
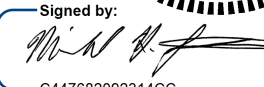


GEOTECHNICAL  
ENGINEER



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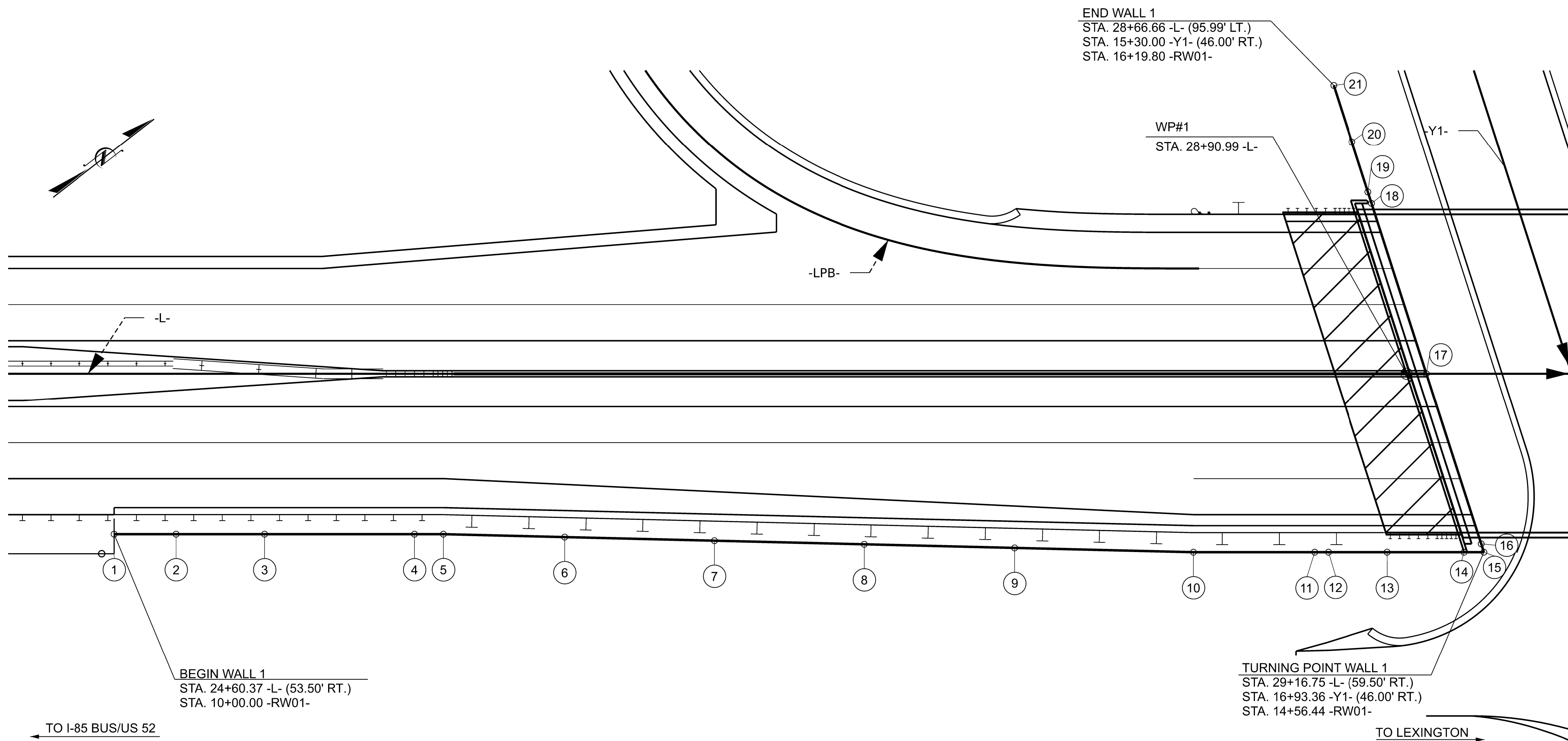
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ENGINEER

SIGNATUREDATE

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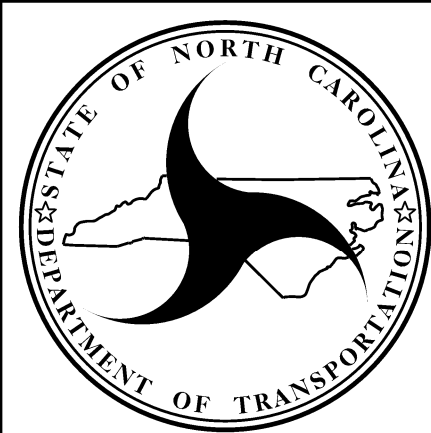
ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	10,595 SF



RETAINING WALL NO. 1 - MSE WALL PLAN VIEW

PROJECT NO.: BR-0015  
DAVIDSON COUNTY  
STATION: 28+90.99 -L-  
SHEET 1 OF 7

PREPARED BY: MHS	DATE: 8/24
REVIEWED BY: SCC	DATE: 8/24



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
GEOTECHNICAL  
ENGINEERING UNIT

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

GEOTECHNICAL  
ENGINEER

NORTH CAROLINA  
PROFESSIONAL  
SEAL  
028893  
MICHAEL H. STEPHENS  
ENGINEER

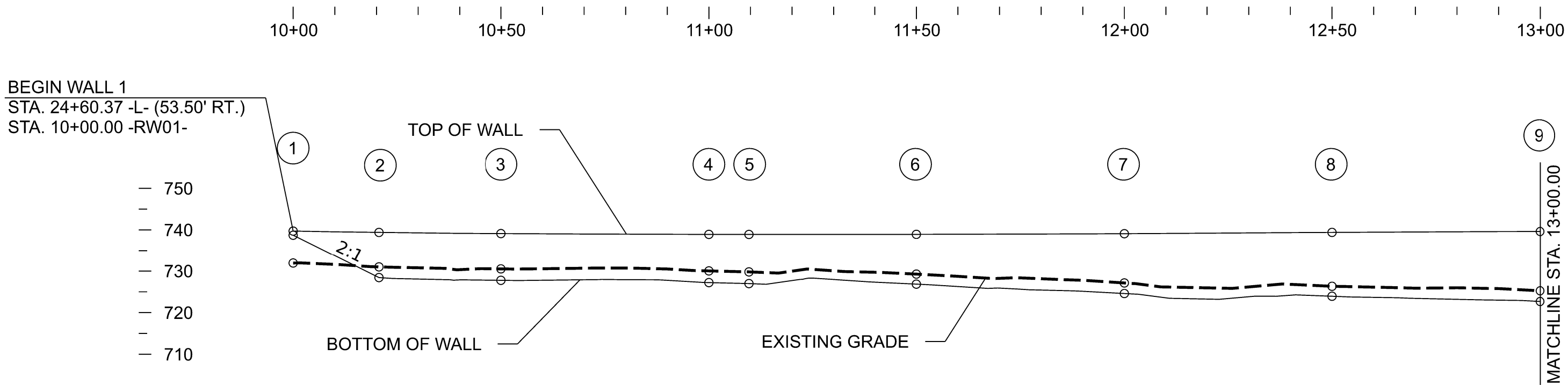
Signed by  
08/15/2024  
C447602092314CC...

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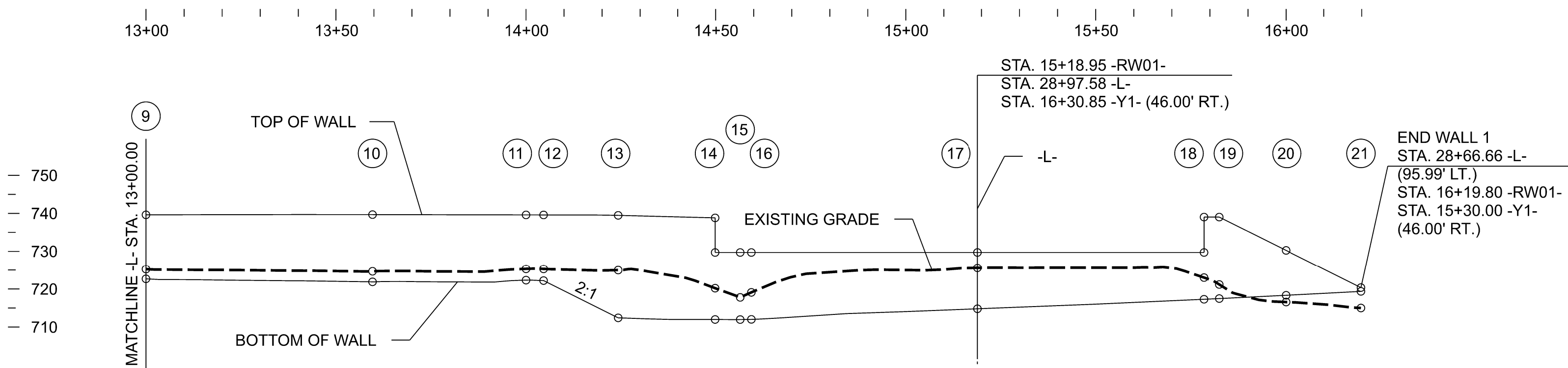
ENGINEER

SIGNATUREDATE

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UNLESS ALL SIGNATURES COMPLETED



RETAINING WALL NO. 1 - MSE WALL PARTIAL ENVELOPE - FRONT FACE



RETAINING WALL NO. 1 - MSE WALL PARTIAL ENVELOPE - FRONT FACE

WALL 1 DATA TABLE						
POINT NO.	-L- STATION	-L- OFFSET	-RW01- STATION	PROPOSED TOP OF WALL ELEVATION	PROPOSED BERM ELEVATION	EXISTING GROUND ELEVATION
1	24+60.37	53.50 (RT)	10+00.00	739.721	738.721	731.921
2	24+80.97	53.50 (RT)	10+20.60	739.389	728.421	730.989
3	25+10.37	53.50 (RT)	10+50.00	739.115	727.760	730.507
4	25+60.37	53.50 (RT)	11+00.00	738.924	727.213	730.022
5	25+70.00	53.50 (RT)	11+09.63	738.909	726.964	729.783
6	26+10.36	54.47 (RT)	11+50.00	738.933	726.831	729.253
7	26+60.35	55.67 (RT)	12+00.00	739.091	724.573	727.125
8	27+10.33	56.87 (RT)	12+50.00	739.408	723.920	726.328
9	27+60.32	58.07 (RT)	13+00.00	739.615	722.660	725.241
10	28+19.93	59.50 (RT)	13+59.63	739.673	721.881	724.662
11	28+60.30	59.50 (RT)	14+00.00	739.594	722.327	725.305
12	28+64.91	59.50 (RT)	14+04.61	739.609	722.212	725.291
13	28+84.53	59.50 (RT)	14+24.23	739.575	712.414	724.990
14	29+10.16	59.50 (RT)	14+49.85	738.818 / 729.710	711.981	720.208
15	29+16.75	59.50 (RT)	14+56.44	729.710	711.962	717.791
16	29+15.85	56.70 (RT)	14+59.38	729.710	712.008	719.110
17	28+97.58	56.67 (RT)	15+18.95	729.710	714.795	725.578
18	28+79.34	56.63 (LT)	15+78.45	729.710 / 739.021	717.296	723.004
19	28+78.12	60.44 (LT)	15+82.45	739.021	717.481	721.182
20	28+72.74	77.14 (LT)	16+00.00	729.795	718.343	716.567
21	28+66.66	95.99 (LT)	16+19.80	720.370	719.370	714.997

PROJECT NO.: BR-0015

DAVIDSON COUNTY

STATION: 28+90.99 -L-

SHEET 2 OF 7

PREPARED BY: MHS	DATE: 8/24
REVIEWED BY: SCC	DATE: 8/24

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL  
ENGINEERING UNIT

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

RETAINING WALL NO. 1  
MSE WALL ENVELOPE VIEWS

REVISIONS

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

SHEET NO.

W-2

GEOTECHNICAL  
ENGINEER

Signed by: *Michael H. Stephens*  
08/15/2024  
C447622092314CC...

SIGNATUREDATE

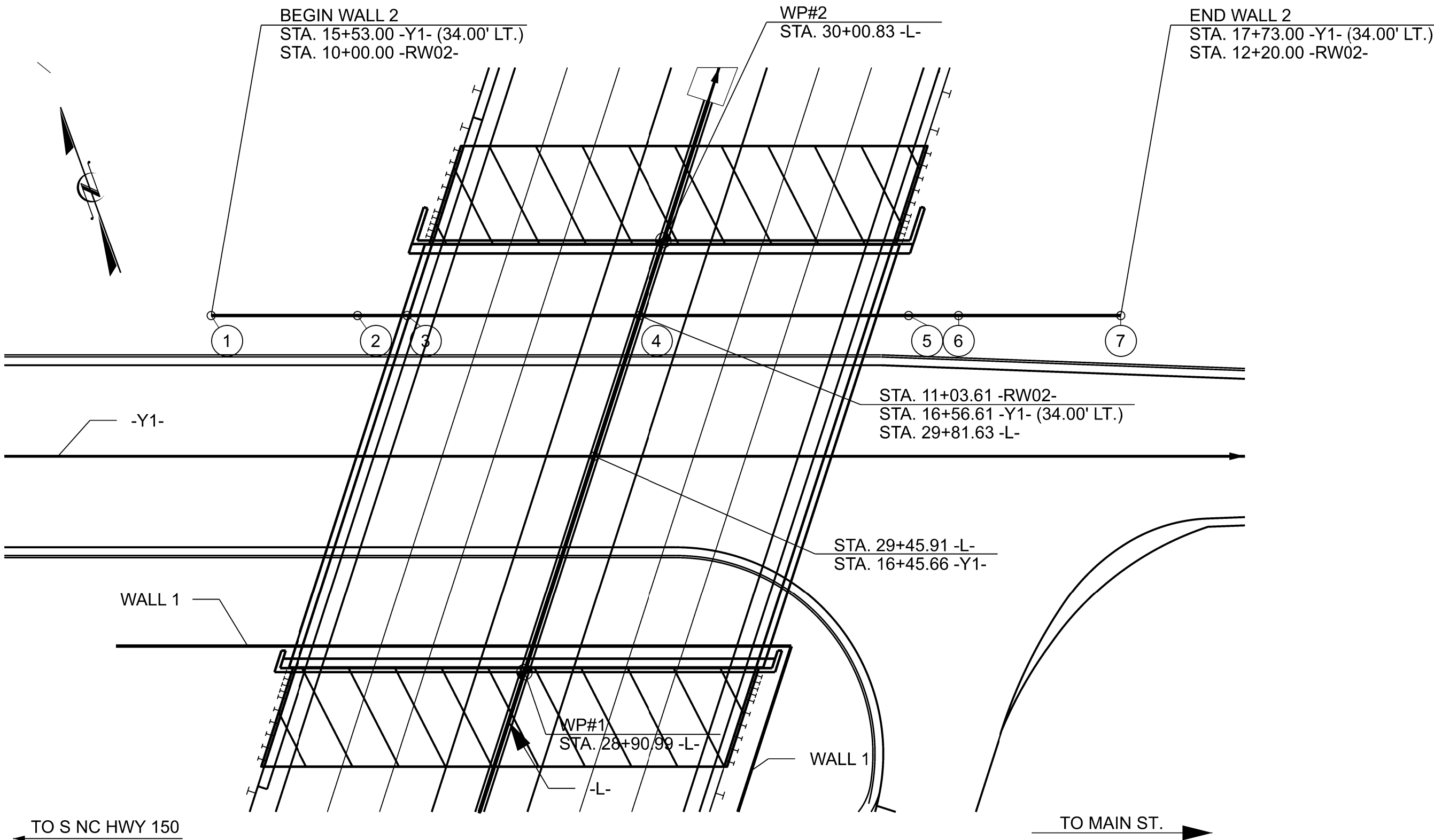
ENGINEER

SIGNATUREDATE

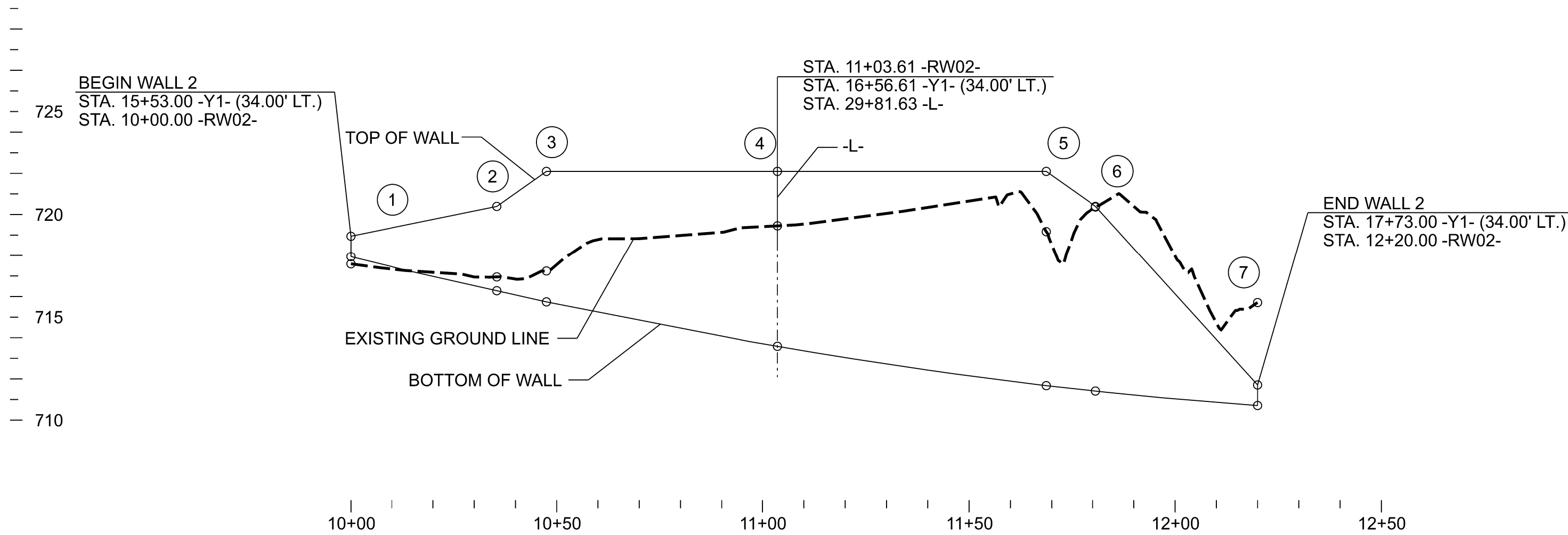
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 2	1,950 SF

WALL 2 DATA TABLE						
POINT NO.	-Y1- STATION	-Y1- OFFSET	-RW02- STATION	PROPOSED TOP OF WALL ELEVATION	PROPOSED BERM ELEVATION	EXISTING GROUND ELEVATION
1	15+53.00	34.00' LT	10+00.00	718.944	717.944	717.589
2	15+88.48	34.00' LT	10+35.48	720.935	716.282	716.955
3	16+00.49	34.00' LT	10+47.49	722.095	715.740	717.242
4	16+56.61	34.00' LT	11+03.61	722.095	713.582	719.451
5	17+21.66	34.00' LT	11+68.66	722.095	711.675	719.172
6	17+33.69	34.00' LT	11+80.69	720.395	711.412	720.367
7	17+73.00	34.00' LT	12+20.00	711.708	710.708	715.706



RETAINING WALL NO. 2 - MSE WALL PLAN VIEW



RETAINING WALL NO. 1 - MSE WALL ENVELOPE - FRONT FACE

PROJECT NO.: BR-0015  
DAVIDSON COUNTY  
STATION: 30+00.83 -L-  
SHEET 3 OF 7

PREPARED BY: MHS	DATE: 8/24
REVIEWED BY: SCC	DATE: 8/24

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

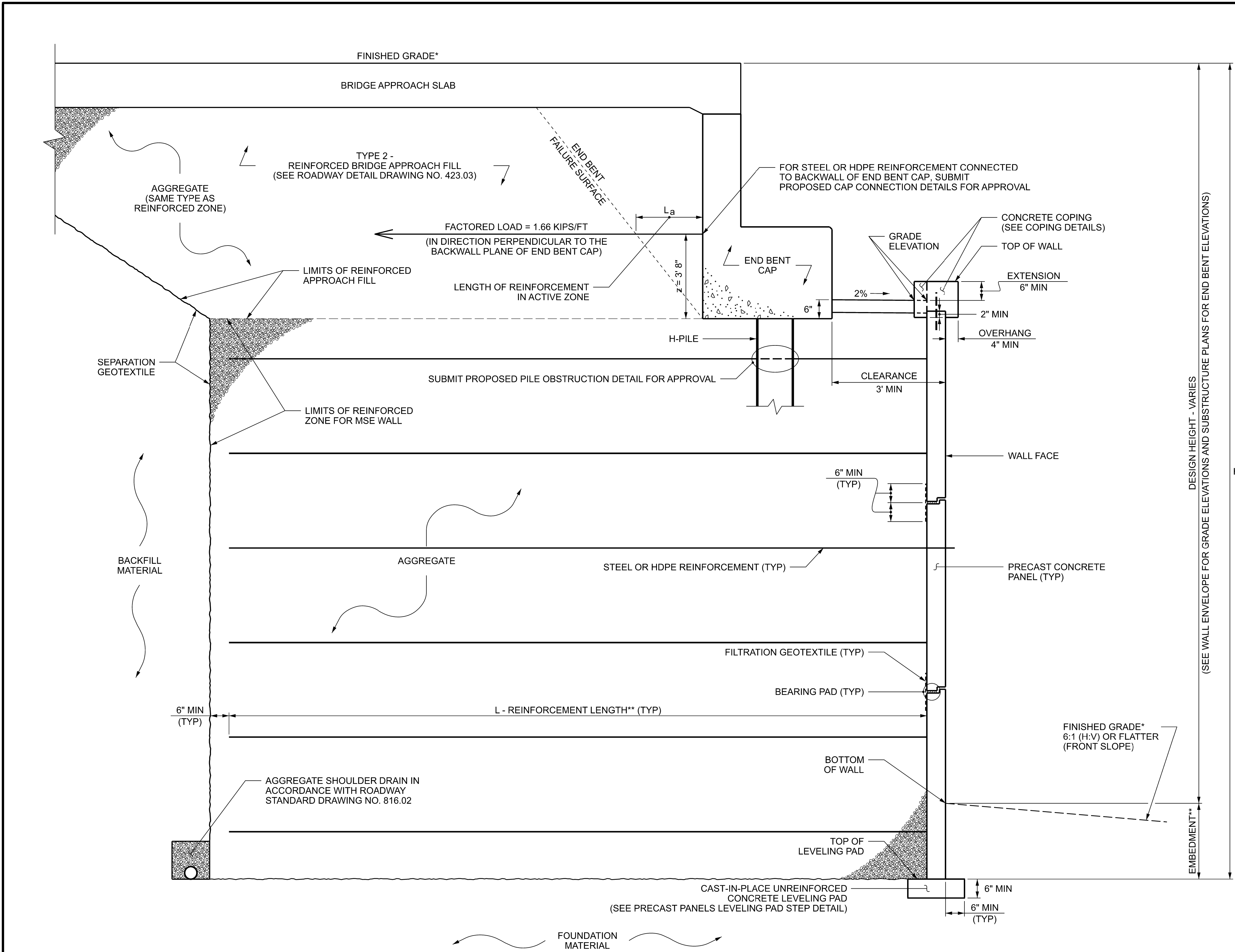
GEOTECHNICAL  
ENGINEERING UNIT

RETAINING WALL NO. 2  
MSE WALL PLAN AND  
ENVELOPE VIEWS

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





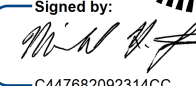
MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

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

GEOTECHNICAL  
ENGINEER

SEAL  
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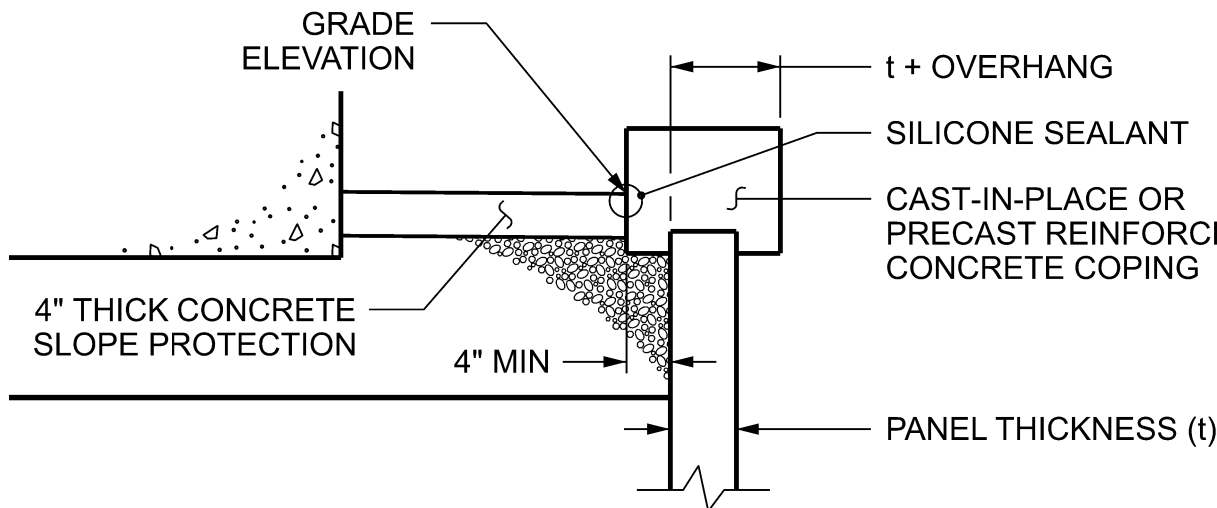
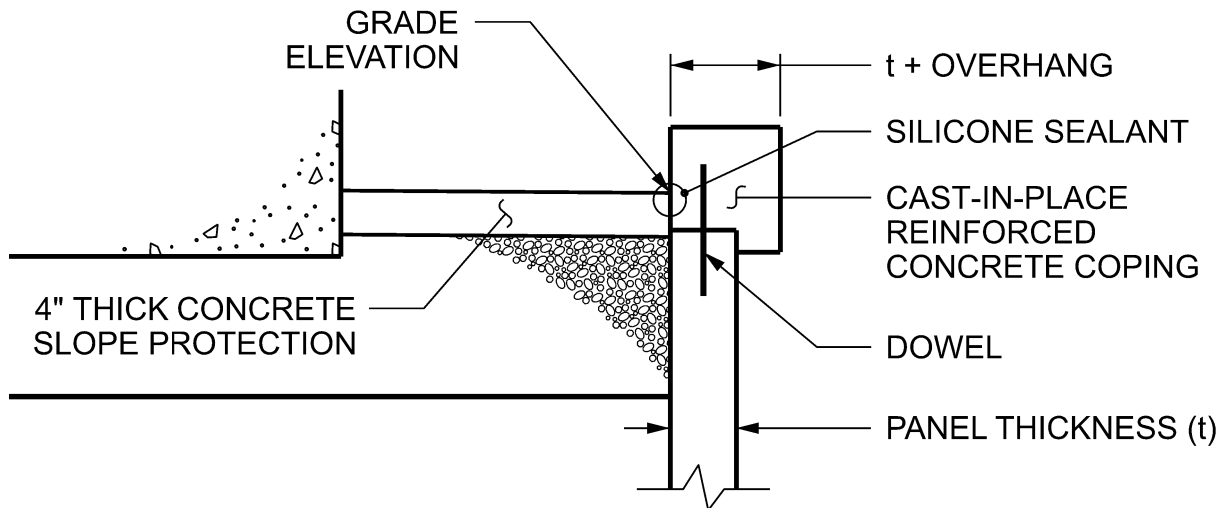
ENGINEER  
MICHAEL H. STEPHENS

Signed by:  08/15/2024  
C447682092314CC...

SIGNATURE DATE

ENGINEER

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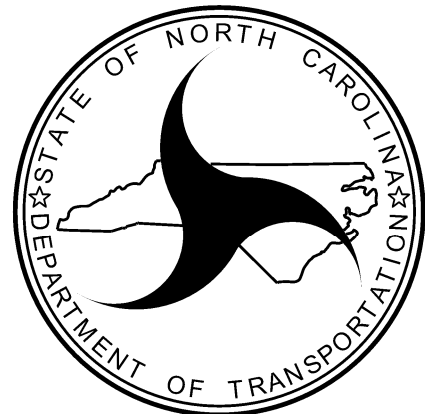


COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS  
WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

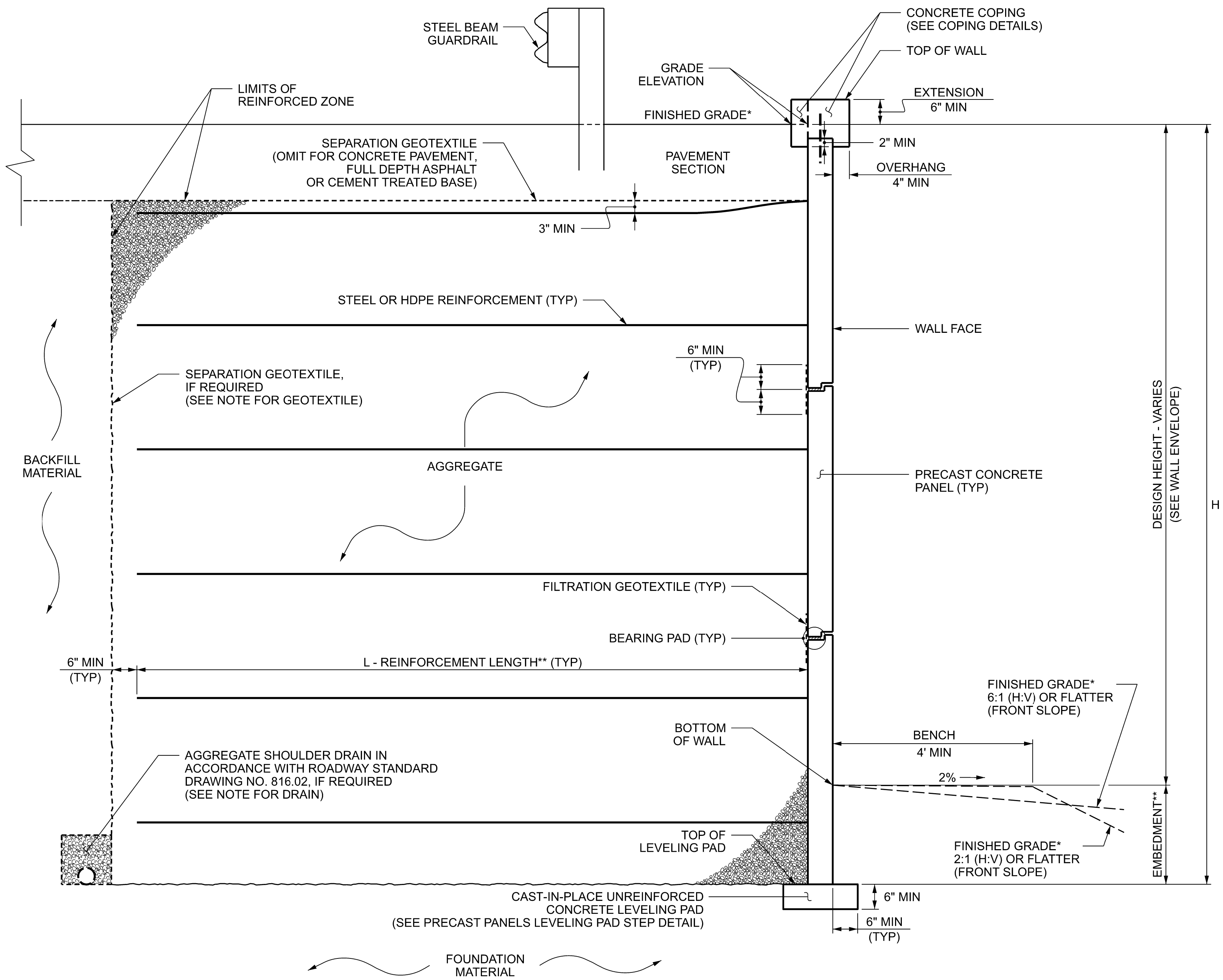
PROJECT NO.: BR-0015  
DAVIDSON COUNTY  
STATION: \_\_\_\_\_  
SHEET 4 OF 7

PREPARED BY: MHS	DATE: 8/24
REVIEWED BY: SCC	DATE: 8/24



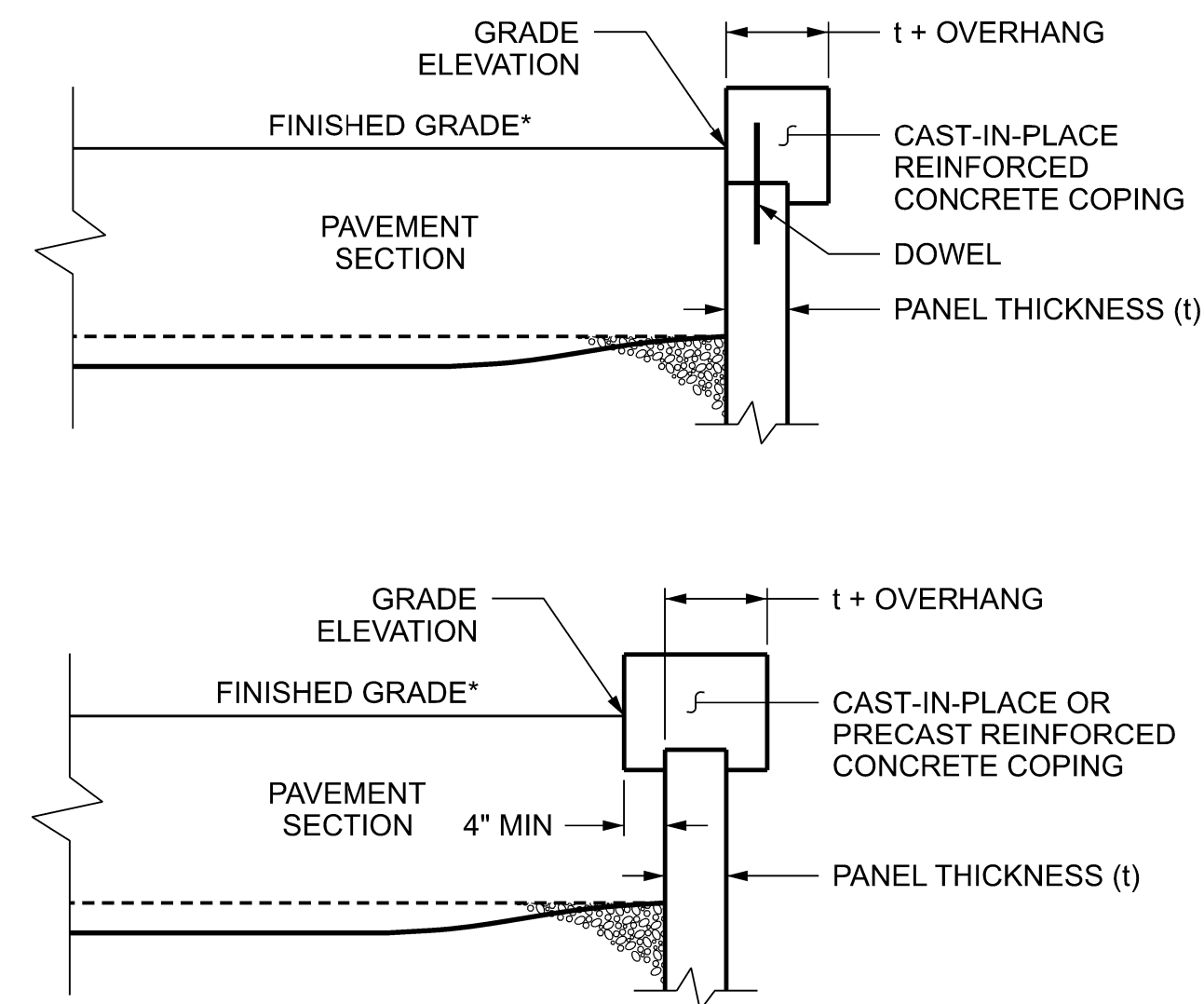
NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
GEOTECHNICAL  
ENGINEERING UNIT

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



### 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.

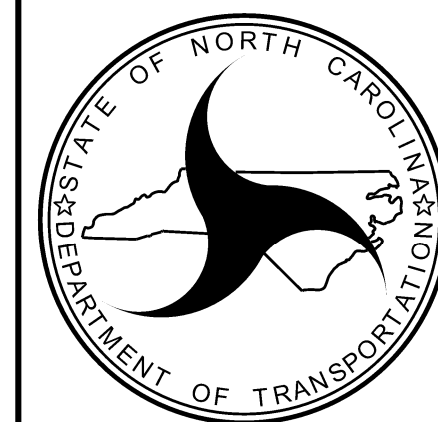


### COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.  
\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: BR-0015  
DAVIDSON COUNTY  
STATION: \_\_\_\_\_  
SHEET 5 OF 7

PREPARED BY: MHS	DATE: 8/24
REVIEWED BY: SCC	DATE: 8/24



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
GEOTECHNICAL  
ENGINEERING UNIT

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





NOTES:

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

FOR TYPE 2 REINFORCED BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 423.03 (RETAINING WALL NO. 1 ONLY)

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

CAST IN PLACE VERTICAL COUPING WILL BE REQUIRED AT THE ABUTMENT WALL FOR END BENT NO. 1 (RETAINING WALL NO. 1).

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NOS. 1 AND 2.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NOS. 1 AND 2.

A DRAIN IS REQUIRED FOR RETAINING WALL NOS. 1, 2, AND 3.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NOS. 1 AND 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 NOS. 1 AND 2 FOR THE FOLLOWING:

- 1) H = DESIGN HEIGHT + EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL:  
RETAINING WALL NO. 1 = 6,500 PSF  
RETAINING WALL NO. 2 = 4,700 PSF
- 4) MINIMUM REINFORCEMENT LENGTH:  
RETAINING WALL NO. 1 (L) = 0.8H OR 6 FT, WHICHEVER IS LONGER  
RETAINING WALL NO. 2 (L) = 1.5H OR 6 FT, WHICHEVER IS LONGER
- 5) MINIMUM EMBEDMENT ELEVATION = 2 FT
- 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT ( $\gamma$ ) PCF	FRICTION ANGLE ( $\phi$ ) DEGREES	COHESION (c) PSF
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 ( $\gamma$ ) PCF	FRICTION ANGLE ( $\phi$ ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NOS. 1 AND 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

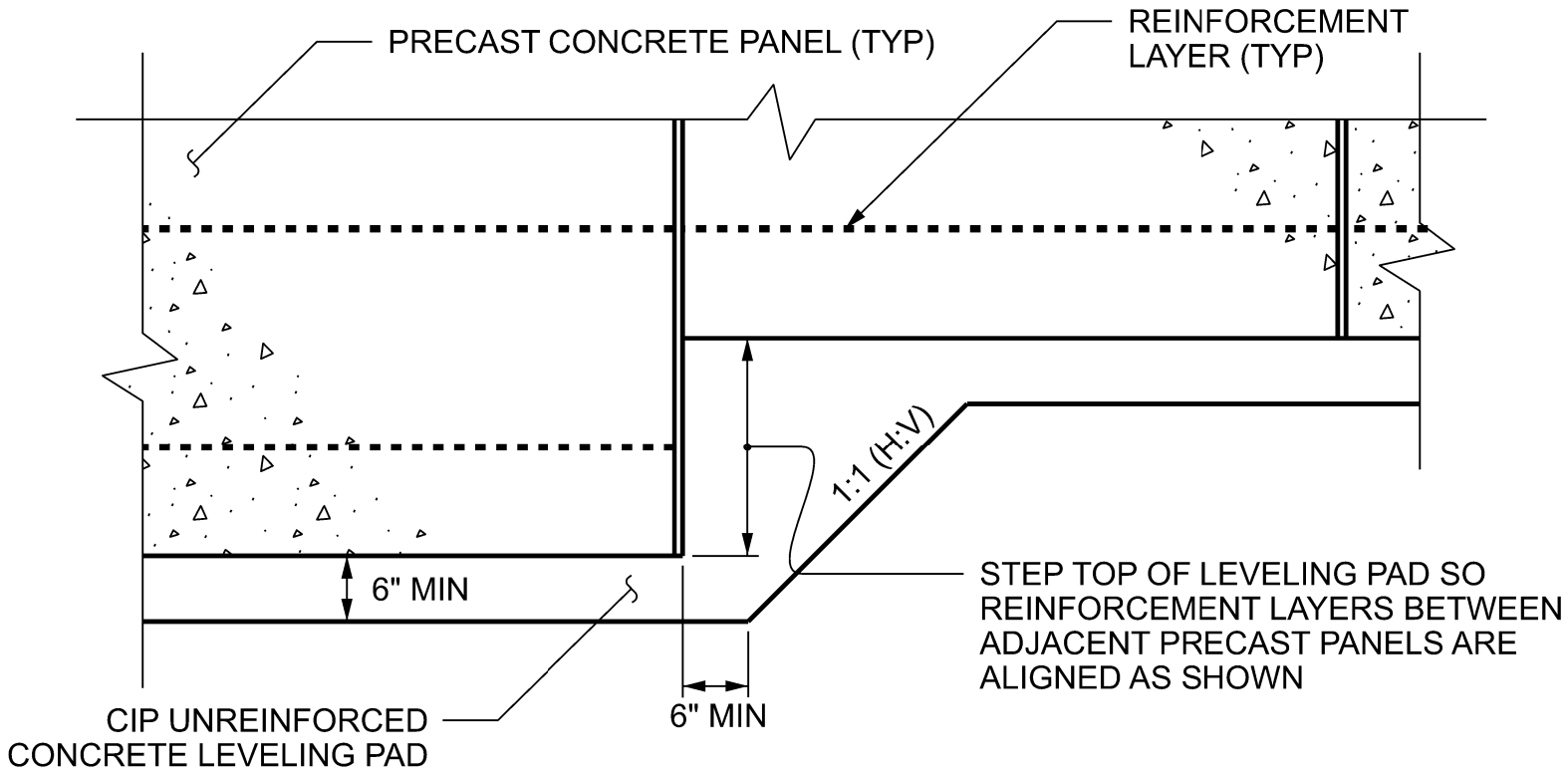
DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE ( $L_a$ ) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NOS. 1 AND 2.

FOUNDATIONS FOR END BENT NOS. 1 AND 2 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NOS. 1 AND 2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NOS. 1 AND 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

"TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NOS. 1 AND 2 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.



PRECAST PANELS  
LEVELING PAD STEP DETAIL

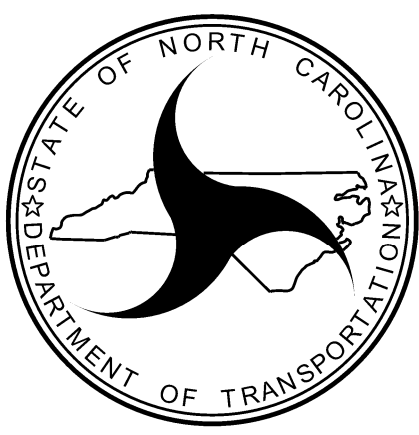
PROJECT NO.: BR-0015

DAVIDSON COUNTY

STATION: \_\_\_\_\_

SHEET 7 OF 7

PREPARED BY: MHS	DATE: 8/24
REVIEWED BY: SCC	DATE: 8/24

	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS	GEOTECHNICAL ENGINEERING UNIT	MSE RETAINING WALL NOS. 1 AND 2 NOTES AND STEP DETAIL						
			REVISIONS						SHEET NO. W-7
			NO.	BY	DATE	NO.	BY	DATE	
1			3						
2			4						