

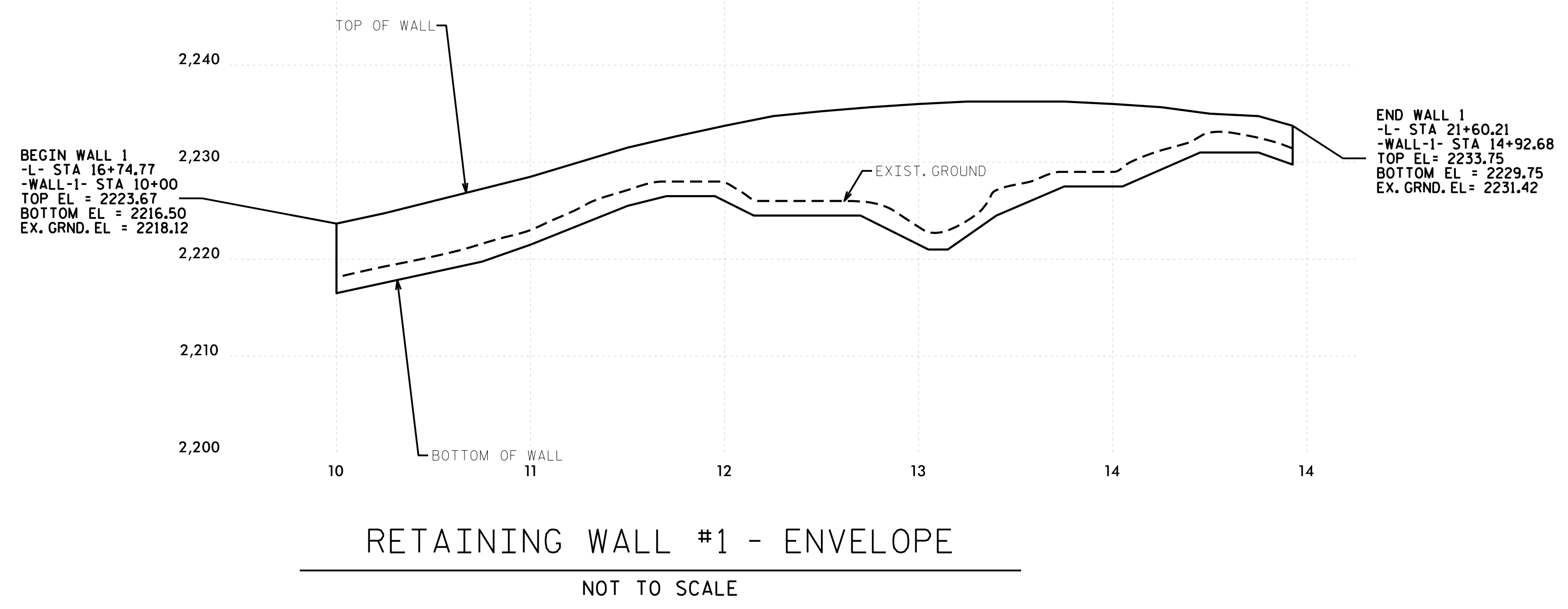
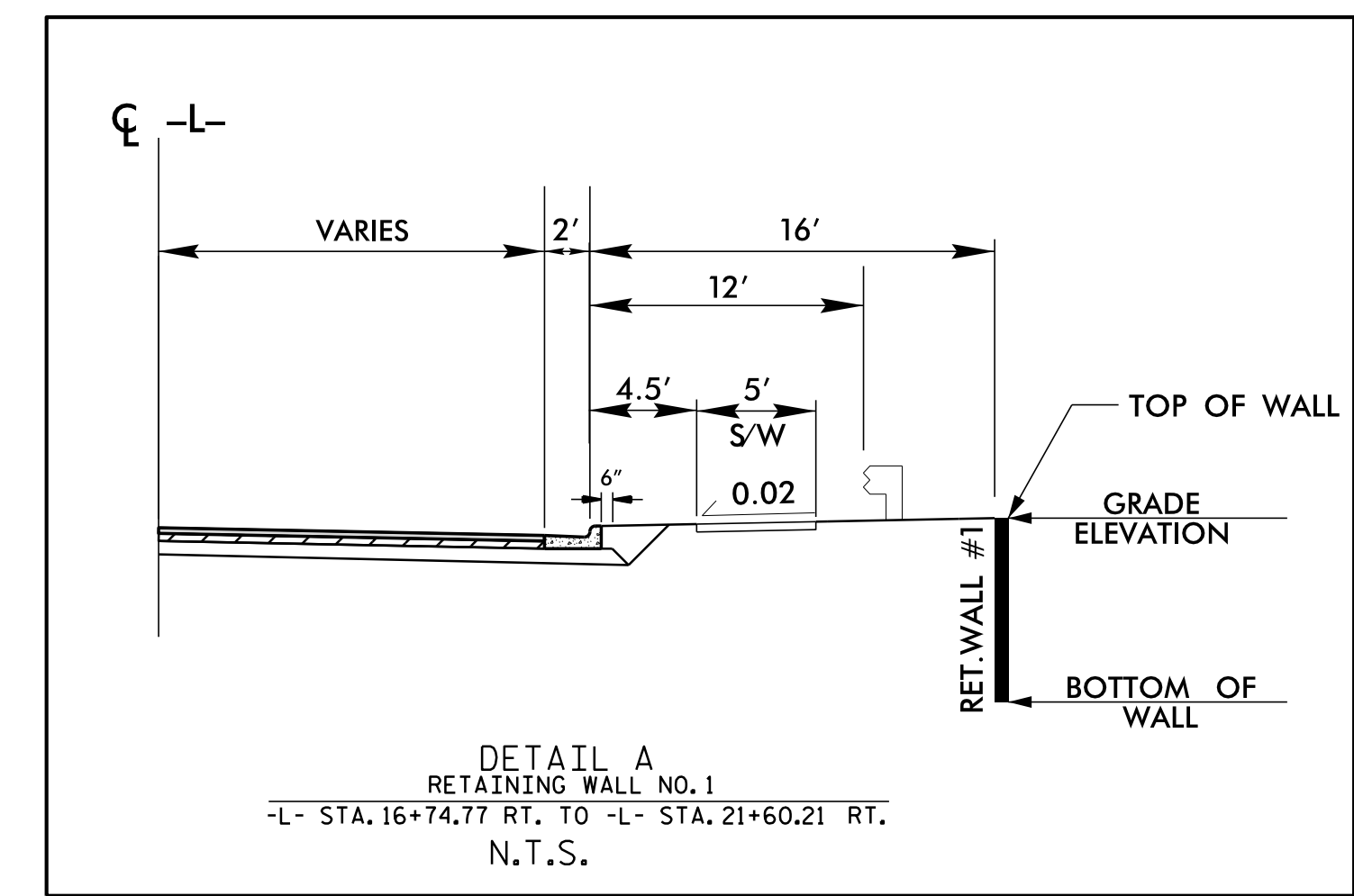
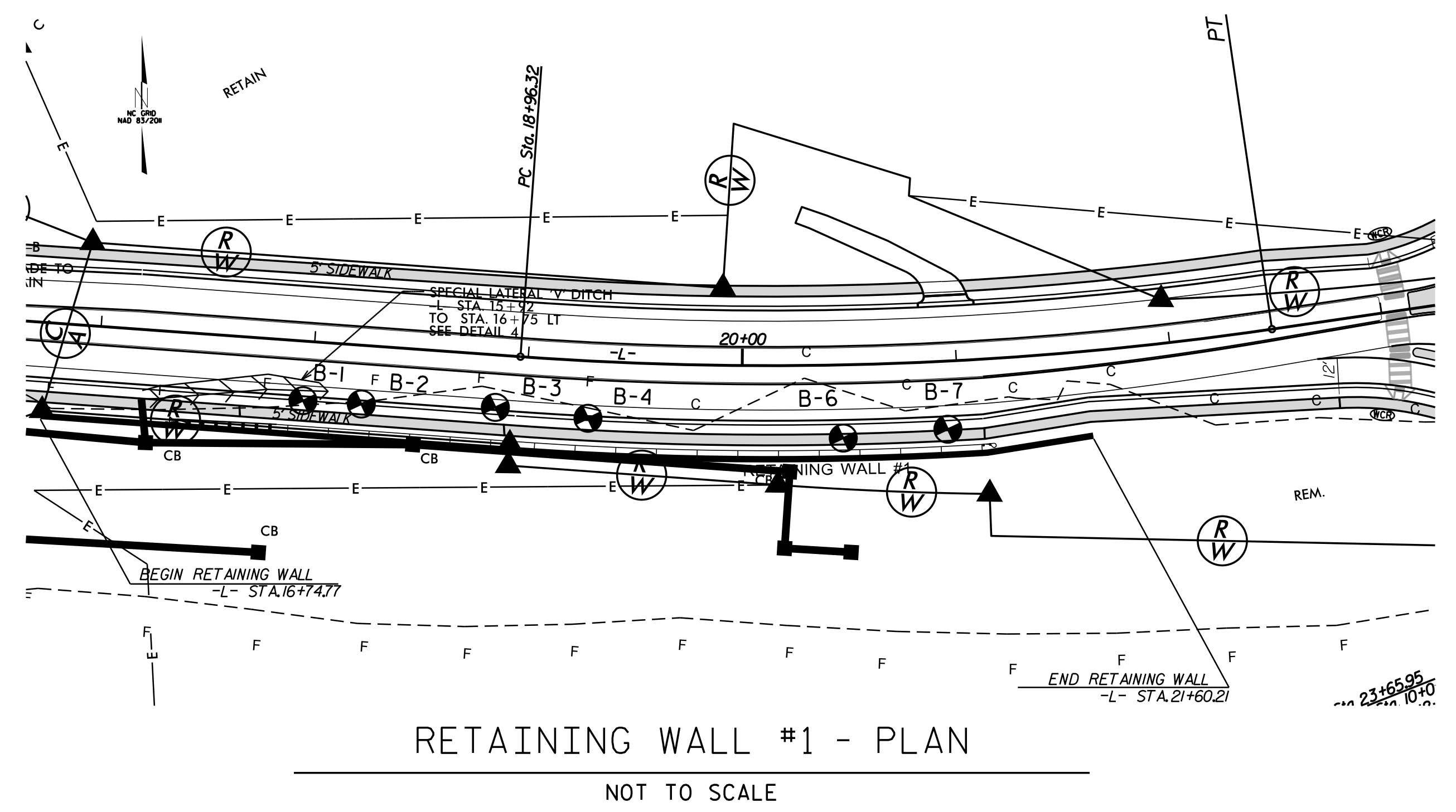
GEOTECHNICAL ENGINEER

ENGINEER

DocuSigned by:
Michael J. Walker 11/16/2023

SIGNATURE DATE SIGNATURE DATE

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UNLESS ALL SIGNATURES COMPLETED**



THE WALL ENVELOPE DOES NOT ACCURATELY
DEPICT THE ACTUAL FACE OF THE WALL
WALL NO. 1 SURFACE AREA = 4,090 SQ.FT.

PROJECT NO.: U-5783
 HENDERSON COUNTY
 STATION: -WALL1- STA. 10+00.00 to 14+92.68
 SHEET 1 OF 2 WALL NO. 1

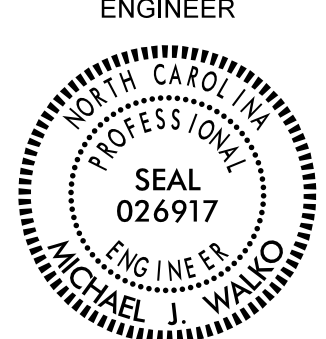
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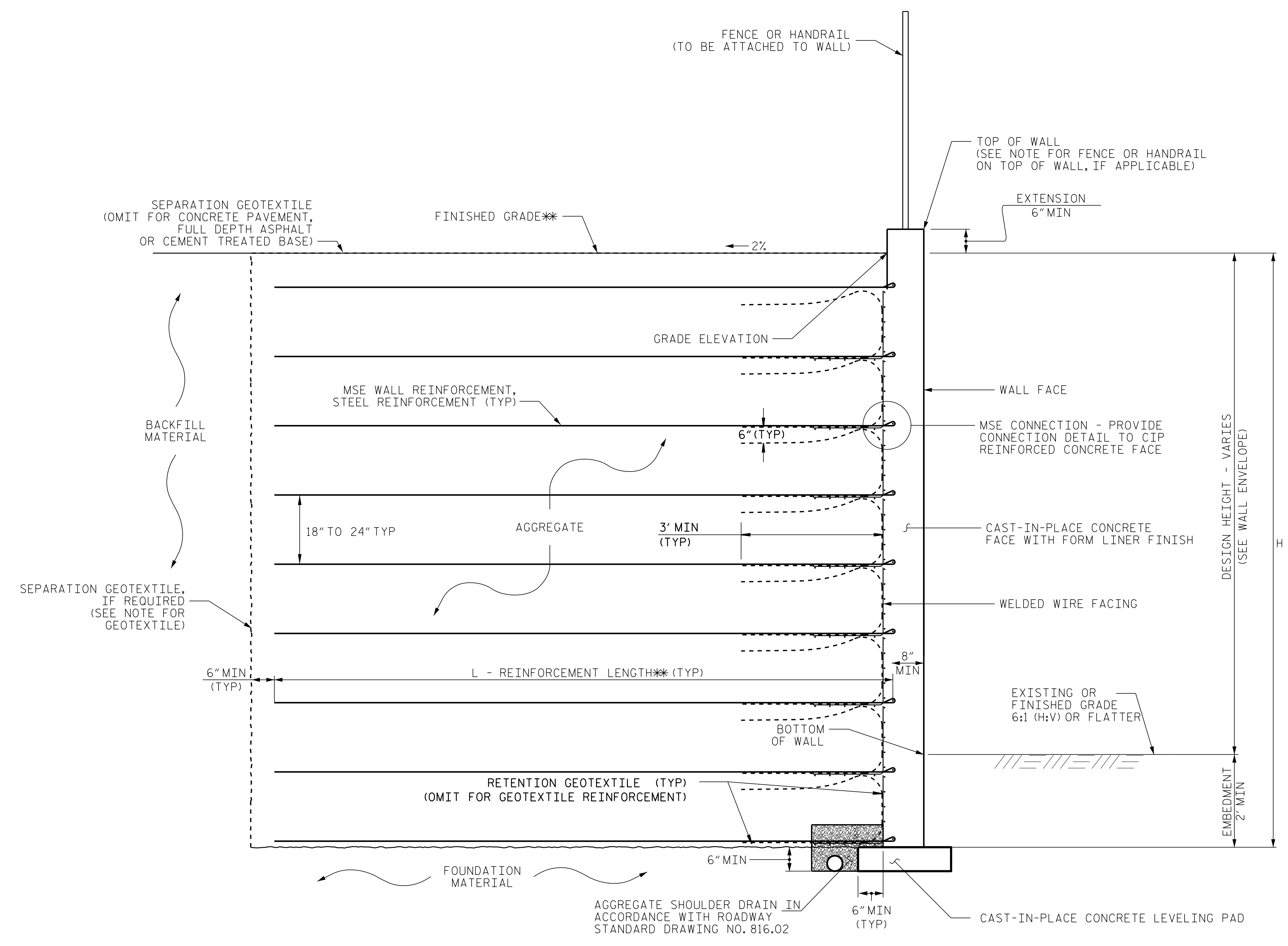
ECS SOUTHEAST, LLP
 1812 CENTER PARK DRIVE, SUITE D
 CHARLOTTE, NC 28217
 (704) 525-5152 [PHONE]
 (704) 357-0023 [FAX]
 NC REGISTERED
 ENGINEERING
 FIRM # F-1078

**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

REVISIONS						
NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1	ECS	11/23	3			W-1
2			4			

GEOTECHNICAL ENGINEER  SEAL 026917 ENGINEER MICHAEL J. WALKER	ENGINEER _____ SIGNATURE DATE
DocuSigned by: Michael J. Walker 11/16/2023 SIGNATURE DATE	_____ SIGNATURE DATE
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MSE WALL WITH CIP CONCRETE FACE - 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.

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS WITH CIP CONCRETE FACE, SEE MSE RETAINING WALL WITH CIP CONCRETE FACE PROVISION.

A DRY STACKED NATURAL STONE PATTERN ARCHITECTURAL FINISH IS REQUIRED FOR THE CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 1. SEE SIMULATED STONE FORM LINER FINISH PROVISION.

A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NO. 1. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

DO NOT USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 1.

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

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1, 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 FOR THE FOLLOWING:
 1) H = DESIGN HEIGHT + EMBEDMENT
 2) DESIGN LIFE = 75 YEARS
 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 3,600 LB/SF
 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H OR 6 FT, WHICHEVER IS LONGER
 5) MINIMUM EMBEDMENT DEPTH = 2 FT
 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE 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	115	28	0

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1.
 DESIGN AND DETAIL CONNECTION OF HANDRAIL TO TOP OF WALL.
 DESIGN RETAINING WALL NO. 1 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALL NO. 1 FOR DESIGN HEIGHTS EQUAL TO THE WALL HEIGHT PLUS DEPTH TO TOP OF FOOTING (DIFFERENCE BETWEEN GRADE ELEVATIONS AND TOP OF FOOTING ELEVATION).

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.


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

DO NOT PLACE WELDED WIRE FACING, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 UNTIL OBTAINING APPROVAL OF THE EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL.

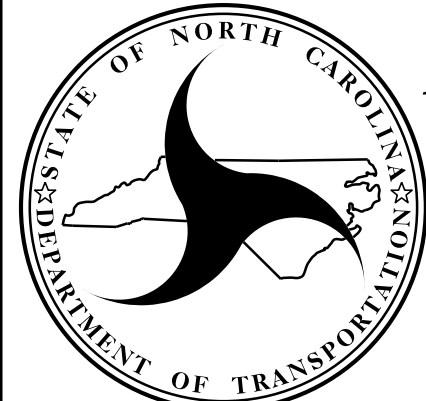
UNDERCUTTING SOFT/VERY LOOSE SOILS IN THE VICINITY OF THE WALL FOUNDATION MAY BE REQUIRED TO IMPROVE BEARING RESISTANCE. AT THE DISCRETION OF THE ENGINEER, UNDERCUT TO SUITABLE FOUNDATION SOILS OR TO A DEPTH NO GREATER THAN 3 FEET BELOW THE BOTTOM OF FOOTING ELEVATION, WHICHEVER OCCURS FIRST. PLACE GEOTEXTILE FOR SOIL STABILIZATION IN THE BOTTOM OF THE EXCAVATION AND BACKFILL WITH SELECT GRANULAR MATERIAL. FOR UNDERCUT EXCAVATION AND SELECT GRANULAR MATERIAL, SEE STANDARD SPECIFICATIONS.

PROJECT NO.: U-5783
 HENDERSON COUNTY
 STATION: -WALL1- STA. 10+00.00 to 14+92.68
 SHEET 2 OF 2 WALL NO. 1

Prepared in the Office of:



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 FIRM # F-1078



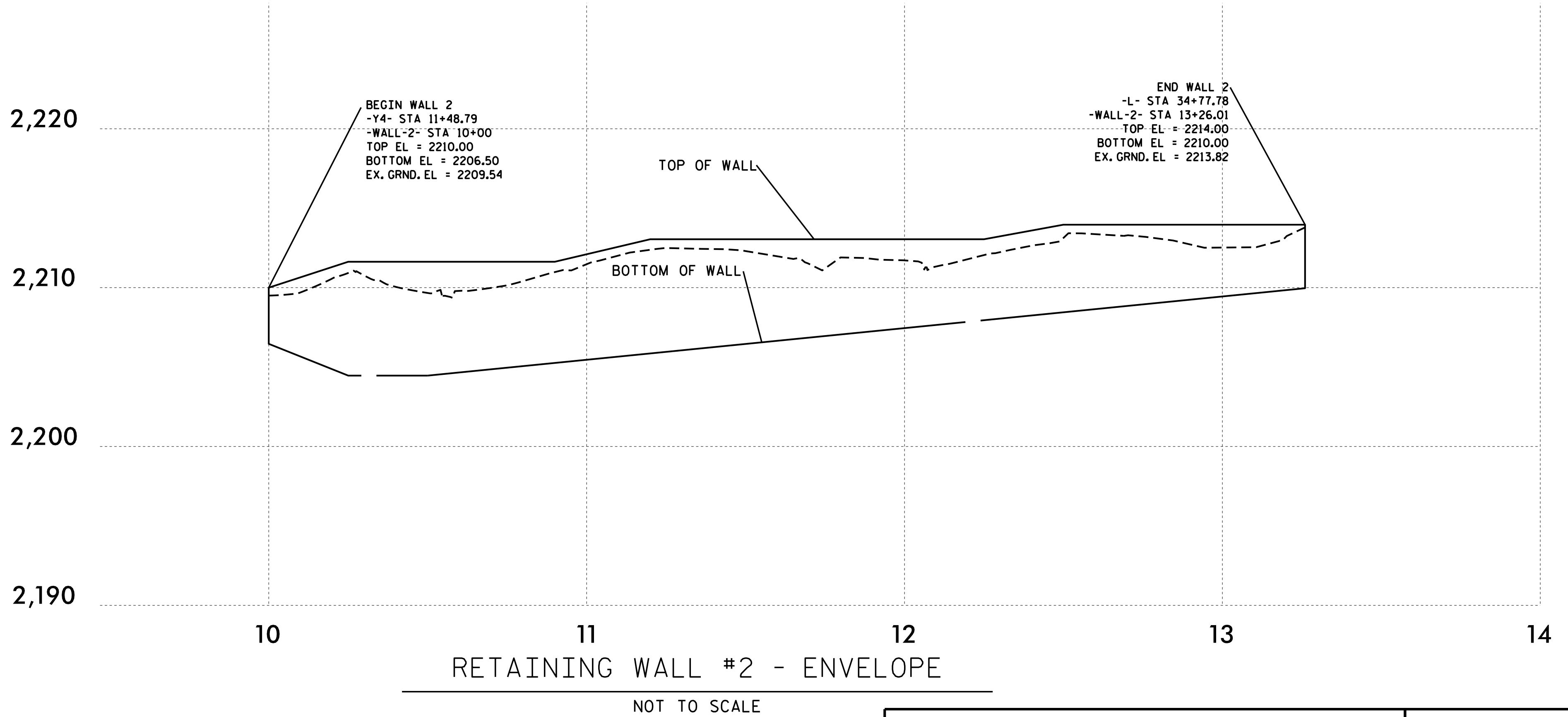
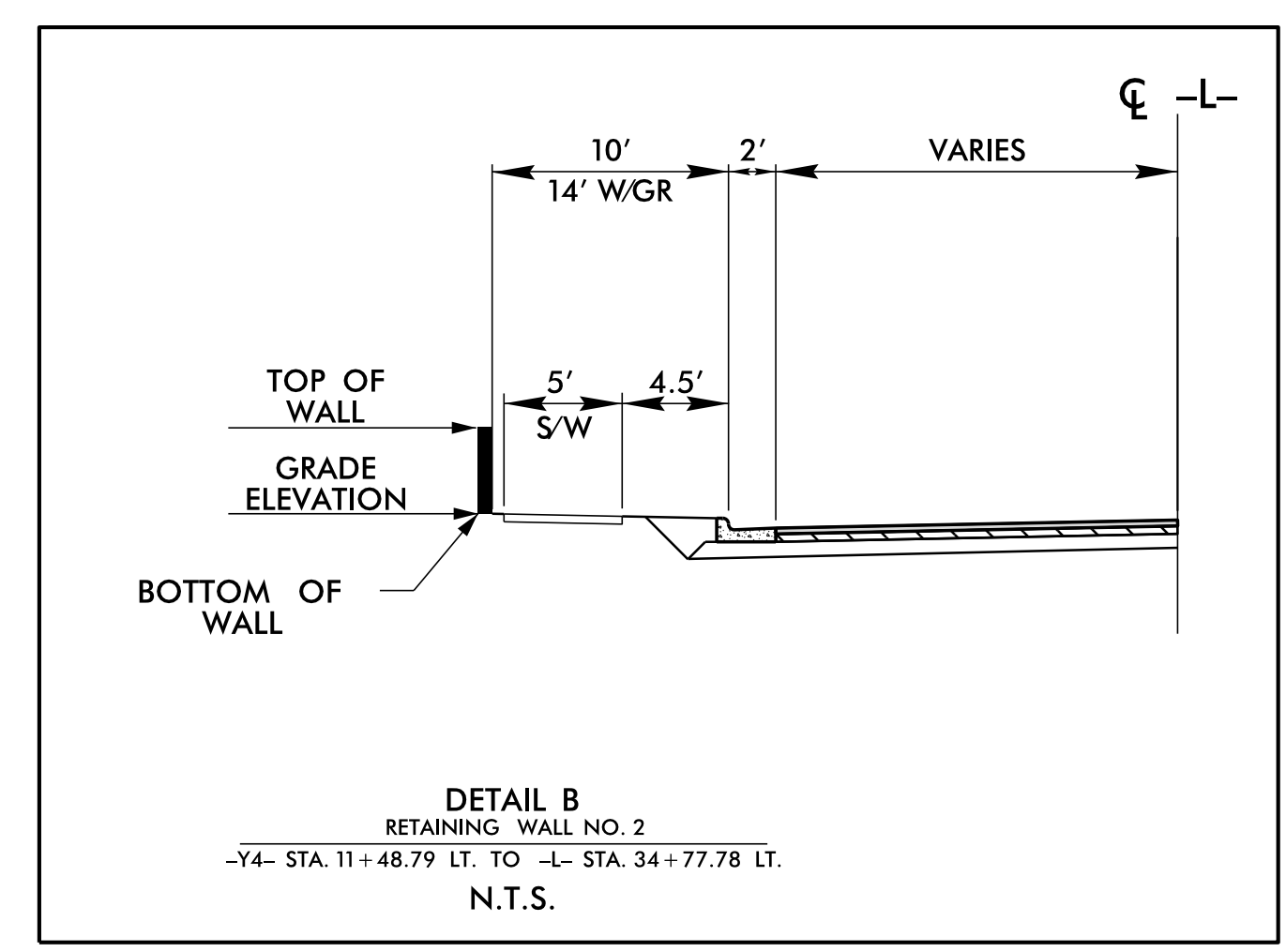
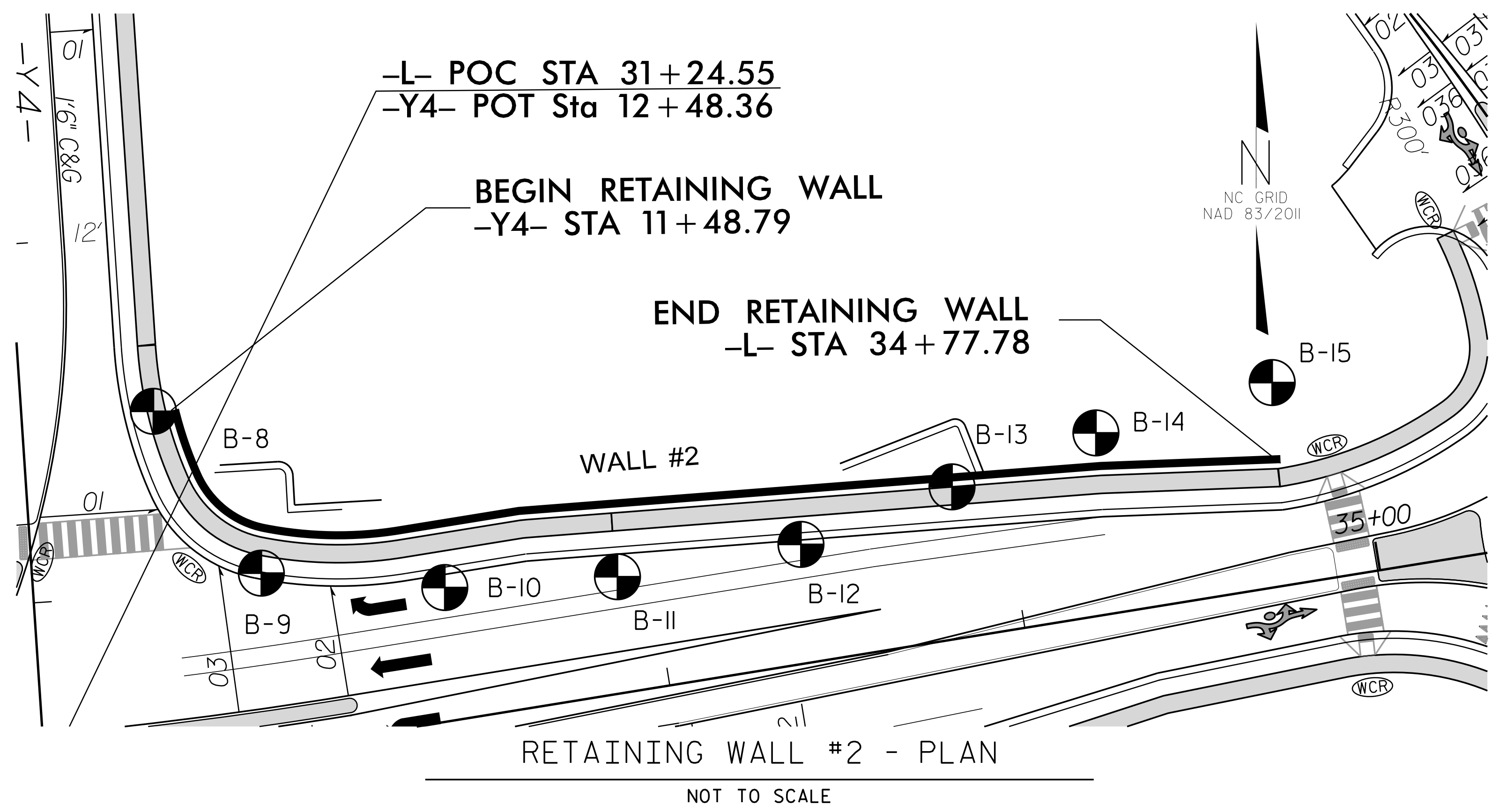
**NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS**

**GEOTECHNICAL
 ENGINEERING UNIT**

**RETAINING WALL 1
 MSE RETAINING WALL
 WITH CIP CONCRETE FACE
 NOTES AND DETAILS**

DATE: 03-22-23

SHEET NO. W-1A



THE WALL ENVELOPE DOES NOT ACCURATELY
DEPICT THE ACTUAL FACE OF THE WALL
WALL NO. 2 SURFACE AREA = 1,820 SQ.FT.

GEOTECHNICAL ENGINEER

ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045542 ENGINEERS KELLY DE MONTMAYRE MONTERO

DocuSigned by: Kelly de Montmayre 3/27/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PREPARED BY: KND	DATE: 01/2023
REVIEWED BY: MJW	DATE: 01/2023

Prepared in the Office of:

ECS

ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED ENGINEERING FIRM # F-1078

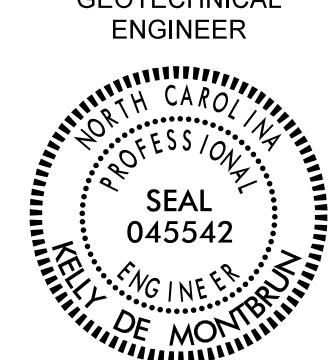
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

PROJECT NO.: U-5783
HENDERSON COUNTY
STATION: -WALL2- STA. 10+00.00 to 13+26.01
SHEET 1 OF 2 WALL NO 2

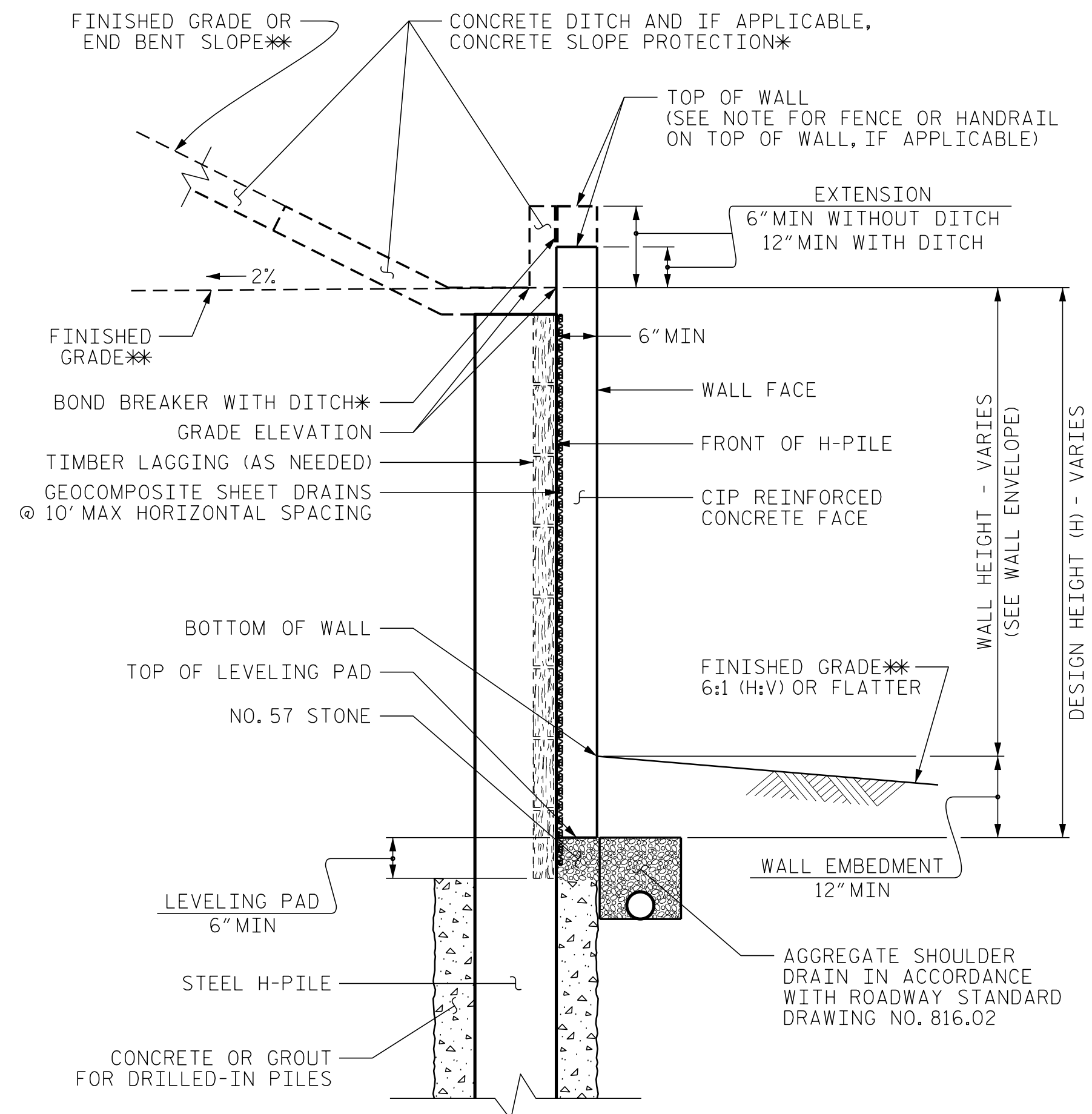
SOLDIER PILE WALL TYPICAL DETAIL & NOTES

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

GEOTECHNICAL ENGINEER  DocuSigned by: Kelly de Montbrun 78009975E2220480 SIGNATURE	ENGINEER DATE: 3/27/2023 SIGNATURE: _____ DATE: _____
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

NOTES:

- FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.
- A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NO. 2. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
- DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALL NO. 2.
- AT THE CONTRACTOR'S OPTION, USE DRIVEN H-PILES FOR RETAINING WALL NO. 2.
- USE A SOLDIER PILE RETAINING WALL WITH A CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 2.
- A DRY STACKED NATURAL STONE PATTERN ARCHITECTURAL FINISH IS REQUIRED FOR THE CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 2. SEE SIMULATED STONE FORM LINER FINISH PROVISION.
- BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL 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. 2 FOR THE FOLLOWING:
 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
 2) DESIGN LIFE = 75 YEARS
 3) MINIMUM WALL EMBEDMENT DEPTH = 1 FT
 4) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 2214 FT:
 UNIT WEIGHT, $\gamma = 115$ PCF
 FRICTION ANGLE, $\phi = 28$ DEGREES
 COHESION, $c = 0$ PSF
- AT THE CONTRACTOR'S OPTION, USE A TEMPORARY SLOPE INSTEAD OF TEMPORARY SUPPORT OF EXCAVATIONS FOR RETAINING WALL NO. 2.
- "TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALL NO. 2 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY PLANS.



**SOLDIER PILE WALL WITH
CIP FACE - TYPICAL SECTION**

*SEE CONCRETE DITCH BEHIND WALL DETAILS.
 **SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.

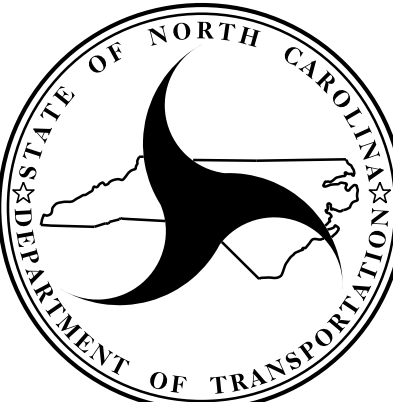
PROJECT NO.: U-5783
 HENDERSON COUNTY
 STATION: -WALL2- STA. 10+00.00 to 13+26.01
 SHEET 2 OF 2 WALL NO. 2

PREPARED BY: KND	DATE: 01/2023
REVIEWED BY: MJW	DATE: 01/2023

Prepared in the Office of:



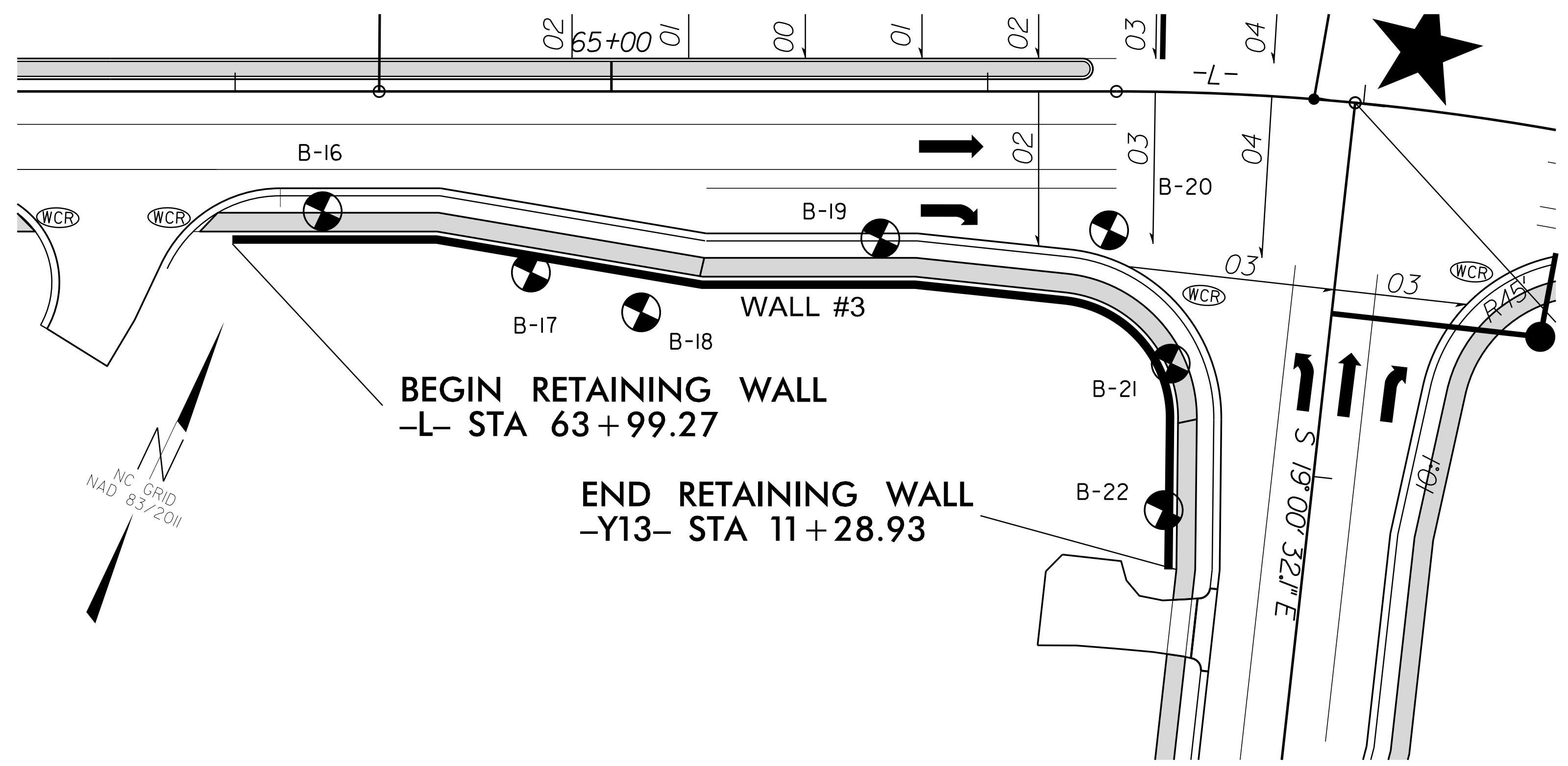
ECS SOUTHEAST, LLP
 1812 CENTER PARK DRIVE, SUITE D
 CHARLOTTE, NC 28217
 (704) 525-5152 [PHONE]
 (704) 357-0023 [FAX]
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 ENGINEERING
 FIRM # F-1078



**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

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

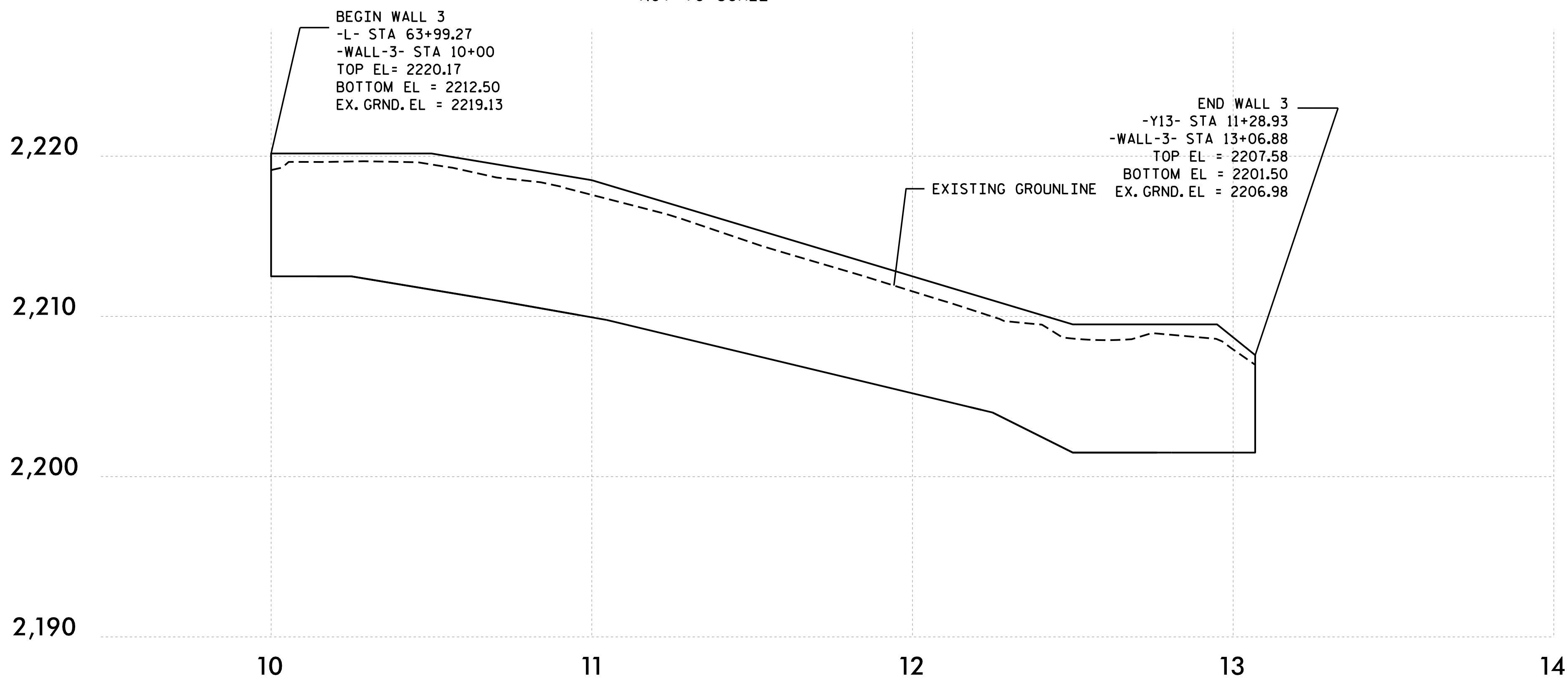


BEGIN RETAINING WALL
-L- STA 63+99.27

END RETAINING WALL
-Y13- STA 11+28.93

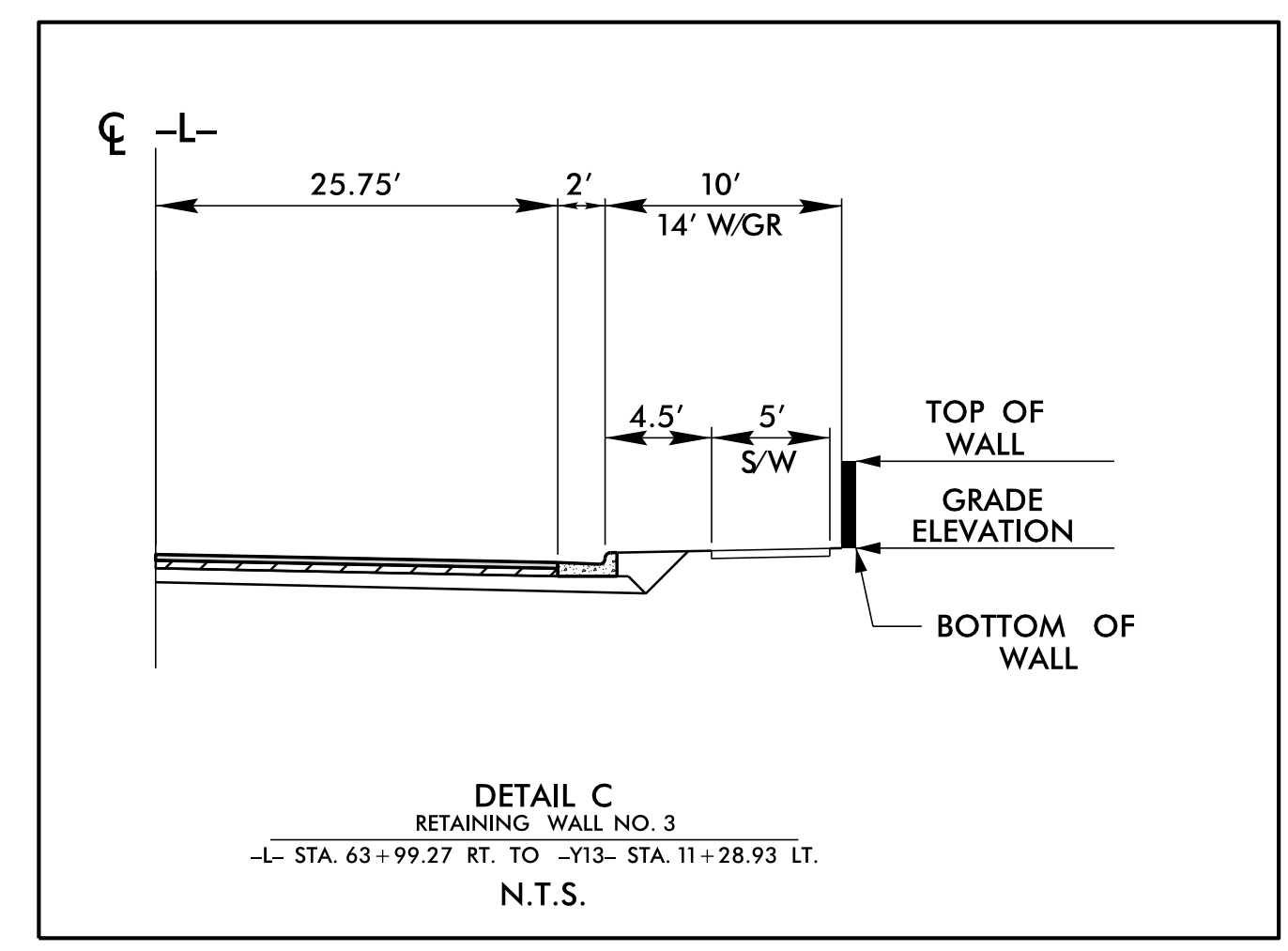
RETAINING WALL #3 - PLAN

NOT TO SCALE



RETAINING WALL #3 - ENVELOPE

NOT TO SCALE



DETAIL C
RETAINING WALL NO. 3
-L- STA. 63+99.27 RT. TO -Y13- STA. 11+28.93 LT.
N.T.S.

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

WALL NO. 3 SURFACE AREA = 2,420 SQ.FT.

GEOTECHNICAL ENGINEER 	ENGINEER
Documented by: Michael J. Walker SIGNATURE	3/27/2023 DATE
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PROJECT NO.: U-5783
 HENDERSON COUNTY
 STATION: -WALL3- STA. 10+00.00 to 13+06.88
 SHEET 1 OF 2 WALL NO 3

PREPARED BY: KND DATE: 01/2023
 REVIEWED BY: MJW DATE: 01/2023

Prepared in the Office of:

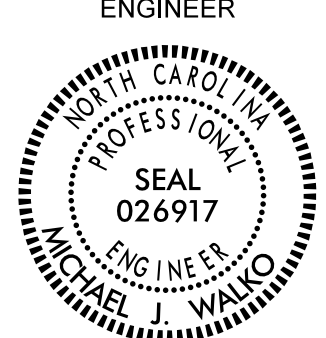
ECS SOUTHEAST, LLP
 1812 CENTER PARK DRIVE, SUITE D
 CHARLOTTE, NC 28217
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 (704) 357-0023 [FAX]
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 FIRM # F-1078

NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS

**GEOTECHNICAL
 ENGINEERING UNIT**

**SOLDIER PILE WALL
 TYPICAL DETAIL & NOTES**

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

GEOTECHNICAL ENGINEER  SEAL 026917 MICHAEL J. WALLO	ENGINEER
DocuSigned by: Michael J. Wallo 3/27/2023	DATE SIGNATURE DATE
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NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.

A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NO. 3. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALL NO. 3.

AT THE CONTRACTOR'S OPTION, USE DRIVEN H-PILES FOR RETAINING WALL NO. 3.

USE A SOLDIER PILE RETAINING WALL WITH A CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 3.

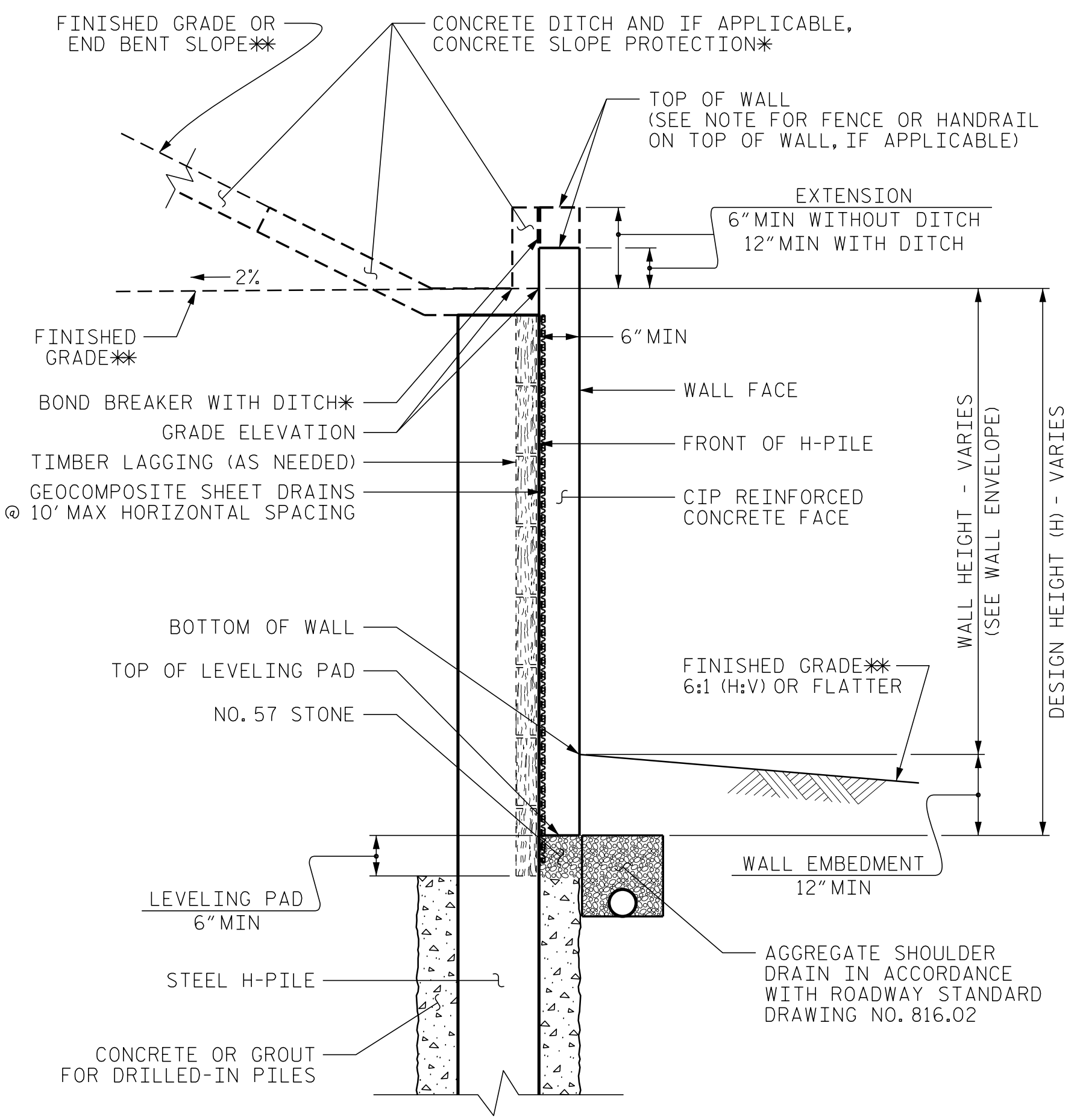
A DRY STACKED NATURAL STONE PATTERN ARCHITECTURAL FINISH IS REQUIRED FOR THE CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 3. SEE SIMULATED STONE FORM LINER FINISH PROVISION.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL 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. 3 FOR THE FOLLOWING:
 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
 2) DESIGN LIFE = 75 YEARS
 3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
 4) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 2220 FT:
 UNIT WEIGHT, γ = 115 PCF
 FRICTION ANGLE, ϕ = 28 DEGREES
 COHESION, c = 0 PSF

AT THE CONTRACTOR'S OPTION, USE A TEMPORARY SLOPE INSTEAD OF TEMPORARY SUPPORT OF EXCAVATIONS FOR RETAINING WALL NO. 3.

TEMPORARY SHORING MAY BE REQUIRED FOR RETAINING WALL NO. 3 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY PLANS.



**SOLDIER PILE WALL WITH
CIP FACE - TYPICAL SECTION**

*SEE CONCRETE DITCH BEHIND WALL DETAILS.
 **SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.

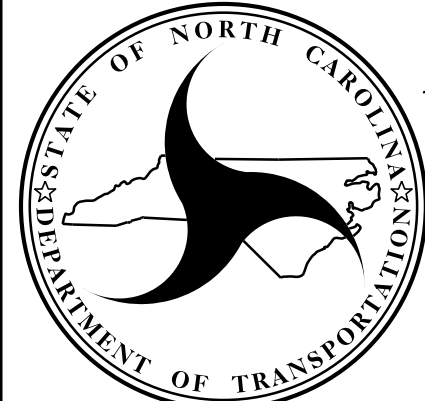
PROJECT NO.: U-5783
 HENDERSON COUNTY
 STATION: -WALL3- STA. 10+00.00 to 13+06.88
 SHEET 2 OF 2 WALL NO. 3

PREPARED BY: KND	DATE: 01/2023
REVIEWED BY: MJW	DATE: 01/2023

Prepared in the Office of:



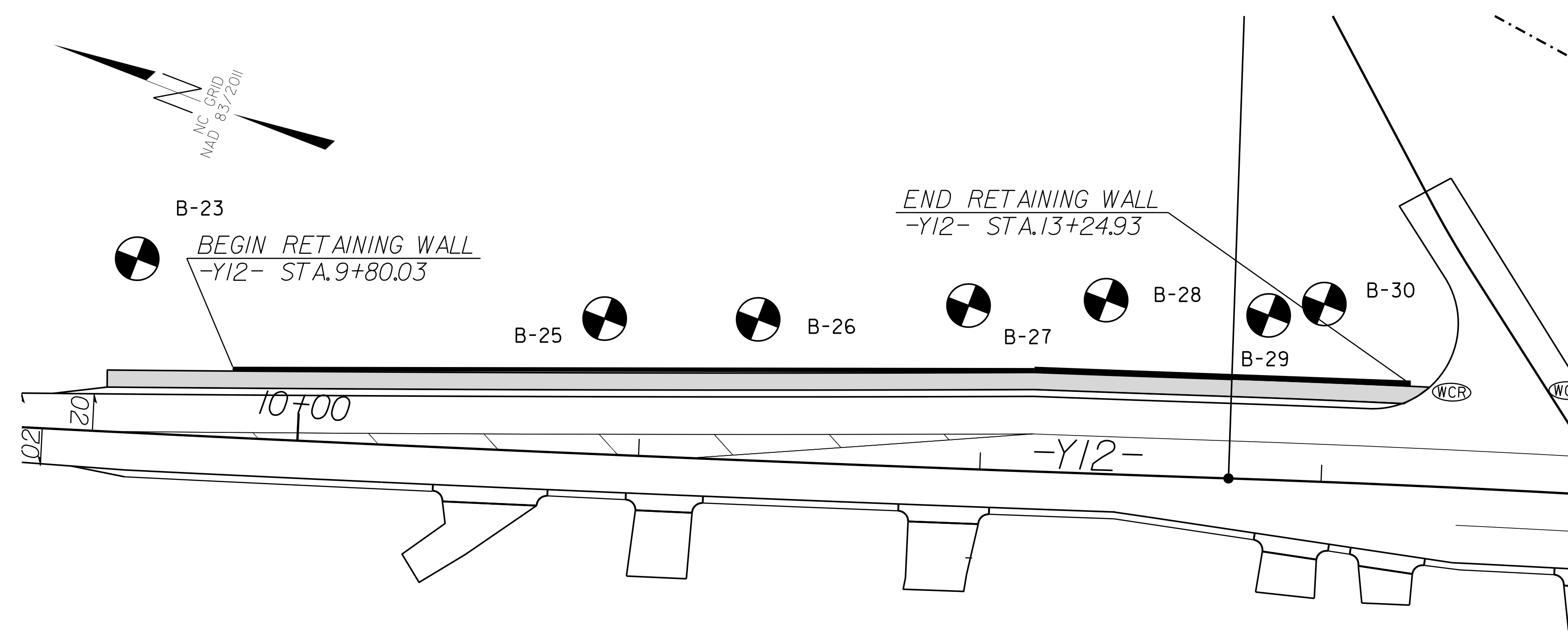
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 (704) 357-0023 [FAX]
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 FIRM # F-1078



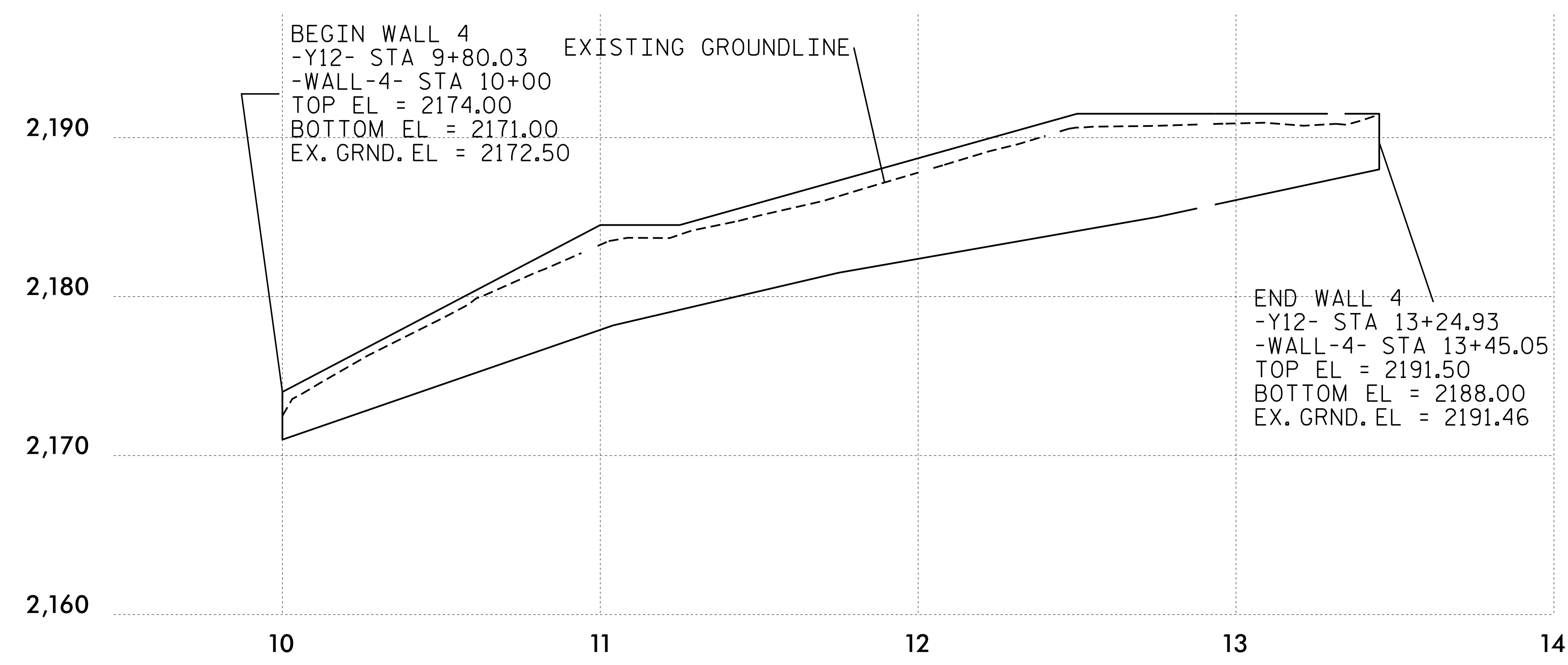
**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

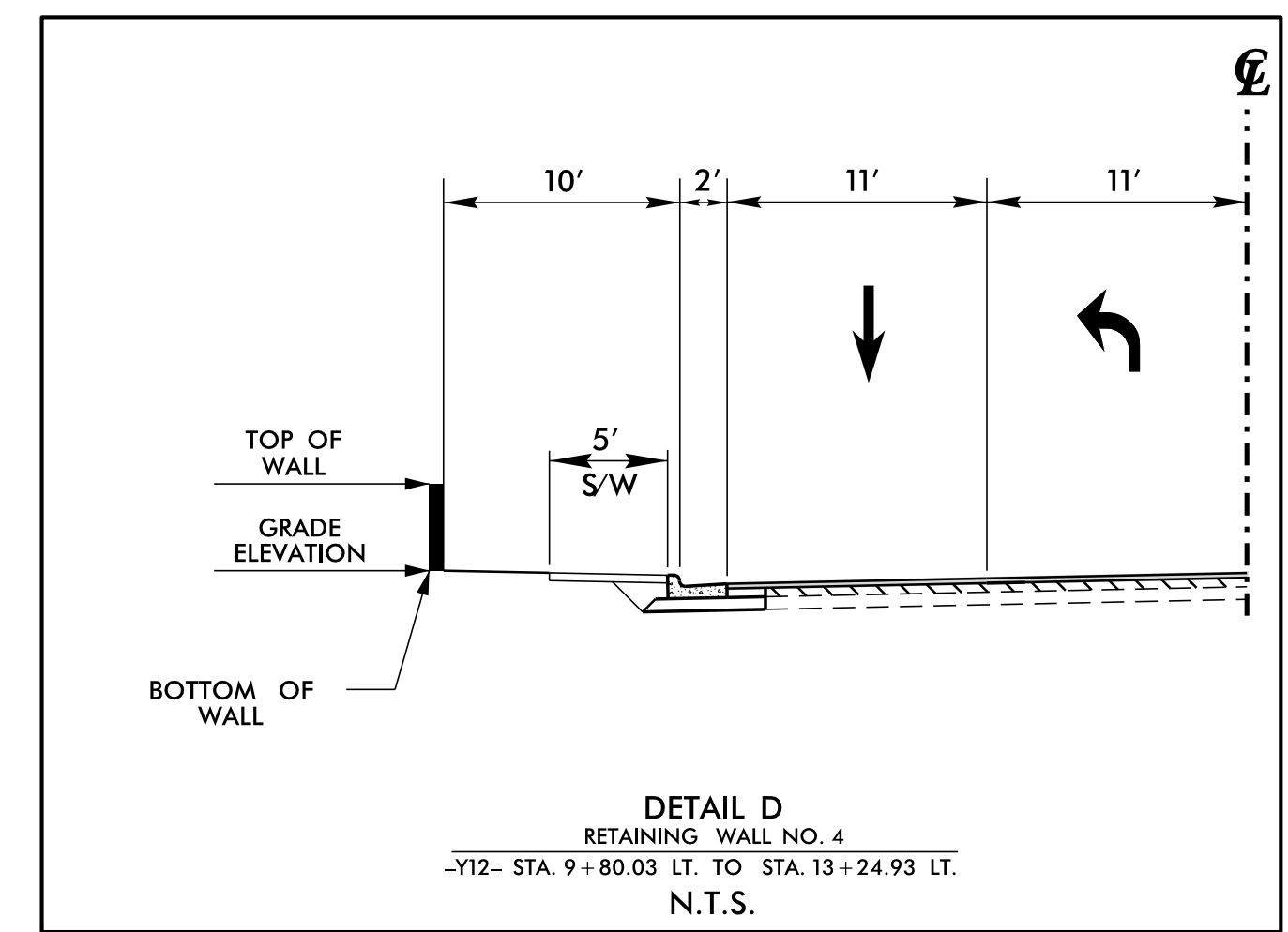
REVISIONS						SHEET NO. W-3A
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



RETAINING WALL #4 - PLAN
NOT TO SCALE



RETAINING WALL #4 - ENVELOPE
NOT TO SCALE



DETAIL D
RETAINING WALL NO. 4
-Y12- STA. 9+80.03 LT. TO STA. 13+24.93 LT.
N.T.S.

THE WALL ENVELOPE DOES NOT ACCURATELY
DEPICT THE ACTUAL FACE OF THE WALL
WALL NO. 4 SURFACE AREA = 1,920 SQ.FT.

GEOTECHNICAL ENGINEER

ENGINEER

SEAL 026917

Michael J. Walko 3/27/2023

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PROJECT NO.: U-5783
HENDERSON COUNTY
STATION: -WALL4- STA. 10+00.00 to 13+45.05
SHEET 1 OF 2 WALL NO 4

PREPARED BY: KND DATE: 01/2023
REVIEWED BY: MJW DATE: 01/2023

Prepared in the Office of:

ECS

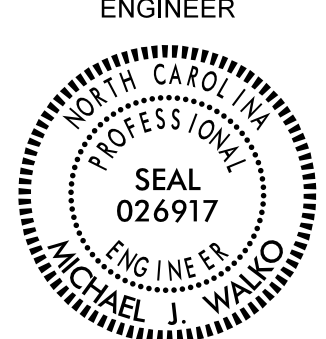
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CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED ENGINEERING FIRM # F-1078

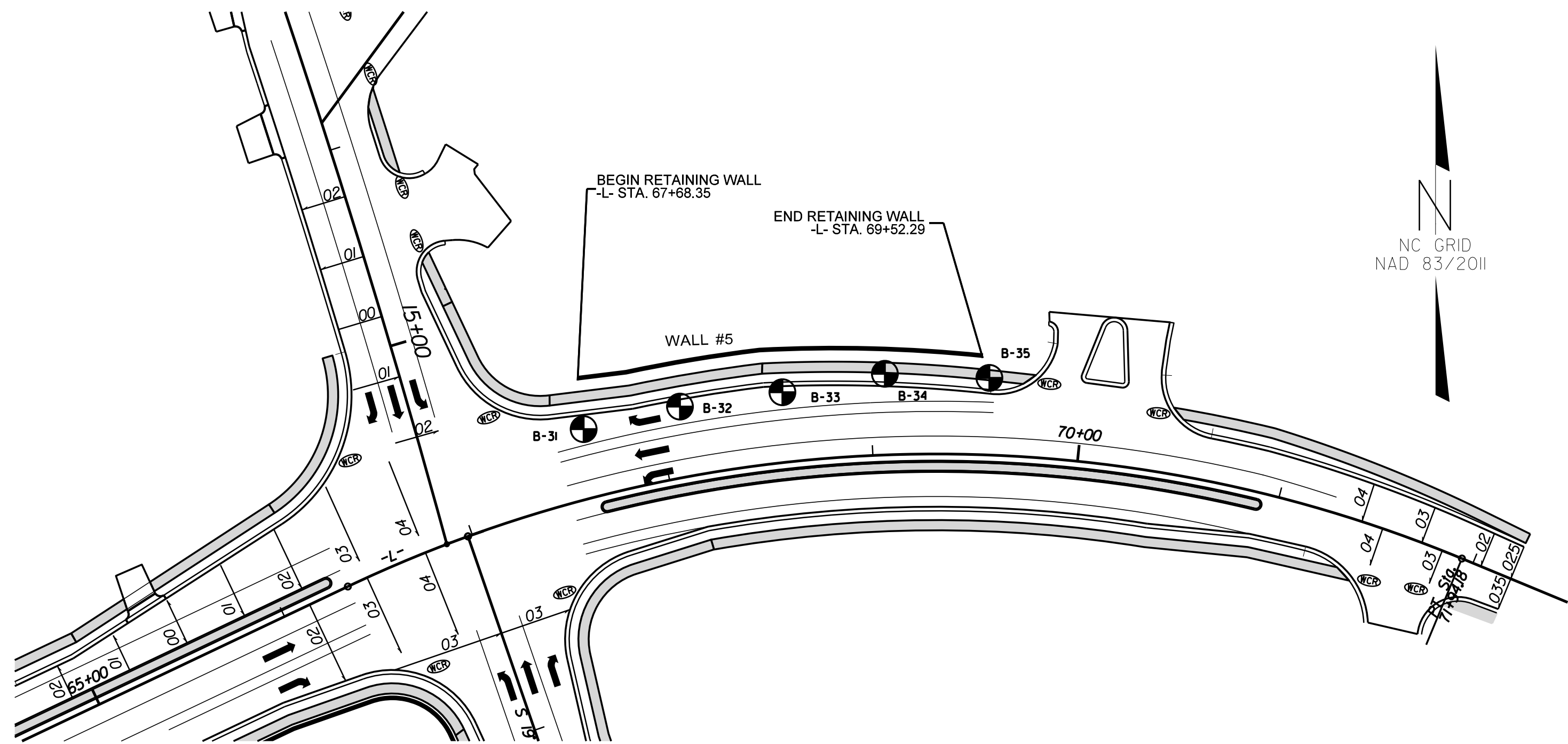
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

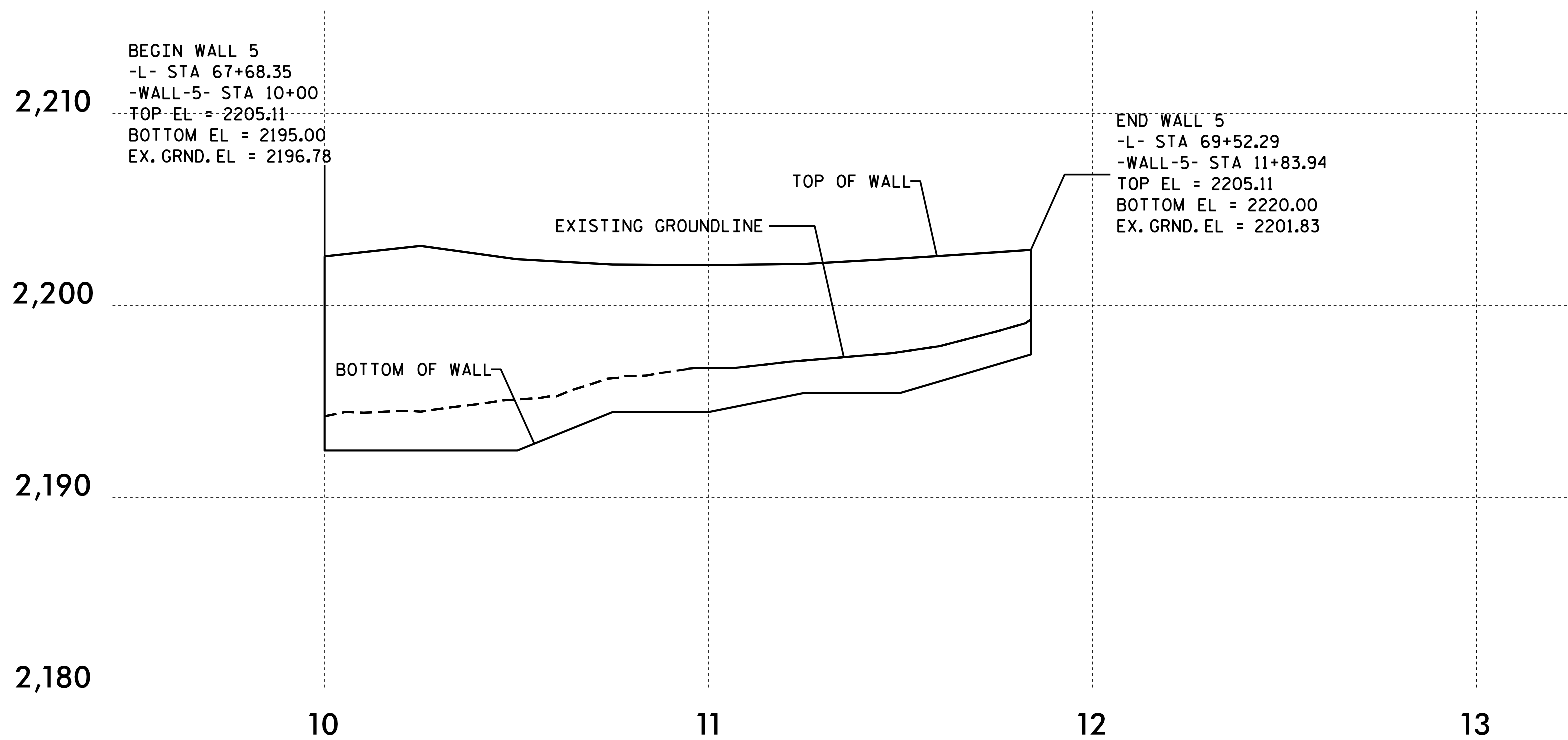
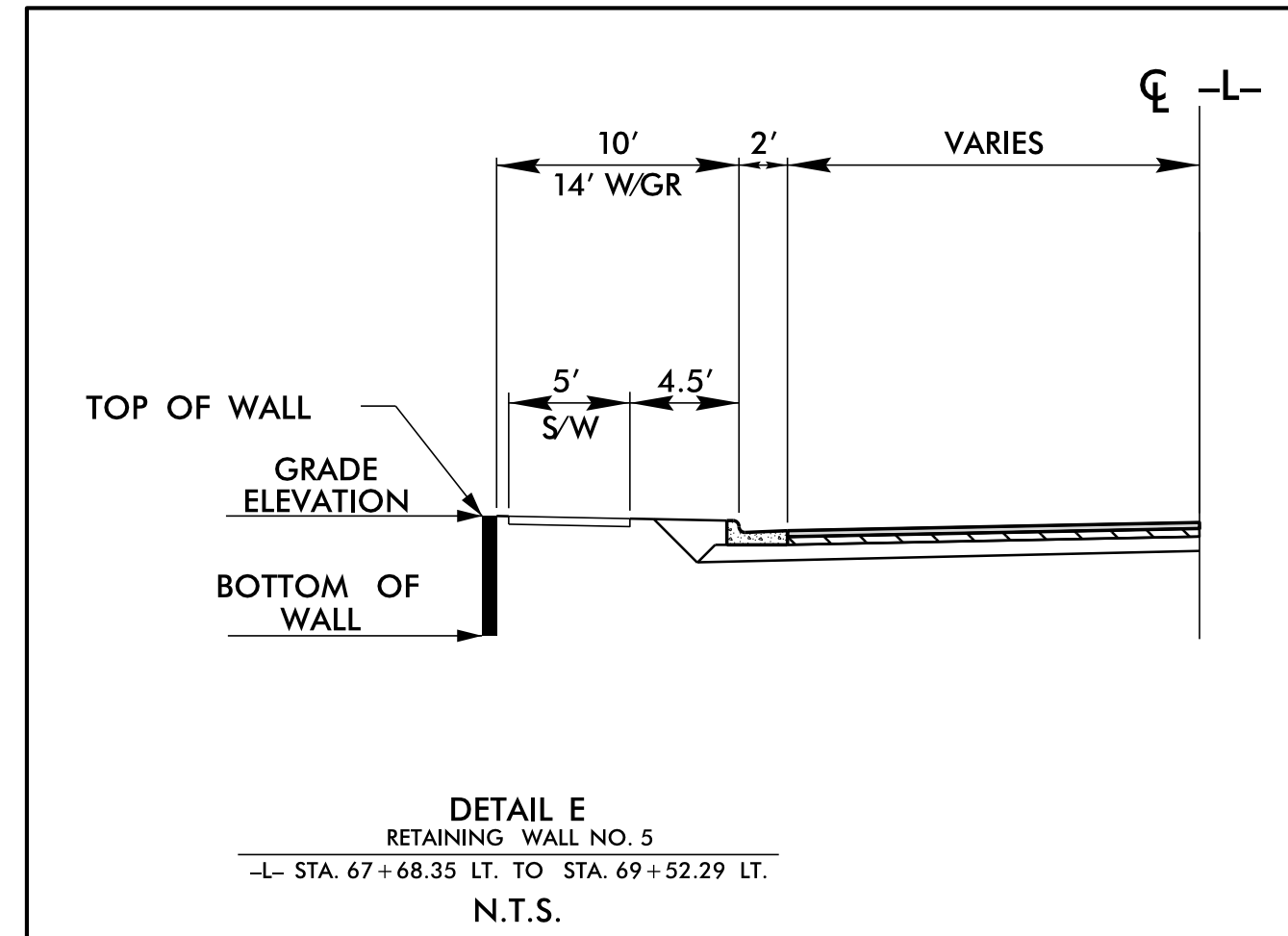
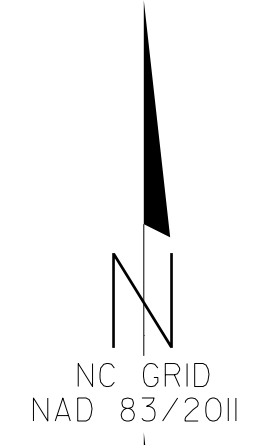
SOLDIER PILE WALL TYPICAL DETAIL & NOTES

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

GEOTECHNICAL ENGINEER  SEAL 026917 ENGINEER MICHAEL J. WALKO	ENGINEER
Documented by: <i>Michael J. Walko</i>	3/27/2023
SIGNATURE	DATE
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NOT TO SCALE




NOT TO SCALE

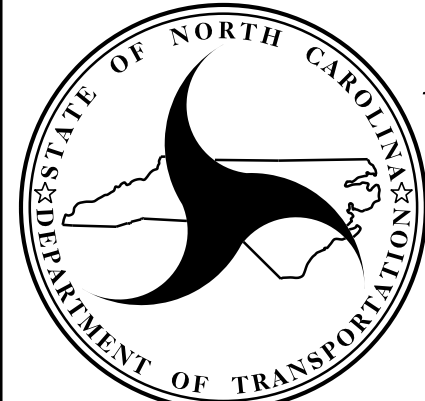
THE WALL ENVELOPE DOES NOT ACCURATELY
DEPICT THE ACTUAL FACE OF THE WALL
WALL NO. 5 SURFACE AREA = 1,495 SQ.FT.

PROJECT NO.: U-5783
 HENDERSON COUNTY
 STATION: -WALL5- STA. 10+00.00 to 11+83.94
 SHEET 1 OF 2 WALL NO. 5

Prepared in the Office of:



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 1812 CENTER PARK DRIVE, SUITE D
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 (704) 525-5152 [PHONE]
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 ENGINEERING
 FIRM # F-1078




**NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS**

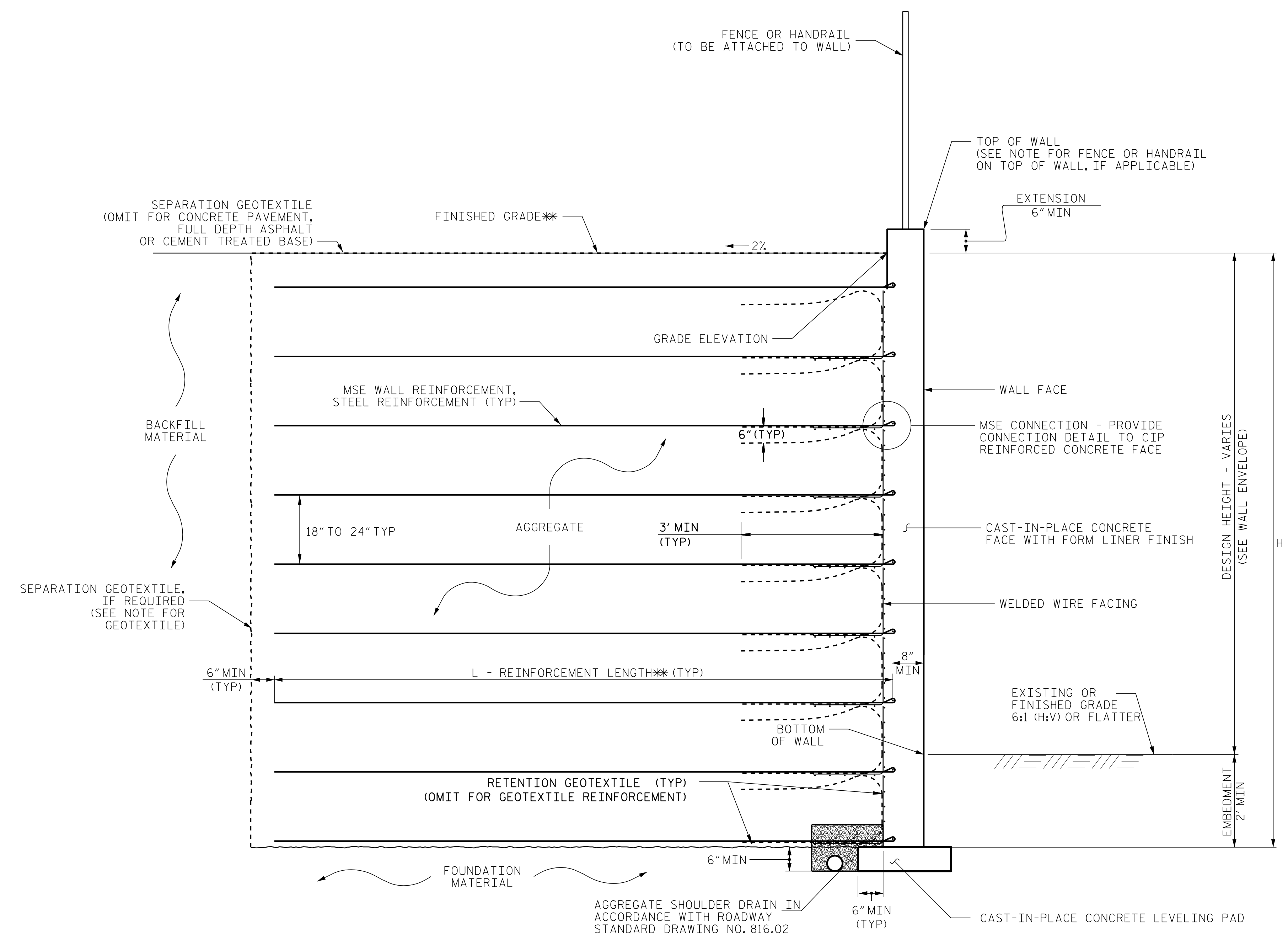
**GEOTECHNICAL
 ENGINEERING UNIT**

**RETAINING WALL 5
 MSE RETAINING WALL
 WITH CIP CONCRETE FACE
 NOTES AND DETAILS**

DATE: 03-22-23

SHEET NO. W-5

GEOTECHNICAL ENGINEER  SEAL 026917 ENGINEER MICHAEL J. WALKER	ENGINEER
Designed by: Michael J. Walker 782224074	DATE: 3/27/2023 SIGNATURE: _____ DATE: _____
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MSE WALL WITH CIP CONCRETE FACE - 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.

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS WITH CIP CONCRETE FACE, SEE MSE RETAINING WALL WITH CIP CONCRETE FACE PROVISION.

A DRY STACKED NATURAL STONE PATTERN FORM LINER ARCHITECTURAL FINISH IS REQUIRED FOR THE CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 5. SEE SIMULATED STONE FORM LINER FINISH PROVISION.

A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NO. 5. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

DO NOT USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 5.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 5.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 5, 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. 5 FOR THE FOLLOWING:
 1) H = DESIGN HEIGHT + EMBEDMENT
 2) DESIGN LIFE = 75 YEARS
 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 2,750 LB/SF
 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H OR 6 FT, WHICHEVER IS LONGER
 5) MINIMUM EMBEDMENT DEPTH = 2 FT
 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (Φ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE 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	115	28	0

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 5.
 DESIGN AND DETAIL CONNECTION OF HANDRAIL TO TOP OF WALL.
 DESIGN RETAINING WALL NO. 5 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALL NO. 5 FOR DESIGN HEIGHTS EQUAL TO THE WALL HEIGHT PLUS DEPTH TO TOP OF FOOTING (DIFFERENCE BETWEEN GRADE ELEVATIONS AND TOP OF FOOTING ELEVATION).

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. 5.


DO NOT PLACE CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 5 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

DO NOT PLACE WELDED WIRE FACING, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 5 UNTIL OBTAINING APPROVAL OF THE EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL.

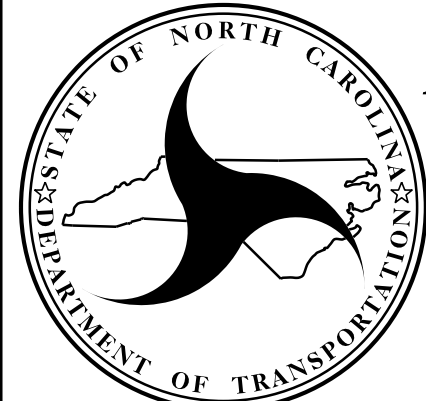
UNDERCUTTING SOFT/VERY LOOSE SOILS IN THE VICINITY OF THE WALL FOUNDATION MAY BE REQUIRED TO IMPROVE BEARING RESISTANCE. AT THE DISCRETION OF THE ENGINEER, UNDERCUT TO SUITABLE FOUNDATION SOILS OR TO A DEPTH NO GREATER THAN 3 FEET BELOW THE BOTTOM OF FOOTING ELEVATION, WHICHEVER OCCURS FIRST. PLACE GEOTEXTILE FOR SOIL STABILIZATION IN THE BOTTOM OF THE EXCAVATION AND BACKFILL WITH SELECT GRANULAR MATERIAL. FOR UNDERCUT EXCAVATION AND SELECT GRANULAR MATERIAL, SEE STANDARD SPECIFICATIONS.

PROJECT NO.: U-5783
 HENDERSON COUNTY
 STATION: -WALL5- STA. 10+00.00 to 11+83.94
 SHEET 2 OF 2 WALL NO. 5

Prepared in the Office of:



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**NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS**

**GEOTECHNICAL
 ENGINEERING UNIT**

**RETAINING WALL 5
 MSE RETAINING WALL
 WITH CIP CONCRETE FACE
 NOTES AND DETAILS**

DATE: 03-22-23

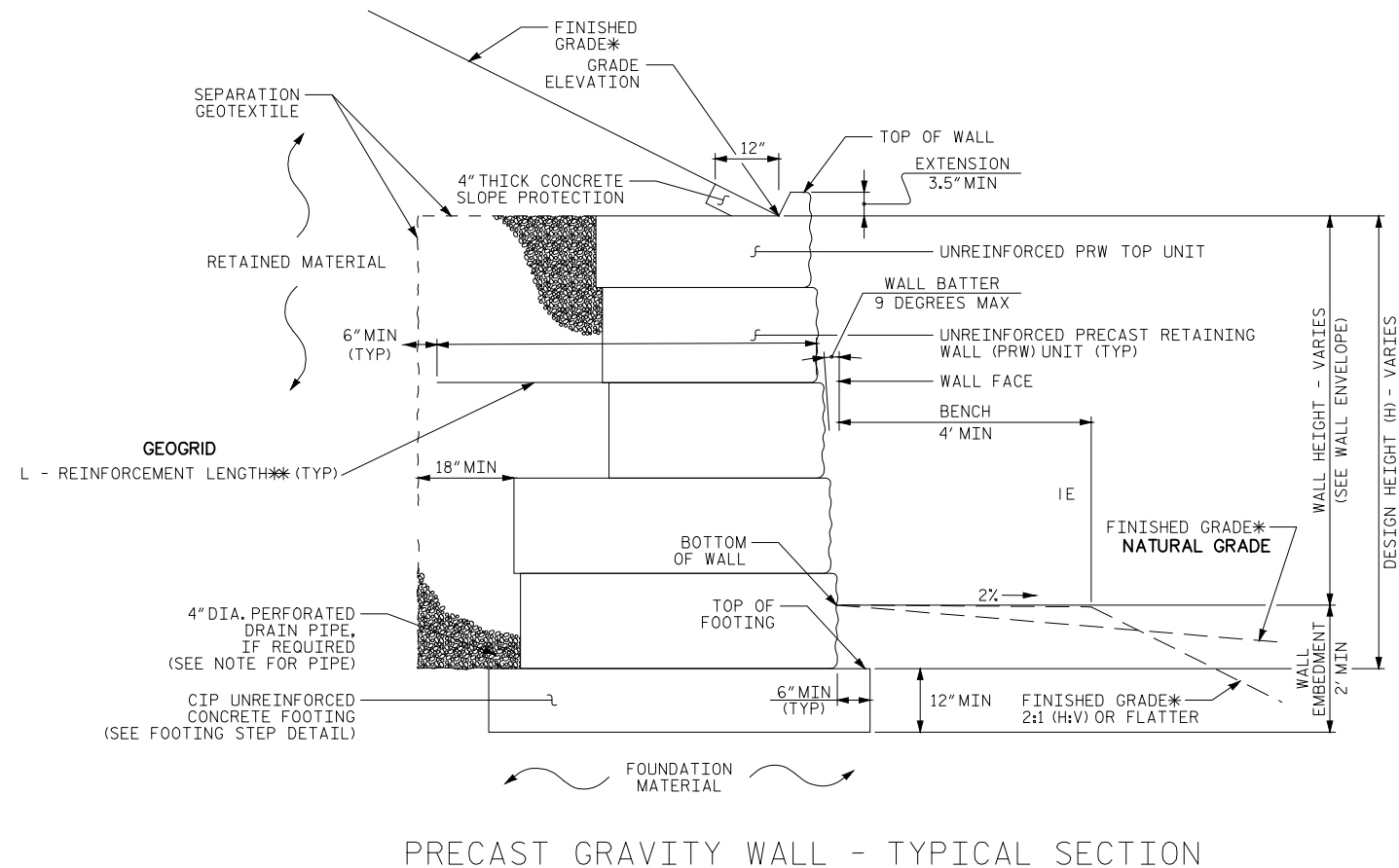
SHEET NO. W-5A

ENGINEER

01/04/24
DATE

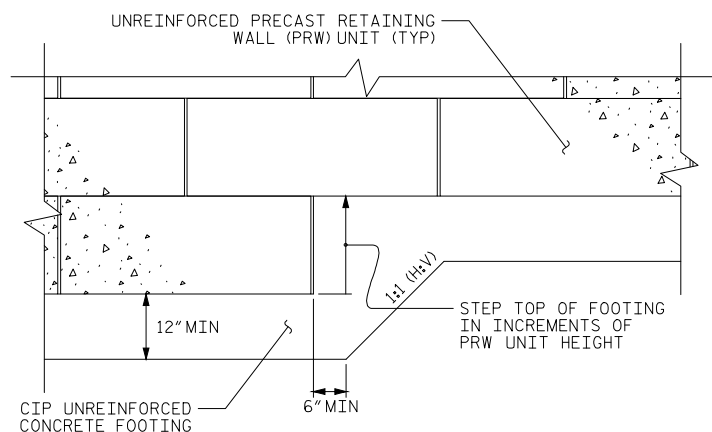
SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



PRECAST GRAVITY WALL - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



FOOTING STEP DETAIL

NOTES:

- FOR PRECAST GRAVITY GRAVITY RETAINING WALLS, SEE SECTION 455 OF THE STANDARD SPECIFICATIONS.
- FOR SEPERATION GEOTEXTILE, SEE SECTION 1056 OF THE STANDARD SPECIFICATIONS.
- A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NO. 6. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
- A DRAIN PIPE IS REQUIRED FOR RETAINING WALL NO. 6.
- BEFORE BEGINNING PRECAST GRAVITY WALL DESIGN FOR RETAINING WALL NO.6, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVIESED WALL ENVELOPE IS ACCEPTED.
- DESIGN RETAINING WALL NO. 6 FOR DESIGN HEIGHTS EQUAL TO THE WALL HEIGHT PLUS DEPTH TO TOP OF FOOTING (DIFFERENCE BETWEEN GRADE ELEVATION AND TOP OF FOUNDATION ELEVATION).
- DESIGN RETAINING WALL NO. 6 FOR GEOGRID REINFORCEMENT REQUIRED TO ACHIEVE MINIMUM FACTOR OF SAFETY FOR GLOBAL STABILITY.
- DESIGN RETAINING WALL NO. 6 WALL EMBEDMENT REQUIRED TO ACHIEVE MINIMUM FACTOR OF SAFETY FOR GLOBAL STABILITY.
- DESIGN RETAINING WALL NO. 6 FOR THE FOLLOWING:
 - 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT.
 - 2) DESIGN LIFE = 75 YEARS.
 - 3) MINIMUM FACTOR OF SAFETY FOR GLOBAL STABILITY OF 1.3.
 - 5) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 1,500 PSF
 - 6) MINIMUM WALL EMBEDMENT ELEVATION = 2 FT BELOW ELEVATION OF BOTTOM OF WALL
 - 7) IN-SITU ASSUMED MATERIAL PARAMETERS ABOVE ELEVATION 2190 FT:
UNIT WEIGHT, GAMMA = 120 PCF
FRICTION ANGLE, PHI = 30 DEGREES
COHESION, C = 50 PSF
 - 8) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 2190 FT:
UNIT WEIGHT, GAMMA = 120 PCF
FRICTION ANGLE, PHI = 30 DEGREES
COHESION, C = 0 PSF
- DESIGN RETAINING WALL NO. 6 FOR A LIVE LOAD (PEDESTRIAN) SURCHARGE OF 150 PSF.
- DESIGN RETAINING WALL NO. 6 FOR A PIPE EXTENDING THROUGH THE WALL AS SWOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING PRECAST GRAVITY WALL DESIGN OR CONSTRUCTION.
- DO NOT PLACE CONCRETE FOR FOUNDATIONS FOR RETAINING WALL NO. 6 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIALS ARE APPROVED.
- "TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALL NO. 6 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY, STRUCTURE OR TRAFFICE CONTROL PLANS.
- AT THE CONTRACTOR'S OPTION, "TEMPORARY SHORING FOR WALL CONSTRUCTION" MAY BE USED TO CONSTRUCT RETAINING WALL NO. 6, SEE PRECAST GRAVITY RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.

PROJECT NO.: U-5783
HENDERSON COUNTY
 STATION: 201+55.00 10' - LT TO 204+01.21 - 13' LT
 SHEET 2 OF 2 WALL ID : WALL NO. 6

PREPARED BY: JUSTIN A. GOEHRING DATE: 01/04/24
 REVIEWED BY: MOHAMMED A. MULLA DATE: 01/04/24

PREPARED IN THE OFFICE OF:
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NC REGISTERED
 ENGINEERING
 FIRM # F-1519

**NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS**

**GEOTECHNICAL
 ENGINEERING UNIT**

PRECAST GRAVITY - TYPICAL
 NOTES & FOOTING STEP DETAIL

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