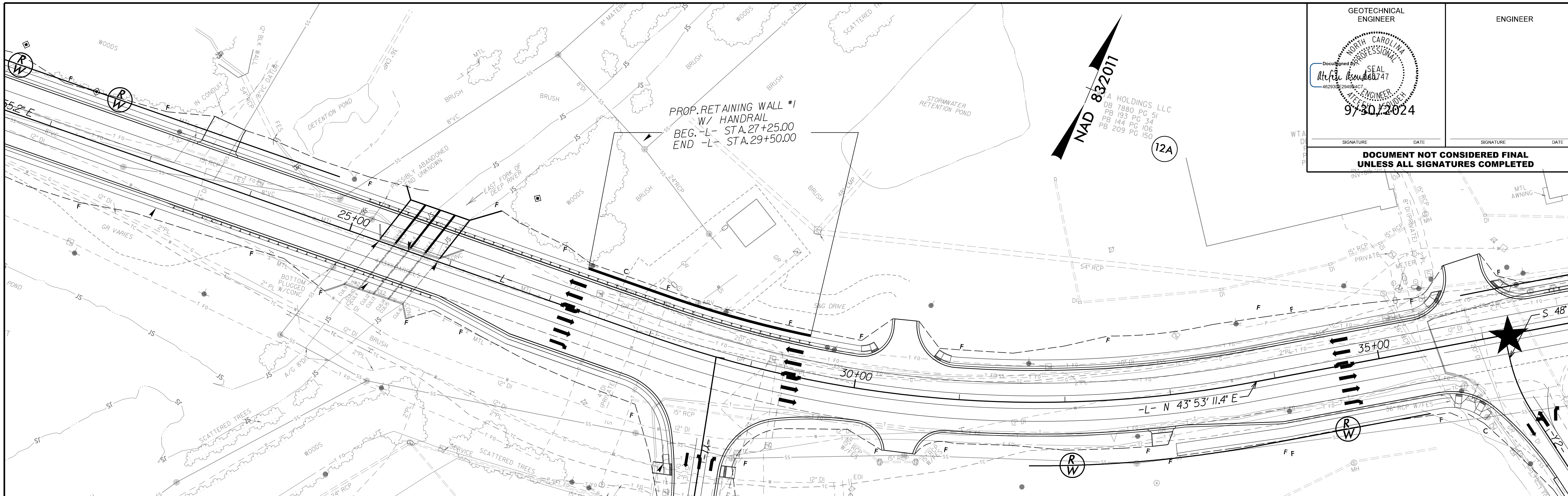
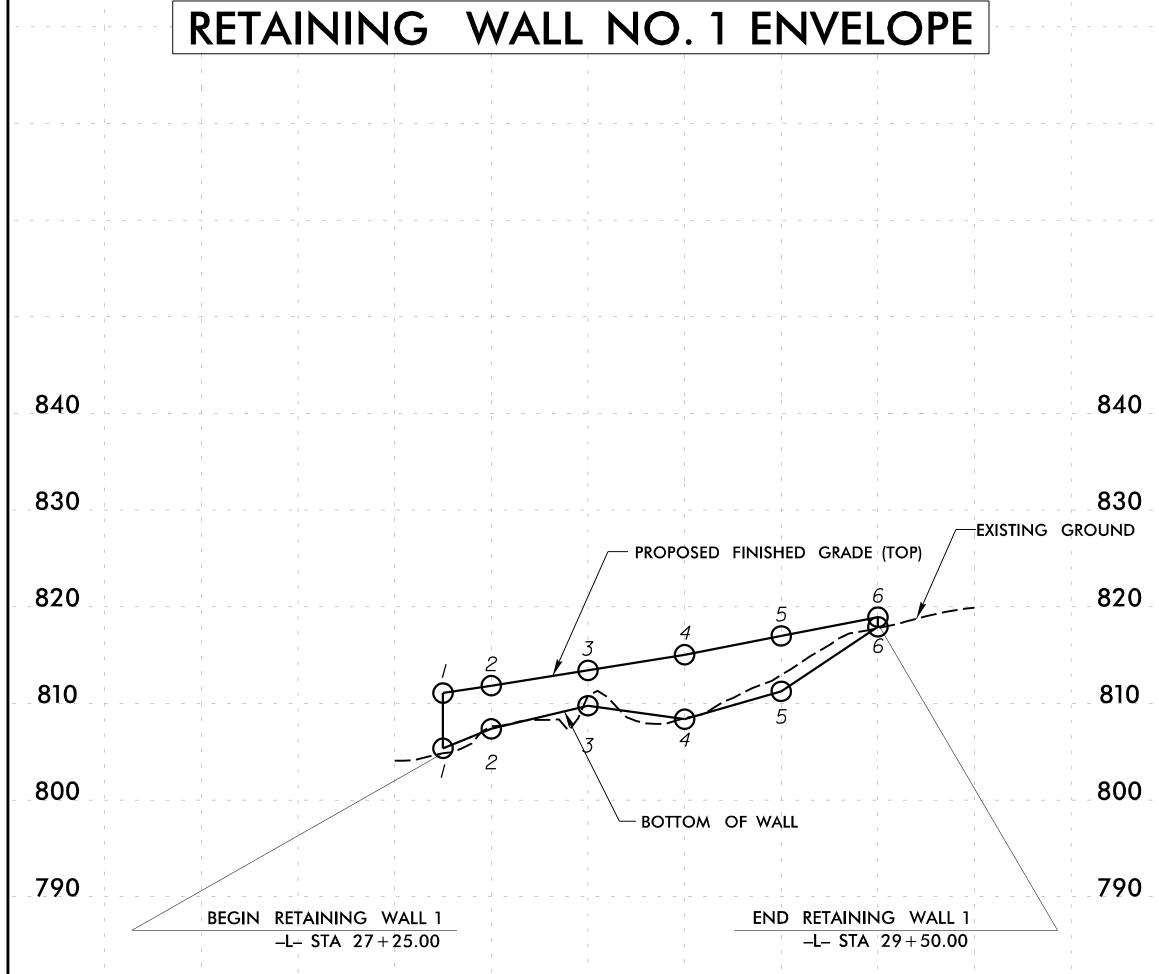


GEOTECHNICAL ENGINEER | ENGINEER

9/30/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

RETAINING WALL NO. 1 ENVELOPE



POINT NO.	-L- STATION	PROPOSED FINISHED GRADE (TOP)	BOTTOM OF WALL
1	27+25.00	811.07′	805.35′
2	27+50.00	811.84′	807.37′
3	28+00.00	813.41′	809.76′
4	28+50.00	815.04′	808.37′
5	29+00.00	816.98′	811.24′
6	29+50.00	818.92′	817.92′

ESTIMATED QUANTITIES

RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FOOT)
1	1630

PROJECT NO.: U-4015A

GUILFORD COUNTY

STATION: RW-1: -L- 27+25.00 TO -L- 29+50.00

SHEET 1 OF 5

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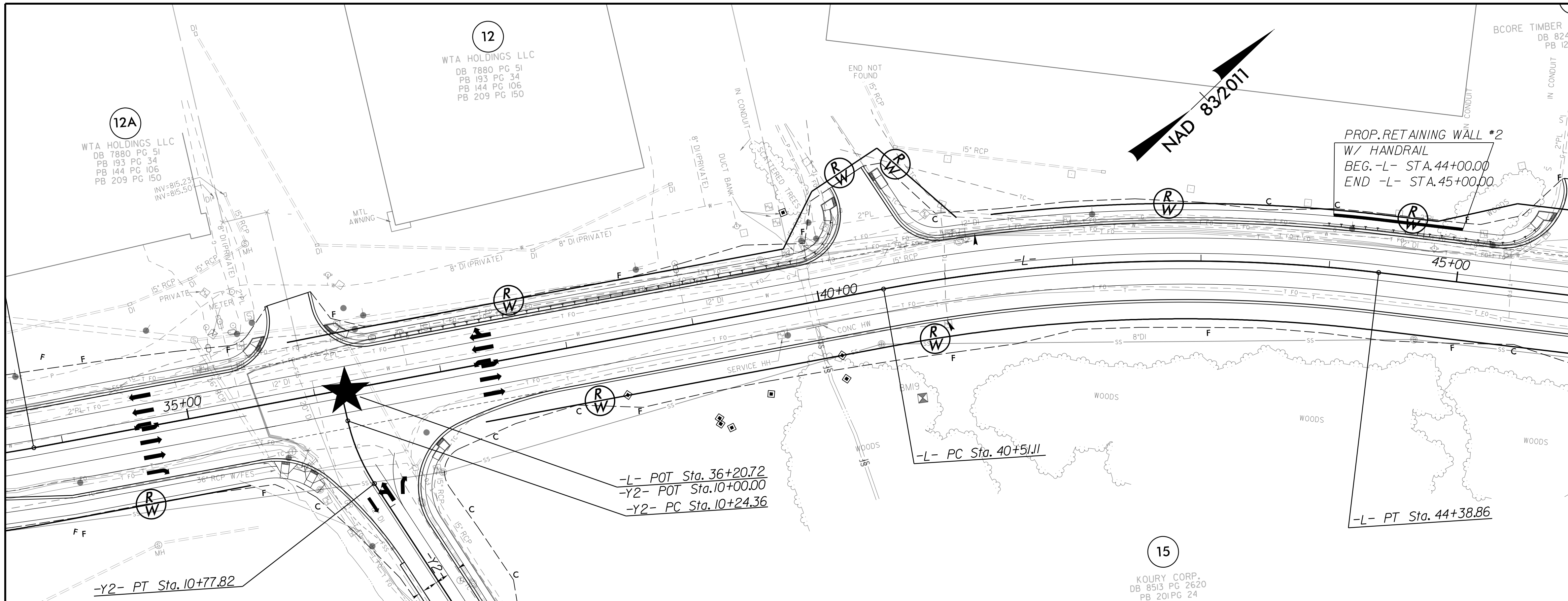
RETAINING WALL NO. 1
PLAN AND PROFILE

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	S. KABRA	12/20/21	3		
2	M. METRY	02/13/23	4		

SHEET NO. W-1



GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER 043747 ATEFEH ASOUDEH

9/30/2024

SIGNATURE DATE

ENGINEER

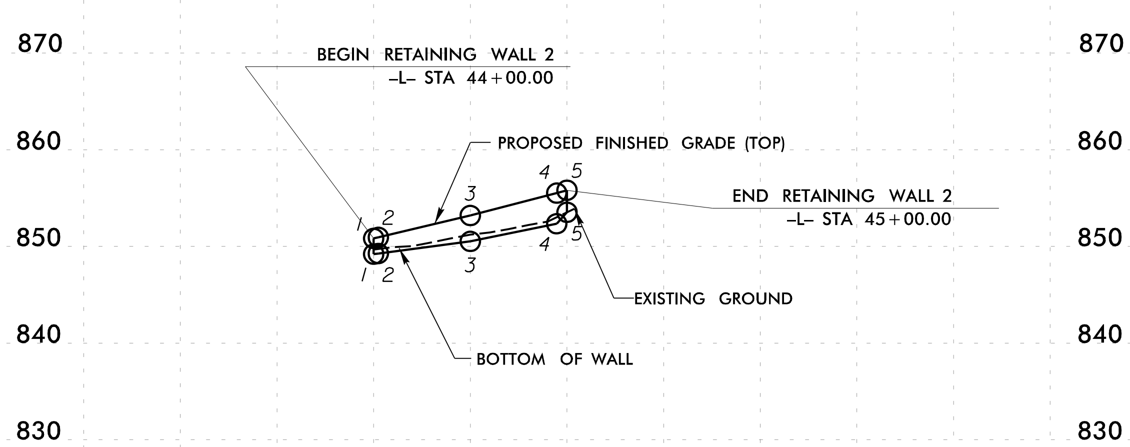
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

44+00 45+00 46+00

RETAINING WALL NO. 2 ENVELOPE

POINT NO.	-L- STATION	PROPOSED FINISHED GRADE (TOP)	PROPOSED FINISHED GRADE (BOT.)
1	44+00.00	850.83′	849.20′
2	44+02.43	850.94′	849.27′
3	44+50.00	853.20′	850.52′
4	44+94.71	855.52′	852.35′
5	45+00.00	855.80′	853.53′



44+00 45+00 46+00

ESTIMATED QUANTITIES

RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FOOT)
2	510

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PROJECT NO.: U-4015A

GUILFORD COUNTY

STATION: RW-2: -L- 44+00.00 TO -L- 45+00.00

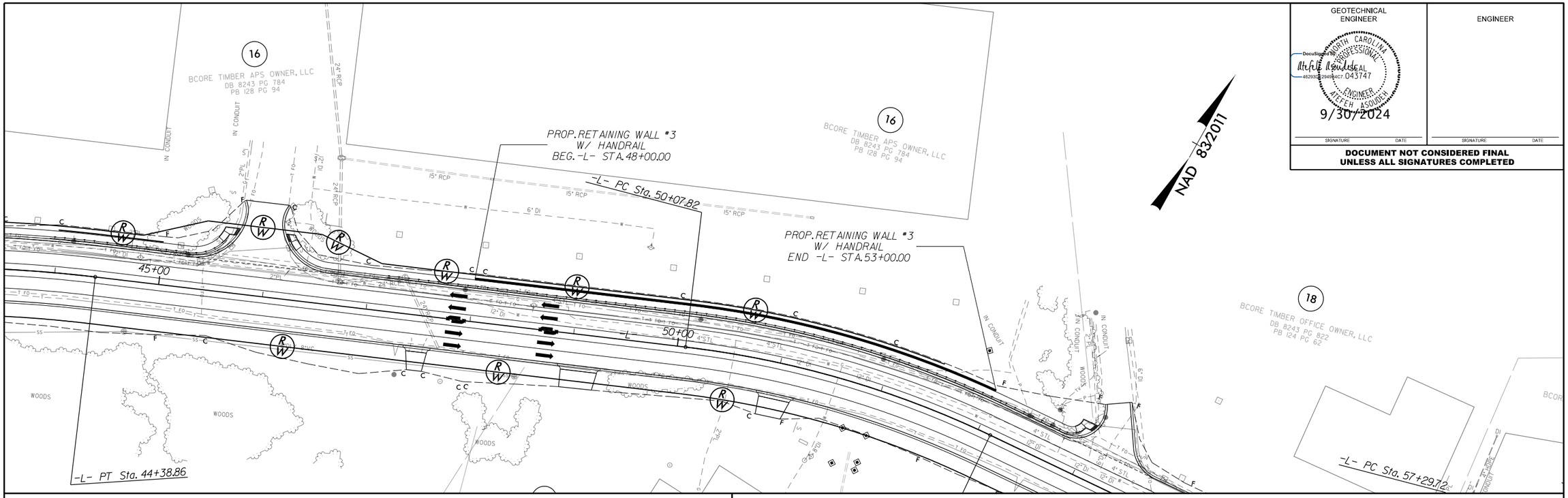
SHEET 2 OF 5

RETAINING WALL NO. 2
PLAN AND PROFILE

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	S. KABRA	12/20/21	3		
2	M. METRY	02/13/23	4		

SHEET NO. W-2



GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043747 ENGINEER MEFEH ASOUDEH

DocuSigned by: Mefeh Asoudeh 48293E2949B4C7...

9/30/2024

SIGNATURE DATE

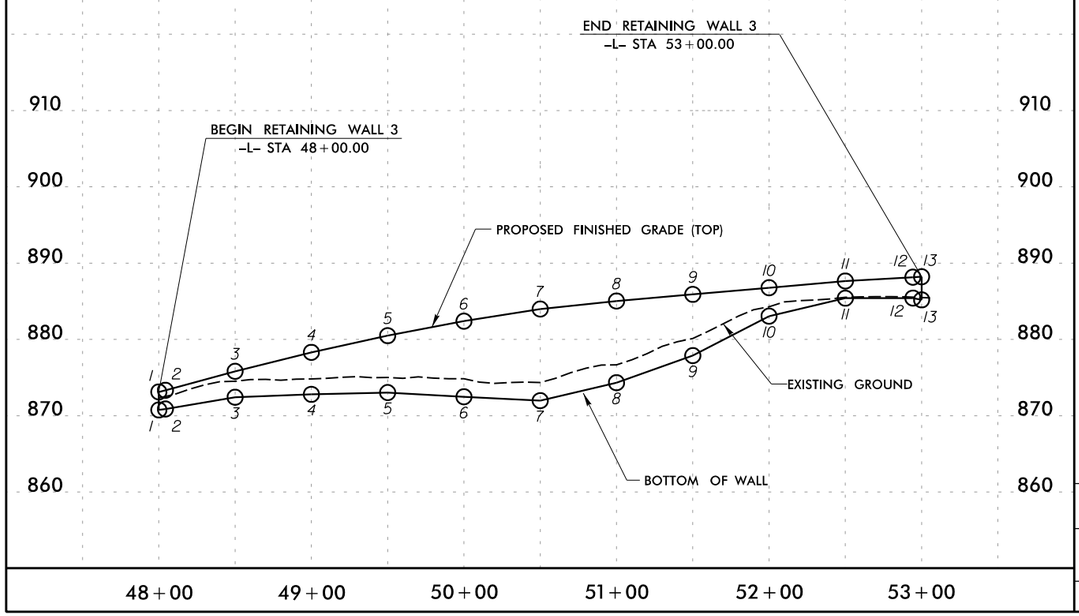
ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

48+00 49+00 50+00 51+00 52+00 53+00

RETAINING WALL NO. 3 ENVELOPE



48+00 49+00 50+00 51+00 52+00 53+00

POINT NO.	-L- STATION	PROPOSED FINISHED GRADE (TOP)	PROPOSED FINISHED GRADE (BOT.)
1	48+00.00	873.11′	870.76′
2	48+04.34	873.33′	870.88′
3	48+50.00	875.82′	872.42′
4	49+00.00	878.30′	872.79′
5	49+50.00	880.50′	873.04′
6	50+00.00	882.39′	872.48′
7	50+50.00	883.98′	871.98′
8	51+00.00	885.03′	874.33′
9	51+50.00	885.90′	877.88′
10	52+00.00	886.78′	883.05′
11	52+50.00	887.65′	885.41′
12	52+94.27	888.15′	885.41′
13	53+00.00	888.21′	885.19′

ESTIMATED QUANTITIES

RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FOOT)
3	4,530

PROJECT NO.: U-4015A

GUILFORD COUNTY

STATION: RW-3: -L- 48+00.00 TO -L- 53+00.00

SHEET 3 OF 5

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RETAINING WALL NO. 3 PLAN AND PROFILE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	S. KABRA	12/20/21	3			W-3
2	M. METRY	02/13/23	4			

GEOTECHNICAL ENGINEER	ENGINEER
DocuSigned by: Atefeh Asoudeh; SEAL 043747; NORTH CAROLINA PROFESSIONAL ENGINEER; ATEFEH ASOUDEH; 9/30/2024	
SIGNATURE DATE	SIGNATURE DATE

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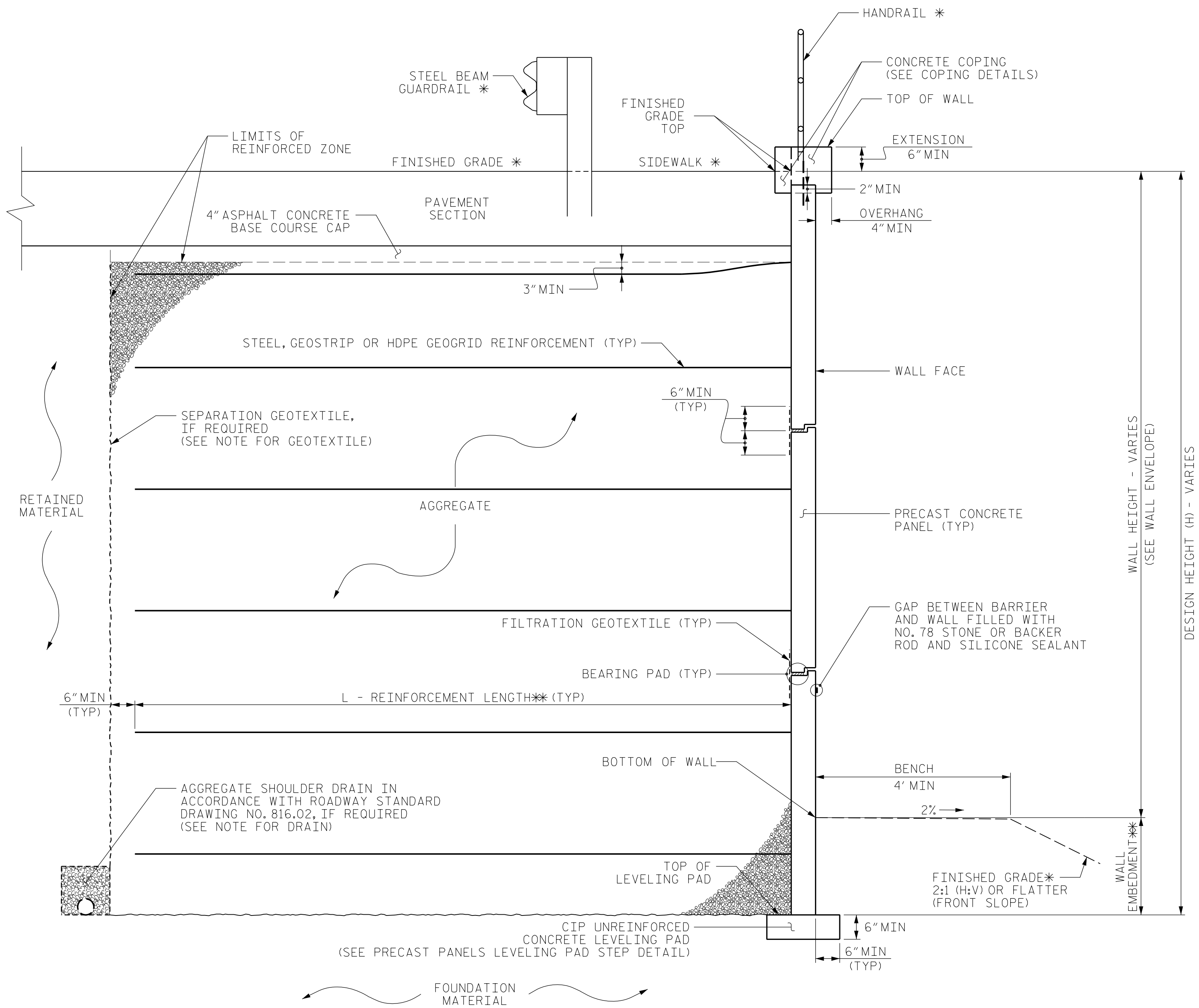
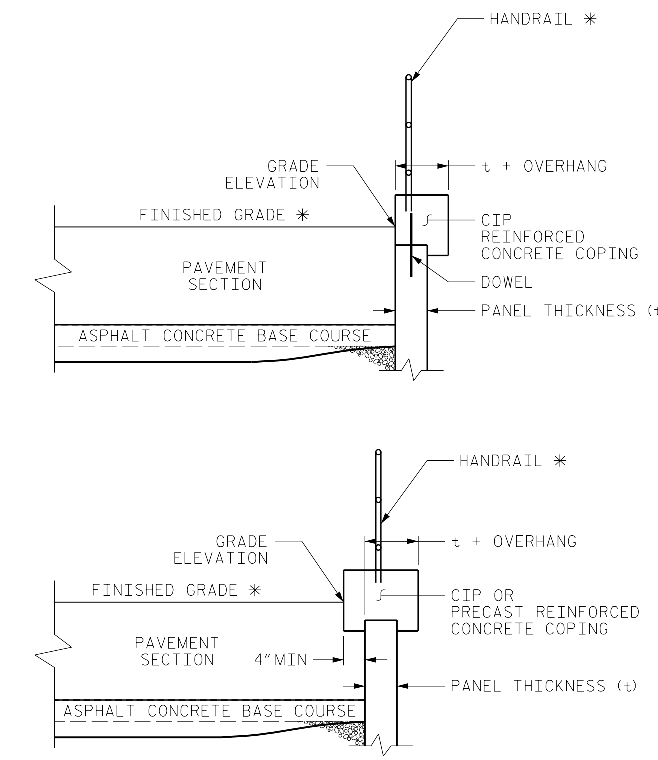


MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

✳ SEE ROADWAY PLANS FOR FINISHED GRADE, SIDEWALK, GUARDRAIL AND HANDRAILS 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.

PROJECT NO.: U-4015A

GUILFORD COUNTY

STATION: RW1: -L- 27+25.00 TO -L- 29+50.00
RW2: -L- 44+00.00 TO -L- 45+00.00
RW3: -L- 48+00.00 TO -L- 53+00.00

SHEET 4 OF 5 WALL ID RW-1 TO 3

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 THROUGH NO. 3 DETAILS

PREPARED BY: S. KABRA	DATE: 03/25/22
REVIEWED BY: M. METRY	DATE: 03/28/22

REVISIONS

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1	S. KABRA	12/20/21	3			W-4
2	M. METRY	02/13/23	4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 048747 ENGINEER MATTHEW ASQUITH

Docusigned by: Matthew Asquith 462907...

9/30/2024

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 1 THROUGH NO. 3.

AN ASHLAR STONE ARCHITECTURAL FINISH IS REQUIRED FOR CONCRETE FOR RETAINING WALLS NO. 1 THROUGH NO. 3. SEE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION.

CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 1 THROUGH NO. 3.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 1 THROUGH NO. 3.

A SEPARATION GEOTEXTILE IS NOT REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1 THROUGH NO. 3, PROVIDED FINE AGGREGATE IS USED IN THE REINFORCED ZONE.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1 THROUGH NO. 3.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1 THROUGH NO. 3, 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 THROUGH NO. 3 FOR THE FOLLOWING:
1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 75 YEARS
3) MINIMUM EMBEDMENT DEPTH = 2 FT
4) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL SHALL BE AS SHOWN BELOW.
5) MINIMUM REINFORCEMENT LENGTH (L) SHALL BE AS SHOWN BELOW OR 6 FT, WHICHEVER IS LONGER

WALL NO.	-L- STATION	REINFORCEMENT LENGTH RATIO	MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL (KSF)
1	27+25.00 TO 29+50.00	0.8H	2.5
2	44+00.00 TO 45+00.00	1.2H	1.4
3	48+00.00 TO 49+00.00	0.8H	2.2
3	49+00.00 TO 52+00.00	0.7H	3.9
3	52+00.00 TO 53+00.00	0.8H	2.2

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
RETAINED	120	30	0
FOUNDATION AT RW NO. 1	120	28	0
FOUNDATION AT RW NO. 2	120	28	0
FOUNDATION AT RW NO. 3	120	28	0

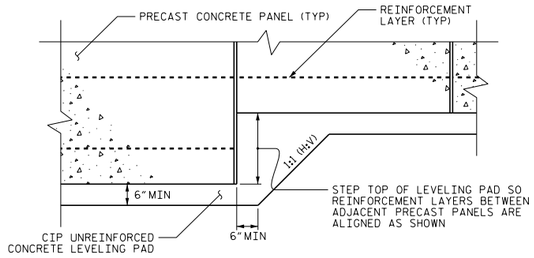
DESIGN RETAINING WALL NO. 1 THROUGH NO.3 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO. 1 THROUGH NO. 3, 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 MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1 THROUGH NO. 3.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 AND NO. 3, UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

"TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALL NO. 1 THROUGH NO. 3, IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY or TRAFFIC CONTROL PLANS.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: U-4015A

GUILFORD COUNTY

STATION: RW1: -L- 27+25.00 TO -L- 29+50.00
RW2: -L- 44+00.00 TO -L- 45+00.00
RW3: -L- 48+00.00 TO -L- 53+00.00

SHEET 5 OF 5 WALL ID RW-1 TO 3

PREPARED BY: S. KABRA	DATE: 03/25/22
REVIEWED BY: M. METRY	DATE: 03/28/22

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO. 1 THROUGH NO. 3 NOTES AND LEVELING PAD DETAILS

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	S. KABRA	12/20/21	3		
2	M. METRY	02/13/23	4		

SHEET NO. W-5