8/17/99

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032125 ENGINEER STACIE E MITCHELL

DocuSigned by: Stacie Mitchell 04/26/2025

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NAD 83

N 21°10'40" E 29.99'

S 68°49'14" E 20.62'

N 42°45'39" E 86.26'

N 40°43'55" E 76.02'

N 23°00'00" W 90.22'

17' CONC

16' CONC

EASEMENT SIGN EASEMENT

15' PROTECTED DRAINAGE AREA REF PB 139 PG 48

10' PUBLIC WALKWAY EASEMENT REF PB 139 PG 48

15' ELECTRIC UTILITY EASEMENT REF PB 139 PG 48

-WALL1- Sta.10+50.00 = -L- Sta.42+00.00 OFF 56.50' LT

TYPE B-77

EXISTING R/W

S 39°46'59.6" W

-WALL1-

GREU TL-3

HIGH POINT CITY LIMITS

WOODS

TELEPHONE CABINETS

END RETAINING WALL 1 BEGIN CONC.BARRIER -WALL1- Sta.11+00.00 = -L- Sta.41+50.00 OFF 56.50' LT

PLUG

-WALL1- Sta.10+25.00 = -L- Sta.42+25.00 OFF 56.50' LT

-WALL1- Sta.10+75.00 = -L- Sta.41+75.00 OFF 56.50' LT

BEGIN RETAINING WALL 1 END CONC.BARRIER -WALL1- Sta.10+00.00 = -L- Sta.42+50.00 OFF 56.50' LT

SR 1818 JOHNSON STREET

-L-

CONCRETE MONUMENT

EIP

20 10 0 20 40

PLANS

-WALL1- ENVELOPE

APPROXIMATE WALL FACE AREA = 522 SQFT

-WALL1- Sta.10+50.00 = -L- Sta.42+00.00 OFF 56.50' LT EL = 852.22'

-WALL1- Sta.10+25.00 = -L- Sta.42+25.00 OFF 56.50' LT EL = 852.02'

-WALL1- Sta.10+75.00 = -L- Sta.41+75.00 OFF 56.50' LT EL = 852.48'

GRADE ELEVATION

END RETAINING WALL 1 -WALL1- Sta.11+00.00 = -L- Sta.41+50.00 OFF 56.50' LT EL = 852.78'

BEGIN RETAINING WALL 1 -WALL1- Sta.10+00.00 = -L- Sta.42+50.00 OFF 56.50' LT EL = 851.88'

852
848
844
840
836

PI = 10+00.00 EL = 843.91'

PI = 10+25.00 EL = 844.16'

PI = 10+50.00 EL = 845.91'

PI = 10+75.00 EL = 848.23'

PI = 10+93.75 EL = 849.65'

EXISTING GROUND LINE

BOTTOM OF THE WALL

20 10 0 20 40
PROFILE (HORIZONTAL)

4 2 0 4 8
PROFILE (VERTICAL)

PROJECT NO.: U-4758

GUILFORD COUNTY

STATION: -L- 42+50 TO -L- 41+50

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL
WALL 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-1
2	-	-	4	-	-	

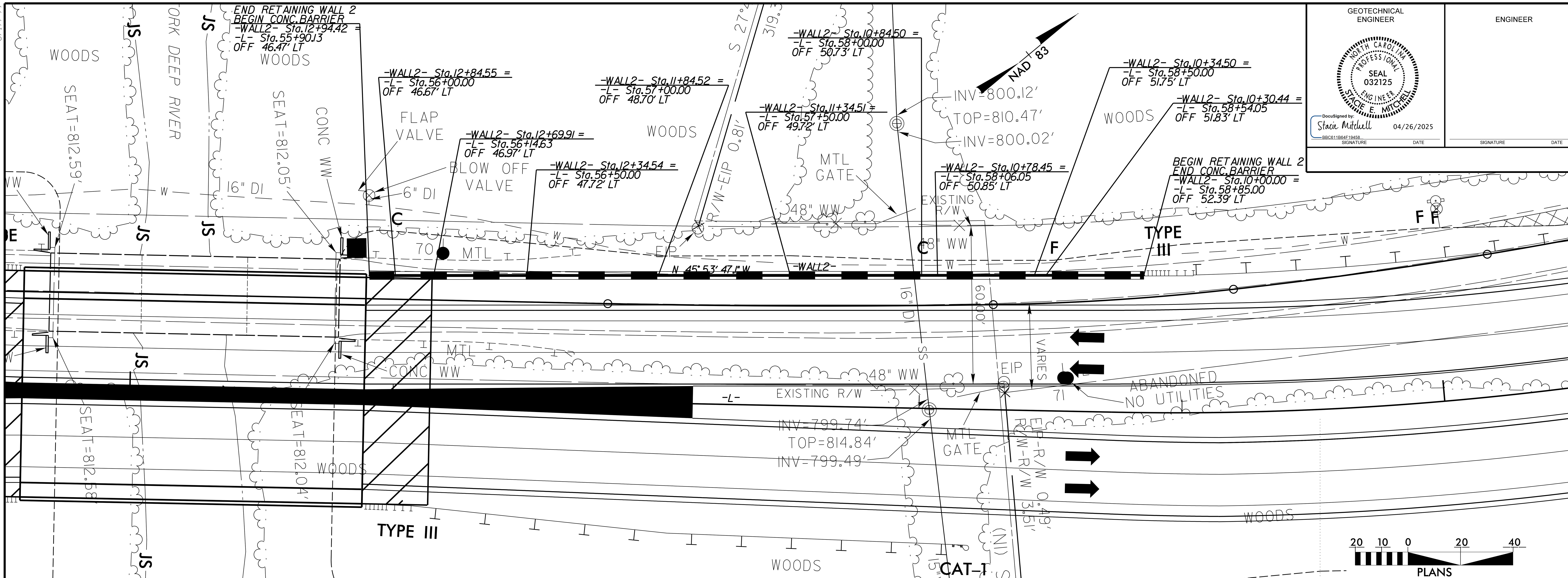
PREPARED BY: SEM	DATE: 10/3/23
REVIEWED BY: KHH	DATE: 10/3/23

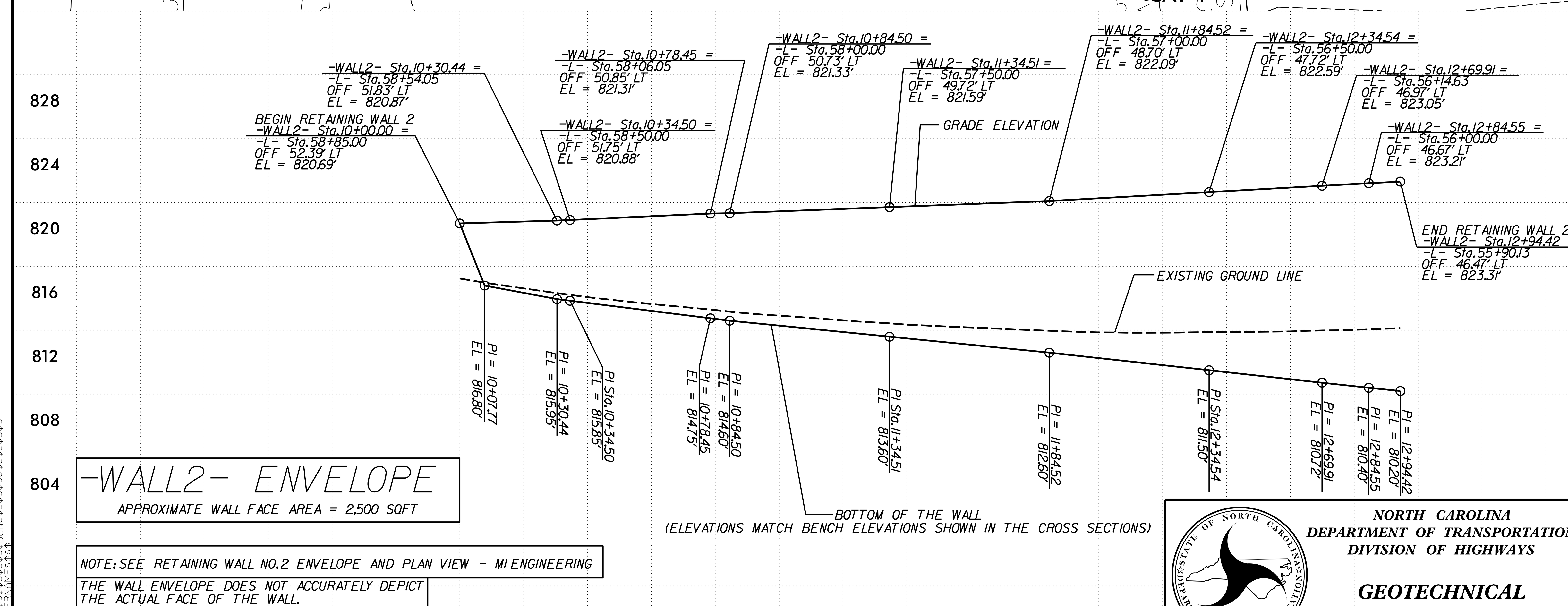
10 11

$$$$SYSTIME$$$$ $$$$SYSDATE$$$$

GEOTECHNICAL ENGINEER
SEAL 032125 NORTH CAROLINA PROFESSIONAL ENGINEER STACIE E. MITCHELL
DocuSigned by: Stacie Mitchell 04/26/2025
BBC611B64F19458...
SIGNATURE DATE

ENGINEER
SIGNATURE DATE





PROPOSED WALL TIES TO BRIDGE STRUCTURE ABUTMENT.

20 10 0 20 40
PROFILE (HORIZONTAL)

4 2 0 4 8
PROFILE (VERTICAL)

-WALL2- ENVELOPE

APPROXIMATE WALL FACE AREA = 2,500 SQFT

NOTE: SEE RETAINING WALL NO.2 ENVELOPE AND PLAN VIEW - MI ENGINEERING

THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL.

PROJECT NO.: U-4758

GUILFORD COUNTY

STATION: -L- 58+85 TO -L- 55+90.13

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL
WALL 2

PREPARED BY: SEM	DATE: 10/3/23
REVIEWED BY: KHH	DATE: 10/3/23

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	_		3	_	_
2	_		4		

SHEET NO. W-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032125 ENGINEER STACIE E. MITCHELL

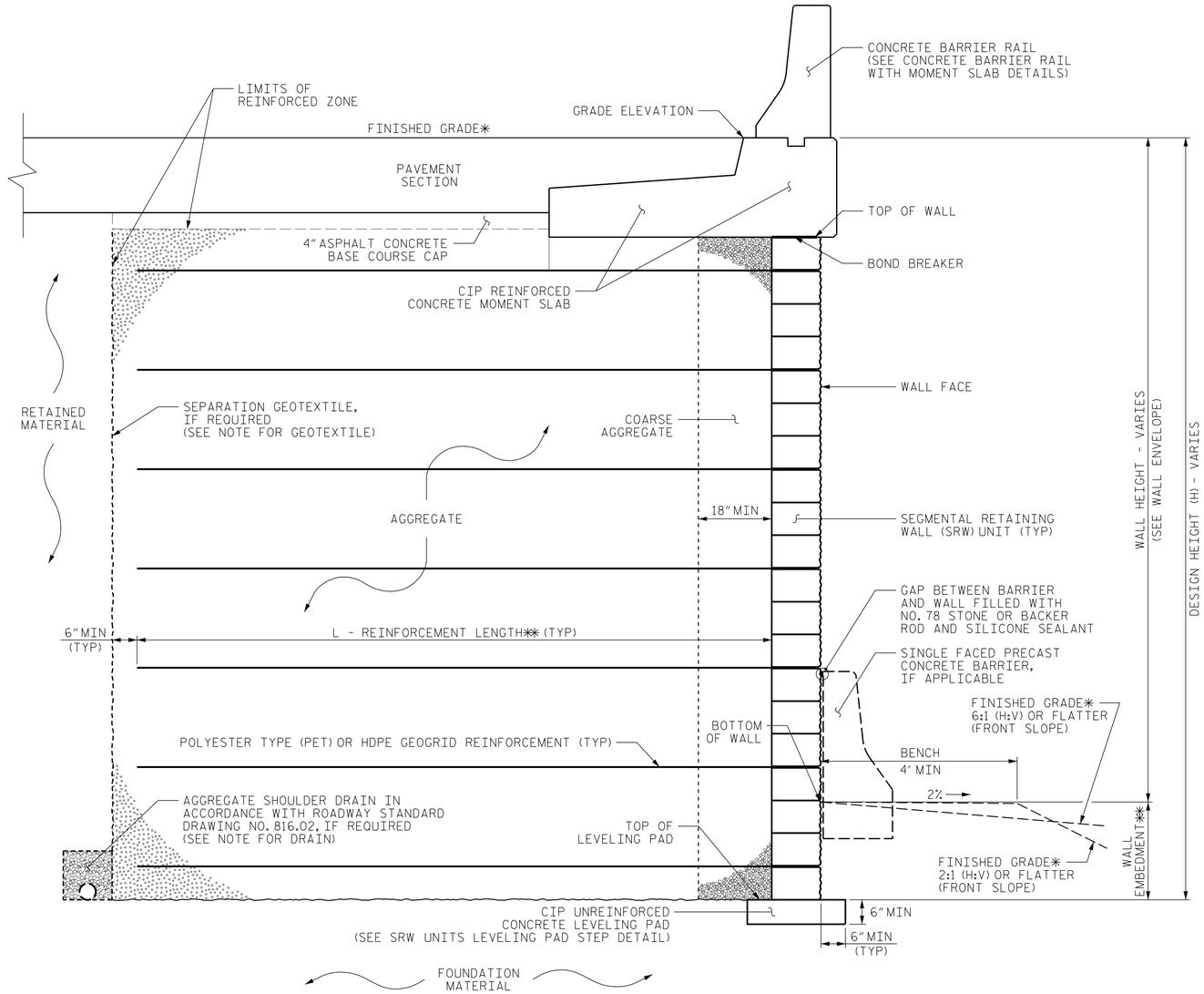
DocuSigned by: Stacie Mitchell BBC611B64F19458

04/26/2025

SIGNATURE DATE

ENGINEER

SIGNATURE DATE



MSE WALL WITH SRW UNITS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: U-4758

GUILFORD COUNTY

STATION: -L- 42+50 TO -L- 41+50

PREPARED BY: SEM	DATE: 04/16/25
REVIEWED BY: KHH	DATE: 04/16/25

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO.1 TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-3
1			3			
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032125 ENGINEER STACIE E. MITCHELL

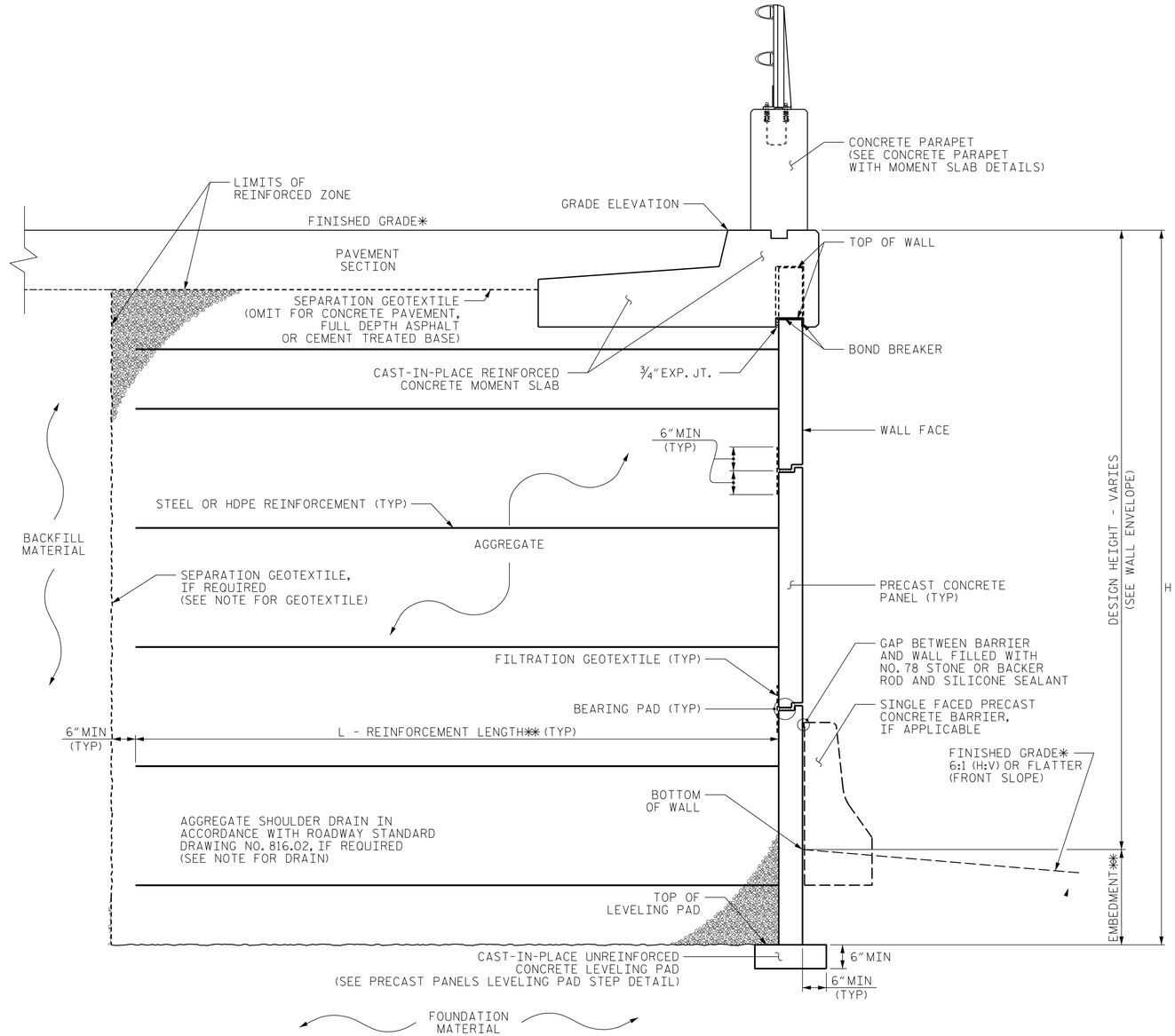
DocuSigned by: Stacie Mitchell BBC611B6AF10408...

04/26/2025

SIGNATURE DATE

ENGINEER

SIGNATURE DATE



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: U-4758

GUILFORD COUNTY

STATION: -L- 58+85 TO -L- 55+90.13

PREPARED BY: SEM	DATE: 04/16/25
REVIEWED BY: KHH	DATE: 04/16/25

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL
NO. 2
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-4
1			3			
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032125 ENGINEER STACIE E. MITCHELL

DocuSigned by: Stacie Mitchell BBC611B64F1D465...

04/26/2025

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 1

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 1 AND NO. 2.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 AND NO. 2.

A DRAIN IS NOT REQUIRED FOR RETAINING WALL NO. 1 AND NO. 2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 AND NO. 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 2,500 LB/SF FOR WALL NO. 1 AND 4,000 LB/SF FOR WALL NO. 2
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H OR 6 FT, WHICHEVER IS LONGER
5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

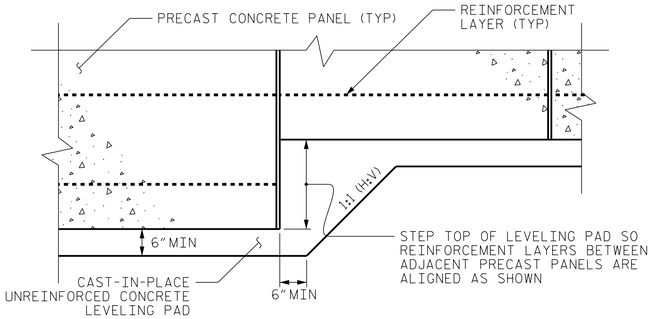
MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION WALL 1	120	28	0
FOUNDATION WALL 2	120	30	0

DESIGN RETAINING WALL NO. 1 AND NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

FOUNDATIONS FOR SIGNS, LIGHTING MAY BE LOCATED BEHIND RETAINING WALLS AND MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: U-4758

GUILFORD COUNTY

STATION: VARIOUS

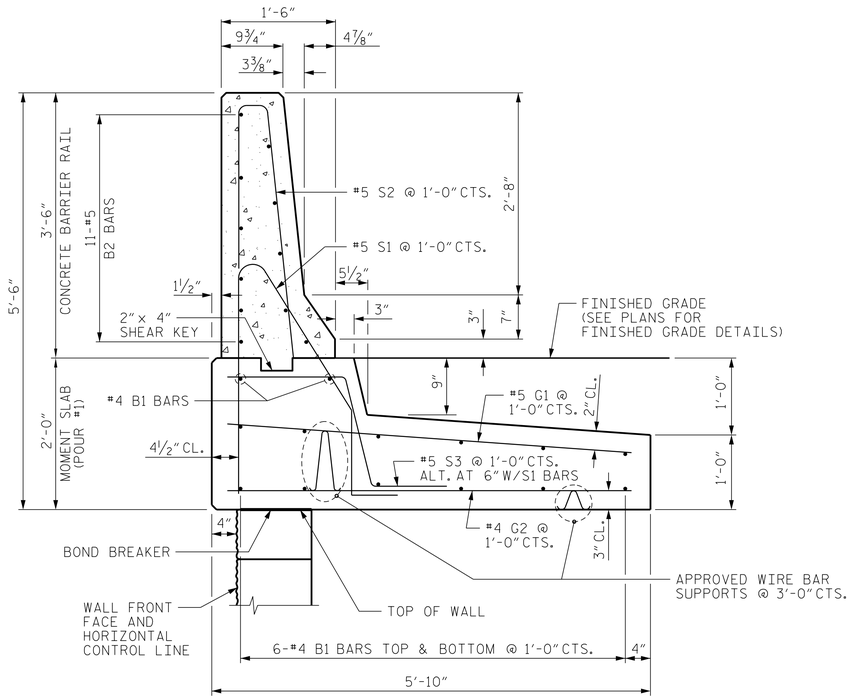
PREPARED BY: SEM	DATE: 04/16/25
REVIEWED BY: KHH	DATE: 04/16/25

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

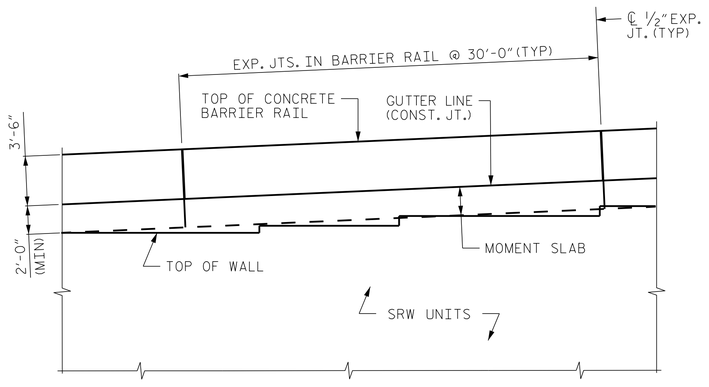
GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NOTES & DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-5
2			4			



CONCRETE BARRIER RAIL WITH MOMENT SLAB



CONCRETE BARRIER RAIL WITH MOMENT SLAB - PARTIAL ELEVATION

NOTES:

FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB, SEE SECTION 460 OF THE STANDARD SPECIFICATIONS.

CONCRETE BARRIER RAIL WITH MOMENT SLAB SHALL BE A MINIMUM OF 15' IN LENGTH.

EXPANSION JOINTS SHALL BE PLACED IN THE BARRIER RAIL AND MOMENT SLAB AT A MAXIMUM SPACING OF 30'.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED SURFACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MID-POINT OF BARRIER RAIL SEGMENTS LESS THAN 20' IN LENGTH.

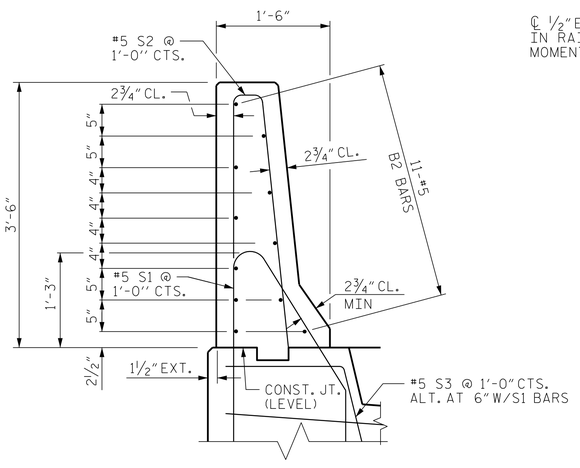
THE BARRIER RAIL SHALL NOT BE CAST UNTIL THE MOMENT SLAB HAS ATTAINED AN AGE OF THREE CURING DAYS OR A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. IN ADDITION, NO FILL MATERIAL, ASPHALT, OR CONSTRUCTION EQUIPMENT IS ALLOWED ON THE MOMENT SLAB PRIOR TO SATISFYING THE MINIMUM CONCRETE CURING AND STRENGTH REQUIREMENTS.

ALL REINFORCING STEEL IN THE BARRIER RAIL SHALL BE EPOXY COATED.

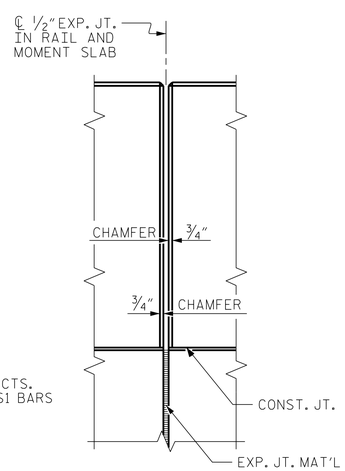
IF STEPS ARE REQUIRED AT TOP OF WALL, DETAILS SHOWING INTERFACE BETWEEN BOTTOM OF MOMENT SLAB AND STEPS SHALL BE SUBMITTED FOR APPROVAL.

IF EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, BARRIERS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH CONCRETE BARRIER RAIL WITH MOMENT SLAB, CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS SHALL BE REVISED AND SUBMITTED FOR APPROVAL.

CONCRETE BARRIER RAIL WITH MOMENT SLAB
PAY LENGTH = 100 LIN FT



SECTION THRU RAIL



ELEV. @ EXP. JOINTS

BARRIER RAIL DETAILS

STRUCTURE ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032125 ENGINEER STACIE E. MITCHELL

DocuSigned by: Stacie Mitchell BBC611B64E8D4F8...

04/26/2025

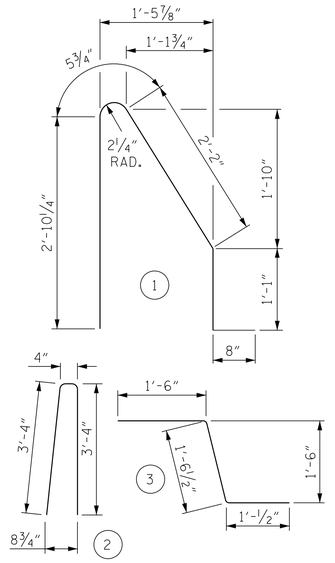
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE 30'-0" SECTION OF CONCRETE BARRIER RAIL WITH MOMENT SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#4	STR	29'-7"	277
✳ B2	11	#5	STR	29'-7"	339
G1	31	#5	STR	5'-6"	178
G2	31	#4	STR	5'-6"	114
✳ S1	31	#5	1	7'-3"	234
✳ S2	31	#5	2	7'-0"	226
S3	30	#5	3	4'-1"	128

REINFORCING STEEL	697 LB
✳ EPOXY COATED REINFORCING STEEL	799 LB
CLASS AA CONCRETE BARRIER RAIL	4.1 CY
CLASS A CONCRETE MOMENT SLAB	9.1 CY
CONCRETE BARRIER RAIL WITH MOMENT SLAB	30 LIN FT

PROJECT NO.: U-4758

GUILFORD COUNTY

STATION: -L- 42+50 TO -L- 41+50

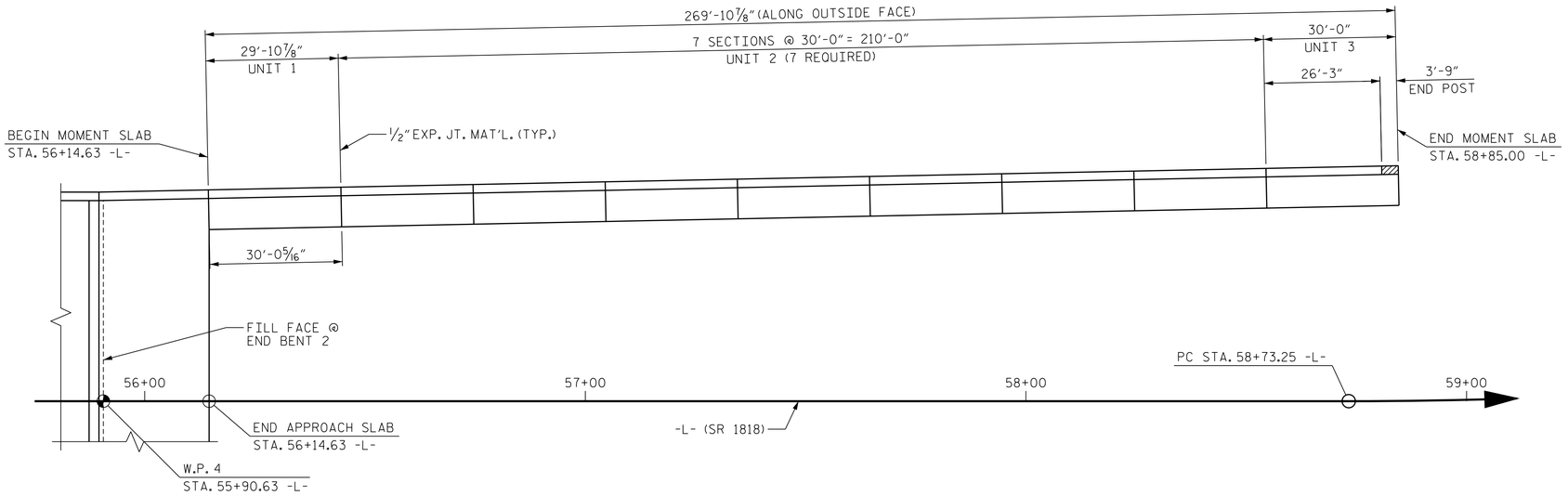
PREPARED BY: SEM	DATE: 04/16/25
REVIEWED BY: KHH	DATE: 04/16/25

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

CONCRETE BARRIER RAIL WITH MOMENT SLAB FOR SEGMENTAL RETAINING WALL (SRW) UNITS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-6
2			4			



PLAN

NOTES:

SEE "2 BAR METAL RAIL" STANDARD DRAWINGS FOR METAL RAIL DETAILS.

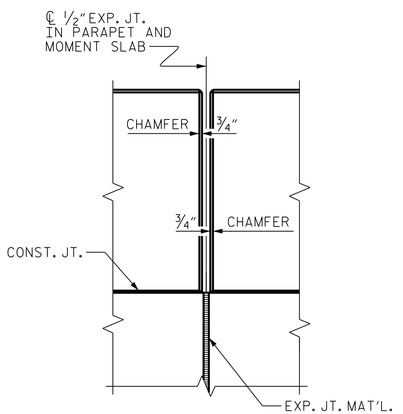
ALL REINFORCING STEEL IN THE PARAPET AND MOMENT SLAB SHALL BE EPOXY COATED.

EXPANSION JOINTS SHALL BE PLACED IN THE MOMENT SLAB AT A MAXIMUM SPACING OF 30'. SEE PLAN VIEW.

THE 2 BAR METAL RAIL SHALL NOT BE INSTALLED UNTIL THE MOMENT SLAB HAS ATTAINED AN AGE OF THREE CURING DAYS OR A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. IN ADDITION, NO FILL MATERIAL, ASPHALT, OR CONSTRUCTION EQUIPMENT IS ALLOWED ON THE MOMENT SLAB PRIOR TO SATISFYING THE MINIMUM CONCRETE CURING AND STRENGTH REQUIREMENTS.

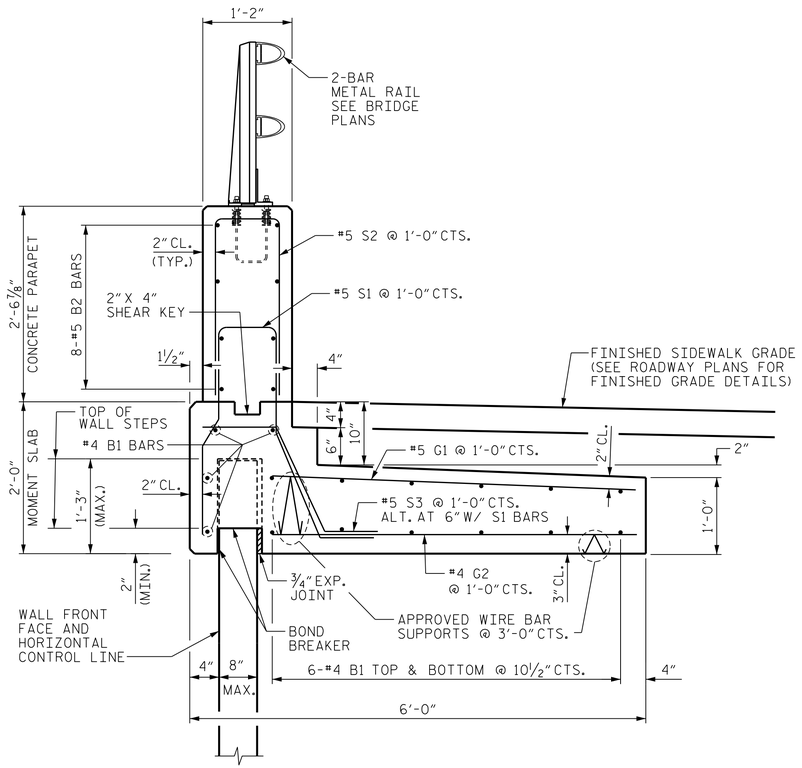
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF MOMENT SLAB AND PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

1'-2" × 2'-6⅞" CONCRETE PARAPET WITH MOMENT SLAB
TOTAL PAY LENGTH = 269.91 LIN FT

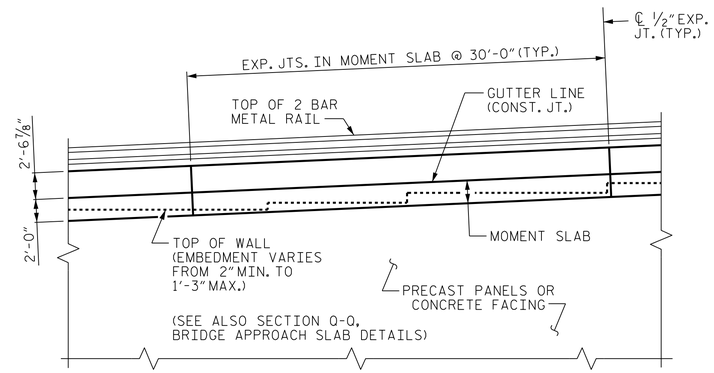


ELEV. @ EXP. JOINTS

EXPANSION JOINT DETAIL



CONCRETE PARAPET WITH MOMENT SLAB



PARAPET WITH MOMENT SLAB - PARTIAL ELEVATION

PROJECT NO. U-4758

GUILFORD COUNTY

STATION: 55+24.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET WITH MOMENT SLAB FOR PRECAST PANELS AND CONCRETE FACING

NORTH CAROLINA PROFESSIONAL SEAL 24939 ENGINEER BYRON E. ATKINSON
4/16/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-7
1			3			TOTAL SHEETS
2			4			

DRAWN BY :	B.E. LANNING	DATE : 08/2021
CHECKED BY :	B.E. ATKINSON	DATE : 08/2021
DESIGN ENGINEER OF RECORD :	B.E. ATKINSON	DATE : 06/2024

4/16/2025
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User: blanning
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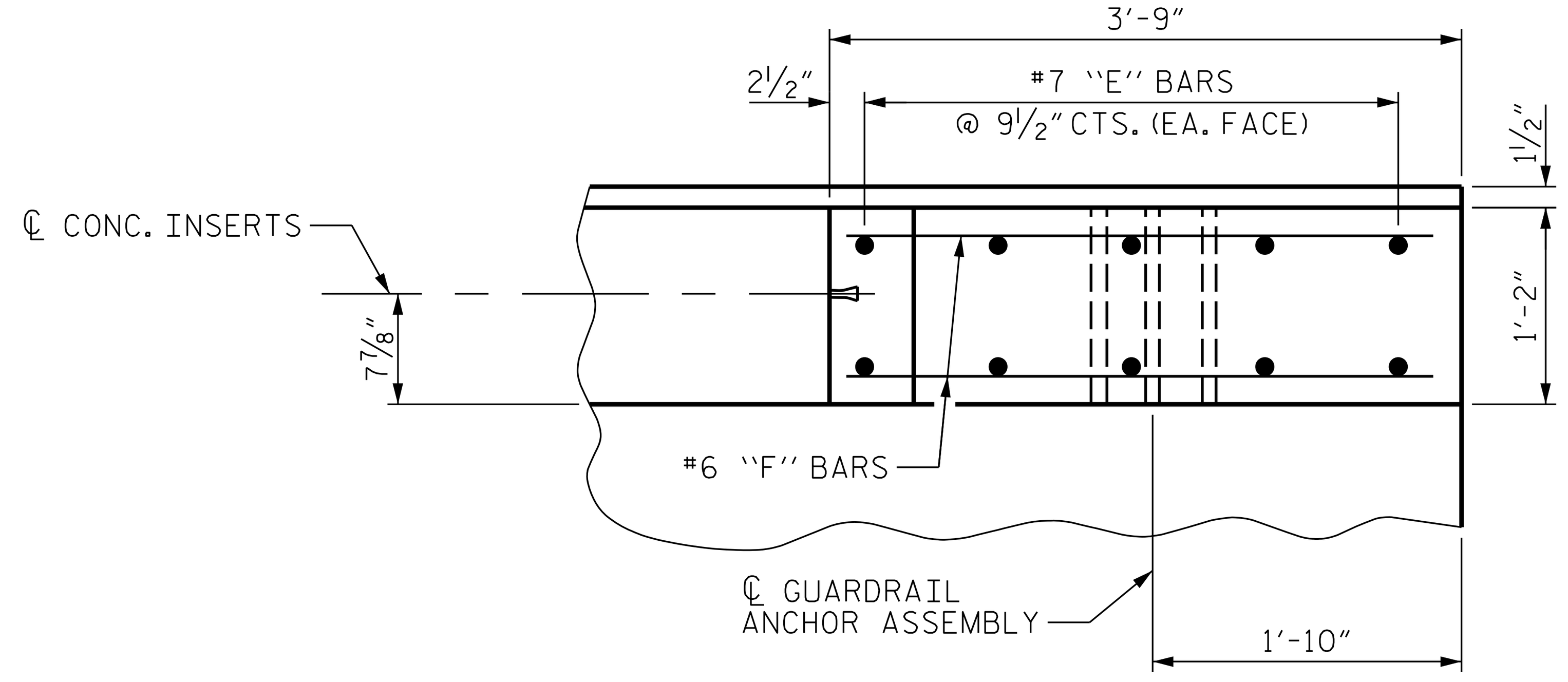
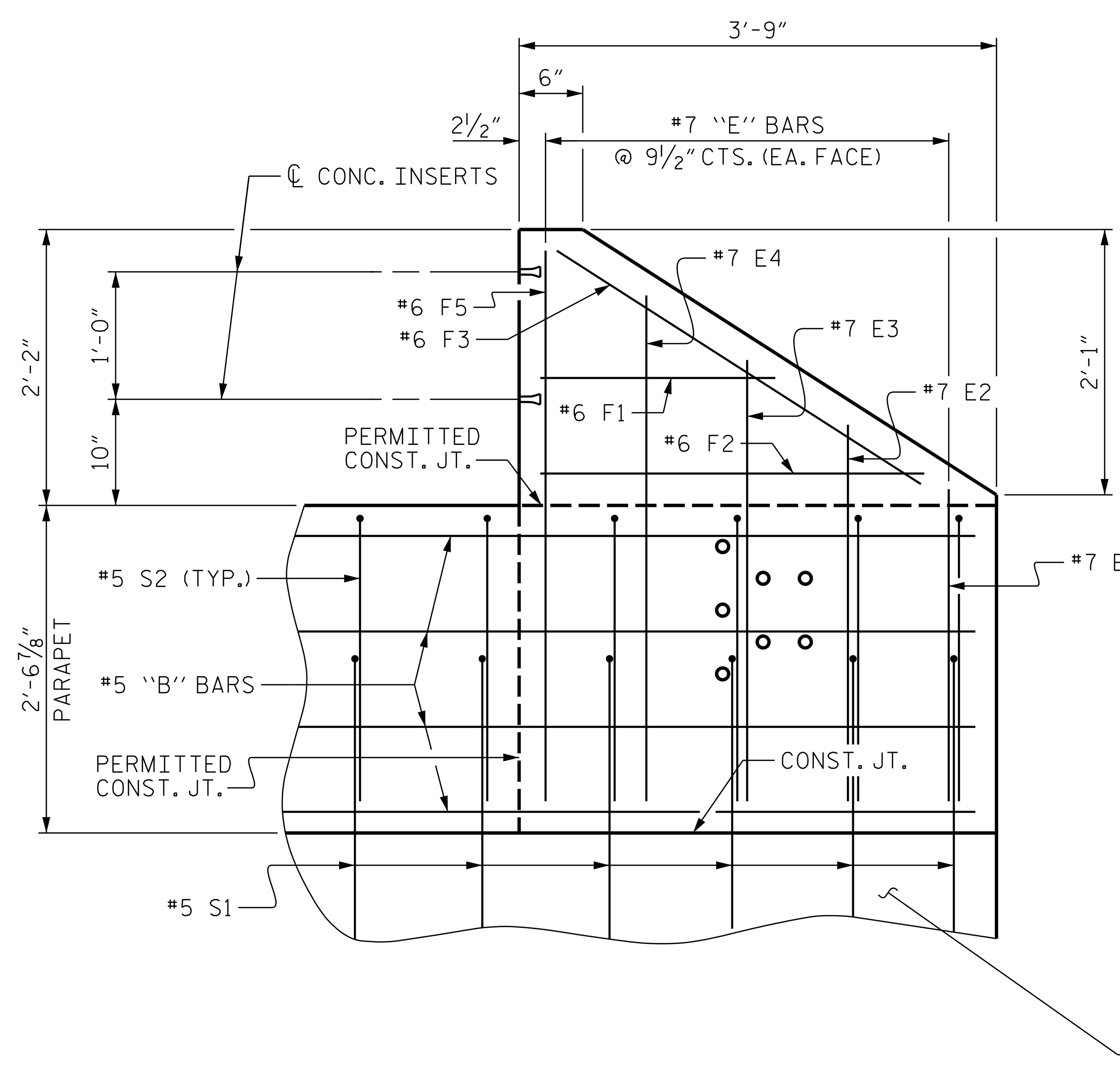
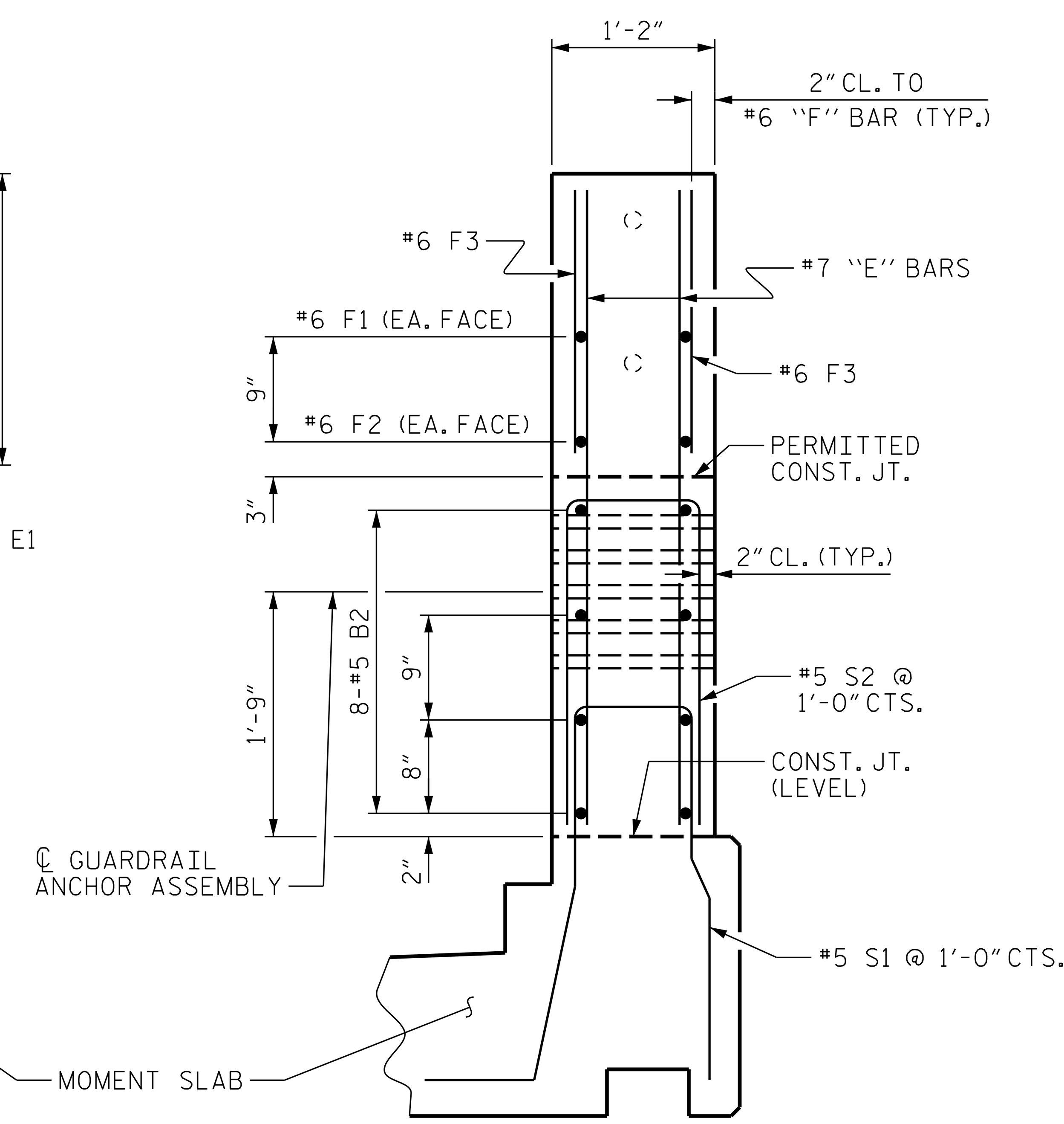


PLAN OF END POST



ELEVATION



END VIEW

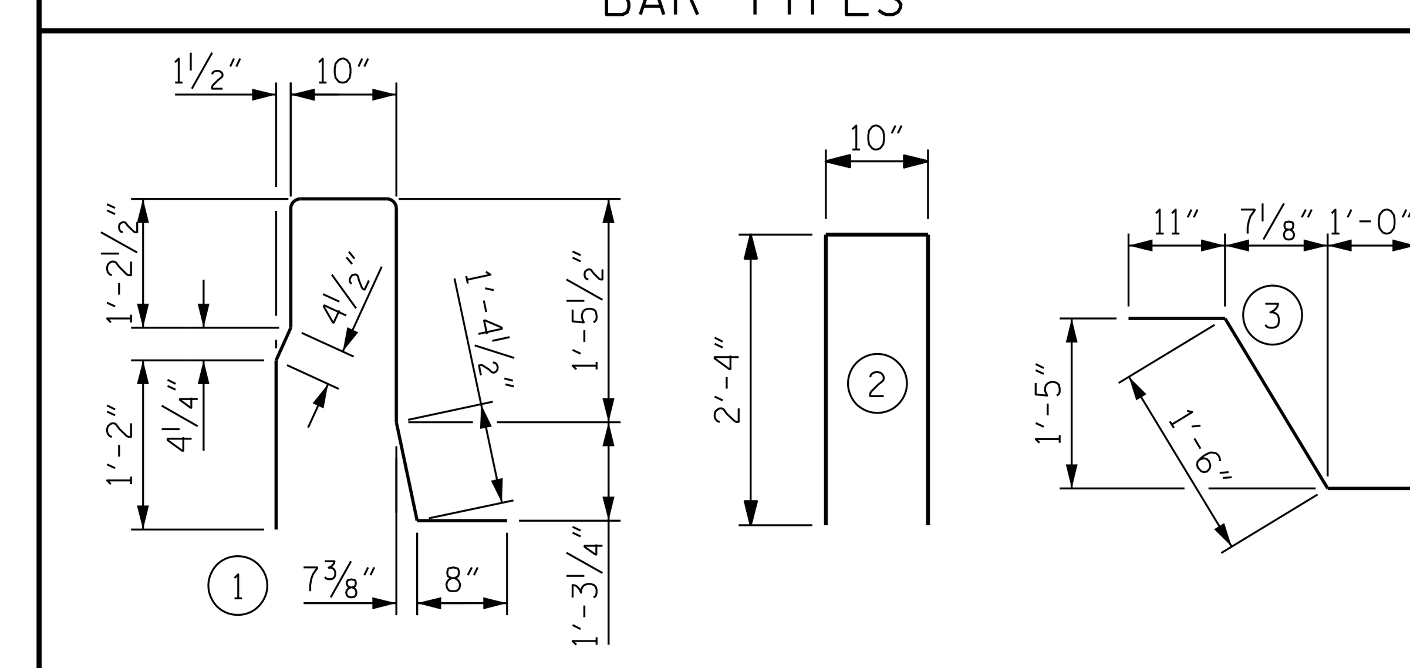
PARAPET AND END POST FOR TWO BAR RAIL

BILL OF MATERIAL

UNIT 1 (1 REQUIRED)						UNIT 2 (7 REQUIRED)						UNIT 3 (1 REQUIRED)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#4	STR	29'-6"	315	B1	16	#4	STR	29'-6"	315	B1	16	#4	STR	29'-6"	315
*B2	8	#5	STR	29'-6"	246	*B2	8	#5	STR	29'-6"	246	*B2	8	#5	STR	29'-6"	246
G1	31	#5	STR	4'-6"	145	G1	31	#5	STR	4'-6"	145	*E1	2	#7	STR	2'-6"	10
G2	31	#4	STR	4'-6"	93	G2	31	#4	STR	4'-6"	93	*E2	2	#7	STR	3'-0"	12
												*E3	2	#7	STR	3'-6"	14
*S1	31	#5	1	7'-1"	229	*S1	31	#5	1	7'-1"	229	*E4	2	#7	STR	4'-0"	16
*S2	31	#5	2	5'-6"	178	*S2	31	#5	2	5'-6"	178	*E5	2	#7	STR	4'-4"	18
S3	30	#5	3	3'-5"	107	S3	30	#5	3	3'-5"	107						
												*F1	2	#6	STR	1'-9"	5
												*F2	2	#6	STR	2'-11"	9
												*F3	2	#6	STR	3'-3"	10
												G1	31	#5	STR	4'-6"	145
												G2	31	#4	STR	4'-6"	93
												*S1	31	#5	1	7'-1"	229
												*S2	31	#5	2	5'-6"	178
												S3	30	#5	3	3'-5"	107

UNIT 1			UNIT 2			UNIT 3		
REINFORCING STEEL	660	LBS.	REINFORCING STEEL	660	LBS.	REINFORCING STEEL	660	LBS.
*EPOXY COATED REINFORCING STEEL	653	LBS.	*EPOXY COATED REINFORCING STEEL	653	LBS.	*EPOXY COATED REINFORCING STEEL	747	LBS.
CLASS AA CONCRETE PARAPET	3.4	C.Y.	CLASS AA CONCRETE PARAPET	3.4	C.Y.	CLASS AA CONCRETE PARAPET	3.6	C.Y.
CLASS A CONCRETE MOMENT SLAB	8.6	C.Y.	CLASS A CONCRETE MOMENT SLAB	8.6	C.Y.	CLASS A CONCRETE MOMENT SLAB	8.6	C.Y.
CONCRETE PARAPET WITH MOMENT SLAB	29.91	LIN. FT.	CONCRETE PARAPET WITH MOMENT SLAB	30.00	LIN. FT.	CONCRETE PARAPET WITH MOMENT SLAB	30.00	LIN. FT.

BAR TYPES



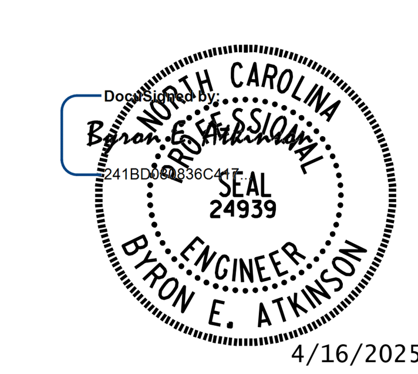
ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. U-4758

GUILFORD COUNTY

STATION: 55+24.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET WITH MOMENT SLAB FOR PRECAST PANELS AND CONCRETE FACING

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-8
1			3			TOTAL SHEETS
2			4			

DRAWN BY : B.E. LANNING DATE : 08/2021
CHECKED BY : B.E. ATKINSON DATE : 08/2021
DESIGN ENGINEER OF RECORD : B.E. ATKINSON DATE : 06/2024

4/16/2025
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User: blanning
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