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GEOTECHNICAL ENGINEER

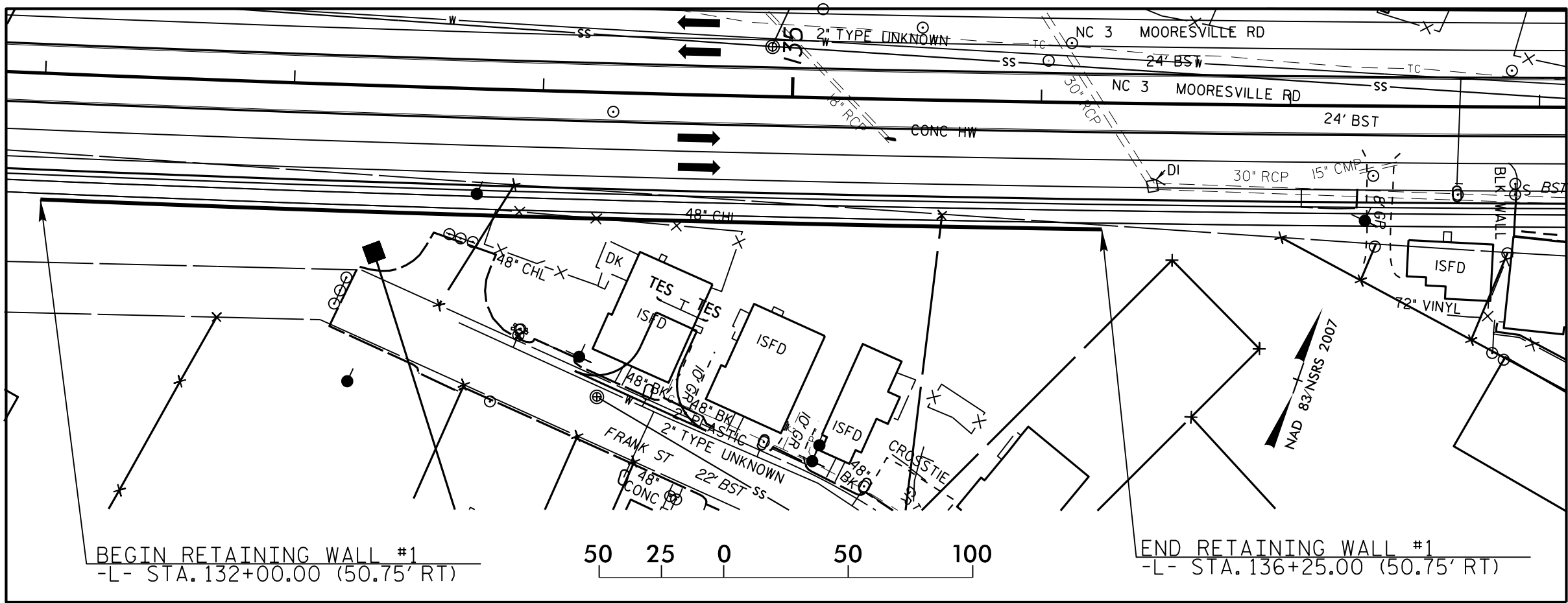
ENGINEER

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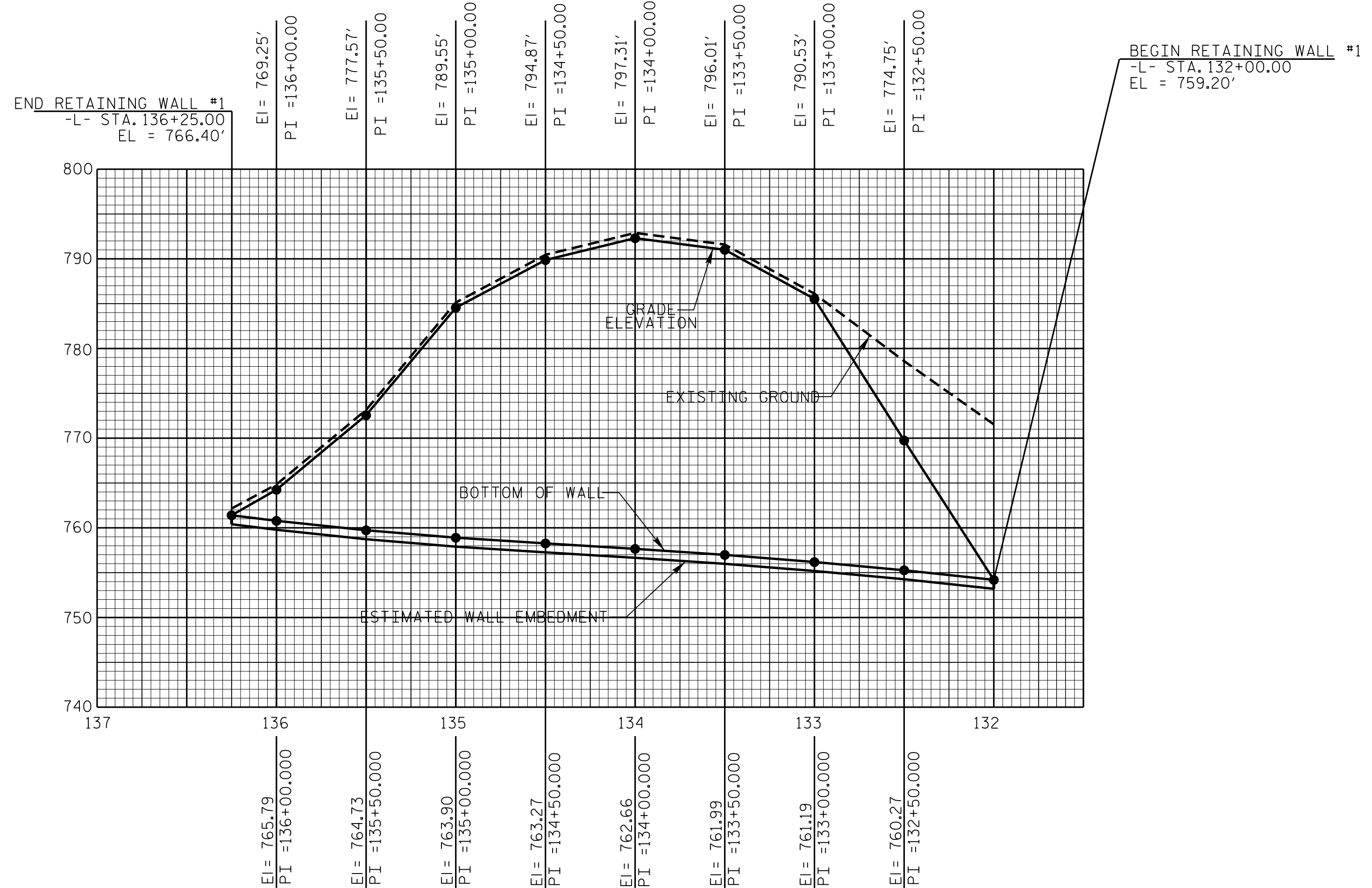
DocuSigned by:  
**Michael H. Stephens** 8/1/2016  
C44786202314CC1 SIGNATURE DATE

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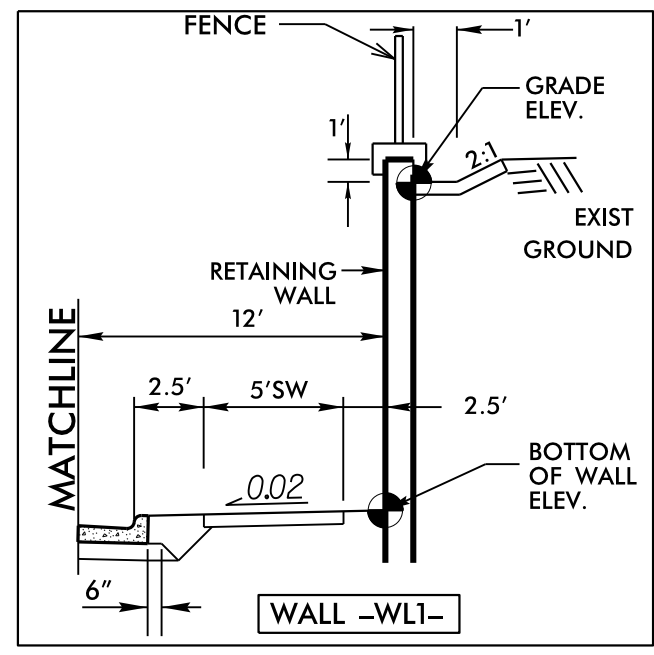


PLAN VIEW - RETAINING WALL NO. 1



WALL ENVELOPE - RETAINING WALL NO. 1

NOTE: OFFSET DIMENSIONS ARE FROM FACE OF WALL



ESTIMATED SOIL NAIL WALL QUANTITIES

RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
WALL #1	9,690 SF	2	26

\* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

PROJECT NO.: 39010.1.R2 (U-3440)  
 CABARRUS COUNTY  
 STATION: 132+00 -L- TO 136+25 -L-  
 SHEET 1 OF 9

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

**GEOTECHNICAL  
 ENGINEERING UNIT**

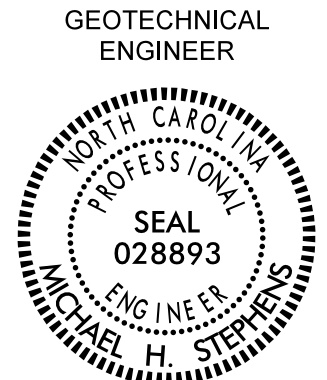
**RETAINING WALL NO. 1  
 SOIL NAIL WALL**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W1
2			4			

PREPARED BY: MHS      DATE: 7/25/2016  
 REVIEWED BY: SCC      DATE: 7/25/2016

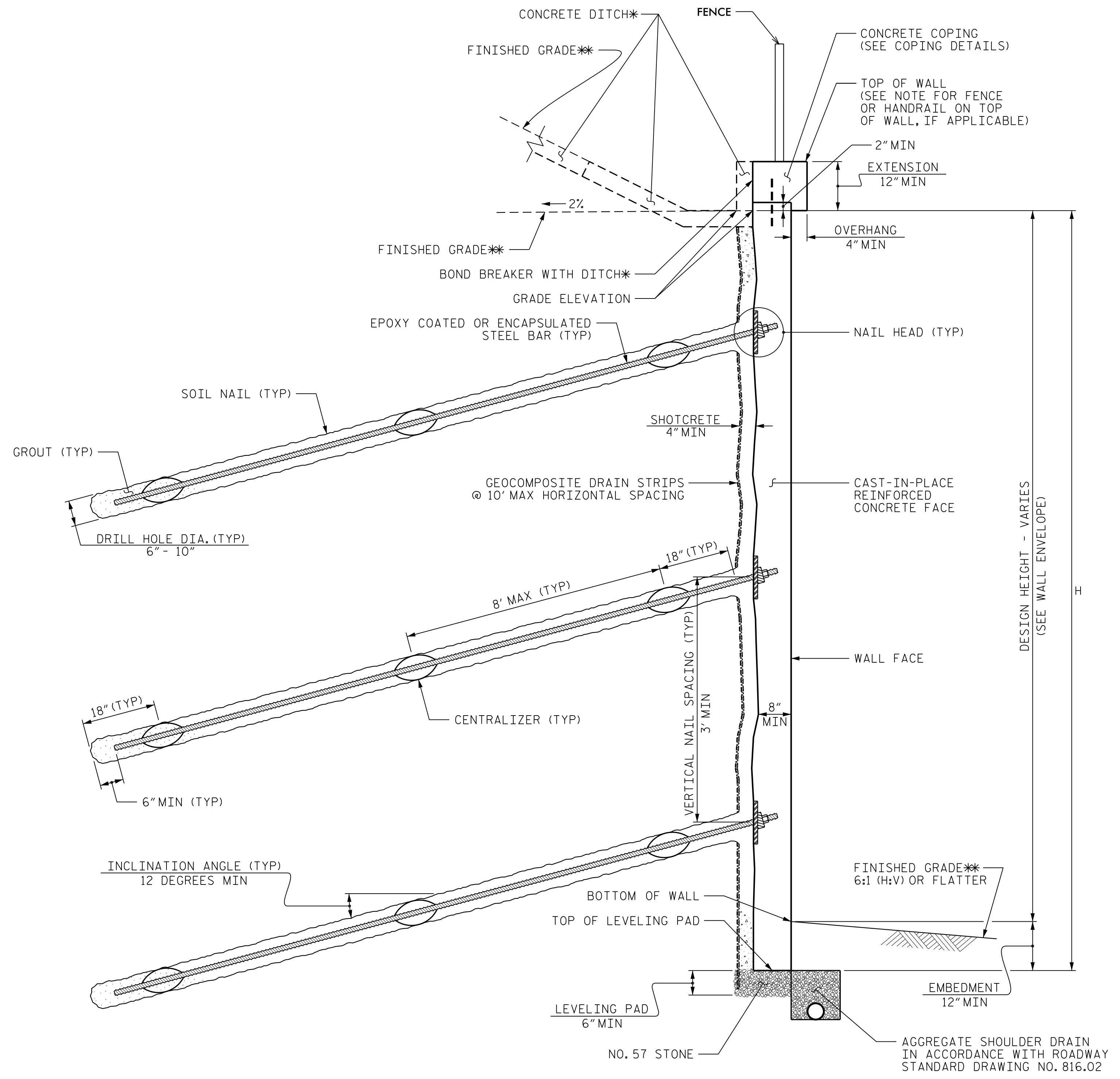
GEOTECHNICAL ENGINEER

ENGINEER



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**Michael H. Stephens**  
8/1/2016

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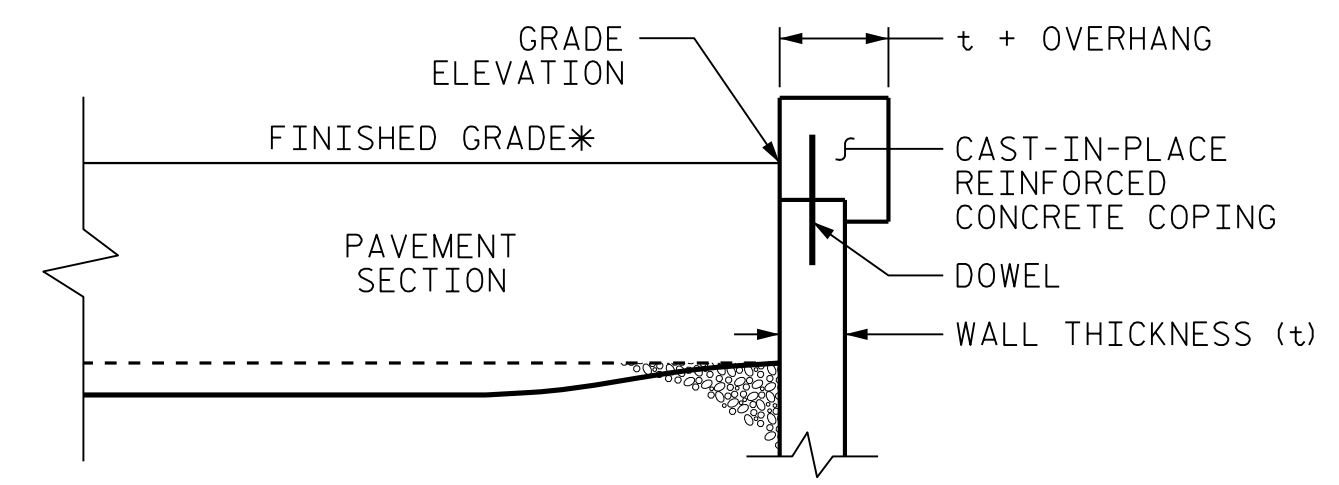


**SOIL NAIL WALL - TYPICAL SECTION**

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

**NOTES:**

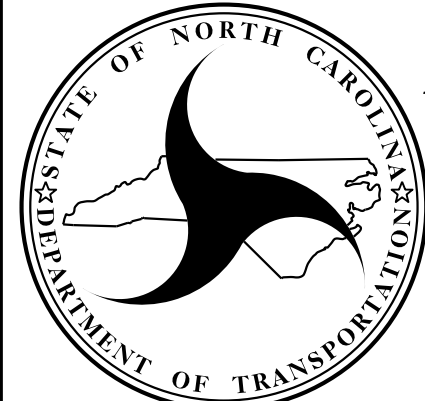
- FOR SOIL NAIL RETAINING WALLS, SEE SOIL NAIL RETAINING WALLS PROVISION.
  - FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.
  - FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.
  - A FENCE IS REQUIRED ON TOP OF RETAINING WALL NO. 1. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
  - A SIMULATED BRICK FORM LINER FINISH IS REQUIRED FOR THE CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 1. SUBMIT BRICK FORM LINER SAMPLES FOR APPROVAL BEFORE BEGINNING SOIL NAIL WALL CONSTRUCTION. SEE SIMULATED BRICK FORM LINER FINISH SPECIAL PROVISION.
  - 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) H = DESIGN HEIGHT + EMBEDMENT
  - 2) DESIGN LIFE = 100 YEARS
  - 3) MINIMUM EMBEDMENT ELEVATION = 1 FT
  - 4) IN-SITU ASSUMED MATERIAL PARAMETERS FOR RESIDUAL SOIL:  
UNIT WEIGHT,  $\gamma = 120$  LB/CF  
FRICTION ANGLE,  $\phi = 30$  DEGREES
  - 5) IN-SITU ASSUMED MATERIAL PARAMETERS FOR PARTIALLY WEATHER ROCK:  
UNIT WEIGHT,  $\gamma = 135$  LB/CF  
FRICTION ANGLE,  $\phi = 36$  DEGREES
- 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 MAY INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. 1.



**COPING DETAILS**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: 39010.1.R2 (U-3440)  
 CABARRUS COUNTY  
 STATION: 132+00 -L- TO 136+25 -L-  
 SHEET 2 OF 9



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

**GEOTECHNICAL  
ENGINEERING UNIT**

REVISIONS						SHEET NO. W2
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PREPARED BY: MHS	DATE: 7/25/2016
REVIEWED BY: SCC	DATE: 7/25/2016



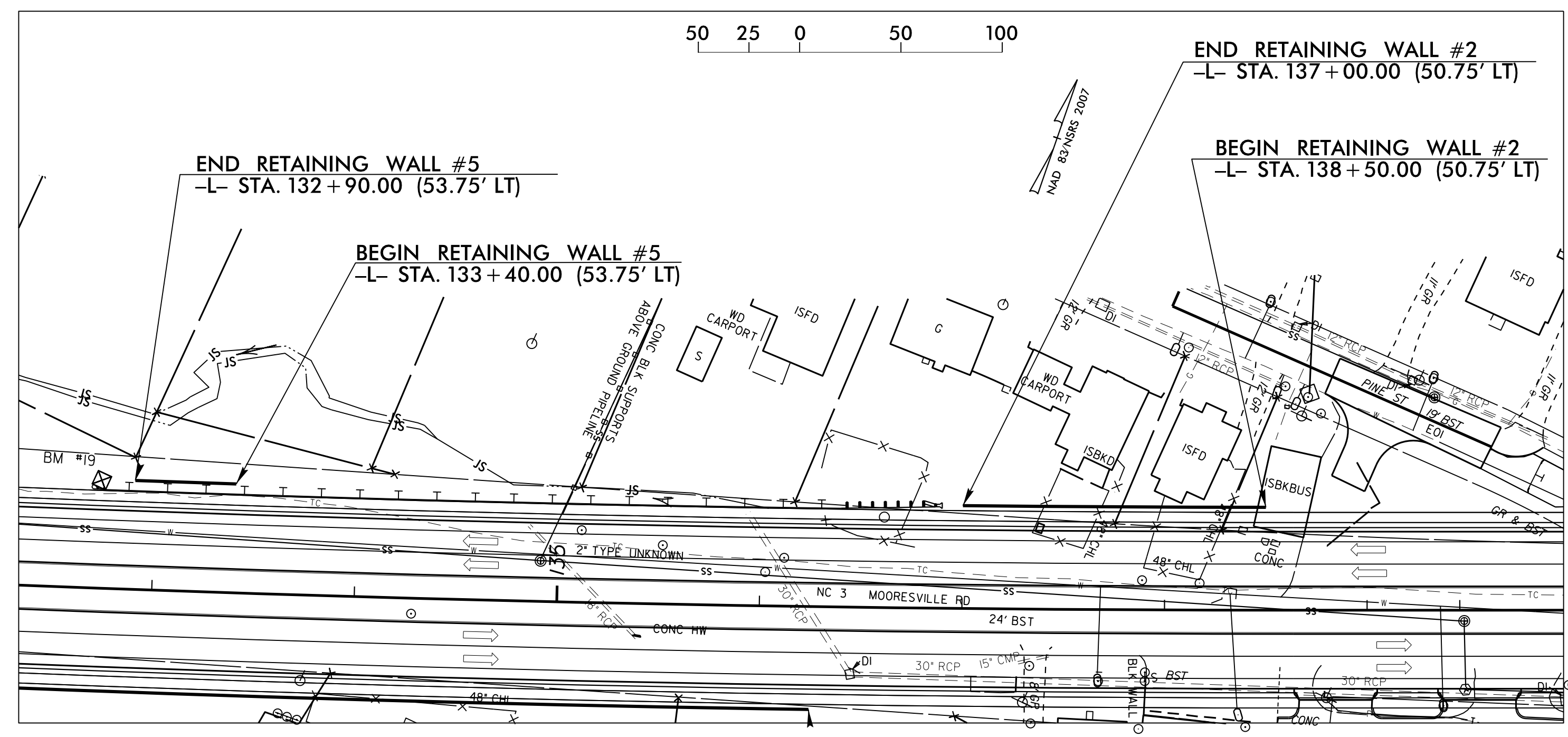
GEOTECHNICAL ENGINEER

ENGINEER

DocuSigned by: Michael Stephens 8/16/2016

DATE: 8/16/2016

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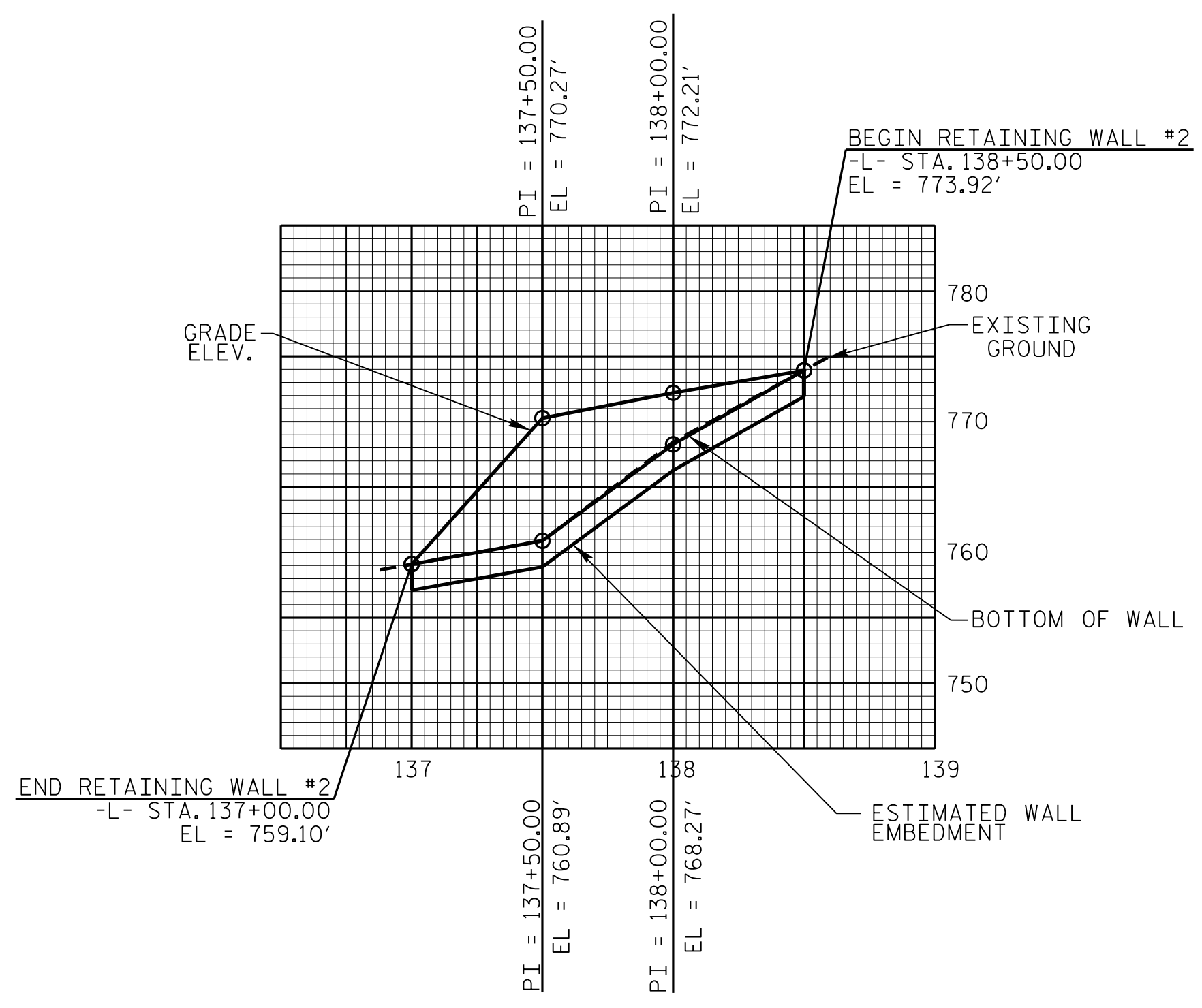


PLAN VIEW - RETAINING WALL NOS. 2 AND 5

FRONT SLOPE WALL EMBEDMENT

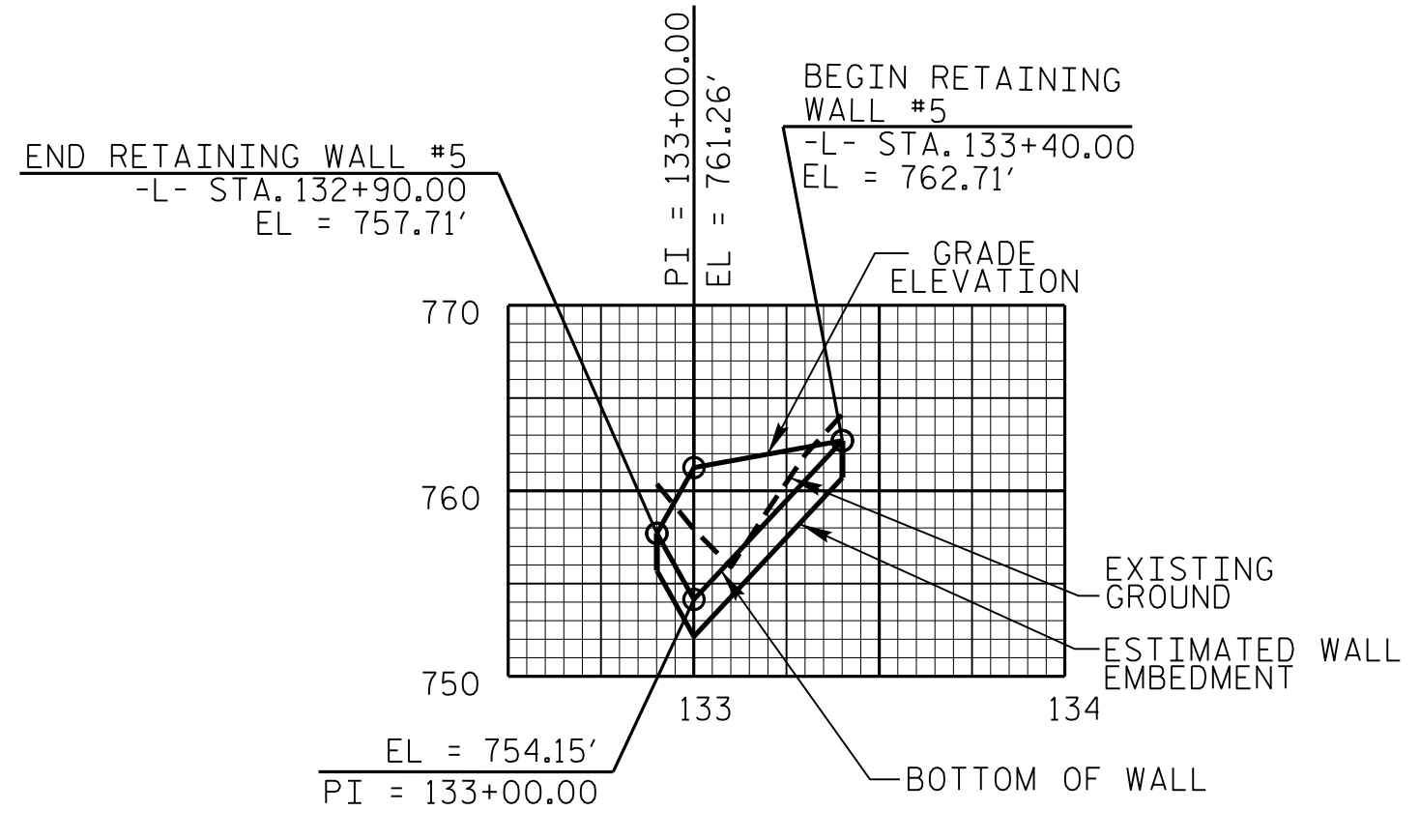
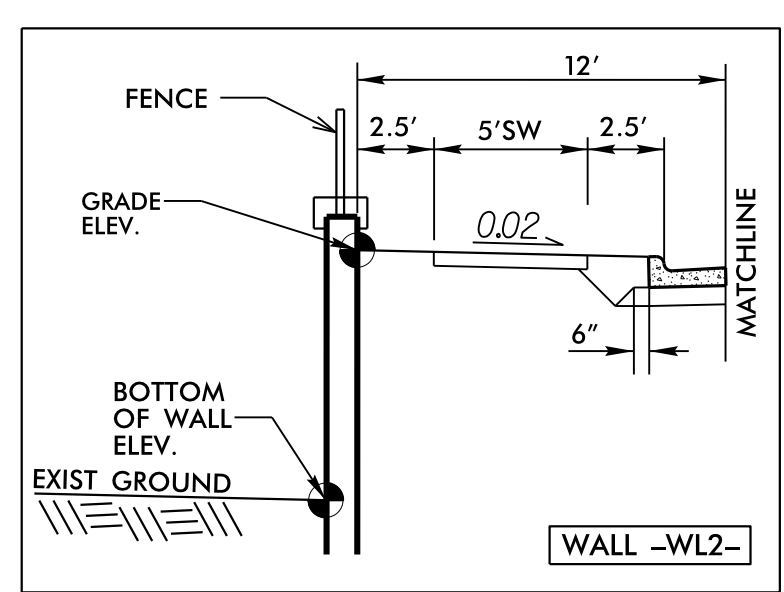
SLOPE IN FRONT OF STRUCTURES		MINIMUM EMBEDMENT DEPTH
HORIZONTAL	FOR WALLS	H/20
	FOR ABUTMENTS	H/10
3.0H:1.0V	WALLS	H/10
2.5H:1.0V	WALLS	H/8.5
2.0H:1.0V	WALLS	H/7
1.5H:1.0V	WALLS	H/5
1.25H:1.0V	WALLS	H/4
1.0H:1.0V	WALLS	H/3

NOTE:  
 1) MAINTAIN A MINIMUM BENCH WIDTH OF 4.0 IN FRONT OF THE WALL FOR ITS ENTIRE LENGTH.  
 2) MINIMUM EMBEDMENT DEPTH OF 2 FT. UNLESS LARGER DEPTHS DICTATED BY THE ABOVE TABLE.  
 3) MAXIMUM SLOPE OF 1H:1V WILL BE MAINTAINED ON FRONT SLOPES FOR THE ENTIRE LENGTH OF THE WALL.  
 4) SUBMIT WITH THE WALL DESIGN INTERNAL, EXTERNAL, AND GLOBAL STABILITY ANALYSES.



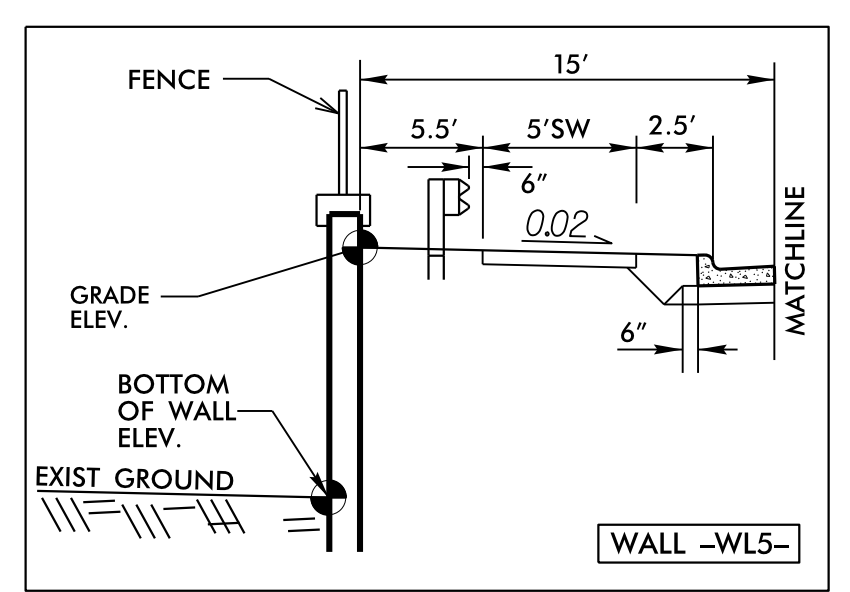
WALL ENVELOPE - RETAINING WALL NO. 2

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL  
 2) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL



WALL ENVELOPE - RETAINING WALL NO. 5

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL  
 2) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL



MSE RETAINING WALL QUANTITIES		
RETAINING WALL NO. 2	-WL2-	* 970 SQUARE FEET
RETAINING WALL NO. 5	-WL5-	* 280 SQUARE FEET

\* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS

**GEOTECHNICAL ENGINEERING UNIT**


PROJECT NO.: 39010.1.R2 (U-3440)  
 CABARRUS COUNTY  
 STATION: RWALL2: 138+50 -L- TO 137+00 -L-  
 RWALL5: 133+40 -L- TO 132+90 -L-  
 SHEET 3 OF 9

RETAINING WALL NOS. 2 AND 5  
 MSE RETAINING WALL

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

PREPARED BY: MHS DATE: 7/25/2016  
 REVIEWED BY: SCC DATE: 7/25/2016

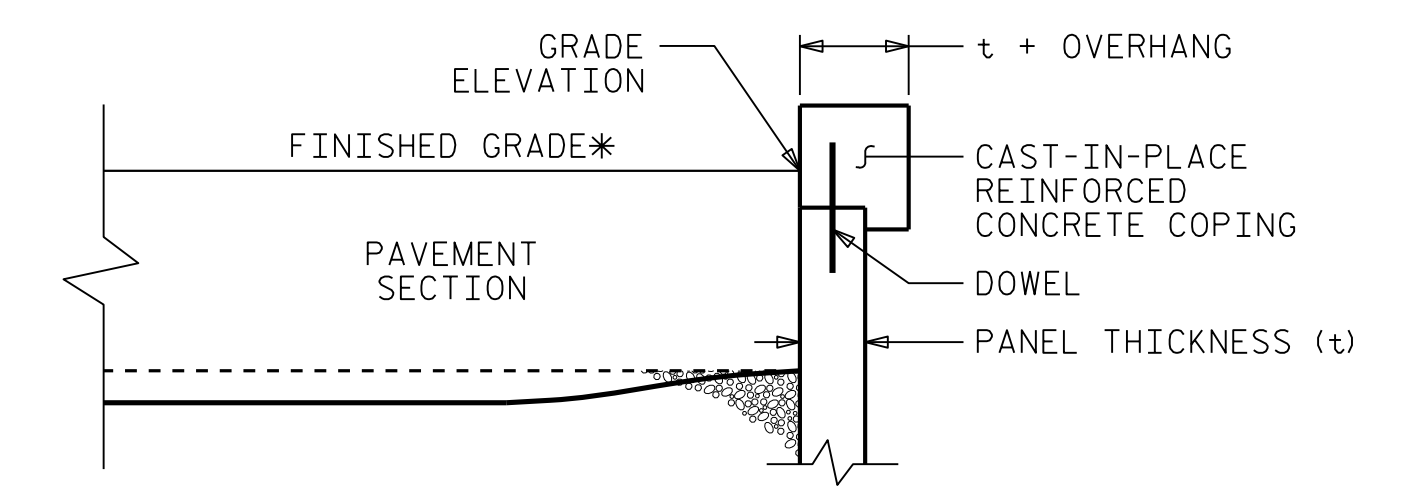
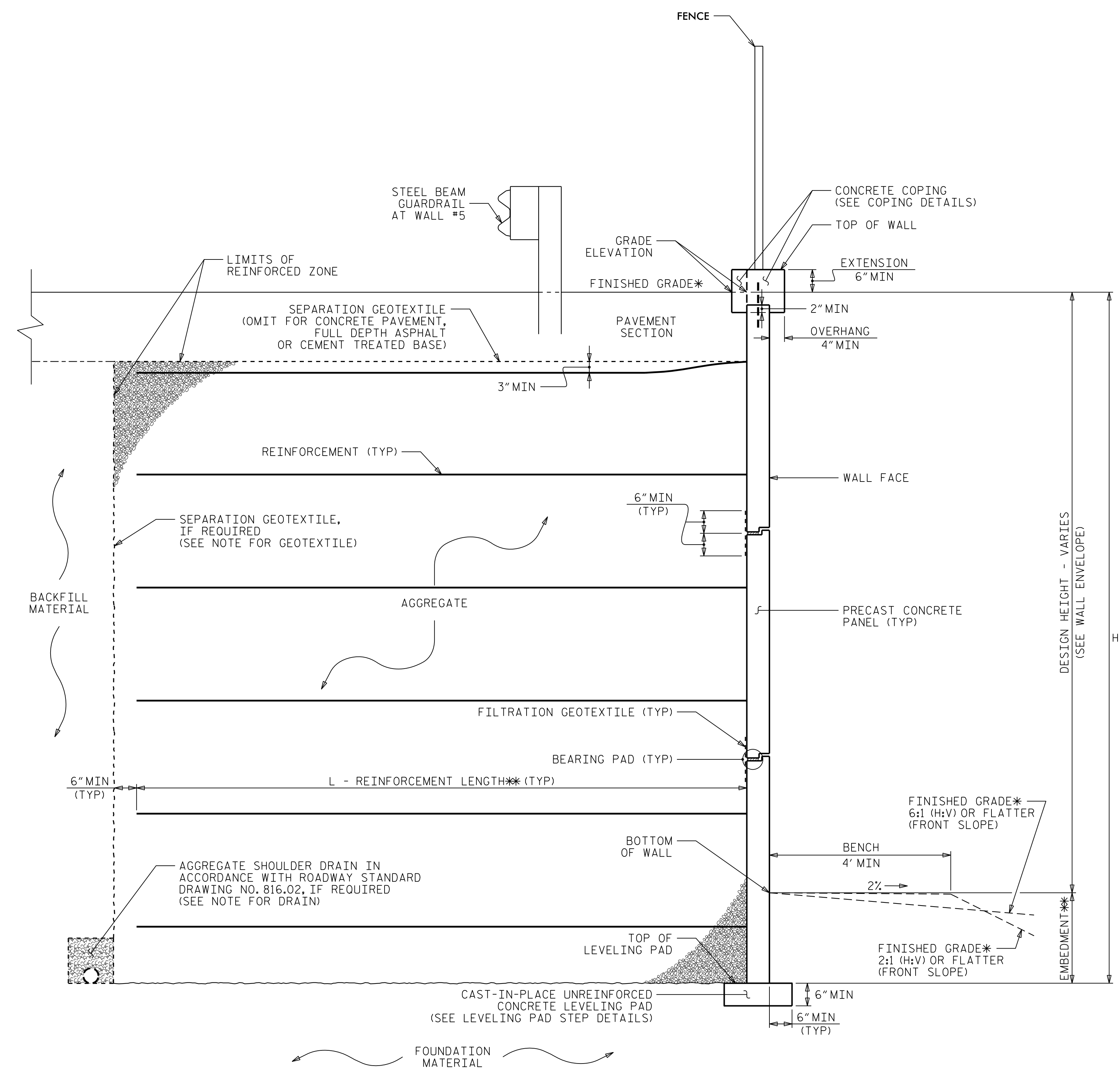
GEOTECHNICAL ENGINEER



ENGINEER

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**Michael H. Stephens**  
C4478280234 ACC  
SIGNATURE      8/1/2016      DATE  
SIGNATURE      DATE

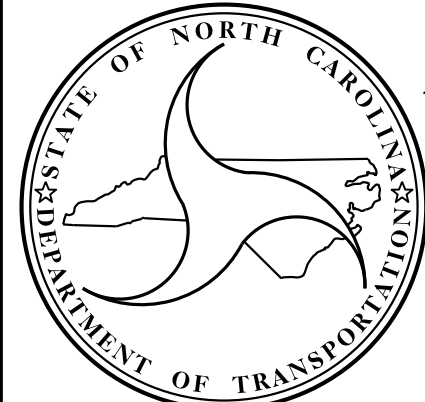
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\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: 39010.1.R2 (U-3440)  
 CABARRUS COUNTY  
 STATION: RWALL2: 138+50 -L- TO 137+00 -L-  
 SHEET 4 OF 9 RWALL5: 133+40 -L- TO 132+90 -L-

PREPARED BY: MHS      DATE: 7/25/2016  
 REVIEWED BY: SCC      DATE: 7/25/2016



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

**GEOTECHNICAL  
ENGINEERING UNIT**

REVISIONS						SHEET NO. W4
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



GEOTECHNICAL ENGINEER

ENGINEER

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DocuSigned by: Michael Stephens 10/27/2016

DATE      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 FOR WALL NO. 5.

A FENCE IS REQUIRED ON TOP OF RETAINING WALL NOS. 2 AND 5. SEE ROADWAY PLANS FOR FENCE ATTACHMENT DETAILS.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NOS. 2 AND 5.

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NOS. 2 AND 5.

A SIMULATED BRICK FORM LINER FINISH IS REQUIRED FOR THE PRECAST CONCRETE PANELS FOR RETAINING WALL NOS. 2 AND 5. SUBMIT BRICK FORM LINER SAMPLES FOR APPROVAL BEFORE BEGINNING MSE WALL CONSTRUCTION. SEE SIMULATED BRICK FORM LINER FINISH SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NOS. 2 AND 5 IF COARSE AGGREGATE IS USED.

A DRAIN IS REQUIRED FOR RETAINING WALL NOS. 2 AND 5.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NOS. 2 AND 5, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NOS. 2 AND 5 FOR THE FOLLOWING:

- 1) H = DESIGN HEIGHT + EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL =  $(3,300)$  LB/SF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
- 5) MINIMUM EMBEDMENT ELEVATION = SEE WALL EMBEDMENT TABLE
- 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:

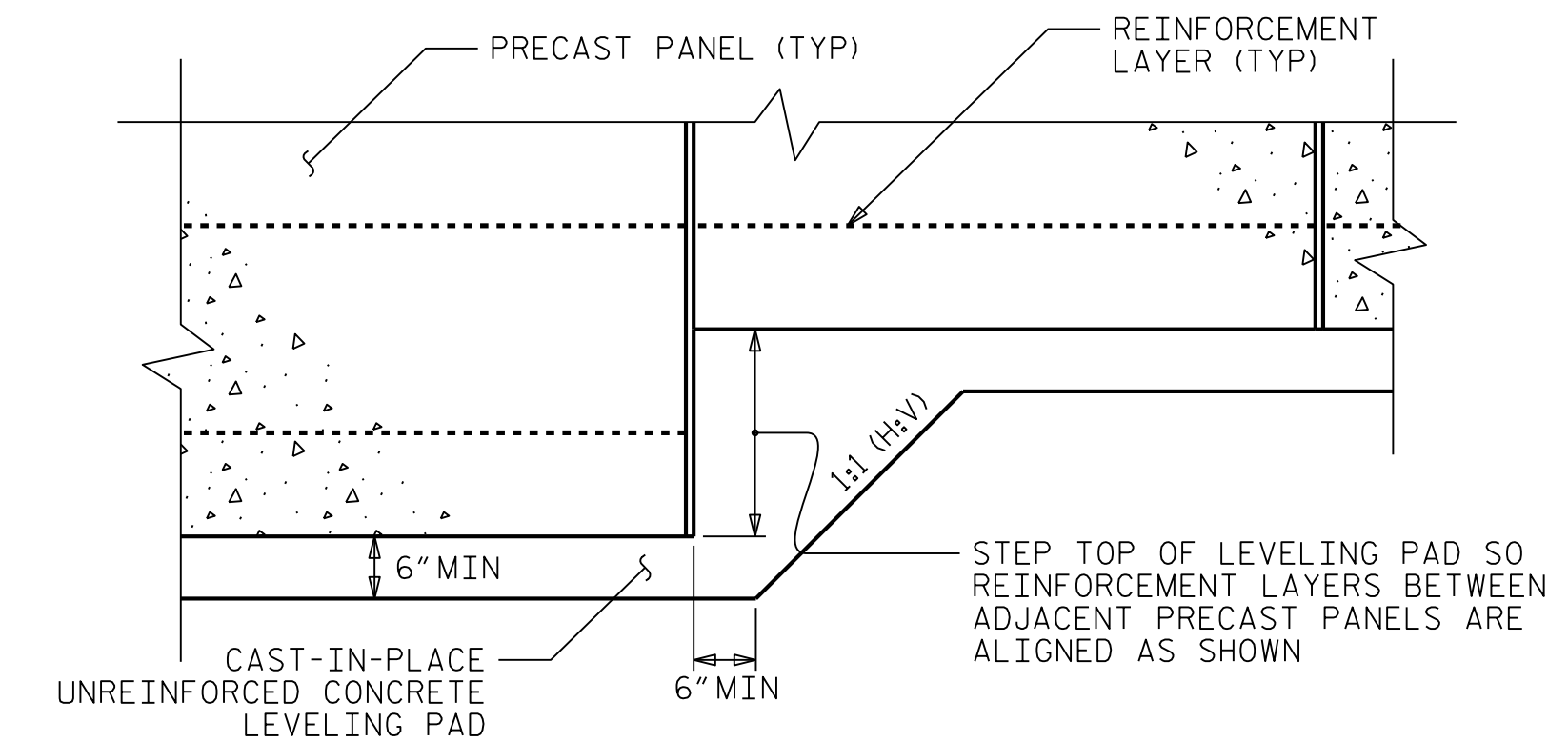
MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NOS. 2 AND 5 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NOS. 2 AND 5.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NOS. 2 AND 5 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

"TEMPORARY SHORING" MAYBE REQUIRED FOR RETAINING WALL NO. 5 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY, STRUCTURE or TRAFFIC CONTROL PLANS.



PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

PROJECT NO.: 39010.1.R2 (U-3440)

CABARRUS COUNTY

STATION: RWALL2: 138+50 -L- TO 137+00 -L-  
RWALL5: 133+40 -L- TO 132+90 -L-

SHEET 5 OF 9

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

**GEOTECHNICAL  
ENGINEERING UNIT**

**RETAINING WALL NOS. 2 AND 5  
MSE RETAINING WALL**

REVISIONS						SHEET NO. W5
NO.	BY	DATE	NO.	BY	DATE	
1	MHS	10/27/16	3			
2			4			

PREPARED BY: MHS	DATE: 7/25/2016
REVIEWED BY: SCC	DATE: 7/25/2016

GEOTECHNICAL ENGINEER

ENGINEER

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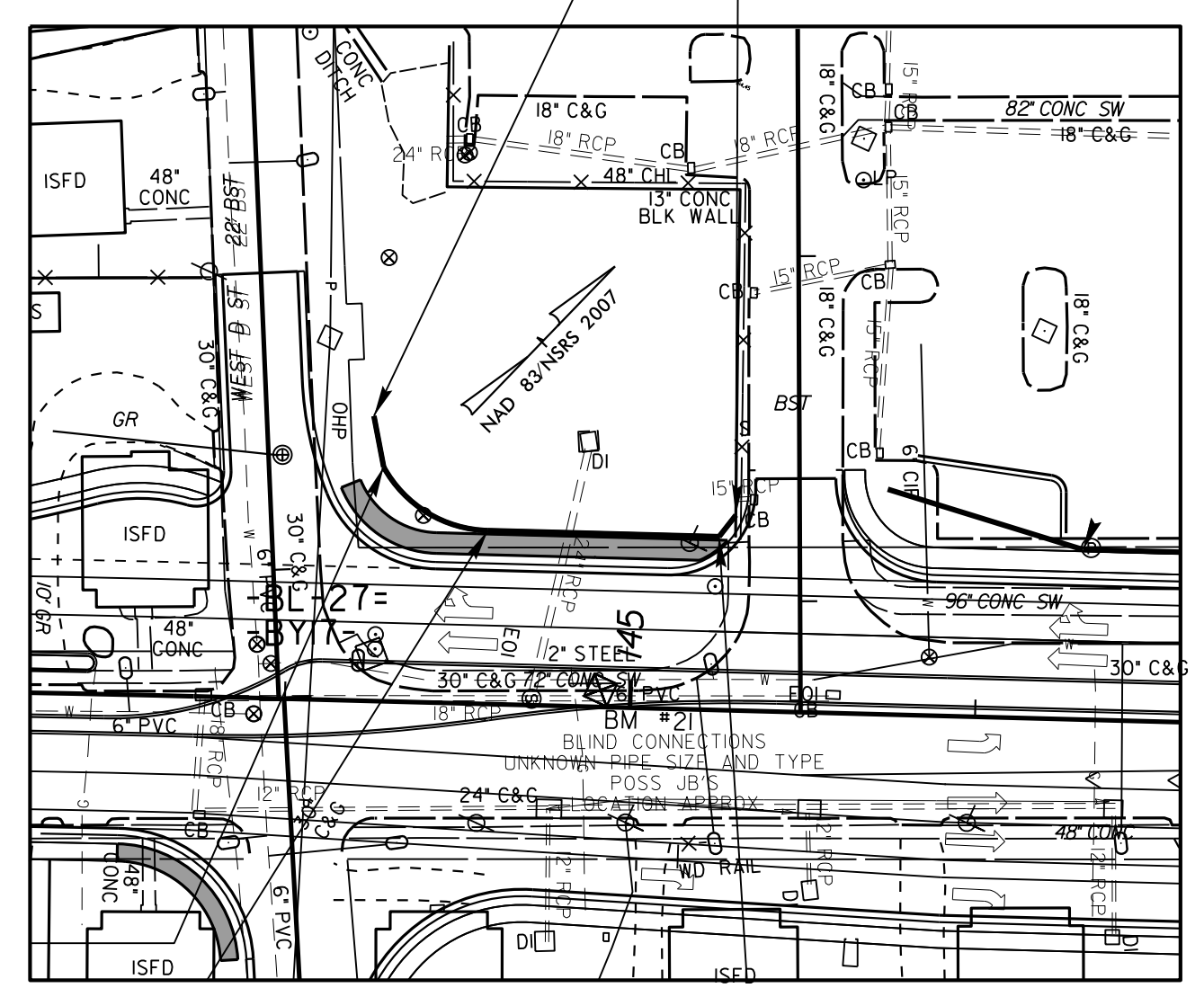
DocuSigned by:  
**Michael H. Stephens** 8/1/2016

SIGNATURE DATE

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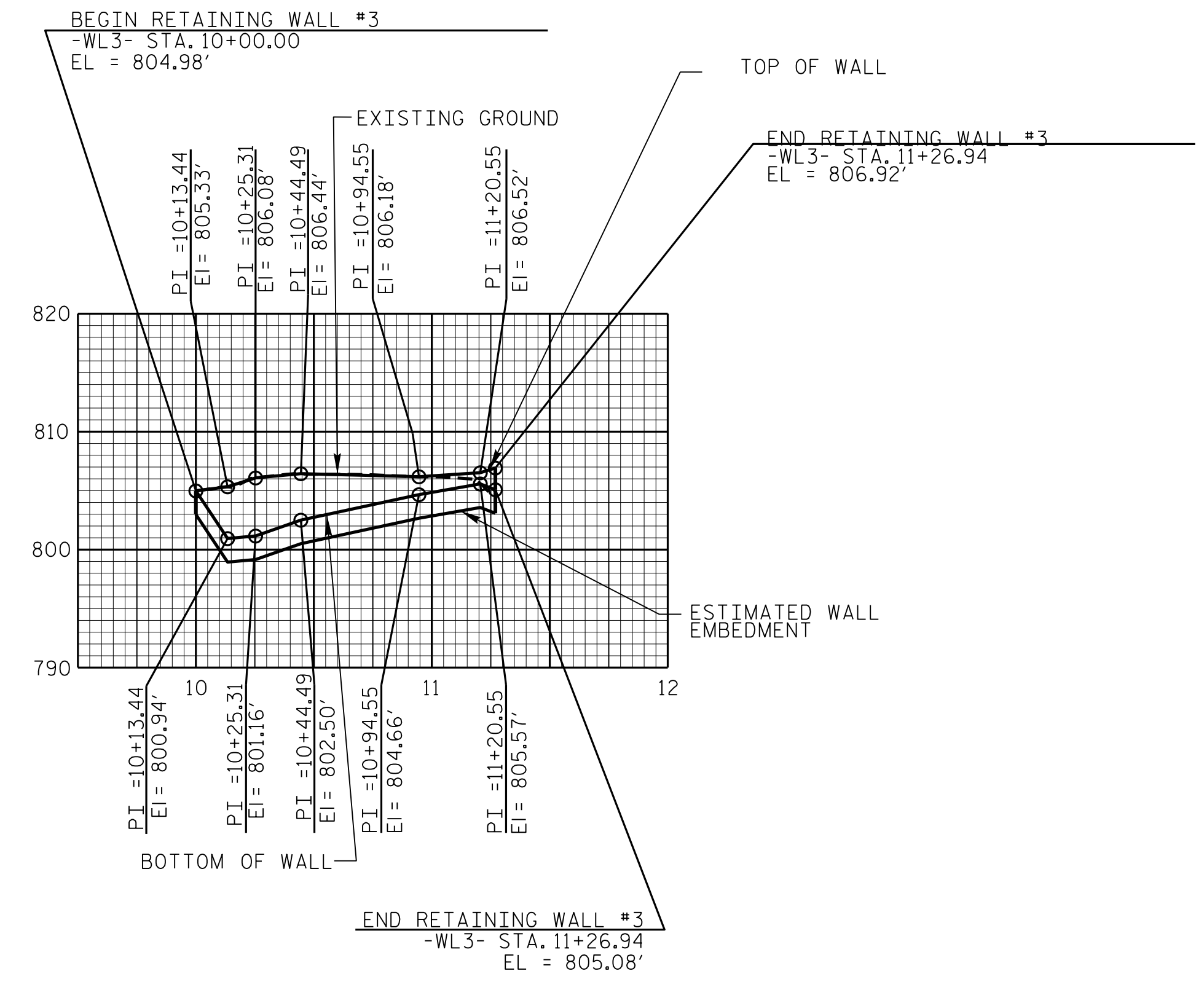
BEGIN RETAINING WALL #3  
-WL3- STA. 10+00.00=  
-Y18- STA. 11+56.70 (30.99' LT)

END RETAINING WALL #3  
TIE TO EXISTING WALL  
-WL3- STA. 11+26.94=  
-DR2- STA. 11+75.00 (18.50' RT)



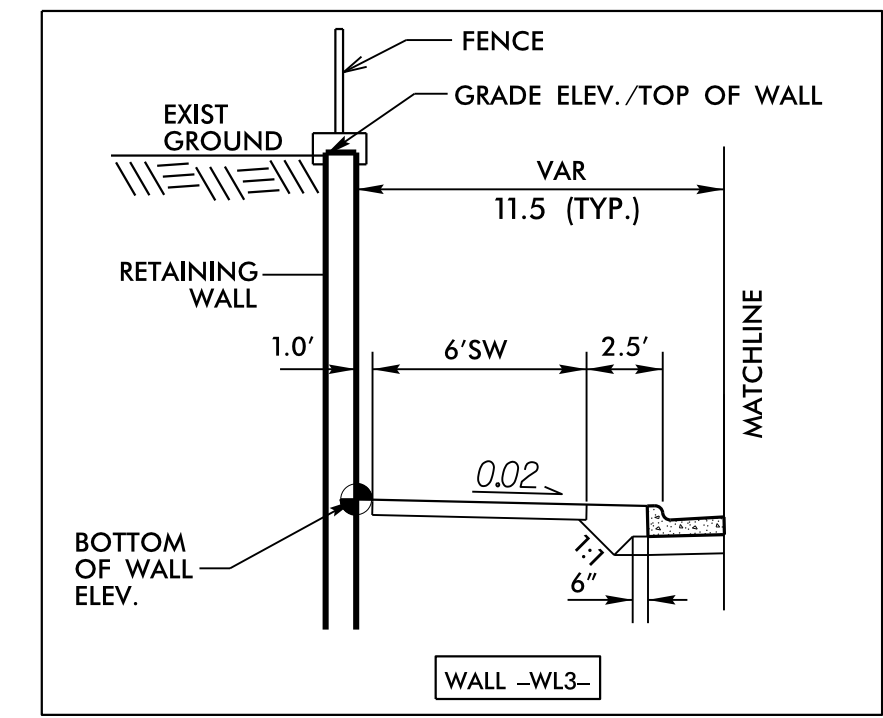
PLAN VIEW - RETAINING WALL NO. 3

CAST IN PLACE (CIP) GRAVITY WALL		
RETAINING WALL NO. 3	-WL3-	* 605 SQUARE FEET
* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"		



WALL ENVELOPE - RETAINING WALL NO. 3

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL  
2) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL



PROJECT NO.: 39010.1.R2 (U-3440)  
CABARRUS COUNTY  
STATION: 11+56.7 -Y18- TO 11+75 -DR2-  
SHEET 6 OF 9

PREPARED BY: MHS	DATE: 7/25/2016
REVIEWED BY: SCC	DATE: 7/25/2016

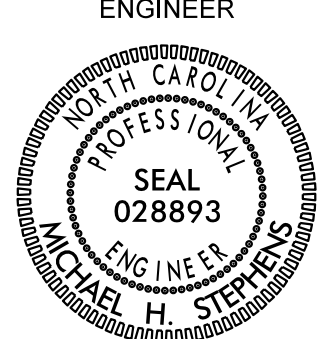
**NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS**

**GEOTECHNICAL  
ENGINEERING UNIT**

REVISIONS						SHEET NO. W6
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



GEOTECHNICAL ENGINEER

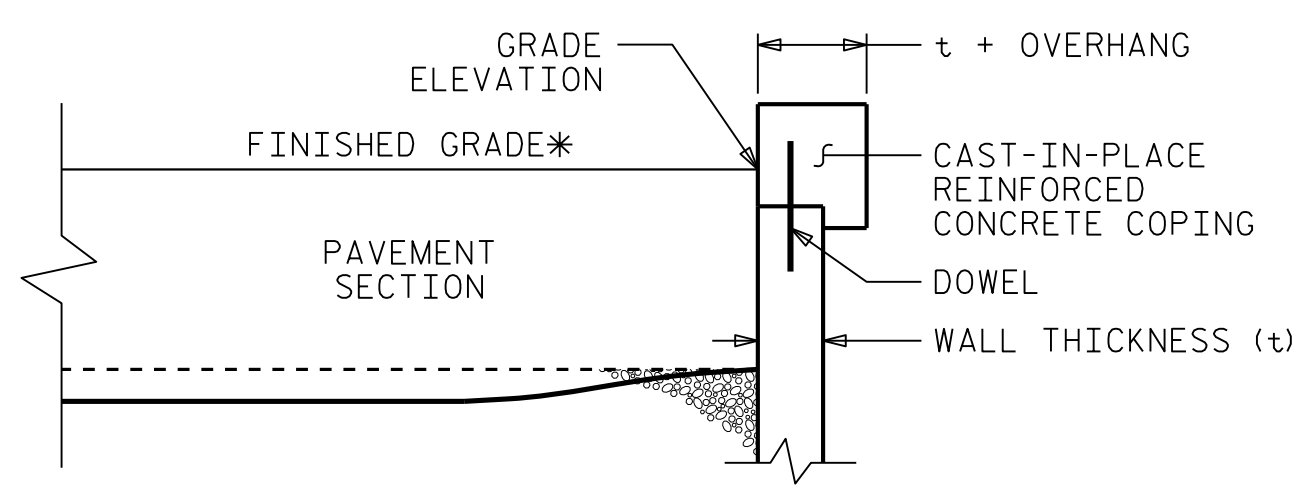


ENGINEER

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**Michael H. Stephens** 8/1/2016

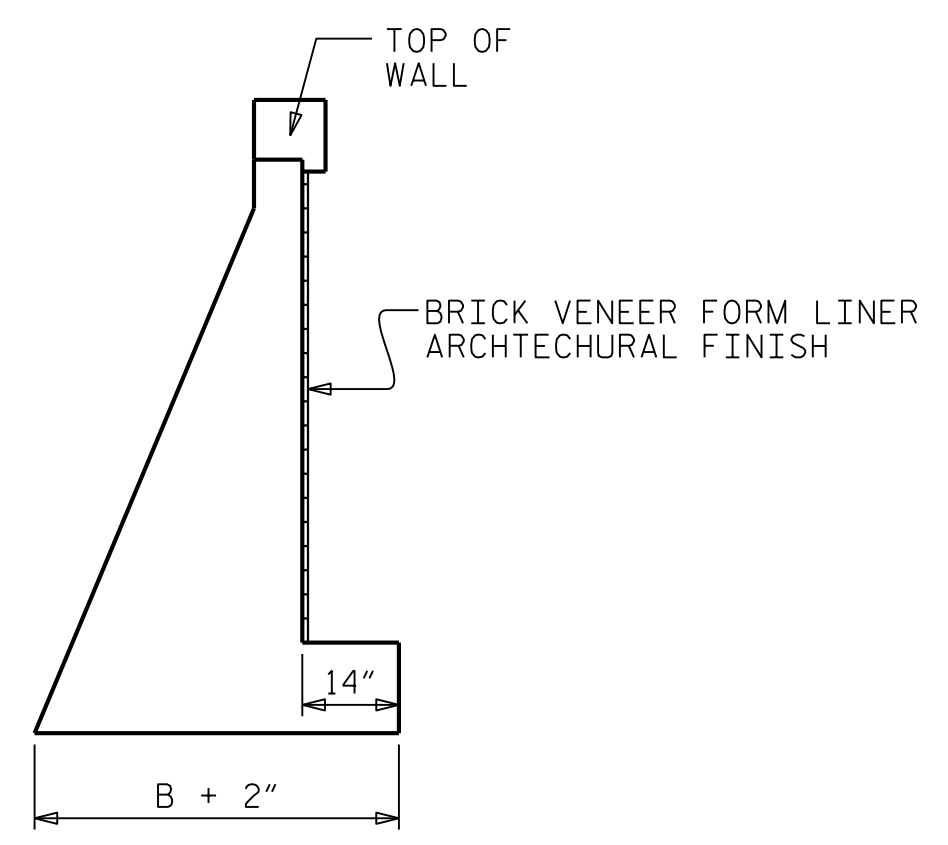
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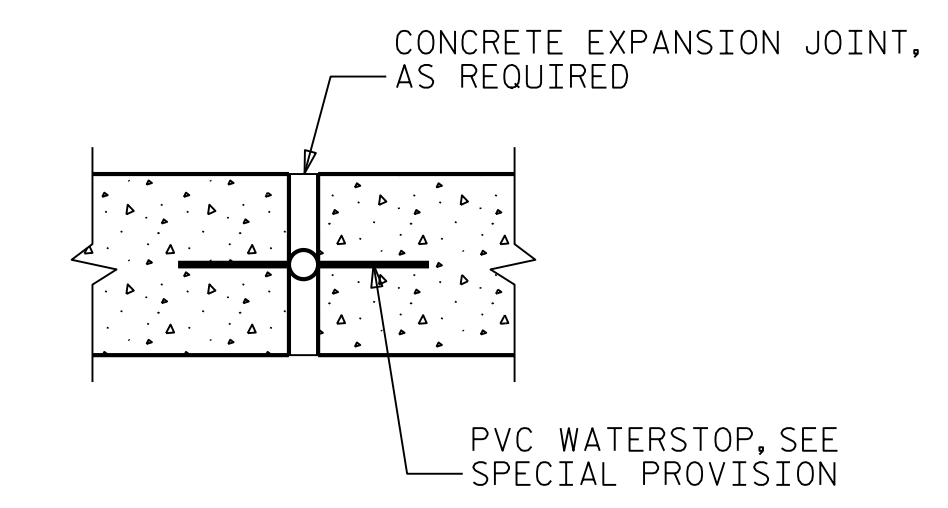
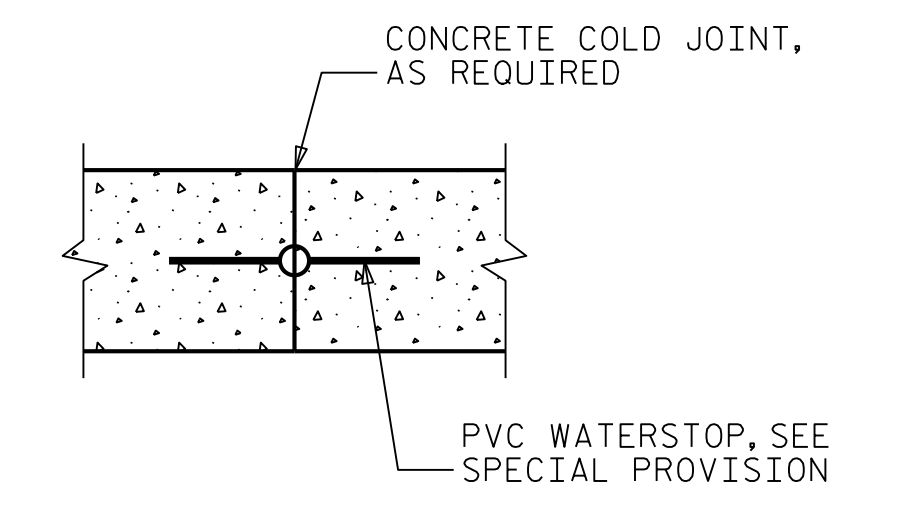


**COPING DETAILS**

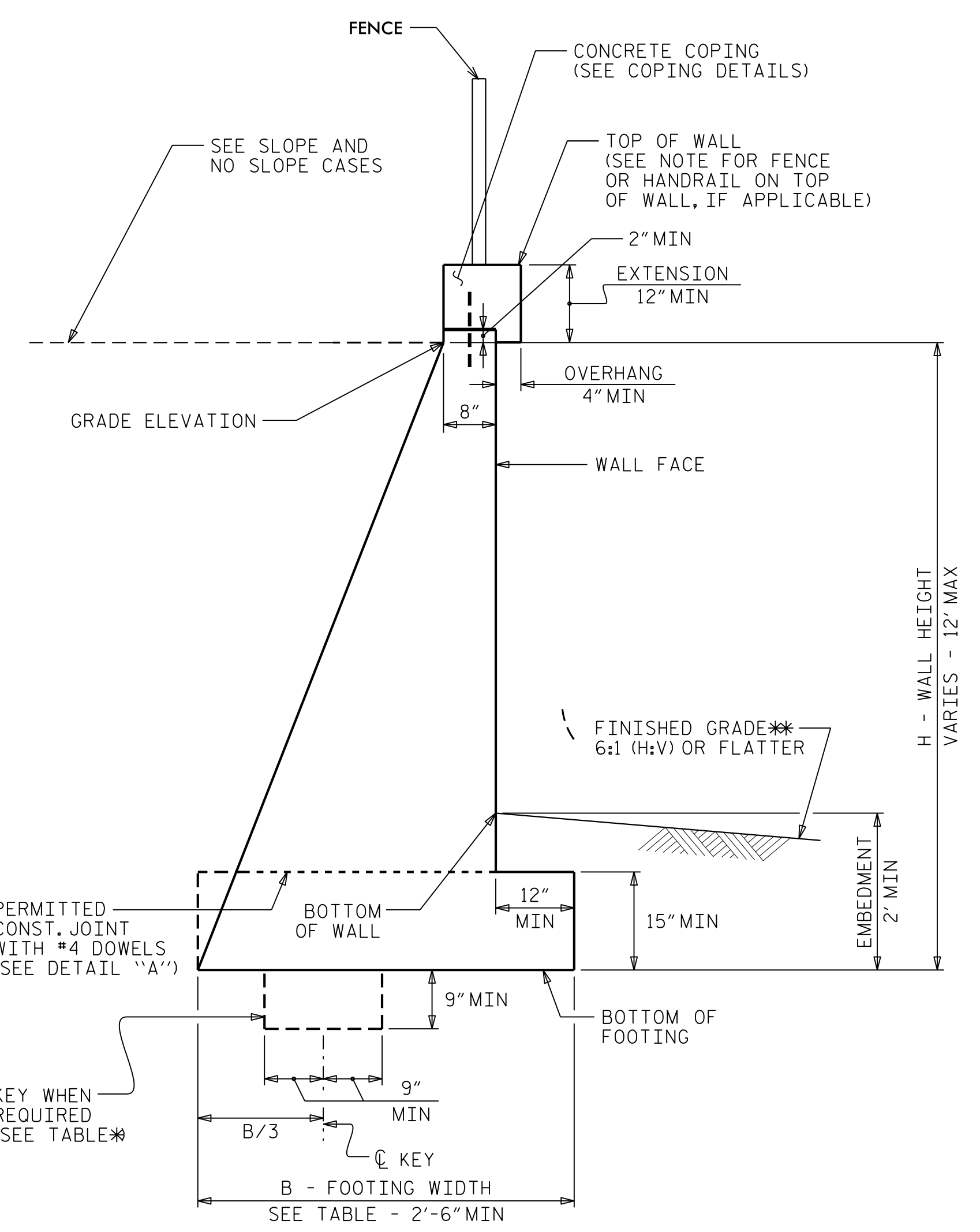
\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



**BRICK VENEER DETAIL**

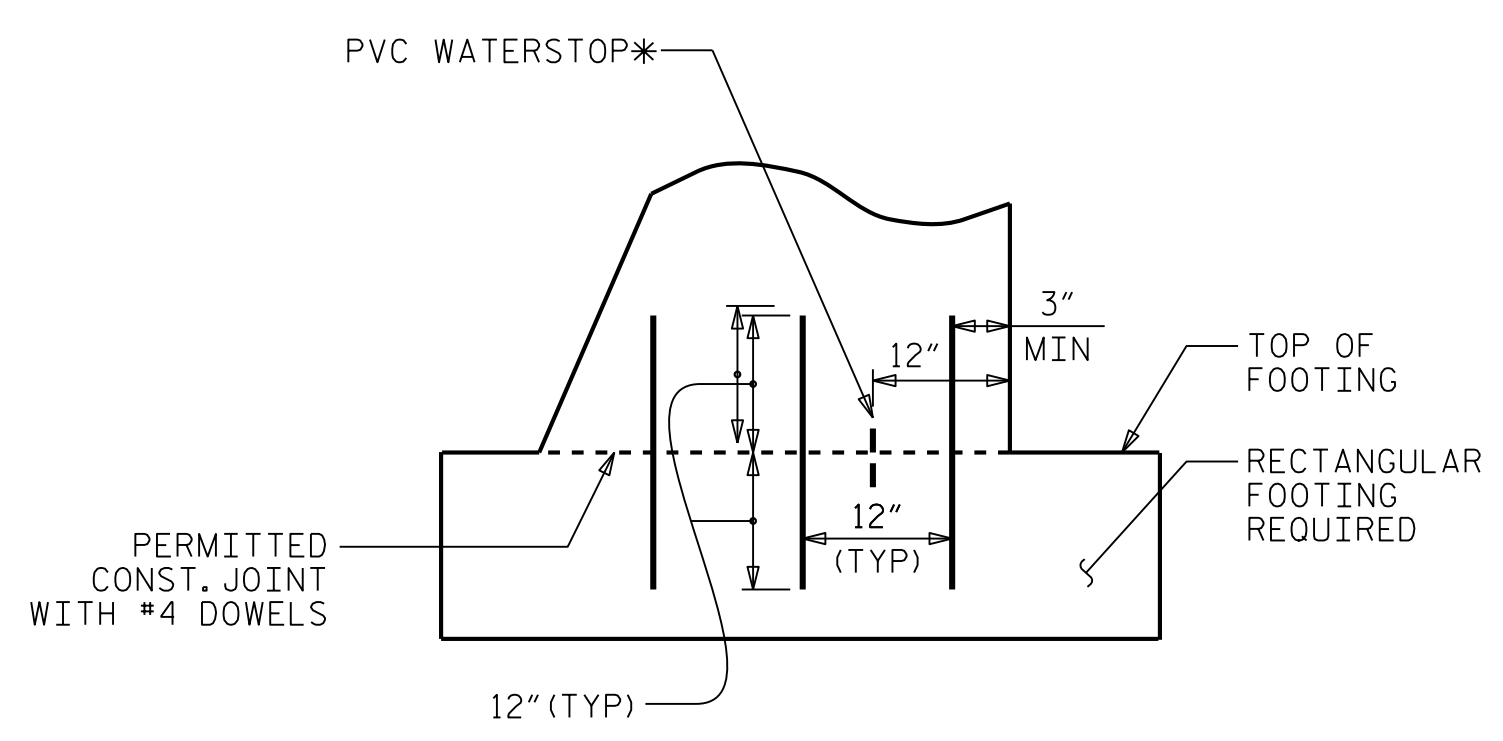


**PVC WATERSTOP DETAIL**



**STANDARD CIP GRAVITY WALL**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



**DETAIL "A"**

\*INSTALL PVC WATERSTOP AT ALL COLD JOINTS AND EXPANSION JOINT LOCATIONS, SEE PVC WATERSTOP SPECIAL PROVISION.

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

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.

A SIMULATED BRICK FORM LINER FINISH IS REQUIRED FOR THE CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 3. SUBMIT BRICK FORM LINER SAMPLES FOR APPROVAL BEFORE BEGINNING CIP GRAVITY WALL CONSTRUCTION. SEE SIMULATED BRICK FORM LINER FINISH SPECIAL PROVISION.

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.

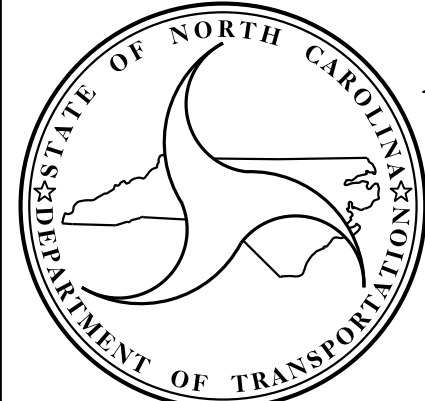
INSTALL PVC WATERSTOP AT ALL COLD JOINTS AND EXPANSION JOINT LOCATIONS, SEE PVC WATERSTOP SPECIAL PROVISION. SUBMIT INSTALL LOCATIONS AND PVC WATERSTOP TYPE FOR APPROVAL.

PROJECT NO.: 39010.1.R2 (U-3440)

CABARRUS COUNTY

STATION: 11+56.7 -Y18- TO 11+75 -DR2-

SHEET 7 OF 9



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

**GEOTECHNICAL  
ENGINEERING UNIT**

**RETAINING WALL NO. 3  
CIP GRAVITY WALL**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W7
2			4			

PREPARED BY: MHS	DATE: 7/25/2016
REVIEWED BY: SCC	DATE: 7/25/2016



GEOTECHNICAL ENGINEER

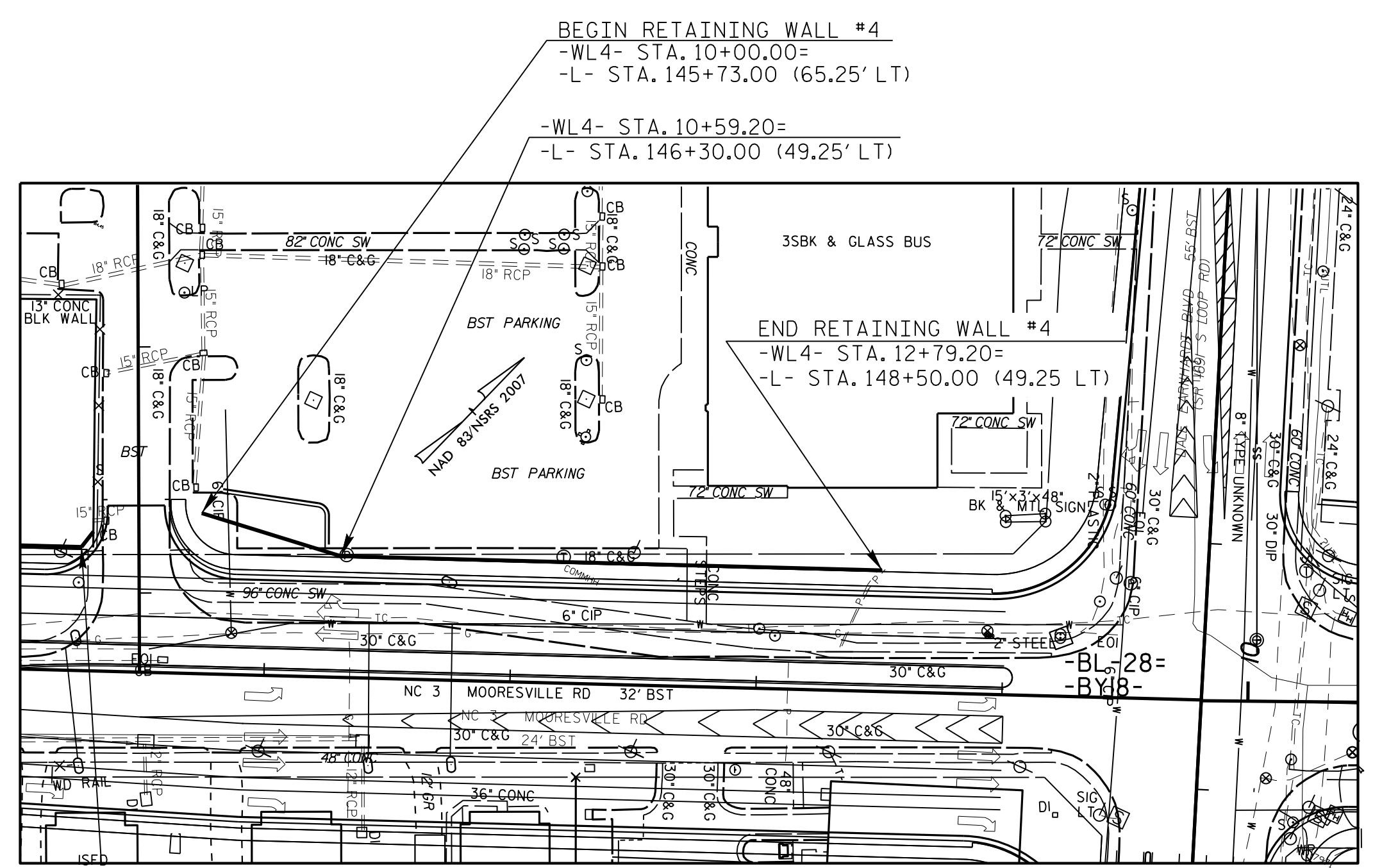
DocuSigned by:  
**Michael H. Stephens**  
C44768209314CC  
SIGNATURE

ENGINEER

8/1/2016  
DATE

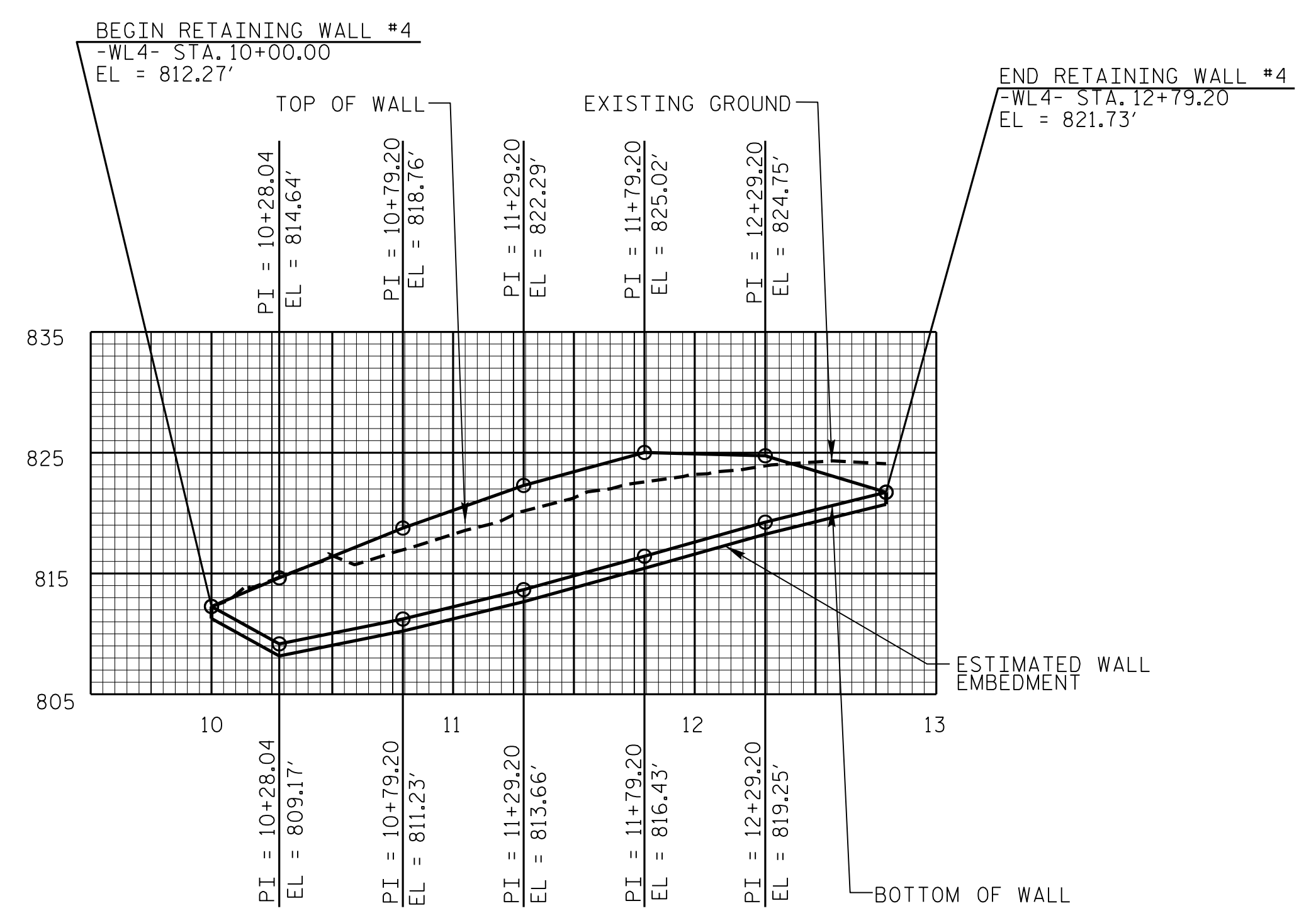
SIGNATURE DATE

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



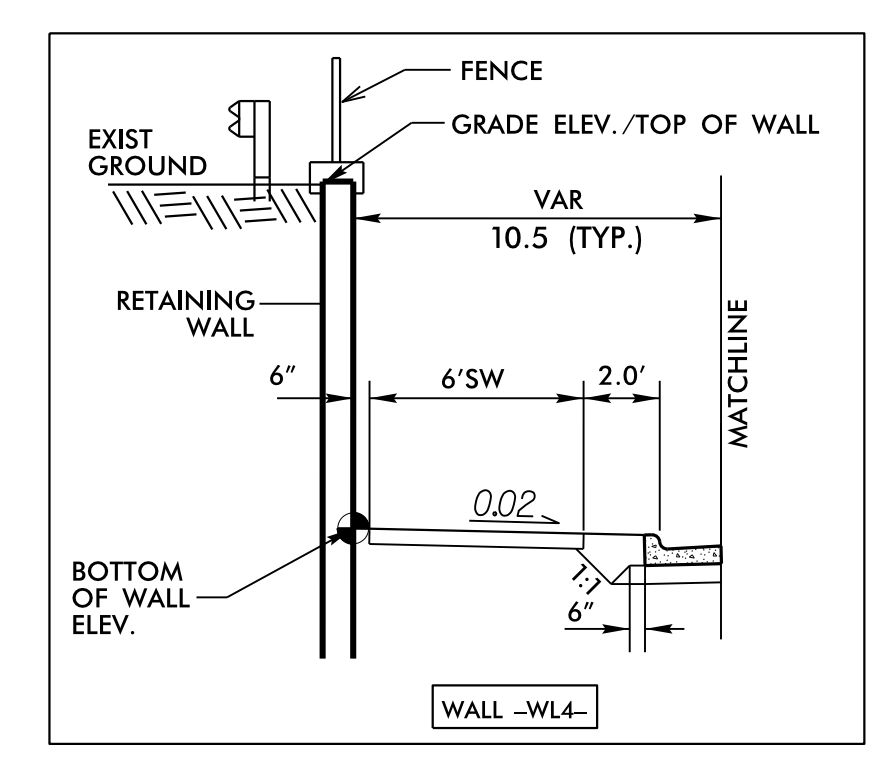
PLAN VIEW - RETAINING WALL NO. 4

SOLDIER PILE RETAINING WALL QUANTITIES		
RETAINING WALL NO. 4	-WL4-	* 2,015 SQUARE FEET
* WALL AREA IS MEASURED USING THE DESIGN HEIGHT 'H'		



WALL ENVELOPE - RETAINING WALL NO. 4

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL  
2) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL



PROJECT NO.: 39010.1.R2 (U-3440)  
CABARRUS COUNTY  
STATION: 145+73 -L- TO 148+50 -L-  
SHEET 8 OF 9

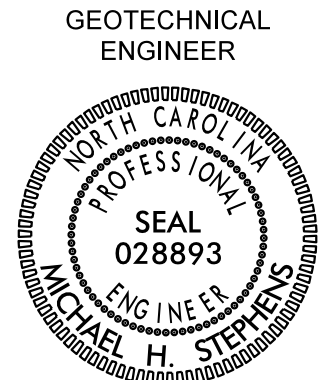
**NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS**

**GEOTECHNICAL  
ENGINEERING UNIT**

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

PREPARED BY: MHS	DATE: 7/25/2016
REVIEWED BY: SCC	DATE: 7/25/2016

GEOTECHNICAL ENGINEER



ENGINEER

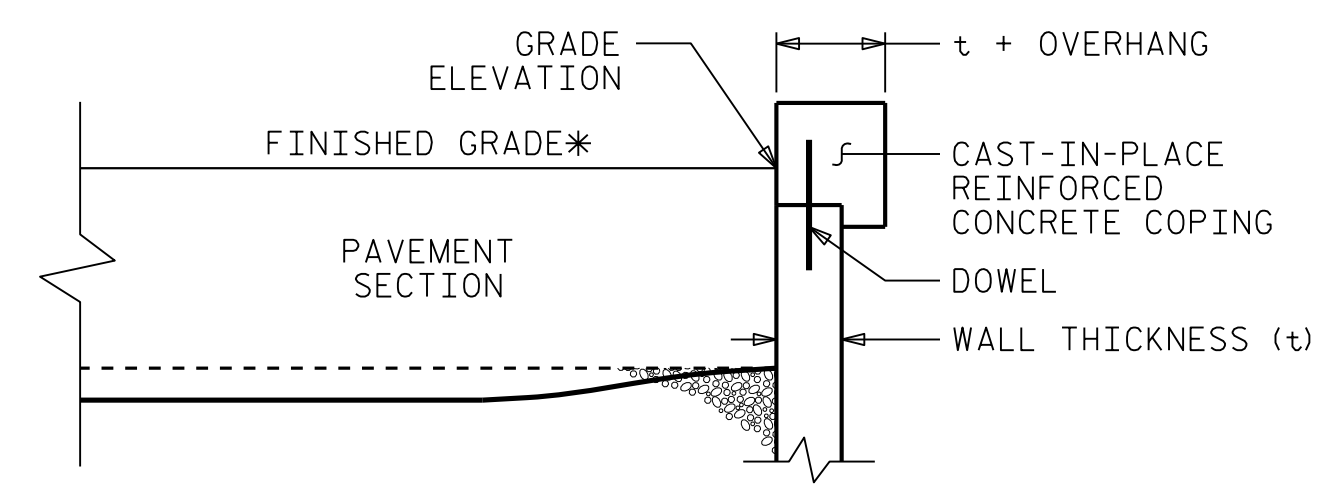
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DocuSigned by:  
*Michael H. Stephens* 8/1/2016

SIGNATURE DATE

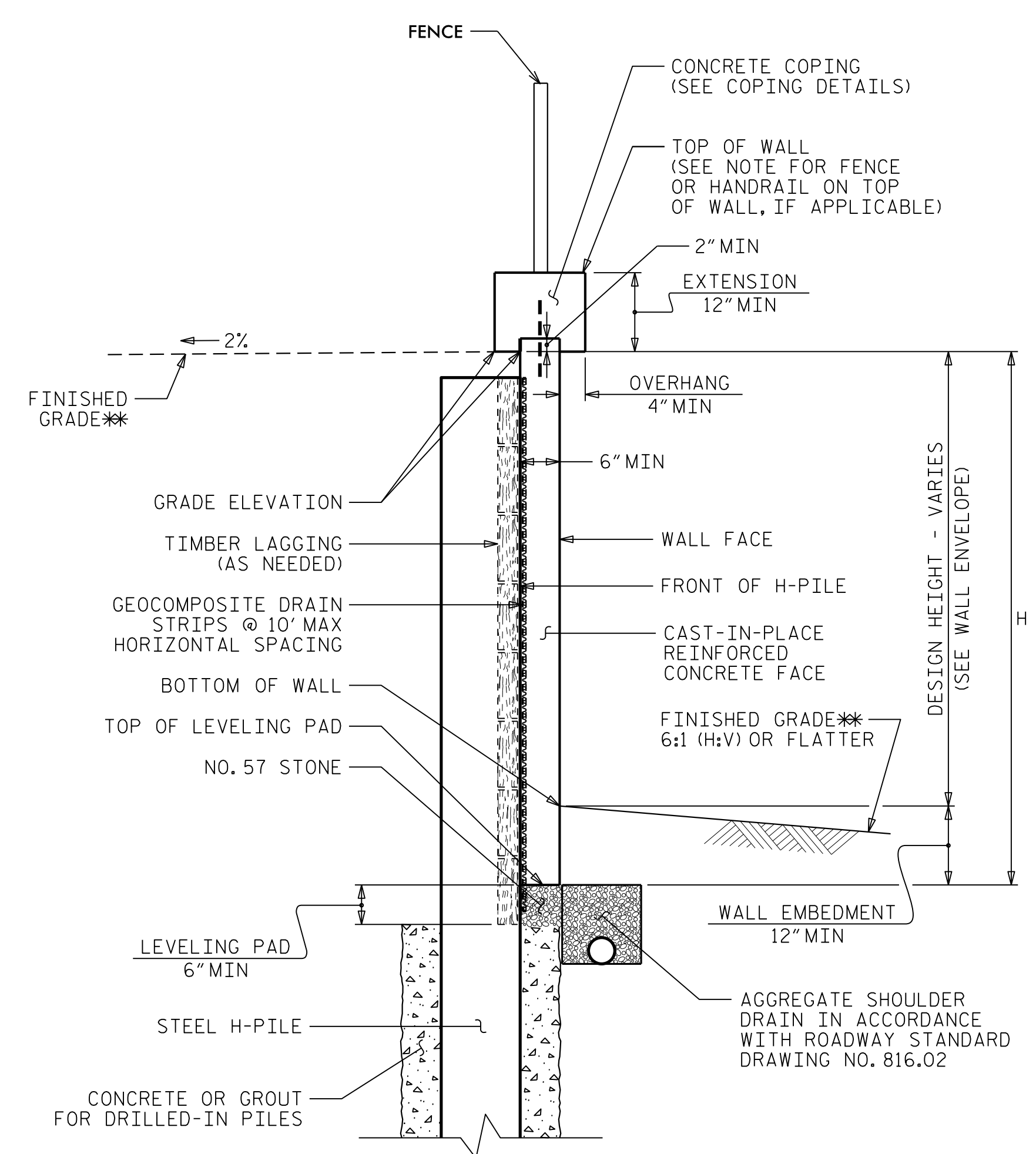
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**COPING DETAILS**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



**SOLDIER PILE WALL WITH  
CAST-IN-PLACE FACE - TYPICAL SECTION**

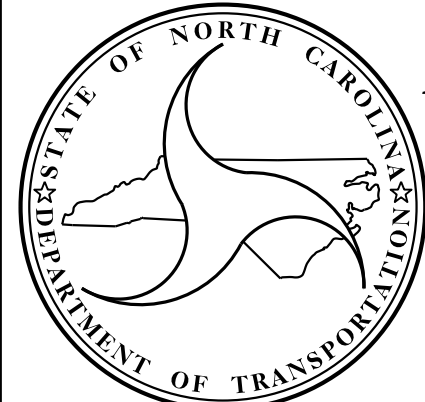
\*SEE CONCRETE DITCH BEHIND WALL DETAILS.  
\*SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.

**NOTES:**

- FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.
- FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.
- A FENCE IS REQUIRED ON TOP OF RETAINING WALL NO. 4. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
- DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALL NO. 4.
- USE A SOLDIER PILE RETAINING WALL WITH A CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 4.
- A SIMULATED BRICK FORM LINER FINISH IS REQUIRED FOR THE CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 4. SUBMIT BRICK FORM LINER SAMPLES FOR APPROVAL BEFORE BEGINNING SOLDIER PILE WALL CONSTRUCTION. SEE SIMULATED BRICK FORM LINER FINISH SPECIAL PROVISION.
- BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL NO. 4, 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. 4 FOR THE FOLLOWING:
  - 1) H = DESIGN HEIGHT + WALL EMBEDMENT
  - 2) DESIGN LIFE = 100 YEARS
  - 3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
  - 4) MINIMUM PILE EMBEDMENT = 15 FT
  - 5) IN-SITU ASSUMED MATERIAL PARAMETERS FOR RESIDUAL SOILS:
    - UNIT WEIGHT,  $\gamma = 120$  LB/CF
    - FRICTION ANGLE,  $\phi = 30$  DEGREES
  - 6) IN-SITU ASSUMED MATERIAL PARAMETERS FOR PARTIALLY WEATHER ROCK:
    - UNIT WEIGHT,  $\gamma = 135$  LB/CF
    - FRICTION ANGLE,  $\phi = 38$  DEGREES
- DESIGN RETAINING WALL NO. 4 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

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 CABARRUS COUNTY  
 STATION: 145+73 -L- TO 148+50 -L-  
 SHEET 9 OF 9

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 REVIEWED BY: SCC      DATE: 7/25/2016



**NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
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**GEOTECHNICAL  
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REVISIONS						SHEET NO. W9
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			