

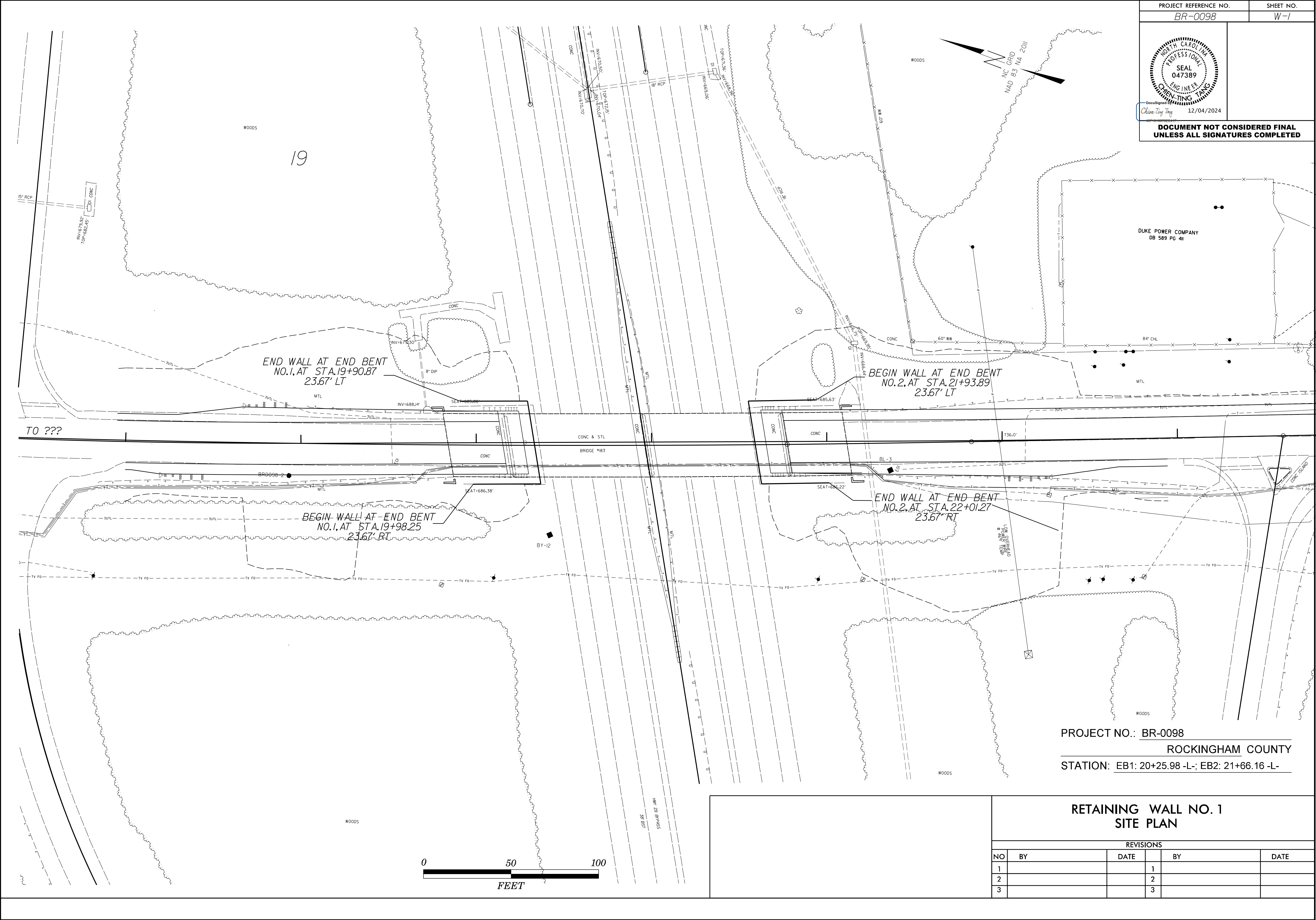
PROJECT REFERENCE NO.  
BR-0098

SHEET NO.  
W-1

NO. 174 CAROLINA  
PROFESSIONAL  
SEAL  
047389  
ENGINEER  
CHEN-TING TANG

DocuSigned by  
Chen-Ting Tang  
12/04/2024

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



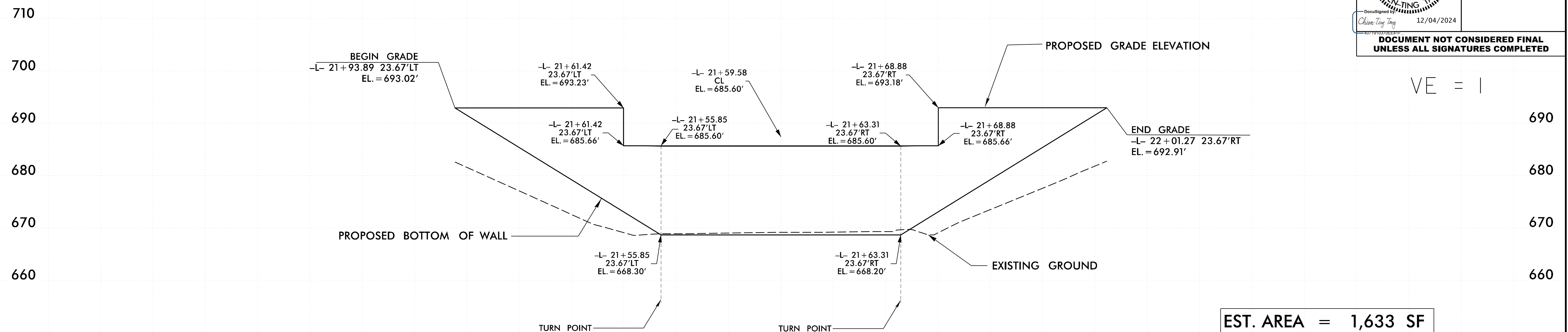
PROJECT NO.: BR-0098  
ROCKINGHAM COUNTY  
STATION: EB1: 20+25.98 -L-; EB2: 21+66.16 -L-

RETAINING WALL NO. 1  
SITE PLAN

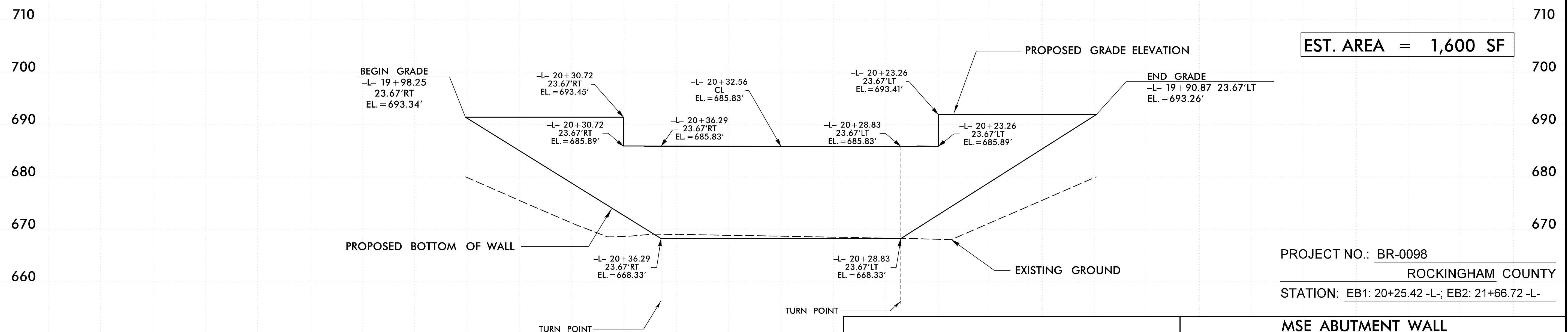
REVISIONS					
NO	BY	DATE		BY	DATE
1				1	
2				2	
3				3	

I:\5-2024  
BR-0098 GEO WALL PLAN - WALL SHEET1.dgn  
USC1719530

## MSE WALL AT END BENT NO. 2 PROFILE



**MSE WALL AT END BENT NO. 1 PROFILE**

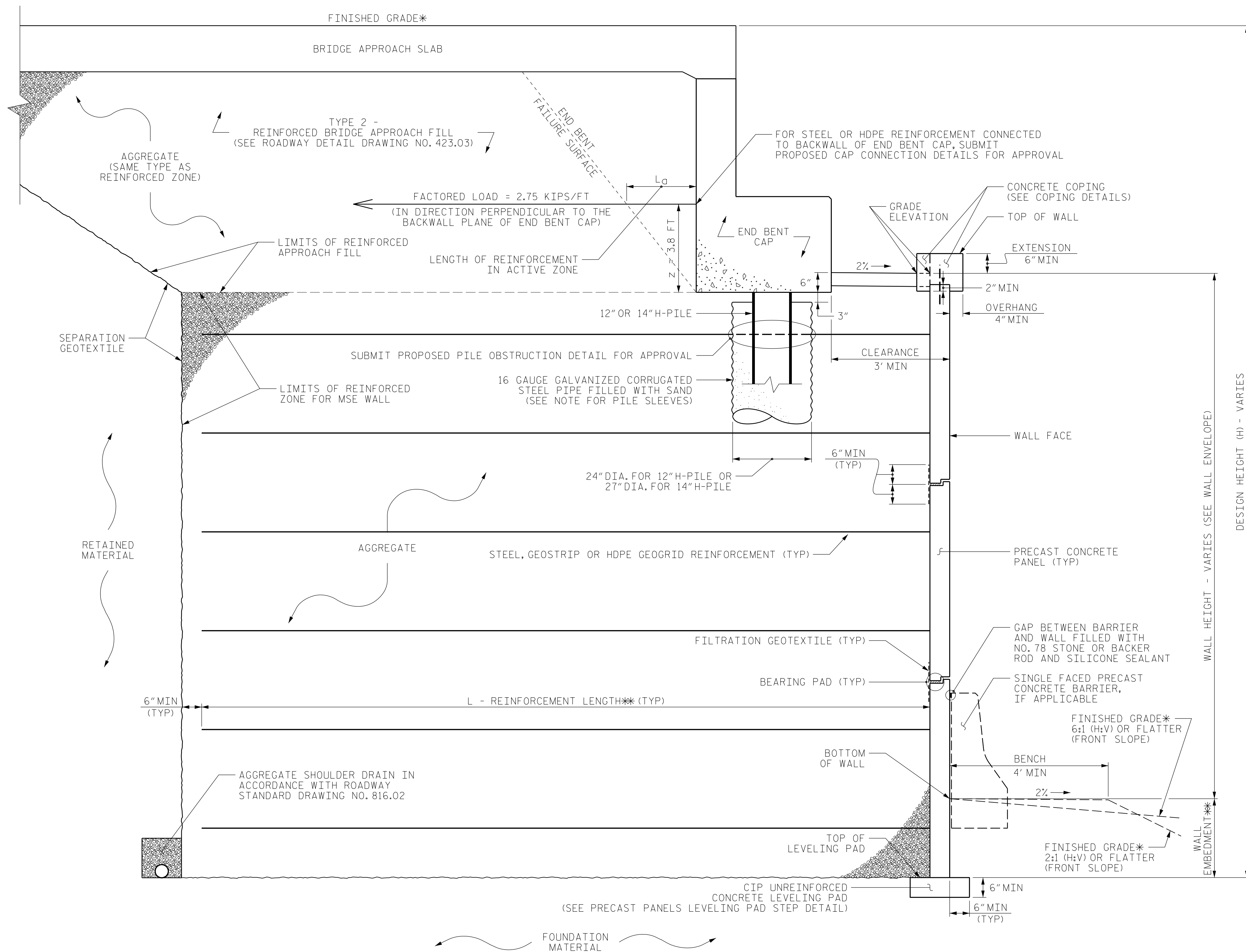


WSP

MSE ABUTMENT WALL  
FOR END BENT NO.1 AND NO. 2  
PROFILES

REVISIONS					
NO	BY	DATE		BY	DATE
1			1		
2			2		
3			3		



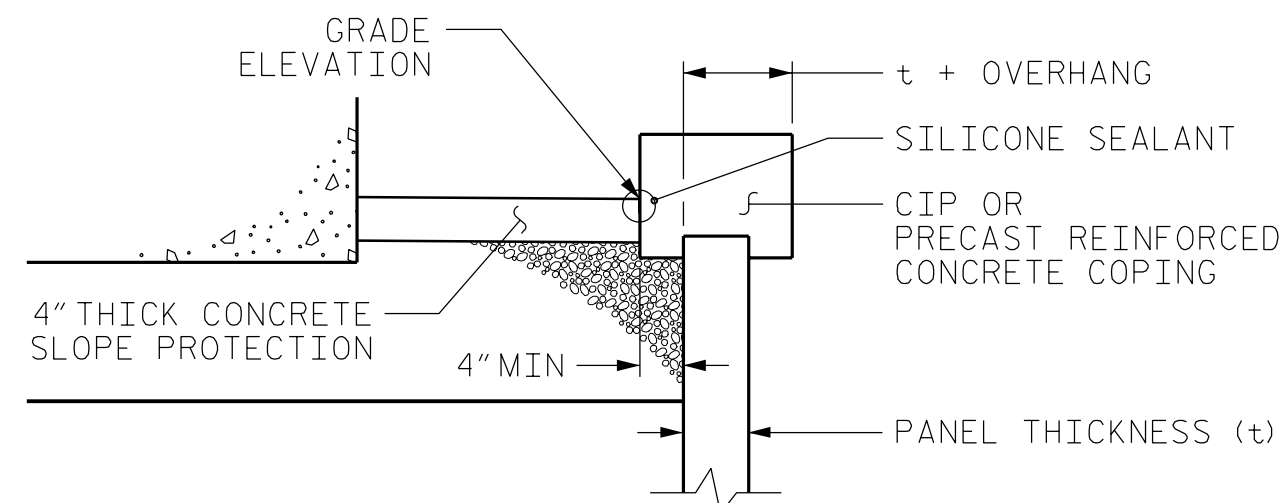
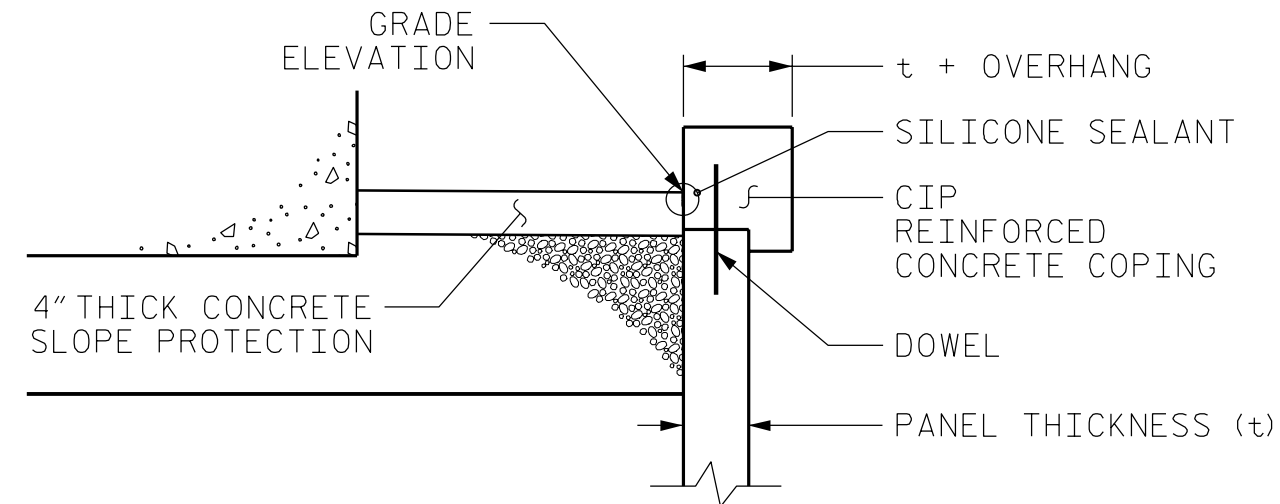


MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

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

<div>GEOTECHNICAL ENGINEER</div> <div></div> <div>DocuSigned by: <i>Chen-Ting Tang</i> 407191037</div>	ENGINEER
12/04/2024	
SIGNATURE	SIGNATURE
DATE	DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



COPING DETAILS

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

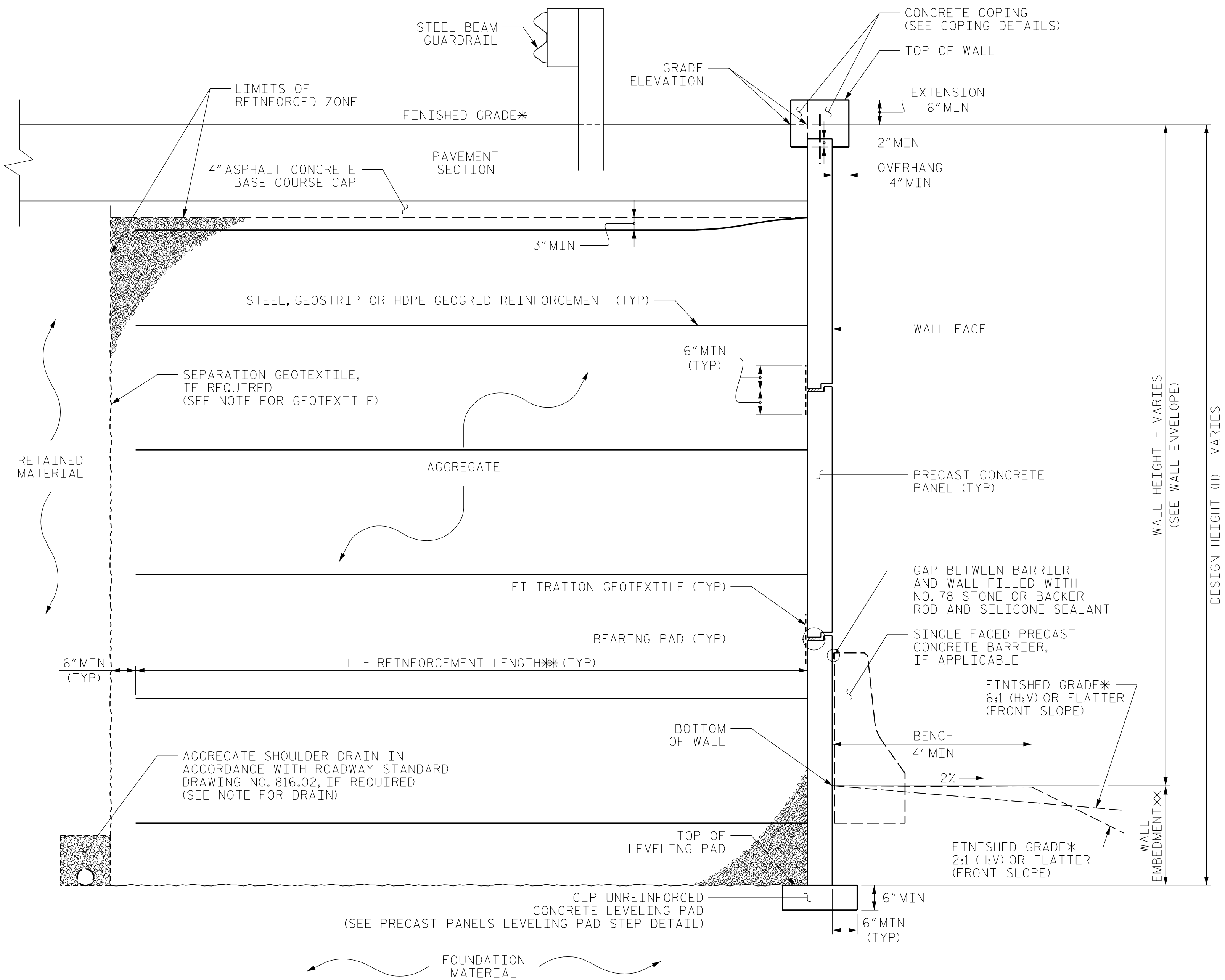
PROJECT NO.: BR-0098  
ROCKINGHAM COUNTY  
STATION: EB1: 20+25.42 -L-; EB2: 21+66.72 -L-

STD CELL WALL\_MSE\_Panels\_Abutment\_HPiles\_Sleeves

MSE ABUTMENT WALL  
FOR END BENT NO. 1 AND NO. 2  
MSE ABUTMENT WALL WITH PANELS  
AND H-PILES - TYPICAL & COPING  
DETAILS

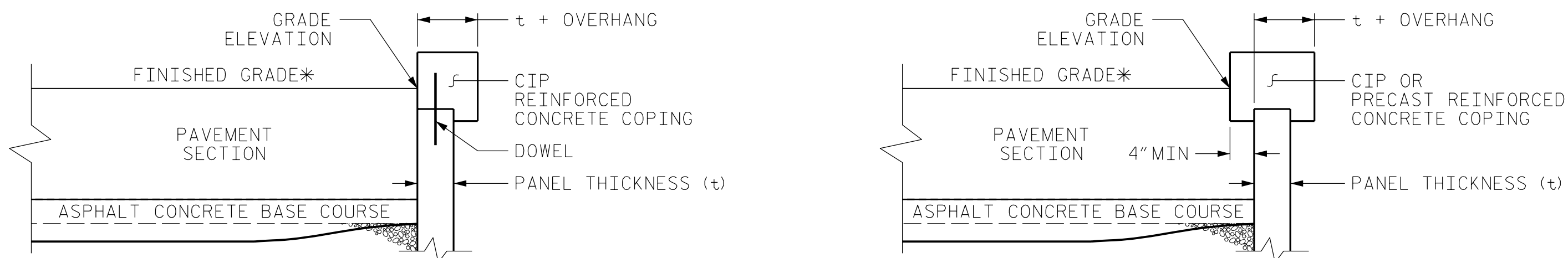
DATE: 10-19-21

SHEET  
NO.  
W-3



### 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 WALL 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.

GEOTECHNICAL ENGINEER		ENGINEER	
DocuSigned by: Chien-Ting Tang 4071910370EE41F		12/04/2024	
SIGNATURE	DATE	SIGNATURE	DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

PROJECT NO.: BR-0098  
ROCKINGHAM COUNTY  
STATION: EB1: 20+25.42 -L-; EB2: 21+66.72 -L-

STD CELL WALL\_MSE\_Panels\_Guardrail

MSE ABUTMENT WALL  
FOR END BENT NO. 1 AND NO. 2  
MSE WALL WITH PANELS AND  
GUARDRAIL- TYPICAL & COPING  
DETAILS

DATE: 10-19-21

SHEET  
NO.  
W-4



NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DETAIL DRAWING NO. 423.03.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2.

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

CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2.

A STAINED, SIMULATED STONE MASONRY ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS FOR RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2.

A DRAIN IS REQUIRED FOR RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2.

PILE SLEEVES ARE REQUIRED AROUND PILES FOR END BENT NO.1 AND END BENT NO.2 LOCATED AT STATION 20+25.42 -L- AND 21+66.72 -L-.

DESIGN RETAINING WALL AT END BENT NO.1 AND END BENT NO.2 FOR THE FOLLOWING:

- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT  
2) DESIGN LIFE = 100 YEARS  
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL SHALL BE AS SHOWN BELOW.

LOCATION	STATION	WALL HEIGHT (FT)	MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL (KSF)
END BENT NO. 1	-L- 19+98 (RT) - 20+11 (RT) & 19+91 (LT) - 20+04 (LT)	10.3	3.0
	-L- 20+11 (RT) - 20+23(RT) & 20+04 (LT) - 20+16 (LT)	18.7	4.7
	-L- 20+23 (RT) - 20+16 (LT)	27.9	5.7
END BENT NO. 2	-L- 21+94 (LT) - 21+83 (LT) & 21+89 (RT) - 22+01 (RT)	10.3	3.0
	-L- 21+83 (LT) - 21+72 (LT) & 21+76 (RT) - 21+89 (RT)	18.7	4.7
	-L- 21+72 (LT) - 21+76 (RT)	27.6	5.6

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7 H OR 6 FT, WHICHEVER IS LONGER.

5) MINIMUM EMBEDMENT DEPTH = 2 FEET OR H/10, WHICHEVER IS DEEPER.

6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) 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 (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	100
FOUNDATION - END BENT NO.1 (20+23 (24' RT) - 20+16 (24' LT) -L-)	135	42	0
FOUNDATION - END BENT NO.1 (REMINDER SECTIONS)	120	35	0
FOUNDATION - END BENT NO.2 (21+72 (24' LT) - 21+76 (24' RT) -L-)	120	31	0
FOUNDATION - END BENT NO.2 (REMINDER SECTIONS)	120	35	0

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALLS AT END BENT NO.1 AND END BENT 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 WALLS AT END BENT NO.1 AND END BENT NO.2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2.

FOUNDATIONS FOR END BENT NO.1 AND END BENT NO.2 LOCATED AT STATIONS 20+25.42 -L- AND 21+66.72 -L-, RESPECTIVELY, MAY INTERFERE WITH REINFORCEMENT FOR THE RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2. SEE FOUNDATION LAYOUT SHEET FOR FOUNDATION LOCATIONS.

"TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY, STRUCTURE or TRAFFIC CONTROL PLANS.

UNDERCUT SOFT CLAYEY SOILS UNDERNEATH FOOTPRINT OF MSE ABUTMENT WALL AT END BENT NO.2 AND EXTEND TO 5 FEET BEYOND THE RINFORCED ZONE FOOTPRINT. UNDERCUT TO A DEPTH OF 3 FEET OR TO SUITABLE MATERIAL AT THE DISCRETION OF THE ENGINEER AND BACKFILL PRIOR TO CONSTRUCTION OF LEVELING PAD.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS AT END BENT NO.1 AND END BENT NO.2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

INSTALL PILES AT END BENT NO.1 AND END BENT NO.2 BEFORE CONSTRUCTING MSE RETAINING WALLS.

GEOTECHNICAL ENGINEER

SEAL

047389

ENGINEER

CHEN-TING TANG

DocuSigned by:  
*Chen-Ting Tang*  
407191037

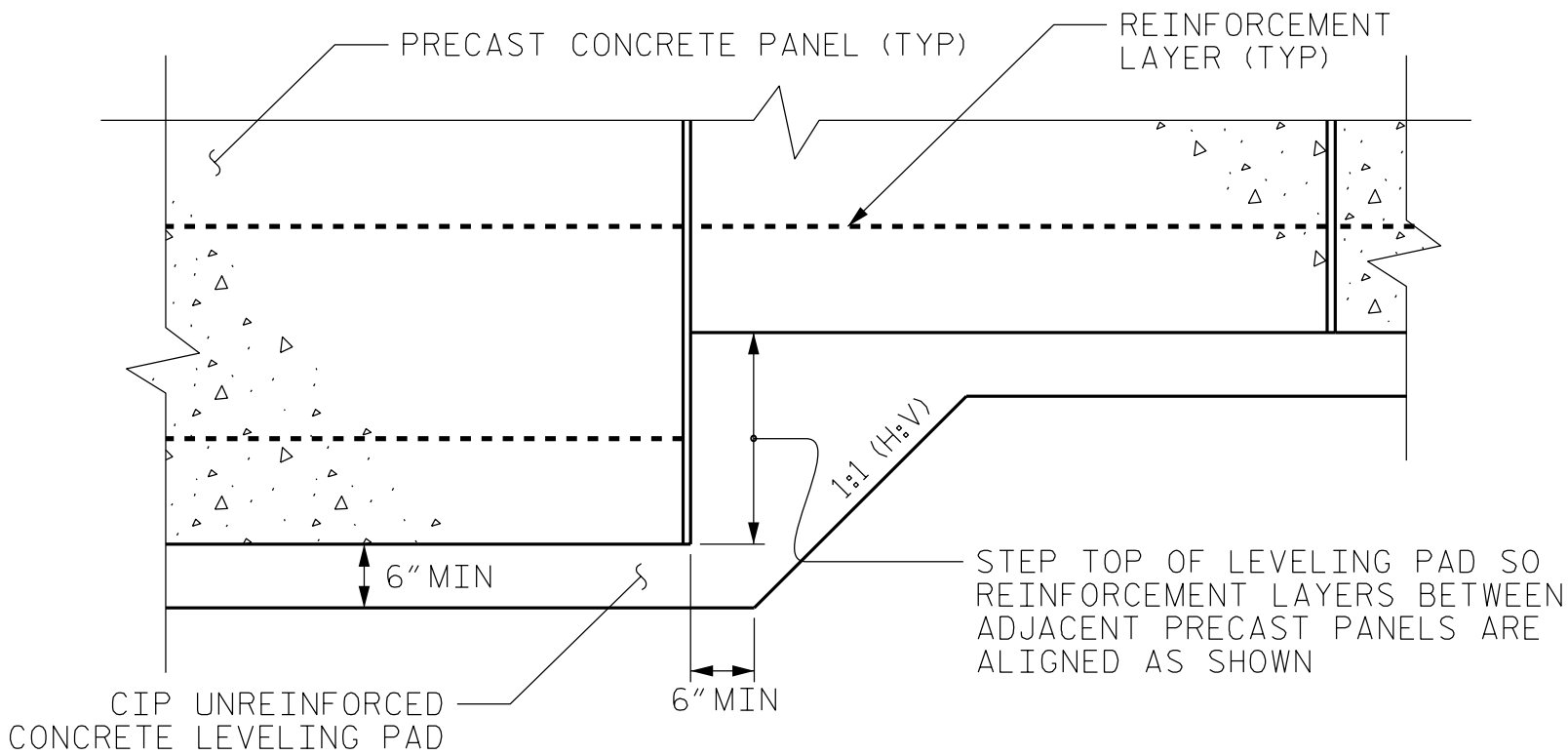
12/04/2024

SIGNATUREDATE

ENGINEER

SIGNATUREDATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



PRECAST PANELS  
LEVELING PAD STEP DETAIL

PROJECT NO.: BR-0098  
ROCKINGHAM COUNTY  
STATION: EB1: 20+25.42 -L-; EB2: 21+66.72 -L-



STD CELL wall MSE Notes Panels LevelingPad

MSE ABUTMENT WALL  
FOR END BENT NO. 1 AND NO. 2  
NOTES AND LEVELING  
PAD STEP DETAIL

SHEET  
NO.  
W-5

DATE: 1-16-18