
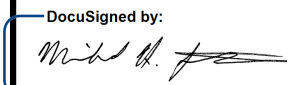
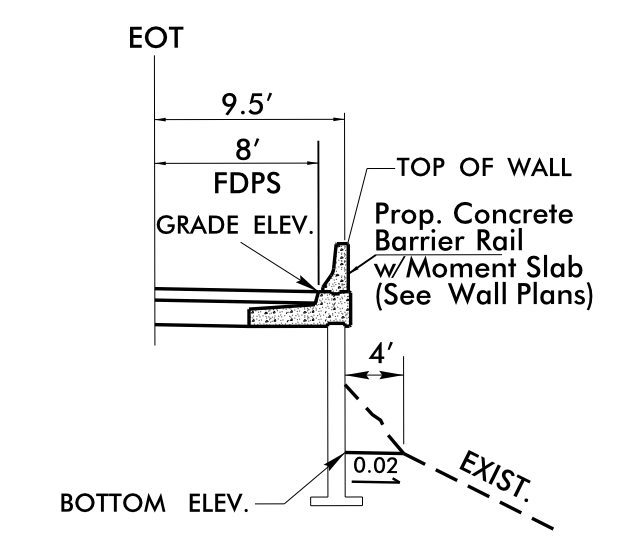
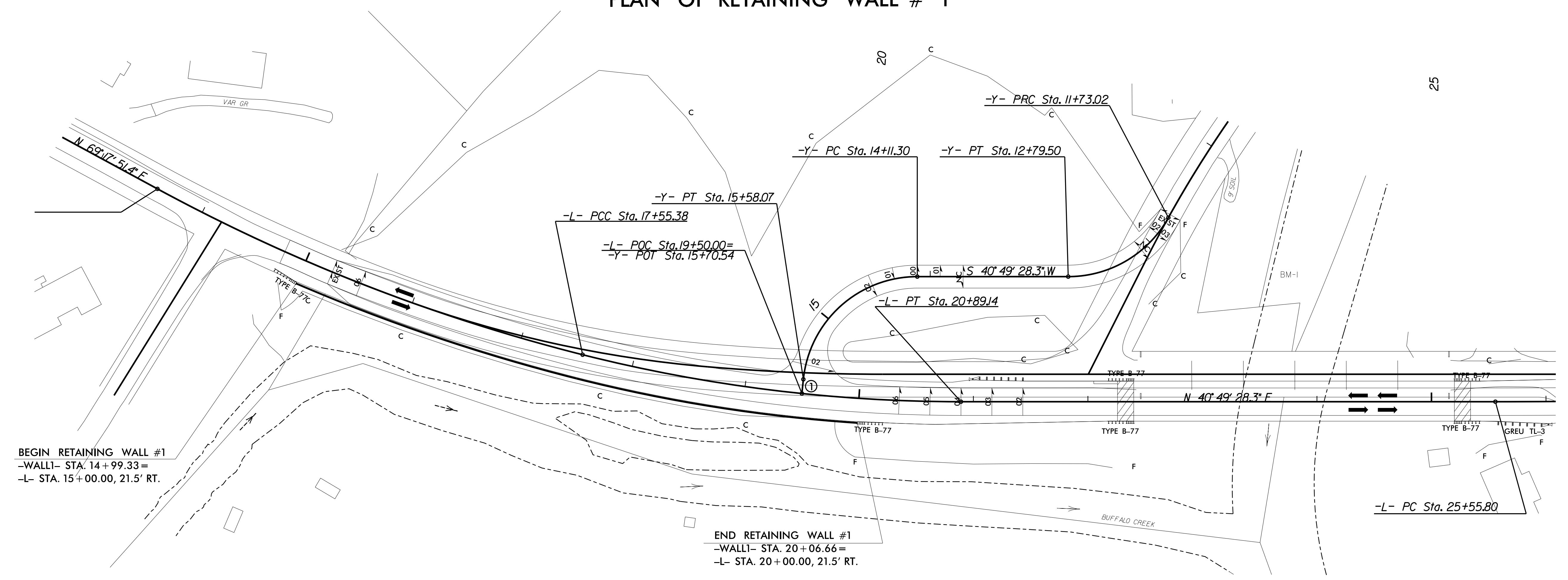


PROJECT REFERENCE NO. 49071.1.1(BR-0002)	SHEET NO. RW-01
GEOTECHNICAL ENGINEER  MICHAEL H. STEPHENS	ENGINEER
DocuSigned by:  4/15/2020	SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



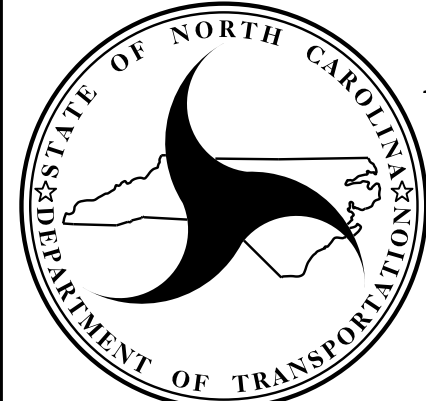
PLAN OF RETAINING WALL # 1



BEGIN RETAINING WALL #1
 -WALL- STA. 14+99.33 =
 -L- STA. 15+00.00, 21.5' RT.

END RETAINING WALL #1
 -WALL- STA. 20+06.66 =
 -L- STA. 20+00.00, 21.5' RT.

PREPARED BY: MHS	DATE: 4/14/20
REVIEWED BY: SCC	DATE: 4/14/20



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

**BRIDGE NO. 8 ON NC 194
OVER N. FORK NEW RIVER
RETAINING WALL NO. 1
PLAN VIEW**

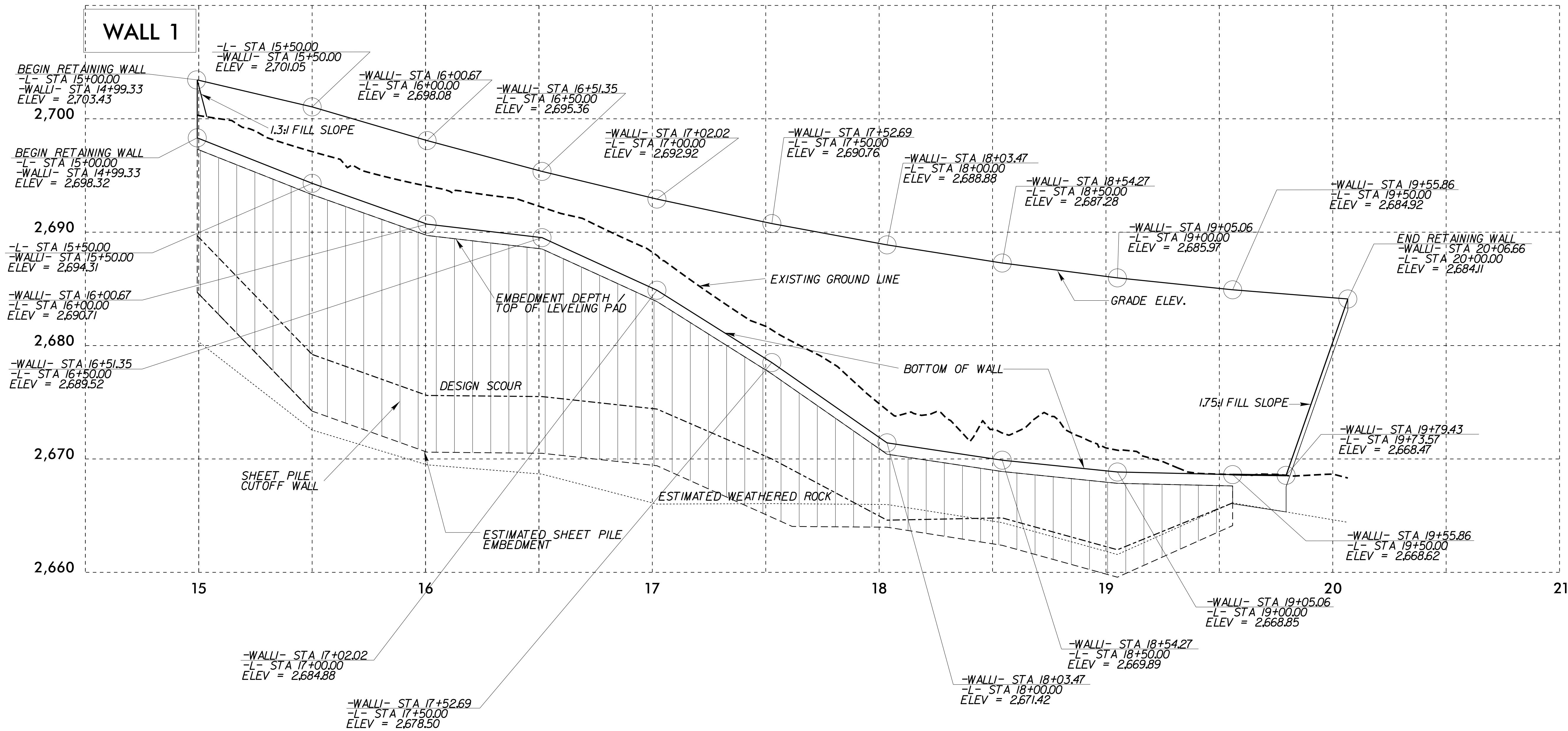
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
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RETAINING WALL NO.1 ESTIMATED QUANTITIES	
ANCHORED RETAINING WALL	6,330 SF
SHEET PILE CUTOFF WALL	5,730 SF

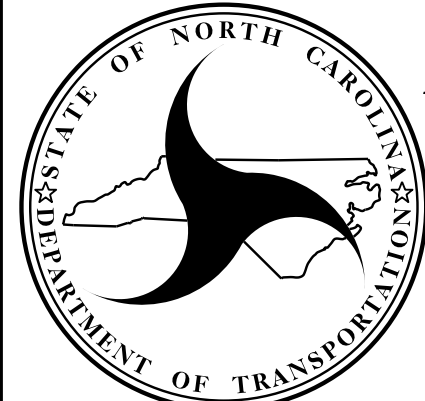
NOTE: BACKFILL FOR RETAINING WALL, CLASS VI SELECT MATERIAL (57 STONE), IS ESTIMATED TO BE APPROXIMATELY 5,600 TONS.

ANCHORED RETAINING WALL SCHEDULE											
Station	Grade Elevation (ft)	Top of Wall Elevation (ft)	Bottom of Wall Elevation (ft)	Wall Embedment Depth (ft)	Design Scour Elevation (ft)	Design Height, (ft)	*Weather Rock Elevation (>3500)	*Rock Elevation (>7500)	Depth to WR (ft)	Depth to HR (ft)	Estimated Sheet Pile Tip Elevation (ft)
15+00.00	2703.4	2701.4	2698.3	1	2689.7	13.7	2680.4	2666.8	23.0	36.6	2684.7
15+50.00	2701.1	2699.1	2694.3	1	2679.1	22.0	2672.6	2659.2	28.5	41.8	2674.1
16+00.00	2698.1	2696.1	2690.7	1	2675.6	22.5	2669.5	2651.5	28.6	46.6	2670.6
16+50.00	2695.4	2693.4	2689.5	1	2675.5	19.9	2668.7	2646.5	26.7	48.8	2670.5
17+00.00	2692.9	2690.9	2684.9	1	2674.4	18.5	2666.0	2651.8	26.9	41.2	2669.4
17+50.00	2690.8	2688.8	2678.5	1	2670.0	20.8	2666.1	2650.0	24.7	40.8	2665.0
18+00.00	2688.9	2686.9	2671.4	1	2664.6	24.3	2664.2	2649.2	24.7	39.7	2662.2
18+50.00	2687.3	2685.3	2669.9	1	2664.8	22.5	2664.4	2656.8	22.9	30.5	2662.4
19+00.00	2686.0	2684.0	2668.9	1	2662.0	24.0	2661.6	2656.0	24.3	29.9	2659.6
19+50.00	2684.9	2682.9	2668.6	4.5	2666.1	18.8	2666.1	2662.3	18.8	22.6	--
20+00.00	2684.1	2682.1	2668.3	5.9	2664.4	19.7	2664.4	2659.4	19.7	24.7	--

Note: * Weathered rock and hard rock elevations are based on a Geophysical study and are approximate and for estimating purposes only.



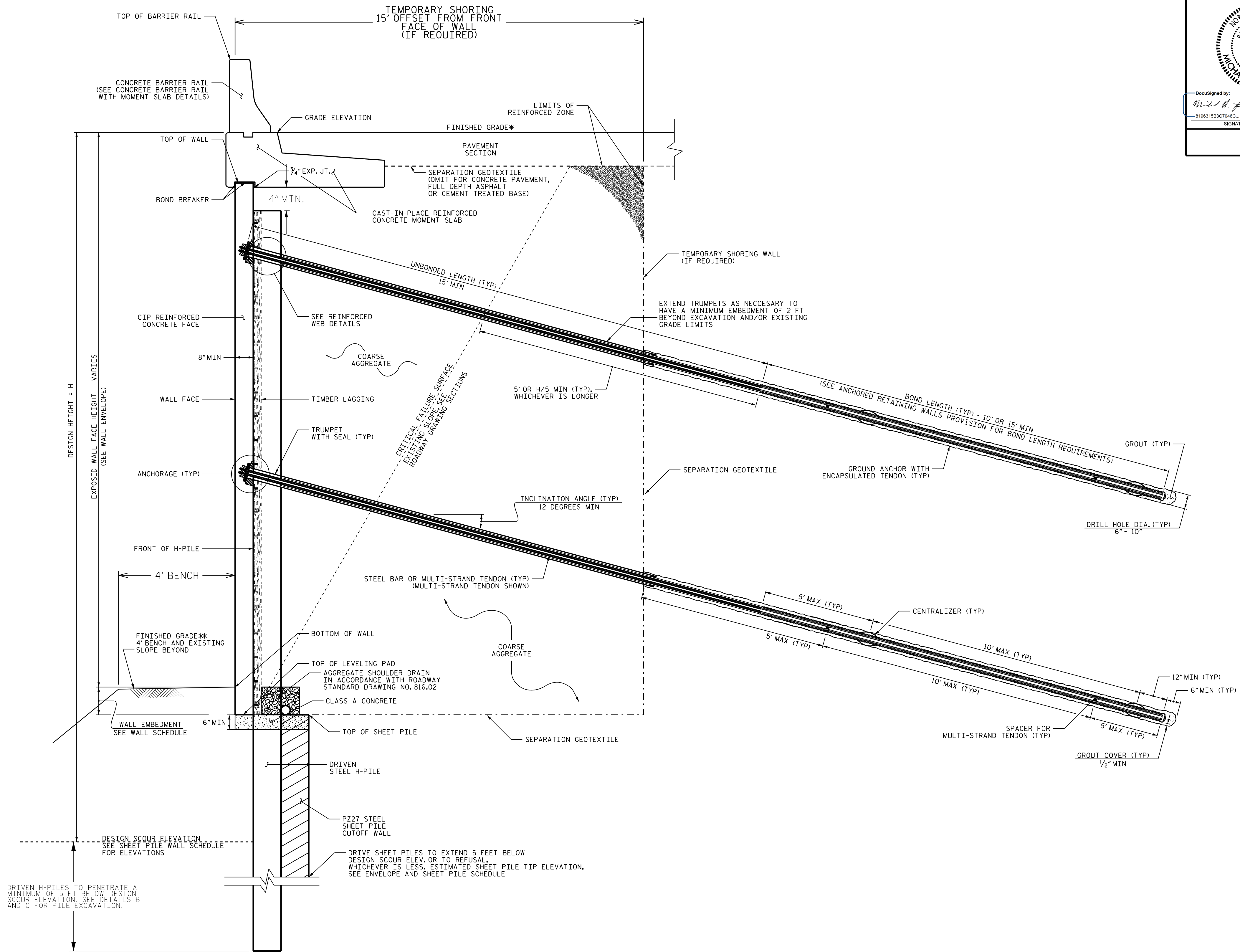
PREPARED BY: MHS DATE: 4/14/20
 REVIEWED BY: SCC DATE: 4/14/20



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GEOTECHNICAL
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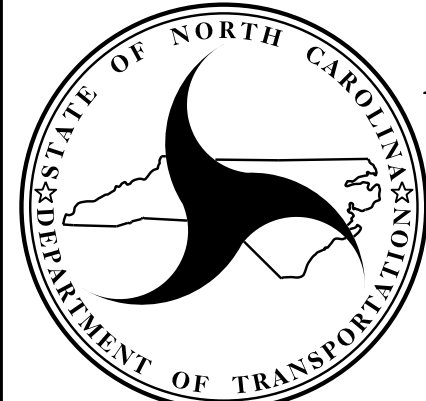
BRIDGE NO. 8 ON NC 194 OVER N. FORK NEW RIVER RETAINING WALL NO. 1 ENVELOPE					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



**DETAIL A, TYPICAL SECTION - ANCHORED WALL
DRIVEN H-PILES WITH SHEET PILES**

TYPICAL SECTION FROM STA 15+00 -L- TO STA 17+75 -L-
(DOUBLE ROW OF GROUND ANCHORS SHOWN, AS NEEDED)
**SEE PLANS FOR FINISHED GRADE.

PREPARED BY: MHS	DATE: 4/14/20
REVIEWED BY: SCC	DATE: 4/14/20

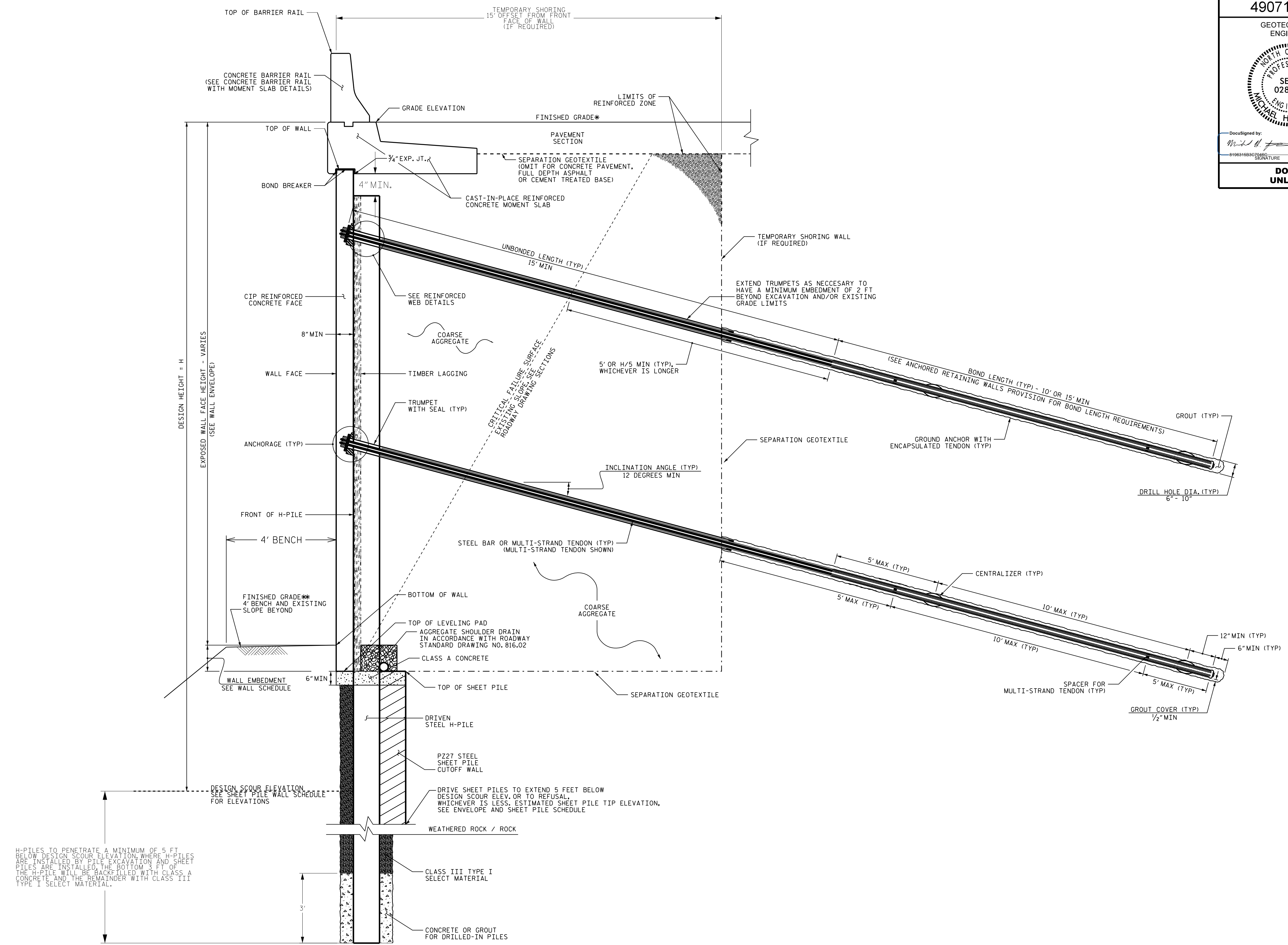


**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

**BRIDGE NO. 8 ON NC 194
OVER N. FORK NEW RIVER
RETAINING WALL NO. 1
DETAIL A - TYPICAL SECTION**

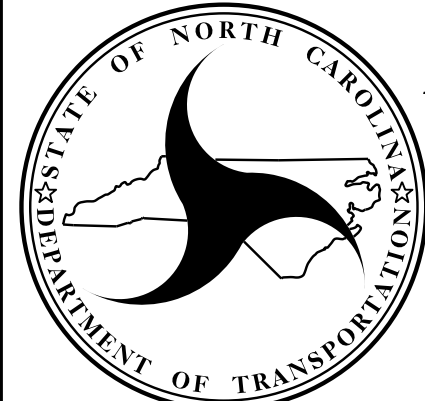
REVISIONS					
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**DETAIL B, TYPICAL SECTION - ANCHORED WALL
PILE EXCAVATION WITH SHEET PILES**

TYPICAL SECTION FROM STA 17+75 -L- TO STA 19+50 -L-
(DOUBLE ROW OF GROUND ANCHORS SHOWN, AS NEEDED)
**SEE PLANS FOR FINISHED GRADE.

PREPARED BY: MHS	DATE: 4/14/20
REVIEWED BY: SCC	DATE: 4/14/20

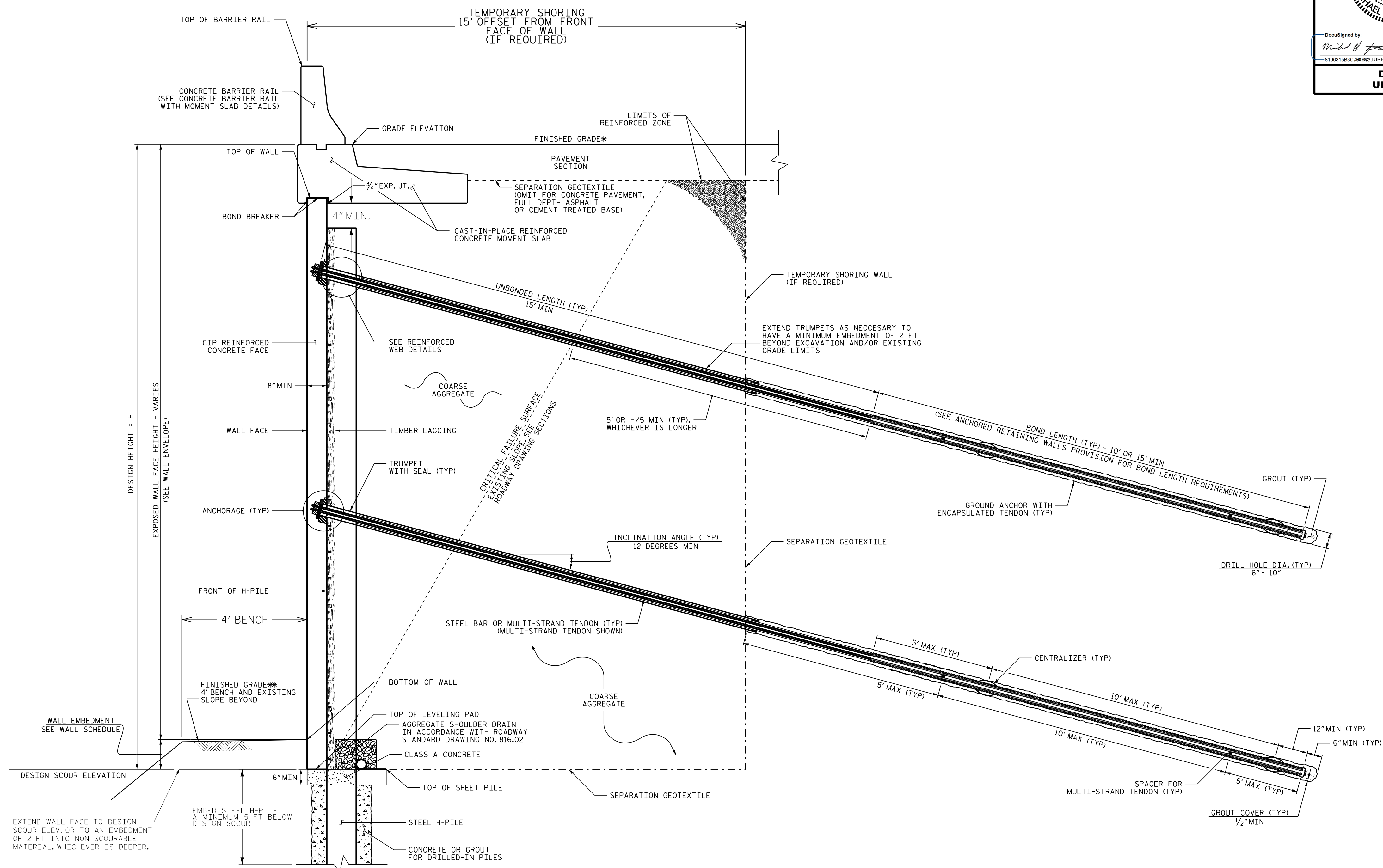


**NORTH CAROLINA
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DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

**BRIDGE NO. 8 ON NC 194
OVER N. FORK NEW RIVER
RETAINING WALL NO. 1
DETAIL B - TYPICAL SECTION**

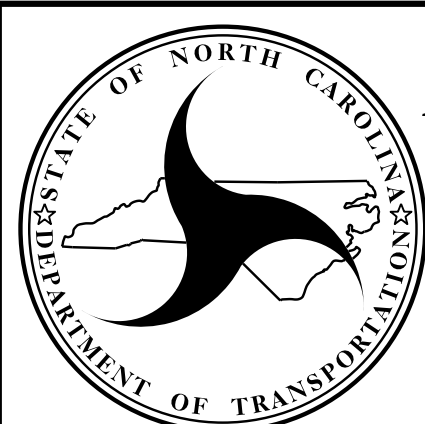
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
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DETAIL C, TYPICAL SECTION - ANCHORED WALL PILE EXCAVATION

TYPICAL SECTION FROM STA 19+50 -L- TO STA 20+00 -L- (DOUBLE ROW OF GROUND ANCHORS SHOWN, AS NEEDED)
 *SEE PLANS FOR FINISHED GRADE.


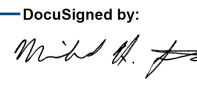
PREPARED BY: MHS DATE: 4/14/20
 REVIEWED BY: SCC DATE: 4/14/20

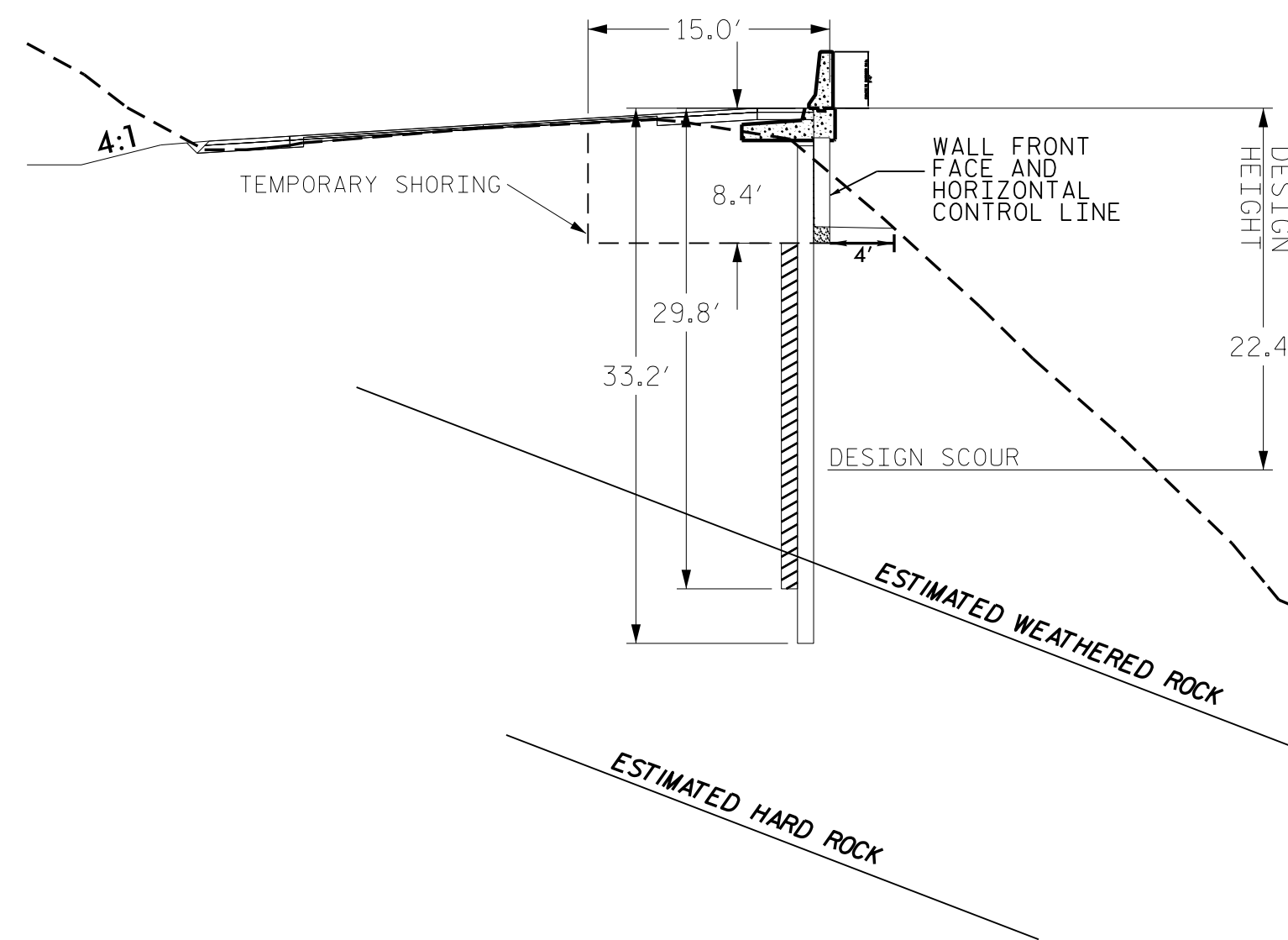


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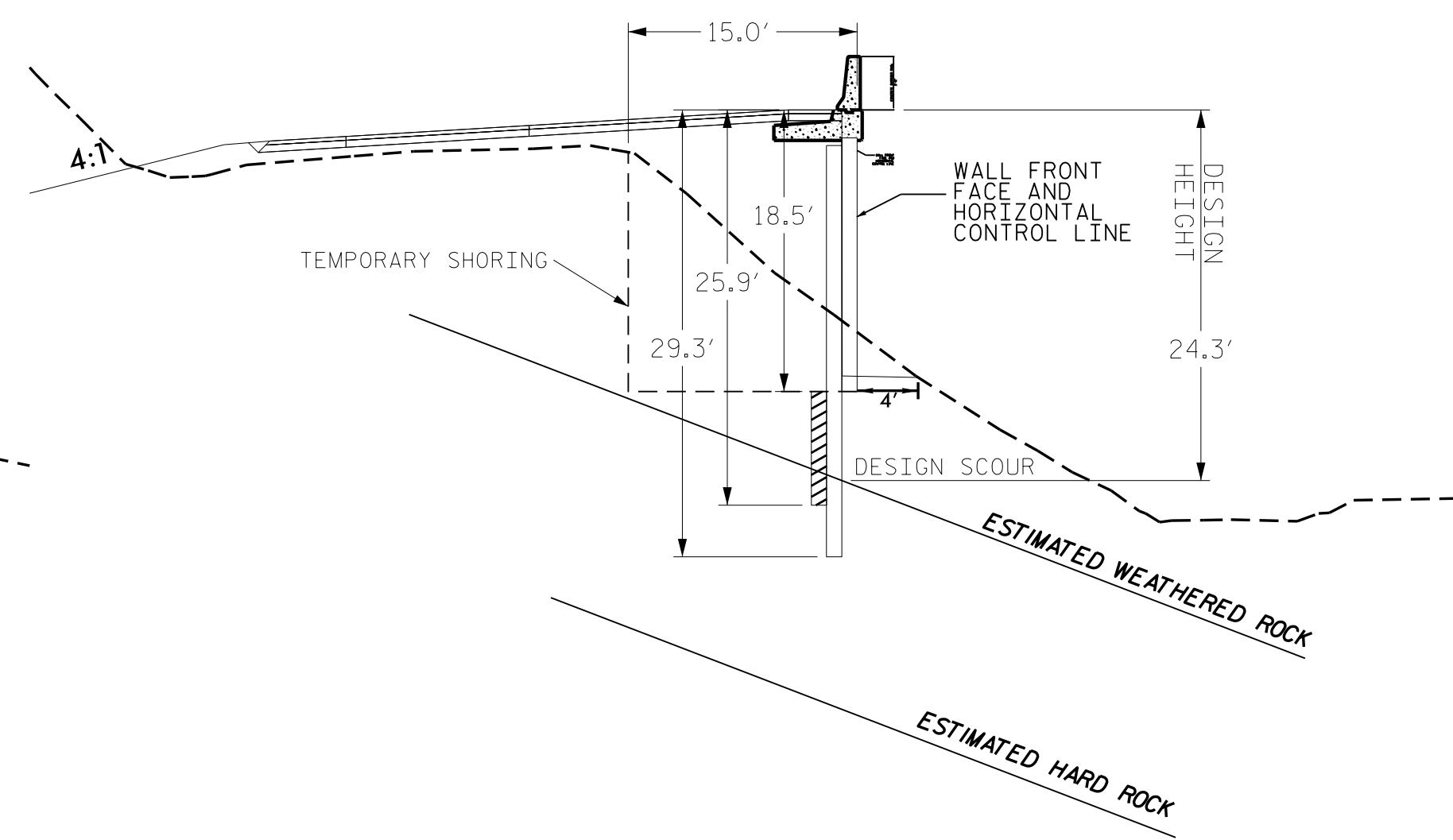
BRIDGE NO. 8 ON NC 194 OVER N. FORK NEW RIVER RETAINING WALL NO. 1 DETAIL C - TYPICAL SECTION					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO. 49071.1.1(BR-0002)		SHEET NO. RW-06	
GEOTECHNICAL ENGINEER  SEAL 028893 MICHAEL H. STEPHENS		ENGINEER	
DocuSigned by:  4/15/2020		DATE: 4/15/2020 SIGNATURE: _____ DATE: _____	
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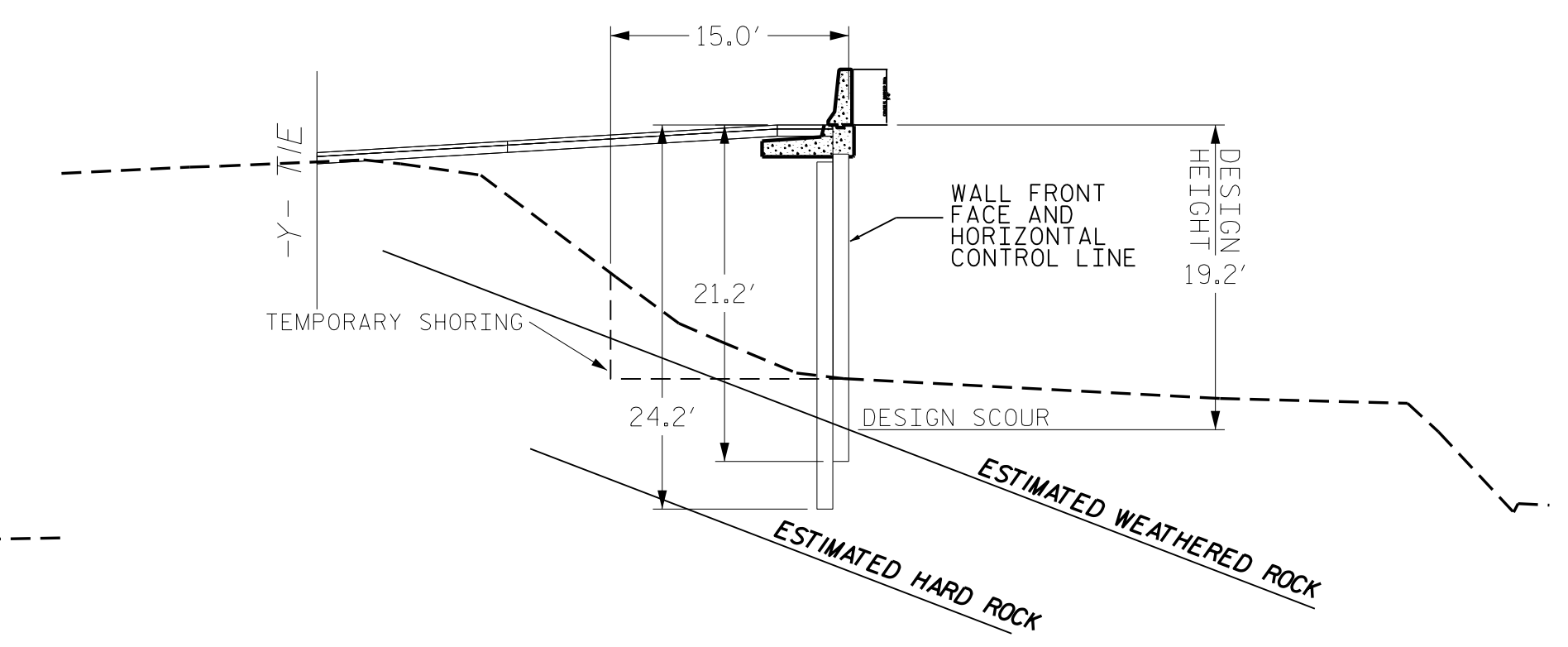
CROSS SECTION 16+00 -L-

WEATHERED ROCK AND HARD ROCK ELEVATIONS ARE BASED ON A GEOPHYSICAL STUDY AND ARE APPROXIMATE AND FOR ESTIMATING PURPOSES ONLY.



CROSS SECTION 18+00 -L-

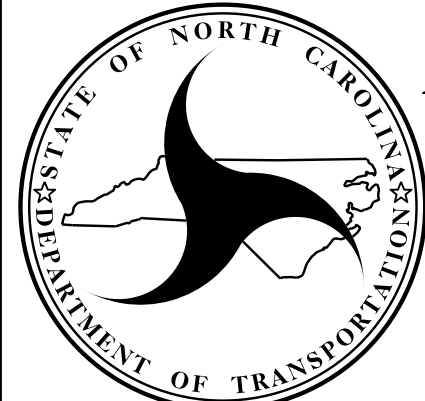
WEATHERED ROCK AND HARD ROCK ELEVATIONS ARE BASED ON A GEOPHYSICAL STUDY AND ARE APPROXIMATE AND FOR ESTIMATING PURPOSES ONLY.



CROSS SECTION 19+75 -L-

WEATHERED ROCK AND HARD ROCK ELEVATIONS ARE BASED ON A GEOPHYSICAL STUDY AND ARE APPROXIMATE AND FOR ESTIMATING PURPOSES ONLY.

PREPARED BY: MHS	DATE: 4/14/20
REVIEWED BY: SCC	DATE: 4/14/20



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DIVISION OF HIGHWAYS

GEOTECHNICAL
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BRIDGE NO. 8 ON NC 194 OVER N. FORK NEW RIVER RETAINING WALL NO. 1 CROSS SECTIONS					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

NOTES:

FOR ANCHORED RETAINING WALL, SEE ANCHORED RETAINING WALL SPECIAL PROVISION.

FOR SHEET PILE CUTOFF WALL, SEE SHEET PILE CUTOFF WALL SPECIAL PROVISION.

COARSE AGGREGATE SHALL MEET REQUIREMENTS FOR CLASS VI SELECT MATERIAL (57 STONE).

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO.1. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

AT THE CONTRACTORS OPTION, MSE PRECAST PANELS WITH CLOSURE POUR CAN BE USED IN LIEU OF CAST IN PLACE FACING.

BEFORE BEGINNING ANCHORED 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 = GRADE ELEVATION TO DESIGN SCOUR
- 2) DESIGN LIFE = 100 YEARS
- 3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT OR UNLESS OTHERWISE NOTED ON PLANS
- 4) MINIMUM PILE PENETRATION = 5 FT BELOW DESIGN SCOUR.
- 5) EMBANKMENT FILL, ALLUVIAL, AND RESIDUAL ASSUMED MATERIAL PARAMETERS:

UNIT WEIGHT, $\gamma = 120$ PCF
 FRICTION ANGLE, $\phi = 30$ DEGREES

6) COARSE AGGREGATE MATERIAL PARAMETERS:
 UNIT WEIGHT, $\gamma = 110$ PCF
 FRICTION ANGLE, $\phi = 36$ DEGREES

7) WEATHERED ROCK ASSUMED MATERIAL PARAMETERS:
 UNIT WEIGHT, $\gamma = 135$ PCF
 FRICTION ANGLE, $\phi = 36$ DEGREES
 COHESION, $c = 200$ PSF

8) ROCK ASSUMED MATERIAL PARAMETERS:
 UNIT WEIGHT, $\gamma = 155$ PCF
 FRICTION ANGLE, $\phi = 45$ DEGREES
 COHESION, $c = 500$ PSF

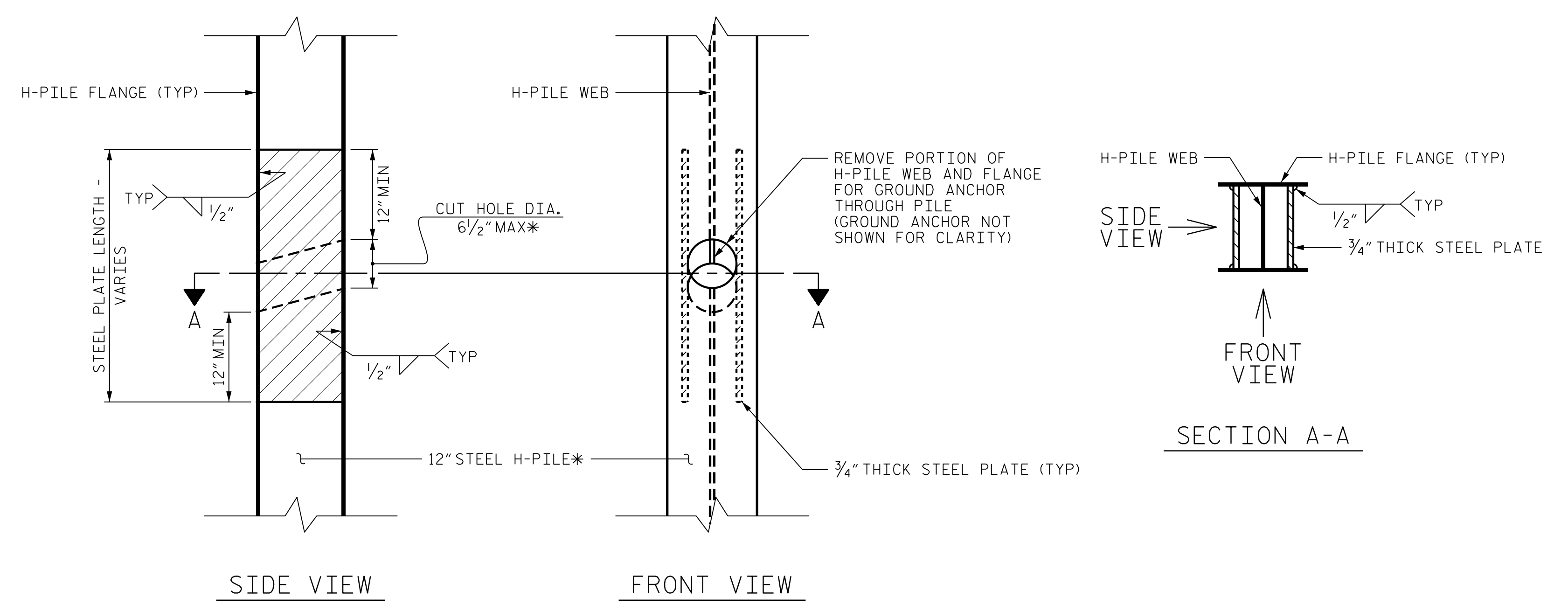
THE SHEET PILE CUTOFF WALL TIP ELEVATION FOR RETAINING WALL NO.1 INCLUDES EMBEDMENT FOR SCOUR.

DESIGN RETAINING WALL NO.1 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALL NO.1 FOR AN IMPACT LOAD FROM THE CONCRETE BARRIER RAIL ABOVE ANCHORED WALLS, ANALYZE WALLS FOR A NOMINAL P_u OF 500 LB/FT OF WALL.

FOUNDATIONS FOR SIGNS, LIGHTING SIGNALS WILL BE LOCATED BEHIND RETAINING WALL NO.1 AND MAY INTERFERE WITH GROUND ANCHORS. SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS WITH THE ANCHORED WALL CONSTRUCTION PLAN.

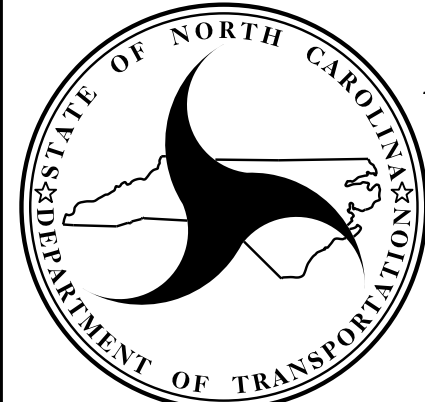
TEMPORARY SHORING MAYBE REQUIRED FOR RETAINING WALL NO.1 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.



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 ACCEPTANCE.

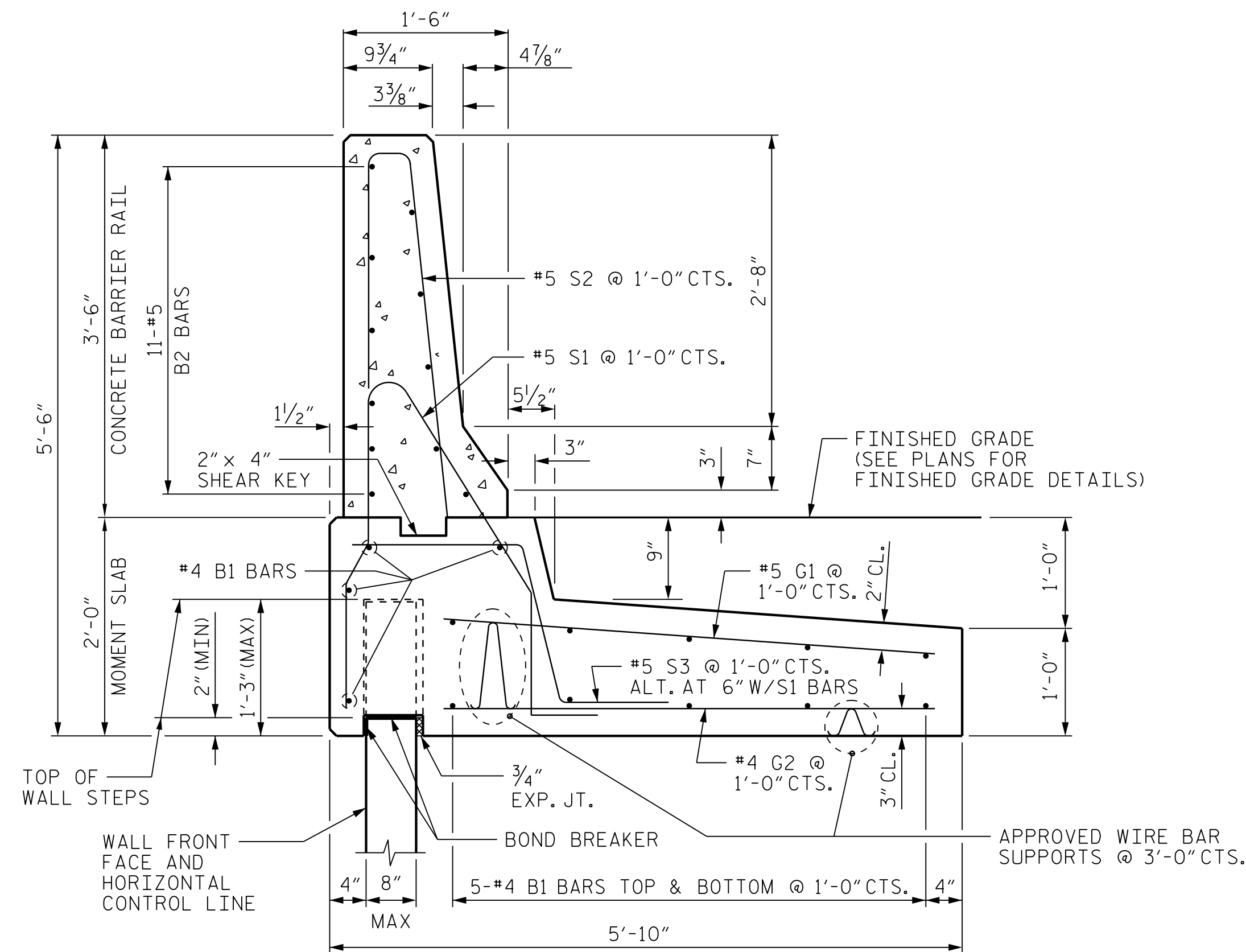
PREPARED BY: MHS	DATE: 4/14/20
REVIEWED BY: SCC	DATE: 4/14/20


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

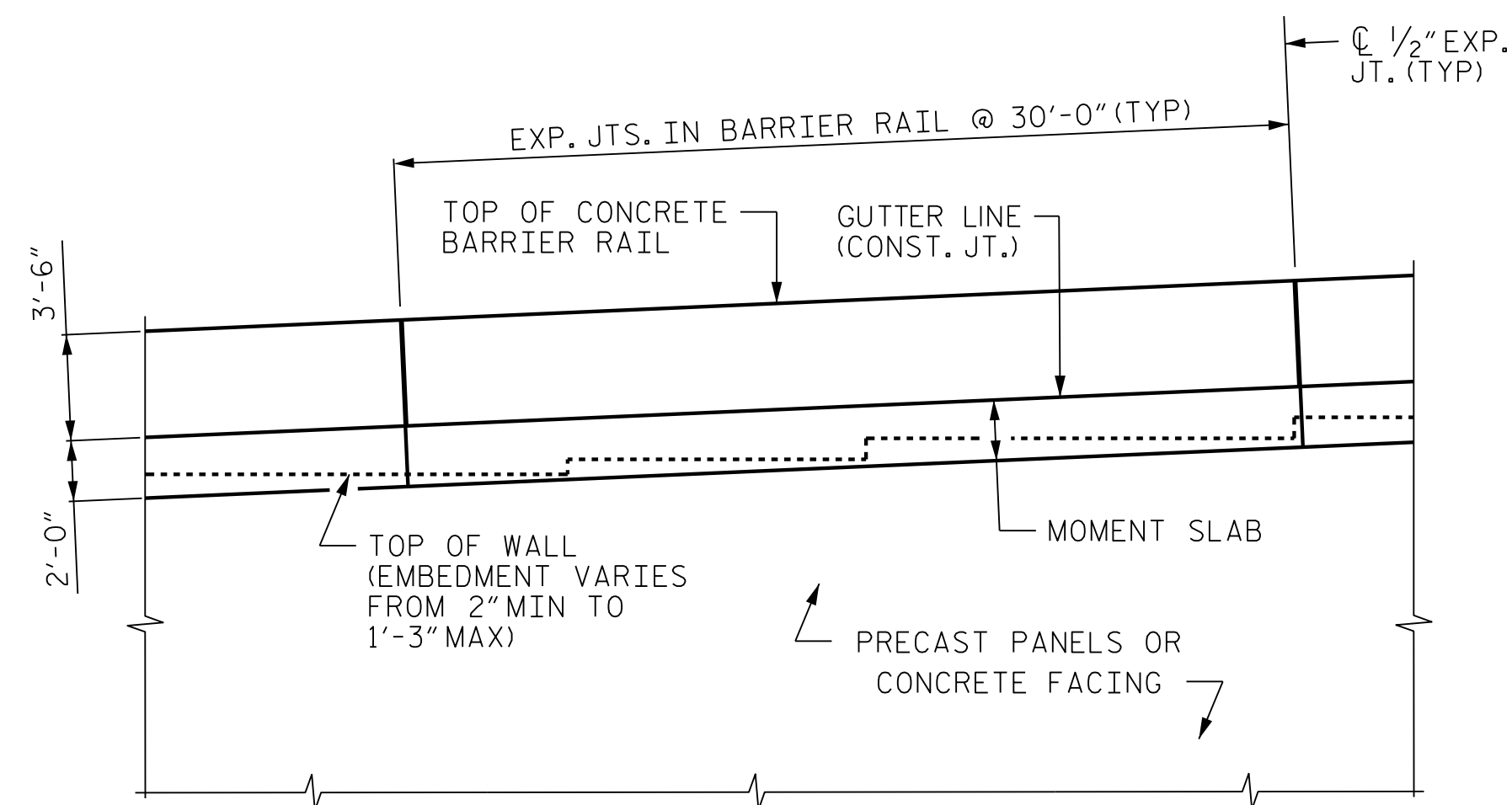
GEOTECHNICAL
ENGINEERING UNIT

BRIDGE NO. 8 ON NC 194 OVER N. FORK NEW RIVER RETAINING WALL NO. 1 NOTES

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



CONCRETE BARRIER RAIL WITH MOMENT SLAB



CONCRETE BARRIER RAIL WITH MOMENT SLAB - PARTIAL ELEVATION

NOTES:

FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB, SEE SECTION 460 OF THE STANDARD SPECIFICATIONS.

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

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

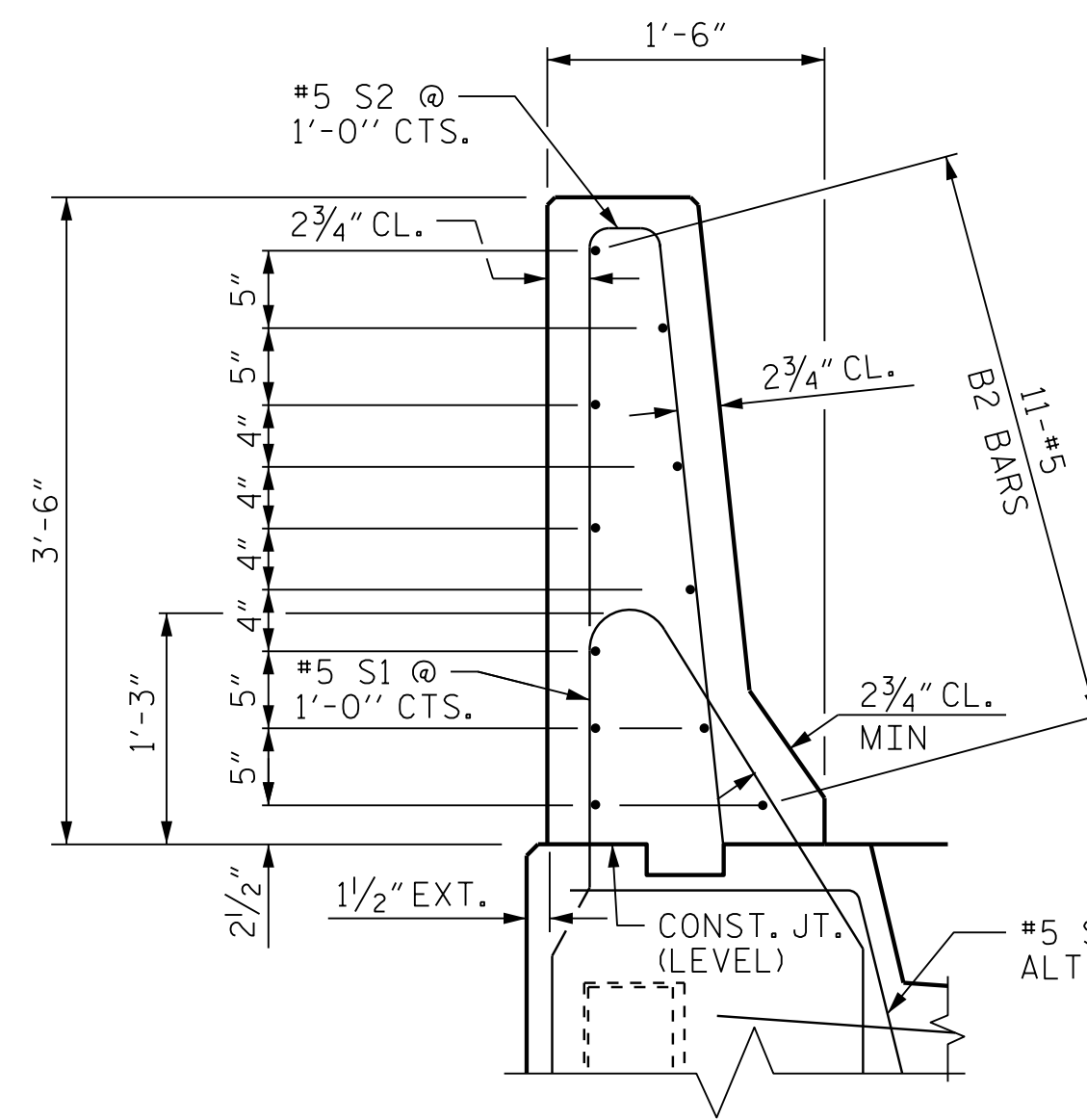
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED SURFACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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

THE BARRIER RAIL 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.

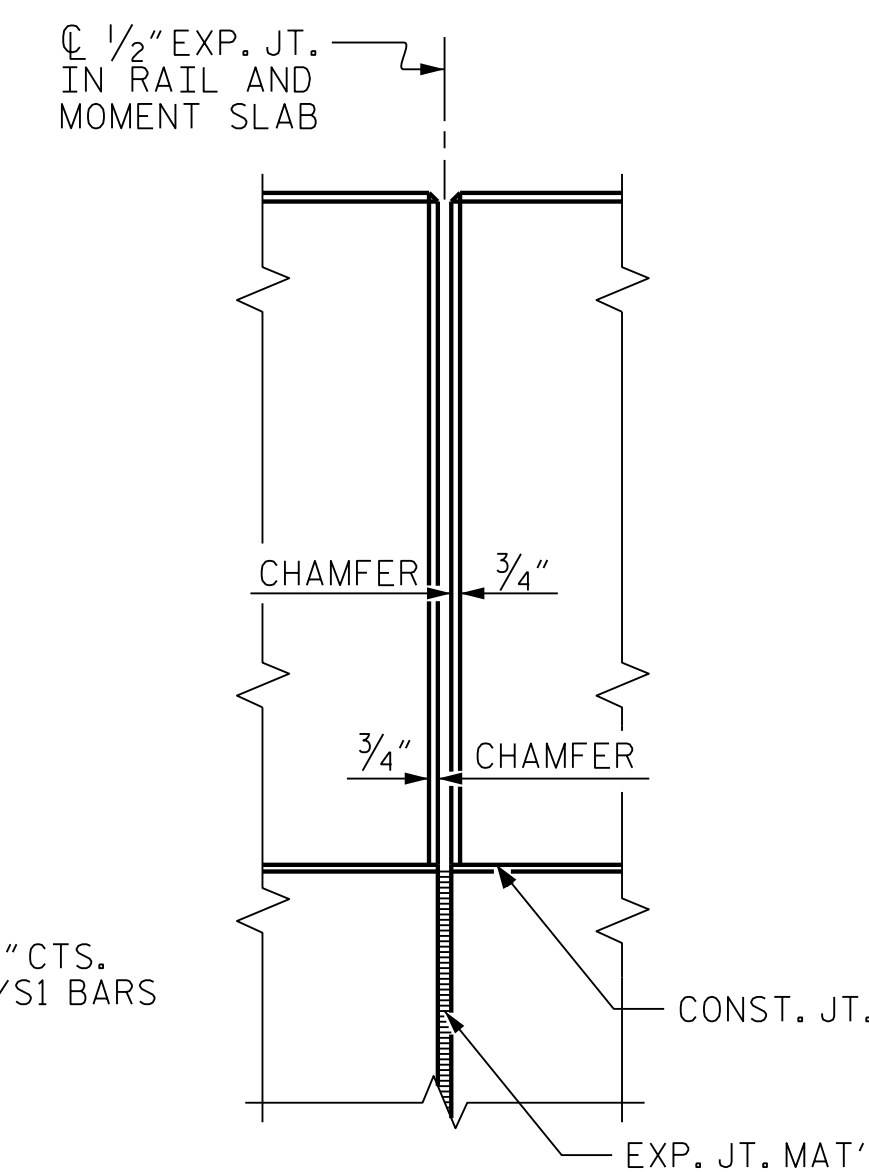
ALL REINFORCING STEEL IN THE BARRIER RAIL SHALL BE EPOXY COATED.

IF EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, BARRIERS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH CONCRETE BARRIER RAIL WITH MOMENT SLAB OR CONCRETE FACING FOR RETAINING WALL WILL BE THICKER THAN 8", CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS SHALL BE REVISED AND SUBMITTED FOR APPROVAL.

CONCRETE BARRIER RAIL WITH MOMENT SLAB
PAY LENGTH = 500 LIN FT



SECTION THRU RAIL



ELEV. @ EXP. JOINTS

BARRIER RAIL DETAILS

STRUCTURE ENGINEER
ENGINEER

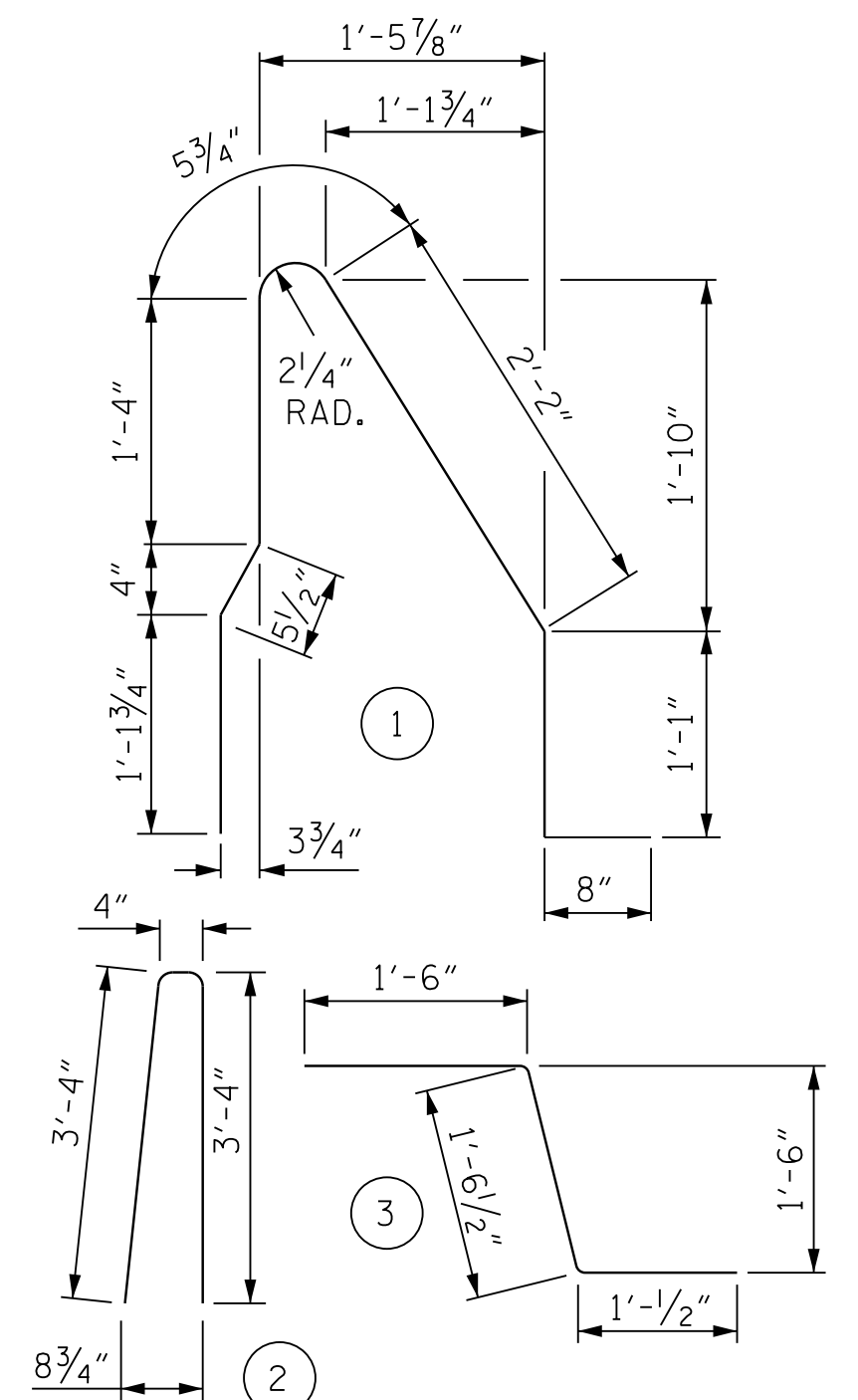
SEAL 029869
ENGINEER
SHANE C. CLARK

DocuSigned by:
Shane C. Clark
4/15/2020

SIGNATURE DATE

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BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE 30'-0" SECTION OF CONCRETE BARRIER RAIL WITH MOMENT SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#4	STR	29'-7"	277
* B2	11	#5	STR	29'-7"	339
G1	31	#5	STR	4'-4"	140
G2	31	#4	STR	4'-4"	90
* S1	31	#5	1	7'-4"	237
* S2	31	#5	2	7'-0"	226
S3	30	#5	3	4'-1"	128

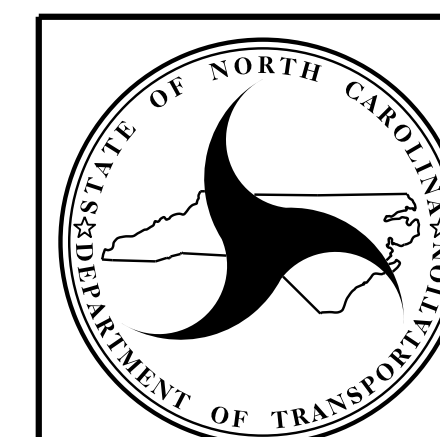
REINFORCING STEEL	635 LB
* EPOXY COATED REINFORCING STEEL	802 LB
CLASS AA CONCRETE BARRIER RAIL	4.1 CY
CLASS A CONCRETE MOMENT SLAB	9.1 CY
CONCRETE BARRIER RAIL WITH MOMENT SLAB	30 LIN FT

PROJECT NO.: 49071.1.1(BR-0002)

ASHE COUNTY

STATION: STA 15+00 -L- TO 20+00 -L-

SHEET 8 OF 8



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

CONCRETE BARRIER RAIL WITH MOMENT SLAB FOR PRECAST PANELS AND CONCRETE FACING

REVISIONS

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1			3			RW-08
2			4			

PREPARED BY: MHS	DATE: 4/14/20
REVIEWED BY: SCC	DATE: 4/14/20