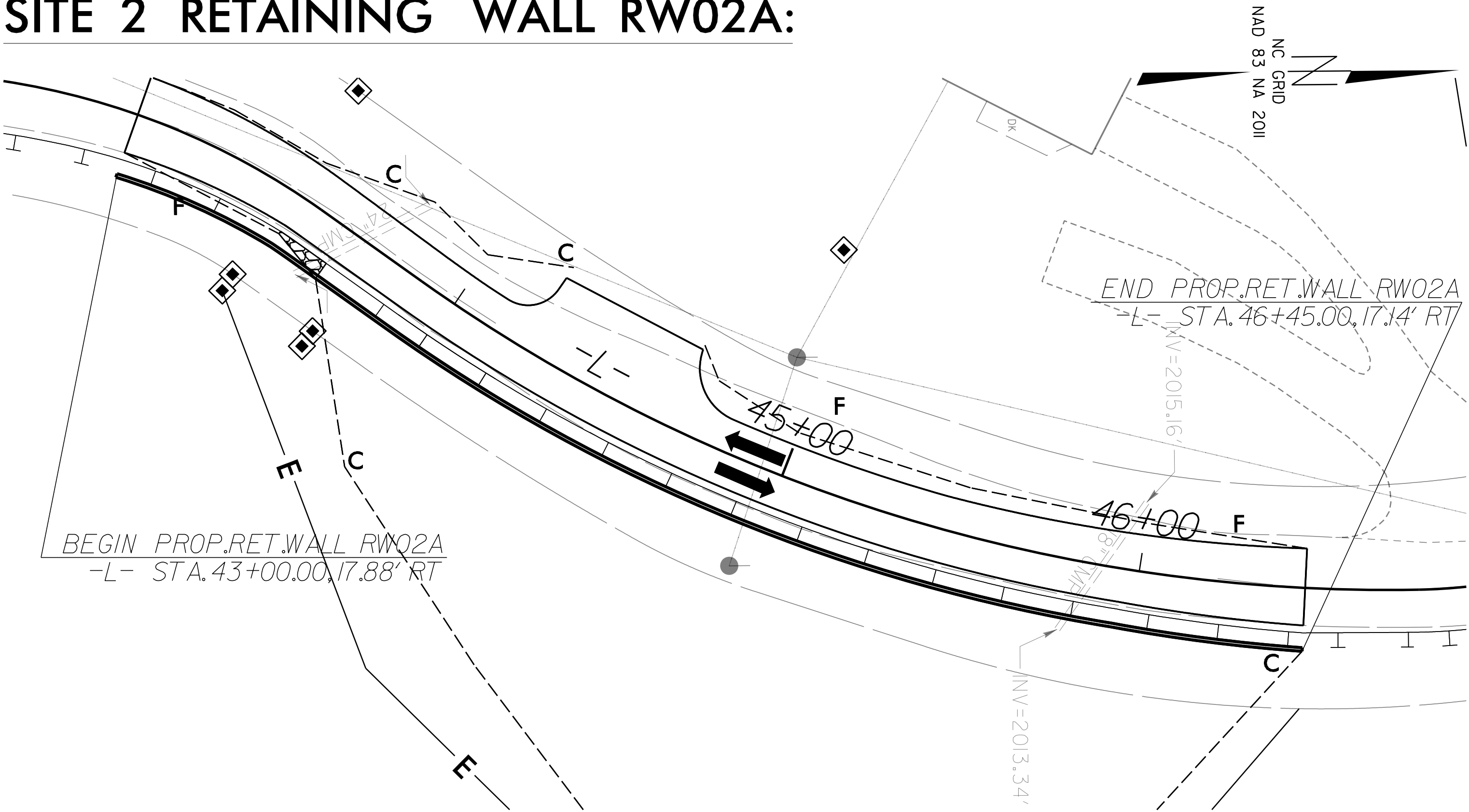


**This electronic collection of documents is provided
for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

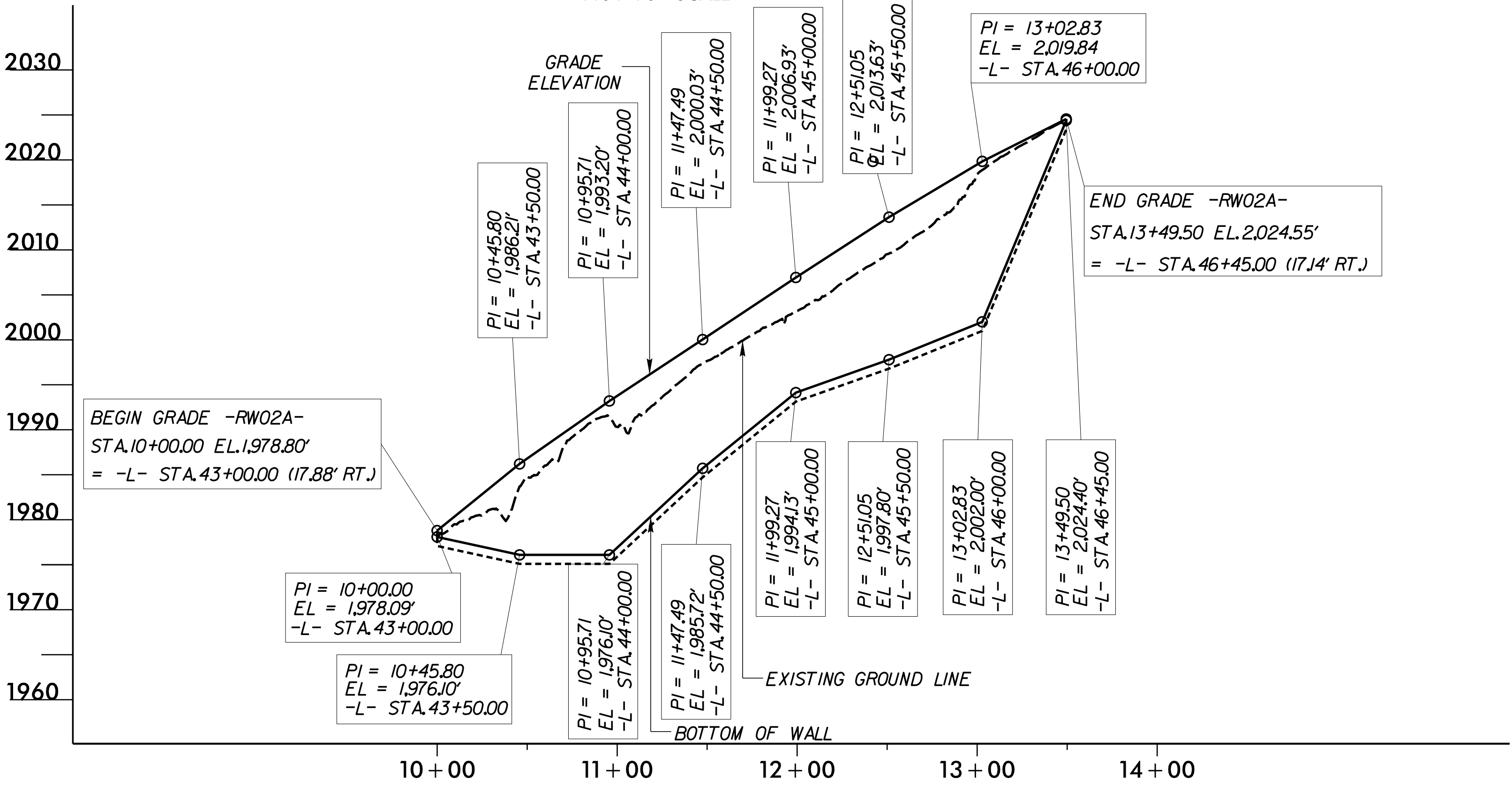
**This file or an individual page
shall not be considered a certified document.**

SITE 2 RETAINING WALL RW02A:



RETAINING WALL RW02A – PLAN

NOT TO SCALE



RETAINING WALL RW02A – ENVELOPE

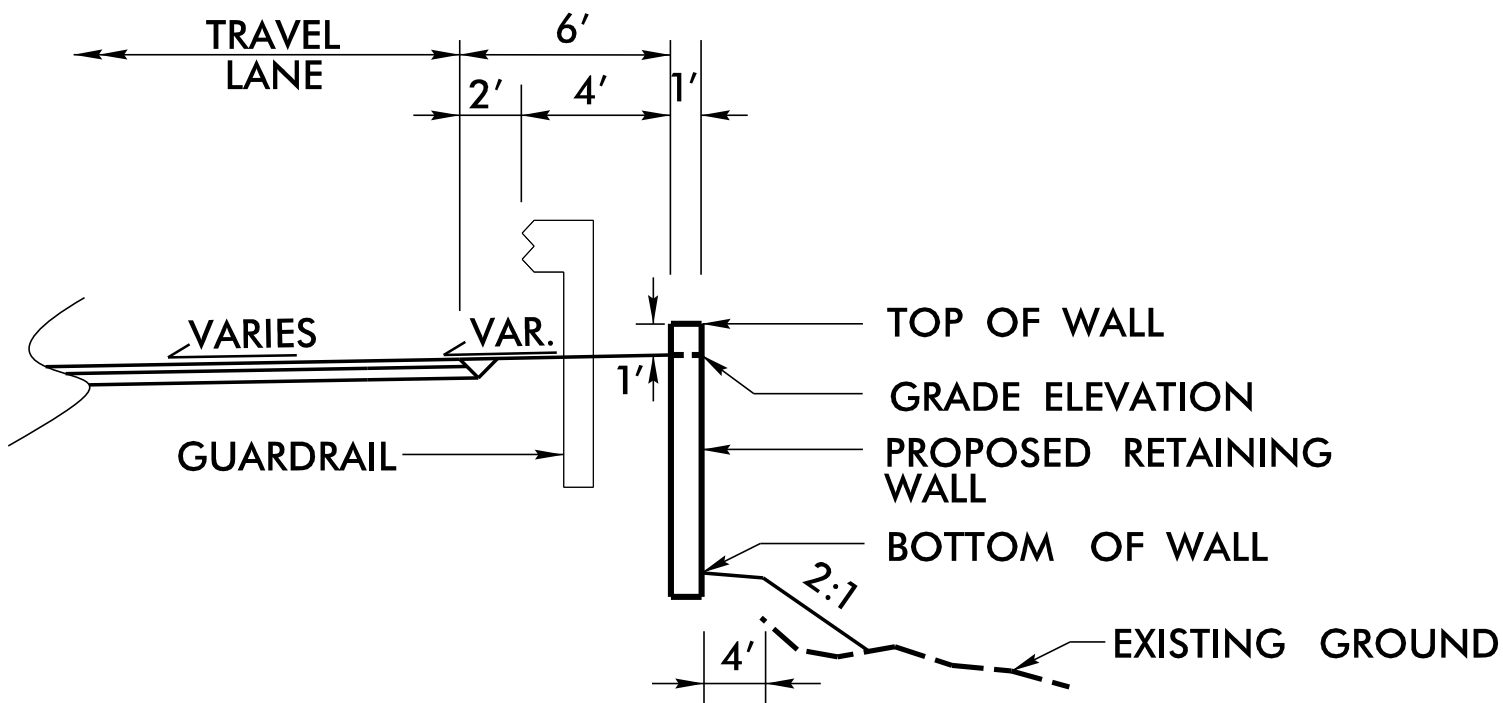
NOT TO SCALE
(LOOKING AT FACE OF WALL)

GEOTECHNICAL
ENGINEER

Signed by:
Robert E. Kral
06/17/2025
SIGNATURE DATE

ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



SECTION THROUGH RETAINING WALL

-L- STA. 43+00.00 TO -L- STA. 46+45.00
-RW02A- STA. 10+00.00 TO -RW02A- STA. 13+49.50

RETAINING WALL RW02A					
STA. -RW02A-	GRADE ELEVATION (FT)	PROP. BOTTOM OF WALL ELEVATION (FT)	TOP OF LEVELING PAD (FT)	ESTIMATED WALL EMBEDMENT (FT)	WALL DESIGN HEIGHT "H" (FT)
10+00.00	1,978.80	1,978.09	1,977.09	1.00	1.71
10+45.80	1,986.21	1,976.10	1,975.10	1.00	11.11
10+95.71	1,993.20	1,976.10	1,975.10	1.00	18.10
11+47.49	2,000.03	1,985.72	1,984.72	1.00	15.31
11+99.27	2,006.93	1,994.13	1,993.13	1.00	13.80
12+15.05	2,013.63	1,997.80	1,996.80	1.00	16.83
13+02.83	2,019.84	2,002.00	2,001.00	1.00	18.84
13+49.50	2,024.55	2,024.40	2,023.40	1.00	1.15

PROJECT NO.: DF18314.2045383

HENDERSON COUNTY

RETAINING WALL RW02A: -RW02A- STA. 10+00.00 TO 13+49.50

SHEET 1 OF 5

PREPARED BY: KND
REVIEWED BY: REK

DATE: 06/25
DATE: 06/25

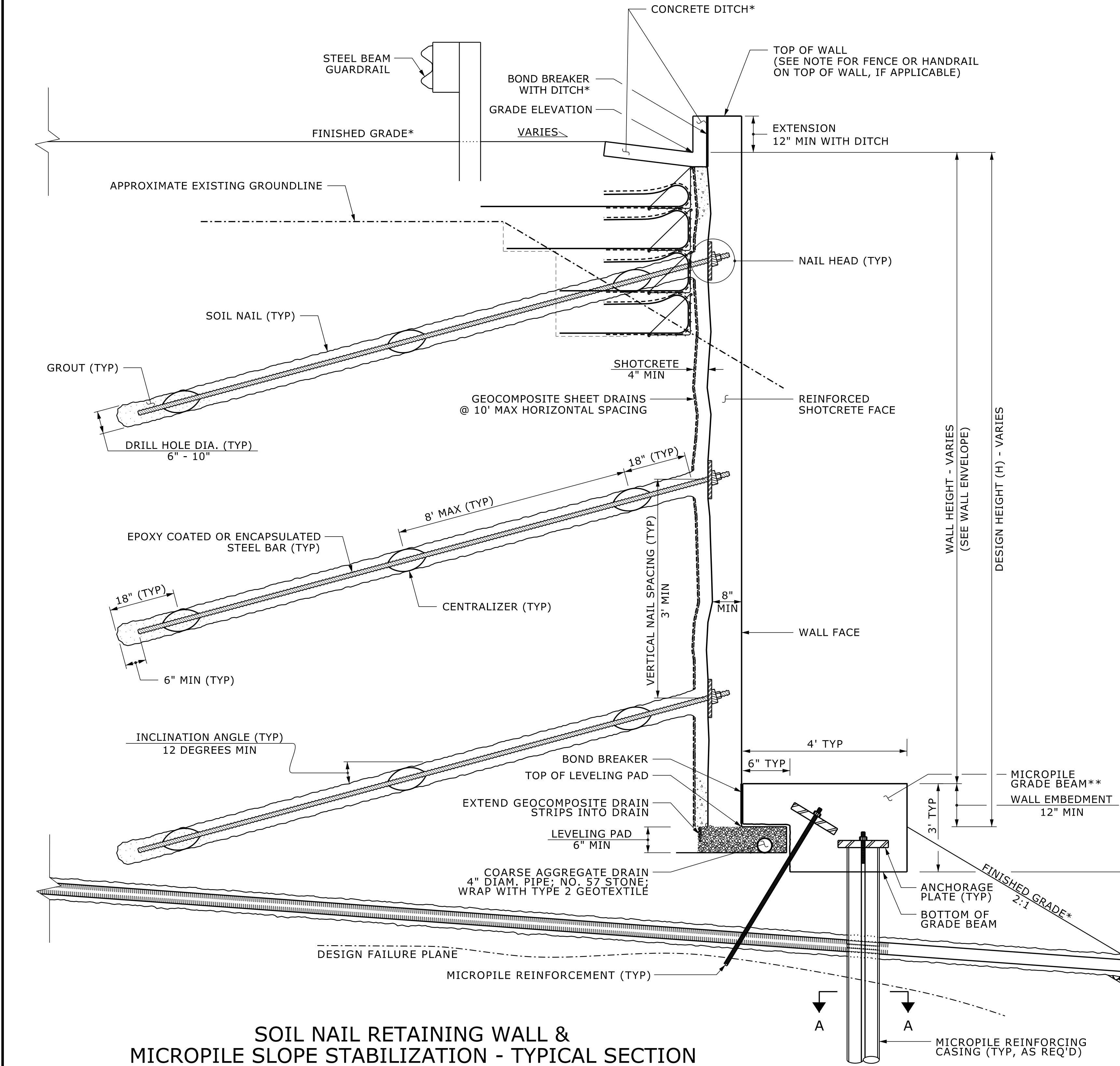
RETAINING WALL RW02A ENVELOPE AND WALL LAYOUT PROVIDED BY RS&H MAY 2025.

Prepared in the Office of:

CAROLINAS
GEOTECHNICAL
GROUP
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

SITE 2 RETAINING WALL RW02A

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



NOTES:

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

FOR MICROPILES AND MICROPILE FOOTING, SEE MICROPILE SLOPE STABILIZATION SPECIAL PROVISION.

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

AVOID SOIL NAILS WHEN INSTALLING GUARDRAIL POSTS.

DESIGN SOIL NAIL REPAIR AND MICROPILE SLOPE STABILIZATION FOR INTERNAL, EXTERNAL, AND GLOBAL STABILITY.

AT THE OPTION OF THE CONTRACTOR, A CANTILEVER SOLDIER PILE RETAINING WALL MAY SUBSTITUTE THE SOIL NAIL RETAINING WALL FOR RETAINING WALL NO. RW02A. FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS STANDARD PROVISION AND SHEET 3.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR RETAINING WALL NO. RW02A, 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. RW02A FOR THE FOLLOWING:
- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
 - 2) DESIGN LIFE = 75 YEARS
 - 3) MINIMUM WALL EMBEDMENT = 1 FT
 - 4) IN-SITU ASSUMED COLLUVIAL MATERIAL PARAMETERS:
UNIT WEIGHT, γ = 110 PCF
FRICTION ANGLE, ϕ = 26 DEGREES
COHESION, c = 0 PSF
 - 5) IN-SITU ASSUMED RESIDUAL MATERIAL PARAMETERS:
UNIT WEIGHT γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 PSF
 - 6) IN-SITU ASSUMED CRYSTALLINE ROCK MATERIAL PARAMETERS BELOW:
UNIT WEIGHT γ = 170 PCF
FRICTION ANGLE, ϕ = 34 DEGREES
COHESION, c = 1,000 PSF
 - 7) DESIGN FAILURE PLANE AT WALL AND FOOTING EQUAL TO THE INFERRED ROCK LINE INDICATED ON THE SUBSURFACE PROFILE IN THE CONTRACT. FAILURE PLANE MAY BE EXTRAPOLATED WHERE DATA IS NOT AVAILABLE.

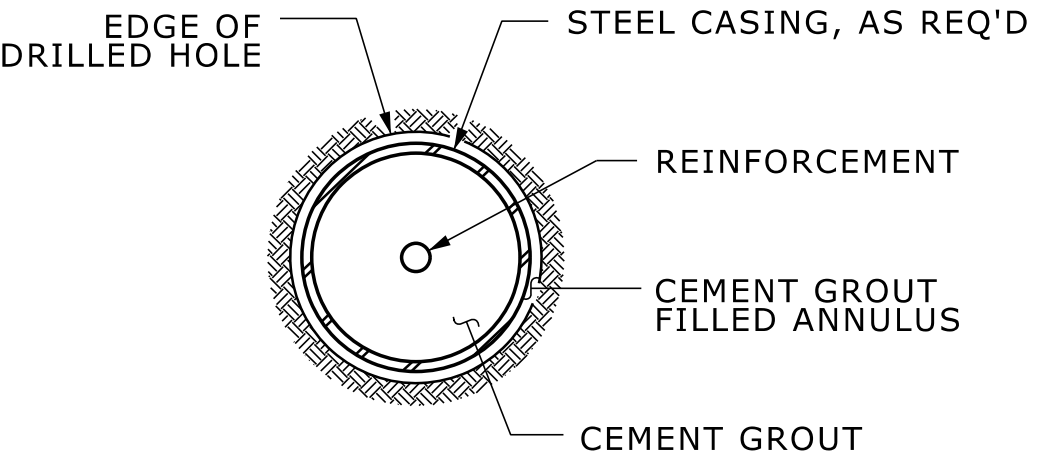
DESIGN RETAINING WALL NO. RW02A FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALL NO. RW02A FOR 300 LB/FT HORIZONTAL TRAFFIC IMPACT LOAD.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. RW02A.

HORIZONTAL DRAINS WILL BE REQUIRED FOR RETAINING WALL NO. RW02A. SEE THE TYPICAL SECTION AND AS DIRECTED BY THE ENGINEER. AVOID SOIL NAILS AND MICROPILES DURING INSTALLATION.

SOIL NAIL WALL CONSTRUCTION WILL REQUIRE GROUND TO BE CREATED TO REACH TOP OF WALL AT SOME LOCATIONS WITHIN THE WALL ENVELOPE. CONSTRUCTION OF THE CREATED GROUND SHOULD BE ACCOUNTED FOR IN THE SOIL NAIL WALL DESIGN.



SECTION A-A

PROJECT NO.: DF18314.2045383

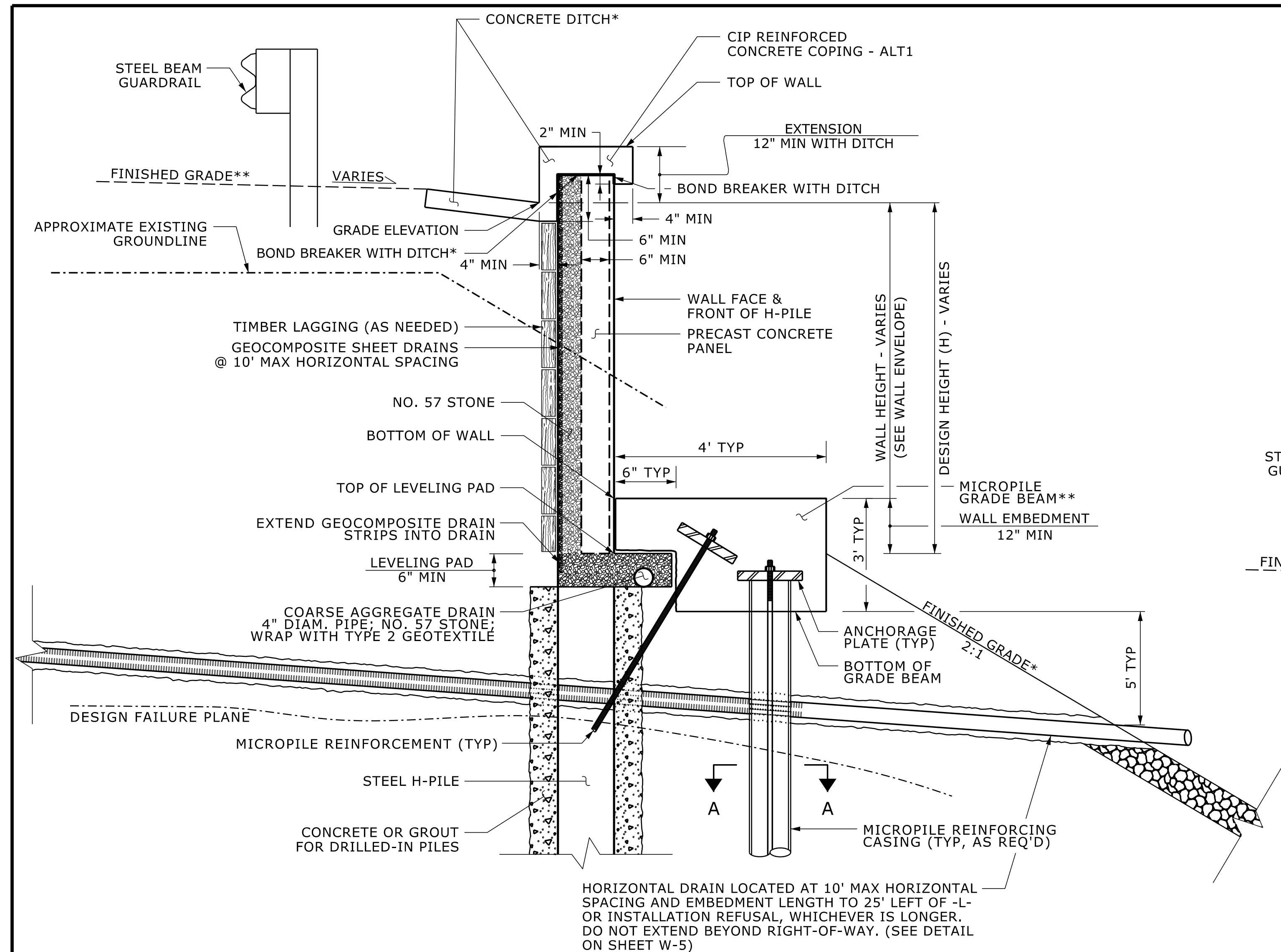
HENDERSON COUNTY

RETAINING WALL RW02A: -RW02A- STA. 10+00.00 TO 13+49.50

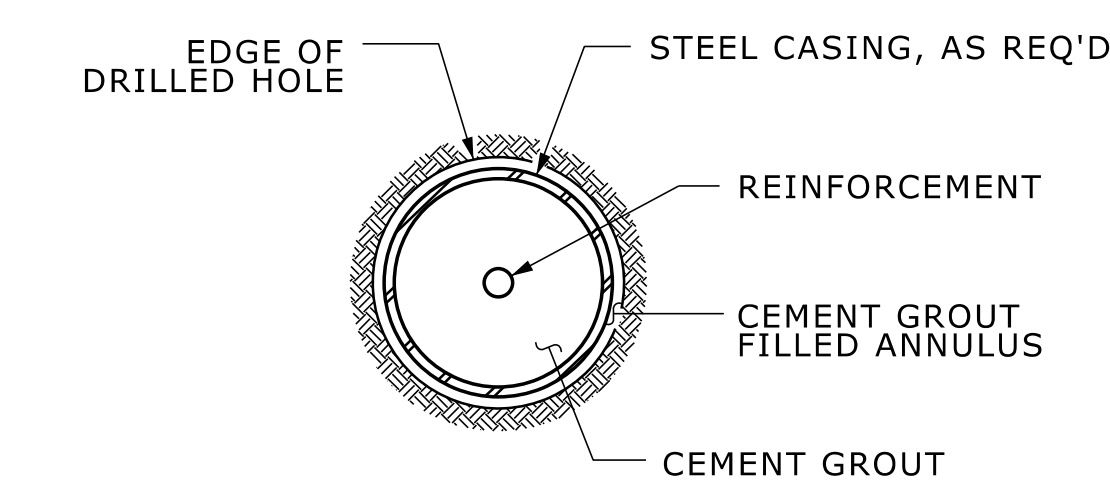
SHEET 2 OF 5

**SOIL NAIL RETAINING WALL &
MICROPILE SLOPE STABILIZATION - TYPICAL SECTION**

* SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.
** CONCEPTUAL MICROPILE ARRANGEMENT SHOWN.



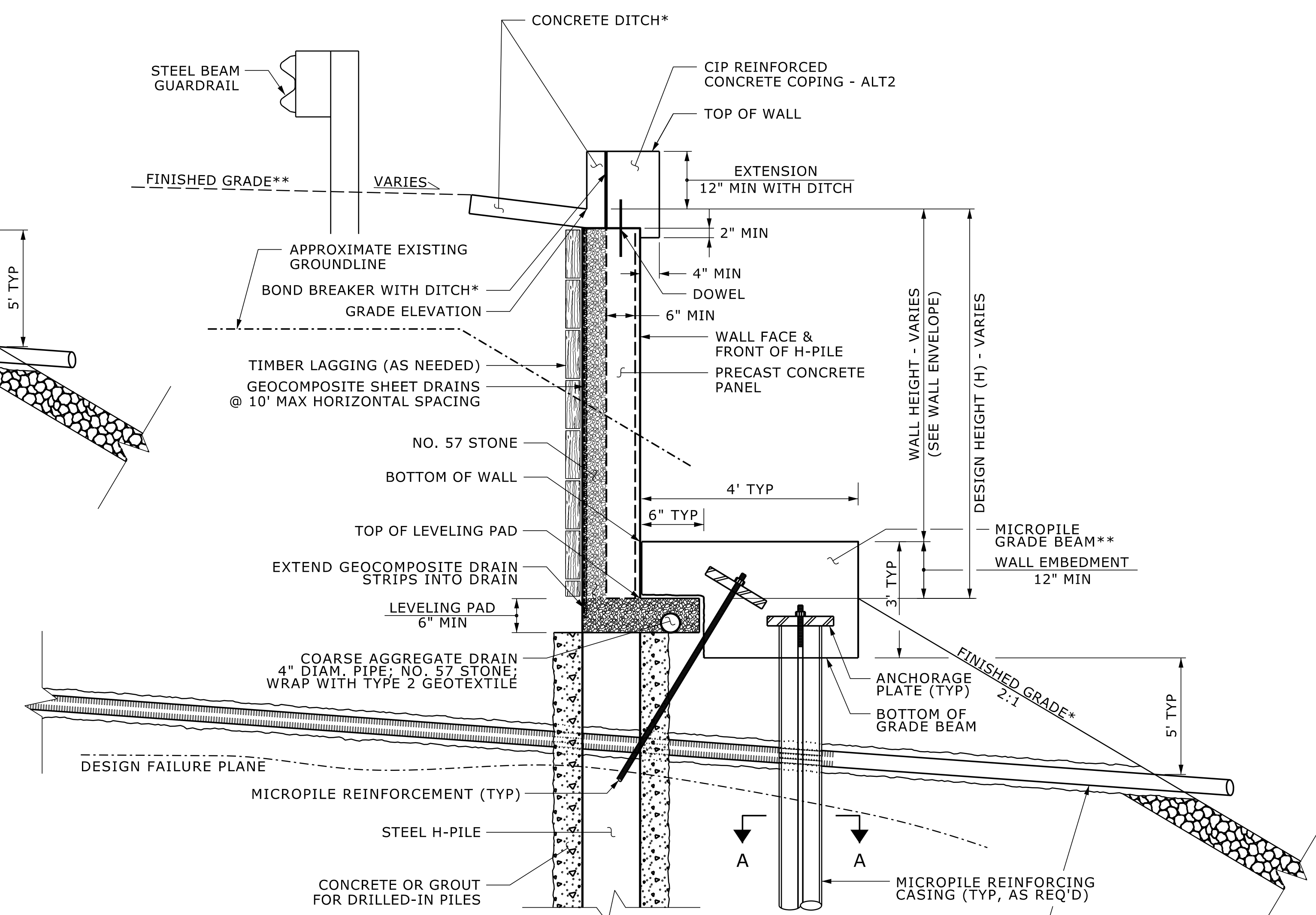
HORIZONTAL DRAIN LOCATED AT 10' MAX HORIZONTAL SPACING AND EMBEDMENT LENGTH TO 25' LEFT OF -L- OR INSTALLATION REFUSAL, WHICHEVER IS LONGER. DO NOT EXTEND BEYOND RIGHT-OF-WAY. (SEE DETAIL ON SHEET W-5)



SECTION A-A

CANTILEVER SOLDIER PILE RETAINING WALL WITH PRECAST PANEL & MICROPILE SLOPE STABILIZATION - TYPICAL SECTION

* SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.
** CONCEPTUAL MICROPILE ARRANGEMENT SHOWN.



HORIZONTAL DRAIN LOCATED AT 10' MAX HORIZONTAL SPACING AND EMBEDMENT LENGTH TO 25' LEFT OF -L- OR INSTALLATION REFUSAL, WHICHEVER IS LONGER. DO NOT EXTEND BEYOND RIGHT-OF-WAY. (SEE DETAIL ON SHEET W-5)

PROJECT NO.: DF18314.2045383
HENDERSON COUNTY
RETAINING WALL RW02A: -RW02A- STA. 10+00.00 TO 13+49.50
SHEET 3 OF 5

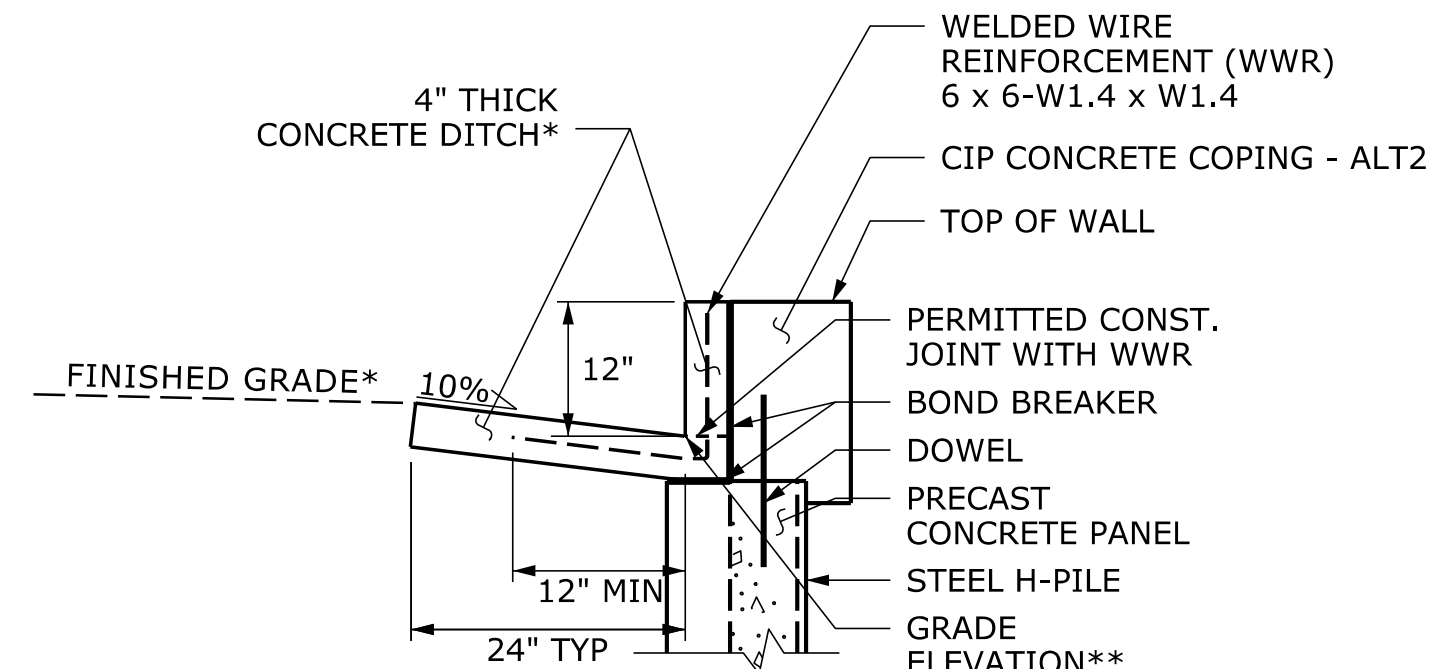
Prepared in the Office of:

**CARLINAS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

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

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

GEOTECHNICAL ENGINEER	ENGINEER
Signed by: Robert E. Kral	06/17/2025
SIGNATURE	DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SIGNATURE	DATE



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

HORIZONTAL DRAINS WILL BE REQUIRED FOR RETAINING WALL NO. RW02A. SEE THE TYPICAL SECTION AND AS DIRECTED BY THE ENGINEER. AVOID SOIL NAILS AND MICROPILES DURING INSTALLATION.

* INCLUDES RETAINING WALL EMBEDMENT AND EXTENSION

* INCLUDES RETAINING WALL EMBEDMENT AND EXTENSION

SITE 2 RETAINING WALL RW02A

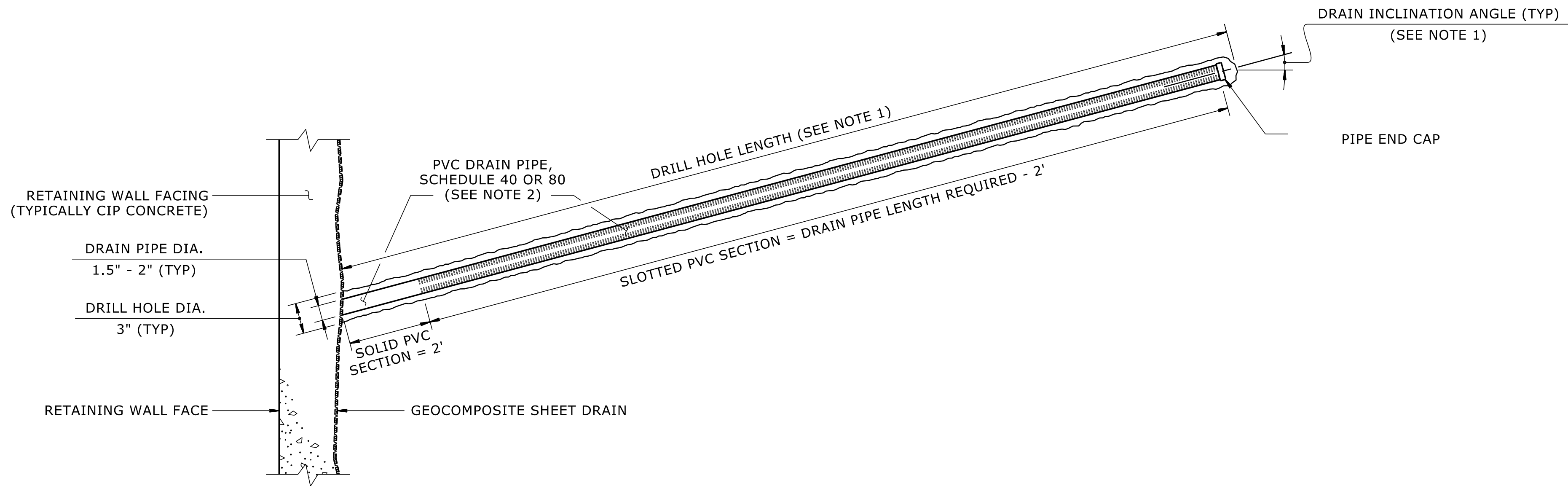
REVISIONS						SHEET NO. W-4
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

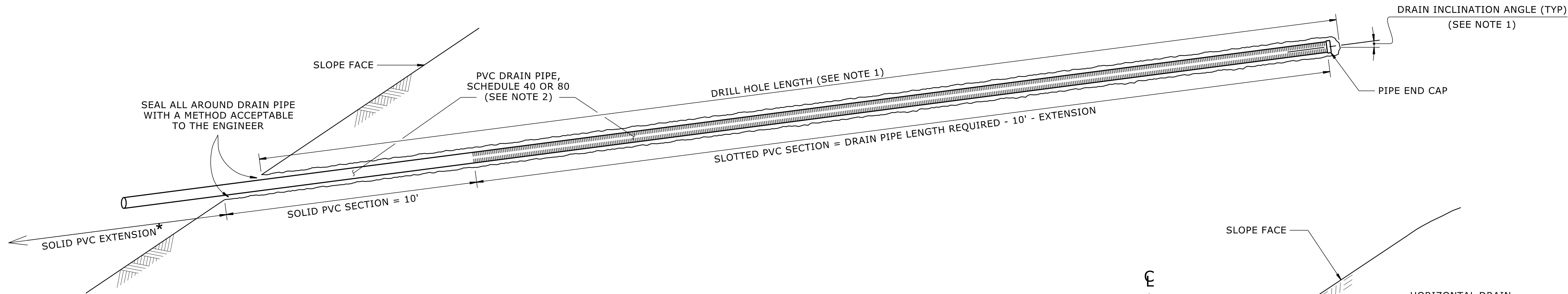
Prepared in the Office of:

 **CARLINAS
GEOTECHNICAL
GROUP**

**1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684**

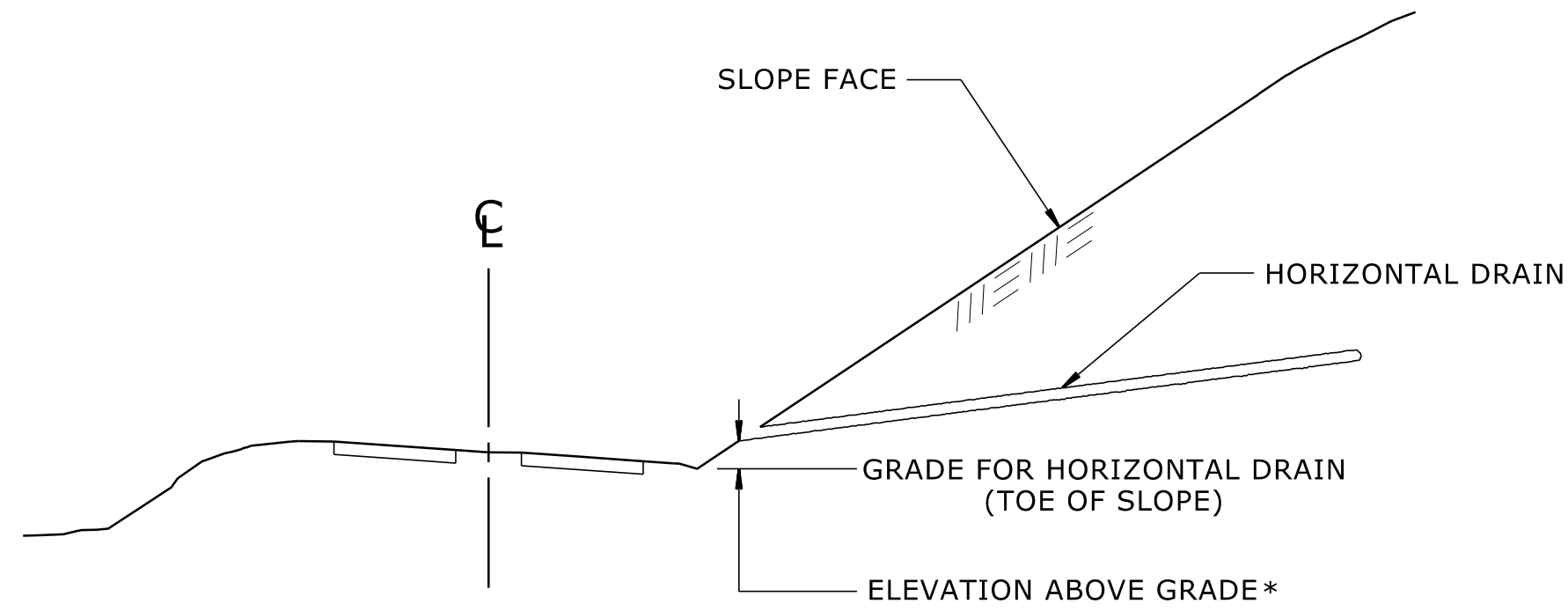


RETAINING WALL HORIZONTAL DRAIN



SLOPE HORIZONTAL DRAIN

*EXTEND SOLID PVC SECTION TO CONNECT PIPE TO A DRAINAGE SYSTEM OR DISCHARGE WATER AS DIRECTED



EXAMPLE CROSS-SECTION WITH SLOPE HORIZONTAL DRAIN

*SEE NOTE 1 FOR DRAIN ELEVATIONS ABOVE (OR BELOW) GRADE

NOTES:

- SEE ROADWAY SUMMARY SHEETS FOR APPROXIMATE KNOWN HORIZONTAL DRAIN LOCATIONS, ELEVATIONS, INCLINATION AND LENGTHS. ADDITIONAL DRAINS MAY BE REQUIRED AS DETERMINED BY THE ENGINEER.
- DRAIN PIPES MAY BE OMITTED FOR SOME HORIZONTAL DRAINS. SEE ROADWAY SUMMARY SHEETS FOR DRAIN PIPE REQUIREMENTS INCLUDING THOSE DRAINS WITHOUT PIPES.
- FOR HORIZONTAL DRAINS, SEE HORIZONTAL DRAINS PROVISION.

PROJECT NO.: DF18314.2045383

HENDERSON COUNTY

RETAINING WALL RW02A: -RW02A- STA. 10+00.00 TO 13+49.50

SHEET 5 OF 5

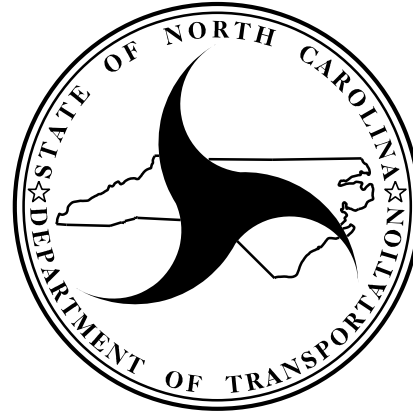
SITE 2 RETAINING WALL RW02A

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:

CGE | **CAROLINAS GEOTECHNICAL GROUP**

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

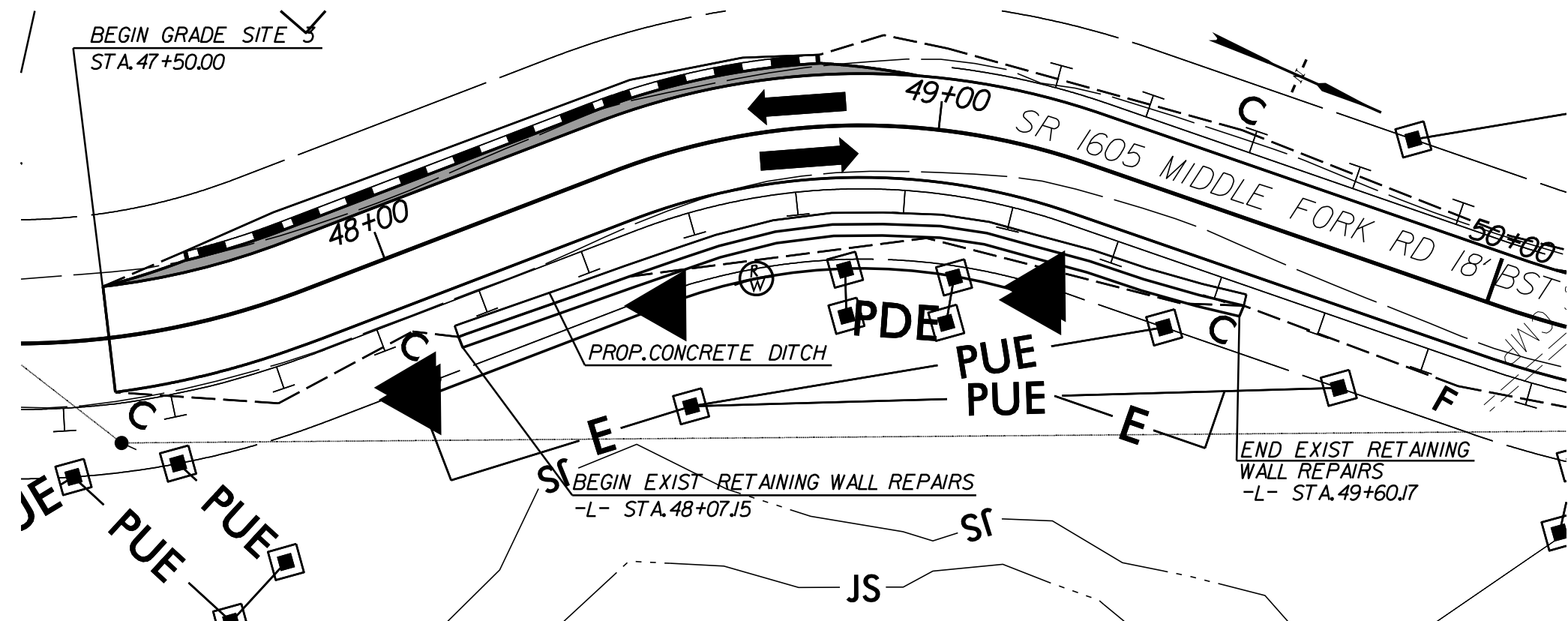


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

REVISIONS						SHEET NO. W-5
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

SITE 3 EXISTING RETAINING WALL REPAIR:



EXISTING RETAINING WALL SITE 3 – PLAN

NOT TO SCALE

CONSTRUCTION SEQUENCE:

1. DEMOLISH AND REMOVE CONCRETE COPING, AS NEEDED.
2. REMOVE CONCRETE PANELS BETWEEN PILES 1 THROUGH 14.
3. INSTALL SOLDIER PILE WALL ANCHORS AND WALERS.
4. UNCLASSIFIED EXCAVATION IN PREPARATION FOR ROCK EMBANKMENTS.
5. PLACE TIMBER LAGGING BEHIND SOLDIER PILES AND EXISTING DRILLED SHAFTS, AS NEEDED.
6. PLACE EXCAVATABLE FLOWABLE FILL BEHIND TIMBER LAGGING TO TOP OF EXISTING DRILLED SHAFTS IN LIFTS, AS NEEDED.
7. CONTRACTOR TO ASSESS THE PRESENCE OF VOIDS BEHIND EXISTING PANELS.
8. REINSTALL PRECAST PANELS LEVEL AND FILL VOIDS WITH EXCAVATABLE FLOWABLE FILL, AS NEEDED.
9. PLACE 8 INCH MIN. REINFORCED SHOTCRETE FACE FROM TOP OF WALER TO TOP OF ROCK.
10. INSTALL PARTIALLY GROUTED ROCK FILL AND ROCK EMBANKMENTS.
11. PLACE CAST-IN-PLACE (CIP) CONCRETE COPING WITH DITCH, AS NEEDED.
12. CONTRACTOR TO PLACE ROCK EMBANKMENTS AROUND THE ENDS OF THE EXISTING WALL TO TIE INTO GROUTED ROCK FILL, AS GEOMETRY ALLOWS.



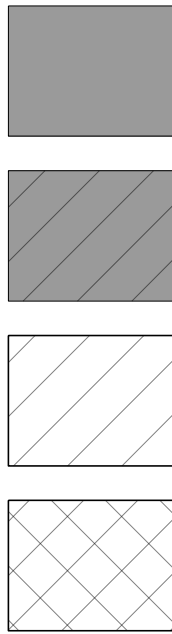
EXISTING RETAINING WALL SITE 3 – PROFILE

NOT TO SCALE
(LOOKING AT FACE OF WALL)

EXISTING PILE DESIGNATION

PROPOSED ANCHOR AND ANCHOR DESIGNATION

KEY:



APPROXIMATE EXISTING WALL FACE AREA & EXPOSED WALL FOUNDATIONS

APPROXIMATE LIMITS OF PROPOSED SHOTCRETE FACE

APPROXIMATE LIMITS OF UNCLASSIFIED EXCAVATION & PARTIALLY GROUTED ROCK FILL

APPROXIMATE LIMITS OF ROCK EMBANKMENTS

PREPARED BY: KND

DATE: 06/25

REVIEWED BY: REK

DATE: 06/25

RETAINING WALL IMAGERY TAKEN MARCH 2025.

*ELEVATIONS PRESENTED ON SCALED IMAGERY AND MEASURED FROM PROVIDED CROSS SECTIONS OR ESTIMATED. ELEVATIONS SHOULD BE CONSIDERED APPROXIMATE.

GEOTECHNICAL
ENGINEER

ENGINEER



Signed by:
Robert E. Kral

06/27/2025

SIGNATURE

DATE

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT NO.: DF18314.2045382

HENDERSON COUNTY

RETAINING WALL: -L- STA. 48+07.15 TO 49+60.17, RT

SHEET 1 OF 7

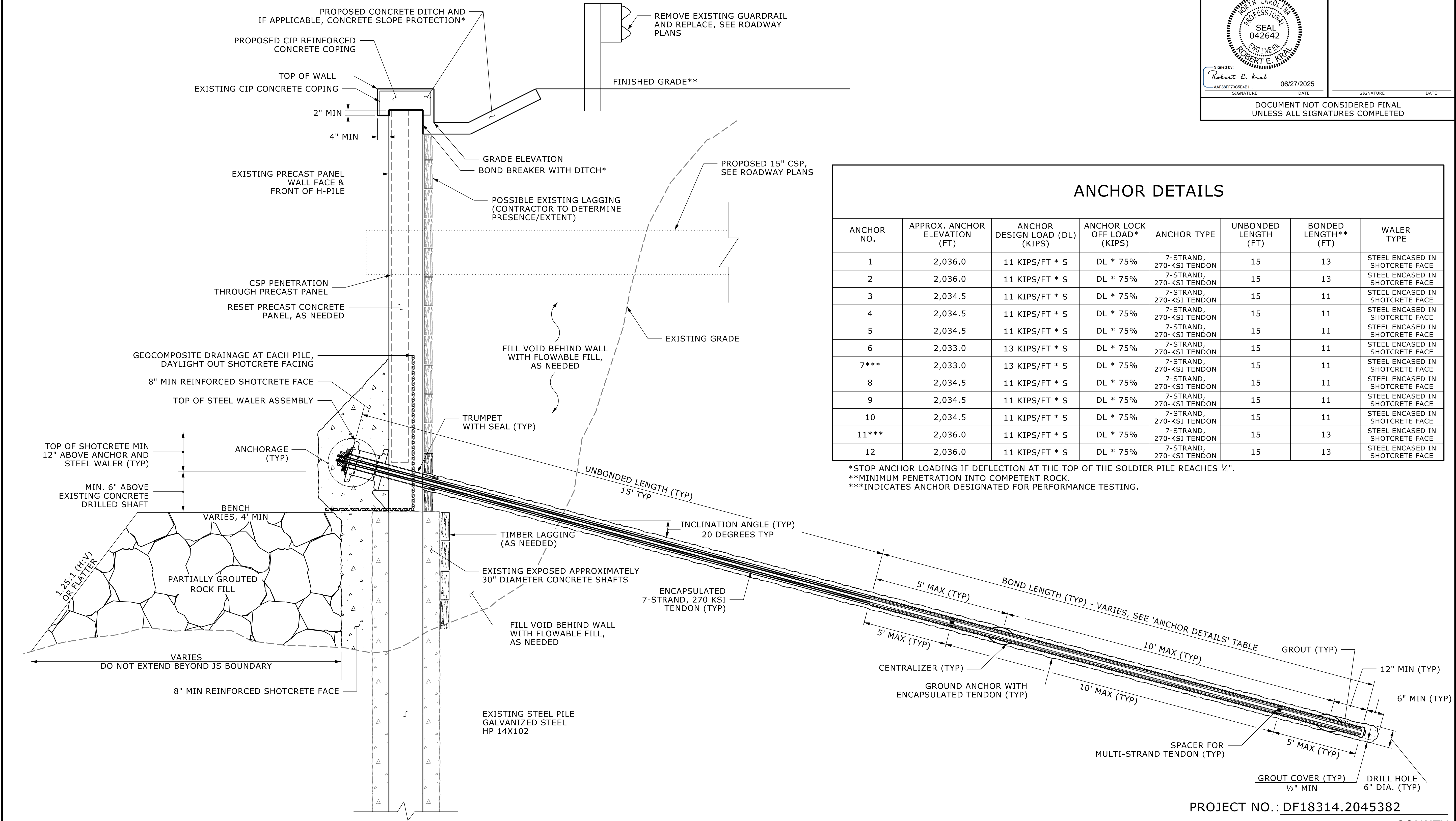
Prepared in the Office of:
CGE CAROLINAS
GEOTECHNICAL
GROUP
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

SITE 3 EXISTING
SOLDIER PILE RETAINING WALL
REPAIR

REVISIONS

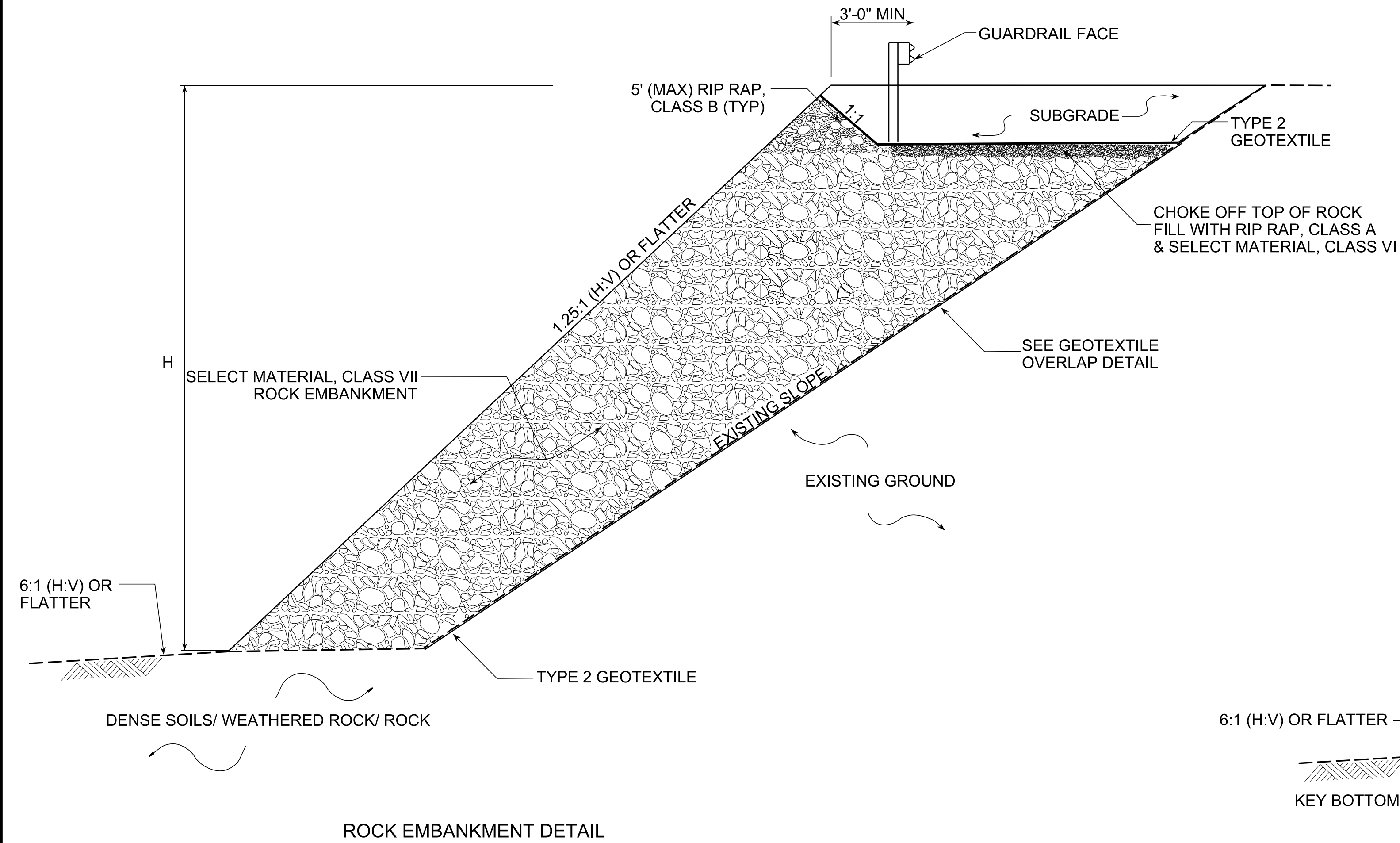
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET
NO.
W-6

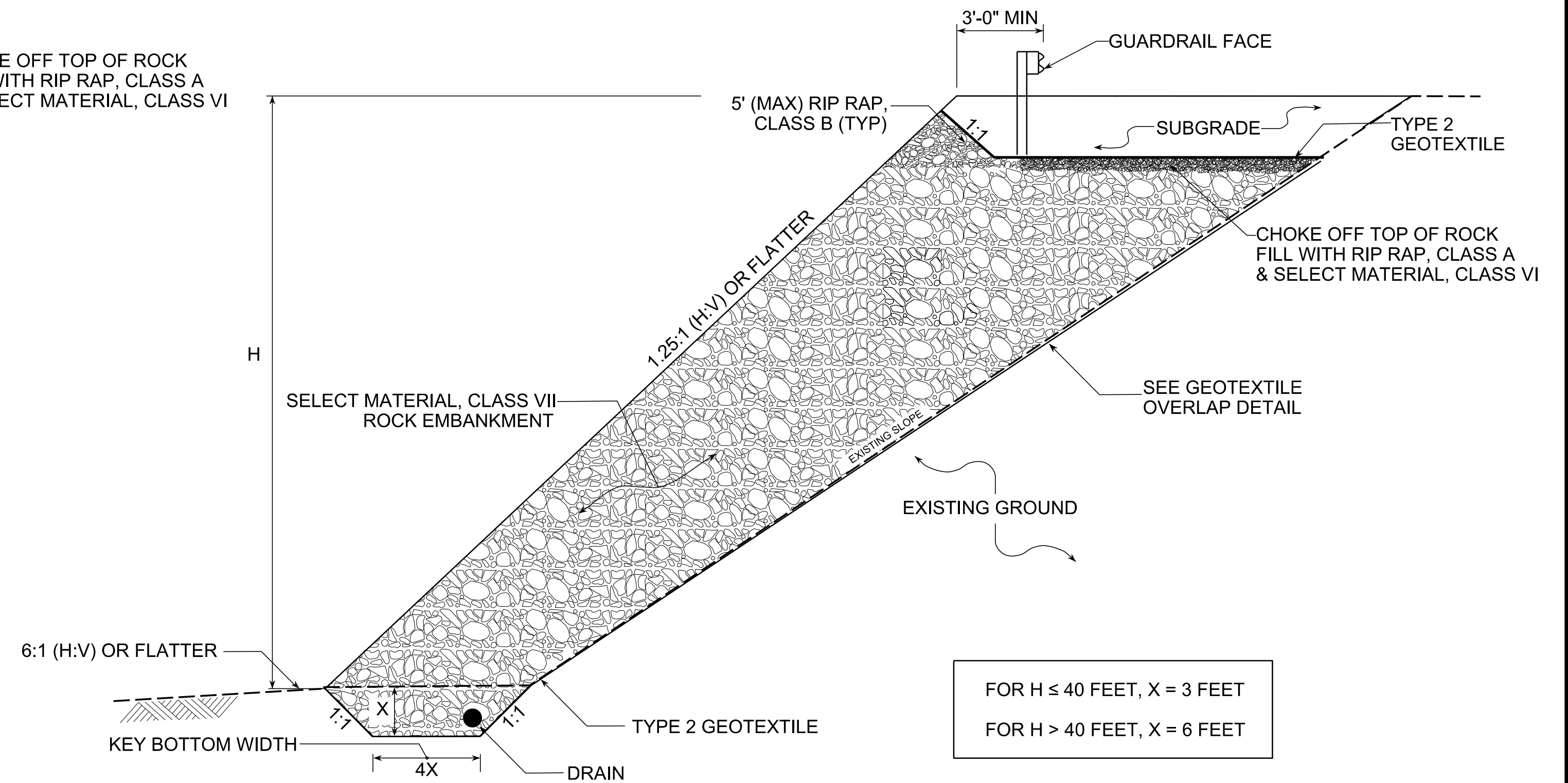


ANCHORED SOLDIER PILE WALL REPAIR - TYPICAL SECTION

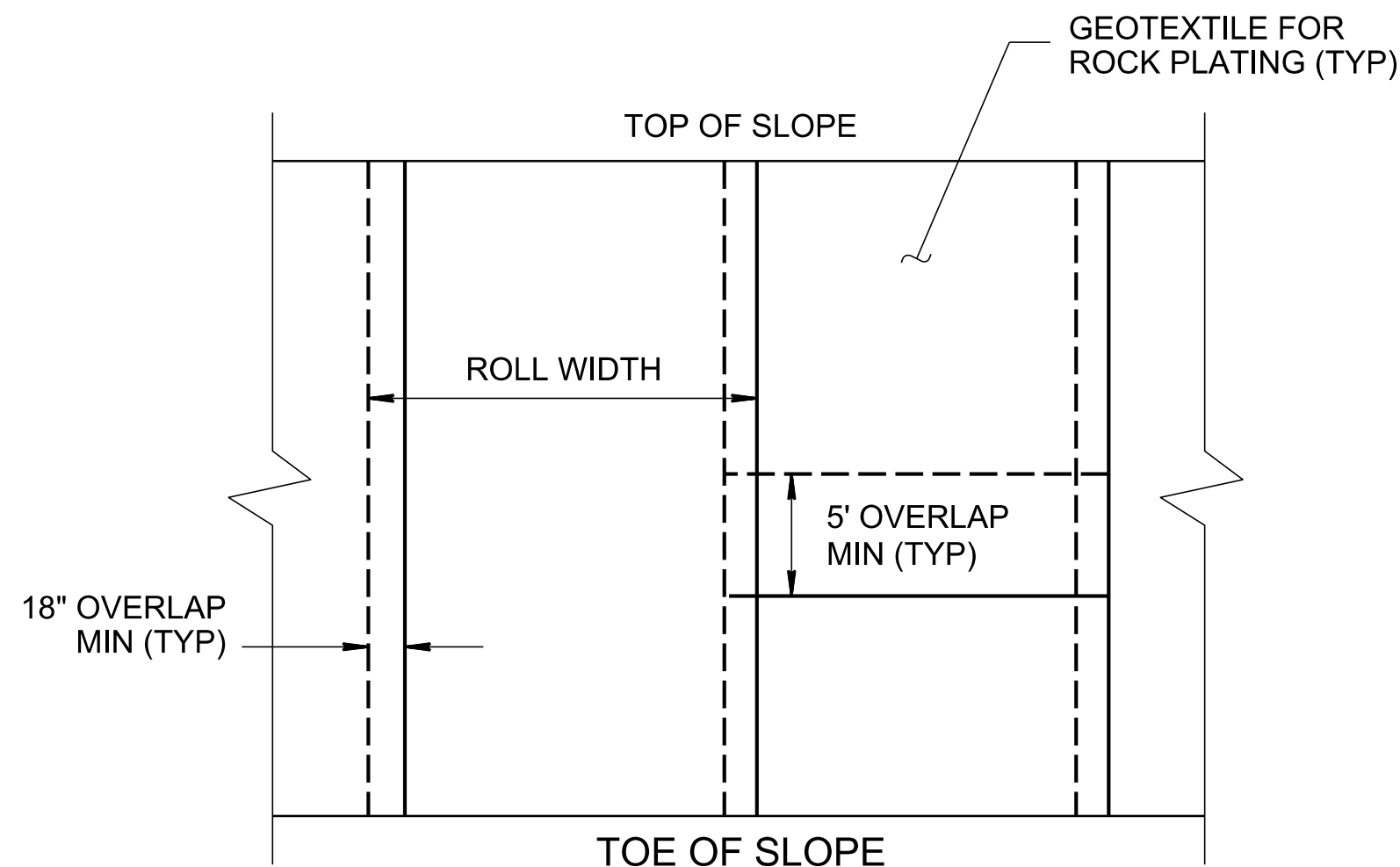
-L- STA. 48+07.15 TO APPROX. 49+00.00, RT
*SEE CONCRETE DITCH BEHIND WALL DETAILS.
**SEE PLANS FOR FINISHED GRADE.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ROCK EMBANKMENT DETAIL



ROCK EMBANKMENT WITH TOE KEY DETAIL



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW)

NOTES:

1. THE MAXIMUM ALLOWABLE HEIGHT FOR THE ROCK EMBANKMENT DETAIL IS 80'.
2. FOR ROCK EMBANKMENT, BENCH EXISTING SLOPE IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS, WHERE POSSIBLE.

ROCK EMBANKMENTS

PROJECT NO.: DF18314.2045382

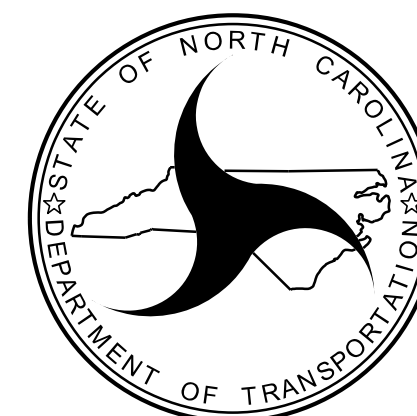
HENDERSON COUNTY

RETAINING WALL: -L- STA. 48+07.15 TO 49+60.17, RT

SHEET 3 OF 7

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:
CG2 | **CAROLINAS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

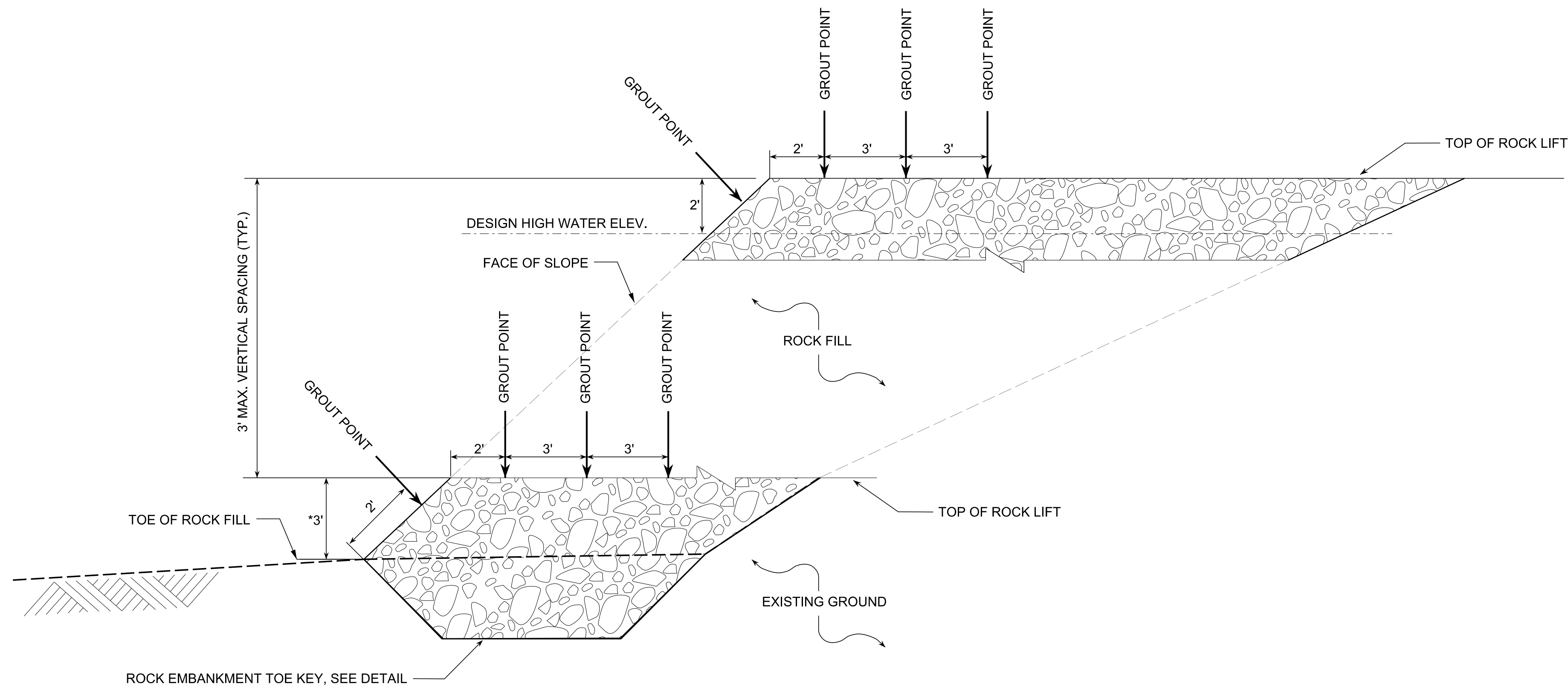


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

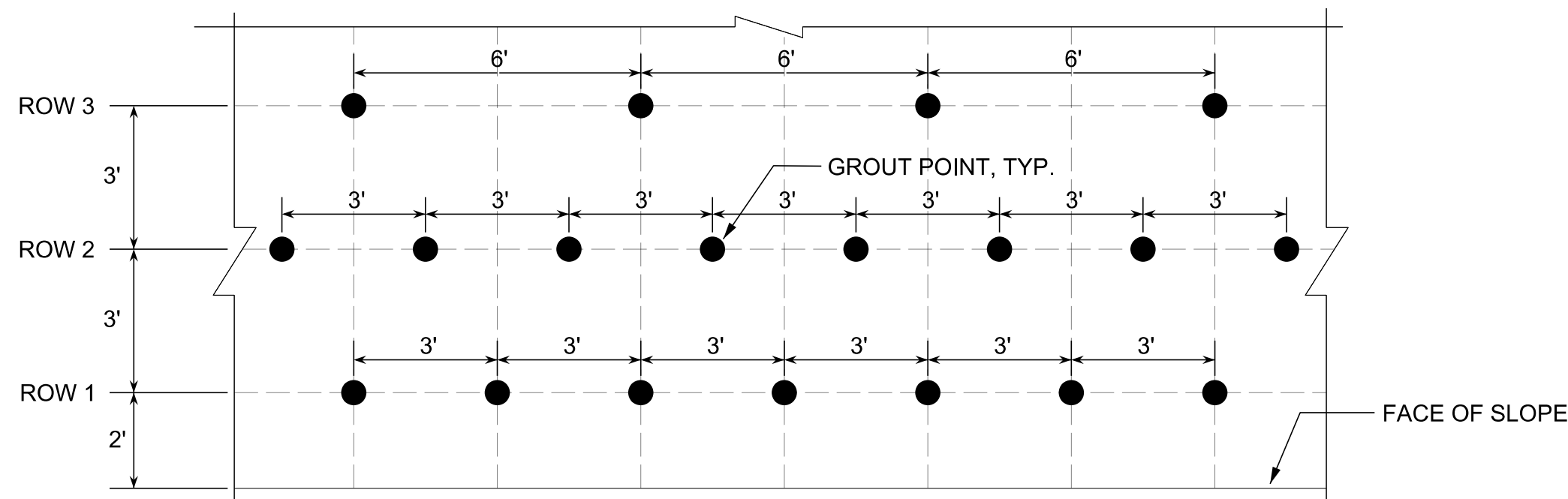
GEOTECHNICAL
ENGINEERING UNIT

EXISTING RETAINING WALL REPAIR
SITE 3

REVISIONS						SHEET NO. W-8
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



PARTIALLY GROUTED ROCK FILL - ROCK FILL SECTION
* IF NO TOE KEY, START GROUTING AT THE TOP OF THE FIRST 3-FT LIFT

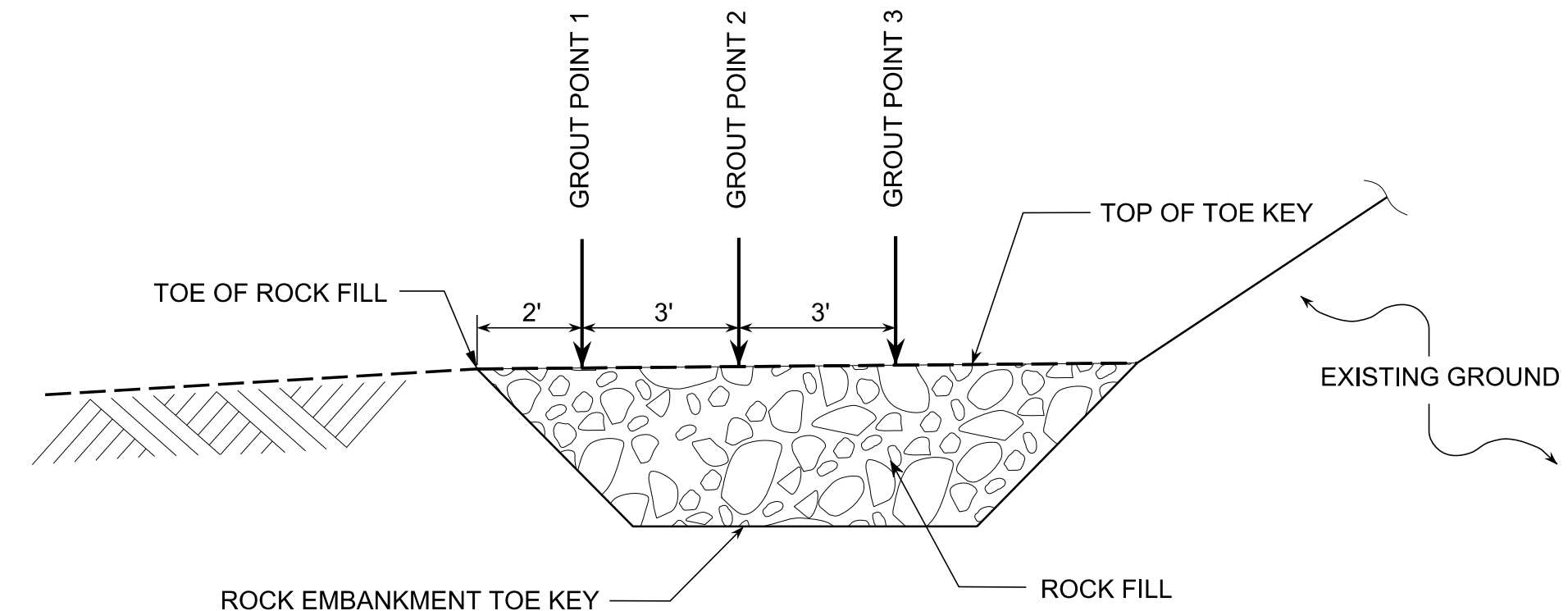


PARTIALLY GROUTED ROCK FILL - PLAN VIEW GROUT POINTS
VIEW FROM FRONT TOP

NOTES:

FOR PARTIALLY GROUTED ROCK FILL, SEE SPECIAL PROVISION.

APPLY GROUT ON THE SLOPE FACE AND AT THE TOP OF EACH 3 FT LIFT OF ROCK FILL. APPLY 3 CUBIC FEET OF GROUT AT EACH GROUT POINT IN THE PATTERNS SHOWN ON PAGE 2. THE HIGHEST GROUT POINT WILL BE THE TOP OF THE ROCK EMBANKMENT.



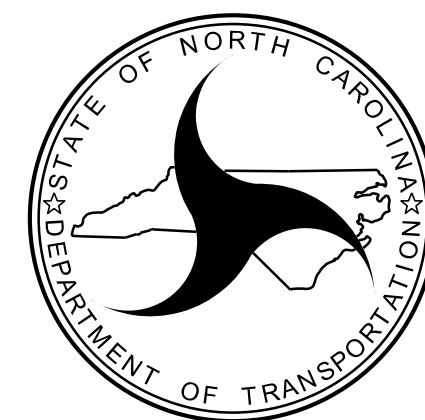
PARTIALLY GROUTED ROCK FILL - TOE KEY DETAIL

PARTIALLY GROUTED ROCK FILL DETAILS

PROJECT NO.: DF18314.2045382
HENDERSON COUNTY
RETAINING WALL: -L- STA. 48+07.15 TO 49+60.17, RT
SHEET 4 OF 7

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:
CG2 | **CAROLINAS GEOTECHNICAL GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
**GEOTECHNICAL
ENGINEERING UNIT**

REVISIONS						SHEET NO. W-9
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

GEOTECHNICAL ENGINEER

ENGINEER

ENGINEER

Seal of Robert E. Kral, Professional Engineer, Seal 042642, State of North Carolina.

Signed by: Robert E. Kral

06/27/2025

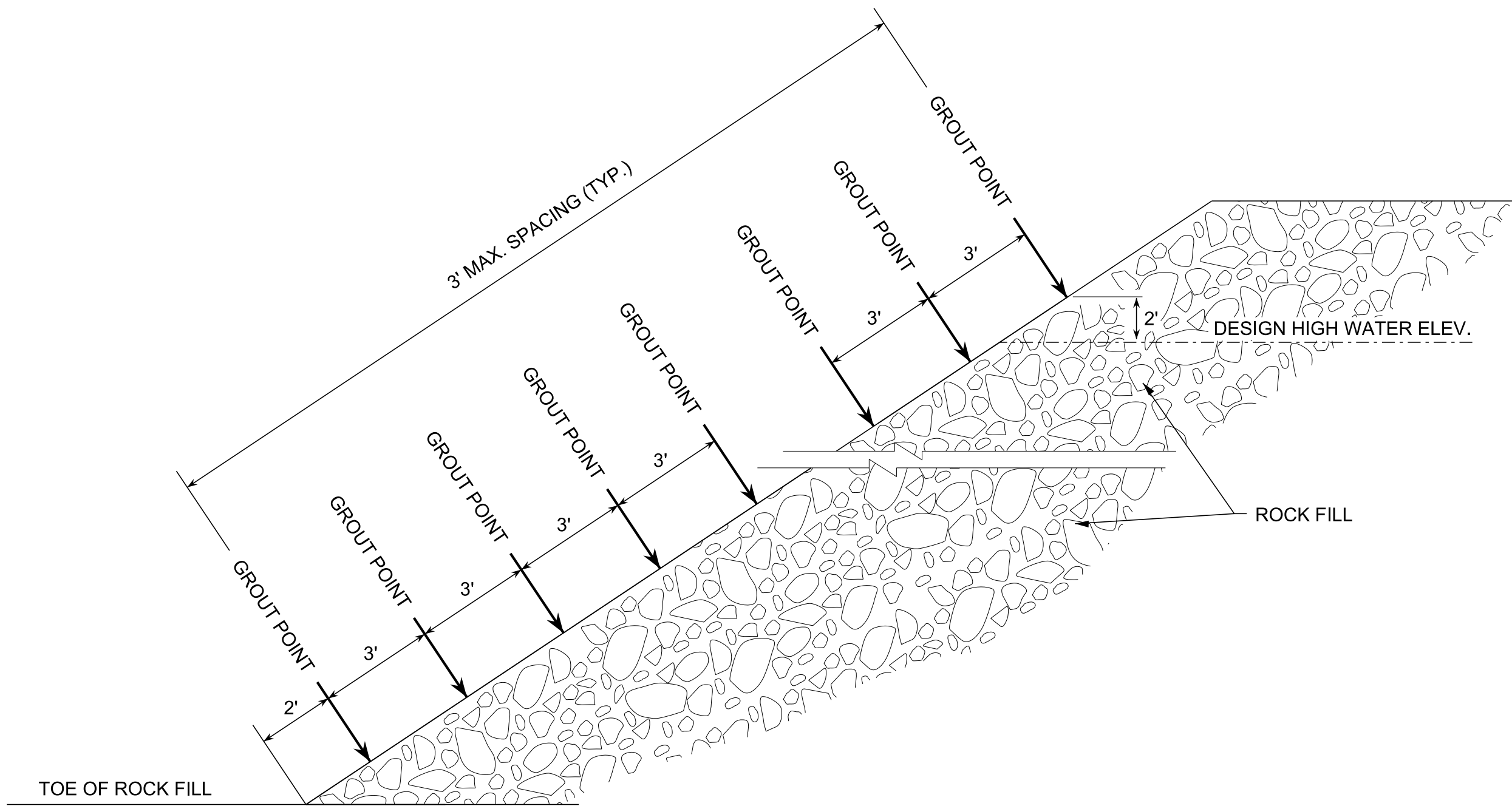
SIGNATURE

DATE

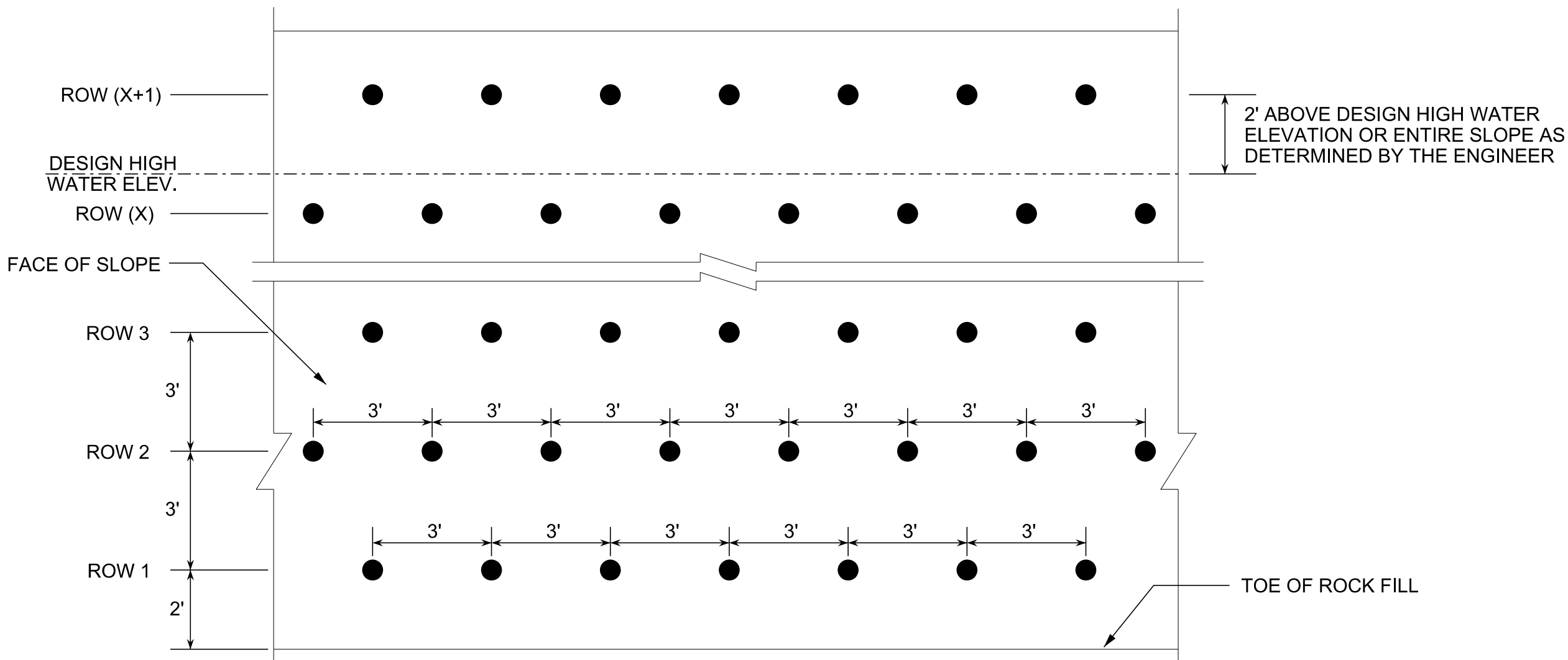
SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



PARTIALLY GROUTED ROCK FILL - SLOPE FACE DETAIL



PARTIALLY GROUTED ROCK FILL - SLOPE FACE GROUT POINTS
VIEW FROM FRONT SLOPE FACE

PARTIALLY GROUTED ROCK FILL DETAILS

PROJECT NO.: DF18314.2045382

HENDERSON COUNTY

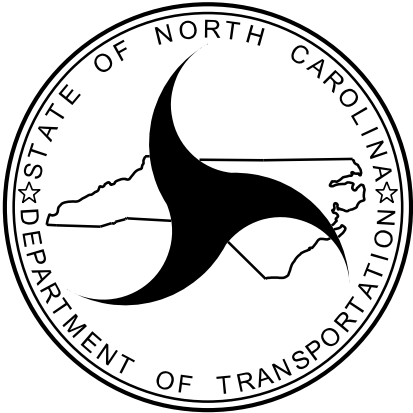
RETAINING WALL: -L- STA. 48+07.15 TO 49+60.17, RT

SHEET 5 OF 7

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25



Prepared in the Office of:
**CAROLINAS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684



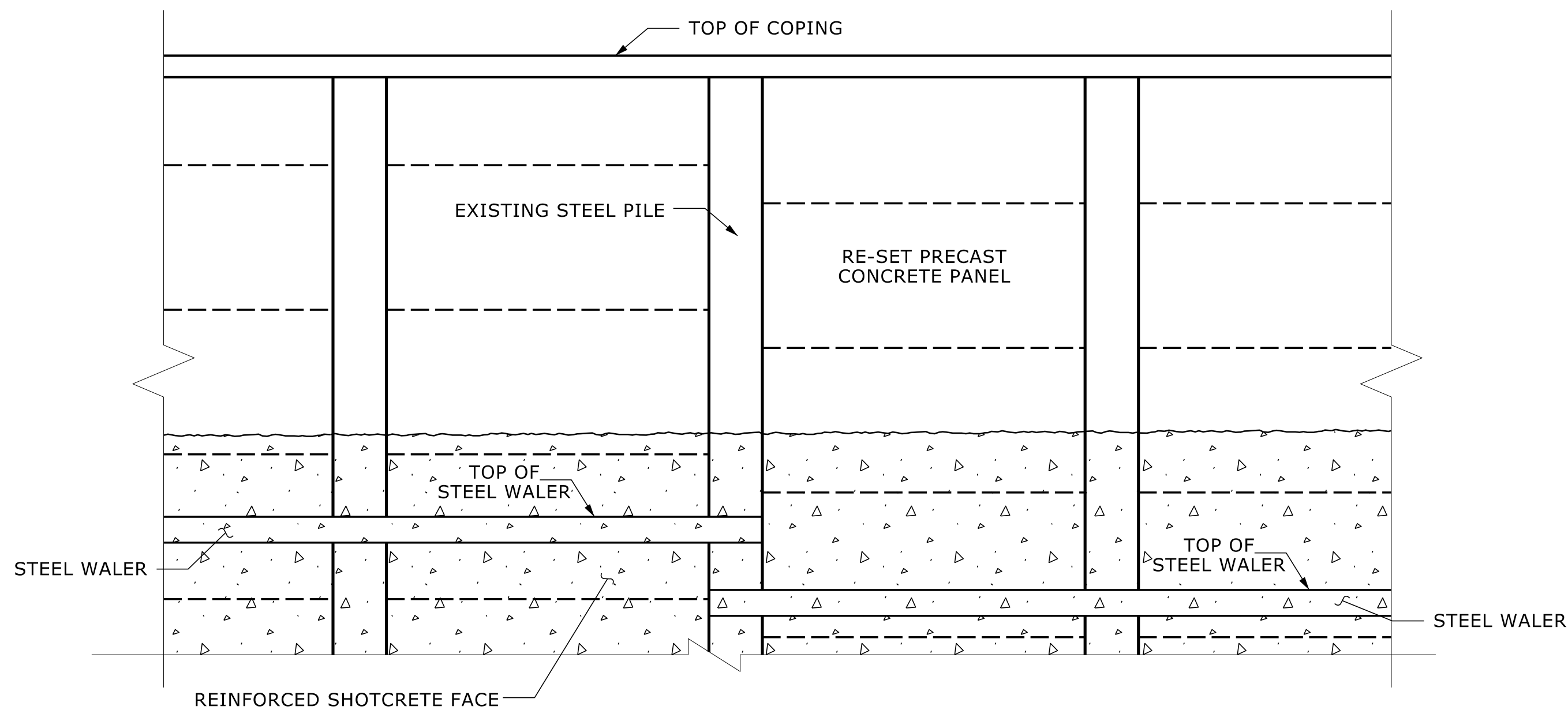
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

EXISTING RETAINING WALL REPAIR
SITE 3

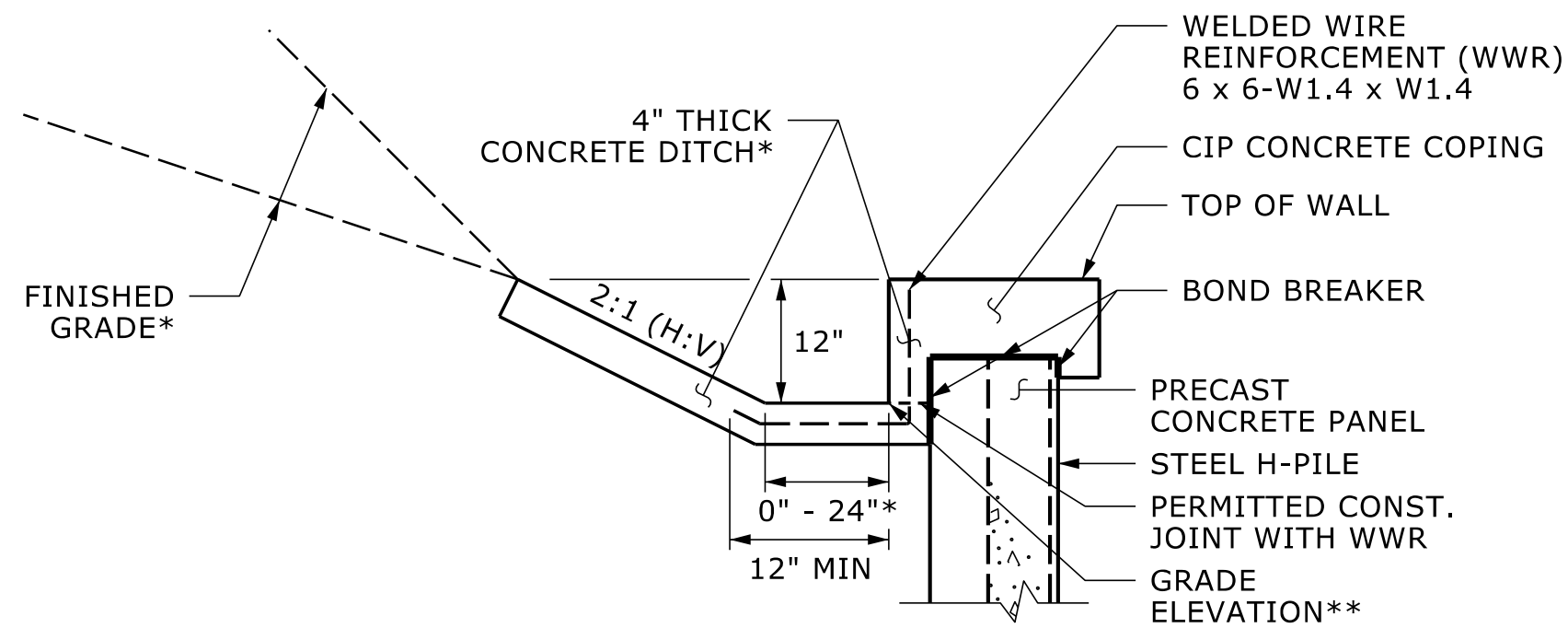
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1		3			
2		4			

SHEET
NO.
W-10



SOLDIER PILE WALL FACE - TYPICAL

-L- STA. 48+07.15 TO APPROX. 49+00.00, RT



**CONCRETE DITCH BEHIND
WALL WITH CONCRETE COPING**

CONCRETE COPING: -L- STA. 48+07.15 TO APPROX. 49+00.00, RT
CONCRETE DITCH: -L- STA. 48+02.15 TO APPROX. 49+00.00, RT
*SEE ROADWAY PLANS FOR CONCRETE DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.
FOR CONCRETE DITCHES, SEE SECTION 850 OF THE STANDARD SPECIFICATIONS.

PROJECT NO.: DF18314.2045382

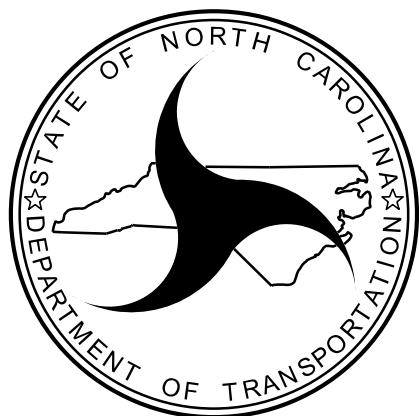
HENDERSON COUNTY

RETAINING WALL: -L- STA. 48+07.15 TO 49+60.17, RT

SHEET 6 OF 7

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:
 **CAROLINUS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

EXISTING RETAINING WALL REPAIR
SITE 3

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

		<div>GEOTECHNICAL ENGINEER</div> <div><div>SEAL042642</div><div>ENGINEER</div><div>ROBERT E. KRAL</div></div> <div><div>Signed by: Robert E. Kral</div><div>06/27/2025</div></div> <div><div>AAFB8FF73C5E4B1</div><div>SIGNATURE</div></div> <div><div>DATE</div></div>		<div>ENGINEER</div> <div><div>SIGNATURE</div></div> <div><div>DATE</div></div>	
		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

NOTES:

FOR EXISTING SOLDIER PILE RETAINING WALL REPAIRS, SEE EXISTING RETAINING WALL REPAIRS SPECIAL PROVISION.

FOR ROCK EMBANKMENTS, SEE ROCK EMBANKMENTS STANDARD PROVISION.

FOR PARTIALLY GROUTED ROCK FILL, SEE PARTIALLY GROUTED ROCK FILL SPECIAL PROVISION.

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

EACH TIEBACK ANCHOR SHALL BE STRESSED AND LOCKED OFF TO THE LOADS SPECIFIED IN THE TABLE ON SHEET W-7. ANCHOR STRESSING SHALL BE PERFORMED IN ACCORDANCE WITH THE EXISTING RETAINING WALL REPAIRS SPECIAL PROVISION.

ALL ANCHORS SHALL BE STRESSED AND LOCKED OFF PRIOR TO PLACING ANY EXCAVATABLE FLOWABLE FILL.

PROVIDE EXCAVATABLE FLOWABLE FILL IN ACCORDANCE WITH SECTION 1000-7 OF THE STANDARD SPECIFICATIONS. PLACE EXCAVATABLE FLOWABLE FILL IN LIFTS NOT EXCEEDING 24 INCHES AND ONLY AFTER ALL TIEBACK ANCHORS HAVE BEEN STRESSED AND LOCKED OFF.

CONTRACTOR SHALL DEMOLISH AND REMOVE THE EXISTING CONCRETE COPING AS NECESSARY TO ACCESS AND RESET THE PRECAST CONCRETE PANELS BETWEEN SOLDIER PILES. PANELS SHALL BE RESET TO A LEVEL AND PLUMB POSITION CONSISTENT WITH ORIGINAL ALIGNMENT AND ELEVATIONS. CONTRACTOR SHALL EXERCISE CARE TO PREVENT DAMAGE TO THE EXISTING PANELS. ANY PANELS DAMAGED OR BROKEN DURING DEMOLITION, HANDLING, OR RESETTING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. ALL LABOR, MATERIALS, EQUIPMENT, AND DISPOSAL ASSOCIATED WITH COPING REMOVAL, PANEL RESETTING, AND ANY REQUIRED PANEL REPLACEMENT SHALL BE CONSIDERED INCIDENTAL TO THE WALL REPAIR AND NO ADDITIONAL COMPENSATION WILL BE MADE.

CONTRACTOR SHALL CORE OR SAW-CUT A CLEAN, CIRCULAR OPENING THROUGH THE EXISTING PRECAST CONCRETE PANEL TO ACCOMMODATE THE PROPOSED 15-INCH CORRUGATED STEEL PIPE (CSP) AS SHOWN ON THE PLANS. THE OPENING SHALL ALLOW A MAXIMUM 1-INCH ANNULAR SPACE AROUND THE PIPE. AFTER INSTALLATION, SEAL THE ANNULAR SPACE USING NON-SHRINK, NON-METALLIC GROUT CONFORMING TO NCDOT STANDARD SPECIFICATIONS SECTION 1003 FOR TYPE 2 GROUT. GROUT SHALL BE PLACED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS TO ACHIEVE A WATERTIGHT CONNECTION. CONTRACTOR SHALL PREVENT DAMAGE TO THE PANEL DURING CUTTING, PIPE PLACEMENT, OR GROUTING. ALL LABOR, MATERIALS, AND ANY NECESSARY PANEL REPAIRS SHALL BE CONSIDERED INCIDENTAL TO THE PIPE INSTALLATION.

ESTIMATED QUANTITIES - SITE 3 EXISTING RETAINING WALL REPAIRS							
SHOTCRETE WALL FACE				800 SF			
TIEBACK ANCHORS				12 EA			
ANCHOR PERFORMANCE TESTS				2 EA			
ANCHOR PROOF TESTS				12 EA			
CIP CONCRETE COPING				95 LF			
CONCRETE DITCH				100 LF			
UNCLASSIFIED EXCAVATION				175 CY			

EXISTING RETAINING WALL REPAIRS PAY ITEMS							
SITE 3 EXISTING RETAINING WALL REPAIRS				1 LS			
ROCK EMBANKMENTS				2,050 TON			
#57 STONE				0 TON			
GEOTEXTILE FOR ROCK EMBANKMENTS				480 SY			
GROUT FOR ROCK FILL				75 CY			

ROCK EMBANKMENTS							
BEGIN STA. -L-	TOP OFFSET	BOT. OFFSET	INCLINATION (H:V)	END STA.	TOP OFFSET	BOT. OFFSET	INCLINATION (H:V)
47+50.00	18.2' RT	22.4' RT	1.25:1, OR FLATTER	48+07.15	17.5' RT	45.1' RT	1.25:1, OR FLATTER
48+07.15	25.2' RT	39.7' RT	1.25:1, OR FLATTER	49+00.00	22.7' RT	46.0' RT	1.25:1, OR FLATTER
49+00.00	22.7' RT	46.0' RT	1.25:1, OR FLATTER	49+65.00	21.3' RT	39.1' RT	1.25:1, OR FLATTER

PROJECT NO.: DF18314.2045382

HENDERSON COUNTY

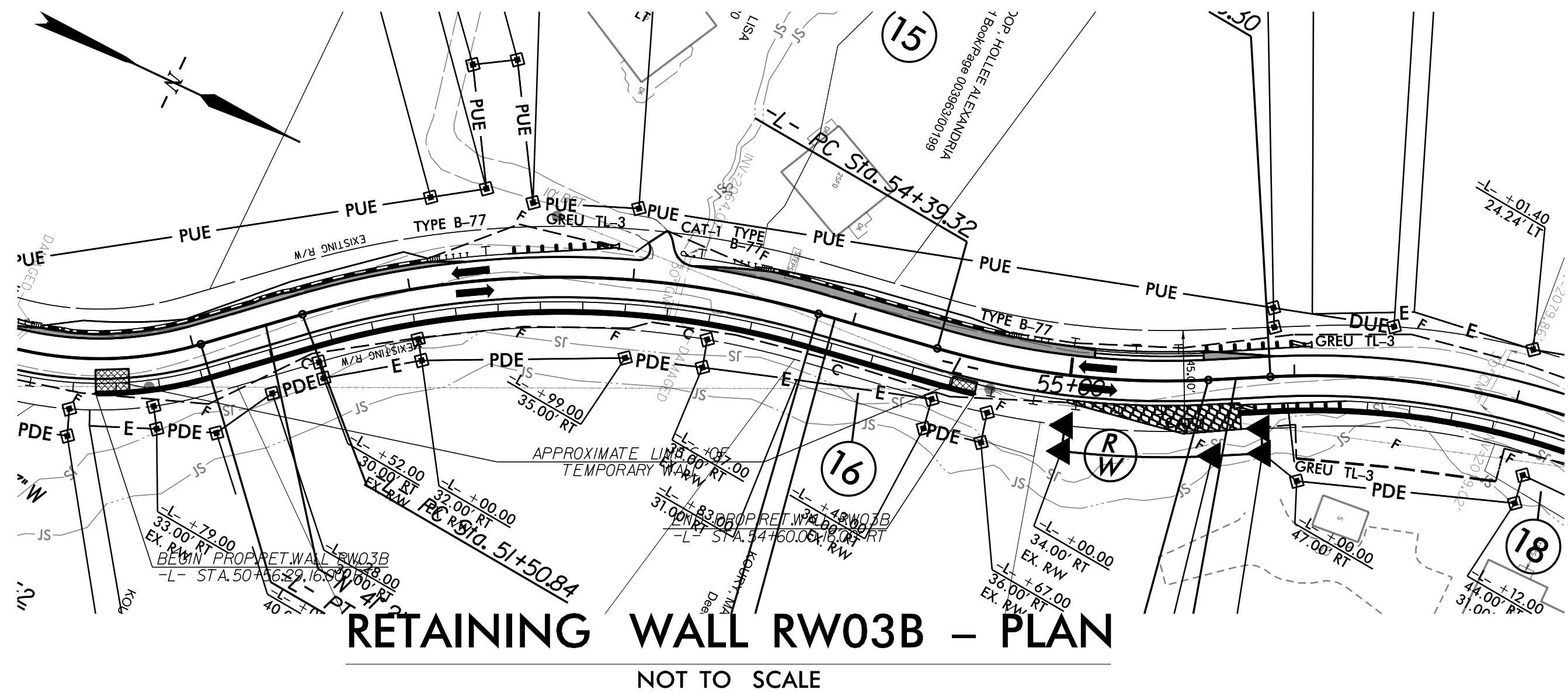
RETAINING WALL: -L- STA. 48+07.15 TO 49+60.17, RT

SHEET 7 OF 7

PREPARED BY: KND		DATE: 06/25	
REVIEWED BY: REK		DATE: 06/25	

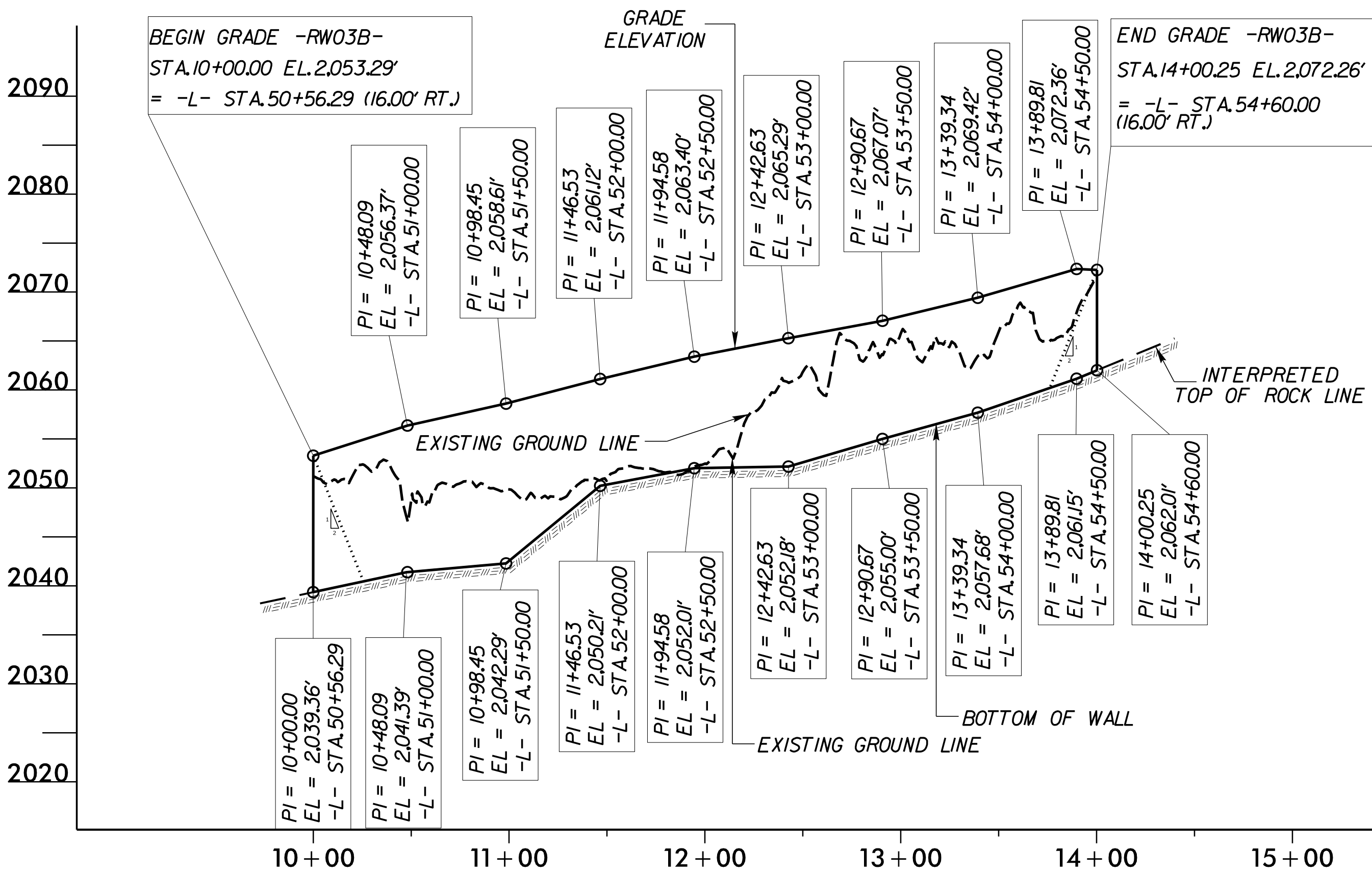
<div>Prepared in the Office of:</div> <div><div><div>CGE</div><div>CAROLINAS GEOTECHNICAL GROUP</div></div><div>1805 SARDIS ROAD NORTH SUITE 100 CHARLOTTE, NC 28270 (980) 339-8684</div></div>		<div>EXISTING RETAINING WALL REPAIR SITE 3</div> <table><tr><td colspan="4">REVISIONS</td><td rowspan="4">SHEET NO. W-12</td></tr><tr><td>NO.</td><td>BY</td><td>DATE</td><td>NO.</td></tr><tr><td>1</td><td></td><td></td><td>3</td></tr><tr><td>2</td><td></td><td></td><td>4</td></tr></table>		REVISIONS				SHEET NO. W-12	NO.	BY	DATE	NO.	1			3	2			4
REVISIONS				SHEET NO. W-12																
NO.	BY	DATE	NO.																	
1			3																	
2			4																	

SITE 3 RETAINING WALL RW03B:



RETAINING WALL RW03B – PLAN

NOT TO SCALE

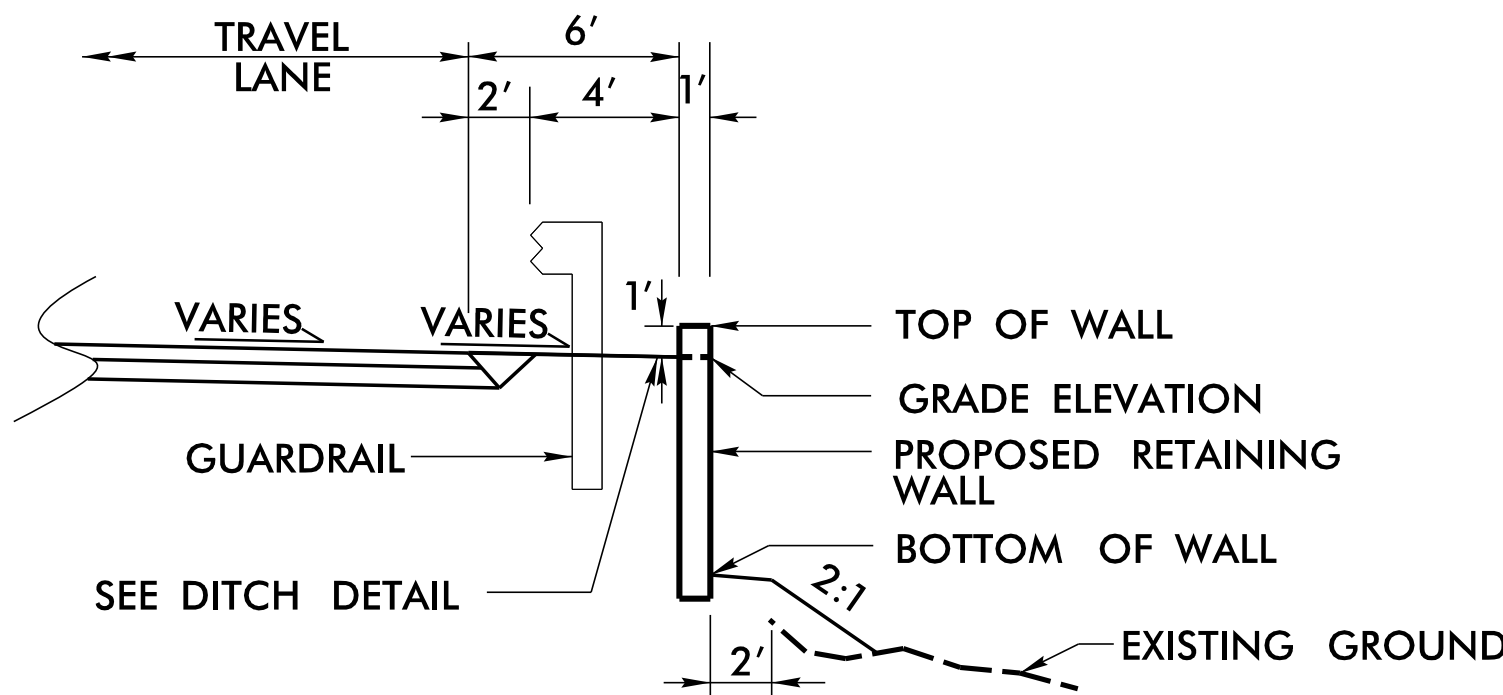


RETAINING WALL RW03B – ENVELOPE

NOT TO SCALE
(LOOKING AT FACE OF WALL)

TEMPORARY WALL AT ENDS OF RETAINING WALL RW03B
SECTION THROUGH RETAINING WALL RW03B STA. 10+00.00
(SECTION AT RW03B STA. 14+00.25 MIRRORED)

NOT TO SCALE
*SEE PLANS FOR FINISHED GRADE



SECTION THROUGH RETAINING WALL

-L- STA. 50+56.29 TO -L- STA. 54+60.00*
-RW03B- STA. 10+00.00 TO -RW03B- STA. 14+00.25*
*SEE TEMPORARY WALL DETAIL AT WALL ENDS

PROJECT NO.: DF18314.2045382

HENDERSON COUNTY

RETAINING WALL RW03B: -RW03B- STA. 10+00.00 TO 14+00.25

SHEET 1 OF 10

PREPARED BY: KND
REVIEWED BY: REK

DATE: 06/25
DATE: 06/25

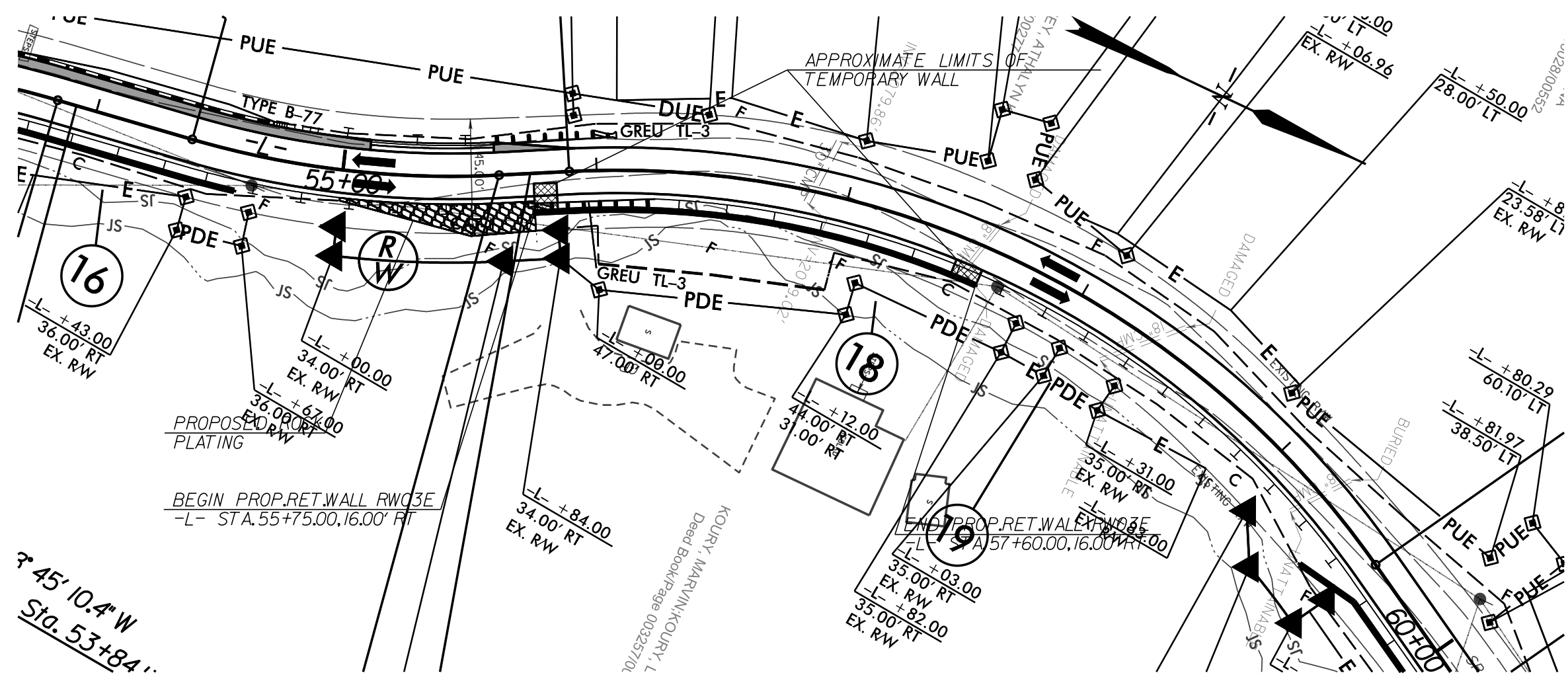
RETAINING WALL RW03B ENVELOPE AND WALL LAYOUT PROVIDED BY RS&H IN MAY 2025 AND MODIFIED BY CG2.

Prepared in the Office of:
CG2 | **CAROLINAS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

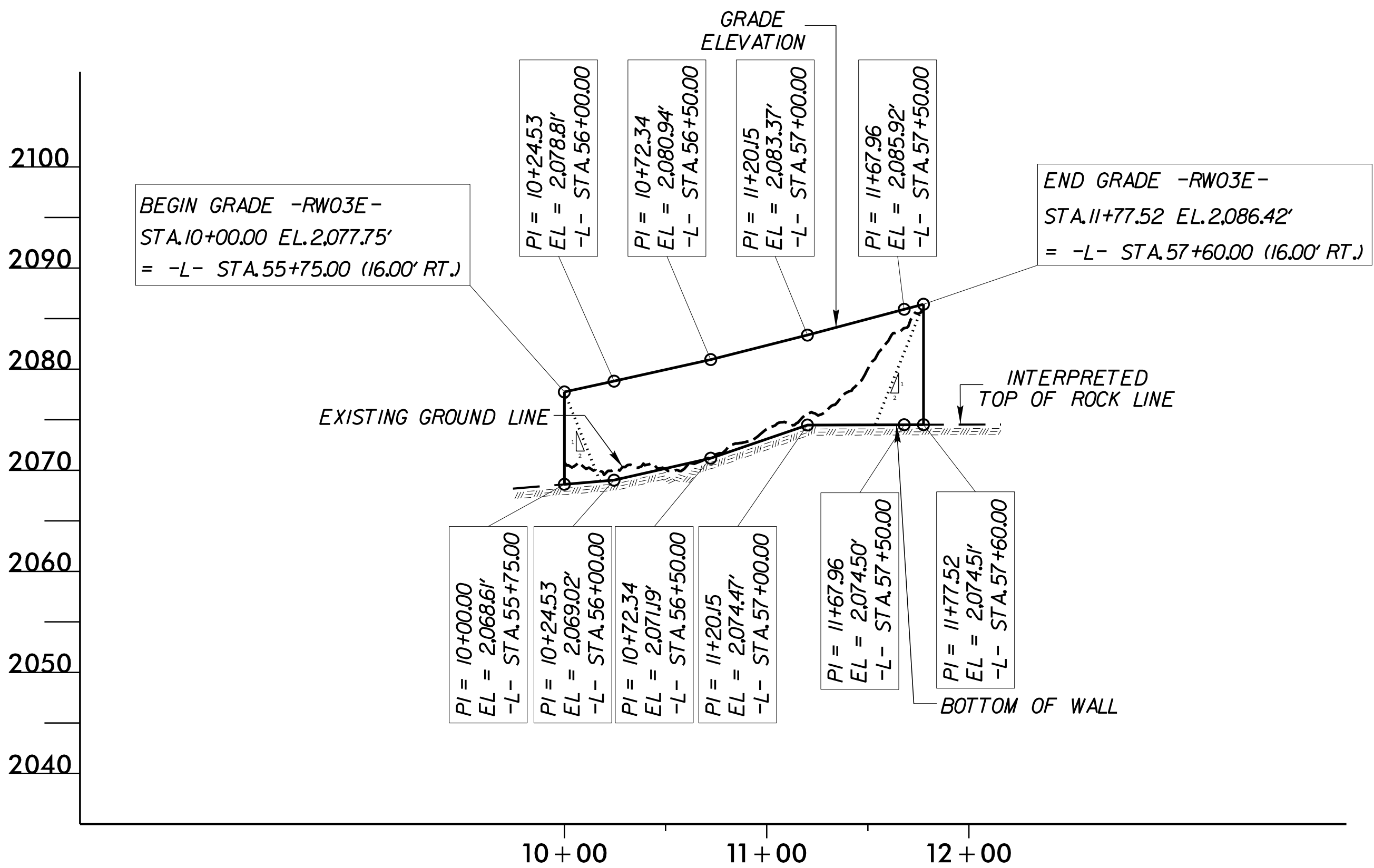
SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

REVISIONS						SHEET NO. W-13
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

SITE 3 RETAINING WALL RW03E:



RETAINING WALL RW03E – PLAN
NOT TO SCALE



RETAINING WALL RW03E – ENVELOPE
NOT TO SCALE
(LOOKING AT FACE OF WALL)

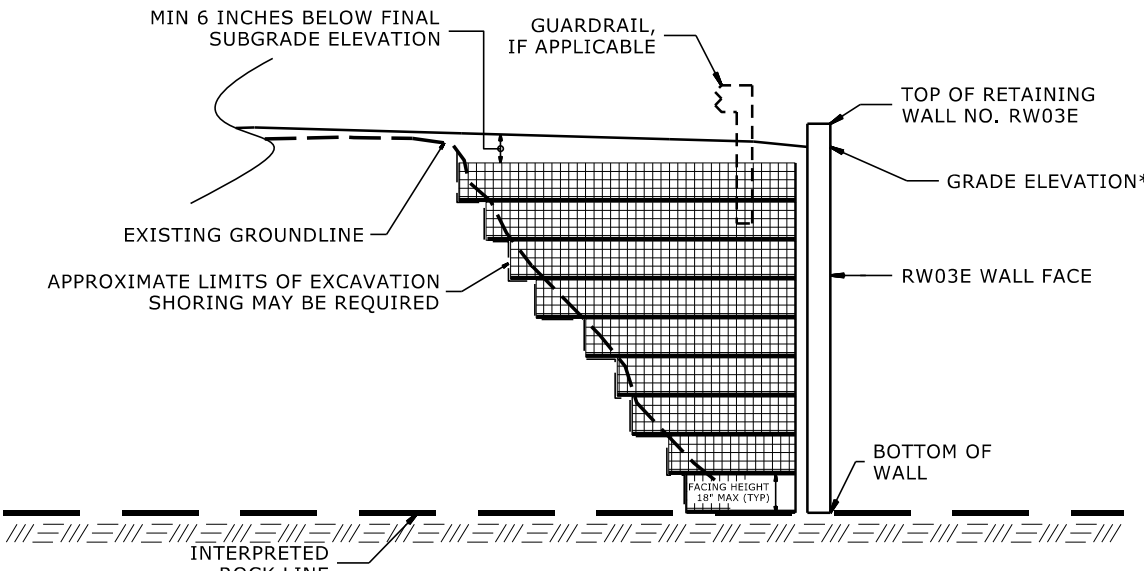
GEOTECHNICAL
ENGINEER

Signed by:
Robert E. Kral
06/25/2025
DATE

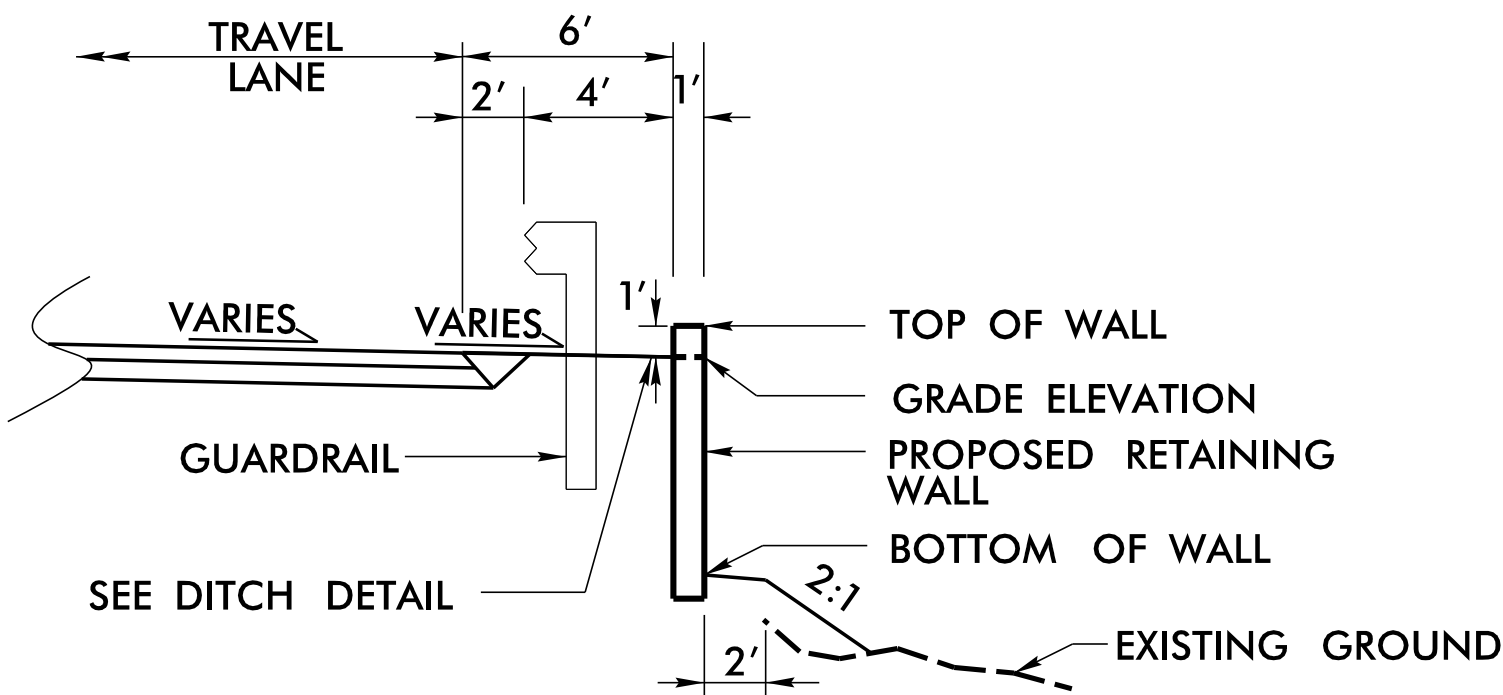
ENGINEER

SIGNATURE
DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



TEMPORARY WALL AT ENDS OF RETAINING WALL RW03E
SECTION THROUGH RETAINING WALL RW03E STA. 10+00.00
(SECTION AT RW03E STA. 11+77.52 MIRRORED)
NOT TO SCALE
*SEE PLANS FOR FINISHED GRADE



SECTION THROUGH RETAINING WALL
-L- STA. 55+75.00 TO -L- STA. 57+60.00*
-RW03E- STA. 10+00.00 TO -RW03E- STA. 11+77.52*
*SEE TEMPORARY WALL DETAIL AT WALL ENDS

PROJECT NO.: DF18314.2045382

HENDERSON COUNTY
RETAINING WALL RW03E: -RW03E- STA. 10+00.00 TO 11+77.52
SHEET 2 OF 10

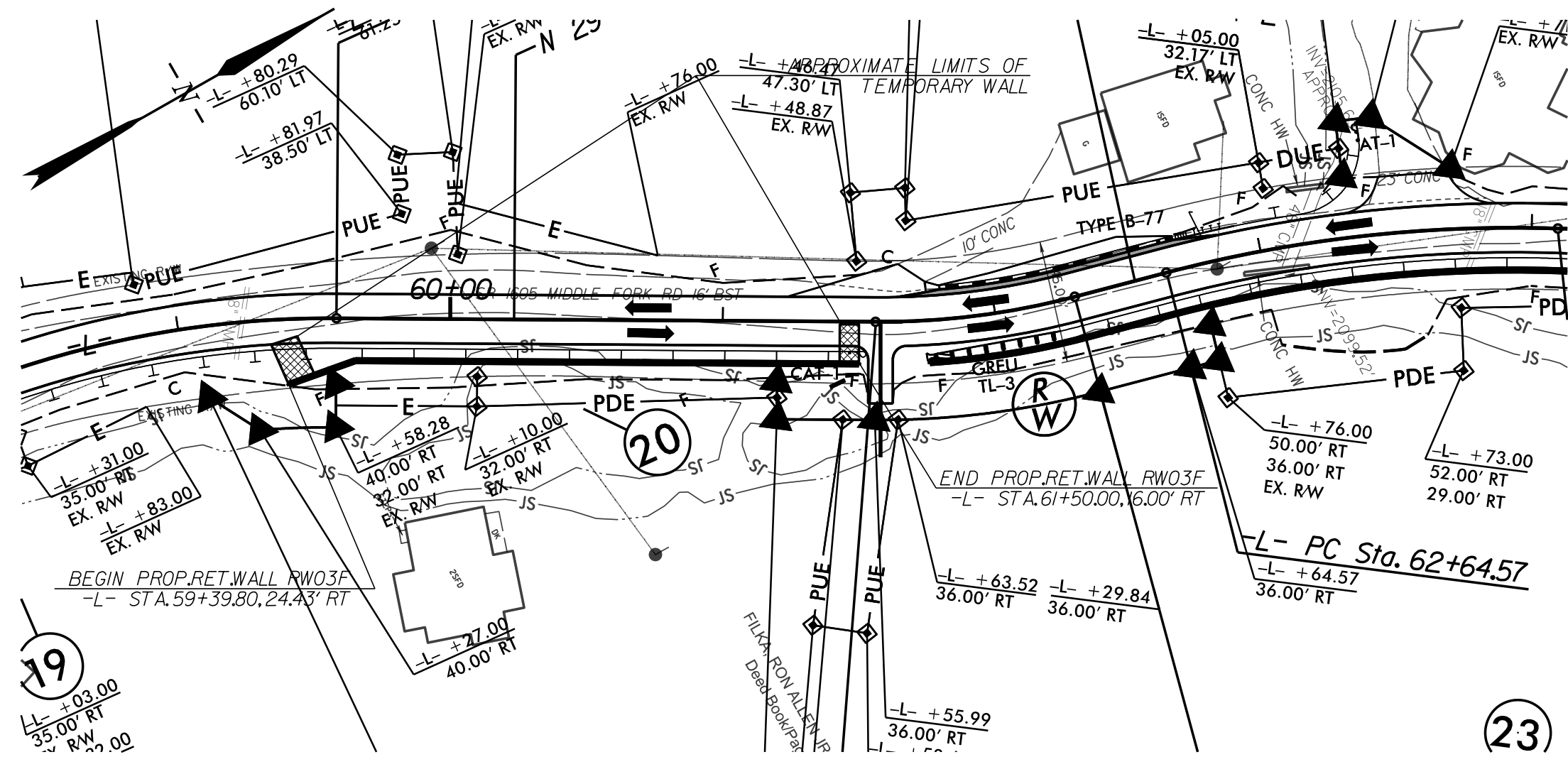
Prepared in the Office of:
**CAROLINAS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

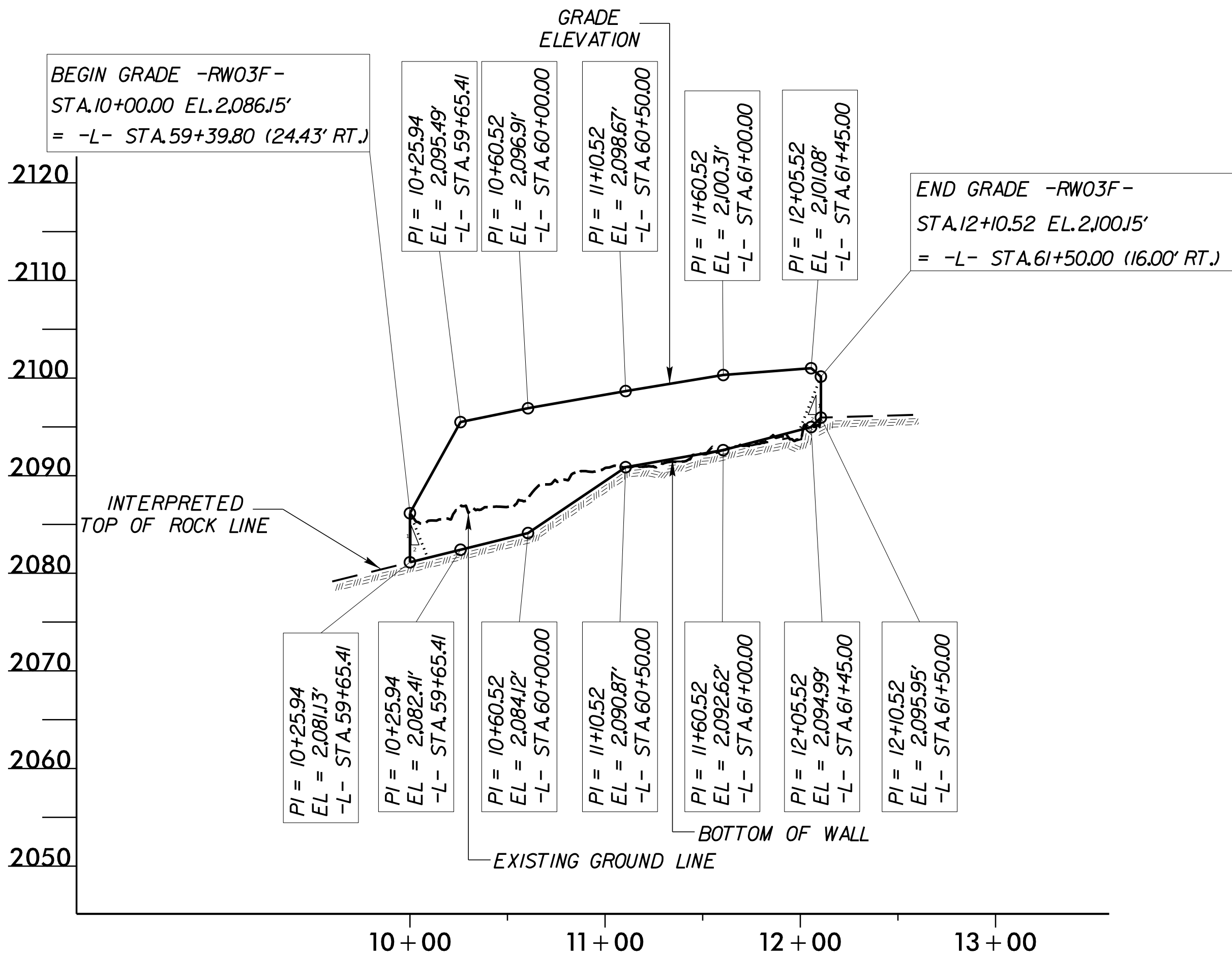
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET
NO.
W-14

SITE 3 RETAINING WALL RW03F:



RETAINING WALL RW03F – PLAN
NOT TO SCALE



RETAINING WALL RW03F – ENVELOPE
NOT TO SCALE
(LOOKING AT FACE OF WALL)

GEOTECHNICAL ENGINEER

ENGINEER

North Carolina Professional Seal
042642
Robert E. Kral

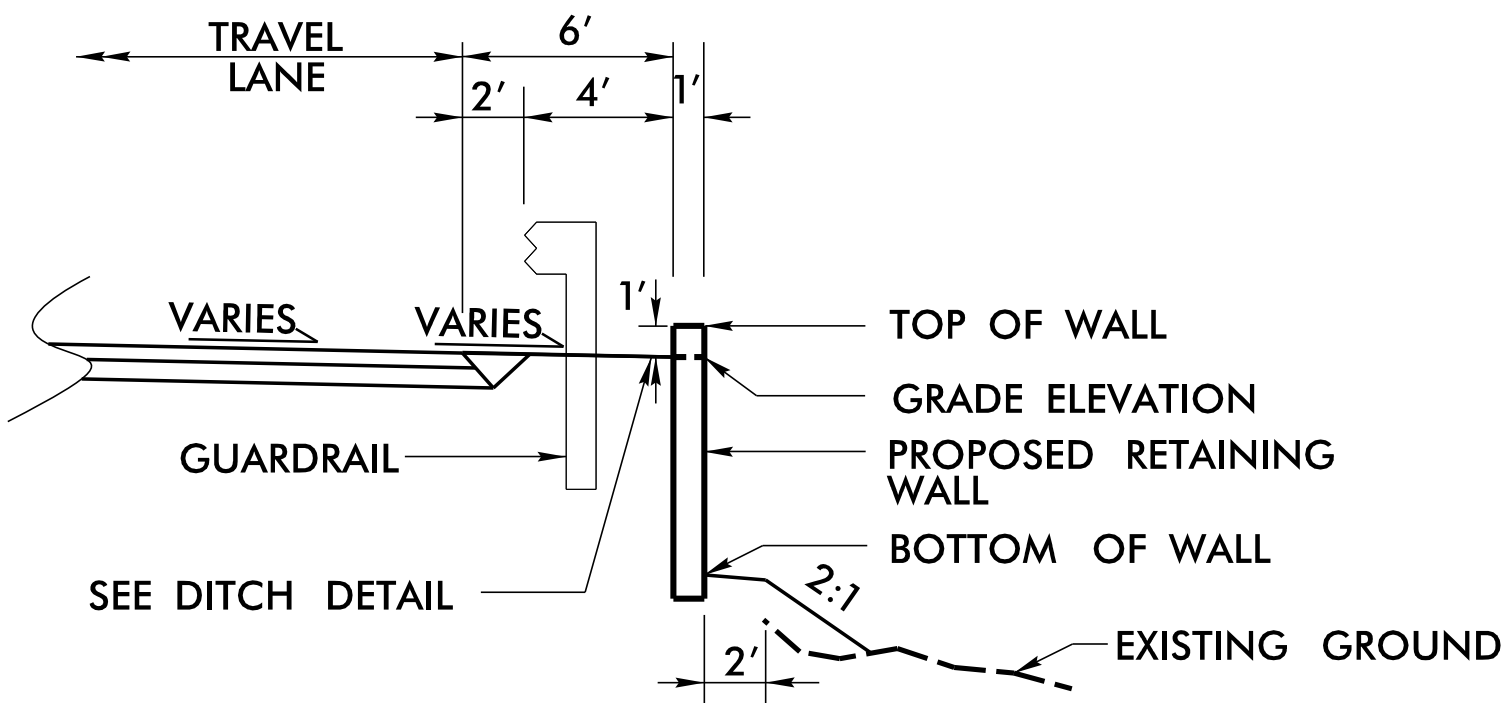
Signed by:
Robert E. Kral
06/25/2025
DATE

06/25/2025
DATE

SIGNATURE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TEMPORARY WALL AT ENDS OF RETAINING WALL RW03F
SECTION THROUGH RETAINING WALL RW03F STA. 10+00.00
(SECTION AT RW03F STA. 12+10.52 MIRRORED)
NOT TO SCALE
*SEE PLANS FOR FINISHED GRADE



SECTION THROUGH RETAINING WALL
-L- STA. 59+39.80 TO -L- STA. 61+50.00*
-RW03F- STA. 10+00.00 TO -RW03F- STA. 12+10.52*
*SEE TEMPORARY WALL DETAIL AT WALL ENDS

PROJECT NO.: DF18314.2045382

HENDERSON COUNTY

RETAINING WALL RW03F: -RW03F- STA. 10+00.00 TO 12+10.52

SHEET 3 OF 10

PREPARED BY: KND
REVIEWED BY: REK

DATE: 06/25
DATE: 06/25

RETAINING WALL RW03F ENVELOPE AND WALL LAYOUT PROVIDED BY RS&H IN MAY 2025 AND MODIFIED BY CG2.

Prepared in the Office of:

CG2

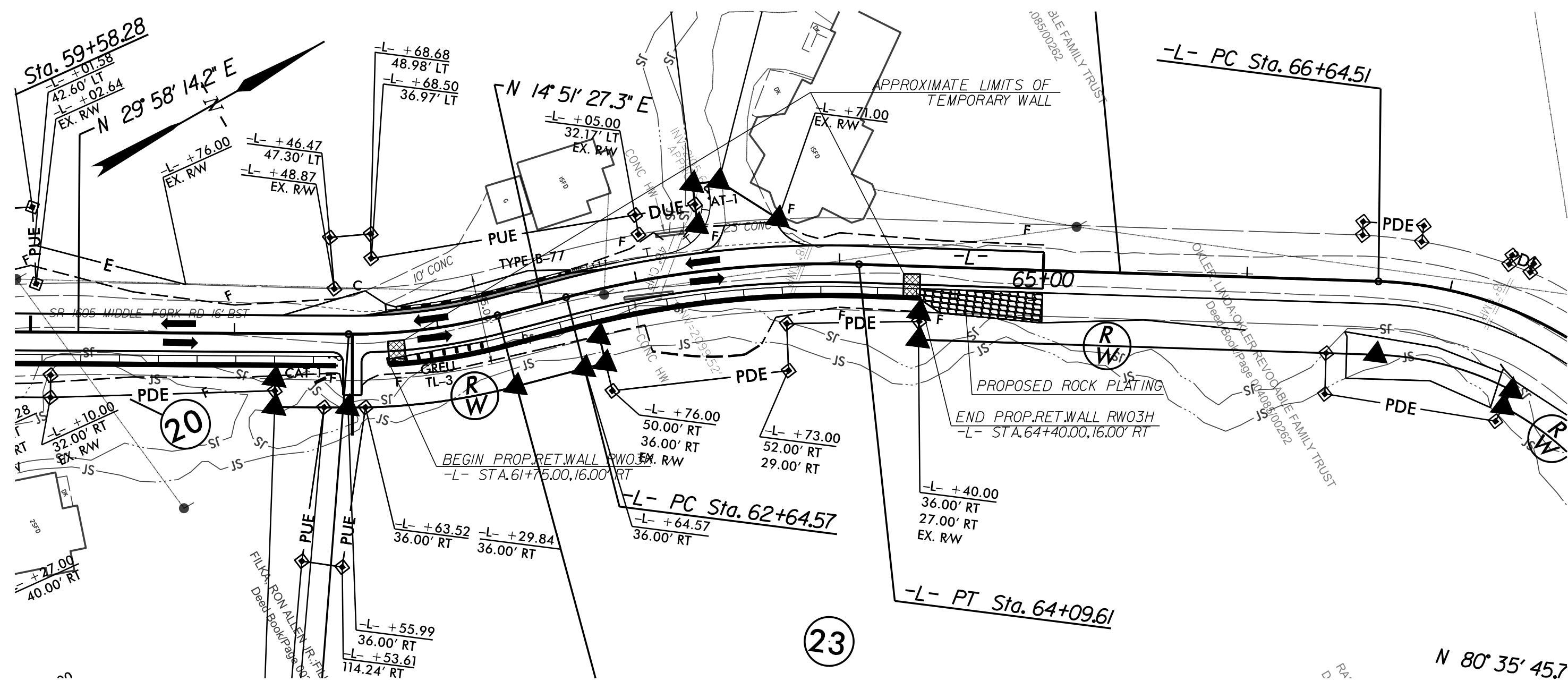
CAROLINAS
GEOTECHNICAL
GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

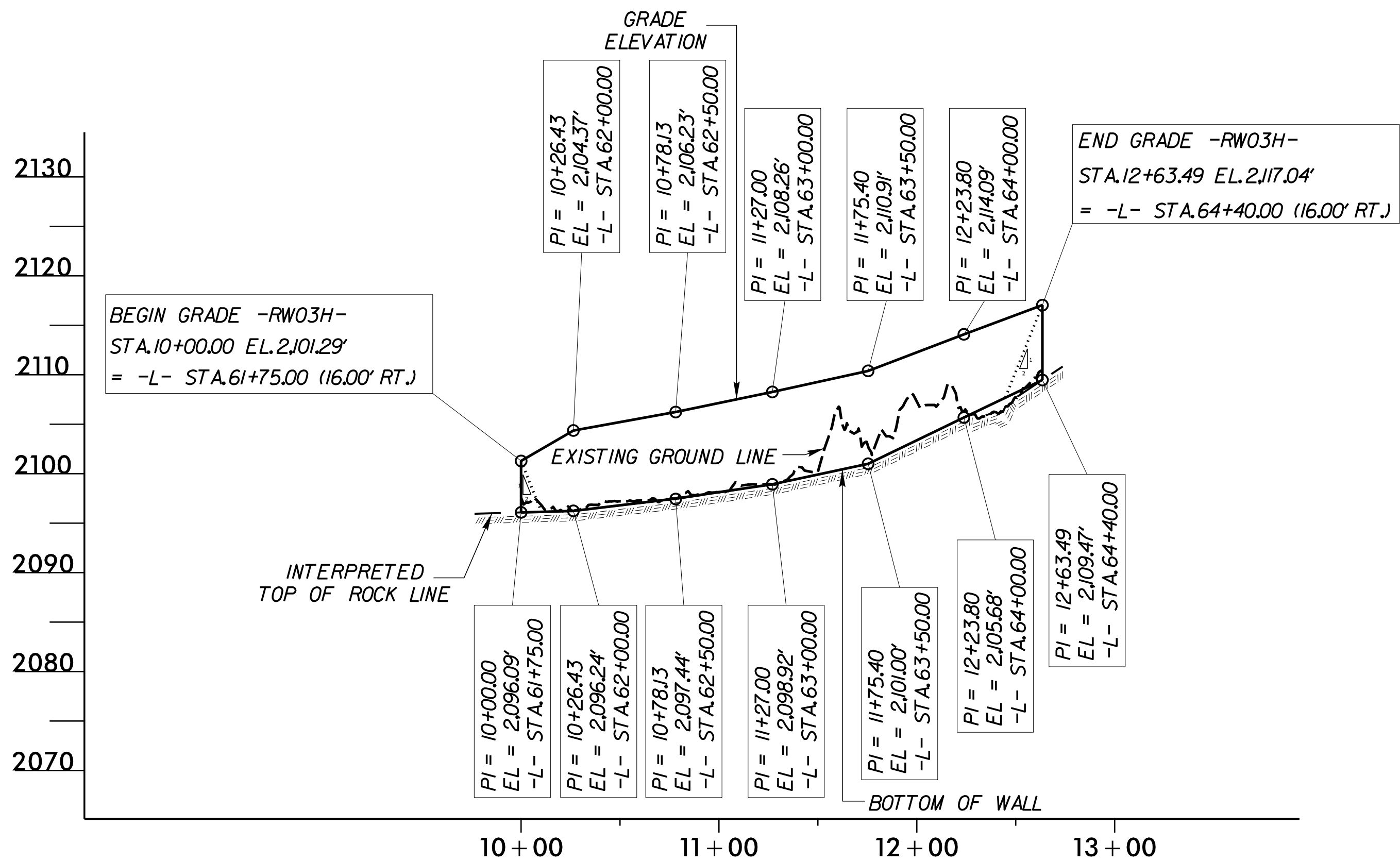
SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

REVISIONS						SHEET NO. W-15
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

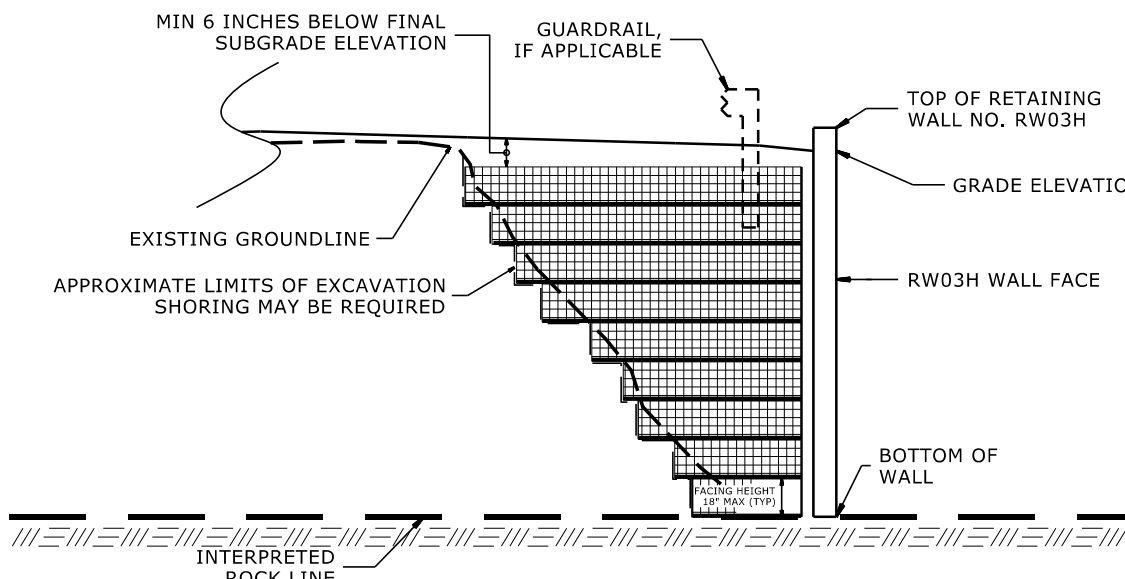
SITE 3 RETAINING WALL RW03H:



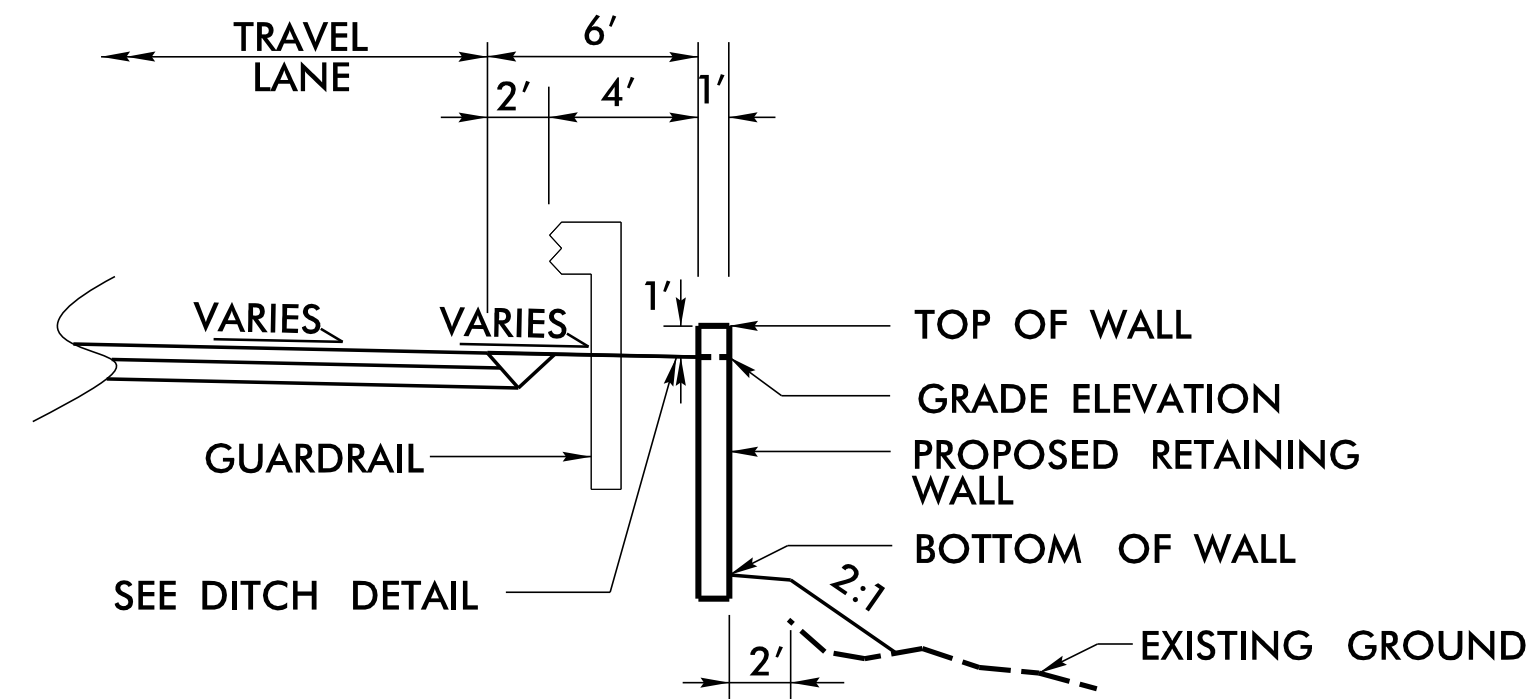
RETAINING WALL RW03H – PLAN
NOT TO SCALE



RETAINING WALL RW03H – ENVELOPE
NOT TO SCALE
(LOOKING AT FACE OF WALL)



TEMPORARY WALL AT ENDS OF RETAINING WALL RW03H
SECTION THROUGH RETAINING WALL RW03H STA. 10+00.00
(SECTION AT RW03H STA. 12+63.49 MIRRORED)
NOT TO SCALE
*SEE PLANS FOR FINISHED GRADE



SECTION THROUGH RETAINING WALL
-L- STA. 61+75.00 TO -L- STA. 64+40.00*
-RW03H- STA. 10+00.00 TO -RW03H- STA. 12+63.49*
*SEE TEMPORARY WALL DETAIL AT WALL ENDS

PROJECT NO.: DF18314.2045382
HENDERSON COUNTY
RETAINING WALL RW03H: -RW03H- STA. 10+00.00 TO 12+63.49
SHEET 4 OF 10

Prepared in the Office of:

CG2 | **CAROLINAS GEOTECHNICAL GROUP**

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

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

SHEET NO. W-16

SOLDIER PILE RETAINING WALL RW03B			
STA. -RW03B-	GRADE ELEVATION (FT)	PROP. BOTTOM OF WALL ELEVATION* (FT)	WALL DESIGN HEIGHT "H" (FT)
10+00.00	2,053.29	2,039.36	13.93
10+48.09	2,056.37	2,041.39	14.98
10+98.45	2,058.61	2,042.29	16.32
11+46.53	2,061.12	2,050.21	10.91
11+94.58	2,063.40	2,052.01	11.39
12+42.63	2,065.29	2,052.18	13.11
12+90.67	2,067.07	2,055.00	12.07
13+39.34	2,069.42	2,057.68	11.74
13+89.81	2,072.36	2,061.15	11.21
14+00.25	2,072.26	2,062.01	10.25

*BOTTOM OF WALL ELEVATION INTERPRETED FROM APPROXIMATE TOP OF ROCK LINE AS INDICATED BY THE BORINGS.

SOLDIER PILE RETAINING WALL RW03E			
STA. -RW03E-	GRADE ELEVATION (FT)	PROP. BOTTOM OF WALL ELEVATION* (FT)	WALL DESIGN HEIGHT "H" (FT)
10+00.00	2,077.75	2,068.61	9.14
10+24.53	2,078.81	2,069.02	9.79
10+72.34	2,080.94	2,071.19	9.75
11+20.15	2,083.37	2,074.47	8.90
11+67.96	2,085.92	2,074.50	11.42
11+77.52	2,086.42	2,074.51	11.91

*BOTTOM OF WALL ELEVATION INTERPRETED FROM APPROXIMATE TOP OF ROCK LINE AS INDICATED BY THE BORINGS.

SOLDIER PILE RETAINING WALL RW03F			
STA. -RW03F-	GRADE ELEVATION (FT)	PROP. BOTTOM OF WALL ELEVATION* (FT)	WALL DESIGN HEIGHT "H" (FT)
10+00.00	2,086.15	2,081.13	5.02
10+25.94	2,095.49	2,082.41	13.08
10+60.52	2,096.91	2,084.12	12.79
11+10.52	2,098.67	2,090.87	7.80
11+60.52	2,100.31	2,092.62	7.69
12+05.52	2,101.08	2,094.99	6.09
12+10.52	2,100.15	2,095.95	4.20

*BOTTOM OF WALL ELEVATION INTERPRETED FROM APPROXIMATE TOP OF ROCK LINE AS INDICATED BY THE BORINGS.

SOLDIER PILE RETAINING WALL RW03H			
STA. -RW03H-	GRADE ELEVATION (FT)	PROP. BOTTOM OF WALL ELEVATION* (FT)	WALL DESIGN HEIGHT "H" (FT)
10+00.00	2,101.29	2,096.09	5.20
10+26.43	2,104.37	2,096.24	8.13
10+78.13	2,106.23	2,097.44	8.79
11+27.00	2,108.26	2,098.92	9.34
11+75.40	2,110.91	2,101.00	9.91
12+23.80	2,114.09	2,105.68	8.41
12+63.49	2,117.04	2,109.47	7.57

*BOTTOM OF WALL ELEVATION INTERPRETED FROM APPROXIMATE TOP OF ROCK LINE AS INDICATED BY THE BORINGS.

NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS WITH PANEL KEY SPECIAL PROVISION.

FOR ANCHORED RETAINING WALLS, SEE ANCHORED RETAINING WALLS WITH PANEL KEY SPECIAL PROVISION.

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

DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H.

USE A SOLDIER PILE RETAINING WALL WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H.

AT THE CONTRACTOR'S OPTION, USE SOLDIER PILE RETAINING WALL FOR RETAINING WALL NO. RW03B. FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS WITH PANEL KEY SPECIAL PROVISION.

AT THE CONTRACTOR'S OPTION, USE SOIL NAIL WALL ON MICROPILE SUPPORTED GRADE BEAM FOR RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H. FOR SOIL NAIL SHOULDER BUILD-OUT, SEE SOIL NAIL RETAINING WALLS SPECIAL PROVISION. FOR MICROPILE 2'-6" GRADE BEAM, SEE SLOPE STABILIZATION GRADE BEAM PLANS AND MICROPILES SPECIAL PROVISION. FOR SOIL NAIL WALL ON MICROPILE SUPPORTED GRADE BEAM, SEE SHEET W-20.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H, 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 NO. RW03B, RW03E, RW03F, AND RW03H FOR THE FOLLOWING:

- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 75 YEARS
- 3) MINIMUM WALL EMBEDMENT DEPTH = 6 INCHES INTO CIP REINFORCED CONCRETE LEVELING PAD
- 4) ASSUMED BORROW MATERIAL PARAMETERS, SEE SECTION 1018 OF THE STANDARD SPECIFICATIONS
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 PSF
- 5) IN-SITU ASSUMED MATERIAL PARAMETERS RESIDUAL SOIL:
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 PSF
- 6) IN-SITU ASSUMED MATERIAL PARAMETERS CRYSTALLINE ROCK:
UNIT WEIGHT, γ = 170 PCF
FRICTION ANGLE, ϕ = 34 DEGREES
COHESION, c = 1,000 PSF

THE MINIMUM WALL EMBEDMENT FOR RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H INCLUDES EMBEDMENT FOR SCOUR.

DESIGN RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H FOR 300 LB/FT HORIZONTAL TRAFFIC IMPACT LOAD.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH GROUND ANCHORS FOR RETAINING WALL NO. RW03B.

KEY THE PRECAST CONCRETE PANELS MINIMUM OF 6 INCHES INTO THE CIP REINFORCED CONCRETE LEVELING PAD AT RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H.

IF THE CIP REINFORCED CONCRETE LEVELING PAD DOES NOT EXTEND A MINIMUM OF 8 INCHES BEYOND THE FACES OF THE SOLDIER PILES ON ALL SIDES, PROVIDE DOWEL REINFORCEMENT AT THE BASE OF THE LEVELING PAD INTO COMPETENT ROCK.

CAST 2 INCH DIAMETER SCHEDULE 40 PVC DRAIN PIPE WEEP HOLES. SPACING OF WEEP HOLES SHALL NOT EXCEED 10 FEET. ANCHOR 6 INCH BY 6 INCH GALVANIZED STEEL WIRE MESH, REINFORCEMENT WWR 4 X 4-W4.0 X W4.0 FIRMLY TO BACK OF PANEL AT THE END OF THE PVC WEEP HOLE PIPE.

"TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY OR TRAFFIC CONTROL PLANS.

<div>GEOTECHNICAL ENGINEER</div> <div><div><div>Seal</div><div><div>North Carolina</div><div>Professional Engineer</div><div>Seal</div><div>042642</div><div>Robert E. Kral</div></div></div></div> <div><div>Signed by:</div><div><div>Robert E. Kral</div><div>AAFBFF73C5E4B1</div></div></div> <div><div>SIGNATURE</div><div>DATE</div></div>	<div>ENGINEER</div> <div><div>SIGNATURE</div><div>DATE</div></div>
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

TOTAL STRUCTURE QUANTITIES - ANCHORED RETAINING WALLS		
RW03B	ANCHORED RETAINING WALLS WITH PANEL KEY	5,150 SF

TOTAL STRUCTURE QUANTITIES - SOLDIER PILE RETAINING WALLS		
RW03E	SOLDIER PILE RETAINING WALLS WITH PANEL KEY	1,750 SF
RW03F	SOLDIER PILE RETAINING WALLS WITH PANEL KEY	1,930 SF
RW03H	SOLDIER PILE RETAINING WALLS WITH PANEL KEY	2,260 SF
TOTAL SOLDIER PILE RETAINING WALLS WITH PANEL KEY		5,940 SF

PROJECT NO.: DF18314.2045382
HENDERSON COUNTY

RETAINING WALL RW03B: -RW03B- STA. 10+00.00 TO 14+00.25
RETAINING WALL RW03E: -RW03E- STA. 10+00.00 TO 11+77.52
RETAINING WALL RW03F: -RW03F- STA. 10+00.00 TO 12+10.52
RETAINING WALL RW03H: -RW03H- STA. 10+00.00 TO 12+63.49
SHEET 5 OF 10

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:

CGR

CAROLINAS GEOTECHNICAL GROUP

1805 SARDIS ROAD NORTH

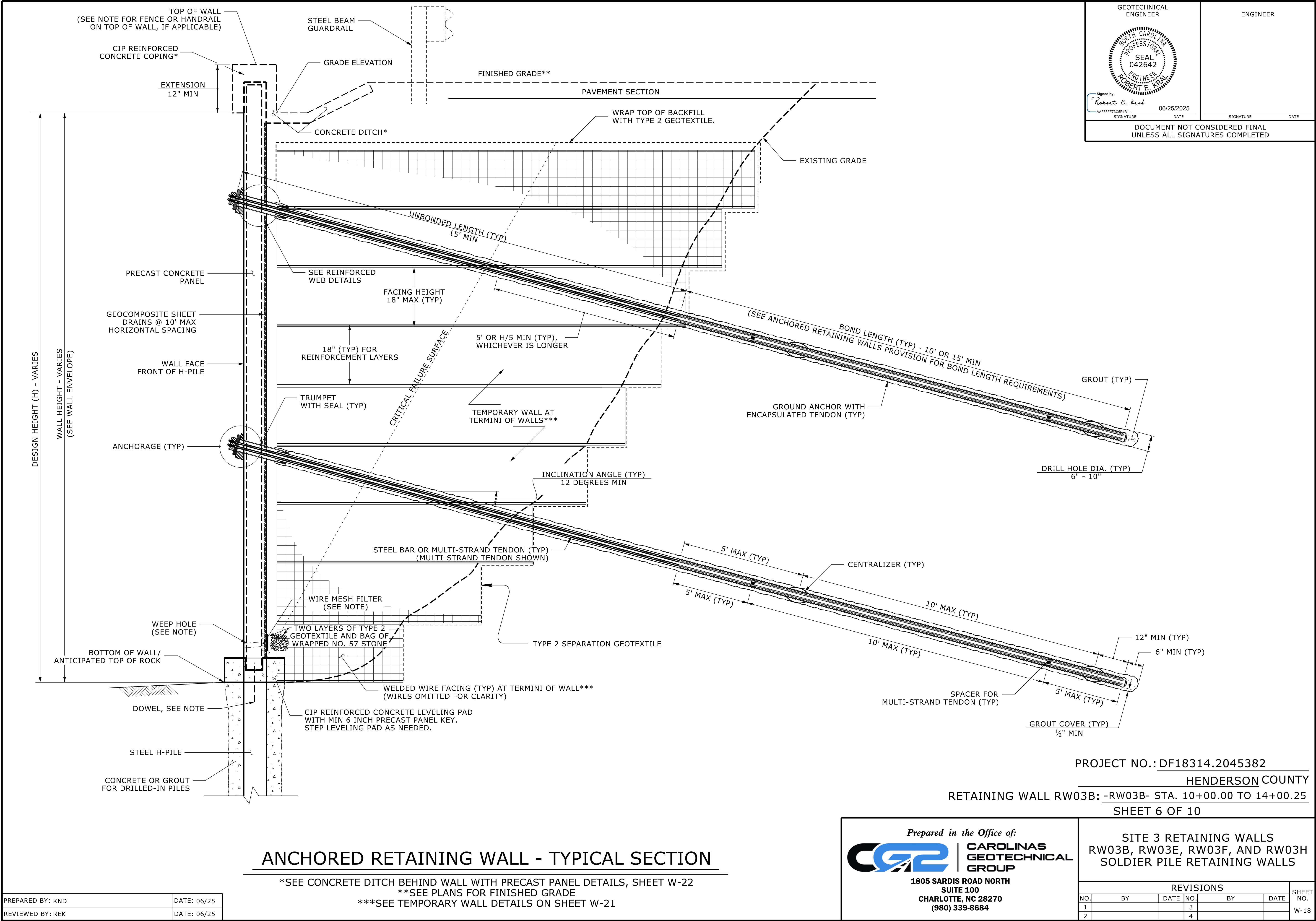
SUITE 100

CHARLOTTE, NC 28270


(980) 339-8684

SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

REVISIONS						SHEET NO. W-17
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



GEOTECHNICAL
ENGINEER



ENGINEER

Signed by:
Robert E. Kral
AAFBFF73CE4B1
SIGNATURE

06/25/2025
DATE

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED


ANCHORED RETAINING WALL - TYPICAL SECTION

*SEE CONCRETE DITCH BEHIND WALL WITH PRECAST PANEL DETAILS, SHEET W-22
**SEE PLANS FOR FINISHED GRADE
***SEE TEMPORARY WALL DETAILS ON SHEET W-21

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

PROJECT NO.: DF18314.2045382
HENDERSON COUNTY
RETAINING WALL RW03B: -RW03B- STA. 10+00.00 TO 14+00.25
SHEET 6 OF 10

Prepared in the Office of:



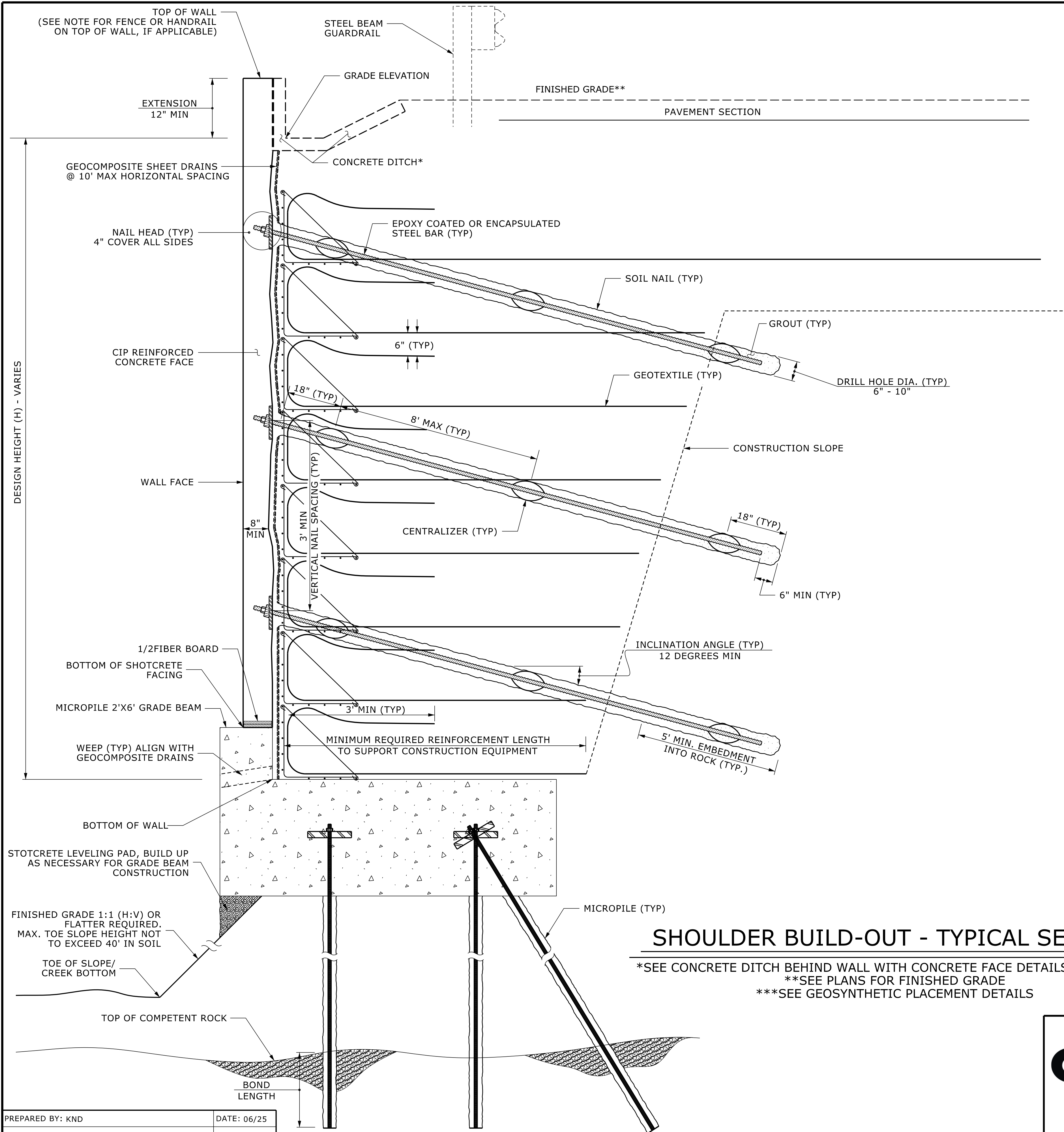
CARLINAS
GEOTECHNICAL
GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

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

SHEET
NO.
W-18



GEOTECHNICAL ENGINEER

ENGINEER

North Carolina Professional Seal
042642
Robert E. Kral
ENGINEER

Signed by:
Robert E. Kral
AAFBFF73C5E4B
SIGNATURE

06/25/2025
DATE

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

- NOTES:**
- FOR SOIL NAIL SHOULDER BUILD-OUT, SEE SOIL NAIL RETAINING WALLS SPECIAL PROVISION.
 - FOR MICROPILE 2'6' GRADE BEAM, SEE SLOPE STABILIZATION GRADE BEAM PLANS AND MICROPILES SPECIAL PROVISION.
 - FOR MICROPILES, SEE MICROPILES SPECIAL PROVISION.
 - ESTABLISH THE BACK OF SOIL NAIL WALL FACE AT A 3.5' OR GREATER OFFSET FROM THE BACK OF THE EXISTING OR PROPOSED GUARDRAIL POST.
 - EXTEND THE TOP TWO LAYERS OF GEOTEXTILE TO CENTERLINE OF ROAD.
 - ESTIMATED SOIL NAIL AVERAGE LENGTH = 25'
 - ESTIMATED MICROPILE AVERAGE LENGTH = 20'
 - MINIMUM MICROPILE ROCK BOND LENGTH = 5'
 - MINIMUM SOIL NAIL ROCK BOND LENGTH = 5'
 - MINIMUM OVERALL SOIL NAIL AND MICROPILE LENGTH = 10'
 - AT THE TERMINI OF RETAINING WALLS NO. RW03B, RW03E, RW03F, AND RW03H, PROVIDE WELDED WIRE MESH FACING INSTALLED PERPENDICULAR TO THE WALL FACE. SEE SHEET W-21.

SHOULDER BUILD-OUT - TYPICAL SECTION

*SEE CONCRETE DITCH BEHIND WALL WITH CONCRETE FACE DETAILS, SHEET W-22
**SEE PLANS FOR FINISHED GRADE
***SEE GEOSYNTHETIC PLACEMENT DETAILS

PROJECT NO.: DF18314.2045382
HENDERSON COUNTY

RETAINING WALL RW03B: -RW03B- STA. 10+00.00 TO 14+00.25
RETAINING WALL RW03E: -RW03E- STA. 10+00.00 TO 11+77.52
RETAINING WALL RW03F: -RW03F- STA. 10+00.00 TO 12+10.52
RETAINING WALL RW03H: -RW03H- STA. 10+00.00 TO 12+63.49

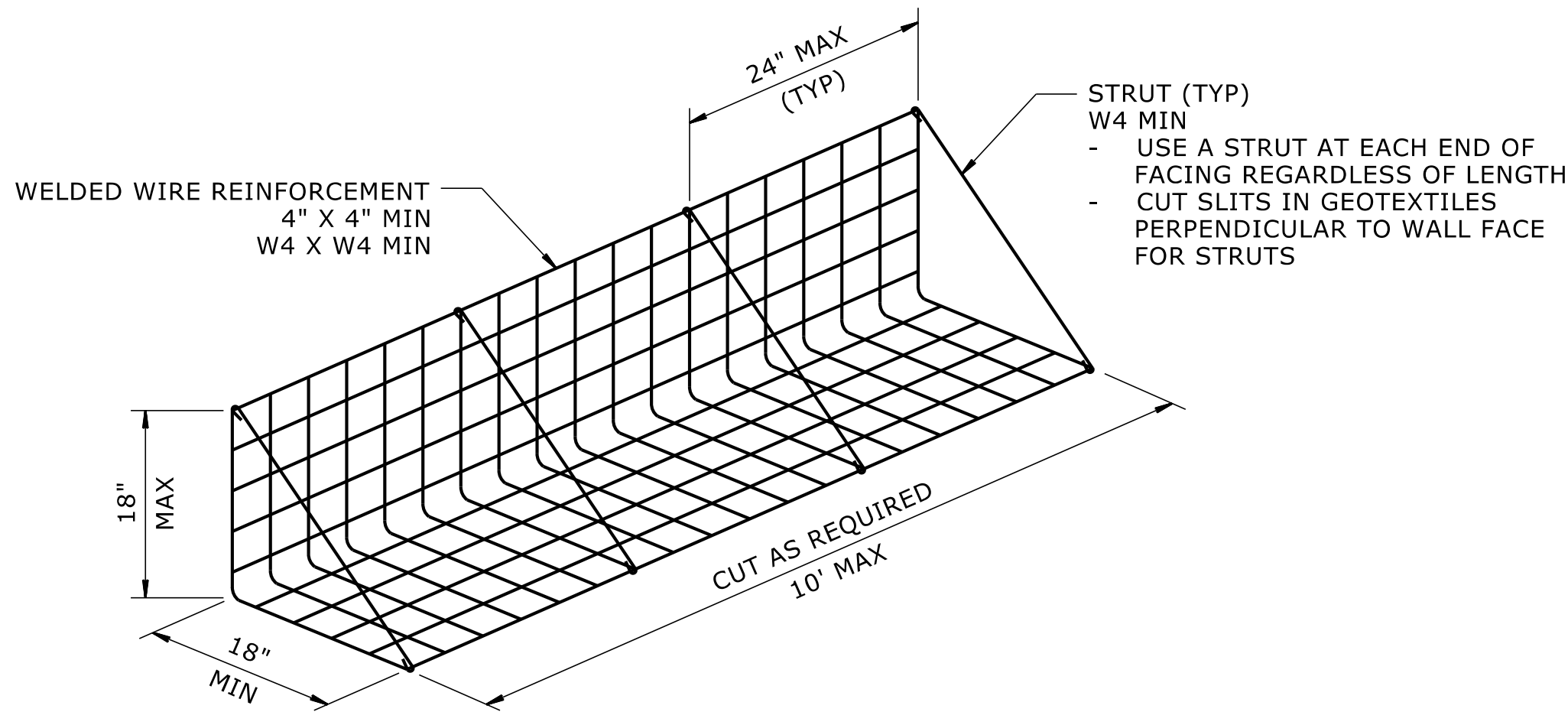
SHEET 8 OF 10

Prepared in the Office of:

CAROLINAS
GEOTECHNICAL
GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

REVISIONS						SHEET NO. W-20
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

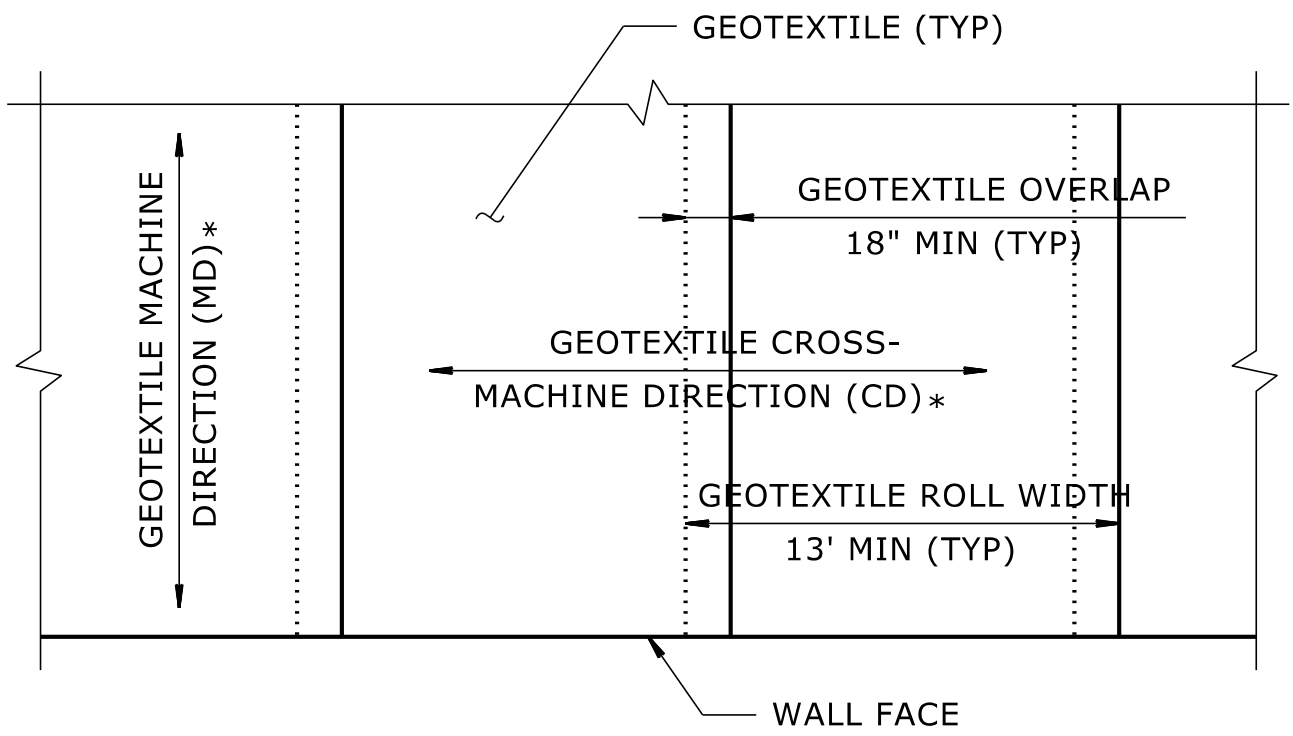


TEMPORARY WALL FACING DETAIL

NOTES:

- FOR TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 PSF
- DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- WALL EMBEDMENT IS NOT REQUIRED FOR TEMPORARY WALLS ON ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.

ESTIMATED TEMPORARY WALL QUANTITIES	
TEMPORARY WALLS RW03B	350 SQ FT
TEMPORARY WALLS RW03E	250 SQ FT
TEMPORARY WALLS RW03F	75 SQ FT
TEMPORARY WALLS RW03H	125 SQ FT

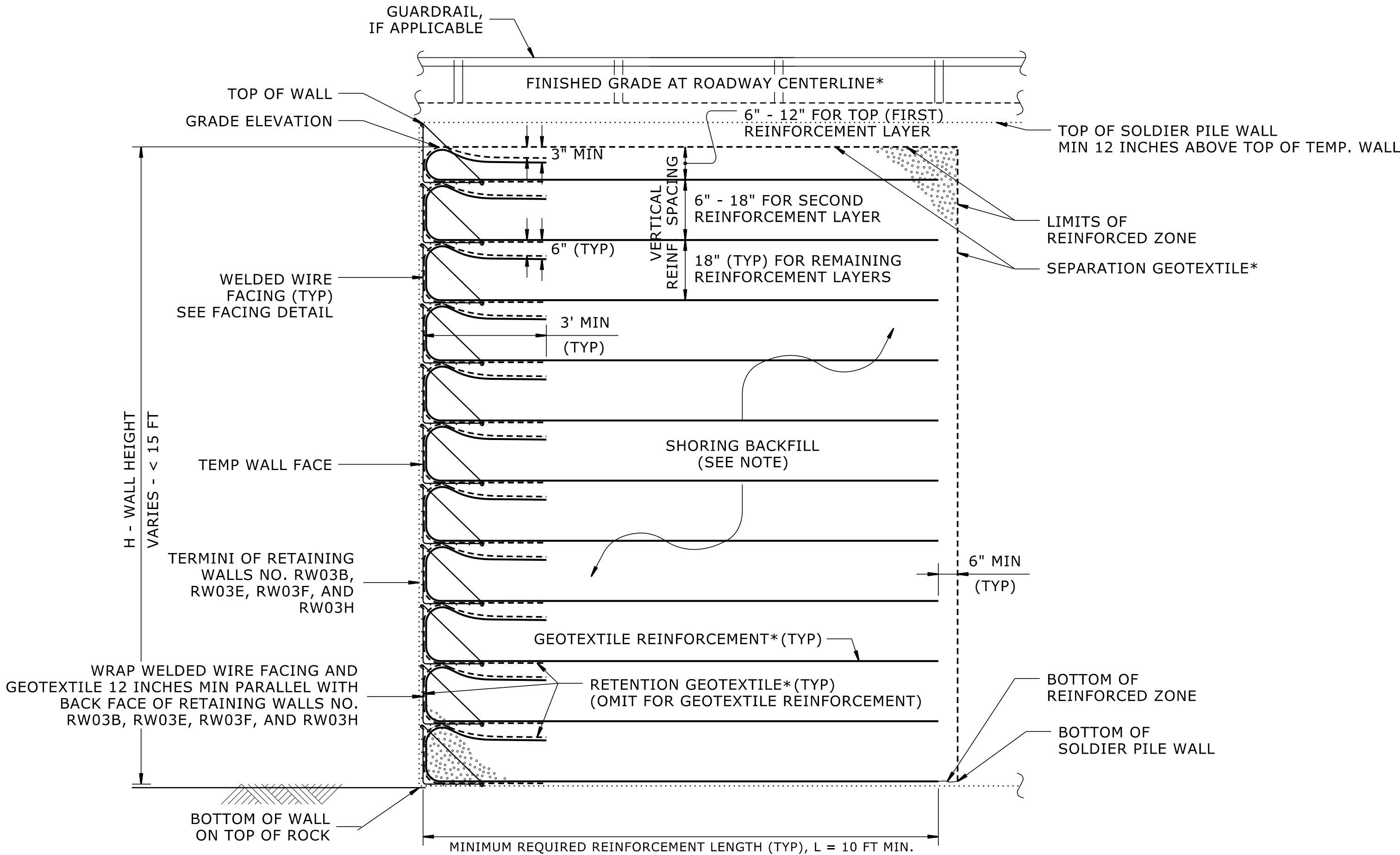


TEMPORARY WALL GEOTEXTILE PLACEMENT DETAIL

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

PLAN VIEW

*SEE NOTE



TEMPORARY WALL DETAIL

LOOKING AT FACE OF BEGINNING RETAINING WALLS
NO. RW03B, RW03E, RW03F AND RW03H
(MIRRORED FOR END OF WALL)
*SEE GEOSYNTHETIC PLACEMENT DETAILS
**SEE ROADWAY PLANS FOR FINISHED GRADE

RETAINING WALL RW03B: -RW03B- STA. 10+00.00 TO 14+00.25
RETAINING WALL RW03E: -RW03E- STA. 10+00.00 TO 11+77.52
RETAINING WALL RW03F: -RW03F- STA. 10+00.00 TO 12+10.52
RETAINING WALL RW03H: -RW03H- STA. 10+00.00 TO 12+63.49

PROJECT NO.: DF18314.2045382

HENDERSON COUNTY

SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-21
2			4			

GEOTECHNICAL ENGINEER

Signed by: *Robert E. Kral*
AAFBFF73CE4B
SIGNATURE

06/25/2025
DATE

ENGINEER

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:

CAROLINAS
GEOTECHNICAL
GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

TOTAL STRUCTURE QUANTITIES - CONTRACTORS
OPTION SOLDIER PILE RETAINING WALLS

RW03B	SOLDIER PILE RETAINING WALLS WITH PANEL KEY	5,150 SF
-------	---	----------

TOTAL STRUCTURE QUANTITIES - CONTRACTORS
OPTION SHOULDER BUILD-OUT RW03B

SHOTCRETE	210 CY
REINFORCING STEEL	35,505 LB
MICROPILE, AVERAGE LENGTH	310 EA
MICROPILE, ADDITIONAL LENGTH OVER AVERAGE	0 LF
MICROPILE PROOF TESTS	16 EA
GEOCOMPOSITE DRAINS	525 LF
SOIL NAIL, AVERAGE LENGTH	245 EA
SOIL NAIL, ADDITIONAL LENGTH OVER AVERAGE	0 LF
WIRE BASKET FORMS	380 EA
GEOTEXTILE FOR TEMPORARY WALL	1,650 SY
BORROW	660 CY

TOTAL STRUCTURE QUANTITIES - CONTRACTORS
OPTION SHOULDER BUILD-OUT RW03E

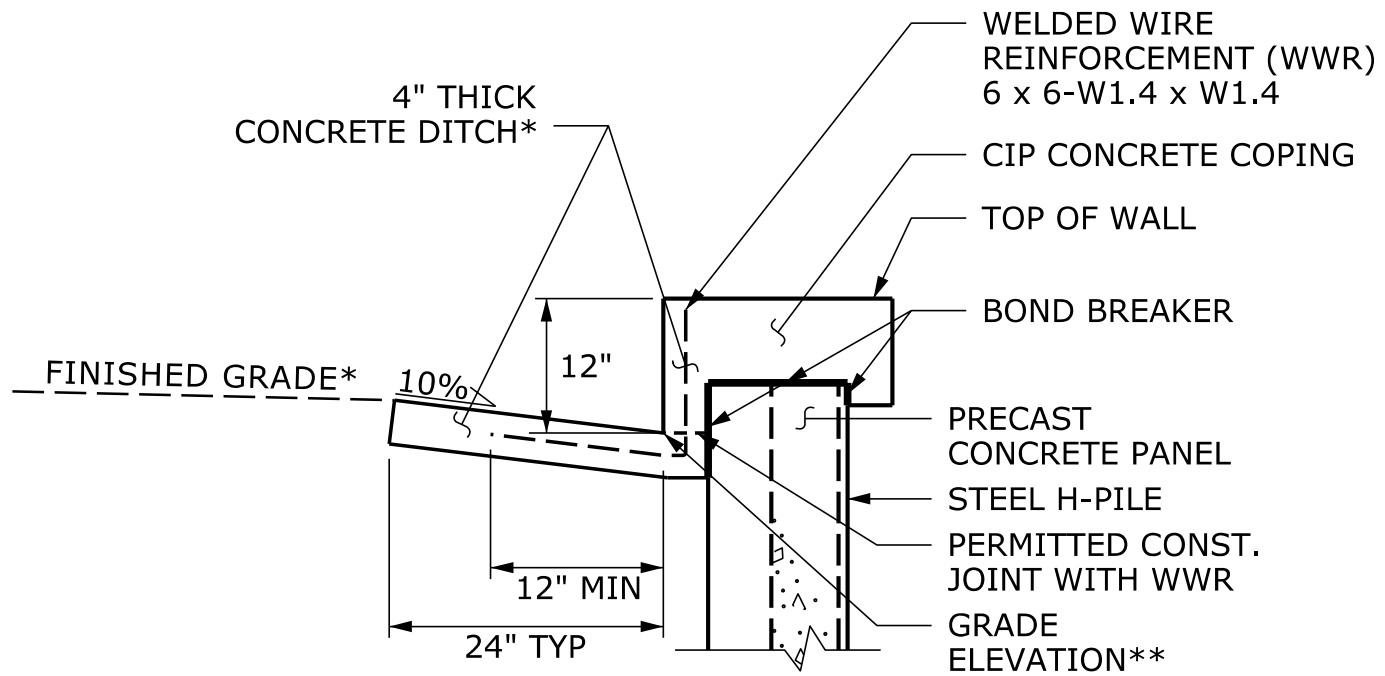
SHOTCRETE	80 CY
REINFORCING STEEL	14,845 LB
MICROPILE, AVERAGE LENGTH	140 EA
MICROPILE, ADDITIONAL LENGTH OVER AVERAGE	0 LF
MICROPILE PROOF TESTS	7 EA
GEOCOMPOSITE DRAINS	195 LF
SOIL NAIL, AVERAGE LENGTH	85 EA
SOIL NAIL, ADDITIONAL LENGTH OVER AVERAGE	0 LF
WIRE BASKET FORMS	135 EA
GEOTEXTILE FOR TEMPORARY WALL	850 SY
BORROW	330 CY

TOTAL STRUCTURE QUANTITIES - CONTRACTORS
OPTION SHOULDER BUILD-OUT RW03F

SHOTCRETE	95 CY
REINFORCING STEEL	17,445 LB
MICROPILE, AVERAGE LENGTH	165 EA
MICROPILE, ADDITIONAL LENGTH OVER AVERAGE	0 LF
MICROPILE PROOF TESTS	9 EA
GEOCOMPOSITE DRAINS	185 LF
SOIL NAIL, AVERAGE LENGTH	95 EA
SOIL NAIL, ADDITIONAL LENGTH OVER AVERAGE	0 LF
WIRE BASKET FORMS	150 EA
GEOTEXTILE FOR TEMPORARY WALL	1,150 SY
BORROW	435 CY

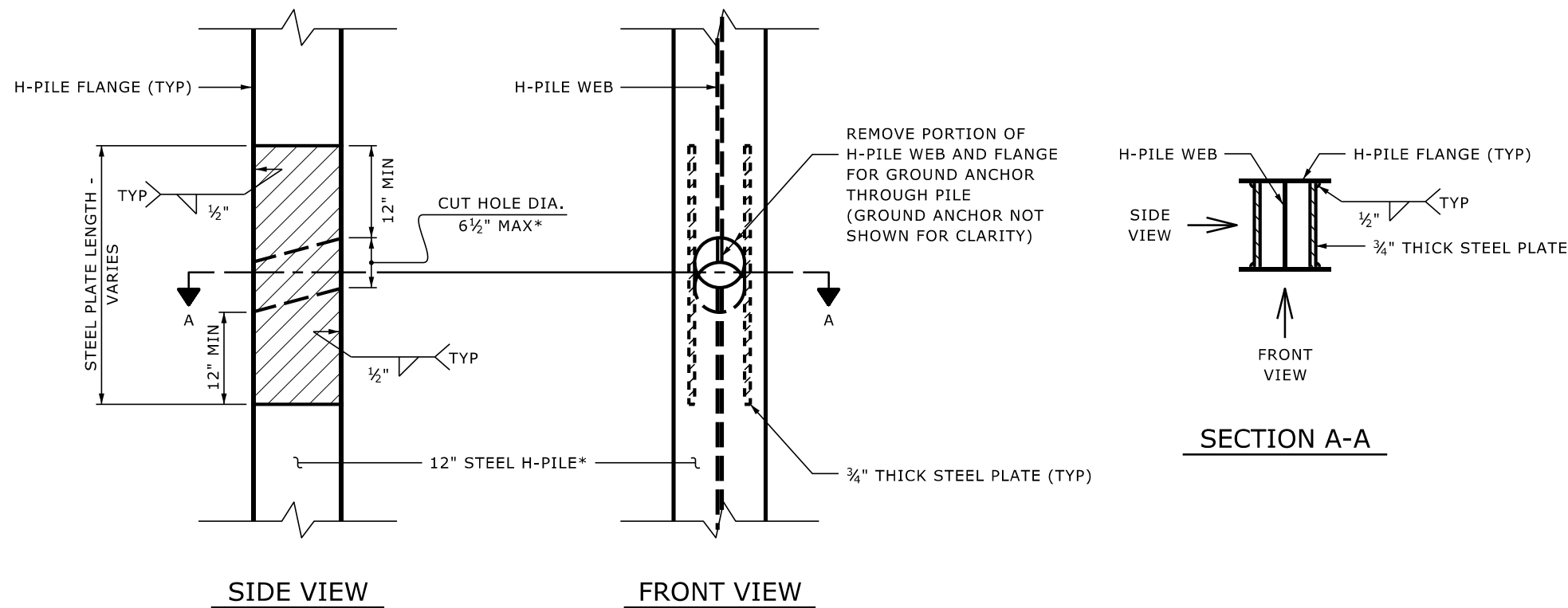
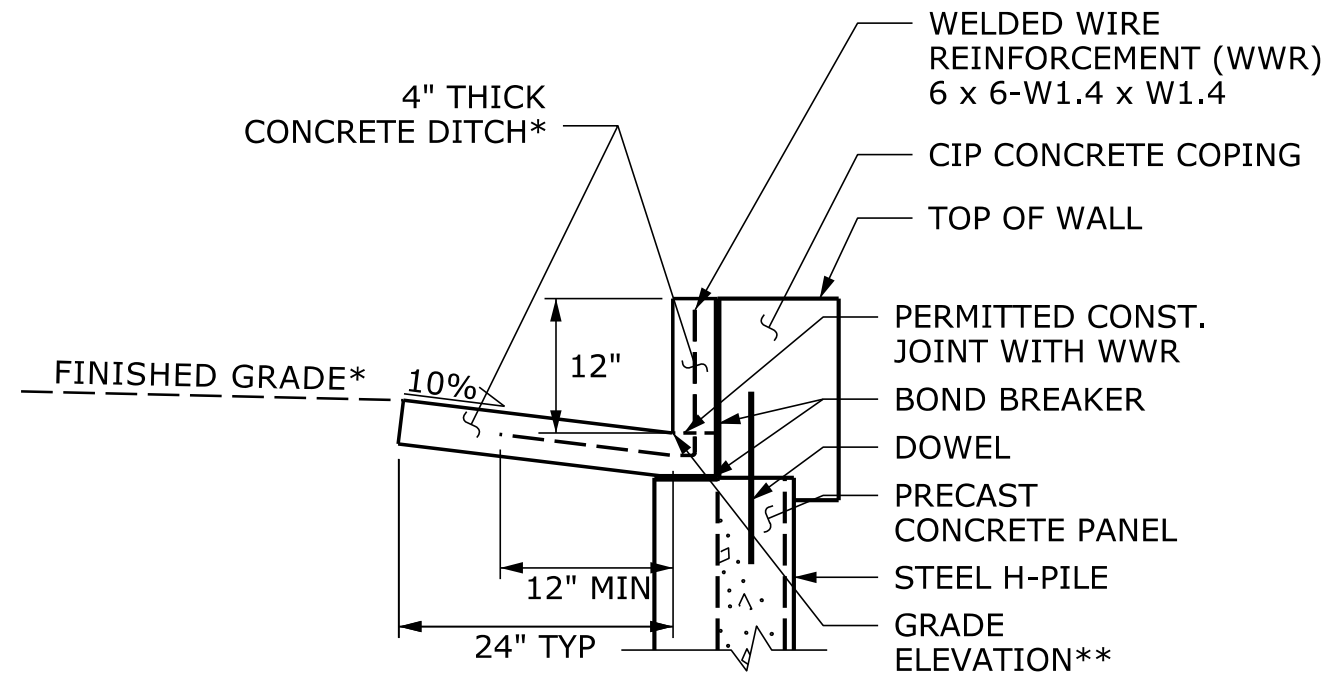
TOTAL STRUCTURE QUANTITIES - CONTRACTORS
OPTION SHOULDER BUILD-OUT RW03H

SHOTCRETE	110 CY
REINFORCING STEEL	21,320 LB
MICROPILE, AVERAGE LENGTH	205 EA
MICROPILE, ADDITIONAL LENGTH OVER AVERAGE	0 LF
MICROPILE PROOF TESTS	11 EA
GEOCOMPOSITE DRAINS	230 LF
SOIL NAIL, AVERAGE LENGTH	115 EA
SOIL NAIL, ADDITIONAL LENGTH OVER AVERAGE	0 LF
WIRE BASKET FORMS	175 EA
GEOTEXTILE FOR TEMPORARY WALL	1,100 SY
BORROW	410 CY



CONCRETE DITCH BEHIND
WALL WITH PRECAST PANEL

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



REINFORCED WEB DETAILS

*DETAILS SHOWN ARE FOR 12" H-PILES WITH 6" DIA.
GROUND ANCHORS. FOR DIFFERENT DIAMETER ANCHORS,
SUBMIT ALTERNATE REINFORCED WEB DETAILS FOR APPROVAL.

CONCRETE DITCH BEHIND
WALL WITH CONCRETE FACING

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

PROJECT NO.: DF18314.2045382
HENDERSON COUNTY

RETAINING WALL RW03B: -RW03B- STA. 10+00.00 TO 14+00.25
RETAINING WALL RW03E: -RW03E- STA. 10+00.00 TO 11+77.52
RETAINING WALL RW03F: -RW03F- STA. 10+00.00 TO 12+10.52
RETAINING WALL RW03H: -RW03H- STA. 10+00.00 TO 12+63.49

SHEET 10 OF 10

GEOTECHNICAL
ENGINEER

SEAL
042642

ENGINEER
ROBERT E. KRAL

Signed by:
Robert E. Kral
AAFBFF73CE4B3

ENGINEER

06/25/2025

SIGNATURE

DATE

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:

CAROLINAS
GEOTECHNICAL
GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

SITE 3 RETAINING WALLS
RW03B, RW03E, RW03F, AND RW03H
SOLDIER PILE RETAINING WALLS

REVISIONS						SHEET NO. W-22
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			