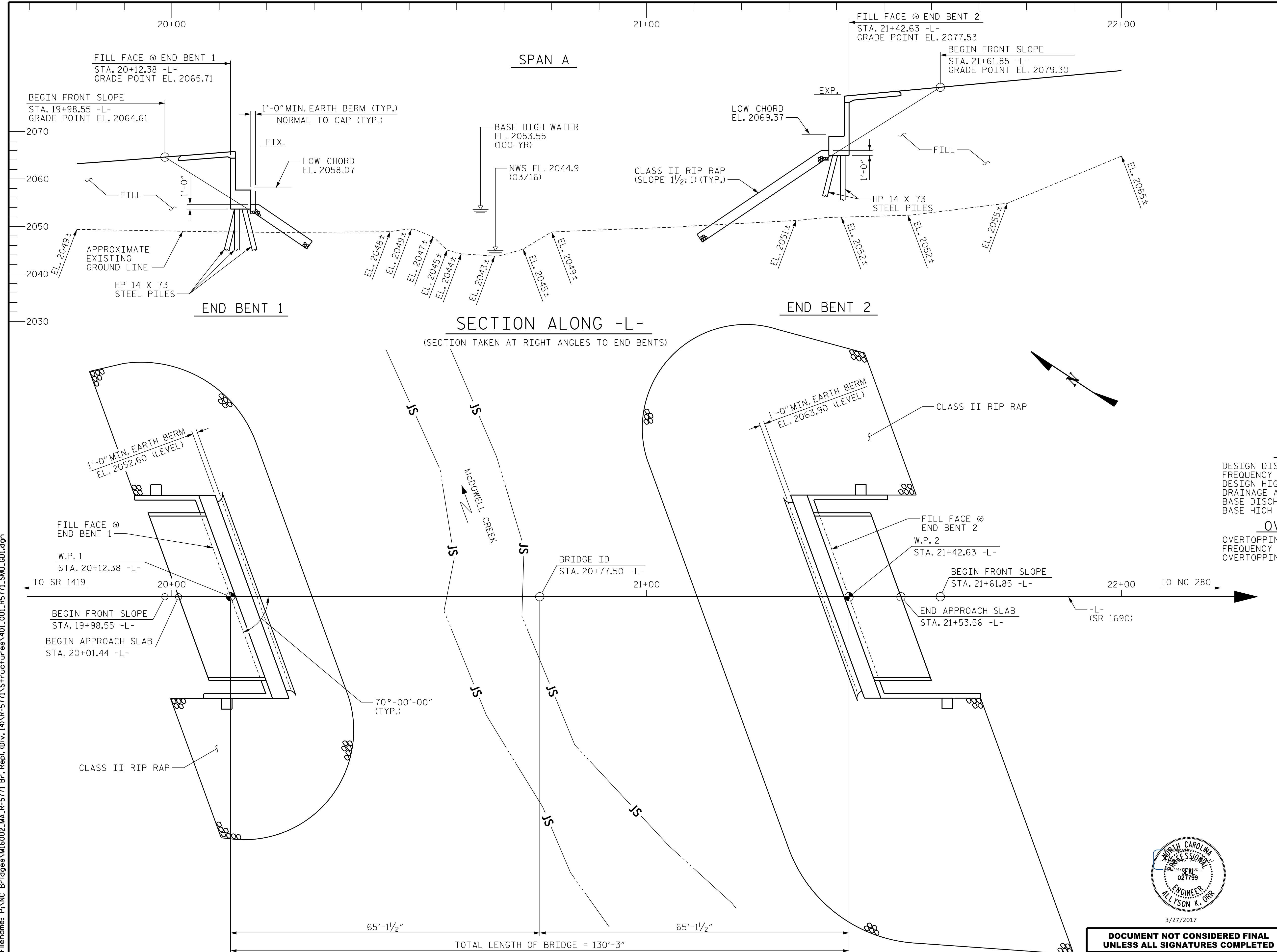


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**This file or an individual page
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-4.8718% Δ +9.2237%
 PVI = 17+90.00 -L-
 EL. = 2045.00
 V.C. = 522.00'
GRADE DATA -L-

HYDROGRAPHIC DATA
 DESIGN DISCHARGE = 1200 CFS
 FREQUENCY OF DESIGN FLOOD = 25 YRS.
 DESIGN HIGH WATER ELEVATION = 2052.6
 DRAINAGE AREA = 4.62 SQ. MI.
 BASE DISCHARGE (Q100) = 1700 CFS
 BASE HIGH WATER ELEVATION = 2053.55

OVERTOPPING FLOOD DATA
 OVERTOPPING DISCHARGE = 2000 CFS
 FREQUENCY OF OVERTOPPING FLOOD = 100+ YRS.
 OVERTOPPING FLOOD ELEVATION = 2054.0

I HEREBY CERTIFY THESE PLANS
 ARE THE AS-BUILT PLANS

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 107

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 1690
 OVER McDOWELL CREEK
 BETWEEN SR 1419 AND NC 280

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

MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-1 TOTAL SHEETS 29
2			4			

DRAWN BY : B.E. LANNING DATE : 02/17
 CHECKED BY : A.K. ORR DATE : 03/17
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 03/17

TOTAL LENGTH OF BRIDGE = 130'-3"
 (W.P. 1 TO W.P. 2)

PLAN
 (PILES NOT SHOWN FOR CLARITY)

3/27/2017 2:13:45 PM User: blanning
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FOUNDATION NOTES

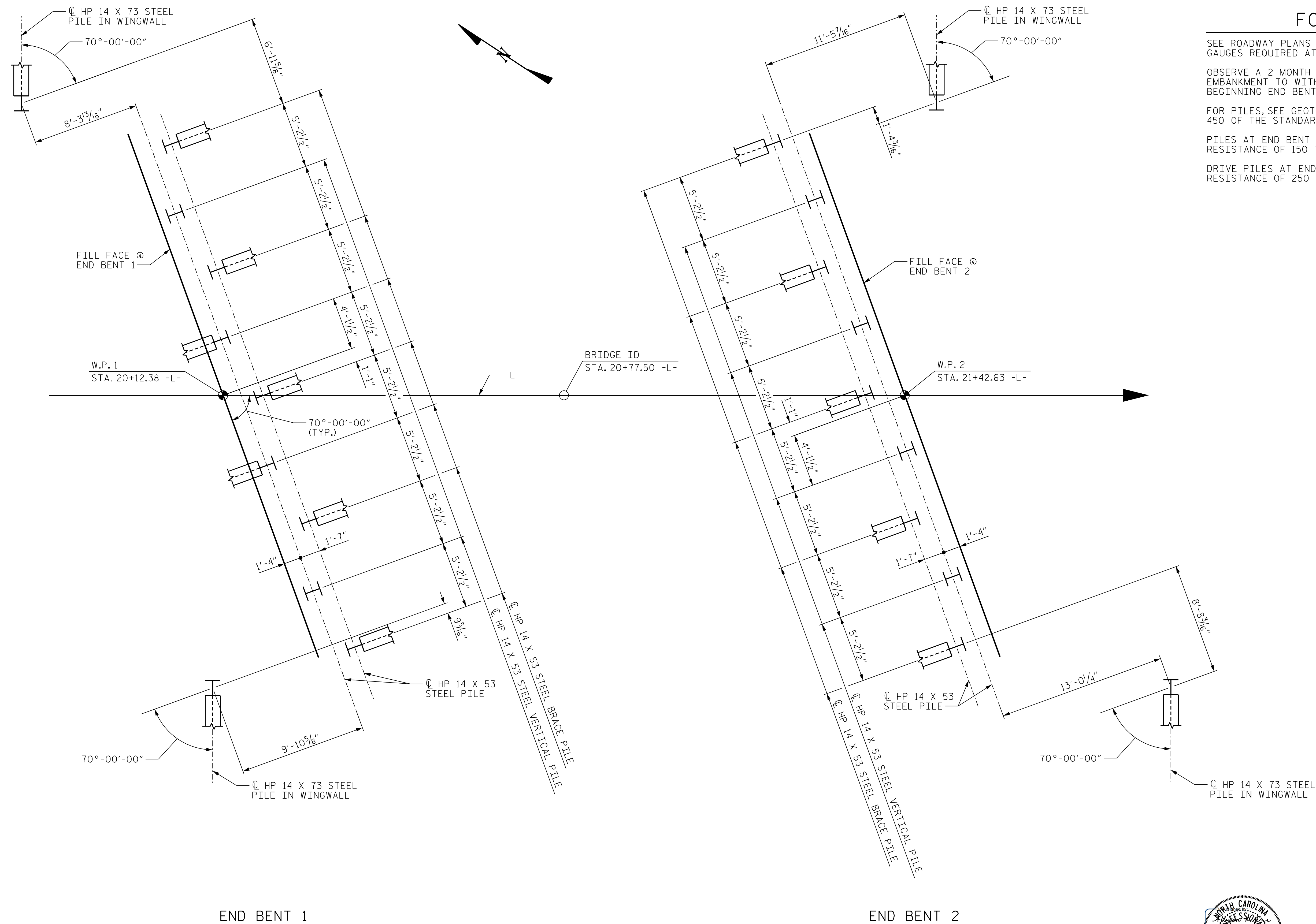
SEE ROADWAY PLANS AND SPECIAL PROVISIONS FOR THE SETTLEMENT GAUGES REQUIRED AT END BENTS 1 AND 2.

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FEET OF THE FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS 1 AND 2.

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 150 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 250 TONS PER PILE.



END BENT 1

END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF CAP.

BRACE PILES ARE TO BE BATTERED AT 3:12 IN THE DIRECTION INDICATED.

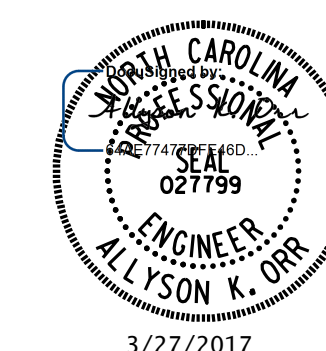
PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 2 OF 3

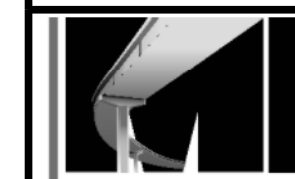
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1690
 OVER McDOWELL CREEK
 BETWEEN SR 1419 AND NC 280



**DOCUMENT NOT CONSIDERED FINAL
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MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

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

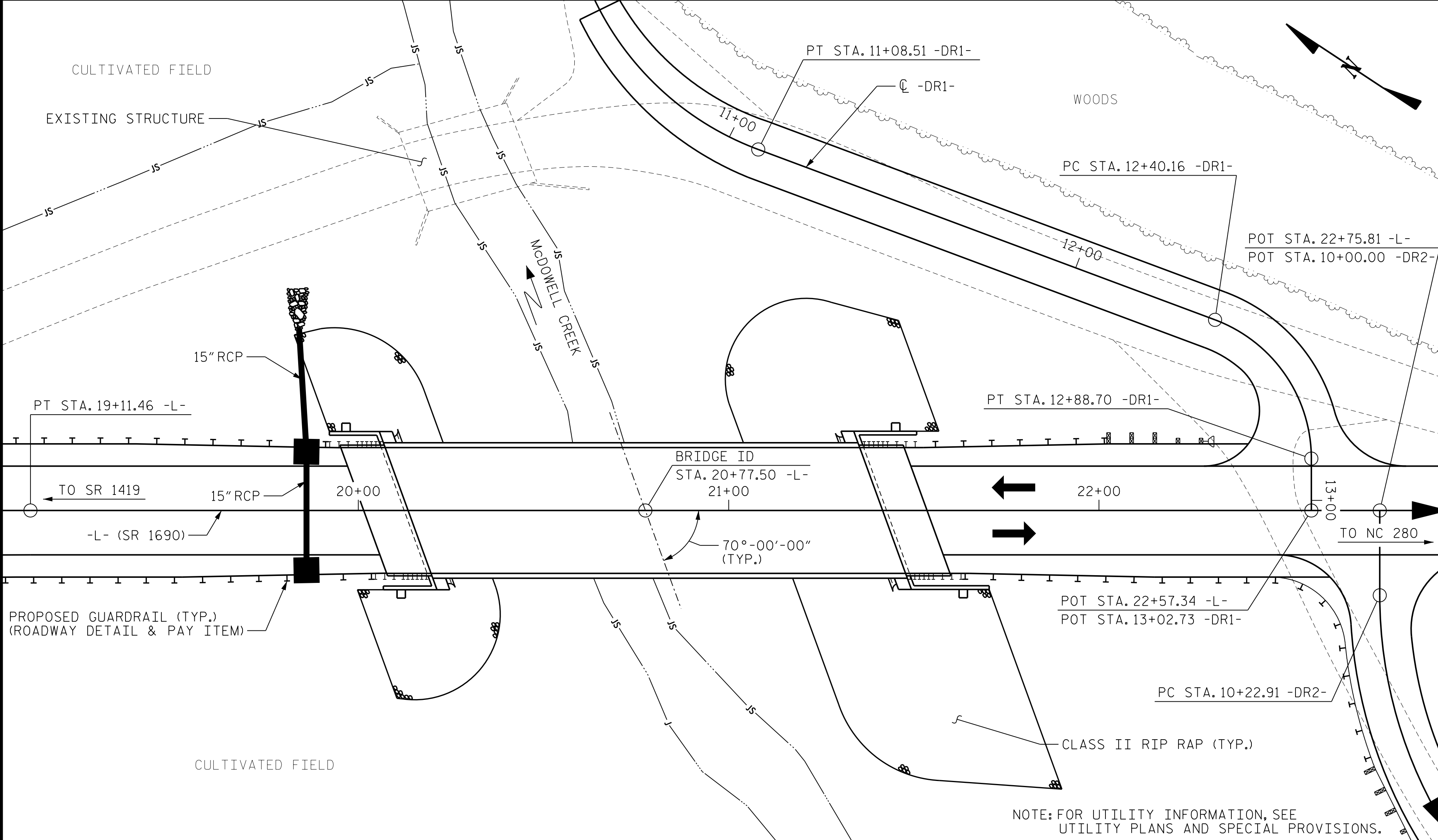
SHEET NO.
S-2
 TOTAL SHEETS
29

DRAWN BY : <u>B.E. LANNING</u>	DATE : <u>03/17</u>
CHECKED BY : <u>A.K. ORR</u>	DATE : <u>03/17</u>
DESIGN ENGINEER OF RECORD : <u>A.K. ORR</u>	DATE : <u>03/17</u>

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B.M. 2: CHISELED SQUARE IN BACK OF CONCRETE CURB, 17.26' LT. OF STA. 25+99.50 -L-, EL. 2103.36

NOTES



ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 THE EXISTING STRUCTURE CONSISTING OF ONE SPAN AT 30'-8" WITH ASPHALT WEARING SURFACE ON TIMBER DECK WITH STEEL I BEAMS AND A CLEAR ROADWAY WIDTH OF 21'-0" ON TIMBER CAP WITH TIMBER PILE END BENTS LOCATED DOWNSTREAM OF THE PROPOSED STRUCTURE SHALL BE REMOVED.
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
 THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 20+77.50 -L-."
 REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
 THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES".
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 FOR FOUNDATION NOTES, SEE "FOUNDATION LAYOUT" SHEET.
 FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.
 FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

LOCATION SKETCH

TOTAL BILL OF MATERIAL

	REMOVING OF EXISTING STRUCTURE	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 X 73 STEEL PILES	2 BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	ASBESTOS ASSESSMENT	
	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	TON	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM	
SUPERSTRUCTURE		4684	4648				4	507.73			240.04	256.07		LUMP SUM	LUMP SUM		
END BENT 1				55.9		6603			11	517.0		248	275				
END BENT 2				63.5		7918			11	517.0		630	700				
TOTAL	LUMP SUM	4684	4648	119.4	LUMP SUM	14,521	4	507.73	22	1034.0	240.04	256.07	878	975	LUMP SUM	LUMP SUM	LUMP SUM

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 3 OF 3



3/28/2017

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MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1690
 OVER McDOWELL CREEK
 BETWEEN SR 1419 AND NC 280

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-3
2			4			TOTAL SHEETS 29

DRAWN BY : B.E. LANNING DATE : 03/17
 CHECKED BY : A.K. ORR DATE : 03/17
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 03/17

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE										COMMENT NUMBER
						MOMENT					SHEAR					MOMENT										
						LIVE-LOAD FACTORS (LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)				
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.18	--	1.75	0.860	1.38	A	E	62.5	1.015	1.18	A	I	6.3	0.80	0.772	1.19	A	I	62.5				
	HL-93 (OPERATING)	N/A		1.56	--	1.35	0.860	1.79	A	E	62.5	1.015	1.56	A	I	6.3	N/A	--	--	--	--	--				
	HS-20 (INVENTORY)	36.000	2	1.73	62.28	1.75	0.860	2.04	A	E	62.5	1.015	1.73	A	I	6.3	0.80	0.772	1.76	A	I	62.5				
	HS-20 (OPERATING)	36.000		2.27	81.72	1.35	0.860	2.65	A	E	62.5	1.015	2.27	A	I	6.3	N/A	--	--	--	--	--				
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.29	57.92	1.40	0.860	6.22	A	E	62.5	1.015	5.65	A	I	6.3	0.80	0.772	4.29	A	I	62.5			
		SNGARBS2	20.000		3.06	61.20	1.40	0.860	4.43	A	E	62.5	1.015	3.89	A	I	6.3	0.80	0.772	3.06	A	I	62.5			
		SNAGRIS2	22.000		2.84	62.48	1.40	0.860	4.12	A	E	62.5	1.015	3.57	A	I	6.3	0.80	0.772	2.84	A	I	62.5			
		SNCOTTS3	27.250		2.13	58.04	1.40	0.860	3.09	A	E	62.5	1.015	2.76	A	I	6.3	0.80	0.772	2.13	A	I	62.5			
		SNAGGRS4	34.925		1.73	60.42	1.40	0.860	2.50	A	E	62.5	1.015	2.21	A	I	6.3	0.80	0.772	1.73	A	I	62.5			
		SNS5A	35.550		1.69	60.08	1.40	0.860	2.45	A	E	62.5	1.015	2.20	A	I	6.3	0.80	0.772	1.69	A	I	62.5			
		SNS6A	39.950		1.53	61.12	1.40	0.860	2.22	A	E	62.5	1.015	1.97	A	I	6.3	0.80	0.772	1.53	A	I	62.5			
		SNS7B	42.000		1.46	61.32	1.40	0.860	2.11	A	E	62.5	1.015	1.91	A	I	6.3	0.80	0.772	1.46	A	I	62.5			
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.86	61.38	1.40	0.860	2.70	A	E	62.5	1.015	2.39	A	I	6.3	0.80	0.772	1.86	A	I	62.5			
		TNT4A	33.075		1.86	61.52	1.40	0.860	2.70	A	E	62.5	1.015	2.35	A	I	6.3	0.80	0.772	1.86	A	I	62.5			
		TNT6A	41.600		1.50	62.40	1.40	0.860	2.18	A	E	62.5	1.015	1.97	A	I	6.3	0.80	0.772	1.50	A	I	62.5			
		TNT7A	42.000		1.50	63.00	1.40	0.860	2.18	A	E	62.5	1.015	1.95	A	I	6.3	0.80	0.772	1.50	A	I	62.5			
		TNT7B	42.000		1.53	64.26	1.40	0.860	2.21	A	E	62.5	1.015	1.88	A	I	6.3	0.80	0.772	1.53	A	I	62.5			
		TNAGRIT4	43.000		1.47	63.21	1.40	0.860	2.13	A	E	62.5	1.015	1.82	A	I	6.3	0.80	0.772	1.47	A	I	62.5			
TNACT5A	45.000		1.40	63.00	1.40	0.860	2.02	A	E	62.5	1.015	1.77	A	I	6.3	0.80	0.772	1.40	A	I	62.5					
TNACT5B	45.000		3	1.39	62.55	1.40	0.860	2.01	A	E	62.5	1.015	1.73	A	I	6.3	0.80	0.772	1.39	A	I	62.5				

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

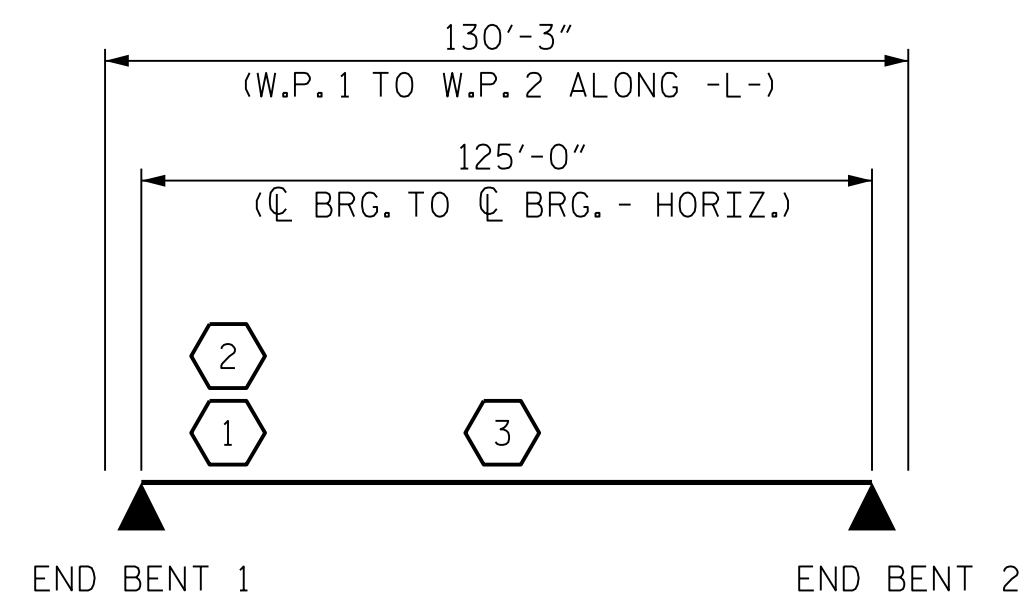
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

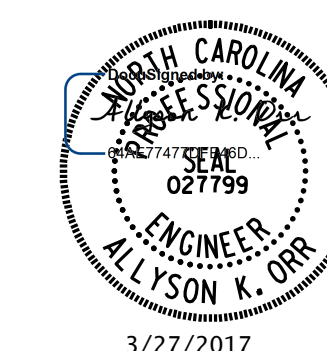
#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
	** SEE CHART FOR VEHICLE TYPE
GIRDER LOCATION	
I	INTERIOR GIRDER
E	EXTERIOR GIRDER



SPAN A

LRFR SUMMARY

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-



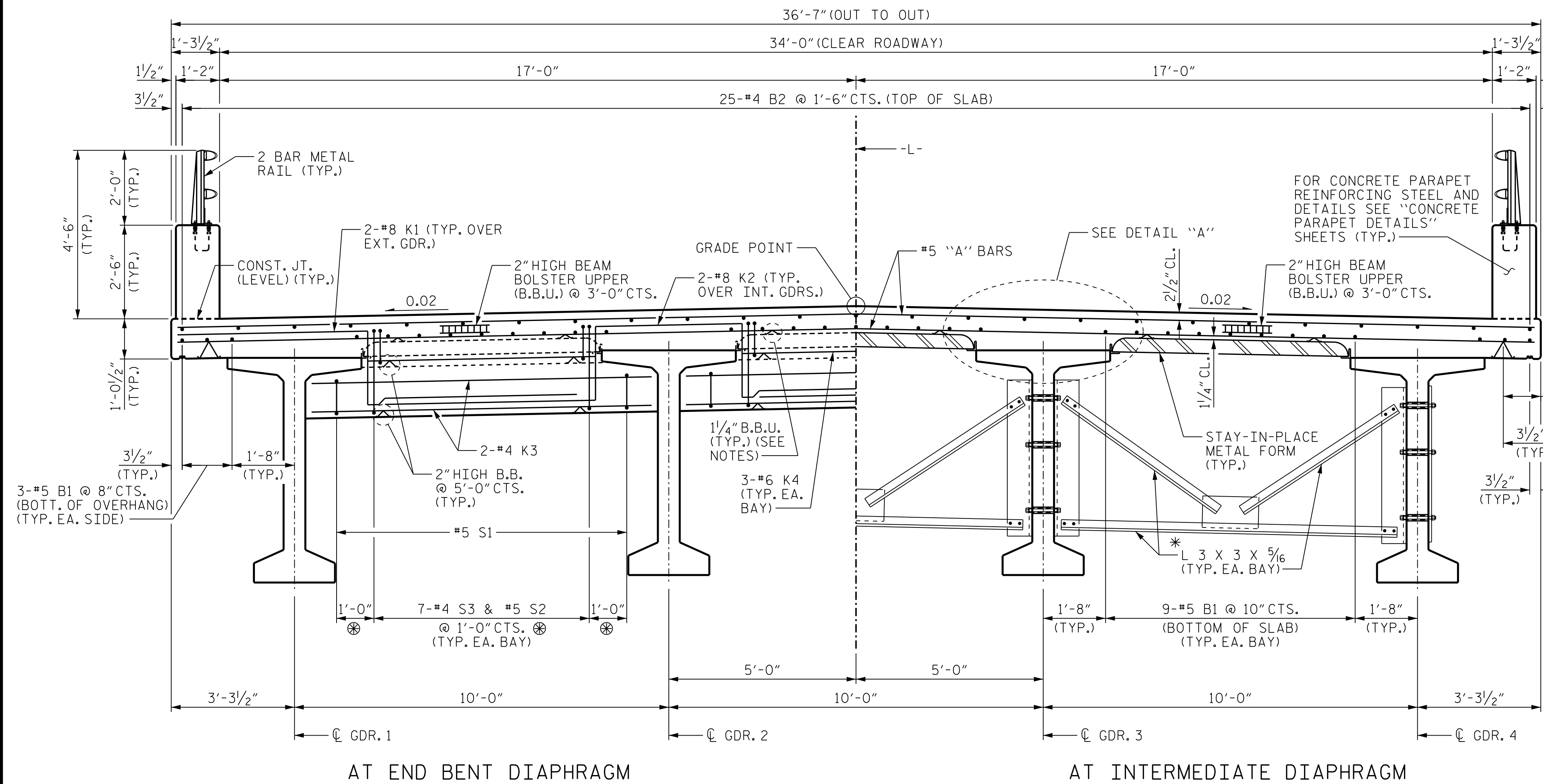
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MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-4
TOTAL SHEETS					29

DRAWN BY : B.E. ATKINSON	DATE : 03/17
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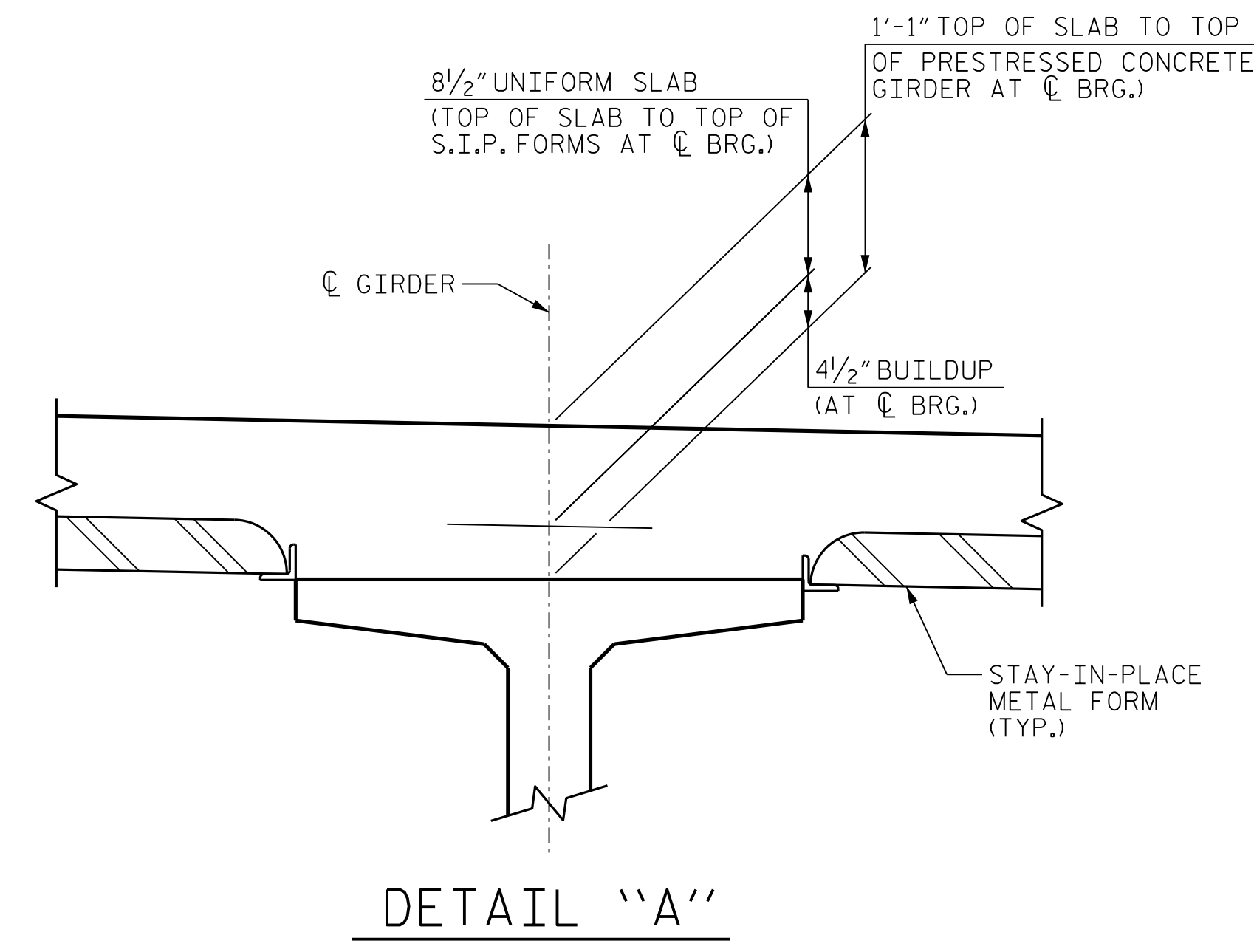
NOTES

- PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.
- PREVIOUSLY CAST CONCRETE IN A SIMPLE SPAN SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE SPAN.
- PARAPETS SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.
- ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED.
- * FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDERS" SHEET.

AT END BENT DIAPHRAGM AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

⊗ ALONG SKEW



PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 TYPICAL SECTION
 AND DETAILS**



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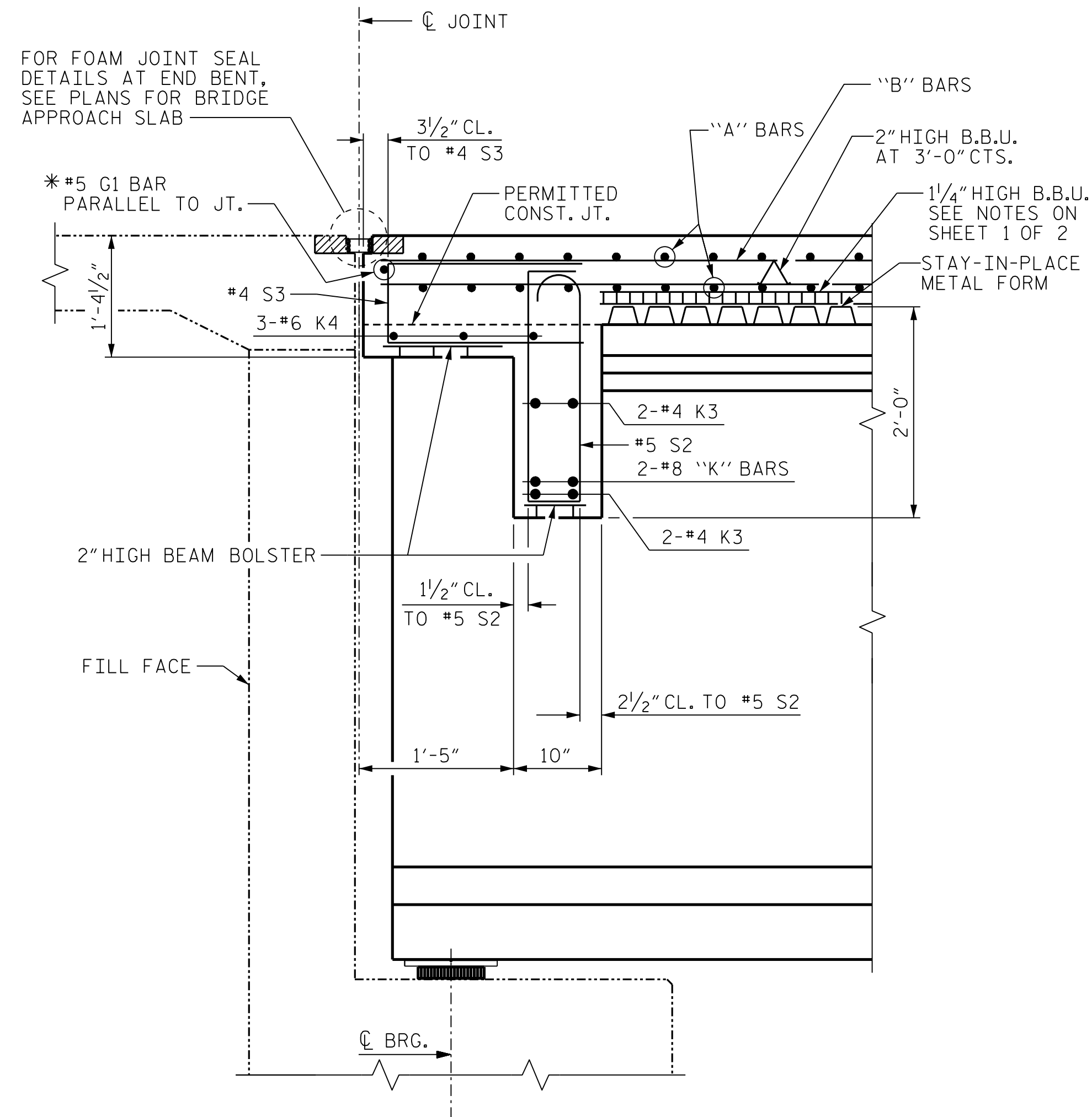
MI ENGINEERING
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 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : B.E. LANNING	DATE : 01/17
CHECKED BY : A.K. ORR	DATE : 01/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 03/17

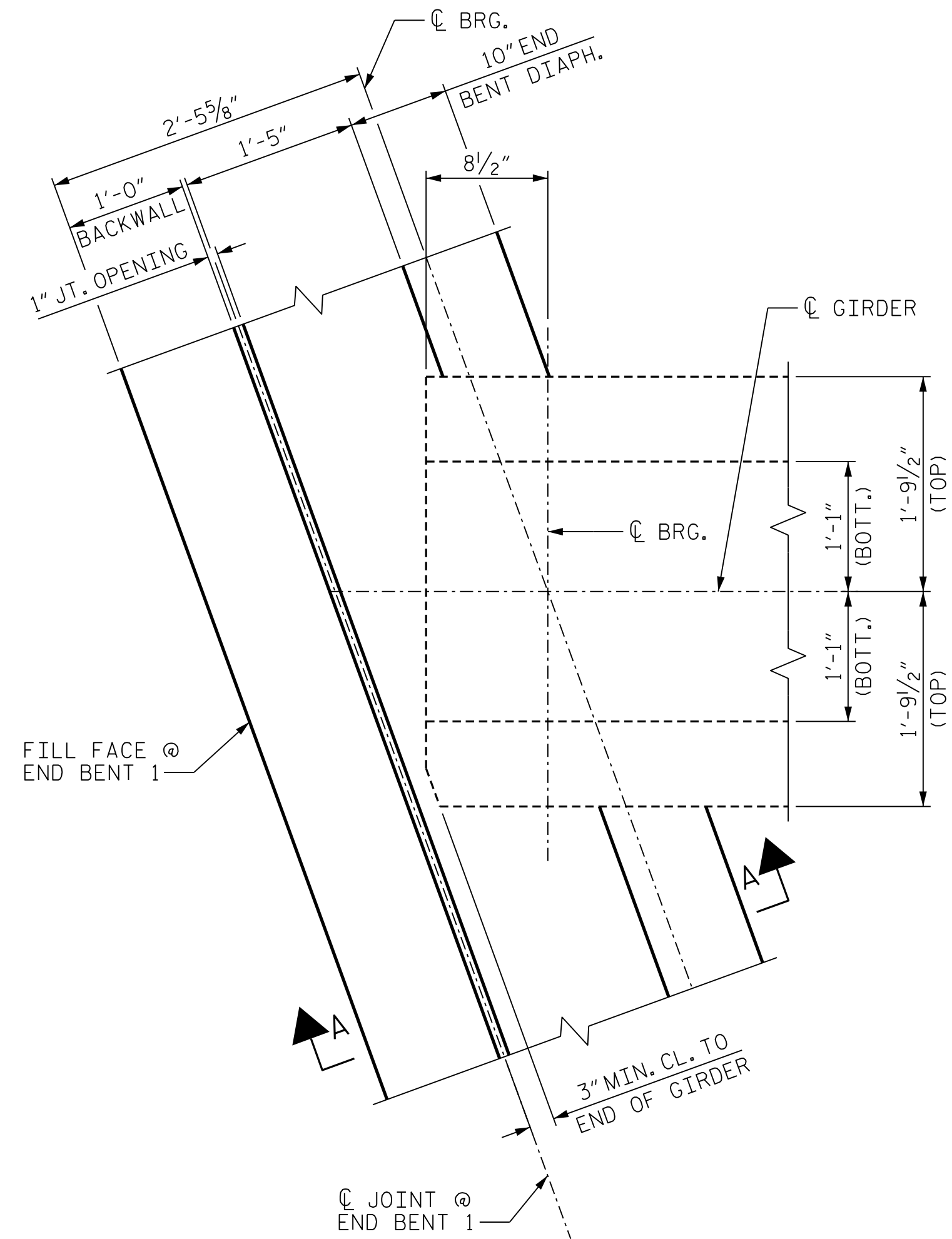
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SECTION A-A

* #5 G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

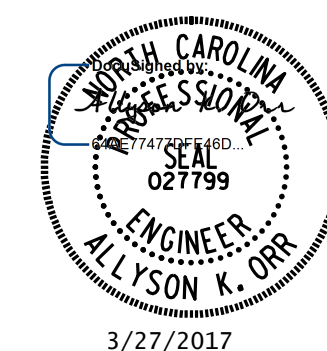


PLAN OF GIRDER AT END BENT JOINT

END BENT 1 SHOWN, END BENT 2 SIMILAR

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION
 DETAILS

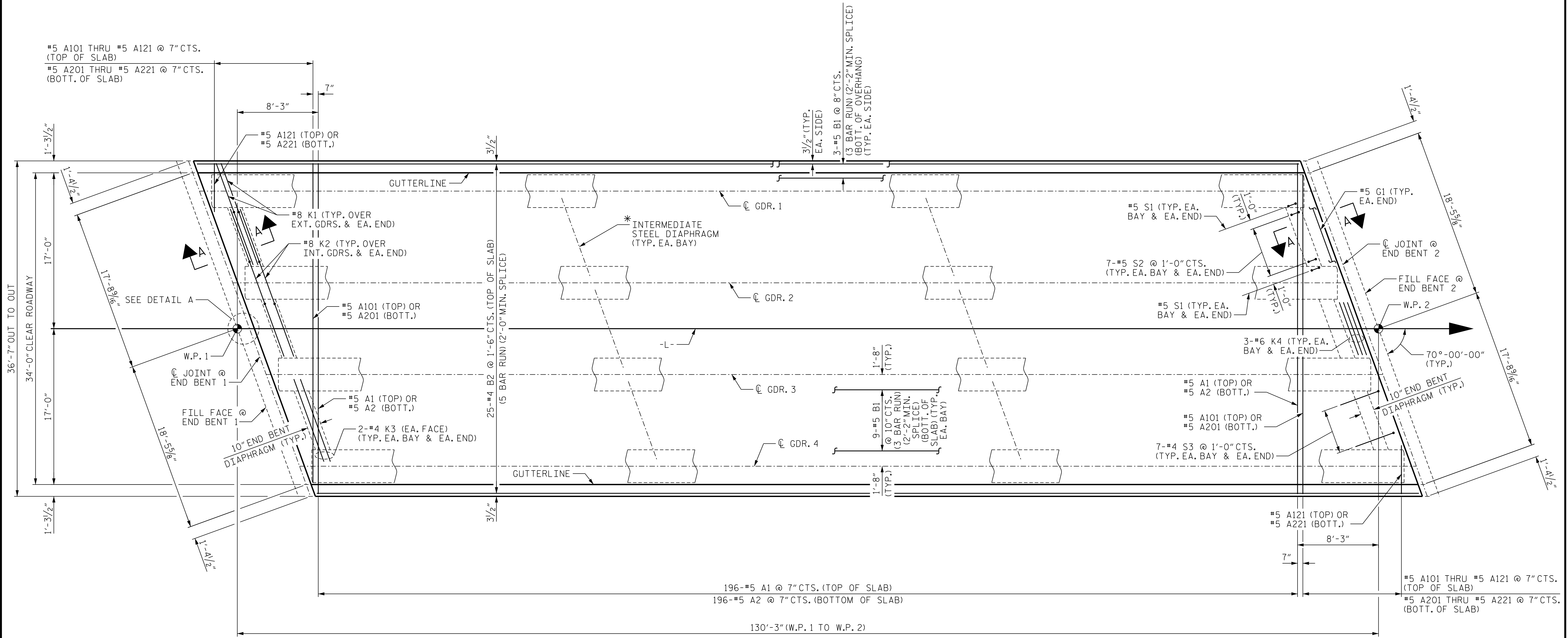
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-6
2			4			TOTAL SHEETS 29

MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
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 FIRM PE NUMBER : P-0671

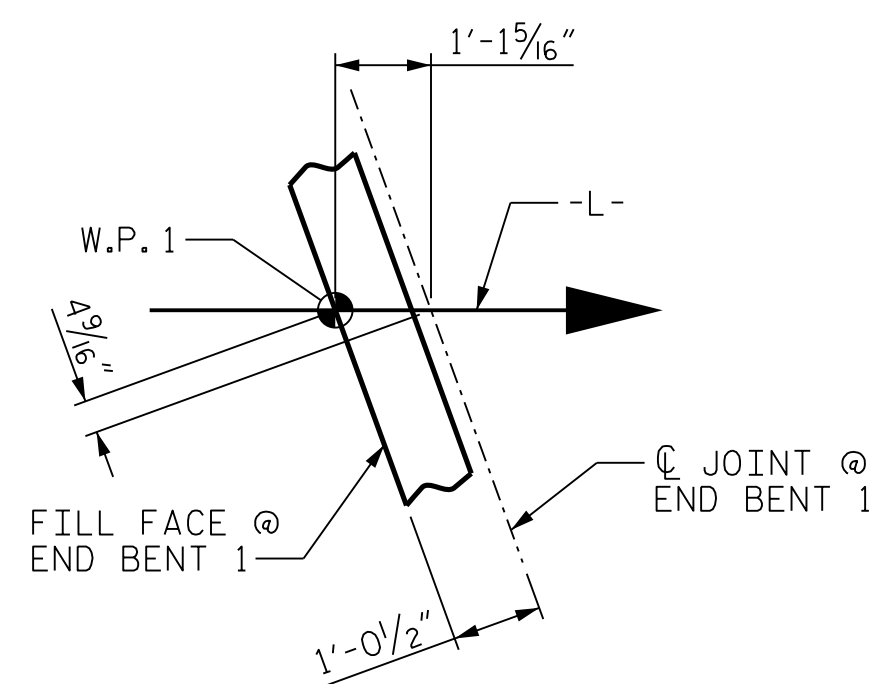
#5 A101 THRU #5 A121 @ 7" CTS.
(TOP OF SLAB)
#5 A201 THRU #5 A221 @ 7" CTS.
(BOTT. OF SLAB)



PLAN OF SPAN A

NOTES

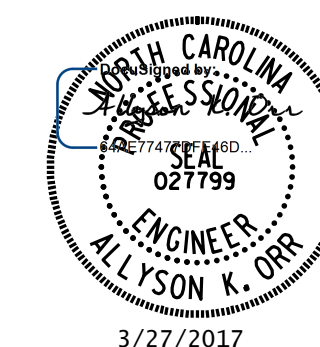
- FOR REINFORCING STEEL IN CONCRETE PARAPET, SEE "CONCRETE PARAPET DETAILS" SHEETS.
- FOR SECTION VIEW A-A, SEE "TYPICAL SECTION DETAILS" SHEET 2 OF 2.
- FOR LOCATION OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "FRAMING PLAN" SHEET.
- * FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



DETAIL "A"

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. R-5771
HENDERSON COUNTY
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN
 SPAN A

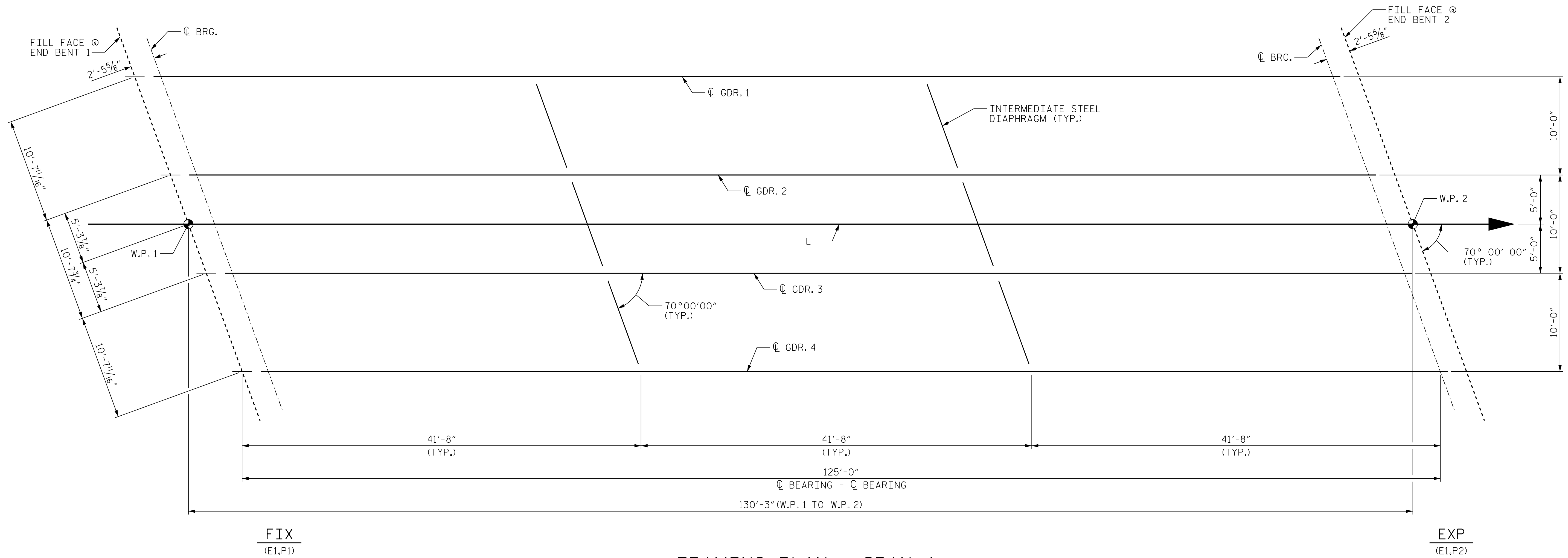
DOCUMENT NOT CONSIDERED FINAL
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MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

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1			3			S-7
2			4			TOTAL SHEETS 29

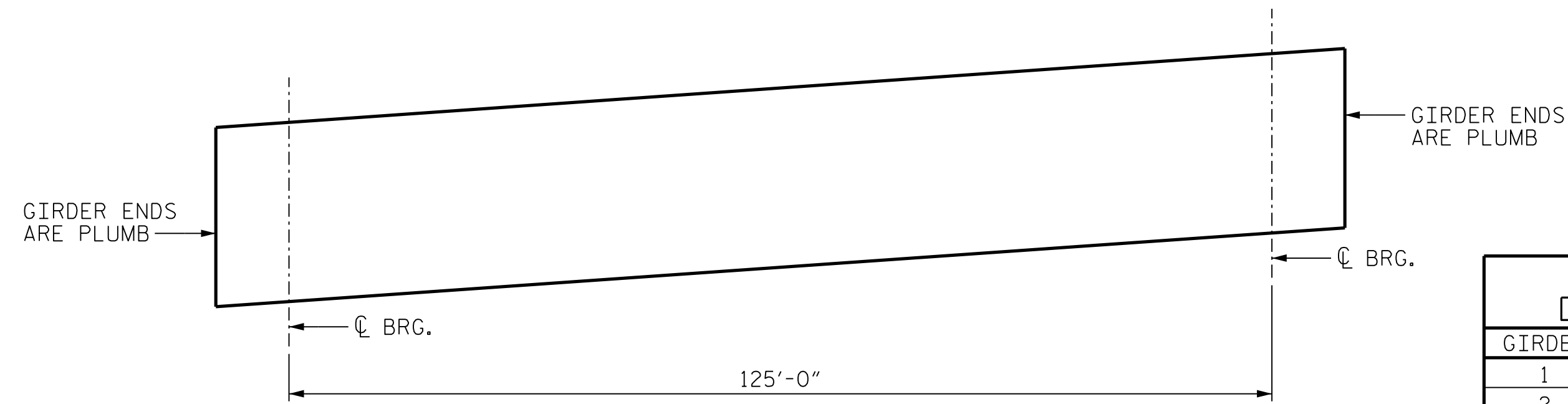
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DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 03/17

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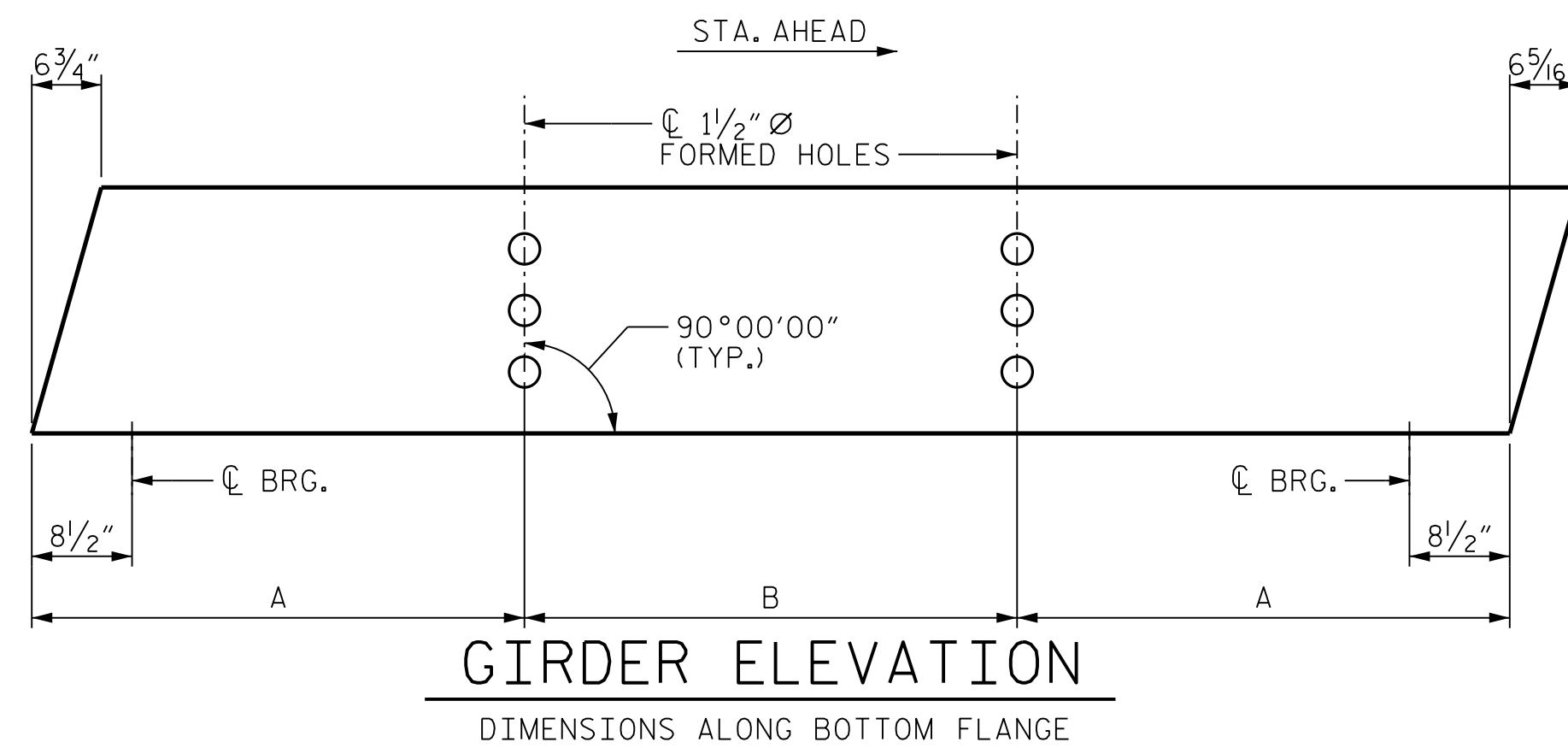


FRAMING PLAN - SPAN A

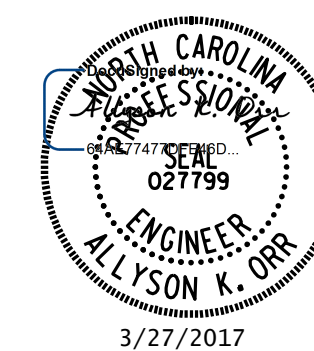
NOTE: ALL DIMENSIONS HORIZONTAL.



GIRDER DIMENSIONS		
GIRDER	A	B
1	42'-6 ⁹ / ₁₆ "	41'-10"
2	42'-6 ⁹ / ₁₆ "	41'-10"
3	42'-6 ⁹ / ₁₆ "	41'-10 ¹ / ₈ "
4	42'-6 ⁹ / ₁₆ "	41'-10 ¹ / ₈ "



PROJECT NO. R-5771
HENDERSON COUNTY
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SUPERSTRUCTURE
 FRAMING PLAN**

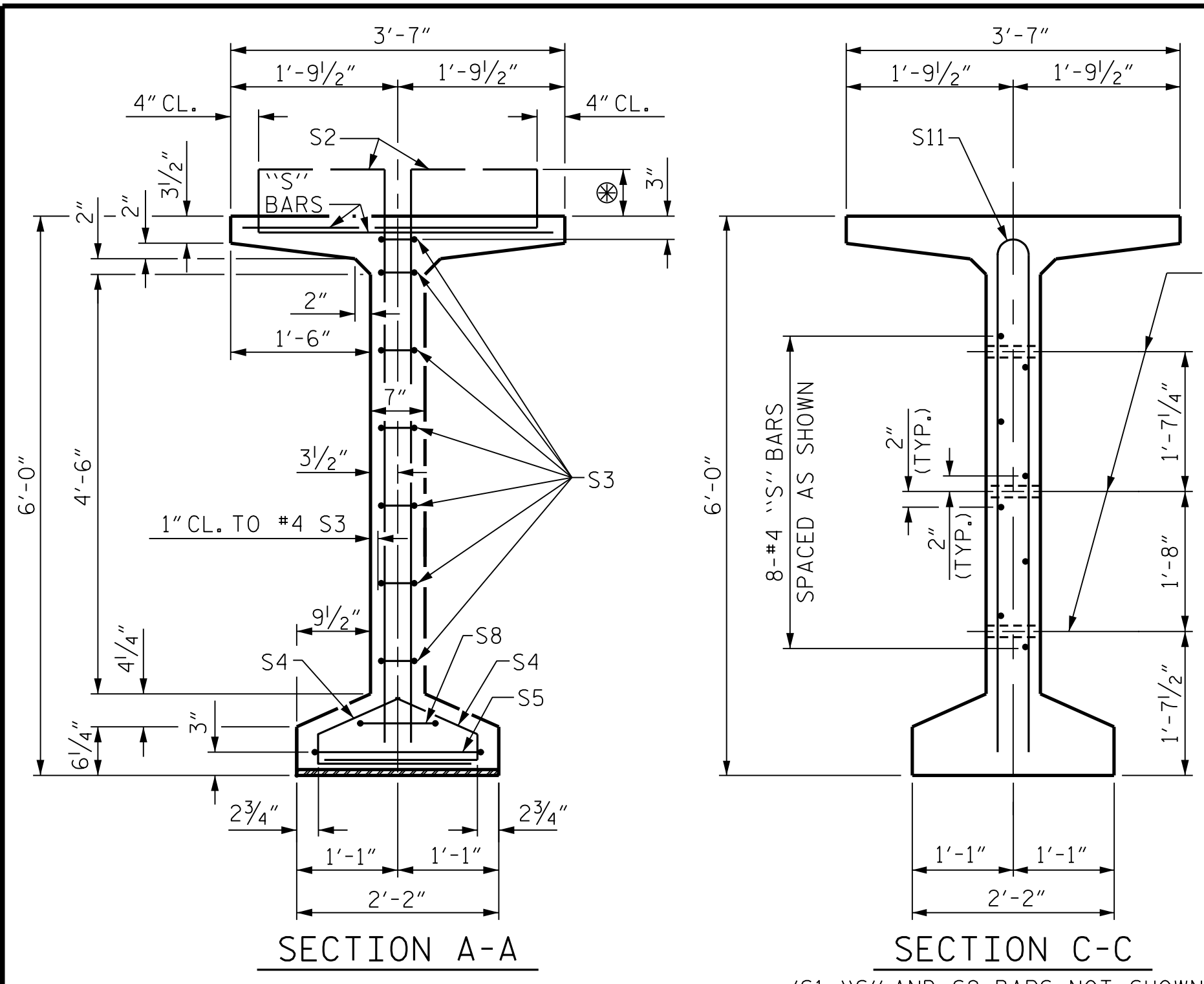
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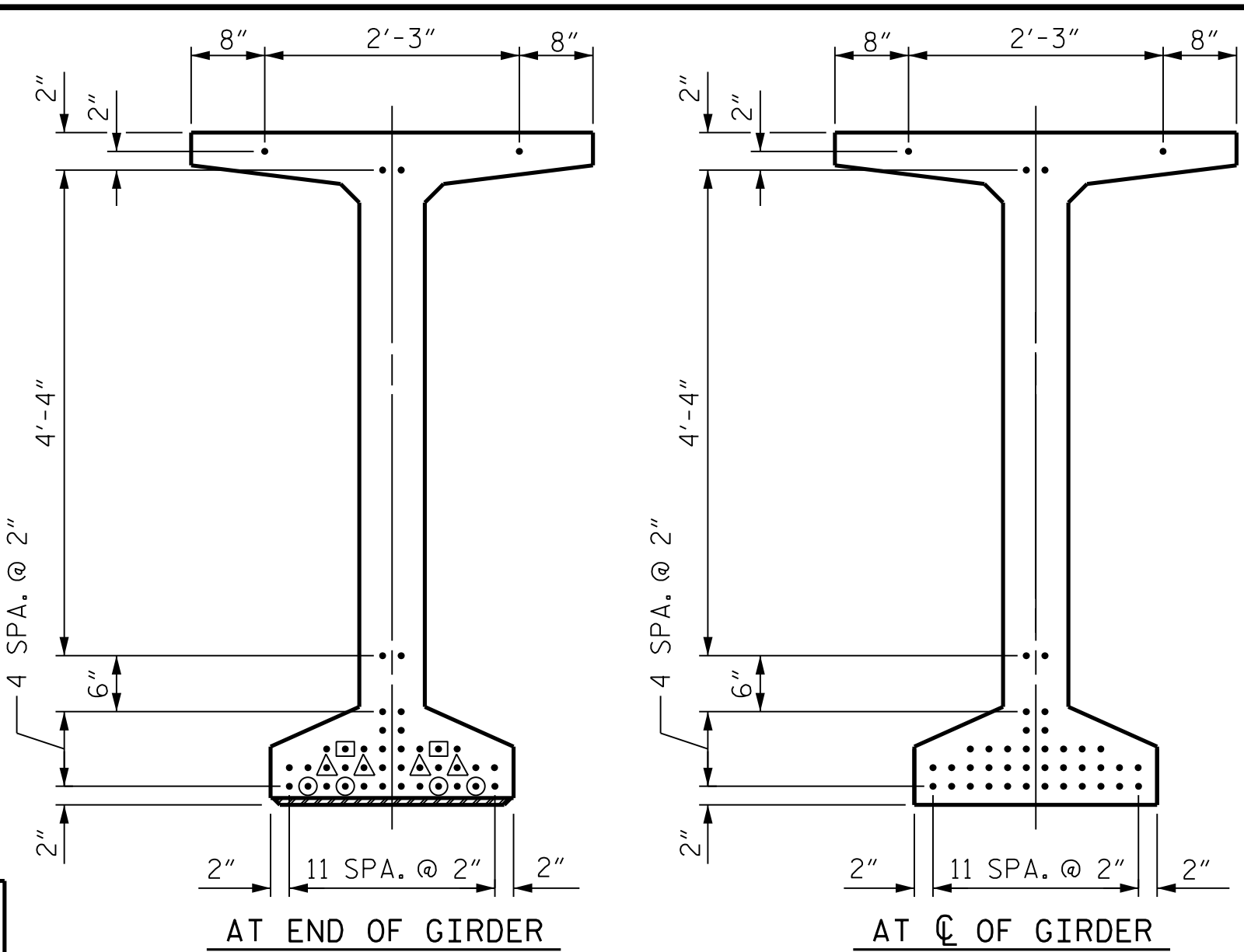
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-8
2			4			TOTAL SHEETS 29

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GIRDER DIMENSIONS		
	A	B
1	126'-11 1/8"	9 1/16"
2	126'-11 1/8"	9 1/16"
3	126'-11 1/4"	9 1/8"
4	126'-11 1/4"	9 1/8"

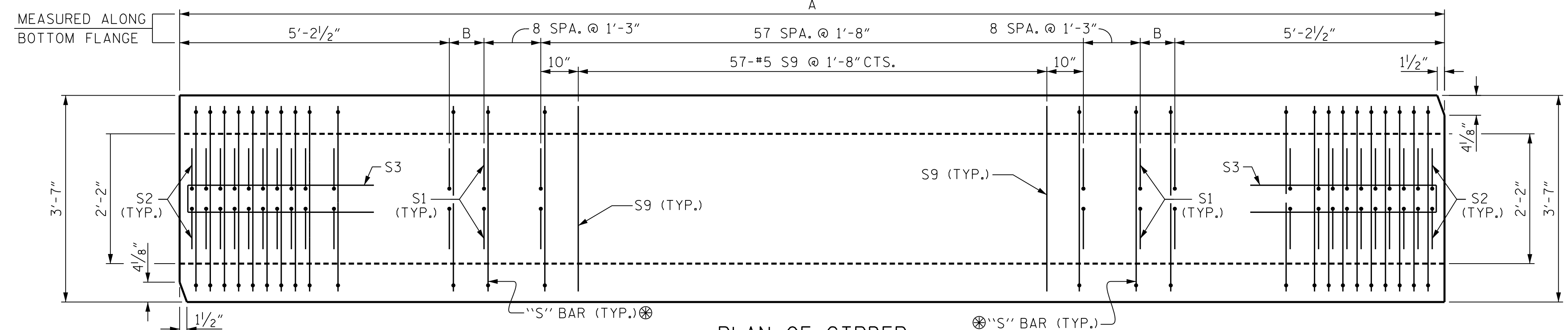
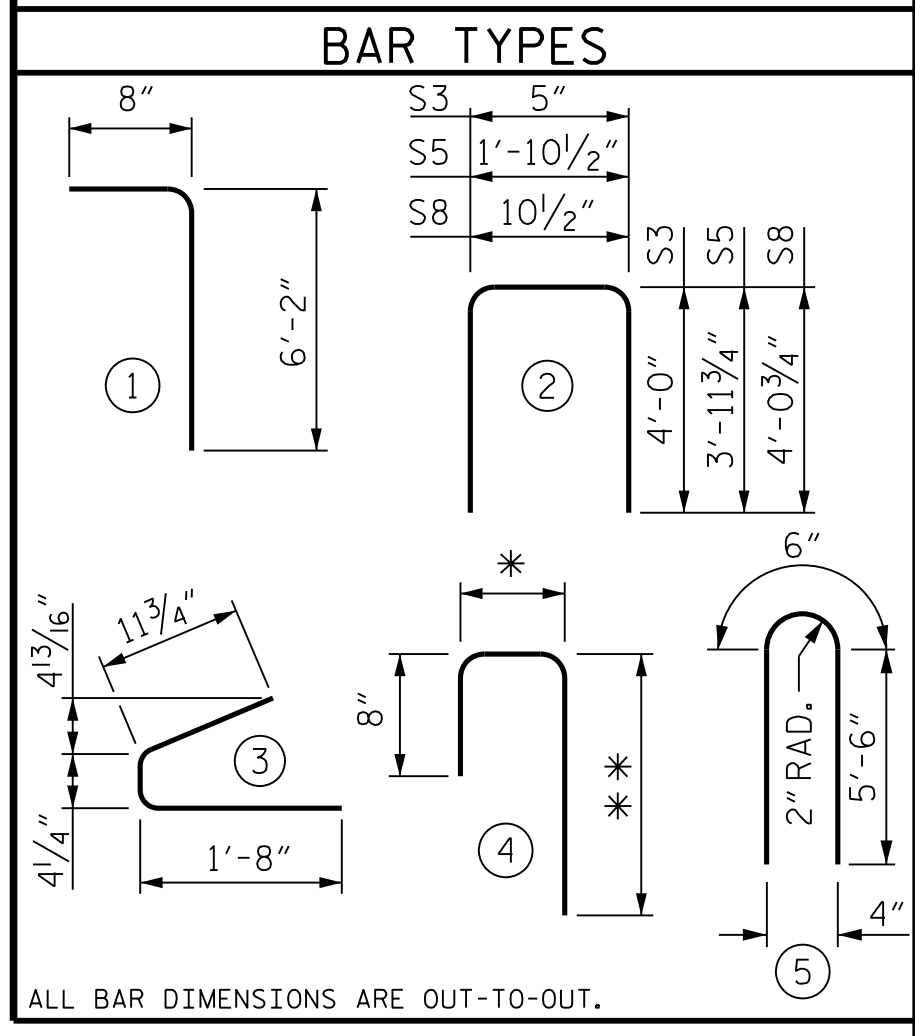


DEBONDING LEGEND

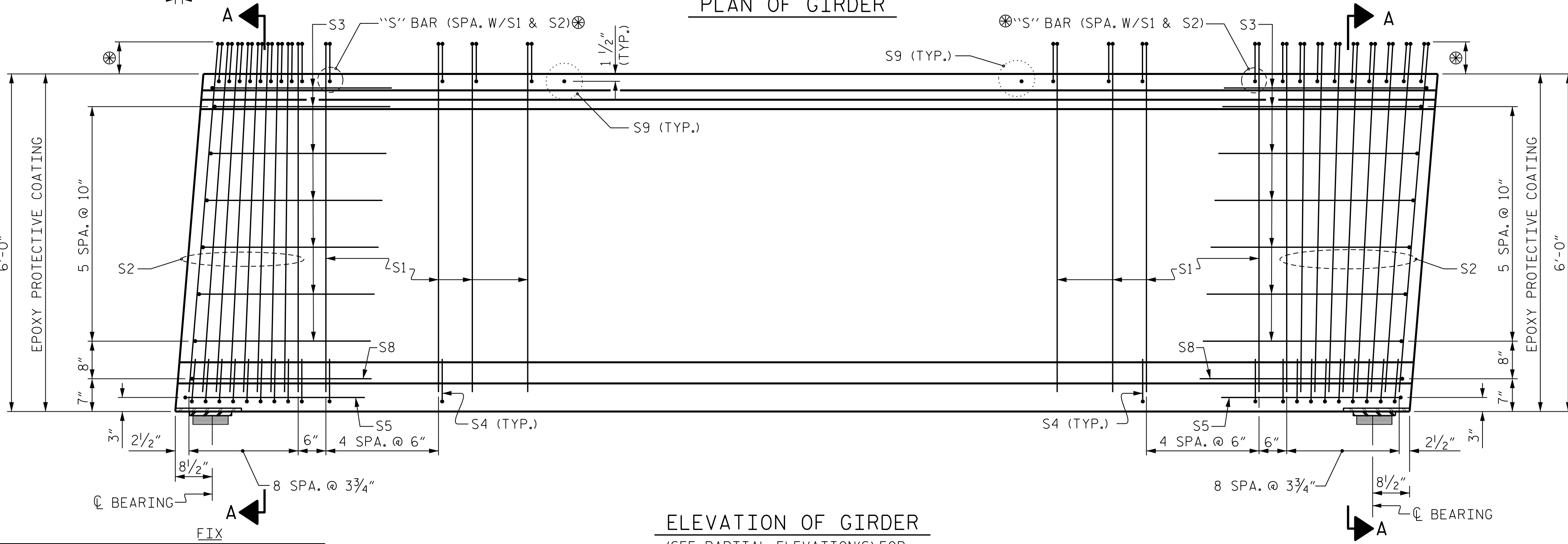
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

REINFORCING STEEL FOR GDR G1											REINFORCING STEEL FOR ONE GDR G2 - G4					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT					
S1	168	#4	1	6'-10"	767	S1	168	#4	1	6'-10"	767					
S2	36	#5	1	6'-10"	257	S2	36	#5	1	6'-10"	257					
S3	14	#4	2	8'-5"	79	S3	14	#4	2	8'-5"	79					
S4	56	#4	3	3'-0"	112	S4	56	#4	3	3'-0"	112					
S5	2	#5	2	9'-10"	21	S5	2	#5	2	9'-10"	21					
S8	2	#5	2	9'-0"	19	S8	2	#5	2	9'-0"	19					
S9	57	#5	STR	3'-3"	193	S9	57	#5	STR	3'-3"	193					
S11	8	#5	5	11'-6"	96	S11	8	#5	5	11'-6"	96					
S12	16	#4	STR	8'-0"	86	S12	16	#4	STR	8'-0"	86					
S61	72	#5	4	4'-7"	344	S61	72	#5	4	4'-7"	344					
S62	44	#5	4	4'-6"	207	S62	56	#5	4	4'-6"	263					
S64	88	#5	4	4'-5"	405	S63	76	#5	4	4'-5"	350					

TYPE 4 DIMENSIONS		
	*	**
S61	10 3/4"	3'-0 1/4"
S62	9 3/4"	3'-0 1/4"
S63	8 3/4"	3'-0 1/4"
S64	8 1/2"	3'-0 1/2"



PLAN OF GIRDER

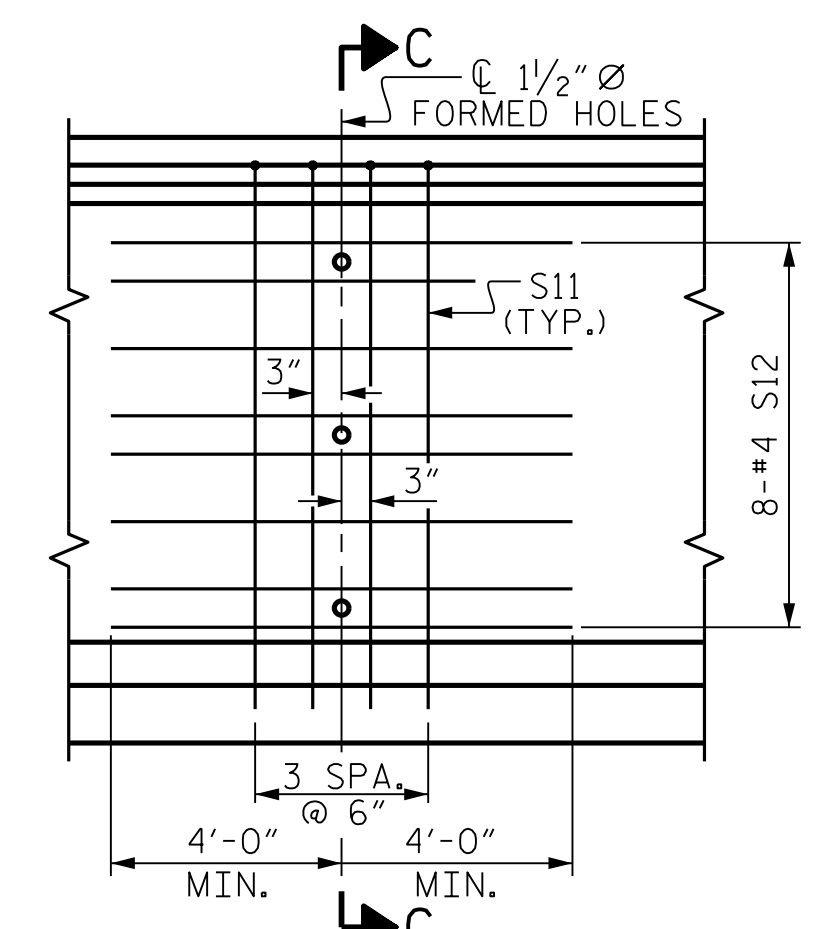


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION(S) FOR ADDITIONAL "S" BARS)

FOR 1 1/2 inch diameter FORMED HOLE LOCATION, SEE "FRAMING PLAN" SHEET

FOR STIRRUP PROJECTIONS, SEE SHEET 2 OF 3.



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS 1 THRU 4

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
G1	2586	27.2	42
G2-G4	2587	27.2	42

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
2	126'-11 1/8"	253'-10 1/4"
2	126'-11 1/4"	253'-10 1/2"

PROJECT NO. R-5771
 HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 72" PRESTRESSED CONCRETE
 MODIFIED BULB TEE
 CONTINUOUS FOR LIVE LOAD



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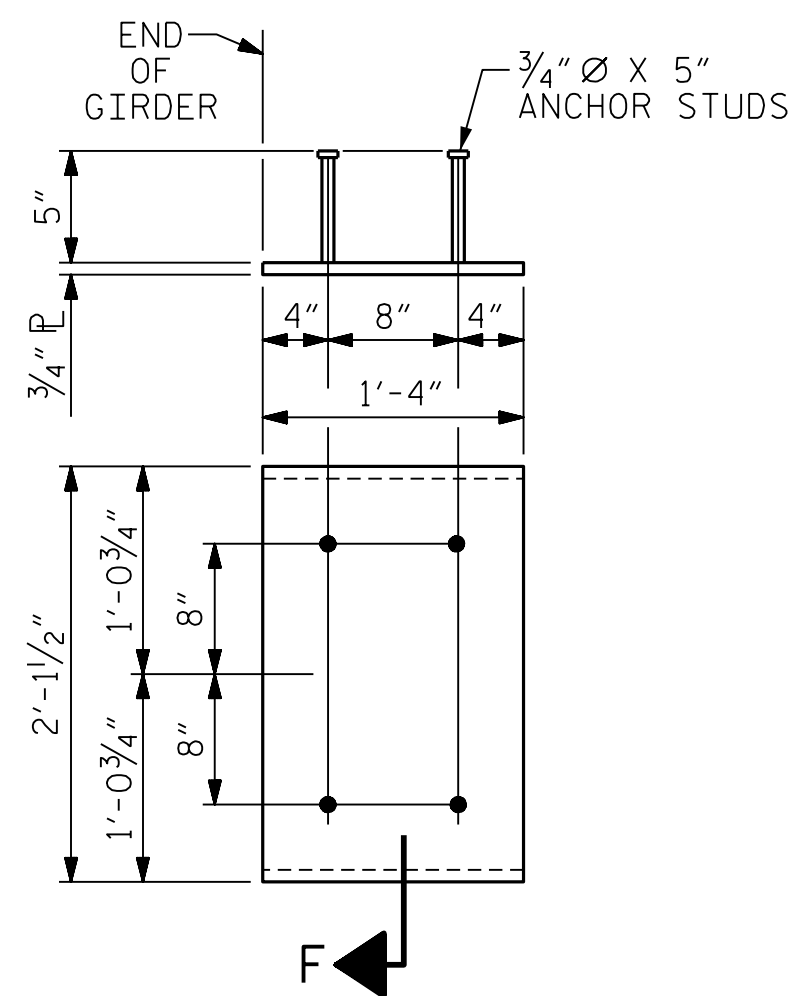
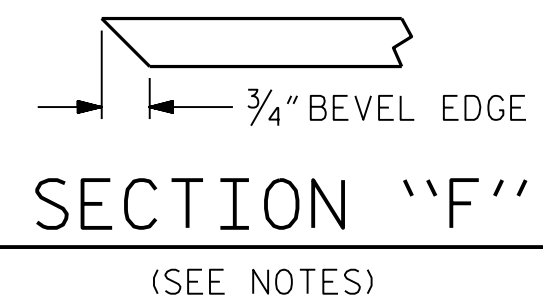
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1			3		
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SHEET NO. **S-9**
 TOTAL SHEETS **29**

STD. NO. PCC8

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CHECKED BY: A.K. ORR	DATE: 01/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: EEM 2/6/97	REV. 10/1/11 MAA/GM
CHECKED BY: VAP 2/6/97	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG



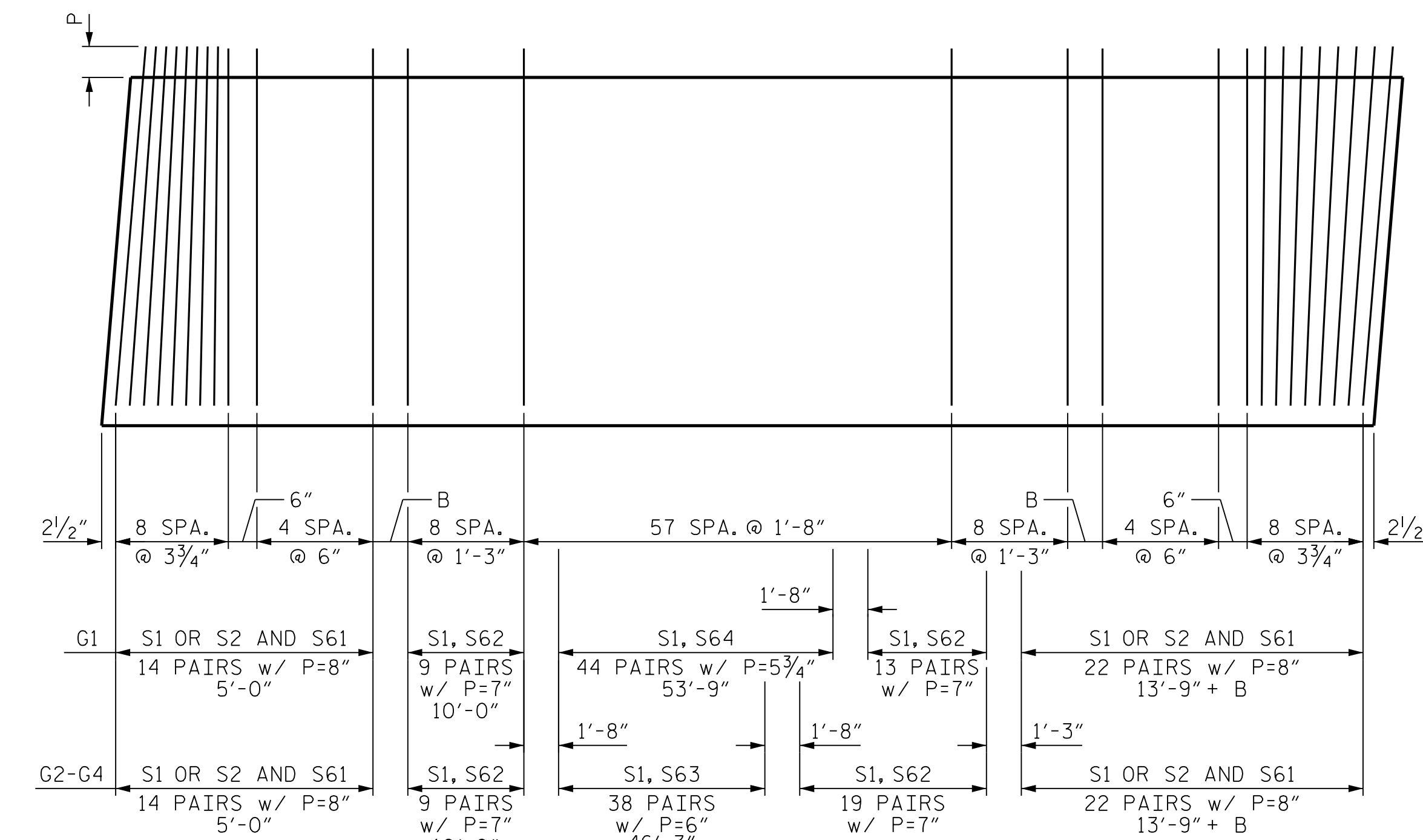
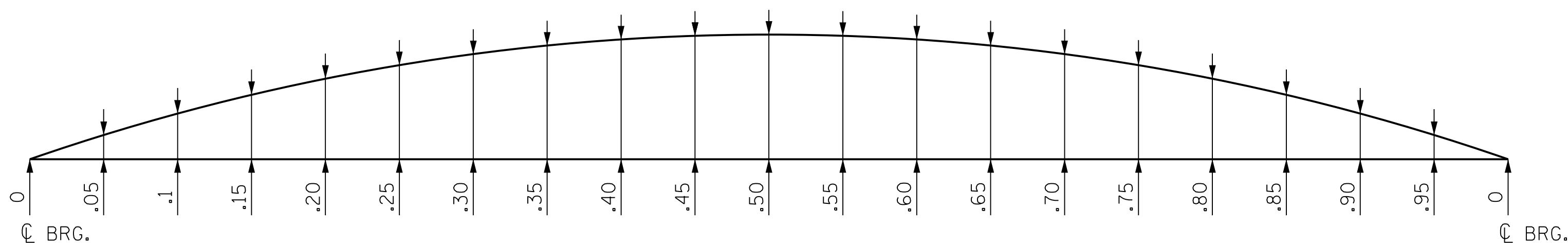
EMBEDDED PLATE "B-1" DETAILS

(2 REQUIRED PER GIRDER)

GIRDER		SPAN A																					
TWENTIETH POINTS		0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0	
1 & 4	CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.046	0.092	0.134	0.173	0.208	0.237	0.261	0.278	0.288	0.292	0.288	0.278	0.261	0.237	0.208	0.173	0.134	0.092	0.046	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.028	0.057	0.084	0.111	0.132	0.153	0.167	0.180	0.185	0.190	0.185	0.180	0.167	0.153	0.132	0.111	0.084	0.057	0.028	0
	FINAL CAMBER	↑	0	3/16"	7/16"	5/8"	3/4"	15/16"	1"	1 1/8"	1 3/16"	1 1/4"	1 1/4"	1 1/4"	1 3/16"	1 1/8"	1"	15/16"	3/4"	5/8"	7/16"	3/16"	0
2 & 3	CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.046	0.092	0.134	0.173	0.208	0.237	0.261	0.278	0.288	0.292	0.288	0.278	0.261	0.237	0.208	0.173	0.134	0.092	0.046	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.032	0.064	0.094	0.124	0.148	0.171	0.187	0.202	0.207	0.212	0.207	0.202	0.187	0.171	0.148	0.124	0.094	0.064	0.032	0
	FINAL CAMBER	↑	0	3/16"	5/16"	1/2"	9/16"	3/4"	13/16"	7/8"	15/16"	1"	15/16"	1"	15/16"	7/8"	13/16"	3/4"	9/16"	1/2"	5/16"	3/16"	0

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS SHOWN IN INCHES (FRACTION FORM).



STIRRUP PROJECTION

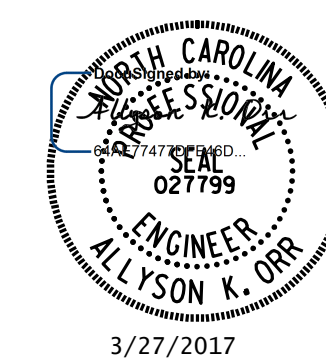
P = PROJECTION ABOVE TOP OF TOP FLANGE.

STIRRUP SPACING MEASURED ALONG BOTTOM FLANGE.

FOR DIMENSION B, SEE SHEET 1 OF 3.

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HENDERSON COUNTY
STATION: 20+77.50 -L-

SHEET 2 OF 3



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RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER: P-0671

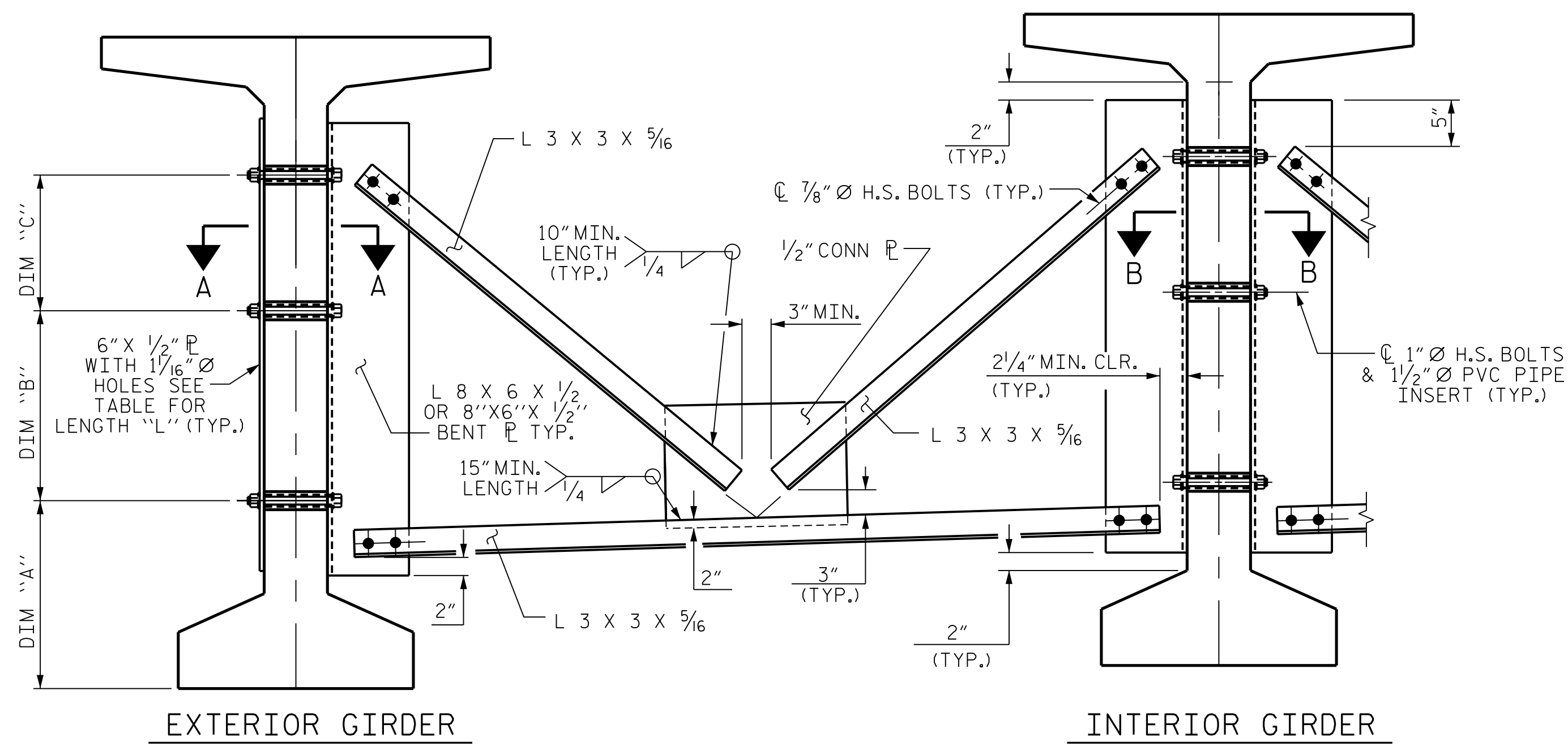
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

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1			3			TOTAL SHEETS 29
2			4			

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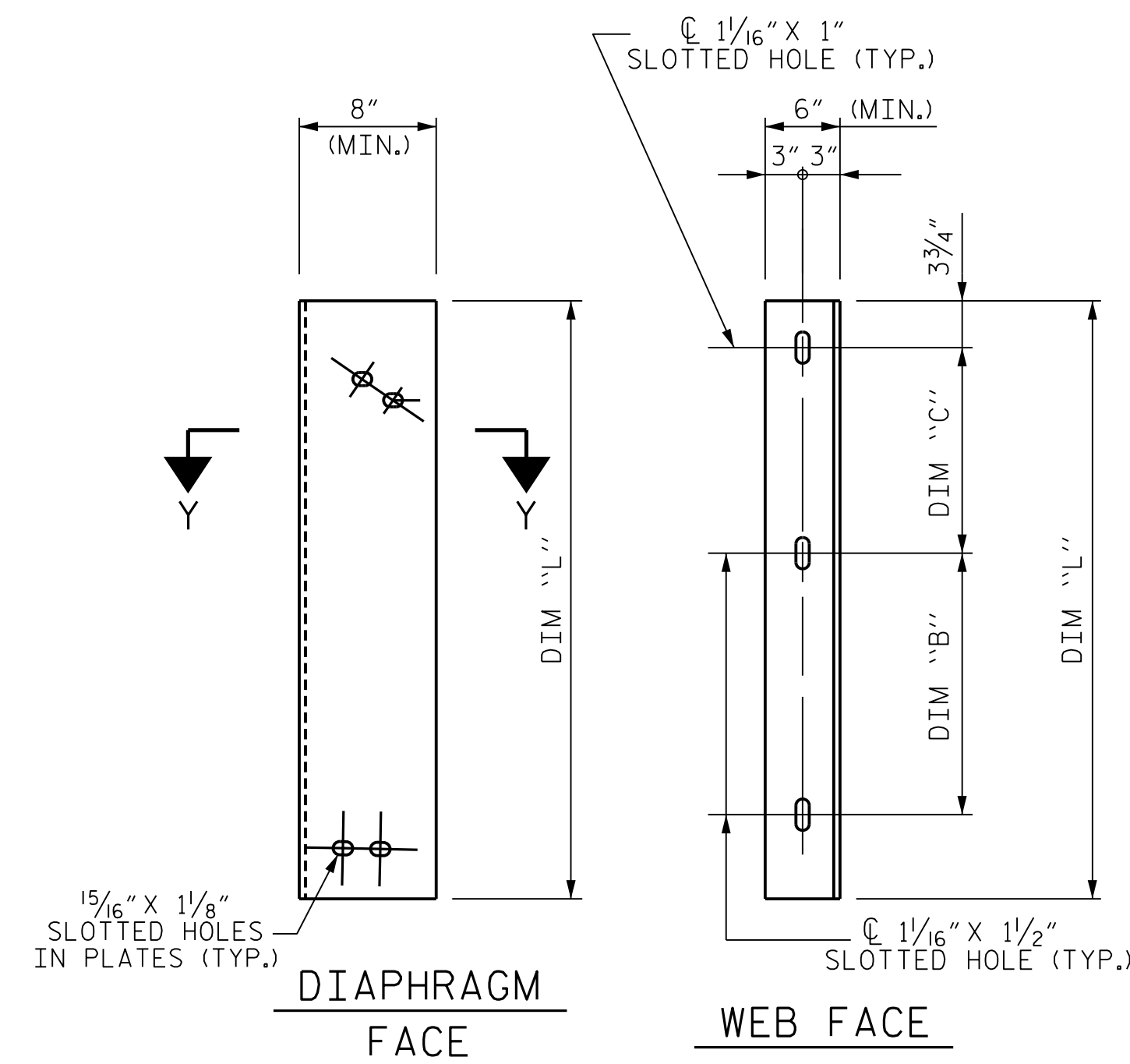
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DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: ELR 11/91	REV. 10/1/11 MAA/GM
CHECKED BY: GRP 11/91	REV. 1/15 MAA/TMG
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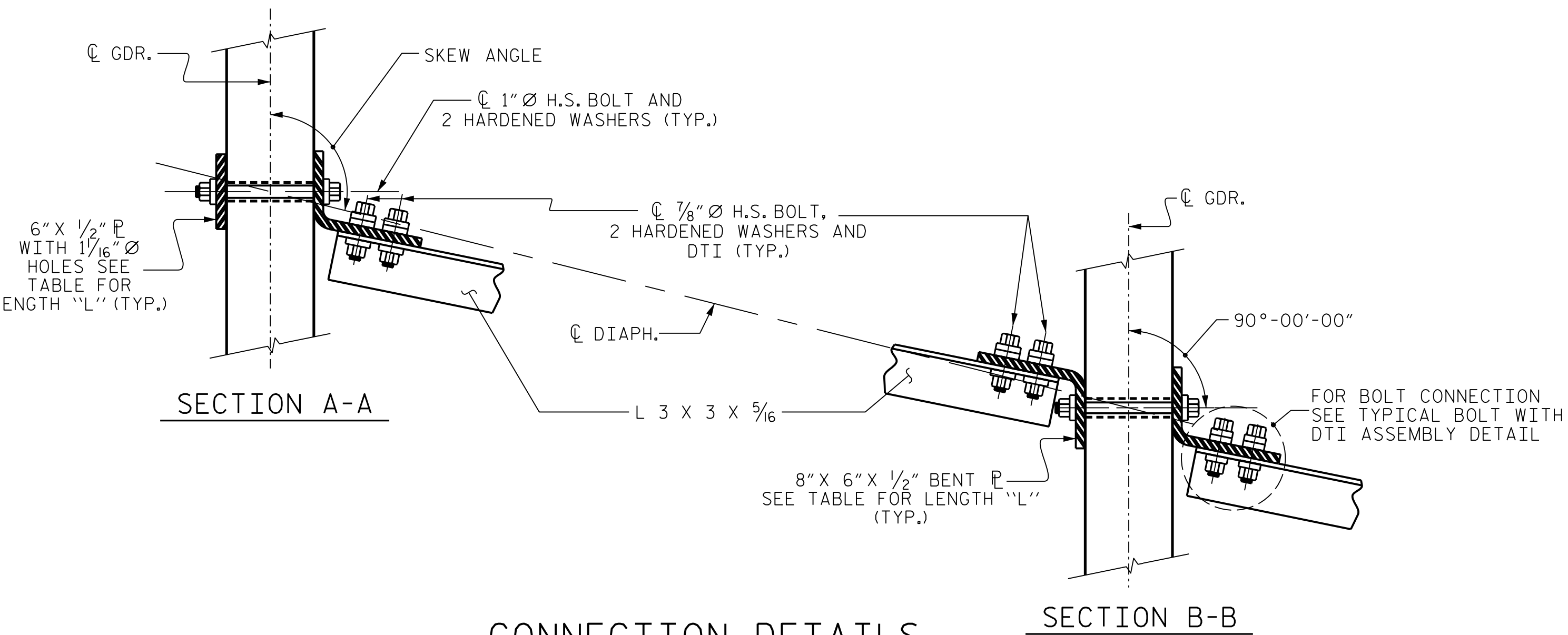


PART SECTION AT INTERMEDIATE DIAPHRAGM

(72" BULB TEE GIRDER SHOWN)

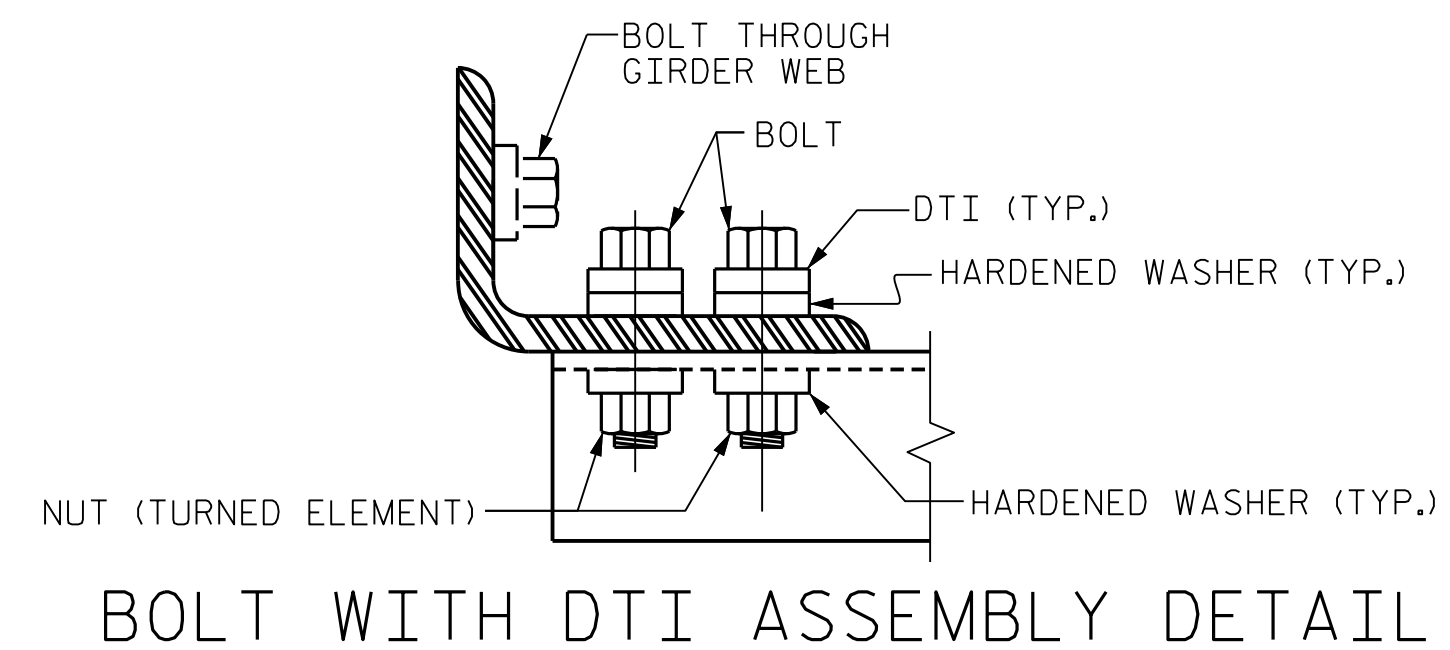


CONNECTOR PLATE DETAIL

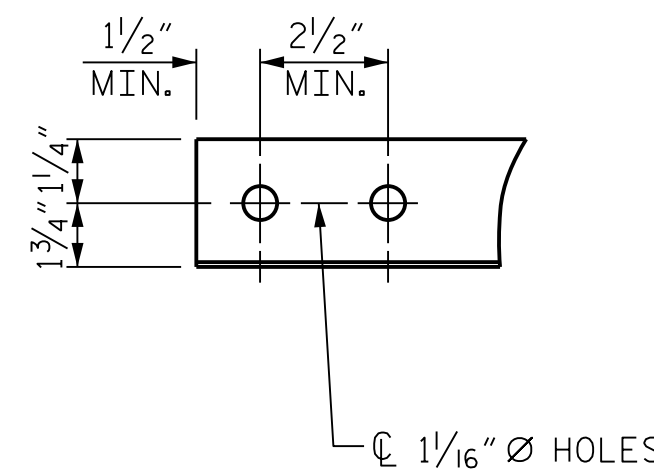


CONNECTION DETAILS

(90° < SKEW < 110° SHOWN
70° < SKEW < 90° SIM.)



BOLT WITH DTI ASSEMBLY DETAIL



ANGLE END

(L 3 x 3 x 5/16)

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

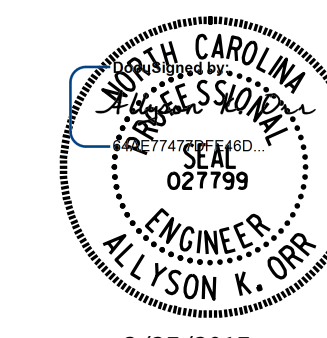
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-7 1/2"	1'-8"	1'-7 1/4"	4'-2"

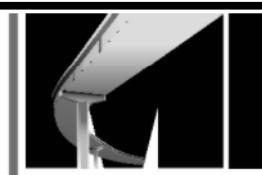
PROJECT NO. R-5771
HENDERSON COUNTY
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SHEET 3 OF 3



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 (919) 851-6606
 FIRM PE NUMBER : P-0671

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 INTERMEDIATE
 STEEL DIAPHRAGMS
 72" MODIFIED BULB TEE
 PRESTRESSED CONCRETE
 GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			29

STD. NO. PCG11

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DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: RWW 11/09	ADDED 11/23/09R
CHECKED BY: GM 11/09	REV. 10/1/11 MAA/GM

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

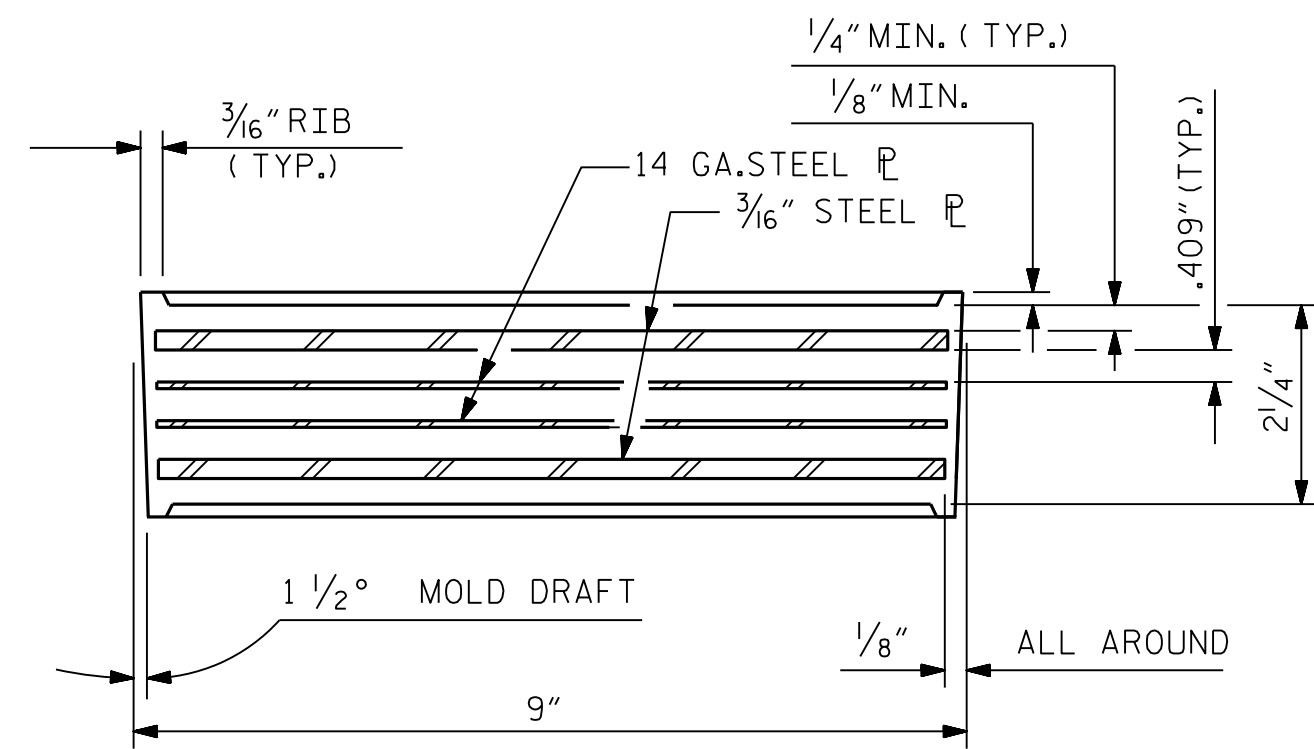
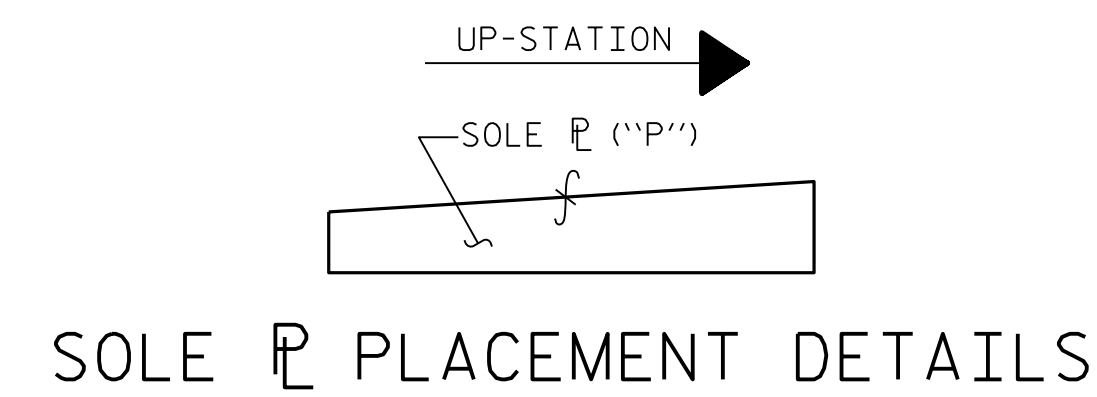
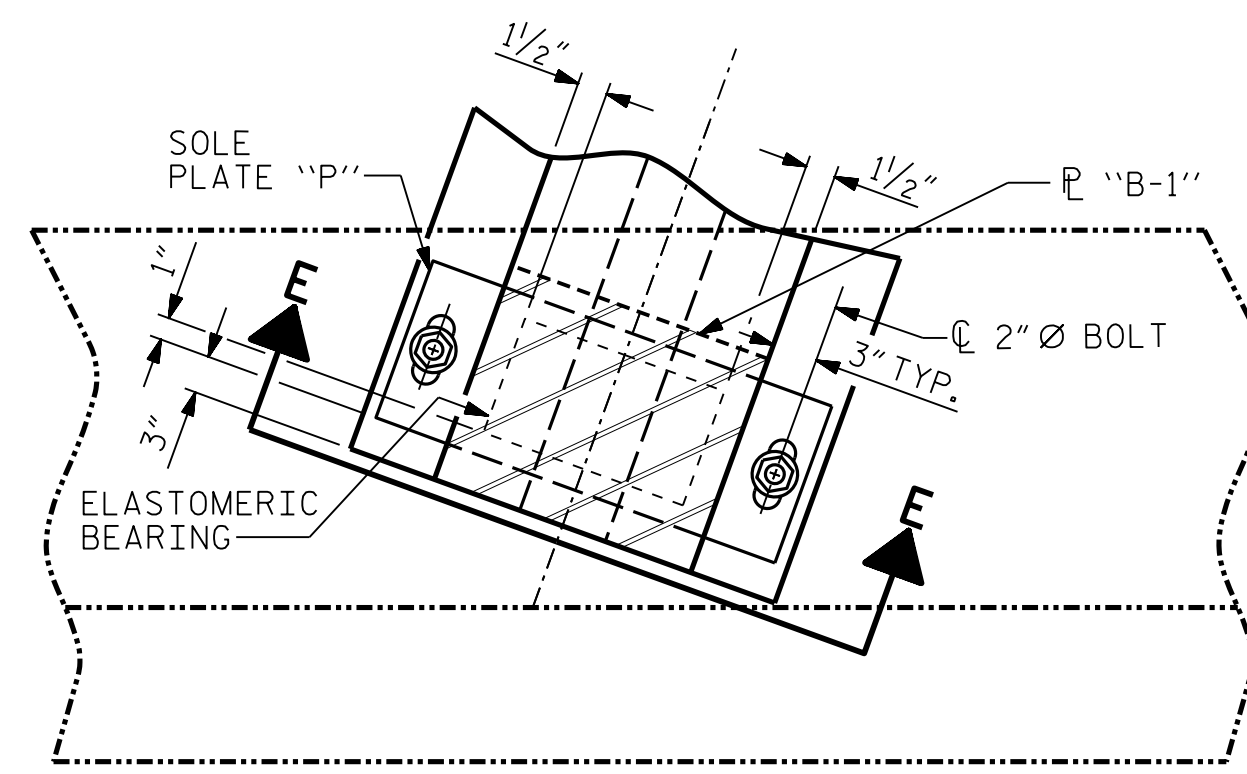
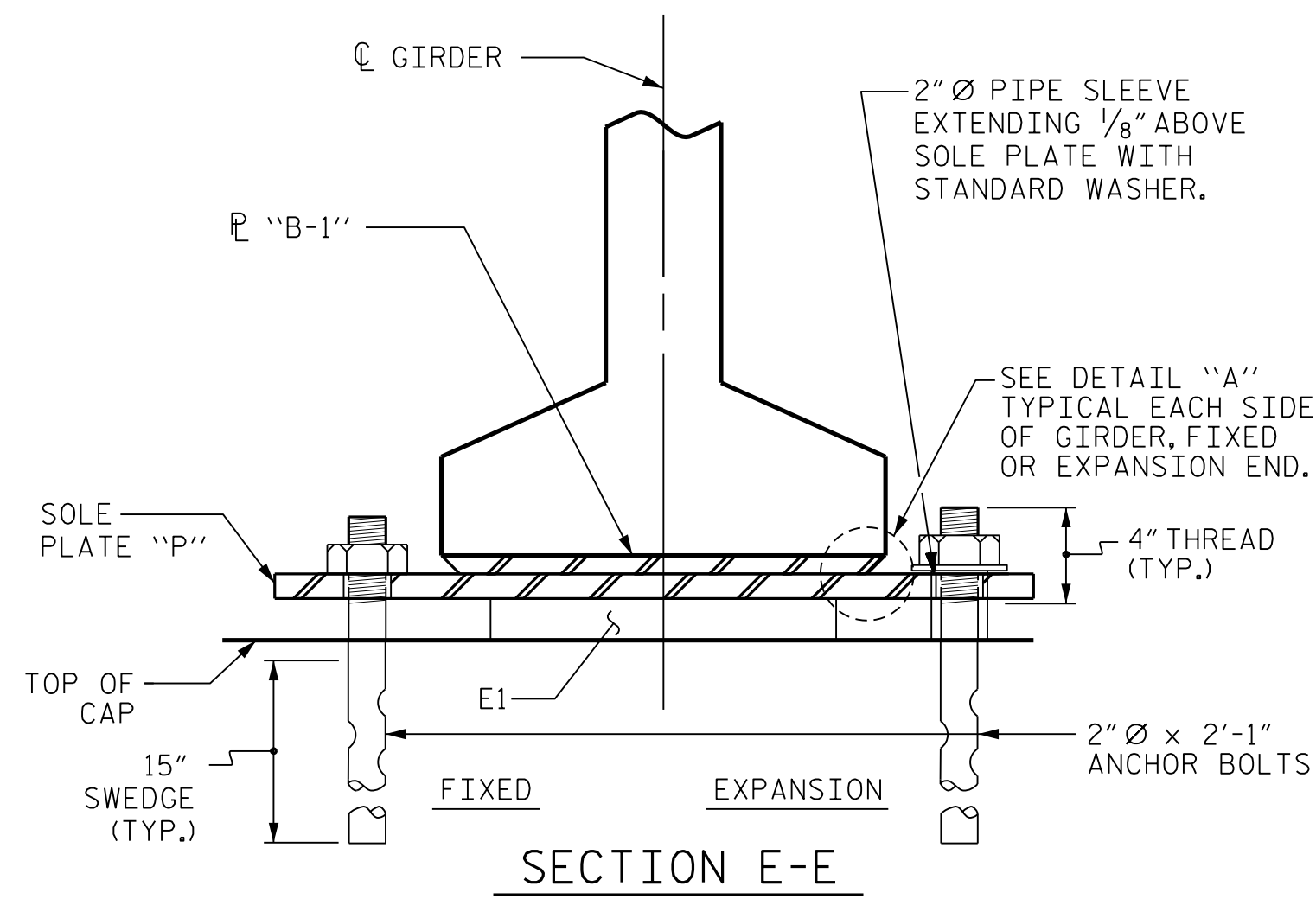
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

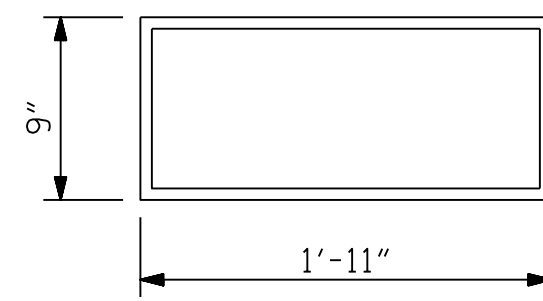
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

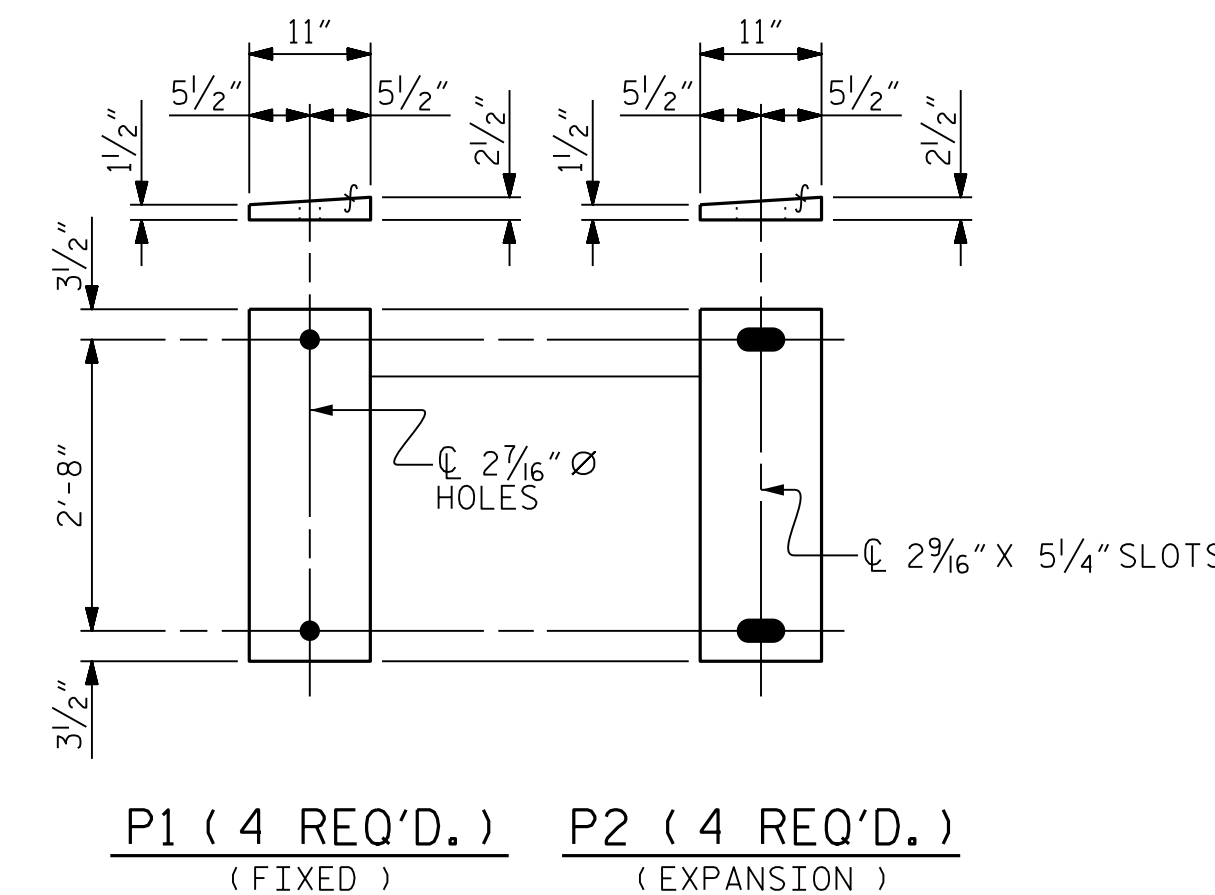
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



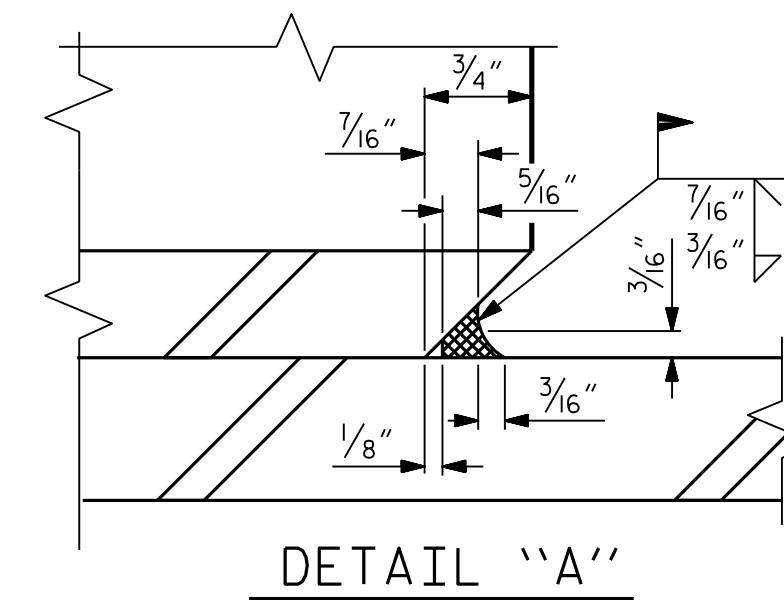
TYPICAL SECTION OF ELASTOMERIC BEARINGS



PLAN VIEW OF ELASTOMERIC BEARING
TYPE V

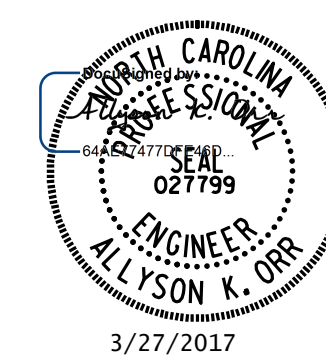


SOLE PLATE DETAILS ("P")



MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-



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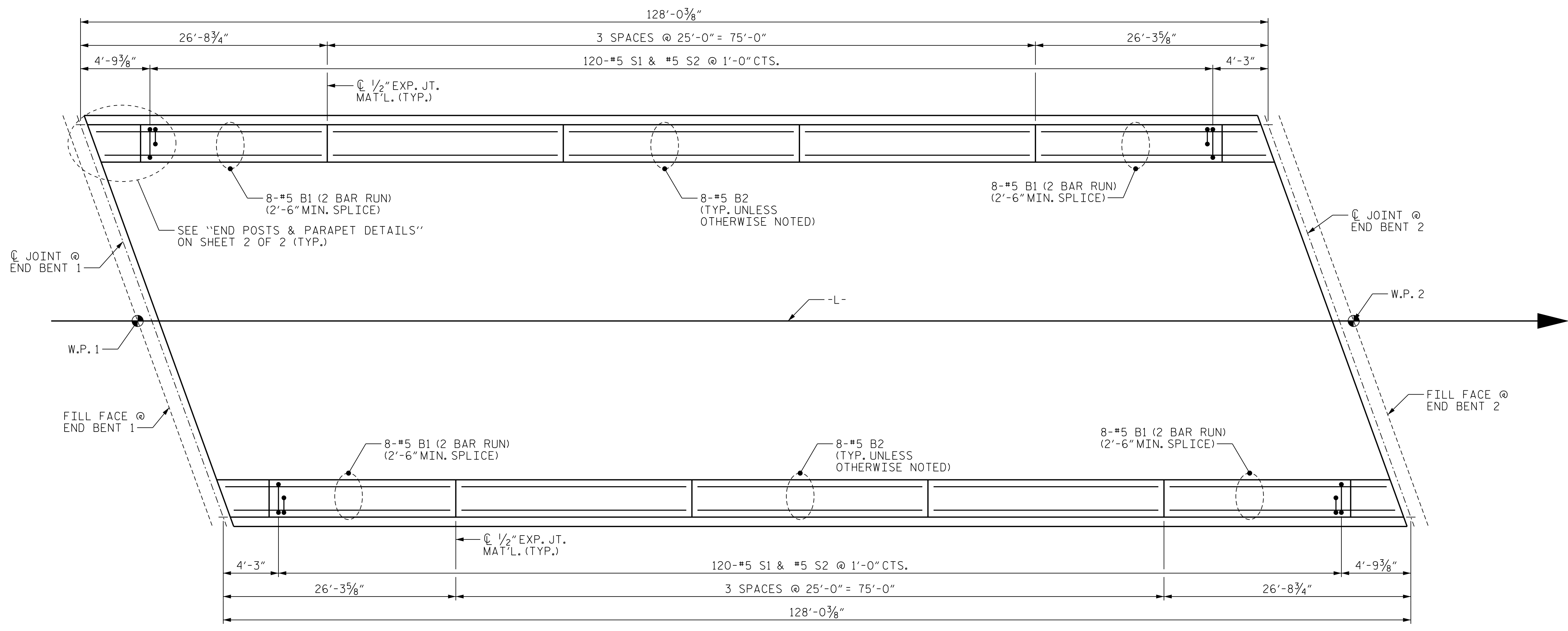
MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
ELASTOMERIC BEARING DETAILS
 PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			
2			4			TOTAL SHEETS 29

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CHECKED BY: A.K. ORR	DATE: 01/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: EEM 2/97	REV. 10/1/11 MAA/GM
CHECKED BY: VAP 2/97	REV. 6/13 AAC/MAA
	REV. 1/15 MAA/TMG

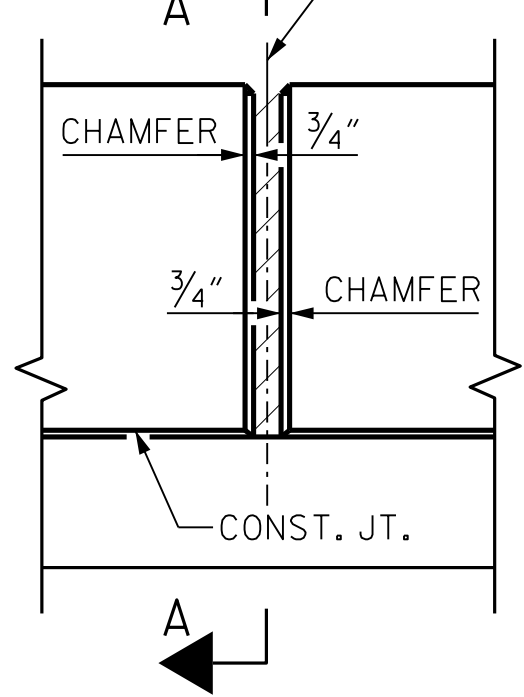


PLAN OF CONCRETE PARAPET

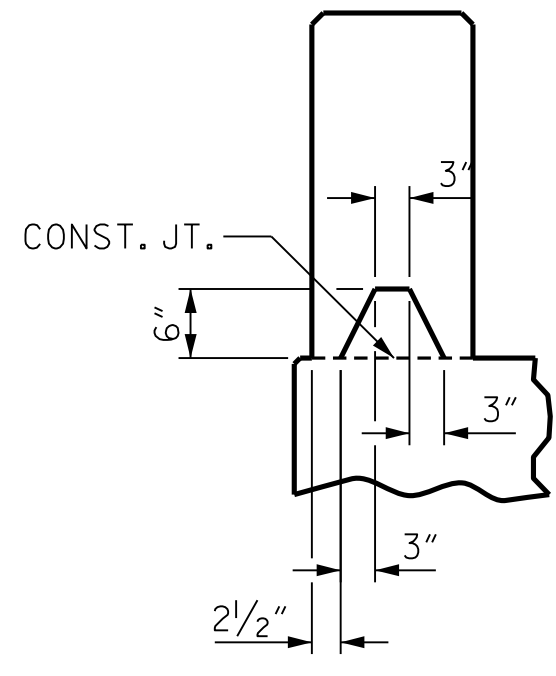
FOR NOTES AND DETAILS, SEE SHEET 2 OF 2.

DIMENSIONS SHOWN ARE HORIZONTAL AND HAVE NOT BEEN ADJUSTED FOR THE GRADE SLOPE.

1/2" EXP. JT. MAT'L. HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)



ELEVATION AT EXPANSION JOINTS



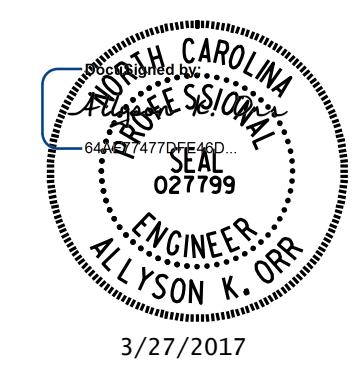
SECTION A-A
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED.)

PARAPET DETAILS

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE PARAPET



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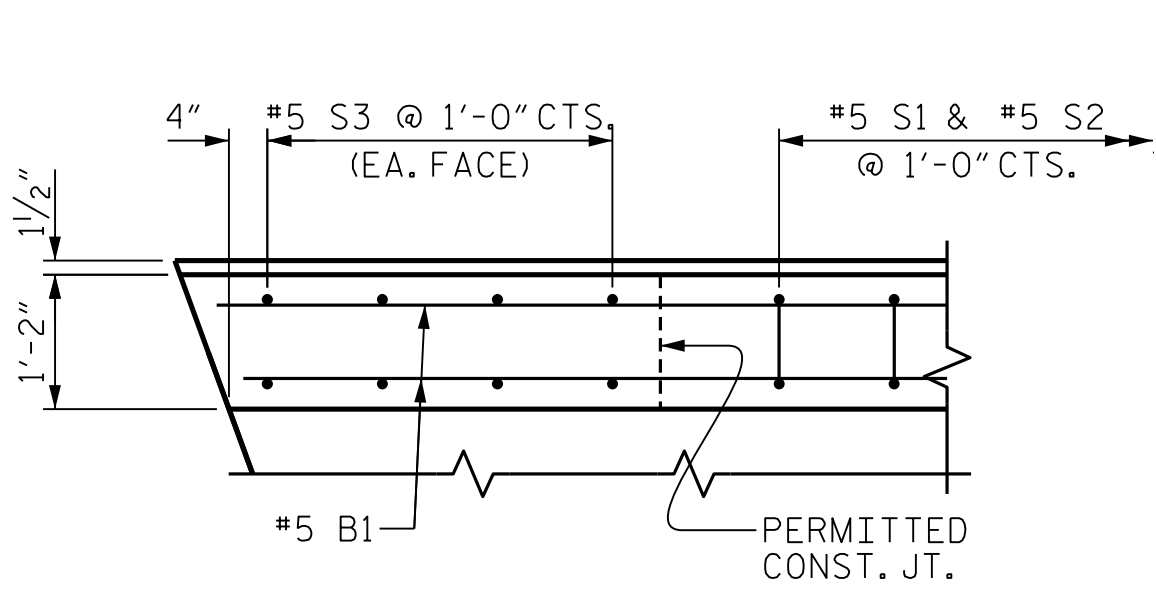
MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

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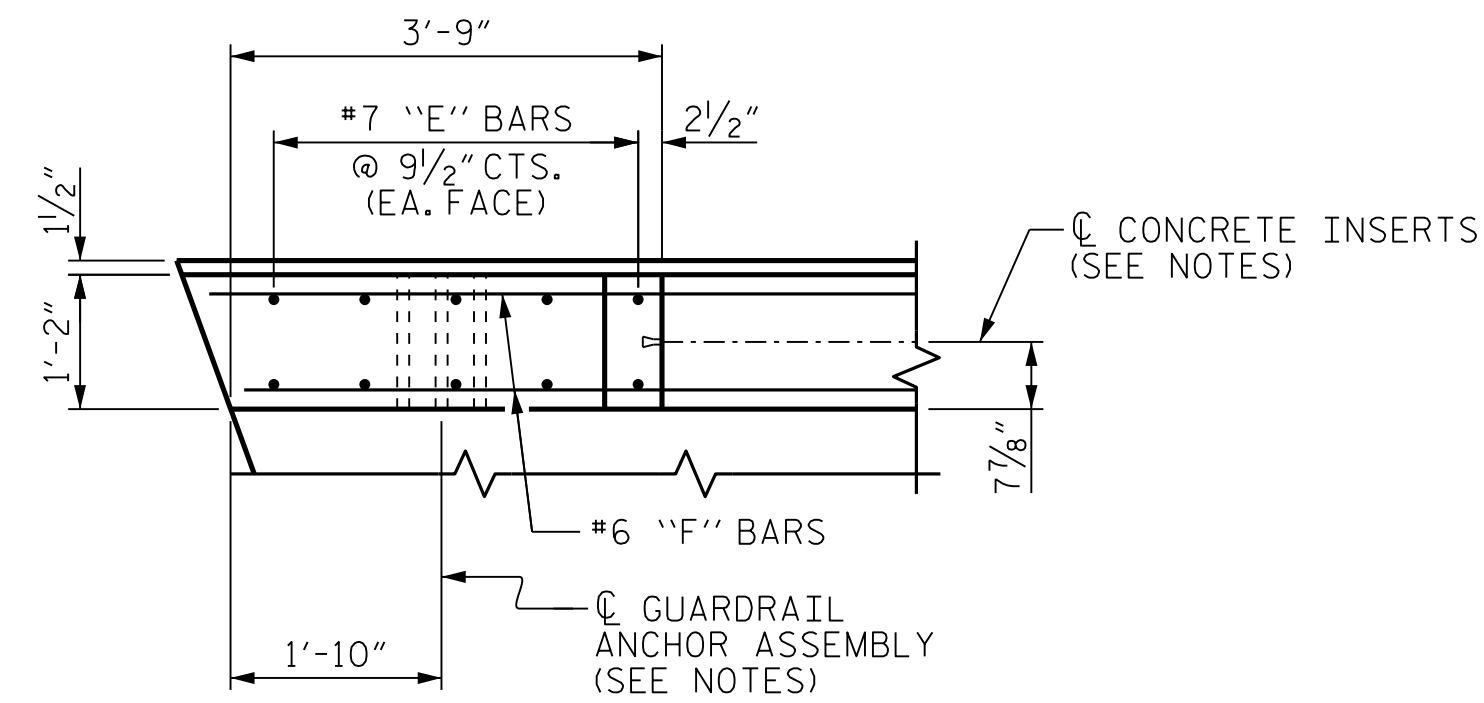
SHEET NO.
S-13
 TOTAL SHEETS
29

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CHECKED BY : <u>A.K. ORR</u>	DATE : <u>01/17</u>
DESIGN ENGINEER OF RECORD : <u>A.K. ORR</u>	DATE : <u>03/17</u>

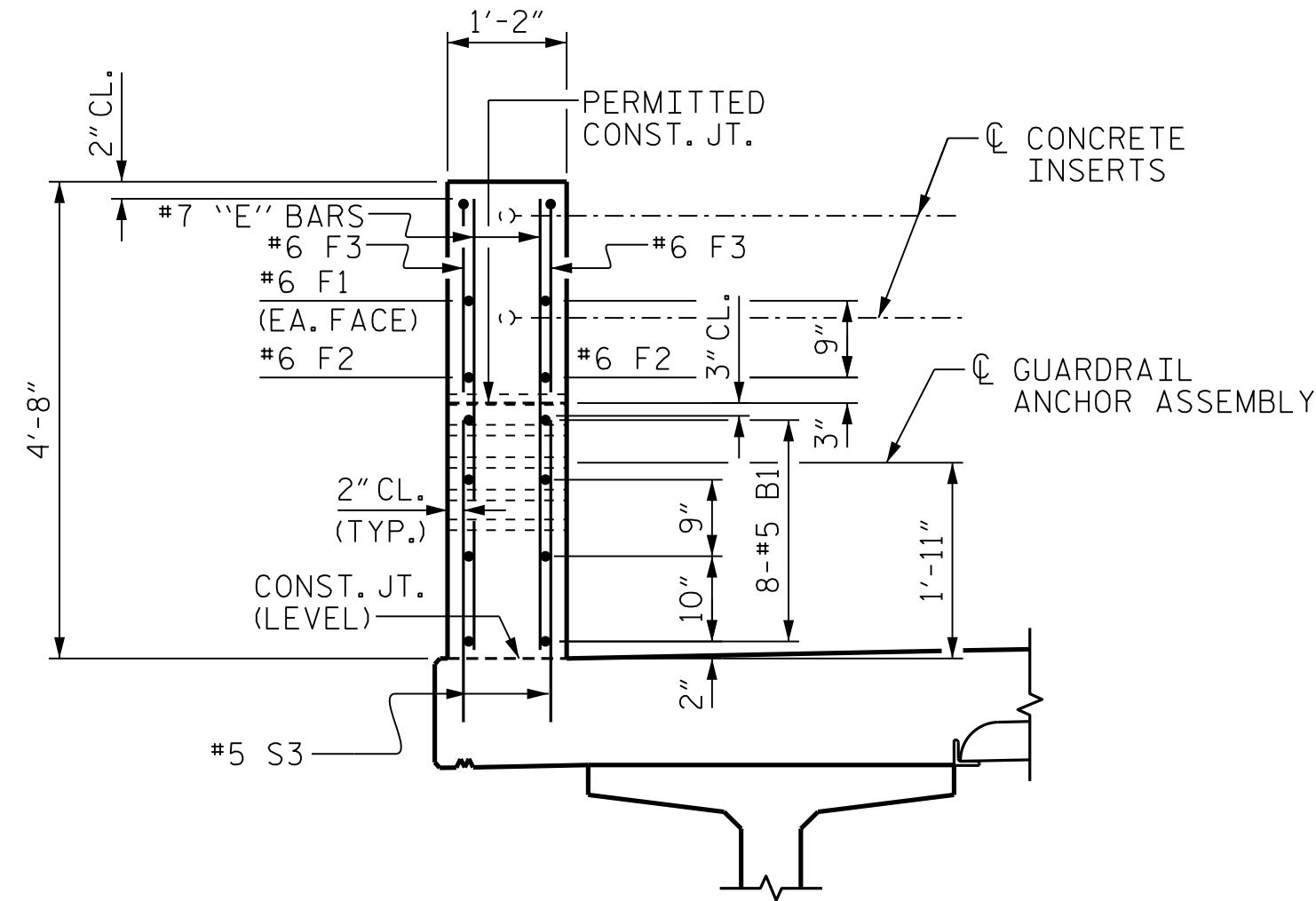
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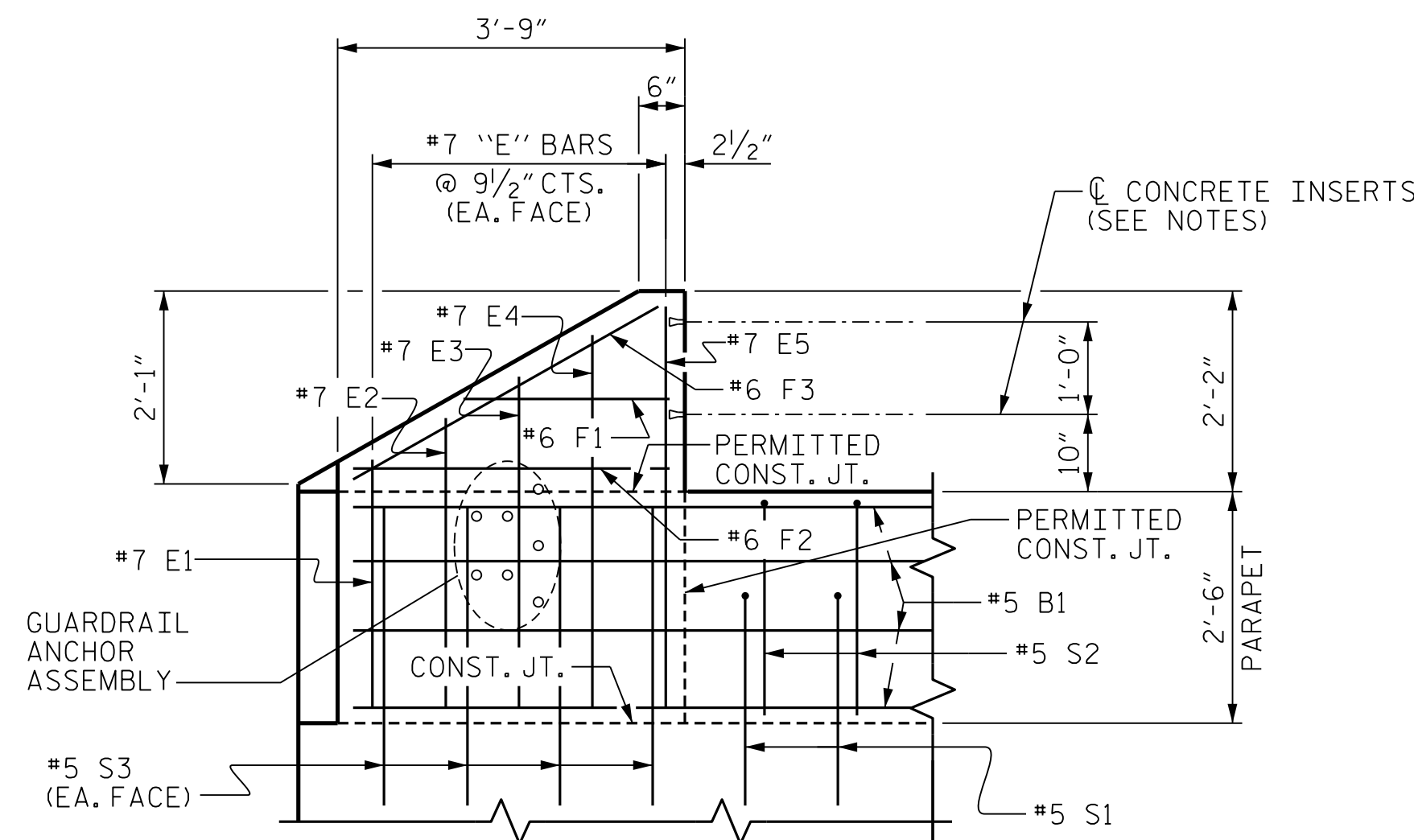
PLAN OF PARAPET



PLAN OF END POST



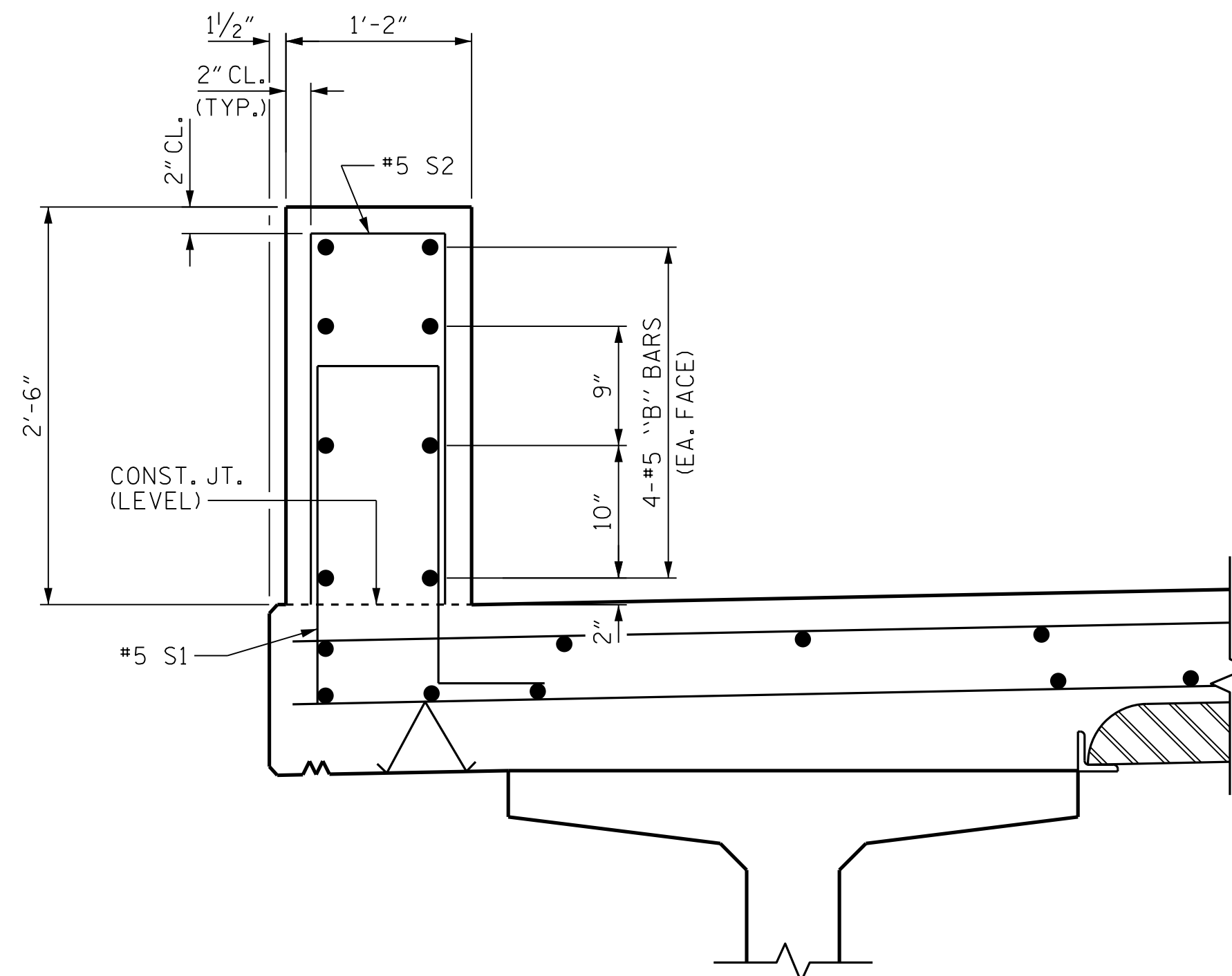
END VIEW



ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR



SECTION THRU PARAPET

NOTES

THE PARAPET SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN PARAPET AND END POSTS SHALL BE EPOXY COATED.

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

THE #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MIN. CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

FOR DETAILS AND LOCATION OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEETS.

THE JOINT AT ENDS OF DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE PARAPET.

THE #5 S3 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM. AFTER SAWING THE JOINT, THE YIELD LOAD FOR THE #5 S3 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

BILL OF MATERIAL

PARAPET AND END POSTS

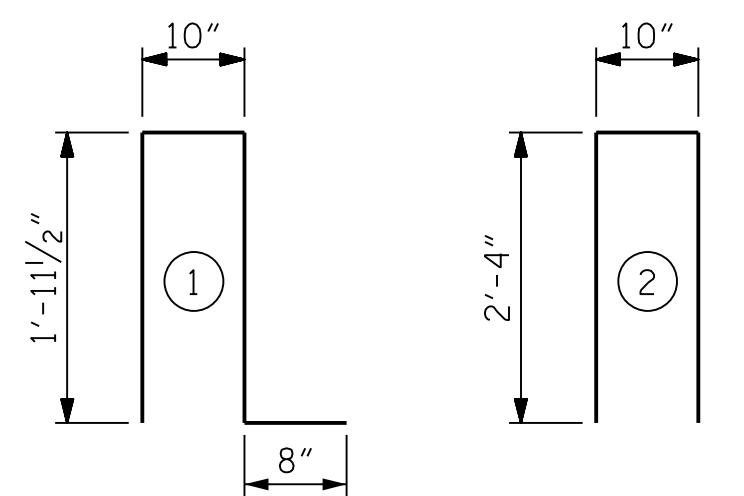
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	64	#5	STR	15'-1"	1007
*B2	48	#5	STR	24'-7"	1231
*E1	8	#7	STR	2'-6"	41
*E2	8	#7	STR	3'-0"	49
*E3	8	#7	STR	3'-6"	57
*E4	8	#7	STR	4'-0"	65
*E5	8	#7	STR	4'-4"	71
*F1	8	#6	STR	2'-0"	24
*F2	8	#6	STR	3'-4"	40
*F3	8	#6	STR	3'-8"	44
*S1	240	#5	1	5'-5"	1356
*S2	240	#5	2	5'-6"	1377
*S3	32	#5	STR	3'-0"	100

*EPOXY COATED REINFORCING STEEL 5,462 LBS.

CLASS AA CONCRETE 28.6 C. Y.

1'-2" x 2'-6" CONCRETE PARAPET 256.07 LIN. FT.

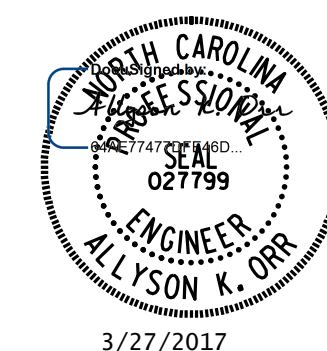
BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 2 OF 2



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 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

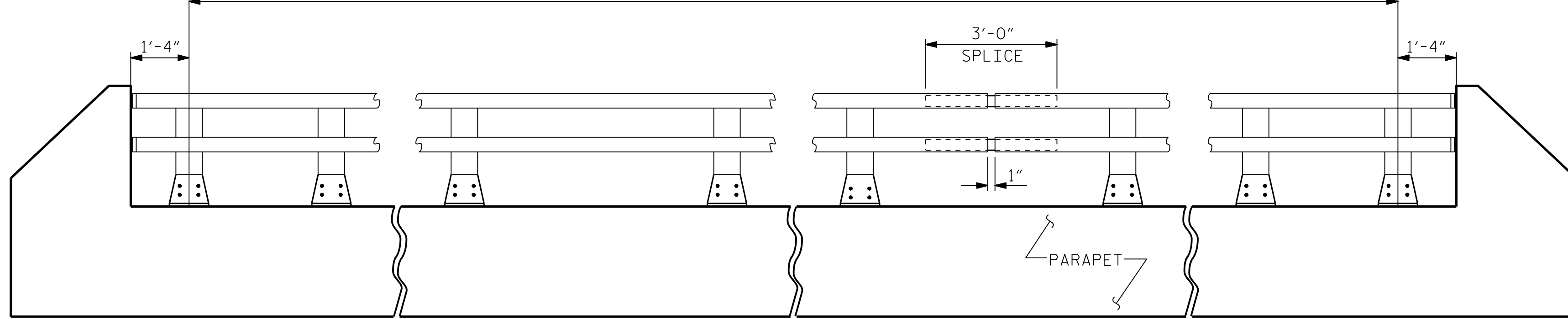
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 END POSTS &
 PARAPET DETAILS

REVISIONS						SHEET NO.
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2			4			29

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SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET



ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

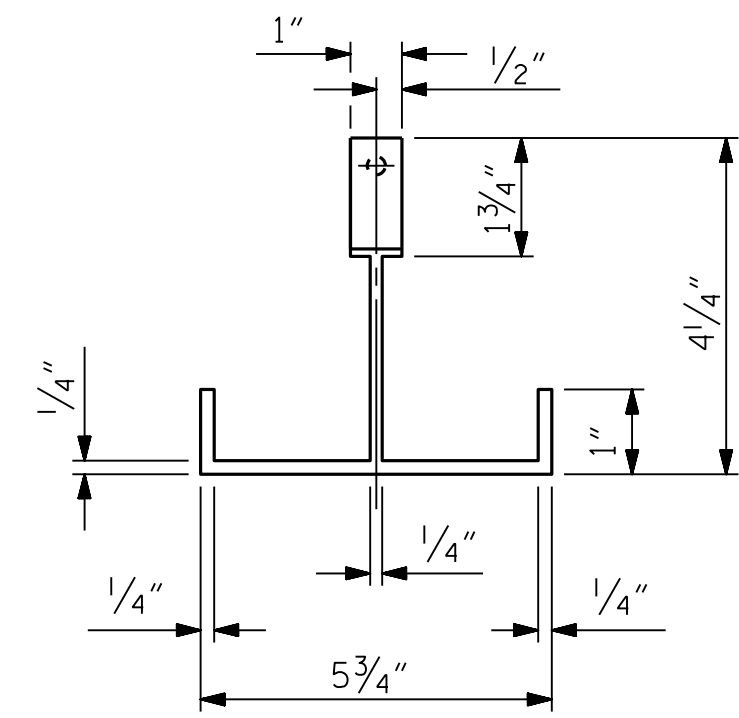
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

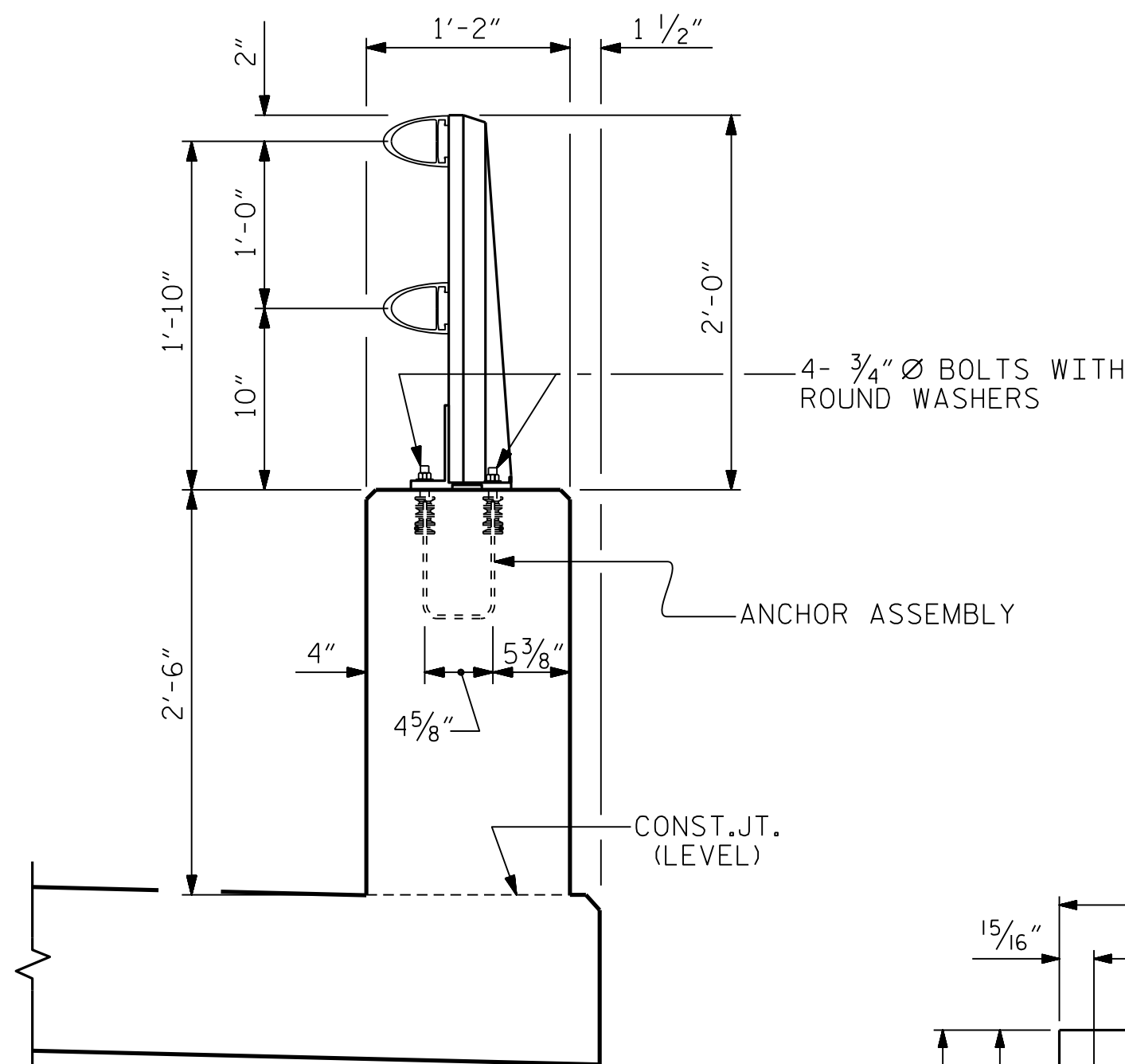
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES 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 MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

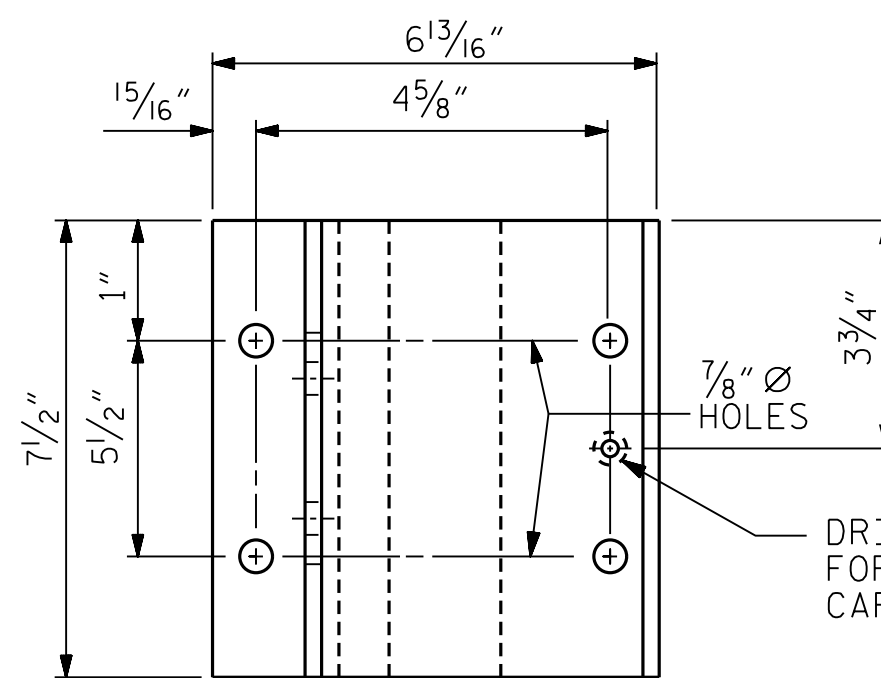
PAY LENGTH = 240.04 LIN. FT.



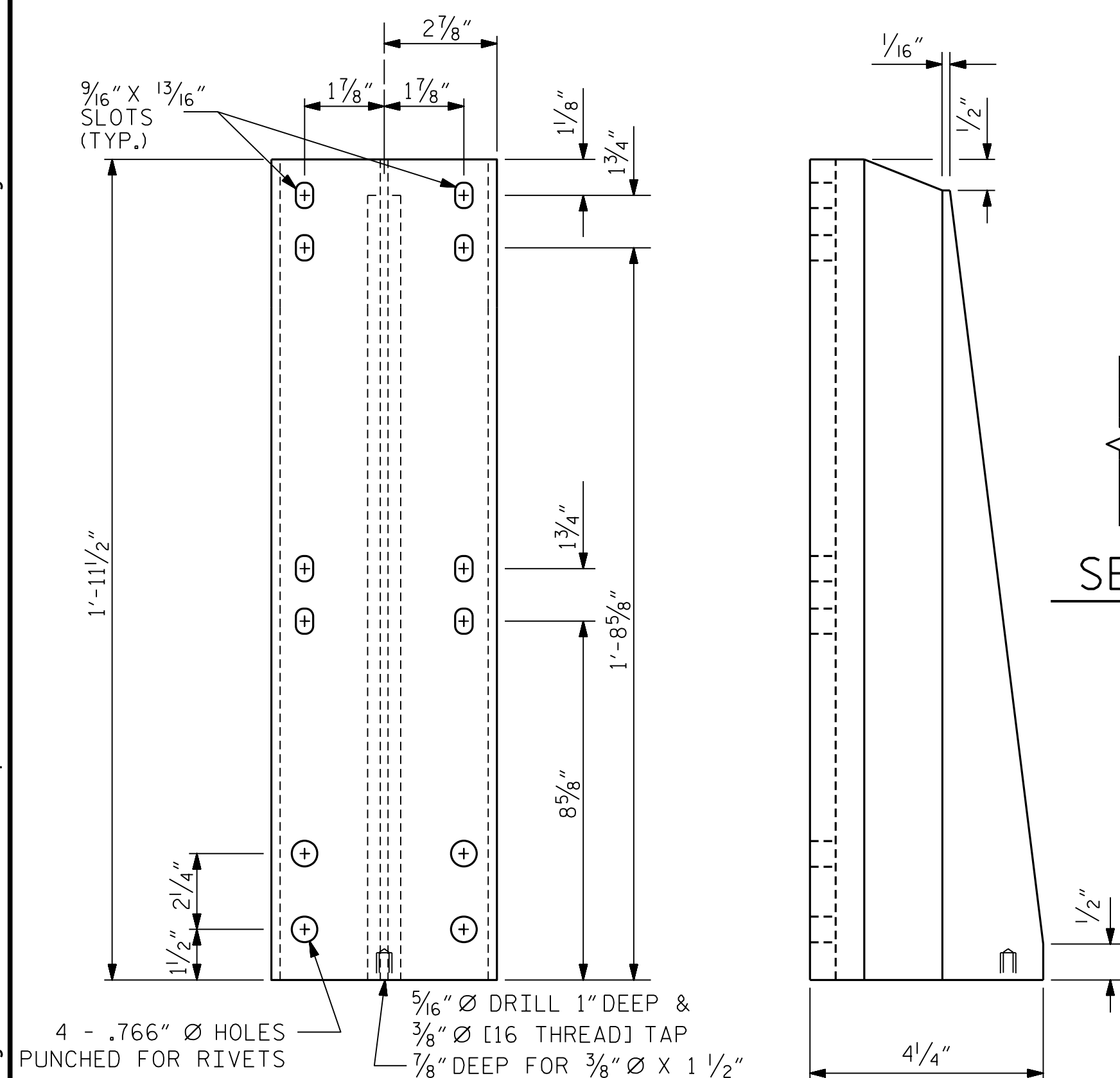
PLAN



SECTION THRU PARAPET AND RAIL



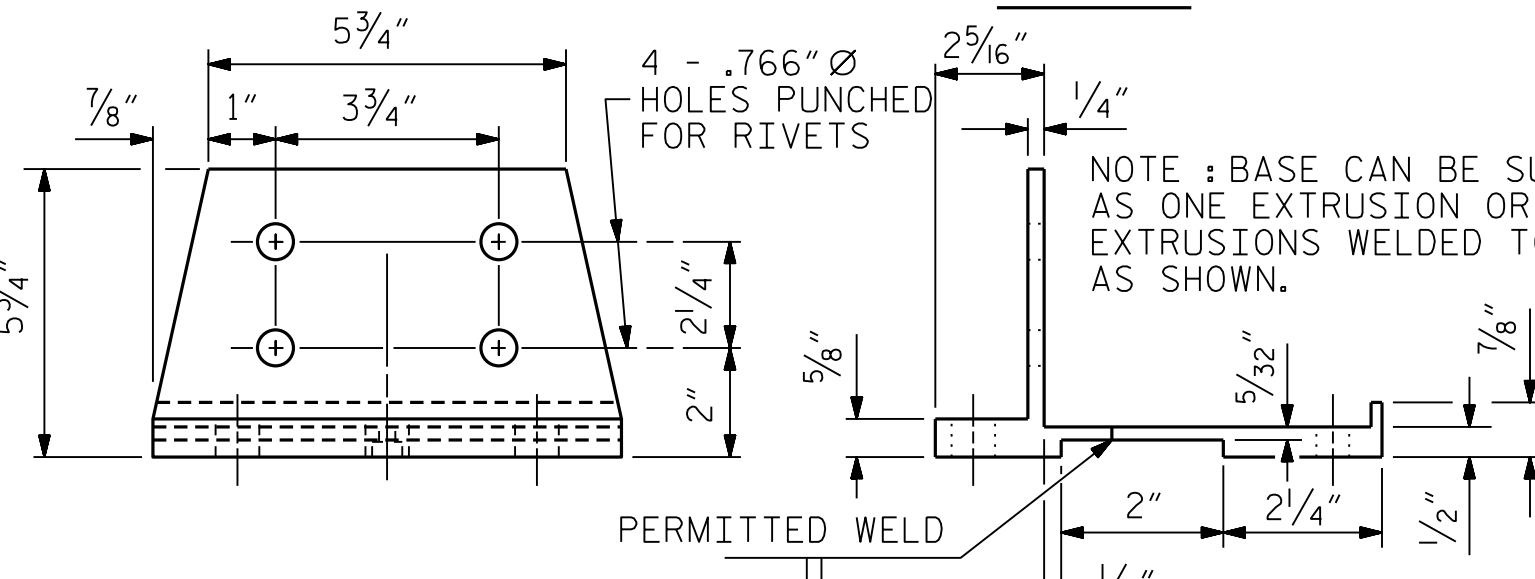
PLAN



FRONT ELEVATION

SIDE ELEVATION

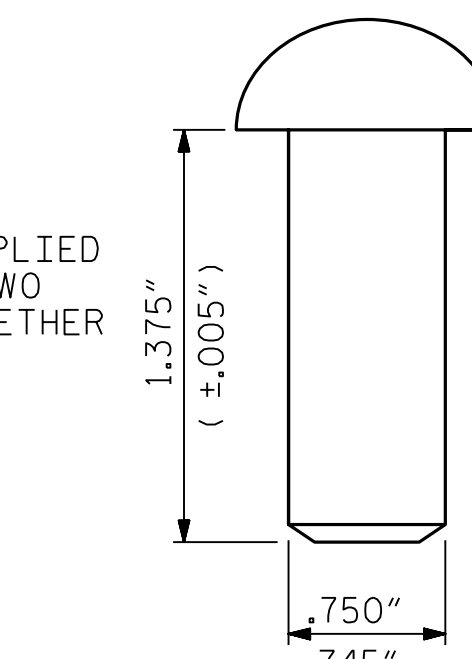
DETAILS OF POST



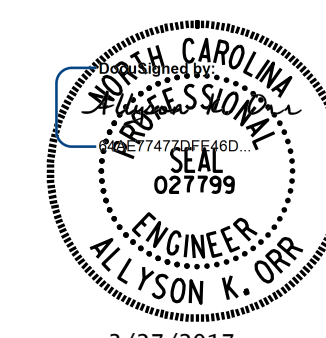
FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL



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(919) 851-6606
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PROJECT NO. R-5771
HENDERSON COUNTY
STATION: 20+77.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-15
TOTAL SHEETS					29

STD. NO. BMR3

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DRAWN BY: EEM 6/94	REV. 5/1/06 TLA/GM
CHECKED BY: RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 6/13 MAA/GM

NOTES

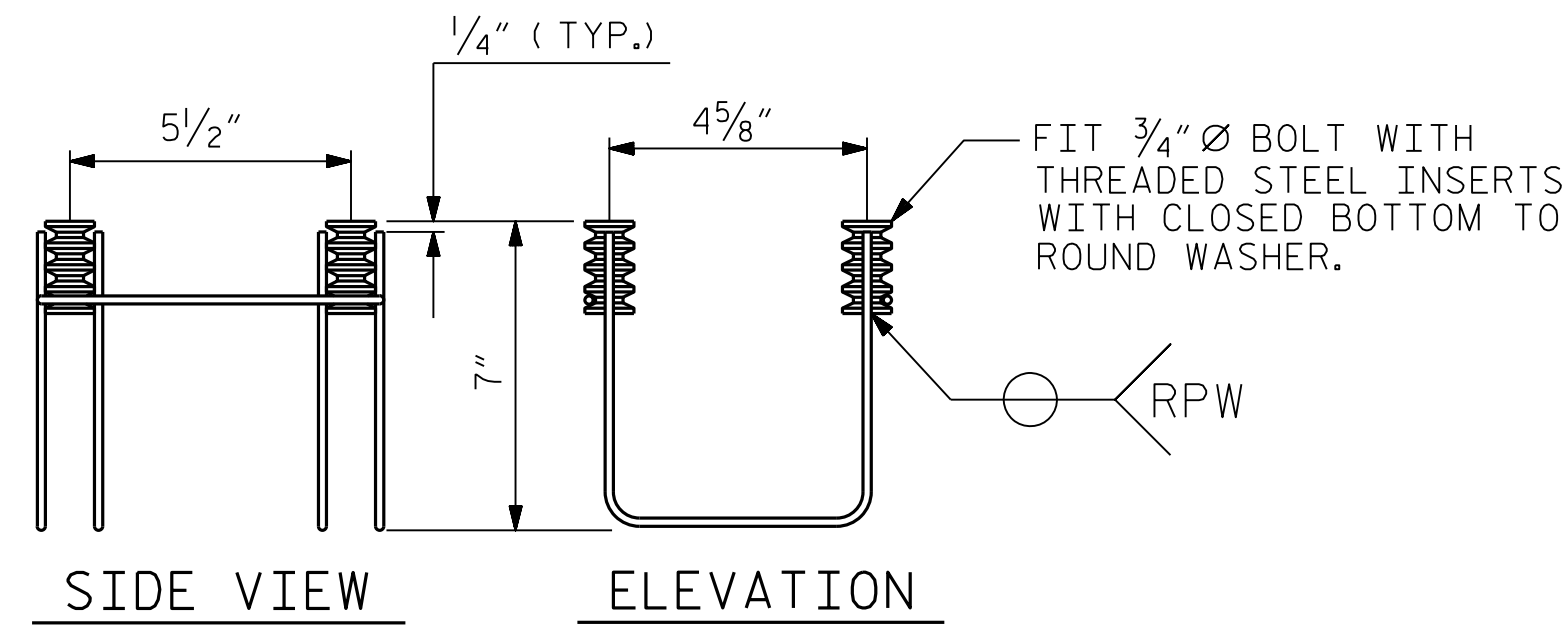
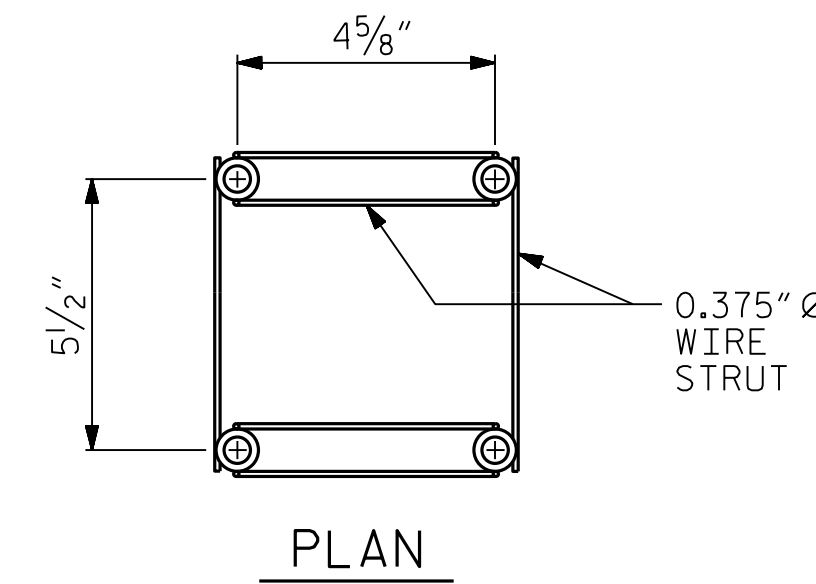
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

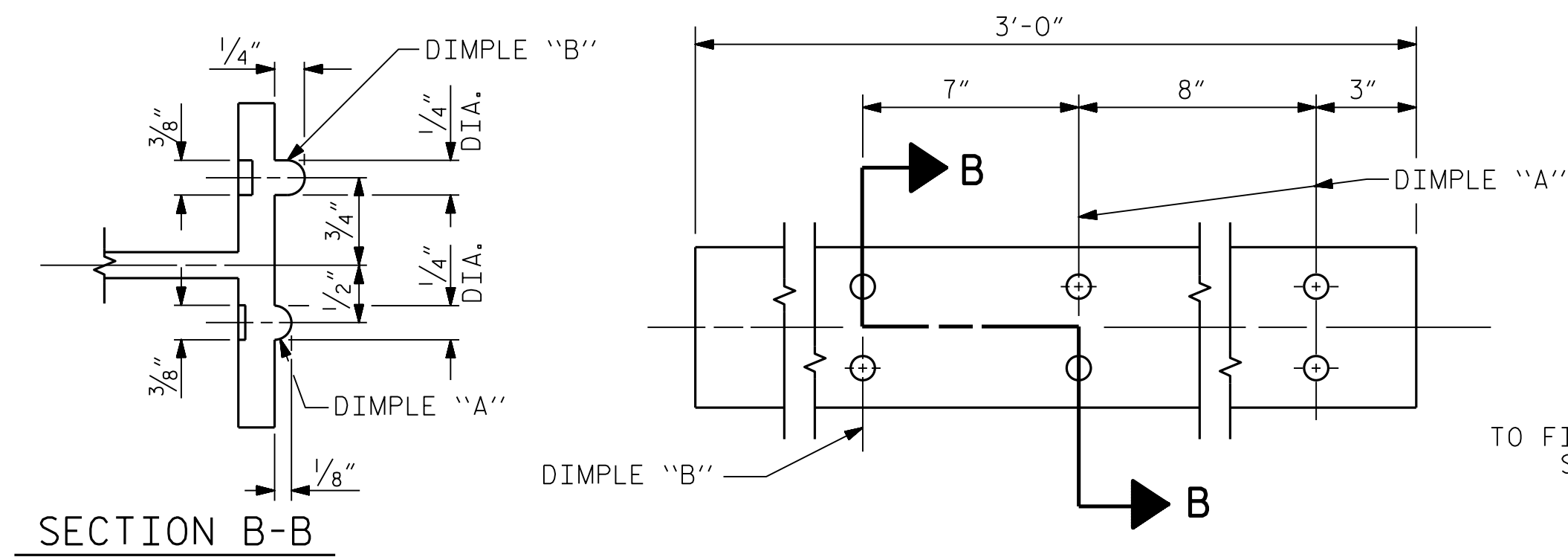
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

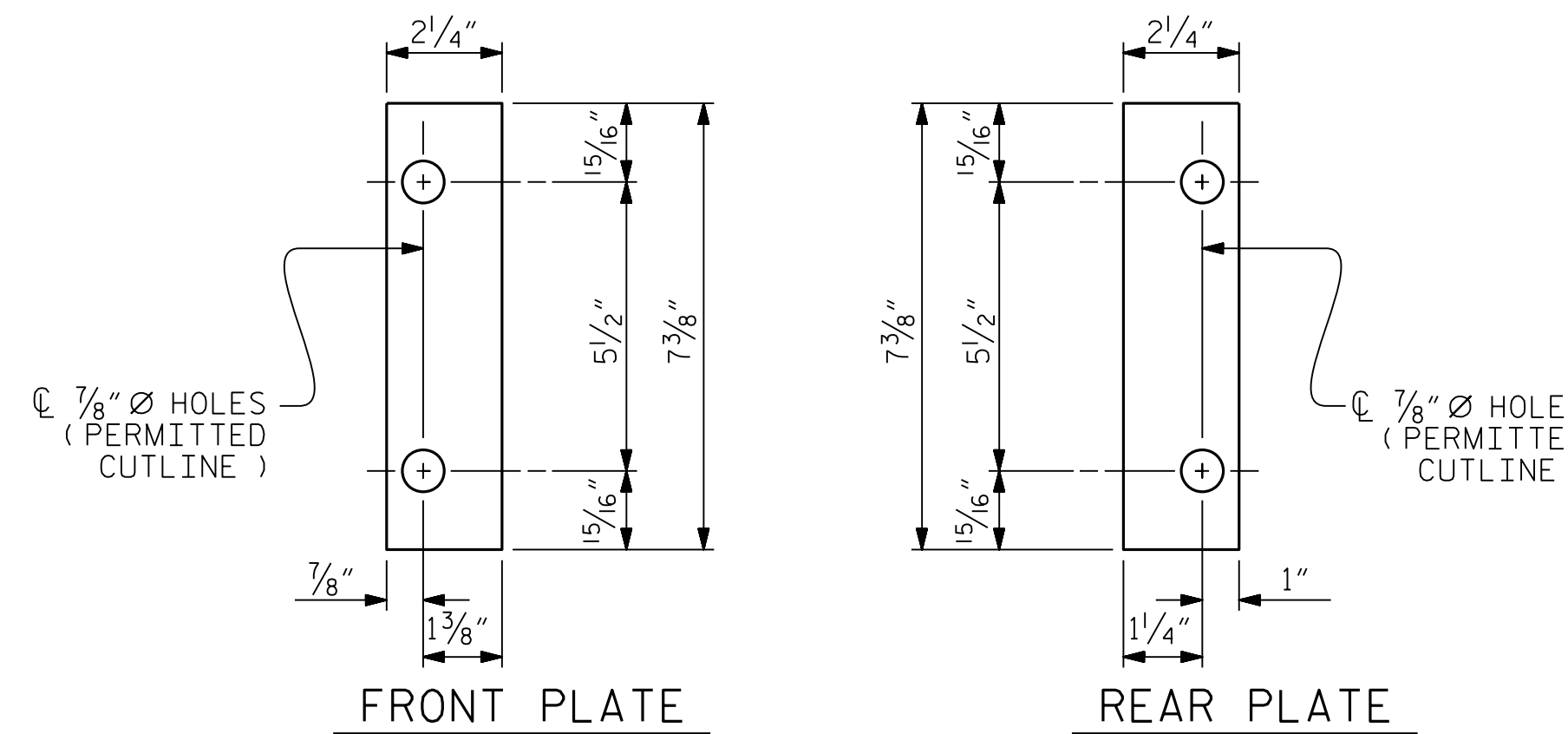
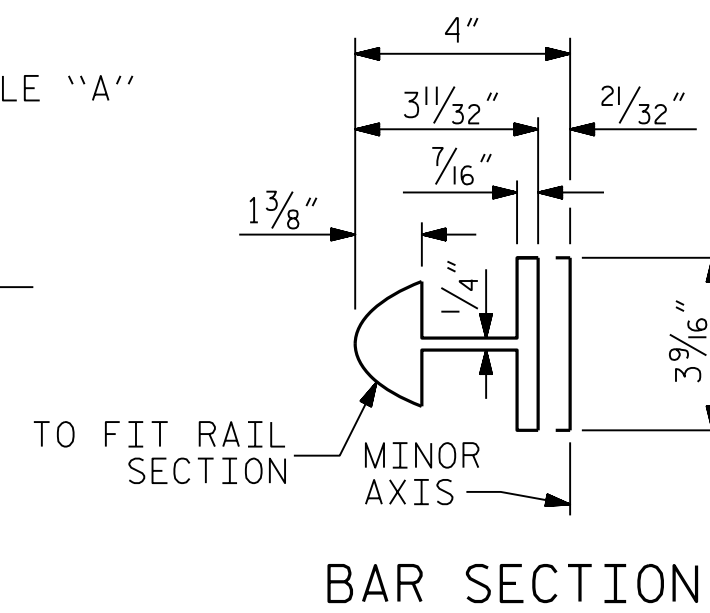


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(44 ASSEMBLIES REQUIRED)

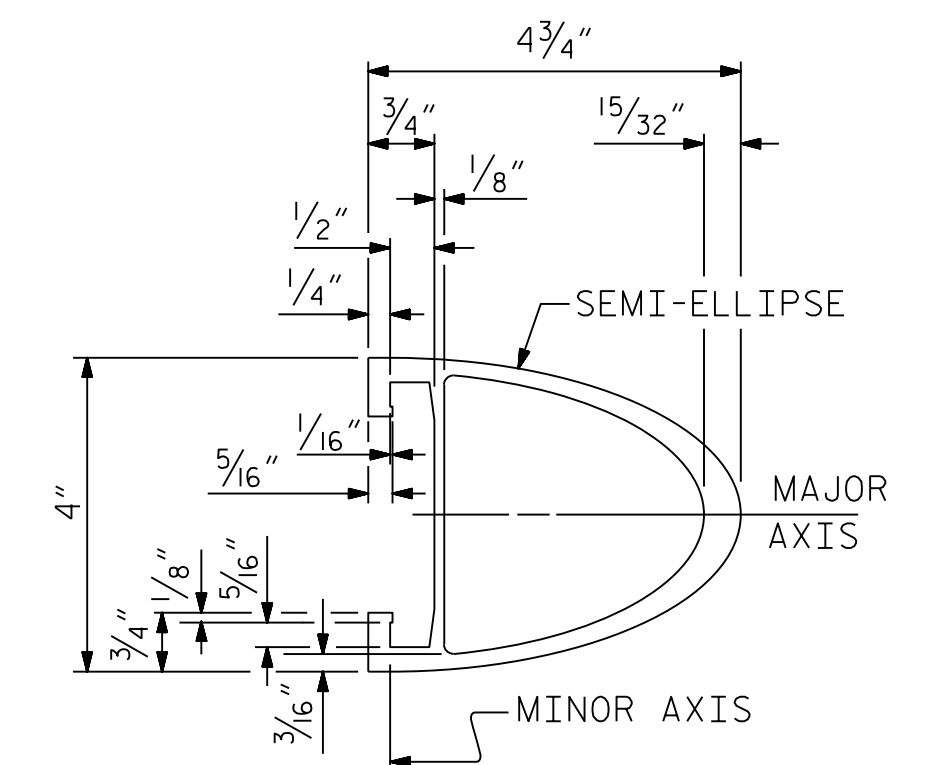


EXPANSION BAR DETAILS

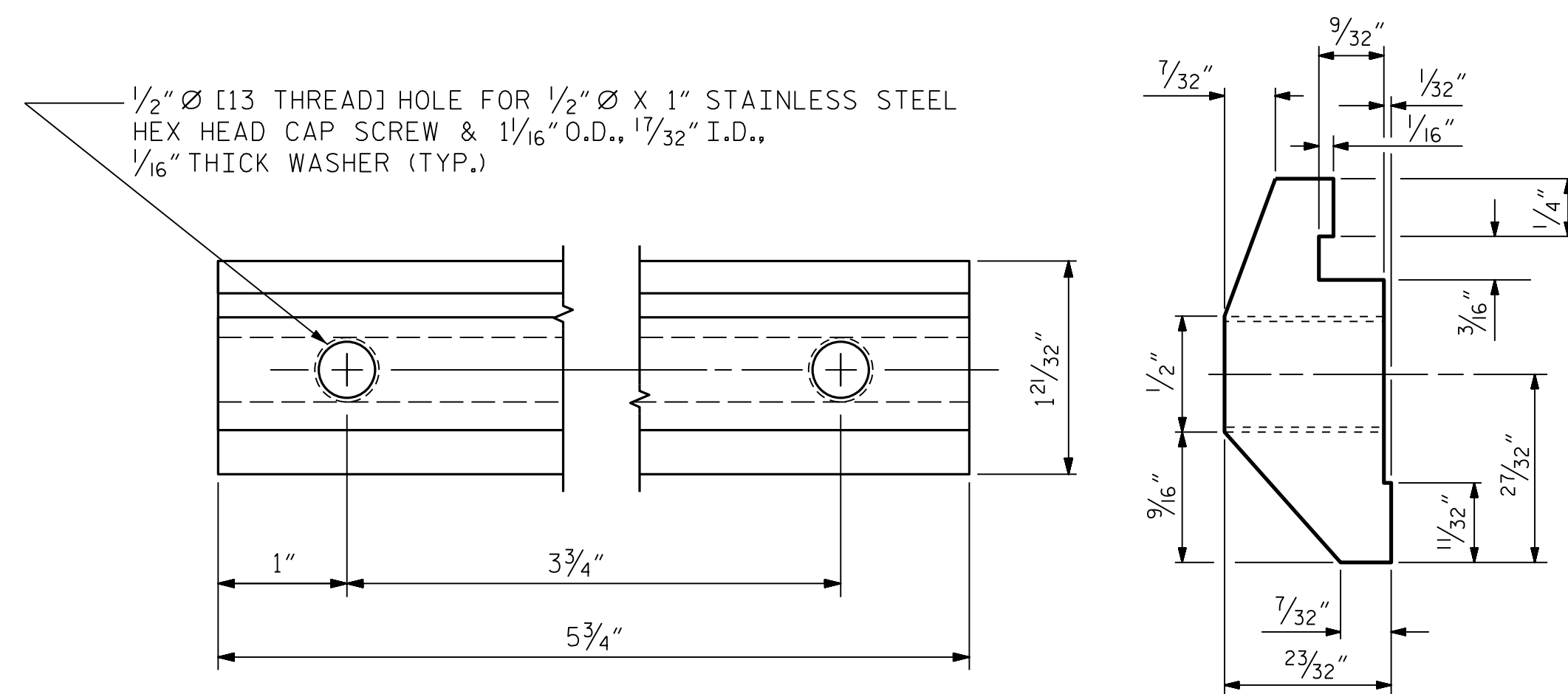


SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

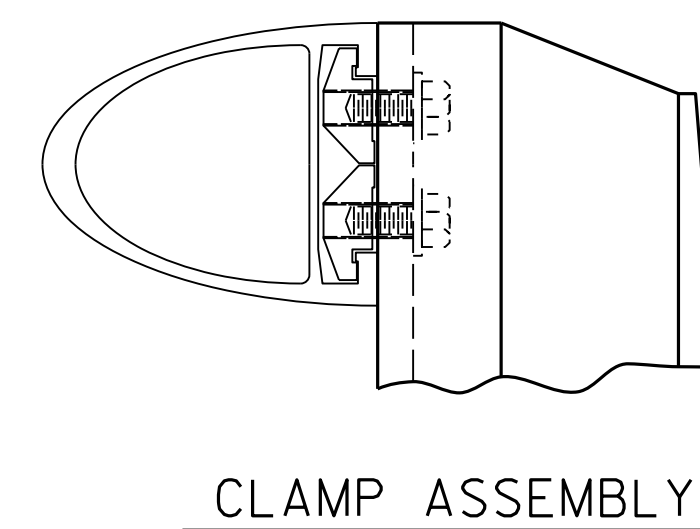


RAIL SECTION

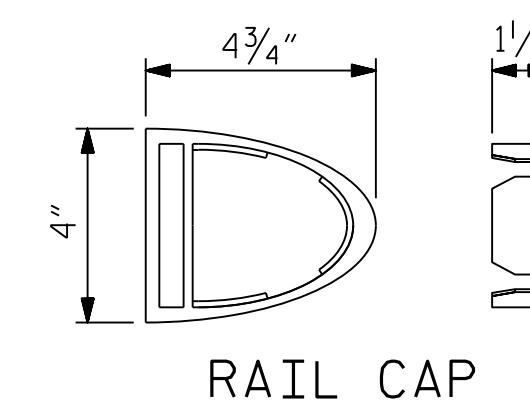


CLAMP BAR DETAIL

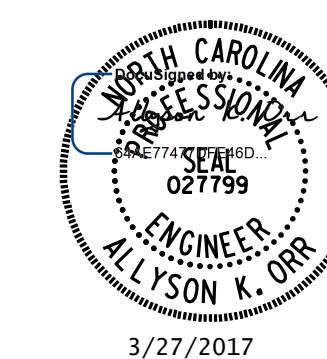
(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP



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HENDERSON COUNTY
STATION: 20+77.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
2 BAR METAL RAIL

REVISIONS						SHEET NO.
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2			4			

STD. NO. BMR4

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ASSEMBLED BY: B.E. LANNING	DATE: 01/17
CHECKED BY: A.K. ORR	DATE: 01/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY: RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

NOTES

STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
 - B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

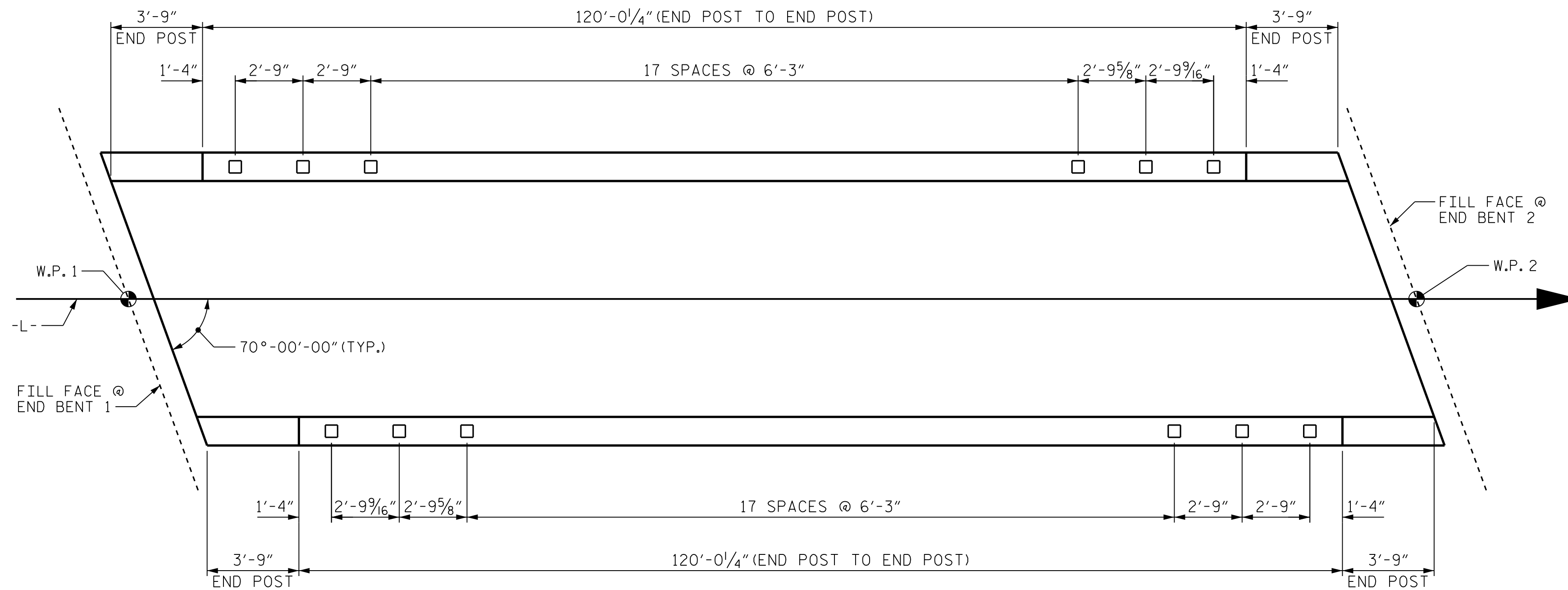
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
 - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
 - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

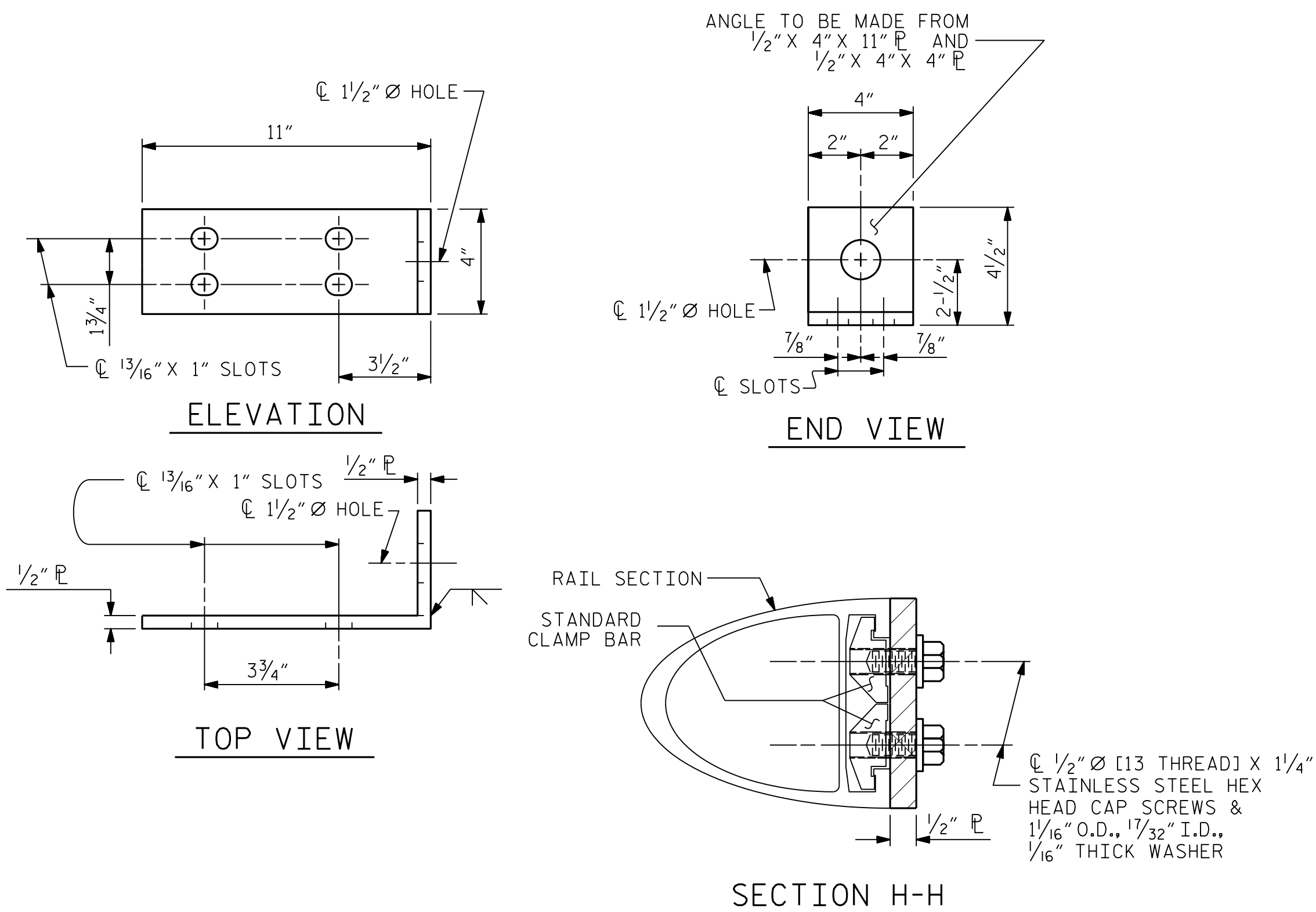
THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

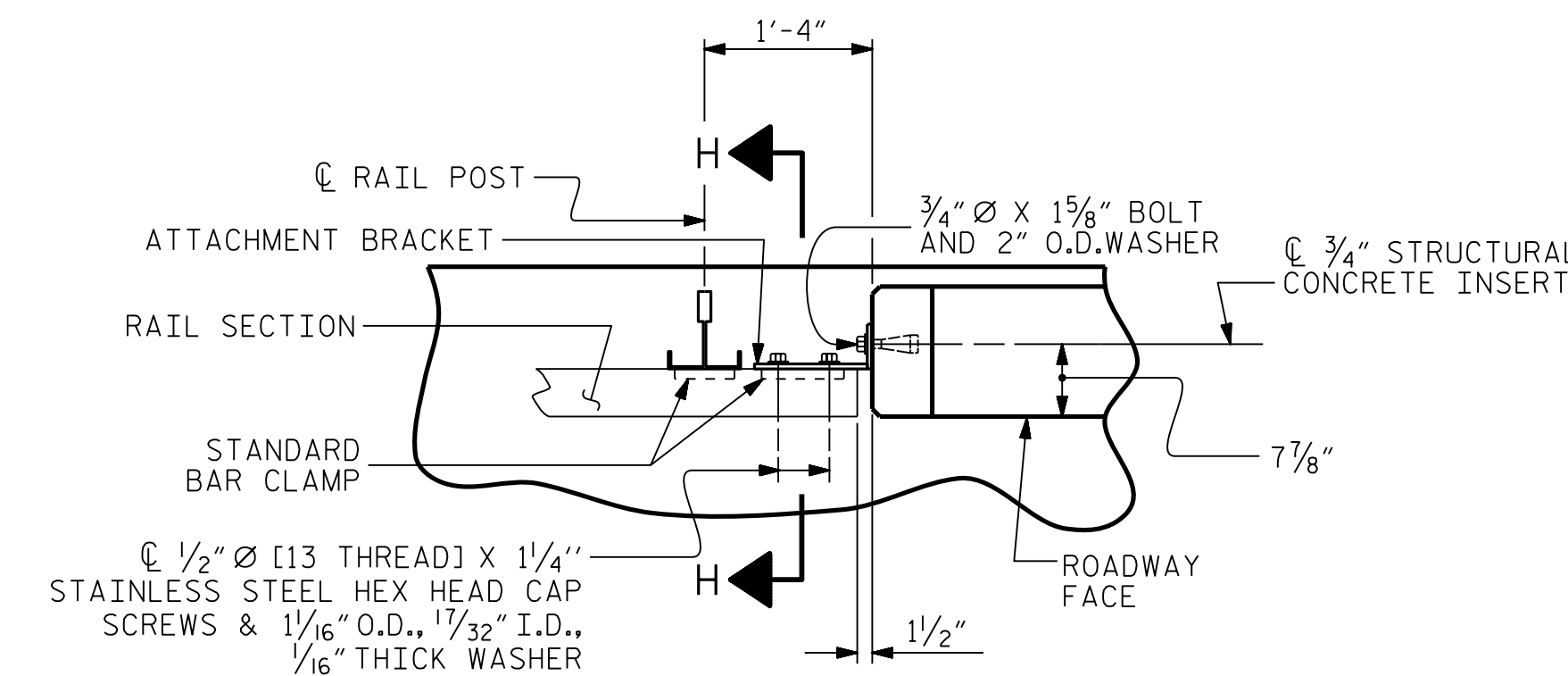


PLAN OF RAIL POST SPACINGS

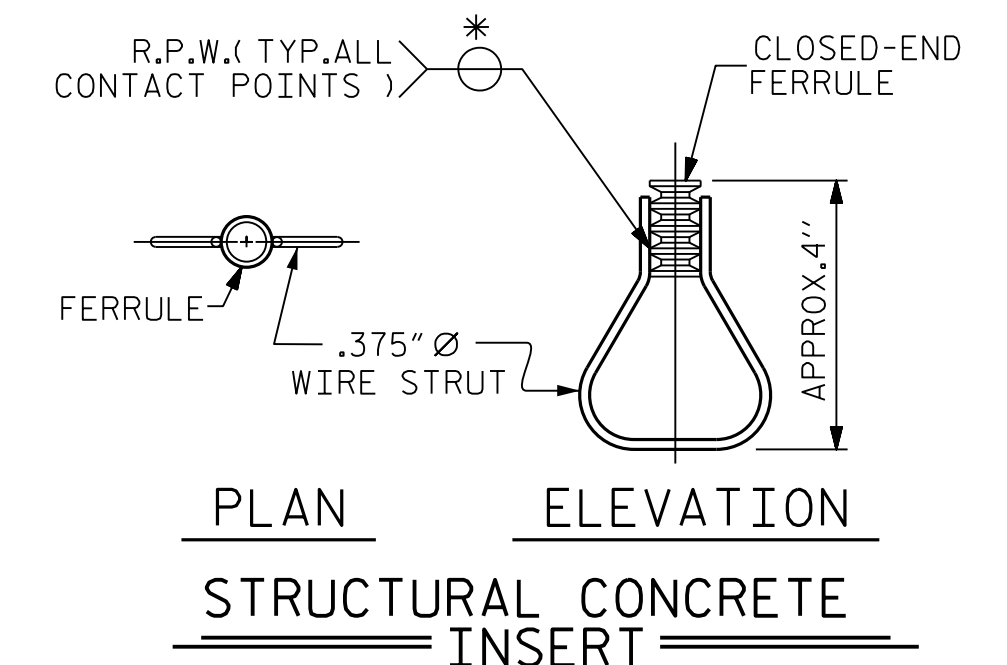
DIMENSIONS SHOWN ARE HORIZONTAL AND HAVE NOT BEEN ADJUSTED FOR THE GRADE SLOPE.



DETAILS FOR ATTACHING METAL RAIL TO END POST



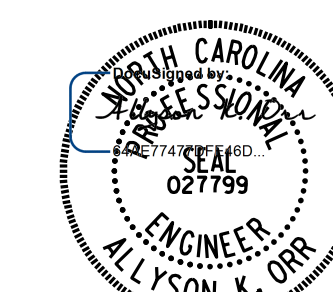
PLAN - RAIL AND END POST



PLAN ELEVATION
STRUCTURAL CONCRETE INSERT

* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-



3/27/2017

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MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RAIL POST SPACINGS
 AND
 END OF RAIL DETAILS
 FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			29

STD. NO. BMR2

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CHECKED BY: A.K. ORR	DATE: 01/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY: CRK 3/89	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

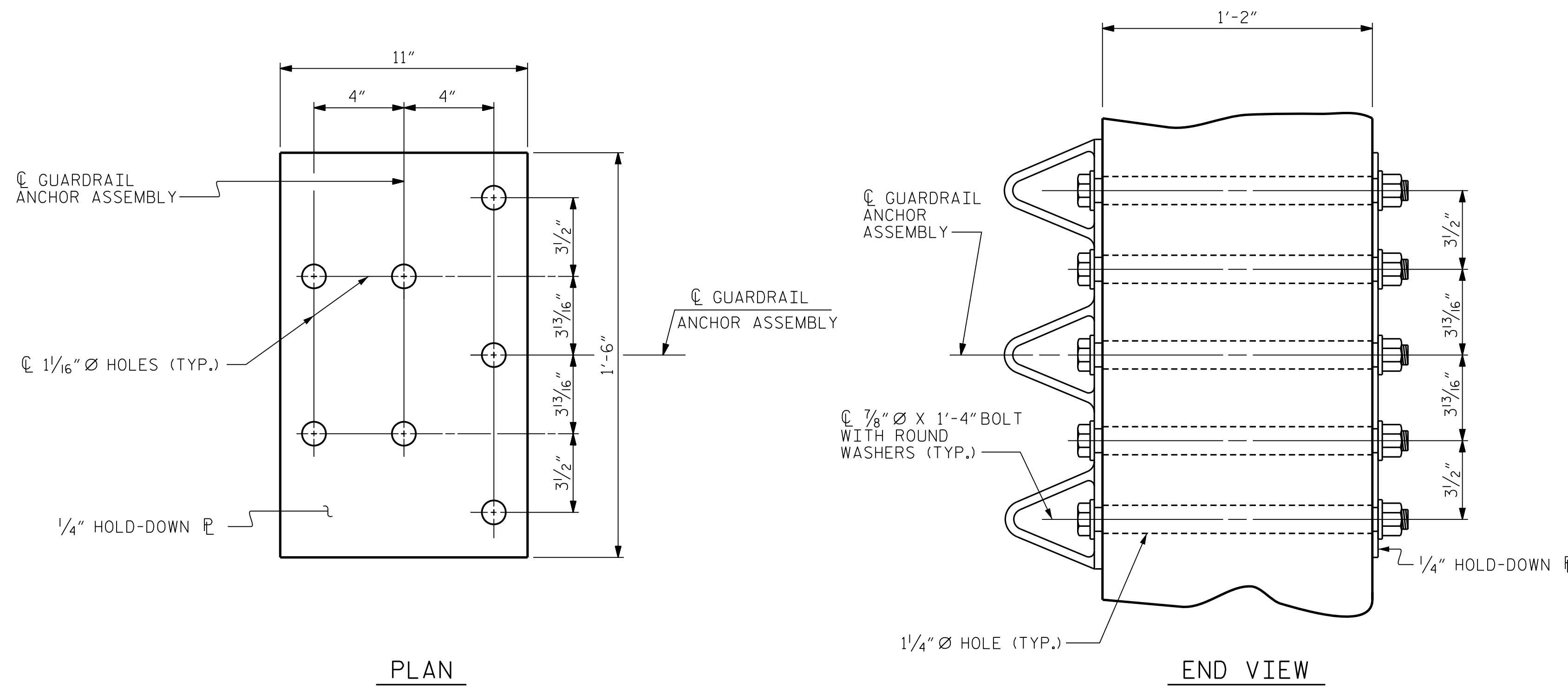
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

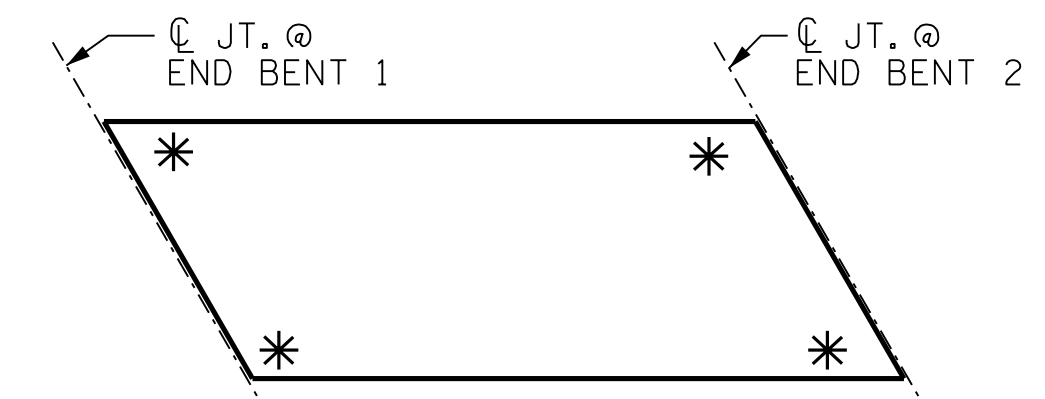
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

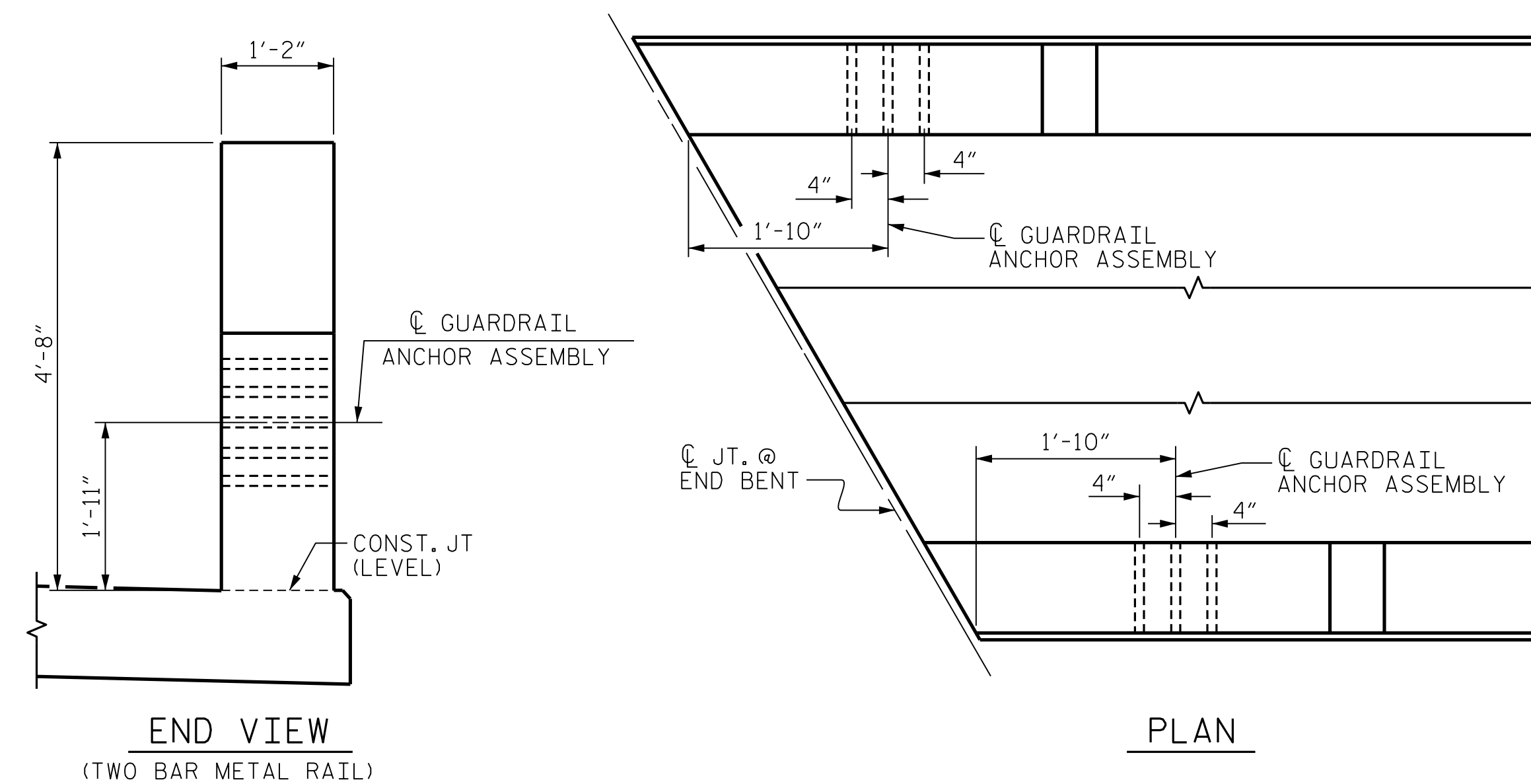


GUARDRAIL ANCHOR ASSEMBLY DETAILS



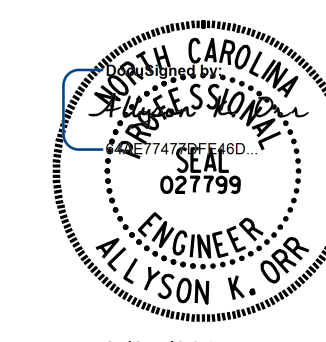
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-



3/27/2017

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 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

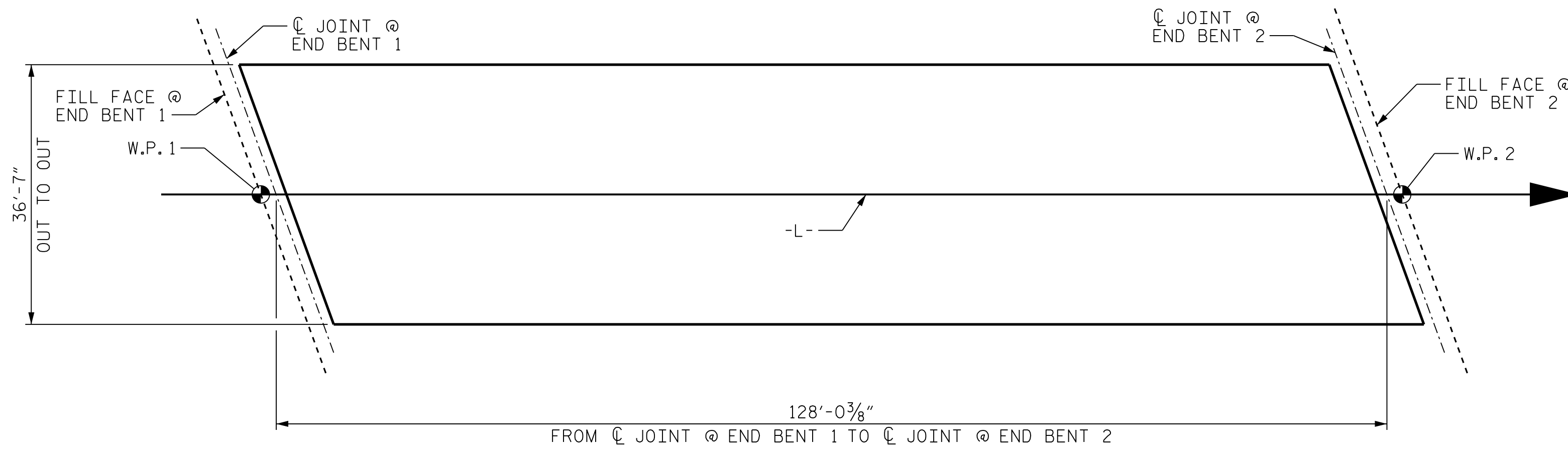
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 DETAILS
 FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			29

(SHT 5) STD. NO. GRA3

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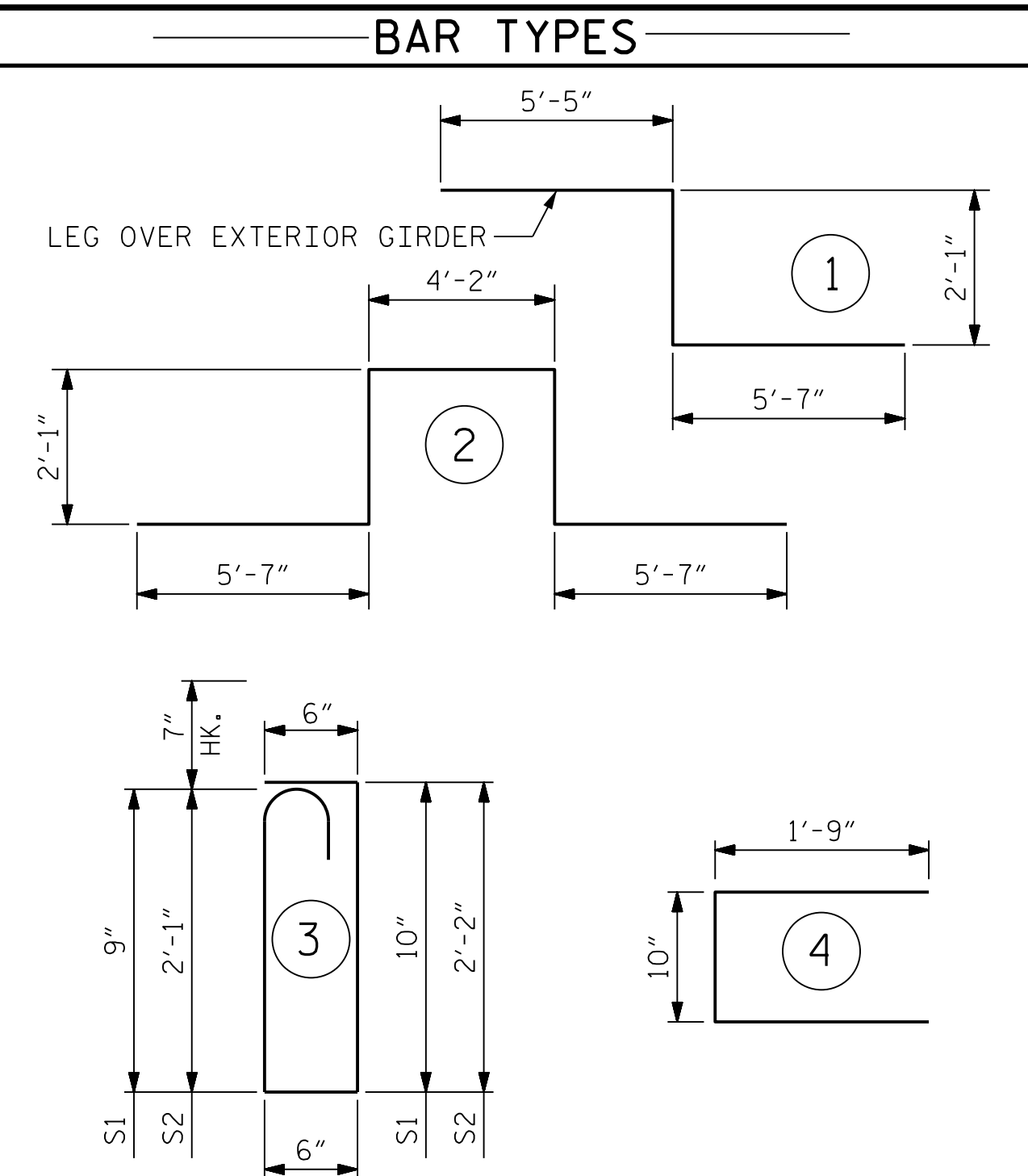
ASSEMBLED BY: B.E. LANNING	DATE: 01/17
CHECKED BY: A.K. ORR	DATE: 01/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: MAA 5/10	REV. 10/1/11 MAA/GM
CHECKED BY: GM 5/10	REV. 12/5/11 MAA/GM
	REV. 6/13 MAA/GM



LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 4,684)

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS					
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

REINFORCING BAR SCHEDULE					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	196	#5	STR	36'-3"	7411
A2	196	#5	STR	36'-3"	7411
*A101	2	#5	STR	35'-4"	74
*A102	2	#5	STR	33'-9"	70
*A103	2	#5	STR	32'-2"	67
*A104	2	#5	STR	30'-6"	64
*A105	2	#5	STR	28'-11"	60
*A106	2	#5	STR	27'-4"	57
*A107	2	#5	STR	25'-9"	54
*A108	2	#5	STR	24'-2"	50
*A109	2	#5	STR	22'-6"	47
*A110	2	#5	STR	20'-11"	44
*A111	2	#5	STR	19'-4"	40
*A112	2	#5	STR	17'-9"	37
*A113	2	#5	STR	16'-1"	34
*A114	2	#5	STR	14'-6"	30
*A115	2	#5	STR	12'-11"	27
*A116	2	#5	STR	11'-4"	24
*A117	2	#5	STR	9'-8"	20
*A118	2	#5	STR	8'-1"	17
*A119	2	#5	STR	6'-6"	14
*A120	2	#5	STR	4'-11"	10
*A121	2	#5	STR	3'-4"	7
A201	2	#5	STR	35'-5"	74
A202	2	#5	STR	33'-10"	71
A203	2	#5	STR	32'-3"	67
A204	2	#5	STR	30'-7"	64
A205	2	#5	STR	29'-0"	60
A206	2	#5	STR	27'-5"	57
A207	2	#5	STR	25'-9"	54
A208	2	#5	STR	24'-2"	50
A209	2	#5	STR	22'-7"	47
A210	2	#5	STR	21'-0"	44
A211	2	#5	STR	19'-5"	41
A212	2	#5	STR	17'-9"	37
A213	2	#5	STR	16'-2"	34
A214	2	#5	STR	14'-7"	30
A215	2	#5	STR	13'-0"	27
A216	2	#5	STR	11'-4"	24
A217	2	#5	STR	9'-9"	20
A218	2	#5	STR	8'-2"	17
A219	2	#5	STR	6'-7"	14
A220	2	#5	STR	5'-0"	10
A221	2	#5	STR	3'-4"	7
B1	99	#5	STR	44'-0"	4543
*B2	125	#4	STR	27'-2"	2268
*G1	2	#5	STR	38'-6"	80
*K1	8	#8	1	13'-1"	279
*K2	8	#8	2	19'-6"	417
*K3	24	#4	STR	8'-7"	138
K4	18	#6	STR	6'-5"	173
S1	12	#5	3	3'-2"	40
*S2	42	#5	3	5'-10"	256
*S3	42	#4	4	4'-4"	122



ALL BAR DIMENSIONS ARE OUT TO OUT.

— SUPERSTRUCTURE BILL OF MATERIAL —

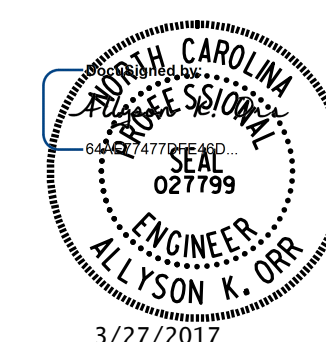
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
SPAN "A"	159.6	13,016	11,818
TOTALS**	159.6	13,016	11,818

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

GROOVING BRIDGE FLOORS

APPROACH SLABS	690 SO.FT.
BRIDGE DECK	3,958 SO.FT.
TOTAL	4,648 SO.FT.

PROJECT NO. R-5771
HENDERSON COUNTY
STATION: 20+77.50 -L-



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MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER: P-0671

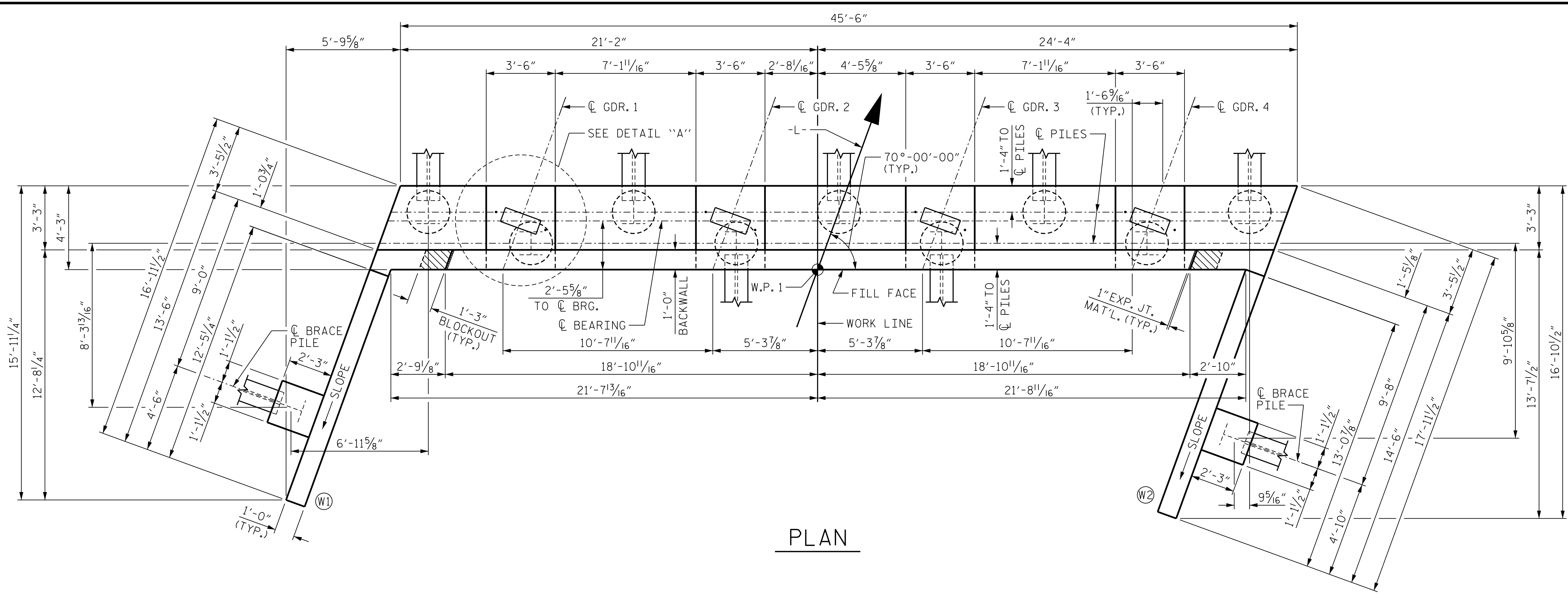
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SUPERSTRUCTURE
BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-19
2			4			TOTAL SHEETS 29

STD. NO. BOM2

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ASSEMBLED BY: B.E. LANNING	DATE: 01/17
CHECKED BY: A.K. ORR	DATE: 01/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: JMB 5/87	REV. 8/16/99 RWW/LES
CHECKED BY: SJD 9/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



PLAN

NOTES

STIRRUPS AND #4 U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

#5 V1 BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

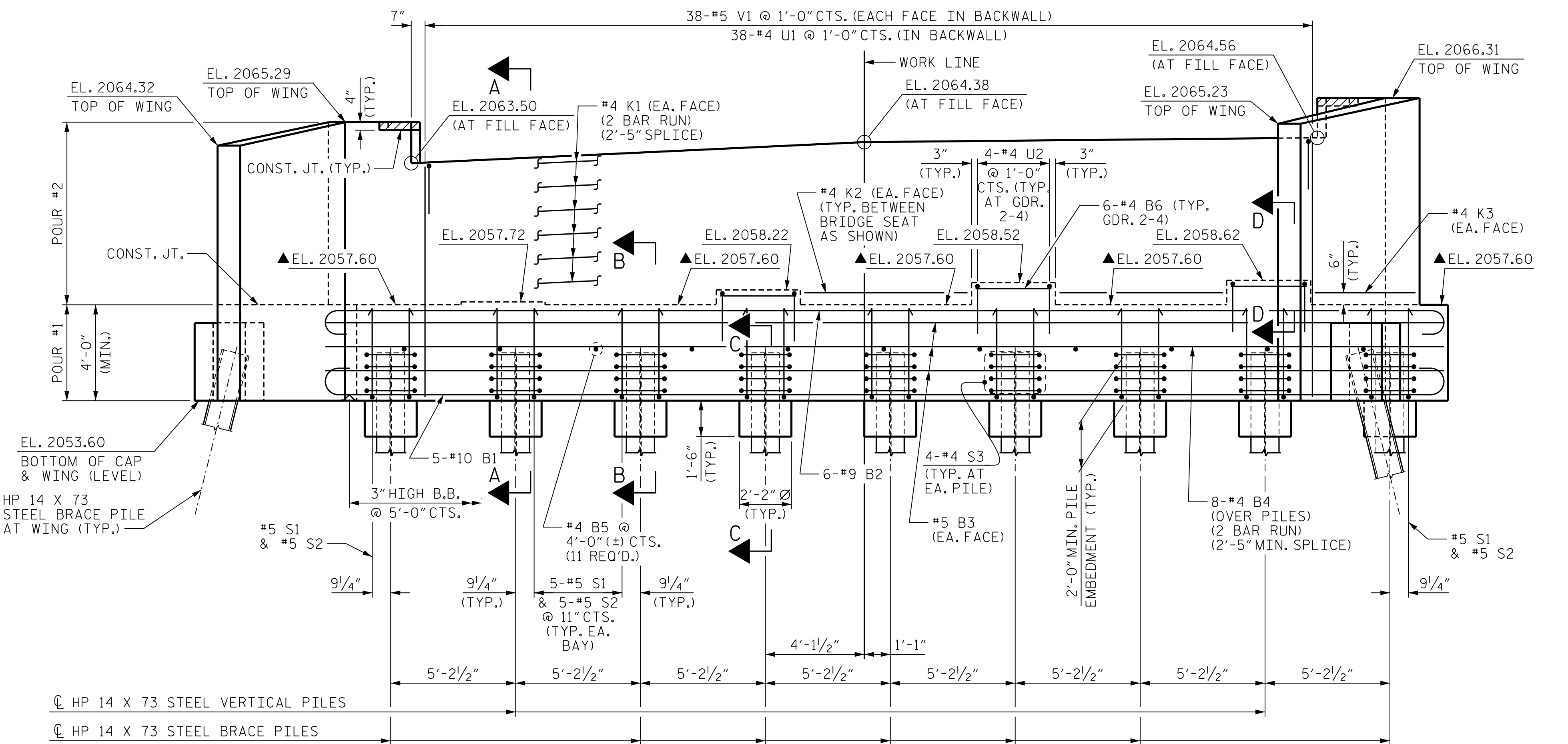
▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

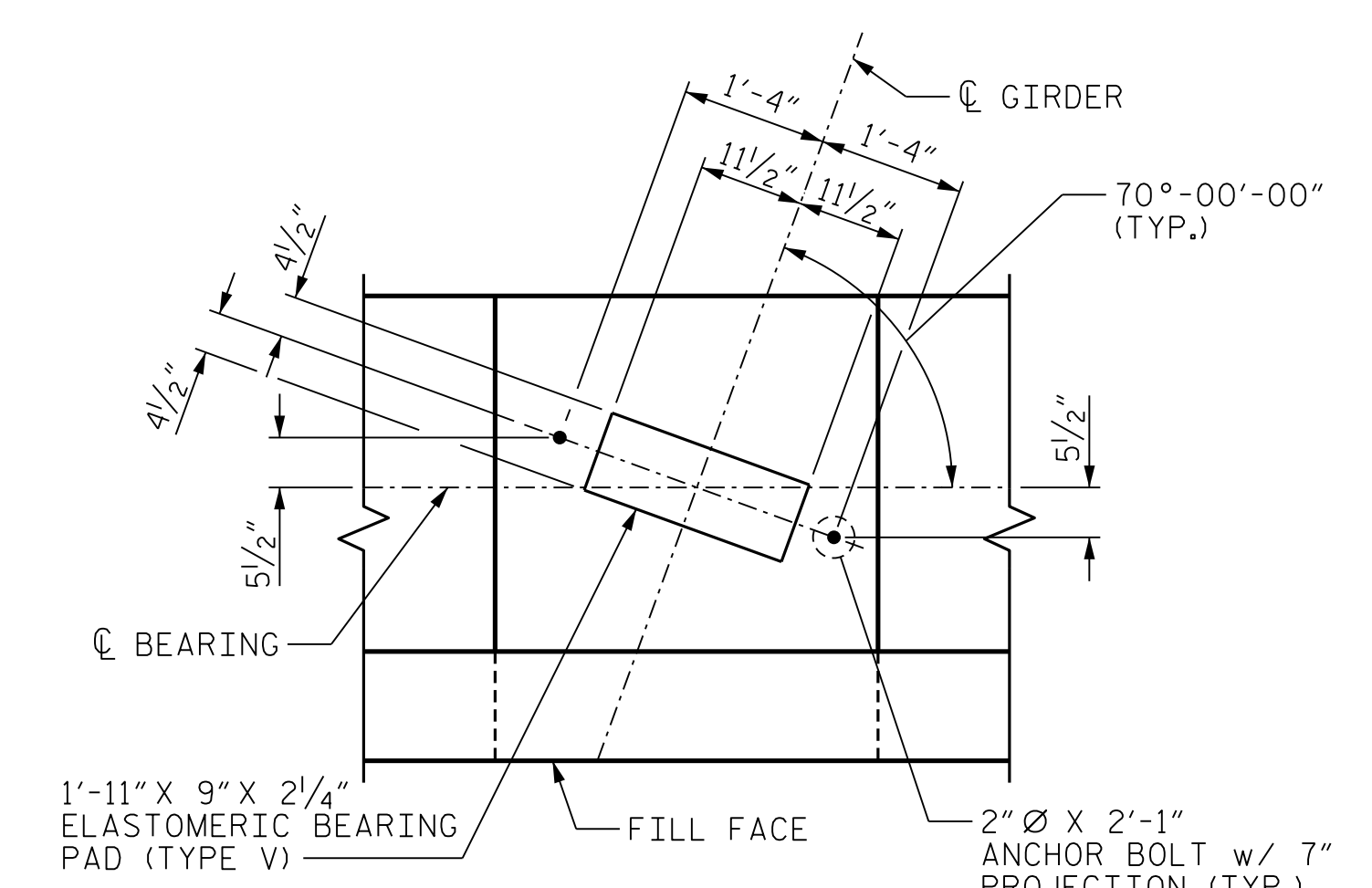
FOR SECTION A-A, SECTION B-B, SECTION C-C AND SECTION D-D, SEE SHEET 3 OF 3.

FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE END BENT 2 SHEET 4 OF 4.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



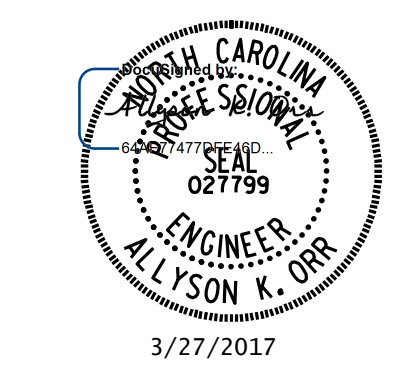
ELEVATION



DETAIL "A"

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1
 PLAN AND ELEVATION

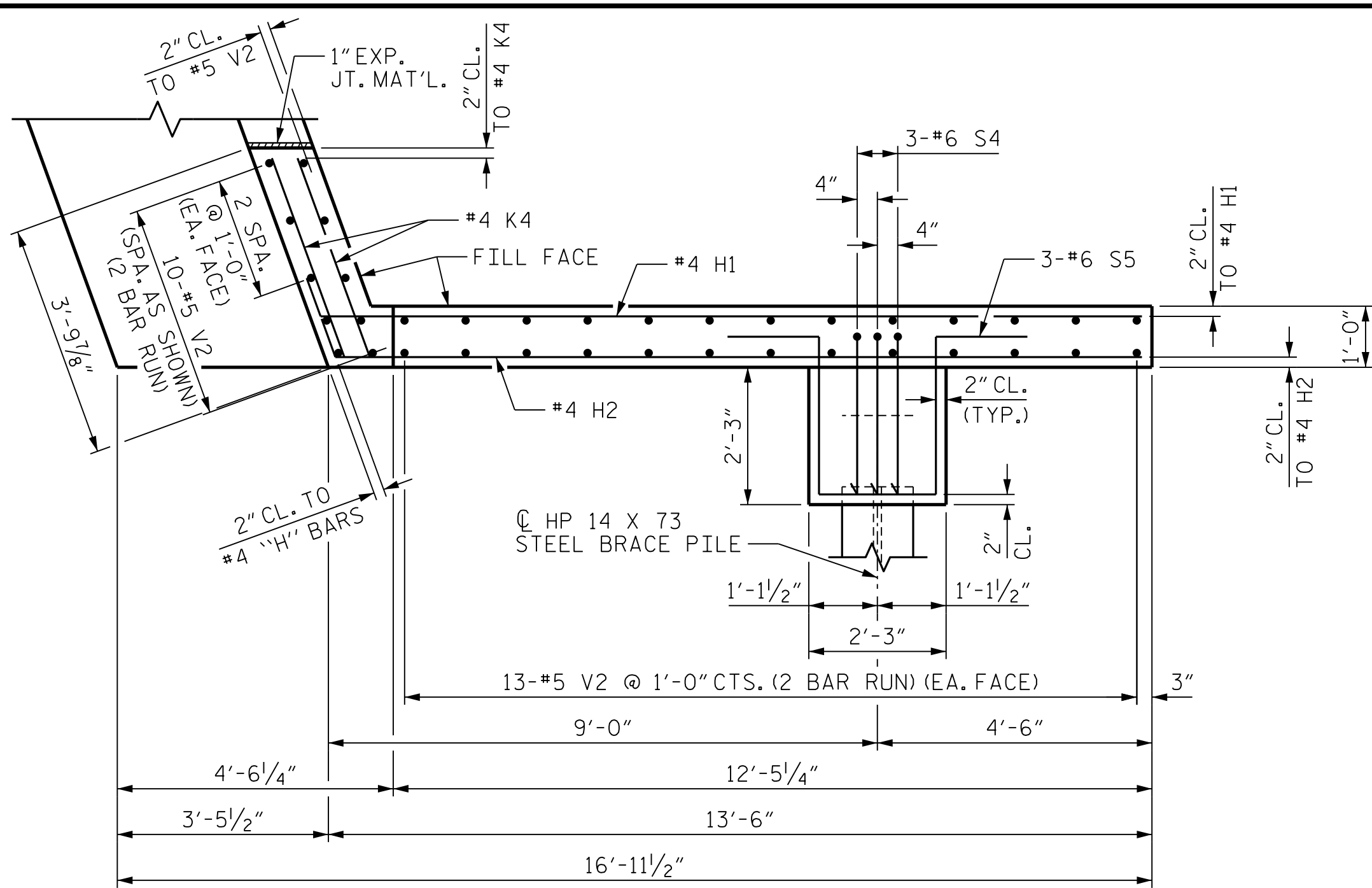
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 (919) 851-6606
 FIRM PE NUMBER: P-0671

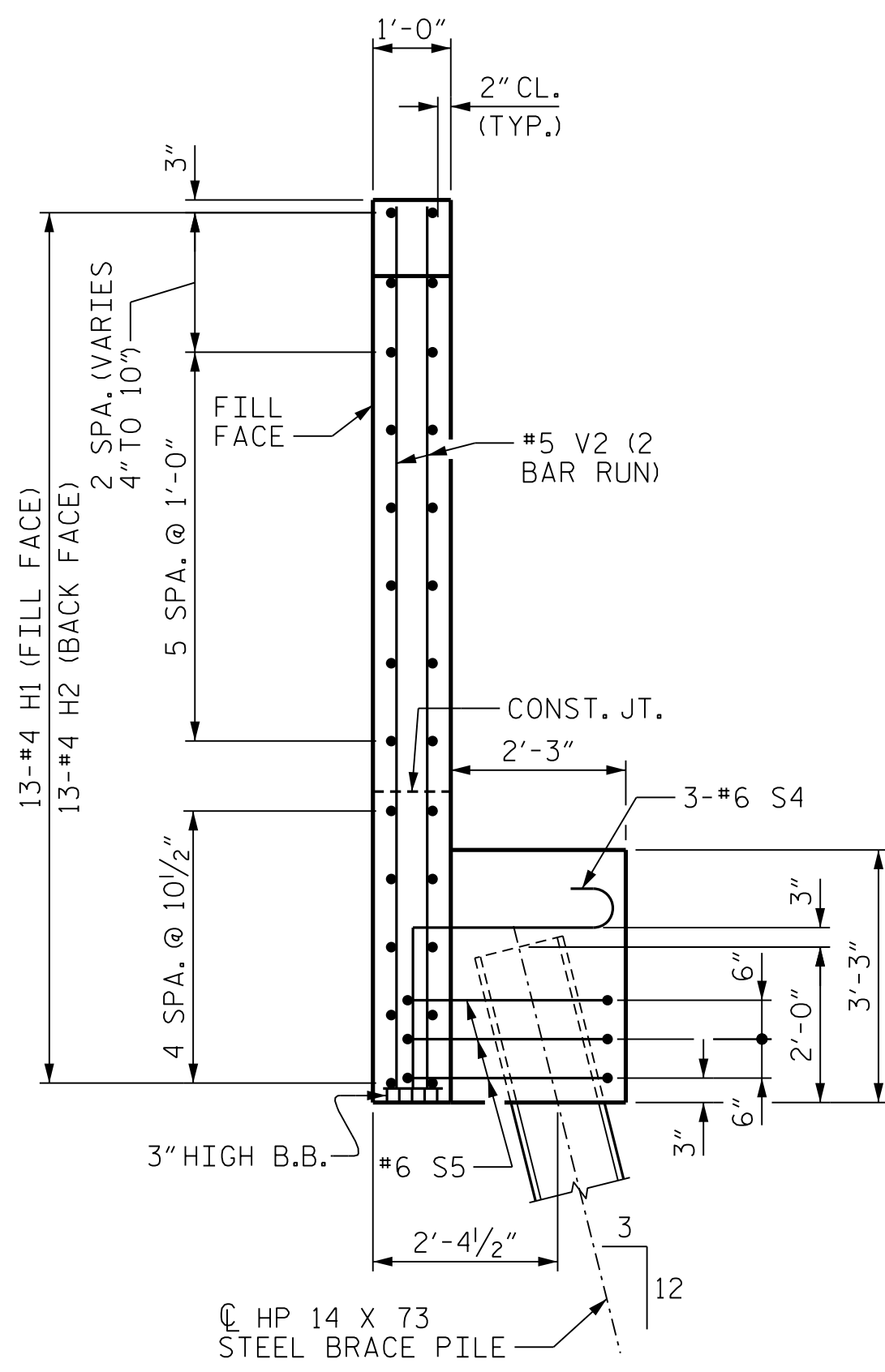
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2			4			29

DRAWN BY: B.E. LANNING DATE: 02/17
 CHECKED BY: A.K. ORR DATE: 02/17
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 03/17

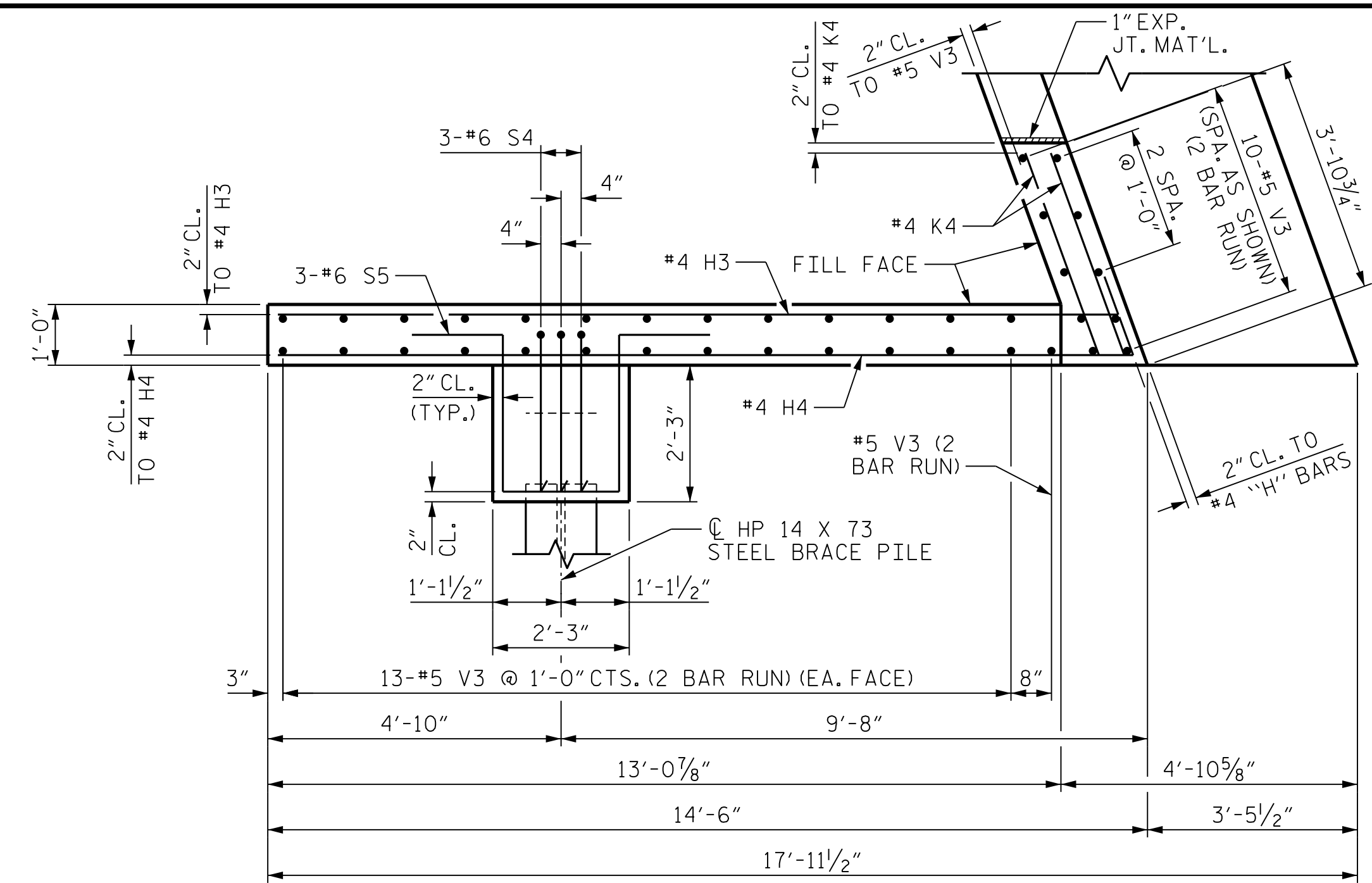
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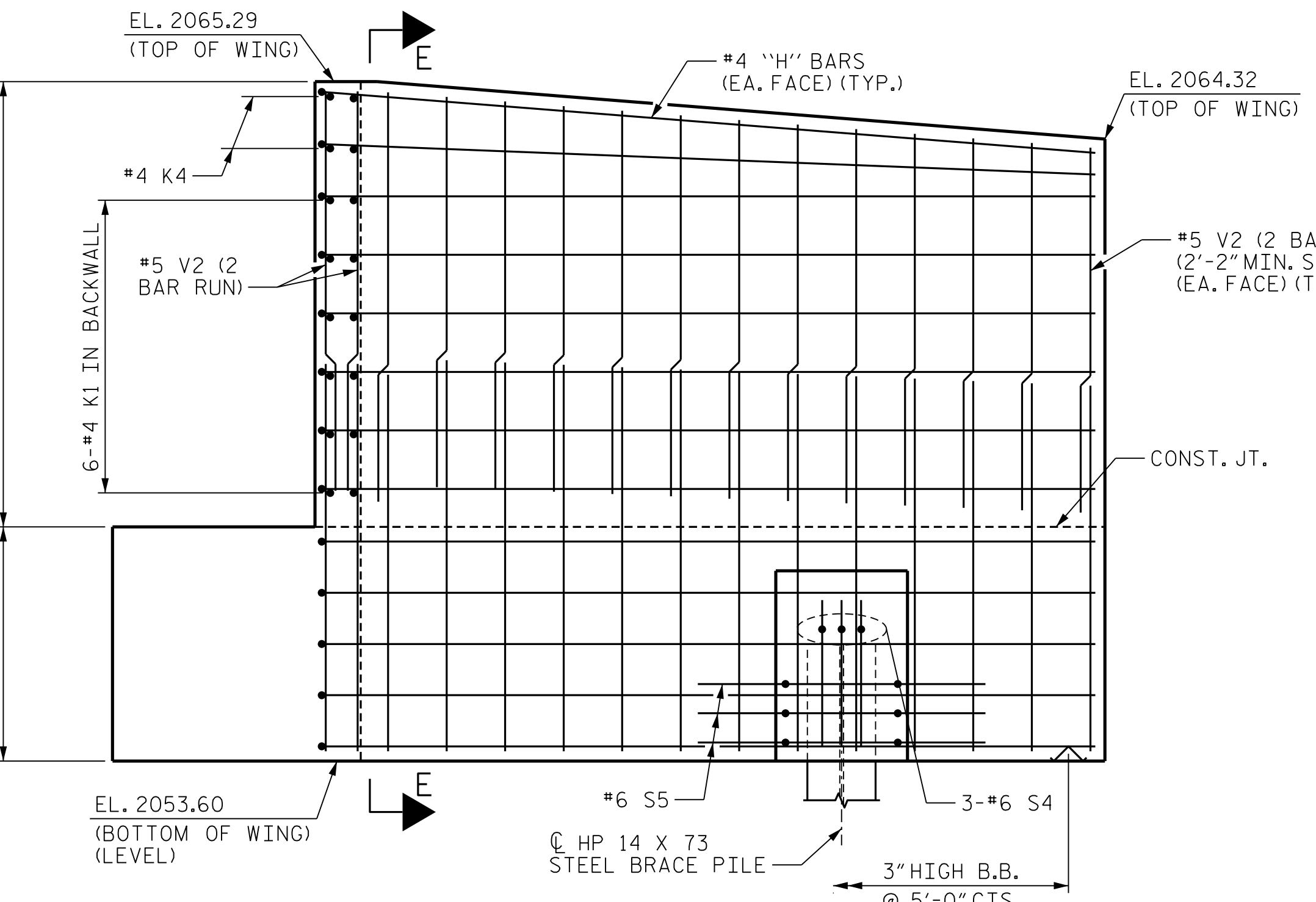
PLAN OF WING (W1)



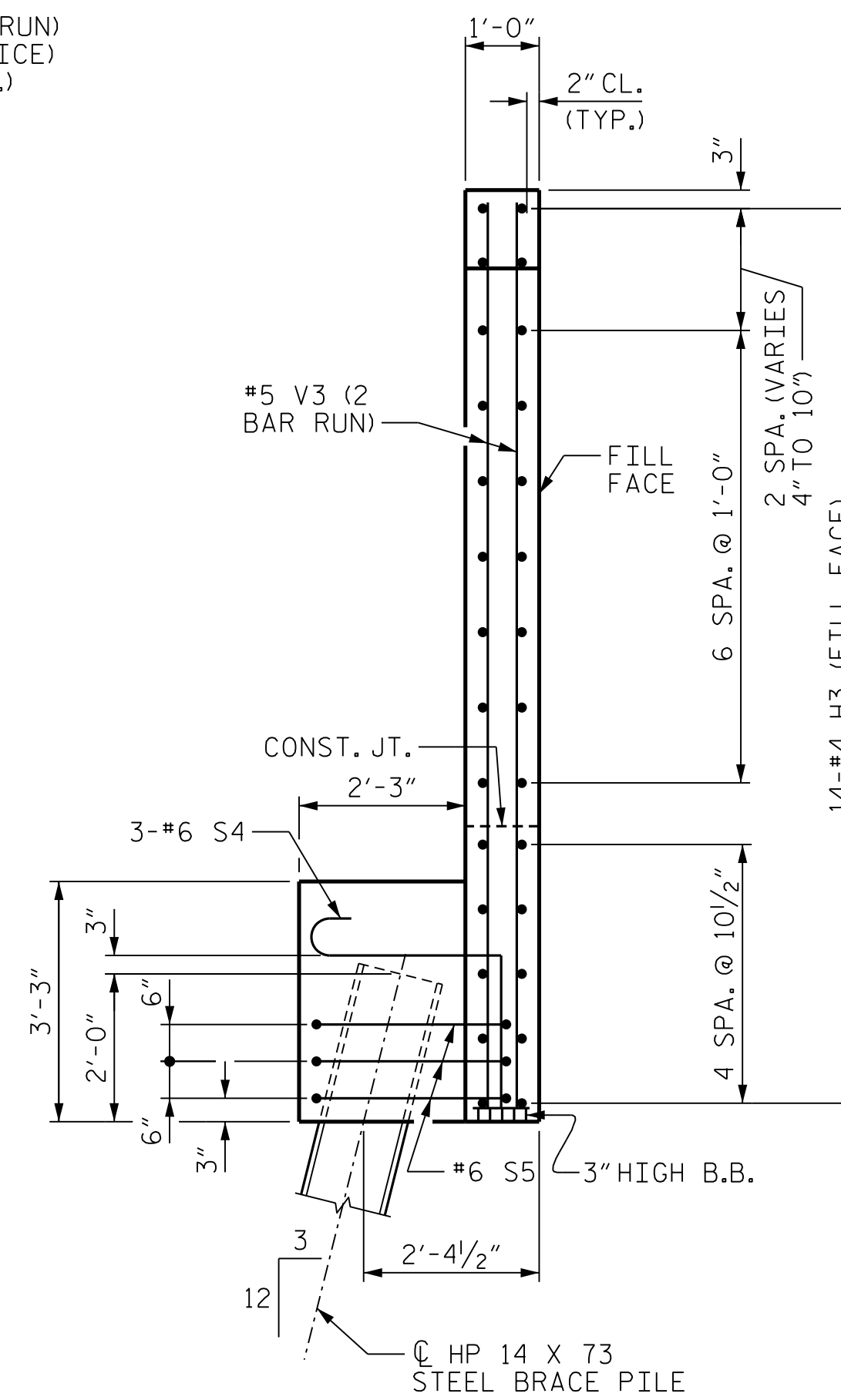
SECTION E-E



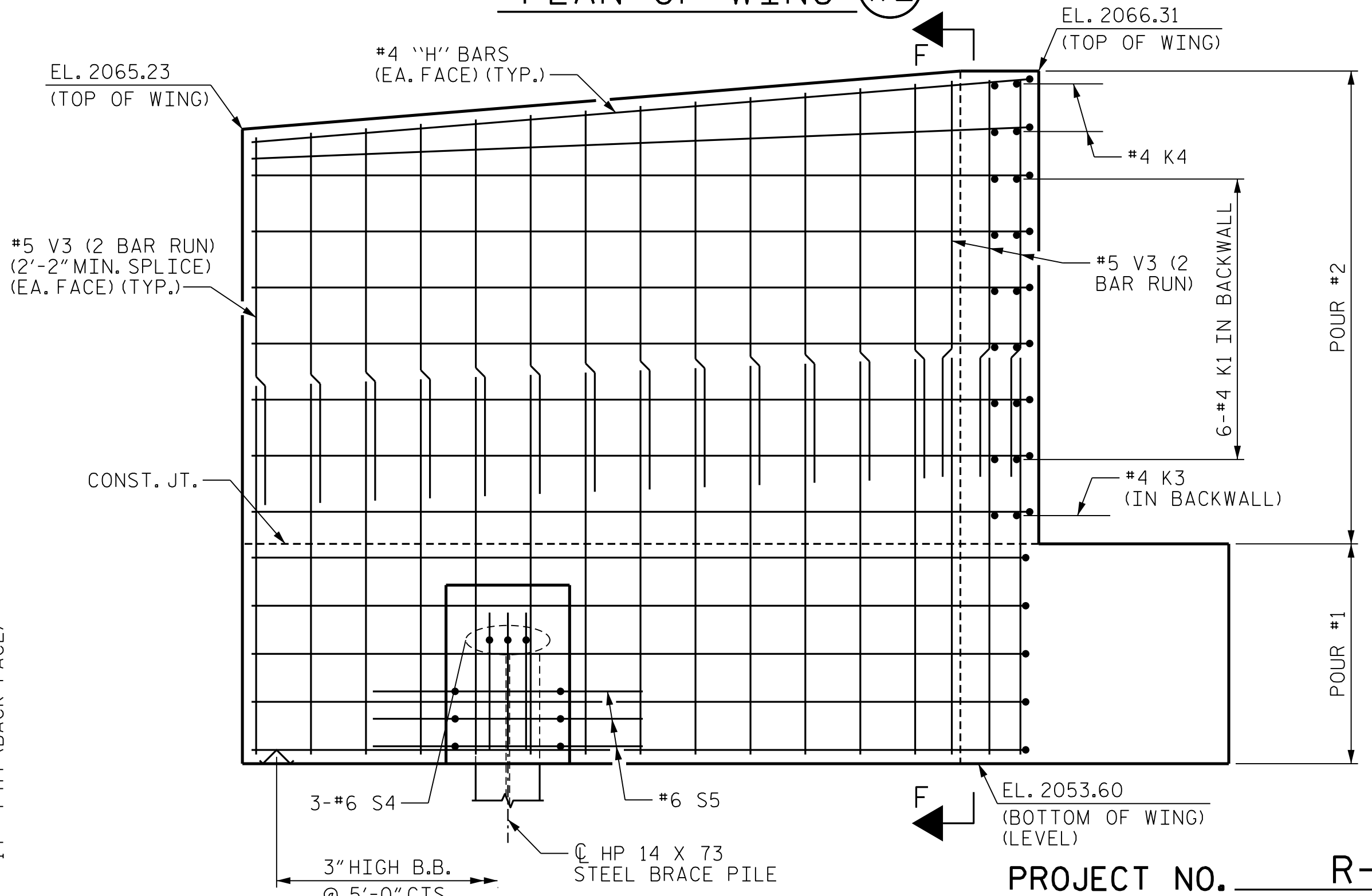
PLAN OF WING (W2)



ELEVATION OF WING (W1)



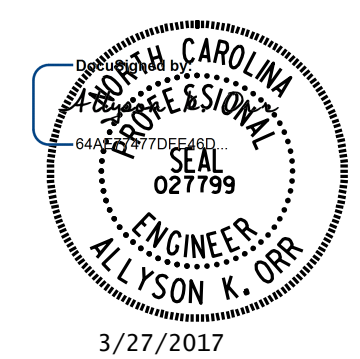
SECTION F-F



ELEVATION OF WING (W2)

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 2 OF 3



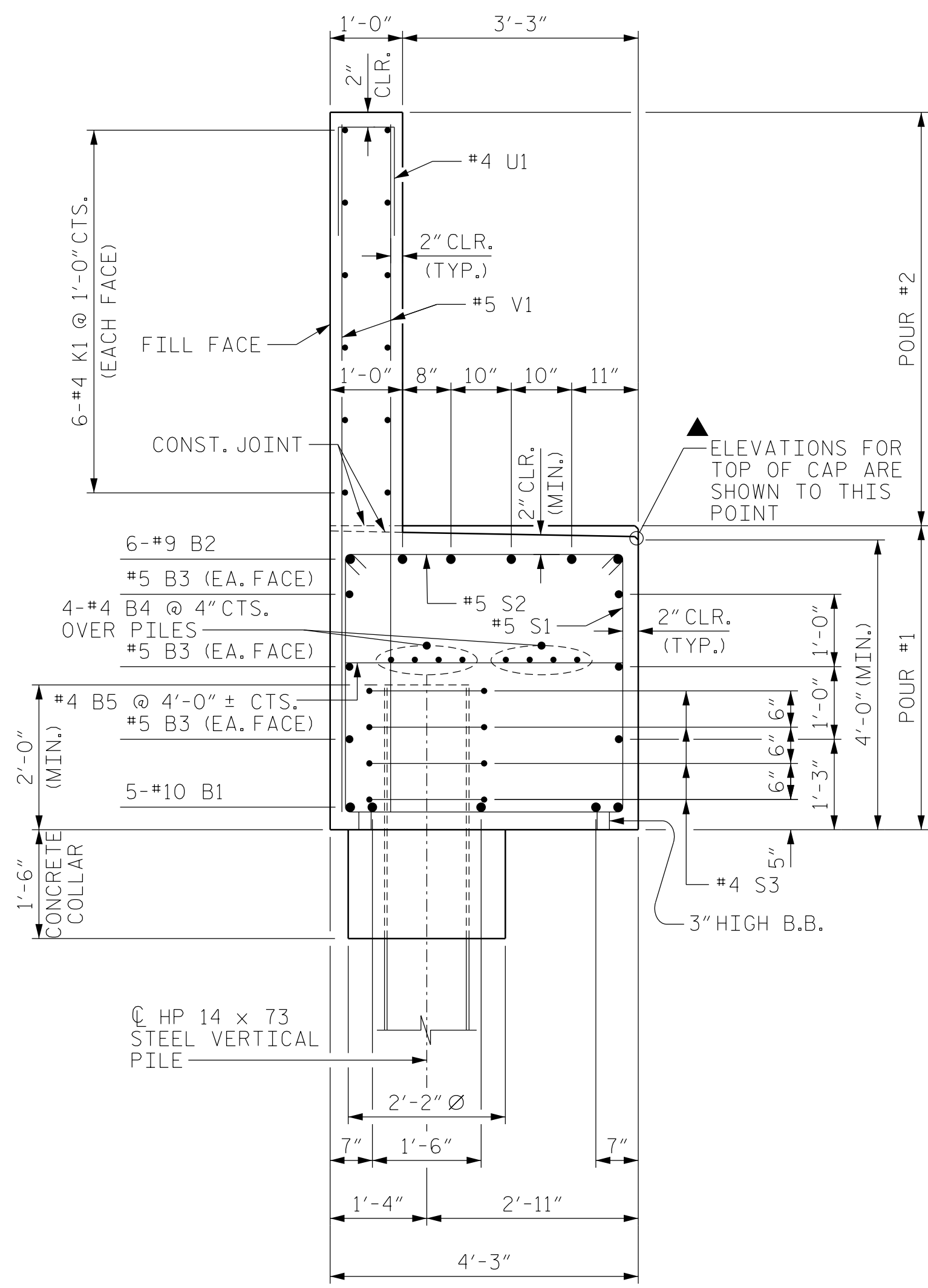
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 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

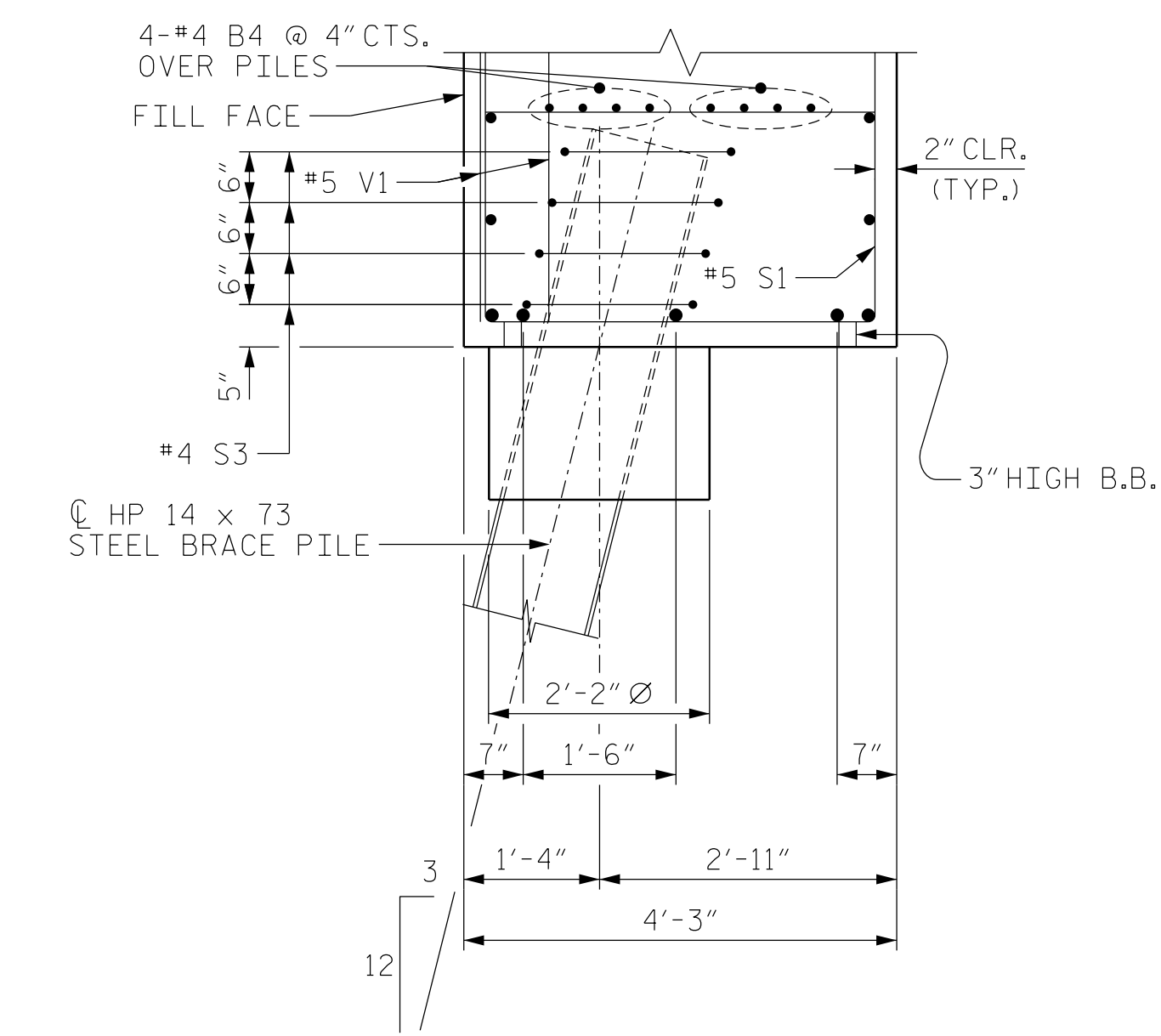
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 1 WING DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-21					TOTAL SHEETS 29

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DRAWN BY : B.E. LANNING DATE : 02/17
 CHECKED BY : A.K. ORR DATE : 02/17
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 03/17

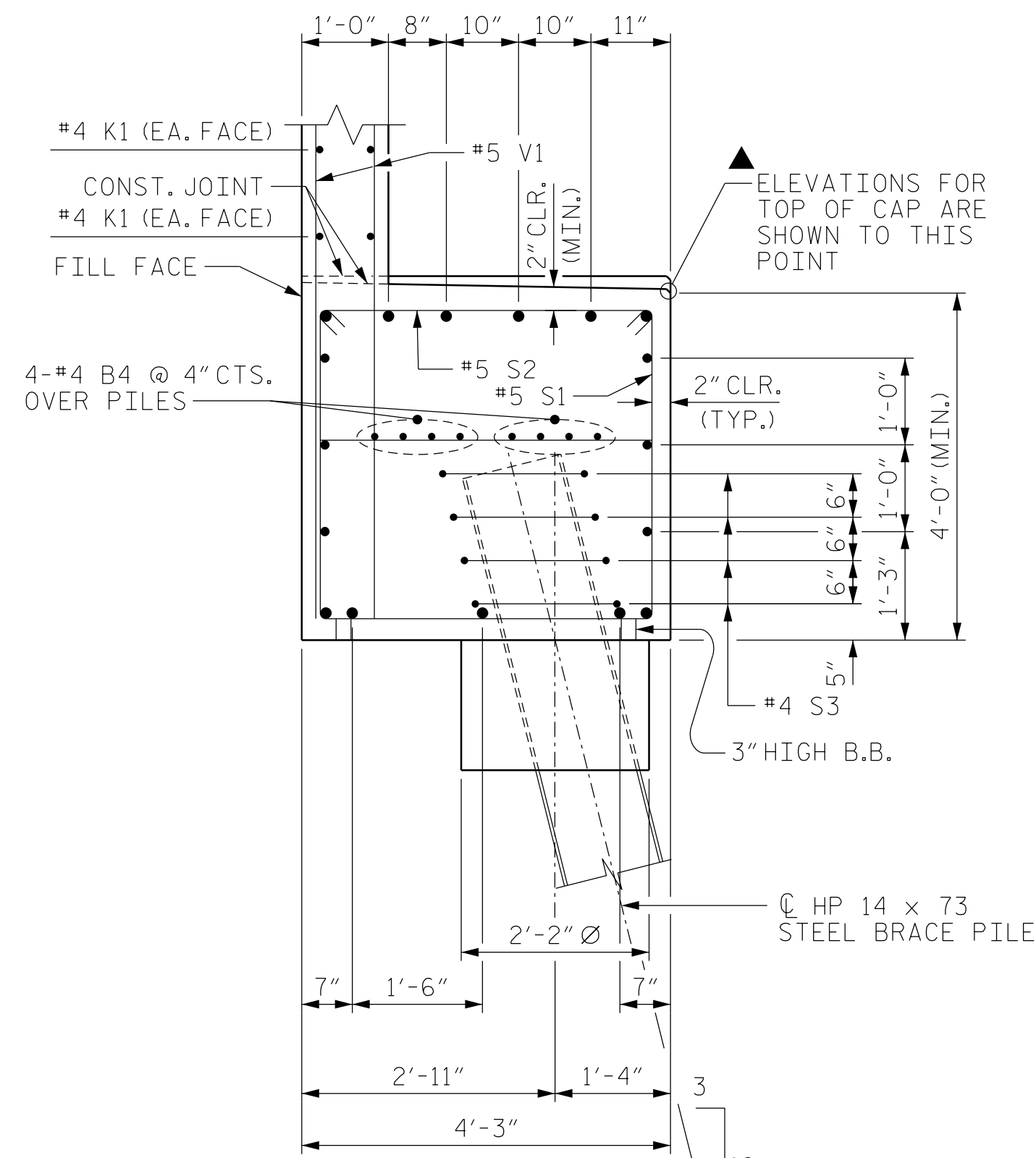


SECTION A-A



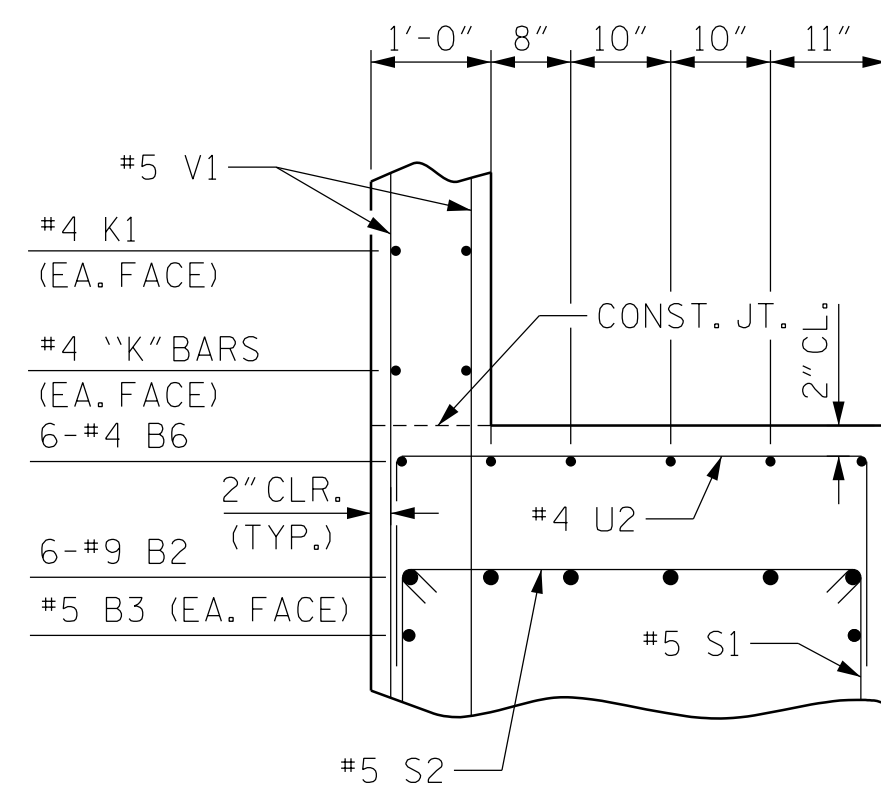
SECTION C-C

FOR ADDITIONAL BARS AND DIMENSIONS, SEE SECTION A-A

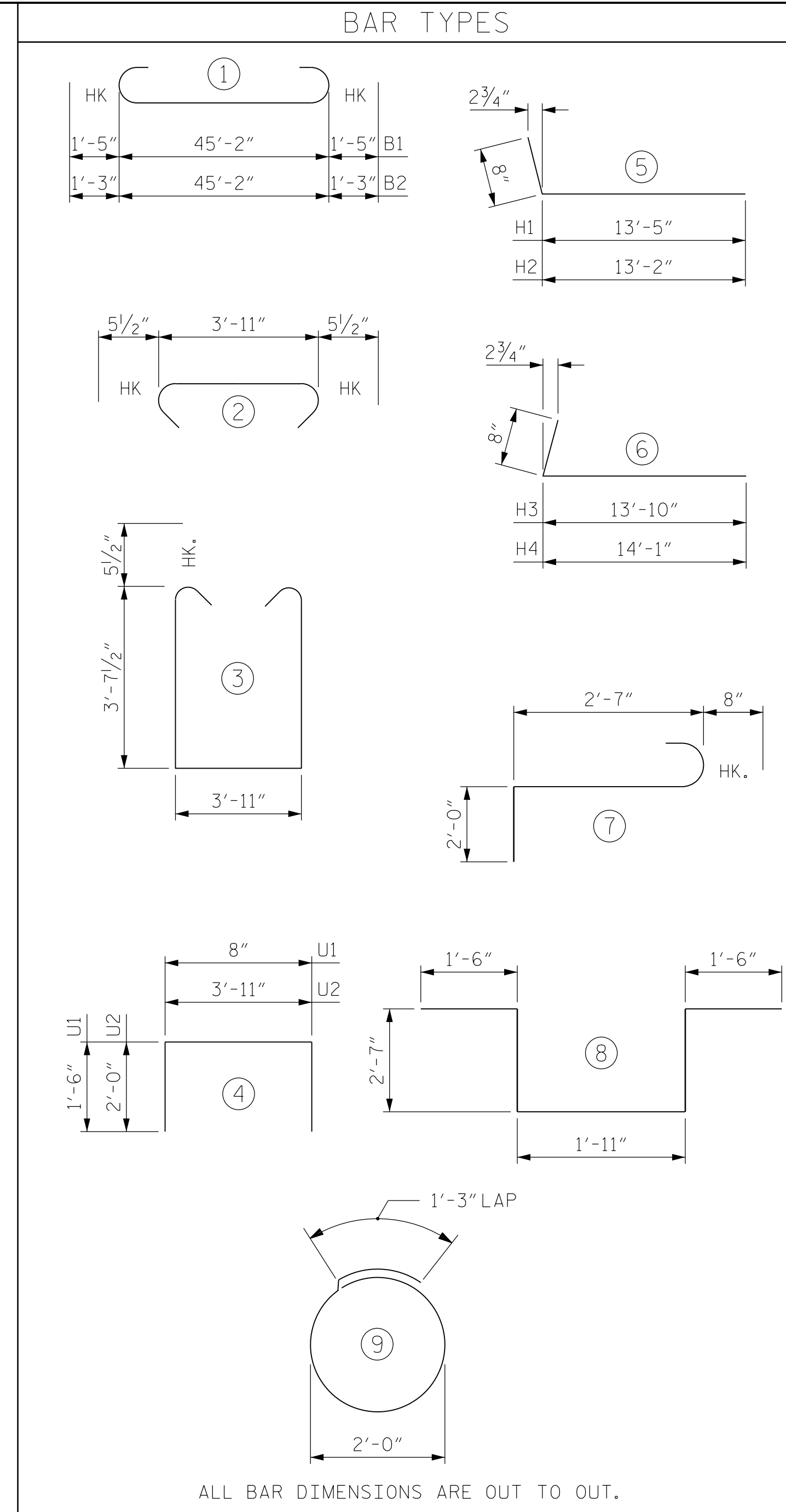


SECTION B-B

FOR ADDITIONAL BARS AND DIMENSIONS, SEE SECTION A-A



SECTION D-D



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	5	#10	1	48'-0"	1033
B2	6	#9	1	47'-8"	972
B3	6	#5	STR	45'-2"	283
B4	16	#4	STR	23'-10"	255
B5	11	#4	STR	3'-11"	29
B6	18	#4	STR	3'-2"	38
H1	13	#4	5	14'-1"	122
H2	13	#4	5	13'-10"	120
H3	14	#4	6	14'-6"	136
H4	14	#4	6	14'-9"	138
K1	24	#4	STR	23'-10"	382
K2	4	#4	STR	6'-9"	18
K3	2	#4	STR	3'-10"	5
K4	8	#4	STR	3'-5"	18
S1	42	#5	3	12'-1"	529
S2	42	#5	2	4'-10"	212
S3	36	#4	9	7'-6"	180
S4	6	#6	7	5'-3"	47
S5	6	#6	8	10'-1"	91
U1	38	#4	4	3'-8"	93
U2	12	#4	4	7'-11"	63
V1	76	#5	STR	9'-7"	760
V2	72	#5	STR	6'-10"	513
V3	74	#5	STR	7'-4"	566

REINFORCING STEEL 6603 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 (CAP & LOWER PART OF WINGS)	37.3 C.Y.
POUR #2 (BACKWALL & UPPER PART OF WINGS)	18.5 C.Y.
TOTAL	55.9 C.Y.

HP 14 X 73 STEEL PILES	NO. : 11
	517.0 LIN. FT.

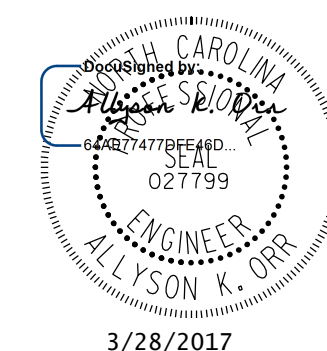
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES EA. 11

PROJECT NO. R-5771
 HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 3 OF 3

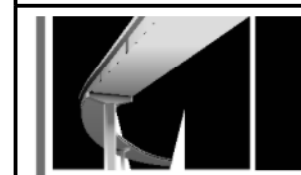
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 DETAILS AND
 BILL OF MATERIAL



3/28/2017

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED



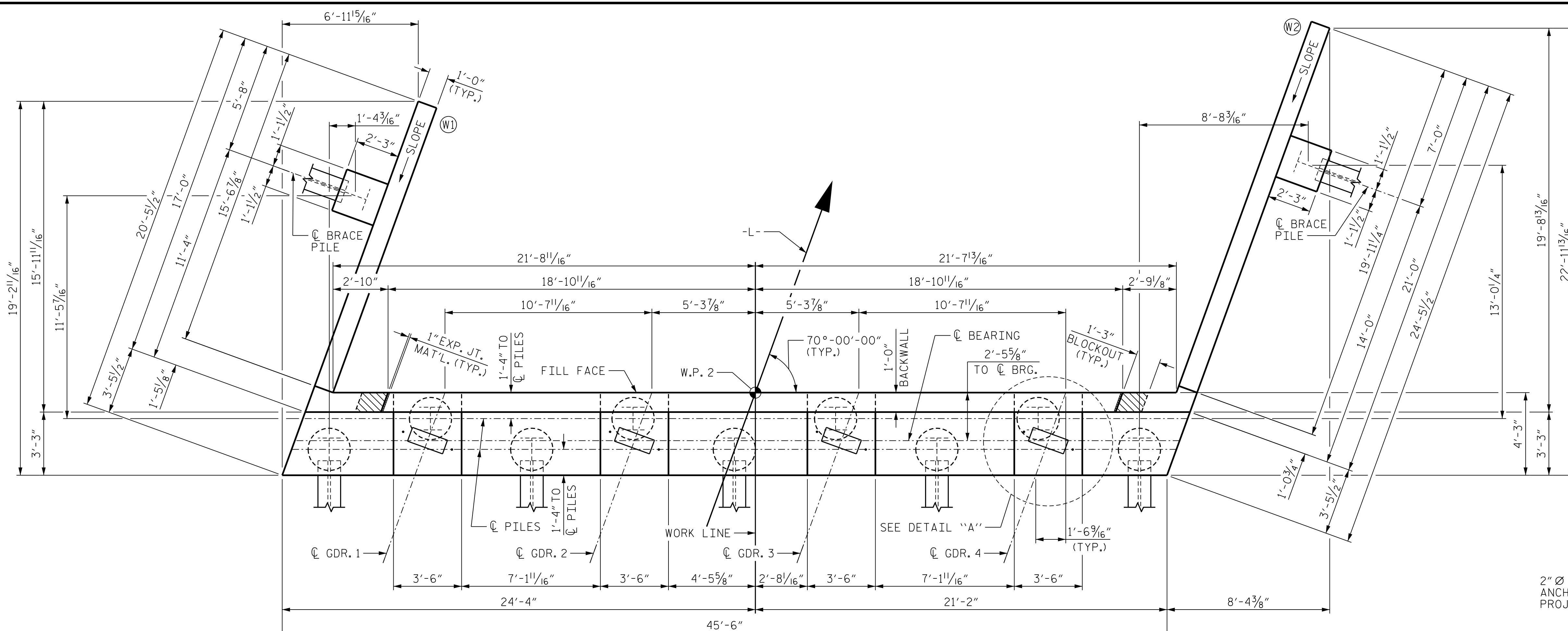
MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

REVISIONS

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

SHEET NO.
 S-22
 TOTAL SHEETS
 29

DRAWN BY : B.E. LANNING DATE : 02/17
 CHECKED BY : A.K. ORR DATE : 02/17
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 03/17



NOTES

STIRRUPS AND #4 U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

#5 V1 BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

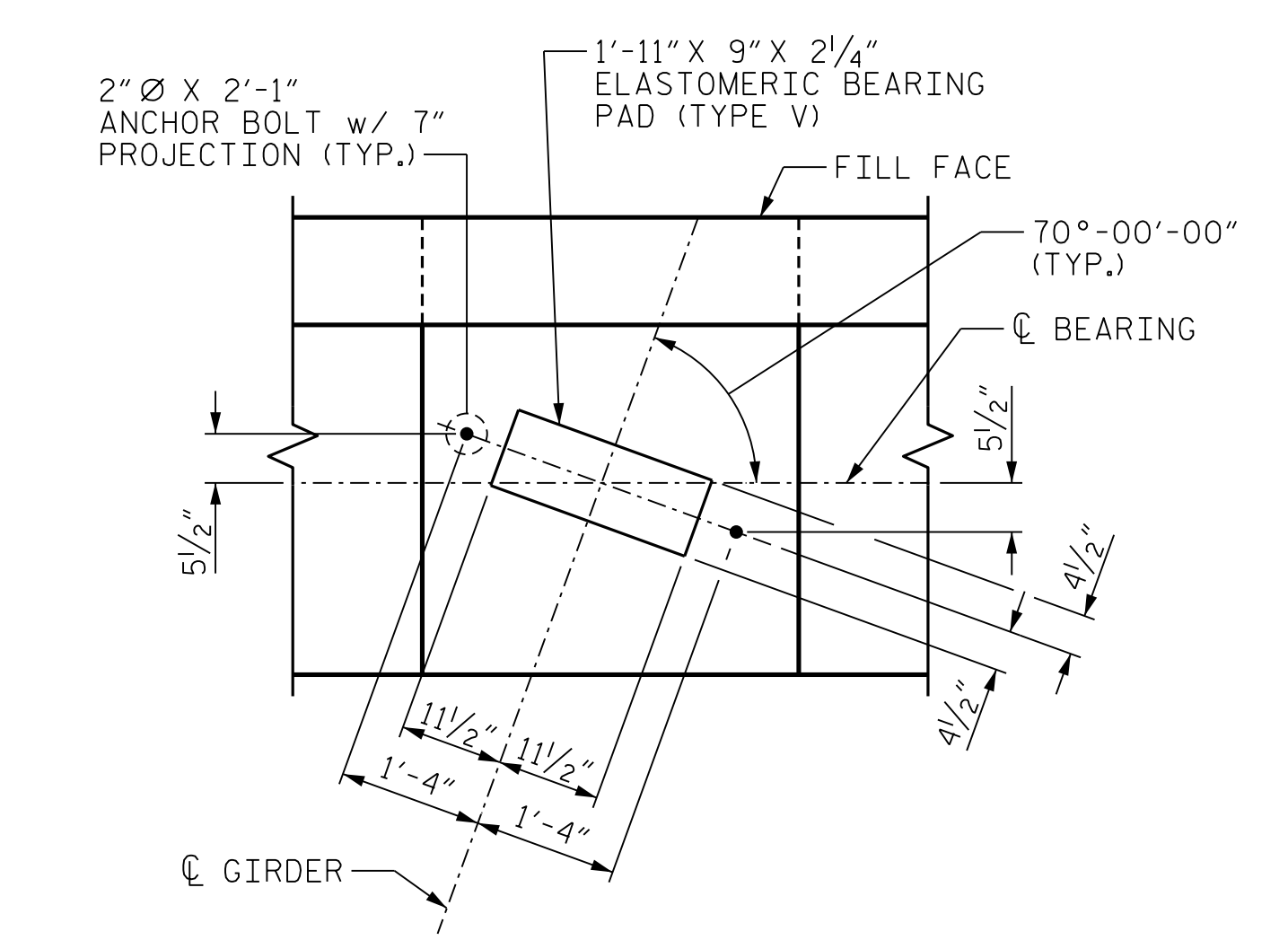
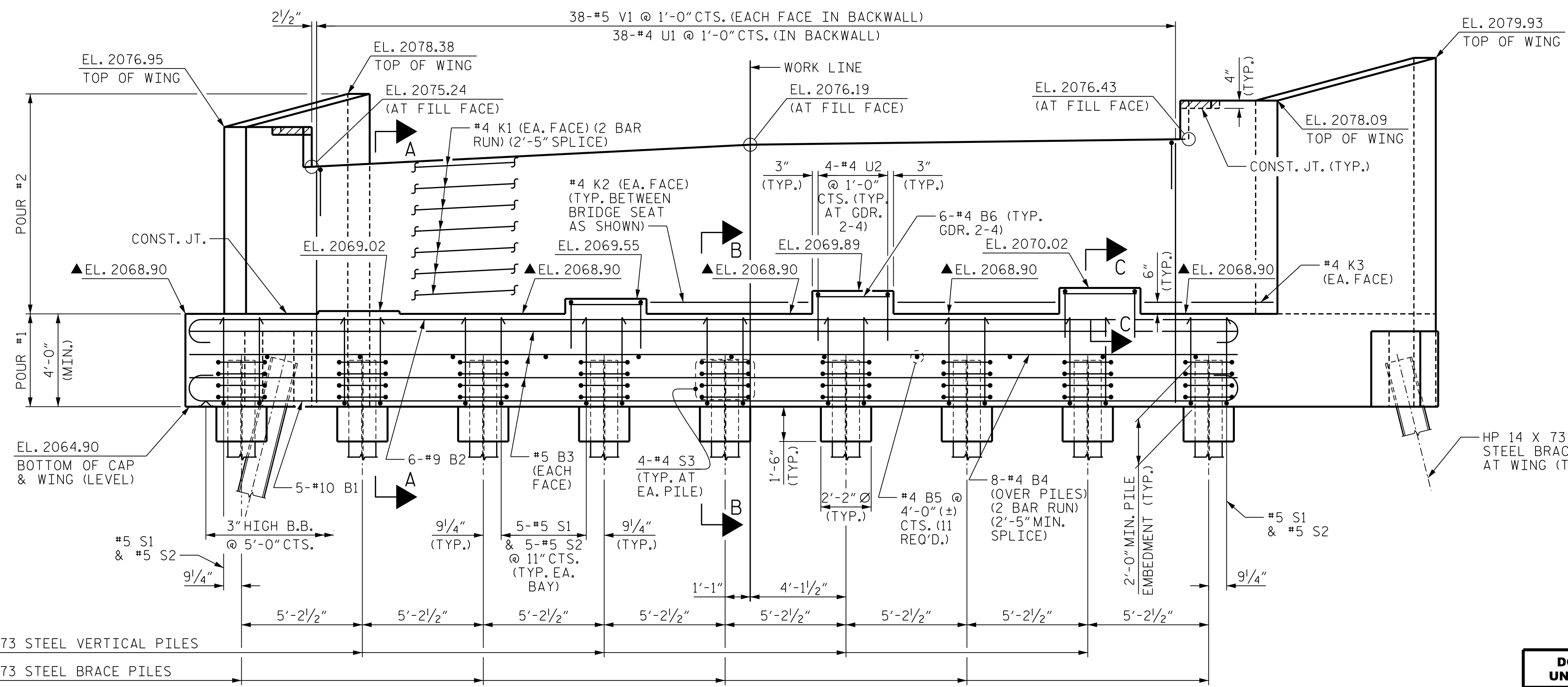
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A ON SHEET 4 OF 4.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR SECTION A-A, SECTION B-B, SECTION C-C, PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 4 OF 4.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

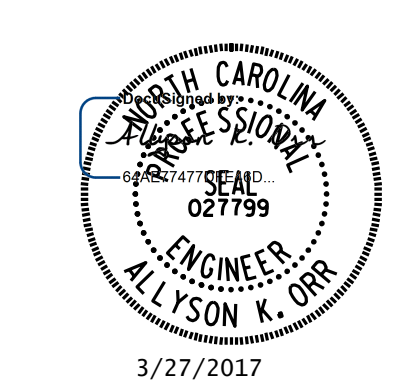


PROJECT NO. R-5771
 HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2
 PLAN AND ELEVATION



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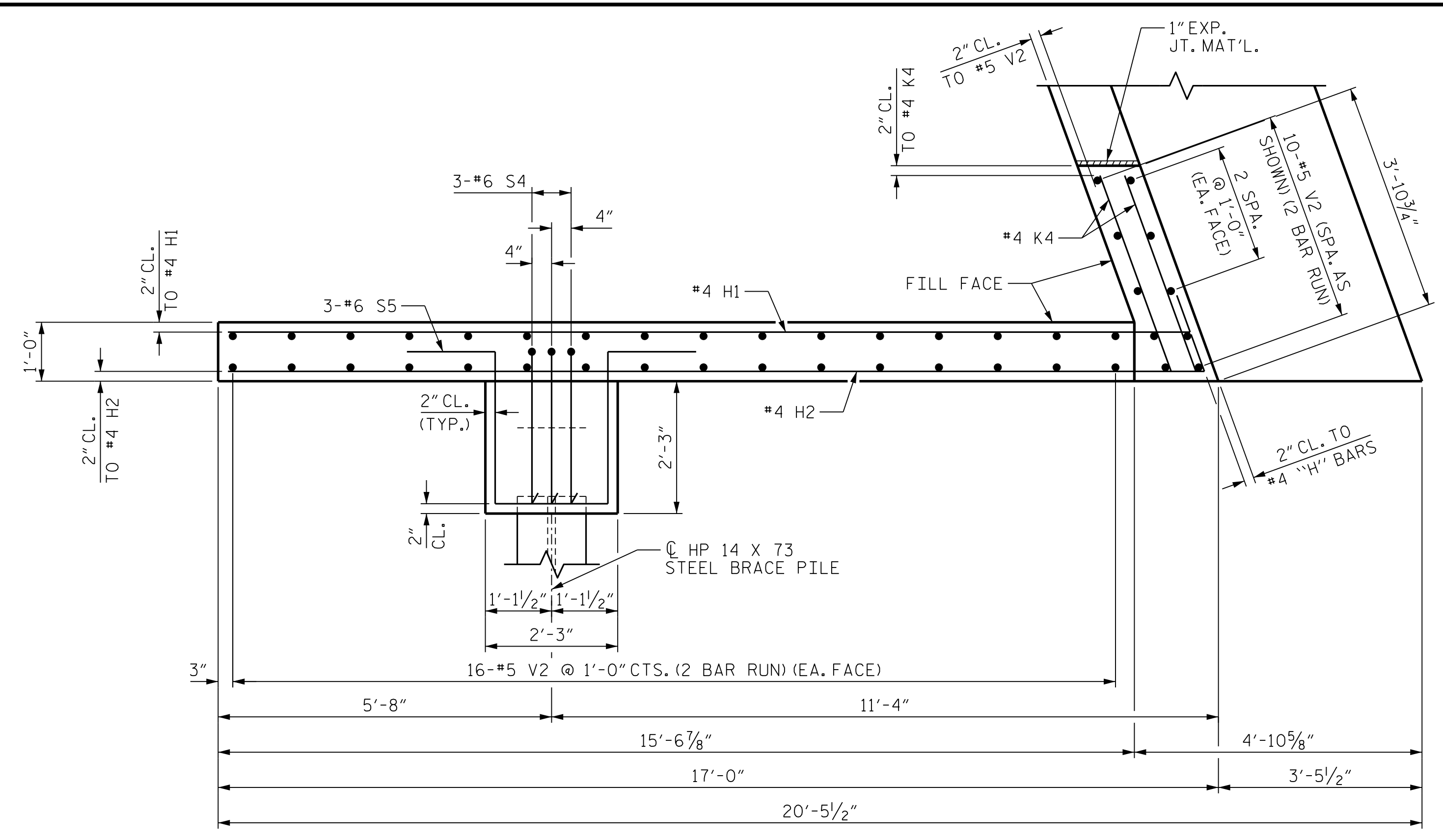
MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

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

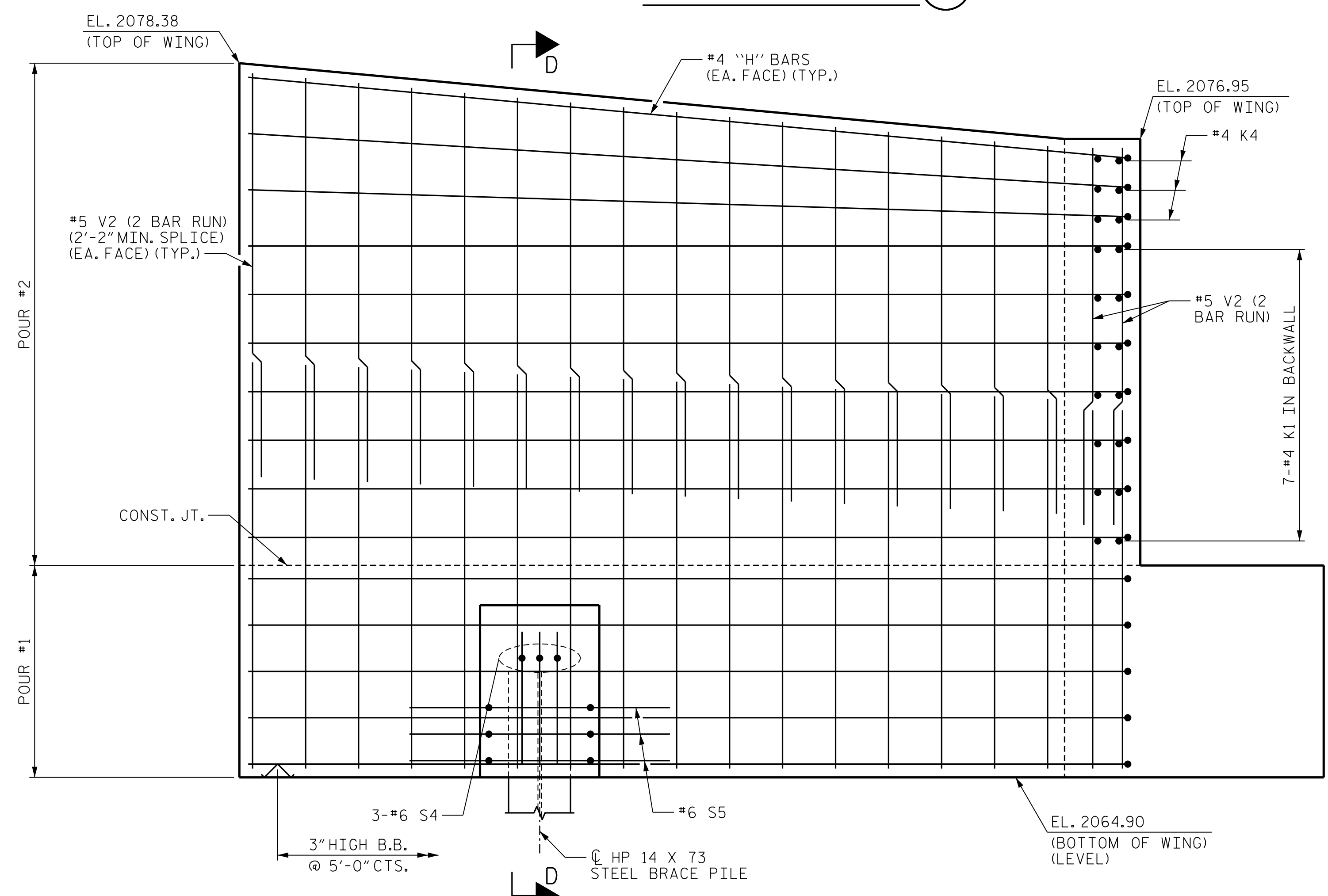
SHEET NO. S-23
 TOTAL SHEETS 29

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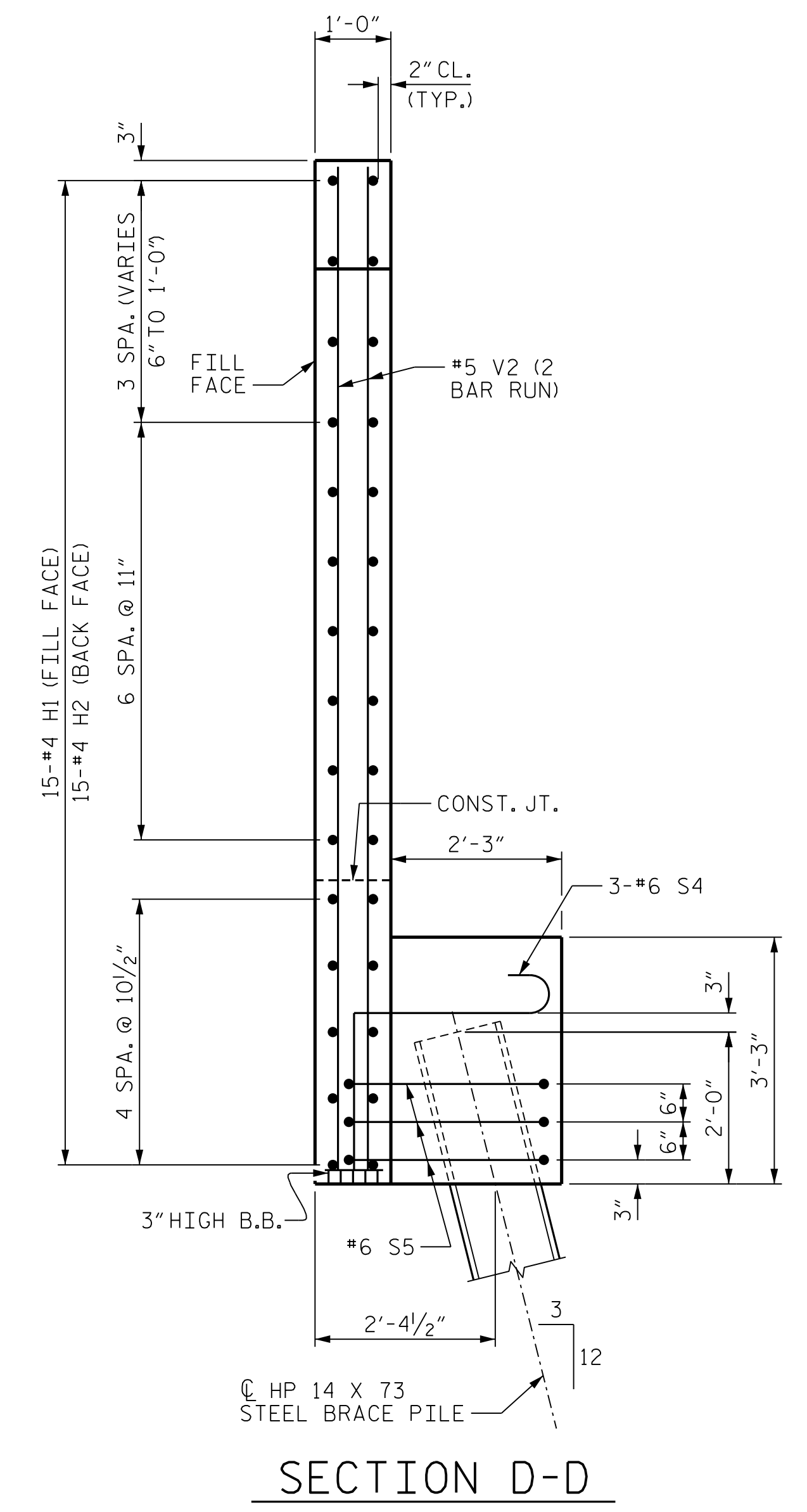
DRAWN BY : B.E. LANNING DATE : 02/17
 CHECKED BY : A.K. ORR DATE : 03/17
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 03/17



PLAN OF WING (W1)



ELEVATION OF WING (W1)



SECTION D-D

PROJECT NO. R-5771
 HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 2 OF 4
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2
 WING W1 DETAILS



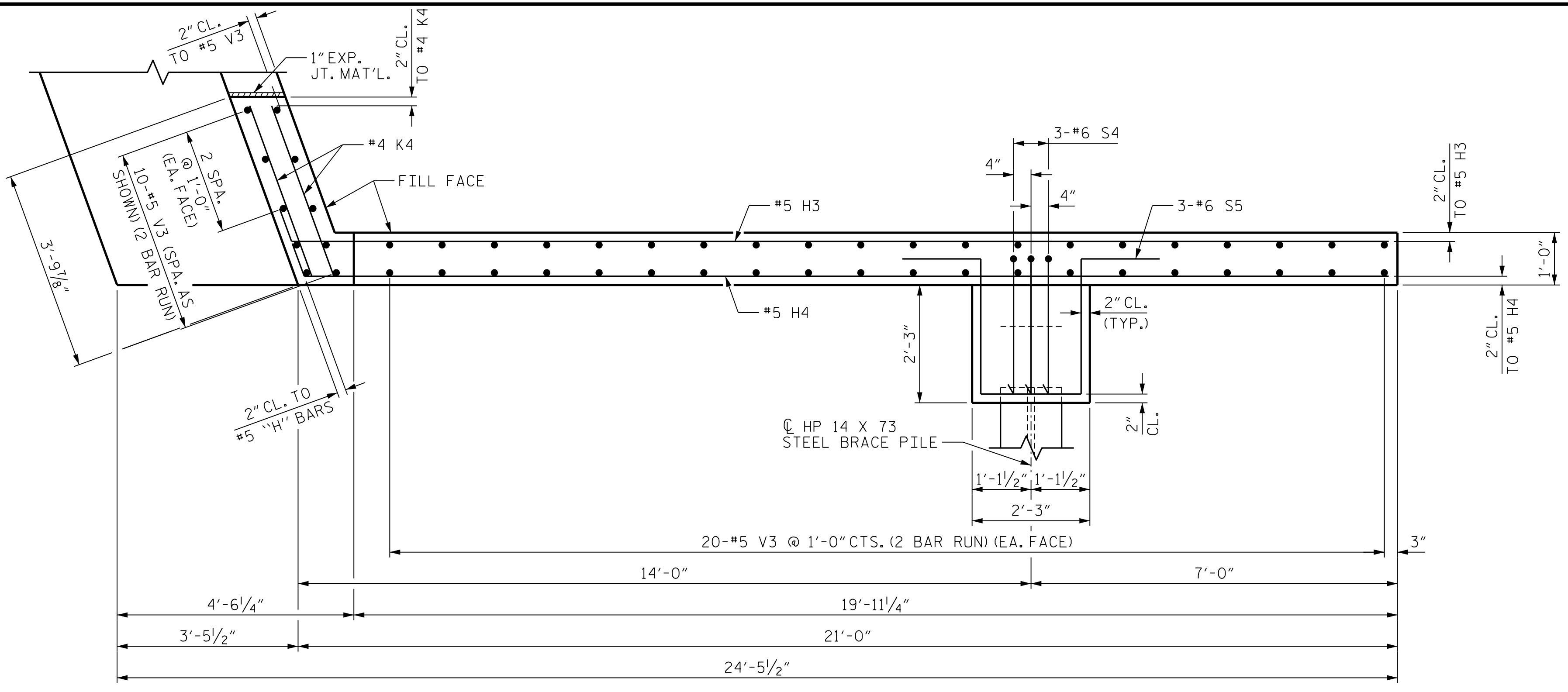
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING		REVISIONS		SHEET NO.	
1011 SCHAUB DRIVE, SUITE 100		NO. BY: DATE:		S-24	
RALEIGH, NC 27606		NO. BY: DATE:		TOTAL SHEETS	
(919) 851-6606		1 3		29	
FIRM PE NUMBER: P-0671		2 4			

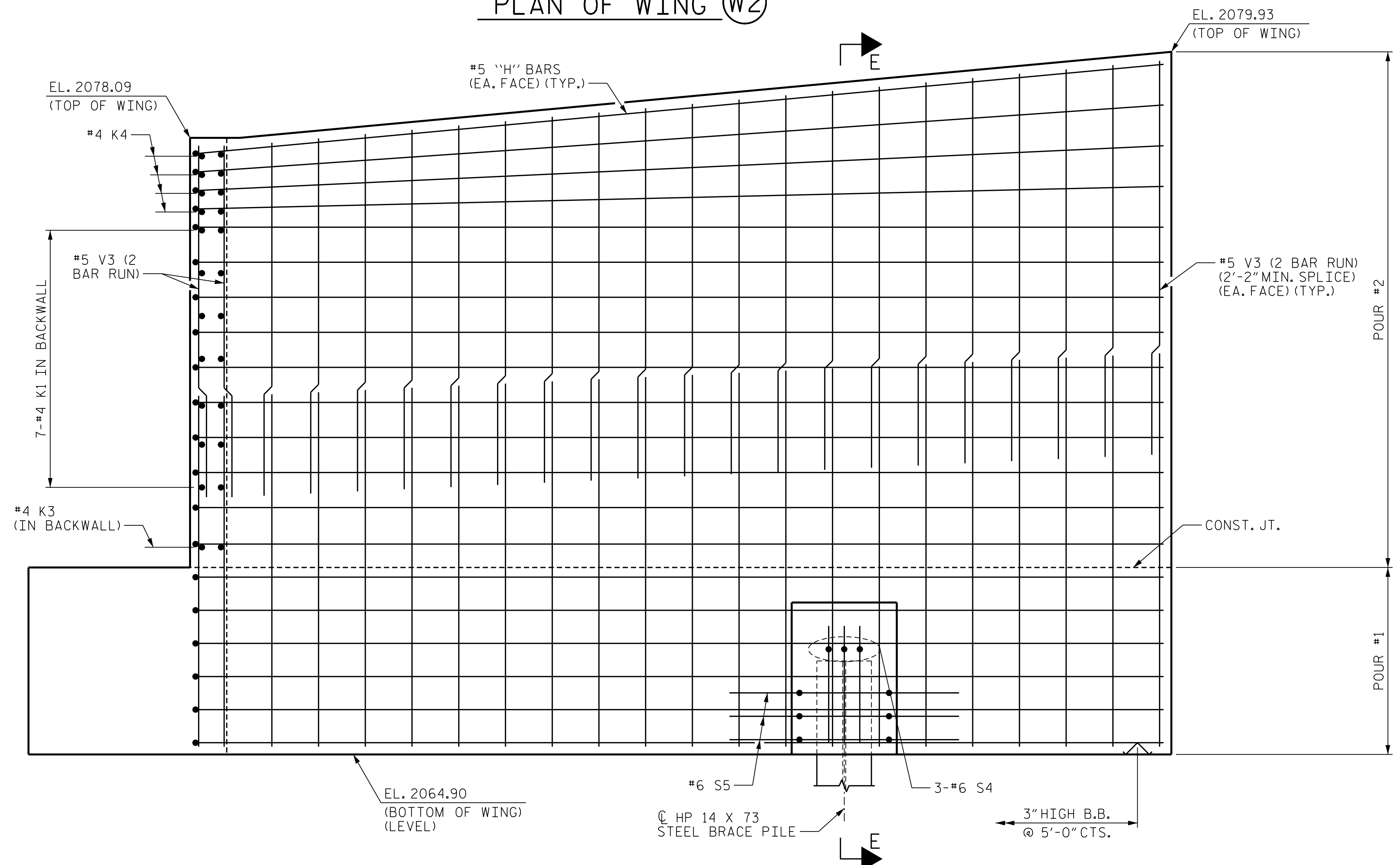
DRAWN BY : B.E. LANNING	DATE : 02/17
CHECKED BY : A.K. ORR	DATE : 03/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 03/17

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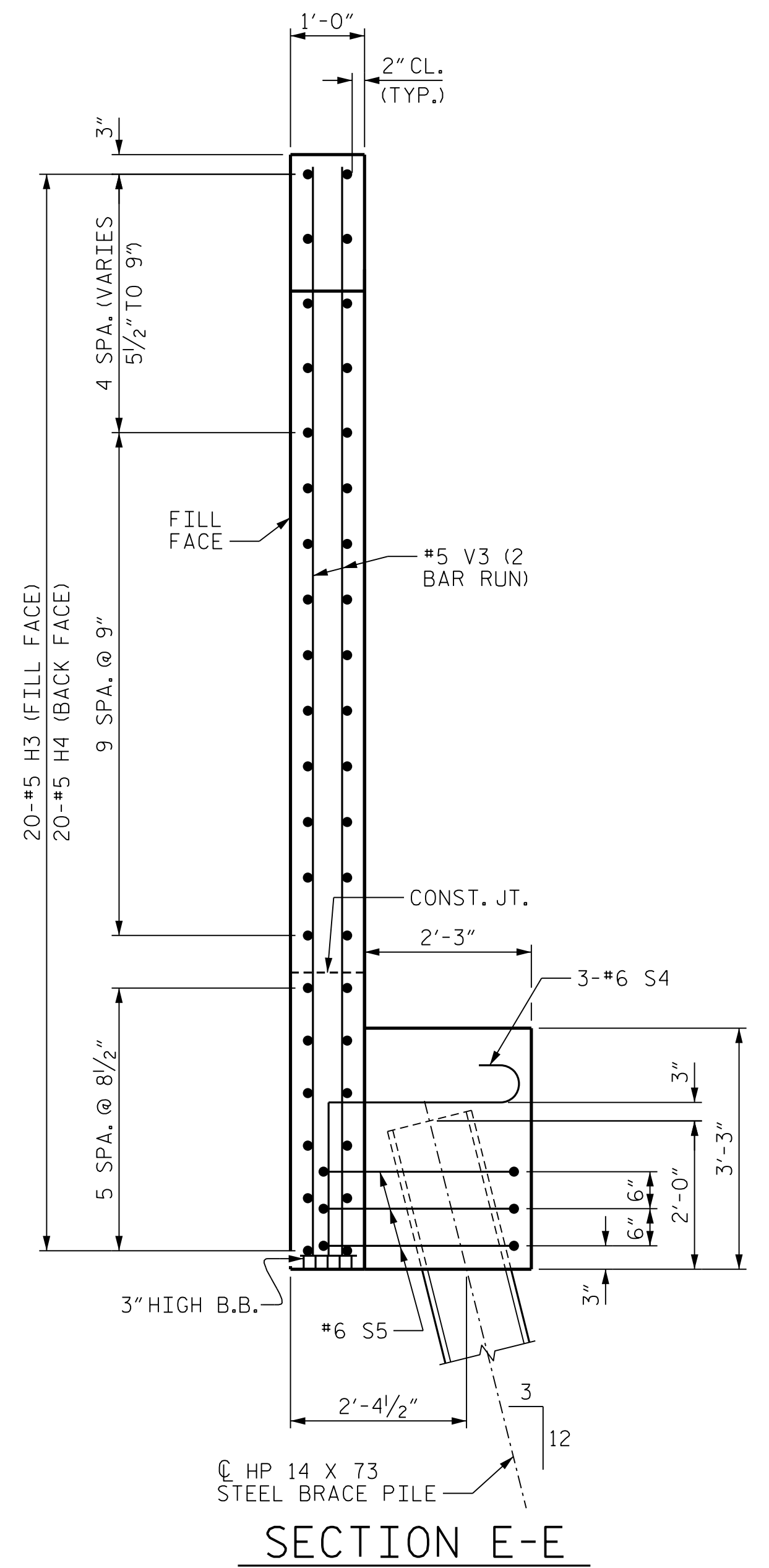
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Filename: P:\NC Bridges\W6002.MA.R-5771.Br.Repl.\4\N-5771\Structures\401.049.R5771.SMJ.E2C.dgn



PLAN OF WING W2



ELEVATION OF WING W2



SECTION E-E

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-
 SHEET 3 OF 4

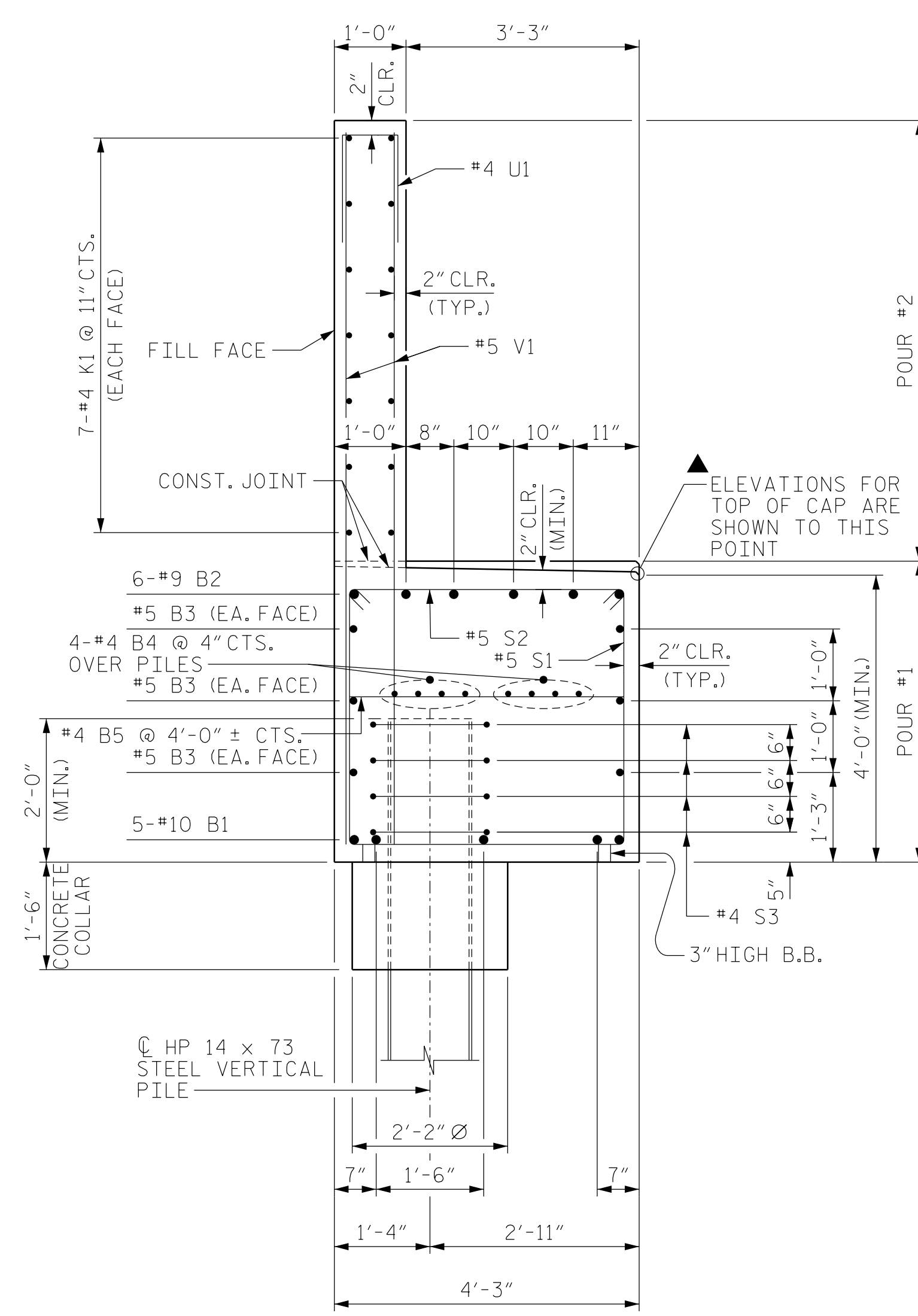


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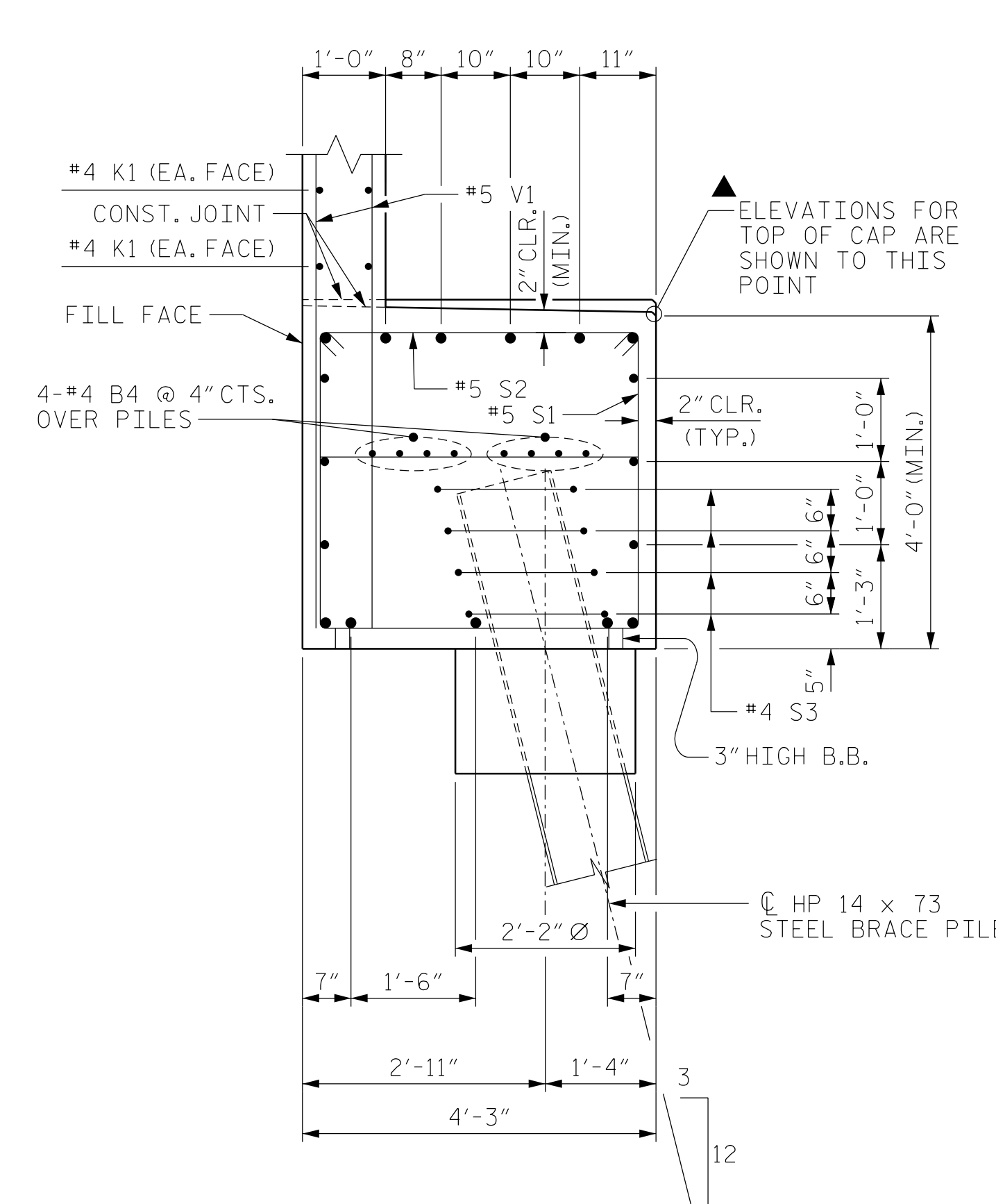
MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2 WING W2 DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-25					TOTAL SHEETS 29

DRAWN BY : B.E. LANNING	DATE : 02/17
CHECKED BY : A.K. ORR	DATE : 03/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 03/17

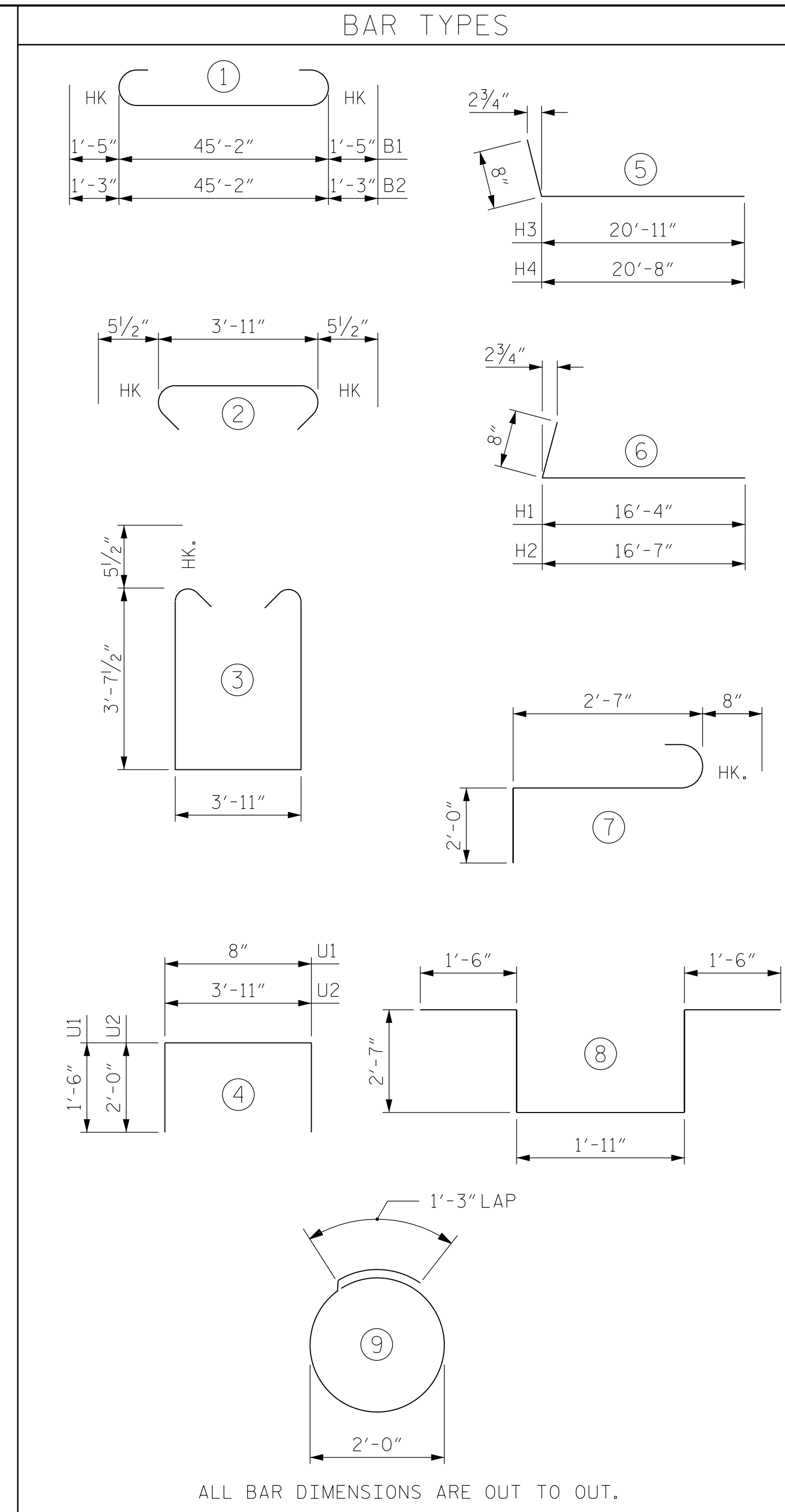


SECTION A-A



SECTION B-B

FOR ADDITIONAL BARS AND DIMENSIONS, SEE SECTION A-A



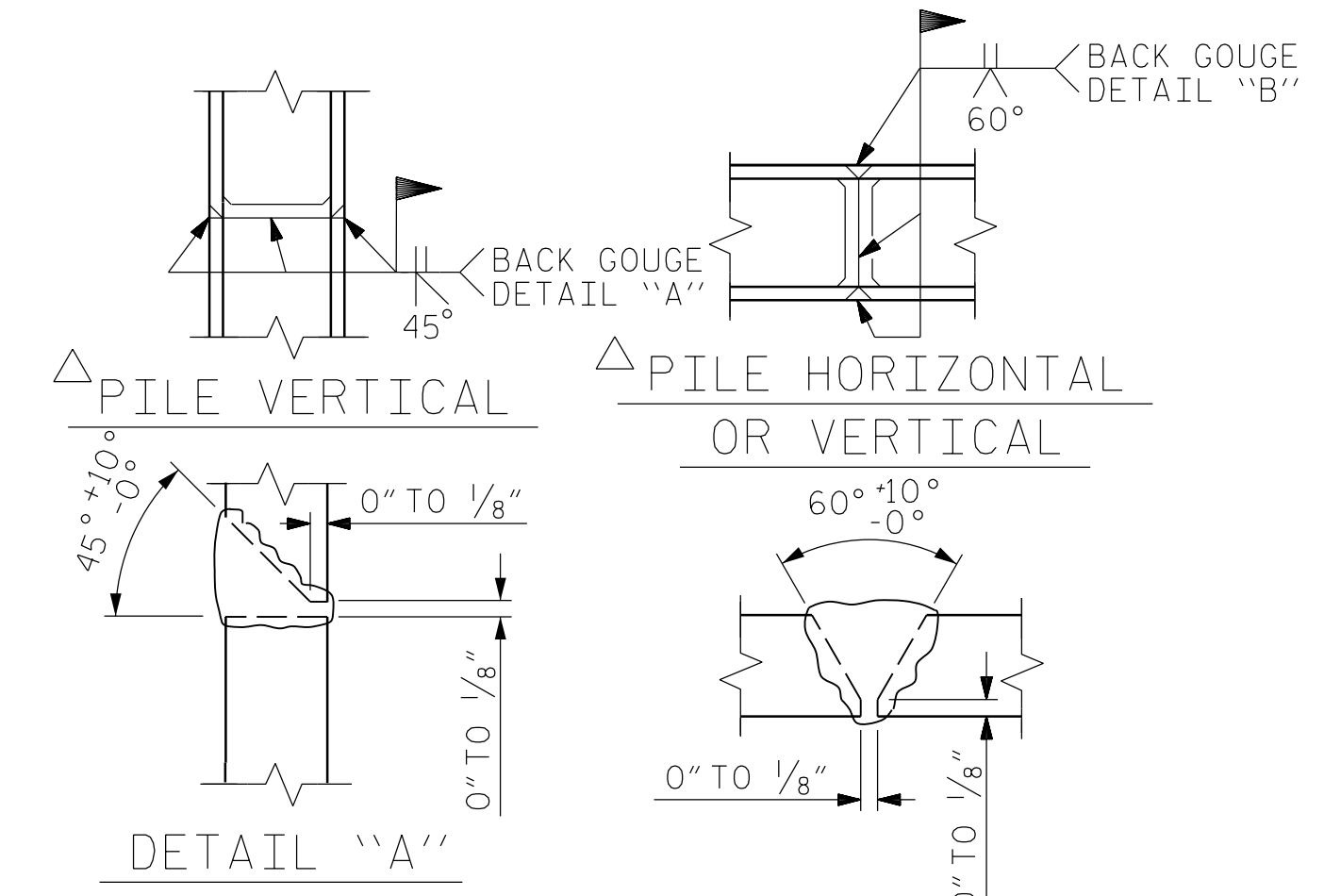
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	5	#10	1	48'-0"	1033
B2	6	#9	1	47'-8"	972
B3	6	#5	STR	45'-2"	283
B4	16	#4	STR	23'-10"	255
B5	11	#4	STR	3'-11"	29
B6	18	#4	STR	3'-2"	38
H1	15	#4	6	17'-0"	170
H2	15	#4	6	17'-3"	173
H3	20	#5	5	21'-7"	450
H4	20	#5	5	21'-4"	445
K1	28	#4	STR	23'-10"	446
K2	4	#4	STR	6'-9"	18
K3	2	#4	STR	5'-6"	7
K4	14	#4	STR	3'-5"	32
S1	42	#5	3	12'-1"	529
S2	42	#5	2	4'-10"	212
S3	36	#4	9	7'-6"	180
S4	6	#6	7	5'-3"	47
S5	6	#6	8	10'-1"	91
U1	38	#4	4	3'-8"	93
U2	12	#4	4	7'-11"	63
V1	76	#5	STR	10'-0"	793
V2	84	#5	STR	7'-8"	672
V3	100	#5	STR	8'-6"	887
REINFORCING STEEL					7918 LBS.

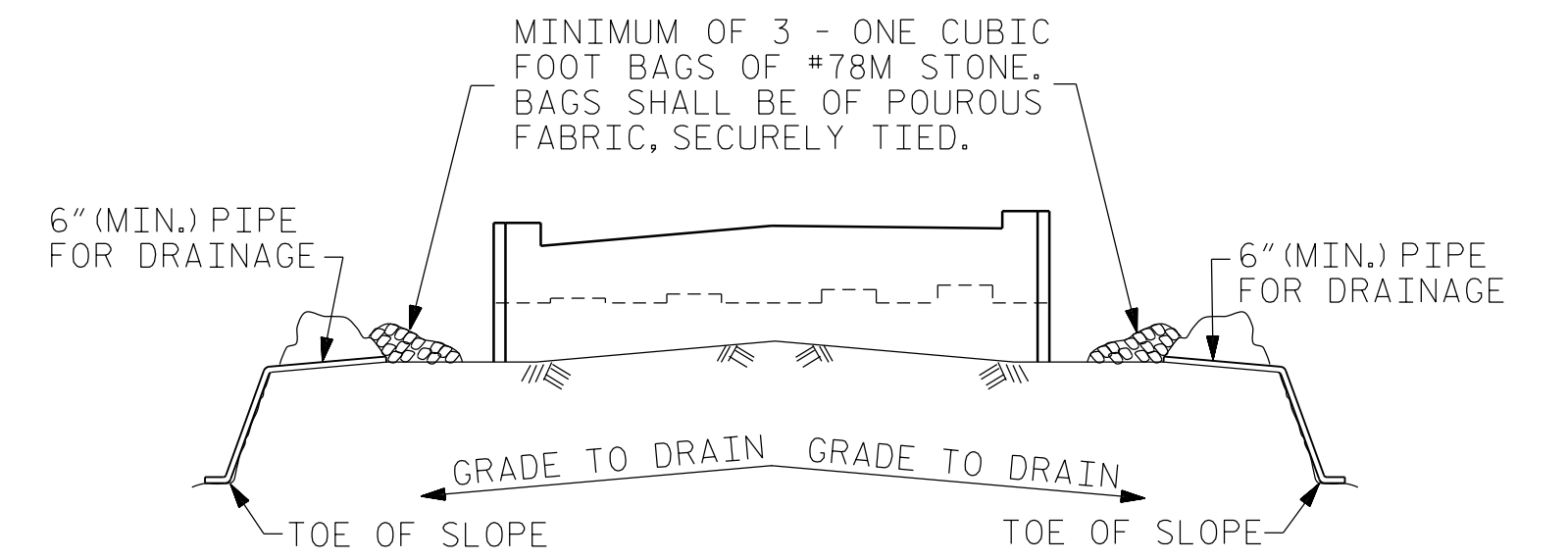
CLASS A CONCRETE BREAKDOWN	
POUR #1 (CAP & LOWER PART OF WINGS)	39.0 C.Y.
POUR #2 (BACKWALL & UPPER PART OF WINGS)	24.5 C.Y.
TOTAL	63.5 C.Y.

HP 14 X 73 STEEL PILES	NO. : 11
	517.0 LIN. FT.

PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	
	EA. 11



PILE SPLICE DETAILS

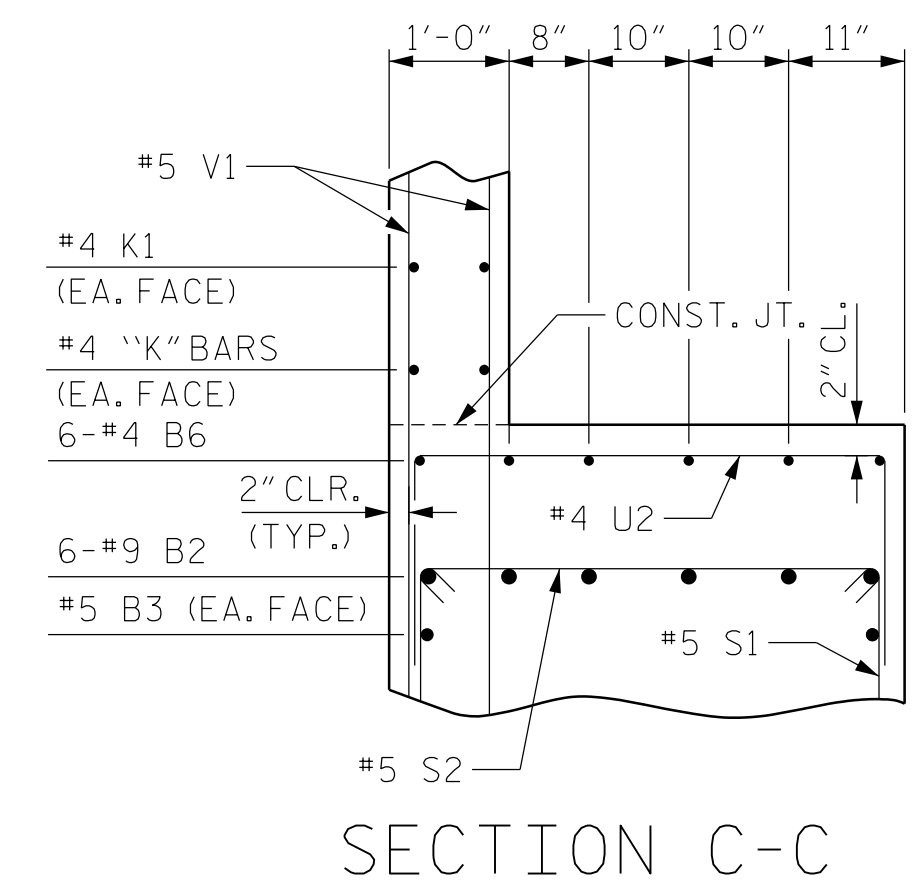


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

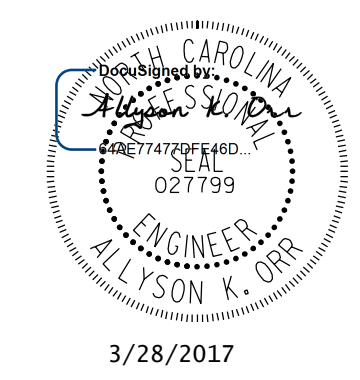
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



SECTION C-C



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-
 SHEET 4 OF 4

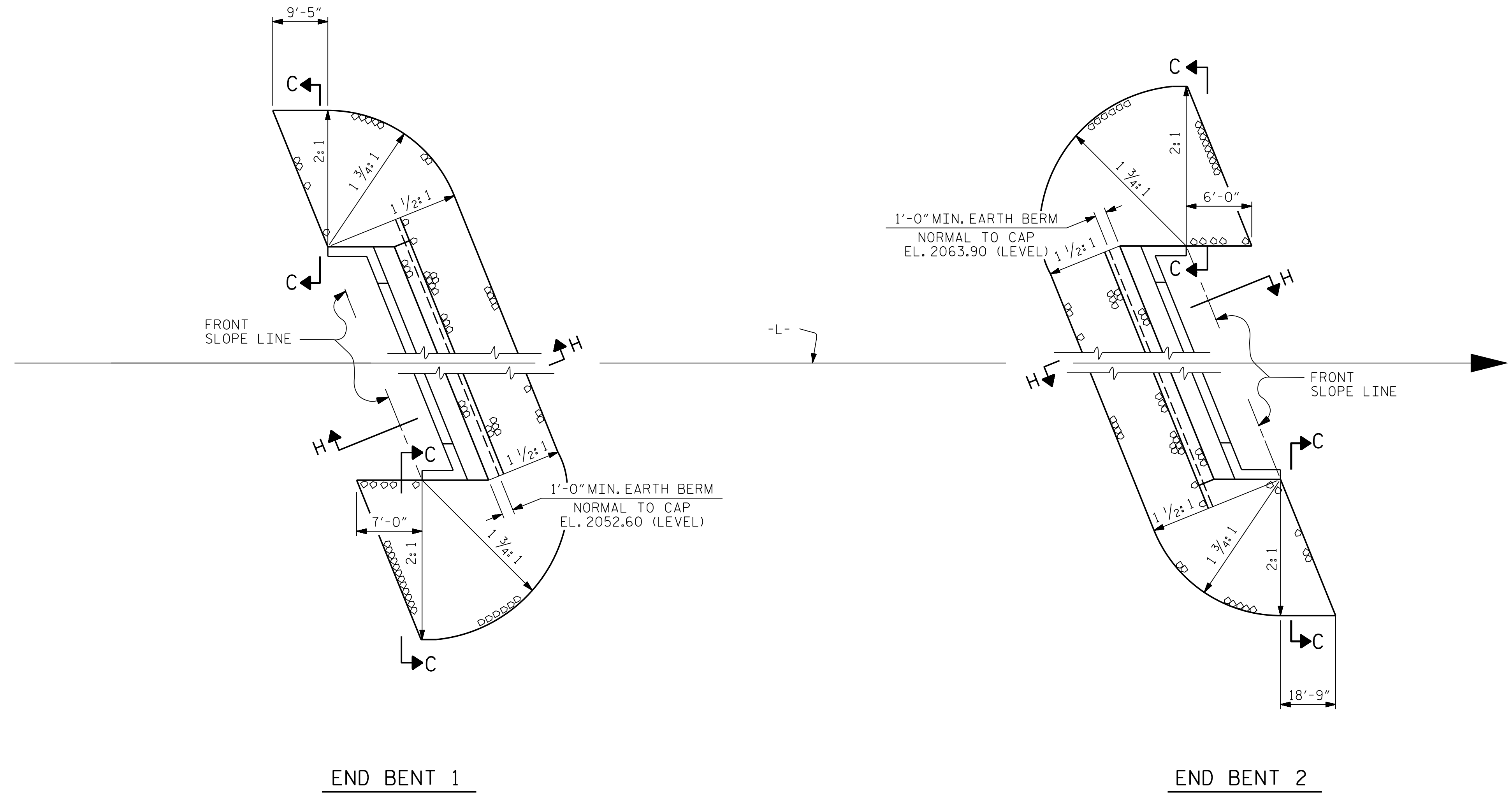
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2 DETAILS AND BILL OF MATERIAL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	
S-26	TOTAL SHEETS 29

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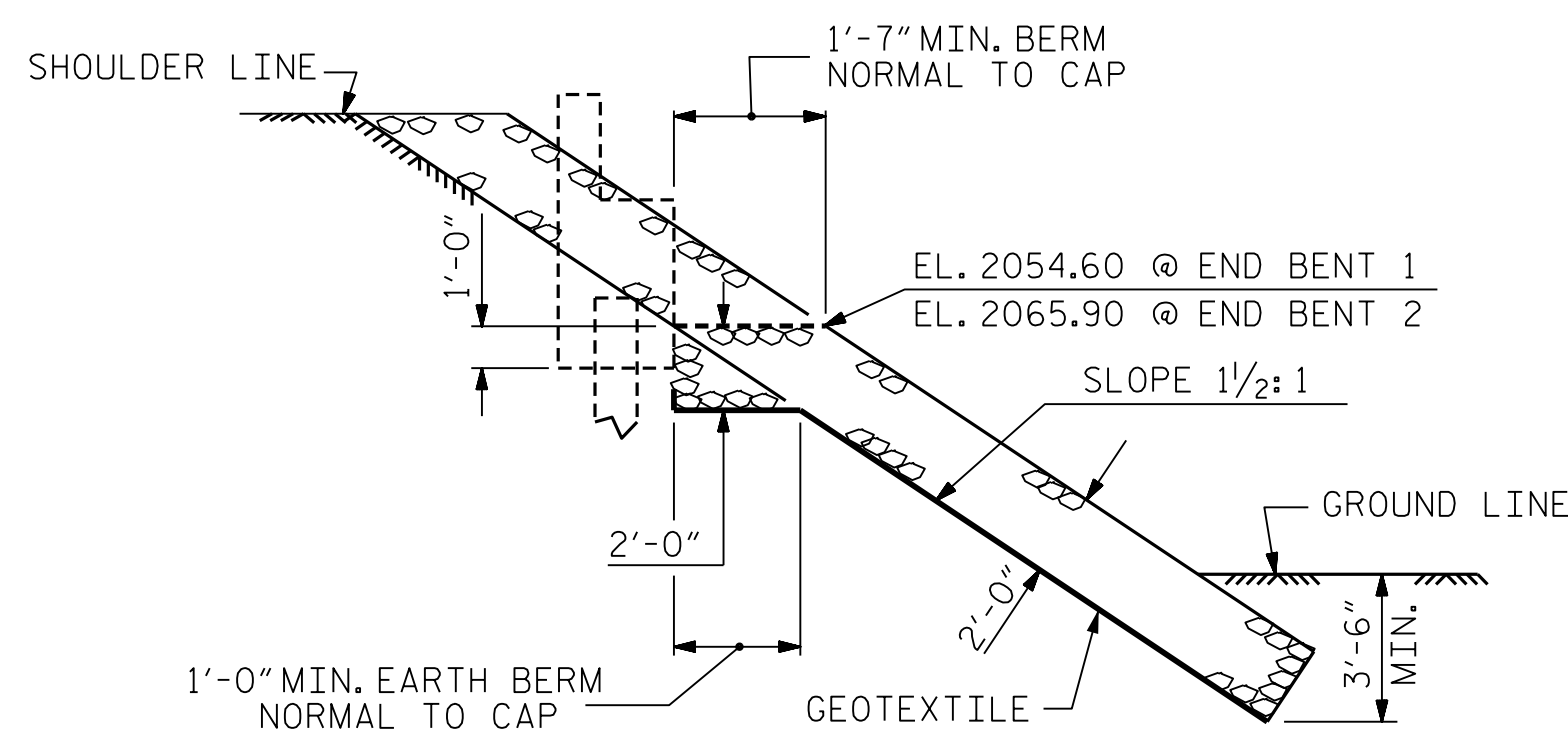
DRAWN BY : B.E. LANNING	DATE : 02/17
CHECKED BY : A.K. ORR	DATE : 03/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 03/17

NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

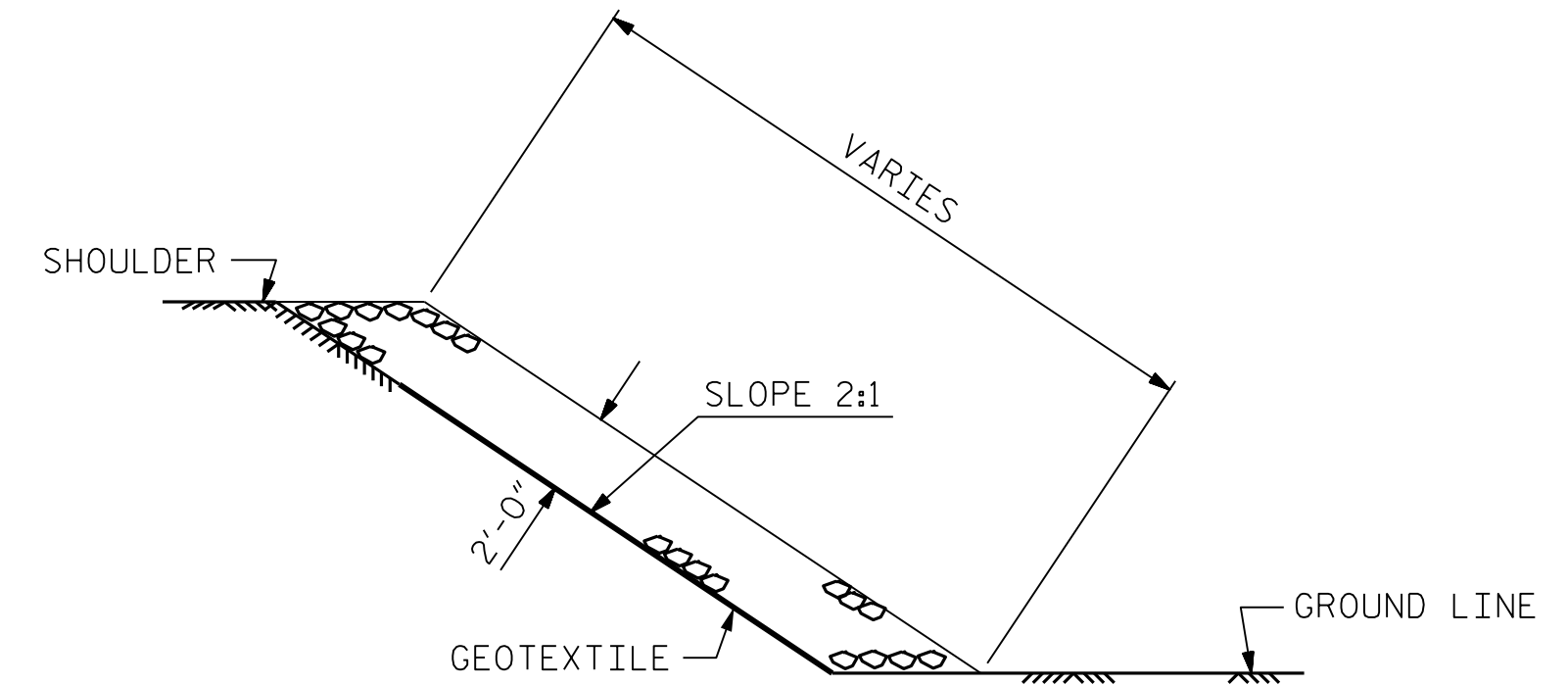


PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 20+77.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	248	275
END BENT 2	630	700



SECTION H-H



SECTION C-C

PROJECT NO. R-5771
HENDERSON COUNTY
STATION: 20+77.50 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

== RIP RAP DETAILS ==

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

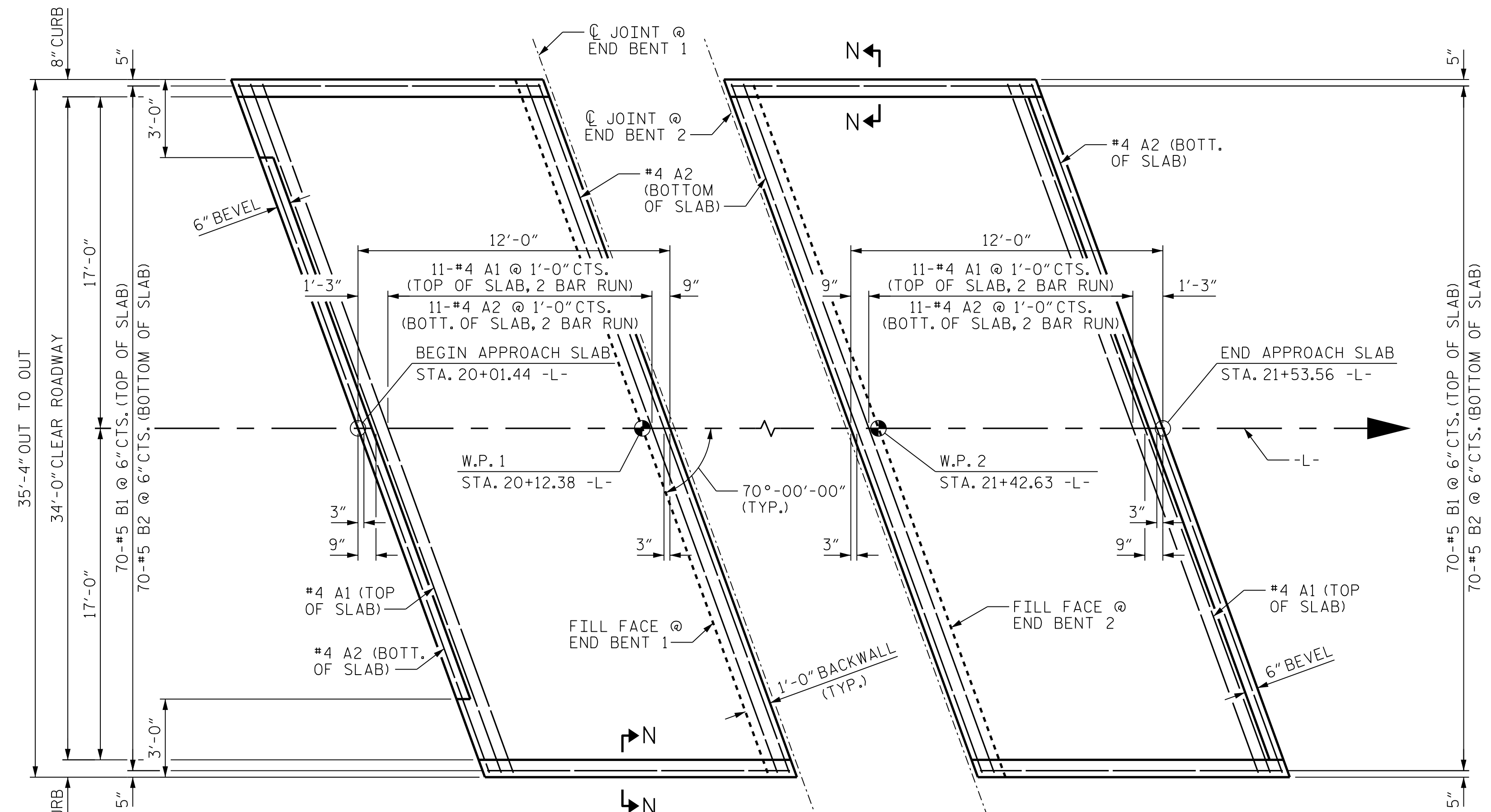
MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER: P-0671

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

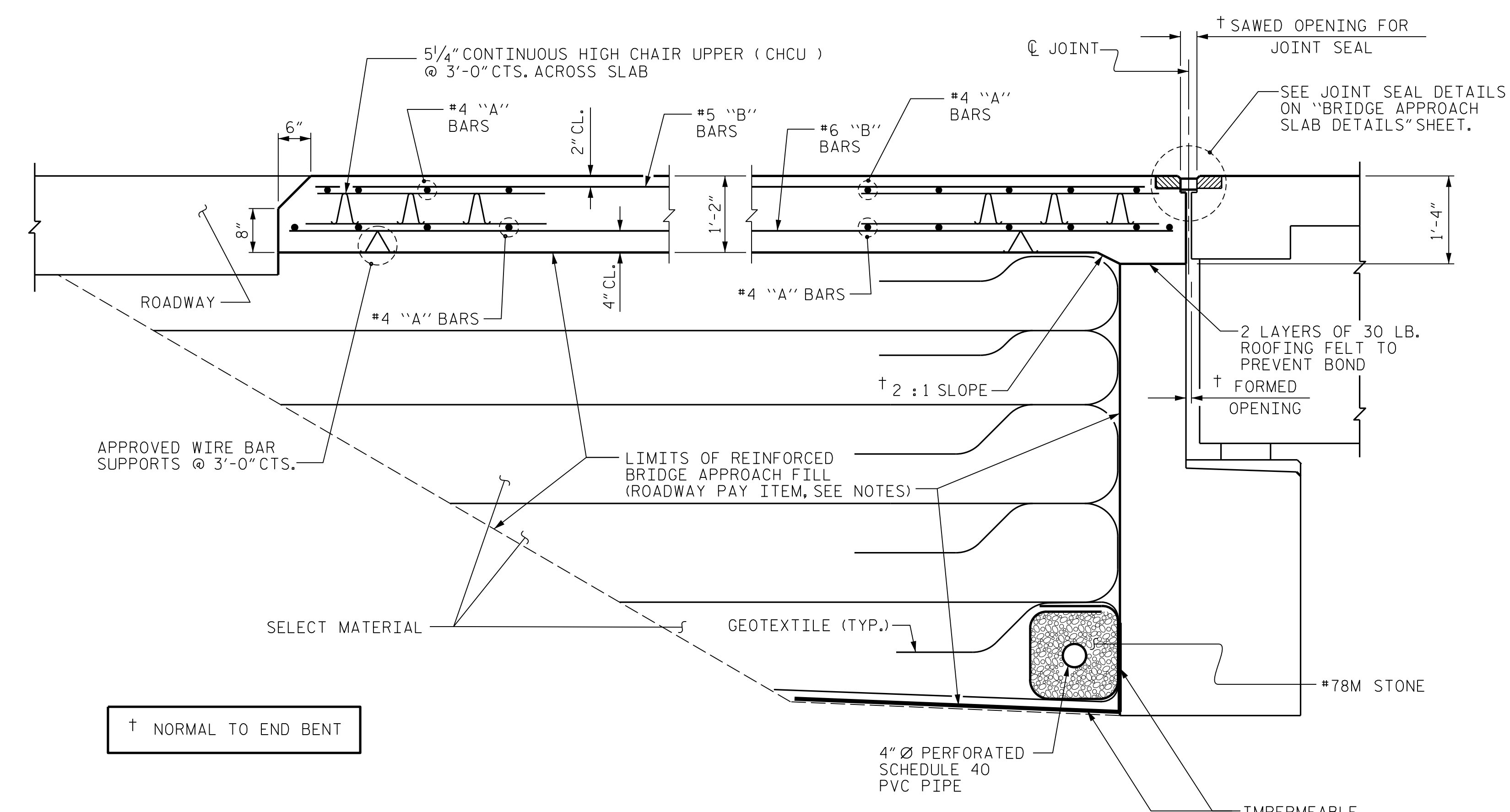
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TOTAL SHEETS
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DRAWN BY : B.E. ATKINSON DATE : 03/17
 CHECKED BY : A.K. ORR DATE : 03/17
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 03/17



PLAN AT END BENT 1 PLAN AT END BENT 2
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE JOINT SHALL BE SAWS PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

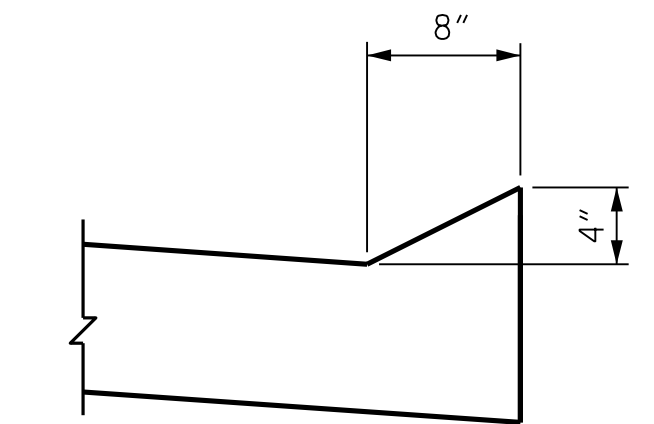
WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

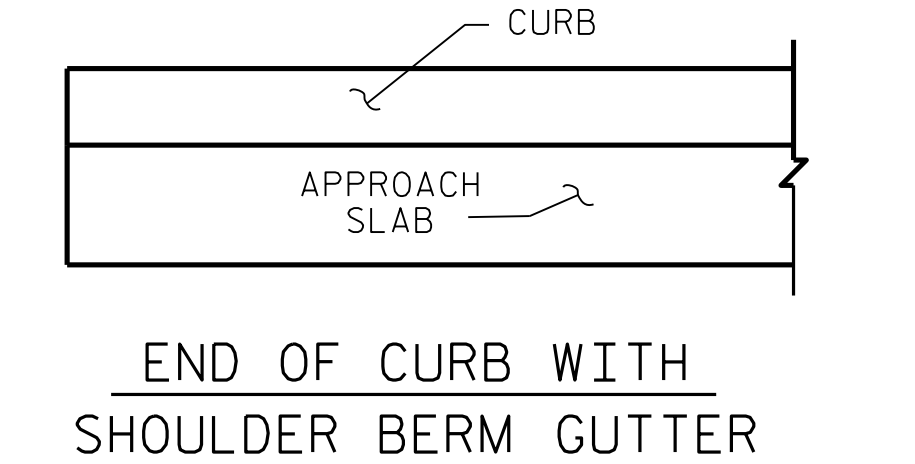
FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	24	#4	STR	19'-8"	315
A2	26	#4	STR	19'-6"	339
*B1	70	#5	STR	10'-6"	767
B2	70	#6	STR	11'-7"	1218
REINFORCING STEEL					LBS. 1557
*EPOXY COATED REINFORCING STEEL					LBS. 1082
CLASS AA CONCRETE					C. Y. 18.5
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	24	#4	STR	19'-8"	315
A2	26	#4	STR	19'-6"	339
*B1	70	#5	STR	10'-6"	767
B2	70	#6	STR	11'-7"	1218
REINFORCING STEEL					LBS. 1557
*EPOXY COATED REINFORCING STEEL					LBS. 1082
CLASS AA CONCRETE					C. Y. 18.4

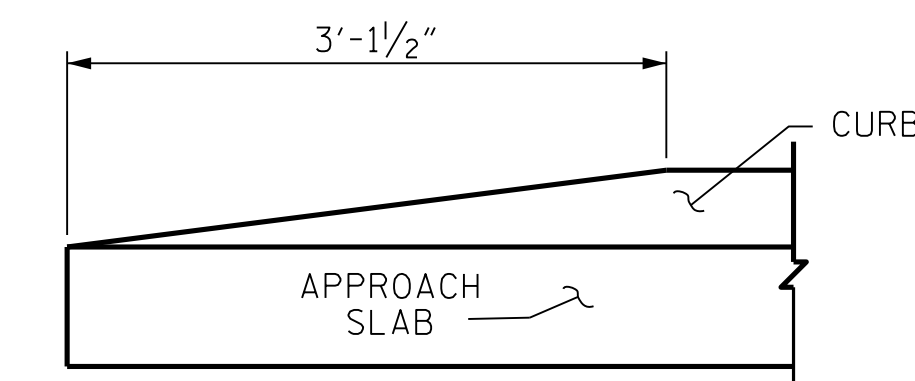


SECTION N-N

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



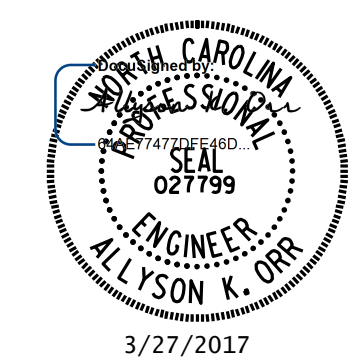
END OF CURB WITH SHOULDER BERM GUTTER



END OF CURB WITHOUT SHOULDER BERM GUTTER CURB DETAILS

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 1 OF 2



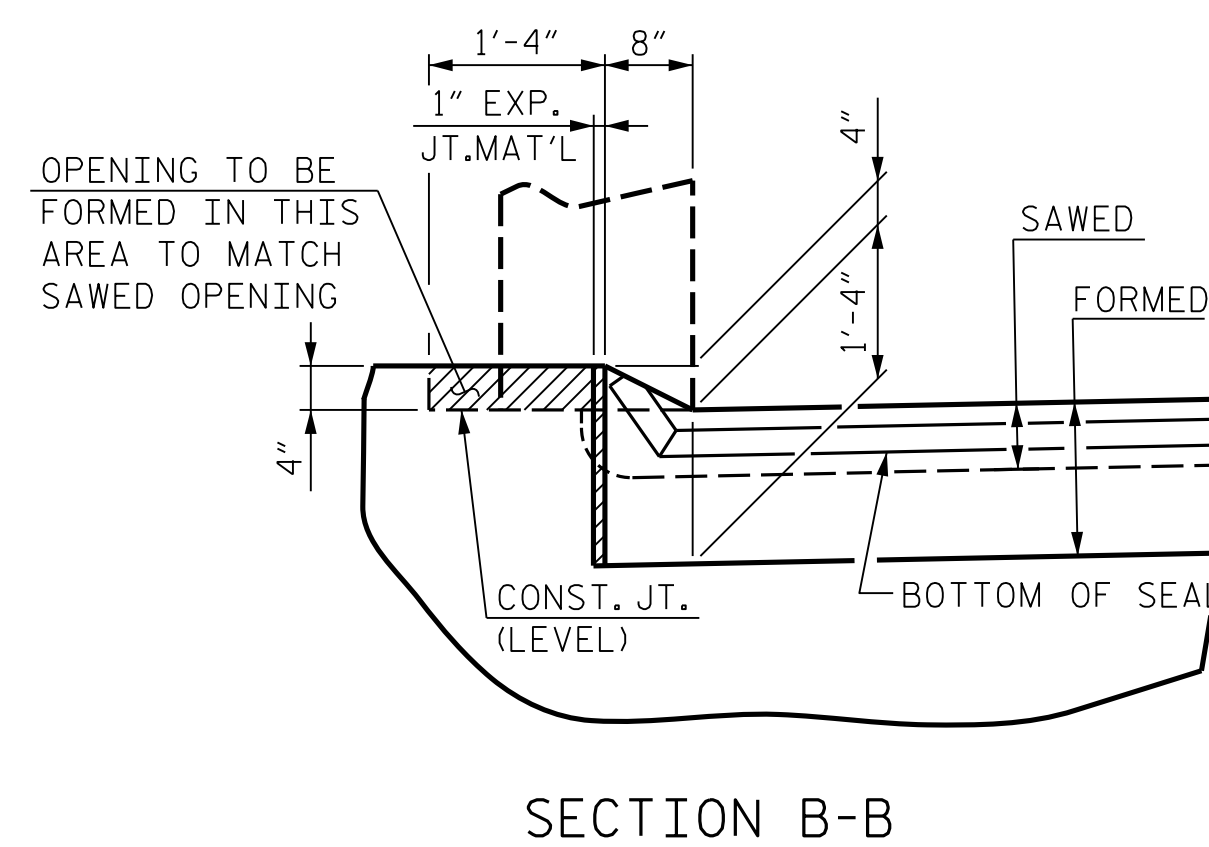
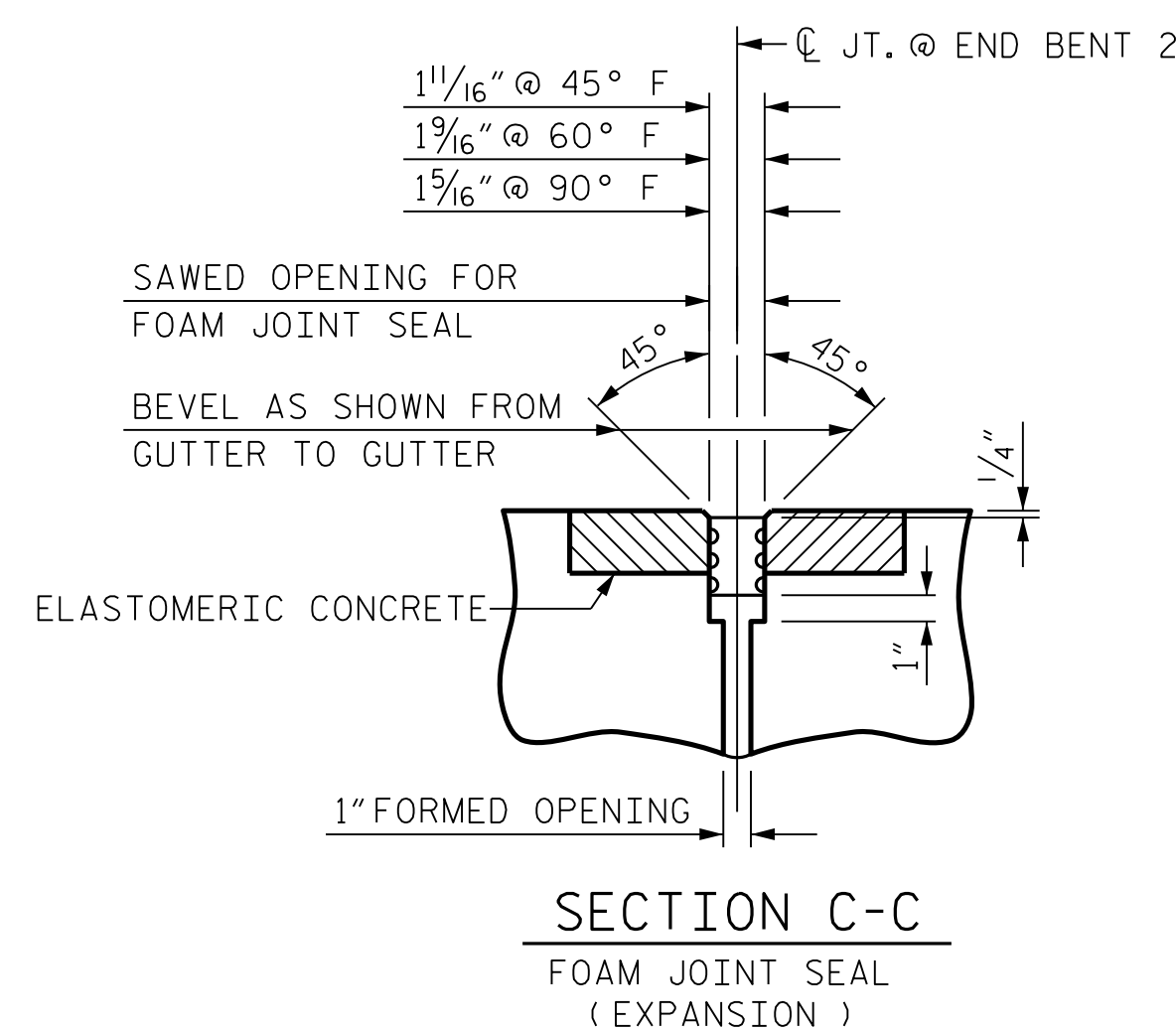
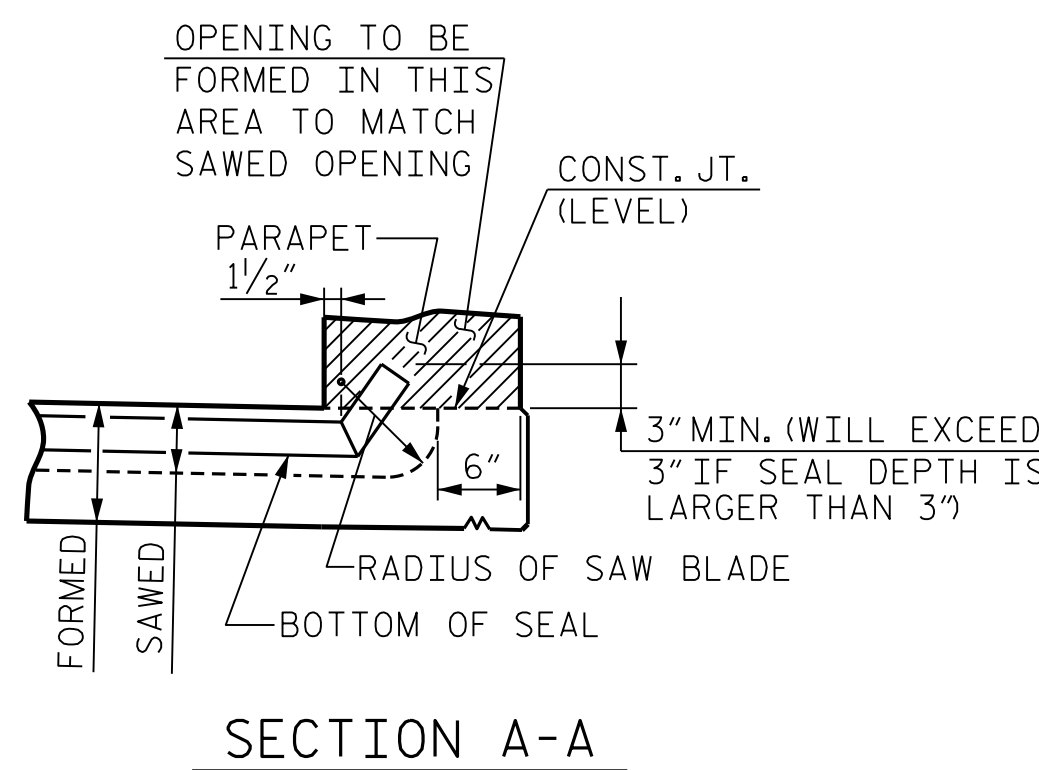
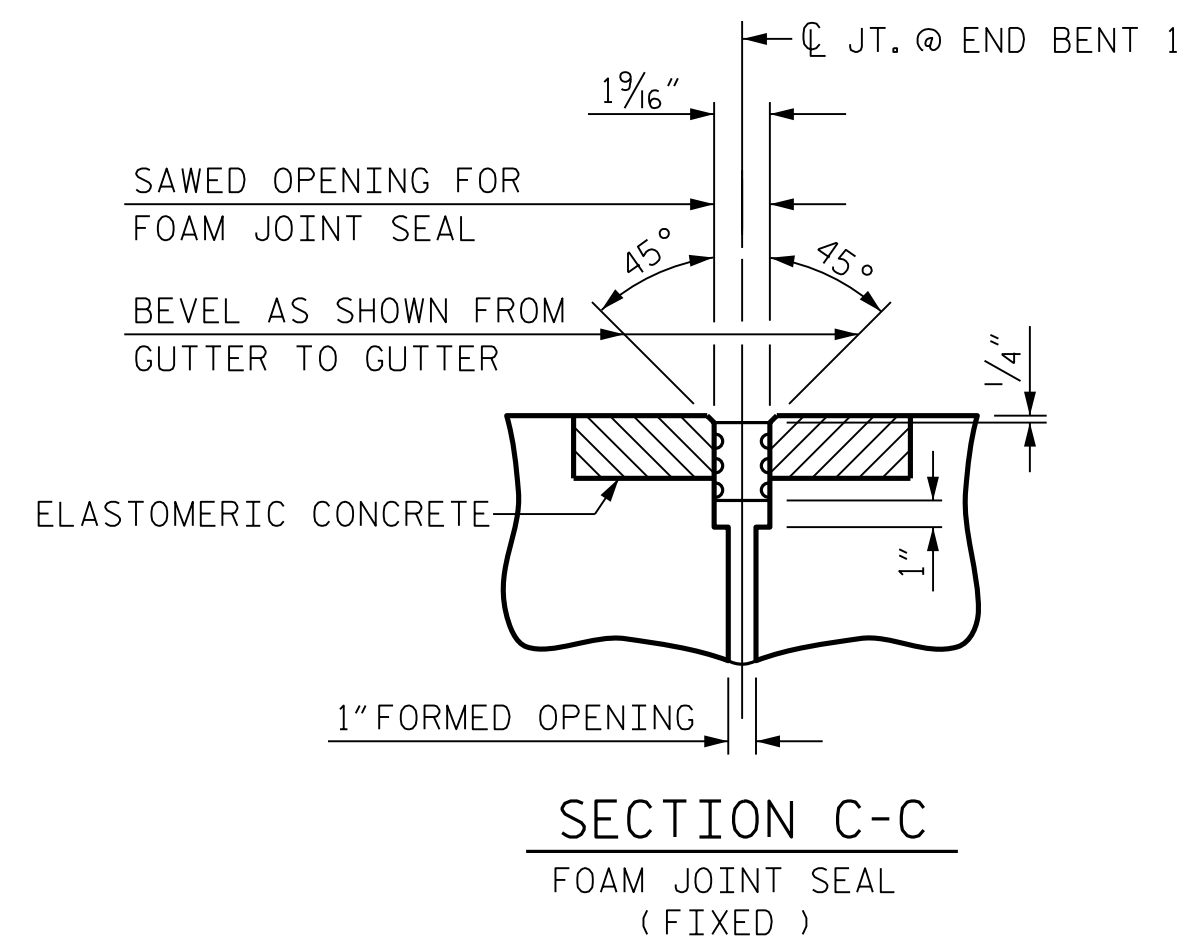
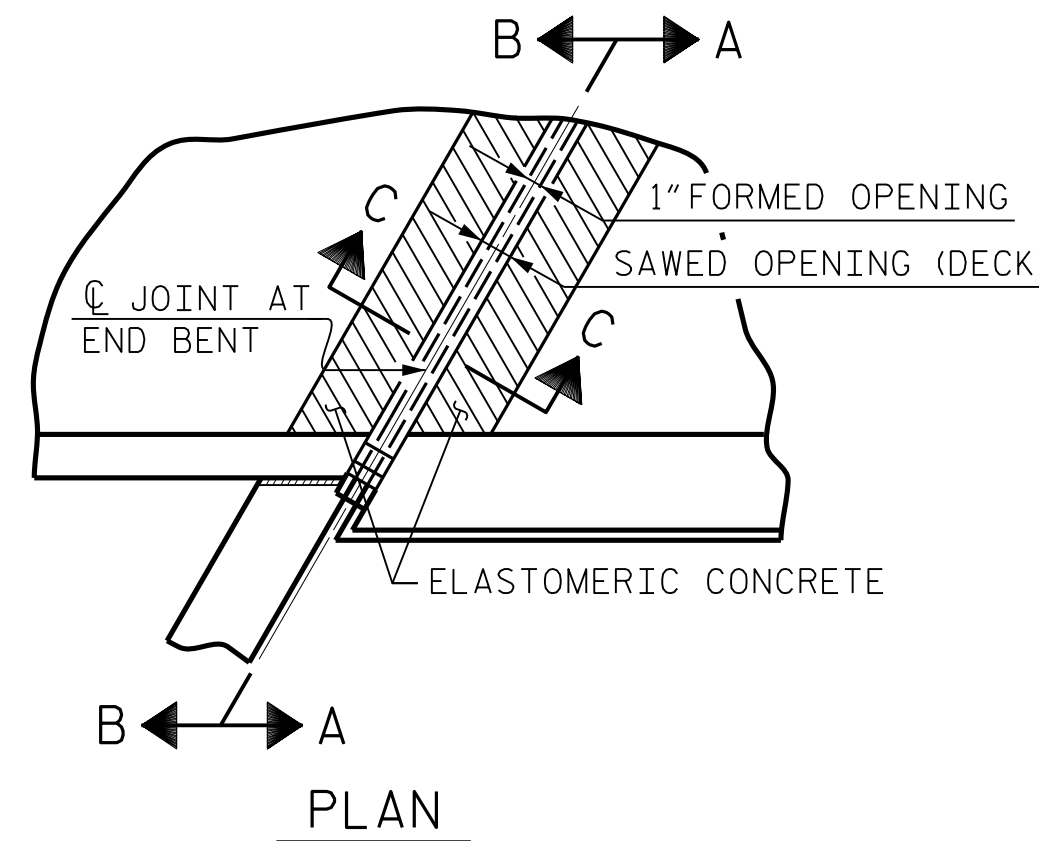
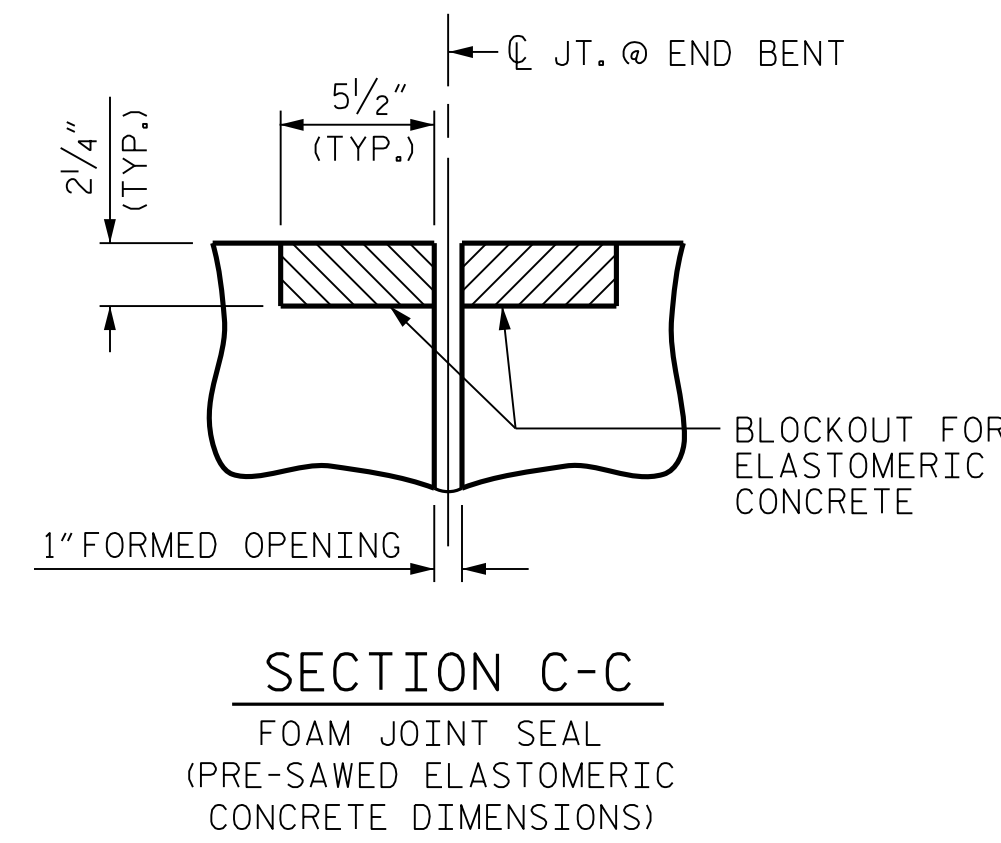
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28	
1			3			TOTAL SHEETS 29	
2			4				

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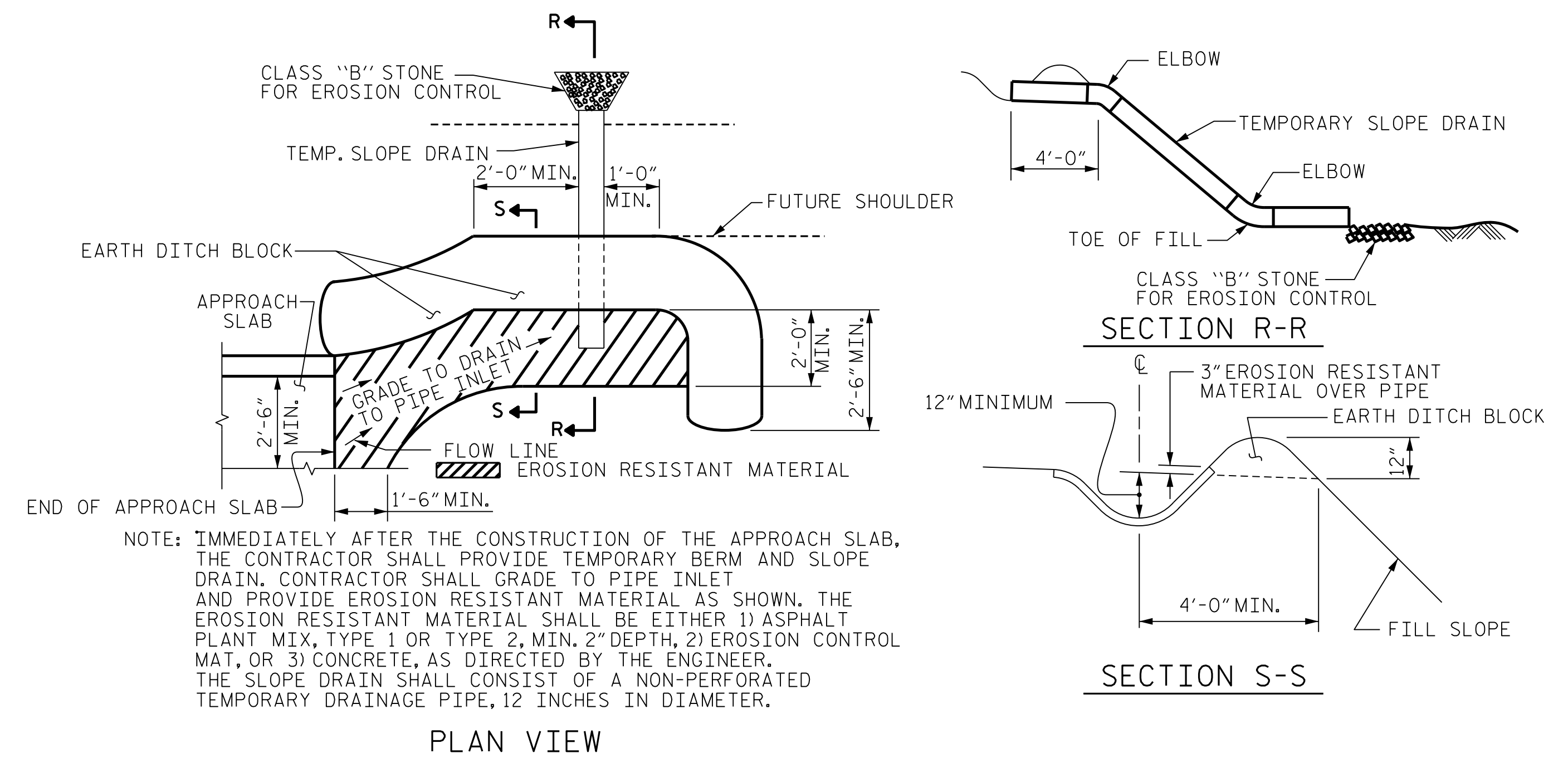
DRAWN BY : B.E. LANNING DATE : 01/17
 CHECKED BY : A.K. ORR DATE : 01/17
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 03/17



JOINT SEAL DETAILS AT PARAPET
FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP.

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.5
2	6.5
TOTAL	13.0

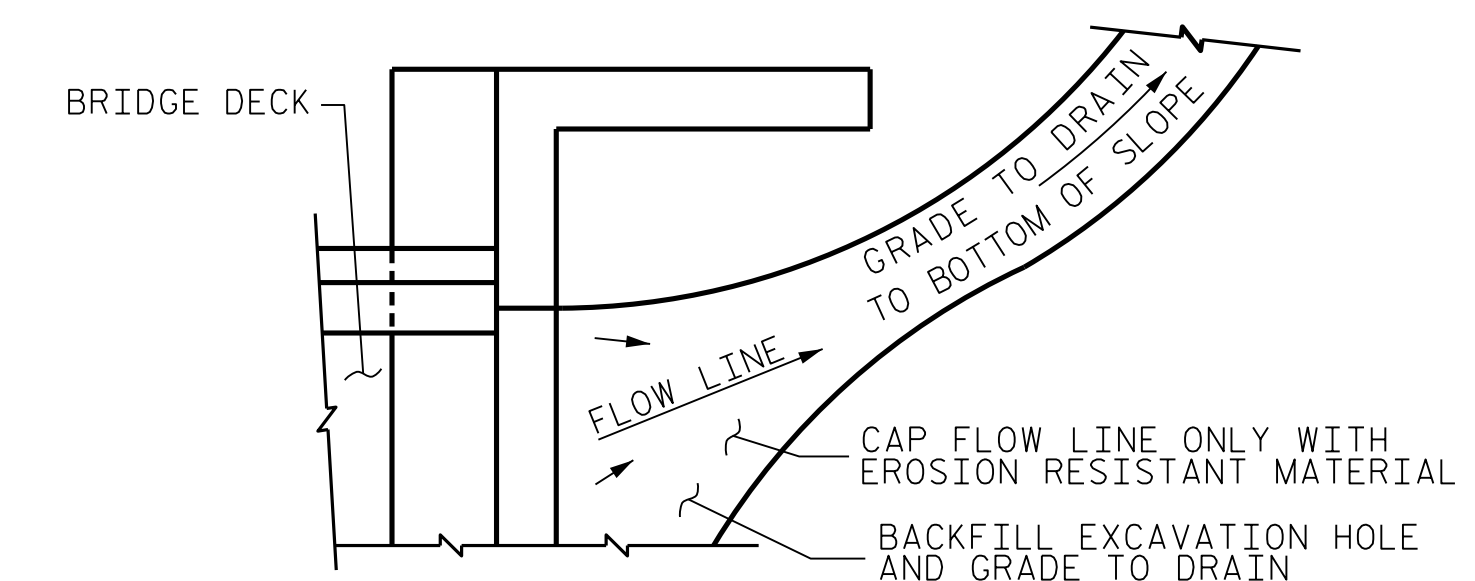
* BASED ON THE MINIMUM BLOCKOUT SHOWN.



PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

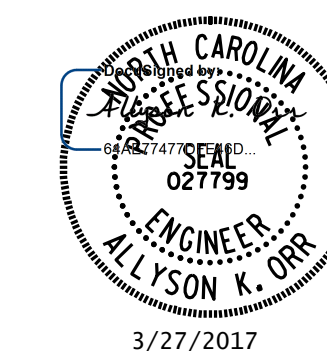


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. R-5771
HENDERSON COUNTY
 STATION: 20+77.50 -L-

SHEET 2 OF 2



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-29
TOTAL SHEETS 29

STD. NO. BAS4

3/27/2017 2:14:48 PM User: blanning
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ASSEMBLED BY: B.E. LANNING	DATE: 01/17
CHECKED BY: A.K. ORR	DATE: 01/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 03/17
DRAWN BY: FCJ 11/88	REV. 10/1/11 MAA/GM
CHECKED BY: ARB 11/88	REV. 7/12 MAA/GM
	REV. 6/13 MAA/GM

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	--	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	-----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER. DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS. WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0". EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED. WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB. METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN