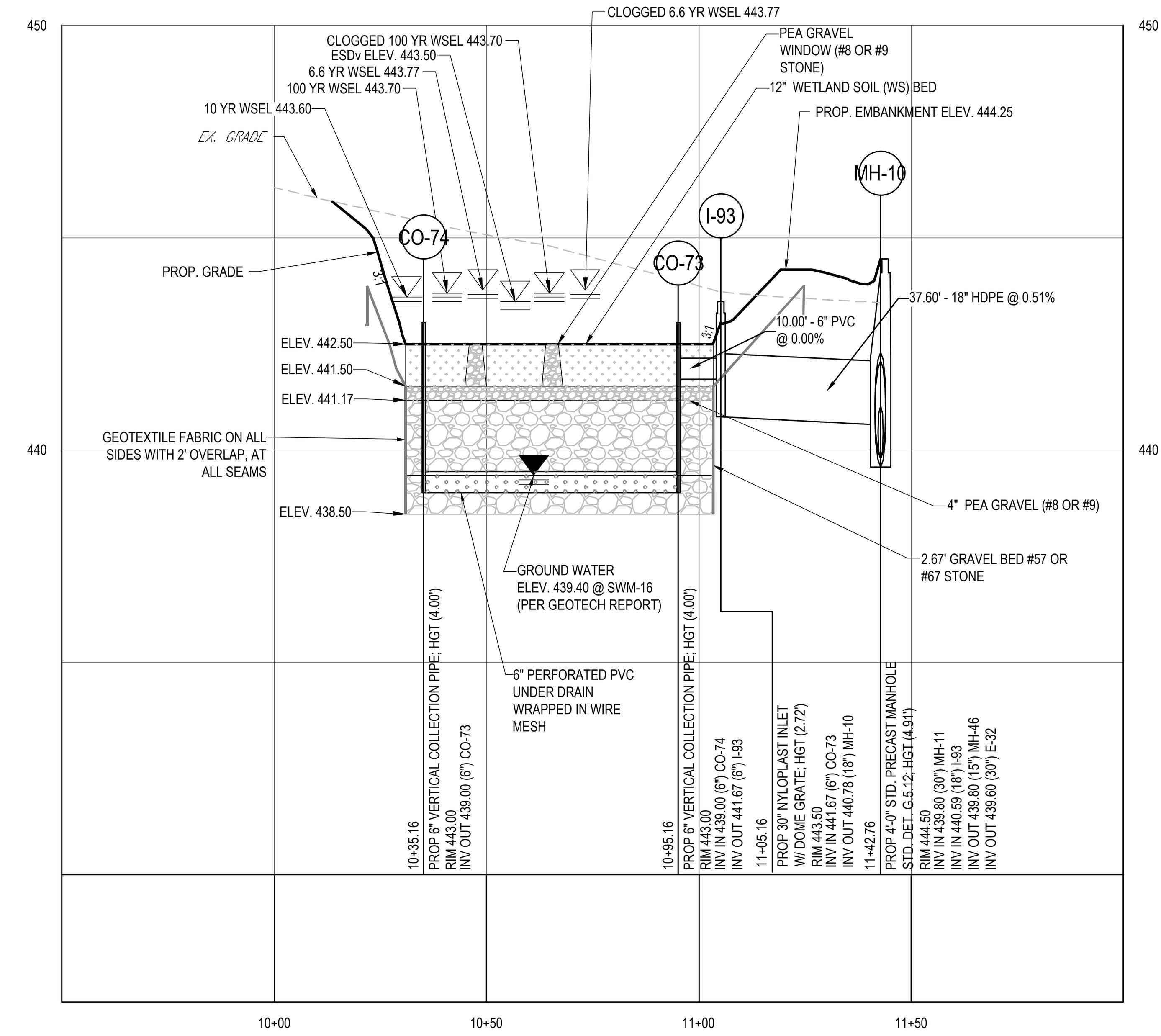


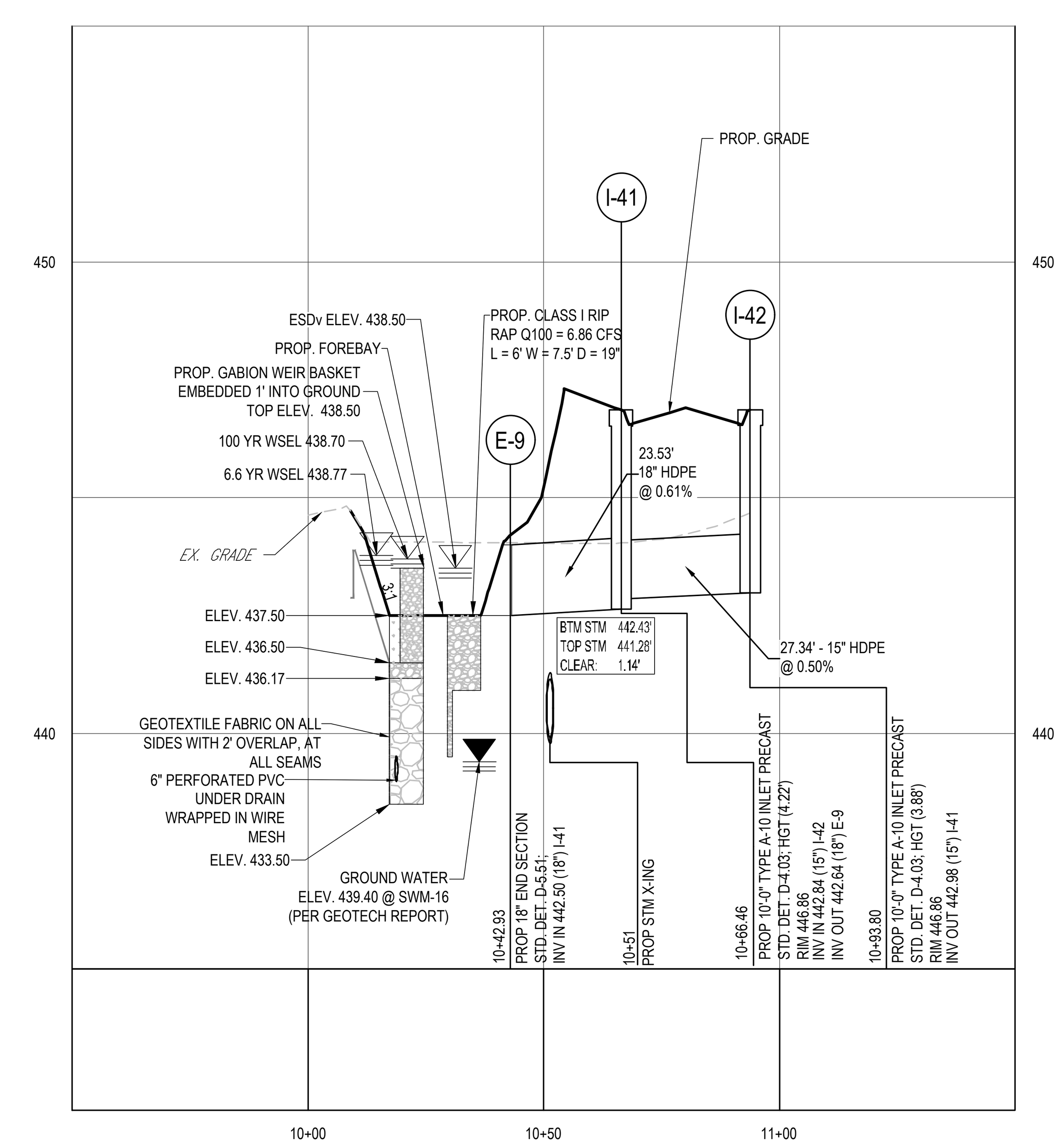
PLAN VIEW - SWM FACILITY #C4 - SUBMERGED GRAVEL WETLAND (M-2)

SCALE: 1 = 30'



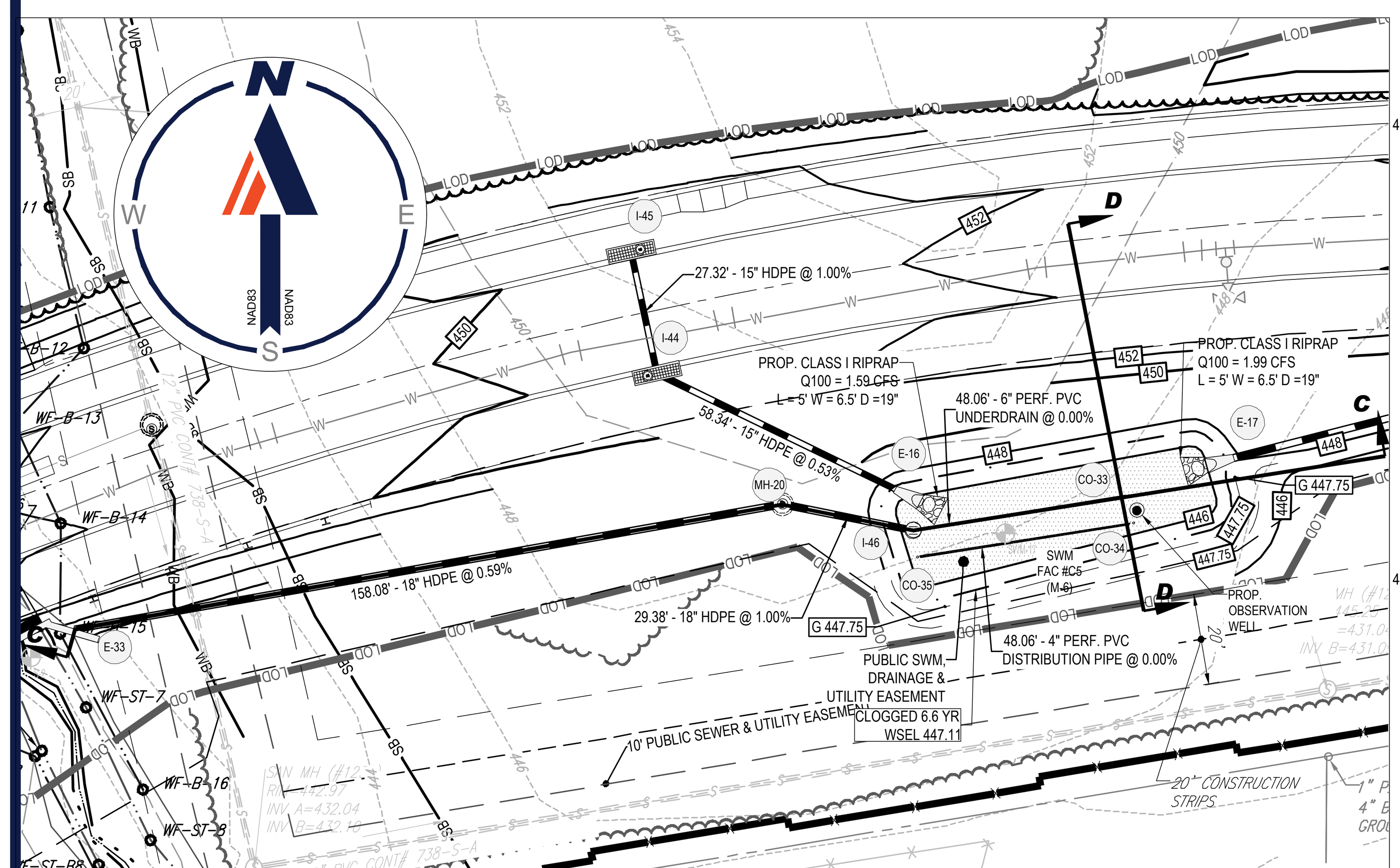
SECTION A-A - SWM FACILITY #C4- SUBMERGED GRAVEL WETLAND

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



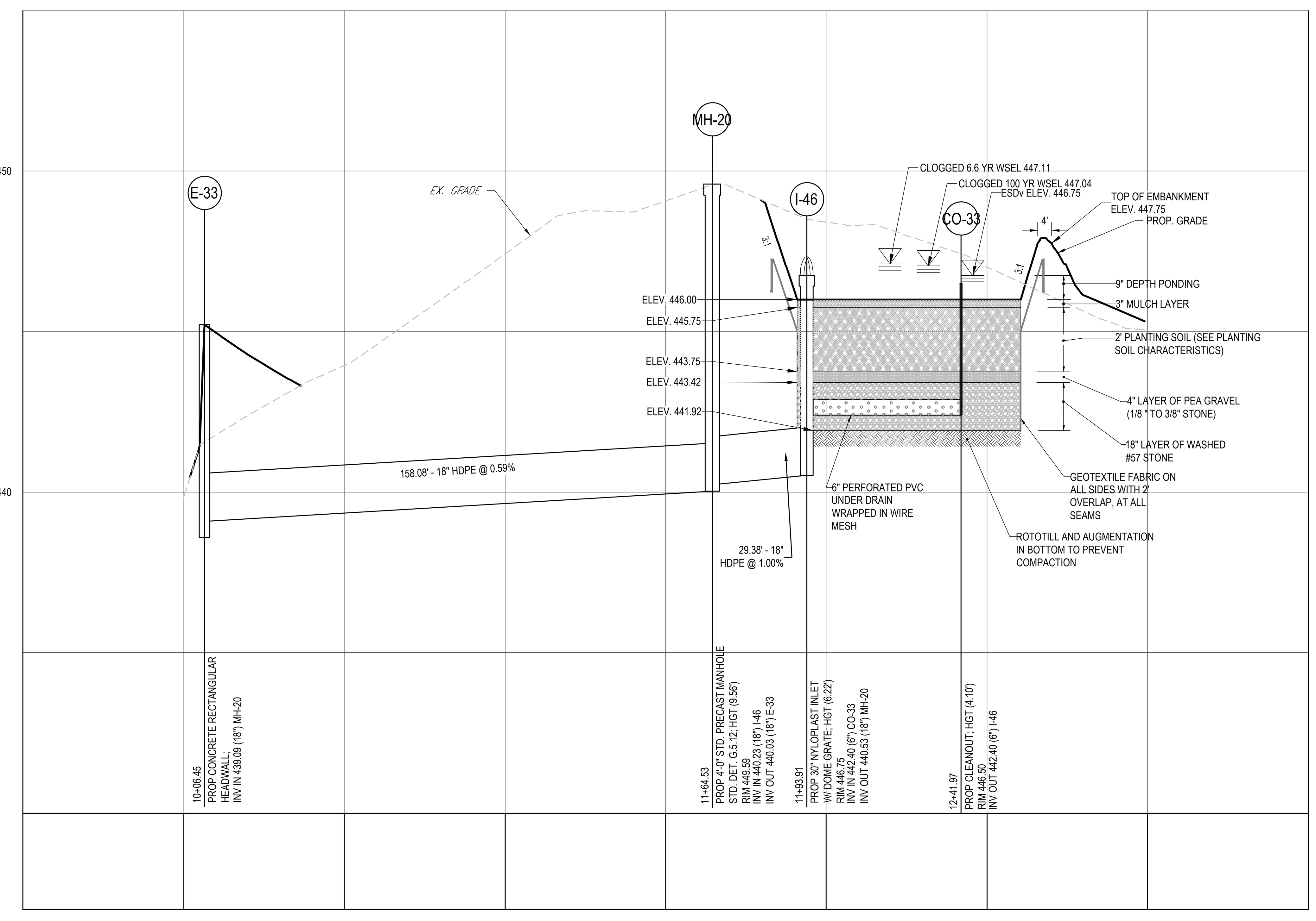
SECTION B-B - SWM FACILITY #C4 - SUBMERGED GRAVEL WETLAND

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



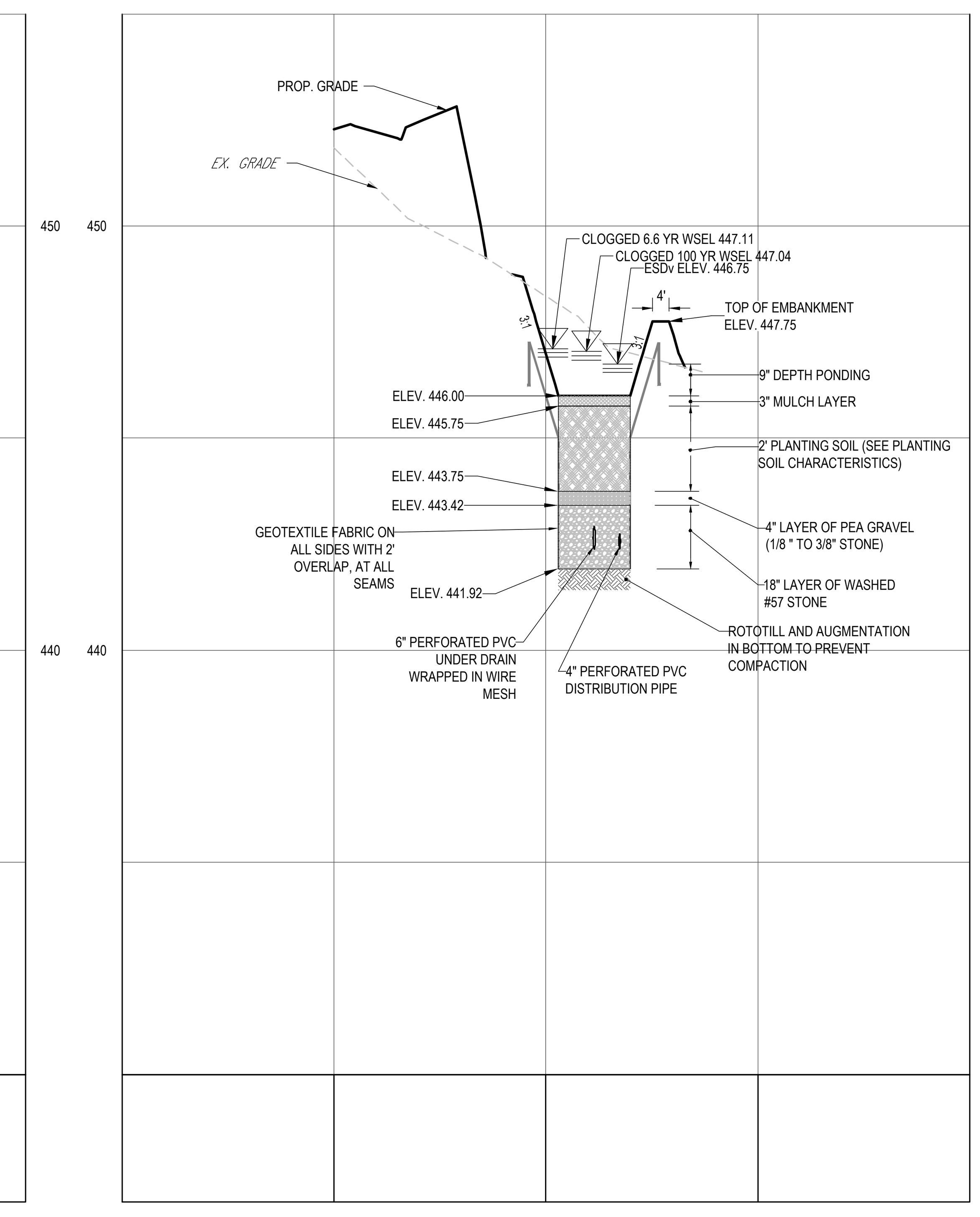
PLAN VIEW - SWM FACILITY #C5 - MICRO-BIORETENTION (M-6)

SCALE: 1 = 30'



SECTION C-C - SWM FACILITY #C5 - MICRO-BIORETENTION (M-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION D-D - SWM FACILITY #C5 - MICROBIORETENTION (M-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

30 15 7.5 0 30
1"= 30'

NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)

ERNST SEEDS — #C4 - SUBMERGED GRAVEL WETLAND (M-2)
Catalog | Price List | Project Planner | Contact | 800-873-3321
Products | Resource Center | About Us | News & Media
Seed Finder TOOL

Home / Stormwater Management / Native Detention Area Mix
« Back to List

Native Detention Area Mix

Mix Composition

- 26.0% *Panicum clandestinum*, Tioga (Deertongue, Tioga)
- 25.0% *Panicum virgatum*, 'Shelter' (Switchgrass, 'Shelter')
- 20.0% *Carex vulpinoidea*, PA Ecotype (Fox Sedge, PA Ecotype)
- 20.0% *Elymus virginicus*, 'Madison' (Virginia Wildrye, 'Madison')
- 4.0% *Agrostis perennans*, Albany Pine Bush-NY Ecotype (Autumn Bentgrass, Albany Pine Bush-NY Ecotype)
- 3.0% *Juncus effusus* (Soft Rush)
- 1.0% *Juncus tenuis*, PA Ecotype (Path Rush, PA Ecotype)
- 1.0% *Panicum rigidulum*, PA Ecotype (Redtop Panicgrass, PA Ecotype)

General Product Information:

The native grasses, sedges and rushes establish quickly in areas where mowing is not anticipated. With a high seed count per pound, it can achieve native establishment with minimum risk and tolerate low-fertility. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

Item Number: ERNMX-183
Product Categories: Stormwater Management
Height: 0.3 – 5.0 Ft
Seeding Rate: 20 lb per acre, or 1/2 lb per 1,000 sq ft

PRINT | EMAIL | SHARE
Price: $15.98/lb
ADD TO PLANNER

MICRO-BIORETENTION AREAS PLANTING SCHEDULE

SPECIES		TYPE	VEGETATION TYPE	SPACING	SIZE	FACILITY #C5 (1222 S.F.)
BOTANICAL NAME	COMMON NAME					
CLETHERA ALNIFOLIA	SWEET PEPPERBUSH	SHRUB	FAC+	30" O.C.	1 GAL. CONT.	21
CORNUS AMMOMUM	SILKY DOGWOOD	SHRUB	FACW	30" O.C.	1 GAL. CONT.	21
RUDBECKIA HIRTA	BLACK EYE SUSAN	PERENNIAL	FACU	12" O.C.	PLUG	135
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	PERENNIAL	FACW	12" O.C.	PLUG	135
RUDBECKIA LACINIATA	TALL CONEFLOWER	PERENNIAL	FACW	12" O.C.	PLUG	135
JUNCUS EFFUSUS	SOFT RUSH	PERENNIAL	FACW+	12" O.C.	PLUG	272
SCIRPUS ACUTUS	HARDSTEMMED BULLRUSH	PERENNIAL	OBL	12" O.C.	PLUG	272

NOTES:
1) ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE C SOIL STABILIZATION MATTING (SSM)
2) ALL PROPOSED FOREBAYS TO BE SODDED

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE No. 3697
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CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by:
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

Mar 19, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SWMD - 2---->LAYOUT: 41 - SMW NOTES & DETAILS
JC

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
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2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
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TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

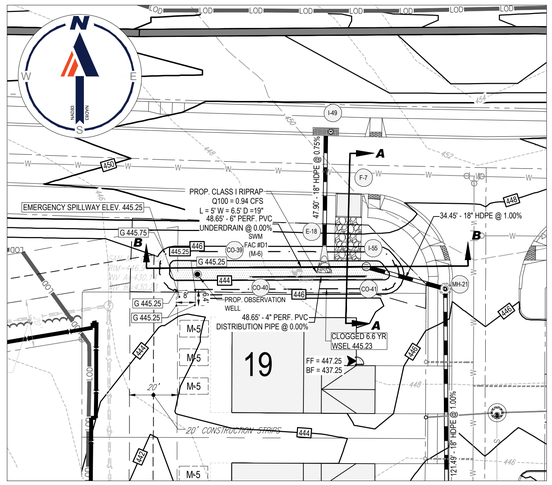
SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

F-22-033

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F



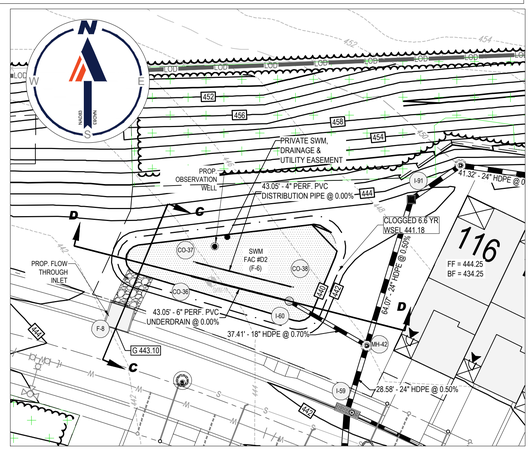
PLAN VIEW SWM FACILITY #D1 - MICRO-BIORETENTION (M-6)

SCALE: 1 = 30'

BIORETENTION & MICRO-BIORETENTION AREAS PLANTING SCHEDULE

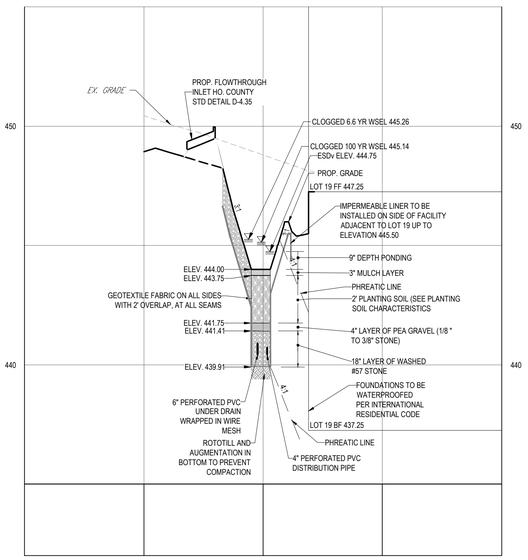
SPECIES		TYPE	VEGETATION TYPE	SPACING	SIZE	FACILITY D1 (703 S.F.)	FACILITY D2 (2246 S.F.)	TOTAL
BOTANICAL NAME	COMMON NAME							
CLETHERA ALNIFOLIA	SWEET PEPPERBUSH	SHRUB	FAC+	30" O.C.	1 GAL. CONT.	12	39	51
CORNUS AMMOMUM	SILKY DOGWOOD	SHRUB	FACW	30" O.C.	1 GAL. CONT.	12	39	51
RUDBECKIA HIRTA	BLACK EYE SUSAN	PERENNIAL	FACU	12" O.C.	PLUG	78	250	328
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	PERENNIAL	FACW	12" O.C.	PLUG	78	250	328
RUDBECKIA LACINIATA	TALL CONEFLOWER	PERENNIAL	FACW	12" O.C.	PLUG	78	250	328
JUNCUS EFFUSUS	SOFT RUSH	PERENNIAL	FACW+	12" O.C.	PLUG	156	500	656
SCIRPUS ACUTUS	HARDSTEMMED BULLRUSH	PERENNIAL	OBL	12" O.C.	PLUG	156	500	656

NOTES:
1) ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE C SOIL STABILIZATION MATTING (SSM)
2) ALL PROPOSED FOREBAYS TO BE SODDED



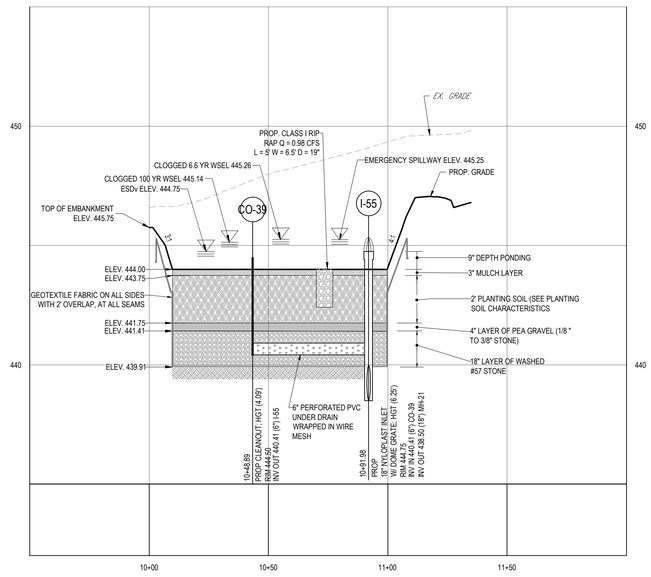
PLAN VIEW SWM FACILITY #D2 - BIORETENTION (F-6)

SCALE: 1 = 30'



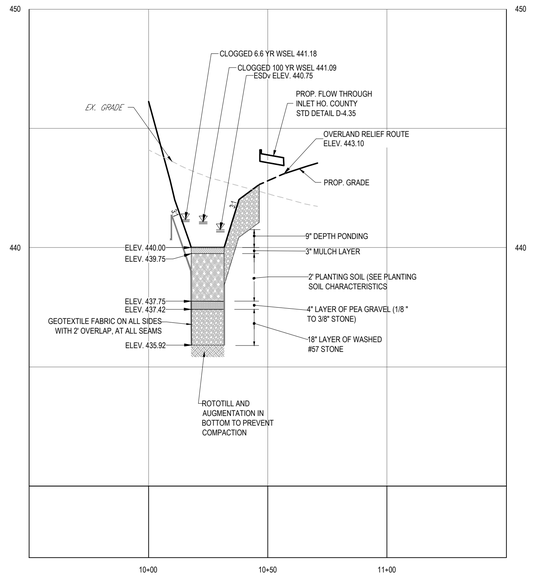
SECTION A-A - SWM FACILITY #D1 - MICRO-BIORETENTION (M-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



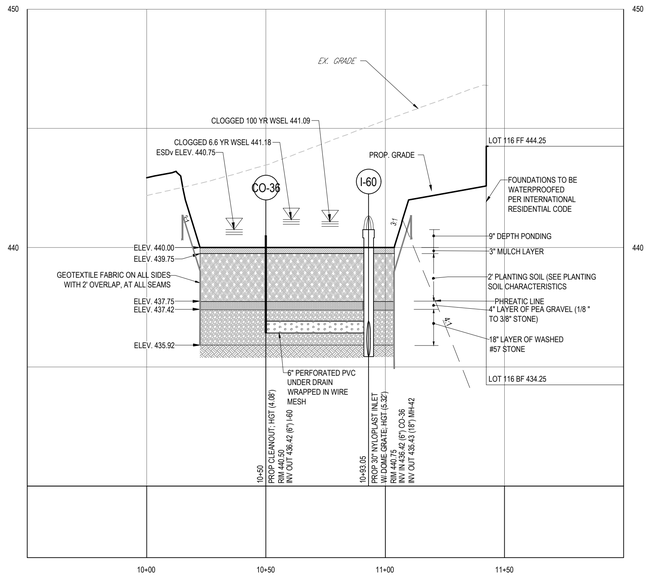
SECTION B-B - SWM FACILITY #D1 - MICRO-BIORETENTION (M-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION C-C - SWM FACILITY #D2 - BIORETENTION (F-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION D-D - SWM FACILITY #D2 - BIORETENTION (F-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

30 15 7.5 0 30
1"= 30'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-016C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE NO. 3996
PROFESSIONAL CERTIFICATION
I, ERICA McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3997, EXPIRATION DATE: 9/2024

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40828
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40828, EXPIRATION DATE: 7/3/2025

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DATE: 03/08/24
CAD I.D.: SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
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Fax: (410) 821-7987
MD@BohlerEng.com

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

42 of 117

F-22-033

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F

PLAN VIEW - SWM FACILITY #D4 (BIORETENTION)(F-6) & #D5 (SURFACE SAND FILTER)(F-1)

SCALE: 1 = 30'

BIORETENTION AREAS PLANTING SCHEDULE

SPECIES		TYPE	VEGETATION TYPE	SPACING	SIZE	FACILITY D4 (1757 S.F.)
BOTANICAL NAME	COMMON NAME					
CLETHERA ALNIFOLIA	SWEET PEPPERBUSH	SHRUB	FAC+	30" O.C.	1 GAL. CONT.	31
CORNUS AMMOMUM	SILKY DOGWOOD	SHRUB	FACW	30" O.C.	1 GAL. CONT.	31
RUDBECKIA HIRTA	BLACK EYE SUSAN	PERENNIAL	FACU	12" O.C.	PLUG	196
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	PERENNIAL	FACW	12" O.C.	PLUG	196
RUDBECKIA LACINIATA	TALL CONEFLOWER	PERENNIAL	FACW	12" O.C.	PLUG	196
JUNCUS EFFUSUS	SOFT RUSH	PERENNIAL	FACW+	12" O.C.	PLUG	391
SCIRPUS ACUTUS	HARDSTEMMED BULLRUSH	PERENNIAL	OBL	12" O.C.	PLUG	391

NOTES:
1) ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE C SOIL STABILIZATION MATTING (SSM)
2) ALL PROPOSED FOREBAYS TO BE SODDED

NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)

ERNST SEEDS — #D5 (SURFACE SAND FILTER)(F-1)

Catalog | Price List | Project Planner | Contact | 800-873-3321

Products | Resource Center | About Us | News & Media

Seed Finder TOOL

Home / Stormwater Management / Native Detention Area Mix

Native Detention Area Mix

Mix Composition

26.0% *Panicum clandestinum*, Tioga (Deertongue, Tioga)
15.0% *Panicum virgatum*, Shelter (Switchgrass, 'Shelter')
20.0% *Carex vulpinoidea*, PA Ecotype (Fox Sedge, PA Ecotype)
20.0% *Elymus virginicus*, Madison ('Virginia Wildrye, 'Madison')
4.0% *Agrostis perennans*, Albany Pine Bush NY Ecotype (Autumn Bentgrass, Albany Pine Bush NY Ecotype)
5.0% *Juncus effusus* (Soft Rush)
1.0% *Juncus tenuis*, PA Ecotype (Path Rush, PA Ecotype)
1.0% *Panicum rigidulum*, PA Ecotype (Redtop Panicgrass, PA Ecotype)

General Product Information:

The native grasses, sedges and rushes establish quickly in areas where mowing is not anticipated. With a high seed count per pound, it can achieve native establishment with minimum risk and tolerate low-fertility. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

Item Number: EARMX-183
Product Categories: Stormwater Management
Height: 0.3 - 3.0 Ft
Seeding Rate: 20 lb per acre, or 1/2 lb per 1,000 sq ft

PRINT | EMAIL | SHARE

Price: $15.98/lb

1 ADD TO PLANTER

SEE SHEET 44 FOR GEOTECHNICAL RECOMMENDATIONS FOR CUT-OFF TRENCH AND IMPERVIOUS CORE CONSTRUCTION

DAM SAFETY POLICY MEMORANDUM #14
SMALL POND CUTOFF TRENCHES
DECEMBER 21, 2022
PAGE 3

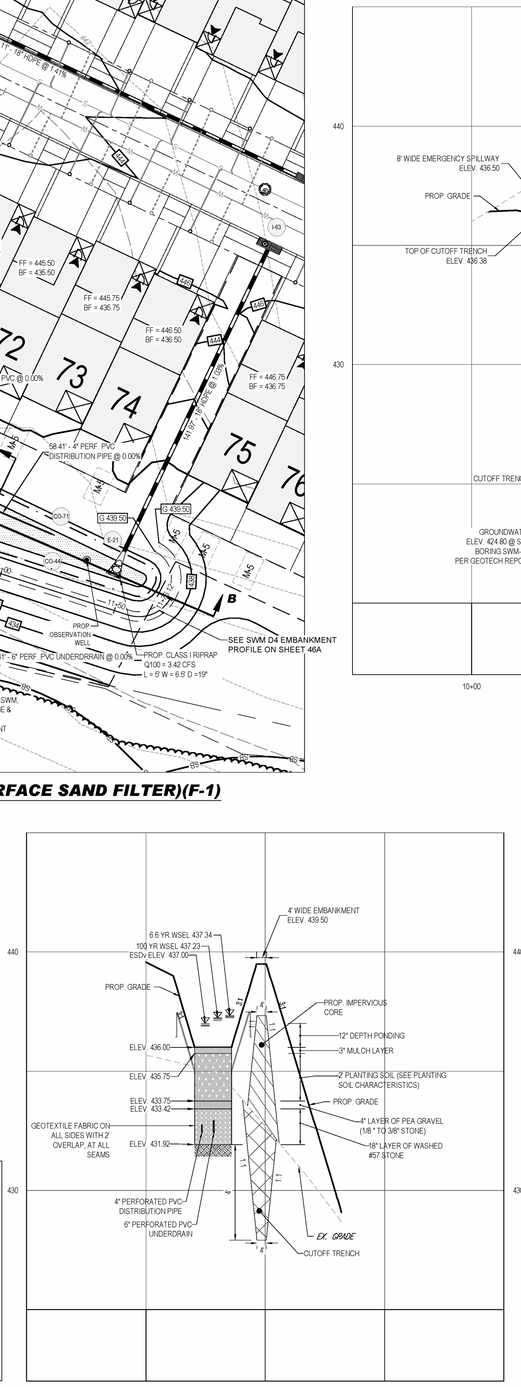
RECOMMENDED NOTATION FOR CONSTRUCTION PLANS

THE FOLLOWNG LANGUAGE IS RECOMMENDED FOR CONSTRUCTION PLAN NOTES:

PROVIDE IMPERVIOUS CORE AND CUTOFF TRENCH MEETING USCS GC, SC, CH, OR CL WITH A MINIMUM OF 30% PASSING NO. 200 SIEVE. DEPTH AND SUITABILITY OF IMPERVIOUS CUTOFF TRENCH SHALL BE DETERMINED IN THE FIELD BY A GEOTECHNICAL ENGINEER. CUTOFF MUST EXTEND A MINIMUM OF 12 INCHES INTO IMPERVIOUS FOUNDATION MATERIAL.

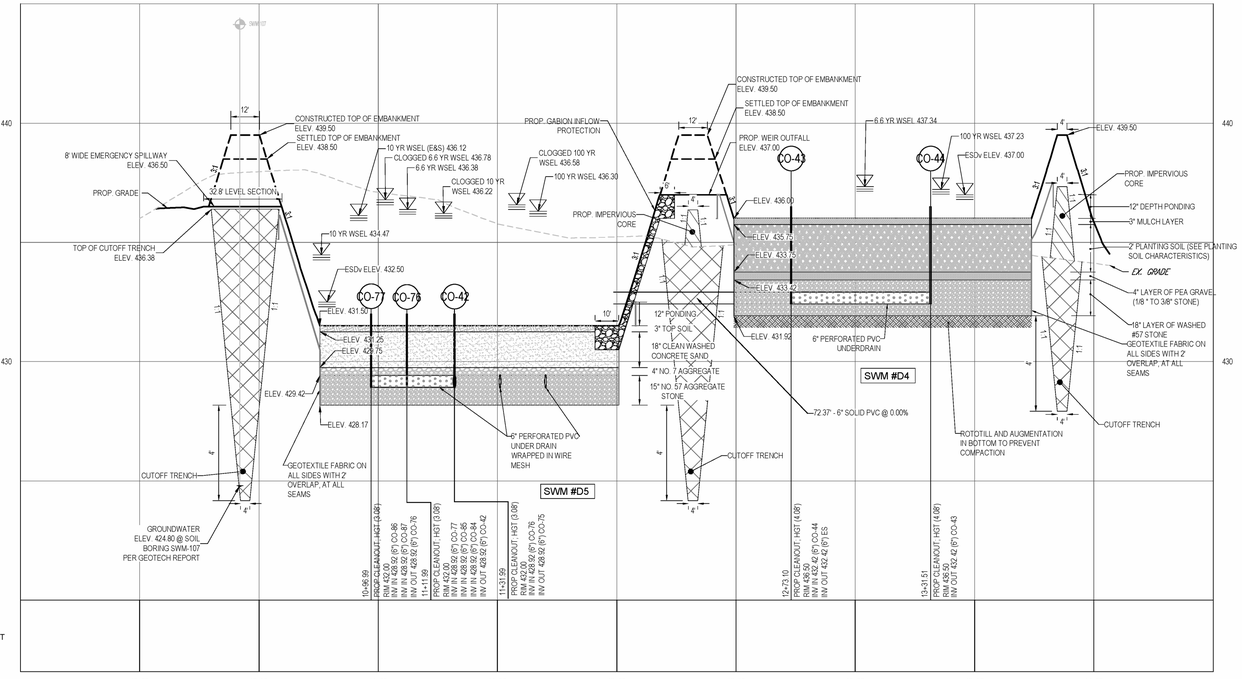
ADDITIONAL INFORMATION

QUESTIONS ABOUT THIS POLICY OR OTHER ITEMS RELATING TO PONDS AND DAMS CAN BE DIRECTED TO THE CHIEF OF THE DAM SAFETY PERMITS DIVISION AT 410-537-3552.



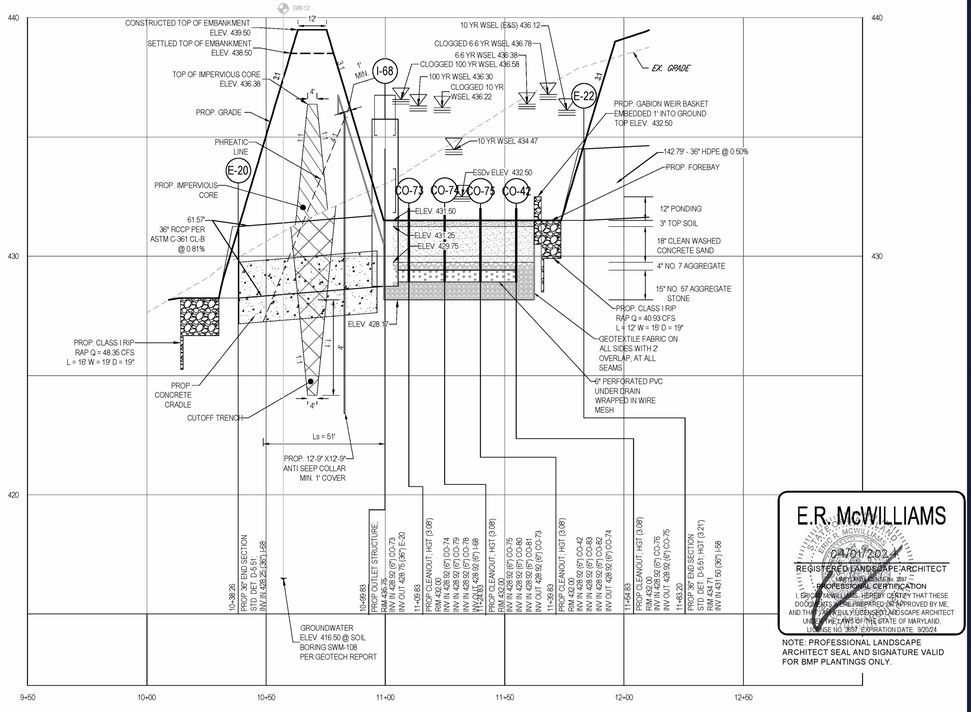
SECTION C-C - SWM FACILITY #D4 - BIORETENTION (F-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION B-B - SWM FACILTY #D4 (BIORETENTION) & #D5 (SURFACE SAND FILTER)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION A-A - SWM FACILITY #D5 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

30 15 7.5 0 30
1"= 30'

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Docusigned by: Alexander Brattbie — 6/11/2024
HOWARD SOIL CONSERVATION DISTRICT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS
Docusigned by: — 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
Docusigned by: — DATE
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
Docusigned by: — 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SEDIMENT CONTROL AND POND

Owners/Developer Certification:

"I/We hereby 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 the responsible personnel involved in the construction project will have a Certificate of Training at a Maryland Department of the Environment (MDE) approved training program for the control on erosion and sediment prior to beginning the project. I shall engage a Maryland registered professional engineer to supervise pond construction, and provide the Howard Soil Conservation District with an "As-built" plan of the pond within 30 days of completion. I certify right-of-entry for periodic on-site evaluation by Howard County, the Howard Soil Conservation District and/or MDE."

Owner's/ Developer's Signature — 3-12-24 Date
Jason Van Kirk
Printed Name & Title

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. I have notified the developer that he/she must engage a registered professional engineer to supervise pond construction and provide the Howard Soil Conservation District with an "As-built" plan of the pond within 30 days of completion."

Designer's Signature — 3/12/24 Date
BRANDON R. ROWE, P.E.
Printed Name
MD Registration No. 40808
(P.E. R.L.S., or R.L.A. (circle one))

Professional Certification:

"I hereby certify 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. 40808, Expiration Date: 7/03/25

(Title block, certification, seal, and signature shall appear close to each other)

E.R. McWILLIAMS — 04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE NO. 3267
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3267, EXPIRATION DATE: 9/2024

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

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LAND SURVEYING
PROGRAM MANAGEMENT
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PROJECT NO.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE — PROFESSIONAL ENGINEER
MARYLAND LICENSE NO. 40808
PROFESSIONAL CERTIFICATION
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SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:
43 of 117

F-22-033

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

Mar 19, 2024
H:\SWD\152018\DRAWINGS\PLANSHEETS\FINAL PLANS\D152018 - SWMD - 2 - LAYOUT 43 - SWM NOTES & DETAILS

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GEOTECHNICAL RECOMMENDATIONS FOR CUT-OFF TRENCH AND IMPERVIOUS CORE CONSTRUCTION

approximate; in situ, the transitions may be gradual. Select data that was obtained from the laboratory tests are included on the soil boring logs, with complete laboratory test results on separate sheets in Appendix C of this report.

4.0 DESIGN RECOMMENDATIONS

4.1 STORMWATER MANAGEMENT STRUCTURES

Based on the information provided to us, it is our understanding that five (5) stormwater management (SWM) pond dam embankments will be constructed per the plans provided. Based on the test boring results, clay material was only encountered in Boring SWM-103. The clay material extended from approximately 0.5 feet to 3 feet below existing grades, or approximately EL + 454.5 feet to EL +452 feet. The groundwater and rock/impermeable layers encountered in the vicinity of the proposed Maryland Code 378 ponds is listed in the table below.

Table 4.1.1 – Groundwater Measurements During Exploration

SWM Facility	Invert Elevation (feet)	Boring	Groundwater Elevation (feet)	Impermeable Layer / Rock (feet)
A1 (F-1)	464	SWM-101	454.4	N.E.
		SWM-102	453.8	N.E.
A8 (F-1)	460	SWM-103	450.4	N.E.
		SWM-104	450.1	N.E.
C6 (M-2)	445.5	SWM-105	441.2	N.E.
		SWM-106	441.3	N.E.
D5 (F-1)	431.5	SWM-107	424.8	N.E.
		SWM-108	416.5	428
D6 (F-1)	425	SWM-109	410.6	N.E.
		SWM-110	N.E.	N.E.

*N.E. = Not encountered during this exploration. Groundwater depths may differ during construction.

Cut-Off Trench and Impervious Core Construction

In accordance with the Maryland Code 378 requirements, it is recommended that a cutoff trench should extend at least 4 feet below the principal spillway pipe, 4 feet below the lowest toes of constructed embankments in fill areas, or 4 feet below the bottom level of the pond, depending on the particular conditions in the area under consideration. Considering that the bottom of the ponds range from about EL 464 feet to EL 425 feet, and the mesium dense granular materials encountered at and below that elevation, we recommend that the bottom level of the cutoff trenches extend an additional 4 feet below the planned pond depth.

Refer to **Table 4.1.1** for groundwater elevations in the proximity of the proposed SWM facilities. We anticipate that localized dewatering should be anticipated near facility C6 (M-2). The cutoff trench should be provided at, or upstream from, the centerline of the embankment, should have a minimum width of 4 ft at the base, and should have side slopes with gradients of 1H:1V, or flatter, back to original grade levels in fill areas.

In addition, an impervious core with side slopes of 1H:1V or flatter should be provided vertically from the top of the cutoff trench, up to the 10-year-storm water surface elevation.

Maryland Code 378 requires that seepage control must be provided if pervious soil layers are not intercepted by the cutoff trench, if seepage from the abutments may create a wet embankment, if the phreatic line intersects the downstream slope, or if special conditions require drainage to insure a stable dam. Based on the soil borings, the core trench should be adequate to provide seepage control if it extends to EL 42.

Fill materials for the cutoff trench and impervious core construction should consist of soils having USCS classifications of GC, SC, CL, or CH, and having at least 30 percent by weight passing the No. 200 sieve. Some of these soil types exist elsewhere at the site; however, sufficient quantities for the cutoff trench and impervious core construction may not be readily available unless mined from borrow pits on-site or brought in from an off-site source.

Caution should be exercised by the Contractor when excavating cohesive soil types planned for use in the cutoff trench and impervious core construction, so that the clayey soils do not become mixed with sandy soils or undesirable materials that might preclude their use for the stormwater management facility construction. In addition, before soils are used for the cutoff trench or impervious core construction, laboratory testing should be performed to verify material suitability.

Fill materials for the cutoff trench and an impervious core should be placed in 8-inch loose lifts and should be compacted to at least 95 percent of the maximum dry density in accordance with the Standard Proctor test method, ASTM D698. We recommend that moisture contents at the time of construction should generally be within the range of the optimum moisture content to 3 percentage points wet of the optimum moisture content to help to decrease soil permeability. Placement and compaction of the cut-off trench and impervious core fill materials should be monitored by the Geotechnical Engineer on a full-time basis to ensure that fill materials are being placed and compacted in accordance with plans and specifications.

We recommend the principal spillway outlet pipes be installed with a concrete cradle along the upstream two-thirds of the pipe length with a drainage blanket along the downstream third of its length. The concrete cradle should extend up the sides of the pipe at least 50% of its outside diameter with a minimum thickness of 6 inches. A typical Dam Cross-Section and Drainage Detail is provided in the Appendix of this report.

Embankment Fill Slope Construction

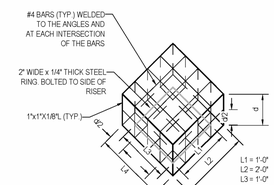
Based on the results of the borings, it appears that foundation soils for the SWM Pond embankment should consist of medium dense or denser granular soils, that will be able to support fill embankments constructed with side slope gradients of 3H:1V.

Embankment soils placed outside the limits of the cutoff trench and impervious core should consist of soils classified as CL, ML, SC, SM, in accordance with ASTM D-2487. Some of these soil types may be available from other nearby areas at site; however sufficient quantities for the cutoff trench and impervious core construction may not be readily available unless mined on site or brought in from an off-site source. Again, the Contractor will need to exercise care during excavation of borrow soils to ensure that the materials do not become mixed with organics or other undesirable materials that would make the borrow soils unsuitable for the general embankment construction.

Fill materials for any constructed embankments should be placed in 8-inch loose lifts and compacted to at least 95 percent of the maximum dry density in accordance with the Standard Proctor test method, ASTM D698.

We recommend that moisture contents at the time of construction should generally be within the range of the optimum moisture content +2 percentage points for compatibility and stability considerations. Completed cut and fill slopes should be properly stabilized to reduce the risk of erosion as soon as possible following construction to final grades.

REFERENCE: GEOTECHNICAL ENGINEERING REPORT, BETHANY GLEN SWM, PREPARED BY ECS MID-ATLANTIC, LLC. DATED JUNE 17, 2023.



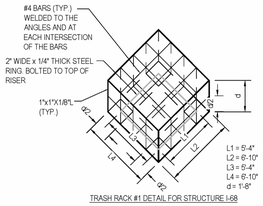
TRASH RACK #2 DETAIL FOR STRUCTURE I-68

NOT TO SCALE

Atb = (2 x 0.67) = 1.34 SF

Awf = 3.14 x (0.5)² = 0.79 SF

Atb > Awf



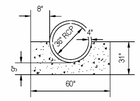
TRASH RACK #1 DETAIL FOR STRUCTURE I-68

NOT TO SCALE

Atb = (6.83 x 6.83) - (5.33 x 5.33) = 18.24 SF

Awf = (435.59' - 434.50') x (4' x 4 SIDES) = 17.44 SF

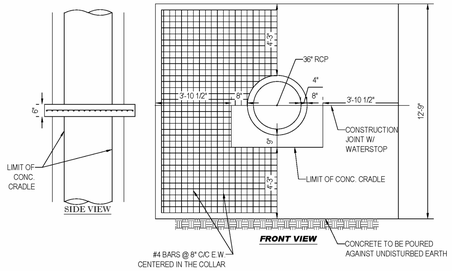
Atb > Awf



NOTES:
1. CRADLE TO BE CONTINUOUS ALONG PIPE.
2. CONCRETE FOR CRADLE TO BE MD SHA MIX No. 3.

SCS TR-46 A2 CONCRETE CRADLE DETAIL

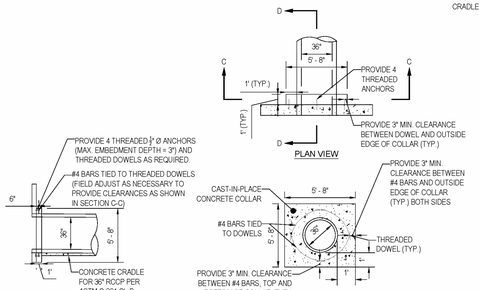
NOT TO SCALE



ANTI-SEEP COLLAR DETAIL

NOT TO SCALE

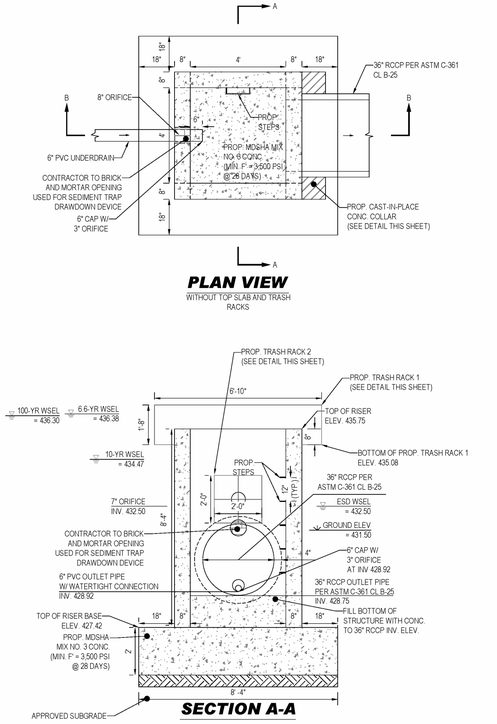
NOTES:
1. CONTRACTOR IS TO CONSTRUCT AND INSTALL ANTI-SEEP COLLAR IN ACCORDANCE WITH ALL APPLICABLE MD-378 REGULATIONS.
2. ANTI-SEEP COLLARS ARE TO BE CONSTRUCTED IN TWO (2) POURS. THE BOTTOM SECTION IS TO BE POURED WITH THE CONCRETE CRADLE. FORM AND POUR THE TOP SECTION OF THE COLLAR.
3. ANTI-SEEP COLLARS ARE TO BE POURED AT LEAST TWO (2) FEET FROM THE NEAREST PIPE JOINT.
4. LOOSE CONCRETE, EARTH, ETC. IS TO BE REMOVED FROM THE PIPE SURFACE.
5. CONCRETE SHALL HAVE A MINIMUM F' = 3,500 PSI (MSHA MIX NO. 3) AT 28 DAYS.
6. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER ENGINEERING TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.



NOTES:
1. PROVIDE 1" MIN CONCRETE COVER AROUND O.D. OF PIPE.
2. Fc = 3,500 PSI AT 28 DAYS
3. TO BE USED WITH PRE-CAST RISERS ONLY.
4. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

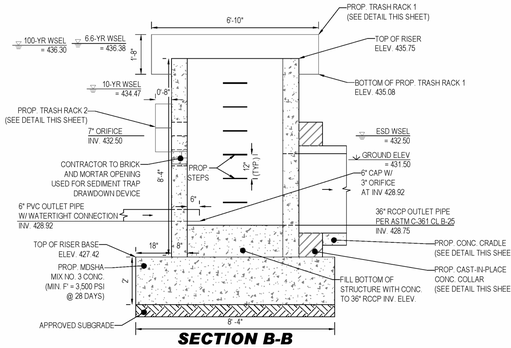
CAST-IN-PLACE CONCRETE COLLAR DETAILS

NOT TO SCALE



PLAN VIEW

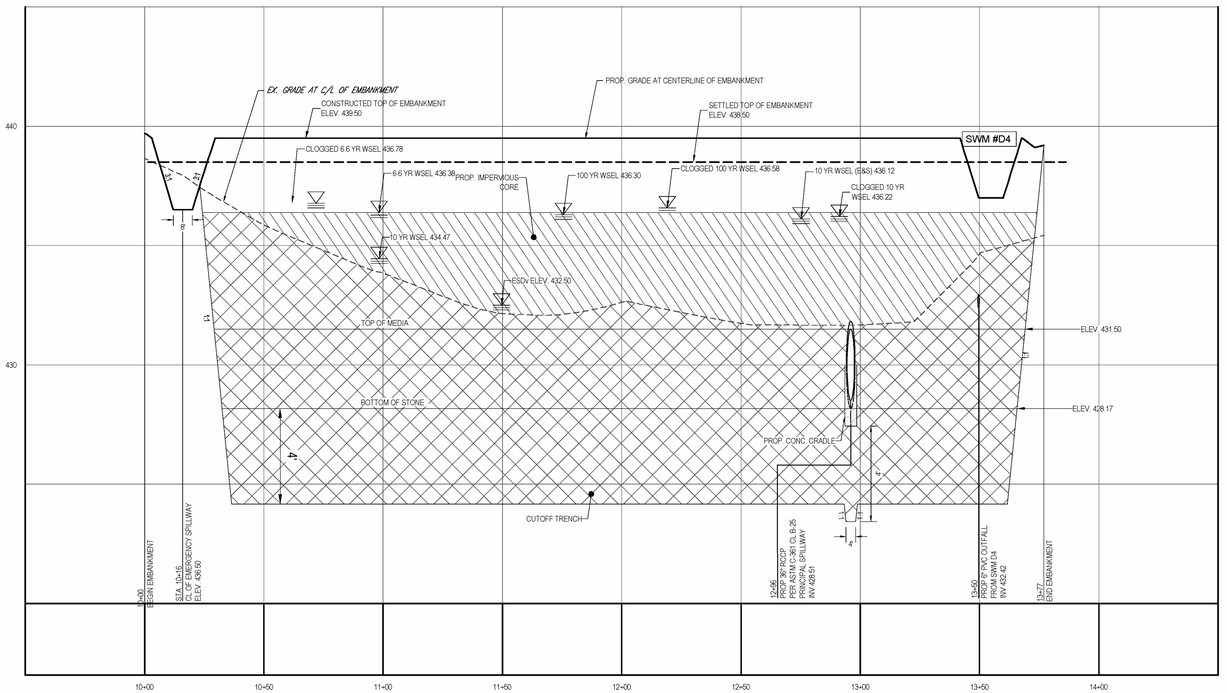
WITHOUT TOP SLAB AND TRASH RACKS



TYPICAL RISER STRUCTURE DETAILS (STRUCTURE I-68)

NOT TO SCALE

NOTES:
1. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. STRUCTURES ARE INTENDED TO BE STANDARD PRECAST CONCRETE STRUCTURES. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.
2. DETAIL SHOWN IS FOR FINAL CONDITIONS ONLY. ANY TEMPORARY OPENING IN THE STRUCTURE USED FOR SEDIMENT CONTROL IS TO BE PERMANENTLY SEALED WITH BRICK AND MORTAR.



EMBANKMENT PROFILE - SWM FACILITY #D5 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL

Professional Certification:

"I hereby certify 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. 40808 , Expiration Date 7/03/25 ."

(Title block, certification, seal, and signature shall appear close to each other)

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. I have notified the developer that he/she must engage a registered professional engineer to supervise pond construction and provide the Howard Soil Conservation District with an "As-built" plan of the pond within 30 days of completion."

Designer's Signature — Date 3/12/24

BRANDON R. ROWE, P.E. — MD Registration No. 40808 (P.E., R.L.S., or R.L.A. (Circle one))

Printed Name

SEDIMENT CONTROL AND POND

Owners/Developer Certification:

"I/We hereby 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 the responsible personnel involved in the construction project will have a Certificate of Training at a Maryland Department of the Environment (MDE) approved training program for the control on erosion and sediment prior to beginning the project. I shall engage a Maryland registered professional engineer to supervise pond construction, and provide the Howard Soil Conservation District with an "As-built" plan of the pond within 30 days of completion. I certify right-of-entry for periodic on-site evaluation by Howard County, the Howard Soil Conservation District and/or MDE."

Owner's/ Developer's Signature — Date 3-12-24

Jason Van Kirk

Printed Name & Title

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

Alexander Beatrice — 6/11/2024

HOWARD SOIL CONSERVATION DISTRICT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

Chad Edmondson — 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

Mar 19, 2024
H:\SWD\18\2018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SWMD - 2----LAYOUT 44 - SWM NOTES & DETAILS

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
PLANNING SERVICES
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TRANSPORTATION SERVICES

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REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
STATE OF MARYLAND
PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE 7/3/2025

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

44 of 117

F-22-033

30 15 7.5 0 30
1"= 30'

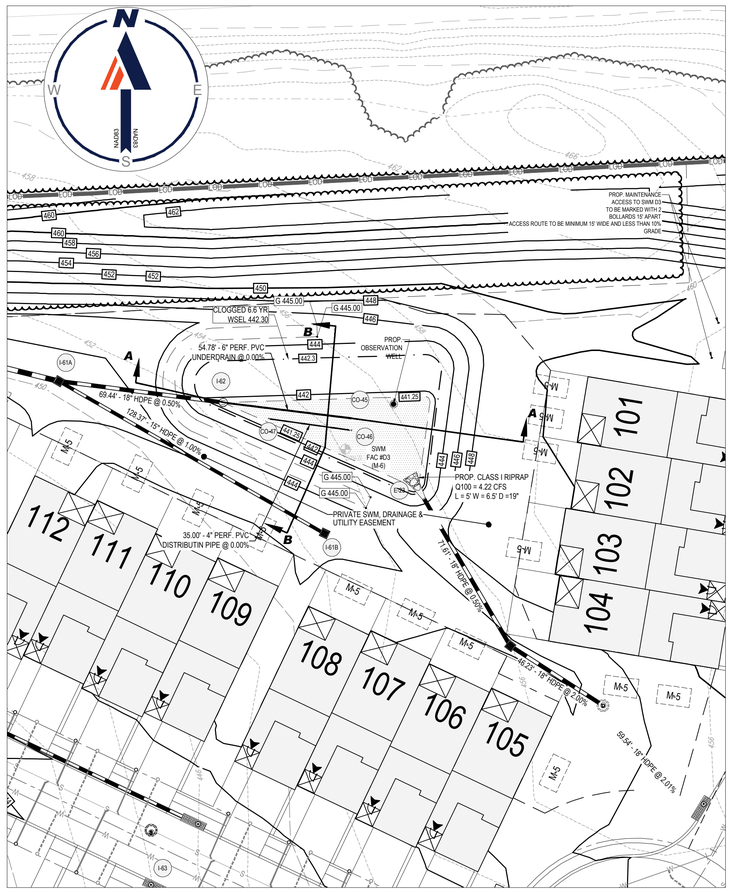
OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

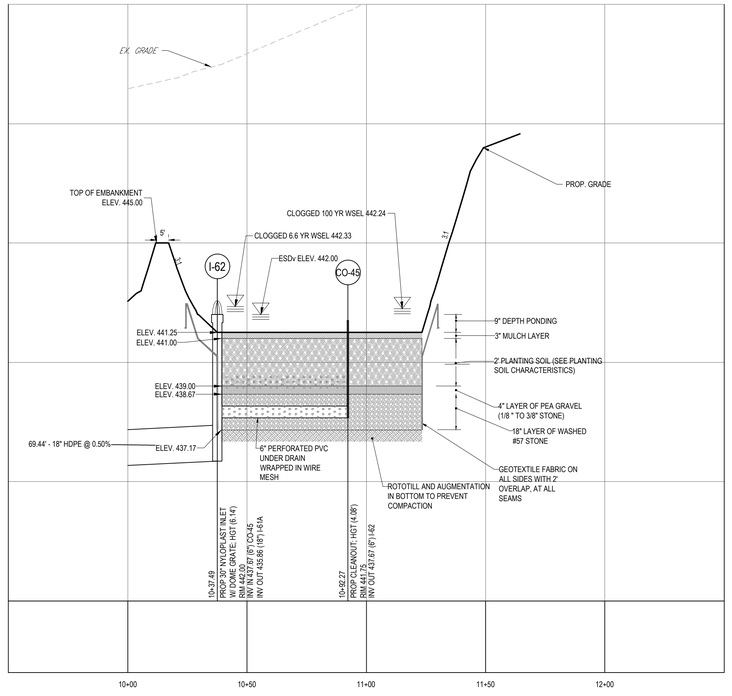
TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F



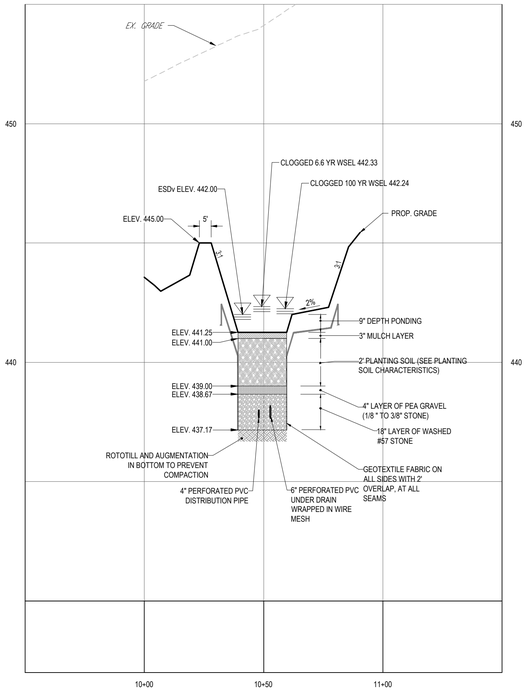
PLAN VIEW - SWM FACILITY #D3 - MICRO-BIORETENTION (M-6)

SCALE: 1 = 30'



SECTION A-A - SWM FACILITY #D3 - MICRO-BIORETENTION (M-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION B-B - SWM FACILITY #D3 - MICRO-BIORETENTION (M-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

MICRO-BIORETENTION AREAS PLANTING SCHEDULE

SPECIES		TYPE	VEGETATION TYPE	SPACING	SIZE	FACILITY D3 (1683 S.F.)
BOTANICAL NAME	COMMON NAME					
CLETHERA ALNIFOLIA	SWEET PEPPERBUSH	SHRUB	FAC+	30" O.C.	1 GAL. CONT.	29
CORNUS AMMOMUM	SILKY DOGWOOD	SHRUB	FACW	30" O.C.	1 GAL. CONT.	29
RUDBECKIA HIRTA	BLACK EYE SUSAN	PERENNIAL	FACU	12" O.C.	PLUG	187
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	PERENNIAL	FACW	12" O.C.	PLUG	187
RUDBECKIA LACINIATA	TALL CONEFLOWER	PERENNIAL	FACW	12" O.C.	PLUG	187
JUNCUS EFFUSUS	SOFT RUSH	PERENNIAL	FACW+	12" O.C.	PLUG	374
SCIRPUS ACUTUS	HARDSTEMMED BULLRUSH	PERENNIAL	OBL	12" O.C.	PLUG	374

NOTES:
1) ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE C SOIL STABILIZATION MATTING (SSM)
2) ALL PROPOSED FOREBAYS TO BE SODDED

30 15 7.5 0 30
1"= 30'

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT DATE
DocuSigned by: 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE NO. 3997
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3997, EXPIRATION DATE: 8/20/24.

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT NO.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE NO. 40908
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40908, EXPIRATION DATE: 7/3/2025.

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:
45 of 117

F-22-033

Mar 19, 2024
H:\152018\2018DRAWINGS\PLAN SET\FINAL PLANS\152018 - SWMD - 2 - LAYOUT 45 - SWM NOTES & DETAILS.MCD

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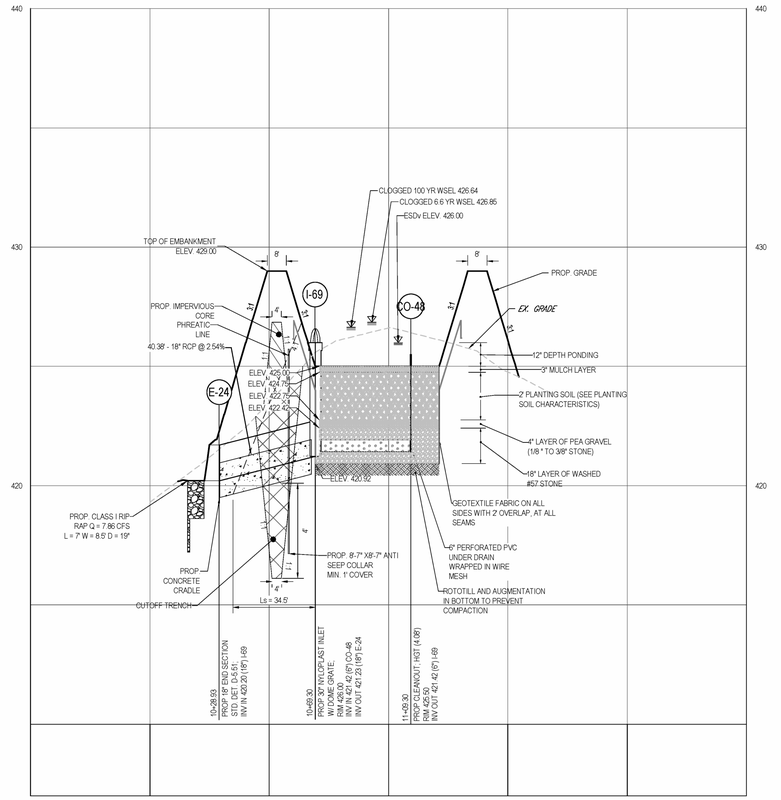
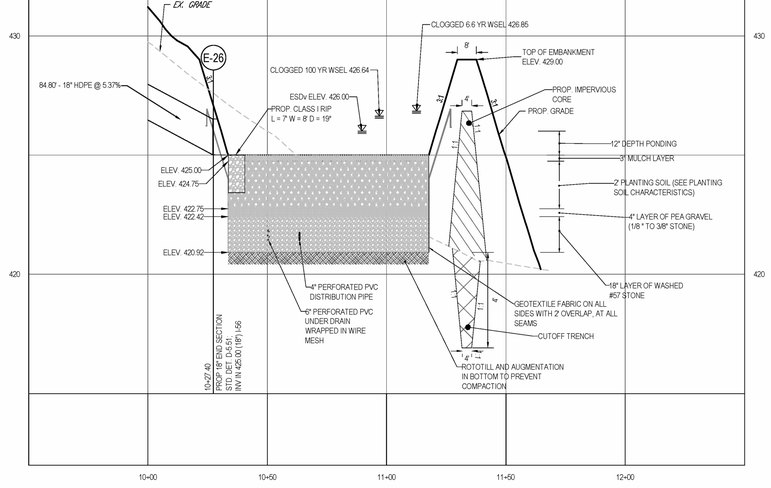
PLAN VIEW - SWM FACILITY #D6 - SURFACE SAND FILTER (F-1)

SCALE: 1 = 30'



SECTION A-A - SWM FACILITY #D6 - BIORETENTION

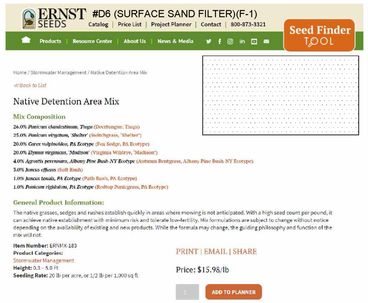
SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL



SECTION B-B - SWM FACILTY #D6 - SURFACE SAND FILTER

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL

NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)



NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

ENGINEER'S CERTIFICATE

I HEREBY 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 COUNTY SOIL CONSERVATION DISTRICT.

SIGNATURE OF ENGINEER
BRANDON R. ROWE P.E.

DATE 3/12/24

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 PERSONAL 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

SIGNATURE OF DEVELOPER (NAME): Jason Van Kirk, Vice President

DATE 3-12-24

30 15 7.5 0 30
1"= 30'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

APPROVED: DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

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SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND
BRANDON RICHARD ROWE
No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SWM NOTES AND DETAILS

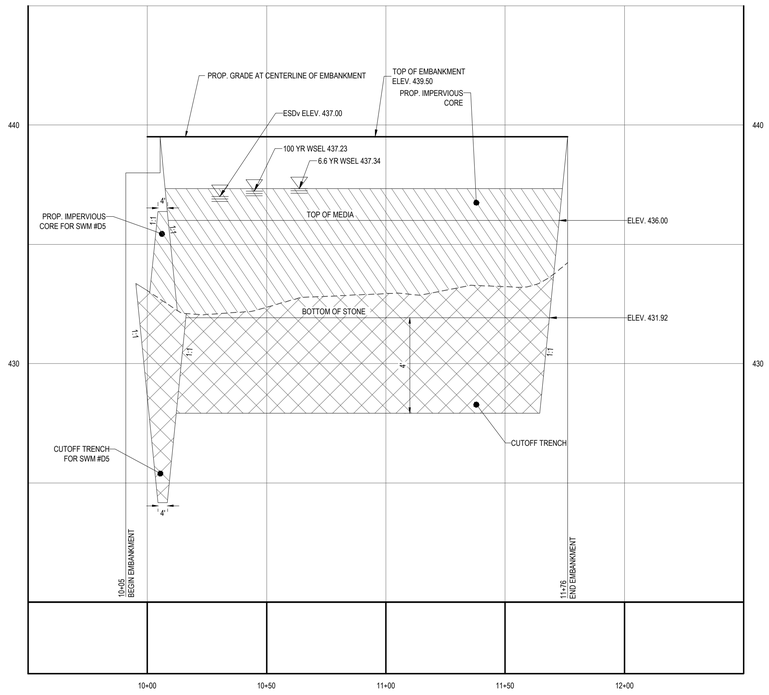
SHEET NUMBER:

46 of 117

F-22-033

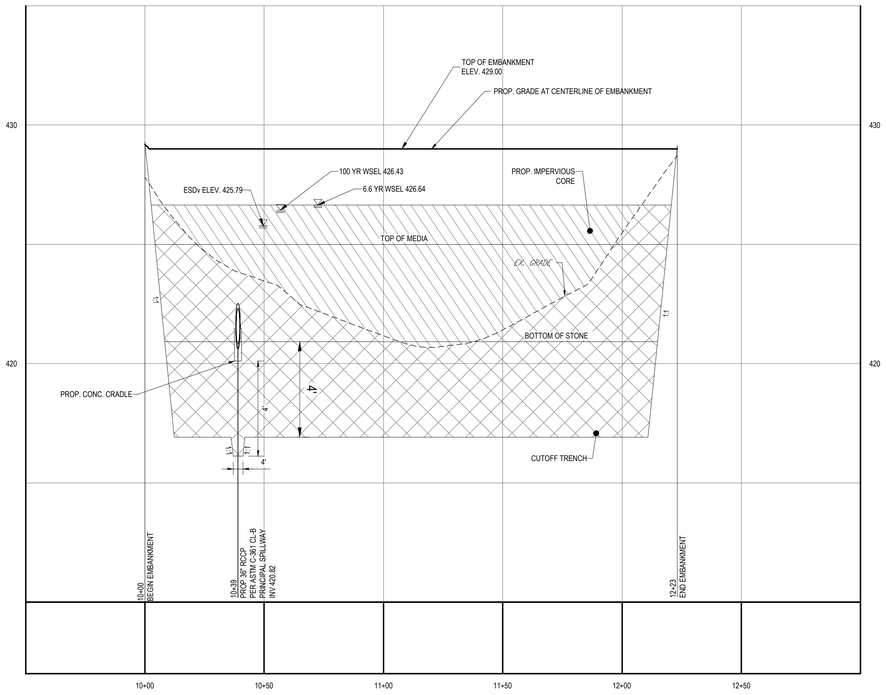
Mar 19, 2024
H:\SWM\152018\DRAWINGS\PLANSETS\FINAL PLAN\MD152018 - SWMD - 2 - LAYOUT 46 - SWM NOTES & DETAILS

DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F



EMBANKMENT PROFILE - SWM FACILITY #D4 - BIORETENTION (F-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



EMBANKMENT PROFILE - SWM FACILITY #D6 - BIORETENTION

SCALE: 1"= 30 ' HORIZONTAL
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CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: _____ 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: Chad Edmondson 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
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Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
STATE OF MARYLAND — BRANDON RICHARD ROWE — 40808 — REGISTERED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
STATE OF MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SWM NOTES & DETAILS

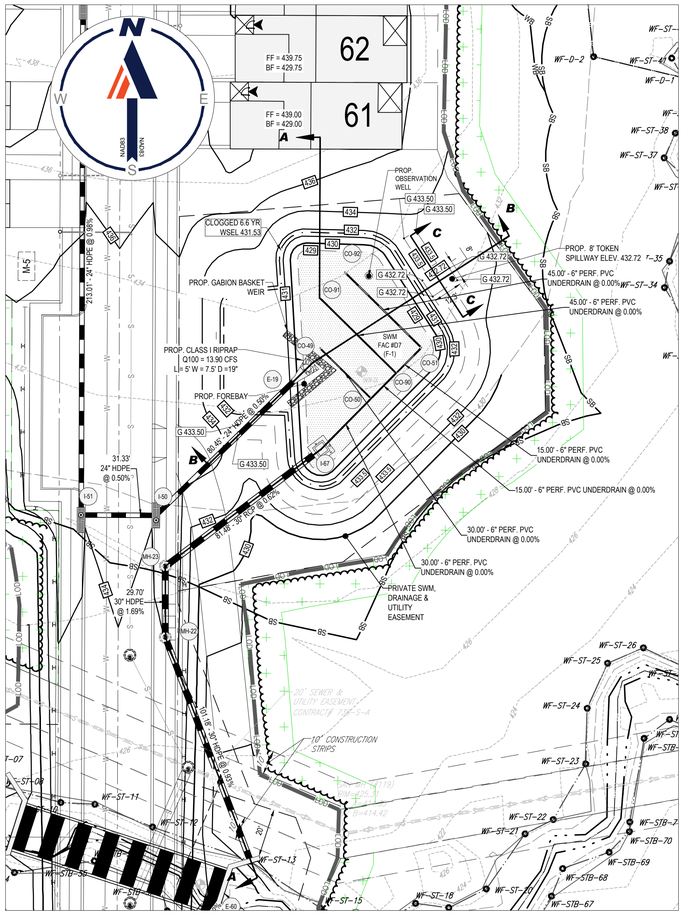
SHEET NUMBER:

46A of 117

F-22-033

Mar 19, 2024
H:\SMD\152018\DRAWINGS\PLAN SETS\FINAL PLANS\D152018 - SWMD - 2 - LAYOUT 46A - SWM NOTES & DETAILS.DWG

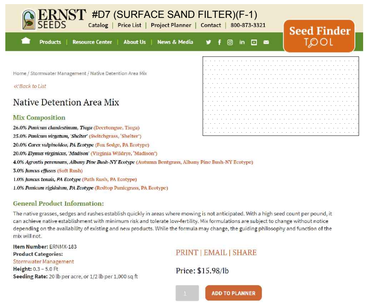
DocuSign Envelope ID: 67E553CA-5FFE-49EE-9611-19F161C30A9F

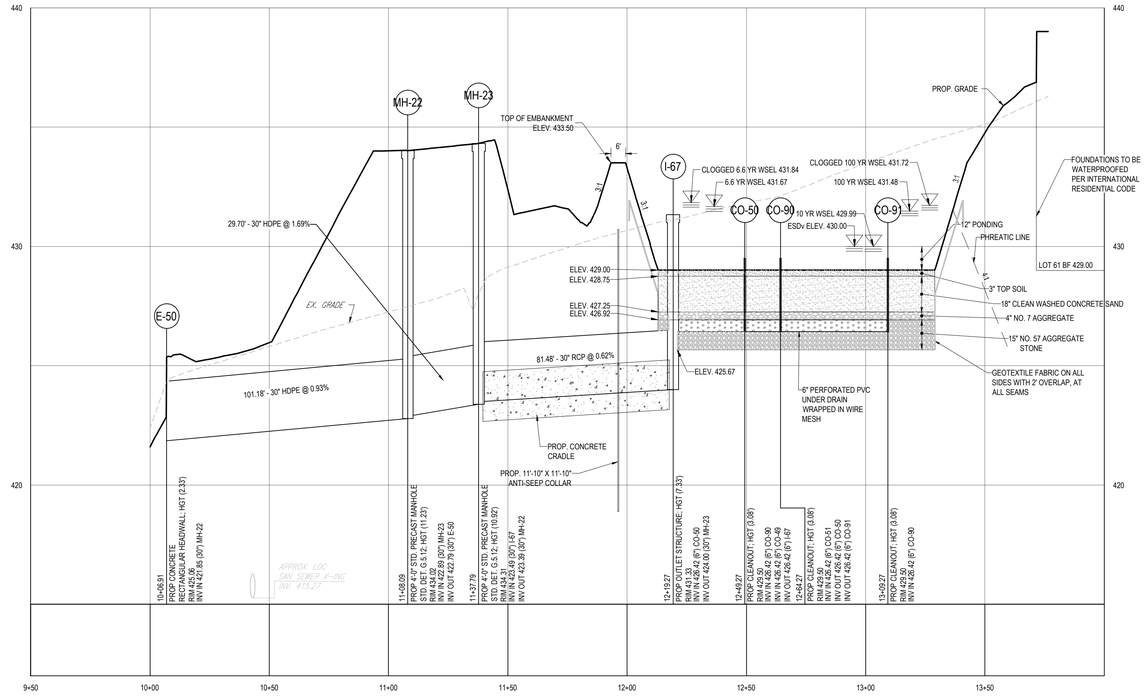


PLAN VIEW - SWM FACILITY #D7 - SURFACE SAND FILTER (F-1)

SCALE: 1 = 30'

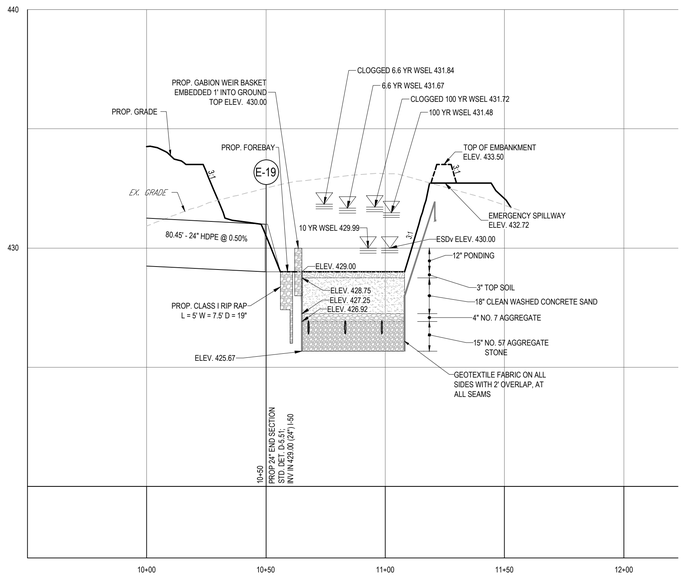
NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)





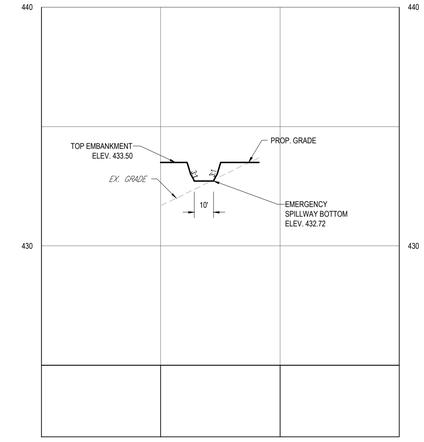
SECTION A-A - SWM FACILITY #D7 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION B-B - SWM FACIILTY #D7 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION C-C - SWM FACILITY #D7 - TOKEN SPILLWAY

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

APPROVED: DEPARTMENT OF PUBLIC WORKS	
Docusigned by:	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
Docusigned by:	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
Docusigned by: Chad Edmondson	6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

30 15 7.5 0 30
1"= 30'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

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5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

E.R. McWILLIAMS
LANDSCAPE ARCHITECT
MARYLAND LICENSE No. 3697
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE NO. 3697
PROFESSIONAL CERTIFICATION.
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

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DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
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HOWARD COUNTY, MARYLAND

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Phone: (410) 821-7900
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MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION.
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F-22-033

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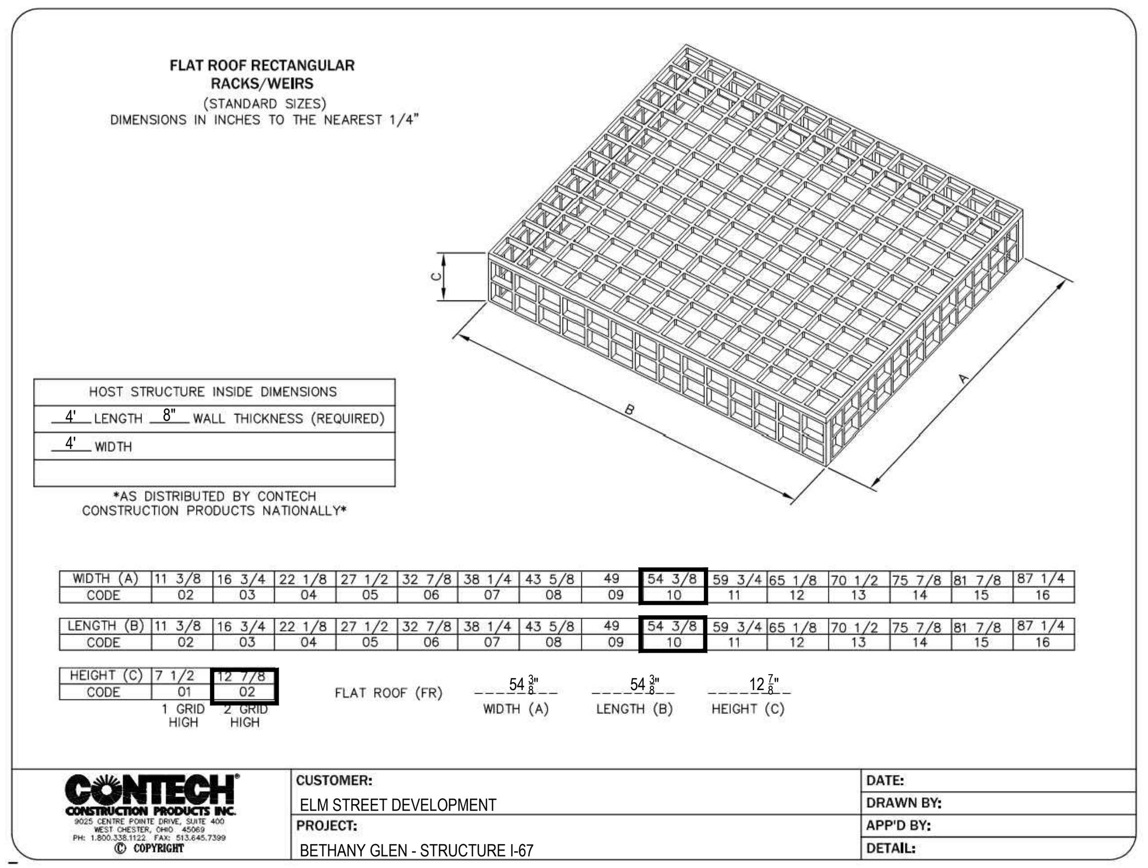
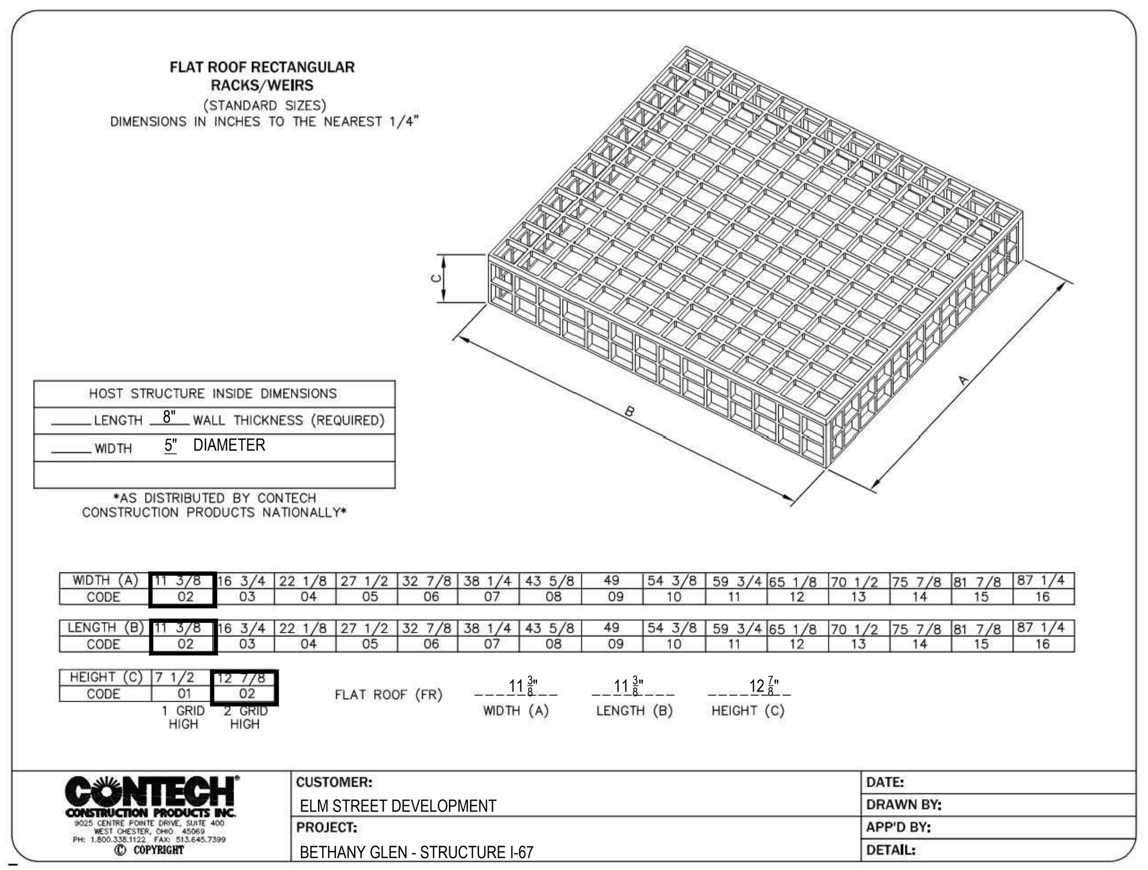
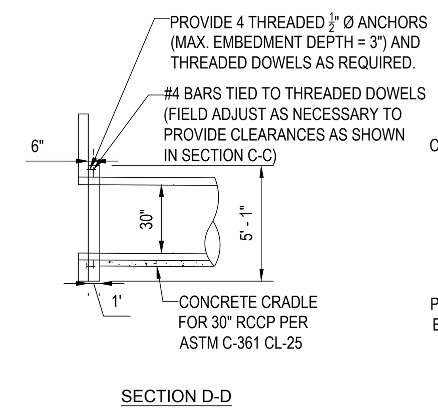
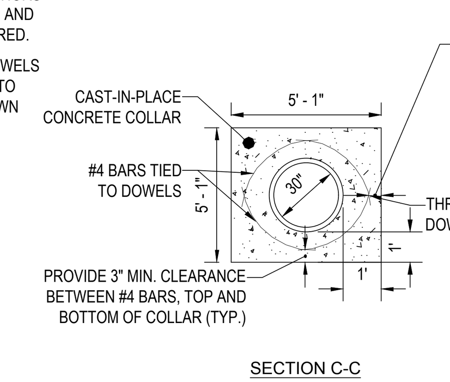
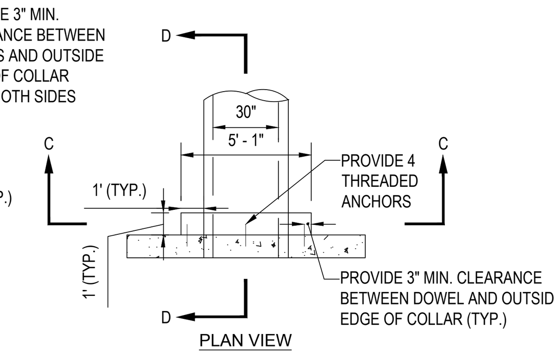








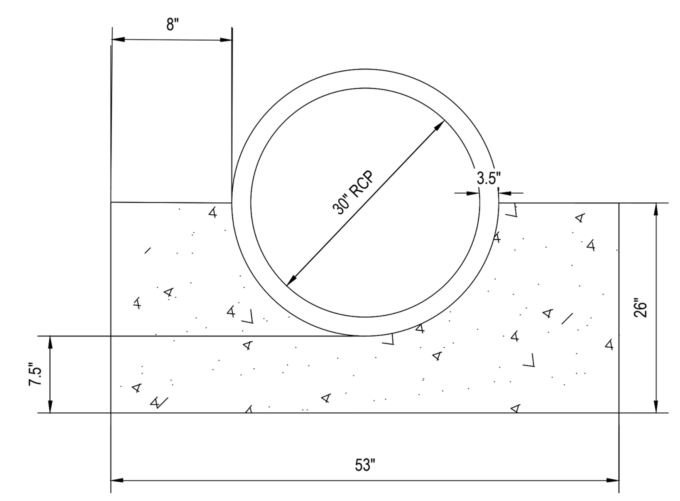


NOTES:

1. PROVIDE 1' MIN CONCRETE COVER AROUND O.D. OF PIPE.
2. Fc = 3,500 PSI AT 28 DAYS
3. TO BE USED WITH PRE-CAST RISERS ONLY
4. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

CAST-IN-PLACE CONCRETE COLLAR DETAILS

NOT TO SCALE

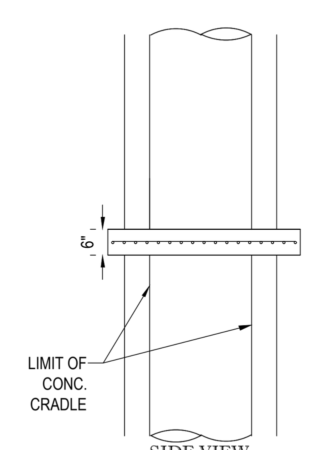


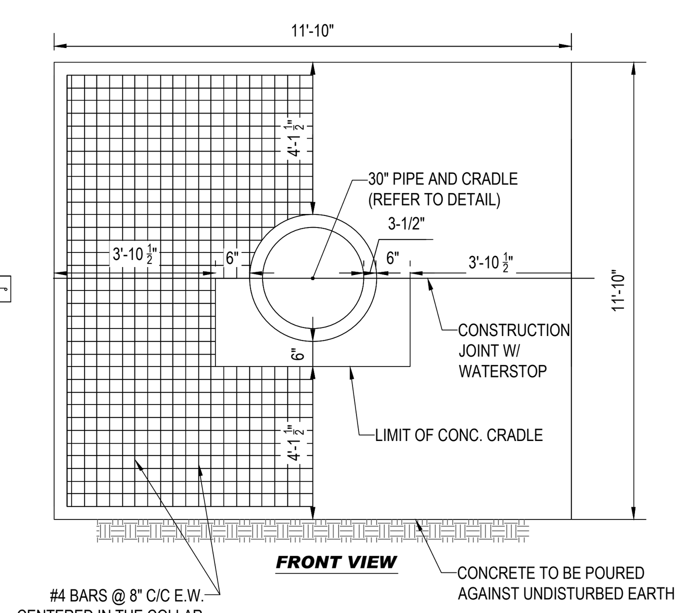
NOTES:

1. CRADLE TO BE CONTINUOUS ALONG PIPE.
2. CONCRETE FOR CRADLE TO BE MDSHA MIX No. 3.

SCS TR-46 A2 CONCRETE CRADLE DETAIL

NOT TO SCALE



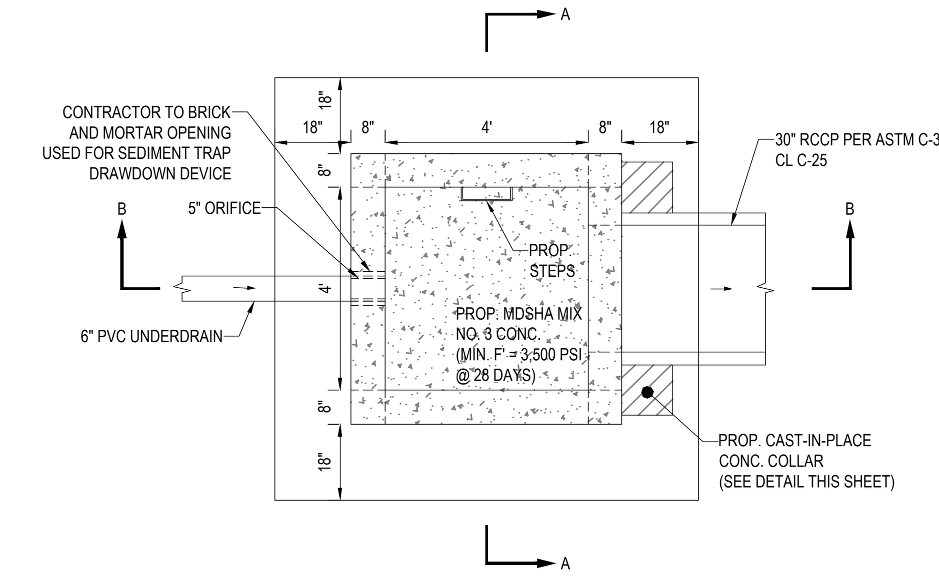


ANTI-SEEP COLLAR DETAIL

NOT TO SCALE

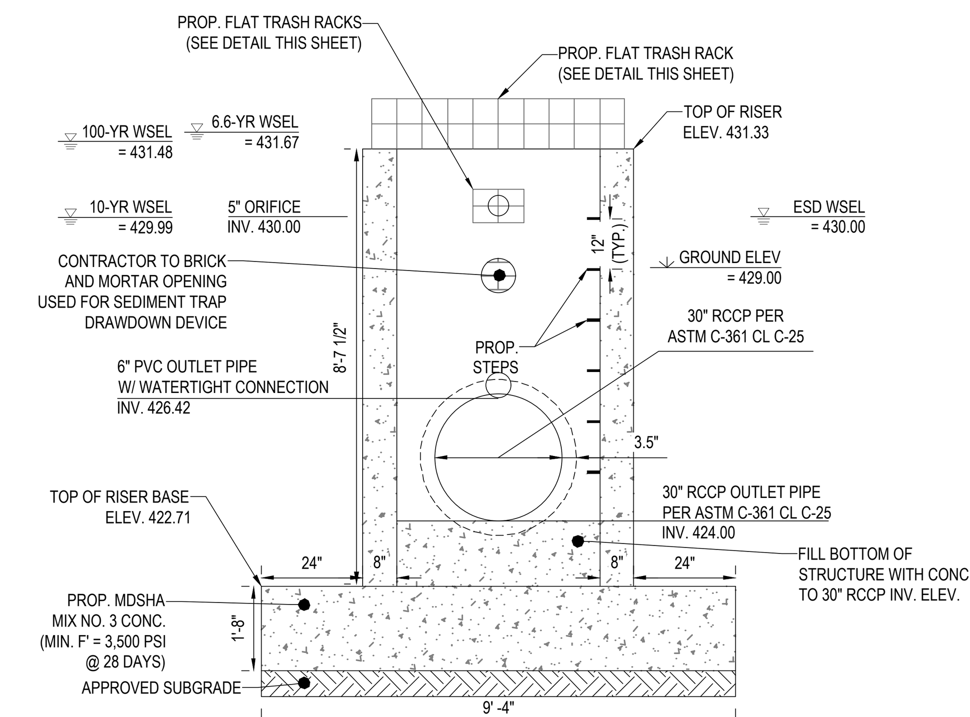
NOTES:

1. CONTRACTOR IS TO CONSTRUCT AND INSTALL ANTI-SEEP COLLAR IN ACCORDANCE WITH ALL APPLICABLE MD-378 REGULATIONS.
2. ANTI-SEEP COLLARS ARE TO BE CONSTRUCTED IN TWO (2) POURS. THE BOTTOM SECTION IS TO BE POURED WITH THE CONCRETE CRADLE. FORM AND POUR THE TOP SECTION OF THE COLLAR.
3. ANTI-SEEP COLLARS ARE TO BE POURED AT LEAST TWO (2) FEET FROM THE NEAREST PIPE JOINT.
4. LOOSE CONCRETE, EARTH, ETC. IS TO BE REMOVED FROM THE PIPE SURFACE.
5. CONCRETE SHALL HAVE A MINIMUM F' = 3,500 PSI (MSHA MIX NO. 3) AT 28 DAYS.
6. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER ENGINEERING TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

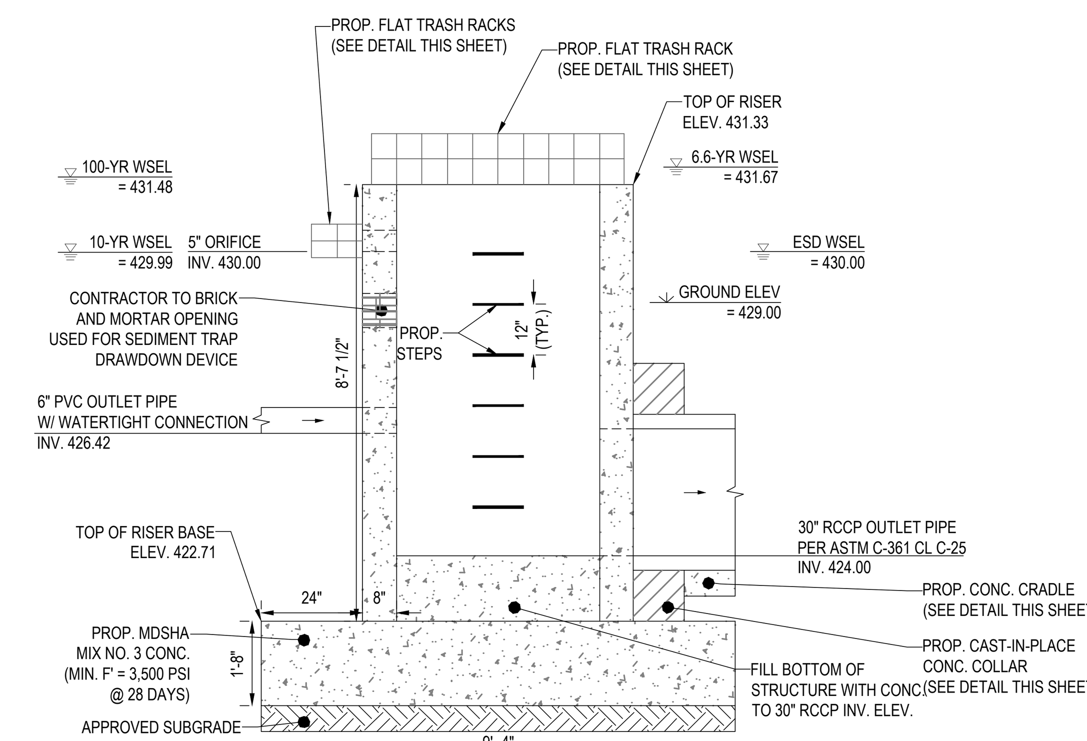


PLAN VIEW

WITHOUT TOP SLAB AND TRASH RACKS



SECTION A-A



SECTION B-B

TYPICAL RISER STRUCTURE DETAILS (STRUCTURE I-67)

NOT TO SCALE

NOTES:

1. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. STRUCTURES ARE INTENDED TO BE STANDARD PRECAST CONCRETE STRUCTURES. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.
2. DETAIL SHOWN IS FOR FINAL CONDITIONS ONLY. ANY TEMPORARY OPENING IN THE STRUCTURE USED FOR SEDIMENT CONTROL IS TO BE PERMANENTLY SEALED WITH BRICK AND MORTAR.

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 6/12/2024

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No.: WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002	OWNER / DEVELOPER: BETHANY GLEN DEVELOPMENT, INC. 5074 DORSEY HALL ROAD, SUITE 205 ELLICOTT CITY, MD 21042 CONTACT: JASON VAN KIRK PHONE: (410) 720-3021 TAX MAP: 17 GRID: 15 ZONED: R-20 PARCEL: 34 2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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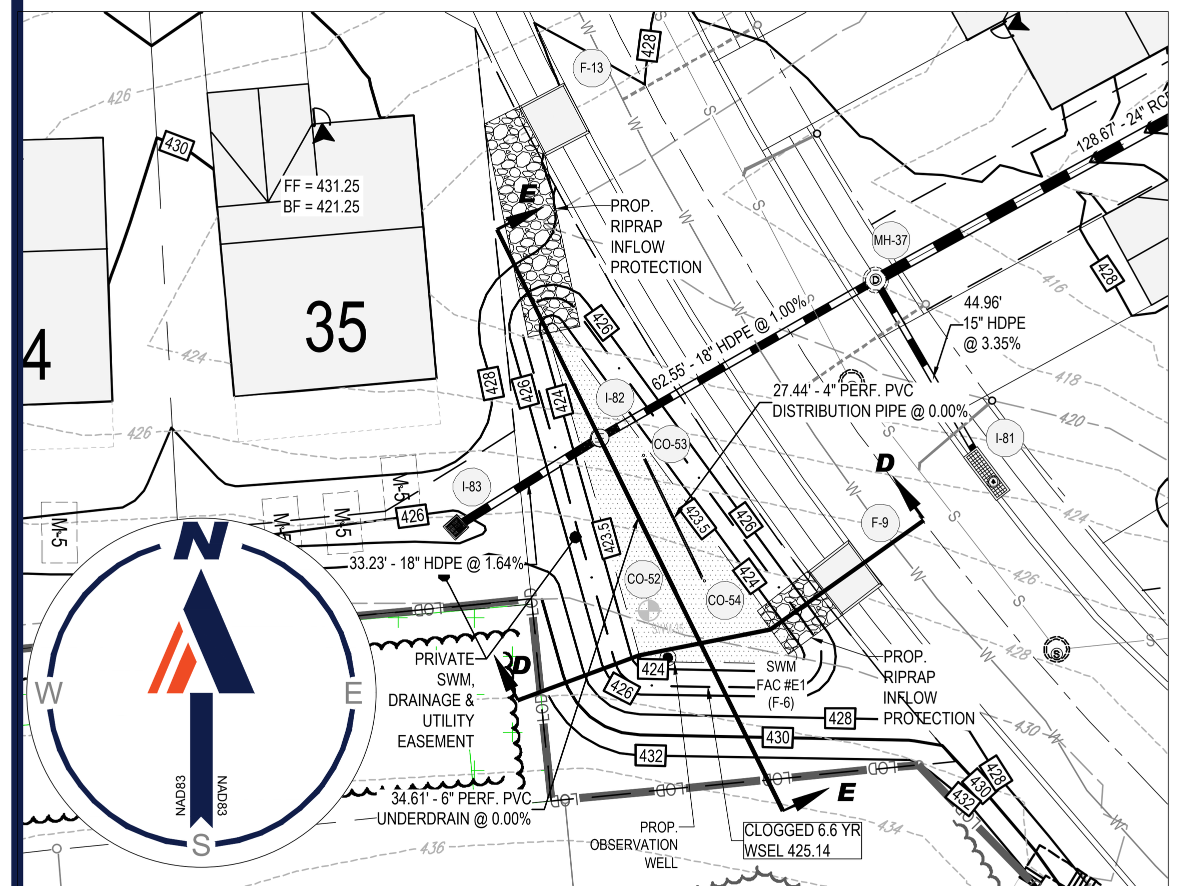
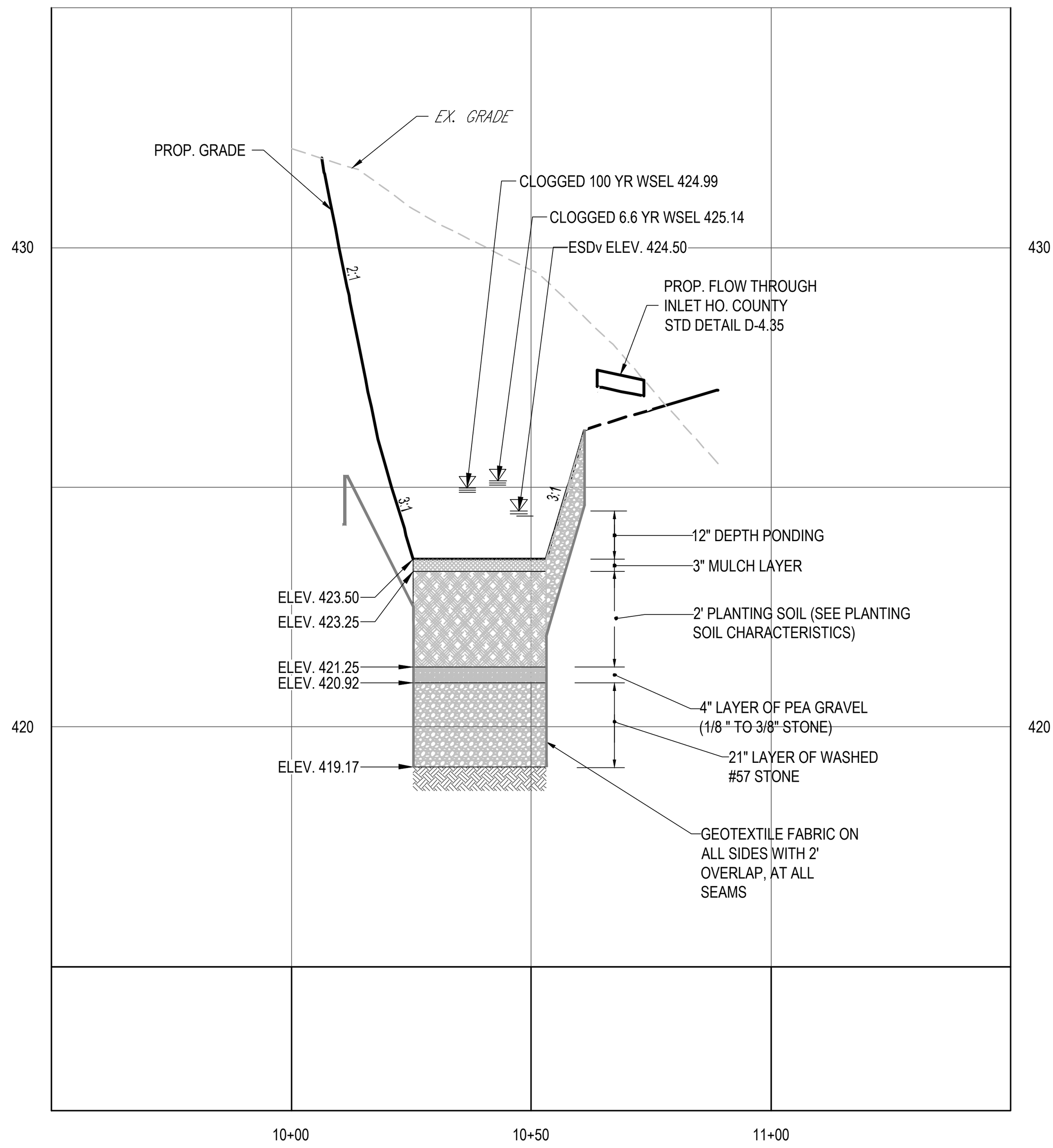


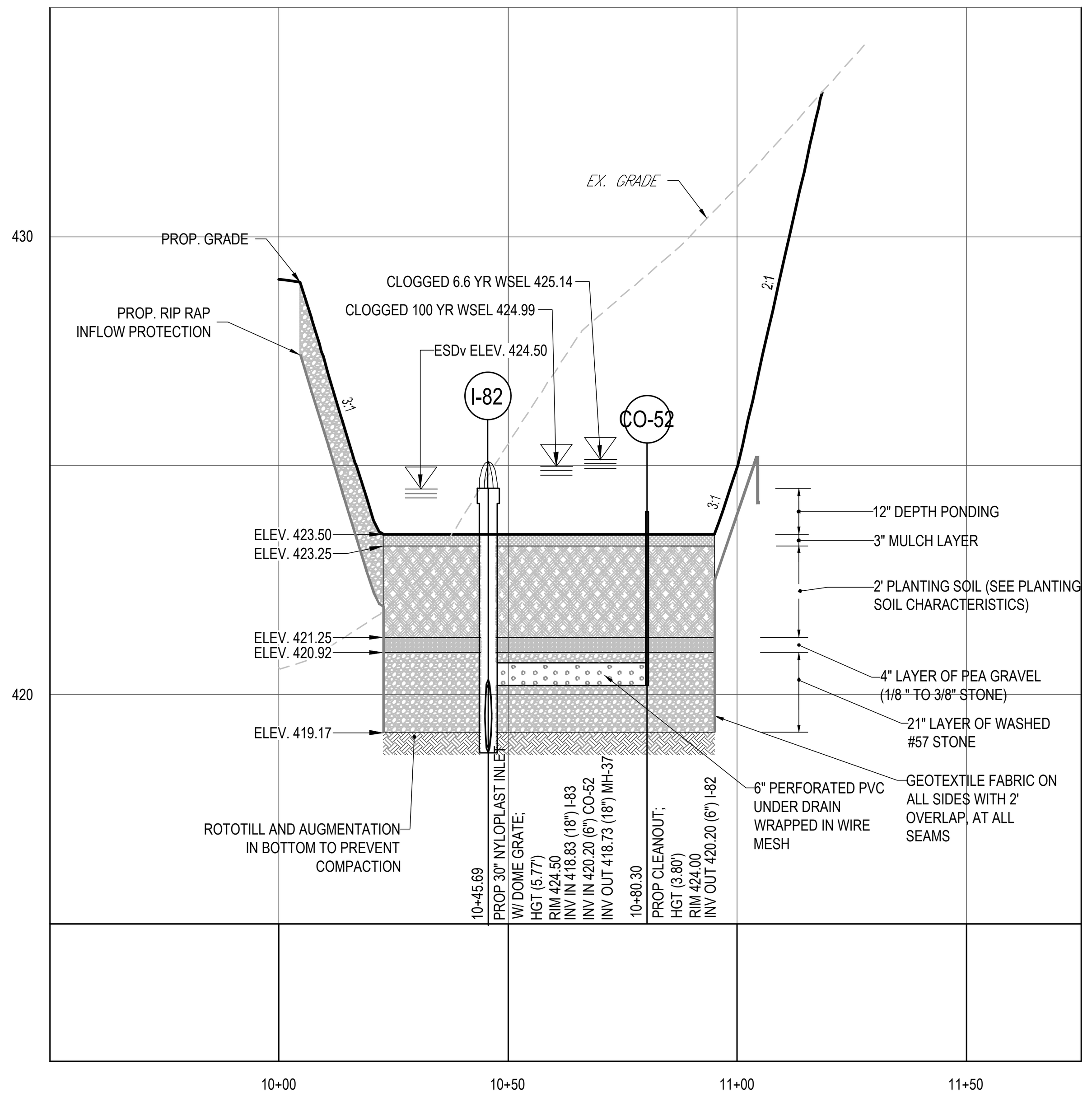
PLAN VIEW - SWM FACILITY #E1 - BIORETENTION (F-6)

SCALE: 1 = 30'



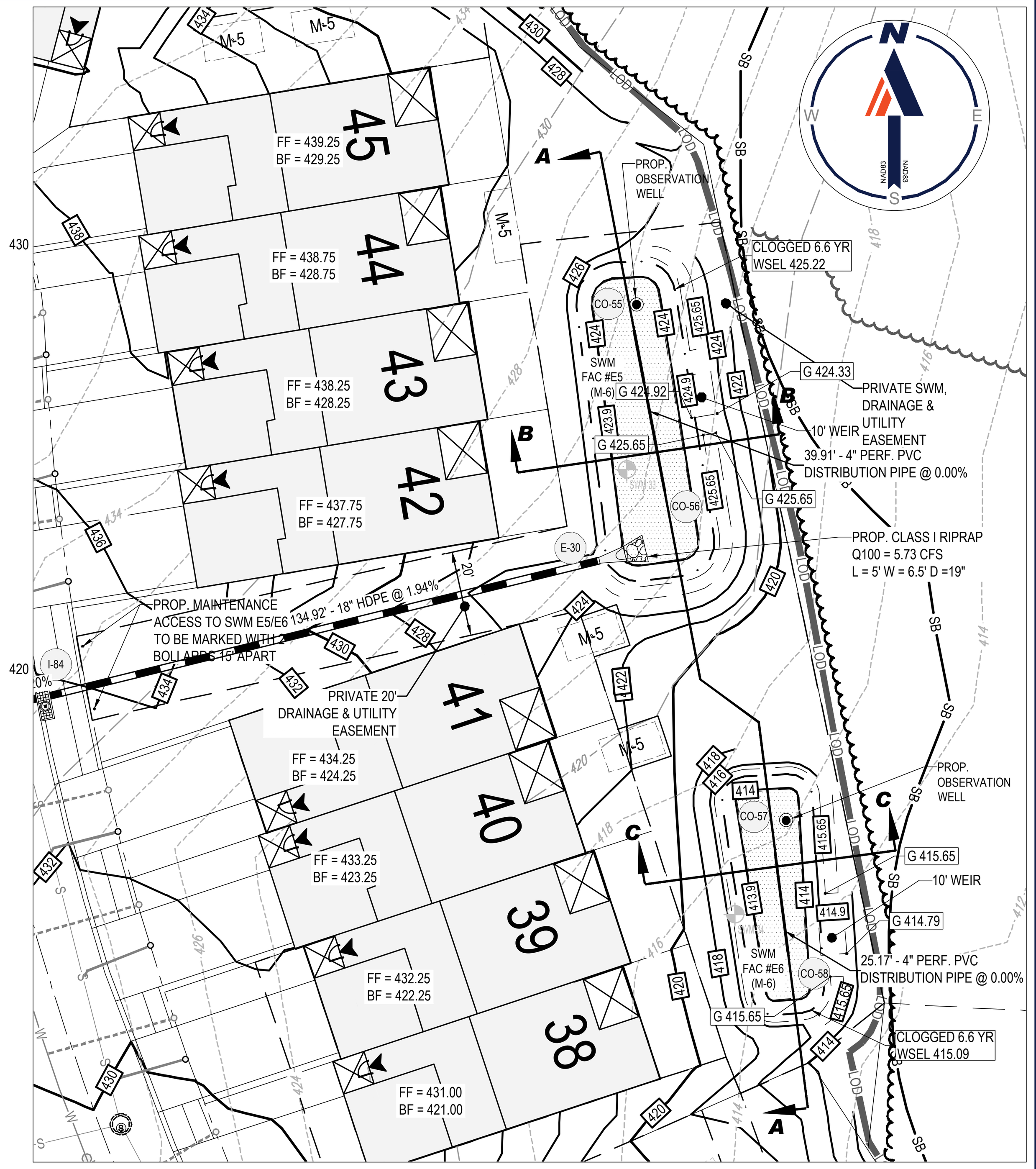
SECTION D-D - SWM FACILITY #E1 - BIORETENTION (F-6)

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL



SECTION E-E - FACILITY #E1 - BIORETENTION (F-6)

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL



PLAN VIEW - SWM FACILITIES #E5 (MICRO-BIO M-6) AND #E6 (MICRO-BIO M-6) - PLAN VIEW

SCALE: 1 = 30'

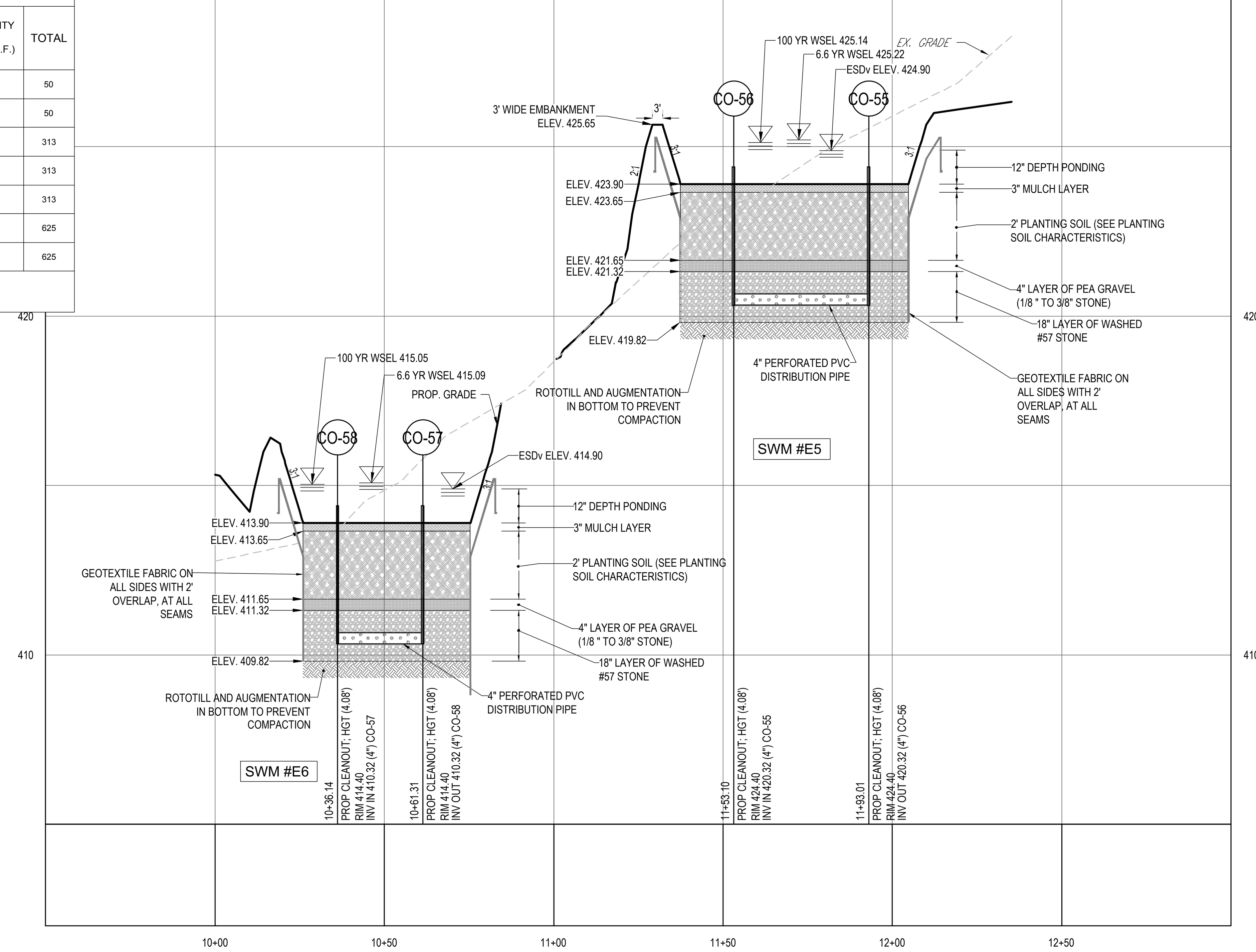
BIORETENTION & MICRO-BIORETENTION AREAS PLANTING SCHEDULE

SPECIES		TYPE	VEGETATION TYPE	SPACING	SIZE	FACILITY E1 (1125 S.F.)	FACILITY E5 (1093 S.F.)	FACILITY E6 (594 S.F.)	TOTAL
BOTANICAL NAME	COMMON NAME								
CLETHERA ALNIFOLIA	SWEET PEPPERBUSH	SHRUB	FAC+	30" O.C.	1 GAL. CONT.	20	19	11	50
CORNUS AMMOMUM	SILKY DOGWOOD	SHRUB	FACW	30" O.C.	1 GAL. CONT.	20	19	11	50
RUDBECKIA HIRTA	BLACK EYE SUSAN	PERENNIAL	FACU	12" O.C.	PLUG	125	122	66	313
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	PERENNIAL	FACW	12" O.C.	PLUG	125	122	66	313
RUDBECKIA LACINIATA	TALL CONEFLOWER	PERENNIAL	FACW	12" O.C.	PLUG	125	122	66	313
JUNCUS EFFUSUS	SOFT RUSH	PERENNIAL	FACW+	12" O.C.	PLUG	250	243	132	625
SCIRPUS ACUTUS	HARDSTEMMED BULLRUSH	PERENNIAL	OBL	12" O.C.	PLUG	250	243	132	625

NOTES:
1) ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE C SOIL STABILIZATION MATTING (SSM)
2) ALL PROPOSED FOREBAYS TO BE SODDED

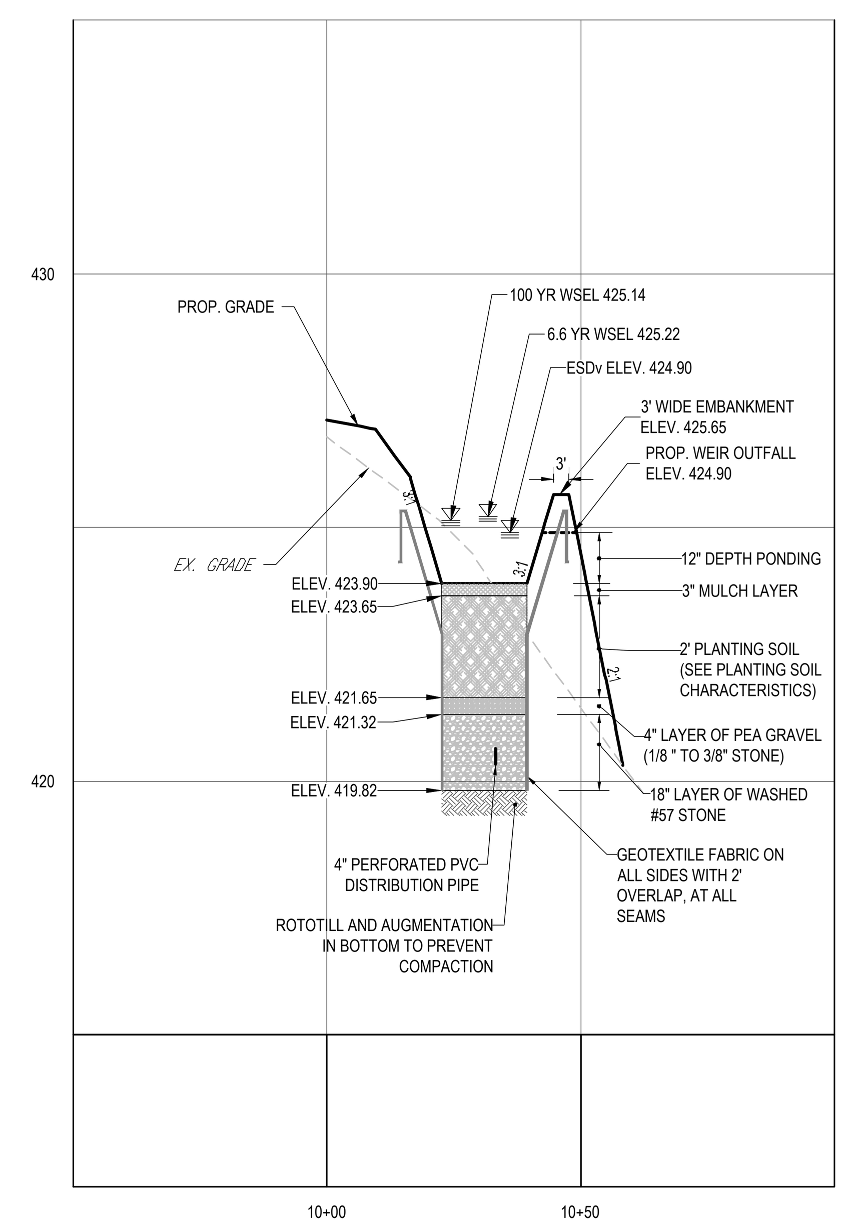
E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

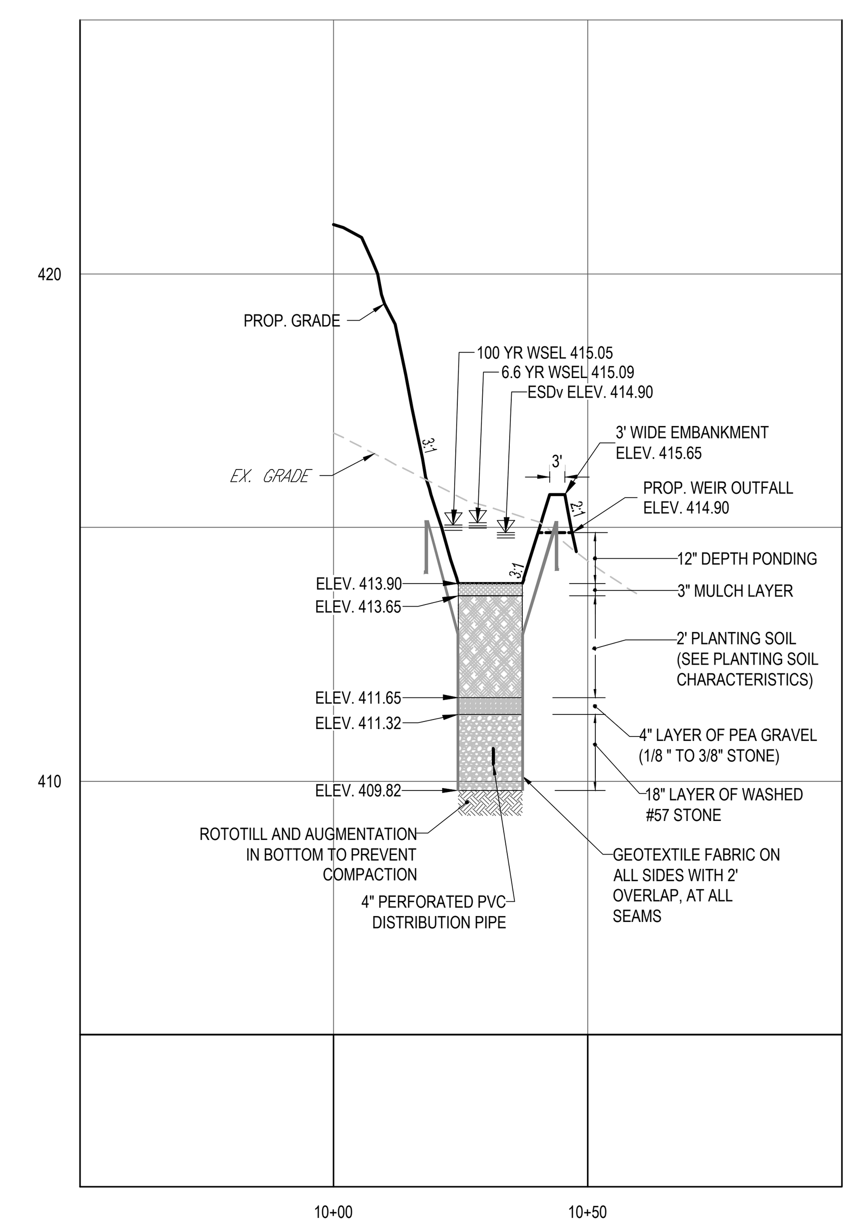
NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.



SECTION A-A - SWM FACILITIES #E5 MICRO-BIORETENTION (M-6) AND #E6 MICRO-BIORETENTION (M-6)

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL





SECTION C-C

SECTION B-B - SWM FACILITY #E5 - MICROBIORETENTION (M-6) SWM FACILITY #E6 - MICROBIORETENTION (M-6)

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL

30 15 7.5 0 30
1"= 30'

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 — GRID: 15 — ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
SWM NOTES AND DETAILS

SHEET NUMBER:
49 of 117

F-22-033

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THIS SHEET HAS BEEN INTENTIONALLY LEFT BLANK

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DocuSigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

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DocuSigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
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5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
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Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE NO. 40908 C.E.S.
PROFESSIONAL CERTIFICATION.
I, BRANDON R. ROWE, 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. 40908, EXPIRATION DATE: 7/2/2025

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

50 of 117

F-22-033

Mar 19, 2024
H:\15MD\152018\DRAWINGS\PLAN SET\FINAL PLAN\MD152018 - SWMD - 2 - LAYOUT 50 - SWM NOTES & DETAILS.MCD

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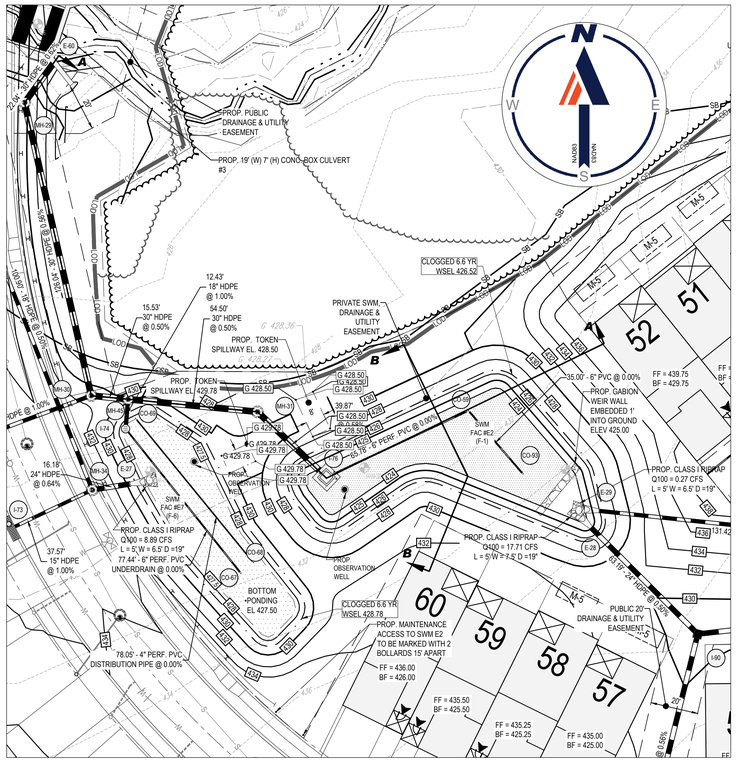
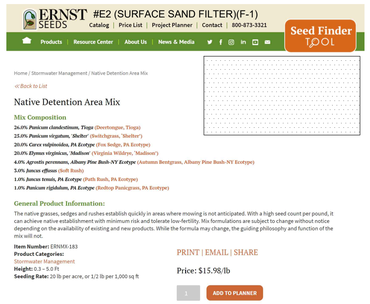
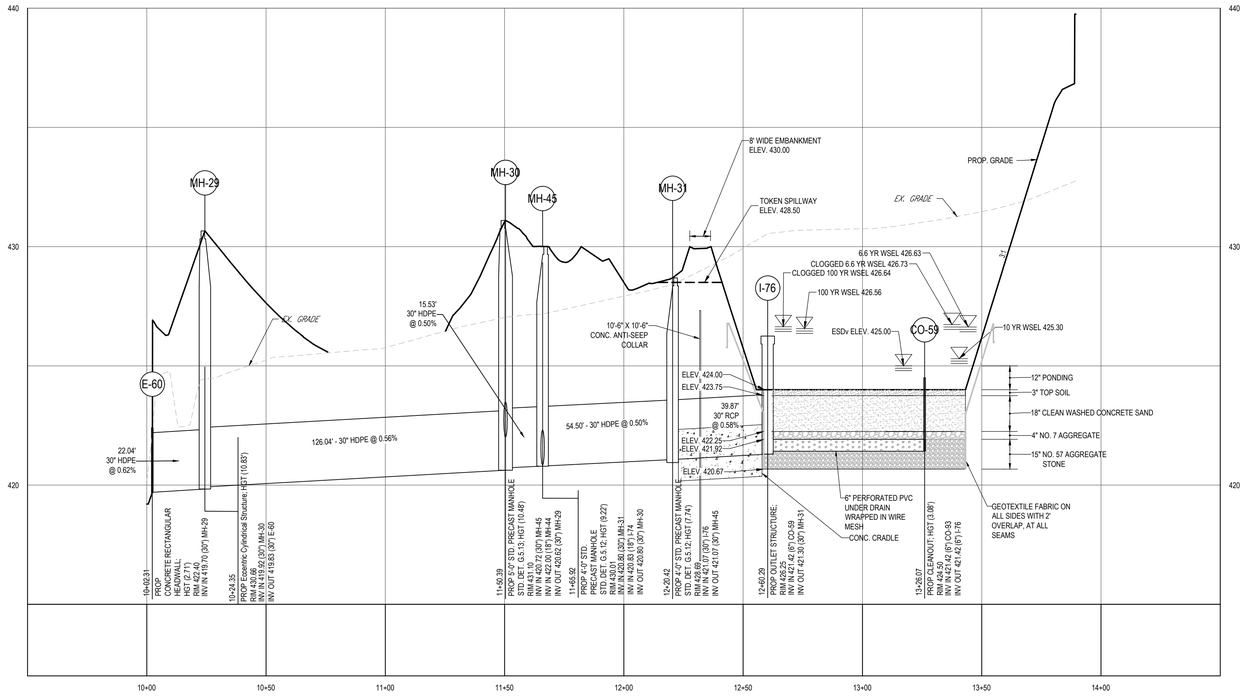


PLAN VIEW - SWM FACILITY #E2 - SURFACE SAND FILTER (F-1)

SCALE: 1 = 30'

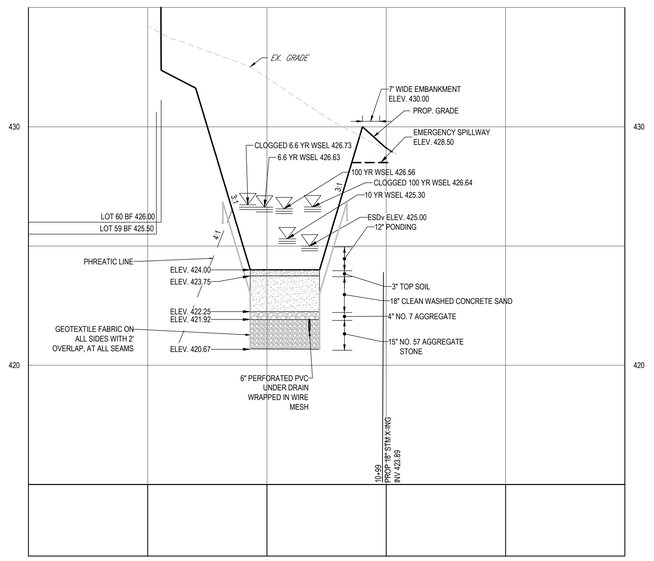
NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)





SECTION A-A - SWM FACILITY #E2 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION B-B - SWM FACILITY #E2 - SURFACE SAND FILTER (F-1)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

30 15 7.5 0 30

1"= 30'

APPROVED: DEPARTMENT OF PUBLIC WORKS	
DocuSigned by: 6/12/2024	
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
DocuSigned by: 6/12/2024	
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

E.R. McWILLIAMS
STATE OF MARYLAND
ELIZABETH RUTH McWILLIAMS
21677
REGISTERED
03/15/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE NO. 3697
PROFESSIONAL CERTIFICATION:
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

B.R. ROWE
STATE OF MARYLAND
BRANDON RAY ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC. 5074 DORSEY HALL ROAD, SUITE 205 ELLICOTT CITY, MD 21042 CONTACT: JASON VAN KIRK PHONE: (410) 720-3021

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002	TAX MAP: 17 GRID: 15 ZONED: R-20 PARCEL: 34 2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD -2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

51 of 117

F-22-033

Mar 12, 2024
H:\19\MD\152018\DRAWINGS\PLAN SETS\FINAL PLANS\D152018 - SWMD -2---LAYOUT 51 - SWM NOTES & DETAILS
AG

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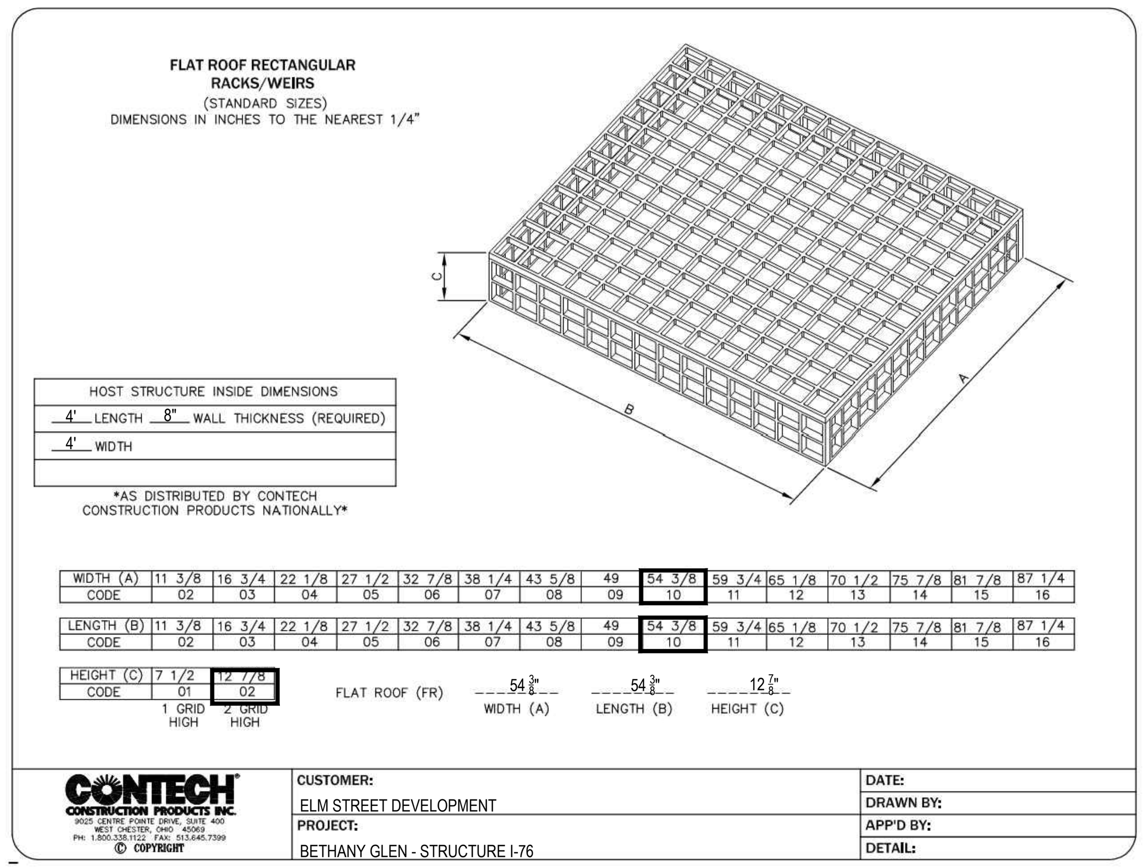
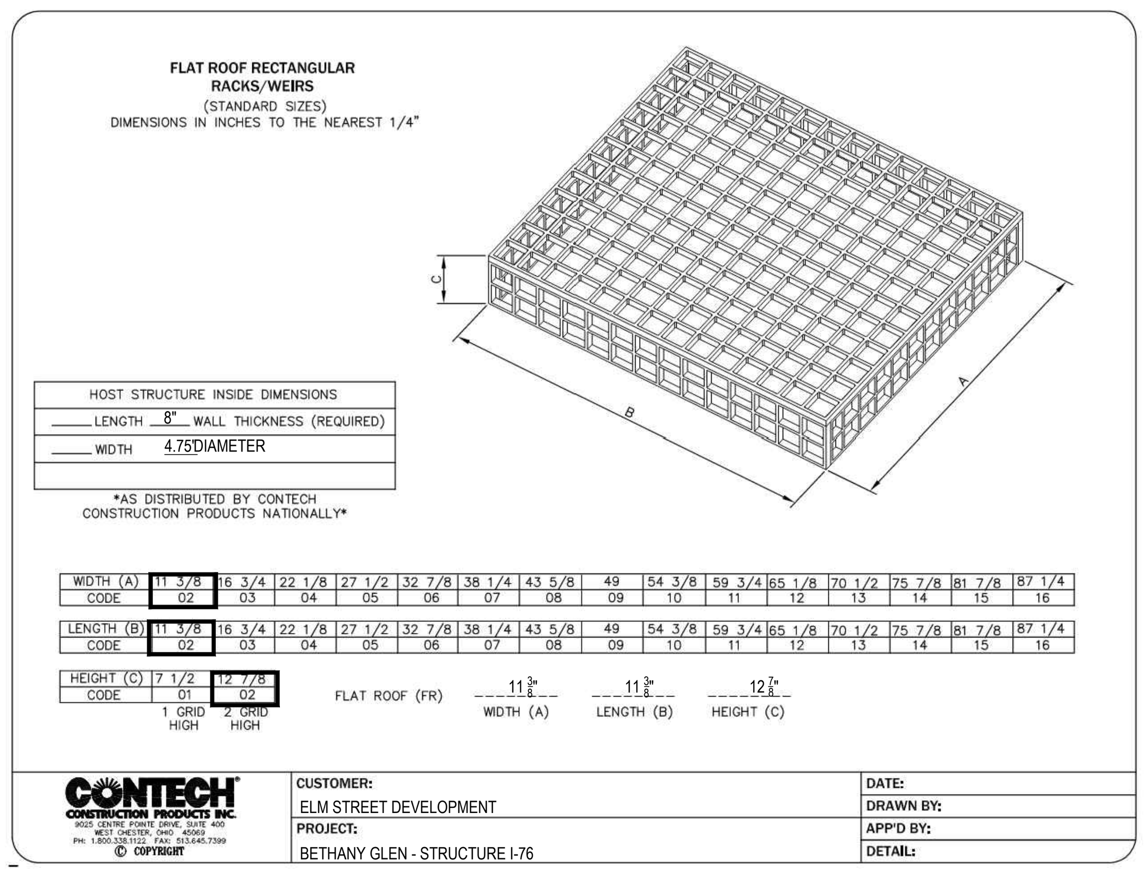
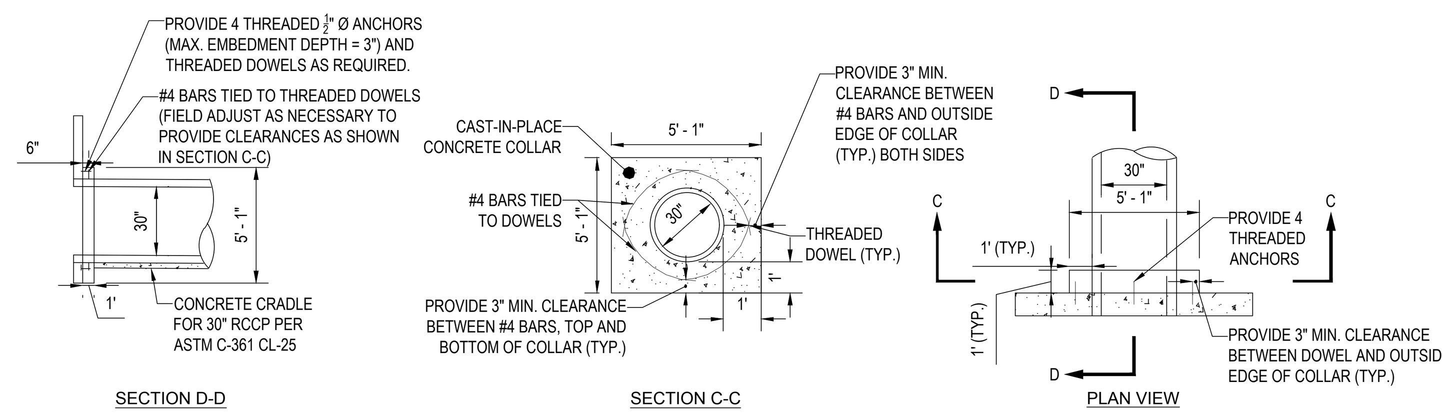


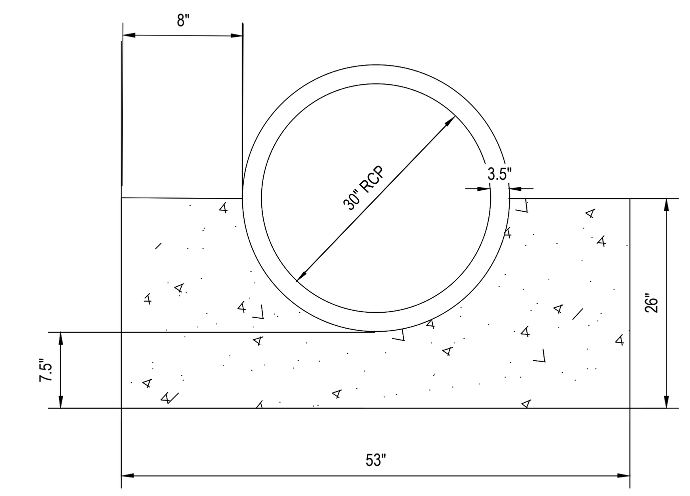




NOTES:
1. PROVIDE 1' MIN CONCRETE COVER AROUND O.D. OF PIPE.
2. Fc = 3,500 PSI AT 28 DAYS
3. TO BE USED WITH PRE-CAST RISERS ONLY
4. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

CAST-IN-PLACE CONCRETE COLLAR DETAILS

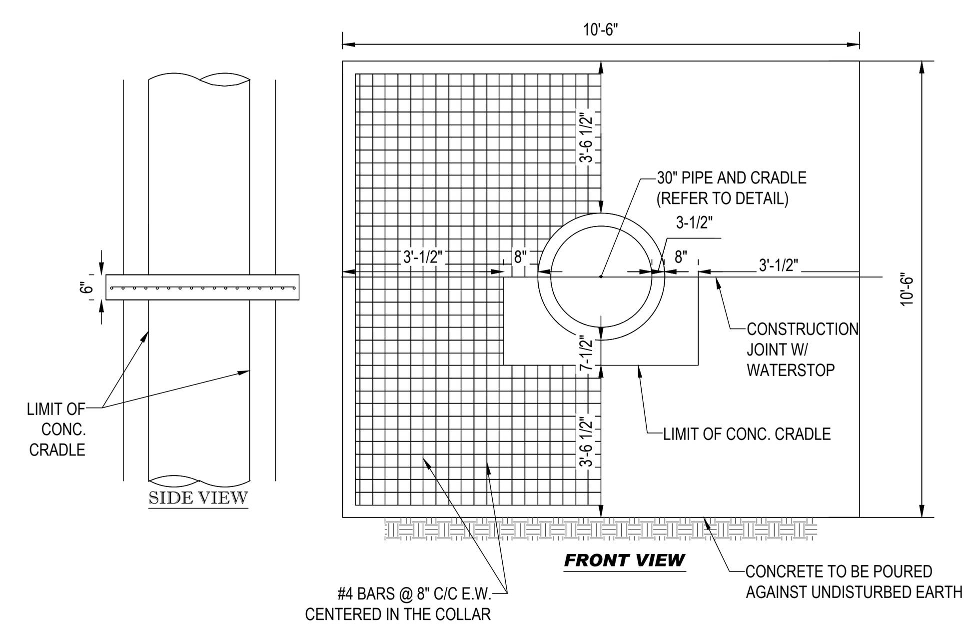
NOT TO SCALE



NOTES:
1. CRADLE TO BE CONTINUOUS ALONG PIPE.
2. CONCRETE FOR CRADLE TO BE MDSHA MIX No. 3.

SCS TR-46 A2 CONCRETE CRADLE DETAIL

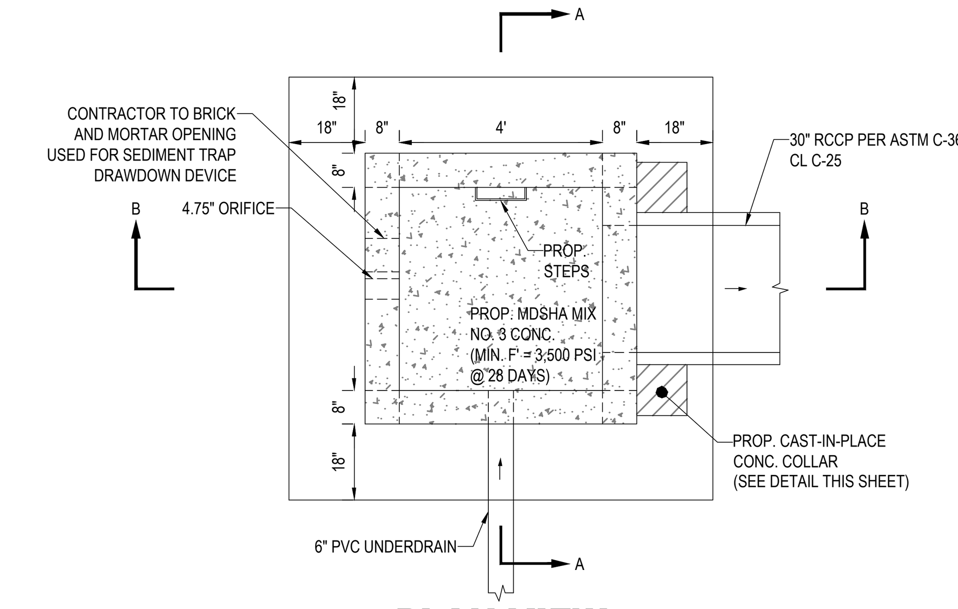
NOT TO SCALE



ANTI-SEEP COLLAR DETAIL

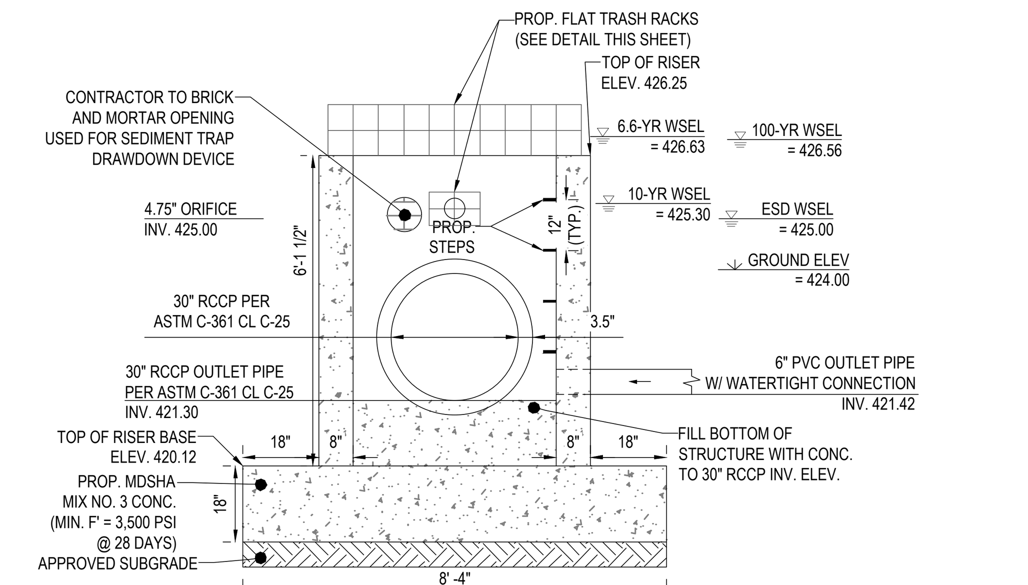
NOT TO SCALE

NOTES:
1. CONTRACTOR IS TO CONSTRUCT AND INSTALL ANTI-SEEP COLLAR IN ACCORDANCE WITH ALL APPLICABLE MD-378 REGULATIONS.
2. ANTI-SEEP COLLARS ARE TO BE CONSTRUCTED IN TWO (2) POURS. THE BOTTOM SECTION IS TO BE POURED WITH THE CONCRETE CRADLE. FORM AND POUR THE TOP SECTION OF THE COLLAR.
3. ANTI-SEEP COLLARS ARE TO BE POURED AT LEAST TWO (2) FEET FROM THE NEAREST PIPE JOINT.
4. LOOSE CONCRETE, EARTH, ETC. IS TO BE REMOVED FROM THE PIPE SURFACE.
5. CONCRETE SHALL HAVE A MINIMUM F' = 3,500 PSI (MSHA MIX NO. 3) AT 28 DAYS.
6. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. FINAL DESIGN TO BE PROVIDED BY STRUCTURAL ENGINEER. BOHLER ENGINEERING TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.

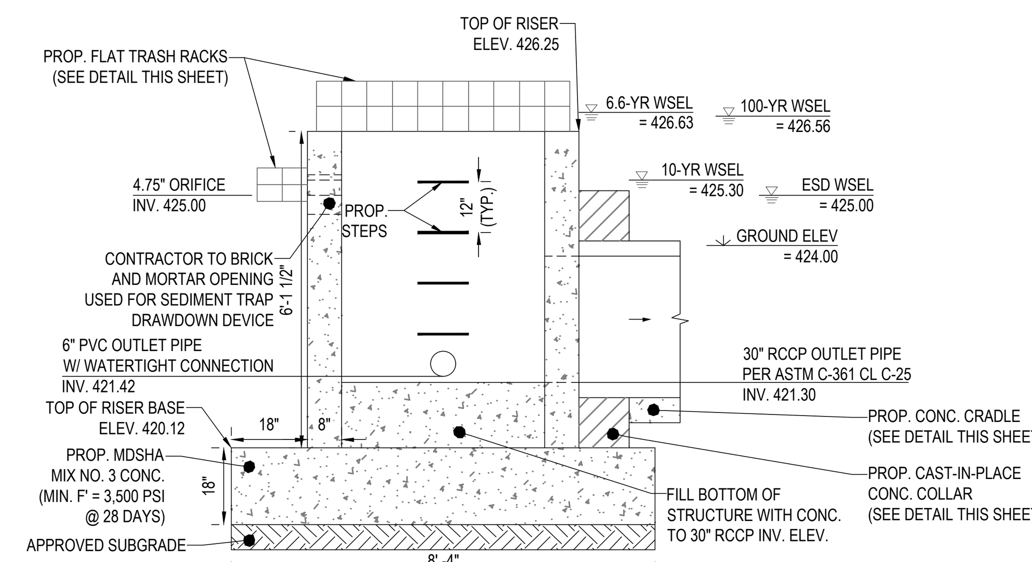


PLAN VIEW

WITHOUT TOP SLAB AND TRASH RACKS



SECTION A-A



SECTION B-B

TYPICAL RISER STRUCTURE DETAILS (STRUCTURE I-76)

NOT TO SCALE

NOTES:
1. DETAIL SHOWN IS FOR SCHEMATIC PURPOSES ONLY. STRUCTURES ARE INTENDED TO BE STANDARD PRECAST CONCRETE STRUCTURES. BOHLER TO BE HELD HARMLESS IN THE EVENT OF STRUCTURAL FAILURE.
2. DETAIL SHOWN IS FOR FINAL CONDITIONS ONLY. ANY TEMPORARY OPENING IN THE STRUCTURE USED FOR SEDIMENT CONTROL IS TO BE PERMANENTLY SEALED WITH BRICK AND MORTAR.

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

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SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
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ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 — GRID: 15 — ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:
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FOR
BETHANY GLEN - ARAH
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LOTS 1 THRU 116 AND
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B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
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SHEET TITLE:
SWM NOTES & DETAILS

SHEET NUMBER:
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F-22-033

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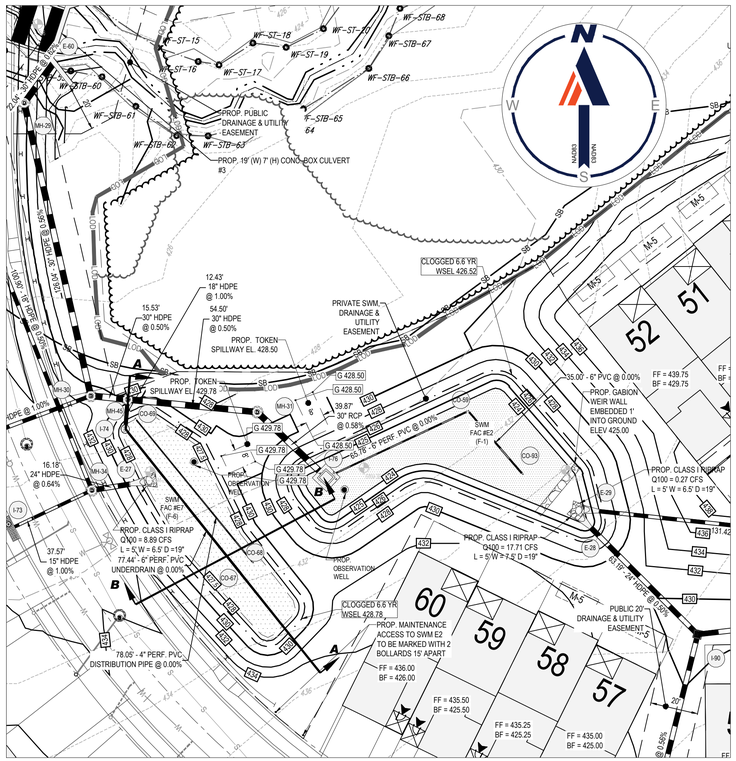
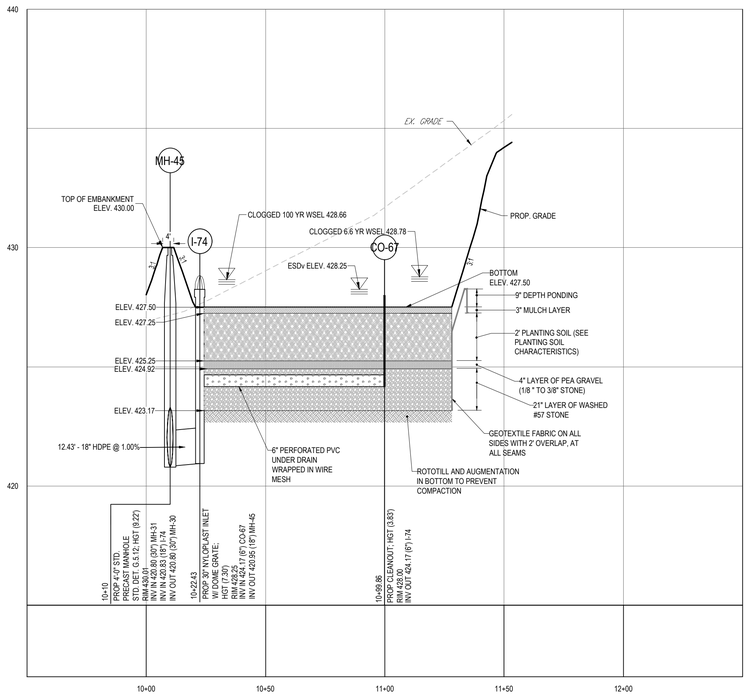


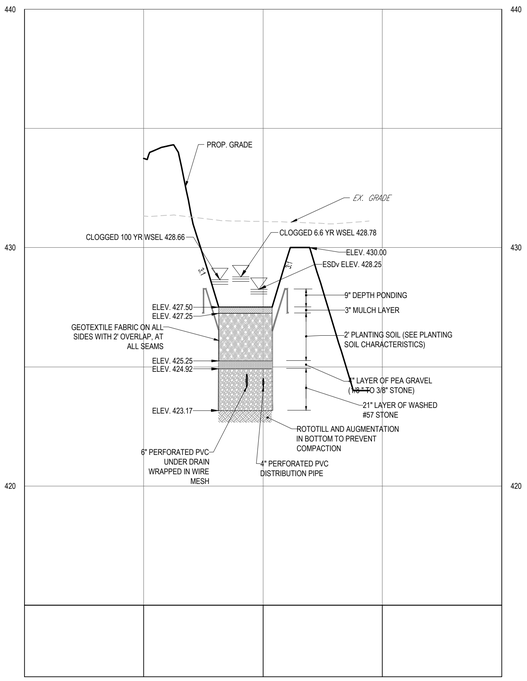
PLAN VIEW - SWM FACILITY #E7 - BIORETENTION (F-6)

SCALE: 1 = 30'



SECTION A-A - SWM FACILITY #E7 - BIORETENTION (F-6)

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



SECTION B-B - SWM FACILITY #E7 - BIORETENTION (F-6)

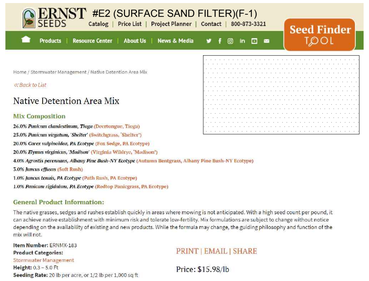
SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

BIORETENTION AREAS PLANTING SCHEDULE

SPECIES		TYPE	VEGETATION TYPE	SPACING	SIZE	FACILITY E7 (2356 S.F.)
BOTANICAL NAME	COMMON NAME					
CLETHERA ALNIFOLIA	SWEET PEPPERBUSH	SHRUB	FAC+	30" O.C.	1 GAL. CONT.	41
CORNUS AMMOMUM	SILKY DOGWOOD	SHRUB	FACW	30" O.C.	1 GAL. CONT.	41
RUDBECKIA HIRTA	BLACK EYE SUSAN	PERENNIAL	FACU	12" O.C.	PLUG	262
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	PERENNIAL	FACW	12" O.C.	PLUG	262
RUDBECKIA LACINIATA	TALL CONEFLOWER	PERENNIAL	FACW	12" O.C.	PLUG	262
JUNCUS EFFUSUS	SOFT RUSH	PERENNIAL	FACW+	12" O.C.	PLUG	524
SCIRPUS ACUTUS	HARDSTEMMED BULLRUSH	PERENNIAL	OBL	12" O.C.	PLUG	524

NOTES:
1) ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE C SOIL STABILIZATION MATTING (SSM)
2) ALL PROPOSED FOREBAYS TO BE SODDED

NOTE: ALL FACILITY SIDE SLOPES TO BE PLANTED WITH TURFGRASS ESTABLISHMENT AND TYPE B SOIL STABILIZATION MATTING (SSM)



APPROVED: DEPARTMENT OF PUBLIC WORKS	
Developed by:	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	6/12/2024
Developed by:	DATE
CHIEF, DIVISION OF LAND DEVELOPMENT	6/12/2024
Developed by:	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONCEPTS OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED TO ANY PURPOSE, IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE NO. 3697
PROFESSIONAL CERTIFICATION.
I, ERIC R. MCWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

30 15 7.5 0 30
1"= 30'

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:
53 of 117

F-22-033

Mar 19, 2024
H:\SMD\152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SWMD - 2 - LAYOUT 1\D- SWM NOTES & DETAILS

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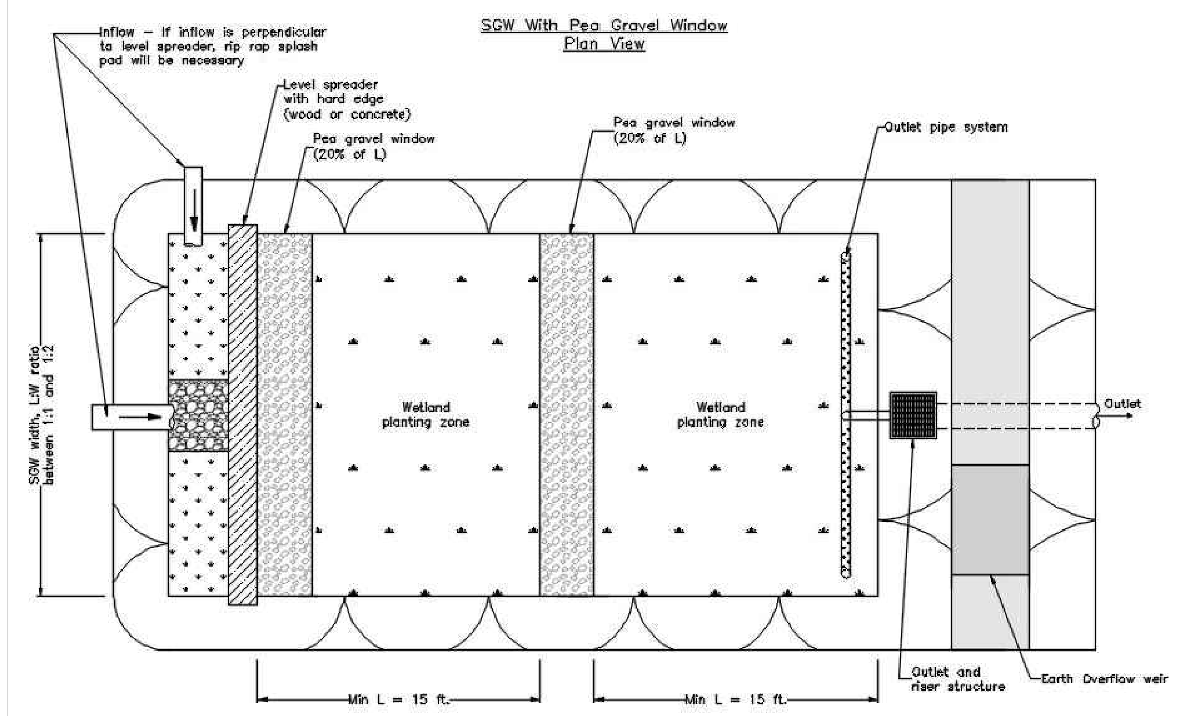
CONSTRUCTION SPECIFICATIONS FOR SUBMERGED GRAVEL WETLAND FACILITY

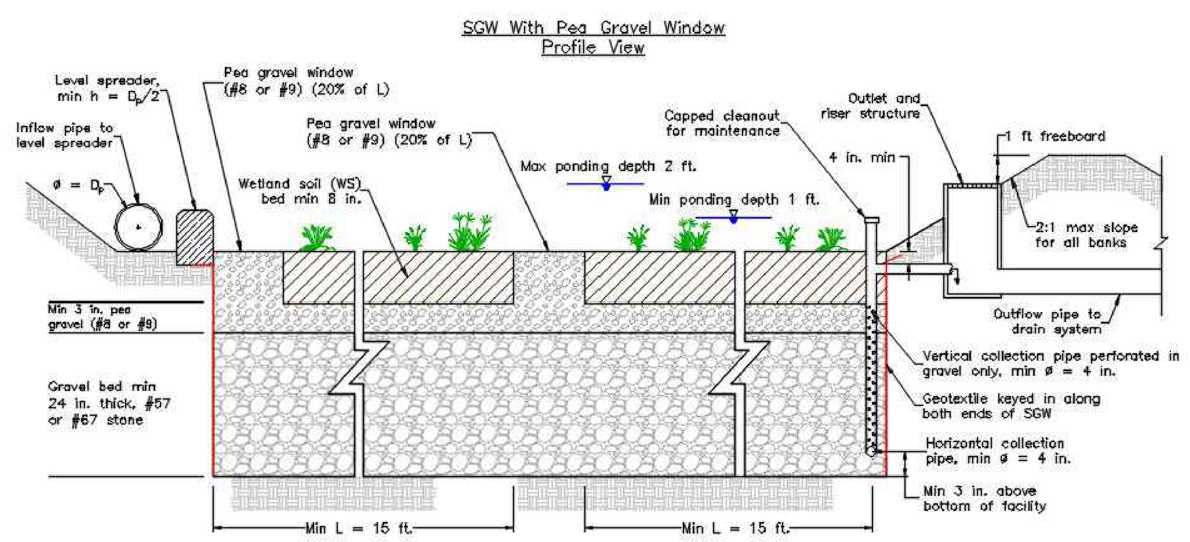
1. UNDERDRAIN INSTALLATION: GRAVEL FOR THE UNDERDRAIN SYSTEM SHOULD BE CLEAN, WASHED, AND FREE OF FINES. UNDERDRAIN PIPES SHOULD BE CHECKED TO ENSURE THAT BOTH THE MATERIAL AND PERFORATIONS MEET SPECIFICATIONS. THE UPSTREAM ENDS OF THE UNDERDRAIN PIPE SHOULD BE CAPPED PRIOR TO INSTALLATION.
2. FILTER MEDIA INSTALLATION: BSM MAY BE MIXED ON-SITE BEFORE PLACEMENT. HOWEVER, BSM SHOULD NOT BE PLACED UNDER SATURATED CONDITIONS. BSM SHOULD BE PLACED AND GRADED USING EXCAVATORS OR BACKHOES OPERATING ADJACENT TO THE PRACTICE AND BE PLACED IN HORIZONTAL LAYERS (12 INCHES PER LIFT MAXIMUM). PROPER COMPACTION OF THE BSM WILL OCCUR NATURALLY. SPRAYING OR SPRINKLING WATER ON EACH LIFT UNTIL SATURATED MAY QUICKEN SETTLING TIMES.
3. LANDSCAPE INSTALLATION: THE OPTIMUM PLANTING TIME IS DURING THE FALL. SPRING PLANTING IS ALSO ACCEPTABLE BUT MAY REQUIRE WATERING.



TYPICAL SUBMERGED GRAVEL WETLAND PLAN VIEW
NOT TO SCALE

GRAVEL WETLAND: Operation and Maintenance

- During the first year of operation, inspections should be conducted after every major storm and poorly established areas revegetated
- Sediment accumulation in the pretreatment areas should be removed as necessary.
- Signs of uneven flow distribution within the wetland may mean that the gravel or underdrain is clogged. The gravel and/or underdrain may need to be removed, cleaned and replaced.
- A dense stand of wetland vegetation should be maintained throughout the life of the facility with plantings replaced as needed.
- Inlets and outlets to each submerged gravel wetland cell should be free from debris to prevent clogging.
- Erosion at inflow points should be repaired. Flow splitters should be functional to prevent bypassing of the facility.



TYPICAL SUBMERGED GRAVEL WETLAND PROFILE VIEW
NOT TO SCALE

B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION, RAIN GARDENS, LANDSCAPE INFILTRATION, AND INFILTRATION BERMS

1. **MATERIAL SPECIFICATIONS**

   THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

2. **FILTERING MEDIA OR PLANTING SOIL**

   THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICROBIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.

   THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

   SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION)

   ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (30%), COARSE SAND (30%), AND COMPOST (40%).

   CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.

   PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED INTO THE SOIL TO INCREASE OR DECREASE PH.

   THERE SHALL BE AT LEAST ONE SOIL TEST PER PROJECT. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH, AND ADDITIONAL TESTS OF ORGANIC MATTER, AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

3. **COMPACTION**

   IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE APPENDIX B.4. CONSTRUCTION SPECIFICATIONS FOR ENVIRONMENTAL SITE DESIGN PRACTICES B.4.5 SUPP. 1 EXCAVATED USING A LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

   COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS A CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

   ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE.

   WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.

   WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

4. **PLANT MATERIAL**

   RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

5. **PLANT INSTALLATION**

   COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.

   ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION.

   TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.

   GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

   THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS DEFEATS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

6. **UNDERDRAINS UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:**

   PIPE- SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTMF 758, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OR HDPE).

   PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE ⅜" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A ¼" (NO. 4 OR 4X4) GALVANIZED HARDWARE CLOTH.

   GRAVEL - THE GRAVEL LAYER (NO. 57 STONE PREFERRED) SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.

   THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.

   A RIGID, NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,0000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.

   A 4" LAYER OF PEA GRAVEL (⅛" TO ⅜" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES INTO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".

   THE MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

7. **MISCELLANEOUS**

   THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

OPERATION AND MAINTENANCE SCHEDULE FOR MICRO-BIORETENTION FACILITIES

1. THE STORMWATER MANAGEMENT FACILITIES ARE PRIVATELY OWNED AND IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO PERIODICALLY INSPECT AND CLEAN THE FACILITY TO MAINTAIN IT'S OPERATION AND FUNCTION.
2. THE MICRO-BIORETENTION FACILITIES SHALL BE INSPECTED YEARLY AT A MINIMUM AND AFTER ESPECIALLY SEVERE STORM EVENTS.
3. WHEN SEDIMENT ACCUMULATION OF MORE THAN 1" IS OBSERVED OR ANY DEBRIS THAT MIGHT OBSTRUCT THE OUTFALL IS OBSERVED, THE FACILITIES SHALL BE CLEANED. THE OWNER SHALL FOLLOW PROPER CLEANING PROCEDURES AND PROPERLY DISPOSE OF THE REMOVED MATERIAL AND LIQUID.
4. THE TOP FEW INCHES OF MEDIA SHOULD BE REMOVED AND REPLACED WHEN WATER PONDS FOR MORE THAN 24 HOURS.
5. THE 3" MULCH LAYER SHALL BE REPLACED ANNUALLY OR IF WATER PONDS FOR MORE THAN 24 HRS.
6. OCCASIONAL PRUNING AND REPLACEMENT OF DEAD VEGETATION IS NECESSARY. IF SPECIFIC PLANTS ARE NOT SURVIVING, MORE APPROPRIATE SPECIES SHOULD BE USED. WATERING MAY BE REQUIRED DURING PROLONGED DRY PERIODS.
7. THE INLET AND OUTLET PIPES SHALL BE CHECKED FOR ANY OBSTRUCTIONS AT LEAST ONCE EVERY SIX MONTHS. IF OBSTRUCTIONS ARE FOUND, THE OWNER SHALL HAVE THEM REMOVED AND PROPERLY DISPOSED OF.
8. STORM DRAINAGE SYSTEMS - THE STORMWATER MANAGEMENT FACILITIES INCLUDING THE INLETS AND STORMWATER PIPING ON THIS SITE SHALL BE MAINTAINED IN PROPER WORKING ORDER IN ACCORDANCE WITH THESE PLANS AND PER THE RECOMMENDATION OF THE STRUCTURE(S) MANUFACTURER(S). MAINTENANCE OF THESE STORMWATER MANAGEMENT FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER UPON WHOSE PROPERTY THE FACILITIES ARE LOCATED.
9. ALL ONSITE INLETS, MANHOLES, AND STORMWATER PIPING SHALL BE CLEARED OF DEBRIS EVERY THREE (3) MONTHS OR WHEN ACCUMULATION HINDERS OPERATION OF THE FACILITY.
10. ALL SEDIMENT/DEBRIS/OIL REMOVED FROM THE STORMWATER MANAGEMENT SYSTEM SHALL BE DISPOSED PER LOCAL, STATE, AND FEDERAL STANDARDS.
11. SHOULD ONSITE EROSION OCCUR FROM THE LANDSCAPED AREAS, SOURCE OF EROSION SHALL BE IMMEDIATELY STABILIZED AND THE INLETS, MANHOLES, AND STORMWATER PIPING SHALL BE CHECKED FOR SEDIMENT ACCUMULATION AND CLEARED IF ACCUMULATION OF SEDIMENT EXISTS.
12. INSPECTION REPORTS FOR THE MICRO-BIORETENTION FACILITIES TO BE MAINTAINED BY THE PROPERTY OWNER SHALL INCLUDE:

    A. DATE OF INSPECTION

    B. NAME OF INSPECTOR

    C. AN ASSESSMENT OF THE QUALITY OF THE STORMWATER MANAGEMENT SYSTEM RELATED TO ESD TREATMENT PRACTICE EFFICIENCY AND THE CONTROL OF RUNOFF TO THE MAXIMUM EXTENT PRACTICABLE.

    D. CONDITION OF VEGETATION AND FILTER MEDIA, INLET AND OUTLET CHANNELS OR STRUCTURES, UNDERGROUND DRAINAGE, SEDIMENT AND DEBRIS ACCUMULATION IN STORAGE AREA, ANY NONSTRUCTURAL PRACTICES TO THE EXTENT PRACTICABLE, AND ANY OTHER ITEM THAT COULD AFFECT THE PROPER FUNCTION OF THE STORMWATER MANAGEMENT SYSTEM.

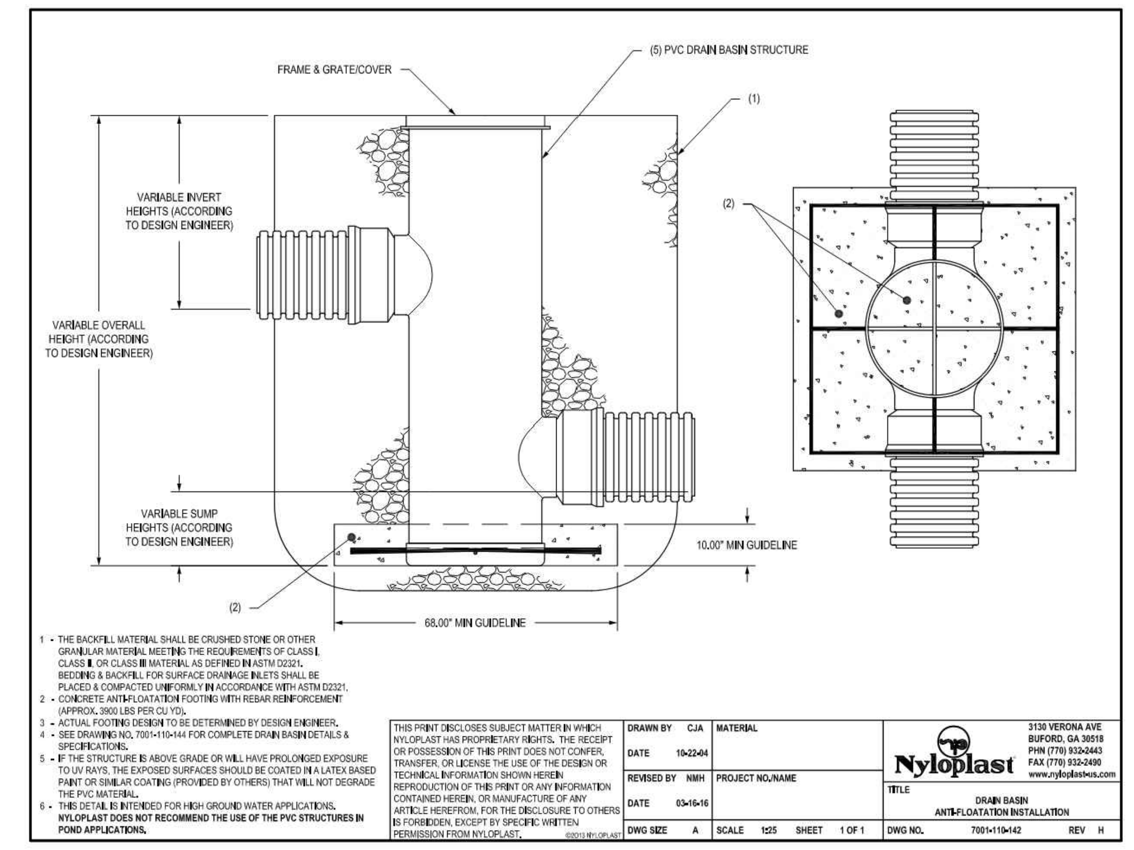
    E. DESCRIPTION OF NEEDED MAINTENANCE
13. UPON NOTIFYING AN OWNER OF INSPECTION RESULTS, THE OWNER SHALL HAVE 30 DAYS TO CORRECT THE DEFICIENCIES DISCOVERED. THE COUNTY SHALL CONDUCT A SUBSEQUENT INSPECTION TO ENSURE COMPLETION OF REPAIRS.

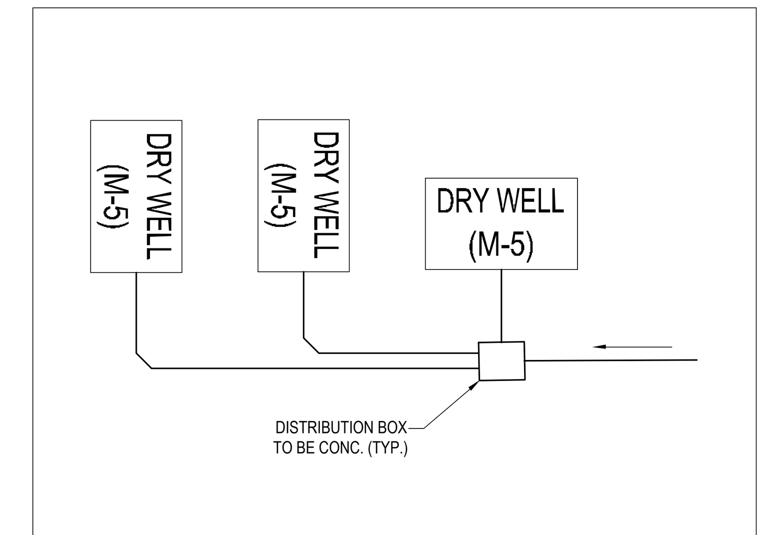
MICRO-BIORETENTION CONSTRUCTION SPECIFICATIONS

1. EROSION AND SEDIMENT CONTROL: MICRO-BIORETENTION PRACTICES SHOULD NOT BE CONSTRUCTED UNTIL THE CONTRIBUTING DRAINAGE AREA IS STABILIZED. IF THIS IMPRACTICAL, RUN-OFF FROM DISTURBED AREAS SHALL BE DIVERTED AND NO SEDIMENT CONTROL PRACTICES SHALL BE USED NEAR THE PROPOSED LOCATION.
2. SOIL COMPACTION: EXCAVATION SHOULD BE CONDUCTED IN DRY CONDITIONS WITH EQUIPMENT LOCATED OUTSIDE OF THE PRACTICE TO MINIMIZE BOTTOM AND SIDEWALL COMPACTION. ONLY LIGHTWEIGHT, LOW GROUND-CONTACT EQUIPMENT SHOULD BE USED WITHIN MICRO-BIORETENTION PRACTICES AND THE BOTTOM SCARIFIED BEFORE INSTALLING UNDERDRAINS AND FILTERING MEDIA.
3. UNDERDRAIN INSTALLATION: GRAVEL FOR THE UNDERDRAIN SYSTEM SHOULD BE CLEAN, WASHED, AND FREE OF FINES. UNDERDRAIN PIPES SHOULD BE CHECKED TO ENSURE THAT BOTH THE MATERIAL AND PERFORATIONS MEET SPECIFICATIONS. THE UPSTREAM ENDS OF THE UNDERDRAIN PIPE SHOULD BE CAPPED PRIOR TO INSTALLATION.
4. FILTER MEDIA INSTALLATION: BIORETENTION SOILS MAY BE MIXED ON-SITE BEFORE PLACEMENT. HOWEVER, SOILS SHOULD NOT BE PLACED UNDER SATURATED CONDITIONS. THE FILTER MEDIA SHOULD BE PLACED AND GRADED USING EXCAVATORS OR BACKHOES OPERATION ADJACENT TO THE PRACTICE AND BE PLACED IN HORIZONTAL LAYERS (12 INCHES PER LIFT MAXIMUM). PROPER COMPACTION OF THE MEDIA WILL OCCUR NATURALLY. SPRAYING OR SPRINKLING WATER ON EACH LIFT UNTIL SATURATED MAY QUICKEN SETTLING TIMES.
5. LANDSCAPE INSTALLATION: THE OPTIMUM PLANTING TIME IS DURING THE FALL. SPRING PLANTING IS ALSO ACCEPTABLE BUT MAY REQUIRE WATERING.

INSPECTION OF MICRO-BIORETENTION FACILITIES

1. THE DEVELOPER SHALL NOTIFY ANNE ARUNDEL COUNTY AT LEAST 48 HOURS BEFORE COMMENCING ANY WORK IN CONJUNCTION WITH SITE DEVELOPMENT, THE STORMWATER MANAGEMENT PLAN, AND UPON COMPLETION OF THE PROJECT.
2. REGULAR INSPECTIONS SHALL BE MADE AND DOCUMENTED FOR EACH ESD PLANNING TECHNIQUE AND PRACTICE AT THE STAGES OF CONSTRUCTION SPECIFIED IN THE DESIGN MANUAL BY THE CERTIFYING ENGINEER. AT A MINIMUM, ALL ESD AND OTHER NONSTRUCTURAL PRACTICES SHALL BE INSPECTED UPON COMPLETION OF FINAL GRADING, THE ESTABLISHMENT OF PERMANENT STABILIZATION, AND BEFORE ISSUANCE OF USE AND OCCUPANCY APPROVAL.
3. WRITTEN INSPECTION REPORTS SHALL INCLUDE:
   A. THE DATE AND LOCATION OF THE INSPECTION;
   B. WHETHER CONSTRUCTION WAS IN COMPLIANCE WITH THE APPROVED STORMWATER MANAGEMENT PLAN;
   C. ANY VARIATIONS FROM THE APPROVED CONSTRUCTION SPECIFICATIONS; AND
   D. ANY VIOLATIONS THAT EXIST.
4. THE OWNER/DEVELOPER AND ON-SITE PERSONNEL SHALL BE NOTIFIED IN WRITING WHEN VIOLATIONS ARE OBSERVED. WRITTEN NOTIFICATION SHALL DESCRIBE THE NATURE OF THE VIOLATION AND THE REQUIRED CORRECTIVE ACTION.
5. NO WORK SHALL PROCEED ON THE NEXT PHASE OF DEVELOPMENT UNTIL THE CERTIFYING ENGINEER INSPECTS AND APPROVES THE WORK PREVIOUSLY COMPLETED, AND FURNISHES THE COUNTY ENGINEER AND THE OWNER/DEVELOPER WITH THE REQUIRED INSPECTION REPORTS AS SOON AS POSSIBLE AFTER COMPLETION OF EACH REQUIRED INSPECTION.
6. AT A MINIMUM, REGULAR INSPECTIONS SHALL BE MADE AND DOCUMENTED BY THE CERTIFYING ENGINEER AT THE FOLLOWING SPECIFIED STAGES OF CONSTRUCTION:
   A. DURING EXCAVATION TO SUBGRADE;
   B. DURING PLACEMENT AND BACKFILL OF UNDER DRAIN SYSTEMS;
   C. DURING PLACEMENT OF GEOTEXTILES AND ALL FILTER MEDIA;
   D. DURING CONSTRUCTION OF APPURTENANT CONVEYANCE SYSTEMS SUCH AS FLOW DIVERSION STRUCTURES, PRE-FILTERS AND FILTERS, INLETS, OUTLETS, ORIFICES, AND FLOW DISTRIBUTION STRUCTURES; AND
   E. UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION.





GENERIC DISTRIBUTION BOX - TYPICAL
NOT TO SCALE

MATERIALS SPECIFICATIONS FOR SUBMERGED GRAVEL WETLANDS

MATERIAL	SPECIFICATIONS	SIZE	NOTES
PLANTINGS	SEE LANDSCAPE PLAN	N/A	PLANTINGS ARE SITE-SPECIFIC
BIORETENTION SOIL MIX	MDSHA SPECIFICATION 920	N/A	
WINDOW STONE	ASTM-D-448	WASHED NO. 7	
GEOTEXTILE	CLASS 'C - APPARENT OPENING SIZE (ASTM D-4571), GRAB TENSILE STRENGTH (ASTM D-4632), PUNCTURE RESISTANCE (ASTM D-4833)	N/A	SIDES ONLY, NOT ON BOTTOM UNLESS SPECIFIED ON PLANS
UNDERDRAIN AND RESERVOIR GRAVEL	AASHTO M-43	WASHED NO. 8	
UNDERDRAIN PIPING AND DRAWDOWN PIPE	SLOTTED PVC OR SLOTTED HDPE TYPE 'SP' PIPES SOLID SCHEDULE 40 PVC OR HDPE TYPE 'S'		ALL PIPES MUST BE DOUBLE WALLED (SMOOTH CORE) AND SLOTTED (NO CIRCULAR HOLES)
POURED IN PLACE CONCRETE (IF REQUIRED)	MSHA MIX NO. 3; f'c = 3500 psi @ 28 DAYS, NORMAL WEIGHT, AIR-ENTRAINED; REINFORCING TO MEET ASTM-615-60	N/A	ON-SITE TESTING OF POUR-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 350.R/89; VERTICAL LOADING [H-10 OR H-20]; ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OF POTENTIAL CRACKING
SAND	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.
GABION BASKET	MIN 11 GAUGE WIRE		
GABION STONES		4" TO 7" STONES	

TABLE B.4.1 MATERIALS SPECIFICATIONS FOR MICRO-BIORETENTION, RAIN GARDENS & LANDSCAPE INFILTRATION

MATERIAL	SPECIFICATIONS	SIZE	NOTES
PLANTINGS	SEE APPENDIX A, TABLE A.4	N/A	PLANTINGS ARE SITE-SPECIFIC
PLANTING SOIL [2' TO 4']	LOAMY SAND 60-65% COMPOST 35-40% OR SANDY LOAM 30% COARSE SAND 30% COMPOST 40%	N/A	USDA SOIL TYPES LOAMY SAND OR SANDY LOAM; CLAY CONTENT < 5%
ORGANIC CONTENT	MIN. 10% BY DRY WEIGHT (ASTM-D-2974)		
MULCH	SHREDDED HARDWOOD		AGED 6 MONTHS, MINIMUM; NO PINE OR WOOD CHIPS
STONE APRON / INFLOW PROTECTION	CLASS I RIPRAP		
BRIDGING LAYER / STONE WINDOW	PEA GRAVEL: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	TOP OF WINDOW TO BE CAPPED WITH 4" OF WASHED COBBLES (1" - 3" IN SIZE)
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, OBSERVATION WELLS, AND CLEANOUTS	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" GRAVEL ABOVE AND BENEATH PIPES; MAY USE HDPE MEETING AASHTO M294.
POURED IN PLACE CONCRETE (IF REQUIRED)	MSHA MIX NO. 3; f'c = 3500 psi @ 28 DAYS, NORMAL WEIGHT, AIR-ENTRAINED; REINFORCING TO MEET ASTM-615-60	N/A	ON-SITE TESTING OF POUR-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 350.R/89; 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.
JUTE MATTING	6 - 9 MONTHS BEFORE BIODEGRADATION	4' WIDE ROLLS	MANUFACTURER: GRANITE ENVIRONMENTAL, PLACE OVER MULCH AT BOTTOM OF FACILITIES

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.: WP-19-118, ECP-19-041, BA-CASE NO. 17-018C, ECP-21-017, WP-21-064, SP-19-005, F-22-033, WP-21-127, 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
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B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

F-22-033

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STORMWATER MANAGEMENT CONSTRUCTION SPECIFICATIONS

THESE SPECIFICATIONS ARE APPROPRIATE TO ALL PONDS WITHIN THE SCOPE OF THE STANDARD FOR PRACTICE MD-378. ALL REFERENCES TO ASTM AND AASHTO SPECIFICATIONS APPLY TO THE MOST RECENT VERSION.

SITE PREPARATION

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENT, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS AND SHARP BREAKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH, AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORMWATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

EARTH FILL

MATERIAL - THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUT OFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE CONSTRUCTION SUPERVISED BY A GEOTECHNICAL ENGINEER. MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE CAPABILITY TO SUPPORT VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

PLACEMENT - AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

COMPACTION - THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPS FOOT, RUBBER TIRED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

WHEN REQUIRED BY THE REVIEWING AGENCY THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN ±2% OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99 (STANDARD PROCTOR).

CUT OFF TRENCH - THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION, WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

EMBANKMENT CORE - THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITION, THE CORE SHALL BE PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE, UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE.

STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI; 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM PH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM-CM. MATERIAL SHALL BE PLACED SUCH THAT A MINIMUM OF 6" (MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE UNDER (BEDDING), OVER AND, ON THE SIDES OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE. UNDER NO IRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURAL BACKFILL (FLOWABLE FILL) ZONE SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

PIPE CONDUITS

ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION.

CORRUGATED METAL PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR CORRUGATED METAL PIPE:

1. MATERIALS - (POLYMER COATED STEEL PIPE) - STEEL PIPES WITH POLYMERIC COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF 0.01 INCH (10 MIL) ON BOTH SIDES OF THE PIPE. THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATIONS M-245 & M-246 WITH WATERTIGHT COUPLING BANDS OR FLANGES.

MATERIALS - (ALUMINUM COATED STEEL PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-274 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM COATED STEEL PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT.

MATERIALS - (ALUMINUM PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-196 OR M-211 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT. HOT DIP GALVANIZED BOLTS MAY BE USED FOR CONNECTIONS. THE PH OF THE SURROUNDING SOILS SHALL BE BETWEEN 4 AND 9.

2. COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC., MUST BE COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. METALS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT LEAST 24 MILS IN THICKNESS.

3. CONNECTIONS - ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATERTIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ANTI-SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATERTIGHT. DIMPLE BANDS ARE NOT CONSIDERED TO BE WATERTIGHT.

ALL CONNECTIONS SHALL USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE-ROLLED AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BANDWIDTH. THE FOLLOWING TYPE CONNECTIONS ARE ACCEPTABLE FOR PIPES LESS THAN 24 INCHES IN DIAMETER: FLANGES ON BOTH ENDS OF THE PIPE WITH A CIRCULAR 3/8 INCH CLOSED CELL NEOPRENE GASKET, PRE-PUNCHED TO THE FLANGE BOLT CIRCLE, SANDWICHED BETWEEN ADJACENT FLANGES; A 12-INCH WIDE STANDARD LAP TYPE BAND WITH 12-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET; AND A 12-INCH WIDE HUGGER TYPE BAND WITH ORING GASKETS HAVING A MINIMUM DIAMETER OF 1/2 INCH GREATER THAN THE CORRUGATION DEPTH. PIPES 24 INCHES IN DIAMETER AND LARGER SHALL BE CONNECTED BY A 24 INCH LONG ANNULAR CORRUGATED BAND USING A MINIMUM OF 4 (FOUR) RODS AND LUGS, 2 ON EACH CONNECTING PIPE END. A 24-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET WILL BE INSTALLED WITH 12 INCHES ON THE END OF EACH PIPE. FLANGED JOINTS WITH 3/8 INCH CLOSED CELL GASKETS THE FULL WIDTH OF THE FLANGE IS ALSO ACCEPTABLE.

HELICALLY CORRUGATED PIPE SHALL HAVE EITHER CONTINUOUSLY WELDED SEAMS OR HAVE LOCK SEAMS WITH INTERNAL CAULKING OR A NEOPRENE BEAD.

4. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

6. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS. REINFORCED CONCRETE PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR REINFORCED CONCRETE PIPE:

1. MATERIALS - REINFORCED CONCRETE PIPE SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM C-361.

2. BEDDING - REINFORCED CONCRETE PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING / CRADLE FOR THEIR ENTIRE LENGTH. THIS BEDDING / CRADLE SHALL CONSIST OF HIGH SLUMP CONCRETE PLACED UNDER THE PIPE AND UP THE SIDES OF THE PIPE AT LEAST 50% OF ITS OUTSIDE DIAMETER WITH A MINIMUM THICKNESS OF 6 INCHES. WHERE A CONCRETE CRADLE IS NOT NEEDED FOR STRUCTURAL REASONS, FLOWABLE FILL MAY BE USED AS DESCRIBED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

3. LAYING PIPE - BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL END UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL. AFTER THE JOINTS ARE SEALED FOR THE ENTIRE LINE, THE BEDDING SHALL BE PLACED SO THAT ALL SPACES UNDER THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

PLASTIC PIPE

THE FOLLOWING CRITERIA SHALL APPLY FOR PLASTIC PIPE:

1. MATERIALS - PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORMING TO ASTM D-1785 OR ASTM D-2241. CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, COUPLINGS AND FITTINGS SHALL CONFORM TO THE FOLLOWING: 4" – 10" INCH PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M252 TYPE S, AND 12" THROUGH 24" INCH SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S.

2. JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLETELY WATERTIGHT.

3. BEDDING -THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS. DRAINAGE DIAPHRAGMS - WHEN A DRAINAGE DIAPHRAGM IS USED, A REGISTERED PROFESSIONAL ENGINEER WILL SUPERVISE THE DESIGN AND CONSTRUCTION INSPECTION.

CONCRETE

CONCRETE SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 414, MIX NO. 3.

ROCK RIPRAP

ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 311.

GEOTEXTILE SHALL BE PLACED UNDER ALL RIPRAP AND SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 921.09, CLASS C.

CARE OF WATER DURING CONSTRUCTION

ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE AREAS TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL THE FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM REQUIRED EXCAVATIONS AND WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRE DRAINING THE WATER SUMPS FROM WHICH THE WATER SHALL BE PUMPED.

STABILIZATION

ALL BORROW AREAS SHALL BE GRADED TO PROVIDE PROPER DRAINAGE AND LEFT IN A SIGHTLY CONDITION. ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING AND MULCHING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

OPERATION AND MAINTENANCE

AN OPERATION AND MAINTENANCE PLAN IN ACCORDANCE WITH LOCAL OR STATE REGULATIONS WILL BE PREPARED FOR ALL PONDS. AS A MINIMUM, THE DAM INSPECTION CHECKLIST LOCATED IN APPENDIX A SHALL BE INCLUDED AS PART OF THE OPERATION AND MAINTENANCE PLAN AND PERFORMED AT LEAST ANNUALLY. WRITTEN RECORDS OF MAINTENANCE AND MAJOR REPAIRS NEEDS TO BE RETAINED IN A FILE. THE ISSUANCE OF A MAINTENANCE AND REPAIR PERMIT FOR ANY REPAIRS OR MAINTENANCE THAT INVOLVES THE MODIFICATION OF THE DAM OR SPILLWAY FROM ITS ORIGINAL DESIGN AND SPECIFICATIONS IS REQUIRED. A PERMIT IS ALSO REQUIRED FOR ANY REPAIRS OR RECONSTRUCTION THAT INVOLVE A SUBSTANTIAL PORTION OF THE STRUCTURE. ALL INDICATED REPAIRS ARE TO BE MADE AS SOON AS PRACTICAL.

B.3.B SPECIFICATIONS FOR BIORETENTION

1. MATERIAL SPECIFICATIONS

THE ALLOWABLE MATERIALS TO BE USED IN BIORETENTION AREA ARE DETAILED IN TABLE B.3.2.

2. PLANTING SOIL

THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE BIORETENTION AREA THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.

THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

PH RANGE	5.2 -7.0
ORGANIC MATTER	1.5 -4% (BY WEIGHT)
MAGNESIUM	35LB./AC
PHOSPHORUS (PHOSPHATE -P2O5)	75LB./AC
POTASSIUM (POTASH -K2O)	85LB./AC
SOLUBLE SALTS	NOT TO EXCEED 500 PPM

ALL BIORETENTION AREAS SHALL HAVE A MINIMUM OF ONE TEST. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH, PHOSPHORUS, AND POTASSIUM AND ADDITIONAL TESTS OF ORGANIC MATTER, AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOP SOIL WAS EXCAVATED.

SINCE DIFFERENT LABS CALIBRATE THEIR TESTING EQUIPMENT DIFFERENTLY, ALL TESTING RESULTS SHALL COME FROM THE SAME TESTING FACILITY.

SHOULD THE PH FALL OUT OF THE ACCEPTABLE RANGE, IT MAY BE MODIFIED (HIGHER) WITH LIME OR (LOWER) WITH IRON SULFATE PLUS SULFUR.

3. COMPACTION

IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF THE BIORETENTION AREA AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF BIORETENTION RUBBER TIRES WITH LARGE LUGS, OR HIGH PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS A CHISEL PLOW, RIPPER OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE.

WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER. FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.

WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/ LOADER WITH MARSH TRACKS.

4. PLANT MATERIAL

RECOMMENDED PLANT MATERIAL FOR BIORETENTION AREAS CAN BE FOUND IN APPENDIX A. SECTION A.2.3.

5. PLANT INSTALLATION

MULCH SHOULD BE PLACED TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.

ROOT STOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION.

TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.

GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS DEFEATS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

6. UNDERDRAINS

UNDERDRAINS ARE TO BE PLACED ON A 3'-0" WIDE SECTION OF FILTER CLOTH. PIPE IS PLACED NEXT, FOLLOWED BY THE GRAVEL BEDDING. THE ENDS OF UNDERDRAIN PIPES NOT TERMINATING IN AN OBSERVATION WELL SHALL BE CAPPED.

THE MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

7. MISCELLANEOUS

THE BIORETENTION FACILITY MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

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CHIEF, BUREAU OF HIGHWAYS — DATE

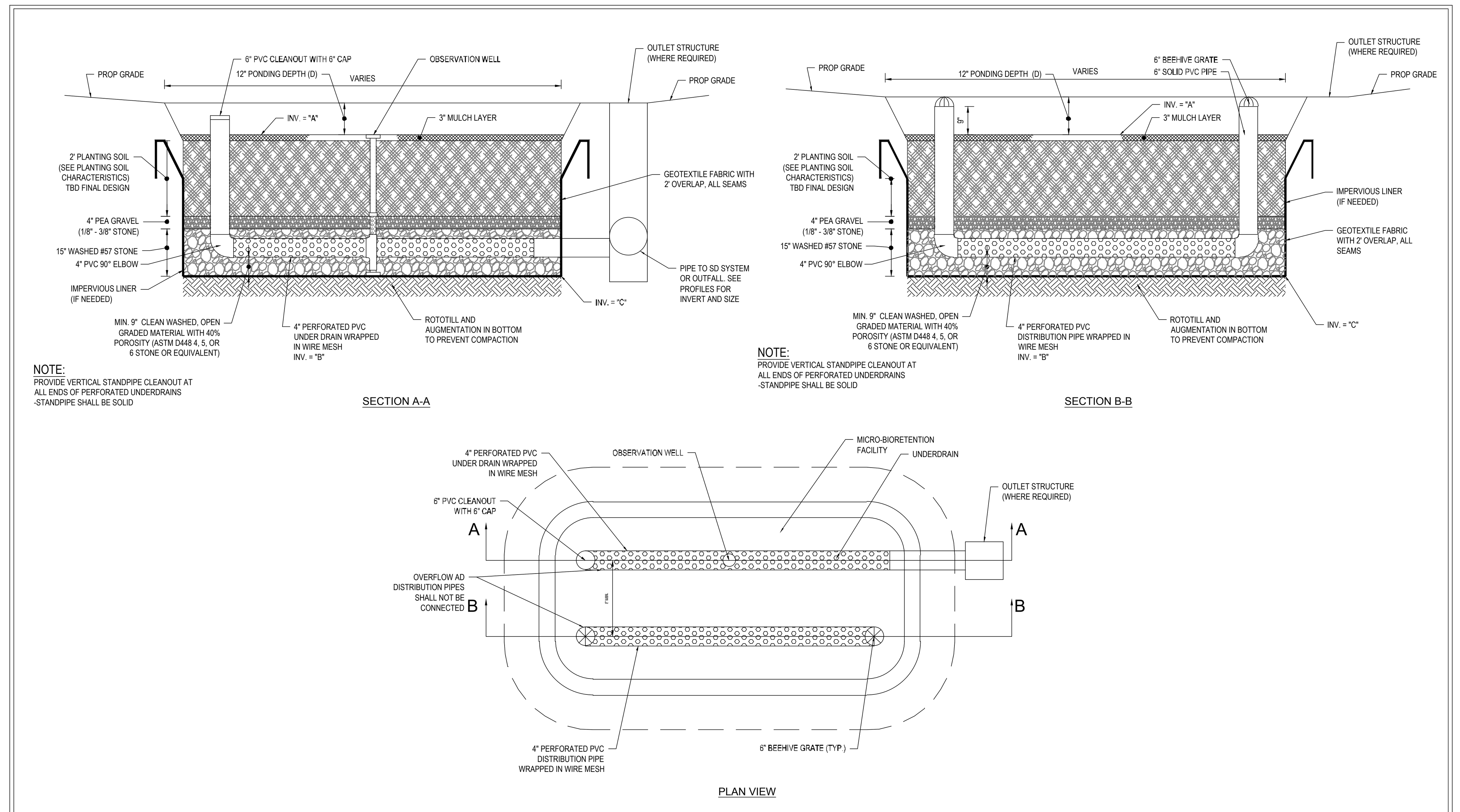
APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
[signature] 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

TABLE B.3.2 MATERIALS SPECIFICATIONS FOR BIORETENTION

MATERIAL	SPECIFICATIONS	SIZE	NOTES
PLANTINGS	SEE APPENDIX A, TABLE A.4	N/A	PLANTINGS ARE SITE-SPECIFIC
PLANTING SOIL	SAND 35-60% SILT 30-55% CLAY 10-25%	N/A	USDA SOIL TYPES LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDDED HARDWOOD		AGED 6 MONTHS, MINIMUM
PEA GRAVEL DIAPHRAGM AND CURTAIN DRAIN	PEA GRAVEL: ASTM-D-448 ORNAMENTAL STONE: WASHED COBBLES	PEA GRAVEL: NO. 6 STONE: 2" TO 5"	
GEOTEXTILE	CLASS "C" - APPARENT OPENING SIZE (ASTM-D-4751), GRAB TENSILE STRENGTH (ASTM-D-4632), PUNCTURE RESISTANCE (ASTM-D-4833)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAINS ONLY
UNDERDRAIN GRAVEL	AASHTO M-43	0.375" TO 0.75"	
UNDERDRAIN PIPING	F 758, TYPE PS 28 OR AASHTO M-278	4" TO 6" RIGID SCHEDULE 40 PVC OR SDR35	3/8" PERF. @ 6" ON CENTER, 4 HOLES PER ROW; MINIMUM OF 3" OF GRAVEL OVER PIPES; NOT NECESSARY UNDERNEATH PIPES
POURED IN PLACE CONCRETE (IF REQUIRED)	MSHA MIX NO. 3; F'c = 3500 PSI @ 28 DAYS, 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 SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND - DESIGN TO INCLUDE MEETING ACI CODE 350.R/89; VERTICAL LOADING [H-10 OR H-20]; ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OR POTENTIAL CRACKING
SAND [1' DEEP]	AASHTO-M-6 OR ASTM-C-33	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.

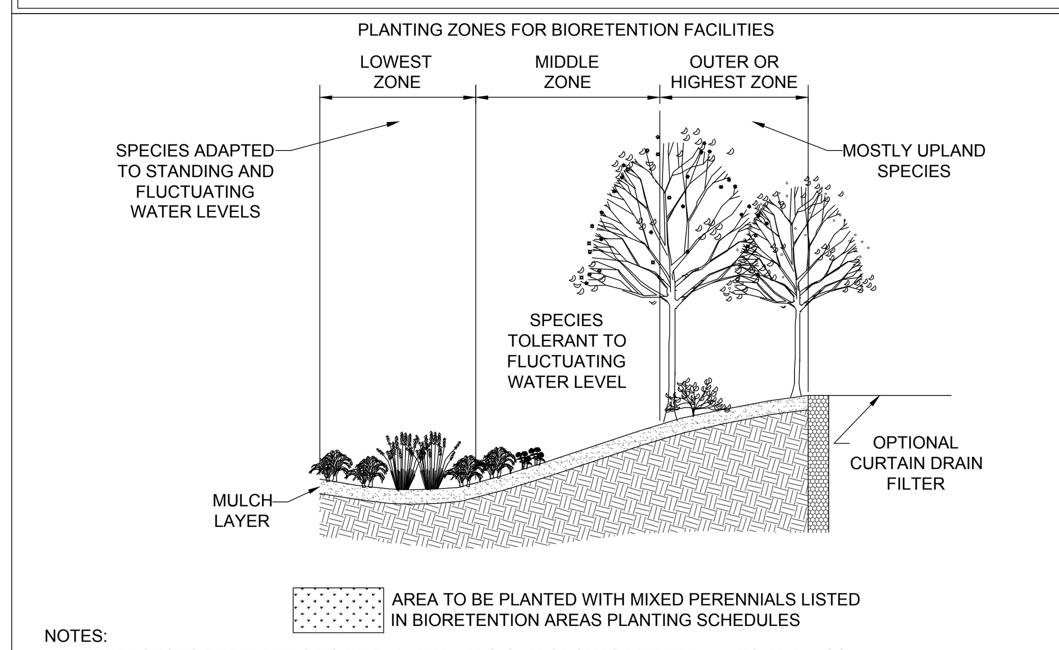
OPERATION AND MAINTENANCE SCHEDULE FOR MICRO-BIORETENTION (M-6), AND BIORETENTION (F-6)

1. THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II, TABLE A.4.1 AND 2.
2. THE OWNER SHALL PERFORM A PLANT IN THE SPRING AND IN THE FALL EACH YEAR. DURING THE INSPECTION, THE OWNER SHALL REMOVE DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT PLAN MATERIAL, TREAT DISEASED TREES AND SHRUBS AND REPLACE DEFICIENT STAKES AND WIRES.
3. THE OWNER SHALL INSPECT THE MULCH EACH SPRING. THE MULCH SHALL BE REPLACED EVERY TWO TO THREE YEARS. THE PREVIOUS MULCH LAYER SHALL BE REMOVED BEFORE THE NEW LAYER IS APPLIED.
4. THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.
5. THE OWNER SHOULD REMOVE AND REPLACE THE TOP FEW INCHES OF FILTER MEDIA IF WATER REMAINS IN THE FACILITY FOR LONGER THAN 24 HOURS FOLLOWING A STORM EVENT.



TYPICAL BIORETENTION (F-6) AND MICRO-BIORETENTION (M-6) FACILITY SECTION

NOT TO SCALE

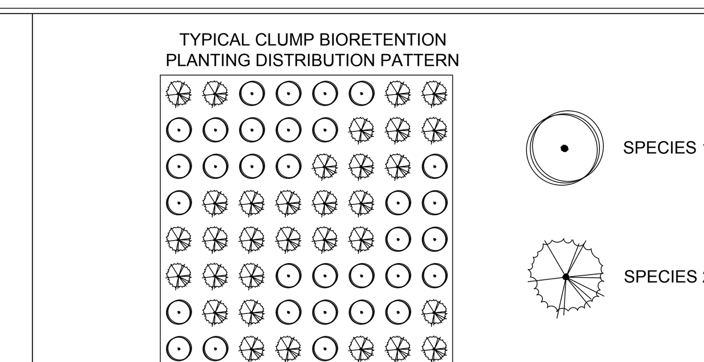


AREA TO BE PLANTED WITH MIXED PERENNIALS LISTED IN BIORETENTION AREAS PLANTING SCHEDULES

NOTES:
1. HERBACEOUS PERENNIALS TO BE PLANTED 12" O.C. IN GROUPS BETWEEN 15 TO 20 PLUGS
2. LANDSCAPE CONTRACTOR TO GROUP LIKE PLANTS TOGETHER IN EACH BED AS SHOWN IN PLANTING DISTRIBUTION PATTERN DETAIL.
3. ALL BIORETENTION AREAS ARE TO BE MULCHED WITH A 3" LAYER OF DOUBLE SHREDDED HARDWOOD BARK MULCH.
4. PLACEMENT OF THE PLANTING SOIL SHOULD BE IN 12" TO 18" LIFTS THAT ARE LOOSELY COMPACTED (TAMPED LIGHTLY WITH A BACKHOE BUCKET OR TRAVERSED BY DOZER TRACKS.

TYPICAL PLANTING FOR BIORETENTION AND MICROBIORETENTION AREAS

NOT TO SCALE



NOTE:
NATURALLY OCCURRING POPULATIONS TEND TO BE FOUND IN INFORMAL GROUPINGS. A CLUSTER OF PLANTS IS REALLY A MOSAIC OF DIFFERENT SPECIES GROUPS. THE OBJECTIVE IS TO SELECT THE APPROPRIATE SPECIES AND DISTRIBUTION PATTERN FOR A CHOSEN SITE THAT MIMIC NATURAL PATTERNS.

PLANTING DISTRIBUTION PATTERN DETAIL

NOT TO SCALE

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE No. 3697
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

NOTE: PROFESSIONAL LANDSCAPE ARCHITECT SEAL AND SIGNATURE VALID FOR BMP PLANTINGS ONLY.

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

— FOR —

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER//
901 DULANEY VALLEY ROAD, SUITE 801
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B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

F-22-033

Mar 19, 2024 H:\152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SWMD - 2---->LAYOUT: 55- SWM NOTES & DETAILS

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B.3.A SAND FILTER SPECIFICATIONS

1. MATERIAL SPECIFICATIONS FOR SAND FILTERS

THE ALLOWABLE MATERIALS FOR SAND FILTER CONSTRUCTION ARE DETAILED IN TABLE B.3.1.

2. SAND FILTER TESTING SPECIFICATIONS

UNDERGROUND SAND FILTERS, FACILITIES WITHIN SENSITIVE GROUNDWATER AQUIFERS, AND FILTERS DESIGNED TO SERVE URBAN HOT SPOTS ARE TO BE TESTED FOR WATER TIGHTNESS PRIOR TO PLACEMENT OF FILTER MEDIA. ENTRANCES AND EXITS SHOULD BE PLUGGED AND THE SYSTEM COMPLETELY FILLED WITH WATER TO DEMONSTRATE WATER TIGHTNESS. WATER TIGHTNESS MEANS NO LEAKAGE FOR A PERIOD OF 8 HOURS.

ALL OVERFLOW WEIRS, MULTIPLE ORIFICES AND FLOW DISTRIBUTION SLOTS ARE TO BE FIELD-TESTED TO VERIFY ADEQUATE DISTRIBUTION OF FLOWS.

3. SAND FILTER CONSTRUCTION SPECIFICATIONS

PROVIDE SUFFICIENT MAINTENANCE ACCESS (I.E., 12-FOOT-WIDE ROAD WITH LEGALLY RECORDED EASEMENT). VEGETATED ACCESS SLOPES ARE TO BE A MAXIMUM OF 10%; GRAVEL SLOPES TO 15%; PAVED SLOPES TO 25%.

ABSOLUTELY NO RUNOFF IS TO ENTER THE FILTER UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED.

SURFACE OF FILTER BED IS TO BE LEVEL.

ALL UNDERGROUND SAND FILTERS SHOULD BE CLEARLY DELINEATED WITH SIGNS SO THAT THEY MAY BE LOCATED WHEN MAINTENANCE IS DUE.

SURFACE SAND FILTERS MAY BE PLANTED WITH APPROPRIATE GRASSES; SEE APPENDIX A.

"POCKET" SAND FILTERS (AND RESIDENTIAL BIORETENTION FACILITIES TREATING AREAS LARGER THAN AN ACRE) SHALL BE SIZED WITH A STONE "WINDOW" THAT COVERS APPROXIMATELY 10% OF THE FILTER AREA. THIS "WINDOW" SHALL BE FILLED PEA GRAVEL (3/4 INCH STONE).

4. SPECIFICATIONS PERTAINING TO UNDERGROUND SAND FILTERS (F-2)

PROVIDE MANHOLE AND/OR GRATES TO ALL UNDERGROUND AND BELOW GRADE STRUCTURES. MANHOLES SHALL BE IN COMPLIANCE WITH STANDARD SPECIFICATIONS FOR EACH COUNTY BUT DIAMETERS SHOULD BE 30" MINIMUM (TO COMPLY WITH OSHA CONFINED SPACE REQUIREMENTS). ALUMINUM AND STEEL LOUVERED DOORS ARE ALSO ACCEPTABLE. TEN INCH WIDE (MINIMUM) MANHOLE STEPS (12" O.C.) SHALL BE CAST IN PLACE OR DRILLED AND MORTARED INTO THE WALL BELOW EACH MANHOLE. A 5' MINIMUM HEIGHT CLEARANCE (FROM THE TOP OF THE SAND LAYER TO THE BOTTOM OF THE UPPER/SURFACE SLAB) IS REQUIRED FOR ALL PERMANENT UNDERGROUND STRUCTURES. LIFT RINGS ARE TO BE SUPPLIED TO REMOVE/REPLACE TOP SLABS ON PRE-FABRICATED STRUCTURES. MANHOLE COVERS SHOULD ALLOW FOR PROPER VENTILATION.

UNDERGROUND SAND FILTERS SHOULD BE CONSTRUCTED WITH A GATE VALVE LOCATED JUST ABOVE THE TOP OF THE FILTER BED FOR DEWATERING IN THE EVENT THAT CLOGGING OCCURS.

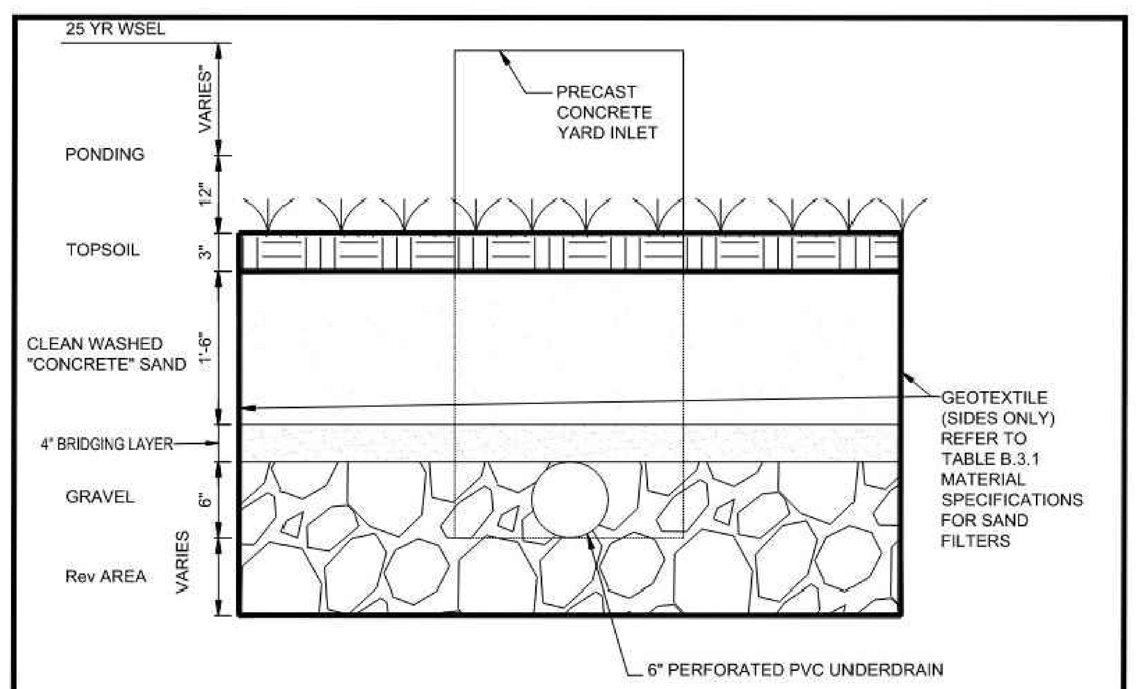
UNDERGROUND SAND BEDS SHALL BE PROTECTED FROM TRASH ACCUMULATION BY A WIDE MESH GEOTEXTILE SCREEN TO BE PLACED ON THE SURFACE OF THE SAND BED; SCREEN IS TO BE ROLLED UP, REMOVED, CLEANED AND RE-INSTALLED DURING MAINTENANCE OPERATIONS.

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	N/A	THE MATERIAL MUST BE REED-SEDGE 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 #80 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 LAYER
IMPERMEABLE LINER (IF REQUIRED)	ASTM-D-4833 (PUNCTURE STRENGTH -125 LB.) ASTM-D-4632 (TENSILE STRENGTH - 300 LB.)	30 MIL THICKNESS	LINER TO BE ULTRAVIOLET RESISTANT. A GEOTEXTILE FABRIC SHOULD BE USED TO PROTECT THE LINER FROM PUNCTURE
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" OF GRAVEL OVER PIPES; NOT NECESSARY UNDERNEATH PIPES
CONCRETE (CAST-IN-PLACE)	MSHA STANDARDS AND SPECS. SECTION 902, MIX NO. 3, F'C = 3500 PSI, NORMAL WEIGHT, AIR-ENTRAINED; RE-INFORCING 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 PRECAST) 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

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SURFACE STORMWATER FILTRATION SYSTEMS (F-1, F-4, AND F-5)

1. The stormwater wetland facility shall be inspected annually and after major storms. Inspections shall be performed during wet weather to determine if the facility is functioning properly.
2. The top and side slopes of the embankment shall be mowed a minimum of once per year, when vegetation reaches 18" in height or as needed.
3. Filters that have a grass cover shall be mowed a minimum of three (3) times per growing season to maintain a maximum grass height of less than 12 inches.
4. Debris and litter shall be removed during regular mowing operations and as needed.
5. Visible signs of erosion in the facility shall be repaired as soon as it is noticed.
6. Remove silt when it exceeds four (4) inches deep in the forebay.
7. When water ponds on the surface of the filter bed for more than 72 hours, the top few inches of discolored material shall be replaced with fresh material. Proper cleaning and disposal of the removed materials and liquid must be followed by the owner.
8. A logbook shall be maintained to determine the rate at which the facility drains.
9. The maintenance logbook shall be available to Howard County for inspection to insure compliance with operation and maintenance criteria.
10. Once the performance characteristics of the infiltration system have been verified, the monitoring schedule can be reduced to an annual basis unless the performance data indicates that a more frequent schedule is required.



TYPICAL SURFACE SAND FILTER (F-1) SECTION
NOT TO SCALE

OPERATION AND MATINENACE NOTES FOR JOINTLY MAINTED SAND FILTER

1. SAND FILTERS SHALL BE INSPECTED AND CLEANED ANNUALLY BY THE HOME OWNERS ASSOCIATION.
2. HOWARD COUNTY SHALL REPAIR EROSION AND MAINTAIN ACCESS SURFACE IN GOOD CONDITION.
3. THE HOME OWNERS ASSOCIATION SHALL CHECK FOR DEWATERING WITHIN 48 HOURS OF RAINFALL, NOTICEABLE ODORS, WATER STAINS ON THE FILTER SURFACE OR AT THE OUTLET AND PRESENCE OF ALGAE OR AQUATIC VEGETATION.
4. THE COUNTY SHALL REMOVE AND REPLACE FILTER MEDIA AS NEEDED.
5. FILTERS THAT HAVE A GRASS COVER SHALL BE MOWED A MINIMUM OF THREE TIMES PER YEAR TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 12" BY THE HOME OWNERS ASSOCIATION.
6. THE HOME OWNERS ASSOCIATION SHALL CHECK FLOW SPLITTER FOR PROPER FUNCTIONING.
7. HOWARD COUNTY SHALL ONLY BE RESPONSIBLE FOR THE OUTFALL PIPING, CONTROL STRUCTURE AND EMBANKMENT MAINTANENCE. THE HOMEOWNER'S ASSOCIATION SHALL BE RESPONSIBLE FOR FILTER MATERIAL, CLEANING, AND MOWING.

APPROVED: DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 6/12/2024

Mar 19, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SWMD - 2---->LAYOUT: 56 - SWM NOTES & DETAILS JC

INFILTRATION AND FILTER SYSTEM CONSTRUCTION SPECIFICATIONS

INFILTRATION AND FILTER SYSTEMS EITHER TAKE ADVANTAGE OF EXISTING PERMEABLE SOILS OR CREATE A PERMEABLE MEDIUM SUCH AS SAND FOR WC1. AND RE V. IN SOME INSTANCES WHERE PERMEABILITY IS GREAT, THESE FACILITIES MAY BE USED FOR QP AS WELL. THE MOST COMMON SYSTEMS INCLUDE INFILTRATION TRENCHES, INFILTRATION BASINS, SAND FILTERS, AND ORGANIC FILTERS.

WHEN PROPERLY PLANTED VEGETATION WILL THRIVE AND ENHANCE THE FUNCTIONING OF THESE SYSTEMS. FOR EXAMPLE, PRE-TREATMENT BUFFERS WILL TRAP SEDIMENTS THAT OFTEN ARE BOUND WITH PHOSPHOROUS AND METALS. VEGETATION PLANTED IN THE FACILITY WILL AID IN NUTRIENT UPTAKE AND WATER STORAGE. ADDITIONALLY, PLANT ROOTS WILL PROVIDE ARTERIES FOR STORMWATER TO PERMEATE SOIL FOR GROUNDWATER RECHARGE. FINALLY, SUCCESSFUL PLANTINGS PROVIDE AESTHETIC VALUE AND WILDLIFE HABITAT MAKING THESE FACILITIES MORE DESIRABLE TO THE PUBLIC.

DESIGN CONSTRAINTS:

- PLANTING BUFFER STRIPS OF AT LEAST 20 FEET WILL CAUSE SEDIMENTS TO SETTLE OUT BEFORE REACHING THE FACILITY, THEREBY REDUCING THE POSSIBILITY OF CLOGGING.
- DETERMINE AREAS THAT WILL BE SATURATED WITH WATER AND WATER TABLE DEPTH SO THAT APPROPRIATE PLANTS MAY BE SELECTED (HYDROLOGY WILL BE SIMILAR TO BIORETENTION FACILITIES. SEE FIGURE A5 AND TABLE A4 FOR PLANTING MATERIAL GUIDANCE).
- PLANTS KNOWN TO SEND DOWN DEEP TAPROOTS SHOULD BE AVOIDED IN SYSTEMS WHERE FILTER FABRIC IS USED AS PART OF FACILITY DESIGN.
- TEST SOIL CONDITIONS TO DETERMINE IF SOIL AMENDMENTS ARE NECESSARY.
- PLANTS SHALL BE LOCATED SO THAT ACCESS IS POSSIBLE FOR STRUCTURE MAINTENANCE.
- STABILIZE HEAVY FLOW AREAS WITH EROSION CONTROL MATS OR SOD.
- TEMPORARILY DIVERT FLOWS FROM SEEDED AREAS UNTIL VEGETATION IS ESTABLISHED.
- SEE TABLE A5 FOR ADDITIONAL DESIGN CONSIDERATIONS.

BIO-RETENTION

SOIL BED CHARACTERISTICS
THE CHARACTERISTICS OF THE SOIL FOR THE BIORETENTION FACILITY ARE PERHAPS AS IMPORTANT AS THE FACILITY LOCATION, SIZE, AND TREATMENT VOLUME. THE SOIL MUST BE PERMEABLE ENOUGH TO ALLOW RUNOFF TO FILTER THROUGH THE MEDIA, WHILE HAVING CHARACTERISTICS SUITABLE TO PROMOTE AND SUSTAIN A ROBUST VEGETATIVE COVER CROP. IN ADDITION, MUCH OF THE NUTRIENT POLLUTANT UPTAKE (NITROGEN AND PHOSPHORUS) IS ACCOMPLISHED THROUGH ABSORPTION AND MICROBIAL ACTIVITY WITHIN THE SOIL PROFILE. THEREFORE, SOILS MUST BALANCE THEIR CHEMICAL AND PHYSICAL PROPERTIES TO SUPPORT BIOTIC COMMUNITIES ABOVE AND BELOW GROUND.

THE PLANTING SOIL SHOULD BE A SANDY LOAM, LOAMY SAND, LOAM (USDA), OR A LOAM/SAND MIX (SHOULD CONTAIN A MINIMUM 35 TO 60% SAND, BY VOLUME). THE CLAY CONTENT FOR THESE SOILS SHOULD BE LESS THAN 25% BY VOLUME [ENVIRONMENTAL QUALITY RESOURCES (EQR), 1996; ENGINEERING TECHNOLOGY INC. AND BIOHABITATS, INC. (ETAB), 19931. SOILS SHOULD FALL WITHIN THE SM, ML, SC CLASSIFICATIONS OR THE UNIFIED SOIL CLASSIFICATION SYSTEM (USCS). A PERMEABILITY OF AT LEAST 1.0 FEET PER DAY (.5"/HR) IS REQUIRED (A CONSERVATIVE VALUE OF 0.5 FEET PER DAY IS USED FOR DESIGN). THE SOIL SHOULD BE FREE OF STONES, STUMPS, ROOTS, OR OTHER WOODY MATERIAL OVER 1" IN DIAMETER. BRUSH OR SEEDS FROM NOXIOUS WEEDS (E.G., JOHNSON GRASS, MUGWORT, NUTSEDGE, AND CANADA THISTLE OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.) SHOULD NOT BE PRESENT IN THE SOILS. PLACEMENT OF THE PLANTING SOIL SHOULD BE IN 12 TO 18 LIFTS THAT ARE LOOSELY COMPACTED (TAMPED LIGHTLY WITH A BACKHOE BUCKET OR TRAVERSED BY DOZER TRACKS). THE SPECIFIC CHARACTERISTICS ARE PRESENTED IN TABLE A.3.

TABLE A.3 PLANTING SOIL CHARACTERISTICS

PARAMETER	VALUE
PH RANGE	5.2 TO 7.00
ORGANIC MATTER	1.5 TO 4.0% (BY WEIGHT)
MAGNESIUM	35 LBS. PER ACRE. MINIMUM
PHOSPHORUS (PHOSPHATE - P205)	75 LBS. PER ACRE. MINIMUM
POTASSIUM (POTASH - 1(K20)	85 LBS. PER ACRE. MINIMUM
SOLUBLE SALTS	500 PPM
CLAY	10 TO 25%
SILT	30 TO 55%
SAND	35 TO 60%

MULCH LAYER

THE MULCH LAYER PLAYS AN IMPORTANT ROLE IN THE PERFORMANCE OF THE BIORETENTION SYSTEM. THE MULCH LAYER HELPS MAINTAIN SOIL MOISTURE AND AVOIDS SURFACE SEALING, WHICH REDUCES PERMEABILITY. MULCH HELPS PREVENT EROSION, AND PROVIDES A MICROENVIRONMENT SUITABLE FOR SOIL BIOTA AT THE MULCH/SOIL INTERFACE. IT ALSO SERVES AS A PRETREATMENT LAYER, TRAPPING THE FINER SEDIMENTS, WHICH REMAIN SUSPENDED AFTER THE PRIMARY PRETREATMENT.

THE MULCH LAYER SHOULD BE STANDARD LANDSCAPE STYLE, SINGLE OR DOUBLE SHREDDED HARDWOOD MULCH OR CHIPS. THE MULCH LAYER SHOULD BE WELL AGED (STOCKPILED OR STORED FOR AT LEAST 12 MONTHS), UNIFORM IN COLOR, AND FREE OF OTHER MATERIALS, SUCH AS WEED SEEDS, SOIL, ROOTS, ETC. THE MULCH SHOULD BE APPLIED TO A MAXIMUM DEPTH OF THREE INCHES. GRASS CLIPPINGS SHOULD NOT BE USED AS A MULCH MATERIAL.

PLANTING GUIDANCE

PLANT MATERIAL SELECTION SHOULD BE BASED ON THE GOAL OF SIMULATING A TERRESTRIAL FORESTED COMMUNITY OF NATIVE SPECIES. BIORETENTION SIMULATES AN UPLAND-SPECIES ECOSYSTEM. THE COMMUNITY SHOULD BE DOMINATED BY TREES, BUT HAVE A DISTINCT COMMUNITY OF UNDERSTORY TREES, SHRUBS AND HERBACEOUS MATERIALS. BY CREATING A DIVERSE, DENSE PLANT COVER, A BIORETENTION FACILITY WILL BE ABLE TO TREAT STORMWATER RUNOFF AND WITHSTAND URBAN STRESSES FROM INSECTS, DISEASE, DROUGHT, TEMPERATURE, WIND AND EXPOSURE.

THE PROPER SELECTION AND INSTALLATION OF PLANT MATERIALS IS KEY TO A SUCCESSFUL SYSTEM. THERE ARE ESSENTIALLY THREE ZONES WITHIN A BIORETENTION FACILITY (FIGURE A5). THE LOWEST ELEVATION SUPPORTS PLANT SPECIES ADAPTED TO STANDING AND FLUCTUATING WATER LEVELS. THE MIDDLE ELEVATION SUPPORTS PLANTS THAT LIKE DRIER SOIL CONDITIONS, BUT CAN STILL TOLERATE OCCASIONAL INUNDATION BY WATER. THE OUTER EDGE IS THE HIGHEST ELEVATION AND GENERALLY SUPPORTS PLANTS ADAPTED TO DRYER CONDITIONS. A SAMPLE OF APPROPRIATE PLANT MATERIALS FOR BIORETENTION FACILITIES ARE INCLUDED IN TABLE A4. THE LAYOUT OF PLANT MATERIAL SHOULD BE FLEXIBLE, BUT SHOULD FOLLOW THE GENERAL PRINCIPALS DESCRIBED IN TABLE A5. THE OBJECTIVE IS TO HAVE A SYSTEM, WHICH RESEMBLES A RANDOM, AND NATURAL PLANT LAYOUT, WHILE MAINTAINING OPTIMAL CONDITIONS FOR PLANT ESTABLISHMENT AND GROWTH. FOR A MORE EXTENSIVE BIORETENTION PLAN, CONSULT ETAB, 1993 OR CLAYTOR AND SCHUELER, 1997.

DRY WELL NOTES

INSPECTION:

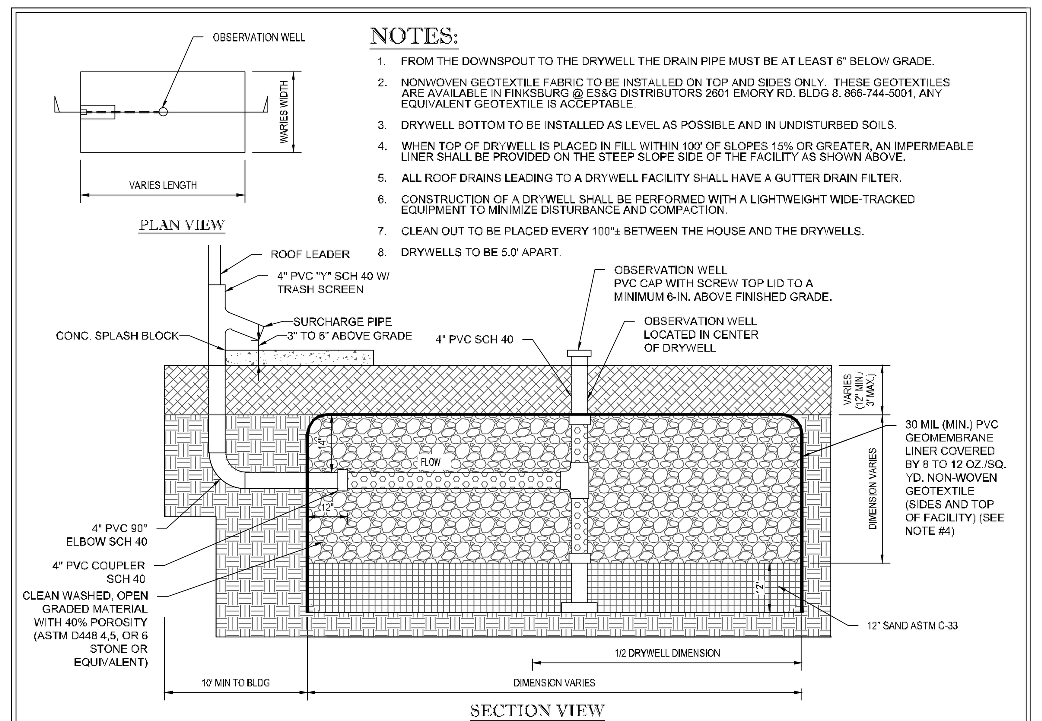
REGULAR INSPECTIONS SHALL BE MADE DURING THE FOLLOWING STAGES OF CONSTRUCTION:

- DURING EXCAVATION TO SUBGRADE.
- DURING PLACEMENT OF BACKFILL AND PERFORATED INLET PIPE AND OBSERVATION WELL.
- DURING PLACEMENT OF GEOTEXTILES AND ALL FILTER MEDIA.
- DURING CONSTRUCTION OF THE APPURTENANT CONVEYANCE.
- UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION.

MAINTENANCE CRITERIA:

THE FOLLOWING ITEMS SHOULD BE ADDRESSED TO ENSURE PROPER MAINTENANCE AND LONG-TERM PERFORMANCE OF DRY WELLS:

- PRIVATELY OWNED PRACTICES SHALL HAVE A MAINTENANCE PLAN AND SHALL BE PROTECTED BY EASEMENT, DEED RESTRICTION, ORDINANCE, OR OTHER LEGAL MEASURES PREVENTING ITS NEGLECT, ADVERSE ALTERATION, AND REMOVAL.
- DRY WELLS SHALL BE INSPECTED AND CLEANED ANNUALLY. THIS INCLUDES PIPES, GUTTERS, DOWNSPOUTS, AND ALL FILTERS.
- PONDING, STANDING WATER OR ALGAL GROWTH ON THE TOP OF A DRY WELL MAY INDICATE FAILURE DUE TO SEDIMENTATION IN THE GRAVEL MEDIA. IF WATER PONDS FOR MORE THAN 48 HOURS AFTER A MAJOR STORM OR MORE THAN SIX INCHES OF SEDIMENT HAS ACCUMULATED, THE GRAVEL MEDIA SHOULD BE EXCAVATED AND REPLACED.



TYPICAL DRYWELL (M-5) FACILITY SECTION
NOT TO SCALE

DRY WELL – Residential: Operation and Maintenance

- Dry wells shall be inspected and cleaned annually. This includes pipes, gutters, downspouts and all filters.
- Ponding, standing water or algae growth on the top of a dry well may indicate failure due to sedimentation in the gravel media.
- If water ponds for more than 48 hours after a major storm or more than 6" of sediment has accumulated, the gravel media should be excavated and replaced.
- Privately owned practices shall have a maintenance plan and shall be protected by easement, deed restriction, ordinance or other legal measures preventing its neglect, adverse alteration and removal.

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118, ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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It's fast. It's free. It's the law.

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THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWMD - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

SWM NOTES AND DETAILS

SHEET NUMBER:

F-22-033

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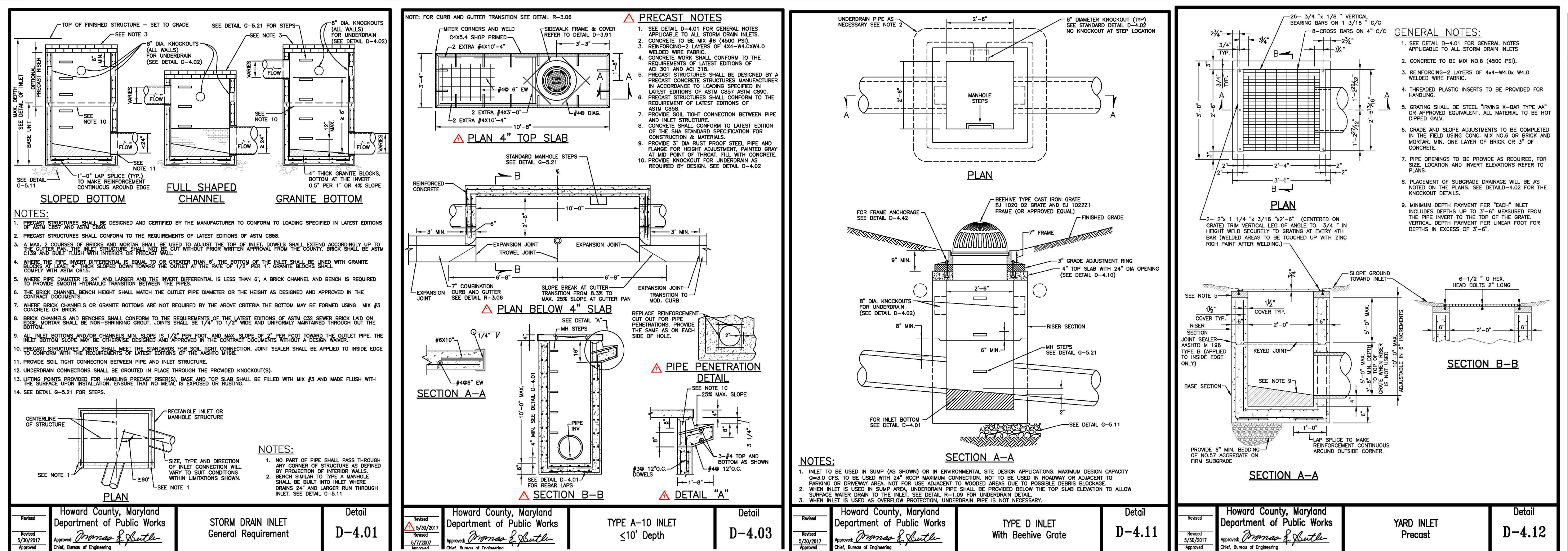
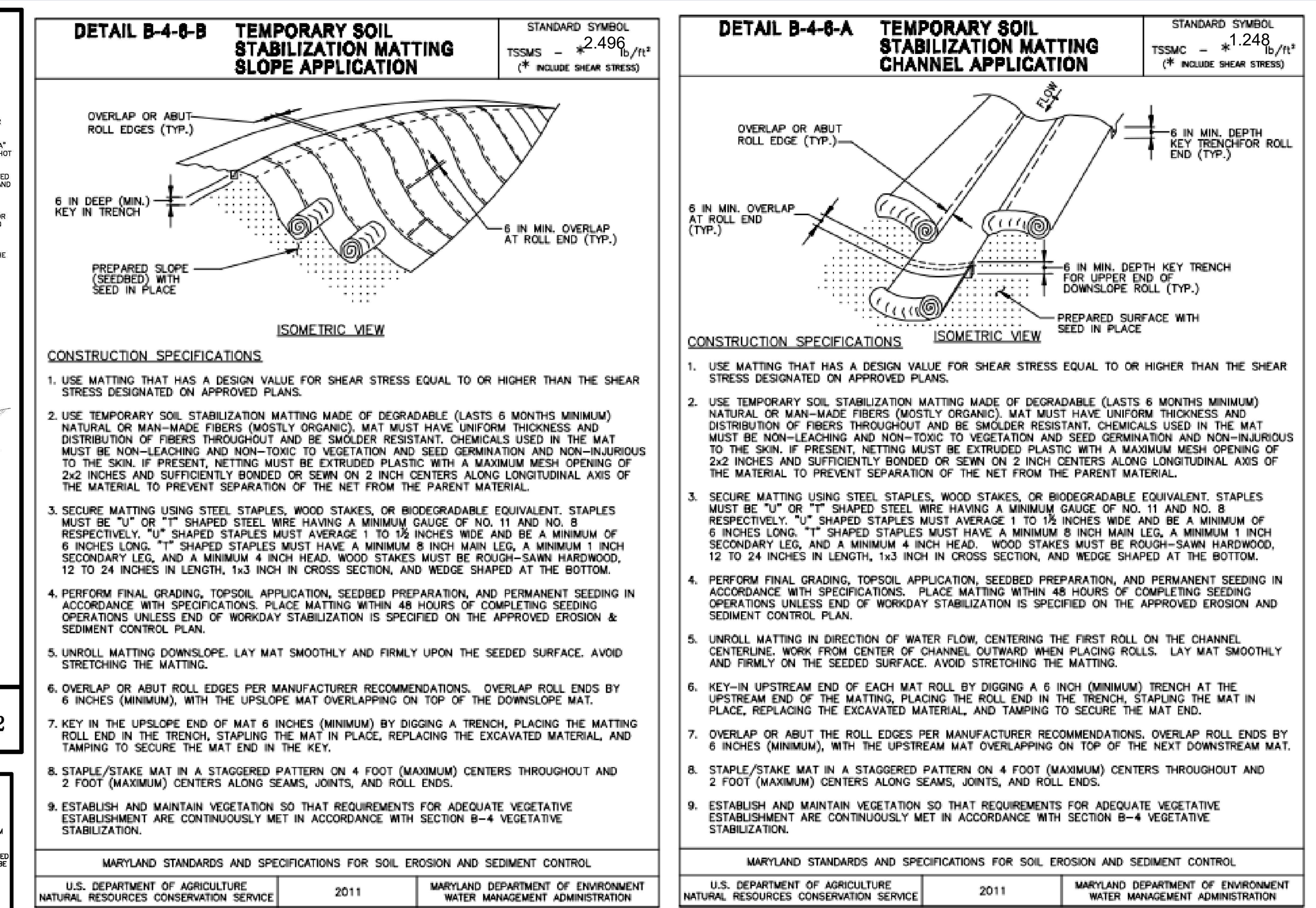
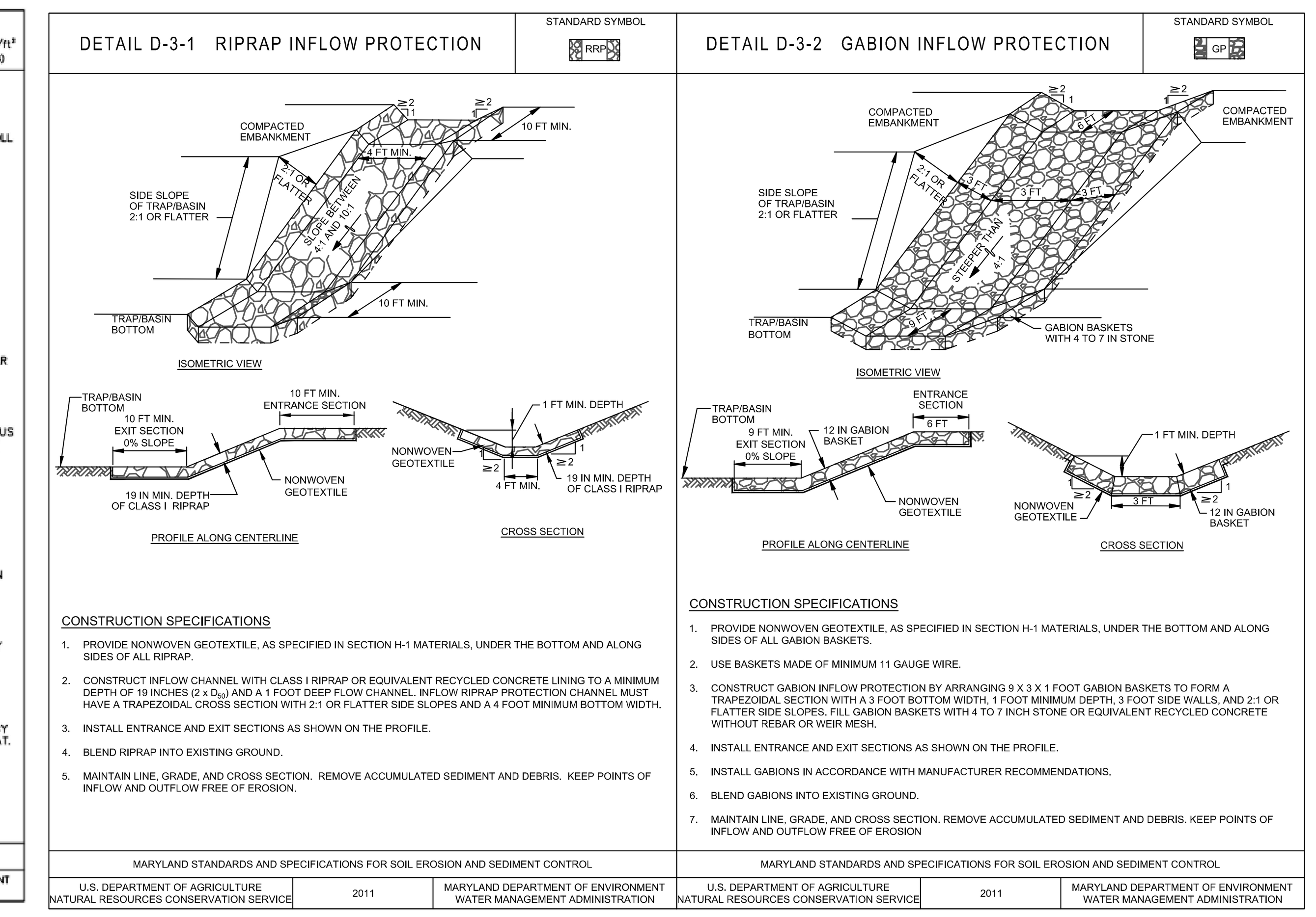






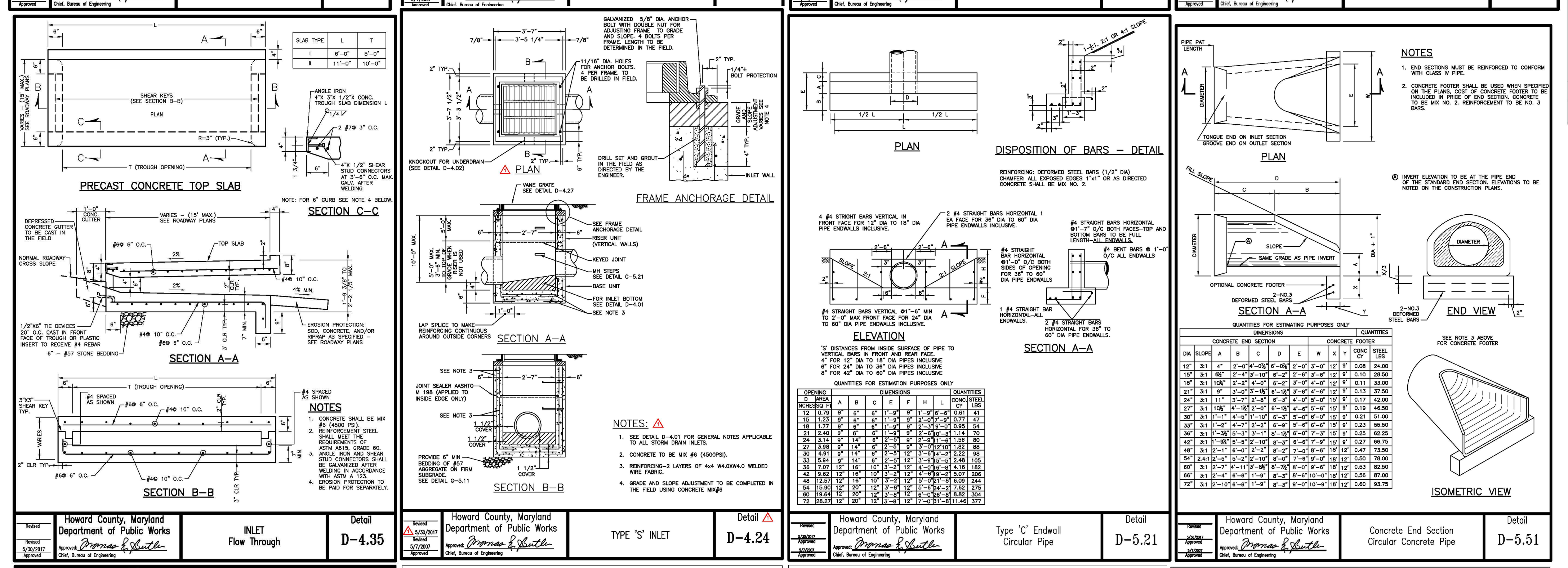
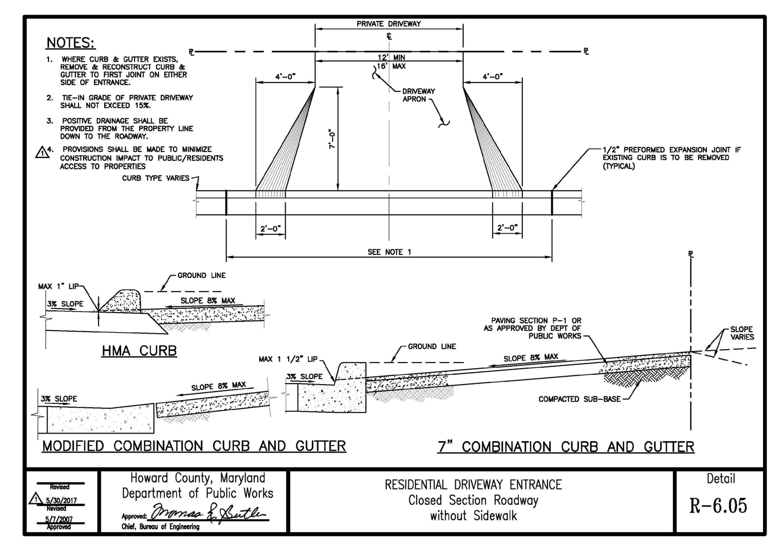


Table B.7: Soil Stabilization on Slopes

Slope	20:1 or Flatter (≤5%)			<20:1 to 4:1 (>5 - 25%)			<4:1 to 3:1 (>25 - 33%)			<3:1 to 2.5:1 (>33 - 40%)			<2.5:1 to 2:1** (>40 - 50%)		
Slope Length (feet)*	0-30	30-60	60-120	0-30	30-60	60-120	0-30	30-60	60-120	0-30	30-60	60-120	0-30	30-60	60-120
Straw Mulch/Wood Cellulose Fiber				for K ≤ 0.35***											
Temporary Matting with Design Shear Stress ≥ 1.5 lb/sf															
Temporary Matting with Design Shear Stress ≥ 1.75 lb/sf															
Temporary Matting with Design Shear Stress ≥ 2.0 lb/sf															
Temporary Matting with Design Shear Stress ≥ 2.25 lb/sf															



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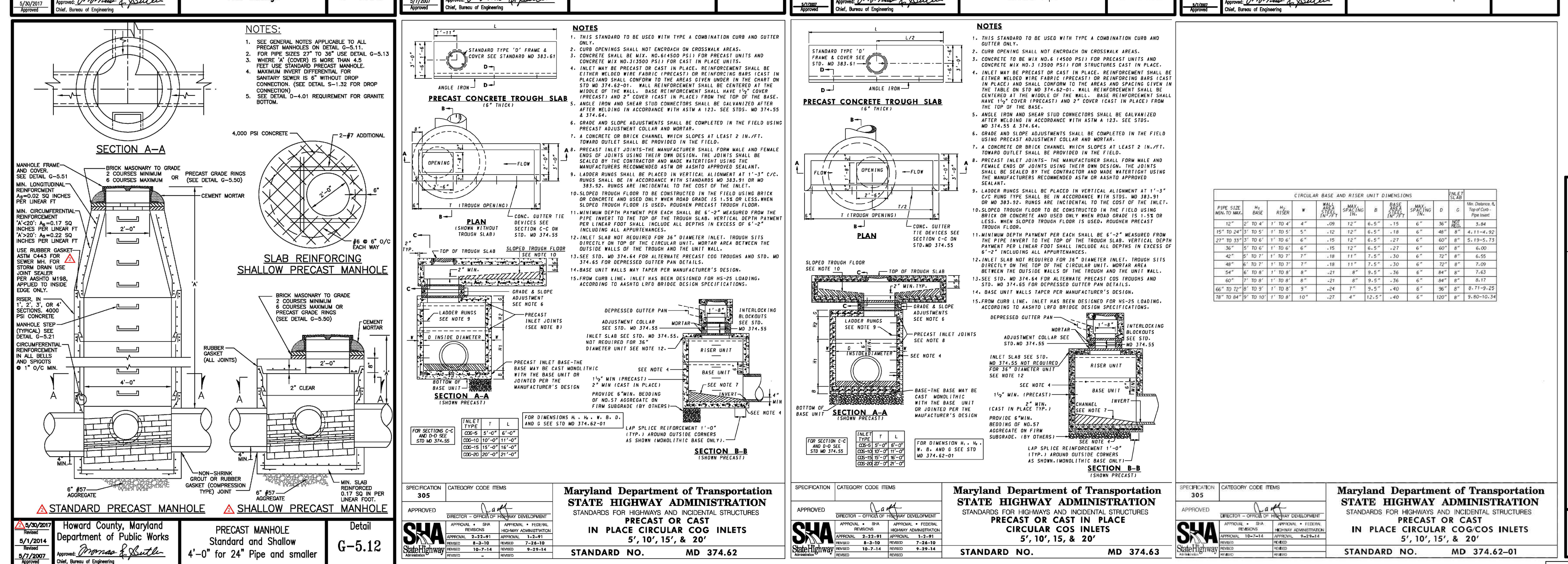
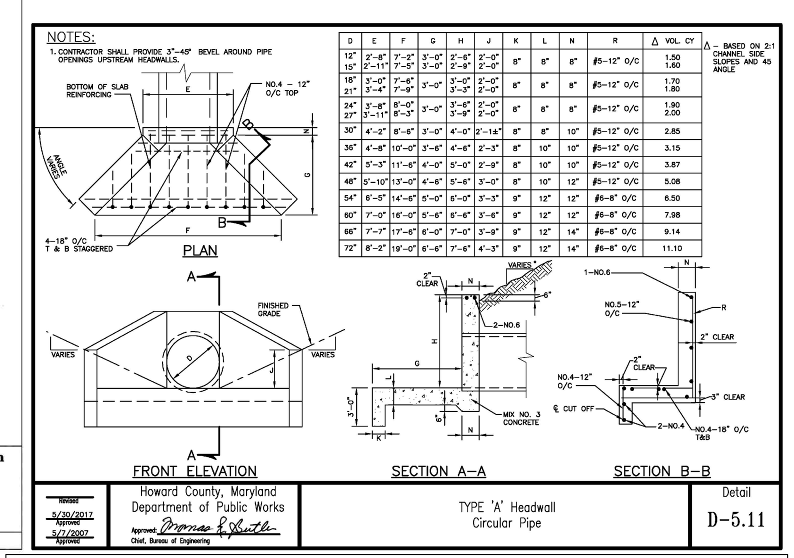
PLANTING GUIDANCE

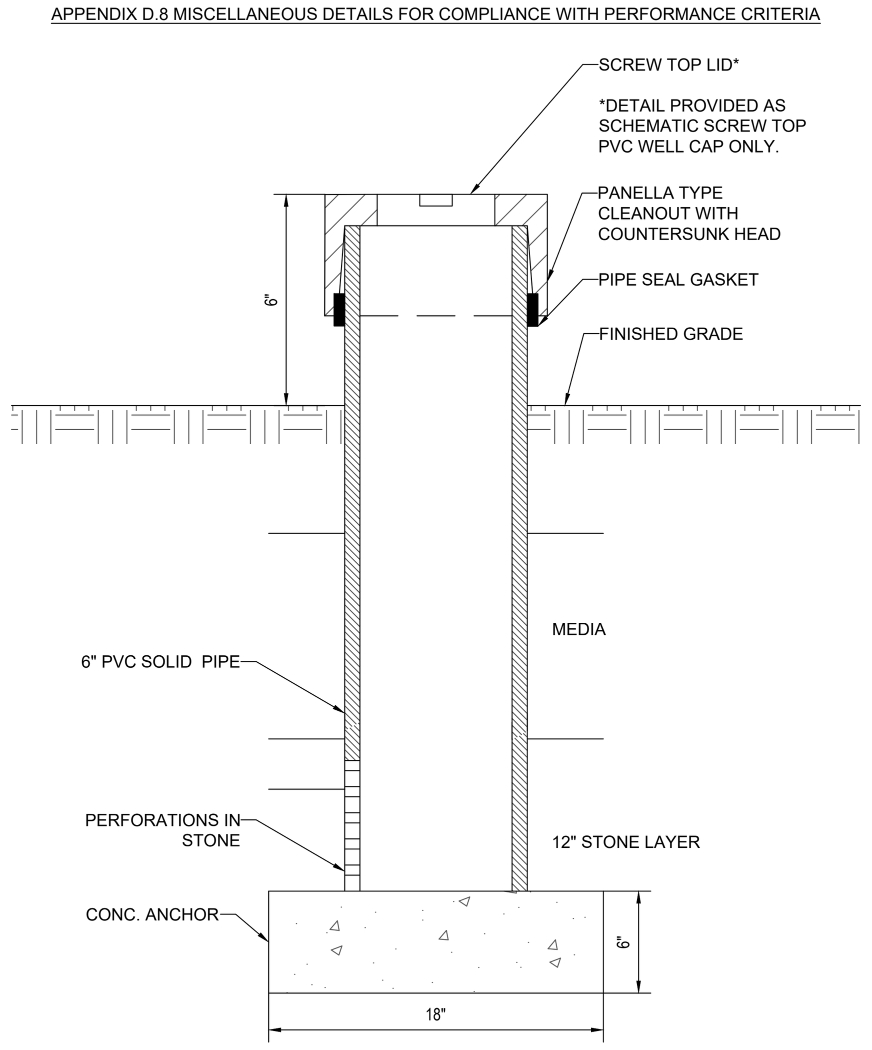
PLANT MATERIAL SELECTION SHOULD BE BASED ON THE GOAL OF SIMULATING A TERRESTRIAL FORESTED COMMUNITY OF NATIVE SPECIES. BIORETENTION SIMULATES AN UPLAND-SPECIES ECOSYSTEM. THE COMMUNITY SHOULD BE DOMINATED BY TREES, BUT HAVE A DISTINCT COMMUNITY OF UNDERSTORY TREES, SHRUBS AND HERBACEOUS MATERIALS. BY CREATING A DIVERSE, DENSE PLANT COVER, A BIORETENTION FACILITY WILL BE ABLE TO TREAT STORMWATER RUNOFF AND WITHSTAND URBAN STRESSES FROM INSECTS, DISEASE, DROUGHT, TEMPERATURE, WIND AND EXPOSURE.

THE PROPER SELECTION AND INSTALLATION OF PLANT MATERIALS IS KEY TO A SUCCESSFUL SYSTEM. THERE ARE ESSENTIALLY THREE ZONES WITHIN A BIORETENTION FACILITY (FIGURE A5). THE LOWEST ELEVATION SUPPORTS PLANT SPECIES ADAPTED TO STANDING AND FLUCTUATING WATER LEVELS. THE MIDDLE ELEVATION SUPPORTS PLANTS THAT LIKE DRIER SOIL CONDITIONS, BUT CAN STILL TOLERATE OCCASIONAL INUNDATION BY WATER. THE OUTER EDGE IS THE HIGHEST ELEVATION AND GENERALLY SUPPORTS PLANTS ADAPTED TO DRYER CONDITIONS. A SAMPLE OF APPROPRIATE PLANT MATERIALS FOR BIORETENTION FACILITIES ARE INCLUDED IN TABLE A4. THE LAYOUT OF PLANT MATERIAL SHOULD BE FLEXIBLE, BUT SHOULD FOLLOW THE GENERAL PRINCIPALS DESCRIBED IN TABLE A5. THE OBJECTIVE IS TO HAVE A SYSTEM, WHICH RESEMBLES A RANDOM, AND NATURAL PLANT LAYOUT, WHILE MAINTAINING OPTIMAL CONDITIONS FOR PLANT ESTABLISHMENT AND GROWTH. FOR A MORE EXTENSIVE BIORETENTION PLAN, CONSULT ETAB, 1993 OR CLAYTOR AND SCHUELER, 1997.





APPENDIX D.8 MISCELLANEOUS DETAILS FOR COMPLIANCE WITH PERFORMANCE CRITERIA



OBSERVATION WELL DETAIL

EACH OBSERVATION WELL/CLEANOUT MUST INCLUDE THE FOLLOWING:

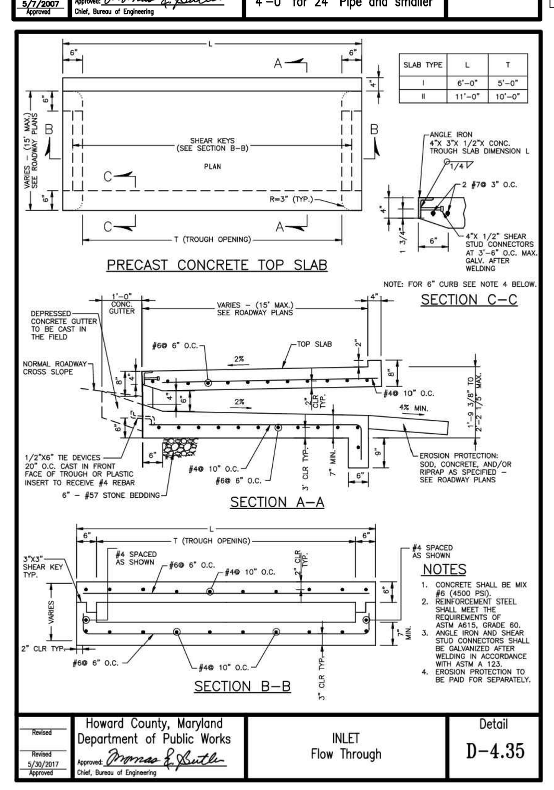
1. FOR AN UNDERGROUND FLUSH MOUNTED OBSERVATION WELL/CLEANOUT, PROVIDE A TUBE MADE OF NON-CORROSIVE MATERIAL, SCHEDULE 40 OR EQUAL, AT LEAST THREE FEET LONG WITH AN INSIDE DIAMETER OF AT LEAST 6 INCHES.

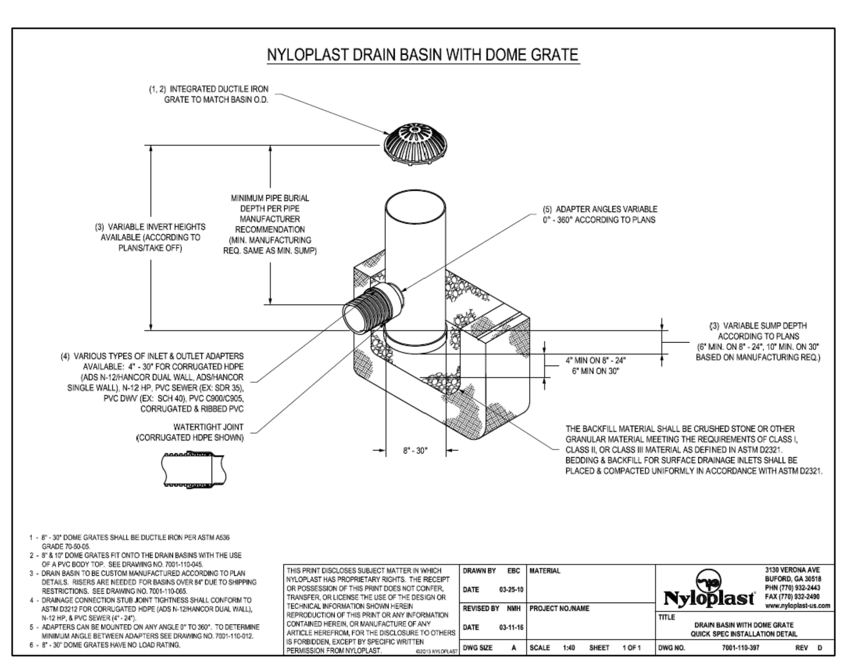
2. THE TUBE SHALL HAVE A FACTORY ATTACHED CAST IRON OR HIGH IMPACT PLASTIC COLLAR WITH RIBS TO PREVENT ROTATION WHEN REMOVING SCREW TOP LID. THE SCREW TOP SHALL BE CAST IRON OR HIGH IMPACT PLASTIC THAT WILL WITHSTAND ULTRA-VIOLET RAYS.

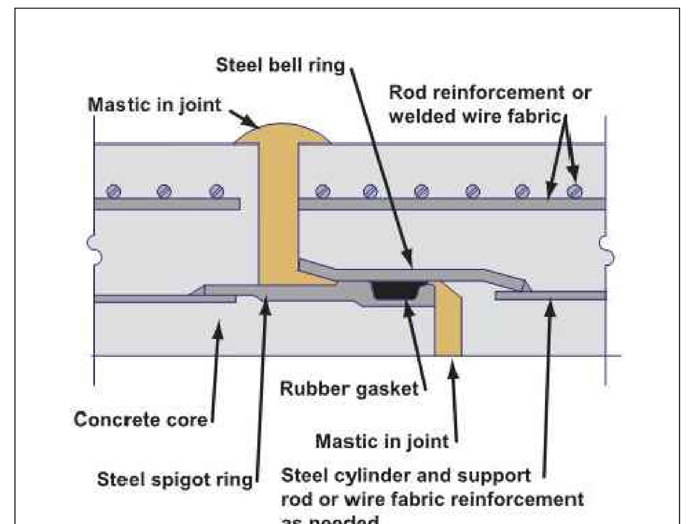
3. OBSERVATION WELL TO EXTEND 6" ABOVE THE TOP OF MULCH. THE 6" PVC PIPE IS TO BE PERFORATED WITH 3/8" PERFORATIONS AT 6" ON CENTER, 4 PER ROW WITHIN THE STONE LAYER.

NOTE: WELL CAP MUST BE PERMANENTLY MARKED WITH AS-BUILT DEPTH TO INVERT.

D.8.5



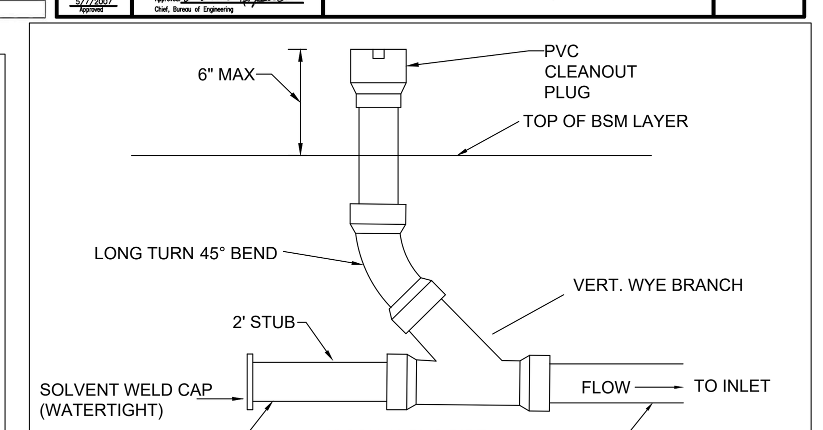




BARREL JOINT SEAL DETAIL

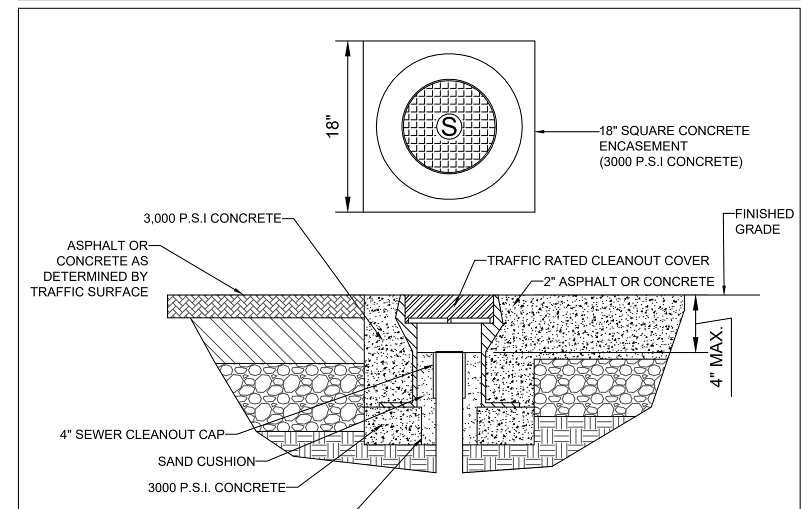
NOT TO SCALE

NOTE: DETAIL PROVIDED BY HOWARD COUNTY SOIL CONSERVATION DISTRICT.



CLEANOUT DETAIL (TYP.)

NOT TO SCALE



TRAFFIC RATED CLEANOUT DETAIL

NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: [signature] 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: [signature] 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: CHAD Edmondson 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

[signature] 3-12-24

DEVELOPER'S / OWNER'S NAME — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.: WP-19-118, ECP-19-041, BA-CASE NO. 17-018C, ECP-21-017, WP-21-064, SP-19-005, F-22-033, WP-21-127, 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20 PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

— FOR —

BETHANY GLEN - ARAH

SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

STORMWATER MANAGEMENT AND STORM DRAIN NOTES AND DETAILS

SHEET NUMBER:

57 of 117

F-22-033

Mar 12, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - CNDS

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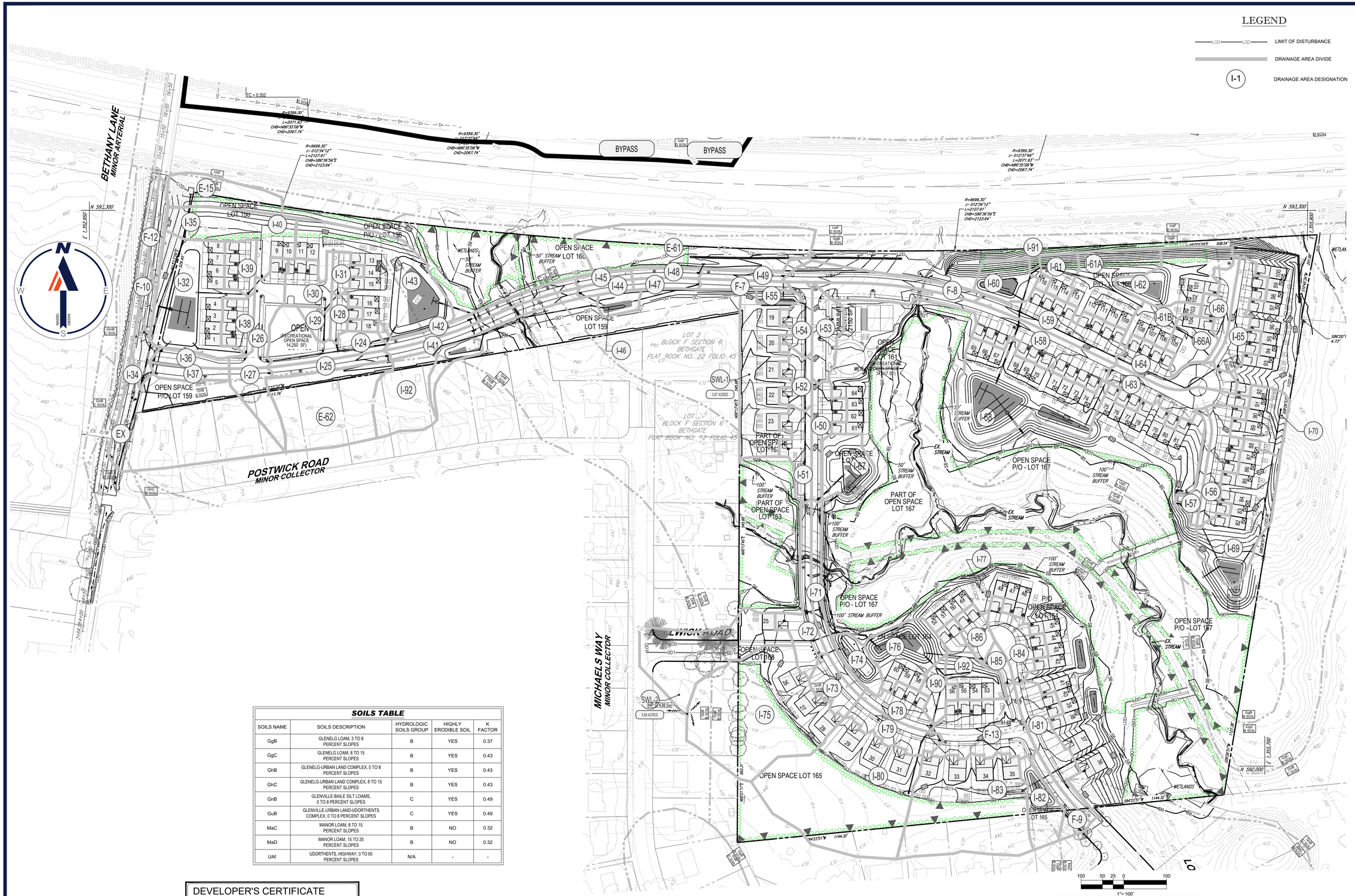

SOILS TABLE				
SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	YES	0.37
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	YES	0.43
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	YES	0.43
GnB	GLENVILLE-BALE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.49
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.49
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.32
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.32
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

APPROVED: DEPARTMENT OF PUBLIC WORKS	
Docusigned by:	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
Docusigned by:	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
Docusigned by: Chad Edmondson	6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

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 PERSONAL 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.

SIGNATURE OF DEVELOPER — DATE: 3-12-24

NAME: Jason Van Kirk, Vice President

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
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TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
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THE WORKING IDEAS AND CONCEPTS OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED FOR ANY PURPOSE, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES BY BOHLER.

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PROJECT No.:	MD152018
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CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	EROS - 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
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Phone: (410) 821-7900
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B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
OVERALL STORMDRAIN DRAINAGE AREA MAP

SHEET NUMBER:
58 of 117

F-22-033

Mar 12, 2024
H:\152018\SUB\DRAWINGS\PLAN SETS\FINAL PLANS\D150\19 - SDRN - 2---LAYOUT 58 - STORMDRAIN DWG

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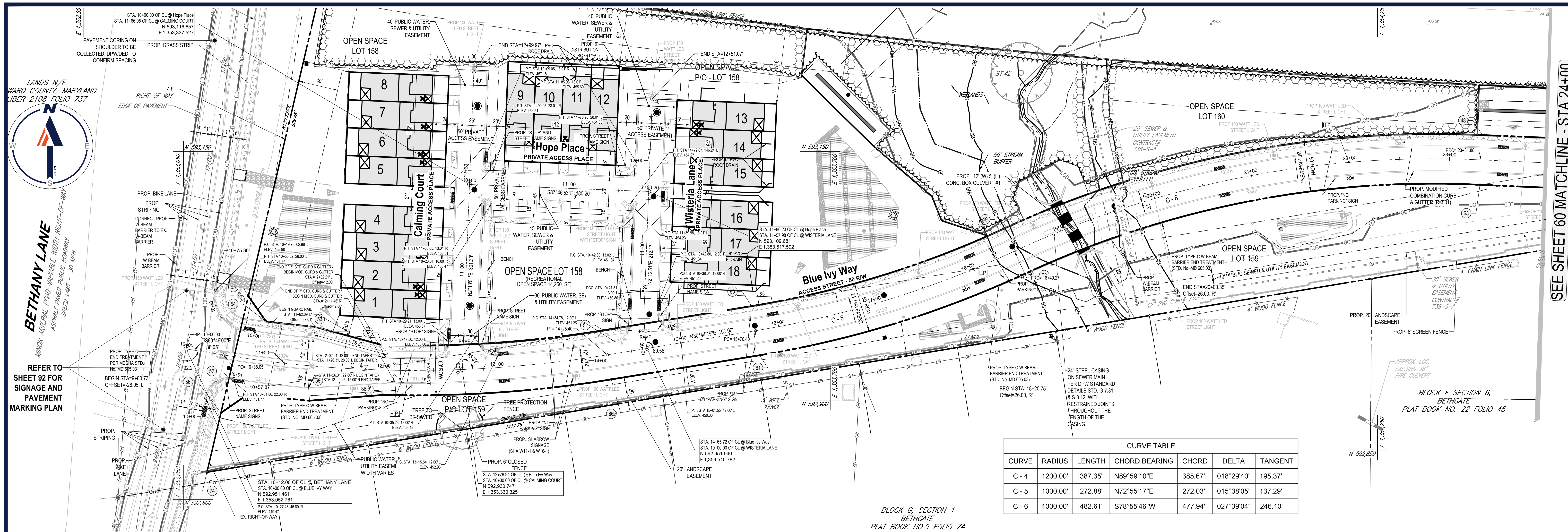
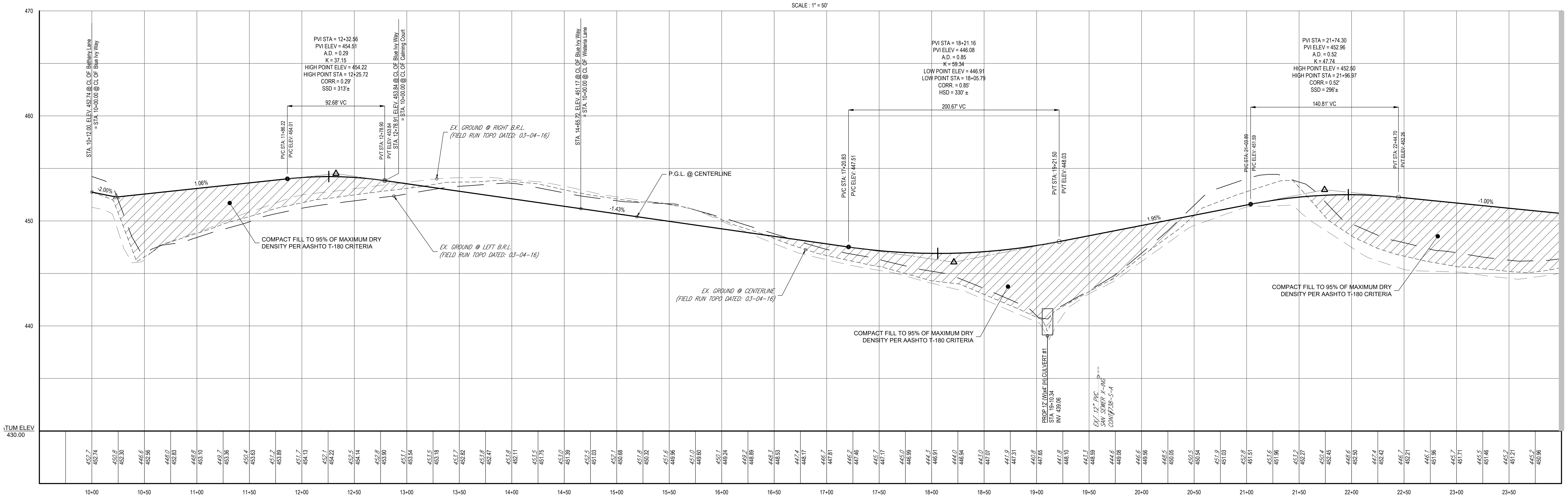


CURVE TABLE						
CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C - 4	1200.00'	387.35'	N89°59'10"E	385.67'	018°29'40"	195.37'
C - 5	1000.00'	272.88'	N72°55'17"E	272.03'	015°38'05"	137.29'
C - 6	1000.00'	482.61'	S78°55'46"W	477.94'	027°39'04"	246.10'

BLUE IVY WAY - PLAN

SCALE : 1" = 50'



PUBLIC ACCESS STREET
DESIGN SPEED = 30 MPH

Blue Ivy Way - PROFILE

SCALE: 1"= 50' HORIZONTAL
1"= 5' VERTICAL

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

Road Classification Chart								
Road Name	Classification	Design Speed (MPH)	Horizontal Curve (Min.)	Crest Vertical Curve (K)	Sag Vertical Curve (K)	Stopping Sight Distance	Max Slope	Intersection Spacing
BLUE IVY WAY	Public Access Street	30	350'	19	37	200'	10%	250'
CALMING COURT	Private Access Place	25	210'	12	26	155'	10%	250'
HOPE PLACE	Private Access Place	25	210'	12	26	155'	10%	250'
WISTERIA LANE	Private Access Place	25	210'	12	26	155'	10%	250'

NOTE:
SEE SHEET 63 OF 94 FOR CURB RETURN PROFILES AT BETHANY LANE & BLUE IVY WAY

1"= 5'
1"= 50'

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

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ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	PROD-2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN
— FOR —
BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
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TAX MAP 17, GRID 15, PARCEL 34
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SHEET TITLE:

ROAD PLAN AND PROFILES

SHEET NUMBER:

F-22-033

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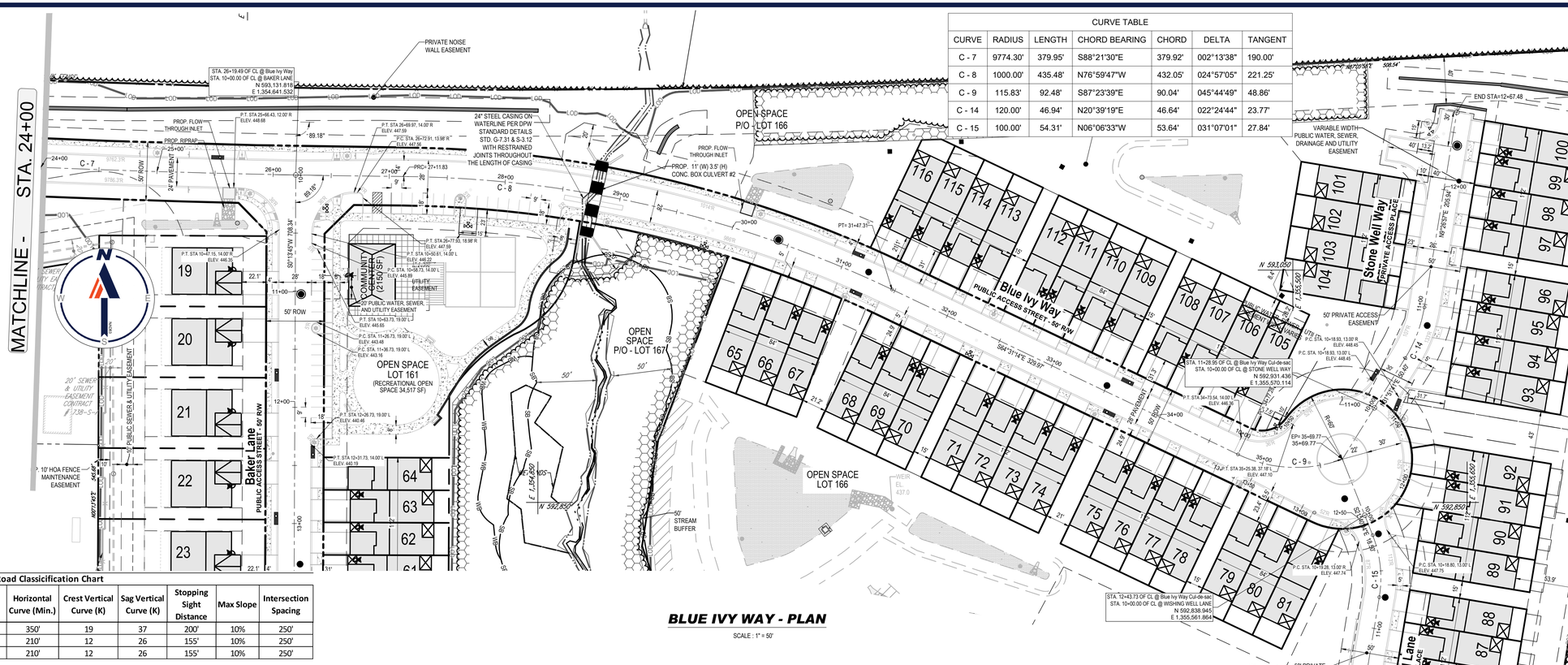

CURVE TABLE						
CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C - 7	9774.30'	379.95'	S88°21'30"E	379.92'	002°13'38"	190.00'
C - 8	1000.00'	435.48'	N76°59'47"W	432.05'	024°57'05"	221.25'
C - 9	115.83'	92.48'	S87°23'39"E	90.04'	045°44'49"	48.86'
C - 14	120.00'	46.94'	N20°39'19"E	46.64'	022°24'44"	23.77'
C - 15	100.00'	54.31'	N06°06'33"W	53.64'	031°07'01"	27.84'

Road Classicification Chart							
Road Name	Classification	Design Speed (MPH)	Horizontal Curve (Min.)	Crest Vertical Curve (K)	Sag Vertical Curve (K)	Stopping Sight Distance	Max Slope	Intersection Spacing
BLUE IVY WAY	Public Access Street	30	350'	19	37	200'	10%	250'
STONE WELL WAY	Private Access Place	25	210'	12	26	155'	10%	250'
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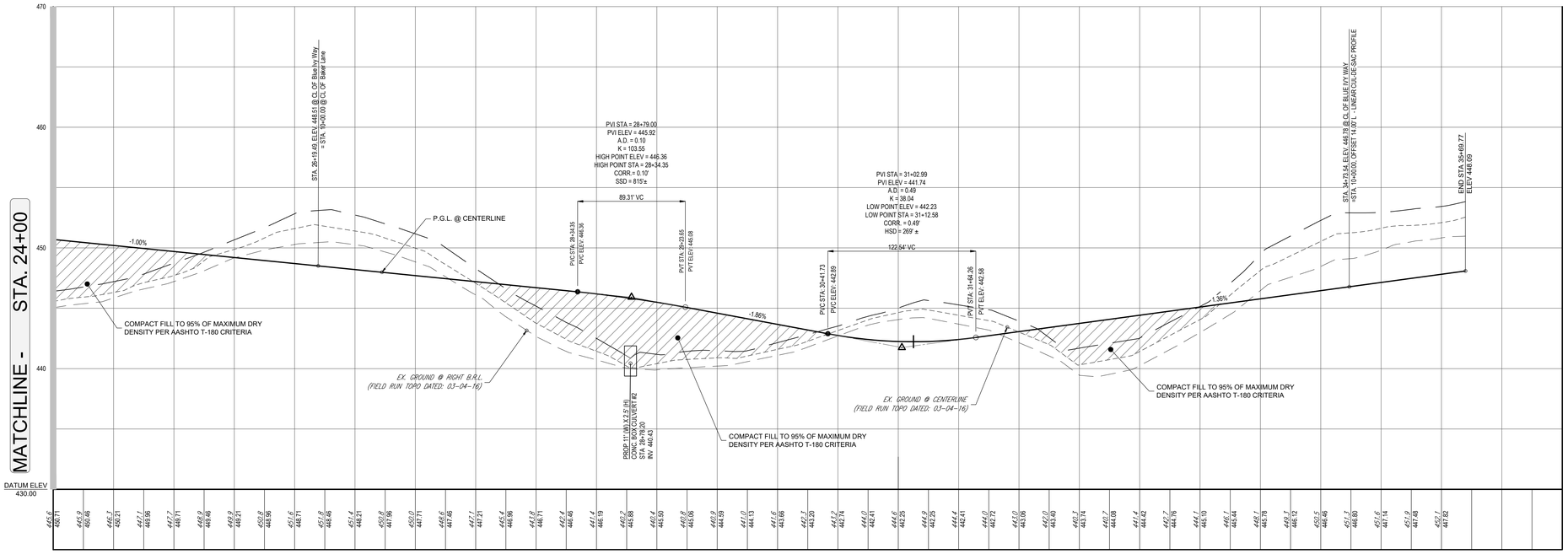
BLUE IVY WAY - PLAN

SCALE : 1" = 50'



PUBLIC ACCESS STREET
DESIGN SPEED = 30 MPH

Blue Ivy Way - PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

STREET LIGHT LEGEND

150 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

100 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

1"= 5'

1"= 50'

APPROVED: DEPARTMENT OF PUBLIC WORKS	
	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
(Jeff) Edmondson	6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
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FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE NO. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

ROAD PLAN AND PROFILES

SHEET NUMBER:

60 of 117

F-22-033

Mar 12, 2024
H:\SMD\152018\DRAWINGS\PLAN SETS\FINAL PLAN\D152018 - PROD - 2A---LAYOUT 60 - ROAD PLAN & PROFILES

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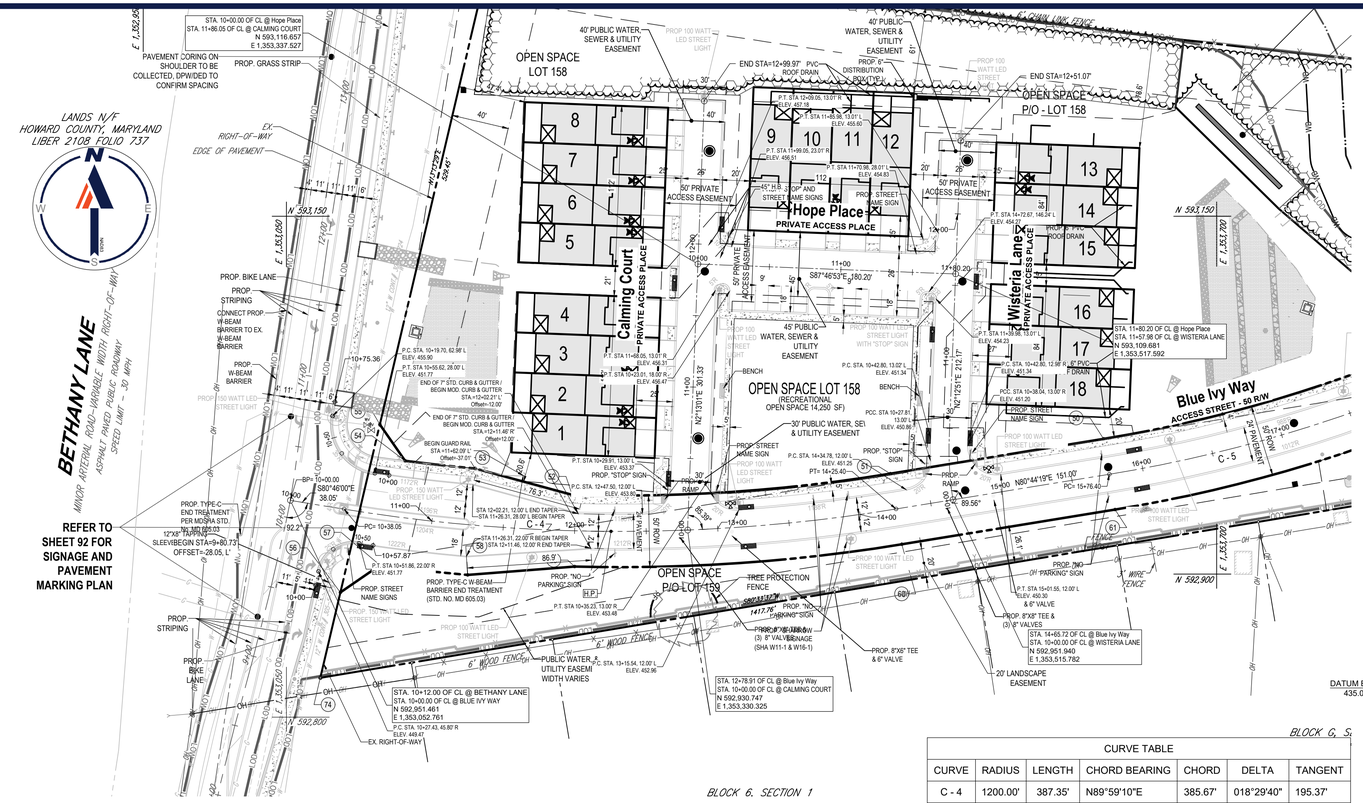
LANDS N/F
HOWARD COUNTY, MARYLAND
LIBER 2108 FOLIO 737
BETHANY LANE
MINOR ARTERIAL ROAD- VARIABLE WIDTH RIGHT-OF-WAY
ASPHALT PAVED PUBLIC ROADWAY
SPEED LIMIT - 30 MPH
REFER TO SHEET 92 FOR SIGNAGE AND PAVEMENT MARKING PLAN
OPEN SPACE LOT 158
OPEN SPACE P/O LOT 158
OPEN SPACE P/O LOT 159
OPEN SPACE LOT 158 (RECREATIONAL OPEN SPACE 14,250 SF)
Hope Place
PRIVATE ACCESS PLACE
Calming Court
PRIVATE ACCESS PLACE
Wisteria Lane
PRIVATE ACCESS PLACE
Blue Ivy Way
ACCESS STREET - 50 R/W
STA. 10+00.00 OF CL @ Hope Place
STA. 11+86.05 OF CL @ CALMING COURT
N 593,116.657
E 1,353,337.527
STA. 10+12.00 OF CL @ BETHANY LANE
STA. 10+00.00 OF CL @ BLUE IVY WAY
N 592,951.461
E 1,353,052.761
STA. 11+80.20 OF CL @ Hope Place
STA. 11+57.98 OF CL @ WISTERIA LANE
N 593,109.681
E 1,353,517.592
STA. 14+65.72 OF CL @ Blue Ivy Way
STA. 10+00.00 OF CL @ WISTERIA LANE
N 592,951.940
E 1,353,515.782
STA. 12+78.91 OF CL @ Blue Ivy Way
STA. 10+00.00 OF CL @ CALMING COURT
N 592,930.747
E 1,353,330.325
PROP. GRASS STRIP
EX. RIGHT-OF-WAY
EDGE OF PAVEMENT
PROP. BIKE LANE
PROP. STRIPING
CONNECT PROP. W-BEAM BARRIER TO EX. W-BEAM BARRIER
PROP. W-BEAM BARRIER
PROP. TYPE-C END TREATMENT PER MDSHA STD. NO. MD 605.03
PROP. TYPE-C W-BEAM BARRIER END TREATMENT (STD. NO. MD 605.03)
PROP. STREET NAME SIGNS
PROP. "NO PARKING" SIGN
PROP. "STOP" SIGN
PROP. RAMP
PROP. 100 WATT LED STREET LIGHT
PROP. 150 WATT LED STREET LIGHT
40' PUBLIC WATER SEWER & UTILITY EASEMENT
45' PUBLIC WATER, SEWER & UTILITY EASEMENT
30' PUBLIC WATER, SEI & UTILITY EASEMENT
PUBLIC WATER & UTILITY EASEMI WIDTH VARIES
20' LANDSCAPE EASEMENT
50' PRIVATE ACCESS EASEMENT
6' WOOD FENCE
CHAIN LINK FENCE
TREE PROTECTION FENCE
PROP. 8"X8"X6" TEE & (3) 8" VALVES
PROP. 8"X8" TEE & (3) 8" VALVES
PROP. 8"X6" TEE & 8" VALVE
PROP. 8"X8" TEE & 8" VALVE
PROP. 8" P.V.C. DISTRIBUTION PIPE/DRAIN
PROP. 6" P.V.C. ROOF DRAIN
PROP. 4" P.V.C. P.DRAIN
PROP. SIGNAGE (SHA W11-1 & W16-1)
PROP. STREET NAME SIGN
PROP. 12"x12" TAPERING SLEEVE
BEGIN GUARD RAIL STA 11+42.09' L
END GUARD RAIL STA 11+80.20' L
BEGIN MOD. CURB & GUTTER STA 11+02.21' L
END MOD. CURB & GUTTER STA 11+11.40' R
END OF 7" STD. CURB & GUTTER STA 11+02.21' L
BEGIN MOD. CURB & GUTTER STA 11+11.40' R
BEGIN 100 WATT LED STREET LIGHT WITH "STOP" SIGN
END 100 WATT LED STREET LIGHT WITH "STOP" SIGN
BENCH
P.C. STA. 10+27.81, 13.00' L, ELEV. 450.86
P.T. STA. 10+42.80, 13.02' L, ELEV. 451.34
P.C. STA. 10+42.80, 12.98' R, ELEV. 451.30
P.C. STA. 10+38.04, 13.00' R, ELEV. 451.20
P.T. STA. 10+29.91, 13.00' L, ELEV. 453.37
P.C. STA. 12+47.50, 12.00' L, ELEV. 453.80
P.T. STA. 11+46.05, 13.07' R, ELEV. 454.11
P.T. STA. 10+23.01, 18.00' R, ELEV. 456.44
P.C. STA. 10+70.82, 12.98' L, ELEV. 455.90
P.C. STA. 10+62.28, 28.00' L, ELEV. 451.77
P.T. STA. 10+51.86, 22.00' R, ELEV. 451.77
P.T. STA. 10+39.25, 13.00' R, ELEV. 453.48
P.C. STA. 10+27.43, 45.80' R, ELEV. 449.47
P.C. STA. 13+15.54, 12.00' L, ELEV. 462.96
P.T. STA. 11+68.05, 23.01' R, ELEV. 456.51
P.T. STA. 11+70.98, 28.01' L, ELEV. 454.83
P.T. STA. 14+72.81, 146.04' L, ELEV. 454.01
P.T. STA. 11+54.01, 35.01' L, ELEV. 454.19
P.C. STA. 11+42.80, 12.98' R, ELEV. 451.30
P.T. STA. 15+01.55, 12.00' L, ELEV. 460.30
P.C. STA. 15+76.40, 12.00' L, ELEV. 462.96
STA 12+02.21' L, 12.00' L END TAPER
STA 11+26.31', 22.00' R BEGIN TAPER
STA 12+11.40, 12.00' R END TAPER
STA 11+26.31, 28.00' L, BEGIN TAPER
STA 11+42.09' L
STA 11+80.20' L
STA 12+99.97' PVC ROOF DRAIN
END STA=12+99.97' ELEV. 459.51
END STA=12+51.07' ELEV. 457.92
S87°46'53"E, 180.20'
N2°13'01"E, 301.33'
S2°12'51"E, 212.17'
N80°44'19"E, 151.00'
S80°46'00"E, 38.05'
N 593,150
E 1,353,069
N 592,800
N 592,900
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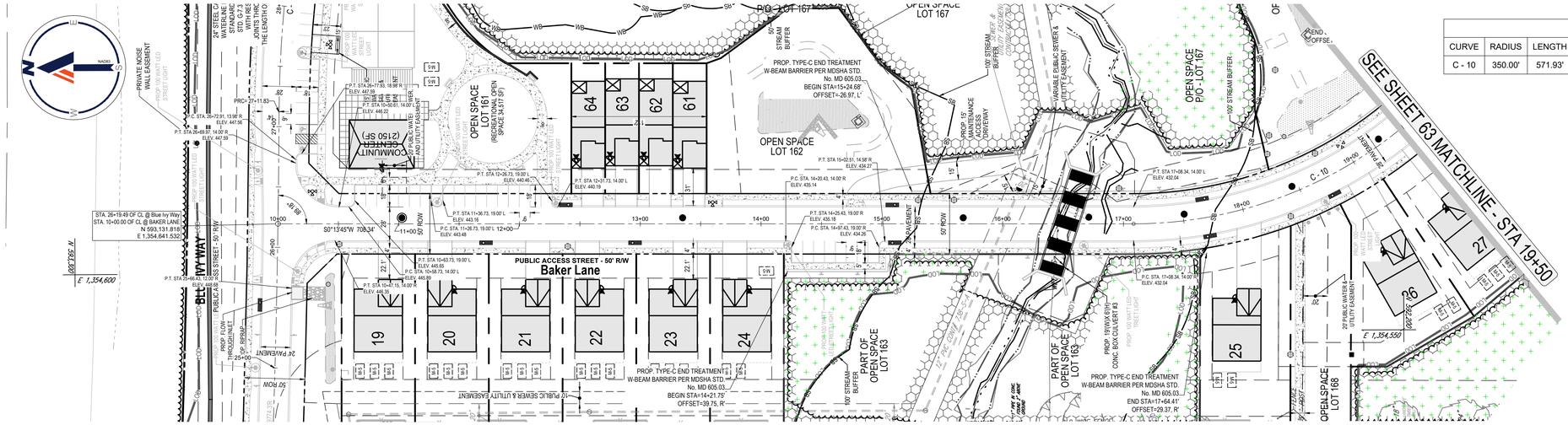
DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

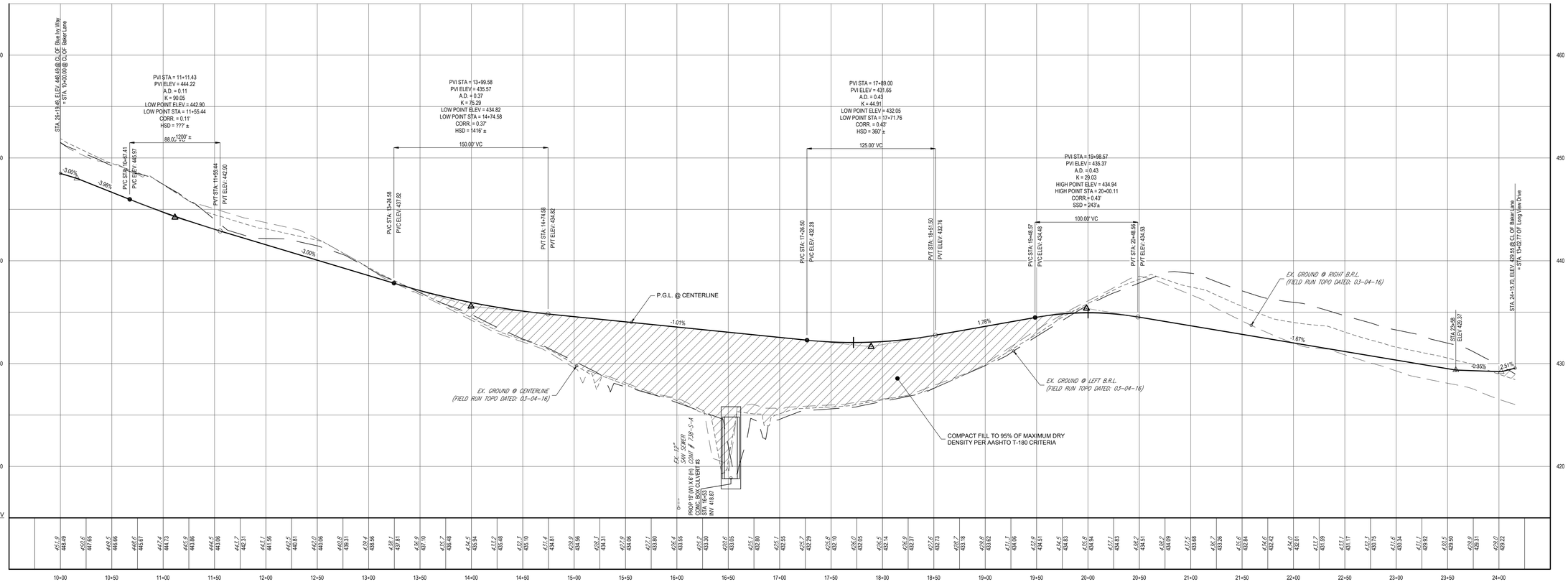
Road Classicification Chart								
Road Name	Classification	Design Speed (MPH)	Horizontal Curve (Min.)	Crest Vertical Curve (K)	Sag Vertical Curve (K)	Stopping Sight Distance	Max Slope	Intersection Spacing
BAKER LANE	Public Access Street	30	350'	19	37	200'	10%	250'

CURVE TABLE						
CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C - 10	350.00'	571.93'	S46°35'03"E	510.39'	093°37'35"	372.88'



BAKER LANE - PLAN

SCALE: 1" = 50'



PUBLIC ACCESS STREET
DESIGN SPEED = 30 MPH
Baker Lane - PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

STREET LIGHT LEGEND

150 WATT, LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

100 WATT, LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

F-22-033

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
STORMWATER MANAGEMENT
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONCEPTS OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED FOR ANY PURPOSE, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED AND SIGNED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES. ©2024 BOHLER

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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ALWAYS CALL 811
It's fast. It's free. It's the law.

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: PROD-2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 43808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 43808, EXPIRATION DATE: 7/3/2025

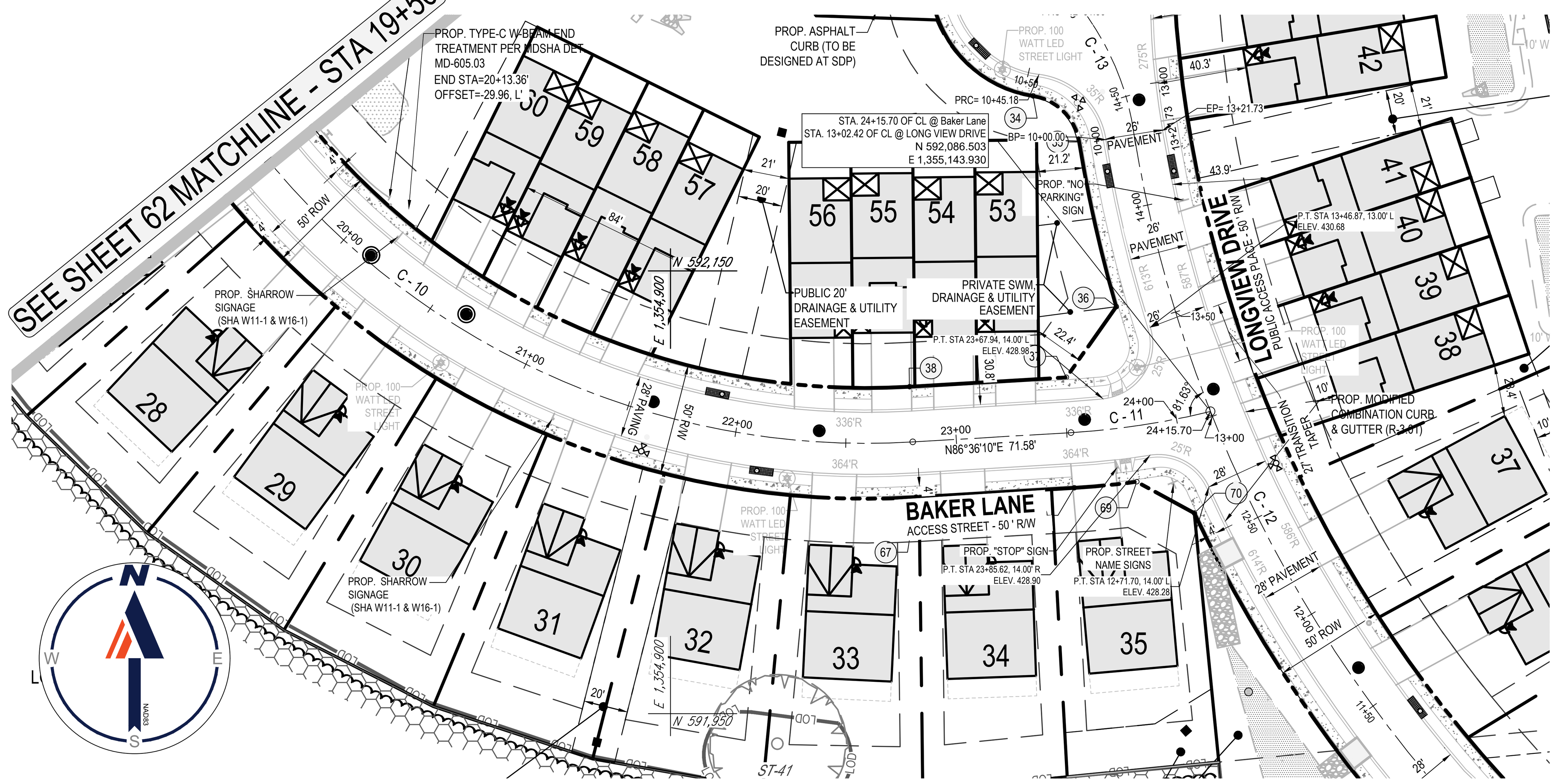
SHEET TITLE:

ROAD PLAN AND PROFILES

SHEET NUMBER:
62 of 117

Mar 12, 2024
H:\1564\D1502\DRAWINGS\PLAN SET\FINAL PLAN\D152018 - PROD - 2A---LAYOUT 62 - ROAD PLAN & PROFILES
AG

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



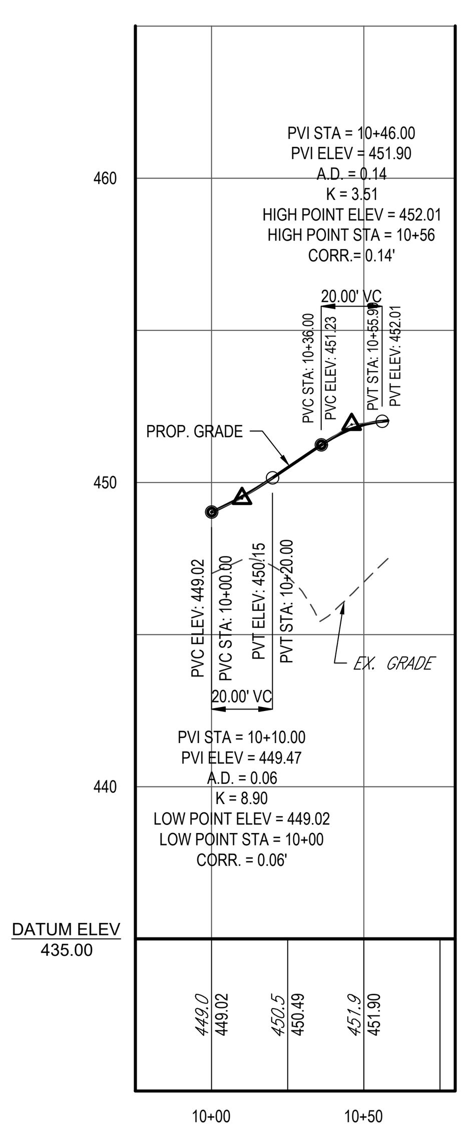
BAKER LANE - PLAN

SCALE : 1" = 50'

CURVE TABLE						
CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C - 10	350.00'	571.93'	S46°35'03"E	510.39'	093°37'35"	372.88'
C - 11	350.00'	63.85'	N81°22'36"E	63.76'	010°27'07"	32.01'
C - 12	600.00'	365.19'	S26°34'52"E	359.58'	034°52'22"	188.45'
C - 13	120.39'	81.79'	N27°34'26"W	80.23'	038°55'33"	42.54'

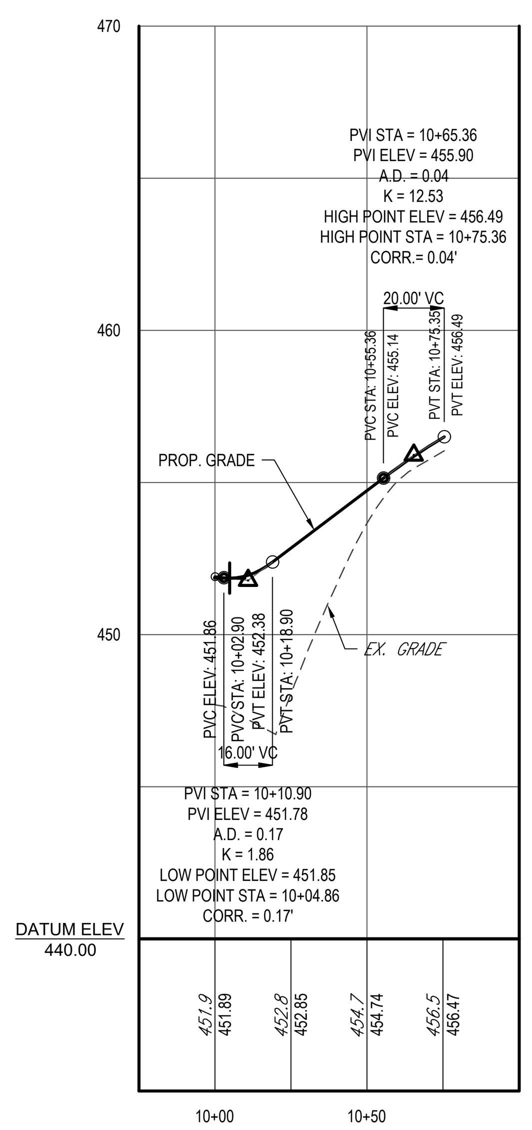
LONGVIEW DRIVE - PLAN

SCALE : 1" = 50'



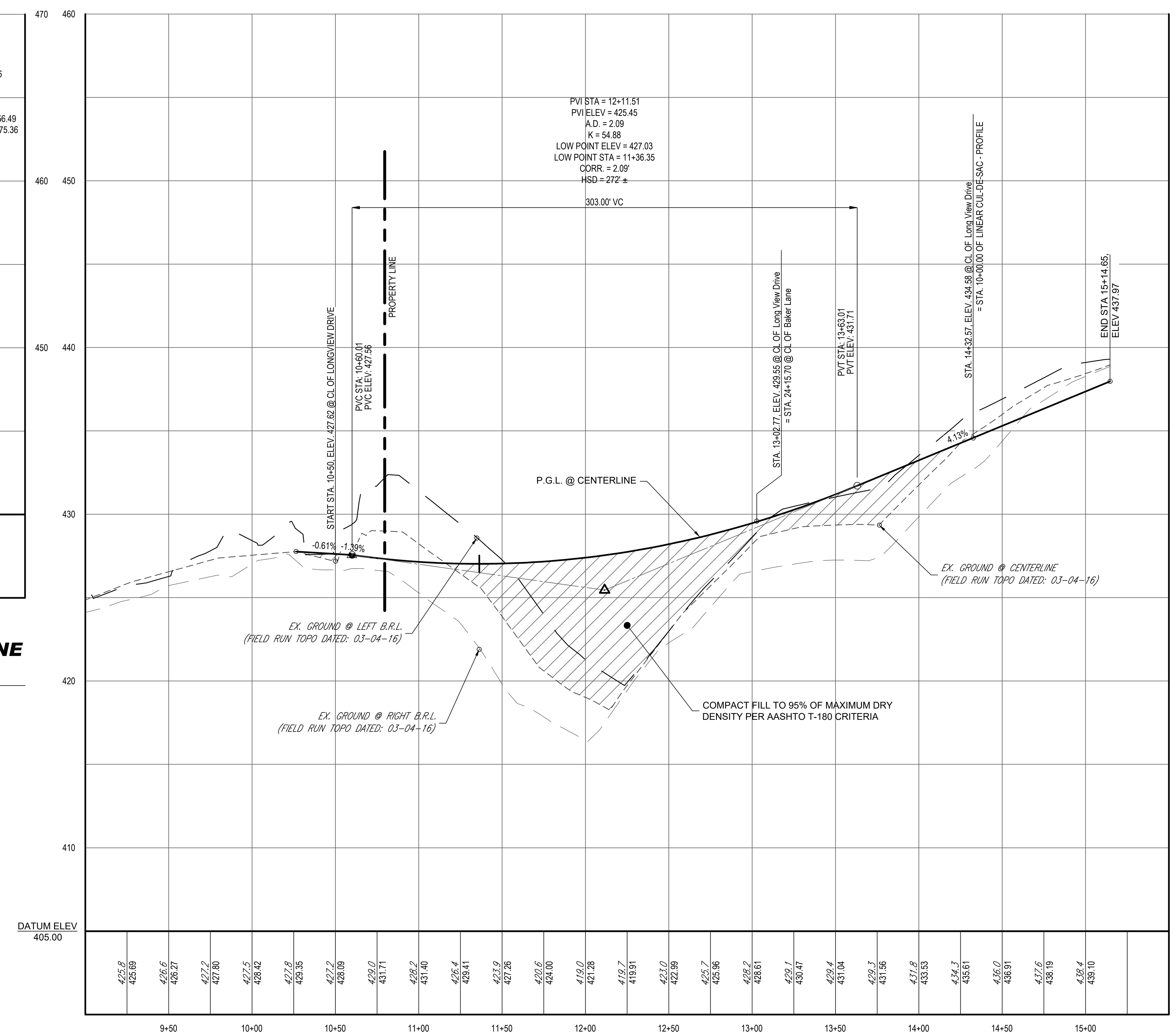
BLUE IVY WAY - SE CURB RETURN

SCALE : 1" = 50' HORIZONTAL
1" = 5' VERTICAL



BLUE IVY WAY - NE CURB RETURN

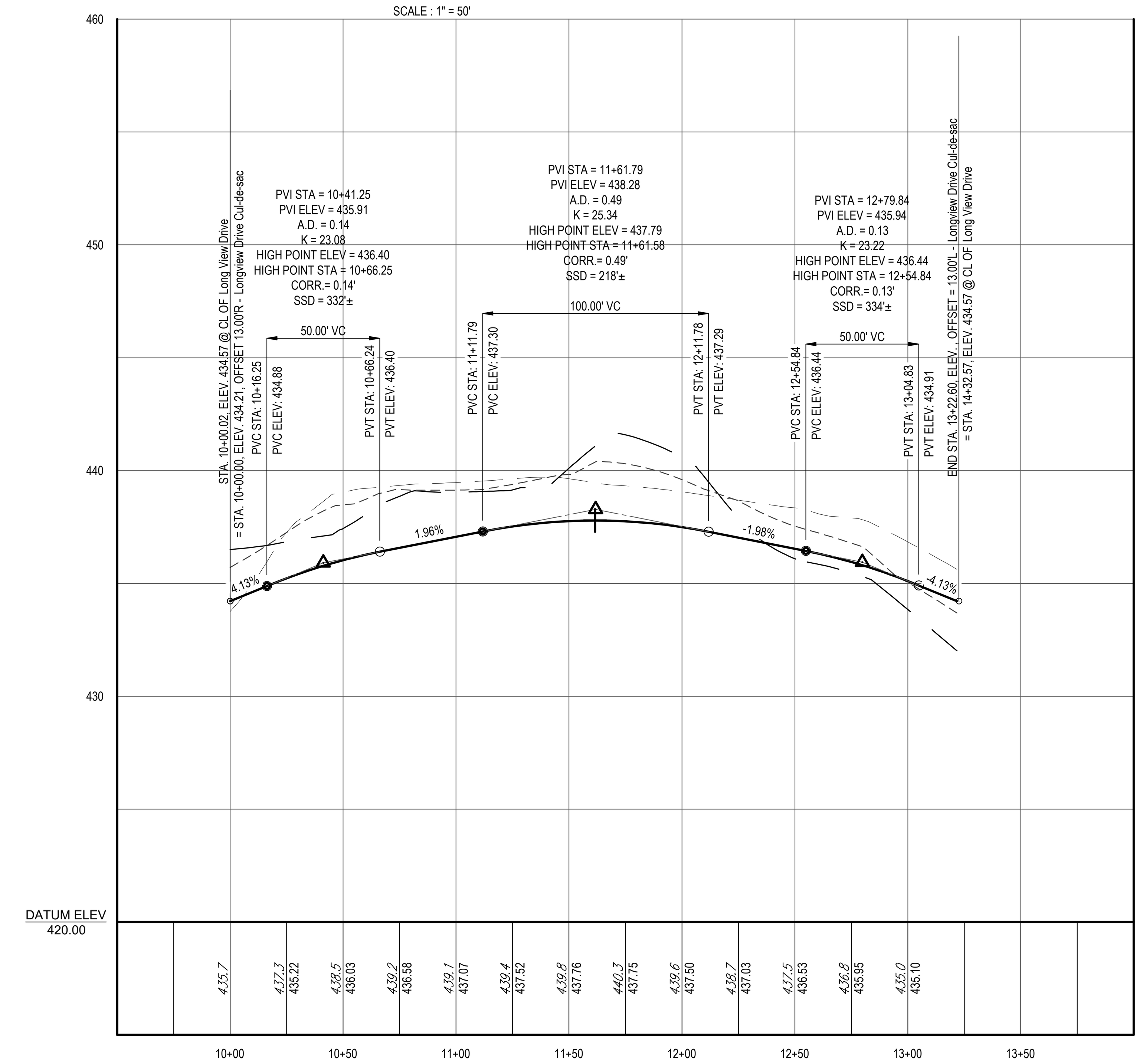
SCALE : 1" = 50' HORIZONTAL
1" = 5' VERTICAL



PUBLIC ACCESS PLACE
DESIGN SPEED = 25 MPH

Long View Drive - PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



Longview Drive Cul-de-sac - PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

Road Classicification Chart								
Road Name	Classification	Design Speed (MPH)	Horizontal Curve (Min.)	Crest Vertical Curve (K)	Sag Vertical Curve (K)	Stopping Sight Distance	Max Slope	Intersection Spacing
BAKER LANE	Public Access Street	30	350'	19	37	200'	10%	250'
LONGVIEW DRIVE	Public Access Place	25	210'	12	26	155'	10%	250'

STREET LIGHT LEGEND

150 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

100 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

1"= 5'

1"= 50'

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TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

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PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
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9891 OLD FREDERICK ROAD - ROUTE 99
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PROFESSIONAL CERTIFICATION
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SHEET TITLE:

ROAD PLAN AND PROFILES

F-22-033

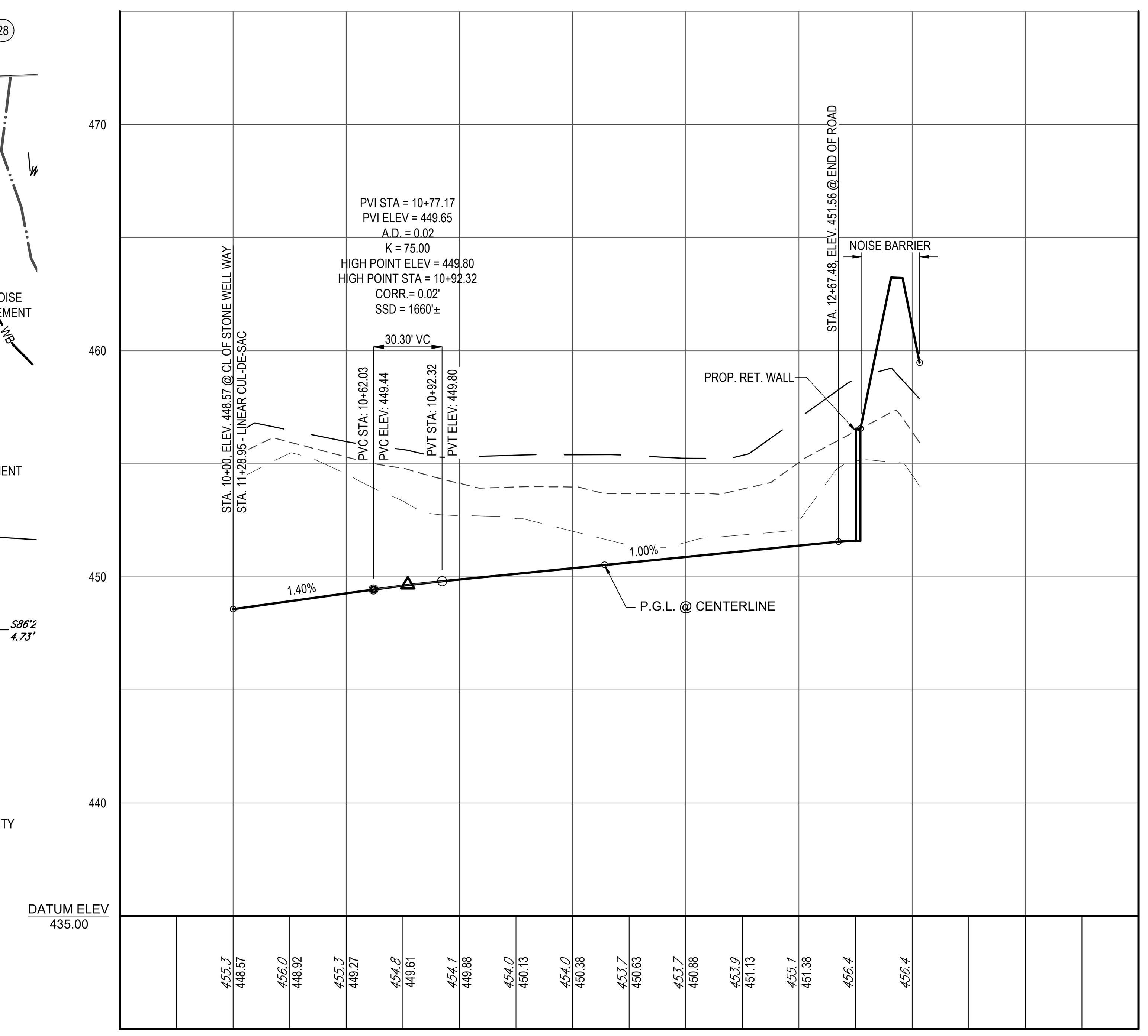
DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

CURVE TABLE

CURVE	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C - 9	115.83'	92.48'	S87°23'39"E	90.04'	045°44'49"	48.86'
C - 14	120.00'	46.94'	N20°39'19"E	46.64'	022°24'44"	23.77'
C - 15	100.00'	54.31'	N06°06'33"W	53.64'	031°07'01"	27.84'

STONE WELL WAY & WISHING WELL LANE - PLAN

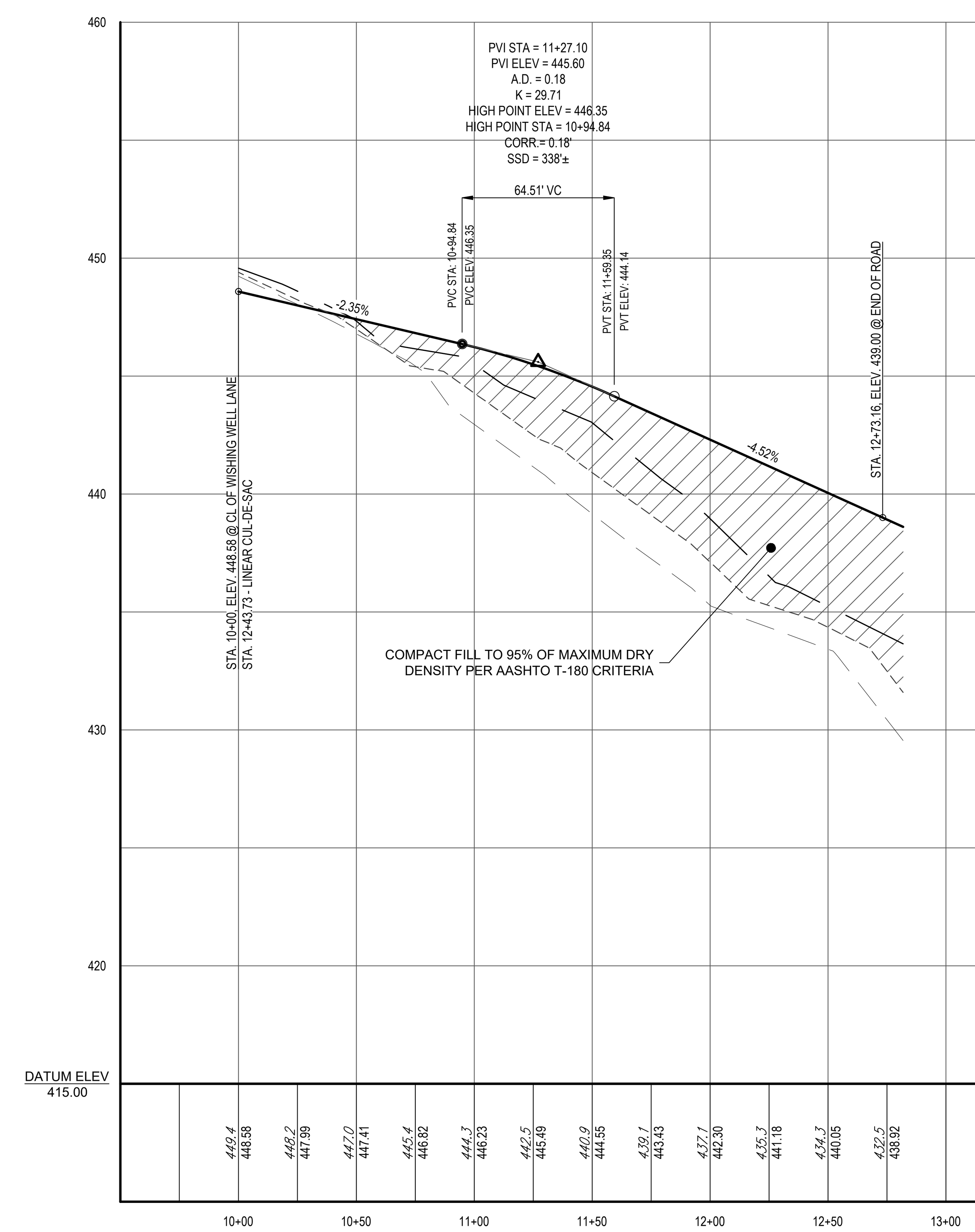
SCALE : 1" = 50'



PRIVATE ACCESS PLACE
DESIGN SPEED = 25 MPH

Stone Well Way - PROFILE

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PRIVATE ACCESS PLACE
DESIGN SPEED = 25 MPH

Wishing Well Lane - PROFILE

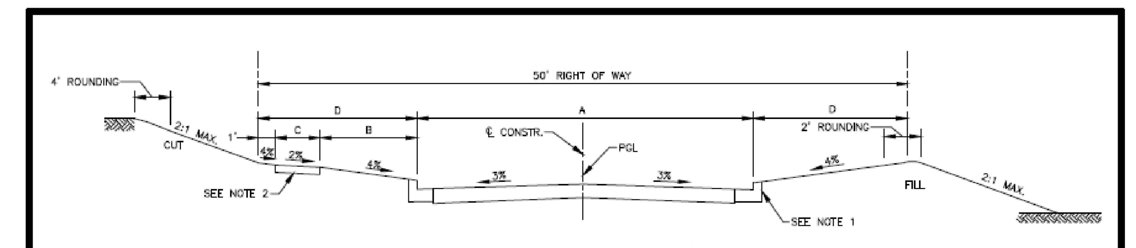
SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

Road Classification Chart

Road Name	Classification	Design Speed (MPH)	Horizontal Curve (Min.)	Crest Vertical Curve (K)	Sag Vertical Curve (K)	Stopping Sight Distance	Max Slope	Intersection Spacing
BLUE IVY WAY	Public Access Street	30	350'	19	37	200'	10%	250'
BAKER LANE	Public Access Street	30	350'	19	37	200'	10%	250'
LONGVIEW DRIVE	Public Access Place	25	210'	12	26	155'	10%	250'
CALMING COURT	Private Access Place	25	210'	12	26	155'	10%	250'
HOPE PLACE	Private Access Place	25	210'	12	26	155'	10%	250'
WISTERIA LANE	Private Access Place	25	210'	12	26	155'	10%	250'
STONE WELL WAY	Private Access Place	25	210'	12	26	155'	10%	250'
WISHING WELL LANE	Private Access Place	25	210'	12	26	155'	10%	250'

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE



CLOSED SECTION

NOTES:

1. TYPE OF CURB VARIES (MODIFIED COMBINATION CURB & GUTTER OR COMBINATION CURB & GUTTER – SEE DESIGN MANUAL VOLUME III FOR CRITERIA).
2. 4" CONCRETE SIDEWALK AS REQUIRED BY SUB-DIVISION REGULATIONS.
3. 4'-0" SIDEWALK REQUIRES A PASSING AREA (SEE DETAIL R-4.01).
4. SEE R-3.05 FOR WHERE SIDEWALK IS AGAINST CURB.

CLASSIFICATION	A	B	C	D	PAVING SECTION
~~MINOR COLLECTOR 2000 ADT~~	~~26'~~	~~8'~~	~~4'~~	~~11'~~	~~P-3~~
ACCESS STREET 1000 ADT	24'*	8'	4'	13'	P-2
ACCESS PLACE 200 ADT	24'*	8'	4'	13'	P-2

*TOWNHOUSES, CONDOMINIUM / APARTMENT DEVELOPMENTS REQUIRE 26' MINIMUM PAVING WIDTH (P-2 PAVING SECTION)
(SEE PLAN VIEW FOR WIDTH OF ROADWAY)

Revised 5/30/2017 — Revised 1/2/2007 — Approved
Howard County, Maryland
Department of Public Works
Approved: Chief, Bureau of Engineering
TYPICAL SECTIONS – RESIDENTIAL STREETS
Access Place, Access Streets, Minor Collector
(Closed Section)
Detail R-1.02

SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BEARING RATIO (CBR) / PAVEMENT MATERIAL (INCHES)	MIN. SUPERPAVE ASPHALT MIX WITH GAB 3 TO <5	5 TO <7	≥ 7	SUPERPAVE ASPHALT MIX WITH CONSTANT GAB 3 TO <5	5 TO <7	≥ 7
~~P-1~~	~~PARKING BAYS: RESIDENTIAL AND NON-RESIDENTIAL; PARKING DRIVE AISLES: RESIDENTIAL AND NON-RESIDENTIAL WITH NO MORE THAN 2 HEAVY TRUCKS PER DAY~~	SUPERPAVE ASPHALT MIX FINAL SURFACE 9.5 MM PG 64-22S, LEVEL 1 (ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE (NA)	NA	NA	NA	NA	NA	NA
		SUPERPAVE ASPHALT MIX BASE 19.0 MM, PG 64-22S, LEVEL 1 (ESAL)	2.0	2.0	2.0	3.5	3.0	2.5
		GRADED AGGREGATE BASE (GAB)	8.5	7.0	5.0	4.0	4.0	4.0
P-2	PARKING DRIVE AISLES: RESIDENTIAL AND NON-RESIDENTIAL WITH NO MORE THAN 10 HEAVY TRUCKS PER DAY; LOCAL ROADS: ACESS PLACE, ACCESS STREET; CUL-DE-SACS: RESIDENTIAL	SUPERPAVE ASPHALT MIX FINAL SURFACE 9.5 MM, PG 64-22S, LEVEL 1 (ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE 9.5 MM, PG 64-22S, LEVEL 1 (ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		SUPERPAVE ASPHALT MIX BASE 19.0 MM, PG 64-22S, LEVEL 1 (ESAL)	2.0	2.0	2.0	3.5	2.0	2.0
		GRADED AGGREGATE BASE (GAB)	8.0	4.0	3.0	4.0	4.0	4.0
P-3	PARKING DRIVE AISLES: RESIDENTIAL AND NON-RESIDENTIAL WITH NO MORE THAN 10 HEAVY TRUCKS PER DAY; LOCAL ROADS: ACCESS PLACE, ACCESS STREET; CUL-DE-SACS: NON-RESIDENTIAL; MINOR COLLECTORS: RESIDENTIAL	SUPERPAVE ASPHALT MIX FINAL SURFACE 9.5 MM, PG 64-22S, LEVEL 1 (ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE 9.5 MM, PG 64-22S, LEVEL 1 (ESAL)	1.0	1.0	1.0	1.0	1.0	1.0
		SUPERPAVE ASPHALT MIX BASE 19.0 MM, PG 64-22S, LEVEL 1 (ESAL)	3.0	3.0	3.0	4.5	3.0	2.0
		GRADED AGGREGATE BASE (GAB)	10.0	6.0	3.0	6.0	6.0	6.0
~~P-4~~	~~MINOR COLLECTORS: NON-RESIDENTIAL; MAJOR COLLECTORS~~	SUPERPAVE ASPHALT MIX FINAL SURFACE 12.5 MM, PG 64-22S, LEVEL 2 (LOW ESAL)	2.0	2.0	2.0	2.0	2.0	2.0
		SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE 12.5 MM, PG 64-22S, LEVEL 2 (LOW ESAL)	2.0	2.0	2.0	2.0	2.0	2.0
		SUPERPAVE ASPHALT MIX BASE 19.0 MM, PG 64-22S, LEVEL 2 (LOW ESAL)	4.0	4.0	3.0	6.0	5.0	3.0
		GRADED AGGREGATE BASE (GAB)	13.0	7.0	4.0	6.0	6.0	6.0

NOTES

1. HEAVY TRUCKS ARE DEFINED AS THOSE WITH SIX (6) WHEELS OR MORE INCLUDING GARBAGE TRUCKS.
2. SUPERPAVE ASPHALT MIX LAYERS SHALL BE PLACED IN APPROPRIATE COMPACTED LIFT THICKNESS: 19.0 MM BASE (2.0" MIN. TO 4.0" MAX.), 12.5 MM SURFACE (1.5" MIN. TO 3.0" MAX.), AND 9.5 MM SURFACE (1.0" MIN. TO 2.0" MAX.)
3. GRADED AGGREGATE BASE (GAB) TO BE PLACED AND COMPACTED IN 6" MAX. COMPACTED THICKNESS LAYERS.
4. THE INTERMEDIATE SURFACE COURSE LAYER MUST BE PLACED WITHIN 2 WEEKS OF PLACEMENT OF BASE COURSE, AND IS REQUIRED PRIOR TO SUBSTANTIAL COMPLETION INSPECTION AND BOND REDUCTION.
5. IN LIEU OF PLACING THE INTERMEDIATE SURFACE COURSE LAYER FOR COMMERCIAL/INDUSTRIAL ENTRANCE APRONS WITHIN THE COUNTY RIGHT-OF-WAY WHERE AUXILIARY LANES ARE NOT REQUIRED, THE THICKNESS OF THE INTERMEDIATE PAVEMENT LAYER CAN BE ADDED TO THE REQUIRED THICKNESS OF THE BASE ASPHALT LAYER.
6. THE CONSTRUCTION DRAWINGS SHALL SHOW THE PAVING SECTION, ROAD CLASSIFICATION AND CBR VALUE FOR EACH ROADWAY.

SUPERPAVE ASPHALT MIX FINAL SURFACE
SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE
SUPERPAVE ASPHALT MIX BASE
GRADED AGGREGATE BASE (GAB)

Revised 5/30/2017 — Revised 5/7/2007 — Approved
Howard County, Maryland
Department of Public Works
Approved: Chief, Bureau of Engineering
PAVING SECTIONS
P-1 to P-4
Detail R-2.01

SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BEARING RATIO (CBR) / PAVEMENT MATERIAL (INCHES)	MIN. SUPERPAVE ASPHALT MIX WITH GAB 3 TO <5	5 TO <7	≥ 7	SUPERPAVE ASPHALT MIX WITH CONSTANT GAB 3 TO <5	5 TO <7	≥ 7
P-5	MINOR ARTERIAL	SUPERPAVE ASPHALT MIX FINAL SURFACE 12.5 MM, PG 70-22, LEVEL 3 (HIGH ESAL)	2.0	2.0	2.0	2.0	2.0	2.0
		SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE 12.5 MM, PG 64-22S, LEVEL 3 (HIGH ESAL)	2.0	2.0	2.0	2.0	2.0	2.0
		SUPERPAVE ASPHALT MIX BASE 19.0 MM, PG 64-22S, LEVEL 3 (HIGH ESAL)	6.0	6.0	6.0	7.0	5.0	4.0
		GRADED AGGREGATE BASE (GAB)	11.0	5.0	4.0	8.0	8.0	8.0
~~P-6~~	~~UNDIVIDED INTERMEDIATE ARTERIAL; DIVIDED INTERMEDIATE ARTERIAL~~	SUPERPAVE ASPHALT MIX FINAL SURFACE 12.5 MM, PG 70-22S, LEVEL 3 (HIGH ESAL)	2.0	2.0	2.0	2.0	2.0	2.0
		SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE 12.5 MM, PG 64-22S, LEVEL 3 (HIGH ESAL)	2.0	2.0	2.0	2.0	2.0	2.0
		SUPERPAVE ASPHALT MIX BASE 19.0 MM, PG 64-22S, LEVEL 3 (HIGH ESAL)	7.0	7.0	7.0	8.5	6.5	5.0
		GRADED AGGREGATE BASE (GAB)	13.0	6.0	4.0	8.0	8.0	8.0
P-7	STABILIZED SHOULDER: MINOR ARTERIAL	CHIP SEAL DOUBLE SURFACE TREATMENT	1.75	1.75	1.75	NA	NA	NA
		GRADED AGGREGATE BASE (GAB)	16.5	14.5	13.0	NA	NA	NA
~~P-8~~	~~PAVED SHOULDER: UNDIVIDED INTERMEDIATE ARTERIAL, DIVIDED INTERMEDIATE ARTERIAL; SIDEWALK AND PARKING AREAS (PRIVATE) (NOTE: THIS SECTION MAY BE USED IN LIEU OF CONCRETE SIDEWALK IN OFF SITE, PRIVATELY MAINTAINED AREAS ONLY.)~~	SUPERPAVE ASPHALT MIX FINAL SURFACE 12.5 MM, PG 64-22S, LEVEL 1 (LOW ESAL)	3.0	3.0	3.0	4.0	3.5	3.5
		GRADED AGGREGATE BASE (GAB)	9.5	8.0	5.5	6.0	6.0	6.0

NOTES

1. HEAVY TRUCKS ARE DEFINED AS THOSE WITH SIX (6) WHEELS OR MORE INCLUDING GARBAGE TRUCKS.
2. SUPERPAVE ASPHALT MIX LAYERS SHALL BE PLACED IN APPROPRIATE COMPACTED LIFT THICKNESS: 19.0 MM BASE (2.0" MIN. TO 4.0" MAX.), 12.5 MM SURFACE (1.5" MIN. TO 3.0" MAX.), AND 9.5 MM SURFACE (1.0" MIN. TO 2.0" MAX.)
3. GRADED AGGREGATE BASE (GAB) TO BE PLACED AND COMPACTED IN 6" MAX. COMPACTED THICKNESS LAYERS.
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5. IN LIEU OF PLACING THE INTERMEDIATE SURFACE COURSE LAYER FOR COMMERCIAL/INDUSTRIAL ENTRANCE APRONS WITHIN THE COUNTY RIGHT-OF-WAY WHERE AUXILIARY LANES ARE NOT REQUIRED, THE THICKNESS OF THE INTERMEDIATE PAVEMENT LAYER CAN BE ADDED TO THE REQUIRED THICKNESS OF THE BASE ASPHALT LAYER.
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SUPERPAVE ASPHALT MIX FINAL SURFACE
SUPERPAVE ASPHALT MIX INTERMEDIATE SURFACE
SUPERPAVE ASPHALT MIX BASE
GRADED AGGREGATE BASE (GAB)

Howard County, Maryland
Department of Public Works
Approved: Chief, Bureau of Engineering
PAVING SECTIONS
P-5 to P-8
Detail R-2.02

1"= 5'

1"= 50'

STREET LIGHT LEGEND

150 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

100 WATT LED COLONIAL POST-TOP (COOPER) MOUNTED ON A 14' BLACK FIBERGLASS POLE

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LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
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REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: PROD-2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

— FOR —

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

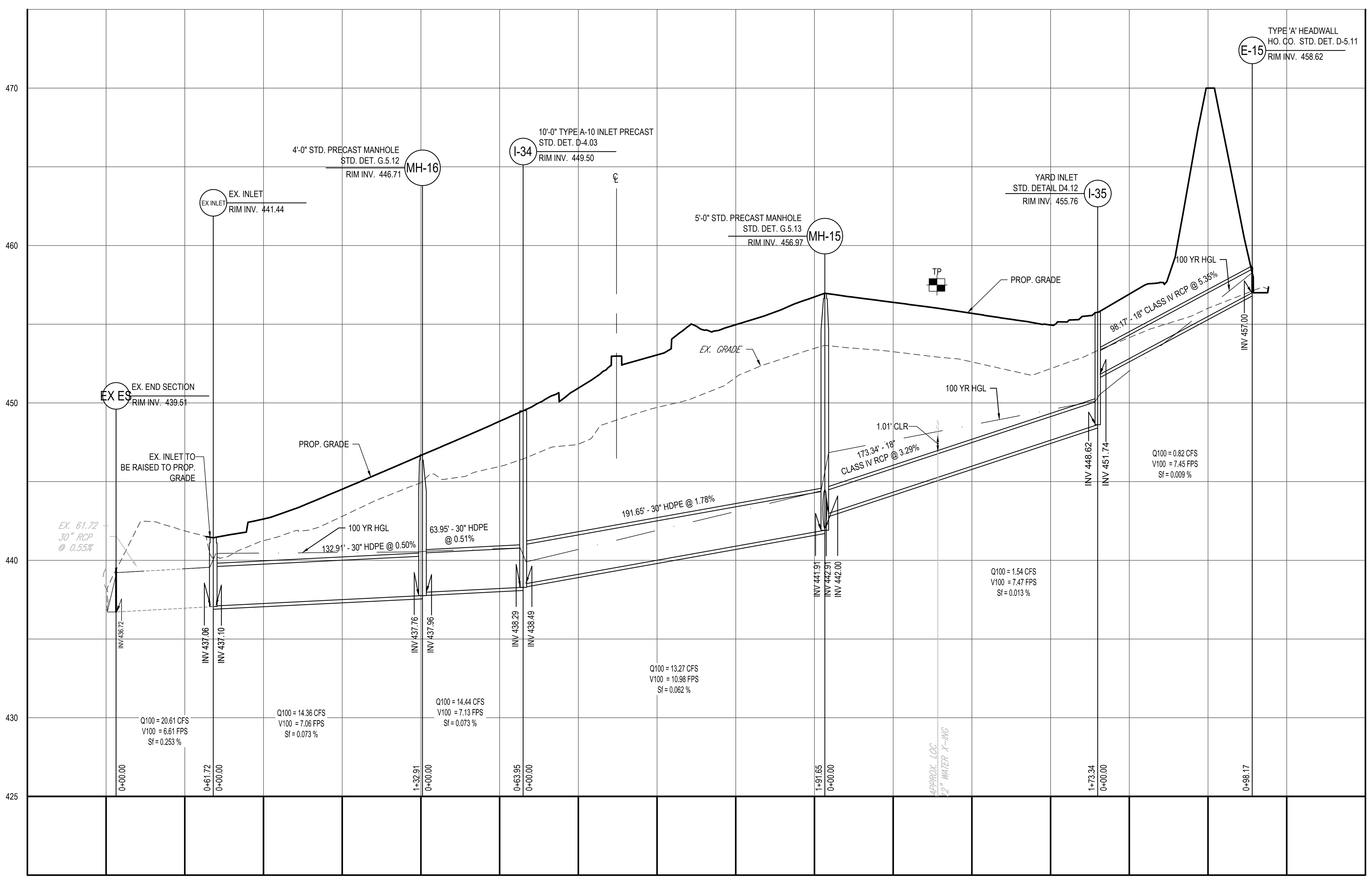
BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

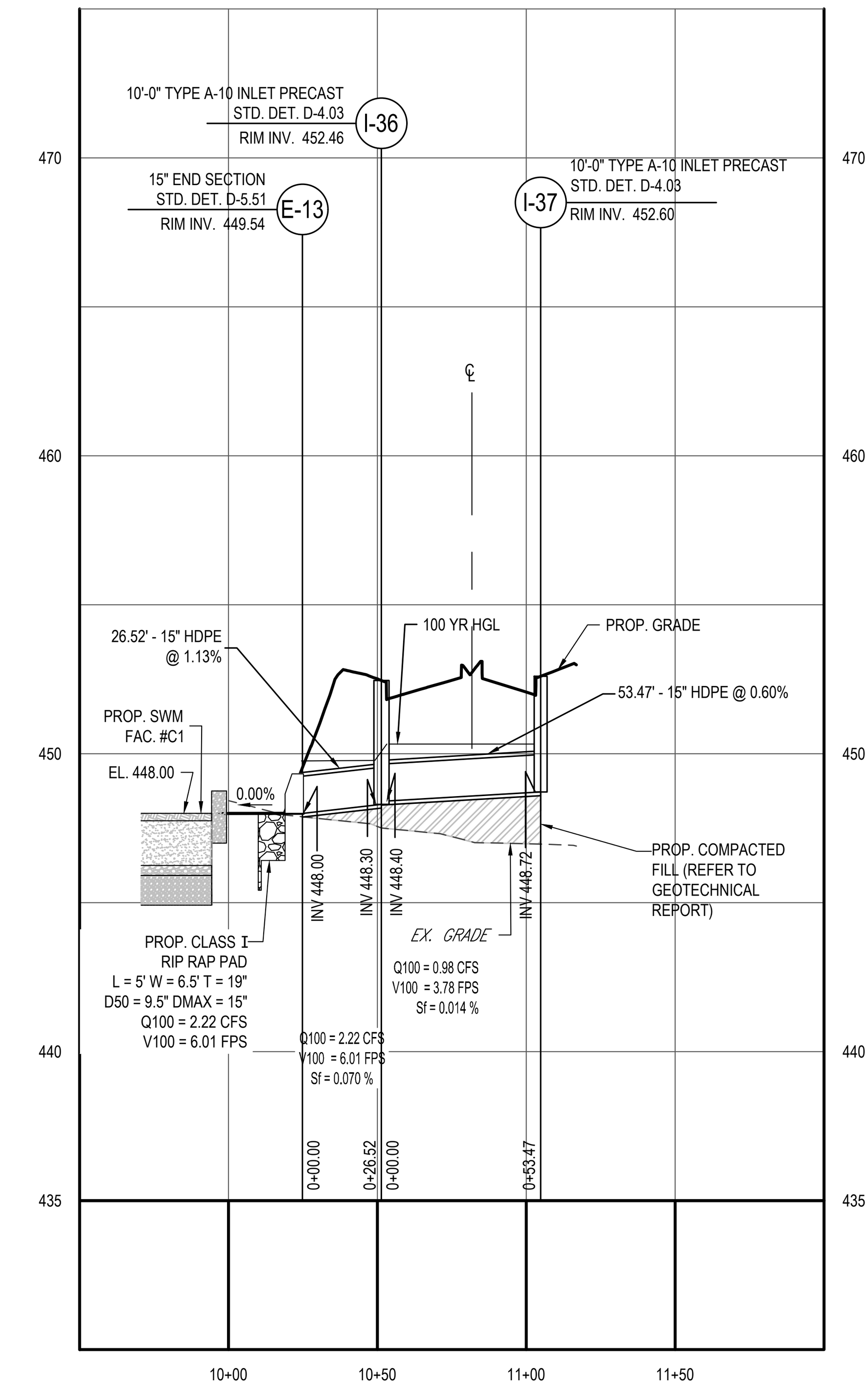
ROAD PLAN AND PROFILES

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



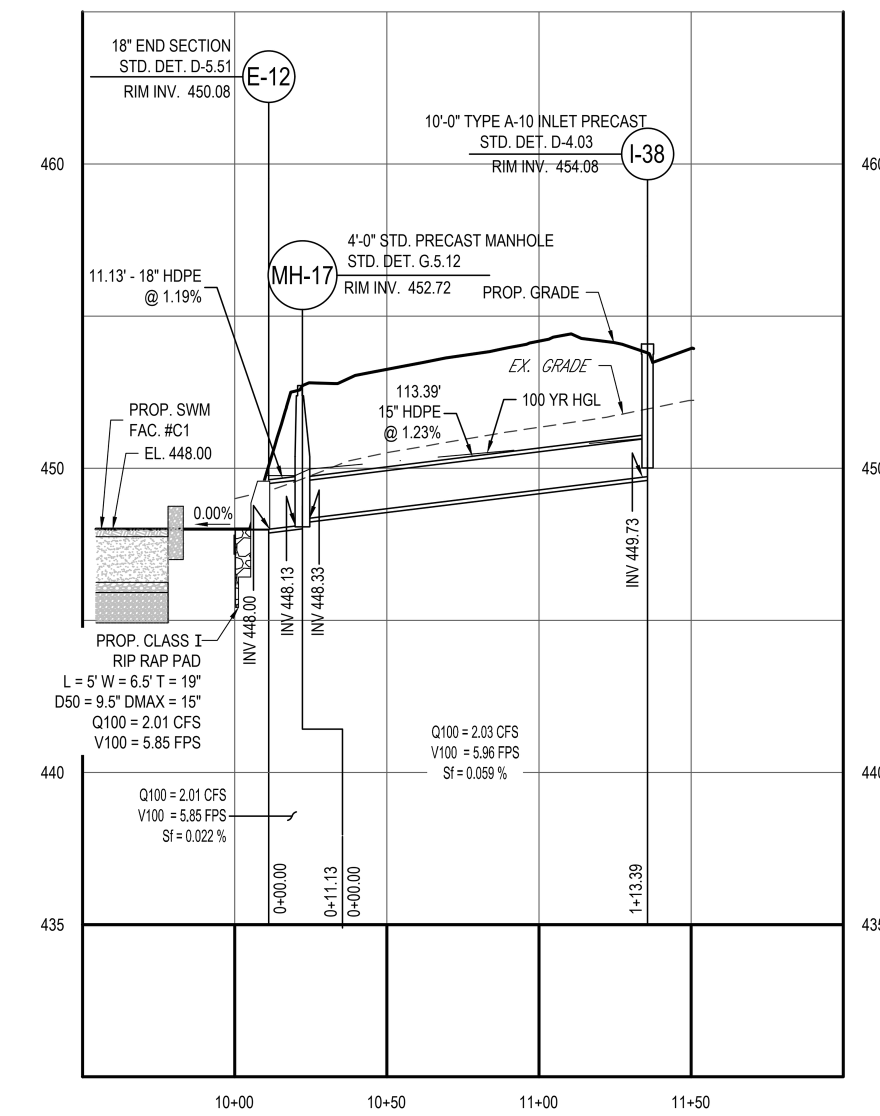
PROP STORMDRAIN - EX-INLET TO E-15

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



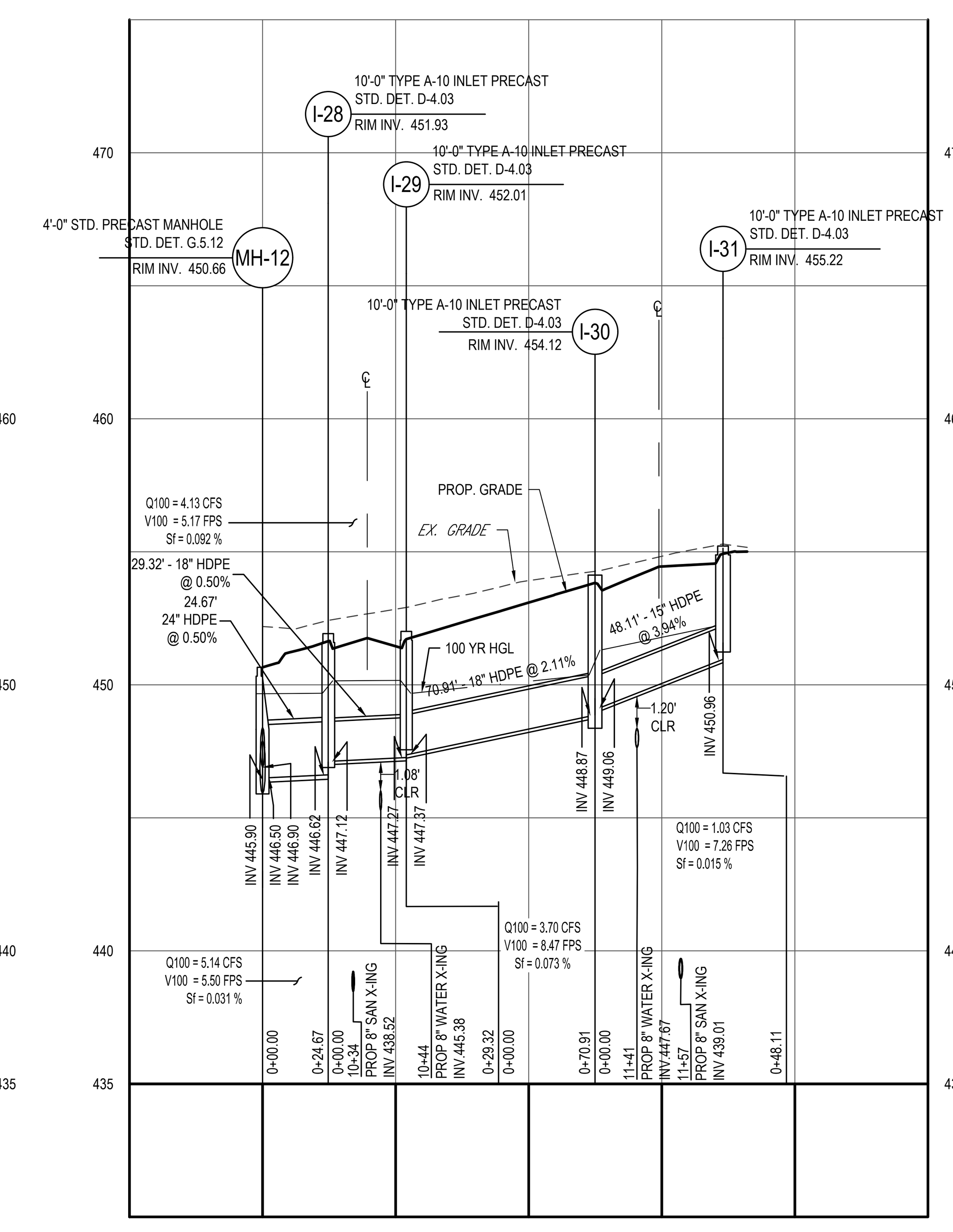
PROP STORMDRAIN - E-13 TO I-37

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



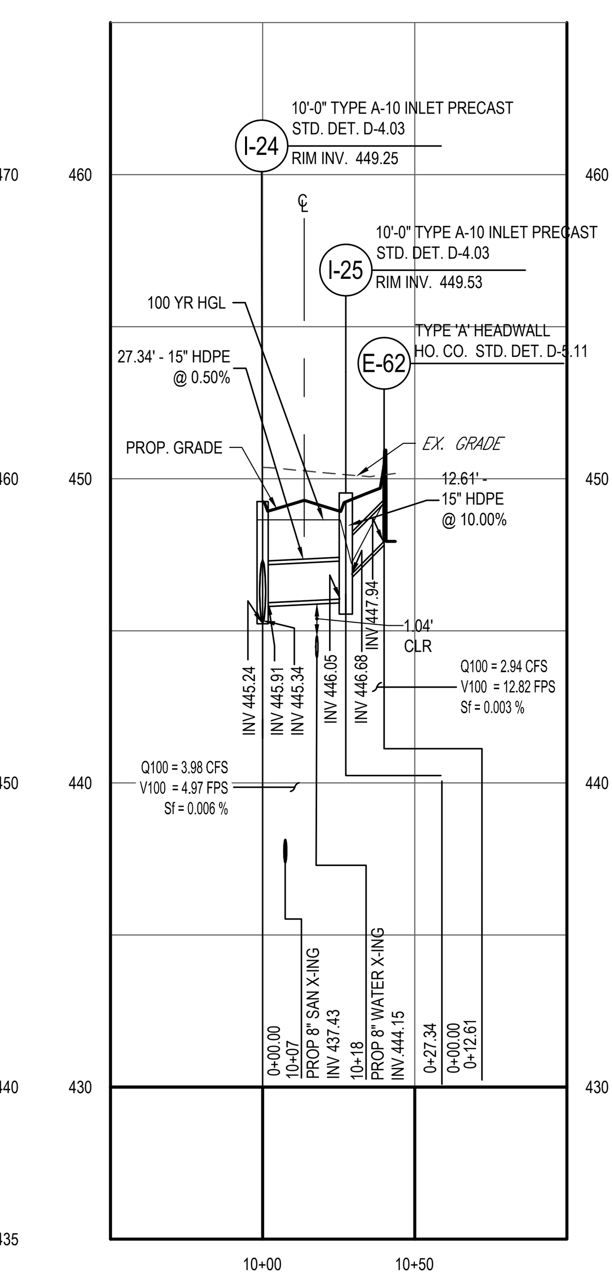
PROP STORMDRAIN - E-12 TO I-38

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



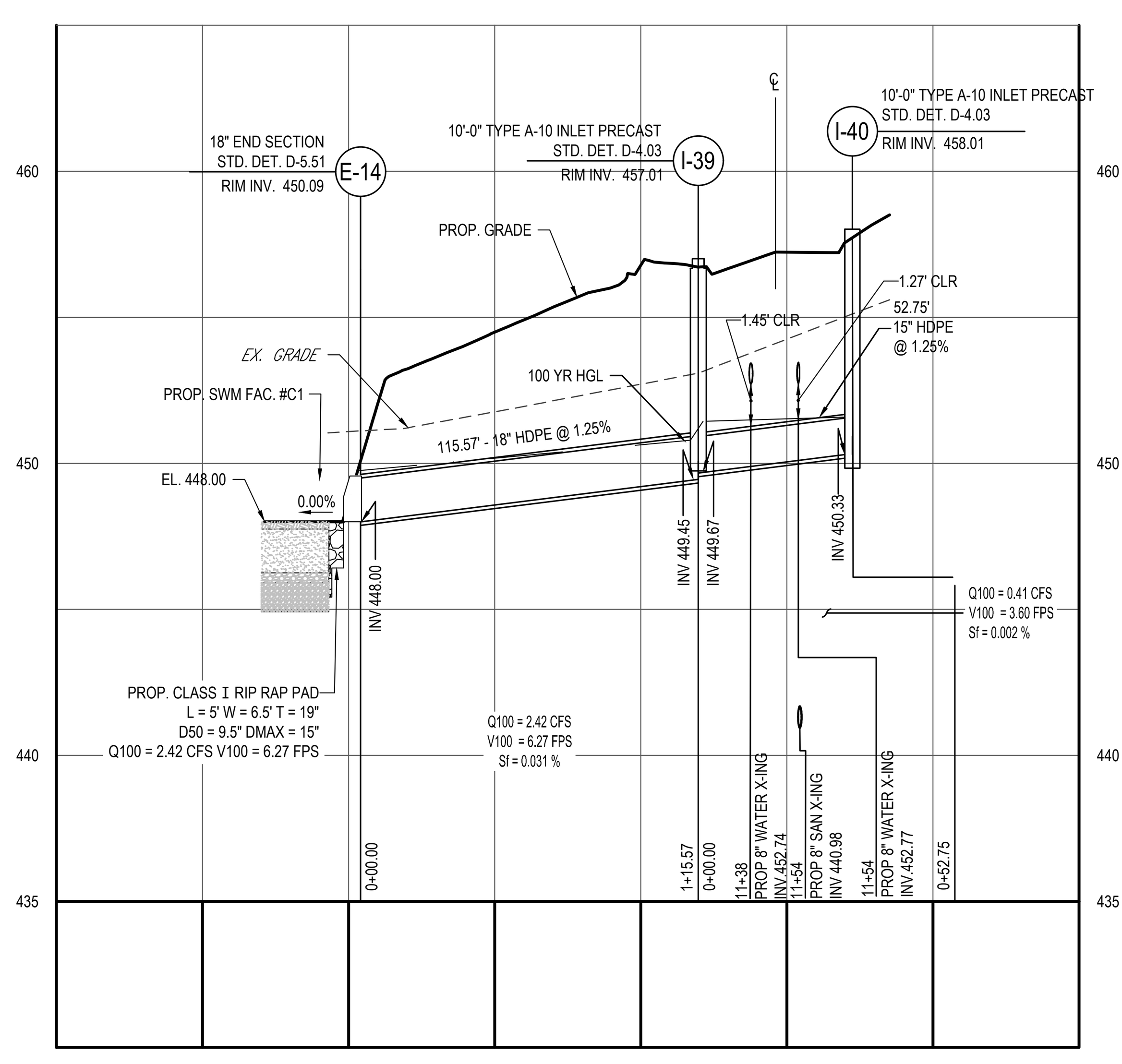
PROP STORMDRAIN - MH-12 TO I-31

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



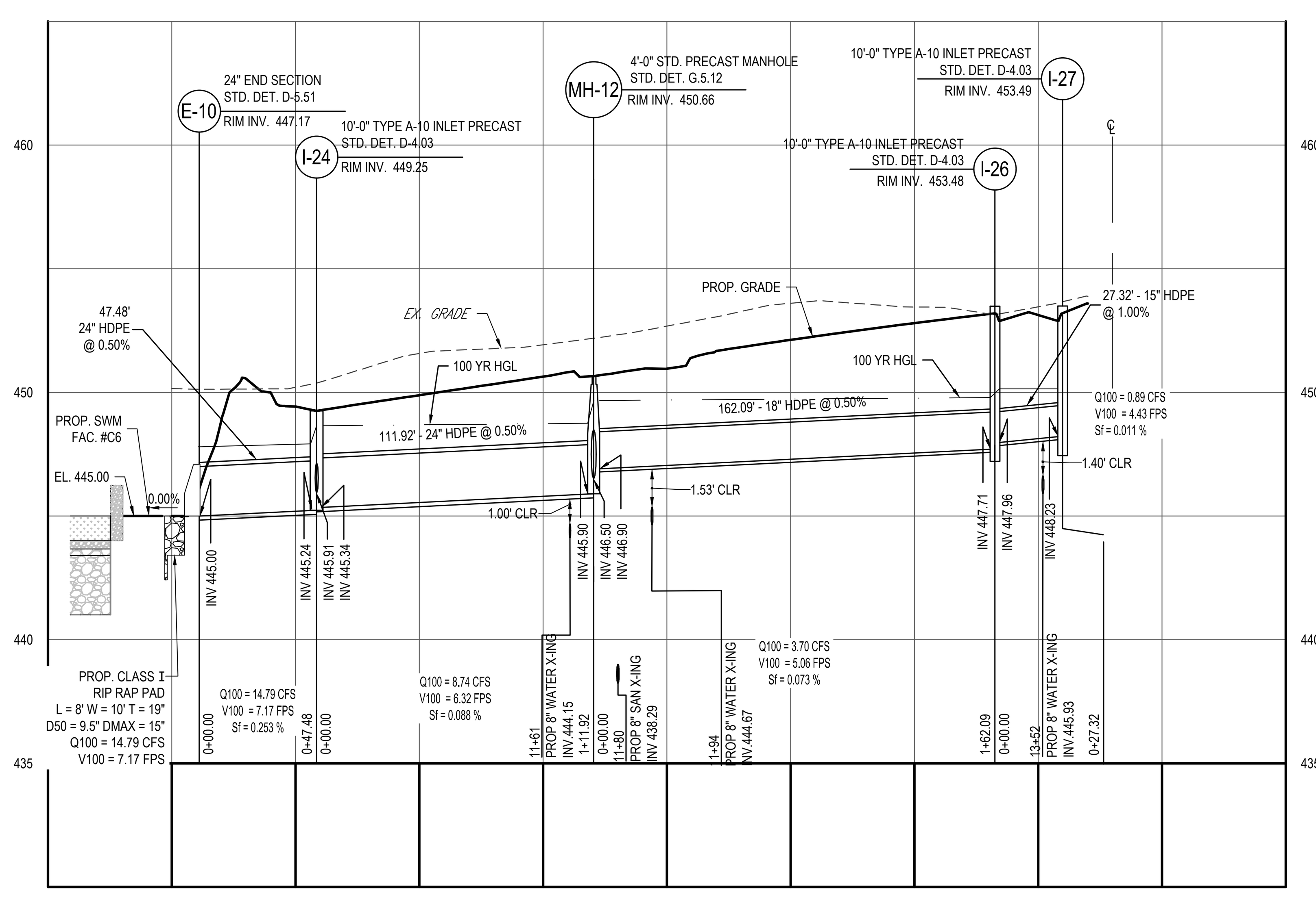
PROP STORMDRAIN - I-24 TO E-62

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP. STORMDRAIN - E-14 TO I-40

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - E-10 TO I-27

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

NOTE: CONTRACTOR TO VERIFY ALL STRUCTURE SIZES PRIOR TO ORDERING ANY STRUCTURES.

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
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PROJECT No.:	MD152018
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CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	PSTM - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
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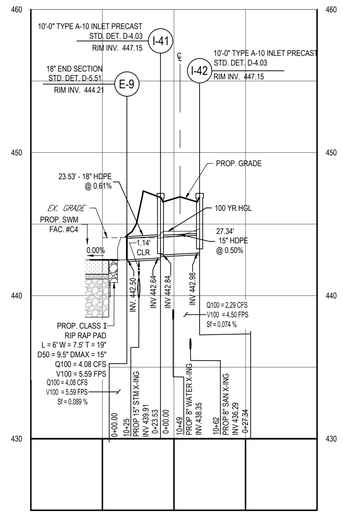
SHEET TITLE:

STORMDRAIN PROFILES

SHEET NUMBER:
65 of 117

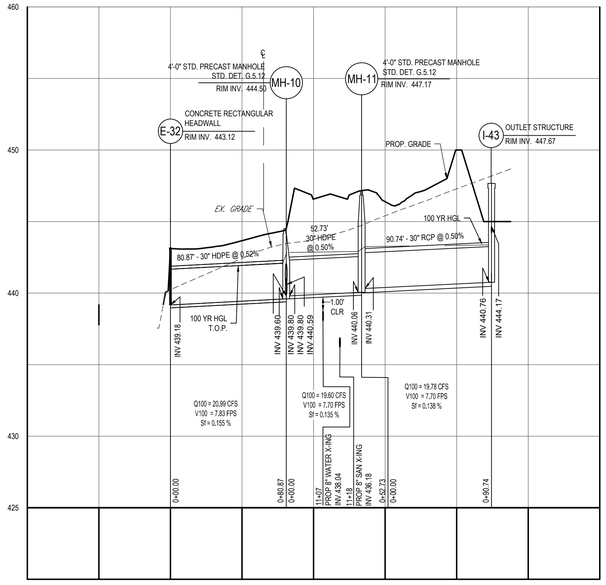
F-22-033

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



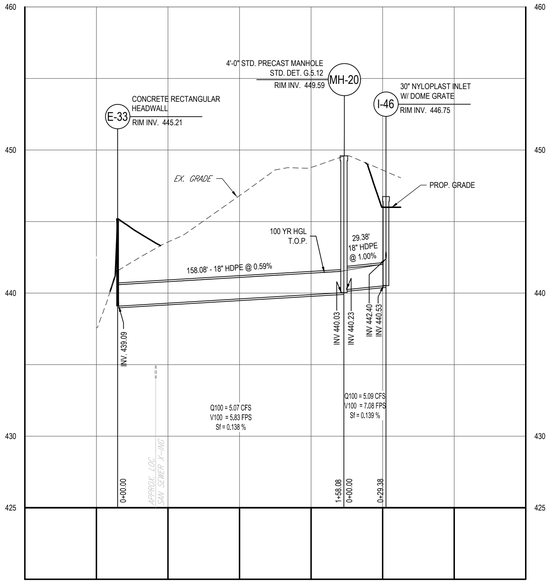
PROP STORMDRAIN - E-9 TO I-42

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



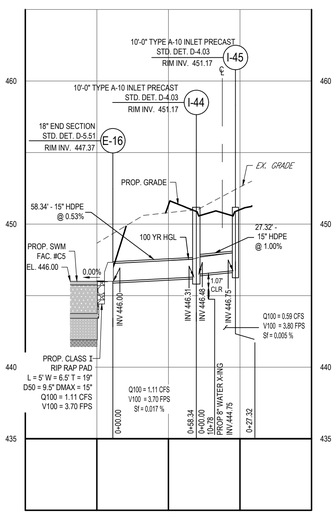
PROP STORMDRAIN - E-32 TO I-43

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



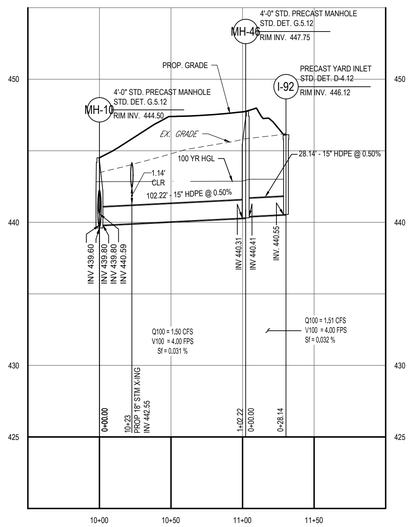
PROP STORMDRAIN - E-33 TO I-46

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



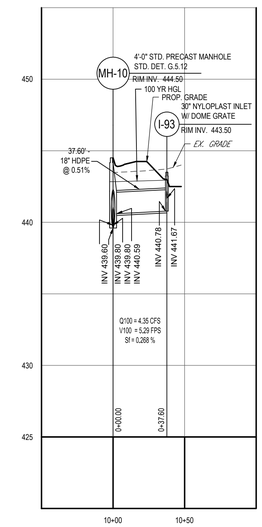
PROP STORMDRAIN - E-16 TO I-45

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



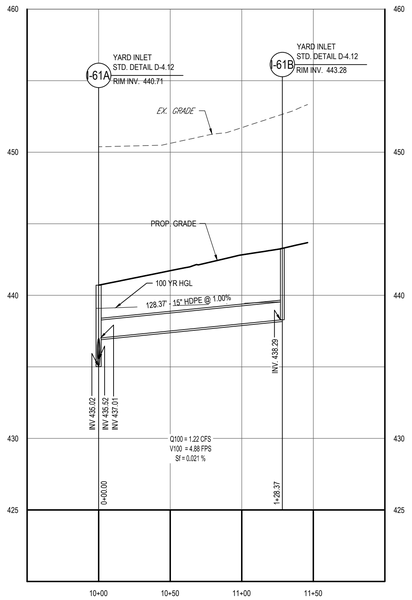
PROP STORMDRAIN - MH-10 TO I-92

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



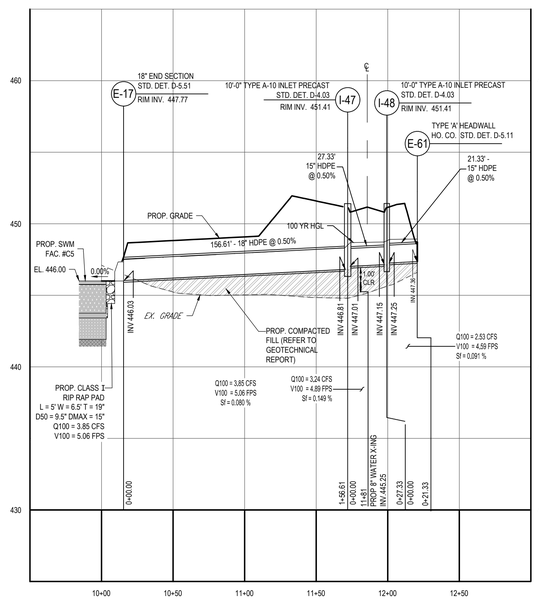
PROP STORMDRAIN - MH-10 TO I-93

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - I-61A TO I-61B

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - E-17 TO E-61

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

NOTE: CONTRACTOR TO VERIFY ALL STRUCTURE SIZES PRIOR TO ORDERING ANY STRUCTURES.

APPROVED: DEPARTMENT OF PUBLIC WORKS	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
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BA-CASE NO. 17-018C
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PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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CAD I.D.:	PSTM - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
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SHEET TITLE:

STORMDRAIN PROFILES

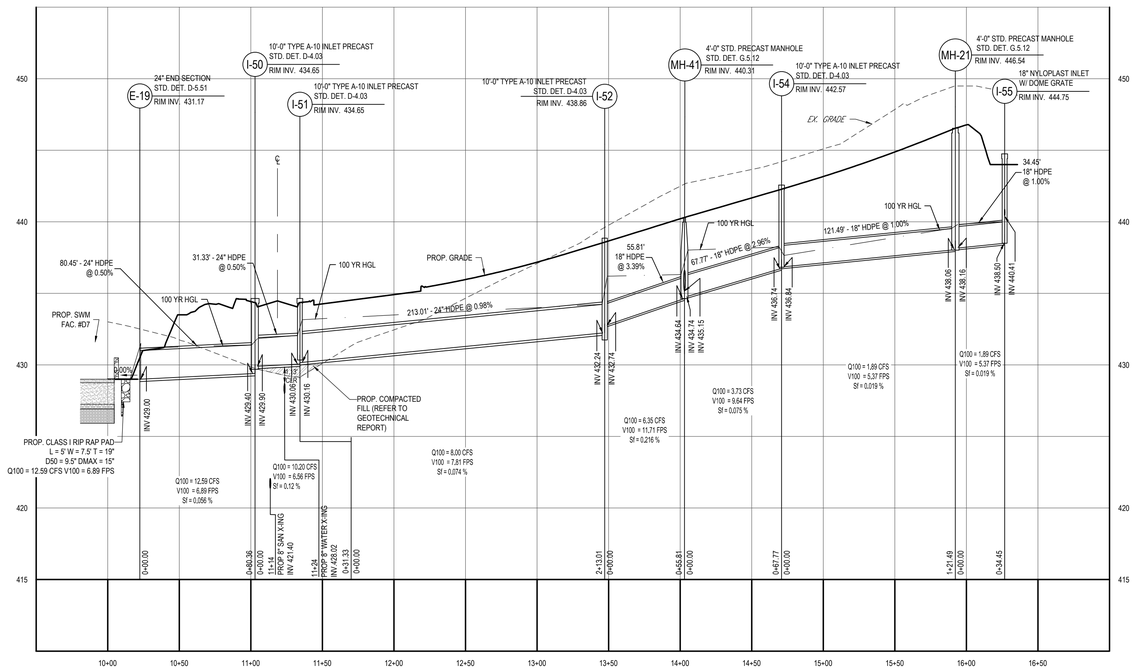
SHEET NUMBER:

66 of 117

F-22-033

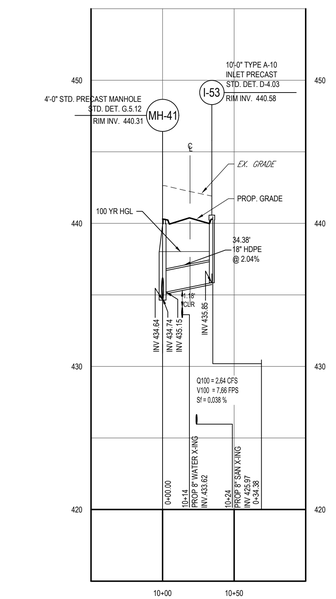
May 30, 2024
H:\MD152018\DRAWINGS\PLANSETS\FINAL PLANMD152018 - PSTM - 2A----LAYOUT 66 - STM DRAIN PROFILES
MD152018

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



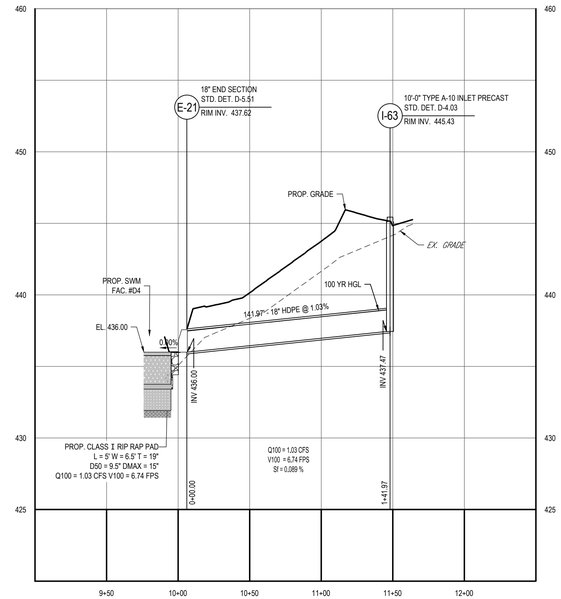
PROP STORMDRAIN - E-19 TO I-55

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



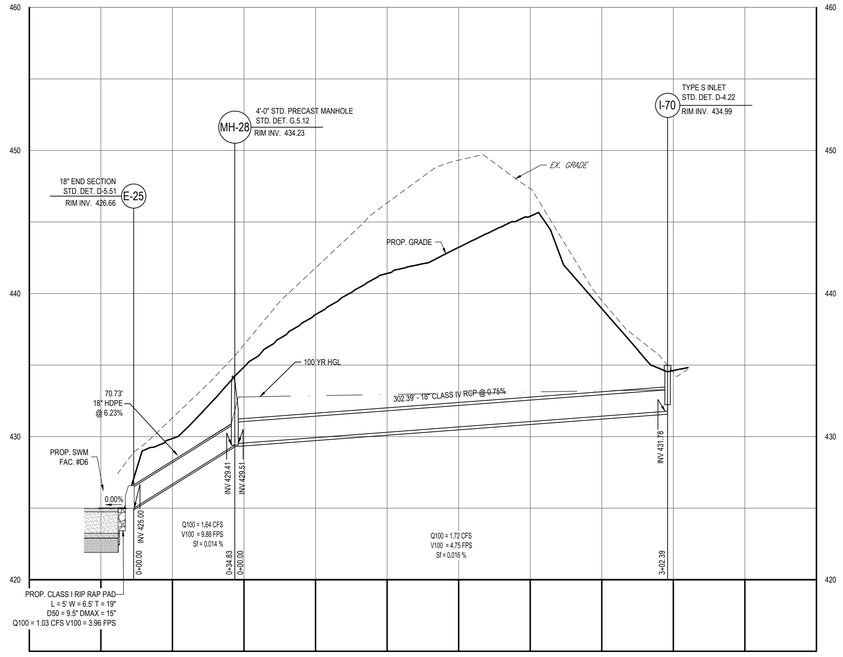
MD152018 - STM I-53 TO MH-41 - (51)

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



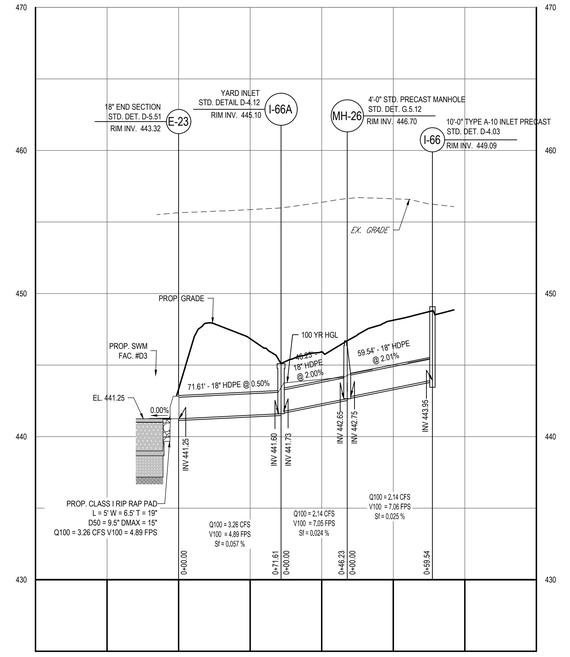
PROP STORMDRAIN - E-21 TO I-63

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



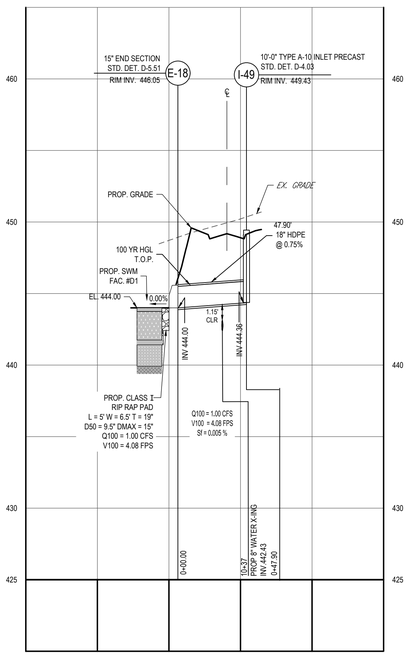
PROP STORMDRAIN - E-25 TO I-70

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - E-23 TO I-66

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - E-18 TO I-49

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

NOTE: CONTRACTOR TO VERIFY ALL STRUCTURE SIZES PRIOR TO ORDERING ANY STRUCTURES.

APPROVED: DEPARTMENT OF PUBLIC WORKS	
Docusigned by:	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
Docusigned by:	6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
Docusigned by: (Will Edmondson)	6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

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TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
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NAME AND LICENSE No. 40868
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SHEET TITLE:

STORMDRAIN PROFILES

SHEET NUMBER:

67 of 117

F-22-033

May 30, 2024
M:\E\MD\152018\DRAWINGS\PLAN SET\FINAL PLANS\152018 PSTM - 2A---LAYOUT 67 - STM DRAIN PROFILES

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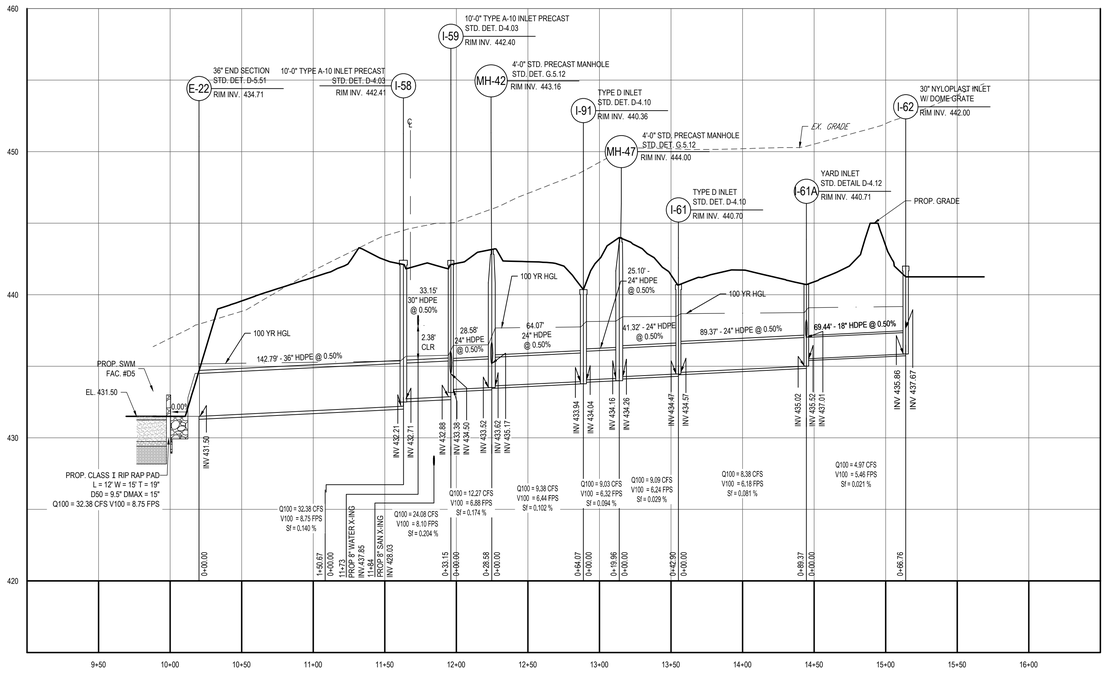
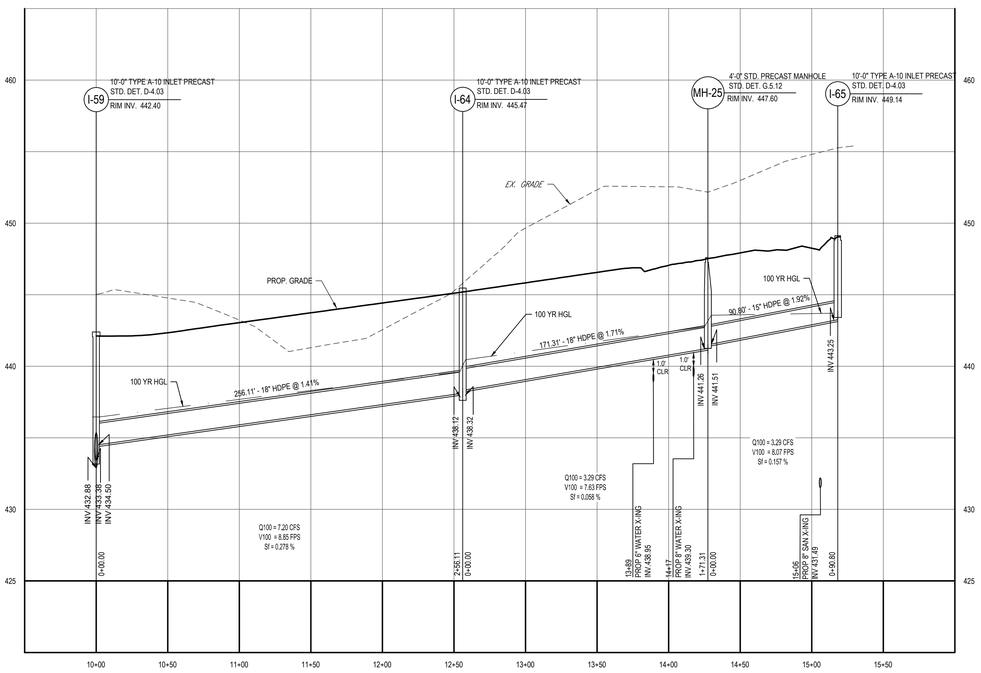


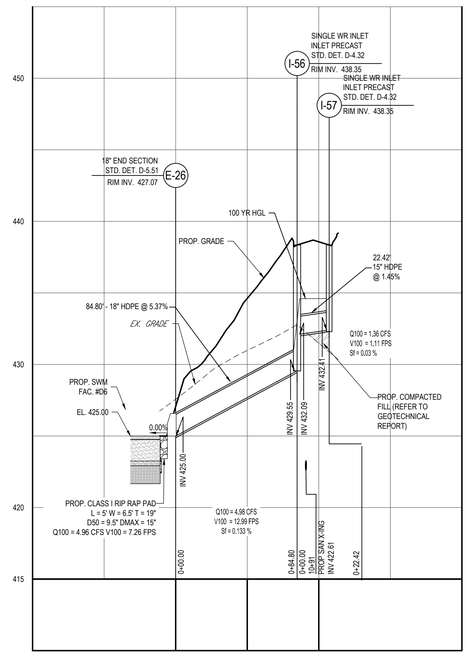
PROP STORMDRAIN - E-22 TO I-62

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



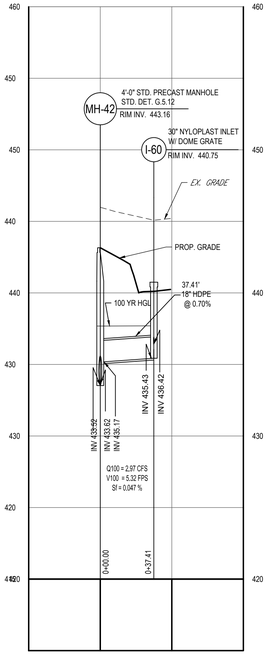
PROP STORMDRAIN - I-59 TO I-65

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - E-26 TO I-57

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - MH-42 TO I-60

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

NOTE: CONTRACTOR TO VERIFY ALL STRUCTURE SIZES PRIOR TO ORDERING ANY STRUCTURES.

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: PSTM - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND LICENSE No. 42808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 42808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

STORMDRAIN PROFILES

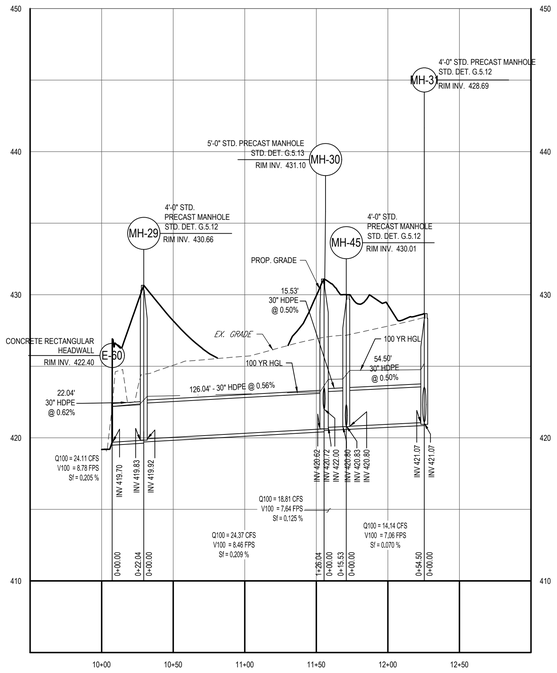
SHEET NUMBER:

68 of 117

F-22-033

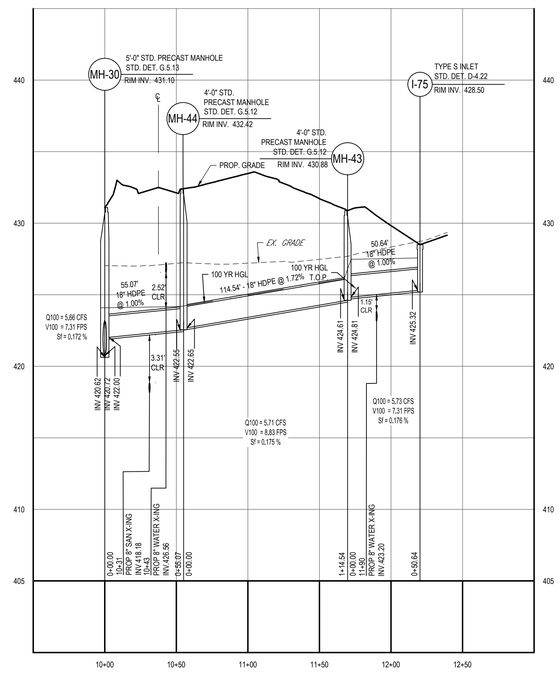
May 30, 2024
H:\152018\2\02\DRAWINGS\PLAN SET\FINAL PLAN\MD152018 - PSTM - 2A---LAYOUT 68 - STM DRAIN PROFILES
MKE

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



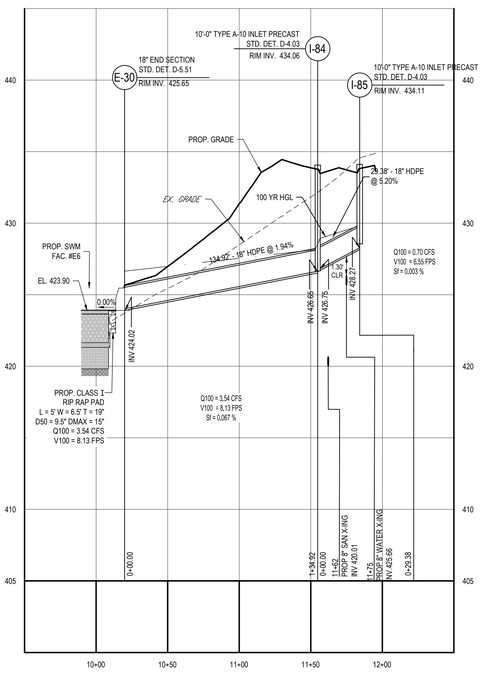
PROP STORMDRAIN - E-60 TO M-31

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



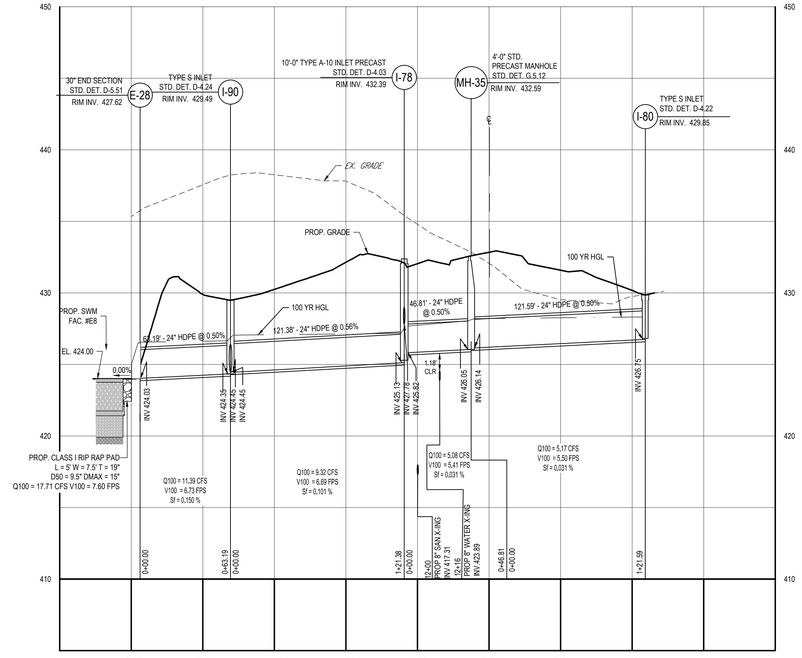
PROP STORMDRAIN - MH-30 TO I-75

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



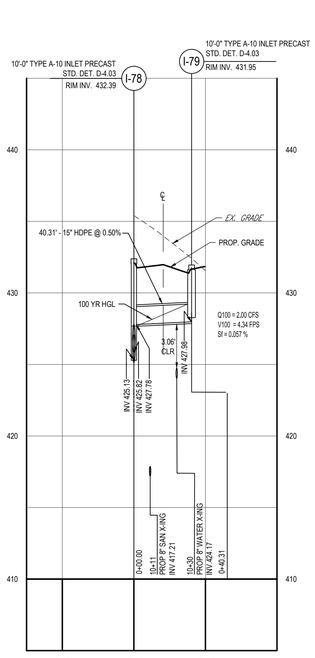
PROP STORMDRAIN - E-30 TO I-85

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



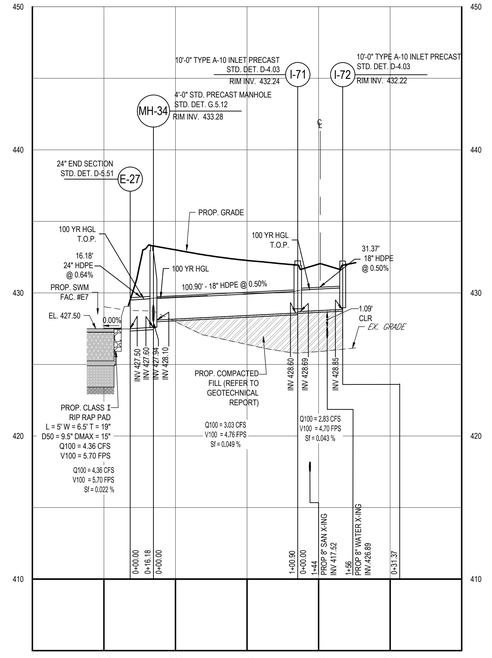
PROP STORMDRAIN - E-28 TO I-80

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



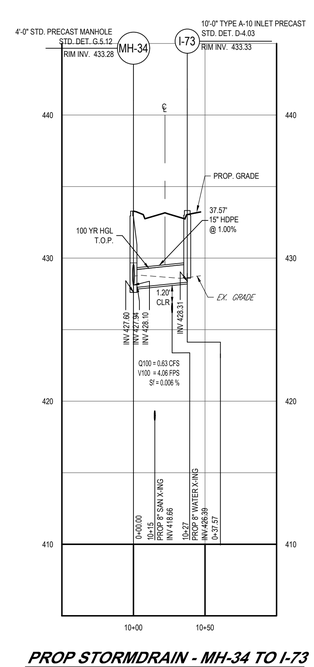
PROP STORMDRAIN - I-78 TO I-79

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - E-27 TO I-72

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP STORMDRAIN - MH-34 TO I-73

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

NOTE: CONTRACTOR TO VERIFY ALL STRUCTURE SIZES PRIOR TO ORDERING ANY STRUCTURES.

APPROVED: DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
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TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: PSTM - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
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901 DULANEY VALLEY ROAD, SUITE 801
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Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
NAME AND LICENSE No. 42808
PROFESSIONAL CERTIFICATION
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SHEET TITLE:

STORMDRAIN PROFILES

SHEET NUMBER:

69 of 117

F-22-033

May 30, 2024
H:\152018\2\DRAWINGS\PLAN SET\FINAL PLANS\D152018 - PSTM - 2A---LAYOUT 69 - STM DRAIN PROFILES
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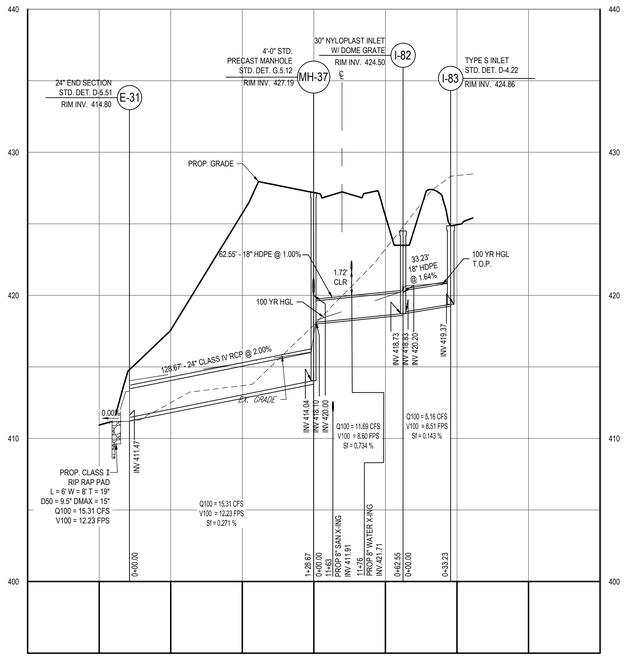
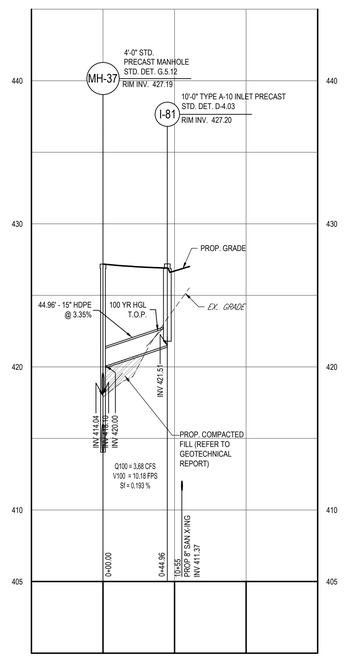
DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



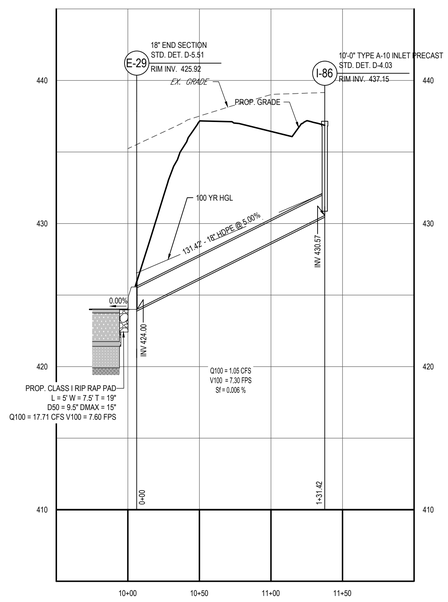
PROP STORMDRAIN - E-31 TO I-83

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



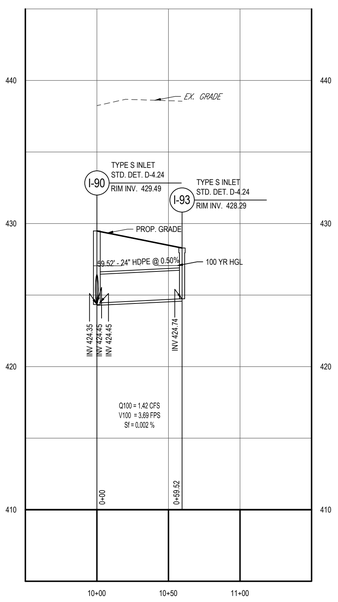
PROP STORMDRAIN - MH-37 TO I-81

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP. STORMDRAIN - E-29 TO I-86

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL



PROP. STORMDRAIN - I-90 TO I-93

SCALE: 1"= 50 ' HORIZONTAL
1"= 5 ' VERTICAL

NOTE:

1. SD PROFILE FOR I67-MH23-MH22-E50, SEE SHEET 47;
2. SD PROFILE FOR I86-E29, SEE SHEET 50;
3. SD PROFILE FOR I76-MH31, SEE SHEET 51.

STORM DRAIN PIPE SCHEDULE

FROM	TO	LOWER ELEVATION	UPPER ELEVATION	PIPE LENGTH	SLOPE (%)	DIAMETER (IN.)	MATERIAL	COMMENTS
CO-23	CO-25	441.50	441.50	10.00'	0.00%	6"	PVC	
CO-25	I-43	444.17	444.17	10.00'	0.00%	6"	PVC	
CO-25	CO-24	441.50	441.50	10.00'	0.00%	6"	PVC	
CO-26	CO-27	444.92	444.92	30.00'	0.00%	6"	PVC	
CO-26	I-32	444.92	444.92	22.32'	0.00%	6"	PVC	
CO-28	CO-26	444.92	444.92	30.00'	0.00%	6"	PVC	
CO-33	I-46	442.40	442.40	48.06'	0.00%	6"	PVC	
CO-35	CO-34	442.40	442.40	48.06'	0.00%	4"	PVC	
CO-36	I-60	436.42	436.42	43.05'	0.00%	6"	PVC	
CO-38	CO-37	436.42	436.42	43.05'	0.00%	4"	PVC	
CO-39	I-55	440.41	440.41	48.65'	0.00%	6"	PVC	
CO-41	CO-40	440.41	440.41	48.65'	0.00%	4"	PVC	
CO-42	CO-75	428.92	428.92	15.00'	0.00%	6"	PVC	
CO-44	CO-43	432.42	432.42	58.41'	0.00%	6"	PVC	
CO-45	I-62	437.67	437.67	54.78'	0.00%	6"	PVC	
CO-47	CO-46	437.67	437.67	35.00'	0.00%	4"	PVC	
CO-48	I-69	421.42	421.42	40.00'	0.00%	6"	PVC	
CO-49	CO-50	426.42	426.42	30.00'	0.00%	6"	PVC	
CO-50	I-67	426.42	426.42	30.00'	0.00%	6"	PVC	
CO-51	CO-90	426.42	426.42	15.00'	0.00%	6"	PVC	
CO-52	I-82	420.20	420.20	34.61'	0.00%	6"	PVC	
CO-53	CO-54	420.20	420.20	27.44'	0.00%	4"	PVC	
CO-55	CO-56	420.32	420.32	39.91'	0.00%	4"	PVC	
CO-57	CO-58	410.32	410.32	25.17'	0.00%	4"	PVC	
CO-59	I-76	421.42	421.42	65.78'	0.00%	6"	PVC	
CO-67	I-74	424.17	424.17	77.44'	0.00%	6"	PVC	
CO-68	CO-69	424.17	424.17	78.05'	0.00%	4"	PVC	
CO-70	CO-26	444.92	444.92	20.00'	0.00%	6"	PVC	
CO-71	CO-70	444.92	444.92	30.00'	0.00%	6"	PVC	
CO-72	CO-70	444.92	444.92	30.00'	0.00%	6"	PVC	
CO-73	I-93	441.67	441.67	10.00'	0.00%	6"	PVC	
CO-74	CO-73	439.00	439.00	60.00'	0.00%	6"	PVC	
E-15	I-35	457.00	451.74	98.17'	5.35%	18"	RCP	
E-62	I-25	447.94	446.68	12.61'	10.00%	15"	HDPE	
EX INLET	EX ES	437.06	436.72	61.72'	0.55%	30"	RCP	
I-24	E-10	445.24	445.00	47.48'	0.50%	24"	HDPE	
I-25	I-24	446.05	445.91	27.34'	0.50%	15"	HDPE	
I-26	MH-12	447.71	446.90	162.09'	0.50%	18"	HDPE	
I-27	I-26	448.23	447.96	27.32'	1.00%	15"	HDPE	
I-28	MH-12	446.62	446.50	24.67'	0.50%	24"	HDPE	
I-29	I-28	447.27	447.12	29.32'	0.50%	18"	HDPE	
I-30	I-29	448.87	447.37	70.91'	2.11%	18"	HDPE	
I-31	I-30	450.96	449.06	48.11'	3.94%	15"	HDPE	
I-32	MH-15	442.15	442.00	27.71'	0.54%	30"	RCP	
I-34	MH-16	438.29	437.96	63.95'	0.51%	30"	HDPE	
I-35	MH-15	448.62	442.91	173.34'	3.29%	18"	RCP	
I-36	E-13	448.30	448.00	26.52'	1.13%	15"	HDPE	
I-37	I-36	448.72	448.40	53.47'	0.60%	15"	HDPE	
I-38	MH-17	449.73	448.33	113.39'	1.23%	15"	HDPE	
I-39	E-14	449.45	448.00	115.57'	1.25%	18"	HDPE	
I-40	I-39	450.33	449.67	52.75'	1.25%	15"	HDPE	
I-41	E-9	442.64	442.50	23.53'	0.61%	18"	HDPE	
I-42	I-41	442.98	442.84	27.34'	0.50%	15"	HDPE	
I-43	MH-11	440.76	440.31	90.74'	0.50%	30"	RCP	
I-44	E-16	446.31	446.00	58.34'	0.53%	15"	HDPE	
I-45	I-44	446.75	446.48	27.32'	1.00%	15"	HDPE	
I-46	MH-20	440.53	440.23	29.38'	1.00%	18"	HDPE	
I-47	E-17	446.81	446.03	156.61'	0.50%	18"	HDPE	
I-48	E-61	447.25	447.36	21.33'	0.50%	15"	HDPE	
I-48	I-47	447.15	447.01	27.33'	0.50%	15"	HDPE	
I-49	E-18	444.36	444.00	47.90'	0.75%	18"	HDPE	
I-50	E-19	429.40	429.00	80.45'	0.50%	24"	HDPE	
I-51	I-50	430.06	429.90	31.33'	0.50%	24"	HDPE	
I-52	I-51	432.24	430.16	213.01'	0.98%	24"	HDPE	
I-53	MH-41	435.85	435.15	34.38'	2.04%	18"	HDPE	

STORM DRAIN PIPE SCHEDULE

FROM	TO	LOWER ELEVATION	UPPER ELEVATION	PIPE LENGTH	SLOPE (%)	DIAMETER (IN.)	MATERIAL	COMMENTS
I-54	MH-41	436.74	434.74	67.77'	2.96%	18"	HDPE	
I-55	MH-21	438.50	438.16	34.45'	1.00%	18"	HDPE	
I-56	E-26	429.55	425.00	84.80'	5.37%	18"	HDPE	
I-57	I-56	432.41	432.09	22.42'	1.45%	15"	HDPE	
I-58	E-22	432.21	431.50	142.79'	0.50%	36"	HDPE	
I-59	I-58	432.88	432.71	33.15'	0.50%	30"	HDPE	
I-60	MH-42	435.43	435.17	37.41'	0.70%	18"	HDPE	
I-61	MH-47	434.47	434.26	41.32'	0.50%	24"	HDPE	
I-61A	I-61B	437.01	438.29	128.37'	1.00%	15"	HDPE	
I-61A	I-61	435.02	434.57	89.37'	0.50%	24"	HDPE	
I-62	I-61A	435.86	435.52	69.44'	0.50%	18"	HDPE	
I-63	E-21	437.47	436.00	141.97'	1.03%	18"	HDPE	
I-64	I-59	438.12	434.50	256.11'	1.41%	18"	HDPE	
I-65	MH-25	443.25	441.51	90.80'	1.92%	15"	HDPE	
I-66	MH-26	443.95	442.75	59.54'	2.01%	18"	HDPE	
I-66A	E-23	441.60	441.25	71.61'	0.50%	18"	HDPE	
I-67	MH-23	424.00	423.49	81.48'	0.62%	30"	RCP	
I-68	E-20	428.75	428.25	61.57'	0.81%	36"	RCP	
I-69	E-24	421.23	420.20	40.38'	2.54%	18"	RCP	
I-70	MH-28	431.78	429.51	302.39'	0.75%	18"	RCP	
I-71	MH-34	428.60	428.10	100.90'	0.50%	18"	HDPE	
I-72	I-71	428.85	428.69	31.37'	0.50%	18"	HDPE	
I-73	MH-34	428.31	427.94	37.57'	1.00%	15"	HDPE	
I-74	MH-45	420.95	420.83	12.43'	1.00%	18"	HDPE	
I-75	MH-43	425.32	424.81	50.64'	1.00%	18"	HDPE	
I-76	MH-31	421.30	421.07	39.87'	0.58%	30"	RCP	
I-78	I-90	425.13	424.45	121.38'	0.56%	24"	HDPE	
I-79	I-78	427.98	427.78	40.31'	0.50%	15"	HDPE	
I-80	MH-35	426.75	426.14	121.59'	0.50%	24"	HDPE	
I-81	MH-37	421.51	420.00	44.96'	3.35%	15"	HDPE	
I-82	MH-37	418.73	418.10	62.55'	1.00%	18"	HDPE	
I-83	I-82	419.37	418.83	33.23'	1.64%	18"	HDPE	
I-84	E-30	426.65	424.02	134.92'	1.94%	18"	HDPE	
I-85	I-84	428.27	426.75	29.38'	5.20%	18"	HDPE	
I-86	E-29	430.57	424.00	131.42'	5.00%	18"	HDPE	
I-90	E-28	424.35	424.03	63.19'	0.50%	24"	HDPE	
I-91	MH-42	433.94	433.62	64.07'	0.50%	24"	HDPE	
I-92	MH-46	440.55	440.41	28.14'	0.50%	15"	HDPE	
I-93	I-90	424.74	424.45	59.52'	0.50%	24"	HDPE	
MH-10	E-32	439.60	439.18	80.87'	0.52%	30"	HDPE	
MH-11	MH-10	440.06	439.80	52.73'	0.50%	30"	HDPE	
MH-12	I-24	445.90	445.34	111.92'	0.50%	24"	HDPE	
MH-15	I-34	441.91	438.49	191.65'	1.78%	30"	HDPE	
MH-16	EX INLET	437.76	437.10	132.91'	0.50%	30"	HDPE	
MH-17	E-12	448.13	448.00	11.13'	1.19%	18"	HDPE	
MH-20	E-33	440.03	439.09	158.08'	0.59%	18"	HDPE	
MH-21	I-54	438.06	436.84	121.49'	1.00%	18"	HDPE	
MH-22	E-50	422.79	421.85	101.18'	0.93%	30"	HDPE	
MH-23	MH-22	423.39	422.89	29.70'	1.69%	30"	HDPE	
MH-25	I-64	441.26	438.32	171.31'	1.71%	18"	HDPE	
MH-26	I-66A	442.65	441.73	46.23'	2.00%	18"	HDPE	
MH-28	E-25	429.41	425.00	70.73'	6.23%	18"	HDPE	
MH-29	E-60	419.83	419.70	22.04'	0.62%	30"	HDPE	
MH-30	MH-29	420.62	419.92	126.04'	0.56%	30"	HDPE	
MH-31	MH-45	421.07	420.80	54.50'	0.50%	30"	HDPE	
MH-34	E-27	427.60	427.50	16.18'	0.64%	24"	HDPE	
MH-35	I-78	426.05	425.82	46.81'	0.50%	24"	HDPE	
MH-37	E-31	414.04	411.47	128.67'	2.00%	24"	RCP	
MH-41	I-52	434.64	432.74	55.81'	3.39%	18"	HDPE	
MH-42	I-59	433.52	433.38	28.58'	0.50%	24"	HDPE	
MH-43	MH-44	424.61	422.65	114.54'	1.72%	18"	HDPE	
MH-44	MH-30	422.55	422.00	55.07'	1.00%	18"	HDPE	
MH-45	MH-30	420.80	420.72	15.53'	0.50%	30"	HDPE	
MH-46	MH-10	440.31	439.80	102.22'	0.50%	15"	HDPE	
MH-47	I-91	434.16	434.04	25.10'	0.50%	24"	HDPE	

STORM DRAIN PIPE SCHEDULE (PUBLIC)

SIZE	MATERIAL/CLASS	TOTAL LENGTH*
4"	PVC	98
6"	PVC	168
15"	HDPE	530
18"	HPDE	2013
24"	HDPE	925
30"	HDPE	504
36"	HDPE	143
18"	CLASS IV RCP	273

* THE TOTAL LENGTH OF PIPE IS LINEAR FEET ONLY

HDPE IS TO BE SMOOTH INTERIOR. CONTRACTOR SHALL INSTALL PIPE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS

STORM DRAIN PIPE SCHEDULE (PRIVATE)

SIZE	MATERIAL/CLASS	TOTAL LENGTH*
4"	PVC	252
6"	PVC	660
15"	HDPE	522
18"	HPDE	948
24"	HDPE	399
30"	HDPE	406
18"	CLASS IV RCP	344
30"	CLASS IV RCP	303
36"	CLASS IV RCP	62

* THE TOTAL LENGTH OF PIPE IS LINEAR FEET ONLY

HDPE IS TO BE SMOOTH INTERIOR. CONTRACTOR SHALL INSTALL PIPE IN ACCORDANCE WITH MANUFACTURER'S SPECFICIATIONS

APPROVED: DEPARTMENT OF PUBLIC WORKS		6/12/2024
CHIEF, BUREAU OF HIGHWAYS		DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING		6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT	DocuSigned by: Chad Edmondson	DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION		DATE

NOTE: CONTRACTOR TO VERIFY ALL STRUCTURE SIZES PRIOR TO ORDERING ANY STRUCTURES.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
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REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	PSTM- 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
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B.R. ROWE
PROFESSIONAL ENGINEER
STATE OF MARYLAND No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

STORMDRAIN PROFILES

SHEET NUMBER:

70 of 117

F-22-033

May 30, 2024
H:\SMD152018\DRAWINGS\PLANSETS\FINAL PLAN\MD152018 - PSTM - 2A-----LAYOUT 70 - STM DRAIN PROFILES

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CLEANOUT STRUCTURE SCHEDULE

NAME	TYPE	RIM ELEV. (FT.)	INVERTS	NORTHING / EASTING
CO-23	6" VERTICAL COLLECTION PIPE	445.50	INV OUT = 441.50' (6")	N 593098.746 E 1353756.564
CO-24	6" VERTICAL COLLECTION PIPE	445.50	INV IN = 441.50' (6")	N 593079.697 E 1353750.472
CO-25	6" VERTICAL COLLECTION PIPE	445.50	INV IN = 441.50' (6") INV OUT = 441.50' (6") INV OUT = 444.17' (6")	N 593089.221 E 1353753.518
CO-26	CLEANOUT	448.50	INV IN = 444.92' (6") INV IN = 444.92' (6") INV OUT = 444.92' (6") INV OUT = 444.92' (6")	N 593064.306 E 1353162.320
CO-27	6" VERTICAL COLLECTION PIPE	448.50	INV IN = 444.92' (6")	N 593093.703 E 1353168.301
CO-28	6" VERTICAL COLLECTION PIPE	448.50	INV OUT = 444.92' (6")	N 593034.908 E 1353156.338
CO-33	CLEANOUT	446.50	INV OUT = 442.40' (6")	N 593079.366 E 1354200.583
CO-34	CLEANOUT	446.00	INV IN = 442.40' (4")	N 593073.440 E 1354201.522
CO-35	CLEANOUT	446.00	INV OUT = 442.40' (4")	N 593065.933 E 1354154.053
CO-36	CLEANOUT	440.50	INV OUT = 436.42' (6")	N 593120.121 E 1355060.203
CO-37	CLEANOUT	440.00	INV IN = 436.42' (4")	N 593125.934 E 1355061.692
CO-38	CLEANOUT	440.00	INV OUT = 436.42' (4")	N 593115.249 E 1355103.399
CO-39	CLEANOUT	444.50	INV OUT = 440.41' (6")	N 593090.079 E 1354542.581
CO-40	CLEANOUT	444.00	INV IN = 440.41' (4")	N 593086.079 E 1354542.602
CO-41	CLEANOUT	440.77	INV OUT = 440.41' (4")	N 593086.327 E 1354591.250
CO-42	CLEANOUT	432.00	INV IN = 428.92' (6") INV OUT = 428.92' (6")	N 592870.108 E 1355063.936
CO-43	CLEANOUT	436.50	INV IN = 432.42' (6") INV OUT = 432.42' (6")	N 592823.943 E 1355195.695
CO-44	CLEANOUT	436.50	INV OUT = 432.42' (6")	N 592801.001 E 1355249.410
CO-45	CLEANOUT	441.75	INV OUT = 437.67' (6")	N 593123.189 E 1355424.464
CO-46	CLEANOUT	441.75	INV IN = 437.67' (4")	N 593118.237 E 1355423.770
CO-47	CLEANOUT	441.75	INV OUT = 437.67' (4")	N 593123.095 E 1355389.109
CO-48	CLEANOUT	425.50	INV OUT = 421.42' (6")	N 592460.561 E 1355632.576
CO-49	CLEANOUT	429.50	INV OUT = 426.42' (6")	N 592693.111 E 1354723.945
CO-50	CLEANOUT	429.50	INV IN = 426.42' (6") INV IN = 426.42' (6") INV OUT = 426.42' (6")	N 592672.045 E 1354745.304
CO-51	CLEANOUT	429.50	INV OUT = 426.42' (6") INV OUT = 426.42' (6")	N 592693.405 E 1354766.370
CO-52	CLEANOUT	424.00	INV OUT = 420.20' (6")	N 591928.861 E 1355176.406
CO-53	CLEANOUT	423.50	INV OUT = 420.20' (4")	N 591956.270 E 1355169.696
CO-54	CLEANOUT	423.50	INV IN = 420.20' (4")	N 591931.625 E 1355181.766
CO-55	CLEANOUT	424.40	INV OUT = 420.32' (4")	N 592284.272 E 1355266.086
CO-56	CLEANOUT	424.40	INV IN = 420.32' (4")	N 592245.058 E 1355273.510
CO-57	CLEANOUT	414.40	INV OUT = 410.32' (4")	N 592161.267 E 1355299.393
CO-58	CLEANOUT	414.40	INV IN = 410.32' (4")	N 592136.296 E 1355302.584
CO-59	CLEANOUT	424.50	INV IN = 421.42' (6") INV OUT = 421.42' (6")	N 592306.164 E 1354854.235
CO-67	CLEANOUT	428.00	INV OUT = 424.17' (6")	N 592238.045 E 1354758.751
CO-68	CLEANOUT	427.50	INV OUT = 424.17' (4")	N 592242.486 E 1354764.023
CO-69	CLEANOUT	427.58	INV IN = 424.17' (4")	N 592302.933 E 1354714.654

STORM DRAIN STRUCTURE SCHEDULE

NAME	TYPE	RIM ELEV. (FT.)	INVERTS	COMMENTS	NORTHING / EASTING
E-9	18" END SECTION STD. DET. D-5.51	444.21	INV IN = 442.50 (18")		N 592995.944 E 1353850.756
E-10	24" END SECTION STD. DET. D-5.51	447.17	INV IN = 445.00 (24")		N 593027.592 E 1353666.380
E-12	18" END SECTION STD. DET. D-5.51	450.08	INV IN = 448.00 (18")		N 592985.504 E 1353196.910
E-13	15" END SECTION STD. DET. D-5.51	449.54	INV IN = 448.00 (15")		N 592989.218 E 1353136.054
E-14	18" END SECTION STD. DET. D-5.51	450.09	INV IN = 448.00 (18")		N 593108.080 E 1353205.759
E-15	TYPE 'A' HEADWALL HO. CO. STD. DET. D-5.11	458.62	INV OUT = 457.00' (18")		N 593335.351 E 1353187.363
E-16	18" END SECTION STD. DET. D-5.51	447.37	INV IN = 446.00 (15")		N 593080.914 E 1354149.163
E-17	18" END SECTION STD. DET. D-5.51	447.77	INV IN = 446.03 (18")		N 593087.812 E 1354223.761
E-18	15" END SECTION STD. DET. D-5.51	446.05	INV IN = 444.00 (18")		N 593099.083 E 1354573.747
E-19	24" END SECTION STD. DET. D-5.51	431.17	INV IN = 429.00 (24")		N 592679.204 E 1354712.836
E-20	36" END SECTION STD. DET. D-5.51	431.58	INV IN = 428.25 (36")		N 592777.798 E 1355135.124
E-21	18" END SECTION STD. DET. D-5.51	437.62	INV IN = 436.00 (18")		N 592798.635 E 1355280.867
E-22	36" END SECTION STD. DET. D-5.51	434.71	INV IN = 431.50 (36")		N 592897.285 E 1355071.954
E-23	18" END SECTION STD. DET. D-5.51	443.32	INV IN = 441.25 (18")		N 593089.634 E 1355454.239
E-24	18" END SECTION STD. DET. D-5.51	421.91	INV IN = 420.20 (18")		N 592444.130 E 1355559.575
E-25	18" END SECTION STD. DET. D-5.51	426.66	INV IN = 425.00 (18")		N 592476.689 E 1355648.843
E-26	18" END SECTION STD. DET. D-5.51	427.07	INV IN = 425.00 (18")		N 592485.950 E 1355588.703
E-27	24" END SECTION STD. DET. D-5.51	431.17	INV IN = 427.50 (24")		N 592275.488 E 1354712.470
E-28	30" END SECTION STD. DET. D-5.51	427.62	INV IN = 424.03 (24")		N 592257.148 E 1354905.631
E-29	18" END SECTION STD. DET. D-5.51	425.92	INV IN = 424.00 (18")		N 592264.159 E 1354908.957
E-30	18" END SECTION STD. DET. D-5.51	425.65	INV IN = 424.02 (18")		N 592229.382 E 1355257.958
E-31	24" END SECTION STD. DET. D-5.51	414.80	INV IN = 411.47 (24")		N 592052.824 E 1355328.358
E-32	CONCRETE RECTANGULAR HEADWALL	443.12	INV IN = 439.18 (30")		N 593038.689 E 1353948.138
E-33	CONCRETE RECTANGULAR HEADWALL	445.21	INV IN = 439.09 (18")		N 593050.127 E 1353968.627
E-50	CONCRETE RECTANGULAR HEADWALL	425.06	INV IN = 421.85 (30")		N 592477.463 E 1354695.077
E-60	CONCRETE RECTANGULAR HEADWALL	422.40	INV IN = 419.70 (30")		N 592453.192 E 1354681.158
E-61	TYPE 'A' HEADWALL HO. CO. STD. DET. D-5.11	448.73	INV OUT = 447.36' (15")		N 593172.935 E 1354386.599
E-62	TYPE 'A' HEADWALL HO. CO. STD. DET. D-5.11	450.44	INV OUT = 447.94' (15")		N 592947.450 E 1353650.098
EX INLET	EX. INLET	441.44	INV IN = 437.10 (30") INV OUT = 437.06' (30")		N 592699.156 E 1353018.011
F-7	INLET - FLOW THROUGH HO. CO. STD. DET. D-4.35	449.01			N 593121.056 E 1354584.158
F-8	INLET - FLOW THROUGH HO. CO. STD. DET. D-4.35	443.39			N 593097.768 E 1355029.200
F-9	INLET - FLOW THROUGH HO. CO. STD. DET. D-4.35	425.51			N 591935.279 E 1355213.493
F-10	INLET- FLOW THROUGH HO. CO. STD. DET. D-4.35	456.67			N 593023.205 E 1353084.313
F-12	INLET- FLOW THROUGH HO. CO. STD. DET. D-4.35	462.95			N 593127.228 E 1353100.545
F-13	INLET - FLOW THROUGH HO. CO. STD. DET. D-4.35	427.91			N 592024.895 E 1355156.668
I-24	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	449.25	INV IN = 445.91 (15") INV IN = 445.34 (24") INV OUT = 445.24' (24")		N 592986.643 E 1353642.355
I-25	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	449.53	INV IN = 446.68 (15") INV OUT = 446.05' (15")		N 592959.872 E 1353647.905
I-26	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	453.48	INV IN = 447.96 (15") INV OUT = 447.71' (18")		N 592946.764 E 1353371.267
I-27	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	453.49	INV OUT = 448.23' (15")		N 592919.496 E 1353372.952
I-28	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	451.93	INV IN = 447.12 (18") INV OUT = 446.62' (24")		N 592994.892 E 1353527.836
I-29	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	452.01	INV IN = 447.37 (18") INV OUT = 447.27' (18")		N 592996.561 E 1353498.568
I-30	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	454.12	INV IN = 449.06 (15") INV OUT = 448.87' (18")		N 593067.414 E 1353501.313
I-31	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	455.22	INV OUT = 450.96' (15")		N 593104.364 E 1353532.127
I-32	OUTLET STRUCTURE	450.00	INV IN = 444.92 (6") INV OUT = 442.15' (30")		N 593069.243 E 1353140.553
I-34	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	449.50	INV IN = 438.49 (30") INV OUT = 438.29' (30")		N 592888.596 E 1353071.432

STORM DRAIN STRUCTURE SCHEDULE

NAME	TYPE	RIM ELEV. (FT.)	INVERTS	COMMENTS	NORTHING / EASTING
I-35	YARD INLET STD. DETAIL D4.12	455.76	INV IN = 451.74 (18") INV OUT = 448.62' (18")		N 593238.135 E 1353173.698
I-36	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	452.46	INV IN = 448.40 (15") INV OUT = 448.30' (15")		N 592971.383 E 1353116.433
I-37	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	452.60	INV OUT = 448.72' (15")		N 592919.157 E 1353104.952
I-38	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	454.08	INV OUT = 449.73' (15")		N 592966.532 E 1353317.033
I-39	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	457.01	INV IN = 449.67 (15") INV OUT = 449.45' (18")		N 593103.325 E 1353321.232
I-40	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	458.01	INV OUT = 450.33' (15")		N 593144.359 E 1353354.379
I-41	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	447.15	INV IN = 442.84 (15") INV OUT = 442.64' (18")		N 593019.465 E 1353850.162
I-42	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	447.15	INV OUT = 442.98' (15")		N 593044.790 E 1353839.866
I-43	OUTLET STRUCTURE	447.67	INV IN = 444.17 (6") INV OUT = 440.76' (30")		N 593086.175 E 1353763.043
I-44	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	451.17	INV IN = 446.48 (15") INV OUT = 446.31' (15")		N 593106.422 E 1354096.697
I-45	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	451.17	INV OUT = 446.75' (15")		N 593133.152 E 1354091.027
I-46	30" NYLOPLAST INLET W/ DOME GRATE	446.75	INV IN = 442.40 (6") INV OUT = 440.53' (18")		N 593071.859 E 1354153.116
I-47	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	451.41	INV IN = 447.01 (15") INV OUT = 446.81' (18")		N 593126.731 E 1354375.462
I-48	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	451.41	INV IN = 447.25 (15") INV OUT = 447.15' (15")		N 593154.036 E 1354376.702
I-49	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	449.43	INV OUT = 444.36' (18")		N 593146.977 E 1354574.364
I-50	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	434.65	INV IN = 429.90 (24") INV OUT = 429.40' (24")		N 592623.120 E 1354655.152
I-51	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	434.65	INV IN = 430.16 (24") INV OUT = 430.06' (24")		N 592623.245 E 1354623.823
I-52	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	438.86	INV IN = 432.74 (18") INV OUT = 432.24' (24")		N 592836.252 E 1354624.675
I-53	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	440.58	INV OUT = 435.85' (18")		N 592893.357 E 1354656.249
I-54	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	442.57	INV IN = 436.84 (18") INV OUT = 436.74' (18")		N 592959.682 E 1354625.169
I-55	18" NYLOPLAST INLET W/ DOME GRATE	444.75	INV IN = 440.41 (6") INV OUT = 438.50' (18")		N 593090.327 E 1354591.230
I-56	SINGLE WR INLET INLET PRECAST STD. DET. D-4.32	438.35	INV IN = 432.09 (15") INV OUT = 429.55' (18")		N 592562.120 E 1355551.440
I-57	SINGLE WR INLET INLET PRECAST STD. DET. D-4.32	438.35	INV OUT = 432.41' (15")		N 592565.851 E 1355529.329
I-58	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	442.41	INV IN = 432.71 (30") INV OUT = 432.21' (36")		N 593030.342 E 1355123.771
I-59	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	442.40	INV IN = 433.38 (24") INV IN = 434.50 (18") INV OUT = 432.88' (30")		N 593063.404 E 1355126.140
I-60	30" NYLOPLAST INLET W/ DOME GRATE	440.75	INV IN = 436.42 (6") INV OUT = 435.43' (18")		N 593109.437 E 1355101.910
I-61	TYPE D INLET STD. DET. D-4.10	440.70	INV IN = 434.57 (24") INV OUT = 434.47' (24")		N 593160.365 E 1355214.509
I-61A	YARD INLET STD. DETAIL D-4.12	440.71	INV IN = 435.52 (18") INV IN = 437.01 (15") INV OUT = 435.02' (24")		N 593138.824 E 1355301.239
I-61B	YARD INLET STD. DETAIL D-4.12	443.28	INV OUT = 438.29' (15")		N 593074.939 E 1355412.586
I-62	30" NYLOPLAST INLET W/ DOME GRATE	442.00	INV IN = 437.67 (6") INV OUT = 435.86' (18")		N 593129.864 E 1355370.096
I-63	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	445.43	INV OUT = 437.47' (18")		N 592926.870 E 1355341.786
I-64	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	445.47	INV IN = 438.32 (18") INV OUT = 438.12' (18")		N 592953.996 E 1355357.700
I-65	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	449.14	INV OUT = 443.25' (15")		N 592933.987 E 1355590.144
I-66	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	449.09	INV OUT = 443.95' (18")		N 592959.785 E 1355570.464
I-66A	YARD INLET STD. DETAIL D-4.12	445.10	INV IN = 441.73 (18") INV OUT = 441.60' (18")		N 593027.870 E 1355490.470
I-67	OUTLET STRUCTURE	431.33	INV IN = 426.42 (6") INV OUT = 424.00' (30")		N 592650.686 E 1354724.238
I-68	OUTLET STRUCTURE	435.75	INV IN = 428.92 (6") INV OUT = 428.75' (36")		N 592826.555 E 1355097.523
I-69	30" NYLOPLAST INLET W/ DOME GRATE	426.00	INV IN = 421.42 (6") INV OUT = 421.23' (18")		N 592466.704 E 1355593.051
I-70	TYPE S INLET STD. DET. D-4.22	434.99	INV OUT = 431.78' (18")		N 592834.401 E 1355737.346
I-71	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	432.24	INV IN = 428.69 (18") INV OUT = 428.60' (18")		N 592366.641 E 1354659.039
I-72	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	432.22	INV OUT = 428.85' (18")		N 592360.100 E 1354628.364
I-73	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	433.33	INV OUT = 428.31' (15")		N 592256.843 E 1354662.541
I-74	30" NYLOPLAST INLET W/ DOME GRATE	428.25	INV IN = 424.17 (6") INV OUT = 420.95' (18")		N 592298.607 E 1354710.496
I-75	TYPE S INLET STD. DET. D-4.22	428.50	INV OUT = 425.32' (18")		N 592243.343 E 1354529.558
I-76	OUTLET STRUCTURE	426.25	INV IN = 421.42 (6") INV OUT = 421.30' (30")		N 592278.265 E 1354794.667

STORM DRAIN STRUCTURE SCHEDULE

NAME	TYPE	RIM ELEV. (FT.)	INVERTS	COMMENTS	NORTHING / EASTING
I-78	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	432.39	INV IN = 427.78 (15") INV IN = 425.82 (24") INV OUT = 425.13' (24")		N 592094.671 E 1354921.250
I-79	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	431.95	INV OUT = 427.98' (15")		N 592059.581 E 1354941.083
I-80	TYPE S INLET STD. DET. D-4.22	429.85	INV OUT = 426.75' (24")		N 591937.108 E 1354866.724
I-81	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	427.20	INV OUT = 421.51' (15")		N 591952.040 E 1355238.022
I-82	30" NYLOPLAST INLET W/ DOME GRATE	424.50	INV IN = 418.83 (18") INV IN = 420.20 (6") INV OUT = 418.73' (18")		N 591959.952 E 1355161.212
I-83	TYPE S INLET STD. DET. D-4.22	424.86	INV OUT = 419.37' (18")		N 591942.390 E 1355133.002
I-84	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	434.06	INV IN = 426.75 (18") INV OUT = 426.65' (18")		N 592197.123 E 1355126.949
I-85	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	434.11	INV OUT = 428.27' (18")		N 592192.903 E 1355097.870
I-86	10'-0" TYPE A-10 INLET PRECAST STD. DET. D-4.03	437.15	INV OUT = 430.57' (18")		N 592250.365 E 1355039.652
I-90	TYPE S INLET STD. DET. D-4.24	429.49	INV IN = 424.45 (24") INV IN = 424.45 (24") INV OUT = 424.35' (24")		N 592212.505 E 1354950.353
I-91	TYPE D INLET STD. DET. D-4.10	440.36	INV IN = 434.04 (24") INV OUT = 433.94' (24")		N 593152.076 E 1355152.976
I-92	PRECAST YARD INLET STD. DET. D-4.12	446.12	INV OUT = 440.55' (15")		N 592962.785 E 1353754.761
I-93	TYPE S INLET STD. DET. D-4.24	428.29	INV OUT = 424.74' (24")		N 592219.172 E 1355009.502
MH-10	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	444.50	INV IN = 439.80 (15") INV IN = 439.80 (30") INV IN = 440.59 (18") INV OUT = 439.60' (30")		N 593010.286 E 1353872.420
MH-11	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	447.17	INV IN = 440.31 (30") INV OUT = 440.06' (30")		N 593057.612 E 1353849.169
MH-12	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	450.66	INV IN = 446.50 (24") INV IN = 446.90 (18") INV OUT = 445.90' (24")		N 592970.512 E 1353531.605
MH-15	5'-0" STD. PRECAST MANHOLE STD. DET. G.5.13	456.97	INV IN = 442.91 (18") INV IN = 442.00 (30") INV OUT = 441.91' (30")		N 593075.561 E 1353113.573
MH-16	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	446.71	INV IN = 437.96 (30") INV OUT = 437.76' (30")		N 592826.640 E 1353055.590
MH-17	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	452.72	INV IN = 448.33 (15") INV OUT = 448.13' (18")		N 592977.025 E 1353204.126
MH-20	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	449.59	INV IN = 440.23 (18") INV OUT = 440.03' (18")		N 593077.607 E 1354124.304
MH-21	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	446.54	INV IN = 438.16 (18") INV OUT = 438.06' (18")		N 593081.168 E 1354624.442
MH-22	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	434.02	INV IN = 422.89 (30") INV OUT = 422.79' (30")		N 592572.024 E 1354659.085
MH-23	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	434.31	INV IN = 423.49 (30") INV OUT = 423.39' (30")		N 592601.724 E 1354659.114
MH-25	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	447.60	INV IN = 441.51 (15") INV OUT = 441.26' (18")		N 592884.261 E 1355514.171
MH-26	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	446.70	INV IN = 442.75 (18") INV OUT = 442.65' (18")		N 593002.832 E 1355529.329
MH-28	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	434.23	INV IN = 429.51 (18") INV OUT = 429.41' (18")		N 592536.234 E 1355687.016
MH-29	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	430.66	INV IN = 419.92 (30") INV OUT = 419.83' (30")		N 592435.411 E 1354668.130
MH-30	5'-0" STD. PRECAST MANHOLE STD. DET. G.5.13	431.10	INV IN = 420.72 (30") INV IN = 422.00 (18") INV OUT = 420.62' (30")		N 592312.498 E 1354696.043
MH-31	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	428.69	INV IN = 421.07 (30") INV OUT = 421.07' (30")		N 592305.707 E 1354765.740
MH-34	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	433.28	INV IN = 427.94 (15") INV IN = 428.10 (18") INV OUT = 427.60' (24")		N 592272.946 E 1354696.486
MH-35	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	432.59	INV IN = 426.14 (24") INV OUT = 426.05' (24")		N 592055.043 E 1354896.327
MH-37	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	427.19	INV IN = 418.10 (18") INV IN = 420.00 (15") INV OUT = 414.04' (24")		N 591990.967 E 1355215.533
MH-41	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	440.31	INV IN = 434.74 (18") INV IN = 435.15 (18") INV OUT = 434.64' (18")		N 592891.992 E 1354621.898
MH-42	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	443.16	INV IN = 433.62 (24") INV IN = 435.17 (18") INV OUT = 433.52' (24")		N 593090.781 E 1355134.335
MH-43	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	430.88	INV IN = 424.81 (18") INV OUT = 424.61' (18")		N 592293.982 E 1354529.898
MH-44	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	432.42	INV IN = 422.65 (18") INV OUT = 422.55' (18")		N 592293.258 E 1354644.440
MH-45	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	430.01	INV IN = 420.80 (30") INV IN = 420.83 (18") INV OUT = 420.80' (30")		N 592310.992 E 1354711.502
MH-46	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	447.75	INV IN = 440.41 (15") INV OUT = 440.31' (15")		N 592983.533 E 1353773.763
MH-47	4'-0" STD. PRECAST MANHOLE STD. DET. G.5.12	444.00	INV IN = 434.26 (24") INV OUT = 434.16' (24")		N 593166.338 E 1355173.625

NOTE: CONTRACTOR TO VERIFY ALL STRUCTURE SIZES PRIOR TO ORDERING ANY STRUCTURES.

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: PSTM- 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

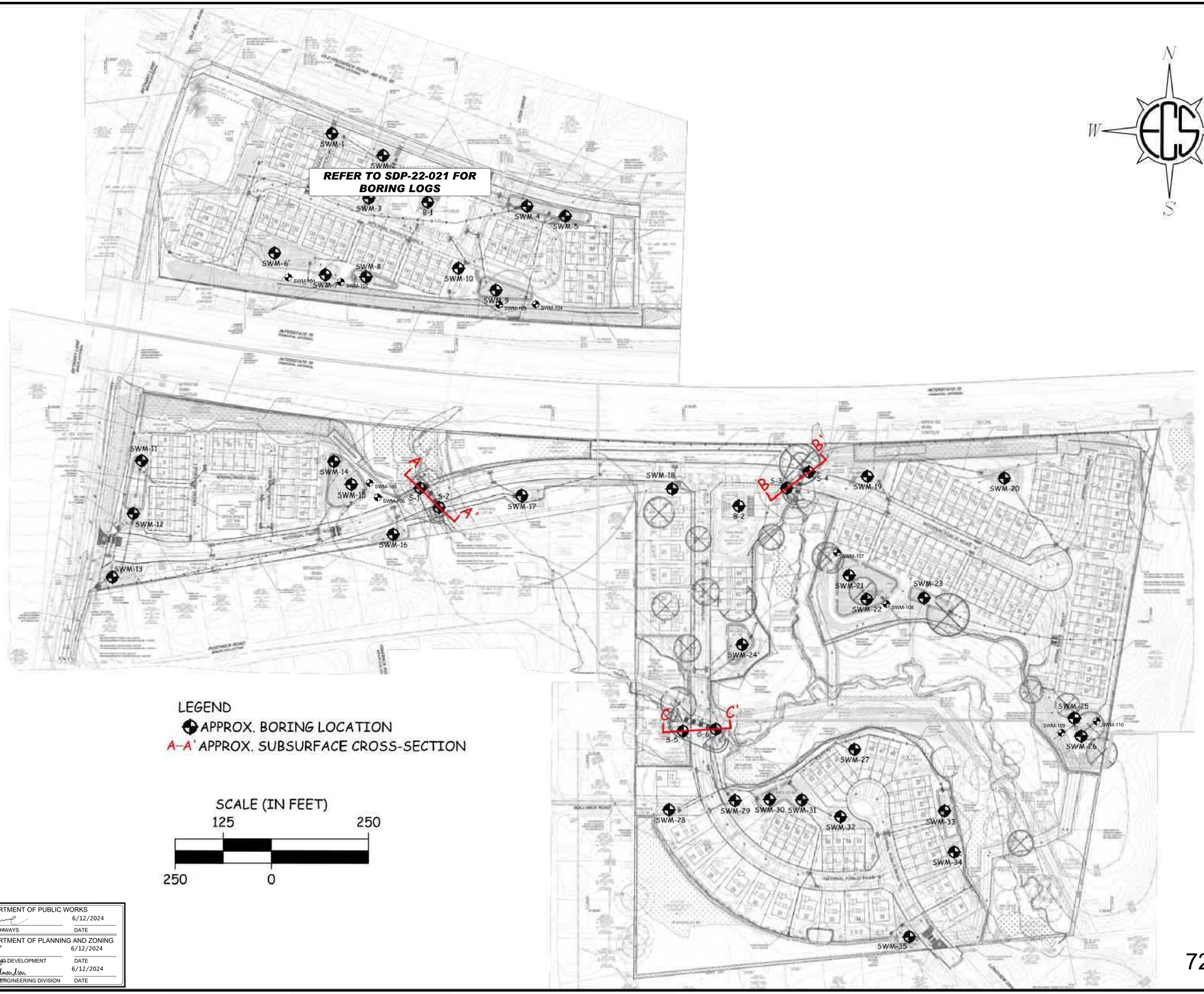
B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
STORMDRAIN PROFILES

SHEET NUMBER:

F-22-033

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



APPROVED: DEPARTMENT OF PUBLIC WORKS

DocuSigned by: 6/12/2024

CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

DocuSigned by: 6/12/2024

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DocuSigned by: Chad Edmondson 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

BETHANY GLEN
ARAH
HOWARD COUNTY

ECS

BORING LOCATION DIAGRAM
ELM STREET DEVELOPMENT

ECS REVISIONS

ENGINEER	DRAFTING
APM	DGT

SCALE	1" = 250'
PROJECT NO.	9597
SHEET	1 of 1
DATE	11/04/2021

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-04 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351382.1 | EASTING: 340293.5 | STATION: | SURFACE ELEVATION: 461.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(4")			
0	S-1	SS	18	16	(SC) CLAYEY SAND, trace mica, grayish brown, moist, stiff		459.6	3-5-6 (11)
5	S-2	SS	18	18			456	4-6-8 (14)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, gray to brown, moist, medium dense to loose		453.7	4-5-3 (12) (25.1%)
10	S-4	SS	18	18			451	4-5-6 (11)
	S-5	SS	18	18			446.5	4-5-5 (10)
15					END OF DRILLING AT 15.0 FT		446	
20							441	
25							436	
30							431	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	DRY	BORING STARTED:	Aug 19 2021	CAVE IN DEPTH:	12.0
WL (Completion)	DRY	BORING COMPLETED:	Aug 19 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: CAW	DRILLING METHOD:	HSA
WL (Stabilized)	DRY				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-03 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351373.6 | EASTING: 340321.7 | STATION: | SURFACE ELEVATION: 462.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(4")			
0	S-1	SS	18	16	(SC) CLAYEY SAND, trace mica, brown, moist, stiff		460.6	3-4-4 (8)
5	S-2	SS	18	18	(SM) SILTY SAND, trace mica, orangish brown, moist, medium dense		457	3-6-9 (15)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, gray to brown, moist, medium dense		454.7	4-5-7 (12)
10	S-4	SS	18	18			452	4-5-6 (11)
15					END OF DRILLING AT 10.0 FT		447	
20							442	
25							437	
30							432	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	DRY	BORING STARTED:	Aug 19 2021	CAVE IN DEPTH:	7.8
WL (Completion)	DRY	BORING COMPLETED:	Aug 19 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: CAW	DRILLING METHOD:	HSA
WL (Stabilized)	DRY				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-06 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351349.9 | EASTING: 340093.0 | STATION: | SURFACE ELEVATION: 466.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(6")			
0	S-1	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, loose		464.5	3-3-4 (7)
5	S-2	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, loose to medium dense		461	3-4-6 (10)
	S-3	SS	18	18			458.5	3-5-6 (11)
10	S-4	SS	18	18			456	3-4-6 (10)
15					END OF DRILLING AT 10.0 FT		451	
20							446	
25							441	
30							436	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	DRY	BORING STARTED:	Aug 18 2021	CAVE IN DEPTH:	7.4
WL (Completion)	DRY	BORING COMPLETED:	Aug 18 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: CAW	DRILLING METHOD:	HSA
WL (Stabilized)	DRY				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-06 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351349.9 | EASTING: 340093.0 | STATION: | SURFACE ELEVATION: 466.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(6")			
0	S-1	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, loose		464.5	2-3-4 (7)
5	S-2	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, loose to medium dense		461	3-4-6 (10)
	S-3	SS	18	18			458.5	3-5-6 (11)
10	S-4	SS	18	18			456	3-4-6 (10)
15					END OF DRILLING AT 10.0 FT		451	
20							446	
25							441	
30							436	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	DRY	BORING STARTED:	Aug 18 2021	CAVE IN DEPTH:	7.4
WL (Completion)	DRY	BORING COMPLETED:	Aug 18 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: CAW	DRILLING METHOD:	HSA
WL (Stabilized)	DRY				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-07 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351332.0 | EASTING: 340181.0 | STAT ON: | SURFACE ELEVATION: 465.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(6")			
0	S-1	SS	18	18	(CL) SANDY LEAN CLAY, trace mica, brown, moist, soft		463.5	1-2-2 (4)
5	S-2	SS	18	18	(SM) SILTY SAND, trace mica, gray to dark brown, moist, loose		460	3-3-5 (8)
					END OF DRILLING AT 5.0 FT		455	
10							450	
15							445	
20							440	
25							435	
30							430	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	DRY	BORING STARTED:	Aug 18 2021	CAVE IN DEPTH:	3.4
WL (Completion)	DRY	BORING COMPLETED:	Aug 18 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: CAW	DRILLING METHOD:	HSA
WL (Stabilized)	DRY				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-08 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351326.0 | EASTING: 340165.2 | STATION: | SURFACE ELEVATION: 458.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(4")			
0	S-1	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, stiff		457.6	2-4-7 (11)
5	S-2	SS	18	18	(SM) SILTY SAND, trace mica, dark brown, moist, medium dense		453	5-7-10 (17)
					END OF DRILLING AT 5.0 FT		448	
10							443	
15							438	
20							433	
25							428	
30							423	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	DRY	BORING STARTED:	Aug 18 2021	CAVE IN DEPTH:	5.1
WL (Completion)	DRY	BORING COMPLETED:	Aug 18 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: CAW	DRILLING METHOD:	HSA
WL (Stabilized)	DRY				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-09 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351335.8 | EASTING: 340269.5 | STATION: | SURFACE ELEVATION: 451.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(6")			
0	S-1	SS	18	16	(SC) SANDY LEAN CLAY, trace mica, brown, moist, firm		450.6	2-2-3 (5)
5	S-2	SS	18	16	(SM) SILTY SAND, trace mica, brown and gray, moist to wet, medium dense		447	3-4-7 (11)
	S-3	SS	18	16			444.5	4-6-9 (15)
10	S-4	SS	18	14			442	7-12-14 (26)
15					END OF DRILLING AT 10.0 FT		437	
20							432	
25							427	
30							422	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	7.0	BORING STARTED:	Aug 19 2021	CAVE IN DEPTH:	7.6
WL (Completion)	8.3	BORING COMPLETED:	Aug 19 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: CAW	DRILLING METHOD:	HSA
WL (Stabilized)	6.8				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-10 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351334.3 | EASTING: 340233.4 | STATION: | SURFACE ELEVATION: 459.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(8")			
0	S-1	SS	18	18	(SM) SILTY SAND, brown, moist, loose to medium dense		458.3	2-3-3 (6)
5	S-2	SS	18	18			454	3-5-9 (14)
	S-3	SS	18	18	(ML) SANDY SILT, trace mica, grayish brown, moist, stiff		451.5	3-5-6 (11)
10	S-4	SS	18	18	(SM) SILTY SAND, trace mica, dark grayish brown, moist, loose		449	3-4-5 (9)
15					END OF DRILLING AT 10.0 FT		444	
20							439	
25							434	
30							429	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	9.0	BORING STARTED:	Aug 17 2021	CAVE IN DEPTH:	6.8
WL (Completion)	6.7	BORING COMPLETED:	Aug 17 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: DGTS	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	6.1				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-11 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351187.6 | EASTING: 339980.0 | STATION: | SURFACE ELEVATION: 452.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(4")			
0	S-1	SS	18	18	(SC) CLAYEY SAND, trace organics and mica, brown, moist, medium dense		451.3	8-6-8 (14)
5	S-2	SS	18	18	(SM) SILTY SAND, trace mica, greenish brown, moist, medium dense		447	7-6-8 (14)
	S-3	SS	18	18			444.5	7-7-7 (14)
10	S-4	SS	18	18			442	6-6-8 (14)
15	S-5	SS	18	18	(SM) SILTY SAND, trace mica, orangish brown, moist, medium dense		439.5	7-6-9 (15)
					END OF DRILLING AT 15.0 FT		437	
20							432	
25							427	
30							422	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED:	Aug 16 2021	CAVE IN DEPTH:	8.1
WL (Completion)	Dry	BORING COMPLETED:	Aug 16 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: DGTS	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	7.3				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-12 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351145.9 | EASTING: 339972.9 | STAT ON: | SURFACE ELEVATION: 449.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(4")			
0	S-1	SS	18	18	[SM] SILTY SAND, trace mica, brown, moist, loose		447.3	7-3-4 (7)
5	S-2	SS	18	18	[SM] SILTY SAND, trace mica, brown, moist, medium dense		444	10-7-8 (15)
	S-3	SS	18	18	[SM] SILTY SAND, trace mica, brown to dark gray, moist to wet, medium dense		441.5	6-8-8 (16) (25.5%)
10	S-4	SS	18	18			439	3-5-6 (11)
15	S-5	SS	18	18	[SM] SILTY SAND, trace mica, light brown to dark brown, moist, medium dense		436.5	4-6-7 (13)
					END OF DRILLING AT 15.0 FT		434	
20							429	
25							424	
30							419	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	9.5	BORING STARTED:	Aug 16 2021	CAVE IN DEPTH:	8.1
WL (Completion)	7.2	BORING COMPLETED:	Aug 16 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: DGTS	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	6.1				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-13 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351093.7 | EASTING: 339955.6 | STATION: | SURFACE ELEVATION: 448.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(5")			
0	S-1	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, medium dense		446.7	4-4-6 (10)
5	S-2	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, brown to dark brown, moist, loose to medium dense		443	4-5-5 (10)
	S-3	SS	18	18			440.5	4-5-6 (11)
10	S-4	SS	18	18			438	4-5-6 (11)
	S-5	SS	18	18			435.5	4-5-6 (11)
15					END OF DRILLING AT 15.0 FT		433	
20							428	
25							423	
30							418	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	13.5	BORING STARTED:	Aug 18 2021	CAVE IN DEPTH:	7.7
WL (Completion)	7.4	BORING COMPLETED:	Aug 18 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: DGTS	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	6.1				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-14 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351182.9 | EASTING: 340132.2 | STATION: | SURFACE ELEVATION: 450.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(4")			
0	S-1	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, loose to very loose		449.3	2-3-3 (6)
5	S-2	SS	18	18			445	3-3-3 (6)
	S-3	SS	18	18	(ML) SANDY SILT, trace mica, brown, wet, soft		442.5	3-3-3 (6)
10	S-4	SS	18	18			440	2-2-2 (4)
	S-5	SS	18	18	(SM) SILTY SAND, trace mica, dark brown, moist, loose		437.5	3-5-5 (10)
15					END OF DRILLING AT 15.0 FT		435	
20							430	
25							425	
30							420	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	8.5	BORING STARTED:	Aug 17 2021	CAVE IN DEPTH:	6.3
WL (Completion)	7.0	BORING COMPLETED:	Aug 17 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: DGTS	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	6.1				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-15 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351135.4 | EASTING: 340144.7 | STAT ON: | SURFACE ELEVATION: 450.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(4")			
0	S-1	SS	18	18	(SM) SILTY SAND, trace mica, gray and brown, moist, loose		449.3	5-4-5 (9)
5	S-2	SS	18	18			445	4-6-8 (14)
	S-3	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, brown, moist, loose		442.5	3-3-7 (10)
10	S-4	SS	18	18	(SM) SILTY SAND, trace mica, gray and white, wet, loose		440	3-4-3 (7)
	S-5	SS	18	18	(ML) SANDY SILT, grayish white, moist, stiff		437.5	4-5-6 (11)
15					END OF DRILLING AT 15.0 FT		435	
20							430	
25							425	
30							420	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	9.0	BORING STARTED:	Aug 17 2021	CAVE IN DEPTH:	6.1
WL (Completion)	5.4	BORING COMPLETED:	Aug 17 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: DGTS	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	4.6				

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:0597 | BORING NO.: SWM-16 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 5891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351115.0 | EASTING: 340177.6 | STATION: | SURFACE ELEVATION: 444.0 | LOSS OF CIRCULATION: | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness(3")			
0	S-1	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, loose		443.3	3-3-4 (7)
5	S-2	SS	18	18			439	3-4-5 (9)
	S-3	SS	18	18	(SP-SM) SAND WITH SILT, trace mica, brown, moist, medium dense		436.5	5-8-10 (18) (13.7%)
10	S-4	SS	18	18			434	10-13-13 (26)
	S-5	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, dark gray, moist, dense		431.5	12-12-20 (32)
15					END OF DRILLING AT 15.0 FT		429	
20							424	
25							419	
30							414	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	9.0	BORING STARTED:	Aug 17 2021	CAVE IN DEPTH:	6.1
WL (Completion)	5.4	BORING COMPLETED:	Aug 17 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY: DGTS	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	4.6				

GEOTECHNICAL BOREHOLE LOG

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-006, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE 7/3/2025

SHEET TITLE:

BORING LOGS

SHEET NUMBER:
73 of 117

F-22-033

Mar 12, 2024
H:\SWM\152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - BORG - 2---LAYOUT T3 - BORING LOGS

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CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-17 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351154.3 | EASTING: 3402820.0 | STATION: | SURFACE ELEVATION: 443.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(3")			
	S-1	SS	18	18	(SM) SILTY SAND, trace mica, light brown, moist, medium dense			5-7-8 (15)
	S-2	SS	18	18				5-5-6 (11)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, medium dense			7-6-7 (18)
	S-4	SS	18	18	(SM) SILTY SAND, little rock fragments, some mica, white, moist, dense			10-20-12 (32)
	S-5	SS	18	18	(SM) SILTY SAND, trace mica, dark gray, moist, medium dense			6-7-9 (16)
					END OF DRILLING AT 15.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	8.0	BORING STARTED: Aug 19 2021	CAVE IN DEPTH: 9.6
WL (Completion)	Dry	BORING COMPLETED: Aug 19 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-18 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351155.5 | EASTING: 3403098.5 | STATION: | SURFACE ELEVATION: 448.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(3")			
	S-1	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, dark gray and brown, moist, dense			5-15-33 (34)
	S-2	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, dark gray, moist, dense			13-20-23 (43)
	S-3	SS	7	7	(WR) WEATHERED ROCK SAMPLED AS SILTY SAND, trace mica, dark gray, moist, very dense			31-50/5" (50/5")
	S-4	SS	5	5				50/3" (50/3")
	S-5	SS	4	4	REFUSAL AT 13.0 FT			50/4" (50/4")

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 19 2021	CAVE IN DEPTH: 7.5
WL (Completion)	Dry	BORING COMPLETED: Aug 19 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-19 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351162.1 | EASTING: 3403553.6 | STATION: | SURFACE ELEVATION: 444.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(7")			
	S-1	SS	18	18	(SM) SILTY SAND, trace organics and mica, brown to orangish brown, moist, medium dense			3-6-7 (13)
	S-2	SS	18	18				7-8-9 (17)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, dark brown to white and dark gray, moist, medium dense			9-12-11 (23)
	S-4	SS	18	18				7-5-8 (13)
	S-5	SS	18	18				4-5-8 (13)
					END OF DRILLING AT 15.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	13.5	BORING STARTED: Aug 20 2021	CAVE IN DEPTH: 8.2
WL (Completion)	Dry	BORING COMPLETED: Aug 20 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-20 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351158.4 | EASTING: 3404661.0 | STATION: | SURFACE ELEVATION: 454.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(4")			
	S-1	SS	18	18	(SM) SILTY SAND, trace organics and mica, brown to orangish brown, moist, medium dense			5-6-8 (14)
	S-2	SS	18	18				6-8-9 (17)
	S-3	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, light brown and gray, moist, dense			11-21-25 (46)
	S-4	SS	2	2	(WR) WEATHERED ROCK SAMPLED AS SAND WITH CLAY, mica, light brown and gray, moist, very dense			50/2" (50/2")
	S-5	SS	7	7				35-50/5" (50/5")
	S-6	SS	8	8				14-50/3" (50/3")
	S-7	SS	0	0	(NO RECOVERY)			100/0" (100/0")
					REFUSAL AT 23.5 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 20 2021	CAVE IN DEPTH: 12.2
WL (Completion)	Dry	BORING COMPLETED: Aug 20 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-21 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351084.9 | EASTING: 3405631.5 | STATION: | SURFACE ELEVATION: 436.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(4")			
	S-1	SS	18	18	(SM) SILTY SAND, trace organics and mica, brown, moist, medium dense			4-5-6 (11)
	S-2	SS	18	18				5-7-10 (17)
	S-3	SS	18	18	(SM) SILTY SAND, trace organics and mica, brown, gray, and white, moist, loose			4-3-4 (7)
	S-4	SS	18	18				3-4-6 (10)
	S-5	SS	18	18	(SM) SILTY SAND, trace mica, dark gray, moist, medium dense			4-4-7 (11)
					END OF DRILLING AT 15.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 25 2021	CAVE IN DEPTH: 10.2
WL (Completion)	Dry	BORING COMPLETED: Aug 25 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-22 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351104.2 | EASTING: 3402560.8 | STATION: | SURFACE ELEVATION: 433.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(6")			
	S-1	SS	18	18	(SM) SILTY SAND, trace organics and mica, brown, moist, medium dense			6-8-9 (17)
	S-2	SS	18	18	(SM) SILTY SAND, greenish brown, moist, medium dense			8-7-8 (15)
	S-3	SS	18	18	(ML) SANDY SILT, trace rock fragments, light gray, wet, firm to stiff			4-4-4 (8)
	S-4	SS	18	18				3-4-6 (10)
					END OF DRILLING AT 10.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 9.2
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-23 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351065.7 | EASTING: 3403597.1 | STATION: | SURFACE ELEVATION: 434.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(5")			
	S-1	SS	18	18	(SM) SILTY SAND, trace organics and mica, brown, moist, medium dense to loose			5-6-5 (11)
	S-2	SS	18	18				3-2-5 (8)
	S-3	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, light gray, moist, medium dense			6-7-3 (10)
	S-4	SS	18	18				13-10-10 (20)
					END OF DRILLING AT 10.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 25 2021	CAVE IN DEPTH: 4.3
WL (Completion)	Dry	BORING COMPLETED: Aug 25 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-24 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4351331.2 | EASTING: 3404353.6 | STATION: | SURFACE ELEVATION: 432.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(5")			
	S-1	SS	18	18	(SM) SILTY SAND, trace mica, brown, moist, medium dense			8-7-7 (14)
	S-2	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, greenish gray, moist, medium dense			5-5-6 (11)
	S-3	SS	18	18	(SM) SILTY SAND, trace organics and mica, light brown, moist, loose			4-6-4 (10)
	S-4	SS	18	18	(SM) SILTY SAND, gray and light brown, moist, medium dense			5-6-7 (13)
	S-5	SS	18	18	(SM) SILTY SAND, trace mica, brown and dark gray, moist, medium dense			5-5-7 (12)
					END OF DRILLING AT 15.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 7.7
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-25 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350969.1 | EASTING: 3407132.2 | STATION: | SURFACE ELEVATION: 431.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(7")			
	S-1	SS	18	18	(SM) SILTY SAND, trace organics and mica, dark gray and brown, moist, medium dense			18-16-15 (29)
	S-2	SS	18	18	(SM) SILTY SAND, trace mica, light brown to gray, moist, medium dense			9-9-15 (24)
	S-3	SS	18	18				13-14-14 (28)
	S-4	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, gray, moist, dense			17-21-25 (46)
					END OF DRILLING AT 10.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 8.7
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-26 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350918.9 | EASTING: 3407318.9 | STATION: | SURFACE ELEVATION: 424.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(7")			
	S-1	SS	18	18	(SM) SILTY SAND, trace mica, light brown, moist, medium dense			3-5-6 (11)
	S-2	SS	18	18	(SM) SILTY SAND, white and light brown, moist, medium dense			5-7-7 (14)
					END OF DRILLING AT 5.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 25 2021	CAVE IN DEPTH: 5.7
WL (Completion)	Dry	BORING COMPLETED: Aug 25 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-27 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350946.9 | EASTING: 3405198.4 | STATION: | SURFACE ELEVATION: 442.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(4")			
	S-1	SS	18	18	(SM) SILTY SAND, trace rock fragments and organics, brown, moist, medium dense			9-13-13 (26)
	S-2	SS	18	18	(SM) SILTY SAND, brown gray, moist, very dense			20-28-30 (58)
	S-3	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, gray, moist, dense			17-20-21 (41)
	S-4	SS	18	18				15-18-24 (42)
	S-5	SS	3	3	(WR) WEATHERED ROCK SAMPLED AS SILTY SAND, trace rock fragments and mica, light gray, dry, very dense			50/5" (50/5")
	S-6	SS	1	1				50/1" (50/1")
					REFUSAL AT 18.6 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 9.2
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-27 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350946.9 | EASTING: 3405198.4 | STATION: | SURFACE ELEVATION: 442.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(4")			
	S-1	SS	18	18	(SM) SILTY SAND, trace rock fragments and organics, brown, moist, medium dense			5-13-13 (26)
	S-2	SS	18	18	(SM) SILTY SAND, brown gray, moist, very dense			20-28-30 (58)
	S-3	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, gray, moist, dense			17-20-21 (41)
	S-4	SS	18	18				15-18-24 (42)
	S-5	SS	3	3	(WR) WEATHERED ROCK SAMPLED AS SILTY SAND, trace rock fragments and mica, light gray, dry, very dense			50/5" (50/5")
	S-6	SS	1	1				50/1" (50/1")
					REFUSAL AT 18.6 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 9.2
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-28 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350981.9 | EASTING: 3403991.4 | STATION: | SURFACE ELEVATION: 428.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(9")			
	S-1	SS	18	18	(ML) SANDY SILT, trace mica, brown, moist, firm			2-3-4 (7)
	S-2	SS	18	18	(ML) SANDY SILT, trace mica, light brown, moist, stiff			4-4-6 (10)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, dark gray, moist, medium dense			6-7-8 (15)
	S-4	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, dark gray, moist, medium dense			8-9-8 (17)
	S-5	SS	18	18				7-6-8 (14)
					END OF DRILLING AT 15.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 8.3
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-28 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350981.9 | EASTING: 3403991.4 | STATION: | SURFACE ELEVATION: 428.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(9")			
	S-1	SS	18	18	(ML) SANDY SILT, trace mica, brown, moist, firm			2-3-4 (7)
	S-2	SS	18	18	(ML) SANDY SILT, trace mica, light brown, moist, stiff			4-4-6 (10)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, dark gray, moist, medium dense			6-7-8 (15)
	S-4	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, dark gray, moist, medium dense			8-9-8 (17)
	S-5	SS	18	18				7-6-8 (14)
					END OF DRILLING AT 15.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 8.3
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-29 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350969.2 | EASTING: 3404342.7 | STATION: | SURFACE ELEVATION: 429.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(7")			
	S-1	SS	18	18	(ML) SANDY SILT, trace organics, rock fragments, and mica, brown, moist, firm			3-3-3 (6)
	S-2	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, tan and brown, moist, medium dense			3-5-7 (12)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, light brown, moist, medium dense			6-7-9 (16)
	S-4	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, brown, moist, medium dense			8-7-10 (17)
	S-5	SS	18	18	(SM) SILTY SAND, trace mica, gray, moist, very stiff			7-10-11 (21)
					END OF DRILLING AT 15.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 24 2021	CAVE IN DEPTH: 8.7
WL (Completion)	Dry	BORING COMPLETED: Aug 24 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:5597 | BORING NO.: SWM-30 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042
NORTHING: 4350954.0 | EASTING: 3403718.9 | STATION: | SURFACE ELEVATION: 427.0 | LOSS OF CIRCULATION: NO | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness(7")			
	S-1	SS	18	18	(SM) SILTY SAND, trace mica, light brown, moist, medium dense			3-5-6 (11)
	S-2	SS	18	18	(SM) SILTY SAND, white and light brown, moist, medium dense			5-7-7 (14)
					END OF DRILLING AT 5.0 FT			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED: Aug 25 2021	CAVE IN DEPTH: 5.7
WL (Completion)	Dry	BORING COMPLETED: Aug 25 2021	HAMMER TYPE: Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:
WL (Stabilized)	Dry	ATV	DRILLING METHOD: 3.25 HSA

GEOTECHNICAL BOREHOLE LOG

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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NOT APPROVED FOR CONSTRUCTION

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PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	2

PROJECT:

**FINAL ROAD CONSTRUCTION PLAN

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

CLIENT: Elm Street Development | PROJECT NO.: 02:9597 | BORING NO.: SWM-10 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042 | END OF EXCAVATION: 20.0
NORTHING: 4350903.5 | EASTING: 340471.8 | STATION: | SURFACE ELEVATION: 431.0 | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[5"]			
					(SM) SILTY SAND, trace mica, reddish brown, moist, medium dense			3-5-6 (11)
5	S-2	SS	18	18	(SM) SILTY SAND, trace mica, dark gray, moist, medium dense		426	10-11-11 (22)
	S-3	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, grayish brown, moist, medium dense			5-5-7 (12)
10	S-4	SS	18	18	(SM) SILTY SAND, trace mica, dark brown, moist, loose		421	3-3-5 (8)
	S-5	SS	18	18	(SM) SILTY SAND, trace mica, dark gray, moist, very dense		416	18-25-29 (54)
15					END OF DRILLING AT 15.0 FT			
20							411	
25							406	
30							401	

[99.1%]

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU; THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED:	Aug 24 2021	CAVE IN DEPTH:	8.0
WL (Completion)	Dry	BORING COMPLETED:	Aug 24 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	Dry	ATV	DGT1		

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:9597 | BORING NO.: SWM-11 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042 | END OF EXCAVATION: 20.0
NORTHING: 4350907.2 | EASTING: 340450.1 | STATION: | SURFACE ELEVATION: 434.0 | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[0"]			
					(SM) SILTY SAND, trace mica, brown, moist, medium dense			5-5-7 (12)
5	S-2	SS	18	18	(SM) SILTY SAND, gray, moist, medium dense		429	6-7-7 (14)
	S-3	SS	18	18				4-6-6 (12)
10	S-4	SS	18	18	(SM) SILTY SAND, brown, moist, medium dense to dense		424	7-9-10 (19)
	S-5	SS	18	18			419	11-13-15 (28)
15	S-6	SS	18	18	END OF DRILLING AT 20.0 FT			14-20-19 (39)
20							414	
25							409	
30							404	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU; THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED:	Aug 24 2021	CAVE IN DEPTH:	11.7
WL (Completion)	Dry	BORING COMPLETED:	Aug 24 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	Dry	ATV	DGT1		

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:9597 | BORING NO.: SWM-12 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042 | END OF EXCAVATION: 15.0
NORTHING: 4350893.6 | EASTING: 340526.5 | STATION: | SURFACE ELEVATION: 438.0 | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[4"]			
					(SM) SILTY SAND, trace mica, dark brown, moist, loose to medium dose			5-5-4 (9)
5	S-2	SS	18	18			433	4-5-7 (12)
	S-3	SS	18	18				4-4-6 (10)
10	S-4	SS	18	18	(SM) SILTY SAND, gray, moist, medium dense		428	4-6-7 (13)
	S-5	SS	18	18			423	6-8-11 (19)
15					END OF DRILLING AT 15.0 FT			
20							418	
25							413	
30							408	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU; THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED:	Aug 24 2021	CAVE IN DEPTH:	8.1
WL (Completion)	Dry	BORING COMPLETED:	Aug 24 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	Dry	ATV	DGT1		

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:9597 | BORING NO.: SWM-33 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042 | END OF EXCAVATION: 15.0
NORTHING: 4350893.5 | EASTING: 340608.7 | STATION: | SURFACE ELEVATION: 423.0 | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[5"]			
					(SM) SILTY SAND, trace rock fragments, light brown, moist, medium dense			8-8-8 (16)
5	S-2	SS	18	18			418	8-7-11 (22)
	S-3	SS	18	18	(SM) SILTY SAND, trace rock fragments and mica, light brown and white, moist, dense			22-18-18 (36)
10	S-4	SS	18	18	(SM) SILTY SAND, trace mica, dark brown, moist, medium dense		413	16-10-9 (19)
					END OF DRILLING AT 10.0 FT			
15							408	
20							403	
25							398	
30							393	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU; THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED:	Aug 25 2021	CAVE IN DEPTH:	5.2
WL (Completion)	Dry	BORING COMPLETED:	Aug 25 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	Dry	ATV	DGT1		

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:9597 | BORING NO.: SWM-34 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042 | END OF EXCAVATION: 20.0
NORTHING: 4350860.0 | EASTING: 340616.7 | STATION: | SURFACE ELEVATION: 414.0 | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[7"]			
					(SM) SILTY SAND, trace rock fragments, organics and mica, brown, moist, loose			3-3-4 (7)
5	S-2	SS	18	18	(ML) SANDY SILT, trace rock fragments, white and tan, moist, stiff		409	4-5-5 (10)
	S-3	SS	18	18	(SM) SILTY SAND, trace mica, dark gray, moist, medium dense			3-4-8 (12)
10	S-4	SS	18	18			404	4-5-7 (12)
					END OF DRILLING AT 10.0 FT			
15							399	
20							394	
25							389	
30							384	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU; THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED:	Aug 25 2021	CAVE IN DEPTH:	6.5
WL (Completion)	Dry	BORING COMPLETED:	Aug 25 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	Dry	ATV	DGT1		

GEOTECHNICAL BOREHOLE LOG

CLIENT: Elm Street Development | PROJECT NO.: 02:9597 | BORING NO.: SWM-35 | SHEET: 1 of 1
PROJECT NAME: Bethany Glen - ARAH | DRILLER/CONTRACTOR: D And S Drilling, Inc.
SITE LOCATION: 9891 Old Frederick Road, Ellicott City, Maryland 21042 | END OF EXCAVATION: 20.0
NORTHING: 4350794.1 | EASTING: 340679.9 | STATION: | SURFACE ELEVATION: 430.0 | BOTTOM OF CASING:

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	Topsoil Thickness[5"]			
					(SM) SILTY SAND, trace rock fragments and mica, brown, moist, medium dense			8-9-10 (19)
5	S-2	SS	18	18	(SM) SILTY SAND, gray, brown, and white, moist, medium dense		425	10-7-6 (13)
	S-3	SS	18	18				7-9-10 (19)
10	S-4	SS	18	18			420	11-10-11 (21)
	S-5	SS	18	18	(SM) SILTY SAND, trace mica, gray, moist, medium dense		415	5-5-6 (11)
15	S-6	SS	18	18				6-8-8 (16)
20					END OF DRILLING AT 20.0 FT		410	
25							405	
30							400	

[89.4%]

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU; THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	Dry	BORING STARTED:	Aug 25 2021	CAVE IN DEPTH:	11.5
WL (Completion)	Dry	BORING COMPLETED:	Aug 25 2021	HAMMER TYPE:	Auto
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	3.25 HSA
WL (Stabilized)	Dry	ATV	DGT1		

GEOTECHNICAL BOREHOLE LOG

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES
THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE EXPOSED OR USED FOR ANY PURPOSE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED & SIGNED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES BY BOHLER.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152016
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

BORING LOGS

SHEET NUMBER:

75 of 117

F-22-033

APPROVED: DEPARTMENT OF PUBLIC WORKS
Docusigned by: [signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
Docusigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
Docusigned by: (Carl) Edmondson
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

Mar 12, 2024
H:\19\MD\152016\DRAWINGS\PLAN SETS\FINAL PLAN\MD152016 - BORG - 2---LAYOUT TS - BORING LOGS
AGC

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

FOREST CONSERVATION SEQUENCE OF CONSTRUCTION

1. PRECONSTRUCTION MEETING SHALL BE HELD BETWEEN DEVELOPER, CONTRACTOR, AND COUNTY INSPECTOR.
2. SEDIMENT CONTROL SHALL BE INSTALLED IN ACCORDANCE WITH GENERAL CONSTRUCTION PLAN FOR SITE, TEMPORARY PROTECTIVE FENCING AND CONSERVATION SIGNAGE SHALL BE INSTALLED AS PER FOREST CONSERVATION PLAN.
3. SITE SHALL BE GRADED, INFRASTRUCTURE INSTALLED, AND HOUSES CONSTRUCTED. DISTURBED AREAS SHALL BE STABILIZED. PERMANENT SIGNAGE IN POOR CONDITION SHALL BE REPLACED.
4. POSTCONSTRUCTION MEETING SHALL BE HELD WITH COUNTY INSPECTOR TO ENSURE COMPLIANCE WITH DEVELOPMENT PLAN. SEDIMENT CONTROL AND TEMPORARY PROTECTIVE FENCING UPON STABILIZATION OF SITE AND COMPLETION OF CONSTRUCTION ACTIVITIES.

SURETY NOTE

FOREST CONSERVATION REQUIREMENTS PER SECTION 16.1200 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION MANUAL FOR THIS SUBDIVISION WILL BE FULFILLED BY RETENTION OF EXISTING FOREST IN THE AMOUNT OF 8.9 ACRES. THE REFORESTATION OBLIGATION OF 16.0 ACRES WILL BE PROVIDED BY 12.9 ACRES ONSITE, AND 4.7 ACRES AT THE WILLOWSHIRE FOREST CONSERVATION BANK (F-18-086). TOTAL REFORESTATION PROVIDED FOR THIS SUBDIVISION IS 17.6 ACRES. SURETY IN THE AMOUNT OF $280,962.00 WILL BE POSTED WITH THE DEVELOPERS AGREEMENT F-22-033.

SITE AREA COMPUTATIONS

GROSS TRACT AREA = 68.57 AC
100 YEAR FLOODPLAIN = 2.10 AC
NET TRACT AREA = 66.47 AC
GROSS ON-SITE FOREST AREA = 27.6 AC
ZONING = R-20

FORESTED FLOODPLAIN

FOREST = 1.94 AC.
(CALCULATED BASED ON EXISTING FOREST WITHIN THE FLOODPLAIN PRIOR TO DEVELOPMENT)

FOREST CLEARING

FOREST TO BE CLEARED = 19.0 AC. (0.3 AC. WITHIN FLOODPLAIN)

SPECIMEN TREES

ID #	SPECIES NAME	SIZE	CONDITION	SPECIMEN TREES TO REMAIN
ST-01	BLACK GUM	34"	VERY GOOD, HEALTHY CROWN	NO
ST-02	TULIP POPLAR	31"	VERY GOOD, HEALTHY CANOPY CROWN	NO
ST-03	TULIP POPLAR	50"	VERY POOR, MOSTLY DEAD CROWN, BROKEN	NO
ST-04	TULIP POPLAR	48"	FAIR, SOME LIMB DIEBACK, BROAD CROWN	YES
ST-05	AMERICAN ELM	38"	VERY GOOD, TYPICAL, HEALTHY CROWN	YES
ST-06	AMERICAN ELM	38"	VERY GOOD, TYPICAL, HEALTHY CROWN	YES
ST-07	AMERICAN ELM	32"	VERY GOOD, TYPICAL, HEALTHY CROWN	YES
ST-08	AMERICAN ELM	36"	VERY GOOD, HEALTHY CROWN, TWO VOLE	YES
ST-09	TULIP POPLAR	37"	GOOD, SOME LIMB DIEBACK	YES
ST-10	TULIP POPLAR	45"	VERY GOOD, HEALTHY CANOPY CROWN	YES
ST-11	TULIP POPLAR	32"	VERY GOOD, HEALTHY CANOPY CROWN	YES
ST-12	TULIP POPLAR	31"	VERY GOOD, HEALTHY CANOPY CROWN	YES
ST-13	TULIP POPLAR	32"	VERY GOOD, HEALTHY CANOPY CROWN	YES
ST-14	TULIP POPLAR	30"	VERY GOOD, HEALTHY CANOPY CROWN	YES
ST-15	TULIP POPLAR	31"	VERY GOOD, HEALTHY CANOPY CROWN	YES
ST-16	BLACK CHERRY	39"	FAIR TO GOOD, OPEN BROKEN, FENCE LINE	YES
ST-17	RED OAK	32"	VERY GOOD, HEALTHY CROWN	YES
ST-18	BLACK OAK	34"	GOOD, BROKEN CROWN LIMB, FENCELINE	YES
ST-19	AMERICAN ELM	31"	GOOD, LIGHT CROWN, FENCELINE	YES
ST-20	AMERICAN ELM	36"	VERY GOOD, LARGE CROWN, FENCELINE	YES
ST-21	TULIP POPLAR	31"	VERY GOOD, HEALTHY CANOPY CROWN	NO
ST-22	AMERICAN SYCAMORE	48"	EXCELLENT, LARGE BROAD CROWN IN OPEN LAWN	YES
ST-23	BLACK OAK	35.5"	DEAD	NO
ST-24	TULIP POPLAR	29.8"	GOOD	NO
ST-25	SCARLET OAK	31.9"	GOOD	NO

SPECIMEN TREES

ID #	SPECIES NAME	SIZE	CONDITION	SPECIMEN TREES TO REMAIN
ST-26	TULIP POPLAR	31.8"	GOOD	NO
ST-27	SCARLET OAK	44.9"	FAIR, DOUBLE BOLE HAZARD	NO
ST-28	SCARLET OAK	41.7"	DEAD	NO
ST-31	TULIP POPLAR	32.1"	FAIR, LIMB BREAKAGE	NO
ST-35	TULIP POPLAR	30.8"	FAIR, LIMB BREAKAGE	NO
ST-36	TULIP POPLAR	31.5"	GOOD	YES
ST-37	TULIP POPLAR	33.7"	POOR, ROTTEN CORE	NO
ST-38	BLACK OAK	39.0"	FAIR, DOUBLE BOLE, BELOW 4.3 Ft.	NO
ST-39	TULIP POPLAR	36.0"	GOOD	NO
ST-40	RED MAPLE	32.9"	POOR, DIEBACK, LIMB BREAKAGE	YES
ST-41	RED OAK	30.4"	GOOD	YES
ST-42	TULIP POPLAR	30.0"	GOOD	YES
ST-43	RED MAPLE	47.4"	POOR, MULTI BOLE, DIEBACK	NO
ST-45	TULIP POPLAR	30.4"	GOOD	YES
ST-46	BLACK GUM	30.0"	FAIR, SOME DIEBACK	NO
ST-47	TULIP POPLAR	33.6"	GOOD	YES
ST-48	TULIP POPLAR	30.2"	FAIR, SOME BREAKAGE	NO

UNDER WP-21-064, SECTION 16.1205.(A).(7) - A REQUEST FOR ALTERNATIVE COMPLIANCE HAS BEEN REQUESTED FROM DPZ FOR THE REMOVAL OF EIGHTEEN (18) SPECIMEN TREES (#ST-01,02, 03, 21, 23, 24, 25, 26, 27, 28, 31, 35, 37, 38, 39, 43, 46 AND 48). MITIGATION FOR THE REMOVAL OF THESE EIGHTEEN (18) SPECIMEN TREES IS TO CONSIST OF TWO (2) 3-4" CALIBER TREE FOR EACH ONE (1) REMOVED SIMILAR OR IDENTICAL SPECIES. THESE THIRTY-SIX (36) TREES SHALL BE PLACED WITHIN CLOSE PROXIMITY TO THE LOCATION OF THE ORIGINAL SPECIMEN TREE AND WILL BE IN ADDITION TO THE REQUIRED PERIMETER LANDSCAPING. COSTS TO COVER THE INSTALLATION OF THESE TREES SHALL BE INCLUDED IN THE PERIMETER LANDSCAPING ESTIMATE; INSPECTION FEES SHALL BE POSTED WITH THE DPW DEVELOPER'S AGREEMENT AT THE FINAL PLAN STAGE FOR THIS DEVELOPMENT; SURETY WILL BE ADDRESSED WITH THIS PLAN STAGE FOR THIS DEVELOPMENT. THE SYMBOL "$" REPRESENTS PLANT MATERIAL TO MEET THIS REQUIREMENT.

FOREST CONSERVATION EASEMENT AREA TABULATION

EASEMENT	EXISTING FOREST AREA (GROSS AC.)	FOREST AREA NONCREDITED (FOR FOREST LESS THAN 10,000 S.F. (AC)	FOREST AREA NONCREDITED (100 YEAR FLOODPLAIN) (AC)	NET FOREST (RETAINED) (CREDITED) (AC)	PLANTED AREA (REFORESTATION) (CREDITED) (AC)	CREDITED EASEMENT AREA (AC)	TOTAL EASEMENT AREA (AC)
FCE # 1	0.3	0.0	0.0	0.3	0.2	0.5	0.5
FCE # 2	0.1	0.0	0.0	0.1	0.2	0.3	0.3
FCE # 3	0.2	0.0	0.0	0.2	7.2	7.4	7.4
FCE # 4	0.6	0.0	0.1	0.5	0.2	0.7	0.8
FCE # 5	0.3	0.0	0.0	0.3	0.4	0.7	0.7
FCE # 6	0.0	0.0	0.0	0.0	0.6	0.6	0.6
FCE # 7	3.9	0.0	0.5	3.4	0.8	4.2	4.7
FCE # 8	1.3	0.0	0.1	1.20	0.2	1.4	1.5
FCE # 9	0.9	0.0	0.5	0.4	0.1	0.5	1.0
FCE # 10	1.6	0.0	0.3	1.3	0.8	2.1	2.4
FCE # 11	1.3	0.0	0.0	1.3	1.0	2.3	2.3
FCE # 12	0.0	0.0	0.0	0.0	0.4	0.4	0.4
FCE # 13	0.0	0.0	0.0	0.0	0.8	0.8	0.8
TOTAL	10.5	0.0	1.5	9.0	12.9	21.9	23.4

FOREST CONSERVATION EASEMENT #12

EXISTING FOREST AREA = 0.0 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 0.0 AC.
REFORESTATION = 0.4 AC.
CREDITED EASEMENT AREA = 0.4 AC.
EASEMENT AREA = 0.4 AC.

FOREST CONSERVATION EASEMENT #3

EXISTING FOREST AREA = 0.2 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 0.2 AC.
REFORESTATION = 7.2 AC.
CREDITED EASEMENT AREA = 7.4 AC.
EASEMENT AREA = 7.4 AC.

FOREST CONSERVATION EASEMENT #6

EXISTING FOREST AREA = 0.0 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 0.0 AC.
REFORESTATION = 0.6 AC.
CREDITED EASEMENT AREA = 0.6 AC.
EASEMENT AREA = 0.6 AC.

FOREST CONSERVATION EASEMENT #13

EXISTING FOREST AREA = 0.0 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 0.0 AC.
REFORESTATION = 0.8 AC.
CREDITED EASEMENT AREA = 0.8 AC.
EASEMENT AREA = 0.8 AC.

FOREST CONSERVATION EASEMENT #4

EXISTING FOREST AREA = 0.6 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.1 AC.
CREDIT FOREST = 0.5 AC.
REFORESTATION = 0.2 AC.
CREDITED EASEMENT AREA = 0.7 AC.
EASEMENT AREA = 0.8 AC.

FOREST CONSERVATION EASEMENT #5

EXISTING FOREST AREA = 0.3 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 0.3 AC.
REFORESTATION = 0.4 AC.
CREDITED EASEMENT AREA = 0.7 AC.
EASEMENT AREA = 0.7 AC.

FOREST CONSERVATION EASEMENT #2

EXISTING FOREST AREA = 0.1 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 0.1 AC.
REFORESTATION = 0.2 AC.
CREDITED EASEMENT AREA = 0.3 AC.
EASEMENT AREA = 0.3 AC.

FOREST CONSERVATION EASEMENT #1

EXISTING FOREST AREA = 0.3 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 0.3 AC.
REFORESTATION = 0.2 AC.
CREDITED EASEMENT AREA = 0.5 AC.
EASEMENT AREA = 0.5 AC.

FOREST CONSERVATION EASEMENT #7

EXISTING FOREST AREA = 3.9 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.5 AC.
CREDIT FOREST = 3.4 AC.
REFORESTATION = 0.8 AC.
CREDITED EASEMENT AREA = 4.2 AC.
EASEMENT AREA = 4.7 AC.

FOREST CONSERVATION EASEMENT #8

EXISTING FOREST AREA = 1.3 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.1 AC.
CREDIT FOREST = 1.2 AC.
REFORESTATION = 0.2 AC.
CREDITED EASEMENT AREA = 1.4 AC.
EASEMENT AREA = 1.5 AC.

FOREST CONSERVATION EASEMENT #9

EXISTING FOREST AREA = 0.9 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.5 AC.
CREDIT FOREST = 0.4 AC.
REFORESTATION = 0.1 AC.
CREDITED EASEMENT AREA = 0.5 AC.
EASEMENT AREA = 1.0 AC.

FOREST CONSERVATION EASEMENT #11

EXISTING FOREST AREA = 1.3 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.0 AC.
CREDIT FOREST = 1.3 AC.
REFORESTATION = 1.0 AC.
CREDITED EASEMENT AREA = 2.3 AC.
EASEMENT AREA = 2.3 AC.

FOREST CONSERVATION EASEMENT #10

EXISTING FOREST AREA = 1.6 AC.
NONCREDIT FOREST/FLOODPLAIN = 0.3 AC.
CREDIT FOREST = 1.3 AC.
REFORESTATION = 0.8 AC.
CREDITED EASEMENT AREA = 2.1 AC.
EASEMENT AREA = 2.4 AC.

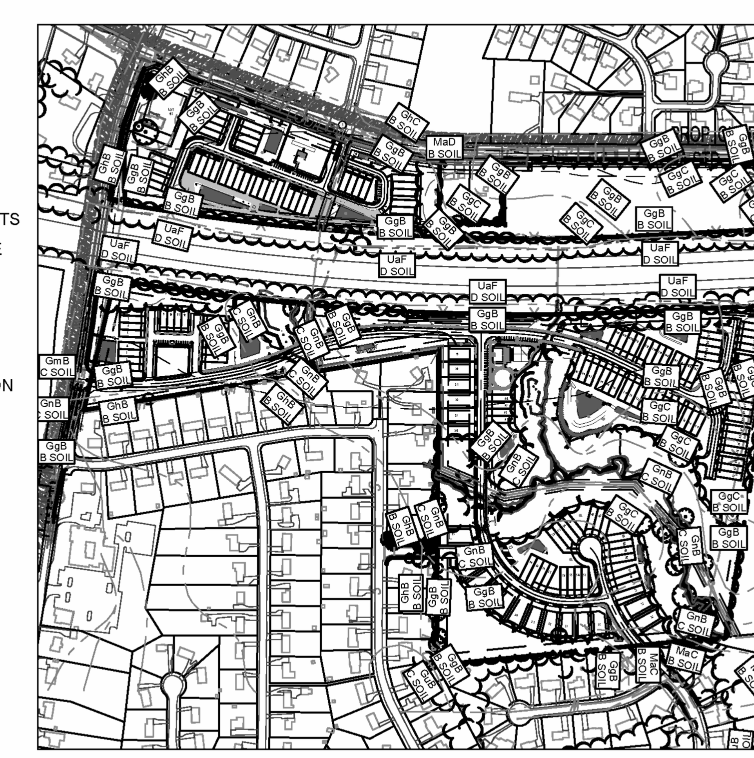
1"= 200'

LEGEND

PROPERTY LINE
WETLAND BUFFER LIMITS
LIMIT OF DISTURBANCE
EXISTING CONTOUR
PROPOSED CONTOUR
TREE PROTECTION FENCE
FOREST CONSERVATION EASEMENT
REFORESTATION AREA
FOREST RETENTION AREA
FOREST REMOVAL AREA
WETLANDS
100 YR. FLOODPLAIN
REFORESTATION SIGNAGE
FOREST RETENTION SIGNAGE
SPECIMEN TREES
WETLAND BOUNDARY
25-FOOT WETLAND BUFFER
100-FOOT STREAM BUFFER
SOILS BOUNDARY
EXISTING TREE LINE
STEEP SLOPES 15-24.99%
STEEP SLOPES 25% +
SPECIMEN TREE (TO BE REMOVED)

FOREST STAND / VEGETATIVE COVER

FOREST STAND	COMMUNITY IDENTIFICATION	AREA (ac*)	AGE (yrs.)	Avg. Dia."	SOIL TYPE	TYPICAL COVER	GENERAL CONDITION	SENSITIVE Area (ac*)
FS1	Early Successional Abandoned Farmland	0.35	35	2-6	GgC	Mixed Hardwoods	Healthy, even-aged dense understory	0.00
FS2	Early Successional Abandoned Farmland	9.45	35	2-6	GgB	Mixed Hardwoods	Healthy, even-aged dense understory	0.00
FS3	Early Successional Abandoned Farmland	0.75	35	2-6	GgB	Mixed Hardwoods	Healthy, even-aged dense understory	0.00
FS4	Red Maple Wetland Association	1.05	75	12-20+	GnB	Mixed Hardwoods	Healthy, even-aged Light understory	Wetlands 0.65
FS5	Tulip Poplar/Oak Association	11.0	75	12-24+	GgBC GnB	Mixed Hardwoods	Healthy, even-aged light understory	Steep slopes 0.45
FS6	Tulip Poplar Association	5.40	75	12-24+	GgC GnB	Mixed Hardwoods	Healthy, even-aged light understory	Floodplain 1.00
FS7	Oak-Hickory Association	2.20	75	12-24+	GgB MaC	Mixed Hardwoods	Healthy, even-aged moderate understory	0.00



SOIL MAP

NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: [signature] 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: [signature] 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

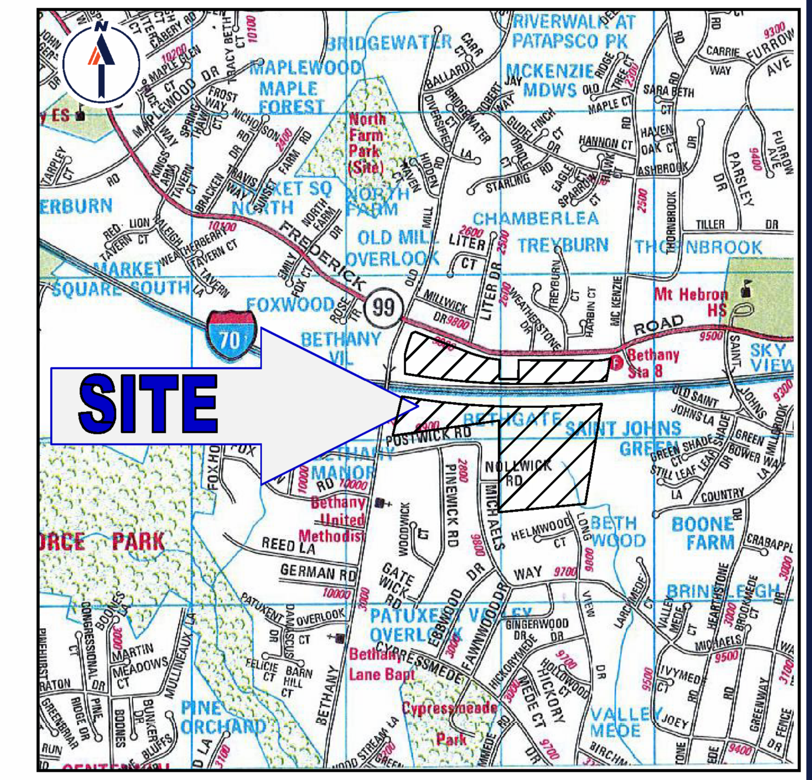
DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

[signature] 3-12-24
DEVELOPER'S / OWNER'S NAME Jason Van Kirk — DATE

FOREST CONSERVATION NOTES:

1. WHEN REFORESTATION IS WITHIN 35 FEET OF THE SIDE OR REAR YARD OF A LOT, TWO (2) ROWS OF 1" CAL. TREES MUST BE PLANTED IN ADDITION TO THE FOREST CONSERVATION REQUIREMENT. THIS AFFECTS THE FOLLOWING LOTS: 7, 8, 9, 10, 11, 12, 13, 24, 25, 26, 27, 28, 29, 30, 31, 45, 46, 47, 48, 49, 50, 51, 52, 114, 115, 116, 149, 150, 151, 152, 153, AND 154.
2. FOR ROOT PRUNING AND SEED FERTILIZATION LOCATIONS SEE LANDSCAPE PLANS.



LOCATION MAP

COPYRIGHT ADC THE MAP PEOPLE
PERMIT USE NO. 20602153-5
SCALE: 1"=2000'

FOREST CONSERVATION WORKSHEET FOR: Bethany Glen

Net Tract Area

A.	Total (Gross) Tract Area	A =	68.6
B.	Area within 100-year Floodplain	B =	2.1
C.	Other Deductions (Identify:)	C =	0.0
D.	Net Tract Area	D =	66.5

Land Use Category
Insert the number "1" under the appropriate land use (limit to only one entry)

Resid. Rural LD	Resid. Rural MD	Resid. Suburban	Inst./ Linear	Retail/Ind./ Office	Mixed Use/ PUD
0	0	1	0	0	0

E.	Afforestation Threshold (Net Tract Area x 15%)	E =	10.0
F.	Reforestation Threshold (Net Tract Area x 20%)	F =	13.3
	Existing Forest Cover		
G.	Existing Forest Cover within the Net Tract Area	G =	27.6
H.	Area of Forest above Afforestation Threshold	H =	17.6
I.	Area of Forest above Reforestation Threshold	I =	14.3
	Break Even Point		
J.	Break Even Point	J =	18.1
K.	Forest Clearing Permitted without Mitigation	K =	9.5
	Proposed Forest Clearing		
L.	Total Area of Forest to be Cleared	L =	18.6
M.	Total Area of Forest to be Retained	M =	9.0
	Planting Requirements Inside Watershed		
N.	Reforestation for Clearing above the Reforestation Threshold	N =	7.2
P	Reforestation for Clearing below the Reforestation Threshold	P =	8.6
Q.	Credit for Retention above the Reforestation Threshold	Q =	0.0
R.	Total Reforestation Required	R =	15.8
S.	Total Afforestation Required	S =	0.0
T	Total Reforestation and Afforestation Requirement	T=	15.8
U	75% of Total Obligation (Retention + Planting)	U=	18.6
V	Planting Required Onsite to meet 75% Obligation	V=	9.6
	Planting Requirements Outside Watershed		
W.	Total Planting within Development Site Watershed	W=	12.9
X.	Total Afforestation Required	X=	0.0
Y.	Remaining Planting within Watershed for Reforestation Credit	Y=	12.9
Z.	Reforestation for Clearing above the Reforestation Threshold	Z=	0.0
AA.	Reforestation for Clearing below the Reforestation Threshold	AA=	4.4
BB.	Credit for Retention above the Reforestation Threshold	BB=	0.0
CC.	Total Reforestation Required	CC=	4.4
DD.	Total Afforestation and Reforestation Requirement	DD=	4.4

Date: ____________

SOILS TABLE

SOILS NAME	SOILS DESCRIPTION	HYDROLOGIC SOILS GROUP	HIGHLY ERODIBLE SOIL	K FACTOR
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	NO	0.28
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.28
GhB	GLENELG-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	B	NO	0.28
GhC	GLENELG-URBAN LAND COMPLEX, 8 TO 15 PERCENT SLOPES	B	NO	0.28
GnB	GLENVILLE-BAILE SILT LOAMS, 0 TO 8 PERCENT SLOPES	C	YES	0.43
GuB	GLENVILLE-URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPES	C	YES	0.43
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.28
MaD	MANOR LOAM, 15 TO 25 PERCENT SLOPES	B	NO	0.28
UAf	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	N/A	-	-

FOREST CONSERVATION NARRATIVE:

THIS FOREST CONSERVATION PLAN PROPOSES THE REMOVAL OF 19.0 (0.30 WITH FLOODPLAIN) ACRES OF FOREST FROM THE PROPOSED LIMIT OF DISTURBANCE. THIS FOREST CLEARING IS UNAVOIDABLE WITH THE SUBDIVISION OF THE PROPERTY. THIS PROJECT IS ZONED R-20 WHICH ENCOURAGES A DEVELOPMENT OF THIS DENSITY. THE PROPOSED CLEARING WILL NOT IMPACT HIGH PRIORITY FOREST OR FOREST AREAS.

THE PROPOSED FOREST RETENTION IS LOCATED WITHIN ENVIRONMENTALLY SENSITIVE AREAS. THIS STAND INCLUDES STEEP SLOPES, STREAMS, WETLANDS AND THEIR BUFFERS AND MULTIPLE SPECIMEN TREES. FOR THESE REASONS THE FOREST RETENTION AREA IS CONSIDERED THE HIGHEST PRIORITY FOR RETENTION WITHIN THE FOREST STAND DELINEATION.

NOTE: ALL EXISTING STRUCTURES, FENCES, DRIVEWAYS, ELECTRIC LINES, ETC. MUST BE REMOVED FROM ALL FOREST EASEMENT AREAS BEFORE RECORDING PLAT.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: FCON-2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
PROFESSIONAL CERTIFICATION
I, ERIC R. McWILLIAMS HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/24

SHEET TITLE:
FOREST CONSERVATION PLAN

SHEET NUMBER:
76 of 117

F-22-033

Apr 01, 2024 \\BOHLERENG.NET\SHARES\MD-PROJECTS\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - FCON - 2---->LAYOUT: 76 - FOREST CONSERVATION PLAN

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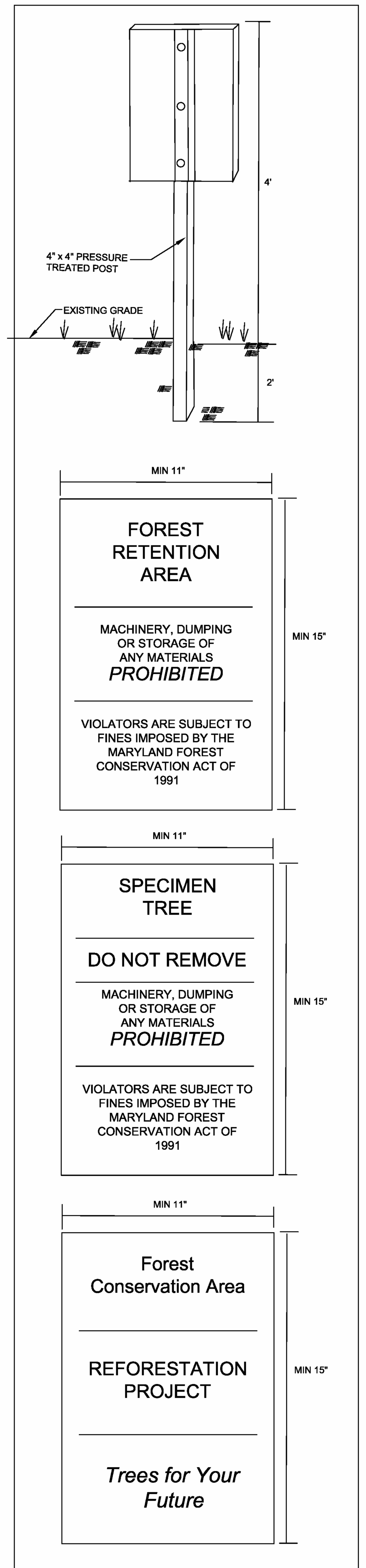


FOREST CONSERVATION SIGN DETAIL

NOT TO SCALE

FOREST CONSERVATION SPECIFICATIONS

9. PLANTING

A. INSOFAR THAT IT IS FEASIBLE, PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THAT THIS IS NOT POSSIBLE, LANDSCAPE CONTRACTOR SHALL PROTECT UNINSTALLED PLANT MATERIAL. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE DAY PERIOD AFTER DELIVERY. PLANTS THAT WILL NOT BE PLANTED FOR A PERIOD OF TIME GREATER THAN THREE DAYS SHALL BE HEALED IN WITH TOPSOIL OR MULCH TO HELP PRESERVE ROOT MOISTURE.

B. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICE. PLANTS SHALL NOT BE INSTALLED IN TOPSOIL THAT IS IN A MUDDY OR FROZEN CONDITION.

C. ANY INJURED ROOTS OR BRANCHES SHALL BE PRUNED TO MAKE CLEAN-CUT ENDS PRIOR TO PLANTING UTILIZING CLEAN, SHARP TOOLS. ONLY INJURED OR DISEASED BRANCHING SHALL BE REMOVED.

D. ALL PLANTING CONTAINERS AND NON-BIODEGRADABLE MATERIALS SHALL BE REMOVED FROM ROOT BALLS DURING PLANTING. NATURAL FIBER BURLAP MUST BE CUT FROM AROUND THE TRUNK OF THE TREE AND FOLDED DOWN AGAINST THE ROOT BALL PRIOR TO BACKFILLING.

E. POSITION TREES AND SHRUBS AT THEIR INTENDED LOCATIONS AS PER THE PLANS AND SECURE THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO EXCAVATING PITS, MAKING NECESSARY ADJUSTMENTS AS DIRECTED.

F. PRIOR TO THE ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY, THE PROPOSED LANDSCAPE, AS SHOWN ON THE APPROVED LANDSCAPE PLAN, MUST BE INSTALLED, INSPECTED AND APPROVED BY THE APPROVING AGENCY. THE APPROVING AGENCY SHALL TAKE INTO ACCOUNT SEASONAL CONSIDERATIONS IN THIS REGARD AS FOLLOWS. THE PLANTING OF TREES, SHRUBS, VINES OR GROUND COVER SHALL OCCUR ONLY DURING THE FOLLOWING PLANTING SEASONS:
1.1. PLANTS: MARCH 15 TO DECEMBER 15
1.2. LAWN: MARCH 15 TO JUNE 15 OR SEPT. 1 TO DECEMBER 1

G. PLANTINGS REQUIRED FOR A CERTIFICATE OF OCCUPANCY SHALL BE PROVIDED DURING THE NEXT APPROPRIATE SEASON AT THE MUNICIPALITY'S DISCRETION. CONTRACTOR SHOULD CONTACT APPROVING AGENCY FOR POTENTIAL SUBSTITUTIONS.

H. FURTHERMORE, THE FOLLOWING TREE VARIETIES ARE UNUSUALLY SUSCEPTIBLE TO WINTER DAMAGE. WITH TRANSPLANT SHOCK AND THE SEASONAL LACK OF NITROGEN AVAILABILITY, THE RISK OF PLANT DEATH IS GREATLY INCREASED. IT IS NOT RECOMMENDED THAT THESE SPECIES BE PLANTED DURING THE FALL PLANTING SEASON:

ACER RUBRUM	PLATANUS X ACERIFOLIA
BETULA VARIETIES	POPULOUS VARIETIES
CARPINUS VARIETIES	PRUNUS VARIETIES
CRATAEGUS VARIETIES	PYRUS VARIETIES
KOELREUTERIA	QUERCUS VARIETIES
LIQUIDAMBER STYRACIFLUA	TILIA TOMENTOSA
LIRIODENDRON TULIPIFERA	ZELKOVA VARIETIES

I. PLANTING PITS SHALL BE DUG WITH LEVEL BOTTOMS, WITH THE WIDTH TWICE THE DIAMETER OF ROOT BALL. THE ROOT BALL SHALL REST ON UNDISTURBED GRADE. EACH PLANT PIT SHALL BE BACKFILLED IN LAYERS WITH THE FOLLOWING PREPARED SOIL MIXED THOROUGHLY:
- 1 PART PEAT MOSS
- 1 PART COMPOSTED COW MANURE BY VOLUME
- 3 PARTS TOPSOIL BY VOLUME
- 21 GRAMS 'AGRIFORM' PLANTING TABLETS (OR APPROVED EQUAL) AS FOLLOWS:
  - A) 2 TABLETS PER 1 GALLON PLANT
  - B) 3 TABLETS PER 5 GALLON PLANT
  - C) 4 TABLETS PER 15 GALLON PLANT
  - D) LARGER PLANTS: 2 TABLETS PER ½" CALIPER OF TRUNK

J. FILL PREPARED SOIL AROUND BALL OF PLANT HALF-WAY AND INSERT PLANT TABLETS. COMPLETE BACKFILL AND WATER THOROUGHLY.

K. ALL PLANTS SHALL BE PLANTED SO THAT THE TOP OF THE ROOT BALL, THE POINT AT WHICH THE ROOT FLARE BEGINS, IS SET AT GROUND LEVEL AND IN THE CENTER OF THE PIT. NO SOIL IS TO BE PLACED DIRECTLY ON TOP OF THE ROOT BALL.

L. ALL PROPOSED TREES DIRECTLY ADJACENT TO WALKWAYS OR DRIVEWAYS SHALL BE PRUNED AND MAINTAINED TO A MINIMUM BRANCHING HEIGHT OF 7' FROM GRADE.

M. GROUND COVER AREAS SHALL RECEIVE A ¼" LAYER OF HUMUS RAKED INTO THE TOP 1" OF PREPARED SOIL PRIOR TO PLANTING. ALL GROUND COVER AREAS SHALL BE WEEDED AND TREATED WITH A PRE-EMERGENT CHEMICAL AS PER MANUFACTURER'S RECOMMENDATION.

N. NO PLANT, EXCEPT GROUND COVERS, GRASSES OR VINES, SHALL BE PLANTED LESS THAN TWO FEET (2') FROM EXISTING STRUCTURES AND SIDEWALKS.

O. ALL PLANTING AREAS AND PLANTING PITS SHALL BE MULCHED AS SPECIFIED HEREIN TO FILL THE ENTIRE BED AREA OR SAUCER. NO MULCH IS TO TOUCH THE TRUNK OF THE TREE OR SHRUB.

P. ALL PLANTING AREAS SHALL BE WATERED IMMEDIATELY UPON INSTALLATION IN ACCORDANCE WITH THE WATERING SPECIFICATIONS AS LISTED HEREIN.

10. TRANSPLANTING (WHEN REQUIRED)

A. ALL TRANSPLANTS SHALL BE DUG WITH INTACT ROOT BALLS CAPABLE OF SUSTAINING THE PLANT.

B. IF PLANTS ARE TO BE STOCKPILED BEFORE REPLANTING, THEY SHALL BE HEALED IN WITH MULCH OR SOIL, ADEQUATELY WATERED AND PROTECTED FROM EXTREME HEAT, SUN AND WIND.

C. PLANTS SHALL NOT BE DUG FOR TRANSPLANTING BETWEEN APRIL 10 AND JUNE 30.

D. UPON REPLANTING, BACKFILL SOIL SHALL BE AMENDED WITH FERTILIZER AND ROOT GROWTH HORMONE.

E. TRANSPLANTS SHALL BE GUARANTEED FOR THE LENGTH OF THE GUARANTEE PERIOD SPECIFIED HEREIN.

F. IF TRANSPLANTS DIE, SHRUBS AND TREES LESS THAN SIX INCHES (6") DBH SHALL BE REPLACED IN KIND. TREES GREATER THAN SIX INCHES (6") DBH MAY BE REQUIRED TO BE REPLACED IN ACCORDANCE WITH THE MUNICIPALITY'S TREE REPLACEMENT GUIDELINES.

11. WATERING

A. NEW PLANTINGS OR LAWN AREAS SHALL BE ADEQUATELY IRRIGATED BEGINNING IMMEDIATELY AFTER PLANTING. WATER SHALL BE APPLIED TO EACH TREE AND SHRUB IN SUCH MANNER AS NOT TO DISTURB BACKFILL AND TO THE EXTENT THAT ALL MATERIALS IN THE PLANTING HOLE ARE THOROUGHLY SATURATED. WATERING SHALL CONTINUE AT LEAST UNTIL PLANTS ARE ESTABLISHED.

B. SITE OWNER SHALL PROVIDE WATER IF AVAILABLE ON SITE AT TIME OF PLANTING. IF WATER IS NOT AVAILABLE ON SITE, CONTRACTOR SHALL SUPPLY ALL NECESSARY WATER. THE USE OF WATERING BAGS IS RECOMMENDED FOR ALL NEWLY PLANTED TREES.

C. IF AN IRRIGATION SYSTEM HAS BEEN INSTALLED ON THE SITE, IT SHALL BE USED TO WATER PROPOSED PLANT MATERIAL, BUT ANY FAILURE OF THE SYSTEM DOES NOT ELIMINATE THE CONTRACTOR'S RESPONSIBILITY OF MAINTAINING THE DESIRED MOISTURE LEVEL FOR VIGOROUS, HEALTHY GROWTH.

12. GUARANTEE

A. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANTS FOR A PERIOD OF ONE (1) YEAR FROM APPROVAL OF LANDSCAPE INSTALLATION BY THE APPROVING AGENCY. CONTRACTOR SHALL SUPPLY THE OWNER WITH A MAINTENANCE BOND FOR TEN PERCENT (10%) OF THE VALUE OF THE LANDSCAPE INSTALLATION WHICH WILL BE RELEASED AT THE CONCLUSION OF THE GUARANTEE PERIOD AND WHEN A FINAL INSPECTION HAS BEEN COMPLETED AND APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.

B. ANY DEAD OR DYING PLANT MATERIAL SHALL BE REPLACED FOR THE LENGTH OF THE GUARANTEE PERIOD. REPLACEMENT OF PLANT MATERIAL SHALL BE CONDUCTED AT THE FIRST SUCCEEDING PLANTING SEASON. ANY DEBRIS SHALL BE DISPOSED OF OFF-SITE, WITHOUT EXCEPTION.

C. TREES AND SHRUBS SHALL BE MAINTAINED BY THE CONTRACTOR DURING CONSTRUCTION AND THROUGHOUT THE 90 DAY MAINTENANCE PERIOD AS SPECIFIED HEREIN. CULTIVATION, WEEDING, WATERING AND THE PREVENTATIVE TREATMENTS SHALL BE PERFORMED AS NECESSARY TO KEEP PLANT MATERIAL IN GOOD CONDITION AND FREE OF INSECTS AND DISEASE.

D. LAWNS SHALL BE MAINTAINED THROUGH WATERING, FERTILIZING, WEEDING, MOWING, TRIMMING AND OTHER OPERATIONS SUCH AS ROLLING, REGARDING AND REPLANTING AS REQUIRED TO ESTABLISH A SMOOTH, ACCEPTABLE LAWN, FREE OF ERODED OR BARE AREAS.

13. CLEANUP

A. UPON THE COMPLETION OF ALL LANDSCAPE INSTALLATION AND BEFORE THE FINAL ACCEPTANCE, THE CONTRACTOR SHALL REMOVE ALL UNUSED MATERIALS, EQUIPMENT AND DEBRIS FROM THE SITE. ALL PAVED AREAS ARE TO BE CLEANED.

B. THE SITE SHALL BE CLEANED AND LEFT IN A NEAT AND ACCEPTABLE CONDITION AS APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.

REFORESTATION PLANTING SCHEDULE

	FCE #1	FCE #2	FCE #4	FCE #5	FCE #6	FCE #7	FCE #8	FCE #9	FCE #10	FCE #11	FCE #12	FCE #13				
ACREAGE	0.2	0.2	0.2	0.4	0.6	0.8	0.2	0.1	0.8	1.0	0.4	0.8				
P.U. REQUIRED	72	72	72	144	216	288	72	36	288	360	144	288				
	QTY												SPECIES	SIZE	SPACING	TOTAL FCA UNITS
	12	12	0	21	36	41	12	6	41	51	21	41	ACER RUBRUM - RED MAPLE	HARDWOOD SEEDLINGS OR WHIPS/ACRE WITH TREE SHELTERS	11' O.C.	253
	12	0	12	21	0	41	12	6	41	51	21	42	PLATNUS OCCIDENTALIS - AMERICAN SYCAMORE	HARDWOOD SEEDLINGS OR WHIPS/ACRE WITH TREE SHELTERS	11' O.C.	217
	0	12	12	21	36	41	12	6	41	51	21	41	QUERCUS PALUSTRIS - PIN OAK	HARDWOOD SEEDLINGS OR WHIPS/ACRE WITH TREE SHELTERS	11' O.C.	253
	12	12	12	21	36	41	12	6	41	51	21	41	QUERCUS RUBRA - RED OAK	HARDWOOD SEEDLINGS OR WHIPS/ACRE WITH TREE SHELTERS	11' O.C.	265
	12	12	12	20	36	41	12	6	41	52	20	41	LIRIODENDRON TULIPIFERA - TULIP POPLAR	HARDWOOD SEEDLINGS OR WHIPS/ACRE WITH TREE SHELTERS	11' O.C.	264
	12	12	12	20	36	41	0	0	41	52	20	41	CERCIS CANADENSIS - EASTERN REDBUD	HARDWOOD SEEDLINGS OR WHIPS/ACRE WITH TREE SHELTERS	11' O.C.	246
	12	12	12	20	36	42	12	6	42	52	20	41	AMELANCHIER CANADENSIS - SERVICEBERRY	HARDWOOD SEEDLINGS OR WHIPS/ACRE WITH TREE SHELTERS	11' O.C.	266
P.U. PROVIDED	72	72	72	144	216	288	72	36	288	360	144	288	TOTAL PLANTINGS			1764

* IN ADDITION TO THE ABOVE REFERENCED MATERIAL 1" CALIPER MATERIAL WILL BE REQUIRED FOR ANY REFORESTATION WITHIN 35' OF THE LOT LINES OF RESIDENTIAL LOT ABUTTING FOREST CONSERVATION REFORESTATION AREAS

LOT 45 (FCE #1)	20 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (10 PLATNUS OCCIDENTALIS, 10 QUERCUS RUBRA)
LOT 24 (FCE #2)	17 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (10 PLATNUS OCCIDENTALIS, 7 QUERCUS RUBRA)
EXISTING RESIDENTIAL (FCE #3)	62 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (31 PLATNUS OCCIDENTALIS, 31 QUERCUS RUBRA)
EXISTING RESIDENTIAL (FCE#13)	30 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (15 PLATINUS OCCIDENTALIS, 15 QUERCUS RUBRA)
LOTS 29 AND 30 (FCE #4)	30 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (15 PLATNUS OCCIDENTALIS, 15 QUERCUS RUBRA)
LOTS 26 THROUGH 35 (FCE #12)	103 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (51 PLATINUS OCCIDENTALIS, 52 QUERCUS RUBRA)
LOTS 76 THROUGH 81 (FCE #13)	92 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (50 PLATNUS OCCIDENTALIS, 49 ACER RUBRUM)
LOTS 42 THROUGH 44 (FCE #14)	42 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (21 ACER RUBRUM, 21 QUERCUS PALUSTRIS)
LOTS 49 THROUGH 51 (FCE #8)	26 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (13 ACER RUBRUM,13 QUERCUS RUBRA)
LOTS 54 THROUGH 56 (FCE #6)	25 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (12 PLATNUS OCCIDENTALIS, 13 QUERCUS RUBRA)
LOTS 34 AND 35 (FCE #5)	6 ADDITIONAL TREES, 2 ROWS OF 1" CALIPER TREES (15' O.C.) (3 QUERCUS PALUSTRIS, 3 QUERCUS RUBRA)

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

REFORESTATION PLAN

THE REFORESTATION AREA WILL BE PLACED INTO A FOREST CONSERVATION EASEMENT.

A. PLANTING PLAN AND METHODS

PLANT SPECIES SELECTION WAS BASED ON OUR KNOWLEDGE REGARDING PLANT COMMUNITIES IN MARYLAND'S PIEDMONT PLATEAU AND INFORMATION PROVIDED IN THE SOIL SURVEY ON TYPICAL VEGETATION FOR THE SOIL TYPE ON THE PLANTING SITE. SPECIES SELECTION WAS ALSO BASED ON OUR KNOWLEDGE OF PLANT AVAILABILITY IN THE NURSERY INDUSTRY.

REFORESTATION WILL BE ACCOMPLISHED THROUGH A MIXED PLANTING OF WHIPS AND BRANCHED TRANSPLANTS. CONTAINER GROWN STOCK IS RECOMMENDED BUT BAREROOT STOCK MAY BE USED TO HELP CONTROL AFFORESTATION COSTS. IF BAREROOT STOCK IS USED THE ROOT SYSTEMS OF ALL PLANTS WILL BE DIPPED IN AN ANTI-DESICCANT GEL PRIOR TO PLANTING TO IMPROVE MOISTURE RETENTION IN THE ROOT SYSTEMS.

PRIOR TO PLANTING THE PROPOSED FOREST CONSERVATION EASEMENTS ALL MULTIFLORA ROSE IN THE PLANTING AREA SHALL BE REMOVED. REMOVAL OF THE ROSE MAY BE PERFORMED WITH MOWING AND HERBICIDE TREATMENTS. PHYSICAL REMOVAL OF ALL TOP GROWTH FOLLOWING BY A PERIODIC HERBICIDE TREATMENT OF STUMP SPROUTS IS RECOMMENDED. NATIVE TREE AND SHRUB SPECIES OCCURRING WITHIN THE ROSE THICKETS SHOULD BE RETAINED WHEREVER POSSIBLE. HERBICIDES TREATMENTS SHALL OCCUR ON 2 MONTH INTERVALS DURING THE FIRST GROWING SEASON AND ONCE EACH IN THE SPRING AND FALL FOR SUBSEQUENT YEARS. HERBICIDE USED SHALL BE MADE SPECIFICALLY TO ADDRESS WOODY PLANT MATERIAL AND SHALL BE APPLIED AS PER MANUFACTURERS SPECIFICATIONS. CARE SHOULD BE TAKEN NOT TO SPRAY PLANTED TREES OR NATURALLY OCCURRING NATIVE TREE/SHRUB SEEDLINGS. IT IS RECOMMENDED THAT INITIATION OF ROSE REMOVAL BEGIN AT LEAST SIX MONTHS PRIOR TO PLANTING.

B. PLANTING AND SOIL SPECIFICATIONS

PLANT MATERIAL WILL BE INSTALLED IN ACCORDANCE WITH THE PLANTING DETAIL AND PLANTING SPECIFICATIONS SHOWN ON THE FOREST CONSERVATION PLAN.

AMENDMENTS TO EXISTING SOIL WILL BE IN ACCORDANCE WITH THE PLANTING SPECIFICATIONS SHOWN ON THE FOREST CONSERVATION PLAN. SOIL DISTURBANCE WILL BE LIMITED TO INDIVIDUAL PLANTING LOCATIONS.

C. MAINTENANCE OF PLANTINGS

SEE POST CONSTRUCTION NOTES

D. GUARANTEE REQUIREMENTS

A 90 PERCENT SURVIVAL RATE OF THE REFORESTATION PLANTINGS WILL BE REQUIRED AFTER ONE GROWING SEASON. ALL PLANT MATERIAL BELOW THE 90 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED AT THE BEGINNING OF THE SECOND GROWING SEASON. AT THE END OF THE SECOND GROWING SEASON, A 75 PERCENT SURVIVAL RATE WILL BE REQUIRED. ALL PLANT MATERIAL BELOW THE 75 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED BY THE BEGINNING OF THE NEXT GROWING SEASON.

E. SECURITY FOR REFORESTATION

SECTION 16-1209 OF THE HOWARD COUNTY FOREST CONSERVATION ACT REQUIRES THAT A DEVELOPER SHALL POST A SECURITY (BOND, LETTER OF CREDIT, ETC.) WITH THE COUNTY TO INSURE THAT ALL WORK IS DONE IN ACCORDANCE WITH THE FCP.

CONSTRUCTION PERIOD PROTECTION PROGRAM

A. FOREST PROTECTION TECHNIQUES

1. SOIL PROTECTION AREA (CRITICAL ROOT ZONE)

THE SOIL PROTECTION AREA, OR CRITICAL ROOT ZONE, OF A TREE IS THAT PORTION OF THE SOIL COLUMN WHERE MOST OF A ITS ROOTS MAY BE FOUND. THE MAJORITY OF ROOTS RESPONSIBLE FOR WATER AND NUTRIENT UPTAKE ARE LOCATED JUST BELOW THE SOIL SURFACE. TEMPORARY FENCING SHALL BE PLACED AROUND THE CRITICAL ROOT ZONE OF THE FOREST IN AREAS WHERE THE FOREST LIMITS OCCUR WITHIN 25 FEET OF THE LIMIT OF DISTURBANCE.

2. FENCING AND SIGNAGE

EXISTING FOREST LIMITS OCCURRING WITHIN 25 FEET OF THE LIMITS OF DISTURBANCE SHALL BE PROTECTED USING TEMPORARY PROTECTIVE FENCING. PERMANENT SIGNAGE SHALL BE PLACED AROUND THE AFFORESTATION AREA PRIOR TO PLANT INSTALLATION, AS SHOWN ON THE PLAN.

B. PRE-CONSTRUCTION MEETING

UPON STAKING OF LIMITS OF DISTURBANCE A PRE-CONSTRUCTION MEETING WILL BE HELD BETWEEN THE DEVELOPER, CONTRACTOR AND APPROPRIATE COUNTY INSPECTOR. THE PURPOSE OF THE MEETING WILL BE TO VERIFY THAT ALL SEDIMENT CONTROL IS IN ORDER, AND TO NOTIFY THE CONTRACTOR OF POSSIBLE PENALTIES FOR NON-COMPLIANCE WITH THE FCP.

C. STORAGE FACILITIES/EQUIPMENT CLEANING

ALL EQUIPMENT STORAGE, PARKING, SANITARY FACILITIES, MATERIAL STOCKPILING, ETC. ASSOCIATED WITH CONSTRUCTION OF THE PROJECT WILL BE RESTRICTED TO THOSE AREAS OUTSIDE OF THE PROPOSED FOREST CONSERVATION EASEMENT. CLEANING OF EQUIPMENT WILL BE LIMITED TO AREA WITHIN THE LOD OF THE PROPOSED HOMESITES. WASTEWATER RESULTING FROM EQUIPMENT CLEANING WILL BE CONTROLLED TO PREVENT RUNOFF INTO ENVIRONMENTALLY SENSITIVE AREAS.

D. SEQUENCE OF CONSTRUCTION

THE FOLLOWING TIMETABLE REPRESENTS THE PROPOSED TIMETABLE FOR DEVELOPMENT. THE ITEMS OUTLINED IN THE FOREST CONSERVATION PLAN WILL BE ENACTED WITHIN THREE (3) YEARS OF SUBDIVISION APPROVAL.

BELOW FIND A PROPOSED SEQUENCE OF CONSTRUCTION.

1. INSTALL ALL SIGNAGE AND SEDIMENT CONTROL DEVICES.
2. HOLD PRE-CONSTRUCTION MEETING BETWEEN DEVELOPER, CONTRACTOR AND COUNTY INSPECTOR.
3. BUILD ACCESS ROADS, INSTALL WELL AND SEPTIC SYSTEMS, AND CONSTRUCT HOUSES. STABILIZE ALL DISTURBED AREAS ACCORDINGLY.
4. INSTALL PERMANENT PROTECTIVE SIGNAGE FOR EASEMENTS AND INITIATE PLANTINGS IN ACCORDANCE WITH FOREST CONSERVATION PLAN. PLANTINGS WILL BE COMPLETED WITHIN THREE (3) YEARS OF SUBDIVISION APPROVAL.
5. REMOVE SEDIMENT CONTROL.
6. HOLD POST-CONSTRUCTION MEETING WITH COUNTY INSPECTORS TO ASSURE COMPLIANCE WITH FCP. SUBMIT CERTIFICATION OF INSTALLATION.
7. MONITOR AND MAINTAIN PLANTINGS FOR 3 YEARS.

E. CONSTRUCTION MONITORING

ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL MONITOR CONSTRUCTION OF THE PROJECT TO ENSURE THAT ALL ACTIVITIES ARE IN COMPLIANCE WITH THE FOREST CONSERVATION PLAN.

F. POST-CONSTRUCTION MEETING

UPON COMPLETION OF CONSTRUCTION, ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL NOTIFY THE COUNTY THAT CONSTRUCTION HAS BEEN COMPLETED AND ARRANGE FOR A POST-CONSTRUCTION MEETING TO REVIEW THE PROJECT SITE. THE MEETING WILL ALLOW THE COUNTY INSPECTOR TO VERIFY THAT AFFORESTATION PLANTINGS HAVE BEEN INSTALLED.

POST-CONSTRUCTION MANAGEMENT PLAN

HOWARD COUNTY REQUIRES A TWO YEAR POST-CONSTRUCTION MANAGEMENT PLAN BE PREPARED AS PART OF THE FOREST CONSERVATION PLAN. THE PLAN GOES INTO EFFECT UPON ACCEPTANCE OF THE CONSTRUCTION CERTIFICATION OF COMPLETION BY THE COUNTY. ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL BE RESPONSIBLE FOR IMPLEMENTATION OF THE POST-CONSTRUCTION MANAGEMENT PLAN.

THE FOLLOWING ITEMS WILL BE INCORPORATED INTO THE PLAN:

A. FENCING AND SIGNAGE

PERMANENT SIGNAGE INDICATING THE LIMITS OF THE RETENTION/REFORESTATION AREA SHALL BE MAINTAINED.

B. GENERAL SITE INSPECTIONS/MAINTENANCE OF PLANTINGS

SITE INSPECTIONS WILL BE PERFORMED A MINIMUM OF THREE TIMES DURING THE GROWING SEASON. THE PURPOSE OF THE INSPECTIONS WILL BE TO ASSESS THE HEALTH OF THE AFFORESTATION PLANTINGS. APPROPRIATE MEASURES WILL BE TAKEN TO RECTIFY ANY PROBLEMS WHICH MAY ARISE.

IN ADDITION, MAINTENANCE OF THE AFFORESTATION PLANTINGS WILL INVOLVE THE FOLLOWING STEPS:

1. WATERING - ALL PLANT MATERIAL SHALL BE WATERED TWICE A MONTH DURING THE 1ST GROWING SEASON, MORE OR LESS FREQUENTLY DEPENDING ON WEATHER CONDITIONS. DURING THE SECOND GROWING SEASON, ONCE A MONTH DURING MAY-SEPTEMBER, IF NEEDED.
2. REMOVAL OF INVASIVE EXOTICS AND NOXIOUS WEEDS. OLD FIELD SUCCESSIONAL SPECIES WILL BE RETAINED.
3. IDENTIFICATION OF SERIOUS PLANT PESTS AND DISEASES, TREATMENT WITH APPROPRIATE AGENT.
4. PRUNING OF DEAD BRANCHES.
5. AFTER 12 AND 24 MONTHS, REPLACEMENT OF PLANTS, IF REQUIRED, IN ACCORDANCE WITH THE GUARANTEE REQUIREMENTS SHOWN ON THE FCP.

C. EDUCATION

THE DEVELOPER WILL PROVIDE APPROPRIATE MATERIALS TO PROPERTY OWNERS INFORMING THEM OF THE LOCATION AND PURPOSE OF THE AFFORESTATION AREA. MATERIALS MAY INCLUDE SITE PLANS AND INFORMATION EXPLAINING THE INTENT OF THE FOREST CONSERVATION LAW.

D. FINAL INSPECTION

AT THE END OF THE THREE YEAR POST-CONSTRUCTION MANAGEMENT PERIOD, ECO-SCIENCE PROFESSIONALS, OR ANOTHER QUALIFIED PROFESSIONAL, WILL SUBMIT TO THE ADMINISTRATOR OF THE HOWARD COUNTY FOREST CONSERVATION PROGRAM CERTIFICATION THAT ALL RETENTION/AFFORESTATION REQUIREMENTS HAVE BEEN MET. UPON ACCEPTANCE OF THIS CERTIFICATION, THE COUNTY WILL RELEASE THE DEVELOPER FROM ALL FUTURE OBLIGATIONS AND RELEASE THE DEVELOPER'S BOND.

PLANTING/SOIL SPECIFICATIONS

1. PLANTING OF NURSERY STOCK SHALL TAKE PLACE BETWEEN MARCH 15TH AND APRIL 30TH OR SEPTEMBER 15TH - NOVEMBER 15TH .
2. A TWELVE (12) INCH LAYER OF TOPSOIL SHALL BE SPREAD OVER ALL FORESTATION AREAS IMPACTED BY SITE GRADING TO ASSURE A SUITABLE PLANTING AREA. DISTURBED AREAS SHALL BE SEEDED AND STABILIZED AS PER GENERAL CONSTRUCTION PLAN FOR PROJECT. PLANTING AREAS NOT IMPACTED BY SITE GRADING SHALL HAVE NO ADDITIONAL TOPSOIL INSTALLED.
3. ALL BAREROOT PLANTING STOCK SHALL HAVE THEIR ROOT SYSTEMS DIPPED INTO AN ANTI-DESICCANT GEL PRIOR TO PLANTING.
4. PLANTS SHALL BE INSTALLED SO THAT THE TOP OF ROOT MASS IS LEVEL WITH THE TOP OF EXISTING GRADE. BACKFILL IN THE PLANTING PITS SHALL CONSIST OF 3 PARTS EXISTING SOIL TO 1 PART PINE FINES OR EQUIVALENT.
5. FERTILIZER SHALL CONSIST OF AGRIFORM 22-8-2, OR EQUIVALENT, APPLIED AS PER MANUFACTURER'S SPECIFICATIONS.
6. A TWO (2) INCH LAYER OF HARDWOOD MULCH SHALL BE PLACED OVER THE ROOT AREA OF ALL PLANTINGS.
7. PLANT MATERIAL SHALL BE TRANSPORTED TO THE SITE IN A TARPED OR COVERED TRUCK. PLANTS SHALL BE KEPT MOIST PRIOR TO PLANTING.
8. ALL NON-ORGANIC DEBRIS ASSOCIATED WITH THE PLANTING OPERATION SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR.

SEQUENCE OF CONSTRUCTION

1. SEDIMENT CONTROL AND TREE PROTECTION DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH GENERAL CONSTRUCTION PLAN FOR SITE. SITE SHALL BE GRADED IN ACCORDANCE WITH GENERAL CONSTRUCTION PLANS.
2. PROPOSED FORESTATION AREAS IMPACTED BY SITE GRADING SHALL BE TOPSOILED AND STABILIZED AS PER #2 OF PLANTING/SOIL SPECIFICATIONS FOR PROJECT.
3. PLANTS SHALL BE INSTALLED AS PER PLANT SCHEDULE AND THE PLANTING/SOIL SPECIFICATIONS FOR THE PROJECT.
4. UPON COMPLETION OF THE PLANTING, SIGNAGE SHALL BE INSTALLED AS PER THE FOREST PROTECTION DEVICES SHOWN ON THE FOREST CONSERVATION PLAN.
5. PLANTINGS SHALL BE MAINTAINED AND GUARANTEED IN ACCORDANCE WITH THE MAINTENANCE AND GUARANTEE REQUIREMENTS FOR PROJECT.

MAINTENANCE OF PLANTINGS

1. MAINTENANCE OF PLANTINGS SHALL LAST FOR A PERIOD OF 36 MONTHS.
2. ALL PLANT MATERIAL SHALL BE WATERED TWICE A MONTH DURING THE 1ST GROWING SEASON. WATERING MAY BE MORE OR LESS FREQUENT DEPENDING ON WEATHER CONDITIONS. DURING SECOND GROWING SEASON, ONCE A MONTH DURING MAY-SEPTEMBER, IF NEEDED.
3. INVASIVE EXOTICS AND NOXIOUS WEEDS WILL BE REMOVED FROM FORESTATION AREAS. OLD FIELD SUCCESSIONAL SPECIES WILL BE RETAINED.
4. PLANTS WILL BE EXAMINED A MINIMUM TWO TIMES DURING THE GROWING SEASON FOR SERIOUS PLANT PESTS AND DISEASES. SERIOUS PROBLEMS WILL BE TREATED WITH THE APPROPRIATE AGENT.
5. DEAD BRANCHES WILL BE PRUNED FROM PLANTINGS.

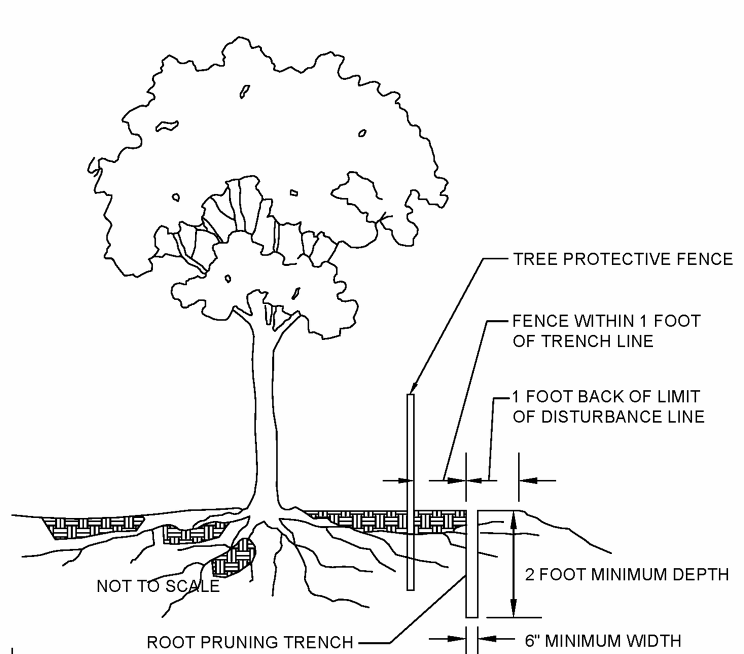
GUARANTEE REQUIREMENTS

1. A 75 PERCENT SURVIVAL RATE OF FORESTATION PLANTINGS WILL BE REQUIRED AT THE END OF THE 36 MONTH MAINTENANCE PERIOD. ALL PLANT MATERIAL BELOW THE 75 PERCENT THRESHOLD WILL BE REPLACED AT THE BEGINNING OF THE NEXT GROWING SEASON.

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

DEVELOPER'S / OWNER'S NAME: Jason Van Kirk — DATE: 3-12-24



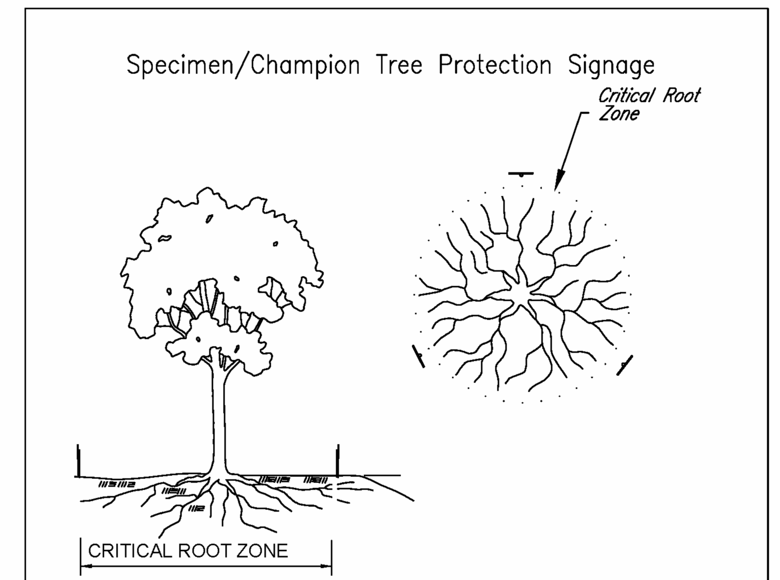
ROOT PRUNING DETAIL

SURETY FOR FORESTATION

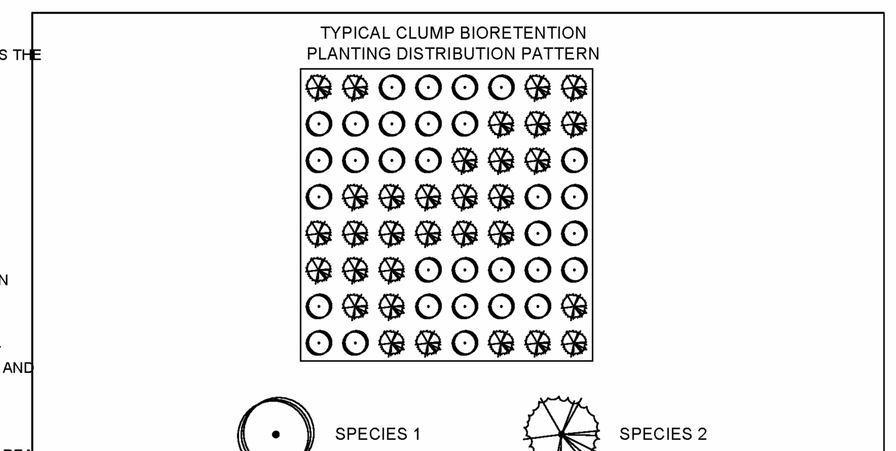
1. THE DEVELOPER SHALL POST A SURETY (BOND, LETTER OF CREDIT) TO ENSURE THAT FORESTATION PLANTINGS ARE COMPLETED. UPON ACCEPTANCE OF THE PLANTINGS BY THE COUNTY, THE BOND SHALL BE RELEASED.

FCP NOTES

1. ANY FOREST CONSERVATION EASEMENT (FCE) AREA SHOWN HEREON IS SUBJECT TO PROTECTIVE COVENANTS WHICH MAY BE FOUND IN THE LAND RECORDS OF HOWARD COUNTY WHICH RESTRICT THE DISTURBANCE AND USE OF THESE AREAS.
2. FORESTED AREAS OCCURRING OUTSIDE OF THE FCE SHALL NOT BE CONSIDERED PART OF THE FCE AND SHALL NOT BE SUBJECT TO PROTECTIVE LAND COVENANTS.
3. LIMITS OF DISTURBANCE SHALL BE RESTRICTED TO AREAS OUTSIDE THE LIMIT OF TEMPORARY FENCING OR THE FCE BOUNDARY, WHICHEVER IS GREATER.
4. THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION OR DISTURBANCE OF VEGETATION IN THE FOREST CONSERVATION EASEMENT, EXCEPT AS PERMITTED BY HOWARD COUNTY DPZ.
5. NO STOCKPILES, PARKING AREAS, EQUIPMENT CLEANING AREAS, ETC. SHALL OCCUR WITHIN AREAS DESIGNATED AS FOREST CONSERVATION EASEMENTS.
6. TEMPORARY FENCING SHALL BE USED TO PROTECT FOREST RESOURCES DURING CONSTRUCTION. FENCING SHALL BE INSTALLED ALONG LIMITS OF DISTURBANCE OCCURRING WITHIN 50 FEET OF THE PROPOSED FCE LIMITS.
7. PERMANENT SIGNAGE WILL BE POSTED A AT 50-100 FOOT INTERVALS ALONG ALL FCE LIMITS.
8. EXISTING FOREST CALCULATIONS DIFFER BETWEEN THE APPROVED FOREST STAND DELINEATION AND THE FOREST CONSERVATION PLAN. THE DIFFERENCE IS ATTRIBUTED TO A DIFFERENCE IN THE MAPPED FLOODPLAIN LIMITS. THE APPROXIMATE FLOODPLAIN LIMITS ON THE FSD WERE LARGER THAN THE CALCULATED LIMITS AND RESULTED IN A CALCULATION OF LESS NET TRACT AREA FOREST. THE EXISTING FOREST CALCULATION SHOWN IN THE FOREST CONSERVATION WORKSHEET REFLECTS THE REVISED FLOODPLAIN LIMITS AND COMPUTER CALCULATED FOREST AREA.



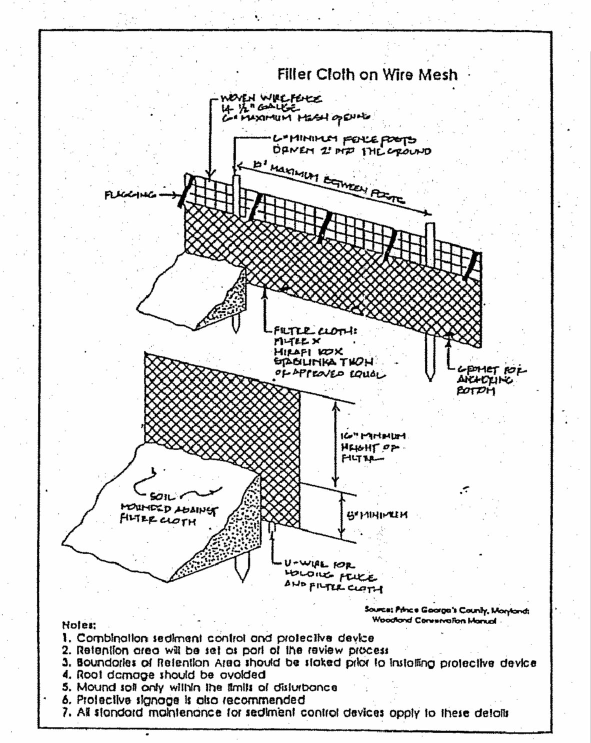
Notes:
1. Retention Areas will be set as part of the review process
2. Boundaries of Retention Areas/Critical Root Zones should be marked with signage prior to construction.
3. Signs should be placed at edge or 1-foot outside the Critical Root Zone.
4. Signs should be placed around each specimen tree as indicated on the plan.



NOTE: NATURALLY OCCURRING POPULATIONS TEND TO BE FOUND IN INFORMAL GROUPINGS. A CLUSTER OF PLANTS IS REALLY A MOSAIC OF DIFFERENT SPECIES GROUPS. THE OBJECTIVE IS TO SELECT THE APPROPRIATE SPECIES AND DISTRIBUTION PATTERN FOR A CHOSEN SITE THAT MIMIC NATURAL PATTERNS.

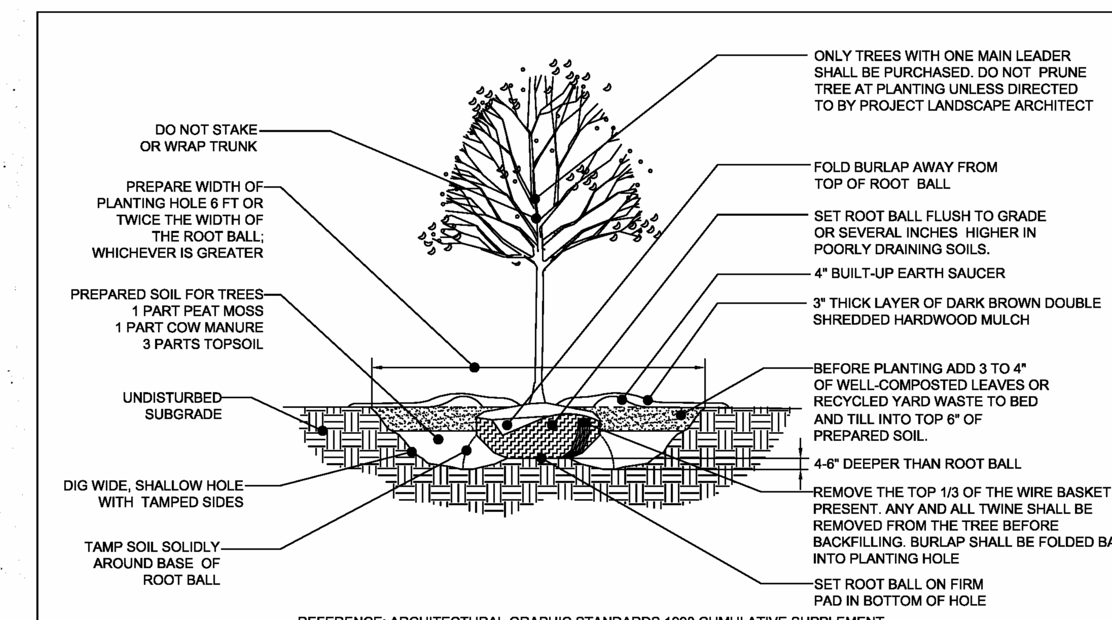
PLANTING DISTRIBUTION PATTERN DETAIL

NOT TO SCALE



PROTECTIVE TREE FENCE DETAIL

NOT TO SCALE



REFERENCE: ARCHITECTURAL GRAPHIC STANDARDS 1998 CUMULATIVE SUPPLEMENT.

DECIDUOUS TREE PLANTING DETAIL

NOT TO SCALE

REFORESTATION PLANTING SCHEDULE

	FCE #3				
ACREAGE	7.2				
P.U. REQUIRED	720				
	QTY	SPECIES	SIZE	SPACING	TOTAL FCA UNITS
	75	ACER RUBRUM - RED MAPLE	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	75
	60	PLATNUS OCCIDENTALIS - AMERICAN SYCAMORE	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	60
	75	QUERCUS PALUSTRIS - PIN OAK	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	75
	75	QUERCUS RUBRA - RED OAK	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	75
	75	LIRIODENDRON TULIPIFERA - TULIP POPLAR	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	75
	75	CERCIS CANADENSIS - EASTERN REDBUD	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	75
	80	AMELANCHIER CANADENSIS - SERVICEBERRY	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	80
	7	PRUNUS SEROTINA - BLACK CHERRY	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	7
	114	ROBINIA PSEUDOACACIA - BLACK LOCUST	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	114
	14	JUGLANS NIGRA-BLACK WALNUT	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	14
	10	SALIX NIGRA - BLACK WILLOW	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	10
	9	ACER NEGUNDO- BOX ELDER	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	9
	3	CORNUS FLORIDA - FLOWERING DOGWOOD	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	3
	1	CELTIS OCCIDENTALIS - HACKBERRY	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	1
	3	CRATAEGUS - HAWTHORN	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	3
	1	JUNIPEROUS SPP.	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	1
	6	PINUS TAEDA - LOBLOLLY PINE	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	6
	65	JUNIPEROUS VIRGINIANA - RED CEDAR	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	65
	12	MORUS RUBRA - RED MULBERRY	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	12
	7	ACER SACCARINUM SILVER MAPLE	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	7
	2	LIQUIDAMBAR STYRACIFLUA SWEET GUM	CONTAINER GROWN 15,25,GALLON OR 1.5" CAL. B & B.	20' O.C.	2
P.U. PROVIDED	769			TOTAL PLANTINGS	769

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.: WP-19-118, ECP-19-041, BA-CASE NO. 17-018C, ECP-21-017, WP-21-064, SP-19-005, F-22-033, WP-21-127, 25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 — GRID: 15 — ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

E.R. McWILLIAMS
04/01/2024
REGISTERED LANDSCAPE ARCHITECT
MARYLAND LICENSE No. 3697
PROFESSIONAL CERTIFICATION.
I, ERIC R. McWILLIAMS, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 3697, EXPIRATION DATE: 9/20/22

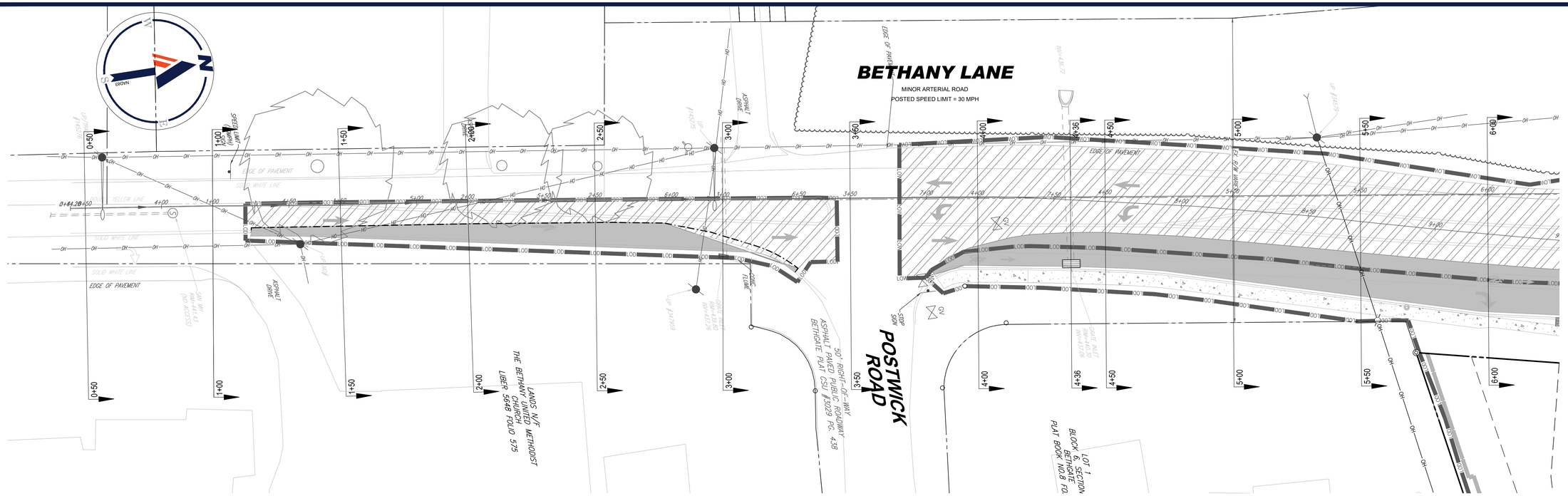
SHEET TITLE:

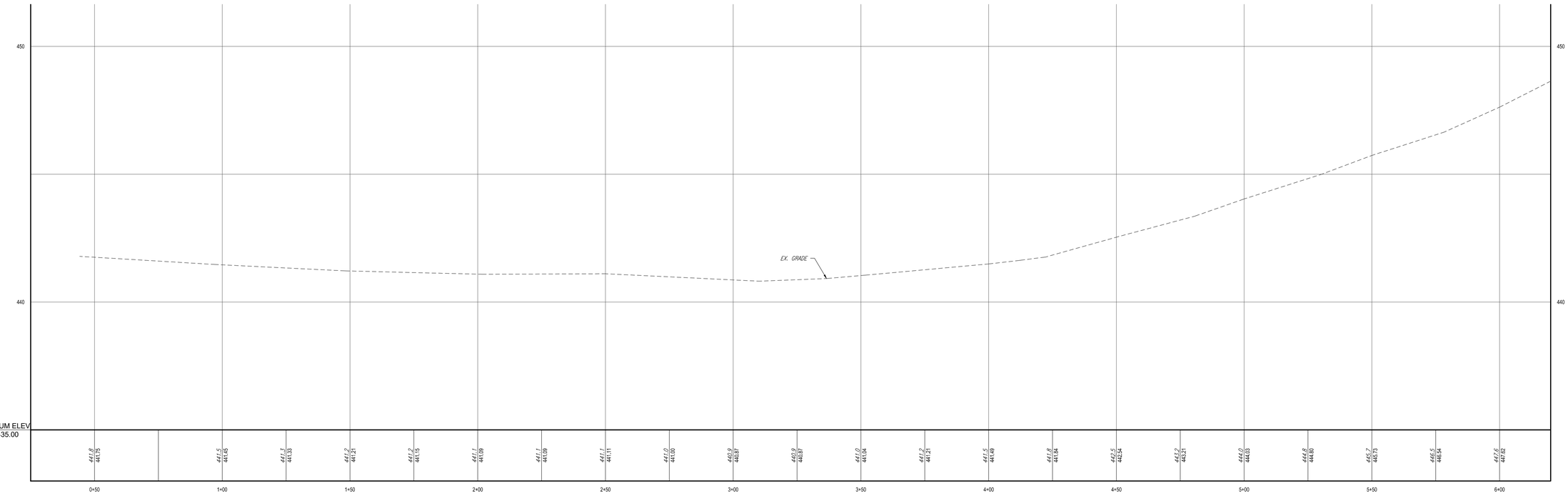
FOREST CONSERVATION NOTES AND DETAILS

SHEET NUMBER:

F-22-033

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586





MATCHLINE - SHEET 79

BETHANY LANE - PROFILE

POSTED SPEED LIMIT = 30 MPH
SCALE: 1" = 20' HORIZONTAL
1" = 2' VERTICAL

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SECT - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168

9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE NO. 43808
PROFESSIONAL CERTIFICATION
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SHEET TITLE:

BETHANY LANE CROSS SECTIONS

SHEET NUMBER:

78 of 117

F-22-033

Mar 12, 2024
H:\1524MD\1520\DRAWINGS\PLAN SETS\SHA PLANS\MD152018 - SECT - BETHANY LN - 2----LAYOUT 79- BETHANY LN STA 0+50 TO 6+00 (PLAN VIEW).DWG

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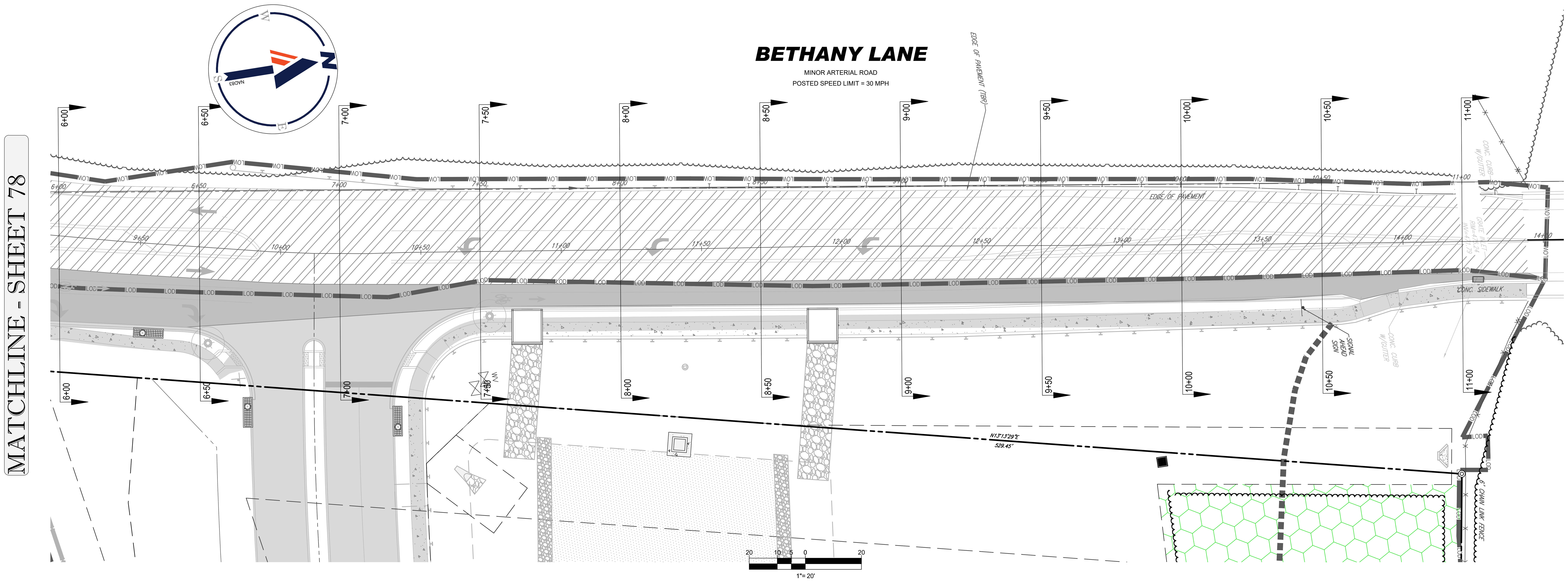
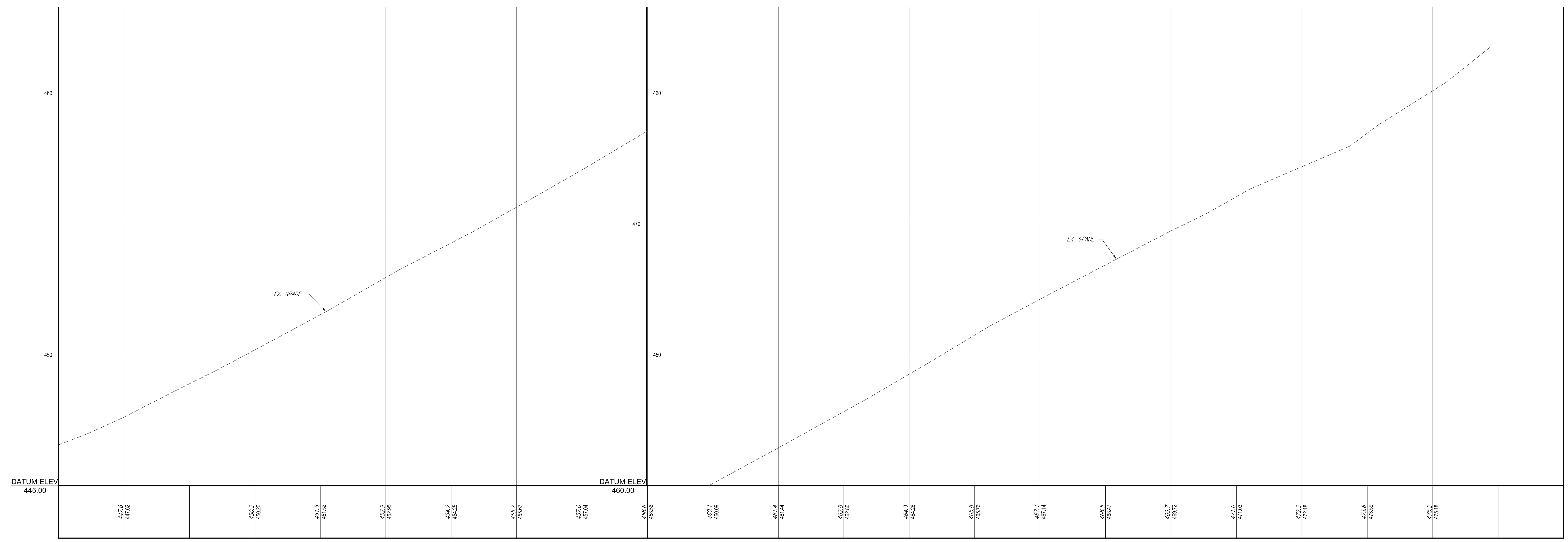
BETHANY LANE

MINOR ARTERIAL ROAD
POSTED SPEED LIMIT = 30 MPH





BETHANY LANE - PROFILE

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APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

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6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
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DATE:	03/08/24
CAD I.D.:	SECT - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
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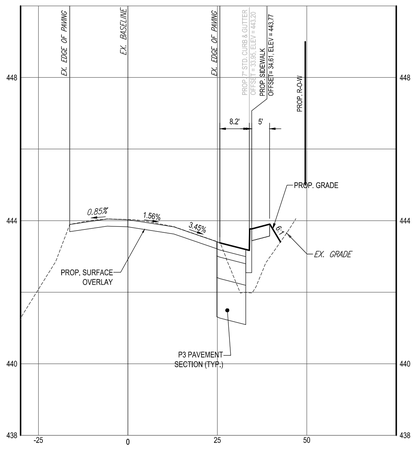

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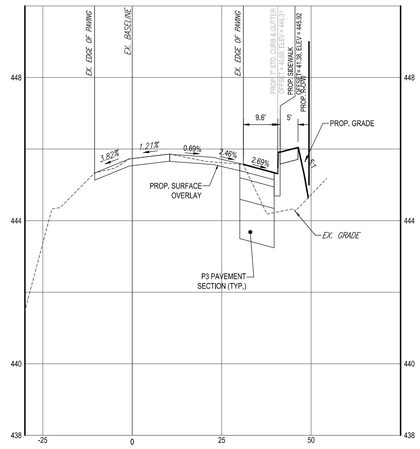

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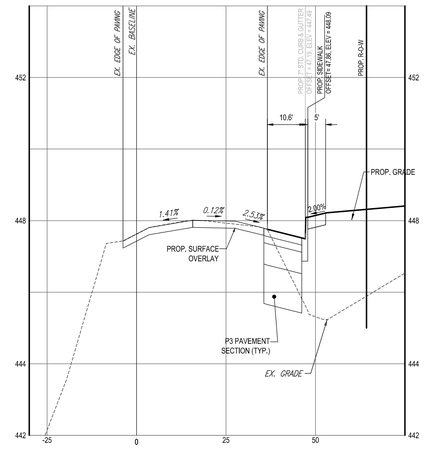

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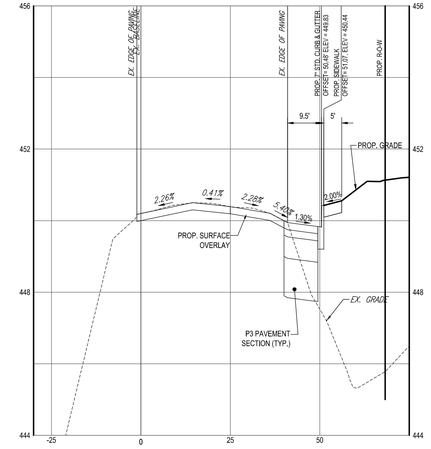

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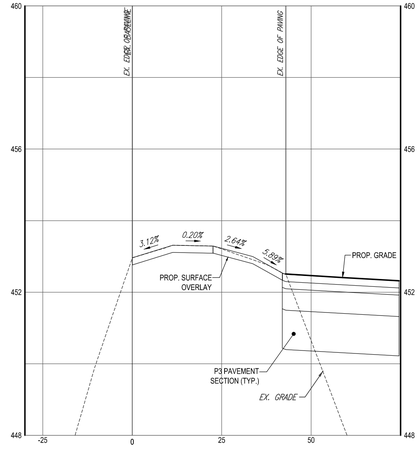

STA 3+00

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STA 4+00

STA 4+36

STA 4+50

STA 0+50

STA 1+00

STA 1+50

STA 2+00

STA 2+50

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DIRECTOR	6/12/2024
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: DEPARTMENT OF PLANNING AND ZONING	
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2 1 2.5 0 2
1"= 2'

20 10 5 0 20
1"= 20'

SUBDIVISION NAME: BETHANY GLEN - ARAH SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E DEED # 00226/ 00064	PREVIOUS FILE No. : WP-19-118; ECP-19-041 BA-CASE NO. 17-018C ECP-21-017, WP-21-064 SP-19-005, F-22-033, WP-21-127 25-5109-D, 688-D-W & S, SP-21-002	OWNER / DEVELOPER: BETHANY GLEN DEVELOPMENT, INC. 5074 DORSEY HALL ROAD, SUITE 205 ELLICOTT CITY, MD 21042 CONTACT: JASON VAN KIRK PHONE: (410) 720-3021
		TAX MAP: 17 GRID: 15 ZONED: R-20 PARCEL: 34 2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

Mar 12, 2024
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FOR

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NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
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9891 OLD FREDERICK ROAD - ROUTE 99
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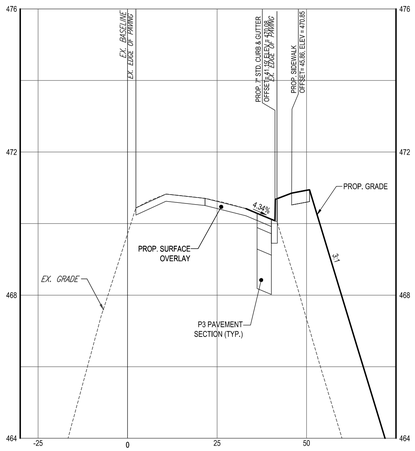

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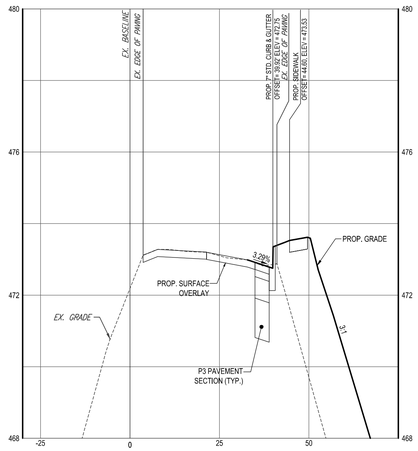

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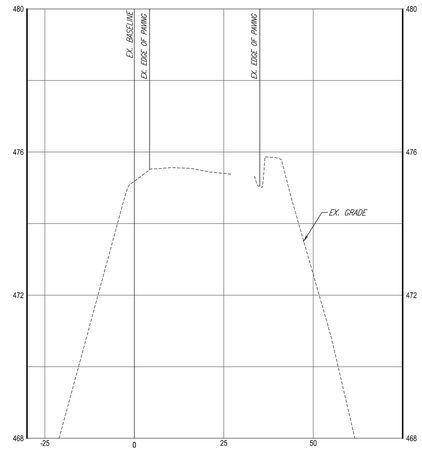

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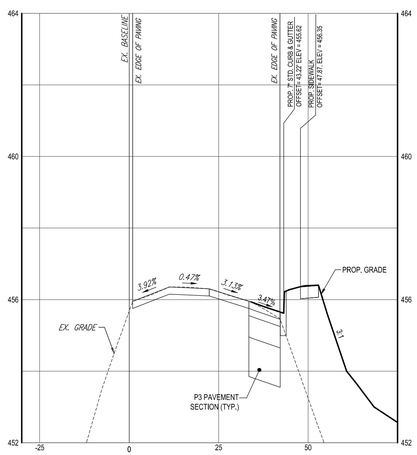

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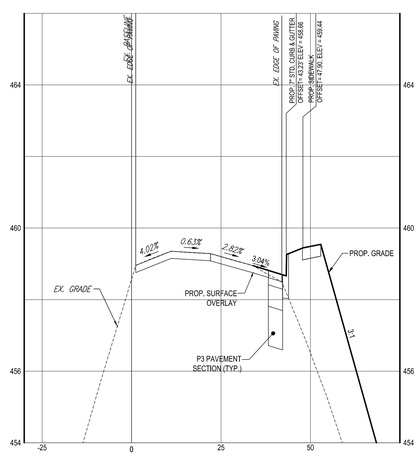

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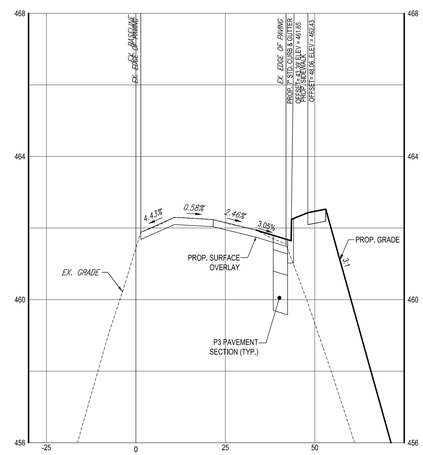

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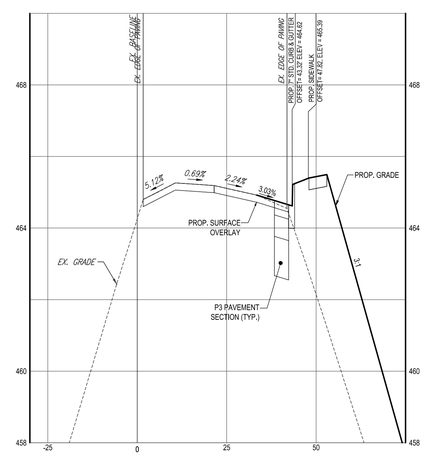

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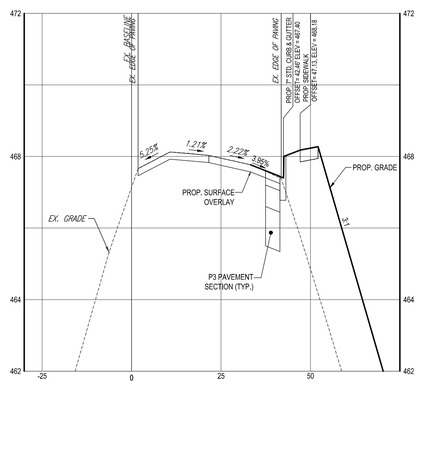

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FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

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NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
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B.R. ROWE — LICENSED PROFESSIONAL ENGINEER — STATE OF MARYLAND — No. 40808

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LICENSED LANDSCAPE ARCHITECT
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F-22-033

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BETHANY GLEN - ARAH - ENDWALL DESIGN
STRUCTURAL SPECIFICATIONS

I. OVERVIEW

THESE STRUCTURAL DRAWINGS PROVIDE DIRECTION FOR THE CONSTRUCTION OF SIX (6) CULVERT ENDWALLS OF CAST-IN-PLACE (C.I.P.) CONCRETE CONSTRUCTION FOR THE ABOVE-NOTED PROJECT. CONSTRUCTION MEANS AND METHODS ARE NOT ADDRESSED. REFER TO THE PROJECT'S CIVIL DRAWINGS FOR OVERALL SITE LAYOUT INFORMATION (INCLUDING THE LOCATION OF THE ENDWALLS AND TOP-OF-WALL INFORMATION). REFER TO THE PROJECT'S GEOTECHNICAL REPORT FOR EARTH-RELATED INFORMATION (INCLUDING GEOTECHNICAL REQUIREMENTS AFFECTING THE WALLS. IF / WHERE DISCREPANCIES OF A CIVIL NATURE EXIST, THE CIVIL DRAWINGS GOVERN; IF / WHERE DISCREPANCIES OF A GEOTECHNICAL NATURE EXIST, THE GEOTECHNICAL REPORT GOVERNS. IF FIELD CONDITIONS DIFFER FROM THE STRUCTURAL INFORMATION PROVIDED, ECS MUST BE CONTACTED SO THAT, IF NECESSARY, A REVISION OF THE WALL DESIGN CAN BE DEVELOPED AND ISSUED.

THE WALL HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2015 MARYLAND BUILDING PERFORMANCE STANDARDS AND THE 2015 INTERNATIONAL BUILDING CODE (IBC), ACI 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY, AND ASCE 7-10 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

II. MATERIAL SPECIFICATIONS

CONCRETE:

1. NORMAL-WEIGHT, 4,500 PSI COMPRESSIVE STRENGTH AT 28 DAYS W/ 4% TO 6% ENTRAINED AIR CONTENT AND A SLUMP BETWEEN 3" AND 5".
2. CONCRETE SHALL HAVE A SAND FINE AGGREGATE AND NORMAL WEIGHT COARSE AGGREGATE CONFORMING TO ASTM-C150.
3. FIELD-CURED CONCRETE SHALL ATTAIN A MINIMUM STRENGTH OF 75% OF THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH PRIOR TO ANY BACKFILL PLACEMENT.
4. UNLESS SUBMITTED AND APPROVED OTHERWISE, ASTM C150, TYPE I CEMENT SHALL BE USED.
5. CONCRETE SHALL BE AIR-ENTRAINED AS SPECIFIED ABOVE AND SHALL HAVE A SLUMP AS SPECIFIED ABOVE. THE MAXIMUM BATCH-TO-PLACEMENT TIME FOR THE RETAINING WALL CONCRETE IS 90 MINUTES. CONCRETE SHALL BE PLACED WITH AN AMBIENT TEMPERATURE RANGE OF 55 TO 90 DEGREES FAHRENHEIT.
6. VIBRATE CONCRETE IN ACCORDANCE WITH ACI-309.
7. MATERIALS USED FOR FORMING SHALL BE STRAIGHT, SMOOTH, AND - WHERE POSSIBLE FROM A CONSTRUCTABILITY STANDPOINT - BE CONTINUOUS WITH THE NUMBER OF PROVIDED JOINTS AND SEAMS MINIMIZED.
8. PROVIDE VERTICAL CONTROL JOINTS ALONG WALL AT 20 FOOT SPACING (MAX.) PER DETAIL E/S2. PROVIDE CONSTRUCTION JOINTS AS NECESSARY PER DETAIL F/S1.

REINFORCING STEEL:

1. REINFORCING BARS SHALL CONFORM TO ASTM-A615, GRADE 60. REINFORCING BARS SHALL NOT BE TACK WELDED, WELDED, HEATED, OR THERMALLY CUT WITHOUT PRIOR APPROVAL BY ECS.
2. HORIZONTAL REINFORCING SHALL BE CONTINUOUS AROUND CORNERS (OR "BENDS") AND SHALL BE PROPERLY LAP SPLICED AS INDICATED ON THE DRAWINGS.
3. DETAILING OF CONCRETE REINFORCING BARS AND ACCESSORIES SHALL CONFORM TO THE RECOMMENDATIONS OF ACI 315, "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT" AND ACI SP-66, "DETAILING MANUAL". PLACING OF REINFORCING BARS SHALL CONFORM TO THE RECOMMENDATIONS OF ACI 315R, "MANUAL OF ENGINEERING AND PLACING DRAWINGS FOR REINFORCED CONCRETE STRUCTURES" AND CRSI, "MANUAL OF STANDARD PRACTICE".

BACKFILL:

1. BACKFILL SHALL NOT BE PLACED UNTIL THE FIELD CURED CONCRETE HAS REACHED A MINIMUM STRENGTH OF 75% OF THE SPECIFIED DESIGN COMPRESSIVE STRENGTH.
2. A MINIMUM OF 1.5 FEET OF SOIL SHALL BE PLACED WITH COMPACTION OVER THE TOE OF THE FOUNDATION PRIOR TO PLACEMENT OF THE BACKFILL.
3. SOIL MATERIALS SHALL NOT BE PLACED ON FROZEN SOILS. ALL SUCH SOILS SHALL BE REMOVED PRIOR TO FILL PLACEMENT.
4. BACKFILL AND FILL SHALL BE PLACED IN LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS AND COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY OBTAINED IN ACCORDANCE WITH ASTM D-698, STANDARD PROCTOR METHOD.
5. LIGHTWEIGHT COMPACTION EQUIPMENT SHALL BE USED IMMEDIATELY ADJACENT TO WALL.
6. ALL FILL OPERATIONS SHALL BE OBSERVED ON A FULL-TIME BASIS BY A QUALIFIED SOIL TECHNICIAN, WORKING UNDER THE DIRECTION OF A REGISTERED PROFESSIONAL ENGINEER, TO CONFIRM IF THE MINIMUM COMPACTION REQUIREMENT IS BEING MET.
7. A MINIMUM OF 3 IN-PLACE DENSITY TESTS SHALL BE TYPICALLY PERFORMED PER LIFT OF FILL PLACED, OR AS OTHERWISE DIRECTED BY THE REGISTERED PROFESSIONAL ENGINEER.

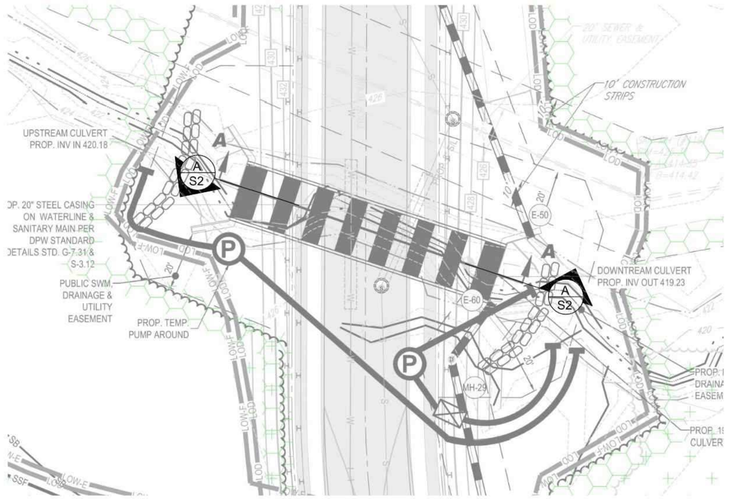
III. INSTALLATION SPECIFICATIONS

FOUNDATIONS:

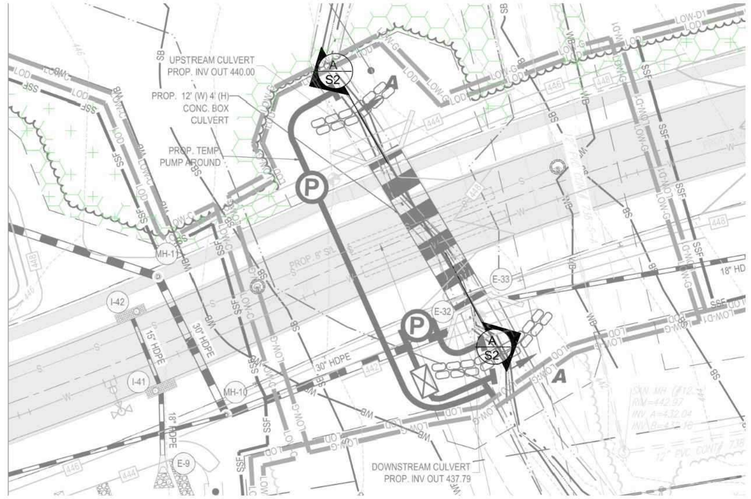
1. SOFT, ORGANIC, OR UNSUITABLE SOILS SHALL BE REMOVED FROM THE AREA OF THE WALL FOOTING, PLUS 2 FEET IN FRONT OF THE FOUNDATION.
2. FOUNDATION SOILS SHALL BE TESTED AT 2 POINTS (THE THIRD POINTS) ALONG THE LENGTH OF THE WALL AT THE TOE AND MIDPOINT OF THE FOOTING WIDTH TO DOCUMENT THAT THE SOILS ARE CAPABLE OF SUPPORTING A DESIGN BEARING PRESSURE OF 2,000 PSF FOR SOIL. WHERE SOILS ARE NOT CAPABLE OF SUPPORTING THE DESIGN BEARING PRESSURE, THEY SHALL BE REMOVED AND BE REPLACED WITH ADEQUATE BACKFILL AND FILL PLACEMENT PER THE GEOTECHNICAL ENGINEER OF RECORD'S RECOMMENDATION. FOUNDATION TESTING SHALL BE PERFORMED BY A MARYLAND GEOTECHNICAL ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

FOUNDATION
BEARING CAPACITY (PSF): 1,500 (CULVERT 1)
2,000 (CULVERT 2)
2,500 (CULVERT 3)

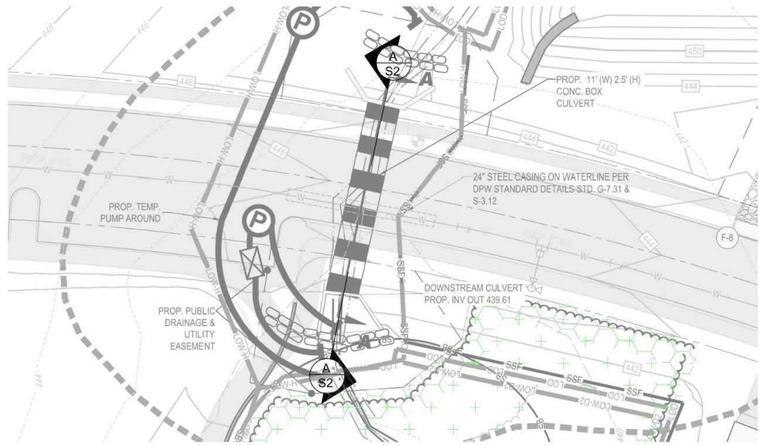
MINIMUM FACTORS OF SAFETY
F.S. AGAINST SLIDING: 1.5
F.S. AGAINST OVERTURNING: 1.5



C / S1 PLAN VIEW OF CULVERT #3
Scale: N.T.S.



A / S1 PLAN VIEW OF CULVERT #1
Scale: N.T.S.



B / S1 PLAN VIEW OF CULVERT #2
Scale: N.T.S.

MATERIAL/ACTIVITY	TYPE OF INSPECTION	APPLICABLE TO THIS PROJECT				
		Y/N	C/P	EXTENT/REFERENCE	AGENT	COMPLETED
GENERAL						
Pre-construction conference	Meeting with parties listed to discuss Special Inspection procedures	Y	P	Scheduled by Howard County with the Contractor pror to commencement of work		
EARTHWORK						
Site preperation (building)	Field testing and inspection	Y	P	Field Review; IBC 1705.6		
Fill material (building)	Review submittals, field testing and inspection	Y	P	Field Review; IBC 1705.6		
Fill compaction (building)	In-place density tests, lift thickness	Y	C	Field Review; IBC 1705.6		
Excavation	Field inspection and verification of proper depth	Y	P	Field Review; IBC 1705.6		
Foundation sub-grade	Field inspection of foundation subgrade prior to placement of concrete	Y	P	Field Review; IBC 1705.6		
CONCRETE						
Materials	Review product supplied versus certificates of compliance and mix design	Y	P	Submittal & Field Review; IBC 1705.3; ACI 318: Ch. 4 and 5; IBC 1904.2, 1910.2, 1903.3		
Installation of reinforcing steel, including Pre-stressed tendons and anchor bolts as well as welding	Field inspection of placement	Y	P	Submittal and Field Review; ACI 318:3.5, 3.5.2 3.8.6 & Ch. 7 8.1.3 and 21.2.8; AWS D1.4; IBC 1705.3, 1908.5, 1909.1, 1910.4		
Formwork installation	Field inspection	Y	P	Field Review; ACI 318: 6.1.1; IBC 1705.3		
Concreting operations and placement	Field inspection of placement/sampling	Y	C	Field Review; ACI 318: 5.6, 5.8, 5.9-10; ASTM C 172, C 31; IBC 1705.3, 1910.6, 1910.7, 1910.8, 1910.10		
Concrete curing	Field inspection of curing process	Y	P	Field Review; ACI 318: 5.11-13; IBC 1705.3, 1910.9		
Concrete strength	Evaluation of concrete strength	Y	P	Laboratory Testing; ACI 318: 6.2; IBC 1705.3		

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

FOR REFERENCE ONLY

NOTE:

DEVELOPER TO UTILIZE CULVERT END WALL DESIGN FROM SHEETS 82 AND 83 OR FROM SHEETS 84-86 BASED ON SUPPLY CHAIN CONSTRAINTS. FINAL STRUCTURAL DRAWINGS FOR SELECTED APPROACH WILL BE SIGNED AND SEALED BY A STRUCTURAL ENGINEER.

ECS Mid-Atlantic, LLC
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Chantilly, Virginia 20151
p. 703-471-8400
www.ECSlimited.com

CLIENT

BOHLER ENGINEERING
901 DULANEY VALLEY ROAD
SUITE 801
TOWSON, MD 21204

SEAL

STATE OF MARYLAND — KEVIN SCHMITT — 52257 — PROFESSIONAL ENGINEER
9/26/2022

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. 52257 Expiration Date 2-6-2026

PROJECT INFORMATION

BETHANY GLEN - ARAH

CULVERT END WALL DESIGN
9891 OLD FREDRICK ROAD
ELLICOTT CITY, MD 21042

SUBMISSION	DATE
-	-
-	-
-	-
-	-
-	-
-	-
PERMIT	9/26/2022

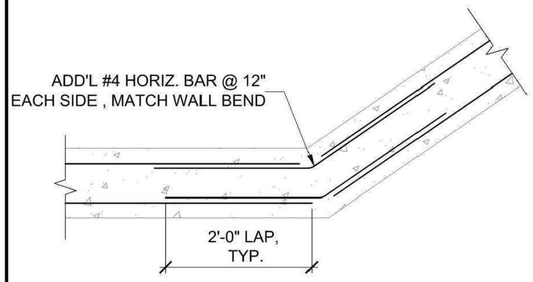
DRAWN BY: KS
CHECKED BY: MAP

ECS PROJECT NO.
7540

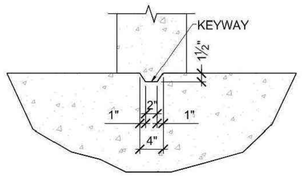
CULVERT END WALL DESIGN

S1
82 OF 117

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



C / S2 WALL BEND DETAIL
Scale: 1" = 1'-0"



D / S2 KEYWAY DETAIL
Scale: 1" = 1'-0"

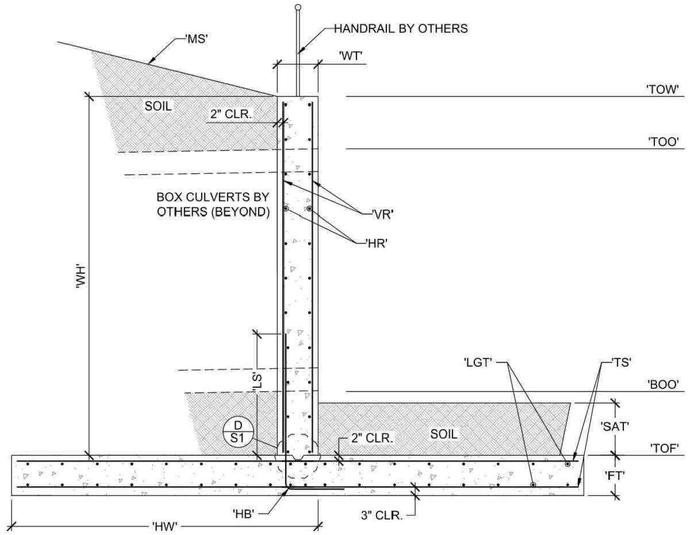
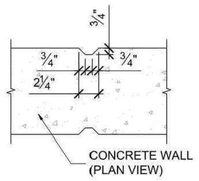
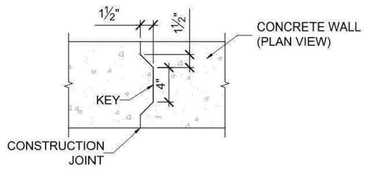


TABLE 1							
		CULVERT 1		CULVERT 2		CULVERT 3	
MAX SLOPE	MS	1:3		1:3		1:3	
		OUTLET	INLET	OUTLET	INLET	OUTLET	INLET
MAX TOP OF WALL ELEVATION	TOW	439.29'	446.49'	443.61'	444.99'	426.73'	427.68'
TOP OF OPENING ELEVATION	TOO	440.79'	443.99'	441.11'	442.49'	424.23'	425.18'
BOTTOM OF OPENING ELEVATION	BOO	436.79'	439.99'	438.61'	439.99'	418.23'	419.18'
TOP OF FOOTING ELEVATION	TOF	431.79'	438.99'	437.61'	438.99'	417.73'	418.68'
MAX WALL HEIGHT	WH	7'-6"		6'-0"		9'-0"	
WALL THICKNESS	WT	1'-6"		1'-6"		1'-6"	
VERTICAL REINFORCING IN WALL	VR	#4 @ 12", E.F.		#4 @ 12", E.F.		#6 @ 12", E.F.	
HORIZONTAL REINFORCING IN WALL	HR	#4 @ 12", E.F.		#4 @ 12", E.F.		#6 @ 12", E.F.	
LENGTH OF LAP SPLICE	LS	3'-0"		2'-0"		3'-0"	
SOIL ABOVE TOE	SAT	1'-0"		1'-0"		6"	
FOOTING THICKNESS	FT	1'-6"		1'-6"		2'-0"	
TEMP. & SHRINKAGE REINFORCMENT	TS	#5 @ 12", T+B		#5 @ 12", T+B		#6 @ 12", T+B	
LONGITUDINAL REINFORCEMENT	LGT	#5 @ 12", T+B		#5 @ 12", T+B		#6 @ 12", T+B	
HOOKED BARS	HB	#5 @ 12"		#5 @ 12"		#6 @ 12"	
HEEL WIDTH	HW	8'-0"		7'-0"	2'-6"	11'-0"	



E / S2 CONTROL JOINT DETAIL
Scale: 1-1/2" = 1'-0"



F / S2 CONSTRUCTION JOINT DETAIL
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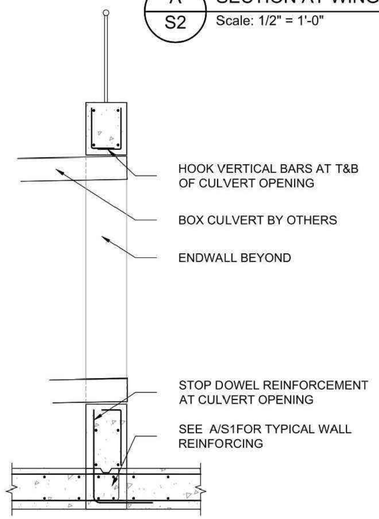
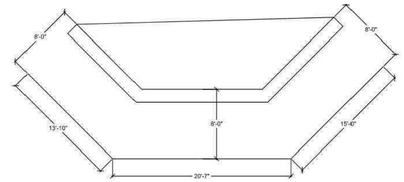
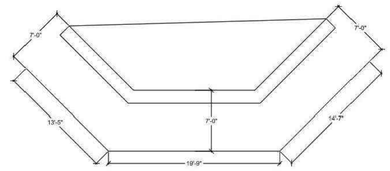


A / S2 SECTION AT WING WALL
Scale: 1/2" = 1'-0"

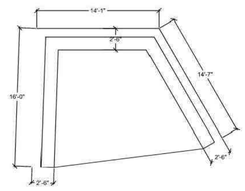
B / S2 SECTION AT CULVERT
Scale: 1/2" = 1'-0"



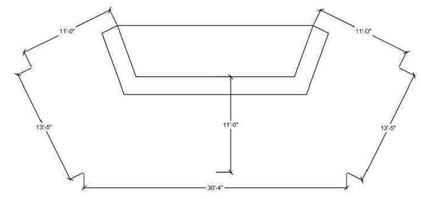
1 / S2 FOOTING PLAN VIEW - INLET AND OUTLET FOR CULVERT #1
Scale: 1/2" = 1'-0"



2 / S2 FOOTING PLAN VIEW - OUTLET FOR CULVERT #2
Scale: 1/2" = 1'-0"



3 / S2 FOOTING PLAN VIEW - INLET FOR CULVERT #2
Scale: 1/2" = 1'-0"



4 / S2 FOOTING PLAN VIEW - INLET AND OUTLET FOR CULVERT #3
Scale: 1/2" = 1'-0"

NOTE:

DEVELOPER TO UTILIZE CULVERT END WALL DESIGN FROM SHEETS 82 AND 83 OR FROM SHEETS 84-86 BASED ON SUPPLY CHAIN CONSTRAINTS. FINAL STRUCTURAL DRAWINGS FOR SELECTED APPROACH WILL BE SIGNED AND SEALED BY A STRUCTURAL ENGINEER.

APPROVED: DEPARTMENT OF PUBLIC WORKS
Docusigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
Docusigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
Docusigned by: 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

ECS Mid-Atlantic, LLC
14026 Thunderbolt Place, Suite 100
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CLIENT

BOHLER ENGINEERING
901 DULANEY VALLEY ROAD
SUITE 801
TOWSON, MD 21204

SEAL

STATE OF MARYLAND
MATTHEW A. PRICE
52257
PROFESSIONAL ENGINEER
9/26/2022

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. 52257 Expiration Date 2-6-2026

PROJECT INFORMATION

BETHANY GLEN - ARAH

CULVERT END WALL DESIGN
9891 OLD FREDRICK ROAD
ELLICOTT CITY, MD 21042

SUBMISSION	DATE
-	-
-	-
-	-
-	-
-	-
-	-
PERMIT	9/26/2022

DRAWN BY: KS
CHECKED BY: MAP

ECS PROJECT NO. 7540

CULVERT END WALL DETAILS

S2
83 OF 117

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BETHANY GLEN - ARAH
INTERNAL PUBLIC ROAD 'B' - NEIGHBORHOOD D/E
HOWARD COUNTY, MARYLAND

DRAWING SCHEDULE

SHEET NO.	DESCRIPTION	REVISIONS	
		REV. NO.	DATE
1	COVER SHEET	A	9/6/22
2	BOX CULVERT PLAN VIEW	A	9/6/22
3	SECTION VIEW A-A	A	9/6/22
4	SECTION VIEW B-B & SECTION VIEW C-C	A	9/6/22
5	BOX CULVERT & WINGWALL REINFORCING DETAILS	A	9/6/22
6	BOLT POCKET AND JOINT DETAILS	A	9/6/22
7	HEADWALL, TOEWALL AND WINGWALL CONNECTION DETAILS	A	9/6/22
8	WINGWALL #1 & WINGWALL #2	A	9/6/22
9	WINGWALL #3 & WINGWALL #4	A	9/6/22

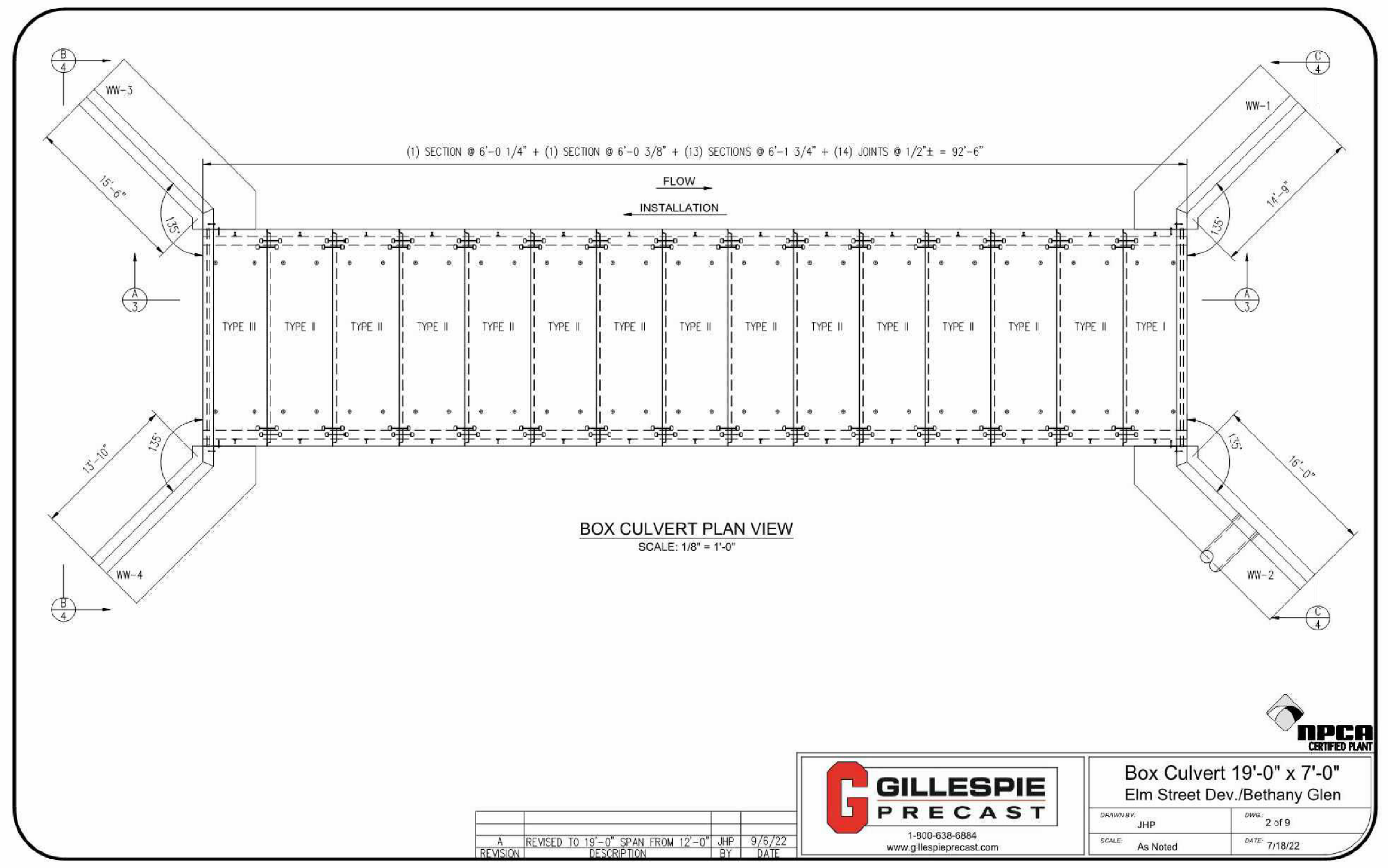
TABLE OF UNITS

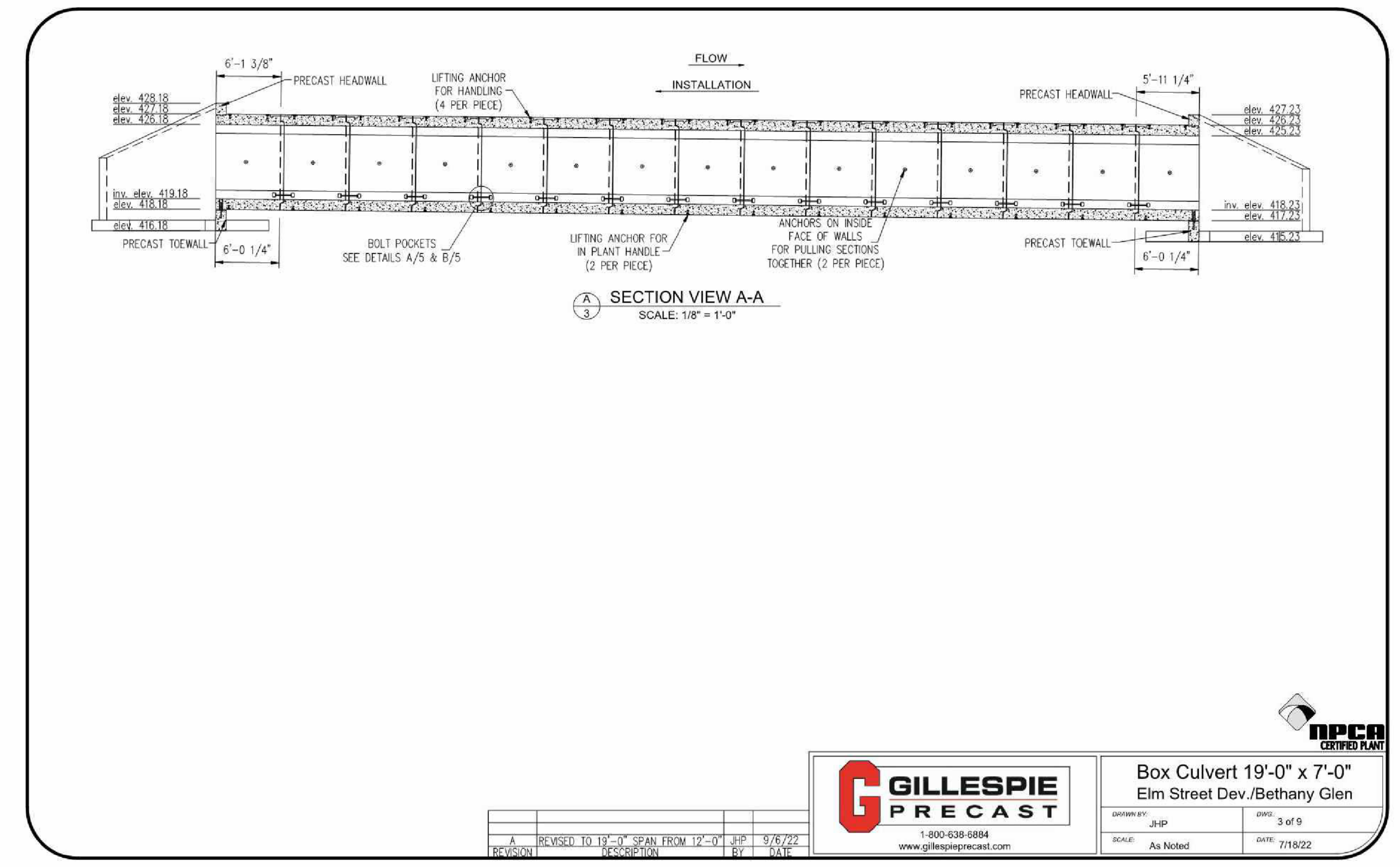
MARK	QUANTITY	LAY LENGTH (AT BOTTOM)	VOLUME (CU. YD.)	WEIGHT (LBS.)
TYPE I*	1	5'-11 1/4"/6'-0 1/4"	12.13	48,520
TYPE II	13	6'-1 3/4"	11.70	46,800
TYPE III*	1	6'-1 3/8"/6'-0 1/4"	12.30	49,200
TOEWALL	2	14'-0"	1.51	6,040
WINGWALL #1	1	14'-9"	10.65	42,600
WINGWALL #2	1	16'-0"	11.06	44,240
WINGWALL #3	1	15'-6"	11.43	45,720
WINGWALL #4	1	13'-10"	10.32	41,280

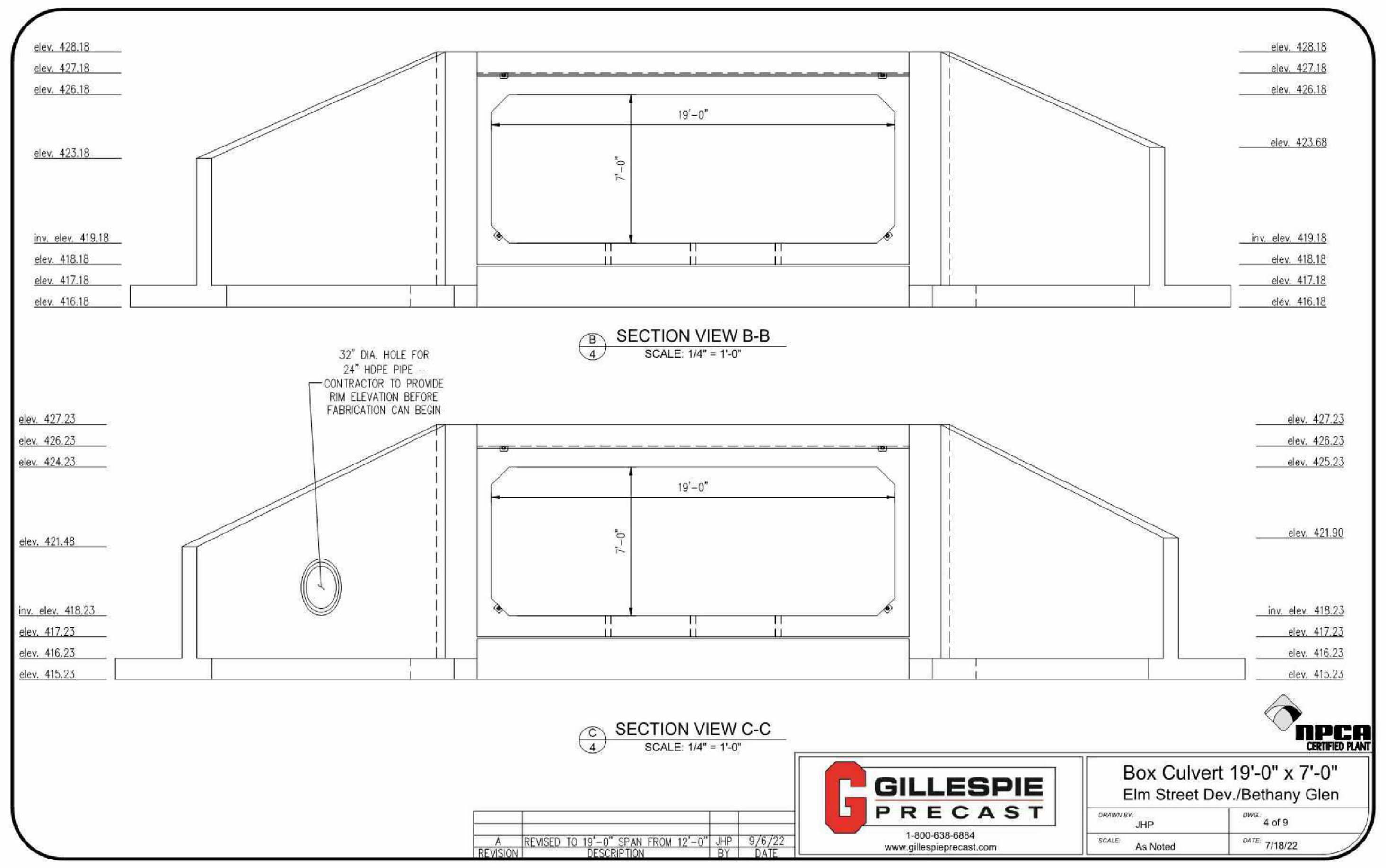
- ALL WEIGHTS AND VOLUMES ARE APPROXIMATE
* INCLUDES HEADWALL WEIGHTS AND YARDS

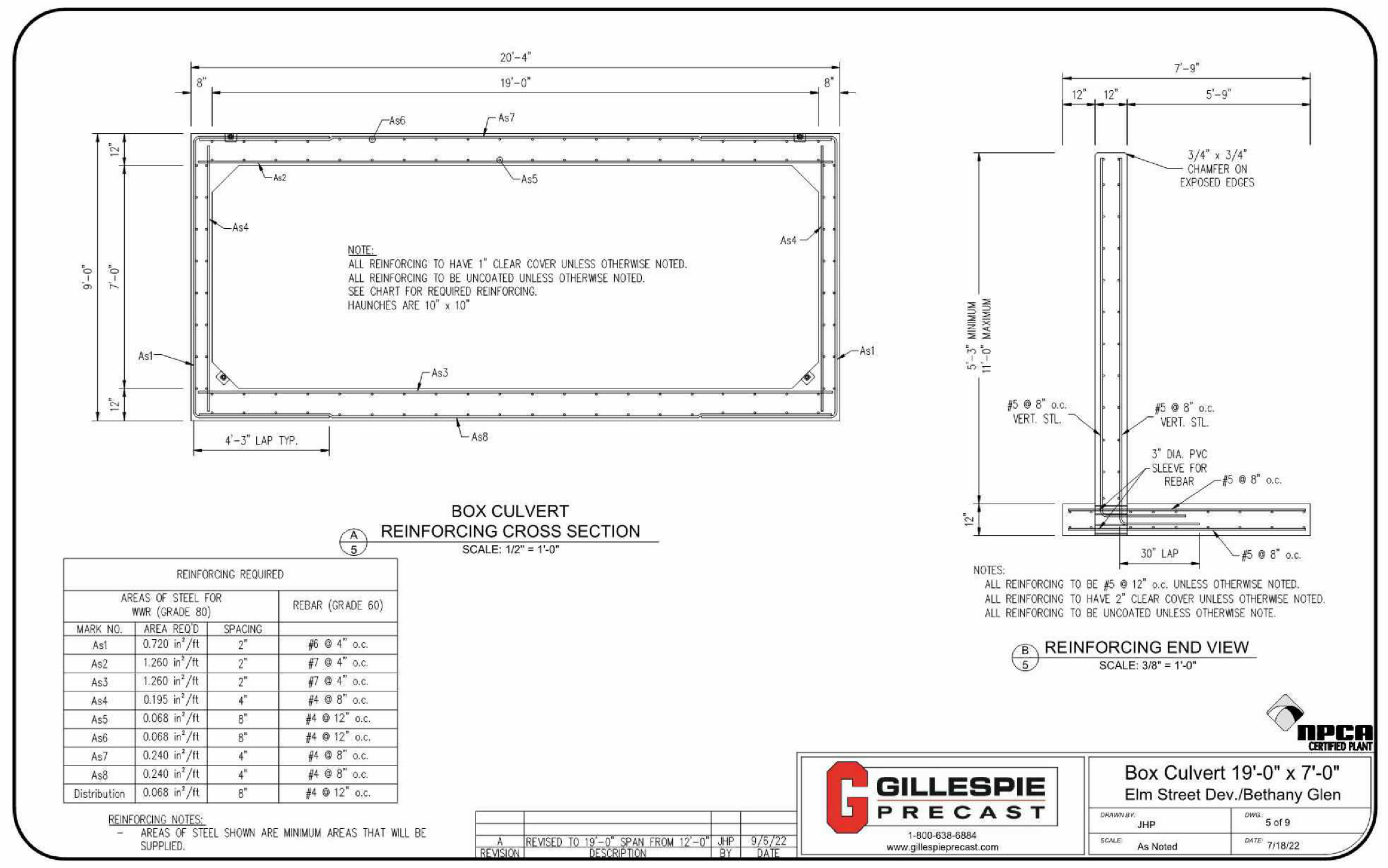
NOTES:
1. Concrete strengths:

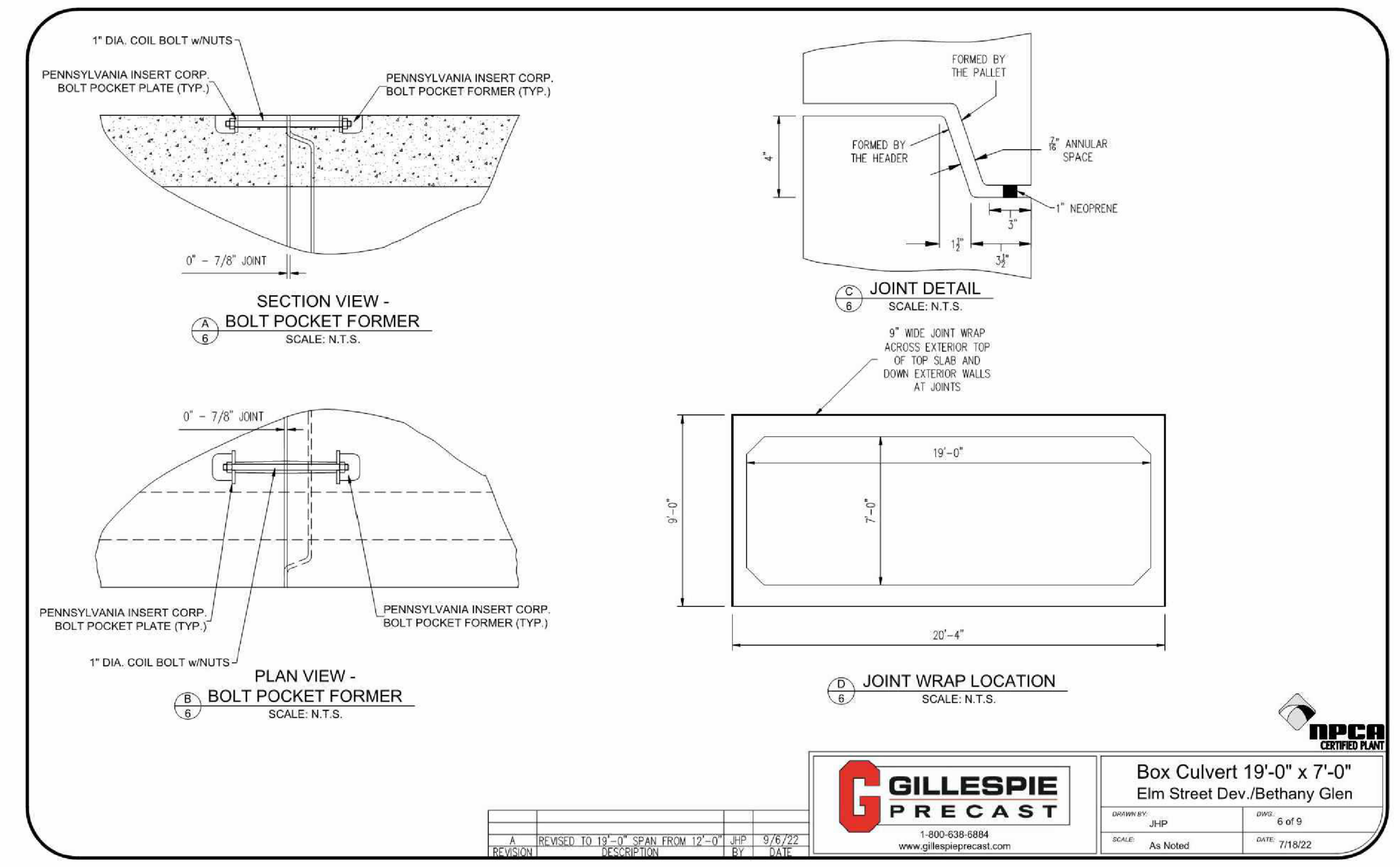
GILLESPIE PRECAST — 1-800-638-6884 — www.gillespieprecast.com
Box Culvert 19'-0" x 7'-0" — Elm Street Dev./Bethany Glen — DRAWN BY: JHP — DWG.: 1 of 9 — SCALE: As Noted — DATE: 7/18/22
A — REVISED TO 19'-0" SPAN FROM 12'-0" — JHP — 9/6/22

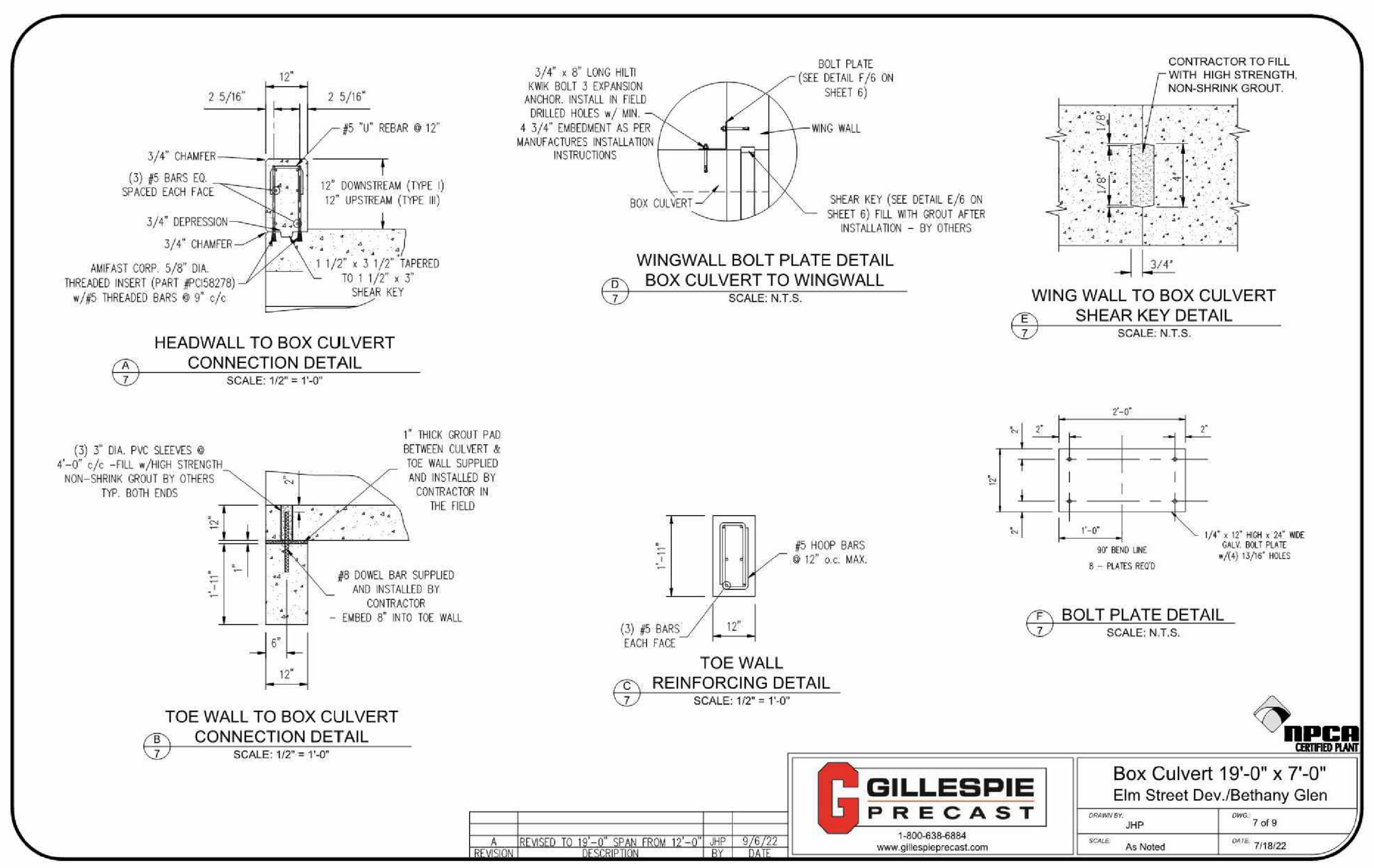


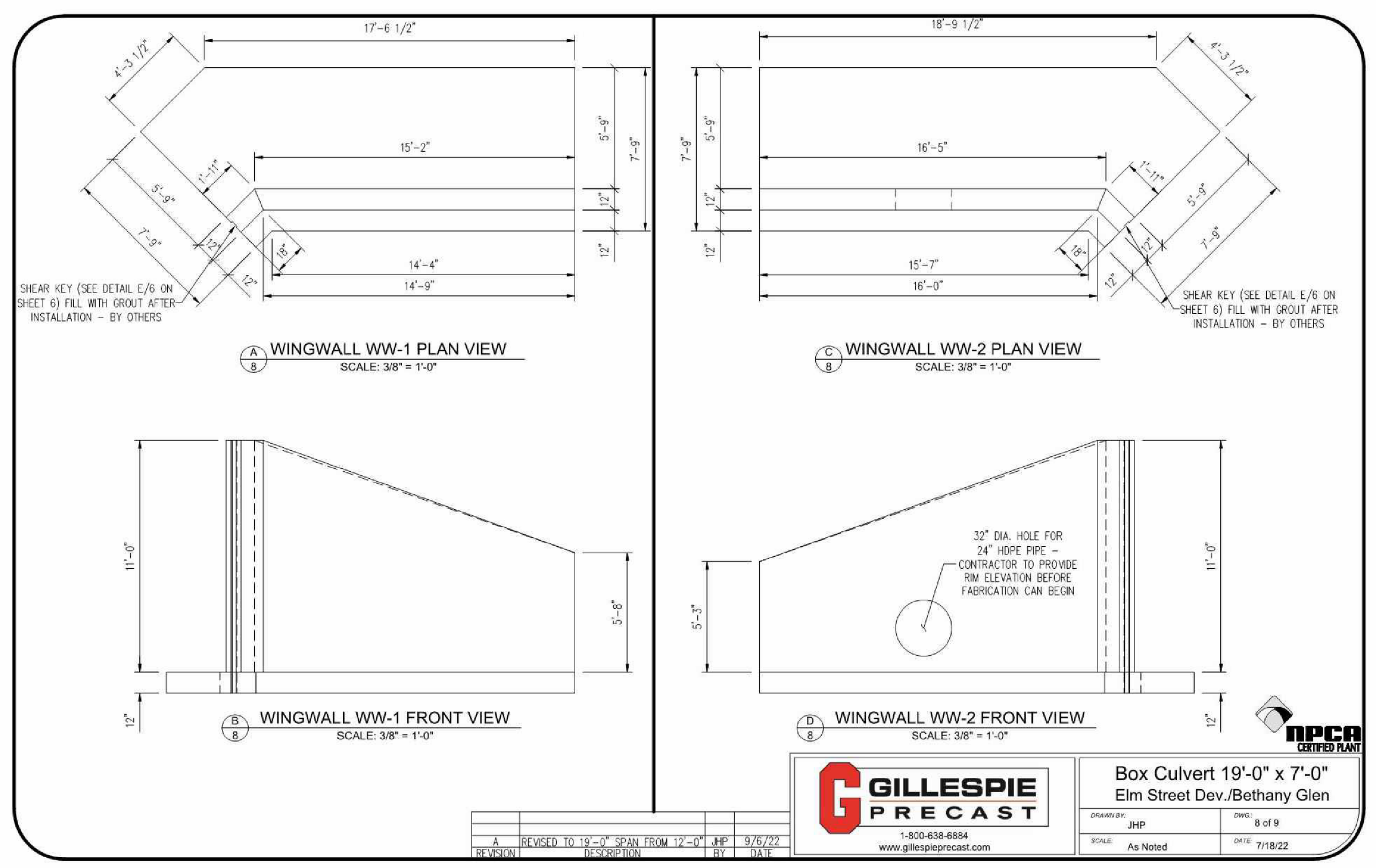


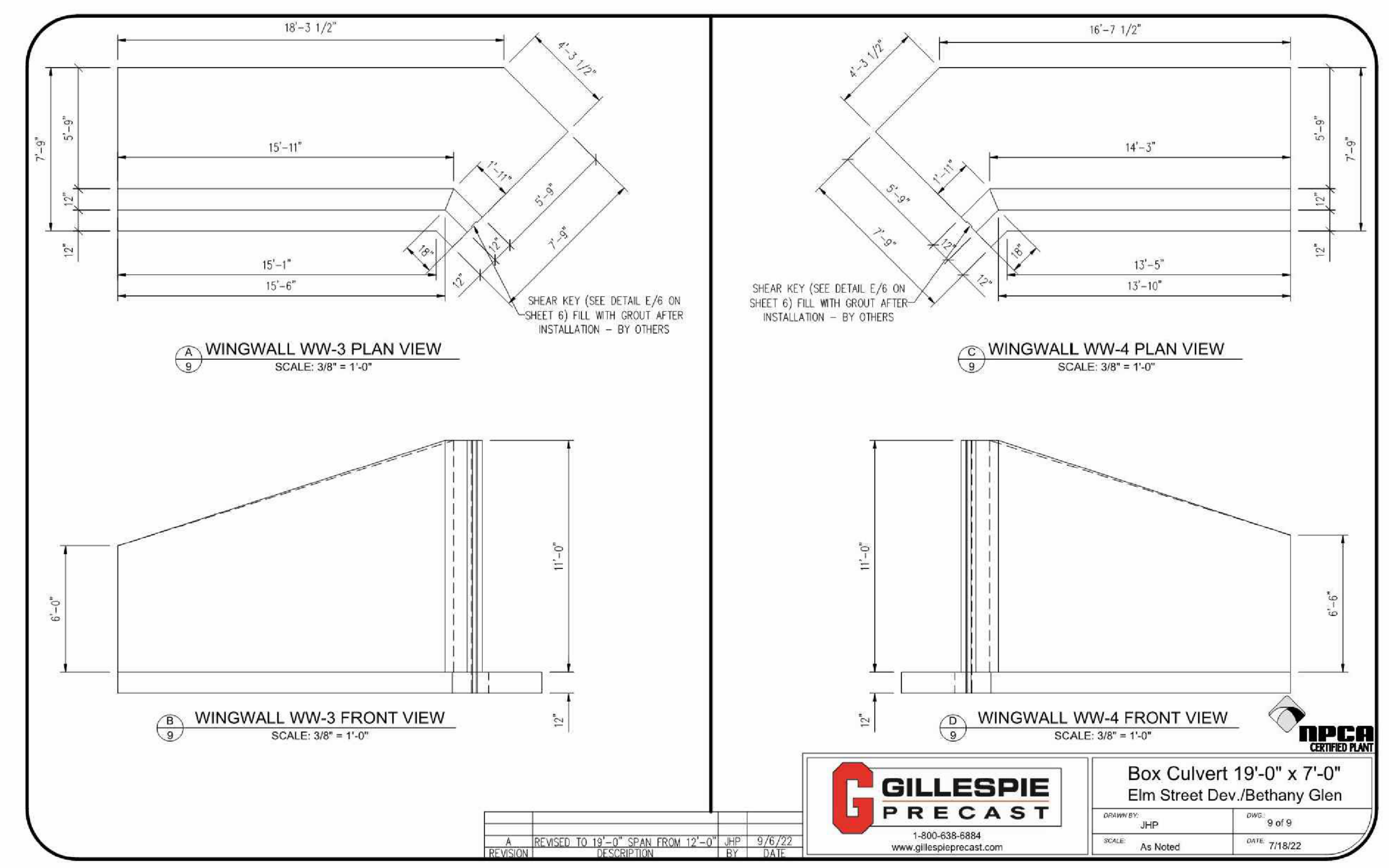












APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

DEVELOPER'S / OWNER'S NAME Jason Van Kirk — DATE 3-12-24

NOTE:

DEVELOPER TO UTILIZE CULVERT END WALL DESIGN FROM SHEETS 82 AND 83 OR FROM SHEETS 84-86 BASED ON SUPPLY CHAIN CONSTRAINTS. FINAL STRUCTURAL DRAWINGS FOR SELECTED APPROACH WILL BE SIGNED AND SEALED BY A STRUCTURAL ENGINEER.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 — GRID: 15 — ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

Mar 12, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - CNDS - 2-----LAYOUT: 84 - BOX CULVERT STRUCTURAL DESIGN PLAN — AG

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

811 Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
BOX CULVERT STRUCTURAL DESIGN PLAN

SHEET NUMBER:

F-22-033

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

BETHANY GLEN - ARAH
INTERNAL PUBLIC ROAD 'A' - NEIGHBORHOOD D
HOWARD COUNTY, MARYLAND

DRAWING SCHEDULE

SHEET NO.	DESCRIPTION	REVISIONS	
		REV. NO.	DATE
1	COVER SHEET	A	8/24/22
2	BOX CULVERT PLAN VIEW & SECTION VIEW A-A	A	8/24/22
3	SECTION VIEW B-B & SECTION VIEW C-C	A	8/24/22
4	BOX CULVERT & WINGWALL REINFORCING DETAILS	A	8/24/22
5	BOLT POCKET AND JOINT DETAILS	A	8/24/22
6	HEADWALL, TOEWALL AND WINGWALL CONNECTION DETAILS	A	8/24/22
7	WINGWALL #1 & WINGWALL #2	A	8/24/22
8	WINGWALL #3 & WINGWALL #4	A	8/24/22

TABLE OF UNITS

MARK	QUANTITY	LAY LENGTH (AT BOTTOM)	VOLUME (CU. YD.)	WEIGHT (LBS.)
TYPE I*	1	5'-4 1/2"/5'-5 3/4"	6.63	26,520
TYPE II	9	6'-3"	6.16	24,640
TYPE III*	1	5'-5 3/4"/5'-4 3/8"	6.62	26,480
TOEWALL	2	12'-4"	0.91	3,640
WINGWALL #1	1	13'-7"	7.17	28,680
WINGWALL #2	1	14'-0"	6.43	25,720
WINGWALL #3	1	12'-8"	6.56	26,240
WINGWALL #4	1	11'-10"	6.27	25,080

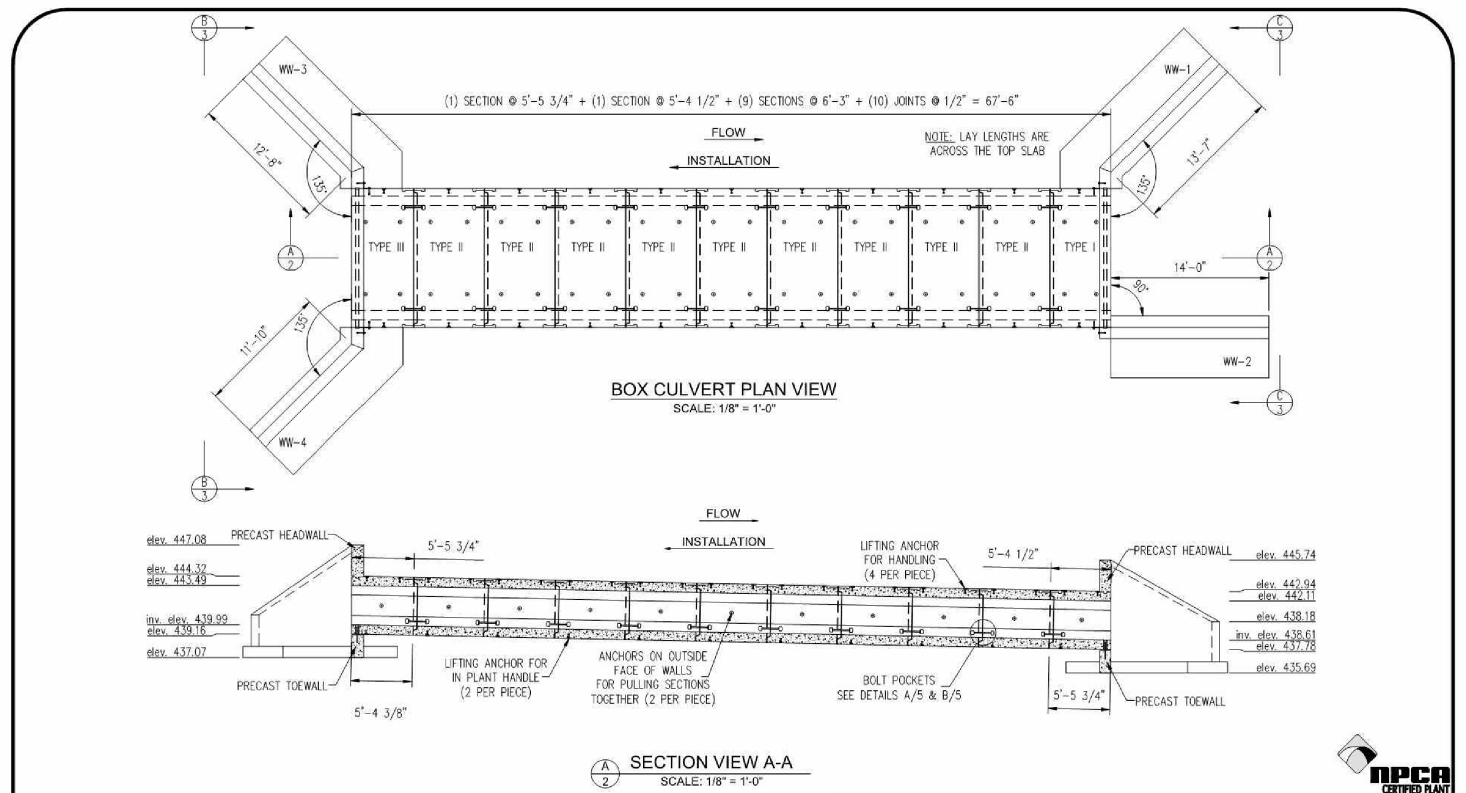
- ALL WEIGHTS AND VOLUMES ARE APPROXIMATE
* INCLUDES HEADWALL WEIGHTS AND YARDS

NOTES:
1. Concrete strengths:
   The minimum compressive strength at 28 days equals 5,000 psi.
2. Reinforcement:
   Materials requirement: ASTM A615 - Grade 60 (rebar) uncoated . ASTM A1064 - Grade 80 (welded wire reinforcement) uncoated. All reinforcement to have 1" minimum cover except as noted or detailed.
3. Box culvert sections to be pulled together and permanently connected. Use 1" diameter bolts in recessed pockets.
4. Joints between precast sections:
   Neoprene gaskets shall be provided at the joints between all precast joints in order to make the joints watertight. All joints between precast box sections shall be tongue and groove. All joint exteriors shall be covered with a minimum 9" wide wrap centered on the joint.
5. Design is in accordance to ASTM C-1577-20 - Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD.
6. Live Load at Surface: AASHTO HL93.
7. Soil Cover: 1.50' minimum to 3.25' maximum.

REVISION	DESCRIPTION	BY	DATE
A	REVISED PER COMMENTS	JHP	8/24/22

GILLESPIE PRECAST
1-800-638-6884
www.gillespieprecast.com

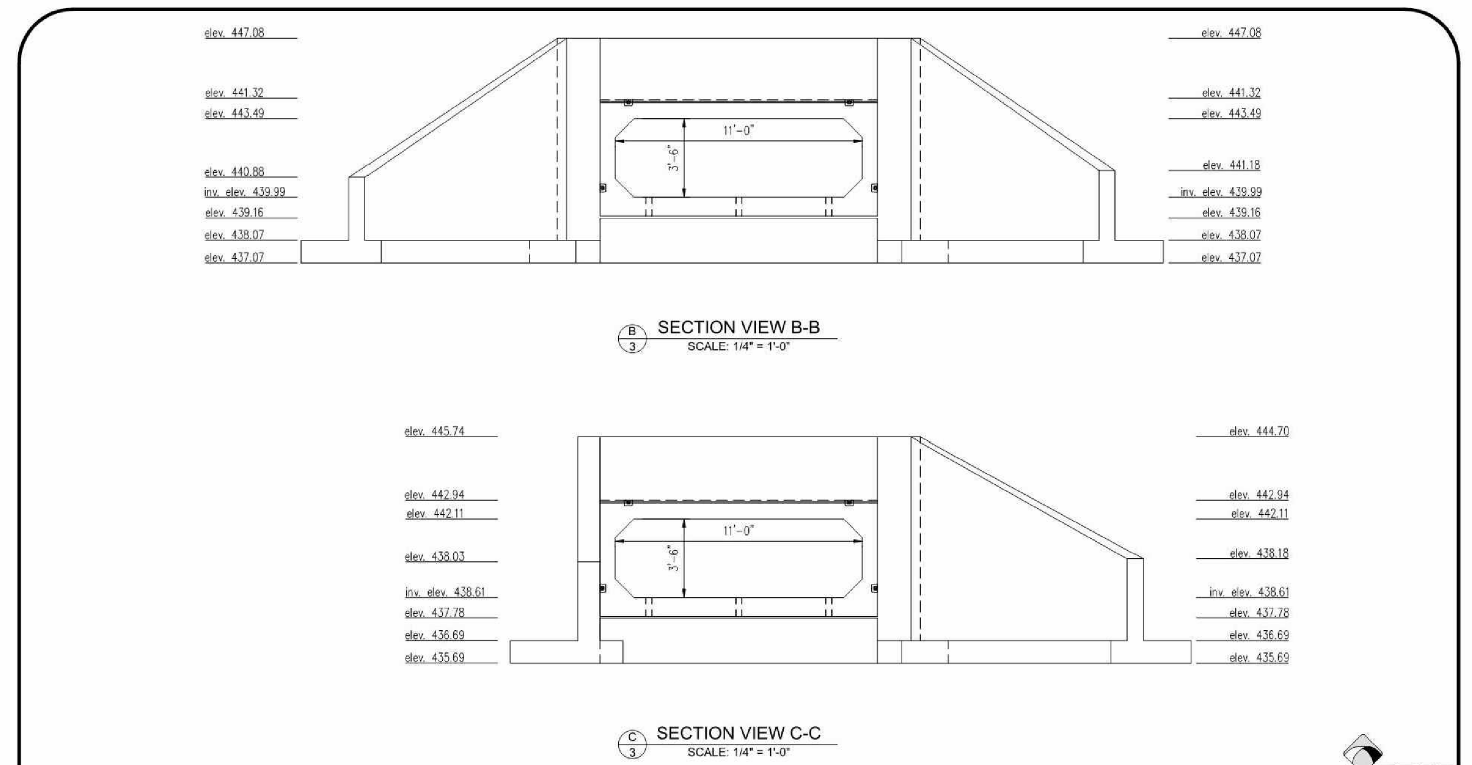
Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 1 of 8
SCALE: As Noted DATE: 7/13/22



BOX CULVERT PLAN VIEW
SCALE: 1/8" = 1'-0"

SECTION VIEW A-A
SCALE: 1/8" = 1'-0"

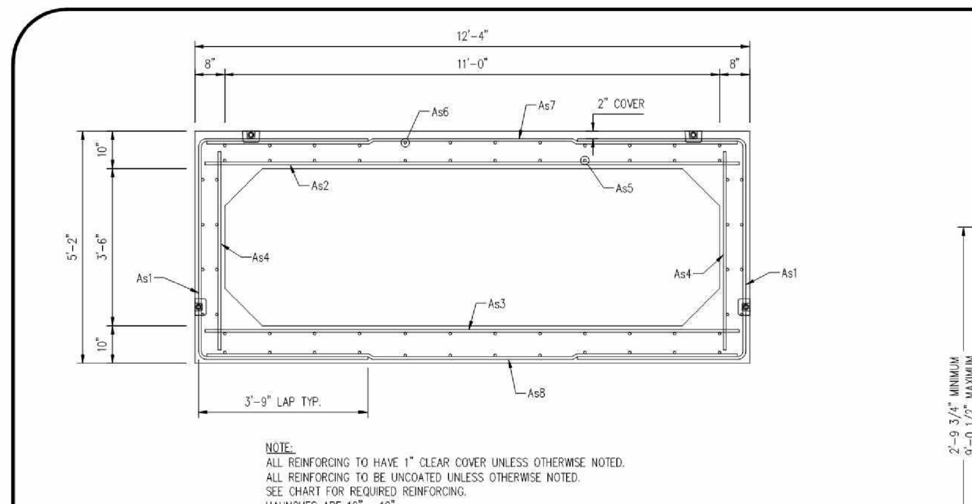
Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 2 of 8
SCALE: As Noted DATE: 7/13/22



SECTION VIEW B-B
SCALE: 1/4" = 1'-0"

SECTION VIEW C-C
SCALE: 1/4" = 1'-0"

Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 3 of 8
SCALE: As Noted DATE: 7/13/22

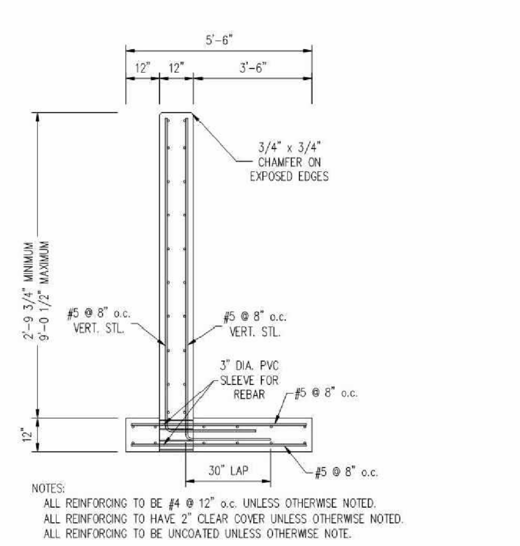


NOTE:
ALL REINFORCING TO HAVE 1" CLEAR COVER UNLESS OTHERWISE NOTED.
ALL REINFORCING TO BE UNCOATED UNLESS OTHERWISE NOTED.
SEE CHART FOR REQUIRED REINFORCING.
HAUNCHES ARE 10" x 10"

BOX CULVERT
REINFORCING CROSS SECTION
SCALE: 1/2" = 1'-0"

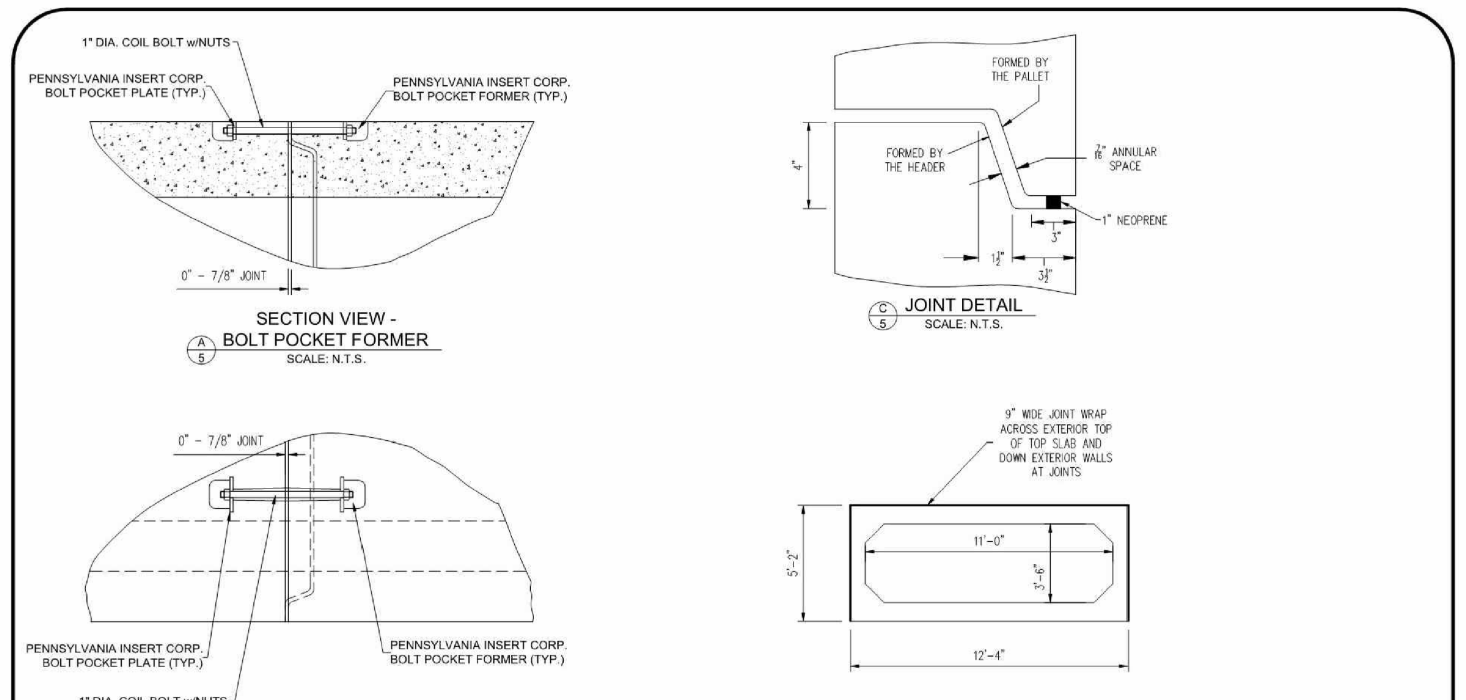
REINFORCING REQUIRED			
AREAS OF STEEL FOR WWR (GRADE 80)			REBAR (GRADE 60)
MARK NO.	AREA REQ'D	SPACING	REBAR REQ'D
As1	0.300 in²/ft	4"	#5 @ 8" o.c.
As2	0.405 in²/ft	4"	#5 @ 6" o.c.
As3	0.375 in²/ft	4"	#5 @ 6" o.c.
As4	0.195 in²/ft	4"	#4 @ 8" o.c.
As5	0.068 in²/ft	8"	#4 @ 12" o.c.
As6	0.068 in²/ft	8"	#4 @ 12" o.c.
As7	0.240 in²/ft	4"	#4 @ 8" o.c.
As8	0.240 in²/ft	4"	#4 @ 8" o.c.
Distribution	0.068 in²/ft	8"	#4 @ 12" o.c.

REINFORCING NOTES:
- AREAS OF STEEL SHOWN ARE MINIMUM AREAS THAT WILL BE SUPPLIED.



REINFORCING END VIEW
SCALE: 3/8" = 1'-0"

Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 4 of 8
SCALE: As Noted DATE: 7/13/22



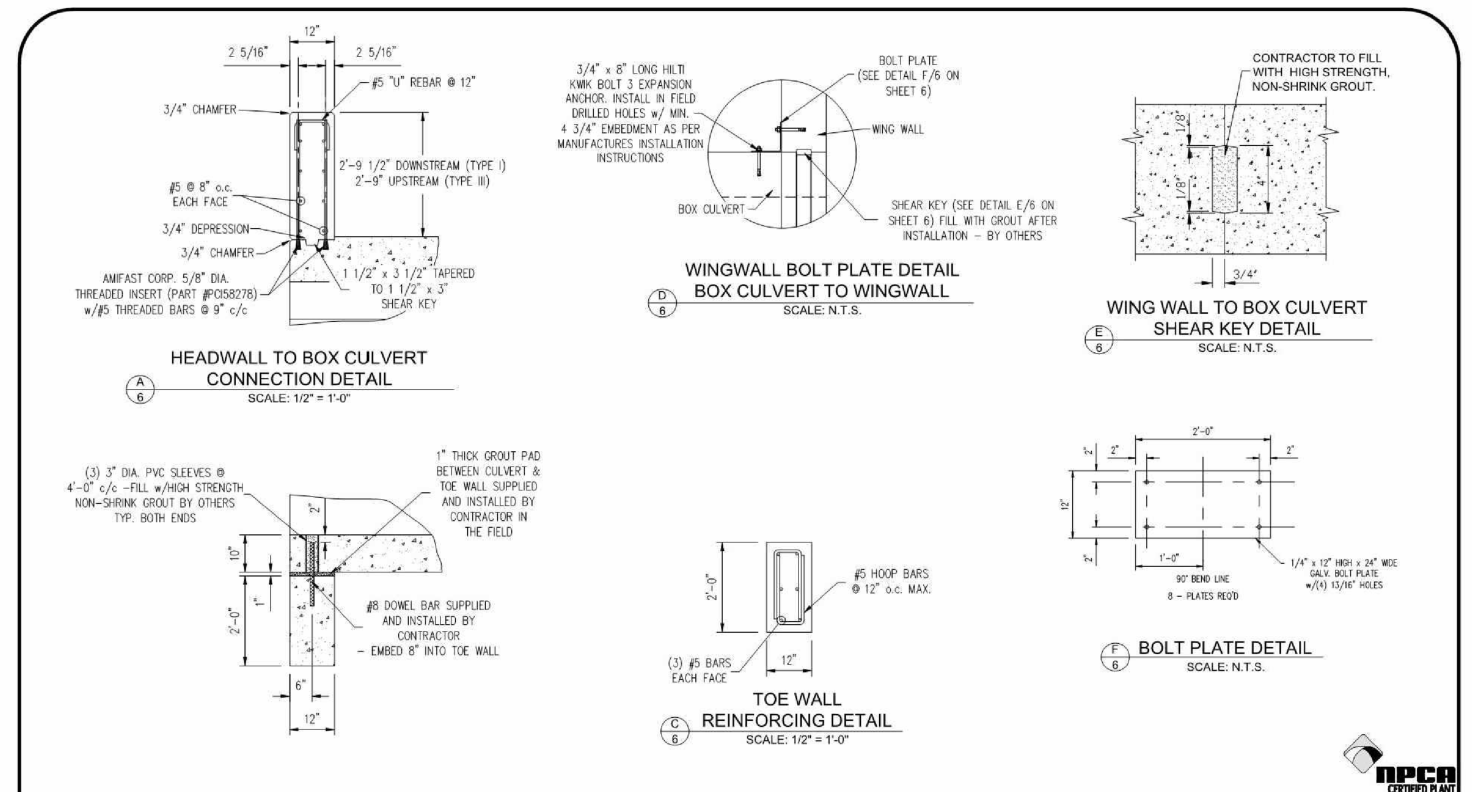
SECTION VIEW - BOLT POCKET FORMER
SCALE: N.T.S.

JOINT DETAIL
SCALE: N.T.S.

PLAN VIEW - BOLT POCKET FORMER
SCALE: N.T.S.

JOINT WRAP LOCATION
SCALE: N.T.S.

Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 5 of 8
SCALE: As Noted DATE: 7/13/22



HEADWALL TO BOX CULVERT CONNECTION DETAIL
SCALE: 1/2" = 1'-0"

WINGWALL BOLT PLATE DETAIL BOX CULVERT TO WINGWALL
SCALE: N.T.S.

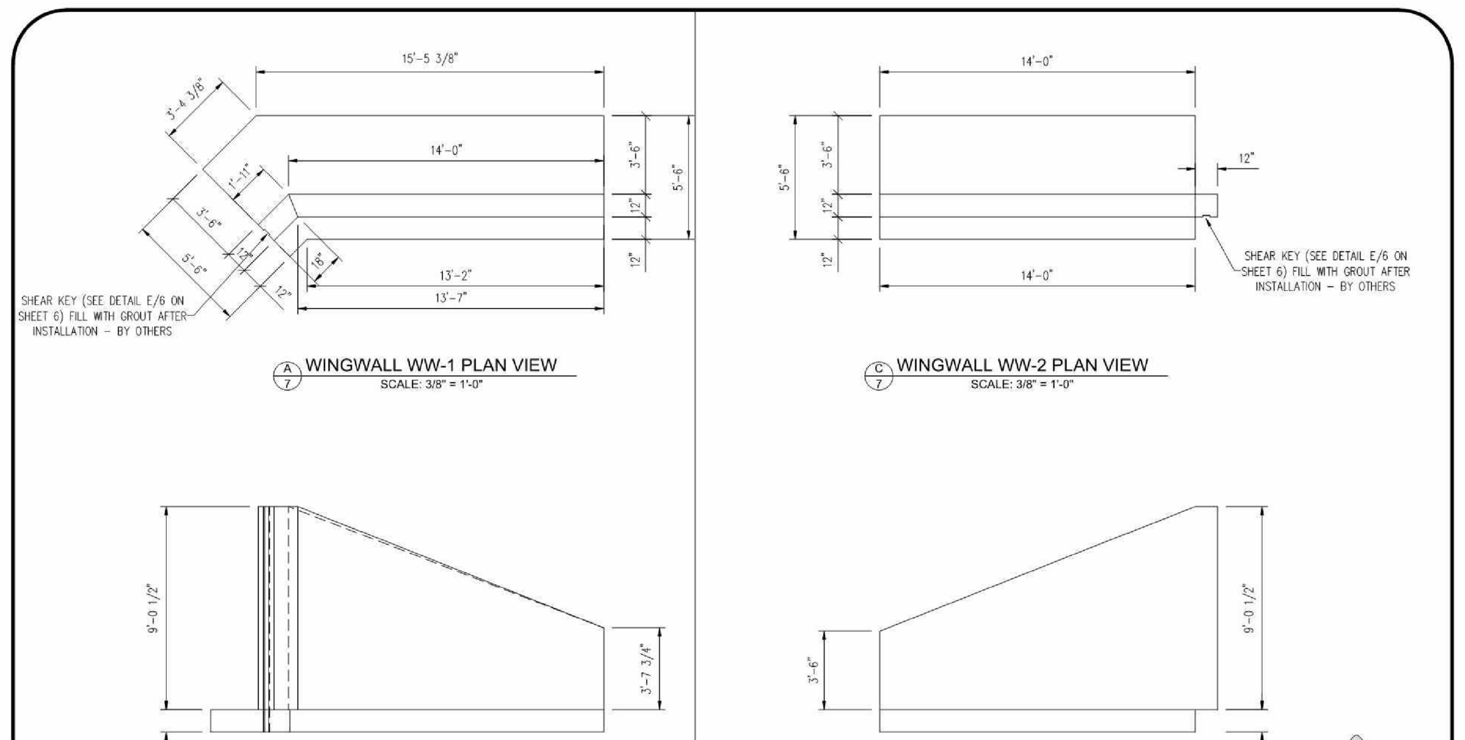
WING WALL TO BOX CULVERT SHEAR KEY DETAIL
SCALE: N.T.S.

TOE WALL TO BOX CULVERT CONNECTION DETAIL
SCALE: 1/2" = 1'-0"

TOE WALL REINFORCING DETAIL
SCALE: 1/2" = 1'-0"

BOLT PLATE DETAIL
SCALE: N.T.S.

Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 6 of 8
SCALE: As Noted DATE: 7/13/22



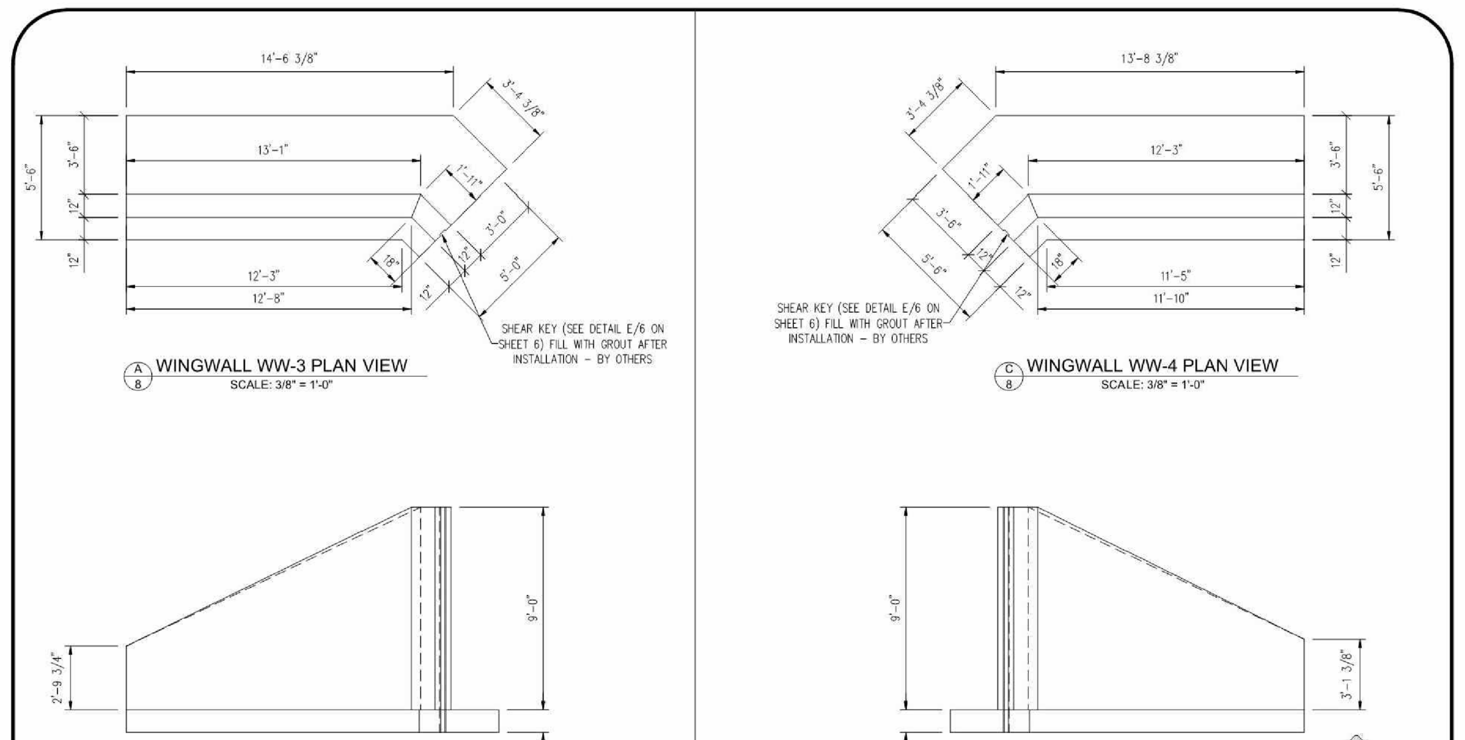
WINGWALL WW-1 PLAN VIEW
SCALE: 3/8" = 1'-0"

WINGWALL WW-2 PLAN VIEW
SCALE: 3/8" = 1'-0"

WINGWALL WW-1 FRONT VIEW
SCALE: 3/8" = 1'-0"

WINGWALL WW-2 FRONT VIEW
SCALE: 3/8" = 1'-0"

Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 7 of 8
SCALE: As Noted DATE: 7/13/22



WINGWALL WW-3 PLAN VIEW
SCALE: 3/8" = 1'-0"

WINGWALL WW-4 PLAN VIEW
SCALE: 3/8" = 1'-0"

WINGWALL WW-3 FRONT VIEW
SCALE: 3/8" = 1'-0"

WINGWALL WW-4 FRONT VIEW
SCALE: 3/8" = 1'-0"

Box Culvert 11'-0" x 3'-6"
Elm Street Dev./Bethany Glen
DRAWN BY: JHP DWG.: 8 of 8
SCALE: As Noted DATE: 7/13/22

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: Chad Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

DEVELOPER'S / OWNER'S NAME Jason Van Kirk — DATE 3-12-24

NOTE:

DEVELOPER TO UTILIZE CULVERT END WALL DESIGN FROM SHEETS 82 AND 83 OR FROM SHEETS 84-86 BASED ON SUPPLY CHAIN CONSTRAINTS. FINAL STRUCTURAL DRAWINGS FOR SELECTED APPROACH WILL BE SIGNED AND SEALED BY A STRUCTURAL ENGINEER.

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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It's fast. It's free. It's the law.

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THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
BOX CULVERT STRUCTURAL DESIGN PLAN

SHEET NUMBER:

F-22-033

Mar 12, 2024
H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - CNDS - 2----LAYOUT: 85 - BOX CULVERT STRUCTURAL DESIGN PLAN
AG

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

BETHANY GLEN - ARAH
INTERNAL PUBLIC ROAD 'A' - NEIGHBORHOOD C
HOWARD COUNTY, MARYLAND

DRAWING SCHEDULE

SHEET NO.	DESCRIPTION	REVISIONS REV. NO.	DATE
1	COVER SHEET	B	5/22/23
2	BOX CULVERT PLAN VIEW & SECTION VIEW A-A	B	5/22/23
3	SECTION VIEW B-B & SECTION VIEW C-C	B	5/22/23
4	BOX CULVERT & WINGWALL REINFORCING DETAILS	B	5/22/23
5	BOLT POCKET AND JOINT DETAILS	B	5/22/23
6	HEADWALL, TOEWALL AND WINGWALL CONNECTION DETAILS	B	5/22/23
7	WINGWALL #1 & WINGWALL #2	B	5/22/23
8	WINGWALL #3 & WINGWALL #4	B	5/22/23

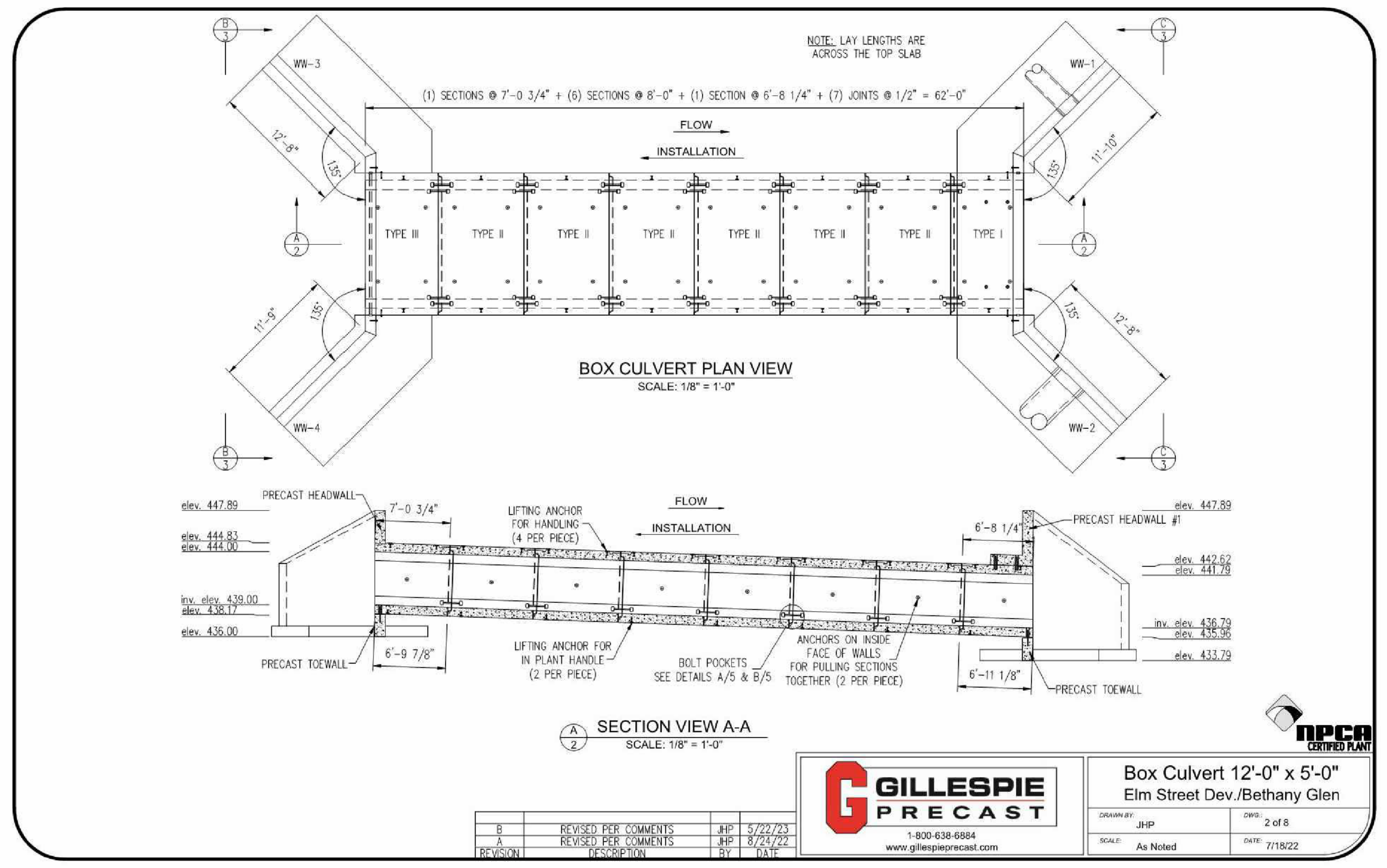
TABLE OF UNITS

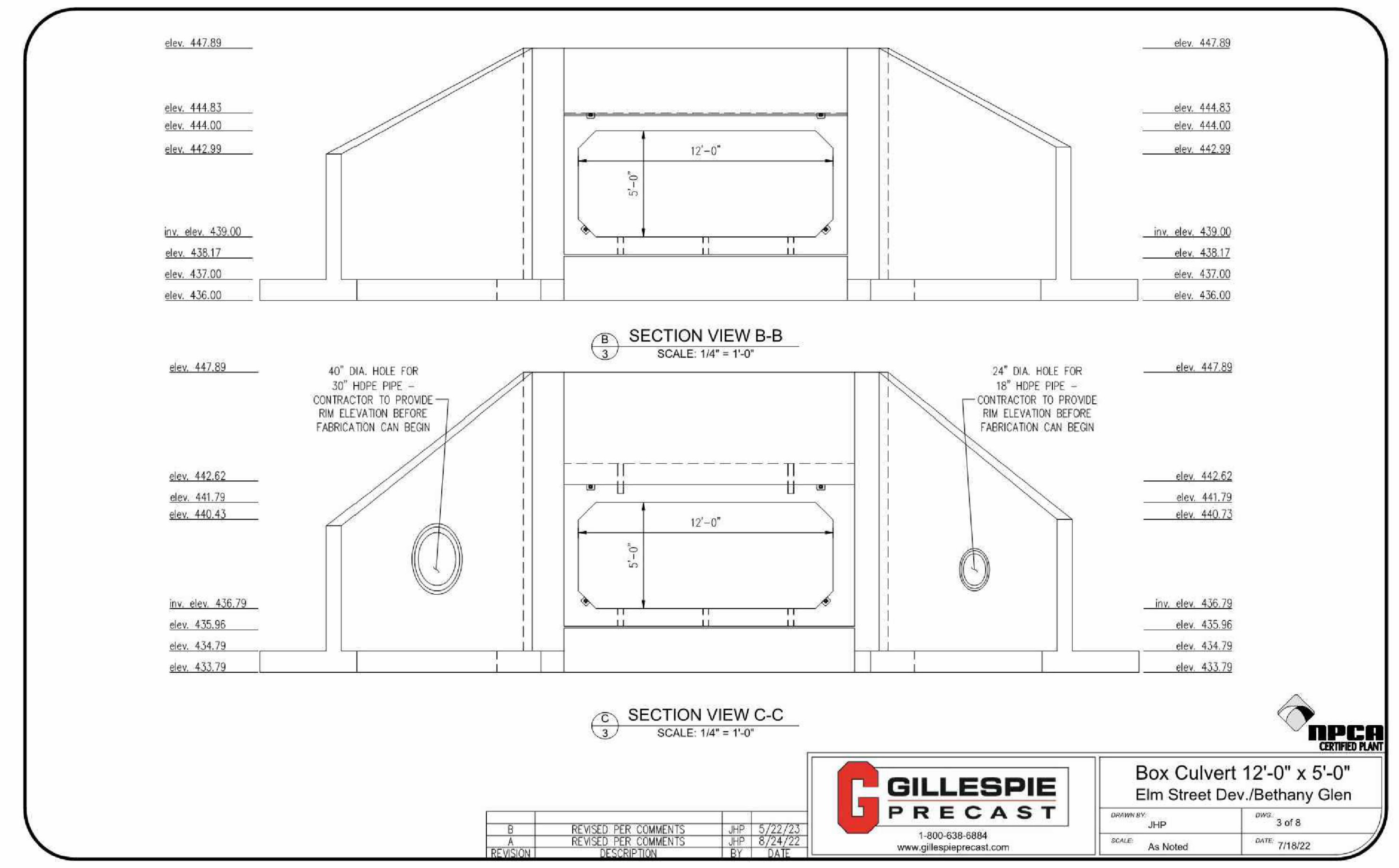
MARK	QUANTITY	LAY LENGTH (AT BOTTOM)	VOLUME (CU. YD.)	WEIGHT (LBS.)
TYPE I	1	6'-8 1/4"/6'-11 1/8"	7.63	30,520
TYPE II	8	8'-0"	8.97	35,880
TYPE III*	1	7'-0 3/4"/6'-9 7/8"	9.29	31,160
TOEWALL	2	13'-4"	0.99	3,960
WINGWALL #1	1	11'-10"	9.16	36,640
WINGWALL #2	1	12'-8"	9.73	38,920
WINGWALL #3	1	12'-8"	9.07	36,280
WINGWALL #4	1	12'-9"	8.61	34,440
HEADWALL #1	1	13'-4"	4.08	16,320

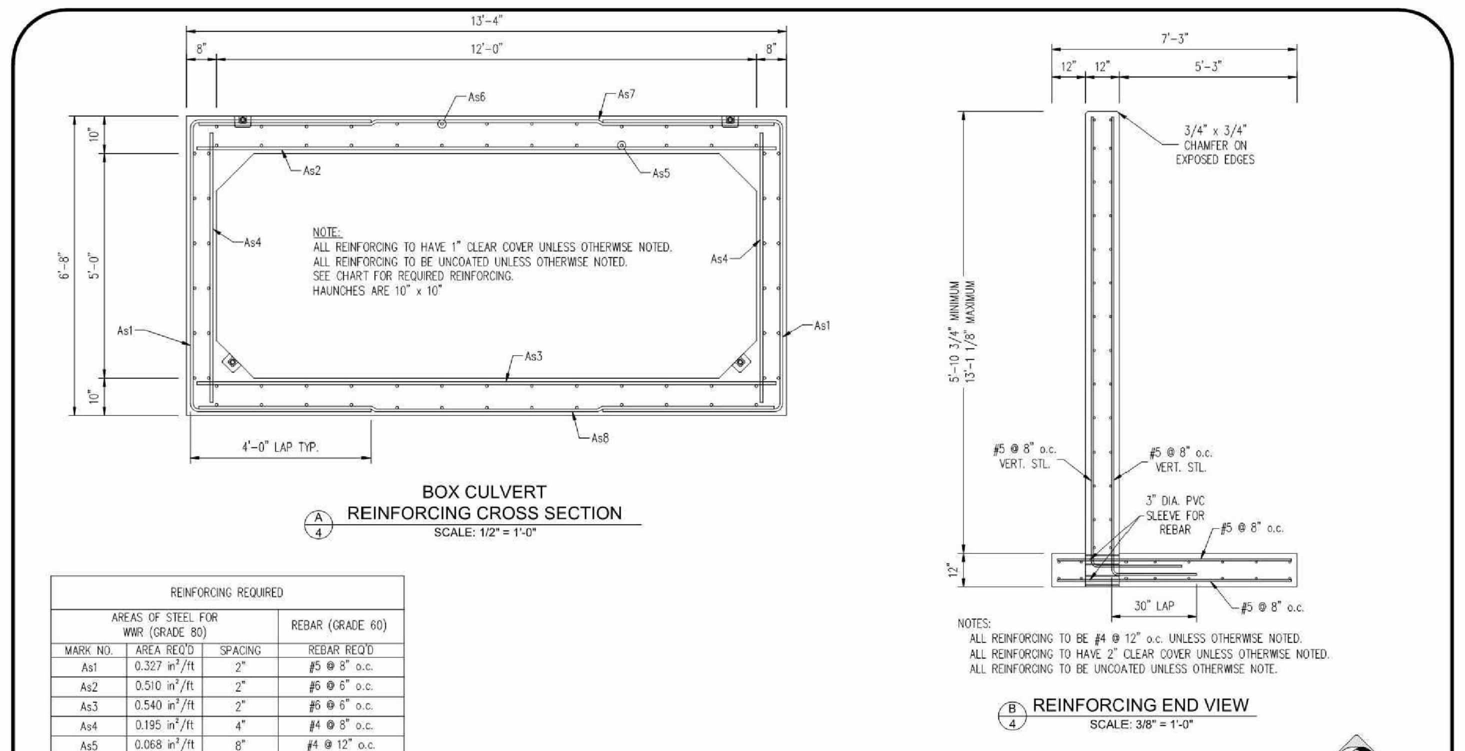
- ALL WEIGHTS AND VOLUMES ARE APPROXIMATE
* INCLUDES HEADWALL WEIGHT AND YARDS

NOTES:
1. Concrete strengths:
The minimum compressive strength at 28 days equals 5,000 psi.
2. Reinforcement:
Materials requirement: ASTM A615 - Grade 60 (rebar) uncoated . ASTM A1064 - Grade 80 (welded wire reinforcement) uncoated. All reinforcement to have 1" minimum cover except as noted or detailed.
3. Box culvert sections to be pulled together and permanently connected. Use 1" diameter bolts in recessed pockets.
4. Joints between precast sections:
Neoprene gaskets shall be provided at the joints between all precast joints in order to make the joints watertight. All joints between precast box sections shall be tongue and groove. All joint exteriors shall be covered with a minimum 9" wide wrap centered on the joint.
5. Design is in accordance to ASTM C-1577-20 - Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD.
6. Live Load at Surface: AASHTO HL93.
7. Soil Cover: 2.00' minimum to 6.00' maximum.

GILLESPIE PRECAST — Box Culvert 12'-0" x 5'-0" Elm Street Dev./Bethany Glen — 1 of 8



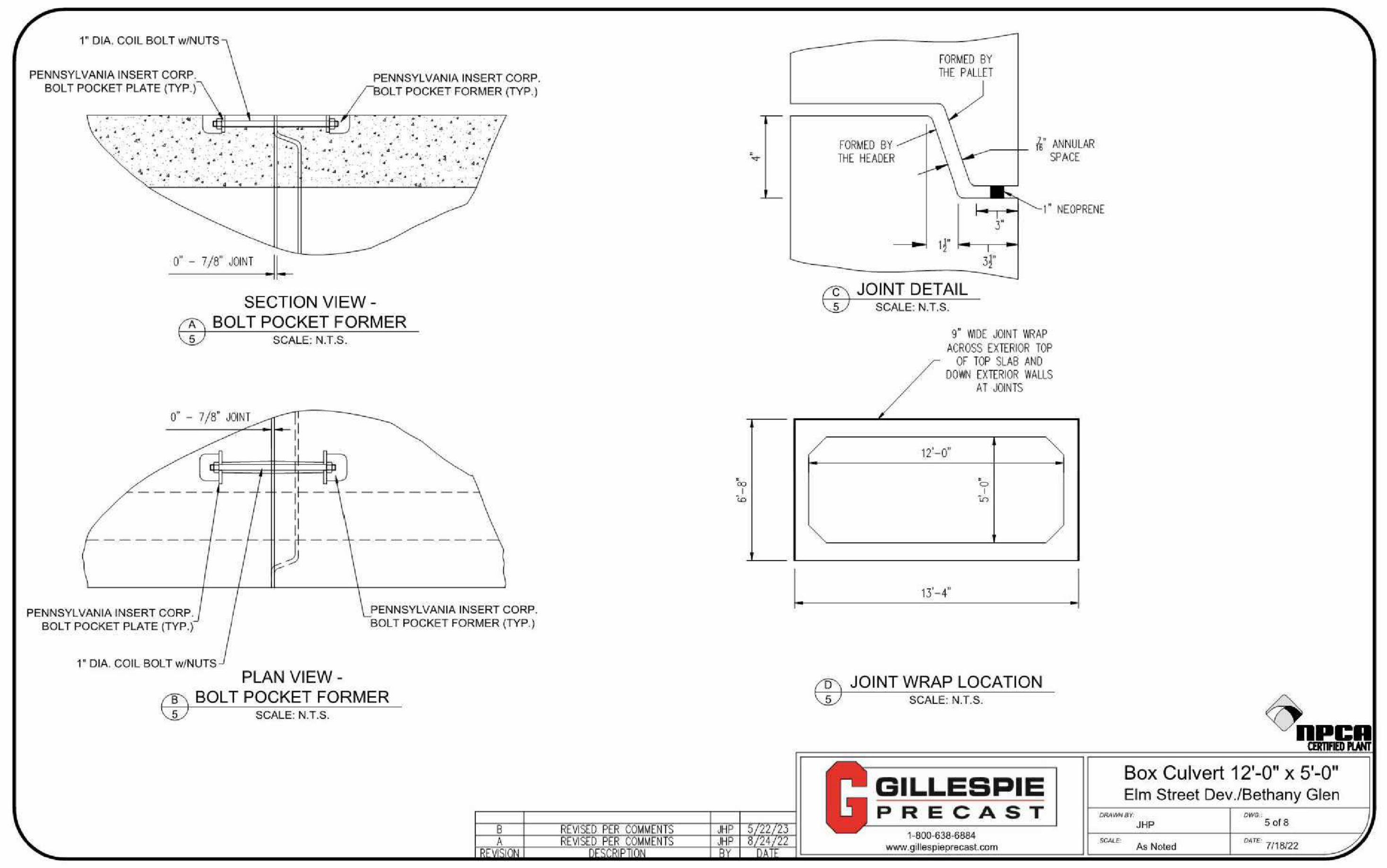


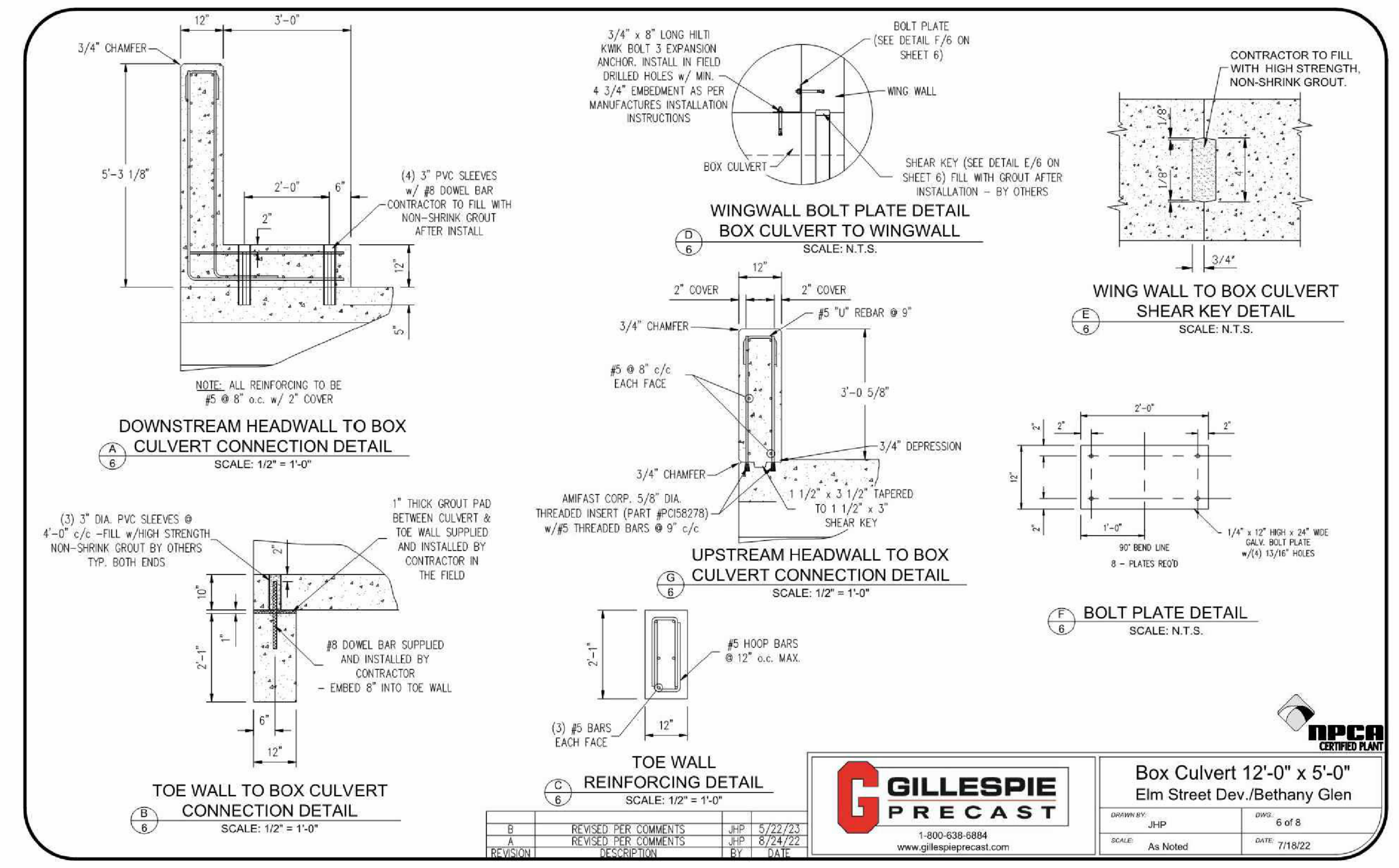


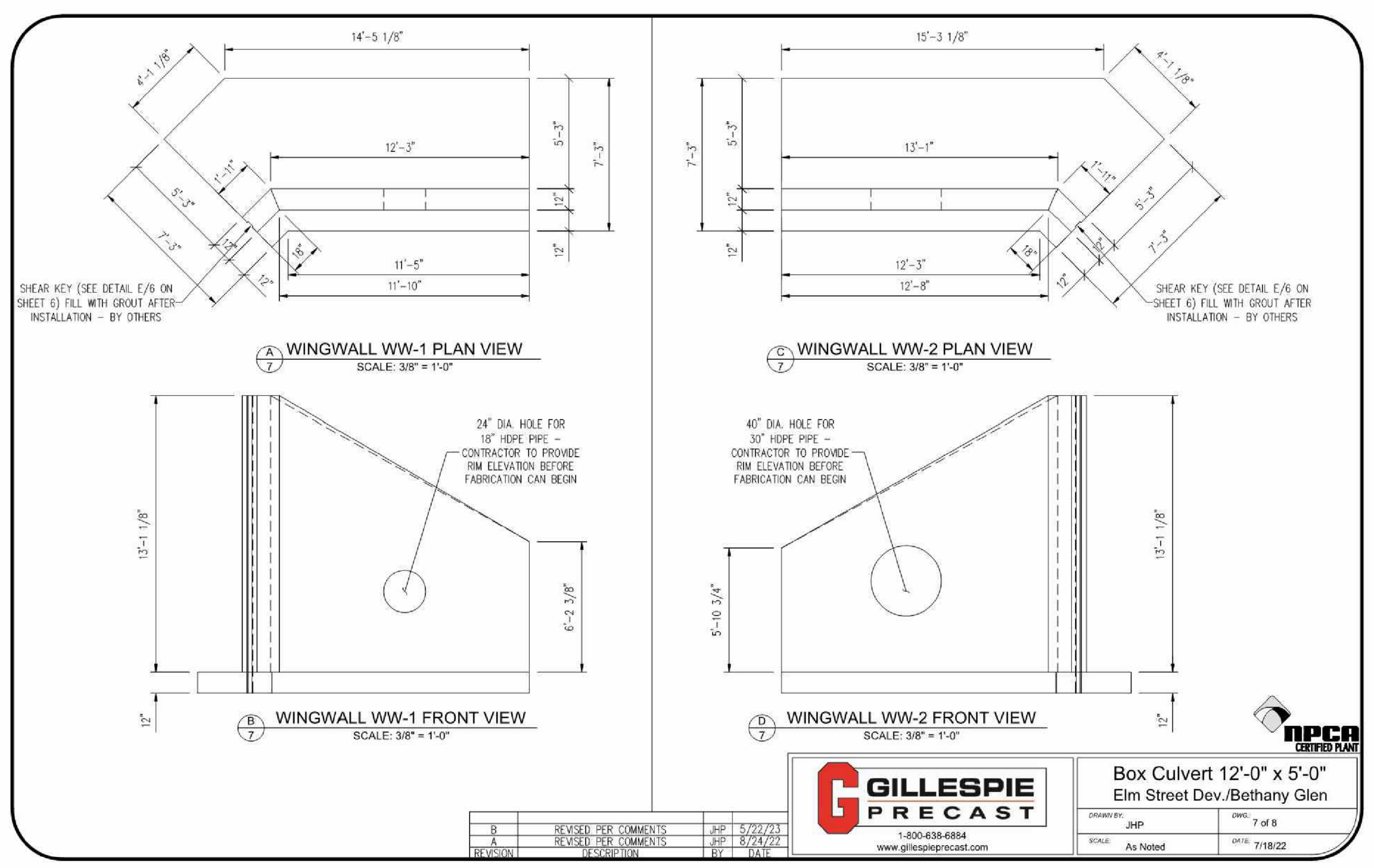
REINFORCING REQUIRED			
AREAS OF STEEL FOR WWR (GRADE 80)			REBAR (GRADE 60)
MARK NO.	AREA REQ'D	SPACING	REBAR REQ'D
As1	0.327 in²/ft	2"	#5 @ 8" o.c.
As2	0.510 in²/ft	2"	#6 @ 6" o.c.
As3	0.540 in²/ft	2"	#6 @ 6" o.c.
As4	0.195 in²/ft	4"	#4 @ 8" o.c.
As5	0.068 in²/ft	8"	#4 @ 12" o.c.
As6	0.068 in²/ft	8"	#4 @ 12" o.c.
As7	0.240 in²/ft	4"	#4 @ 8" o.c.
As8	0.240 in²/ft	4"	#4 @ 8" o.c.
Distribution	0.068 in²/ft	8"	#4 @ 12" o.c.

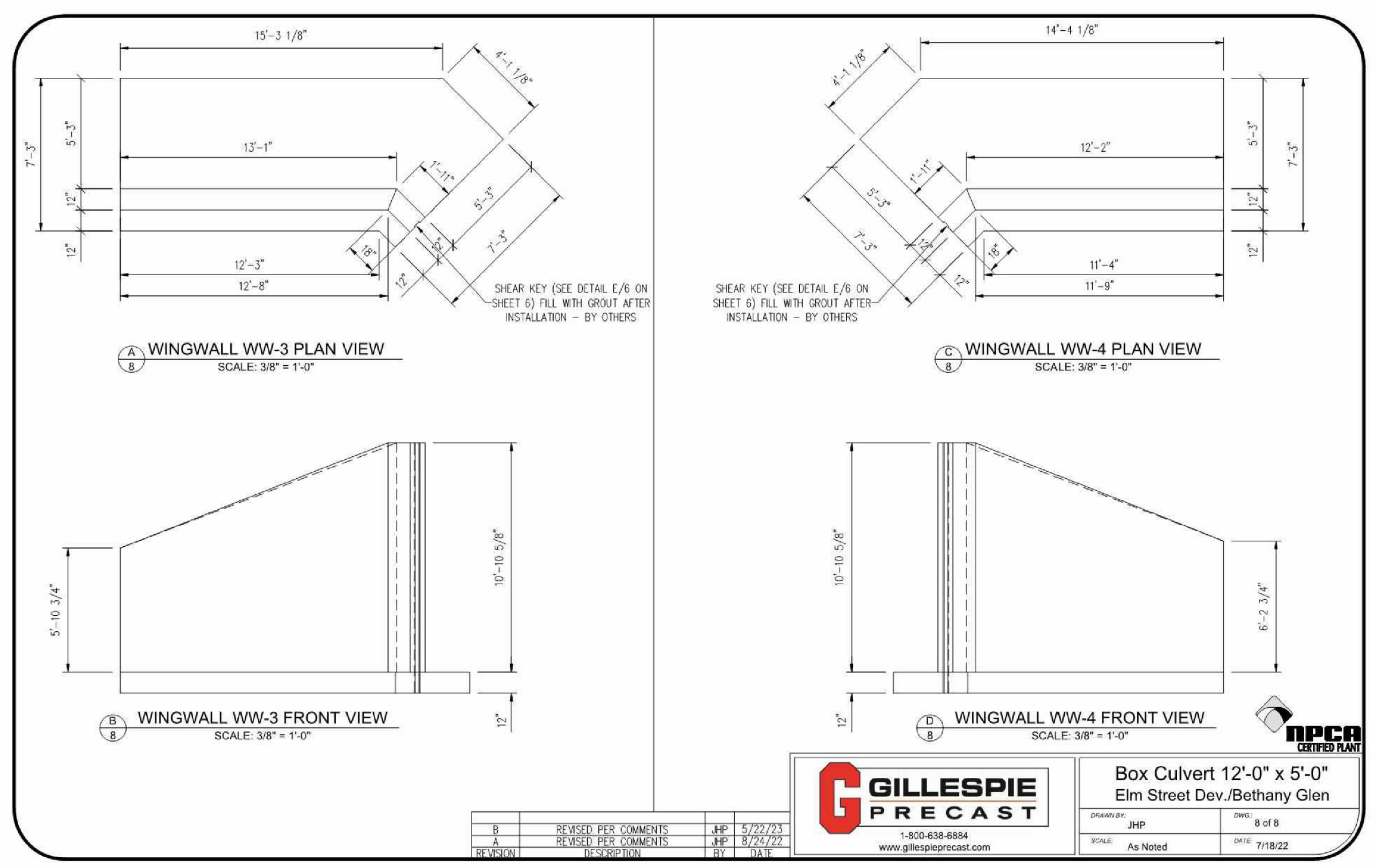
REINFORCING NOTES:
- AREAS OF STEEL SHOWN ARE MINIMUM AREAS THAT WILL BE SUPPLIED.

GILLESPIE PRECAST — Box Culvert 12'-0" x 5'-0" Elm Street Dev./Bethany Glen — 4 of 8









NOTE:

DEVELOPER TO UTILIZE CULVERT END WALL DESIGN FROM SHEETS 82 AND 83 OR FROM SHEETS 84-86 BASED ON SUPPLY CHAIN CONSTRAINTS. FINAL STRUCTURAL DRAWINGS FOR SELECTED APPROACH WILL BE SIGNED AND SEALED BY A STRUCTURAL ENGINEER.

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

DEVELOPER'S/OWNER'S LANDSCAPE CERTIFICATE

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

DEVELOPER'S / OWNER'S NAME: Jason Van Kirk — DATE: 3-12-24

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No.:
WP-19-118, ECP-19-041
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ECP-21-017, WP-21-064
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25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
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PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

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901 DULANEY VALLEY ROAD, SUITE 801
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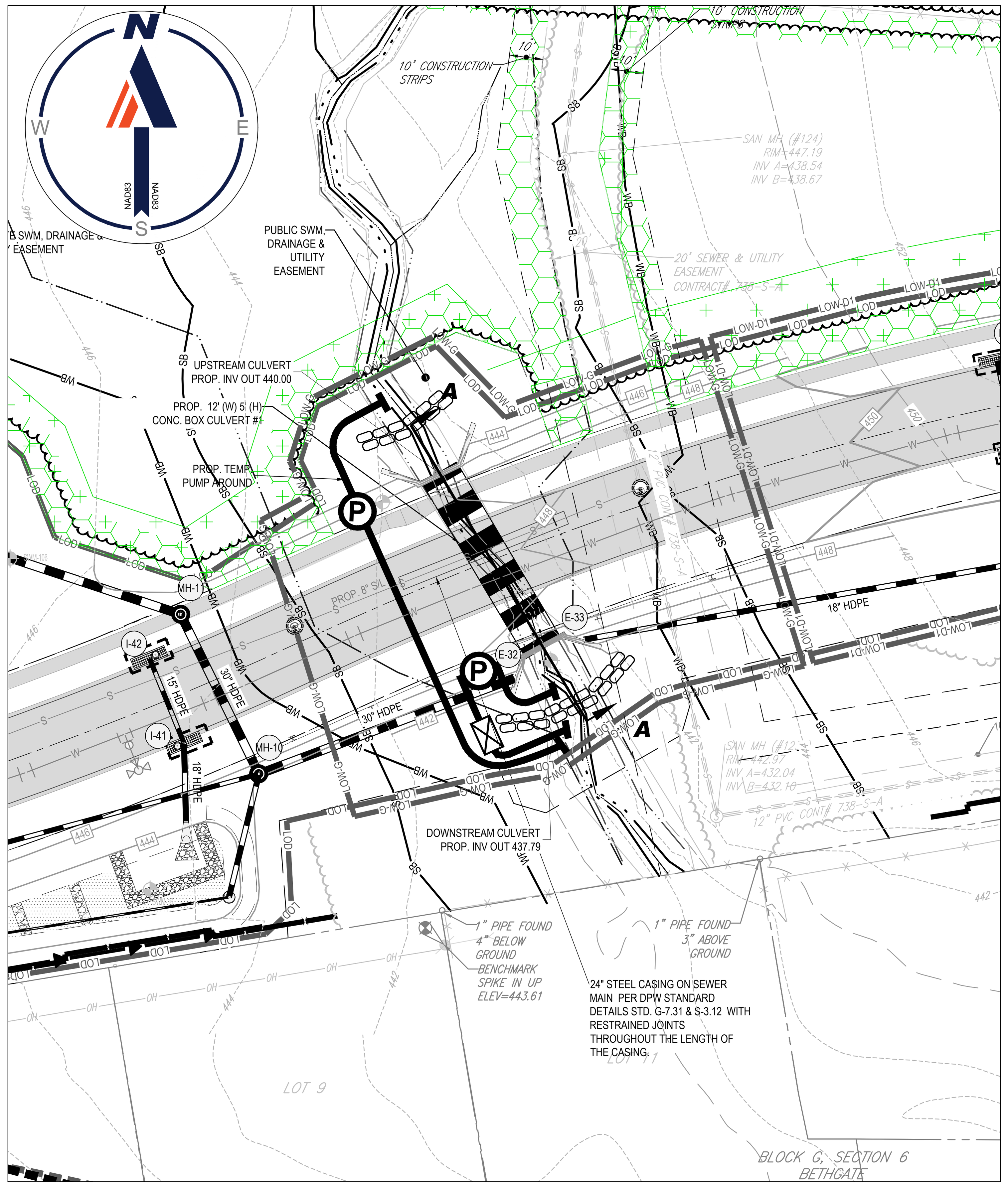
SHEET NUMBER:

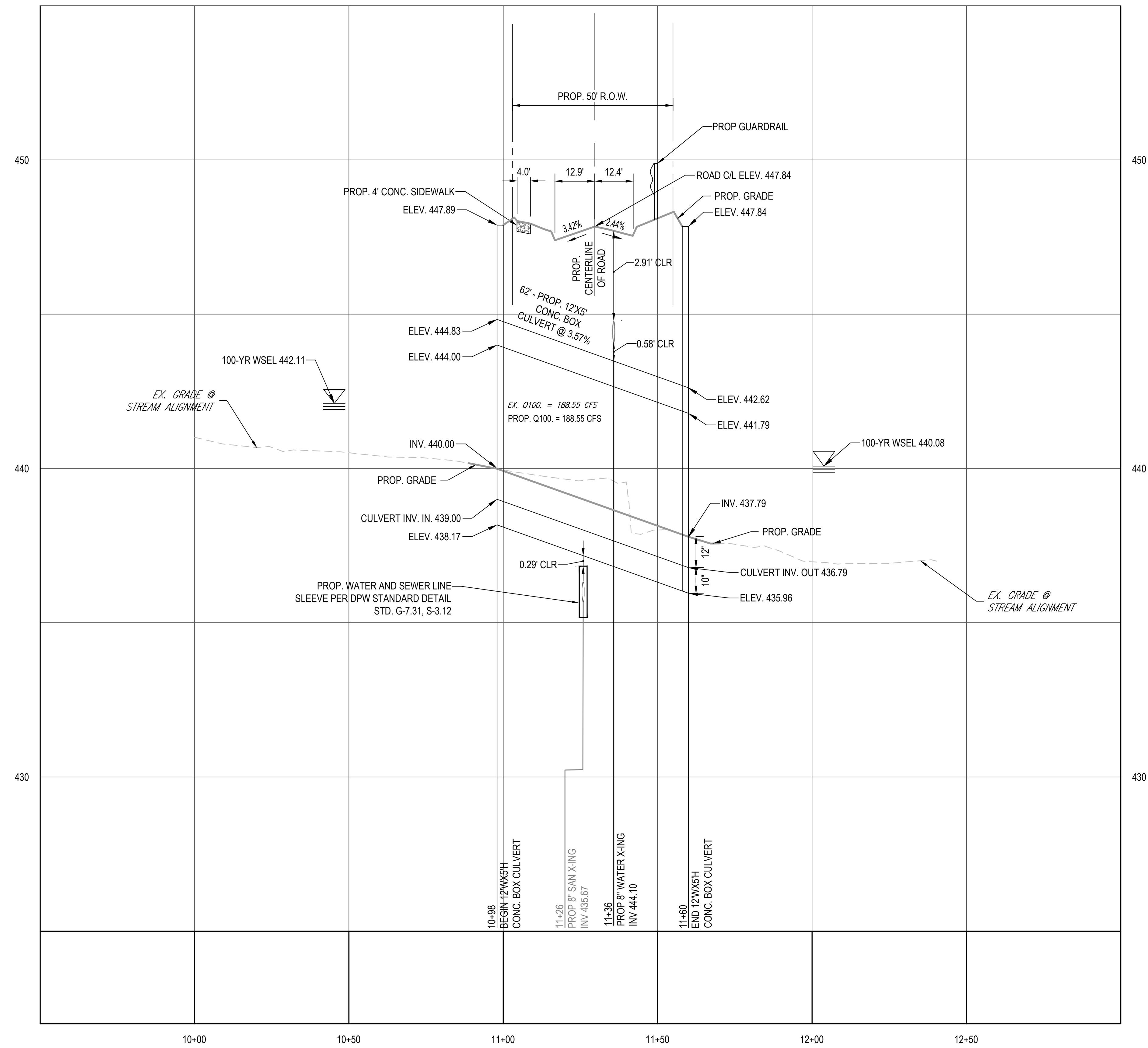
F-22-033

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



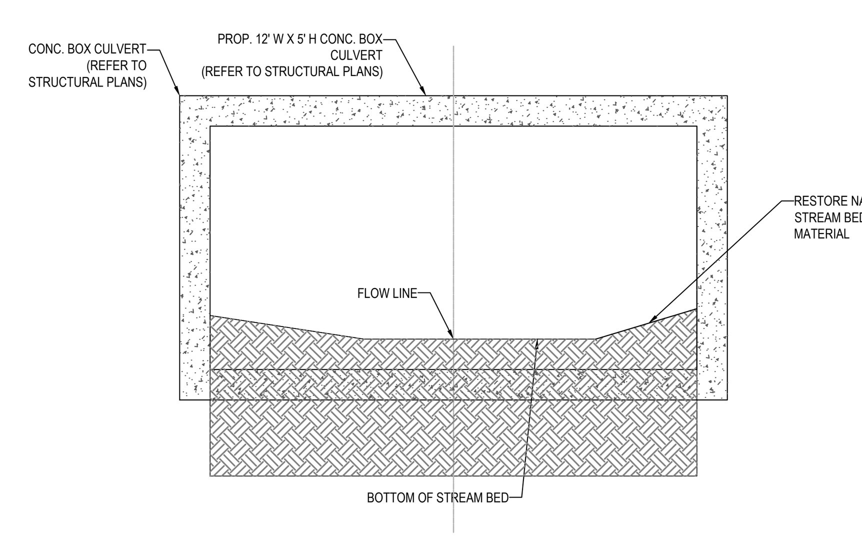
PROP CULVERT #1 - CONCRETE BOX CULVERT - PLAN VIEW

SCALE: 1 = 30'



PROP. CONCRETE BOX CULVERT #1 - SECTION A--A

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL



TYPICAL CONCRETE BOX CULVERT #1 SECTION

NOT TO SCALE

LEGEND FOR EROSION AND SEDIMENT CONTROL PRACTICES

TITLE	KEY	SYMBOL	TITLE	KEY	SYMBOL
LIMITS OF DISTURBANCE	LOD	LOD	SUPER SILT FENCE	SSF	SSF
CURB INLET PROTECTION	CIP		SAND BAG/STONE BARRIERS		
			DIVERSION DIKE		

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1) NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
2) PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
3) DO NOT USE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
4) PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
5) REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
6) RECTIFY ANY NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
7) ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (*LOLIUM MULTIFLORUM*), MILLET *(SETARIA ITALICA)*, BARLEY (*HORDEUM* SP.), OATS (*UNIOLA* SP.), AND/OR RYE (*SECALE CEREALE*). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. **KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS.** THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.
8) AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
9) TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:

   USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.

10) STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
11) CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.
12) CULVERTS SHALL BE INSPECTED BY MDE AND ACOE, AS REQUIRED.

SEQUENCE OF CONSTRUCTION CULVERT:

1. NOTIFY HOWARD COUNTY'S SEDIMENT CONTROL INSPECTOR AT 410-313-1855 AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION. (1 DAY)
2. THE GENERAL CONTRACTOR SHALL NOT COMMENCE ANY LAND DISTURBING ACTIVITIES PRIOR TO OBTAINING A GRADING PERMIT. (1 DAY)
3. THE CONTRACTOR SHALL HOLD A PRE-CONSTRUCTION MEETING WITH THE CONSTRUCTION MANAGER AND THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR PRIOR TO COMMENCING ANY LAND DISTURBING ACTIVITIES. (1 DAY)
4. ALL AREAS WHICH ARE TO BE DISTURBED SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO CONSTRUCTION. DISTURBED AREAS WITHIN THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED SHALL BE PERMANENTLY OR TEMPORARILY STABILIZED WITHIN (2 DAYS):
   a. THREE (3) CALENDAR DAYS ON SLOPES GREATER THAN 3:1, ALL WATERWAYS AND TO THE SURFACE OF ALL PERIMETER CONTROLS.
   b. SEVEN (7) CALENDAR DAYS ON ALL OTHER DISTURBED OR GRADED AREAS OF THE PROJECT.
5. INSTALL PERIMETER SUPER SILT FENCE AS SHOWN ON THE SEDIMENT CONTROL PLANS. (3 DAYS)
6. INSTALL TYPE 3 OBJECT MARKERS ON ALL (4) FOUR CORNERS OF THE CULVERT CROSSING. (1 DAY)
7. INSTALL PUMP AROUND PRACTICE AS SHOWN ON THE SEDIMENT CONTROL PLANS (REFER TO SHEETS 14-28). (2 DAYS)
8. BEGIN STREAM RESTORATION. CONTRACTOR TO ROUGH GRADE STREAM CHANNEL. (1 WEEK)
9. BEGIN INSTALLATION RETAINING WALLS AND CONCRETE BOX CULVERT (REFER TO STRUCTURAL DESIGN PLANS). (1 WEEK)
10. FINALIZE STREAM RESTORATION. UTILIZE JUTE MATTING FOR SOIL STABILIZATION. SEE STREAM RESTORATION AREA PLANTING SCHEDULE AND PLANT DETAIL FOR PROPOSED CHANNEL. (1 WEEK)
11. INSTALL PROPOSED ROAD BASE COURSE AS SHOWN ON THE ROAD PLANS. (4 WEEKS)
12. AS THE SITE IS BROUGHT TO FINAL GRADE, PERMANENTLY STABILIZE ALL DISTURBED AREAS WITHIN SEVEN (7) CALENDAR DAYS. (8 WEEKS)
13. INSTALL PERMANENT LANDSCAPING AROUND THE STREAM AND CULVERT AREAS. (1 WEEK)
14. AFTER ALL CONSTRUCTIONS HAS BEEN COMPLETED AND UPON APPROVAL FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR REMOVE SEDIMENT CONTROL MEASURES. (1 WEEK)
15. NOTIFY HOWARD COUNTY OFFICE OF INSPECTIONS AND PERMITS FOR FINAL INSPECTION OF THE COMPLETED PROJECT. (3 DAYS)

SUMMARY TABLE - CULVERT 1 (12'X5')

	2-YEARS		10-YEARS		100-YEAR	
	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
UPSTREAM W.S.E	440.91	440.92	441.30	442.05	441.98	441.86
DOWN STREAM W.S.E	438.92	438.99	439.38	439.47	440.15	439.85
UPSTREAM VELOCITY	4.00 FPS	4.17 FPS	4.78 FPS	5.21 FPS	5.25 FPS	6.15 FPS
DOWNSTREAM VELOCITY	2.42 FPS	2.59 FPS	3.64 FPS	3.89 FPS	5.89 FPS	5.13 FPS
FROUDE #	1.01	1.00	1.00	0.99	1.00	1.00

EXISTING HYDROLOGICAL AND HYDRAULIC ANALYSIS

DRAINAGE AREA	TC	RCN	Q100
AC.	0.95 HR	72	188.55 CFS

PROPOSED HYDROLOGICAL AND HYDRAULIC ANALYSIS

DRAINAGE AREA	TC	RCN	Q100
AC.	0.95 HR	72	188.55 CFS

PROPOSED FLOODPLAIN NOTE

1. THE PROPOSED FLOODPLAIN SHOWN DOES NOT IMPACT ANY ADJACENT PROPERTY OR STRUCTURES BOTH UPSTREAM AND DOWN STREAM
2. THE PROPOSED CULVERT #1 BOX CULVERT IS DESIGNED TO SAFELY CONVEY THE 100-YR. STORM WITHOUT IMPACTING ANY ADJACENT PROPERTY STRUCTURES BOTH UPSTREAM AND DOWN STREAM.

NOTES:

1. WORK PERFORMED INSIDE STREAM BUFFER, WETLAND, AND STREAM TO BE STABILIZED AT THE END OF EACH DAY.
2. PLANS REFLECT DESIGN PER STRUCTURAL DESIGN PLANS PREPARED BY HILLS-CARNES ENGINEERING ASSOCIATES, ENTITLED "CONCRETE STRUCTURE LOCATION PLANS; BETHANY PROPERTY; HOWARD COUNTY, MARYLAND" DATED 7/6/2020. PROJECT NO. G20054.
3. MDE TRACKING NO. IS 22-NT-3046.
4. SAFETY FENCE TO BE ONGUARD STARLING ALUMINUM FENCE PANELS (BLACK, 36" HIGH X 72.5" WIDE PANELS) OR APPROVED EQUIVALENT.

30 15 7.5 0 30
1"= 30'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: CHAD Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
DocuSigned by: Alexander Bratchie 65648D5BA9B64C1... 6/11/2024
HOWARD SCD — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — 3-12-24 DATE
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

ENGINEER'S CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARD THAT IT 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 COUNTY SOIL CONSERVATION DISTRICT.

SIGNATURE OF ENGINEER — 3/12/24 DATE
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER//
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.
© BOHLER

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

811 Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWTP - 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER//
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

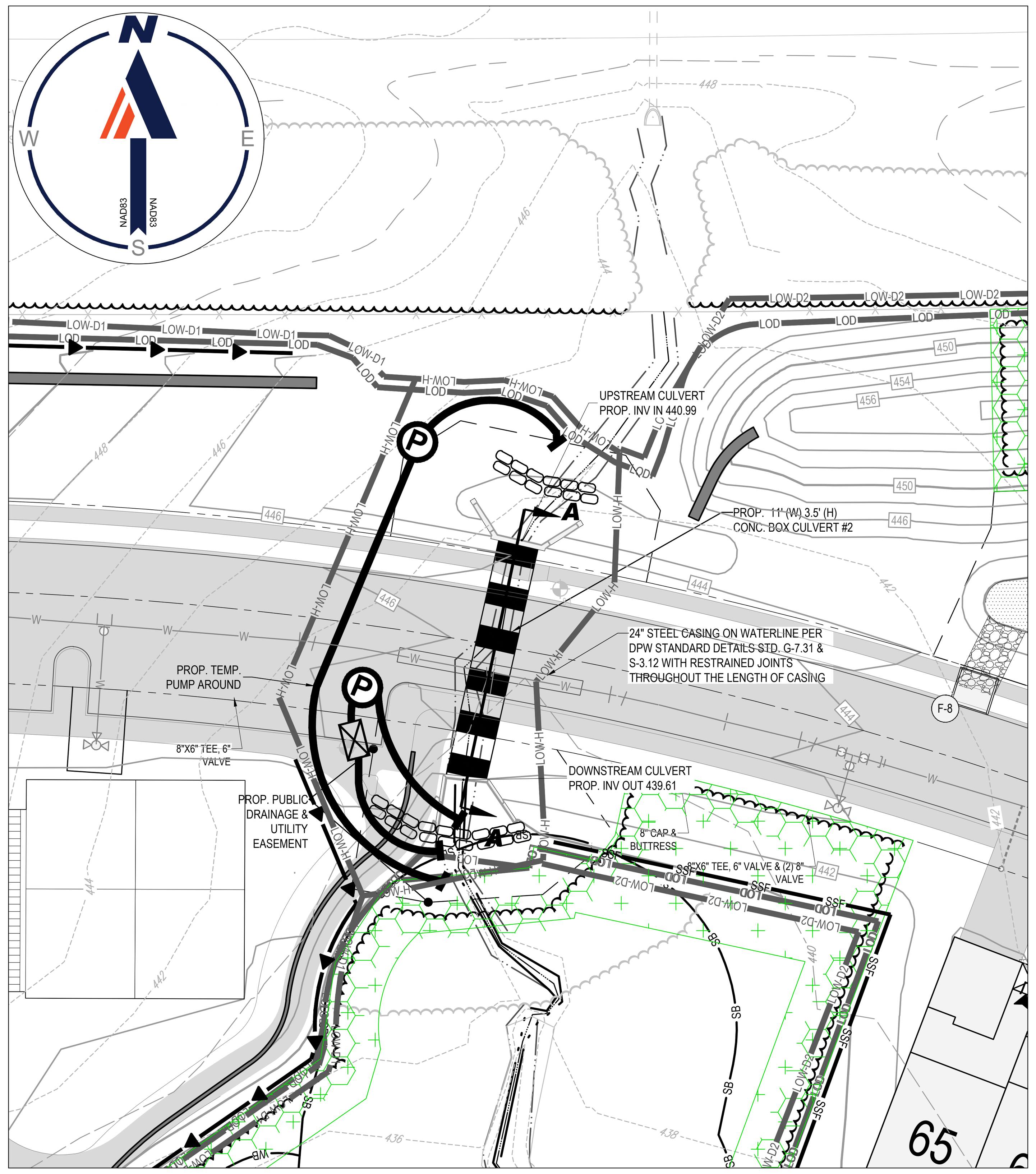
B.R. ROWE
PROFESSIONAL ENGINEER
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:
CULVERT INSTALLATION PLAN, NOTES AND PROFILE

SHEET NUMBER:

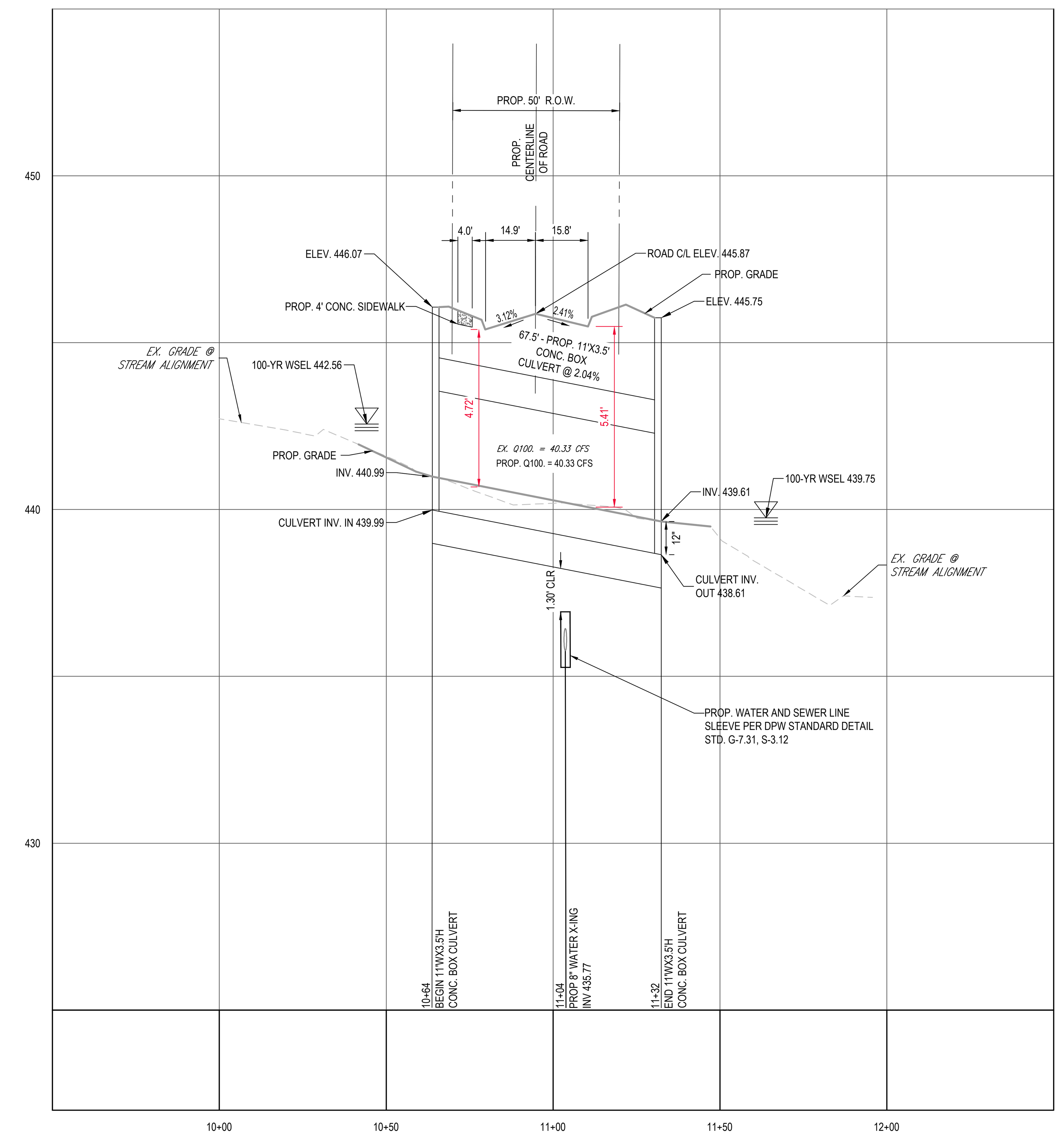
F-22-033

Apr 03, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SWTP - 2---->LAYOUT: 87 - CULVERT INSTALLATION PLAN



PROP CULVERT #2 - CONCRETE BOX CULVERT - PLAN VIEW

SCALE: 1 = 30'

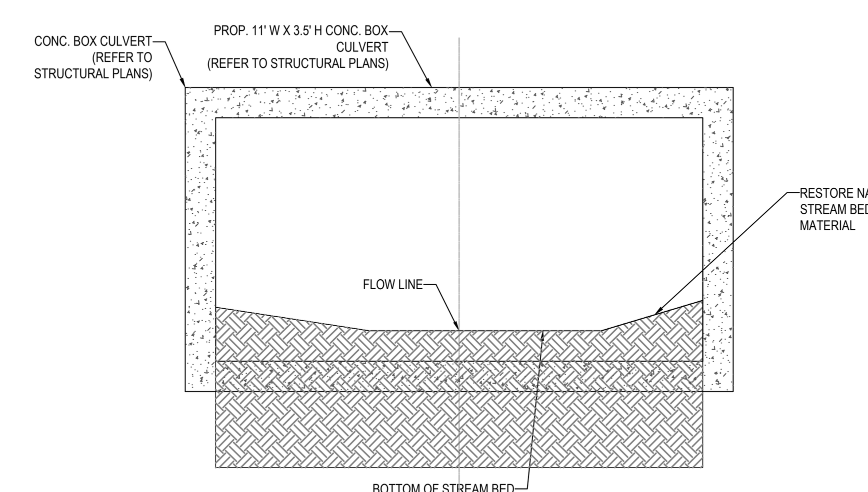


PROP. CONCRETE BOX CULVERT #2 - SECTION A-A

SCALE: 1"= 30 ' HORIZONTAL
1"= 3 ' VERTICAL

SEQUENCE OF CONSTRUCTION CULVERT:

1. NOTIFY HOWARD COUNTY'S SEDIMENT CONTROL INSPECTOR AT 410-313-1855 AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION. (1 DAY)
2. THE GENERAL CONTRACTOR SHALL NOT COMMENCE ANY LAND DISTURBING ACTIVITIES PRIOR TO OBTAINING A GRADING PERMIT. (1 DAY)
3. THE CONTRACTOR SHALL HOLD A PRE-CONSTRUCTION MEETING WITH THE CONSTRUCTION MANAGER AND THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR PRIOR TO COMMENCING ANY LAND DISTURBING ACTIVITIES. (1 DAY)
4. ALL AREAS WHICH ARE TO BE DISTURBED SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO CONSTRUCTION. DISTURBED AREAS WITHIN THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED SHALL BE PERMANENTLY OR TEMPORARILY STABILIZED WITHIN (2 DAYS):
   a. THREE (3) CALENDAR DAYS ON SLOPES GREATER THAN 3:1, ALL WATERWAYS AND TO THE SURFACE OF ALL PERIMETER CONTROLS.
   b. SEVEN (7) CALENDAR DAYS ON ALL OTHER DISTURBED OR GRADED AREAS OF THE PROJECT.
5. INSTALL PERIMETER SUPER SILT FENCE AS SHOWN ON THE SEDIMENT CONTROL PLANS. (3 DAYS)
6. INSTALL TYPE 3 OBJECT MARKERS ON ALL (4) FOUR CORNERS OF THE CULVERT CROSSING. (1 DAY)
7. INSTALL PUMP AROUND PRACTICE AS SHOWN ON THE SEDIMENT CONTROL PLANS (REFER TO SHEETS 14-28). (2 DAYS)
8. BEGIN STREAM RESTORATION. CONTRACTOR TO ROUGH GRADE STREAM CHANNEL. (1 WEEK)
9. BEGIN INSTALLATION RETAINING WALLS AND CONCRETE BOX CULVERT (REFER TO STRUCTURAL DESIGN PLANS). (1 WEEK)
10. FINALIZE STREAM RESTORATION. UTILIZE JUTE MATTING FOR SOIL STABILIZATION. SEE STREAM RESTORATION AREA PLANTING SCHEDULE AND PLANT DETAIL FOR PROPOSED CHANNEL. (1 WEEK)
11. INSTALL PROPOSED ROAD BASE COURSE AS SHOWN ON THE ROAD PLANS. (4 WEEKS)
12. AS THE SITE IS BROUGHT TO FINAL GRADE, PERMANENTLY STABILIZE ALL DISTURBED AREAS WITHIN SEVEN (7) CALENDAR DAYS. (8 WEEKS)
13. INSTALL PERMANENT LANDSCAPING AROUND THE STREAM AND CULVERT AREAS. (1 WEEK)
14. AFTER ALL CONSTRUCTIONS HAS BEEN COMPLETED AND UPON APPROVAL FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR REMOVE SEDIMENT CONTROL MEASURES. (1 WEEK)
15. NOTIFY HOWARD COUNTY OFFICE OF INSPECTIONS AND PERMITS FOR FINAL INSPECTION OF THE COMPLETED PROJECT. (3 DAYS)



TYPICAL CONCRETE BOX CULVERT #2 SECTION

NOT TO SCALE

LEGEND FOR EROSION AND SEDIMENT CONTROL PRACTICES

TITLE	KEY	SYMBOL	TITLE	KEY	SYMBOL
LIMITS OF DISTURBANCE	LOD	LOD	SUPER SILT FENCE	SSF	SSF
CURB INLET PROTECTION	CIP		SAND BAG/STONE BARRIERS		
			DIVERSION DIKE		

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1) NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
2) PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
3) DO NOT USE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
4) PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
5) REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
6) RECTIFY ANY NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
7) ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (*LOLIUM MULTIFLORUM*), MILLET (*SETARIA ITALICA*), BARLEY (*HORDEUM* SP.), OATS (*UNIOLA* SP.), AND/OR RYE (*SECALE CEREALE*). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. **KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS.** THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.
8) AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
9) TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:

   USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.

10) STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
11) CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.
12) CULVERTS SHALL BE INSPECTED BY MDE AND ACOE, AS REQUIRED.

SUMMARY TABLE - CULVERT 2 (11'X3.5')

	2-YEARS		10-YEARS		100-YEAR	
	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
UPSTREAM W.S.E	442.16	442.264	442.21	442.41	442.299	442.63
DOWN STREAM W.S.E	439.41	39.43	439.48	439.55	439.59	439.72
UPSTREAM VELOCITY	1.64 FPS	2.03 FPS	2.03 FPS	3.50 FPS	2.78 FPS	4.45 FPS
DOWNSTREAM VELOCITY	2.61 FPS	2.58 FPS	3.20 FPS	3.04 FPS	3.79 FPS	3.77 FPS
FROUDE #	1.36	1.00	1.44	1.01	1.45	1.00

EXISTING HYDROLOGICAL AND HYDRAULIC ANALYSIS

DRAINAGE AREA	TC	RCN	Q100
AC.	0.98 HR	73	40.33 CFS

PROPOSED HYDROLOGICAL AND HYDRAULIC ANALYSIS

DRAINAGE AREA	TC	RCN	Q100
AC.	0.98 HR	73	40.33 CFS

PROPOSED FLOODPLAIN NOTE

1. THE PROPOSED FLOODPLAIN SHOWN DOES NOT IMPACT ANY ADJACENT PROPERTY OR STRUCTURES BOTH UPSTREAM AND DOWN STREAM
2. THE PROPOSED CULVERT #2 BOX CULVERT IS DESIGNED TO SAFELY CONVEY THE 100-YR. STORM WITHOUT IMPACTING ANY ADJACENT PROPERTY STRUCTURES BOTH UPSTREAM AND DOWN STREAM.

NOTES:

1. WORK PERFORMED INSIDE STREAM BUFFER, WETLAND, AND STREAM TO BE STABILIZED AT THE END OF EACH DAY.
2. PLANS REFLECT DESIGN PER STRUCTURAL DESIGN PLANS PREPARED BY HILLS-CARNES ENGINEERING ASSOCIATES, ENTITLED "CONCRETE STRUCTURE LOCATION PLANS; BETHANY PROPERTY; HOWARD COUNTY, MARYLAND" DATED 7/6/2020. PROJECT NO. G20054.
3. MDE TRACKING NO. IS 22-NT-3046.
4. SAFETY FENCE TO BE ONGUARD STARLING ALUMINUM FENCE PANELS (BLACK, 36" HIGH X 72.5" WIDE PANELS) OR APPROVED EQUIVALENT.

30 15 7.5 0 30
1"= 30'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

APPROVED: DEPARTMENT OF PUBLIC WORKS
DocuSigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
DocuSigned by: Chad Edmondson 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
DocuSigned by: Alexander Bratchie 6/11/2024
HOWARD SCD — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

"I/WE HEREBY 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 THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."

SIGNATURE OF DEVELOPER — DATE 3-12-24
Jason Van Kirk, V.P.
PRINTED NAME & TITLE

ENGINEER'S CERTIFICATE

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARD THAT IT 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 COUNTY SOIL CONSERVATION DISTRICT.

SIGNATURE OF ENGINEER — DATE 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
WP-19-118, ECP-19-041
BA-CASE NO. 17-018C
ECP-21-017, WP-21-064
SP-19-005, F-22-033, WP-21-127
25-5109-D, 688-D-W & S, SP-21-002

OWNER / DEVELOPER:
BETHANY GLEN DEVELOPMENT, INC.
5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MD152018
DRAWN BY:	AVG
CHECKED BY:	TG
DATE:	03/08/24
CAD I.D.:	SWTP - 2

PROJECT:
FINAL ROAD CONSTRUCTION PLAN
FOR
BETHANY GLEN - ARAH
SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

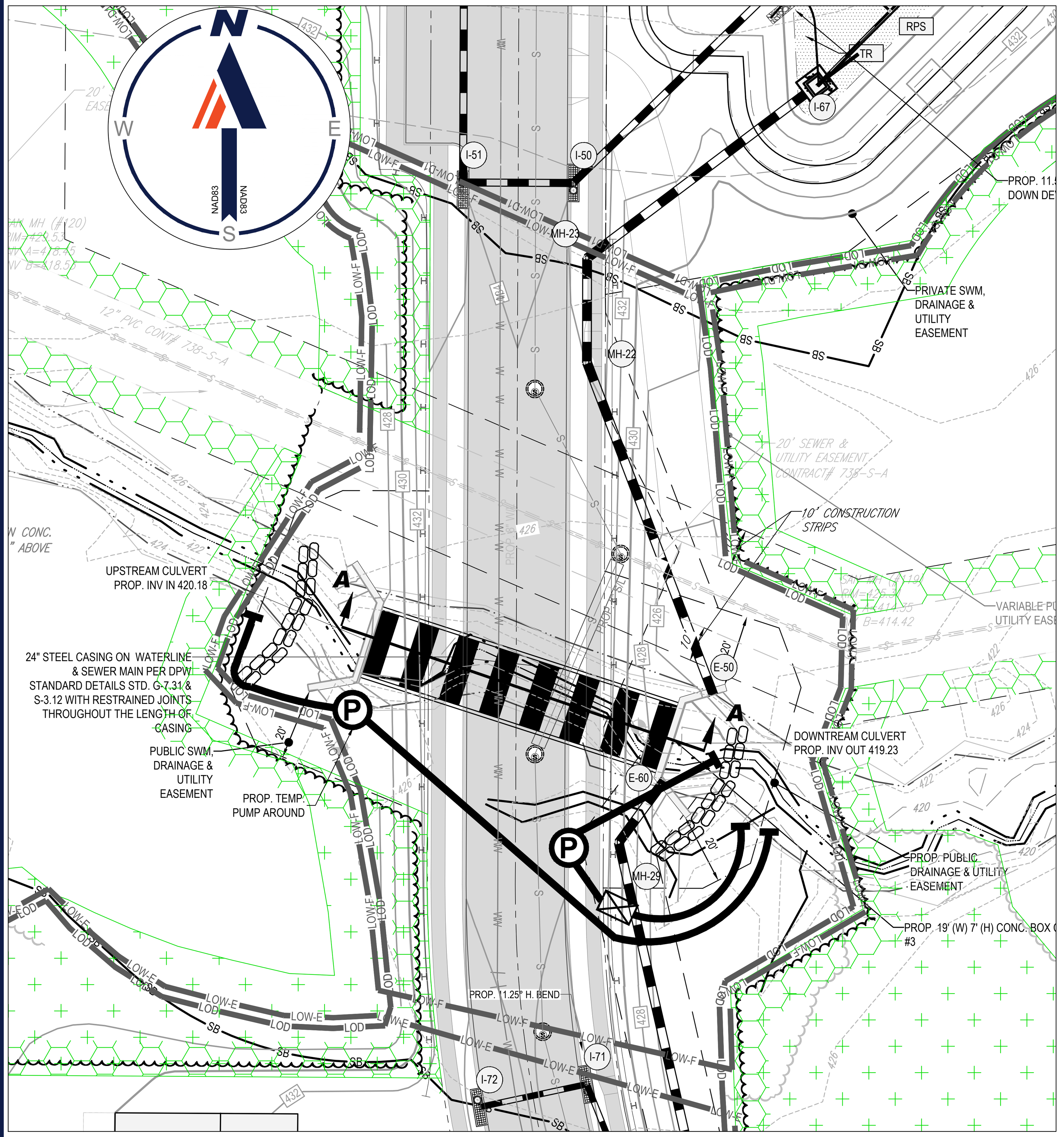
SHEET TITLE:
CULVERT INSTALLATION PLAN, NOTES AND PROFILE

SHEET NUMBER:

F-22-033

Mar 12, 2024 H:\15\MD152018\DRAWINGS\PLAN SETS\FINAL PLAN\MD152018 - SWTP - 2---->LAYOUT: 88 - CULVERT INSTALLATION PLAN

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

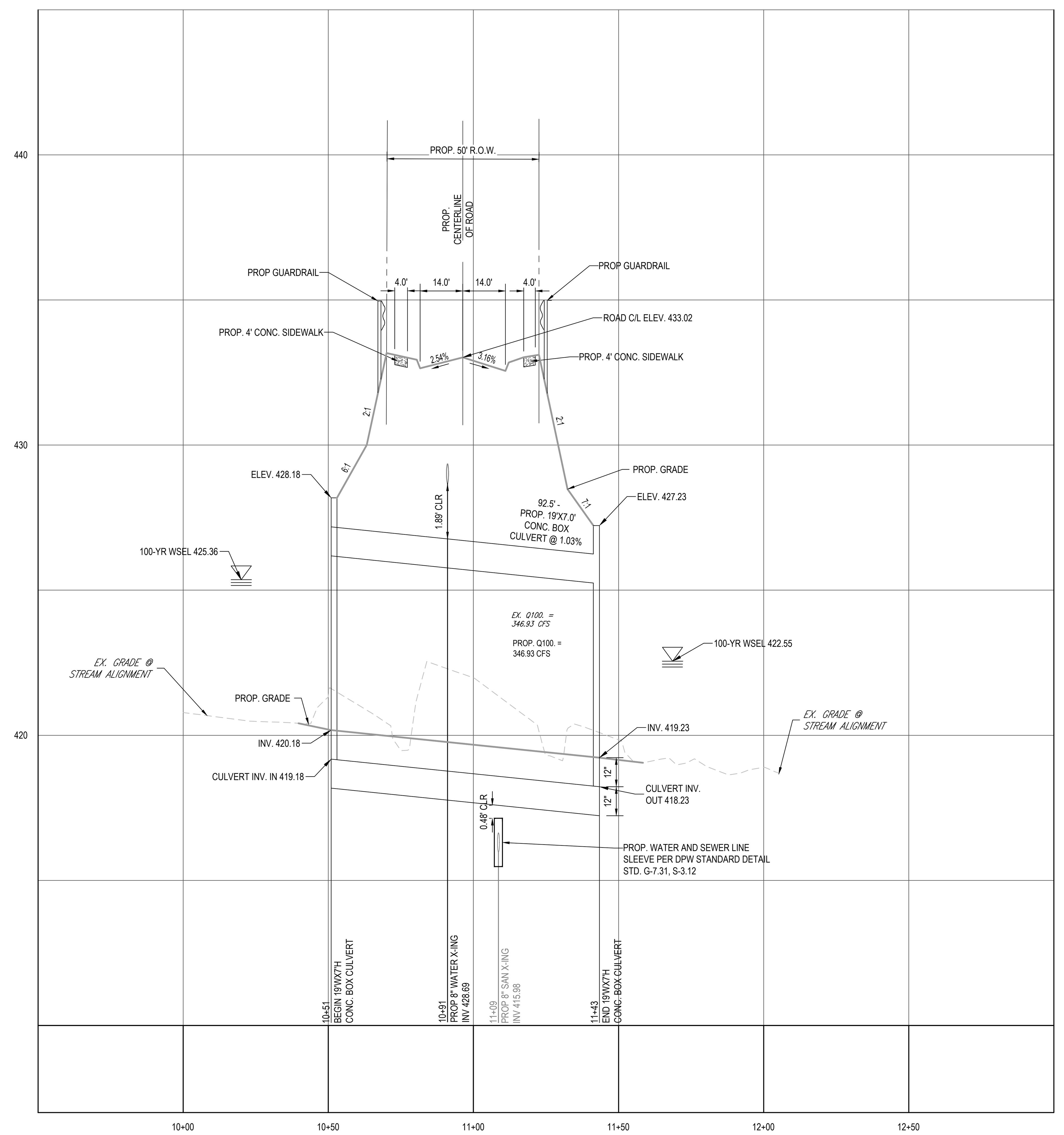


PROP CULVERT #3 - CONCRETE BOX CULVERT - PLAN VIEW

SCALE: 1 = 30'

LEGEND FOR EROSION AND SEDIMENT CONTROL PRACTICES

TITLE	KEY	SYMBOL	TITLE	KEY	SYMBOL
LIMITS OF DISTURBANCE	LOD	LOD	SUPER SILT FENCE	SSF	SSF
CURB INLET PROTECTION	CIP		SAND BAG/STONE BARRIERS		
			DIVERSION DIKE		



PROP. CONCRETE BOX CULVERT #3 - SECTION A-A

SCALE: 1"= 30' HORIZONTAL
1"= 3' VERTICAL

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1) NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
2) PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
3) DO NOT USE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
4) PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
5) REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
6) RECTIFY ANY NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
7) ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (*LOLIUM MULTIFLORUM*), MILLET (*SETARIA ITALICA*), BARLEY (*HORDEUM* SP.), OATS (*UNIOLA* SP.), AND/OR RYE (*SECALE CEREALE*). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. **KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS.** THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.
8) AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
9) TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:

USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.

10) STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
11) CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.
12) CULVERTS SHALL BE INSPECTED BY MDE AND ACOE, AS REQUIRED.

SEQUENCE OF CONSTRUCTION CULVERT:

1. NOTIFY HOWARD COUNTY'S SEDIMENT CONTROL INSPECTOR AT 410-313-1855 AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION. (1 DAY)
2. THE GENERAL CONTRACTOR SHALL NOT COMMENCE ANY LAND DISTURBING ACTIVITIES PRIOR TO OBTAINING A GRADING PERMIT. (1 DAY)
3. THE CONTRACTOR SHALL HOLD A PRE-CONSTRUCTION MEETING WITH THE CONSTRUCTION MANAGER AND THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR PRIOR TO COMMENCING ANY LAND DISTURBING ACTIVITIES. (1 DAY)
4. ALL AREAS WHICH ARE TO BE DISTURBED SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO CONSTRUCTION. DISTURBED AREAS WITHIN THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED SHALL BE PERMANENTLY OR TEMPORARILY STABILIZED WITHIN (2 DAYS):
   a. THREE (3) CALENDAR DAYS ON SLOPES GREATER THAN 3:1, ALL WATERWAYS AND TO THE SURFACE OF ALL PERIMETER CONTROLS.
   b. SEVEN (7) CALENDAR DAYS ON ALL OTHER DISTURBED OR GRADED AREAS OF THE PROJECT.
5. INSTALL PERIMETER SUPER SILT FENCE AS SHOWN ON THE SEDIMENT CONTROL PLANS. (3 DAYS)
6. INSTALL TYPE 3 OBJECT MARKERS ON ALL (4) FOUR CORNERS OF THE CULVERT CROSSING. (1 DAY)
7. INSTALL PUMP AROUND PRACTICE AS SHOWN ON THE SEDIMENT CONTROL PLANS (REFER TO SHEETS 14-28). (2 DAYS)
8. BEGIN STREAM RESTORATION. CONTRACTOR TO ROUGH GRADE STREAM CHANNEL. (1 WEEK)
9. BEGIN INSTALLATION RETAINING WALLS AND CONCRETE BOX CULVERT (REFER TO STRUCTURAL DESIGN PLANS). (1 WEEK)
10. FINALIZE STREAM RESTORATION. UTILIZE JUTE MATTING FOR SOIL STABILIZATION. SEE STREAM RESTORATION AREA PLANTING SCHEDULE AND PLANT DETAIL FOR PROPOSED CHANNEL. (1 WEEK)
11. INSTALL PROPOSED ROAD BASE COURSE AS SHOWN ON THE ROAD PLANS. (4 WEEKS)
12. AS THE SITE IS BROUGHT TO FINAL GRADE, PERMANENTLY STABILIZE ALL DISTURBED AREAS WITHIN SEVEN (7) CALENDAR DAYS. (8 WEEKS)
13. INSTALL PERMANENT LANDSCAPING AROUND THE STREAM AND CULVERT AREAS. (1 WEEK)
14. AFTER ALL CONSTRUCTIONS HAS BEEN COMPLETED AND UPON APPROVAL FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR REMOVE SEDIMENT CONTROL MEASURES. (1 WEEK)
15. NOTIFY HOWARD COUNTY OFFICE OF INSPECTIONS AND PERMITS FOR FINAL INSPECTION OF THE COMPLETED PROJECT. (3 DAYS)

SUMMARY TABLE - CULVERT 3 (19'X7')

	2-YEARS		10-YEARS		100-YEAR	
	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
UPSTREAM W.S.E	422.05	422.85	422.954	423.60	425.03	424.65
DOWN STREAM W.S.E	420.59	420.63	421.18	421.25	422.24	422.04
UPSTREAM VELOCITY	3.25 FPS	2.05 FPS	3.89 FPS	3.09 FPS	4.78 FPS	3.76 FPS
DOWNSTREAM VELOCITY	3.20 FPS	3.27 FPS	4.11 FPS	4.19 FPS	5.25 FPS	5.02 FPS
FROUDE #	0.53	0.28	0.51	0.37	0.43	0.40

EXISTING HYDROLOGICAL AND HYDRAULIC ANALYSIS

DRAINAGE AREA	TC	RCN	Q100
AC.	1.58 HR	72	346.93 CFS

PROPOSED HYDROLOGICAL AND HYDRAULIC ANALYSIS

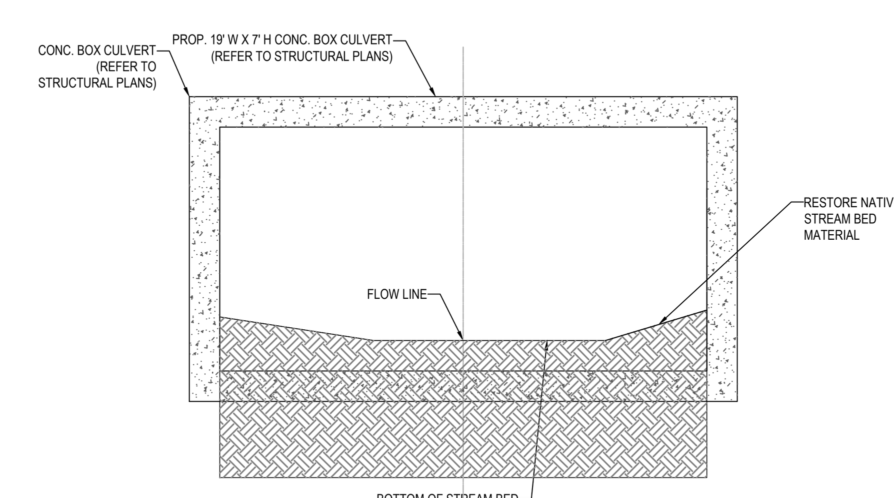
DRAINAGE AREA	TC	RCN	Q100
AC.	1.58 HR	72	346.93 CFS

PROPOSED FLOODPLAIN NOTE

1. THE PROPOSED FLOODPLAIN SHOWN DOES NOT IMPACT ANY ADJACENT PROPERTY OR STRUCTURES BOTH UPSTREAM AND DOWN STREAM.
2. THE PROPOSED CULVERT #3 BOX CULVERT IS DESIGNED TO SAFELY CONVEY THE 100-YR. STORM WITHOUT IMPACTING ANY ADJACENT PROPERTY STRUCTURES BOTH UPSTREAM AND DOWN STREAM.

NOTES:

1. WORK PERFORMED INSIDE STREAM BUFFER, WETLAND, AND STREAM TO BE STABILIZED AT THE END OF EACH DAY.
2. PLANS REFLECT DESIGN PER STRUCTURAL DESIGN PLANS PREPARED BY HILLS-CARNES ENGINEERING ASSOCIATES, ENTITLED "CONCRETE STRUCTURE LOCATION PLANS; BETHANY PROPERTY; HOWARD COUNTY, MARYLAND" DATED 7/6/2020. PROJECT NO. G20054.
3. MDE TRACKING NO. IS 22-NT-3046.
4. SAFETY FENCE TO BE ONGUARD STARLING ALUMINUM FENCE PANELS (BLACK, 36" HIGH X 72.5" WIDE PANELS) OR APPROVED EQUIVALENT.



TYPICAL CONCRETE BOX CULVERT #3 SECTION

NOT TO SCALE

30 15 7.5 0 30
1"= 30'

NOTE: A MAXIMUM OF 20 ACRES OF ACTIVE DISTURBANCE AREA WITH AN ADDITIONAL 10 ACRES OF RECENTLY STABILIZED OR TRANSITIONAL AREA IS PERMITTED. NO MORE THAN 30 ACRES, CUMULATIVELY, MAY BE DISTURBED AT ANY GIVEN TIME.

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
Alexander Bratchie — 6/11/2024
HOWARD SCD — DATE

OWNER'S/DEVELOPER'S CERTIFICATION

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SIGNATURE OF DEVELOPER — DATE: 3-12-24
PRINTED NAME & TITLE: Jason Van Kirk, V.P.

ENGINEER'S CERTIFICATE

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SIGNATURE OF ENGINEER — DATE: 3/12/24
BRANDON R. ROWE P.E. — MD. PE REGISTRATION No. 40808

SUBDIVISION NAME: BETHANY GLEN - ARAH
SECTION/AREA: SOUTH COMMUNITY NEIGHBORHOODS C, D, & E
DEED # 00226/ 00064

PREVIOUS FILE No. :
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OWNER / DEVELOPER:
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5074 DORSEY HALL ROAD, SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

TAX MAP: 17 GRID: 15 ZONED: R-20
PARCEL: 34
2ND ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
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REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

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PROJECT No.: MD152018
DRAWN BY: AVG
CHECKED BY: TG
DATE: 03/08/24
CAD I.D.: SWTP - 2

PROJECT:

FINAL ROAD CONSTRUCTION PLAN

FOR

BETHANY GLEN - ARAH

SOUTH COMMUNITY
NEIGHBORHOODS C, D, & E
LOTS 1 THRU 116 AND
OPEN SPACE LOTS 158 THRU 168
9891 OLD FREDERICK ROAD - ROUTE 99
2ND ELECTION DISTRICT
TAX MAP 17, GRID 15, PARCEL 34
HOWARD COUNTY, MARYLAND

BOHLER
901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

B.R. ROWE
PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 40808
PROFESSIONAL CERTIFICATION
I, BRANDON R. ROWE, 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. 40808, EXPIRATION DATE: 7/3/2025

SHEET TITLE:

CULVERT INSTALLATION PLAN, NOTES AND PROFILE

SHEET NUMBER:

F-22-033

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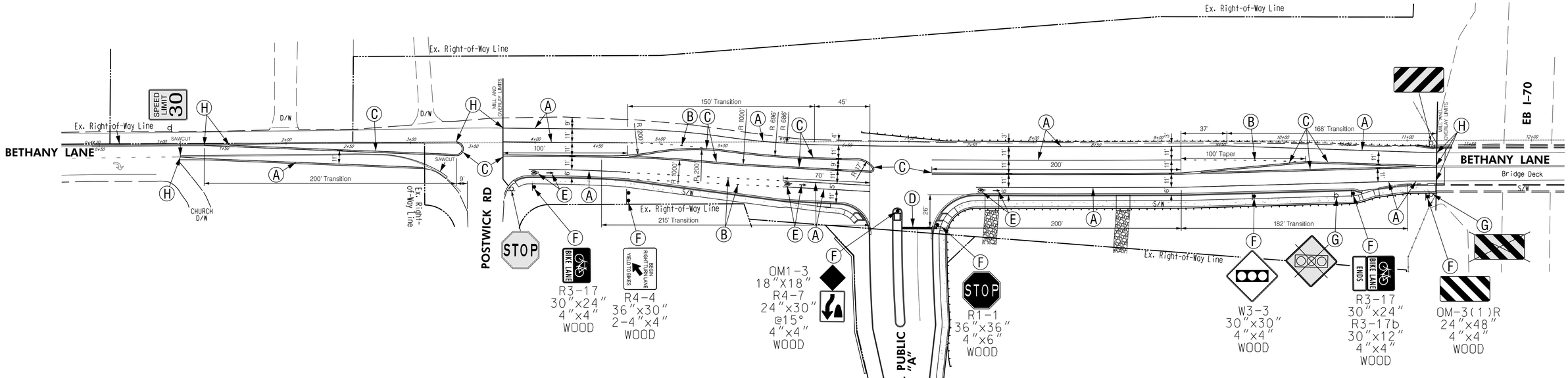

PAVEMENT MARKINGS AND SIGNS ALONG THE PUBLIC ROAD INSTALLED BY OTHERS

LEGEND

- EXISTING GEOMETRICS
- PROPOSED GEOMETRICS
- EXISTING SIGN/PROPOSED SIGN
- EXISTING SIGN TO REMAIN
- EXISTING SIGN TO BE REMOVED
- PROPOSED SIGN

CONSTRUCTION DETAILS

A. INSTALL 5 IN. SOLID WHITE THERMOPLASTIC PAVEMENT MARKING FOR LANE LINE/ EDGE LINE.
B. INSTALL 5 IN. DOTTED (2 FT. SEGMENT, 6 FT. GAP) WHITE THERMOPLASTIC PAVEMENT MARKING FOR LANE LINE.
C. INSTALL 5 IN. SOLID DOUBLE YELLOW THERMOPLASTIC PAVEMENT MARKING FOR CENTER LINE.
D. INSTALL 24 IN. SOLID WHITE THERMOPLASTIC PAVEMENT MARKING FOR STOP LINE.
E. INSTALL WHITE THERMOPLASTIC PAVEMENT MARKING SYMBOL.
F. INSTALL GROUND MOUNTED SIGN ON WOOD SUPPORT(S).
G. REMOVE EXISTING GROUND MOUNTED SIGN.
H. TIE TO EXISTING PAVEMENT MARKING.

MATERIAL LIST

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

QUANTITY	UNITS	DESCRIPTION
1950	LF	5 IN. WIDE HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING - WHITE
2600	LF	5 IN. WIDE HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING - YELLOW
26	LF	24 IN. WIDE HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING - WHITE
30	SF	HEAT APPLIED THERMOPLASTIC PAVEMENT MARKING SYMBOL (BIKE/ ARROW) - WHITE
1	EA	18 IN. X 18 IN. OM1-3 SIGN FOR GROUND MOUNTING
1	EA	24 IN. X 30 IN. R4-7 SIGN FOR GROUND MOUNTING
1	EA	36 IN. X 36 IN. R1-1 SIGN FOR GROUND MOUNTING
1	EA	36 IN. X 30 IN. R4-4 SIGN FOR GROUND MOUNTING
2	EA	30 IN. X 24 IN. R3-17 SIGN FOR GROUND MOUNTING
1	EA	30 IN. X 12 IN. R3-17b SIGN FOR GROUND MOUNTING
1	EA	30 IN. X 30 IN. W3-3 SIGN FOR GROUND MOUNTING
119	LF	4 IN. x 4 IN. WOOD SIGN SUPPORT
15	LF	4 IN. x 6 IN. WOOD SIGN SUPPORT
3	EA	REMOVE GROUND MOUNTED SIGN

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Chief, Bureau of Highways — Date 6/12/2024

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Chief, Division of Land Development — Date 6/12/2024
Chief, Development Engineering Division — Date 6/12/2024

STATE OF MARYLAND · QIANG TIAN · No. 27516 · PROFESSIONAL ENGINEER

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.: 27516
EXPIRATION DATE: 7-4-24

SCALE: 1" = 40'

The Traffic Group, Inc.
Suite H
9900 Franklin Square Drive
Baltimore, Maryland 21236
410-931-6600 1-800-583-6411 Fax: 410-931-6601
www.trafficgroup.com
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DES.: JES | DRN.: JES | CHK.: JJD

DATE	REVISION	BY	APP'R.

OWNER/DEVELOPER/LAND LEASER:
THE ESTATE OF RUTH L.HARBIN
H. MARK BOBTEK, ESQ.
P.O. BOX 66
ELLICOTT CITY, MD 21041
410-964-9700

DEVELOPER:
ELM STREET DEVELOPMENT
5074 DORSEY HALL ROAD SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

SIGNAGE AND PAVEMENT MARKING PLAN

BETHANY GLEN – ARAH
BETHANY LANE (SOUTH OF I-70)

SCALE	ZONING	TTG FILE No.
1" = 40'	R-20	2019-0205
DATE	TAX MAP – GRID	SHEET
JUNE, 2022	17 – 15	1 OF 1

BY: jstarck –

FILE: F:\2019\2019-0205_Bethany Glen (R-20)\DES\TEDD\PM HowCo 1 – Bethany Lane .dgn

F-22-033

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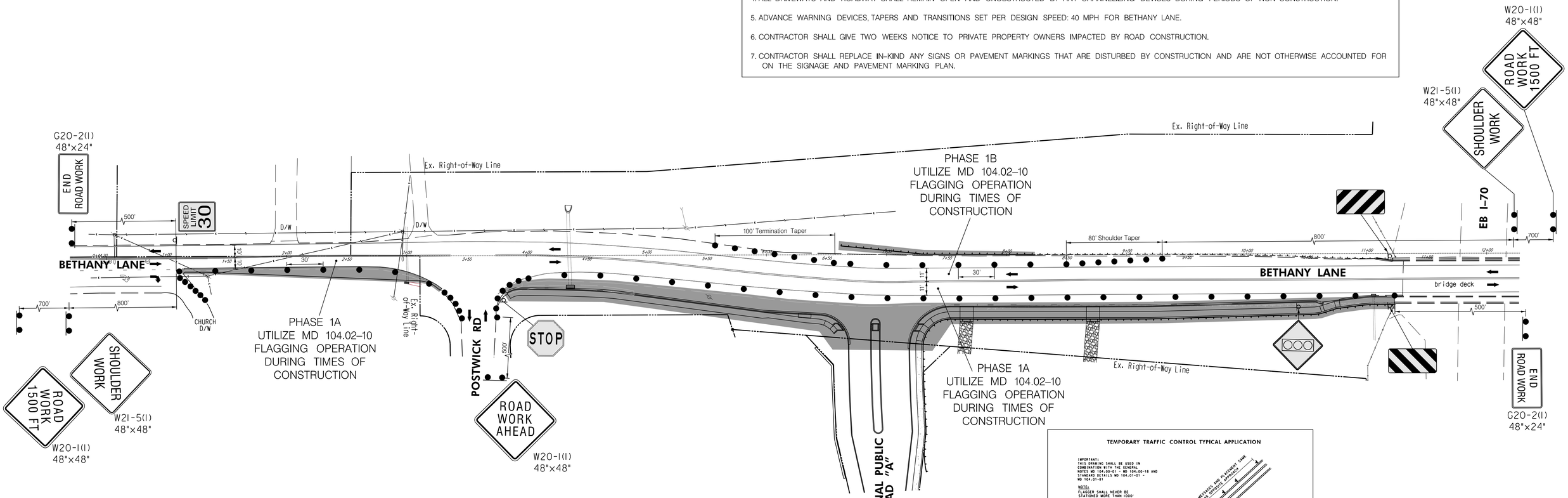
MOT GENERAL NOTES

1. 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.
2. 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.
3. CONTRACTOR SHALL RESTORE CONSTRUCTION AREA BACK TO EXISTING GRADE AT THE END OF THE WORK DAY.
4. ALL DRIVEWAYS AND ROADWAY SHALL REMAIN OPEN AND UNOBSTRUCTED BY ANY CHANNELIZING DEVICES DURING PERIODS OF NON-CONSTRUCTION.
5. ADVANCE WARNING DEVICES, TAPERS AND TRANSITIONS SET PER DESIGN SPEED: 40 MPH FOR BETHANY LANE.
6. CONTRACTOR SHALL GIVE TWO WEEKS NOTICE TO PRIVATE PROPERTY OWNERS IMPACTED BY ROAD CONSTRUCTION.
7. CONTRACTOR SHALL REPLACE IN-KIND ANY SIGNS OR PAVEMENT MARKINGS THAT ARE DISTURBED BY CONSTRUCTION AND ARE NOT OTHERWISE ACCOUNTED FOR ON THE SIGNAGE AND PAVEMENT MARKING PLAN.



SEQUENCE OF OPERATION PHASE 1A – 1B

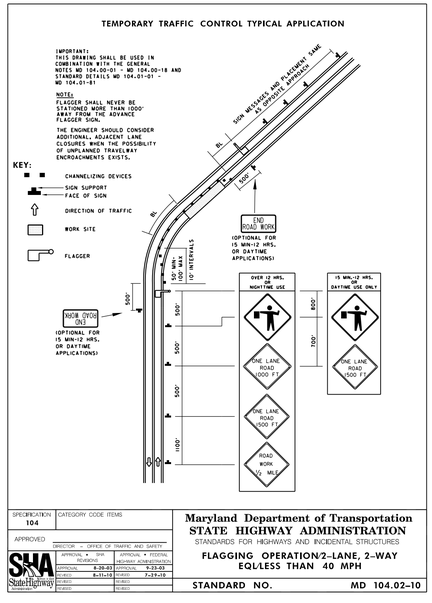
1. INSTALL ADVANCE WARNING SIGNS AND CHANNELIZING DEVICES (DRUMS) (DESIGN SPEED IS 40 MPH FOR BETHANY LANE). TRAFFIC CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL THEY ARE NO LONGER NEEDED.

PHASE 1A

2. CONSTRUCT ROADWAY IMPROVEMENTS PER THE ROADWAY PLANS PREPARED BY BOHLER ENGINEERING INCLUDING SIDEWALK, CURB AND GUTTER, NEW SITE ENTRANCE AND DRAINAGE FEATURES FROM STATION 1+15 TO 11+23.

PHASE 1B

3. CONSTRUCT ROADWAY IMPROVEMENTS PER THE ROADWAY PLANS PREPARED BY BOHLER ENGINEERING INCLUDING W-BEAM TRAFFIC BARRIER FROM STATION 6+61 TO 8+22.



LEGEND

- Area of Construction
- Direction of Traffic
- Channelizing Device (Drum)
- Temp. Traffic Sign
- Existing Sign
- Existing Geometrics
- Proposed Geometrics

40' 0 40' 80'

SCALE: 1" = 40'

MOT PHASE 1A – 1B

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Docusigned by: 6/12/2024
Chief, Bureau of Highways — Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Docusigned by: 6/12/2024
Chief, Division of Land Development — Date
Docusigned by: 6/12/2024
Chief, Development Engineering Division — Date

STATE OF MARYLAND
QIANG TIAN
No. 27516
PROFESSIONAL ENGINEER

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.: 27516
EXPIRATION DATE: 7-4-24

NOTE:
The following standards are required for this project:
MD 104.01-28 Staged Roadway Construction
MD 104.02-02 Shoulder Work/2-Lane, 2-Way EqI/less than 40 MPH
MD 104.02-10 Flagging Operation/2-Lane, 2-Way EqI/less than 40 MPH
MD 104.02-14 Intersection Flagging Operation/2-Lane, 2-Way EqI/less 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/businesswithsha/bizstdsspecs/desmanualstdpub/publicationsonline/ohd/bookstd/index.asp
All items are to be constructed in accordance with the current version of the referenced standard at the time of construction.

The Traffic Group, Inc.
Suite H
9900 Franklin Square Drive
Baltimore, Maryland 21236
410-931-6600 1-800-583-8411 Fax: 410-931-6601
www.trafficgroup.com
Merging Innovation and Excellence®

DES.: JES | DRN.: JES | CHK.: JJD

DATE	REVISION	BY	APP'R.

OWNER/DEVELOPER/LAND LEASER:
THE ESTATE OF RUTH L. HARBIN
H. MARK BOBTEK, ESQ.
P.O. BOX 66
ELLICOTT CITY, MD 21041
410-964-9700

DEVELOPER:
ELM STREET DEVELOPMENT
5074 DORSEY HALL ROAD SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

MAINTENANCE OF TRAFFIC PLAN

BETHANY GLEN – ARAH
BETHANY LANE (SOUTH OF I-70)

SCALE	ZONING	TTG FILE No.
1" = 40'	R-20	2019-0205
DATE	TAX MAP – GRID	SHEET
JUNE, 2022	17 – 15	1 OF 2

BY: jstorck –

FILE: F:\2019\2019-0205_Bethany Glen (R-20)\DES\TEDD\MOT HowCo 1 – Bethany LN.dgn

F-22-033

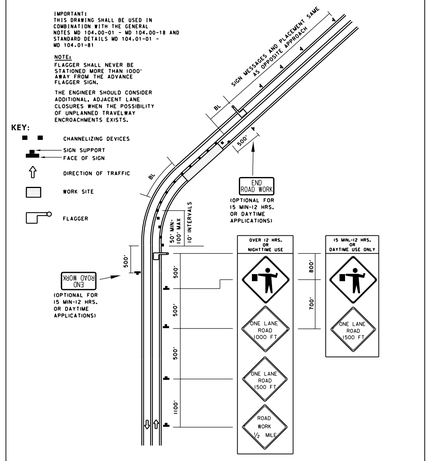
DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

IMPORTANT:
THIS DRAWING SHALL BE USED IN COMBINATION WITH THE GENERAL NOTES MD 104.00-01 - MD 104.00-18 AND STANDARD DETAILS MD 104.01-01 - MD 104.01-81

NOTE:
FLAGGER SHALL NEVER BE STATIONED MORE THAN 1000' AWAY FROM THE ADVANCE FLAGGER SIGN.

THE ENGINEER SHOULD CONSIDER ADDITIONAL ADJACENT LANE CLOSURES WHEN THE POSSIBILITY OF UNPLANNED TRAVELWAY ENCROACHMENTS EXISTS.



SPECIFICATION	CATEGORY CODE ITEMS
104	

APPROVED: DIRECTOR – OFFICE OF TRAFFIC AND SAFETY

APPROVAL • SHA REVIEW	APPROVAL • FEDERAL HIGHWAY ADMINISTRATION
APPROVAL 6-20-23	APPROVAL 9-13-23
REVISED 8-11-10	REVISED 7-27-15
REVISED	REVISED
REVISED	REVISED

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

FLAGGING OPERATION/2-LANE, 2-WAY EQL/LESS THAN 40 MPH

STANDARD NO. MD 104.02-10

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

IMPORTANT:
THIS DRAWING SHALL BE USED IN COMBINATION WITH THE GENERAL NOTES MD 104.00-01 - MD 104.00-18 AND STANDARD DETAILS MD 104.01-01 - MD 104.01-81

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FLAGGER SHALL NEVER BE STATIONED MORE THAN 1000' AWAY FROM THE ADVANCE FLAGGER SIGN.

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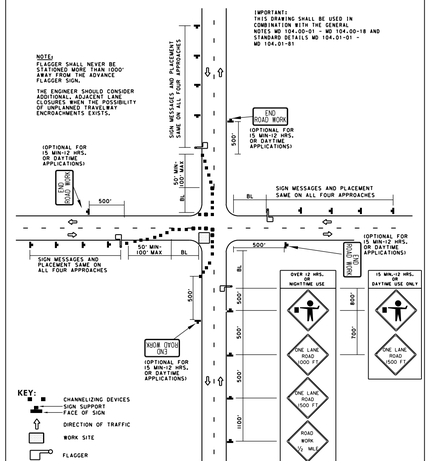


SPECIFICATION	CATEGORY CODE ITEMS
104	

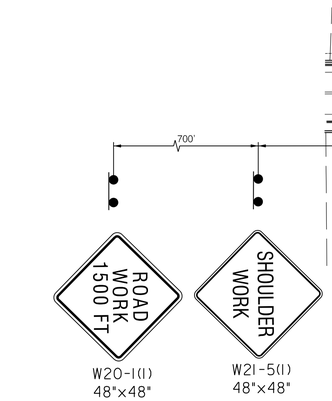
APPROVED: DIRECTOR – OFFICE OF TRAFFIC AND SAFETY

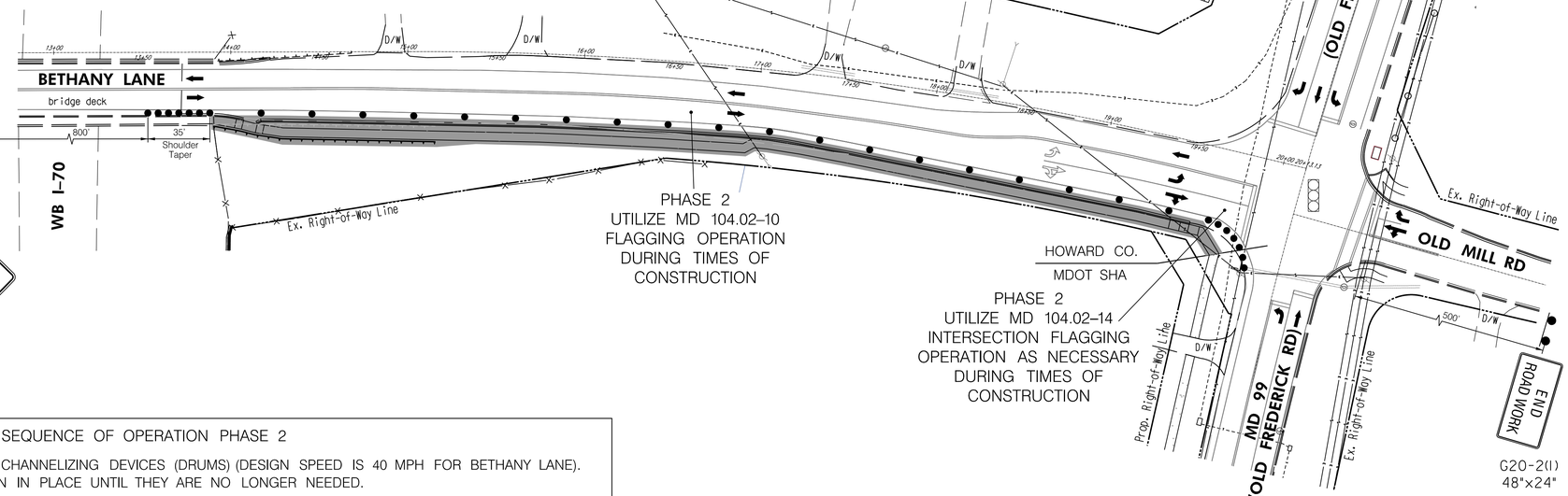
APPROVAL • SHA REVIEW	APPROVAL • FEDERAL HIGHWAY ADMINISTRATION
APPROVAL 6-20-23	APPROVAL 9-13-23
REVISED 8-11-10	REVISED 7-27-15
REVISED	REVISED
REVISED	REVISED

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

INTERSECTION FLAGGING OPERATION 2-LANE,2-WAY EQL/LESS THAN 40 MPH

STANDARD NO. MD 104.02-14





SEQUENCE OF OPERATION PHASE 2

1. INSTALL ADVANCE WARNING SIGNS AND CHANNELIZING DEVICES (DRUMS) (DESIGN SPEED IS 40 MPH FOR BETHANY LANE). TRAFFIC CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL THEY ARE NO LONGER NEEDED.

PHASE 2
2. CONSTRUCT ROADWAY IMPROVEMENTS PER THE ROADWAY PLANS PREPARED BY BOHLER ENGINEERING INCLUDING SIDEWALK AND CURB AND GUTTER FROM STATION 13+90 TO 19+75.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Docusigned by: 6/12/2024
Chief, Bureau of Highways — Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Docusigned by: 6/12/2024
Chief, Division of Land Development — Date
Docusigned by: 6/12/2024
Chief, Development Engineering Division — Date

STATE OF MARYLAND · GUANG TIAN · No. 27516 · PROFESSIONAL ENGINEER

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.: 27516
EXPIRATION DATE: 7-4-24

LEGEND
- Area of Construction
- Direction of Traffic
- Channelizing Device (Drum)
- Temp. Traffic Sign
- Existing Sign
- Existing Geometrics
- Proposed Geometrics
- Existing Traffic Signal

40' 0 40' 80'
SCALE: 1" = 40'

MOT PHASE 2

The Traffic Group, Inc.
Suite H
9900 Franklin Square Drive
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410-931-6600 1-800-583-8411 Fax: 410-931-6601
www.trafficgroup.com
Merging Innovation and Excellence®

DES.: JES DRN.: JES CHK.: JJD

DATE	REVISION	BY	APP'R.

OWNER/DEVELOPER/LAND LEASER:
THE ESTATE OF RUTH L. HARBIN
H. MARK BOBTEK, ESQ.
P.O. BOX 66
ELLICOTT CITY, MD 21041
410-964-9700

DEVELOPER:
ELM STREET DEVELOPMENT
5074 DORSEY HALL ROAD SUITE 205
ELLICOTT CITY, MD 21042
CONTACT: JASON VAN KIRK
PHONE: (410) 720-3021

MAINTENANCE OF TRAFFIC PLAN

BETHANY GLEN – ARAH
BETHANY LANE (NORTH OF I-70)

SCALE	ZONING	TTG FILE No.
1" = 40'	R-20	2019-0205
DATE	TAX MAP – GRID	SHEET
JUNE, 2022	17 – 15	2 OF 2

SP-21-002

BY: jstorck –

FILE: F:\2019\2019-0205_Bethany Glen (R-20)\DES\TEDD\MOT HowCo 2 – Bethany LN.dgn

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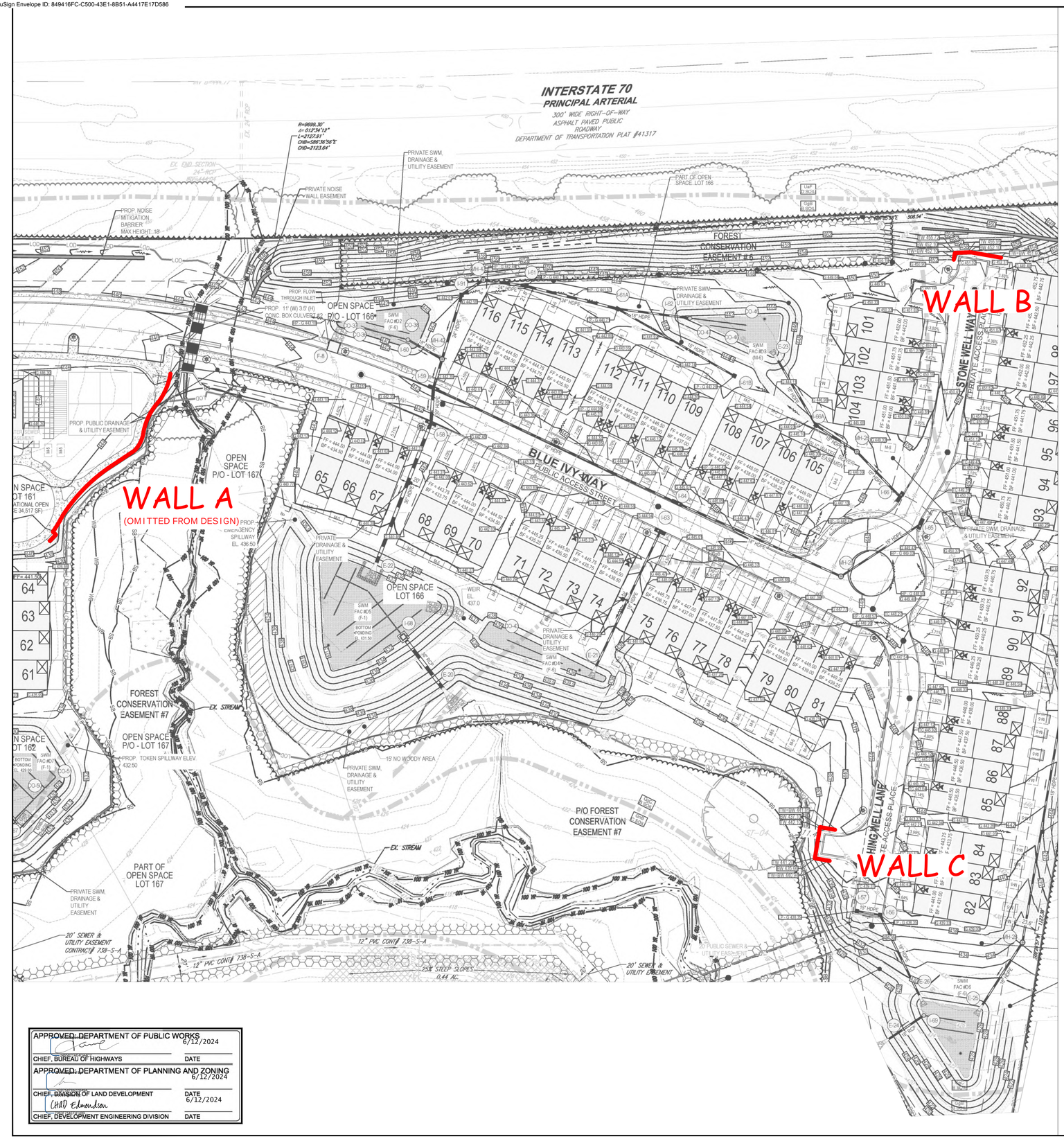


APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

GENERAL NOTES

1. CONSTRUCTION OF THE RETAINING WALLS SHOWN ON THIS PLAN SHALL BE PERFORMED UNDER THE OBSERVATION OF THE OWNERS INDEPENDENT TESTING AGENCY (ITA).
2. IF THE ELEVATION, LOCATION, SURCHARGE LOADING , OR GRADING SURROUNDING THE RETAINING WALL CHANGES FROM THAT DEPICTED ON THESE PLANS, ECS SHALL BE NOTIFIED SO THAT MODIFICATIONS TO THE GEOTECHNICAL DESIGN CAN BE MADE, IF NECESSARY. NO MATERIAL SUBSTITUTIONS ARE PERMITTED.
3. UTILITIES WITHIN THE REINFORCED ZONE AND UTILITIES DEEPER THAN 3 FEET WITHIN THE INFLUENCE OF THE REINFORCED ZONE SHALL BE INSTALLED SIMULTANEOUSLY WITH THE MSE WALL BACKFILL.
4. UTILITIES ALONG THE TOE OF THE RETAINING WALL SHALL BE INSTALLED PRIOR TO RETAINING WALL CONSTRUCTION.

RETAINING WALL DESIGN PARAMETERS

WALL GEOMETRY	
BACK BATTER OF FACE:	8°
MINIMUM BLOCK EMBEDMENT:	SEE WALL PROFILE
WALL SURCHARGE LOADS	
VEHICLE LIVE LOAD (psf) (WALL C):	250
PEDESTRIAN LIVE LOAD (psf) (WALL B):	50
MINIMUM FACTORS OF SAFETY	
F.S. AGAINST SLIDING:	1.5
F.S. AGAINST OVERTURNING:	2.0
F.S. AGAINST BEARING CAPACITY FAILURE:	2.0
F.S. AGAINST GLOBAL INSTABILITY:	1.5
F.S. AGAINST GEOGRID PULLOUT:	1.5
SOIL WITHIN REINFORCED FILL ZONE	
DENSITY (PCF):	120
PHI (DEG):	28°
COHESION (PSF):	0
SOIL WITHIN RETAINED ZONE (WALLS B AND C)	
DENSITY (PCF):	120
PHI (DEG):	28°
COHESION (PSF):	0
SOIL WITHIN RETAINED ZONE (WALL D)	
DENSITY (PCF):	120
PHI (DEG):	28°
COHESION (PSF):	0
FOUNDATION SOIL	
DENSITY (PCF):	120
PHI (DEG):	30°
COHESION (PSF):	0
ALLOWABLE BEARING PRESSURE (PSF):	2,500 psf
LEVELING PAD:	GRADED AGGREGATE (TAMPED NO. 57 STONE)
GEOGRID DATA	
GEOGRID TYPE:	MIRAGRID 3XT
COVERAGE OF GEOGRIDS (%):	100
CREEP REDUCTION FACTOR:	1.58
DURABILITY REDUCTION FACTOR:	1.10
INSTALLATION DAMAGE REDUCTION FACTOR:	
SAND / SILT / CLAY	1.05
GEOTEXTILE TYPE:	MIRAFI 140N OR APPROVED EQUIVALENT
MODULAR BLOCK DATA	
MODULAR BLOCK SYSTEM:	KEYSTONE RETAINING WALL SYSTEM
BLOCK TYPE	KEYSTONE COMPAC III UNITS AND CORRESPONDING CAP UNITS
UNIT FILL:	GRADED AGGREGATE (NO. 57 STONE)

NOTES

1. THE DESIGN IS BASED ON SOILS HAVING A UNIFIED SOIL CLASSIFICATION SYSTEM DESIGNATION OF SM OR COARSER AND A FRICTION ANGLE OF 30° OR HIGHER FOR THE REINFORCED BACKFILL SOILS. REINFORCED FILL SHALL HAVE FINES CONTENT OF LESS THAN 35 PERCENT PASSING THE NO. 200 SIEVE, A LIQUID LIMIT OF LESS THAN 30 AND A PLASTICITY INDEX OF LESS THAN 10. THE OWNER'S ITA SHALL CONFIRM THE SOIL PROPERTIES AND SHEAR STRENGTH PARAMETERS SHOWN ON THESE PLANS PRIOR TO THE START OF WALL CONSTRUCTION. WHEN SHEAR STRENGTH TESTING IS DEEMED NECESSARY BY THE ITA, TRAIXIAL OR DIRECT SHEAR TESTING SHALL BE PERFORMED.
2. BLOCK AND/OR GEOGRID SUBSTITUTIONS SHALL NOT BE PERMITTED UNLESS APPROVED BY ECS.
3. REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.
4. RECYCLED CONCRETE IS NOT SUITABLE FOR REINFORCED FILL UNLESS REVIEWED BY ECS.
5. THE RETAINING WALL DESIGN IS BASED ON THE SUBSURFACE EXPLORATION SUMMARIZED IN THE GEOTECHNICAL REPORT DATED AUGUST 19, 2022 PREPARED BY ECS.

SCALE: 1" = 50'

25 0 50

12.5 25

N W E S

NOTE: BASE DRAWING PROVIDED BY BOHLER ENGINEERING

STATE OF MARYLAND
YOUNG C CHANG
61519
PROFESSIONAL ENGINEER

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. 61519 EXPIRATION DATE: 06-10-2025

ECS MID-ATLANTIC, LLC
1340 CHARWOOD ROAD, SUITE B
HANOVER, MARYLAND 21076
(410) 859-4300 [PHONE]
(410) 859-4324 [FAX]

"ONE FIRM ONE MISSION"

9891 OLD FREDERICK ROAD
ELLICOTT CITY, HOWARD COUNTY, MD

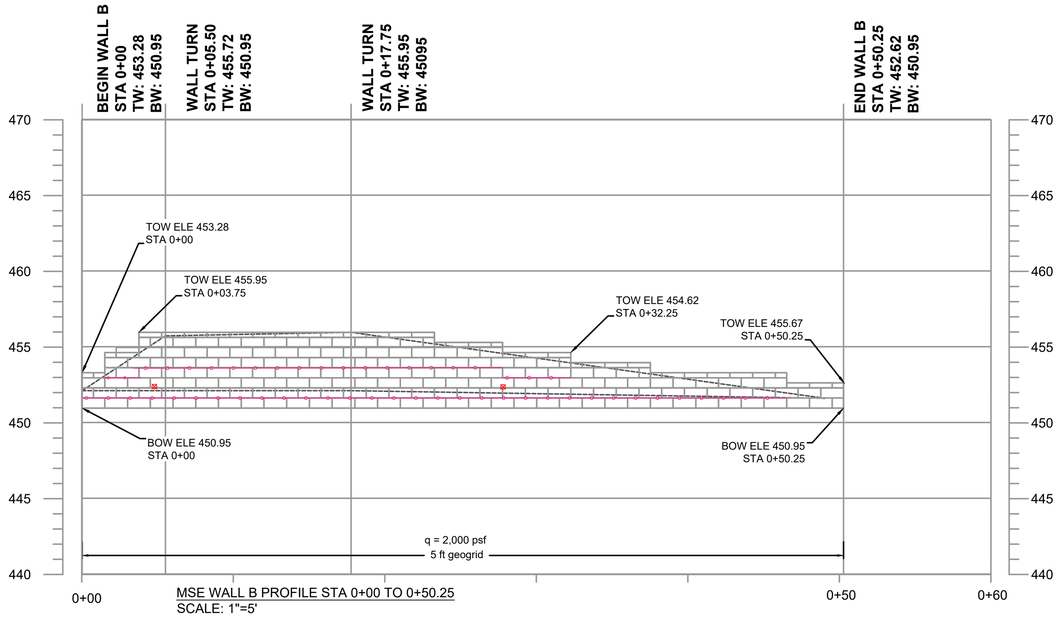
MSE WALL OVERALL SITE PLAN
BETHANY GLEN
RETAINING WALLS B AND C

ECS REVISIONS
REV 1 - 07/25/2023
REV 2 - 08/03/2023
REV 3 - 10/13/2023

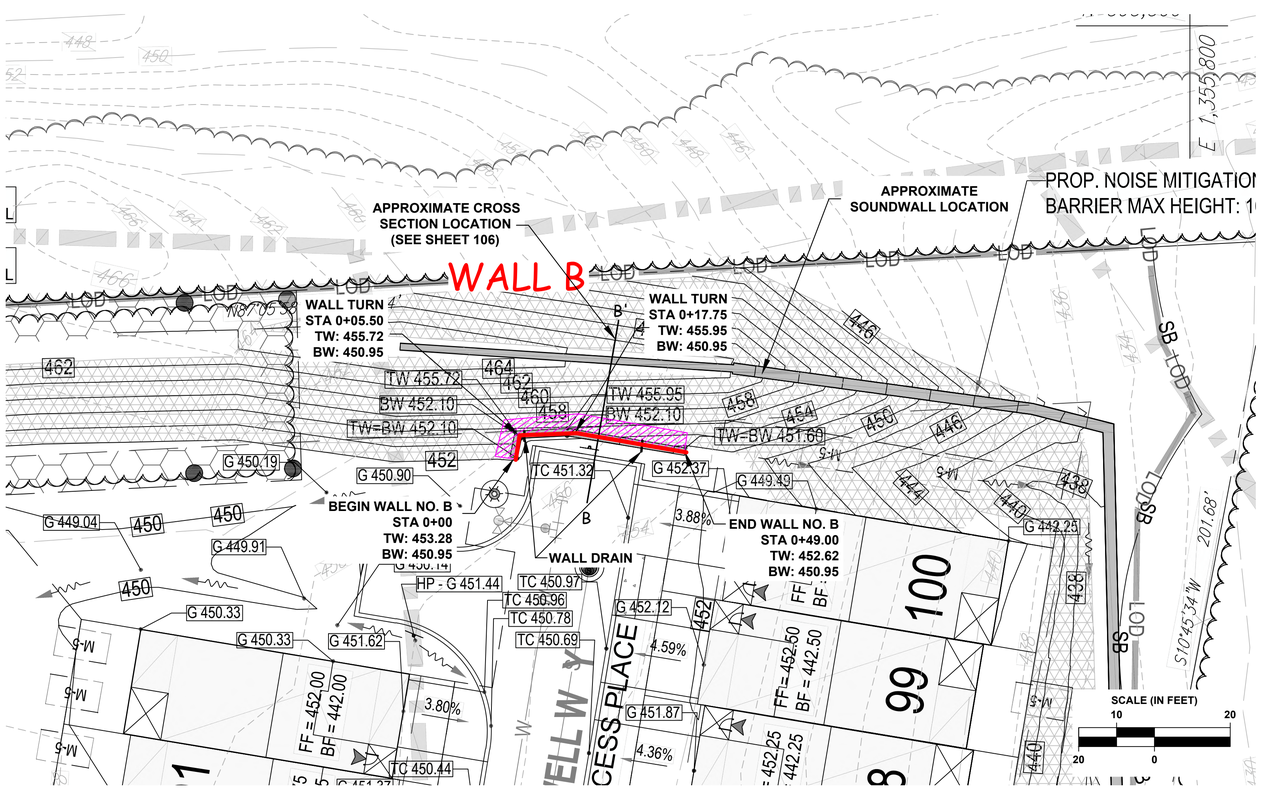
DESIGNER	DRAFTING
YCC	NAC

SCALE	AS SHOWN
PROJECT NO.	02:9597-A
SHEET	93 of 117
DATE	10/20/2022

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



MSE WALL B PROFILE STA 0+00 TO 0+50.25
SCALE: 1"=5'



LEGEND:

- TW = TOP OF WALL
- BW = BOTTOM OF WALL
- TG = TOP GRADE
- BG = BOTTOM GRADE
- q = MAXIMUM BEARING PRESSURE (PSF)
- = MIRAGRID 3XT (SECTION VIEW)
- = 4" DIA. DRAIN, 40 FT MAX SPACING
- = 8' MIRAGRID 3XT (MAP VIEW)

NOTES:

1. REFER TO SHEET 99 AND 100 FOR MSE WALL DETAILS.
2. GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.
3. REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

STATE OF MARYLAND
YCC CHANG
61519
PROFESSIONAL ENGINEER

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. 61519
EXPIRATION DATE: 06-10-2025

ECS MID-ATLANTIC, LLC
1340 CHARWOOD ROAD, SUITE B
HANOVER, MARYLAND 21076
(410) 859-4300 [PHONE]
(410) 859-4324 [FAX]

"ONE FIRM ONE MISSION"

9891 OLD FREDERICK ROAD
ELLICOTT CITY, HOWARD COUNTY, MD

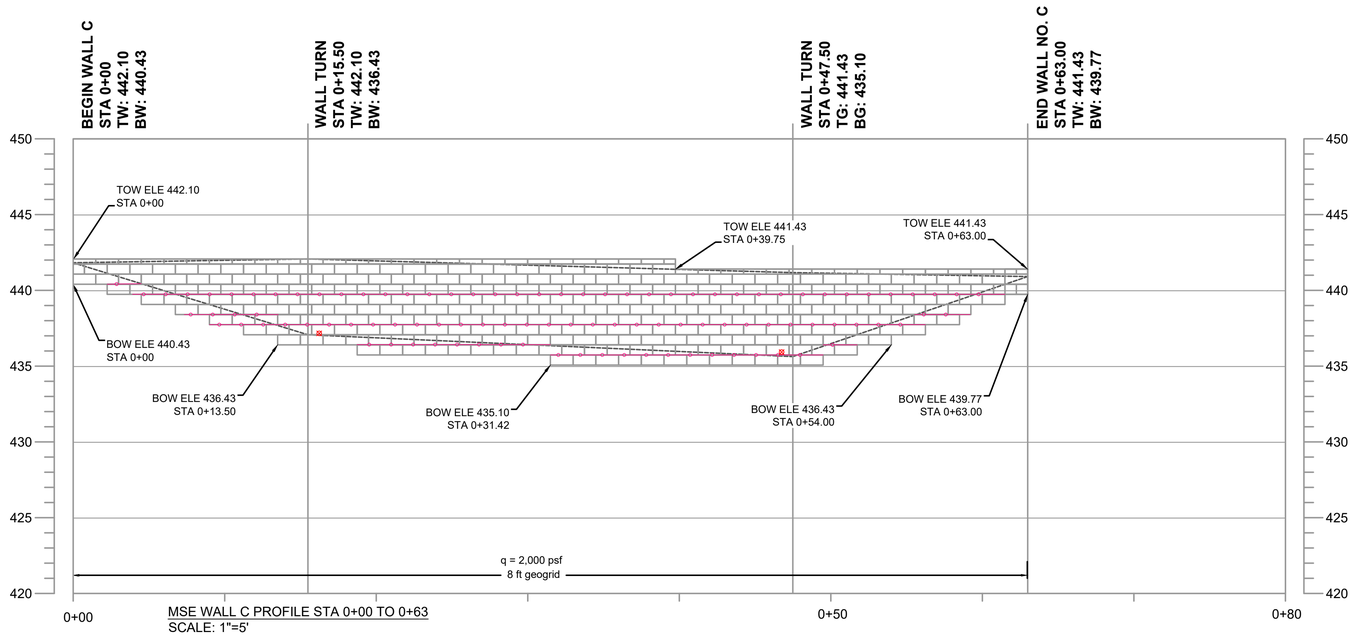
MSE WALL B PROFILE
BETHANY GLEN
RETAINING WALLS B AND C

ECS REVISIONS
REV 1 - 07/25/2023
REV 2 - 08/03/2023
REV 3 - 10/13/2023

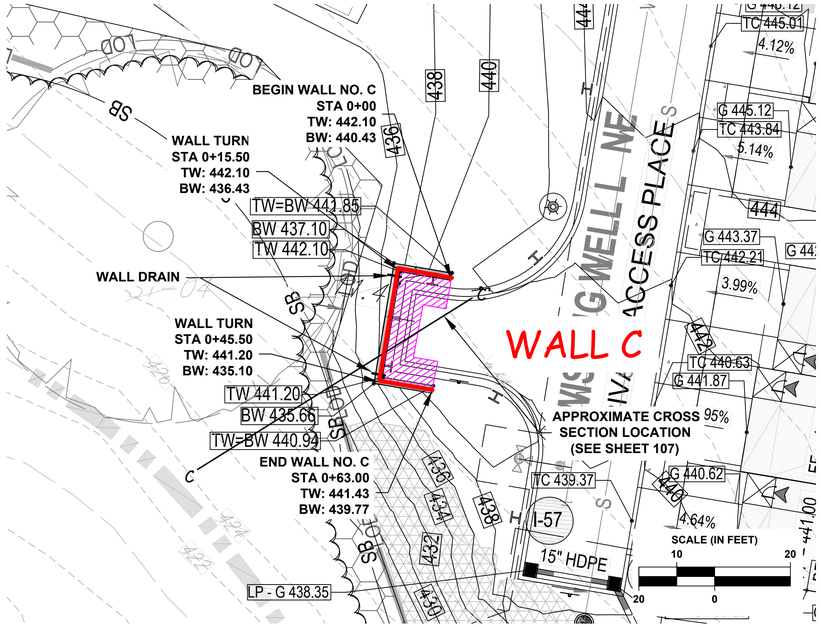
DESIGNER	DRAFTING
YCC	NAC

SCALE: AS SHOWN
PROJECT NO.: 02:9597-A
SHEET: 94 of 117
DATE: 10/19/2022

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



MSE WALL C PROFILE STA 0+00 TO 0+63
SCALE: 1"=5'



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- q = MAXIMUM BEARING PRESSURE (PSF)
- = MIRAGRID 3XT (SECTION VIEW)
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- = 8' MIRAGRID 3XT (MAP VIEW)

NOTES:

1. REFER TO SHEET 99 AND 100 FOR MSE WALL DETAILS.
2. GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.
3. REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

STATE OF MARYLAND
YOUNG C CHANG
61519
PROFESSIONAL ENGINEER

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HANOVER, MARYLAND 21076
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(410) 859-4324 [FAX]

"ONE FIRM ONE MISSION"

9891 OLD FREDERICK ROAD
ELLICOTT CITY, HOWARD COUNTY, MD

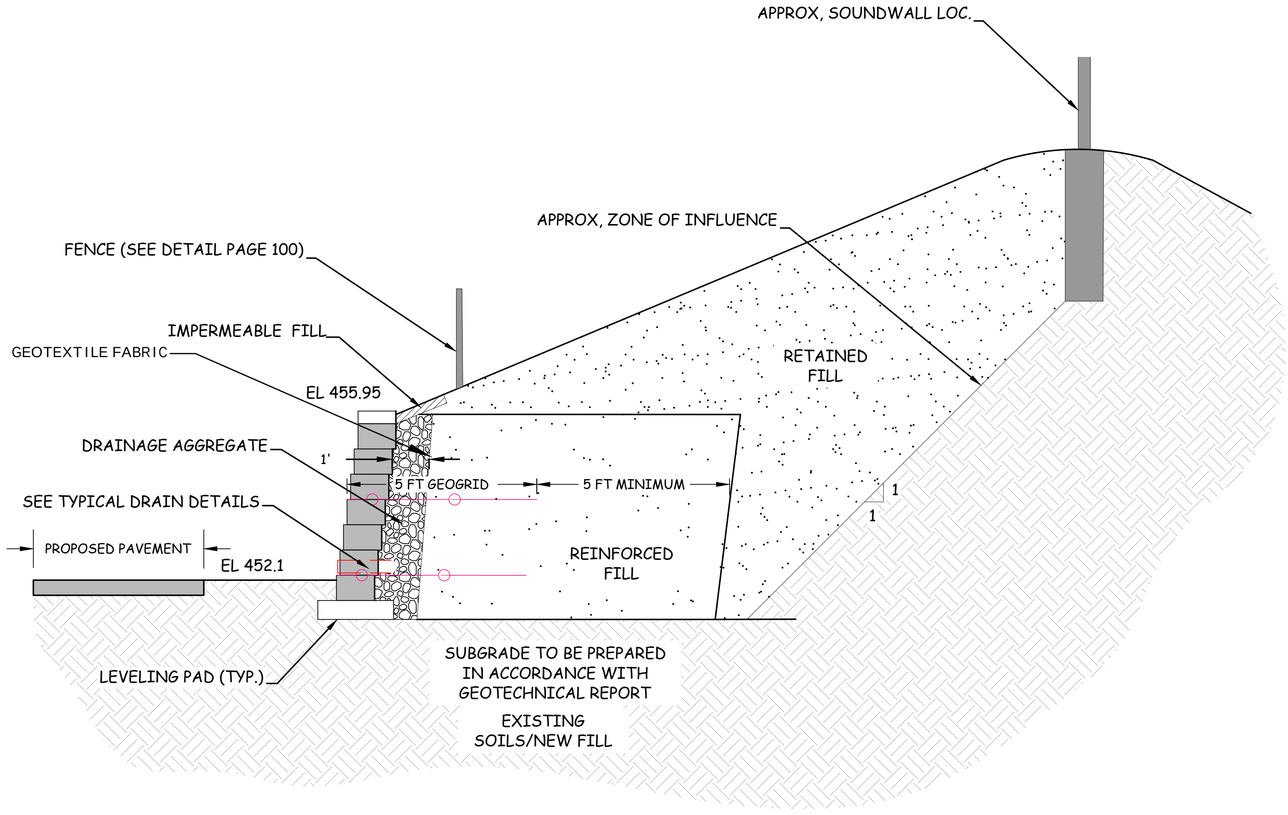
MSE WALL C PROFILE
BETHANY GLEN
RETAINING WALLS B AND C

ECS REVISIONS
REV 1 - 07/26/2023
REV 2 - 08/03/2023
REV 3 - 10/13/2023

DESIGNER	DRAFTING
YCC	NAC

SCALE: AS SHOWN
PROJECT NO.: 02:9597-A
SHEET: 95 of 117
DATE: 10/19/2022

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



WALL B CROSS SECTION B

SCALE: NTS

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

STATE OF MARYLAND
YOUNG C. CHANG
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"ONE FIRM ONE MISSION"

9891 OLD FREDERICK ROAD
ELLICOTT CITY, HOWARD COUNTY, MD

MSE WALL B - CROSS-SECTION B-B'
STATION 0+12.50
BETHANY GLEN
RETAINING WALLS B AND C

ECS REVISIONS
REV 1 - 07/26/2023
REV 2 - 08/03/2023
REV 3 - 10/13/2023

DESIGNER	DRAFTING
YCC	NAC

SCALE: AS SHOWN
PROJECT NO.: 02:9597-A
SHEET: 96 of 117
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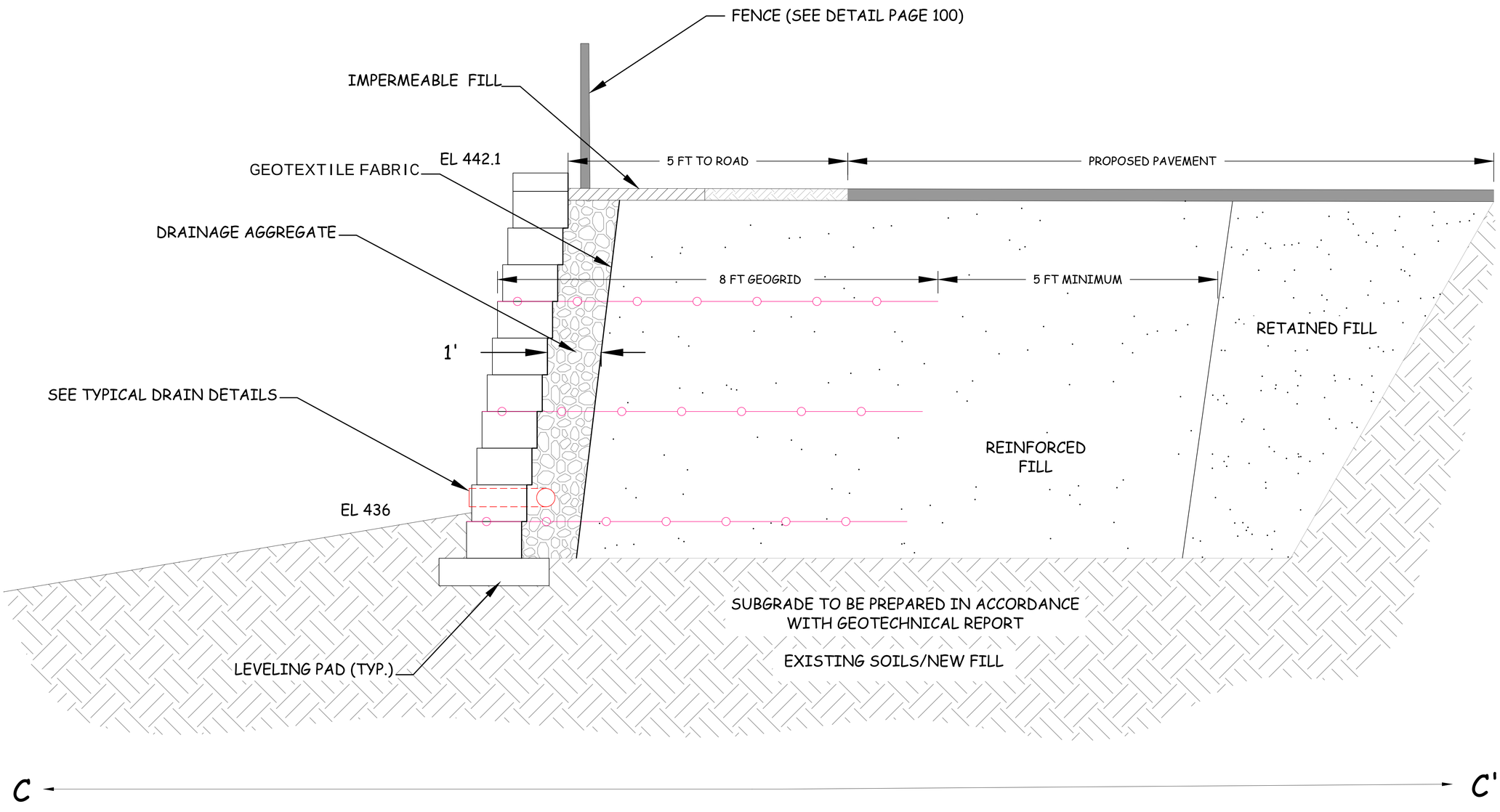

WALL C CROSS SECTION C

SCALE: NTS

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

STATE OF MARYLAND
YOUNG C CHANG
61519
PROFESSIONAL ENGINEER

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. 61519
EXPIRATION DATE: 06-10-2025

ECS MID-ATLANTIC, LLC
1340 CHARWOOD ROAD, SUITE B
HANOVER, MARYLAND 21076
(410) 859-4300 [PHONE]
(410) 859-4324 [FAX]

"ONE FIRM ONE MISSION"

9891 OLD FREDERICK ROAD
ELLICOTT CITY, HOWARD COUNTY, MD

MSE WALL C - CROSS-SECTION C-C'
STATION 0+35.00
BETHANY GLEN
RETAINING WALLS B AND C

ECS REVISIONS
REV 1 - 07/26/2023
REV 2 - 08/03/2023
REV 3 - 10/13/2023

DESIGNER	DRAFTING
YCC	NAC

SCALE	AS SHOWN
PROJECT NO.	02:9597-A
SHEET	97 of 117
DATE	10/20/2022

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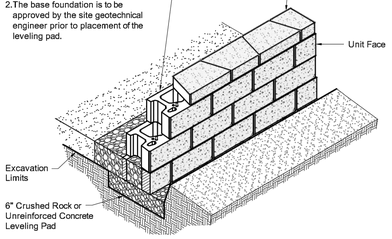
Base Leveling Pad Notes:

1. The leveling pad is to be constructed of crushed stone or 2,000 psi± unreinforced concrete
2. The base foundation is to be approved by the site geotechnical engineer prior to placement of the leveling pad.

Compac III Unit	
Width:	18"
*Depth:	12"
Height:	8"
*Weight:	75 lbs

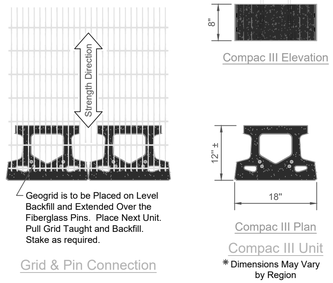
Universal Cap Unit	
Width:	18"/12"
*Depth:	10 1/2"
Height:	4"
*Weight:	49 lbs



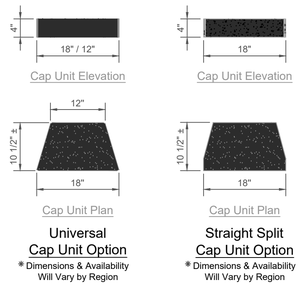
Compac III Unit/Base Pad Isometric Section View

* Dimensions & Weight May Vary by Region

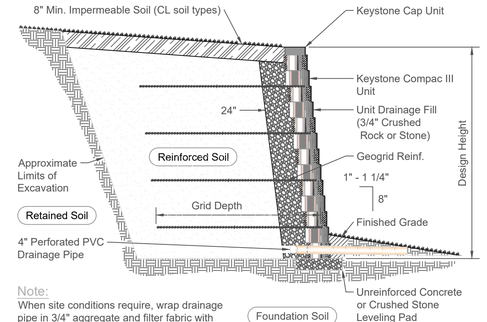
1 COMPAC III UNIT / BASE PAD ISOMETRIC SECTION VIEW NTS



2 GRID/BLOCK CONNECTION DETAIL NTS



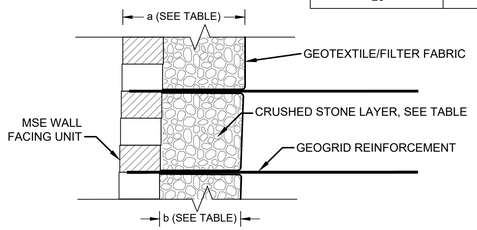
3 CAP UNIT OPTIONS NTS



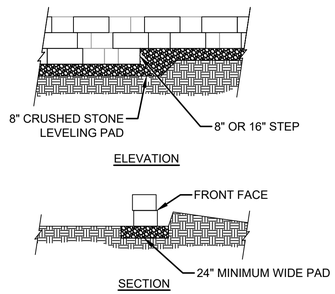
Note:
When site conditions require, wrap drainage pipe in 3/4" aggregate and filter fabric with drainage composite or aggregate back drain system, as directed by wall designer.

4 TYPICAL REINFORCED WALL SECTION NTS

WALL HEIGHT (FEET)	a	b
<10	24"	12"
10 TO 20	36"	24"
>20	48"	36"



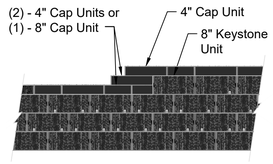
5 MSE WALL FACING DETAIL NTS



NOTE:

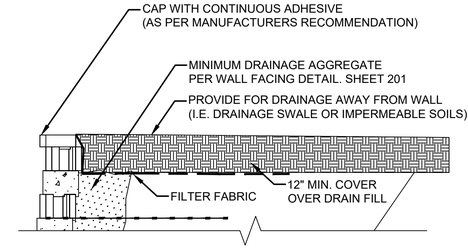
1. THE LEVELING PAD IS TO BE CONSTRUCTED OF CRUSHED STONE OR 2,000 PSI UNREINFORCED CONCRETE

6 LEVELING PAD DETAIL NTS

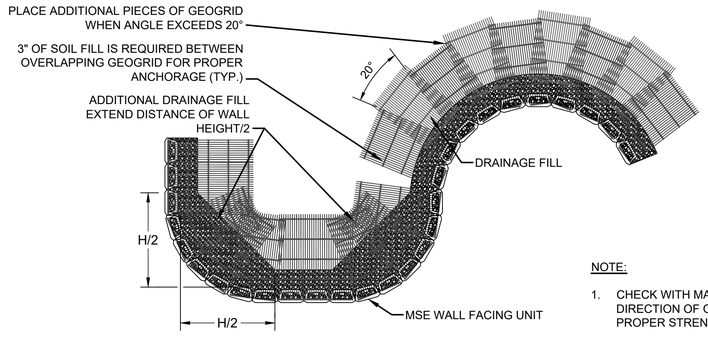


Note:
1. Secure all cap units with Keystone Kapseal or equal.

7 TOP OF WALL STEPS NTS



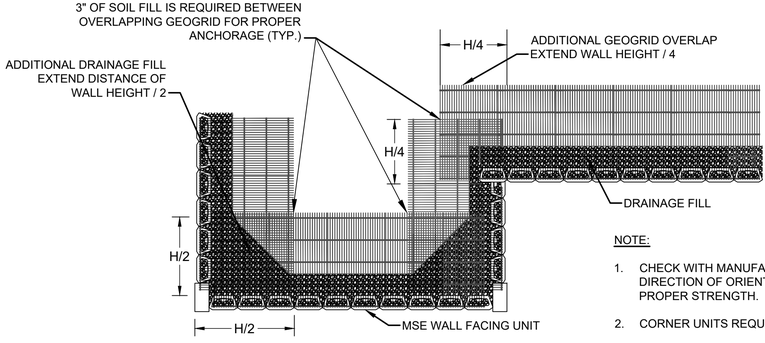
8 TOP OF MSE WALL DETAIL NTS



NOTE:

1. CHECK WITH MANUFACTURE SPECIFICATIONS ON CORRECT DIRECTION OF ORIENTATION FOR GEOGRID TO OBTAIN PROPER STRENGTH.

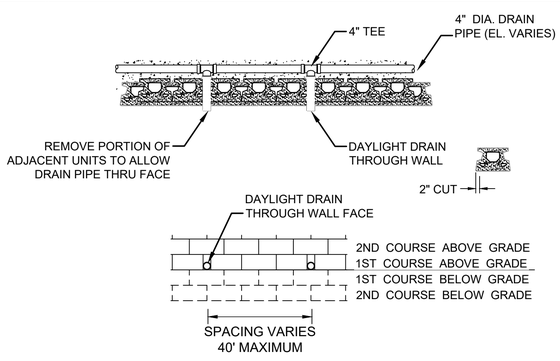
9 TYPICAL GEOGRID PLACEMENT AT CURVES NTS



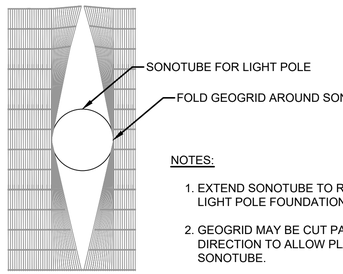
NOTE:

1. CHECK WITH MANUFACTURE SPECIFICATIONS ON CORRECT DIRECTION OF ORIENTATION FOR GEOGRID TO OBTAIN PROPER STRENGTH.
2. CORNER UNITS REQUIRED FOR OUTSIDE CORNERS.

10 TYPICAL GEOGRID PLACEMENT AT CORNERS NTS



11 TYPICAL DRAIN DETAIL NTS



NOTES:

1. EXTEND SONOTUBE TO REQUIRED DEPTH OF LIGHT POLE FOUNDATION, SEE CIVIL PLANS.
2. GEOGRID MAY BE CUT PARALLEL TO THE MACHINE DIRECTION TO ALLOW PLACEMENT AROUND SONOTUBE.
3. SONOTUBES SHALL BE PLACED SIMULTANEOUSLY WITH WALL.

12 LIGHTPOLE SONOTUBE PENETRATION DETAIL NTS

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

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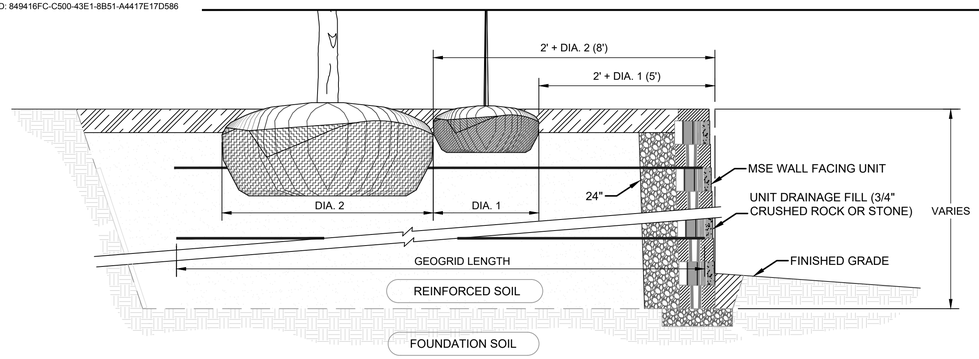
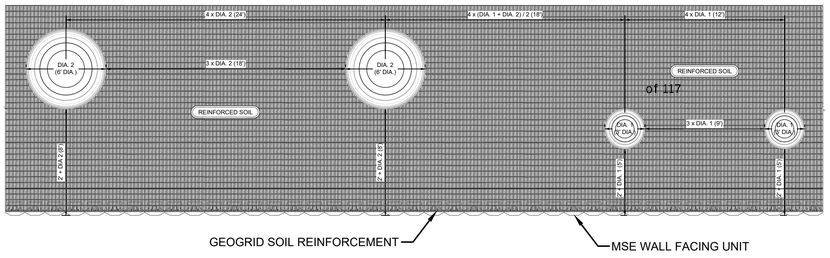
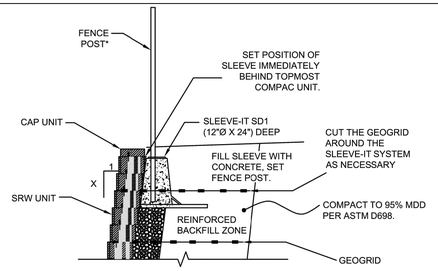


SECTION VIEW



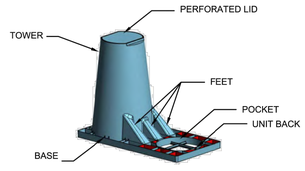
PLAN VIEW

1 TYPICAL PLANTING LIMITS DETAIL NTS



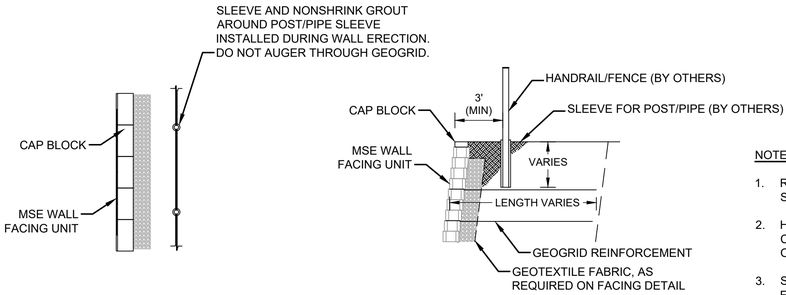
DETAIL OF FENCE POST INSTALLATION USING SLEEVE-IT N.T.S.

4 FENCE POST INSTALLATION USING SLEEVE-IT^{TM} SD1 NTS



NOTES:

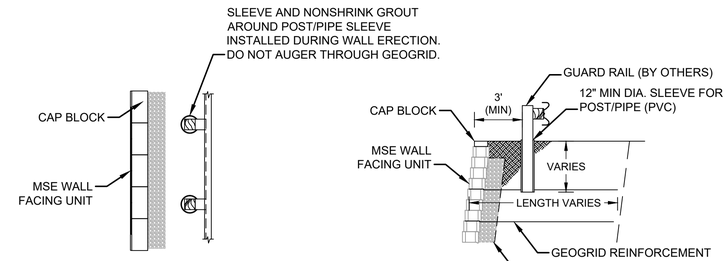
1. SLEEVE-IT^{TM} POST FOUNDATION SYSTEM SHALL BE INSTALLED PER THE MANUFACTURERS AND CURRENT SPECIFICATIONS.



NOTES:

1. REFER TO CIVIL DRAWINGS FOR DIMENSIONS. POSTS SHALL BE SITUATED TO AVOID DRAIN PIPES.
2. HANDRAIL/FENCE SHALL BE DESIGNED IN COMPLIANCE WITH CURRENT IBC REQUIREMENTS BY OTHERS.
3. SEE DETAIL 4 SHEET 202 FOR INSTANCES WHERE FENCE IS REQUIRED CLOSER THAN 3 FEET FROM FACE OF WALL.

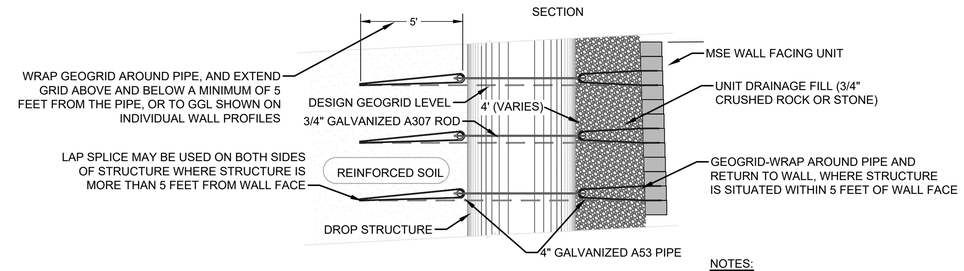
2 TYPICAL FENCE DETAIL NTS



NOTES:

1. REFER TO CIVIL DRAWINGS FOR DIMENSIONS. POSTS SHALL BE SITUATED TO AVOID DRAIN PIPES.
2. GUARDRAIL SHALL BE DESIGNED AND INSTALLED IN COMPLIANCE WITH HOWARD COUNTY GUIDELINES. DESIGN AND INSTALLATION BY OTHERS.

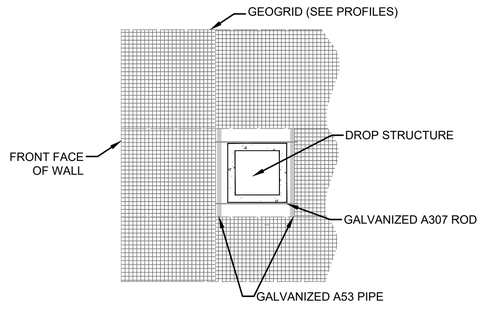
3 TYPICAL GUARD RAIL DETAIL NTS



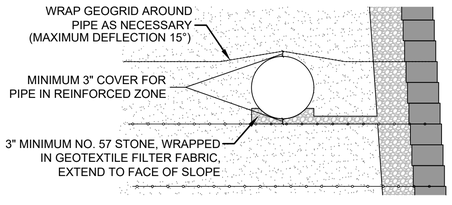
NOTES:

1. CONTRACTOR MAY SUBSTITUTE REINFORCEMENT STRAP FOR PIPE AND ROD. CONTRACTOR SHALL USE PVC PIPE WITH 90 DEGREE ELBOWS AT ENDS AS A SUBSTITUTE FOR GALVANIZED PIPE WITH REINFORCEMENT STRAP.

5 TYPICAL DROP STRUCTURE IN REINFORCED ZONE - SECTION VIEW NTS



6 TYPICAL DROP STRUCTURE IN REINFORCED ZONE - PLAN VIEW NTS



7 TYPICAL PIPE IN REINFORCED ZONE DETAIL NTS

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CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

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1.0 GENERAL

1. THE CONSTRUCTION OF THE MECHANICALLY STABILIZED EARTH (MSE) WALL SHOWN ON THESE PLANS SHALL BE MONITORED AND TESTED BY THE OWNER'S INDEPENDENT TESTING AGENCY (ITA) ON A FULL TIME BASIS TO CONFIRM THAT THE CONSTRUCTION IS IN ACCORDANCE WITH THE INTENT OF THE DESIGN.
2. THE RETAINING WALL DESIGN IS BASED ON THE SUBSURFACE EXPLORATION SUMMARIZED IN THE GEOTECHNICAL REPORT DATED NOVEMBER 5, 2022 PREPARED BY ECS MID-ATLANTIC, LLC TITLED BETHANY GLEN ARHA.
3. UNLESS INDIVIDUALLY IDENTIFIED THE TERM WALL OR WALLS REFERS TO ANY MSE WALL SHOWN ON THESE DRAWINGS.
4. IF THE ELEVATION, LOCATION, SURCHARGE LOADING, OR GRADING SURROUNDING THE WALL CHANGES FROM THOSE DEPICTED ON THESE PLANS, ECS SHALL BE NOTIFIED SO THAT MODIFICATIONS TO THE GEOTECHNICAL DESIGN CAN BE MADE, IF NECESSARY.
5. THE FINAL GRADES SURROUNDING THE WALL SHALL NOT BE MODIFIED WITHOUT NOTIFYING THE ENGINEER. ANY MODIFICATION TO THE GRADES BELOW OR ABOVE THE WALL MAY POSE CONSIDERABLE RISK TO THE PERFORMANCE/STABILITY OF THE WALLS.
6. WHERE DISCREPANCIES ARE NOTED WITHIN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF SUCH DISCREPANCIES IN WRITING.
7. THESE PLANS SHALL NOT BE SCALED OR USED FOR LOCATION OF PAVEMENTS, STRUCTURES OR RETAINING WALLS. THE CONTRACTOR SHALL PROVIDE LAYOUT AND COORDINATION AS NEEDED BY THE WALL CONTRACTOR.
8. BLOCKS, DRAINAGE AGGREGATE, REINFORCED FILL, AND RETAINED FILL SHALL BE BROUGHT UP SIMULTANEOUSLY. NONE OF THESE ITEMS SHOULD LEAD ANOTHER BY MORE THAN ONE COURSE HEIGHT.
9. THE GEOGRID REINFORCEMENT SHALL NOT BE CUT OR AUGERED THROUGH. WHERE THE GEOGRID MUST BE CUT FOR INSTALLATION OF SHALLOW LANDSCAPING, THE GEOGRID REMOVAL MUST BE LIMITED AND PERFORMED WITH CARE AS SHOWN IN THESE DRAWINGS.
10. UTILITIES MUST BE INSTALLED CONCURRENT WITH WALL CONSTRUCTION COMPARE TO 3 AND 4 ON PAGE 201. GEOGRID SHALL NOT BE CUT TO FACILITATE UTILITY CONSTRUCTION. THE LOCATIONS AND ELEVATIONS OF ALL UTILITIES SHALL BE ACCURATELY LOCATED PRIOR TO AND DURING WALL CONSTRUCTION TO ENSURE THE WALL CONSTRUCTION IS IN STRICT CONFORMANCE WITH THESE DRAWINGS.

A. RESPONSIBILITY FOR CONSTRUCTION COMPLIANCE

1. THE CONTRACTOR MUST PROVIDE FOR THE CONSTRUCTION OF THE WALL IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, PLANS AND SPECIFICATIONS. THE CONTRACTOR IS ALSO RESPONSIBLE FOR THE VERIFICATION OF LINE, GRADE AND OTHER PHYSICAL FEATURES.
2. ENSURE WALL IS ALONG THE PROPER ALIGNMENT, AND WITHIN APPROPRIATE PROPERTY BOUNDARIES, AND CONSTRUCTION EASEMENTS.
3. CONTRACTOR IS SOLELY RESPONSIBLE FOR QUALITY OF THE WORK. INSPECTION, MONITORING, AND WALL TESTING BY THE OWNER, THEIR DESIGNATED REPRESENTATIVE, OR ECS ARE SOLELY AT THE DISCRETION OF THE OWNER, AND IN NO WAY RELIEVE THE CONTRACTOR OF SOLE RESPONSIBILITY FOR MAINTAINING A QUALITY CONTROL PLAN.
4. CONTRACTOR SHALL CONTACT MISS UTILITY A MINIMUM OF THREE (3) DAYS PRIOR TO START OF WORK.
5. THE CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, AND MATERIALS TO CONSTRUCT THE PROJECT IN ACCORDANCE WITH THE REQUIREMENTS OF THESE PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER. DURING THE COURSE OF THE CONSTRUCTION. ALTERNATIVES TO, OR CHANGES IN, THE PLANS AND SPECIFICATIONS MUST BE APPROVED BY THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.
6. APPROXIMATE FIELD LOCATION OF EXISTING UTILITIES, FOUNDATIONS AND OTHER STRUCTURES IDENTIFIED TO THE ENGINEER ARE SHOWN ON THESE DRAWINGS. THE ENGINEER IS NOT RESPONSIBLE FOR FIELD VERIFYING THESE LOCATIONS AND DAMAGE TO IDENTIFIED AND UNIDENTIFIED UTILITIES AND FOUNDATION. THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND ELEVATIONS OF ALL UTILITIES WITH IN 50 FEET BEHIND AND IN FRONT OF WALLS.
7. WALL HEIGHTS SHOWN ARE BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN. IF THE ACTUAL WALL HEIGHTS ARE MORE THAN ONE FOOT GREATER THAN THE WALL HEIGHTS SHOWN ON THE DRAWINGS, THE WALL CONTRACTOR SHALL IMMEDIATELY INFORM THE ENGINEER OR REPRESENTATIVE WHO WILL DETERMINE IF ADDITIONAL WALL MODIFICATIONS ARE REQUIRED.
8. THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS, GRADES AND DIMENSIONS AT THE SITE PRIOR TO WALL CONSTRUCTION. IF THE WALL CONTRACTOR DISCOVERS ANY ERRORS, OMISSIONS, OR DISCREPANCIES, HE SHALL CONTACT THE ENGINEER PRIOR TO CONTINUING WALL CONSTRUCTION. THE ENGINEER WILL THEN ISSUE THE INSTRUCTIONS AS HOW TO PROCEED.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY AND UNDER NO CIRCUMSTANCES SHALL THE ENGINEER BE RESPONSIBLE FOR CONSTRUCTION SITE SAFETY.
10. CONSTRUCTION OPERATIONS BEHIND AND IN FRONT OF PREVIOUSLY CONSTRUCTED PORTIONS OF WALLS SHALL BE RESTRICTED TO PREVENT DAMAGE TO EXISTING WALLS. ONLY LIGHT COMPACTION EQUIPMENT (i.e. WALK BEHIND COMPACTORS) SHALL BE USED WITHIN 5 FEET BEHIND WALL TO PREVENT EXCESSIVE LATERAL STRESS ON CONSTRUCTED PORTIONS OF THE WALLS.

B. CLEARING AND SUBGRADE PREPARATION

1. CLEARING AND STRIPPING LIMITS SHALL BE EXTENDED TO THE LIMITS SHOWN ON THE CIVIL DRAWINGS AND TO A MINIMUM OF 1 FOOT IN FRONT OF THE RETAINING WALLS AND 2 FEET BEHIND THE REINFORCED ZONE.
2. ALL EXISTING TOPSOIL, ROOTMAT, AND ANY OTHER SOFT OR UNSUITABLE MATERIALS SHALL BE REMOVED FROM THE CLEARING AND STRIPPING LIMITS.
3. PRIOR TO INITIATION OF RETAINING WALL CONSTRUCTION, THE STRIPPED AREA SHALL BE OBSERVED BY THE OWNER'S ITA TO DETERMINE THE EXTENT OF ANY REQUIRED REMEDIAL WORK. THESE MAY INCLUDE BUT ARE NOT LIMITED TO PROOFROLLING WITH A HEAVY RUBBER TIRED VEHICLE HAVING A SINGLE-AXLE WEIGHT OF AT LEAST 20,000 POUNDS, OR OTHER METHODS DETERMINED APPROPRIATE BY THE OWNER'S ITA. PROOFROLLING SHALL INCLUDE MULTIPLE PASSES IN PERPENDICULAR DIRECTIONS OVER THE EXPOSED SUBGRADE.
4. CONSTRUCTION PHASE DEWATERING MAY BE NECESSARY TO SATISFACTORILY COMPLETE THESE SUBGRADE PREPARATION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING SATISFACTORY CONSTRUCTION PHASE DEWATERING.

C. EXCAVATION SUPPORT AND SLOPES

1. THE DRAWINGS DO NOT PROVIDE A TEMPORARY EXCACATION SUPPORT SYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY EXCAVATION SUPPORT SYSTEMS REQUIRED TO CONSTRUCT THE RETAINING WALL SHOWN ON THESE DRAWINGS AND ENSURING THAT SUCH SYSTEMS ARE IN STRICT ACCORDANCE WITH CURRENT OSHA REQUIREMENTS.
2. EXCAVATIONS SHALL BE CONSTRUCTED AND BRACED IN ACCORDANCE WITH CURRENT OSHA REQUIREMENTS. EXCAVATION AND SITE SAFETY SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. SLOPING AND BENCHING OR SHORING EXCAVATIONS IS PER OSHA REQUIREMENTS.
3. THE CONTRACTOR SHALL NOT STOCKPILE EXCAVATED MATERIALS OR EQUIPMENT IMMEDIATELY ADJACENT TO THE EXCAVATION WALLS OR SLOPES. ALL SUCH MATERIALS SHALL BE KEPT BACK FORM THE TOP OF THE EXCAVATION A MINIMUM DISTANCE EQUAL TO THE EXCAVATION DEPTH. WHERE EQUIPMENT OR MATERIALS MUST BE PLACED IMMEDIATELY ADJACENT TO THE EXCAVATION WALLS, THE EXCAVATION WALLS SHALL BE DESIGNED FOR THE ANTICIPATED SURCHARGE LOADING, OR ADDITIONAL BRACING MUST BE PROVIDED TO SUPPORT THE ANTICIPATED SURCHARGE LOADING.

D. DEWATERING AND SITE DRAINAGE

1. THE CONTRACTOR SHALL PROVIDE SUMP PIT AND PUMPING OPERATIONS AS REQUIRED FOR DEWATERING THE RETAINING WALL AREA WHERE NEEDED.
2. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ADEQUATE SITE DRAINAGE DURING SITE PREPARATION, EARTHWORK OPERATION, INCLUDING PROVIDING FOR DRAINAGE OF SURFACE WATER AWAY FROM THE CONSTRUCTION AREAS, AND ENHANCEMENT OF NATURAL DRAINAGE PATHS WITHOUT INTERRUPTING ITS PATTERN.
3. ALL EROSION AND SEDIMENTATION CONTROL SHALL BE CONTROLLED IN ACCORDANCE WITH SOUND ENGINEERING PRACTICE AND CURRENT STATE, COUNTY AND MUNICIPAL REQUIREMENTS.
4. PROVIDE AND MAINTAIN POSITIVE DRAINAGE FROM BACK OF WALL AT ALL TIMES DURING CONSTRUCTION.
5. THE DESIGN ASSUMES PERMANENT EROSION CONTROL MEASURES WILL BE IMPLEMENTED AT THE TOP AND BOTTOM OF THE WALL IMMEDIATELY UPON COMPLETION OF THE WALL CONSTRUCTION. THESE EROSION CONTROL MEASURES SHOULD BE SPECIFIED BY THE PROJECT CIVIL ENGINEER, IMPLEMENTED BY THE GENERAL CONTRACTOR, AND SHOULD BE MAINTAINED BY THE OWNER. FAILURE TO IMPLEMENT AND MAINTAIN PERMANENT EROSION CONTROL MEASURES MAY RESULT IN DAMAGE OF THE MSE WALL.

E. DESIGN CRITERIA

1. CONSTRUCT MSE WALL IN ACCORDANCE WITH THESE DRAWINGS AND THE GEOTECHNICAL REPORT.
2. THE DESIGN OF THE MSE WALL FOR THIS PROJECT CONTEMPLATES INTERNAL STABILITY, EXTERNAL STABILITY, COMPOUND AND GLOBAL STABILITY.
3. THE MSE WALL HAS BEEN DESIGNED IN GENERAL ACCORDANCE WITH NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA) RECOMMENDATIONS.
4. THE MSE WALL HAS BEEN DESIGNED FOR FACTORS OF SAFETY FOR PERMANENT LOADING CONDITIONS OF 1.5 FOR INTERNAL STABILITY, 1.5 FOR DIRECT SLIDING, 2.0 FOR OVERTURNING, AND 1.5 FOR COMPOUND AND LONG TERM GLOBAL STABILITY.
5. THE WALLS HAVE BEEN DESIGNED FOR FACTORS OF SAFETY OF 1.3 FOR TEMPORARY LOADING CONDITIONS SUCH AS SHORT TERM STORM EVENTS.
6. THE MSE WALLS ARE DESIGNED FOR PERMANENT SURCHARGE LOADING OF 250 PSF TO ACCOUNT FOR VEHICULAR LOADS (WALL C) AND 50 PSFTO ACCOUNT FOR PEDESTRIAN LOADS (WALL B).
7. TEMPORARY SURCHARGE LOADS ABOVE THE WALL DURING CONSTRUCTION HAVE BEEN ANTICIPATED. IF EQUIPMENT OR MATERIAL STORAGE ABOVE THE WALL IS ANTICIPATED TO BE ABOVE 250 PSF, THE SURCHARGE LOADING SHALL BE SUBMITTED FOR REVIEW AND APPROVAL.
8. THE DESIGN REFLECTED ON THESE DRAWINGS IS INTENDED FOR THE CONSTRUCTION OF PERMANENT WALLS. AS WITH ANY REINFORCED EARTH SYSTEM, SOME LIMITED LATERAL AND VERTICAL MOVEMENT MAY OCCUR ABOVE AND BEHIND THE WALLS.
9. SOIL PARAMETERS USED IN THE DESIGN OF THE WALLS SHOULD BE VERIFIED IN THE FIELD PRIOR TO THE START OF WALL CONSTRUCTION.
10. GROUNDWATER IS NOT EXPECTED WITHIN THE EXCAVATION FOR THE WALLS. HOWEVER, WEEP DRAINS WILL BE INSTALLED AS SHOWN ON THESE DRAWINGS. IF GROUNDWATER IS ENCOUNTERED, THE DESIGN ENGINEER MUST BE NOTIFIED TO MODIFY DESIGN IF REQUIRED.

2.0 MATERIALS

1. MSE WALL FACING UNITS SHALL CONSIST OF KEYSTONE COMPAC III STRAIGHT SPLIT MASONRY UNITS. ALL RETAINING WALL FACING UNITS SHALL BE IN STRICT ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY KEYSTONE RETAINING WALL SYSTEMS, INC. MINNEAPOLIS, MINNESOTA.
2. FIBERGLASS PINS SHALL BE NYLON RESIN RODS WITH FIBERGLASS AS SUPPLIED BY KEYSTONE RETAINING WALL SYSTEMS, INC., AND SHALL BE IN ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY KEYSTONE.
3. GEOGRID REINFORCEMENT SHALL CONSIST OF MIRAGRID 3XT BY TENCATE. ALL GEOGRID SHALL BE IN STRICT ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY TENCATE. NO GEOGRID REINFORCEMENT SUBSTITUTIONS SHALL BE PERMITTED UNLESS APPROVED BY ECS.
4. GEOTEXTILES SHALL CONSIST OF MIRAFI 140N BY TENCATE. ALL GEOTEXTILES SHALL BE IN STRICT ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY TENCATE.
5. CRUSHED STONE SHALL CONSIST OF MDOT NO. 57 STONE CRUSHED AGGREGATE. CONTRACTOR SHALL SUBMIT A MATERIAL SOURCE AND GRADATION TO THE ENGINEER.
6. LEVELING PAD SHALL BE CONSTRUCTED OF CRUSHED STONE OR CONCRETE AS SHOWN IN THE DETAIL ON SHEET 201.
7. FILL AREAS WHERE CRUSHED STONE IS NOT REQUIRED, SHALL CONSIST OF SOILS HAVING A UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) DESIGNATION OF SM, SP, SW, GM, GC, OR GW, BE FREE OF ORGANIC MATTER, COBBLES GREATER THAN 3 INCHES IN MAXIMUM DIMENSION, CONTAIN LESS THAN 35 PERCENT MATERIAL PASSING THE 200 SIEVE, OR DEBRIS, AND HAVE MAXIMUM LIQUID LIMIT AND PLASTICITY INDEX OF 30 AND 10, RESPECTIVELY. FURTHERMORE, THE REINFORCED AND RETAINED FILL ZONES SHALL CONSIST OF MATERIALS THAT MEET OR EXCEED THE REQUIREMENTS OF THE DESIGN PARAMETERS. THE OWNER'S ITA SHALL CONFIRM THE SOIL PROPERTIES AND SHEAR STRENGTH PARAMETERS SHOWN ON THESE PLANS PRIOR TO THE START OF WALL CONSTRUCTION. WHEN SHEAR STRENGTH TESTING IS DEEMED NECESSARY BY THE ITA, TRIAXIAL OR DIRECT SHEAR TESTING SHALL BE PERFORMED. CONTRACTOR SHALL SUBMIT MATERIAL SOURCES, GRADATIONS AND SHEAR STRENGTH TEST RESULTS TO THE ENGINEER.
8. UNACCEPTABLE FILL MATERIAL INCLUDE TOPSOIL, ORGANIC MATERIALS (OH, OL), PLASTIC SILTS AND CLAYS (CL, CH, ML AND MH), AND SOILS NOT MEETING THE CRITERIA OF THE PREVIOUS PARAGRAPH.
9. ON SITE SOILS MAY BE USED AS FILL MATERIALS IN THE RETAINED FILL ZONE PROVIDED THE MATERIALS MEET REQUIREMENTS OF THESE SPECIFICATIONS.
10. DRAINAGE PIPES SHALL CONSIST OF 4" CORRUGATED HDPE PIPE.
11. ALL MATERIALS SHALL BE STORED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

3.0 FOUNDATIONS

1. THE MSE WALL FOUNDATION SUBGRADE SOILS SHALL BE PREPARED IN ACCORDANCE WITH THE CLEARING AND SUBGRADE PREPARATION SECTION OF THESE SPECIFICATIONS AND THE GEOTECHNICAL REPORT.
2. THE BEARING CAPACITY OF THE SUBGRADE SUPPORTING MSE WALLS, INCLUDING MASONRY BLOCKS AND REINFORCED FILL ZONE, SHALL BE VERIFIED TO BE EQUAL TO OR GREATER THAN VALUES SHOWN ON THESE DRAWINGS AT THE TIME OF CONSTRUCTION BY THE OWNER'S ITA AT A MINIMUM FREQUENCY OF 25 FEET ON CENTER.
3. THE REQUIRED EMBEDMENT DEPTH FOR EACH SECTION OF WALL IS SPECIFIED ON THE DETAILS AND WALL PROFILE.
4. FOUNDATIONS SUBGRADE SOILS NOT MEETING THE MINIMUM BEARING REQUIREMENTS SHALL BE IMPROVED AS DIRECTED IN THE FIELD BY THE ENGINEER.

4.0 COMPACTIVE EFFORT AND FILL PLACEMENT

1. NO. 57 STONE - TAMP AND COMPACT WITH A SMOOTH PLATE WALK-BEHIND VIBRATORY PLATE COMPACTOR.
2. REINFORCED FILL ZONE - THIS ZONE SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-698 STANDARD PROCTOR METHOD, TO NOT LESS THAN 5 FEET BEYOND THE ENDS OF THE GEOGRID. WHERE REINFORCED FILL CONSISTS OF CRUSHED STONE, THE CRUSHED STONE SHALL BE COMPACTED WITH A SMOOTH PLATE WALK BEHIND VIBRATORY PLATE COMPACTOR OR SMOOTH DRUM VIBRATORY ROLLER.
3. RETAINED FILL ZONE - THIS ZONE SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-698 STANDARD PROCTOR METHOD.
4. FILL MATERIALS SHALL NOT BE PLACED WHEN WET, FROZEN OR FROST HEAVED SOILS. ALL SUCH SOILS SHALL BE REMOVED PRIOR TO CONTINUATION OF FILL OPERATIONS.
5. FILL MATERIALS SHALL NOT CONTAIN FROZEN MATERIALS AT THE TIME OF PLACEMENT. ALL SUCH MATERIALS SHALL BE REMOVED PRIOR TO CONTINUATION OF FILL OPERATIONS.
6. FILL SOILS SHOULD BE PLACED IN LIFTS NOT EXCEEDING 6 INCHES IN LOOSE THICKNESS.
7. AT THE TIME OF COMPACTION, FILL SOILS SHALL BE WITHIN 3 PERCENT OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH THE STANDARD PROCTOR METHOD.
9. ALL FILL AND BACKFILL OPERATIONS SHALL BE OBSERVED ON A FULL-TIME BASIS BY THE OWNER'S ITA TO DETERMINE IF MINIMUM PLACEMENT AND COMPACTION REQUIREMENTS ARE BEING MET AND THAT MATERIALS MEETING OR EXCEEDING THE SPECIFICATION REQUIREMENTS ARE USED.
10. IN-PLACE DENSITY TESTS SHALL BE PERFORMED WITH A MINIMUM OF 1 TEST PER 2500 SQUARE FEET OF SOIL FILL AREA OR EACH LIFT OF FILL PLACE. THE ELEVATION AND LOCATION OF THE TESTS SHOULD BE CLEARLY IDENTIFIED AT THE TIME OF FILL PLACEMENT.
11. GRANULAR SOILS (UNIFIED SOIL CLASSIFICATION SM, SC OR COARSER) SHALL BE COMPACTED WITH VIBRATORY COMPACTION EQUIPMENT.
12. CARE SHOULD BE EXERCISED REGARDING THE USE OF RELATIVELY HEAVY MACHINERY CLOSE TO THE WALL. LIGHTER HAND OPERATED COMPACTION EQUIPMENT (i.e. WALK BEHIND COMPACTORS) WITHIN 5 FEET OF THE WALL.
13. THE FILL AREA SHALL BE GRADED AT THE END OF EACH DAY TO FACILITATE THE POSITIVE DRAINAGE OF SURFACE WATER ASSOCIATED WITH PRECIPITATION AWAY FROM IT.

5.0 CONSTRUCTION SEQUENCE

A. GENERAL

1. CONTRACTOR WILL COORDINATE AND SEQUENCE WORK IN SUCH A MANNER AS TO MINIMIZE DISTURBANCE OF PREVIOUSLY CONSTRUCTED WALLS.
2. FINISH GRADE IN ACCORDANCE WITH THE CIVIL AND LANDSCAPE DRAWINGS.

B. CONSTRUCTION SEQUENCE - MECHANICALLY STABILIZED EARTH WALL.

STEP 1 - EXCAVATION AND LEVELING PAD

a. WALL LAYOUT AND GENERAL EXCAVATION
   1. SURVEY STAKE WALL LOCATION AND GENERAL EXCAVATION LIMITS FOR WALL CONSTRUCTION.
   2. PERFORM GENERAL EXCAVATION FOR WALL AS REQUIRED.

b. LEVELING PAD CONSTRUCTION
   1. STAKE WALL LOCATION FOR LEVELING PAD EXCAVATION.
   2. EXCAVATE TRENCH TO CREATE THE MINIMUM LEVELING PAD THICKNESS AND TO THE MINIMUM WIDTH SHOWN.
   3. PLACE, LEVEL AND COMPACT LEVELING PAD MATERIAL FOR RETAINING WALL UNITS.

STEP 2 - INSTALLING FIRST COURSE OF BLOCK UNITS

a. SETTING FIRST COURSE OF BLOCK UNITS
   1. CHECK LEVELING PAD ELEVATIONS AND SMOOTH LEVELING PAD SURFACE.
   2. STAKE AND STRING LINE THE WALL LOCATION PAYING CLOSE ATTENTION TO EXACT LOCATION OF CURVES, CORNERS, AND VERTICAL AND HORIZONTAL STEPS. STRING LINE MUST BE ALONG THE MOLDED FACE (BACK) OF THE BLOCK UNIT, AND NOT ALONG THE BROKEN BLOCK FINISH SURFACE.
   3. INSTALL FIRST COURSE OF BLOCKS, CHECKING LEVEL AS PLACED.

b. BACKFILLING FIRST COURSE OF BLOCK UNITS
   1. RECHECK WALL LOCATION.
   2. USE NO. 57 STONE TO FILL ANY OPENINGS IN AND BETWEEN BLOCK UNITS AS REQUIRED.
   3. CAREFULLY PLACE DRAINAGE AGGREGATE AND FABRIC BEHIND AND UP TO THE HEIGHT OF THE BLOCK UNIT.
   4. PLACE AND COMPACT THE REINFORCED FILL SOIL.
   5. PLACE AND COMPACT FILL SOILS IN FRONT OF BLOCK UNIT.
   6. PLACE AND COMPACT RETAINED FILL SOILS.

STEP 3 - PLACEMENT AND BACKFILLING OF BLOCK UNITS WITHOUT GEOGRID REINFORCEMENT

a. INSTALLING SUCCESSIVE COURSE OF BLOCK UNITS
   1. ENSURE THAT DRAINAGE AGGREGATE IS LEVEL WITH, OR SLIGHTLY BELOW TOP OF BLOCK UNIT BELOW.
   2. THOROUGHLY CLEAN DEBRIS AND AGGREGATE OFF OF TOP OF BLOCK UNITS.
   3. INSTALL CONNECTING SHEAR PINS.
   4. PLACE NEXT COURSE OF BLOCK AND PUSH UNITS FORWARD AS FAR AS POSSIBLE TO ENGAGE SHEAR PINS AND TO ESTABLISH PROPER SETBACK CONSISTENT WITH SETBACK SHOWN ON THE DETAILS AND IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

b. FILL PLACEMENT AND COMPACTION
   1. RECHECK WALL LOCATION.
   2. USE NO. 57 STONE TO FILL ANY OPENINGS IN AND BETWEEN BLOCK UNITS AS REQUIRED.
   3. CAREFULLY PLACE DRAINAGE AGGREGATE BEHIND AND UP TO THE HEIGHT OF THE BLOCK UNIT.
   4. PLACE GEOTEXTILE AS SHOWN.
   5. PLACE AND COMPACT THE REINFORCED FILL SOIL.
   6. PLACE AND COMPACT FILL SOILS IN FRONT OF BLOCK UNIT TO ELEVATIONS SHOWN ON THE DRAWINGS.
   7. PLACE AND COMPACT RETAINED FILL SOILS.

STEP 4 - PLACEMENT AND BACKFILLING OF BLOCK UNITS WITH GEOGRID REINFORCEMENT CONNECTION

a. INSTALLING SUCCESSIVE COURSE OF BLOCK UNITS
   1. ENSURE THAT NO. 57 STONE IS LEVEL WITH OR SLIGHTLY BELOW TOP OF BLOCK UNIT BELOW.
   2. THOROUGHLY CLEAN DEBRIS AND NO. 57 STONE OFF OF TOP OF BLOCK UNITS.
   3. CUT GEOGRID TO DESIGN LENGTH SHOWN ON PLANS AND INSTALL WITH MACHINE STRENGTH DIRECTION PERPENDICULAR TO THE WALL FACE. PLACE GEOGRID TO FACE OF BLOCKS AS SHOWN ON DETAILS.
   4. INSTALL CONNECTING SHEAR PINS.
   5. PLACE NEXT COURSE OF BLOCK ON GEOGRID AND PUSH UNITS FORWARD TO ENGAGE SHEAR PINS AND TO ESTABLISH PROPER SETBACK, CONSISTENT WITH SETBACK SHOWN ON DETAILS AND IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

b. FILL PLACEMENT AND COMPACTION
   3. PULL GEOGRID TIGHT USING UNIFORM TENSION SO THAT THERE ARE NO WRINKLES IN THE GEOGRID. HOLD OR STAKE IN PLACE TO MAINTAIN TENSION THROUGHOUT FILL PLACEMENT PROCESS.
   4. PLACE NO. 57 STONE IN AND BETWEEN BLOCK UNITS AS REQUIRED.
   5. CAREFULLY PLACE DRAINAGE AGGREGATE BEHIND AND UP TO THE HEIGHT OF THE BLOCK UNIT.
   6. PLACE AND COMPACT REINFORCED FILL STONE BEHIND WALL WORKING FROM THE WALL BACK TOWARDS THE FREE END OF THE GEOGRID.
   7. PLACE AND COMPACT RETAINED FILL SOILS.

NOTE: CONTINUE CONSTRUCTION OF THE WALL TO FULL HEIGHT USING STEPS 3 AND 4.

STEP 5 - CAPPING AND GRADING

1. INSTALL CAP/CAPPING UNIT AND SECURE IN PLACE PER MANUFACTURER'S RECOMMENDATIONS.
2. PLACE AND COMPACT FINAL BACKFILL.
3. ROUGH GRADE FOR POSITIVE DRAINAGE AWAY FROM THE WALL FACE.
4. FINAL GRADING AND RESTORATION PER CIVIL DRAWINGS.

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

STATE OF MARYLAND — YOUNG C. CHANG — 61519 — PROFESSIONAL ENGINEER

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. 61519 EXPIRATION DATE: 06-10-2025

ECS MID-ATLANTIC, LLC
1340 CHARWOOD ROAD, SUITE B
HANOVER, MARYLAND 21076
(410) 859-4300 [PHONE]
(410) 859-4324 [FAX]

"ONE FIRM ONE MISSION"

9891 OLD FREDERICK ROAD
ELLICOTT CITY, HOWARD COUNTY, MD

MSE WALL SPECIFICATIONS
BETHANY GLEN
RETAINING WALLS B AND C

ECS REVISIONS
REV 1 - 07/26/2023
REV 2 - 08/03/2023
REV 3 - 10/13/2023

DESIGNER	DRAFTING
YCC	NAC

SCALE: AS SHOWN
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DATE: 10/20/2022

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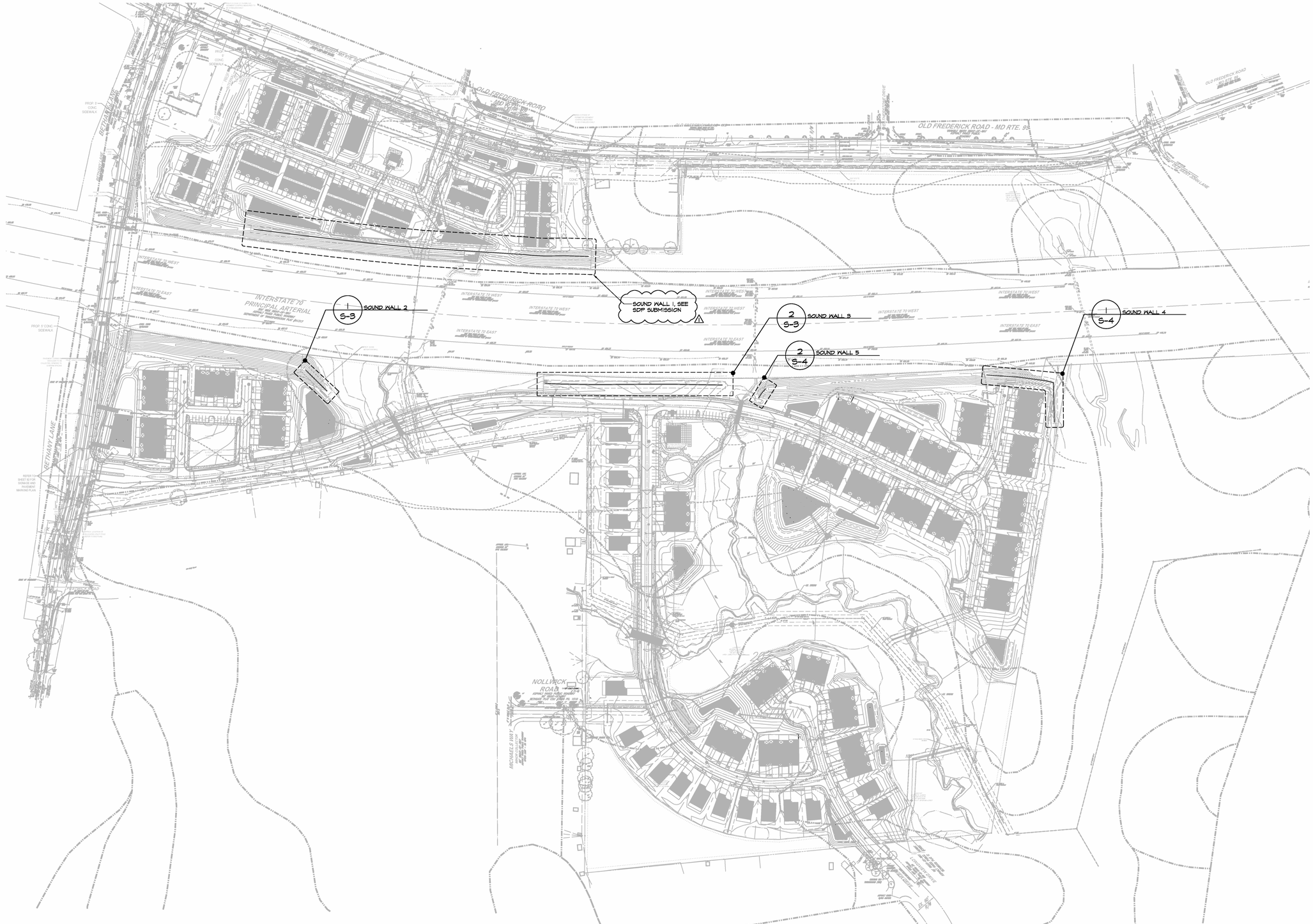

OVERALL PLAN
SCALE: 1/128" = 1'-0"

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

MRA
Buildings Group
MORRIS & RITCHIE ASSOCIATES, INC.
Architects, Engineers, Planners, Surveyors, and Landscape Architects
1220-B East Joppa Road
Suite 400K
Towson, Maryland 21286
410-821-1690

Bethany Glen Soundwalls

2nd Election District
Howard County, Maryland

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. 30729, Expiration Date: 07/11/2024.

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NO.	REVISION	DATE
1	COUNTY COMMENTS	11/06/23

FILE	DRAWN	ISSUED
22291	RJA	08/03/2023

SHEET TITLE
Sound Wall Key Plan

SHEET NUMBER
S-1

V:\bg_PROJECTS\22200 - 22299\22291 - Bethany Glen Soundwalls\300 Structural\306 Construction Documents\22291- Bethany Glen CDs-3
11/6/2023

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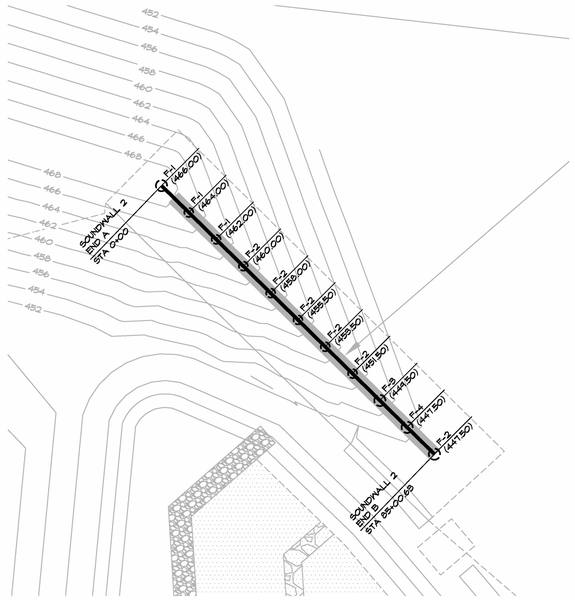
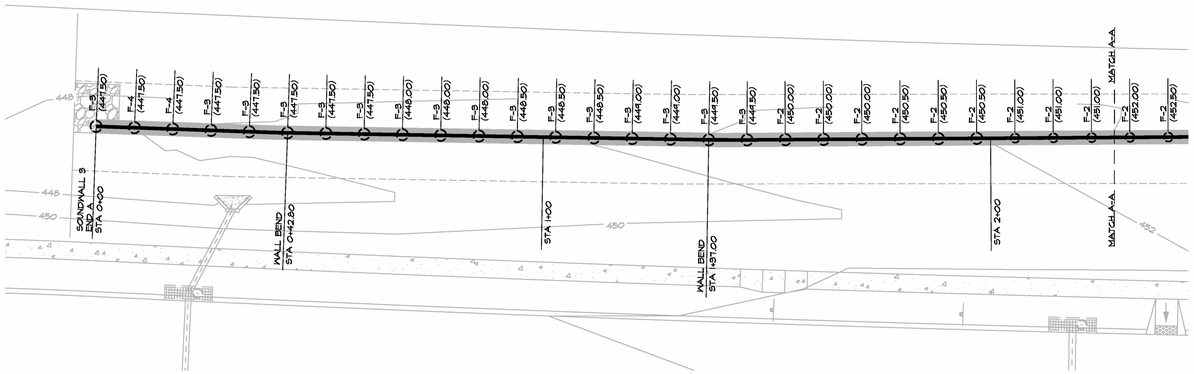


1 / S-1 SOUND WALL 2
SCALE: 1/16" = 1'-0"

SOUND WALL FOUNDATION NOTES:

1. SOUND WALL SHALL CONSIST OF TIMBER WALL SYSTEM SUPPORTED ON DRILLED CONCRETE CAISSON FOUNDATIONS.
2. SOUND WALL LAYOUT SHOWN AS DEPICTED ON THE LIMITED DETAILED SITE PLAN DRAWINGS PREPARED BY BOHLER, DATED 4/21/2023.
3. TOP AND BOTTOM OF WALL ELEVATIONS AS DETERMINED BY BOHLER, DATED 6/7/2023. COORDINATE WALL PANEL LAYOUTS WITH ACCOUSTICAL CONSULTANT AND SOUND WALL MANUFACTURER.
4. SOUND WALL SHALL BE PRESERVATIVE TREATED WOOD MANUFACTURED BY PLYWALL IN ACCORDANCE WITH THE LANDSCAPE ARCHITECTURAL DRAWINGS.
5. CONCRETE CAISSONS ARE INDICATED ON PLAN THUS: F-X, REFER TO CAISSON SCHEDULE ON S-5 FOR SIZE
6. TOP OF CAISSON ELEVATION INDICATED THUS: (X.XX) IN PLAN.



2 / S-1 SOUND WALL 3
SCALE: 1/16" = 1'-0"

SOUND WALL FOUNDATION NOTES:

1. SOUND WALL SHALL CONSIST OF TIMBER SYSTEM SUPPORTED ON DRILLED CONCRETE CAISSON FOUNDATIONS.
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5. CONCRETE CAISSONS ARE INDICATED ON PLAN THUS: F-X, REFER TO CAISSON SCHEDULE ON S-5 FOR SIZE
6. TOP OF CAISSON ELEVATION INDICATED THUS: (X.XX) IN PLAN.

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024
APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

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Bethany Glen Soundwalls

2nd Election District
Howard County, Maryland

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NO.	REVISION	DATE

FILE	DRAWN	ISSUED
22291	RJA	08/03/2023

SHEET TITLE
Soundwall 2 & 3 Foundation Plan

SHEET NUMBER
S-3

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11/6/2023

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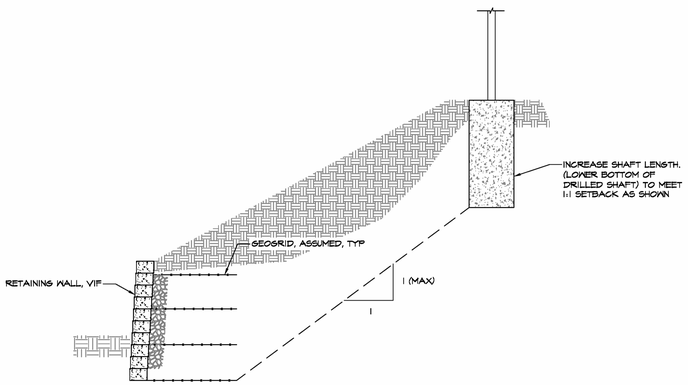
1 / S-1 **SOUND WALL 4**
SCALE: 1/16" = 1'-0"

SOUND WALL FOUNDATION NOTES:

1. SOUND WALL SHALL CONSIST OF TIMBER WALL SYSTEM SUPPORTED ON DRILLED CONCRETE CAISSON FOUNDATIONS.
2. SOUND WALL LAYOUT SHOWN AS DEPICTED ON THE LIMITED DETAILED SITE PLAN DRAWINGS PREPARED BY BOHLER, DATED 4/21/2023.
3. TOP AND BOTTOM OF WALL ELEVATIONS AS DETERMINED BY BOHLER, DATED 6/7/2023. COORDINATE WALL PANEL LAYOUTS WITH ACCOUSTICAL CONSULTANT AND SOUND WALL MANUFACTURER.
4. SOUND WALL SHALL BE PRESERVATIVE TREATED WOOD MANUFACTURED BY PLYWALL IN ACCORDANCE WITH THE LANDSCAPE ARCHITECTURAL DRAWINGS.
5. CONCRETE CAISSONS ARE INDICATED ON PLAN THUS: F-X, REFER TO CAISSON SCHEDULE ON S-5 FOR SIZE
6. TOP OF CAISSON ELEVATION INDICATED THUS: (XXX) IN PLAN.



3 / S-4 **SECTION**
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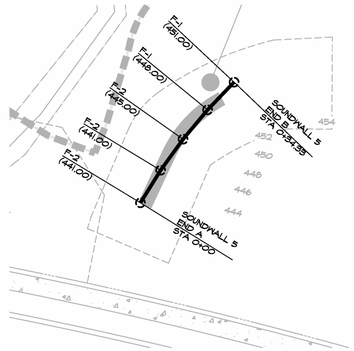

1 / S-1 **SOUND WALL 5**
SCALE: 1/16" = 1'-0"

SOUND WALL FOUNDATION NOTES:

1. SOUND WALL SHALL CONSIST OF TIMBER WALL SYSTEM SUPPORTED ON DRILLED CONCRETE CAISSON FOUNDATIONS.
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5. CONCRETE CAISSONS ARE INDICATED ON PLAN THUS: F-X, REFER TO CAISSON SCHEDULE ON S-5 FOR SIZE
6. TOP OF CAISSON ELEVATION INDICATED THUS: (XXX) IN PLAN.

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

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Bethany Glen Soundwalls

2nd Election District
Howard County, Maryland

STATE OF MARYLAND — RICHARD JOSEPH ANDERSON — No. 30729 — PROFESSIONAL ENGINEER

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NO.	REVISION	DATE

FILE	DRAWN	ISSUED
22291	RJA	08/03/2023

SHEET TITLE
Sound Wall 4 Foundation Plan

SHEET NUMBER
S-4

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11/6/2023

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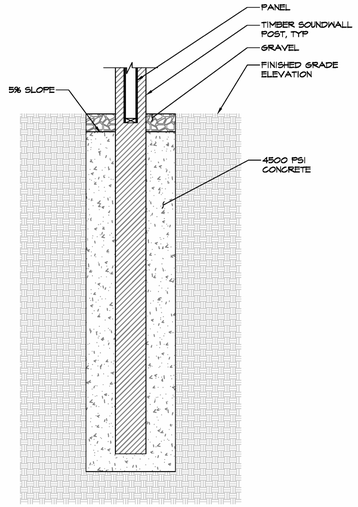
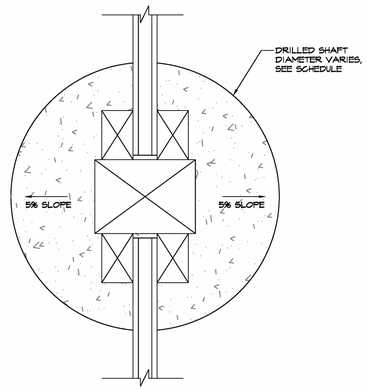
DRILLED CONCRETE SHAFT SCHEDULE

MARK	SHAFT DIAMETER	SHAFT DEPTH
F-1	24 IN	6 FT
F-2	24 IN	8 FT
F-3	30 IN	10 FT
F-4	30 IN	12 FT
F-5	36 IN	12 FT

DRILLED SHAFT DESIGN ASSUMES A MAXIMUM DEPTH OF 4'-0" OF UNCONTROLLED FILL



A DRILLED SHAFT DETAIL
SCALE: 1/2" = 1'-0"



B TOP OF DRILLED SHAFT
SCALE: 1-1/2" = 1'-0"

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

MRA Buildings Group
MORRIS & RITCHIE ASSOCIATES, INC.
Architects, Engineers, Planners, Surveyors, and Landscape Architects
1220-B East Joppa Road
Suite 400K
Towson, Maryland 21286
410-821-1690

Bethany Glen Soundwalls

2nd Election District
Howard County, Maryland

STATE OF MARYLAND — JAMES W. RITCHIE — No. 30729 — PROFESSIONAL ENGINEER

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. 30729, Expiration Date: 07/11/2024.

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NO.	REVISION	DATE

FILE	DRAWN	ISSUED
22291	RJA	08/03/2023

SHEET TITLE
Tables and Typical Details

SHEET NUMBER
S-5

V:\bg_PROJECTS\22200 - 22299\22291 - Bethany Glen Soundwalls\300 Structural\306 Construction Documents\22291- Bethany Glen CDs-3
11/6/2023

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

BUILDING CODES

A. ALL CONSTRUCTION SHALL CONFORM WITH:

ASCE 7-16 MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES

B. IN ADDITION, ALL CONSTRUCTION SHALL CONFORM WITH THE GOVERNING LOCAL BUILDING CODE.

C. WIND LOAD DESIGN CRITERIA:

ANALYSIS PROCEDURE:	ASCE 7-16 CH 29.3: DESIGN WIND LOADS: SOLID FREESTANDING WALLS AND SOLID SIGNS
ULTIMATE WIND SPEED (Vult)	113 MPH
WIND DIRECTIONALITY FACTOR (Kd)	0.85
EXPOSURE CATEGORY	B
TOPOGRAPHIC FACTOR (Kzt)	1
GUST EFFECT FACTOR	0.85
GROUND ELEVATION FACTOR (Ke)	1.0

MISCELLANEOUS

A. SHOP DRAWINGS FOR ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS MUST BE SUBMITTED BY THE CONTRACTOR OR OWNER FOR REVIEW BY THE ENGINEER. IF THE CONTRACTOR OR OWNER FAILS TO SUBMIT THE SHOP DRAWINGS, THE ENGINEER WILL NOT BE RESPONSIBLE FOR STRUCTURAL CERTIFICATION AND DESIGN OF THE PROJECT. THE SHOP DRAWINGS SHALL INDICATE ANY DEVIATIONS OR OMISSIONS FROM THE CONTRACT DOCUMENTS. THE GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION AND MAKE ALL CORRECTIONS DEEMED NECESSARY.

B. SEE, CIVIL DOCUMENTS FOR ADDITIONAL INFORMATION RELATING TO THE COORDINATION OF STRUCTURAL COMPONENTS.

C. IN CASES OF CONFLICT BETWEEN THE DRAWINGS AND/OR SPECIFICATIONS AND OTHER DISCIPLINES OR EXISTING CONDITIONS, CONTRACTOR SHALL NOTIFY THE DESIGN PROFESSIONALS AND OBTAIN CLARIFICATION PRIOR TO BIDDING AND PROCEEDING WITH WORK.

D. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION. ALL DISCREPANCIES AND OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.

E. THE CONTRACTOR SHALL NOT SUBMIT REPRODUCTIONS OF THE STRUCTURAL CONTRACT DOCUMENTS AS SHOP DRAWINGS.

F. SCALES SHOWN ON THE STRUCTURAL CONTRACT DRAWINGS ARE FOR GENERAL INFORMATION ONLY. DIMENSIONAL INFORMATION SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.

G. APPLY DETAILS, SECTIONS AND NOTES ON THE DRAWINGS WHERE CONDITIONS ARE SIMILAR TO THOSE INDICATED BY DETAIL, DETAIL TITLE OR NOTE.

H. ASSUME EQUAL SPACING BETWEEN ESTABLISHED DIMENSIONS, IF NOT INDICATED ON DRAWINGS.

I. PROVIDE SHORING AND PROTECTION FOR EXCAVATION BANKS AS NECESSARY TO PREVENT CAVING AND COMPLY WITH ALL APPLICABLE OSHA RULES AND REGULATIONS.

J. ALL SUBMITTALS SHALL BE PROVIDED IN ENGLISH UNITS. SUBMITTALS INCLUDING METRIC UNITS WILL BE REJECTED.

K. AS REQUIRED BY THE GOVERNING JURISDICTION, THE OWNER SHALL EMPLOY A QUALIFIED INDEPENDENT TESTING AGENCY TO ADMINISTER AND PERFORM A PROGRAM OF STRUCTURAL TESTS AND SPECIAL INSPECTIONS IN COMPLIANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE. THE TESTING AGENCY SHALL PREPARE A STATEMENT OF STRUCTURAL TESTS AND INSPECTIONS, SPECIFYING THE TESTS AND INSPECTIONS TO BE PERFORMED THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. SUBMISSION TO AND APPROVAL OF THIS STATEMENT BY THE GOVERNING JURISDICTION MUST BE COMPLETE PRIOR TO BEGINNING CONSTRUCTION (IF REQUIRED).

L. ALL REQUIRED TESTING AND INSPECTIONS SHALL BE PERFORMED BY AN INDEPENDENT INSPECTION AGENCY HIRED BY THE OWNER. IT SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE INDEPENDENT INSPECTION AGENCY.

M. ALL TESTING AND INSPECTION REPORTS SHALL BE SUBMITTED TO THE CONTRACTOR, THE OWNER'S REPRESENTATIVE, ARCHITECT AND THE STRUCTURAL ENGINEER OF RECORD (SER). THE CONTRACTOR SHALL BE RESPONSIBLE FOR UNDERSTANDING THE TEST AND INSPECTION PROGRAM AND NOTIFYING THE TESTING AGENCY AND THE SER WHEN WORK IS READY FOR TESTS AND INSPECTIONS. THE CONTRACTOR SHALL PROVIDE ACCESS TO THE TESTING AGENCY AND THE SER. INSPECTIONS AND TESTS OF THE STRUCTURAL TESTS AND INSPECTION PROGRAM WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR SUPERVISION, TESTING AND INSPECTION FOR QUALITY CONTROL OF THE WORK.

N. THE OWNER'S REPRESENTATIVE WILL PROVIDE TESTING AND INSPECTION REPORTS TO THE LOCAL BUILDING OFFICIAL WHEN REQUESTED BY THE LOCAL BUILDING OFFICIAL. UPON COMPLETION OF CONSTRUCTION, THE SER WILL MAKE A FINAL REPORT ON THE SATISFACTORY COMPLETION OF THE PROGRAM FOR STRUCTURAL TESTS AND INSPECTION TO THE BUILDING OFFICIAL AND TO THE OWNER'S REPRESENTATIVE.

O. TESTING AND INSPECTION REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO THE APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE SER PRIOR TO THE COMPLETION OF THAT PHASE OF WORK.

DRILLED PIER FOUNDATIONS (CAISSONS)

A. DRILLED PIER FOUNDATIONS (CAISSONS) SHALL BEAR ON UNDISTURBED SOIL. THE PIERS HAVE BEEN DESIGNED FOR THE FOLLOWING PARAMETERS:

	TOP 4'-0" OF SOIL	4'-0" TO 20'-0"
FRICTION ANGLE	28 DEGREES	32 DEGREES
ACTIVE PRESSURE COEFF	Ka = 0.36	Ka = 0.31
AT-REST PRESS COEFF	Ko = 0.53	Ko = 0.47
PASSIVE PRESS COEFF	Kp = 2.77	Kp =3.25
MOIST UNIT WEIGHT	γ = 115 PCF	γ = 125 PCF
ALLOWABLE BEARING	2000 PSF	3000 PSF

B. DRILLED PIER FOUNDATIONS SHALL BE DRILLED WITHOUT DISTURBING THE SURROUNDING SOIL AND SHALL BE KEEP FREE OF WATER INFILTRATION UNTIL CONCRETE CAN BE PLACED.

C. DRILLED PIERS SHALL BE INSTALLED PLUMB. CENTERLINE OF DRILLED PIER SHALL COINCIDE WITH CENTER LINE OF SOUND WALL POST.

CAST IN PLACE CONCRETE

A. ALL CONCRETE CONSTRUCTION SHALL CONFORM TO THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI 301)"; AND TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318)".

B. IN ADDITION TO THE ABOVE, ALL CONCRETE WORK SHALL CONFORM TO THE FOLLOWING:
RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING (ACI 305).
RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING (ACI 306).
RECOMMENDED PRACTICE FOR CONCRETE FORMWORK (ACI 347).
STANDARD SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS (ACI 117).
CHEMICAL ADMIXTURES FOR CONCRETE (ACI 212.3).
STANDARD SPECIFICATION FOR CURING CONCRETE (ACI 308.1).

C. ALL CONCRETE EXPOSED TO PUBLIC VIEW SHALL CONFORM TO THE REQUIREMENTS FOR ARCHITECTURAL CONCRETE CONTAINED IN ACI 301.

D. ALL CONCRETE, UNLESS NOTED OTHERWISE, SHALL BE NORMAL WEIGHT STONE AGGREGATE CONCRETE.

E. THE CONCRETE MIX DESIGNS SHALL ADHERE TO THE REQUIREMENTS OF ACI-301 BASED ON THE CATEGORIES LISTED IN THE FOLLOWING "SCHEDULE OF CONCRETE MIX REQUIREMENTS".

F. PORTLAND CEMENT SHALL CONFORM TO ASTM C150 AND NORMAL WEIGHT AGGREGATES SHALL CONFORM ASTM C33.

G. ADMIXTURES CONTAINING CALCIUM CHLORIDE ARE NOT PERMITTED.

H. ALL CONCRETE MIX DESIGNS, INCLUDING CEMENT CONTENT, WATER CEMENT RATIO, FINE AND COARSE AGGREGATE CONTENT AND ALL ADMIXTURES, SHALL BE REVIEWED BY THE ENGINEER PRIOR TO PLACING FIRST CONCRETE.

I. ALL CONCRETE SHALL BE SAMPLED AND TESTED BY THE TESTING AGENCY. THE CONTRACTOR SHALL NOTIFY THE TESTING AGENCY 48 HOURS PRIOR TO THE PLACING OF ANY CONCRETE. TESTING SHALL BE IN ACCORDANCE WITH ASTM C172. OBTAIN ONE COMPOSITE SAMPLE FOR EACH DAY'S POUR OF EACH CONCRETE MIX EXCEEDING 5 CU. YARDS, BUT LESS THAN 25 CU. YARDS, PLUS ONE SET FOR EACH ADDITIONAL 50 CU. YARDS OR FRACTION THEREOF. WHEN FREQUENCY OF TESTING WILL PROVIDE FEWER THAN THREE COMPRESSIVE-STRENGTH TESTS FOR EACH CONCRETE MIX, TESTING SHALL BE CONDUCTED FROM AT LEAST THREE RANDOMLY SELECTED BATCHES.

J. THE CONCRETE STRUCTURE SHALL NOT SUPPORT THE DESIGN LIVE LOAD FOR A MINIMUM OF 28 DAYS AND ALL SHORING AND RE-SHORING REQUIRED TO SUPPORT THE CONCRETE STRUCTURE DURING CONSTRUCTION SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR. SHOP DRAWINGS, SIGNED AND SEALED BY A REGISTERED ENGINEER IN THE STATE OF MARYLAND, SHALL BE SUBMITTED FOR REVIEW. SHOP DRAWINGS SHALL INDICATE THE TYPE, EXTENT, SIZE, AND LOCATION OF ALL SHORING AND RE-SHORING AS WELL AS THE SEQUENCE OF CONSTRUCTION.

K. GROUND BLAST FURNACE SLAG MAY BE USED TO REPLACE UP TO 50 PERCENT OF THE PORTLAND CEMENT IN A CONCRETE MIX, AND FLY ASH OR POZZOLAN MAY BE USED TO REPLACE UP TO 25 PERCENT OF PORTLAND CEMENT, SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER AND SHALL CONFORM TO ASTM C989. TOTAL OF FLY ASH, SLAG AND POZZOLANS SHALL NOT EXCEED 50 PERCENT OF THE PORTLAND CEMENT IN THE CONCRETE MIX.

L. ALL REINFORCING BARS SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A615 GRADE 60 (F_y = 60 KSI).

M. LAP ALL REINFORCING BARS A MINIMUM OF 48 BAR DIAMETERS AND ALL W.W.F. A MINIMUM OF TWO FULL GRIDS, UNLESS OTHERWISE INDICATED.

N. ALL REINFORCING SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH THE CRSI "MANUAL OF STANDARD PRACTICE", ACI 315" DETAILS AND DETAILING OF CONCRETE REINFORCEMENT", ACI SP 66 "DETAILING MANUAL".

O. DOWELS SHALL MATCH SIZE AND SPACING OF MAIN REINFORCEMENT, UNLESS NOTED OTHERWISE.

P. COVER FOR ALL REINFORCING SHALL BE AS FOLLOWS UNLESS OTHERWISE INDICATED:
FOOTINGS 3 INCHES (BOTTOM & SIDES), 2 INCHES (TOP)

Q. ALL CONCRETE CONSTRUCTION SHALL BE INSPECTED IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE.

ITEM	MIN Fc' (PSI)	MAX SLUMP	AGGREGATE MAX SIZE	EXPOSURE/DURABILITY CATEGORY F	S	C	P .
SHALLOW FOUNDATIONS	4500	3"	1"	F2	S0	C1	P0

SCHEDULE FOOTNOTES:

A. PROVIDE MAX W/C RATIO, AIR CONTENT, CEMENTITIOUS MATERIAL TYPES, CHLORIDE ION LIMITS AND ADD'L MIN. REQUIREMENTS PER ACI-301 FOR THE ABOVE EXPOSURE/DURABILITY CATEGORIES. MOST RESTRICTIVE APPLIES.

B. REFERENCE STRUCTURAL FRAMING PLANS, CONCRETE COLUMN SCHEDULE, SHEAR WALL SCHEDULE, ETC. FOR CONCRETE STRENGTHS INIDICATED "PER DWGS" IN THE ABOVE SCHEDULE.

RETAINING WALLS

A. FOOTINGS FOR ALL RETAINING WALLS HAVE BEEN DESIGNED FOR AN ASSUMED NET ALLOWABLE SOIL BEARING PRESSURE OF 3000 PSF. THE ALLOWABLE SOIL BEARING PRESSURE SHALL BE FIELD VERIFIED BY A REGISTERED GEOTECHNICAL ENGINEER AND APPROVED PRIOR TO PLACING FOOTINGS. SHOULD THE ACTUAL SOIL BEARING PRESSURE BE LESS THAN 3000 PSF, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER.

B. RETAINING WALLS HAVE BEEN DESIGNED WITH BACKFILL MATERIAL HAVING THE FOLLOWING CHARACTERISTICS:

γ	=	125 PCF
Φ	=	32 DEGREES
Ka	=	0.277
COHESION	=	0

IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO INSURE THE BACK FILL MATERIAL MEETS THESE CHARACTERISTICS.

C. RETAINING WALLS HAVE BEEN DESIGNED FOR THE FOLLOWING MINIMUM FACTORS OF SAFETY:

SLIDING	1.5
OVERTURNING	2.0

D. CONSTRUCTION OF ALL RETAINING WALLS SHALL BE PERFORMED UNDER THE SUPERVISION OF A REGISTERED GEOTECHNICAL ENGINEER.

E. ALL RETAINING WALLS SHALL BE BRACED AND SHORED AS REQUIRED DURING BACKFILLING. BOTH SUPPORTING ELEMENTS SHALL BE IN PLACE AND DEVELOPING FULL REQUIRED STRENGTH PRIOR TO BACK FILLING OF WALLS SUPPORTED AT TOP AND BOTTOM.

J. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING IMMEDIATELY THE GEOTECHNICAL ENGINEER OF RECORD IF SOIL OR SITE CONDITIONS ARE NOT AS NOTED ON THE APPROVED RETAINING WALL PLANS OR IF GROUND WATER IS ENCOUNTERED DURING CONSTRUCTION.

K. SUBGRADE CONDITIONS NOT MEETING THE REQUIRED STRENGTH (ALLOWABLE SOIL BEARING PRESSURE DESCRIBED ABOVE) SHALL BE REMOVED AND REPLACED IN ACCORDANCE WITH THE RECOMMENDATIONS OF GEOTECHNICAL ENGINEER OF RECORD.

L. CONSTRUCTION JOINT BETWEEN WALL AND FOOTING SHALL BE ROUGH FLOATED SUFFICIENTLY TO THOROUGHLY CONSOLIDATE THE SURFACE AND SHALL BE INTENTIONALLY LEFT IN A ROUGHENED CONDITION. ALL KEYS ARE NOMINAL SIZE.

APPROVED: DEPARTMENT OF PUBLIC WORKS
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CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
DocuSigned by: 1EB75478A22B49A... 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

DocuSigned by: CHAD Edmondson 7063F754EF41499... 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

MRA
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MORRIS & RITCHIE ASSOCIATES, INC.
Architects, Engineers, Planners, Surveyors, and Landscape Architects
1220-B East Joppa Road
Suite 400K
Towson, Maryland 21286
410-821-1690

Bethany Glen Soundwalls

2nd Election District
Howard County, Maryland

STATE OF MARYLAND · JAMES ... BUCKLER · No. 30729 · PROFESSIONAL ENGINEER · 11/06/23

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. 30729, Expiration Date: 07/11/2024.

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MORRIS AND RITCHIE ASSOC., INC.

NO.	REVISION	DATE

FILE	DRAWN	ISSUED
22291	RJA	08/03/2023

SHEET TITLE
General Notes

SHEET NUMBER
S-8

V:\bg_PROJECTS\22200 - 22299\22291 - Bethany Glen Soundwalls\300 Structural\306 Construction Documents\22291- Bethany Glen CDs-3
11/6/2023

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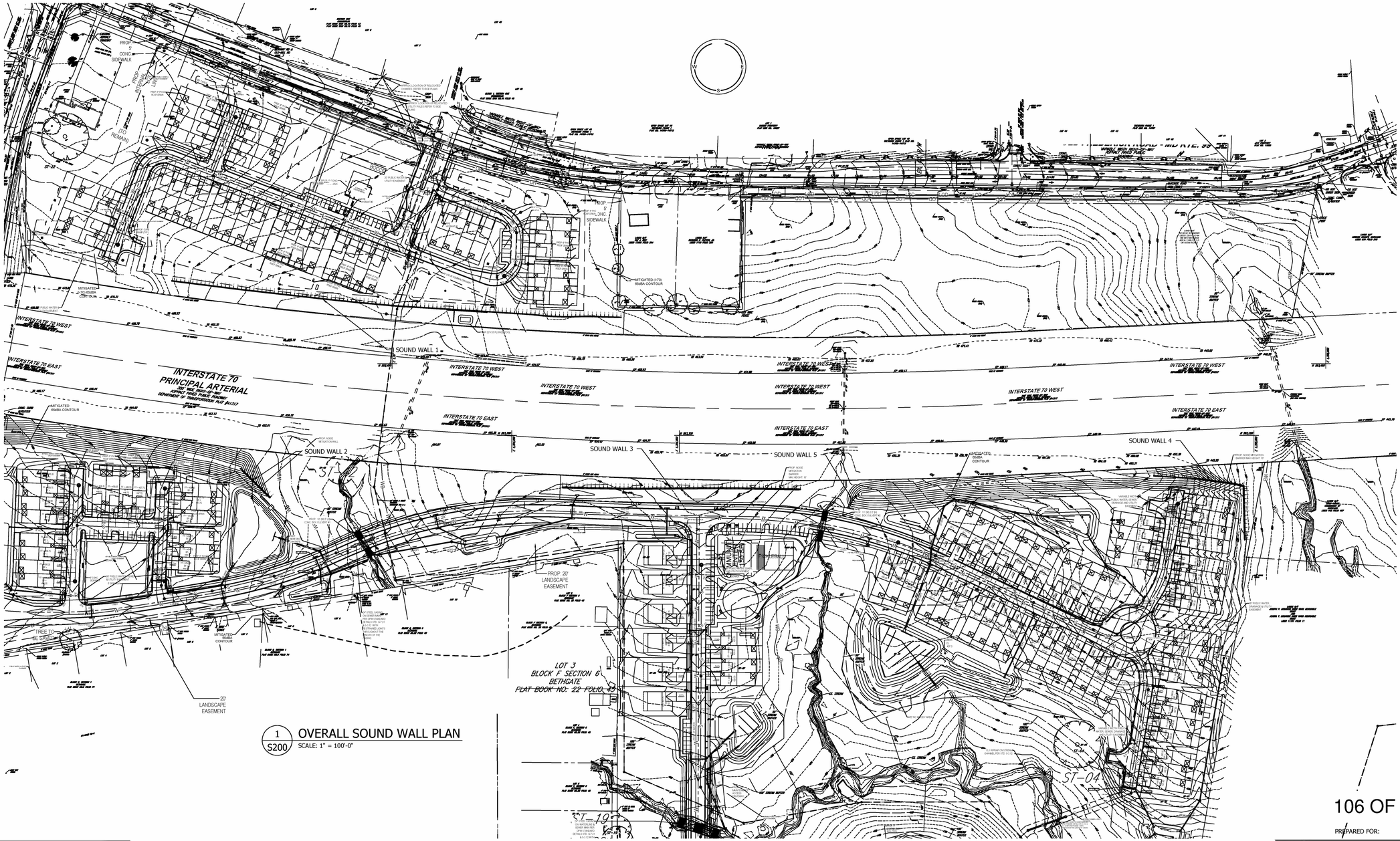

1 / S200 OVERALL SOUND WALL PLAN
SCALE: 1" = 100'-0"

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

STATE OF MARYLAND
JAMES R. EAVENSON
LIC. 61290
PROFESSIONAL ENGINEER
11/07/2023

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. 61290
Expiration Date: 6-25-25

SHEARLOCK ENGINEERING
STRUCTURAL DESIGN CONSULTANTS

REV. No.	DATE	NARRATIVE
2	11-03-2023	REVISED FOR GABION BASKET
1	09-08-2023	REVISED FOR DOOR
0	08-14-2023	ISSUED FOR PERMIT

BETHANY GLEN SOUNDWALLS
2ND ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

106 OF 117

PREPARED FOR:

PLYWALL®
THE SOUND SOLUTION
A Division of Hoover Treated Wood Products, Inc.

DATE 08-14-2023
PROJECT No. 23-040
SHEET TITLE
OVERALL SOUND WALL PLAN
OVERALL PAGE No.
SHEET No. S200

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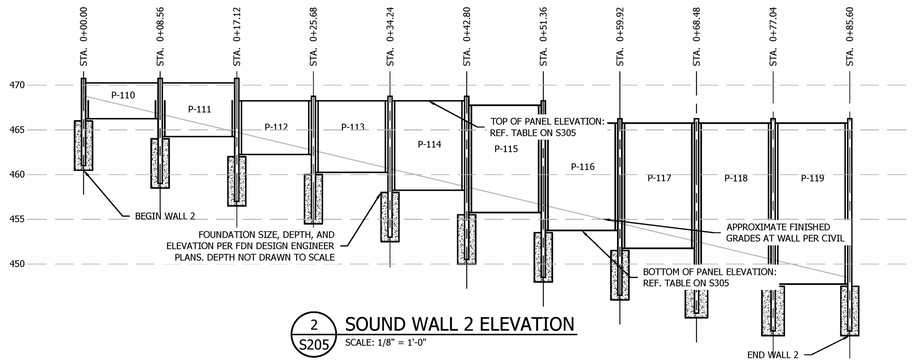
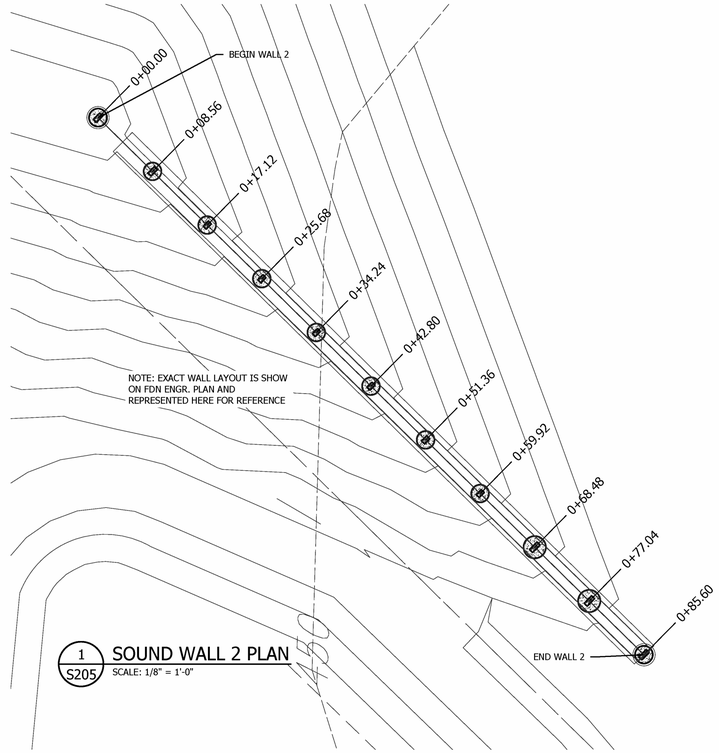


2 / S205 SOUND WALL 2 ELEVATION
SCALE: 1/8" = 1'-0"



1 / S205 SOUND WALL 2 PLAN
SCALE: 1/8" = 1'-0"

APPROVED: DEPARTMENT OF PUBLIC WORKS
Docusigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS DATE

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Docusigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT DATE
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BETHANY GLEN SOUNDWALLS
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DATE 08-14-2023
PROJECT No. 23-040
SHEET TITLE
SOUND WALL 2
OVERALL PAGE No.
SHEET No. S205

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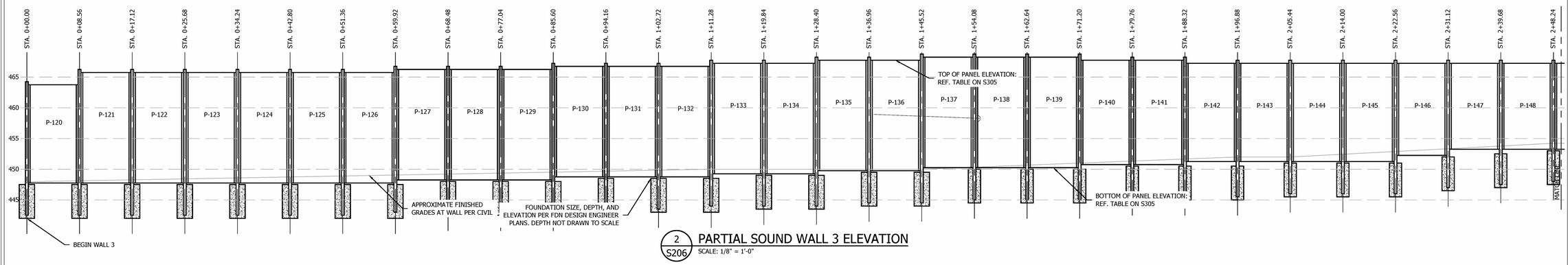

2 S206 PARTIAL SOUND WALL 3 ELEVATION
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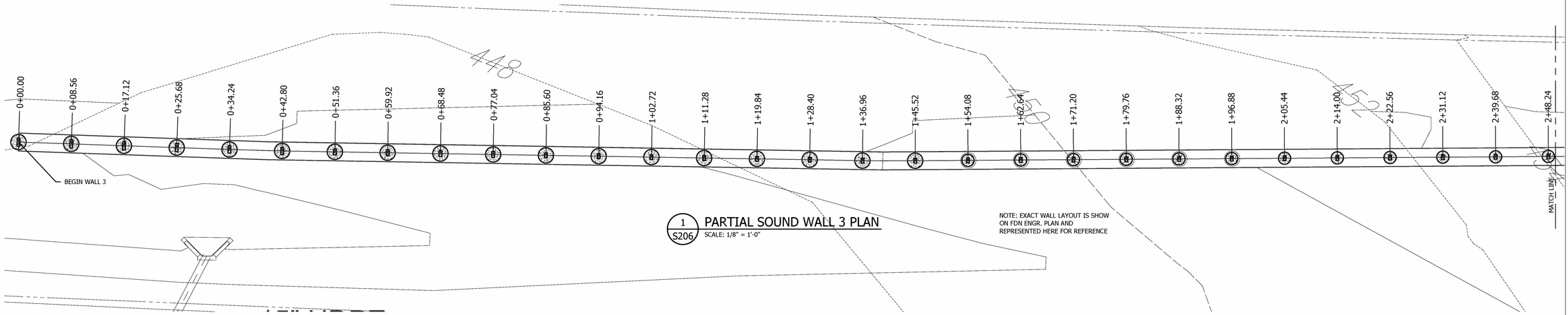

1 S206 PARTIAL SOUND WALL 3 PLAN
SCALE: 1/8" = 1'-0"

NOTE: EXACT WALL LAYOUT IS SHOW ON FDN ENGR. PLAN AND REPRESENTED HERE FOR REFERENCE

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS DATE

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6/12/2024
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6/12/2024
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PLYWALL
THE SOUND SOLUTION
A Division of Hoover Treated Wood Products, Inc.

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BETHANY GLEN SOUNDWALLS
2ND ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

DATE 08-14-2023
PROJECT No. 23-040
SHEET TITLE
PARTIAL SOUND WALL 3

OVERALL PAGE No.
SHEET No. S206

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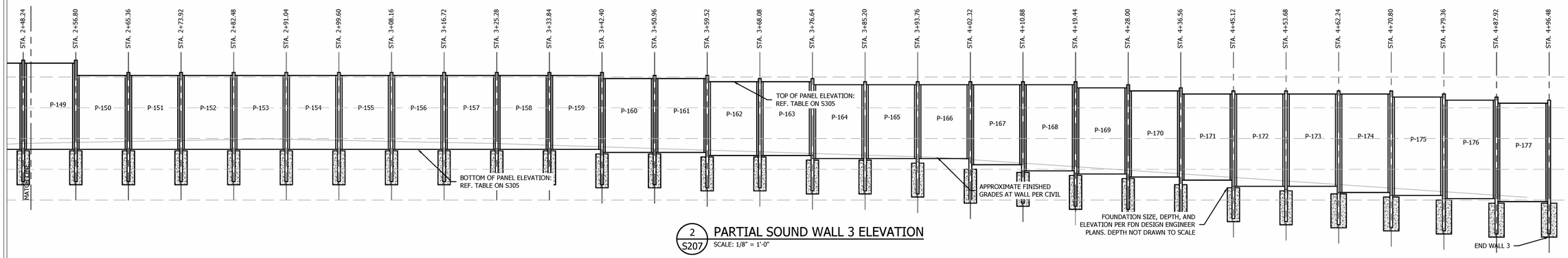
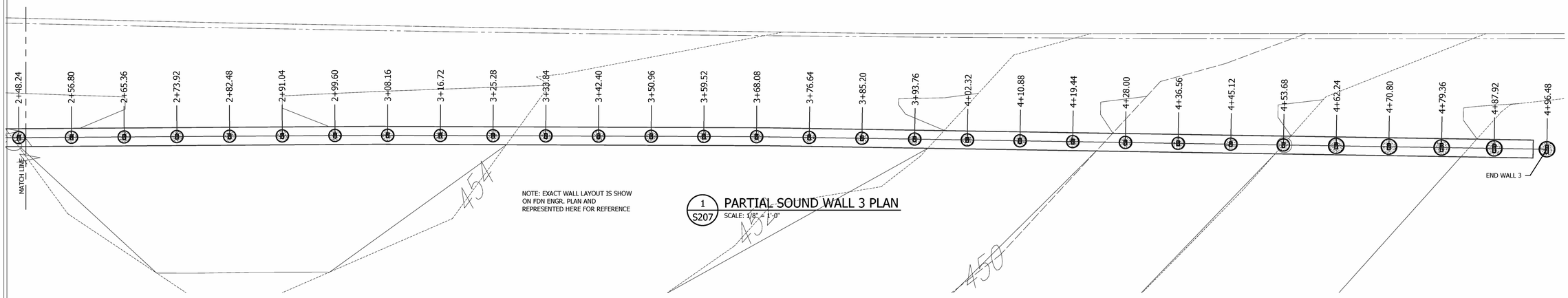


2 / S207 PARTIAL SOUND WALL 3 ELEVATION
SCALE: 1/8" = 1'-0"



NOTE: EXACT WALL LAYOUT IS SHOW ON FDN ENGR. PLAN AND REPRESENTED HERE FOR REFERENCE

1 / S207 PARTIAL SOUND WALL 3 PLAN
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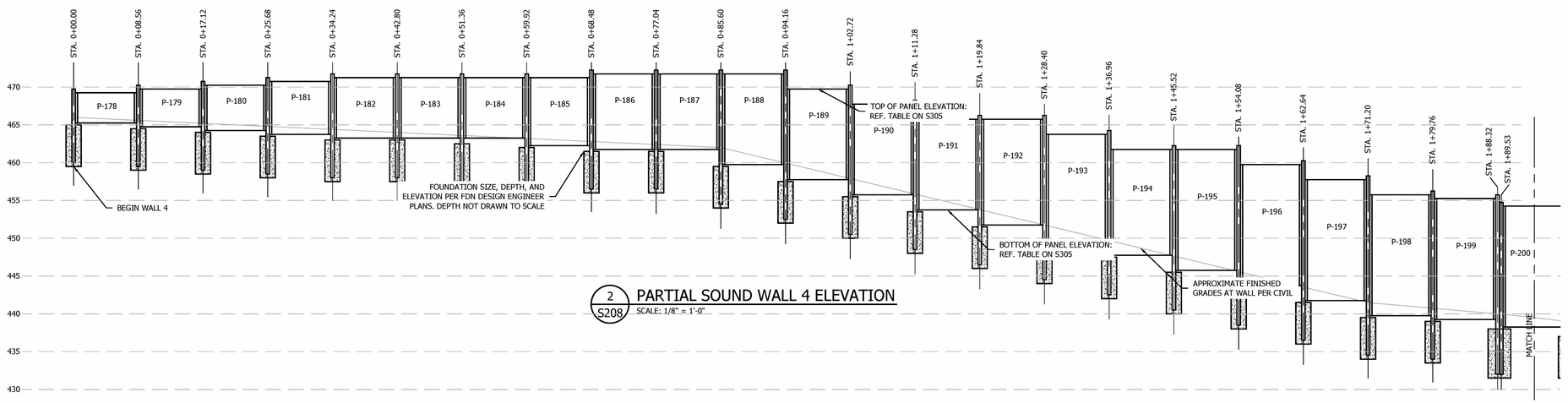
0	08-14-2023	ISSUED FOR PERMIT

BETHANY GLEN SOUNDWALLS
2ND ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

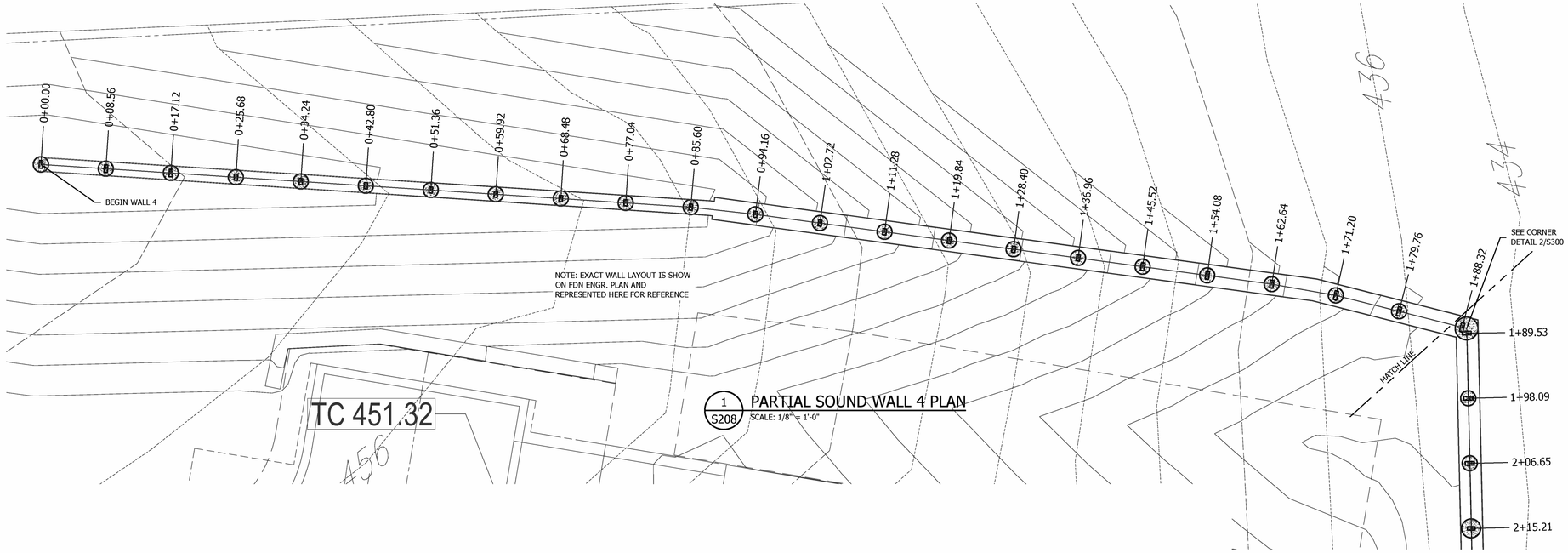
DATE: 08-14-2023
PROJECT No.: 23-040
SHEET TITLE: PARTIAL SOUND WALL 3
OVERALL PAGE No.:
SHEET No.: S207

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



2 S208 PARTIAL SOUND WALL 4 ELEVATION

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



1 S208 PARTIAL SOUND WALL 4 PLAN

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

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

110 OF 117

PREPARED FOR:

PLYWALL® THE SOUND SOLUTION
A Division of Hoover Treated Wood Products, Inc.

STATE OF MARYLAND
JAMES R. EATENSON
LIC. 61290
PROFESSIONAL ENGINEER
11/07/2023

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. 61290
Expiration Date: 6-25-25

SHEARLOCK ENGINEERING
STRUCTURAL DESIGN CONSULTANTS

REV. No.	DATE	NARRATIVE
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DATE 08-14-2023

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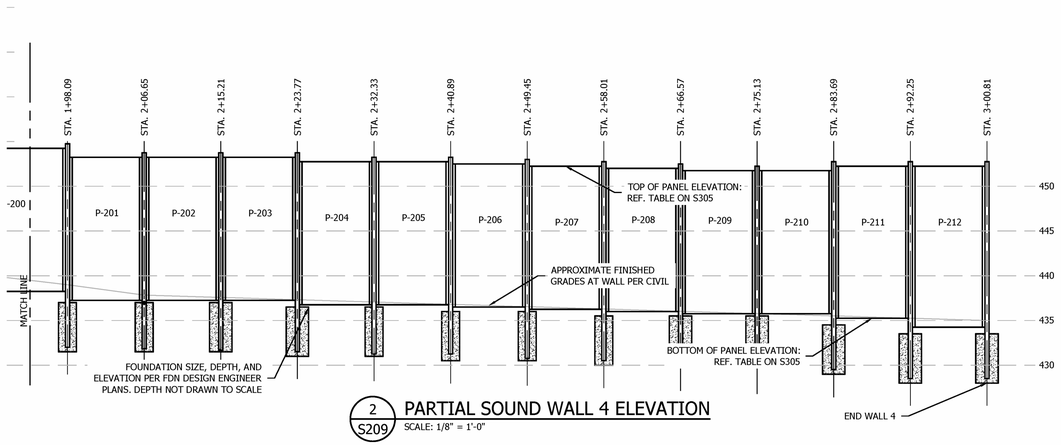
SHEET TITLE

PARTIAL SOUND WALL 4

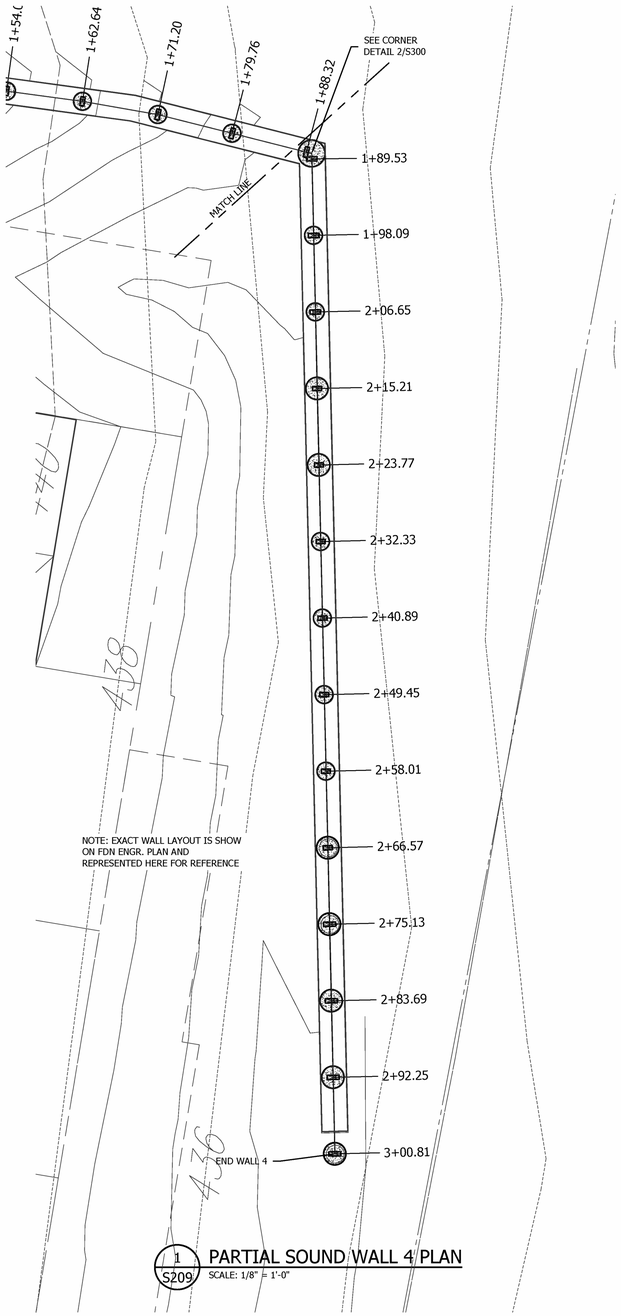
OVERALL PAGE No.

SHEET No. S208

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



2 / S209 PARTIAL SOUND WALL 4 ELEVATION
SCALE: 1/8" = 1'-0"



1 / S209 PARTIAL SOUND WALL 4 PLAN
SCALE: 1/8" = 1'-0"

APPROVED, DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED, DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

111 OF 117

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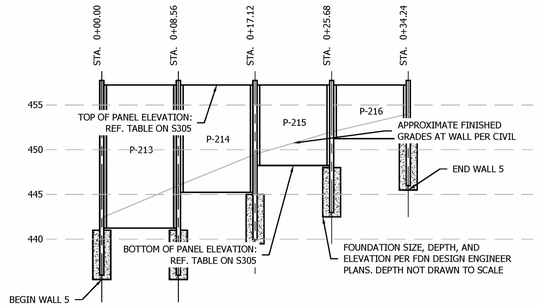
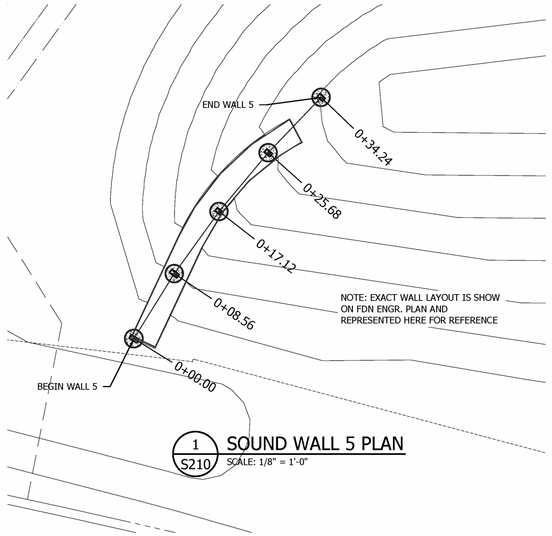
SHEET TITLE
PARTIAL SOUND WALL 4

OVERALL PAGE No.
SHEET No. S209

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



2 / S210 SOUND WALL 5 ELEVATION
SCALE: 1/8" = 1'-0"



1 / S210 SOUND WALL 5 PLAN
SCALE: 1/8" = 1'-0"

APPROVED: DEPARTMENT OF PUBLIC WORKS
6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

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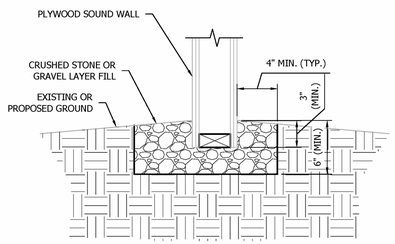
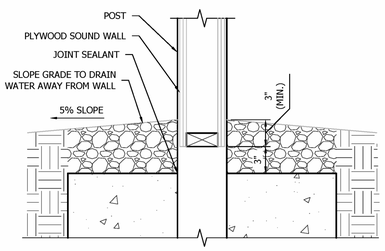
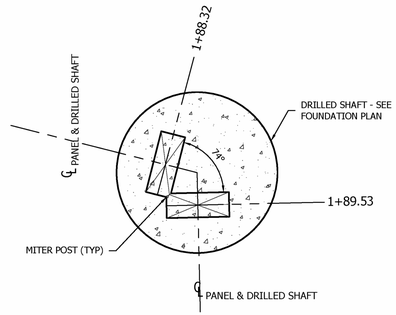
DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



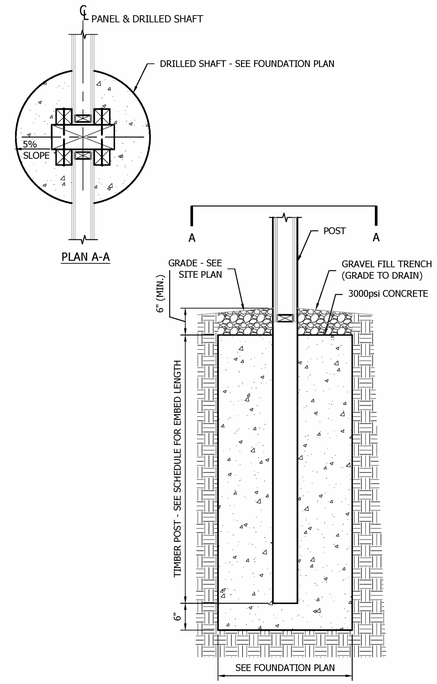
4 S300 SECTION AT GRADE
NOT TO SCALE



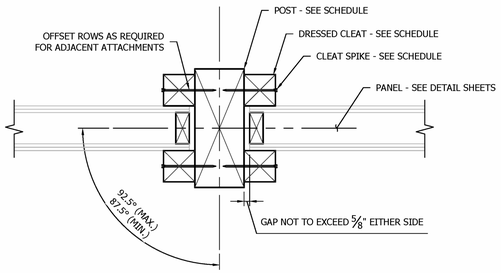
3 S300 SECTION AT TOP OF DRILLED SHAFT
NOT TO SCALE



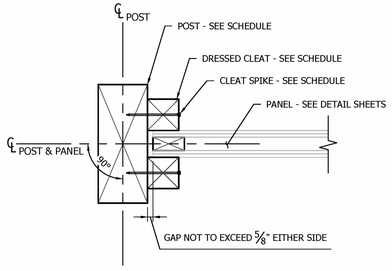
2 S300 CORNER FOUNDATION DETAIL
NOT TO SCALE



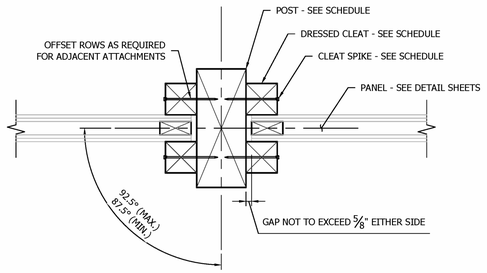
1 S300 DRILLED SHAFT DETAIL
NOT TO SCALE



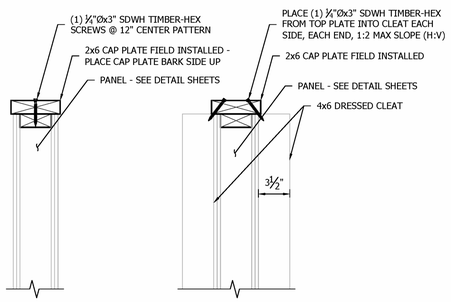
7 S300 IN-LINE POST DETAIL (PANEL 2)
NOT TO SCALE



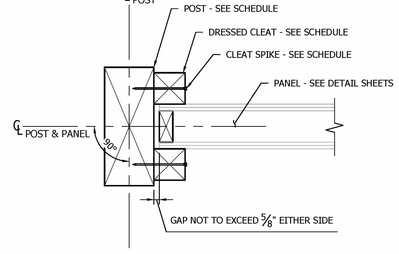
6 S300 END POST DETAIL (PANEL 1)
NOT TO SCALE



5 S300 IN-LINE POST DETAIL (PANEL 1)
NOT TO SCALE



9 S300 TYPICAL CAP PLATE DETAILS
NOT TO SCALE



8 S300 END POST DETAIL (PANEL 2)
NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

STATE OF MARYLAND
JAMES R. EATENSON
LIC. 61290
PROFESSIONAL ENGINEER
11/07/2023

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License No. 61290
Expiration Date: 6-25-25

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HOWARD COUNTY, MARYLAND

DATE 08-14-2023

PROJECT No. 23-040

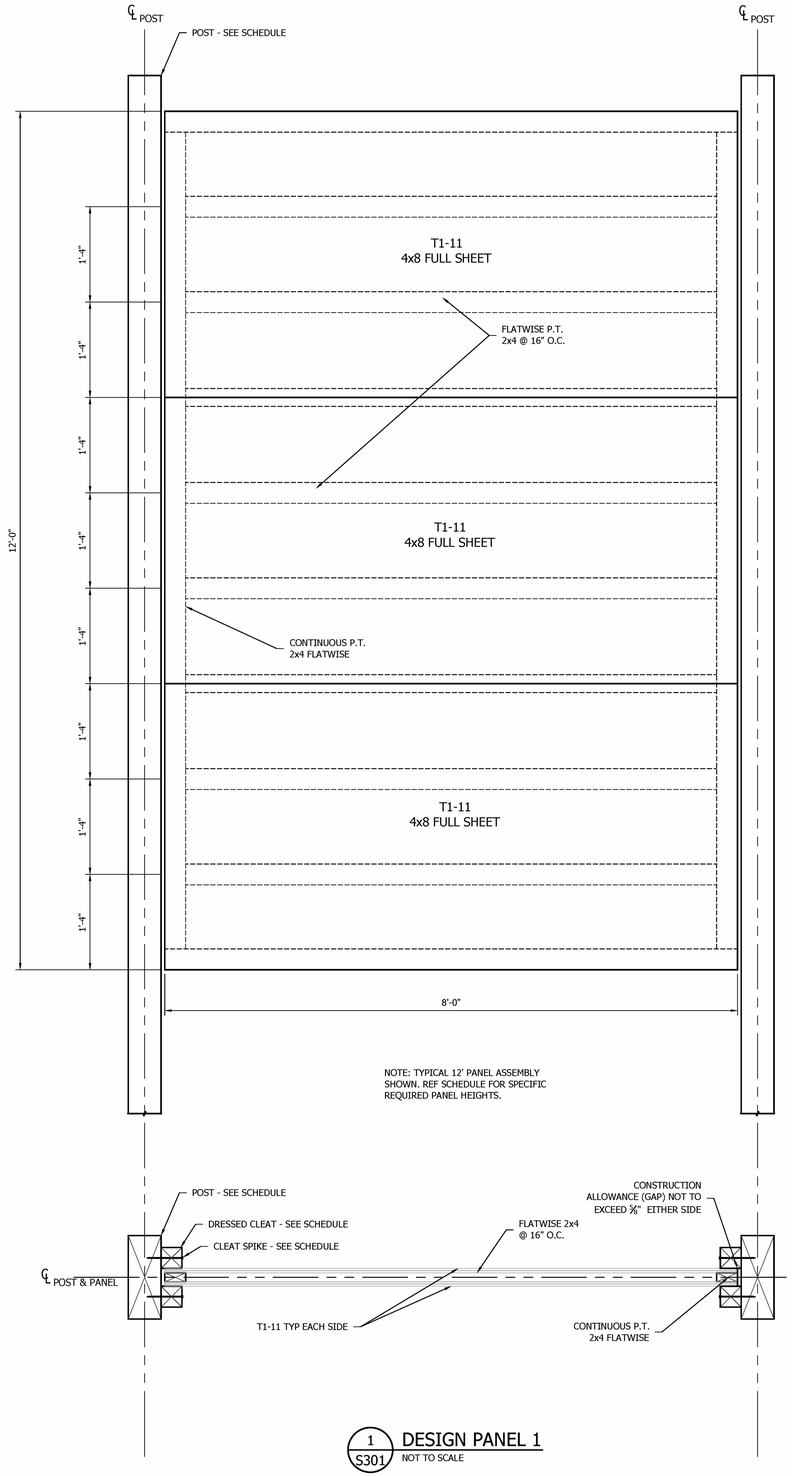
SHEET TITLE
STRUCTURAL DETAILS

OVERALL PAGE No.

SHEET No. S300

PREPARED FOR:
PLYWALL
THE SOUND SOLUTION
A Division of Hoover Treated Wood Products, Inc.

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



1 / S301 DESIGN PANEL 1
NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS
Docusigned by: 6/12/2024
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
Docusigned by: 6/12/2024
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
Docusigned by: 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

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2ND ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

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PREPARED FOR:
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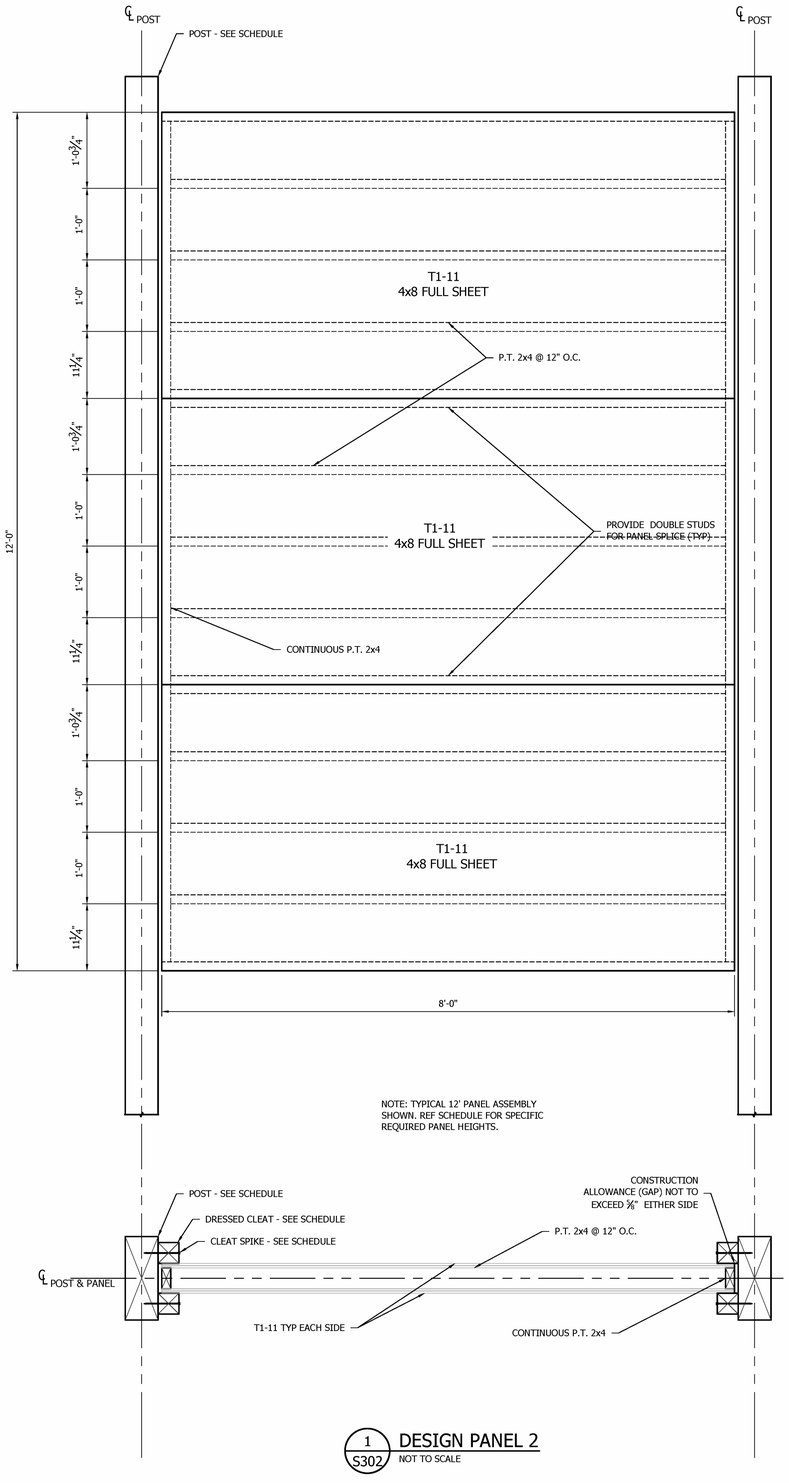
THE SOUND SOLUTION
A Division of Hoover Treated Wood Products, Inc.

DATE: 08-14-2023
PROJECT No.: 23-040
SHEET TITLE: DESIGN PANEL 1 DETAIL
OVERALL PAGE No.
SHEET No.: S301

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586



NOTE: TYPICAL 12' PANEL ASSEMBLY SHOWN. REF SCHEDULE FOR SPECIFIC REQUIRED PANEL HEIGHTS.

1 S302 DESIGN PANEL 2
NOT TO SCALE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

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SHEET TITLE
DESIGN PANEL 2 DETAIL

OVERALL PAGE No.
SHEET No. S302

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

WALL 1 PANEL DESIGN INFORMATION

ID	BEGINNING STATION	END STATION	DESIGN TYPE	HEIGHT	TOP ELEV.	BOTTOM ELEV.
P1	0+00.00	0+08.56	2	4	480.75	476.75
P2	0+08.56	0+17.12	1	4	479.75	475.75
P3	0+17.12	0+25.68	1	4	479.25	475.25
P4	0+25.68	0+34.24	1	5	479.75	474.75
P5	0+34.24	0+42.80	1	6	479.75	473.75
P6	0+42.80	0+51.36	1	6	479.25	473.25
P7	0+51.36	0+59.92	1	6	479.25	473.25
P8	0+59.92	0+68.48	1	8	480.75	472.75
P9	0+68.48	0+77.04	1	8	480.25	472.25
P10	0+77.04	0+85.60	1	8	479.75	471.75
P11	0+85.60	0+94.16	1	8	479.75	471.75
P12	0+94.16	1+02.72	1	8	479.25	471.25
P13	1+02.72	1+11.28	1	10	480.75	470.75
P14	1+11.28	1+19.84	1	10	480.75	470.75
P15	1+19.84	1+28.40	1	10	480.25	470.25
P16	1+28.40	1+36.96	1	10	480.25	470.25
P17	1+36.96	1+45.52	1	10	479.75	469.75
P18	1+45.52	1+54.08	1	10	479.25	469.25
P19	1+54.08	1+62.64	1	10	479.25	469.25
P20	1+62.64	1+71.20	1	10	479.25	469.25
P21	1+71.20	1+79.76	1	12	480.75	468.75
P22	1+79.76	1+88.32	1	12	480.75	468.75
P23	1+88.32	1+96.88	1	12	480.75	468.75
P24	1+96.88	2+05.44	1	12	480.25	468.25
P25	2+05.44	2+14.00	1	12	480.25	468.25
P26	2+14.00	2+22.56	1	12	480.25	468.25
P27	2+22.56	2+31.12	1	12	480.25	468.25
P28	2+31.12	2+39.68	1	12	479.75	467.75
P29	2+39.68	2+48.24	1	12	479.75	467.75
P30	2+48.24	2+56.80	1	12	479.75	467.75
P31	2+56.80	2+65.36	1	12	479.25	467.25
P32	2+65.36	2+73.92	1	12	479.25	467.25
P33	2+73.92	2+82.48	1	12	479.25	467.25
P34	2+82.48	2+91.04	1	12	479.25	467.25
P35	2+91.04	2+99.60	1	12	479.25	467.25
P36	2+99.60	3+08.16	1	12	479.25	467.25
P37	3+08.16	3+16.72	1	10	477.25	467.25
P38	3+16.72	3+25.28	1	10	477.25	467.25
P39	3+25.28	3+33.84	1	10	477.25	467.25
P40	3+33.84	3+42.40	1	10	477.25	467.25
P41	3+42.40	3+50.96	1	10	477.25	467.25
P42	3+50.96	3+59.52	1	10	477.25	467.25
P43	3+59.52	3+68.08	1	10	477.25	467.25
P44	3+68.08	3+76.64	1	10	477.25	467.25
P45	3+76.64	3+85.20	1	12	479.25	467.25
P46	3+85.20	3+93.76	1	12	479.25	467.25
P47	3+93.76	4+02.32	1	12	479.25	467.25
P48	4+02.32	4+10.88	1	12	479.25	467.25
P49	4+10.88	4+19.44	1	12	479.25	467.25
P50	4+19.44	4+28.00	1	12	479.25	467.25
P51	4+28.00	4+36.56	1	12	479.25	467.25
P52	4+36.56	4+45.12	1	12	479.25	467.25
P53	4+45.12	4+53.68	1	10	477.25	467.25
P54	4+53.68	4+62.24	CLEAT SIZE 1	10	477.25	467.25
P55	4+62.24	4+86.80	3	10	477.25	467.25
P56	4+86.80	4+95.36	2	10	476.75	466.75
P57	4+95.36	5+03.92	2	10	476.75	466.75
P58	5+03.92	5+12.48	2	10	476.75	466.75
P59	5+12.48	5+21.04	2	8	474.75	466.75
P60	5+21.04	5+29.60	2	8	474.75	466.75
P61	5+29.60	5+38.16	2	8	474.75	466.75
P62	5+38.16	5+46.72	2	9	474.75	465.75
P63	5+46.72	5+55.28	2	10	474.75	464.75
2 P64	5+55.28	5+63.84	2	10	474.25	464.25
P65	5+63.84	5+72.40	7	8.65	474.25	465.60
P66	5+72.40	5+80.96	7	8.65	474.25	465.60
P67	5+80.96	5+89.52	7	8.65	474.25	465.60
P68	5+89.52	5+98.08	4	10	474.25	464.25
P69	5+98.08	6+06.64	4	12	476.25	464.25
P70	6+06.64	6+15.20	4	12	476.25	464.25
P71	6+15.20	6+23.76	4	12	476.25	464.25
P72	6+23.76	6+32.32	2	12	476.75	464.75
P73	6+32.32	6+40.88	2	12	476.75	464.75
P74	6+40.88	6+49.44	2	12	476.75	464.75
P75	6+49.44	6+58.00	2	14	478.75	464.75
P76	6+58.00	6+66.56	2	14	479.25	465.25
P77	6+66.56	6+75.12	2	12	479.25	467.25
P78	6+75.12	6+83.68	2	10	478.25	468.25
P79	6+83.68	6+92.24	2	10	478.75	468.75
P80	6+92.24	7+00.80	4	10	479.75	469.75
P81	7+00.80	7+09.36	4	10	480.75	470.75
P82	7+09.36	7+17.92	4	10	481.25	471.25
P83	7+17.92	7+26.48	5	10	482.25	472.25
P84	7+26.48	7+35.04	5	10	482.75	472.75
P85	7+35.04	7+43.60	5	10	482.75	472.75
P86	7+43.60	7+52.16	5	10	483.25	473.25
P87	7+52.16	7+60.72	5	10	483.25	473.25
P88	7+60.72	7+69.28	4	10	483.75	473.75
P89	7+69.28	7+77.84	4	10	483.75	473.75
P90	7+77.84	7+86.40	2	10	483.75	473.75
P91	7+86.40	7+94.96	2	10	483.75	473.75
P92	7+94.96	8+03.52	1	10	483.75	473.75
P93	8+03.52	8+12.08	1	10	483.75	473.75
P94	8+12.08	8+20.64	1	10	483.75	473.75
P95	8+20.64	8+29.20	1	10	483.75	473.75
P96	8+29.20	8+37.76	1	10	483.75	473.75
P97	8+37.76	8+46.32	1	10	483.75	473.75
P98	8+46.32	8+54.88	1	10	483.75	473.75
P99	8+54.88	8+63.44	1	10	483.75	473.75
P100	8+63.44	8+72.00	1	8	481.75	473.75
P101	8+72.00	8+80.56	1	8	481.75	473.75
P102	8+80.56	8+89.12	1	8	481.75	473.75
P103	8+89.12	8+97.68	1	8	481.75	473.75
P104	8+97.68	9+06.24	1	8	481.75	473.75
P105	9+06.24	9+14.80	1	6	479.75	473.75
P106	9+14.80	9+23.36	1	6	479.75	473.75
P107	9+23.36	9+31.92	1	6	479.75	473.75
P108	9+31.92	9+40.48	2	6	479.75	473.75

WALL 2 PANEL DESIGN INFORMATION

ID	BEGINNING STATION	END STATION	DESIGN TYPE	HEIGHT	TOP ELEV.	BOTTOM ELEV.
P110	0+00.00	0+08.56	2	4	470.25	466.25
P111	0+08.56	0+17.12	1	6	470.25	464.25
P112	0+17.12	0+25.68	1	6	468.25	462.25
P113	0+25.68	0+34.24	1	8	468.25	460.25
P114	0+34.24	0+42.80	1	10	468.25	458.25
P115	0+42.80	0+51.36	1	12	467.75	455.75
P116	0+51.36	0+59.92	1	12	465.75	453.75
P117	0+59.92	0+68.48	1	14	465.75	451.75
P118	0+68.48	0+77.04	2	16	465.75	449.75
P119	0+77.04	0+85.60	2	18	465.75	447.75

WALL 3 PANEL DESIGN INFORMATION

ID	BEGINNING STATION	END STATION	DESIGN TYPE	HEIGHT	TOP ELEV.	BOTTOM ELEV.
P120	0+00.00	0+08.56	2	16	463.75	447.75
P121	0+08.56	0+17.12	2	18	465.75	447.75
P122	0+17.12	0+25.68	2	18	465.75	447.75
P123	0+25.68	0+34.24	1	18	465.75	447.75
P124	0+34.24	0+42.80	1	18	465.75	447.75
P125	0+42.80	0+51.36	1	18	465.75	447.75
P126	0+51.36	0+59.92	1	18	465.75	447.75
P127	0+59.92	0+68.48	1	18	466.25	448.25
P128	0+68.48	0+77.04	1	18	466.25	448.25
P129	0+77.04	0+85.60	1	18	466.25	448.25
P130	0+85.60	0+94.16	1	18	466.75	448.75
P131	0+94.16	1+02.72	1	18	466.75	448.75
P132	1+02.72	1+11.28	1	18	466.75	448.75
P133	1+11.28	1+19.84	1	18	467.25	449.25
P134	1+19.84	1+28.40	1	18	467.25	449.25
P135	1+28.40	1+36.96	1	18	467.75	449.75
P136	1+36.96	1+45.52	1	18	467.75	449.75
P137	1+45.52	1+54.08	1	18	468.25	450.25
P138	1+54.08	1+62.64	1	18	468.25	450.25
P139	1+62.64	1+71.20	1	18	468.25	450.25
P140	1+71.20	1+79.76	1	17	467.75	450.75
P141	1+79.76	1+88.32	1	17	467.75	450.75
P142	1+88.32	1+96.88	1	16	467.25	451.25
P143	1+96.88	2+05.44	1	16	467.25	451.25
P144	2+05.44	2+14.00	1	16	467.25	451.25
P145	2+14.00	2+22.56	1	16	467.25	451.25
P146	2+22.56	2+31.12	1	15	467.25	452.25
P147	2+31.12	2+39.68	1	14	467.25	453.25
P148	2+39.68	2+48.24	1	14	467.25	453.25
P149	2+48.24	2+56.80	1	14	467.25	453.25
P150	2+56.80	2+65.36	1	12	465.25	453.25
P151	2+65.36	2+73.92	1	12	465.25	453.25
P152	2+73.92	2+82.48	1	12	465.25	453.25
P153	2+82.48	2+91.04	1	12	465.25	453.25
P154	2+91.04	2+99.60	1	12	465.25	453.25
P155	2+99.60	3+08.16	1	12	465.25	453.25
P156	3+08.16	3+16.72	1	12	465.25	453.25
P157	3+16.72	3+25.28	1	12	465.25	453.25
P158	3+25.28	3+33.84	1	12	465.25	453.25
P159	3+33.84	3+42.40	1	12	465.25	453.25
P160	3+42.40	3+50.96	1	12	464.75	452.75
P161	3+50.96	3+59.52	1	12	464.75	452.75
P162	3+59.52	3+68.08	1	12	464.25	452.25
P163	3+68.08	3+76.64	1	12	464.25	452.25
P164	3+76.64	3+85.20	1	12	463.75	451.75
P165	3+85.20	3+93.76	1	12	463.75	451.75
P166	3+93.76	4+02.32	1	12	463.75	451.75
P167	4+02.32	4+10.88	1	13	463.75	450.75
P168	4+10.88	4+19.44	1	14	463.75	449.75
P169	4+19.44	4+28.00	1	14	463.25	449.25
P170	4+28.00	4+36.56	1	14	462.75	448.75
P171	4+36.56	4+45.12	1	14	462.25	448.25
P172	4+45.12	4+53.68	1	15	462.25	447.25
P173	4+53.68	4+62.24	1	15	462.25	447.25
P174	4+62.24	4+70.80	1	16	462.25	446.25
P175	4+70.80	4+79.36	1	16	461.75	445.75
P176	4+79.36	4+87.92	2	16	461.25	445.25
P177	4+87.92	4+96.48	2	16	460.75	444.75

WALL 4 PANEL DESIGN INFORMATION

ID	BEGINNING STATION	END STATION	DESIGN TYPE	HEIGHT	TOP ELEV.	BOTTOM ELEV.
P178	0+00.00	0+08.56	2	4	469.25	465.25
P179	0+08.56	0+17.12	2	5	469.75	464.75
P180	0+17.12	0+25.68	1	6	470.25	464.25
P181	0+25.68	0+34.24	1	7	470.75	463.75
P182	0+34.24	0+42.80	1	8	471.25	463.25
P183	0+42.80	0+51.36	1	8	471.25	463.25
P184	0+51.36	0+59.92	1	8	471.25	463.25
P185	0+59.92	0+68.48	1	9	471.25	462.25
P186	0+68.48	0+77.04	1	10	471.75	461.75
P187	0+77.04	0+85.60	1	10	471.75	461.75
P188	0+85.60	0+94.16	1	12	471.75	459.75
P189	0+94.16	1+02.72	1	12	469.75	457.75
P190	1+02.72	1+11.28	1	12	467.75	455.75
P191	1+11.28	1+19.84	1	12	465.75	453.75
P192	1+19.84	1+28.40	1	14	465.75	451.75
P193	1+28.40	1+36.96	1	14	463.75	449.75
P194	1+36.96	1+45.52	1	14	461.75	447.75
P195	1+45.52	1+54.08	1	16	461.75	445.75
P196	1+54.08	1+62.64	1	16	459.75	443.75
P197	1+62.64	1+71.20	1	16	457.75	441.75
P198	1+71.20	1+79.76	2	16	455.75	439.75
P199	1+79.76	1+88.32	2	16	455.25	439.25
P200	1+89.53	1+98.09	2	16	454.25	438.25
P201	1+98.09	2+06.65	2	16	453.25	437.25
P202	2+06.65	2+15.21	1	16	453.25	437.25
P203	2+15.21	2+23.77	1	16	453.25	437.25
P204	2+23.77	2+32.33	1	16	452.75	436.75
P205	2+32.33	2+40.89	1	16	452.75	436.75
P206	2+40.89	2+49.45	1	16	452.5	436.5
P207	2+49.45	2+58.01	1	16	452.25	436.25
P208	2+58.01	2+66.57	1	16	452	436
P209	2+66.57	2+75.13	1	16	451.75	435.75
P210	2+75.13	2+83.69	2	16	451.75	435.75
P211	2+83.69	2+92.25	2	17	452.25	435.25
P212	2+92.25	3+00.81	2	18	452.25	434.25

WALL 5 PANEL DESIGN INFORMATION

ID	BEGINNING STATION	END STATION	DESIGN TYPE	HEIGHT	TOP ELEV.	BOTTOM ELEV.
P213	0+00.00	0+08.56	1	16	457.25	441.25
P214	0+08.56	0+17.12	1	12	457.25	445.25
P215	0+17.12	0+25.68	1	9	457.25	448.25
P216	0+25.68	0+34.24	1	6	457.25	451.25

CLEAT SIZE AND SPIKE REQUIREMENTS

PANEL TYPE	CLEAT SIZE	CLEAT SPIKES	MIN. EMBED IN POST
DESIGN PANEL 1 (UP TO 16' HEIGHT)	3 ½"x 3 ½"	MAZE ZL 8-A-8 @ 12" O.C.	4 ½"
DESIGN PANEL 1 (OVER 16' HEIGHT)	3 ½"x 5 ½" GLULAM	MAZE ZL 10-A-10 @ 12" O.C.	4 ½"
DESIGN PANEL 2 (UP TO 16' HEIGHT)	3 ½"x 3 ½"	MAZE ZL 8-A-8 @ 12" O.C.	4 ½"
DESIGN PANEL 2 (OVER 16' HEIGHT)	3 ½"x 5 ½" GLULAM	MAZE ZL 10-A-10 @ 12" O.C.	4 ½"
DESIGN PANEL 3	3 ½"x 3 ½"	¾" x 8" COUNTERSUNK LAG BOLT @ 8" O.C.	4 ½"
DESIGN PANEL 4	3 ½"x 3 ½"	MAZE ZL 8-A-8 @ 8" O.C.	4 ½"
DESIGN PANEL 5	3 ½"x 3 ½"	MAZE ZL 8-A-8 @ 8" O.C.	4 ½"
1 DESIGN PANEL 6	3 ½"x 3 ½"	MAZE ZL 8-A-8 @ 12" O.C.	4 ½"
2 DESIGN PANEL 7	3 ½"x 3 ½"	MAZE ZL 8-A-8 @ 12" O.C.	4 ½"

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

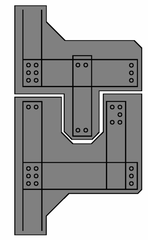
APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/12/2024

STATE OF MARYLAND
JAMES R. EATENSON
LIC. 61290
PROFESSIONAL ENGINEER
11/07/2023

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. 61290
Expiration Date: 6-25-25

SHEARLOCK ENGINEERING
STRUCTURAL DESIGN CONSULTANTS



REV. No.	DATE	NARRATIVE
2	11-03-2023	REVISED FOR GABION BASKET
1	09-08-2023	REVISED FOR DOOR
0	08-14-2023	ISSUED FOR PERMIT

BETHANY GLEN SOUNDWALLS
2ND ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

DATE 08-14-2023
PROJECT No. 23-040
SHEET TITLE
WALL PANEL SCHEDULES

PREPARED FOR:
PLYWALL
THE SOUND SOLUTION
A Division of Hoover Treated Wood Products, Inc.

OVERALL PAGE No. | SHEET No. S305

DocuSign Envelope ID: 849416FC-C500-43E1-8B51-A4417E17D586

WALL 1 POST DESIGN INFORMATION

POST STATION	POST TYPE	TOP ELEV.	TOP OF FTG	LENGTH
0+00.00	B	481.25	476.5	10.25
0+08.56	B	481.25	475.5	11.25
0+17.12	A	480.25	475	10.75
0+25.68	A	480.25	474.5	11.25
0+34.24	A	480.25	473.5	12.25
0+42.80	A	480.25	473	12.75
0+51.36	A	479.75	473	12.25
0+59.92	A	481.25	472.5	16.25
0+68.48	A	481.25	472	16.75
0+77.04	A	480.75	471.5	16.75
0+85.60	A	480.25	471.5	16.25
0+94.16	A	480.25	471	16.75
1+02.72	A	481.25	470.5	18.25
1+11.28	A	481.25	470.5	18.25
1+19.84	A	481.25	470	18.75
1+28.40	A	480.75	470	18.25
1+36.96	A	480.75	469.5	18.75
1+45.52	A	480.25	469	18.75
1+54.08	A	479.75	469	18.25
1+62.64	A	479.75	469	18.25
1+71.20	A	481.25	468.5	20.25
1+79.76	A	481.25	468.5	20.25
1+88.32	A	481.25	468.5	20.25
1+96.88	A	481.25	468	20.75
2+05.44	A	480.75	468	20.25
2+14.00	A	480.75	468	20.25
2+22.56	A	480.75	468	20.25
2+31.12	A	480.75	467.5	20.75
2+39.68	A	480.25	467.5	20.25
2+48.24	A	480.25	467.5	20.25
2+56.80	A	480.25	467	20.75
2+65.36	A	479.75	467	20.25
2+73.92	A	479.75	467	20.25
2+82.48	A	479.75	467	20.25
2+91.04	A	479.75	467	20.25
2+99.60	A	479.75	467	20.25
3+08.16	A	479.75	467	20.25
3+16.72	A	477.75	467	18.25
3+25.28	A	477.75	467	18.25
3+33.84	A	477.75	467	18.25
3+42.40	A	477.75	467	18.25
3+50.96	A	477.75	467	18.25
3+59.52	A	477.75	467	18.25
3+68.08	A	477.75	467	18.25
3+76.64	A	479.75	467	20.25
3+85.20	A	479.75	467	20.25
3+93.76	A	479.75	467	20.25
4+02.32	A	479.75	467	20.25
4+10.88	A	479.75	467	20.25
4+19.44	A	479.75	467	20.25
4+28.00	A	479.75	467	20.25
4+36.56	A	479.75	467	20.25
4+45.12	A	479.75	467	20.25
4+53.68	C	477.75	467	18.25
4+62.24	D	477.75	467	22.25
4+86.80	D	477.75	466.5	22.75
4+95.36	B	477.25	466.5	18.25
5+03.92	B	477.25	466.5	18.25
5+12.48	B	477.25	466.5	18.25
5+21.04	B	475.25	466.5	16.25
5+29.60	B	475.25	466.5	16.25
5+38.16	B	475.25	465.5	17.25
5+46.72	B	475.25	464.5	18.25
5+55.28	B	475.25	464	18.75
5+63.84	B	474.75	464	18.25
5+72.40	B	474.75	464	18.25
5+80.96	C	474.75	464	18.25
5+89.52	C	474.75	464	18.25
5+98.08	C	476.75	464	22.25
6+06.64	C	476.75	464	22.25
6+15.20	C	476.75	464	22.25
6+23.76	B	477.25	464	22.75
6+32.32	B	477.25	464.5	22.25
6+40.88	B	477.25	464.5	22.25
6+49.44	B	479.25	464.5	24.25
6+58.00	B	479.75	464.5	22.75
6+66.56	B	479.75	465	22.25
6+75.12	B	479.75	467	20.25
6+83.68	B	479.25	468	18.75
6+92.24	C	480.25	468.5	19.25
7+00.80	C	481.25	469.5	19.25
7+09.36	D	481.75	470.5	18.75
7+17.92	D	482.75	471	19.25
7+26.48	D	483.25	472	18.75
7+35.04	D	483.25	472.5	18.25
7+43.60	D	483.75	472.5	18.75
7+52.16	D	483.75	473	18.25
7+60.72	C	484.25	473	18.75
7+69.28	C	484.25	473.5	18.25
7+77.84	B	484.25	473.5	18.25
7+86.40	B	484.25	473.5	18.25
7+94.96	A	484.25	473.5	18.25
8+03.52	A	484.25	473.5	18.25
8+12.08	A	484.25	473.5	18.25
8+20.64	A	484.25	473.5	18.25
8+29.20	A	484.25	473.5	18.25
8+37.76	A	484.25	473.5	18.25
8+46.32	A	484.25	473.5	18.25
8+54.88	A	484.25	473.5	18.25
8+63.44	A	484.25	473.5	18.25
8+72.00	A	482.25	473.5	16.25
8+80.56	A	482.25	473.5	16.25
8+89.12	A	482.25	473.5	16.25
8+97.68	A	482.25	473.5	16.25
9+06.24	A	482.25	473.5	16.25
9+14.80	A	480.25	473.5	14.25
9+23.36	A	480.25	473.5	12.25
9+31.92	B	480.25	473.5	12.25
9+40.48	B	480.25	473	12.75

WALL 2 POST DESIGN INFORMATION

POST STATION	POST TYPE	TOP ELEV.	TOP OF FTG	LENGTH
0+00.00	B	470.75	466	10.25
0+08.56	B	470.75	464	12.25
0+17.12	A	470.75	462	14.25
0+25.68	A	468.75	460	16.25
0+34.24	A	468.75	458	18.25
0+42.80	A	468.75	455.5	20.75
0+51.36	A	468.25	453.5	22.25
0+59.92	A	466.25	451.5	22.25
0+68.48	C	466.25	449.5	26.25
0+77.04	C	466.25	447.5	30.25
0+85.60	C	466.25	447.5	26.25

WALL 3 POST DESIGN INFORMATION

POST STATION	POST TYPE	TOP ELEV.	TOP OF FTG	LENGTH
0+00.00	D	464.25	447.5	26.25
0+08.56	D	466.25	447.5	30.25
0+17.12	D	466.25	447.5	30.25
0+25.68	D	466.25	447.5	28.25
0+34.24	C	466.25	447.5	28.25
0+42.80	C	466.25	447.5	28.25
0+51.36	B	466.25	447.5	28.25
0+59.92	B	466.75	447.5	28.75
0+68.48	B	466.75	448	28.25
0+77.04	B	466.75	448	28.25
0+85.60	A	467.25	448	28.75
0+94.16	A	467.25	448.5	28.25
1+02.72	A	467.25	448.5	28.25
1+11.28	A	467.75	448.5	28.75
1+19.84	A	467.75	449	28.25
1+28.40	A	468.25	449	28.75
1+36.96	A	468.25	449.5	28.25
1+45.52	A	468.75	449.5	28.75
1+54.08	A	468.75	450	26.25
1+62.64	A	468.75	450	26.25
1+71.20	A	468.75	450	26.25
1+79.76	A	468.25	450.5	25.25
1+88.32	A	468.25	450.5	25.25
1+96.88	A	467.75	450.5	24.75
2+05.44	A	467.75	451	24.25
2+14.00	A	467.75	451	24.25
2+22.56	A	467.75	451	24.25
2+31.12	A	467.75	452	23.25
2+39.68	A	467.75	452.5	22.75
2+48.24	A	467.75	453	22.25
2+56.80	A	467.75	453	22.25
2+65.36	A	465.75	453	20.25
2+73.92	A	465.75	453	20.25
2+82.48	A	465.75	453	20.25
2+91.04	A	465.75	453	20.25
2+99.60	A	465.75	453	20.25
3+08.16	A	465.75	453	20.25
3+16.72	A	465.75	453	20.25
3+25.28	A	465.75	453	20.25
3+33.84	A	465.75	453	20.25
3+42.40	A	465.75	452.5	20.75
3+50.96	A	465.25	452.5	20.25
3+59.52	A	465.25	452	20.75
3+68.08	A	464.75	452	20.25
3+76.64	A	464.75	451.5	20.75
3+85.20	A	464.25	451.5	20.25
3+93.76	A	464.25	451	20.75
4+02.32	A	464.25	450	21.75
4+10.88	A	464.25	449.5	22.25
4+19.44	A	464.25	449	22.75
4+28.00	A	463.75	448.5	22.75
4+36.56	A	463.25	447.5	23.25
4+45.12	A	462.75	447	23.25
4+53.68	A	462.75	446.5	23.75
4+62.24	B	462.75	446	26.25
4+70.80	B	462.75	445.5	26.75
4+79.36	D	462.25	445	28.75
4+87.92	D	461.75	444.5	28.75
4+96.48	D	461.25	444.5	26.25

WALL 4 POST DESIGN INFORMATION

POST STATION	POST TYPE	TOP ELEV.	TOP OF FTG	LENGTH
0+00.00	B	469.75	465	10.25
0+08.56	B	470.25	464.5	11.25
0+17.12	B	470.75	464	12.25
0+25.68	A	471.25	463.5	15.25
0+34.24	A	471.75	463	16.25
0+42.80	A	471.75	463	16.25
0+51.36	A	471.75	462.5	16.75
0+59.92	A	471.75	462	17.25
0+68.48	A	472.25	461.5	18.25
0+77.04	A	472.25	461.5	18.25
0+85.60	A	472.25	459.5	20.25
0+94.16	A	472.25	457.5	22.25
1+02.72	A	470.25	455.5	22.25
1+11.28	A	468.25	453.5	22.25
1+19.84	A	466.25	451.5	22.25
1+28.40	A	466.25	449.5	24.25
1+36.96	A	464.25	447.5	24.25
1+45.52	B	462.25	445.5	24.25
1+54.08	B	462.25	443.5	26.25
1+62.64	B	460.25	441.5	26.25
1+71.20	C	458.25	439.5	26.25
1+79.76	C	456.25	439	24.75
1+88.32	C	455.75	438	29.25
1+89.53	C	455.75	438	29.25
1+98.09	C	454.75	437	25.25
2+06.65	C	453.75	437	24.25
2+15.21	B	453.75	437	24.25
2+23.77	B	453.75	436.5	24.75
2+32.33	B	453.25	436.5	24.25
2+40.89	B	453.25	436	24.75
2+49.45	B	453	436	24.5
2+58.01	B	452.75	435.5	24.75
2+66.57	B	452.5	435.5	26.5
2+75.13	D	452.25	435.5	26.25
2+83.69	D	452.75	434.5	27.75
2+92.25	D	452.75	433.5	30.75
3+00.81	D	452.75	433.5	28.75

WALL 5 POST DESIGN INFORMATION

POST STATION	POST TYPE	TOP ELEV.	TOP OF FTG	LENGTH
0+00.00	B	457.75	441	24.25
0+08.56	B	457.75	441	24.25
0+17.12	A	457.75	445	20.25
0+25.68	A	457.75	448	15.25
0+34.24	A	457.75	451	12.25

POST SCHEDULE

GLULAM POST	WIDTH	DEPTH	HEIGHT
POST A	0'-5 ½"	0'-9 ½"	VARIES SEE SCHEDULE
POST B	0'-5 ½"	0'-11 ⅞"	VARIES SEE SCHEDULE
POST C	0'-5 ½"	0'-14"	VARIES SEE SCHEDULE
POST D	0'-5 ½"	0'-16"	VARIES SEE SCHEDULE

APPROVED, DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 6/12/2024

APPROVED, DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 6/12/2024

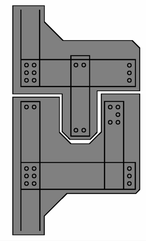
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

STATE OF MARYLAND
JAMES R. EATENSON
LIC. 61290
PROFESSIONAL ENGINEER
11/07/2023

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. 61290
Expiration Date: 6-25-25

SHEARLOCK ENGINEERING
STRUCTURAL DESIGN CONSULTANTS



REV. No.	DATE	NARRATIVE
2	11-03-2023	REVISED FOR GABION BASKET
1	09-08-2023	REVISED FOR DOOR
0	08-14-2023	ISSUED FOR PERMIT

BETHANY GLEN SOUNDWALLS
2ND ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

DATE 08-14-2023

PROJECT No. 23-040

SHEET TITLE
POST SCHEDULES

OVERALL PAGE No.

SHEET No. S306

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PREPARED FOR:
PLYWALL®
THE SOUND SOLUTION
A Division of Hoover Treated Wood Products, Inc.