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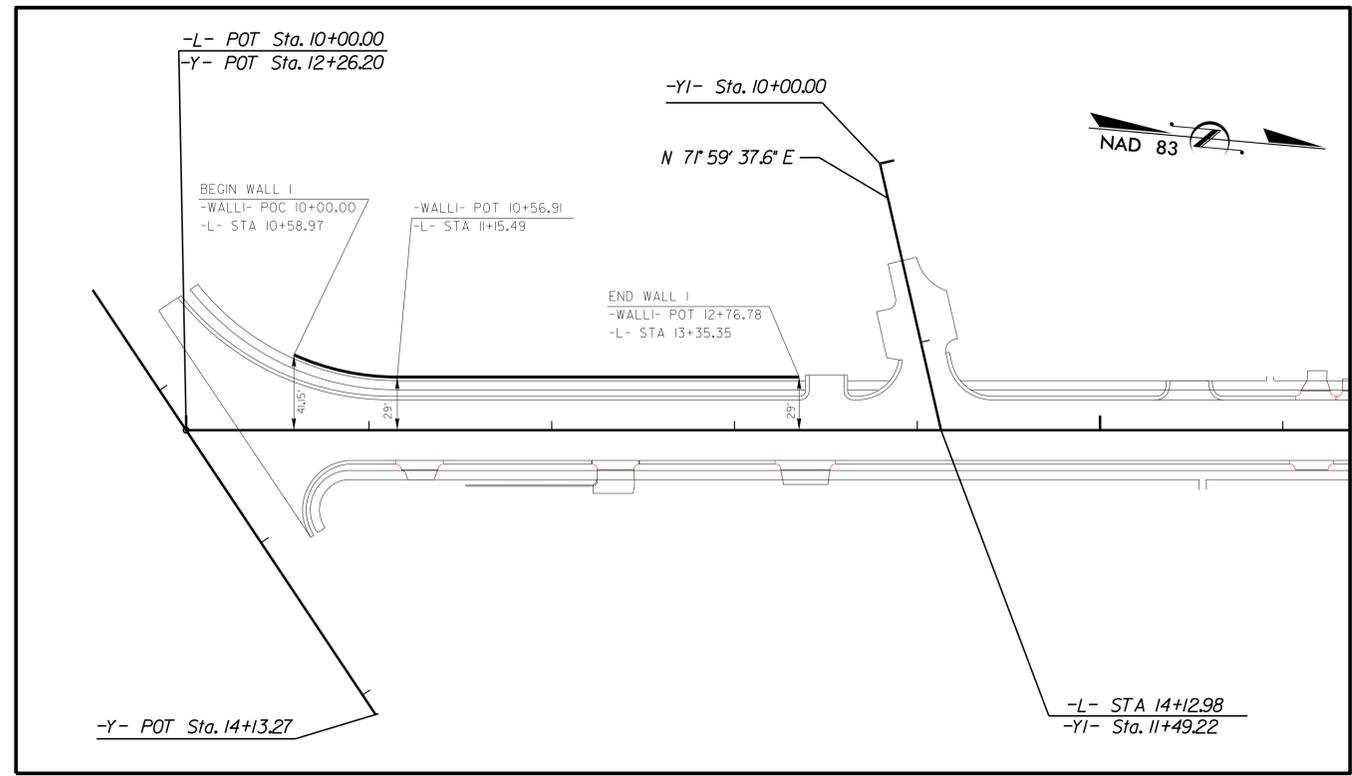
GEOTECHNICAL ENGINEER

ENGINEER

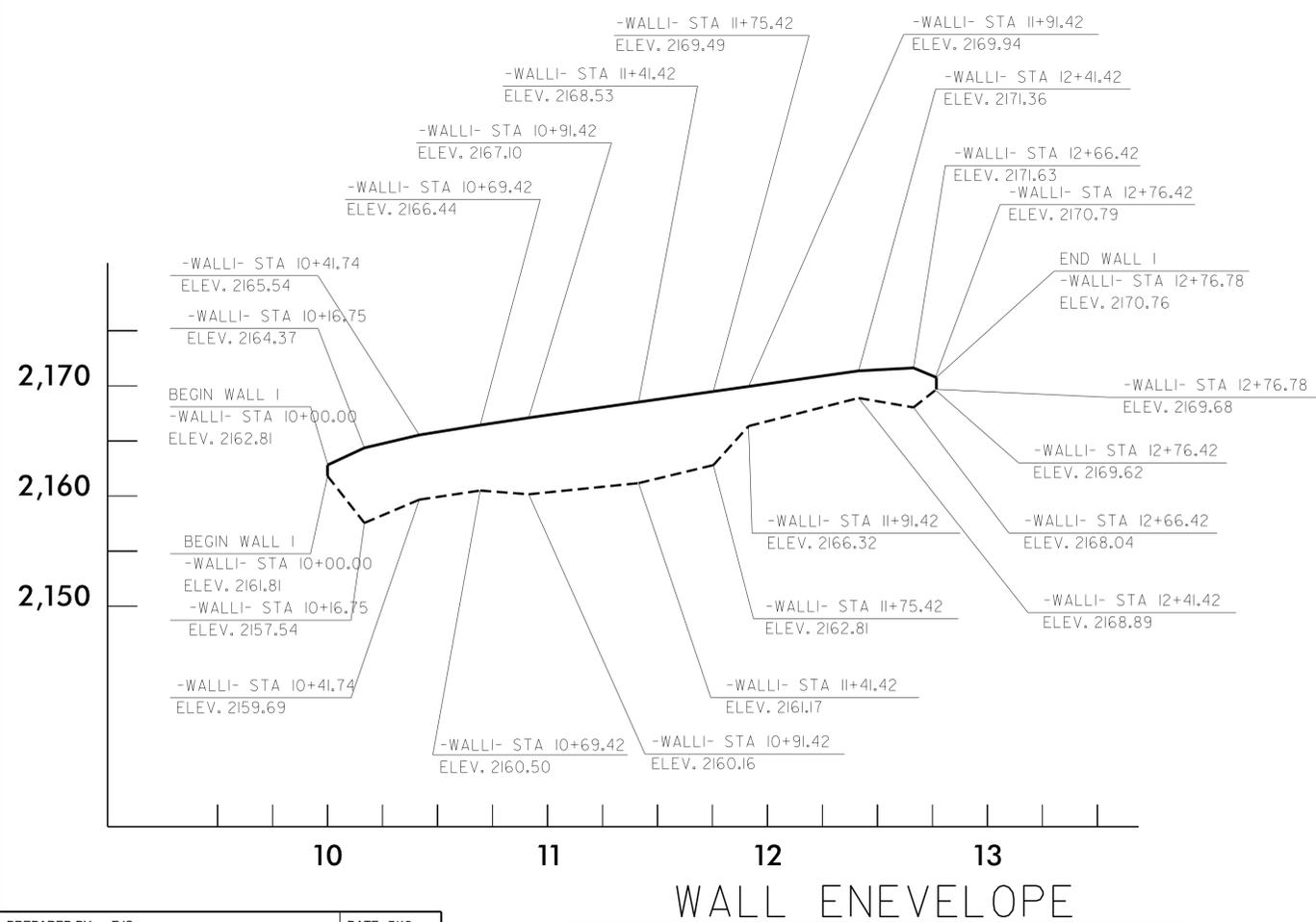
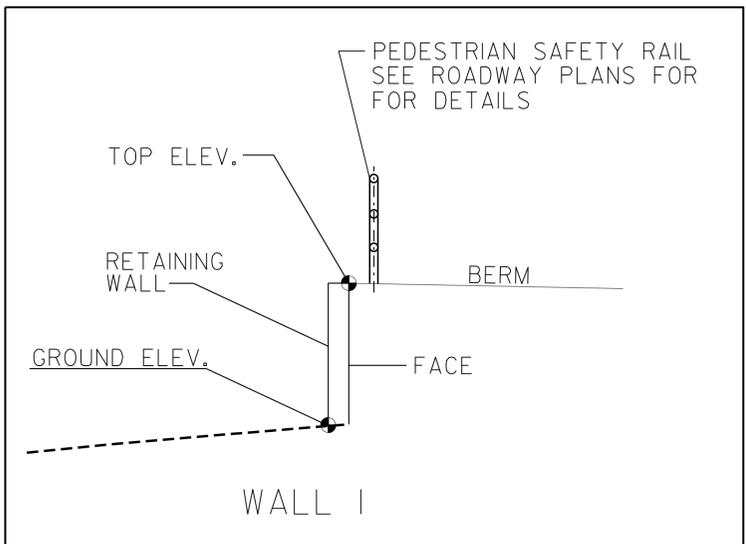
SEAL 29869

8/21/2015

SIGNATURE DATE SIGNATURE DATE



LOCATION SKETCH



ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)

MSE RETAINING WALL NO. 1	1460 SF
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PROJECT NO.: U-5104

TRANSYLVANIA COUNTY

STATION: 10+58.97 -L- TO 13+35.35 -L-

SHEET 1 OF 4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

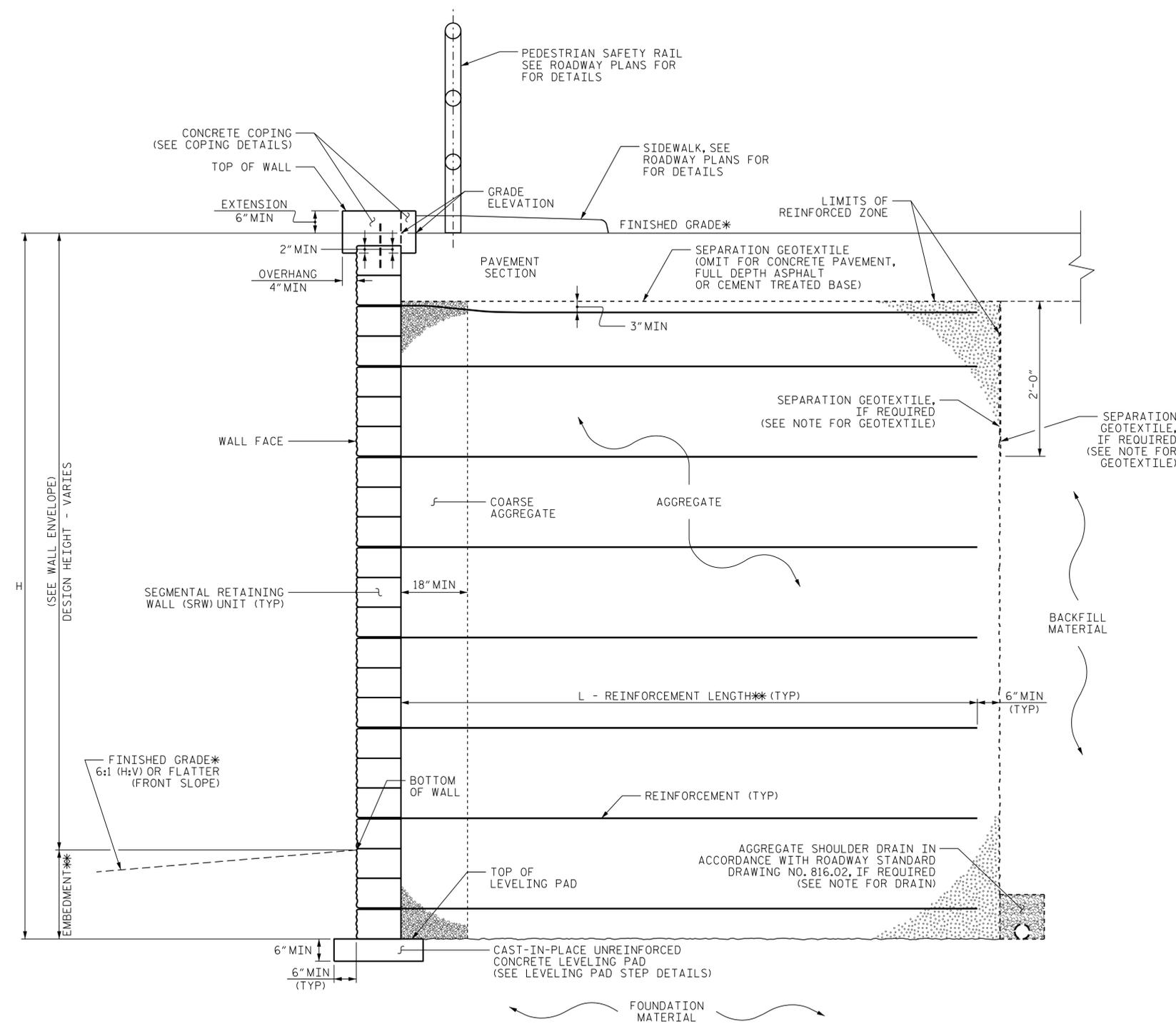
MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL #1

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

SHEET NO. W-1

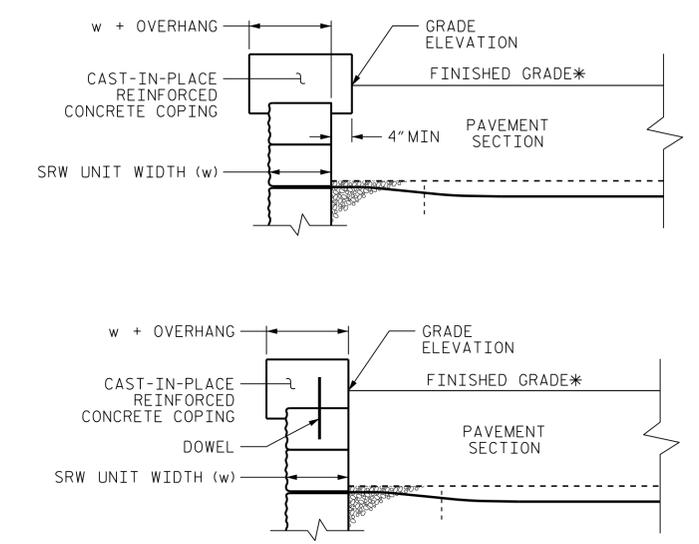
PREPARED BY: EJS DATE: 7/15

REVIEWED BY: SCC DATE: 7/15



MSE WALL WITH SRW UNITS - 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.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO SRW UNITS WITH DOWELS OR EXTEND COPING DOWN BACK OF SRW UNITS.
 *SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

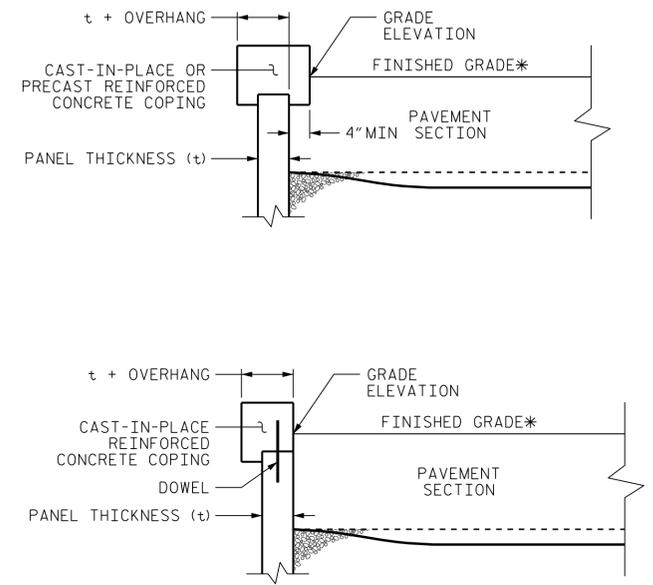
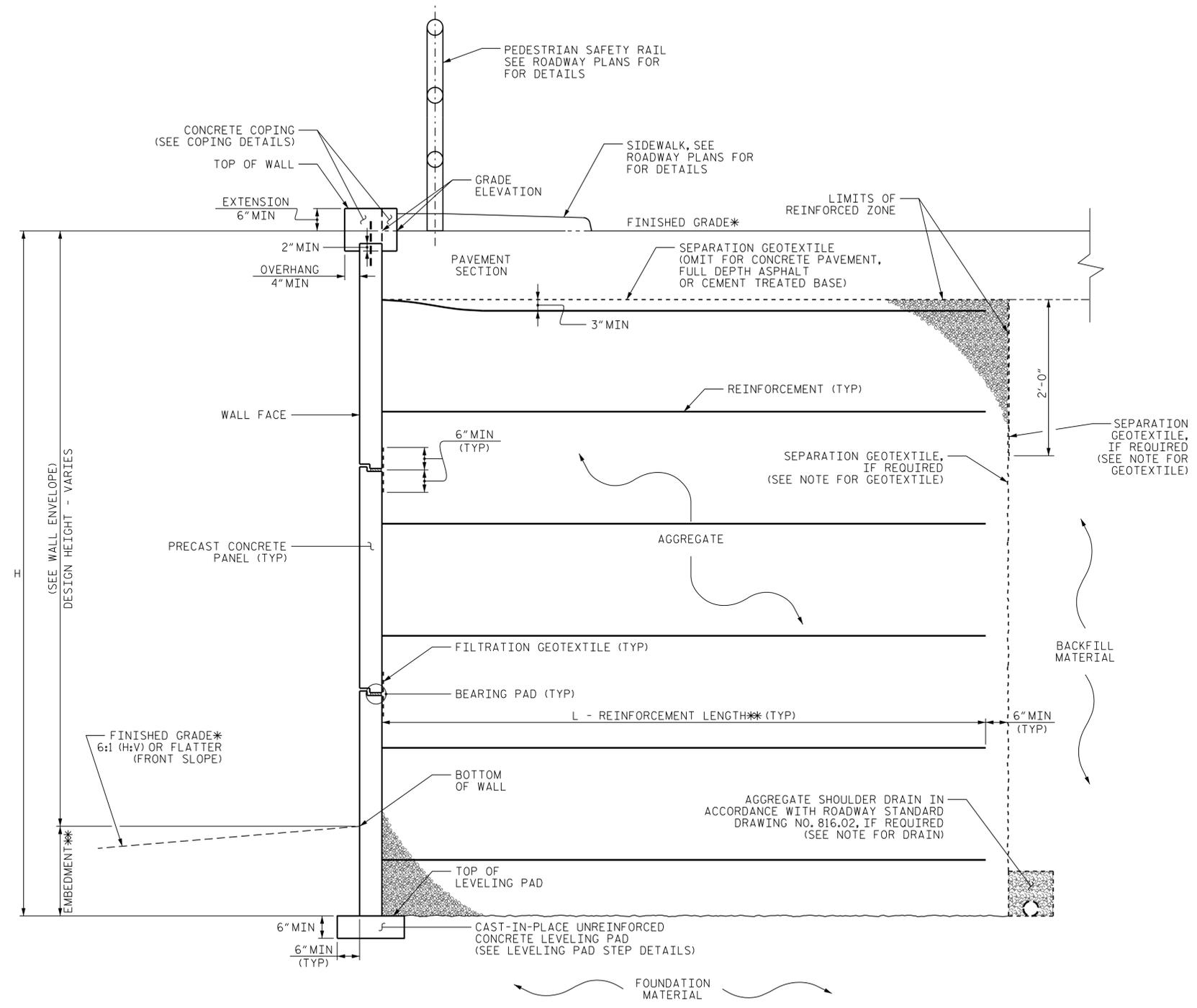
PREPARED BY: EJS	DATE: 7/15
REVIEWED BY: SCC	DATE: 7/15


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 10+58.97 -L- to 13+35.35 -L-
 SHEET 2 OF 4

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

GEOTECHNICAL ENGINEER  8/21/2015 SIGNATURE DATE	ENGINEER SIGNATURE DATE
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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.

MSE WALL WITH PRECAST PANELS - 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.

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 10+58.97 -L- to 13+35.35 -L-
 SHEET 3 OF 4

PREPARED BY: EJS	DATE: 7/15
REVIEWED BY: SCC	DATE: 7/15


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

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

GEOTECHNICAL ENGINEER  JAMES C. CLARK 1F4E87E0D04DEA 8/21/2015 SIGNATURE DATE	ENGINEER SIGNATURE DATE
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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.
 AT THE CONTRACTOR'S OPTION, USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 1.
 WHEN USING AN MSE WALL SYSTEM WITH SRW UNITS FOR RETAINING WALL NO. 1, FREEZE-THAW DURABLE SRW UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS ARE REQUIRED.
 AT THE CONTRACTOR'S OPTION, 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.
 A DRAIN IS REQUIRED 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 = 100 YEARS
 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 3000 LB/SF
 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
 5) MINIMUM EMBEDMENT ELEVATION = H/7 OR 2FT, WHICH EVER IS GREATER
 6) REINFORCED ZONE AGGREGATE PARAMETERS:

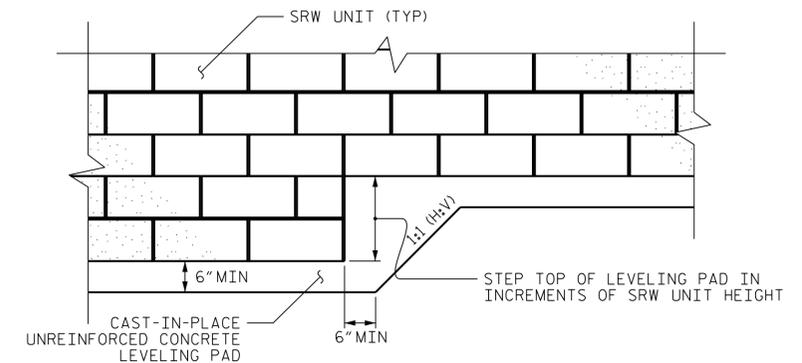
AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

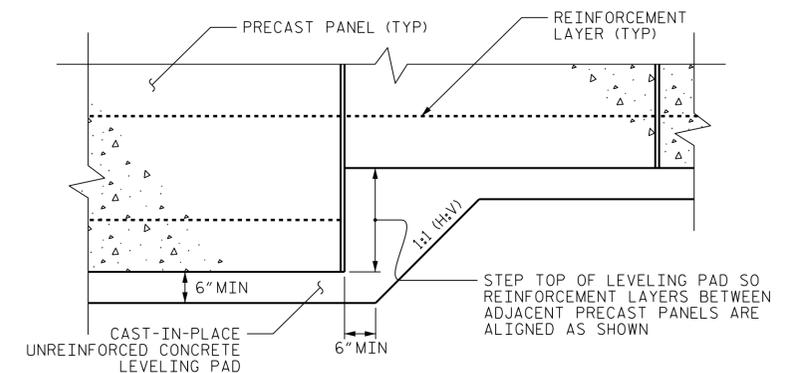
7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 1 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.
 EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1.
 DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
 "TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NO. 1 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.



SEGMENTAL RETAINING WALL (SRW) UNITS



PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 10+58.97 -L- TO 13+35.35 -L-
 SHEET 4 OF 4

PREPARED BY: EJS	DATE: 7/15
REVIEWED BY: SCC	DATE: 7/15

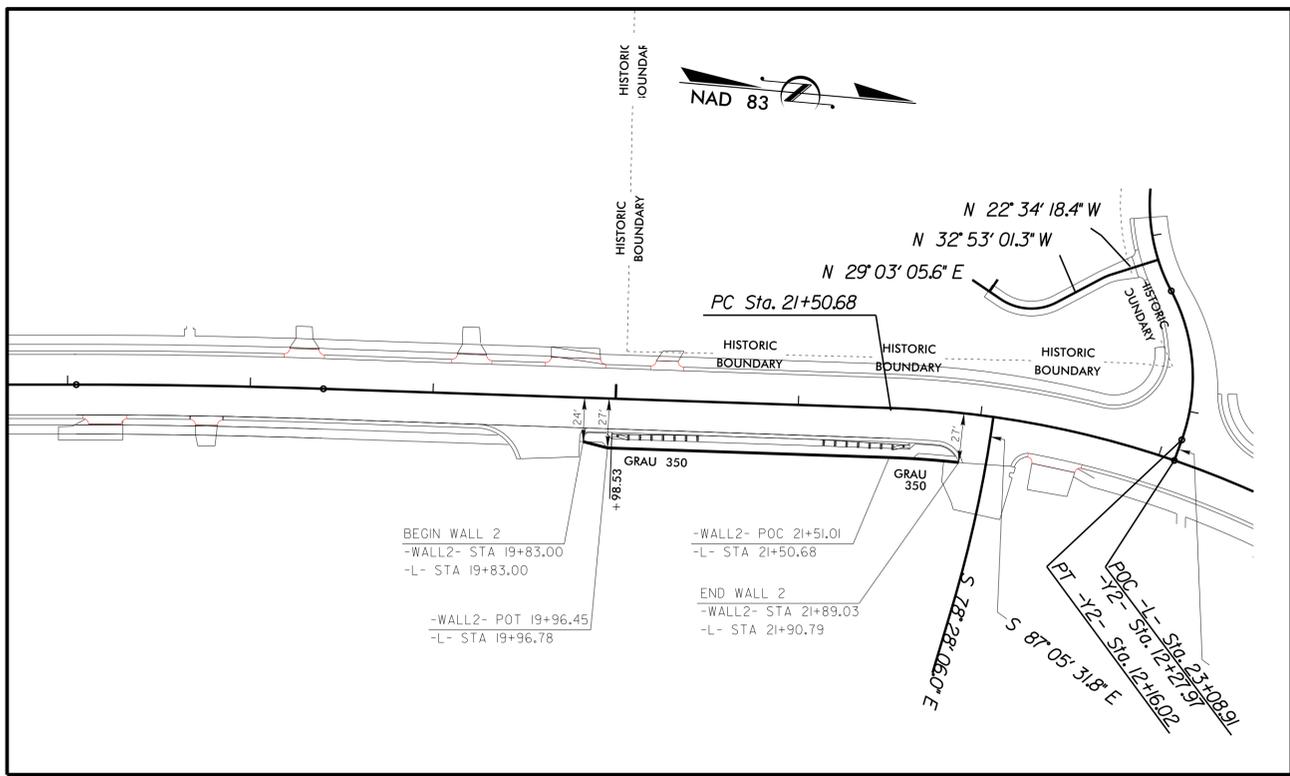

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

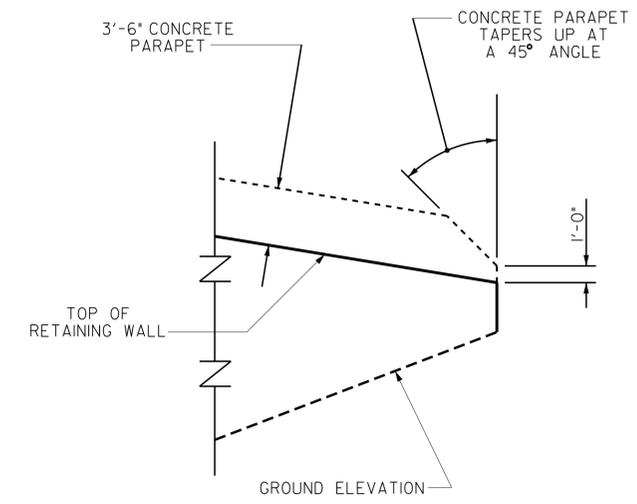
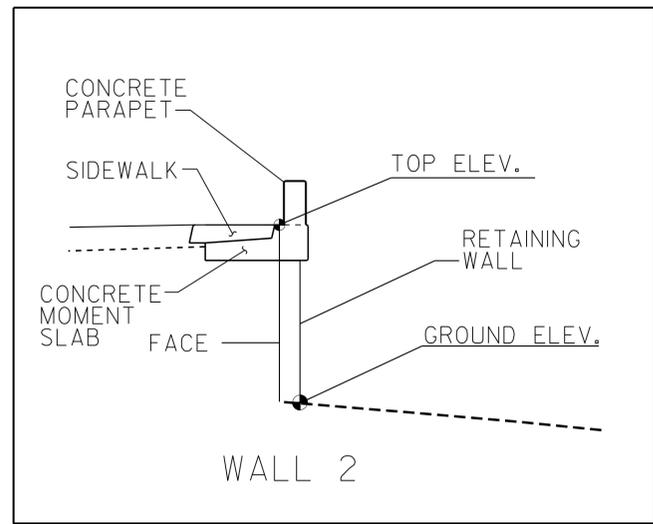
MECHANICALLY STABILIZED EARTH (MSE) DETAILS AND NOTES

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

GEOTECHNICAL ENGINEER  8/21/2015 SIGNATURE _____ DATE _____	ENGINEER SIGNATURE _____ DATE _____
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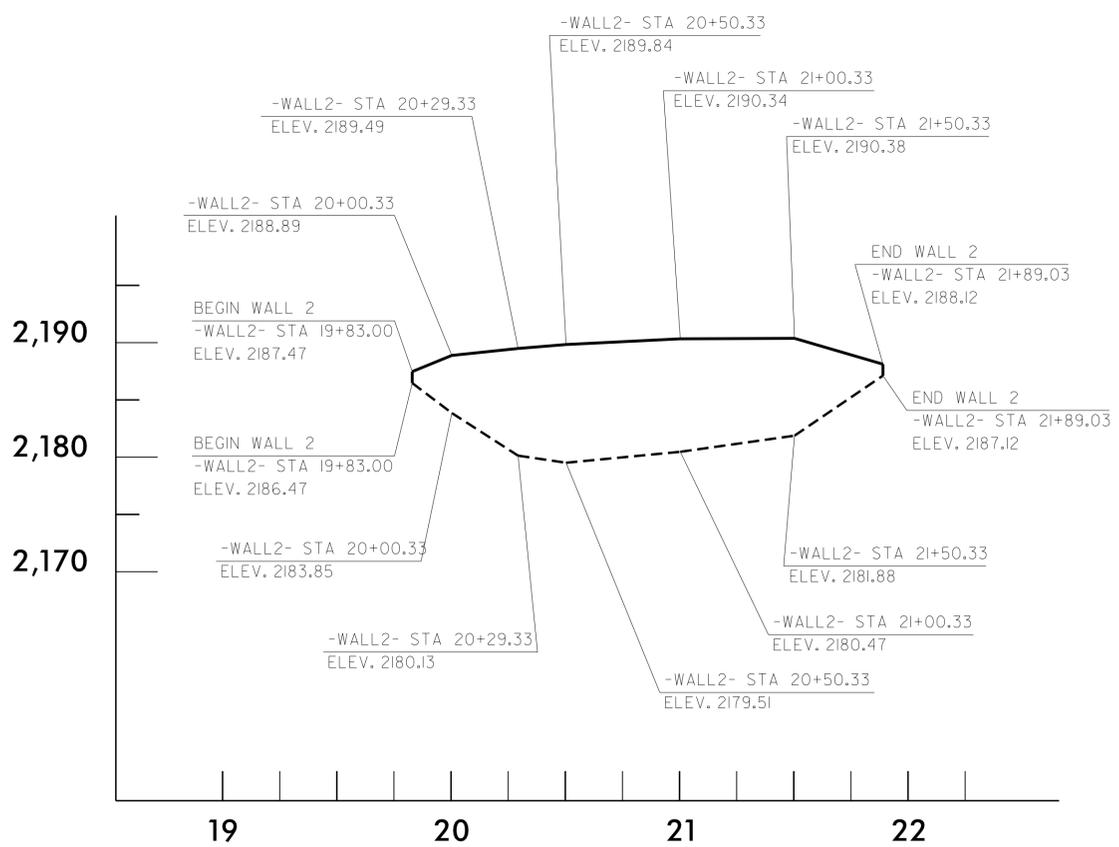


LOCATION SKETCH

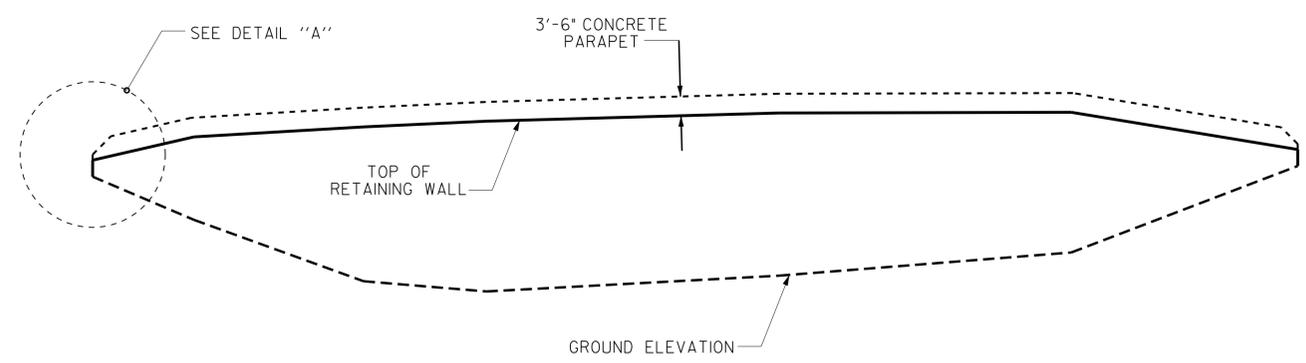


ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL NO. 2	1620 SF

DETAIL "A"



WALL ENEVELOPE



LIMITS OF CONCRETE PARAPET

PROJECT NO.: U-5104
TRANSYLVANIA COUNTY
 STATION: 19+83.00 -L- TO 21+90.79 -L-
 SHEET 1 OF 5

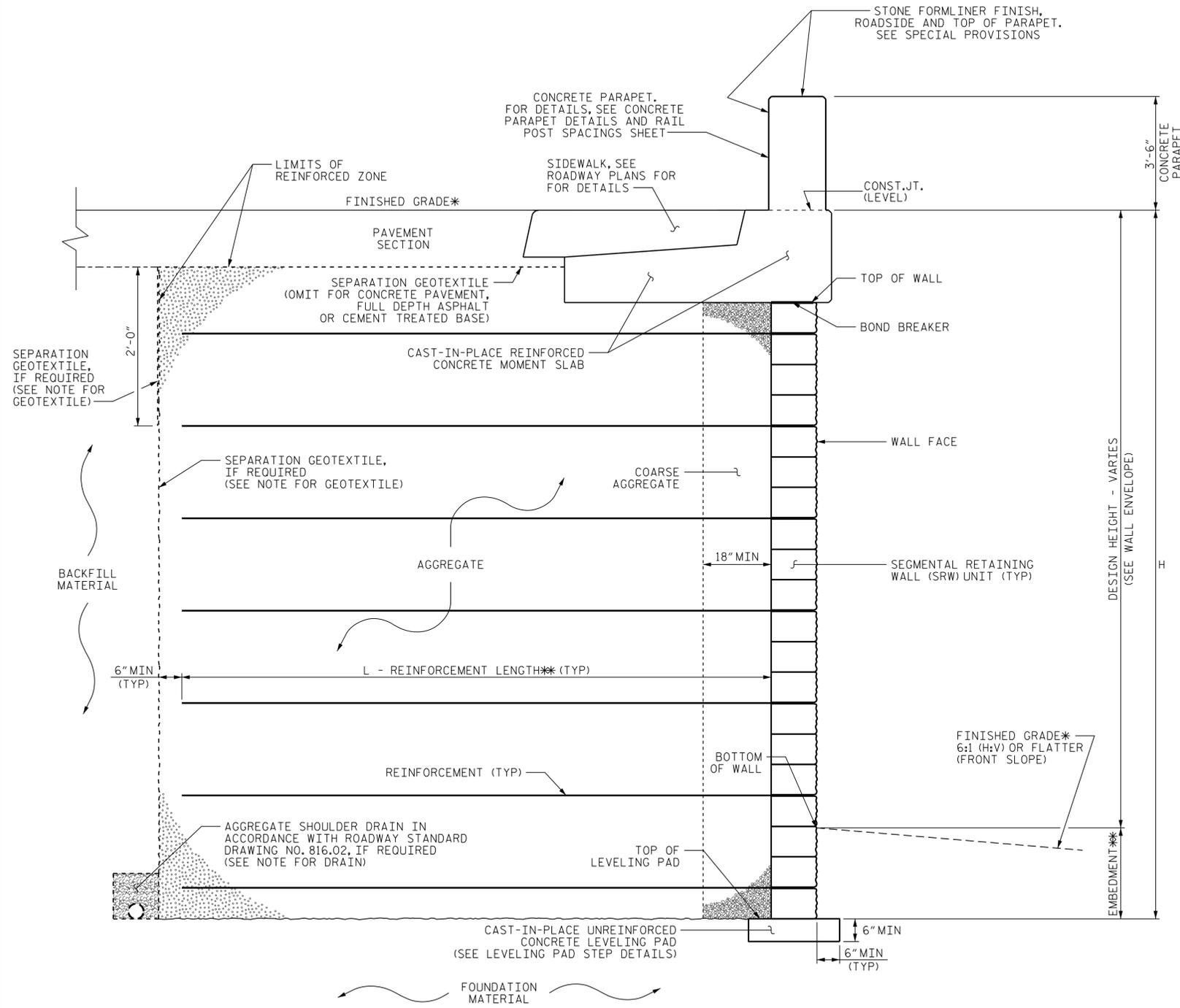
PREPARED BY: EJS DATE: 7/15
 REVIEWED BY: SCC DATE: 7/15


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL #2					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-5



MSE WALL WITH SRW UNITS - 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.

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 19+83.00 -L- to 21+90.79 -L-
 SHEET 2 OF 5

NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS

GEOTECHNICAL
 ENGINEERING UNIT

MSE WALL #2
 WITH SRW UNITS

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

PREPARED BY: EJS	DATE: 7/15
REVIEWED BY: SCC	DATE: 7/15

NOTES:

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

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 2. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

AT THE CONTRACTOR'S OPTION, USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 2.

WHEN USING AN MSE WALL SYSTEM WITH SRW UNITS FOR RETAINING WALL NO. 2, FREEZE-THAW DURABLE SRW UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS ARE REQUIRED.

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

A SIMULATED STONE FINISH IS REQUIRED ALONG THE ROAD FACE AND TOP OF BARRIER RAIL FOR RETAINING WALL NO. 2. SEE SIMULATED STONE FORMLINER FINISH SPECIAL PROVISIONS.

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

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 2.

BEFORE BEGINNING MSE 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. FOR THE FOLLOWING:
- 1) H = DESIGN HEIGHT + EMBEDMENT
 - 2) DESIGN LIFE = 100 YEARS
 - 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 3000 LB/SF
 - 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
 - 5) MINIMUM EMBEDMENT = H/7 OR 2 FEET, WHICHEVER IS GREATER 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
FINE	115	34	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

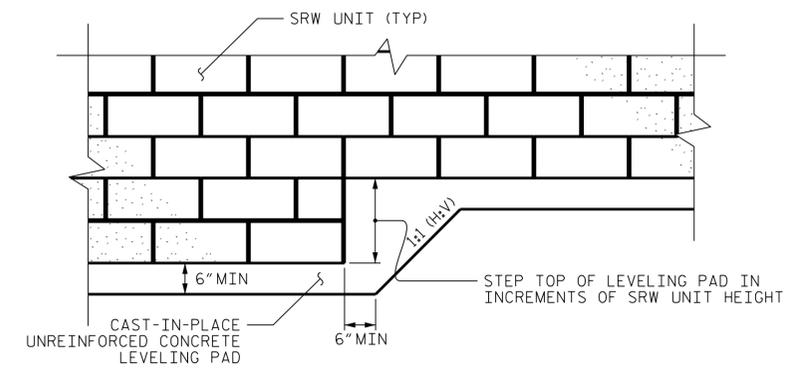
7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

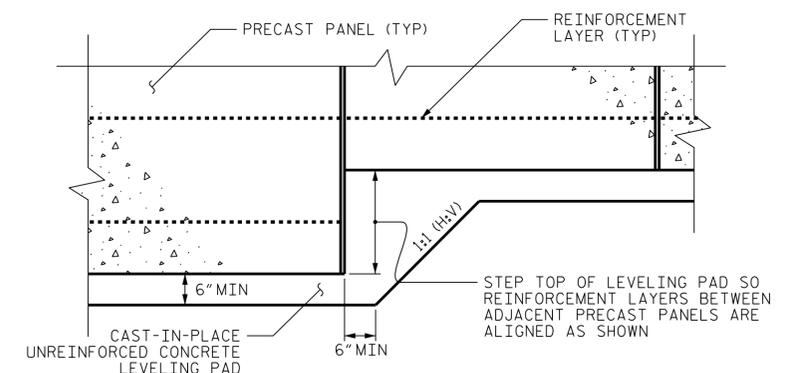
DESIGN RETAINING WALL NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

"TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NO. 2 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.



SEGMENTAL RETAINING WALL (SRW) UNITS



PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 19+83.00 -L- TO 21+90.79 -L-
 SHEET 4 OF 5



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

MECHANICALLY STABILIZED EARTH (MSE) DETAILS AND NOTES					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-8

NOTES:

CONCRETE PARAPET WITH MOMENT SLAB SHALL BE A MINIMUM OF 15' IN LENGTH.

EXPANSION JOINTS SHALL BE PLACED IN THE PARAPET AND MOMENT SLAB AT A MAXIMUM SPACING OF 30'.

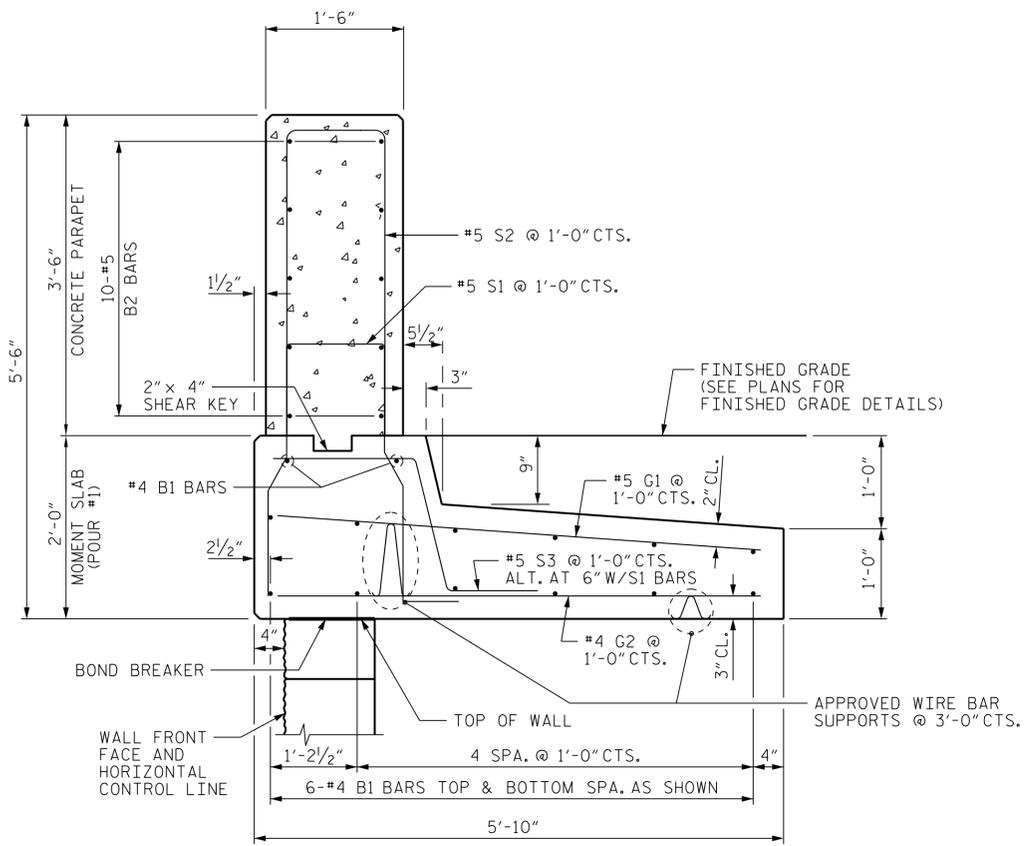
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED SURFACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MID-POINT OF PARAPET SEGMENTS LESS THAN 20' IN LENGTH.

THE PARAPET SHALL NOT BE CAST UNTIL THE MOMENT SLAB HAS ATTAINED AN AGE OF THREE CURING DAYS OR A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. IN ADDITION, NO FILL MATERIAL, ASPHALT, OR CONSTRUCTION EQUIPMENT IS ALLOWED ON THE MOMENT SLAB PRIOR TO SATISFYING THE MINIMUM CONCRETE CURING AND STRENGTH REQUIREMENTS.

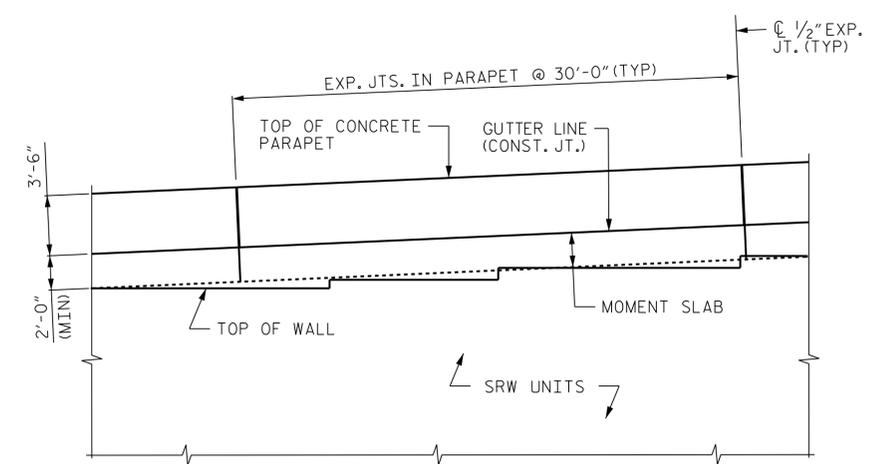
ALL REINFORCING STEEL IN THE PARAPET SHALL BE EPOXY COATED.

IF STEPS ARE REQUIRED AT TOP OF WALL, DETAILS SHOWING INTERFACE BETWEEN BOTTOM OF MOMENT SLAB AND STEPS SHALL BE SUBMITTED FOR APPROVAL.

IF EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, BARRIERS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH CONCRETE PARAPET WITH MOMENT SLAB, CONCRETE PARAPET WITH MOMENT SLAB DETAILS SHALL BE REVISED AND SUBMITTED FOR APPROVAL.

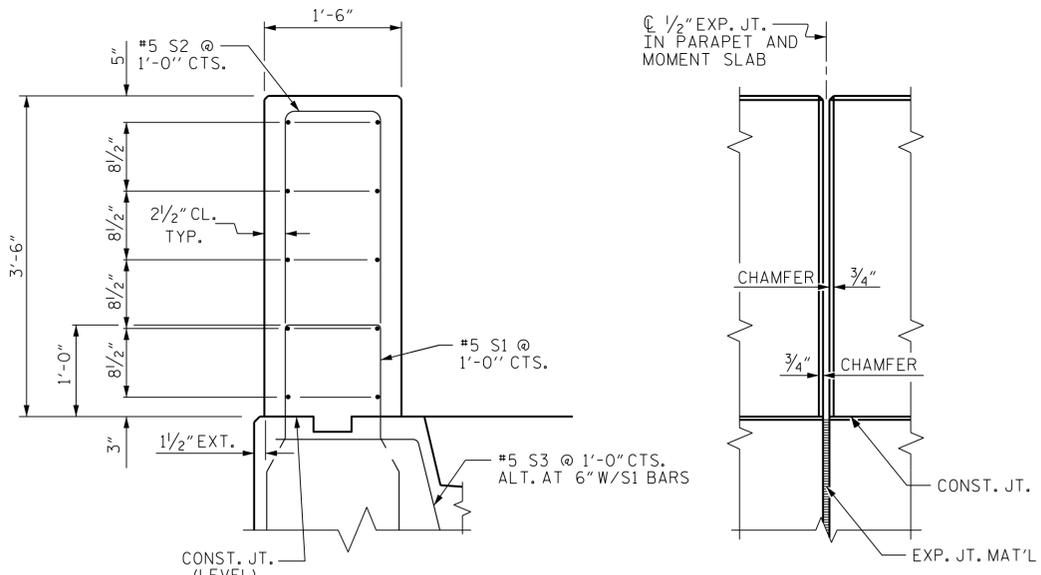


CONCRETE PARAPET WITH MOMENT SLAB



CONCRETE PARAPET WITH MOMENT SLAB - PARTIAL ELEVATION

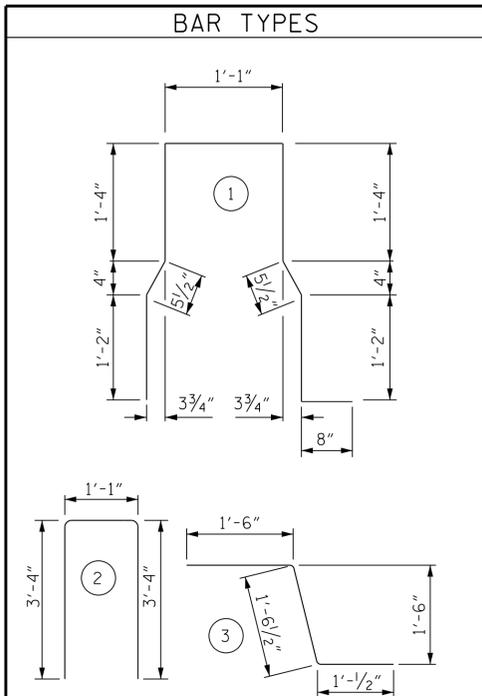
CONCRETE PARAPET WITH MOMENT SLAB PAY LENGTH = 206 LIN FT



SECTION THRU PARAPET

ELEV. @ EXP. JOINTS

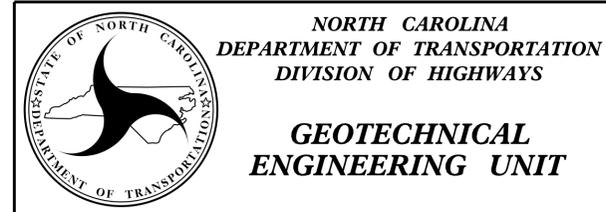
PARAPET DETAILS



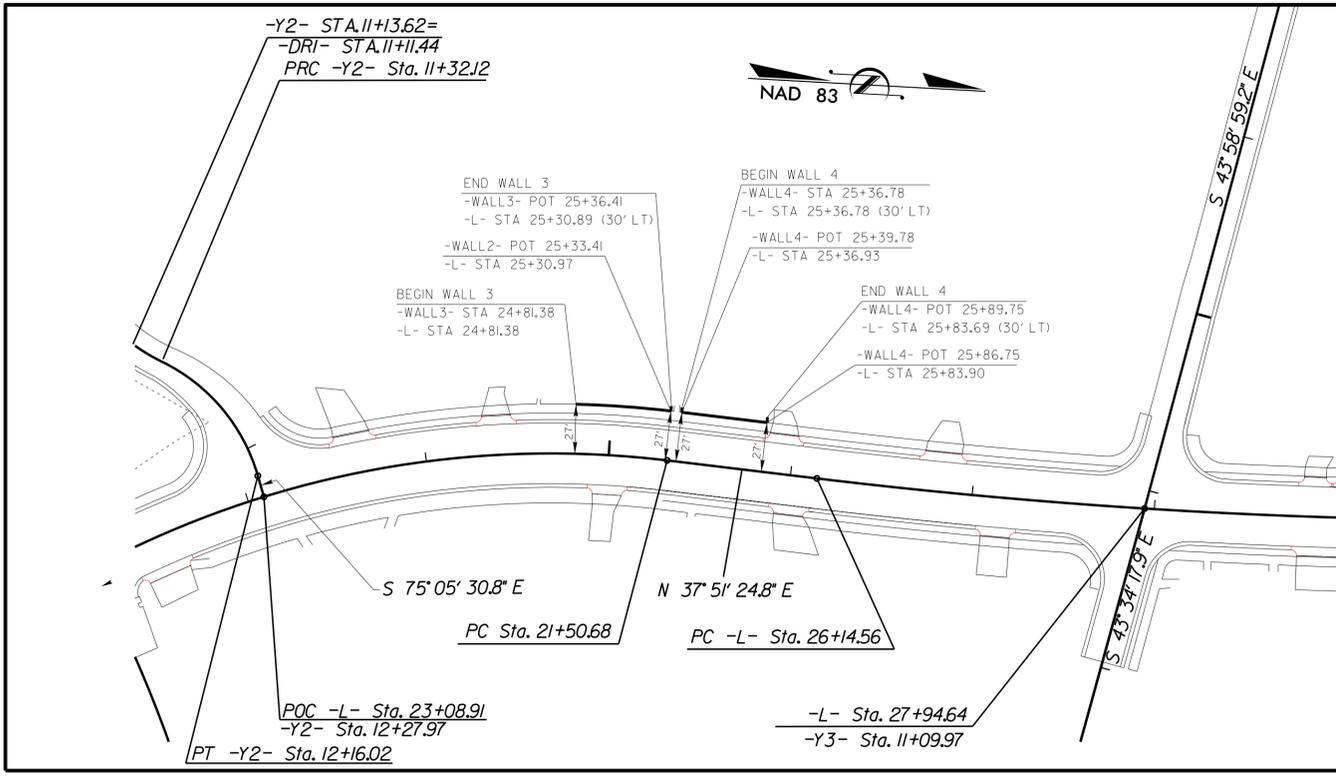
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
FOR ONE 30'-0" SECTION OF CONCRETE PARAPET WITH MOMENT SLAB					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#4	STR	29'-7"	277
* B2	10	#5	STR	29'-7"	309
G1	31	#5	STR	5'-6"	178
G2	31	#4	STR	5'-6"	114
* S1	31	#5	1	7'-0"	226
* S2	31	#5	2	7'-9"	251
S3	30	#5	3	4'-1"	128
REINFORCING STEEL					697 LB
* EPOXY COATED REINFORCING STEEL					786 LB
CLASS AA CONCRETE PARAPET					5.9 CY
CLASS A CONCRETE MOMENT SLAB					9.1 CY
CONCRETE PARAPET WITH MOMENT SLAB					30 LIN FT

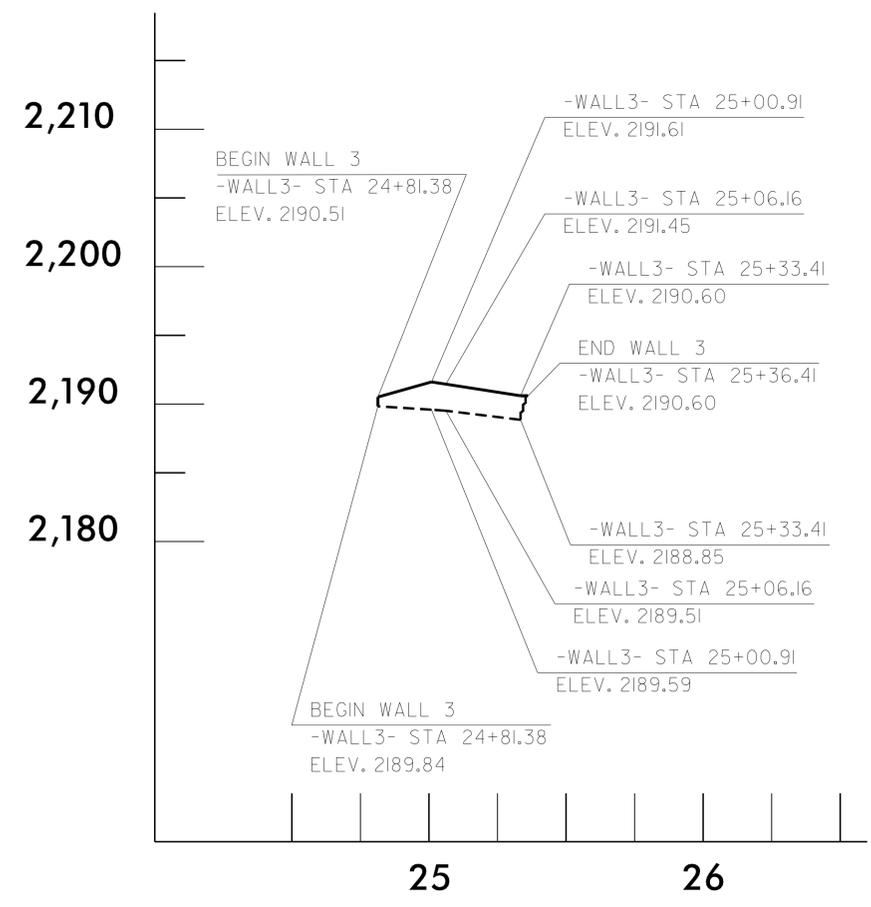
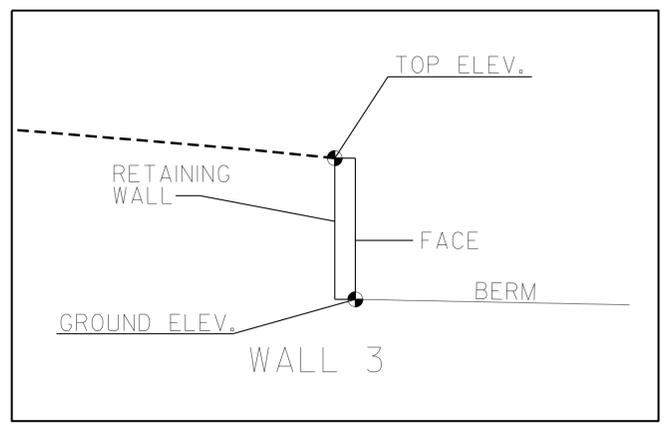
PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 19+83.00 -L- to 21+90.79 -L-
 SHEET 5 OF 5



CONCRETE BARRIER RAIL WITH MOMENT SLAB FOR SEGMENTAL RETAINING WALL (SRW) UNITS					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



LOCATION SKETCH



WALL ENEVELOPE

ESTIMATED WALL QUANTITY

RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQURE FEET)
3	90

PROJECT NO.: U-5104
TRANSYLVANIA COUNTY
STATION: 24+81.38 -L- TO 25+30.89 -L-
SHEET 1 OF 10

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

**GEOTECHNICAL
ENGINEERING UNIT**

CAST IN PLACE (CIP) GRAVITY RETAINING WALL #3

REVISIONS						SHEET NO. W-10
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

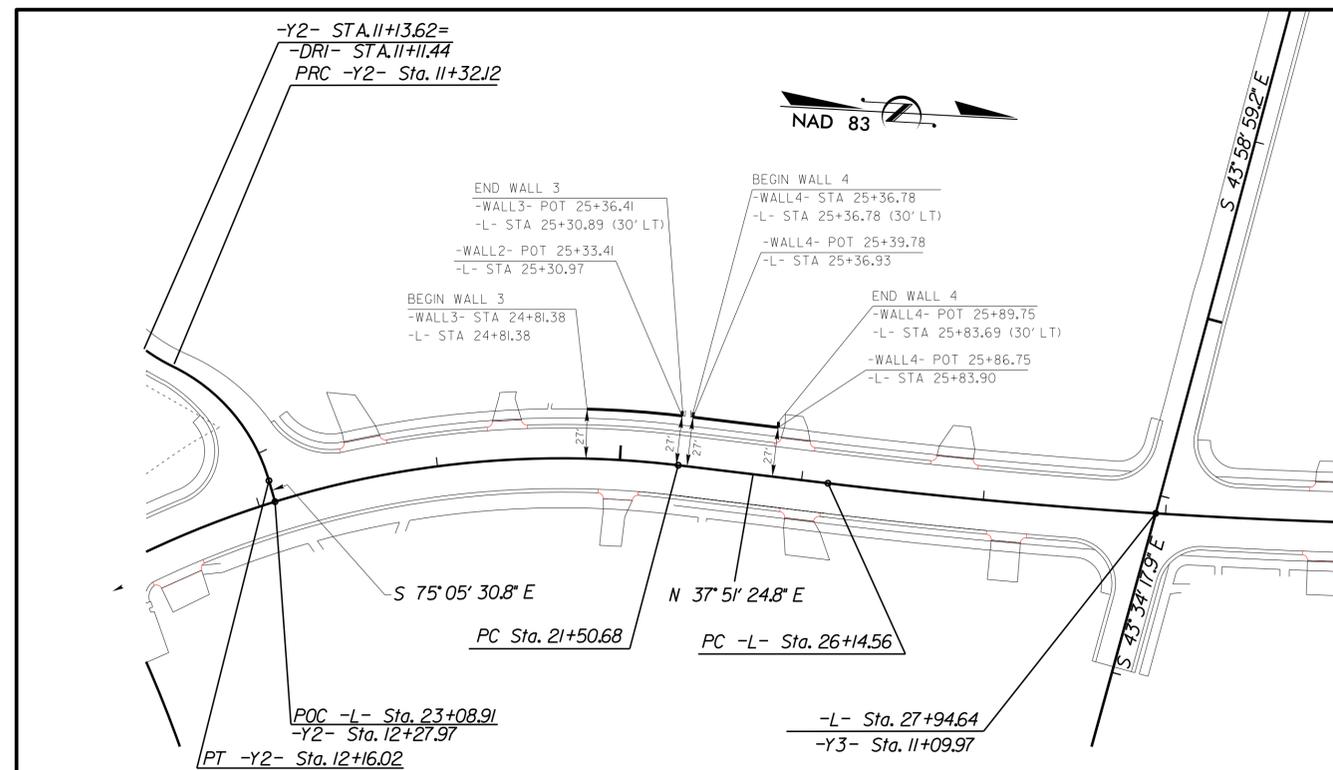
GEOTECHNICAL ENGINEER

ENGINEER

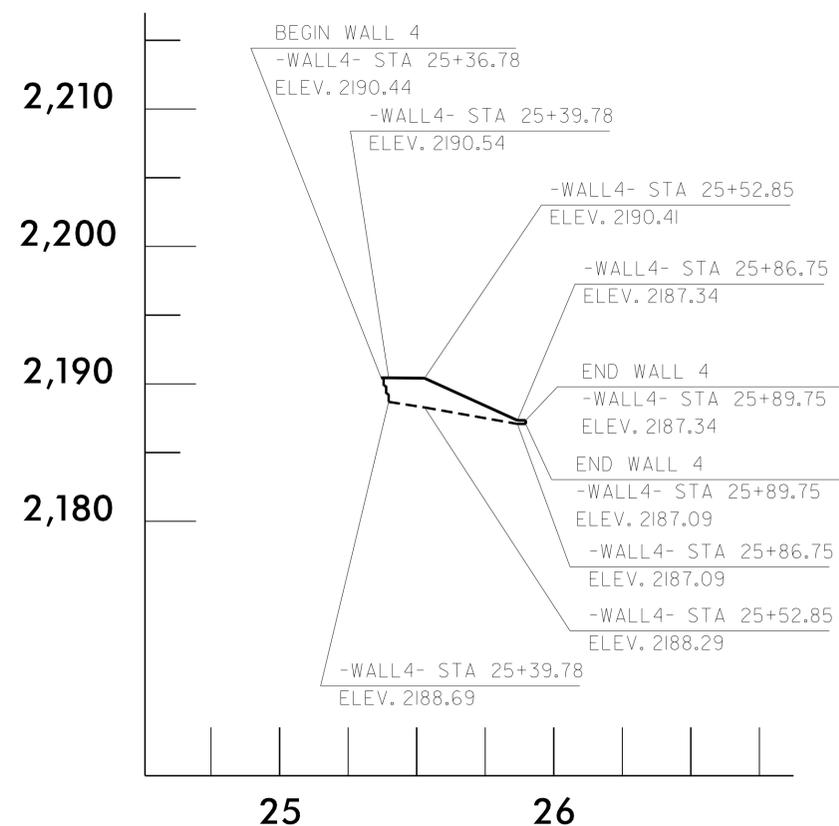
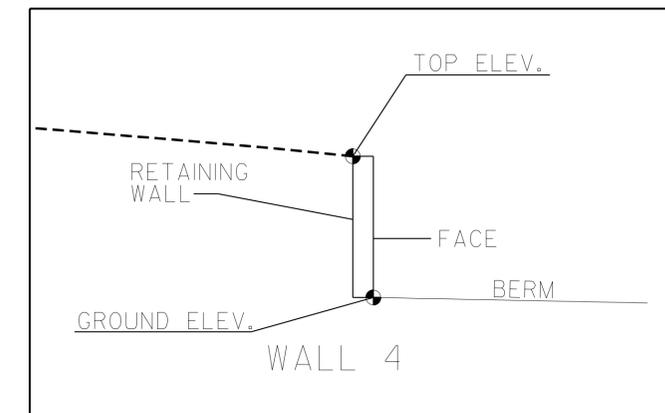
SEAL 29869

8/21/2015

SIGNATURE DATE SIGNATURE DATE



LOCATION SKETCH



WALL ENEVELOPE

ESTIMATED WALL QUANTITY

RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQUARE FEET)
4	70

PROJECT NO.: U-5104

TRANSYLVANIA COUNTY

STATION: 25+36.78 -L- TO 25+83.90 -L-

SHEET 2 OF 10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

CAST IN PLACE (CIP) GRAVITY RETAINING WALL #4

REVISIONS

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

SHEET NO. W-11

PREPARED BY: EJS DATE: 7/15

REVIEWED BY: SCC DATE: 7/15

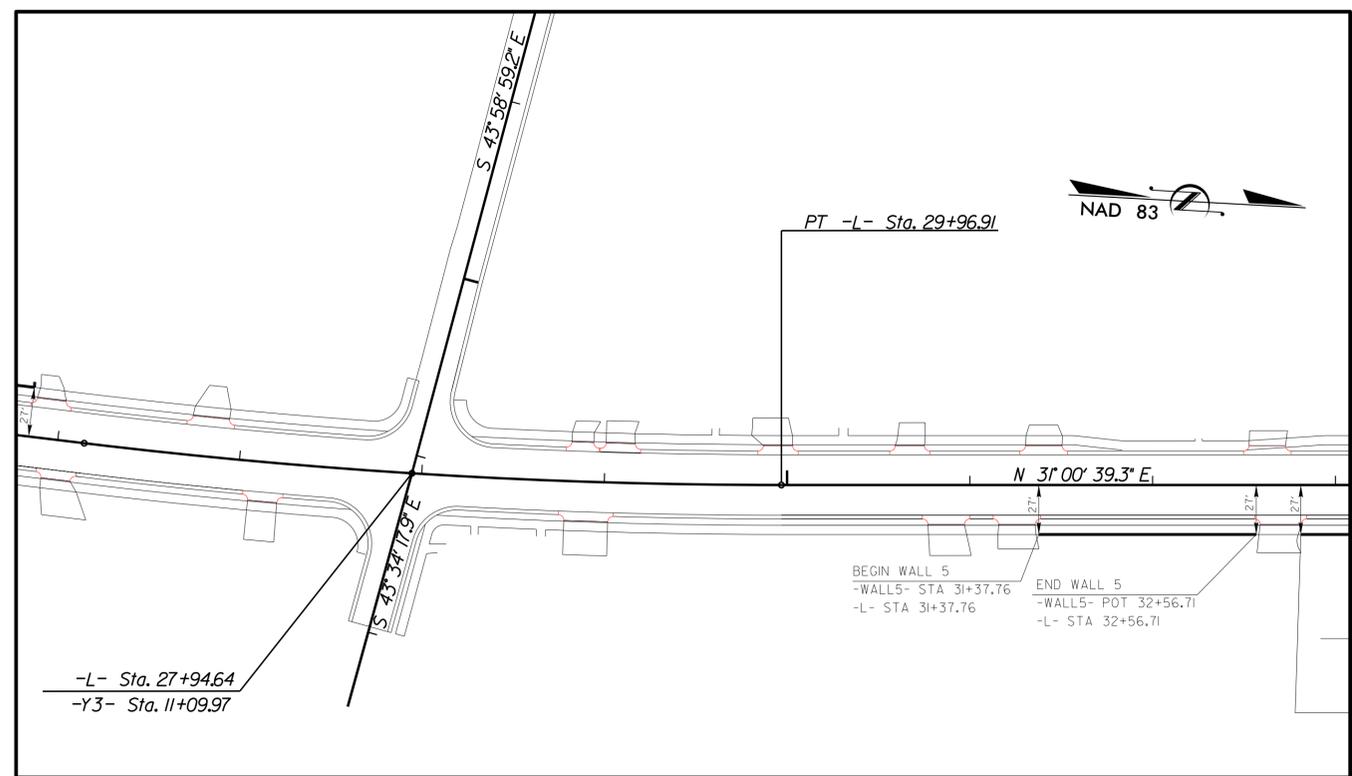
GEOTECHNICAL ENGINEER

ENGINEER

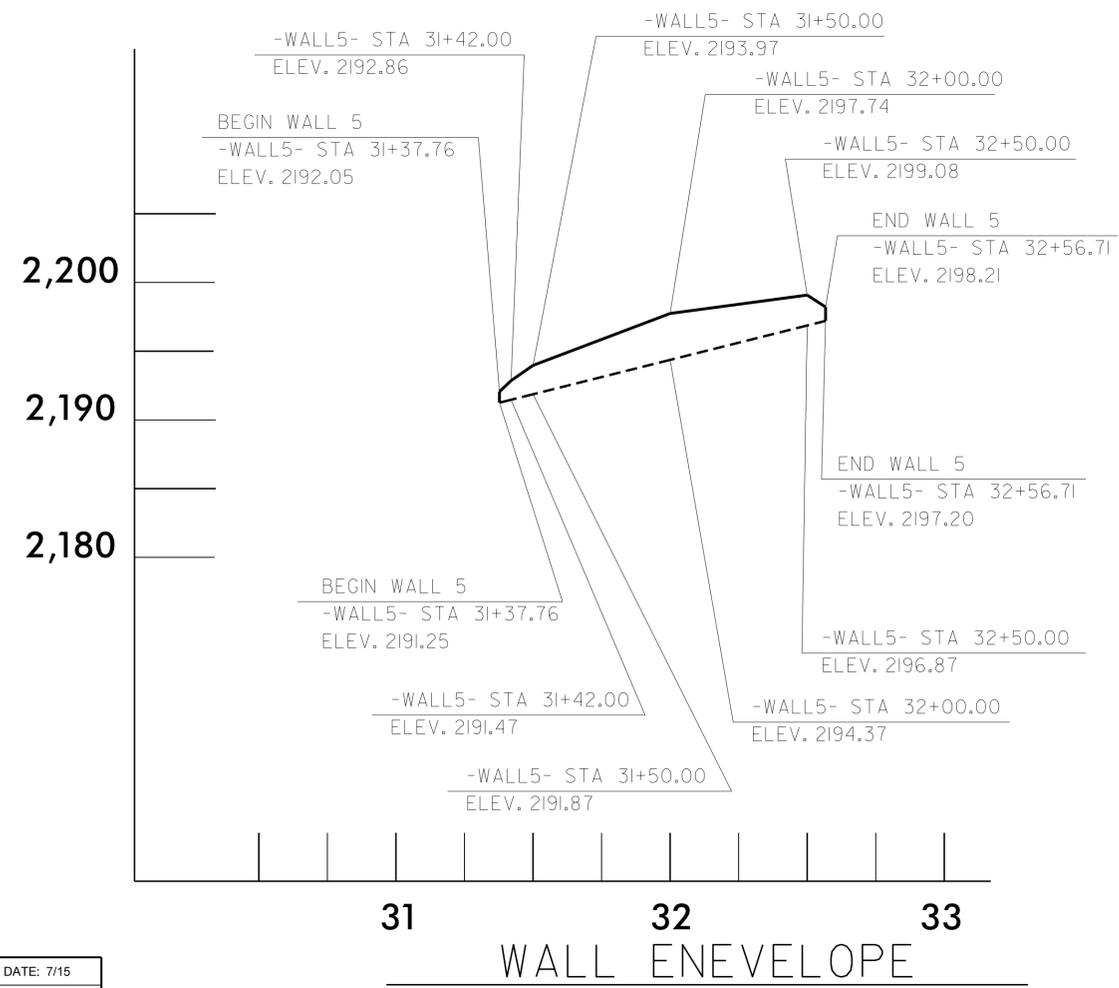
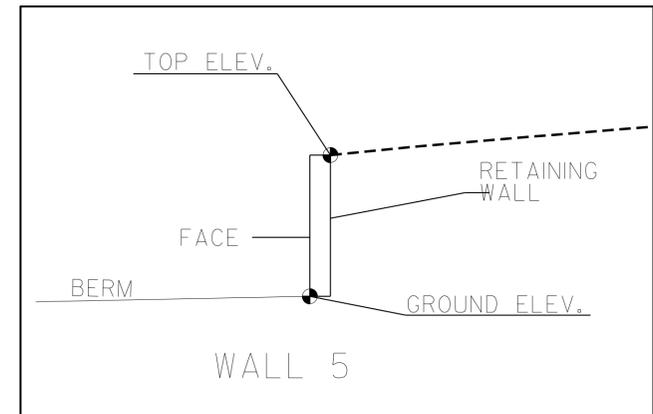
SEAL
29869
ENGINEER
STATE OF NORTH CAROLINA
Shane C. Clark
IF RESTORED/RENEWED

8/21/2015

SIGNATURE DATE SIGNATURE DATE



LOCATION SKETCH



ESTIMATED WALL QUANTITY

RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQ. FEET)
5	310

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 31+37.76 -L- TO 32+56.71 -L-
 SHEET 3 OF 10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

CAST IN PLACE (CIP) GRAVITY RETAINING WALL #5

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

SHEET NO. W-12

PREPARED BY: EJS DATE: 7/15
 REVIEWED BY: SCC DATE: 7/15

GEOTECHNICAL ENGINEER

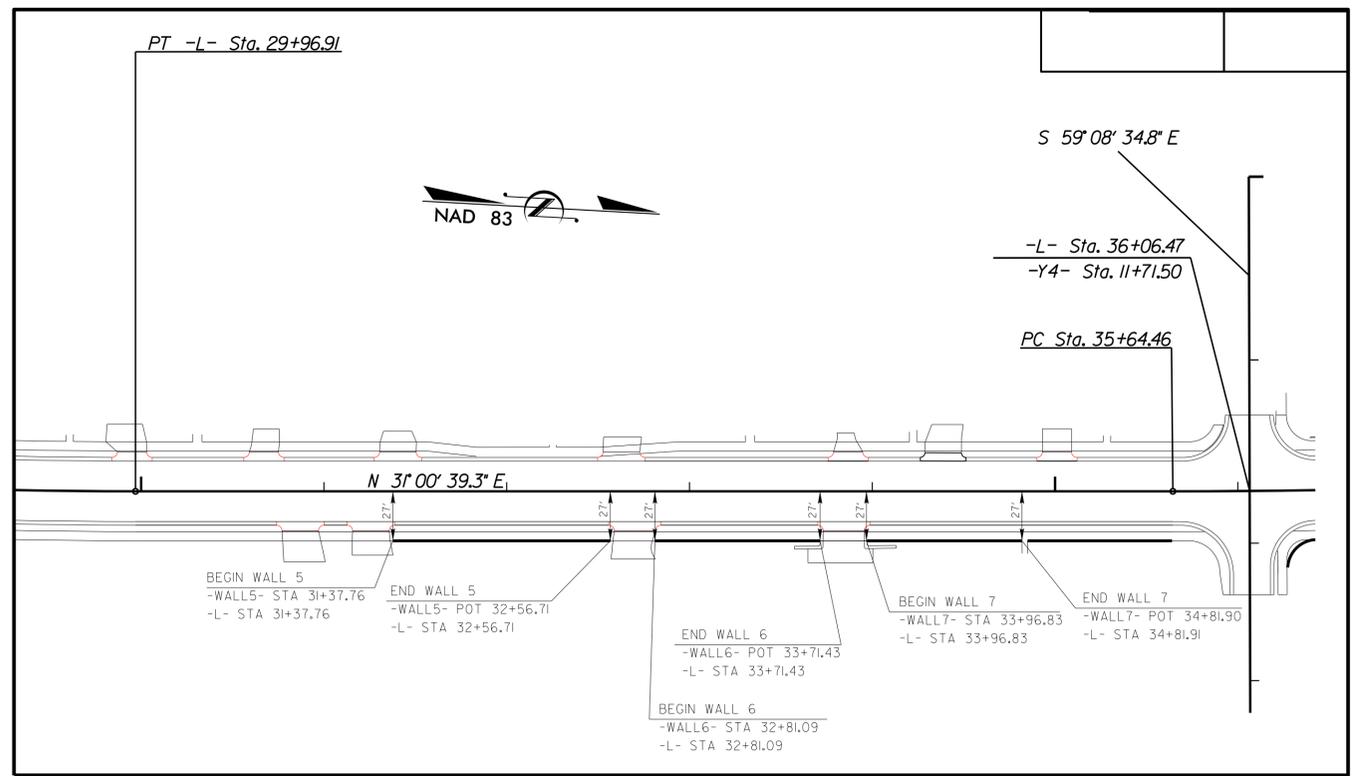
ENGINEER

SEAL 29869

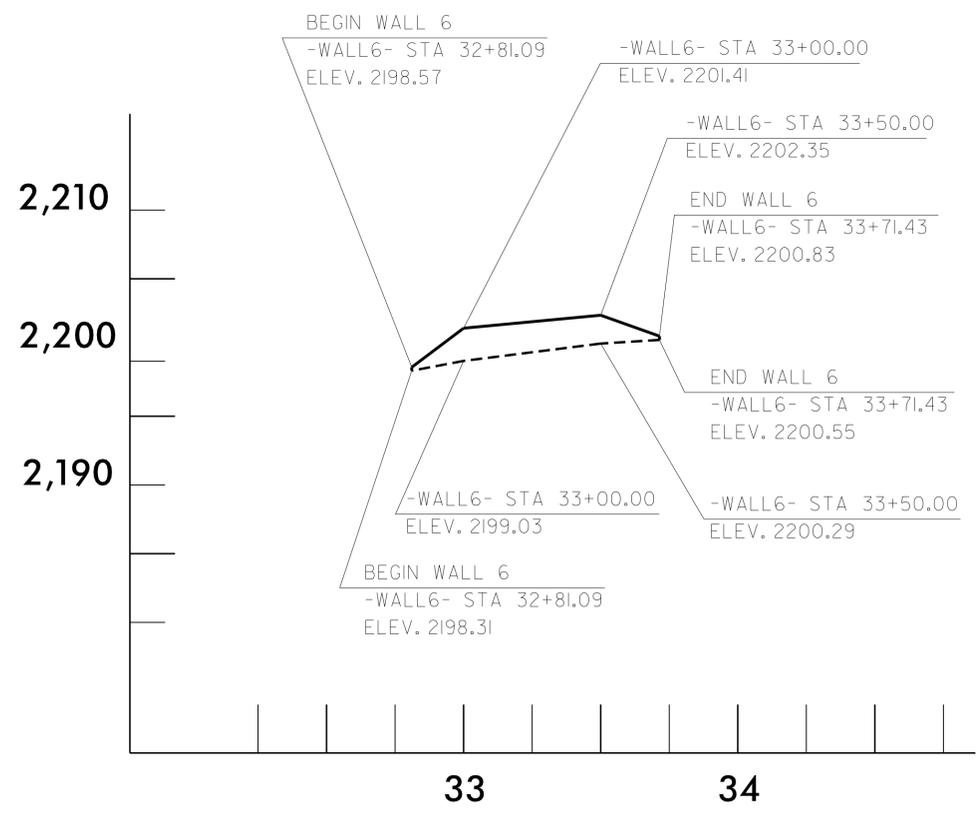
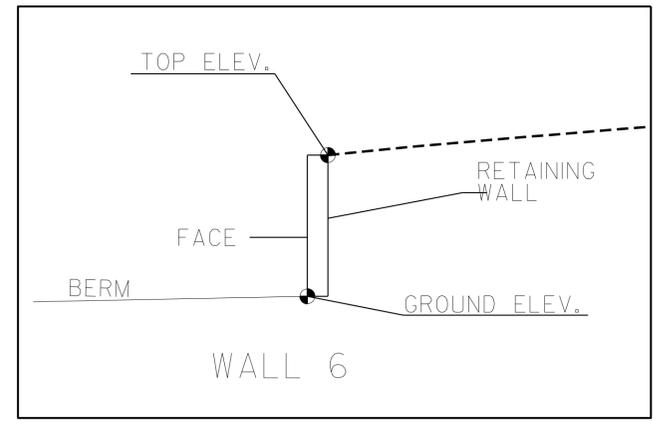
Shane C. Clark

8/21/2015

SIGNATURE DATE SIGNATURE DATE



LOCATION SKETCH



WALL ENEVELOPE

ESTIMATED WALL QUANTITY

RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQUARE FEET)
6	165

PROJECT NO.: U-5104

TRANSYLVANIA COUNTY

STATION: 32+81.09 -L- TO 33+71.43 -L-

SHEET 4 OF 10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

CAST IN PLACE (CIP) GRAVITY RETAINING WALL #6

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

SHEET NO. W-13

PREPARED BY: EJS DATE: 7/15

REVIEWED BY: SCC DATE: 7/15

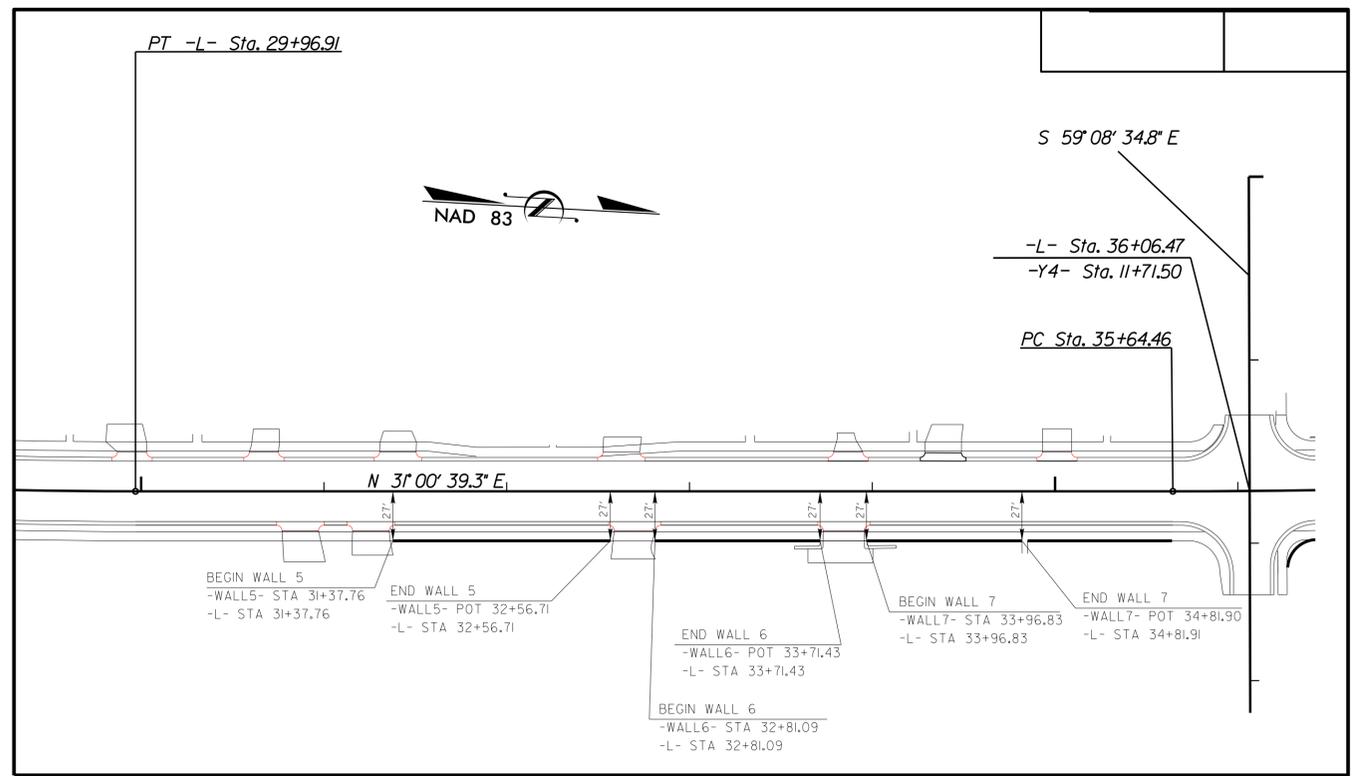
GEOTECHNICAL ENGINEER

ENGINEER

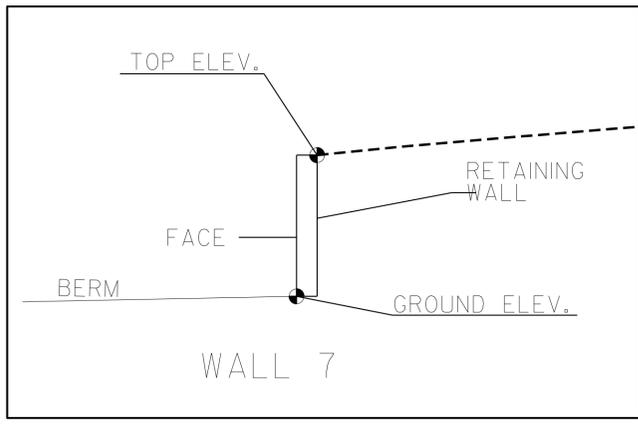
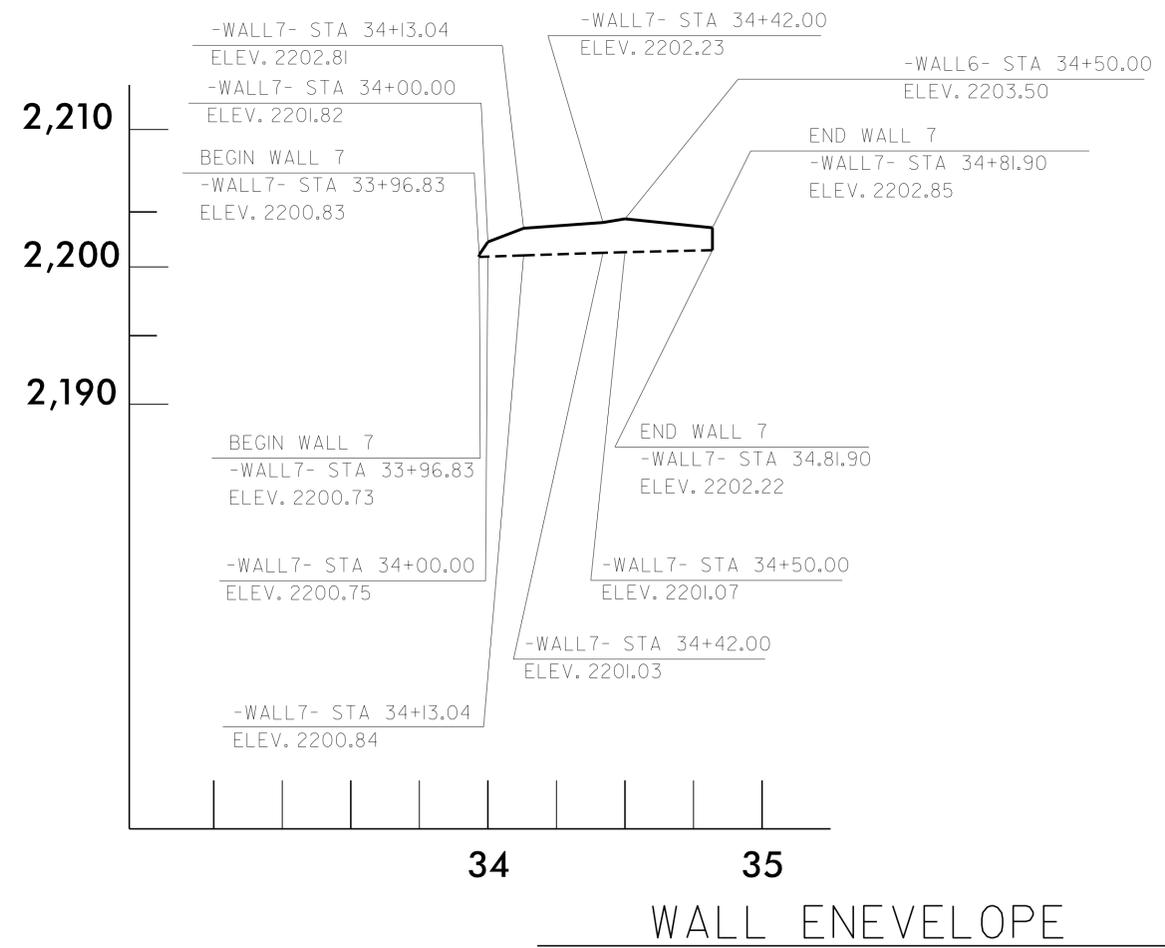
SEAL 29869

8/21/2015

SIGNATURE DATE SIGNATURE DATE



LOCATION SKETCH



ESTIMATED WALL QUANTITY

RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQUARE FEET)
7	170

PROJECT NO.: U-5104

TRANSYLVANIA COUNTY

STATION: 33+96.83 -L- TO 34+81.91 -L-

SHEET 5 OF 10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

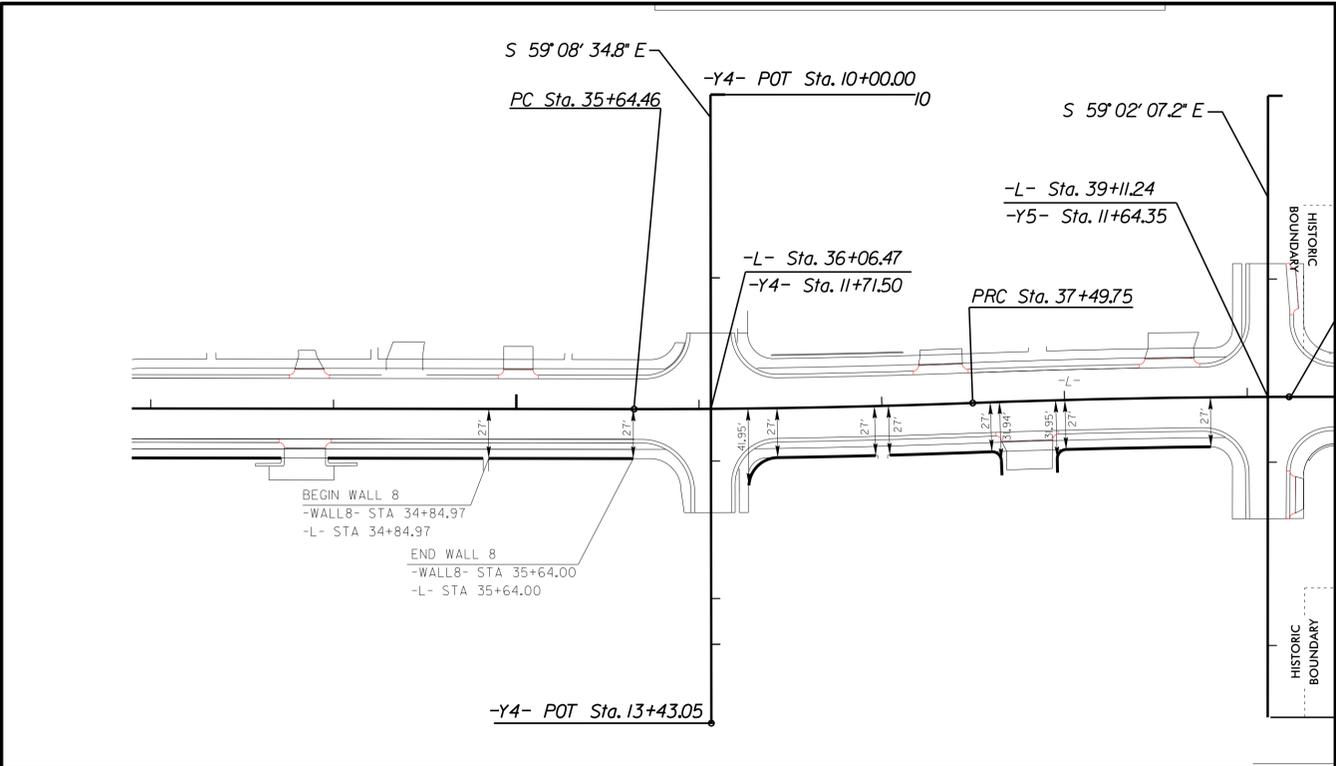
CAST IN PLACE (CIP) GRAVITY RETAINING WALL #7

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

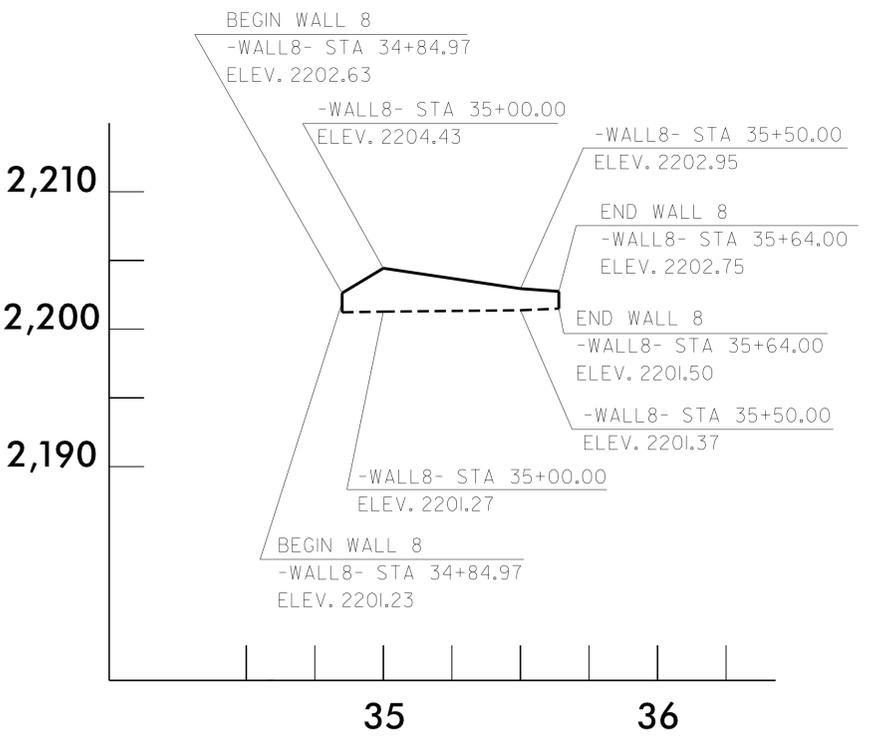
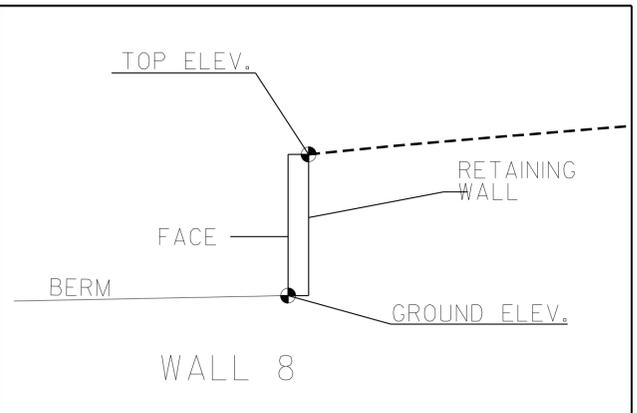
SHEET NO. W-14

PREPARED BY: EJS DATE: 7/15

REVIEWED BY: SCC DATE: 7/15



LOCATION SKETCH



WALL ENEVELOPE

ESTIMATED WALL QUANTITY

RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQUARE FEET)
8	175

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 34+84.97 -L- TO 35+64.00 -L-
 SHEET 6 OF 10

PREPARED BY: EJS DATE: 7/15
 REVIEWED BY: SCC DATE: 7/15


NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

CAST IN PLACE (CIP) GRAVITY RETAINING WALL #8

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

GEOTECHNICAL ENGINEER

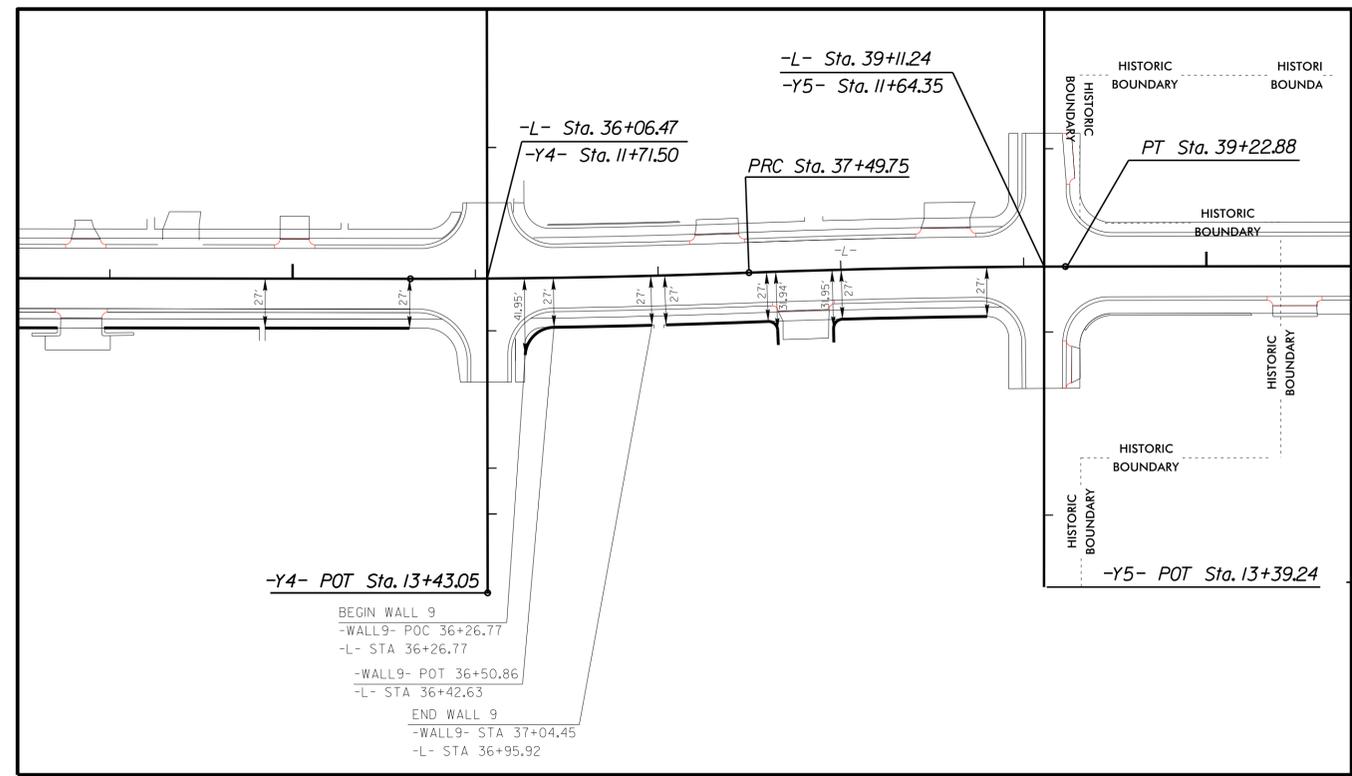
ENGINEER

SEAL 29869

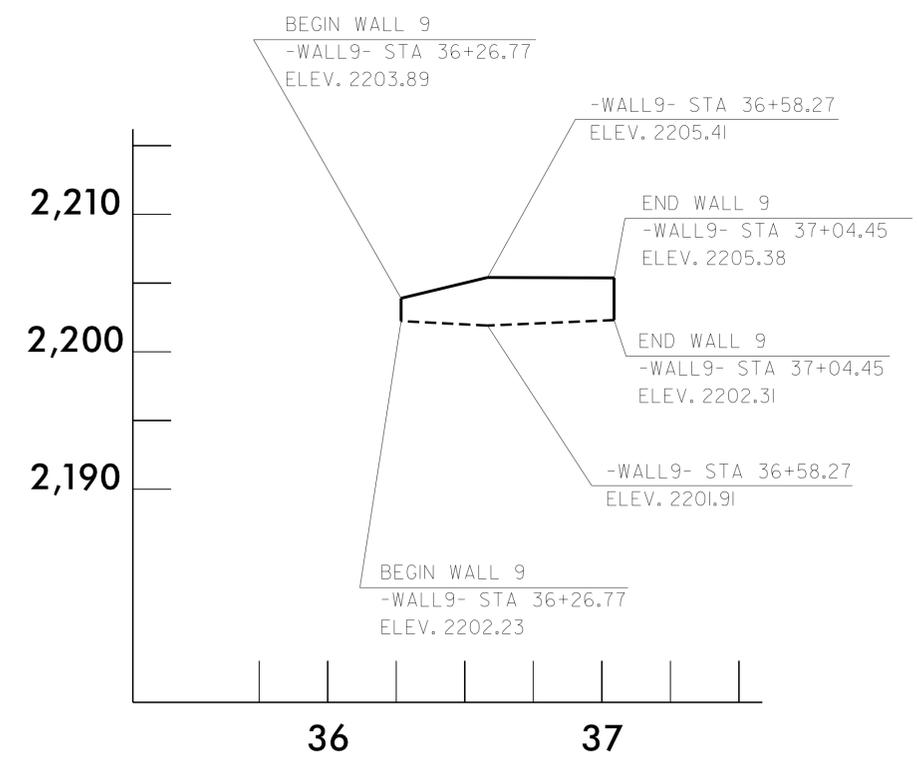
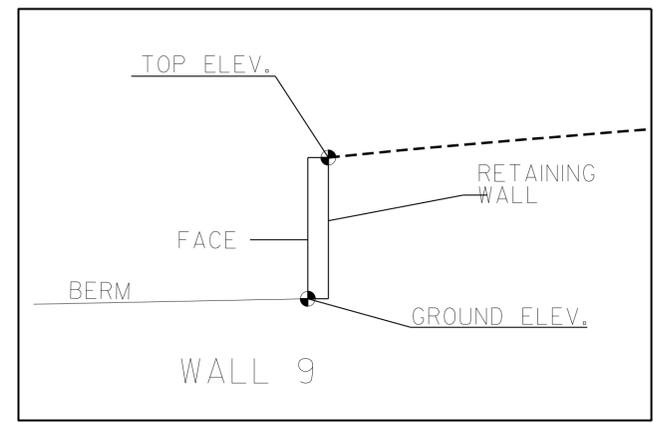
Slane C. Clark

8/21/2015

SIGNATURE DATE SIGNATURE DATE



LOCATION SKETCH



WALL ENEVELOPE

ESTIMATED WALL QUANTITY

RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQ. FEET)
9	235

PROJECT NO.: U-5104

TRANSYLVANIA COUNTY

STATION: 36+26.77 -L- TO 36+95.92 -L-

SHEET 7 OF 10

PREPARED BY: EJS DATE: 7/15

REVIEWED BY: SCC DATE: 7/15

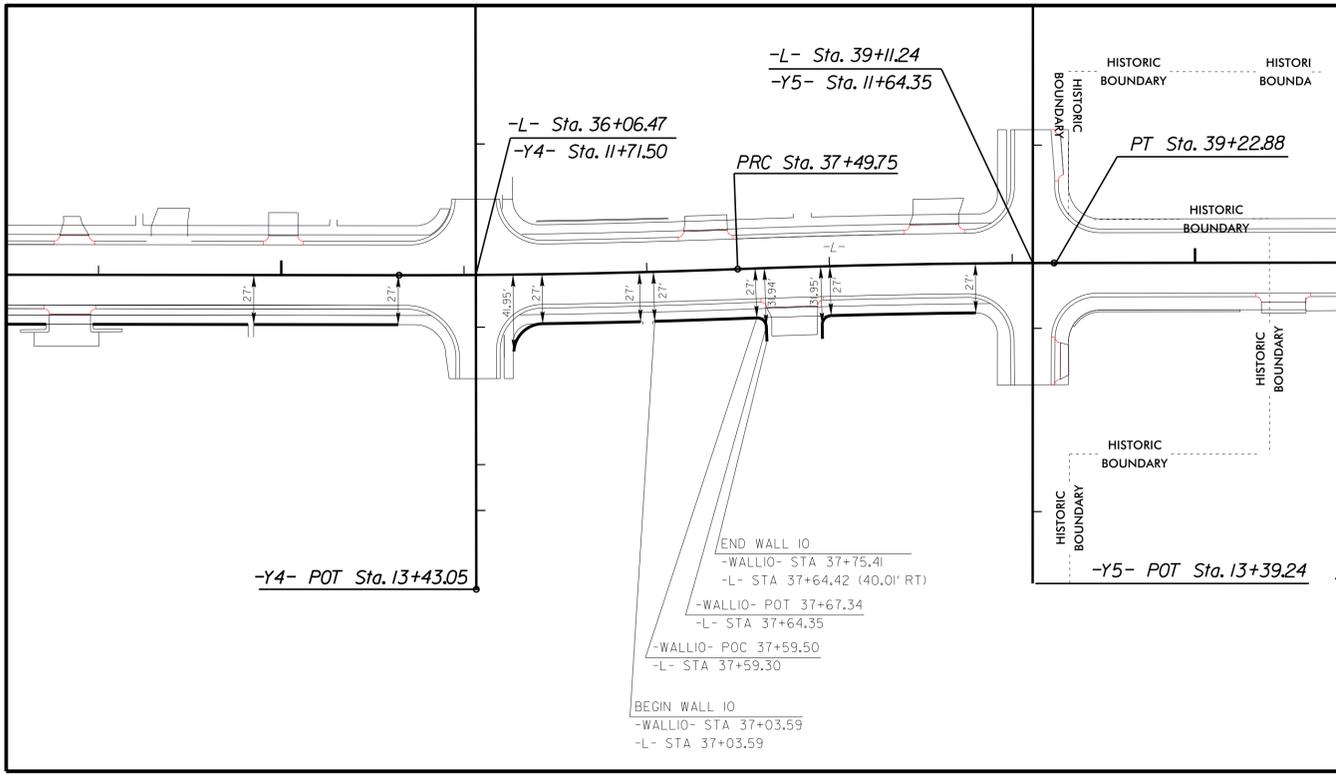
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

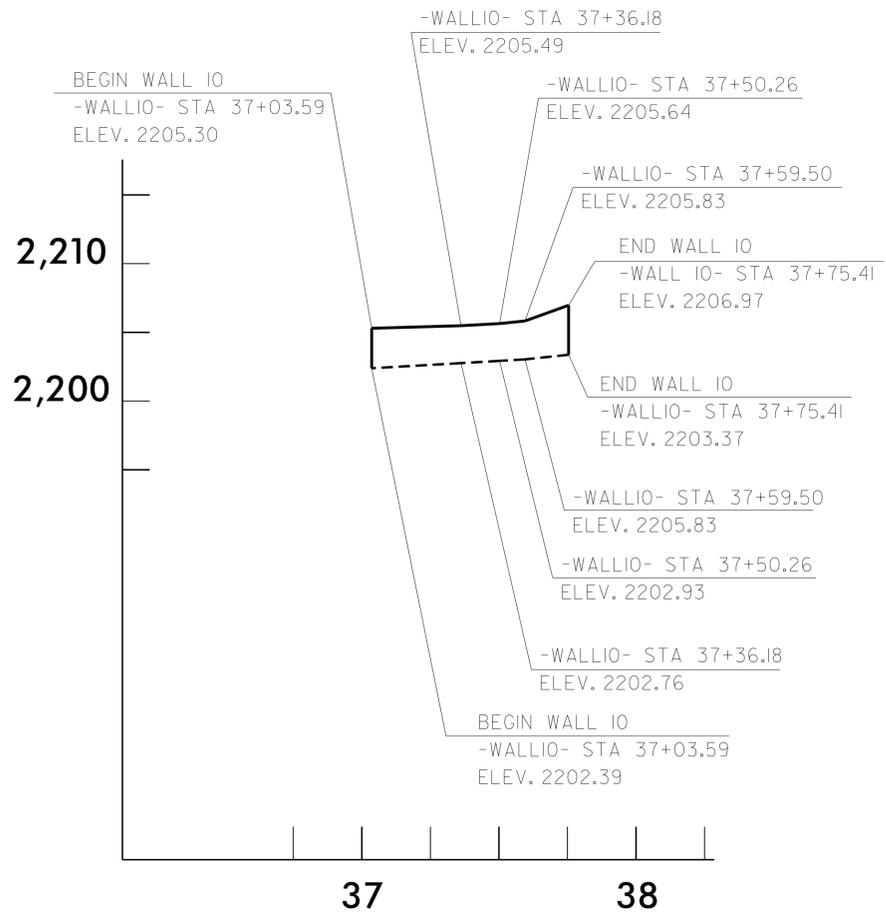
CAST IN PLACE (CIP) GRAVITY RETAINING WALL #9

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-16
2			4			

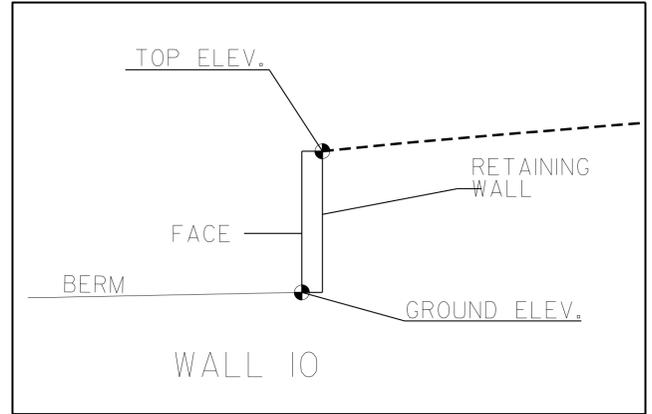
GEOTECHNICAL ENGINEER  SIGNATURE: _____ DATE: 8/21/2015	ENGINEER SIGNATURE: _____ DATE: _____
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LOCATION SKETCH



WALL ENEVELOPE



ESTIMATED WALL QUANTITY	
RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQUARE FEET)
10	210

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 37+03.59 -L- TO 37+64.42 -L-
 SHEET 8 OF 10



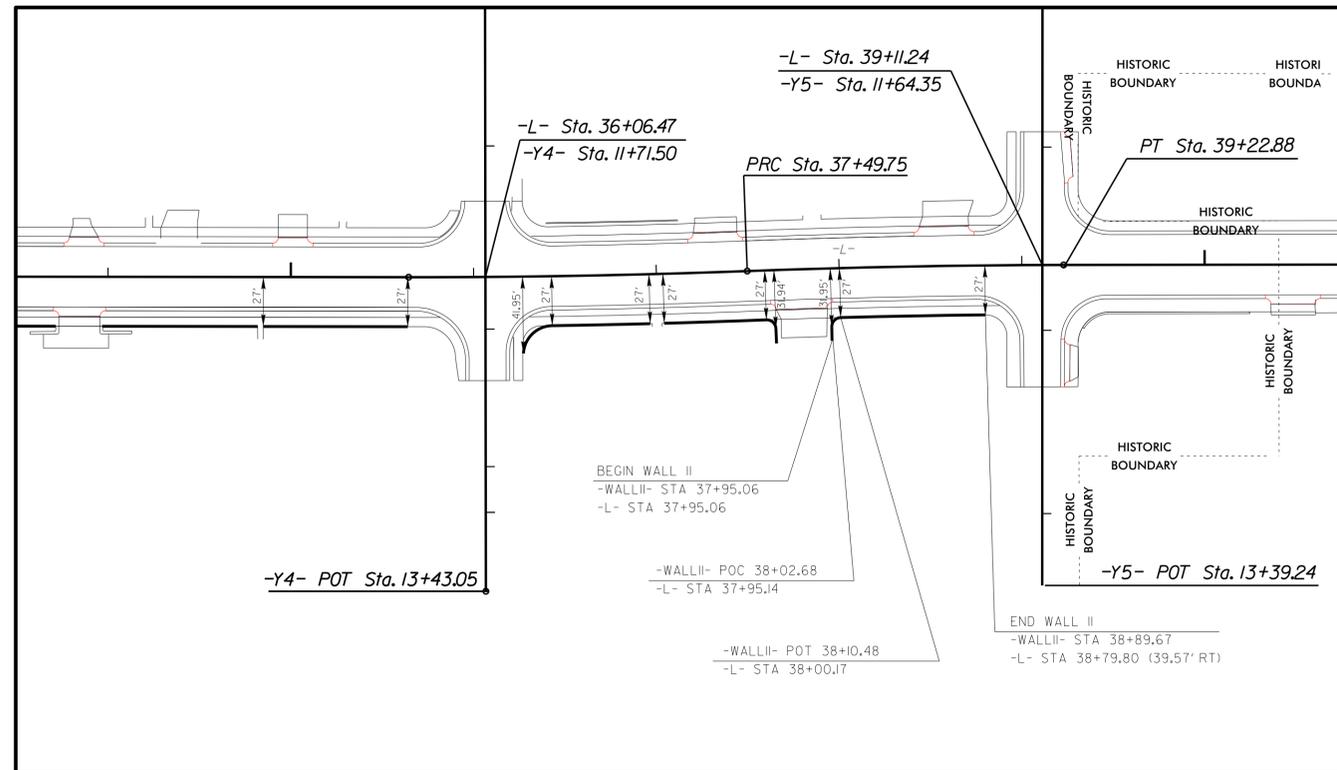
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

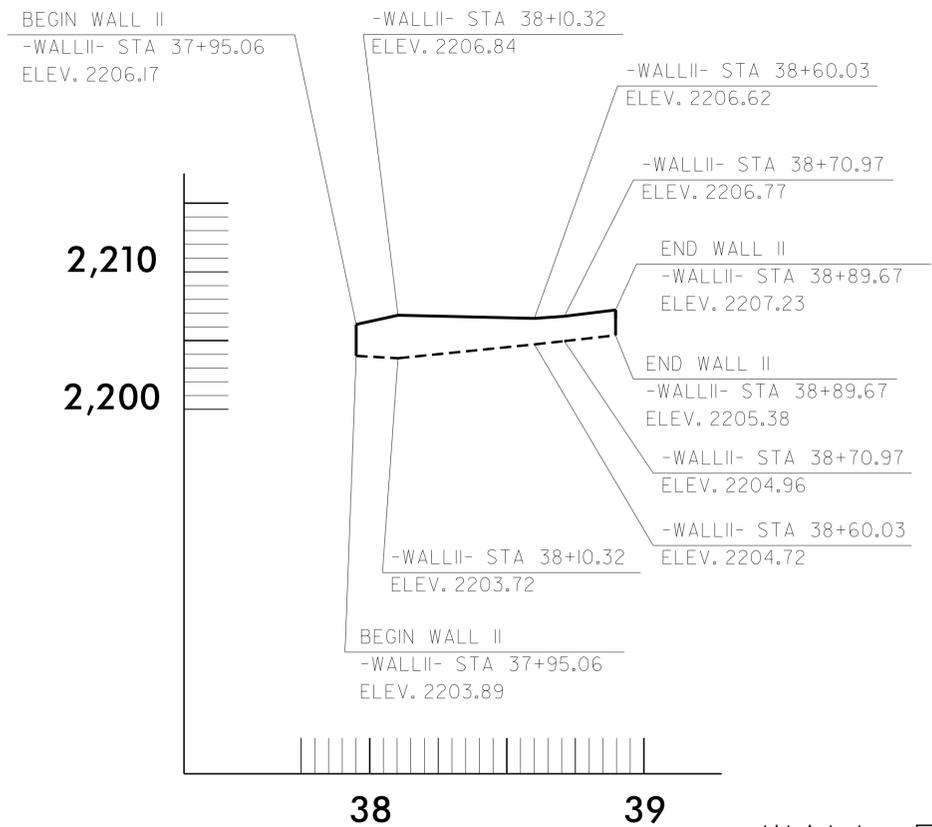
CAST IN PLACE (CIP) GRAVITY RETAINING WALL #10					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PREPARED BY: EJS DATE: 7/15
 REVIEWED BY: SCC DATE: 7/15

SHEET NO. W-17

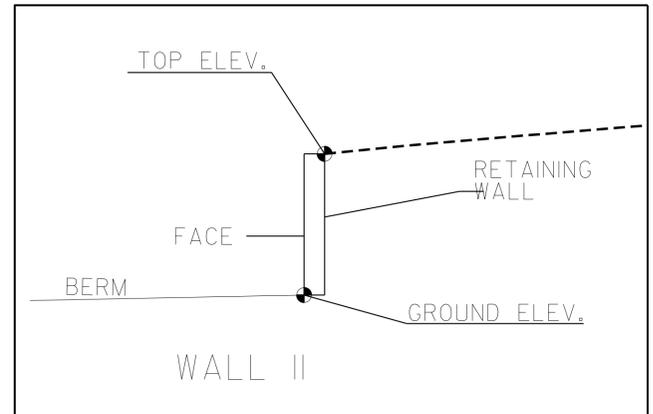


LOCATION SKETCH



WALL ENEVELOPE

Professional Engineer Seal for Shanon C. Clark, License No. 29869, State of North Carolina. The seal is dated 8/21/2015.



ESTIMATED WALL QUANTITY	
RETAINING WALL NO.	CAST-IN-PLACE GRAVITY RETAINING WALL (SQ. FEET)
11	225

PROJECT NO.: U-5104
 TRANSYLVANIA COUNTY
 STATION: 37+95.06 -L- TO 38+79.80 -L-
 SHEET 9 OF 10

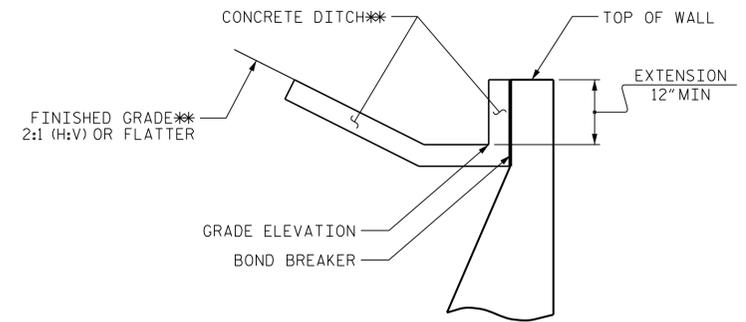
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

CAST IN PLACE (CIP) GRAVITY RETAINING WALL #11

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

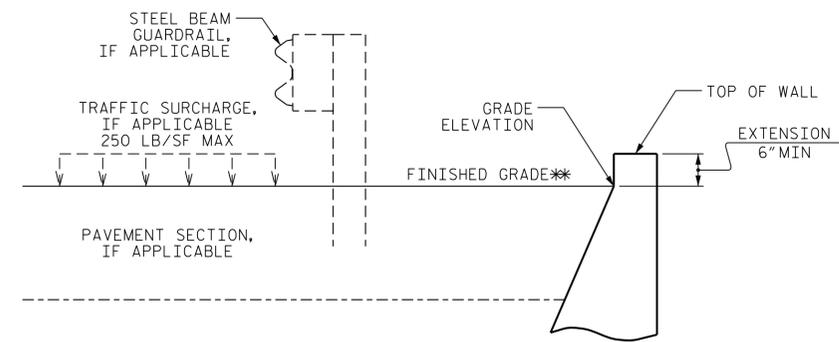
SHEET NO. W-18

PREPARED BY: EJS DATE: 7/15
 REVIEWED BY: SCC DATE: 7/15



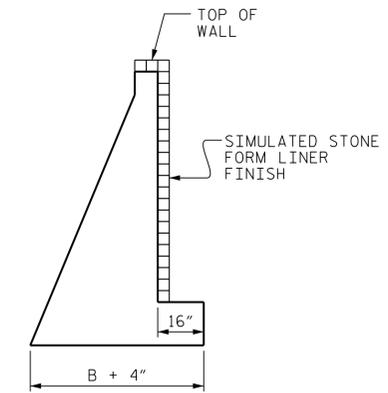
SLOPE CASE

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



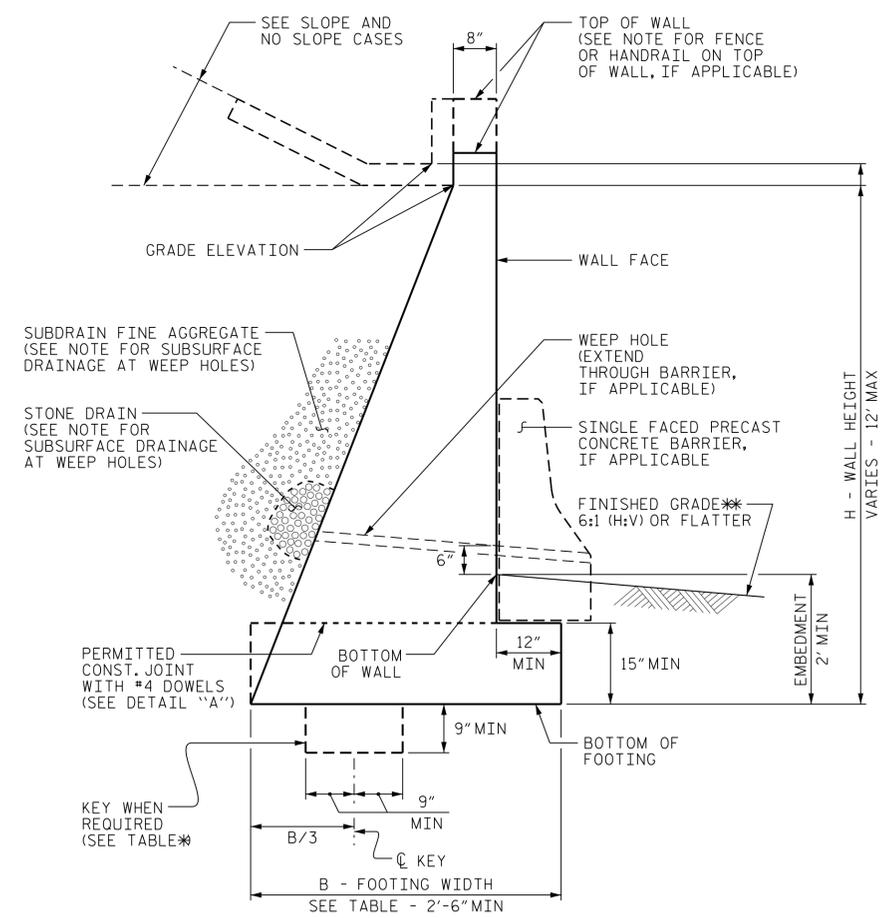
NO SLOPE CASE

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



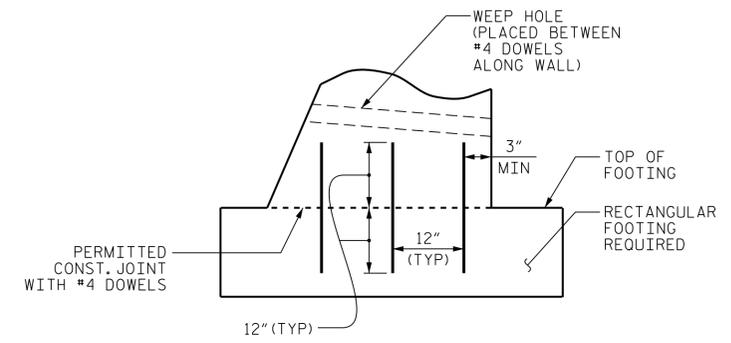
SIMULATED STONE FORM LINER FINISH

(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

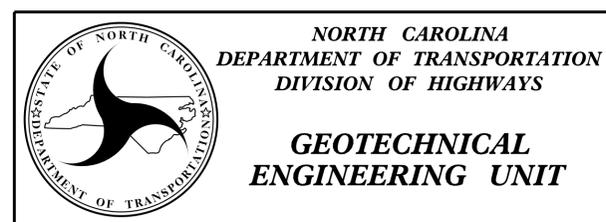
B/H RATIO (B = 2'-6" MIN)

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

NOTES:

- FOR STANDARD CAST-IN-PLACE (CIP) GRAVITY RETAINING WALLS, SEE CAST-IN-PLACE GRAVITY RETAINING WALLS PROVISION.
- 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, $\gamma = 120$ LB/CF
FRICTION ANGLE, $\phi = 35$ DEGREES (GROUNDWATER WITHIN 7' OF BOTTOM OF FOOTING)
FRICTION ANGLE, $\phi = 30$ DEGREES (GROUNDWATER MORE THAN 7' BELOW BOTTOM OF FOOTING)
COHESION, $c = 0$ LB/SF
- 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.
- CONCRETE STEPS ARE REQUIRED BETWEEN WALLS 3 AND 4, 7 AND 8, AND 9 AND 10. SEE ROADWAY PLANS FOR DETAILS

PROJECT NO.: U-5104
TRANSYLVANIA COUNTY
STATION: 24+81.38 -L- to 38+79.80 -L-
SHEET 10 OF 10 WALLS 3 - 11



STANDARD CAST-IN-PLACE (CIP) GRAVITY RETAINING WALL

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

SHEET NO. W-19