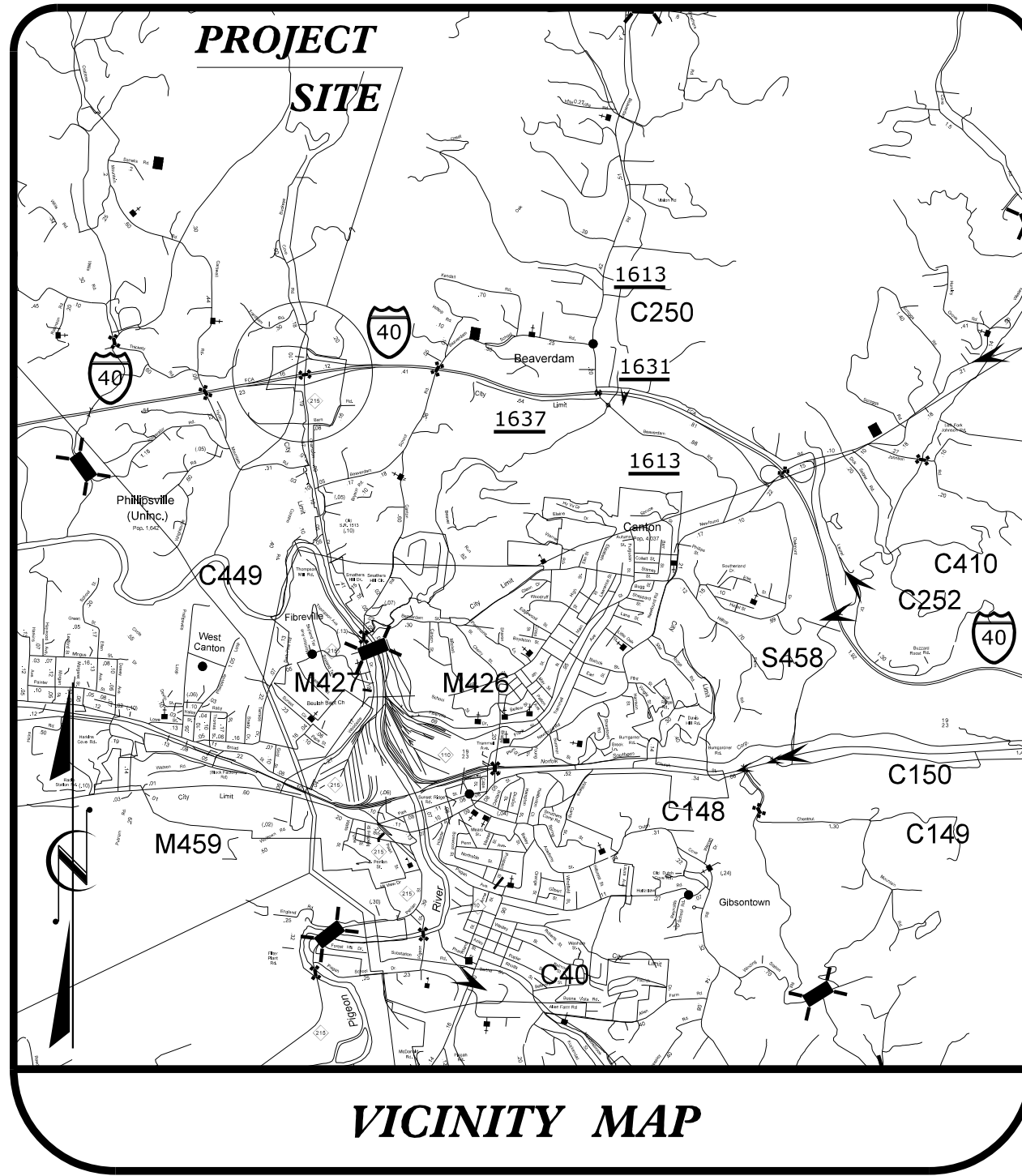


**TIP PROJECT: HB-0004**

**CONTRACT: C204865**



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HAYWOOD COUNTY**

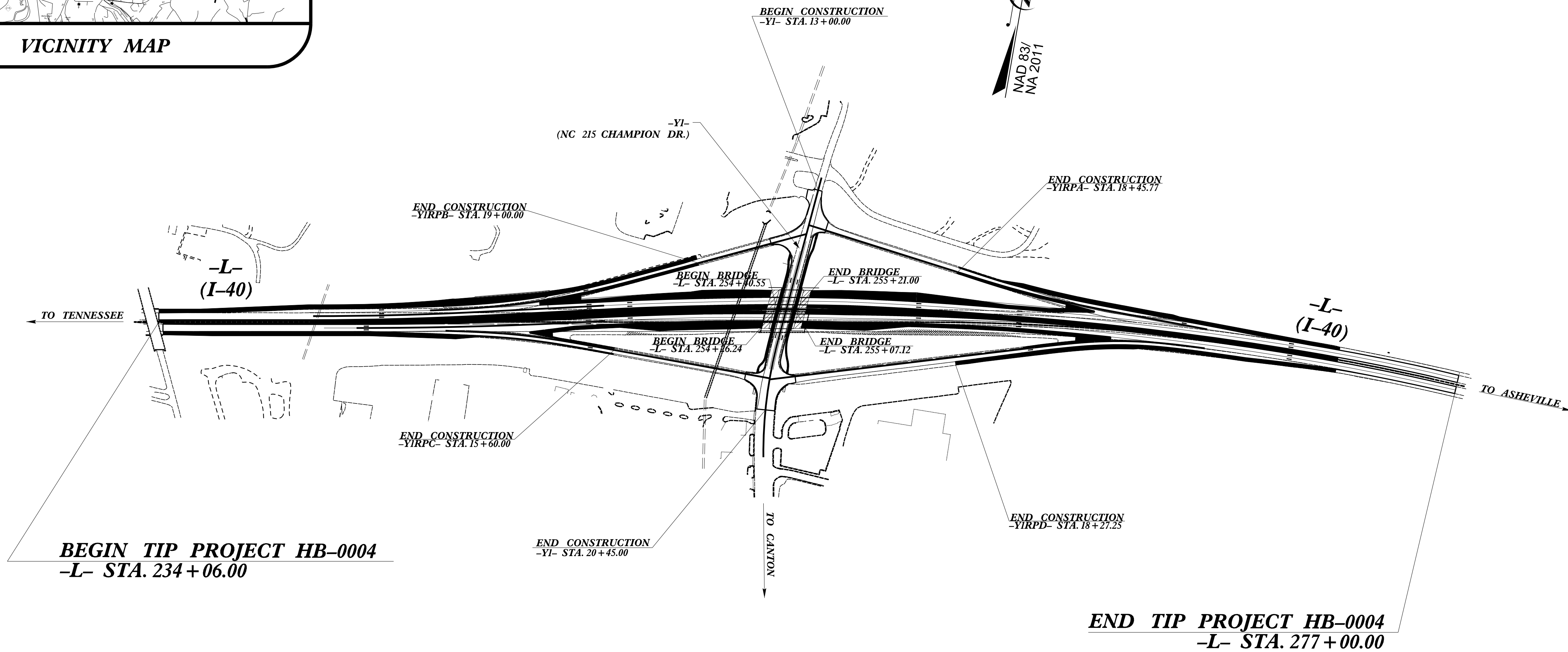
**LOCATION: REPLACE BRIDGE NO. 243 OVER NC 215  
(CHAMPION DRIVE)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURES**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0004		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
49624.1.1		PE	
49624.2.1		ROW, UTIL	
49624.3.1		CONST.	



**STRUCTURE PLANS**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**DESIGN DATA**

ADT 2024 = 61,100  
ADT 2044 = 88,800  
K = 8 %  
D = 55 %  
T = 20 % \*  
V = 70 MPH  
\* TTST = 16% DUAL = 4%  
FUNC. CLASS = INTERSTATE

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT HB-0004 = 0.798 MILES  
LENGTH STRUCTURE TIP PROJECT HB-0004 = 0.015 MILES  
TOTAL LENGTH TIP PROJECT HB-0004 = 0.813 MILES

Prepared in the Office of:  
**ETHERILL ENGINEERING**

1223 Jones Franklin Rd, Raleigh, N.C. 27606  
License No. F-0377  
Bus: 919.851.8077 Fax: 919.851.8107

2024 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
SEPTEMBER 12, 2023

**LETTING DATE:**  
JULY 16, 2024

**NCDOT CONTACT:**

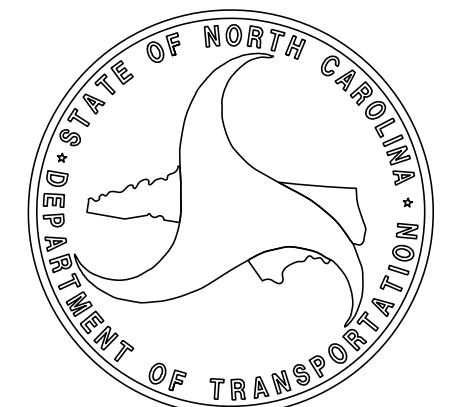
Prepared for:  
**DIVISION OF HIGHWAYS  
DIVISION 14**

253 Webster Road  
Sylva NC, 28779

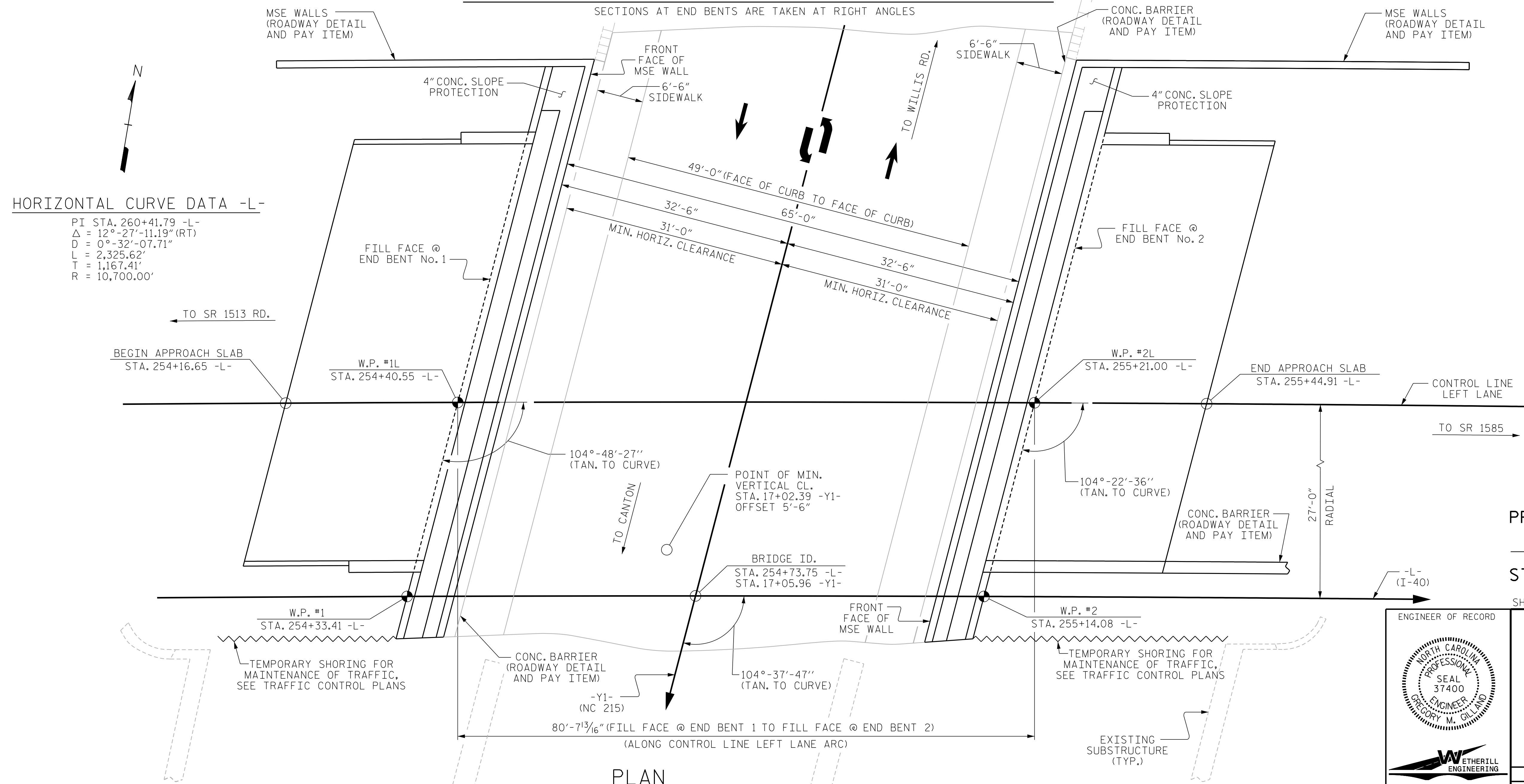
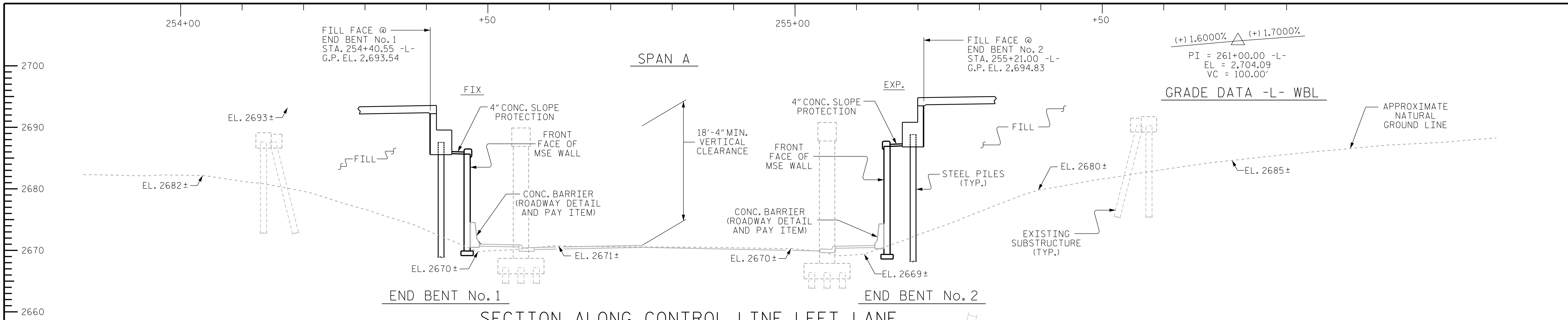
**GREG PURVIS, PE**  
PROJECT ENGINEER

**GREG GILLAND, PE**  
PROJECT DESIGN ENGINEER

**ZACHARY SHULER, PE**  
DIVISION PROJECT MANAGER

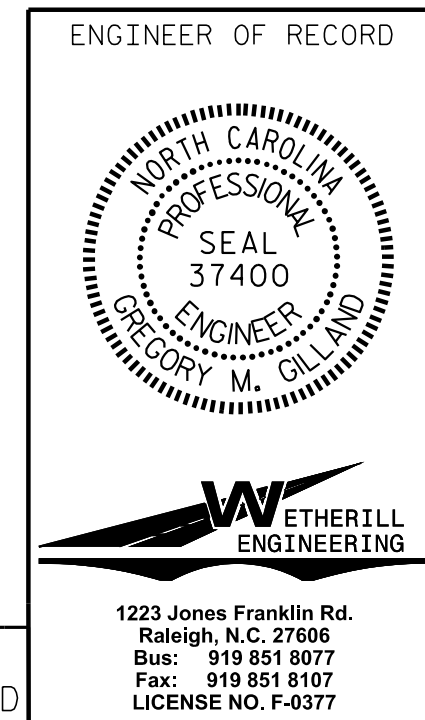


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**HORIZONTAL CURVE DATA -L-**  
 PI STA. 260+41.79 -L-  
 $\Delta = 12^{\circ}-27'-11.19"$  (RT)  
 $D = 0^{\circ}-32'-07.71"$   
 $L = 2,325.62'$   
 $T = 1,167.41'$   
 $R = 10,700.00'$

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
17+05.96 -Y1-  
 SHEET 1 OF 5 BRIDGE No. 430471



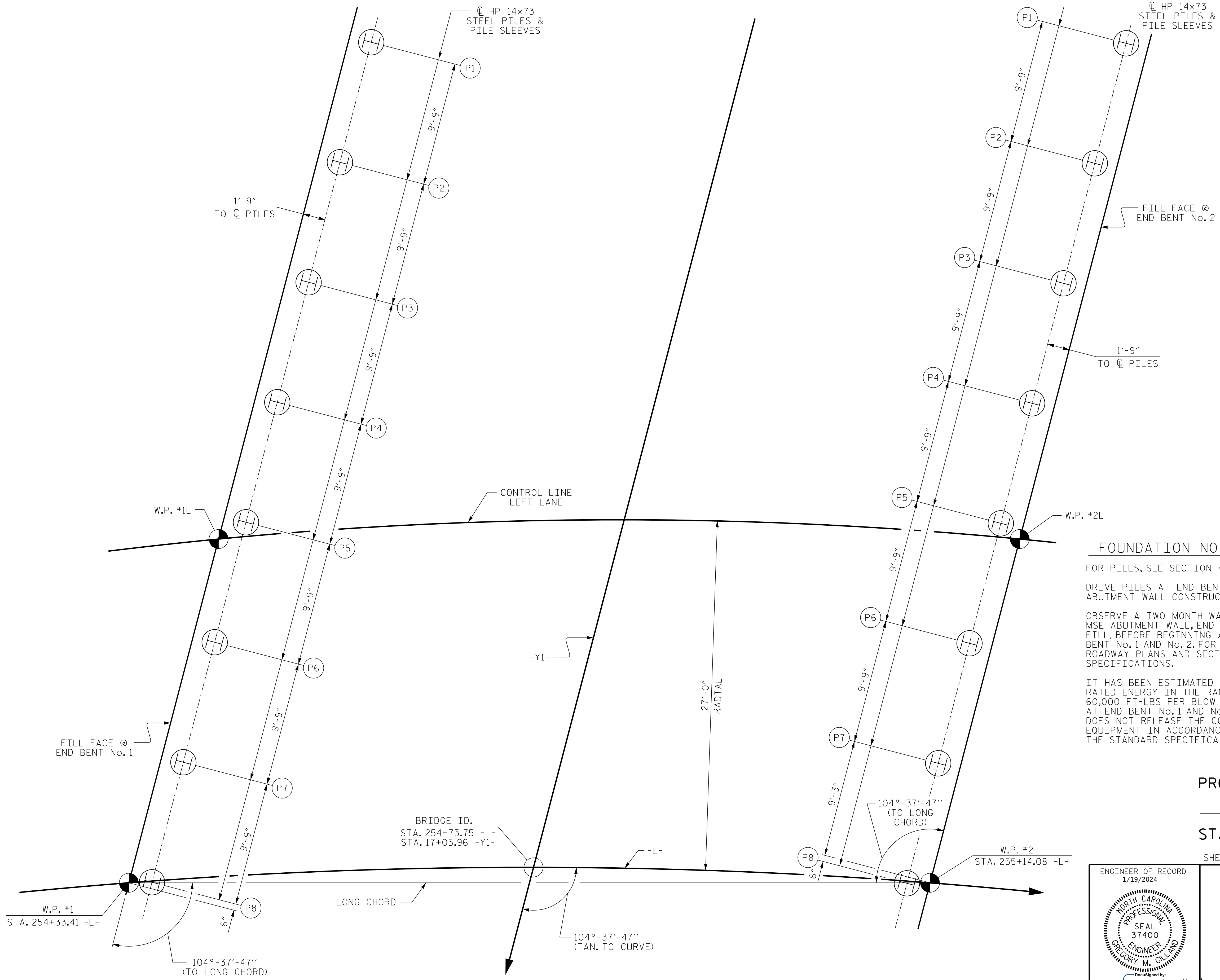
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-01
1			3			TOTAL SHEETS 58
2			4			

DRAWN BY: D. HODGE DATE: 11/23  
 CHECKED BY: G. GILLAND DATE: 11/23

PLAN  
 PILES NOT SHOWN FOR CLARITY  
 END BENTS ARE PARALLEL

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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**FOUNDATION NOTES:**

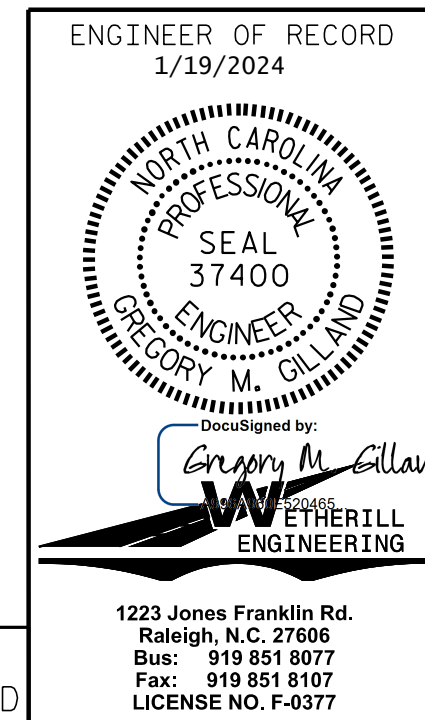
FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRIVE PILES AT END BENT No. 1 AND No. 2 PRIOR TO MSE ABUTMENT WALL CONSTRUCTION.

OBSERVE A TWO MONTH WAITING PERIOD AFTER CONSTRUCTING THE MSE ABUTMENT WALL, END BENT AND REINFORCED BRIDGE APPROACH FILL, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT No. 1 AND No. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 38,500 FT-LBS PER BLOW TO 60,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT No. 1 AND No. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUB ARTICLE 450-3(d)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 5



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON I-40 OVER NC 215 BETWEEN SR 1513 AND SR 1585 (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-02					TOTAL SHEETS 58

**FOUNDATION LAYOUT**

END BENT No. 1

END BENT No. 2

DRAWN BY : D. HODGE DATE : 11/23  
 CHECKED BY : G. GILLAND DATE : 11/23

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 UNLESS ALL SIGNATURES COMPLETED

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### SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent No. 1, Piles 1-3	115	See Structure Drawings	85			300							
End Bent No. 1, Piles 4-15	115		60			300							
End Bent No. 2, Piles 1-3	115		85			300							
End Bent No. 2, Piles 4-15	115		60			300							

\*Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

$$**RDR = \frac{\text{Factored Resistance} + \text{Factored Downdrag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \frac{\text{Nominal Downdrag Resistance} + \text{Nominal Scour Resistance}}{\text{Scour Resistance Factor}}$$

### PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent No. 1, Piles 1-15	113	44		0.60	35		
End Bent No. 2, Piles 1-15	113	44		0.60	35		

\*Factored Dead Load is factored weight of pile above the ground line.

### SUMMARY OF PDA

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	PDA Testing Required? YES or MAYBE	Total PDA Testing Quantity EACH

### SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
<b>TOTAL QTY:</b>					

### NOTES


- The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer Michael H. Stephens (PE No. 028893) on 09/14/2023.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for PDA Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, CSL Testing, SID Inspections and PITs when these items may be required.

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

SHEET 3 OF 5

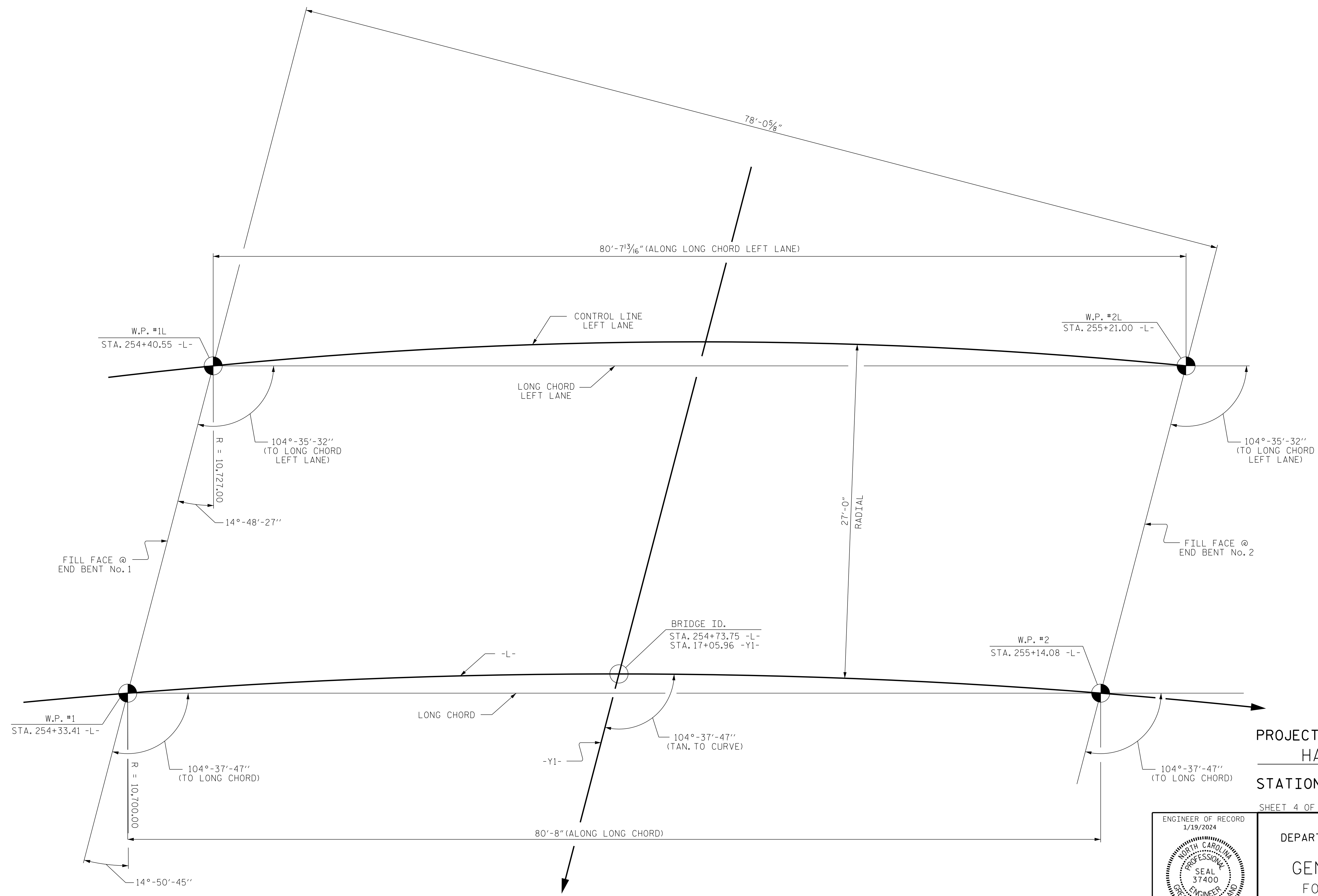
DRAWN BY : D. HODGE DATE : 11/23  
 CHECKED BY : G. GILLAND DATE : 11/23

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 UNLESS ALL SIGNATURES COMPLETED

 ENGINEER OF RECORD 1/19/2024 1223 Jones Franklin Rd. Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 LICENSE NO. F-0377	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH <b>GENERAL DRAWING</b> PILE FOUNDATION TABLES (LEFT LANE)				SHEET NO. S1-03	
	REVISIONS				TOTAL SHEETS 58	
	NO.	BY:	DATE:	NO.	BY:	DATE:
	1			3		
	2			4		

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**LONG CHORD LAYOUT**  
END BENTS ARE PARALLEL

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 4 OF 5

ENGINEER OF RECORD  
1/19/2024

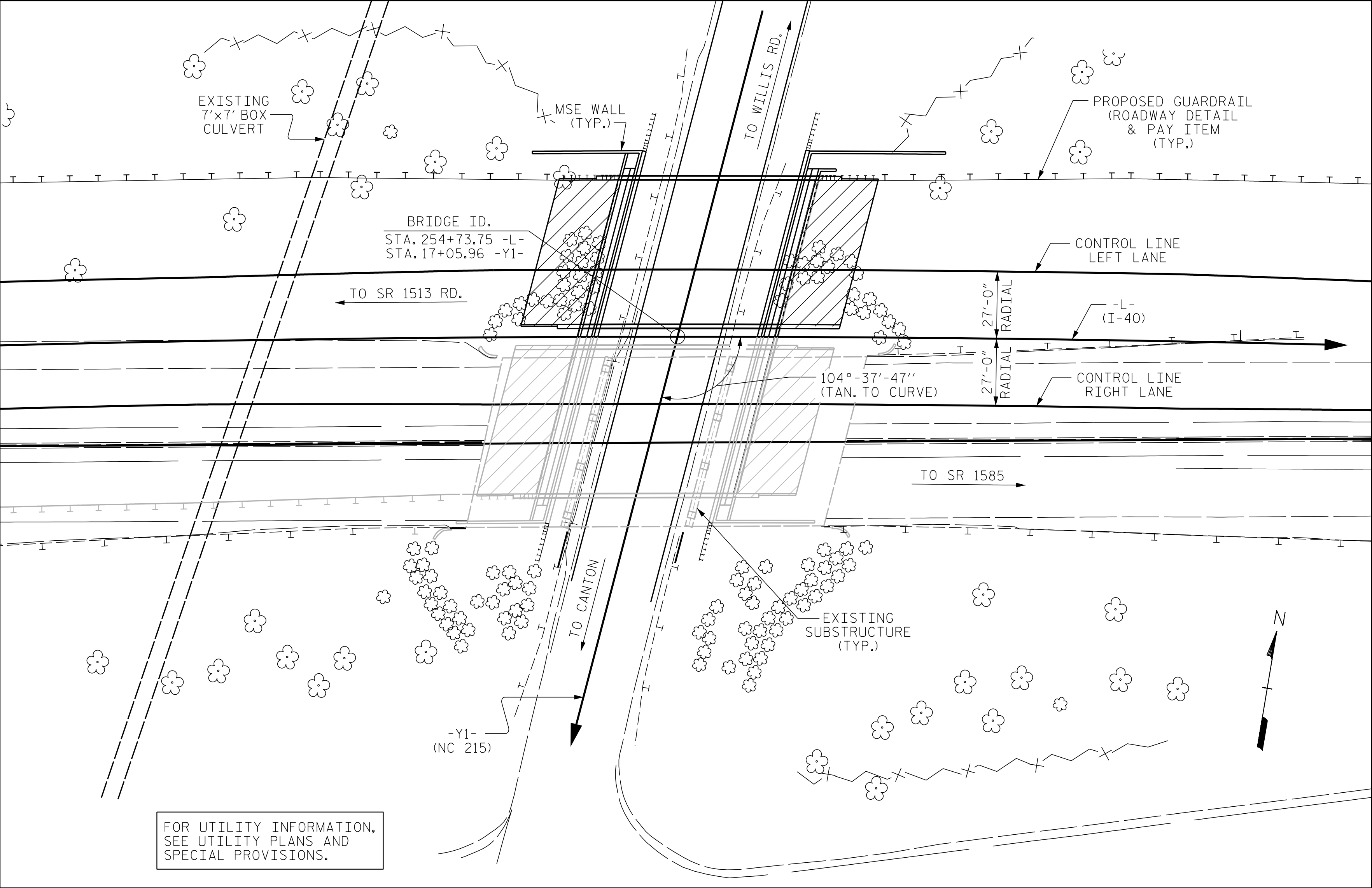
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON I-40 OVER NC 215 BETWEEN SR 1513 AND SR 1585 (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-04					TOTAL SHEETS 58

DRAWN BY : D. HODGE DATE : 7/23  
 CHECKED BY : G. GILLAND DATE : 8/23

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UNLESS ALL SIGNATURES COMPLETED

BM-9 : R/R SPIKE SET IN BASE OF 10" SYCAMORE, 30' RIGHT OF STA. 7+28.00 -BY1- EL. 2668.29



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

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 MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

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 SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

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 254+73.75 -L-".

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.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING 3 SPAN STRUCTURE CONSISTS OF 1 SPAN @ 41', 1 SPAN @ 50' AND 1 SPAN @ 54' WITH REINFORCED CONCRETE DECK ON STEEL I-BEAMS AND A CLEAR ROADWAY WIDTH OF 66' ON A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE END BENTS AND REINFORCED CONCRETE POST AND BEAM BENTS ON PILE FOOTINGS SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE 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.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:  
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30"(SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND  $f_y = 60\text{ksi}$ .

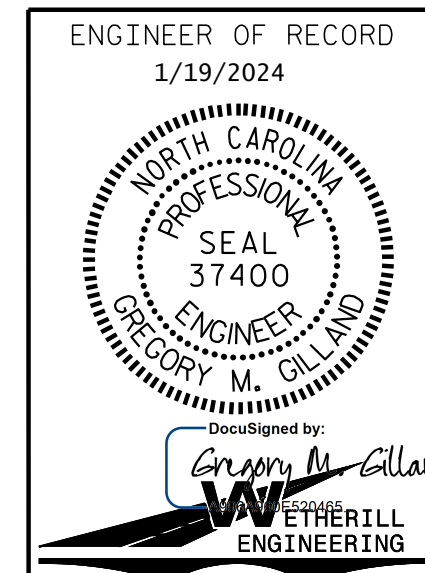
TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	FIB 36" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 x 73 STEEL PILES		* CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	LUMP SUM	LUMP SUM	SO.FT.	SO.FT.	CU.YDS.	LUMP SUM	LBS.	No.	LIN.FT.	EA.	No.	LIN.FT.	LIN.FT.	SO. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			4,808	6,866				7	538.42				* 212.44			
END BENT 1					56.7		7,089			8	8	555		19		
END BENT 2					53.3		7,125			8	8	555		19		
TOTAL	LUMP SUM	LUMP SUM	4,808	6,866	110.0	LUMP SUM	14,214	7	538.42	16	16	1,110	* 212.44	38	LUMP SUM	LUMP SUM

\* CONTAINS THE ADDITIONAL LINEAR FEET OF CONCRETE BARRIER RAIL ON APPROACH SLABS.

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
STATION: 254+73.75 -L-

SHEET 5 OF 5



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
GENERAL DRAWING  
FOR BRIDGE ON I-40  
OVER NC 215 BETWEEN  
SR 1513 AND SR 1585  
(LEFT LANE)

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

SHEET NO. S1-05  
TOTAL SHEETS 58

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LICENSE NO. F-0377

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DRAWN BY : D. HODGE DATE : 11/23  
CHECKED BY : G. GILLAND DATE : 11/23

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

LOAD TYPE	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						
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT			SHEAR			LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT										
							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)							
DESIGN LOAD	HL-93 (INVENTORY)	N/A	①	1.06	--	1.75	0.750	1.360	A	3	37.750	0.950	1.060	A	3	53.130	0.80	0.750	1.080	A	3	37.750	1	
	HL-93 (OPERATING)	N/A		1.50	--	1.35	0.750	1.770	A	3	37.750	0.950	1.500	A	3	60.830	N/A	--	--	--	--	--	1	
	HS-20 (INVENTORY)	36.000	②	1.43	51.480	1.75	0.750	1.800	A	3	37.750	0.950	1.430	A	3	60.830	0.80	0.750	1.430	A	3	37.750	1	
	HS-20 (OPERATING)	36.000		1.88	67.680	1.35	0.750	2.330	A	3	37.750	0.950	1.880	A	3	60.830	N/A	--	--	--	--	--	1	
LEGAL LOAD	SINGLE VEHICLE (SV)	SH		3.53	44.125	1.40	0.750	5.550	A	3	37.750	0.950	4.810	A	3	60.830	0.80	0.750	3.530	A	3	37.750	1	
		S3C		2.06	44.290	1.40	0.750	3.250	A	3	37.750	0.950	2.780	A	3	60.830	0.80	0.750	2.060	A	3	37.750	1	
		S3A		1.96	44.590	1.40	0.750	3.080	A	3	37.750	0.950	2.640	A	3	60.830	0.80	0.750	1.960	A	3	37.750	1	
		S4A		1.73	46.278	1.40	0.750	2.730	A	3	37.750	0.950	2.300	A	3	60.830	0.80	0.750	1.730	A	3	37.750	1	
		S5A		1.53	46.665	1.40	0.750	2.410	A	3	37.750	0.950	2.130	A	3	60.830	0.80	0.750	1.530	A	3	37.750	1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	S6A		1.40	48.300	1.40	0.750	2.190	A	3	37.750	0.950	1.920	A	3	60.830	0.80	0.750	1.400	A	3	37.750	1	
		S7B		1.27	48.895	1.40	0.750	2.000	A	3	37.750	0.950	1.810	A	3	60.830	0.80	0.750	1.270	A	3	37.750	1	
		S7A		③	1.26	50.400	1.40	0.750	1.990	A	3	37.750	0.950	1.900	A	3	60.830	0.80	0.750	1.260	A	3	37.750	1
		T4A		1.72	48.590	1.40	0.750	2.710	A	3	37.750	0.950	2.250	A	3	60.830	0.80	0.750	1.720	A	3	37.750	1	
		T5B		1.51	48.320	1.40	0.750	2.370	A	3	37.750	0.950	2.170	A	3	60.830	0.80	0.750	1.510	A	3	37.750	1	
EMERGENCY VEHICLE (EV)	EV2		④	1.70	48.875	1.30	0.750	2.880	A	3	37.750	0.950	2.340	A	3	60.800	0.80	0.750	1.700	A	3	37.750	1	
	EV3		④	1.12	48.160	1.30	0.750	1.890	A	3	37.750	0.950	1.540	A	3	60.800	0.80	0.750	1.120	A	3	37.750	1	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	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. GIRDER 3 CONTROLS, SAME AS GIRDER 5
- 2.
- 3.
- 4.

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

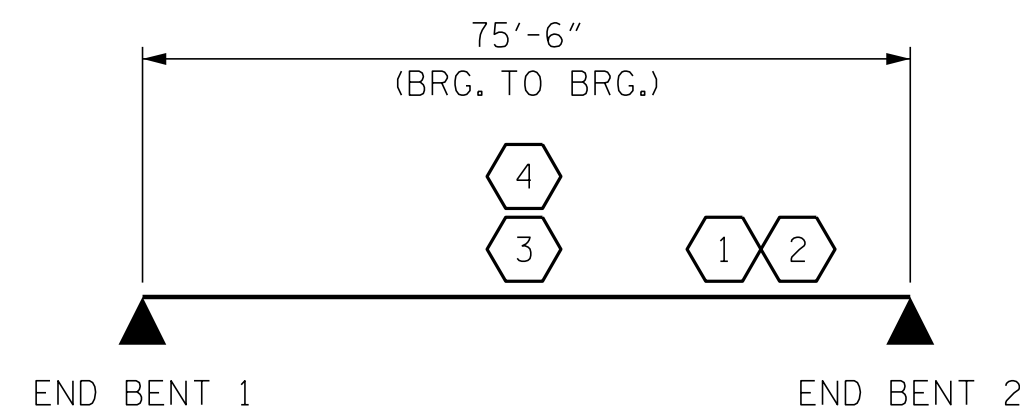
④ EMERGENCY VEHICLE LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

GIRDER LOCATION

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

ASSEMBLED BY : D. HODGE	DATE : 9/23
CHECKED BY : J. DILWORTH	DATE : 9/23
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 04/23 BNB/AAI

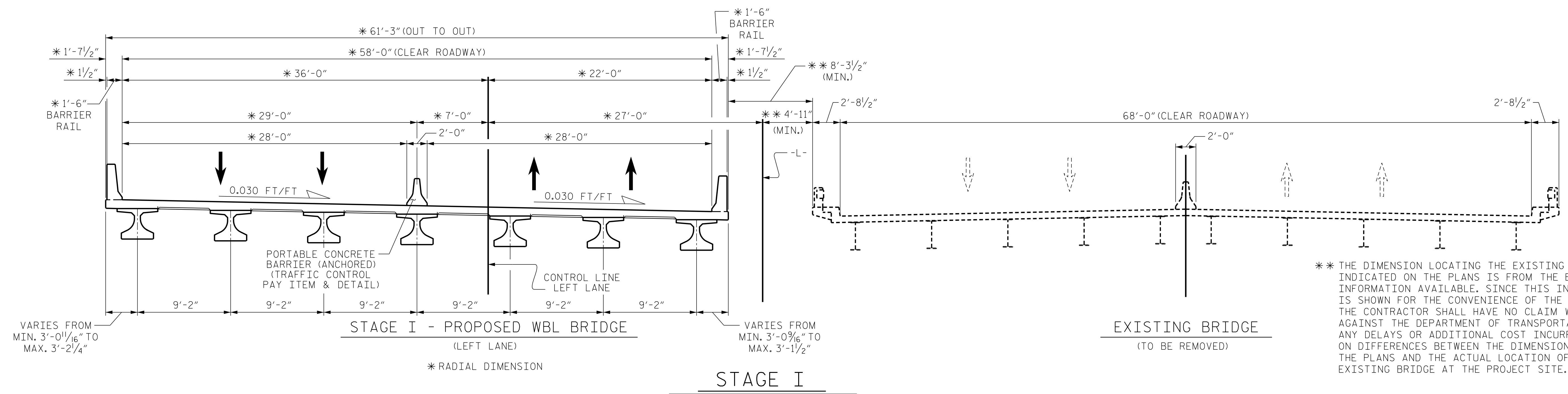
ENGINEER OF RECORD  
1/19/2024

Disseminated by  
*Gregory M. Gilliland*  
ETHERILL  
ENGINEERING

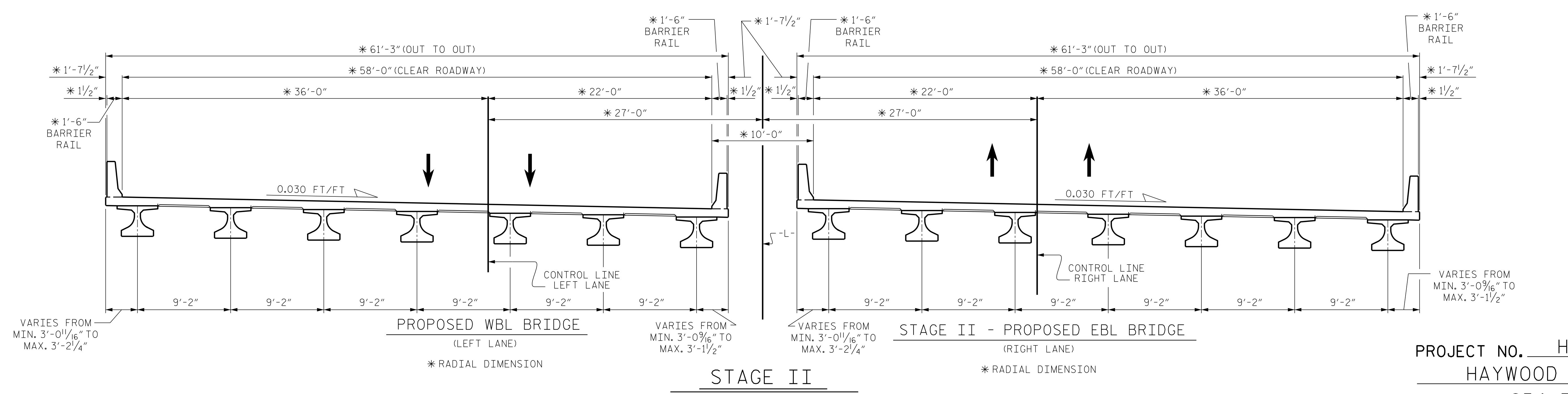
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (INTERSTATE TRAFFIC) (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-06
					TOTAL SHEETS 58

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



STAGE I



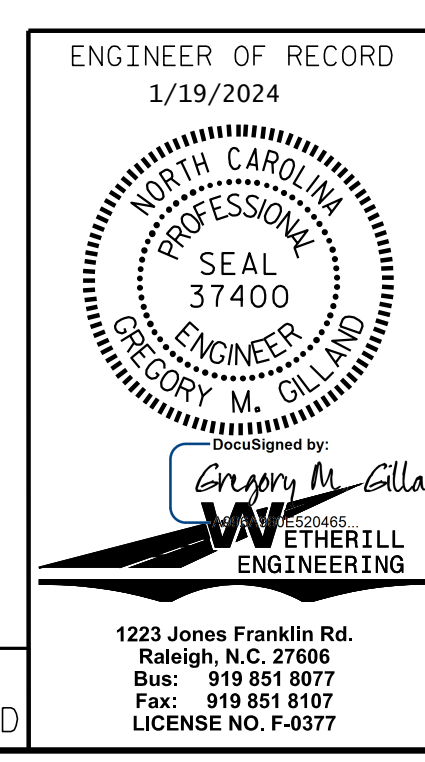
STAGE II

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

P:\2023\2312401\_HB-0004\Structures\DWG\HB-0004 (LEFT LANE)\HB0004-LEFT-COV-SEA.dgn  
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DRAWN BY: D. HODGE DATE: 2/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

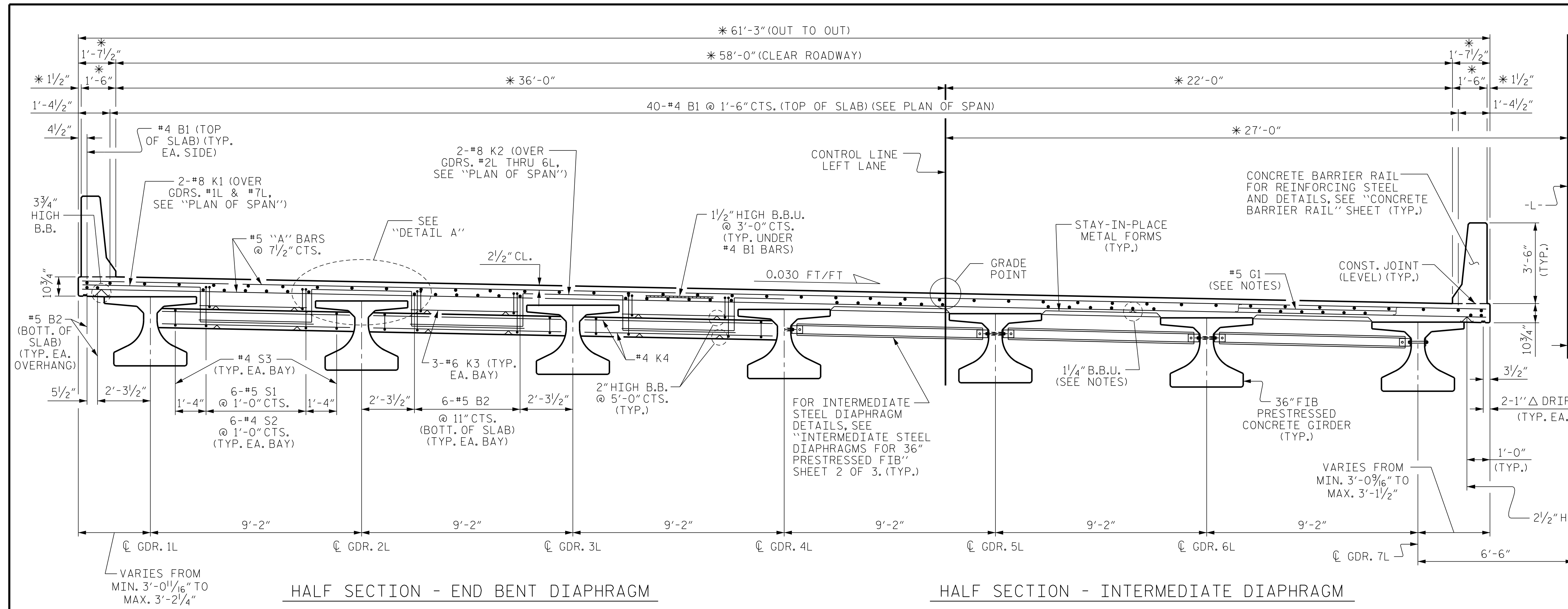
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ENGINEER OF RECORD 1/19/2024		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH	
CONSTRUCTION SEQUENCE		FOR BRIDGES ON I-40 OVER NC 215 BETWEEN SR 1513 AND SR 1585	
		REVISIONS	
NO.	BY:	DATE:	SHEET NO.
1		3	S1-07
2		4	TOTAL SHEETS 58

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HALF SECTION - END BENT DIAPHRAGM

HALF SECTION - INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

\* RADIAL DIMENSION

**NOTES**

PROVIDE 1 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.

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

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

GIRDERS ARE PARALLEL TO THE LONG CHORD OF -L-.

CONCRETE BARRIER RAIL FOR REINFORCING STEEL AND DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET (TYP.)

STAY-IN-PLACE METAL FORMS (TYP.)

CONST. JOINT (LEVEL) (TYP.)

36" FIB PRESTRESSED CONCRETE GIRDER (TYP.)

VARIES FROM MIN. 3'-0 5/16" TO MAX. 3'-1 1/2"

2-1' Δ DRIP GROOVES (TYP. EA. SIDE)

1'-0" (TYP.)

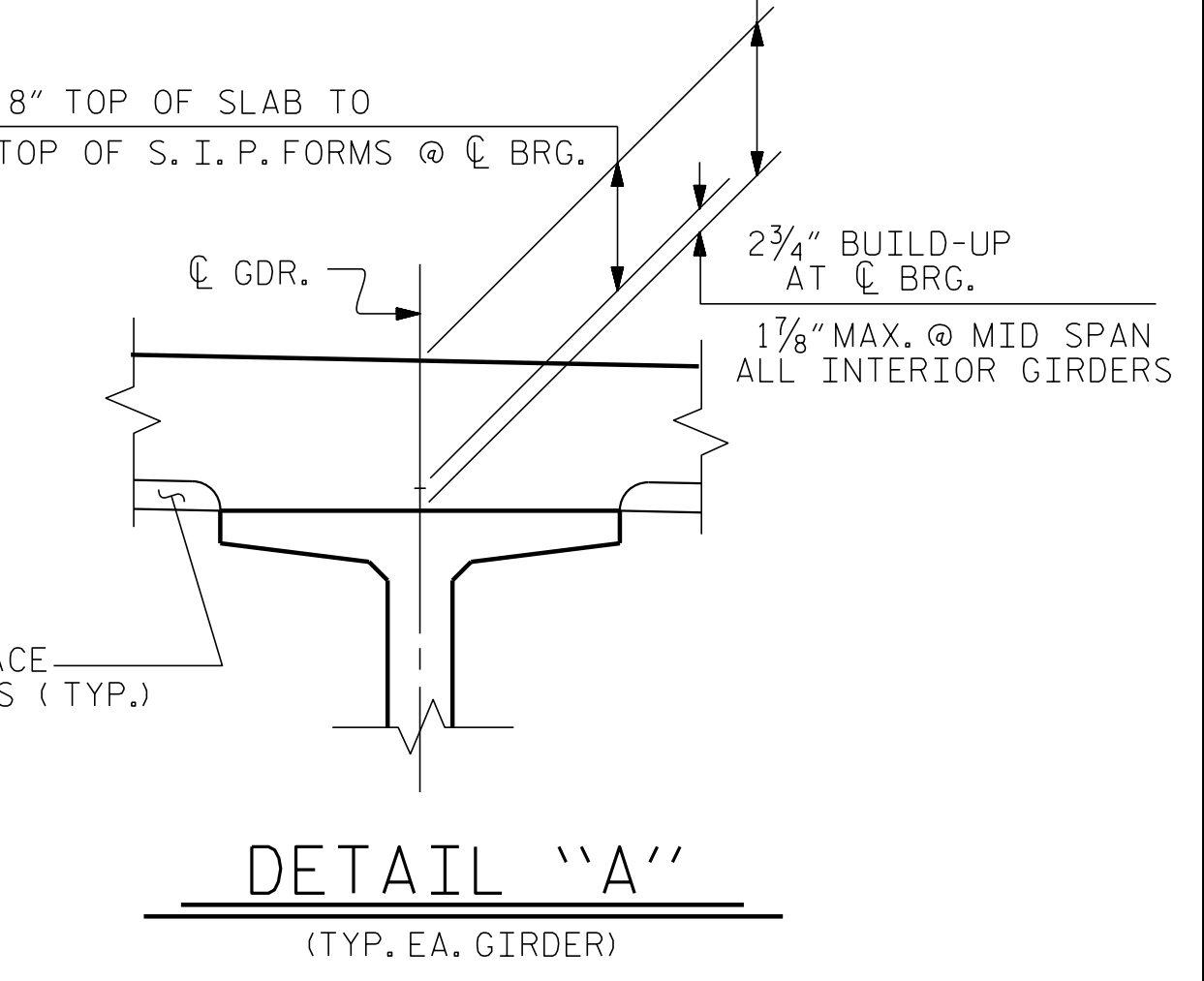
2 1/2" HIGH B.B.

10 3/4" TOP OF SLAB TO TOP OF PREST. CONC. GDR. AT CL BRG.

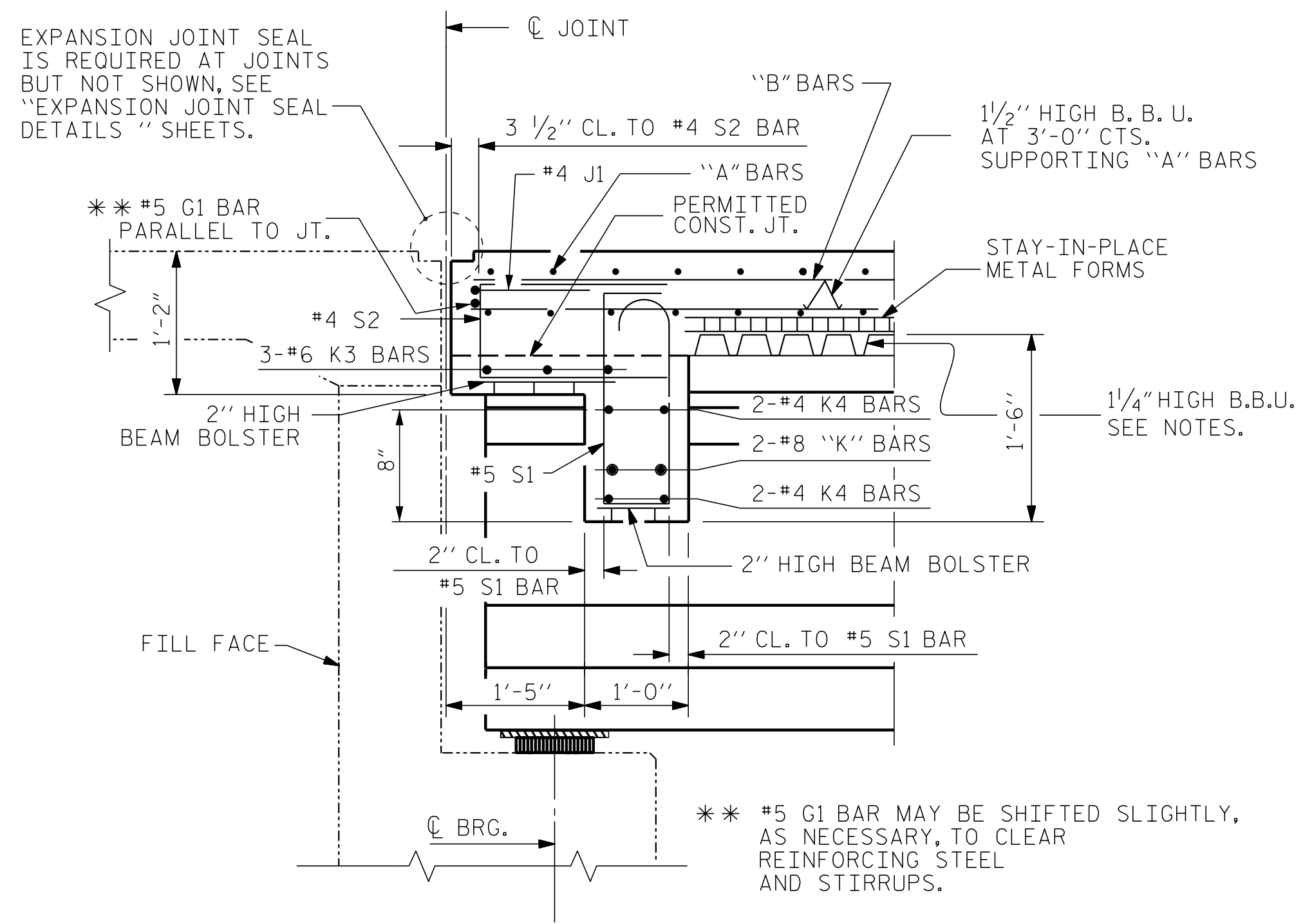
8" TOP OF SLAB TO TOP OF S. I. P. FORMS @ CL BRG.

2 3/4" BUILD-UP AT CL BRG.

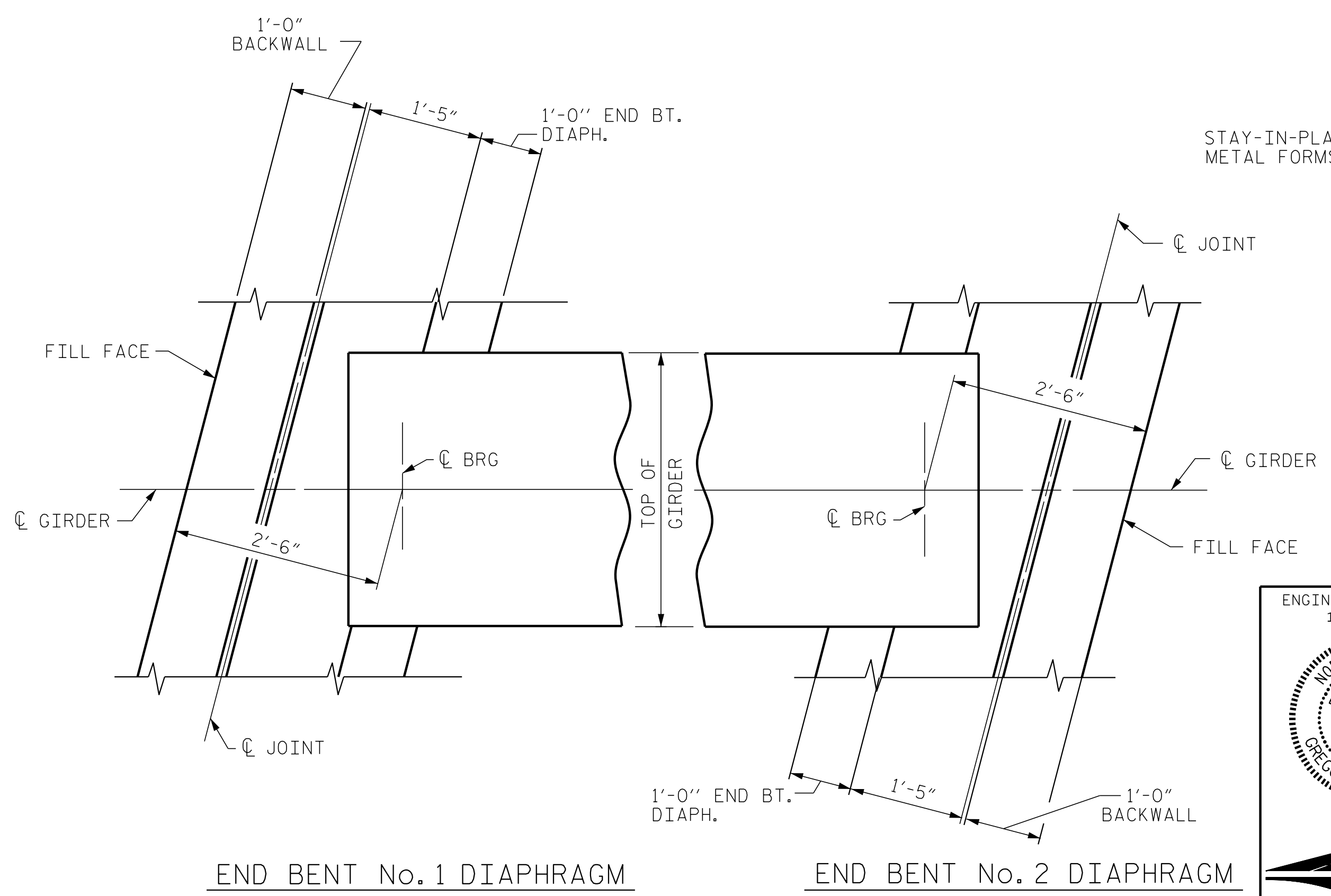
1 1/8" MAX. @ MID SPAN ALL INTERIOR GIRDERS



DETAIL "A"  
(TYP. EA. GIRDER)



SECTION THRU END BENT DIAPHRAGM



END BENT No. 1 DIAPHRAGM

END BENT No. 2 DIAPHRAGM

PLAN

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

ENGINEER OF RECORD  
 1/19/2024  
  
 Designed by:  
  
 WETHERILL ENGINEERING

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

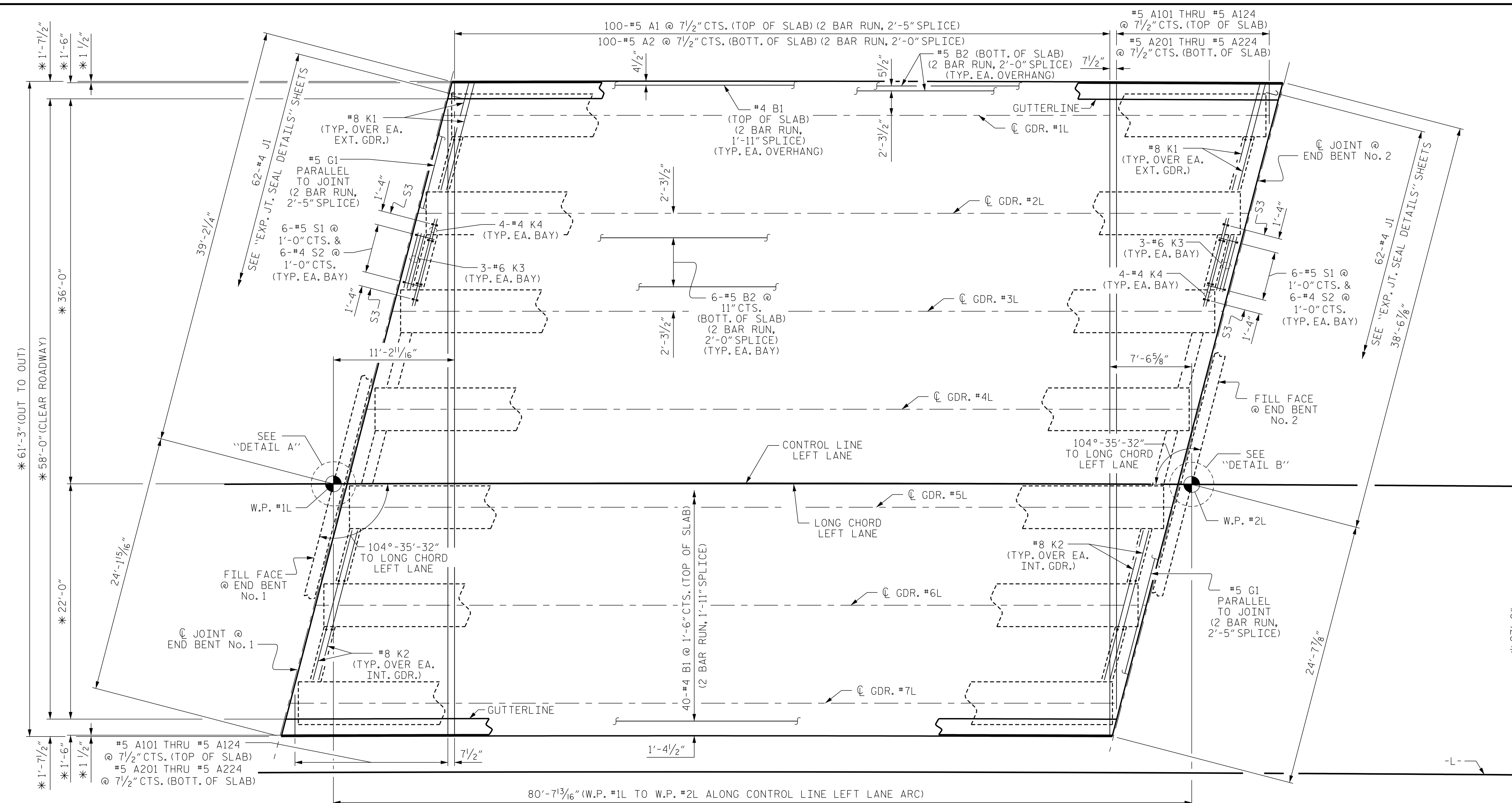
SUPERSTRUCTURE  
 TYPICAL SECTION  
 (LEFT LANE)

REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S1-08
2			TOTAL SHEETS 58

DRAWN BY: D. HODGE DATE: 2/23  
 CHECKED BY: G. GILLAND DATE: 7/23

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PA:2023\2312401-HB-0004-Structures\03\HB-0004 (LEFT LANE)\HB0004-LEFT-TS.dgn  
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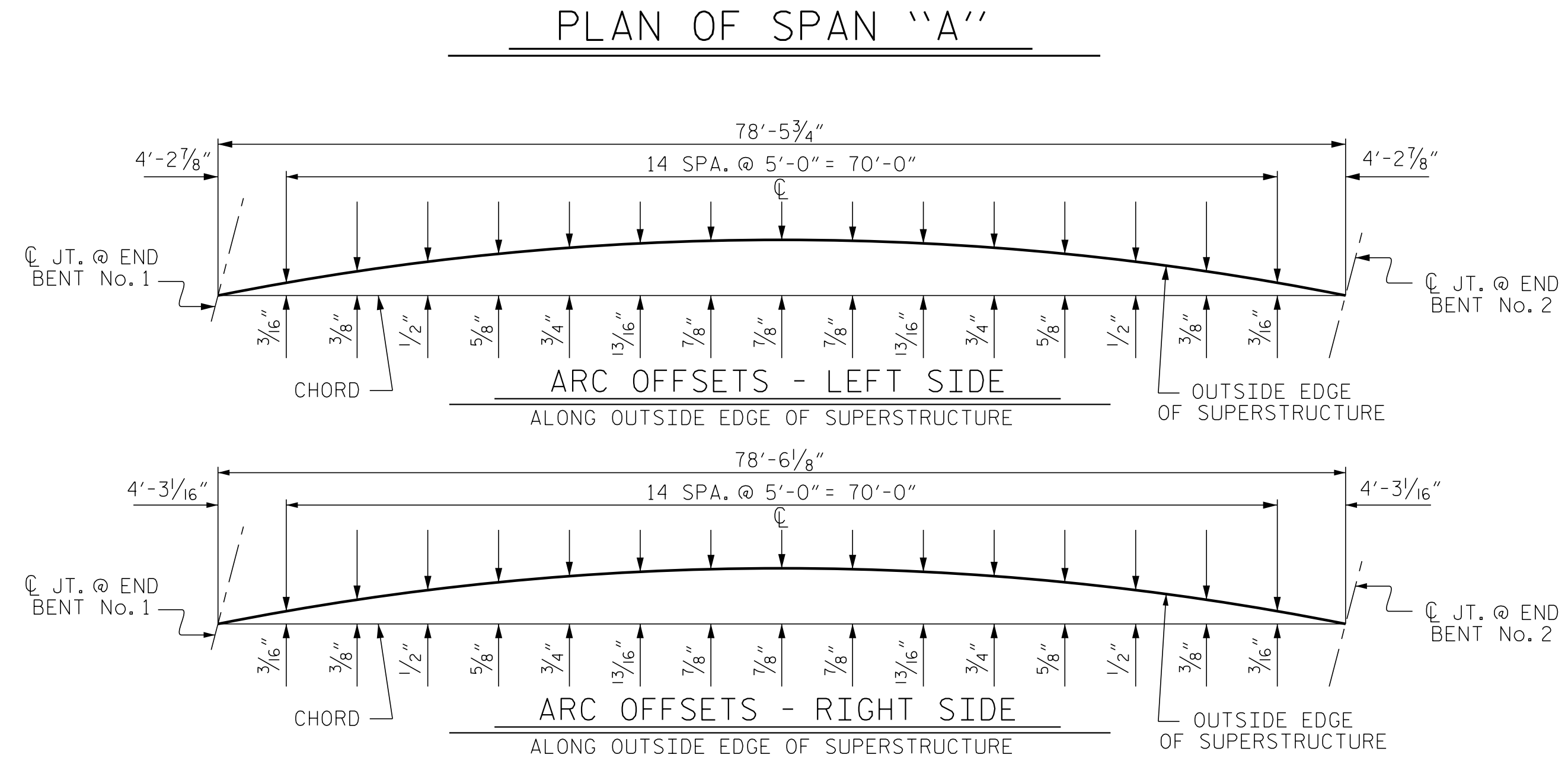
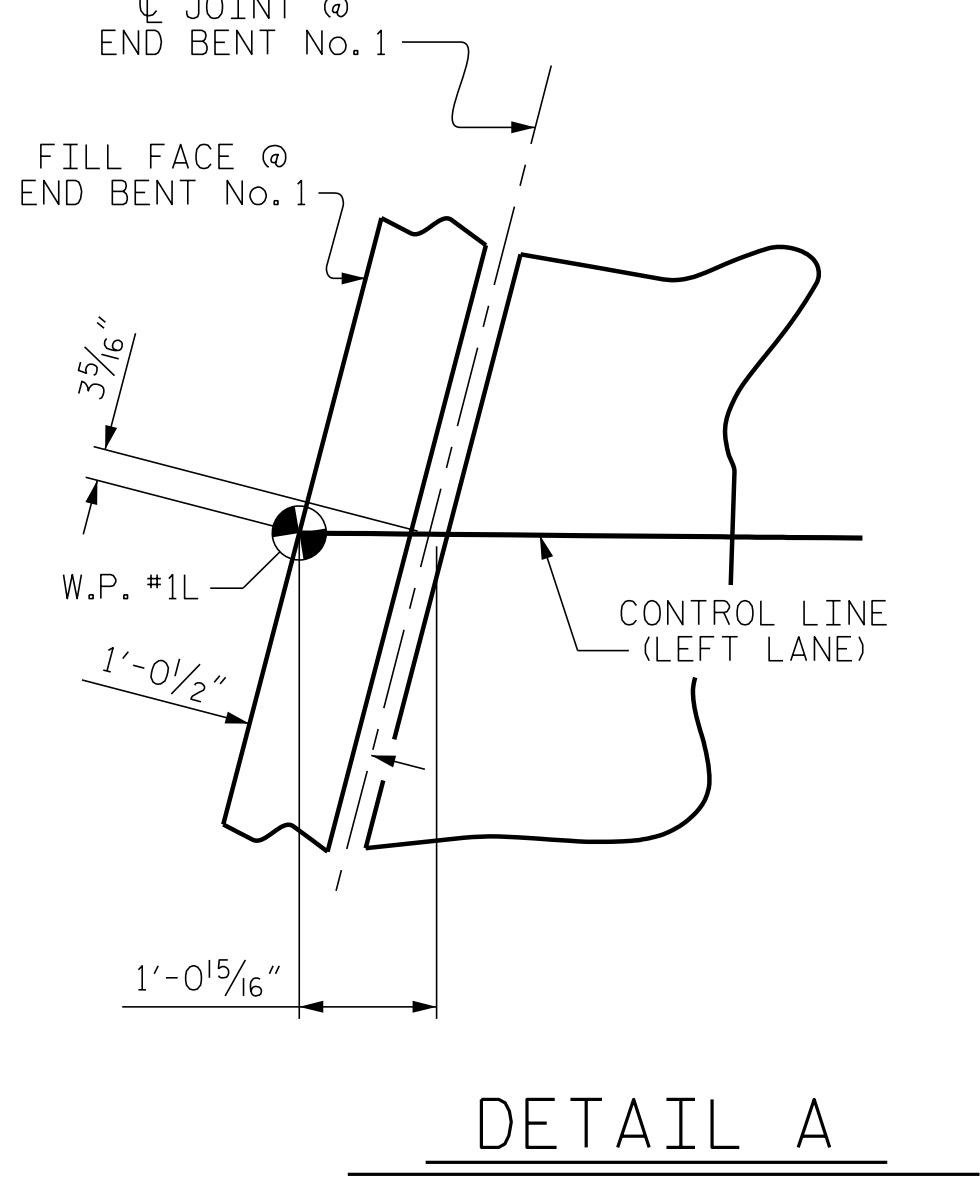
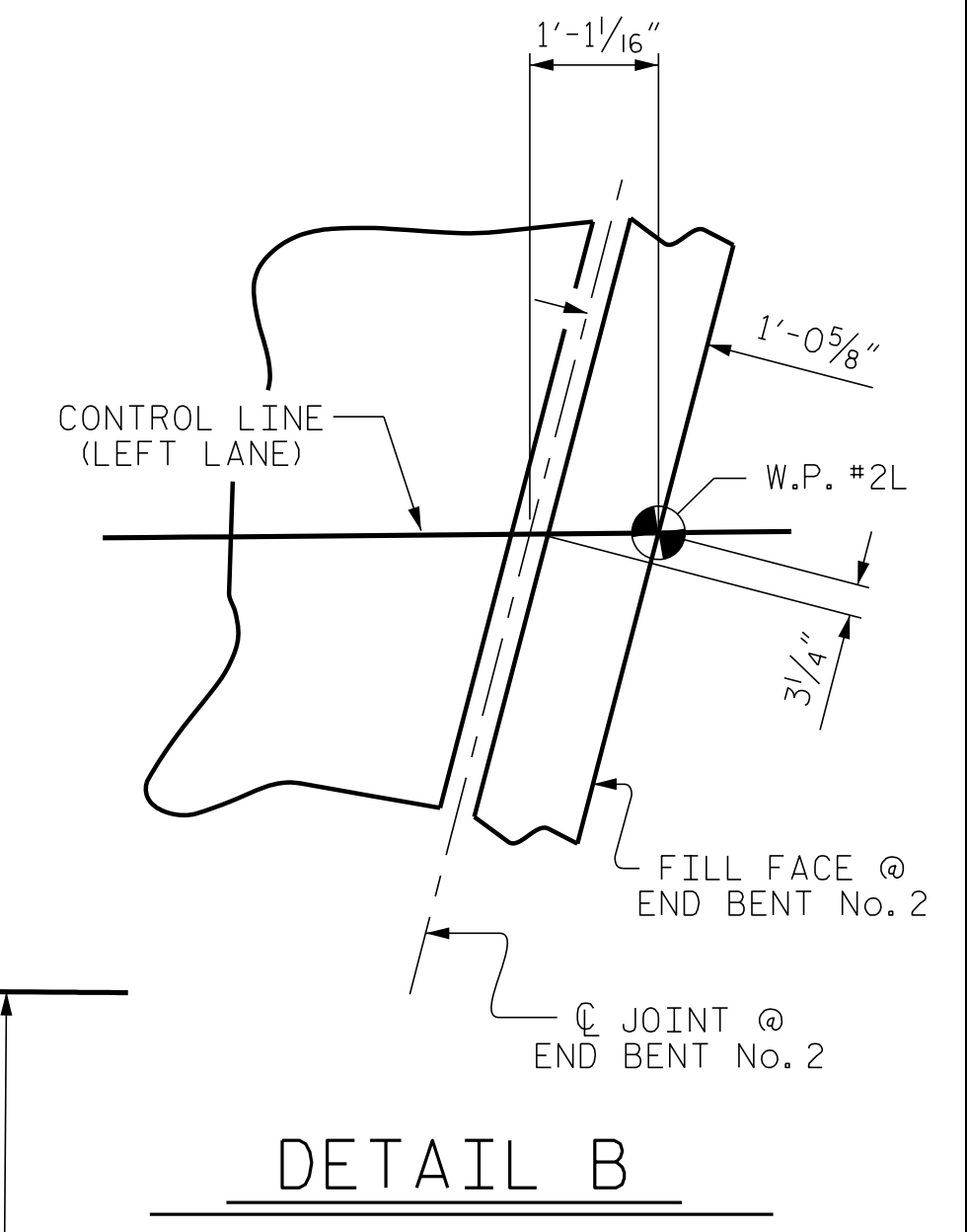


**NOTES :**

FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "FRAMING PLAN" SHEET.

#5 "A" BARS ARE PLACED PERPENDICULAR TO CHORD OF -L- AND MEASURED ALONG SAME.

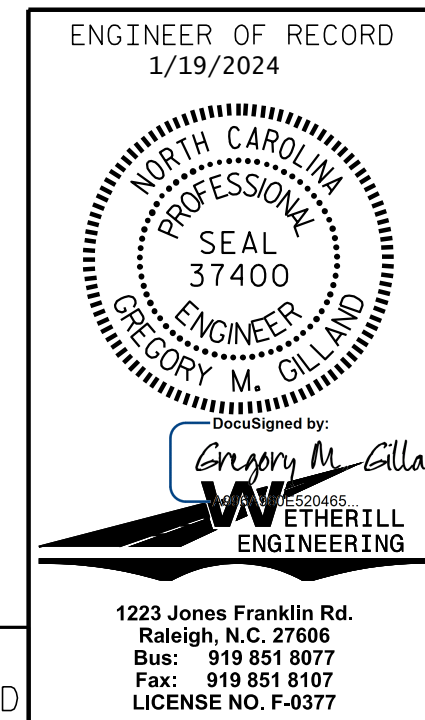


\* DENOTES RADIAL DIMENSIONS

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

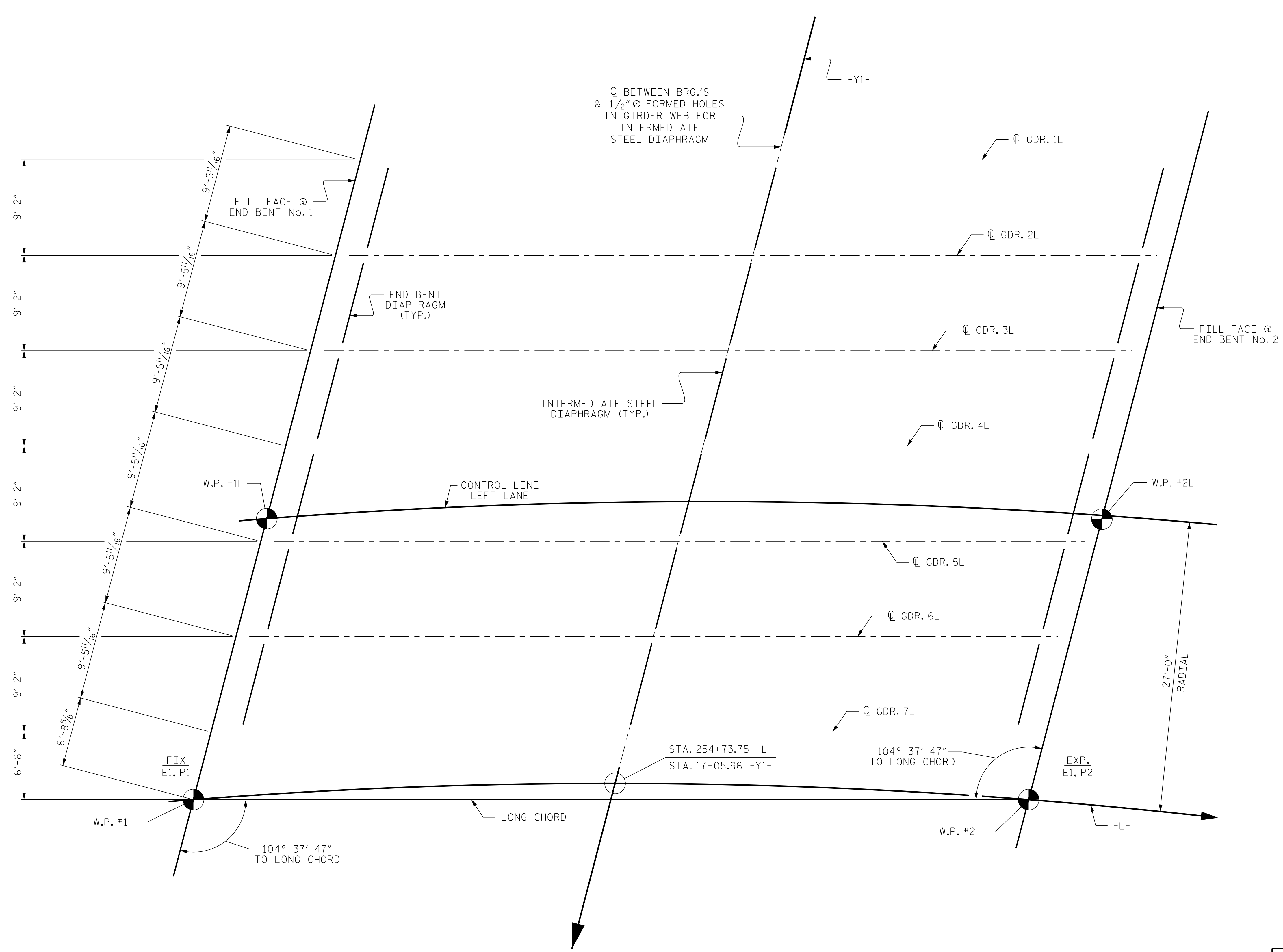
P:\2023\2312401\_HB-0004\_Structures\DWG\HB-0004 (LEFT LANE)\HB0004-LEFT-PS.dgn  
 1/18/2024 4:43:07 PM

DRAWN BY: D. HODGE DATE: 3/23  
 CHECKED BY: G.M. GILLAND DATE: 7/23



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-09 TOTAL SHEETS 58

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SPAN A

### FRAMING PLAN

ALL GIRDERS ARE PARALLEL TO LONG CHORD

FOR LOCATION OF BOLT HOLES IN GIRDERS SEE SHEET ENTITLED "PRESTRESSED CONCRETE GIRDER DETAILS"

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

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DRAWN BY : D. HODGE DATE : 2/23  
 CHECKED BY : G. GILLAND DATE : 7/23

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ENGINEER OF RECORD  
1/19/2024

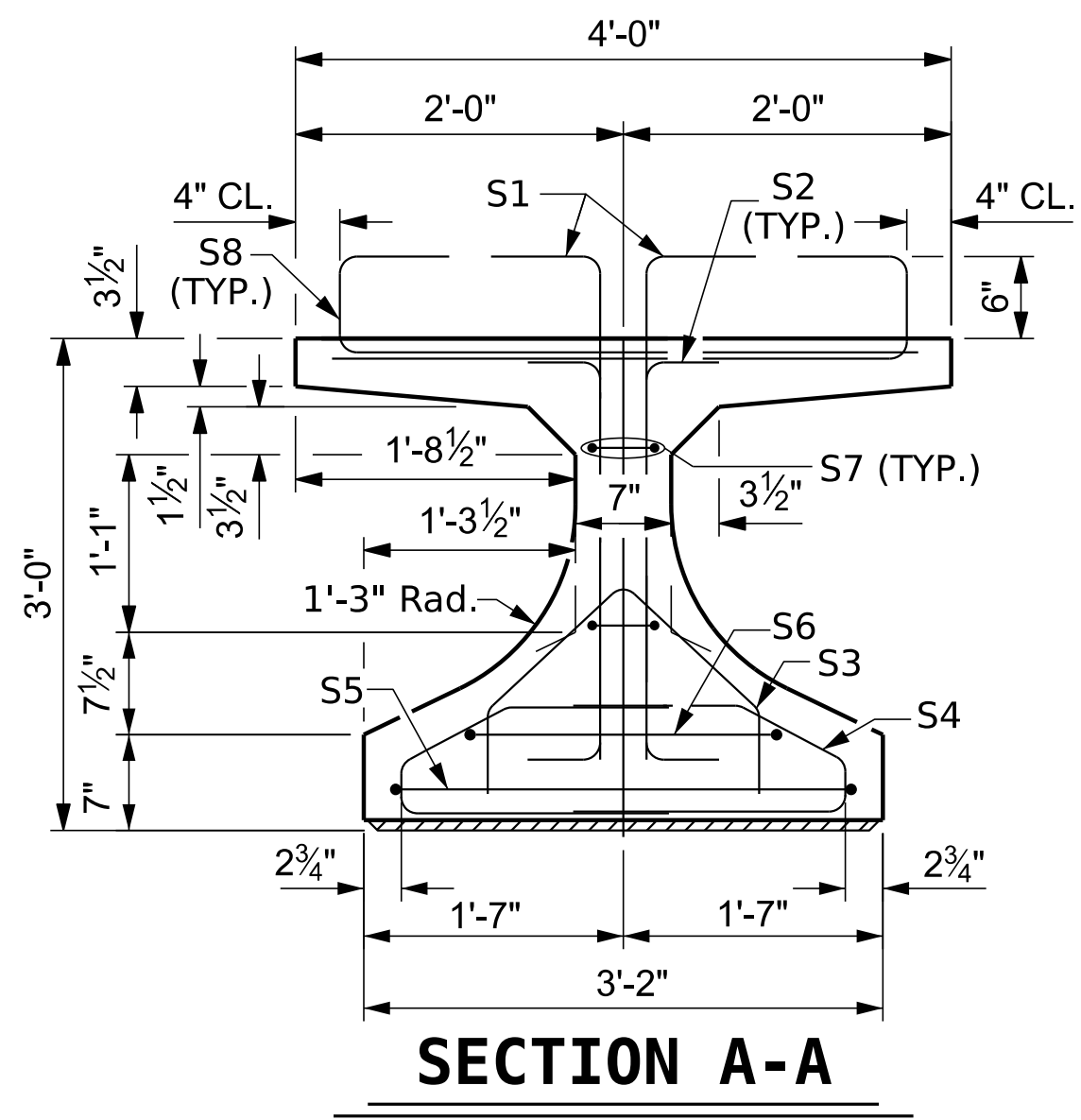
DocuSigned by:  
*Gregory M. Gilland*  
ETHERILL ENGINEERING

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LICENSE NO. F-0377

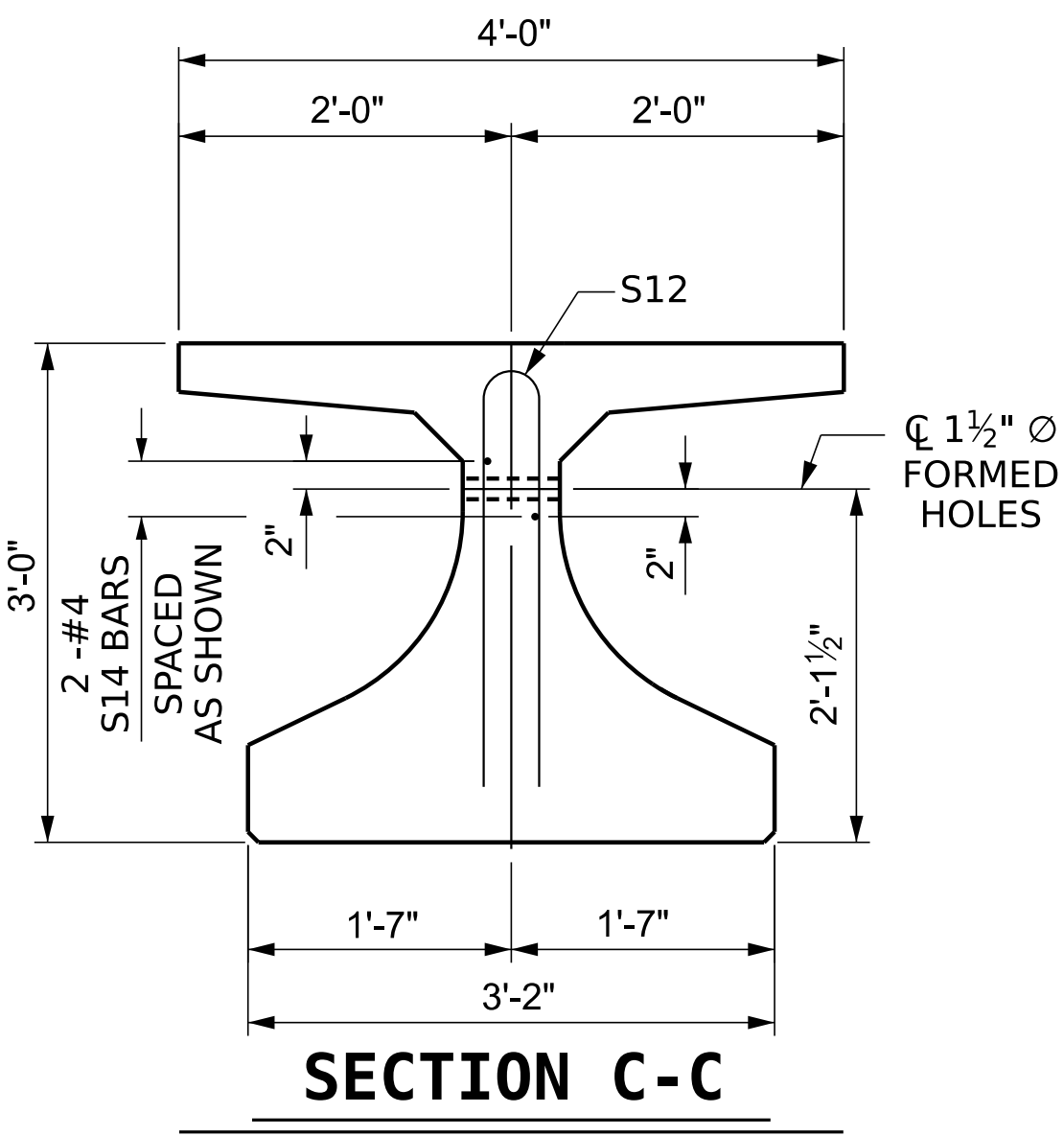
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
FRAMING PLAN  
(LEFT LANE)

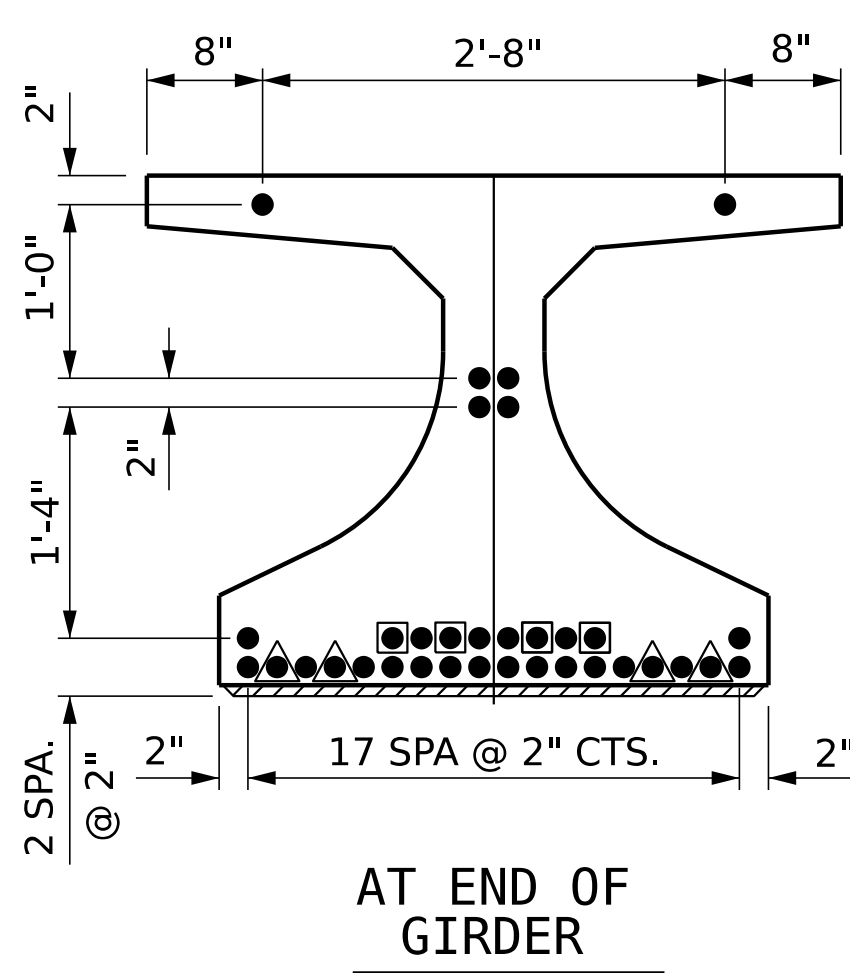
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			58



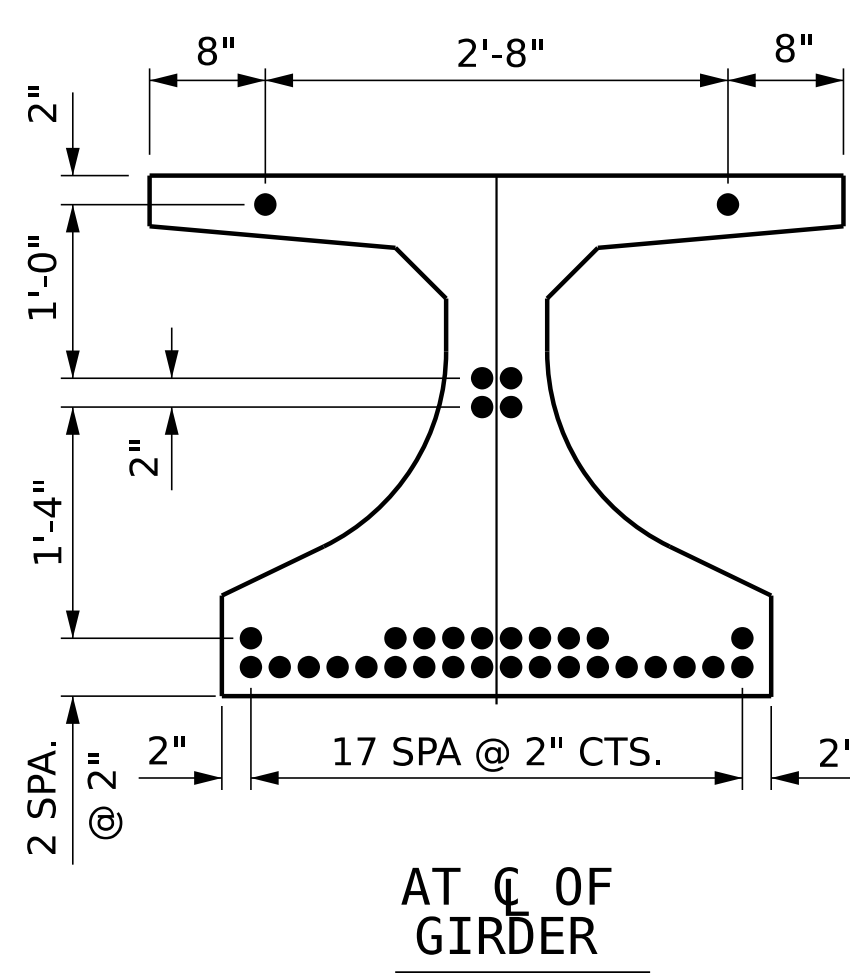
**SECTION A-A**



**SECTION C-C**  
(S8 AND S10 BARS NOT SHOWN)



AT END OF GIRDER

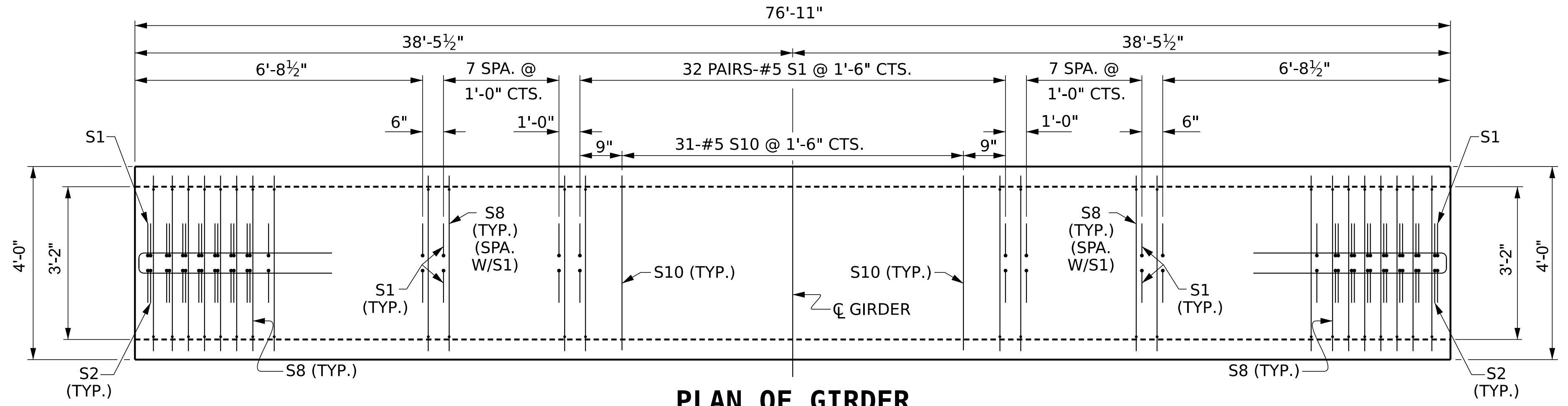


AT C OF GIRDER

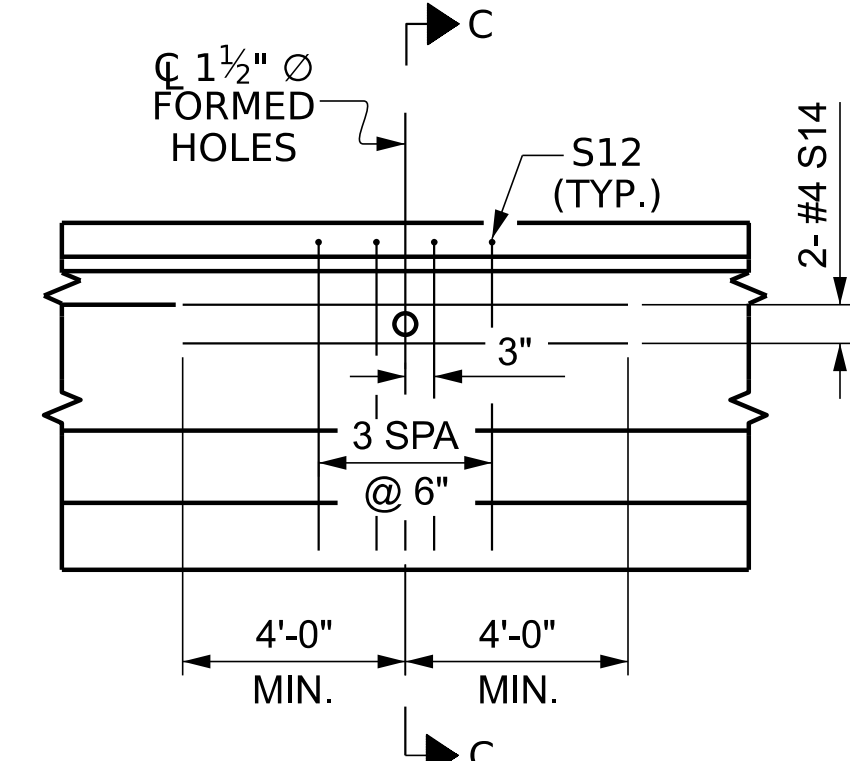
0.6" Ø LOW RELAXATION STRAND LAYOUT

**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- ◻ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER



**PLAN OF GIRDER**



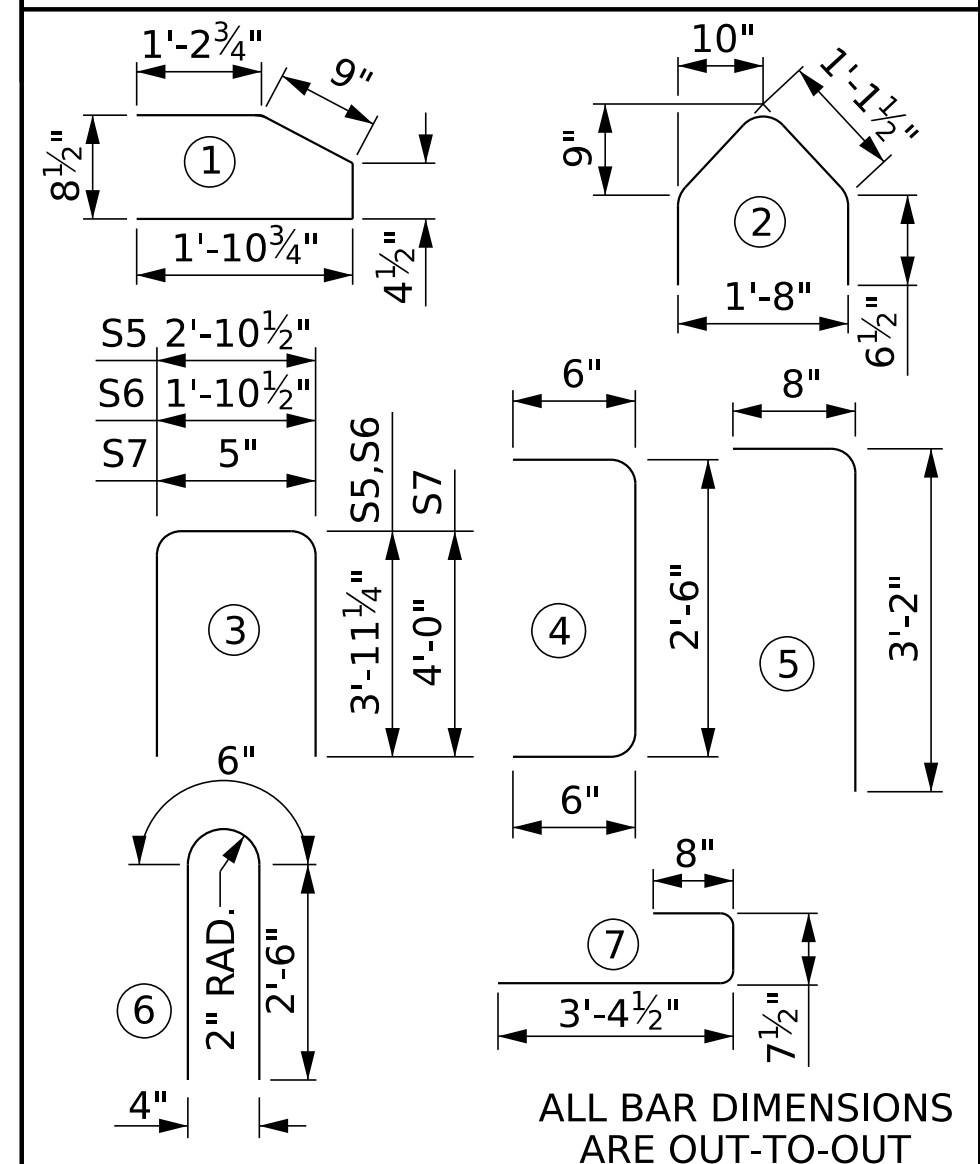
**PARTIAL ELEVATION**

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	160	#5	5	3'-10"	640
S2	28	#5	4	3'-6"	102
S3	32	#3	2	3'-4"	40
S4	64	#3	1	4'-3"	102
S5	2	#5	3	10'-9"	22
S6	2	#5	3	9'-9"	20
S7	4	#4	3	8'-5"	22
S8	160	#5	7	4'-8"	779
S10	31	#5	STR	3'-8"	119
S12	4	#5	6	5'-6"	23
S14	2	#4	STR	8'-0"	11

**BAR TYPES**

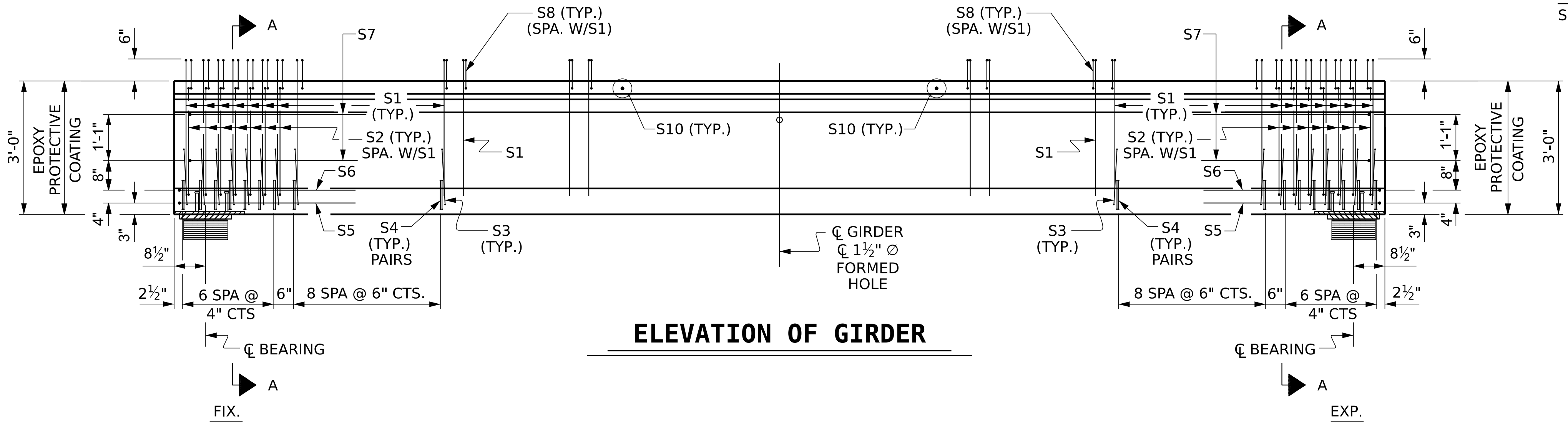


**QUANTITIES FOR ONE GIRDER**

REINFORCING STEEL	7,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
1,880	15.9	34

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
7	76'-11"	538.42



**ELEVATION OF GIRDER**

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**36" FIB PRESTRESSED CONCRETE GIRDER (LEFT LANE)**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS 58
2			4			

ASSEMBLED BY : D. HODGE	DATE : 2/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : BNB 09/21	
CHECKED BY : AAI 09/21	

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### 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 A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, 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.

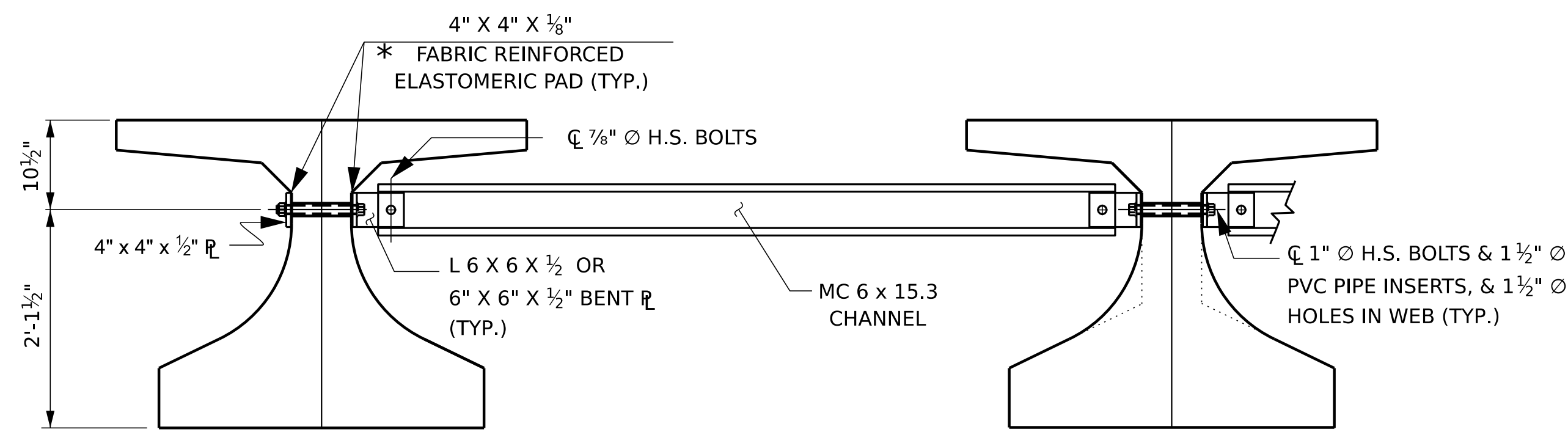
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.



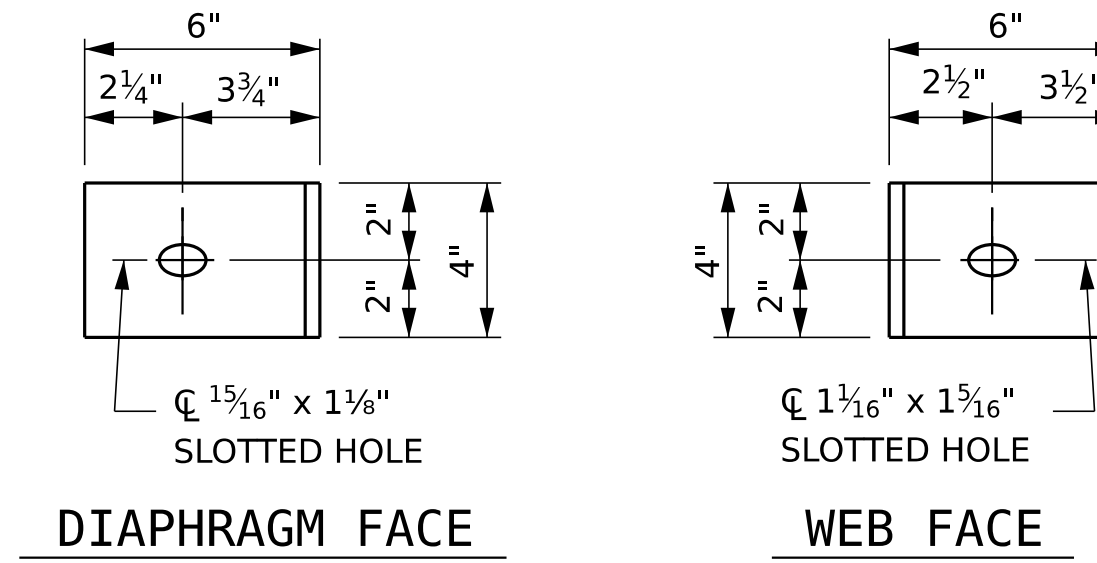
EXTERIOR GIRDER

INTERIOR GIRDER

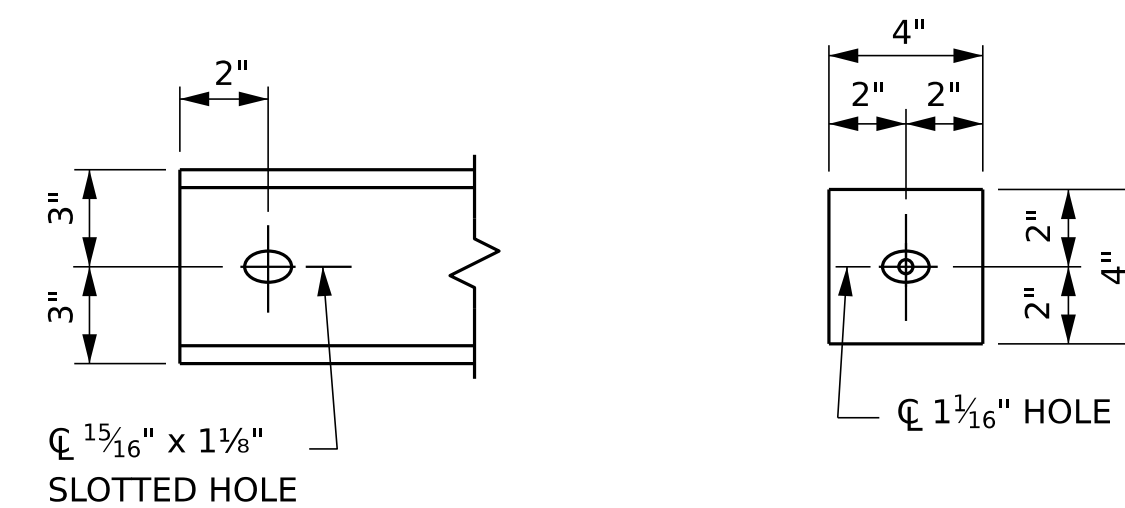
### PART SECTION AT INTERMEDIATE DIAPHRAGM

(36" FIB SHOWN)

\* PLACE ELASTOMERIC PADS AS NECESSARY TO PROVIDE A FLAT MOUNTING SURFACE BETWEEN THE STEEL AND CONCRETE

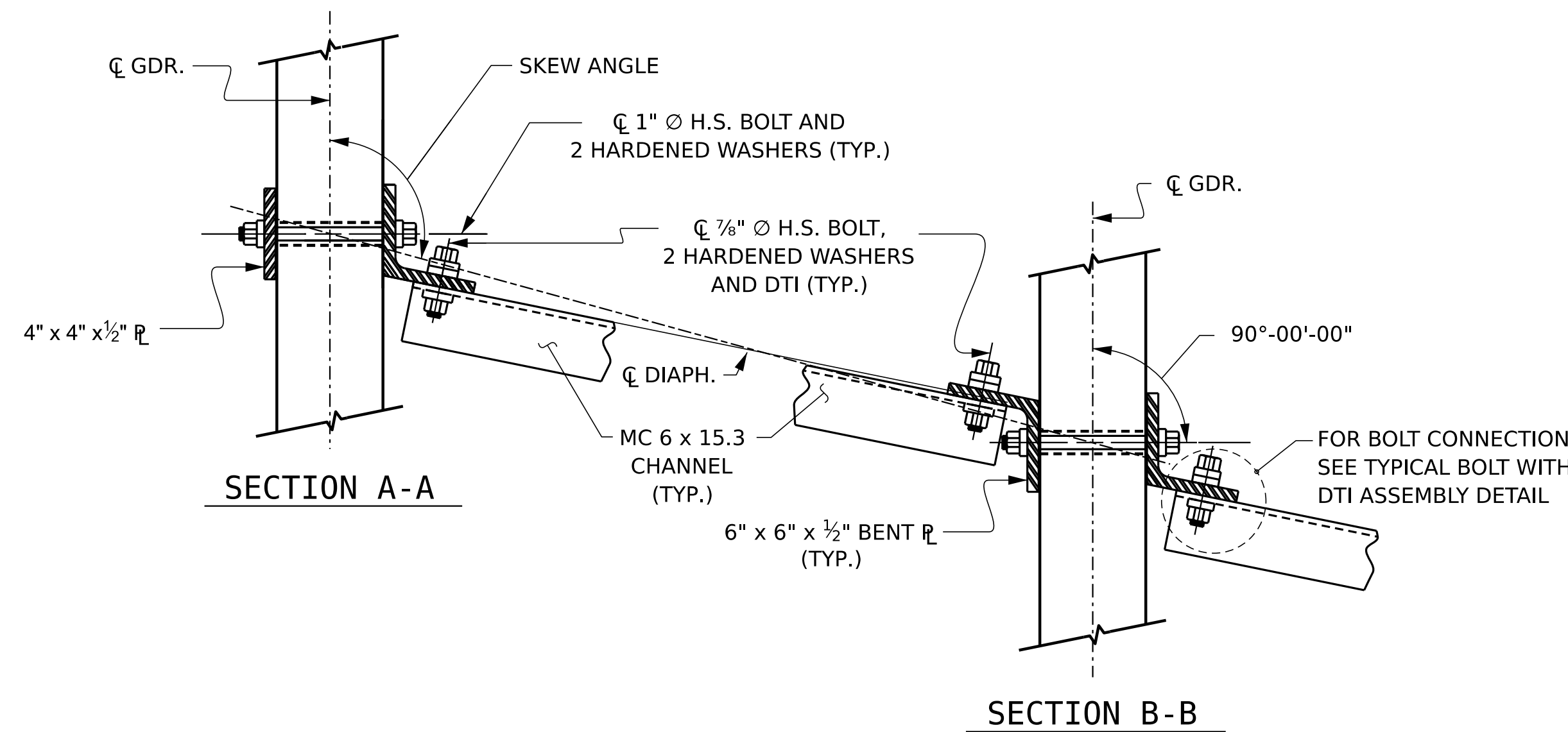


### CONNECTOR PLATE DETAILS



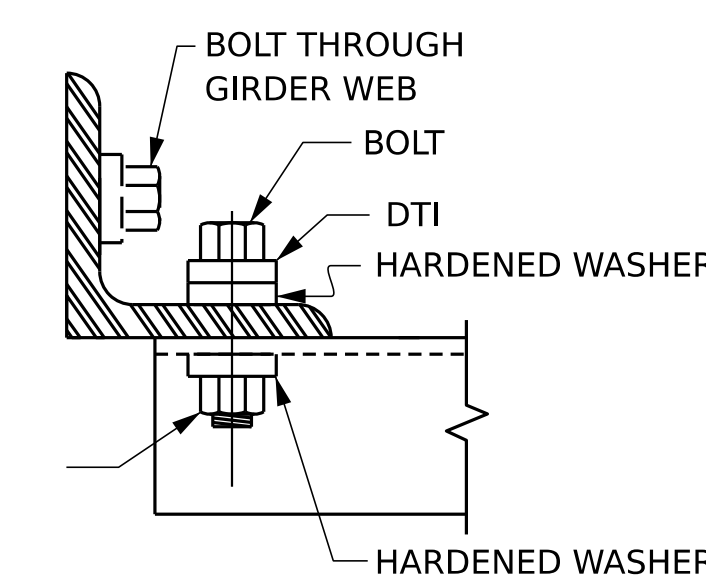
### CHANNEL END

### PLATE DETAILS



### CONNECTION DETAILS

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



### BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
STATION: 254+73.75 -L-

SHEET 2 OF 3

ENGINEER OF RECORD  
1/19/2024

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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

### STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 36" FIB (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-12
1			3			TOTAL SHEETS
2			4			58

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STD. NO. FIB36

**NOTES**

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

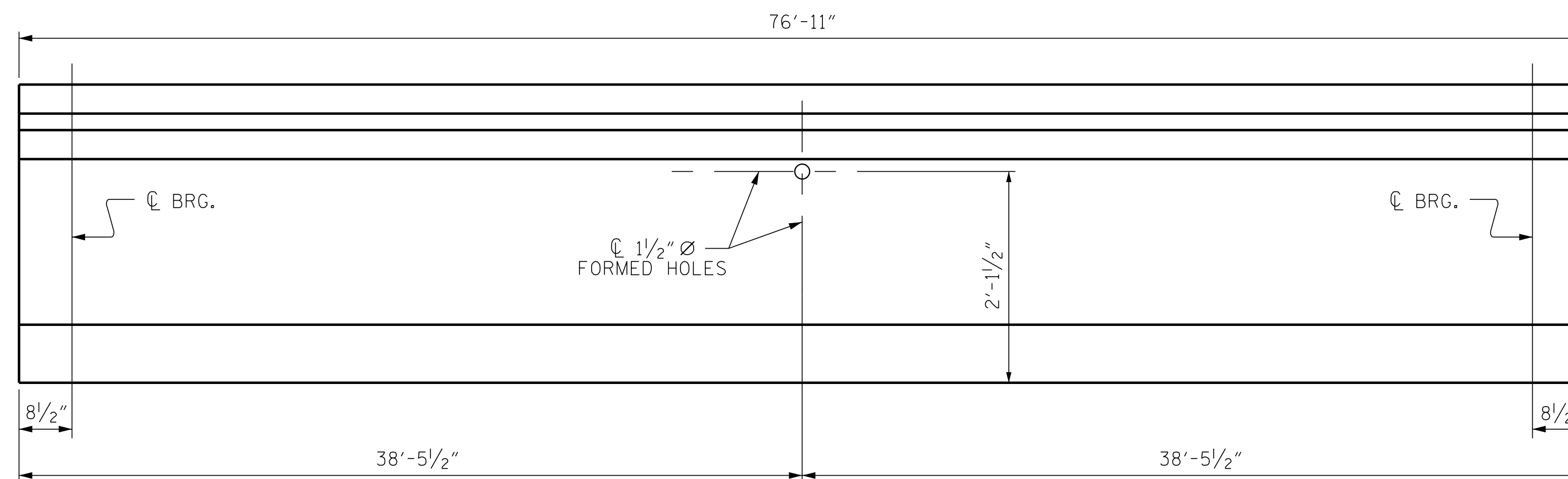
THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN A																				
	GIRDERS 1 & 7																				
TWENTIETH POINTS	0	.050	.100	.150	.200	.250	.300	.350	.400	.450	.500	.550	.600	.650	.700	.750	.800	.850	.900	.950	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.036	0.072	0.096	0.121	0.138	0.155	0.165	0.175	0.178	0.181	0.178	0.175	0.165	0.155	0.138	0.121	0.096	0.072	0.036	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.016	0.032	0.048	0.064	0.076	0.089	0.097	0.105	0.107	0.110	0.107	0.105	0.097	0.089	0.076	0.064	0.048	0.032	0.016	0
FINAL CAMBER ↑	0	1/4"	1/2"	9/16"	11/16"	3/4"	13/16"	13/16"	13/16"	7/8"	7/8"	7/8"	13/16"	13/16"	13/16"	3/4"	11/16"	9/16"	1/2"	1/4"	0

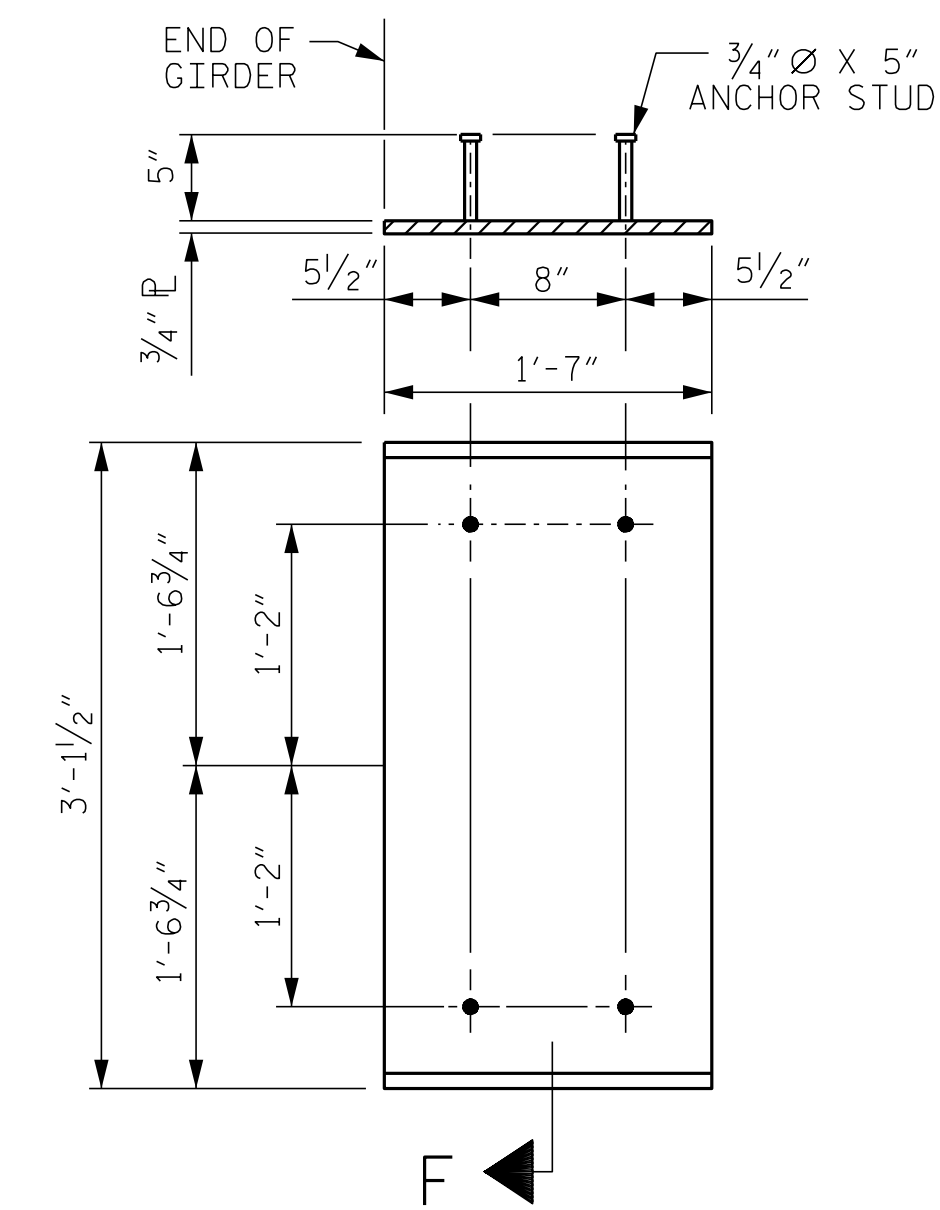
\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN A																				
	GIRDERS 2 THRU 6																				
TWENTIETH POINTS	0	.050	.100	.150	.200	.250	.300	.350	.400	.450	.500	.550	.600	.650	.700	.750	.800	.850	.900	.950	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.036	0.072	0.096	0.121	0.138	0.155	0.165	0.175	0.178	0.181	0.178	0.175	0.165	0.155	0.138	0.121	0.096	0.072	0.036	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.018	0.036	0.053	0.071	0.085	0.099	0.108	0.116	0.119	0.122	0.119	0.116	0.108	0.099	0.085	0.071	0.053	0.036	0.018	0
FINAL CAMBER ↑	0	3/16"	7/16"	1/2"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	1/2"	7/16"	3/16"	0

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

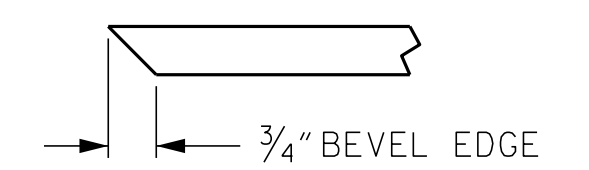


LOCATION OF BOLT HOLE IN GIRDERS



EMBEDDED PLATE "B-1" DETAILS FOR FIB GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
STATION: 254+73.75 -L-

SHEET 3 OF 3

ASSEMBLED BY : D. HODGE DATE : 2/23  
CHECKED BY : G. GILLAND DATE : 8/23  
DRAWN BY : BNB 08/21  
CHECKED BY : AAI 10/21

ENGINEER OF RECORD  
1/19/2024  
NORTH CAROLINA PROFESSIONAL SEAL 37400  
ENGINEER  
GREGORY M. GILLAND  
GREGORY M. GILLAND  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
FIB  
DETAILS  
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-13
1			3			TOTAL SHEETS 58
2			4			

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UNLESS ALL SIGNATURES COMPLETED

**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.

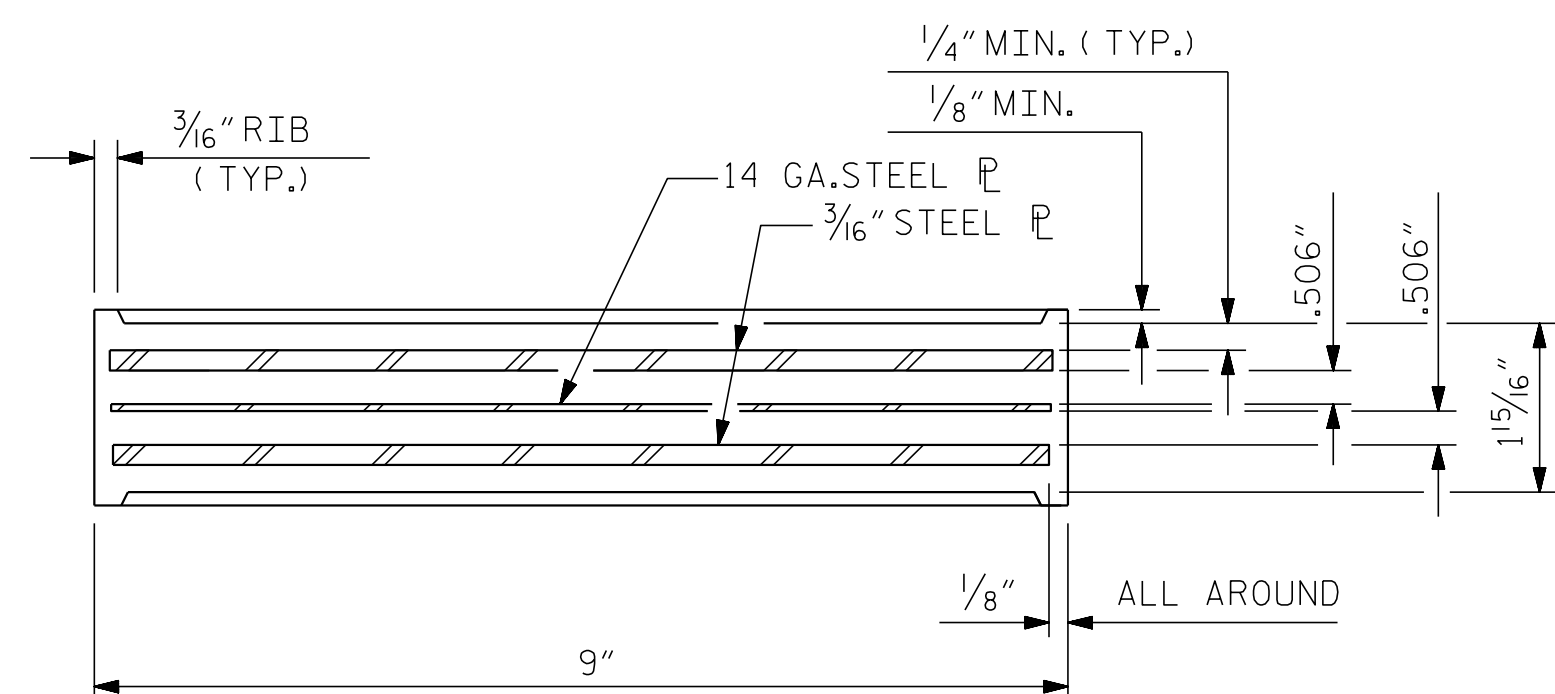
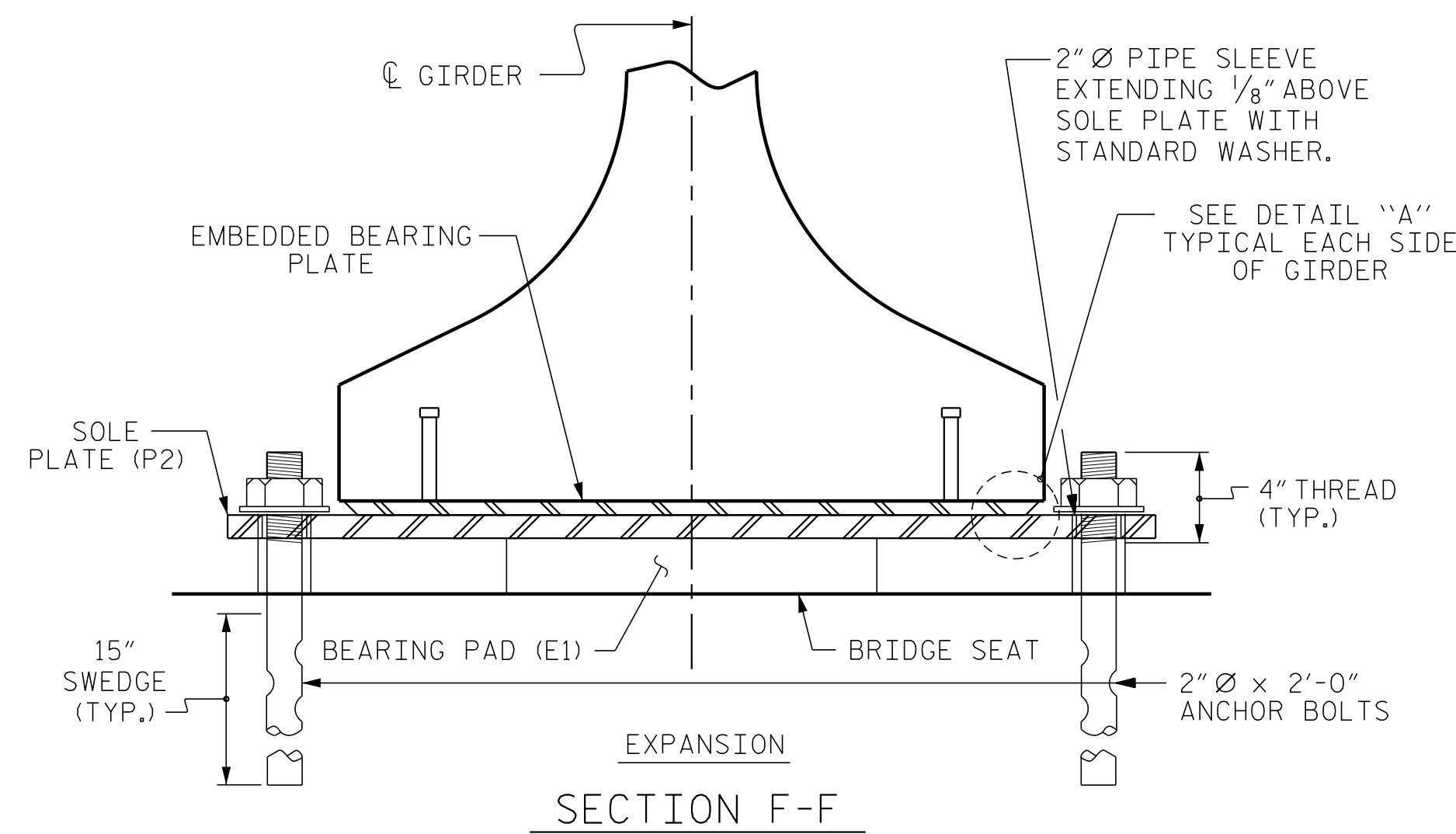
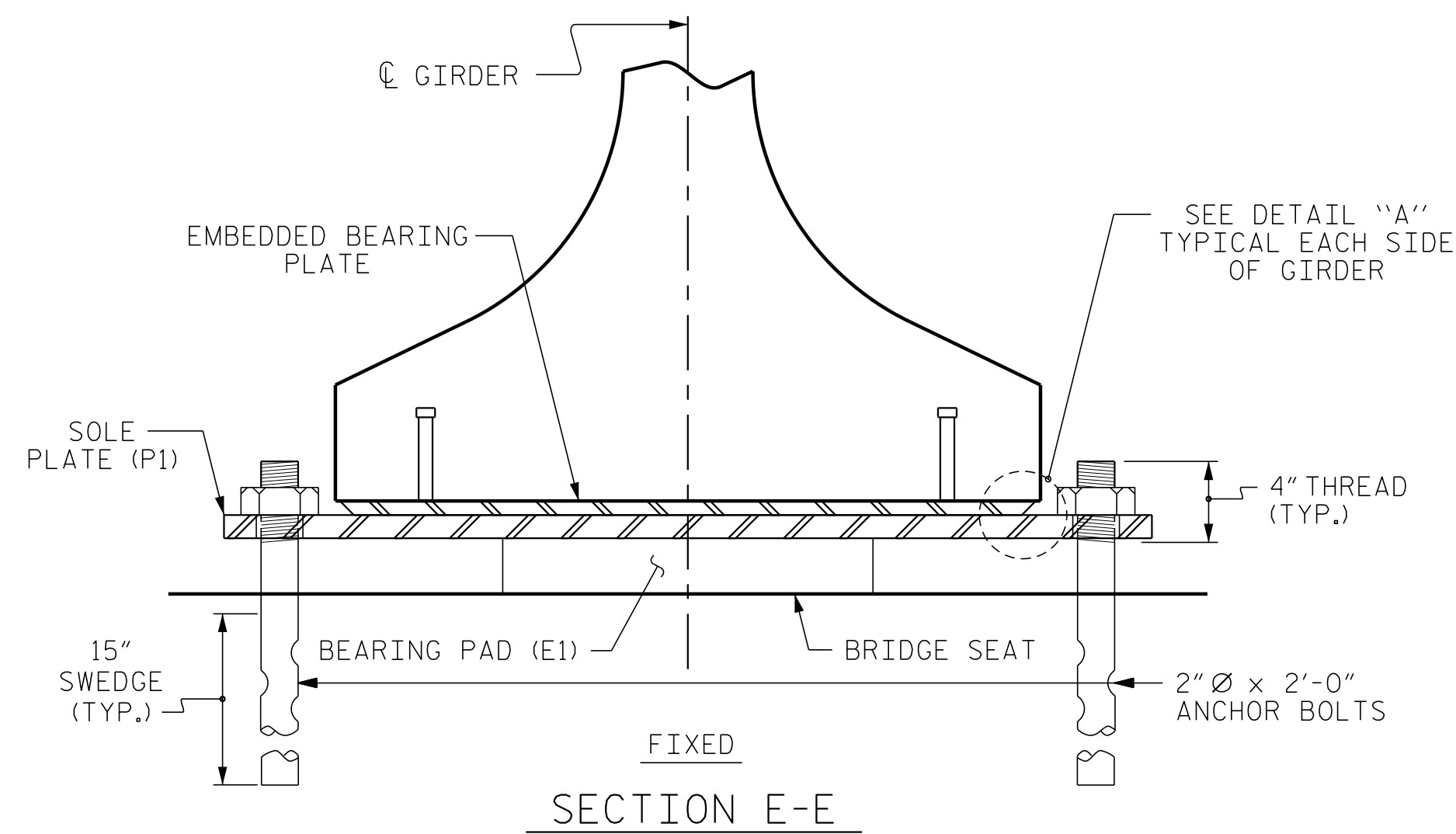
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

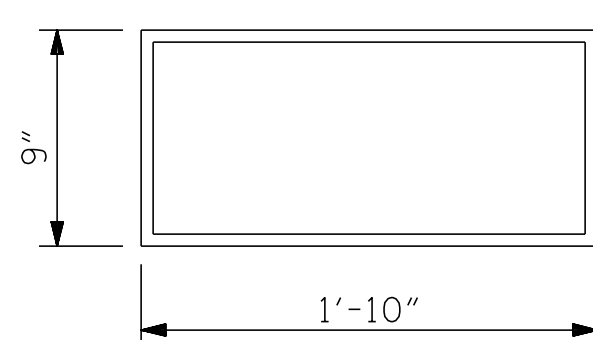
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



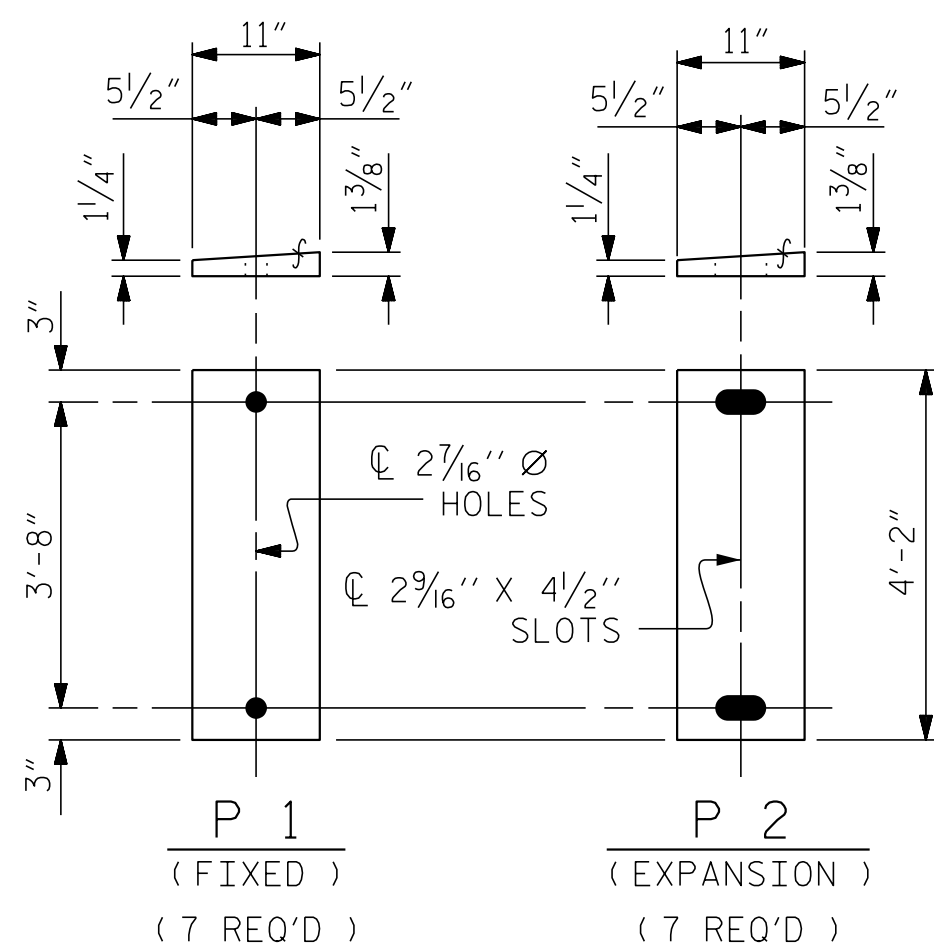
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (14 REQ'D)

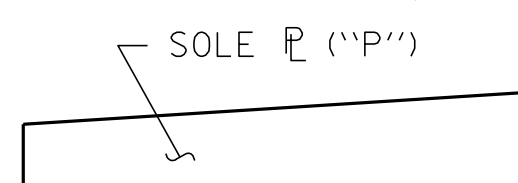
PLAN VIEW OF ELASTOMERIC BEARING

**TYPE IV**

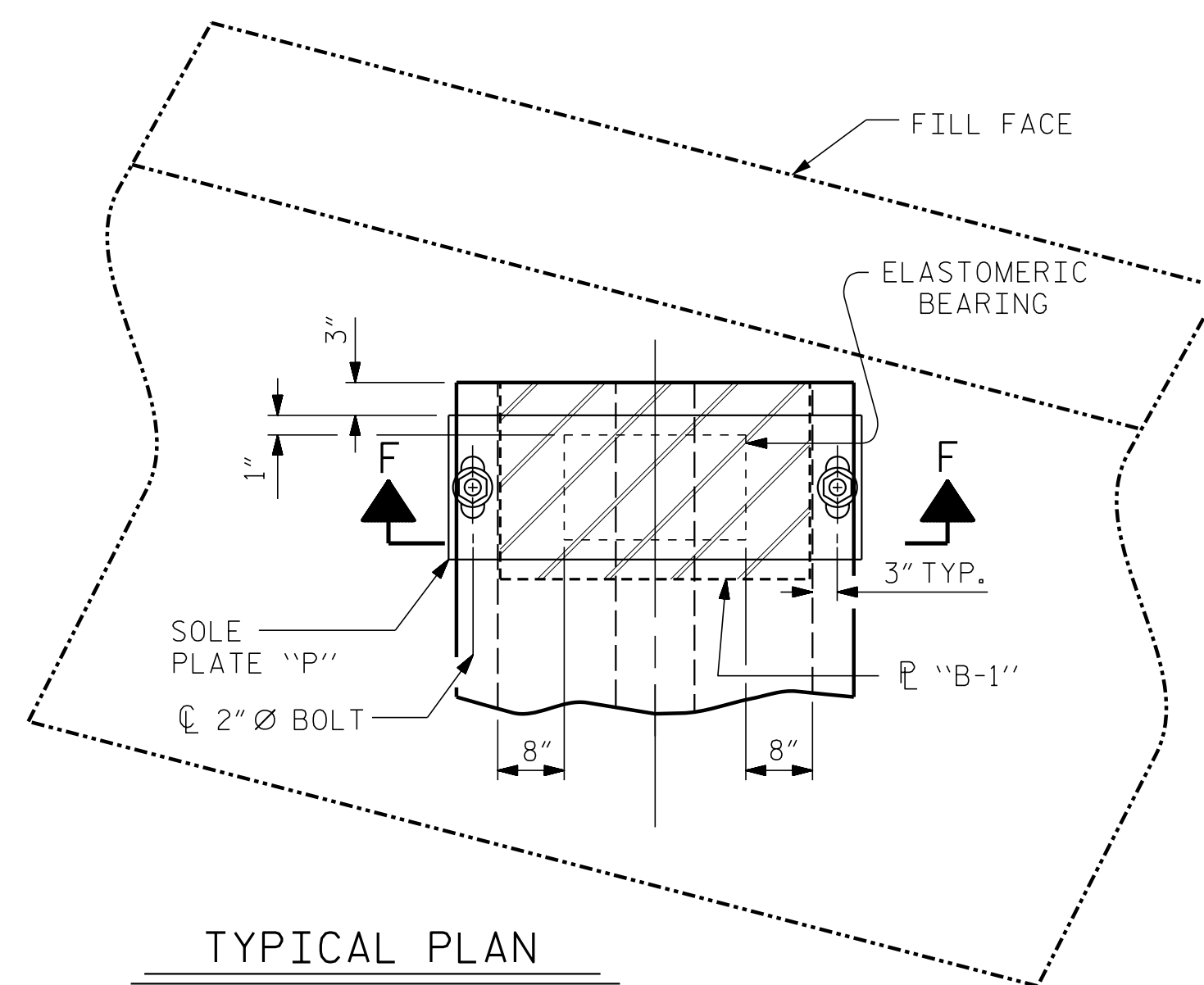


SOLE PLATE DETAILS ("P")

UP-STATION →

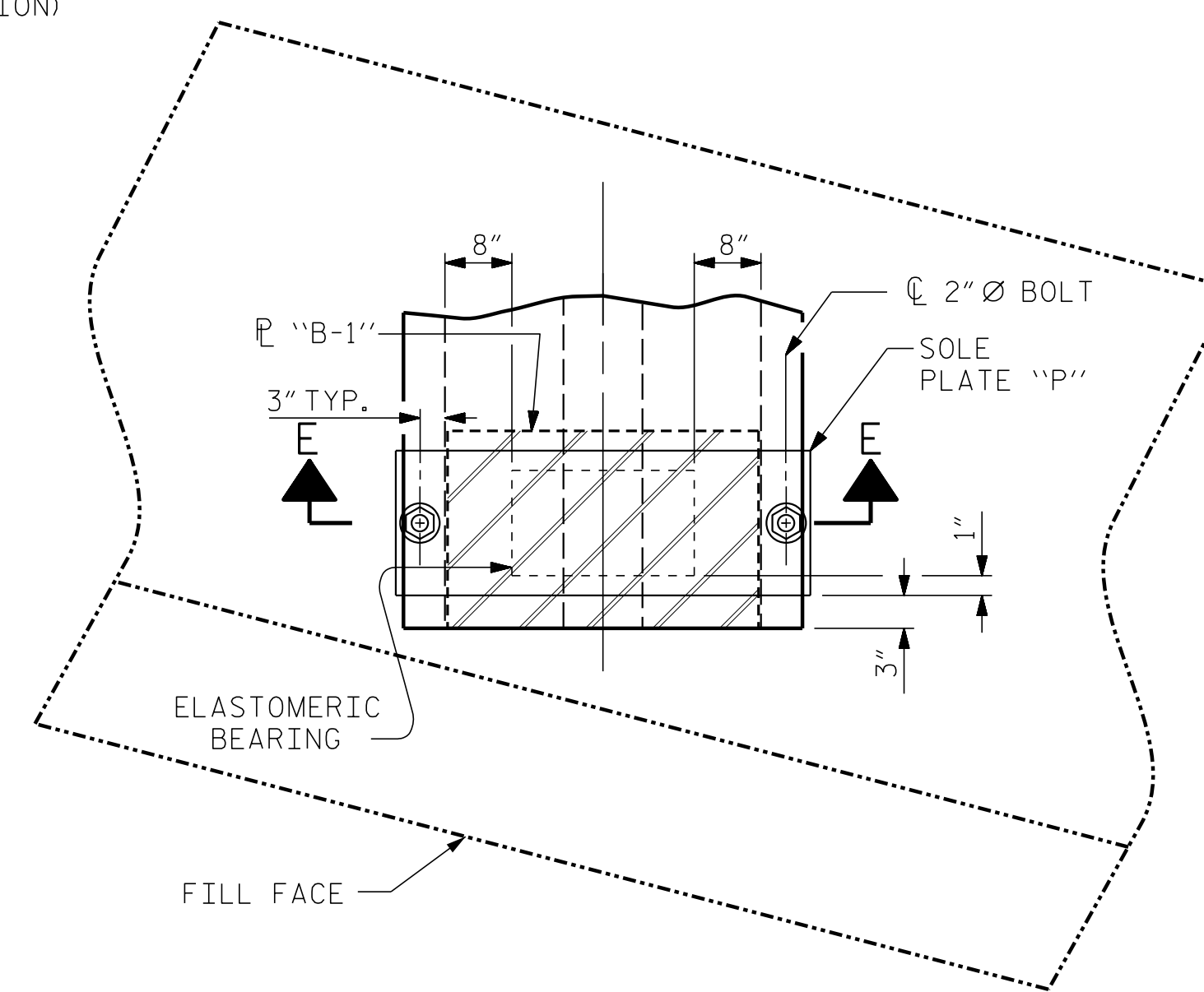


SOLE PLACEMENT DETAIL



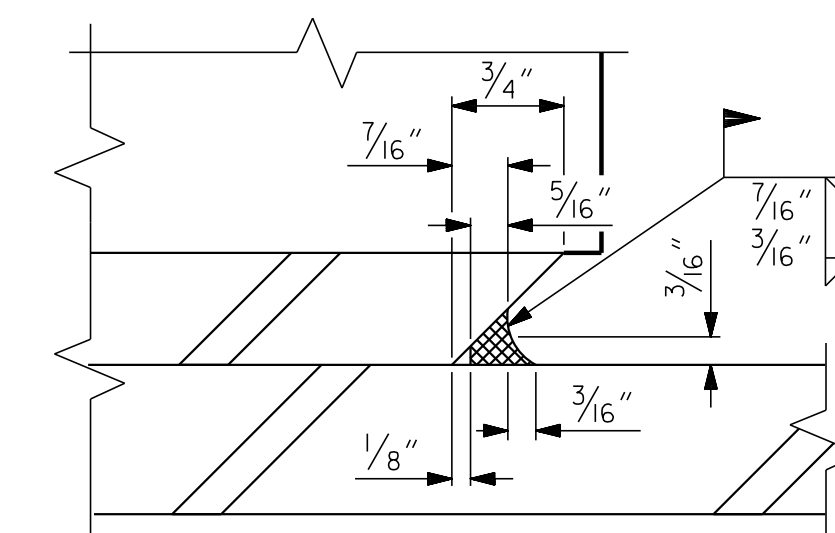
TYPICAL PLAN

(SHOWING END BENT No. 2) (EXPANSION)



TYPICAL PLAN

(SHOWING END BENT No. 1) (FIXED)



DETAIL "A"

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

ENGINEER OF RECORD  
 1/19/2024

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**ELASTOMERIC BEARING DETAILS**  
 PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (LEFT LANE)

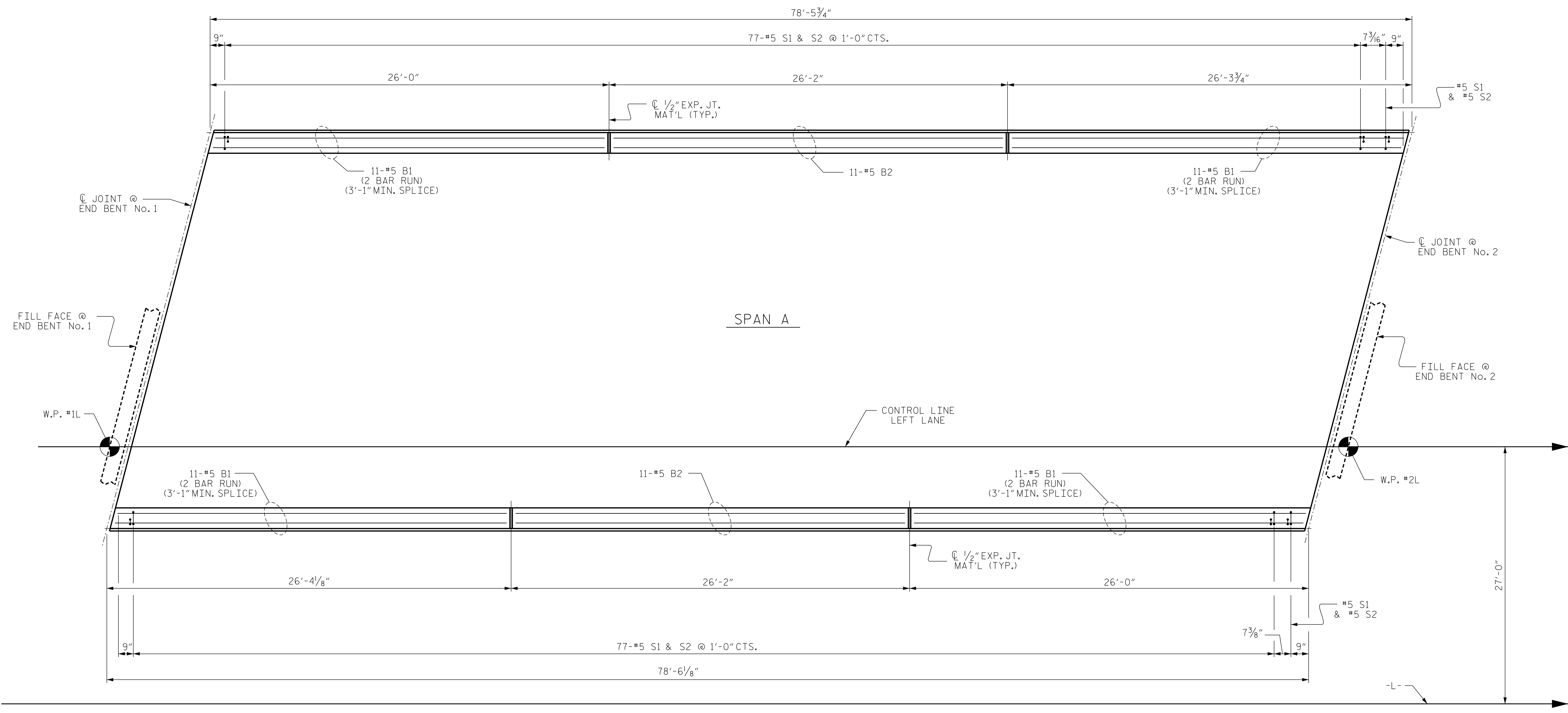
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-14
1			3			TOTAL SHEETS
2			4			58

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DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

NOTES:  
#5 S1 AND S2 BARS MAY BE SHIFTED SLIGHTLY TO MAINTAIN 2" CLEAR TO EXPANSION JOINT IN RAIL.



### PLAN OF CONCRETE BARRIER RAIL

ALL DIMENSIONS ARE TAKEN ALONG THE ARC OF THE OUTSIDE EDGE OF CONCRETE BARRIER.

PROJECT NO. HB-0004

HAYWOOD COUNTY

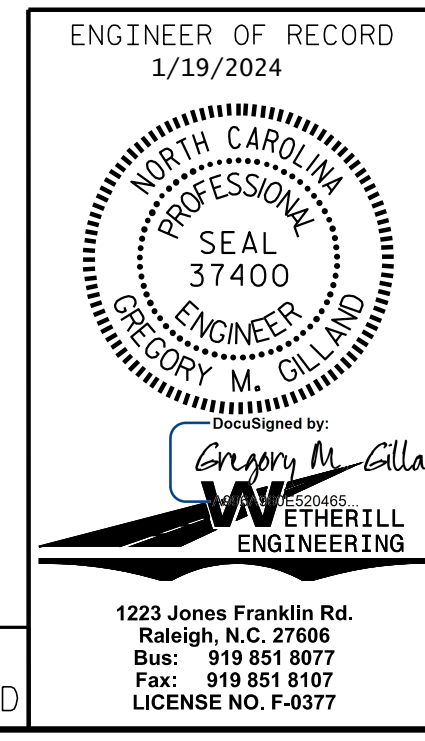
STATION: 254+73.75 -L-

SHEET 1 OF 2

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DRAWN BY : D. HODGE DATE : 2/23  
CHECKED BY : G. GILLAND DATE : 8/23

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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

## CONCRETE BARRIER RAIL (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			58

1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
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Fax: 919 851 8107  
LICENSE NO. F-0377

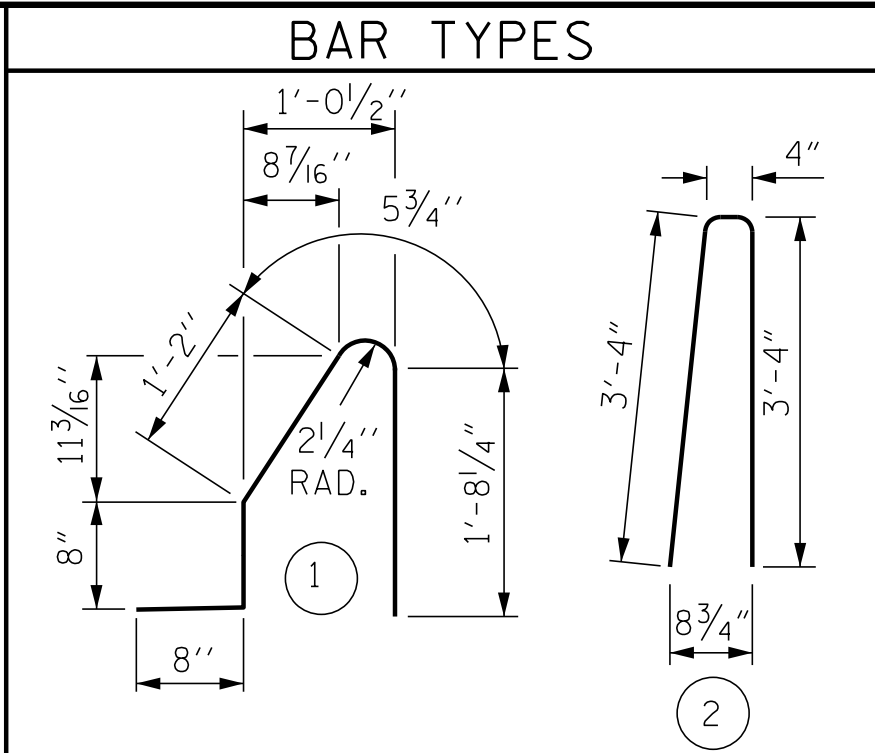


NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.



ALL BAR DIMENSIONS ARE OUT TO OUT

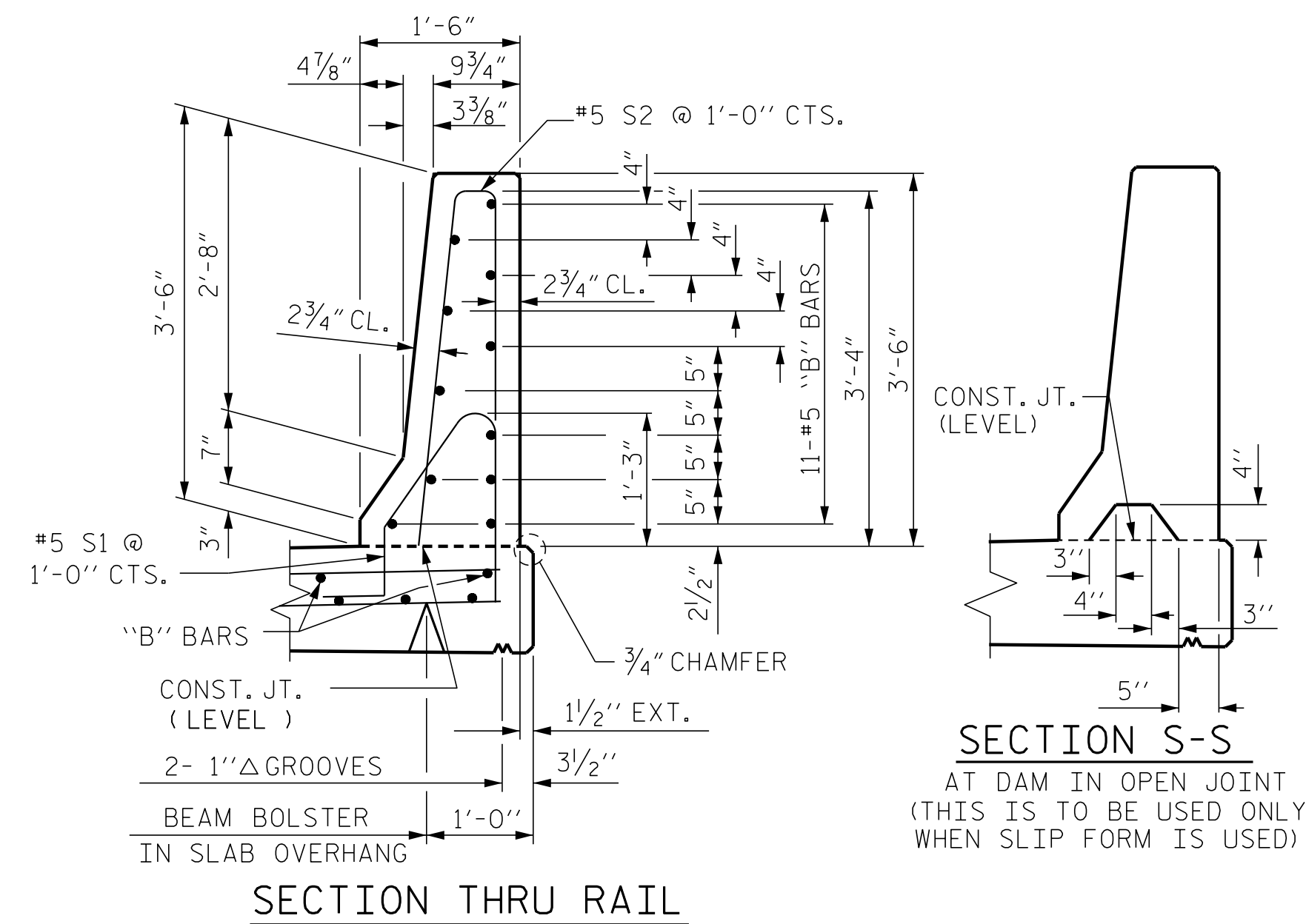
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

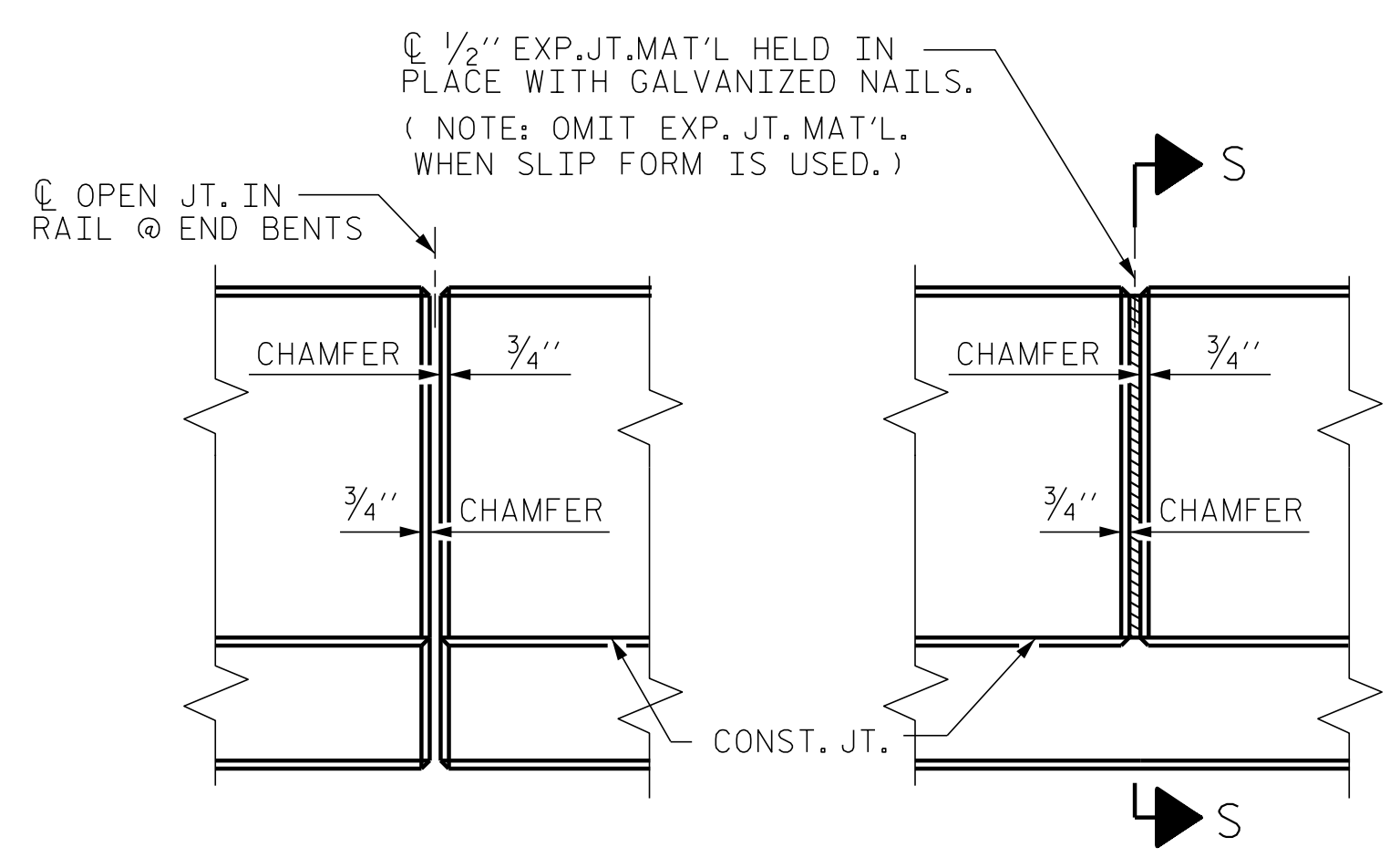
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	156	#5	1	4'-8"	759
* S2	156	#5	2	7'-0"	1,139
* B1	88	#5	STR	14'-6"	1,331
* B2	22	#5	STR	25'-9"	591

* EPOXY COATED REINFORCING STEEL	3,820 LBS.
CLASS AA CONCRETE	21.3 CU. YDS.
CONCRETE BARRIER RAIL	156.99 LIN. FT.

FOR CONCRETE BARRIER RAIL QUANTITIES ON APPROACH SLABS, SEE APPROACH SLAB SHEETS.

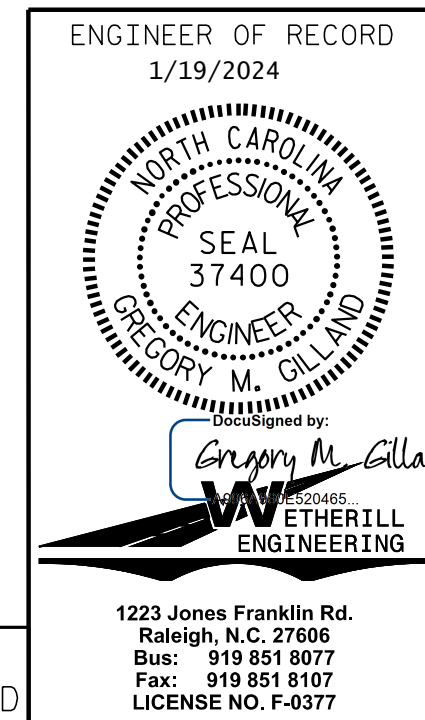


SECTION S-S  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
STATION: 254+73.75 -L-  
SHEET 2 OF 2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
CONCRETE  
BARRIER RAIL  
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-16
1			3			TOTAL SHEETS
2			4			58

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ASSEMBLED BY : D. HODGE	DATE : 1/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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 1/8" 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.)

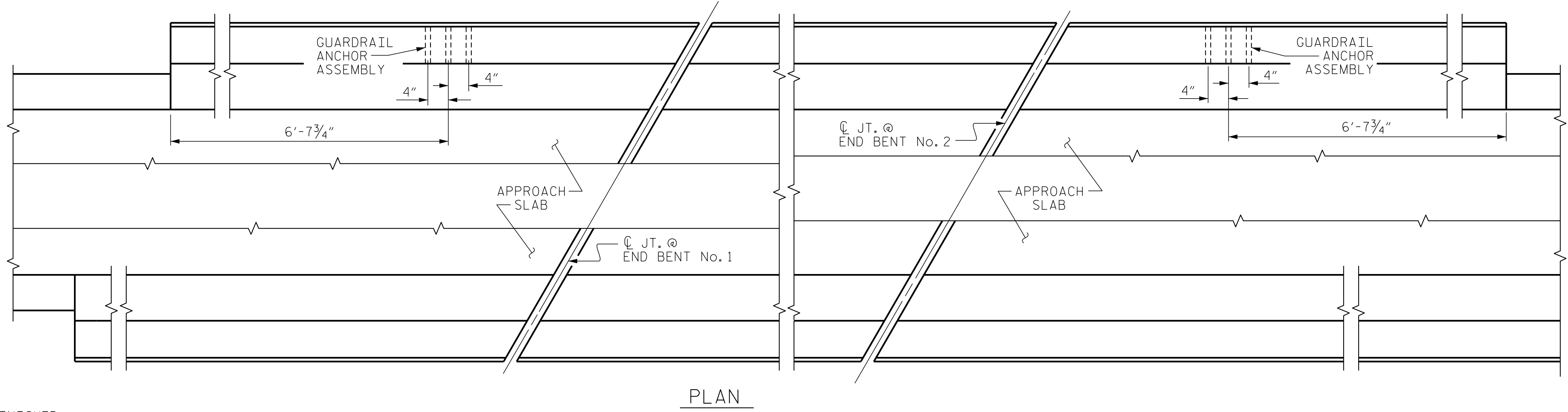
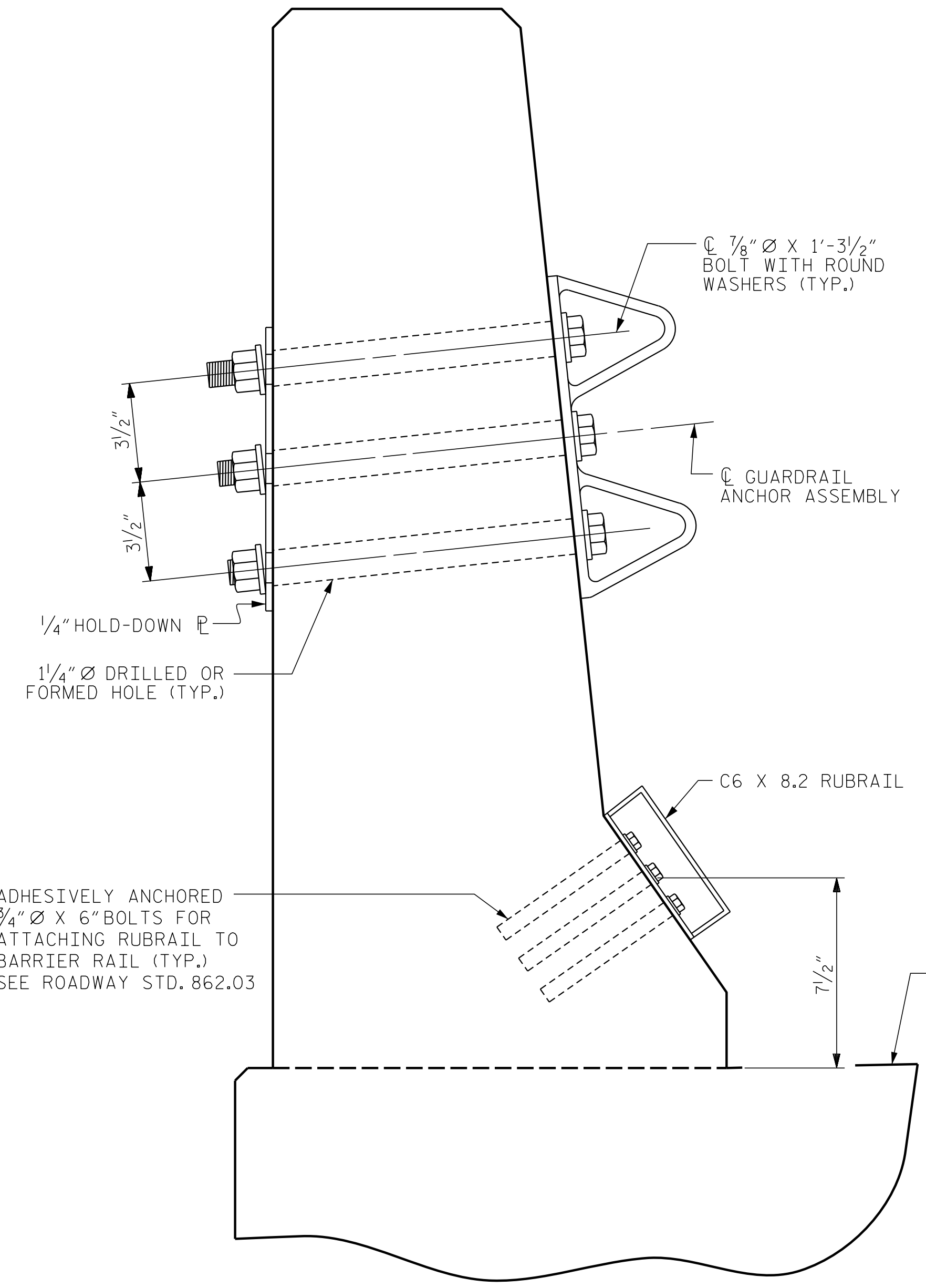
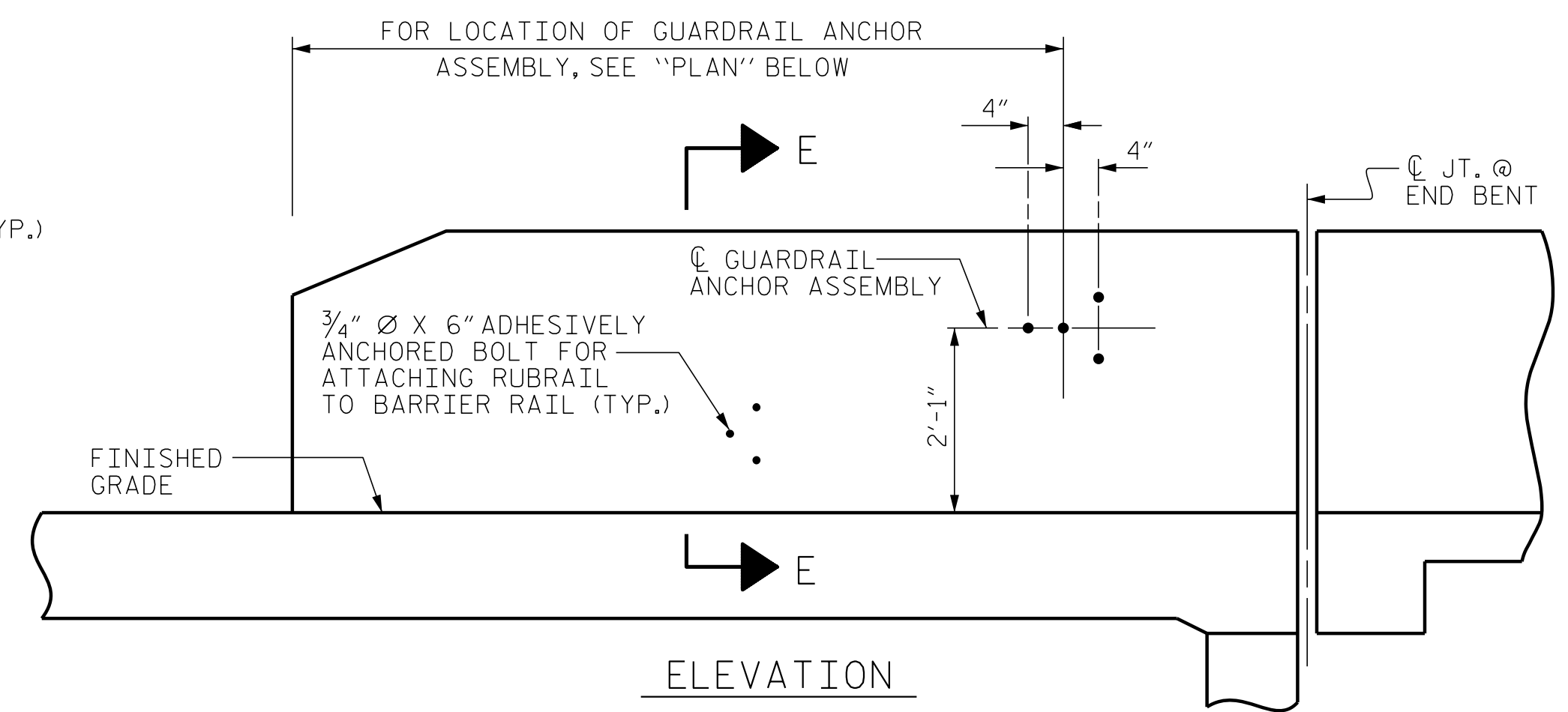
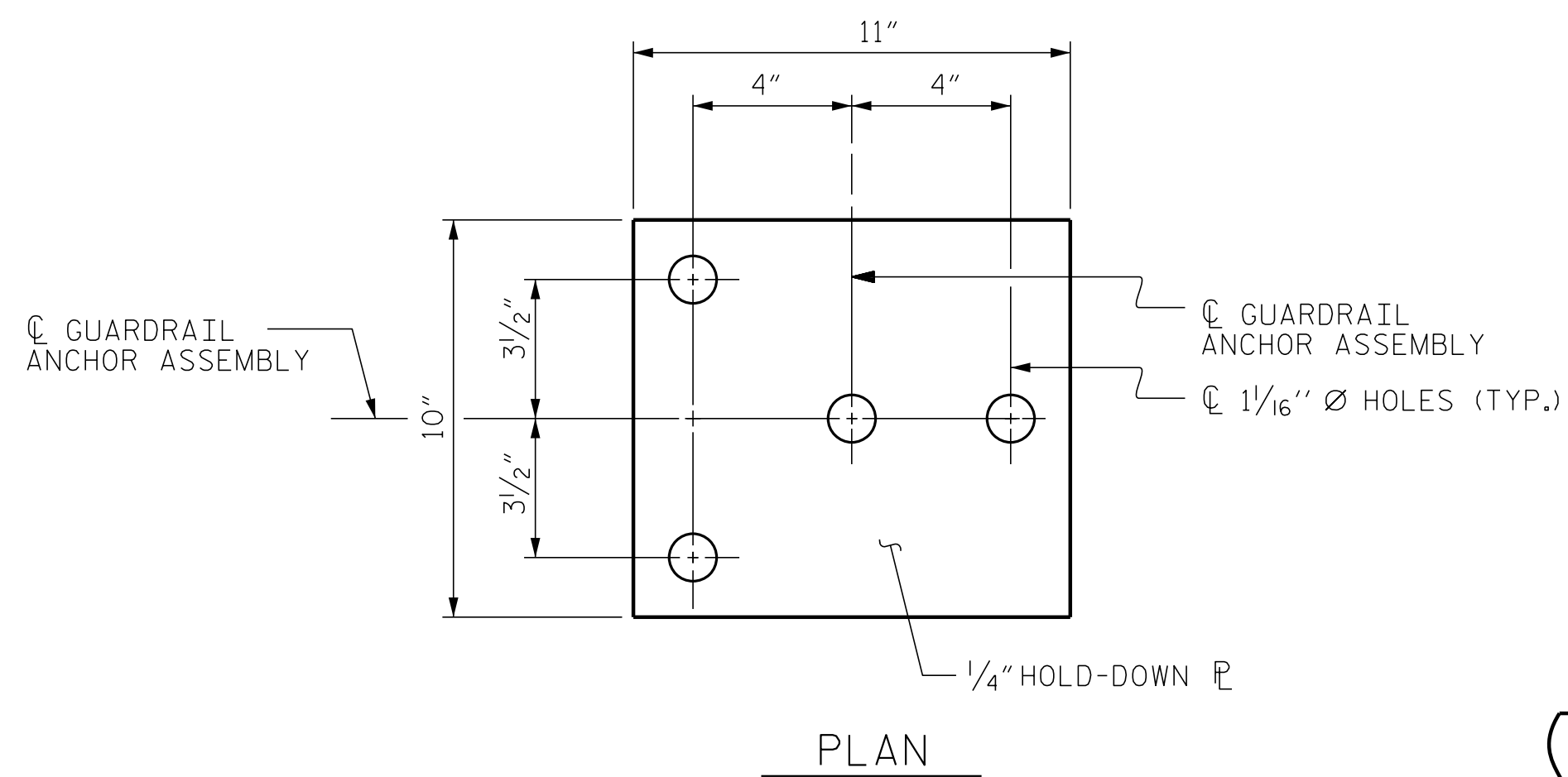
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

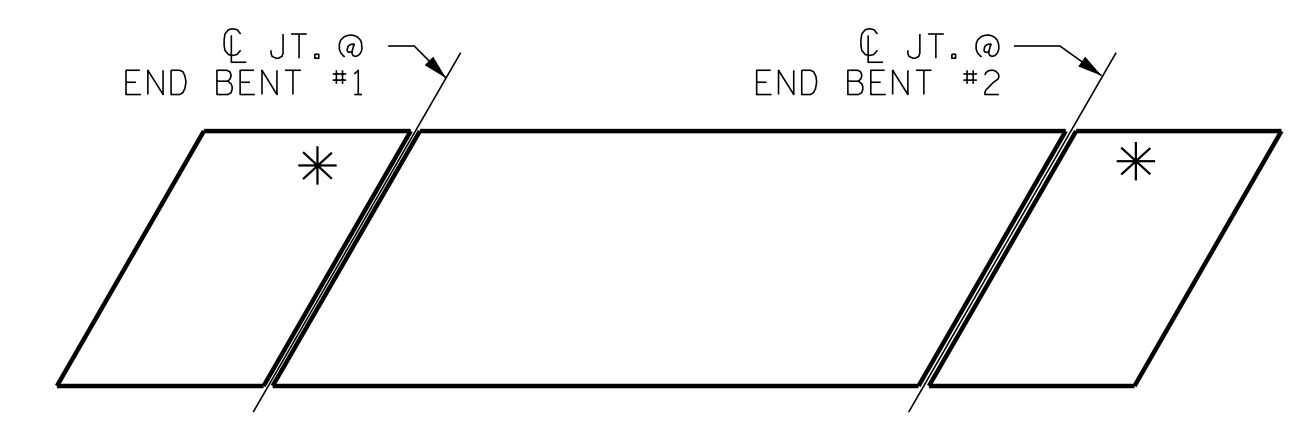
THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



LOCATION OF ANCHORS FOR GUARDRAIL

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-



SKETCH SHOWING POINTS OF ATTACHMENTS  
 \* DENOTES GUARDRAIL ANCHOR ASSEMBLY

SECTION E-E  
 GUARDRAIL ANCHOR ASSEMBLY DETAILS

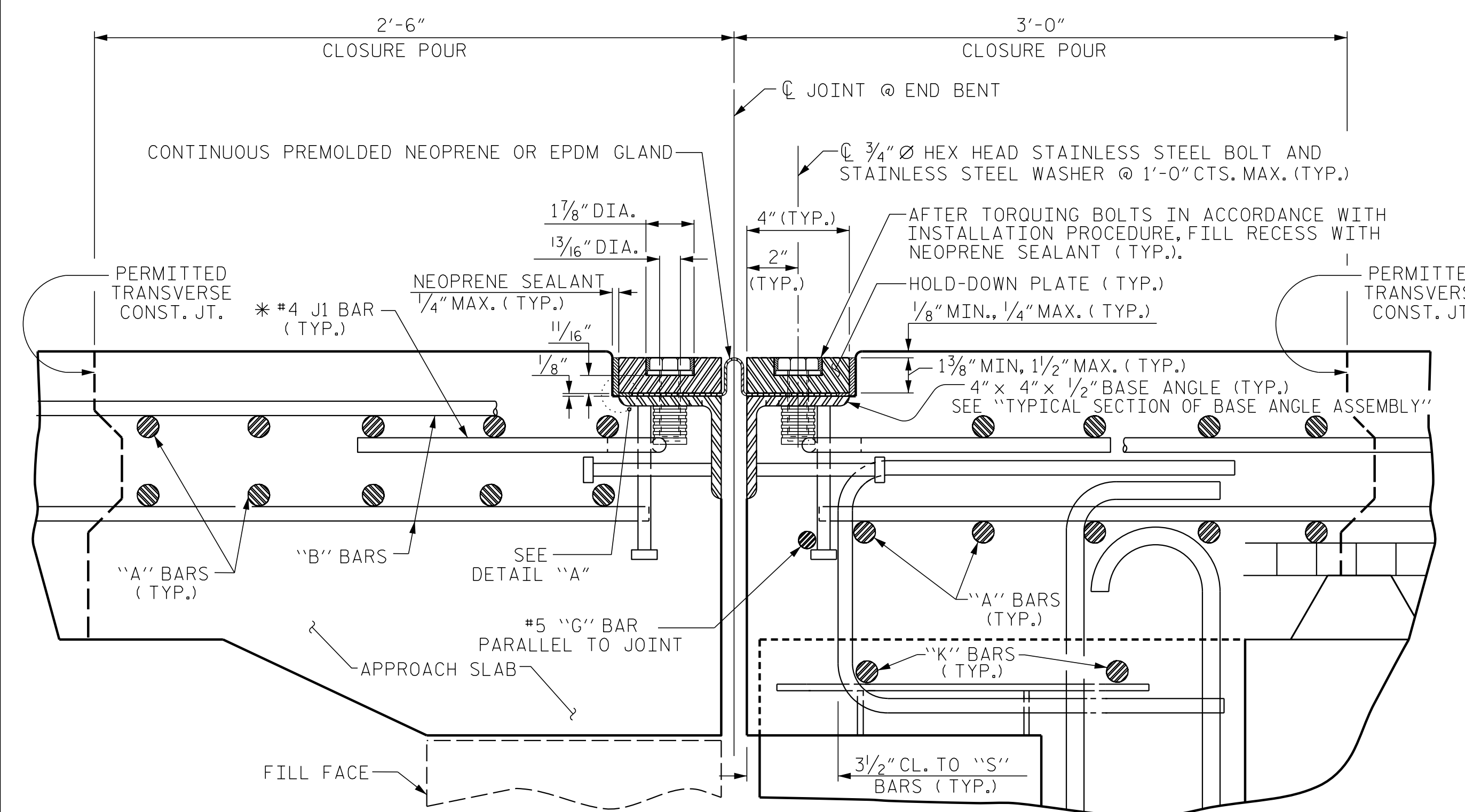
ASSEMBLED BY : D. HODGE	DATE : 1/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

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 UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD  
 1/19/2024  
  
 Designed by:  
  
 GREGORY M. GILLILAND  
 ETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD GUARDRAIL ANCHORAGE FOR BARRIER RAIL (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-17					TOTAL SHEETS 58

PA\2023\2312401-HB-0004-Structures\03\HB-0004 (LEFT LANE)\HB0004-LEFT-GRA.dgn  
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### EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

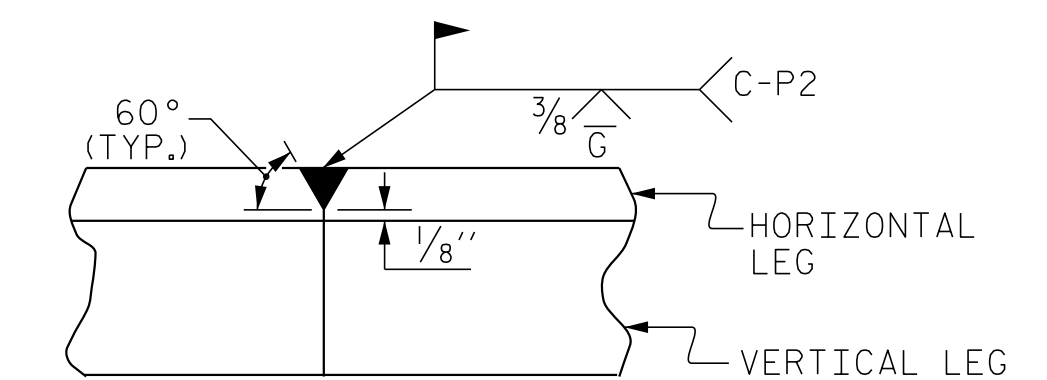
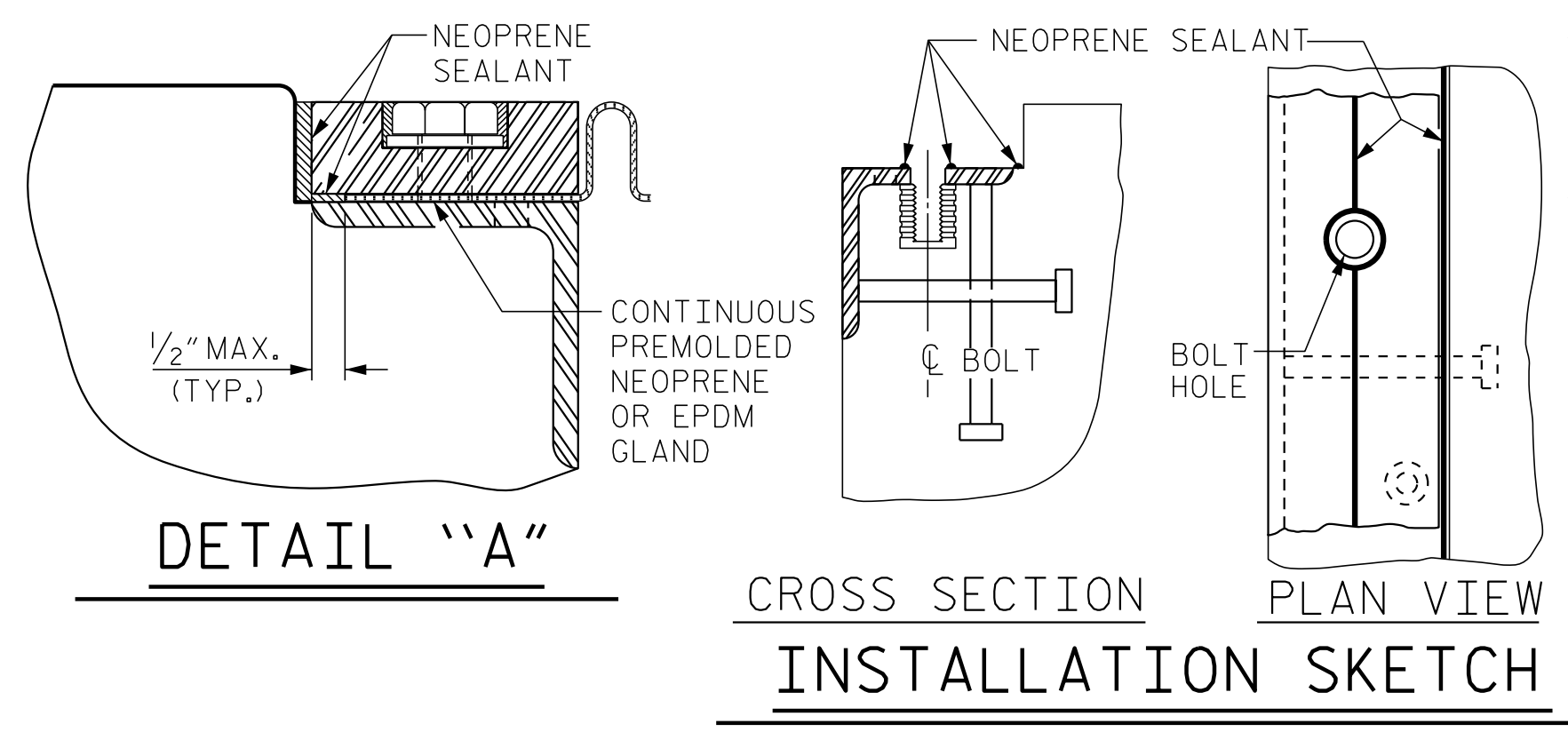
\* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

### INSTALLATION PROCEDURE

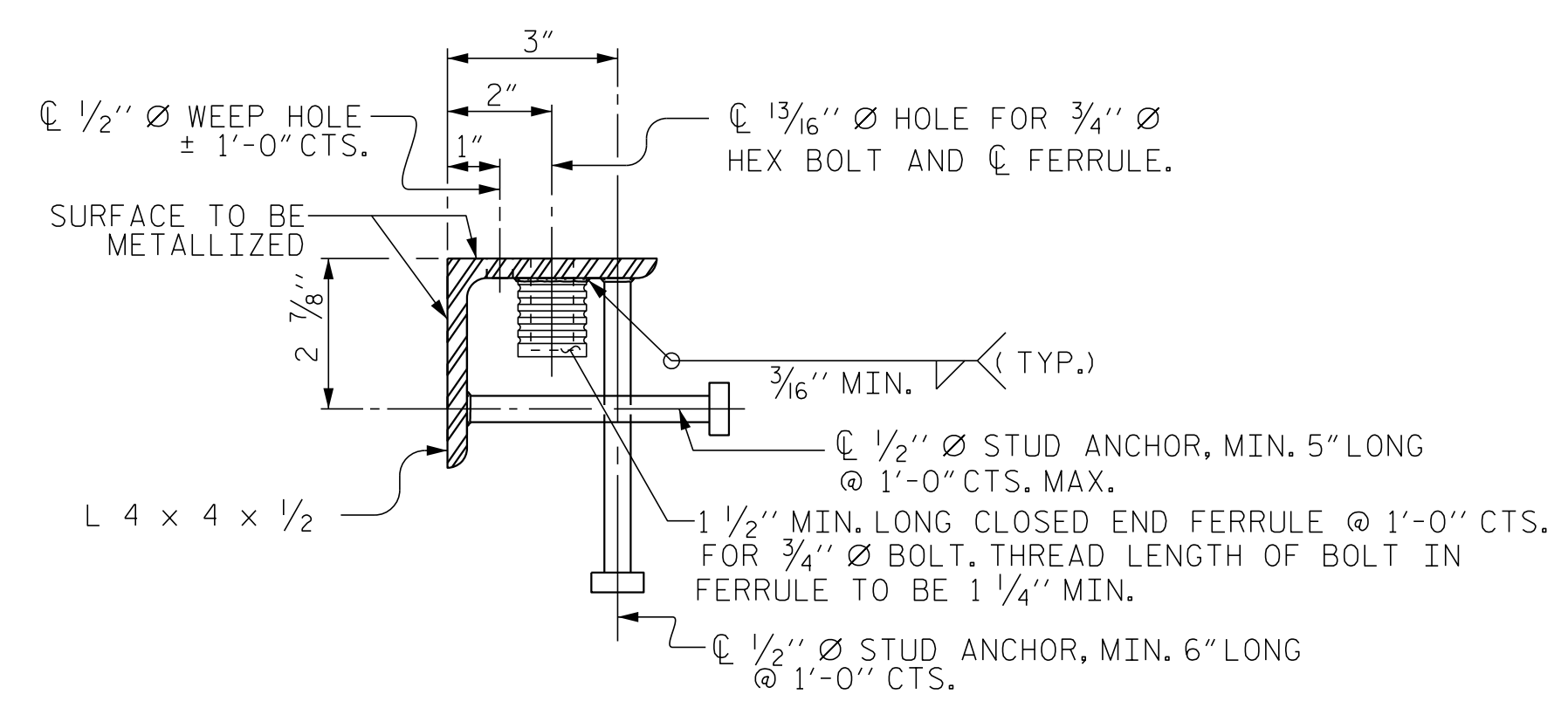
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

### GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG C RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	104°-37'-47"	0"	1"	1"	1"
2	104°-37'-47"	1/2"	1 5/16"	1 1/4"	1 1/16"



### TYPICAL SECTION OF BASE ANGLE ASSEMBLY

### DETAIL- FIELD WELD SPLICE OF BASE ANGLE

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 1 OF 2

ASSEMBLED BY : D. HODGE	DATE : 1/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : REK	9/87
CHECKED BY : CRK	10/87
REV. 10/11	MAA/GM
REV. 10/17	MAA/THC
REV. 6/18	MAA/THC

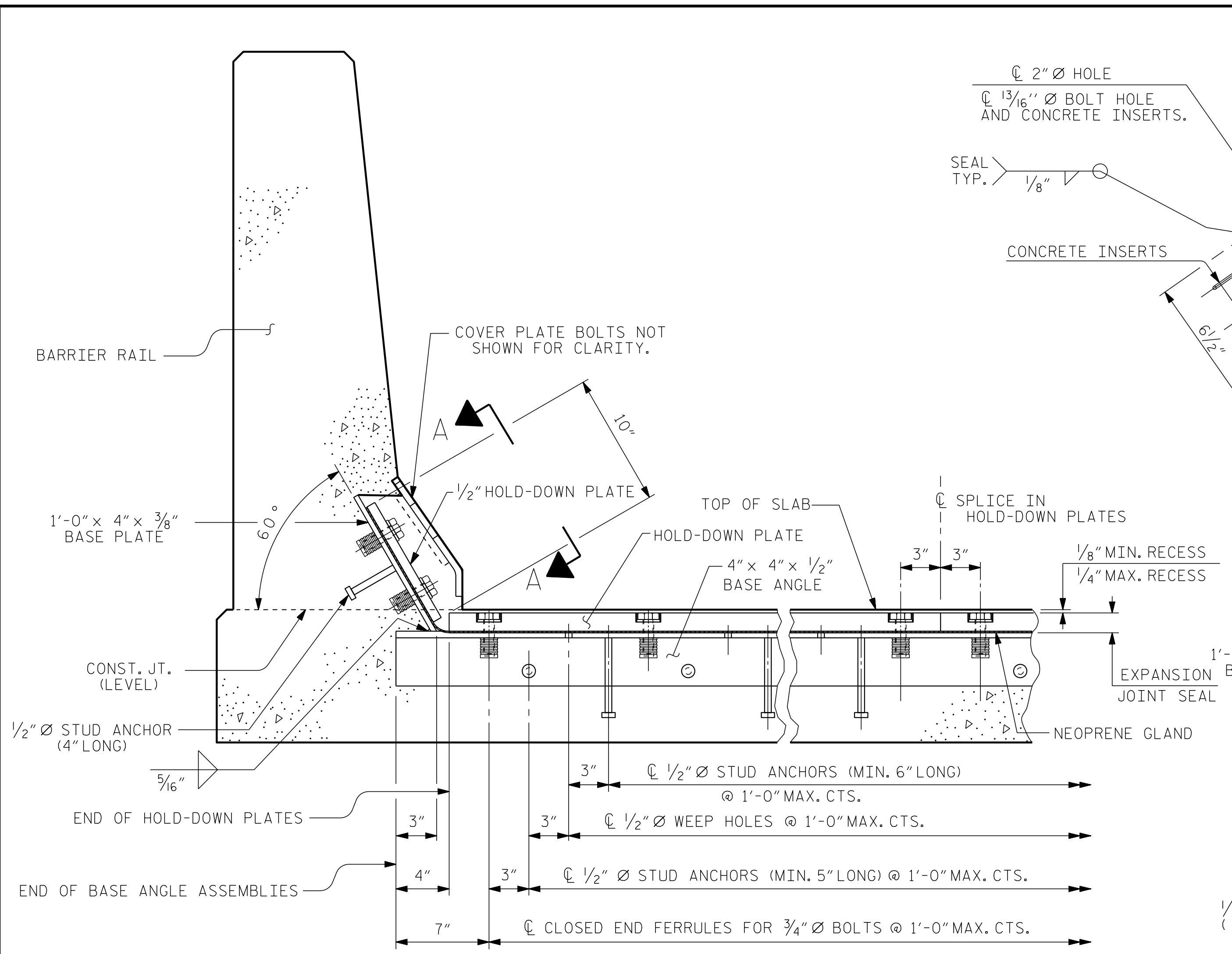
ENGINEER OF RECORD  
 1/19/2024  
  
 Gregory M. Gilland  
 ETHERRILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

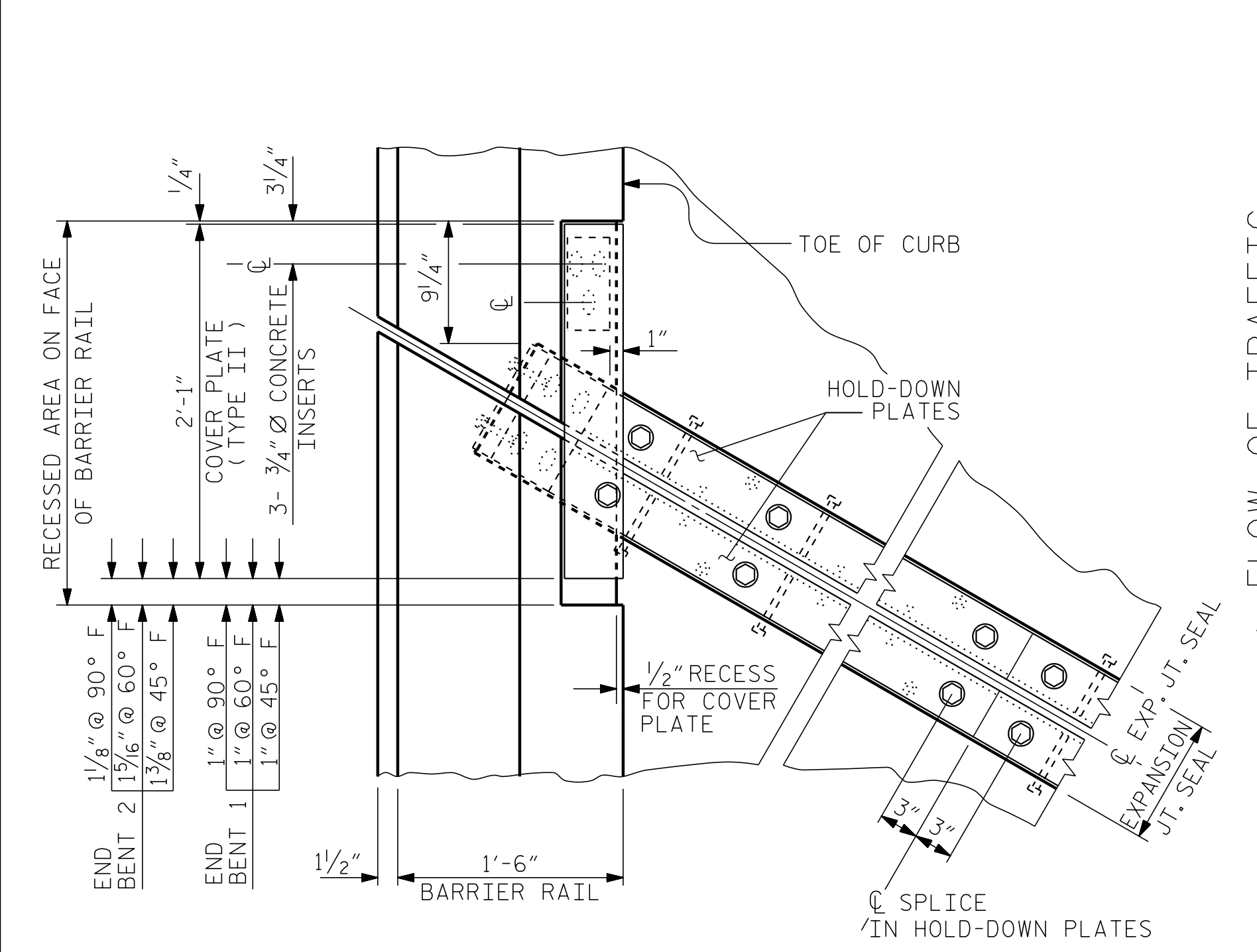
SHEET NO. S1-18				
TOTAL SHEETS 58				

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

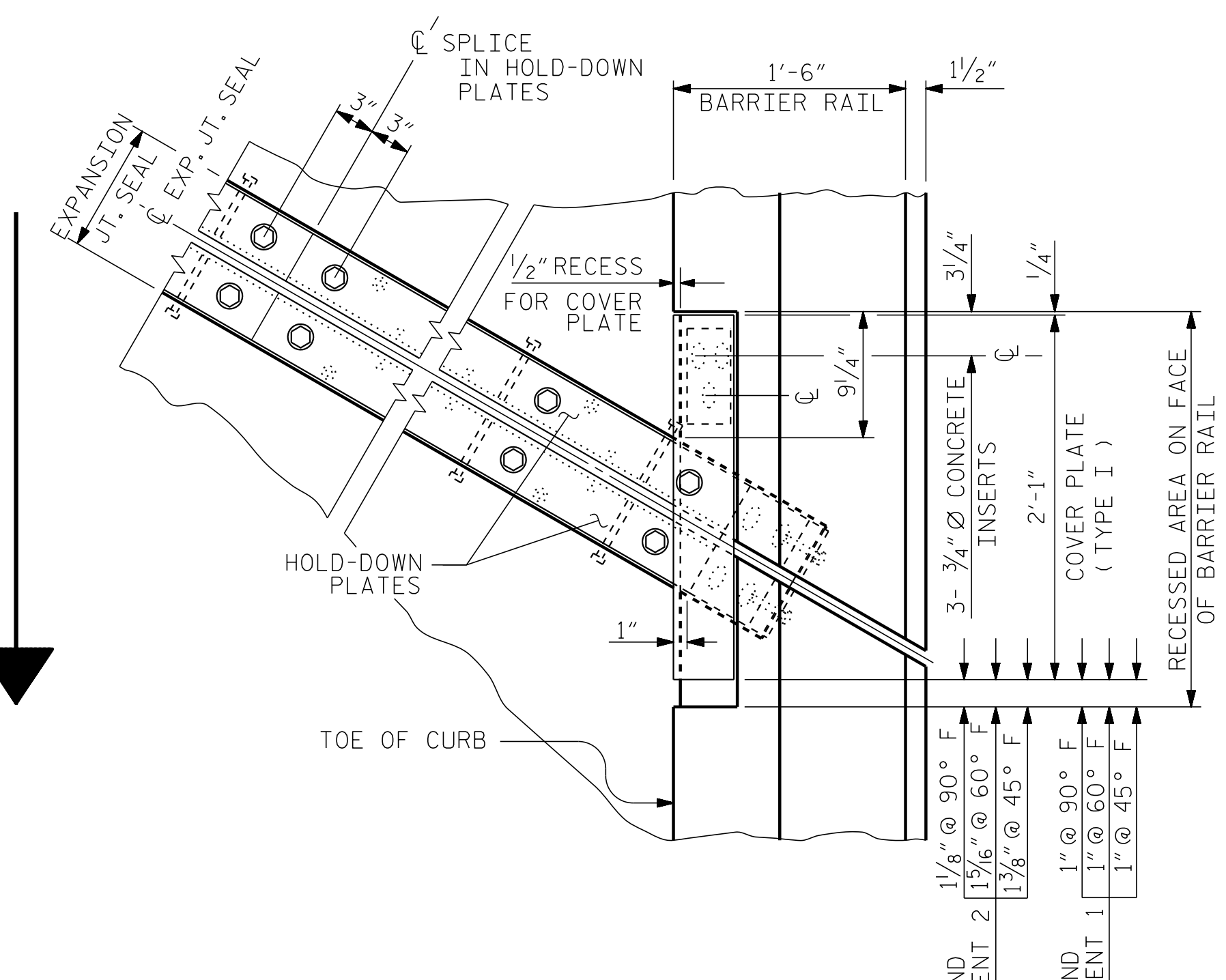
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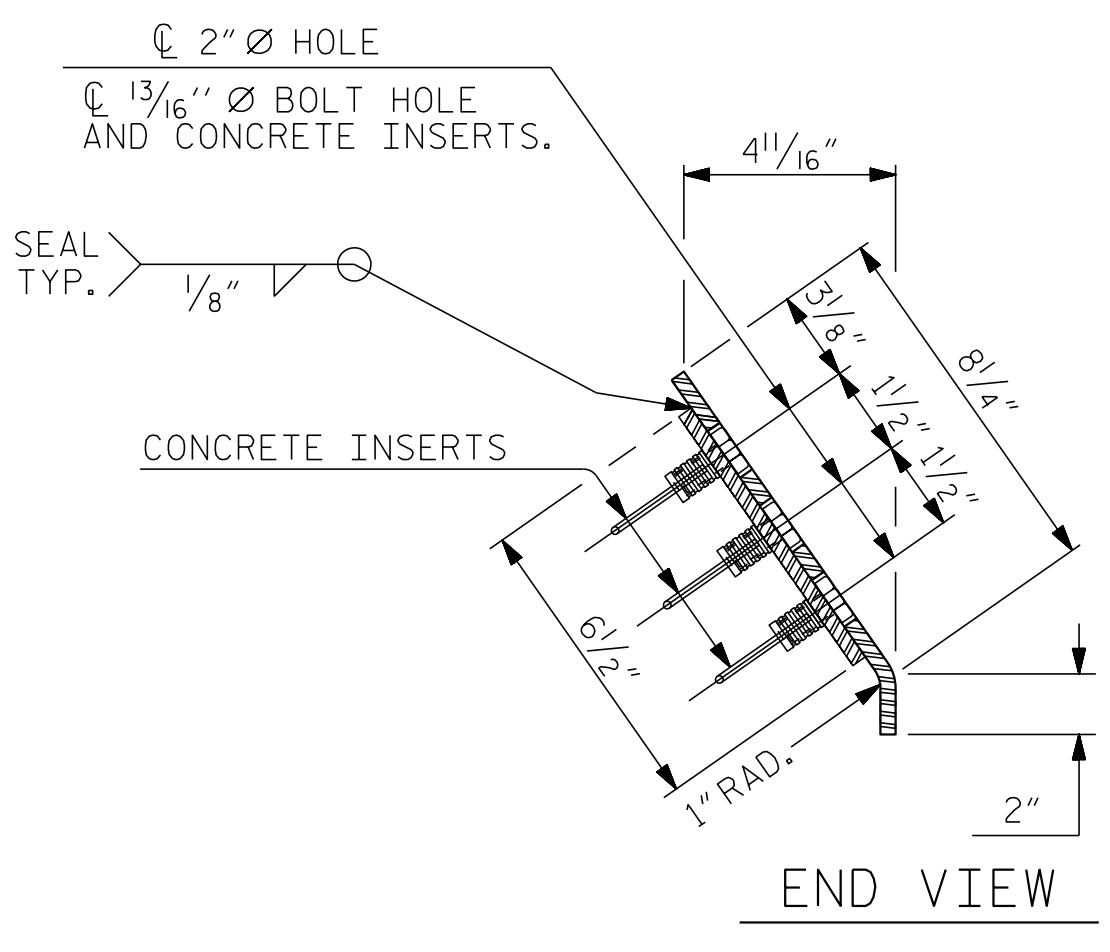
**SECTION THRU RAIL NORMAL TO JOINT**



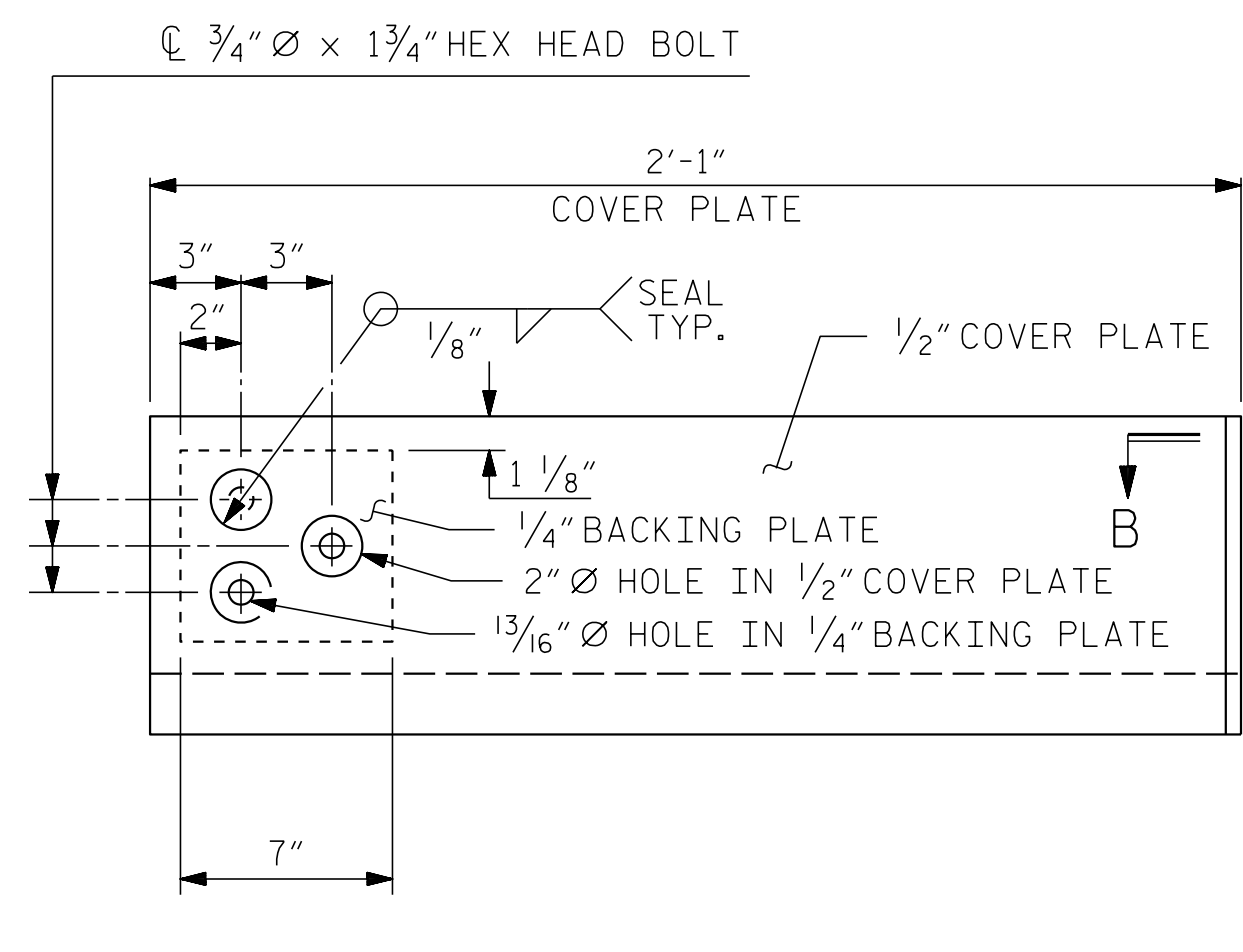
**PLAN OF EXPANSION JOINT SEAL**



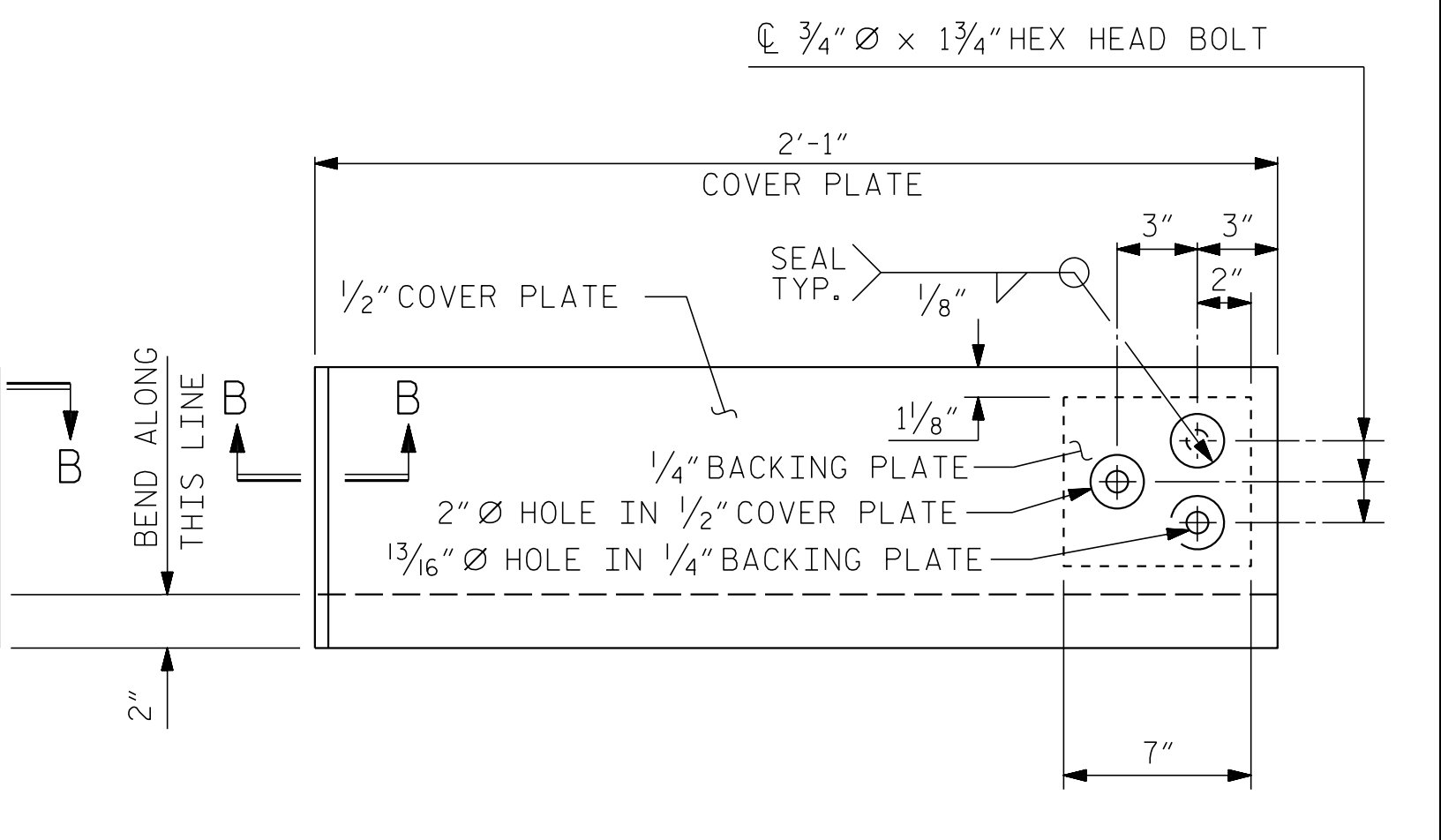
**SECTION A - A**



**END VIEW**

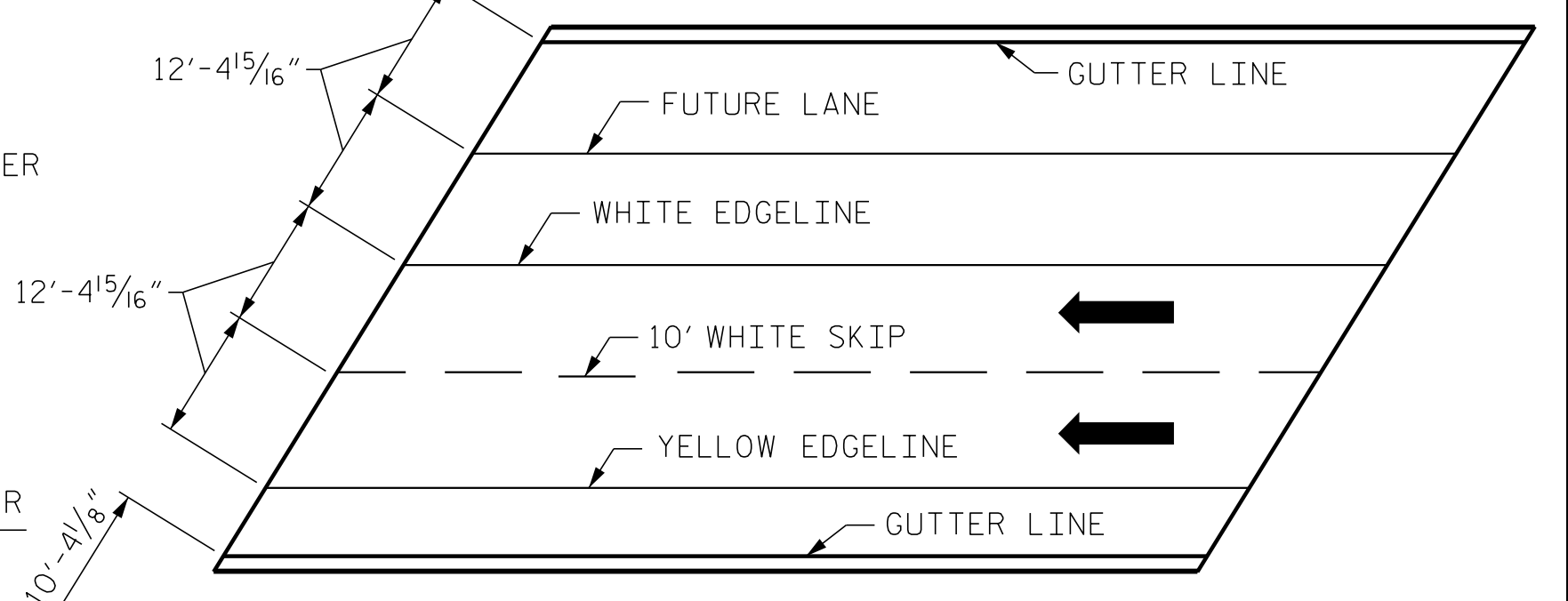


**TYPE I - ELEVATION VIEW**

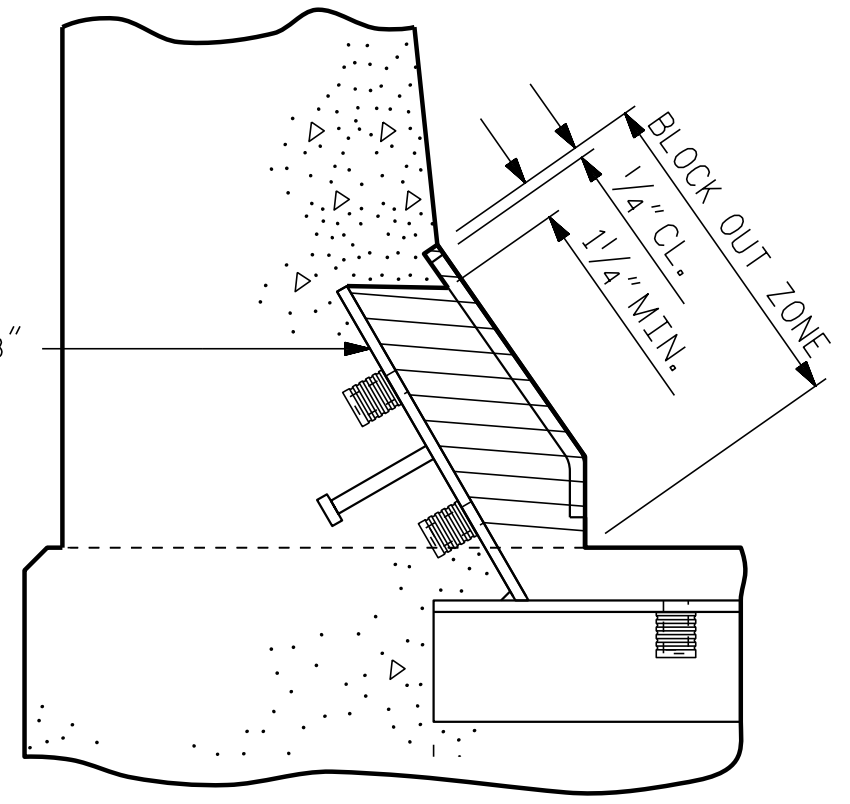


**TYPE II - ELEVATION VIEW**

**COVER PLATE DETAILS**

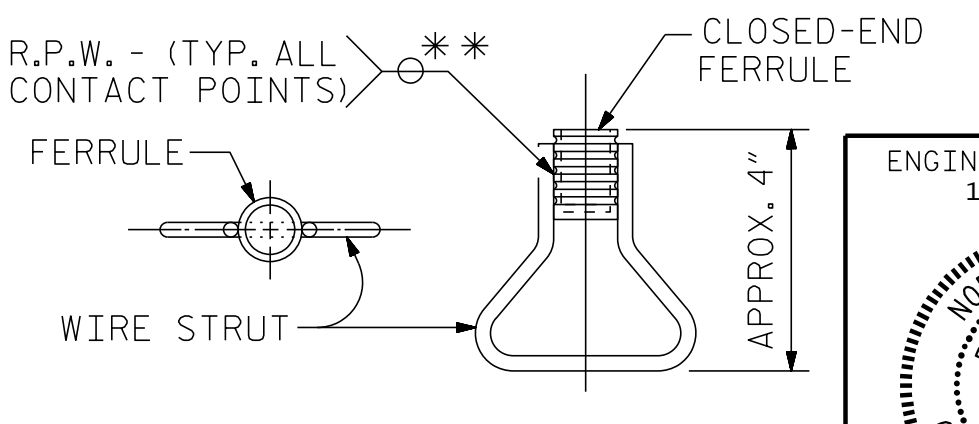


**PAVEMENT MARKING ALIGNMENT**



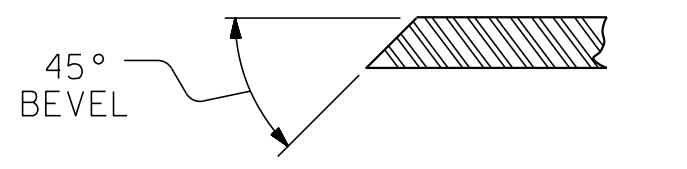
**BLOCK OUT DETAIL**

SEE "SECTION A - A" FOR OTHER DETAILS.



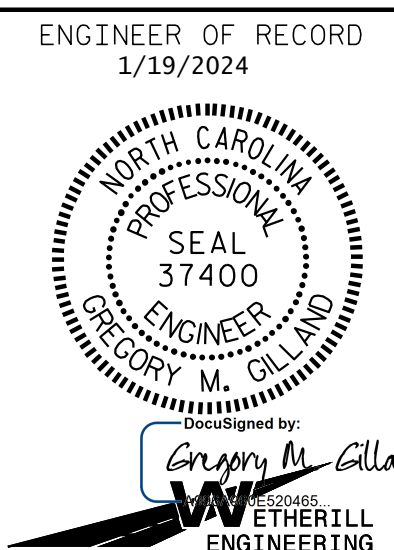
**CONCRETE INSERT**

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



**SECTION B - B**

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 2

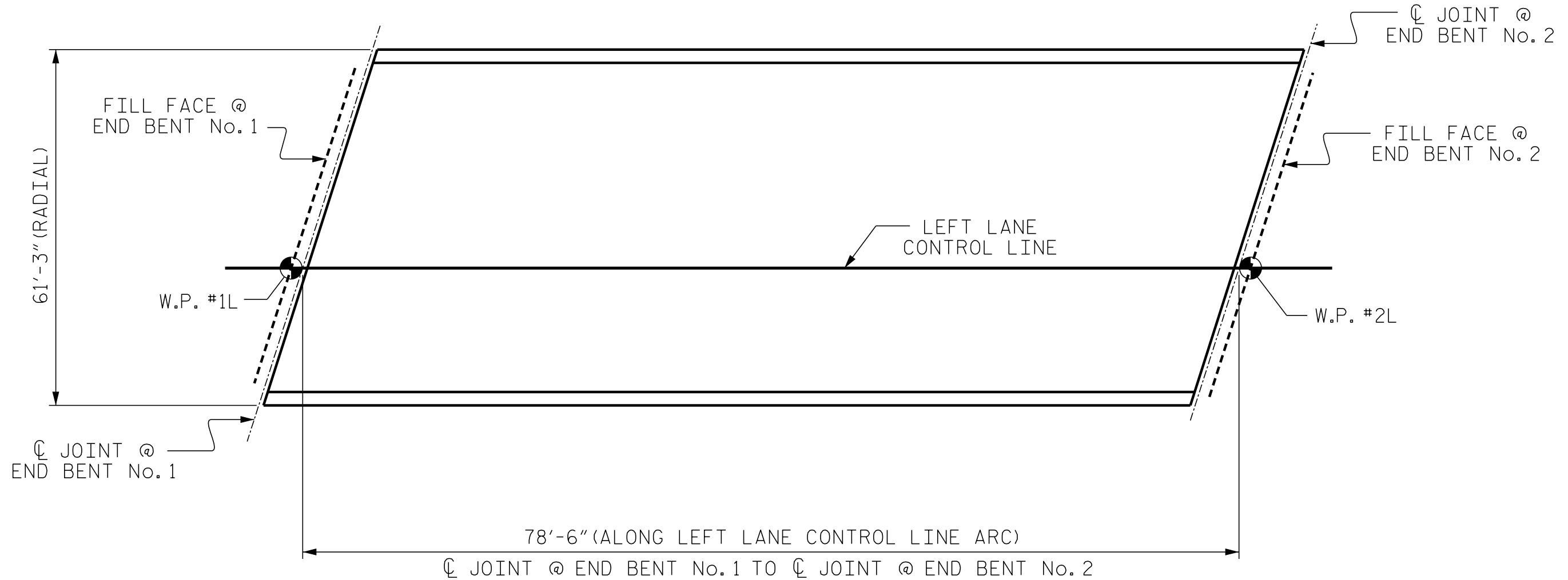


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 EXPANSION JOINT  
 SEAL DETAILS  
 FOR BARRIER RAIL  
 (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-19
1			3			TOTAL SHEETS 58
2			4			

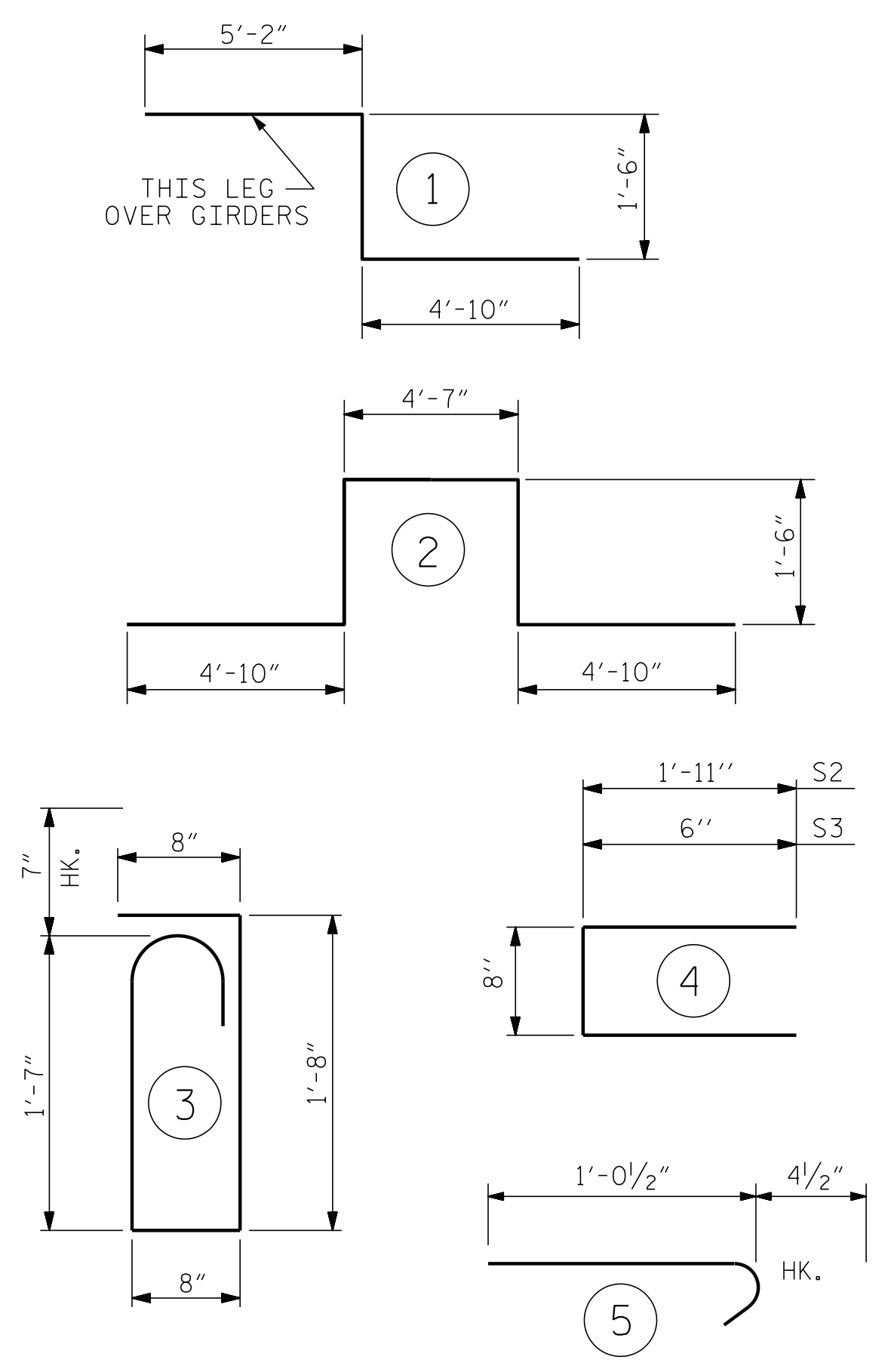
ASSEMBLED BY : D. HODGE	DATE : 1/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : REK 9/87	REV. 7/12 MAA/GM
CHECKED BY : CRK 10/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



LAYOUT FOR COMPUTING AREA  
REINFORCED CONCRETE DECK SLAB  
( SQ. FT. = 4,808 )

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

— SUPERSTRUCTURE BILL OF MATERIAL —

	CLASS AA CONCRETE ( CU. YDS. )	REINFORCING STEEL ( LBS. )	* EPOXY COATED REINFORCING STEEL ( LBS. )
TOTALS**	148.4	12,042	12,447

\*\* QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	200	#5	STR	31'-8"	6,606	A201	2	#5	STR	59'-0"	123
A2	200	#5	STR	31'-6"	6,571	A202	2	#5	STR	56'-8"	118
						A203	2	#5	STR	54'-3"	113
* A101	2	#5	STR	59'-0"	123	A204	2	#5	STR	51'-10"	108
* A102	2	#5	STR	56'-8"	118	A205	2	#5	STR	49'-5"	103
* A103	2	#5	STR	54'-3"	113	A206	2	#5	STR	47'-1"	98
* A104	2	#5	STR	51'-10"	108	A207	2	#5	STR	44'-8"	93
* A105	2	#5	STR	49'-5"	103	A208	2	#5	STR	42'-3"	88
* A106	2	#5	STR	47'-1"	98	A209	2	#5	STR	39'-10"	83
* A107	2	#5	STR	44'-8"	93	A210	2	#5	STR	37'-6"	78
* A108	2	#5	STR	42'-3"	88	A211	2	#5	STR	35'-1"	73
* A109	2	#5	STR	39'-10"	83	A212	2	#5	STR	32'-8"	68
* A110	2	#5	STR	37'-6"	78	A213	2	#5	STR	30'-3"	63
* A111	2	#5	STR	35'-1"	73	A214	2	#5	STR	27'-11"	58
* A112	2	#5	STR	32'-8"	68	A215	2	#5	STR	25'-6"	53
* A113	2	#5	STR	30'-3"	63	A216	2	#5	STR	23'-1"	48
* A114	2	#5	STR	27'-11"	58	A217	2	#5	STR	20'-8"	43
* A115	2	#5	STR	25'-6"	53	A218	2	#5	STR	18'-4"	38
* A116	2	#5	STR	23'-1"	48	A219	2	#5	STR	15'-11"	33
* A117	2	#5	STR	20'-8"	43	A220	2	#5	STR	13'-6"	28
* A118	2	#5	STR	18'-4"	38	A221	2	#5	STR	11'-1"	23
* A119	2	#5	STR	15'-11"	33	A222	2	#5	STR	8'-8"	18
* A120	2	#5	STR	13'-6"	28	A223	2	#5	STR	6'-4"	13
* A121	2	#5	STR	11'-1"	23	A224	2	#5	STR	3'-11"	8
* A122	2	#5	STR	8'-8"	18						
* A123	2	#5	STR	6'-4"	13	* B1	84	#4	STR	40'-0"	2,244
* A124	2	#5	STR	3'-11"	8	B2	80	#5	STR	40'-1"	3,345
						* G1	4	#5	STR	32'-9"	137
						* J1	124	#4	5	1'-5"	117
						* K1	8	#8	1	11'-6"	246
						* K2	20	#8	2	17'-3"	921
						K3	36	#6	STR	5'-0"	270
						K4	48	#4	STR	8'-0"	257
						* S1	72	#5	3	5'-2"	388
						* S2	72	#4	4	4'-6"	216
						S3	24	#4	4	1'-8"	27

REINFORCING STEEL		LBS.	12,042
* EPOXY COATED REINFORCING STEEL		LBS.	12,447
* THESE BARS ARE EPOXY COATED.			

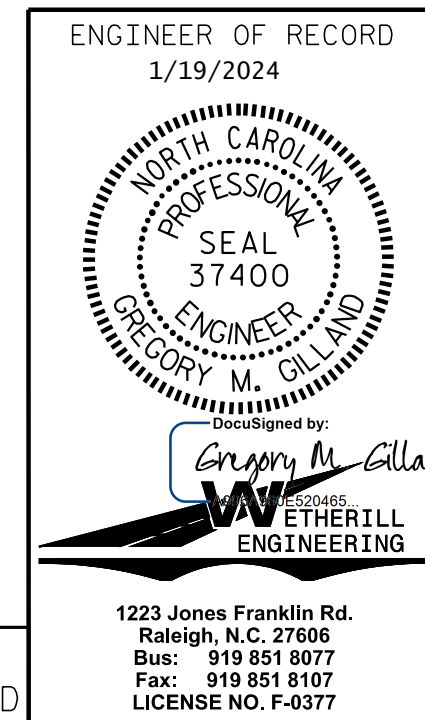
GROOVING BRIDGE FLOORS

APPROACH SLABS	2,613 SQ.FT.
BRIDGE DECK	4,253 SQ.FT.
TOTAL	6,866 SQ.FT.

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	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 BILL OF MATERIAL  
 (LEFT LANE)

REVISIONS

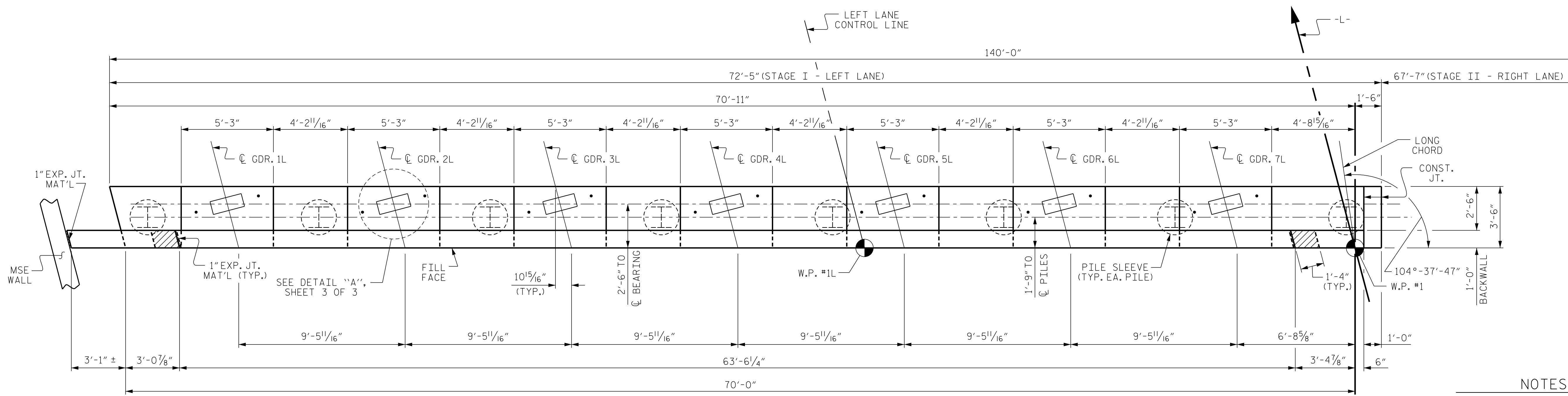
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

SHEET NO. S1-20  
 TOTAL SHEETS 58

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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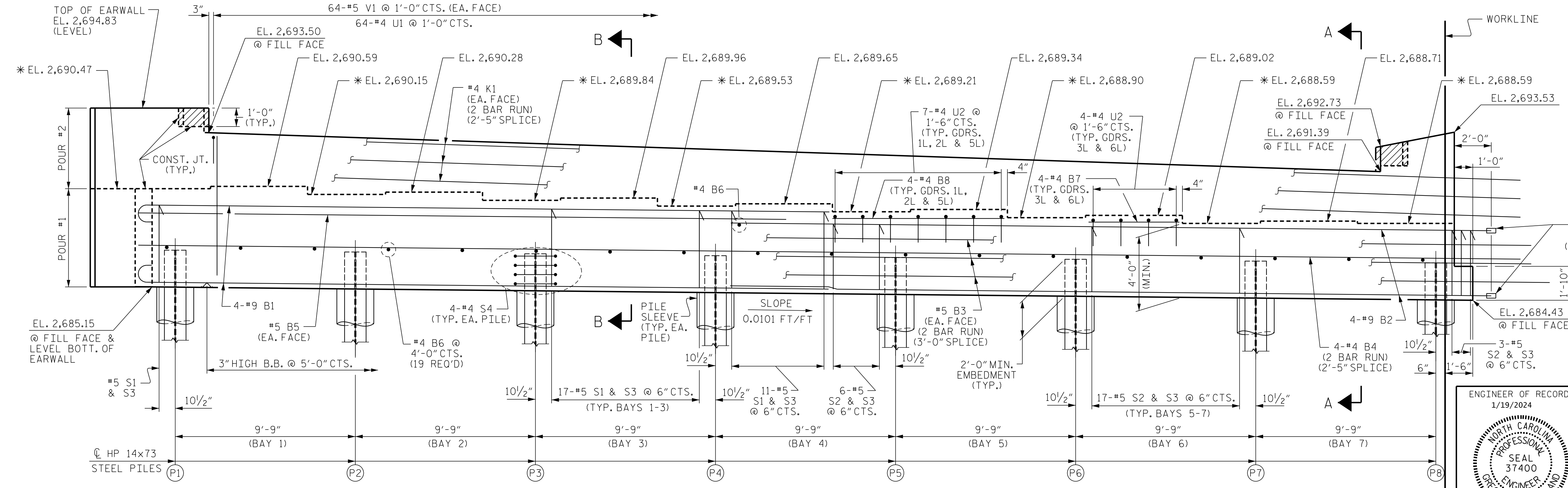
DRAWN BY: D. HODGE DATE: 3/23  
 CHECKED BY: G. GILLAND DATE: 7/23



TOP OF PILE ELEVATION	
PILE	ELEVATION
P1	2,687.14
P2	2,687.04
P3	2,686.94
P4	2,686.85
P5	2,686.75
P6	2,686.65
P7	2,686.55
P8	2,686.45

NOTES

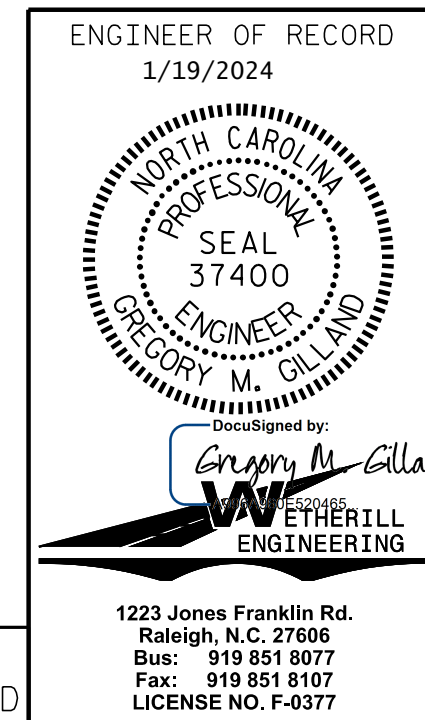
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.



EXTEND #4 B4 BARS 2'-7", #5 B3 BARS 4'-2", #4 K1 BARS 2'-7", INTO STAGE II

PROJECT NO. HB-0004  
 HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 1 OF 3

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A & B-B, SHEET 3 OF 3.



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1  
 (LEFT LANE)  
 (STAGE I)

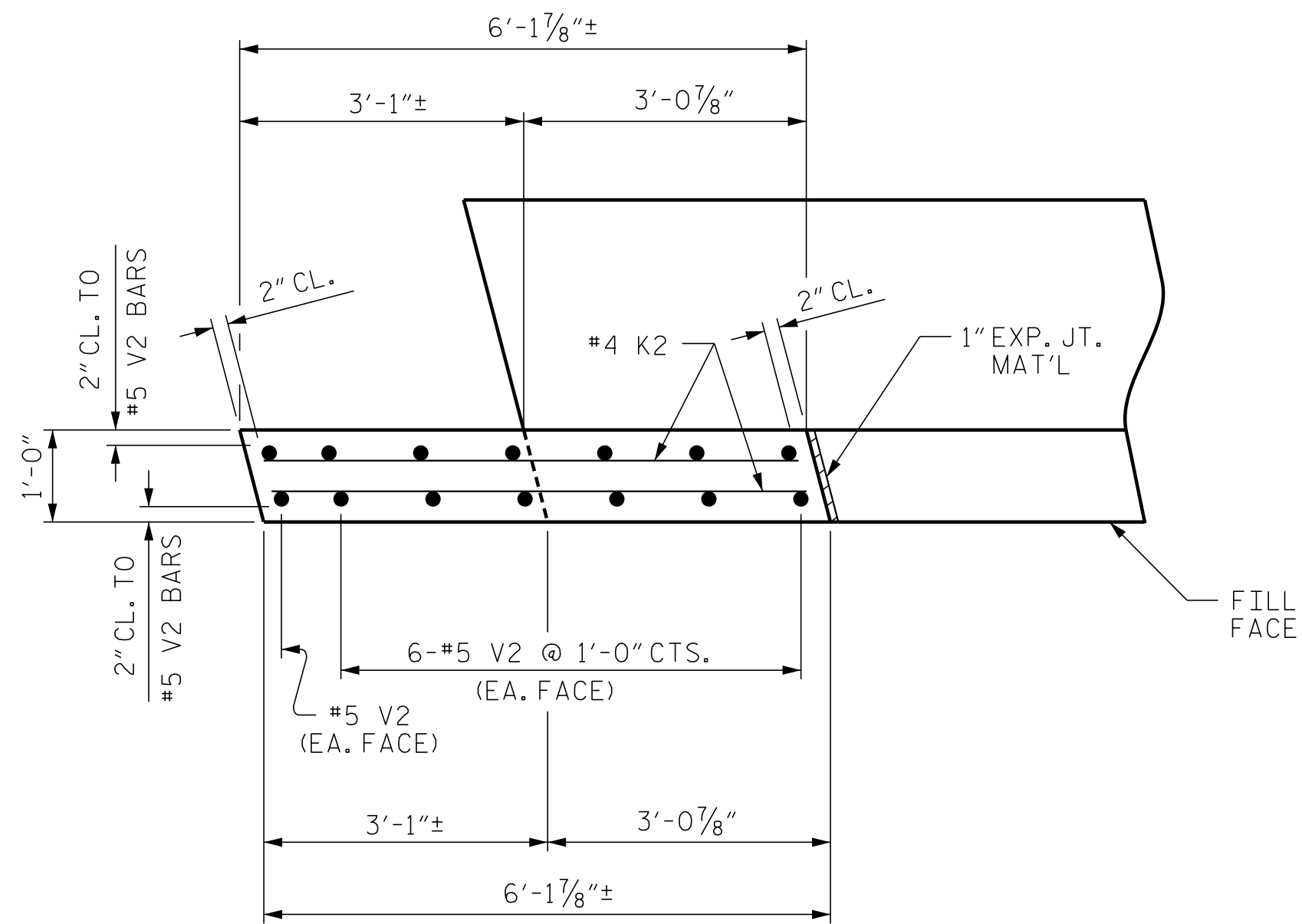
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-21  
 TOTAL SHEETS 58

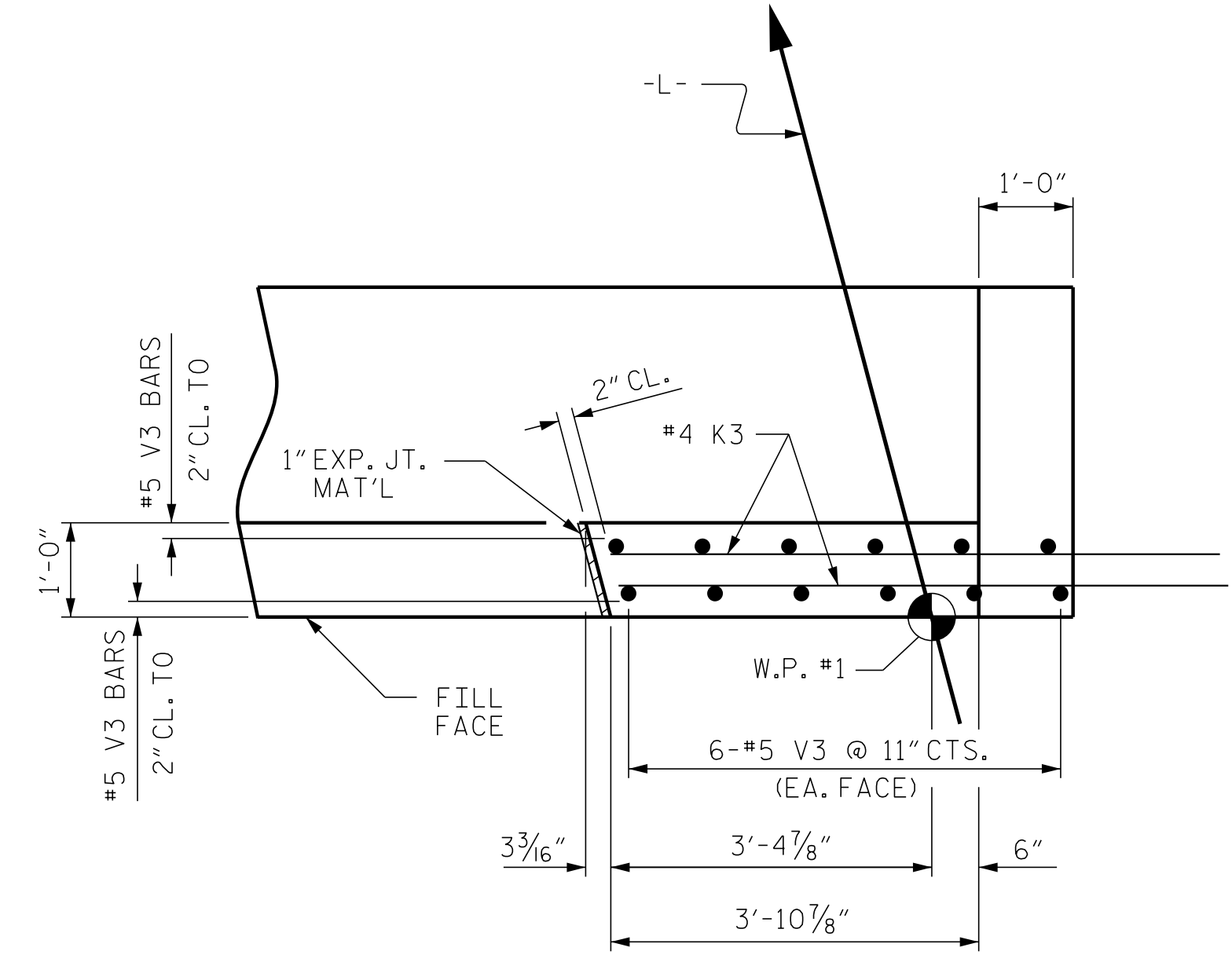
DRAWN BY: D. HODGE DATE: 7/23  
 CHECKED BY: G. GILLAND DATE: 9/23

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

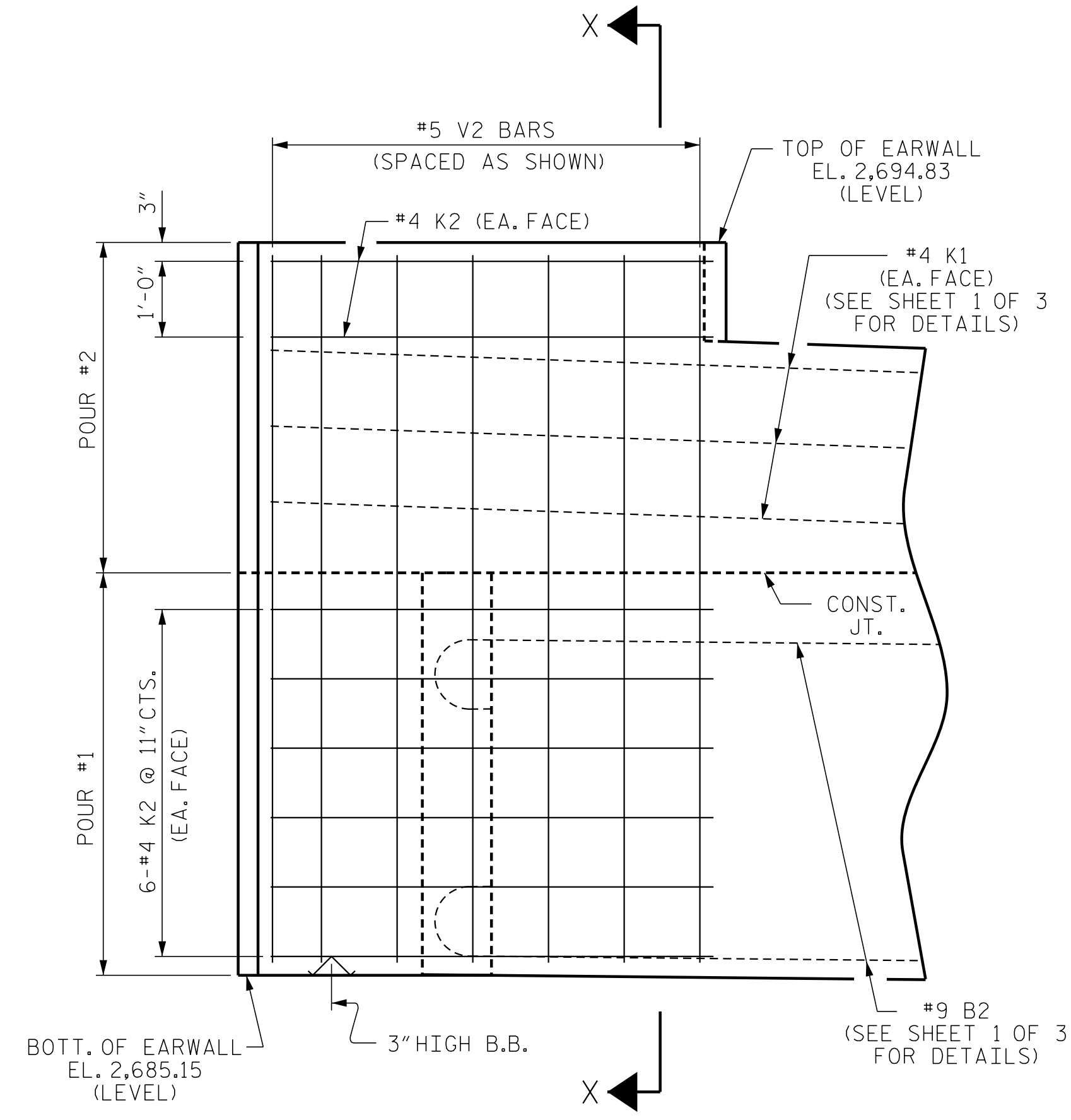
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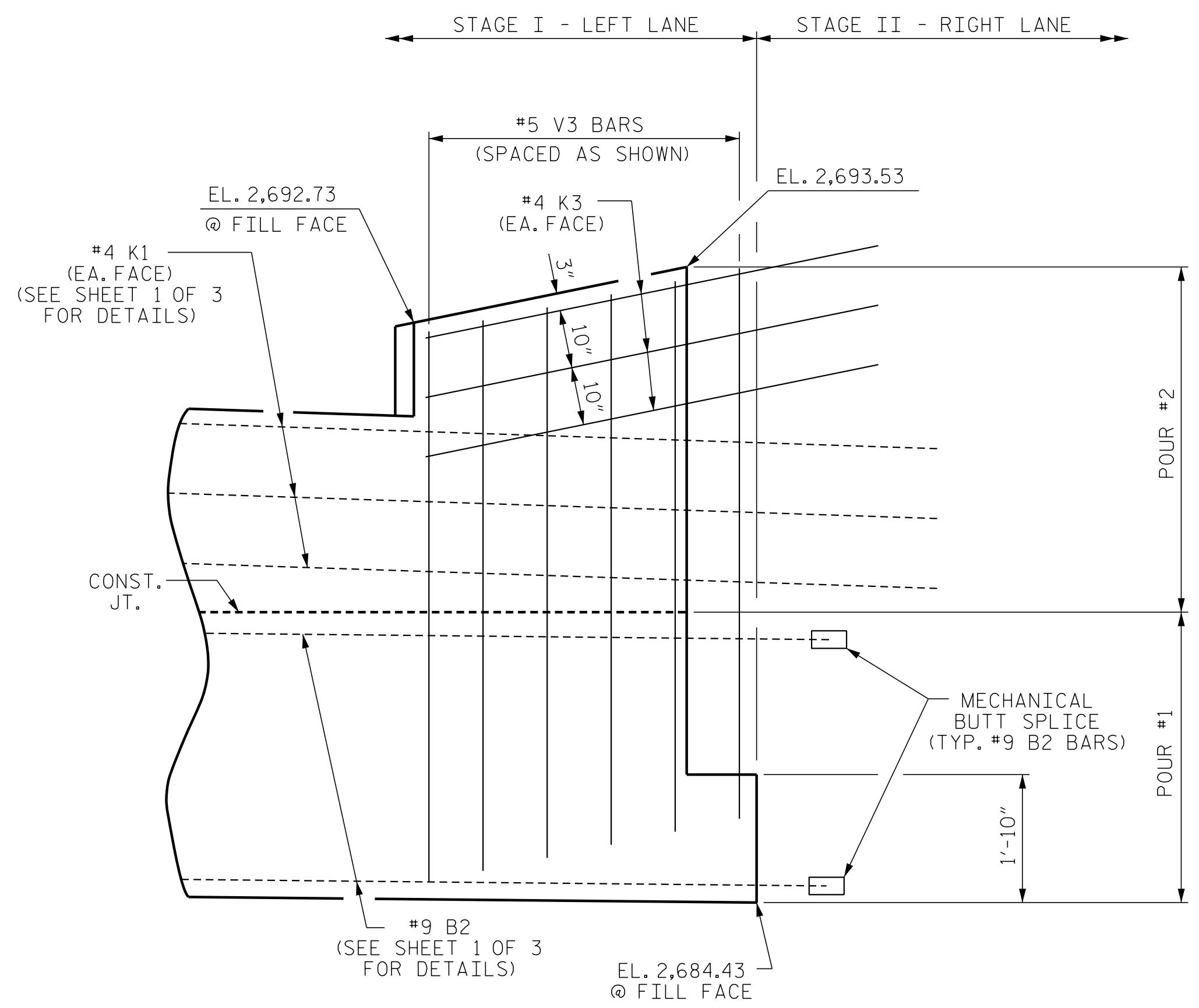
PLAN OF LEFT EARWALL



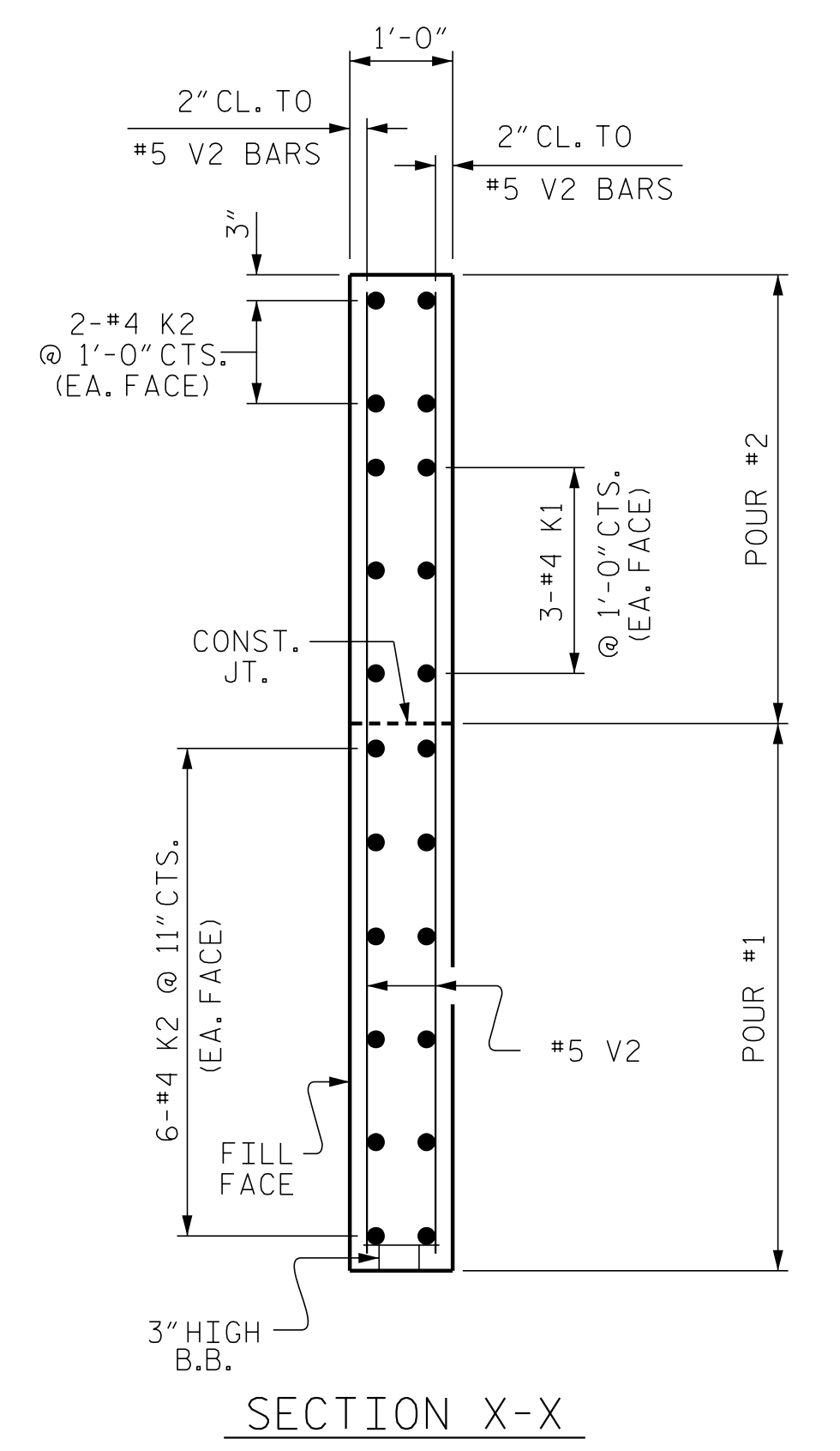
PLAN OF CENTER RAISED BACKWALL



ELEVATION OF LEFT EARWALL

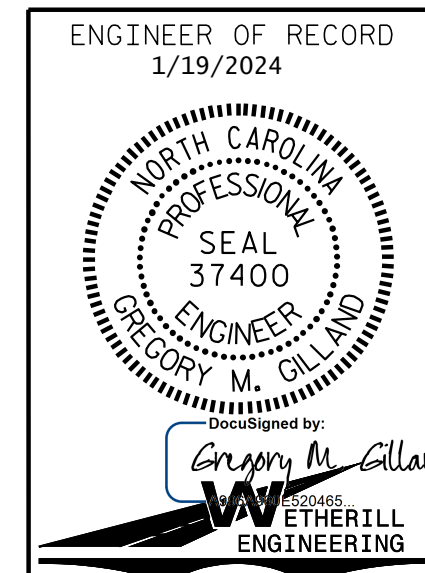


ELEVATION OF CENTER RAISED BACKWALL



SECTION X-X

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1  
 (LEFT LANE)  
 (STAGE I)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-22
1			3			TOTAL SHEETS
2			4			58

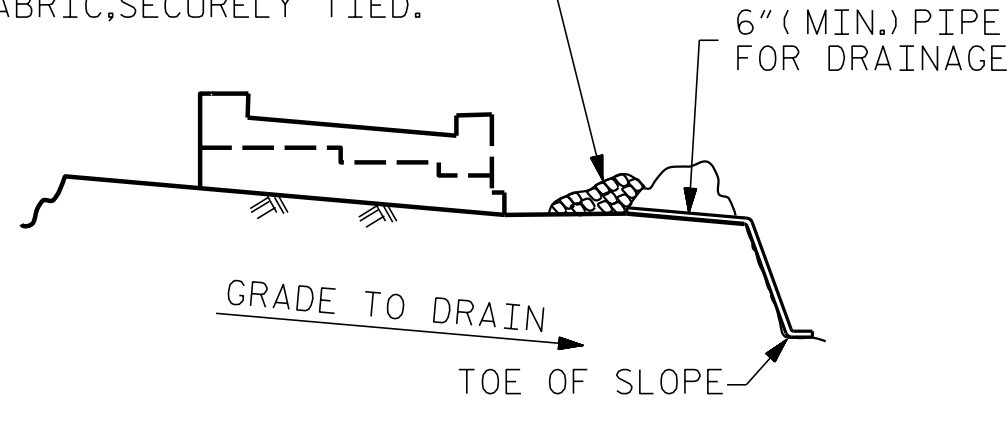
DRAWN BY: D. HODGE DATE: 7/23  
 CHECKED BY: G. GILLAND DATE: 9/23

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

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MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

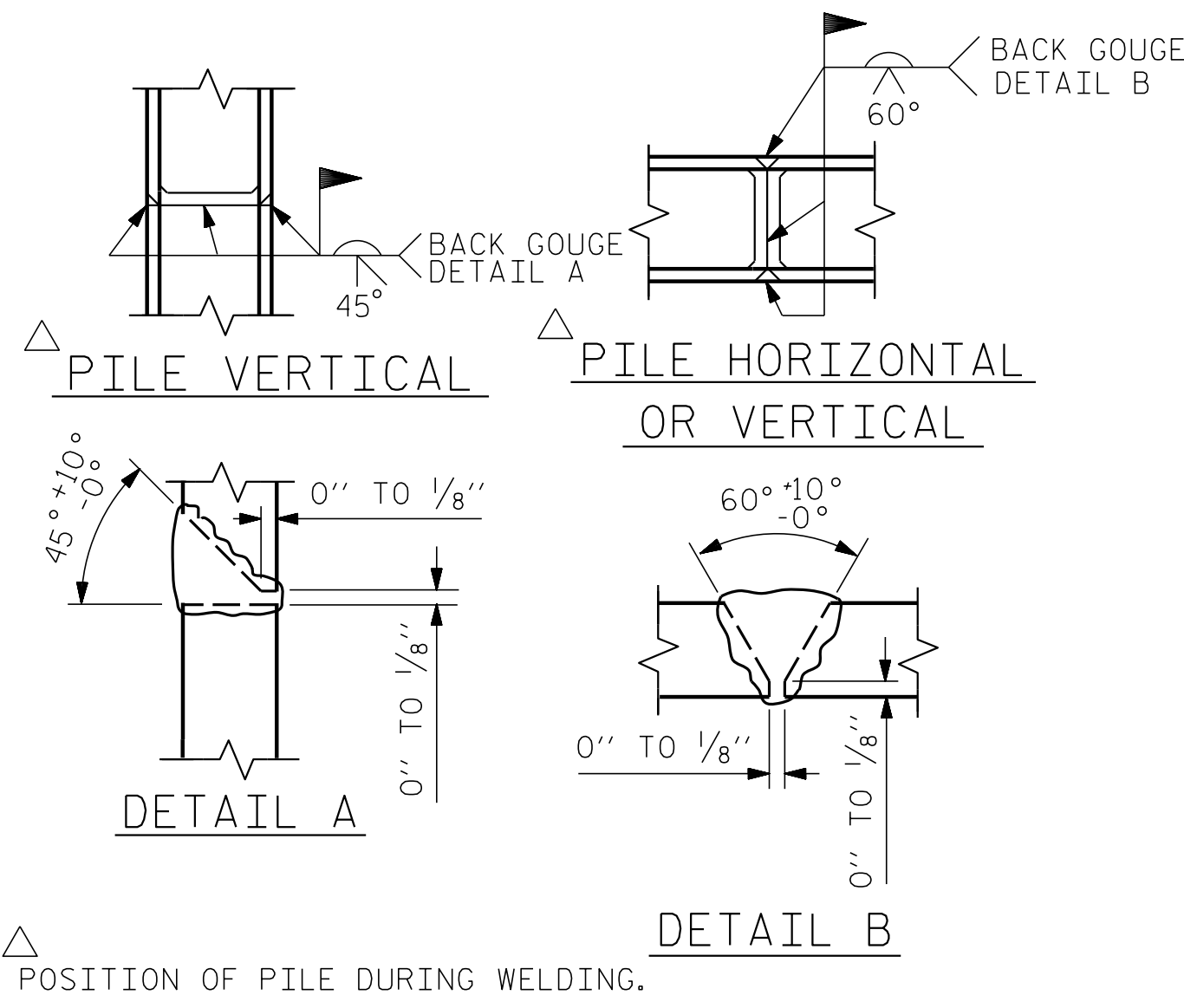


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

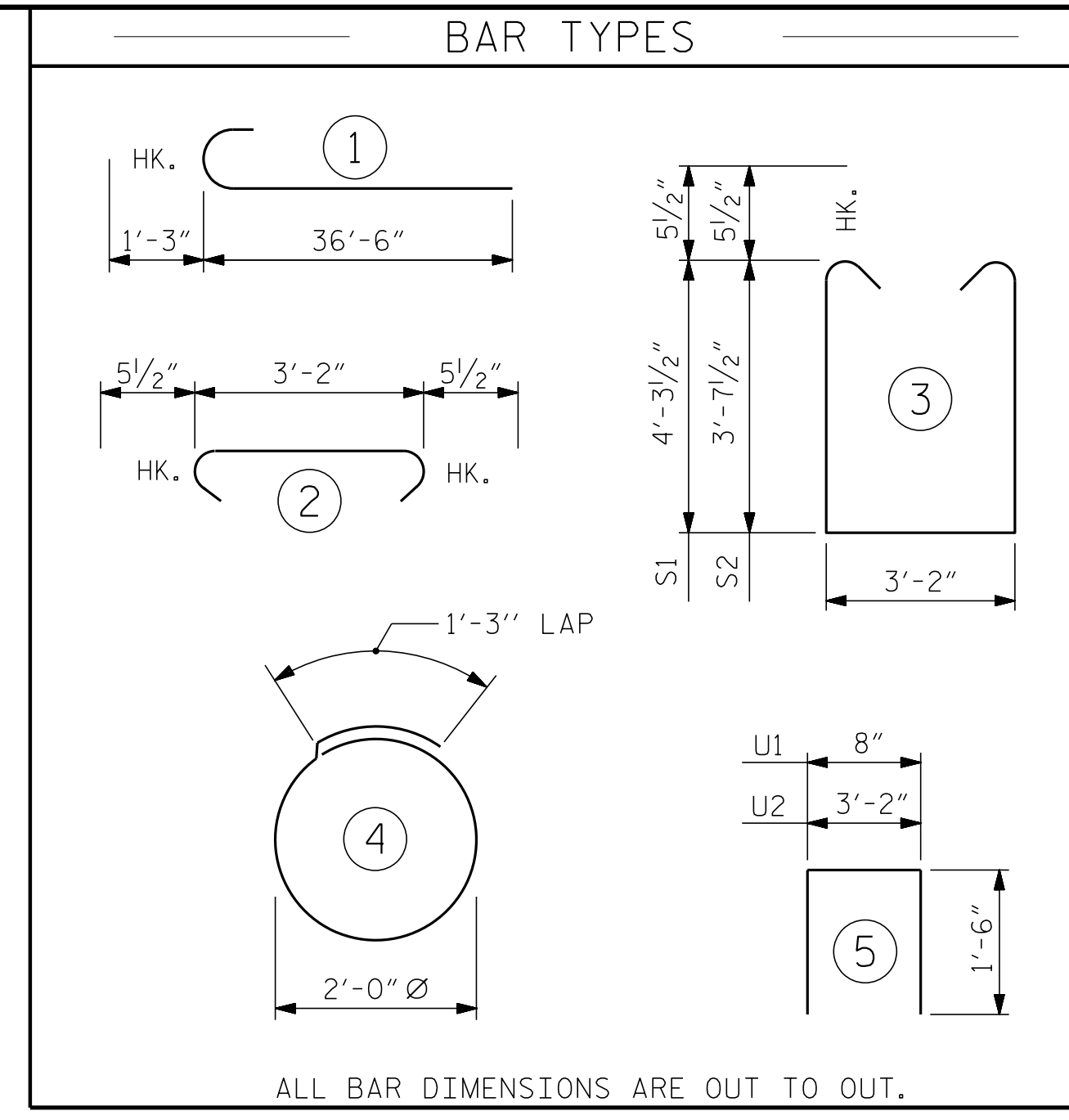
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

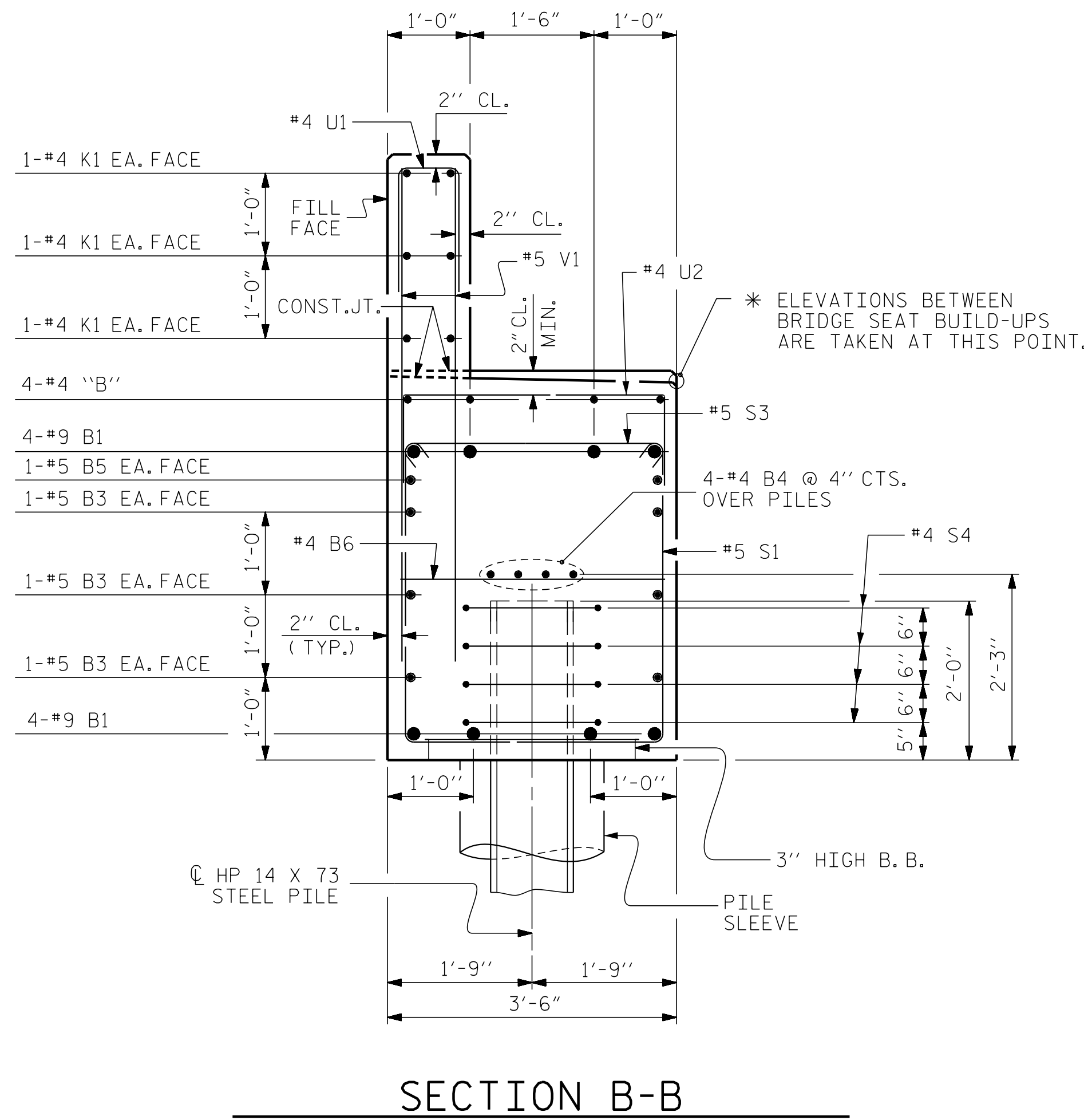
### TEMPORARY DRAINAGE AT END BENT



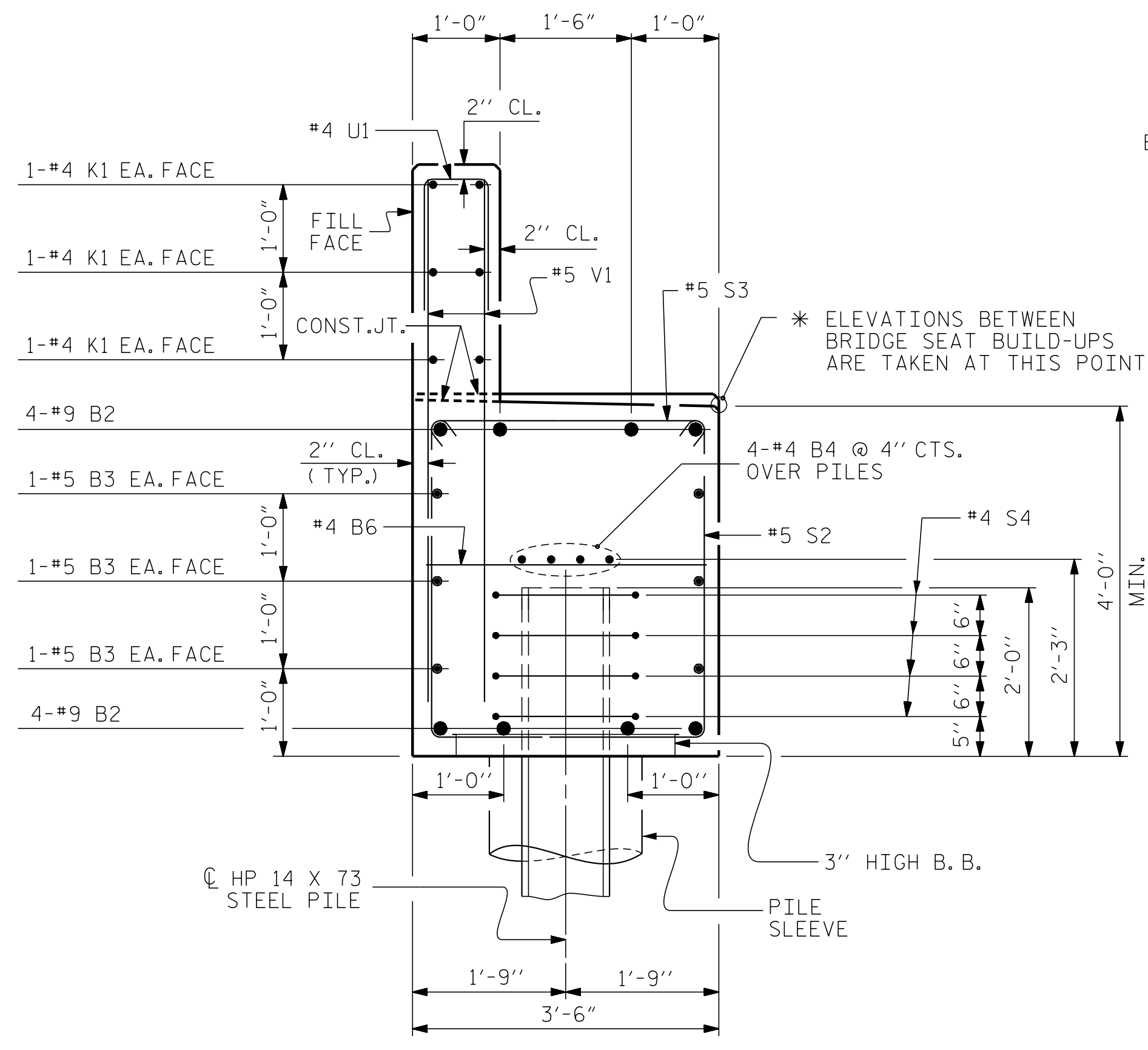
### PILE SPLICE DETAILS



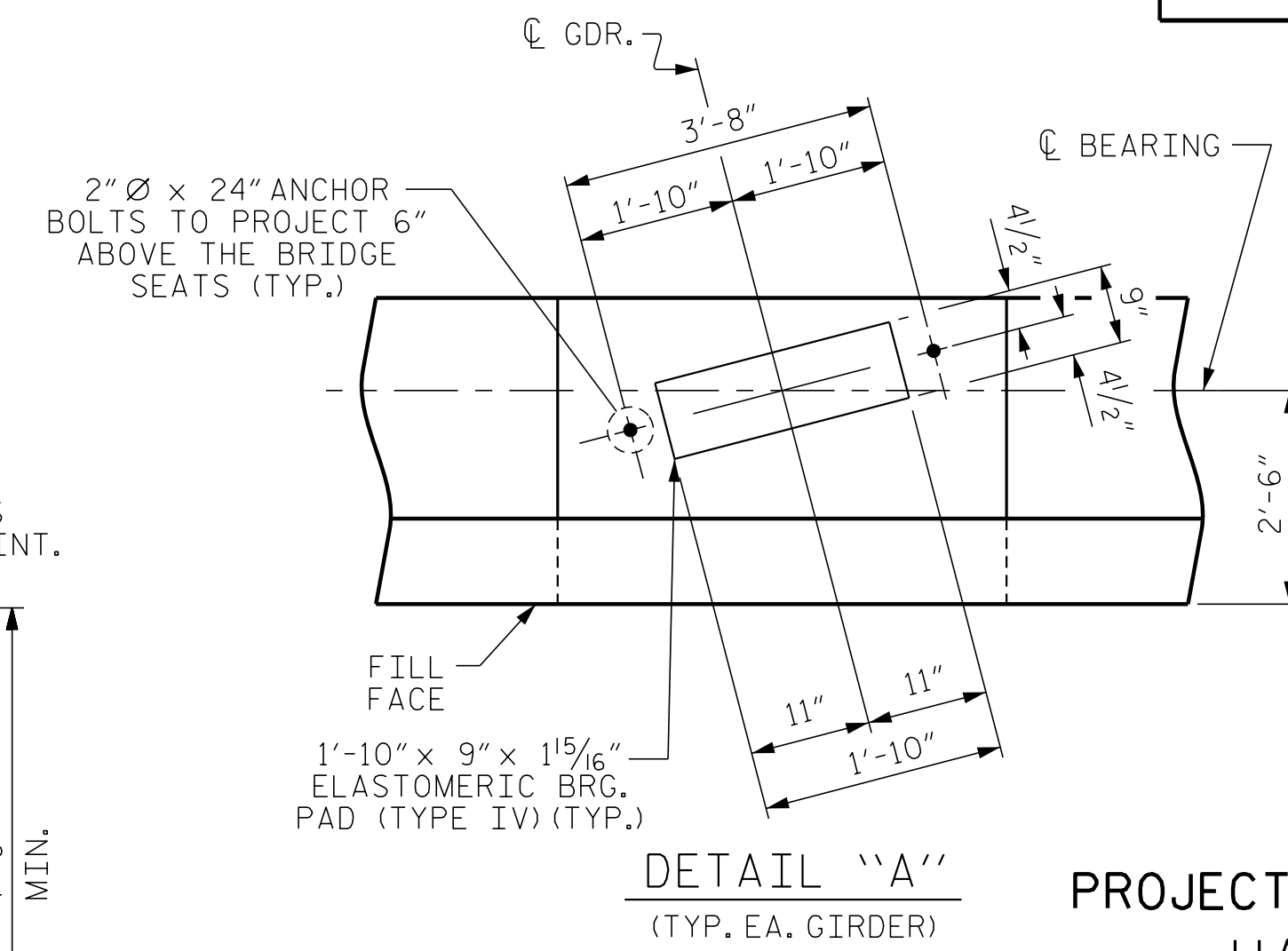
BILL OF MATERIAL					
END BENT No. 1					
STAGE I					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		37'-9"	1,027
B2	8	#9	STR	42'-0"	1,142
B3	12	#5	STR	39'-8"	496
B4	8	#4	STR	38'-2"	204
B5	2	#5	STR	34'-3"	71
B6	19	#4	STR	3'-2"	40
B7	8	#4	STR	4'-11"	26
B8	12	#4	STR	9'-4"	75
K1	12	#4	STR	39'-5"	316
K2	16	#4	STR	5'-9"	61
K3	6	#4	STR	6'-7"	26
S1	63	#5	3	12'-8"	832
S2	60	#5	3	11'-4"	709
S3	123	#5	2	4'-1"	524
S4	32	#4	4	7'-7"	162
U1	64	#4	5	3'-8"	157
U2	29	#4	5	6'-2"	119
V1	128	#5	STR	6'-6"	868
V2	14	#5	STR	9'-3"	135
V3	12	#5	STR	7'-11"	99
REINFORCING STEEL					7,089 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 CAP AND LOWER PORTION OF EARWALL					48.1 C.Y.
POUR #2 UPPER PORTION OF EARWALL AND BACKWALL					8.6 C.Y.
TOTAL CLASS A CONCRETE					56.7 C.Y.



SECTION B-B



SECTION A-A



DETAIL "A"  
(TYP. EA. GIRDER)

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 3 OF 3

ENGINEER OF RECORD  
 1/19/2024  
  
 Designed by:  
  
 GREGORY M. GILLILAND  
 GREGORY M. GILLILAND  
 ENGINEERING

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1  
 (LEFT LANE)  
 (STAGE I)

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

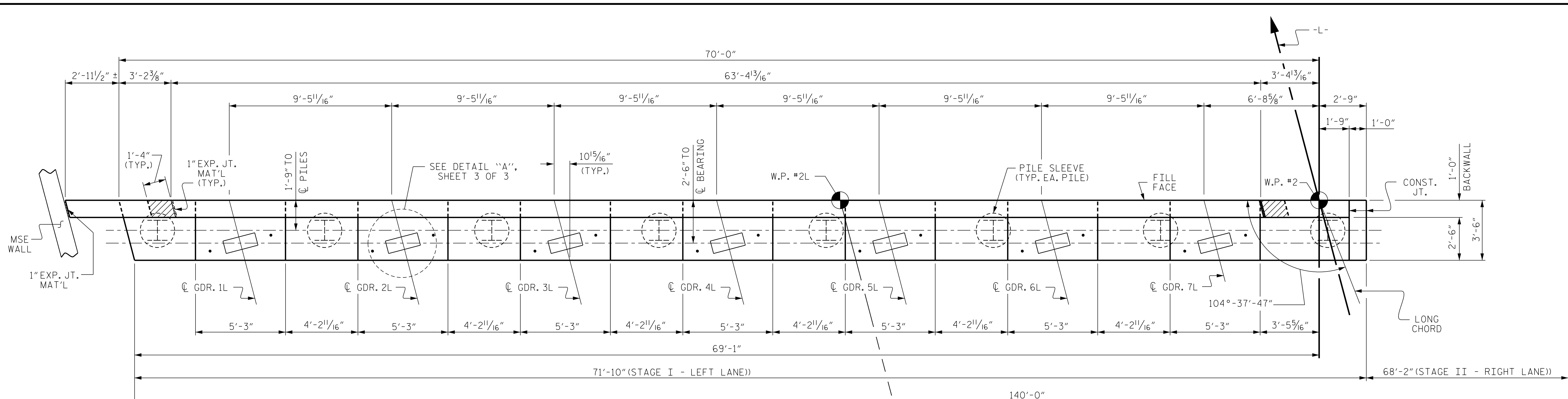
SHEET NO. S1-23  
 TOTAL SHEETS 58

DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: G. GILLILAND DATE: 9/23

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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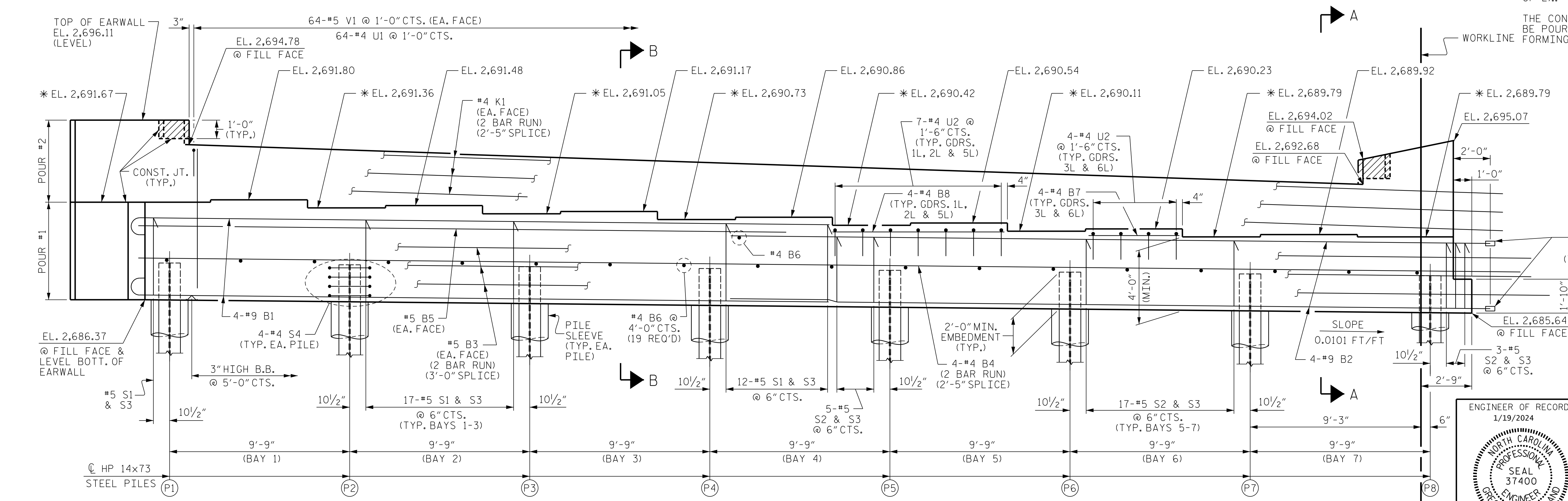


TOP OF PILE ELEVATION	
PILE	ELEVATION
P1	2,688.35
P2	2,688.25
P3	2,688.15
P4	2,688.06
P5	2,687.96
P6	2,687.86
P7	2,687.76
P8	2,687.67

PLAN

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- 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 THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

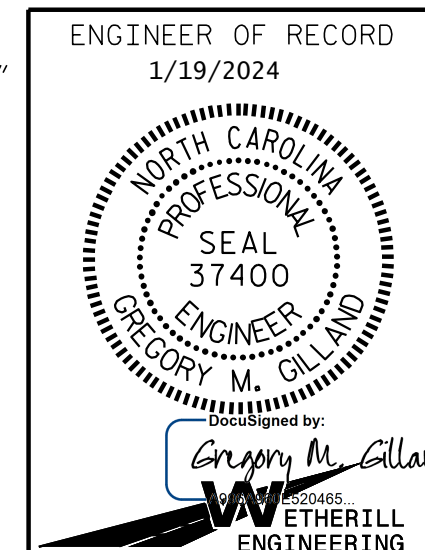


EXTEND #4 B4 BARS 2'-7", #5 B3 BARS 4'-2", #4 K1 BARS 2'-7", INTO STAGE II

ELEVATION

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A & B-B, SHEET 3 OF 3.

PROJECT NO. HB-0004  
 HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2  
 (LEFT LANE)  
 (STAGE I)

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

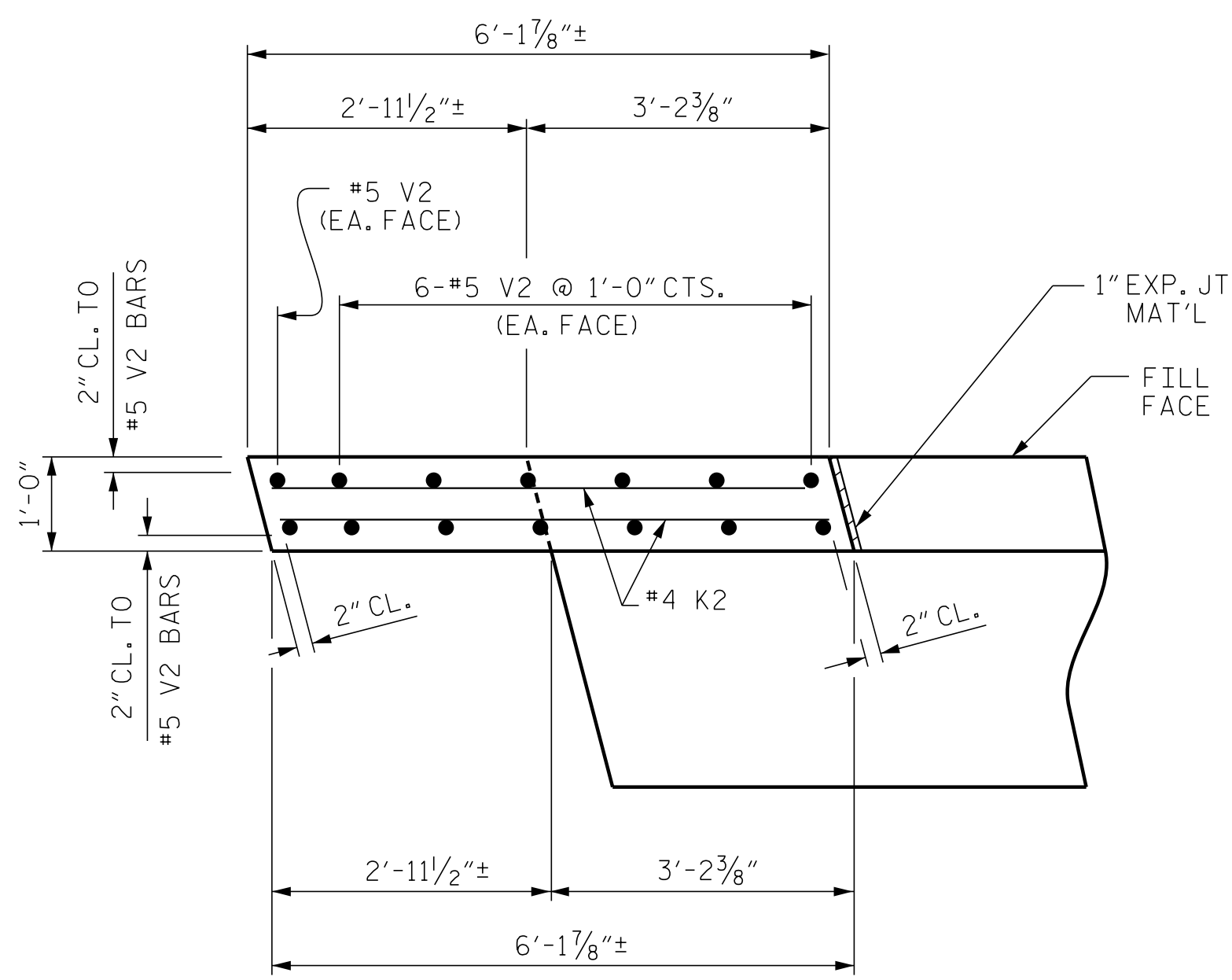
SHEET NO. S1-24  
 TOTAL SHEETS 58

DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: G. GILLAND DATE: 9/23

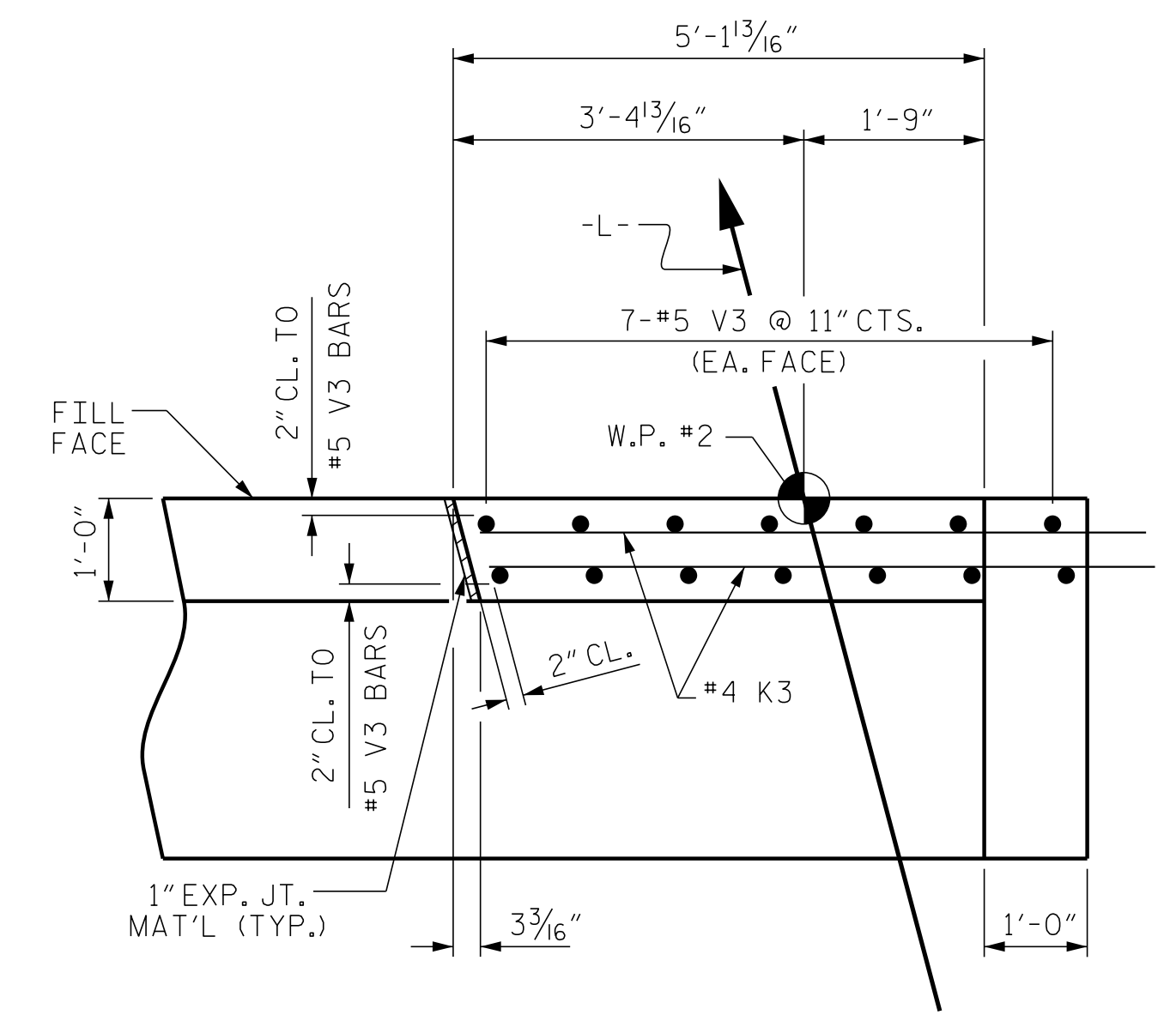
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

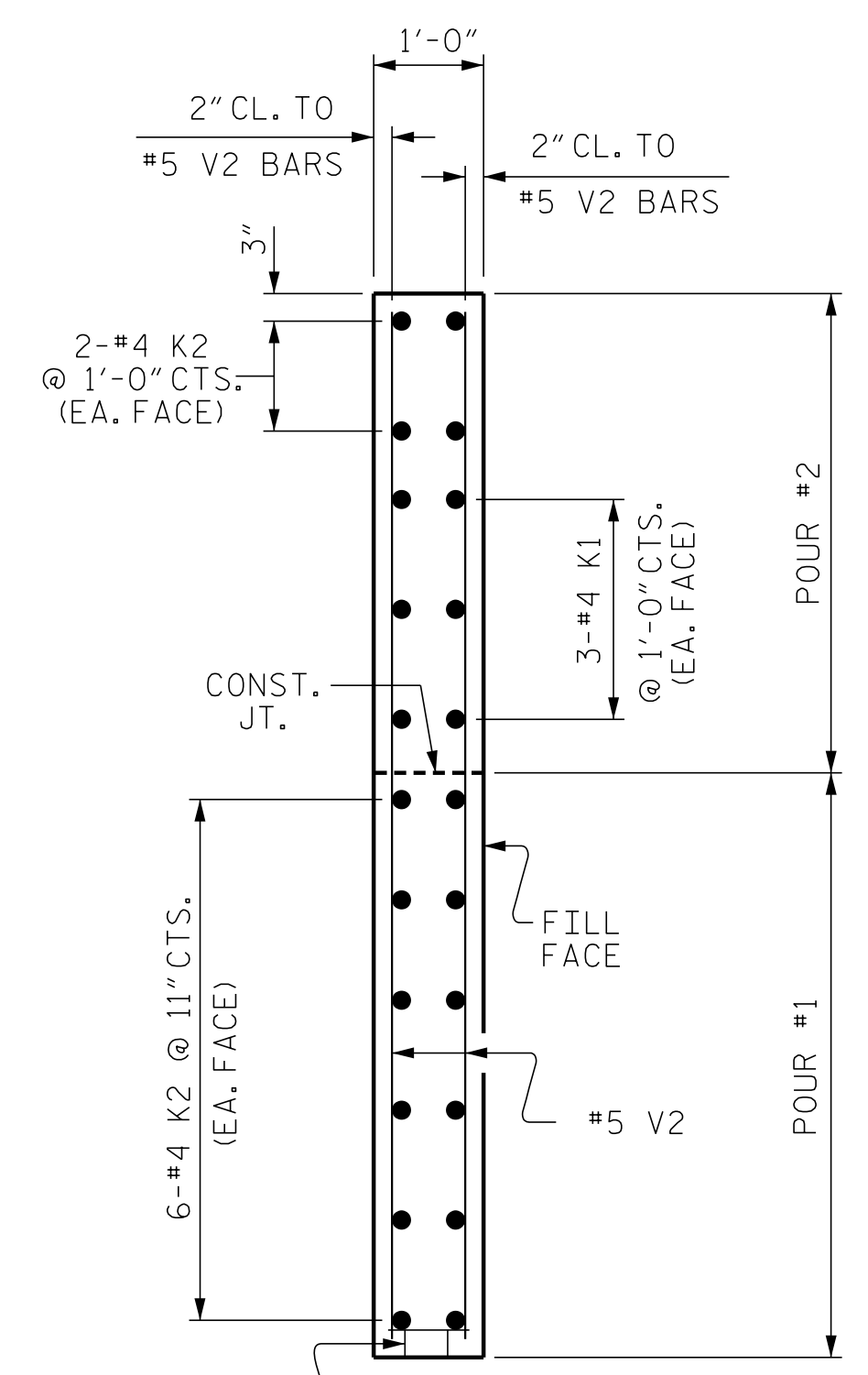
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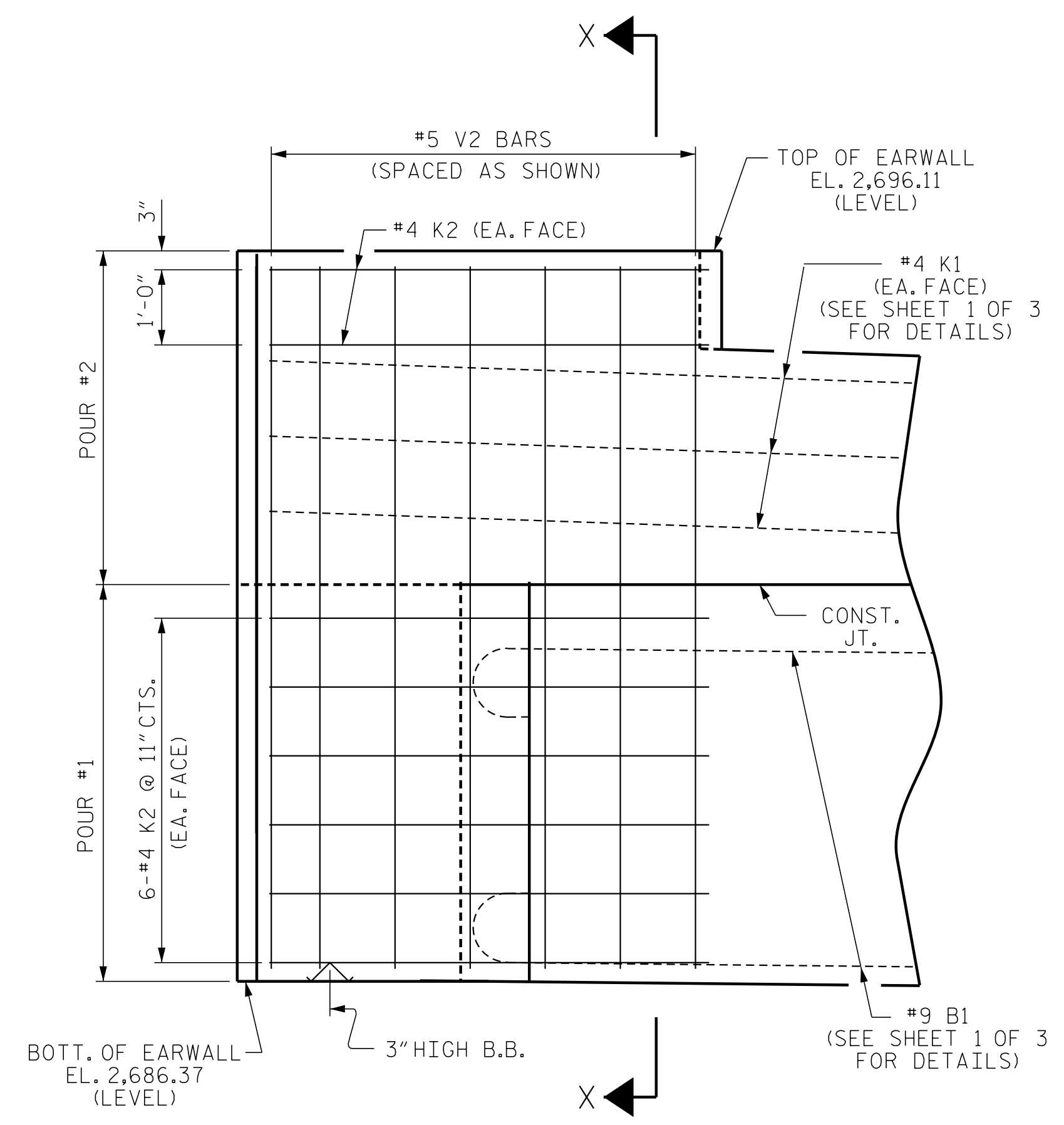
PLAN OF LEFT EARWALL



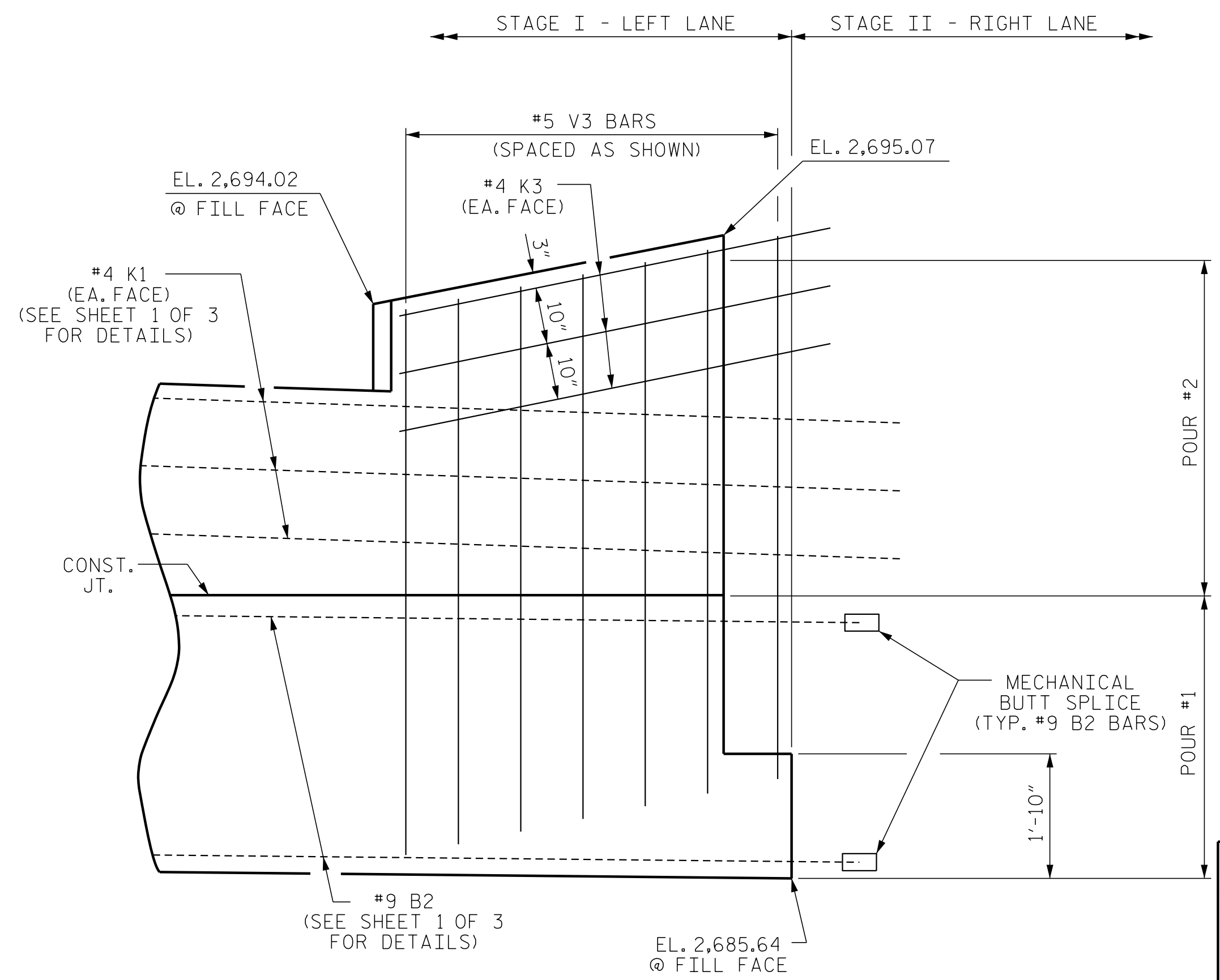
PLAN OF CENTER RAISED BACKWALL



SECTION X-X

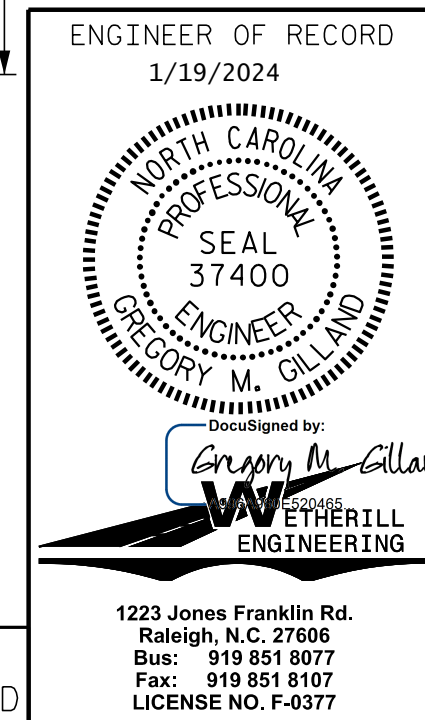


ELEVATION OF LEFT EARWALL



ELEVATION OF CENTER RAISED BACKWALL

PROJECT NO. HB-0004  
 HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 3



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE END BENT No. 2 (LEFT LANE) (STAGE I)	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S1-25
2			TOTAL SHEETS 58

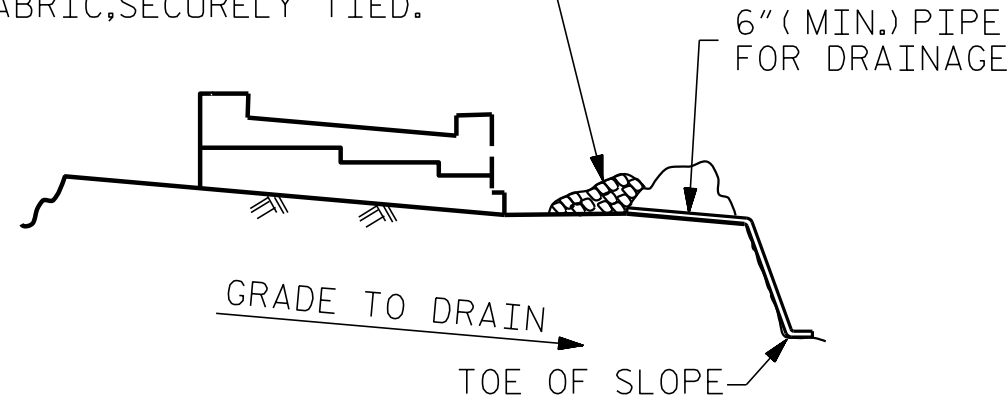
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DRAWN BY : D. HODGE      DATE : 7/23  
 CHECKED BY : G. GILLAND      DATE : 9/23

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 Raleigh, N.C. 27606  
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 LICENSE NO. F-0377

MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

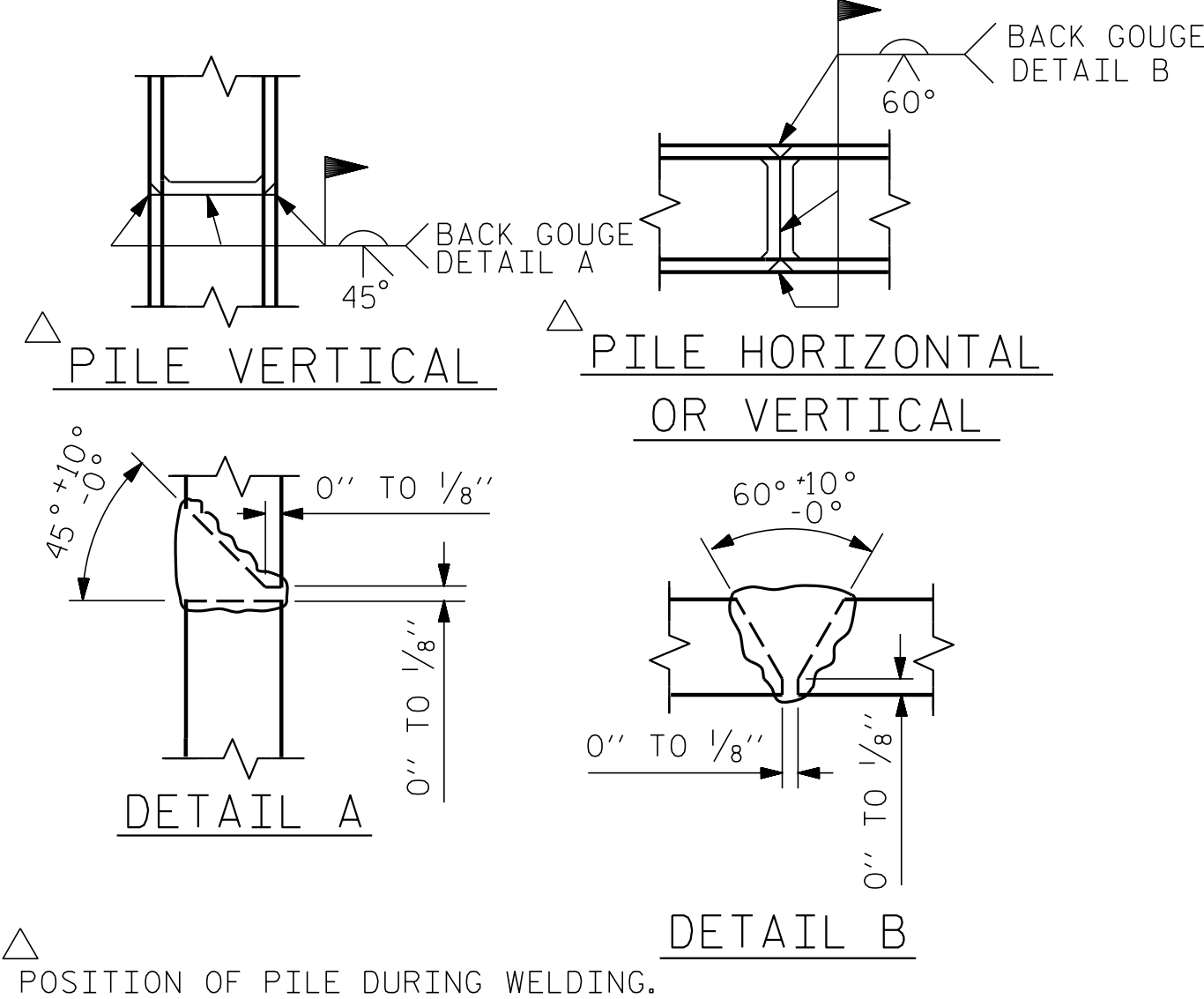


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

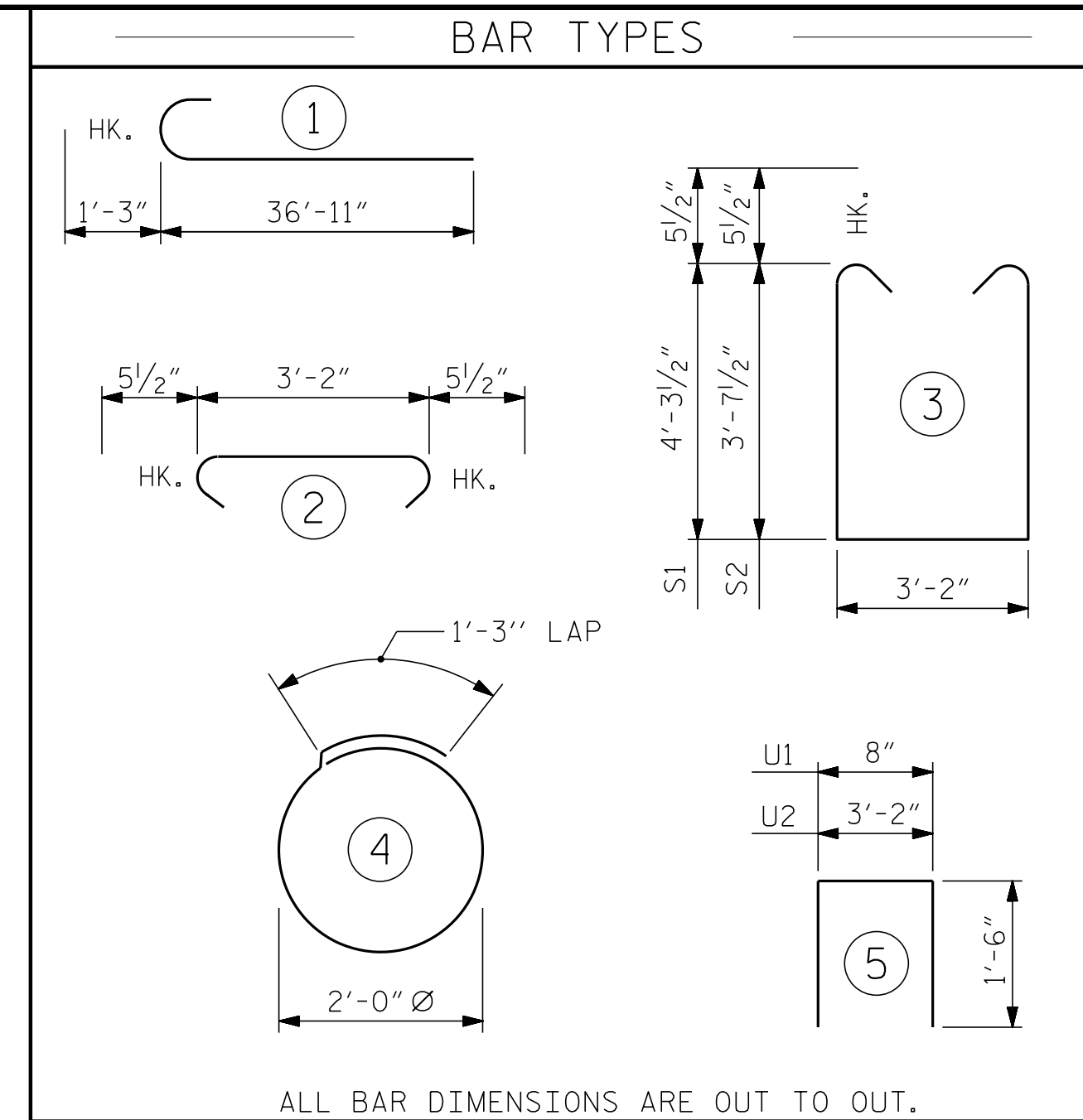
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



POSITION OF PILE DURING WELDING.

**PILE SPLICE DETAILS**



ALL BAR DIMENSIONS ARE OUT TO OUT.

**BILL OF MATERIAL**

**END BENT No. 2**

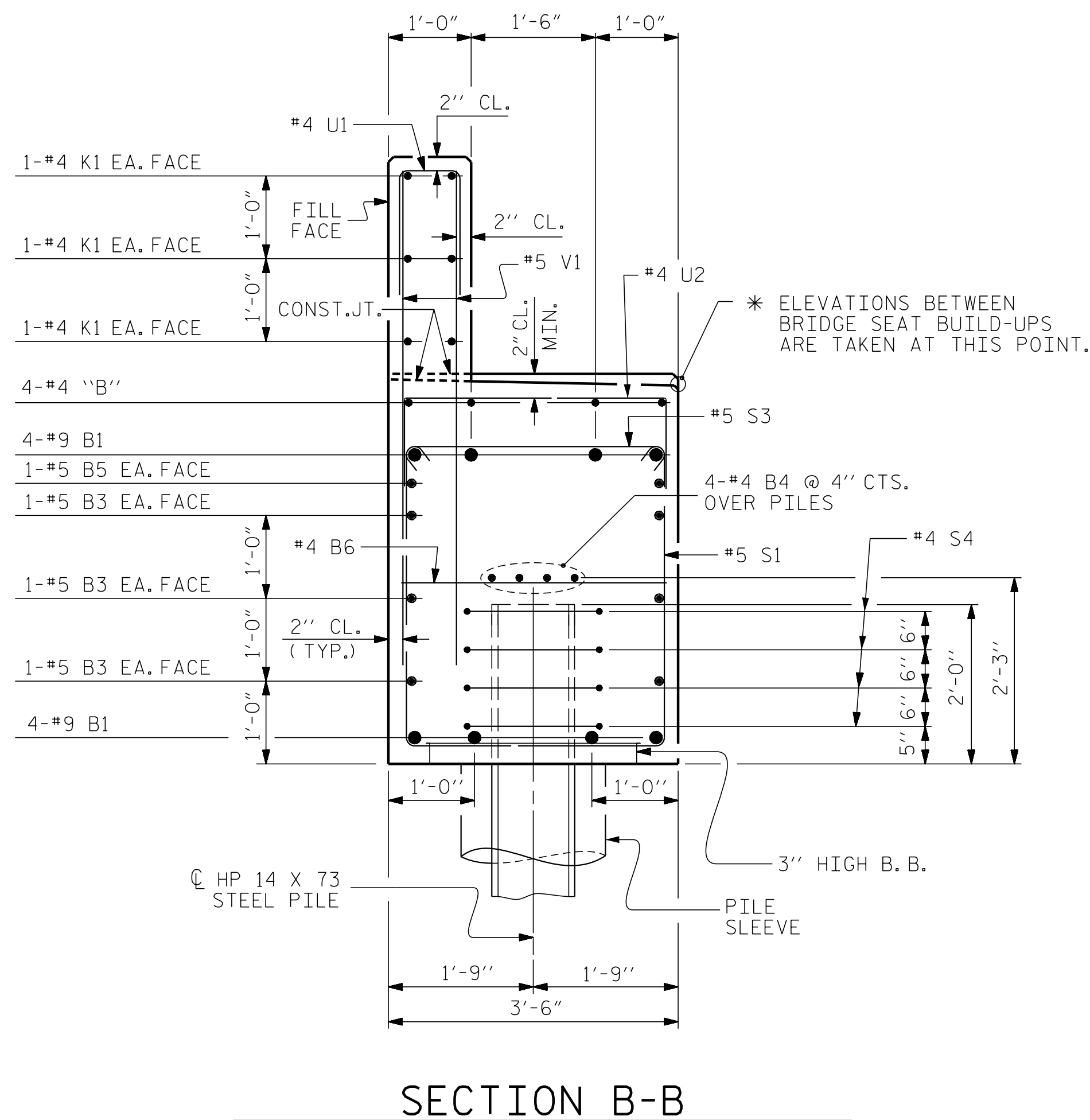
**STAGE I**

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		38'-2"	1,038
B2	8	#9	STR	41'-11"	1,140
B3	12	#5	STR	39'-10"	499
B4	8	#4	STR	38'-4"	205
B5	2	#5	STR	34'-8"	72
B6	19	#4	STR	3'-2"	40
B7	8	#4	STR	4'-11"	26
B8	12	#4	STR	9'-4"	75
K1	12	#4	STR	39'-10"	319
K2	16	#4	STR	5'-9"	61
K3	6	#4	STR	6'-7"	26
S1	64	#5	3	12'-8"	846
S2	59	#5	3	11'-4"	697
S3	123	#5	2	4'-1"	524
S4	32	#4	4	7'-7"	162
U1	64	#4	5	3'-8"	157
U2	29	#4	5	6'-2"	119
V1	128	#5	STR	6'-6"	868
V2	14	#5	STR	9'-3"	135
V3	14	#5	STR	7'-11"	116

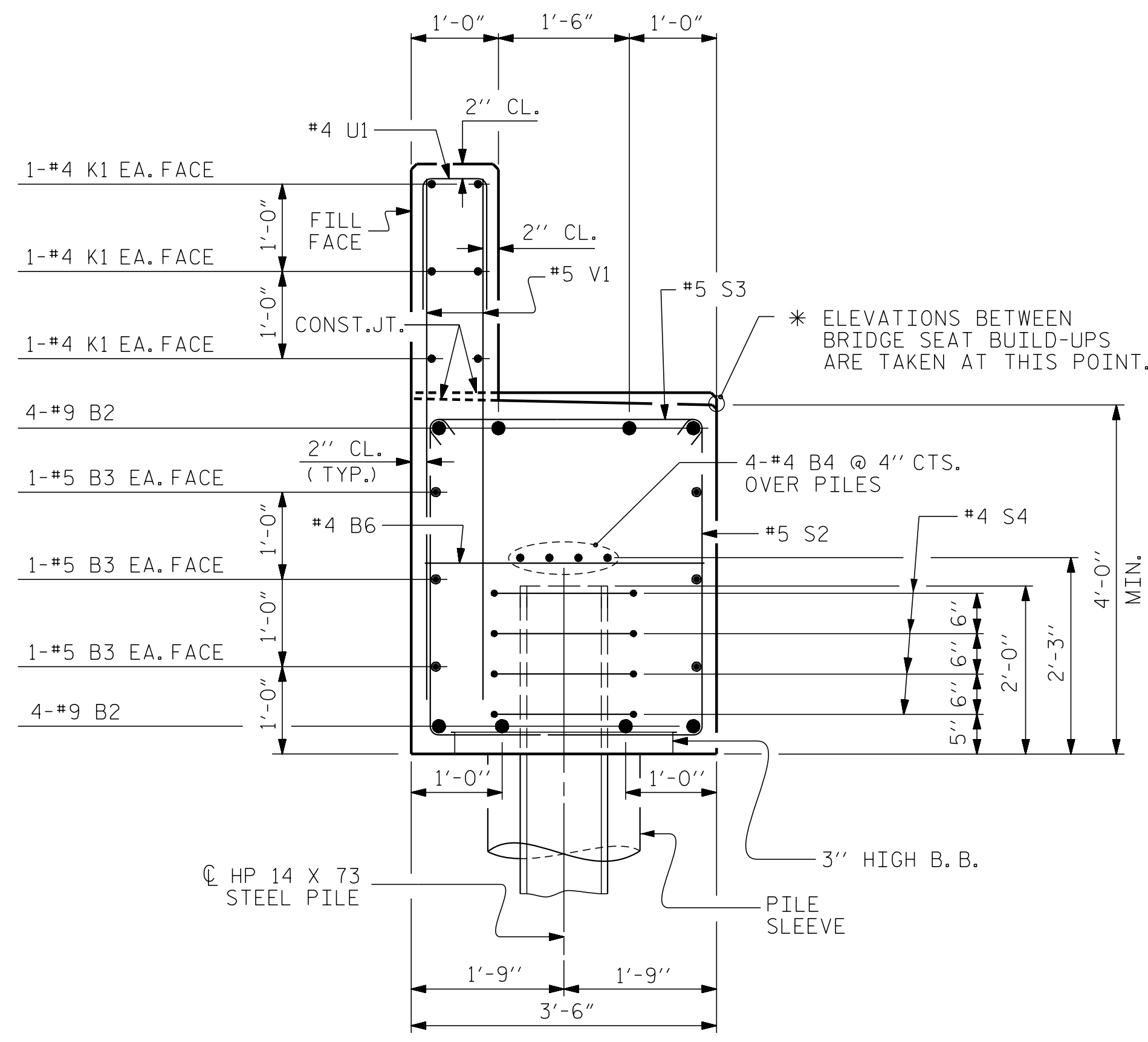
REINFORCING STEEL 7,125 LBS.

**CLASS A CONCRETE BREAKDOWN**

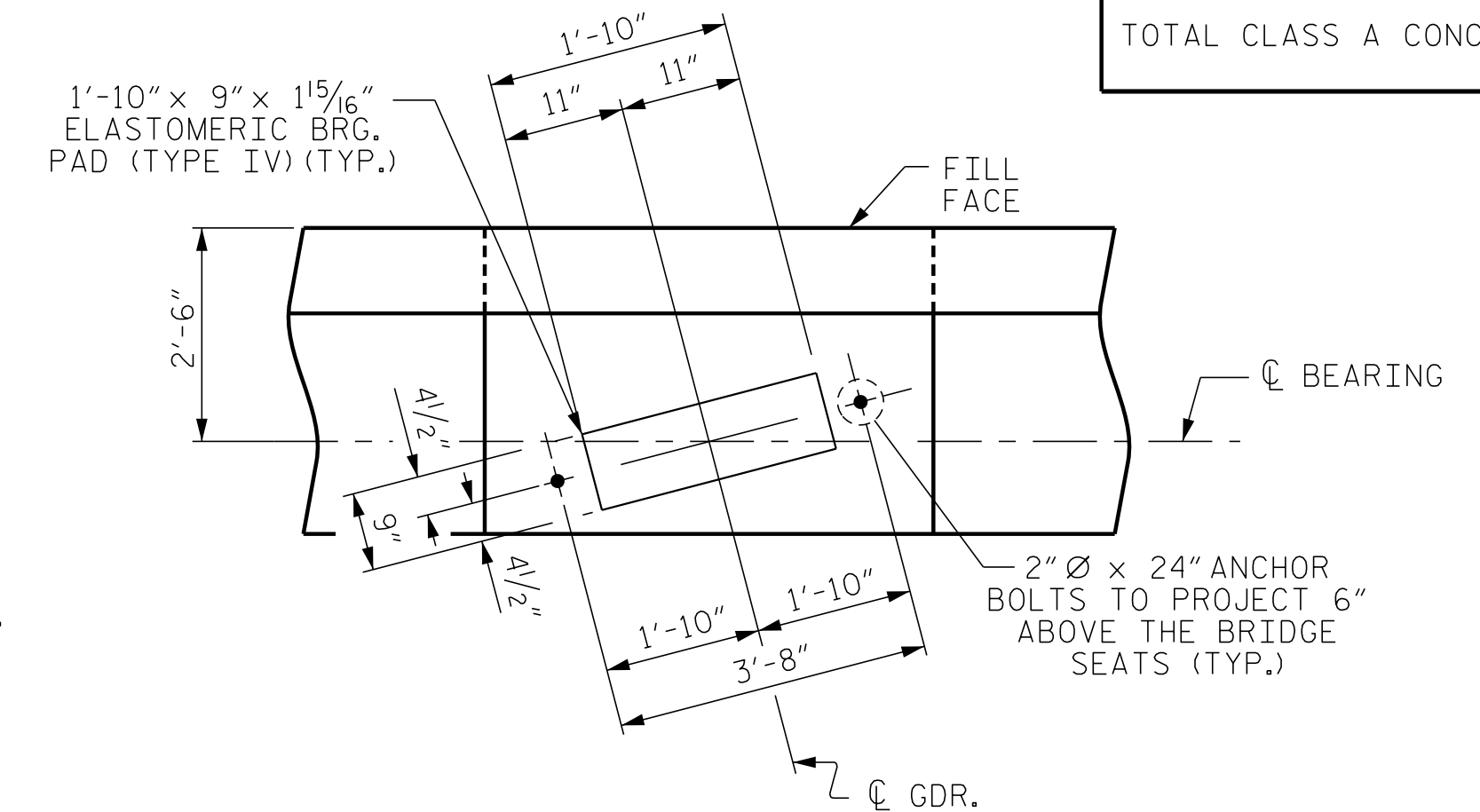
POUR #1	CAP AND LOWER PORTION OF EARWALL	44.5 C.Y.
POUR #2	UPPER PORTION OF EARWALL AND BACKWALL	8.8 C.Y.
<b>TOTAL CLASS A CONCRETE</b>		<b>53.3 C.Y.</b>



**SECTION B-B**



**SECTION A-A**



**DETAIL 'A'**  
(TYP. EA. GIRDER)

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 2  
 (LEFT LANE)  
 (STAGE I)

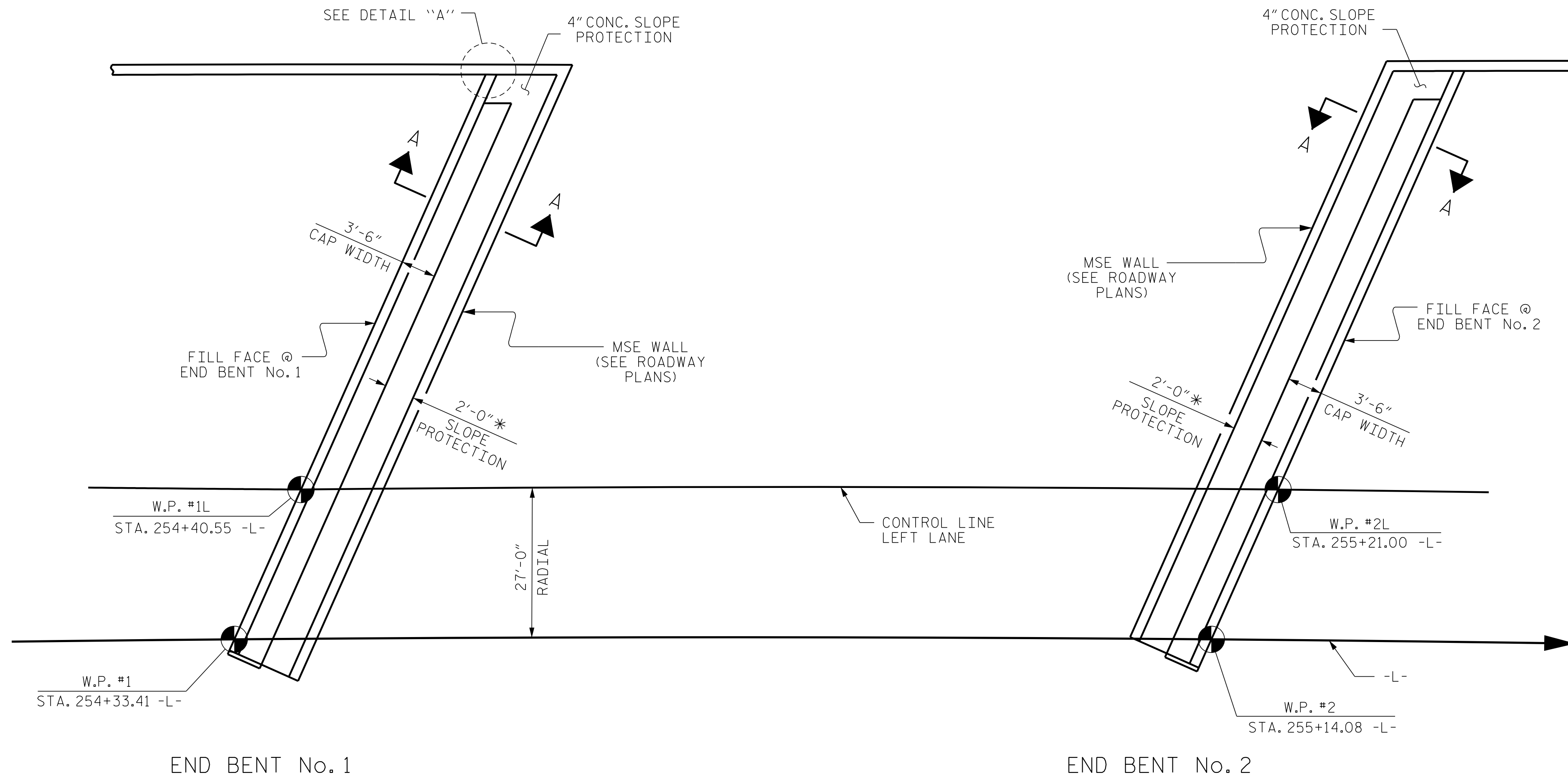
**REVISIONS**

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS 58
2			4			S1-26

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DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: G. GILLAND DATE: 9/23



**NOTES**

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FINISHED TO THE SATISFACTION OF THE ENGINEER. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 20" WIDE AND PLACED IN THE MIDDLE OF THE 4" CONCRETE SLOPE PROTECTION. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

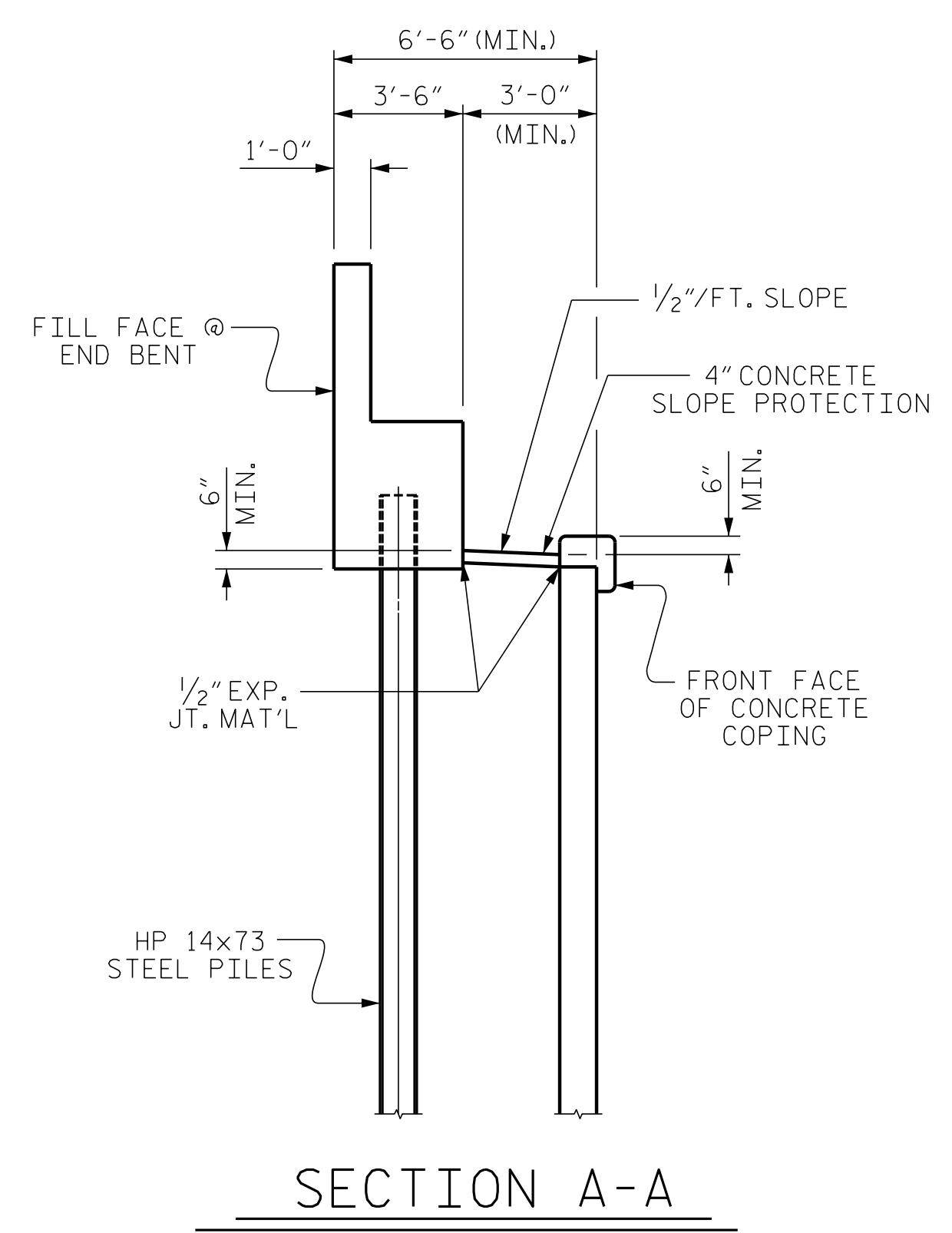
BRIDGE @ STA. 254+73.75 -L- (LEFT LANE)	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	19	77.6
END BENT 2	19	76.5
TOTAL	38	154.1

\* QUANTITIES BASED ON DIMENSION SHOWN. FIELD ADJUST AS REQUIRED BASED ON WALL PANEL AND COPING USED.

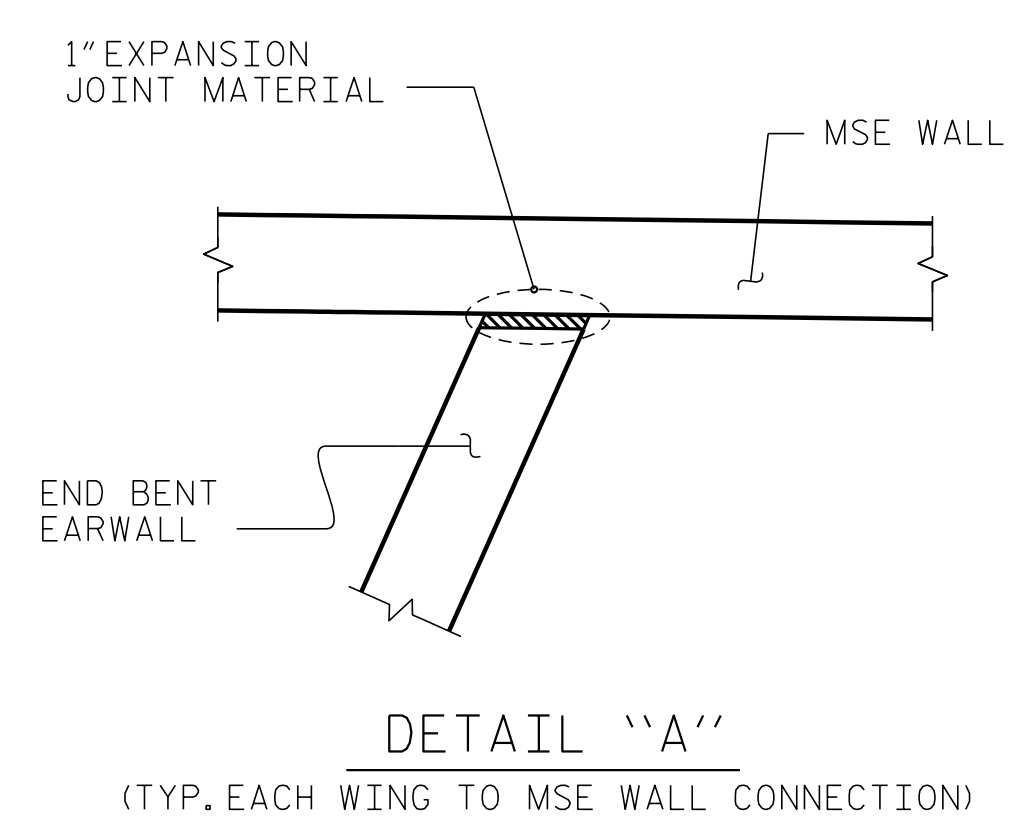
END BENT No. 1

END BENT No. 2

PLAN



SECTION A-A



DETAIL "A"

(TYP. EACH WING TO MSE WALL CONNECTION)

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

ENGINEER OF RECORD  
 1/19/2024

Gregory M. Gilland  
 WETHERILL ENGINEERING

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

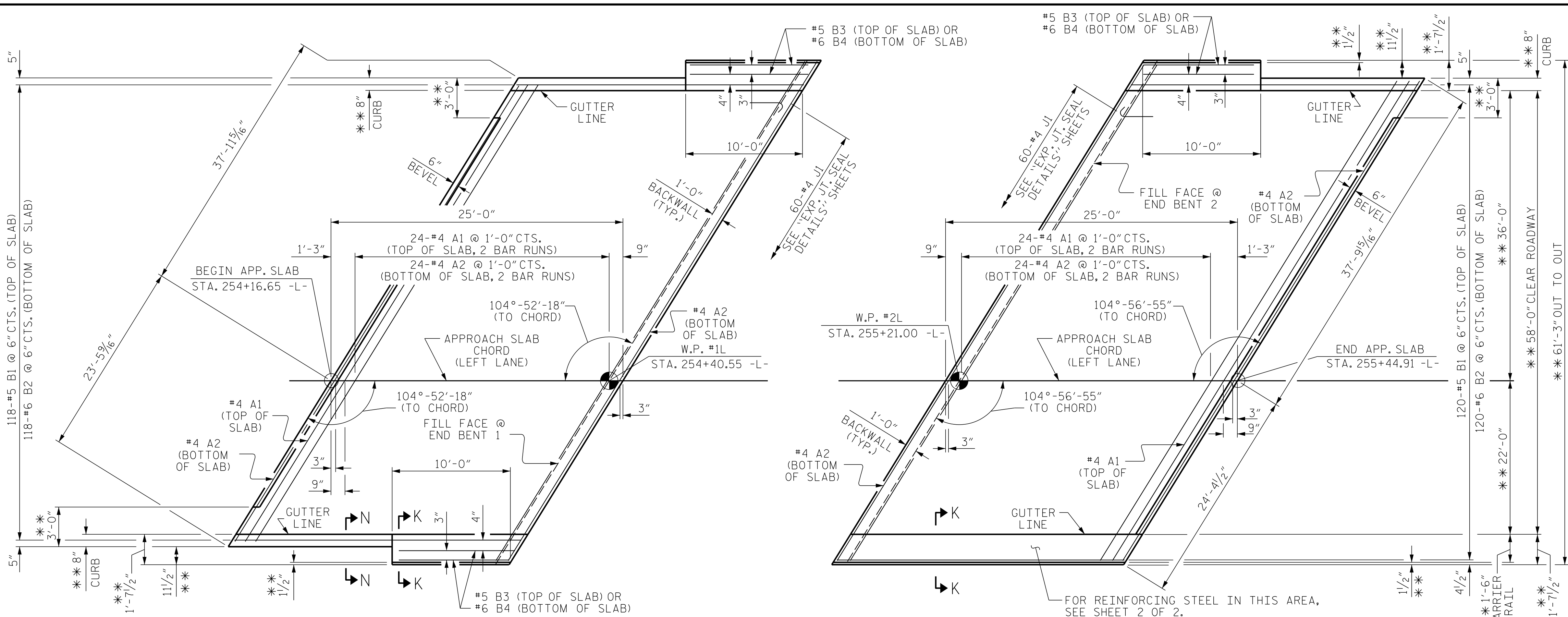
SLOPE PROTECTION DETAILS  
 (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			58

DRAWN BY : D. HODGE DATE : 8/23  
 CHECKED BY : J. DILWORTH DATE : 9/23

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 UNLESS ALL SIGNATURES COMPLETED

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 1/18/2024 4:59:19 PM



PLAN @ END BENT 1      PLAN @ END BENT 2

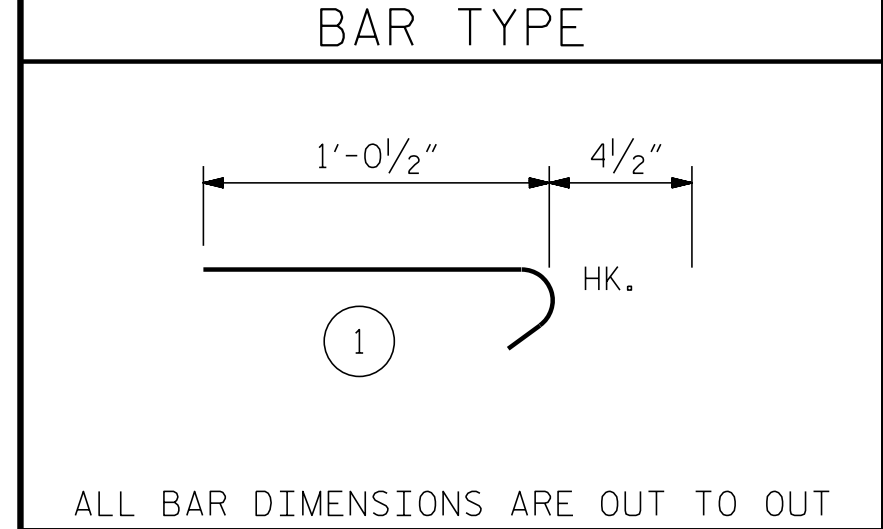
\*\* DENOTES RADIAL DIMENSION

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS  
ARC OFFSETS TO OUTSIDE EDGE OF APPROACH SLABS ARE NEGLIGIBLE, THEREFORE NOT SHOWN

NOTES

- FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.
- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- 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.
- FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

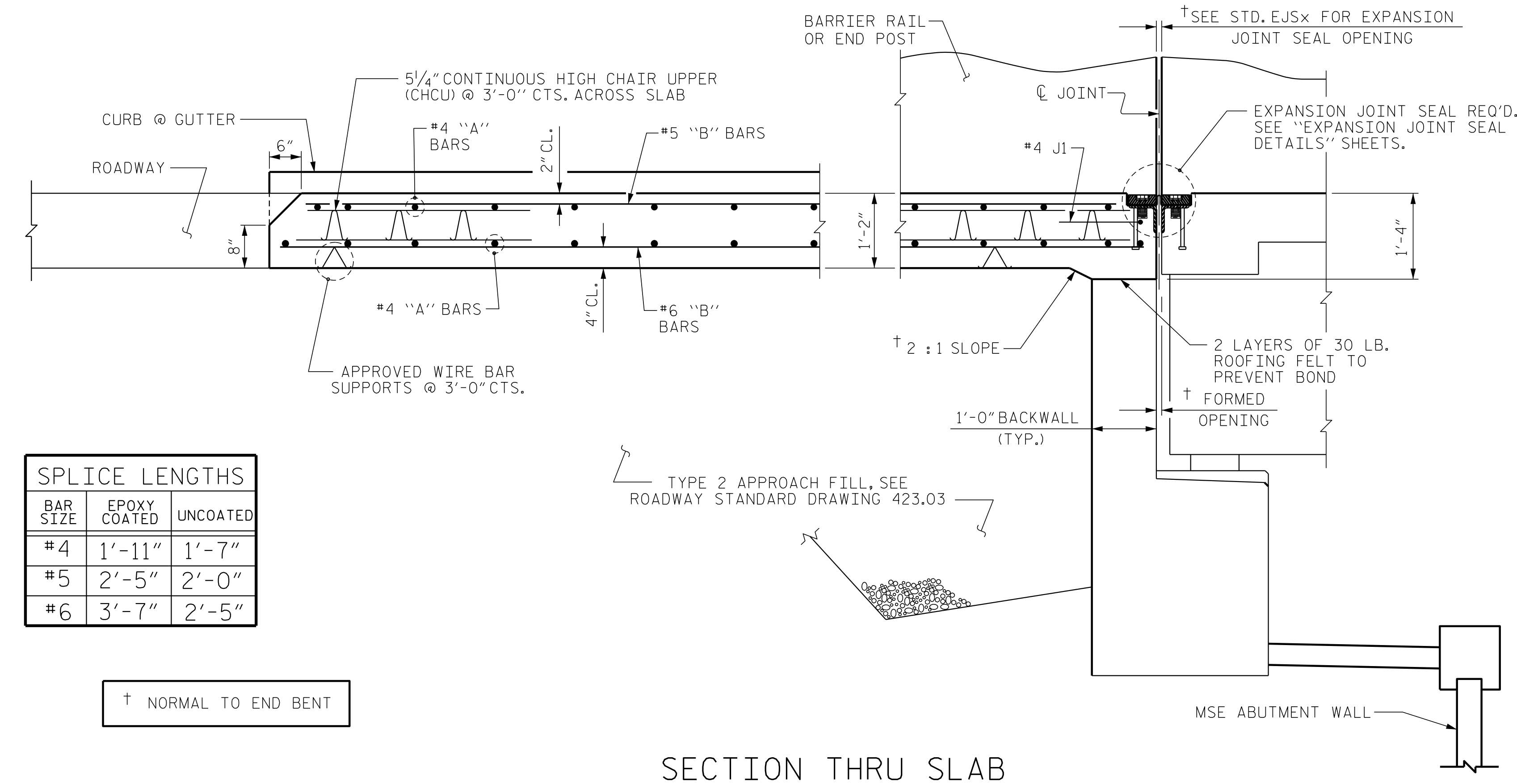
BILL OF MATERIAL					
<b>APPROACH SLAB AT E. BT. 1</b>					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	32'-6"	1,086
A2	52	#4	STR	32'-4"	1,123
*B1	118	#5	STR	23'-6"	2,892
B2	118	#6	STR	24'-7"	4,357
*B3	2	#5	STR	9'-10"	21
B4	2	#6	STR	9'-10"	30
*J1	60	#4	1	1'-5"	57
REINFORCING STEEL *** LBS.					5,510
*EPOXY COATED REINFORCING STEEL *** LBS.					4,056
CLASS AA CONCRETE *** C.Y.					65.3
<b>APPROACH SLAB AT E. BT. 2</b>					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	32'-6"	1,086
A2	52	#4	STR	32'-4"	1,123
*B1	120	#5	STR	23'-6"	2,941
B2	120	#6	STR	24'-7"	4,431
*B3	2	#5	STR	9'-10"	21
B4	2	#6	STR	9'-10"	30
*J1	60	#4	1	1'-5"	57
REINFORCING STEEL *** LBS.					5,584
*EPOXY COATED REINFORCING STEEL *** LBS.					4,105
CLASS AA CONCRETE *** C.Y.					65.8



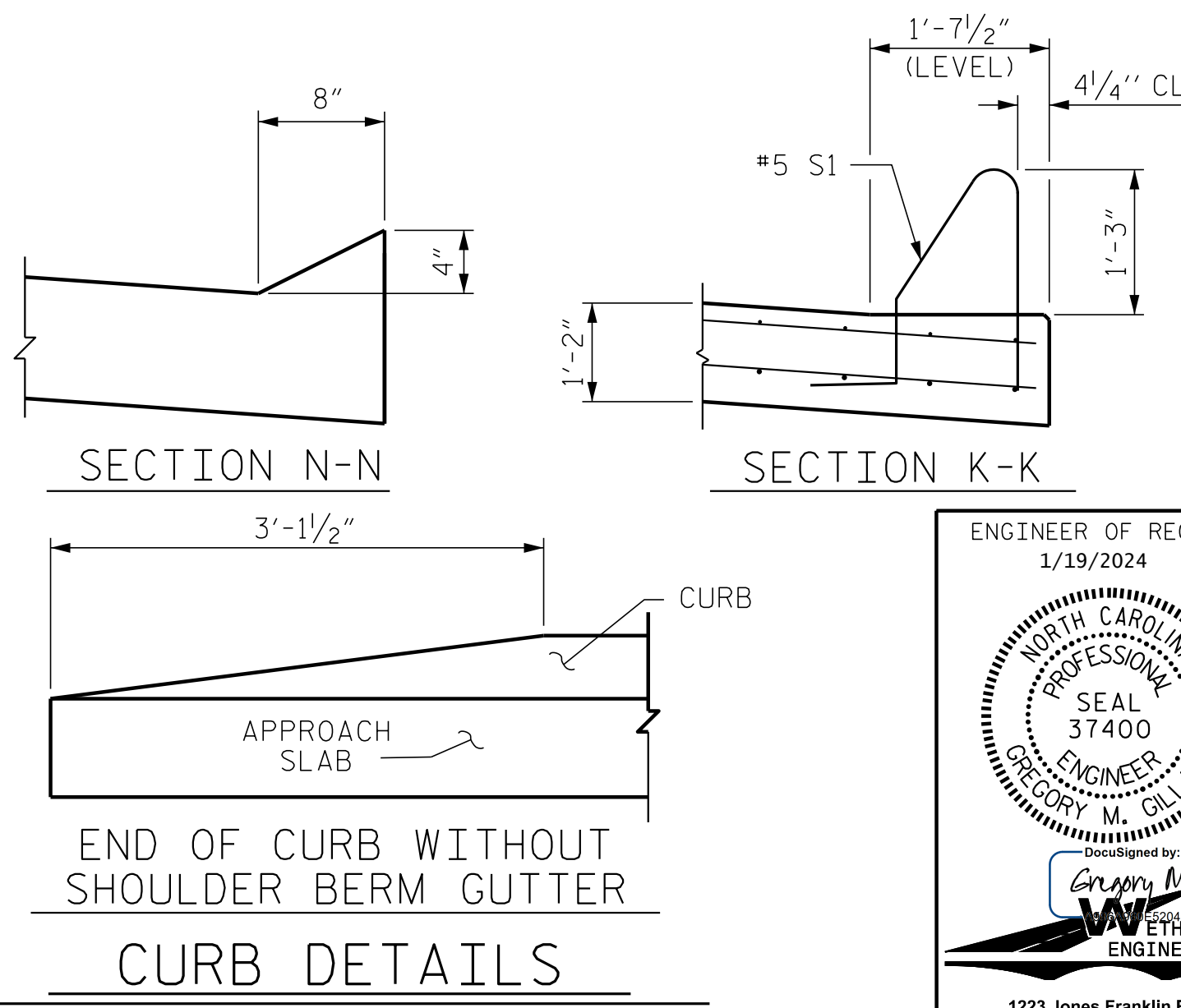
ALL BAR DIMENSIONS ARE OUT TO OUT  
\*\*\* QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
STATION: 254+73.75 -L-  
SHEET 1 OF 2



SECTION THRU SLAB



CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

† NORMAL TO END BENT

DRAWN BY: D. HODGE      DATE: 2/23  
CHECKED BY: G. GILLAND      DATE: 8/23

ENGINEER OF RECORD  
1/19/2024

1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

BRIDGE APPROACH SLAB  
FOR FLEXIBLE PAVEMENT  
(LEFT LANE)

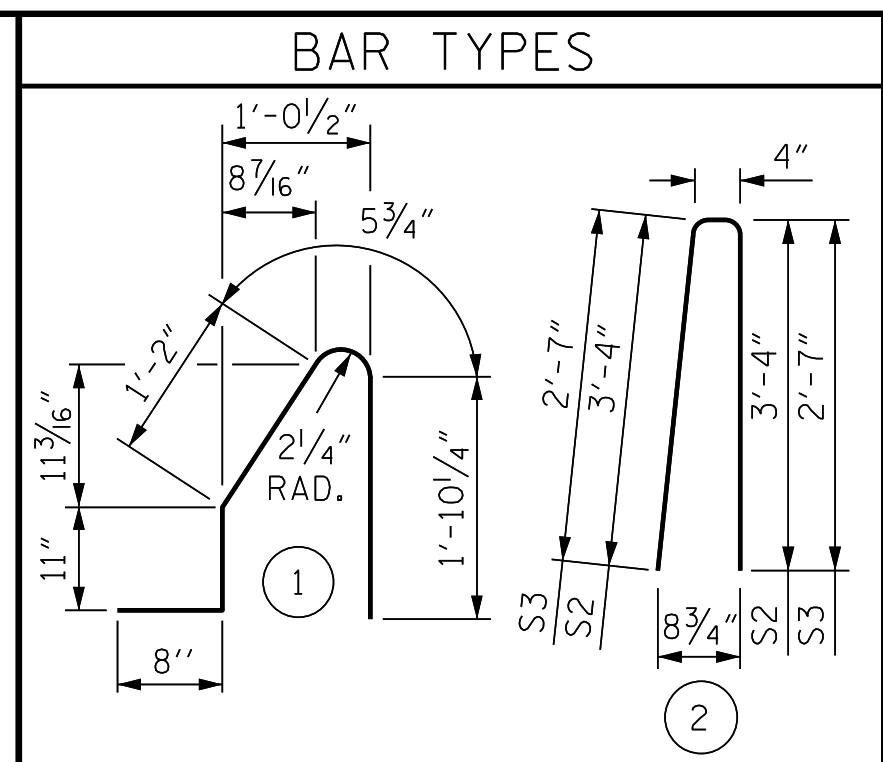
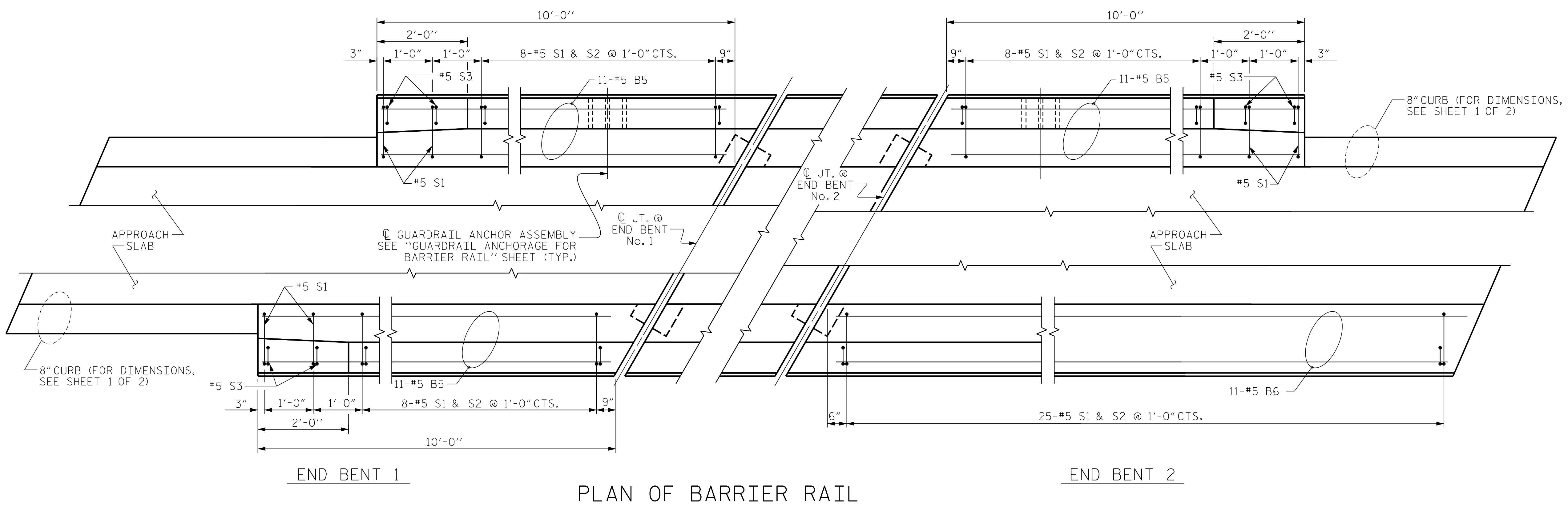
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2			4		

SHEET NO. S1-28  
TOTAL SHEETS 58

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ALL BAR DIMENSIONS ARE OUT TO OUT

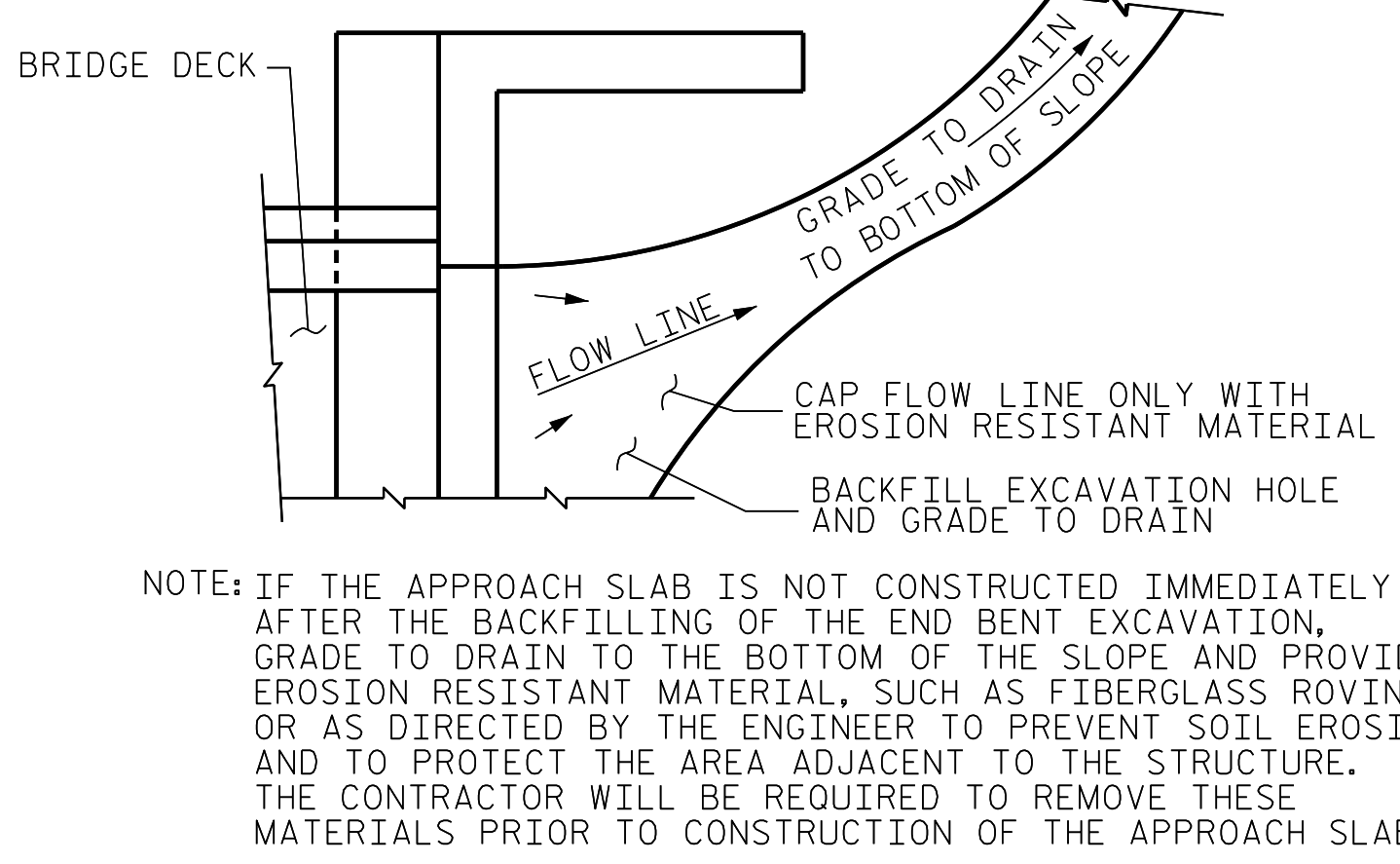
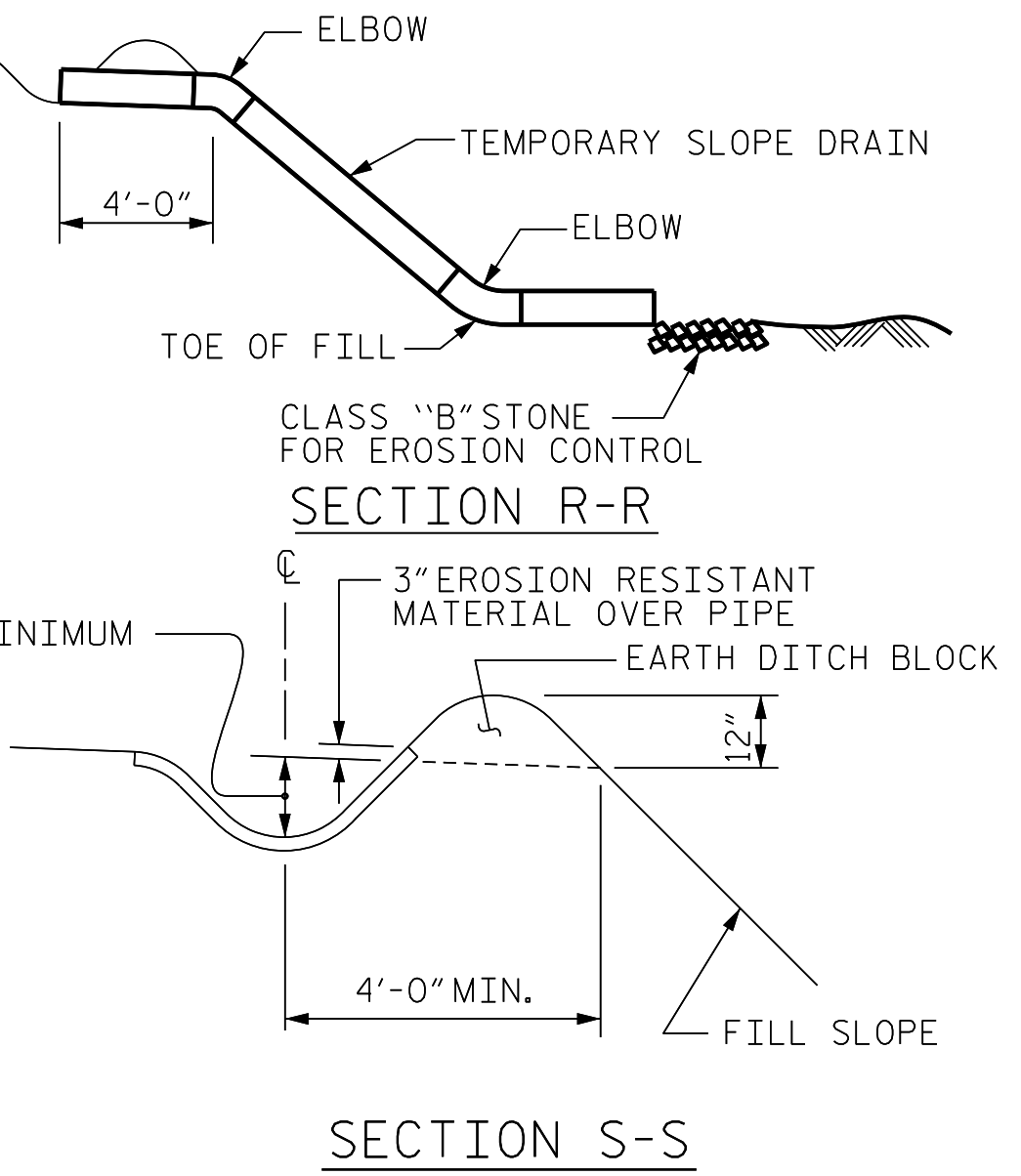
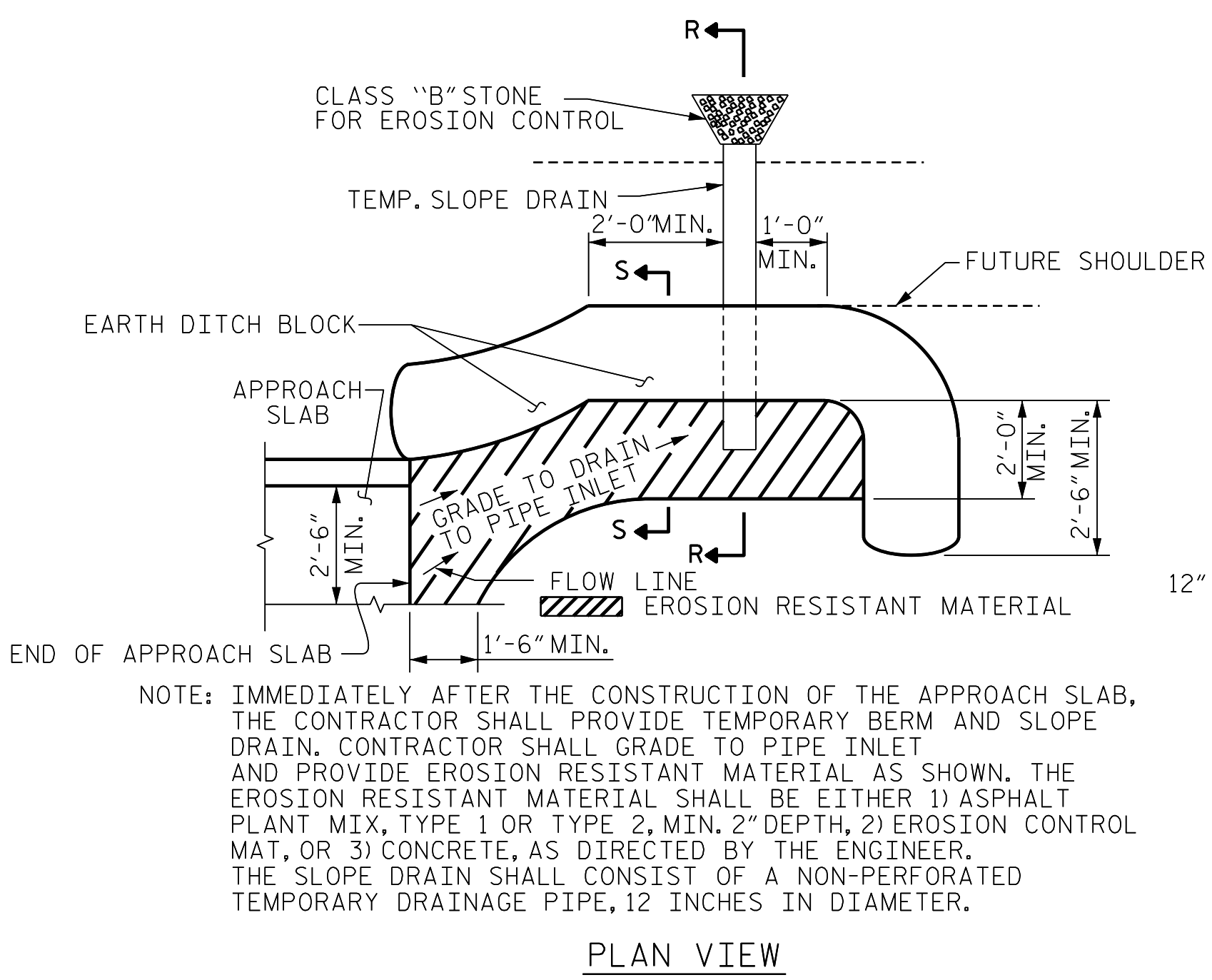
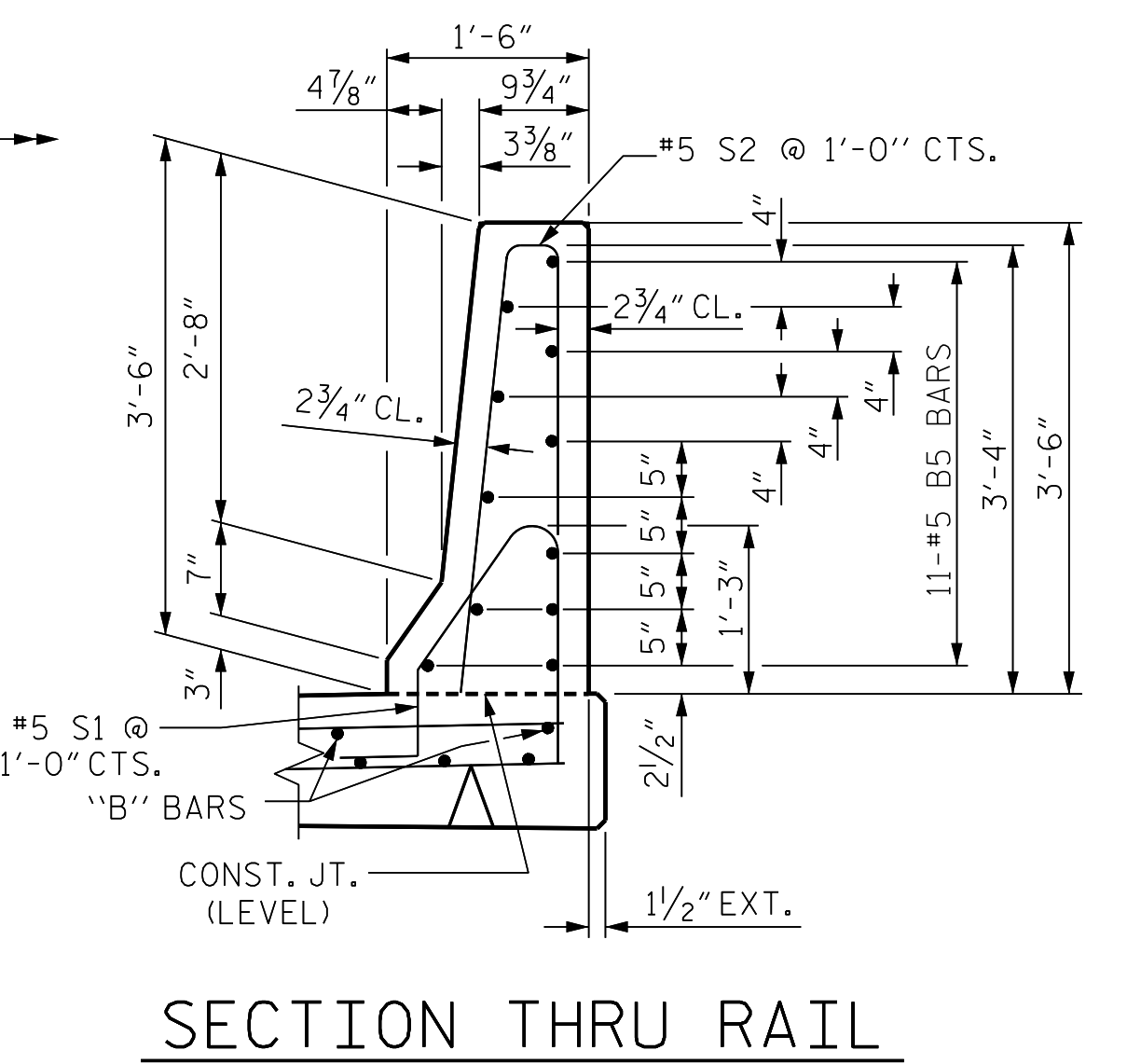
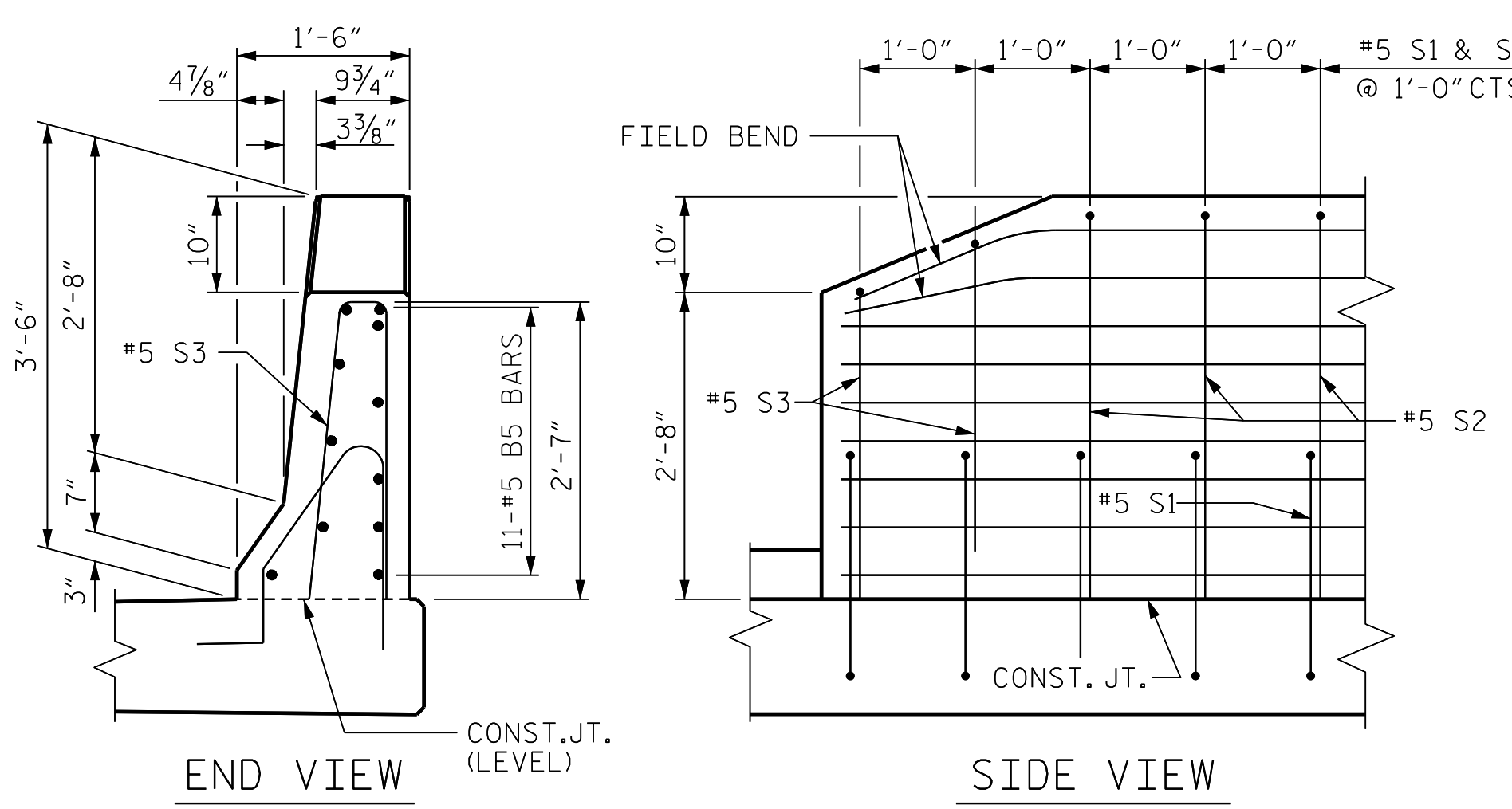
BILL OF MATERIAL					
BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B5	33	#5	STR	9'-8"	333
* B6	11	#5	STR	24'-4"	279
* S1	55	#5	1	5'-1"	292
* S2	49	#5	2	7'-0"	358
* S3	6	#5	2	5'-6"	34
* EPOXY COATED REINFORCING STEEL				LBS.	1,296
CLASS AA CONCRETE				C. Y.	7.5
CONCRETE BARRIER RAIL					55.45 LIN. FT.

**NOTES**

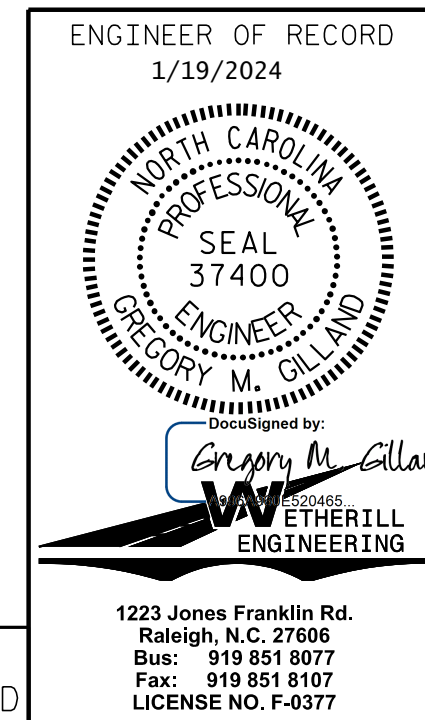
THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 2



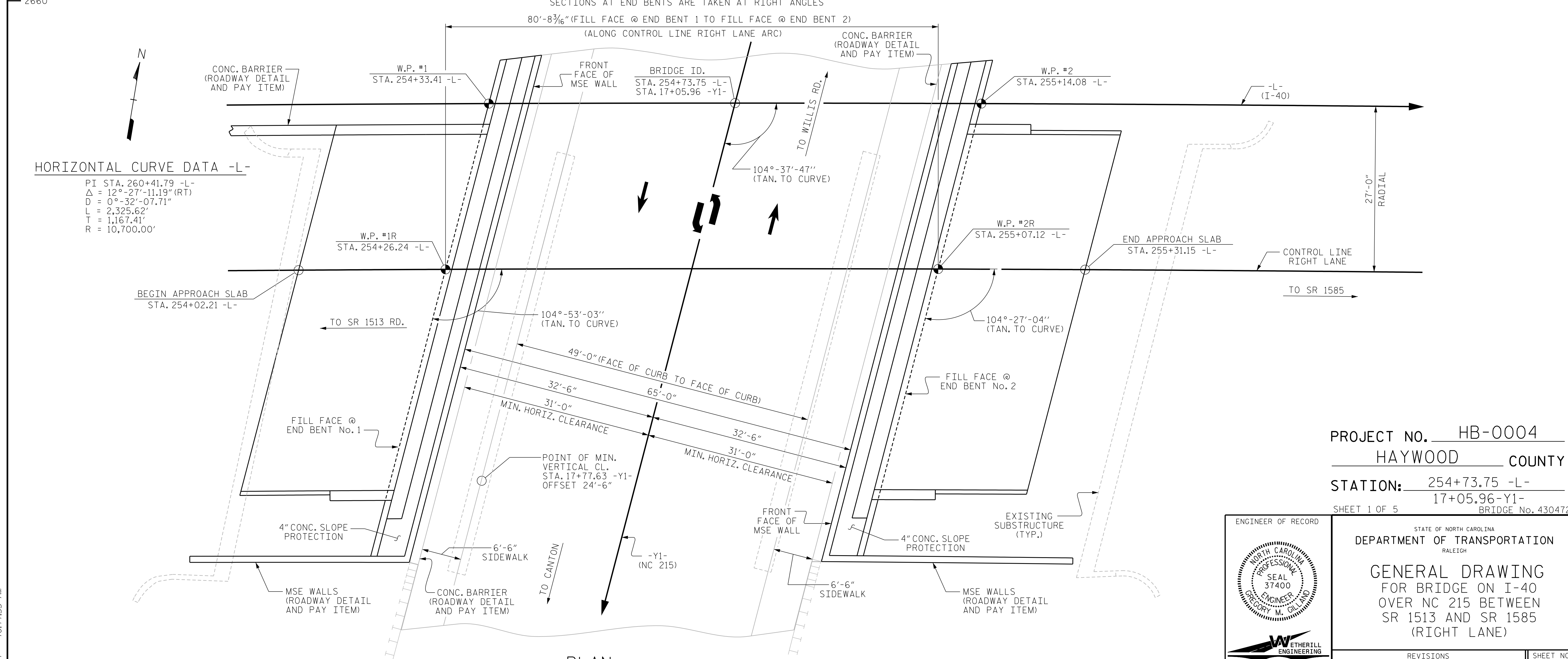
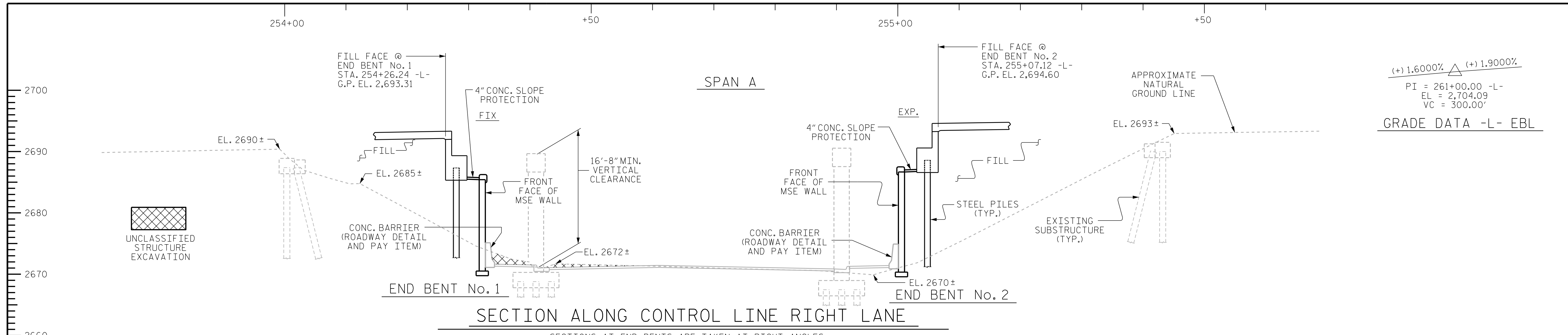
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-29  
 TOTAL SHEETS 58

ASSEMBLED BY : D. HODGE	DATE : 2/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : FCJ 11/88	REV. 6/13 MAA/GM
CHECKED BY : ARB 11/88	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**  
 (TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

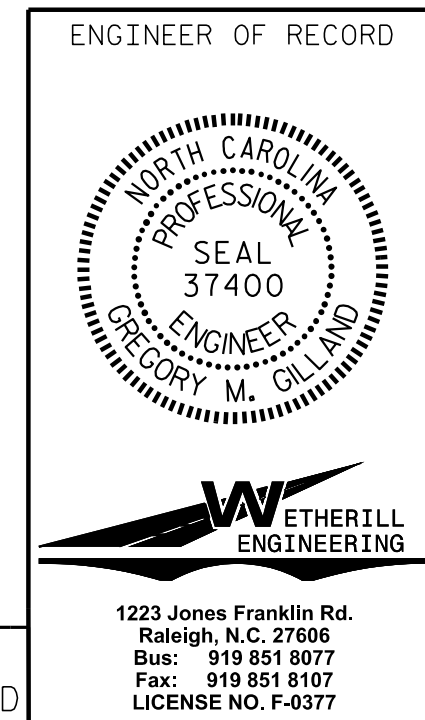
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED



**HORIZONTAL CURVE DATA -L-**

PI STA. 260+41.79 -L-  
 $\Delta = 12^\circ-27'-11.19''$  (RT)  
 $D = 0^\circ-32'-07.71''$   
 $L = 2,325.62'$   
 $T = 1,167.41'$   
 $R = 10,700.00'$

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
17+05.96 -Y1-  
 SHEET 1 OF 5 BRIDGE No. 430472



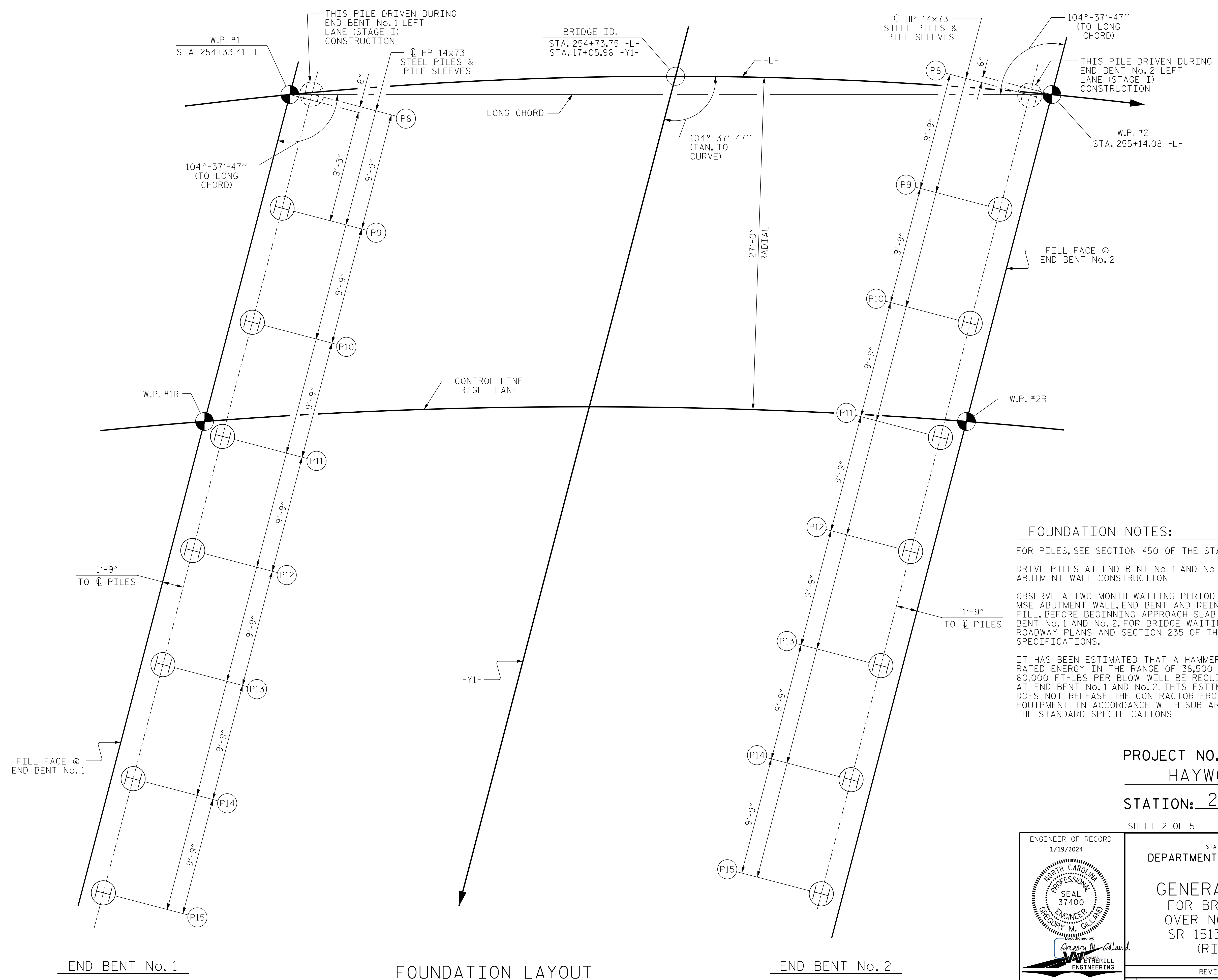
ENGINEER OF RECORD					
STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
GENERAL DRAWING					
FOR BRIDGE ON I-40					
OVER NC 215 BETWEEN					
SR 1513 AND SR 1585					
(RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-01
TOTAL SHEETS					58

DRAWN BY: D. HODGE DATE: 11/23  
 CHECKED BY: G. GILLAND DATE: 11/23

PLAN  
 PILES NOT SHOWN FOR CLARITY  
 END BENTS ARE PARALLEL

DOCUMENT NOT CONSIDERED FINAL  
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**FOUNDATION NOTES:**


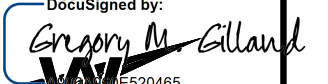
FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRIVE PILES AT END BENT No. 1 AND No. 2 PRIOR TO MSE ABUTMENT WALL CONSTRUCTION.

OBSERVE A TWO MONTH WAITING PERIOD AFTER CONSTRUCTING THE MSE ABUTMENT WALL, END BENT AND REINFORCED BRIDGE APPROACH FILL, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT No. 1 AND No. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 38,500 FT-LBS PER BLOW TO 60,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT No. 1 AND No. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUB ARTICLE 450-3(d)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 5

ENGINEER OF RECORD 1/19/2024  GREGORY M. GILLILAND Designated by  WETHERILL ENGINEERING		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH GENERAL DRAWING FOR BRIDGE ON I-40 OVER NC 215 BETWEEN SR 1513 AND SR 1585 (RIGHT LANE)																			
1223 Jones Franklin Rd. Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 LICENSE NO. F-0377		REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th>NO.</th> <th>BY:</th> <th>DATE:</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table>		NO.	BY:	DATE:	NO.	BY:	DATE:	1			3			2			4		
NO.	BY:	DATE:	NO.	BY:	DATE:																
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2			4																		
DRAWN BY : <u>D. HODGE</u> DATE : <u>11/23</u> CHECKED BY : <u>G. GILLILAND</u> DATE : <u>11/23</u>			SHEET NO. S2-02 TOTAL SHEETS 58																		

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### SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent No. 1, Piles 1-3	115	See Structure Drawings	85			300							
End Bent No. 1, Piles 4-15	115		60			300							
End Bent No. 2, Piles 1-3	115		85			300							
End Bent No. 2, Piles 4-15	115		60			300							

\*Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

$$**RDR = \frac{\text{Factored Resistance} + \text{Factored Downdrag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \frac{\text{Nominal Downdrag Resistance} + \text{Nominal Scour Resistance}}{\text{Scour Resistance Factor}}$$

### PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent No. 1, Piles 1-15	113	44		0.60	35		
End Bent No. 2, Piles 1-15	113	44		0.60	35		

\*Factored Dead Load is factored weight of pile above the ground line.

### SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
<b>TOTAL QTY:</b>					

### SUMMARY OF PDA

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	PDA Testing Required? YES or MAYBE	Total PDA Testing Quantity EACH

### NOTES

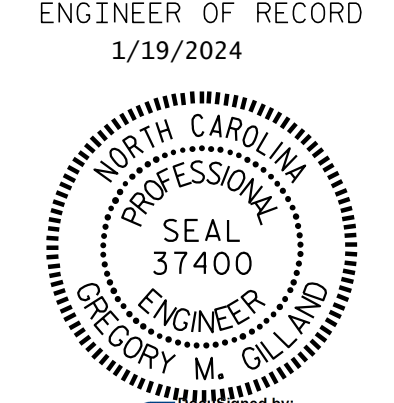
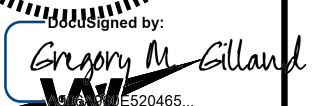
1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer Michael H. Stephens (PE No. 028893) on 09/14/2023.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for PDA Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, CSL Testing, SID Inspections and PITs when these items may be required.

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

SHEET 3 OF 5

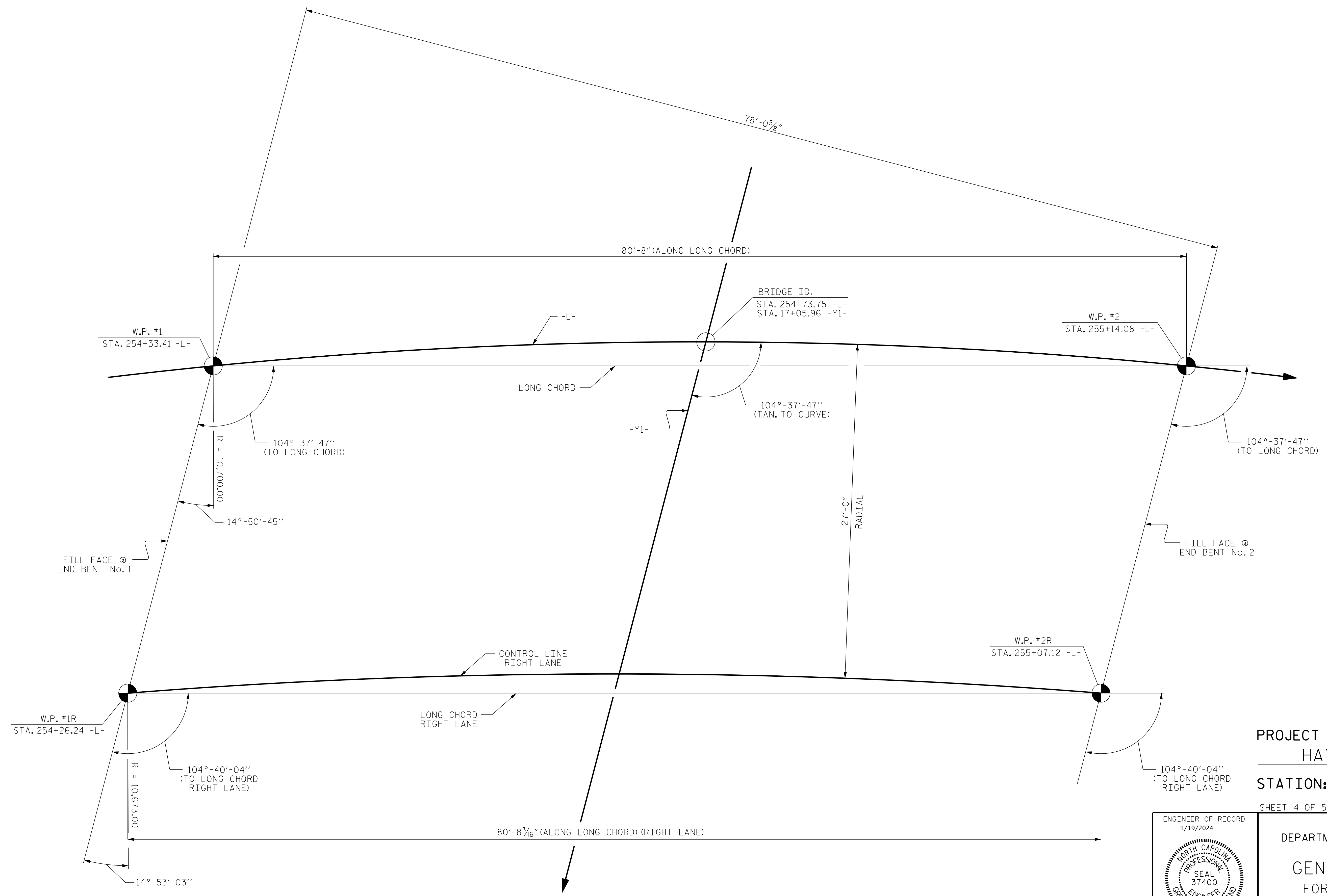
DRAWN BY : D. HODGE DATE : 11/23  
 CHECKED BY : G. GILLAND DATE : 11/23

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 ENGINEER OF RECORD 1/19/2024 Signed by  GREGORY M. GILLILAND GREGORY M. GILLILAND ENGINEERING	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH GENERAL DRAWING PILE FOUNDATION TABLES (RIGHT LANE)				SHEET NO. S2-03
	REVISIONS				TOTAL SHEETS 58
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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**LONG CHORD LAYOUT**  
END BENTS ARE PARALLEL

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 4 OF 5

DRAWN BY : D. HODGE DATE : 7/23  
 CHECKED BY : J. DILWORTH DATE : 9/23

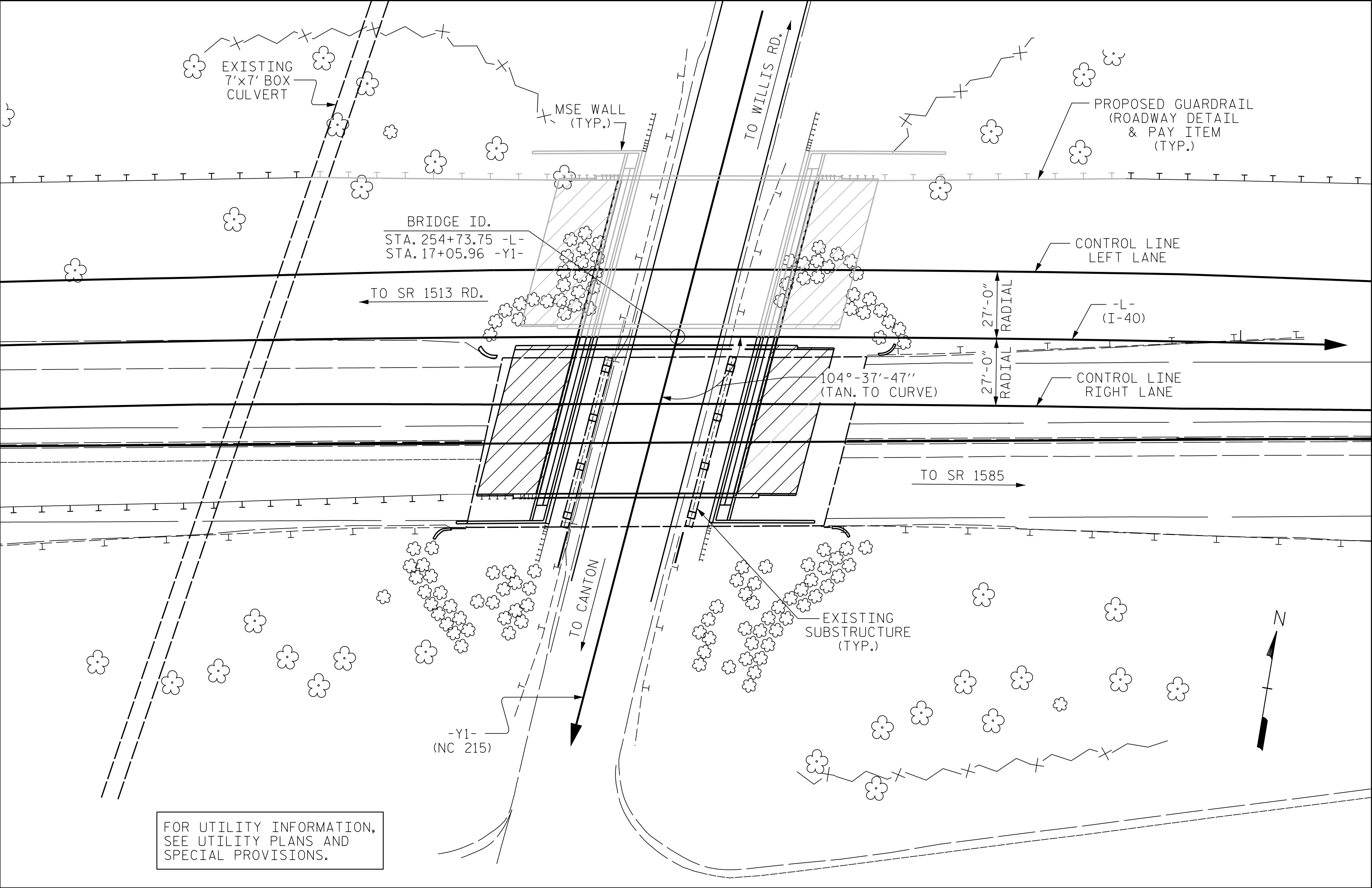
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON I-40 OVER NC 215 BETWEEN SR 1513 AND SR 1585 (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-04
TOTAL SHEETS					58

BM-9 : R/R SPIKE SET IN BASE OF 10" SYCAMORE, 30' RIGHT OF STA. 7+28.00 -BY1- EL. 2668.29



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES:

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- 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 MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- 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 SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- 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 254+73.75 -L-".

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.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 40 FT EACH SIDE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING 3 SPAN STRUCTURE CONSISTS OF 1 SPAN @ 41', 1 SPAN @ 50' AND 1 SPAN @ 54' WITH REINFORCED CONCRETE DECK ON STEEL I-BEAMS AND A CLEAR ROADWAY WIDTH OF 66' ON A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE END BENTS AND REINFORCED CONCRETE POST AND BEAM BENTS ON PILE FOOTINGS SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE 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.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30"(SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND  $f_y = 60$ ksi.

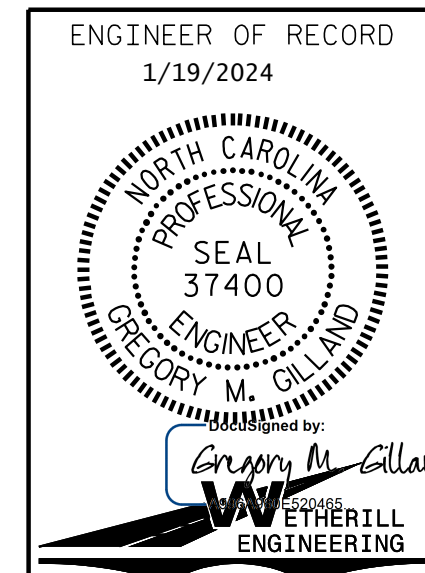
PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

SHEET 5 OF 5

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	FIB 36" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 x 73 STEEL PILES	* CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS				
	LUMP SUM	LUMP SUM	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	No.	LIN.FT.	EA.	NO.	LIN.FT.	LIN.FT.	NO.	YDS.	LUMP SUM	LUMP SUM	
SUPERSTRUCTURE				4,810	6,866				7	538.42		* 212.66							
END BENT 1						50.6		6,674			7	7	420		19				
END BENT 2						50.1		6,646			7	7	420		19				
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	4,810	6,866	100.7	LUMP SUM	13,320	7	538.42	14	14	840	* 212.66	38	LUMP SUM	LUMP SUM		

\* CONTAINS THE ADDITIONAL LINEAR FEET OF CONCRETE BARRIER RAIL ON APPROACH SLABS.



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON I-40  
 OVER NC 215 BETWEEN  
 SR 1513 AND SR 1585  
 (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-05
1			3			TOTAL SHEETS
2			4			58

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DRAWN BY: D. HODGE DATE: 11/23  
 CHECKED BY: G. GILLAND DATE: 11/23

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

LOAD TYPE	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			
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT						
							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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A	①	1.06	--	1.75	0.750	1.360	A	3	37.750	0.950	1.060	A	3	53.130	0.80	0.750	1.080	A	3	37.750	1	
	HL-93 (OPERATING)	N/A		1.50	--	1.35	0.750	1.770	A	3	37.750	0.950	1.500	A	3	60.830	N/A	--	--	--	--	--	1	
	HS-20 (INVENTORY)	36.000	②	1.43	51.480	1.75	0.750	1.800	A	3	37.750	0.950	1.430	A	3	60.830	0.80	0.750	1.430	A	3	37.750	1	
	HS-20 (OPERATING)	36.000		1.88	67.680	1.35	0.750	2.330	A	3	37.750	0.950	1.880	A	3	60.830	N/A	--	--	--	--	--	1	
LEGAL LOAD	SINGLE VEHICLE (SV)	SH		3.53	44.125	1.40	0.750	5.550	A	3	37.750	0.950	4.810	A	3	60.830	0.80	0.750	3.530	A	3	37.750	1	
		S3C		2.06	44.290	1.40	0.750	3.250	A	3	37.750	0.950	2.780	A	3	60.830	0.80	0.750	2.060	A	3	37.750	1	
		S3A		1.96	44.590	1.40	0.750	3.080	A	3	37.750	0.950	2.640	A	3	60.830	0.80	0.750	1.960	A	3	37.750	1	
		S4A		1.73	46.278	1.40	0.750	2.730	A	3	37.750	0.950	2.300	A	3	60.830	0.80	0.750	1.730	A	3	37.750	1	
		S5A		1.53	46.665	1.40	0.750	2.410	A	3	37.750	0.950	2.130	A	3	60.830	0.80	0.750	1.530	A	3	37.750	1	
		S6A		1.40	48.300	1.40	0.750	2.190	A	3	37.750	0.950	1.920	A	3	60.830	0.80	0.750	1.400	A	3	37.750	1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	S7B		1.27	48.895	1.40	0.750	2.000	A	3	37.750	0.950	1.810	A	3	60.830	0.80	0.750	1.270	A	3	37.750	1	
		S7A		③	1.26	50.400	1.40	0.750	1.990	A	3	37.750	0.950	1.900	A	3	60.830	0.80	0.750	1.260	A	3	37.750	1
		T4A			1.72	48.590	1.40	0.750	2.710	A	3	37.750	0.950	2.250	A	3	60.830	0.80	0.750	1.720	A	3	37.750	1
		T5B			1.51	48.320	1.40	0.750	2.370	A	3	37.750	0.950	2.170	A	3	60.830	0.80	0.750	1.510	A	3	37.750	1
		T6A			1.39	50.040	1.40	0.750	2.190	A	3	37.750	0.950	2.010	A	3	60.830	0.80	0.750	1.390	A	3	37.750	1
		T7A			1.30	52.000	1.40	0.750	2.040	A	3	37.750	0.950	1.890	A	3	60.830	0.80	0.750	1.300	A	3	37.750	1
EMERGENCY VEHICLE (EV)	T7B			1.40	56.000	1.40	0.750	2.210	A	3	37.750	0.950	1.740	A	3	60.830	0.80	0.750	1.400	A	3	37.750	1	
	EV2			1.70	48.875	1.30	0.750	2.880	A	3	37.750	0.950	2.340	A	3	60.800	0.80	0.750	1.700	A	3	37.750	1	
	EV3		④	1.12	48.160	1.30	0.750	1.890	A	3	37.750	0.950	1.540	A	3	60.800	0.80	0.750	1.120	A	3	37.750	1	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	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. GIRDER 3 CONTROLS, SAME AS GIRDER 5  
 2.  
 3.  
 4.

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

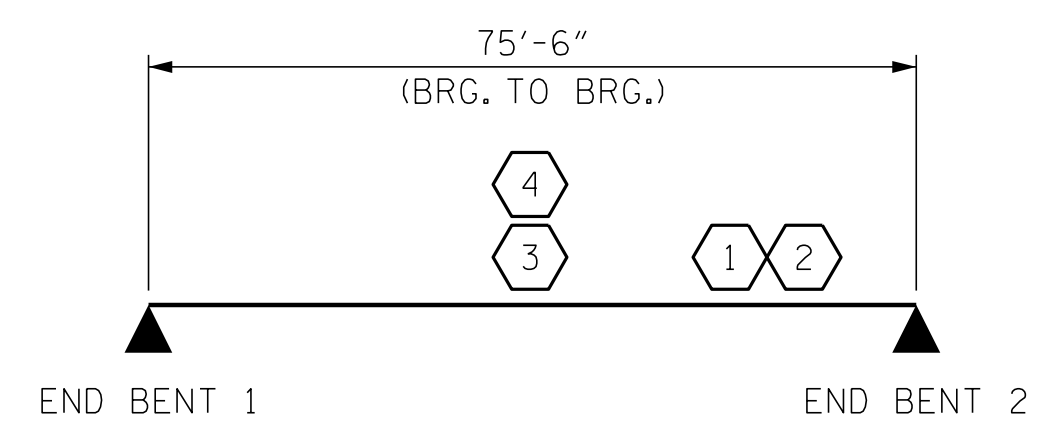
④ EMERGENCY VEHICLE LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

GIRDER LOCATION

I - INTERIOR GIRDER  
 EL - EXTERIOR LEFT GIRDER  
 ER - EXTERIOR RIGHTGIRDER



### LRFR SUMMARY

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

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ASSEMBLED BY : D. HODGE	DATE : 9/23
CHECKED BY : J. DILWORTH	DATE : 9/23
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 04/23 BNB/AAI

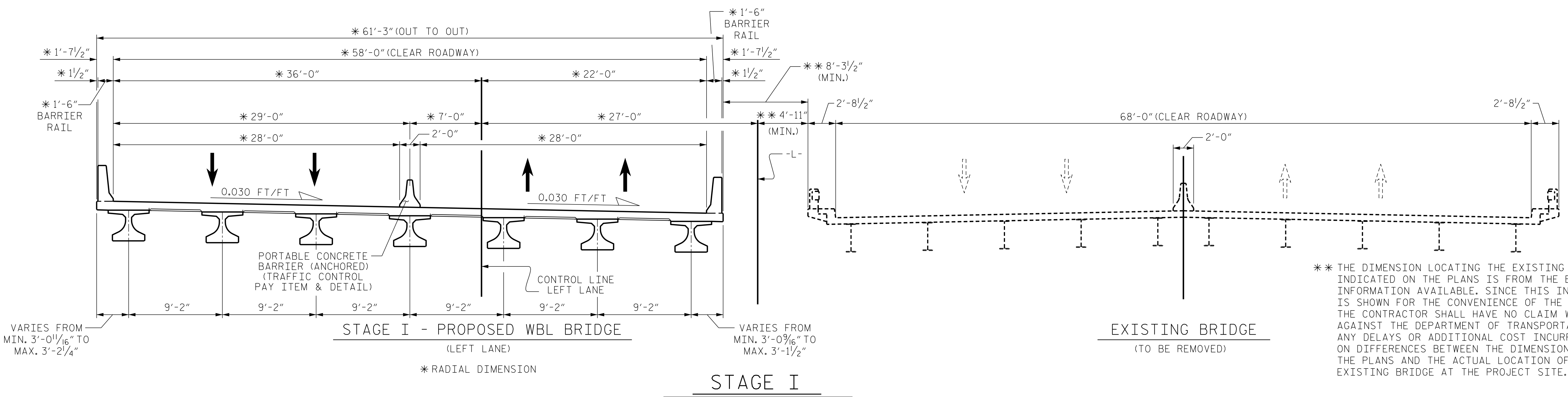
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ENGINEER OF RECORD  
 1/19/2024

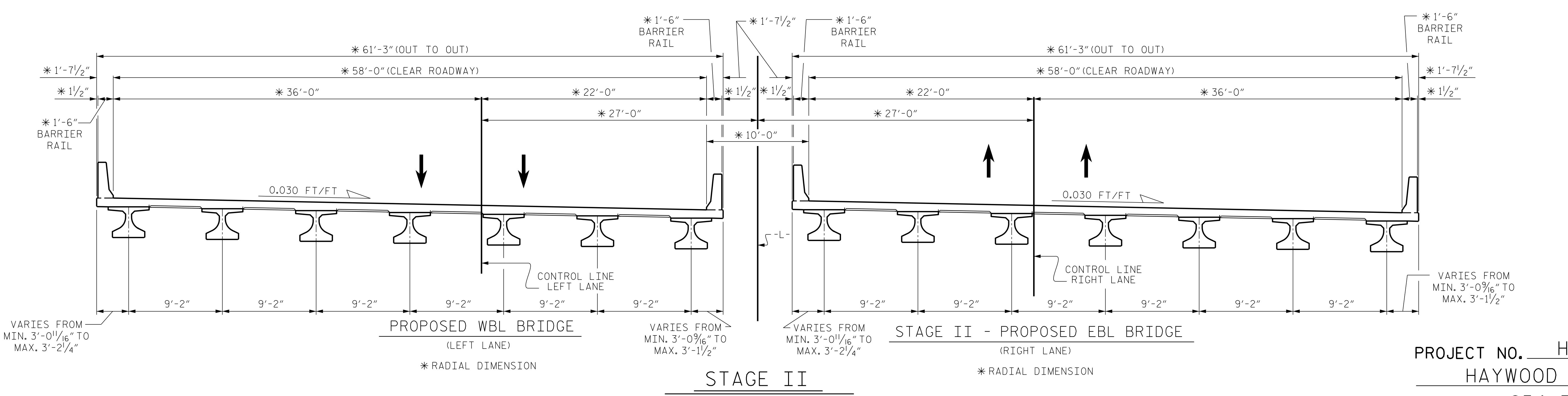
Designed by:  
 Gregory M. Gilliland  
 WETHERILL ENGINEERING

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 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (INTERSTATE TRAFFIC) (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S2-06
					TOTAL SHEETS 58



STAGE I



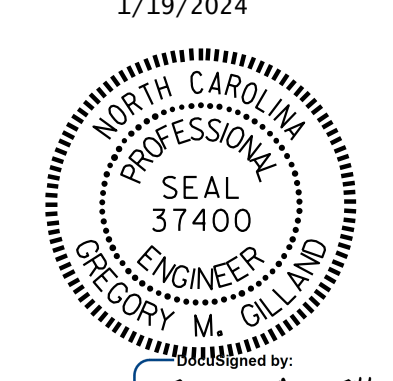
STAGE II

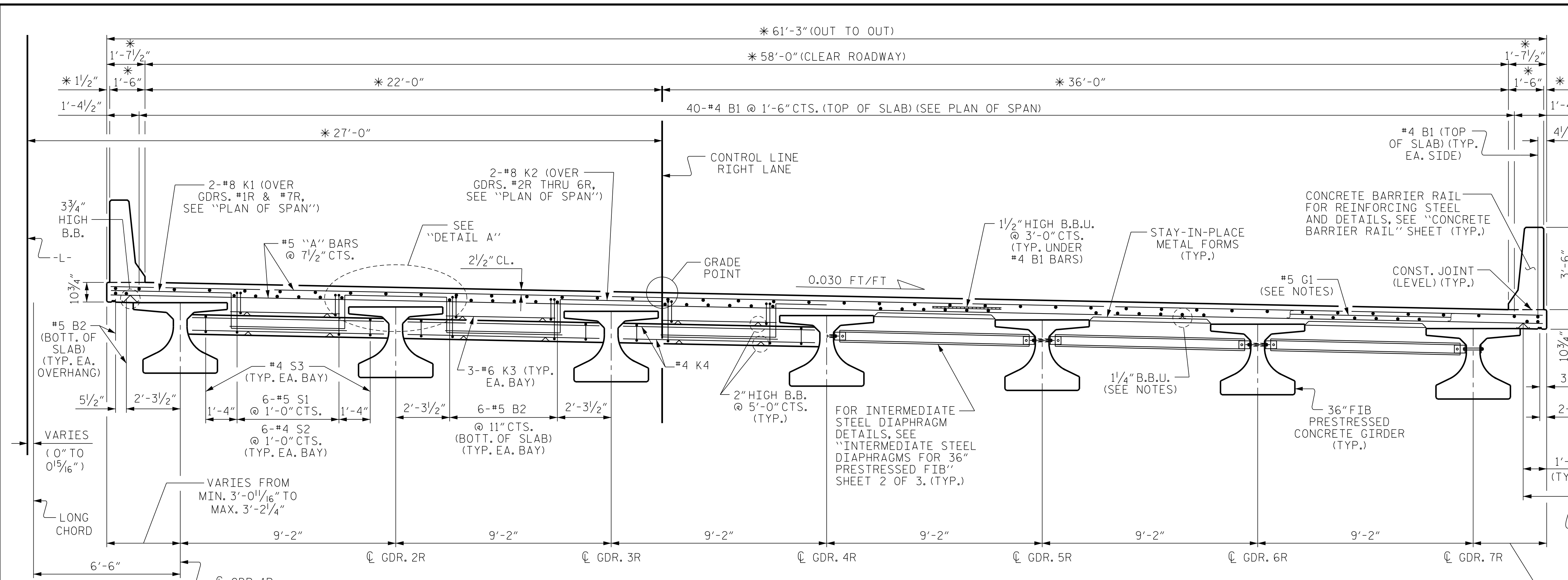
PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

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DRAWN BY: D. HODGE DATE: 2/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

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ENGINEER OF RECORD 1/19/2024  Gregory M. Gilliland WETHERILL ENGINEERING		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH CONSTRUCTION SEQUENCE FOR BRIDGES ON I-40 OVER NC 215 BETWEEN SR 1513 AND SR 1585	
1223 Jones Franklin Rd. Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 LICENSE NO. F-0377		REVISIONS NO. BY: DATE: NO. BY: DATE: 1 3 2 4	SHEET NO. S2-07 TOTAL SHEETS 58



HALF SECTION - END BENT DIAPHRAGM

HALF SECTION - INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

**NOTES**

PROVIDE 1 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.

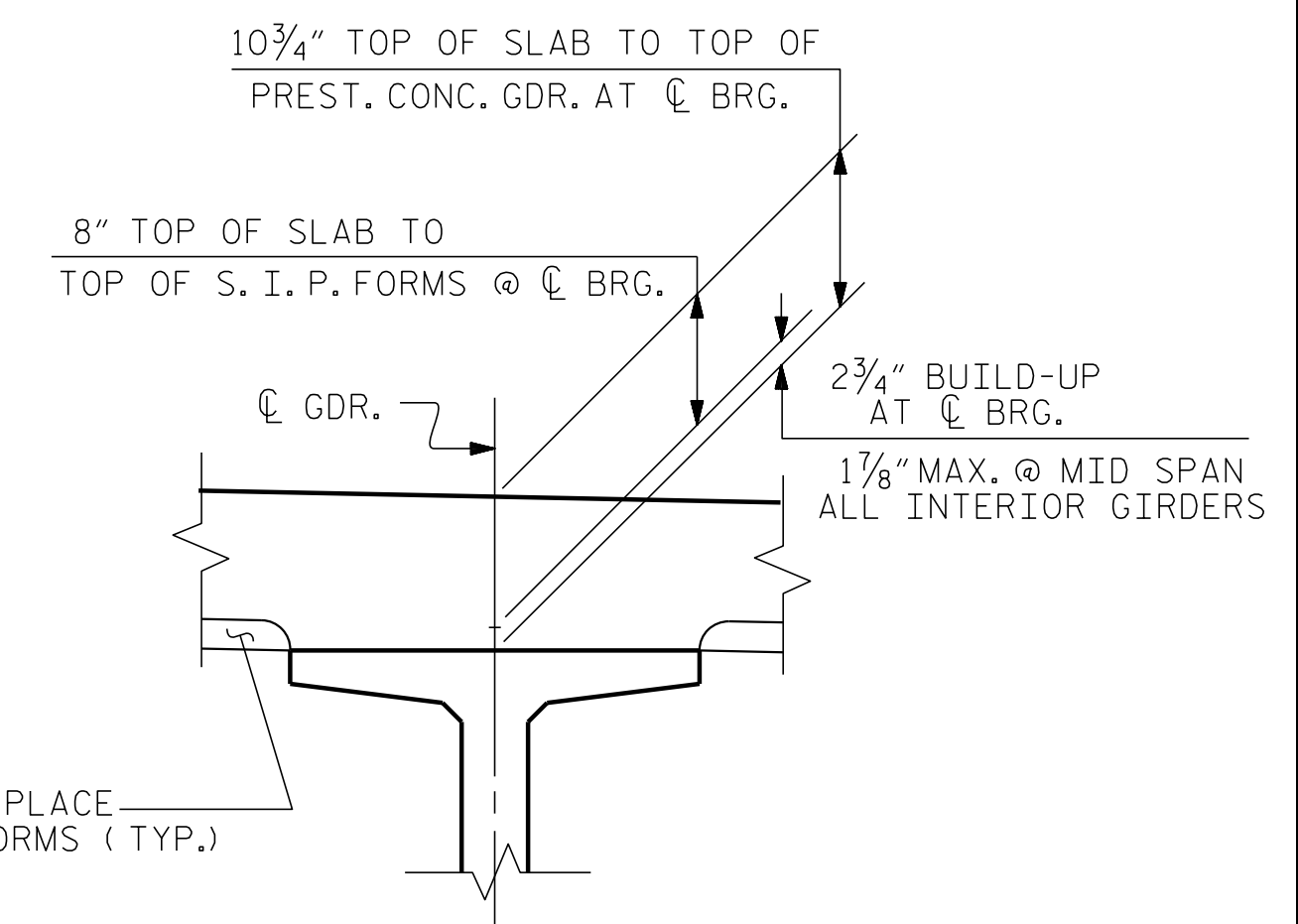
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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

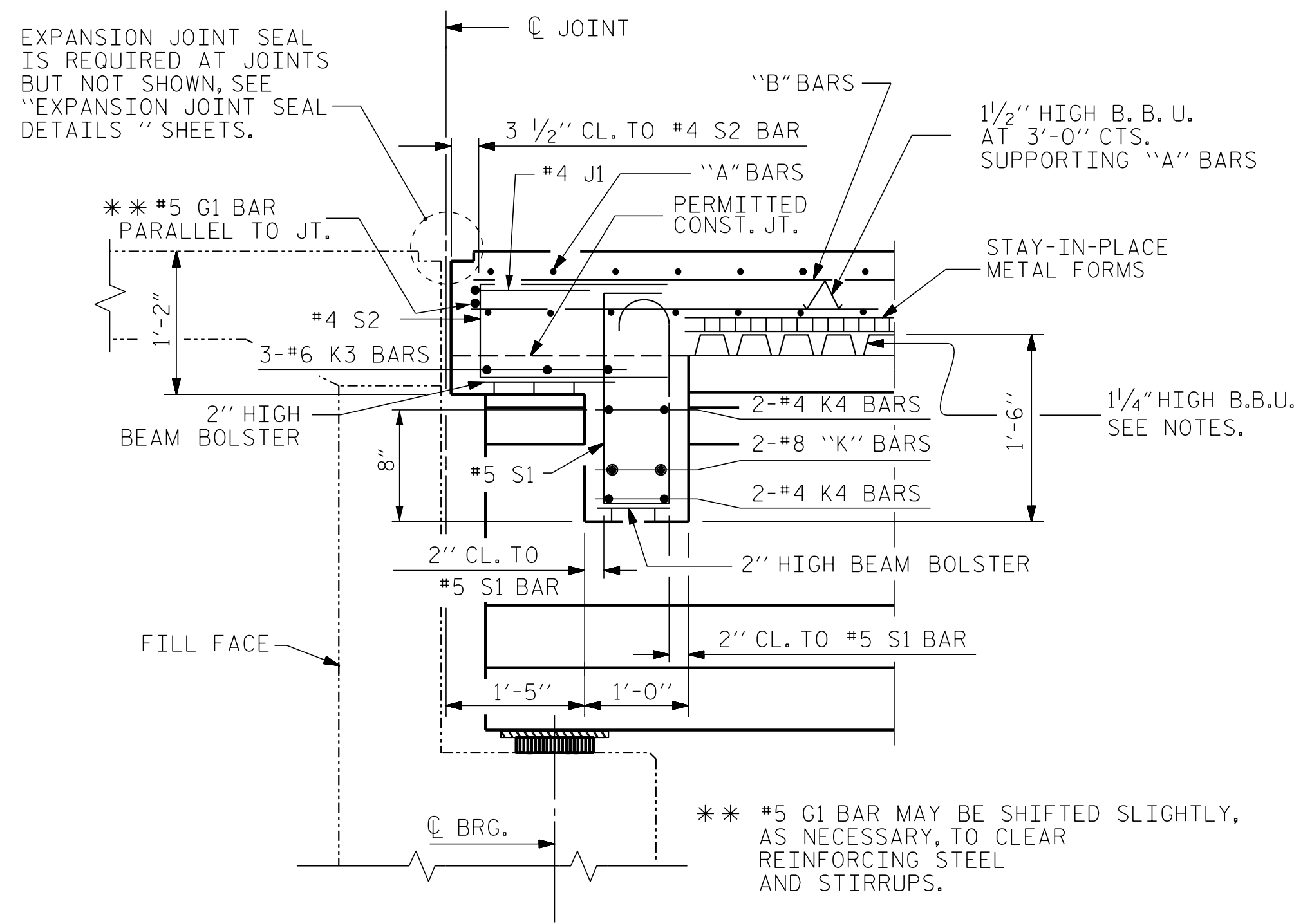
#5 G1 BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

GIRDERS ARE PARALLEL TO THE LONG CHORD OF -L-.

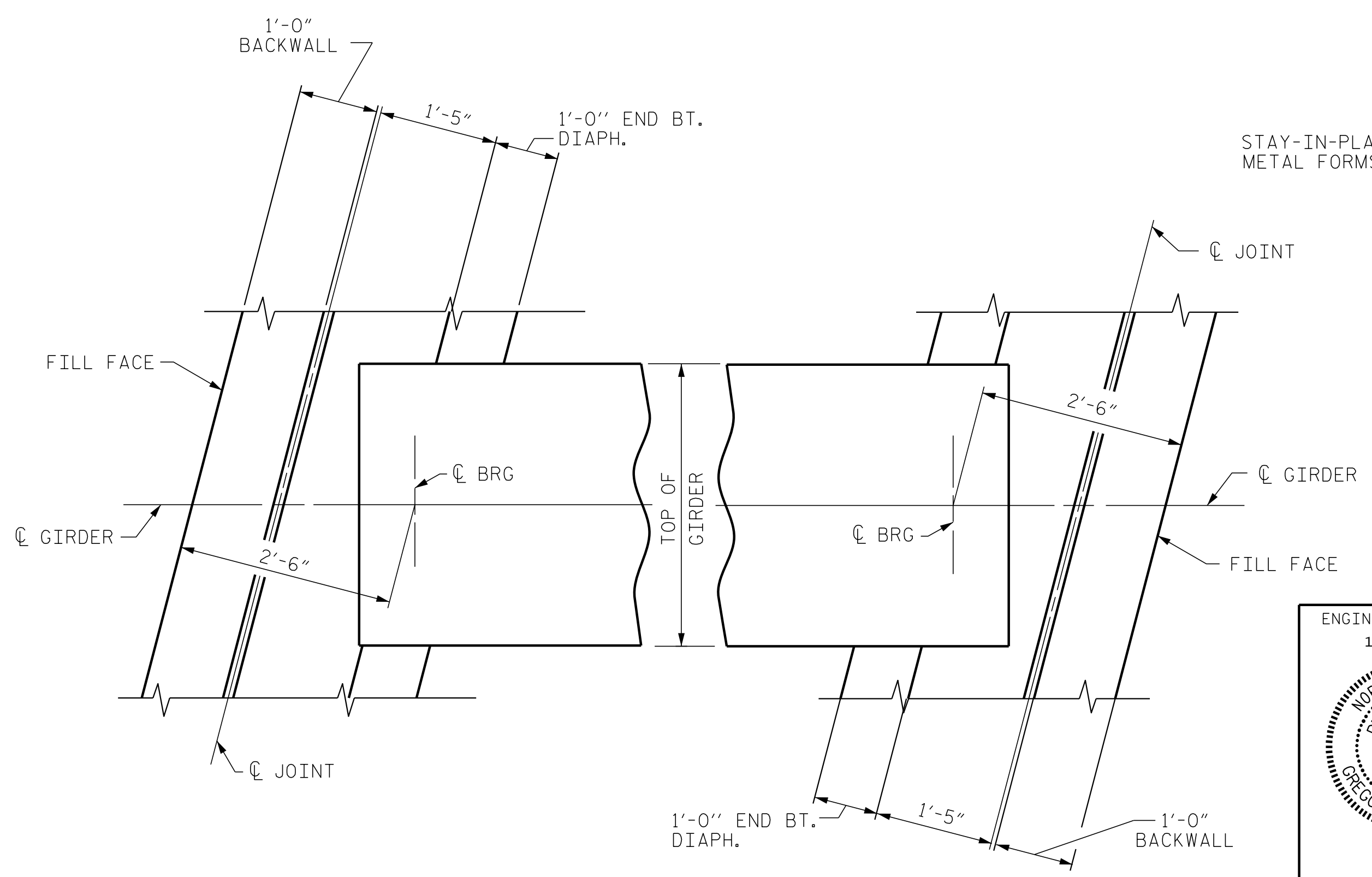
\* RADIAL DIMENSION



DETAIL "A"  
(TYP. EA. GIRDER)



SECTION THRU END BENT DIAPHRAGM

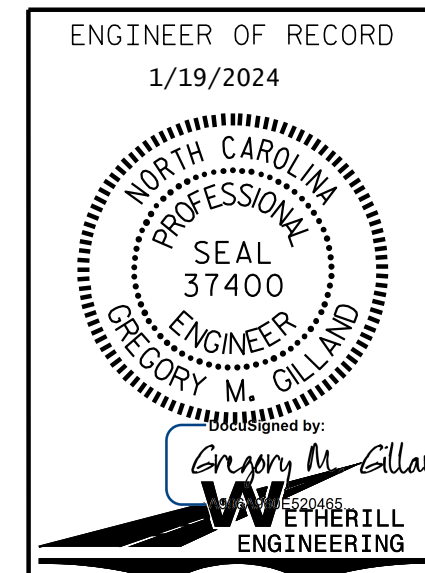


END BENT No. 1 DIAPHRAGM

END BENT No. 2 DIAPHRAGM

PLAN

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION  
 (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			58
2			4			

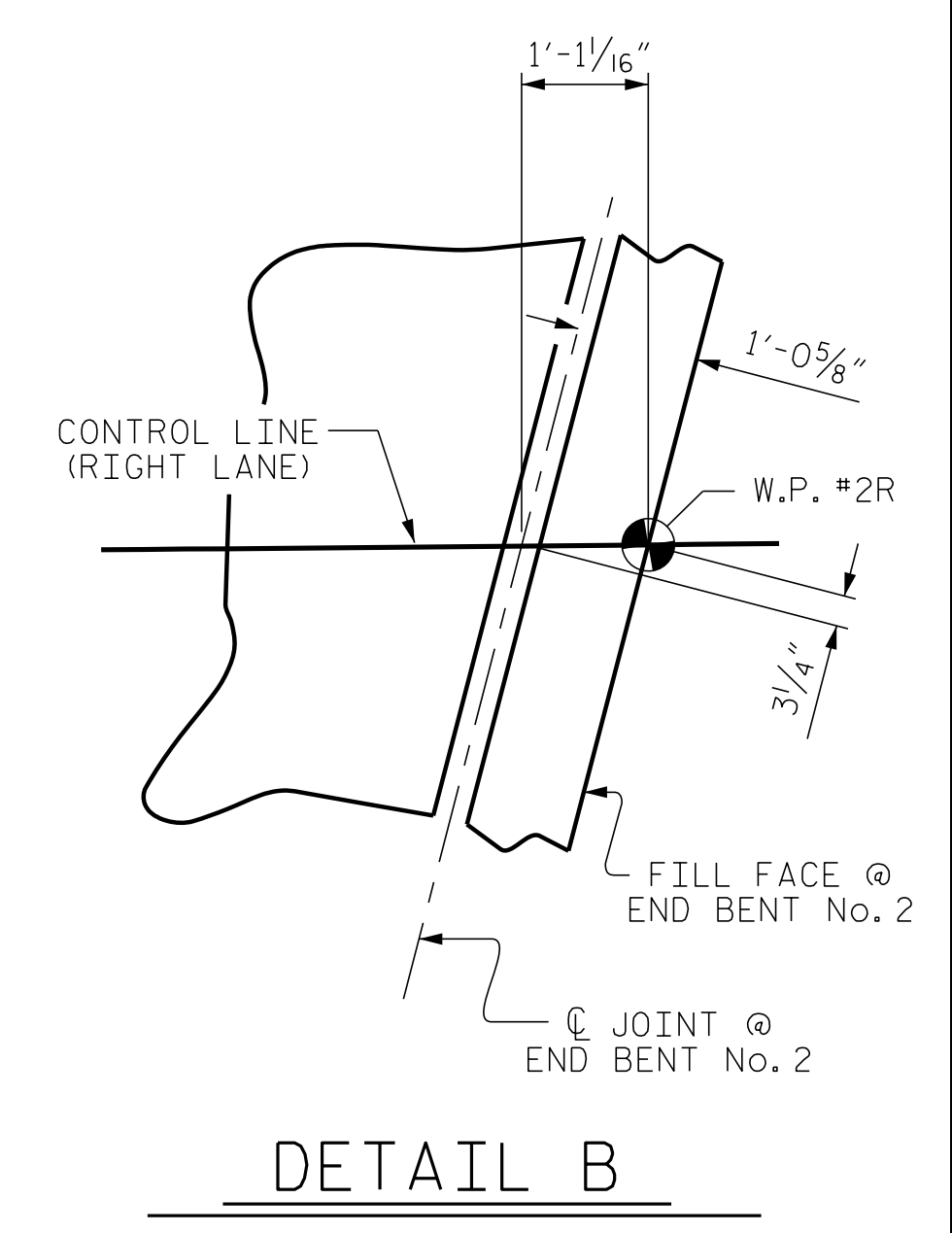
DRAWN BY: D. HODGE DATE: 2/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

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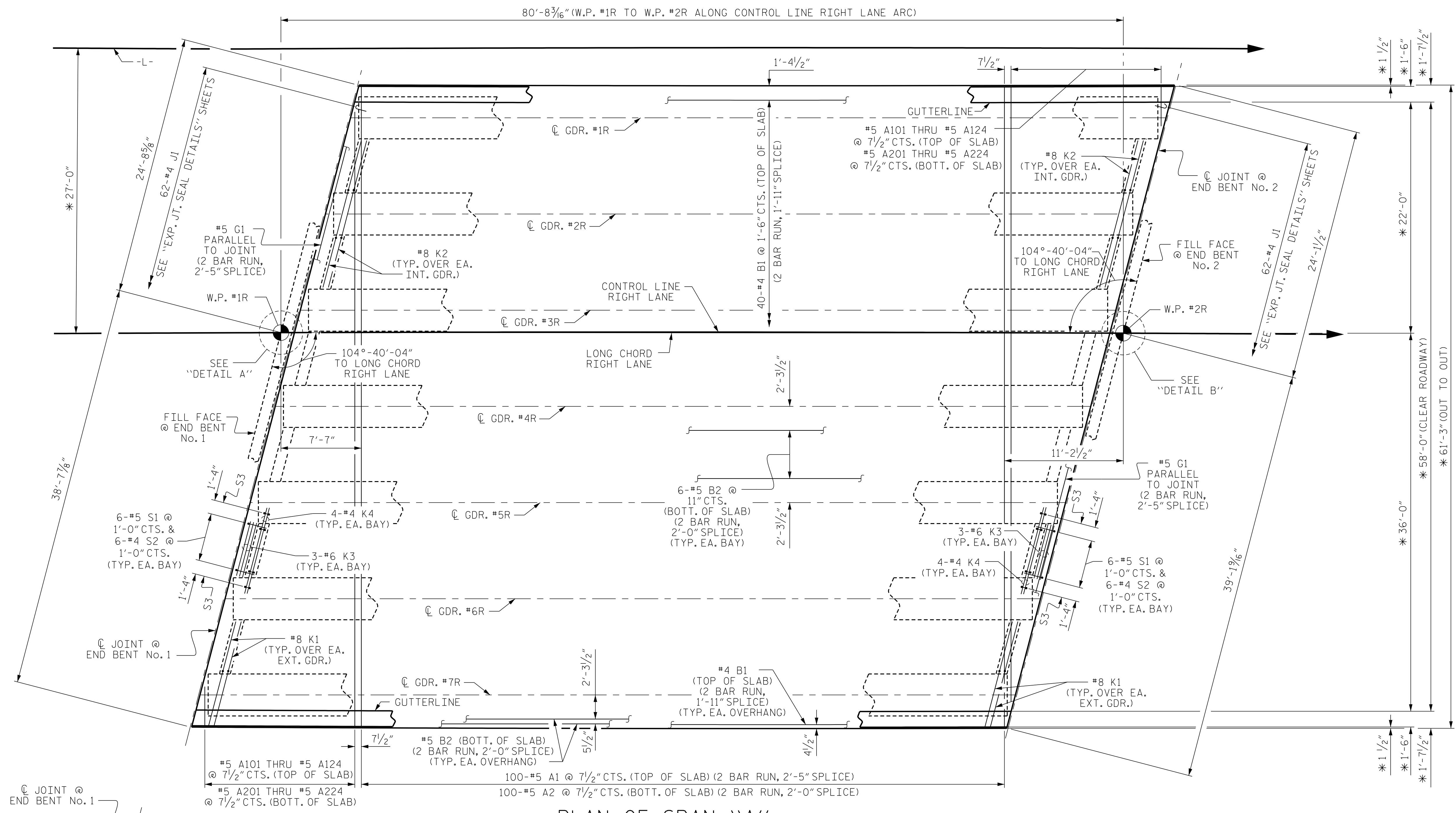
1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

PA-2023-2312401-HB-0004-Structures-DGN-HB-0004-RIGHT-LANE-VH0004-RIGHT-T-5.dgn  
 1/19/2024 6:59:06 AM

**NOTES :**  
 FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.  
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "FRAMING PLAN" SHEET.  
 #5 "A" BARS ARE PLACED PERPENDICULAR TO CHORD OF -L- AND MEASURED ALONG SAME.



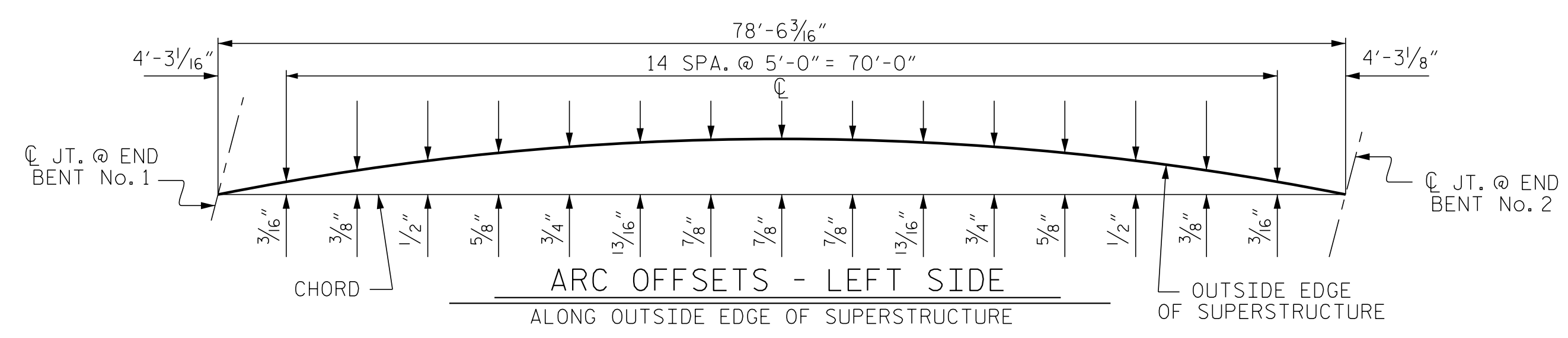
**DETAIL B**



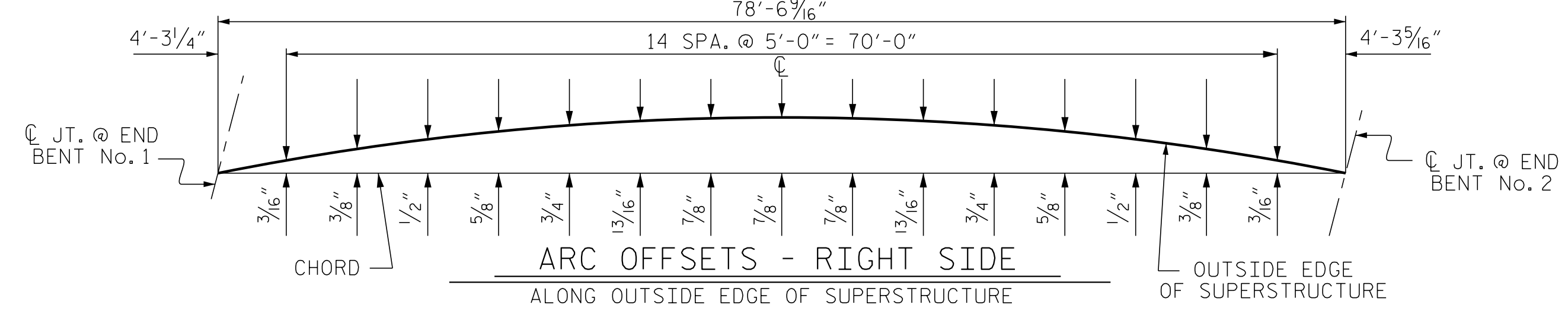
**PLAN OF SPAN "A"**

\* DENOTES RADIAL DIMENSIONS

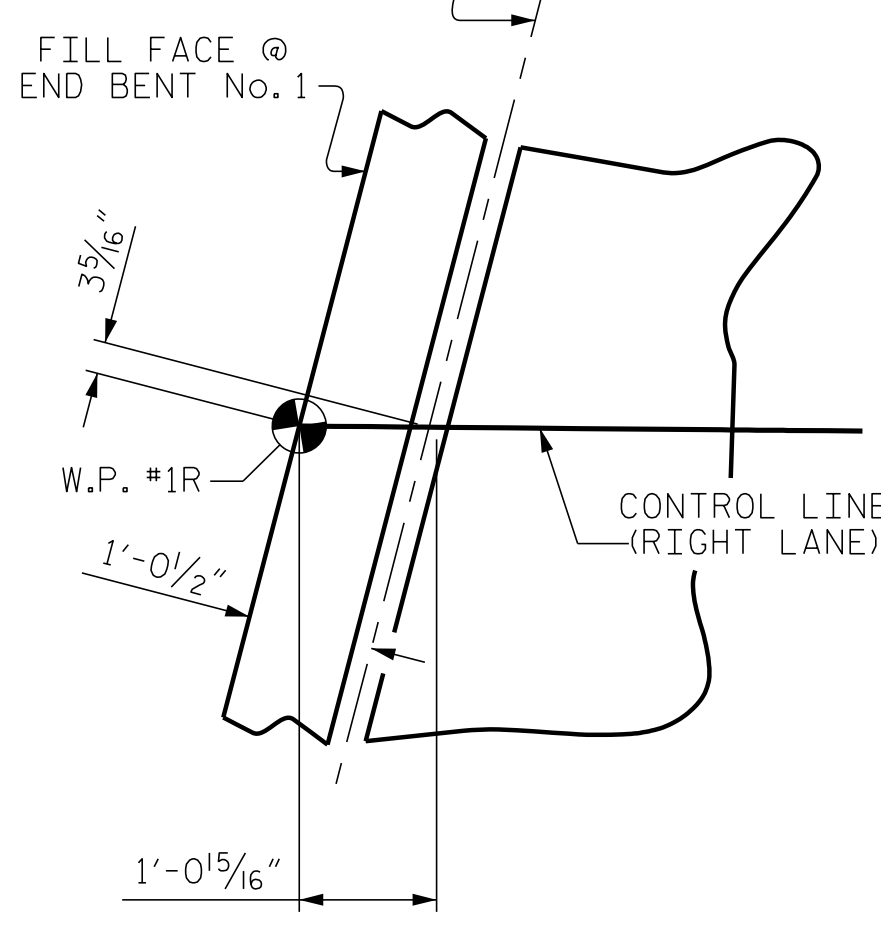
PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-



**ARC OFFSETS - LEFT SIDE**  
 ALONG OUTSIDE EDGE OF SUPERSTRUCTURE



**ARC OFFSETS - RIGHT SIDE**  
 ALONG OUTSIDE EDGE OF SUPERSTRUCTURE



**DETAIL A**

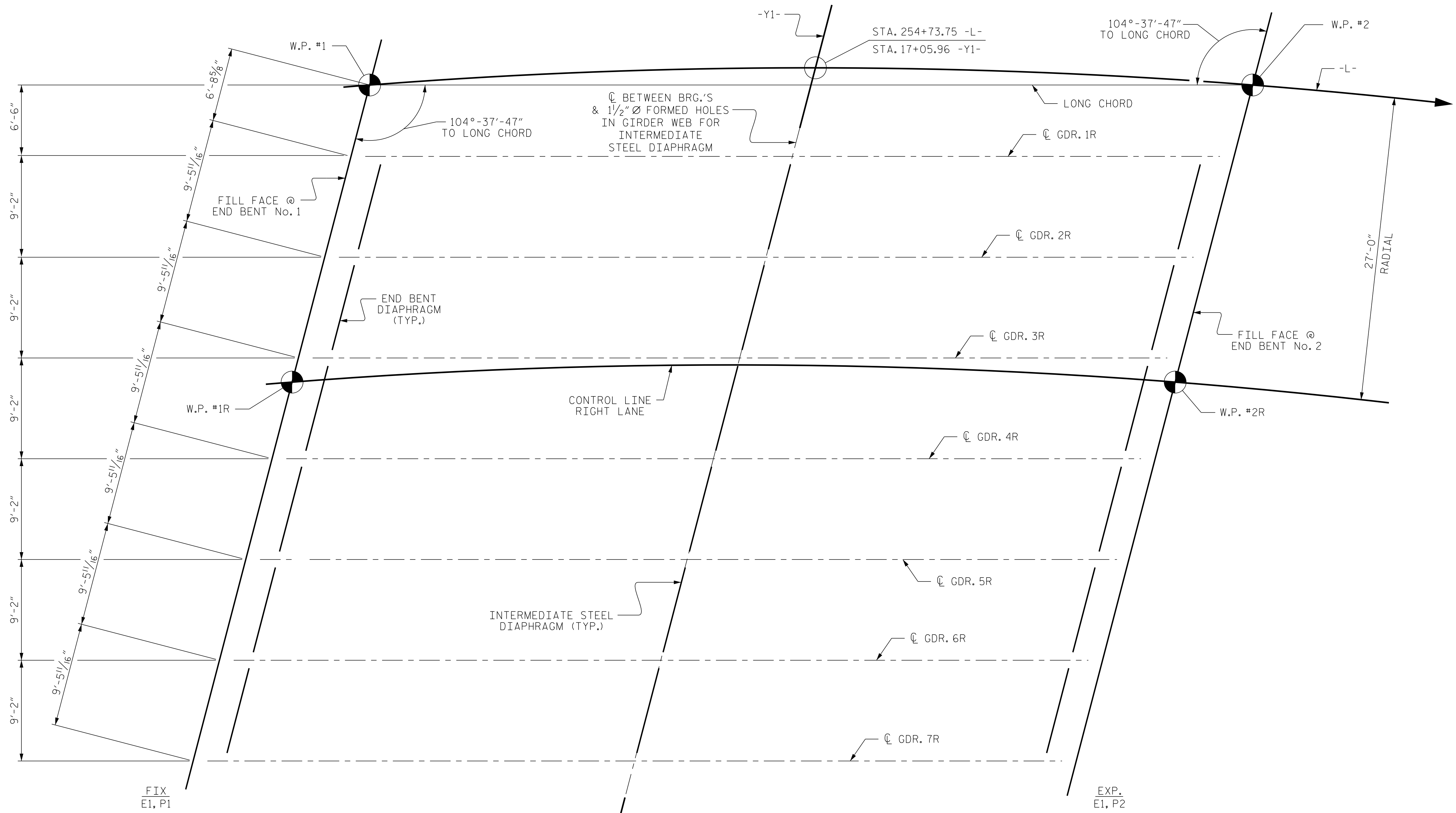
DRAWN BY: D. HODGE DATE: 3/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

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ENGINEER OF RECORD  
 1/19/2024  
  
 GREGORY M. GILLILAND  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-09
TOTAL SHEETS					58

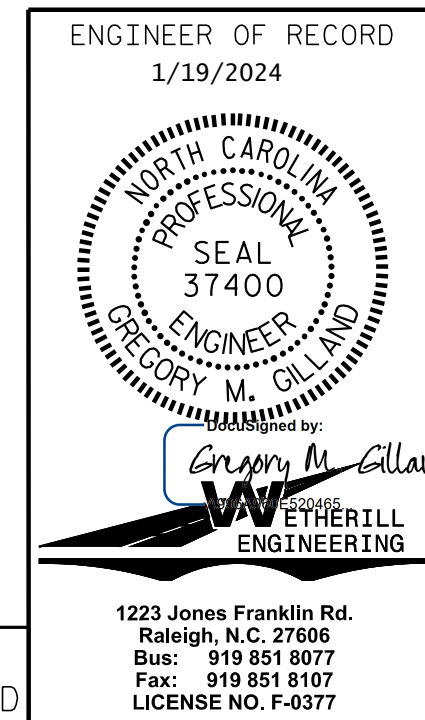
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**FRAMING PLAN**

ALL GIRDERS ARE PARALLEL TO LONG CHORD  
 FOR LOCATION OF BOLT HOLES IN GIRDERS SEE SHEET ENTITLED "PRESTRESSED CONCRETE GIRDER DETAILS"

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-



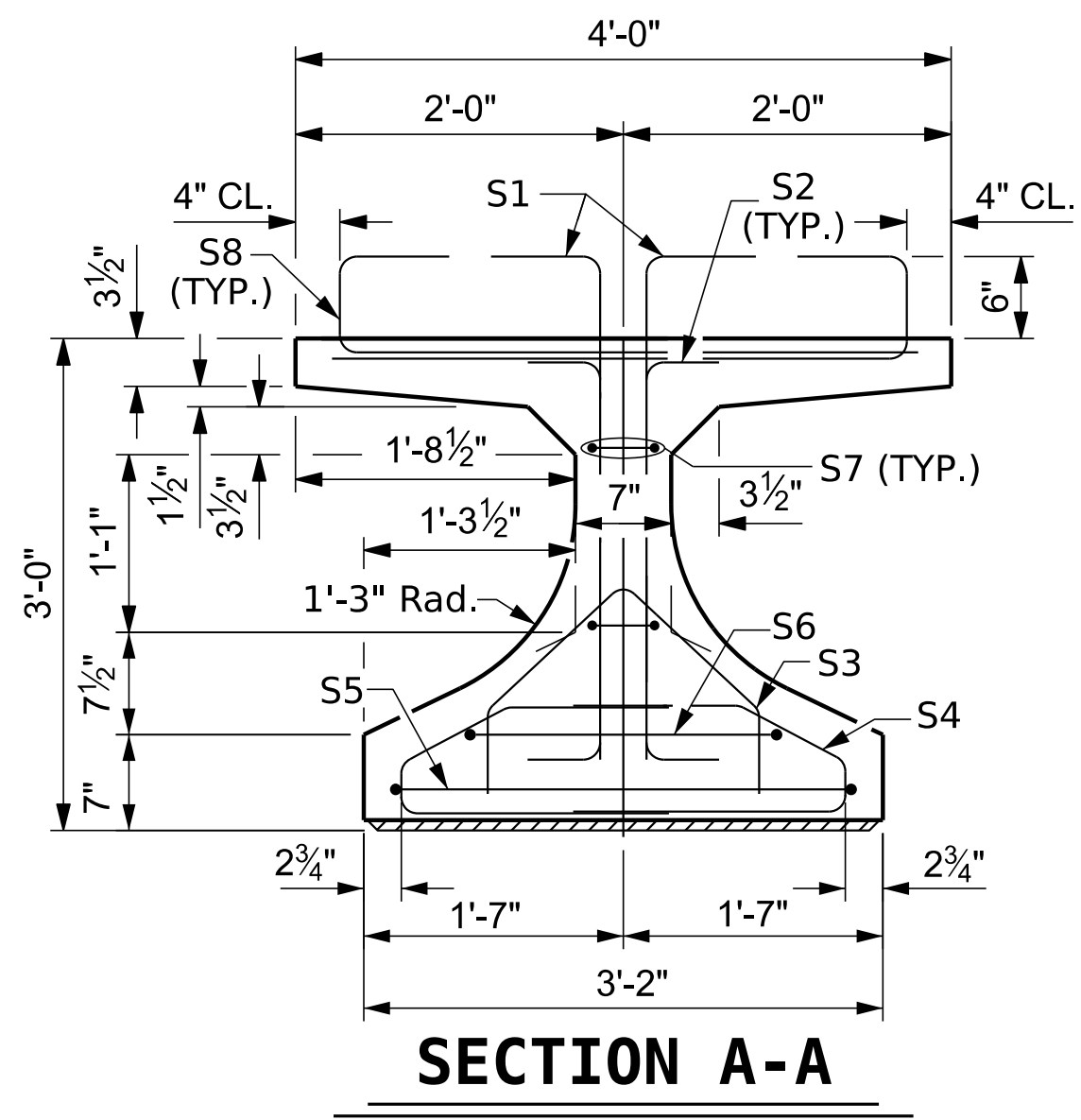
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE FRAMING PLAN (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-10
TOTAL SHEETS					58

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

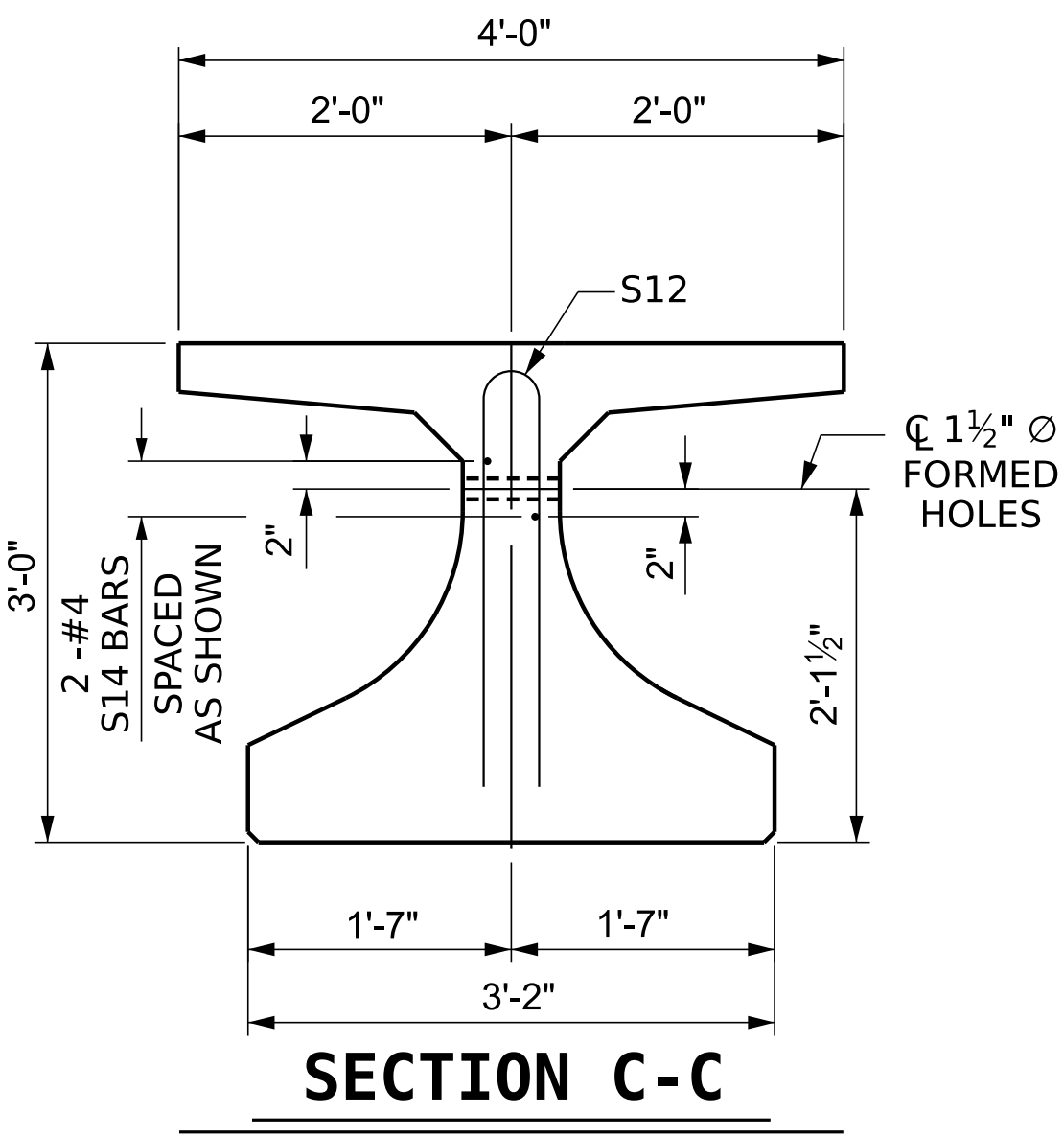
DRAWN BY: D. HODGE DATE: 2/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

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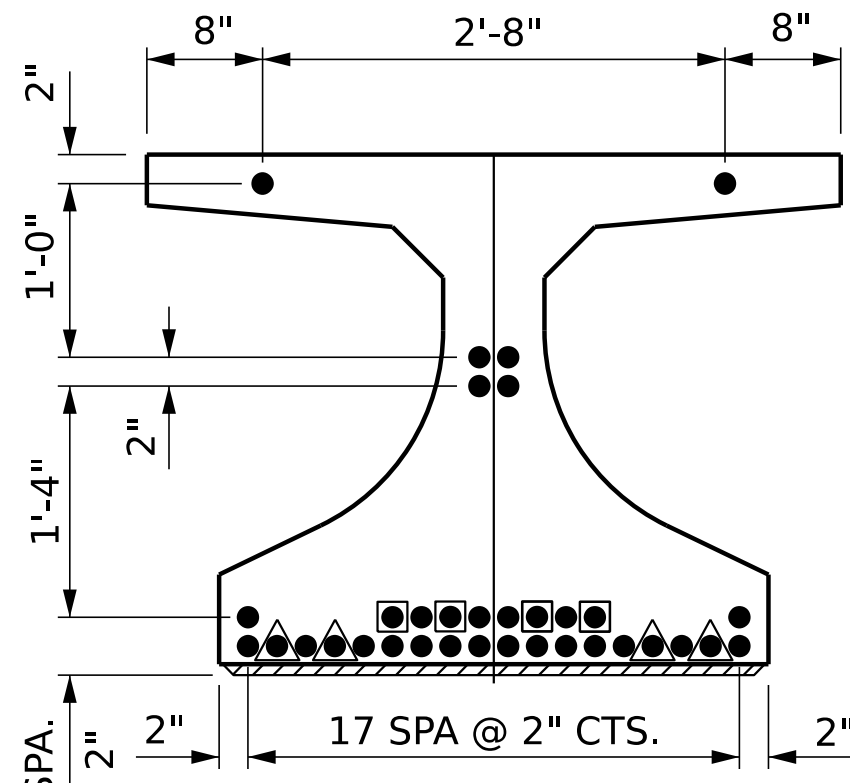




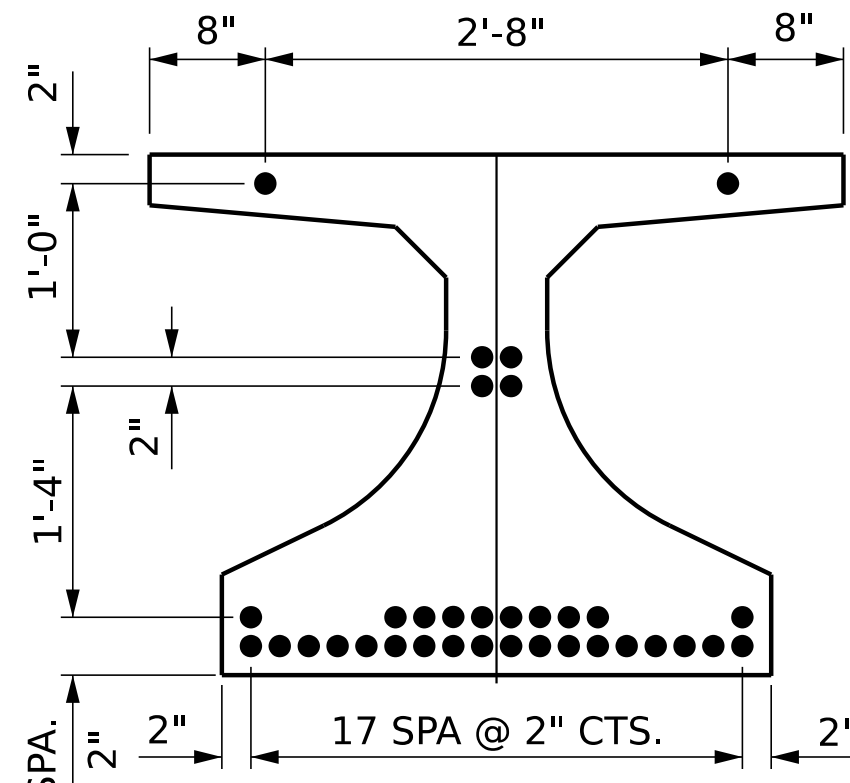
**SECTION A-A**



**SECTION C-C**  
(S8 AND S10 BARS NOT SHOWN)



**AT END OF GIRDER**

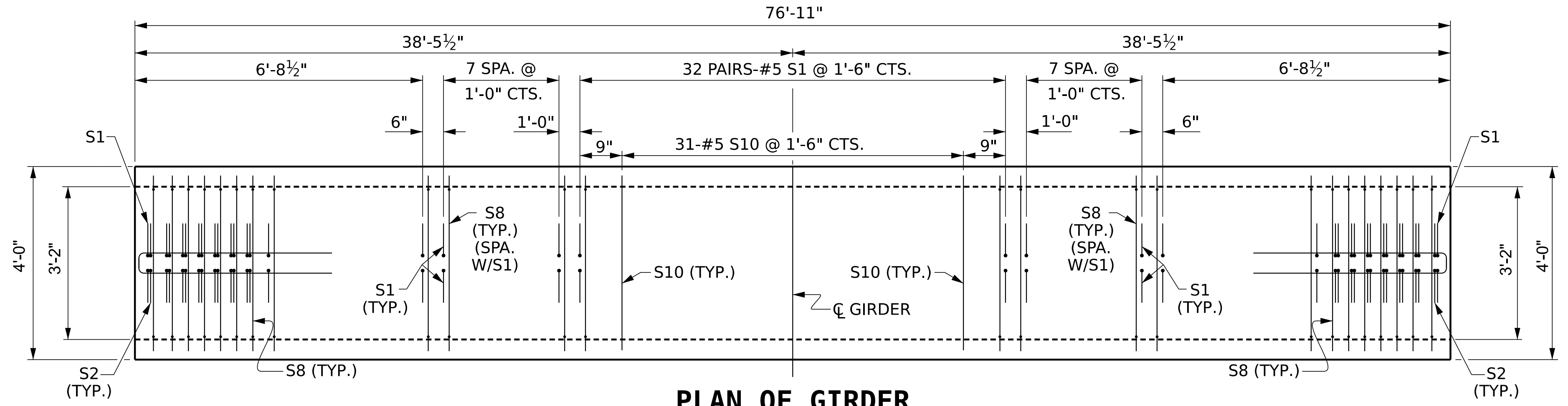


**AT C OF GIRDER**

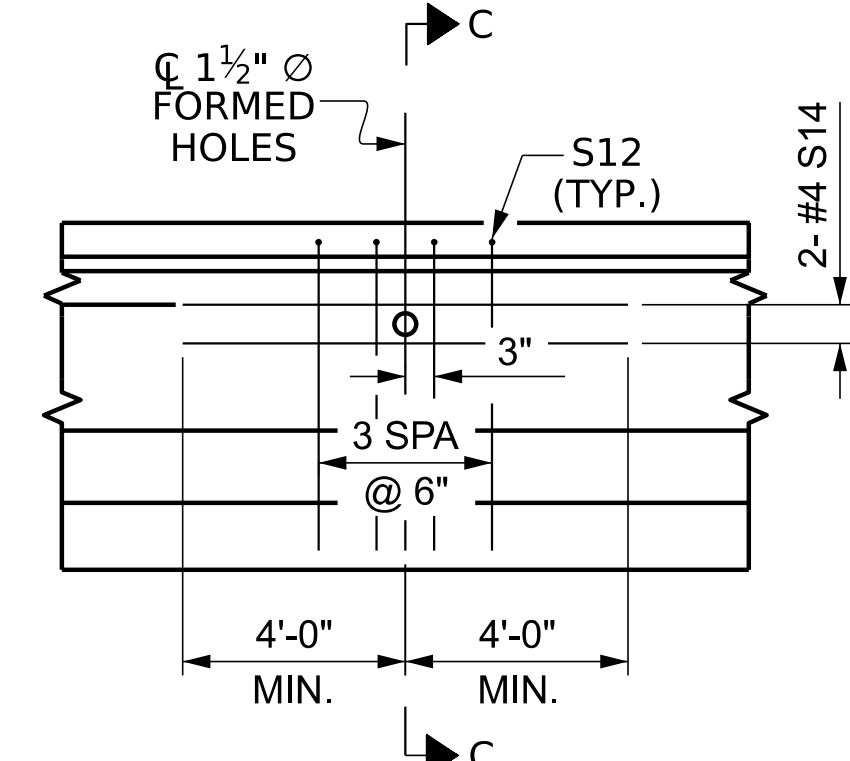
**0.6" Ø LOW RELAXATION STRAND LAYOUT**

**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- ◻ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

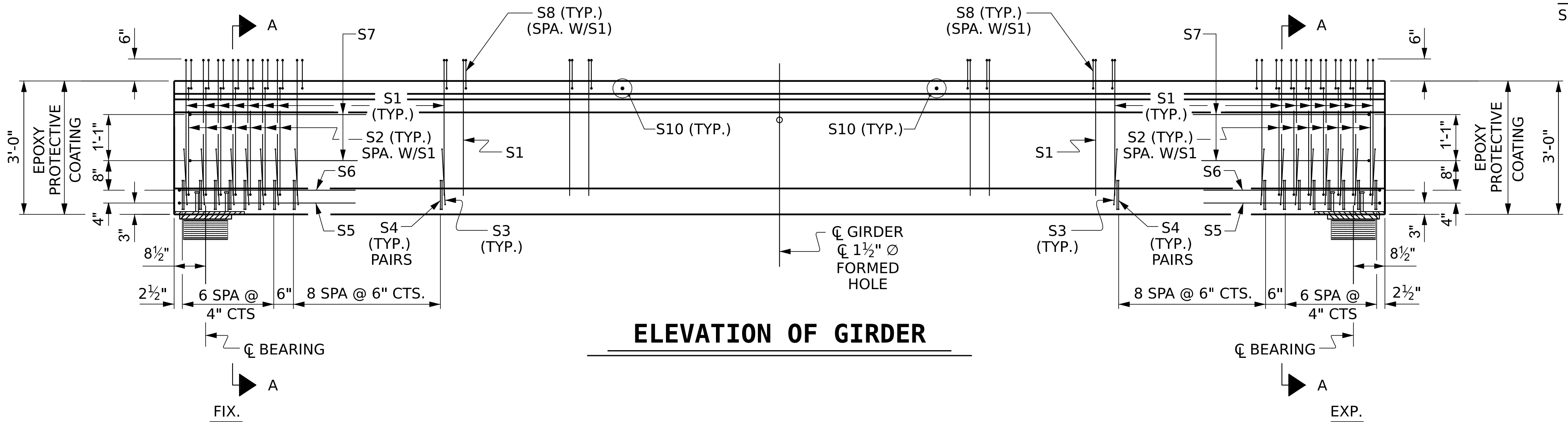


**PLAN OF GIRDER**



**PARTIAL ELEVATION**

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER

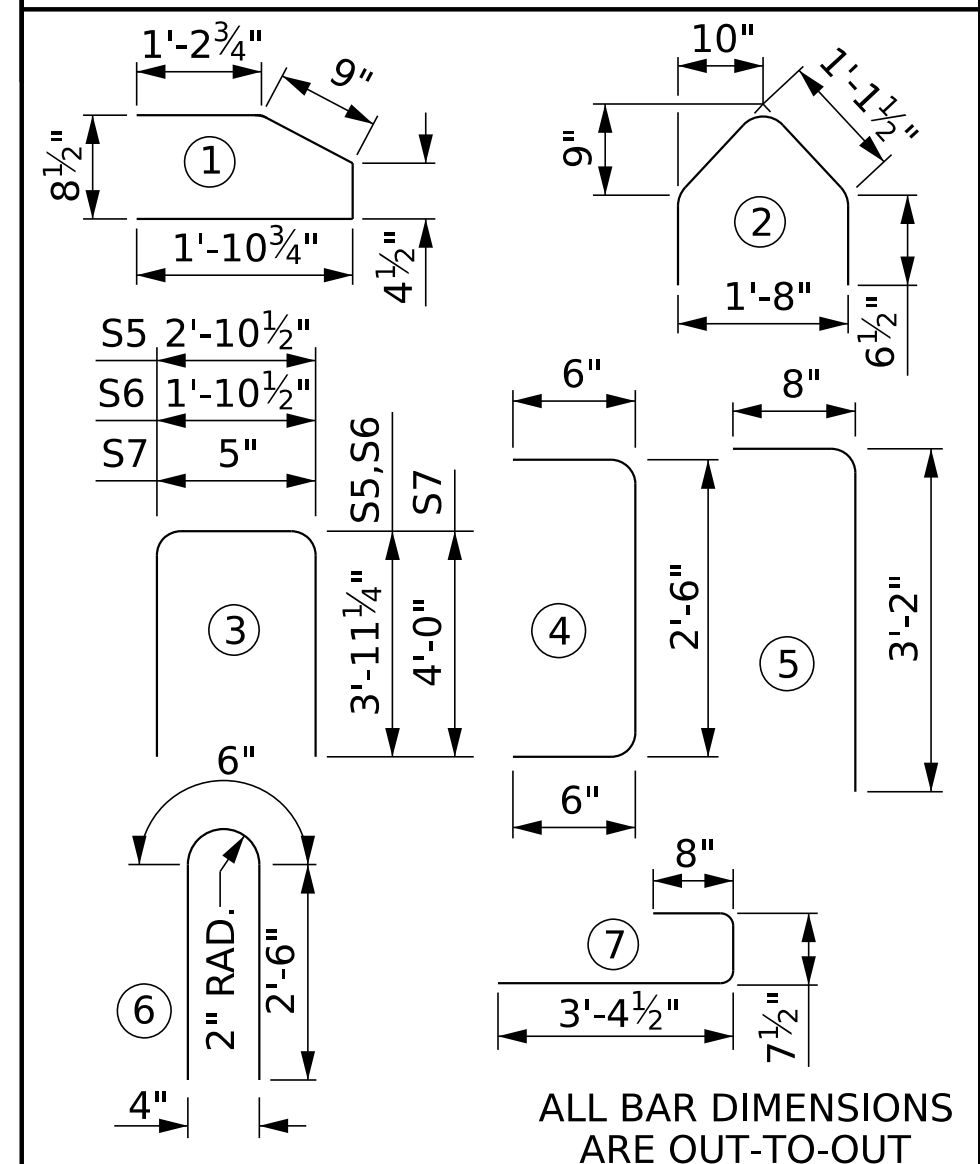


**ELEVATION OF GIRDER**

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	160	#5	5	3'-10"	640
S2	28	#5	4	3'-6"	102
S3	32	#3	2	3'-4"	40
S4	64	#3	1	4'-3"	102
S5	2	#5	3	10'-9"	22
S6	2	#5	3	9'-9"	20
S7	4	#4	3	8'-5"	22
S8	160	#5	7	4'-8"	779
S10	31	#5	STR	3'-8"	119
S12	4	#5	6	5'-6"	23
S14	2	#4	STR	8'-0"	11

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT-TO-OUT

**QUANTITIES FOR ONE GIRDER**

REINFORCING STEEL	7,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
1,880	15.9	34

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
7	76'-11"	538.42

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD**  
**36" FIB PRESTRESSED CONCRETE GIRDER (RIGHT LANE)**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-11
1			3			TOTAL SHEETS 58
2			4			

ASSEMBLED BY : D. HODGE	DATE : 2/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : BNB 09/21	
CHECKED BY : AAI 09/21	

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### 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 A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, 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.

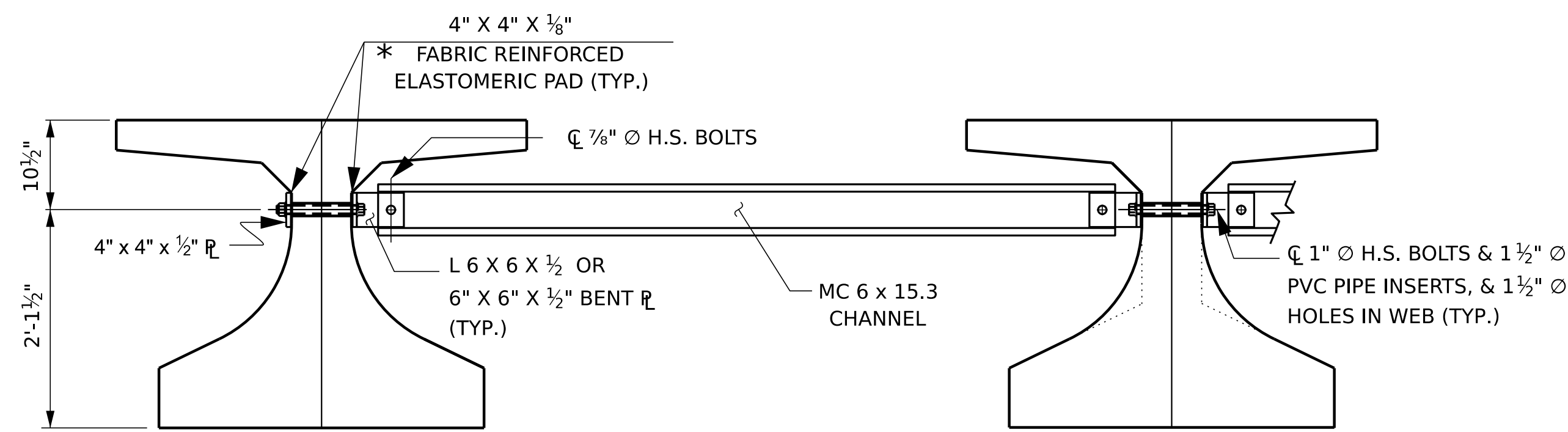
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.



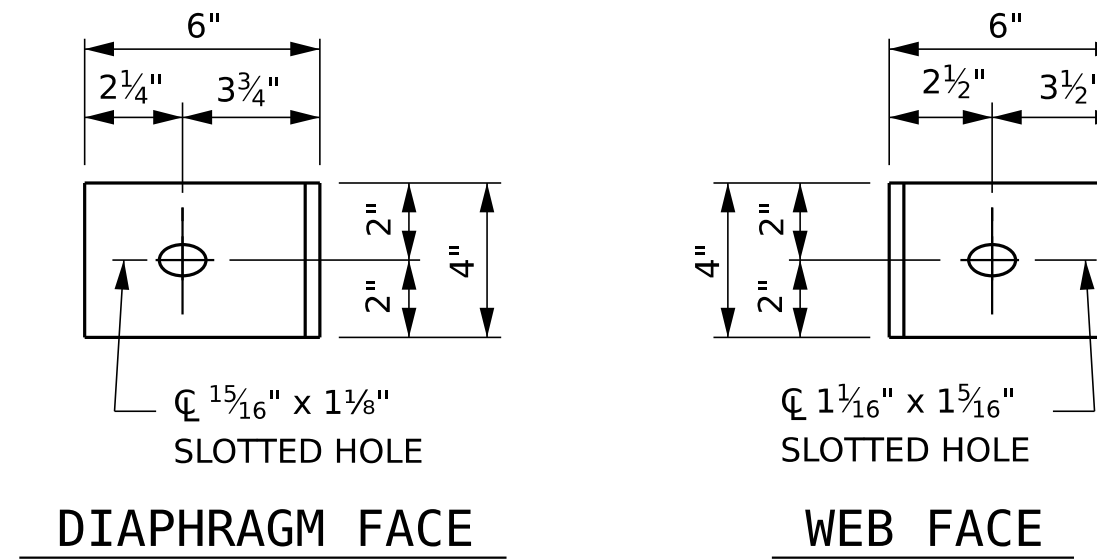
EXTERIOR GIRDER

INTERIOR GIRDER

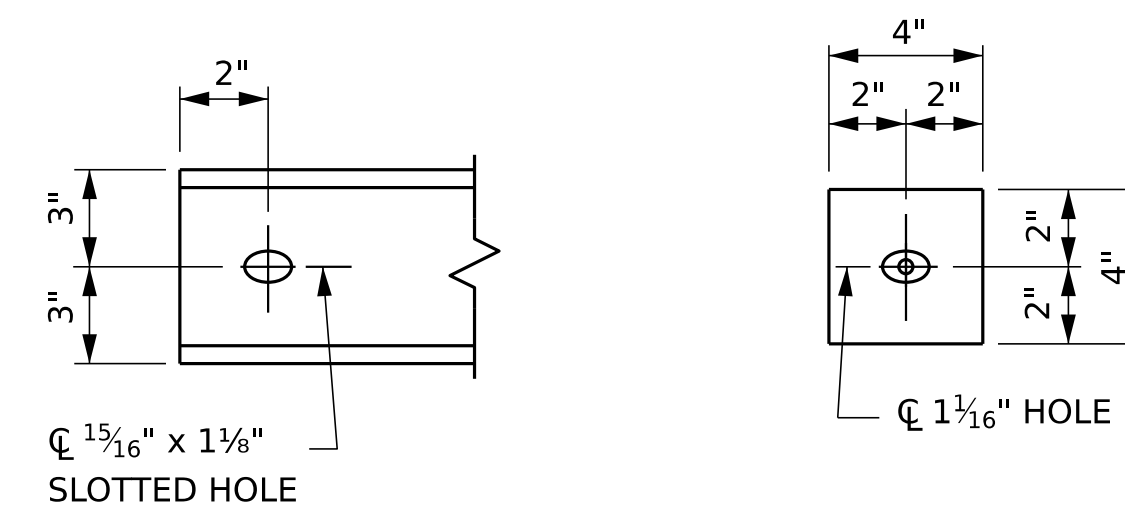
### PART SECTION AT INTERMEDIATE DIAPHRAGM

(36" FIB SHOWN)

\* PLACE ELASTOMERIC PADS AS NECESSARY TO PROVIDE A FLAT MOUNTING SURFACE BETWEEN THE STEEL AND CONCRETE

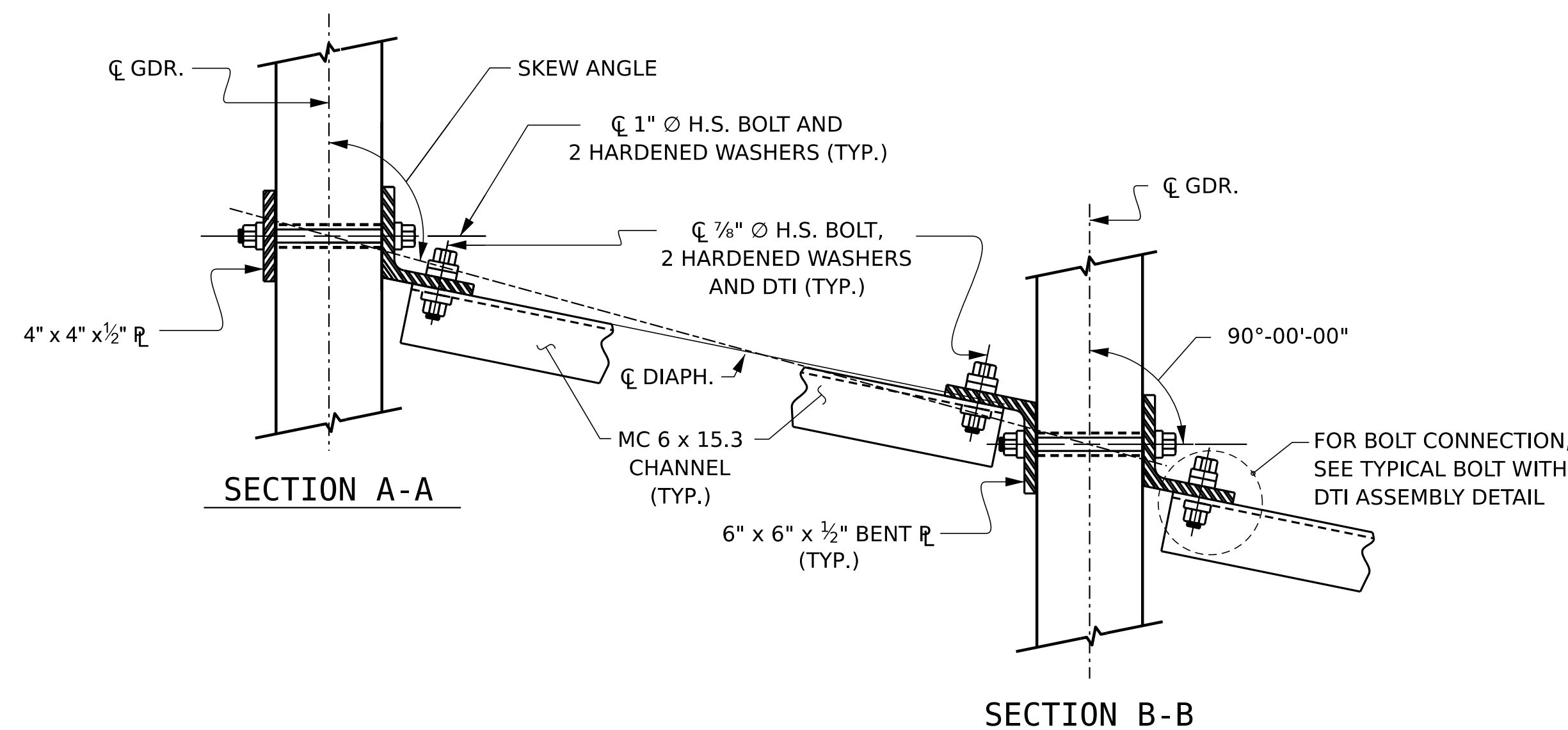


### CONNECTOR PLATE DETAILS



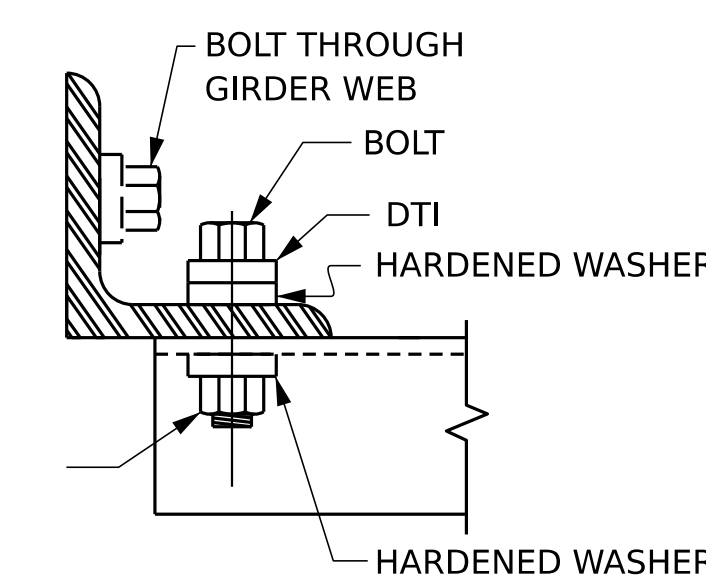
### CHANNEL END

### PLATE DETAILS



### CONNECTION DETAILS

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



### BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
STATION: 254+73.75 -L-

SHEET 2 OF 3

ENGINEER OF RECORD  
1/19/2024

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DEPARTMENT OF TRANSPORTATION  
RALEIGH

### STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 36" FIB (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-12
1			3			TOTAL SHEETS
2			4			58

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STD. NO. FIB36

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 1/19/2024 6:50:01 AM

ASSEMBLED BY : D. HODGE	DATE : 3/23
CHECKED BY : G. GILLAND	DATE : 8/23
DRAWN BY : BNB 08/21	REV. --/--
CHECKED BY : AAI 08/21	REV. --/--

**NOTES**

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

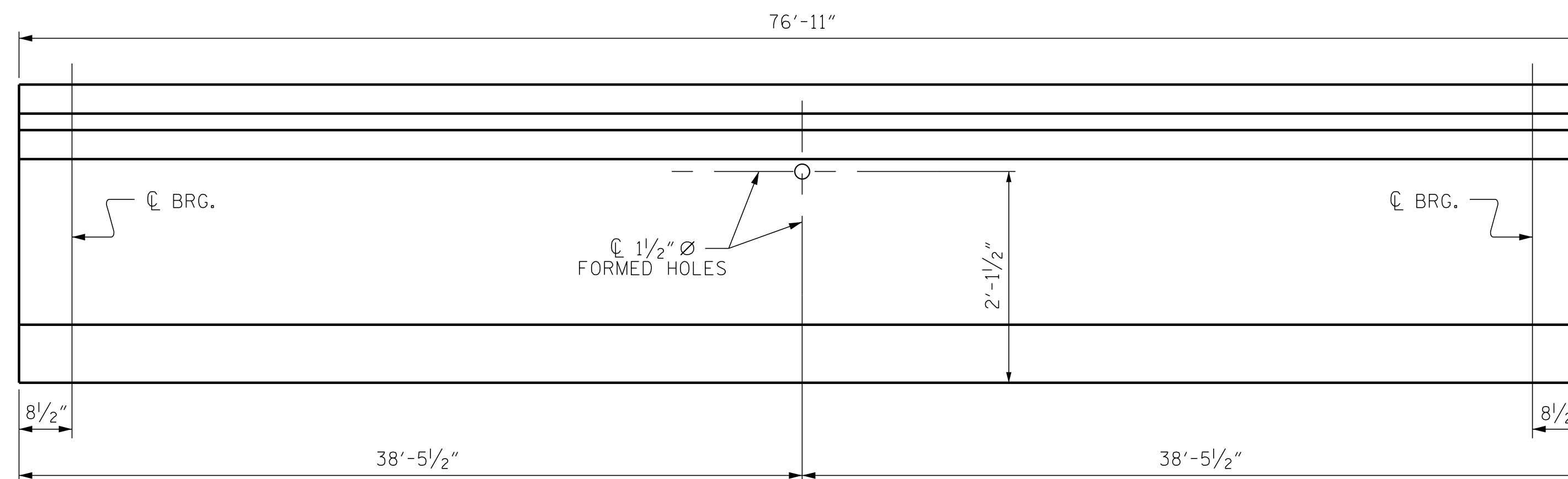
THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN A																				
	GIRDERS 1 & 7																				
TWENTIETH POINTS	0	.050	.100	.150	.200	.250	.300	.350	.400	.450	.500	.550	.600	.650	.700	.750	.800	.850	.900	.950	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.036	0.072	0.096	0.121	0.138	0.155	0.165	0.175	0.178	0.181	0.178	0.175	0.165	0.155	0.138	0.121	0.096	0.072	0.036	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.016	0.032	0.048	0.064	0.076	0.089	0.097	0.105	0.107	0.110	0.107	0.105	0.097	0.089	0.076	0.064	0.048	0.032	0.016	0
FINAL CAMBER ↑	0	1/4"	1/2"	9/16"	11/16"	3/4"	13/16"	13/16"	13/16"	7/8"	7/8"	7/8"	13/16"	13/16"	13/16"	3/4"	11/16"	9/16"	1/2"	1/4"	0

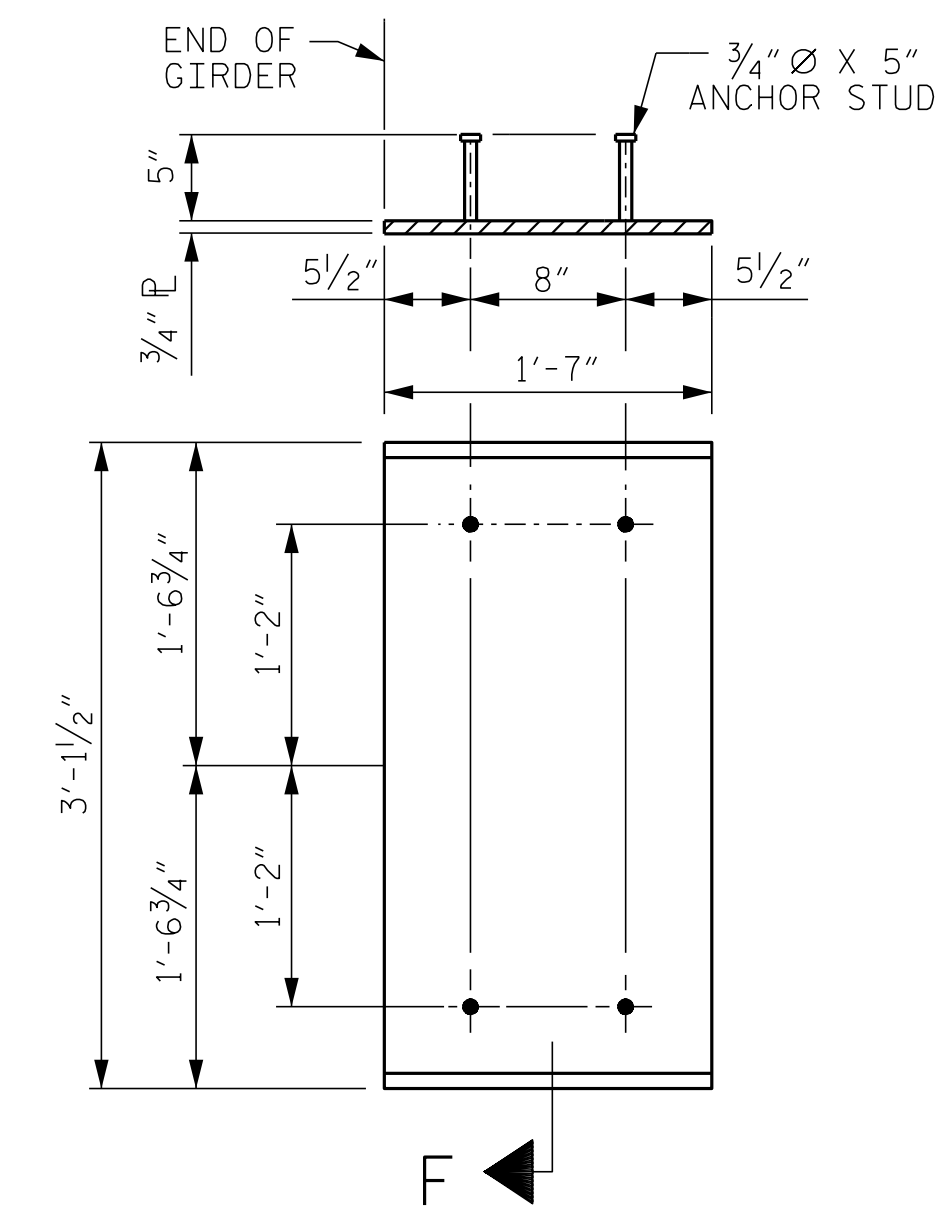
\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN A																				
	GIRDERS 2 THRU 6																				
TWENTIETH POINTS	0	.050	.100	.150	.200	.250	.300	.350	.400	.450	.500	.550	.600	.650	.700	.750	.800	.850	.900	.950	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.036	0.072	0.096	0.121	0.138	0.155	0.165	0.175	0.178	0.181	0.178	0.175	0.165	0.155	0.138	0.121	0.096	0.072	0.036	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.018	0.036	0.053	0.071	0.085	0.099	0.108	0.116	0.119	0.122	0.119	0.116	0.108	0.099	0.085	0.071	0.053	0.036	0.018	0
FINAL CAMBER ↑	0	3/16"	7/16"	1/2"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	1/2"	7/16"	3/16"	0

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

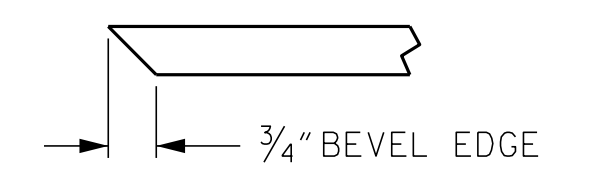


LOCATION OF BOLT HOLE IN GIRDERS



EMBEDDED PLATE "B-1" DETAILS FOR FIB GIRDER

(2 REQ'D PER GIRDER)

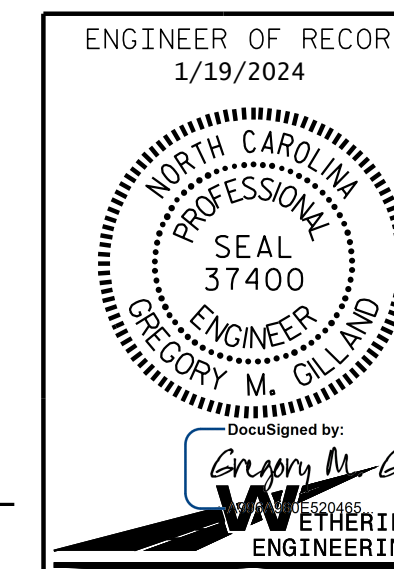


SECTION "F"

(SEE NOTES)

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

SHEET 3 OF 3

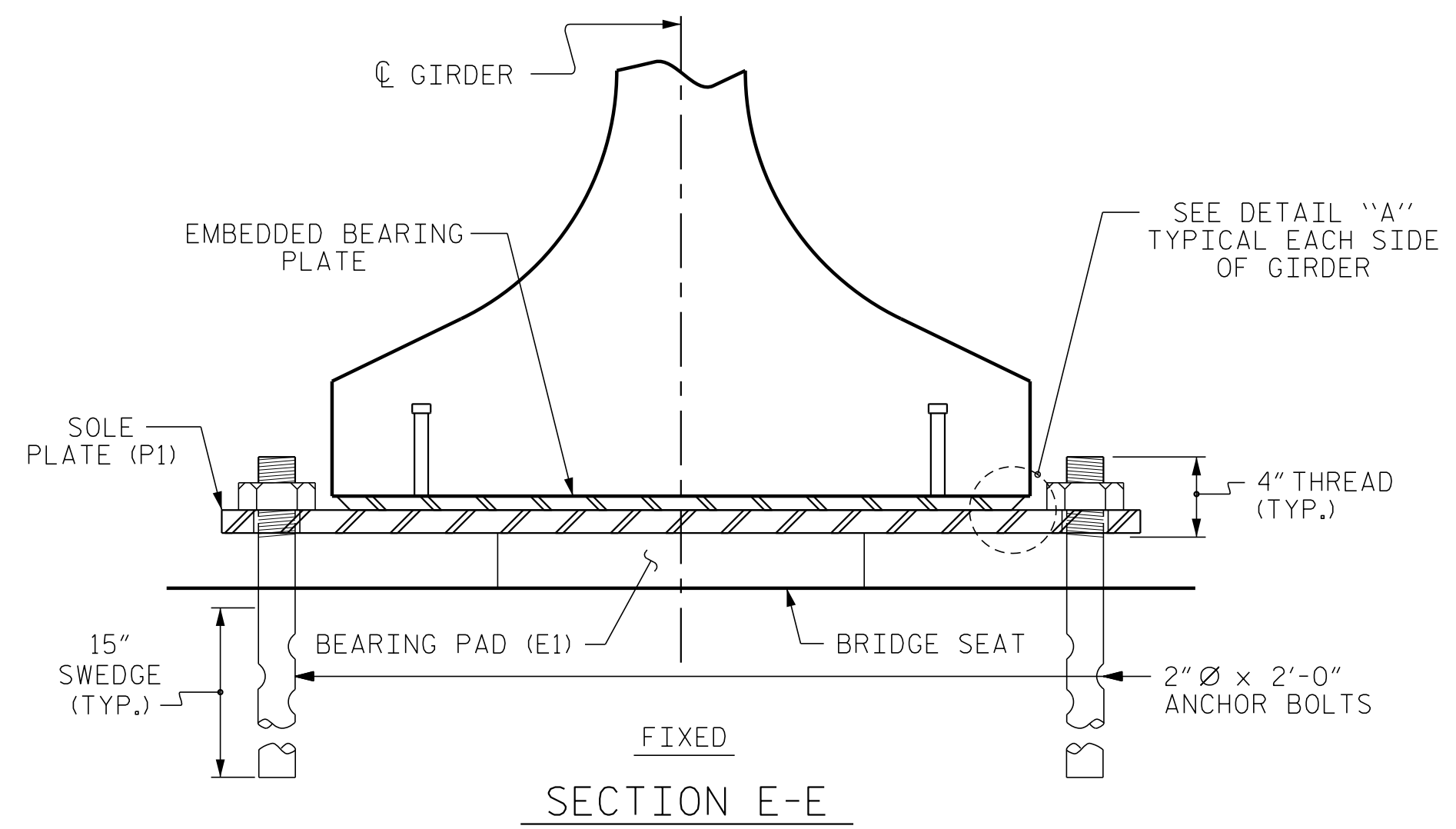


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD FIB DETAILS (RIGHT LANE)**

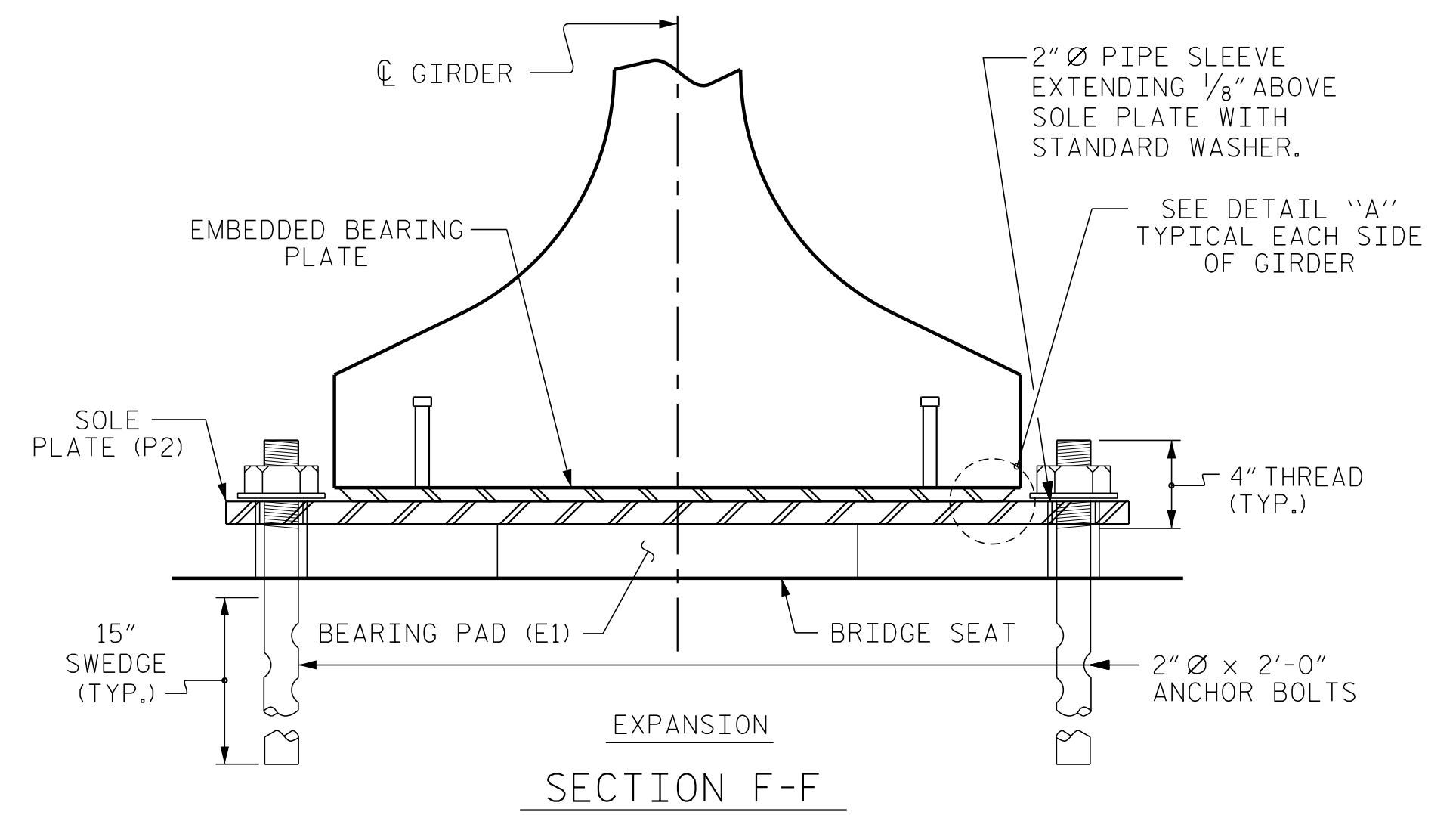
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-13
1			3			TOTAL SHEETS 58
2			4			

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
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 Fax: 919 851 8107  
 LICENSE NO. F-0377

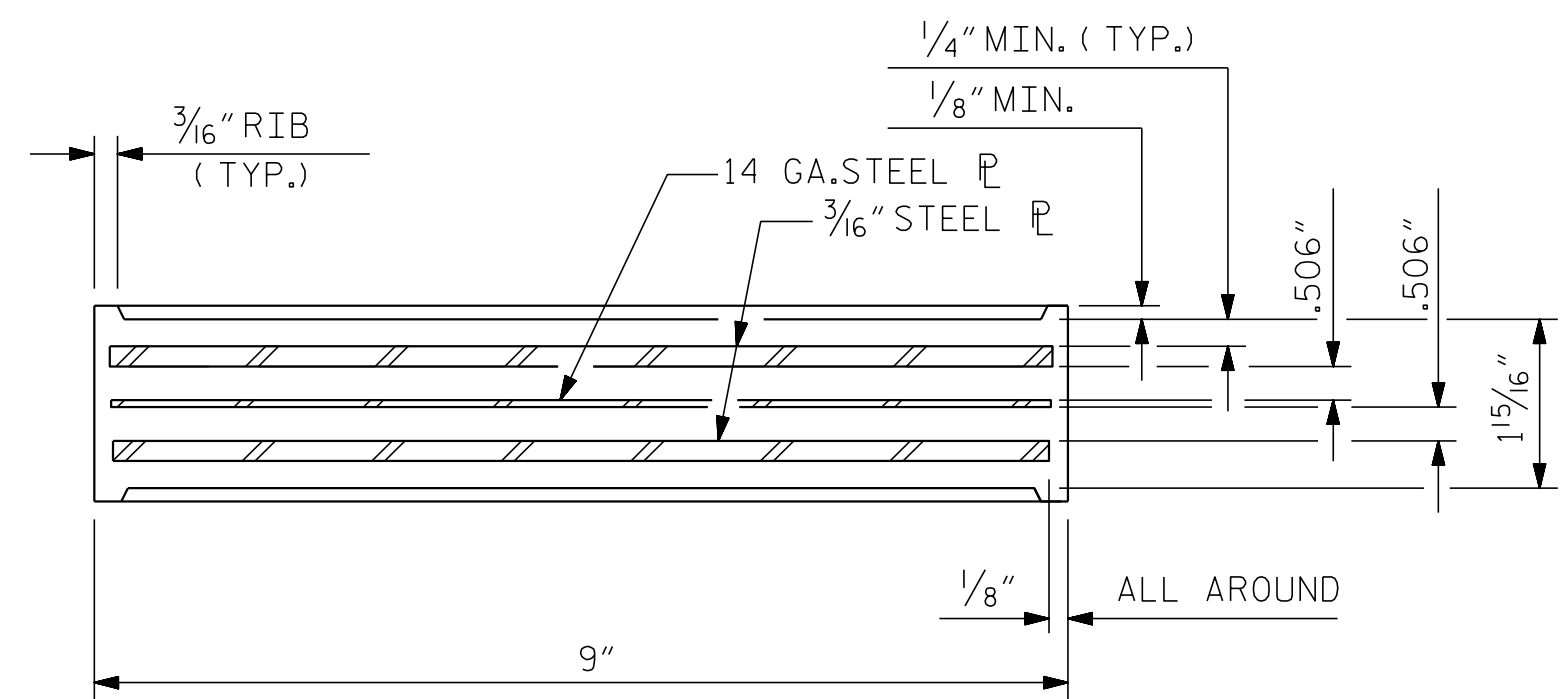
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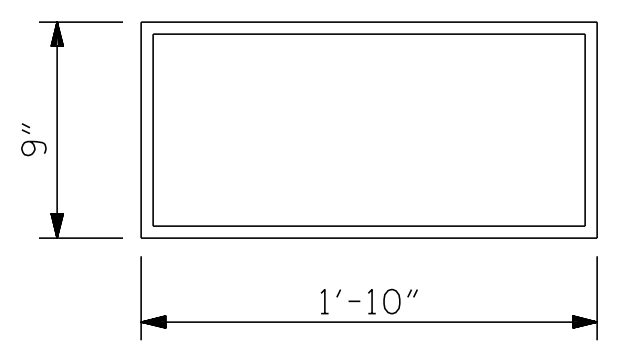
SECTION E-E



SECTION F-F

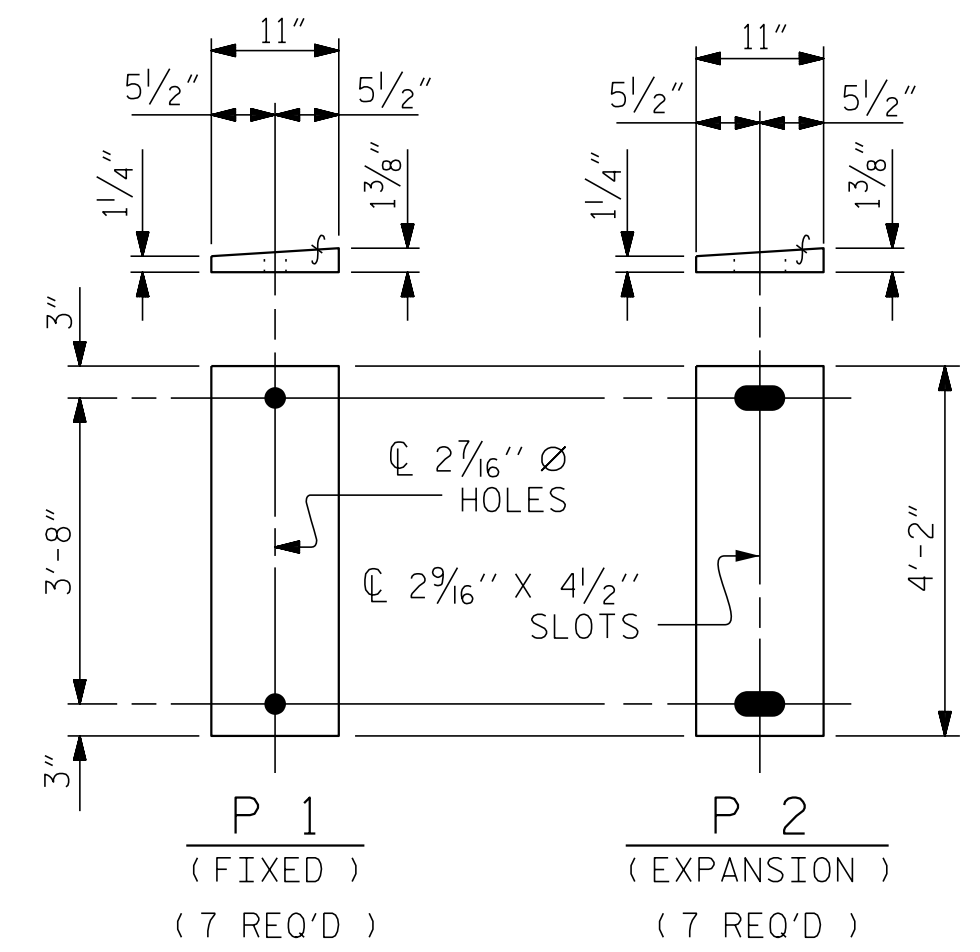


TYPICAL SECTION OF ELASTOMERIC BEARINGS

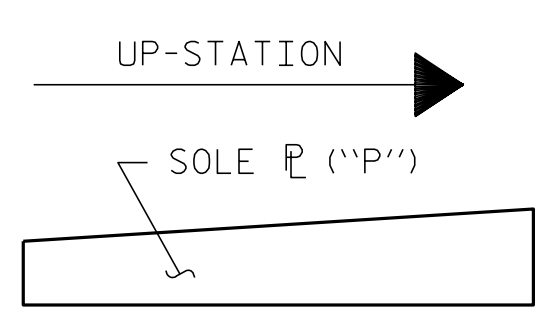


E1 (14 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING

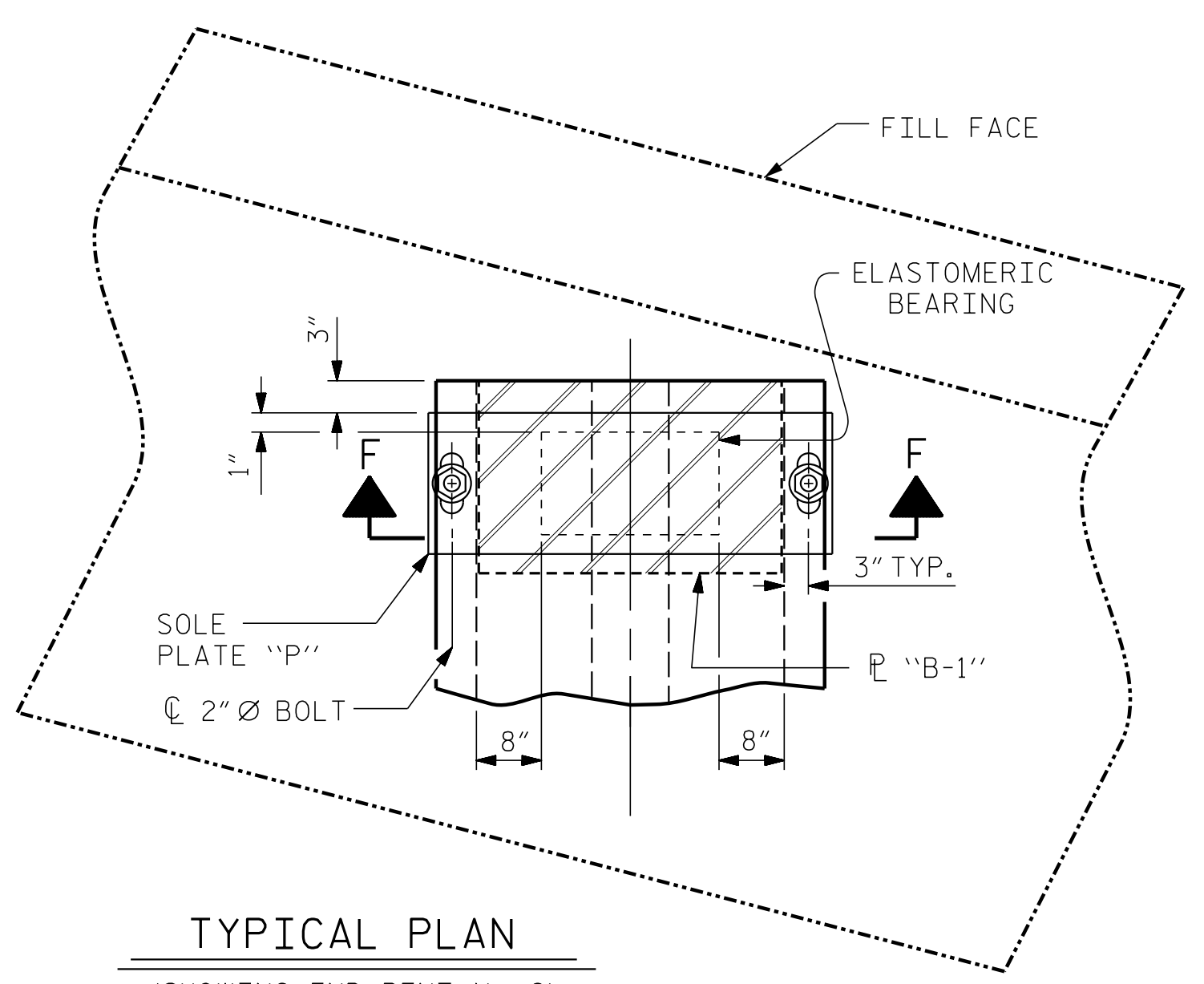
**TYPE IV**



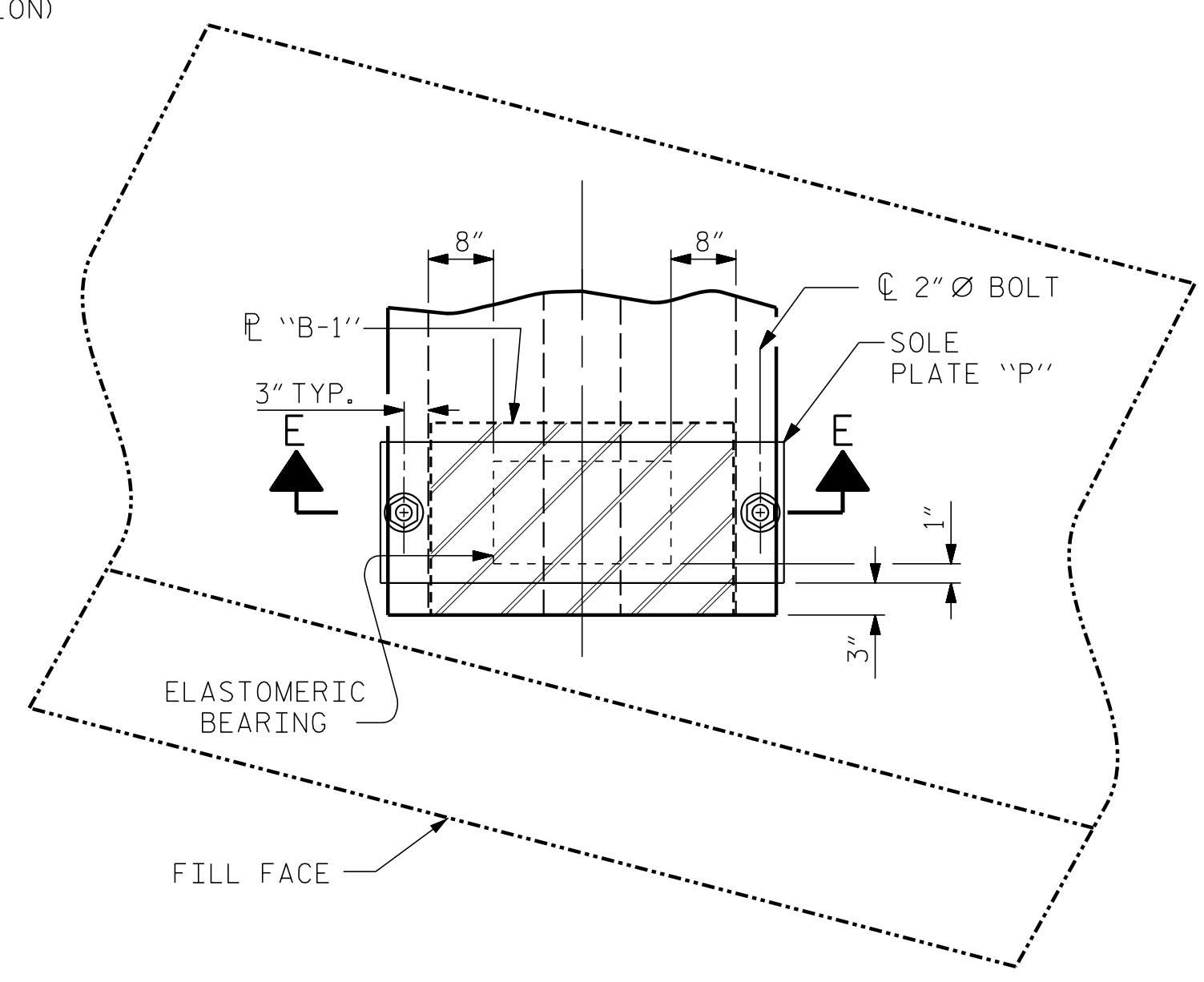
SOLE PLATE DETAILS ("P")



SOLE PLACEMENT DETAIL



TYPICAL PLAN  
(SHOWING END BENT No. 2)  
(EXPANSION)



TYPICAL PLAN  
(SHOWING END BENT No. 1)  
(FIXED)

**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.

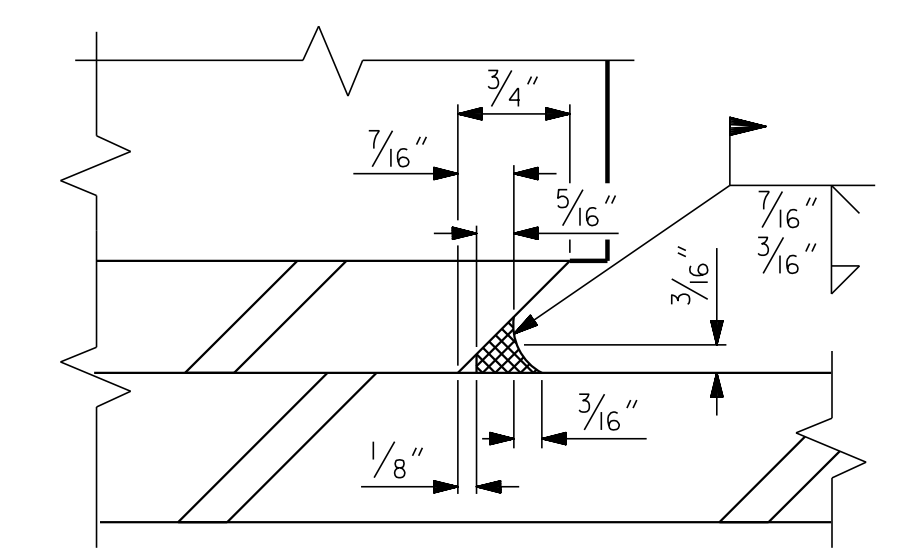
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.

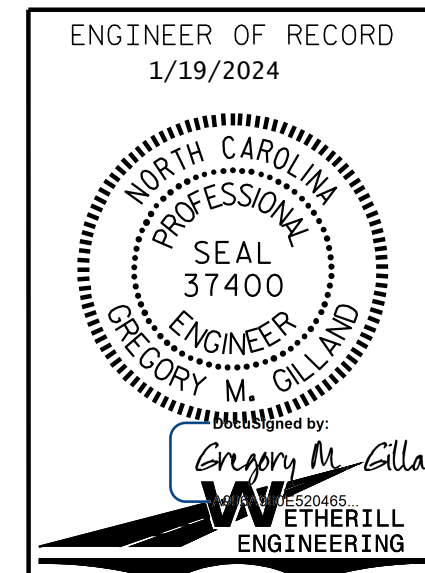
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



DETAIL "A"

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**ELASTOMERIC BEARING DETAILS**  
 PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-14
1			3			TOTAL SHEETS
2			4			58

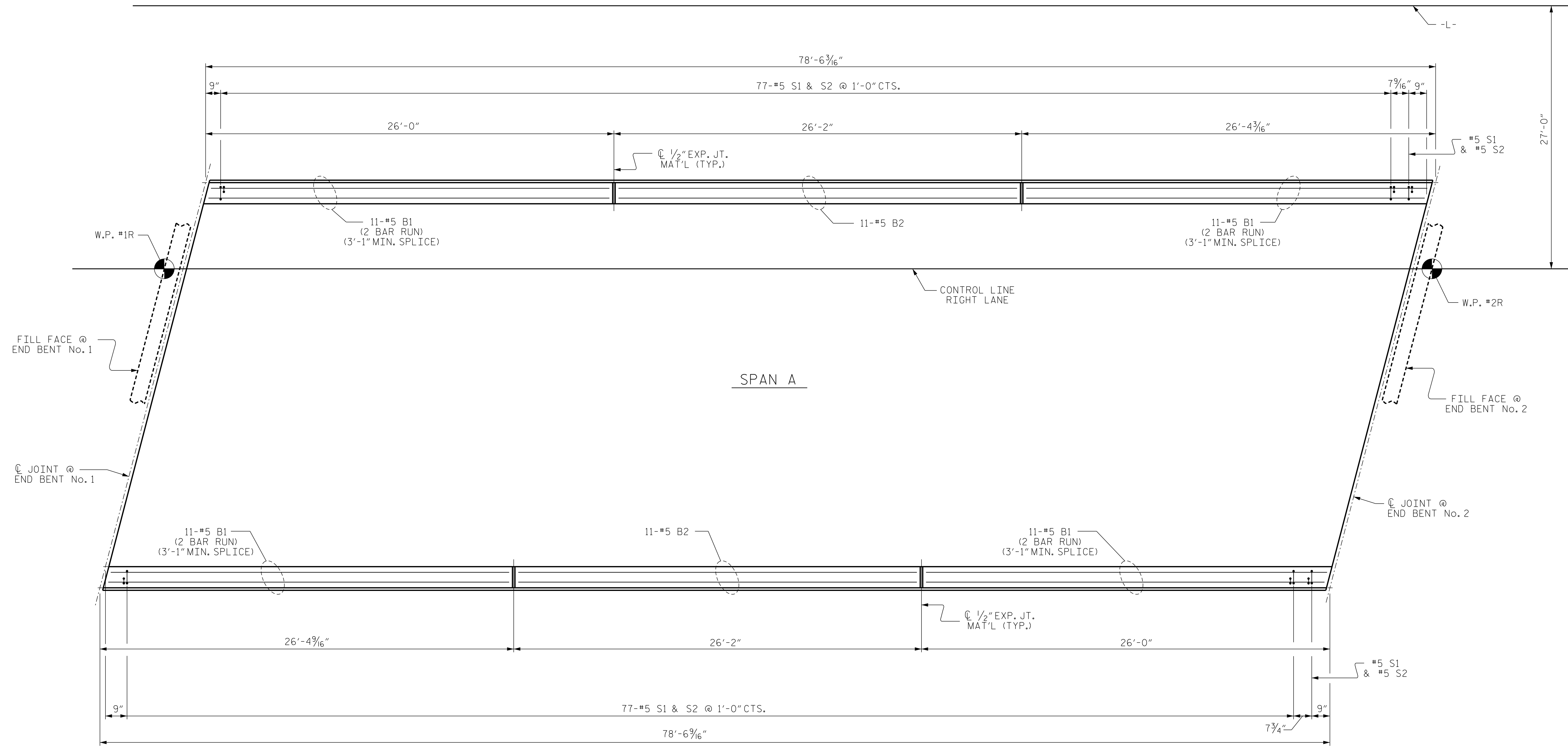
DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

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 LICENSE NO. F-0377

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1/19/2024 7:03:35 AM



### PLAN OF CONCRETE BARRIER RAIL

ALL DIMENSIONS ARE TAKEN ALONG THE ARC OF THE OUTSIDE EDGE OF CONCRETE BARRIER.

PROJECT NO. HB-0004

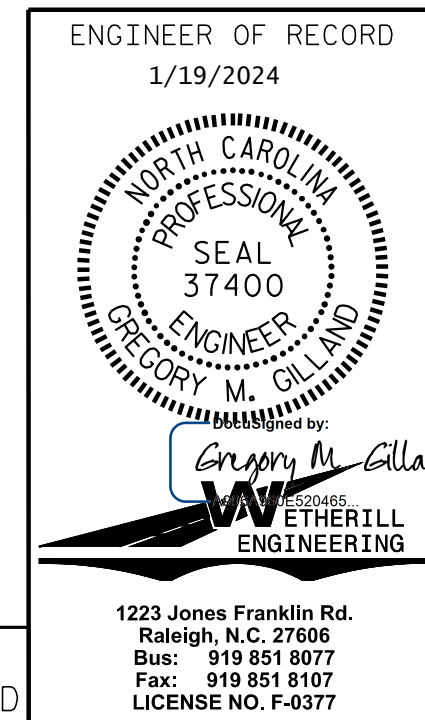
HAYWOOD COUNTY

STATION: 254+73.75 -L-

SHEET 1 OF 2

#### NOTES:

#5 S1 AND S2 BARS MAY BE SHIFTED SLIGHTLY TO MAINTAIN 2" CLEAR TO EXPANSION JOINT IN RAIL.



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

## CONCRETE BARRIER RAIL (RIGHT LANE)

#### REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			58

DRAWN BY : D. HODGE DATE : 2/23  
CHECKED BY : J. DILWORTH DATE : 9/23

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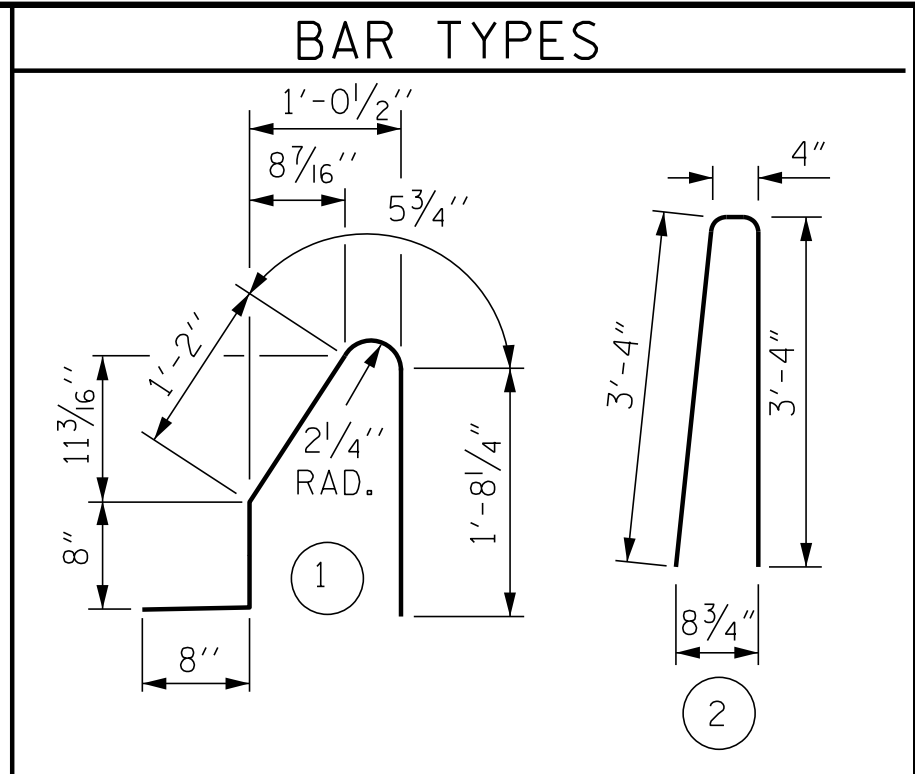
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.



ALL BAR DIMENSIONS ARE OUT TO OUT

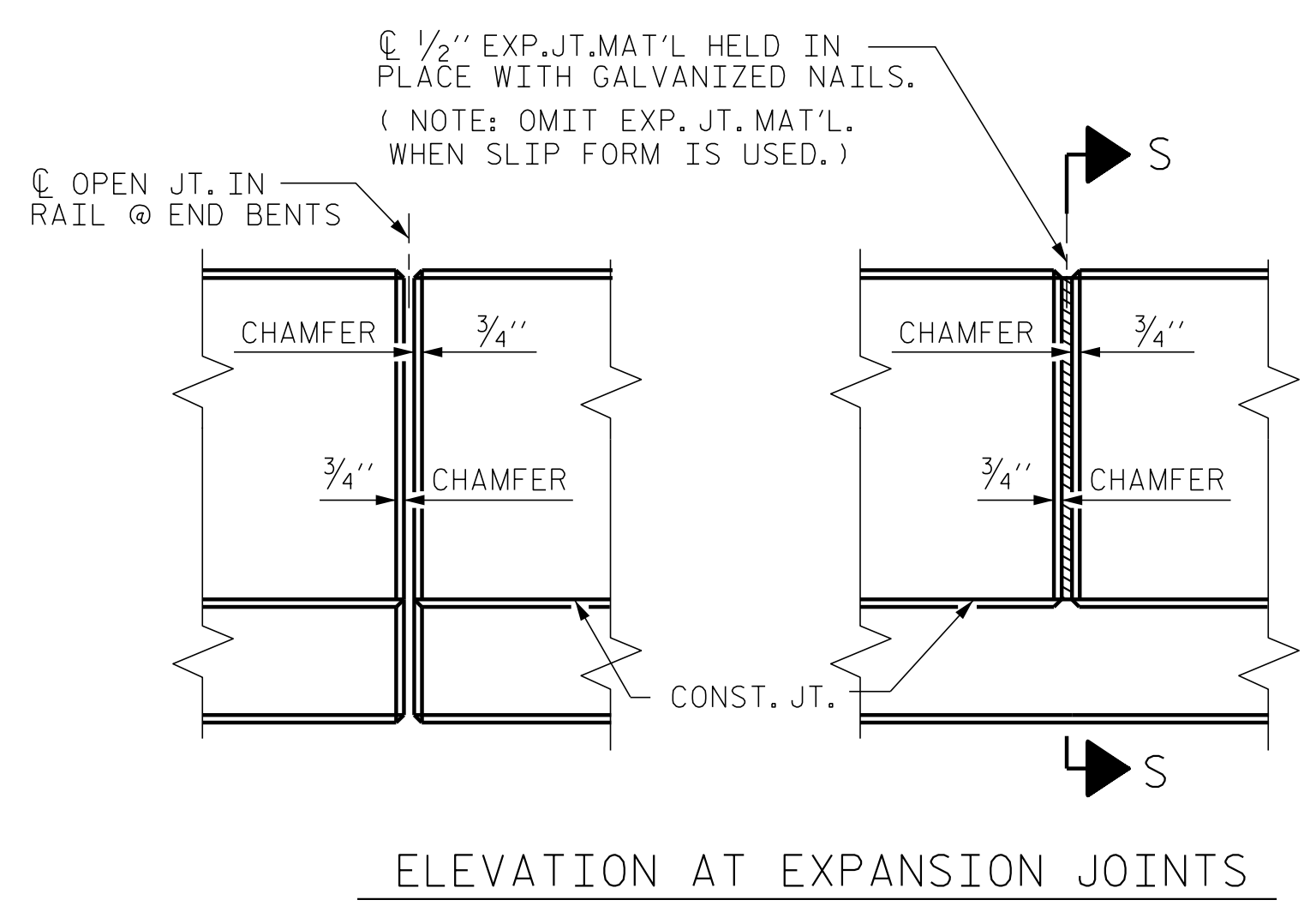
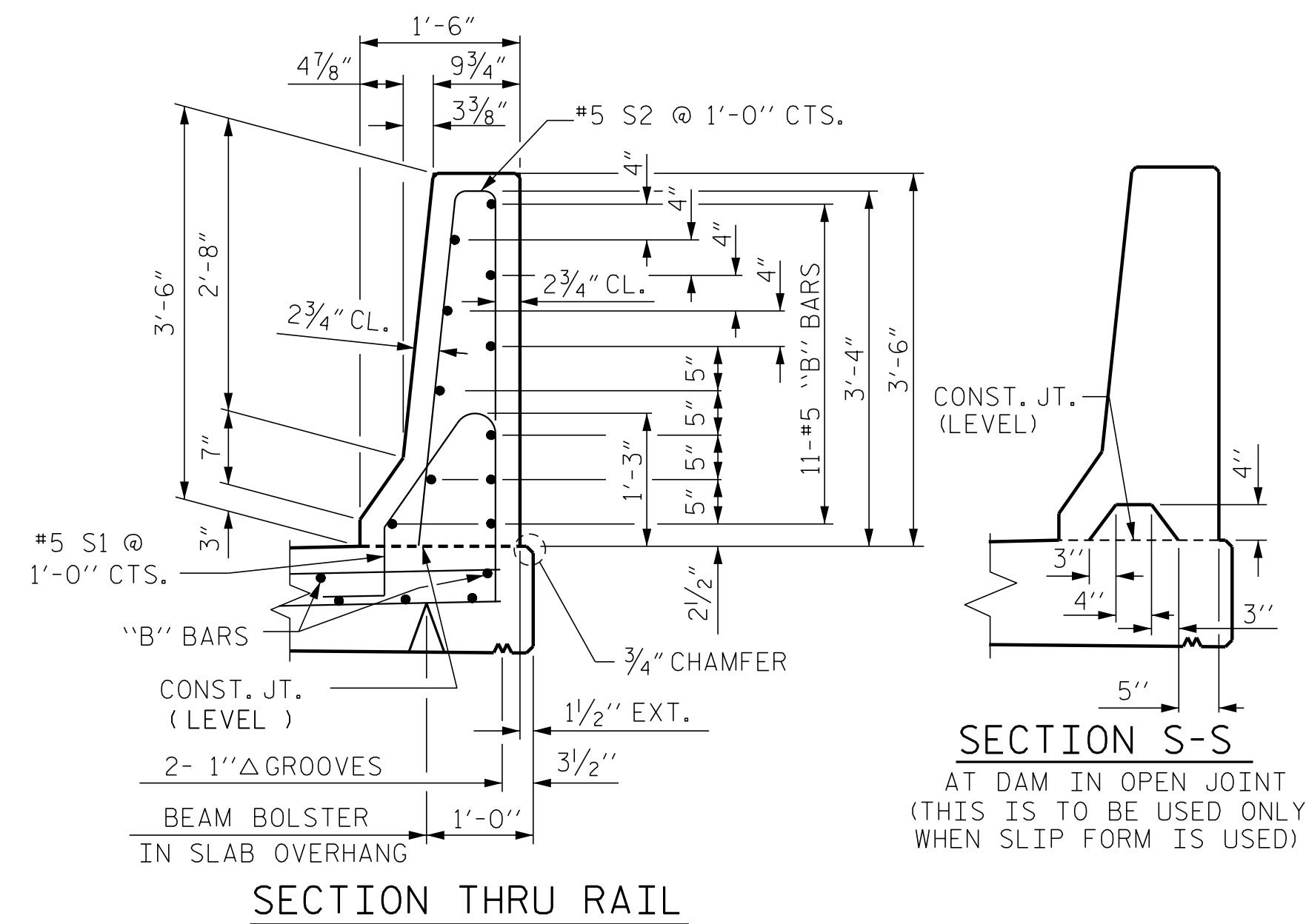
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	156	#5	1	4'-8"	759
* S2	156	#5	2	7'-0"	1,139
* B1	88	#5	STR	14'-6"	1,331
* B2	22	#5	STR	25'-9"	591

* EPOXY COATED REINFORCING STEEL	3,820 LBS.
CLASS AA CONCRETE	21.4 CU. YDS.
CONCRETE BARRIER RAIL	157.06 LIN. FT.

FOR CONCRETE BARRIER RAIL QUANTITIES ON APPROACH SLABS, SEE APPROACH SLAB SHEETS.



BARRIER RAIL DETAILS

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 2

ENGINEER OF RECORD  
 1/19/2024  
 NORTH CAROLINA PROFESSIONAL SEAL 37400  
 ENGINEER  
 GREGORY M. GILLIAND  
 DeSigned by  
 Gregory M. Gilliland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 CONCRETE  
 BARRIER RAIL  
 (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-16
1			3			TOTAL SHEETS
2			4			58

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ASSEMBLED BY : D. HODGE	DATE : 2/23
CHECKED BY : J. DILWORTH	DATE : 9/23
DRAWN BY : ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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 1/8" 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.)

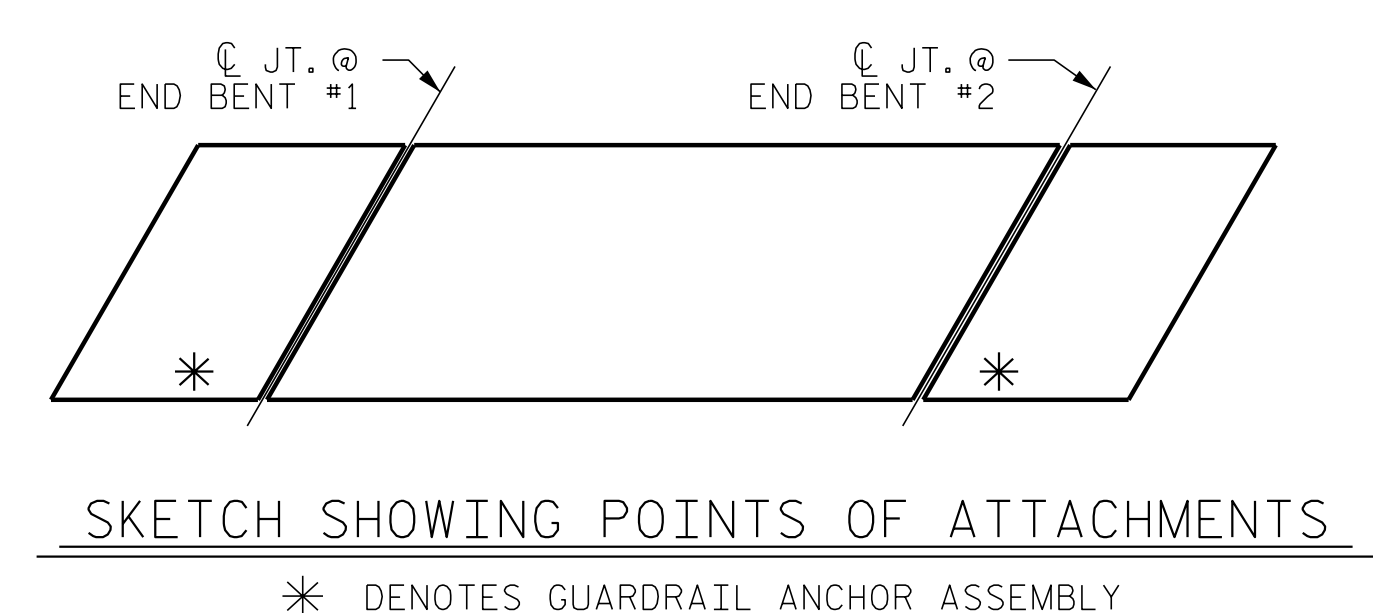
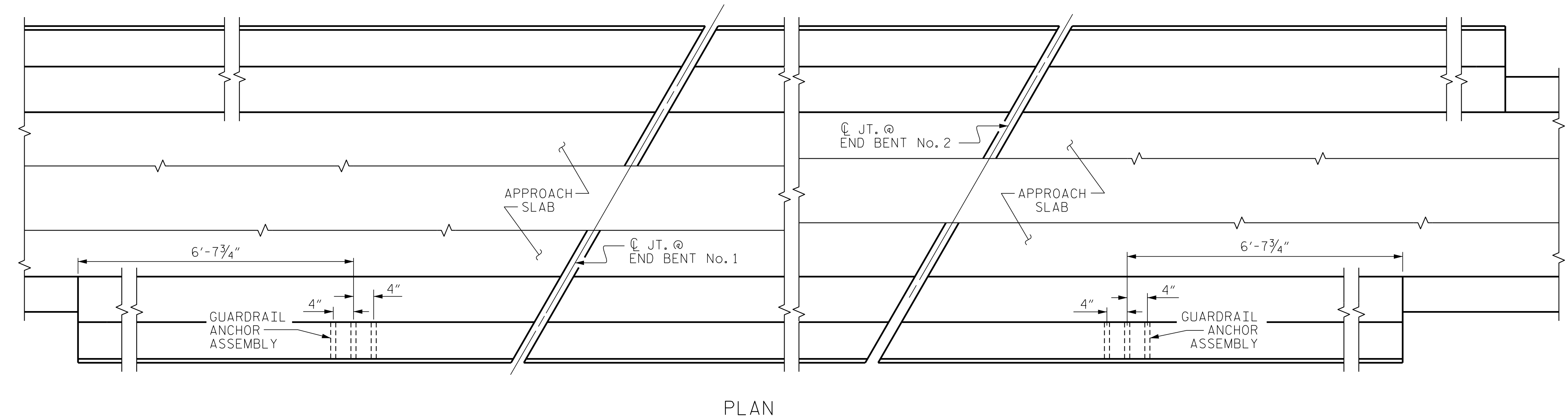
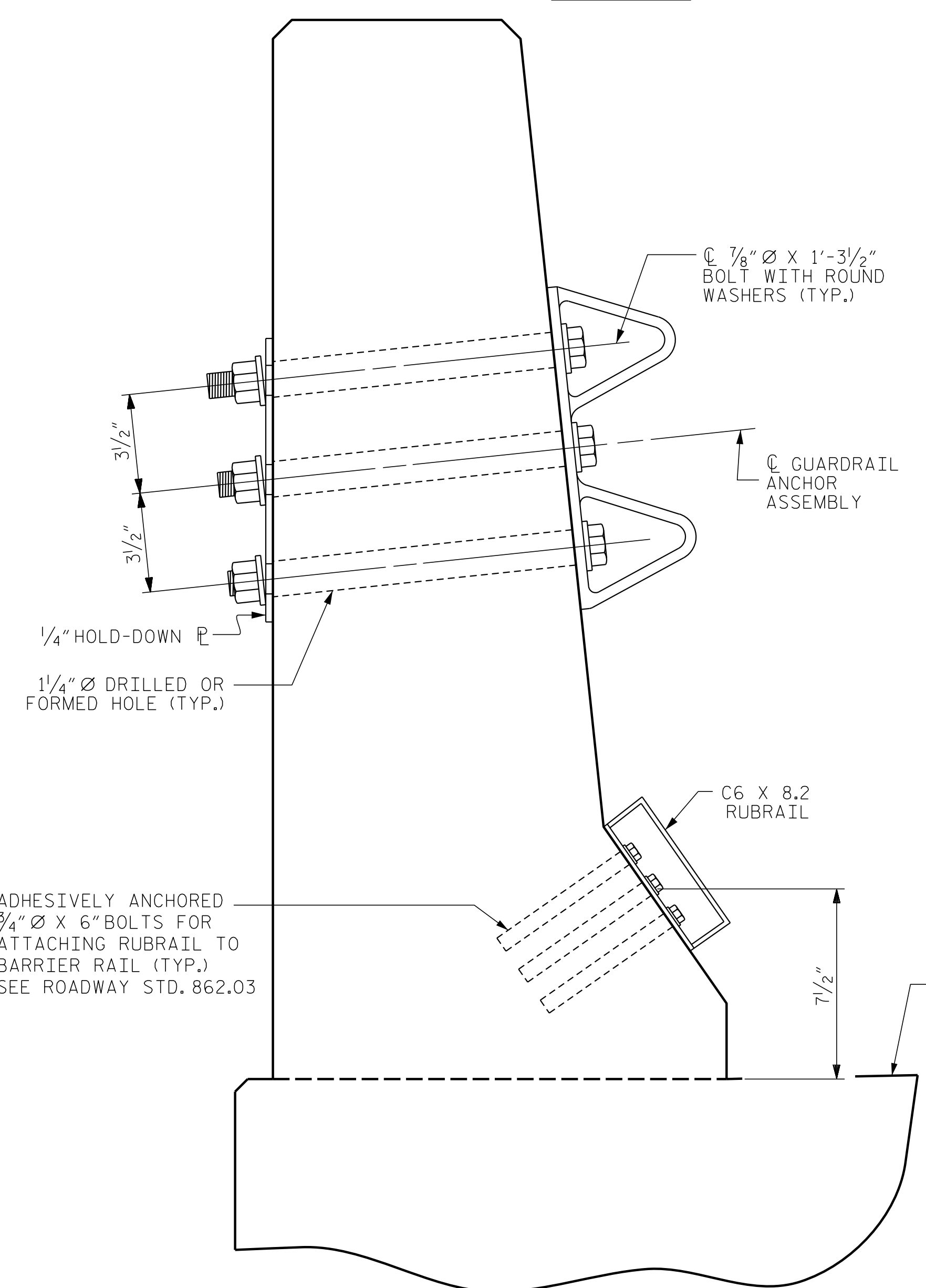
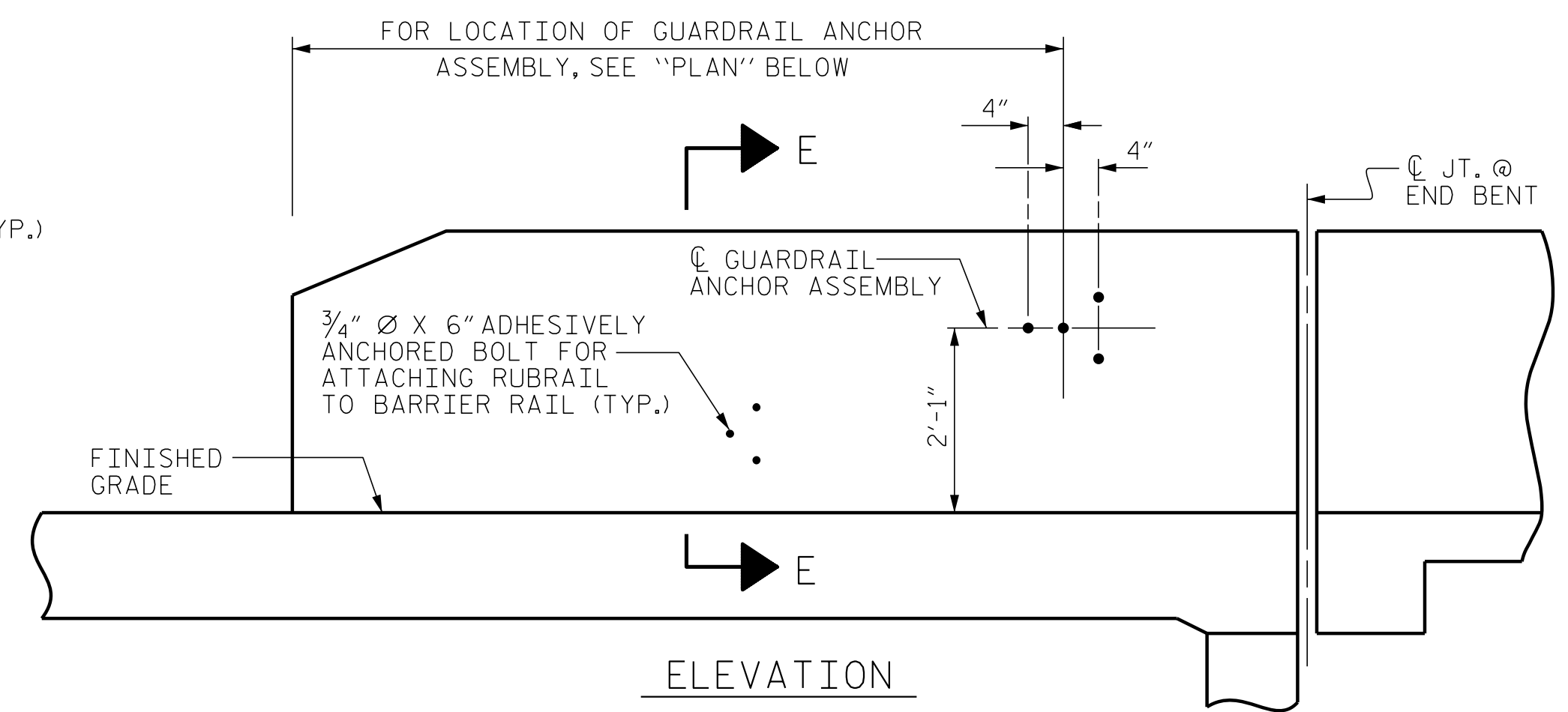
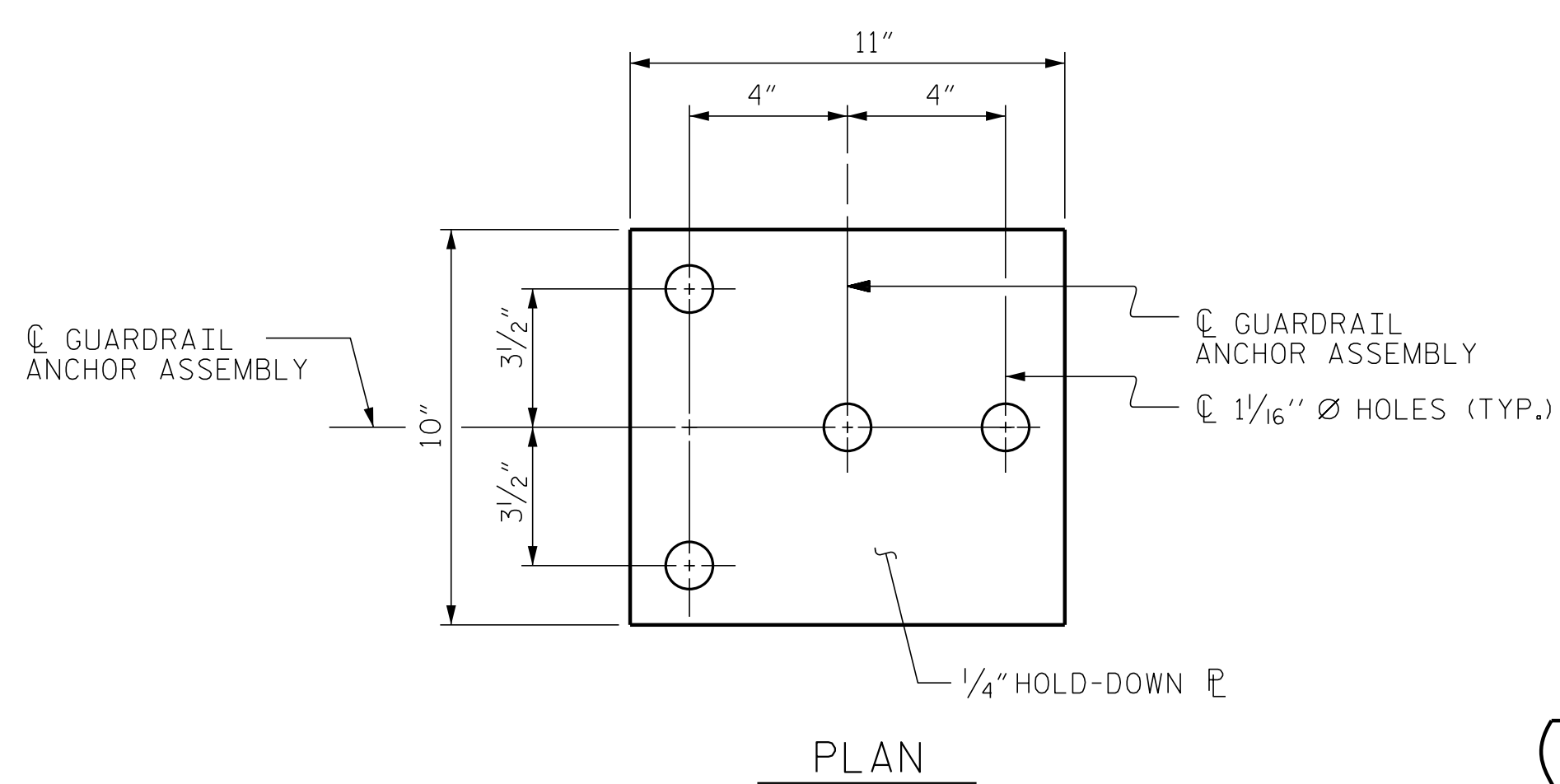
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

ENGINEER OF RECORD  
 1/19/2024  
  
 Signed by:  
  
 GREGORY M. GILLILAND  
 ENGINEERING

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL  
 (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-17
1			3			TOTAL SHEETS
2			4			58

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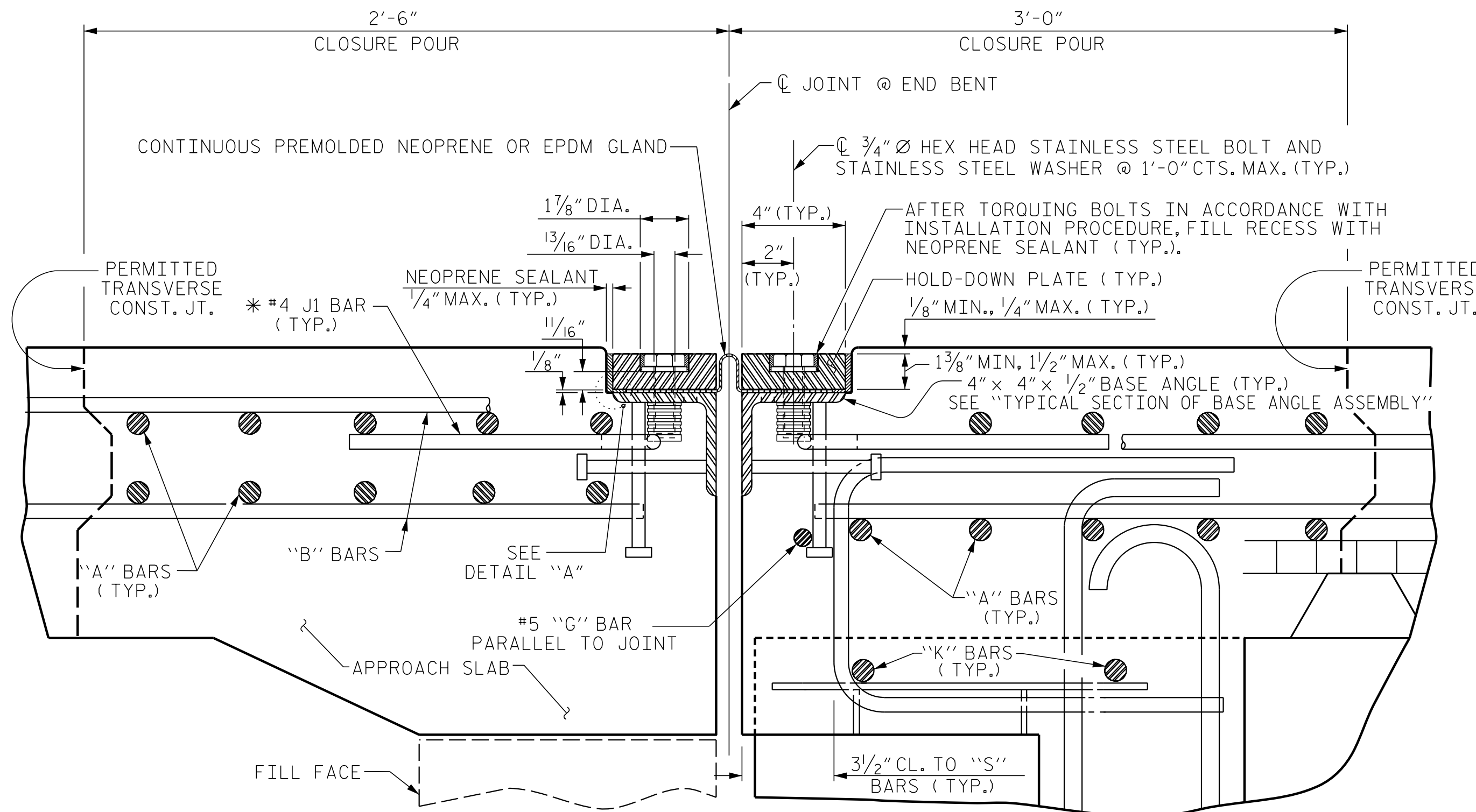
ASSEMBLED BY : D. HODGE	DATE : 1/23
CHECKED BY : J. DILWORTH	DATE : 9/23
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

INSTALLATION PROCEDURE

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" x 4" x 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

GENERAL NOTES

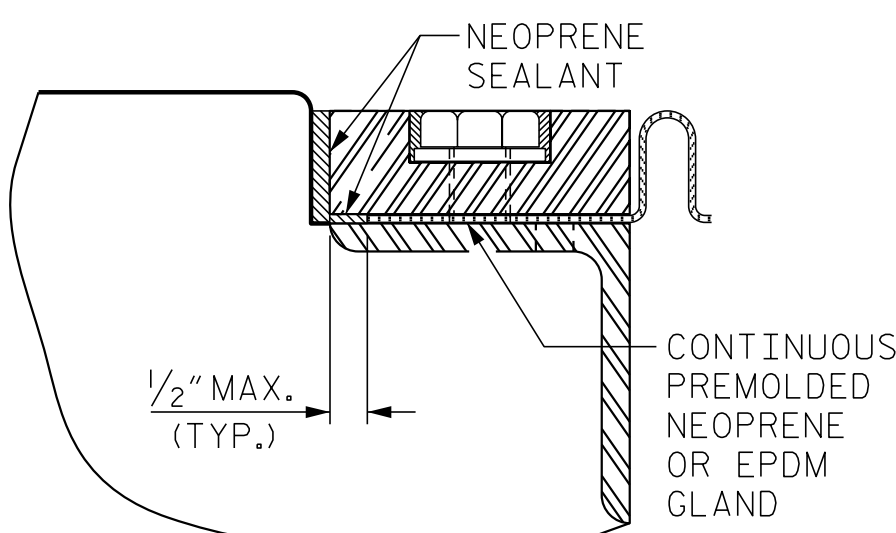
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



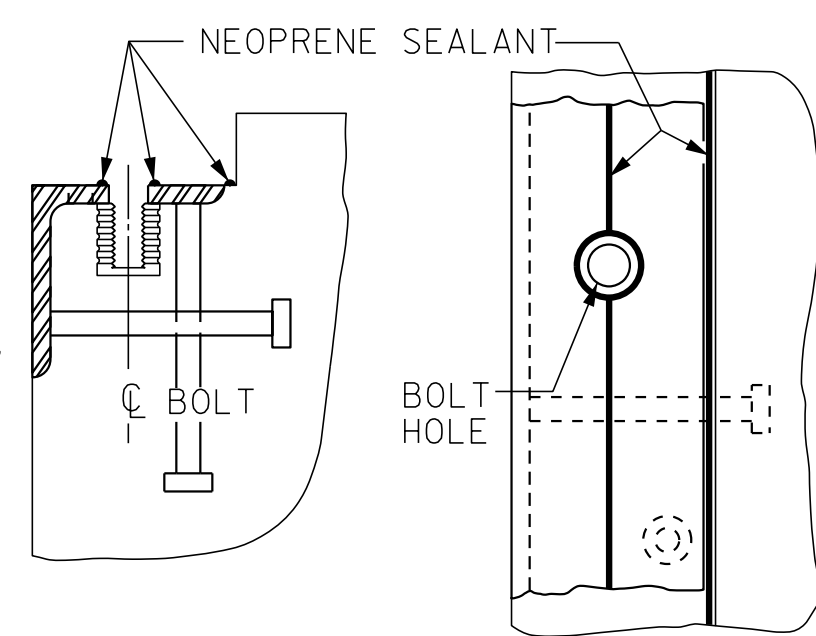
EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

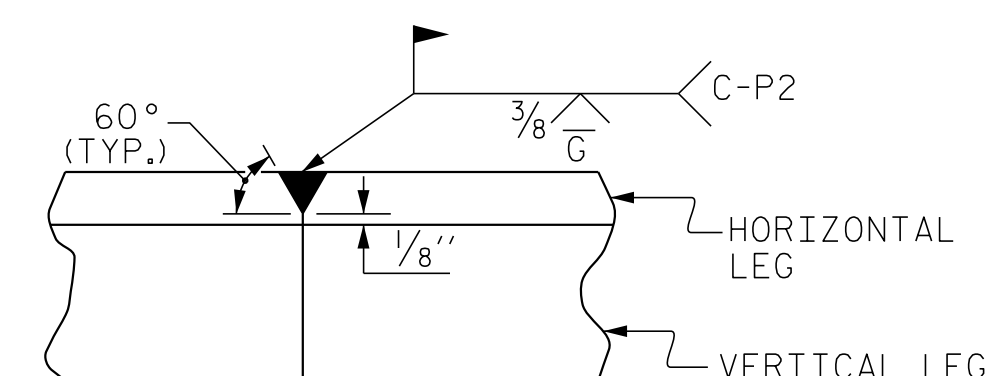
\* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



DETAIL "A"

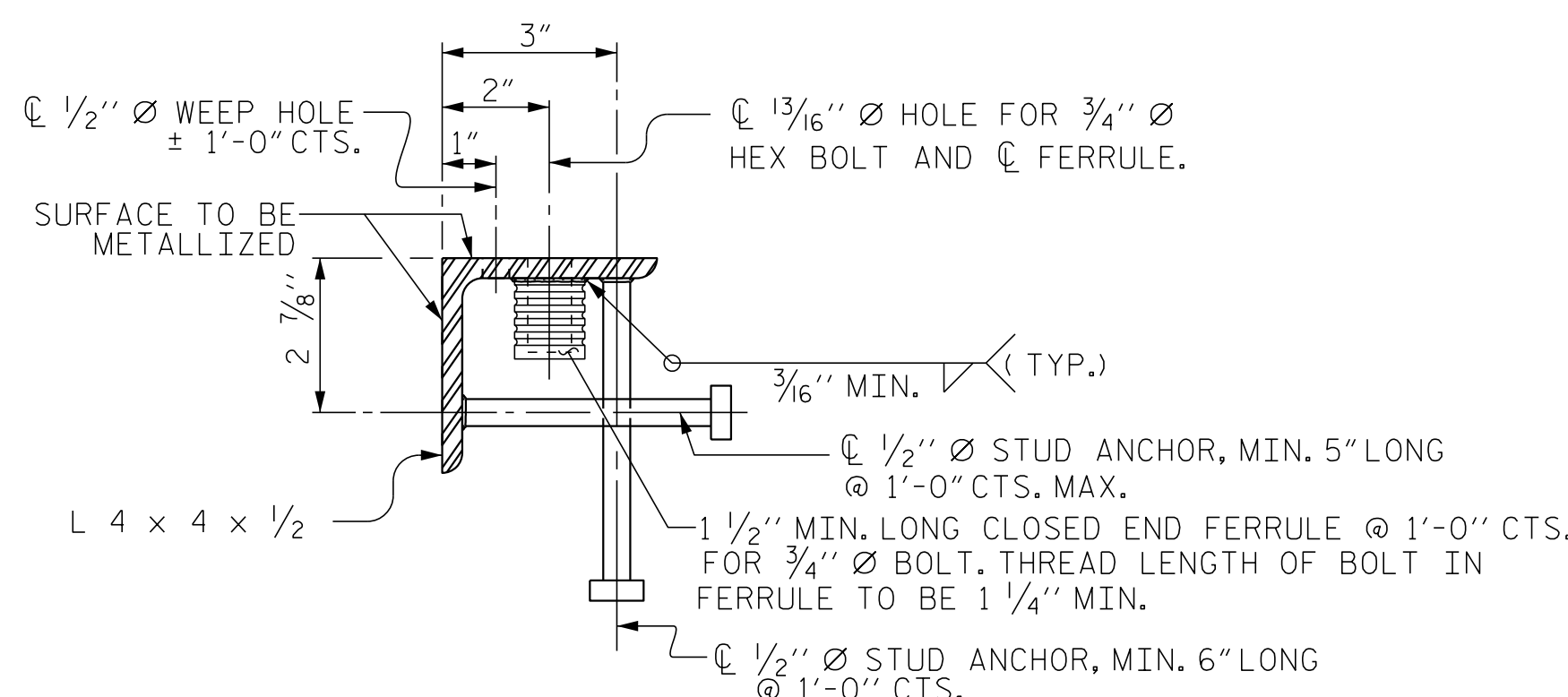


CROSS SECTION  
PLAN VIEW  
INSTALLATION SKETCH



DETAIL - FIELD WELD  
SPLICE OF BASE ANGLE

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG C RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	104°-37'-47"	0"	1"	1"	1"
2	104°-37'-47"	1/2"	1 5/16"	1 1/4"	1 1/16"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

SHEET 1 OF 2

ASSEMBLED BY : D. HODGE	DATE : 7/23
CHECKED BY : J. DILWORTH	DATE : 9/23
DRAWN BY : REK 9/87	REV. 10/11 MAA/GM
CHECKED BY : CRK 10/87	REV. 10/17 MAA/THC
	REV. 6/18 MAA/THC

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ENGINEER OF RECORD  
1/19/2024

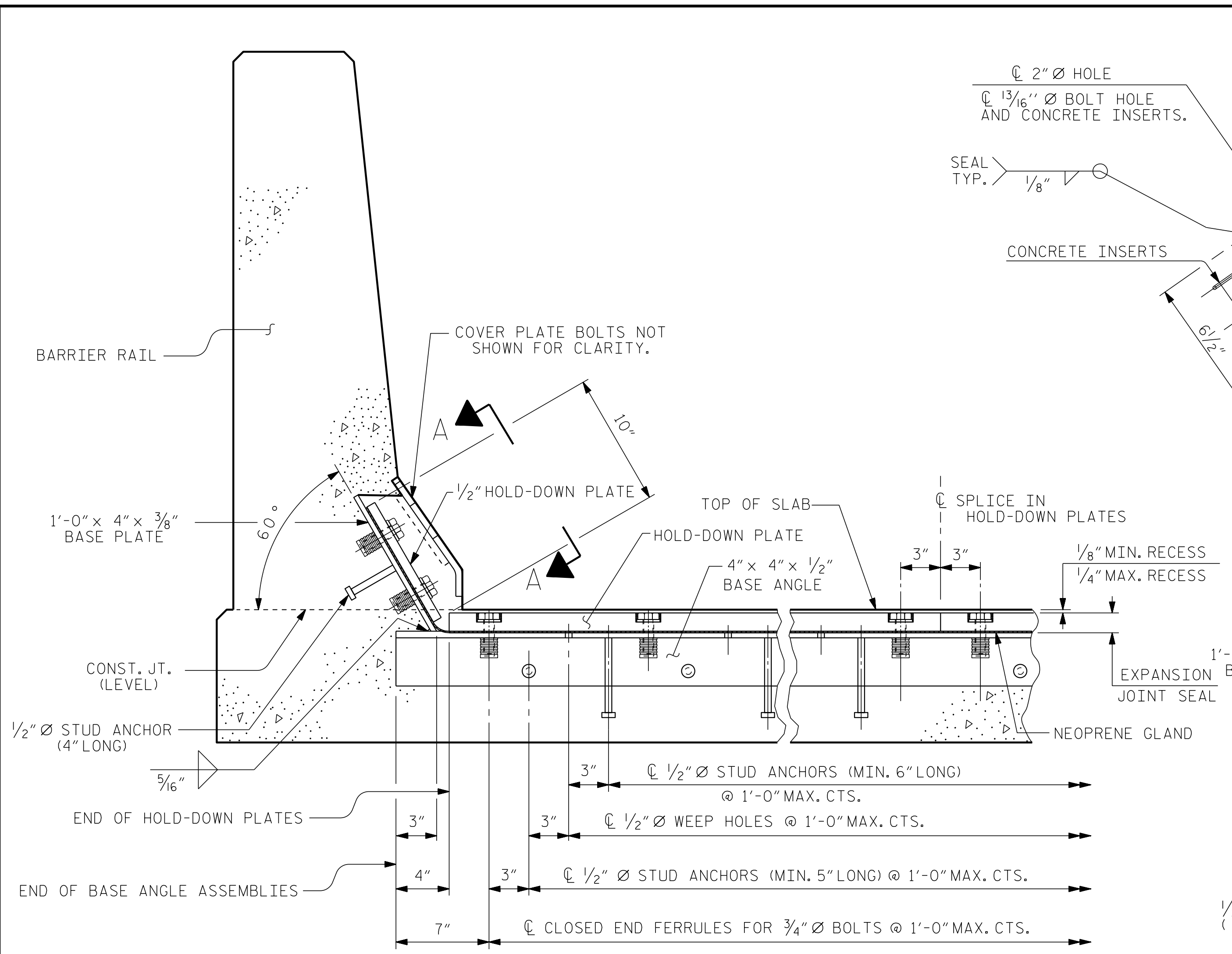
*Gregory M. Gilliland*  
GREGORY M. GILLILAND  
ENGINEERING

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Fax: 919 851 8107  
LICENSE NO. F-0377

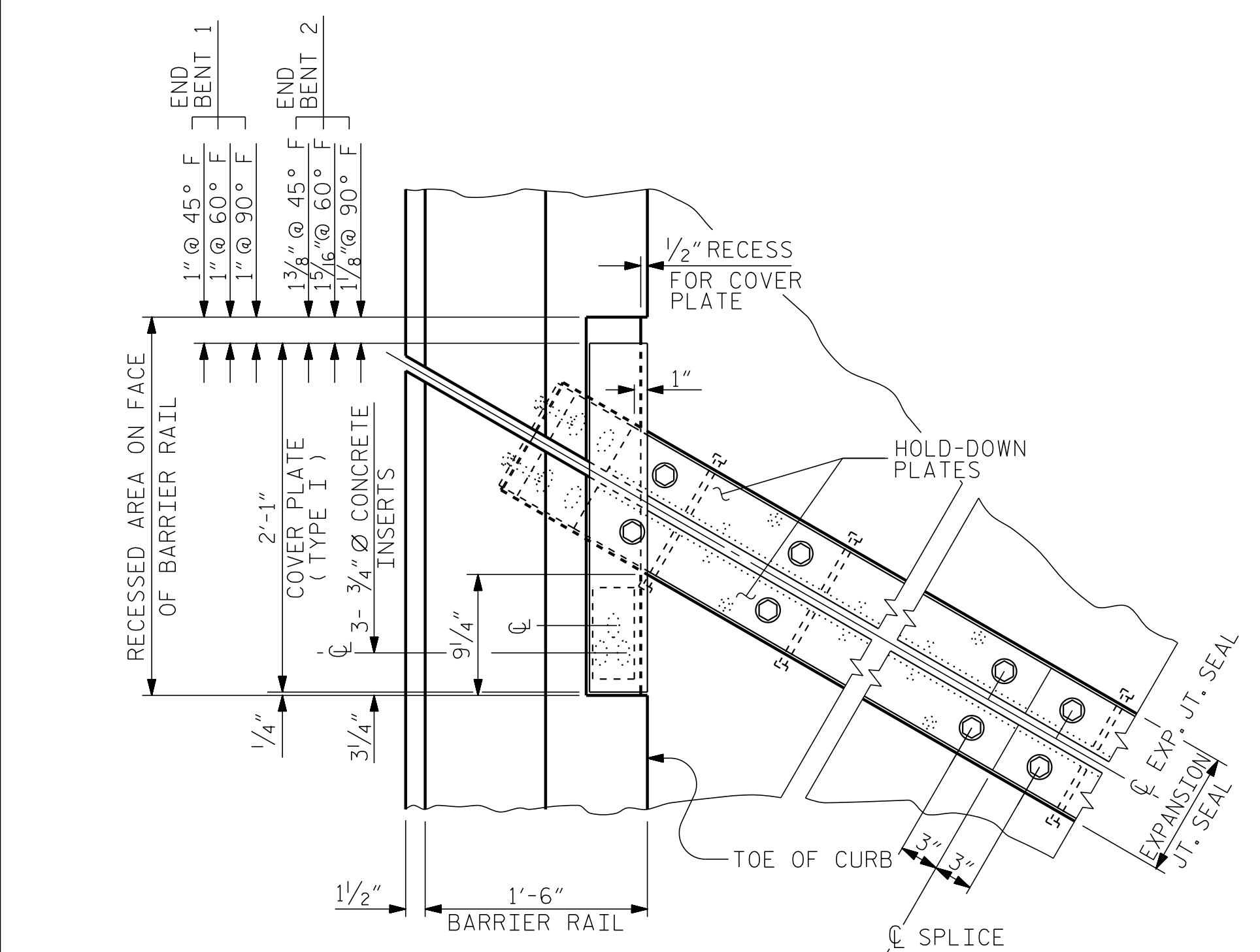
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO.
					S2-18
					TOTAL SHEETS
					58

P:\2023\2312401\_HB-0004\_Structures\DWG\HB-0004 (R) IGH LANE\WB0004-R IGH-T-JS.dgn  
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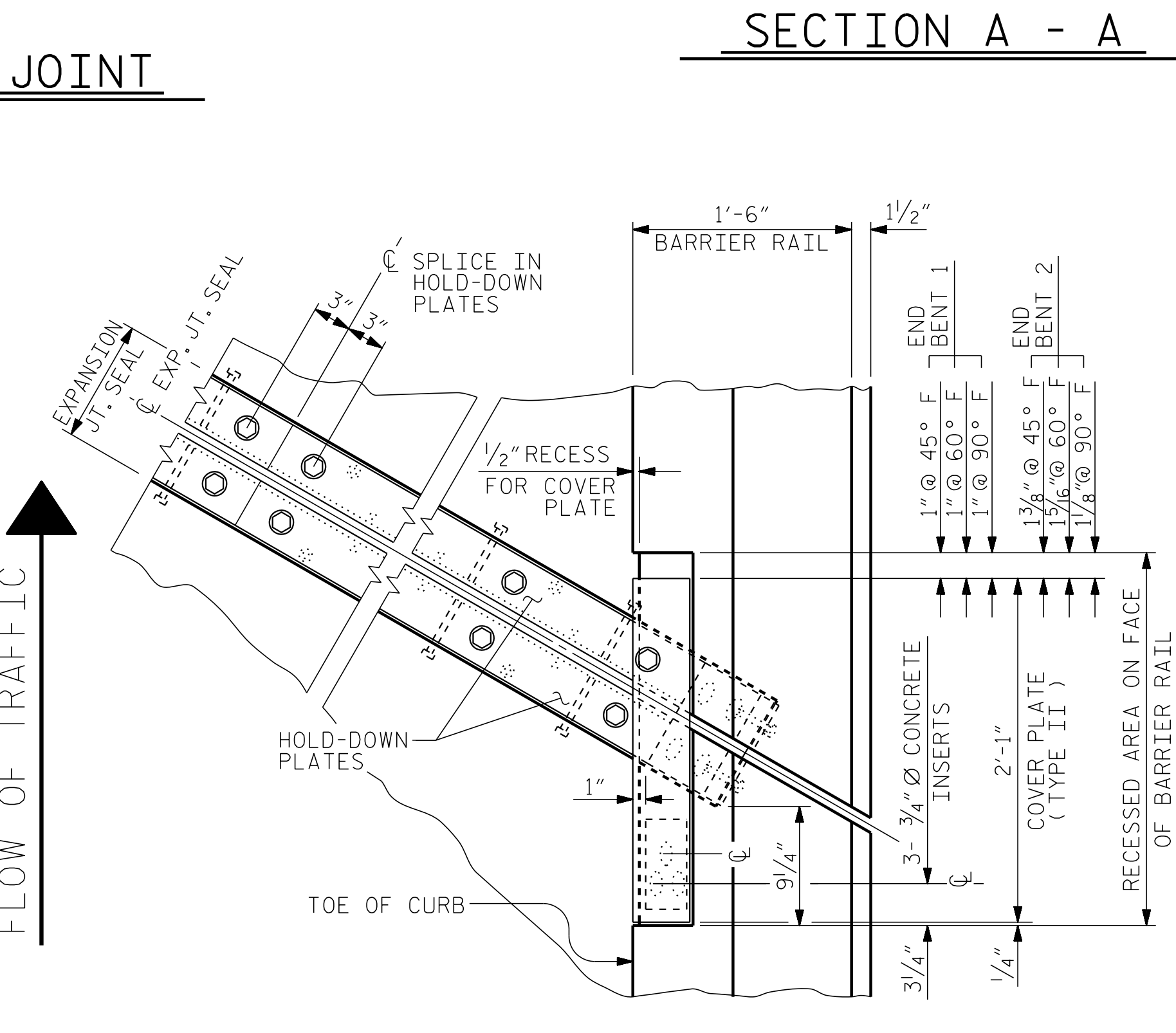




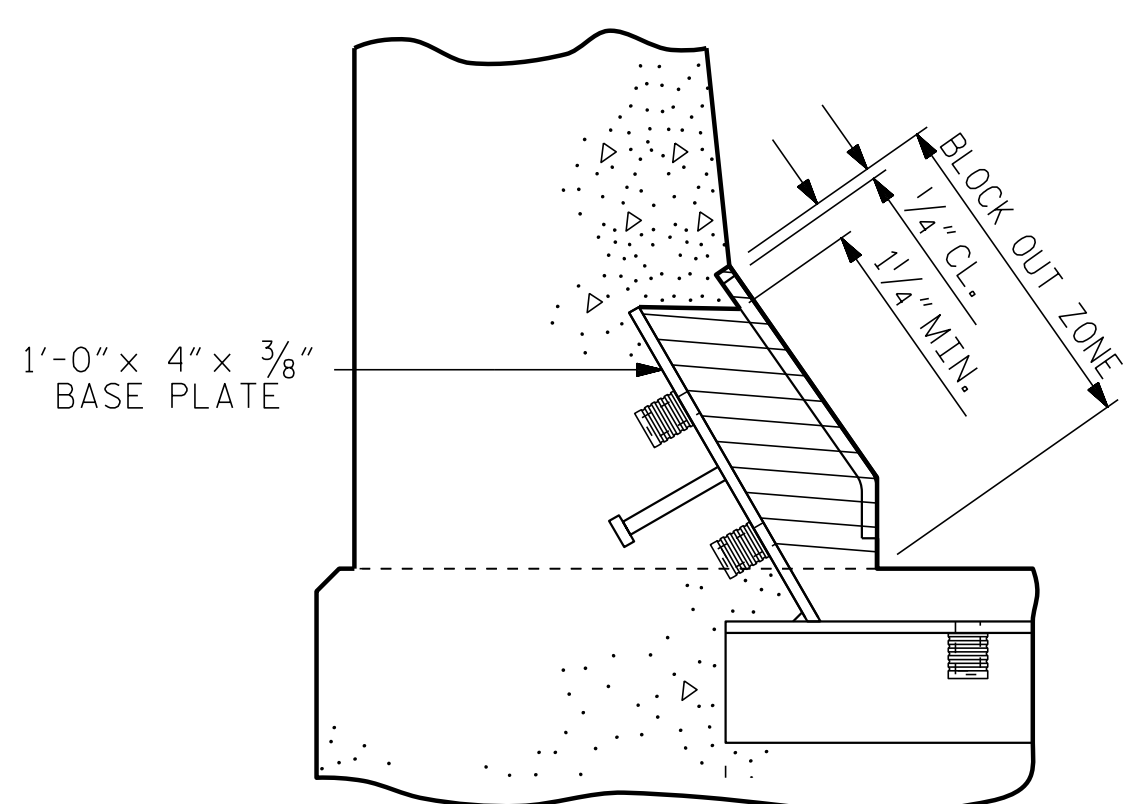
**SECTION THRU RAIL NORMAL TO JOINT**



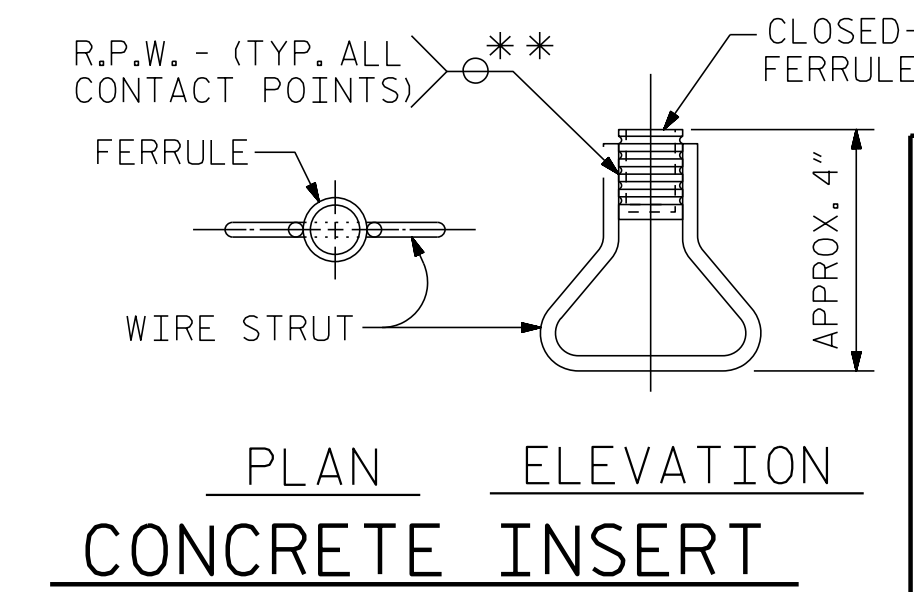
**PLAN OF EXPANSION JOINT SEAL**



**SECTION A - A**



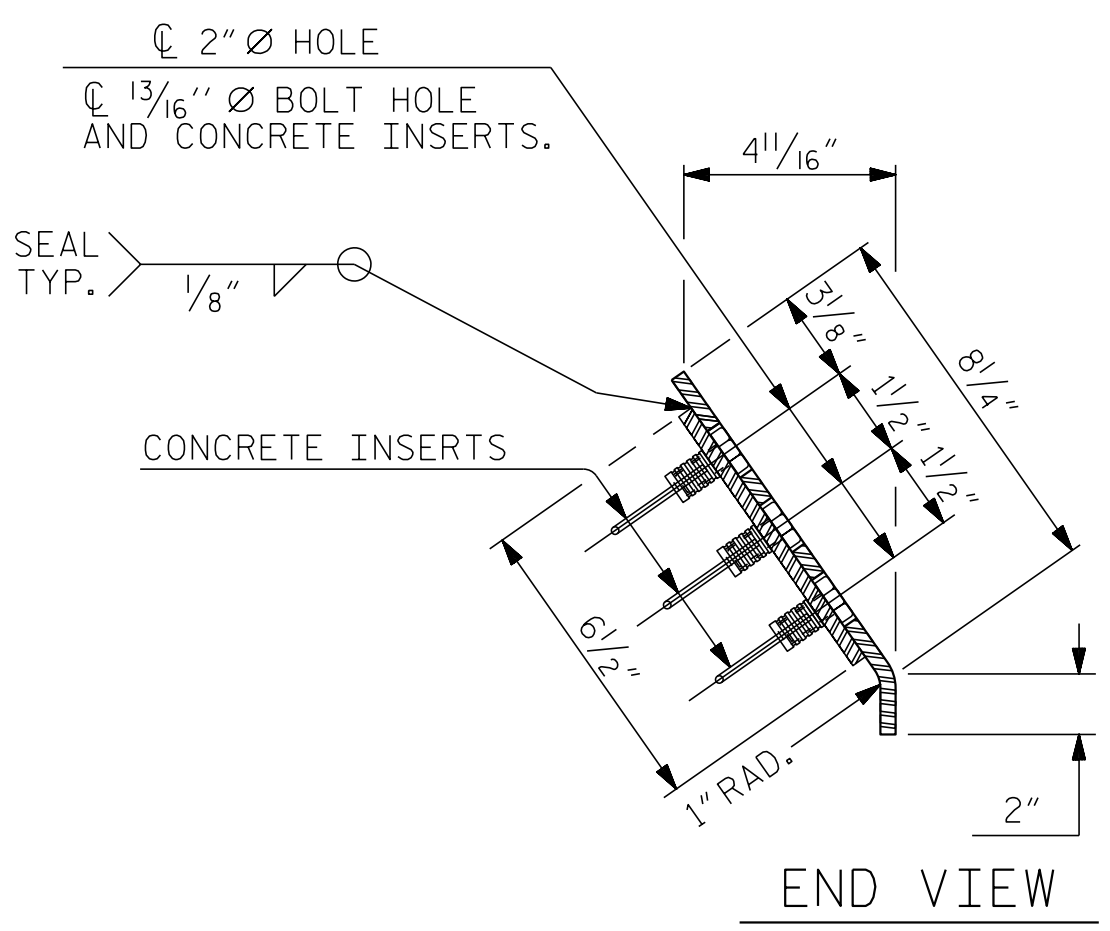
**BLOCK OUT DETAIL**  
SEE "SECTION A - A" FOR OTHER DETAILS.



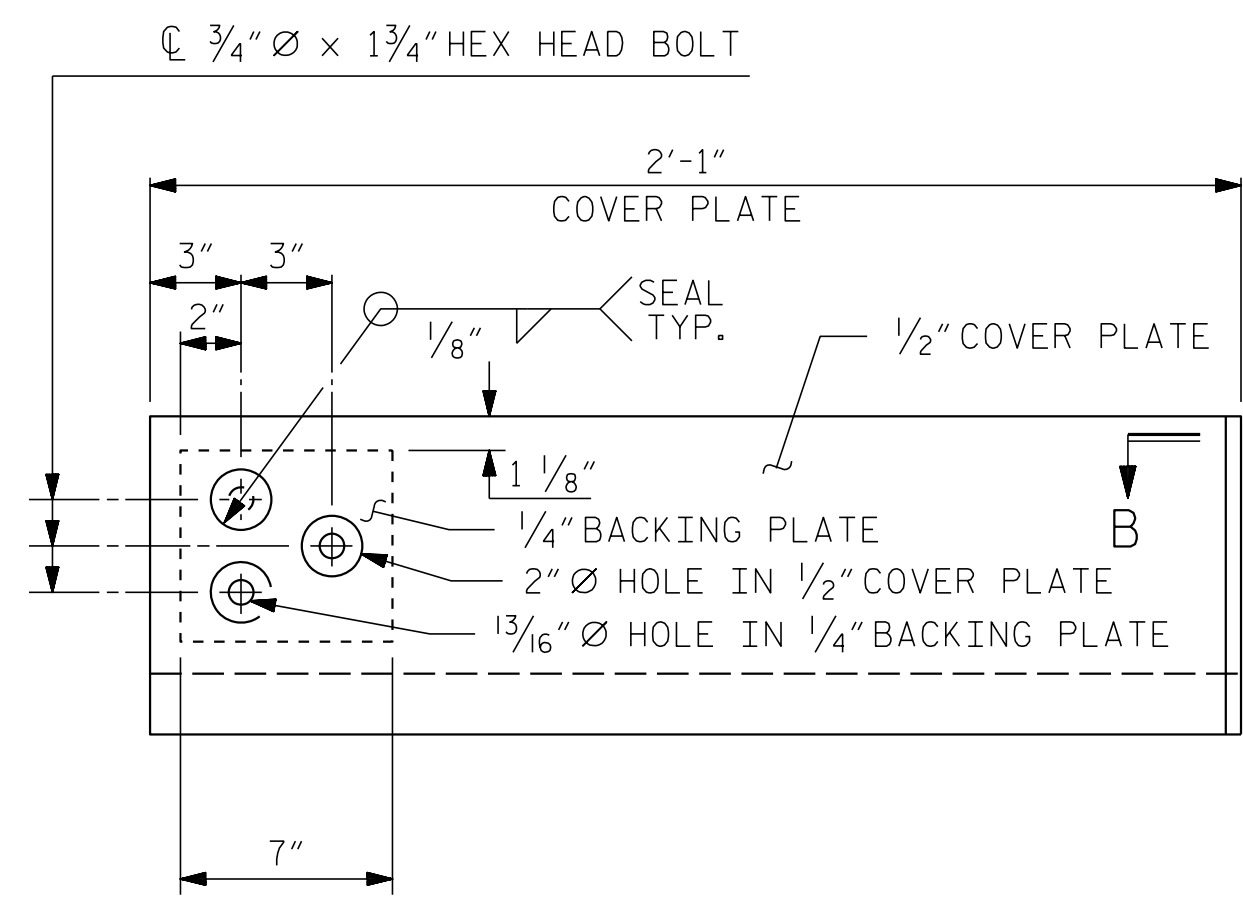
**CONCRETE INSERT**

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

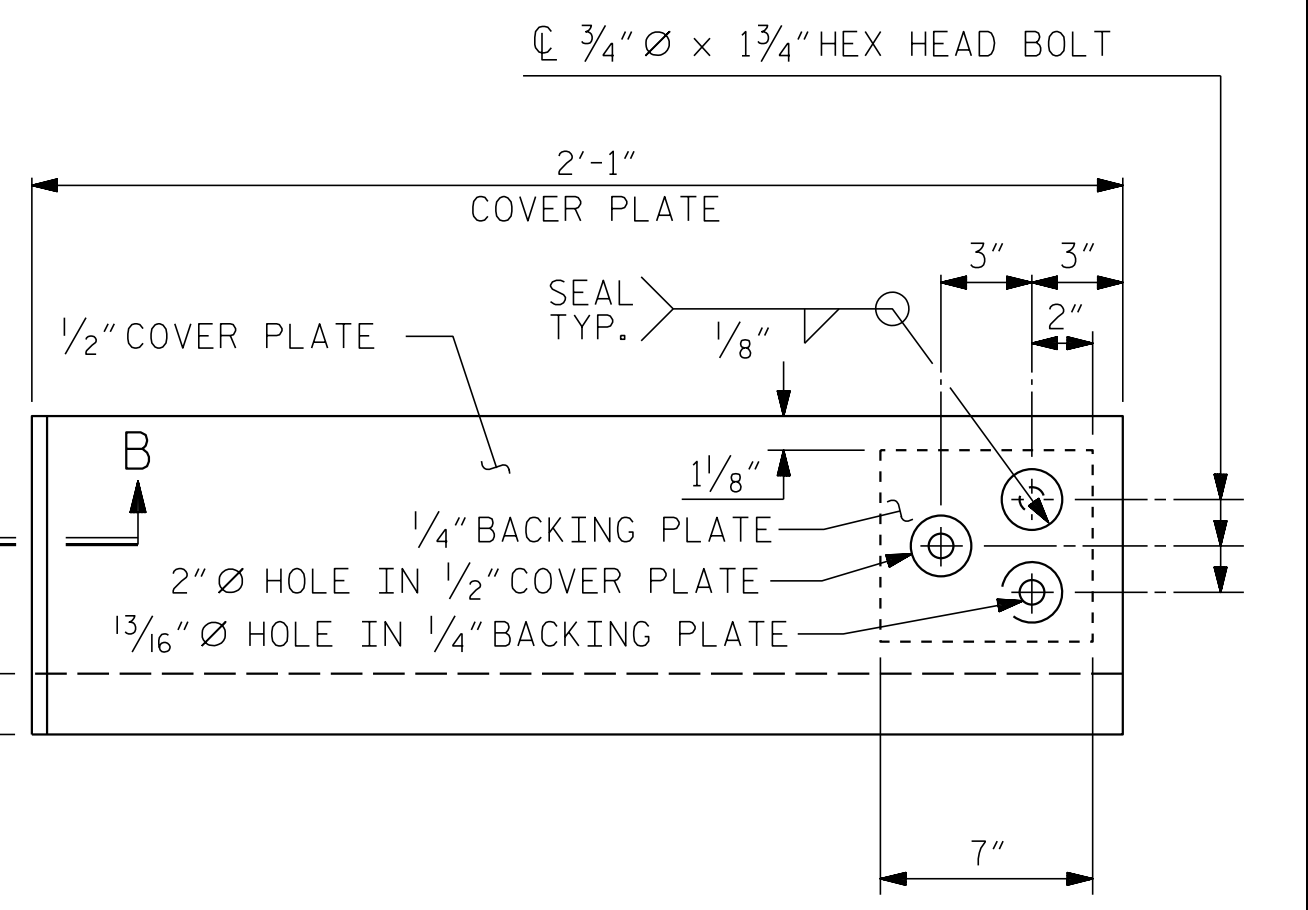
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



**END VIEW**

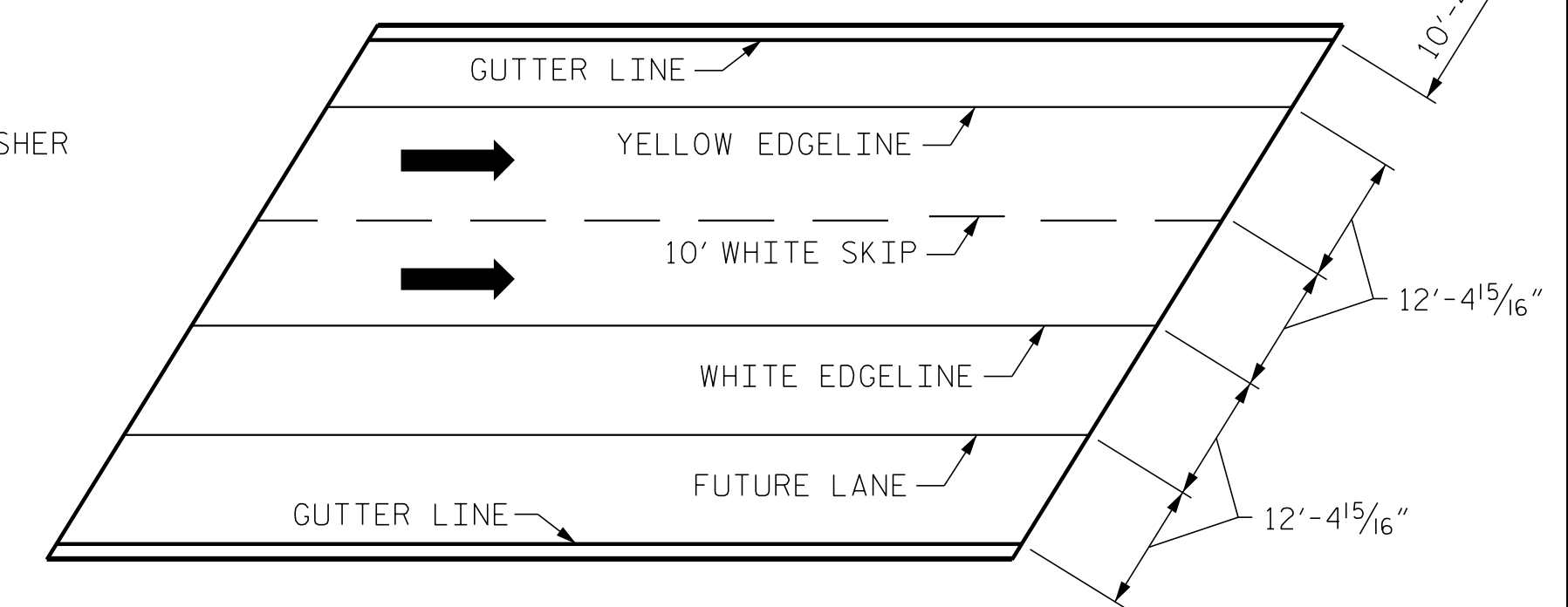


**TYPE I - ELEVATION VIEW**

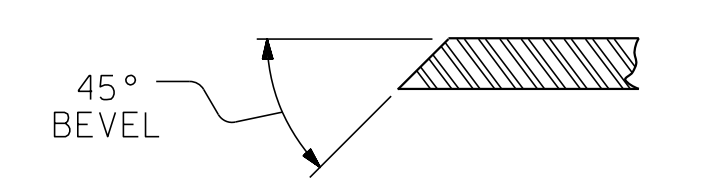


**TYPE II - ELEVATION VIEW**

**COVER PLATE DETAILS**



**PAVEMENT MARKING ALIGNMENT**



**SECTION B - B**

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 2

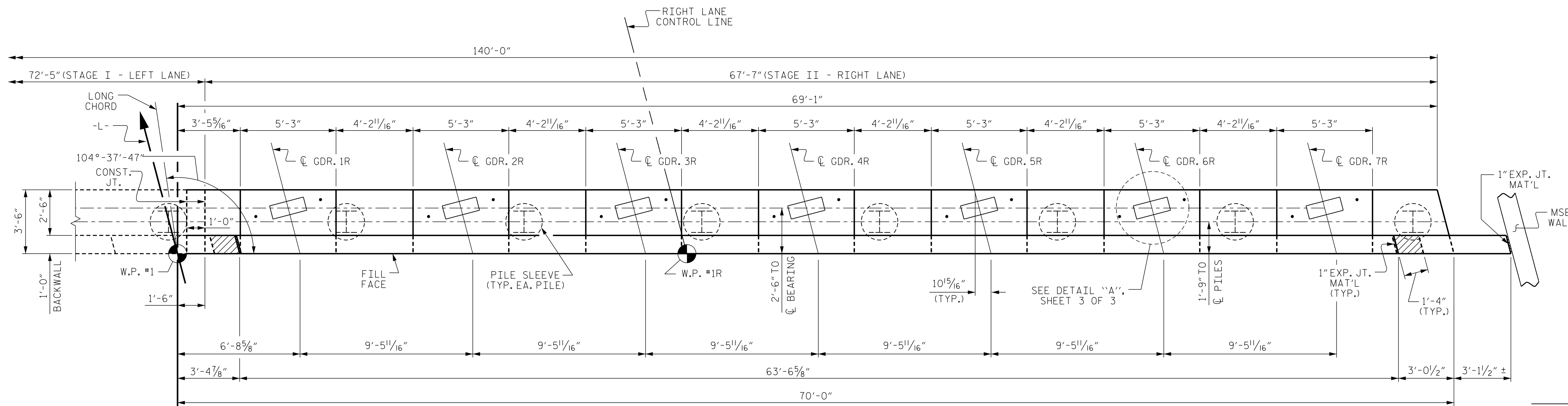
ASSEMBLED BY : D. HODGE	DATE : 7/23
CHECKED BY : J. DILWORTH	DATE : 9/23
DRAWN BY : REK 9/87	REV. 7/12 MAA/GM
CHECKED BY : CRK 10/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

ENGINEER OF RECORD  
 1/19/2024  
  
 Gregory M. Gilliland  
 WETHERILL ENGINEERING

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S2-19					TOTAL SHEETS 58

PA:2023\2312401-HB-0004-Structures\03\HB-0004 (R.IGHT LANE)\HB0004-RIGHT-JS.dgn  
 1/19/2024 7:07:00 AM



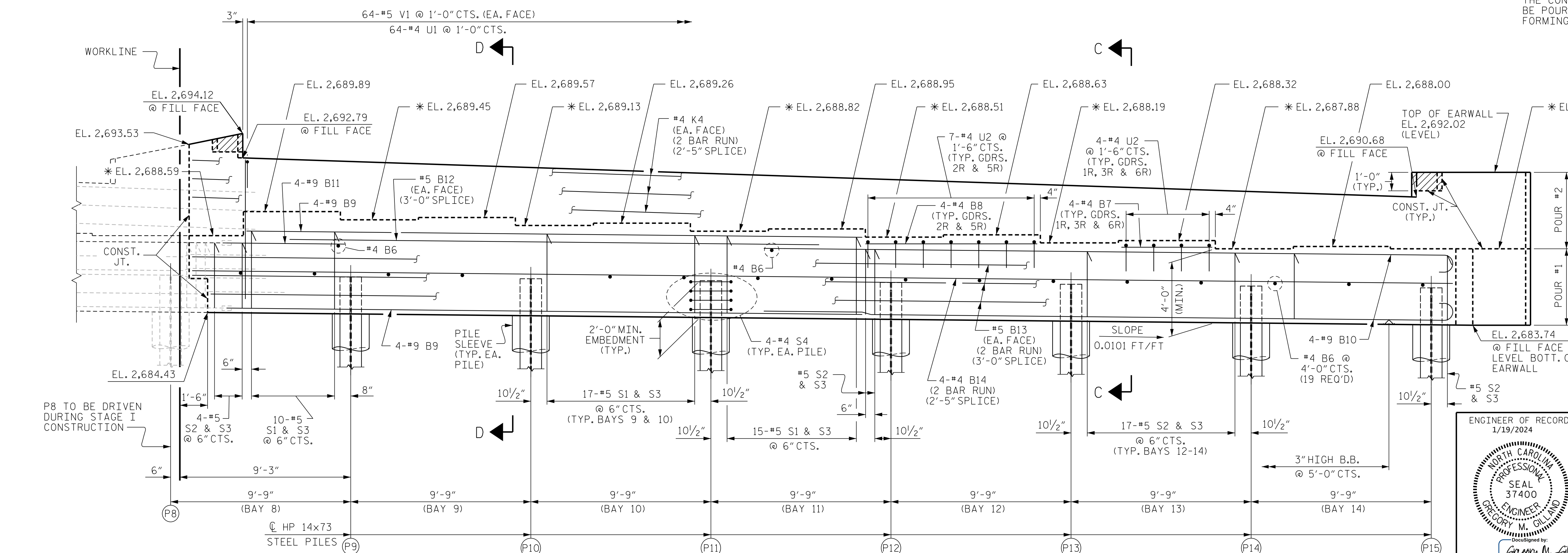


TOP OF PILE ELEVATION	
PILE	ELEVATION
P9	2,686.36
P10	2,686.26
P11	2,686.16
P12	2,686.06
P13	2,685.96
P14	2,685.87
P15	2,685.77

PLAN

NOTES

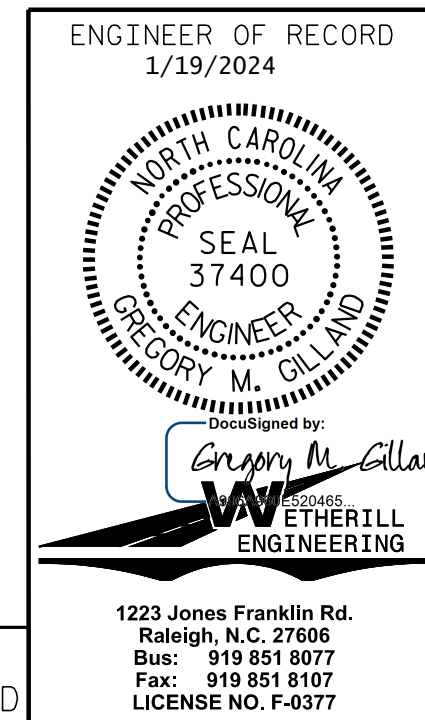
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.



ELEVATION

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
STATION: 254+73.75 -L-  
SHEET 1 OF 3

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION C-C & D-D, SHEET 3 OF 3.



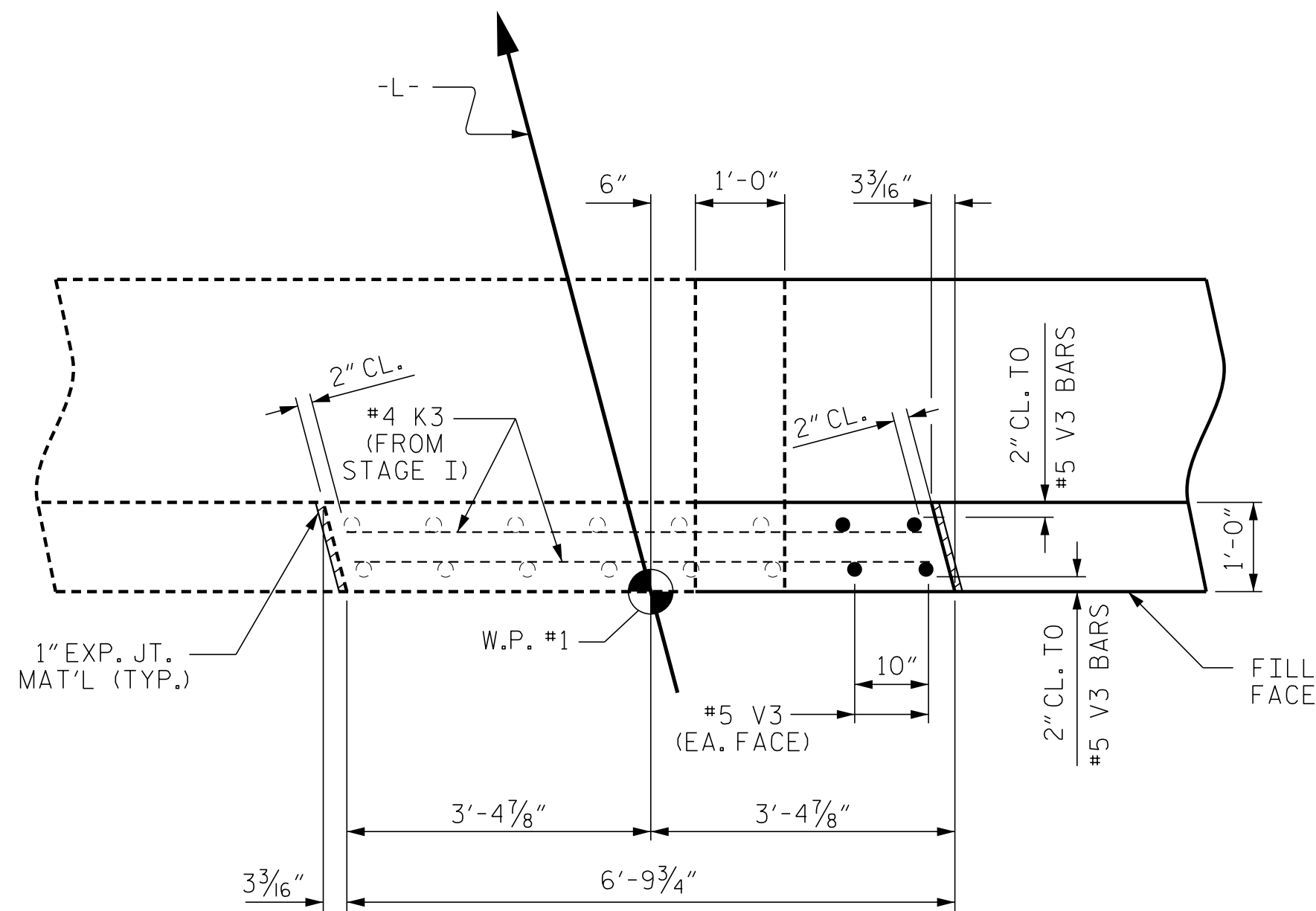
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 1 (RIGHT LANE) (STAGE II)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DRAWN BY: D. HODGE DATE: 7/23  
CHECKED BY: G. GILLAND DATE: 9/23

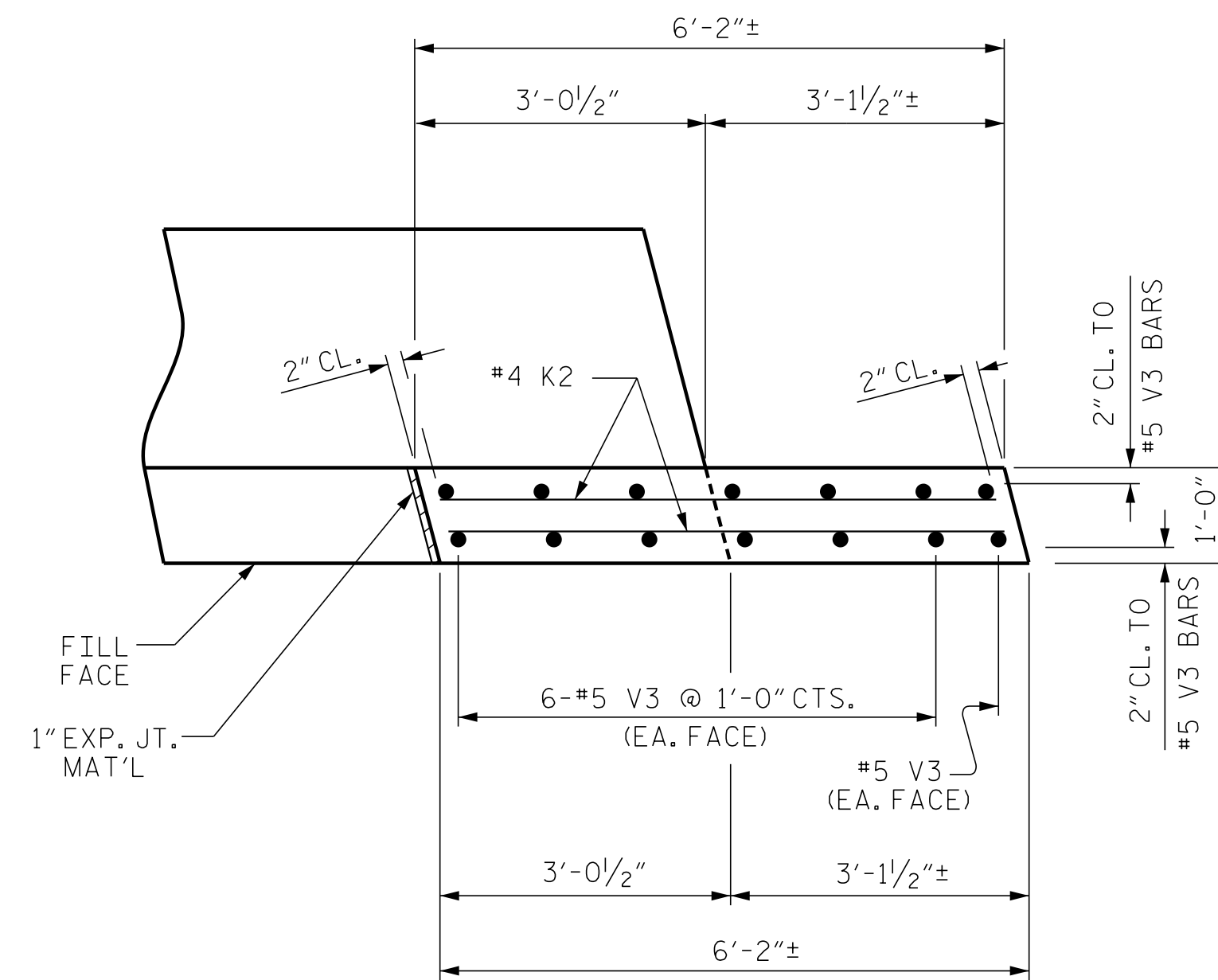
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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LICENSE NO. F-0377

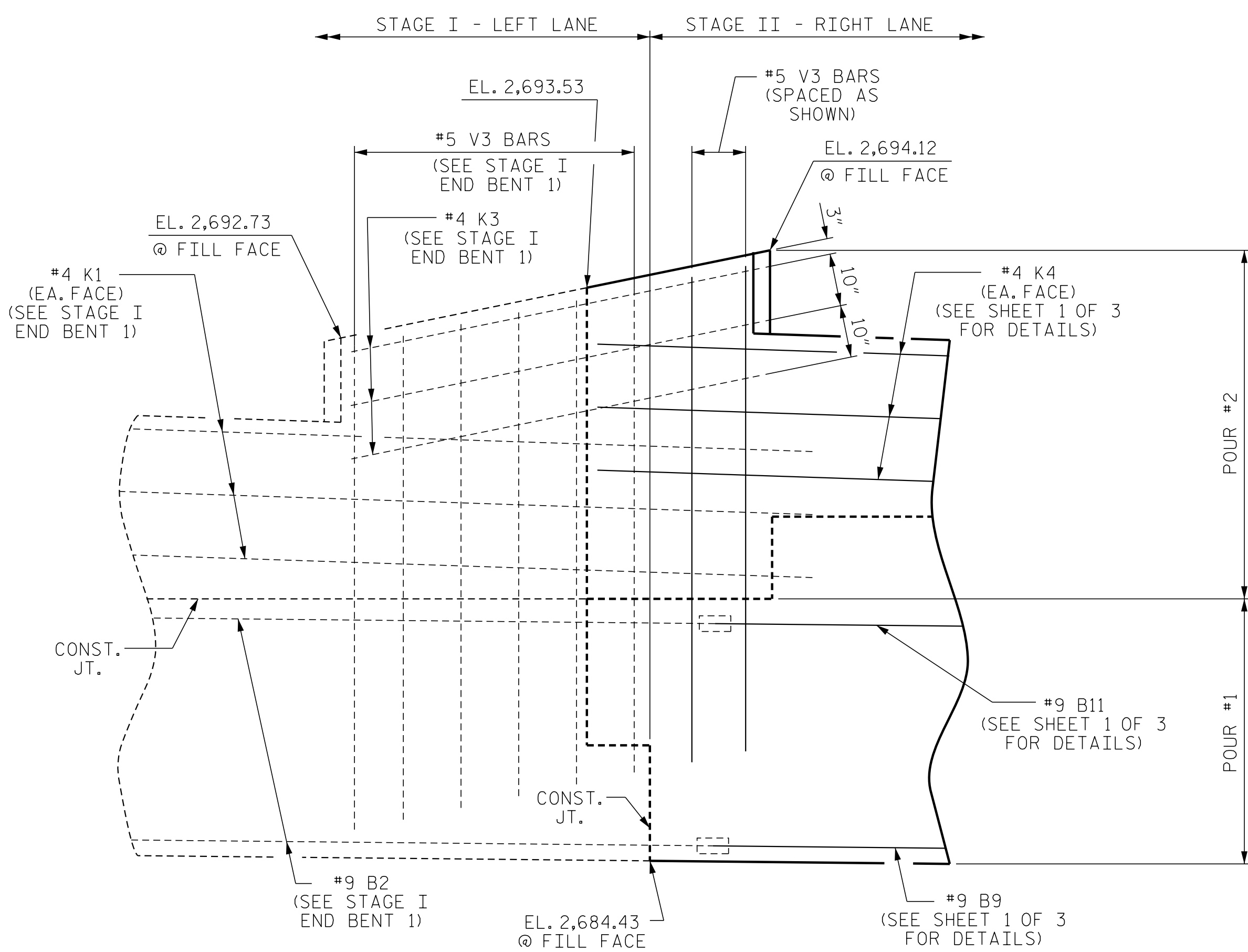
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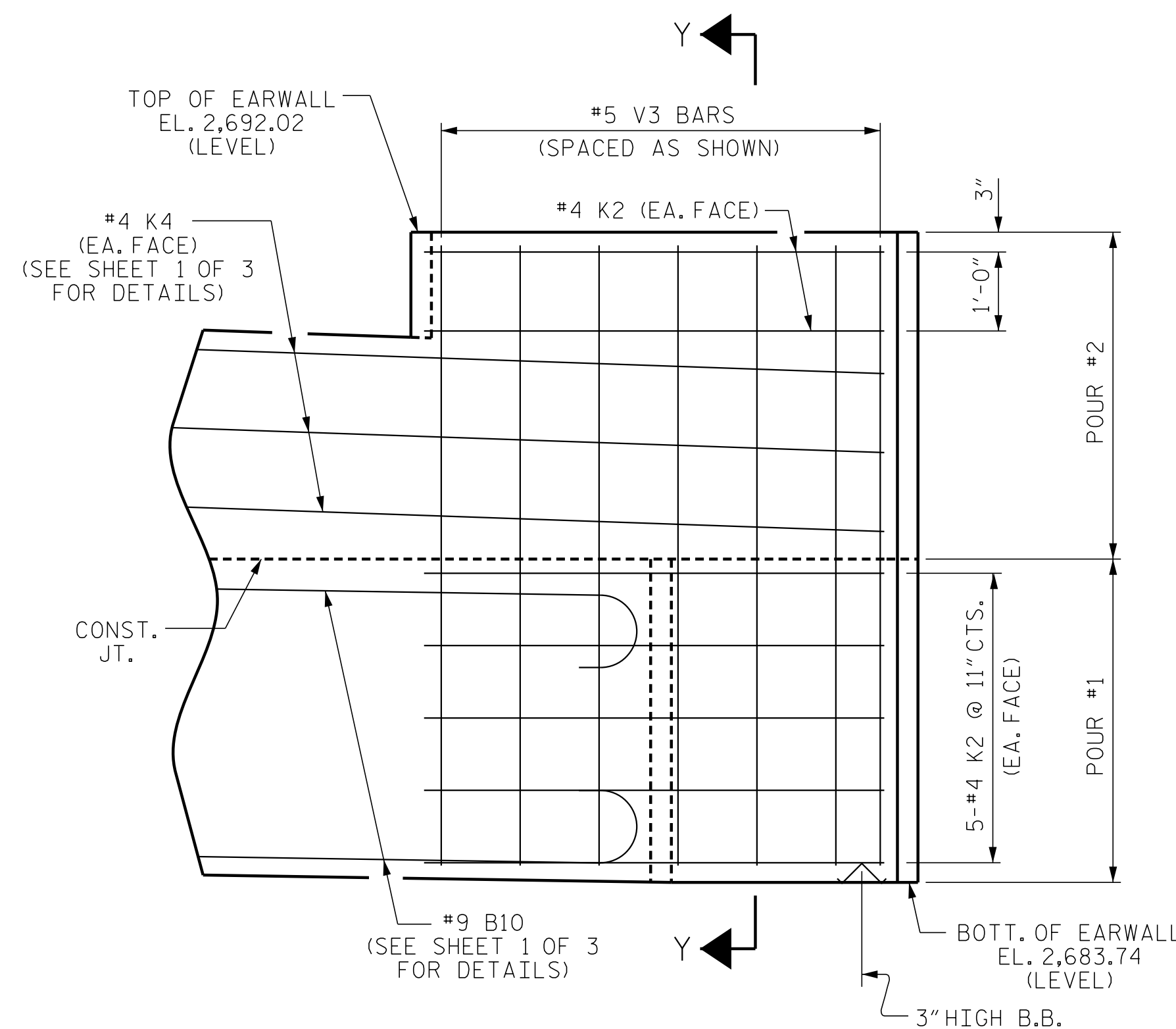
PLAN OF CENTER RAISED BACKWALL



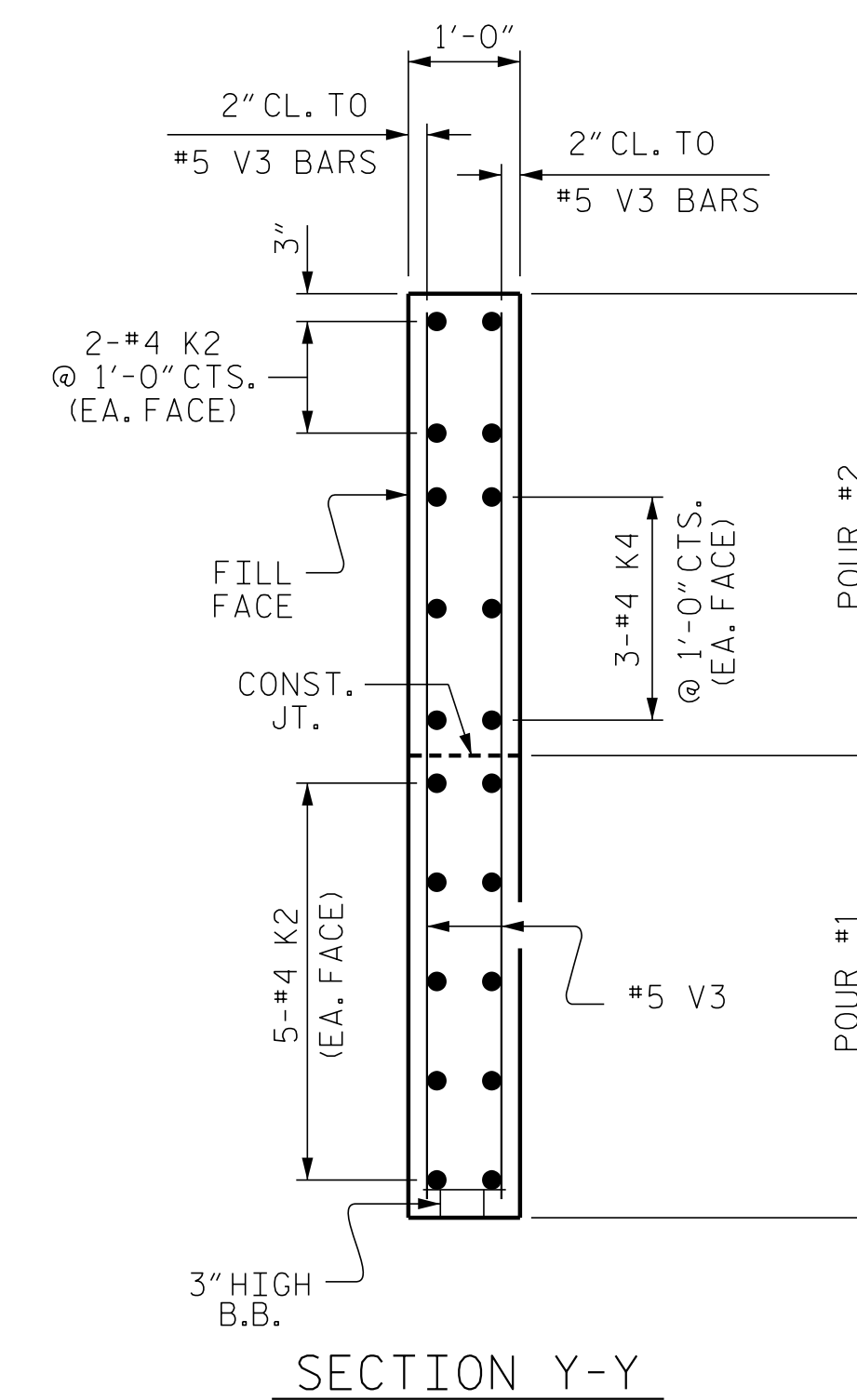
PLAN OF RIGHT EARWALL



ELEVATION OF CENTER RAISED BACKWALL



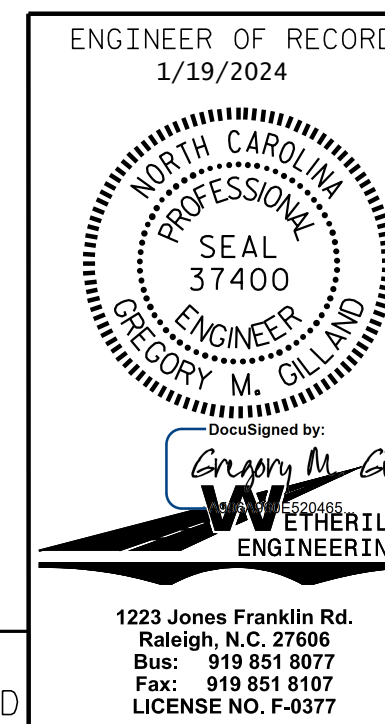
ELEVATION OF RIGHT EARWALL



SECTION Y-Y

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1  
 (RIGHT LANE)  
 (STAGE II)

REVISIONS

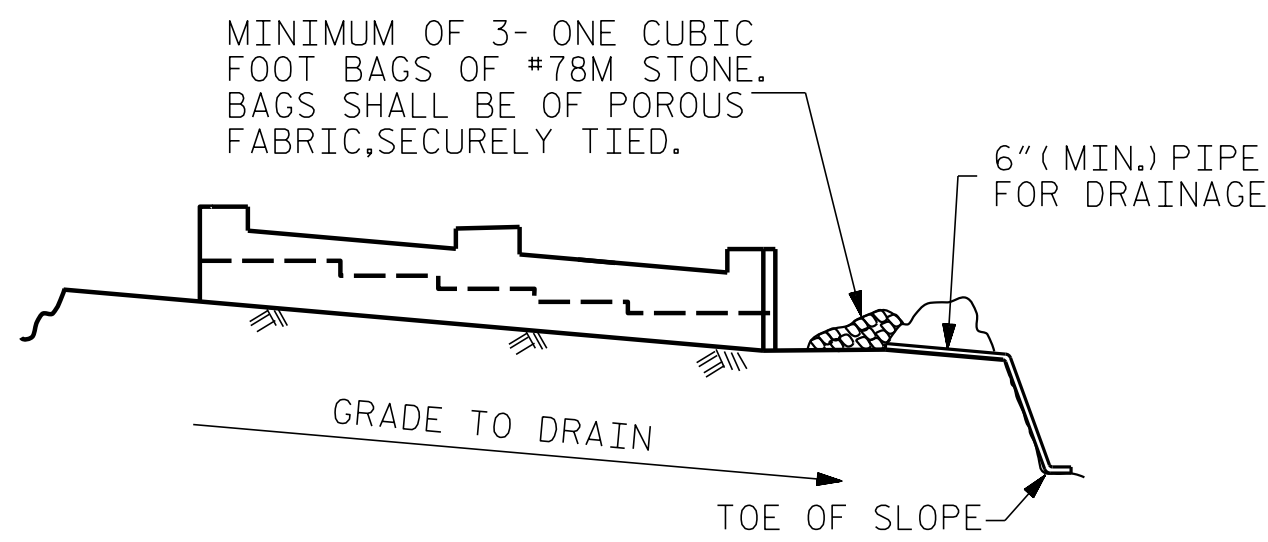
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

SHEET NO.  
 S2-22  
 TOTAL SHEETS  
 58

DRAWN BY: D. HODGE DATE: 7/23  
 CHECKED BY: G. GILLAND DATE: 9/23

DOCUMENT NOT CONSIDERED FINAL  
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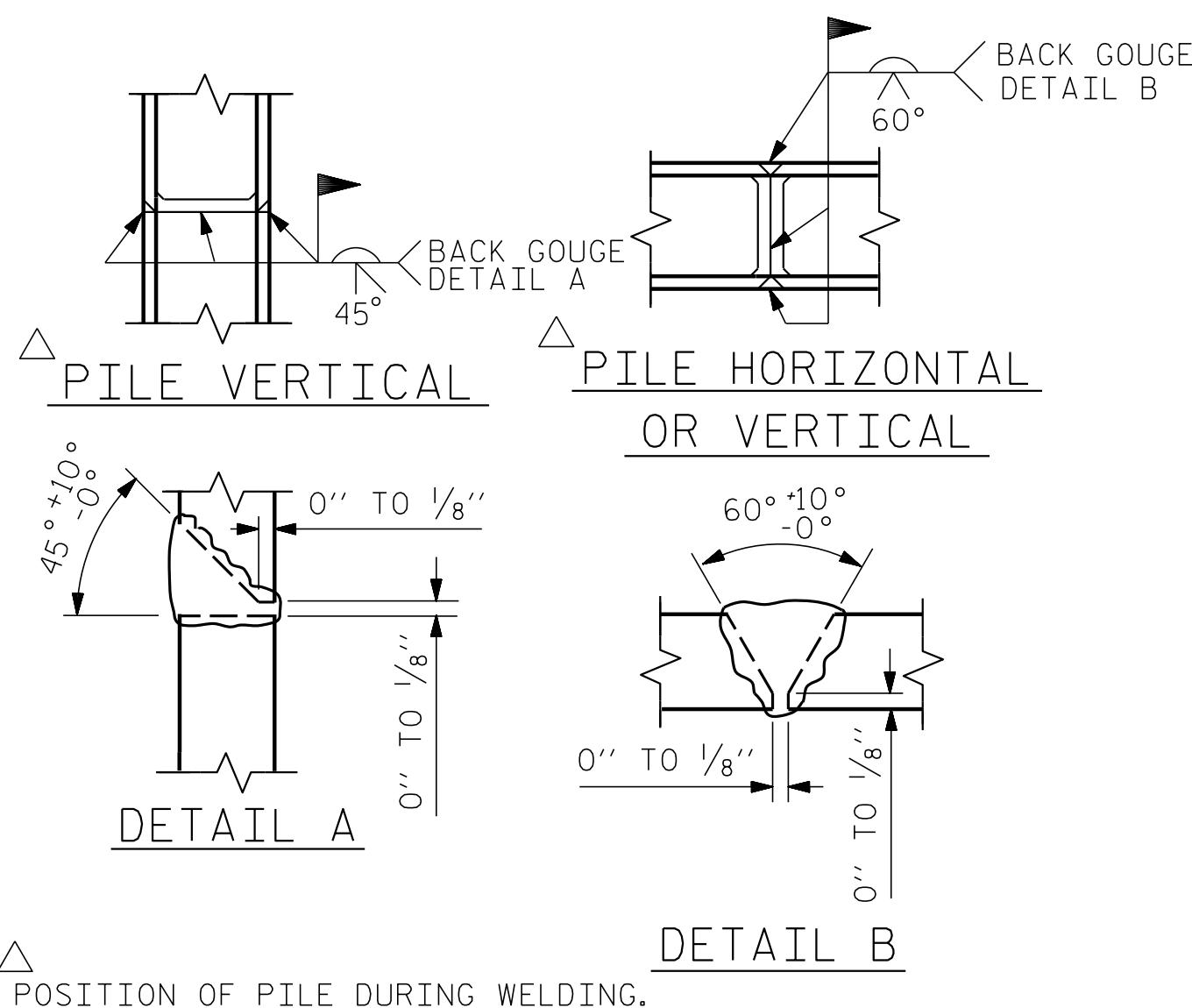


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

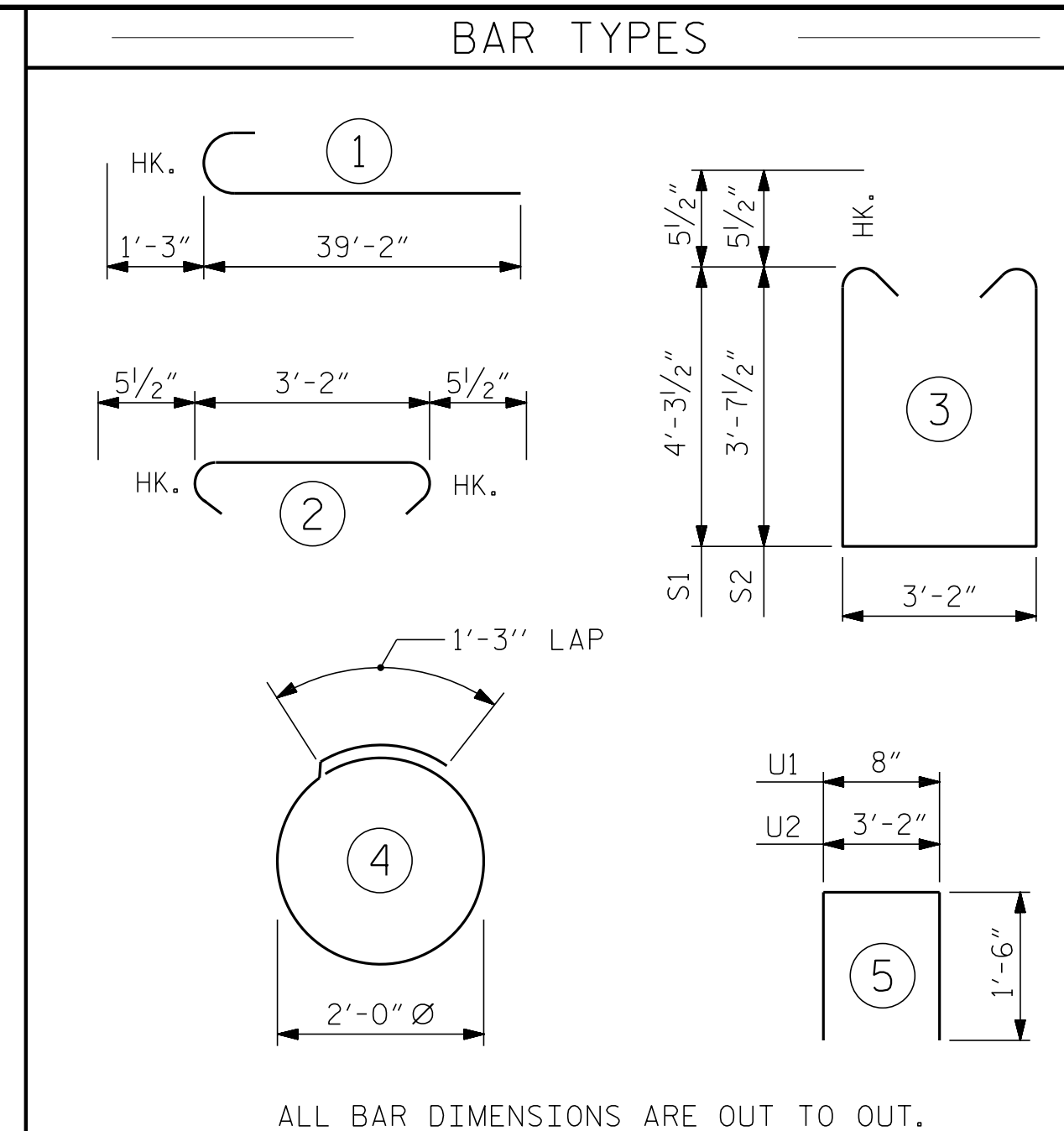
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

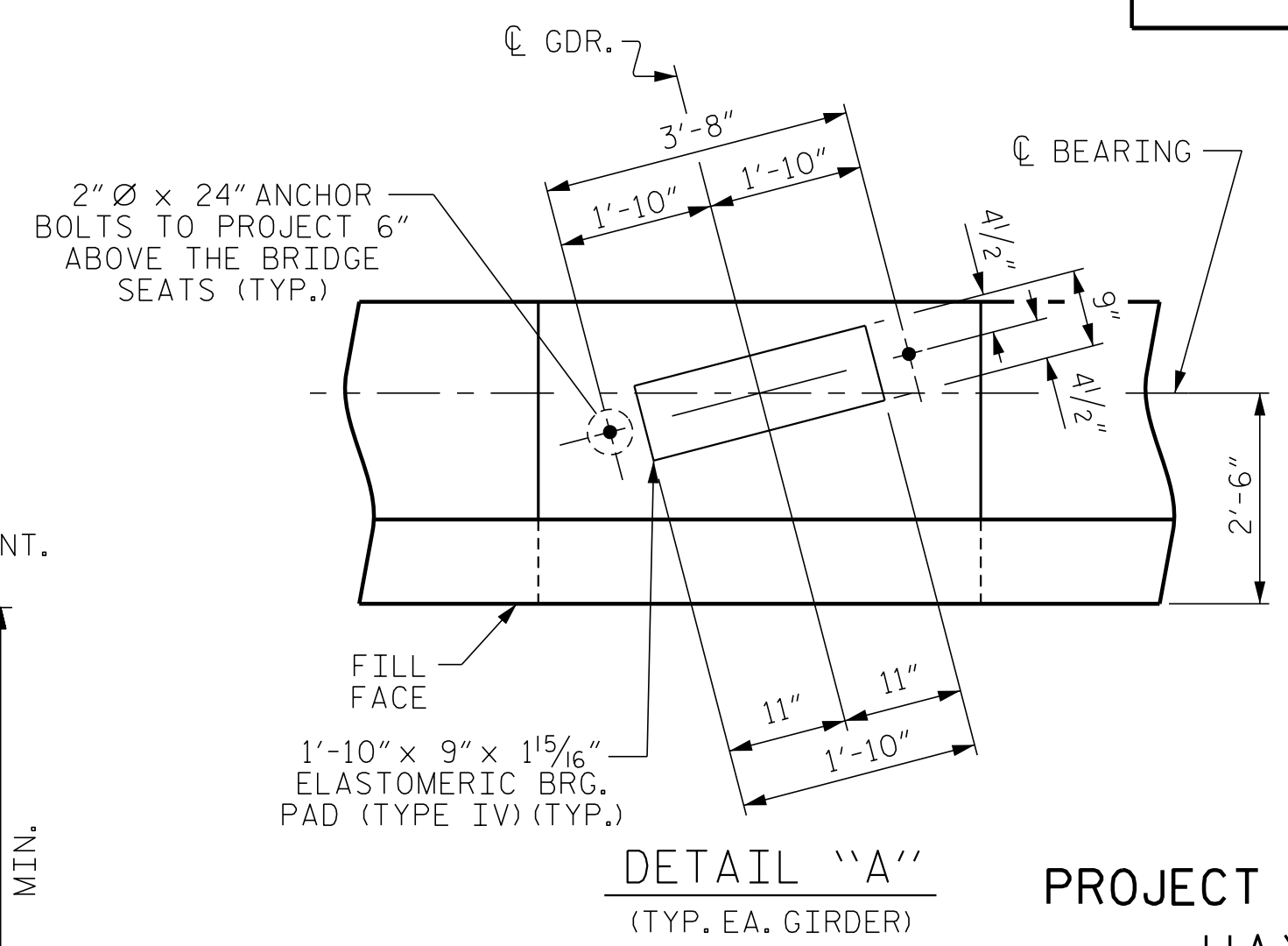
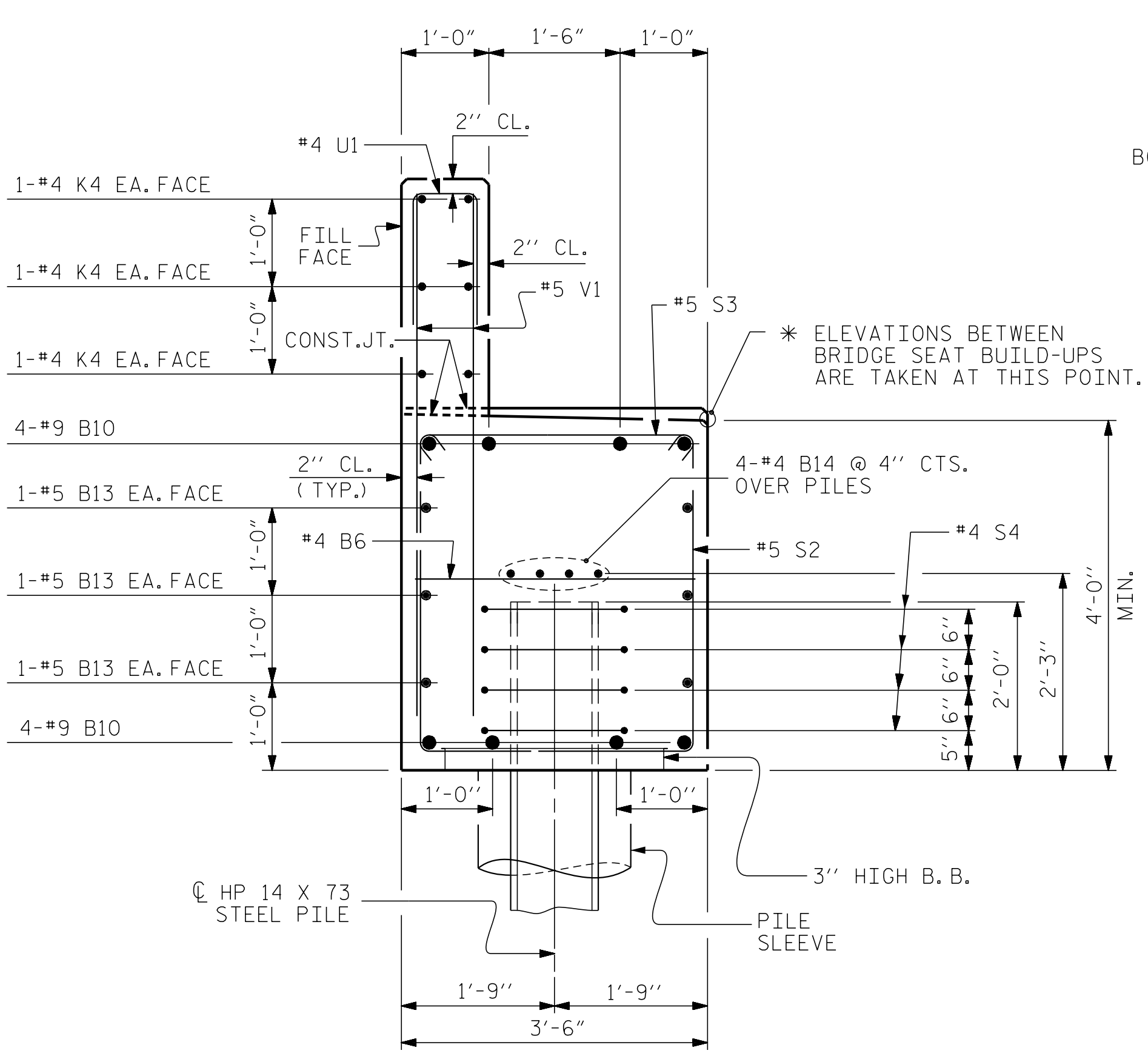
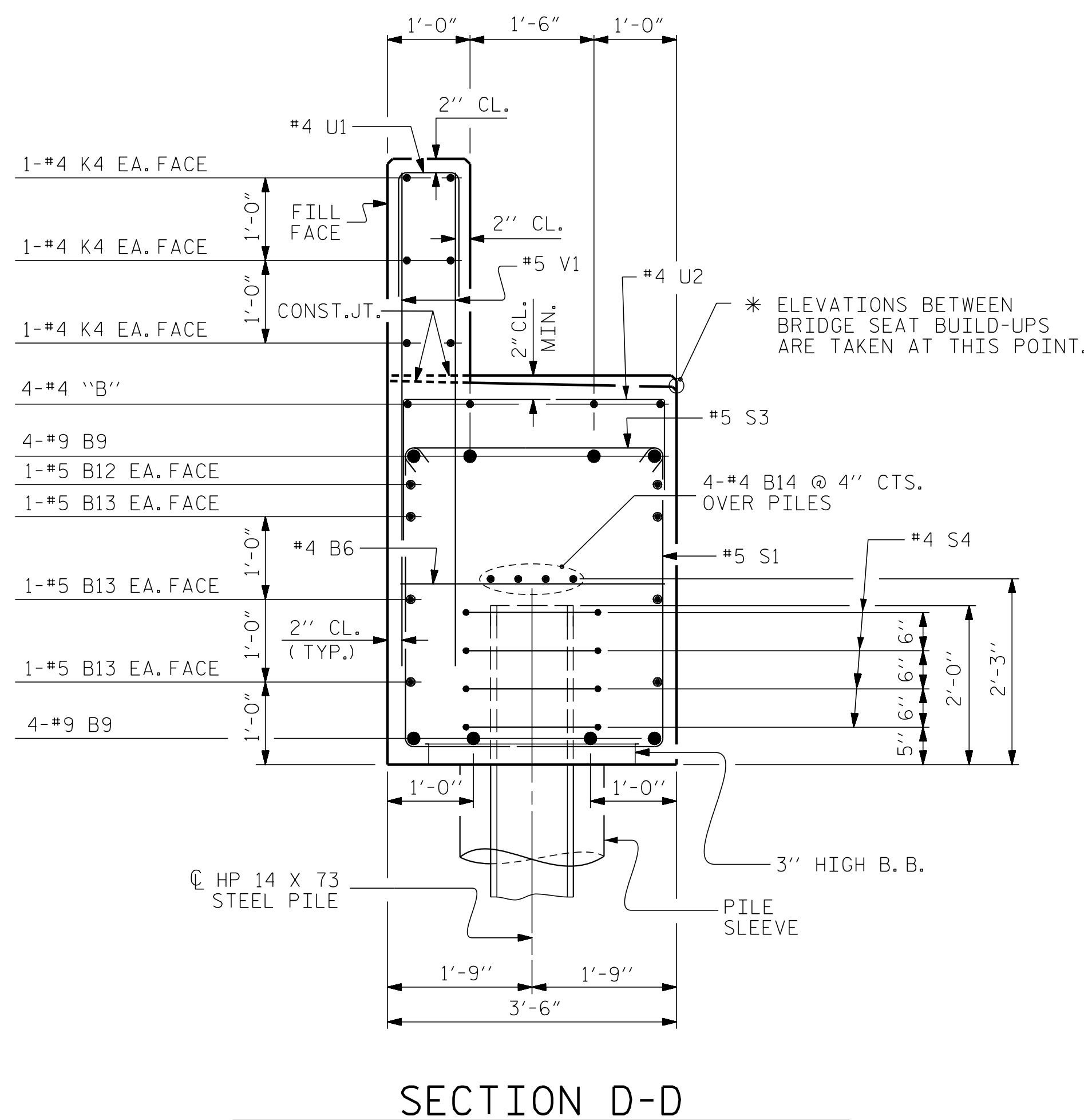


### PILE SPLICE DETAILS



BILL OF MATERIAL					
END BENT No. 1					
STAGE II					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B6	19	#4	STR	3'-2"	40
B7	12	#4	STR	4'-11"	39
B8	8	#4	STR	9'-4"	50
B9	8	#9	STR	33'-4"	907
B10	8	#9	1	40'-5"	1,099
B11	4	#9	STR	7'-6"	102
B12	2	#5	STR	26'-6"	55
B13	12	#5	STR	36'-1"	452
B14	8	#4	STR	35'-9"	191
K2	14	#4	STR	5'-9"	54
K4	12	#4	STR	37'-4"	299
S1	59	#5	3	12'-8"	779
S2	58	#5	3	11'-4"	686
S3	117	#5	2	4'-1"	498
S4	28	#4	4	7'-7"	142
U1	64	#4	5	3'-8"	157
U2	26	#4	5	6'-2"	107
V1	128	#5	STR	6'-6"	868
V3	18	#5	STR	7'-11"	149

REINFORCING STEEL		6,674 LBS.
CLASS A CONCRETE BREAKDOWN		
POUR #3 CAP AND LOWER PORTION OF EARWALL		42.2 C.Y.
POUR #4 UPPER PORTION OF EARWALL AND BACKWALL		8.4 C.Y.
TOTAL CLASS A CONCRETE		50.6 C.Y.



PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 3 OF 3

ENGINEER OF RECORD  
 1/19/2024

Gregory M. Gilliland  
 WITHERILL ENGINEERING

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

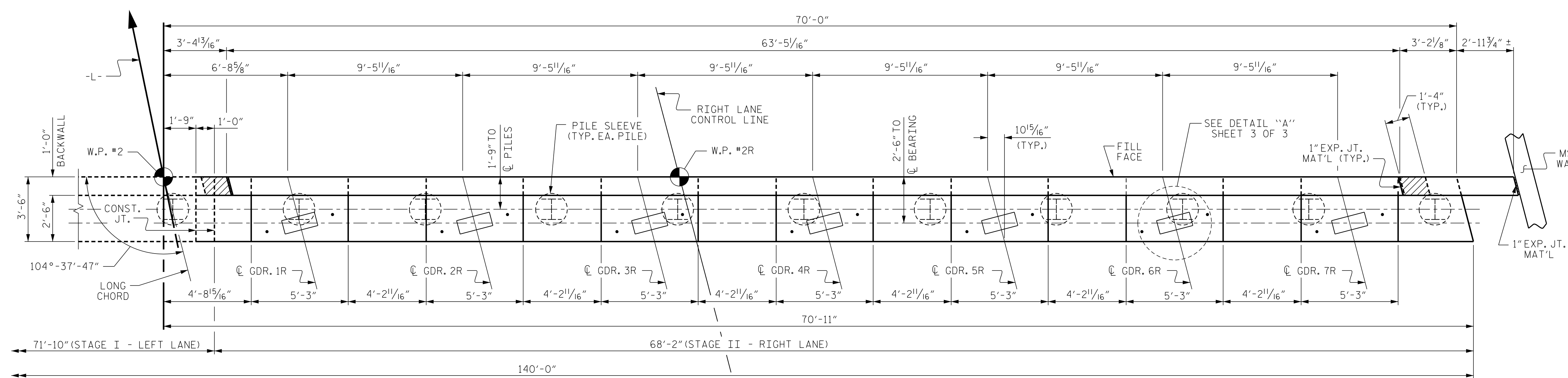
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 1 (RIGHT LANE) (STAGE II)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S2-23				
TOTAL SHEETS 58				

DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: G. GILLAND DATE: 9/23

DOCUMENT NOT CONSIDERED FINAL  
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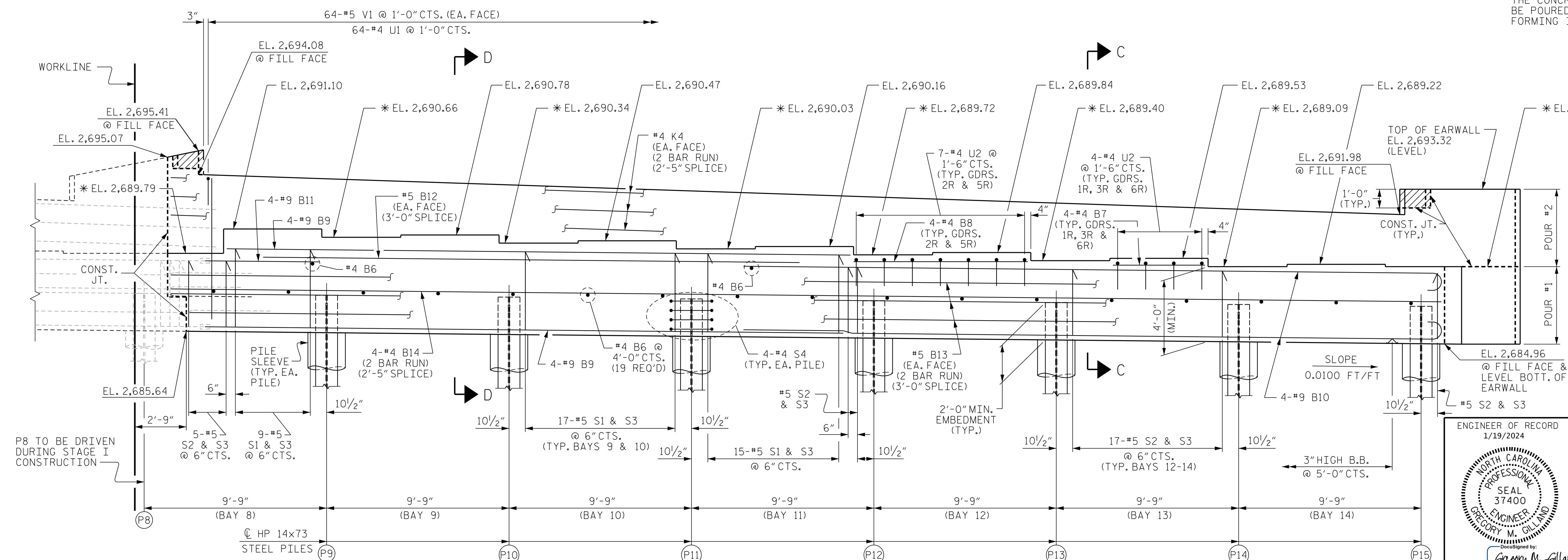


TOP OF PILE ELEVATION	
PILE	ELEVATION
P9	2,687.57
P10	2,687.47
P11	2,687.37
P12	2,687.28
P13	2,687.18
P14	2,687.08
P15	2,686.98

**PLAN**

**NOTES**

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- 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 THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.



**ELEVATION**

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 1 OF 3

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A & B-B, SHEET 3 OF 3.

ENGINEER OF RECORD  
 1/19/2024  
  
 GREGORY M. GILLILAND  
 GREGORY M. GILLILAND  
 ENGINEERING

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 2  
 (RIGHT LANE)  
 (STAGE II)

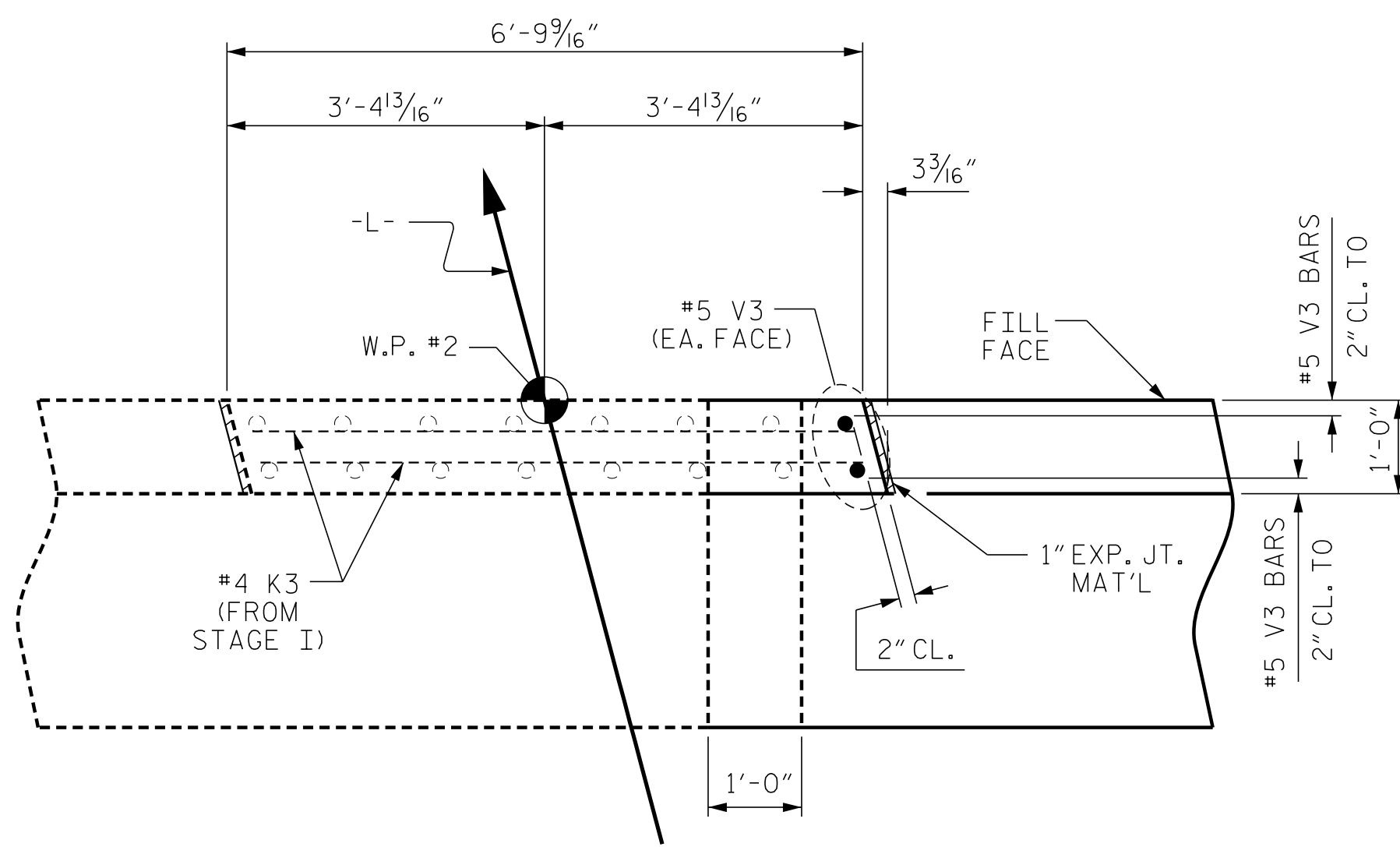
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SHEET NO.  
 S2-24  
 TOTAL SHEETS  
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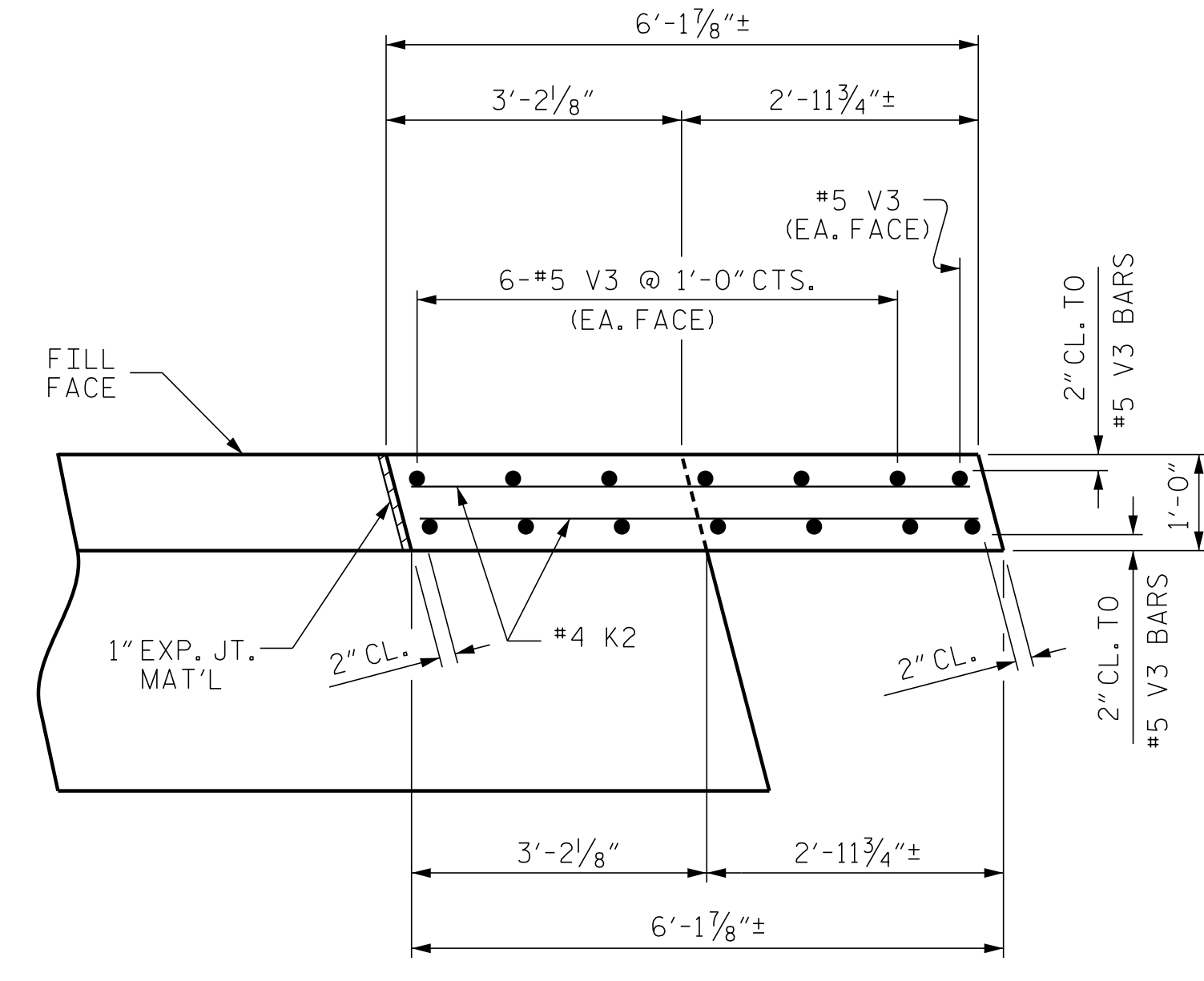
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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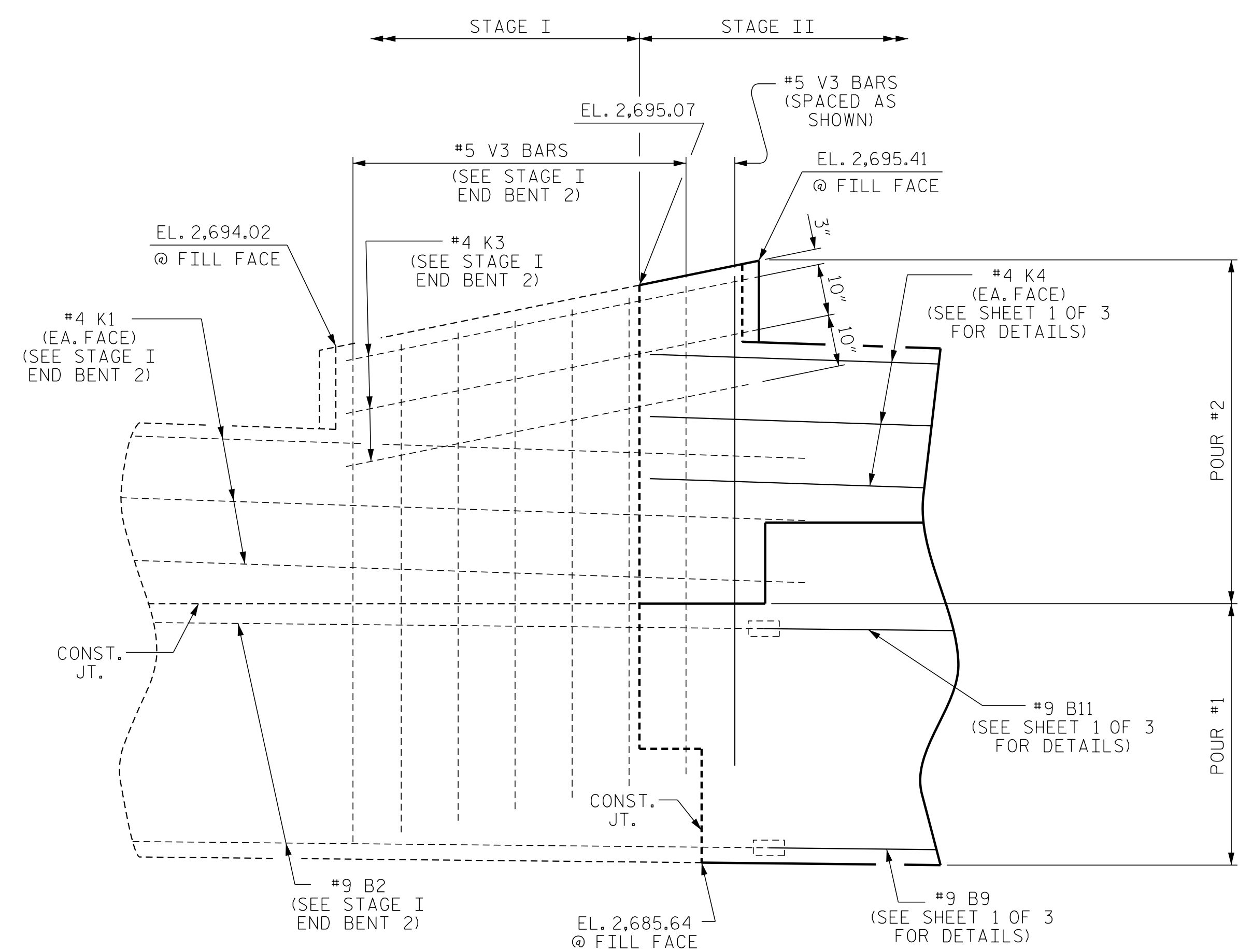
DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: G. GILLILAND DATE: 9/23



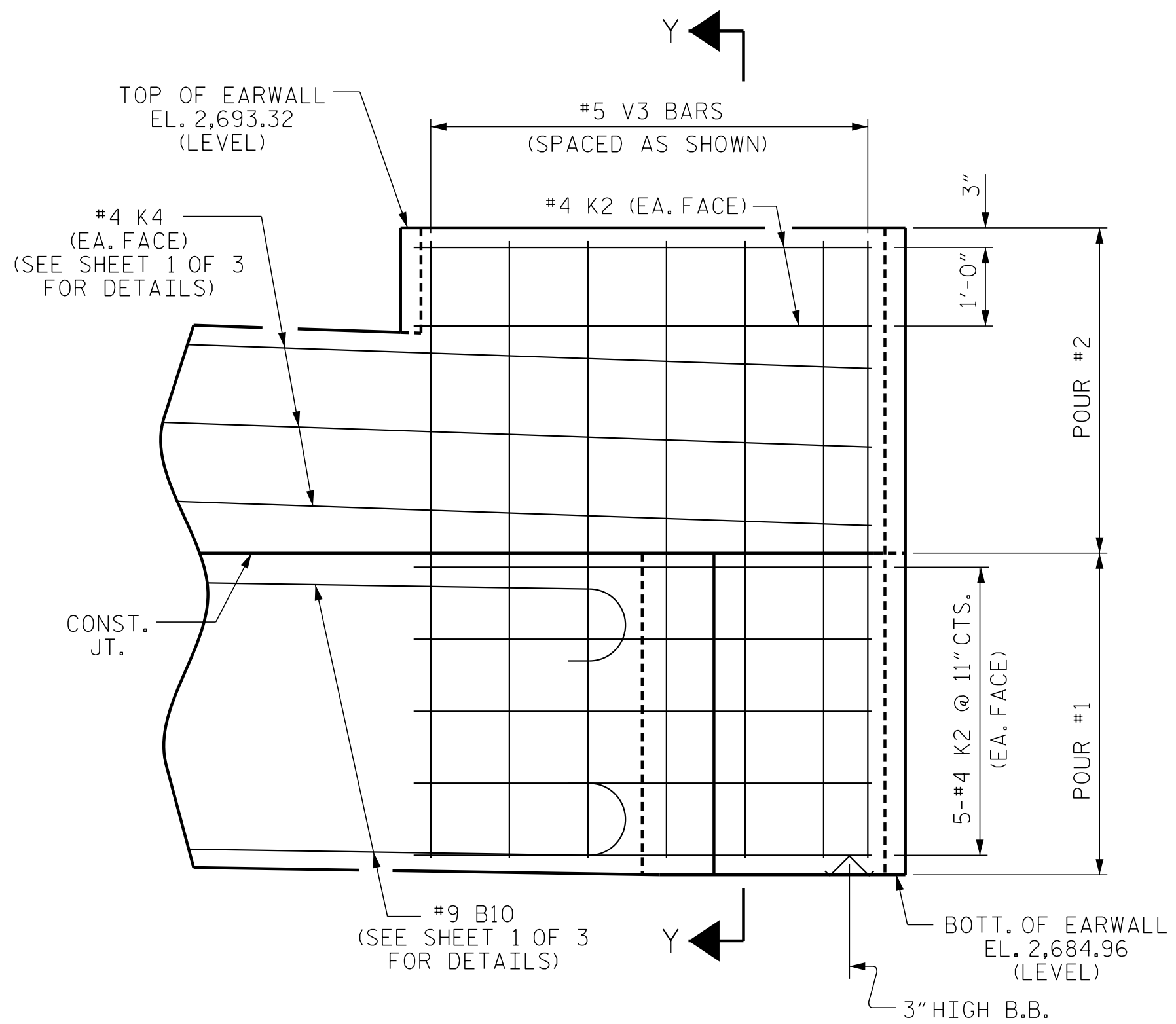
PLAN OF CENTER RAISED BACKWALL



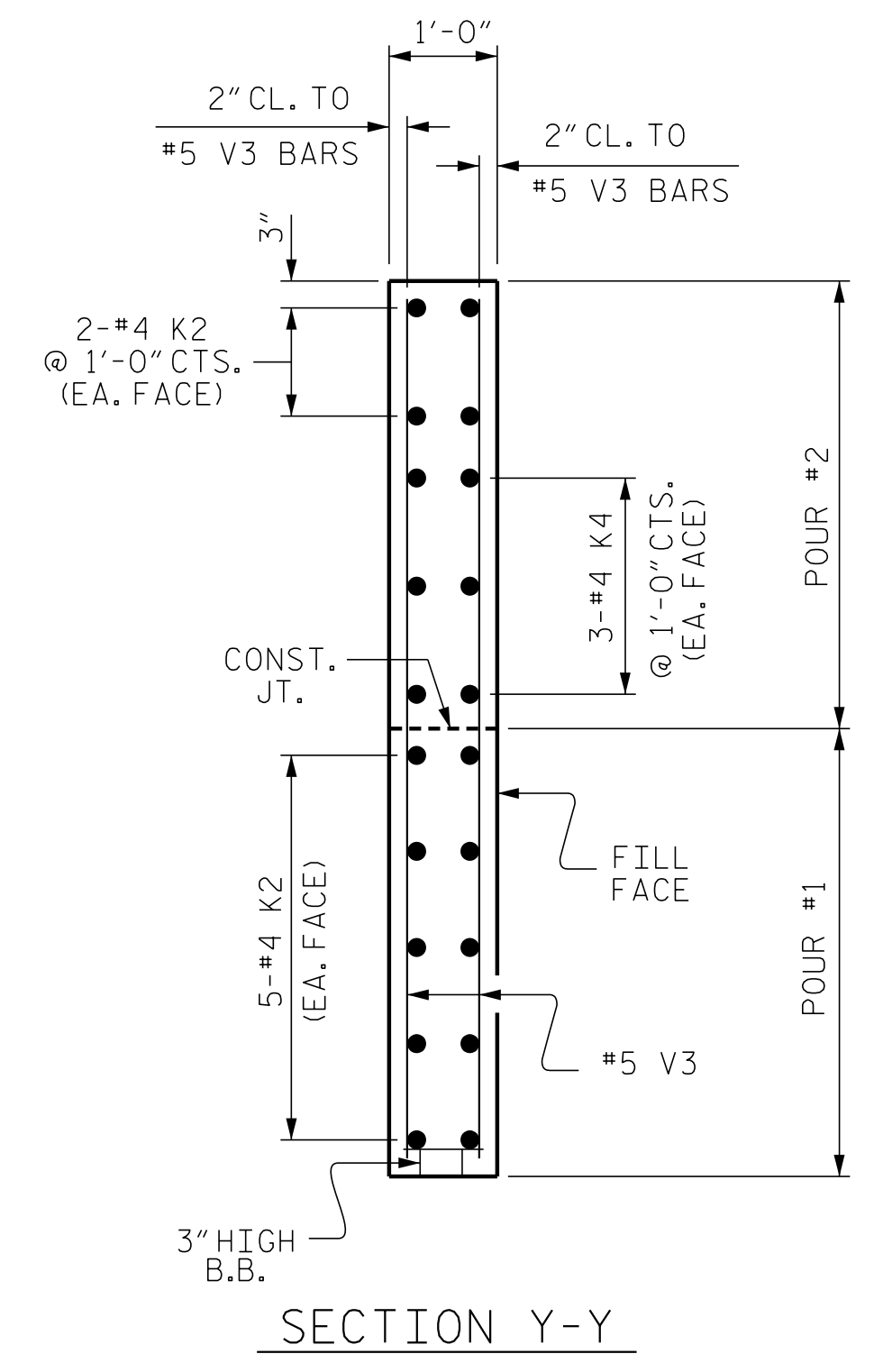
PLAN OF RIGHT EARWALL



ELEVATION OF CENTER RAISED BACKWALL

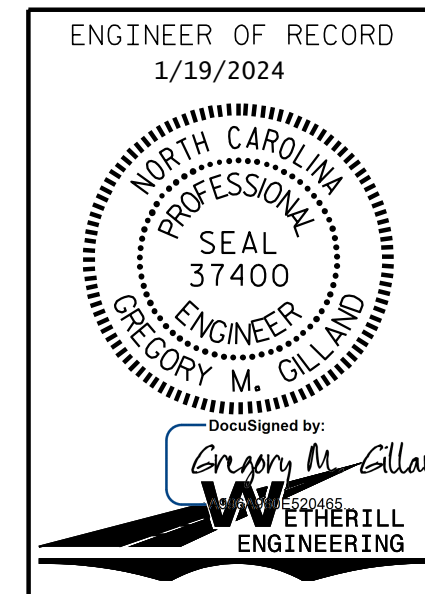


ELEVATION OF RIGHT EARWALL



SECTION Y-Y

PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 2  
 (RIGHT LANE)  
 (STAGE II)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-25
1			3			TOTAL SHEETS 58
2			4			

DRAWN BY: D. HODGE DATE: 7/23  
 CHECKED BY: G. GILLAND DATE: 9/23

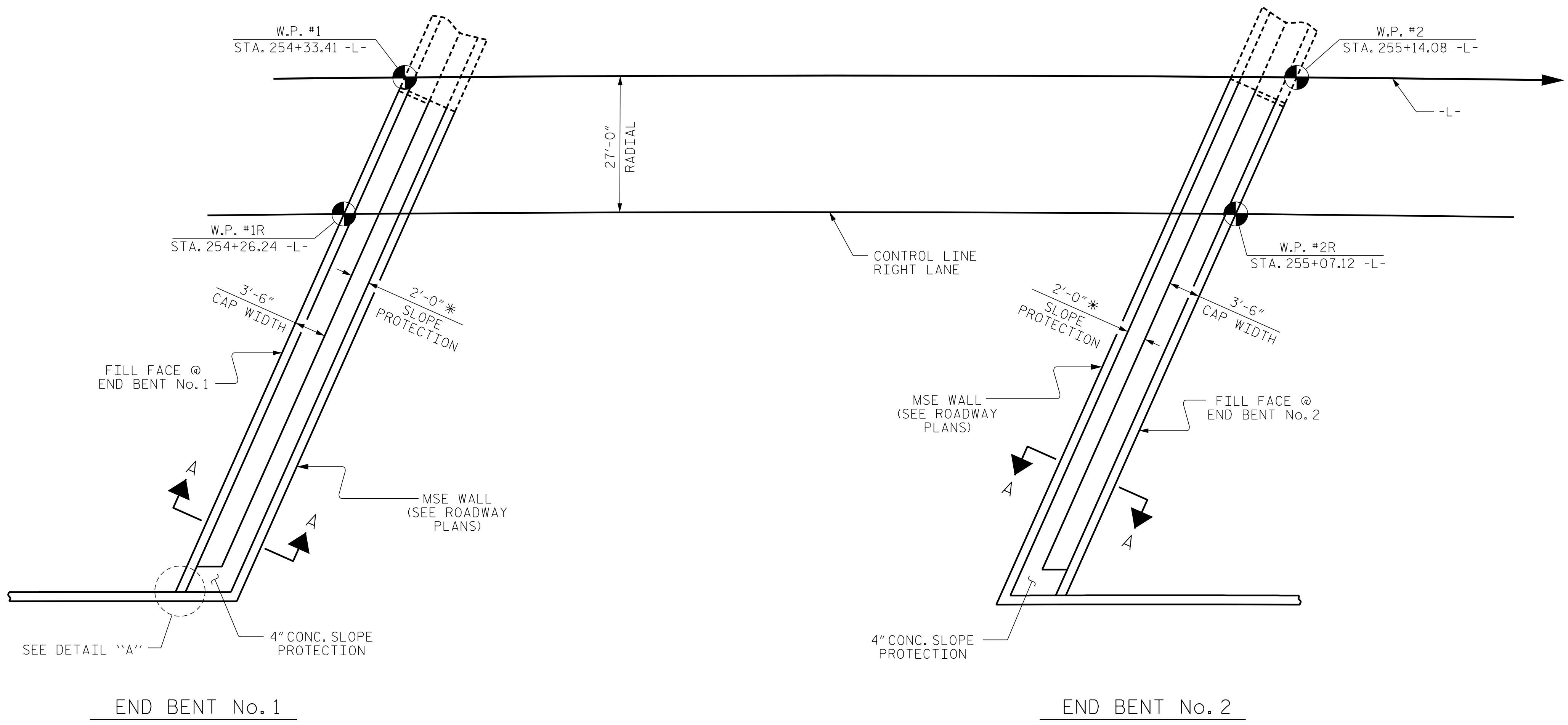
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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 Raleigh, N.C. 27606  
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 Fax: 919 851 8107  
 LICENSE NO. F-0377

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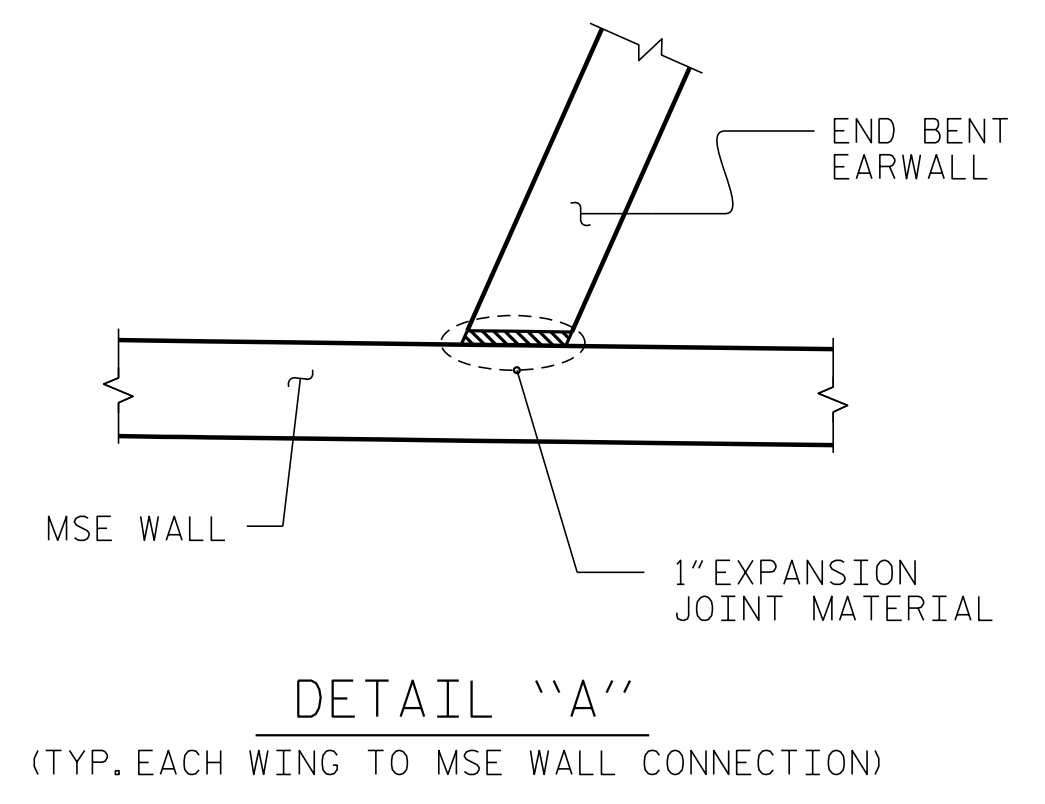
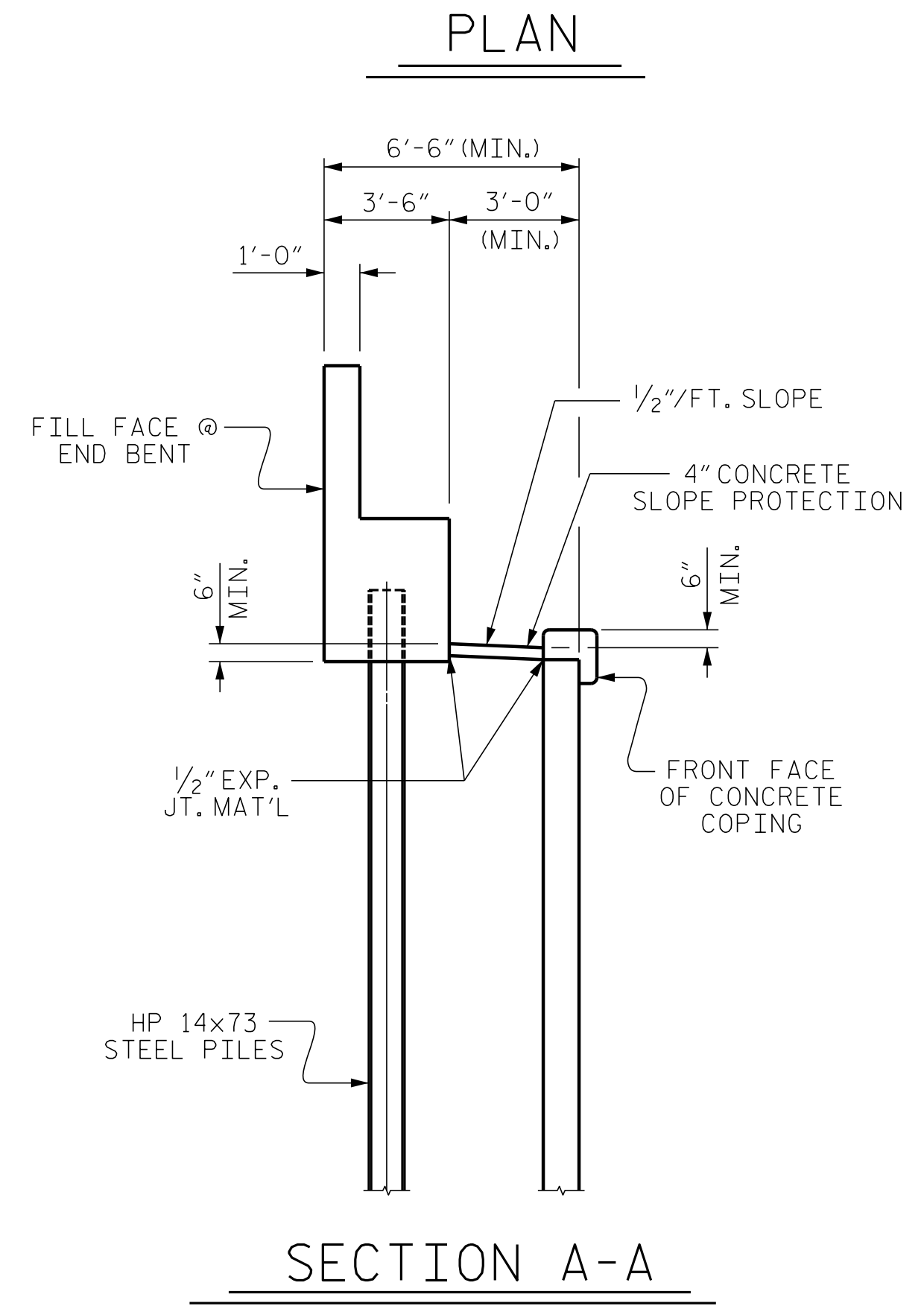
**NOTES**

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

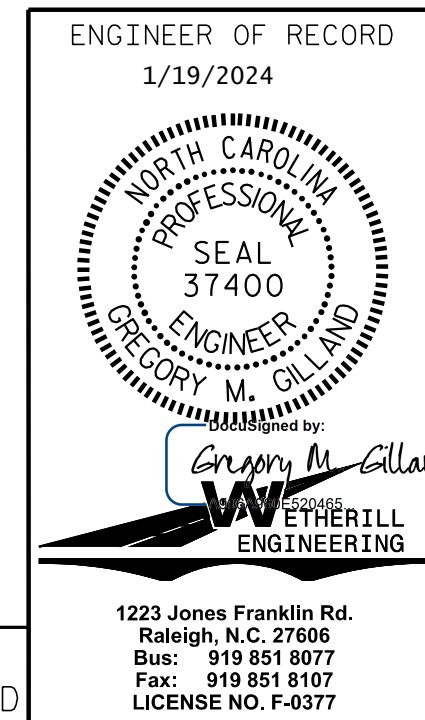
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FINISHED TO THE SATISFACTION OF THE ENGINEER. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 20" WIDE AND PLACED IN THE MIDDLE OF THE 4" CONCRETE SLOPE PROTECTION. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 254+73.75 -L- (RIGHT LANE)	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	19	77.6
END BENT 2	19	76.5
TOTAL	38	154.1

\* QUANTITIES BASED ON DIMENSION SHOWN. FIELD ADJUST AS REQUIRED BASED ON WALL PANEL AND COPING USED.



PROJECT NO. HB-0004  
HAYWOOD COUNTY  
 STATION: 254+73.75 -L-



ENGINEER OF RECORD  
1/19/2024

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SLOPE PROTECTION DETAILS (RIGHT LANE)**

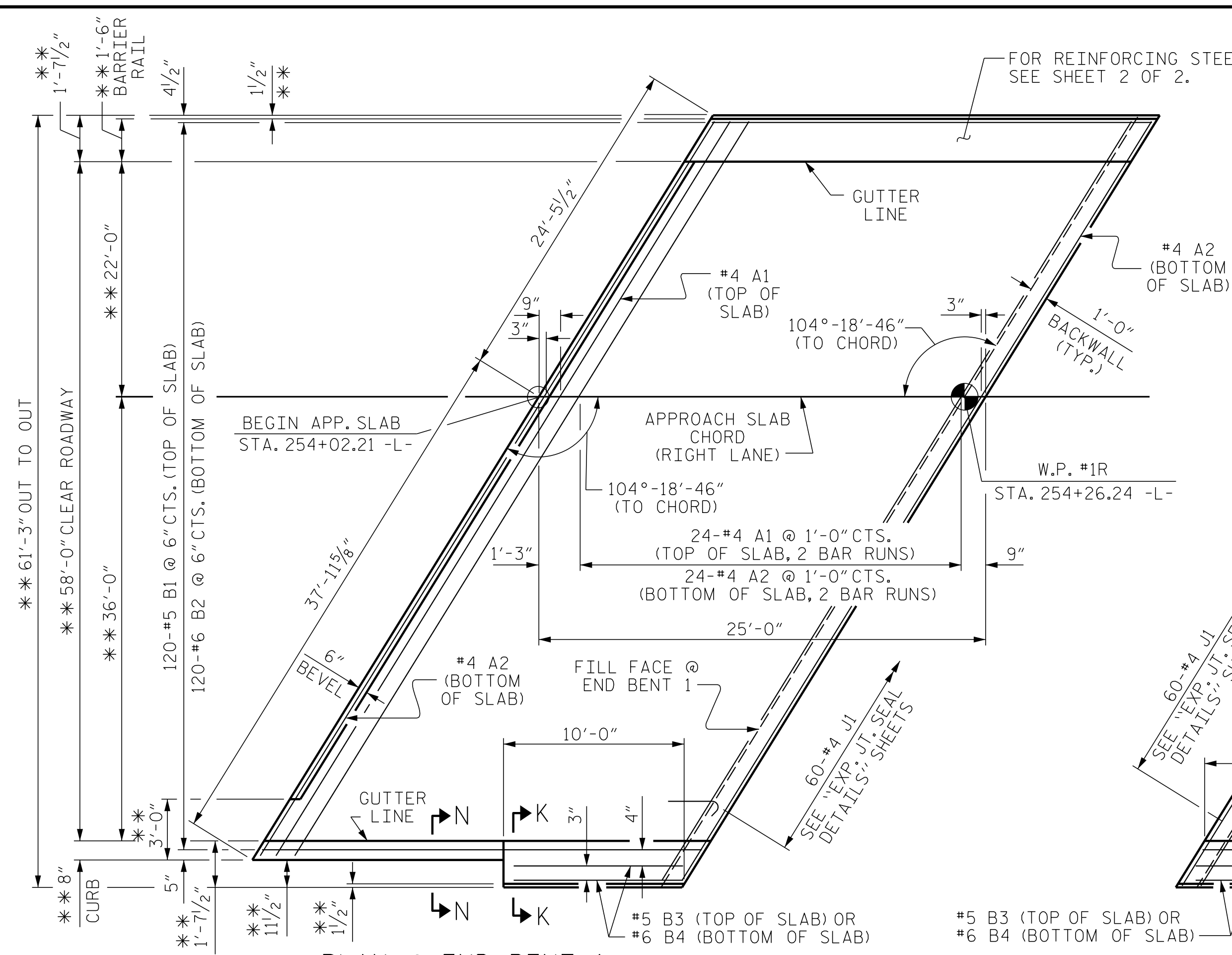
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			58

DRAWN BY: D. HODGE DATE: 8/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

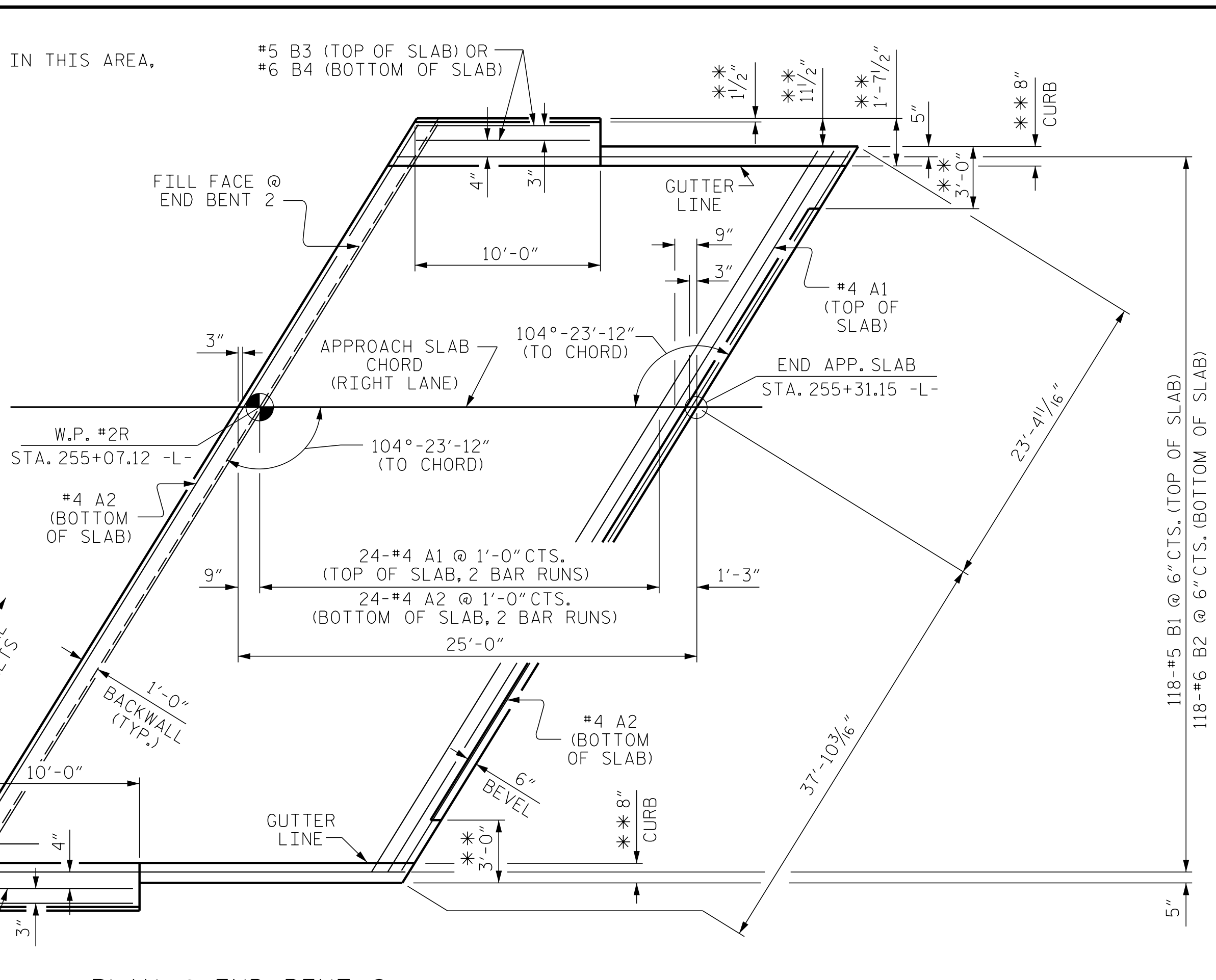
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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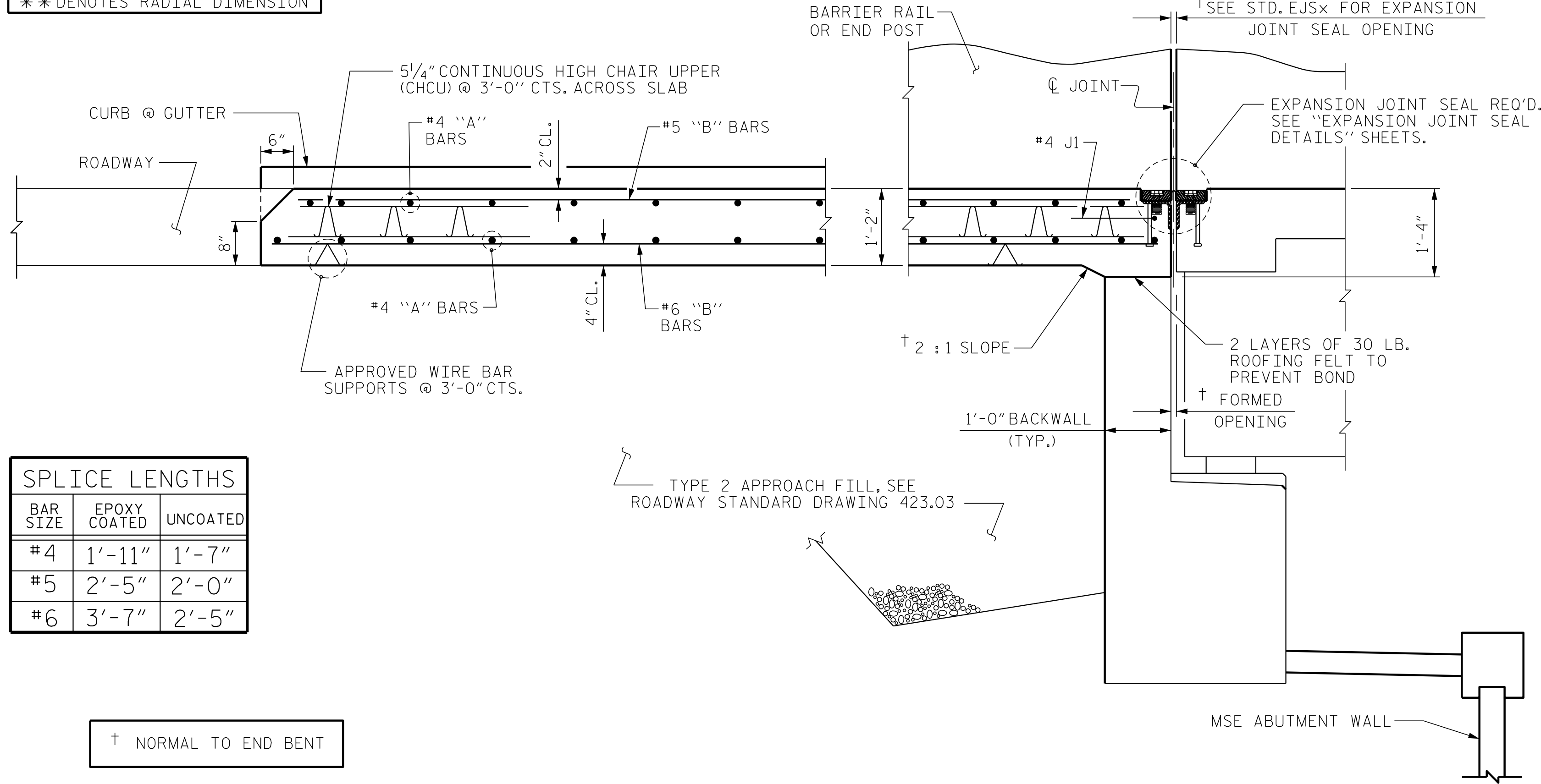
PLAN @ END BENT 1



PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS  
 ARC OFFSETS TO OUTSIDE EDGE OF APPROACH SLABS ARE NEGLIGIBLE, THEREFORE NOT SHOWN

**\*\* DENOTES RADIAL DIMENSION**



SECTION THRU SLAB

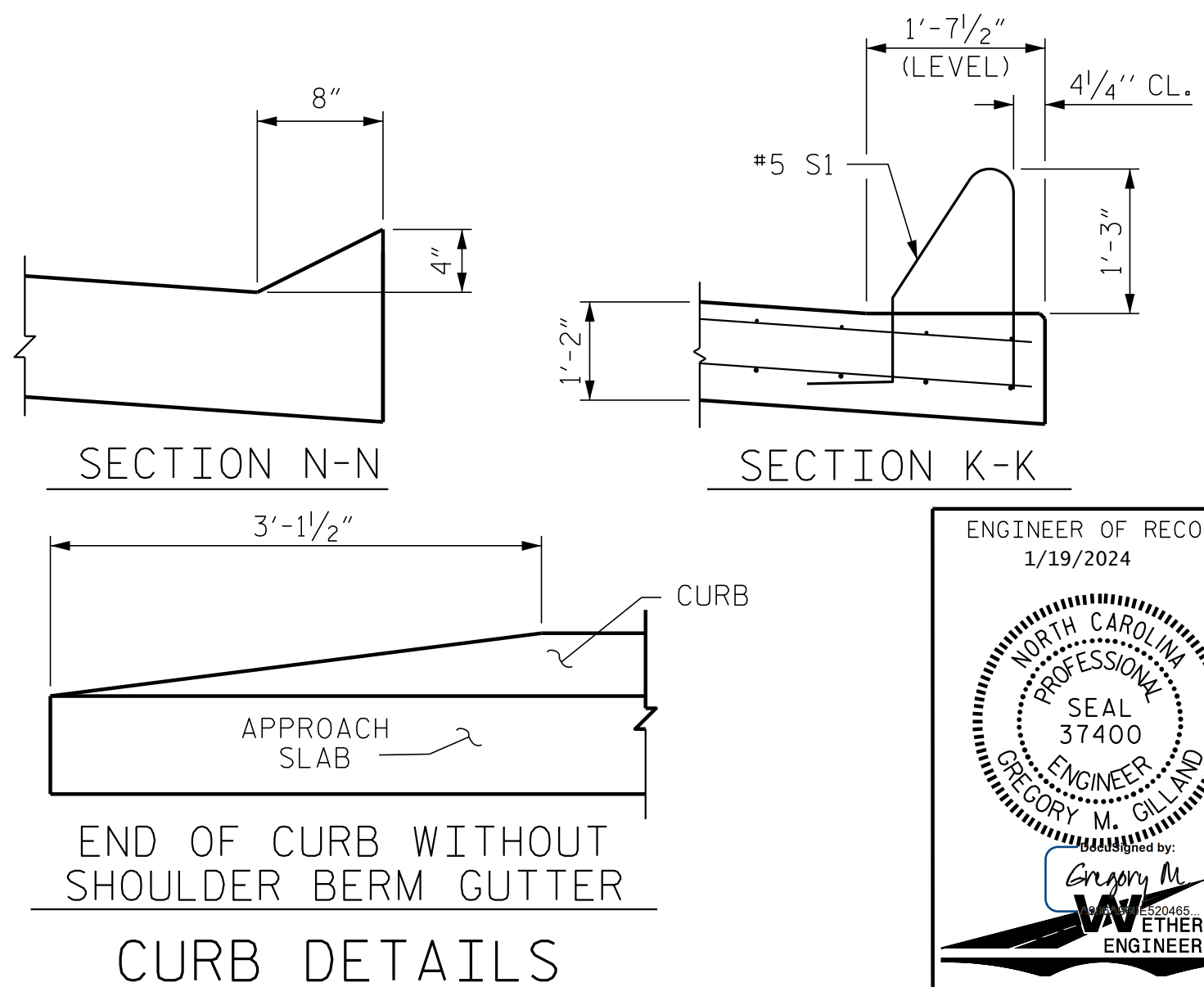
SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

† NORMAL TO END BENT

DRAWN BY: D. HODGE DATE: 2/23  
 CHECKED BY: J. DILWORTH DATE: 9/23

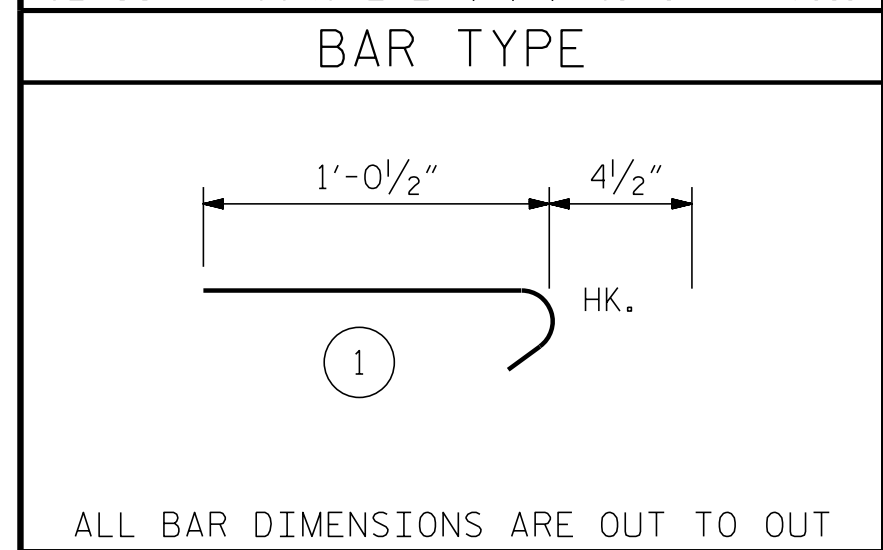
**NOTES**

- FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.
- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- 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.
- FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.



CURB DETAILS

BILL OF MATERIAL					
APPROACH SLAB AT E. BT. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	32'-6"	1,086
A2	52	#4	STR	32'-4"	1,123
*B1	120	#5	STR	23'-6"	2,941
B2	120	#6	STR	24'-7"	4,431
*B3	2	#5	STR	9'-10"	21
B4	2	#6	STR	9'-10"	30
*J1	60	#4	1	1'-5"	57
REINFORCING STEEL *** LBS.					5,584
*EPOXY COATED REINFORCING STEEL *** LBS.					4,105
CLASS AA CONCRETE *** C. Y.					65.8
APPROACH SLAB AT E. BT. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	32'-6"	1,086
A2	52	#4	STR	32'-4"	1,123
*B1	118	#5	STR	23'-6"	2,892
B2	118	#6	STR	24'-7"	4,357
*B3	2	#5	STR	9'-10"	21
B4	2	#6	STR	9'-10"	30
*J1	60	#4	1	1'-5"	57
REINFORCING STEEL *** LBS.					5,510
*EPOXY COATED REINFORCING STEEL *** LBS.					4,056
CLASS AA CONCRETE *** C. Y.					65.3



ALL BAR DIMENSIONS ARE OUT TO OUT  
 \*\*\* QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.  
 THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

PROJECT NO. HB-0004  
 HAYWOOD COUNTY  
 STATION: 254+73.75 -L-  
 SHEET 1 OF 2

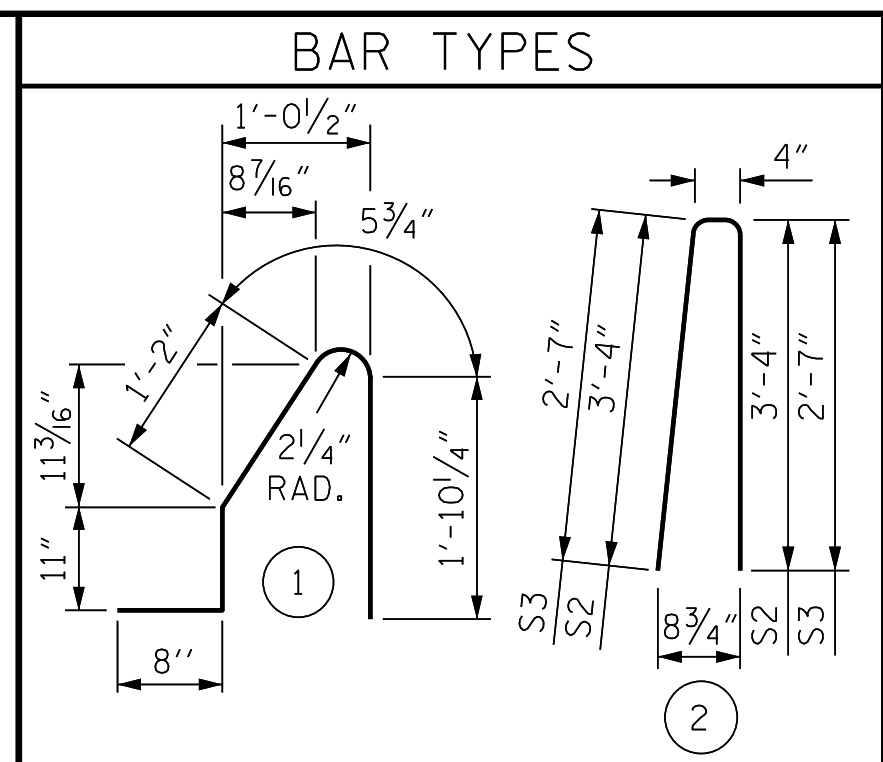
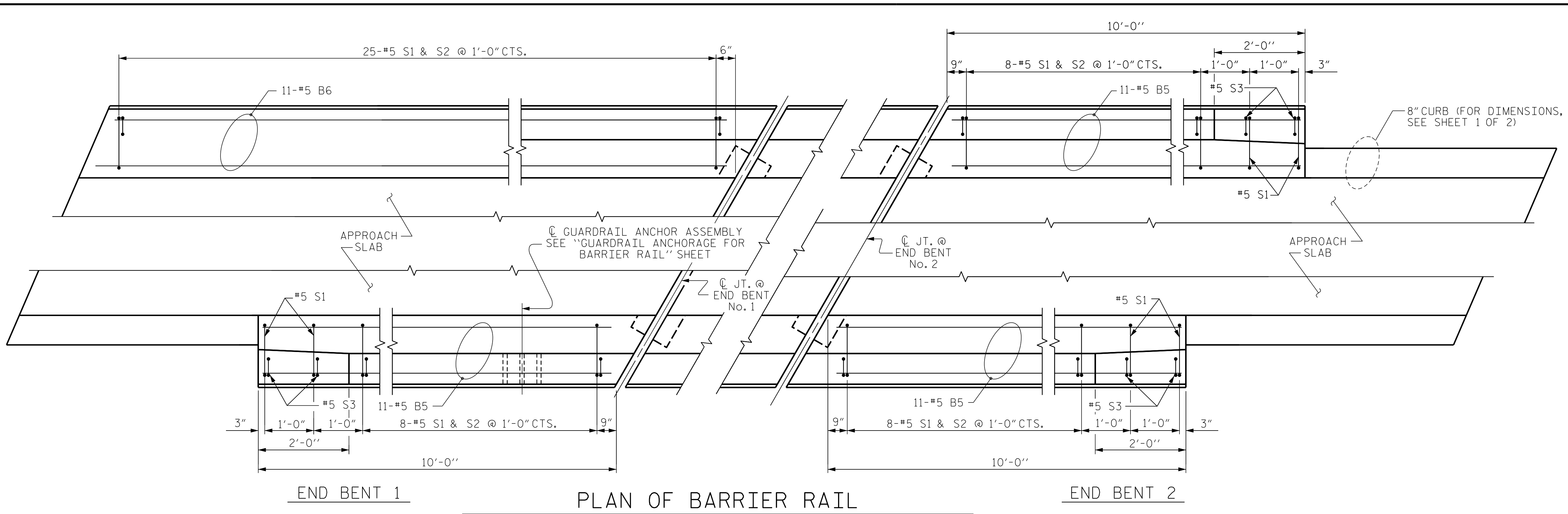
ENGINEER OF RECORD  
 1/19/2024  
  
 Gregory M. Gilliland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S2-28  
 TOTAL SHEETS 58

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

PA:2023\2312401-HB-0004-Structures\03\HB-0004-RIGHT-LANE\HB0004-RIGHT-AS.dgn  
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**BILL OF MATERIAL**

**BARRIER RAIL ONLY**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B5	33	#5	STR	9'-8"	333
* B6	11	#5	STR	24'-4"	279
* S1	55	#5	1	5'-1"	292
* S2	49	#5	2	7'-0"	358
* S3	6	#5	2	5'-6"	34

\* EPOXY COATED REINFORCING STEEL LBS. 1,296

CLASS AA CONCRETE C. Y. 7.5

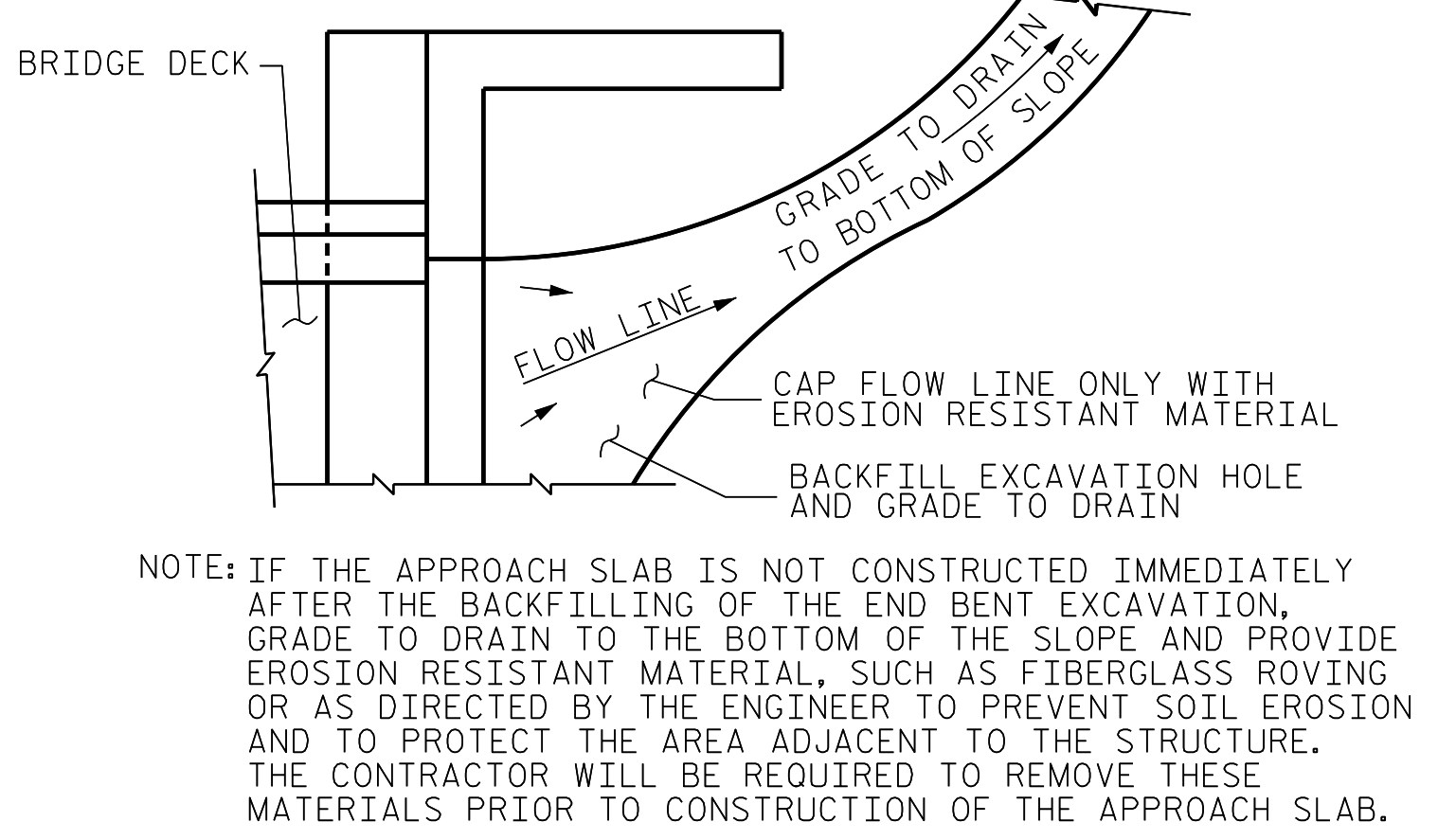
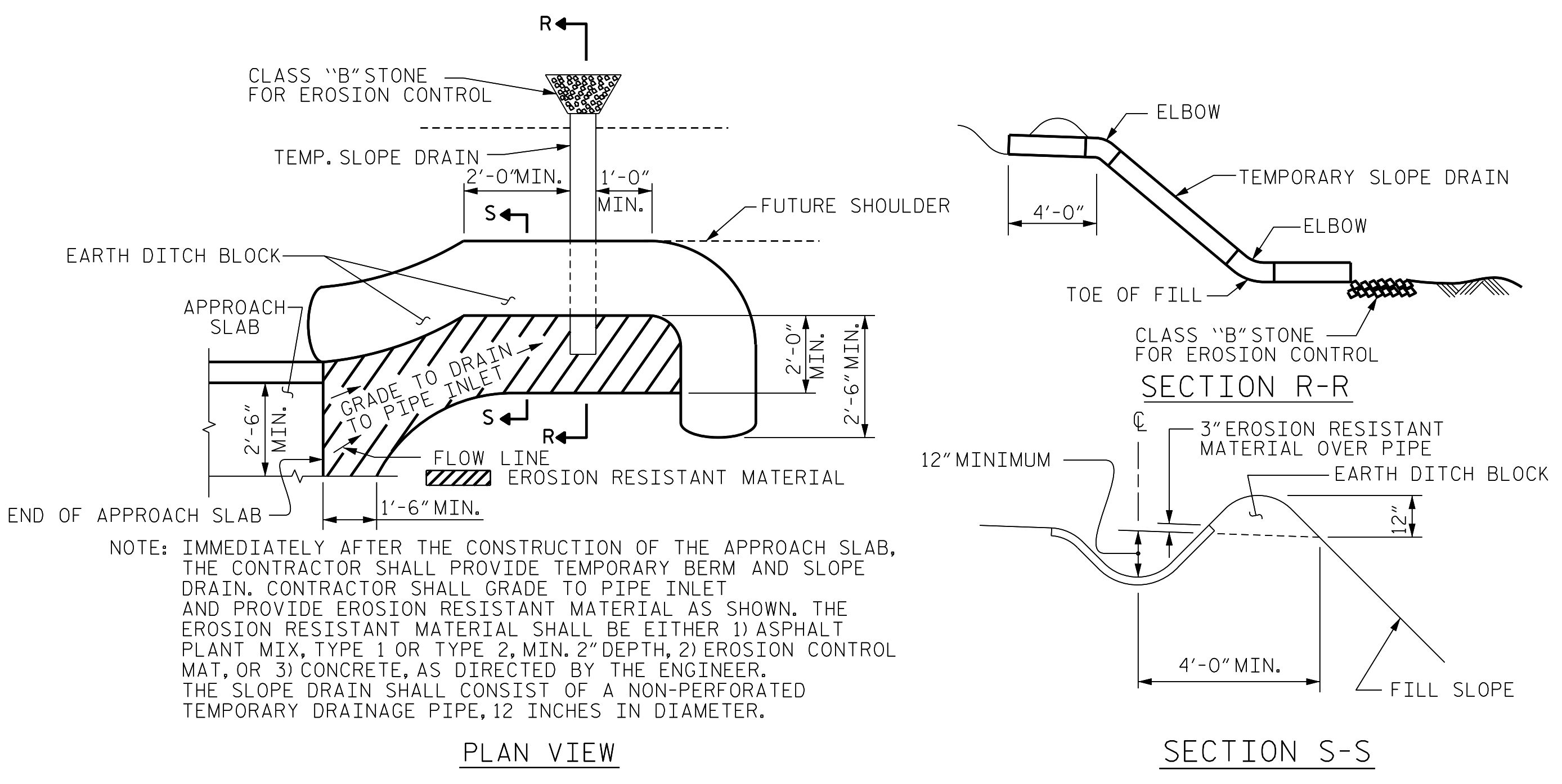
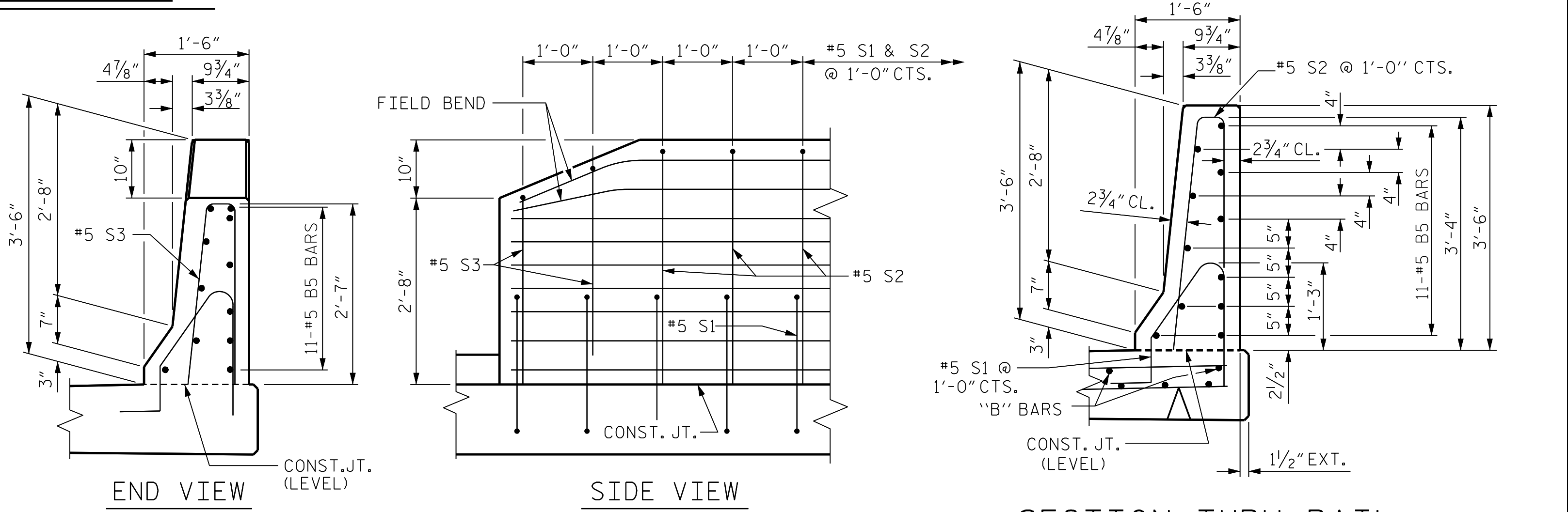
CONCRETE BARRIER RAIL 55.60 LIN. FT.

**NOTES**

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



PROJECT NO. HB-0004

HAYWOOD COUNTY

STATION: 254+73.75 -L-

SHEET 2 OF 2

ENGINEER OF RECORD  
1/19/2024

**NORTH CAROLINA PROFESSIONAL SEAL 37400**  
ENGINEER  
GREGORY M. GILLAND

1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
BRIDGE APPROACH  
SLAB DETAILS  
(RIGHT LANE)

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

SHEET NO. S2-29

TOTAL SHEETS 58

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

## 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 2024 "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  $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO  $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A  $\frac{1}{4}$ " 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  $\frac{1}{4}$ " 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  $\frac{7}{8}$ "  $\emptyset$  SHEAR STUDS FOR THE  $\frac{3}{4}$ "  $\emptyset$  STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF  $\frac{7}{8}$ "  $\emptyset$  STUDS ALONG THE BEAM AS SHOWN FOR  $\frac{3}{4}$ "  $\emptyset$  STUDS BASED ON THE RATIO OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  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  $\frac{3}{16}$ " 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  $\frac{1}{16}$ " 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. FINS 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