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PROJECT REFERENCE NO.	SHEET NO.
BP14.R014	1

GEOTECHNICAL ENGINEER

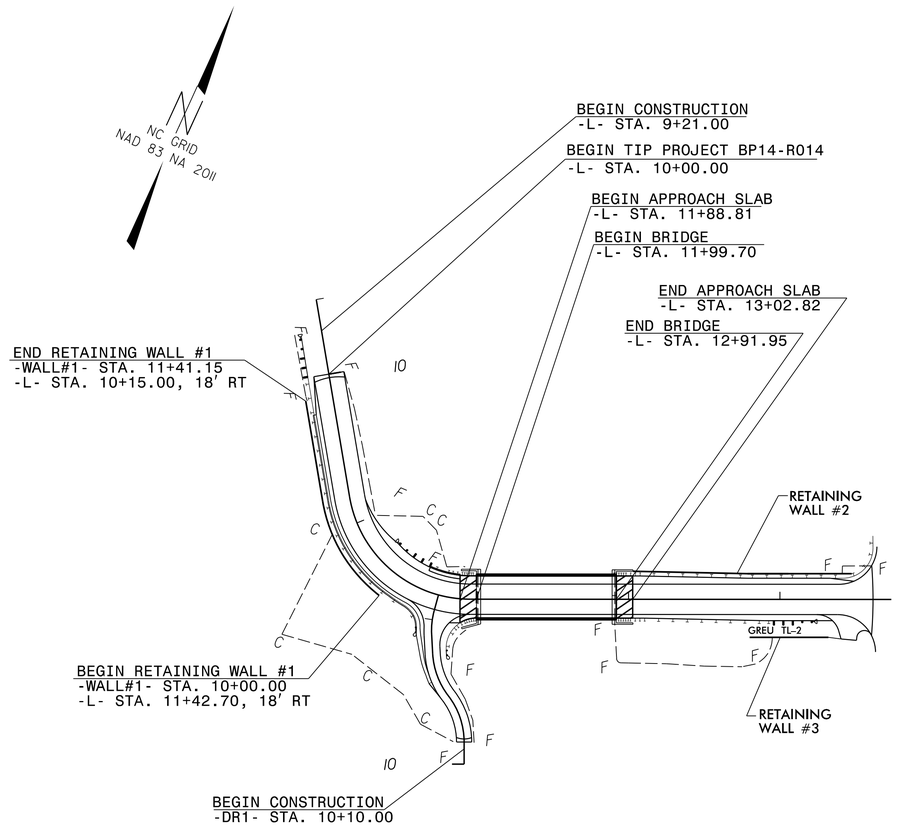
NORTH CAROLINA PROFESSIONAL SEAL 048207 ENGINEER STEPHEN C. CROCKETT

DocuSigned by: Stephen Crockett 10/5/2026
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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

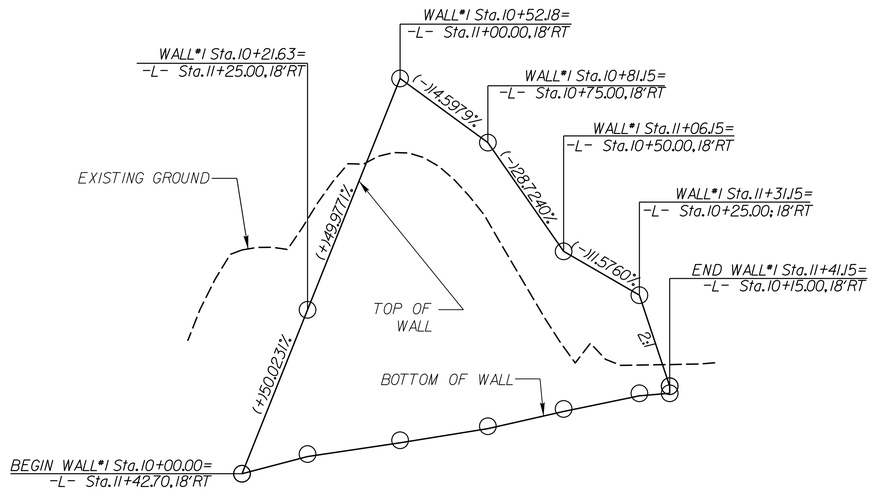
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PLAN VIEW FOR SOIL NAIL RETAINING WALL NO.1

NOT TO SCALE

WALL STATION	TOP OF WALL ELEVATION (FT)	BOTTOM OF WALL ELEVATION (FT)	WALL HEIGHT (FT)
10+15.00	1,956.53	1,956.53	0.00
10+21.63	1,966.92	1,957.23	9.69
10+52.18	1,982.19	1,958.14	24.05
10+81.15	1,977.96	1,959.08	18.88
11+06.15	1,970.78	1,960.21	10.57
11+31.15	1,967.88	1,961.24	6.64
11+41.15	1,961.88	1,961.41	0.47



SOIL NAIL RETAINING WALL - EXPOSED WALL FACE ENVELOPE

NOT TO SCALE

PREPARED BY: S. C. CROCKETT	DATE: 7/7/26
REVIEWED BY: J. R. HAMM	DATE: 7/8/26

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

BRIDGE NO. 152 SOIL NAIL RETAINING WALL NO. 1
PLAN VIEW & WALL ENVELOPE

REVISIONS

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

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PROJECT REFERENCE NO.	SHEET NO.
BP14.R014	2

GEOTECHNICAL ENGINEER

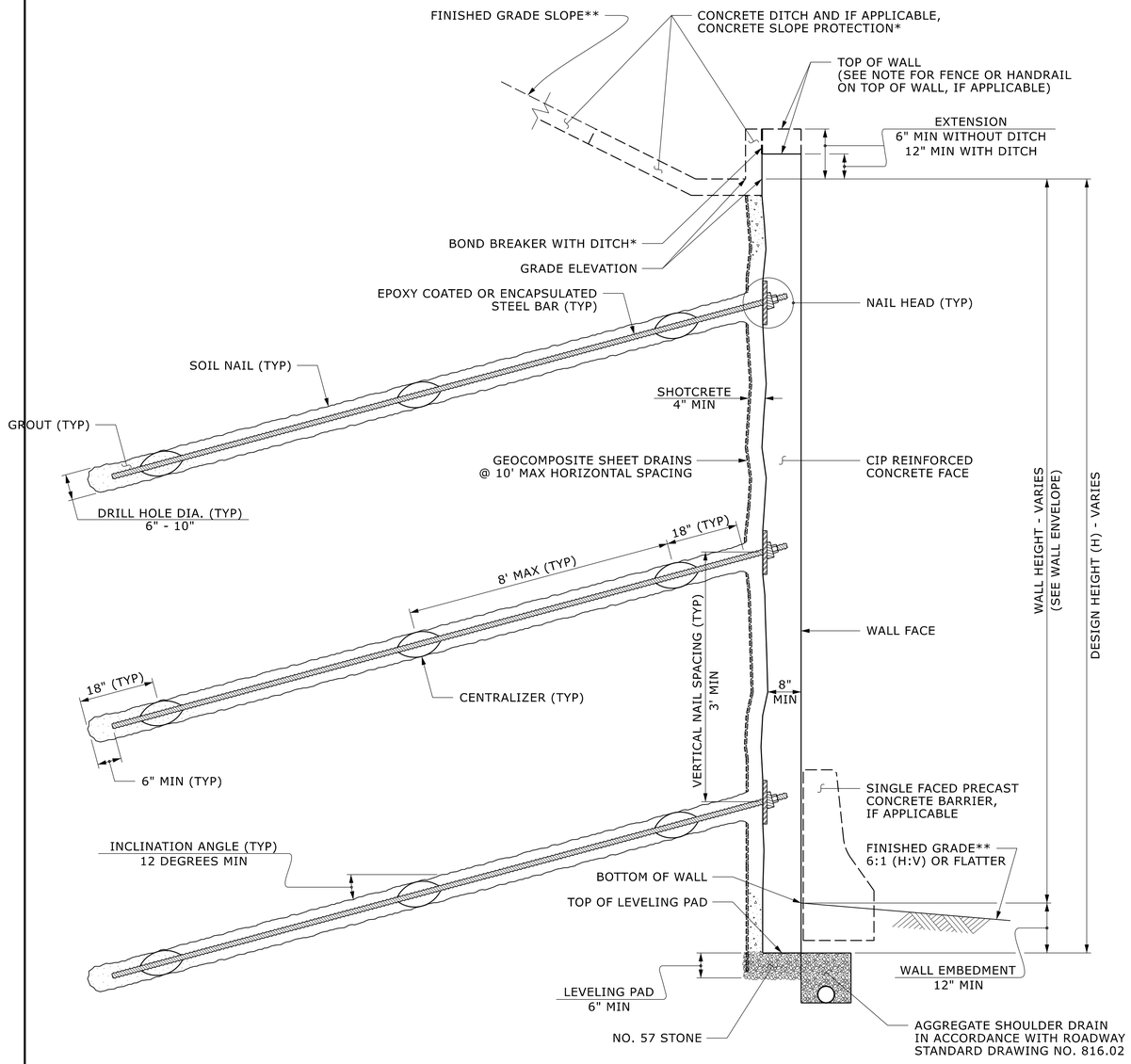
NORTH CAROLINA PROFESSIONAL SEAL 048207 ENGINEER STEPHEN C. CROCKETT

DocuSigned by: Stephen Crockett 10/5/2026
C5CAFED4B6D435...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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SOIL NAIL WALL - TYPICAL SECTION

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

NOTES:

FOR SOIL NAIL RETAINING WALLS, SEE SOIL NAIL RETAINING WALLS PROVISION.

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

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

BEFORE BEGINNING SOIL NAIL 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) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 75 YEARS
3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
4) IN-SITU ASSUMED MATERIAL PARAMETERSABOVE ELEVATION 1,969 FT:
   UNIT WEIGHT, γ = 100 PCF
   FRICTION ANGLE, φ = 30 DEGREES
   COHESION, c = 0 PSF
5) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 1,969 FT:
   UNIT WEIGHT, γ= 140 PCF
   FRICTION ANGLE, φ= 0 DEGREES
   COHESION, c = 8,000 PSF

ESTIMATED SOIL NAIL WALL QUANTITIES

RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
1	2,005	2	6

PREPARED BY: S. C. CROCKETT	DATE: 7/7/26
REVIEWED BY: J. R. HAMM	DATE: 7/8/26

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

BRIDGE NO. 152 SOIL NAIL RETAINING WALL NO. 1 TYPICAL SECTION AND NOTES

REVISIONS

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

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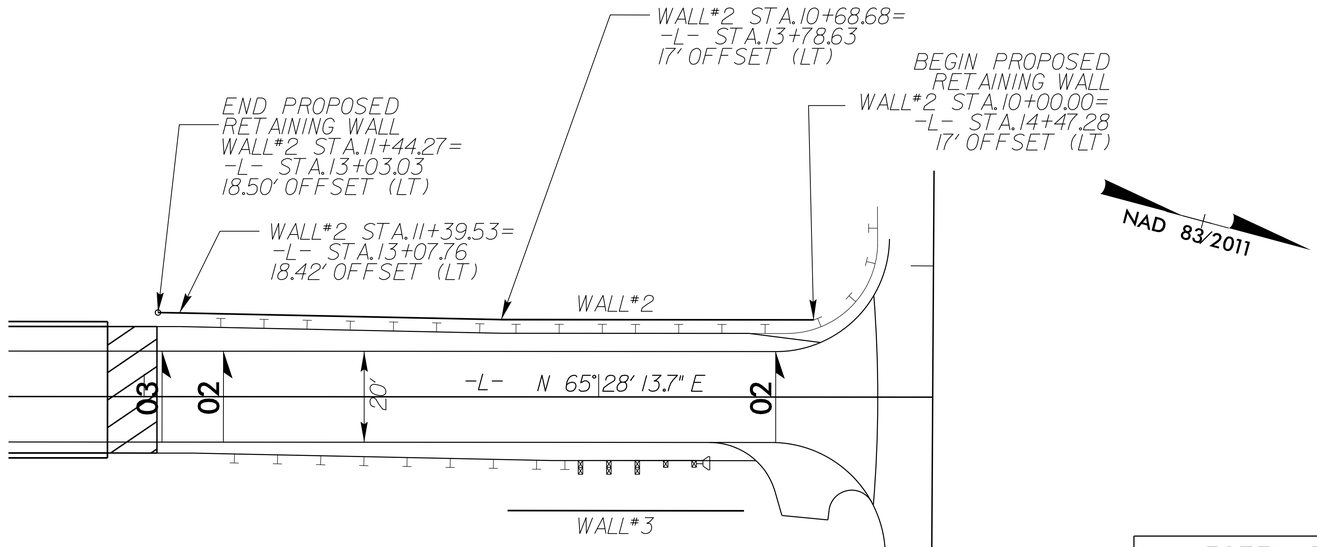
NORTH CAROLINA PROFESSIONAL SEAL 048207 ENGINEER STEPHEN C CROCKETT

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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

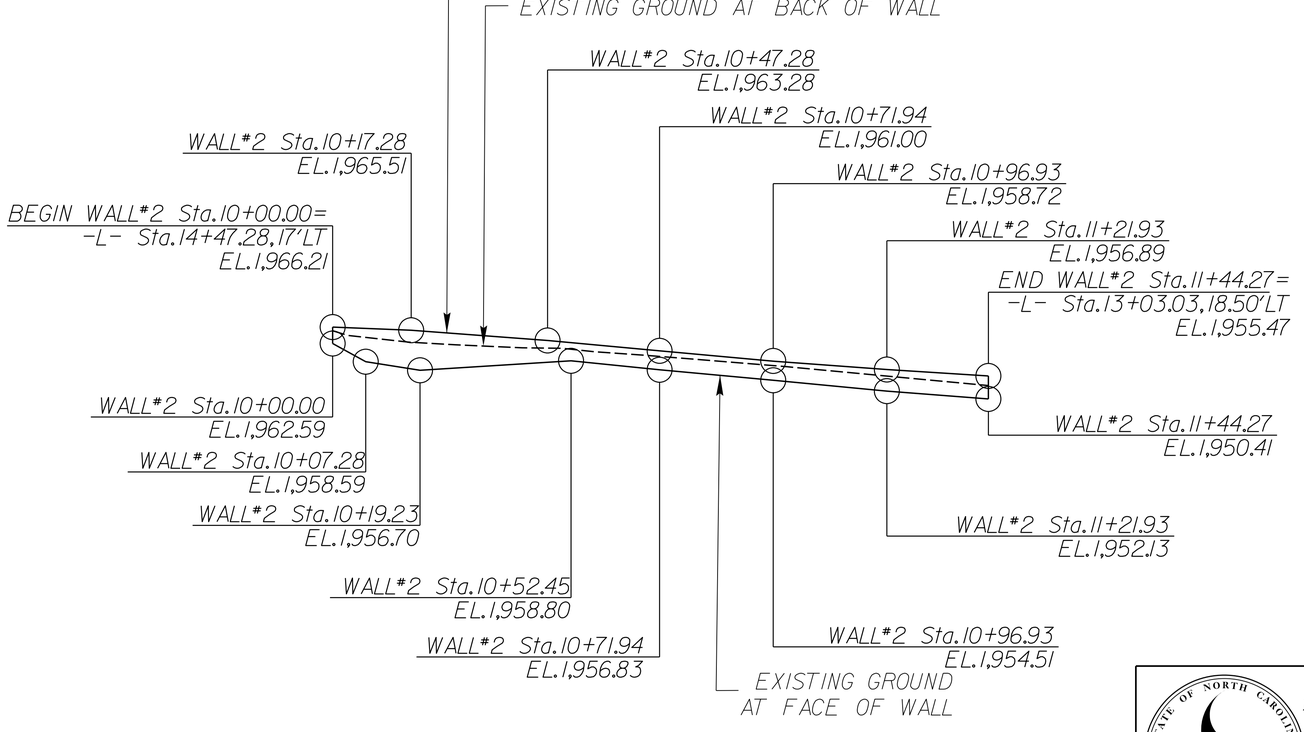
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RETAINING WALL NO. 2 PLAN

NOT TO SCALE

ESTIMATED GABION WALL QUANTITIES	
RETAINING WALL NO.	GABION RETAINING WALLS (SQUARE FEET)
2	TOTAL QUANTITY = 1155 SF



RETAINING WALL NO. 2 ENVELOPE

DIMENSIONS OF WALL TAKEN ALONG FRONT FACE OF MSE WALL
NOT TO SCALE

PREPARED BY: S. CROCKETT	DATE: 6/27/24
REVIEWED BY: J. HAMM	DATE: 6/28/24

PROJECT NO.: BP14.R014

SWAIN COUNTY

STATION: -L- 13+03.03 TO 14+47.28

WALL NO. 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 2 PLAN AND ENVELOPE

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

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GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 048207 ENGINEER STEPHEN C. CROCKETT

DocuSigned by: Stephen Crockett 10/5/2026
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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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NOTES:

FOR GABION RETAINING WALLS, SEE GABION RETAINING WALL PROVISION.

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

BEFORE BEGINNING GABION RETAINING WALL DESIGN, SURVEY EXISTING GROUND ELEVATIONS SHOWN ON THE WALL PROFILE VIEW (WALL ENVELOPE) AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT START DESIGN UNTIL THIS ENVELOPE IS ACCEPTED.

RETAINING WALL IS DESIGNED FOR A TRAFFIC IMPACT LOAD OF 300 LB/FT ON THE STEEL BEAM GUARDRAIL BEHIND IT.

THE MINIMUM EMBEDMENT FOR THE WALL IS 18 INCHES BELOW THE FINISHED GRADE AT THE FRONT OF THE WALL.

TRANSITION ENDS OF WALL BY SPILLING ADJACENT SLOPE SOILS AROUND FACE OF WALL AS DIRECTED BY ENGINEER.

THE TOP OF WALL LOCATION, AS SHOWN IN DETAIL, CORRESPONDS TO WALL LOCATION AS SHOWN IN ROADWAY PLANS. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING THE FACE OF THE BOTTOM OF WALL SO THE TOP OF WALL LINES UP WITH THE CORRECT OFFSET AS SHOWN ON THE PLANS.

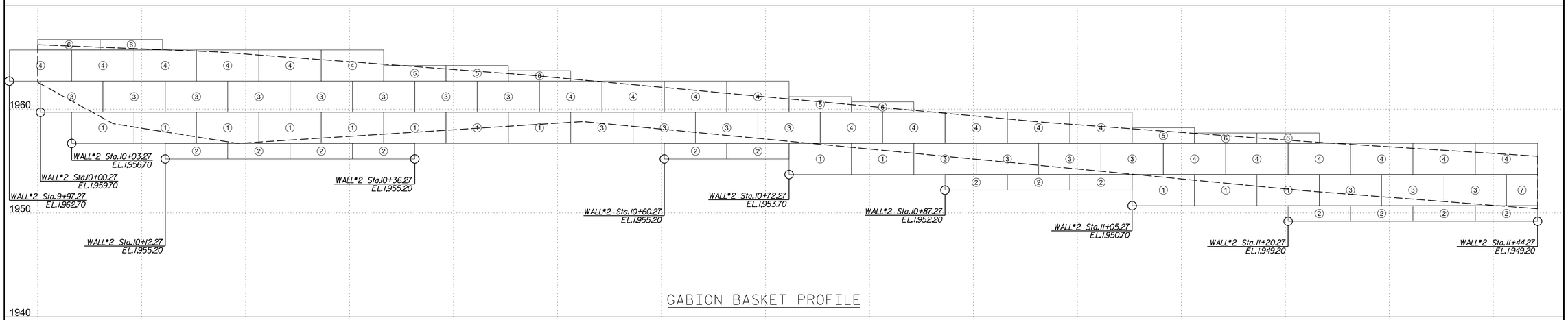
SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

DO NOT PLACE LEVELING PAD STONE OR SELECT MATERIAL UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

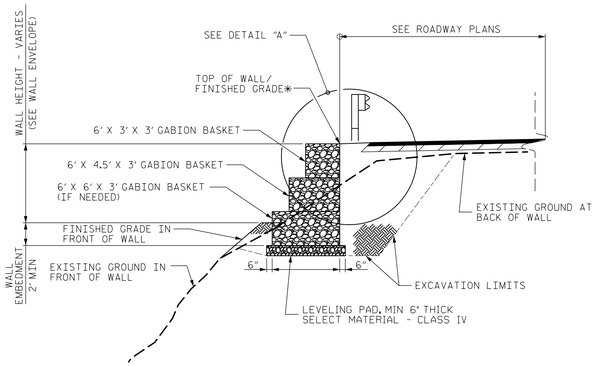
GABION BASKET SIZES ARE NOTATED IN THE GABION BASKET LAYOUT PROFILE AS FOLLOWS:

GABION SIZE #	LENGTH x DEPTH x HEIGHT
①	6'x6'x3'
②	6'x6'x1.5'
③	6'x4.5'x3'
④	6'x3'x3'
⑤	6'x3'x1.5'
⑥	6'x3'x1'
⑦	3'x4.5'x3'

GABION BASKETS OF LENGTHS VARYING FROM THOSE SHOWN IN THE PROFILE LAYOUT ARE ACCEPTABLE PROVIDED STAGGERING OF EACH GABION COURSE IS MAINTAINED EQUAL TO THE HEIGHT OF THE GABION. CONTRACTOR SHALL SUBMIT ALTERNATE LAYOUT WITH WALL ENVELOPE.



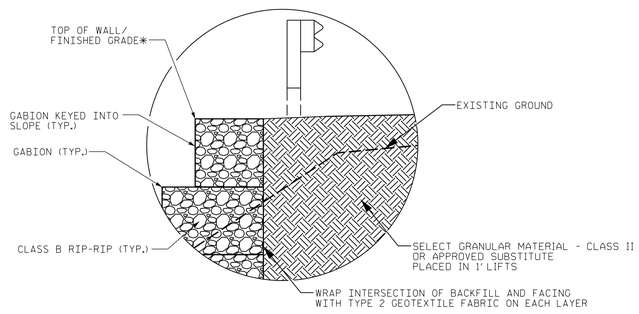
GABION BASKET PROFILE



TYPICAL SECTION

NOT TO SCALE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS



DETAIL "A"

NOT TO SCALE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS

PROJECT NO.: BP14.R014

SWAIN COUNTY

STATION: -L- 13+03.03 TO 14+47.28

WALL NO. 2

PREPARED BY: S. CROCKETT	DATE: 6/27/24
REVIEWED BY: J. HAMM	DATE: 6/28/24

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 2 NOTES, LAYOUT, TYPICAL, AND DETAIL

REVISIONS

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

SHEET NO. W-4

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GEOTECHNICAL ENGINEER

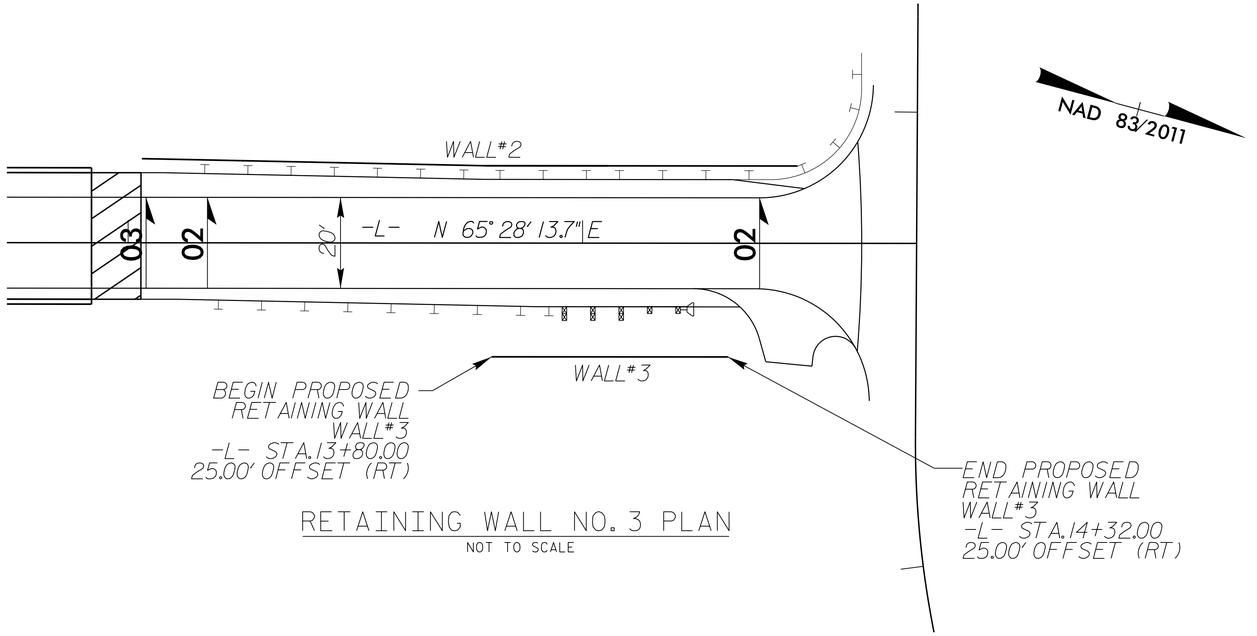
NORTH CAROLINA PROFESSIONAL SEAL 048207 ENGINEER STEPHEN C CROCKETT

DocuSigned by: Stephen Crockett 10/5/2026
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ENGINEER

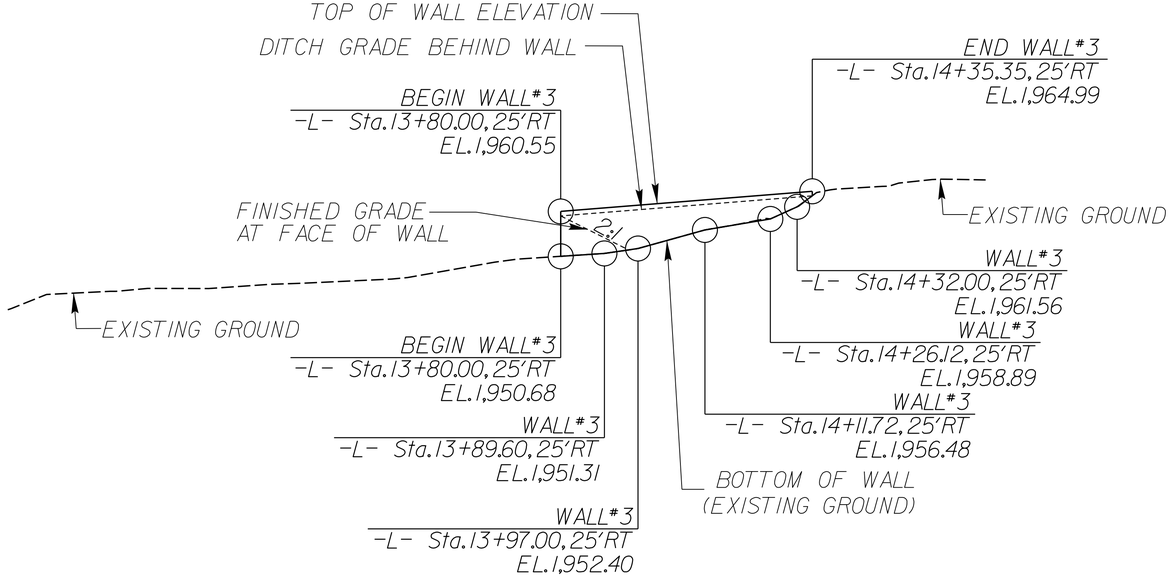
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



RETAINING WALL NO. 3 PLAN

NOT TO SCALE



RETAINING WALL NO. 3 ENVELOPE

DIMENSIONS OF WALL TAKEN ALONG FRONT FACE OF MSE WALL
NOT TO SCALE

ESTIMATED CIP GRAVITY WALL QUANTITIES	
RETAINING WALL NO.	CIP GRAVITY RETAINING WALLS (SQUARE FEET)
2	TOTAL QUANTITY = 450 SF

PROJECT NO.: BP14.R014

SWAIN COUNTY

STATION: -L- 13+03.03 TO 14+47.28

WALL NO. 3

PREPARED BY: S. CROCKETT	DATE: 6/27/24
REVIEWED BY: J. HAMM	DATE: 6/28/24

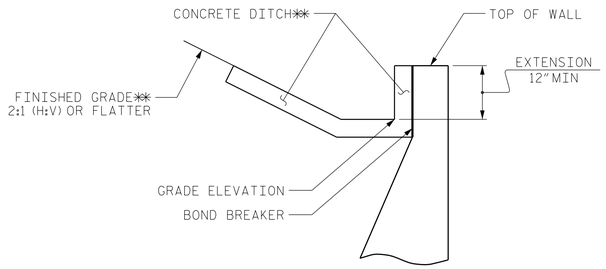
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 3 PLAN AND ENVELOPE

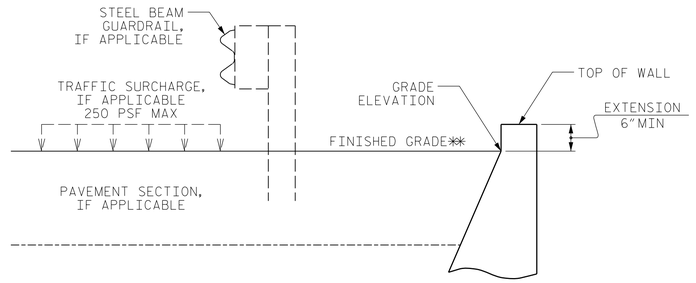
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-5
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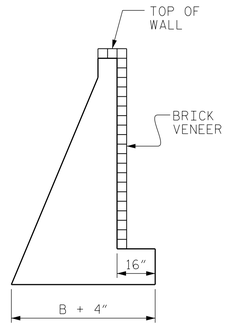
SLOPE CASE

**SEE ROADWAY PLANS FOR CONCRETE DITCH AND FINISHED GRADE DETAILS.



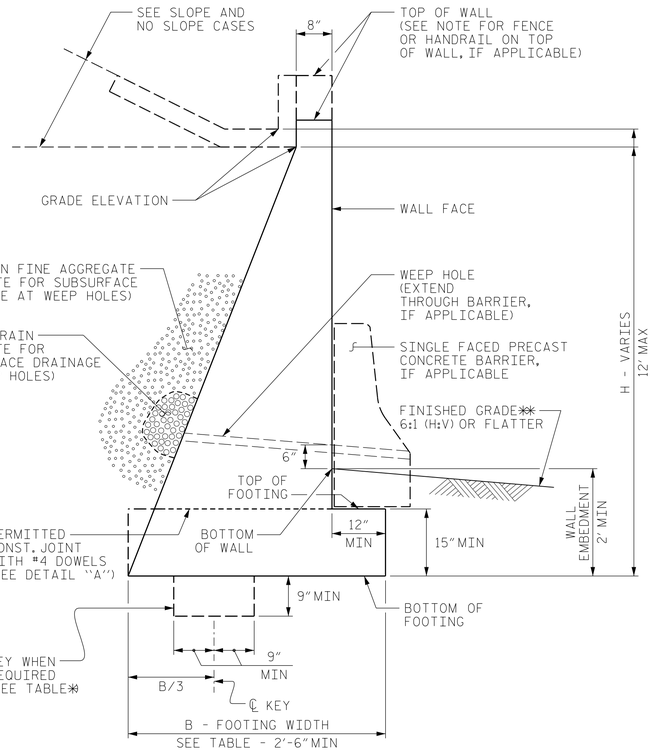
NO SLOPE CASE

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



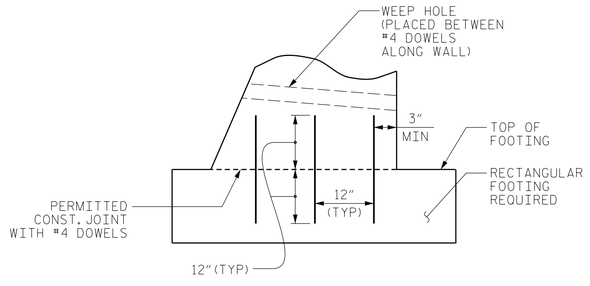
BRICK VENEER DETAIL

(WHEN APPLICABLE)



STANDARD CIP GRAVITY WALL

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



DETAIL "A"

H (FT)	3 - < 6	6 - 9	> 9 - 12
SLOPE CASE	.66	.70*	.75*
NO SLOPE CASE WITH TRAFFIC SURCHARGE	.80	.75*	.70*
NO SLOPE CASE WITHOUT TRAFFIC SURCHARGE	.60	.60	.60

B/H RATIO (B = 2'-6"MIN)

*KEY IS REQUIRED FOR "SLOPE CASE" OR "NO SLOPE CASE WITH TRAFFIC SURCHARGE" WHEN H IS 6' OR GREATER.

NOTES:

FOR STANDARD CIP GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

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

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

FOR FENCES OR HANDRAILS ON TOP OF WALLS, SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

FOR SUBSURFACE DRAINAGE AT WEEP HOLES, SEE ARTICLE 414-8 OF THE STANDARD SPECIFICATIONS.

STANDARD CIP GRAVITY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
- UNIT WEIGHT, γ = 120 PCF
- FRICTION ANGLE, ϕ = 35 DEGREES (GROUNDWATER WITHIN 7' OF BOTTOM OF FOOTING)
- FRICTION ANGLE, ϕ = 30 DEGREES (GROUNDWATER MORE THAN 7' BELOW BOTTOM OF FOOTING)
- COHESION, c = 0 PSF

DO NOT USE STANDARD CIP GRAVITY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE BOTTOM OF FOOTING.

DO NOT USE STANDARD CIP GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW WALLS.

BEFORE BEGINNING STANDARD CIP GRAVITY WALL CONSTRUCTION, SURVEY WALL LOCATIONS AND SUBMIT WALL PROFILE VIEWS (WALL ENVELOPES) FOR REVIEW. FOR WALL ENVELOPES, INCLUDE BOTTOM OF WALL, EXISTING GROUND AND GRADE ELEVATIONS AND OTHER ELEVATIONS AS NEEDED AT INTERVALS OF 25' OR LESS ALONG WALLS. DO NOT START WALL CONSTRUCTION UNTIL WALL ENVELOPES ARE ACCEPTED.

FOR BRICK VENEERS, SUBMIT BRICK SAMPLES FOR APPROVAL BEFORE BEGINNING STANDARD CIP GRAVITY WALL CONSTRUCTION.

DO NOT PLACE CONCRETE FOR FOOTINGS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

WHEN CONSTRUCTING STANDARD CIP GRAVITY WALLS WITH A CONSTRUCTION JOINT AS SHOWN IN DETAIL "A", PROVIDE A MINIMUM OF 3 EQUALLY SPACED #4 DOWELS AT INTERVALS OF 1'-6" ALONG WALLS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 048207 ENGINEER STEPHEN C CROCKETT

DocuSigned by: Stephen Crockett CSCA5FED48E0435... 10/5/2026

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PROJECT NO.: BP14.R014

SWAIN COUNTY

STATION: -L- 13+03.03 TO 14+47.28

WALL NO. 3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 453.01

STANDARD CIP GRAVITY RETAINING WALL

DATE: 10-19-21

SHEET NO. W-6