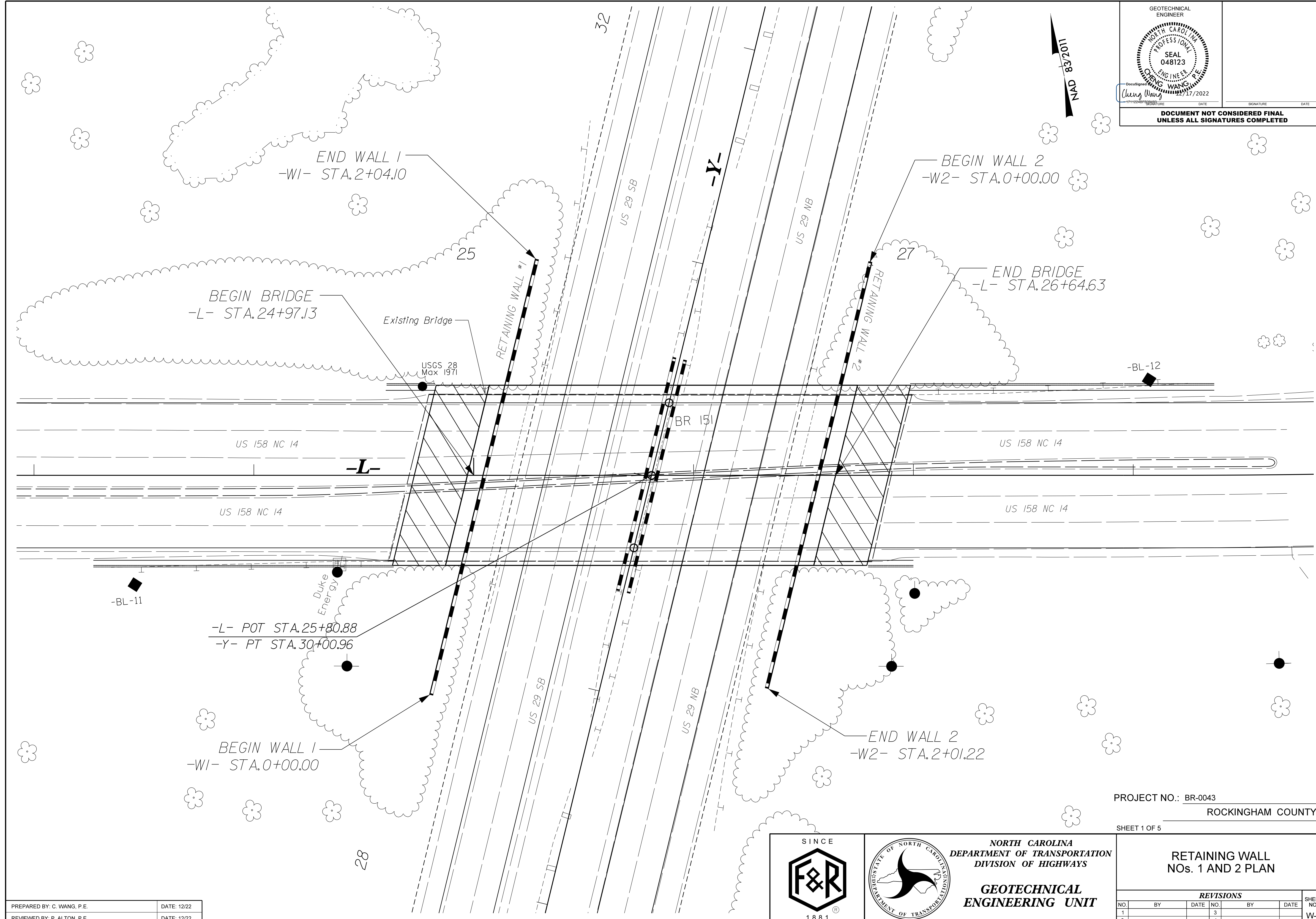



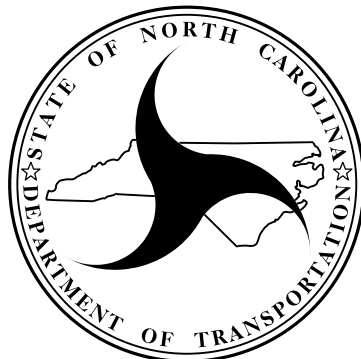
GEOTECHNICAL ENGINEER
 NORTH CAROLINA PROFESSIONAL SEAL 048123
 CHENG WANG, P.E.
 11/12/2019
 12/17/2022
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO.: BR-0043
 ROCKINGHAM COUNTY
 SHEET 1 OF 5

PREPARED BY: C. WANG, P.E. DATE: 12/22
 REVIEWED BY: P. ALTON, P.E. DATE: 12/22

SINCE

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 NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
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REVISIONS						SHEET NO. W-1
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

WALL #1 ENVELOPE (AT END BENT 1)

(LOOKING AT FRONT FACE OF WALL)

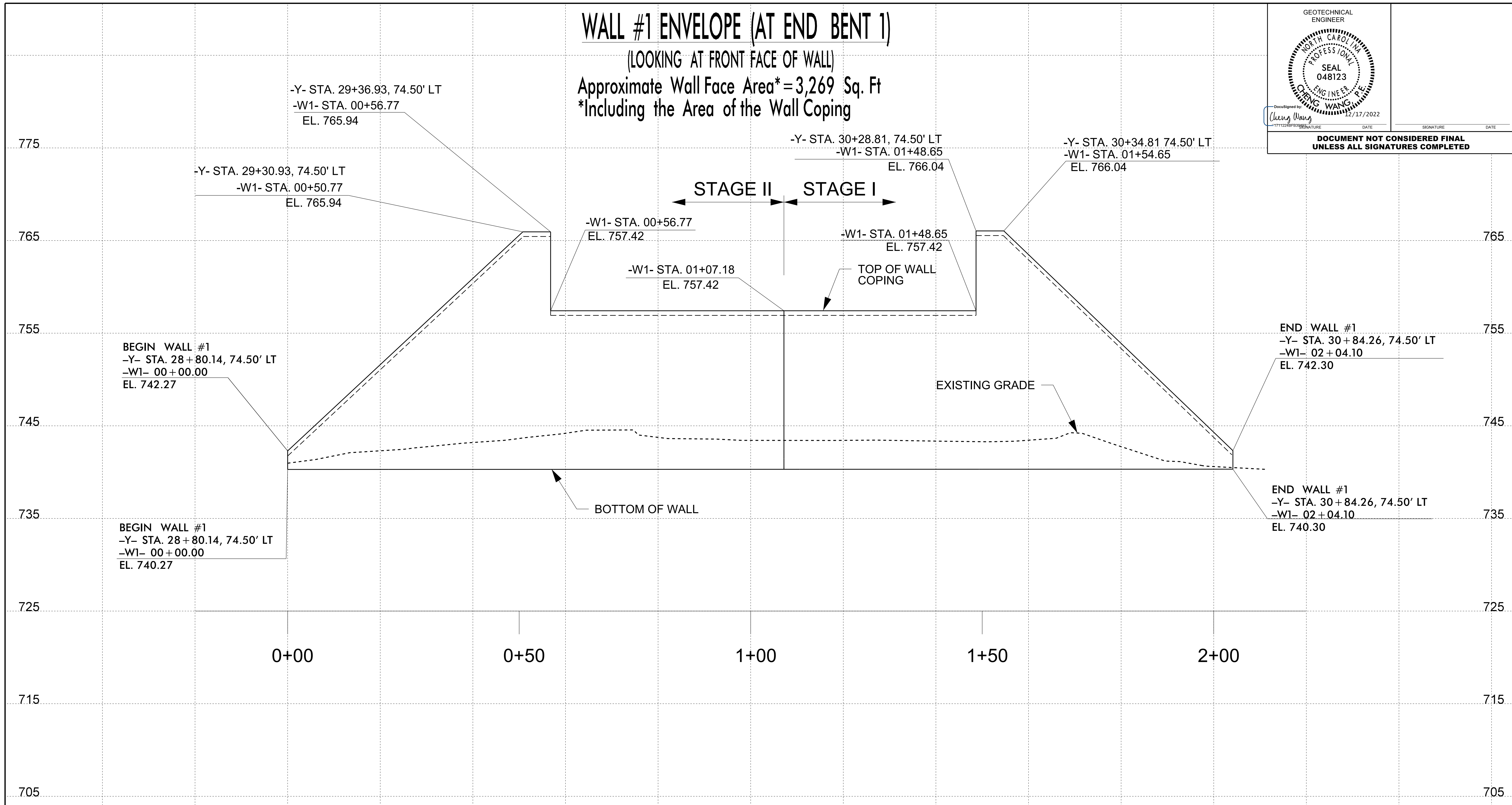
Approximate Wall Face Area* = 3,269 Sq. Ft
 *Including the Area of the Wall Coping

GEOTECHNICAL ENGINEER

DocuSigned by:
 Cheng Wang
 12/17/2022

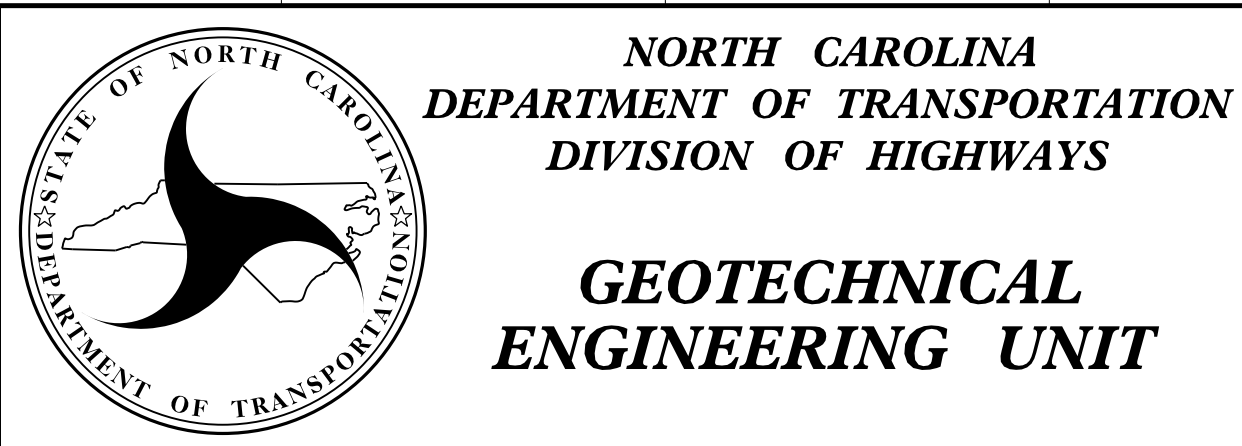
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PROJECT NO.: BR-0043
 ROCKINGHAM COUNTY
 SHEET 2 OF 5

PREPARED BY: C. WANG, P.E. DATE: 12/22
 REVIEWED BY: P. ALTON, P.E. DATE: 12/22



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

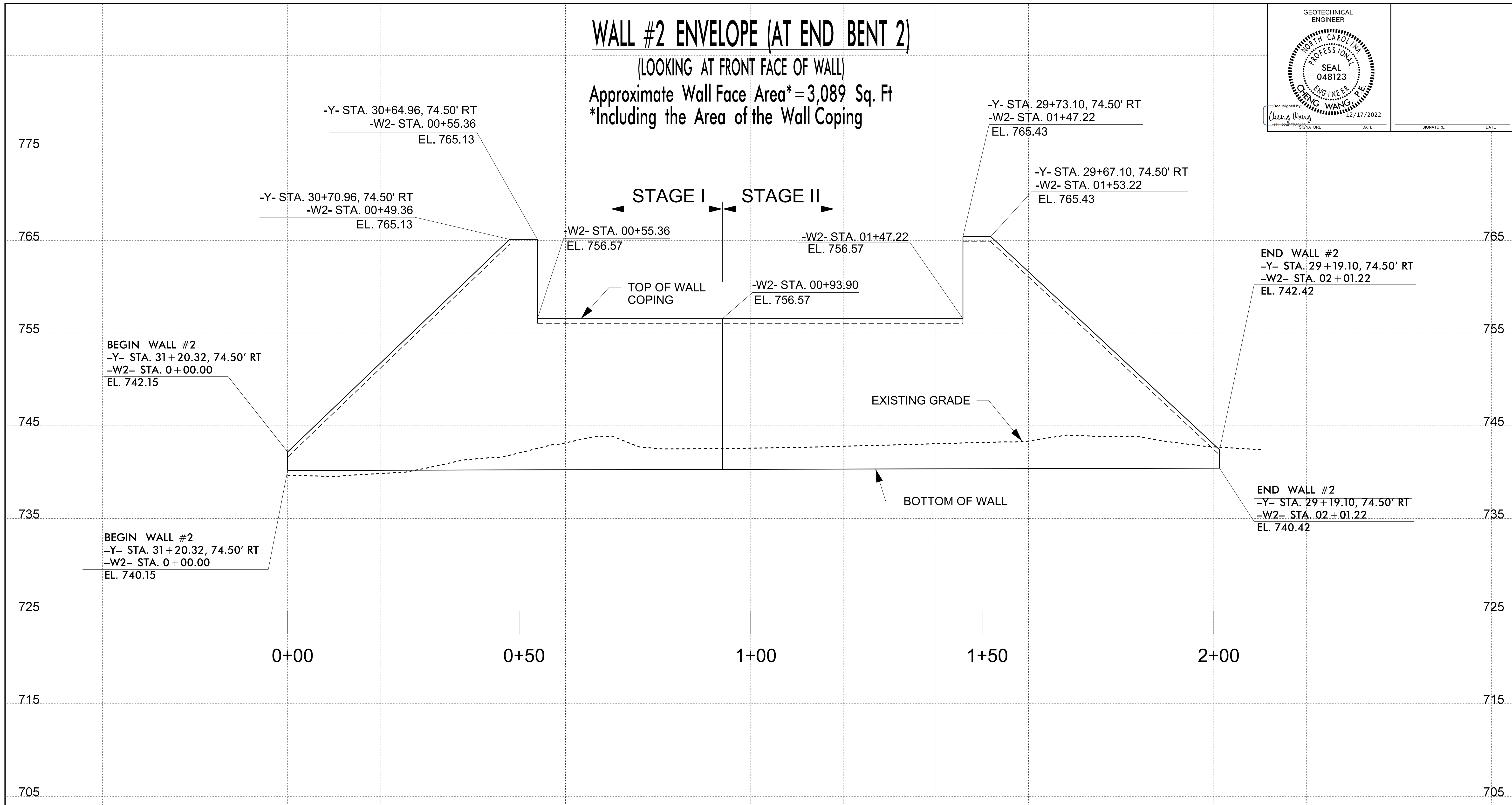
WALL #2 ENVELOPE (AT END BENT 2)

(LOOKING AT FRONT FACE OF WALL)

Approximate Wall Face Area* = 3,089 Sq. Ft
*Including the Area of the Wall Coping

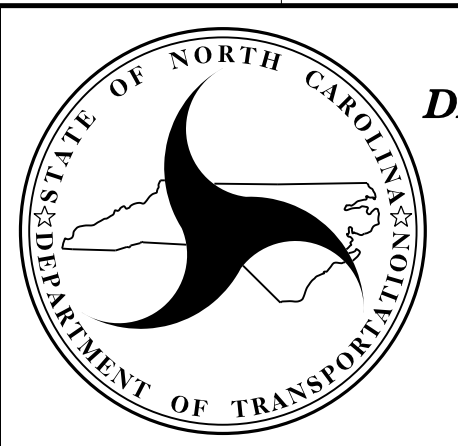
GEOTECHNICAL ENGINEER

DocuSigned by:
Cheng Wang
1711228P53383
SIGNATURE DATE



PROJECT NO.: BR-0043
ROCKINGHAM COUNTY
SHEET 3 OF 5

PREPARED BY: C. WANG, P.E. DATE: 12/22
REVIEWED BY: P. ALTON, P.E. DATE: 12/22



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
**GEOTECHNICAL
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REVISIONS						SHEET NO. W-3
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

NOTES:

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

FOR TYPE III REINFORCED BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

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

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

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

A DRAIN IS REQUIRED FOR RETAINING WALL NO.1 AND 2.

PILE SLEEVES ARE REQUIRED AROUND PILES FOR END BENT NO.1 LOCATED AT STATION -L- 24+97.13.

PILE SLEEVES ARE REQUIRED AROUND PILES FOR END BENT NO.2 LOCATED AT STATION -L- 26+64.13.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.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 NO.1 AND 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 = 5,100 PSF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7 H OR 6 FT, WHICHEVER IS LONGER
- 5) 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.

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	115	29	0

DESIGN RETAINING WALL NO.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_d) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.1 LOCATED AT STATION 24+97.13. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_d) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.2 LOCATED AT STATION 26+64.13. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR END BENT NO.1 LOCATED AT STATION -L-24+97.13 MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

FOUNDATIONS FOR END BENT NO.2 LOCATED AT STATION -L-26+64.13 MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

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

"TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NO.1 AND 2 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE STRUCTURE PLANS.

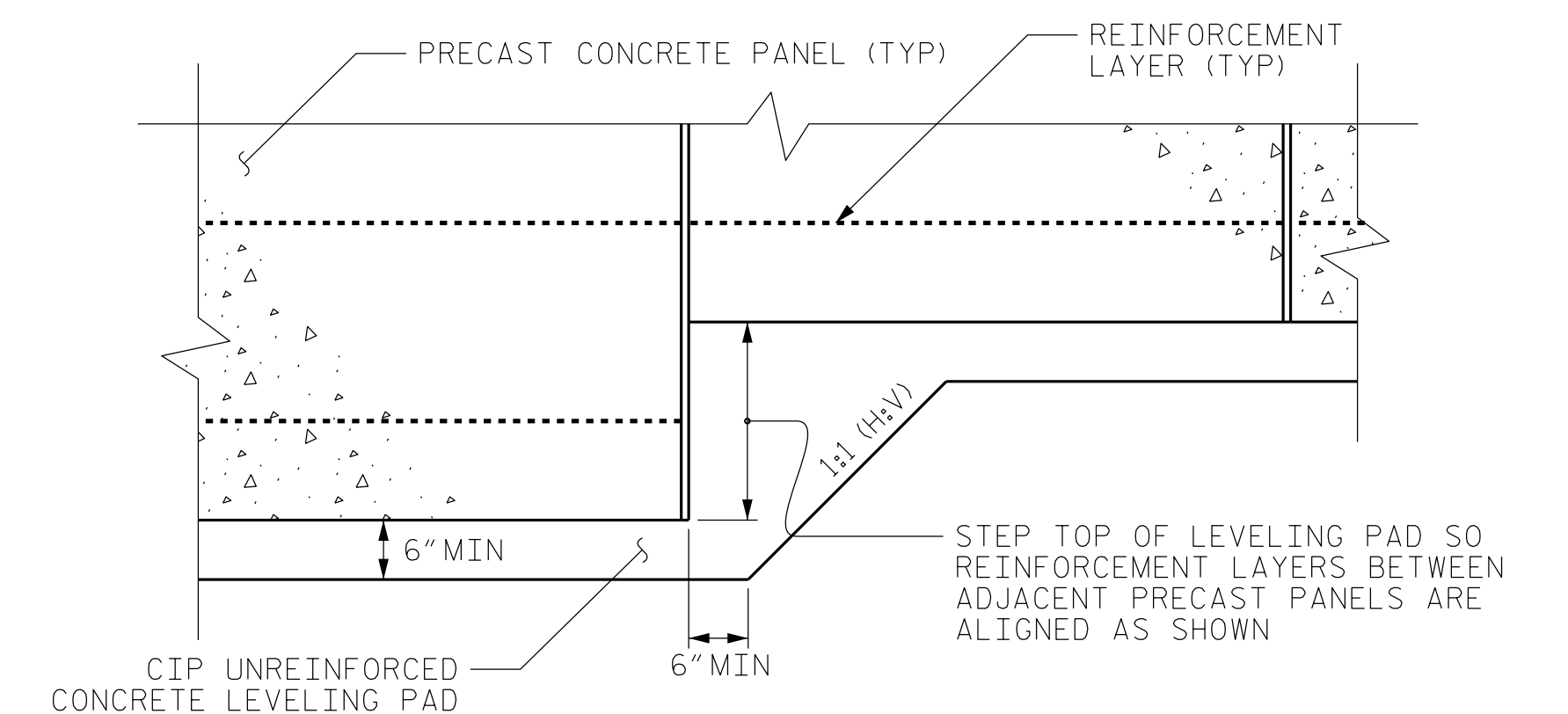
ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL NO.1	3,677 SF
MSE RETAINING WALL NO.2	3,491 SF

GEOTECHNICAL ENGINEER

Documented by: Cheng Wang DATE: 12/17/2022

SIGNATURE DATE

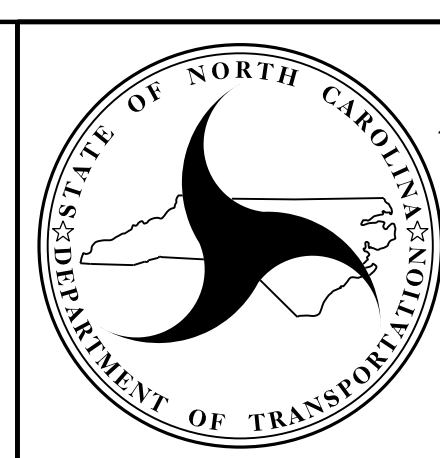
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PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: BR-0043
 ROCKINGHAM COUNTY
 SHEET 5 OF 5

PREPARED BY: C. WANG, P.E. DATE: 12/22
 REVIEWED BY: P. ALTON, P.E. DATE: 12/22



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			

RETAINING WALL
 NOS. 1 AND 2 MSE WALL-
 NOTES & PRECAST PANELS
 LEVELING PAD STEP DETAIL