

09/08/19

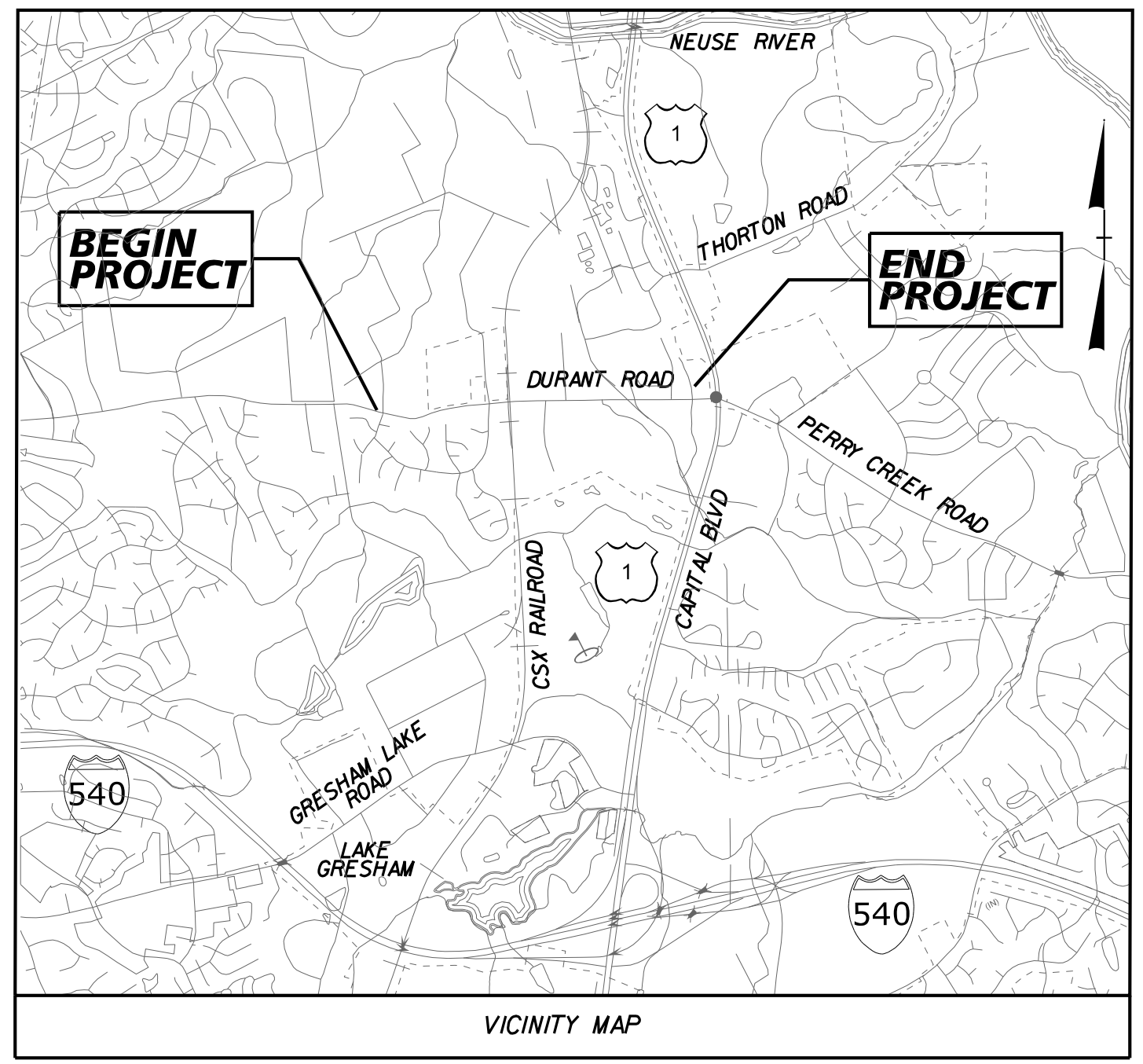
3/22/2024

**CONTRACT: C204204**      **TIP PROJECT: P-5720**

STATE OF NORTH CAROLINA  
RAIL DIVISIONS

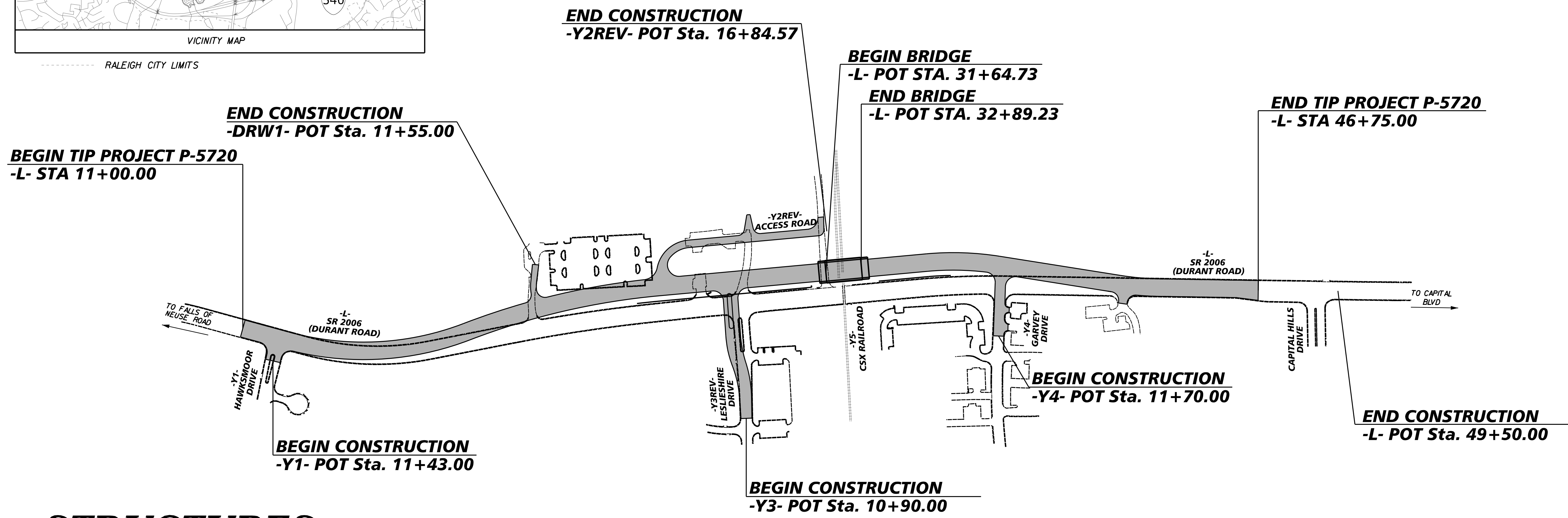
# WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5720		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46932.1.1		PE	
46932.2.1		RW & UTIL	
46932.3.1		CONST.	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			



**LOCATION: PROPOSED GRADE-SEPARATION OF SR 2006 (DURANT ROAD) OVER CSX S LINE RAILROAD IN RALEIGH**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, RETAINING WALLS, STRUCTURE AND SIGNALS**



## STRUCTURES

**DESIGN DATA**

ADT 2019	=	21,000
ADT 2040	=	31,100
K	=	8%
D	=	55%
T	=	3%*
V	=	50 MPH

CLASSIFICATION:  
URBAN COLLECTOR

\* 1% TTST 2% DUAL  
SUBREGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT P-5720	=	0.653 MILES
LENGTH STRUCTURE TIP PROJECT P-5720	=	0.024 MILES
TOTAL LENGTH TIP PROJECT P-5720	=	0.677 MILES

Prepared in the Office of:

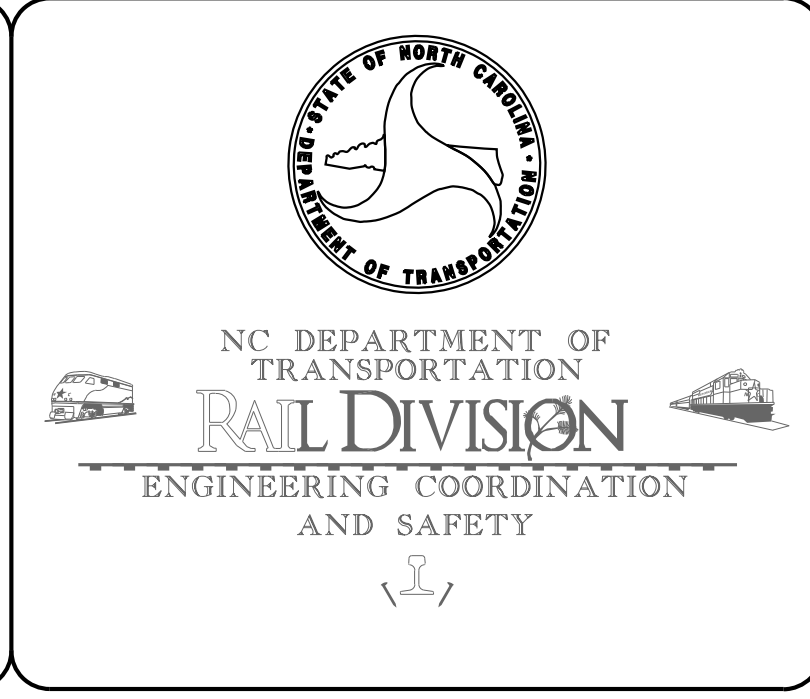
**Kimley»Horn**

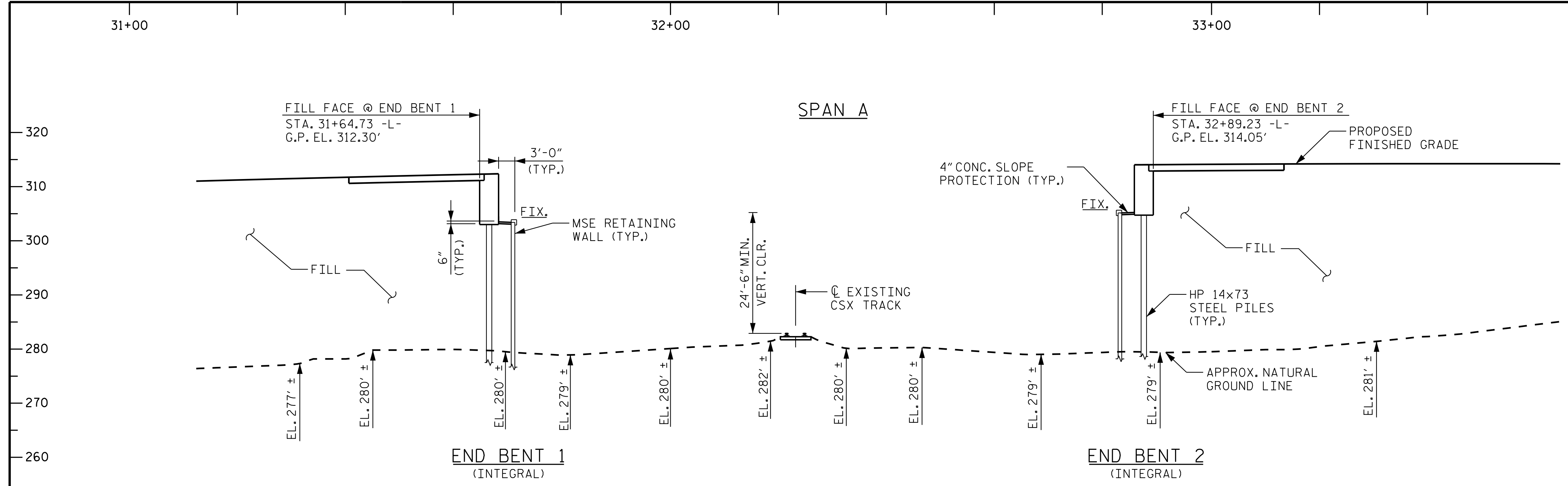
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
JUNE 7, 2018

LETTING DATE:  
APRIL 16, 2024

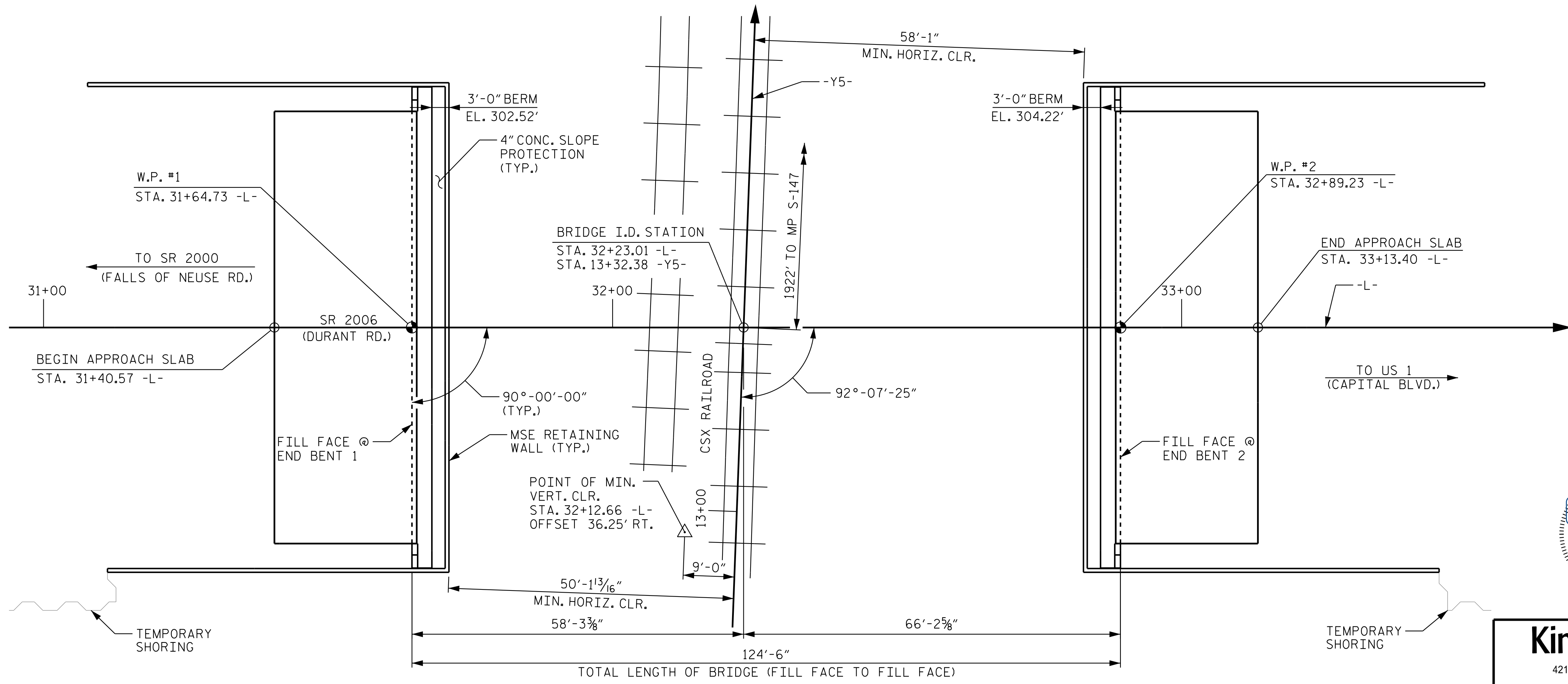
<b>ANDREW L. PHILLIPS, P.E.</b> PROJECT ENGINEER
<b>MITCHELL D. MAGEE, P.E.</b> PROJECT DESIGN ENGINEER
<b>KUMAR TRIVEDI, P.E.</b> PROJECT MANAGER NCDOT RAIL DIVISION





**-L- VERTICAL CURVE DATA**  
 P.I. STA. = 33+80.00  
 EL. = 326.97'  
 V.C. = 930'

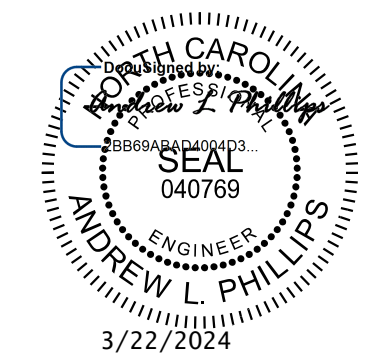
TOP OF RAIL ELEVATIONS		
STATION -Y5-	LEFT RAIL	RIGHT RAIL
12+90.00	282.41	282.44
13+10.00	282.36	282.40
13+30.00	282.26	282.33
13+50.00	282.12	282.21
13+70.00	282.06	282.10



**PLAN**  
 (PILES NOT SHOWN IN PLAN VIEW)

PROJECT NO. P-5720  
 WAKE COUNTY  
 STATION: 32+23.01 -L-  
13+32.38 -Y5-  
 MILE POST S-147.36  
 BRIDGE #911494

SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON DURANT ROAD (SR2006)  
 OVER CSX RAILROAD BETWEEN  
 US 1 AND SR 2000



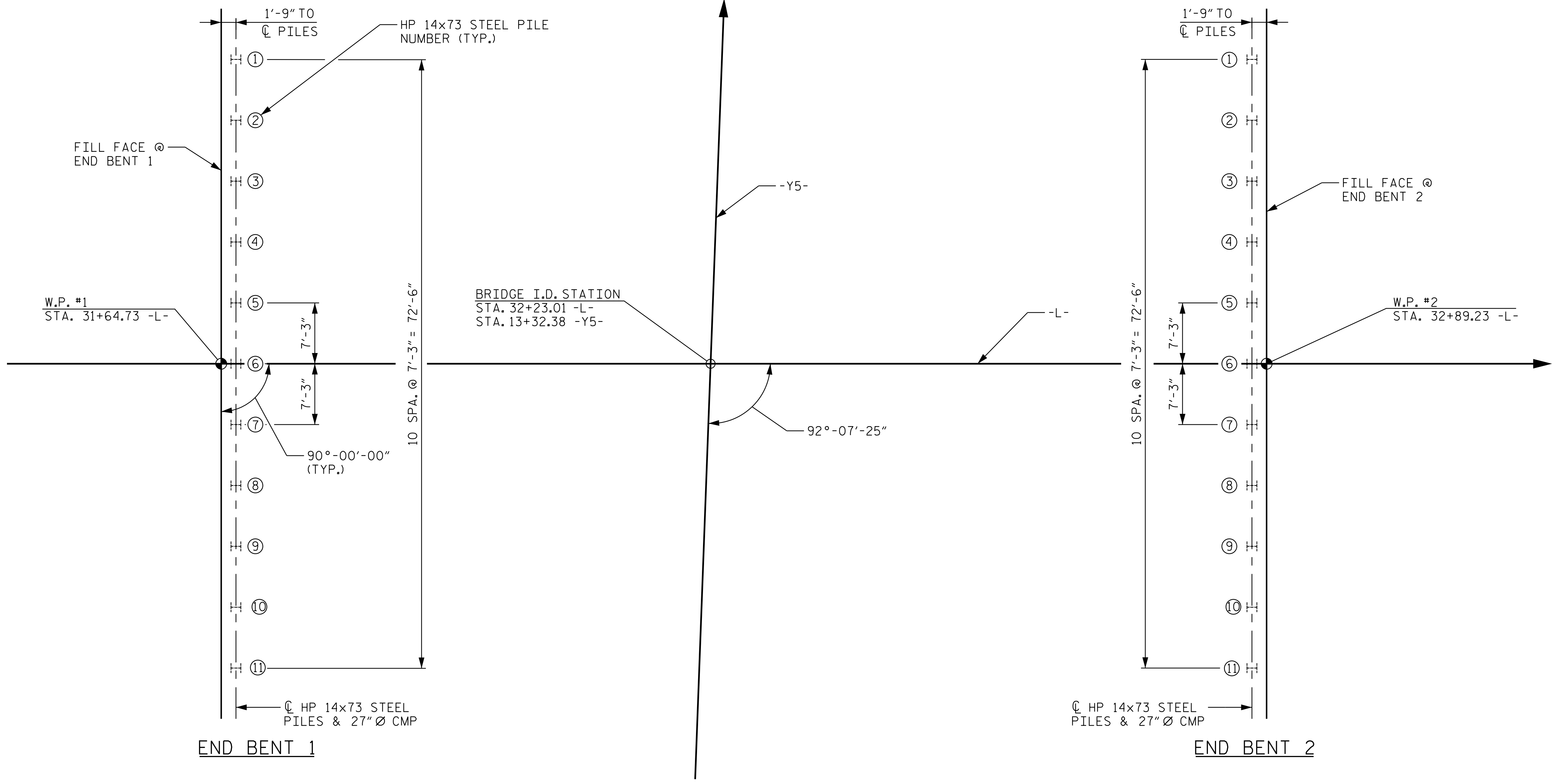
**Kimley»Horn**  
 421 Fayetteville Street, Suite 600  
 Raleigh, NC 27601-1772  
 Phone (919) 677-2000  
 NC LICENSE # F-0102

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

DRAWN BY: J. I. KIMBLE DATE: 1/19  
 CHECKED BY: M. D. MAGEE DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

REVISIONS					SHEET NO. S-1
NO.	BY:	DATE:	NO.	DATE:	
1			3		TOTAL SHEETS
2			4		33

3/22/2024 K:\RD1-Structures\Bridges\NC\1036002 - P-5720\Conc\Drawings\5720\_SML\_CD1\_911494.dgn



FOUNDATION LAYOUT  
 DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES AT BOTTOM OF CAP

NOTES

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL TO WITHIN 1 FT. OF THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

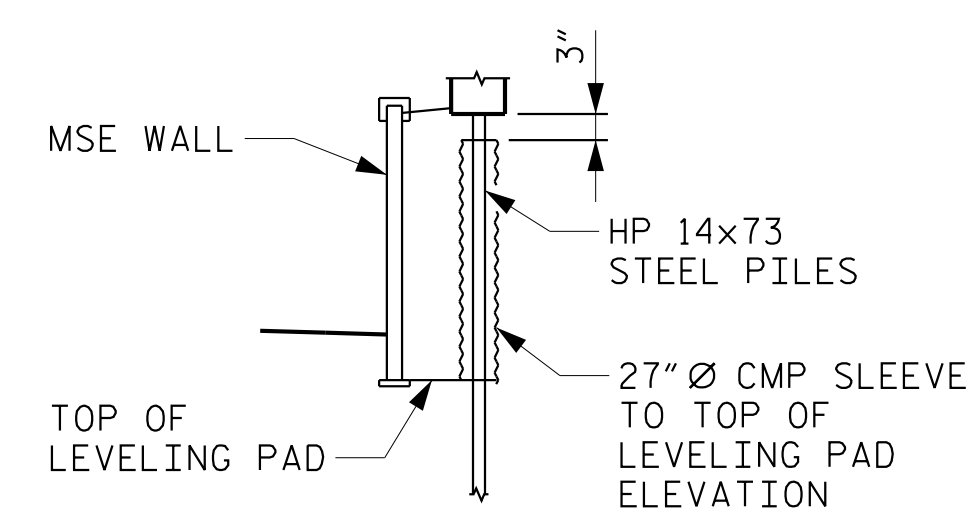
FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 50-85 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1 AND END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3 (D)(2) OF THE STANDARD SPECIFICATIONS.

INSTALL 27" DIAMETER CORRUGATED METAL PIPE (CMP) SLEEVES AT EACH PILE LOCATION BEFORE PLACING FILL OR CONSTRUCTING MSE ABUTMENT WALLS AT END BENTS 1 AND 2.

FILL CMP SLEEVES WITH SELECT MATERIAL CLASS VI OR OTHER GRANULAR MATERIALS APPROVED BY THE ENGINEER AFTER COMPLETION OF PILE DRIVING AT END BENTS 1 AND 2.

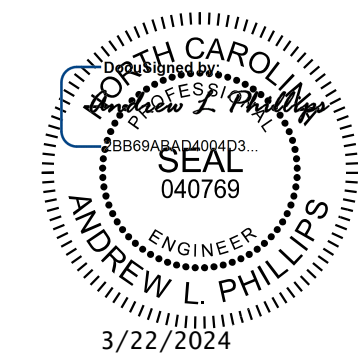
FOR ADDITIONAL FOUNDATION INFORMATION, NOTES, AND QUANTITIES, SEE SHEET S-2A FOR FOUNDATION TABLES.



27" Ø CMP SLEEVE DETAIL  
 (END BENT 2 SHOWN, END BENT 1 SIMILAR)

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON DURANT ROAD (SR2006)  
 OVER CSX RAILROAD BETWEEN  
 US 1 AND SR 2000

**Kimley»Horn**  
 421 Fayetteville Street, Suite 600  
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 Phone (919) 677-2000  
 NC LICENSE # F-0102

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

TOTAL SHEETS: 33

7/22/2024  
 DRAWN BY: J. I. KIMBLE DATE: 1/19  
 CHECKED BY: M. D. MAGEE DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

K:\RD1\Structur es\Bridg e\NC\01036002 - P-5720\Code\09\5720\_SML\_FL\_01149.dgn



**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 1-5	160	304.00	60			270							
End Bent No. 1, Piles 6-11	160	304.00	65			270							
End Bent No. 2, Piles 1-5	160	305.70	50			270							
End Bent No. 2, Piles 6-11	160	305.70	65			270							

\*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 1-5	160			0.60			1.00
End Bent No. 1, Piles 6-11	160			0.60			1.00
End Bent No. 2, Piles 1-5	160			0.60			1.00
End Bent No. 2, Piles 6-11	160			0.60			1.00

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

PROJECT NO. P-5720

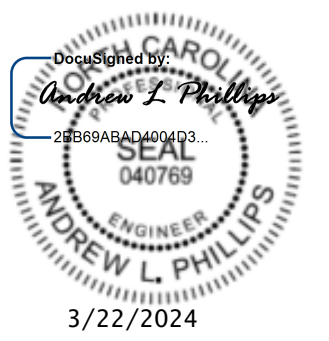
Wake COUNTY

STATION: 32+23.01 -L-

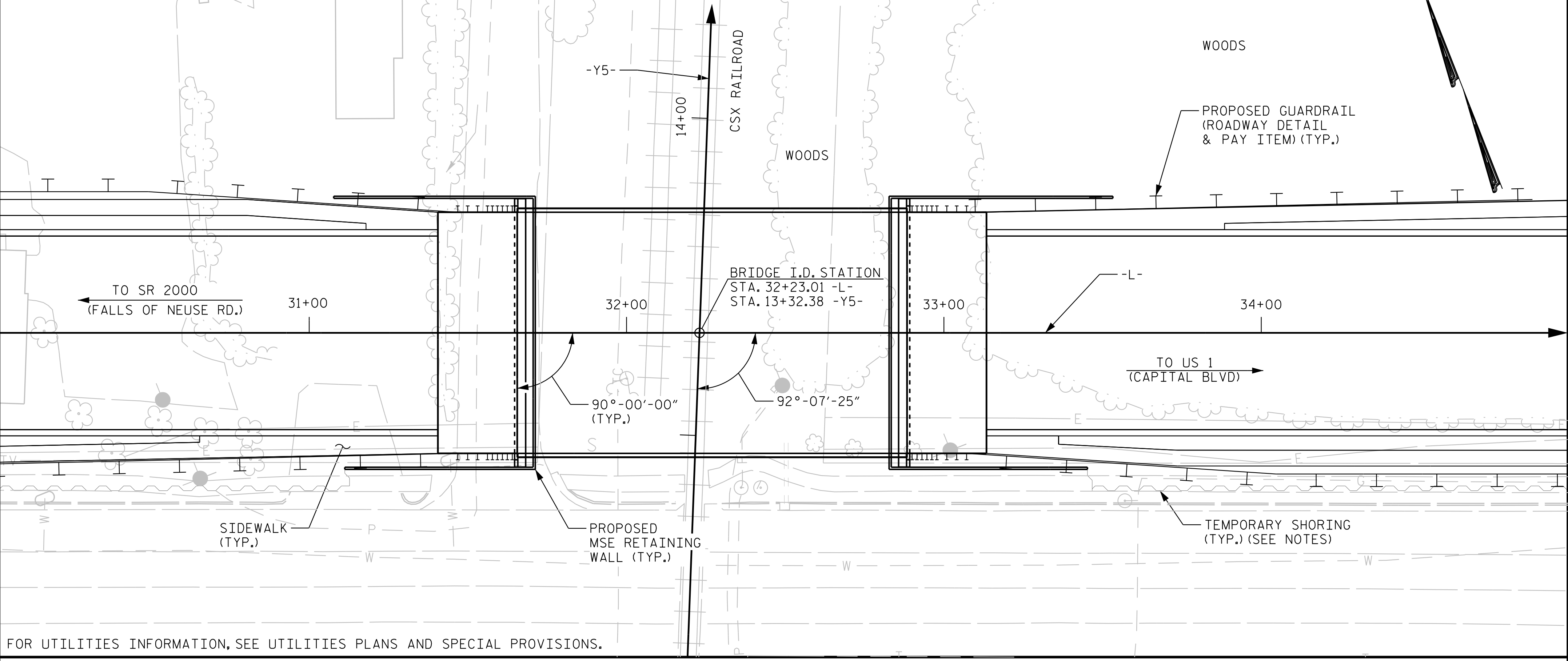
SHEET 3 OF 4

**NOTES:**

- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Jeremy R. Hamm, #039779) on 3/20/2024.
- 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 and Pipe Pile Plates when PDAs or plates may be required.

	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						<b>PILE FOUNDATION TABLES</b>
	SIGNATURE _____ DATE _____						
REVISIONS							TOTAL SHEETS 33
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	NO. <b>1</b>	BY:	DATE:	NO. <b>3</b>	BY:	DATE:	
	<b>2</b>			<b>4</b>			

BM #2: BENCH TIE NAIL IN 10" PINE, EL. 250.05 (N 780573 E 2129763)



FOR UTILITIES INFORMATION, SEE UTILITIES PLANS AND SPECIAL PROVISIONS.

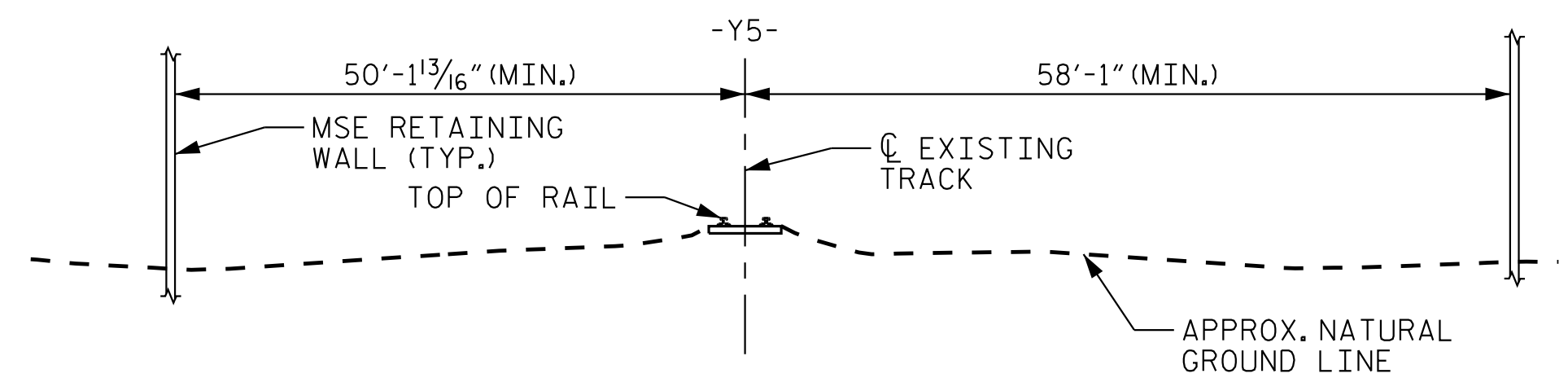
LOCATION SKETCH

NOTES

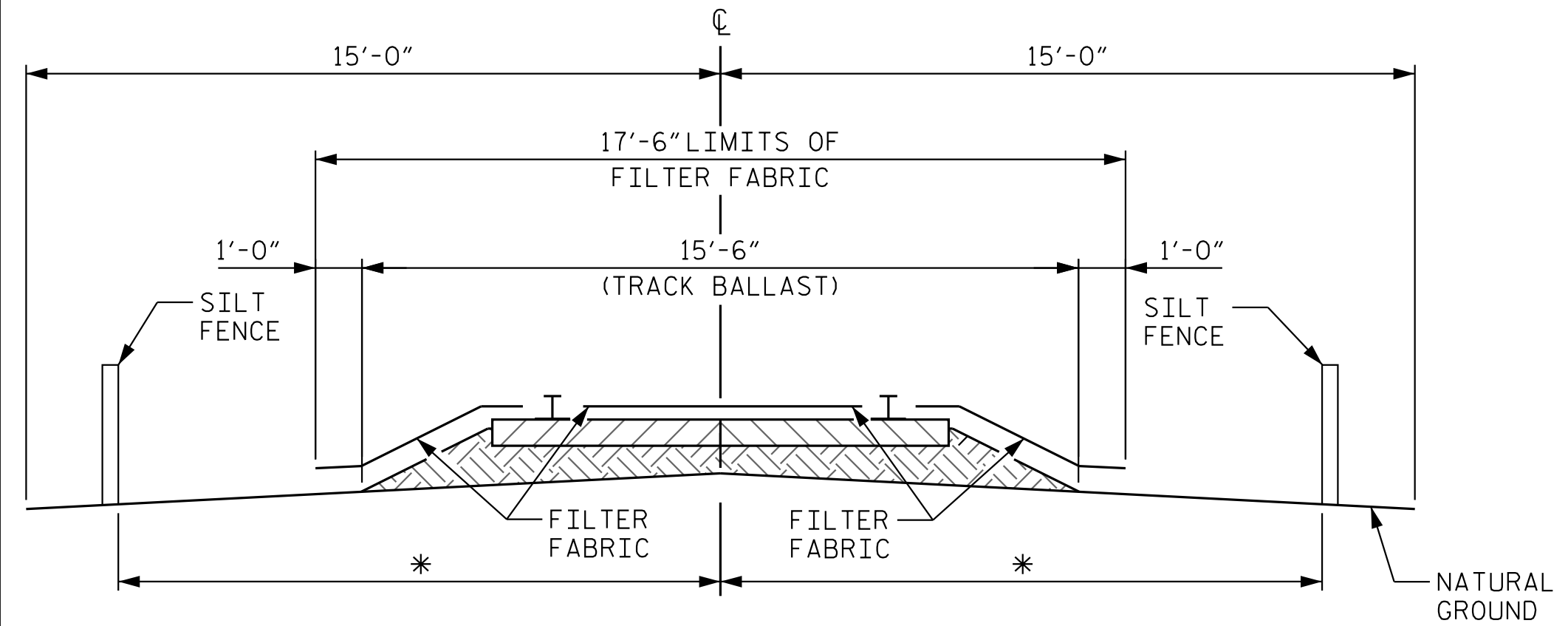
- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- 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.
- THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- 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.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

**TOTAL BILL OF MATERIAL**

	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	FIB 54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SET UP FOR HP 14x73 STEEL PILES	HP 14x73 STEEL PILES	TWO BAR METAL RAIL	1'-2" x 3'-3" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	72" CHAIN LINK FENCE (BLACK VINYL COATED)		
	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LIN. FT.
SUPERSTRUCTURE	9,653	10,716		LUMP SUM		11	1,346.58							LUMP SUM	230.67
END BENT 1			48.5		5,794			11	11	687.5					
END BENT 2			48.5		5,794			11	11	632.5					
<b>TOTAL</b>	<b>9,653</b>	<b>10,716</b>	<b>97.0</b>	<b>LUMP SUM</b>	<b>11,588</b>	<b>11</b>	<b>1,346.58</b>	<b>22</b>	<b>22</b>	<b>1,320</b>	<b>230.67</b>	<b>245.67</b>	<b>44</b>	<b>LUMP SUM</b>	<b>230.67</b>



SECTION NORMAL TO TRACK  
(LOOKING STATION AHEAD ALONG RAILROAD)



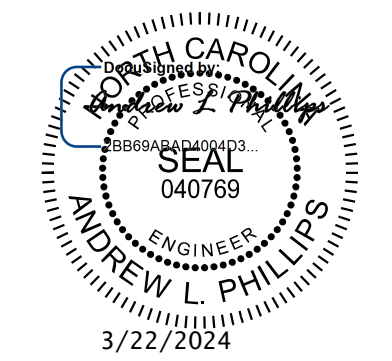
RAILROAD EROSION CONTROL DETAIL

\* TO BE DETERMINED BY THE RESIDENT ENGINEER IN CONSULTATION WITH THE RAILROAD ENGINEER.

- NOTES:**  
RAILROAD EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO PERFORMING ANY WORK IN THE RAILROAD RIGHT-OF-WAY.
- ADDITIONAL EROSION CONTROL MEASURES FOR PROTECTION OF RAILROAD DITCHES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.
- NO SEPARATE PAYMENT WILL BE MADE FOR RAILROAD EROSION CONTROL MEASURES.
- LIMITS OF SILT FENCE AND FILTER FABRIC PARALLEL TO RAILROAD SHALL EXTEND A MINIMUM OF 25'-0" OUTSIDE EDGE OF SUPERSTRUCTURE OR TOE OF SLOPE ON CONSTRUCTION. A GREATER LENGTH OF SILT FENCE OR FILTER FABRIC MAY BE REQUIRED IF SO DIRECTED BY THE ENGINEER.
- FILTER FABRIC TO BE NAILED TO TIMBER RAIL TIES WITH PRIME SOURCE "GRIP CAP" OR EQUIVALENT. FILTER FABRIC ON SHOULDER TO BE SECURED AS DIRECTED BY THE ENGINEER AND RAILROAD.

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

SHEET 4 OF 4



**Kimley»Horn**  
421 Fayetteville Street, Suite 600  
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Phone (919) 677-2000  
NC LICENSE # F-0102

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**  
FOR BRIDGE ON DURANT ROAD (SR2006)  
OVER CSX RAILROAD BETWEEN  
US 1 AND SR 2000

DRAWN BY: J. I. KIMBLE DATE: 1/19  
CHECKED BY: M. D. MAGEE DATE: 1/19  
DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

**DOCUMENT NOT CONSIDERED FINAL  
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REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 33

K:\RD1\_Structures\Bridges\NC\1036002 - P-5720\Cad\Drawings\5720\_SML\_02\_91494.dgn 3/22/2024



LOAD FACTORS:

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A	①	1.14	--	1.75	0.662	1.39	A	EL	60.500	0.771	1.39	A	I	11.500	0.80	0.662	1.14	A	EL	60.500		
	HL-93 (OPERATING)	N/A		1.80	--	1.35	0.662	2.03	A	EL	60.500	0.771	1.84	A	I	11.500	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.67	60.12	1.75	0.662	1.80	A	EL	60.500	0.771	1.99	A	I	11.500	0.80	0.662	1.67	A	EL	60.500		
	HS-20 (OPERATING)	36.000		2.62	94.32	1.35	0.662	2.63	A	EL	60.500	0.771	2.62	A	I	11.500	N/A	--	--	--	--	--		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		4.05	54.68	1.40	0.662	6.15	A	EL	60.500	0.771	6.51	A	I	11.500	0.80	0.662	4.05	A	EL	60.500	
		SNGARBS2	20.000		2.90	58.00	1.40	0.662	4.40	A	EL	60.500	0.771	4.49	A	I	11.500	0.80	0.662	2.90	A	EL	60.500	
		SNAGRIS2	22.000		2.69	59.18	1.40	0.662	4.09	A	EL	60.500	0.771	4.12	A	I	11.500	0.80	0.662	2.69	A	EL	60.500	
		SNCOTTS3	27.250		2.01	54.77	1.40	0.662	3.06	A	EL	60.500	0.771	3.17	A	I	11.500	0.80	0.662	2.01	A	EL	60.500	
		SNAGGRS4	34.925		1.63	56.93	1.40	0.662	2.48	A	EL	60.500	0.771	2.54	A	I	11.500	0.80	0.662	1.63	A	EL	60.500	
		SNS5A	35.550		1.60	56.88	1.40	0.662	2.43	A	EL	60.500	0.771	2.54	A	I	11.500	0.80	0.662	1.60	A	EL	60.500	
		SNS6A	39.950		1.45	57.93	1.40	0.662	2.20	A	EL	60.500	0.771	2.28	A	I	11.500	0.80	0.662	1.45	A	EL	60.500	
	SNS7B	42.000		1.38	57.96	1.40	0.662	2.09	A	EL	60.500	0.771	2.20	A	I	11.500	0.80	0.662	1.38	A	EL	60.500		
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		1.76	58.08	1.40	0.662	2.68	A	EL	60.500	0.771	2.76	A	I	11.500	0.80	0.662	1.76	A	EL	60.500	
		TNT4A	33.075		1.77	58.54	1.40	0.662	2.68	A	EL	60.500	0.771	2.71	A	I	11.500	0.80	0.662	1.77	A	EL	60.500	
		TNT6A	41.600		1.43	59.49	1.40	0.662	2.16	A	EL	60.500	0.771	2.29	A	I	11.500	0.80	0.662	1.43	A	EL	60.500	
		TNT7A	42.000		1.42	59.64	1.40	0.662	2.16	A	EL	60.500	0.771	2.25	A	I	11.500	0.80	0.662	1.42	A	EL	60.500	
		TNT7B	42.000		1.45	60.90	1.40	0.662	2.20	A	EL	60.500	0.771	2.17	A	I	11.500	0.80	0.662	1.45	A	EL	60.500	
		TNAGRIT4	43.000		1.40	60.20	1.40	0.662	2.12	A	EL	60.500	0.771	2.10	A	I	11.500	0.80	0.662	1.40	A	EL	60.500	
TNAGT5A		45.000		1.32	59.40	1.40	0.662	2.01	A	EL	60.500	0.771	2.05	A	I	11.500	0.80	0.662	1.32	A	EL	60.500		
TNAGT5B	45.000	③	1.32	59.40	1.40	0.662	2.00	A	EL	60.500	0.771	2.00	A	I	11.500	0.80	0.662	1.32	A	EL	60.500			
EMERGENCY VEHICLE (EV)	EV2	28.750		2.03	58.36	1.30	0.662	3.32	A	EL	60.500	0.771	3.34	A	I	11.500	0.80	0.662	2.03	A	EL	60.500		
	EV3	43.000	④	1.34	57.62	1.30	0.662	2.20	A	EL	60.500	0.771	2.20	A	I	11.500	0.80	0.662	1.34	A	EL	60.500		

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.  
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

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

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

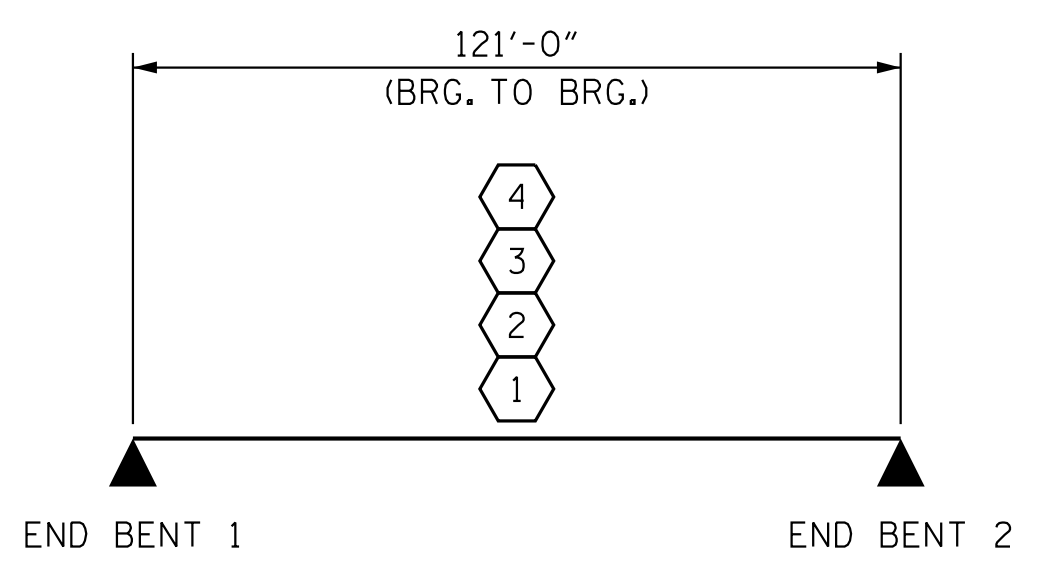
③ LEGAL LOAD RATING \*\*

④ EMERGENCY VEHICLE LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

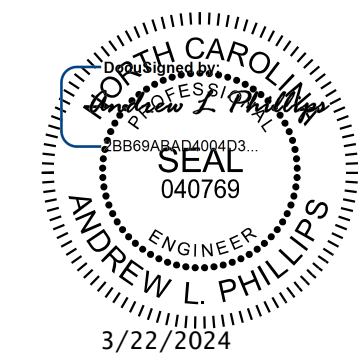
GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-



**Kimley»Horn**  
421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000  
NC LICENSE # F-0102

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
LRFR SUMMARY FOR  
PRESTRESSED  
CONCRETE GIRDERS  
(NON-INTERSTATE TRAFFIC)

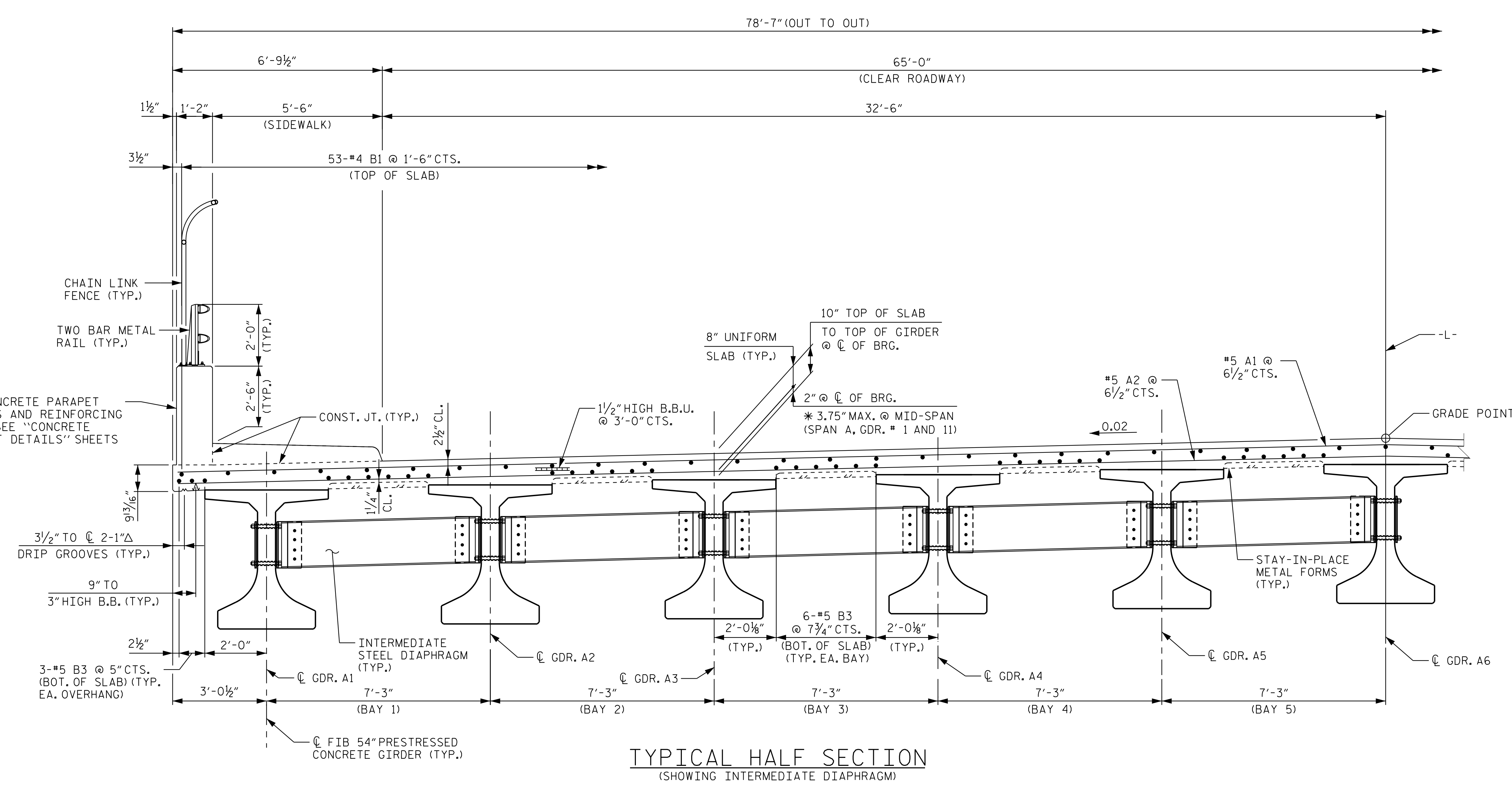
REVISIONS				SHEET NO.
NO.	BY:	DATE:	DATE:	S-4
1				TOTAL SHEETS
2				33

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ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 04/23 BNB/AAI



TYPICAL HALF SECTION  
(SHOWING INTERMEDIATE DIAPHRAGM)

NOTES

PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

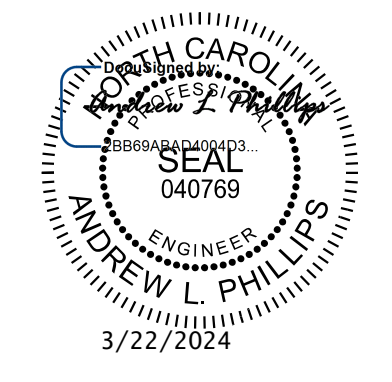
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

\* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
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 SUPERSTRUCTURE  
 TYPICAL SECTION

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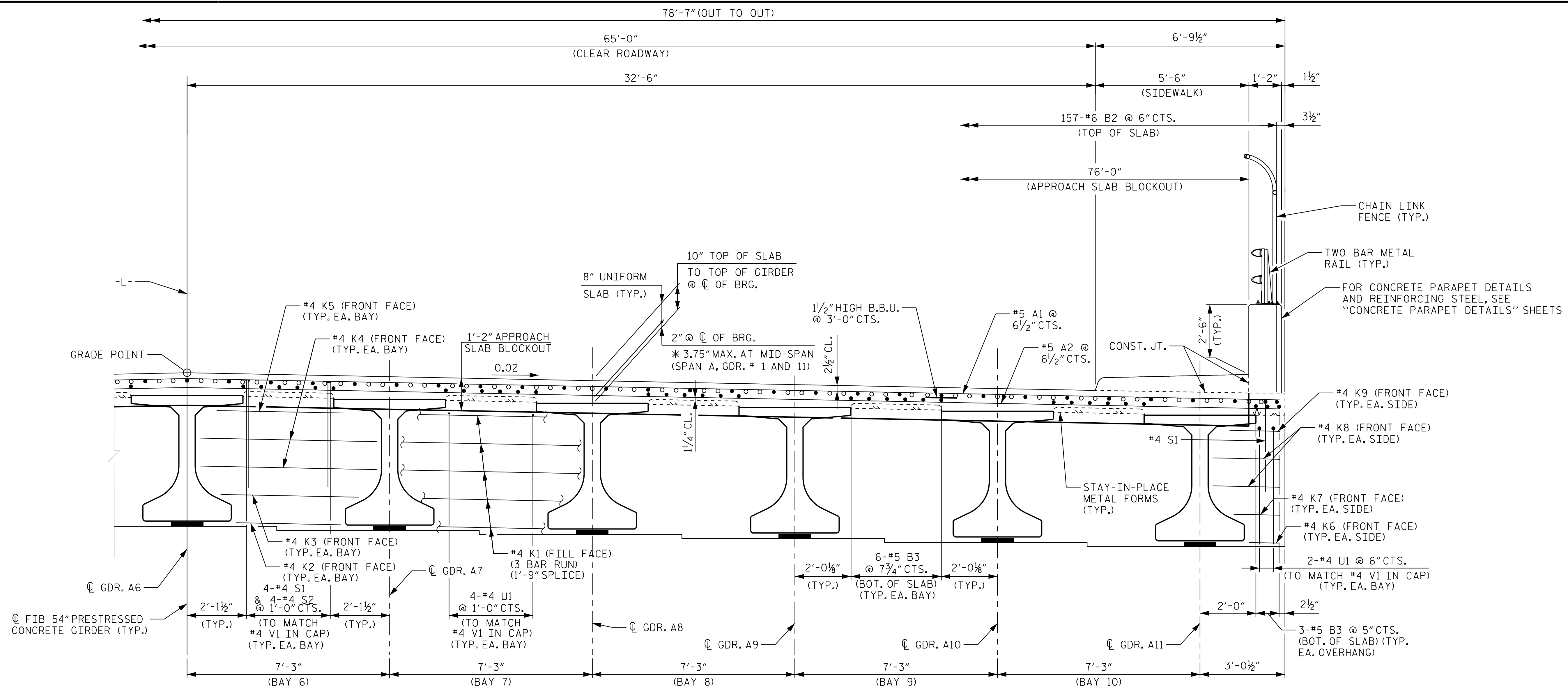
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CHECKED BY: <u>M. D. MAGEE</u>	DATE: <u>1/19</u>
DESIGN ENGINEER OF RECORD: <u>S. A. DENNEY</u>	DATE: <u>1/19</u>

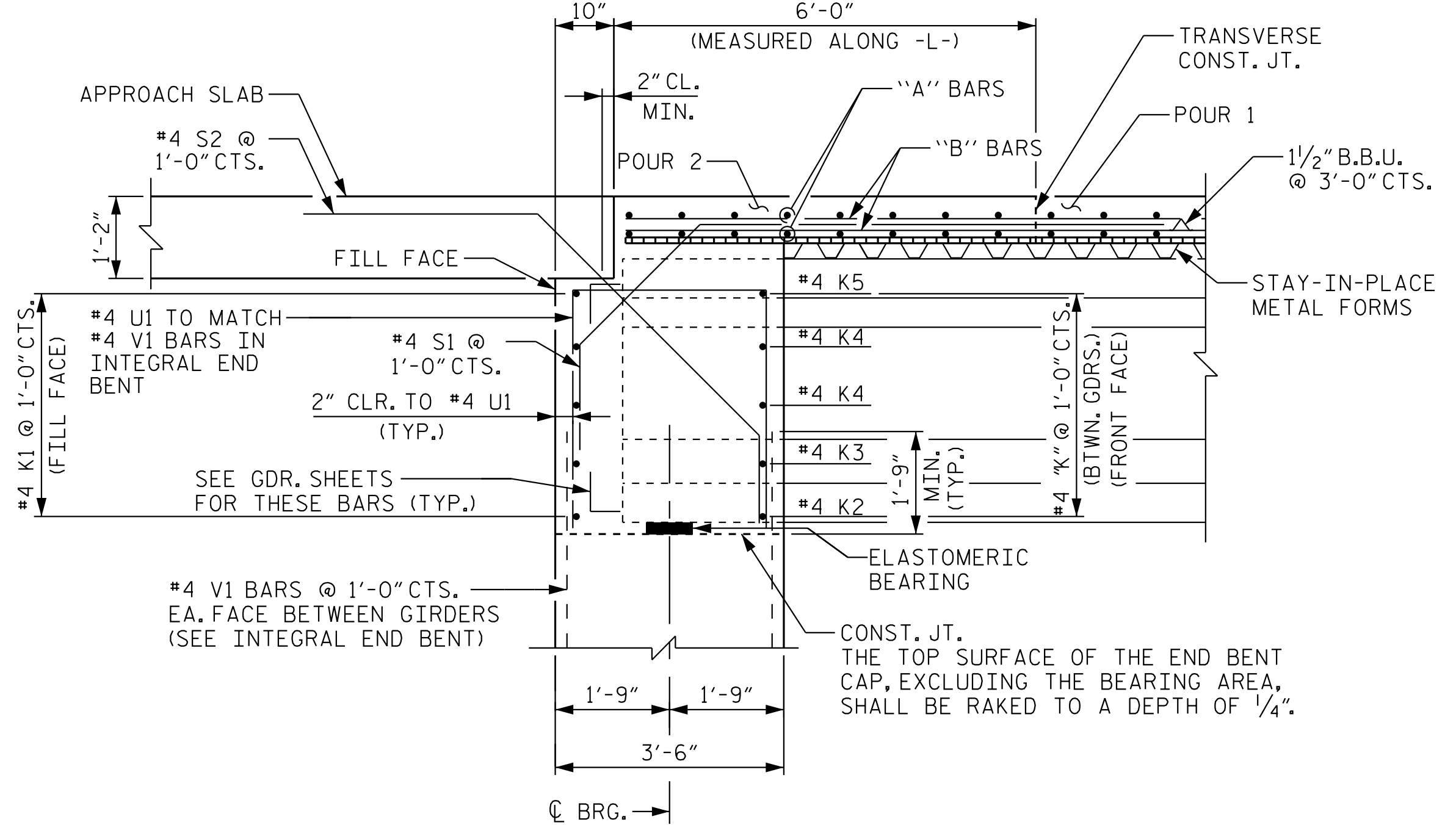
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2			4		

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TYPICAL HALF SECTION (SHOWING INTEGRAL END BENT DIAPHRAGM)



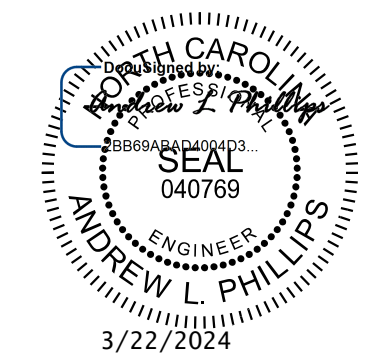
SECTION THRU INTEGRAL END BENT (END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTES

\* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
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 CHECKED BY: M. D. MAGEE DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19



NOTES

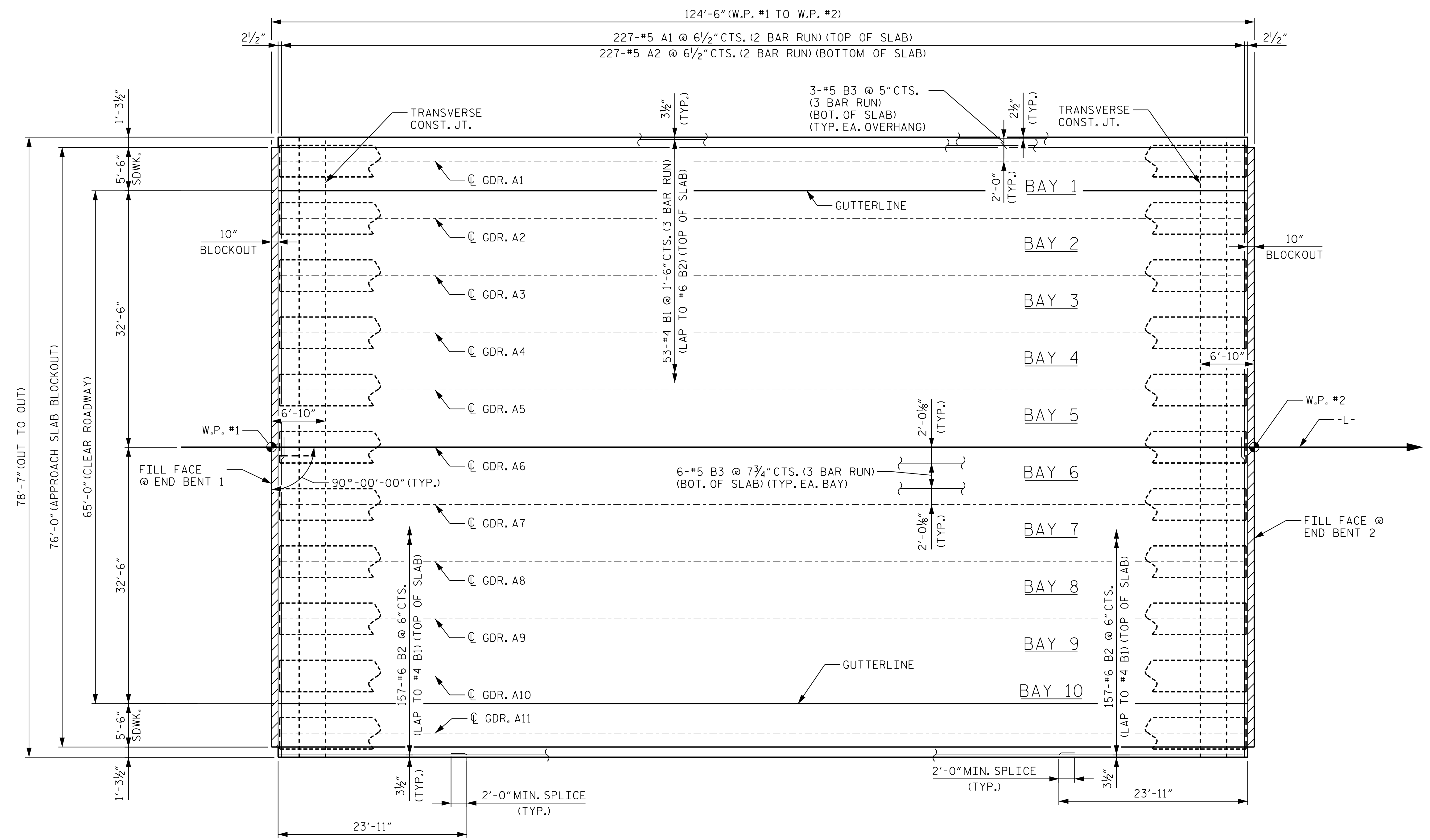
FOR POUR SEQUENCE AND LOCATION OF CONSTRUCTION JOINT, SEE SUPERSTRUCTURE "BILL OF MATERIAL" SHEET.

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

FOR CONCRETE PARAPET REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEET.

INTERMEDIATE DIAPHRAGM NOT SHOWN FOR CLARITY, SEE "FRAMING PLAN" SHEET.

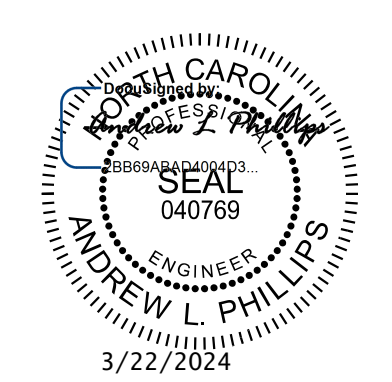
FOR SIDEWALK REINFORCING STEEL, SEE "SIDEWALK DETAILS" SHEET.



PLAN OF SPAN

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 1 OF 2



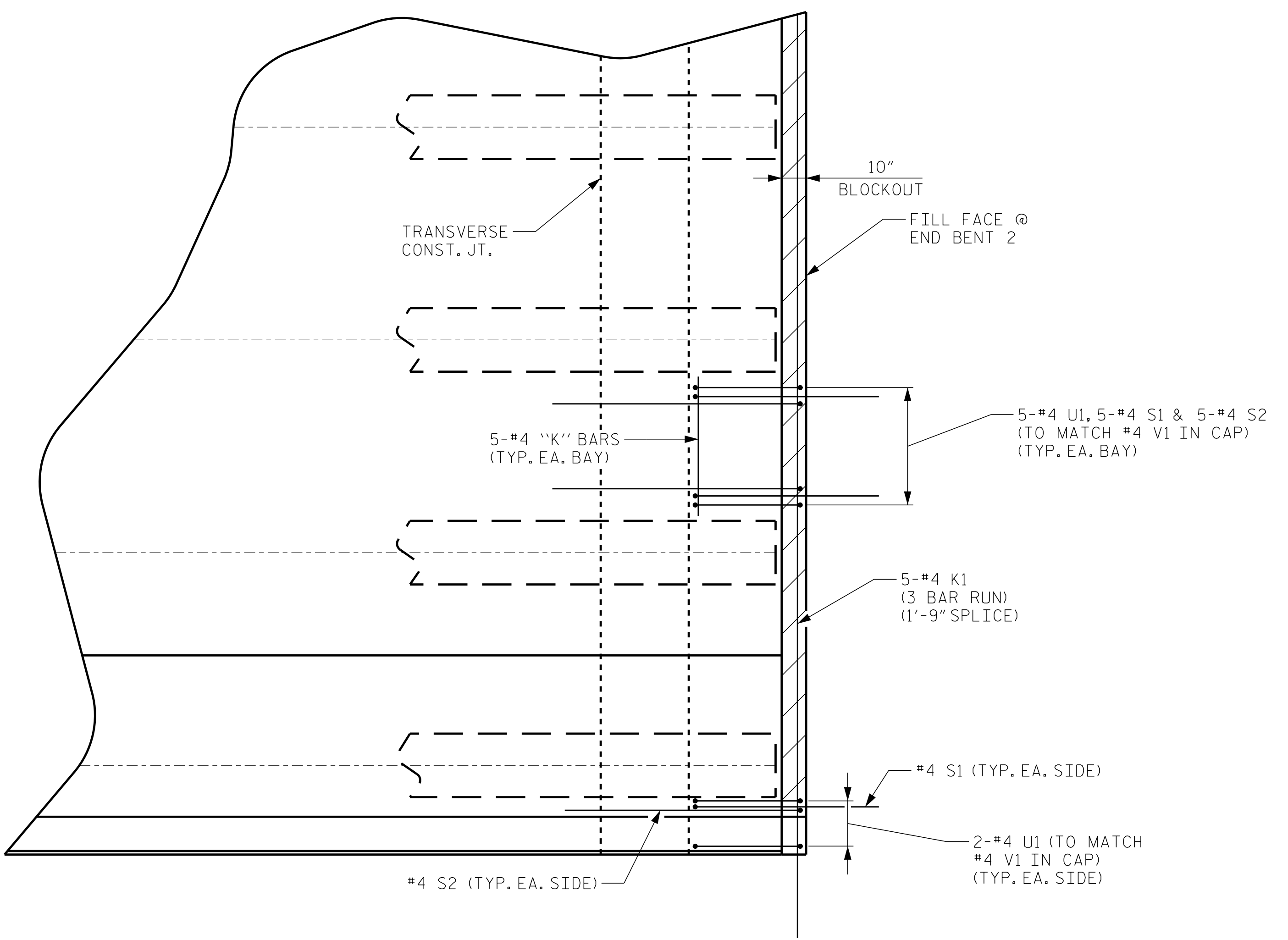
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RALEIGH						TOTAL SHEETS 33
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PLAN OF SPAN						
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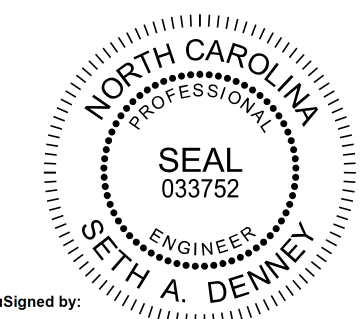
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**END BENT DIAPHRAGM ENLARGEMENT**  
 (END BENT 2 SHOWN, END BENT 1 SIMILAR)

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 2



DocuSigned by:  
 E8EB154CC0ED410  
 1/10/2024

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TOTAL SHEETS: 33

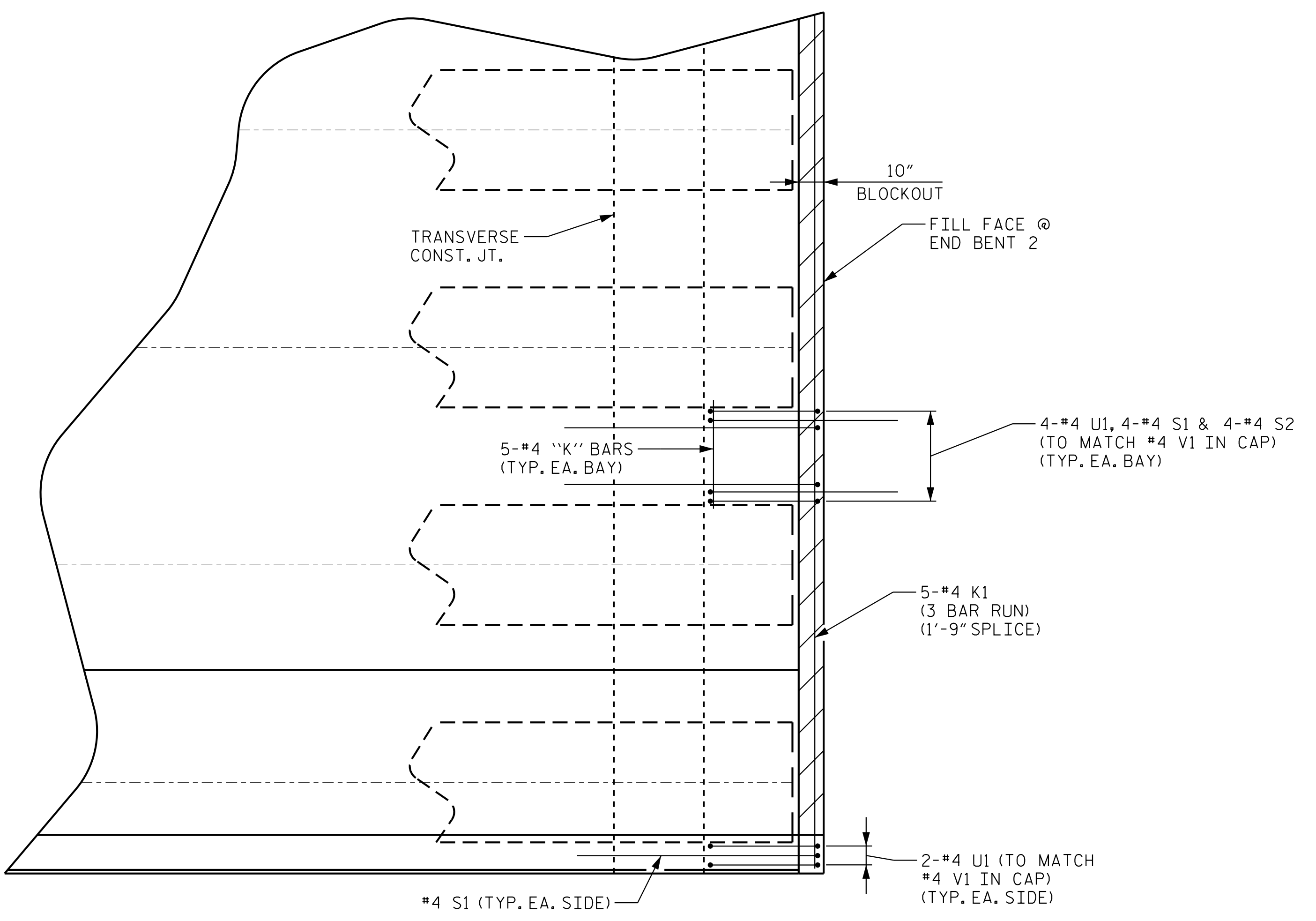
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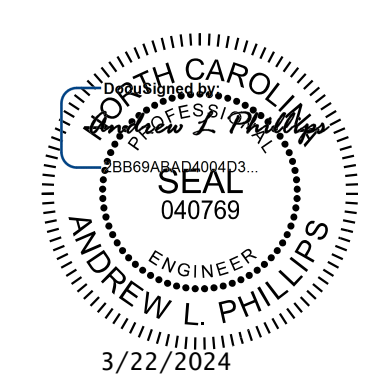




**END BENT DIAPHRAGM ENLARGEMENT**  
 (END BENT 2 SHOWN, END BENT 1 SIMILAR)

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
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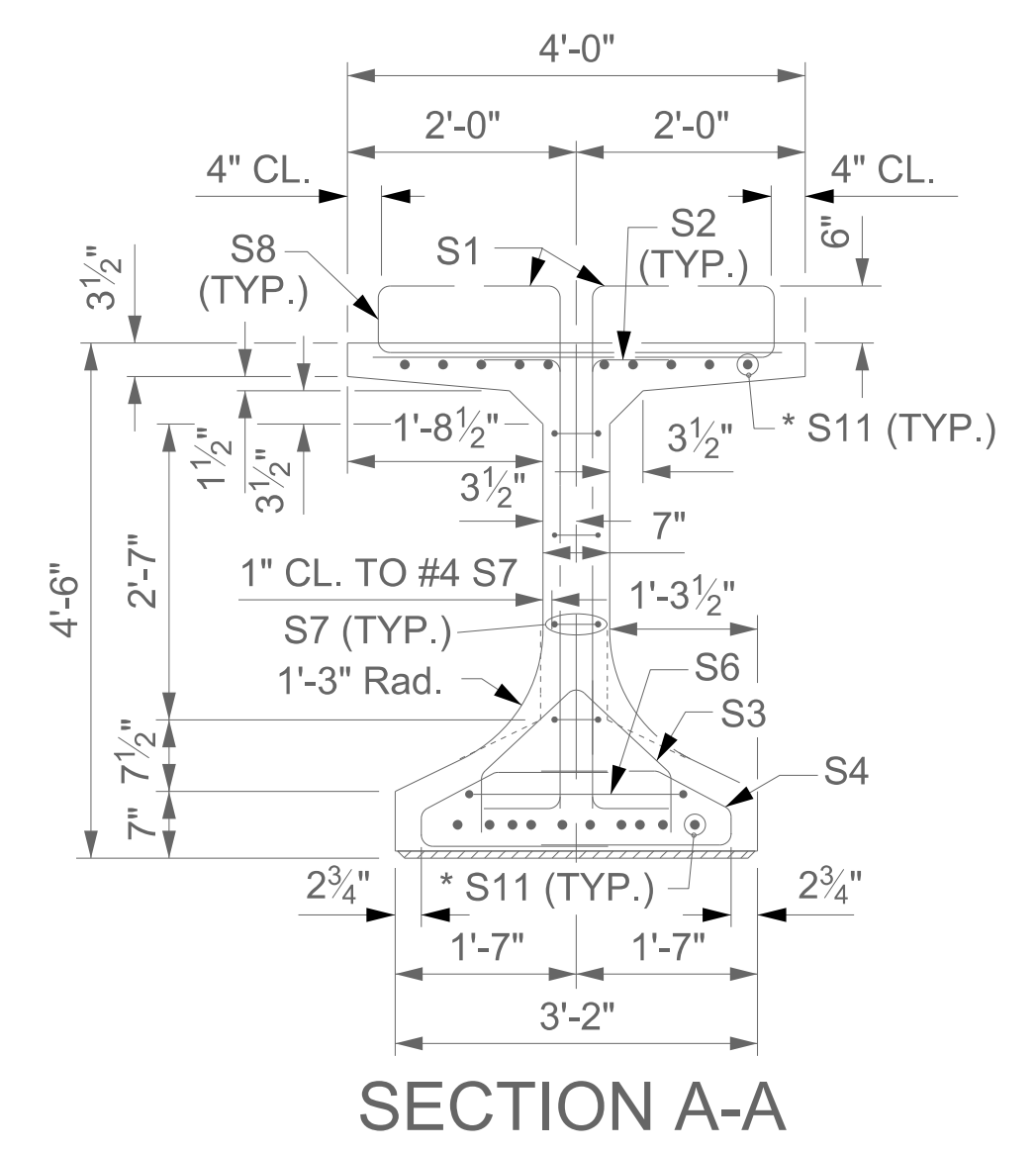
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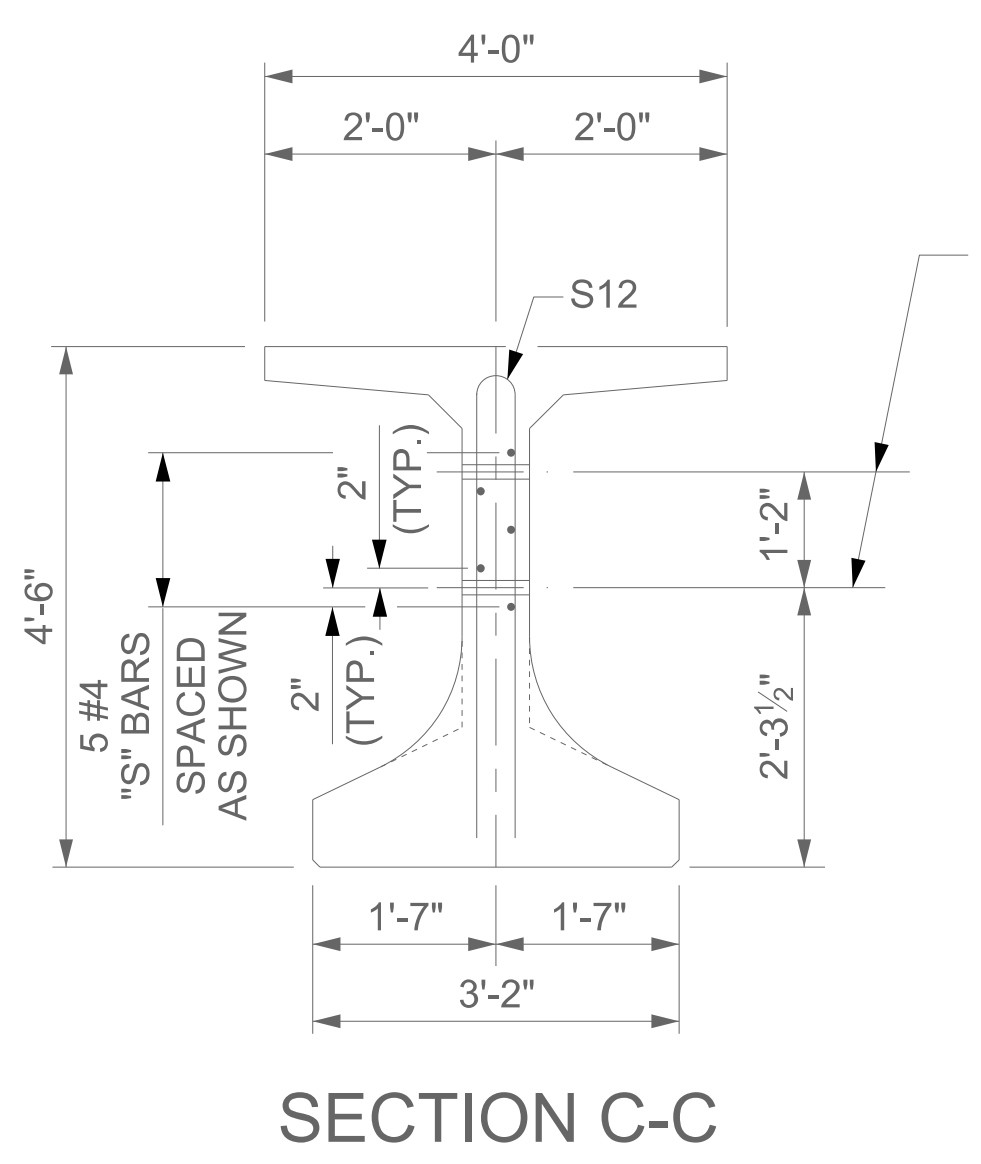
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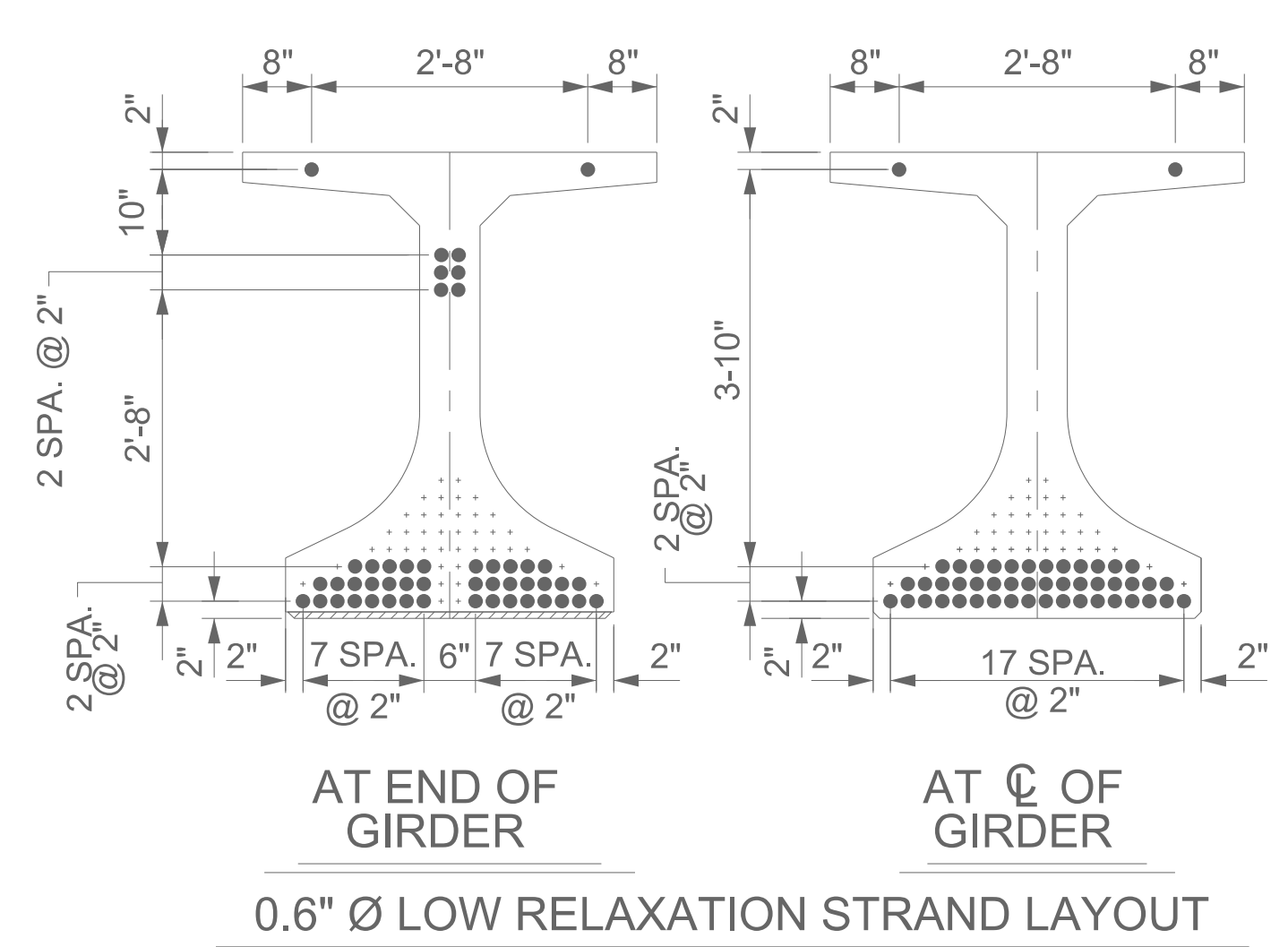
SECTION A-A

\* FOR S11 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



SECTION C-C

(S8, S9 AND S10 BARS NOT SHOWN)



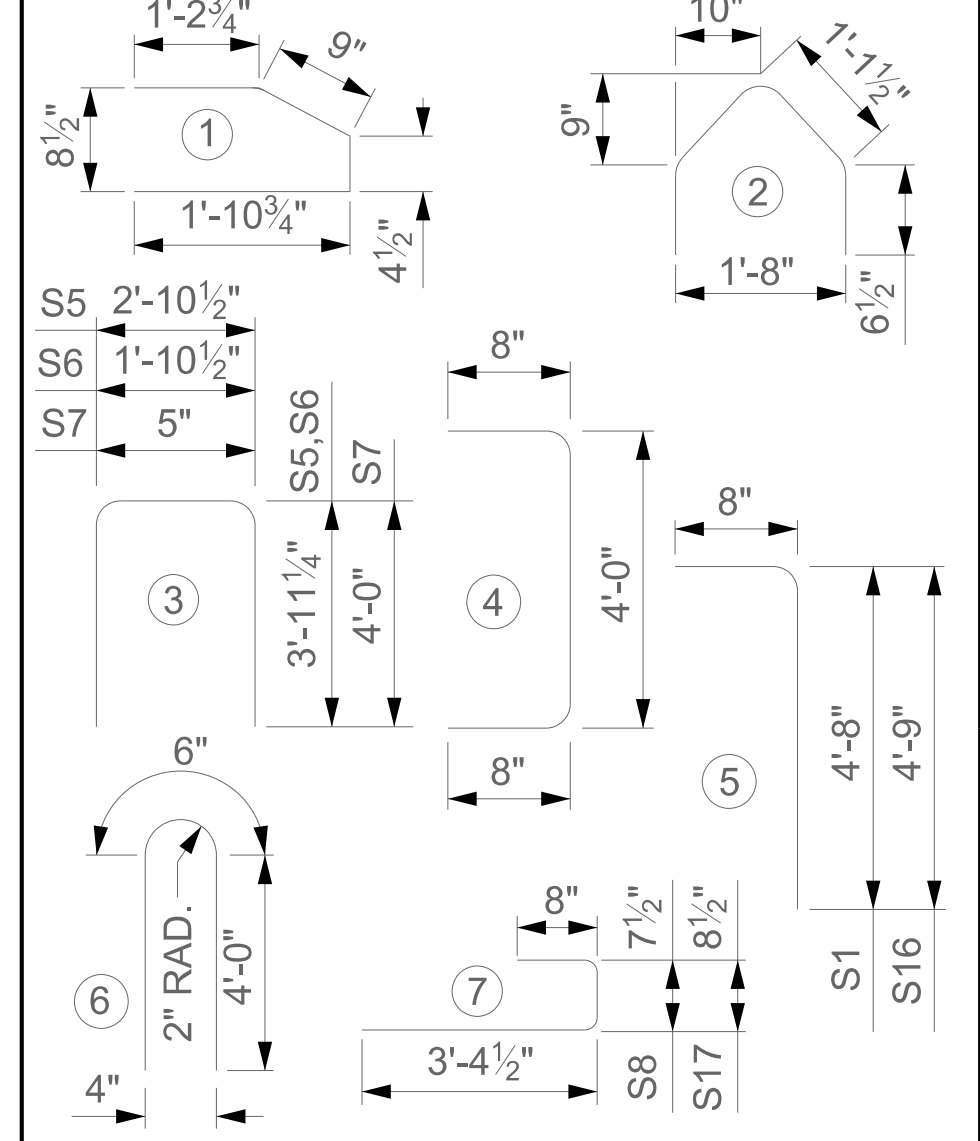
AT END OF GIRDER  
AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- FULLY BONDED STRANDS

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	#5	5	5'-4"	645	
S2	#6	4	5'-4"	224	
S3	#3	2	3'-4"	43	
S4	#3	1	4'-3"	109	
S6	#5	3	9'-9"	20	
S7	#4	3	8'-5"	45	
S8	#5	7	4'-8"	565	
S10	#5	STR	3'-8"	203	
* S11	#6	STR	2'-10"	170	
S12	#5	6	8'-6"	35	
S13	#3	STR	2'-10"	2	
S14	#4	STR	8'-0"	27	
S16	#5	5	5'-5"	542	
S17	#5	7	4'-9"	476	

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
3,106	29.4	48

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
11	122'-5"	1,346'-7"

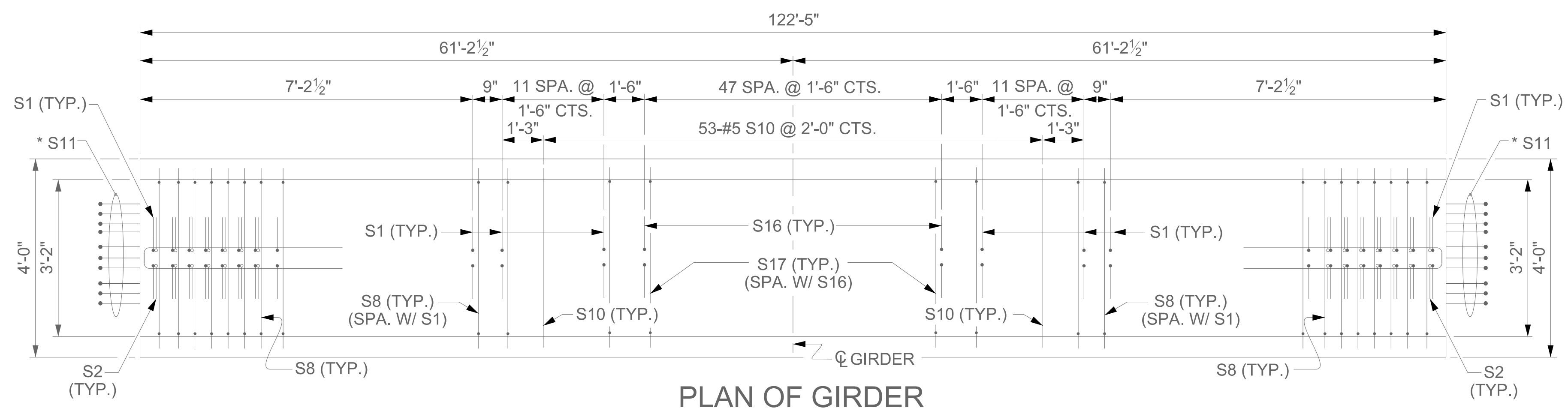
PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

SHEET 1 OF 3

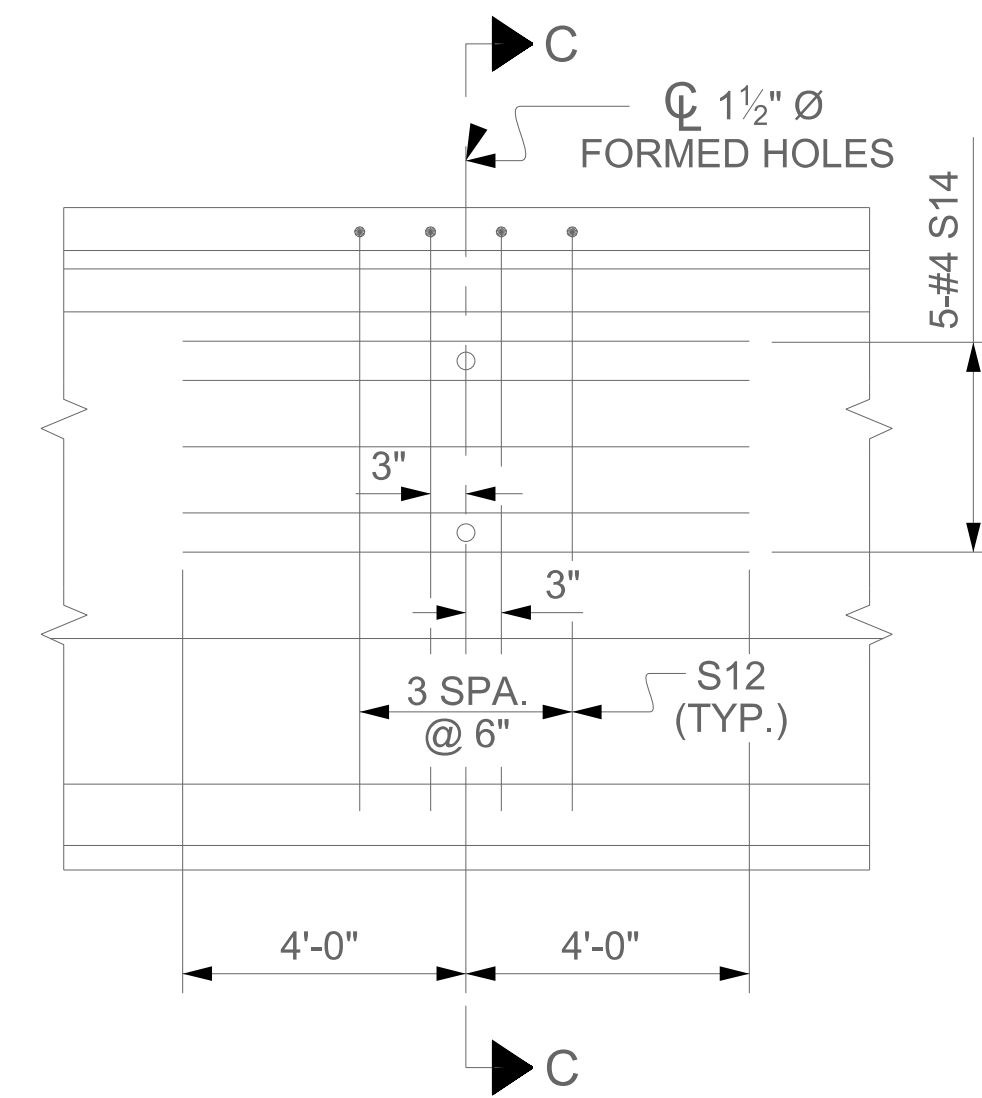
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
54" FIB PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

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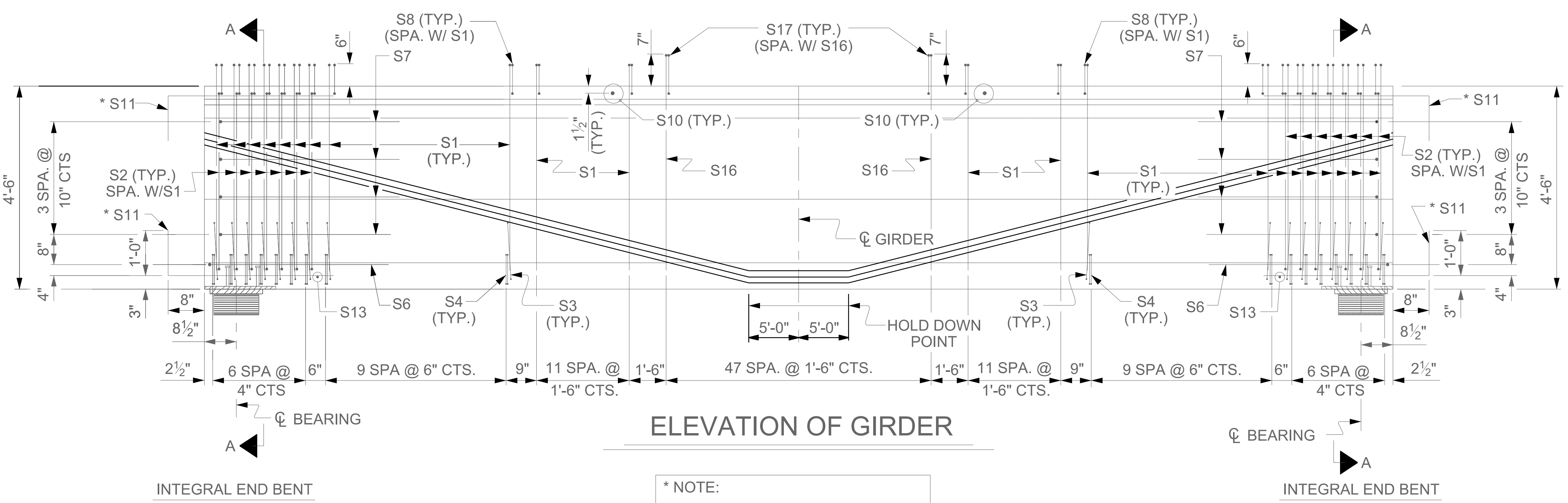


PLAN OF GIRDER



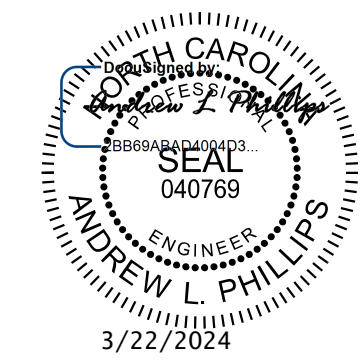
PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-11



ELEVATION OF GIRDER

\* NOTE:  
S11 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



**Kimley Horn**  
421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000  
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ASSEMBLED BY: D.D. LOWERY	DATE: 1/19
CHECKED BY: S.A. DENNEY	DATE: 1/19
DRAWN BY: BNB 09/21	
CHECKED BY: AAI 09/22	



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.

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 SUB SECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

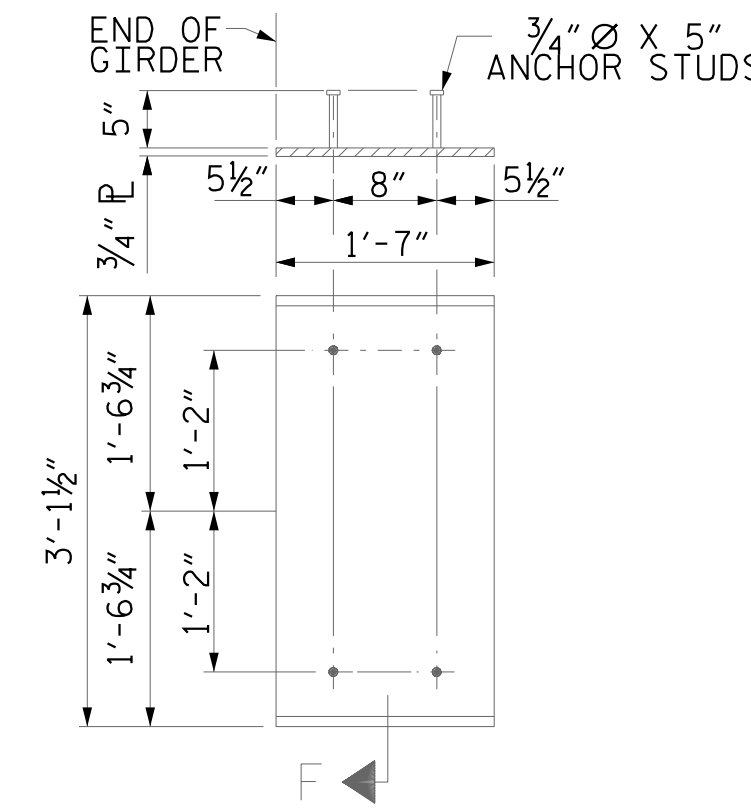
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,000 PSI.

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".

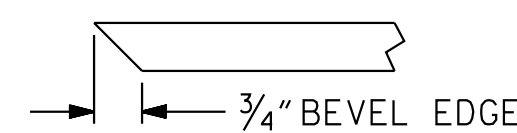
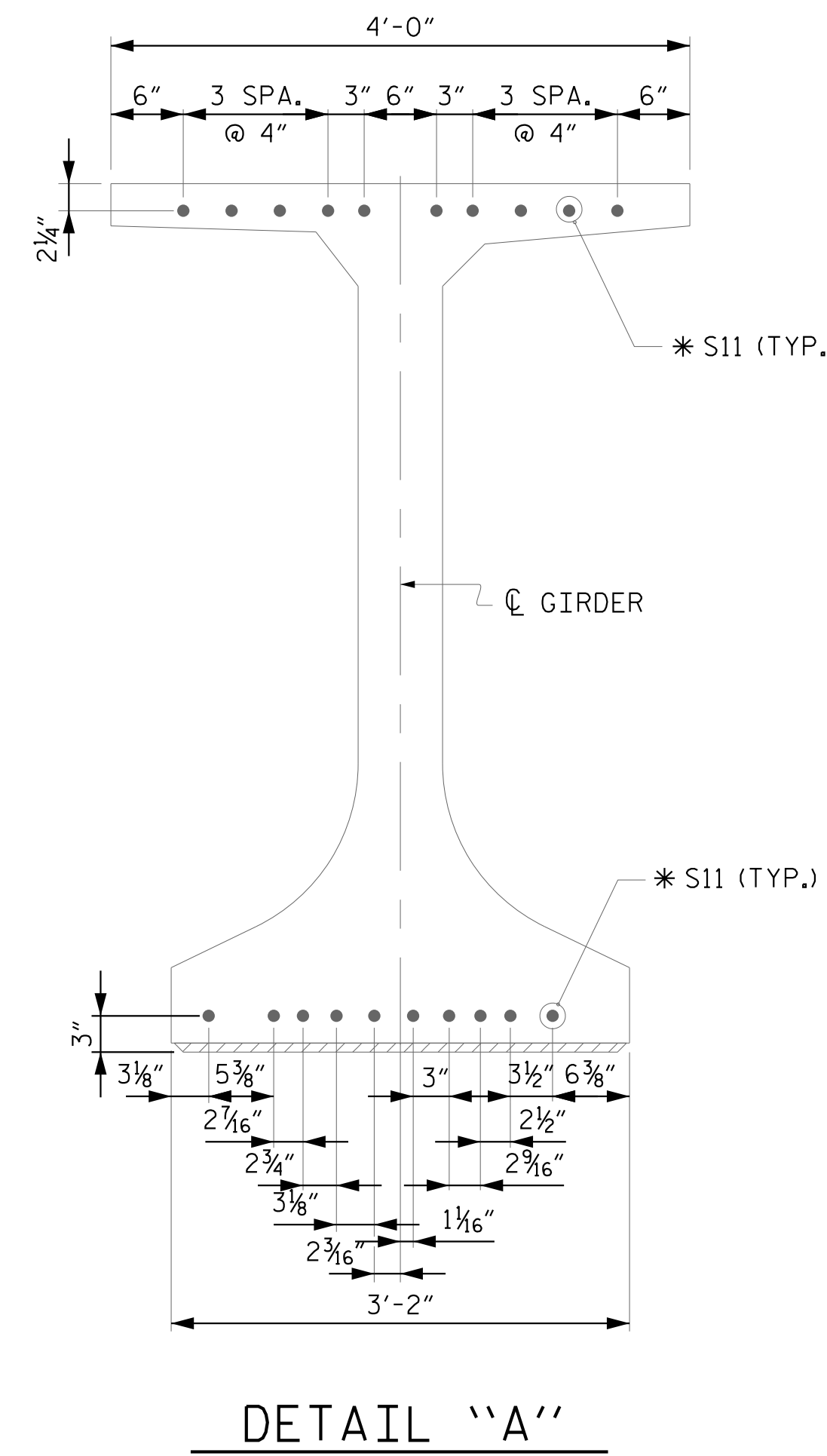
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

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.



EMBEDDED PLATE "B-1" DETAILS FOR FIB GIRDER

(2 REQ'D PER GIRDER)

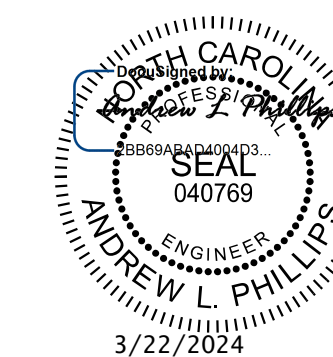


SECTION "F"

(SEE NOTES)

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 3



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

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ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : BMB 05/21	
CHECKED BY : AAI 10/21	

### 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.

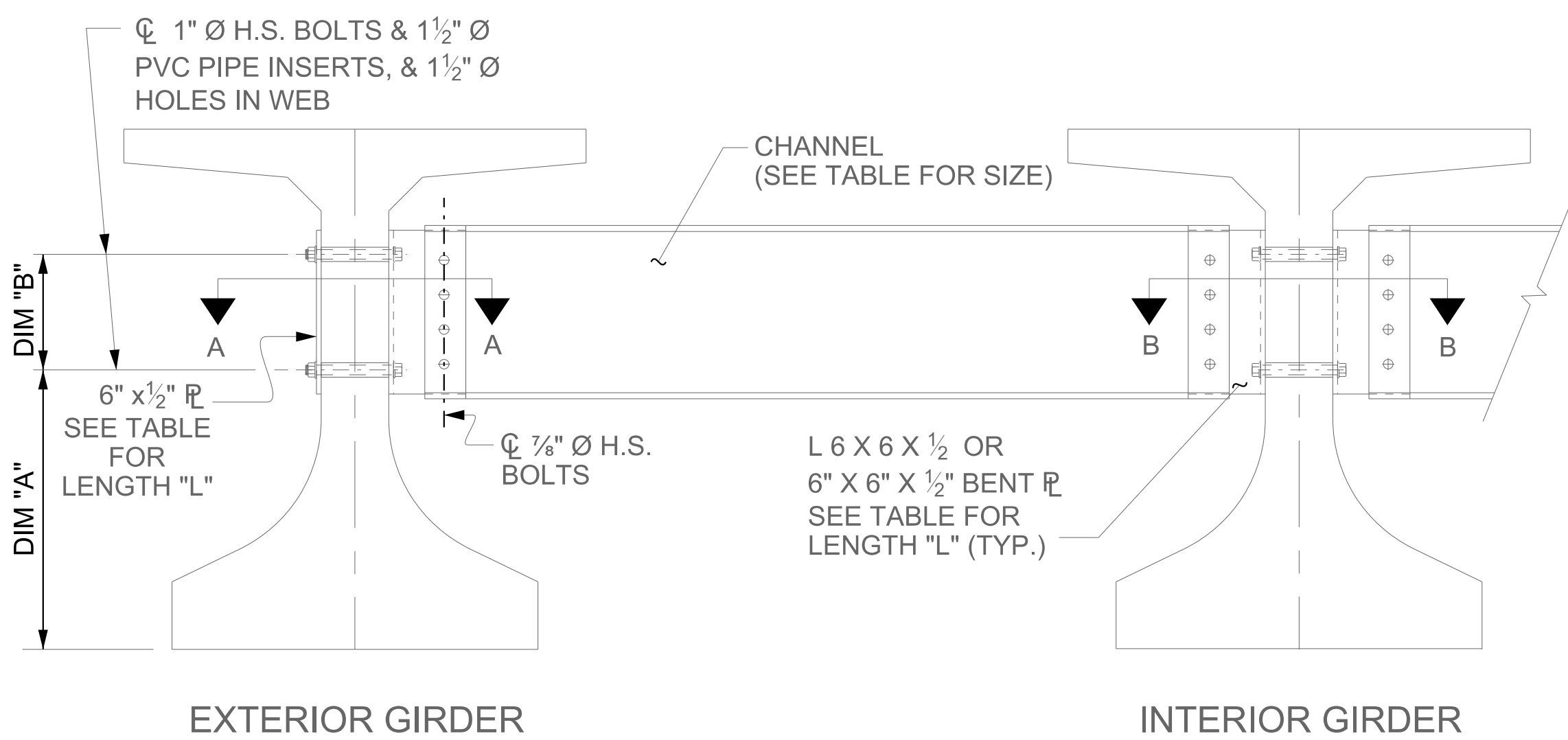
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

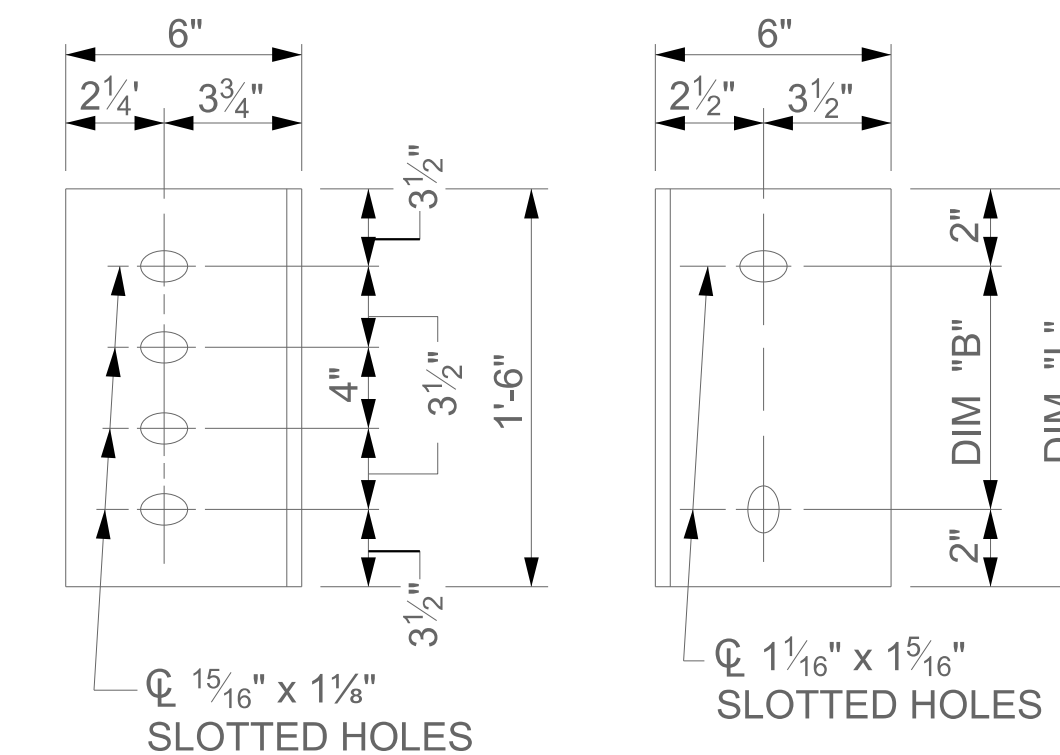
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

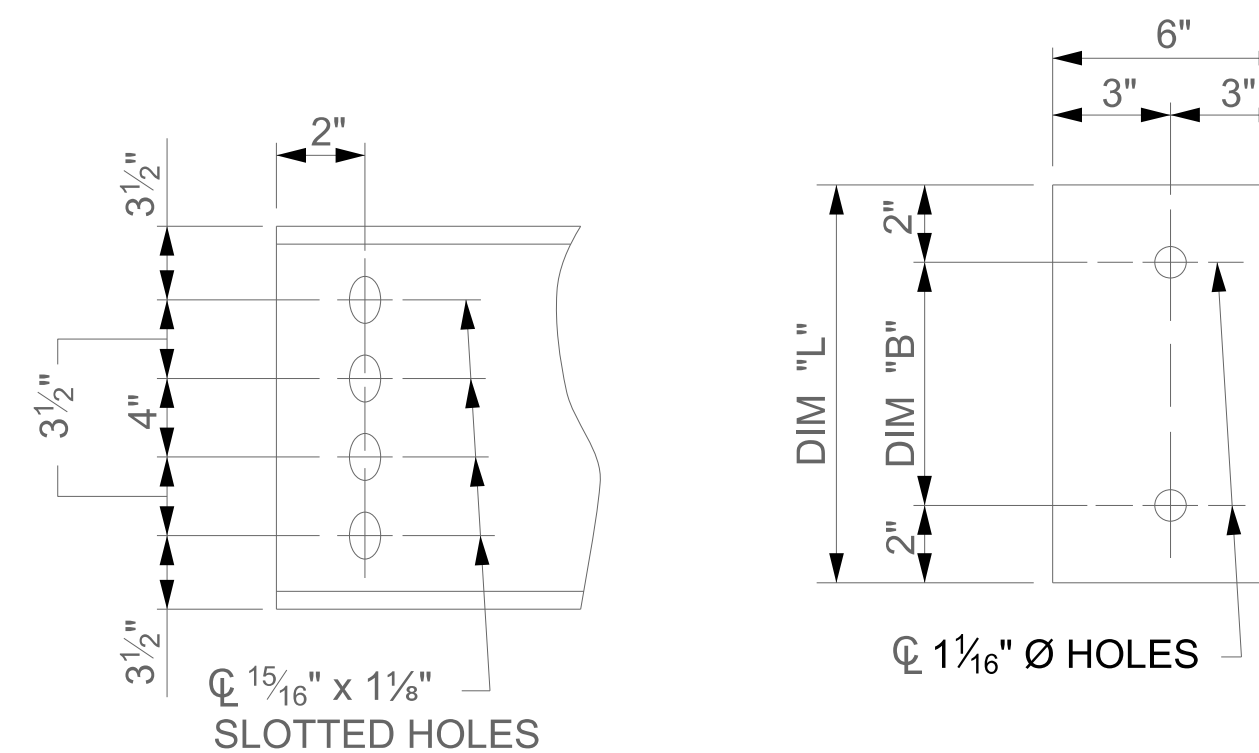


PART SECTION AT INTERMEDIATE DIAPHRAGM

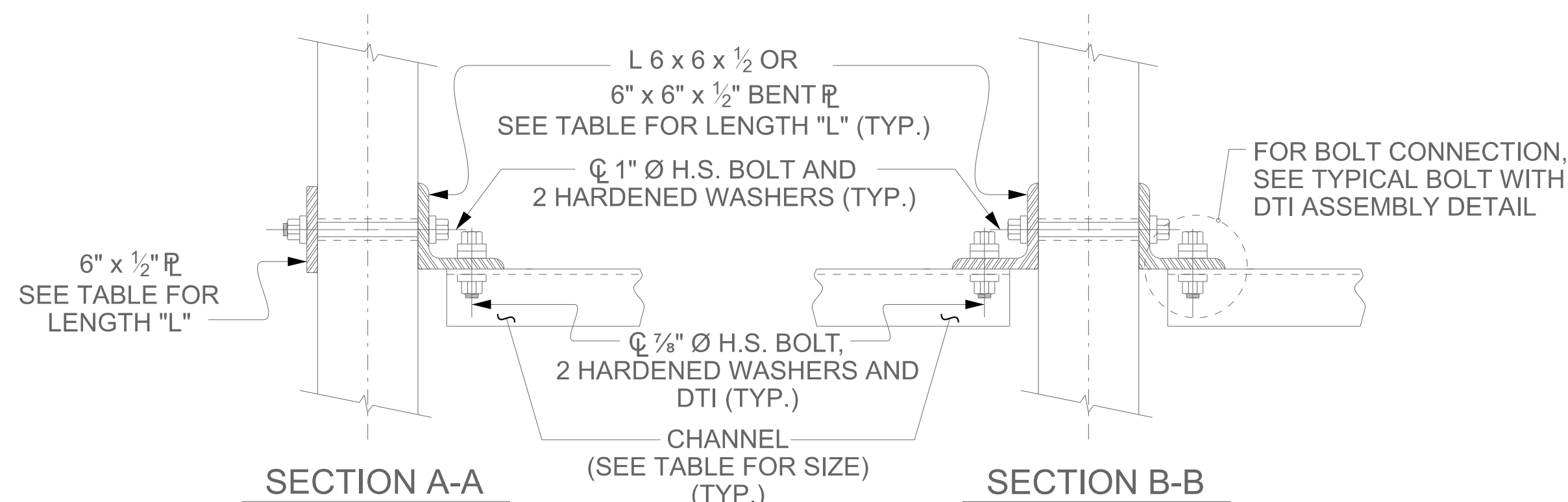


DIAPHRAGM FACE WEB FACE

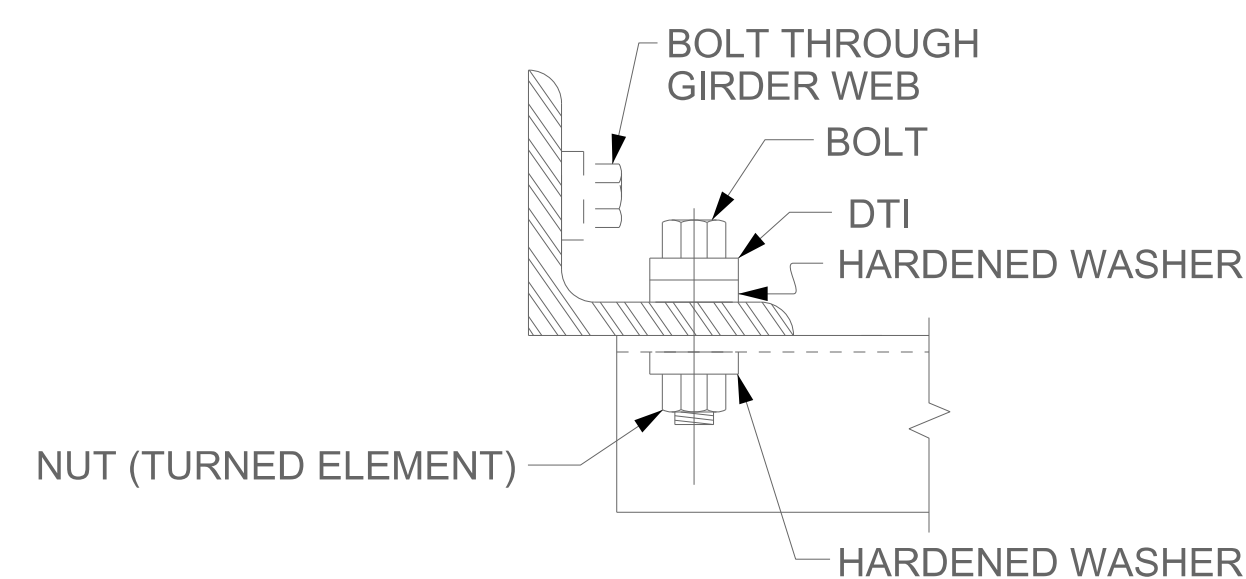
### CONNECTOR PLATE DETAILS



CHANNEL END PLATE DETAILS



CONNECTION DETAILS (FOR SKEW = 90°)



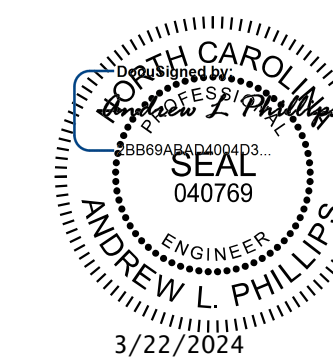
BOLT WITH DTI ASSEMBLY DETAIL

### TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
54" FIB	MC 18 x 42.7	2'-3 1/2"	1'-2"	1'-6"

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 3 OF 3



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 Raleigh, NC 27601-1772  
 Phone (919) 677-2000 NC LICENSE # F-0102

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 INTERMEDIATE  
 STEEL DIAPHRAGMS  
 FOR 54" FIB

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	S-12
1			3		TOTAL SHEETS
2			4		33

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K:\RD1\Structures\Bridges\NC\101036002 - P-5720\Cad\Drawings\5720\_SML\_03\_311494.dgn 3/22/2024

ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : BNB 01/21	
CHECKED BY : AAI 01/21	



DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 30 columns for span A girders AG1 & AG11. Rows include: 0.6" Ø LOW RELAXATION STRANDS, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), \* DEFLECTION DUE TO SUPERIMPOSED D.L., and FINAL CAMBER.

\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS & 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

Table with 30 columns for span A girders AG2 & AG10. Rows include: 0.6" Ø LOW RELAXATION STRANDS, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), \* DEFLECTION DUE TO SUPERIMPOSED D.L., and FINAL CAMBER.

\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS & 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

Table with 30 columns for span A girders AG3 & AG9. Rows include: 0.6" Ø LOW RELAXATION STRANDS, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), \* DEFLECTION DUE TO SUPERIMPOSED D.L., and FINAL CAMBER.

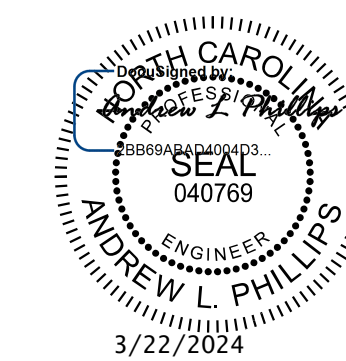
\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS & FUTURE WEARING SURFACE. ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 30 columns for span A girders AG4, AG5, AG6, AG7 & AG8. Rows include: 0.6" Ø LOW RELAXATION STRANDS, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), \* DEFLECTION DUE TO SUPERIMPOSED D.L., and FINAL CAMBER.

\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS & FUTURE WEARING SURFACE. ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. P-5720
WAKE COUNTY
STATION: 32+23.01 -L-



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
GIRDER DEFLECTIONS AND CAMBER
REVISIONS table with columns NO., BY:, DATE:, NO., BY:, DATE:
SHEET NO. S-13
TOTAL SHEETS 33

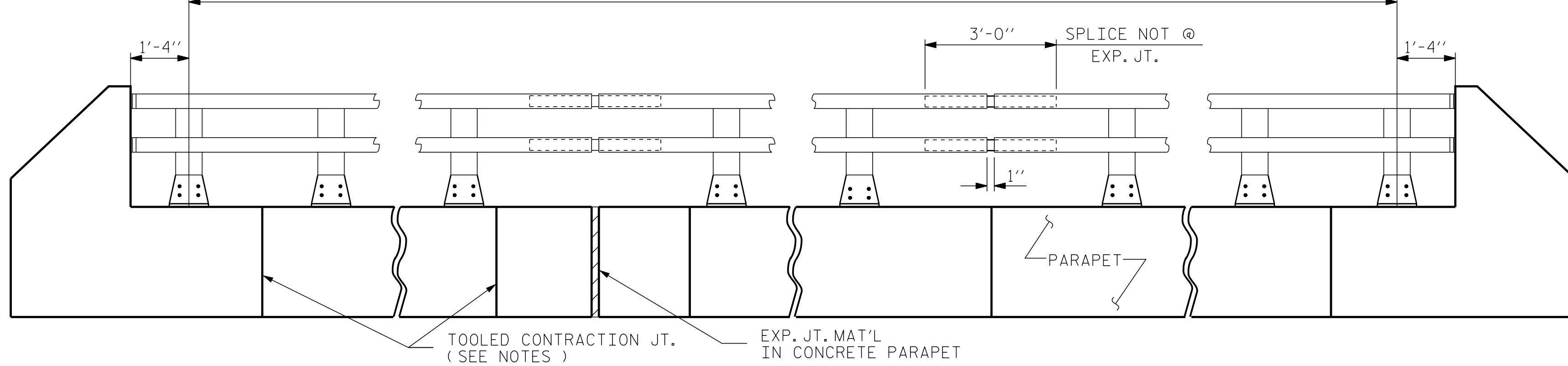
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3/22/2024 K:\RD1\_Structures\Bridges\NC\01036002 - P-5720\Cad\Drawings\5720\_SML\_DL\_91149.dgn

DRAWN BY: J. I. KIMBLE DATE: 1/19
CHECKED BY: M. D. MAGEE DATE: 1/19
DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

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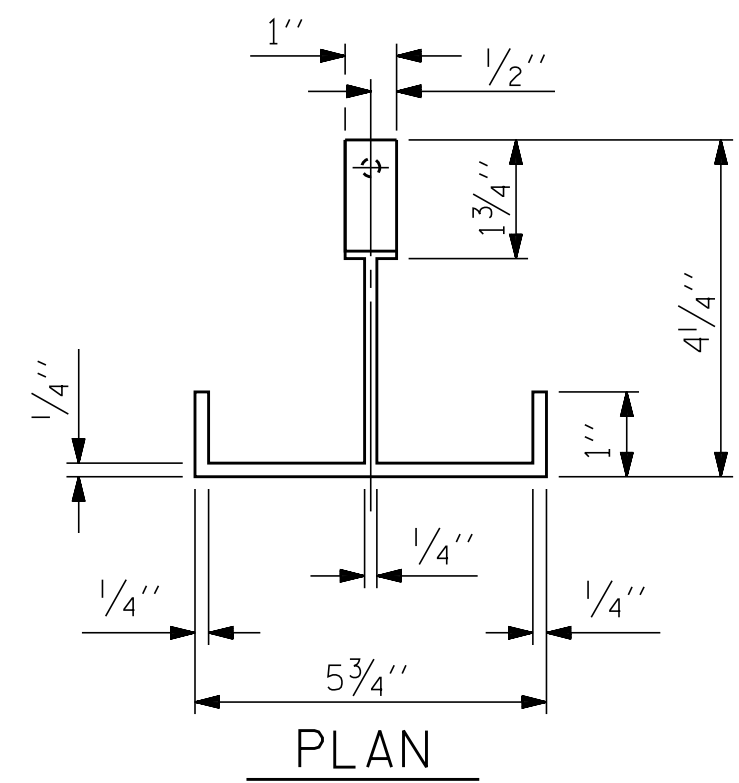
SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET



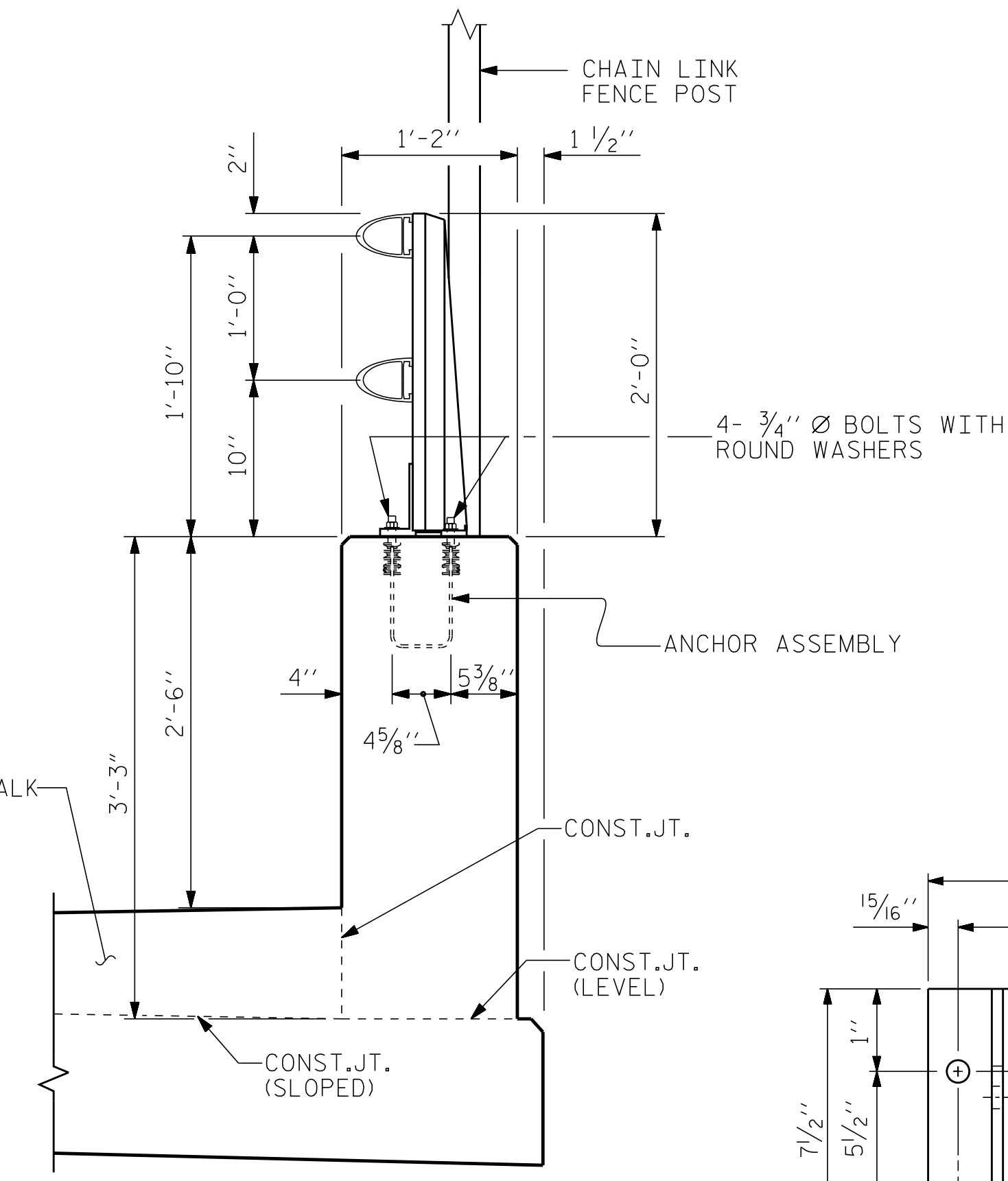
TOOLED CONTRACTION JT. (SEE NOTES)  
EXP. JT. MAT'L IN CONCRETE PARAPET

**ELEVATION**

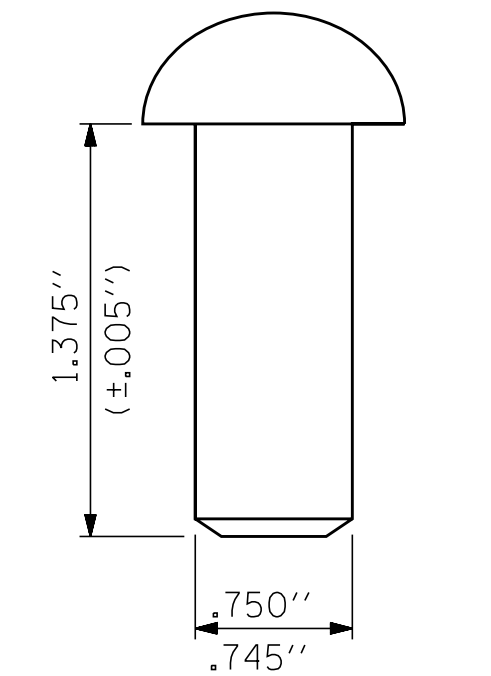
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



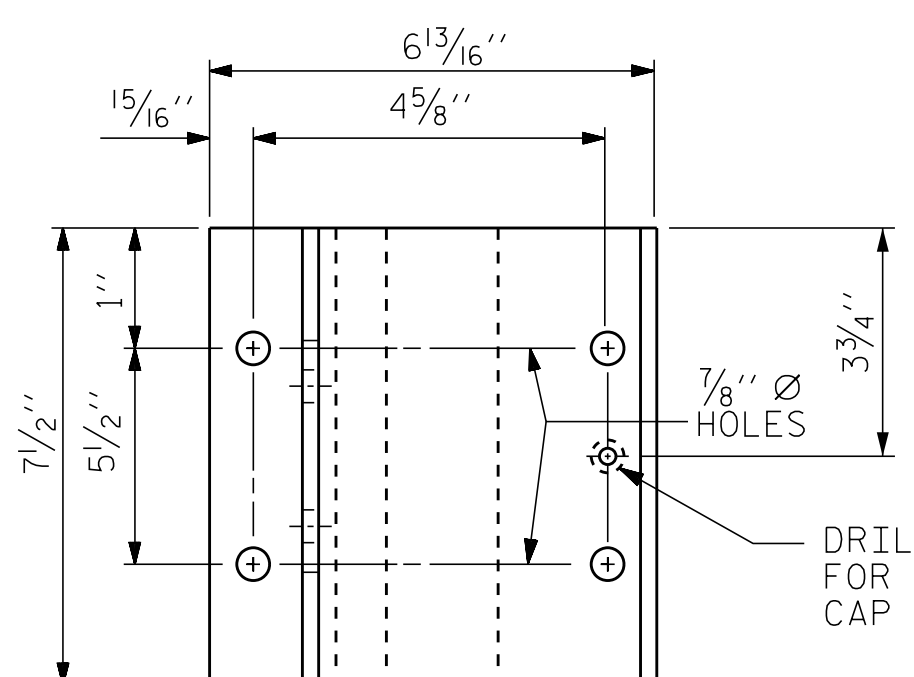
**PLAN**



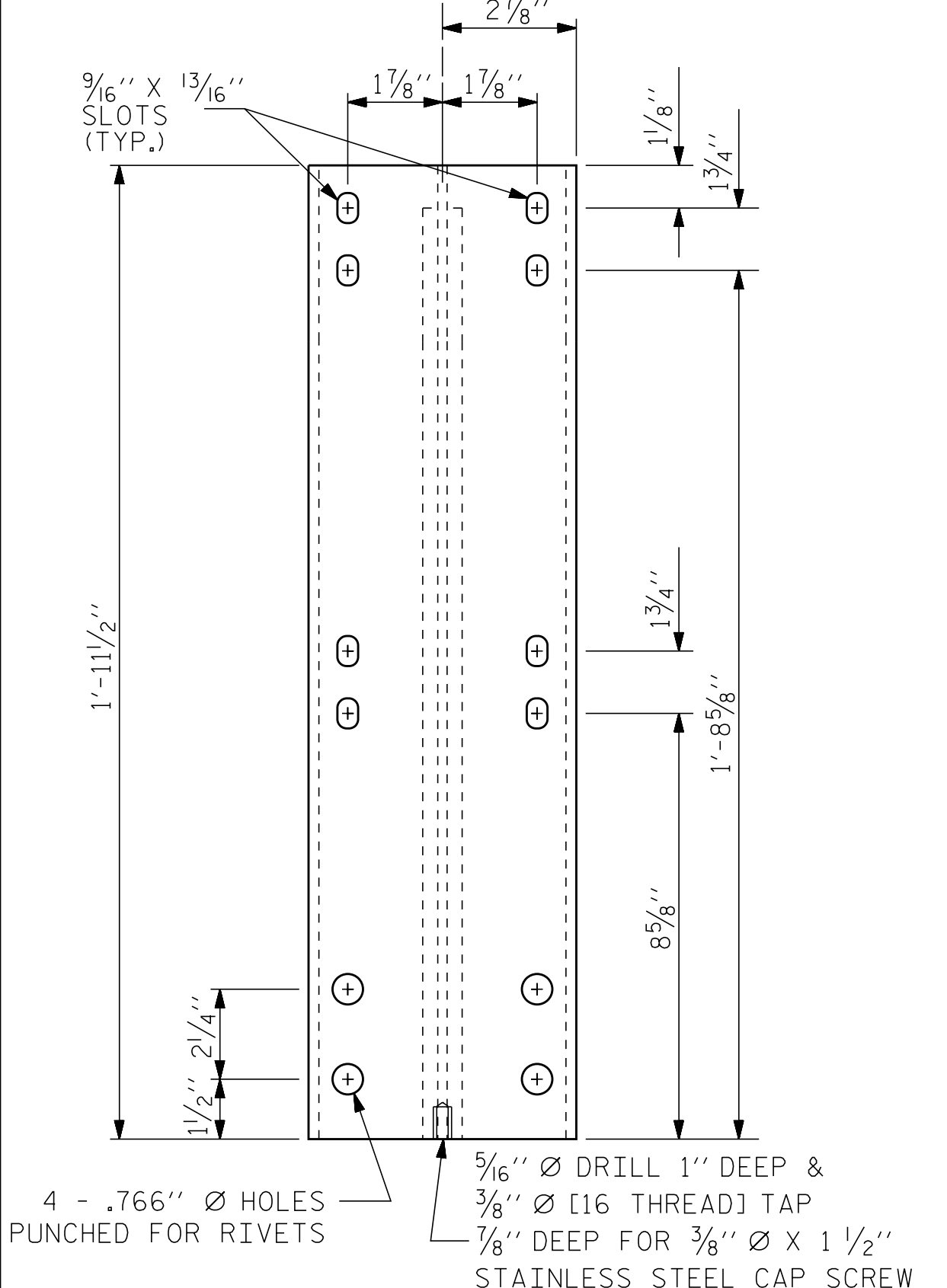
**SECTION THRU PARAPET AND RAIL**



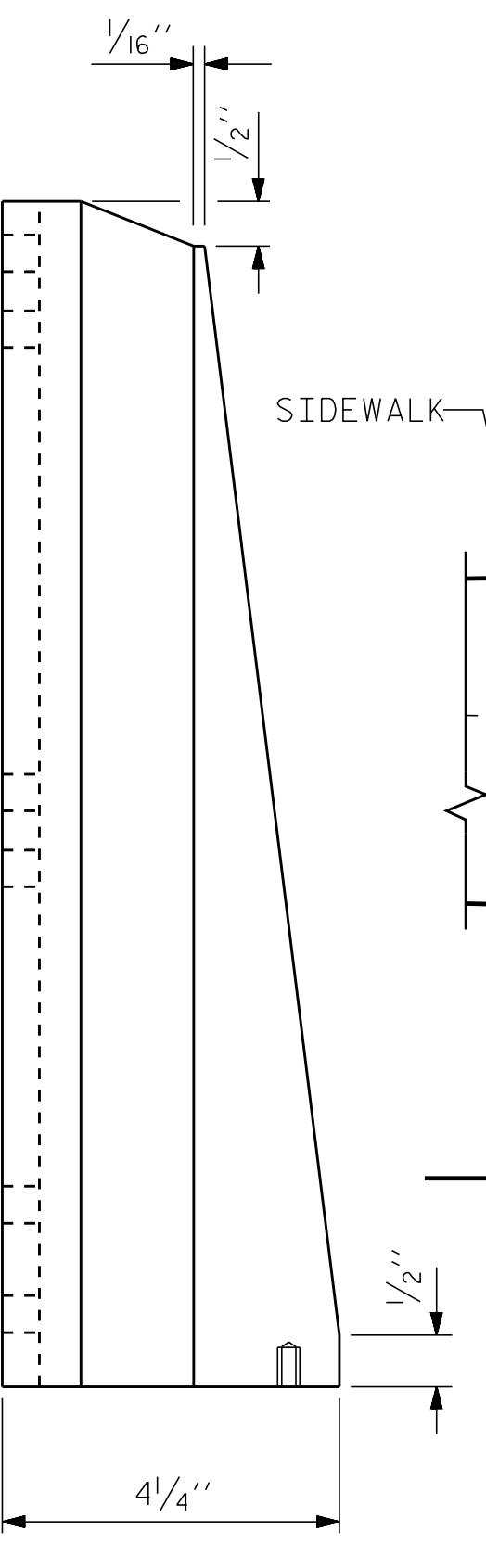
**RIVET DETAIL**



**PLAN**

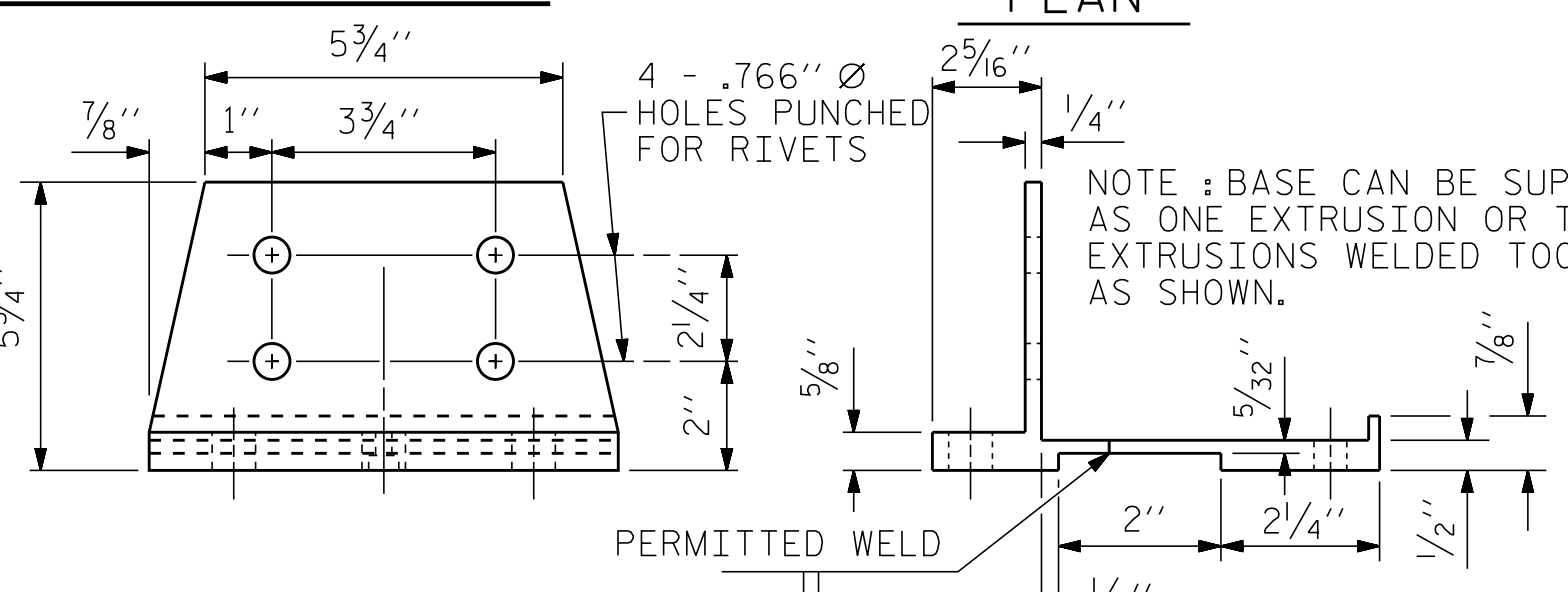


**FRONT ELEVATION**



**SIDE ELEVATION**

**DETAILS OF POST**



**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**

**NOTES**

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

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

**ALUMINUM RAILS**

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

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

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

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

**GENERAL NOTES**

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

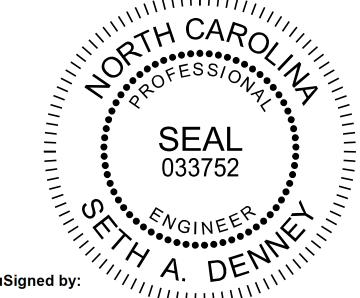
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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

PAY LENGTH = 230.67 LIN. FT.

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

SHEET 1 OF 5



DocuSigned by:  
Seth A. Denney  
E8EB15AC0E8D410  
1/10/2024

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STATE OF NORTH CAROLINA  
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RALEIGH  
STANDARD  
2 BAR METAL RAIL

REVISIONS				SHEET NO.
NO.	BY:	DATE:	DATE:	S-15
1				TOTAL SHEETS
2				33

ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : EEM	6/94
CHECKED BY : RCW	6/94
REV. 10/17/11	MAA/GM
REV. 6/13	MAA/GM
REV. 12/17	MAA/THC

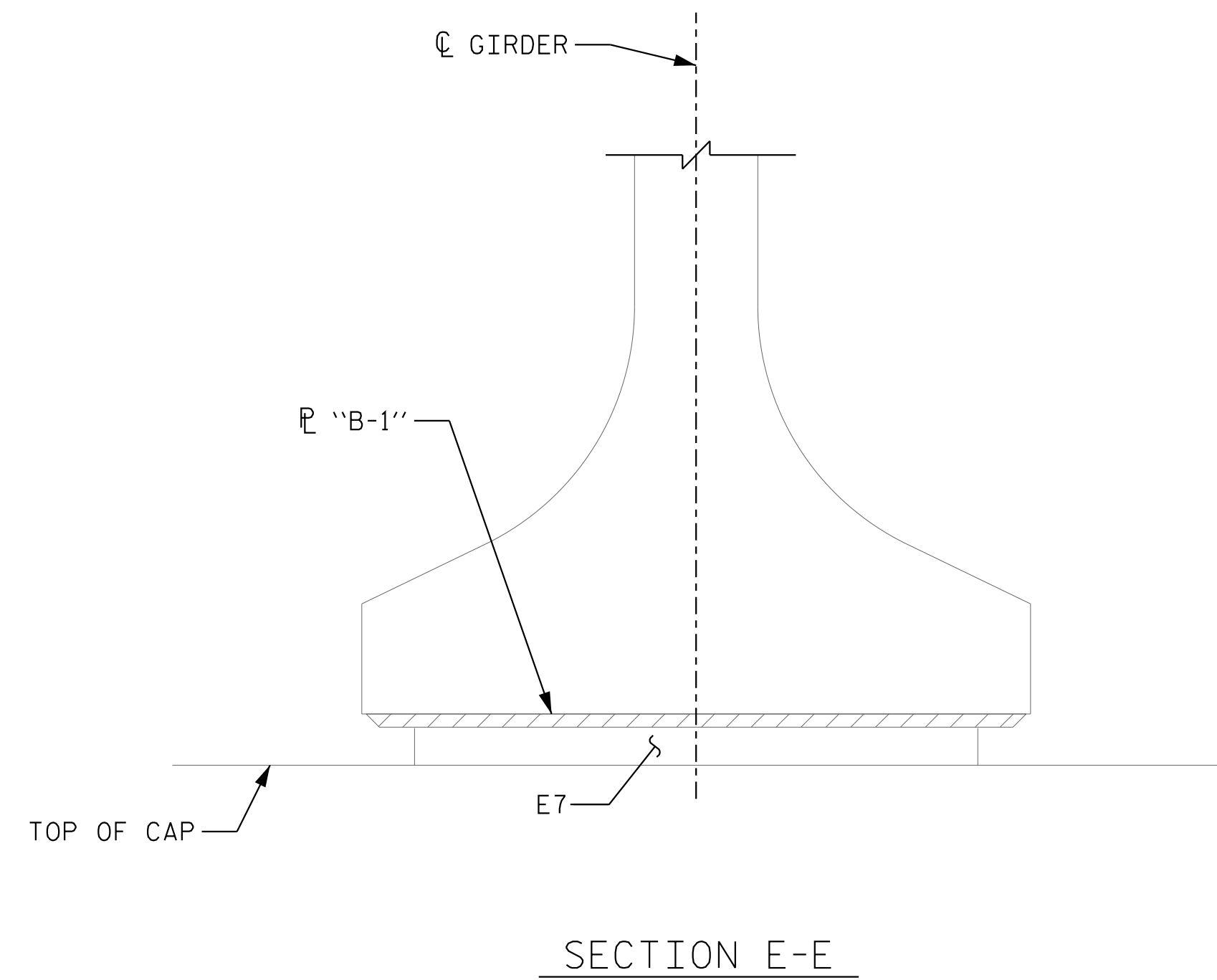
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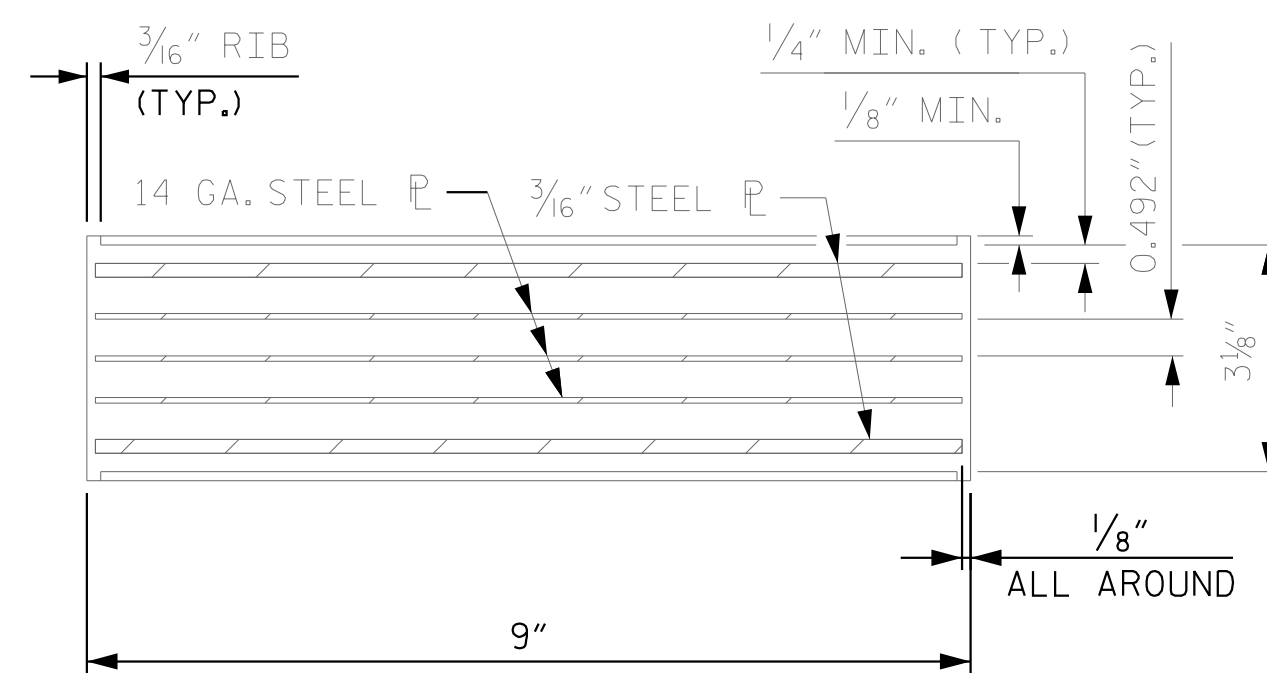
**NOTES**

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

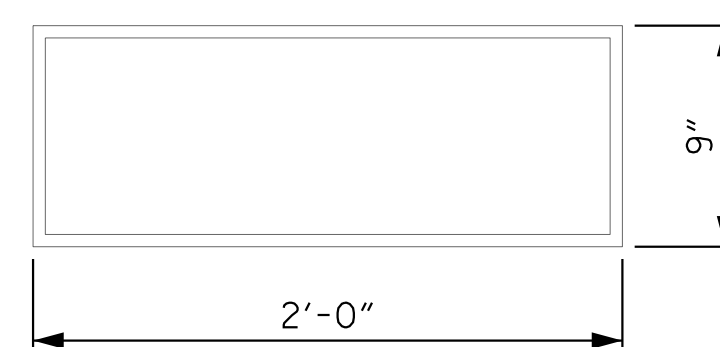
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.



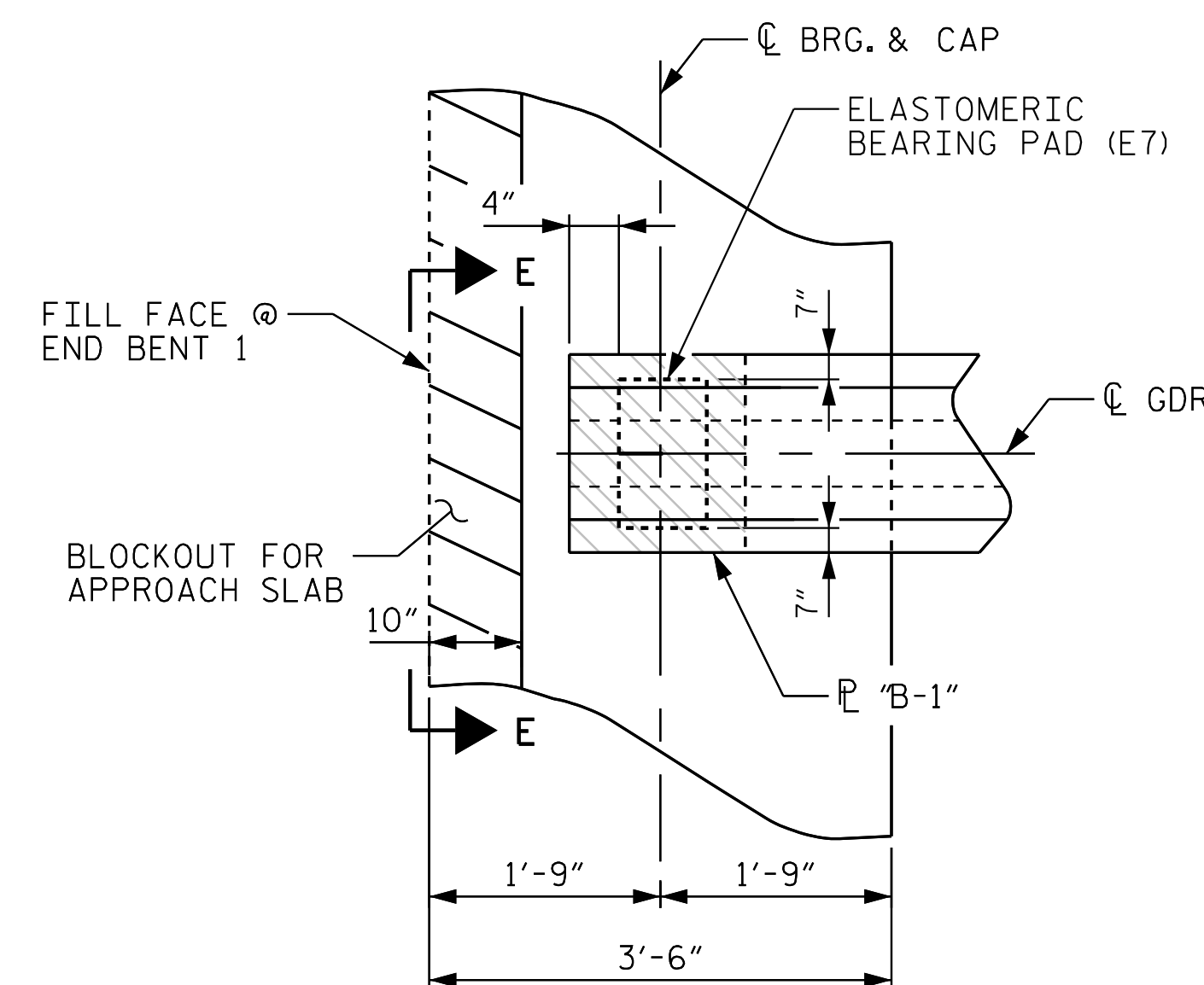
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE VIII	390 K
MAXIMUM ALLOWABLE EXPANSION LENGTH	
TYPE VIII	225 FT.



TYPICAL SECTION OF ELASTOMERIC BEARINGS

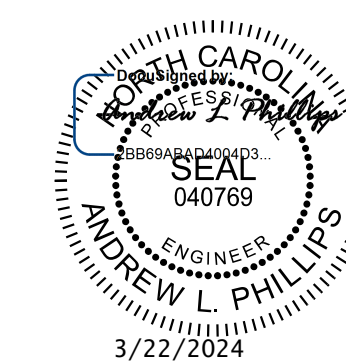


E7 (22 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE VIII



PLAN VIEW AT INTEGRAL END BENT  
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
ELASTOMERIC BEARING  
DETAILS  
FIB SUPERSTRUCTURE

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

TOTAL SHEETS: 33

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ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : WJH 8/89	REV. 1/15 MAA/TMG
CHECKED BY : CRK 8/89	REV. 12/17 MAA/THC
	REV. 10/21 BNB/AAI

**NOTES**

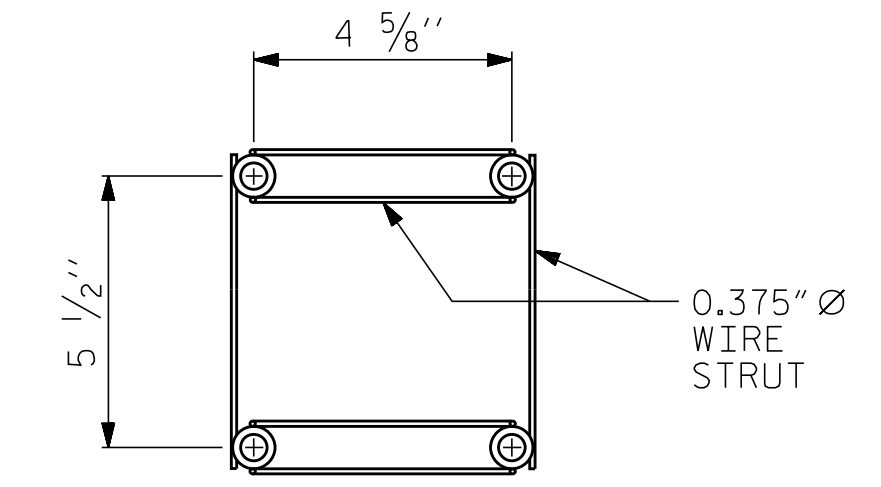
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

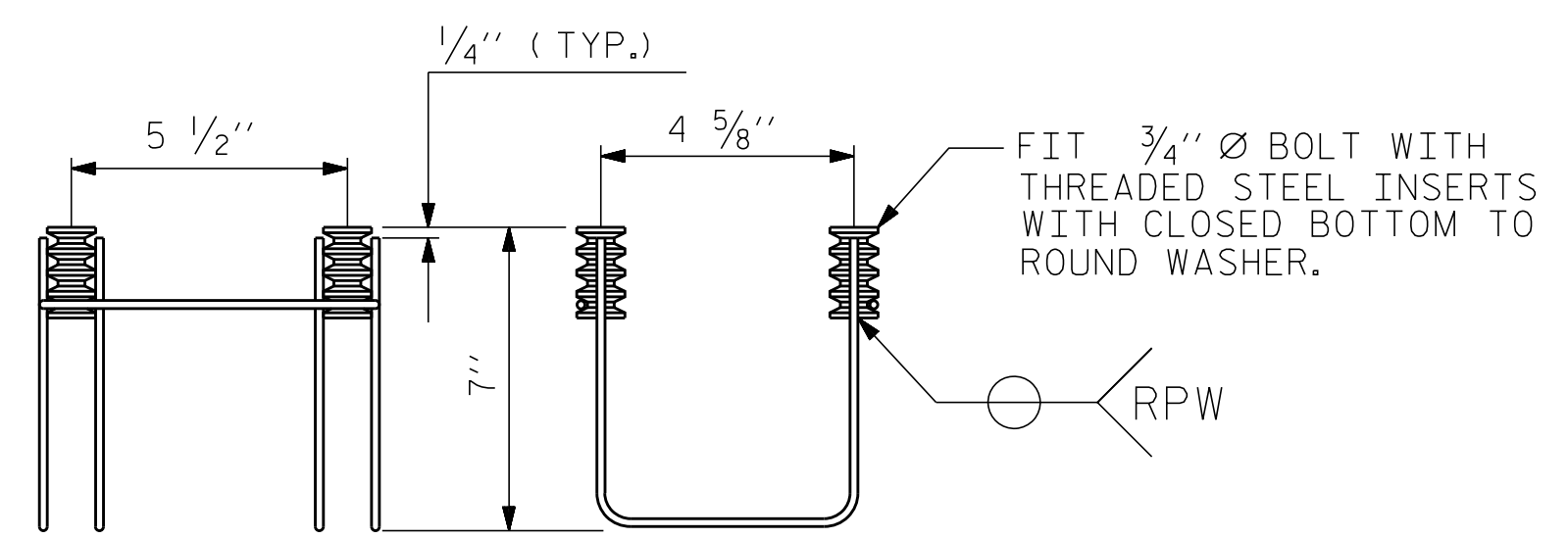
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

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



PLAN

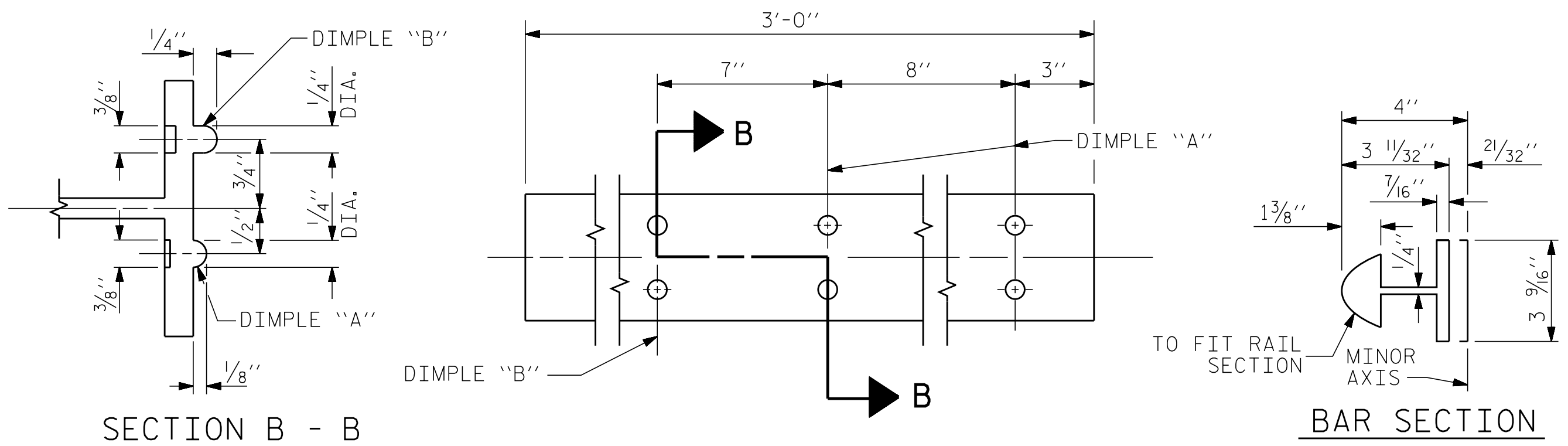


SIDE VIEW

ELEVATION

**4-BOLT METAL RAIL ANCHOR ASSEMBLY**

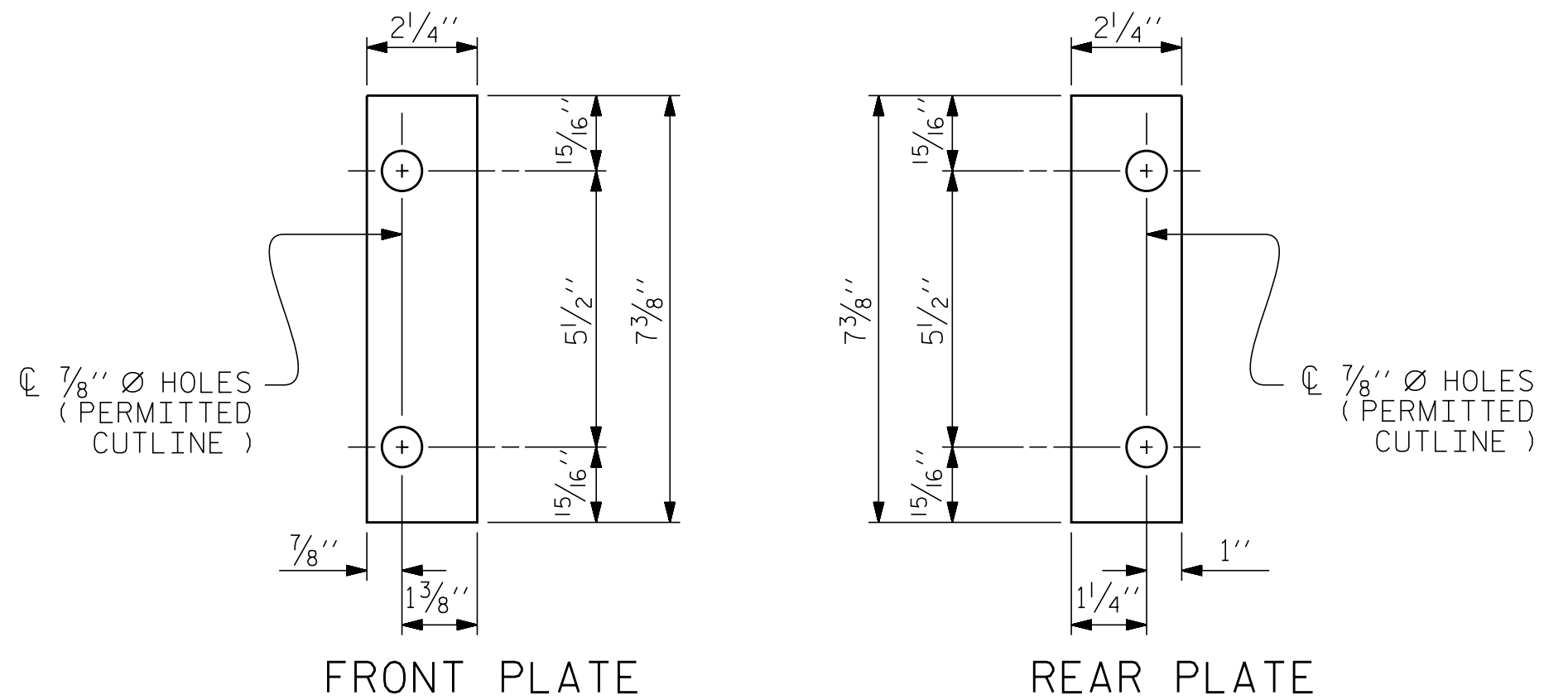
(44 ASSEMBLIES REQUIRED)



SECTION B - B

EXPANSION BAR DETAILS

BAR SECTION

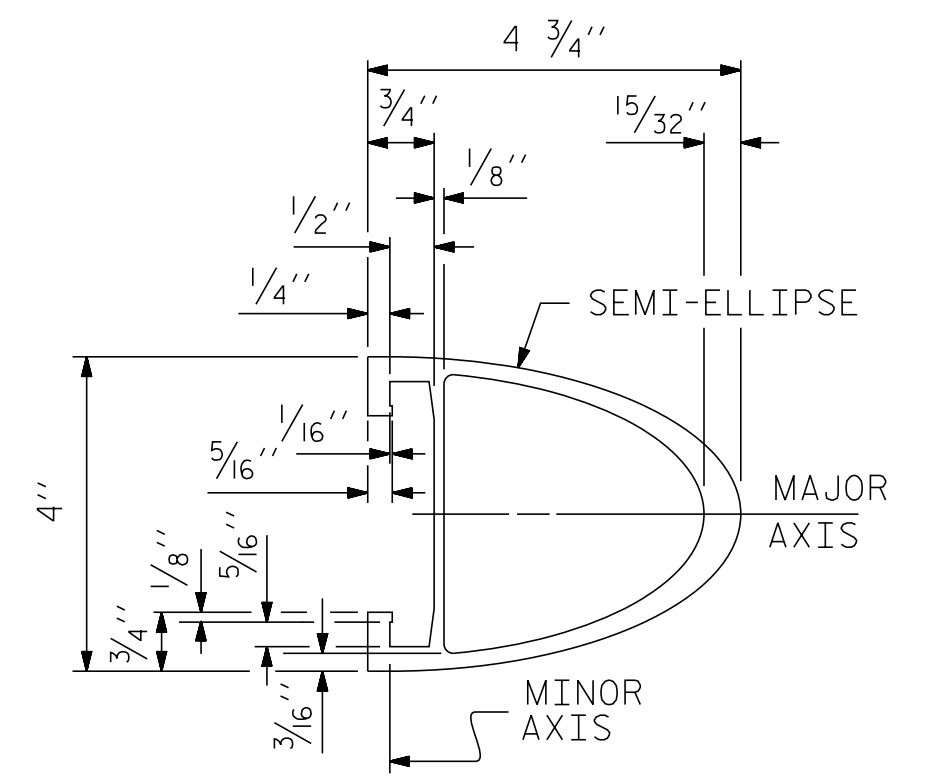


FRONT PLATE

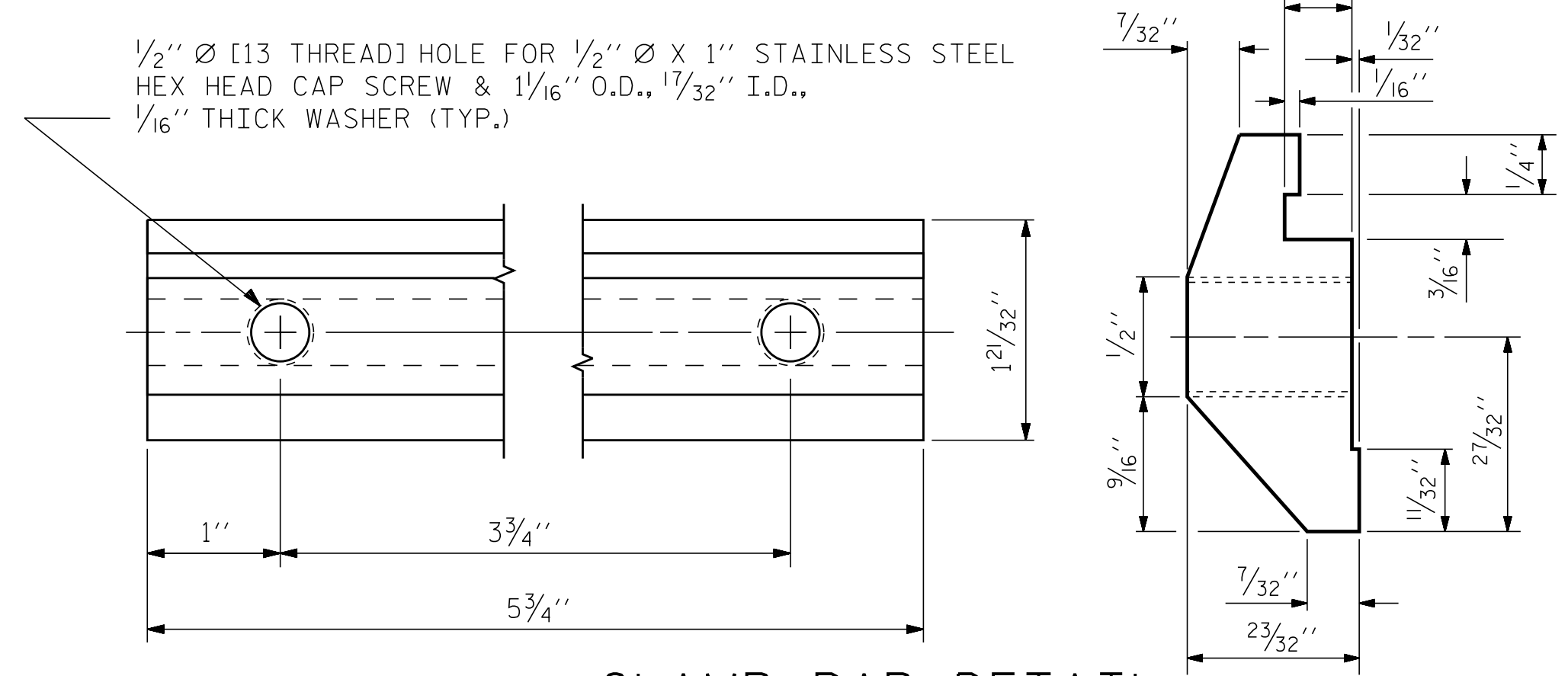
REAR PLATE

**SHIM DETAILS**

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

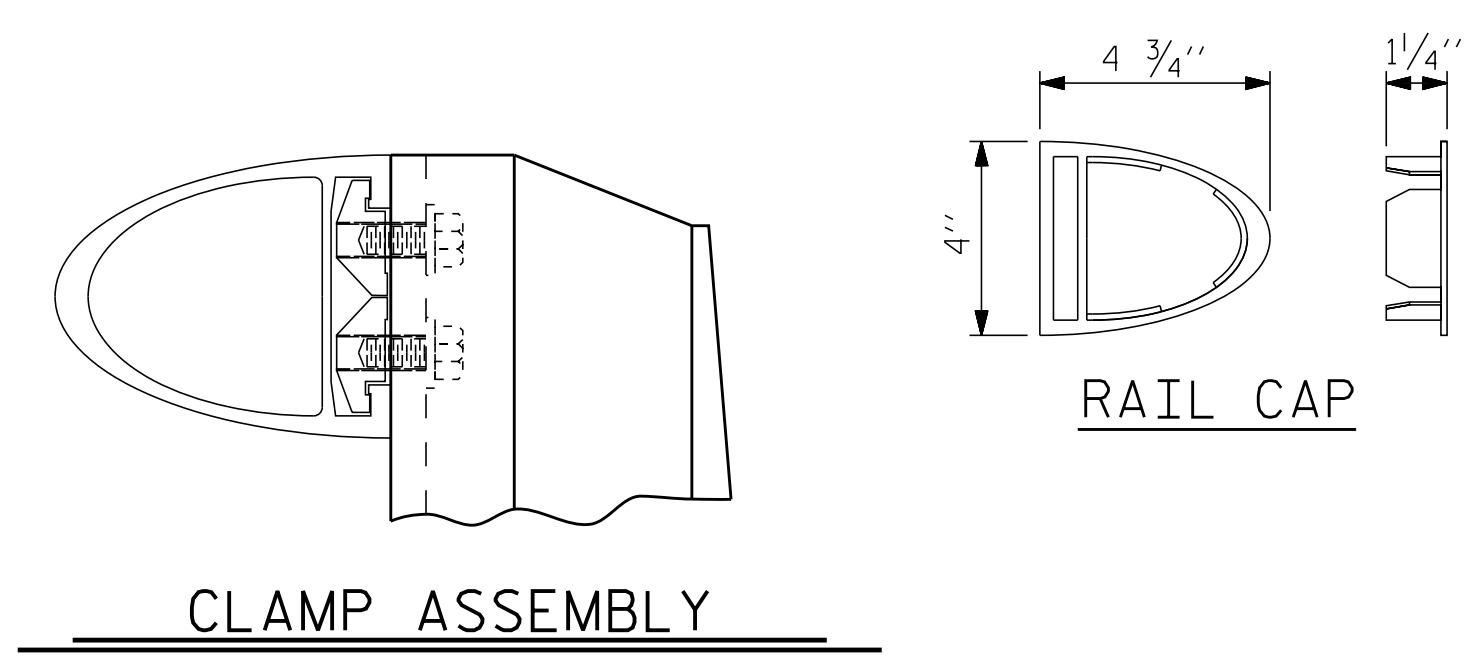


RAIL SECTION



CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

RAIL CAP



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PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

SHEET 2 OF 5

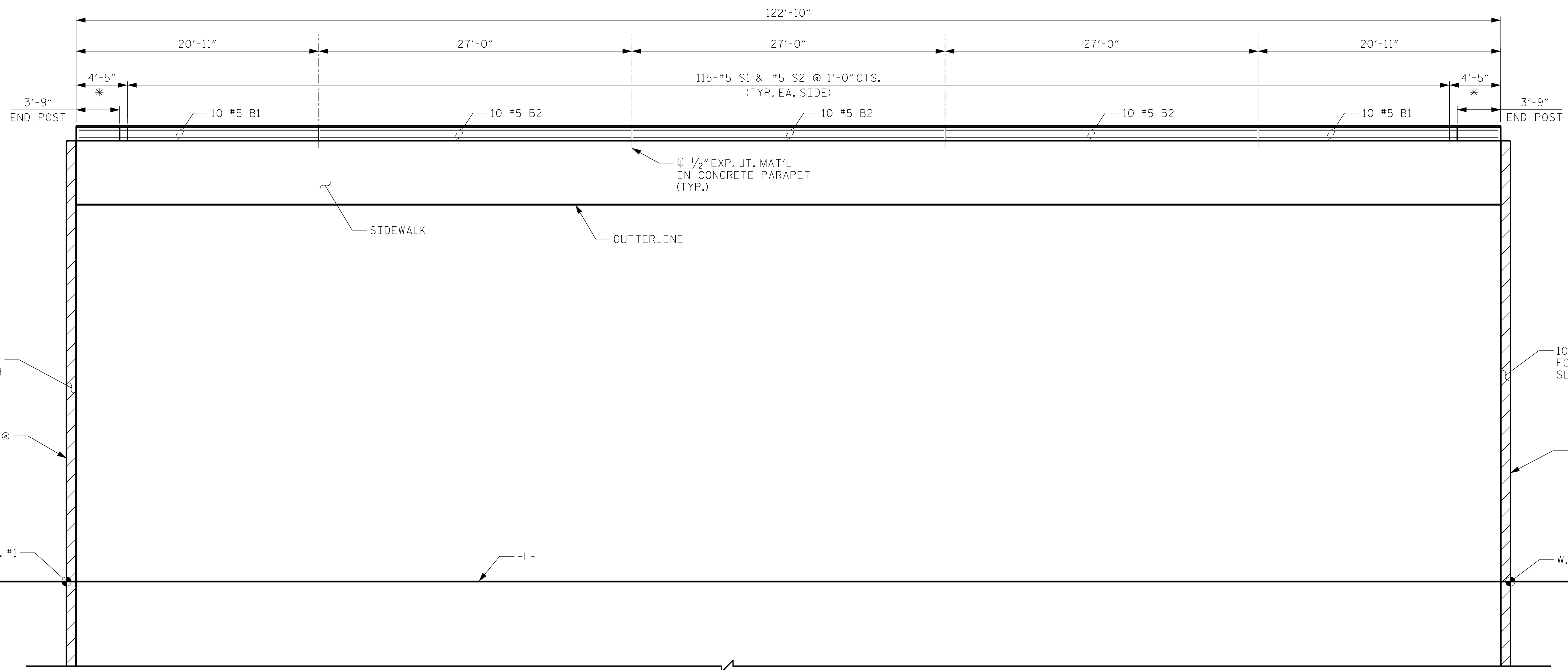
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
**2 BAR METAL RAIL**

ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RCW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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

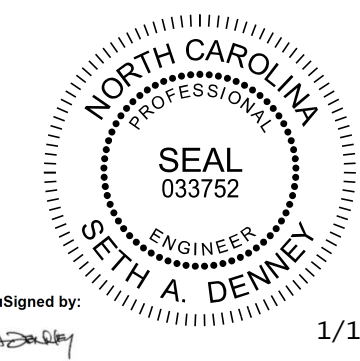
TOTAL SHEETS: 33



**PLAN**  
 (LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)  
 \* SEE "PLAN OF PARAPET" FOR SPACING OF S3 BARS.

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 3 OF 5



DocuSigned by:  
 E8EB15AC09ED410  
 1/10/2024

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 Raleigh, NC 27601-1772  
 Phone (919) 677-2000  
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 CONCRETE PARAPET  
 DETAILS

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

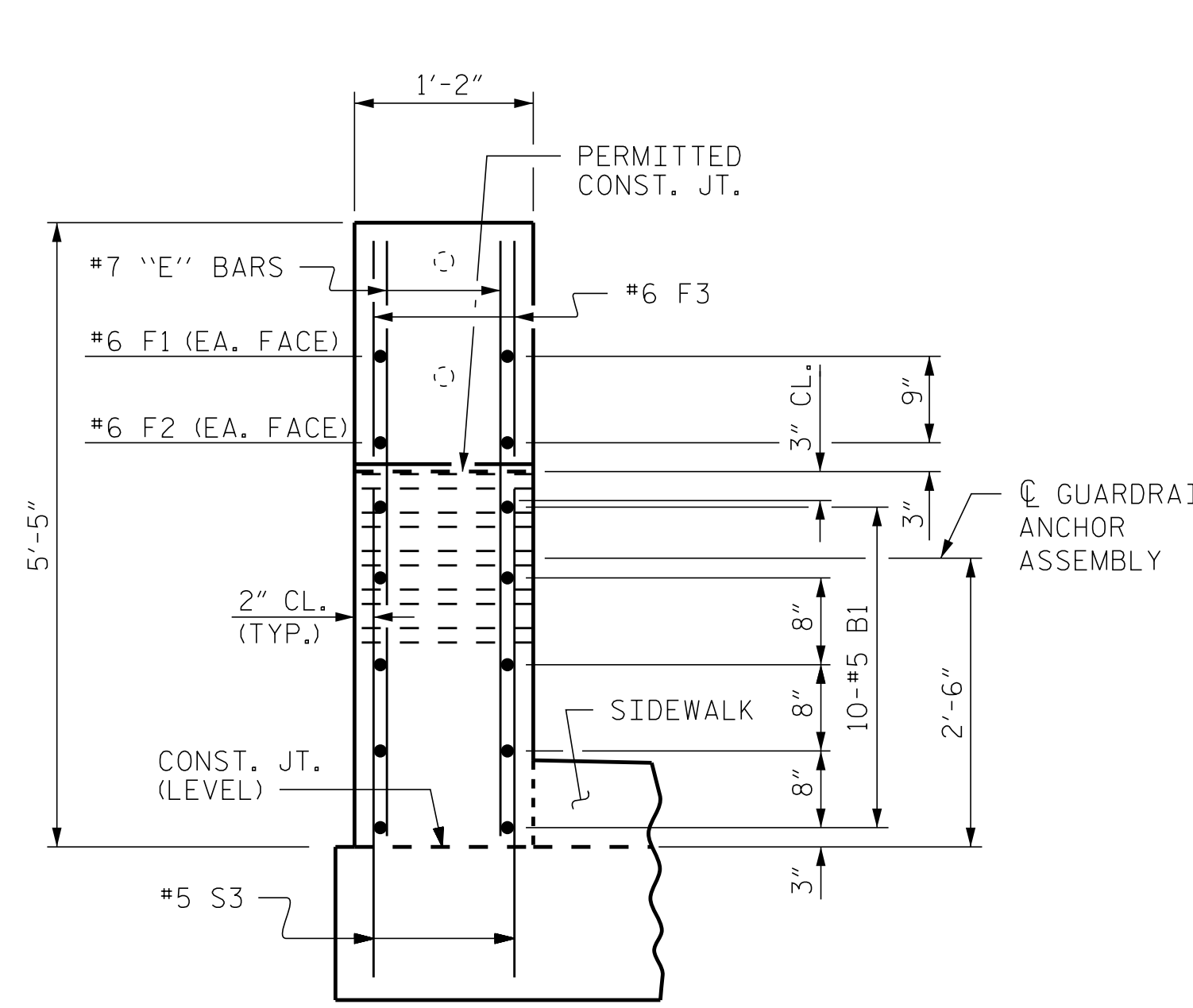
TOTAL SHEETS: 33

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 UNLESS ALL SIGNATURES COMPLETED**

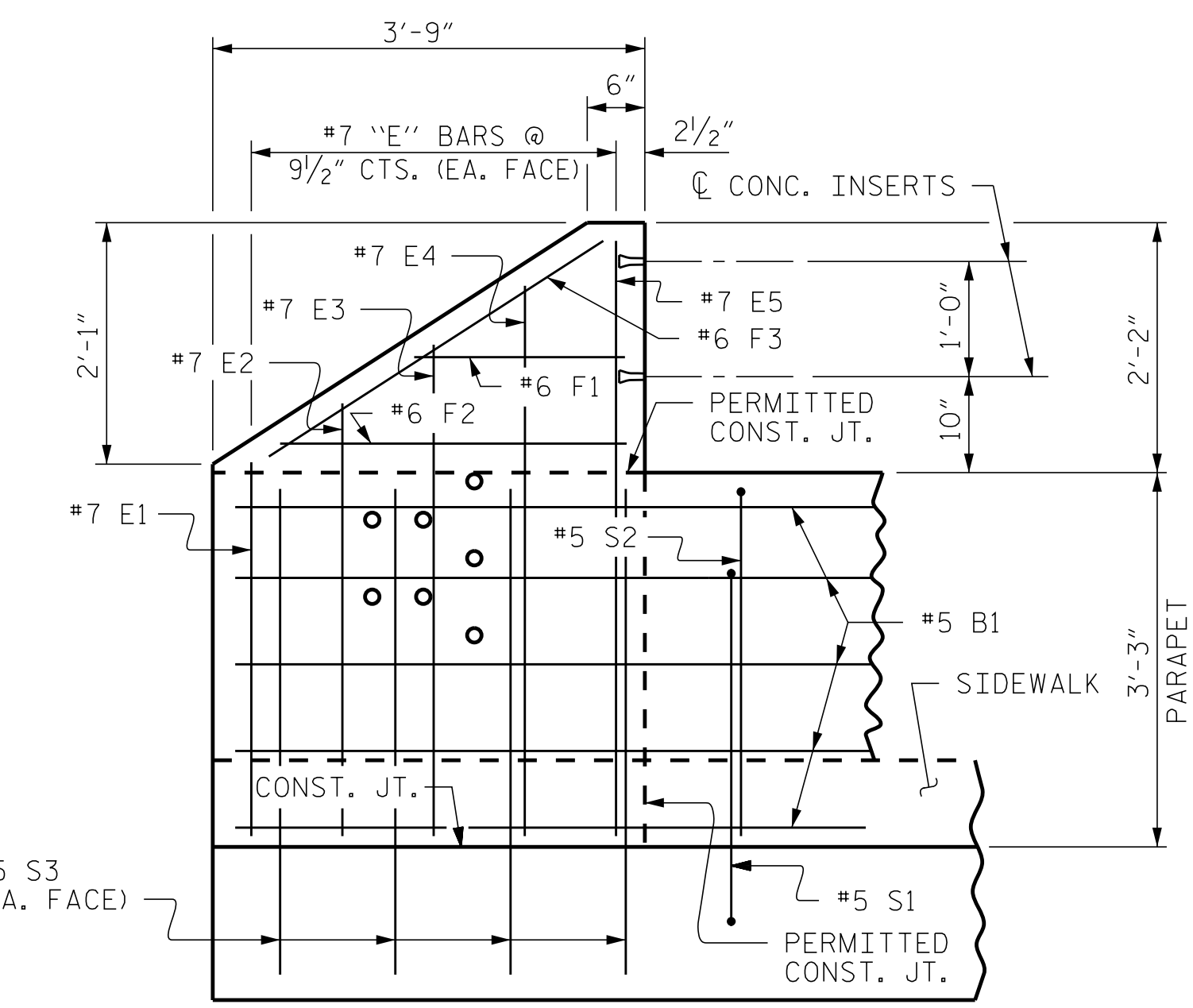
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1/9/2024  
 DRAWN BY: J. I. KIMBLE DATE: 1/19  
 CHECKED BY: M. D. MAGEE DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

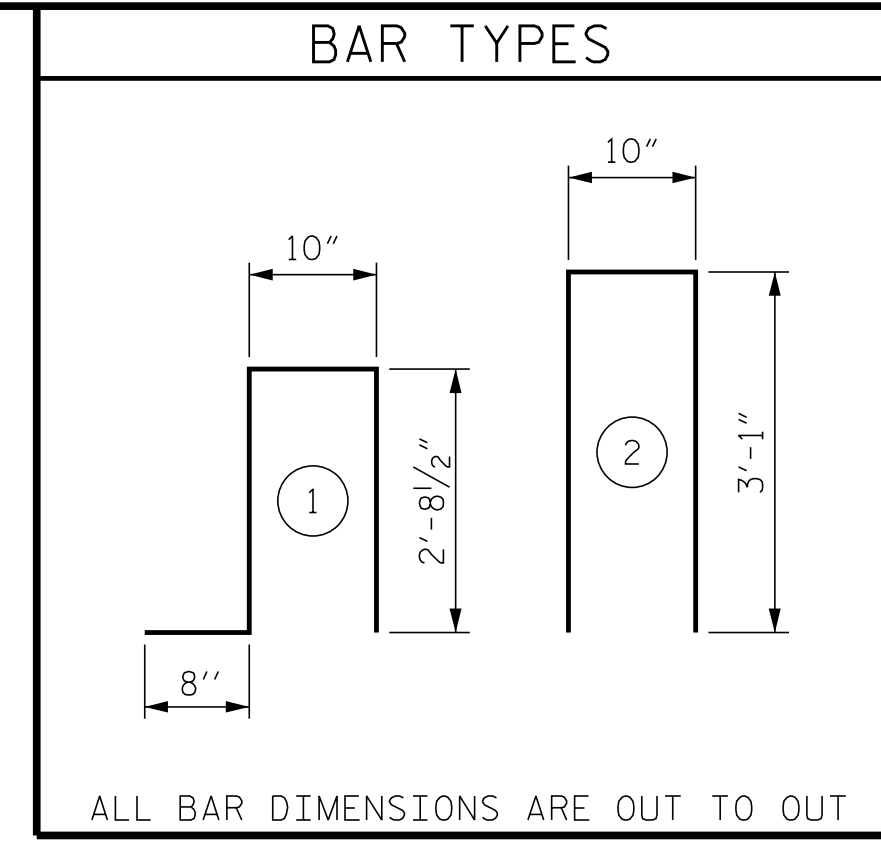




END VIEW

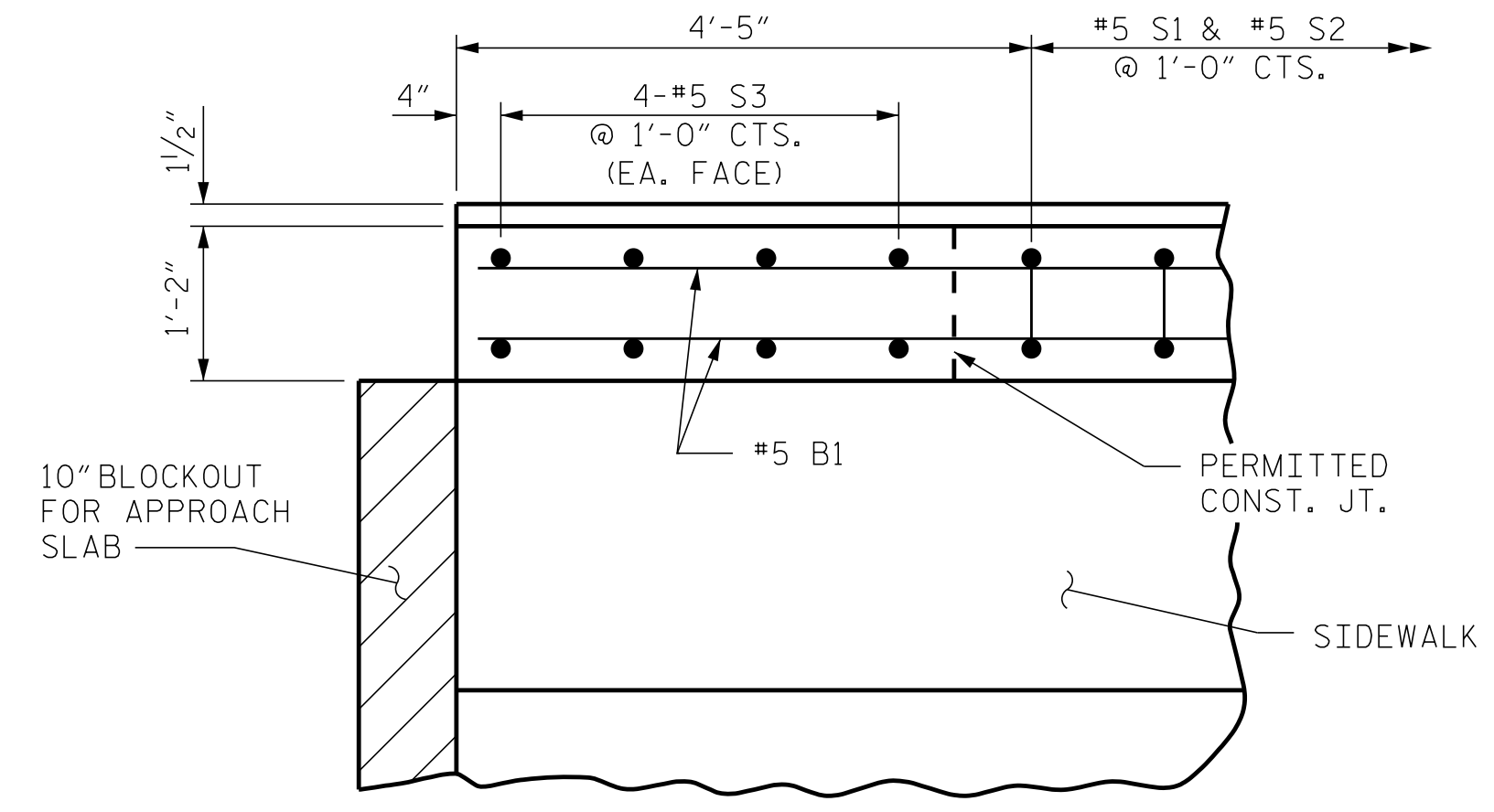


ELEVATION

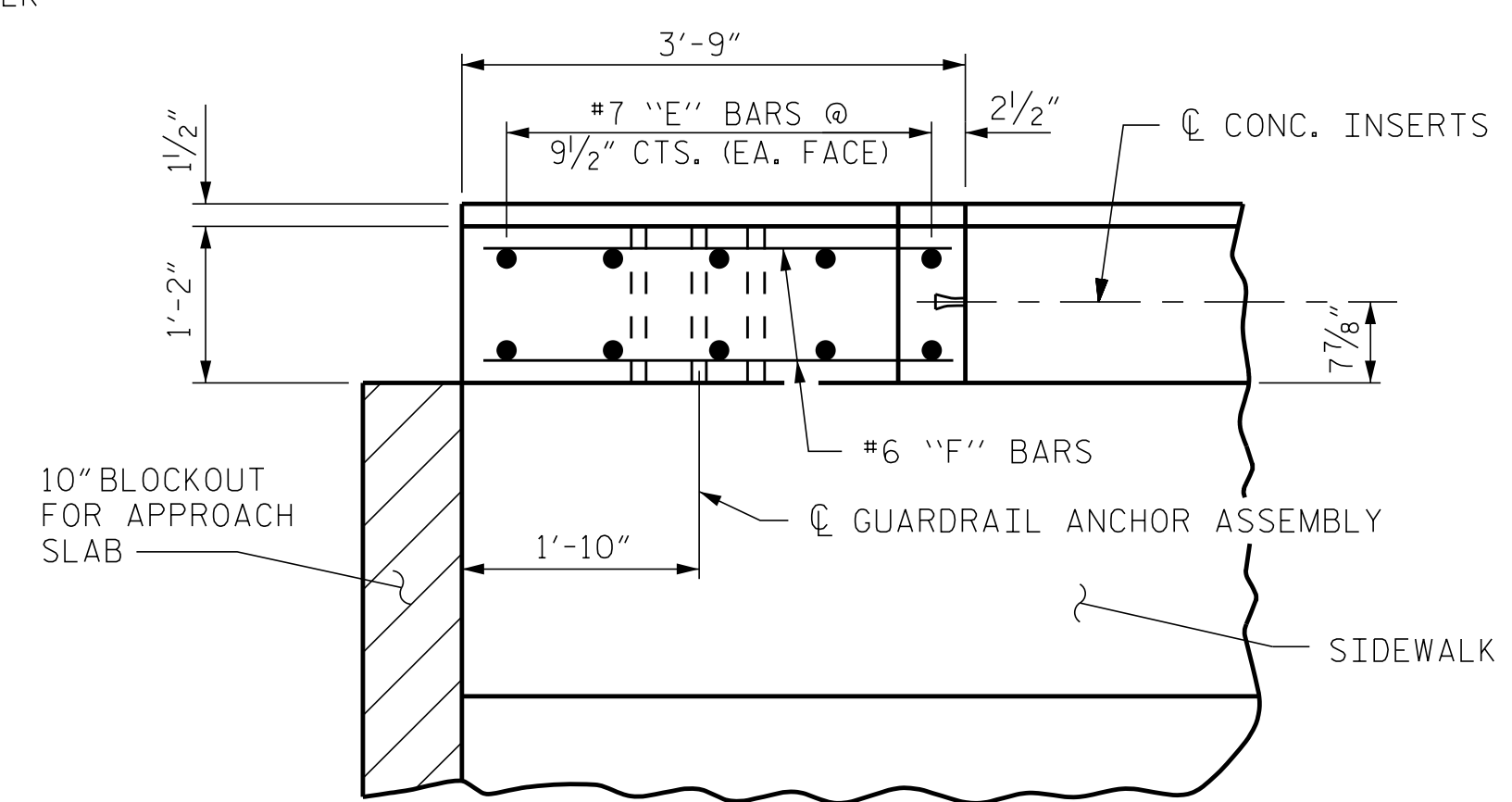


BILL OF MATERIAL					
2 CONCRETE PARAPETS AND 4 END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	40	5	STR	20'-7"	859
*B2	60	5	STR	26'-8"	1,669
*E1	8	7	STR	3'-3"	53
*E2	8	7	STR	3'-9"	61
*E3	8	7	STR	4'-3"	69
*E4	8	7	STR	4'-9"	78
*E5	8	7	STR	5'-1"	83
*F1	8	6	STR	1'-10"	22
*F2	8	6	STR	3'-0"	36
*F3	8	6	STR	3'-5"	41
*S1	230	5	1	6'-11"	1,659
*S2	230	5	2	7'-0"	1,679
*S3	32	5	STR	3'-9"	125
*EPOXY COATED REINFORCING STEEL					6,434 LBS.
CLASS AA CONCRETE					35.3 C.Y.
1'-2" X 3'-3" CONCRETE PARAPET					245.67 LIN. FT.

PARAPET AND END POST FOR TWO BAR RAIL



PLAN OF PARAPET



PLAN OF END POST

NOTES

THE PARAPET 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 PARAPET AND END POSTS SHALL BE EPOXY COATED.

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

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

FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAIL" SHEET.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN 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.

PROJECT NO. P-5720  
 WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 4 OF 5



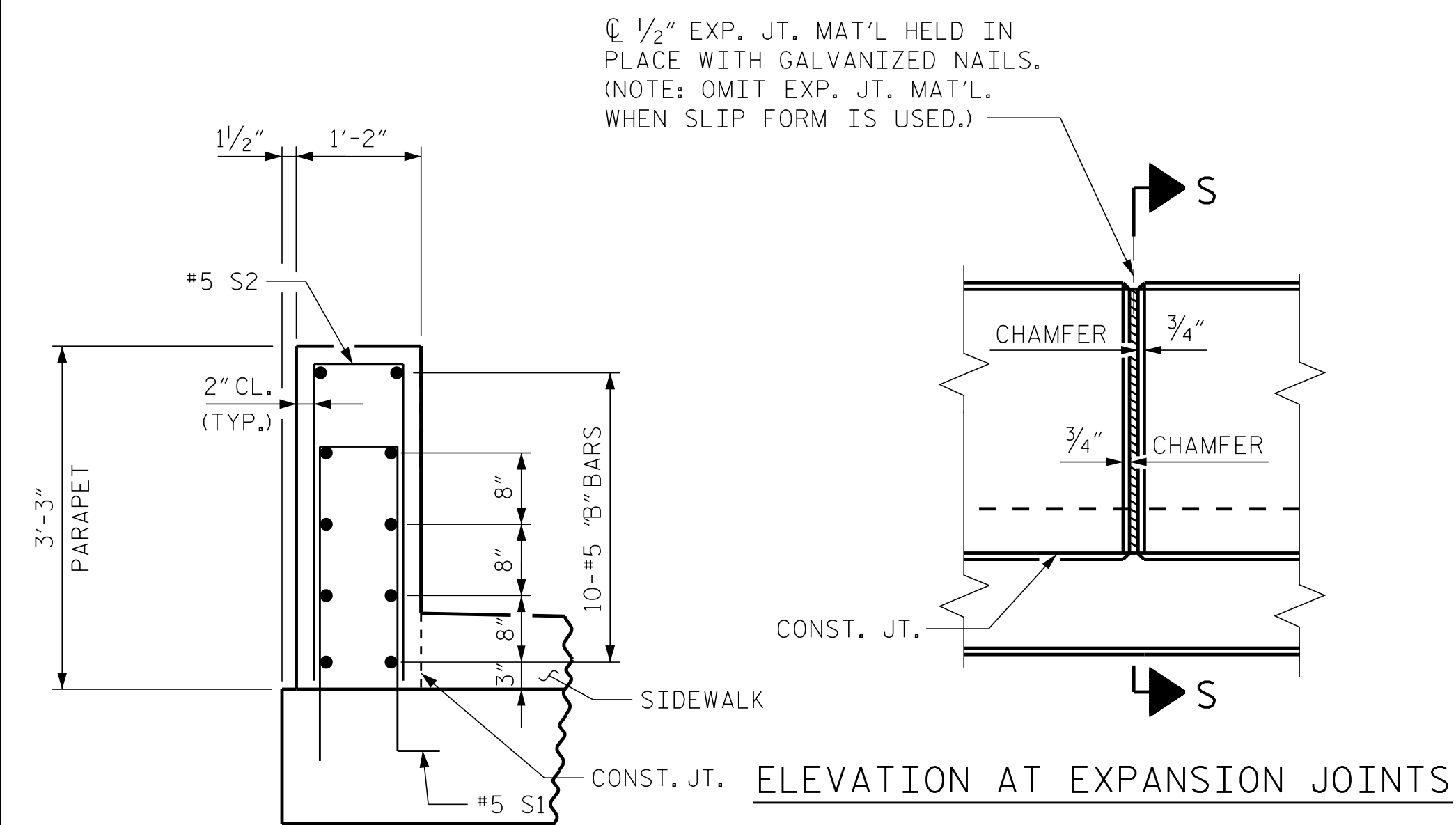
**Kimley»Horn**  
 421 Fayetteville Street, Suite 600  
 Raleigh, NC 27601-1772  
 Phone (919) 677-2000  
 NC LICENSE # F-0102

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 CONCRETE PARAPET  
 DETAILS

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

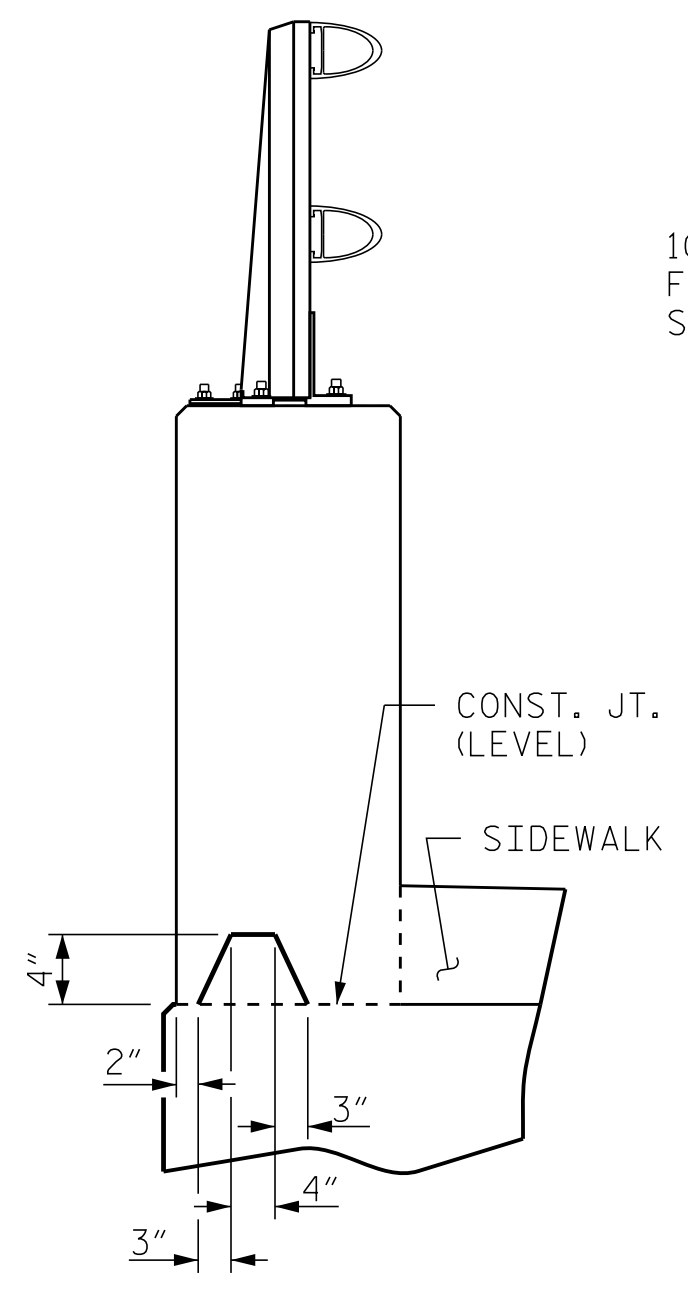
TOTAL SHEETS: 33

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SECTION THRU PARAPET

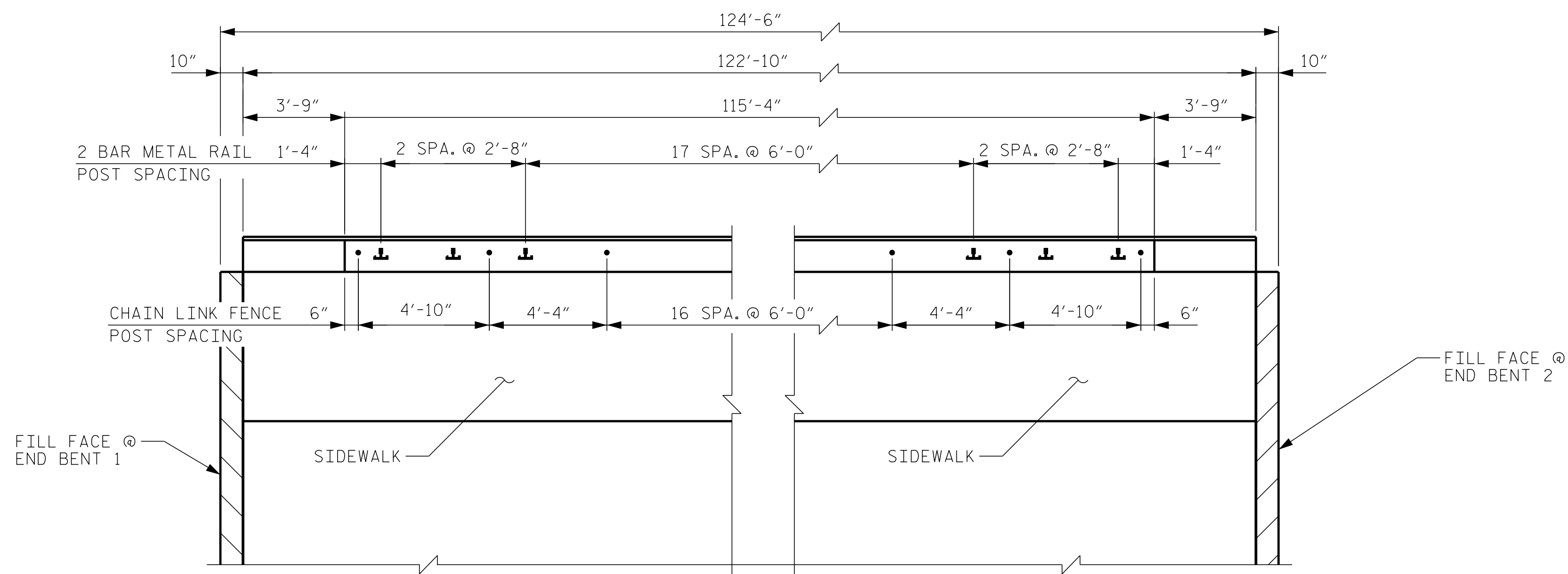
ELEVATION AT EXPANSION JOINTS



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

DRAWN BY: J. I. KIMBLE DATE: 1/19  
 CHECKED BY: M. D. MAGEE DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

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**PLAN OF RAIL & FENCE POST SPACINGS**

(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)

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

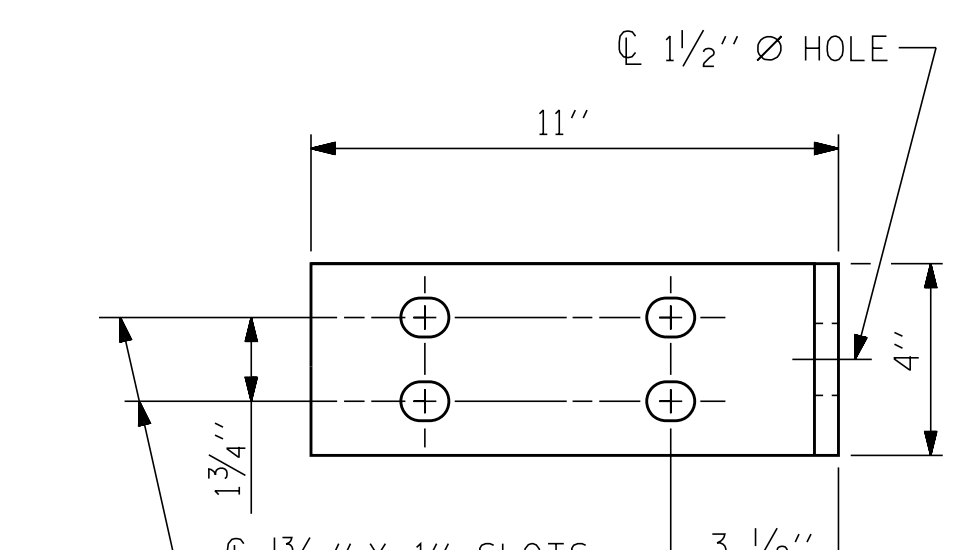
**NOTES**  
 METAL RAIL TO END POST CONNECTION  
 THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:  
 A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.  
 B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY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

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

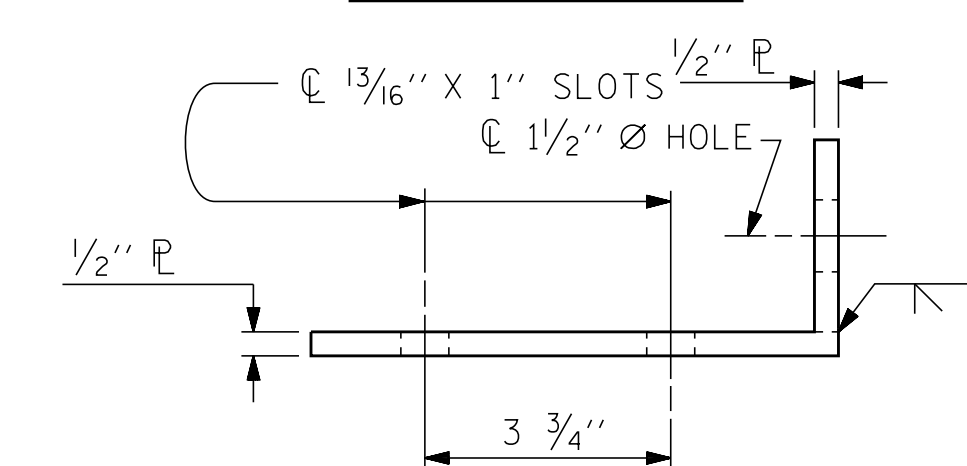
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

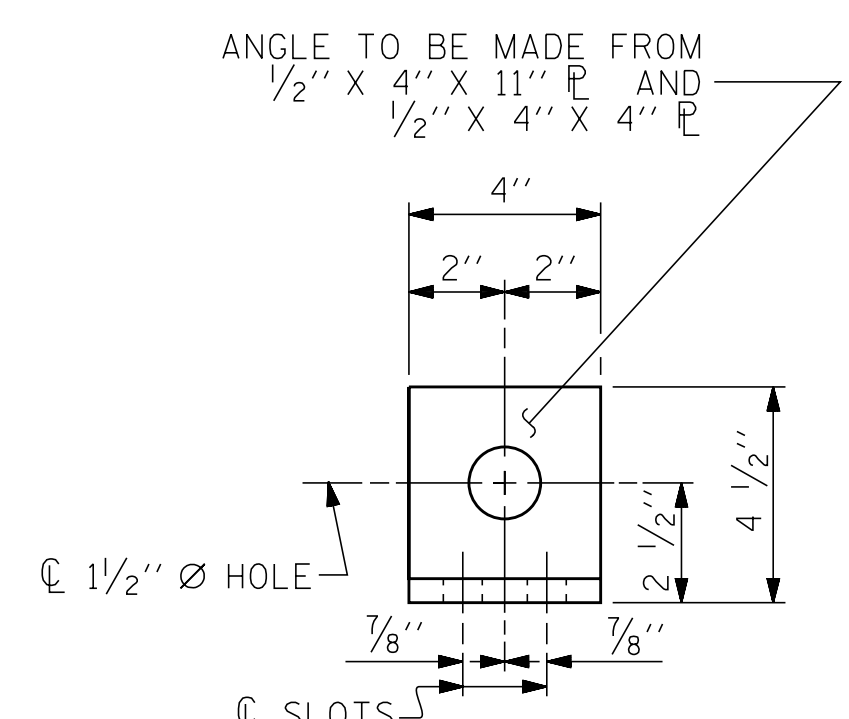
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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



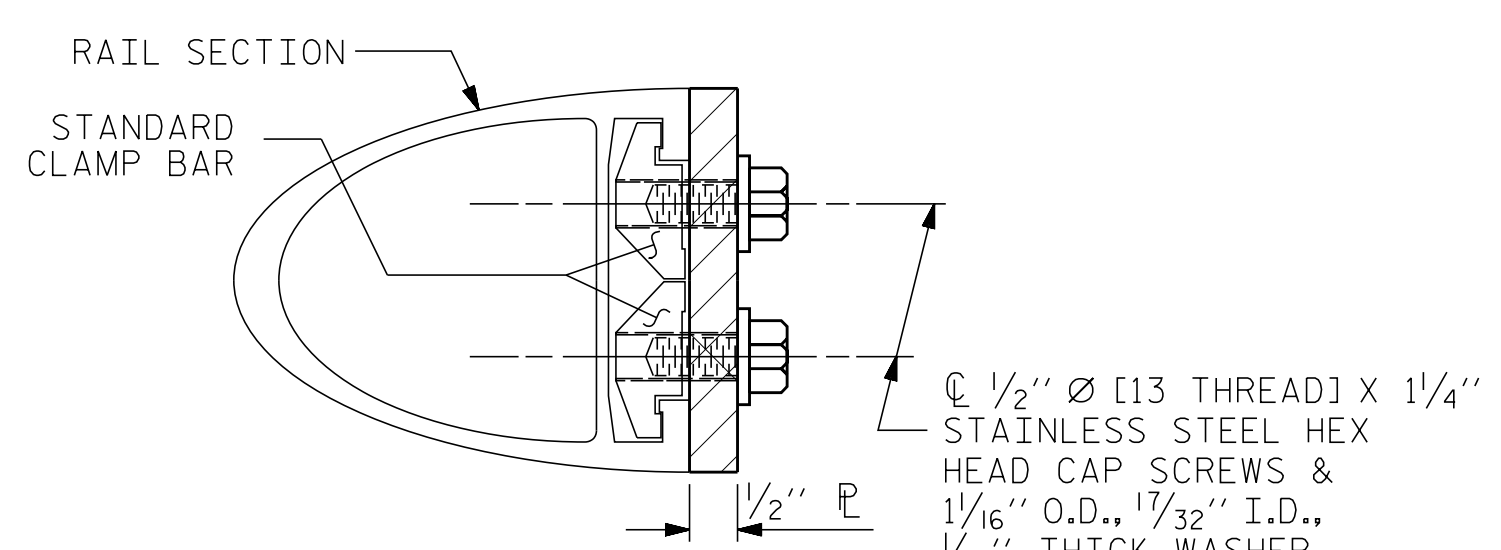
**ELEVATION**



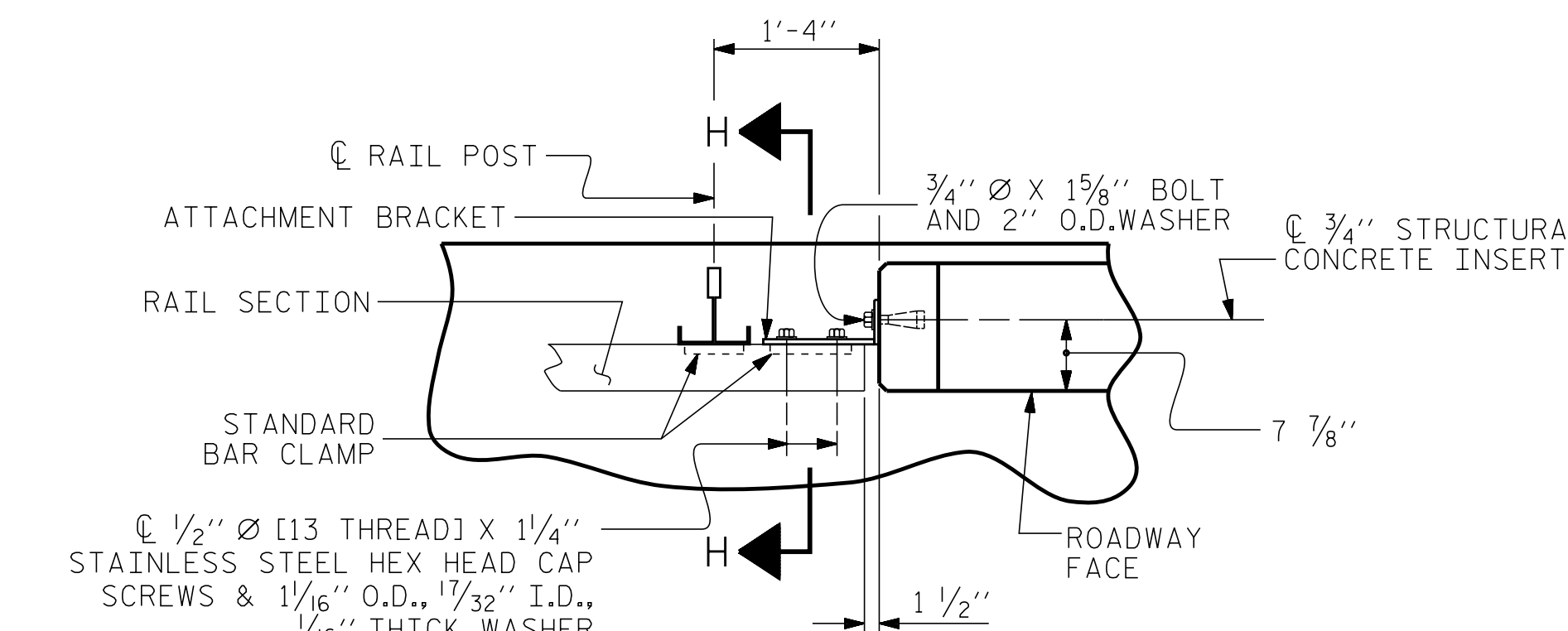
**TOP VIEW**



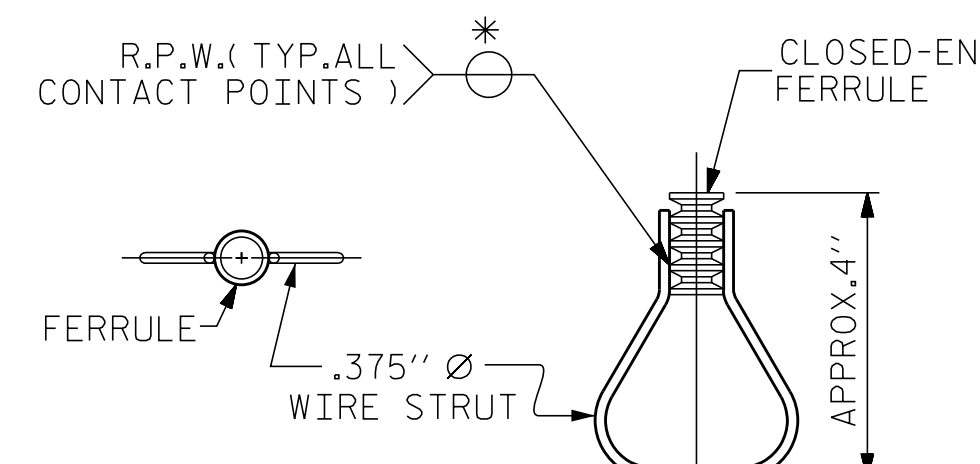
**END VIEW (FIX AND EXP.)**



**SECTION H-H (FIX)**



**PLAN - RAIL AND END POST**



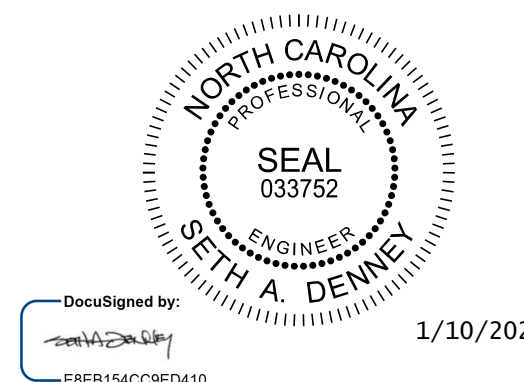
**PLAN ELEVATION**

**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. P-5720  
 WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 5 OF 5



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 421 Fayetteville Street, Suite 600  
 Raleigh, NC 27601-1772  
 Phone (919) 677-2000  
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**DOCUMENT NOT CONSIDERED FINAL  
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STATE OF NORTH CAROLINA		DEPARTMENT OF TRANSPORTATION	
RALEIGH		STANDARD	
RAIL POST SPACINGS AND END OF RAIL DETAILS			

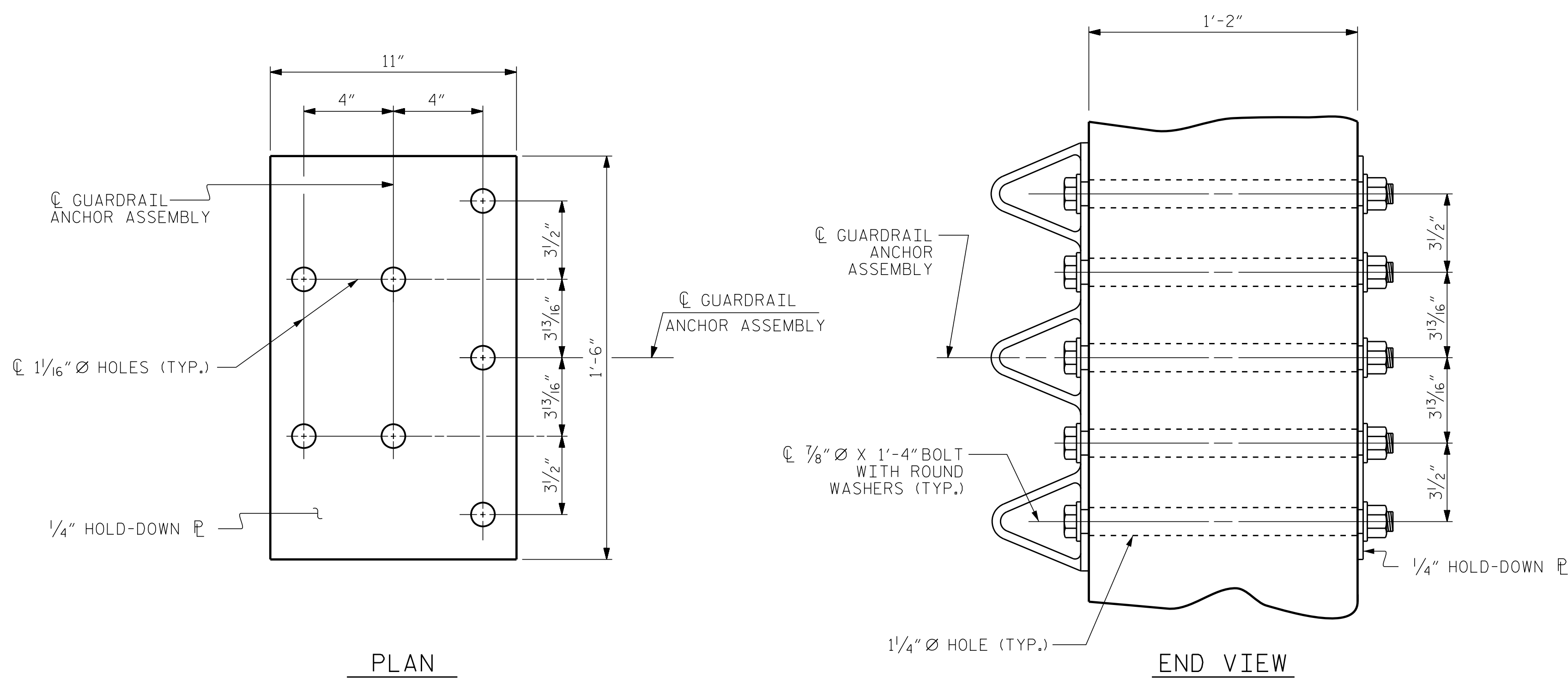
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
				S-19
				TOTAL SHEETS 33

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1/9/2024

ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : FCJ 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC





PLAN END VIEW  
**GUARDRAIL ANCHOR ASSEMBLY DETAILS**

**NOTES**

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

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

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

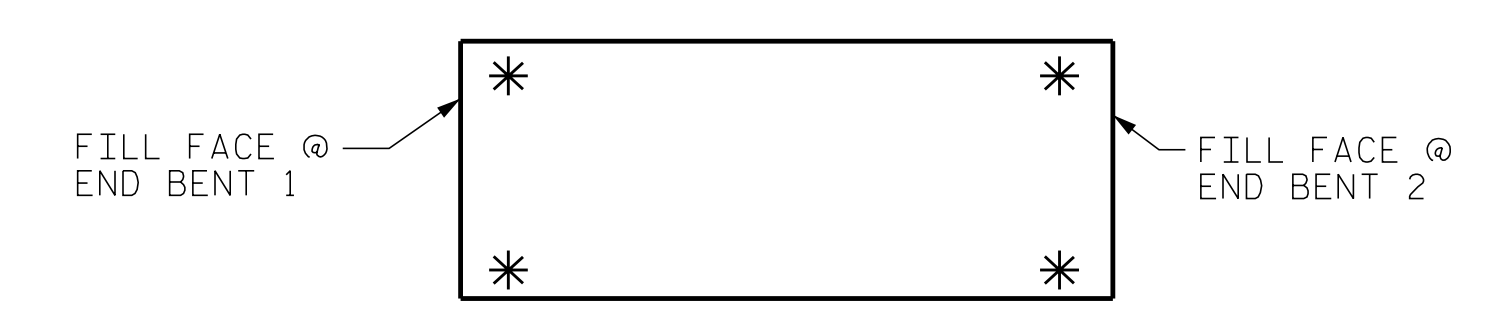
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

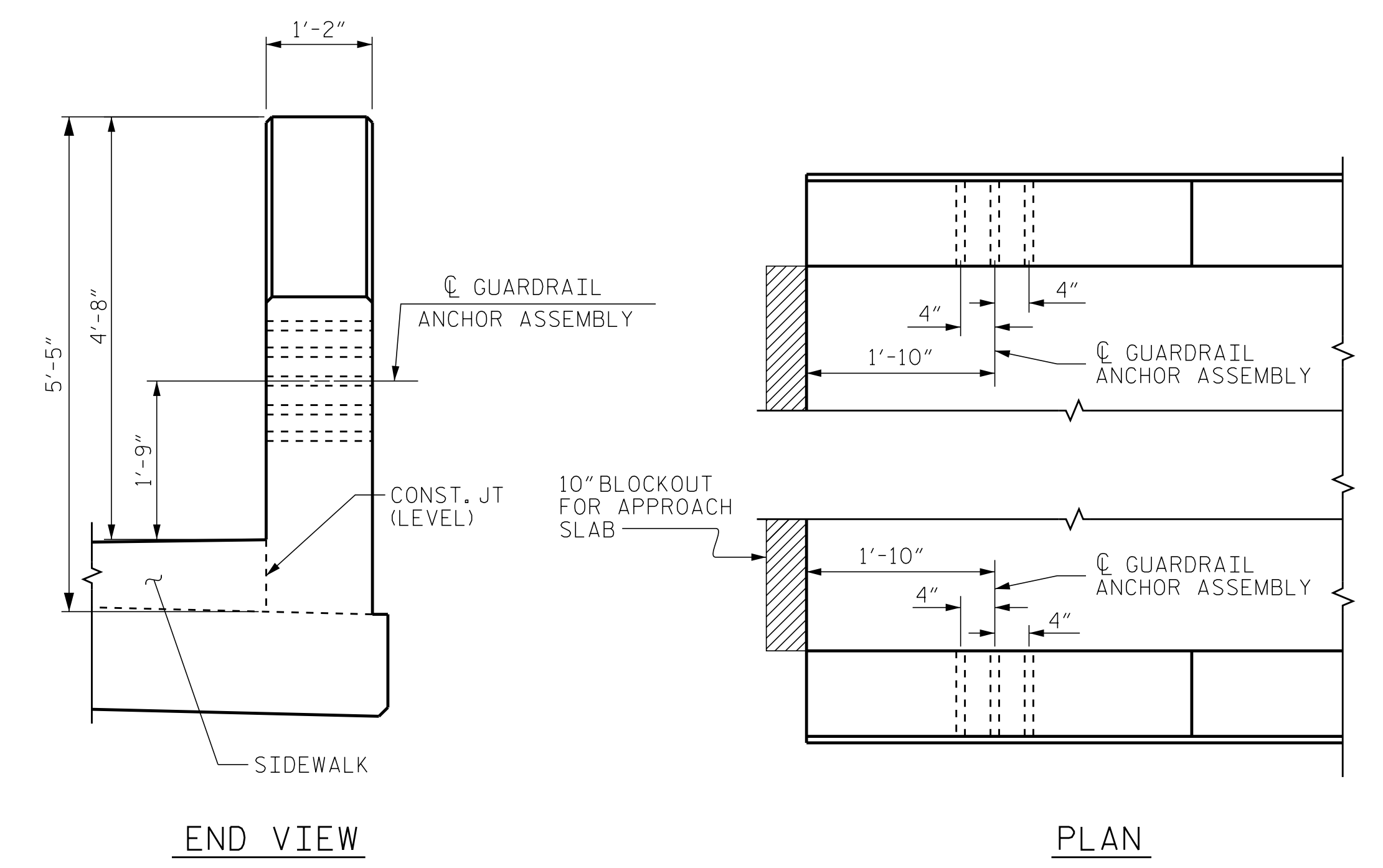
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

THE 1 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.

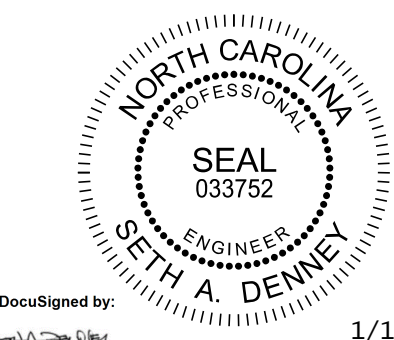


**SKETCH SHOWING POINTS OF ATTACHMENT**  
 \* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW PLAN  
**LOCATION OF GUARDRAIL ANCHOR AT END POST**

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-



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 Raleigh, NC 27601-1772  
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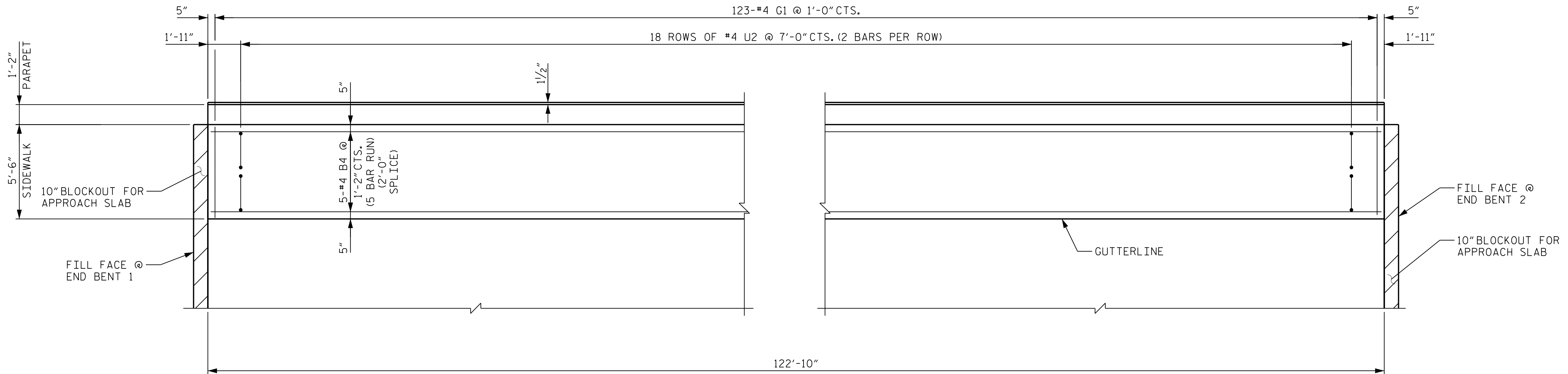
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAIL**

ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : CM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

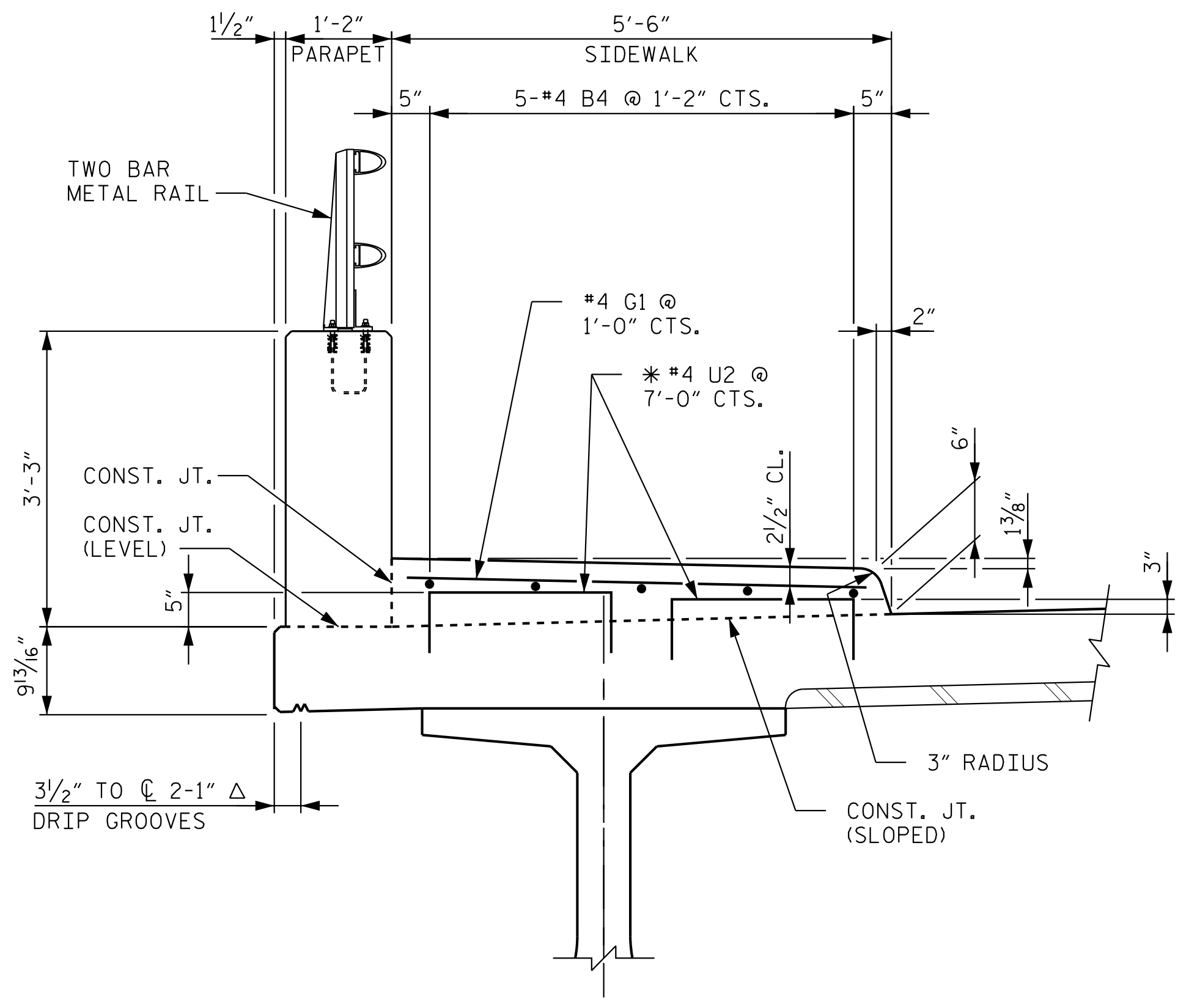
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2			4	

TOTAL SHEETS: 33



PLAN OF SIDEWALK  
(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)

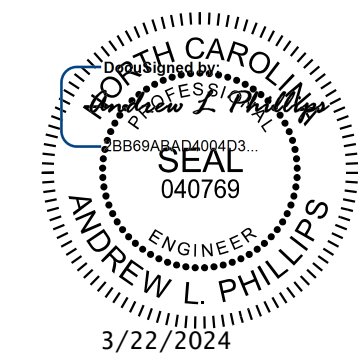


SECTION THRU SIDEWALK

NOTES

- ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.
- GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED IN SEGMENTS LESS THAN 10 FEET IN LENGTH.
- \* #4 U2 MAY BE PUSHED INTO GREEN CONCRETE AFTER THE DECK HAS BEEN SCREEDED OFF.
- SIDEWALK SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSION STRENGTH OF 3,000 PSI.
- SEE APPROACH SLAB SHEETS, FOR SIDEWALK ON APPROACH SLAB.
- CONCRETE AND REINFORCING STEEL FOR THE SIDEWALK IS INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL. PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE PAY ITEM "REINFORCED CONCRETE DECK SLAB".

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-



**Kimley»Horn**  
 421 Fayetteville Street, Suite 600  
 Raleigh, NC 27601-1772  
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STATE OF NORTH CAROLINA				SHEET NO.	
DEPARTMENT OF TRANSPORTATION				S-21	
RALEIGH				TOTAL SHEETS	
SUPERSTRUCTURE				33	
SIDEWALK DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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DRAWN BY: J. I. KIMBLE DATE: 1/19  
 CHECKED BY: M. D. MAGEE DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19



**NOTES**

ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS. GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1079 OF THE STANDARD SPECIFICATIONS.

ALL CHAIN LINK FENCE FABRIC, POST, RAILS, FITTING HARDWARE AND ACCESSORIES SHALL BE BLACK VINYL COATED IN ACCORDANCE WITH ARTICLE 1050 OF THE STANDARD SPECIFICATIONS.

WELDING SHALL BE DONE IN ACCORDANCE WITH ARTICLE 1072-20 OF THE STANDARD SPECIFICATIONS.

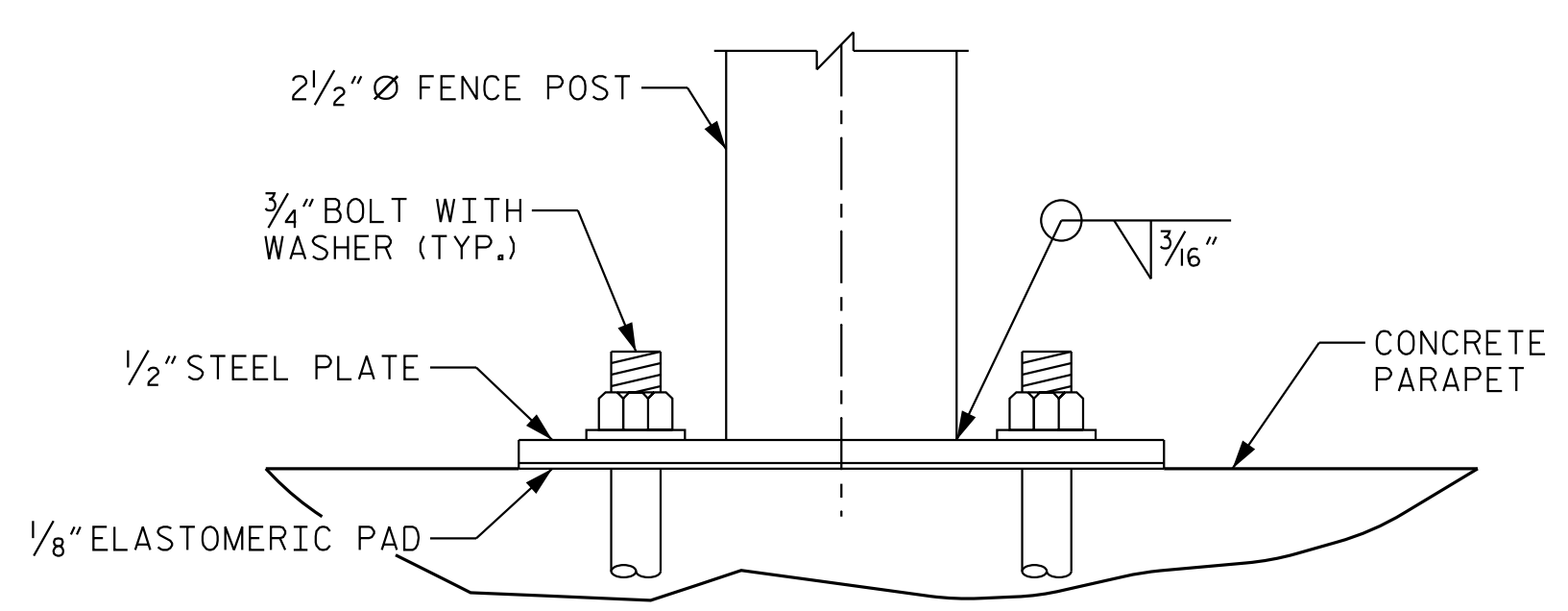
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS.

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

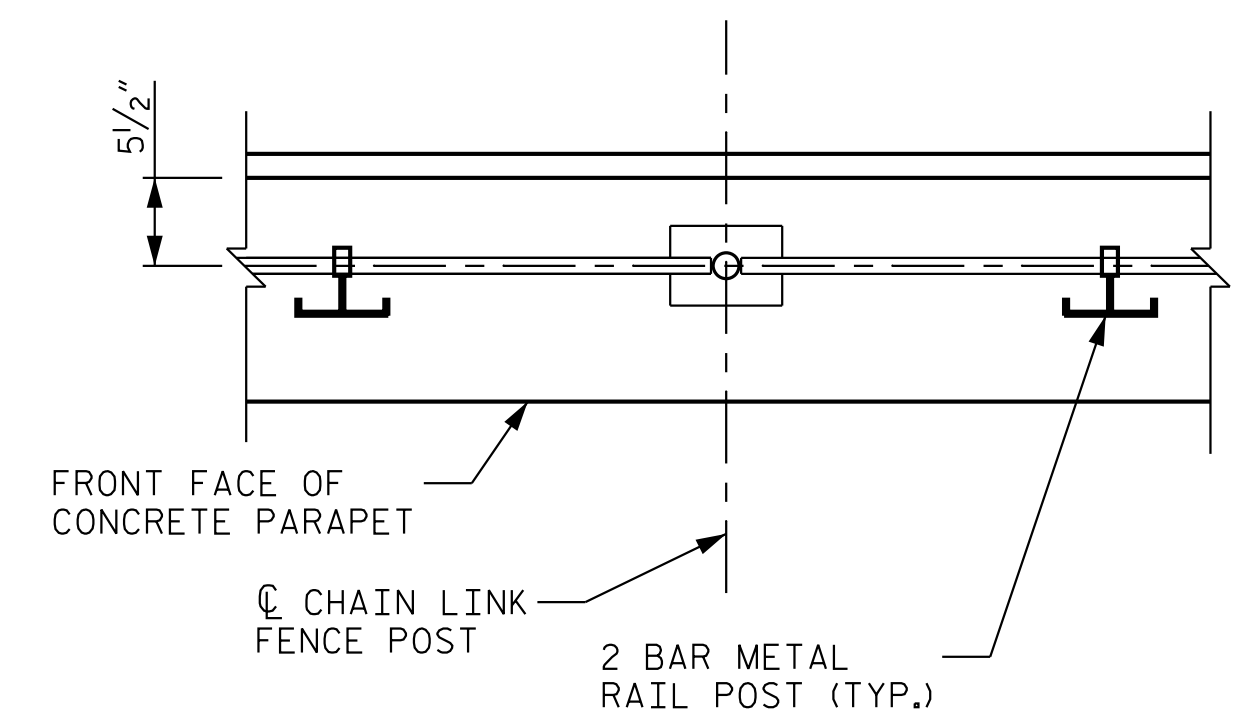
ANCHOR BOLTS SHALL BE EMBEDDED AS PER ADHESIVE BONDING SYSTEM MANUFACTURER SPECIFICATIONS. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK NUTS, CLASS 2B THREADS.

BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM FINGER TIGHT POSITION.

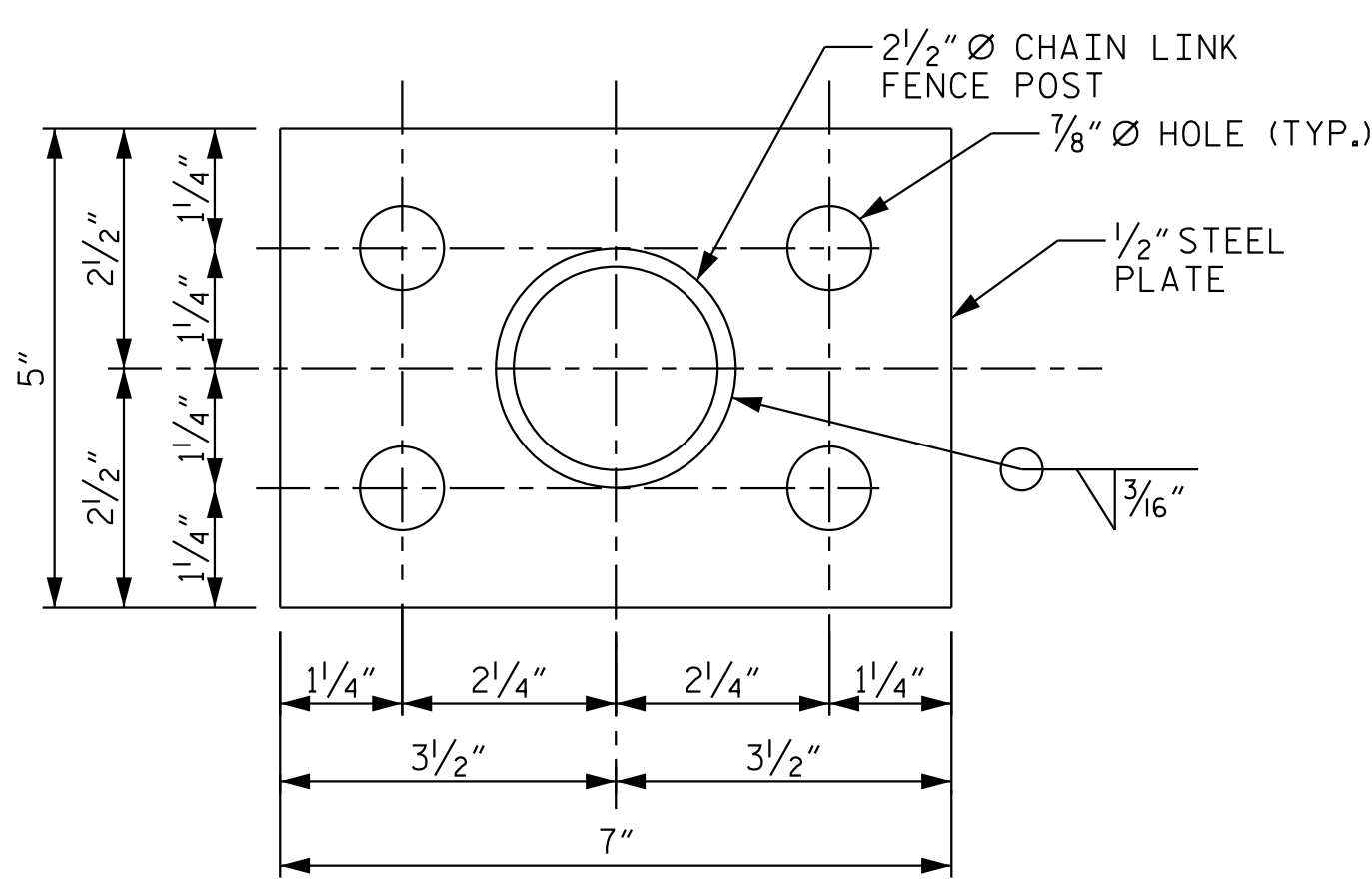
FOR 72" CHAIN LINK FENCE (BLACK VINYL COATED), SEE SPECIAL PROVISIONS.



**ELEVATION**

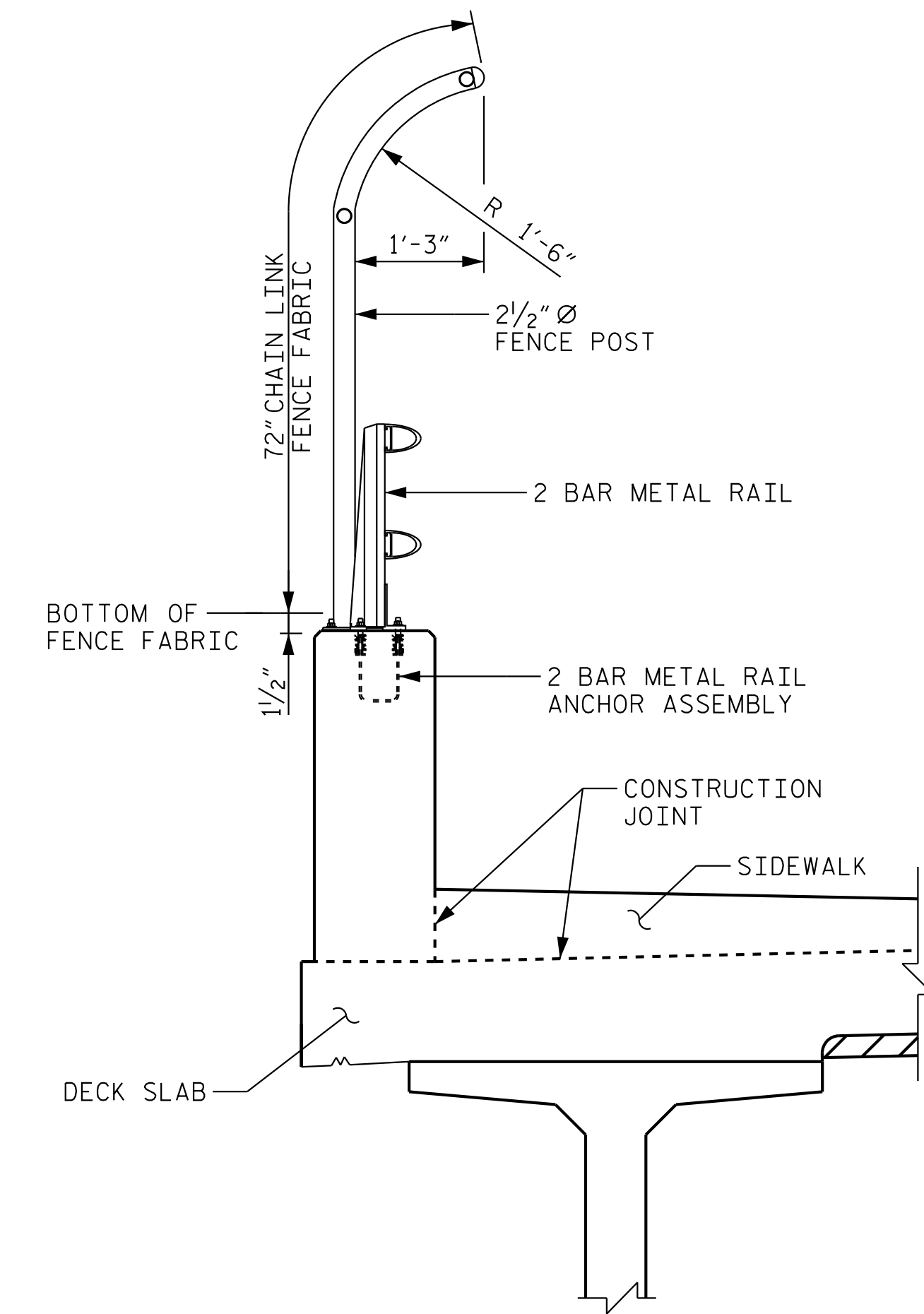


**PARTIAL PLAN**



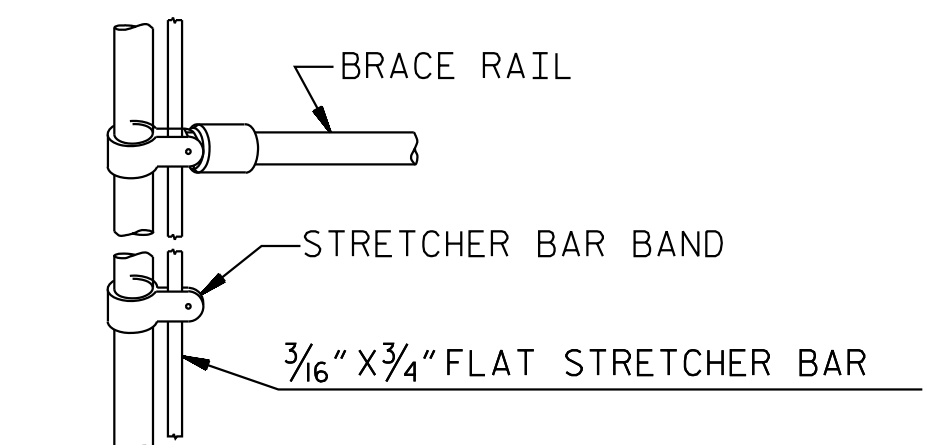
**PLAN**

**CHAIN LINK FENCE POST DETAIL**

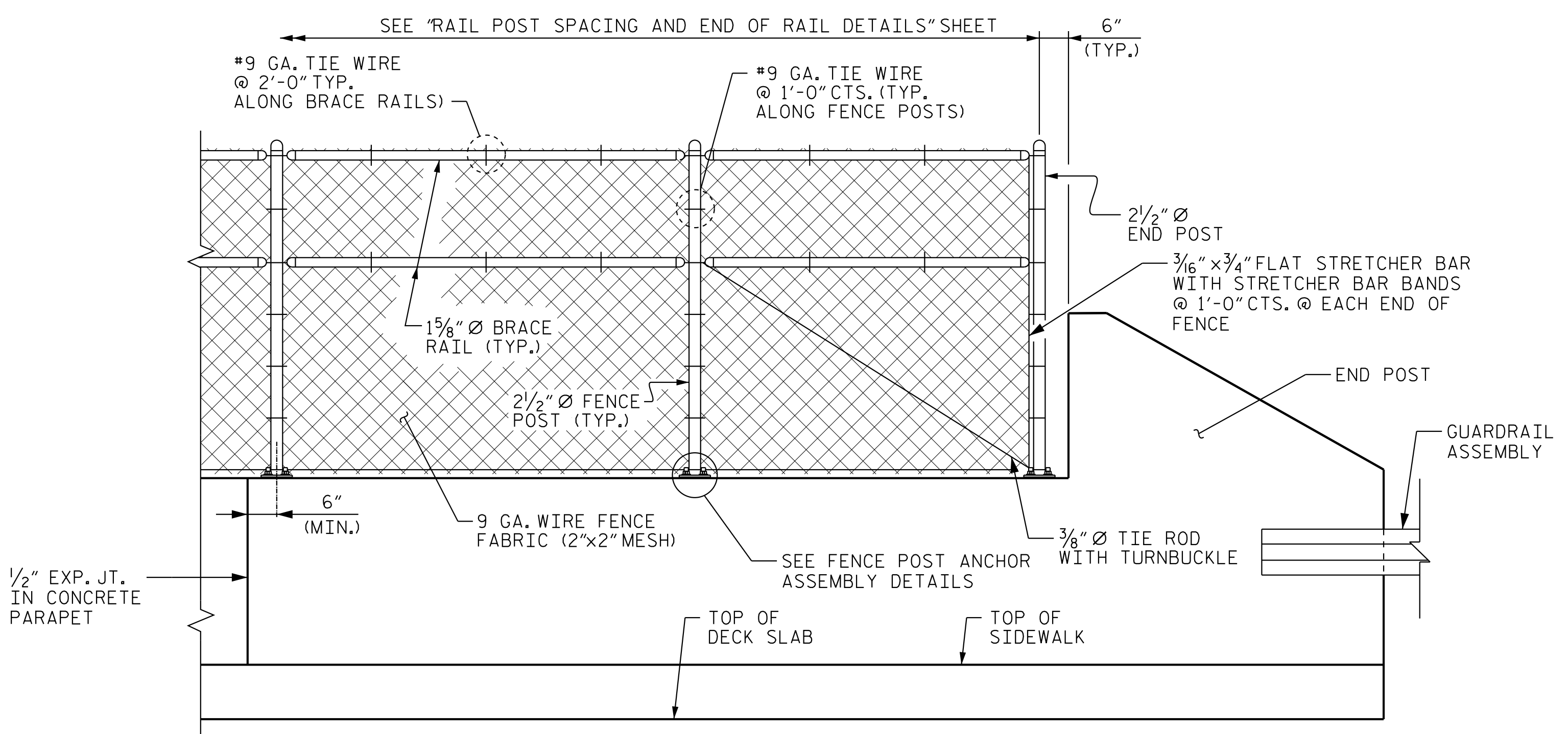


**SECTION THRU FENCE**

(FENCE POST ANCHOR ASSEMBLY NOT SHOWN FOR CLARITY)



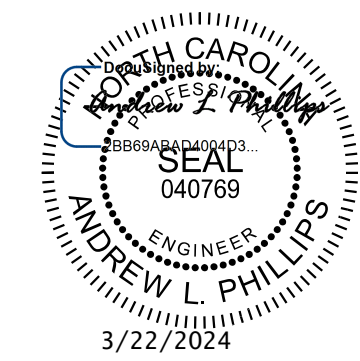
**TERMINAL FENCE POST WITH STRETCHER BAR ATTACHMENT**



**PARTIAL ELEVATION**

(TWO BAR METAL RAIL NOT SHOWN FOR CLARITY)  
TOTAL PAY LENGTH = 230.67 LF

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-



**Kimley»Horn**  
421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000 NC LICENSE # F-0102

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
**CHAIN LINK FENCE  
DETAILS**

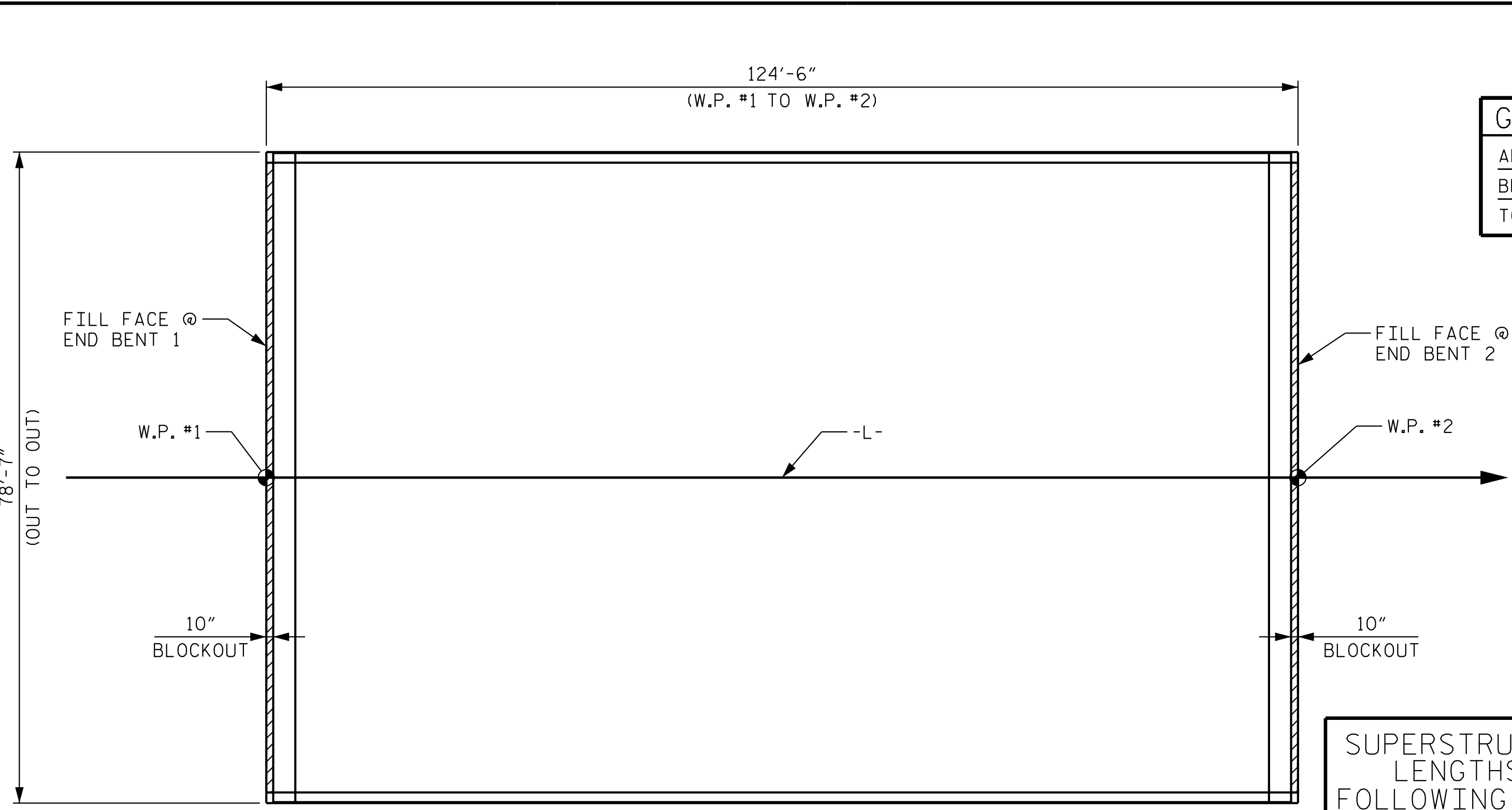
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NO.	BY:	DATE:	NO.	DATE:
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TOTAL SHEETS: 33

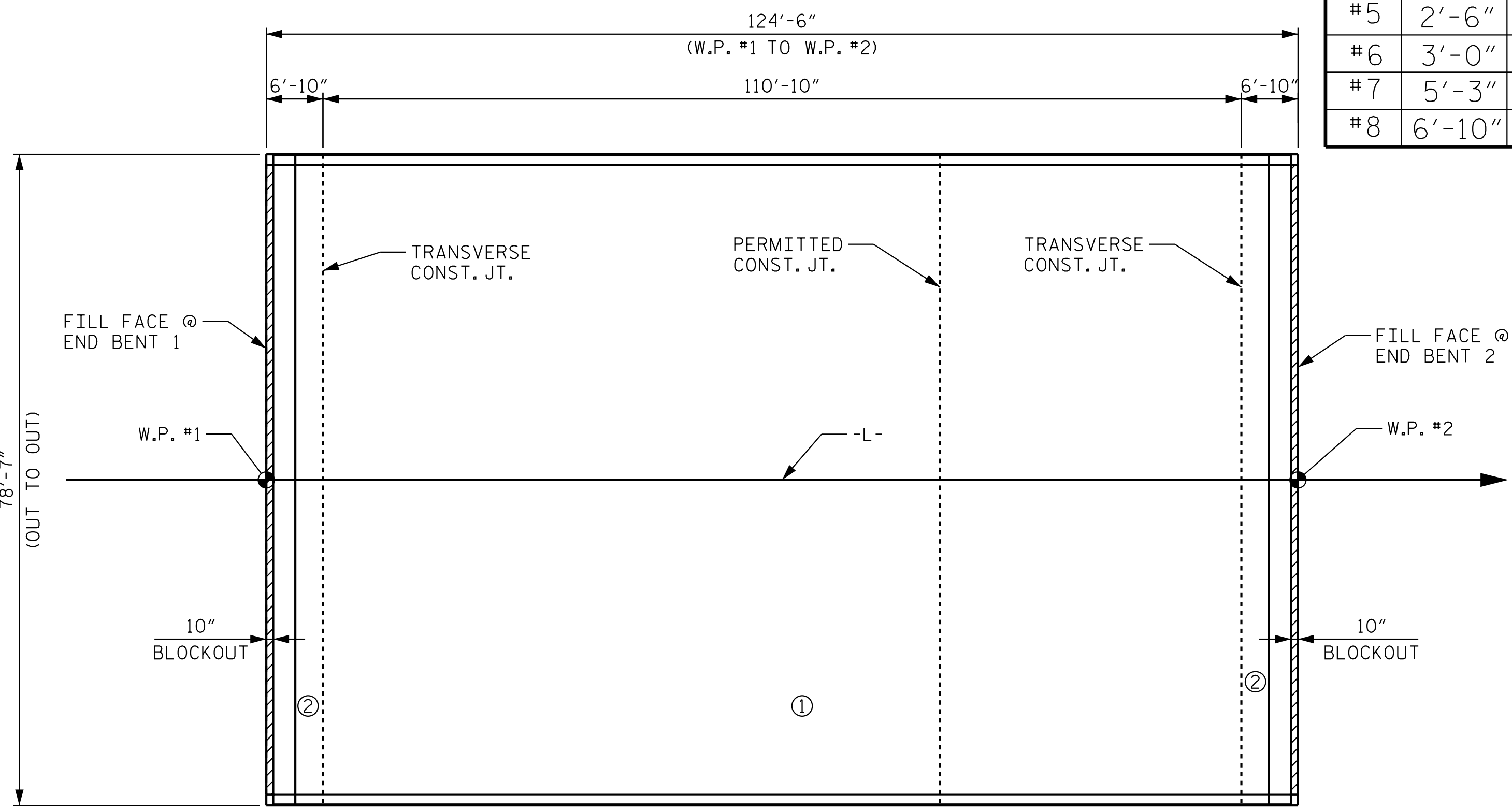
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DRAWN BY: J. I. KIMBLE DATE: 1/19  
CHECKED BY: M. D. MAGEE DATE: 1/19  
DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB  
(SQ. FT. = 9,653)



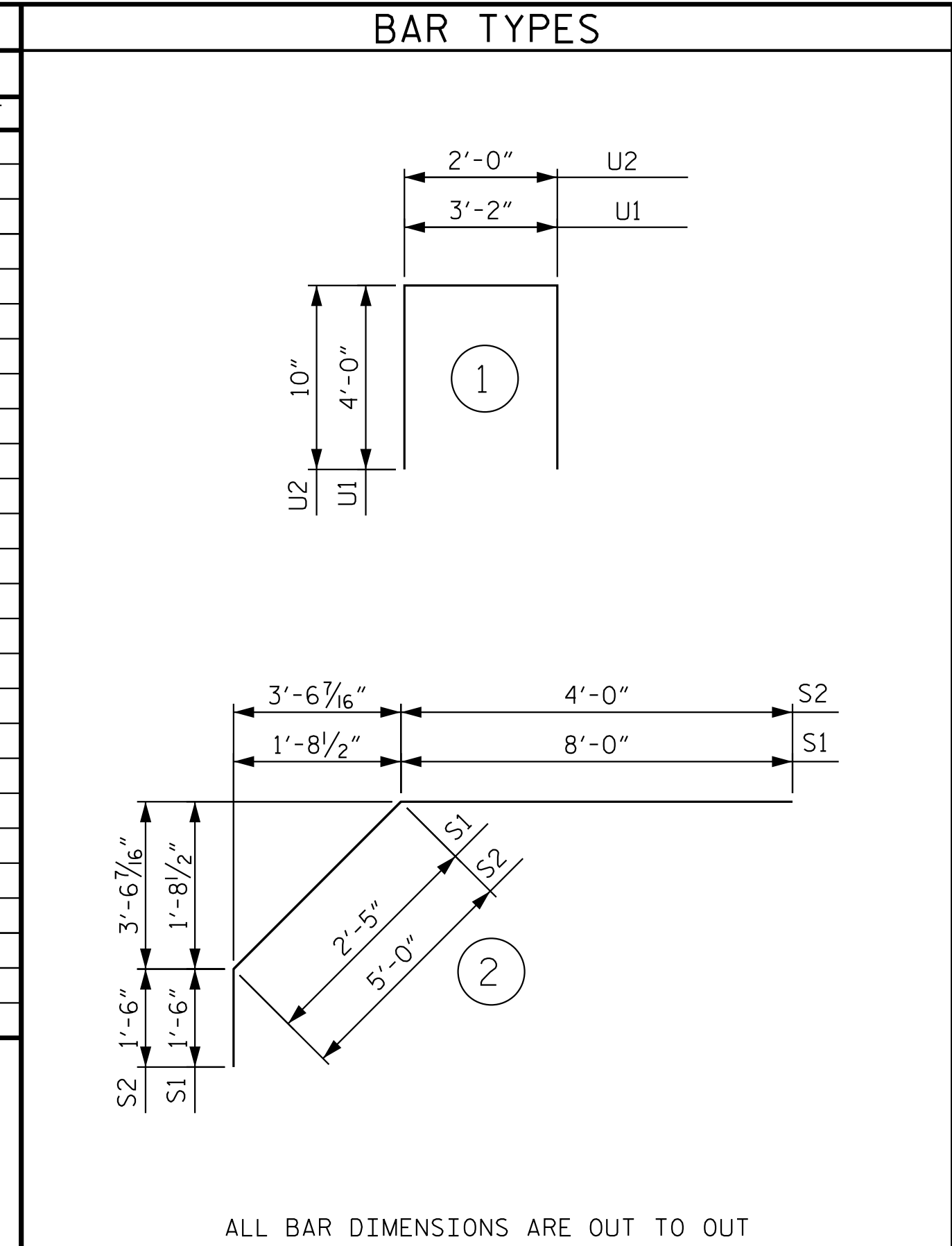
POUR SEQUENCE

GROOVING BRIDGE FLOORS		
APPROACH SLABS	3,100	SQ.FT.
BRIDGE DECK	7,616	SQ.FT.
TOTAL	10,716	SQ.FT.

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

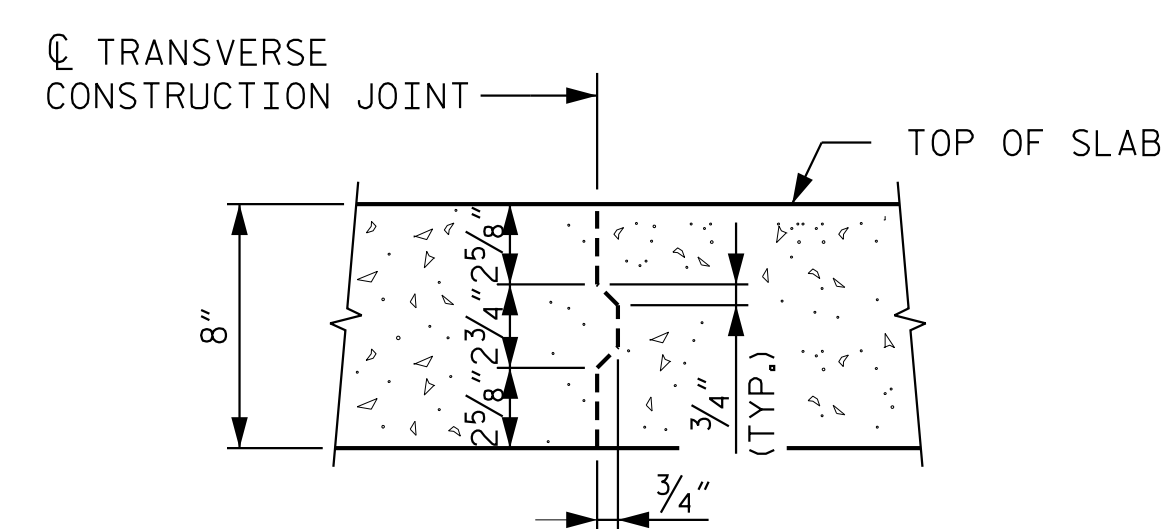
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BILL OF MATERIAL SUPERSTRUCTURE					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	454	5	STR	40'-5"	19,138
A2	454	5	STR	40'-3"	19,059
*B1	159	4	STR	27'-8"	2,939
*B2	314	6	STR	23'-9"	11,201
B3	198	5	STR	42'-4"	8,742
*B4	50	4	STR	26'-2"	874
*G1	246	4	STR	5'-2"	849
K1	30	4	STR	27'-4"	548
K2	20	4	STR	3'-9"	50
K3	20	4	STR	4'-11"	66
K4	40	4	STR	6'-4"	169
K5	20	4	STR	4'-6"	60
K6	4	4	STR	1'-1"	3
K7	4	4	STR	1'-8"	4
K8	8	4	STR	2'-5"	13
K9	4	4	STR	1'-9"	5
*S1	84	4	2	11'-11"	669
*S2	82	4	2	10'-6"	575
U1	88	4	1	11'-2"	656
*U2	72	4	1	3'-8"	176

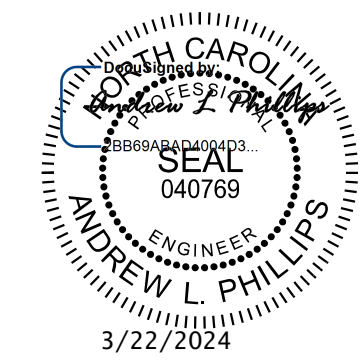


SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	* EPOXY COATED REINFORCING STEEL (LBS.)
SPAN A		29,375	36,421
POUR #1	258.2		
POUR #2	108.3		
SIDEWALK	30.6		
TOTALS **	397.1	29,375	36,421

\*\* QUANTITIES FOR CONCRETE PARAPETS ARE NOT INCLUDED



TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB  
REINFORCING STEEL IN SLAB NOT SHOWN, LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.



**Kimley»Horn**  
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Raleigh, NC 27601-1772  
Phone (919) 677-2000  
NC LICENSE # F-0102

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RAI FTGH  
SUPERSTRUCTURE  
BILL OF MATERIAL

REVISIONS					SHEET NO. S-23
NO.	BY:	DATE:	NO.	DATE:	
1			3		TOTAL SHEETS 33
2			4		

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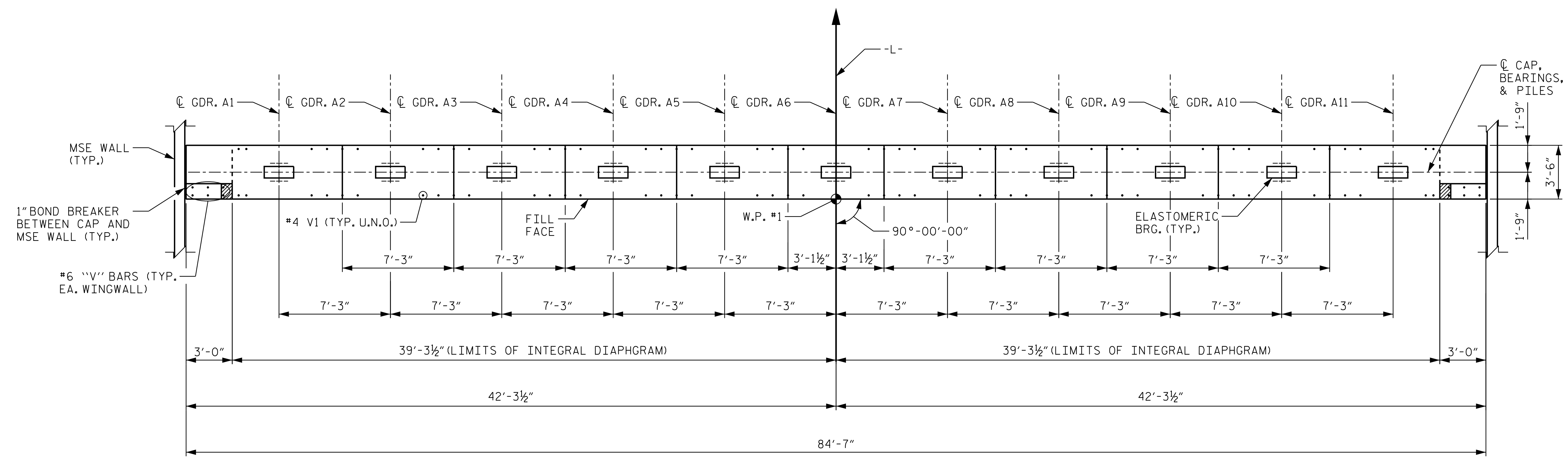
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ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
DRAWN BY : JMB 5/87	REV. 5/1/06 TLA/GM
CHECKED BY : SJD 9/87	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

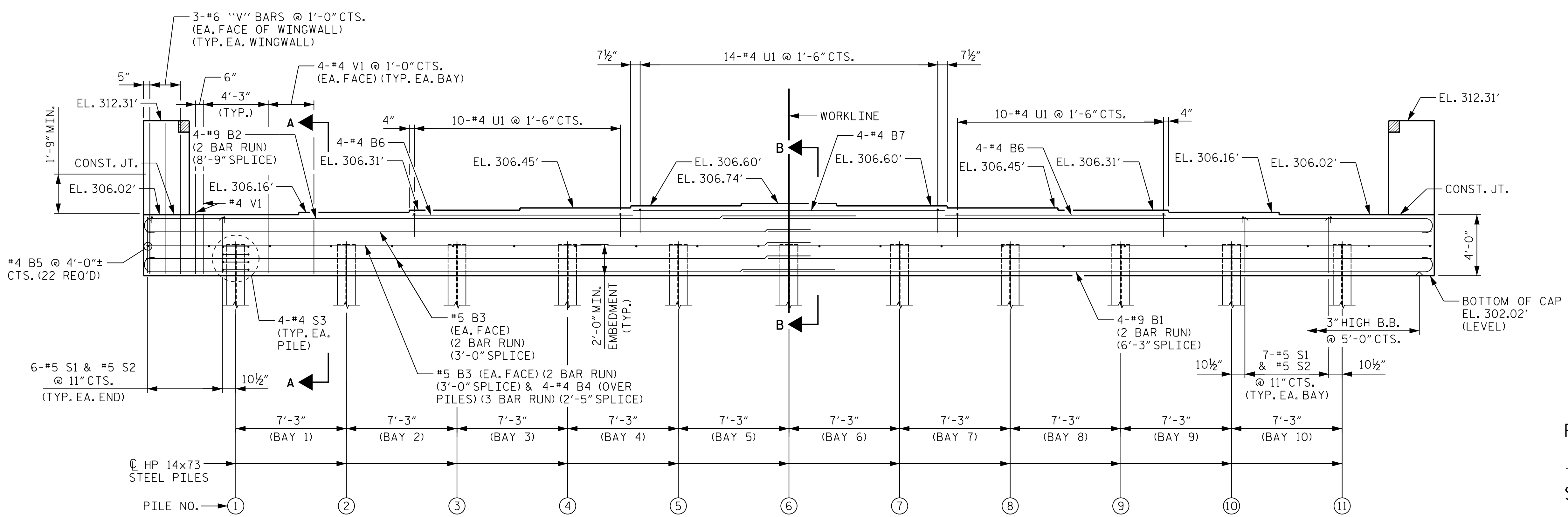


NOTES

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.  
 FOR SECTION A-A AND B-B, SEE SHEET 3 OF 3.  
 THE PORTIONS OF THE WINGWALLS ABOVE THE CONSTRUCTION JOINT ARE TO BE POURED WITH THE END BENTS. AT THE CONTRACTOR'S OPTION, THESE PORTIONS MAY BE POURED AS A PART OF THE SUPERSTRUCTURE, IN WHICH CASE CLASS 'AA' CONCRETE MAY BE USED.



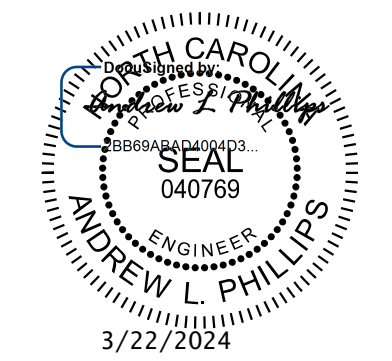
PLAN



ELEVATION

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 1 OF 3



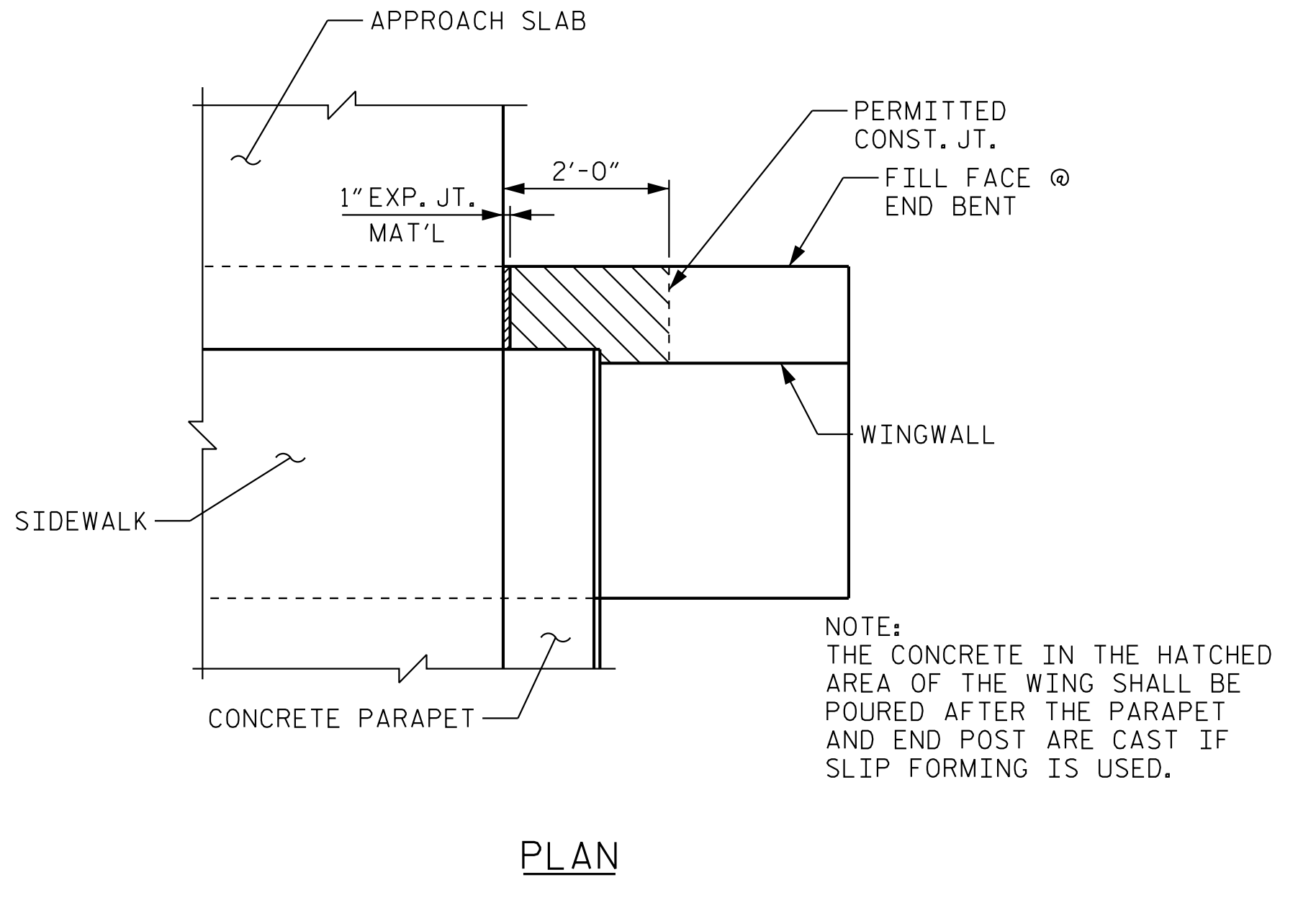
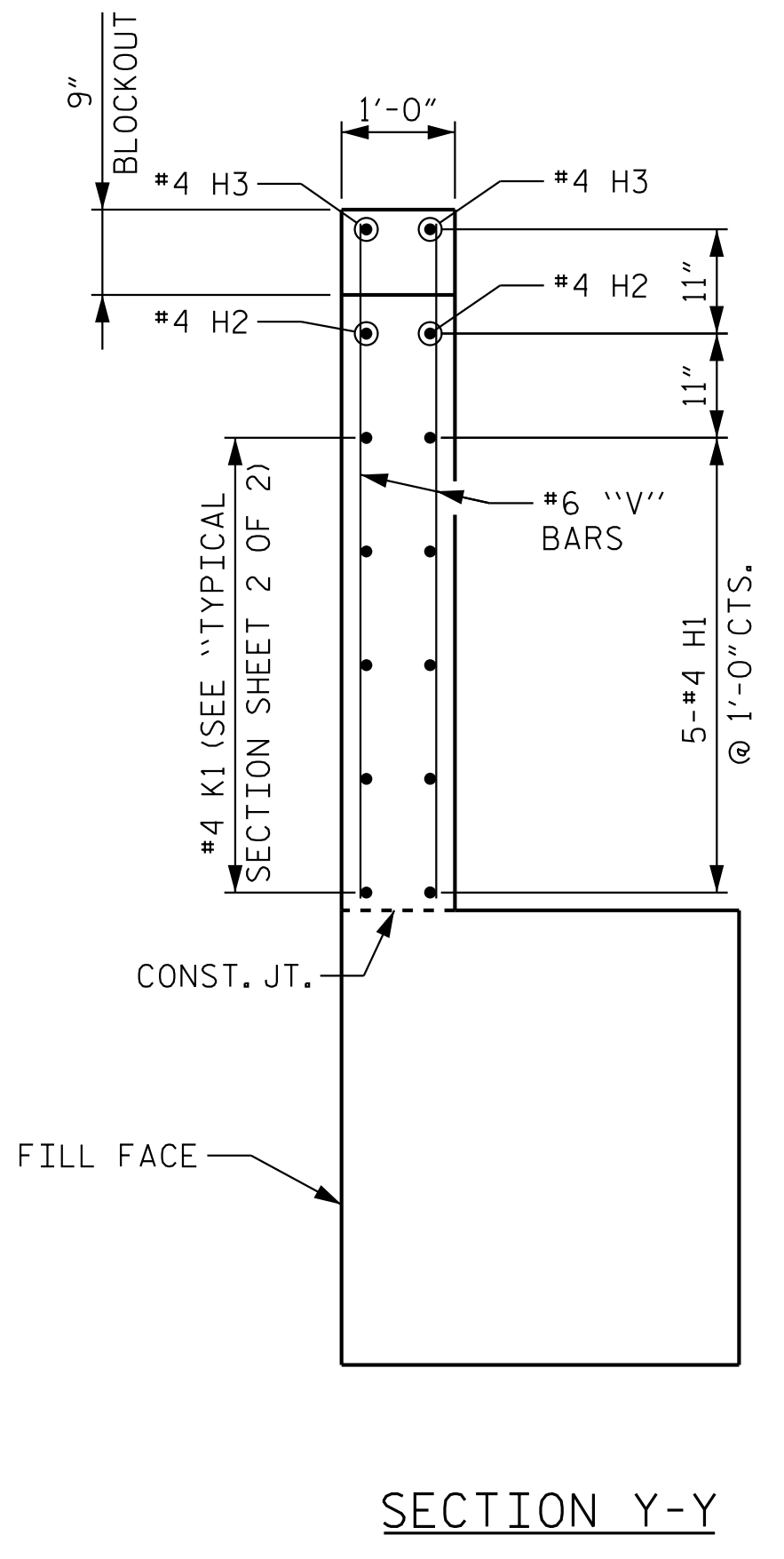
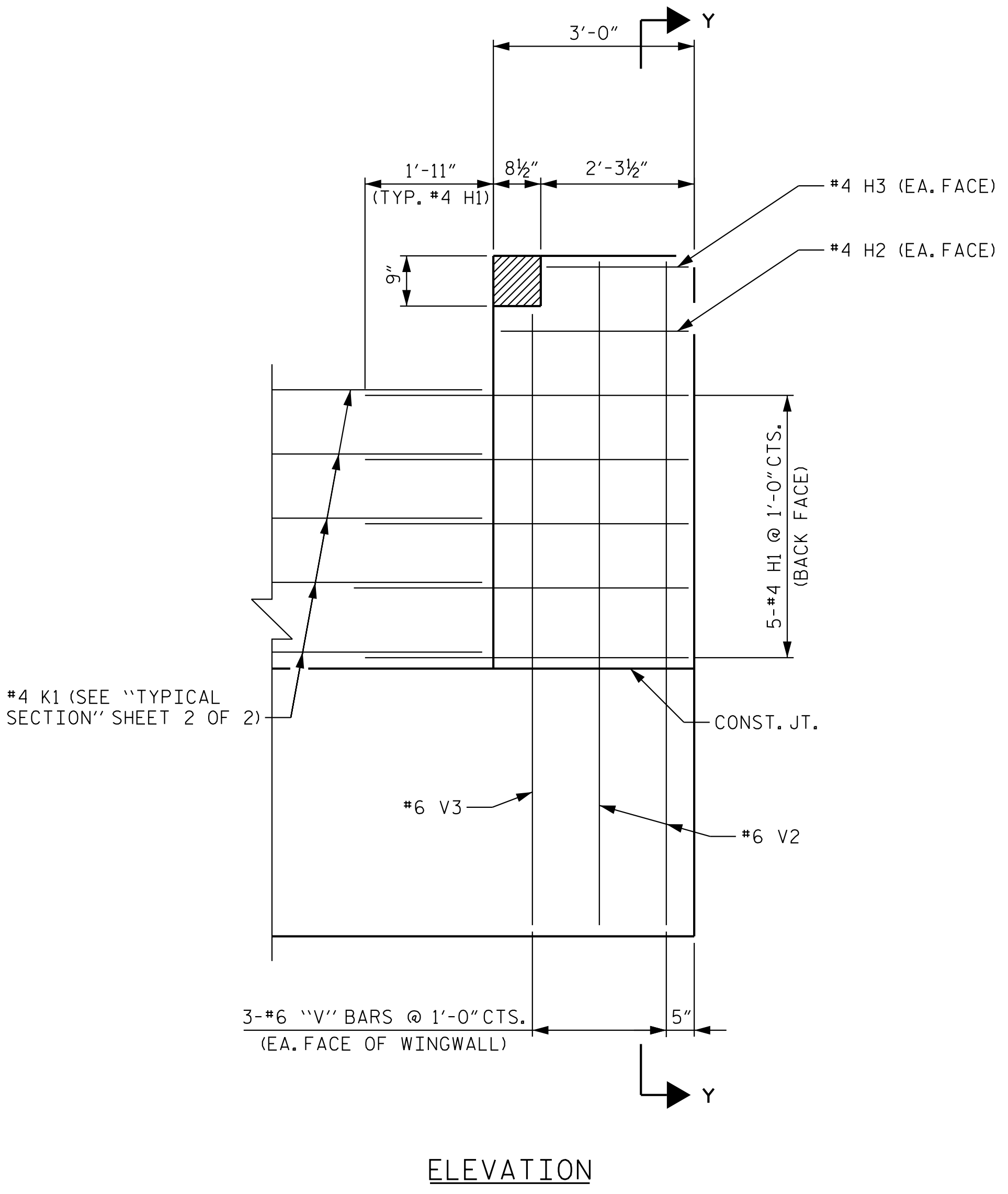
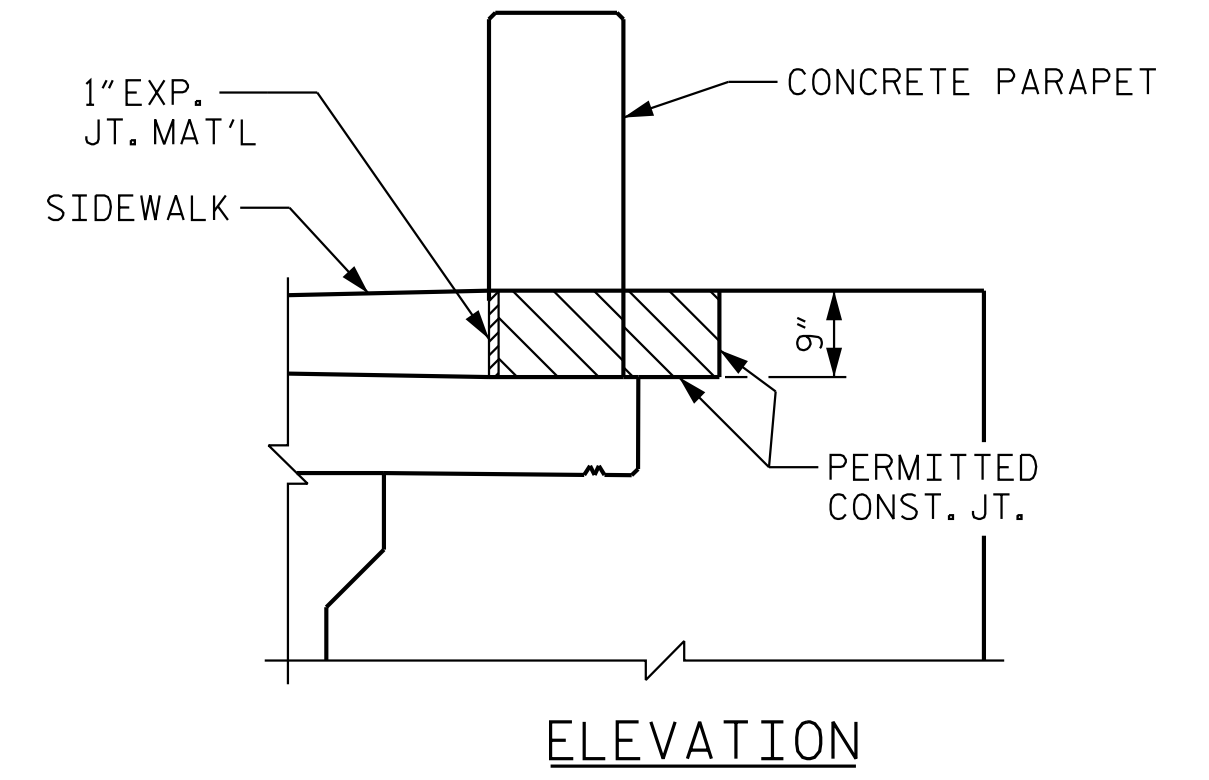
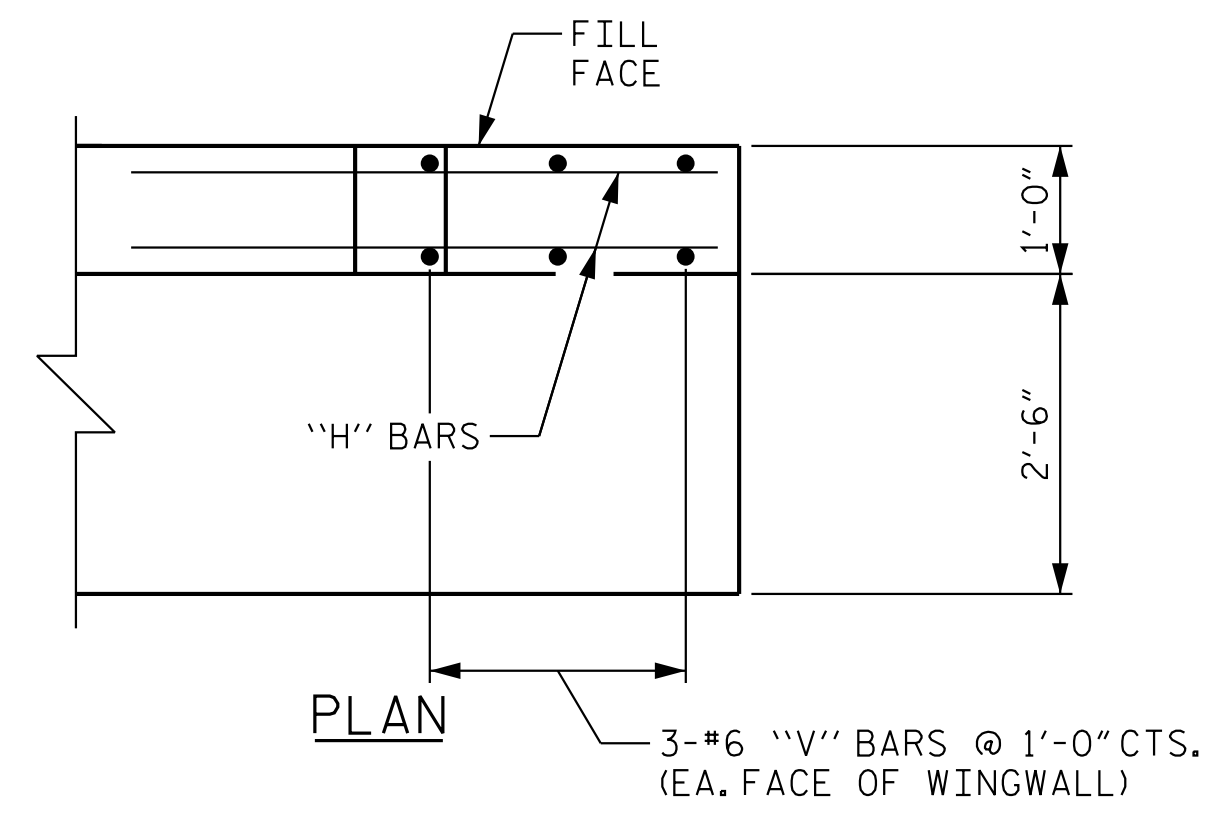
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DEPARTMENT OF TRANSPORTATION				
RALEIGH				TOTAL SHEETS 33
SUBSTRUCTURE				
END BENT 1				
PLAN AND ELEVATION				
REVISIONS				
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1			3	
2			4	

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 CHECKED BY: M. D. MAGEE DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

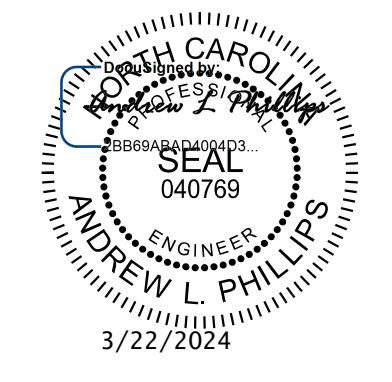


BLOCKOUT IN WINGWALL

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PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 3



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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 SECTION AND DETAILS

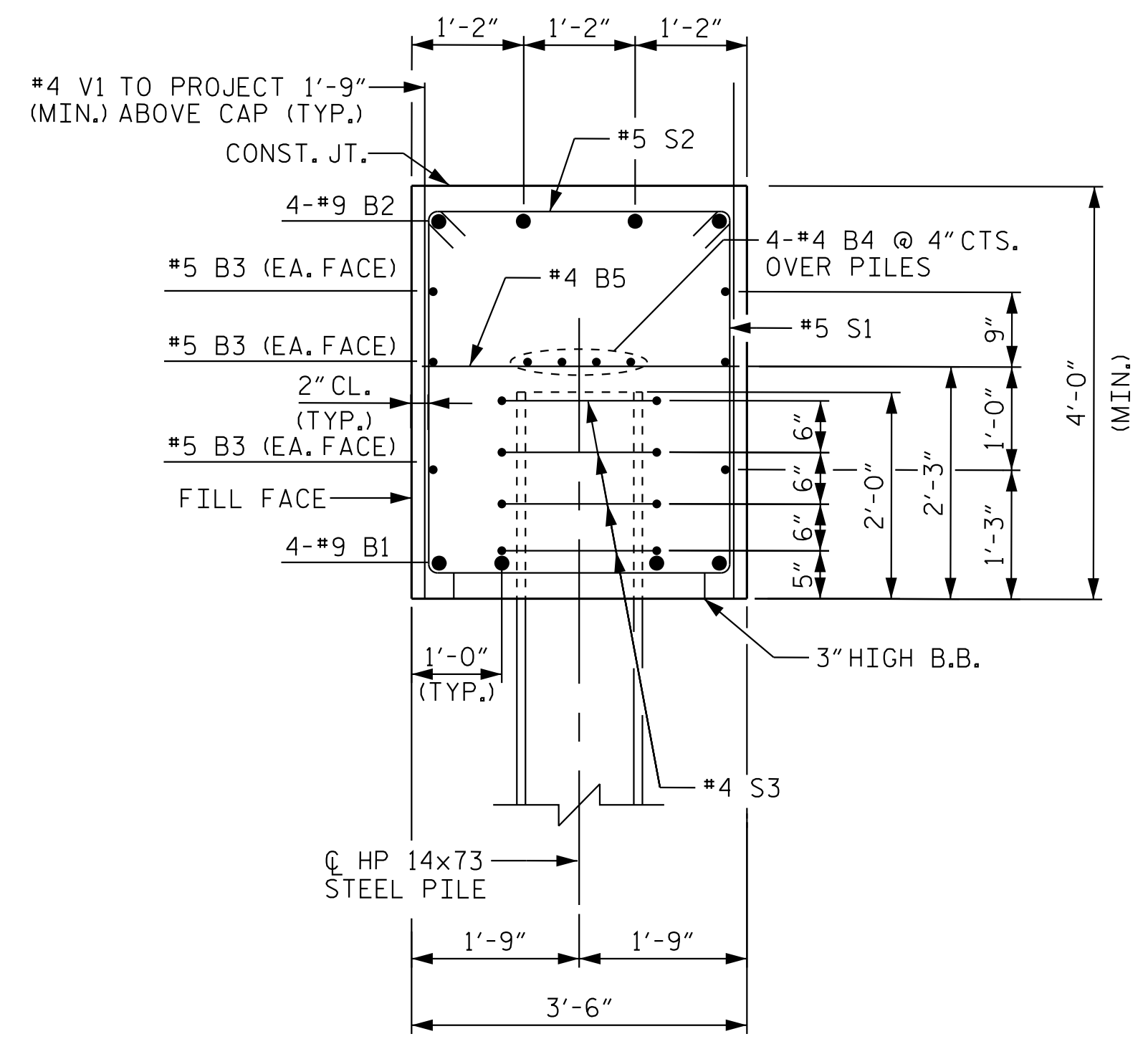
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CHECKED BY: M. D. MAGEE	DATE: 1/19
DESIGN ENGINEER OF RECORD: S. A. DENNEY	DATE: 1/19

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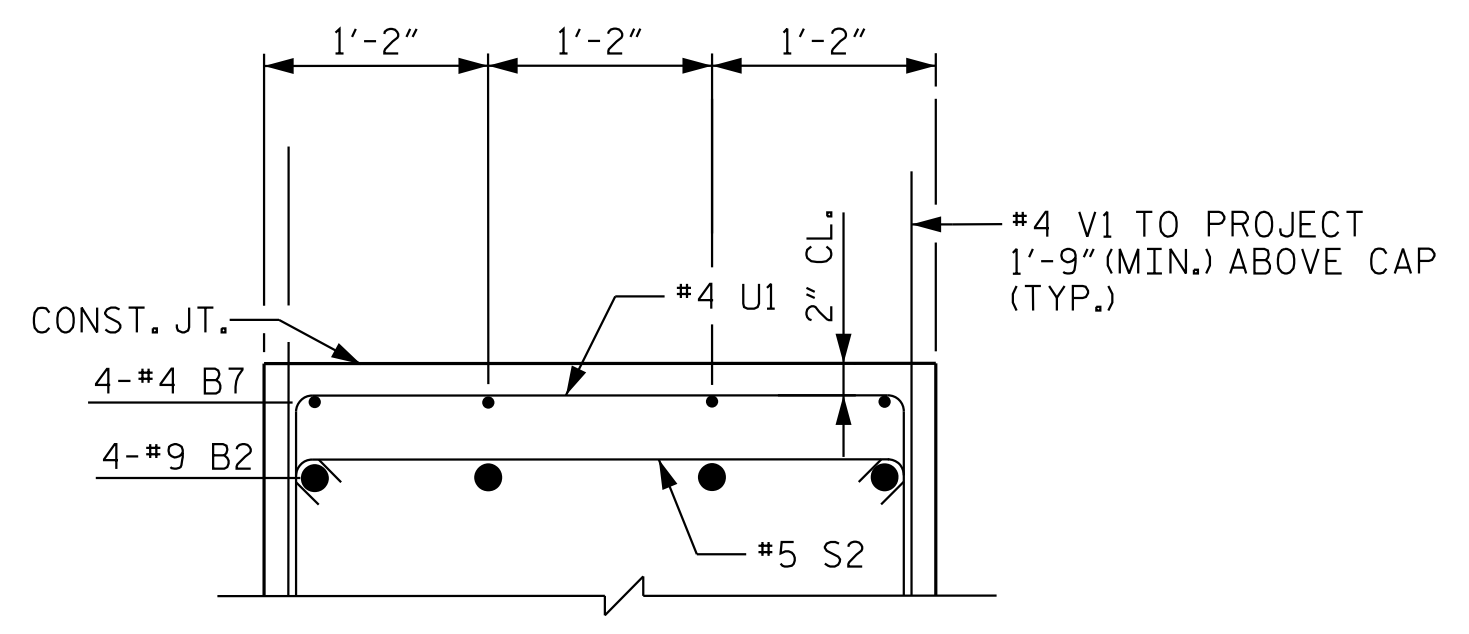
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NO.	BY:	DATE:	NO.	DATE:
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2			4	

TOTAL SHEETS: 33

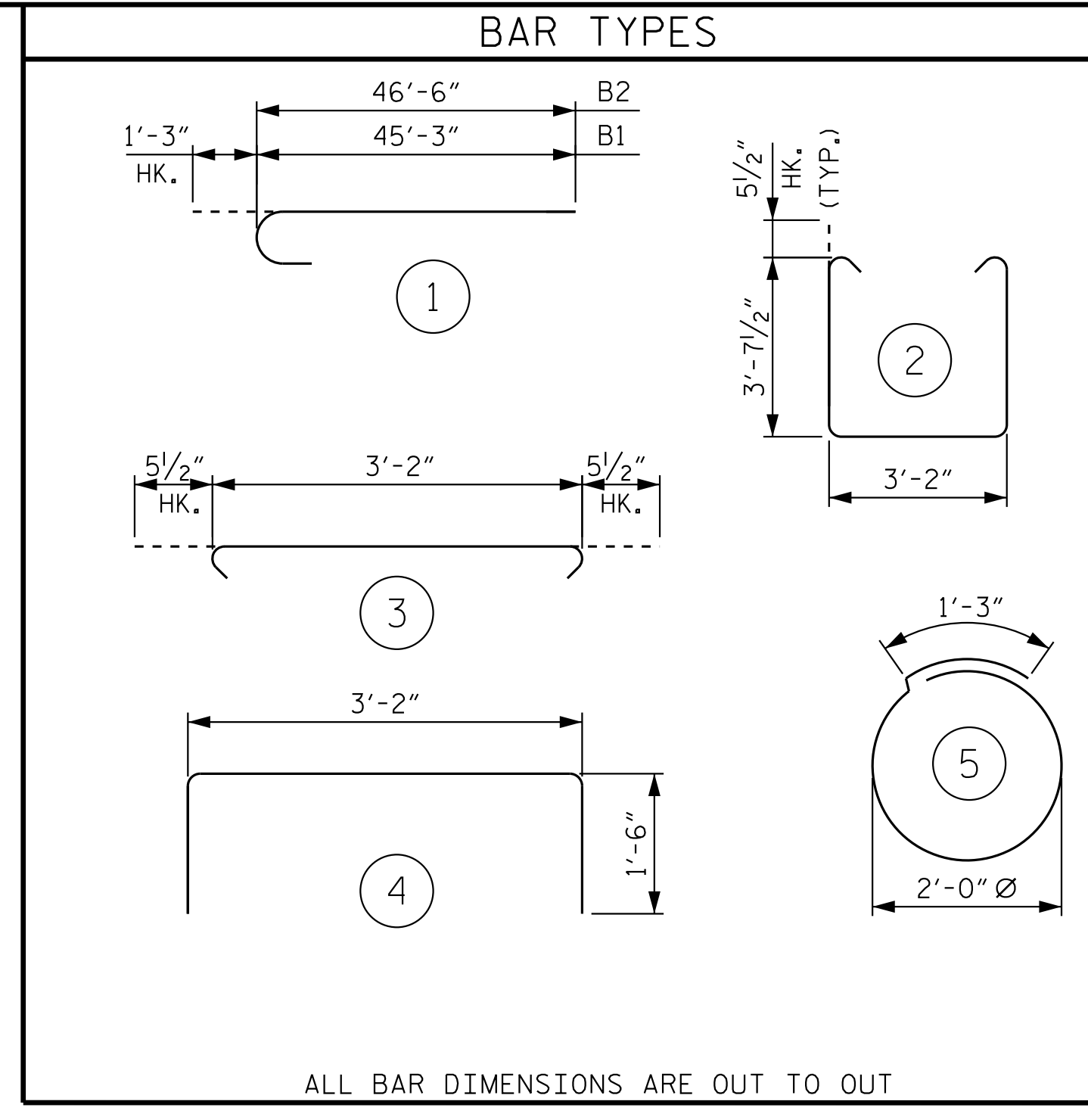




SECTION A-A

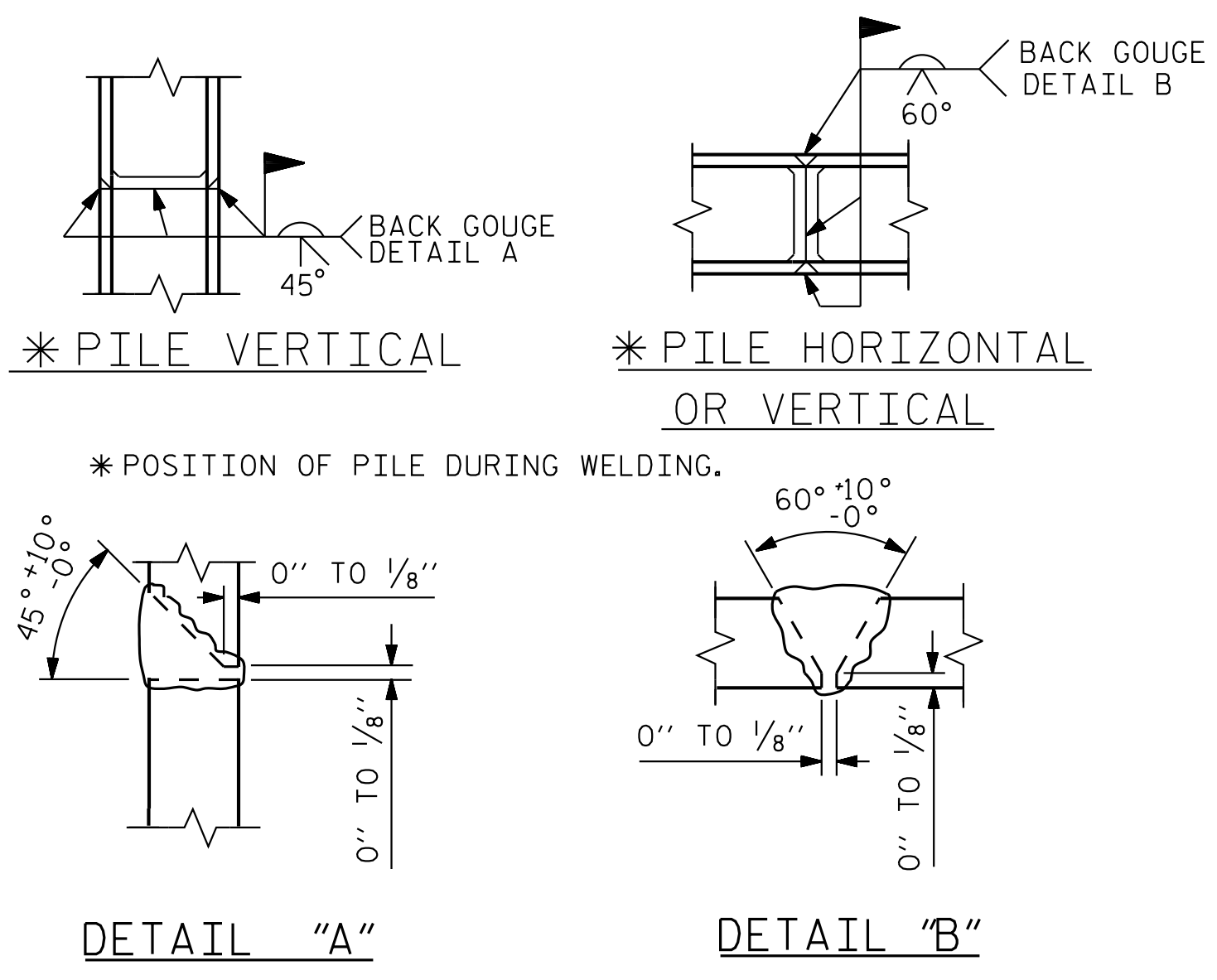


PARTIAL SECTION B-B

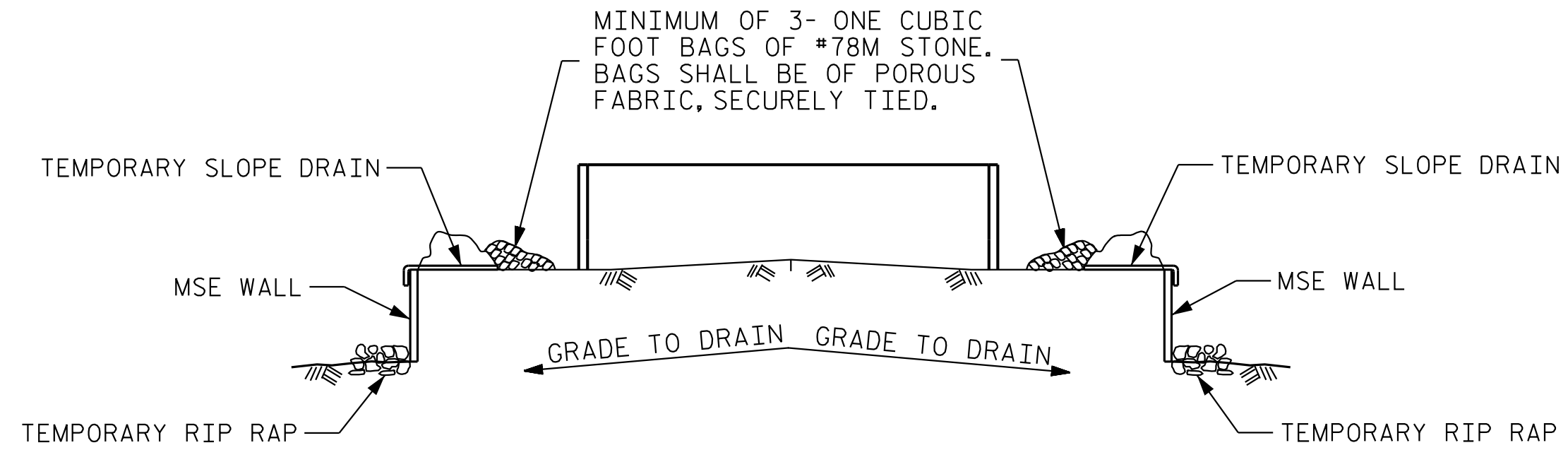


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	46'-6"	1,265
B2	8	9	1	47'-9"	1,299
B3	12	5	STR	43'-8"	547
B4	12	4	STR	29'-9"	238
B5	22	4	STR	3'-2"	47
B6	8	4	STR	14'-6"	77
B7	4	4	STR	20'-5"	55
H1	10	4	STR	4'-9"	32
H2	4	4	STR	2'-8"	7
H3	4	4	STR	1'-11"	5
S1	82	5	2	11'-4"	969
S2	82	5	3	4'-1"	349
S3	44	4	5	7'-7"	223
U1	34	4	4	6'-2"	140
V1	88	4	STR	6'-3"	367
V2	8	6	STR	9'-11"	119
V3	4	6	STR	9'-2"	55
REINFORCING STEEL				5,794 LBS.	
CLASS A CONCRETE				48.5 C.Y.	



HP PILE SPLICE DETAILS



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

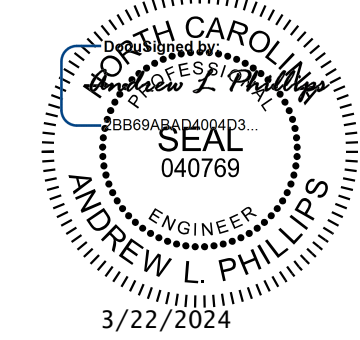
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TEMPORARY DRAINAGE AT END BENT

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 SECTION AND DETAILS

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2			4	

TOTAL SHEETS: 33

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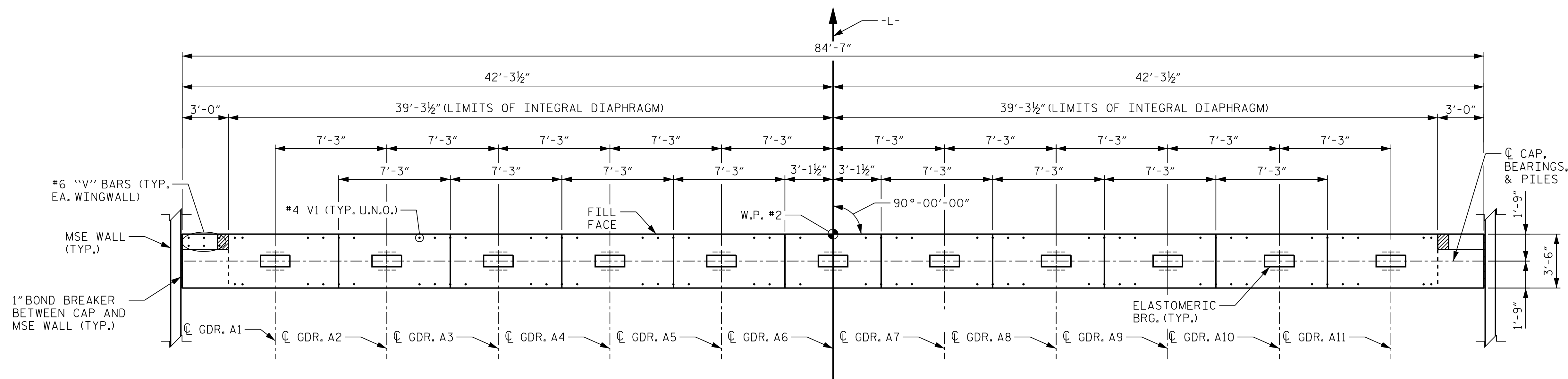
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 DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

NOTES

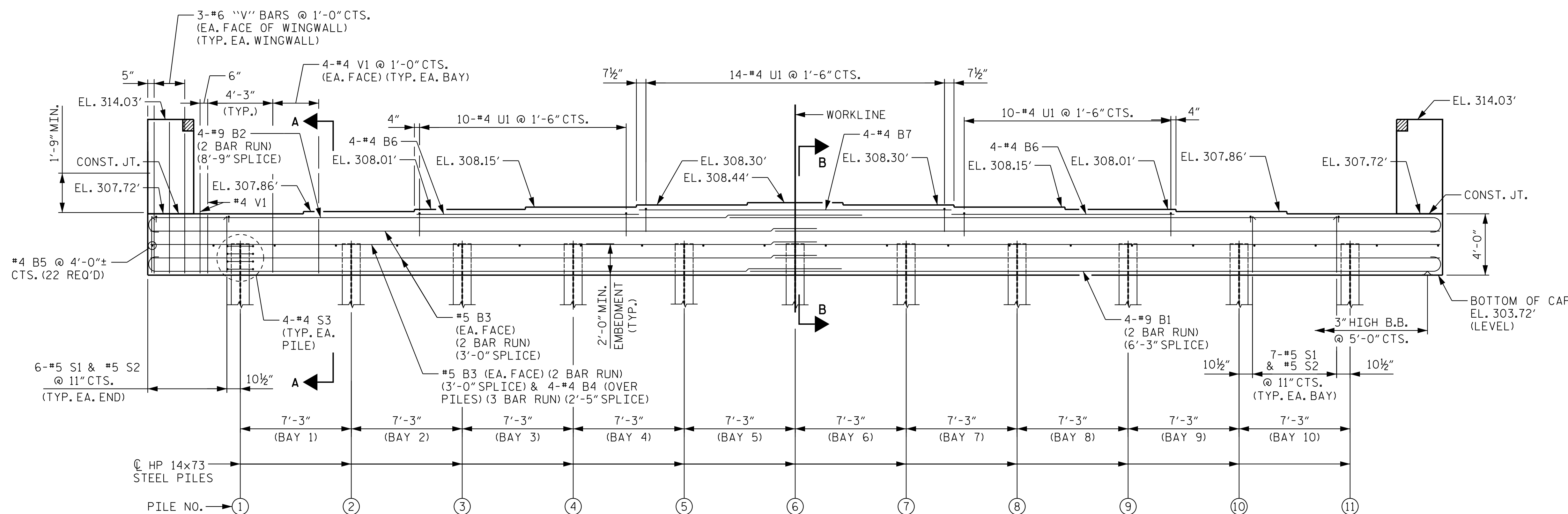
FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

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

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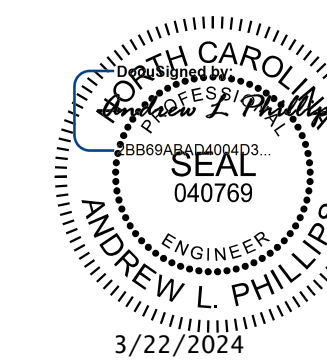
PLAN



ELEVATION

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE

END BENT 2  
PLAN AND ELEVATION

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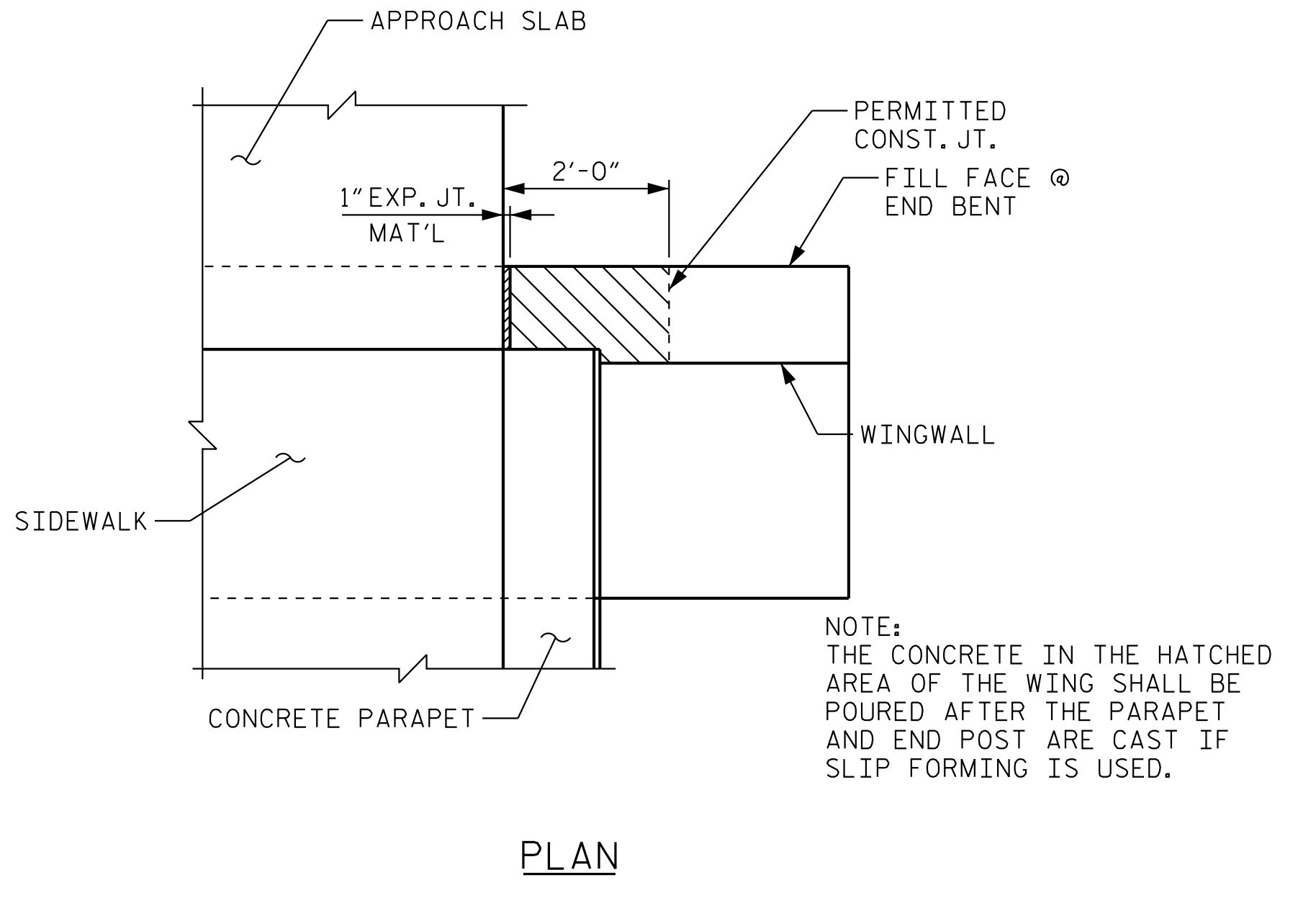
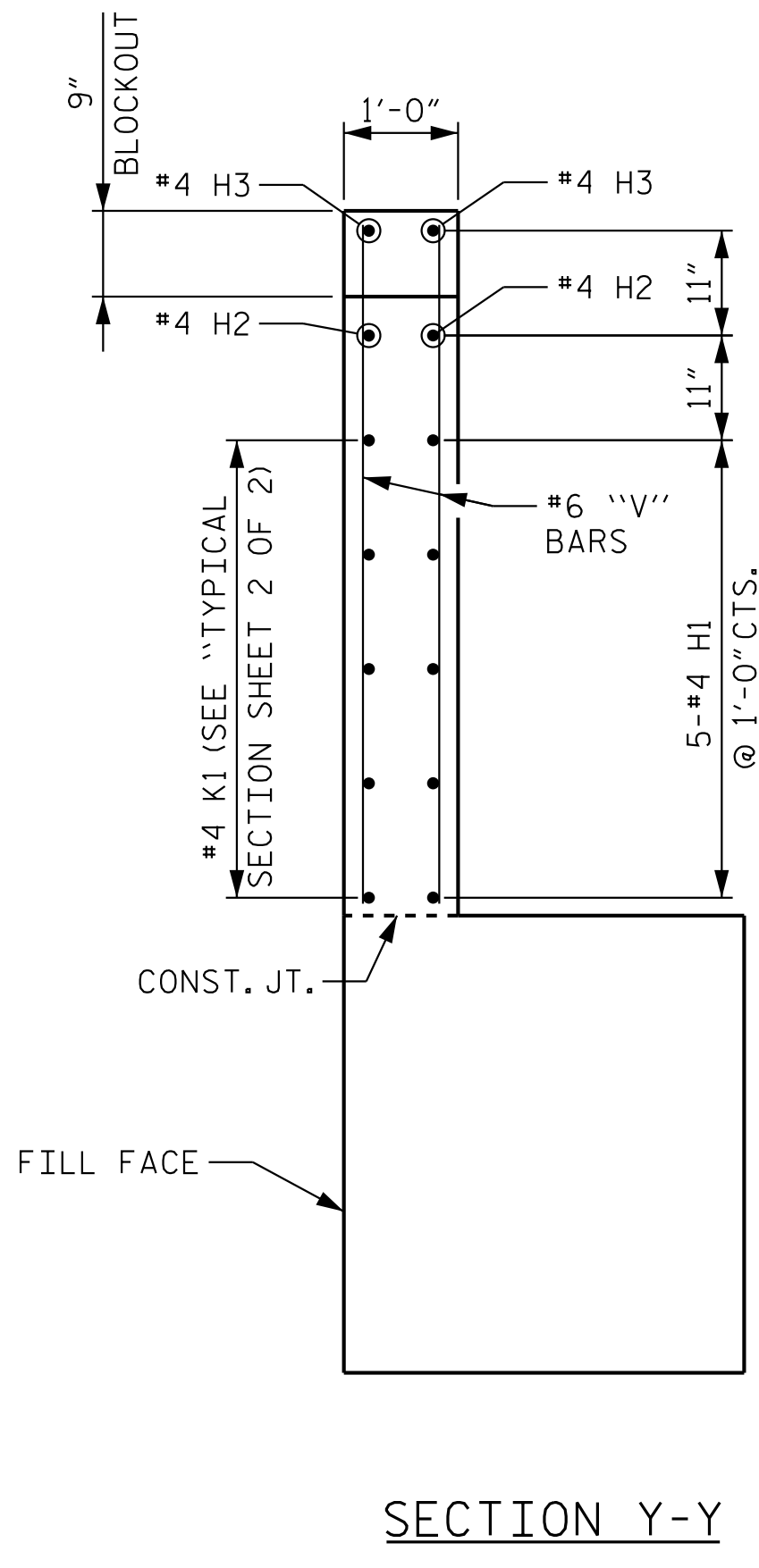
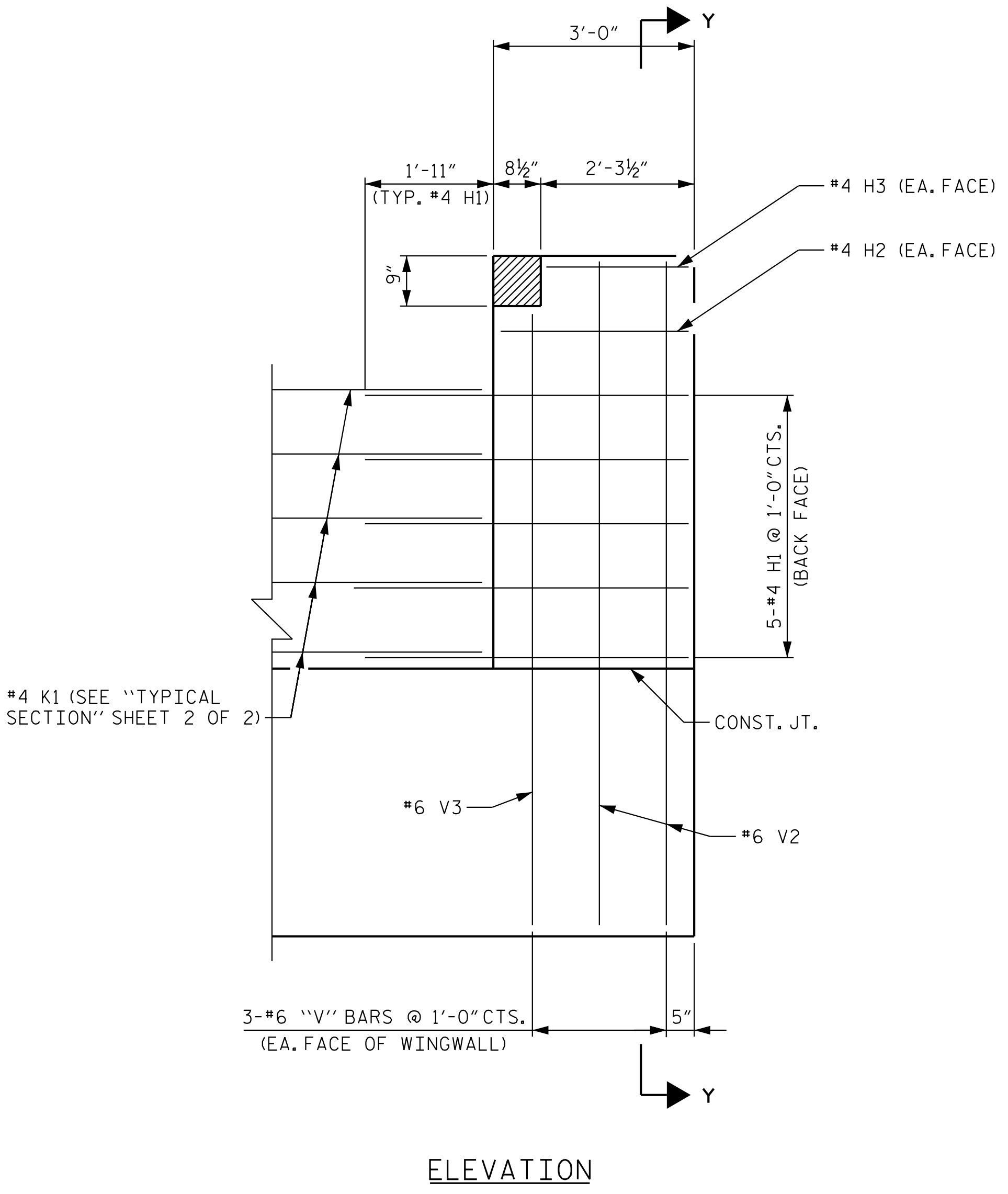
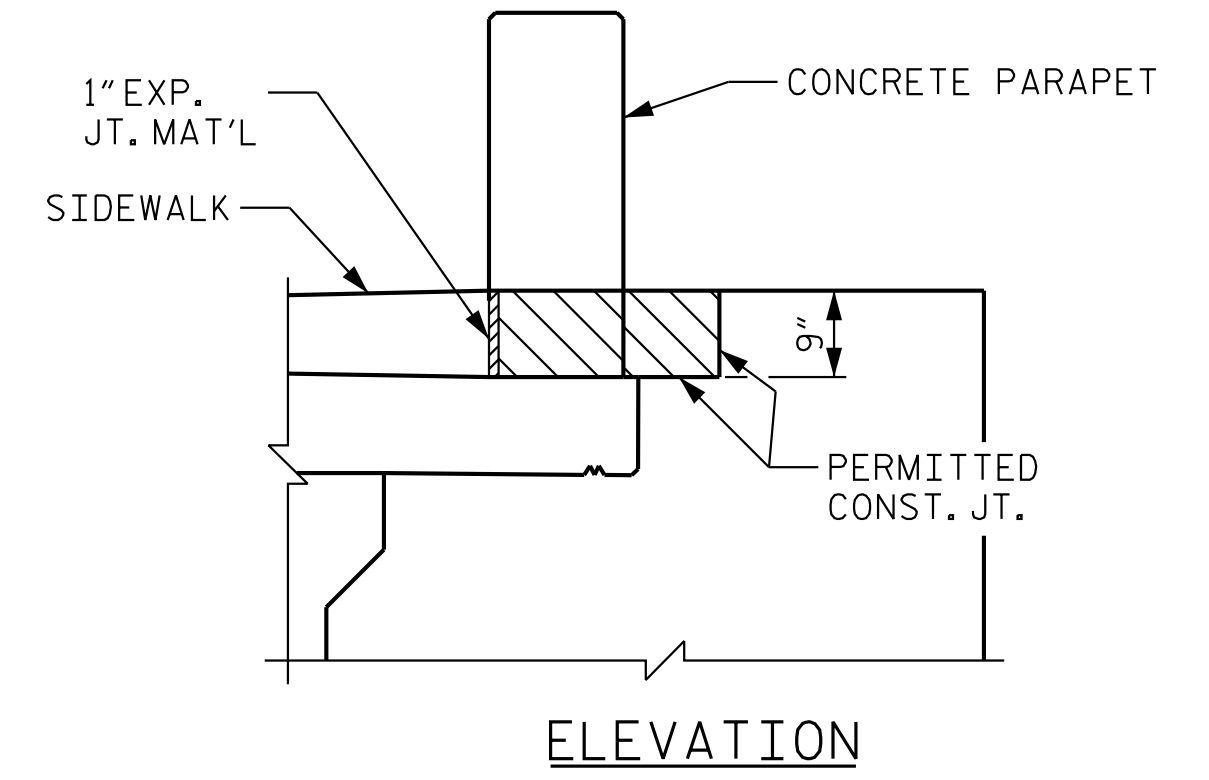
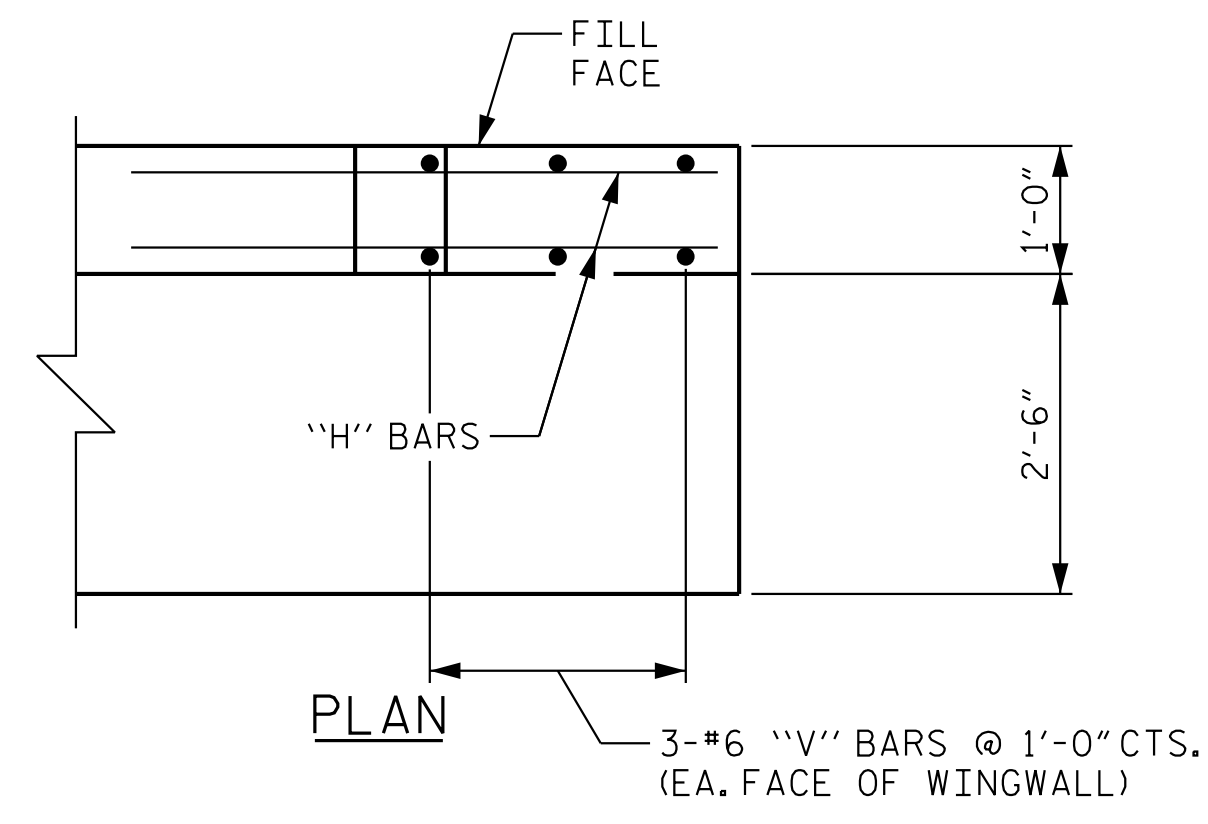
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2			4	

S-27  
TOTAL SHEETS  
33

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DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19

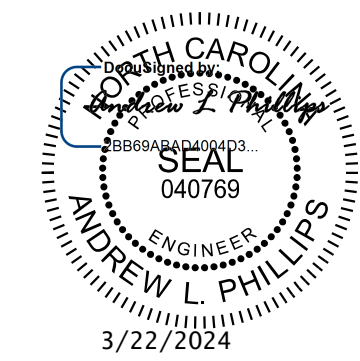




NOTE:  
THE CONCRETE IN THE HATCHED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 3



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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2  
 SECTION AND DETAILS

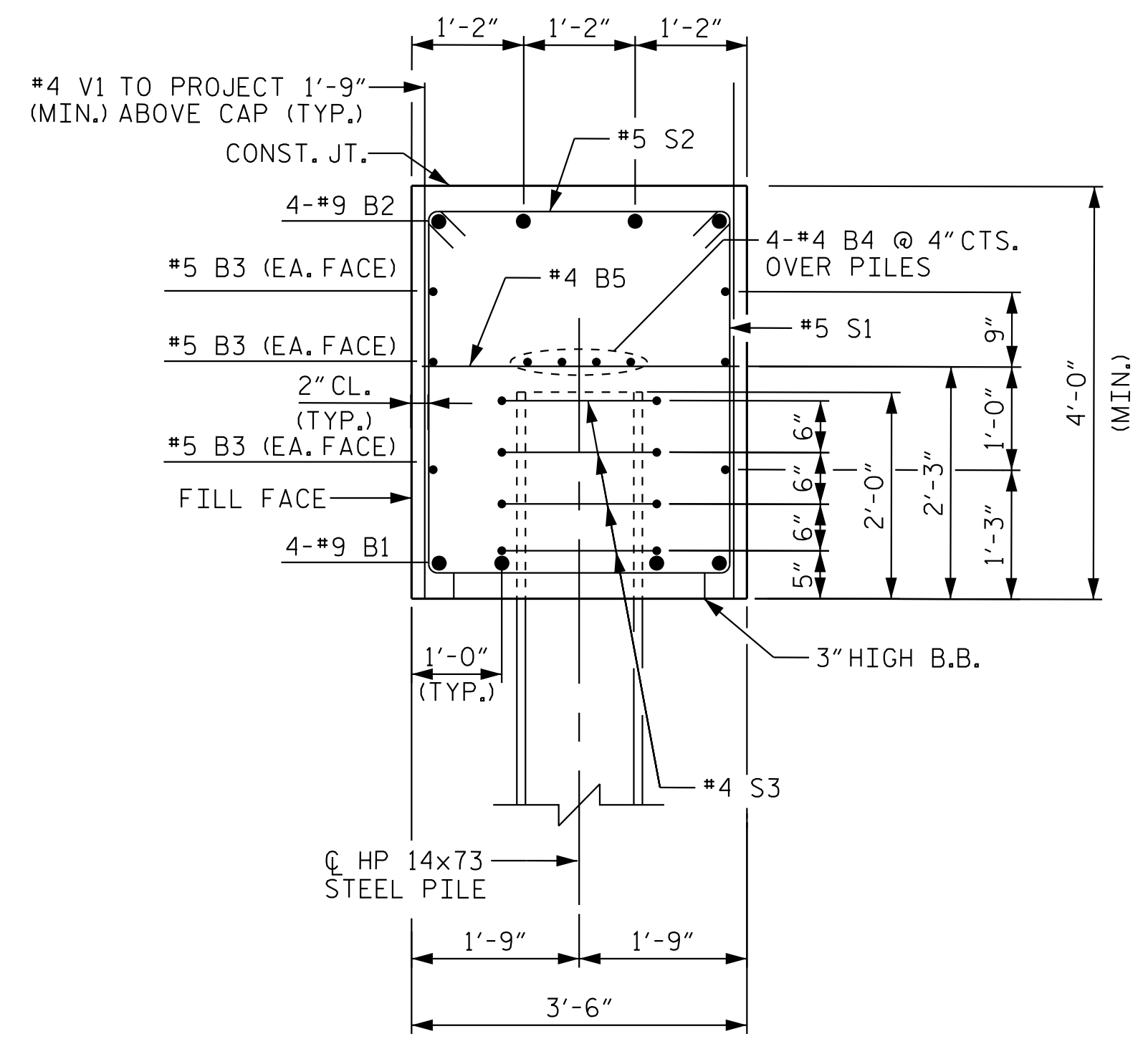
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TOTAL SHEETS: 33

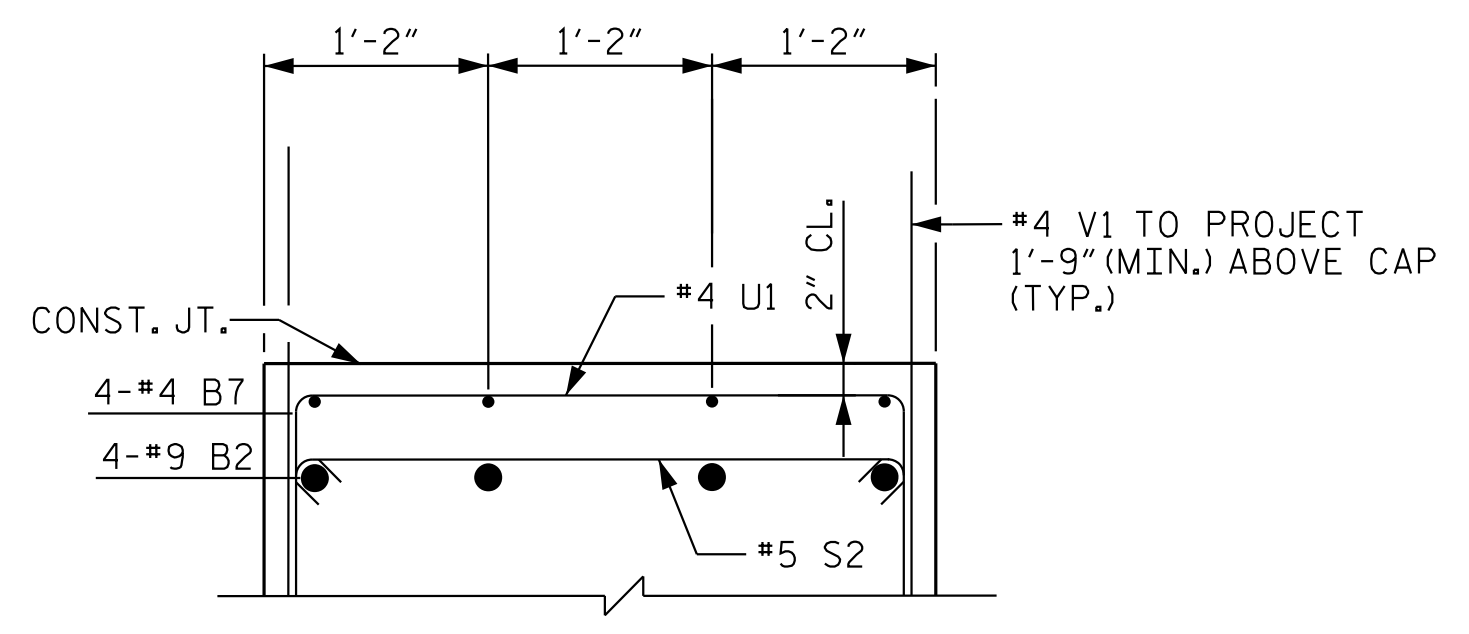
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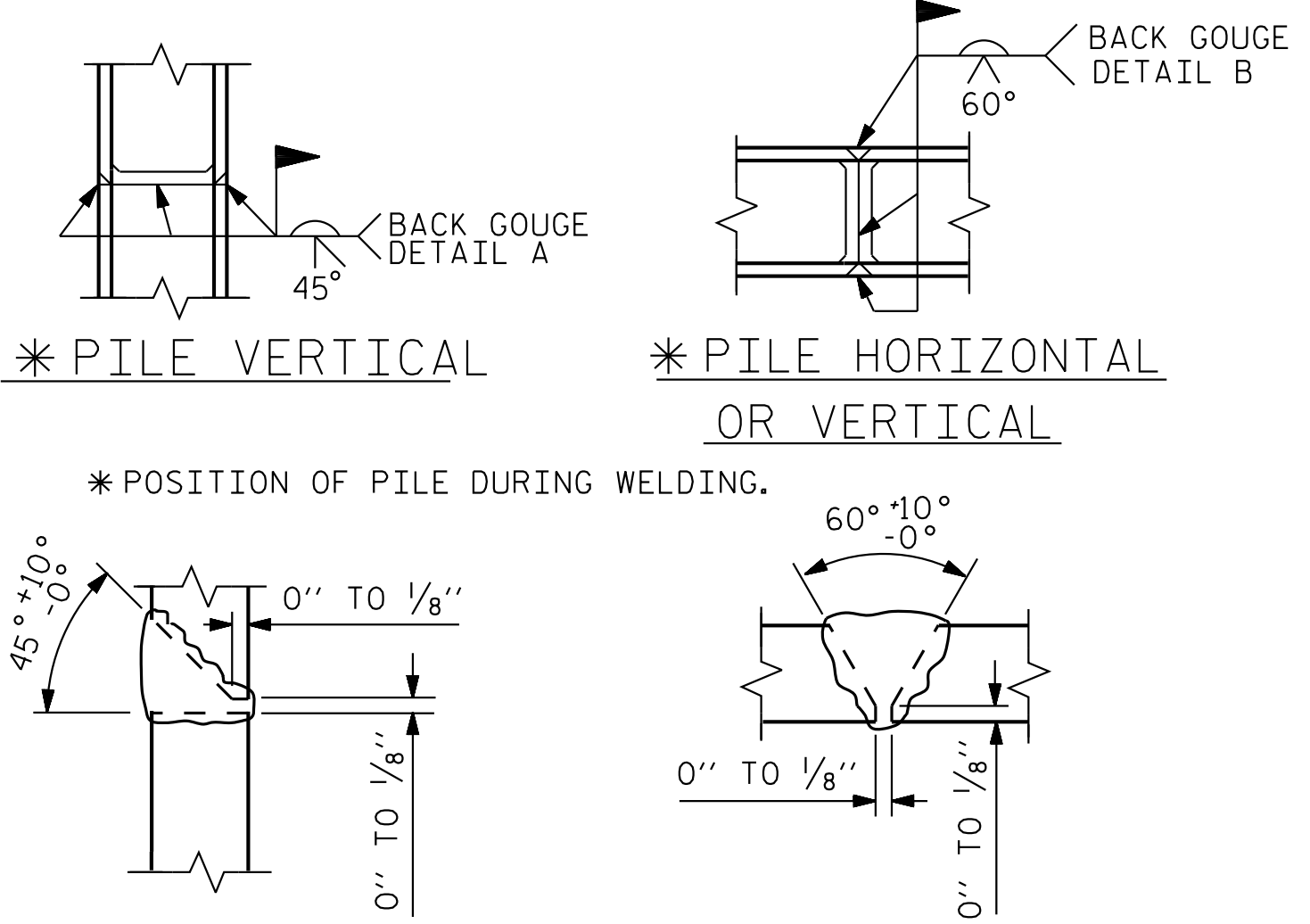
SECTION A-A



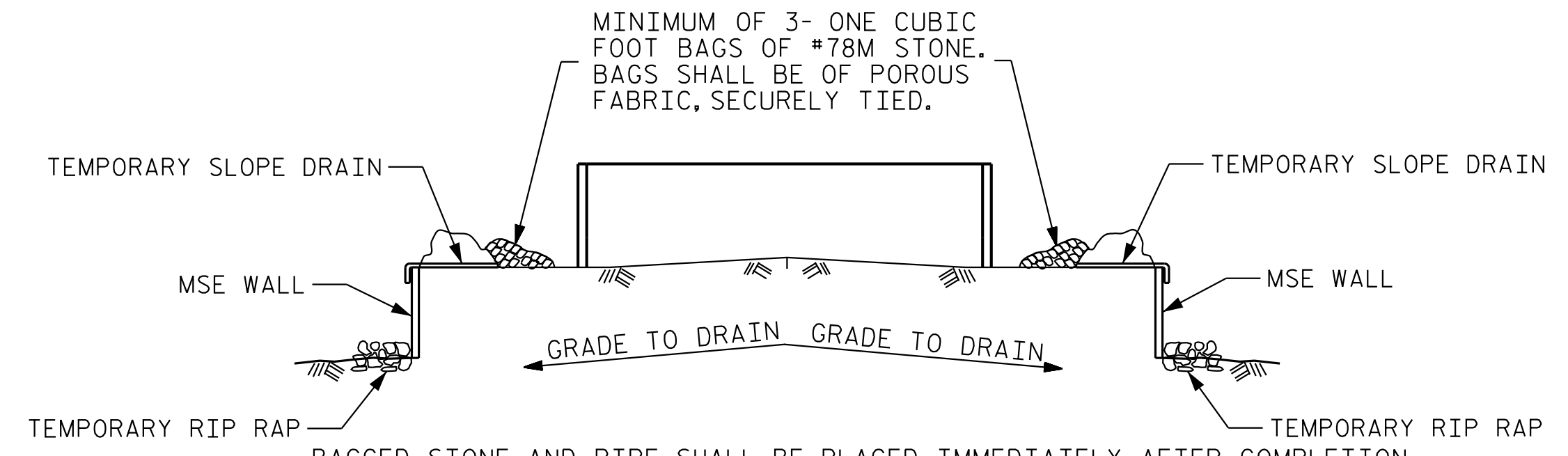
PARTIAL SECTION B-B

BAR TYPES		BILL OF MATERIAL				
		END BENT 1				
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	8	9	1	46'-6"	1,265	
B2	8	9	1	47'-9"	1,299	
B3	12	5	STR	43'-8"	547	
B4	12	4	STR	29'-9"	238	
B5	22	4	STR	3'-2"	47	
B6	8	4	STR	14'-6"	77	
B7	4	4	STR	20'-5"	55	
H1	10	4	STR	4'-9"	32	
H2	4	4	STR	2'-8"	7	
H3	4	4	STR	1'-11"	5	
S1	82	5	2	11'-4"	969	
S2	82	5	3	4'-1"	349	
S3	44	4	5	7'-7"	223	
U1	34	4	4	6'-2"	140	
V1	88	4	STR	6'-3"	367	
V2	8	6	STR	9'-11"	119	
V3	4	6	STR	9'-2"	55	
REINFORCING STEEL				5,794 LBS.		
CLASS A CONCRETE				48.5 C.Y.		

ALL BAR DIMENSIONS ARE OUT TO OUT



DETAIL "A"      DETAIL "B"  
HP PILE SPLICE DETAILS



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

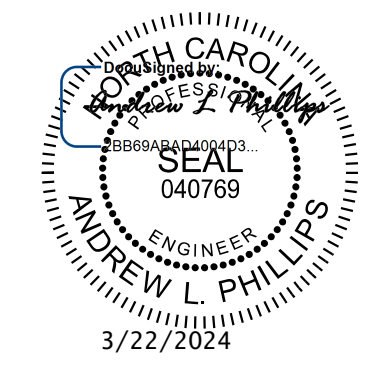
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TEMPORARY DRAINAGE AT END BENT

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2  
 SECTION AND DETAILS

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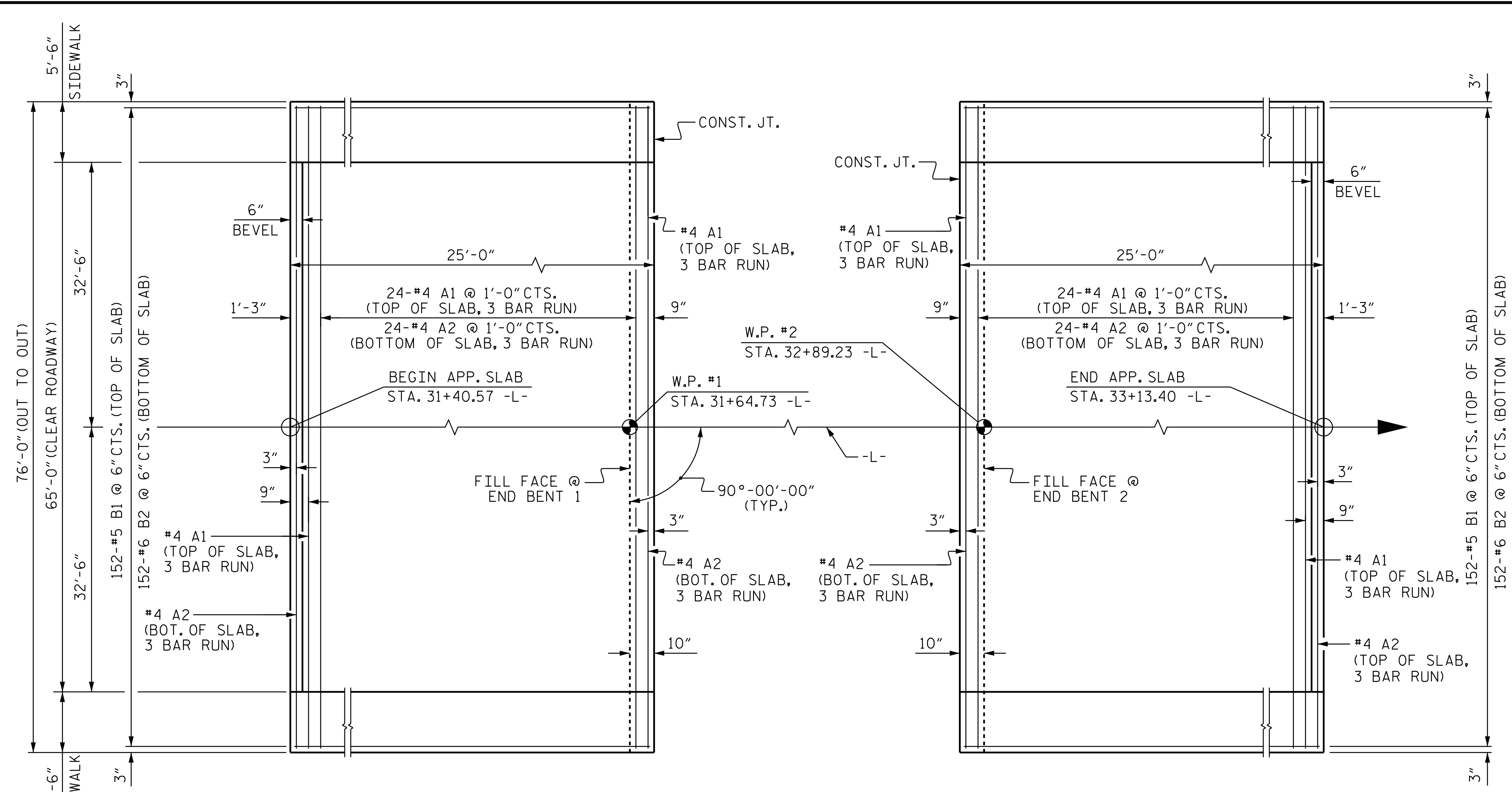
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TOTAL SHEETS: 33

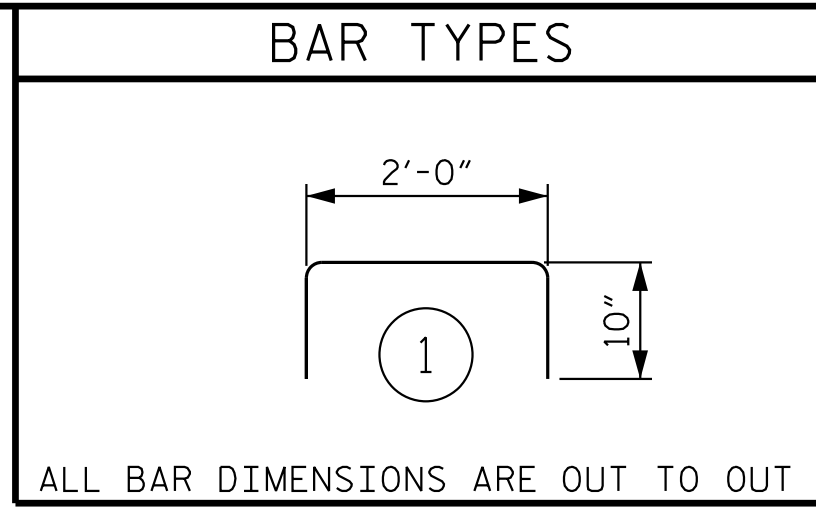
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 CHECKED BY: M. D. MAGEE      DATE: 1/19  
 DESIGN ENGINEER OF RECORD: S. A. DENNEY      DATE: 1/19





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

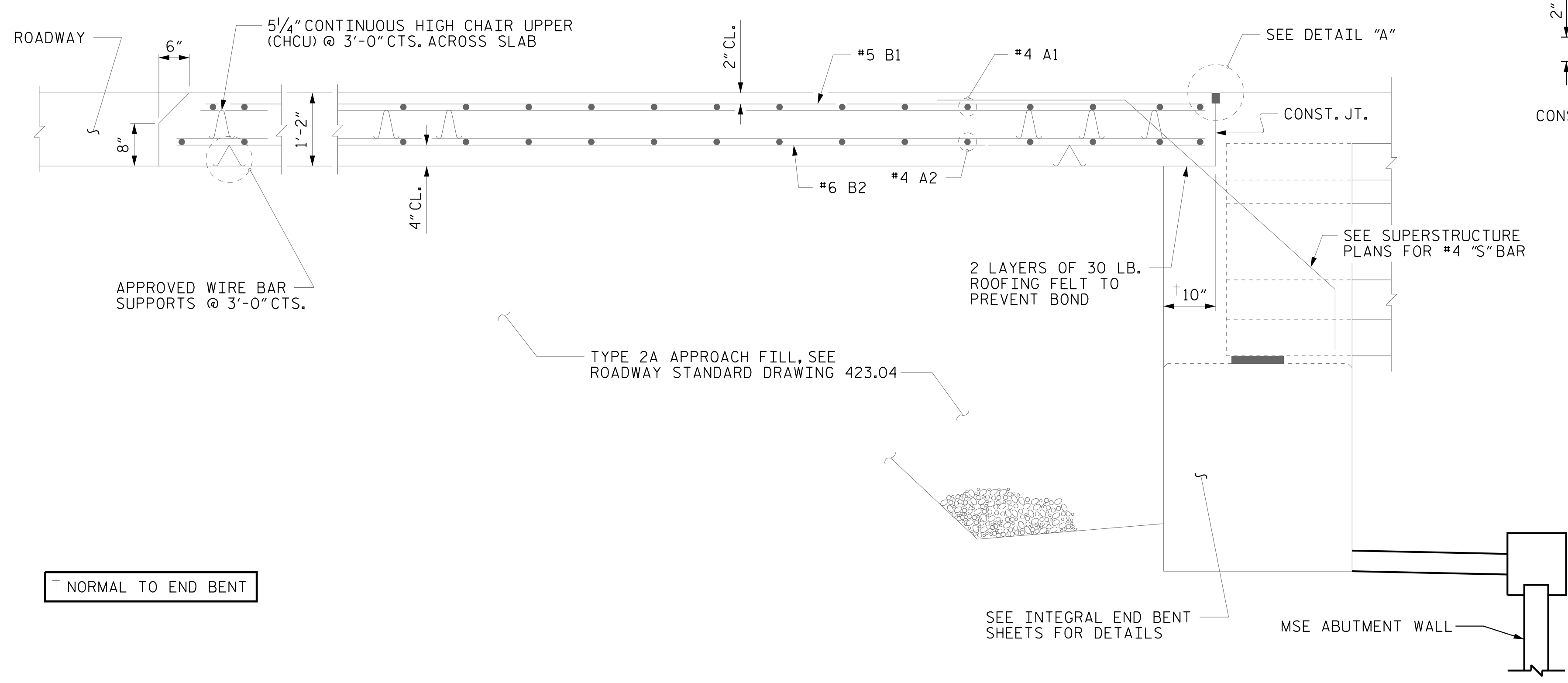


ALL BAR DIMENSIONS ARE OUT TO OUT

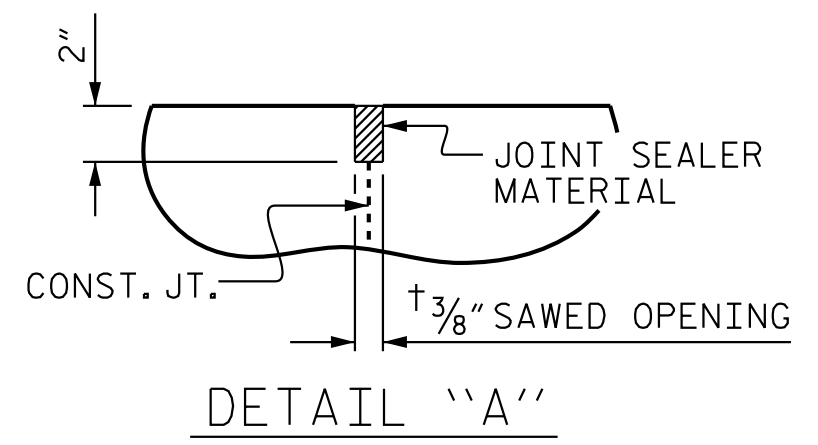
BAR TYPES						BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	78	#4	STR	26'-7"	1,385						
A2	78	#4	STR	26'-5"	1,376						
* B1	152	#5	STR	24'-2"	3,831						
B2	152	#6	STR	24'-8"	5,631						
* B3	10	#4	STR	24'-8"	165						
* G1	50	#4	STR	5'-2"	173						
* U1	16	#4	1	3'-8"	39						
REINFORCING STEEL					7,007 LBS.						
* EPOXY COATED REINFORCING STEEL					5,593 LBS.						
CLASS AA CONCRETE BREAKDOWN											
POUR #1 (SLAB)					82.1 C.Y.						
POUR #2 (SIDEWALK)					6.1 C.Y.						
TOTAL					88.2 C.Y.						

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.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.



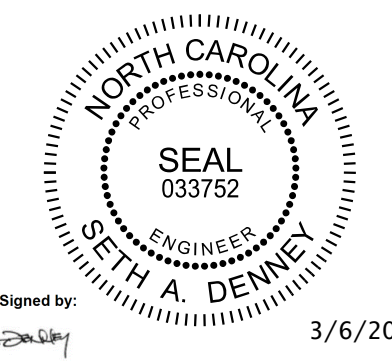
SECTION THRU SLAB



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

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
BRIDGE APPROACH SLAB  
FOR INTEGRAL ABUTMENT  
WITH FLEXIBLE PAVEMENT

**Kimley-Horn**  
421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000  
NC LICENSE # F-0102

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NO.	BY:	DATE:	NO.	DATE:	S-31
1			3		TOTAL SHEETS
2			4		33

K:\RD1\Structure\Bridges\NC\1036002 - P-5720\Code\Drawings\5720\_SML\_ASI\_911494.dgn 3/5/2024

ASSEMBLED BY :	D.D. LOWERY	DATE :	1/19
CHECKED BY :	S.A. DENNEY	DATE :	1/19
DRAWN BY :	TLA	REV. 12/17	MAA/THC
CHECKED BY :	GM	REV. 06/19	BNB/THC
		REV. 07/23	BNB/SNM

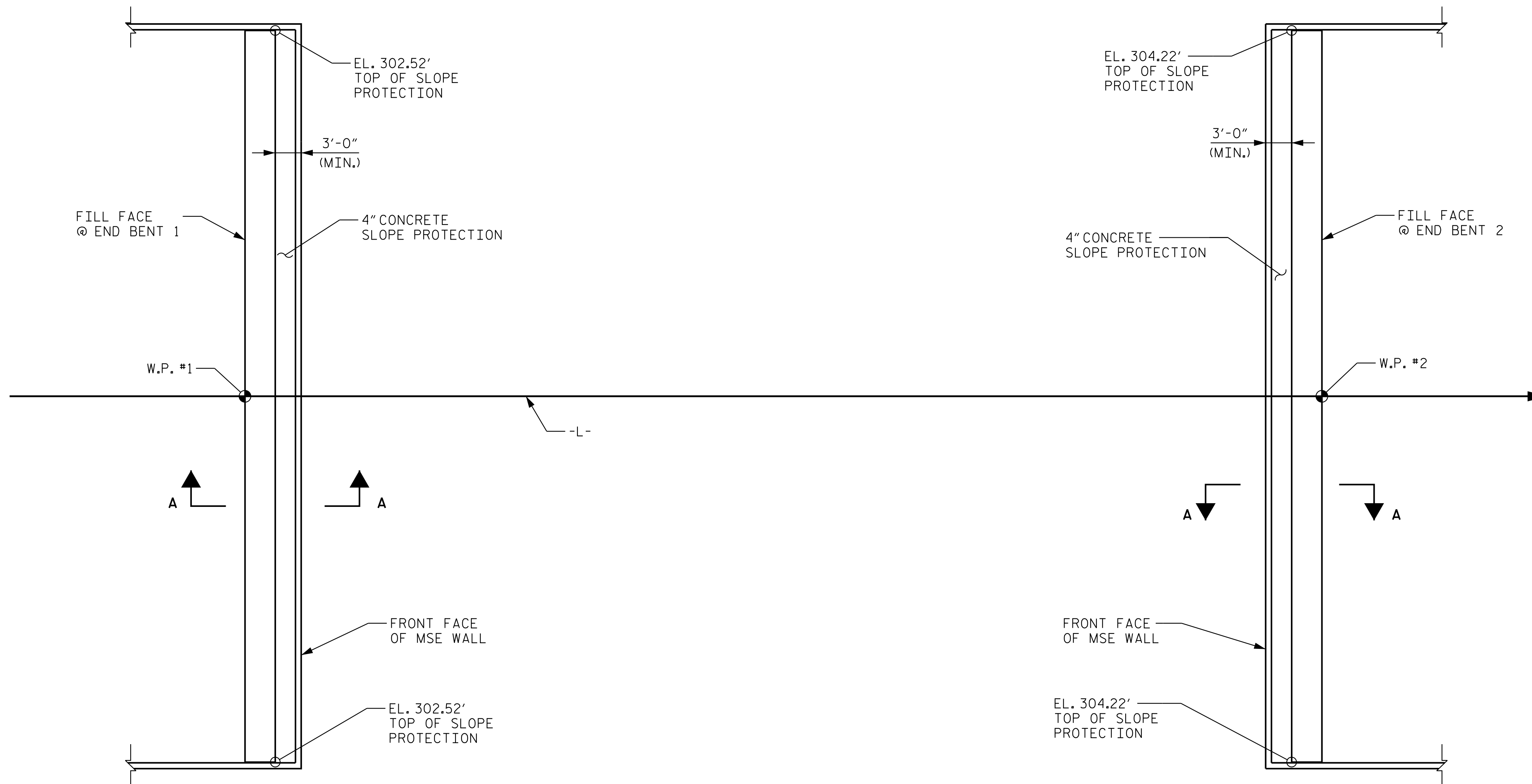
NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

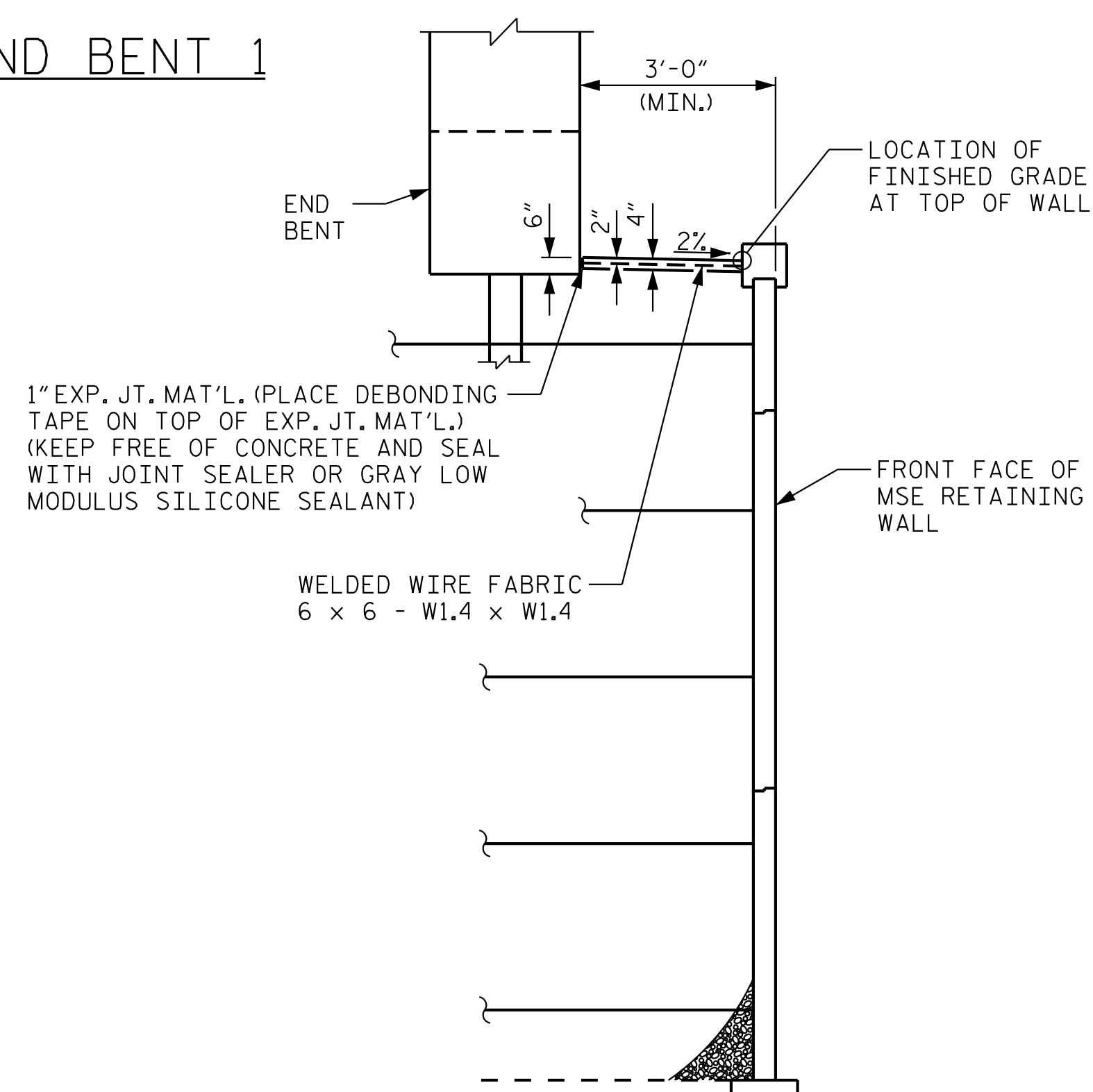
BRIDGE @ STA. 32+23.01 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	22	40
END BENT 2	22	40

\* QUANTITY SHOWN IS BASED ON 5' POURS.

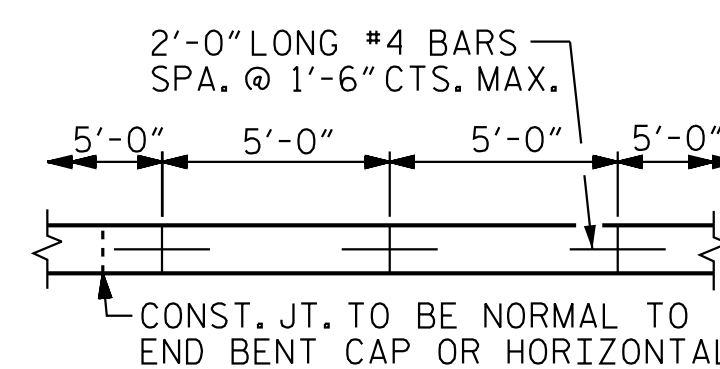


PLAN @ END BENT 1

PLAN @ END BENT 2

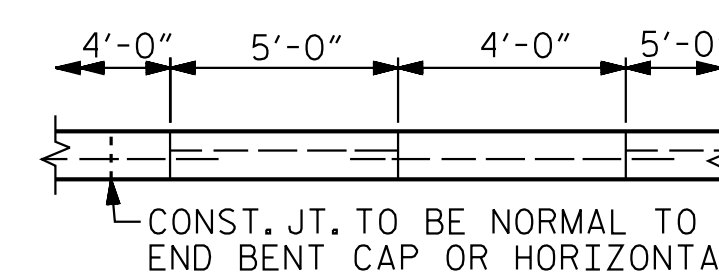


SECTION A-A



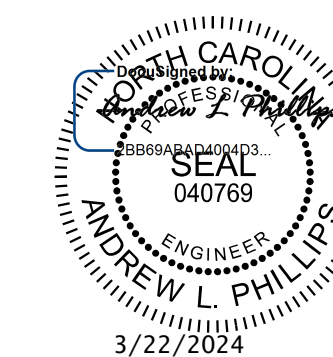
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



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421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000 NC LICENSE # F-0102

PROJECT NO. P-5720  
WAKE COUNTY  
STATION: 32+23.01 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD

SLOPE PROTECTION  
DETAILS

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

TOTAL SHEETS: 33

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DRAWN BY: J. I. KIMBLE DATE: 1/19  
CHECKED BY: M. D. MAGEE DATE: 1/19  
DESIGN ENGINEER OF RECORD: S. A. DENNEY DATE: 1/19



NOTES

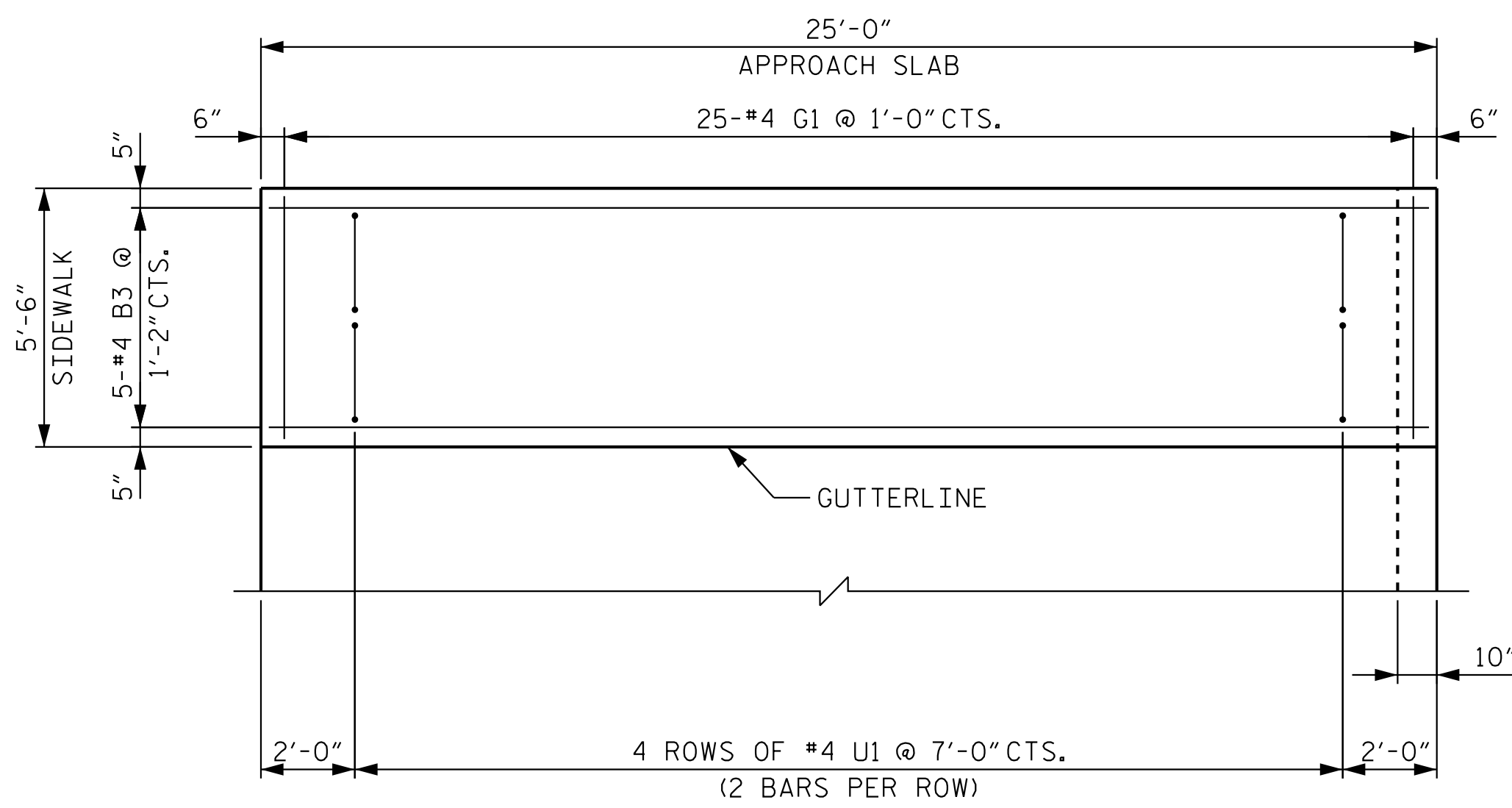
ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

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

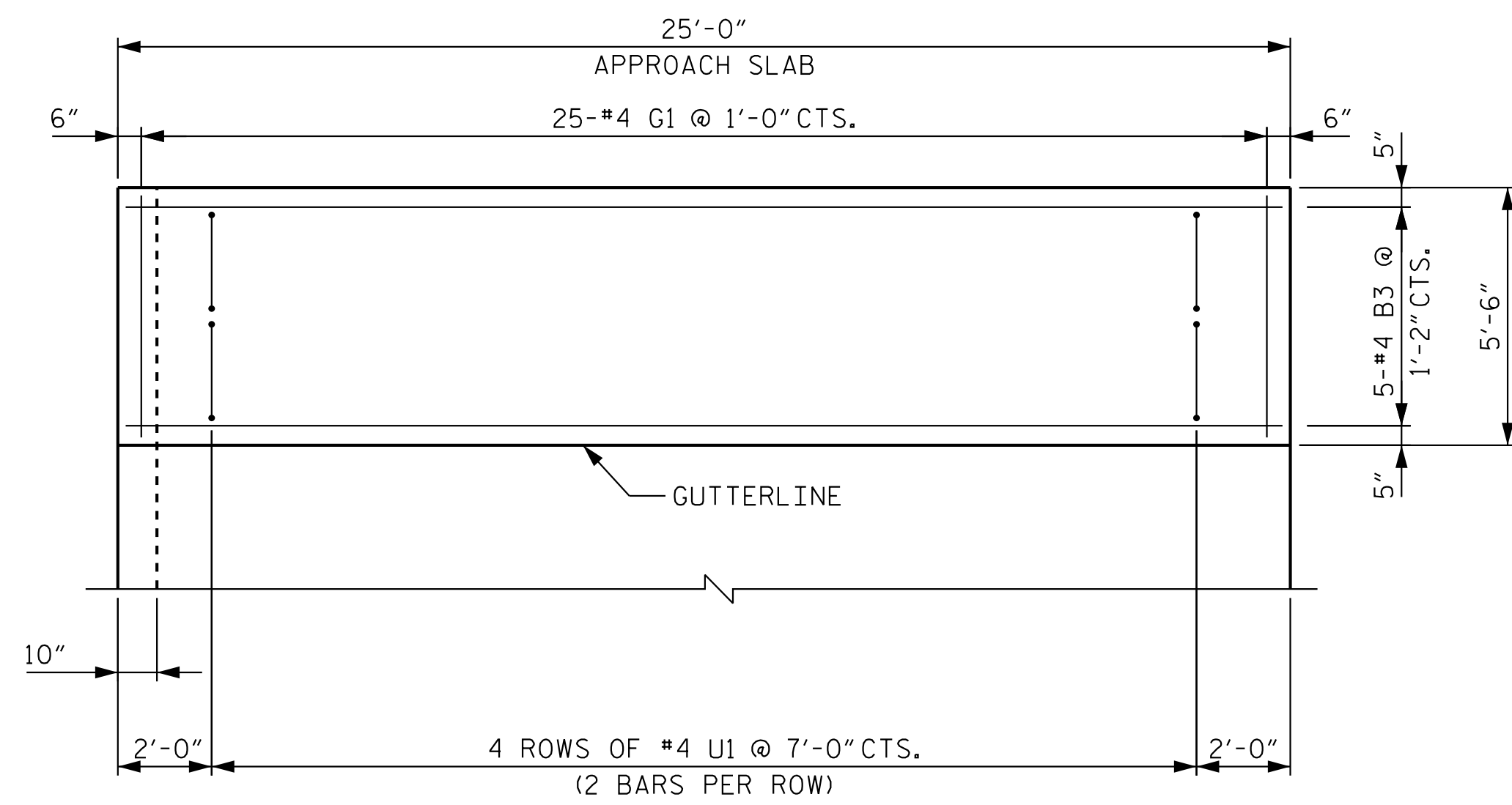
\* #4 U1 MAY BE PUSHED INTO GREEN CONCRETE AFTER THE APPROACH SLAB HAS BEEN SCREEDED OFF.

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

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE SIDEWALK. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR BRIDGE APPROACH SLABS.



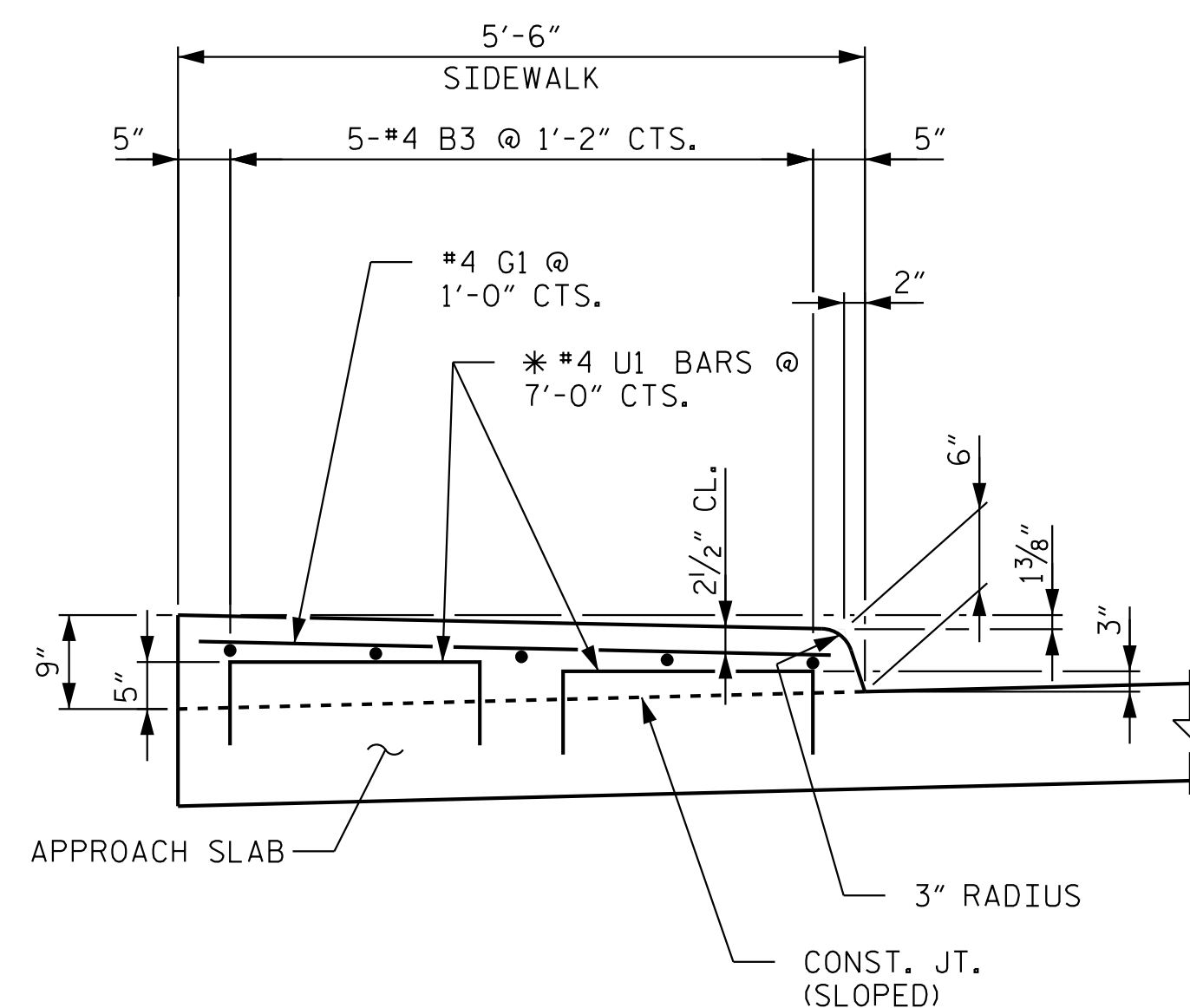
PLAN @ END BENT 1



PLAN @ END BENT 2

SIDEWALK DETAILS

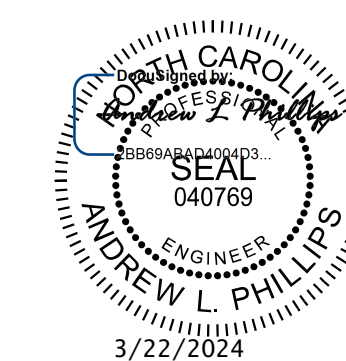
(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)



SECTION THRU SIDEWALK

PROJECT NO. P-5720  
WAKE COUNTY  
 STATION: 32+23.01 -L-

SHEET 2 OF 2



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421 Fayetteville Street, Suite 600  
 Raleigh, NC 27601-1772  
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			33

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ASSEMBLED BY : D.D. LOWERY	DATE : 1/19
CHECKED BY : S.A. DENNEY	DATE : 1/19
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

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

### DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 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 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN