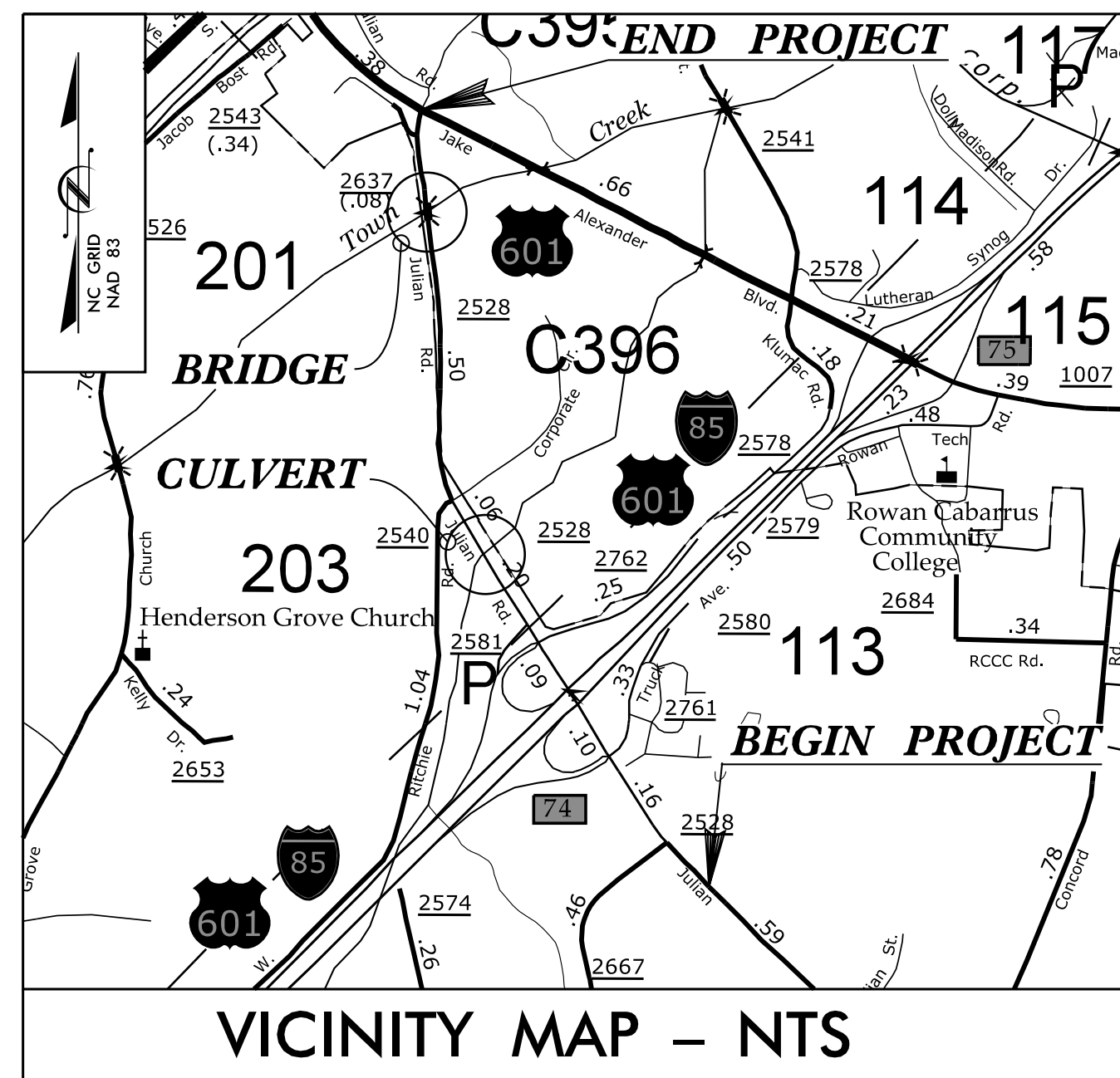


TIP NO: U-5738

CONTRACT: C204426

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5738		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50163.1.1		P.E.	
50163.2.1		RW	
50163.3.1		CONST.	



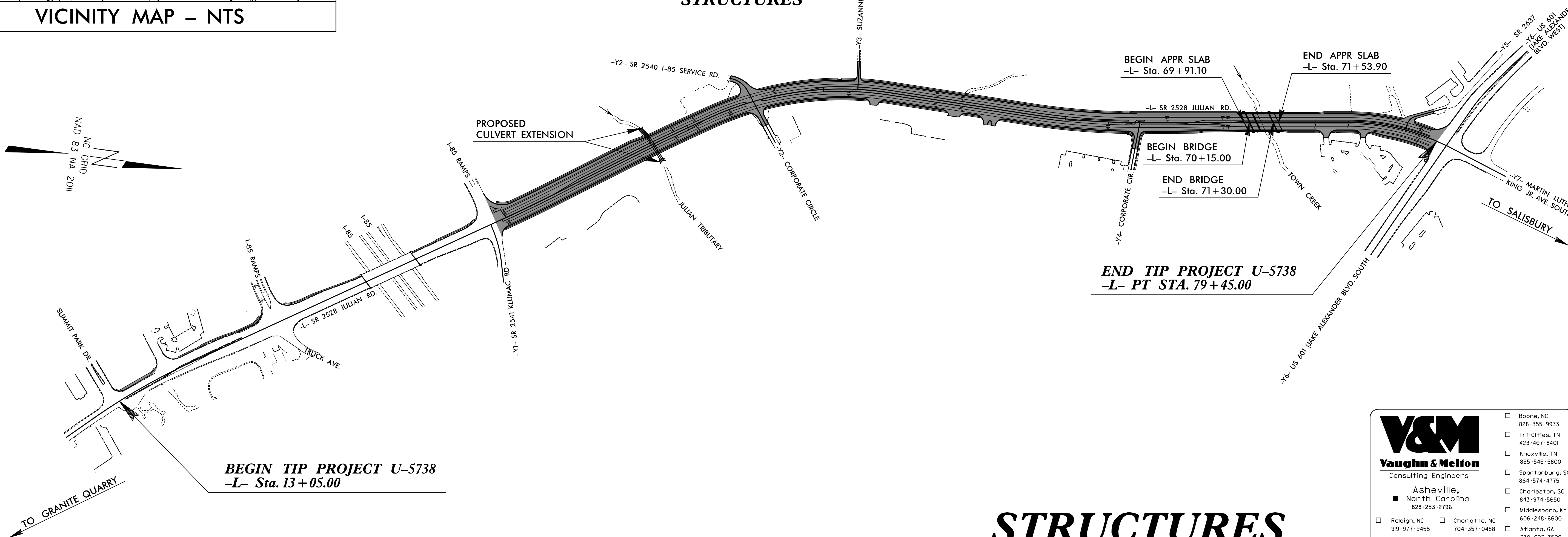
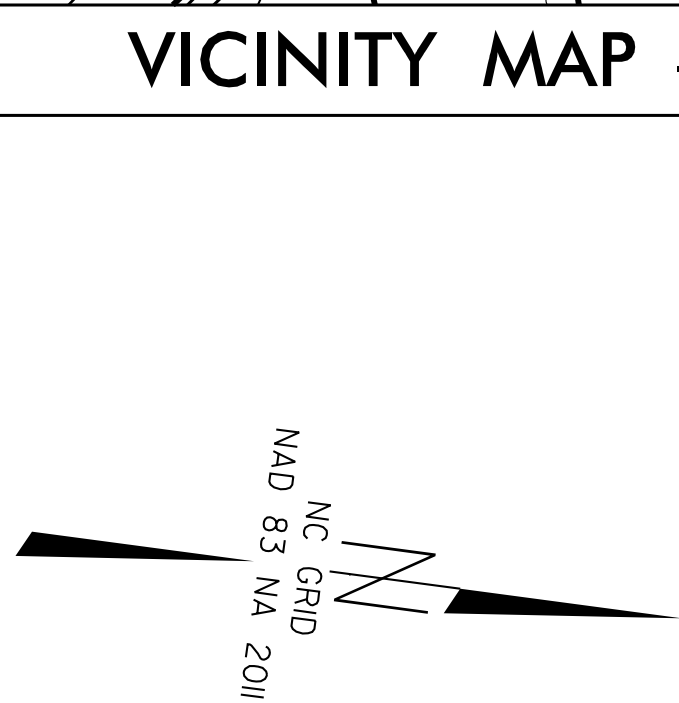
STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

ROWAN COUNTY

**LOCATION: SR 2528 (JULIAN ROAD) FROM
SR 2667 (SUMMIT PARK DRIVE) TO
US 601 (JAKE ALEXANDER BOULEVARD)
IN SALISBURY**

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



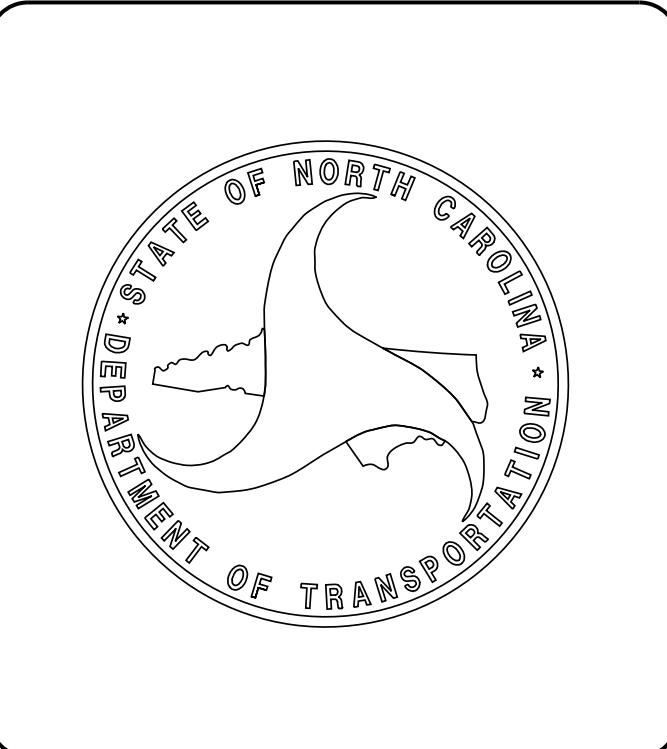
STRUCTURES

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

- Raleigh, NC 919-977-9455
- Charlotte, NC 704-357-0488
- Atlanta, GA 770-627-3509
- Boone, NC 828-356-9933
- Tri-Cities, TN 423-467-8401
- Knoxville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
- Middlesboro, KY 606-248-6600

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DESIGN DATA

ADT 2020 =	24,000
ADT 2040 =	26,800
K =	9 %
D =	60 %
T =	8 % *
V =	50 MPH

* (TTST = 2% DUAL = 6%)

FUNC CLASS = LOCAL STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT U-5738 =	1.236 MILES
LENGTH OF STRUCTURE PROJECT U-5738 =	0.022 MILES
TOTAL LENGTH OF PROJECT U-5738 =	1.258 MILES

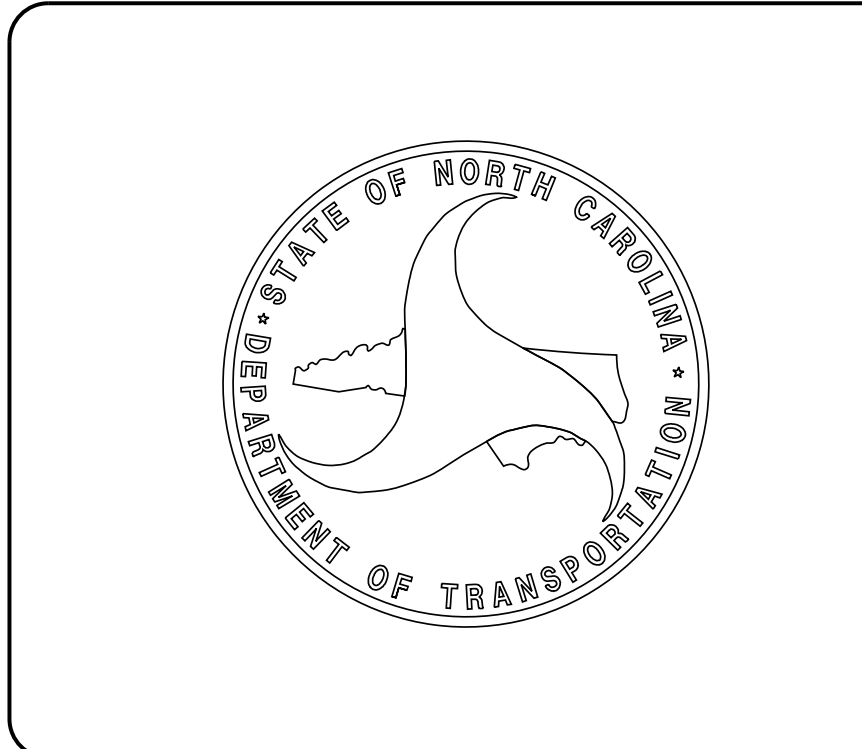
Prepared in the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE, NC, 28806

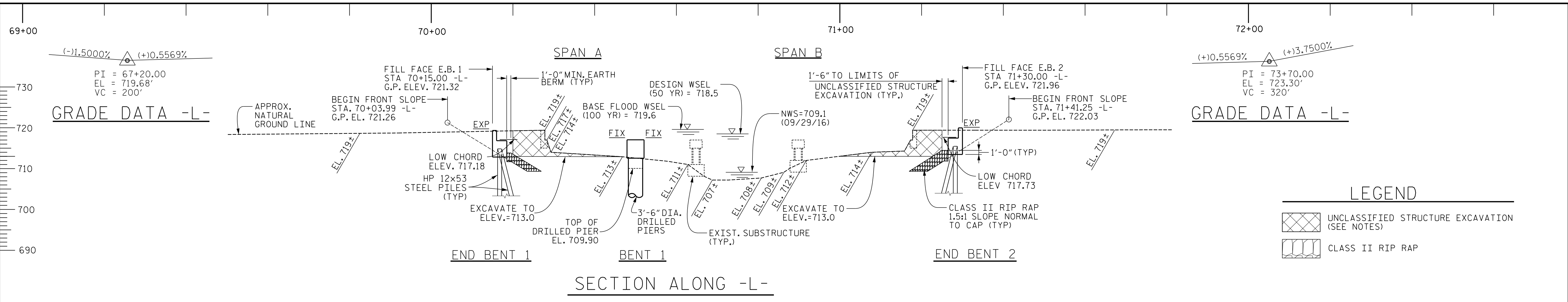
FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2018 STANDARD SPECIFICATIONS	
LETTING DATE : FEBRUARY 15, 2022	HARDY WILLIS, PE PROJECT ENGINEER CHAD BINION, PE PROJECT DESIGN ENGINEER

12/13/2021

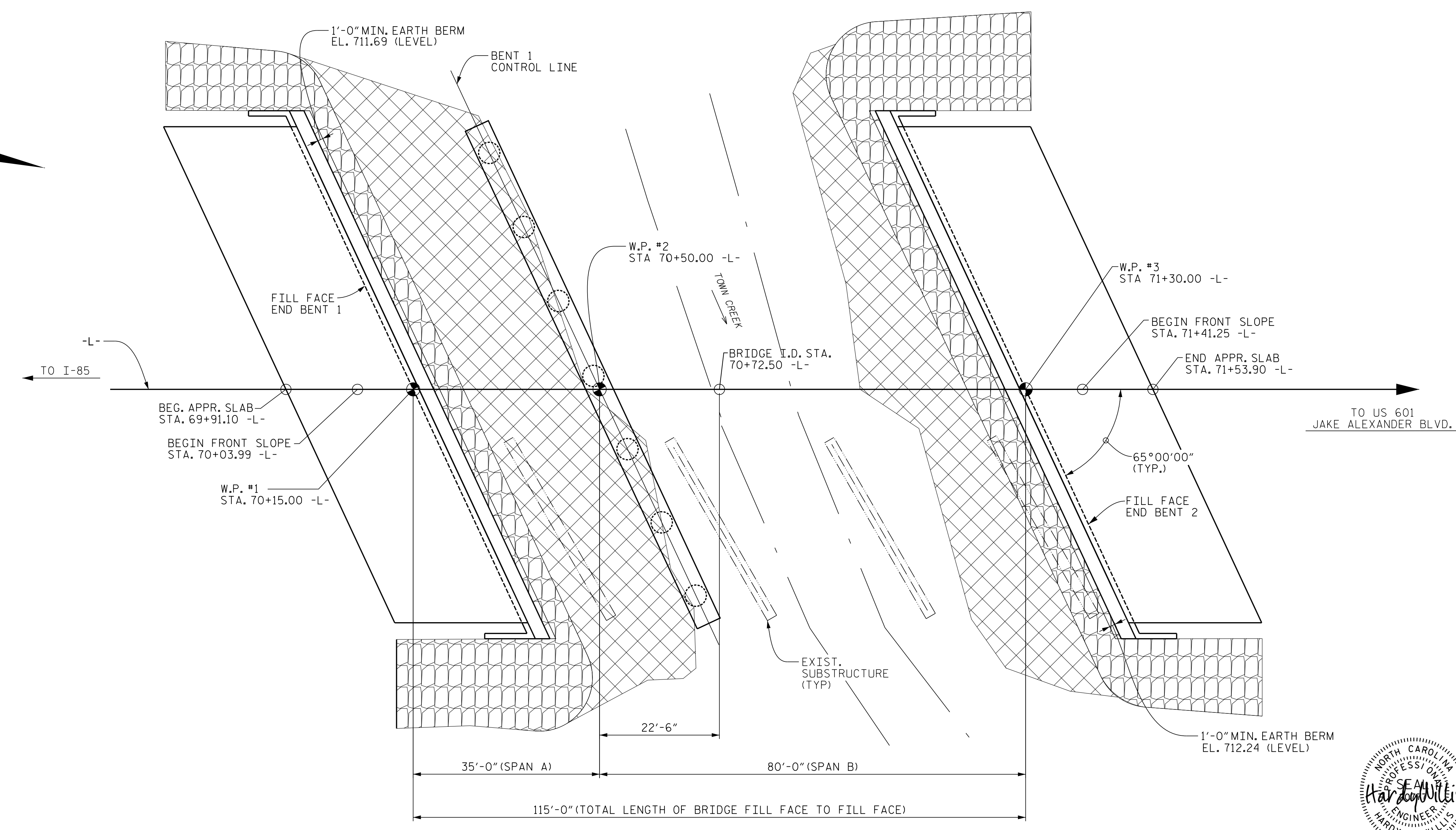
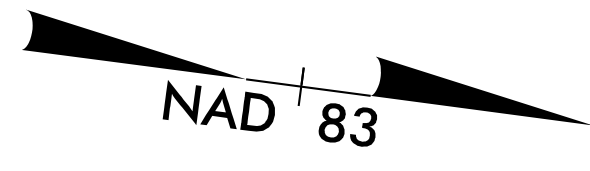
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



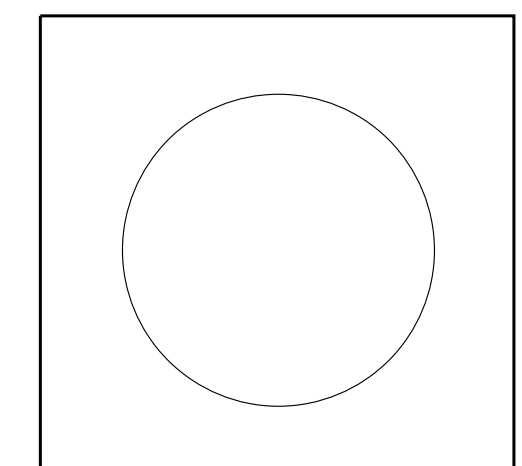


LEGEND

	UNCLASSIFIED STRUCTURE EXCAVATION (SEE NOTES)
	CLASS II RIP RAP



I HEREBY CERTIFY THAT THESE PLANS ARE THE AS-BUILT PLANS.



V&M
 Vaughn & Melton
 Consulting Engineers

Asheville, North Carolina 828-253-2796

Boone, NC 828-355-9933	Tri-Cities, TN 423-467-8401	Spartanburg, SC 864-574-4775	Charleston, SC 843-974-5650
Knoxville, TN 865-546-5800	Middlesboro, KY 606-248-6600	Atlanta, GA 770-627-3509	Charlotte, NC 704-357-0488
Raleigh, NC 919-977-9455	Charlotte, NC 704-357-0488	Atlanta, GA 770-627-3509	

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PROJECT NO. U-5738
 ROWAN COUNTY
 STATION: 70+72.50 -L-
 REPLACES BRIDGE #790201

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER
 TOWN CREEK ON SR 2528
 BETWEEN I-85 AND US 601

NOTES:

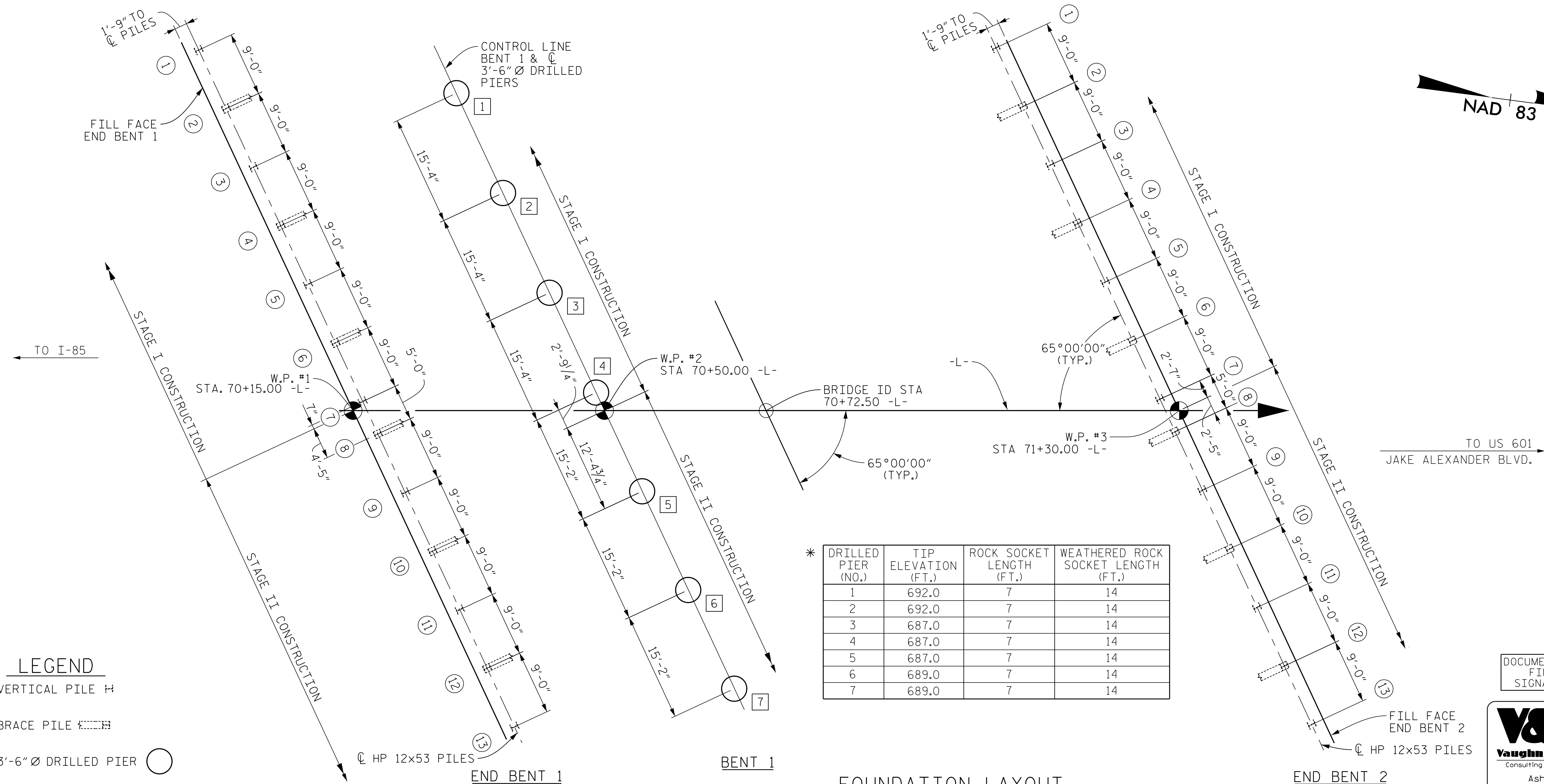
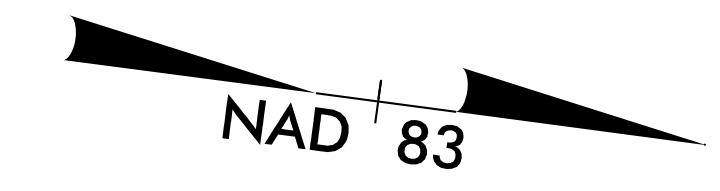
PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.
 END BENTS AND BENT ARE PARALLEL.
 TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC NOT SHOWN.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DWN. BY: FRJ DATE: 11/18
 CHKD. BY: CDB DATE: 11/18
 DES. EGR. OF RECORD: CDB DATE: 11/18

REVISIONS						SHEET NO. S-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			





* DRILLED PIER (NO.)	TIP ELEVATION (FT.)	ROCK SOCKET LENGTH (FT.)	WEATHERED ROCK SOCKET LENGTH (FT.)
1	692.0	7	14
2	692.0	7	14
3	687.0	7	14
4	687.0	7	14
5	687.0	7	14
6	689.0	7	14
7	689.0	7	14

- LEGEND**
- VERTICAL PILE #
 - BRACE PILE
 - 3'-6" Ø DRILLED PIER
 - HP 12x53 PILES

FOUNDATION LAYOUT
DIMENSIONS LOCATING PILES ARE SHOWN TO THE C OF THE PILES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

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828-253-2796

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Charleston, SC 843-974-5650
Middleboro, KY 606-248-6600
Atlanta, GA 770-627-3509

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FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 180 KIPS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 230 KIPS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 300 KIPS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 385 KIPS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT BOTH END BENTS 1 AND 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 450 KIPS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 15 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 703.0 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

* INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN THE ELEVATIONS LISTED IN THE TABLE WITH THE REQUIRED TIP RESISTANCE AND THE MINIMUM PENETRATION INTO ROCK OR WEATHERED ROCK SHOWN AND AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 701.0 FT.

SPT MAY BE REQUIRED FOR DRILLED PIERS THAT DO NOT ENCOUNTER ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NOS. 1 AND 2. SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-5738

ROWAN COUNTY

STATION: 70+72.50 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

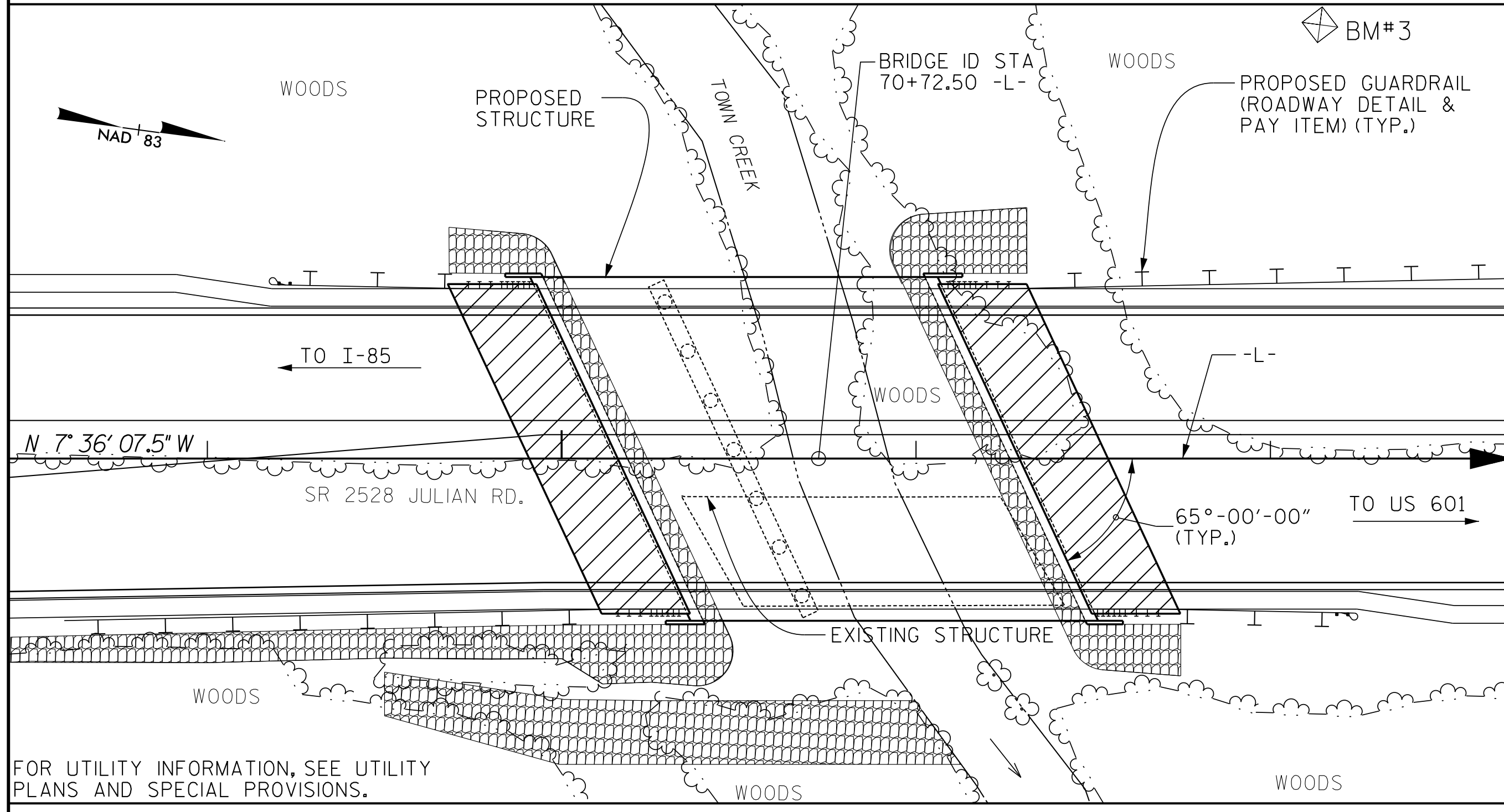
GENERAL DRAWING

FOR BRIDGE OVER
TOWN CREEK ON SR 2528
BETWEEN I-85 AND US 601

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			39

DWN. BY: FRJ DATE: 11/18
CHKD. BY: CDB DATE: 11/18
DES. EGR. OF RECORD: CDB DATE: 11/18

BM #3: RR SPIKE IN EASTERN FACING BASE OF 18" SWEET GUM, 122.47' LEFT OF STA. 72+13.98 -L-, ELEV. 717.28, N 693351, E 1555918



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF 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 EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 THE EXISTING STRUCTURE CONSISTING OF 3 CORED SLAB SPANS AT 60° SKEW; 1 @ 31'-2", 1 @ 30'-1", 1 @ 31'-2" WITH PPC CAPS ON STEEL PILES, ASPHALT DECK WITH A CLEAR ROADWAY WIDTH OF 30'-11" AND STEEL BARRIER RAILS, LOCATED AT THE PROPOSED SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
 THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED AS SHOWN ON THE PLANS AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH 'HEC 18-EVALUATING SCOUR AT BRIDGES'.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

HYDRAULIC DATA	
DESIGN DISCHARGE	= 3000 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 718.5 FT
BASE DISCHARGE	= 3400 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 719.6 FT
DRAINAGE AREA	= 8.01 SQ. MI.
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 4200 CFS
OVERTOPPING FREQUENCY	= 500± YRS
OVERTOPPING ELEVATION	= 720.5* FT

* OVERTOPPING AT LOW ELEVATION IN SAG IN MEDIAN MONOLITHIC ISLAND AT STA. 67+65.85 -L-

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	PDA TESTING	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YARDS	LUMP SUM
SUPERSTRUCTURE											10,491	10,918		LUMP SUM
END BENT 1										LUMP SUM				82.6
BENT 1			88.5	62.0	70.0									84.9
END BENT 2										LUMP SUM				82.6
TOTAL	LUMP SUM	LUMP SUM	88.5	62.0	70.0	1	4	7	1	LUMP SUM	10,491	10,918	250.1	LUMP SUM

	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	APPROX. 325,000 LBS. STRUCTURAL STEEL	PILE DRIVING EQUIP. SETUP FOR HP 12x53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	THREE BAR METAL RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	LBS.	LBS.	LUMP SUM	NO.	NO.	LIN. FT.	EACH	TONS	SQ. YARDS	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			LUMP SUM					209.2		LUMP SUM	LUMP SUM
END BENT 1	10,241			13	13	220	13	210	235		
BENT 1	19,223	3,841									
END BENT 2	10,175			13	13	220	13	250	275		
TOTAL	39,639	3,841	LUMP SUM	26	26	440	26	209.2	460	510	LUMP SUM

PROJECT NO. U-5738
 ROWAN COUNTY
 STATION: 70+72.50 -L-



12/13/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER TOWN CREEK ON SR 2528 BETWEEN I-85 AND US 601

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			39

DWN. BY: FRJ DATE: 11/18
 CHKD. BY: CDB DATE: 11/18
 DES. EGR. OF RECORD: CDB DATE: 11/18

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.53	--	1.75	0.737	1.53	B	E	39.04	0.948	3.53	A	I	32.42	1.30	0.722	1.55	B	I	39.25		
	HL-93 (OPERATING)	N/A		1.98	--	1.35	0.737	1.98	B	E	39.04	0.948	4.58	A	I	32.42	1.00	0.722	2.01	B	I	39.25		
	HS-20 (INVENTORY)	36.00	②	2.02	72.54	1.75	0.737	2.02	B	E	39.04	0.948	4.09	A	I	32.42	1.30	0.722	2.05	B	I	39.25		
	HS-20 (OPERATING)	36.00		2.61	94.03	1.35	0.737	2.61	B	E	39.04	0.948	5.30	A	I	32.42	1.00	0.722	2.66	B	I	39.25		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		4.73	63.81	1.40	0.737	5.84	B	E	39.04	0.948	10.36	A	I	0.65	1.30	0.722	4.73	B	I	39.25		
		SNGARBS2	20,000	3.46	69.26	1.40	0.737	4.26	B	E	41.35	0.948	7.91	A	I	0.65	1.30	0.722	3.46	B	I	39.25		
		SNAGRIS2	22,000	3.25	71.57	1.40	0.737	4.00	B	E	41.35	0.948	7.58	A	I	0.65	1.30	0.722	3.25	B	I	41.35		
		SNCOTTS3	27,250	2.32	63.22	1.40	0.737	2.86	B	E	39.04	0.948	5.15	A	I	32.42	1.30	0.722	2.32	B	I	39.25		
		SNAGGRS4	34,925	1.93	67.41	1.40	0.737	2.37	B	E	41.35	0.948	4.64	A	I	32.42	1.30	0.722	1.93	B	I	39.04		
		SNS5A	35,550	1.89	67.30	1.40	0.737	2.33	B	E	41.35	0.948	4.87	A	I	0.65	1.30	0.722	1.89	B	I	39.25		
		SNS6A	39,950	1.73	69.27	1.40	0.737	2.13	B	E	41.35	0.948	4.53	A	I	0.65	1.30	0.722	1.73	B	I	39.25		
		SNS7B	42,000	1.65	69.34	1.40	0.737	2.03	B	E	39.04	0.948	4.65	A	I	0.65	1.30	0.722	1.65	B	I	39.25		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.12	69.83	1.40	0.737	2.60	B	E	39.04	0.948	5.50	A	I	0.65	1.30	0.722	2.12	B	I	39.04	
		TNT4A	33,075		2.12	69.99	1.40	0.737	2.60	B	E	39.04	0.948	5.17	A	I	0.65	1.30	0.722	2.12	B	I	39.04	
		TNT6A	41,600		1.72	71.72	1.40	0.737	2.12	B	E	39.04	0.948	4.84	A	I	0.65	1.30	0.722	1.72	B	I	39.04	
		TNT7A	42,000		1.73	72.74	1.40	0.737	2.13	B	E	39.04	0.948	4.49	A	I	0.65	1.30	0.722	1.73	B	I	39.04	
		TNT7B	42,000		1.80	75.43	1.40	0.737	2.20	B	E	41.35	0.948	4.41	A	I	0.65	1.30	0.722	1.80	B	I	39.04	
		TNAGRIT4	43,000		1.71	73.44	1.40	0.737	2.10	B	E	39.04	0.948	4.41	A	I	0.65	1.30	0.722	1.71	B	I	37.15	
		TNAGRIT5A	45,000		1.61	72.32	1.40	0.737	1.98	B	E	39.04	0.948	4.64	A	I	32.42	1.30	0.722	1.61	B	I	39.04	
TNAGRIT5B	45,000		③	1.59	71.51	1.40	0.737	1.95	B	E	39.04	0.948	4.03	A	I	0.65	1.30	0.722	1.59	B	I	39.04		
FATIGUE	HL-93 (INVENTORY)	$\gamma_{LL}=0.75$																						

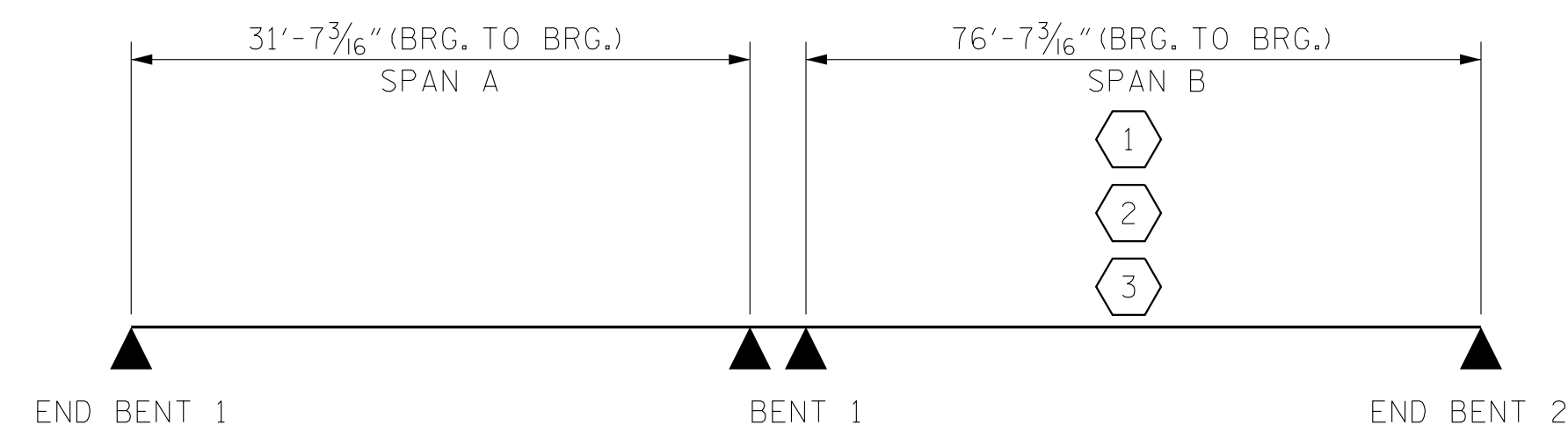
NOTES:

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

COMMENTS:

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

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



LRFR SUMMARY

V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina
828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 423-467-8401
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
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Raleigh, NC 919-977-9455
Charlotte, NC 704-357-0488
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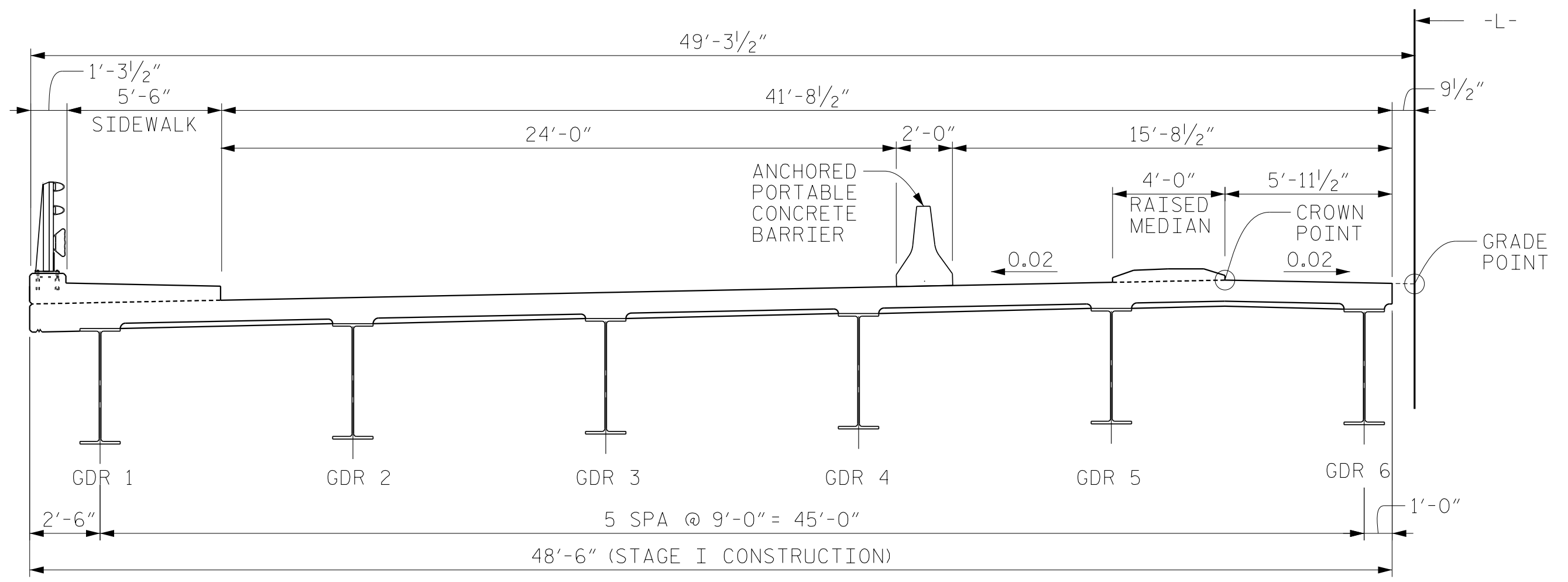
PROJECT NO. U-5738
ROWAN COUNTY
STATION: 70+72.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

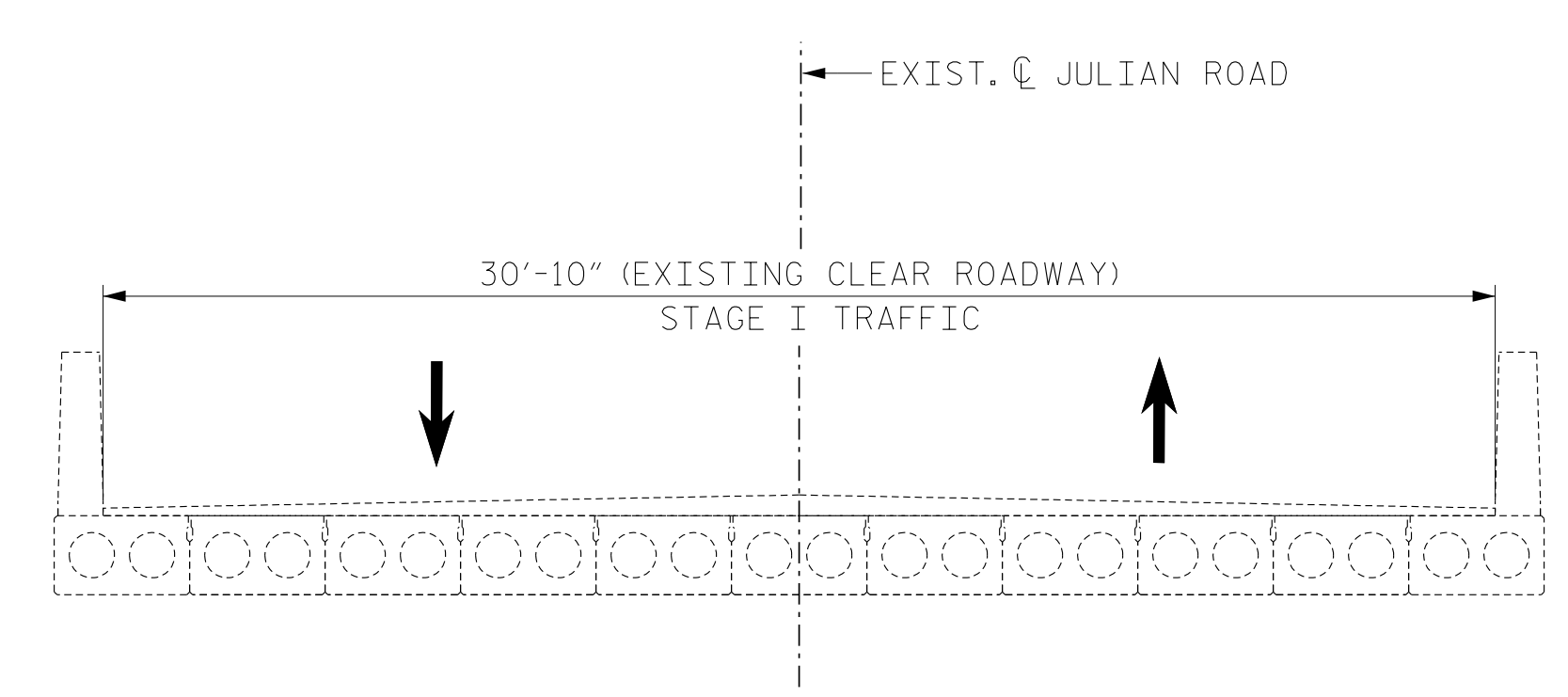
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CHECKED BY : CDB	DATE : 11/18
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/11/11 MAA/GM
	REV. 12/17 MAA/THC

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			39



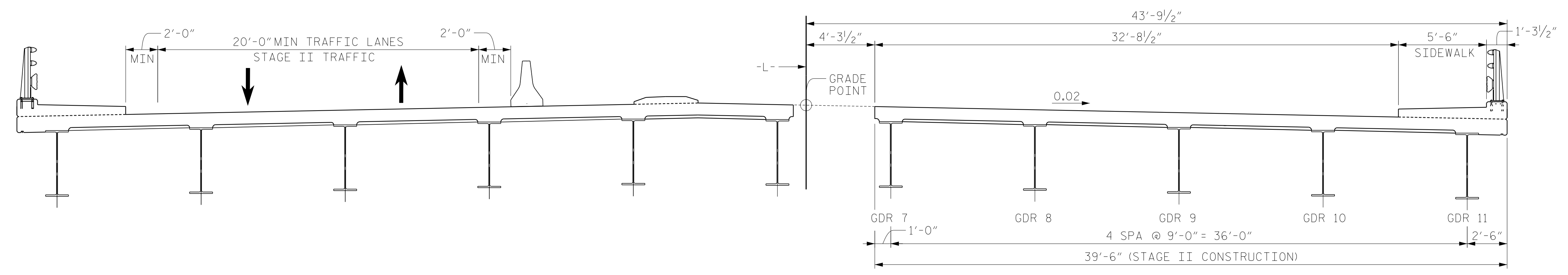
STAGE I CONSTRUCTION



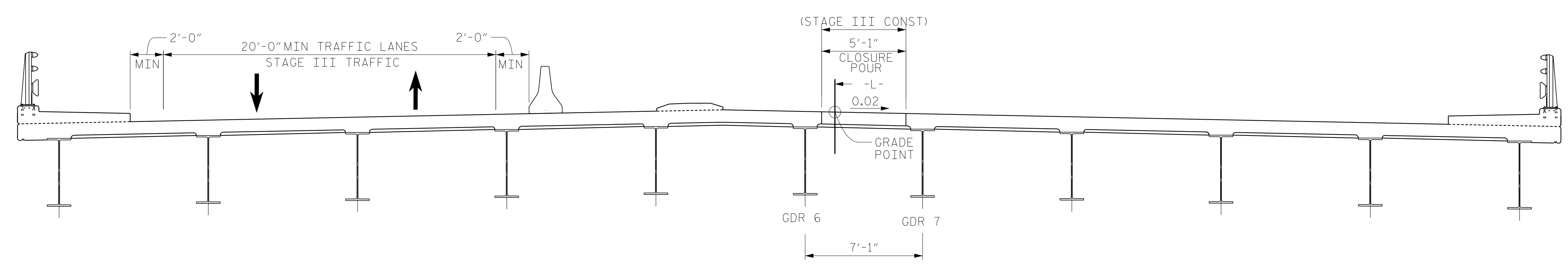
NOTE:
SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE ANCHORED PORTABLE CONCRETE BARRIER.

CONSTRUCTION SEQUENCE

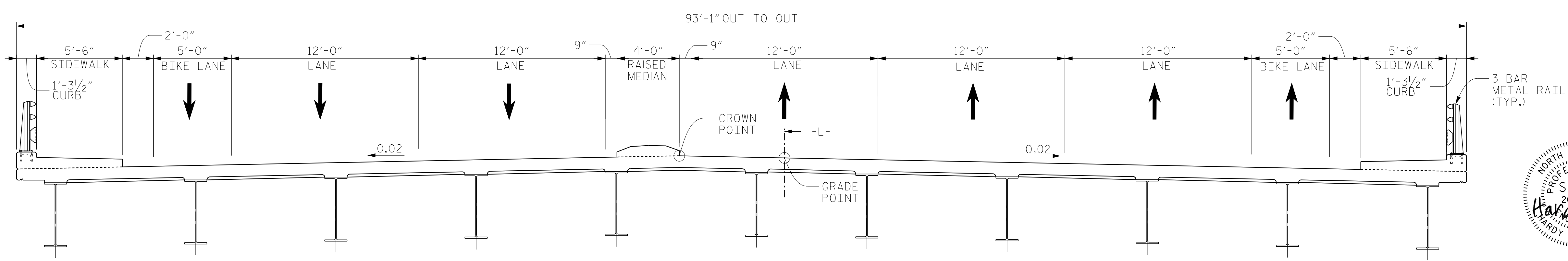
1. MAINTAIN TRAFFIC ON EXISTING BRIDGE.
2. CONSTRUCT LEFT SIDE OF PROPOSED BRIDGE, RAISED MEDIAN, AND LEFT SIDE APPROACH SLABS.
3. MOVE TRAFFIC ONTO LEFT SIDE OF NEW BRIDGE.
4. REMOVE EXISTING BRIDGE.
5. CONSTRUCT RIGHT SIDE OF PROPOSED BRIDGE.
6. CONTINUE TRAFFIC ON LEFT SIDE OF NEW BRIDGE AND CONSTRUCT CLOSURE POUR AND RIGHT SIDE APPROACH SLABS.
7. APPLY PAVEMENT MARKINGS. OPEN BRIDGE TO NORMAL TRAFFIC FLOW.



STAGE II CONSTRUCTION



STAGE III CONSTRUCTION



FINAL

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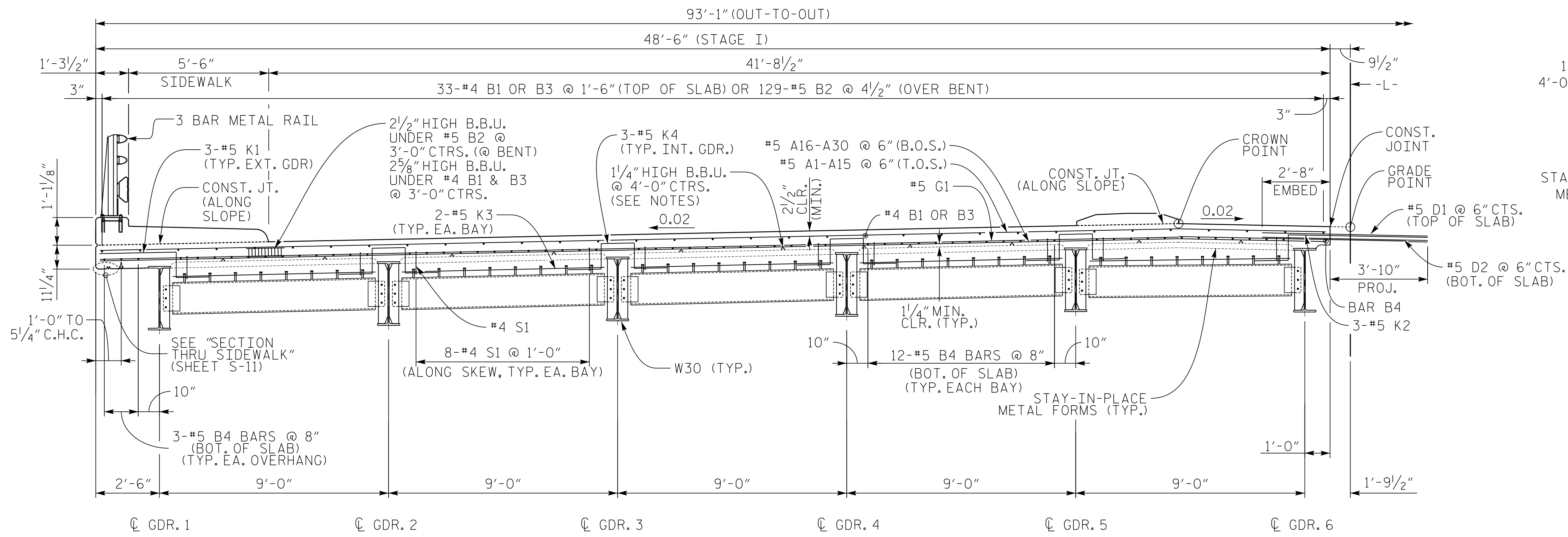
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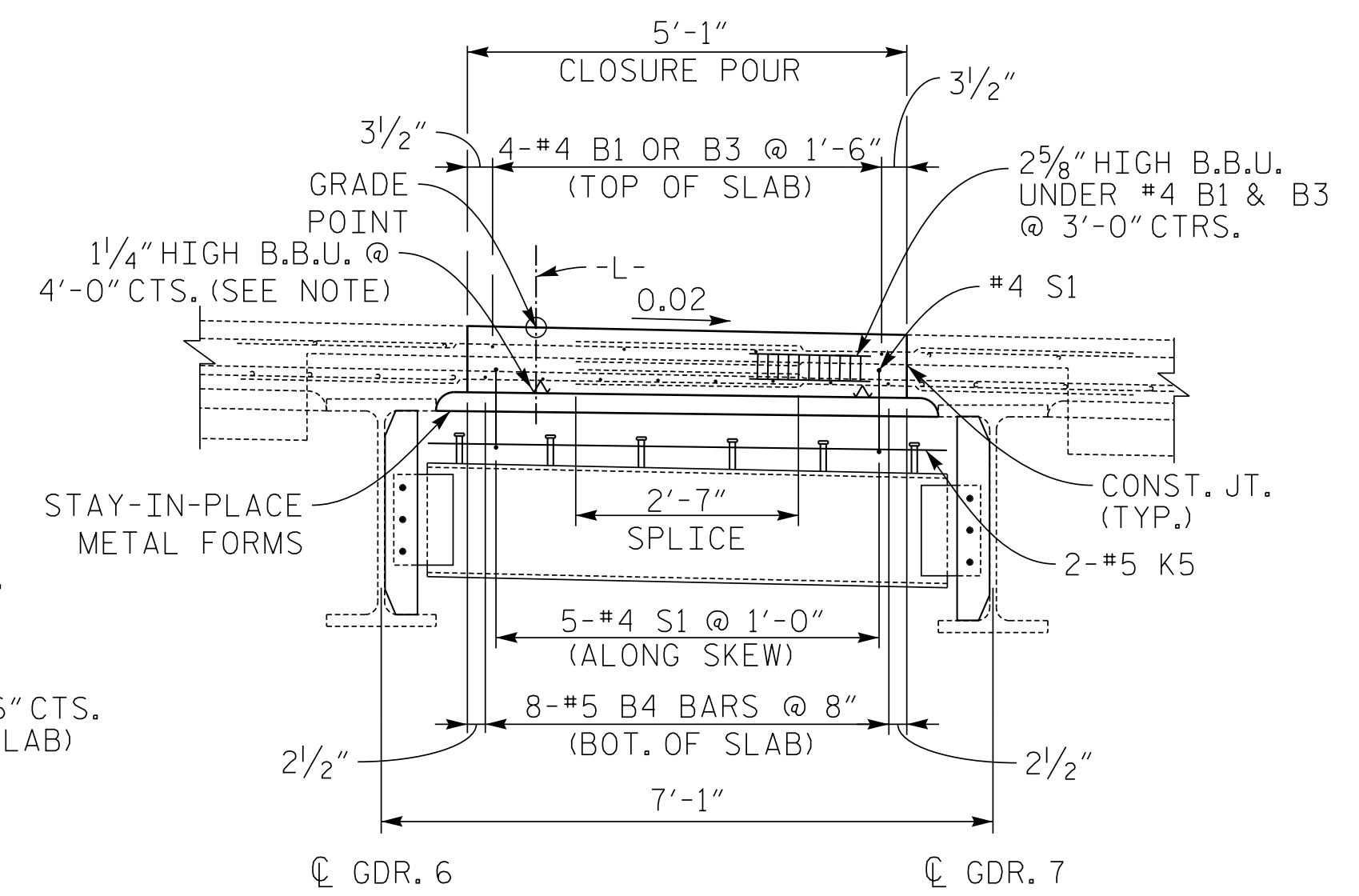
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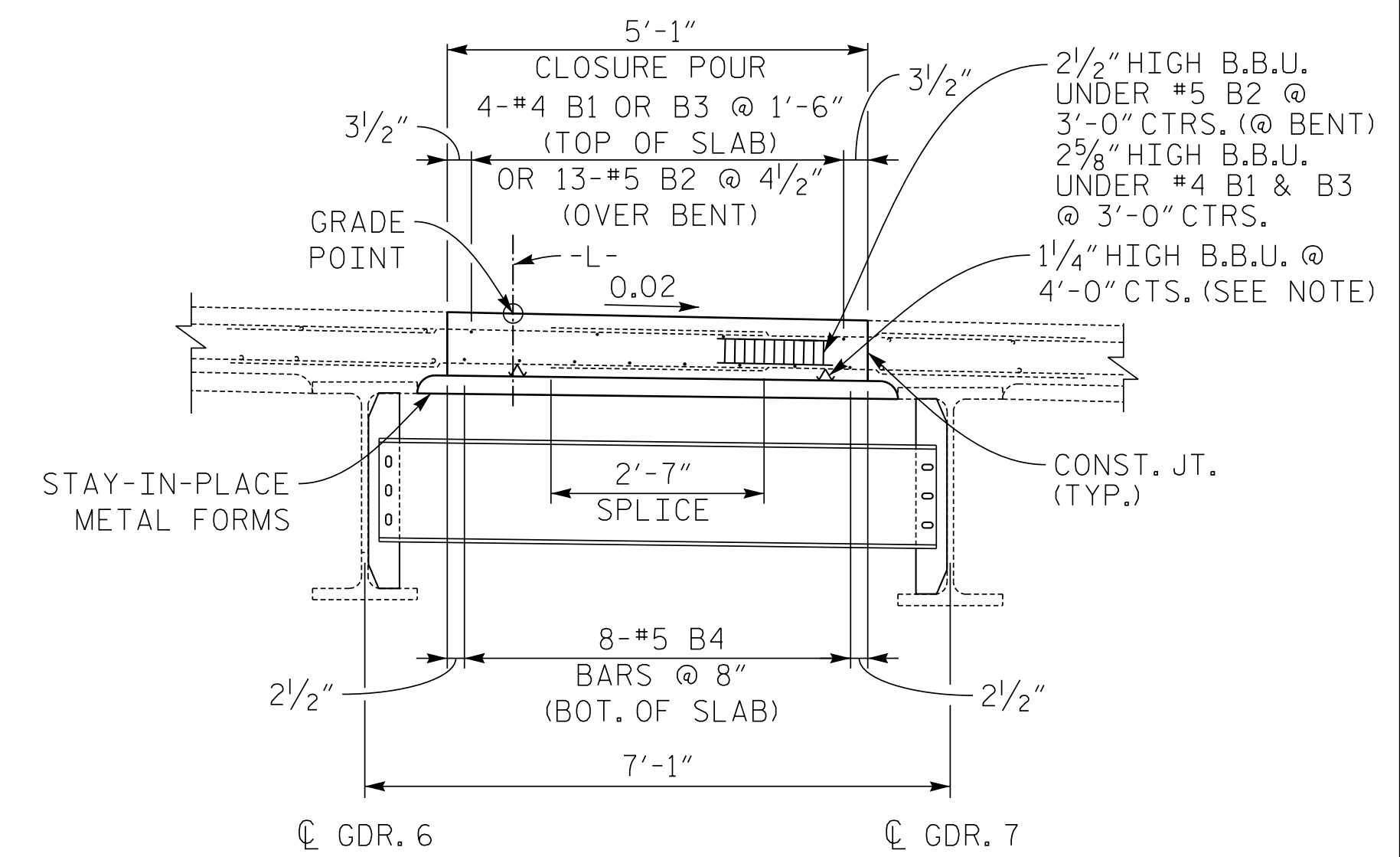


HALF SECTION (STAGE I)
SHOWING END BENT DIAPHRAGMS (D1)

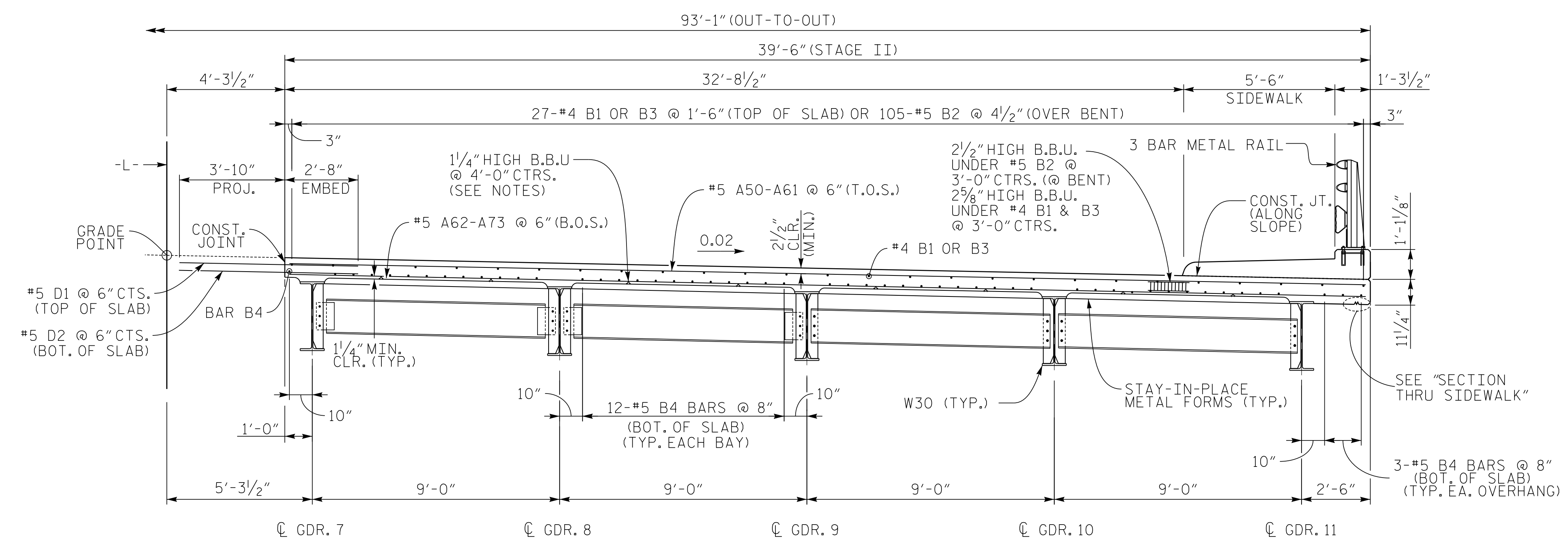
DIAPHRAGM DEPICTIONS SHOWN IN THE HALF-SECTIONS, ARE TYPICAL FOR EACH STAGE



CLOSURE SECTION (STAGE III)
SHOWING END BENT DIAPHRAGMS (D4)



CLOSURE SECTION (STAGE III)
SHOWING INTERMEDIATE DIAPHRAGMS (D3)
(BENT DIAPHRAGMS (D4) SIMILAR WITH ADDITION OF GUSSET PLATES)



SHOWING BENT DIAPHRAGMS (D1)

INTERMEDIATE DIAPHRAGMS (D2)

HALF SECTION (STAGE II)

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SHEET 1 OF 2

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE
TYPICAL SECTION

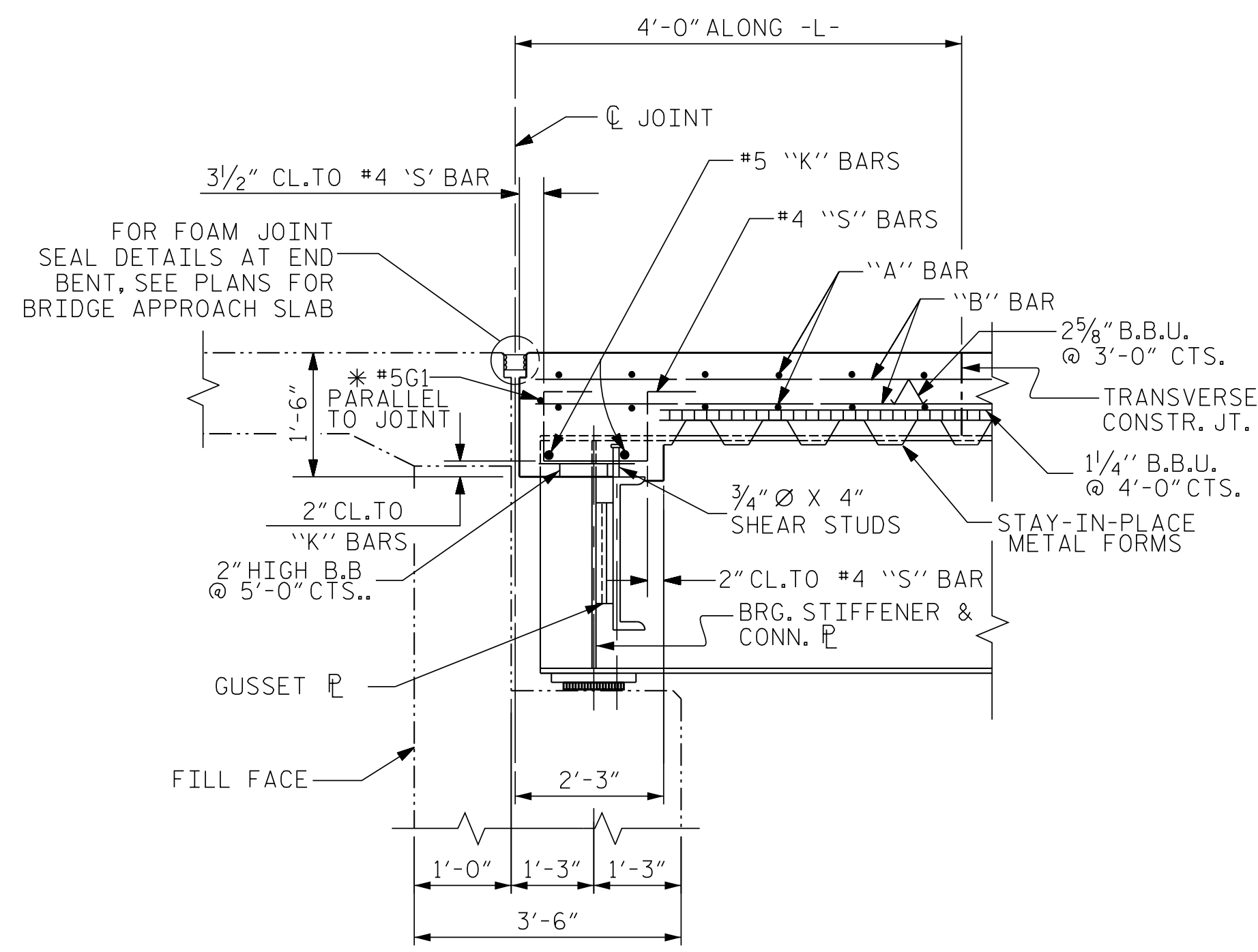


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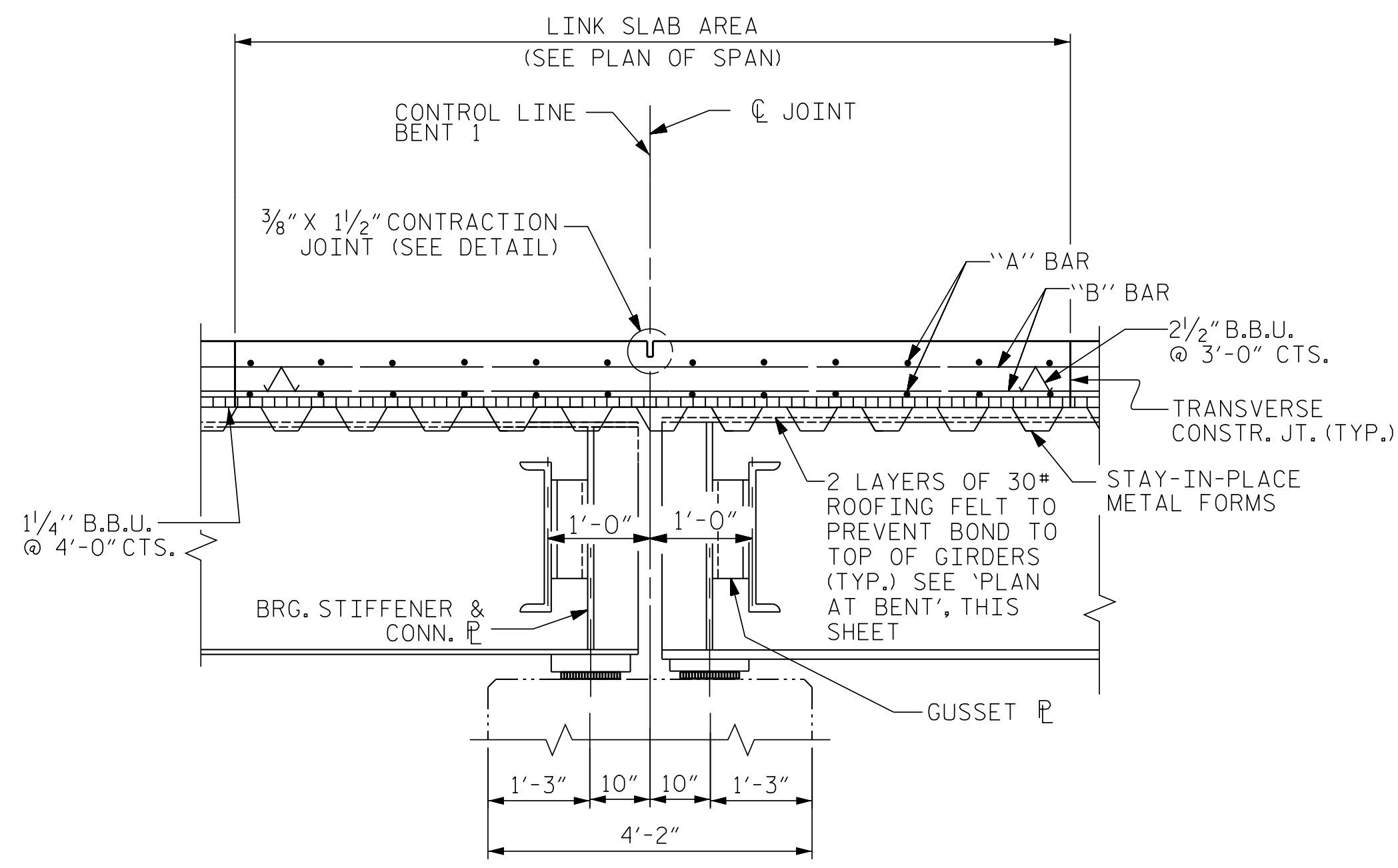
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SECTION AT END BENT 1

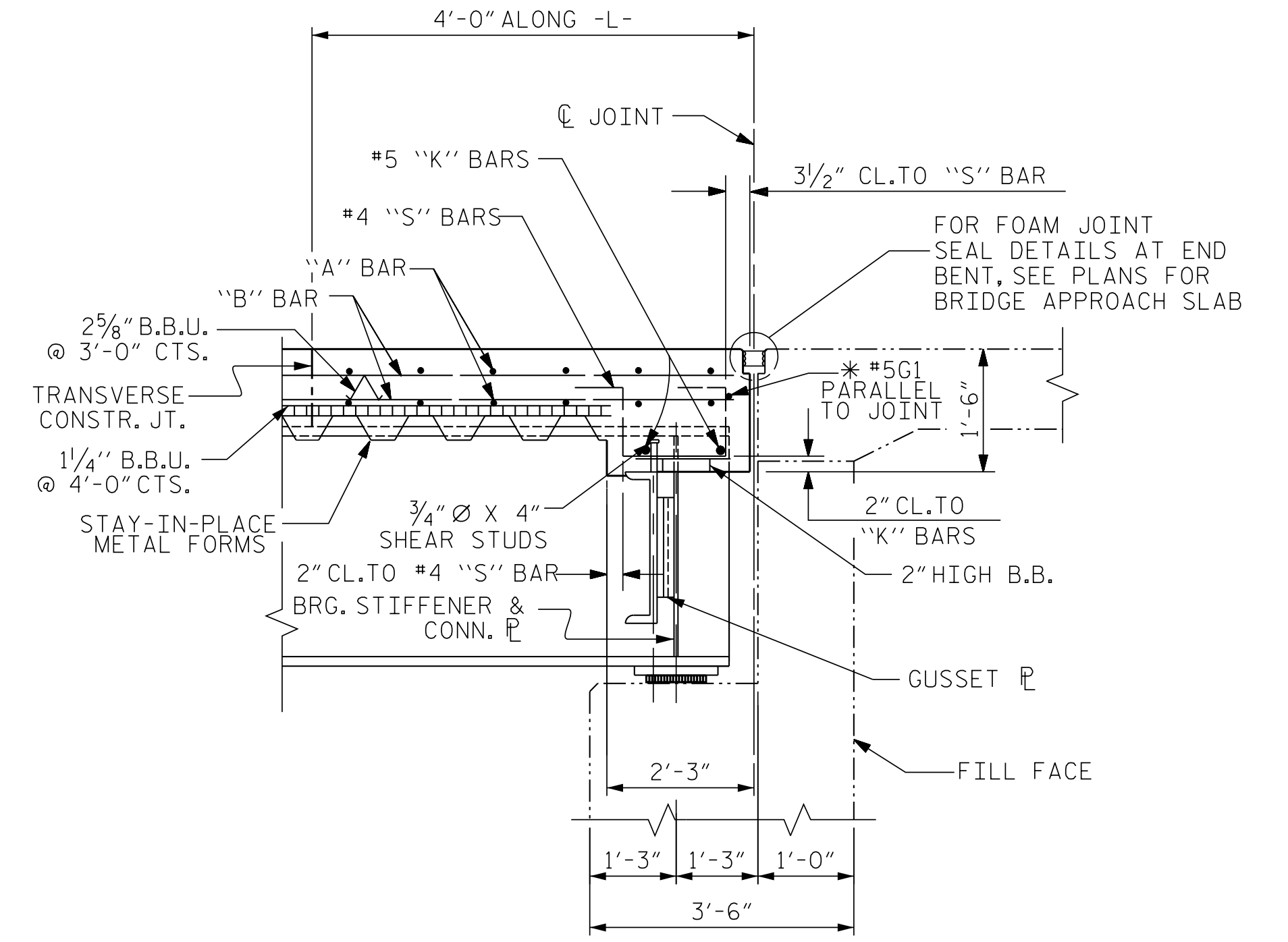
* #5 GI BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR DIAPHRAGM AND REINFORCING STEEL.



SECTION THRU BENT 1

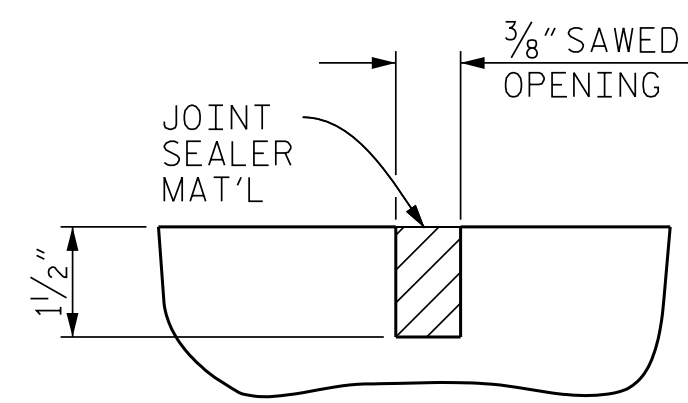
A 3/8" X 1/2" DEEP CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE B LOW MODULUS SILICONE SEALANT. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

NO WELDING OF FORMS OR FALSEWORK TO THE TOP OF THE GIRDER WILL BE PERMITTED IN THE LINK SLAB AREA.

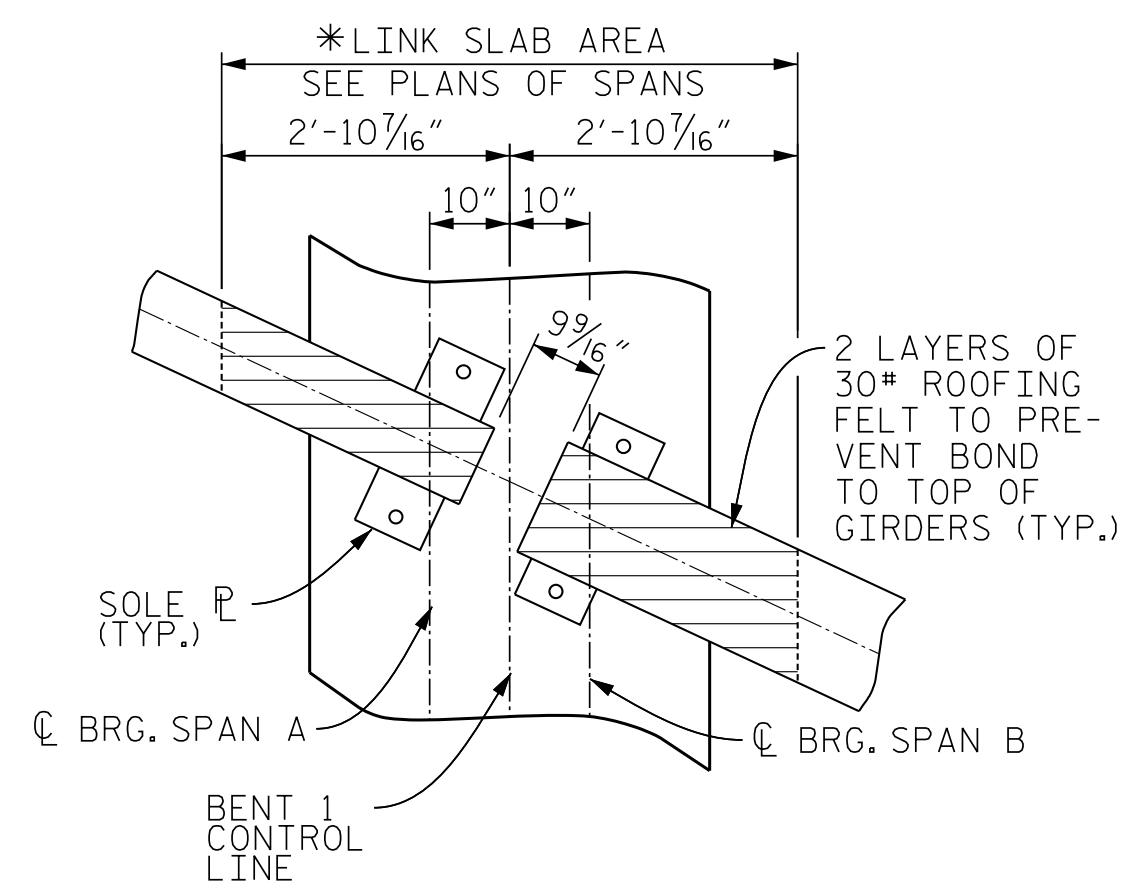


SECTION AT END BENT 2

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

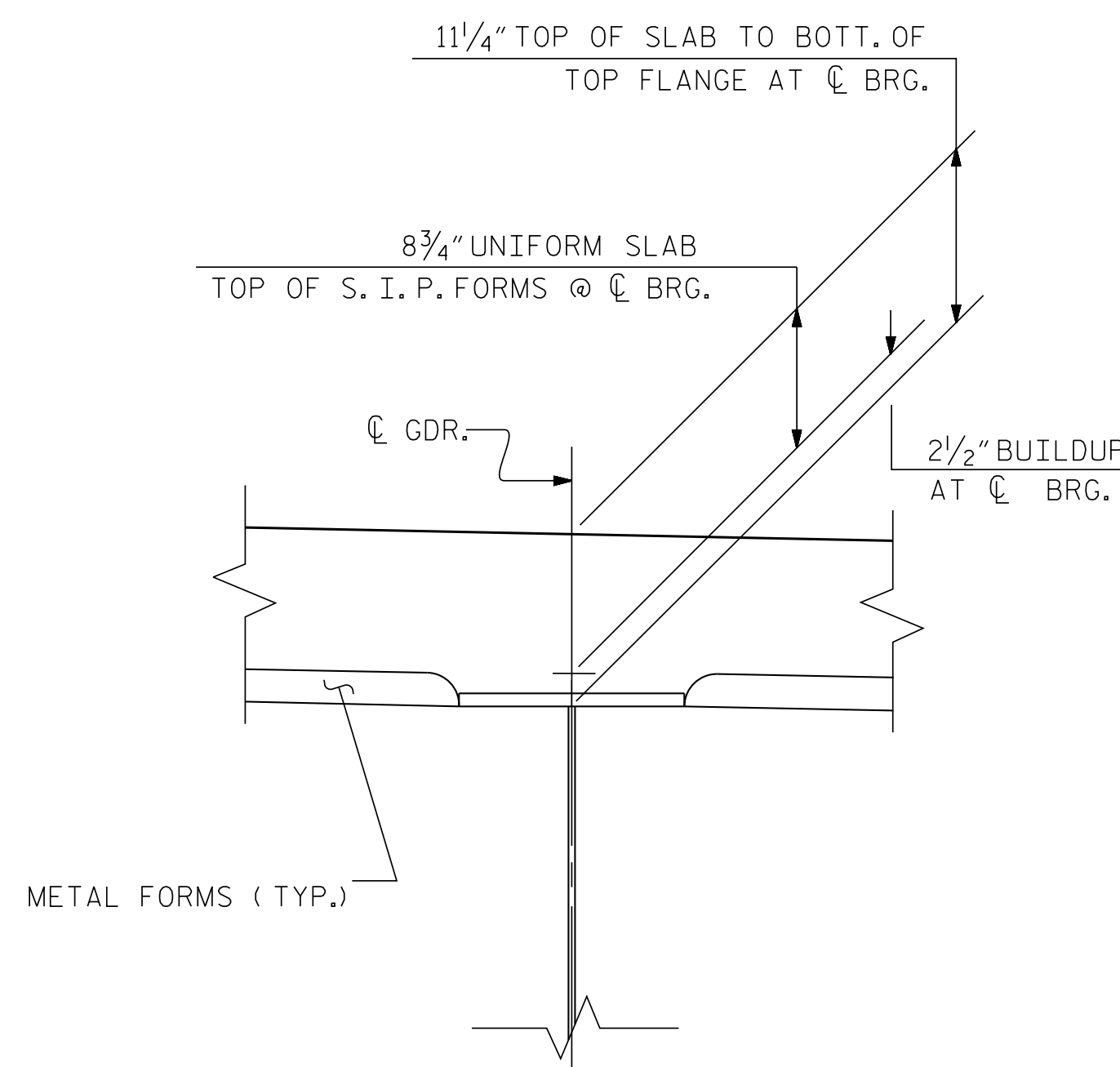


CONTRACTION JOINT DETAIL



PLAN AT BENT

* NO WELDING OF FORMS OR FALSEWORK TO THE TOP OF GIRDER WILL BE PERMITTED IN THE LINK SLAB AREA



SLAB DETAIL

NOTES

PROVIDE 1/4" BEAM BOLSTERS UPPER AT 4'-0" CENTERS ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS.

CONCRETE PARAPET, SIDEWALK, AND MEDIAN BARRIER IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCEMENT STEEL.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

SEE "SECTION THRU SIDEWALK" FOR SIDEWALK REINFORCING AND RUSTICATION GROOVE DETAILS.

SEE "SECTION THRU RAISED MEDIAN" FOR MEDIAN REINFORCING DETAILS.

FOR END RAIL POST AND PARAPET REINFORCING, SEE THREE BAR METAL RAIL DETAILS

PROJECT NO. U-5738

ROWAN COUNTY

STATION: 70+72.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
DETAILS

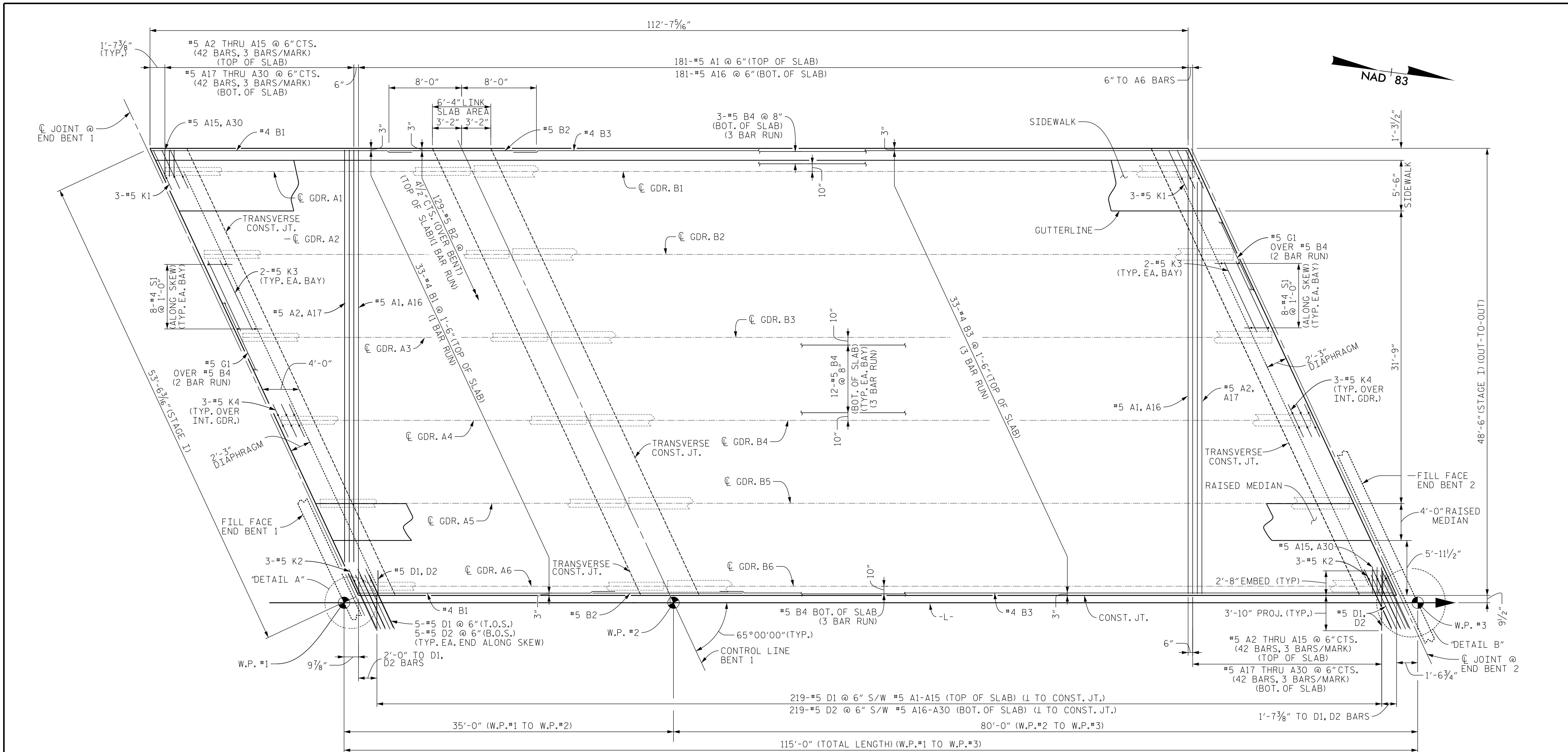


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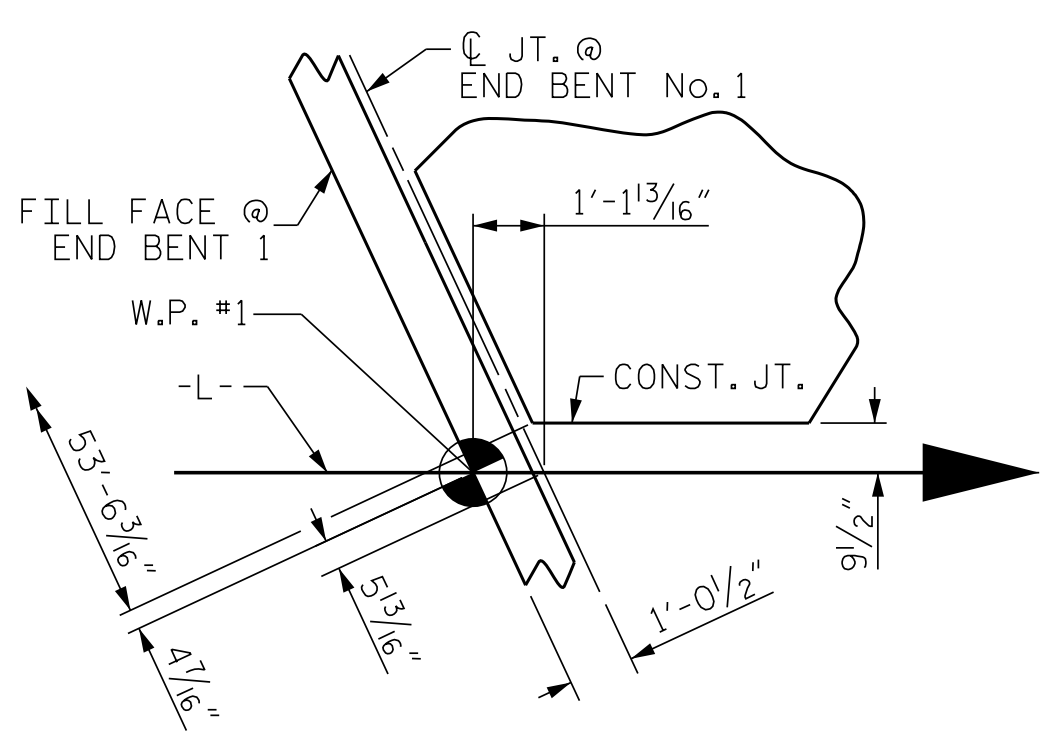
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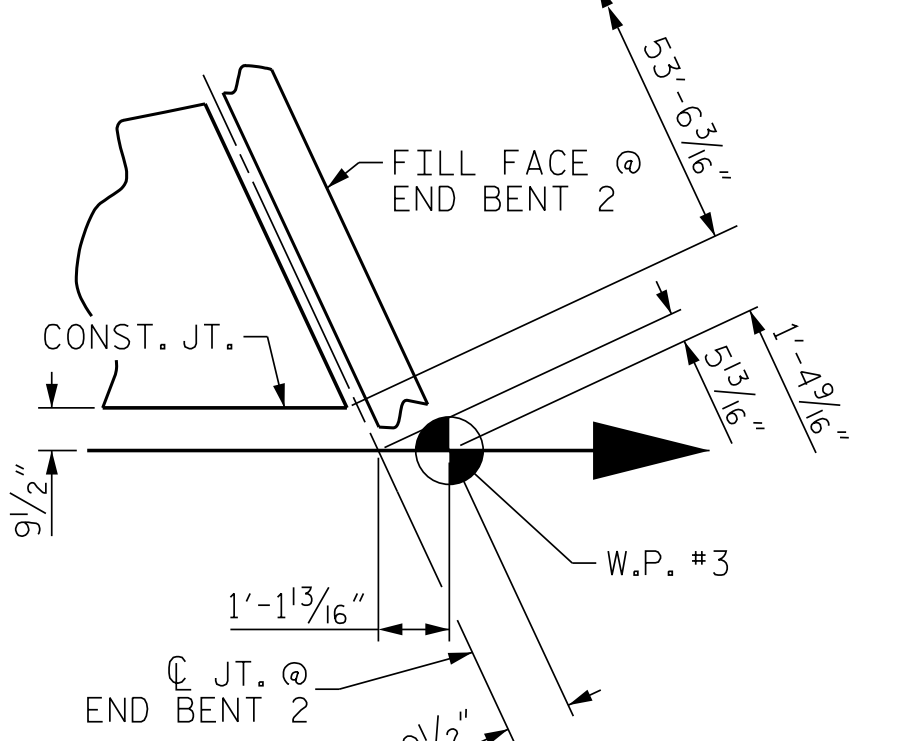
PLAN OF SPAN - STAGE I

NOTES

- SIDEWALK, PARAPET RAIL AND RAISED MEDIAN NOT SHOWN FOR CLARITY.
- FOR BARS IN SIDEWALK SEE "SECTION THRU SIDEWALK" AND "PLAN OF SIDEWALK"
- FOR BARS IN RAISED MEDIAN SEE "SECTION THRU RAISED MEDIAN" AND "PLAN OF RAISED MEDIAN"
- FOR BARS IN PARAPET RAIL SEE THREE BAR RAIL DETAILS.
- FOR TRANSVERSE CONSTRUCTION JOINT DETAILS SEE "POUR SEQUENCE" SHEET.



DETAIL A



DETAIL B

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 SHEET 1 OF 4

STATE OF NORTH CAROLINA
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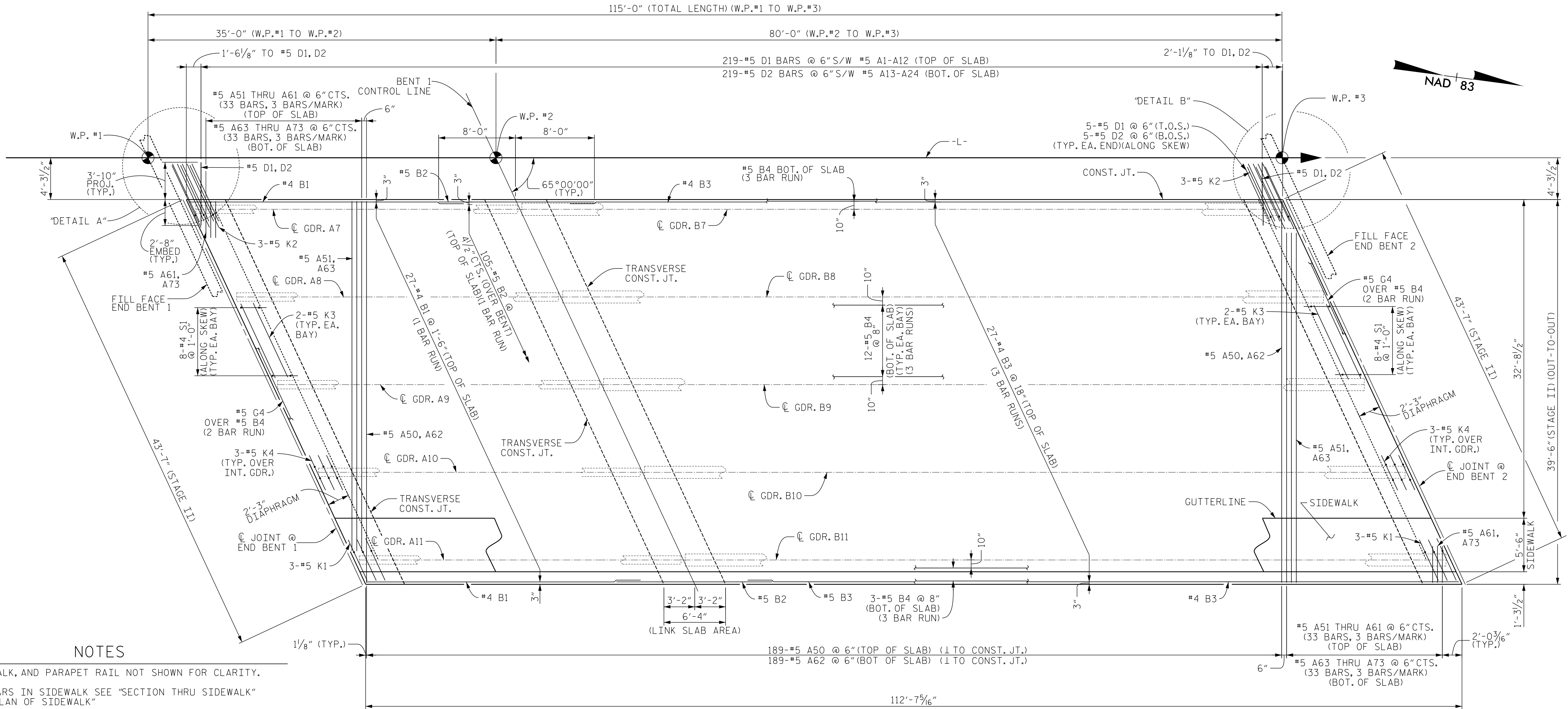
SUPERSTRUCTURE
 PLAN OF SPANS
 STAGE I

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REVISIONS						SHEET NO. S-8
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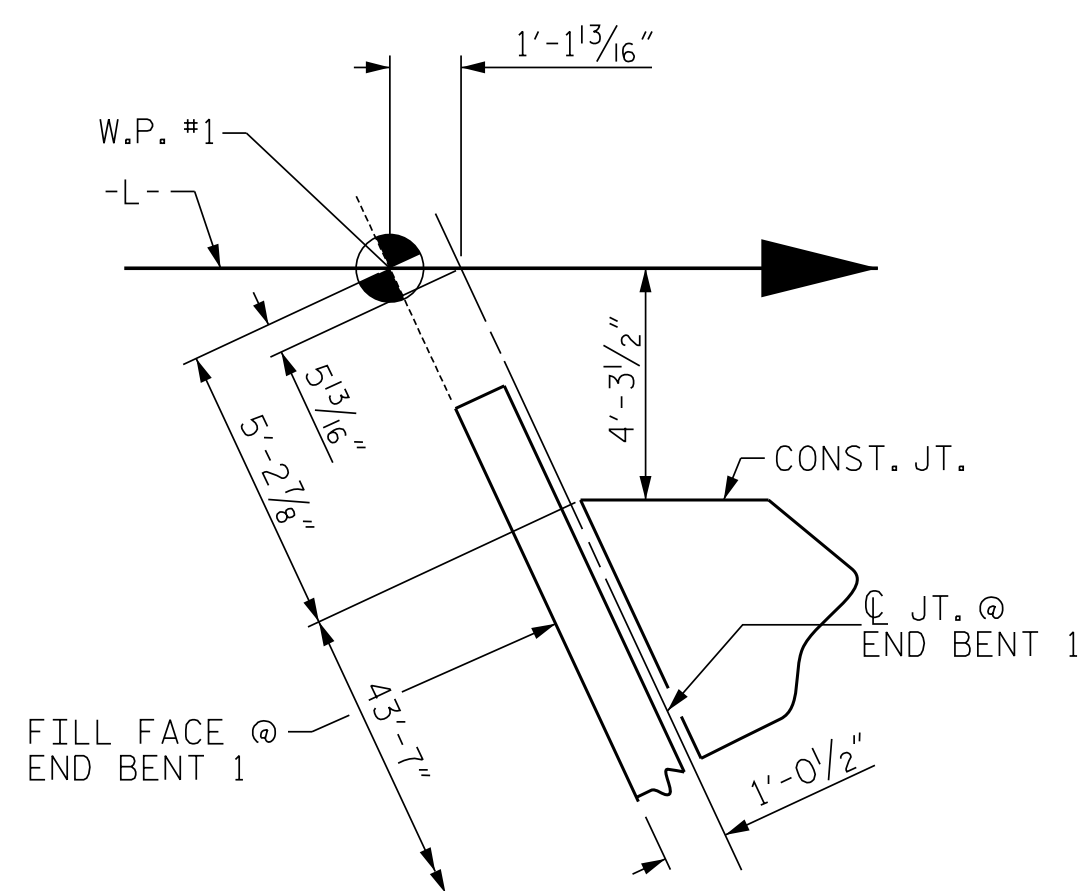
115'-0" (TOTAL LENGTH) (W.P.#1 TO W.P.#3)



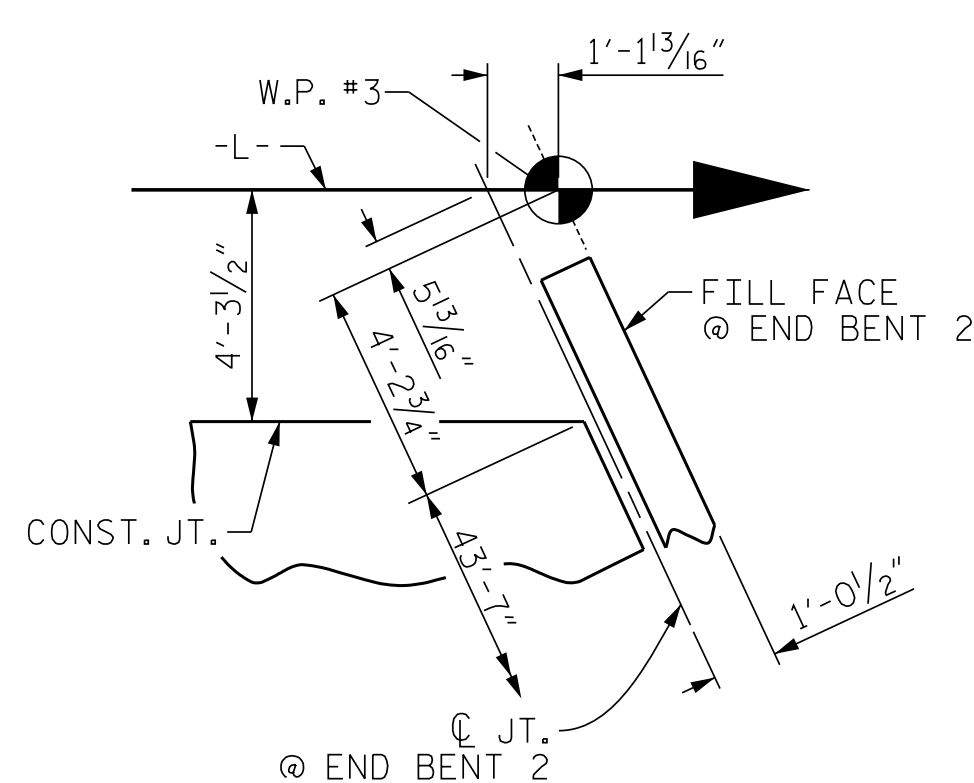
NOTES

- SIDEWALK, AND PARAPET RAIL NOT SHOWN FOR CLARITY.
- FOR BARS IN SIDEWALK SEE "SECTION THRU SIDEWALK" AND "PLAN OF SIDEWALK"
- FOR BARS IN PARAPET RAIL SEE THREE BAR RAIL DETAILS.
- FOR TRANSVERSE CONSTRUCTION JOINT DETAILS SEE "POUR SEQUENCE" SHEET.

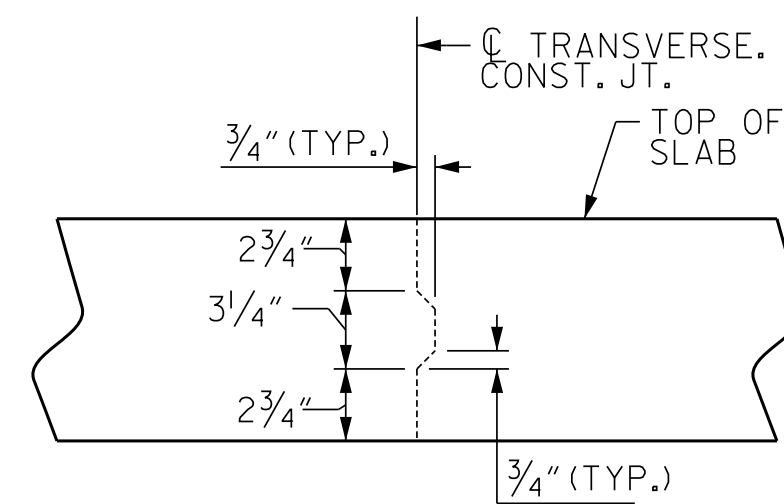
PLAN OF SPAN - STAGE II



DETAIL A



DETAIL B



TRANSVERSE CONSTRUCTION JOINT

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.

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SHEET 2 OF 4

STATE OF NORTH CAROLINA
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**SUPERSTRUCTURE
 PLAN OF SPANS
 STAGE II**

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SHEET NO. S-9
 TOTAL SHEETS 39

NOTES

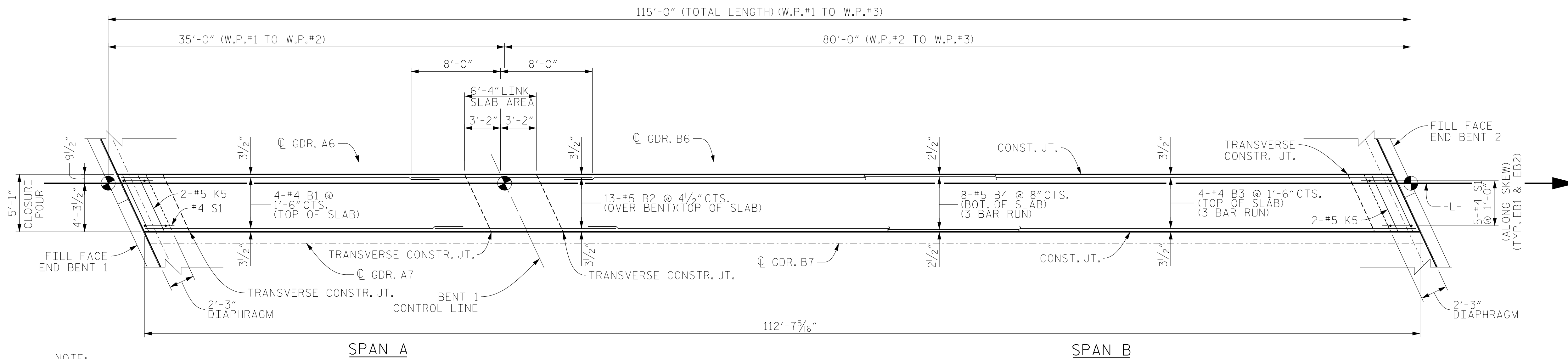
THE CONCRETE AND REINFORCING STEEL REQUIRED FOR THE RAISED MEDIAN IS INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL AND PAYMENT IS INCLUDED IN THE SQUARE FOOT PRICE BID FOR "REINFORCED CONCRETE DECK SLAB."

RAISED MEDIAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.

THE JOINT IN THE DECK AT THE END BENTS AND THE LINK SLAB AT THE BENT SHALL BE SAWED PRIOR TO THE CASTING OF THE RAISED MEDIAN. THE JOINT IN THE RAISED MEDIAN SHALL BE FORMED TO MATCH THE SAWED OPENING FOR THE FOAM JOINT SEALS.

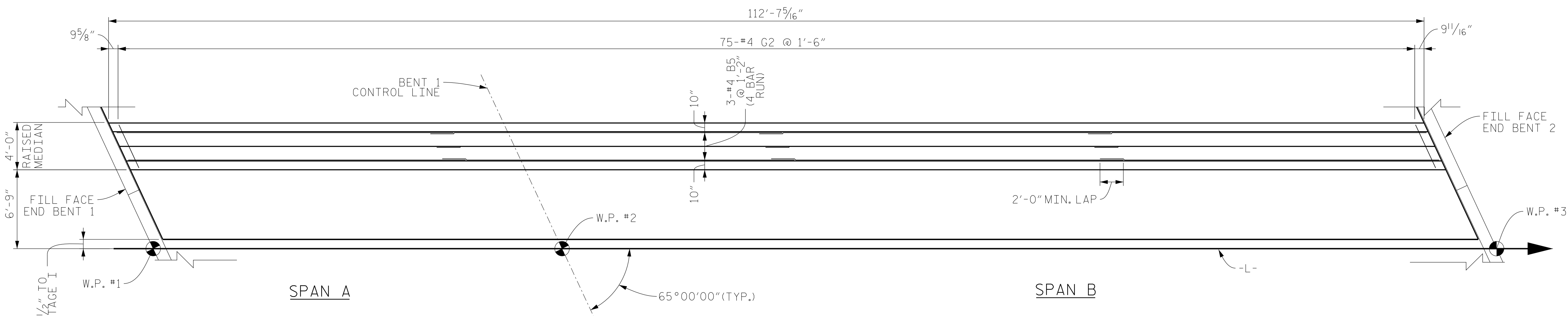
ALL REINFORCING STEEL IN THE RAISED MEDIAN SHALL BE EPOXY COATED.

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



NOTE:
DOWELS FROM STAGES 1 & 2 INTO THE CLOSURE POUR NOT SHOWN FOR CLARITY, SEE SHEETS 1 & 2 OF 4.

PLAN OF CLOSURE POUR (STAGE III)



PLAN OF RAISED MEDIAN (STAGE I)

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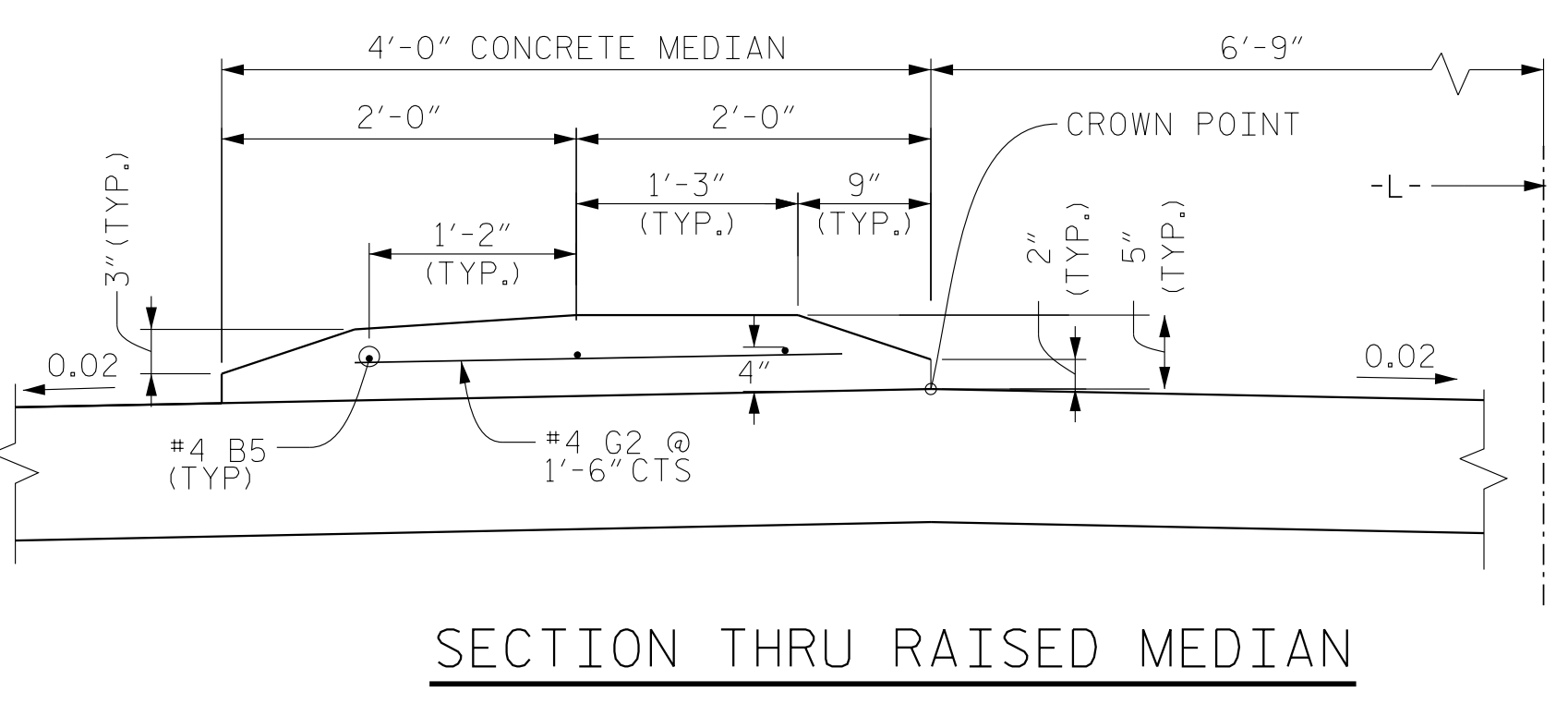
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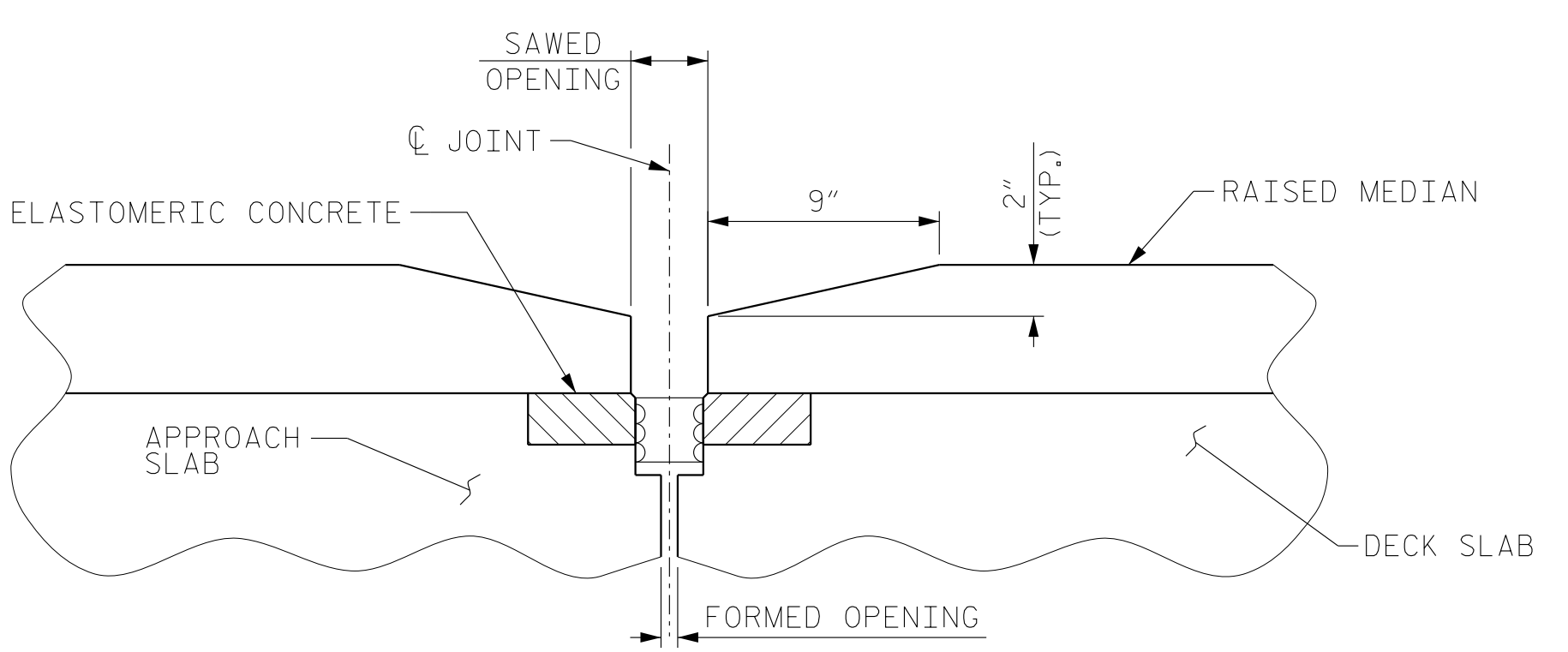
ROWAN COUNTY

STATION: 70+72.50 -L-

SHEET 3 OF 4



SECTION THRU RAISED MEDIAN



SECTION THRU RAISED MEDIAN AT END BENTS
END BENT 1 SHOWN, END BENT 2 SIMILAR



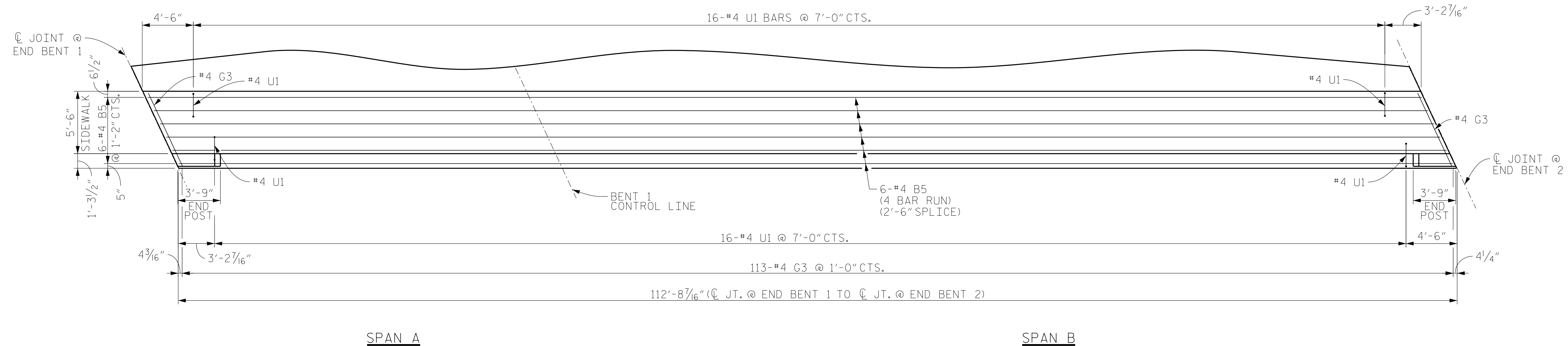
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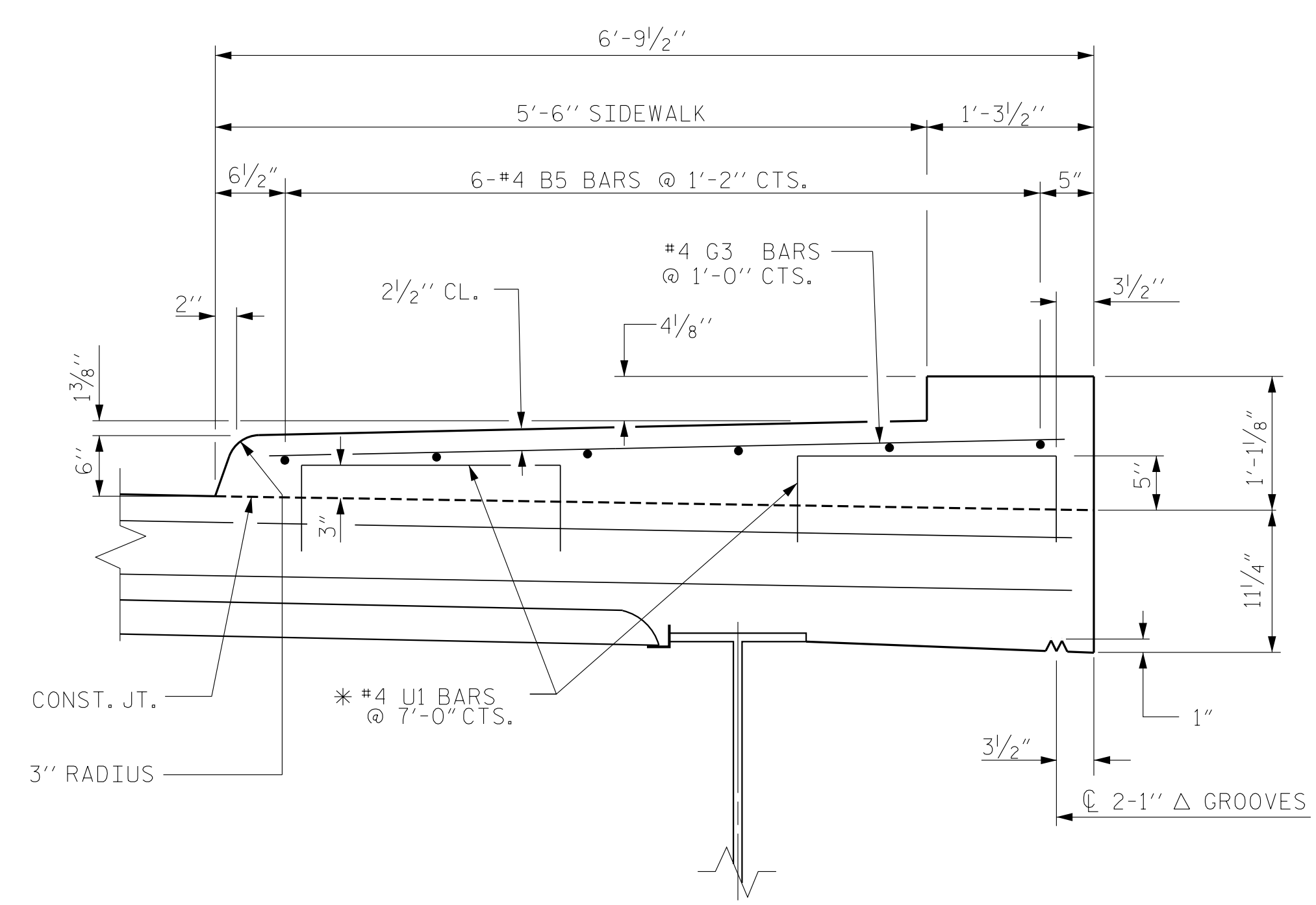
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TOTAL SHEETS 39



PLAN OF SIDEWALK (STAGE I & STAGE II)
RIGHT SIDE SHOWN, LEFT SIDE SIMILAR



SECTION THRU SIDEWALK

* "U" BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

NOTES

THE CONCRETE AND REINFORCING STEEL REQUIRED FOR THE SIDEWALKS IS INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL AND PAYMENT IS INCLUDED IN THE SQUARE FOOT PRICE BID FOR "REINFORCED CONCRETE DECK SLAB."

THE #4U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

SIDEWALK SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.

THE JOINT IN THE DECK AT THE END BENTS AND LINK SLAB AT THE BENT SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALKS.

ALL REINFORCING STEEL IN SIDEWALKS 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 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH.

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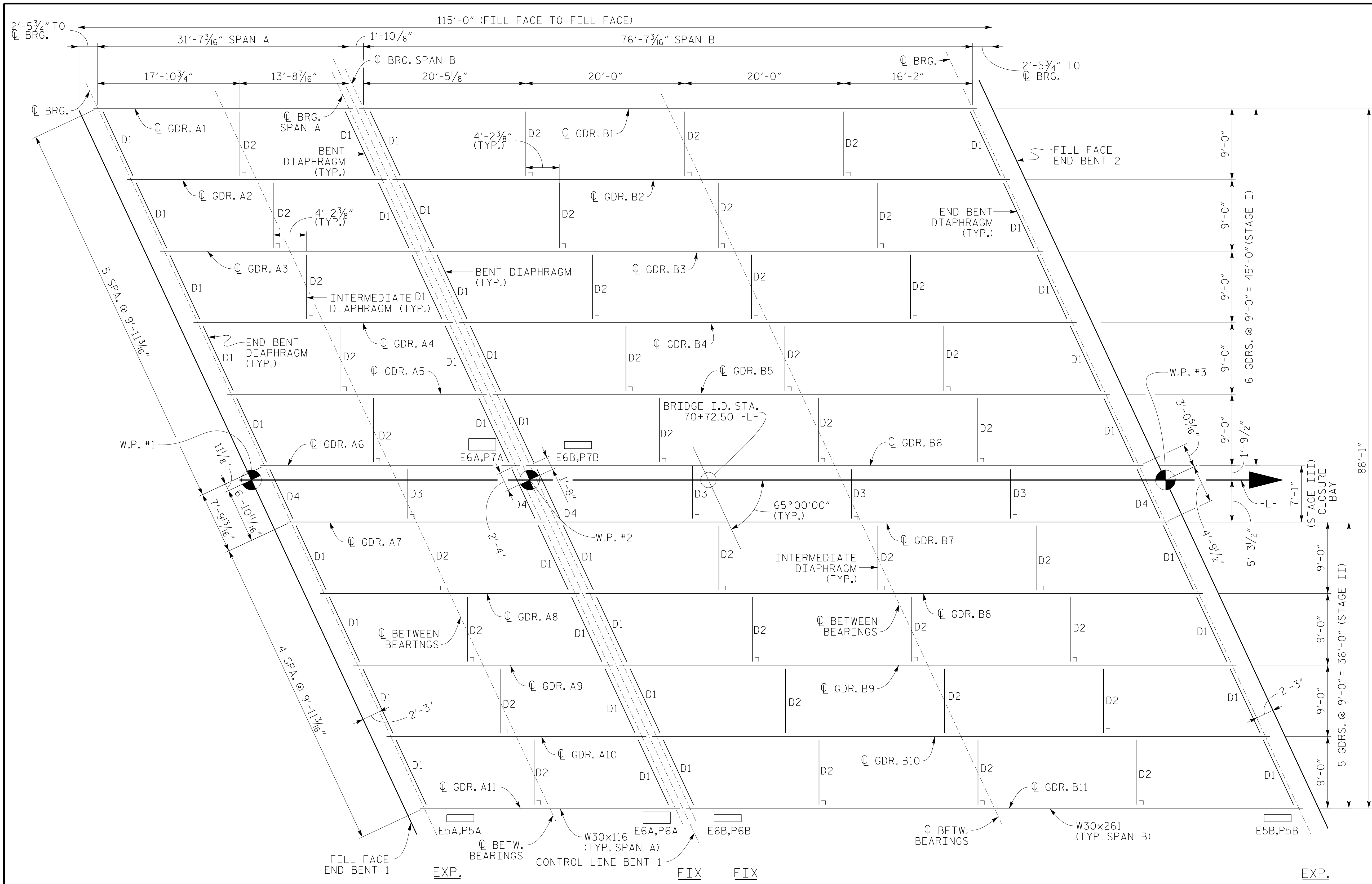
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SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
SIDEWALKS

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		DES. EGR. OF RECORD: CDB	DATE: 11/18	1		
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FRAMING PLAN
 FOR DIMENSIONS ALONG GRDS., SEE
 "SUBSTRUCTURE STEEL DETAILS", SHEET 1 OF 3

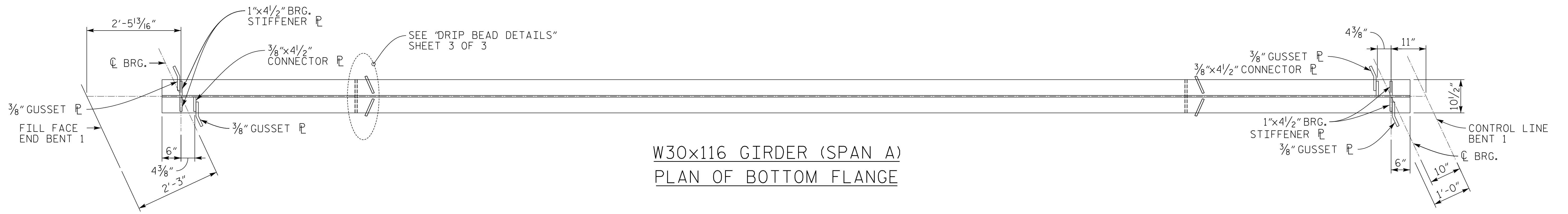


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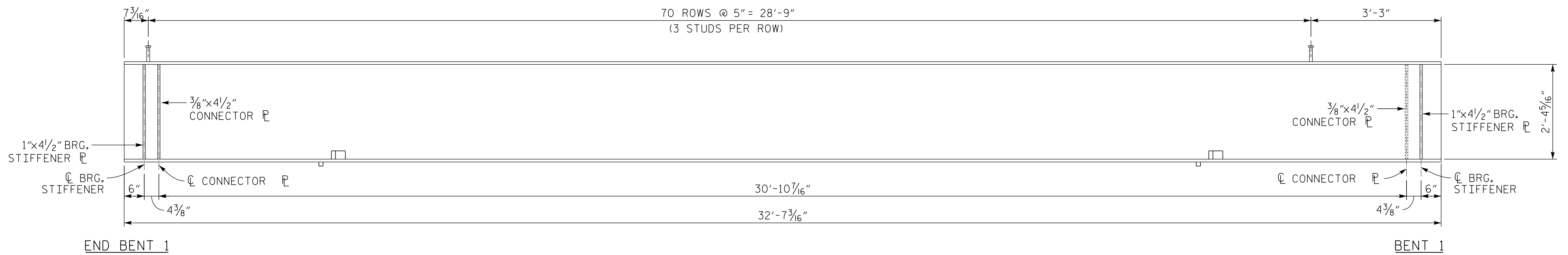
**SUPERSTRUCTURE
 FRAMING PLAN**

12/13/2021

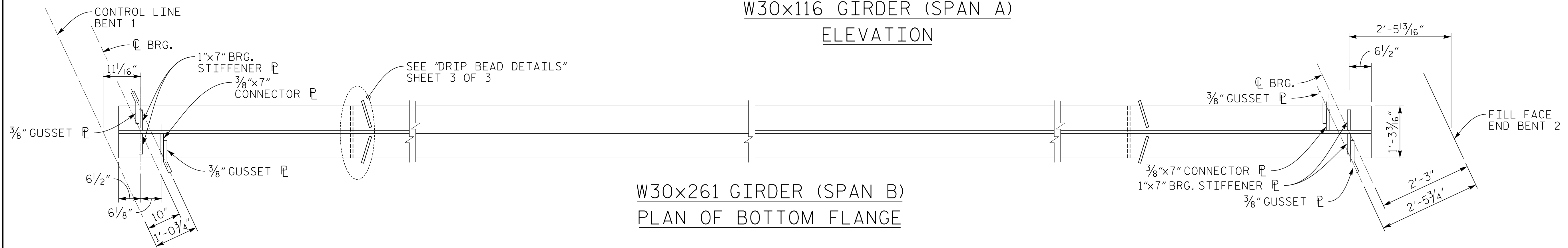
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CHKD. BY: CDB DATE: 11/18						DES. EGR. OF RECORD: CDB DATE: 11/18		TOTAL SHEETS 39	
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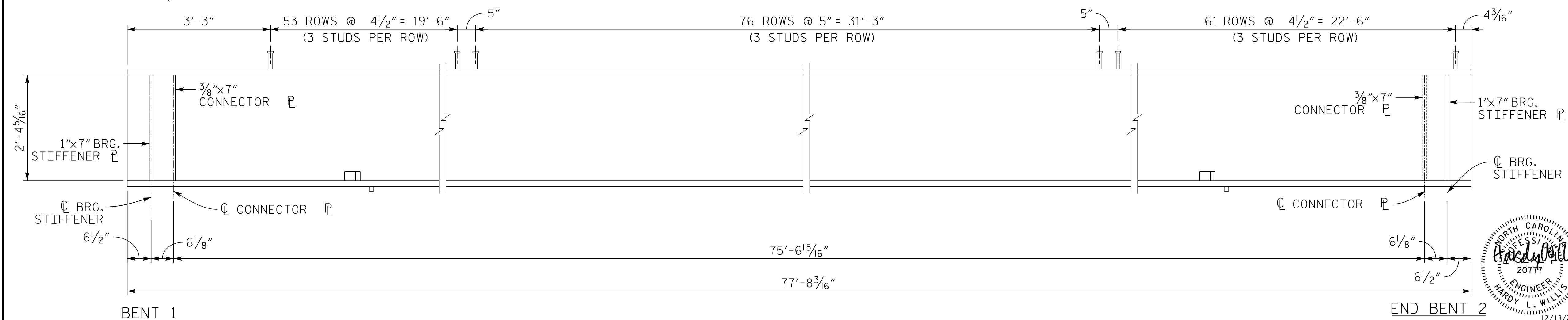
W30x116 GIRDER (SPAN A)
PLAN OF BOTTOM FLANGE



W30x116 GIRDER (SPAN A)
ELEVATION

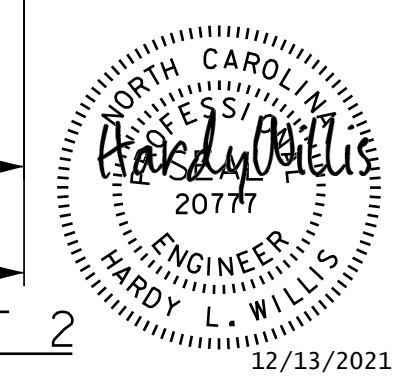


W30x261 GIRDER (SPAN B)
PLAN OF BOTTOM FLANGE



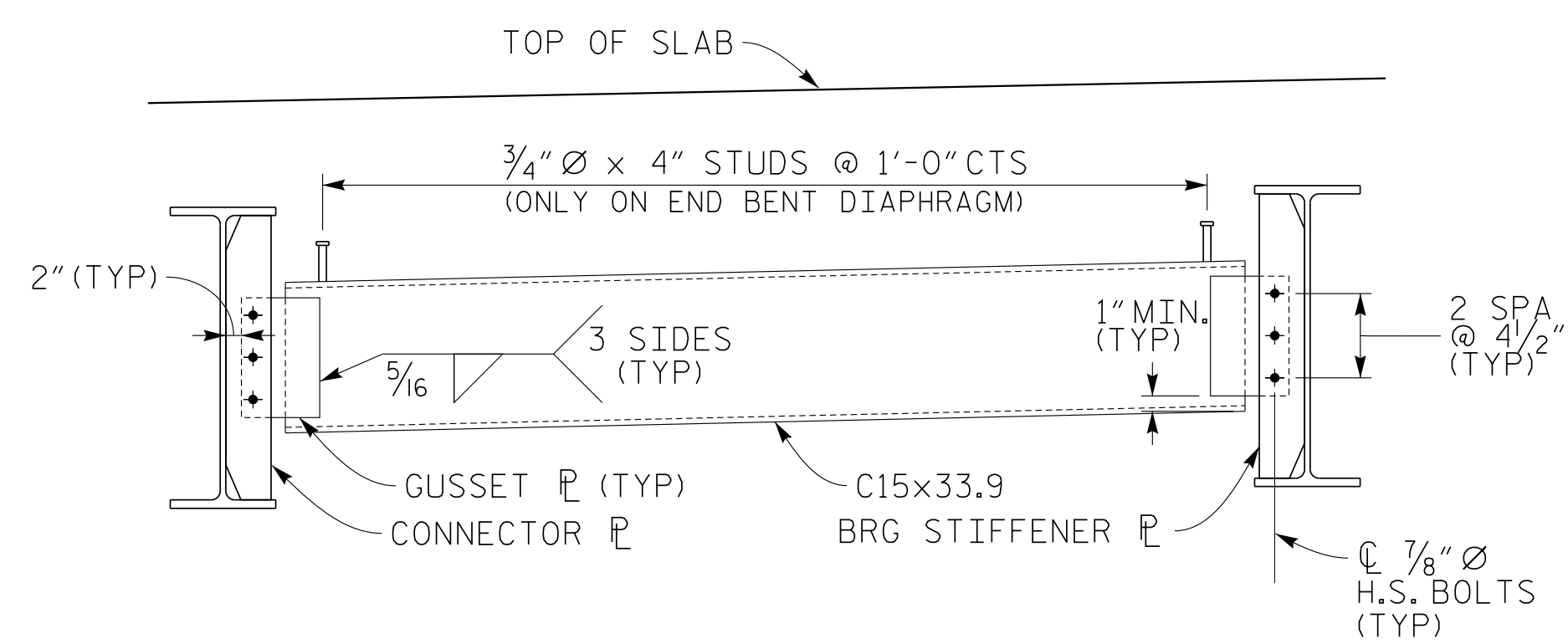
W30x261 GIRDER (SPAN B)
ELEVATION

PROJECT NO. U-5738
ROWAN COUNTY
STATION: 70+72.50 -L-
SHEET 1 OF 3

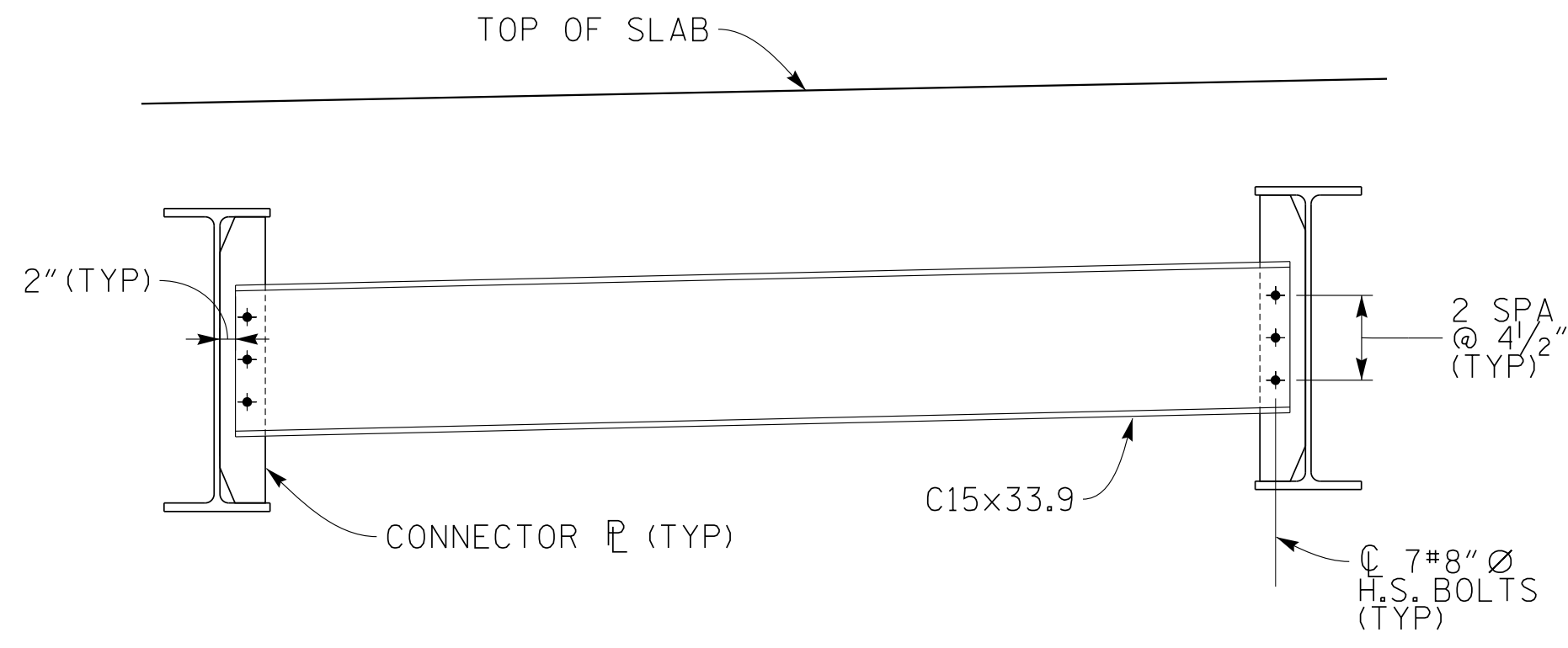


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DETAILS

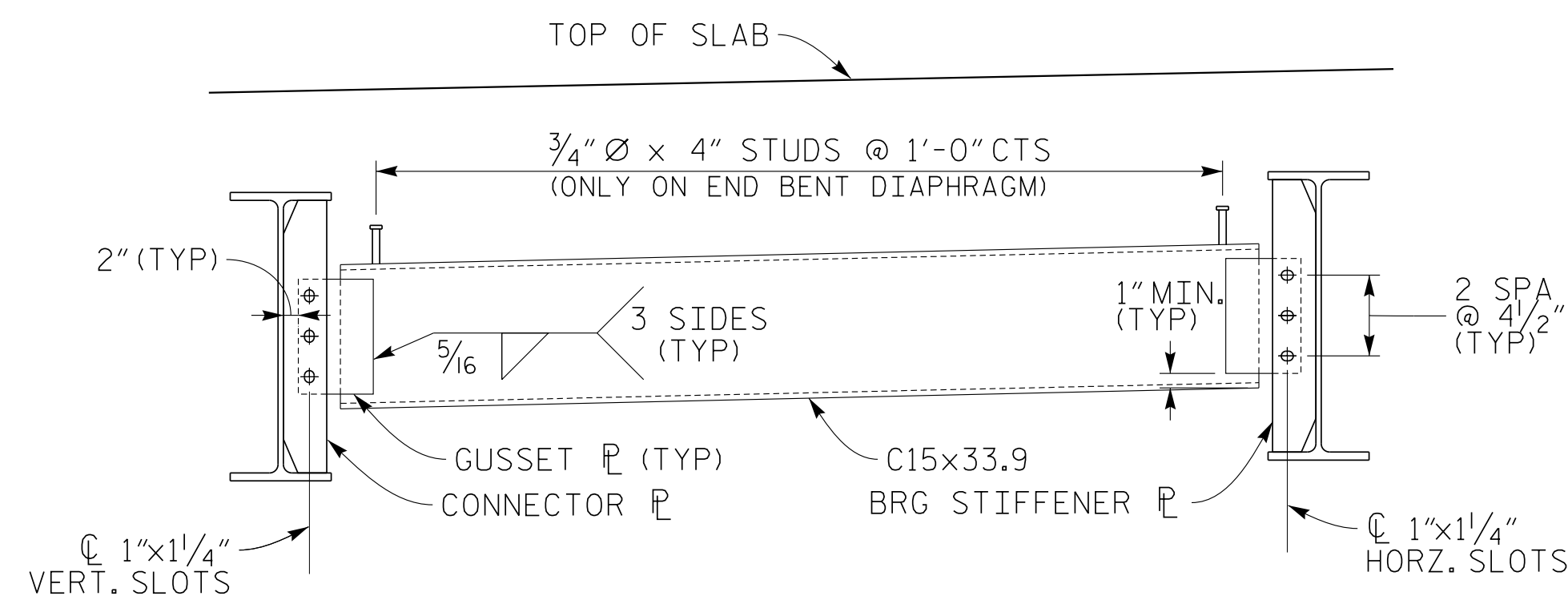
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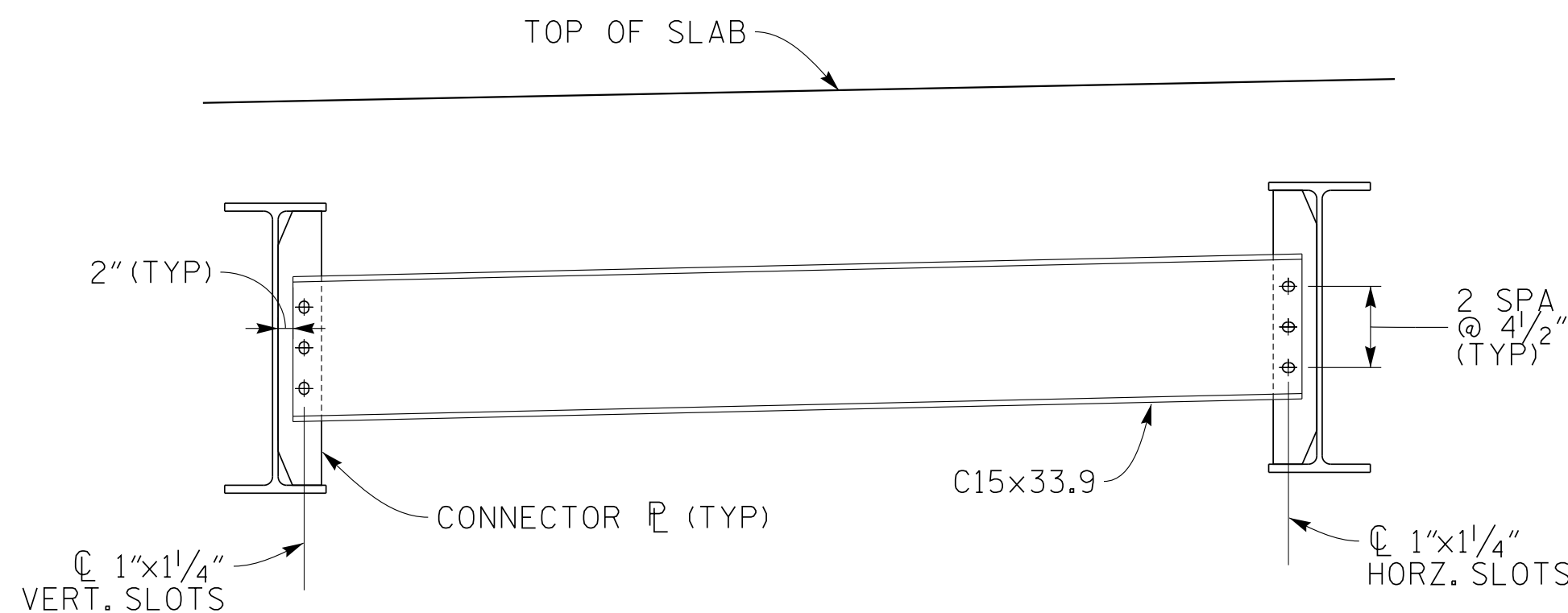
TYPICAL END BENT OR BENT DIAPHRAGM (D1)



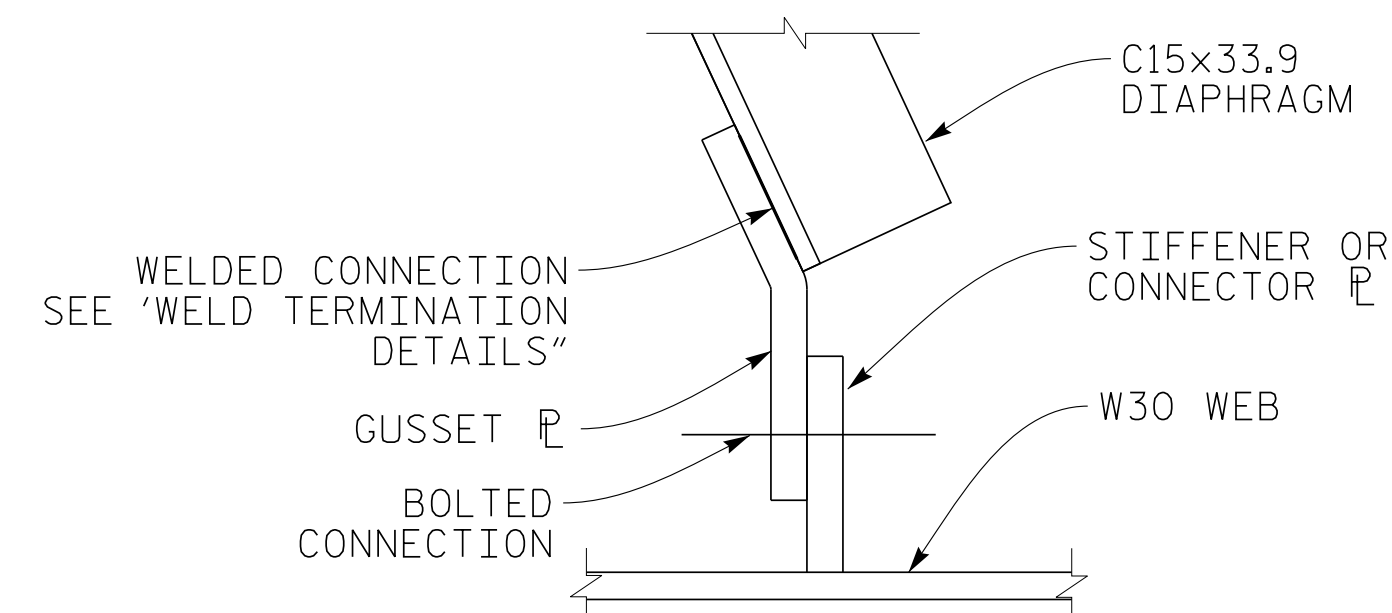
TYPICAL INTERMEDIATE DIAPHRAGM (D2)



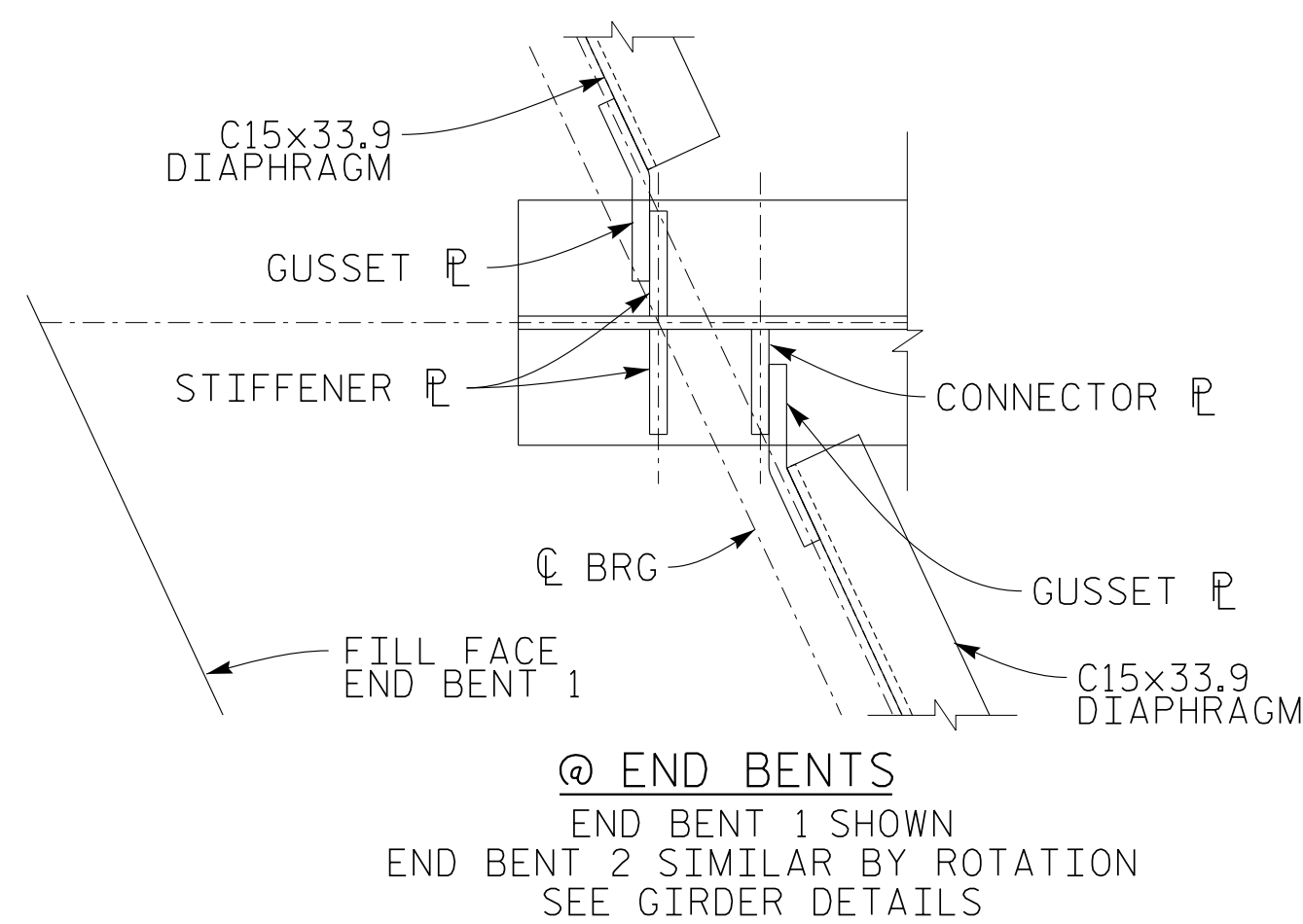
END BENT OR BENT DIAPHRAGM (D4)
IN CLOSURE BAY



INTERMEDIATE DIAPHRAGM (D3)
IN CLOSURE BAY

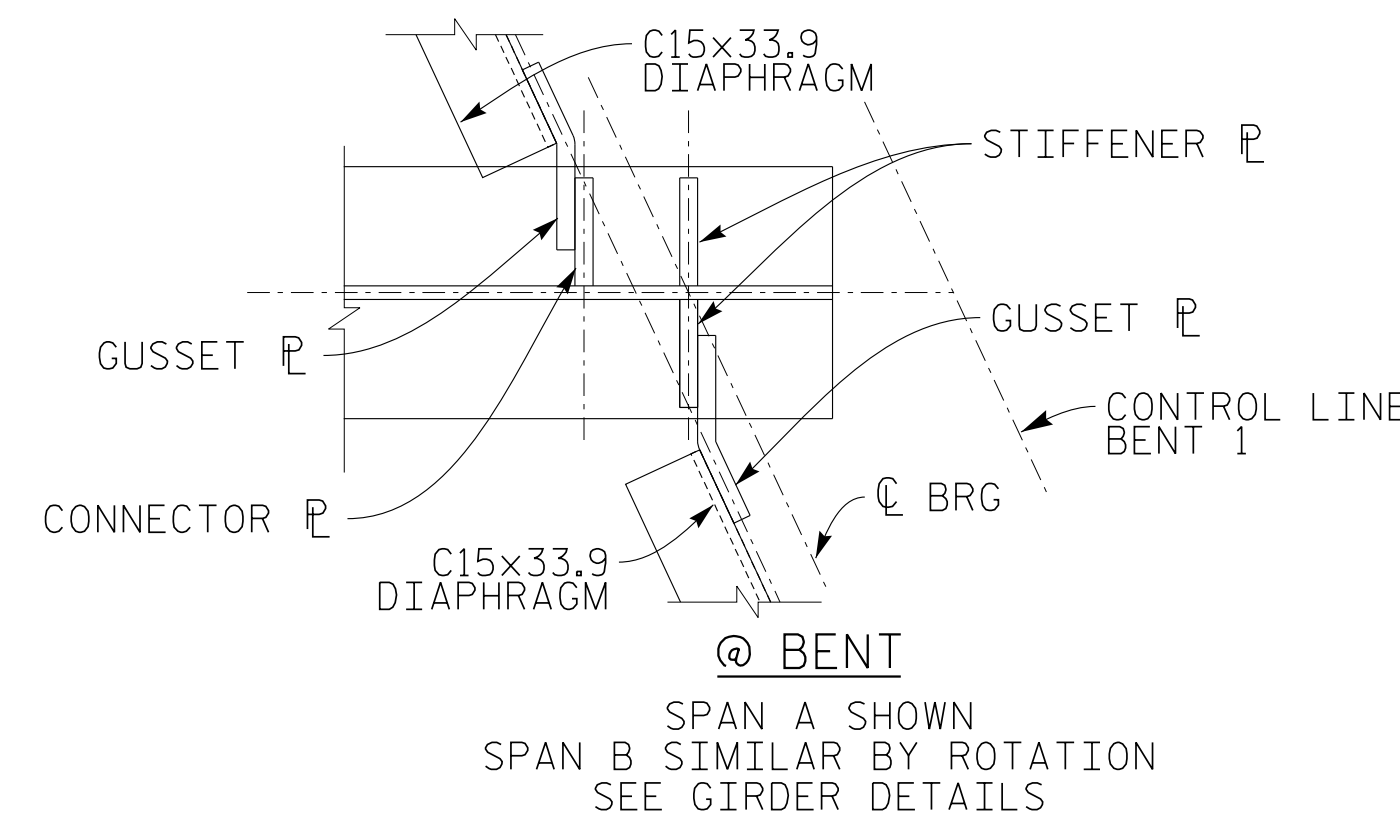


STIFFENER/CONNECTOR TO GUSSET DETAIL



@ END BENTS
END BENT 1 SHOWN
END BENT 2 SIMILAR BY ROTATION
SEE GIRDER DETAILS

DIAPHRAGM CONNECTION DETAILS



@ BENT
SPAN A SHOWN
SPAN B SIMILAR BY ROTATION
SEE GIRDER DETAILS

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

STIFFENERS ARE NOT REQUIRED ON THE OUTSIDE OF EXTERIOR BEAMS.

ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED. ALL BOLTED FIELD CONNECTIONS SHALL BE 7/8" HIGH STRENGTH BOLTS, UNLESS OTHERWISE NOTED.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

NUTS ON BOLTS FOR CONNECTING DIAPHRAGMS TO CONNECTOR PLATE SHALL BE LEFT LOOSE FOR PURPOSE OF ADJUSTMENT UNTIL BOTH SIDES OF SLAB IN CLOSURE BAY HAVE BEEN POURED.

A CHARPY V-NOTCH TEST IS REQUIRED ON ALL BEAM SECTIONS AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

ENDS OF ALL GIRDERS SHALL BE PLUMB.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

FOR WELD SIZE AND WELD TERMINATION DETAILS, SEE SHEET S-15

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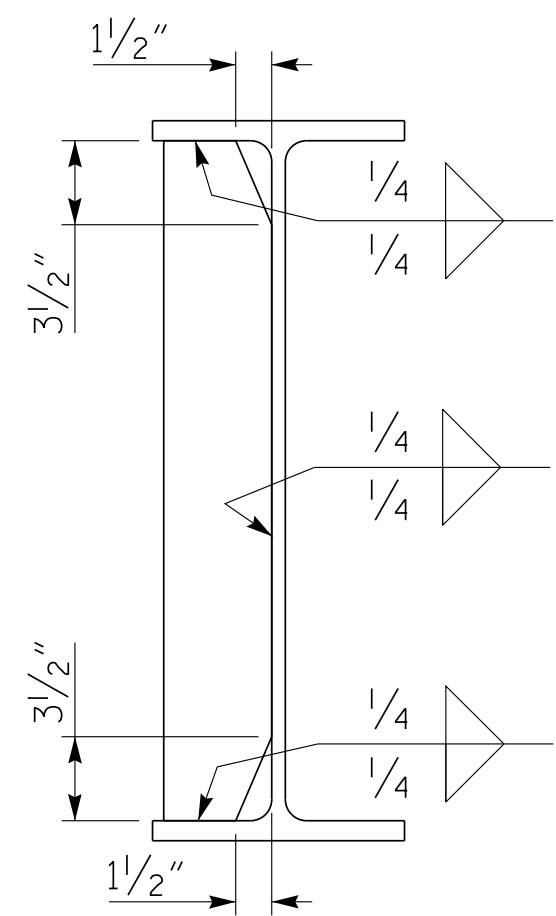
SHEET 2 OF 3

STATE OF NORTH CAROLINA
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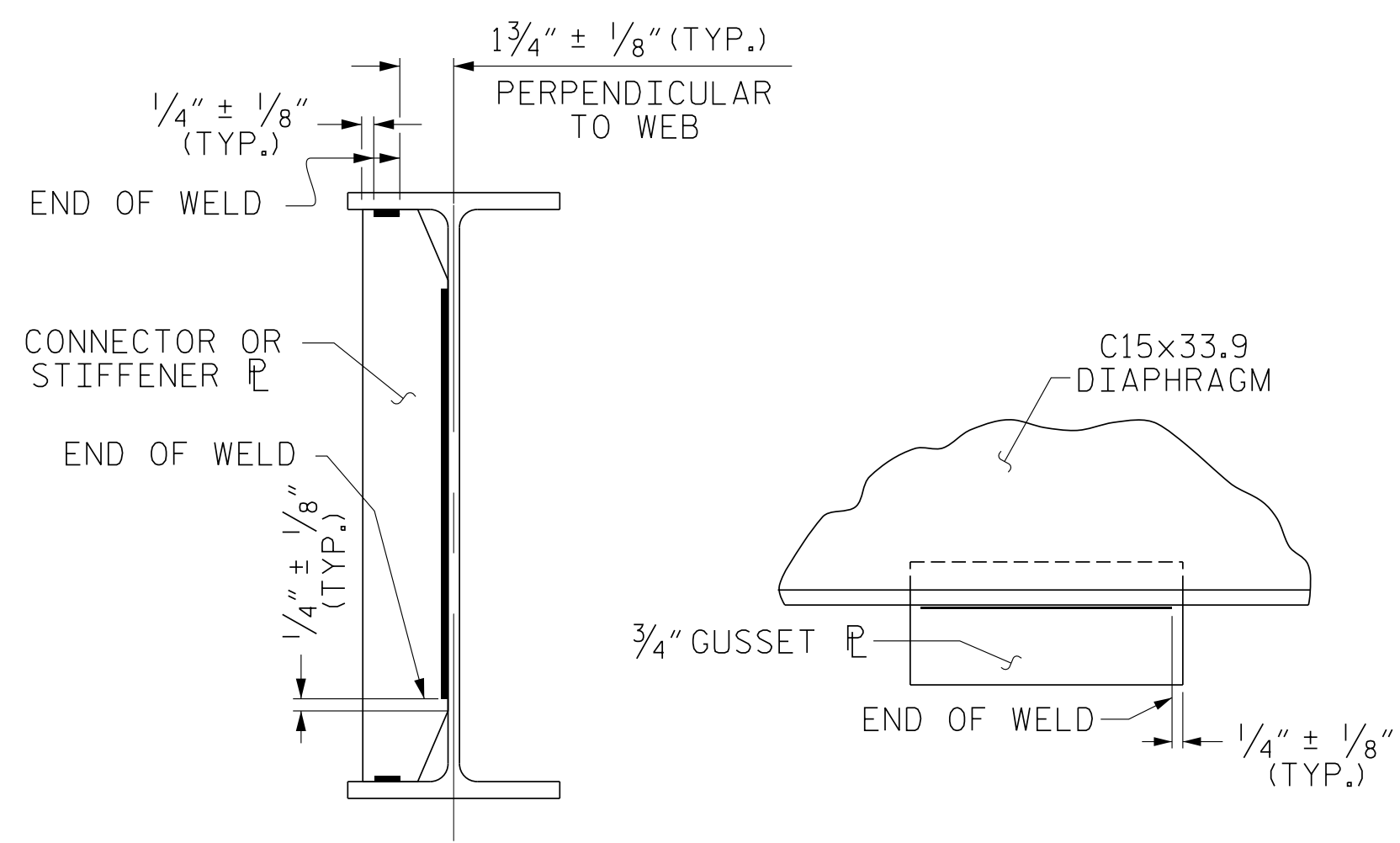
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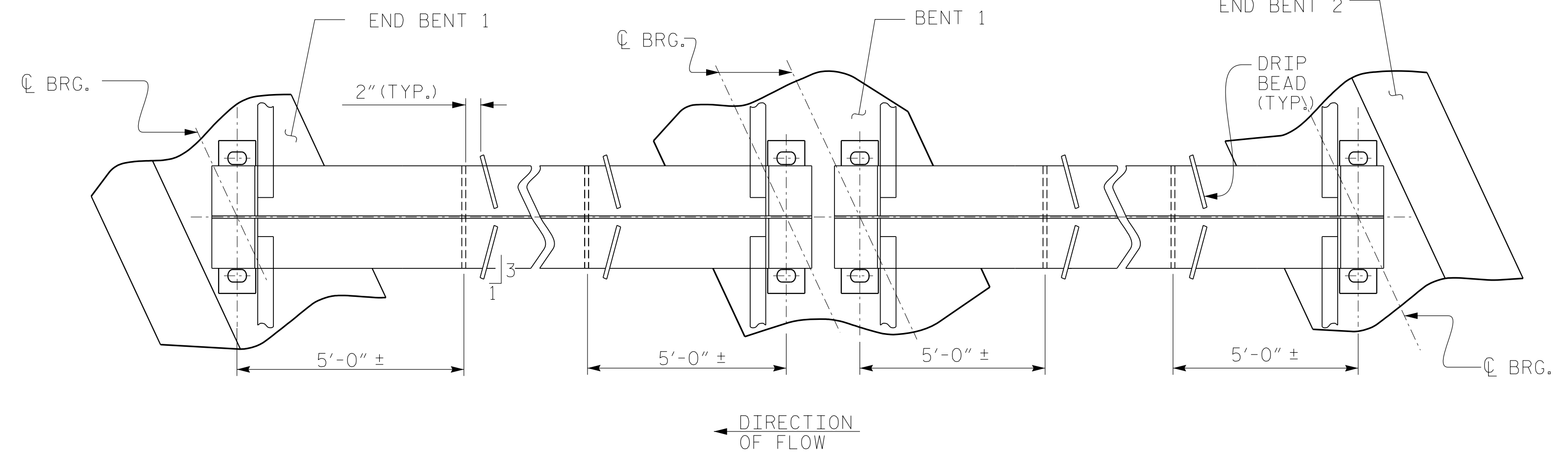
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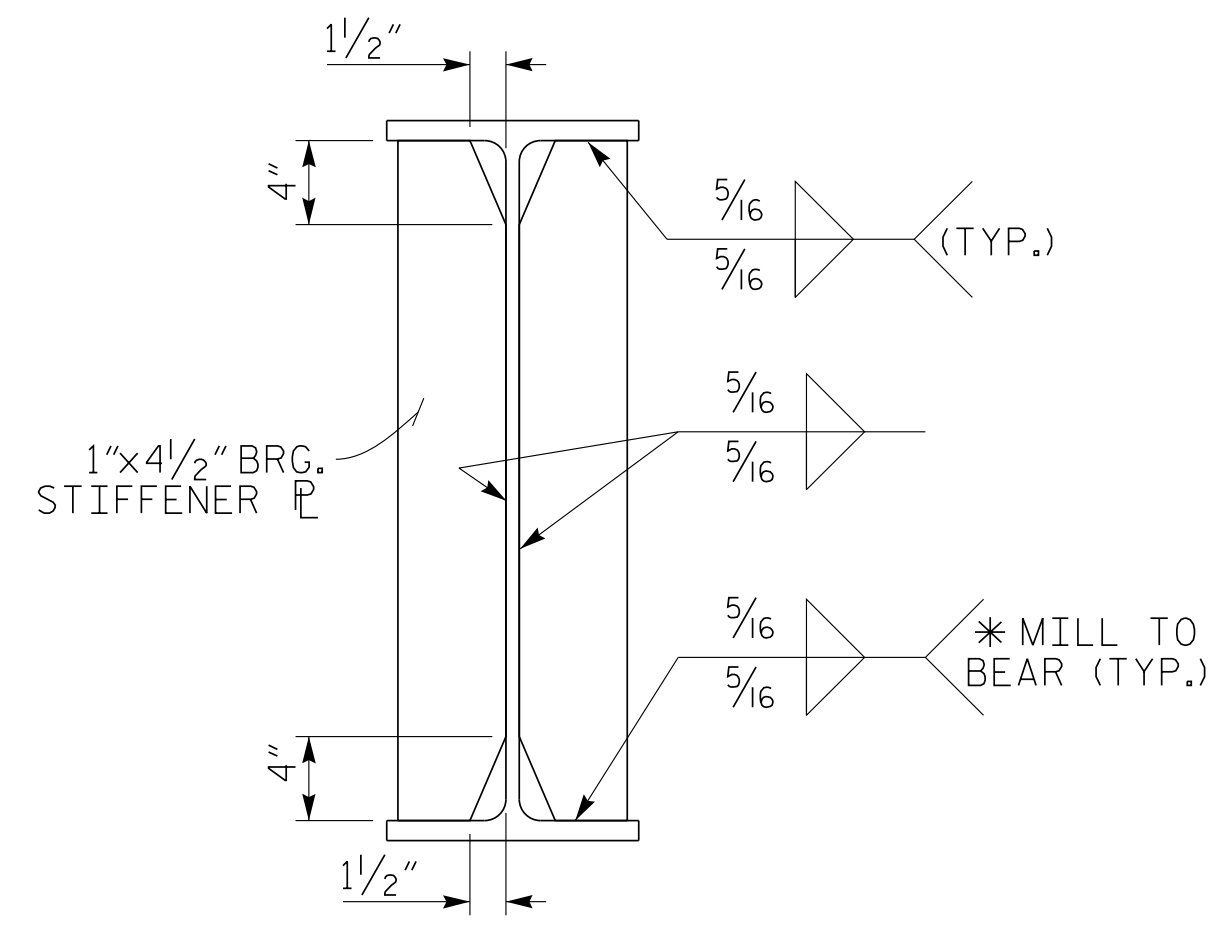
CONNECTOR PLATE
SPAN A



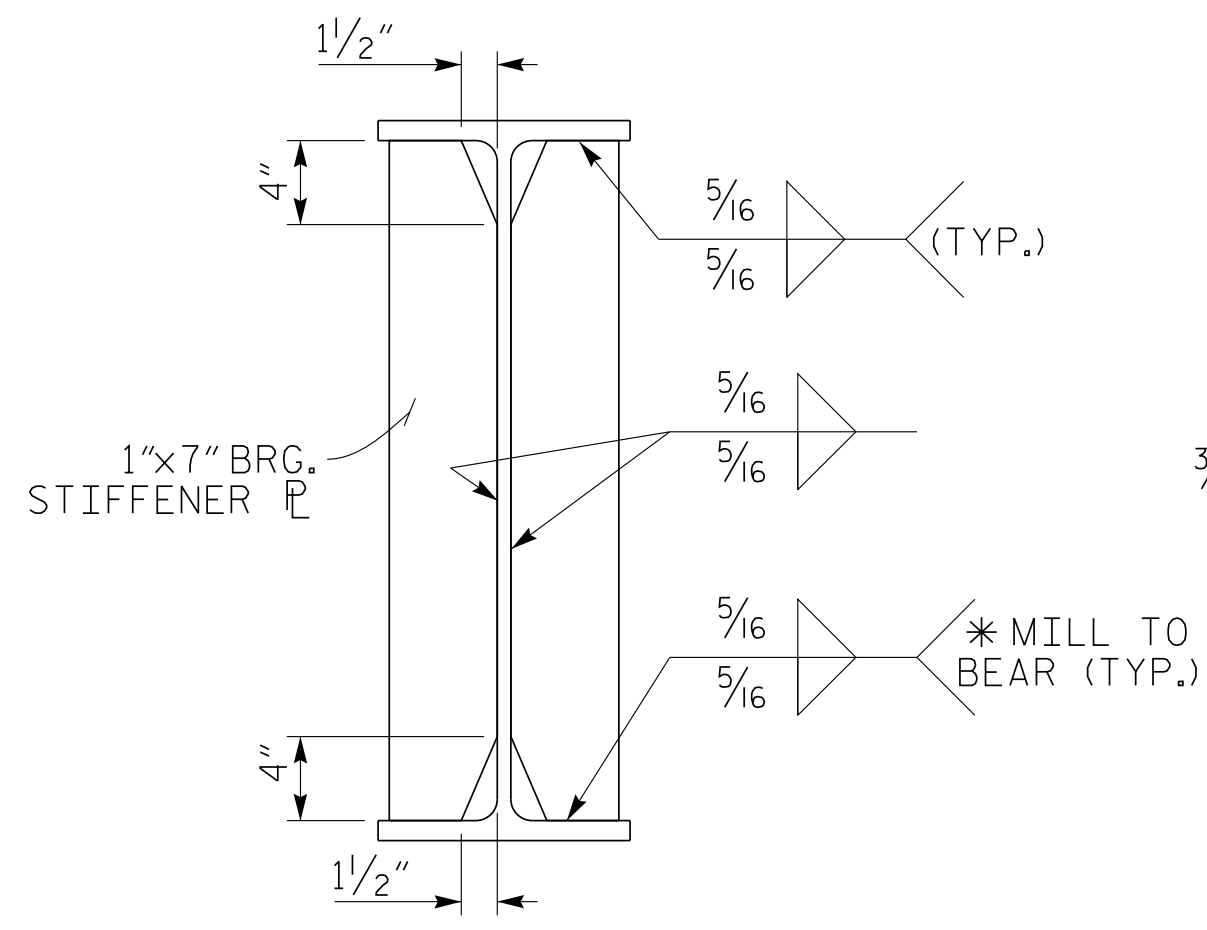
TYPICAL STIFFENER OR
CONNECTOR PLATE CONNECTIONS
TYPICAL GUSSET
PLATE CONNECTION
WELD TERMINATION DETAILS



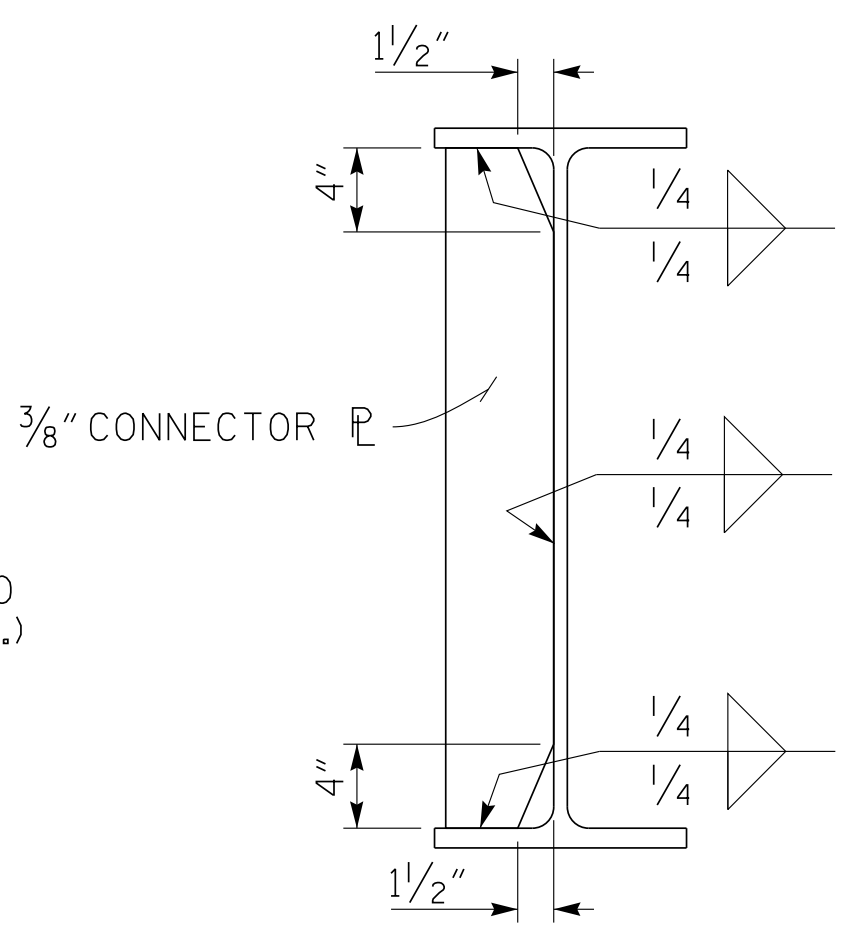
PART PLAN - BOTTOM FLANGE



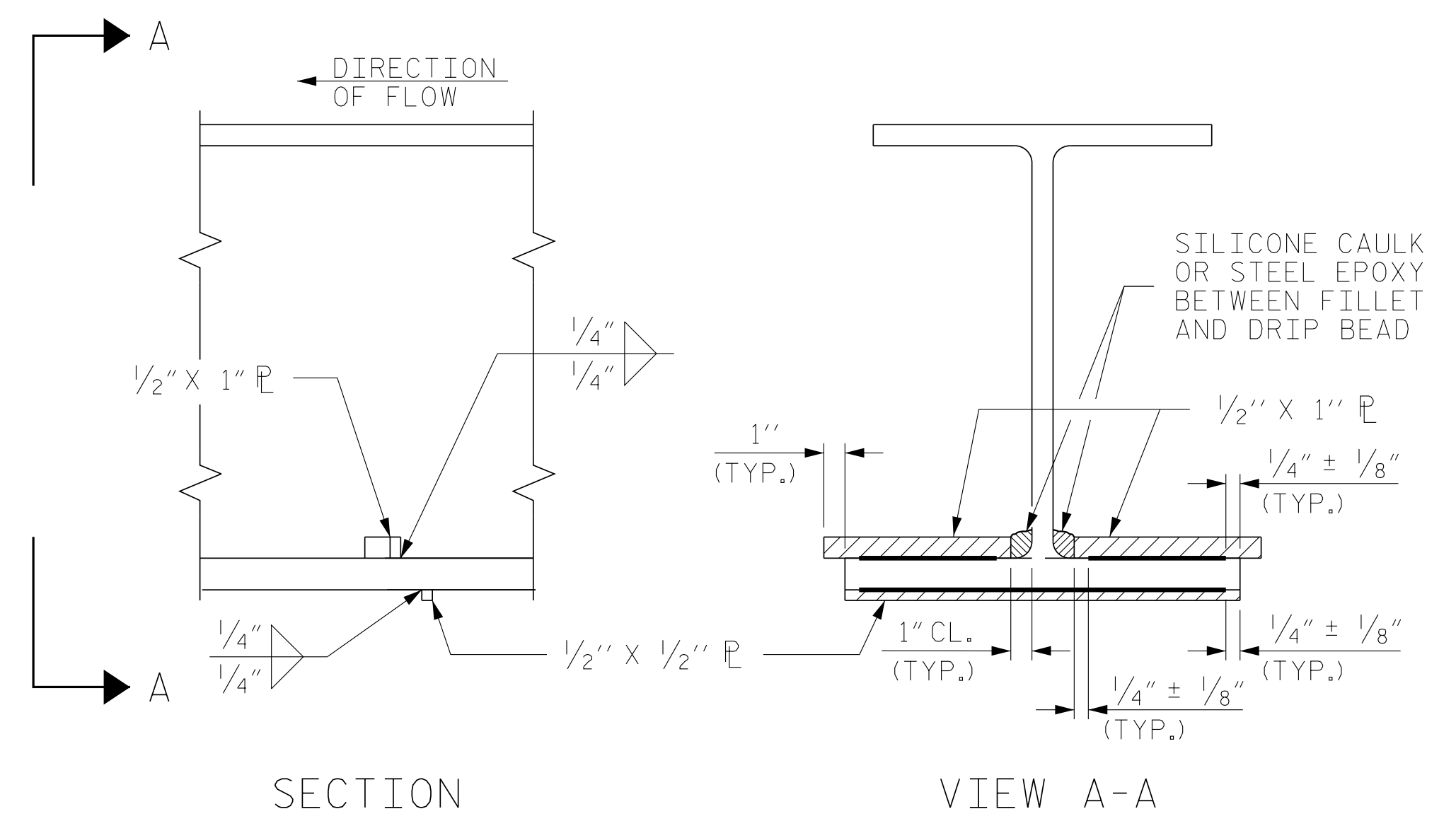
BEARING STIFFENER (SPAN A)
* WELD ONLY WHEN BEARING
STIFFENER IS ALSO CONNECTOR PLATE



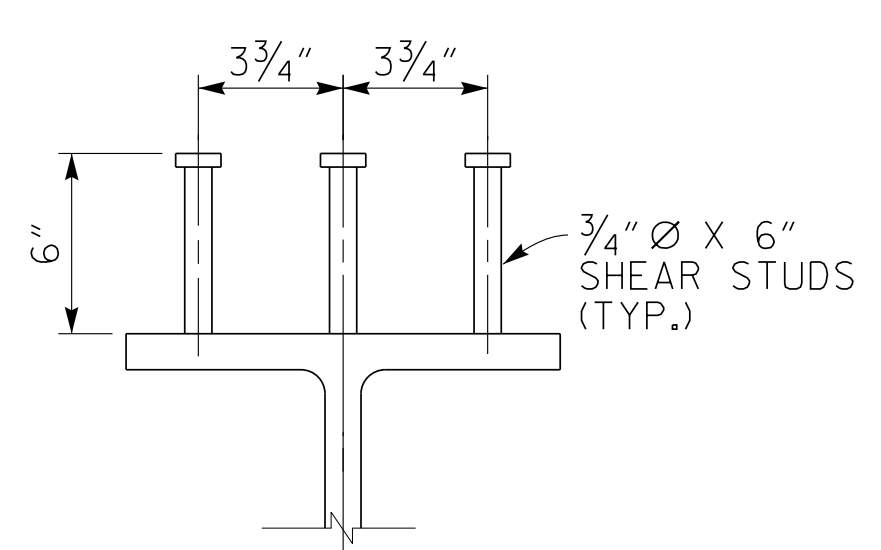
BEARING STIFFENER (SPAN B)
* WELD ONLY WHEN BEARING
STIFFENER IS ALSO CONNECTOR PLATE



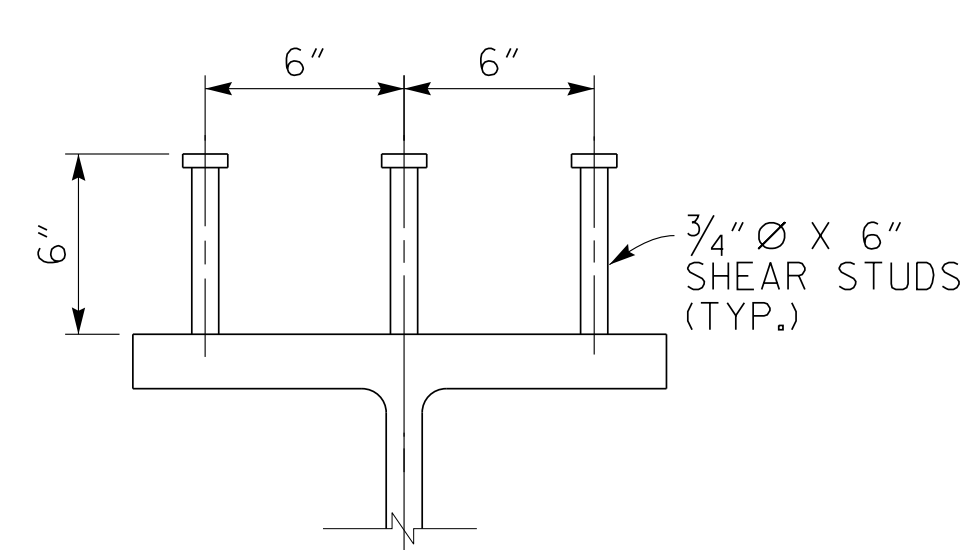
CONNECTOR PLATE
SPAN B



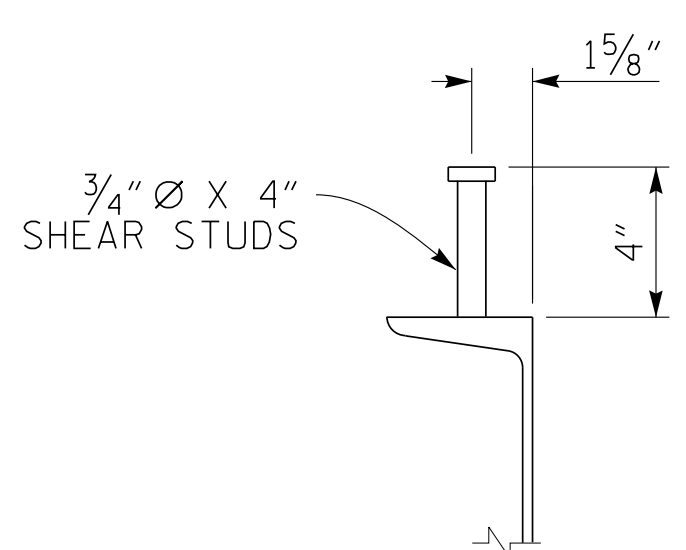
DRIP BEAD DETAILS



W30x116 SHEAR STUD DETAIL



W30x261 SHEAR STUD DETAIL

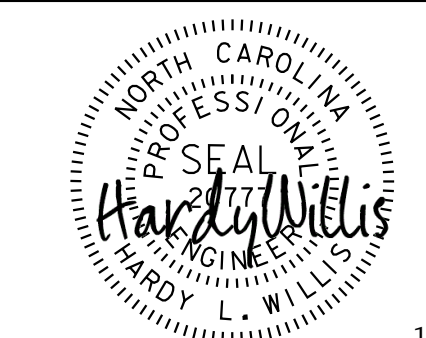


C15x33.9 SHEAR STUD DETAIL
TYP. ONLY @ END BENT DIAPHRAGM (D1)

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SHEET 3 OF 3

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE
STRUCTURAL STEEL
DETAILS

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2			4			39	

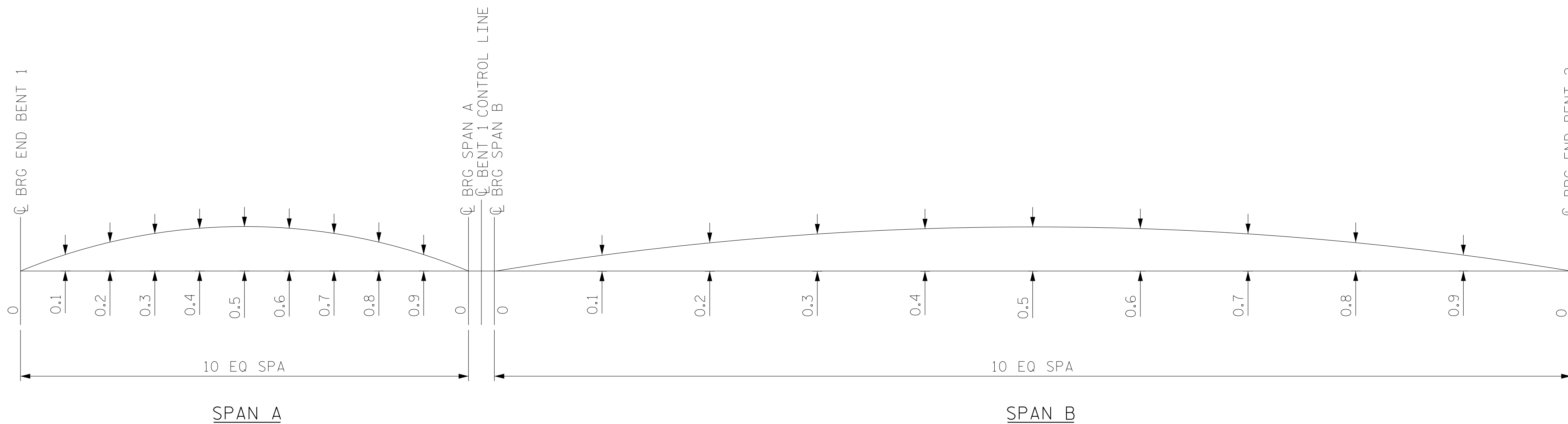
SPAN A
NO SHOP CAMBER REQUIRED,
TURN NATURAL MILL CHAMBER UP.

DEAD LOAD DEFLECTION TABLE FOR SPAN B GIRDERS																																	
	SPAN B											SPAN B										SPAN B											
	GIRDERS 1 & 11											GIRDERS 2 & 10										GIRDERS 3 & 9											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.015	0.028	0.038	0.044	0.047	0.044	0.038	0.028	0.015	0.000	0.000	0.015	0.028	0.039	0.045	0.047	0.045	0.039	0.028	0.015	0.000	0.000	0.015	0.028	0.039	0.046	0.048	0.046	0.039	0.028	0.015	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.049	0.093	0.127	0.149	0.157	0.149	0.127	0.093	0.049	0.000	0.000	0.057	0.108	0.148	0.173	0.182	0.173	0.148	0.108	0.057	0.000	0.000	0.061	0.116	0.158	0.185	0.194	0.185	0.158	0.116	0.061	0.000
DEFLECTION DUE TO WEIGHT OF S.W. & MED. **	0.000	0.005	0.009	0.012	0.014	0.015	0.014	0.012	0.009	0.005	0.000	0.000	0.005	0.009	0.012	0.014	0.014	0.014	0.012	0.009	0.005	0.000	0.000	0.004	0.008	0.012	0.014	0.014	0.014	0.012	0.008	0.004	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.069	0.130	0.177	0.207	0.219	0.207	0.177	0.130	0.069	0.000	0.000	0.077	0.145	0.199	0.232	0.243	0.232	0.199	0.145	0.077	0.000	0.000	0.080	0.152	0.209	0.245	0.256	0.245	0.209	0.152	0.080	0.000
REQUIRED CAMBER	0	13/16"	1 9/16"	2 1/8"	2 1/2"	2 5/8"	2 1/2"	2 1/8"	1 9/16"	13/16"	0	0	15/16"	1 3/4"	2 3/8"	2 13/16"	2 15/16"	2 13/16"	2 3/8"	1 3/4"	15/16"	0	0	15/16"	1 13/16"	2 1/2"	2 15/16"	3 1/16"	2 15/16"	2 1/2"	1 13/16"	15/16"	0

	SPAN B											SPAN B										
	GIRDERS 4, 5 & 8											GIRDERS 6 & 7										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.015	0.028	0.039	0.046	0.048	0.046	0.039	0.028	0.015	0.000	0.000	0.015	0.028	0.038	0.044	0.047	0.044	0.038	0.028	0.015	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.061	0.115	0.157	0.184	0.194	0.184	0.157	0.115	0.061	0.000	0.000	0.046	0.087	0.119	0.139	0.146	0.139	0.119	0.087	0.046	0.000
DEFLECTION DUE TO WEIGHT OF S.W. & MED. **	0.000	0.004	0.009	0.012	0.014	0.014	0.014	0.012	0.009	0.004	0.000	0.000	0.005	0.009	0.012	0.014	0.015	0.014	0.012	0.009	0.005	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.080	0.152	0.208	0.244	0.256	0.244	0.208	0.152	0.080	0.000	0.000	0.066	0.124	0.169	0.197	0.208	0.197	0.169	0.124	0.066	0.000
REQUIRED CAMBER	0	15/16"	1 13/16"	2 1/2"	2 15/16"	3 1/16"	2 15/16"	2 1/2"	1 13/16"	15/16"	0	0	13/16"	1 1/2"	2"	2 3/8"	2 1/2"	2 3/8"	2"	1 1/2"	13/16"	0

NOTE:
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE DEAD LOAD DEFLECTIONS AND REQUIRED CAMBERS SHOWN IN THE TABLES ARE BASED UPON LOADING FOR THE FINAL STAGE ONLY. THE DEFLECTION OF THE GIRDERS DURING STAGE I OR STAGE II CONSTRUCTION MIGHT BE DIFFERENT THAN THOSE SHOWN IN THE TABLES.

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
** INCLUDES RAILING, SIDEWALK, AND MEDIAN.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).



SCHEMATIC OF CAMBER ORDINATES
FOR CAMBER VALUES AT EACH GIRDER TENTH POINTS, SEE TABLES ABOVE.

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SUPERSTRUCTURE

DEAD LOAD DEFLECTION TABLES
SPAN B

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2			4			39

NOTES

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

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

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR PAINTED STRUCTURAL STEEL (EXCLUDING AASHTO M270 GRADE 50W), SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

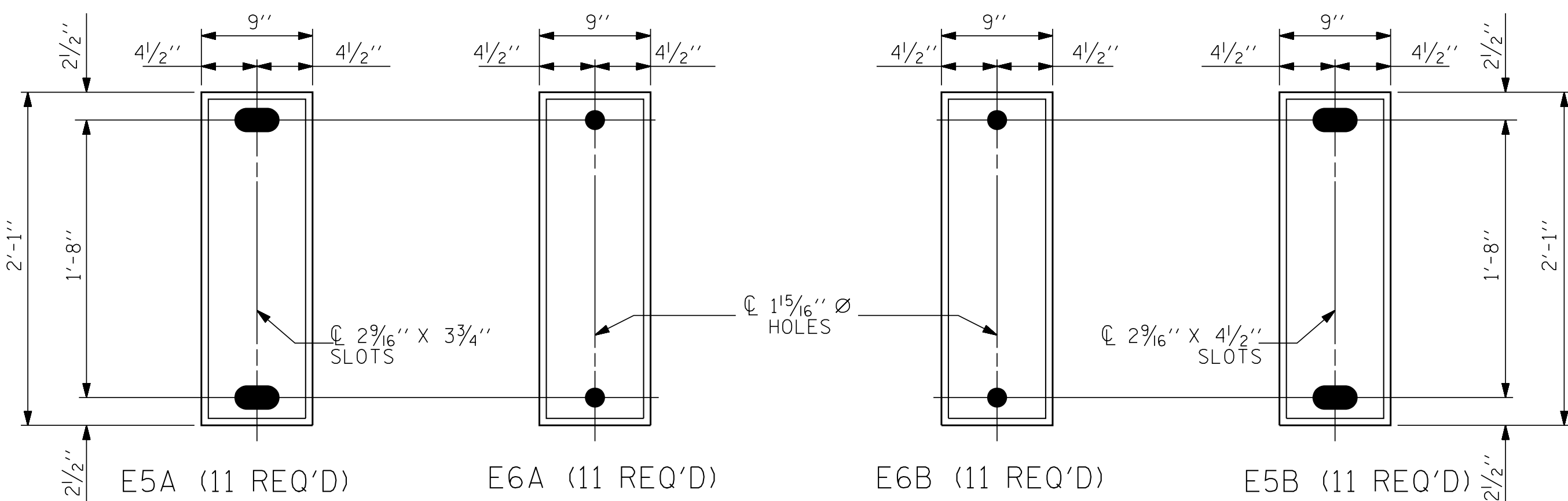
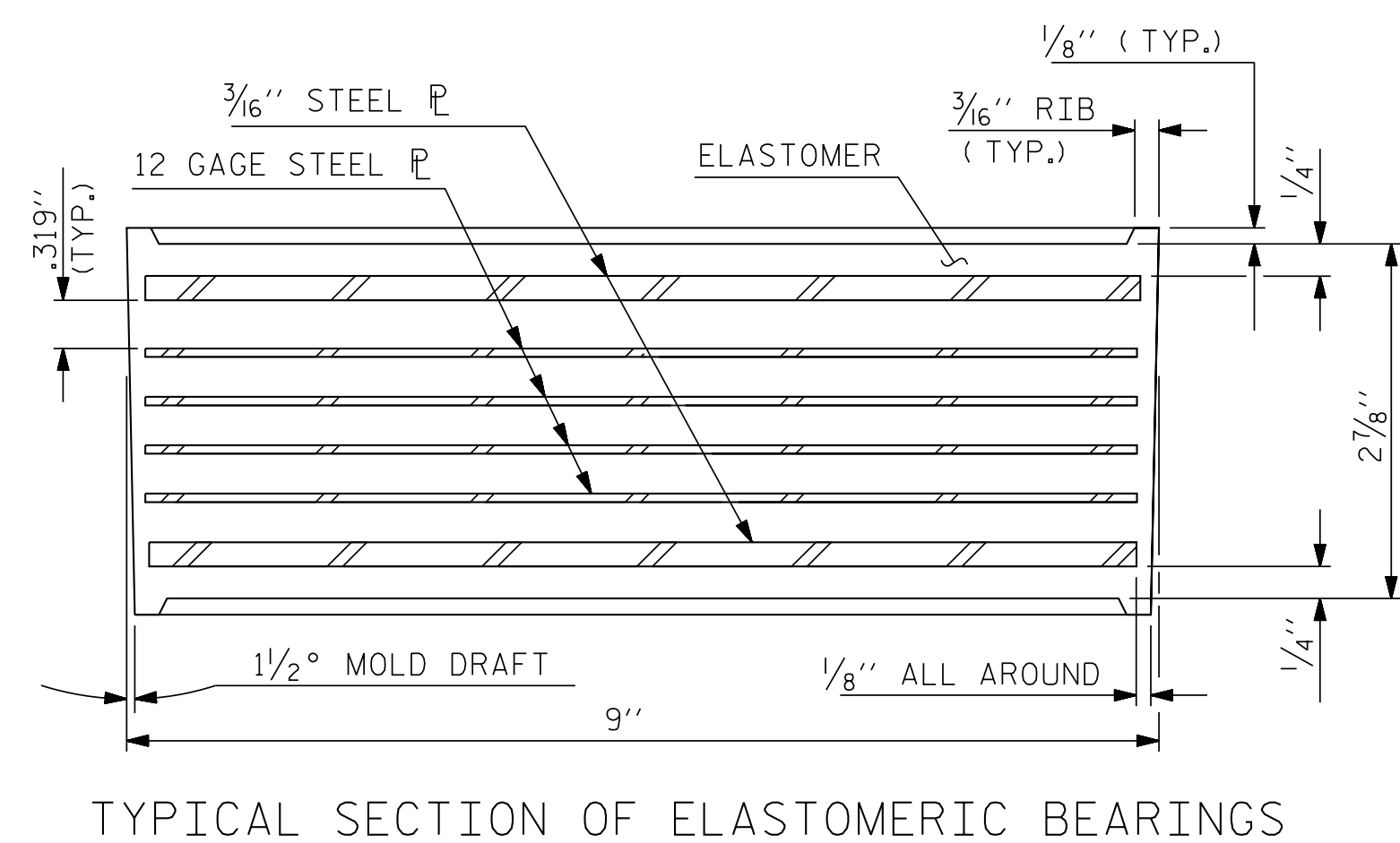
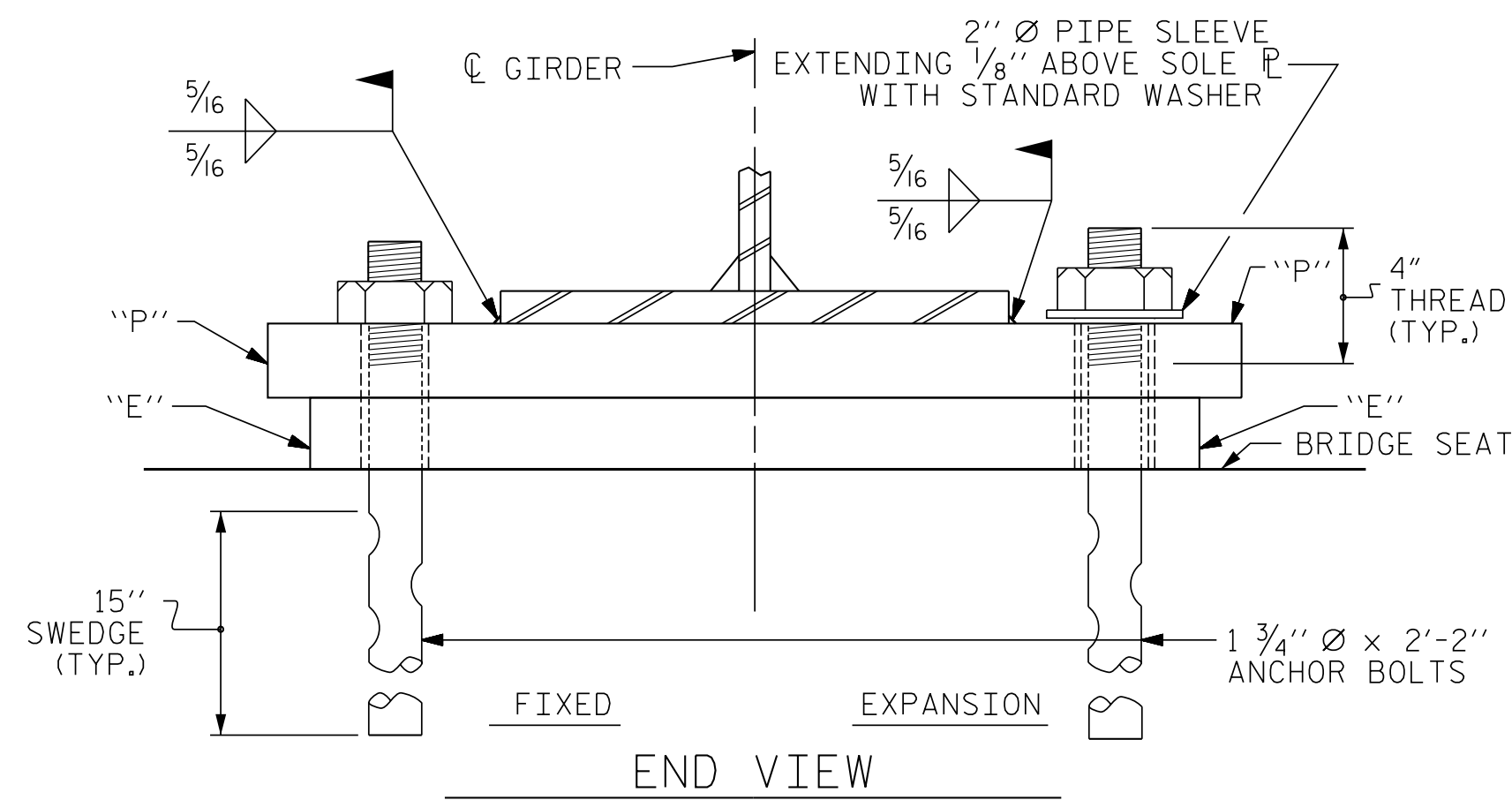
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.

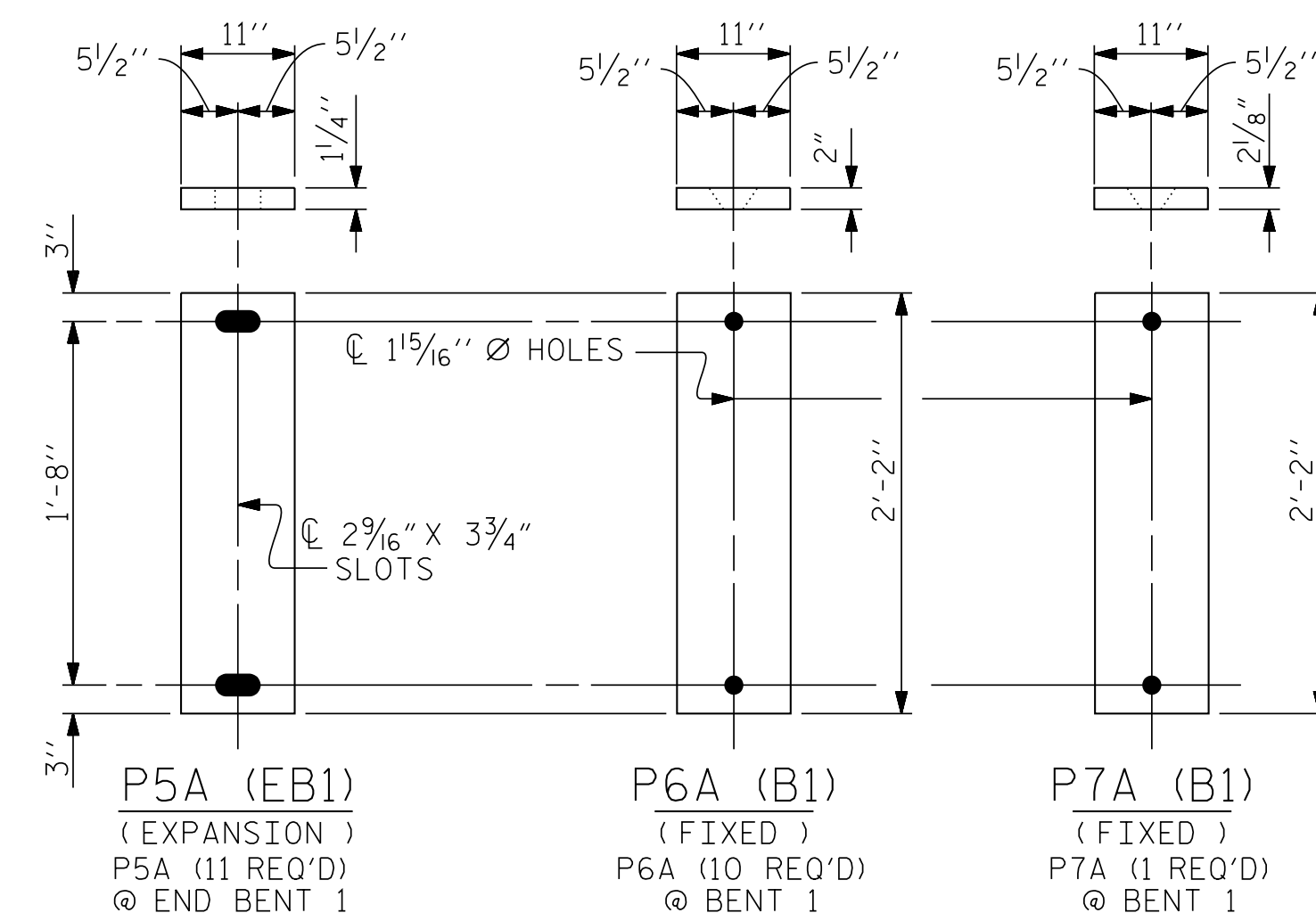
THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.



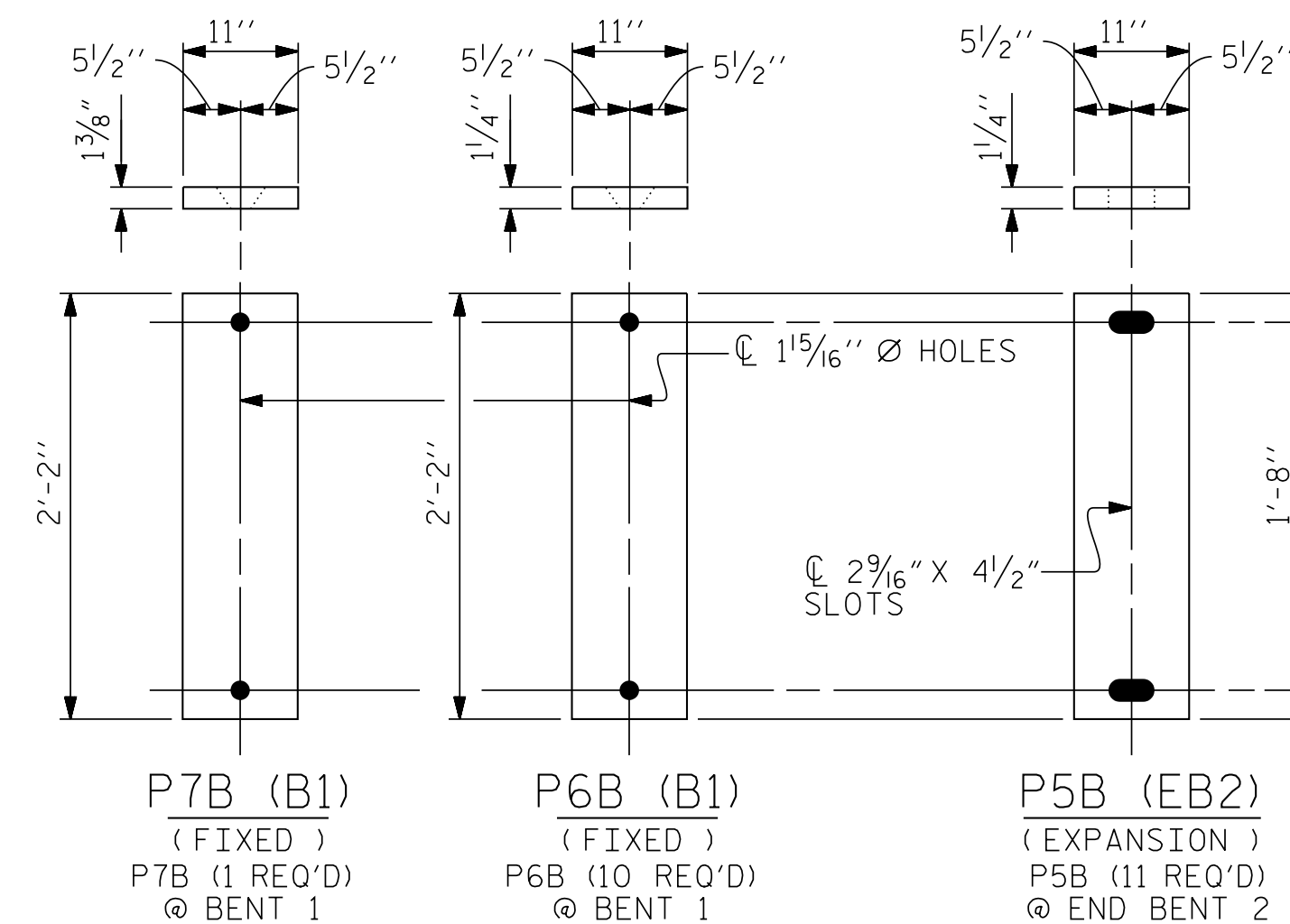
SPAN A PLAN VIEW OF ELASTOMERIC BEARING SPAN B PLAN VIEW OF ELASTOMERIC BEARING

TYPE III

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	255 k



SPAN A



SPAN B

SOLE PLATE DETAILS ('P')

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ELASTOMERIC BEARING
DETAILS

DRAWN BY : JMB 11/87 REV. 10/1/11 MAA/GM
CHECKED BY : ARB 11/87 REV. 6/13 AAC/MAA
REV. 12/17 MAA/THC

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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.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 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. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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 REMAIN 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.

PAY LENGTH = 209.2 LIN.FT.

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PROJECT NO. U-5738

ROWAN COUNTY

STATION: 70+72.50 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

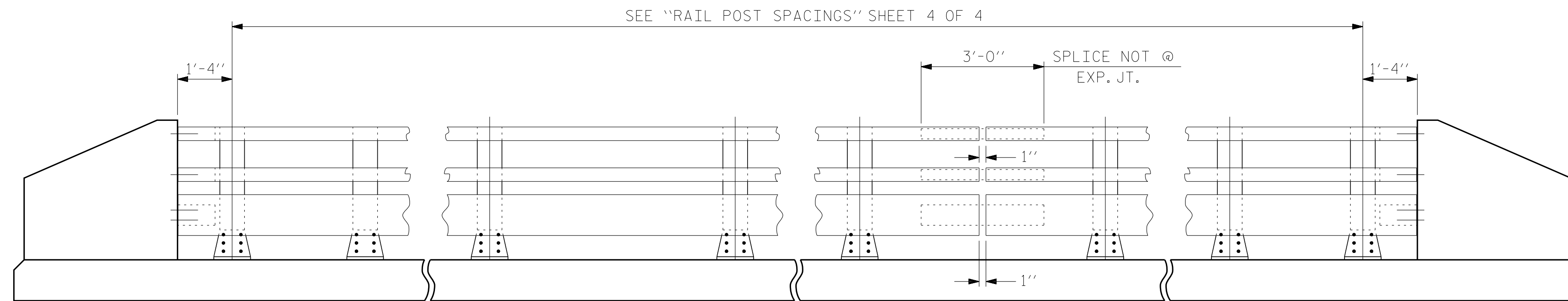
STANDARD
RAIL POST SPACING
END OF RAIL DETAILS



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			39

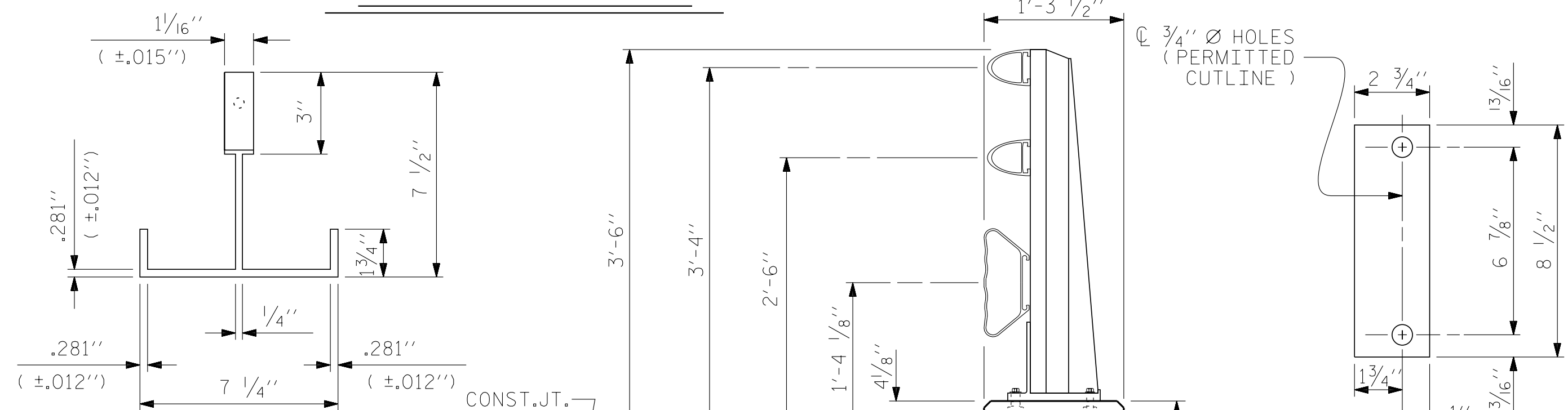
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. BMR5

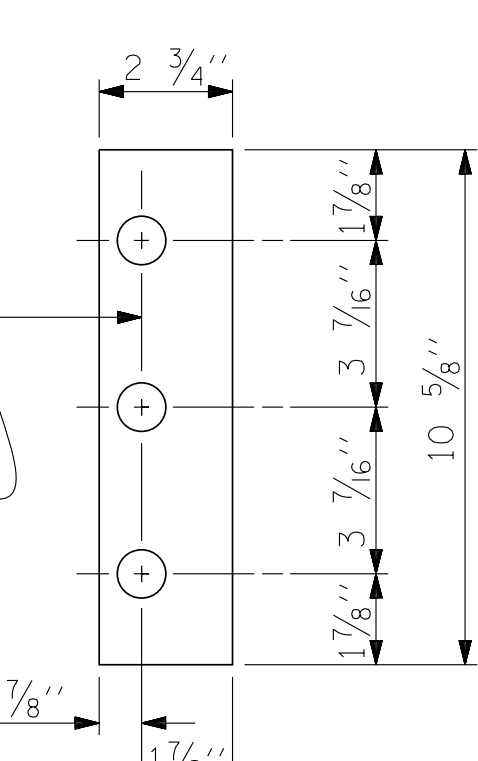


NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

ELEVATION

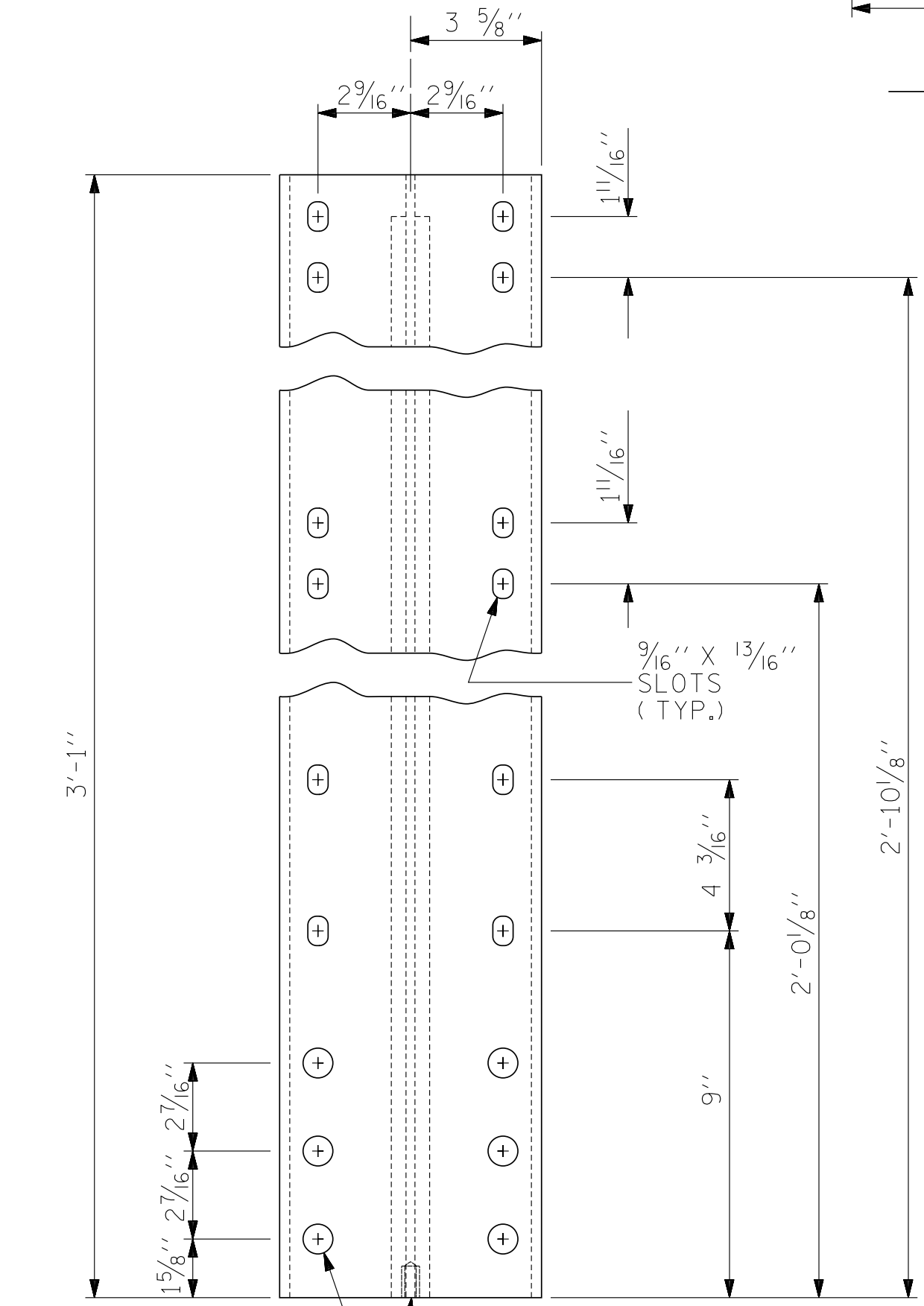


REAR PLATE



FRONT PLATE SHIM DETAILS

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



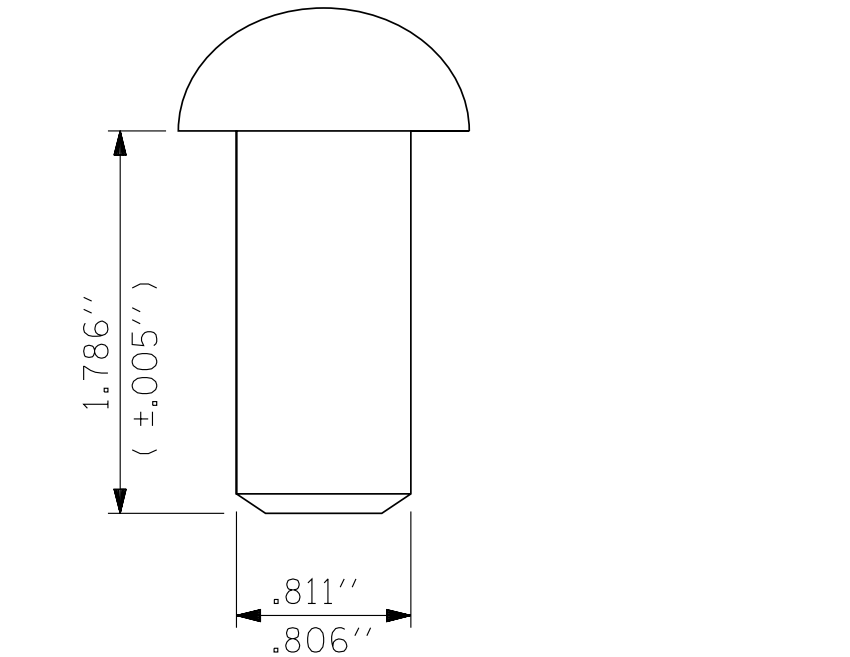
FRONT ELEVATION

SIDE ELEVATION

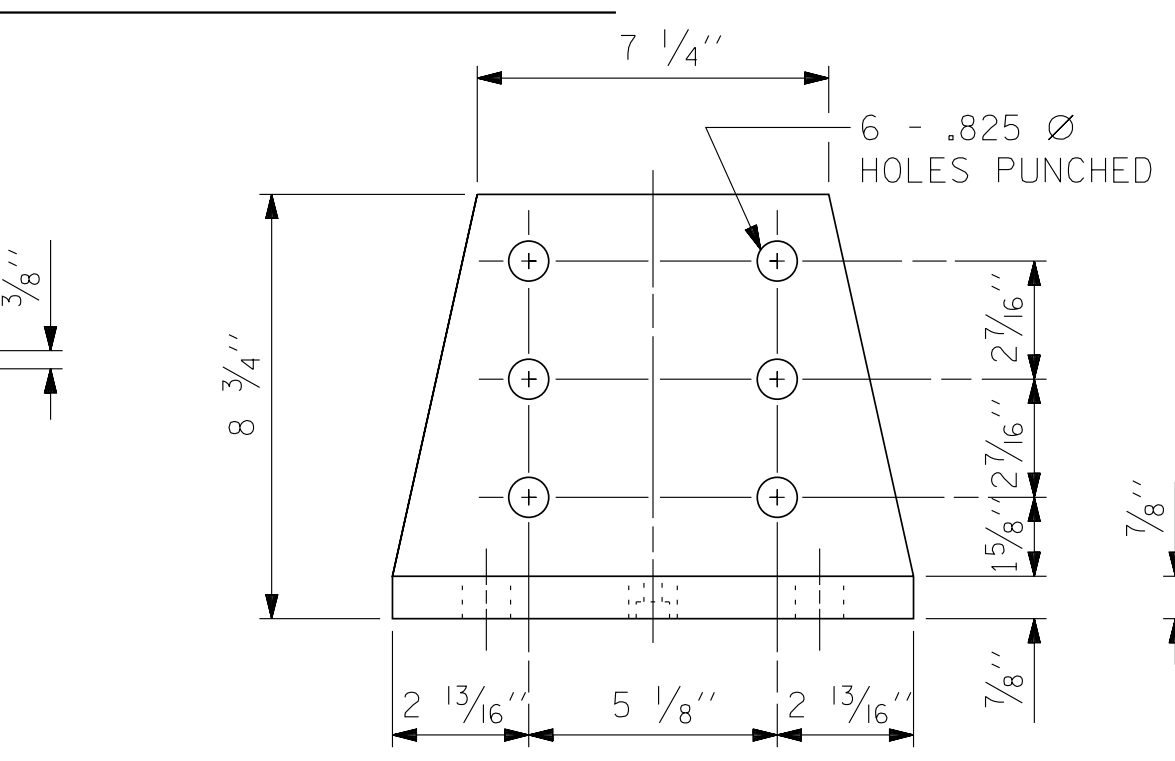
DETAILS OF POST

SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



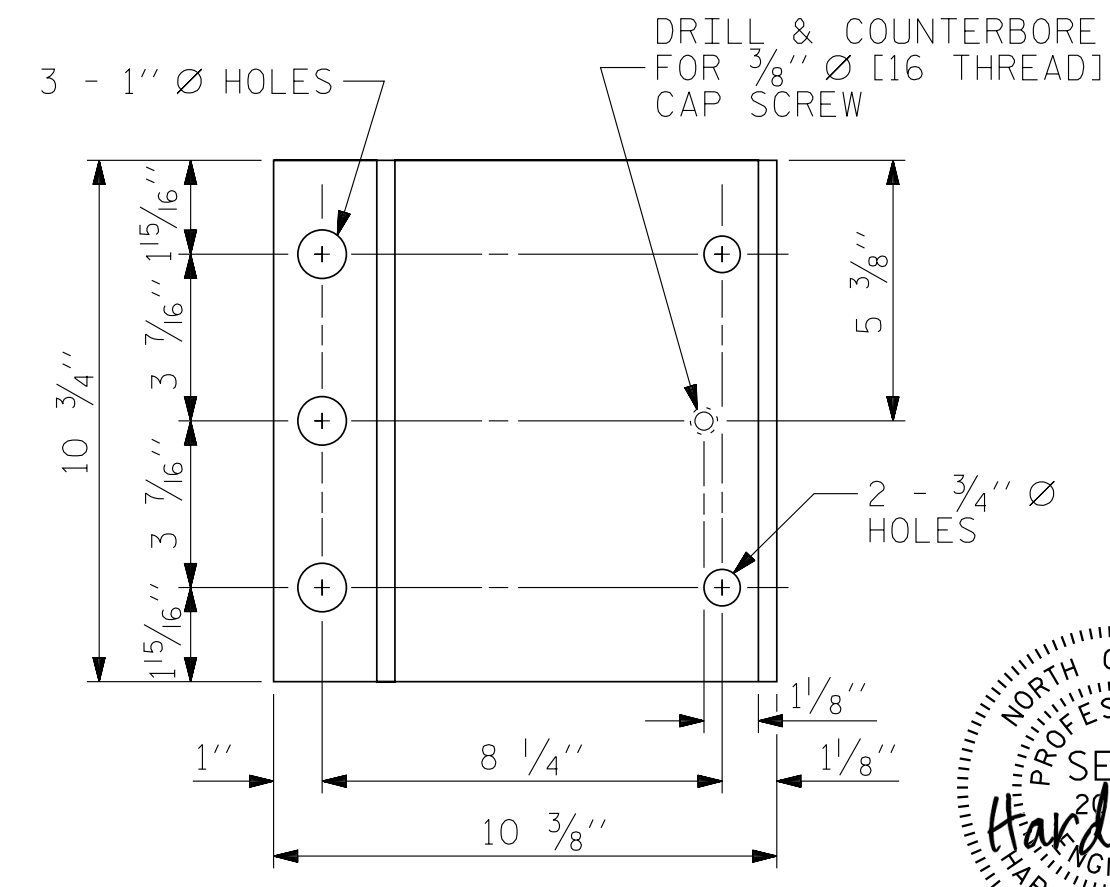
RIVET DETAIL



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



PLAN

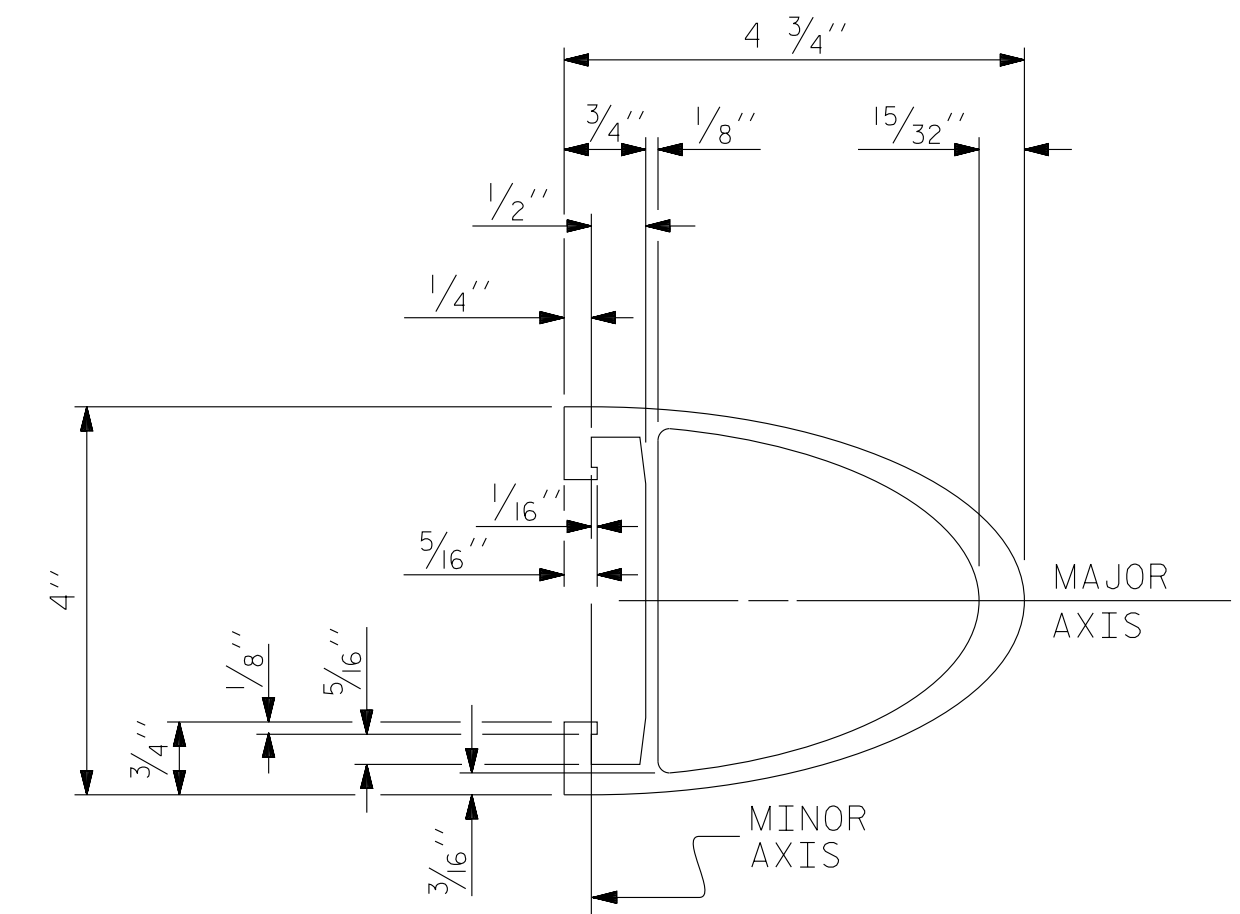
ASSEMBLED BY : FRJ	DATE : 11/18
CHECKED BY : CDB	DATE : 11/18
DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

NOTES

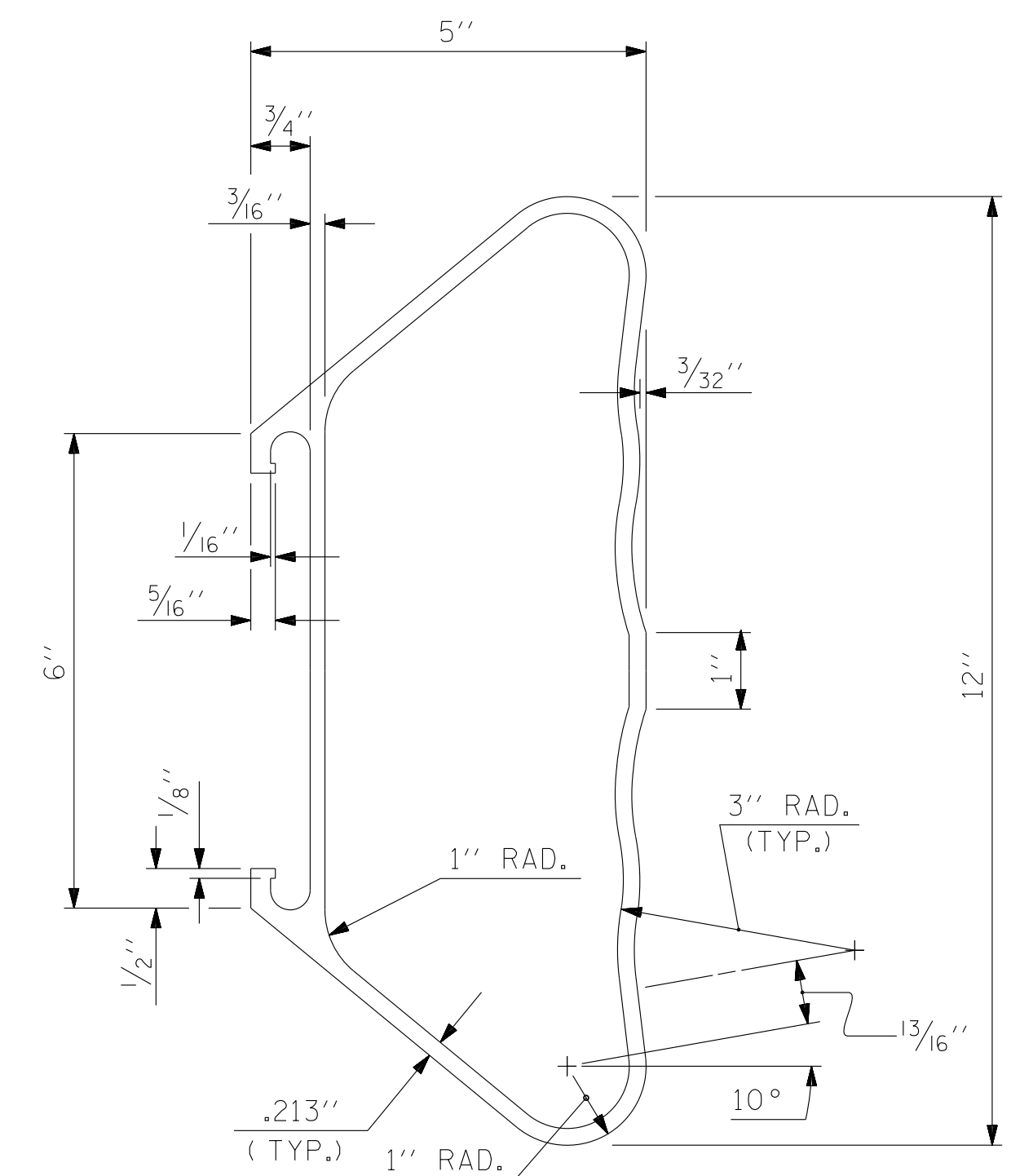
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

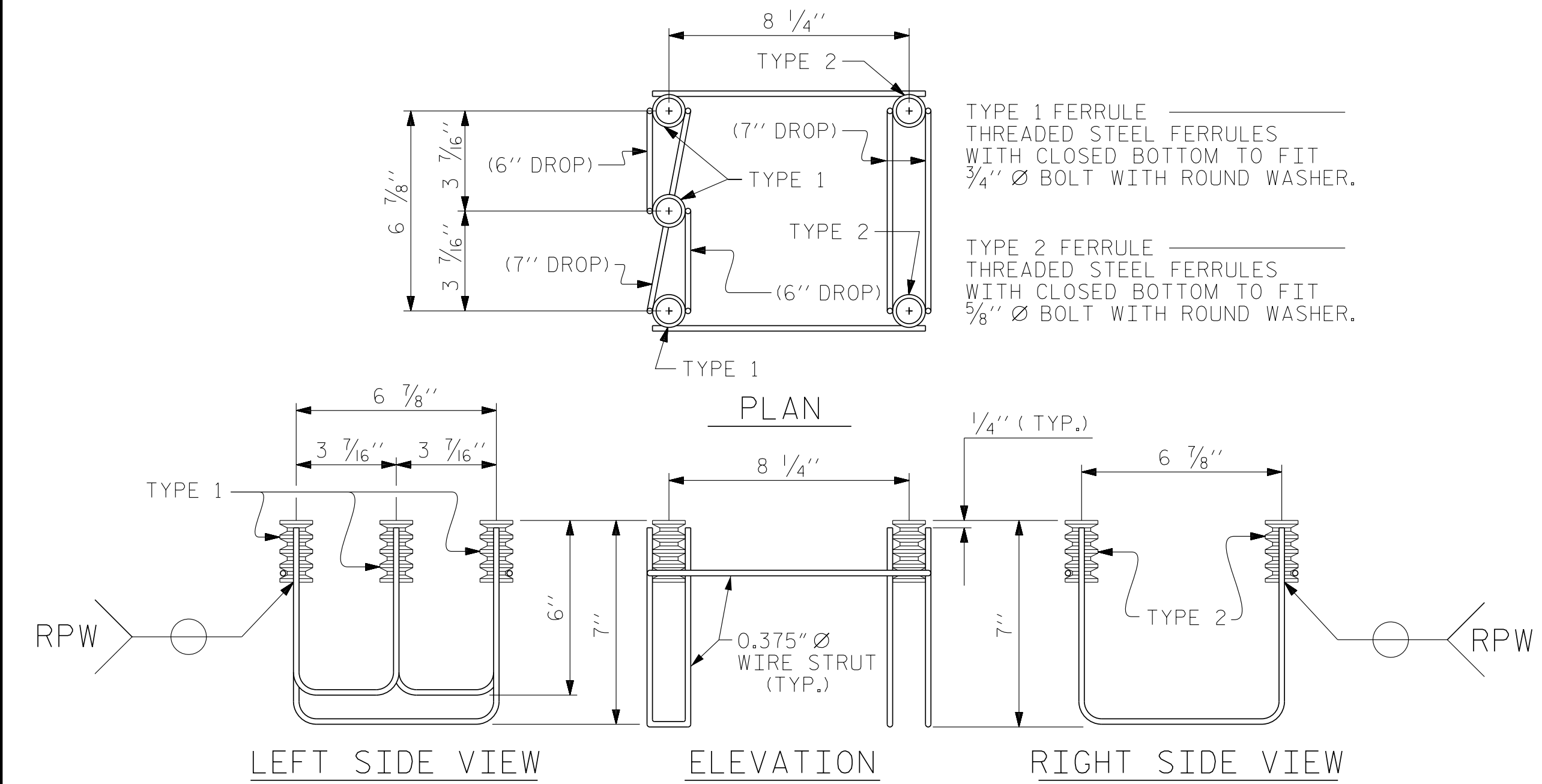
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 1/4" FOR 5/8" FERRULES.
- 3 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL 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.
- 2 - 5/8" Ø X 2 1/4" 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 5/8" Ø X 2 1/4" 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.
- 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.
- THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- 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.
- BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



TOP & MIDDLE RAIL SECTION



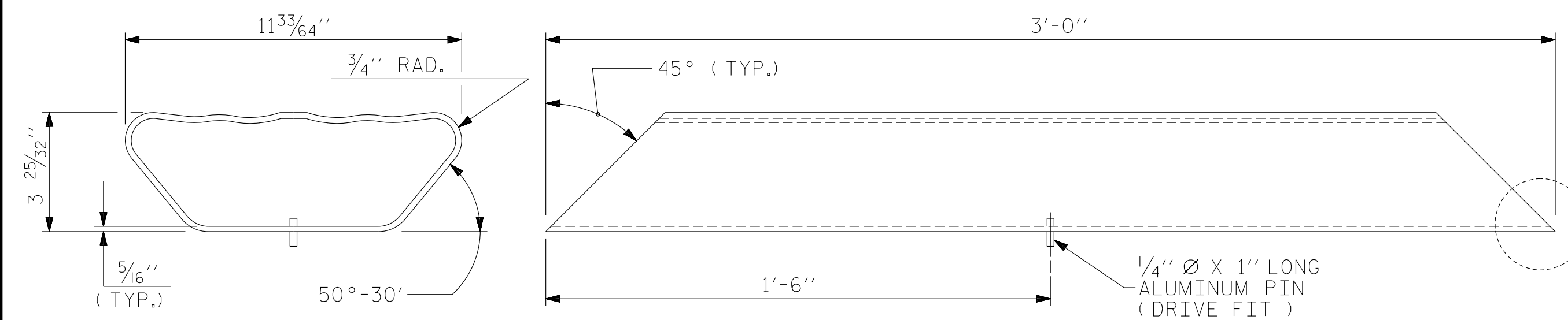
BOTTOM RAIL SECTION



LEFT SIDE VIEW ELEVATION RIGHT SIDE VIEW

5-BOLT METAL RAIL ANCHOR ASSEMBLY

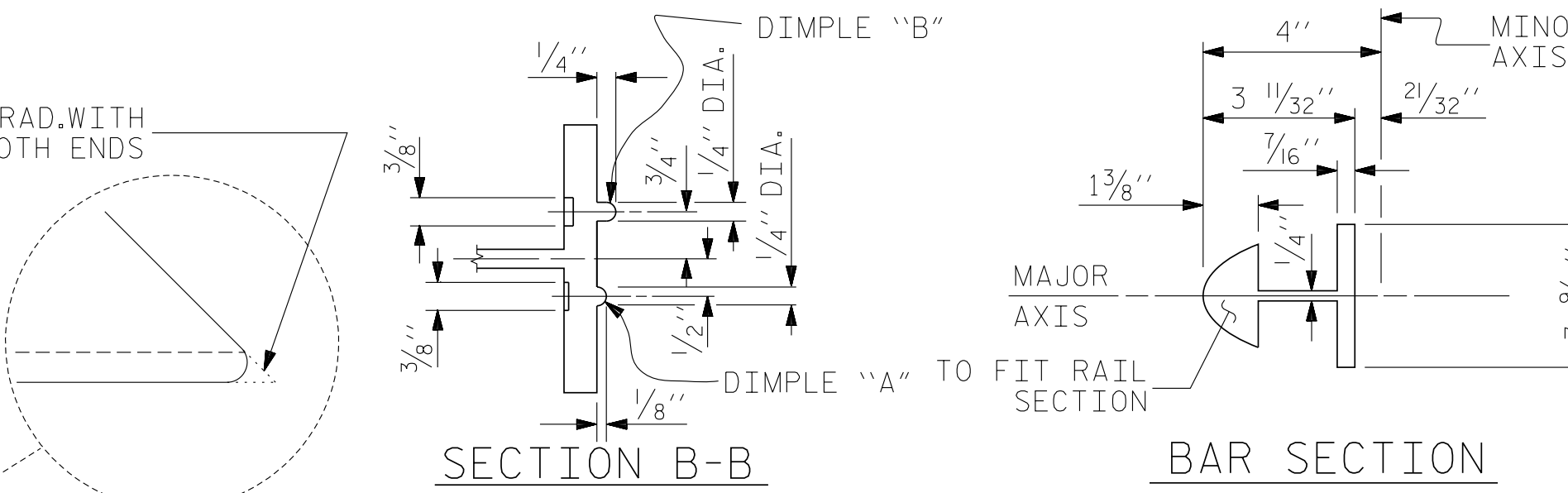
(38 ASSEMBLIES REQUIRED)



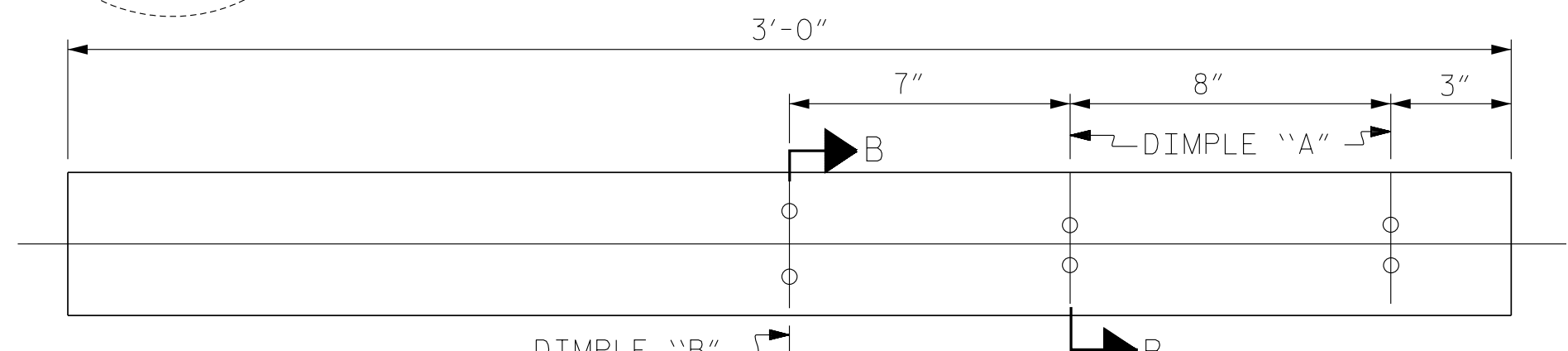
END VIEW PLAN VIEW

BOTTOM RAIL EXPANSION BAR

BREAK 1/8" RAD. WITH GRINDER - BOTH ENDS

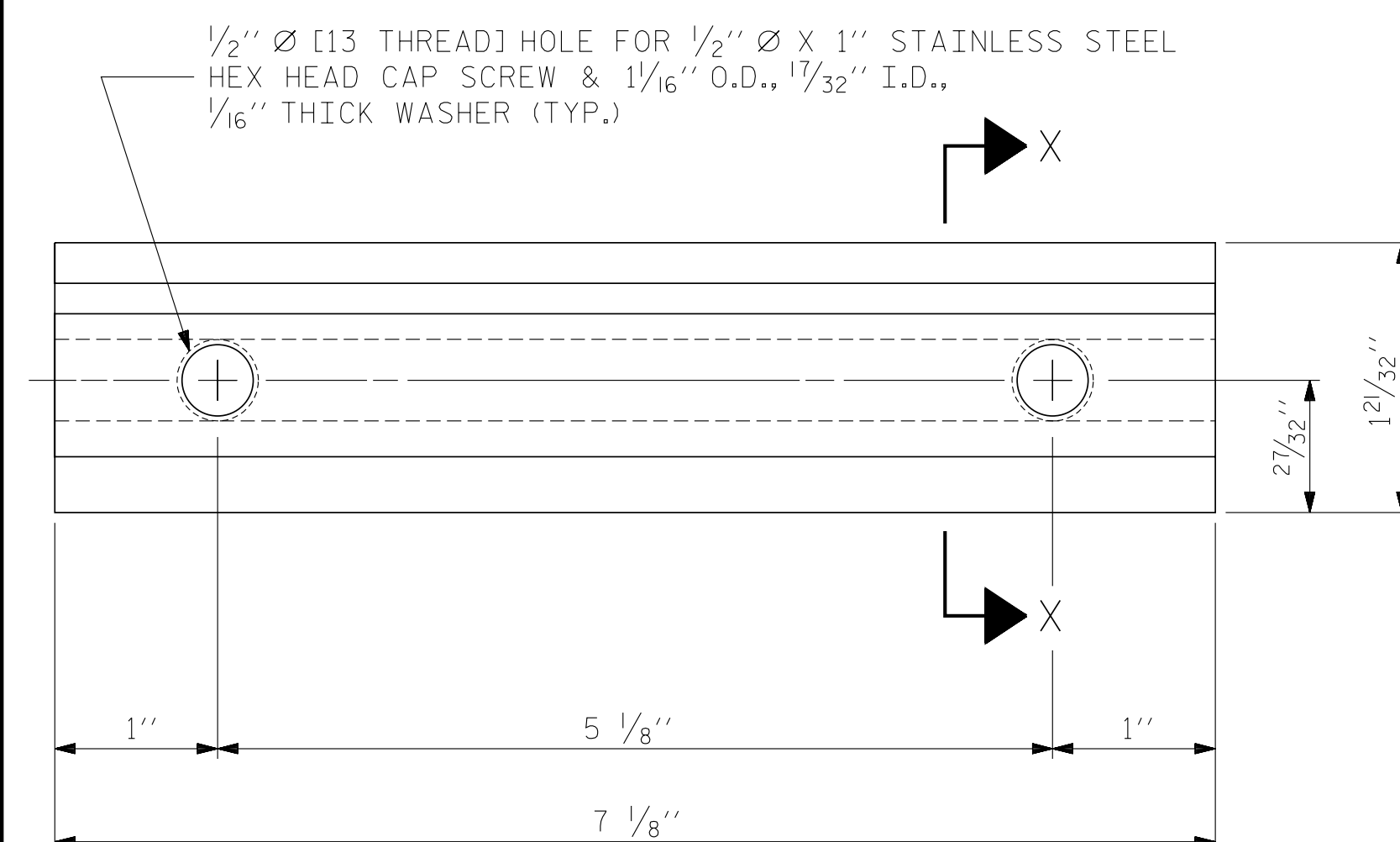


SECTION B-B BAR SECTION



BACK ELEVATION

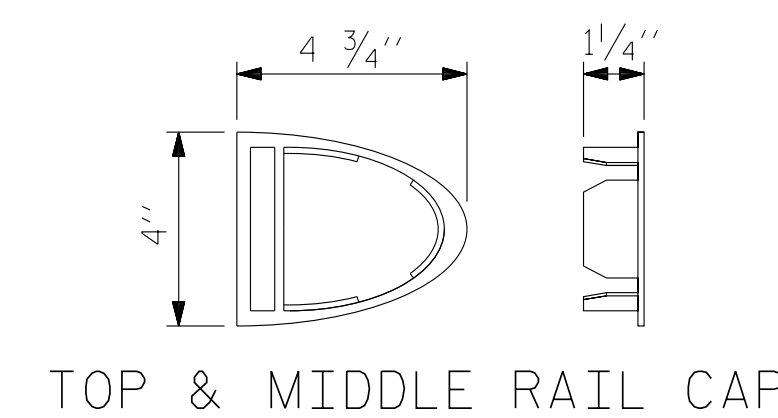
TOP & MIDDLE RAIL EXPANSION BAR



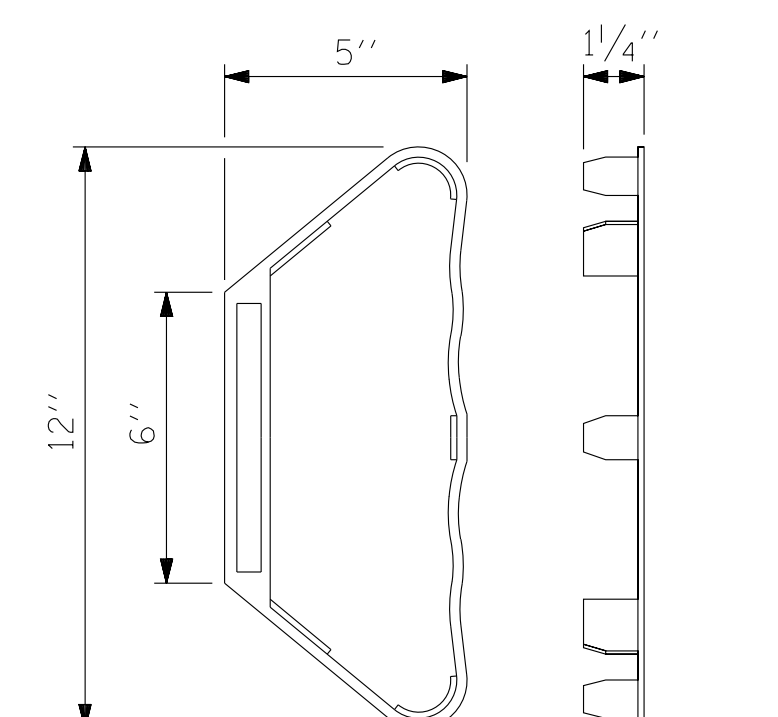
ELEVATION SECTION X-X

CLAMP BAR DETAIL

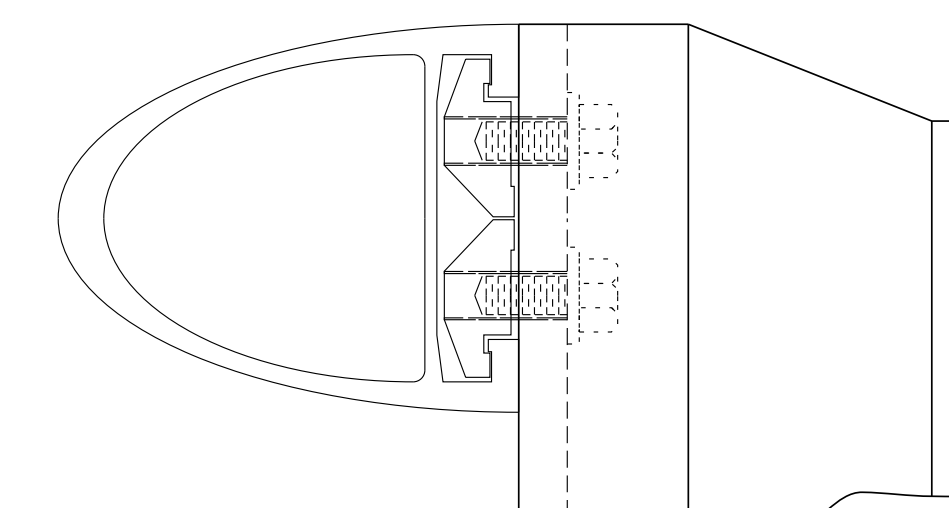
(6 REQUIRED PER POST)



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY

TOP RAIL SHOWN (MIDDLE & BOTTOM RAIL ARE SIMILAR)

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12/13/2021

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CHECKED BY : CDB	DATE : 11/18
DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

PROJECT NO. U-5738
ROWAN COUNTY
STATION: 70+72.50 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD 3 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-19
					TOTAL SHEETS 39

STD. NO. BMR6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
 - D. STANDARD CLAMP BARS (STD. No. BMR6).

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 3 BAR METAL RAIL.

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.

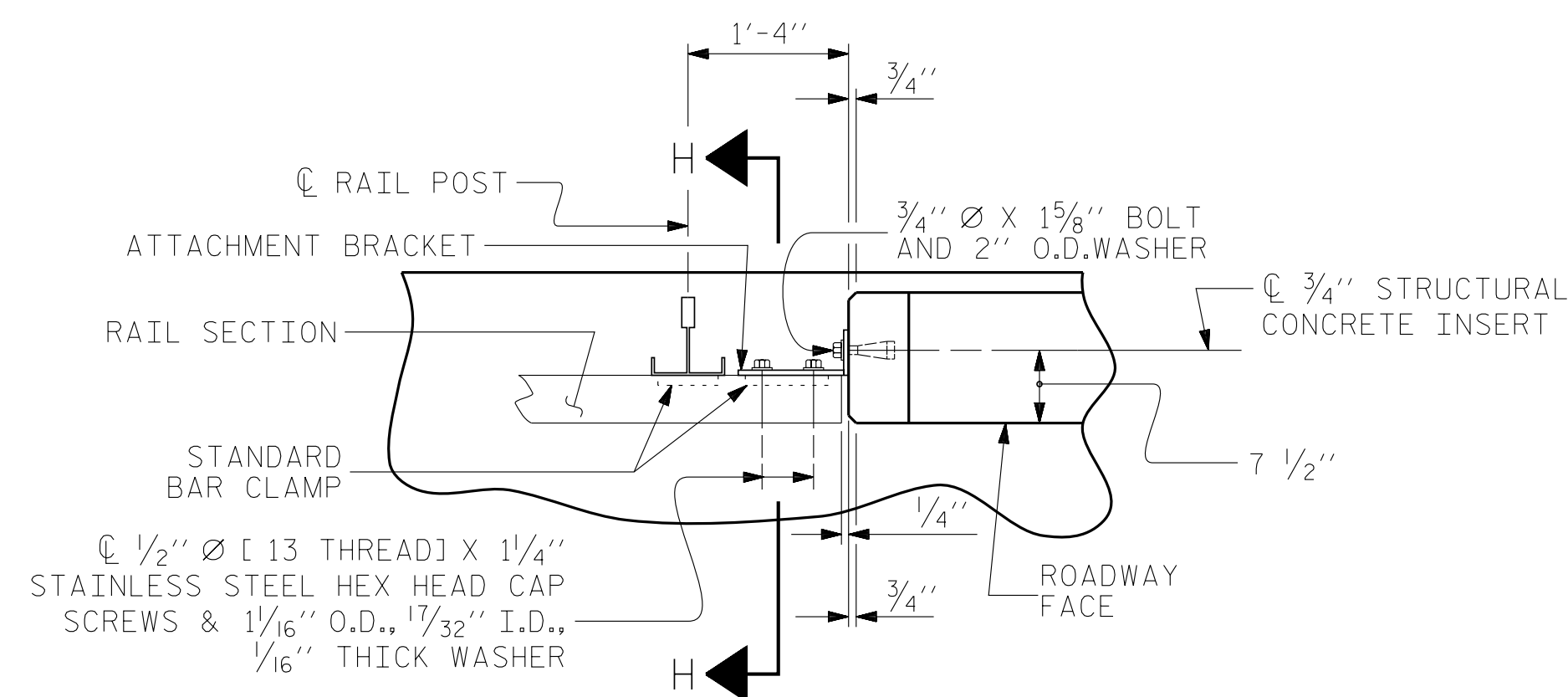
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT 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.

NOTES

STRUCTURAL CONCRETE INSERT

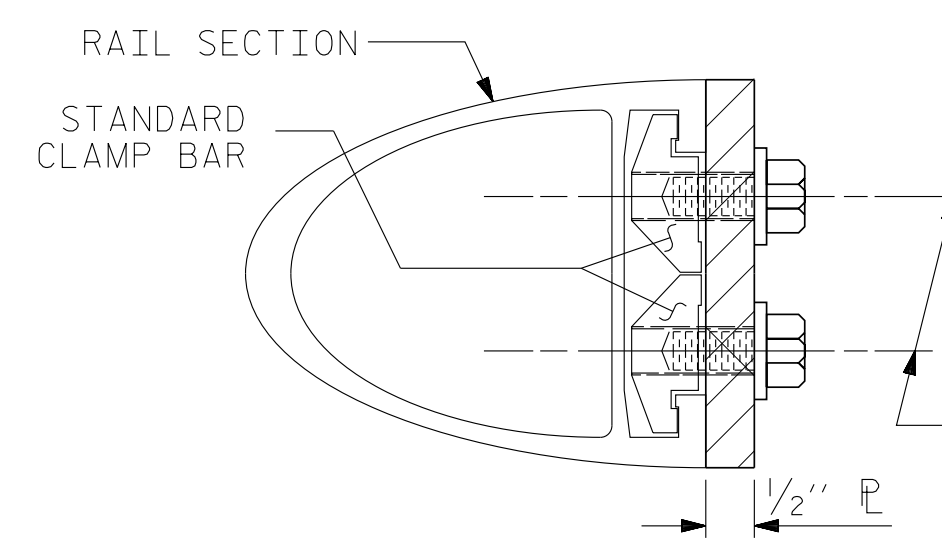
THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- 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 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 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.



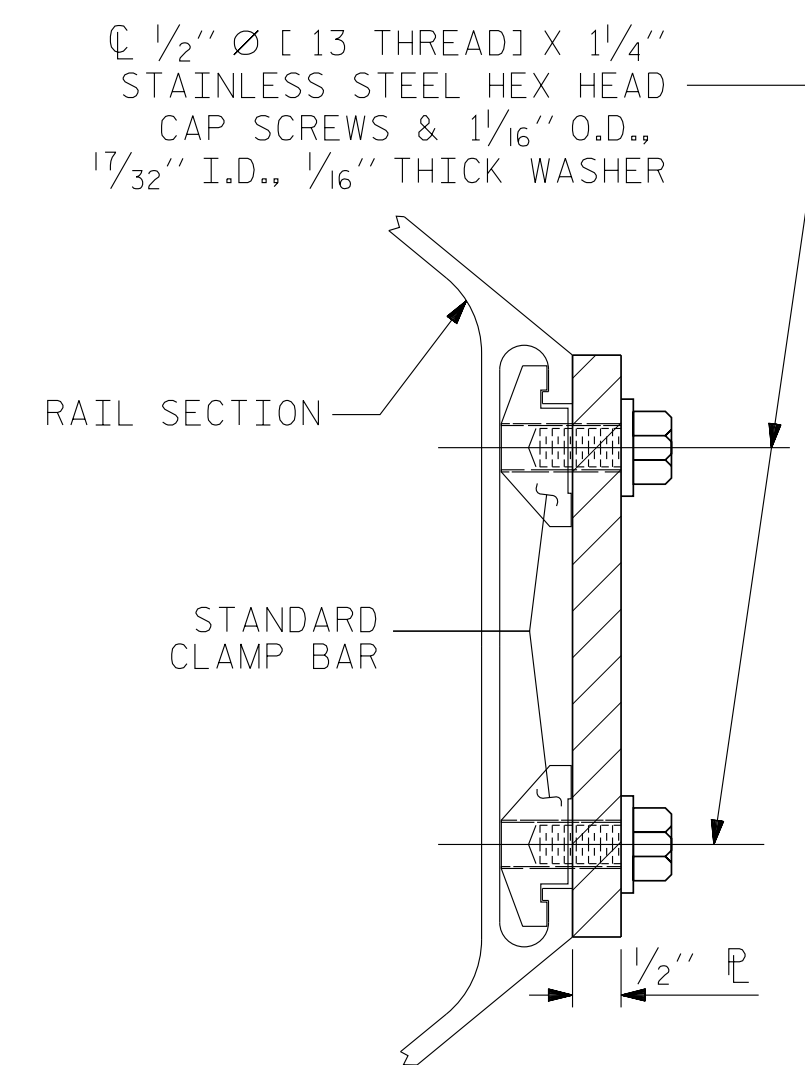
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" R NOT SHOWN FOR CLARITY)



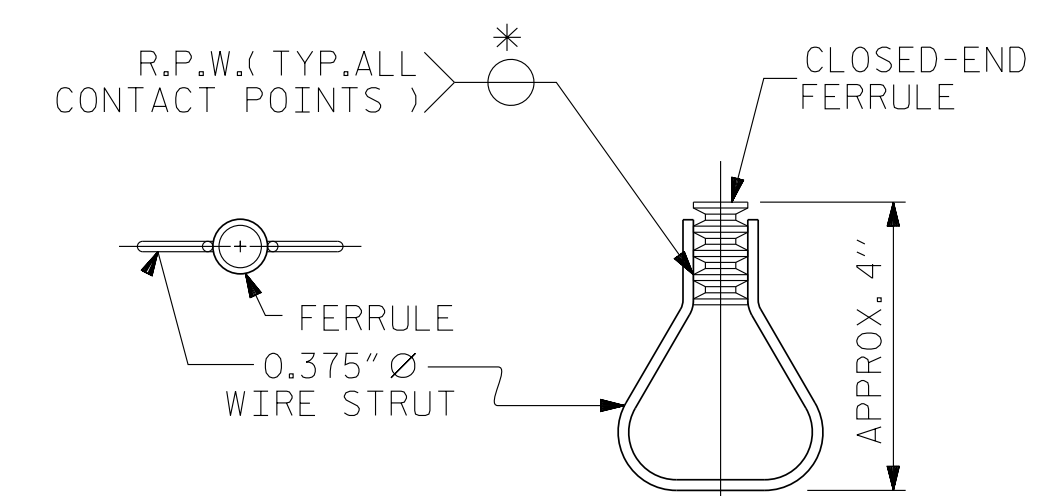
SECTION H-H

(FOR TOP & MIDDLE RAIL)



SECTION H-H

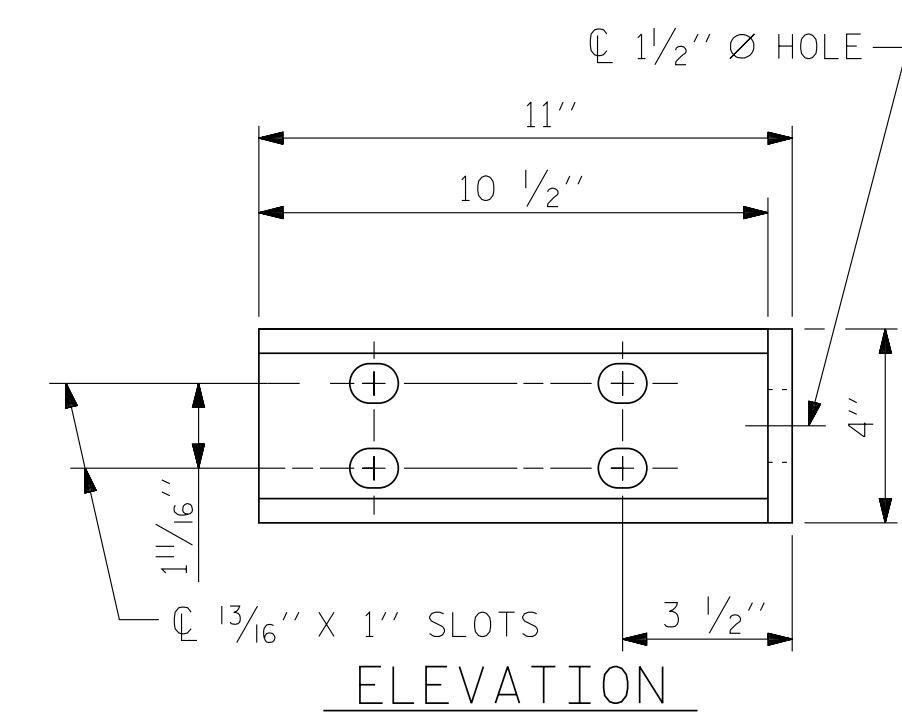
(FOR BOTTOM RAIL)



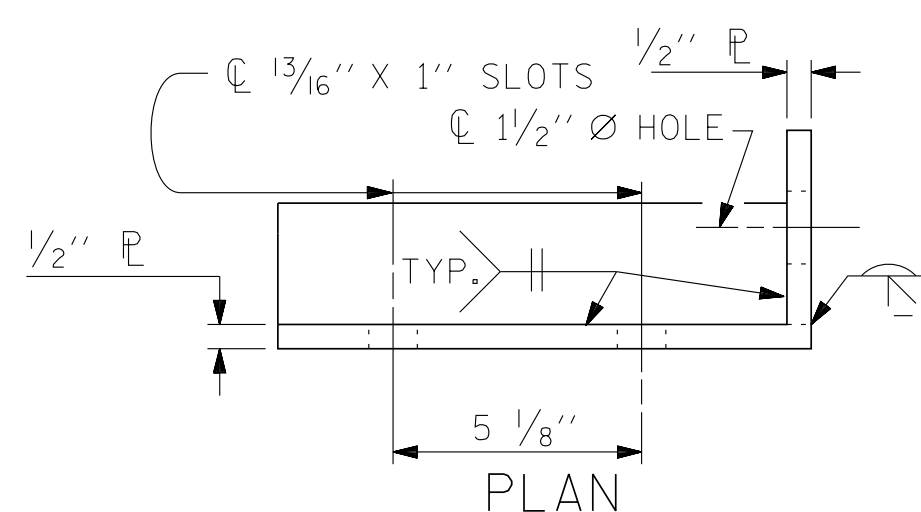
PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

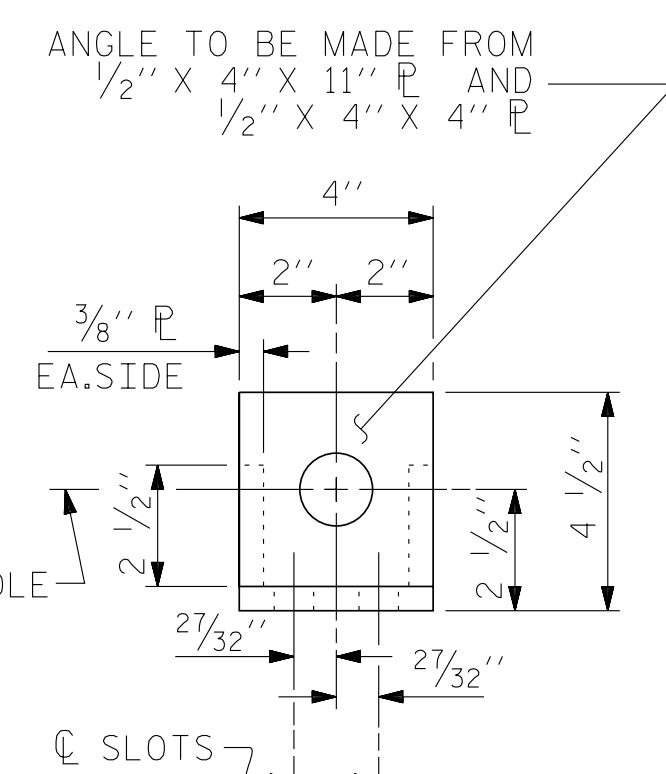
* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



ELEVATION

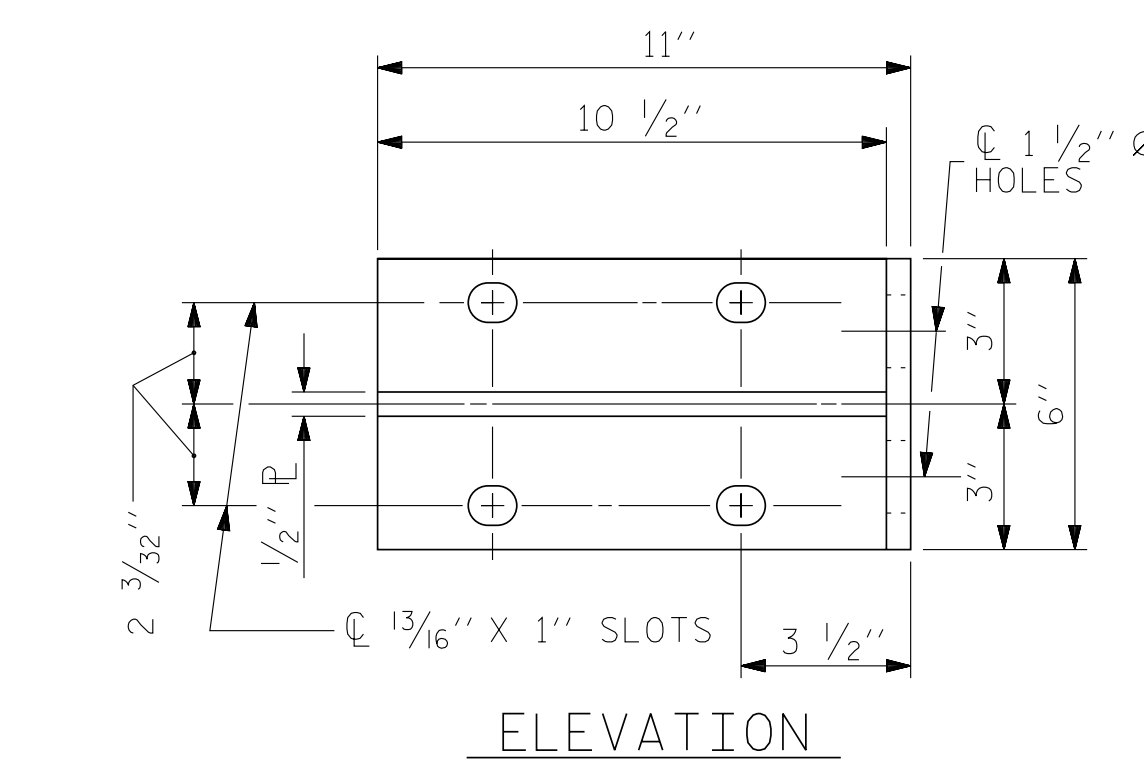


PLAN

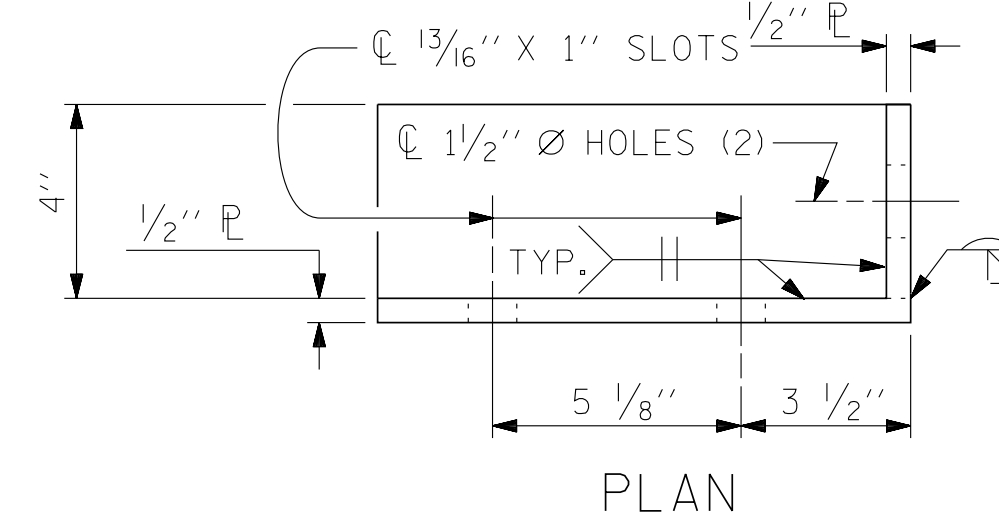


END VIEW

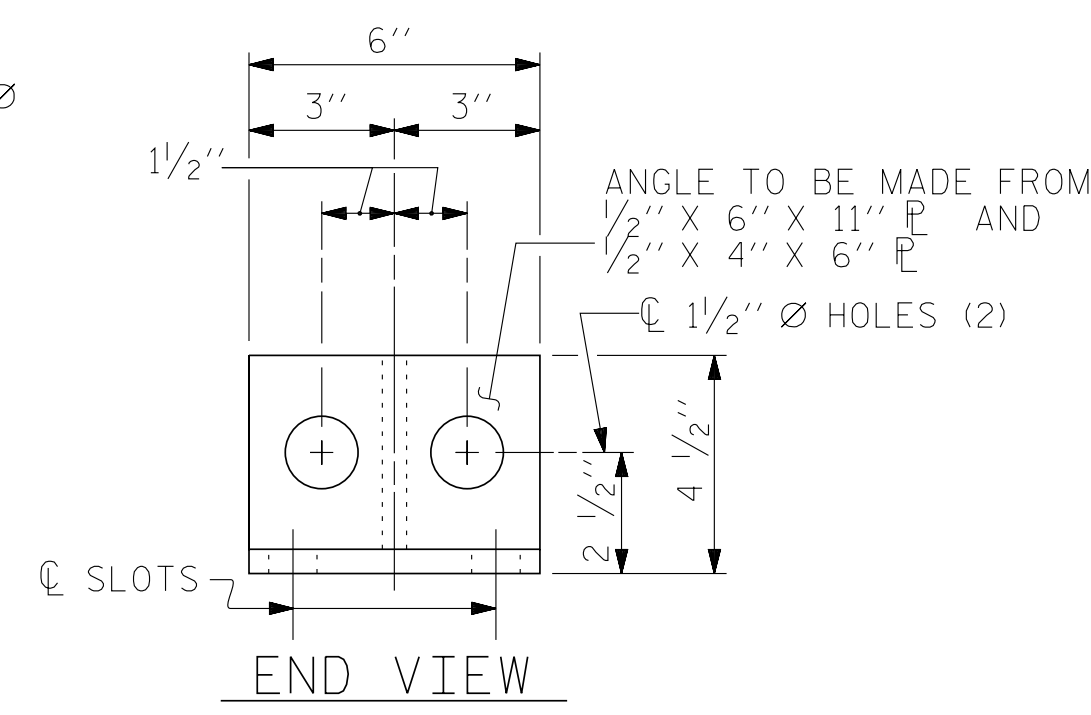
(FIX. AND EXP.)



ELEVATION



PLAN



END VIEW

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

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12/13/2021

PROJECT NO. U-5738

ROWAN COUNTY

STATION: 70+72.50 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

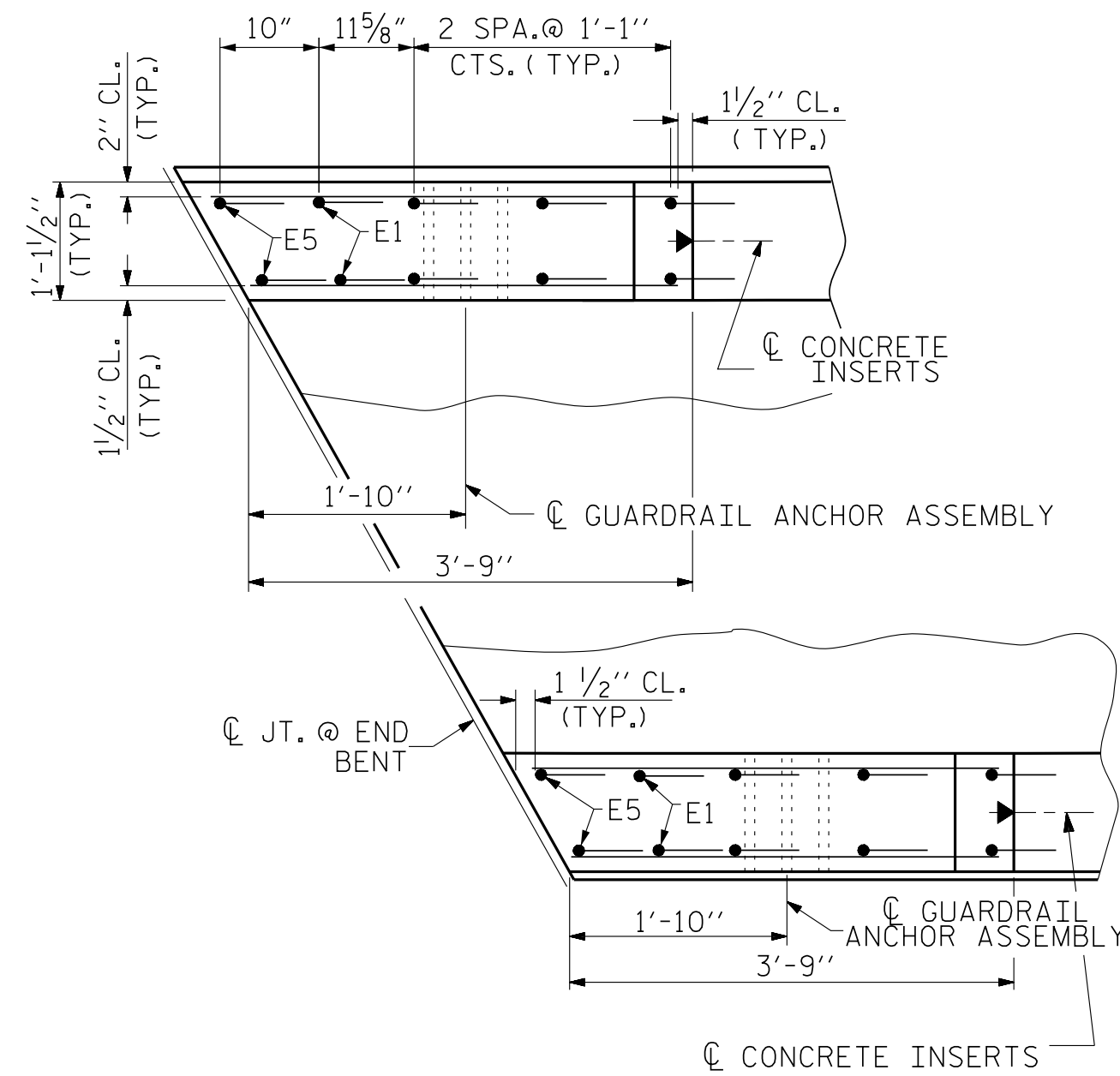
STANDARD
 3 BAR METAL RAIL

ASSEMBLED BY : FRJ	DATE : 11/18
CHECKED BY : CDB	DATE : 11/18
DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

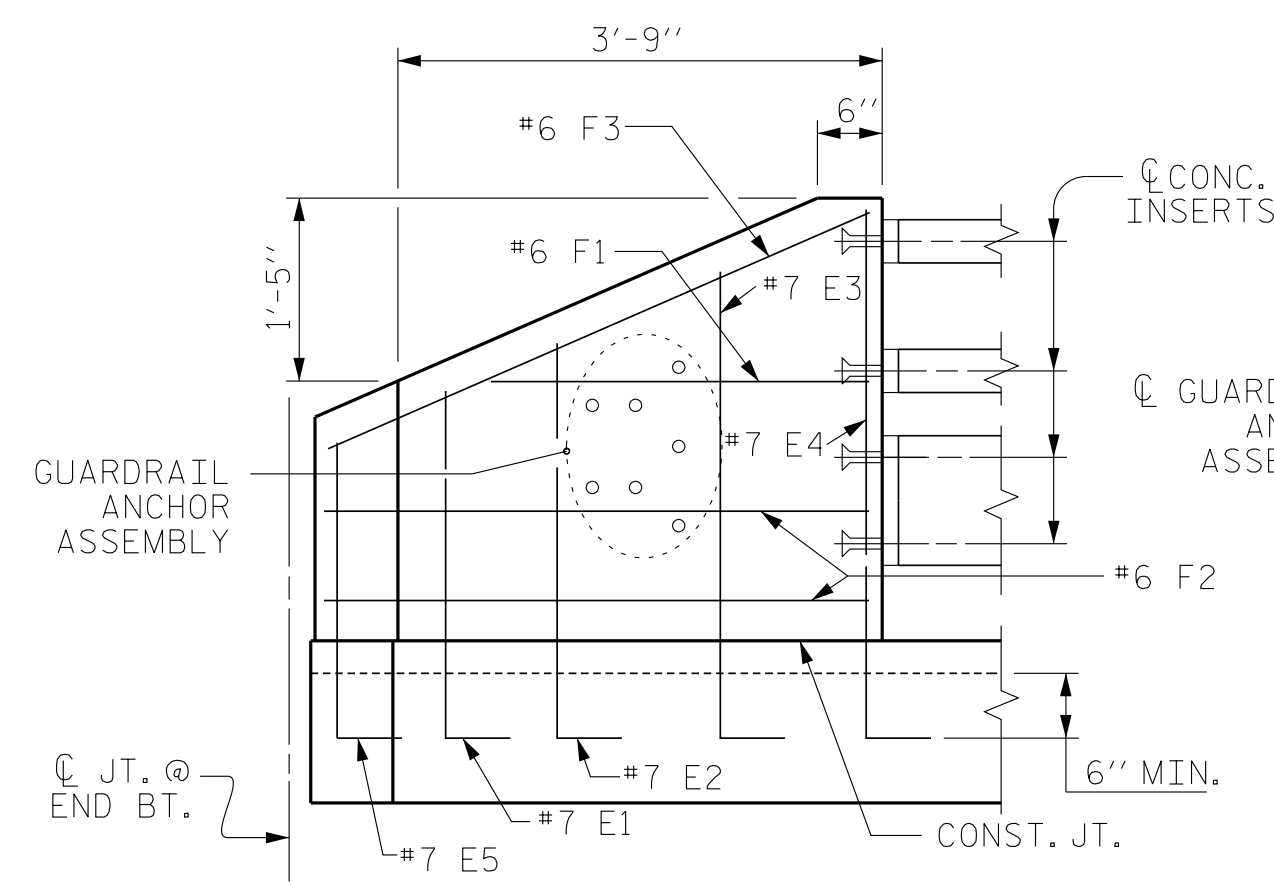
DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS 39
2			4			

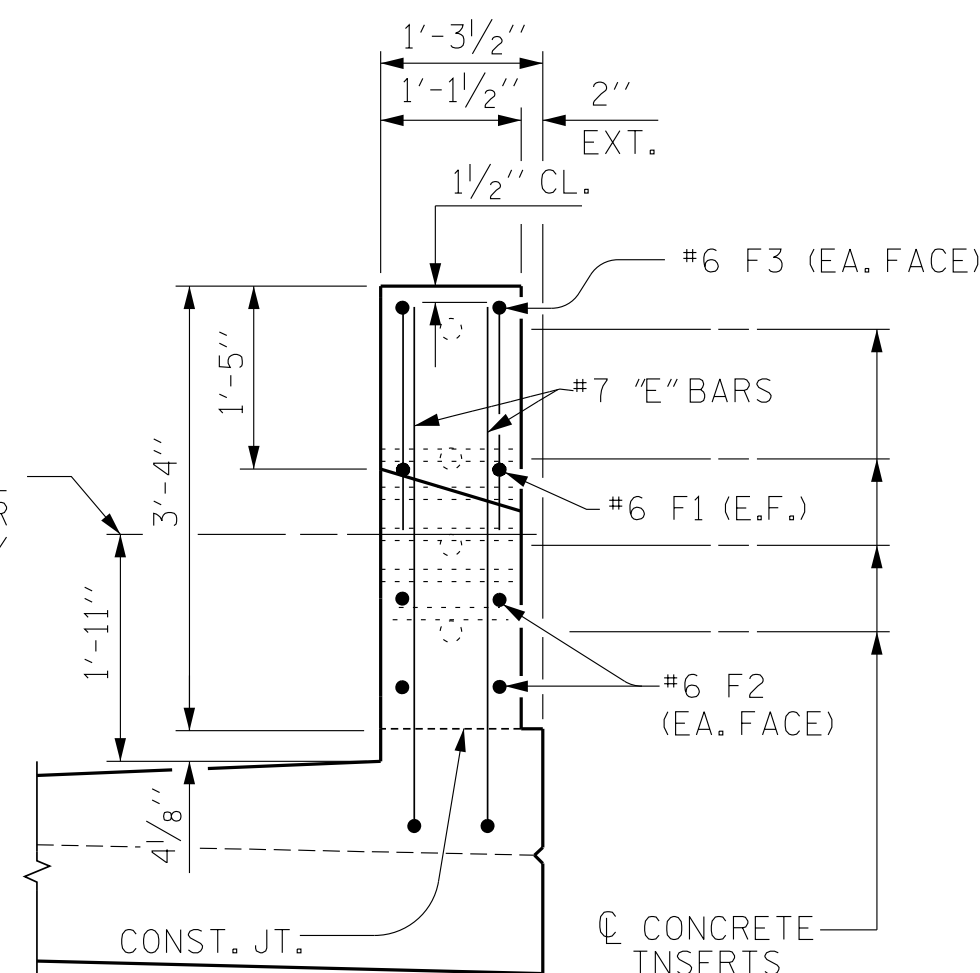
STD. NO. BMR7



PLAN



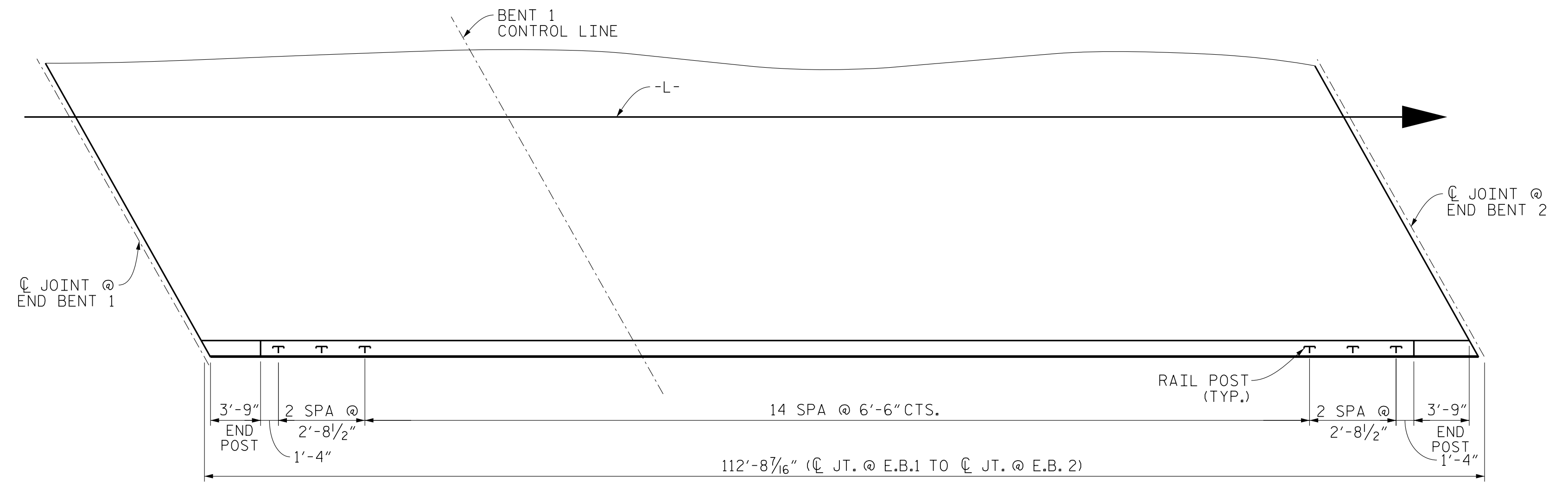
ELEVATION



END VIEW

END POST FOR THREE BAR METAL RAIL DETAILS

FOR REINFORCEMENT AND CONCRETE TOTALS, SEE SUPERSTRUCTURE BILL OF MATERIAL



PLAN OF RAIL POST SPACINGS

RIGHT SIDE SHOWN, LEFT SIDE SIMILAR

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SHEET 4 OF 4



12/13/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
3 BAR METAL RAIL

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SIGNATURES COMPLETED

DWN. BY: FRJ DATE: 11/18
CHKD. BY: CDB DATE: 11/18
DES. EGR. OF RECORD: CDB DATE: 11/18

REVISIONS						SHEET NO. S-21
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			

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.

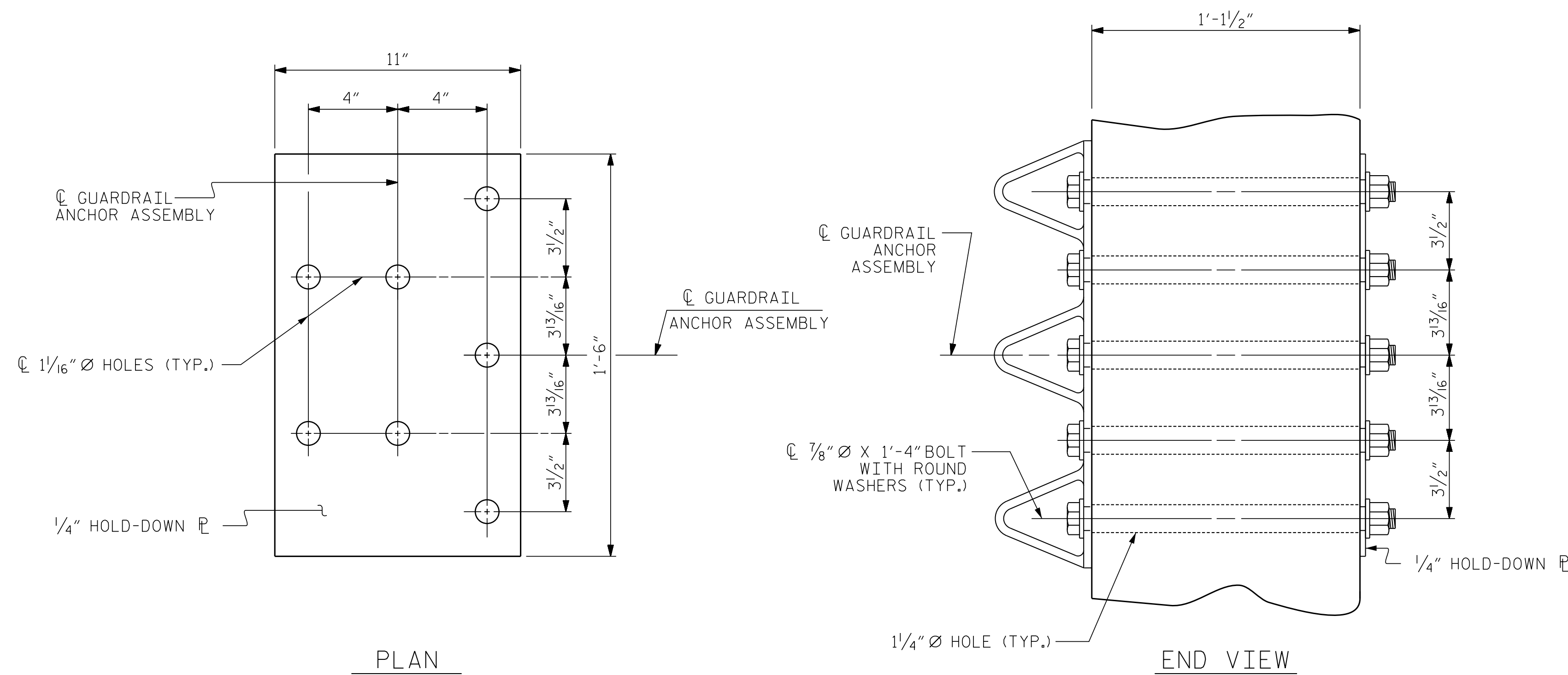
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

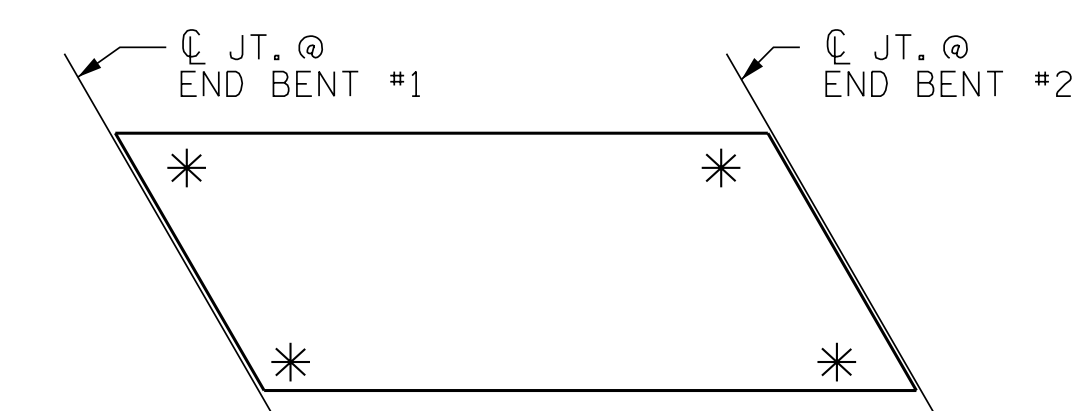
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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.

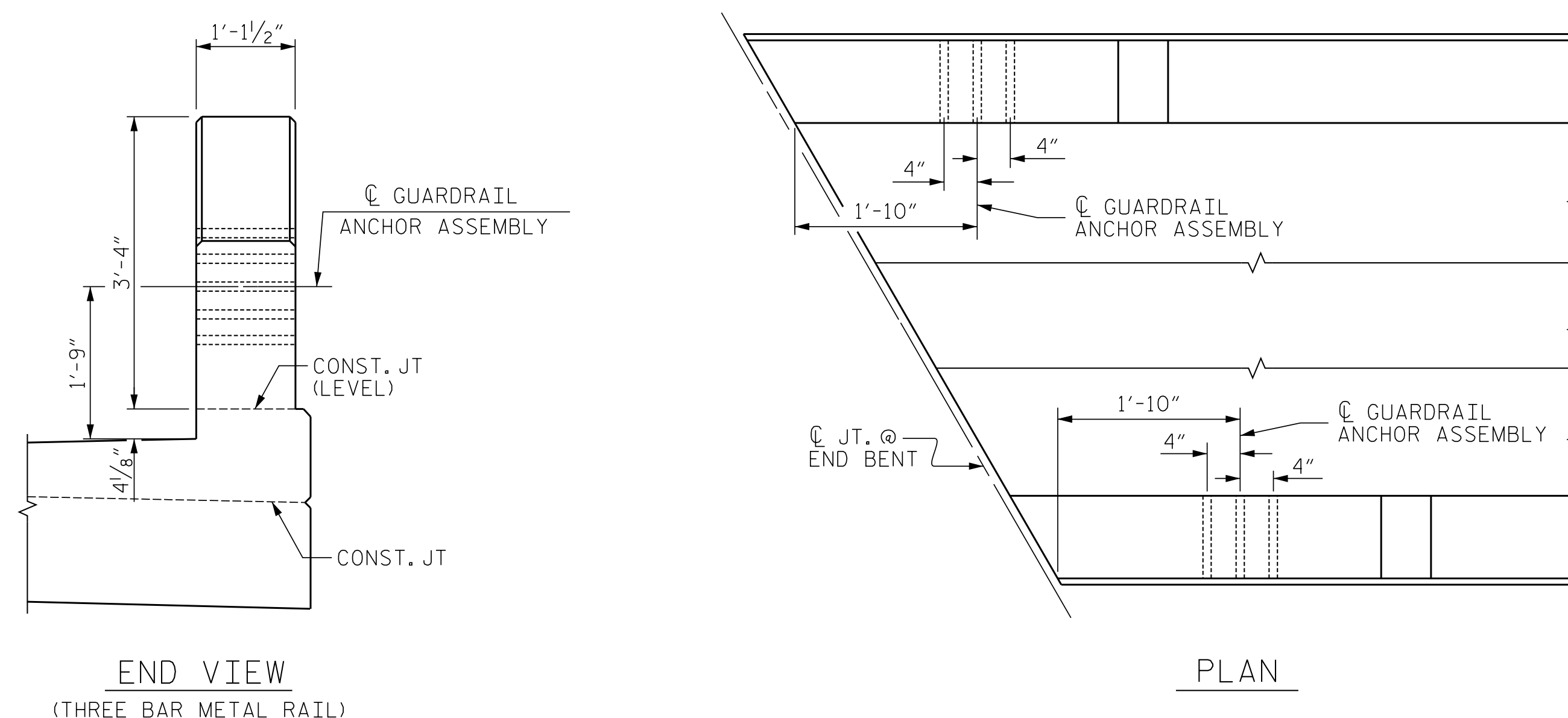


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

END BENT 1 SHOWN, END BENT 2 SIMILAR

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Vaughn & Melton
Consulting Engineers
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North Carolina
828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 423-467-8401
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
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Raleigh, NC 919-977-9455
Charlotte, NC 704-357-0488
Atlanta, GA 770-627-3509

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PROJECT NO. U-5738
ROWAN COUNTY
STATION: 70+72.50 -L-

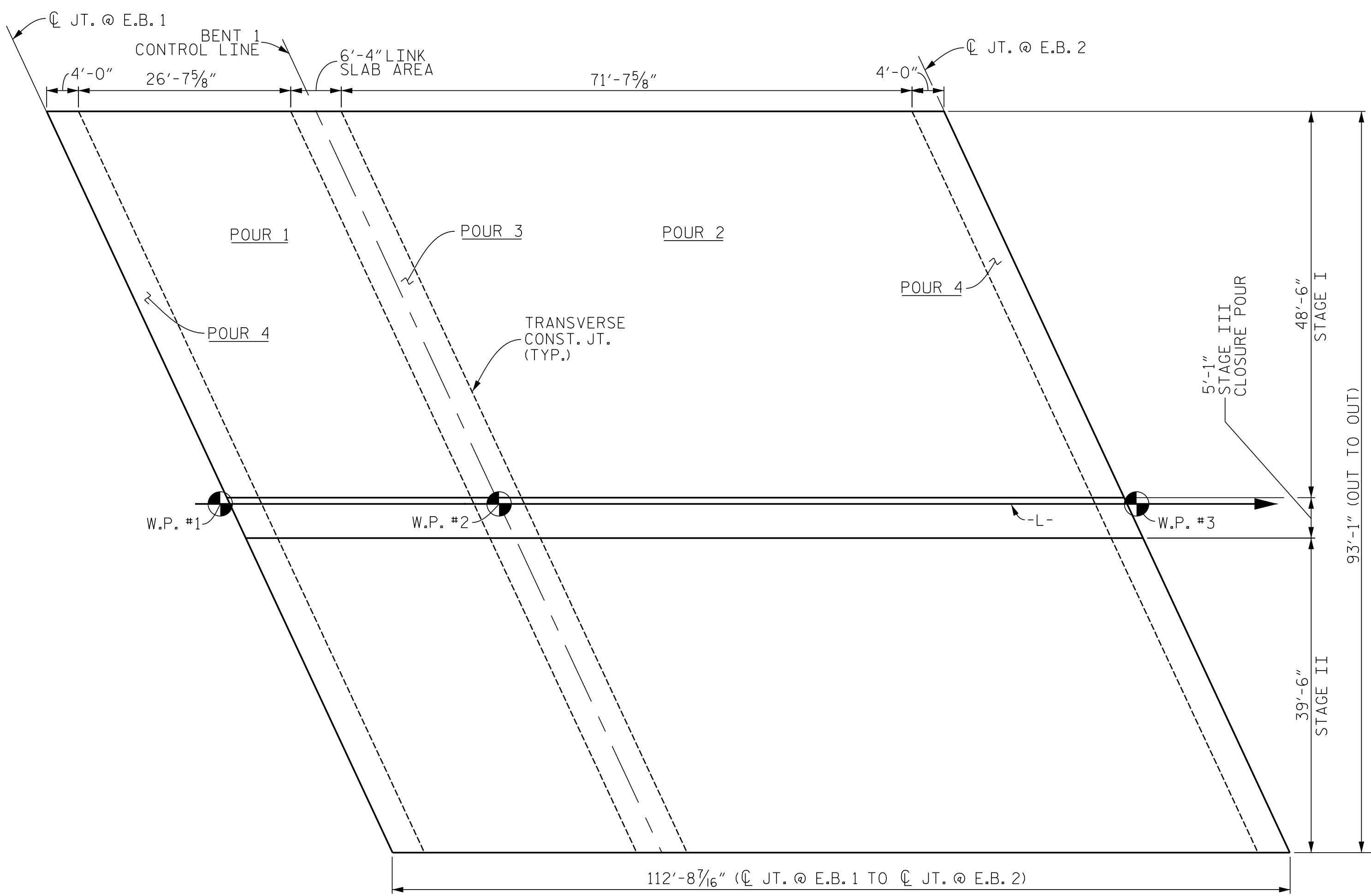


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE
DETAILS
FOR METAL RAILS

ASSEMBLED BY : FRJ	DATE : 7/18
CHECKED BY : CDB	DATE : 7/18
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			39



POUR SEQUENCE BREAKDOWN	CLASS AA CONCRETE (CU. YD.)		
	STAGE I	STAGE II	STAGE III
POUR 1	40.0	32.7	4.1
POUR 2	107.0	87.4	11.0
POUR 3	13.5	11.0	1.6
POUR 4	17.1	13.9	2.0
SIDEWALKS	19.8	19.8	
MEDIAN	6.6		
TOTAL	204.0	164.8	18.7

LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB & POURING SEQUENCE

STAGE I - SQ. FT. = 5,466
 STAGE II - SQ. FT. = 4,452
 STAGE III - SQ. FT. = 573
 TOTAL SQ. FT. = 10,491

GROOVING BRIDGE FLOORS			
BRIDGE DECK	STAGE I	3,673	SQ.FT.
	STAGE II	3,450	SQ.FT.
	STAGE III	528	SQ.FT.
APPROACH SLABS	STAGE I	1,567	SQ.FT.
	STAGE II	1,700	SQ.FT.
TOTAL		10,918	SQ.FT.

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YD.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
STAGE I	204.0	21,520	18,784
STAGE II	164.8	17,826	15,545
STAGE III	18.7	1,030	497
TOTAL	387.5	40,376	34,826

QUANTITIES FOR CLOSURE POUR ARE INCLUDED IN STAGE III.

SUPERSTRUCTURE BILL OF MATERIAL

STAGE I						STAGE II						STAGE III					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	181	#5	STR	48'-2"	9093	*A50	189	#5	STR	39'-2"	7721	*B1	4	#4	STR	28'-0"	75
*A2	6	#5	STR	44'-8"	280	*A51	6	#5	STR	35'-11"	225	*B2	13	#5	STR	16'-0"	217
*A3	6	#5	STR	41'-6"	260	*A52	6	#5	STR	32'-8"	204	*B3	12	#4	STR	25'-7"	205
*A4	6	#5	STR	38'-3"	239	*A53	6	#5	STR	29'-6"	185	B4	24	#5	STR	39'-0"	976
*A5	6	#5	STR	35'-1"	220	*A54	6	#5	STR	26'-3"	164	K5	4	#5	STR	5'-3"	22
*A6	6	#5	STR	31'-10"	199	*A55	6	#5	STR	23'-0"	144	S1	10	#4	3	4'-9"	32
*A7	6	#5	STR	28'-7"	179	*A56	6	#5	STR	19'-10"	124	REINFORCING STEEL = 1,030 LBS					
*A8	6	#5	STR	25'-5"	159	*A57	6	#5	STR	16'-7"	104	*EPOXY COATED REINF. STEEL = 497 LBS					
*A9	6	#5	STR	22'-2"	139	*A58	6	#5	STR	13'-5"	84	BAR TYPES					
*A10	6	#5	STR	19'-0"	119	*A59	6	#5	STR	10'-2"	64						
*A11	6	#5	STR	15'-9"	99	*A60	6	#5	STR	6'-11"	43						
*A12	6	#5	STR	12'-6"	78	*A61	6	#5	STR	3'-9"	23						
*A13	6	#5	STR	9'-4"	58	A62	189	#5	STR	39'-2"	7721						
*A14	6	#5	STR	6'-1"	38	A63	6	#5	STR	35'-11"	225						
*A15	6	#5	STR	2'-11"	18	A64	6	#5	STR	32'-8"	204						
A16	181	#5	STR	48'-2"	9093	A65	6	#5	STR	29'-6"	185						
A17	6	#5	STR	44'-8"	280	A66	6	#5	STR	26'-3"	164						
A18	6	#5	STR	41'-6"	260	A67	6	#5	STR	23'-0"	144						
A19	6	#5	STR	38'-3"	239	A68	6	#5	STR	19'-10"	124						
A20	6	#5	STR	35'-1"	220	A69	6	#5	STR	16'-7"	104						
A21	6	#5	STR	31'-10"	199	A70	6	#5	STR	13'-5"	84						
A22	6	#5	STR	28'-7"	179	A71	6	#5	STR	10'-2"	64						
A23	6	#5	STR	25'-5"	159	A72	6	#5	STR	6'-11"	43						
A24	6	#5	STR	22'-2"	139	A73	6	#5	STR	3'-9"	23						
A25	6	#5	STR	19'-0"	119	*B1	27	#4	STR	28'-0"	505						
A26	6	#5	STR	15'-9"	99	*B2	105	#5	STR	16'-0"	1752						
A27	6	#5	STR	12'-6"	78	*B3	81	#4	STR	25'-7"	1384						
A28	6	#5	STR	9'-4"	58	B4	156	#5	STR	39'-0"	6346						
A29	6	#5	STR	6'-1"	38	*B5	24	#4	STR	30'-0"	481						
A30	6	#5	STR	2'-11"	18												
*D1	229	#5	STR	6'-6"	1553	E1	4	#7	1	3'-5"	28						
D2	229	#5	STR	6'-6"	1553	E2	4	#7	1	4'-0"	33						
E1	4	#7	1	3'-5"	28	E3	4	#7	1	4'-7"	37						
E2	4	#7	1	4'-0"	33	E4	4	#7	1	5'-1"	42						
E3	4	#7	1	4'-7"	37	E5	4	#7	1	3'-2"	26						
E4	4	#7	1	5'-1"	42	*G3	113	#4	STR	6'-9"	510						
E5	4	#7	1	3'-2"	26	*G4	4	#5	STR	24'-11"	104						
F1	4	#6	STR	2'-5"	15	K1	6	#5	5	6'-11"	43						
F2	8	#6	STR	3'-6"	42	K2	6	#5	5	8'-11"	56						
F3	4	#6	STR	3'-9"	23	K3	16	#5	STR	8'-0"	134						
*G1	4	#5	STR	30'-1"	126	K4	18	#5	4	8'-6"	160						
*G2	75	#4	STR	3'-3"	163	S1	64	#4	3	4'-9"	203						
*G3	113	#4	STR	6'-9"	510	*U1	32	#4	2	3'-4"	71						
K1	6	#5	5	6'-11"	43	REINFORCING STEEL = 17,826 LBS											
K2	6	#5	5	8'-11"	56	*EPOXY COATED REINF. STEEL = 15,545 LBS											
K3	20	#5	STR	8'-0"	167												
K4	24	#5	4	8'-6"	213												
S1	80	#4	3	4'-9"	254												
*U1	32	#4	2	3'-4"	71												



PROJECT NO. U-5738
 ROWAN COUNTY
 STATION: 70+72.50 -L-

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

ASSEMBLED BY : FRJ	DATE : 11/18
CHECKED BY : CDB	DATE : 11/18
DRAWN BY : JMB 5/87	REV. 10/1/11 MAA/GM
CHECKED BY : SJD 9/87	REV. 12/17 MAA/THC
	REV. 06/19 BNB/THC

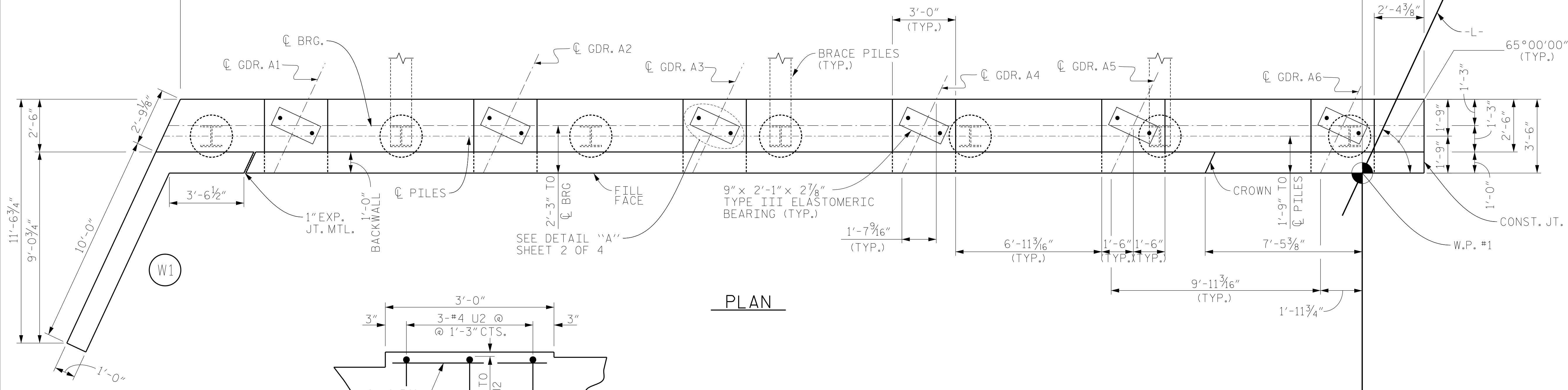
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS 39
2			4			

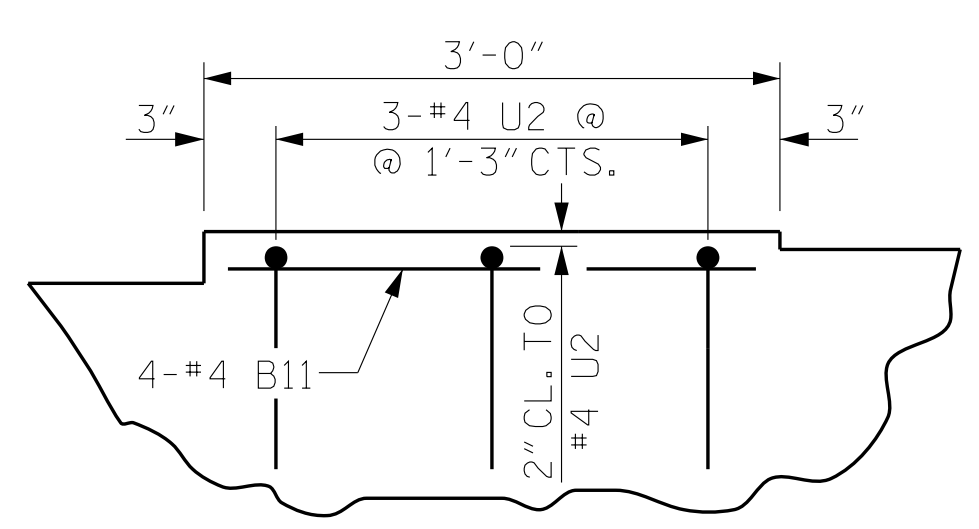
109'-4" TOTAL END BENT LENGTH

59'-0" STAGE I
56'-0^{13/16}"

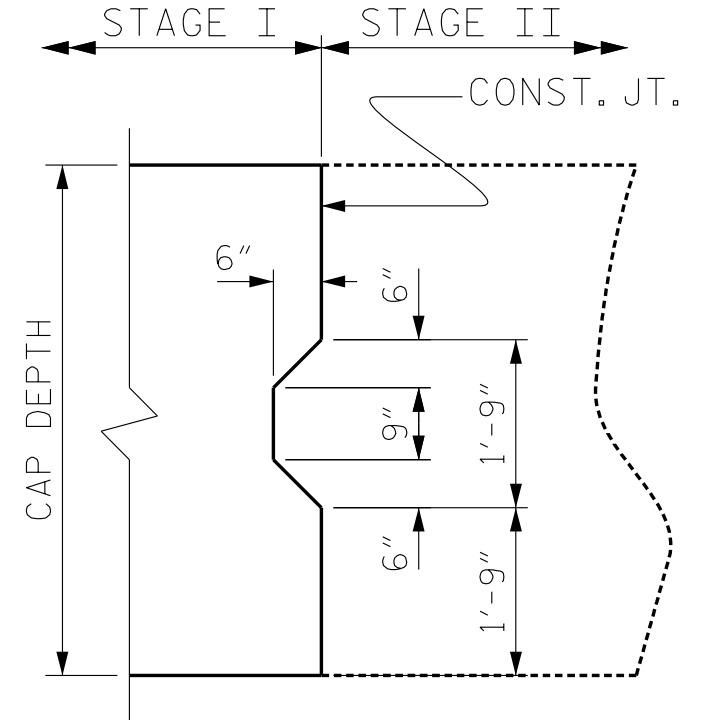
STAGE I STAGE II



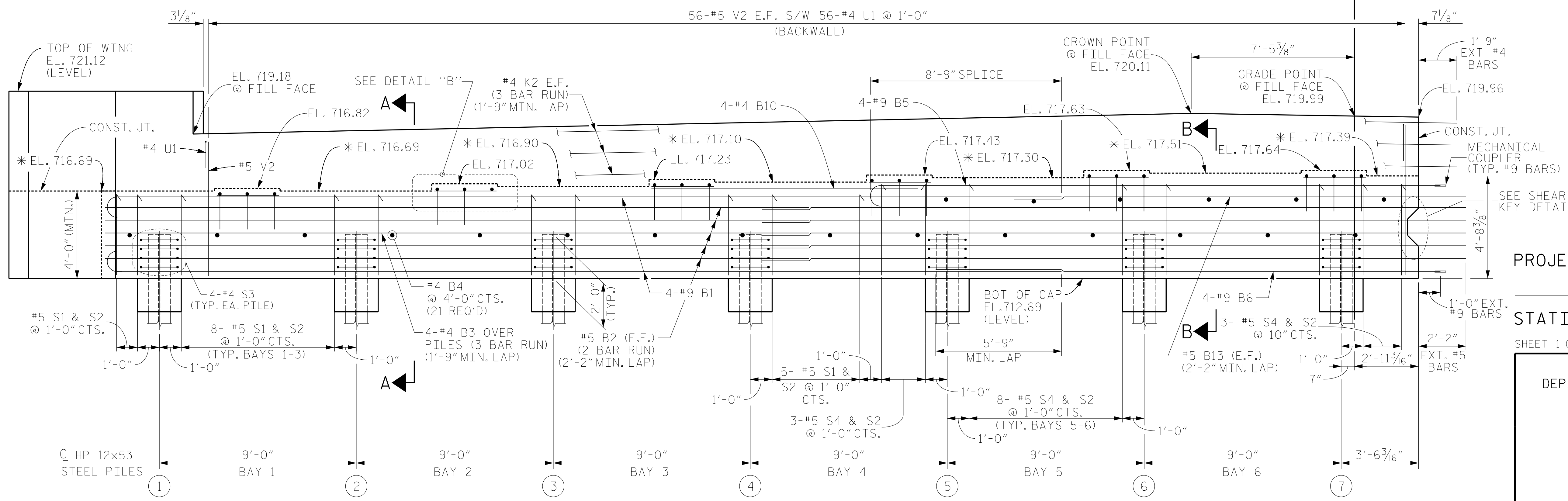
PLAN



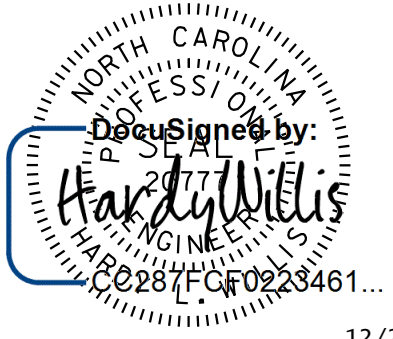
DETAIL "B"
(TYP. EA. BRIDGE SEAT)



SHEAR KEY DETAIL



ELEVATION



12/20/2021

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PROJECT NO. U-5738

ROWAN COUNTY

STATION: 70+72.50 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

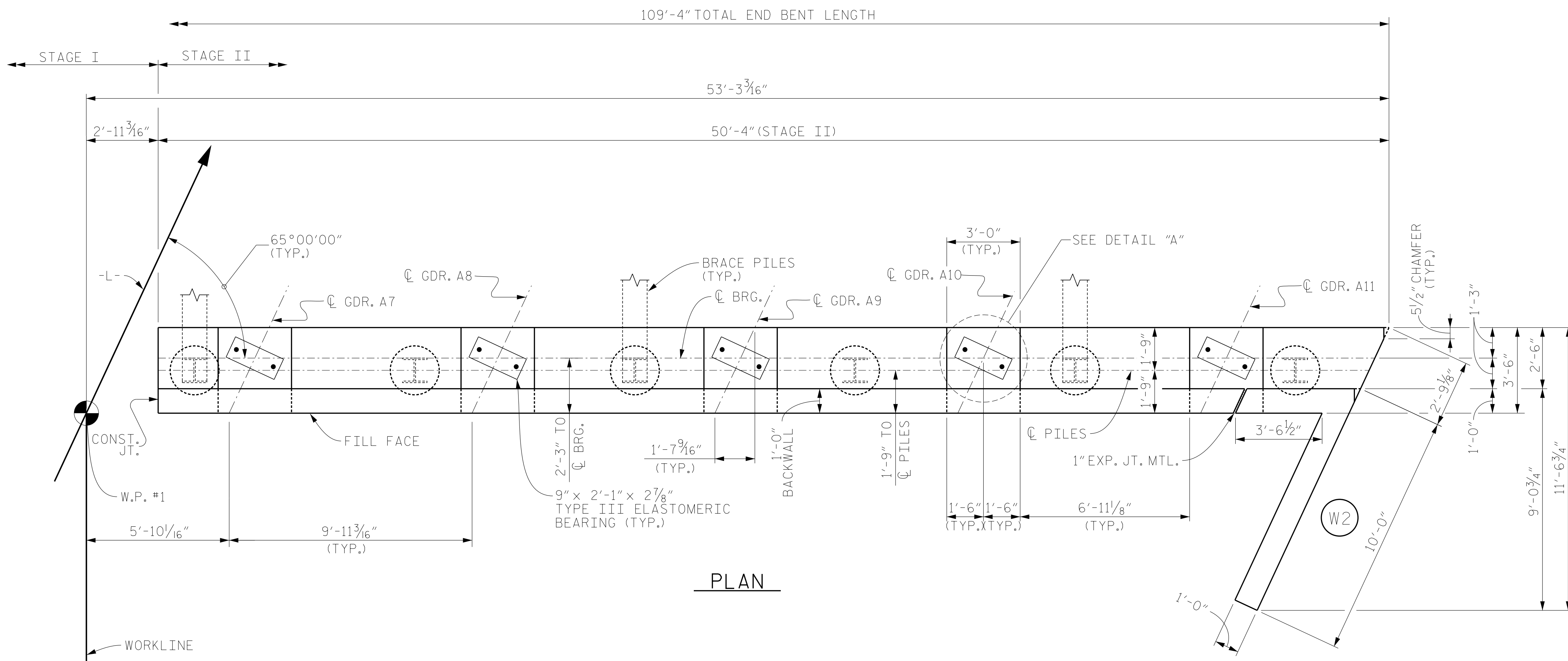
SUBSTRUCTURE
END BENT 1
STAGE I

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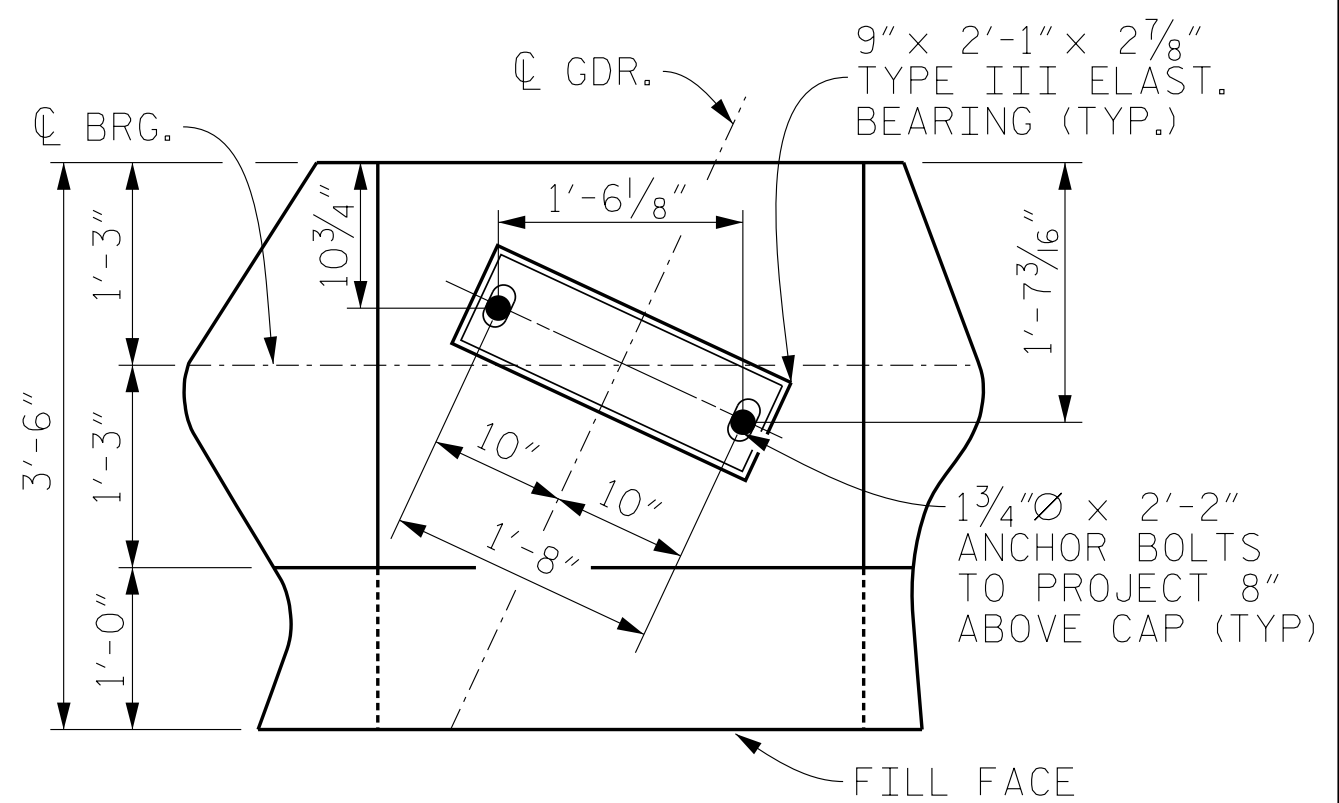
DWN. BY: FRJ	DATE: 11/18
CHKD. BY: CDB	DATE: 11/18
DES. EGR. OF RECORD: CDB	DATE: 11/18

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

SHEET NO. S-24
TOTAL SHEETS 39



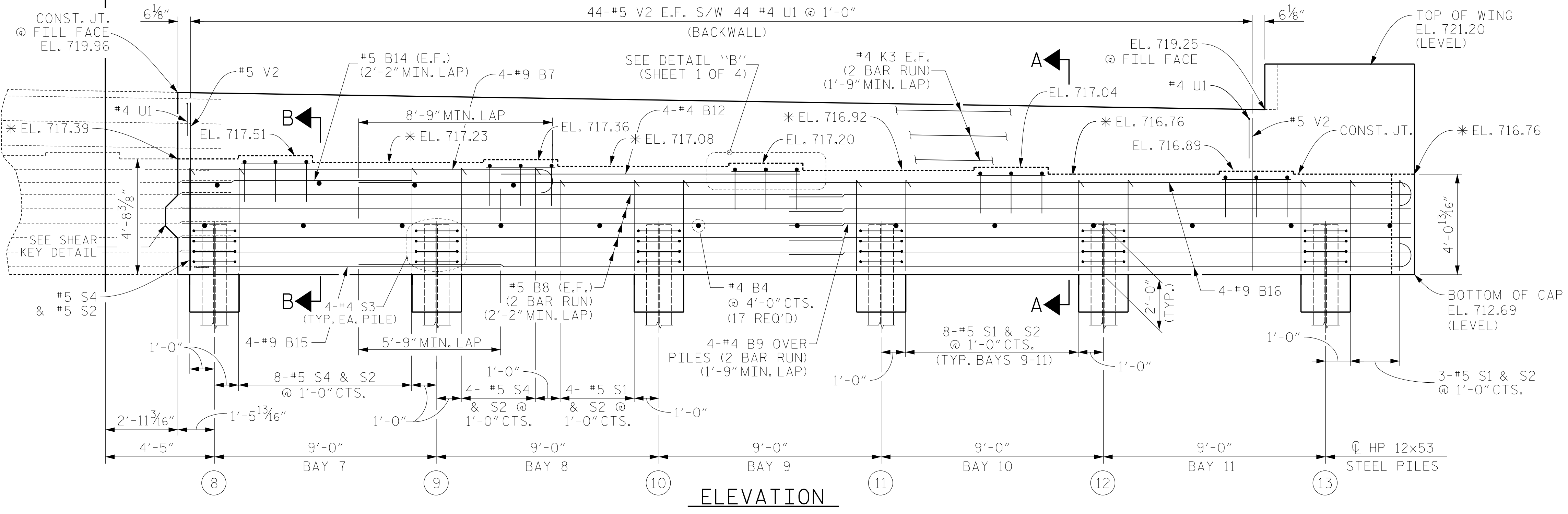
PLAN



DETAIL "A"
(DIMENSIONS ARE TYPICAL EACH GIRDER)

NOTES

- STIRRUPS IN CAPS MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE PLACED.
- * THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE TOP SURFACE AREAS OF THE CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING METHOD SHALL NOT BE USED.



ELEVATION

(WING NOT SHOWN FOR CLARITY)

V&M
Vaughn & Melton
Consulting Engineers
Asheville, NC
1100 North Lexington Ave.
828-253-2796

Blaine, NC 828-355-9933	Trenton, TN 423-467-8401	Sparksburg, MD 864-574-4775
Knoxville, TN 865-546-5800	Charleston, SC 843-914-9650	Atlanta, GA 770-627-3509
Midvale, KY 506-248-6500	Charlotte, NC 704-357-0488	
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PROJECT NO. U-5738
ROWAN COUNTY
STATION: 70+72.50 -L-
SHEET 2 OF 4

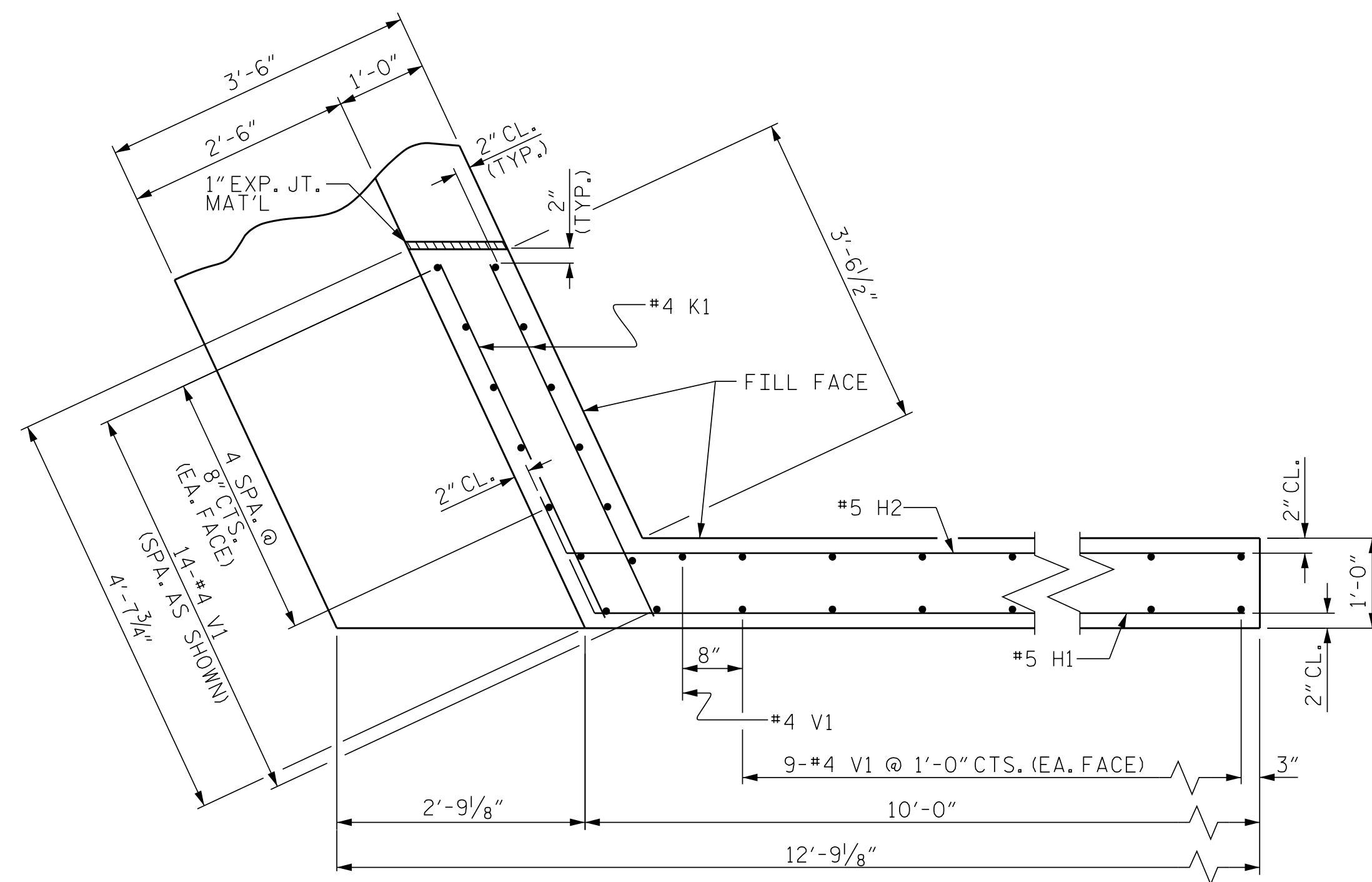
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 1
STAGE II



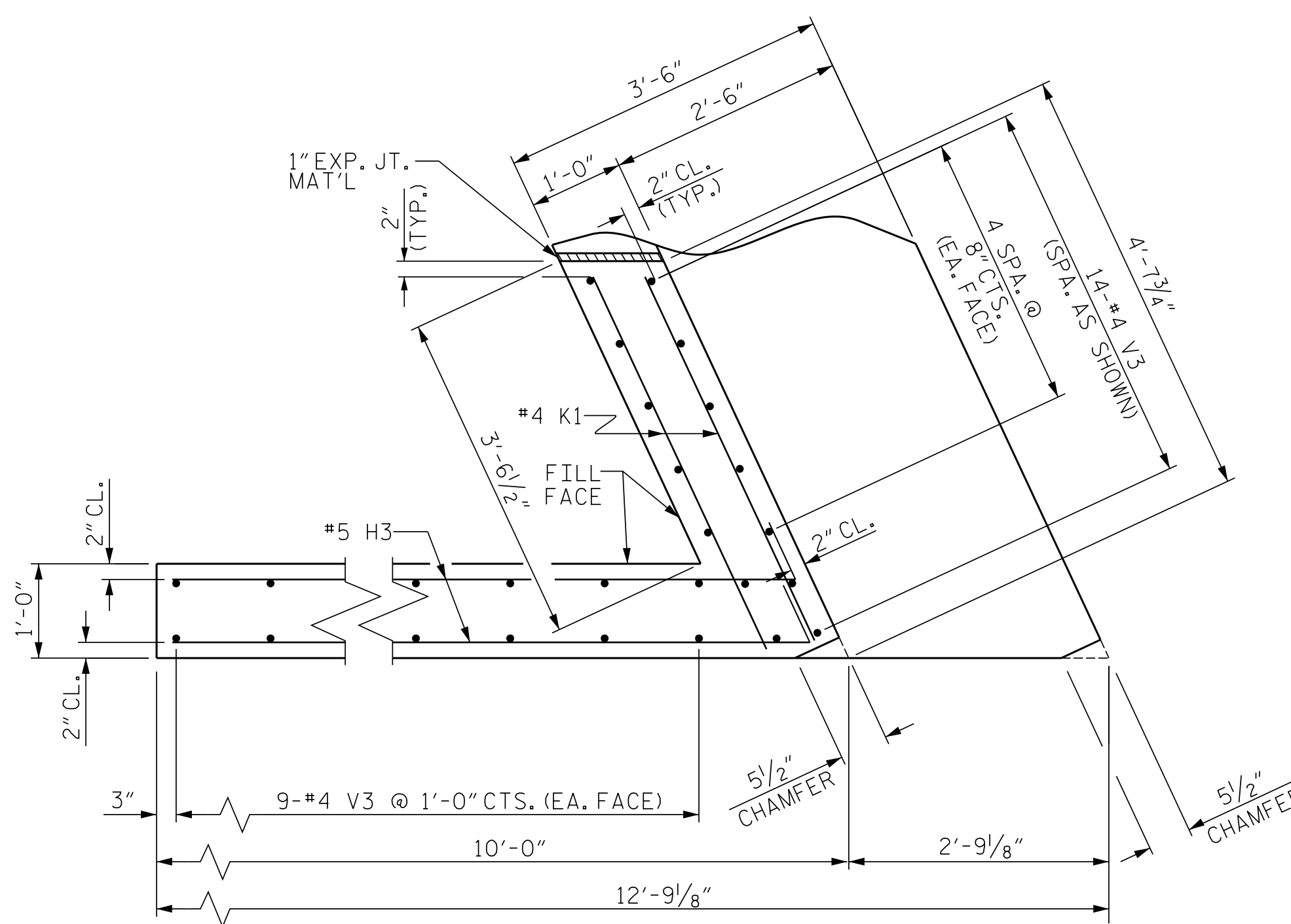
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		DWN. BY: FRJ	DATE: 11/18
		CHKD. BY: CDB	DATE: 11/18
		DES. EGR. OF RECORD: CDB	DATE: 11/18

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

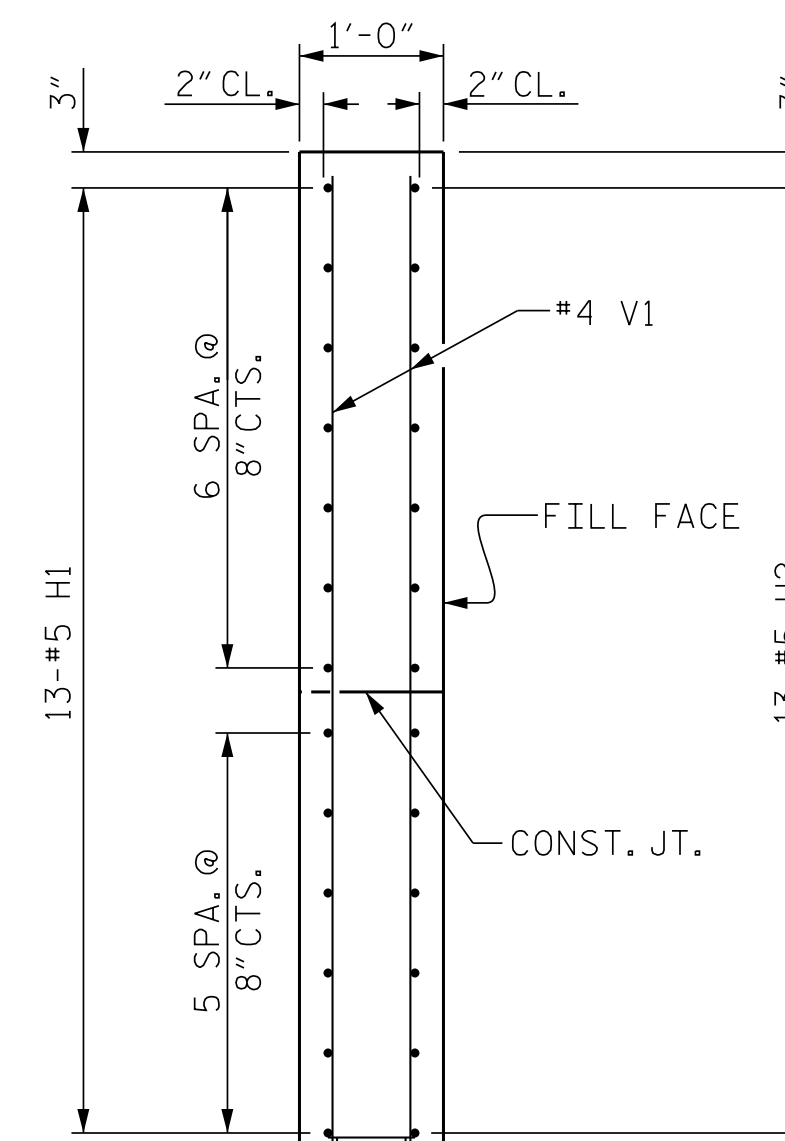
SHEET NO. S-25
TOTAL SHEETS 39



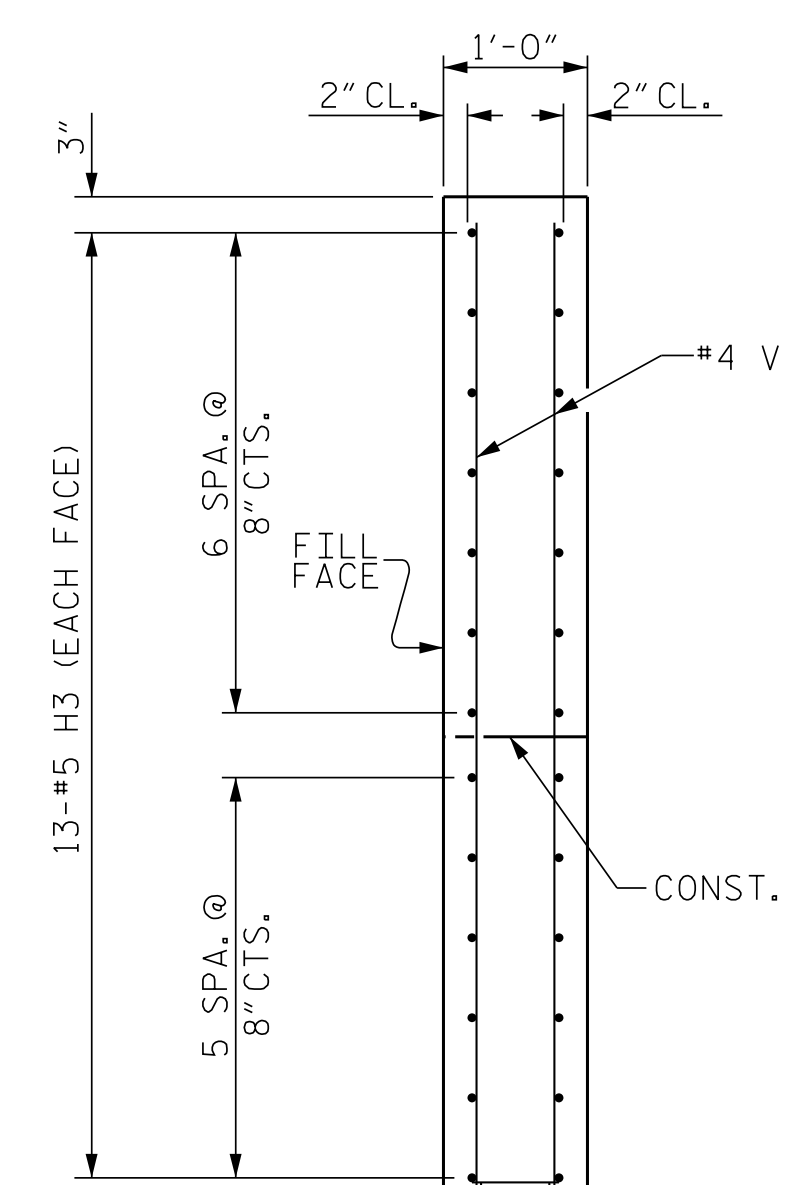
PLAN OF WING (W1)
STAGE I



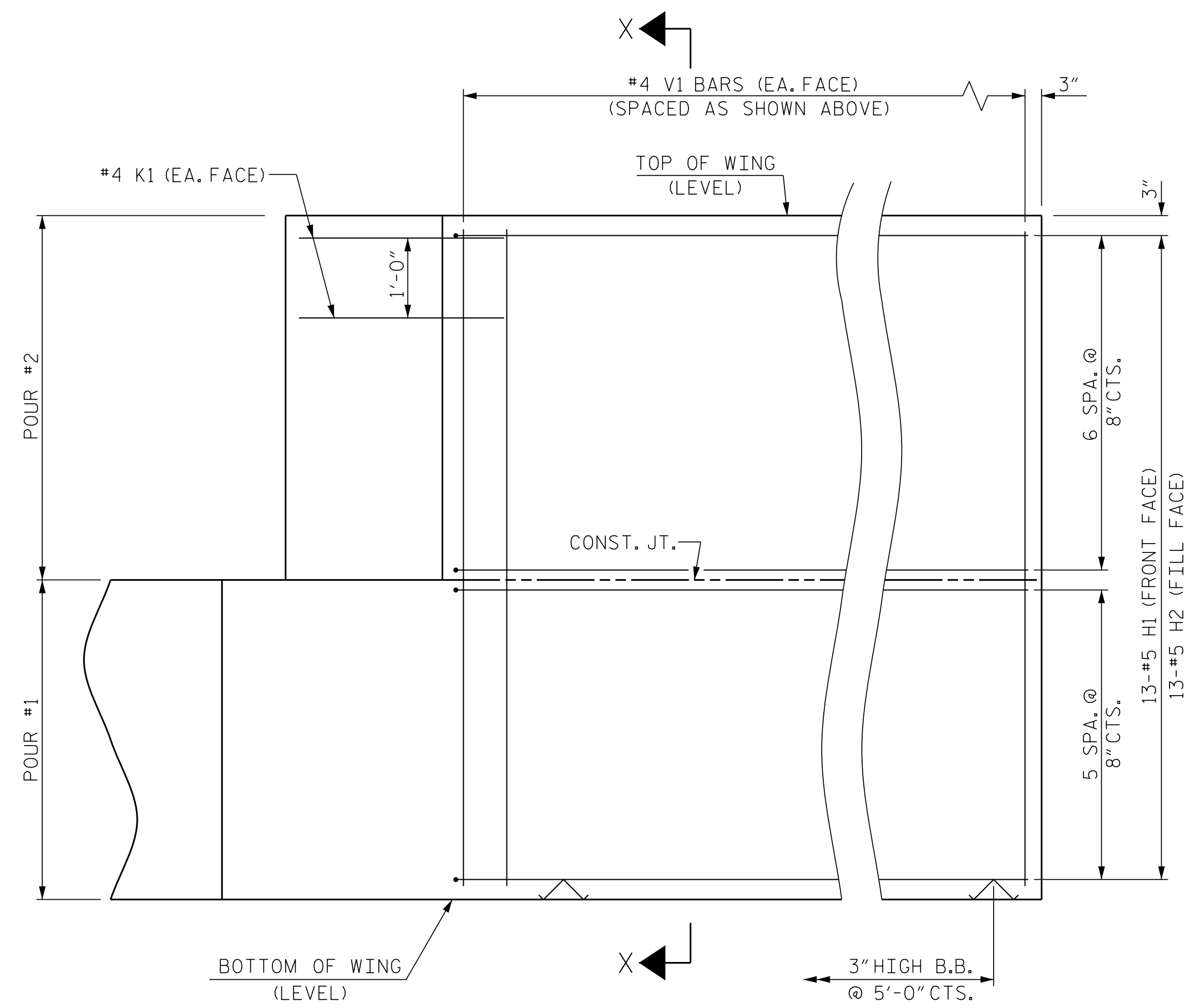
PLAN OF WING (W2)
STAGE II



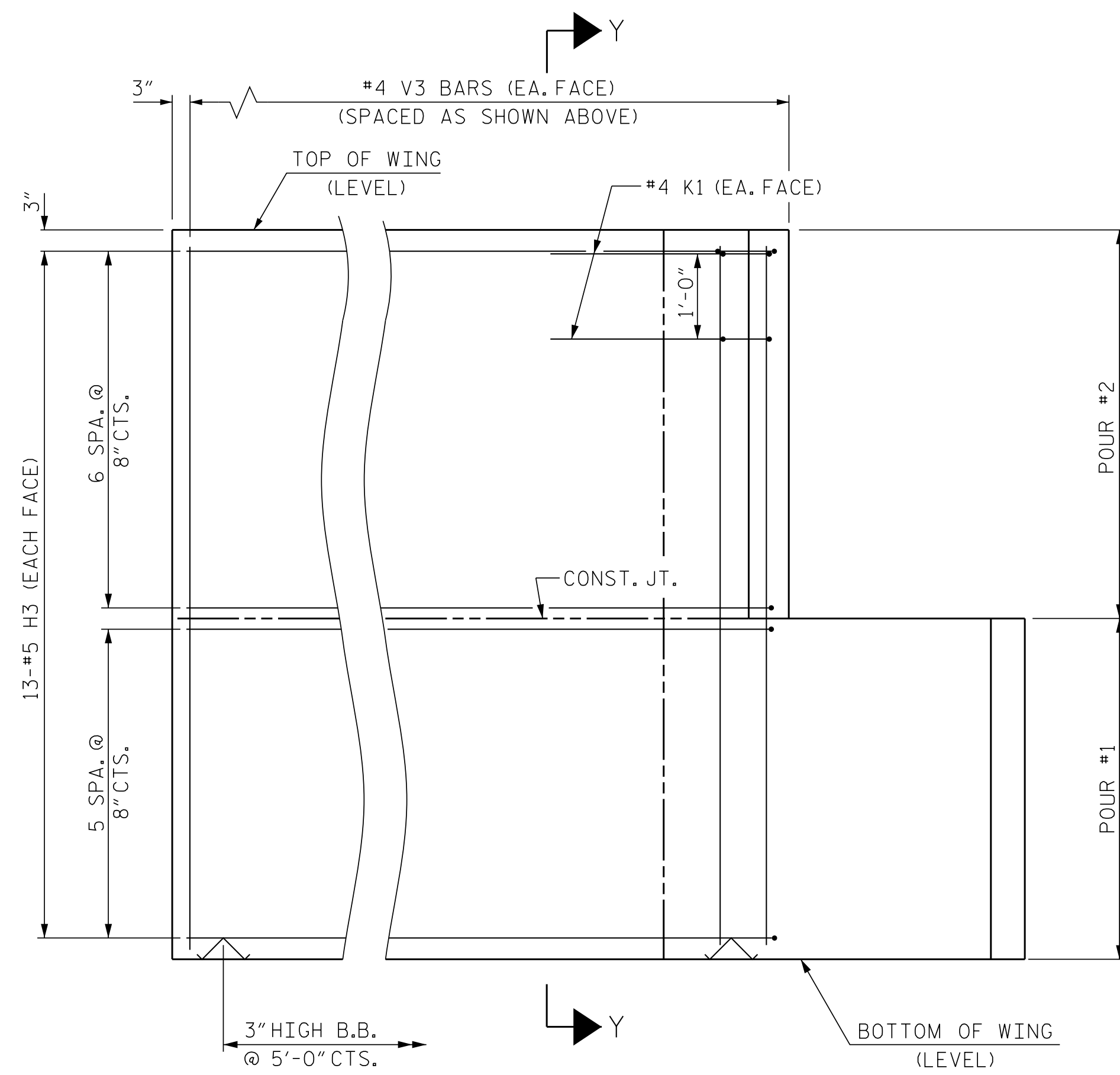
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)
STAGE I



ELEVATION OF WING (W2)
STAGE II

WING DETAILS

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Consulting Engineers

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828-253-2196

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- Tri-Cities, TN 423-467-8400
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- Middlesboro, KY 606-248-6600
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- Atlanta, GA 770-621-3509

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12/13/2021

PROJECT NO. U-5738
ROWAN COUNTY
STATION: 70+72.50 -L-
SHEET 3 OF 4

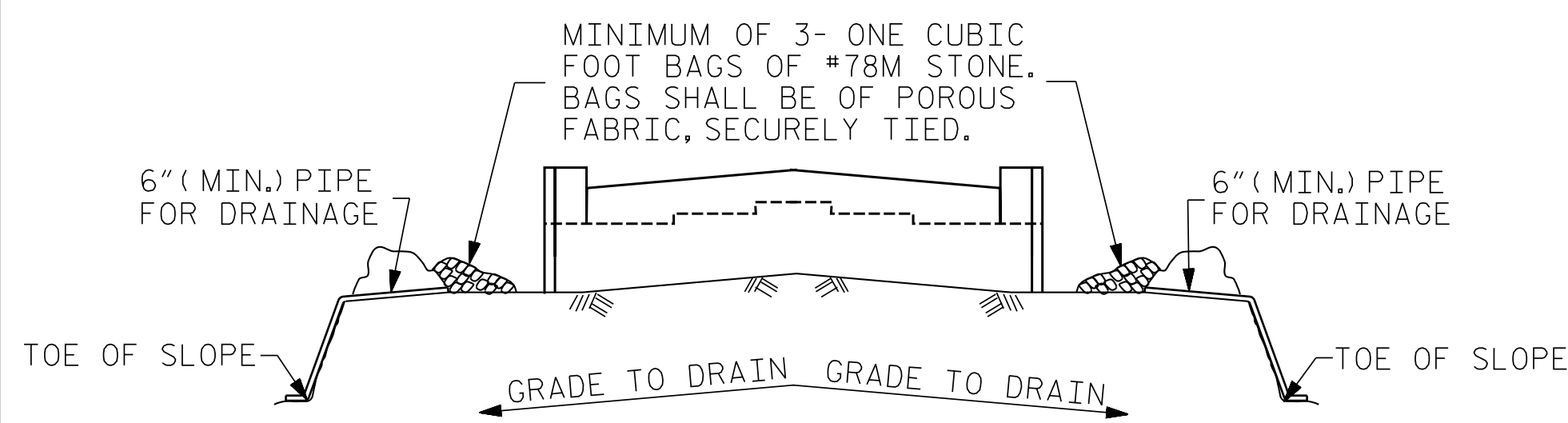
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
WING DETAILS

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

DWN. BY: FRJ DATE: 11/18
CHKD. BY: CDB DATE: 11/18
DES. EGR. OF RECORD: CDB DATE: 11/18

REVISIONS						SHEET NO. S-26
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			

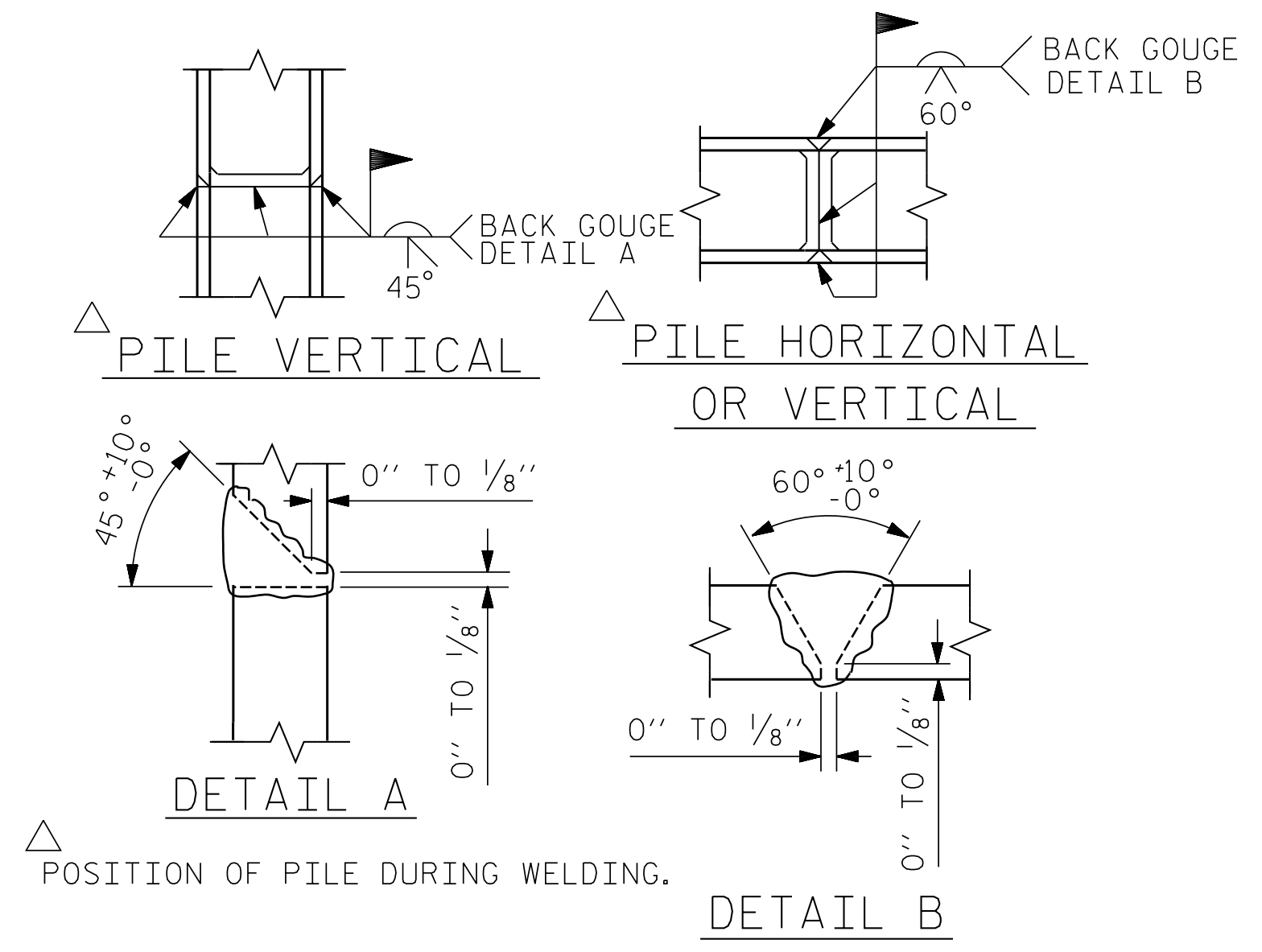


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

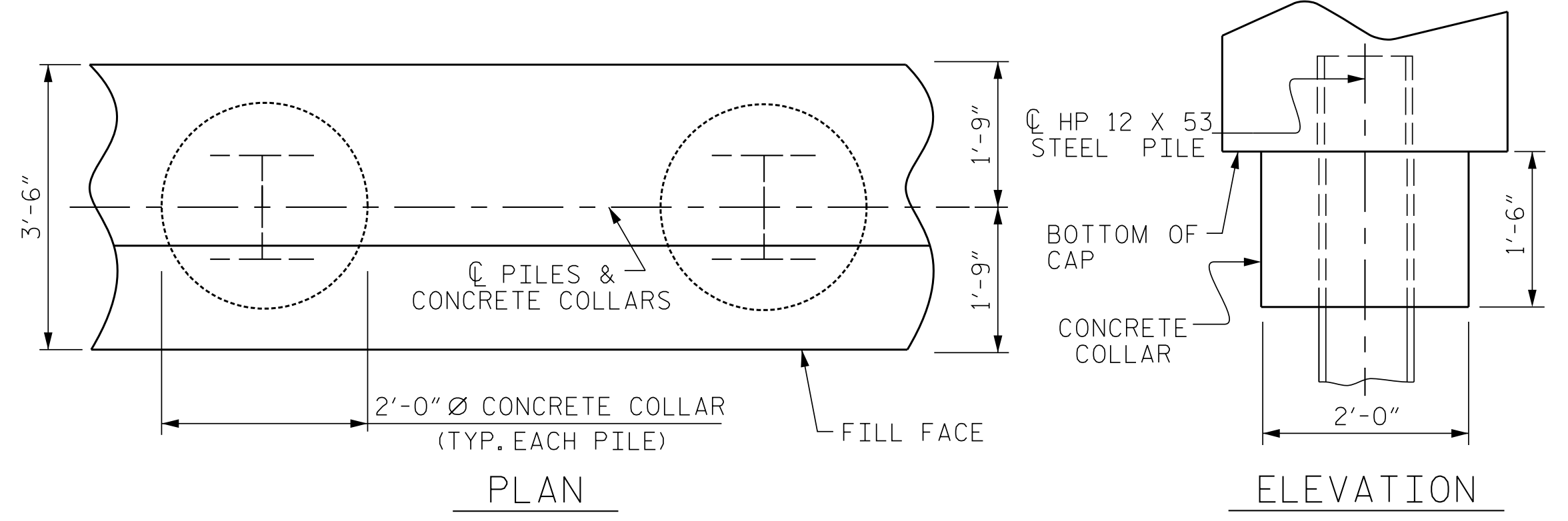
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

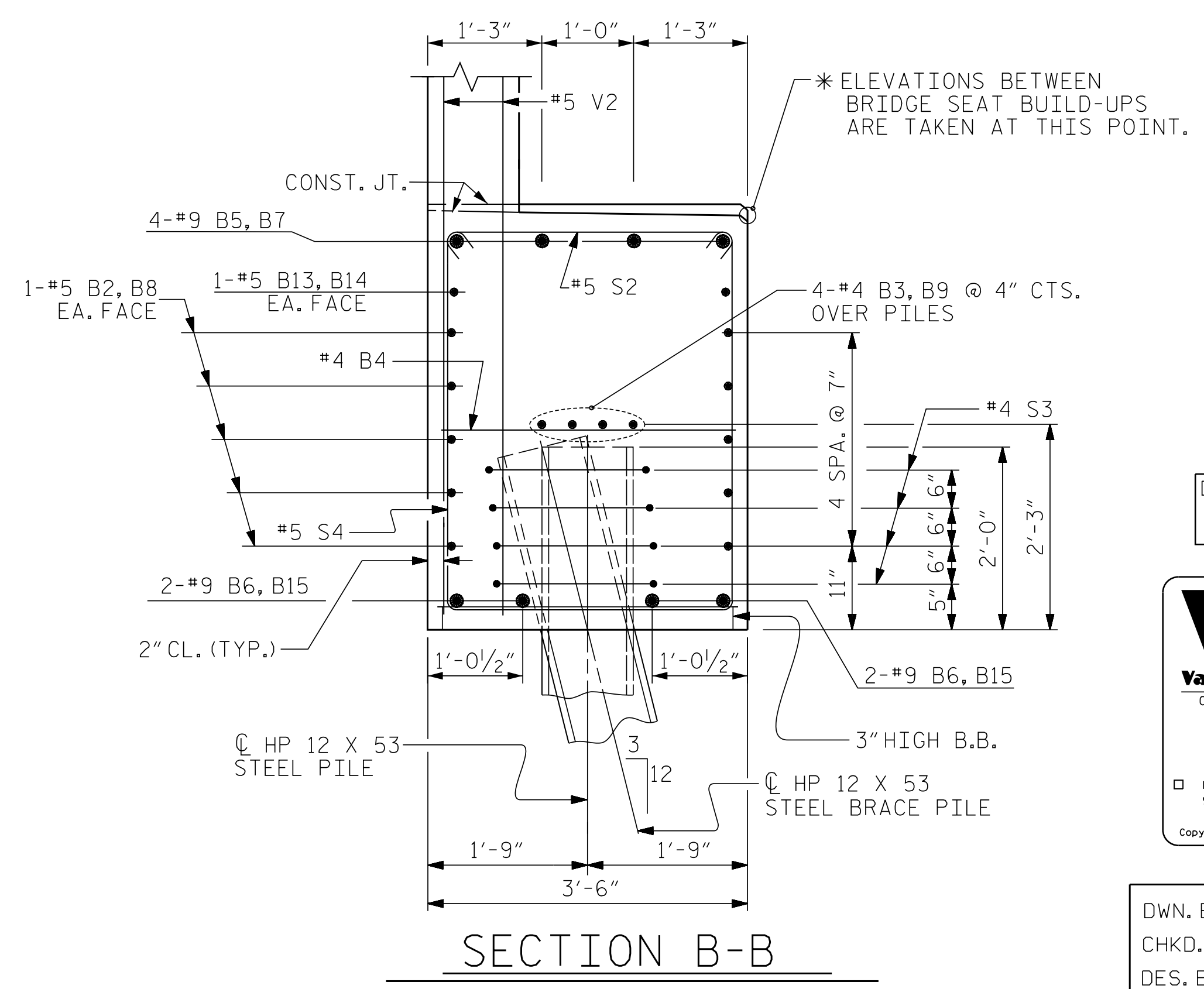
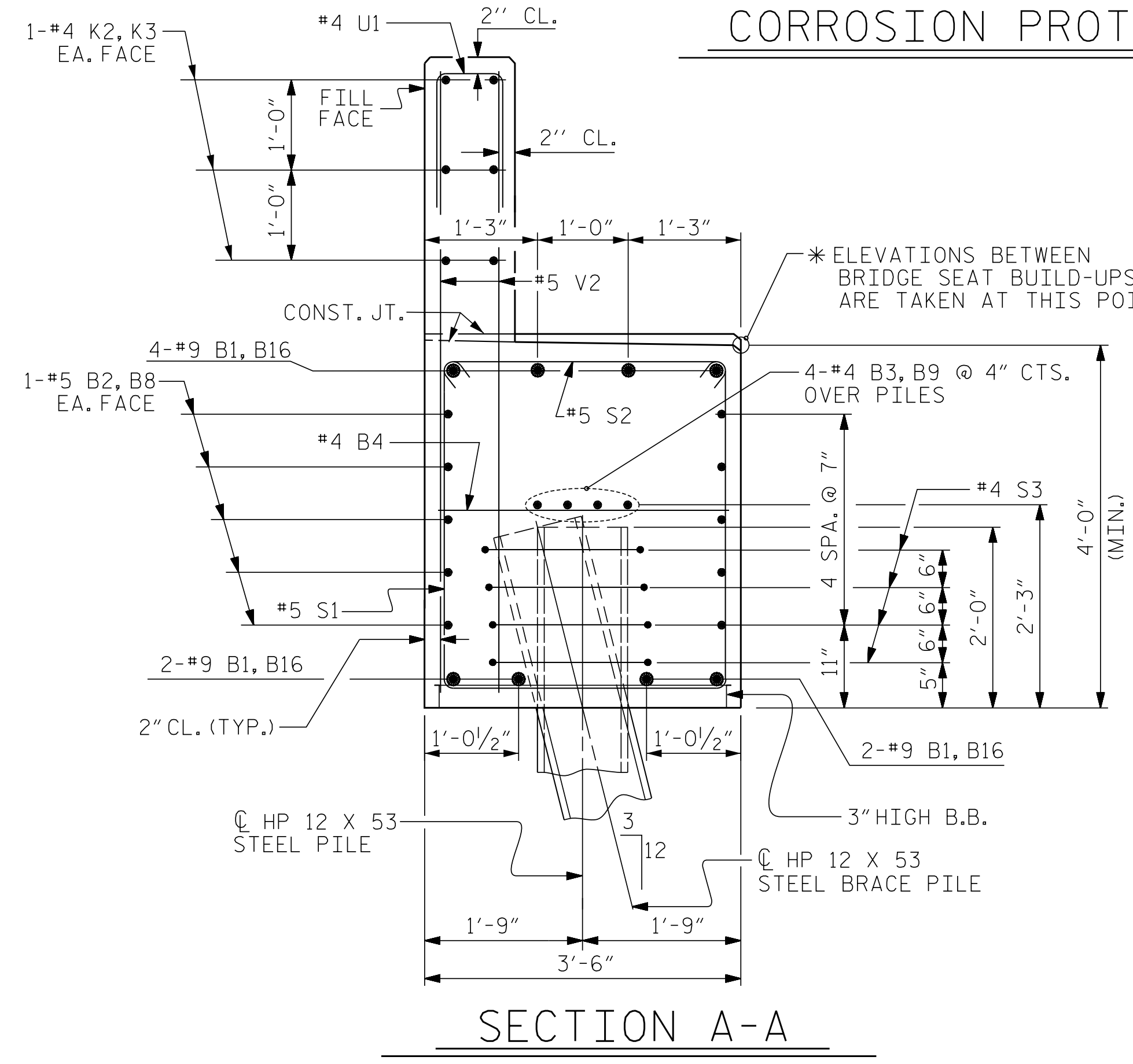
TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS



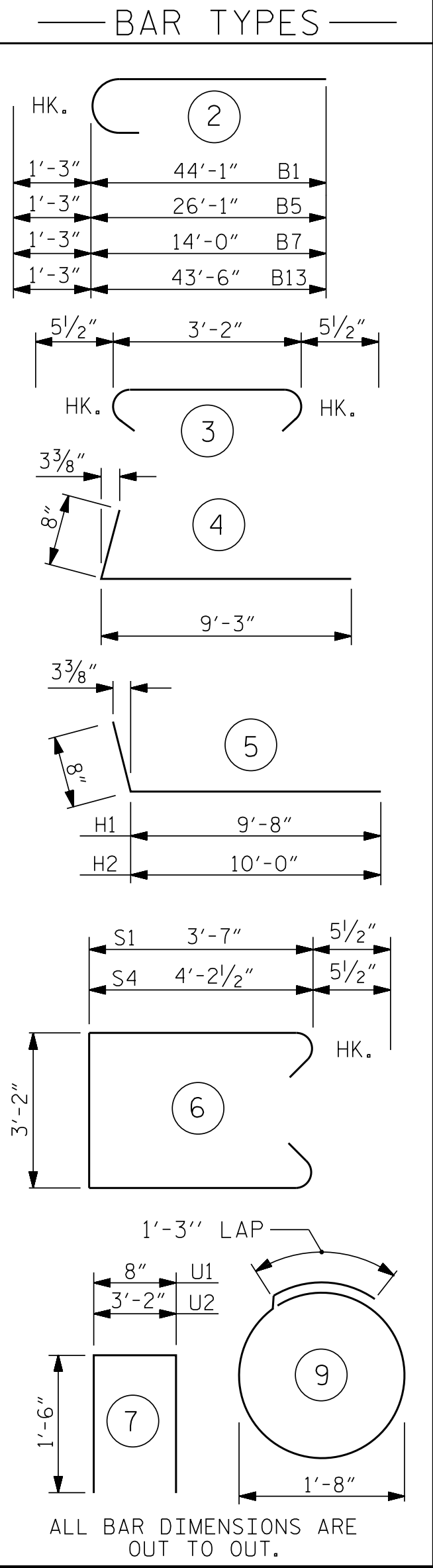
CORROSION PROTECTION FOR STEEL PILES DETAIL



BILL OF MATERIAL

END BENT 1

STAGE I					STAGE II						
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	8	#9	2	45'-4"	1,233	B4	17	#4	STR	3'-2"	36
B2	20	#5	STR	32'-4"	674	B7	4	#9	2	15'-3"	207
B3	12	#4	STR	21'-9"	174	B8	20	#5	STR	26'-3"	548
B4	21	#4	STR	3'-2"	44	B9	8	#4	STR	26'-0"	139
B5	4	#9	2	27'-4"	372	B11	20	#4	STR	2'-8"	36
B6	4	#9	STR	23'-1"	314	B12	4	#4	STR	12'-6"	33
B10	4	#4	STR	12'-2"	33	B14	2	#5	STR	8'-6"	18
B11	24	#4	STR	2'-8"	43	B15	4	#9	STR	12'-1"	164
B13	2	#5	STR	20'-8"	43	B16	8	#9	2	44'-9"	1,217
H1	13	#5	5	10'-4"	140	H3	26	#5	4	9'-11"	269
H2	13	#5	5	10'-8"	145	K1	4	#4	STR	4'-3"	11
K1	4	#4	STR	4'-3"	11	K3	12	#4	STR	25'-2"	202
K2	18	#4	STR	21'-4"	257	S1	31	#5	6	11'-3"	364
S1	31	#5	6	11'-3"	364	S2	44	#5	3	4'-1"	187
S2	53	#5	3	4'-1"	226	S3	24	#4	9	6'-6"	104
S3	28	#4	9	6'-6"	122	S4	13	#5	6	12'-6"	169
S4	22	#5	6	12'-6"	287	U1	44	#4	7	3'-8"	108
U1	56	#4	7	3'-8"	137	U2	15	#4	7	6'-2"	62
U2	18	#4	7	6'-2"	74	V2	88	#5	STR	6'-4"	581
V1	33	#4	STR	8'-1"	178	V3	32	#4	STR	8'-2"	175
V2	112	#5	STR	6'-4"	740						
REINFORCING STEEL 5,611 LBS.					REINFORCING STEEL 4,630 LBS.						
CLASS A CONCRETE BREAKDOWN					CLASS A CONCRETE BREAKDOWN						
POUR 1: CAP, BOT OF WINGS, PILE COLLARS 37.1 C.Y.					POUR 1: CAP, BOT OF WINGS, PILE COLLARS 30.4 C.Y.						
POUR 2: BACKWALL, UPPER PART OF WINGS 8.1 C.Y.					POUR 2: BACKWALL, UPPER PART OF WINGS 7.0 C.Y.						
TOTAL CLASS A CONCRETE 45.2 C.Y.					TOTAL CLASS A CONCRETE 37.4 C.Y.						
HP 12 X 53 STEEL PILES NO: 7 LIN. FT. = 120'-0"					HP 12 X 53 STEEL PILES NO: 6 LIN. FT. = 100'-0"						
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7					PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 6						
PILE POINTS NO: 7					PILE POINTS NO: 6						



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PROJECT NO. U-5738

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STATION: 70+72.50 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
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**SUBSTRUCTURE
END BENT 1
DETAILS**

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SHEET NO. S-27
TOTAL SHEETS 39

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

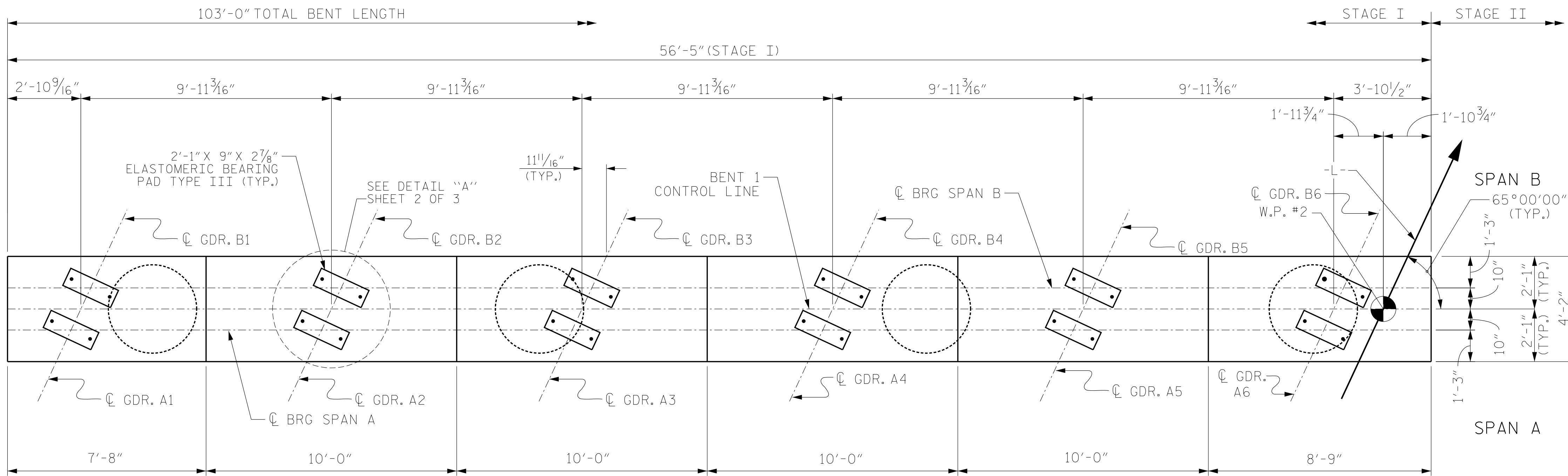
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★INVERT ALTERNATE STIRRUPS.

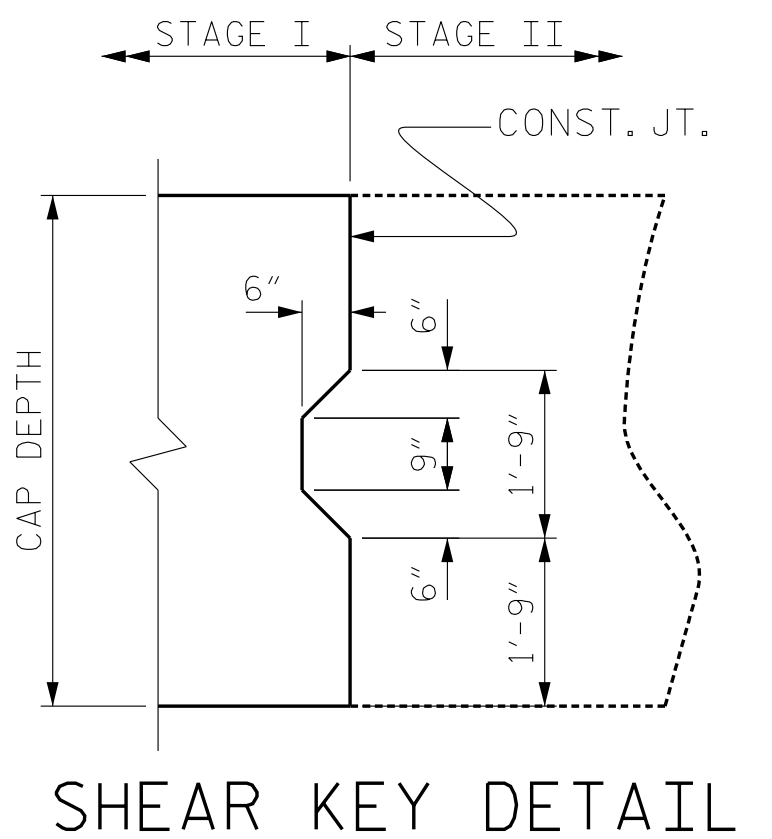
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

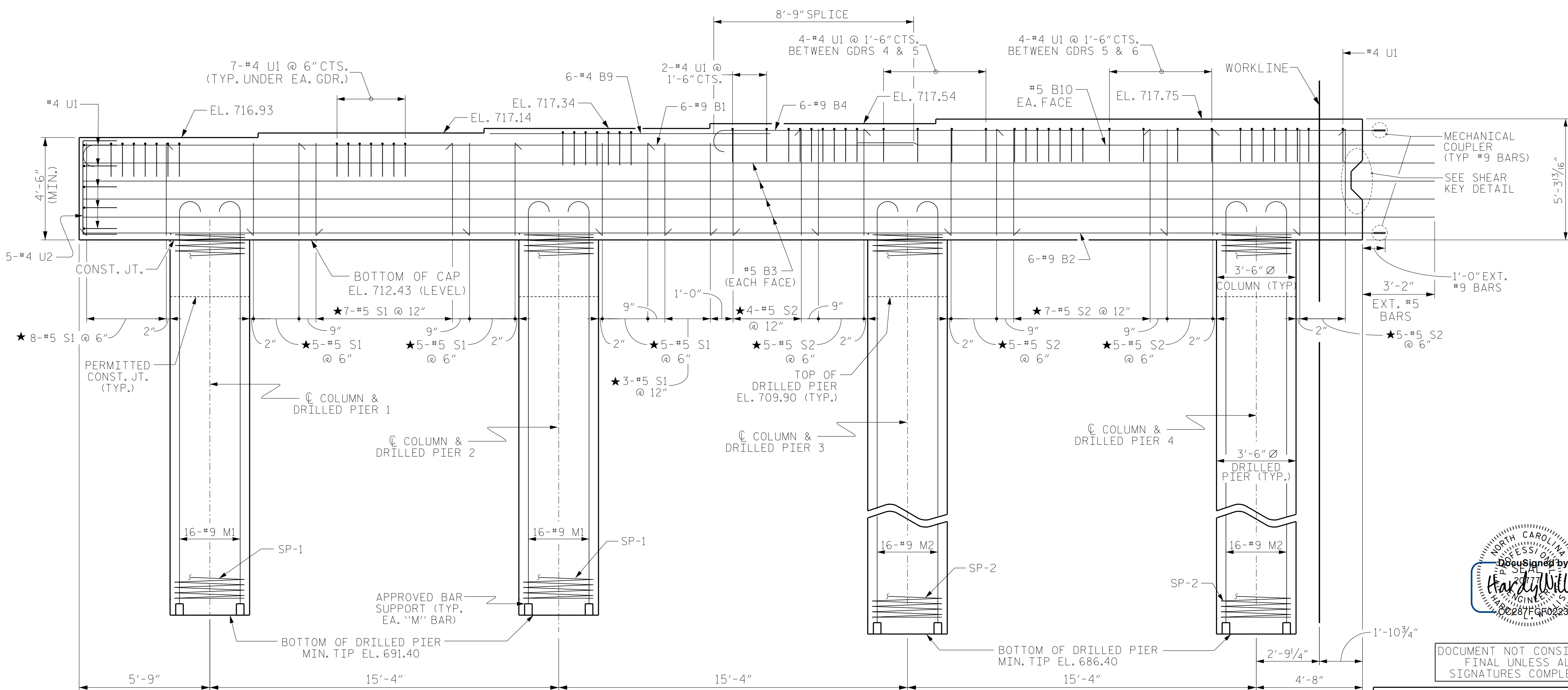
SPlicing OF THE LONGITUDINAL BARS IN DRILLED PIERS WILL NOT BE PERMITTED.



PLAN



SHEAR KEY DETAIL



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

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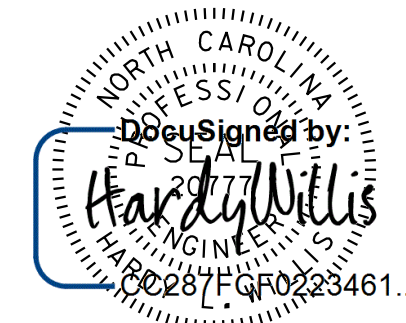
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SHEET 1 OF 3

STATE OF NORTH CAROLINA
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SUBSTRUCTURE

**BENT 1
STAGE I**

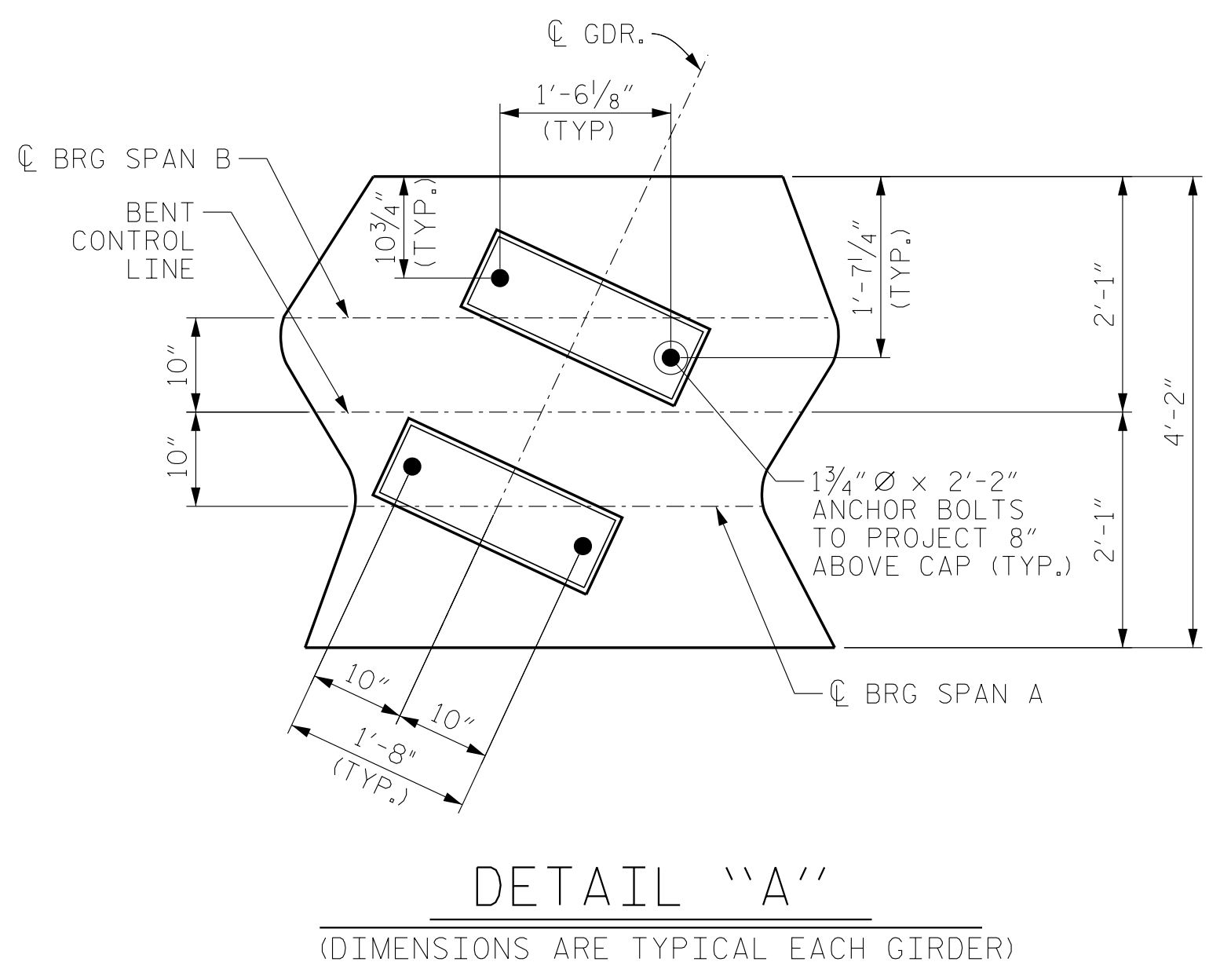
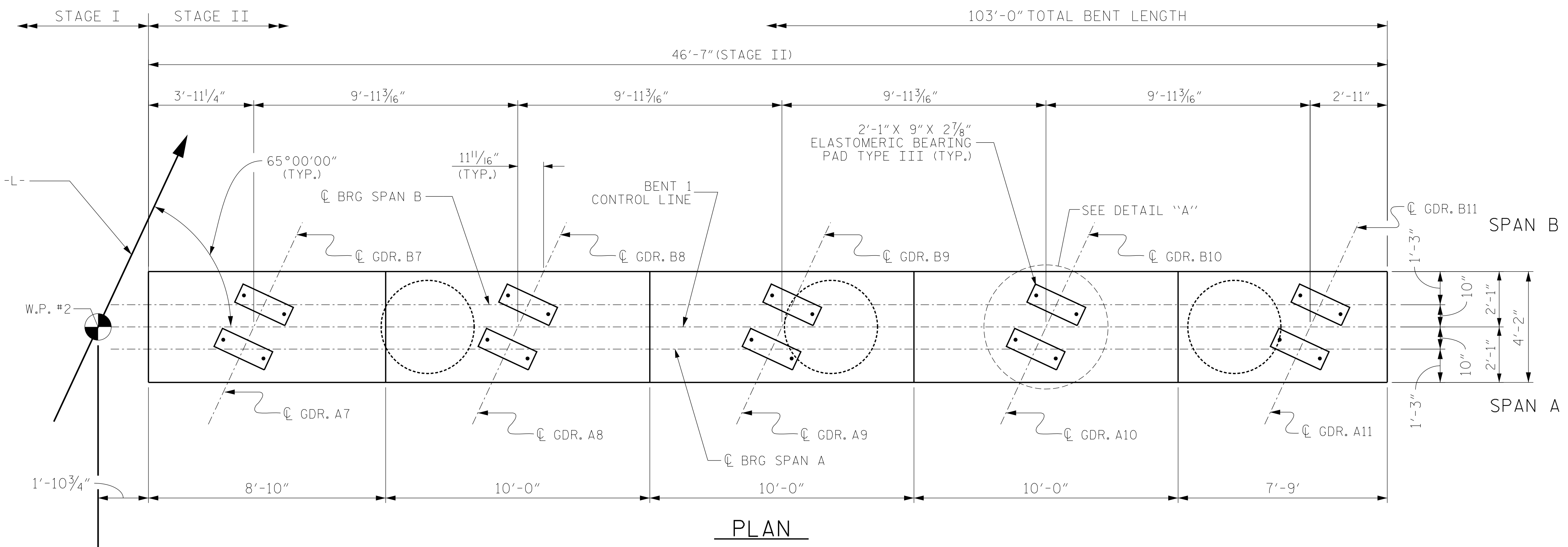


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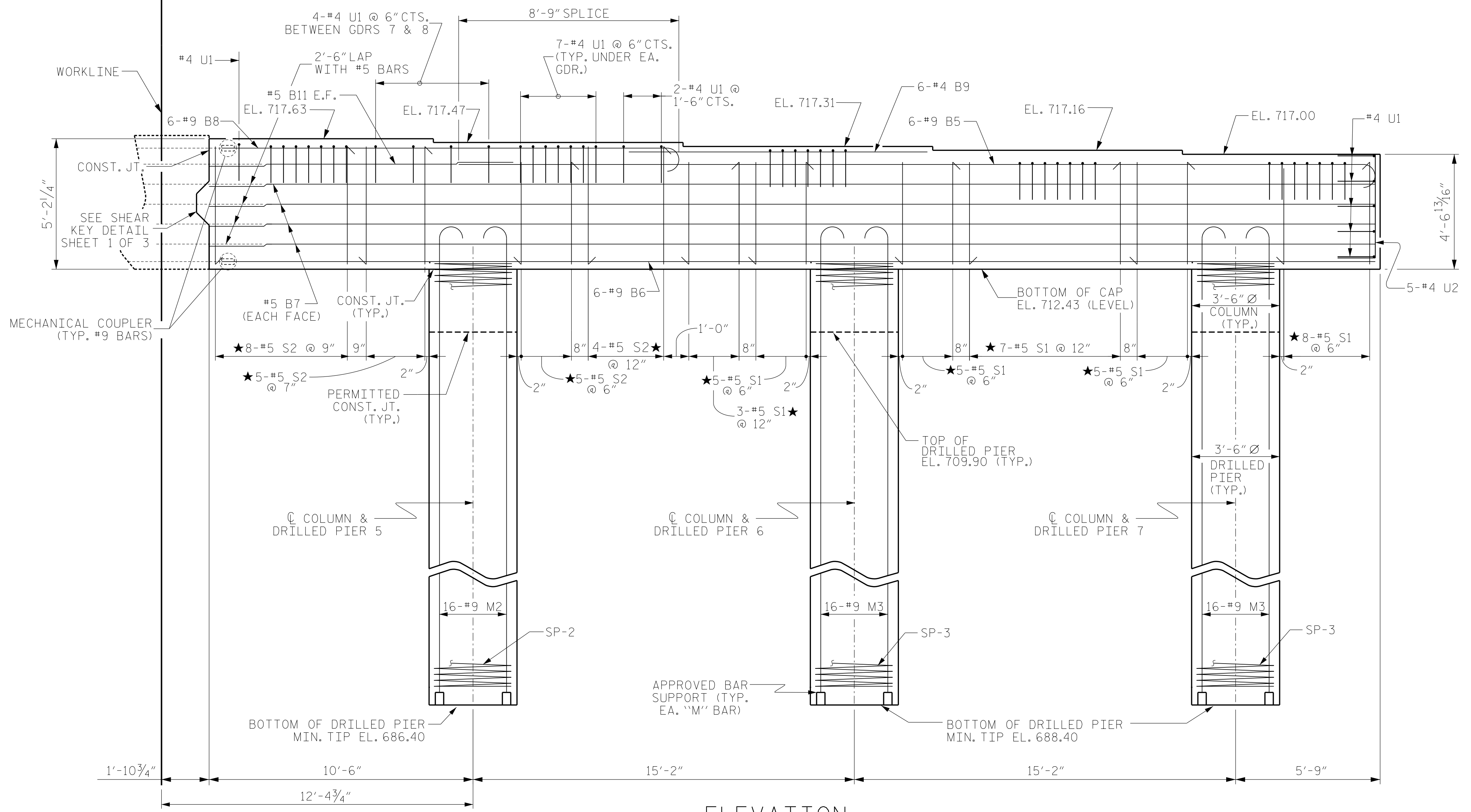
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PLAN



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

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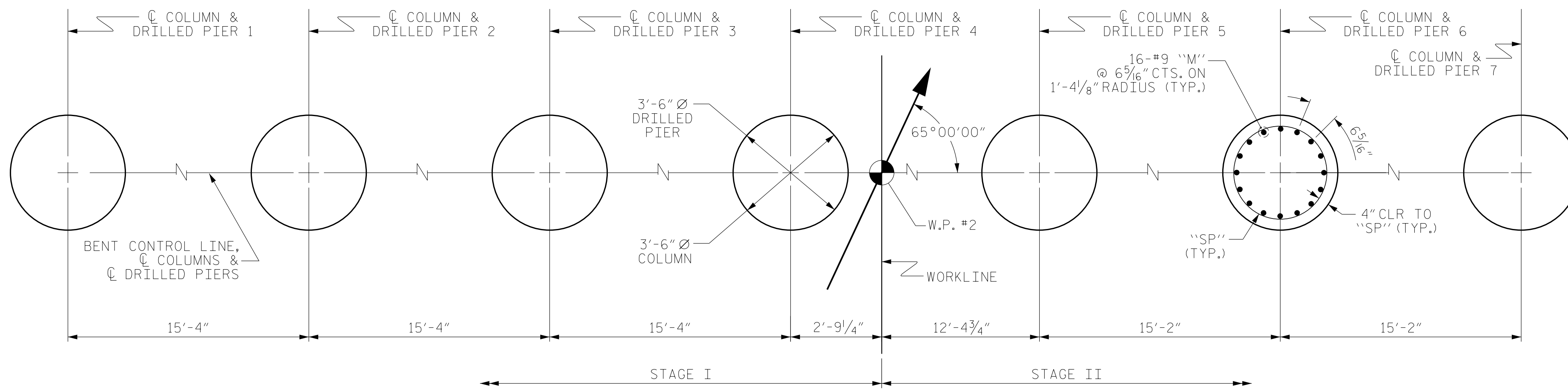
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 SHEET 2 OF 3

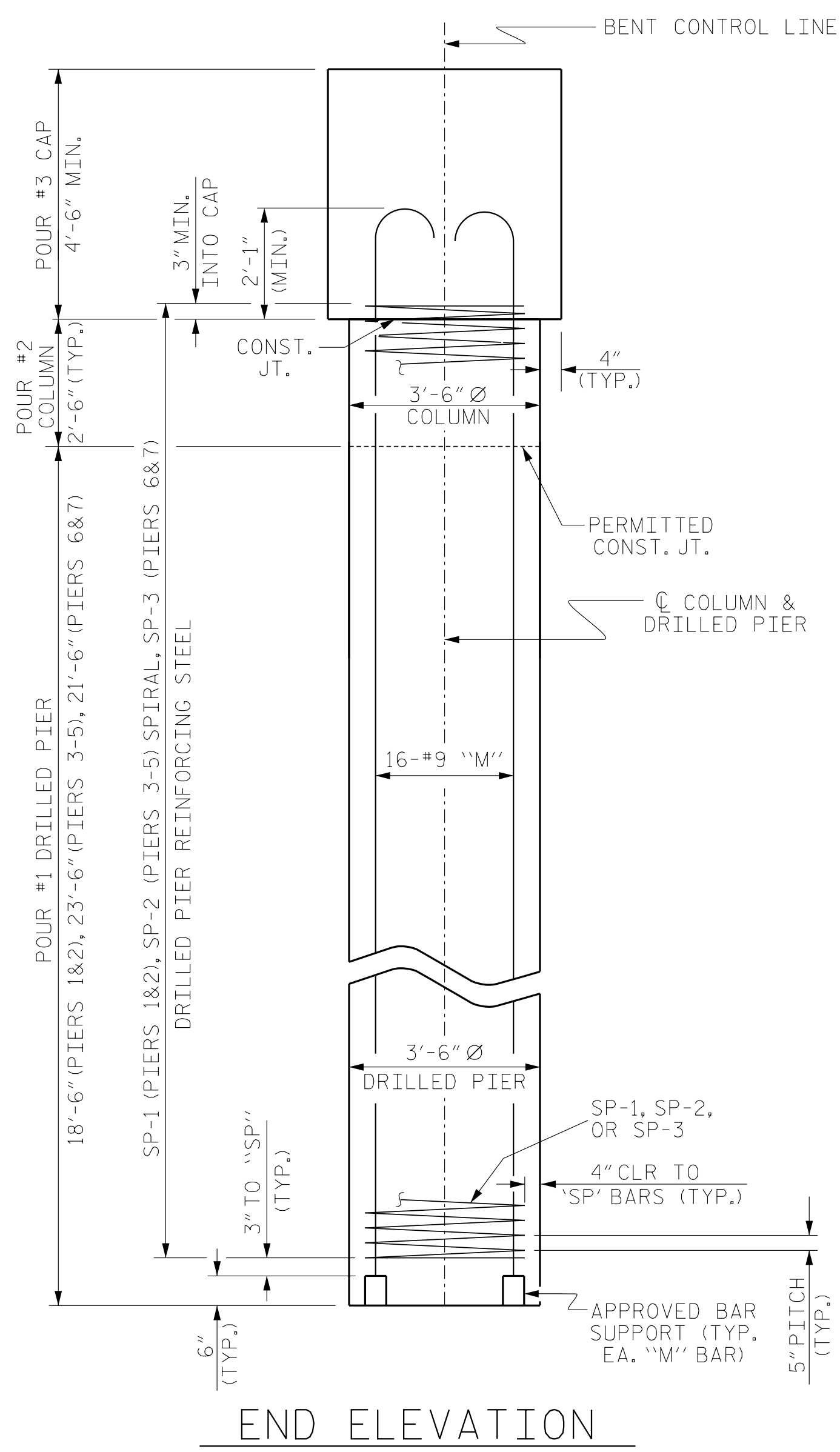
DESIGNED BY
Hardy Willis
12/20/2021

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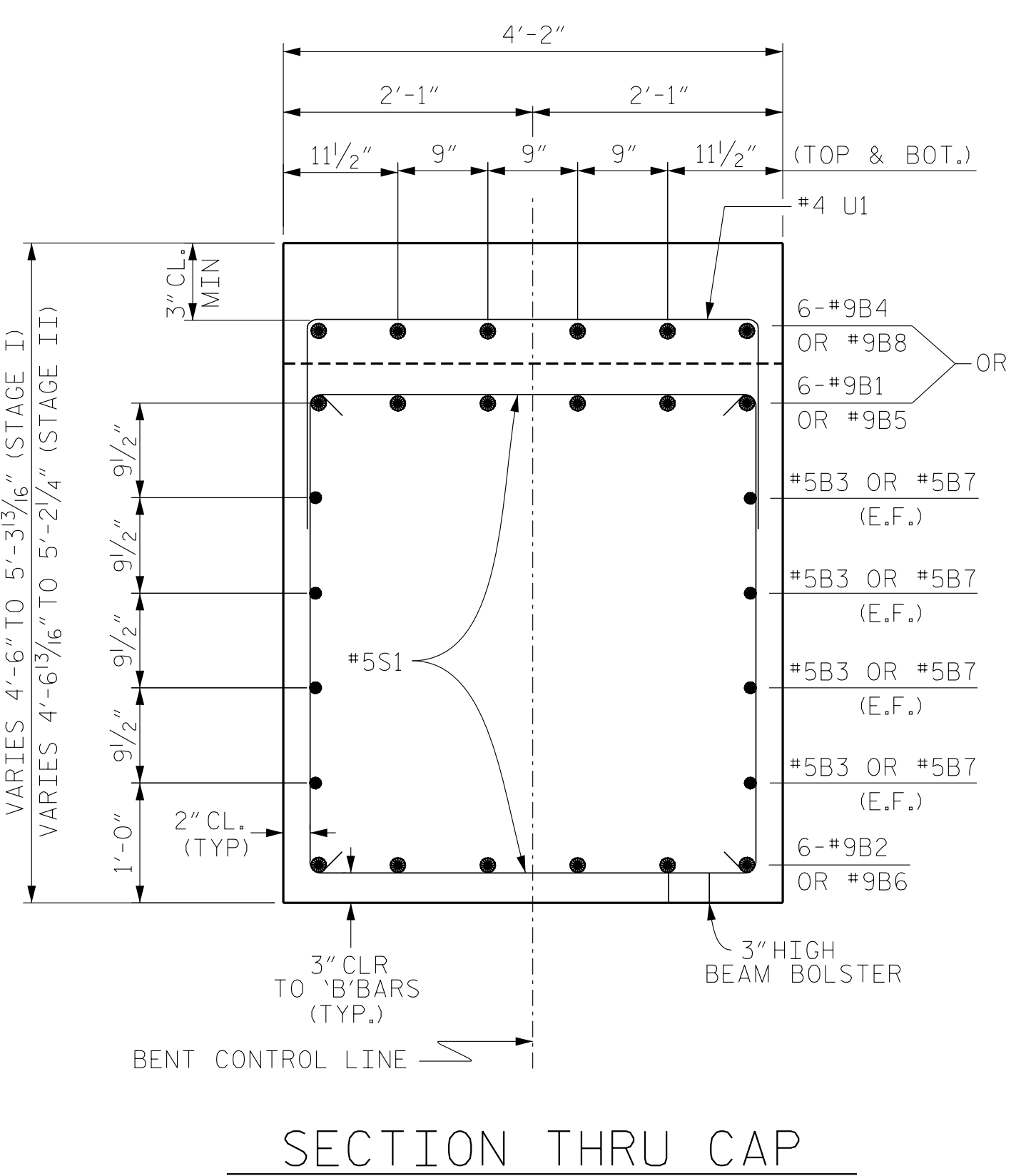
REVISIONS						SHEET NO. S-29
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2			4			



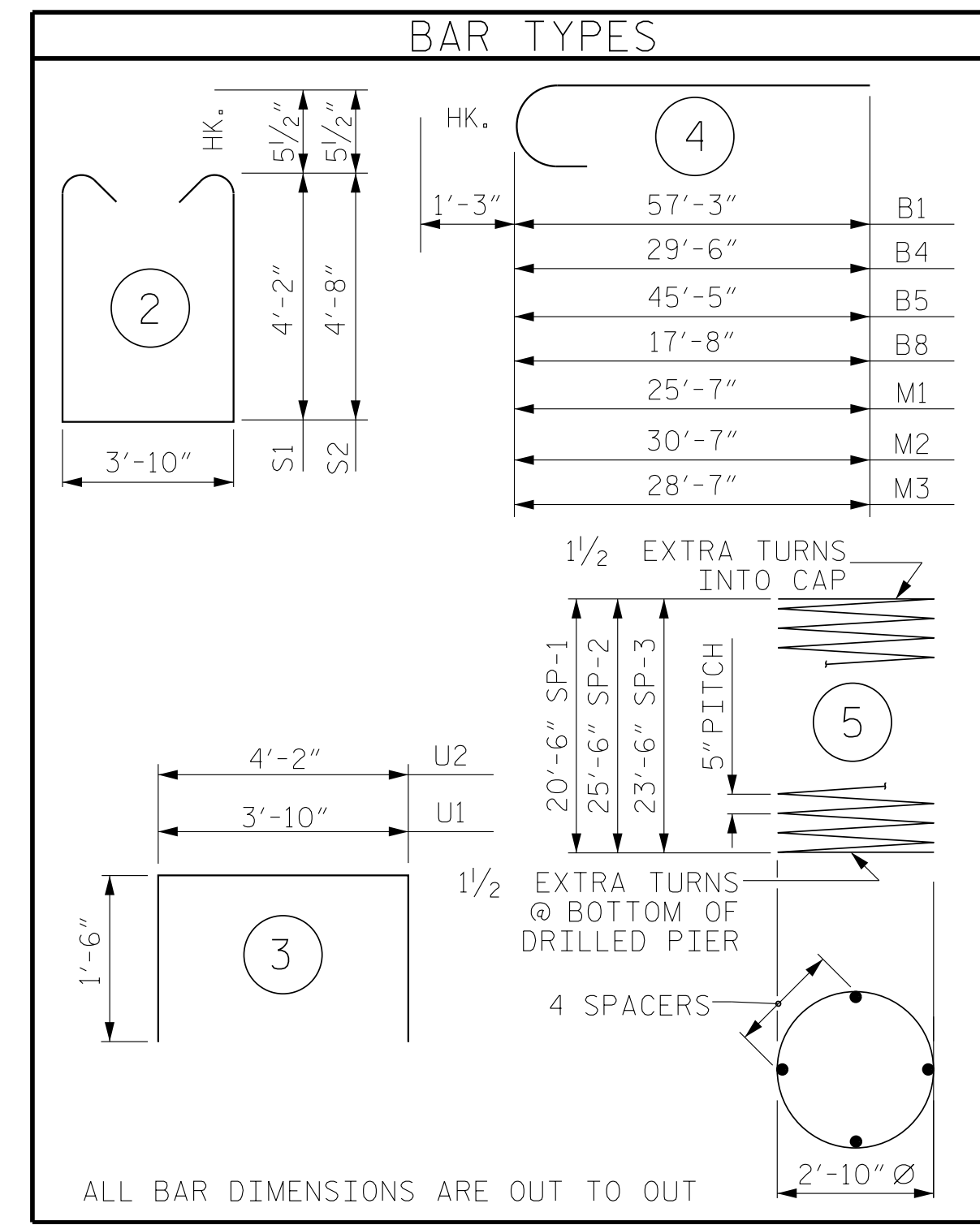
PLAN OF DRILLED PIERS & COLUMNS



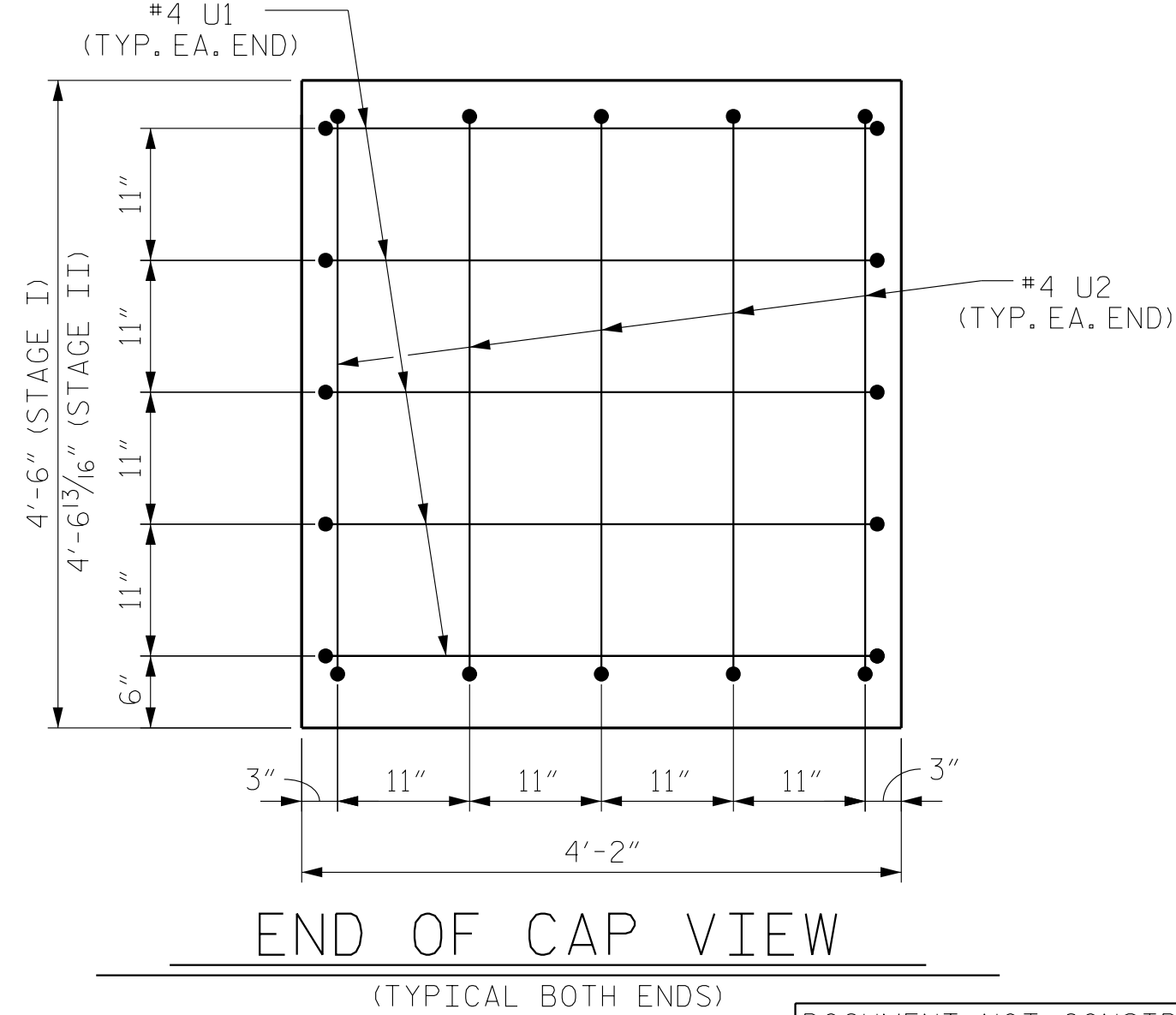
END ELEVATION



SECTION THRU CAP



BAR TYPES



END OF CAP VIEW

(TYPICAL BOTH ENDS)

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BILL OF MATERIAL											
FOR BENT 1 STAGE I					FOR BENT 1 STAGE II						
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	4	36'-6"	745	B5	6	#9	4	36'-6"	745
B2	6	#9	STR	57'-3"	1168	B6	6	#9	STR	45'-5"	927
B3	8	#5	STR	59'-5"	496	B7	8	#5	STR	46'-3"	386
B4	6	#9	4	30'-9"	627	B8	6	#9	STR	18'-11"	386
B9	6	#4	STR	12'-5"	50	B9	6	#4	STR	12'-5"	50
B10	2	#5	STR	25'-1"	52	B11	2	#5	STR	12'-2"	25
M1	32	#9	4	26'-10"	2919	M2	16	#9	4	31'-10"	1732
M2	32	#9	4	31'-10"	3463	M3	32	#9	4	29'-10"	3246
S1	33	#5	2	13'-1"	450	S1	33	#5	2	13'-1"	450
S2	31	#5	2	14'-1"	455	S2	22	#5	2	14'-1"	323
U1	58	#4	3	6'-10"	265	U1	47	#4	3	6'-10"	215
U2	5	#4	3	7'-2"	24	U2	5	#4	3	7'-2"	24
REINFORCING STEEL					10,714 LBS.	REINFORCING STEEL					8,509 LBS.
SP-1	2	*	5	463'-8"	967	SP-2	1	*	5	568'-8"	593
SP-2	2	*	5	568'-8"	1186	SP-3	2	*	5	524'-11"	1095
SPIRAL COLUMN REINF. STEEL					2,153 LBS.	SPIRAL COLUMN REINF. STEEL					1,688 LBS.
THE SPIRAL REINFORCING STEEL SHALL * BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.						THE SPIRAL REINFORCING STEEL SHALL * BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE BREAKDOWN						CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					3.6 C.Y.	POUR #2 (COLUMNS)					2.7 C.Y.
POUR #3 (CAP)					43.4 C.Y.	POUR #3 (CAP)					35.2 C.Y.
TOTAL CLASS A CONCRETE					47.0 C.Y.	TOTAL CLASS A CONCRETE					37.9 C.Y.
DRILLED PIERS:						DRILLED PIERS:					
DRILLED PIER CONCRETE						DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)					29.9 C.Y.	POUR #1 (DRILLED PIERS)					23.7 C.Y.
3'-6" DRILLED PIER NOT IN SOIL					35.4 LIN. FT.	3'-6" DRILLED PIER NOT IN SOIL					26.6 LIN. FT.
3'-6" DRILLED PIER IN SOIL					50.6 LIN. FT.	3'-6" DRILLED PIER IN SOIL					37.9 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" DRILLED PIER					40.0 LIN. FT.	PERMANENT STEEL CASING FOR 3'-6" DRILLED PIER					30.0 LIN. FT.
CSL TUBES					400.0 LIN. FT.	CSL TUBES					314.0 LIN. FT.

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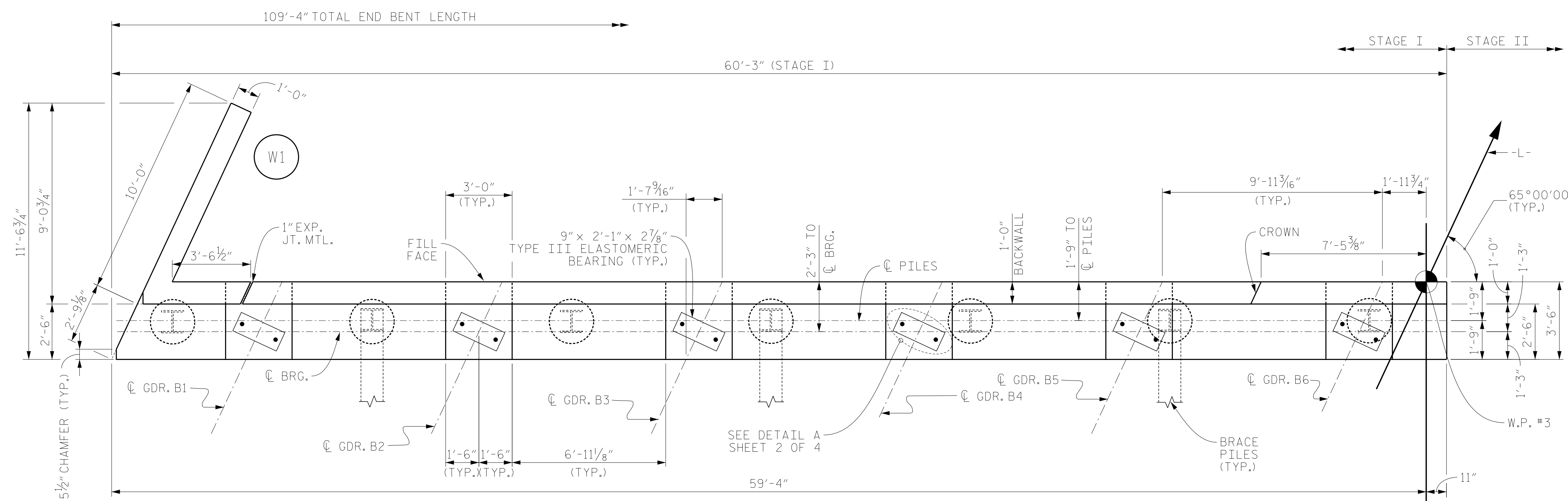
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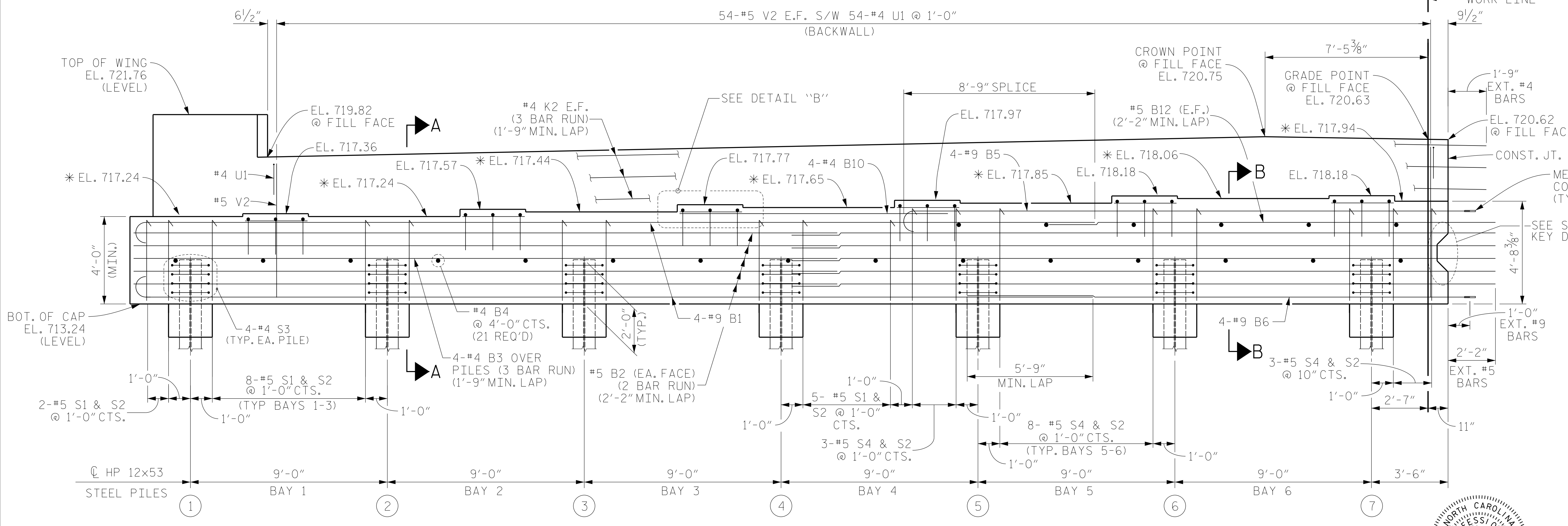
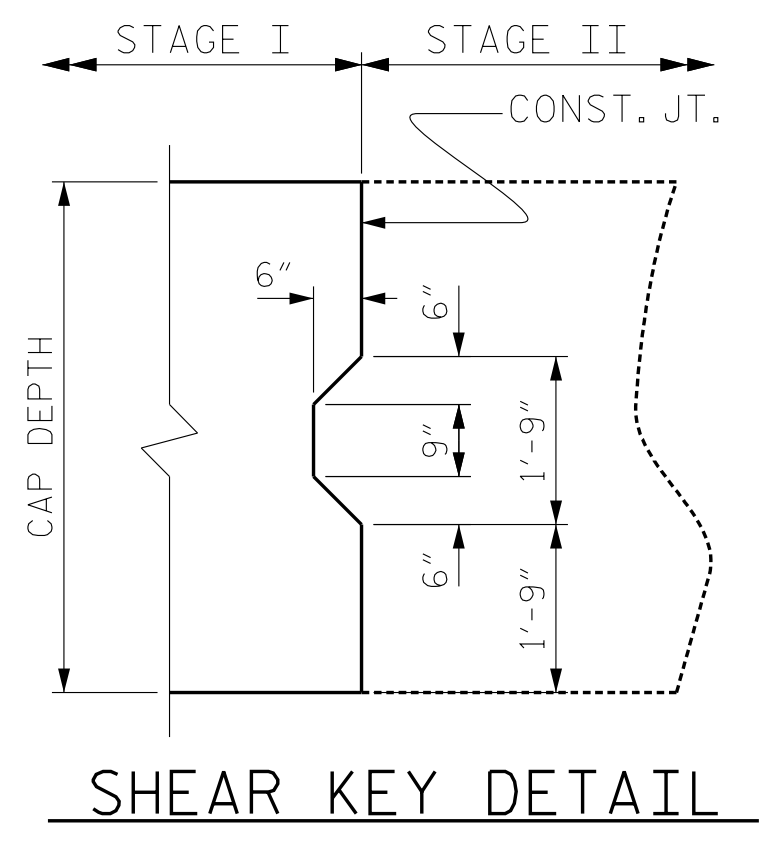
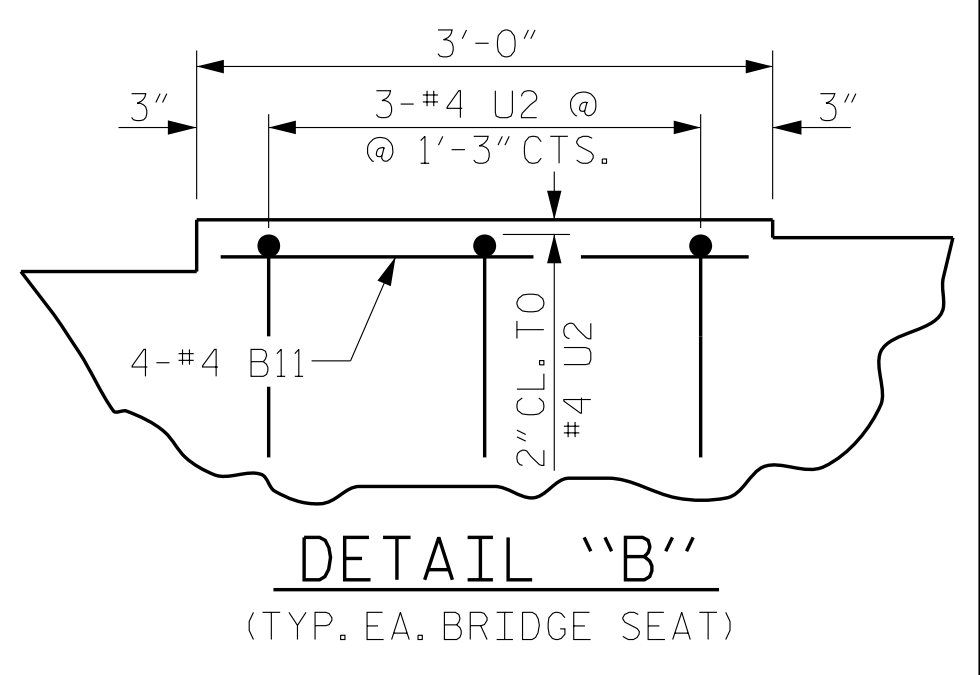
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SUBSTRUCTURE
BENT No. 1
DETAILS

REVISIONS						SHEET NO.	
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2			4				



PLAN



ELEVATION

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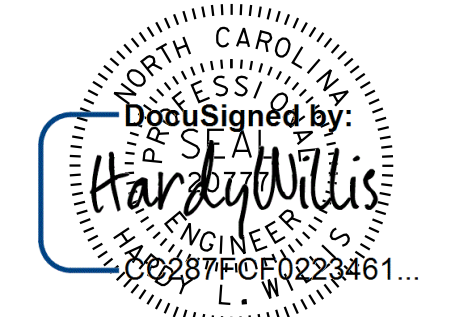
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**SUBSTRUCTURE
END BENT 2
STAGE I**



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SHEET NO. S-31
TOTAL SHEETS 39

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NOTES

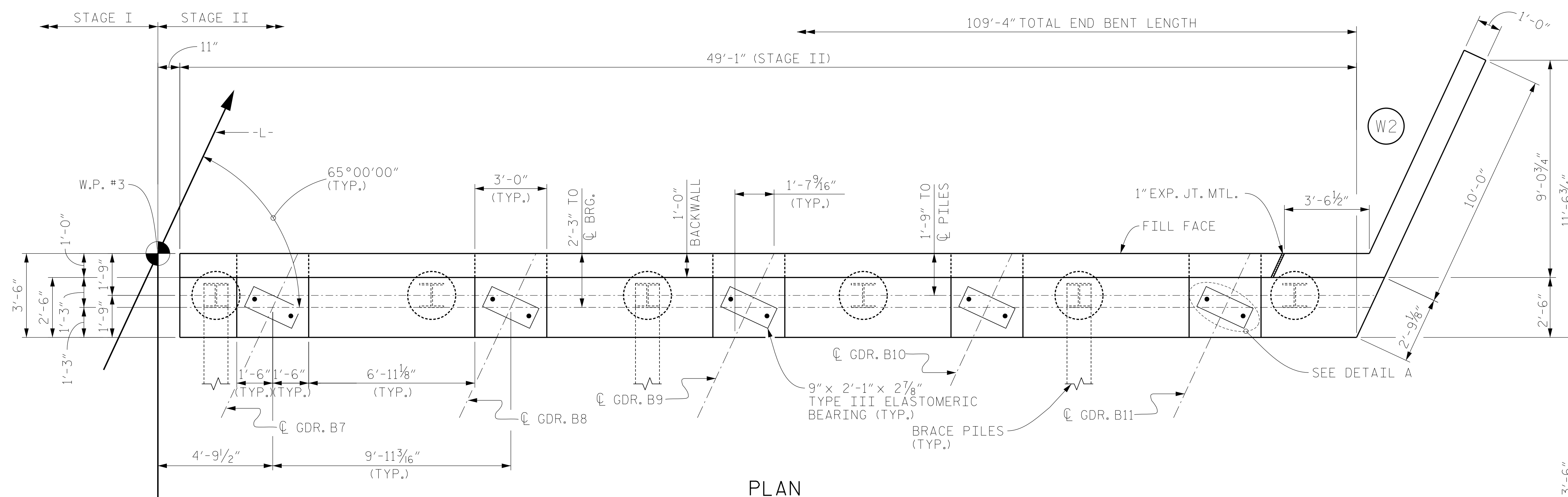
STIRRUPS IN CAPS MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

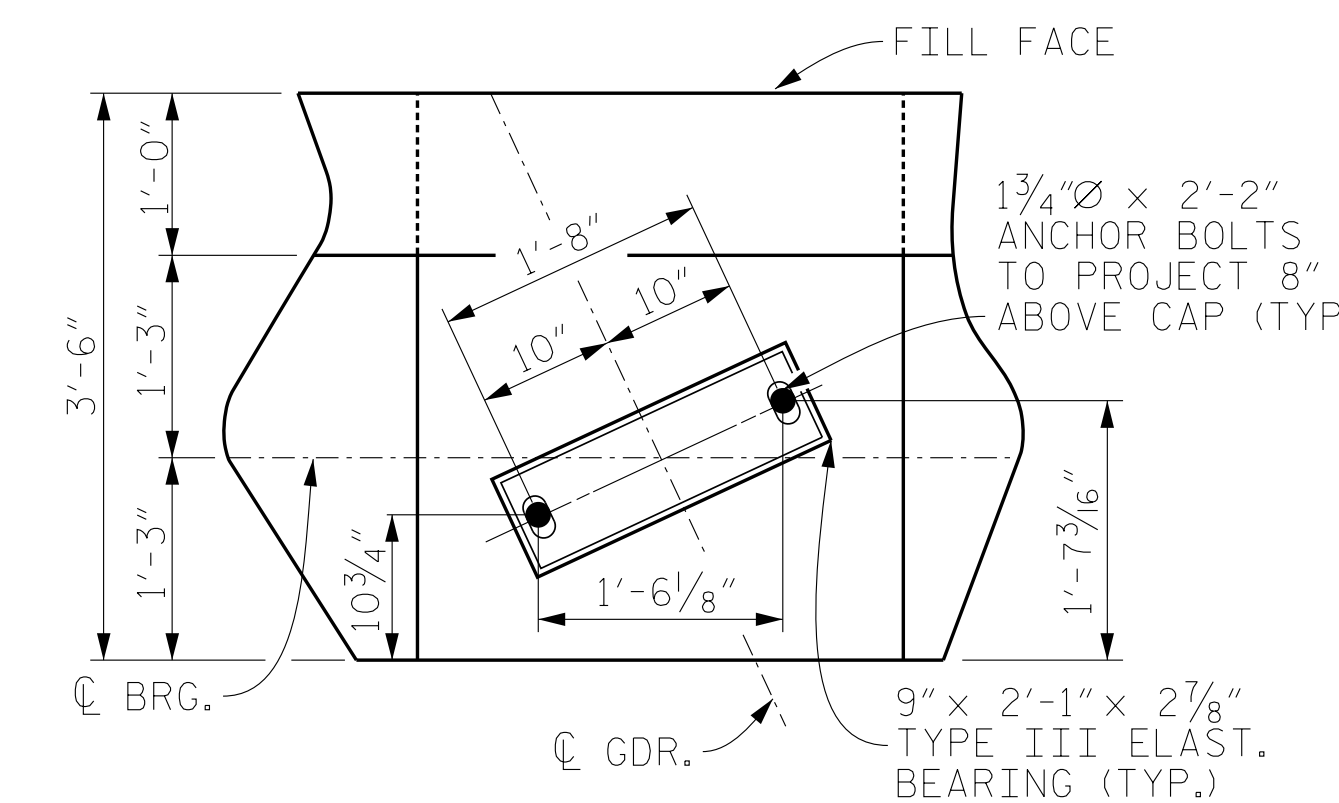
EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE PLACED.

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

THE TOP SURFACE AREAS OF THE CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING METHOD SHALL NOT BE USED.

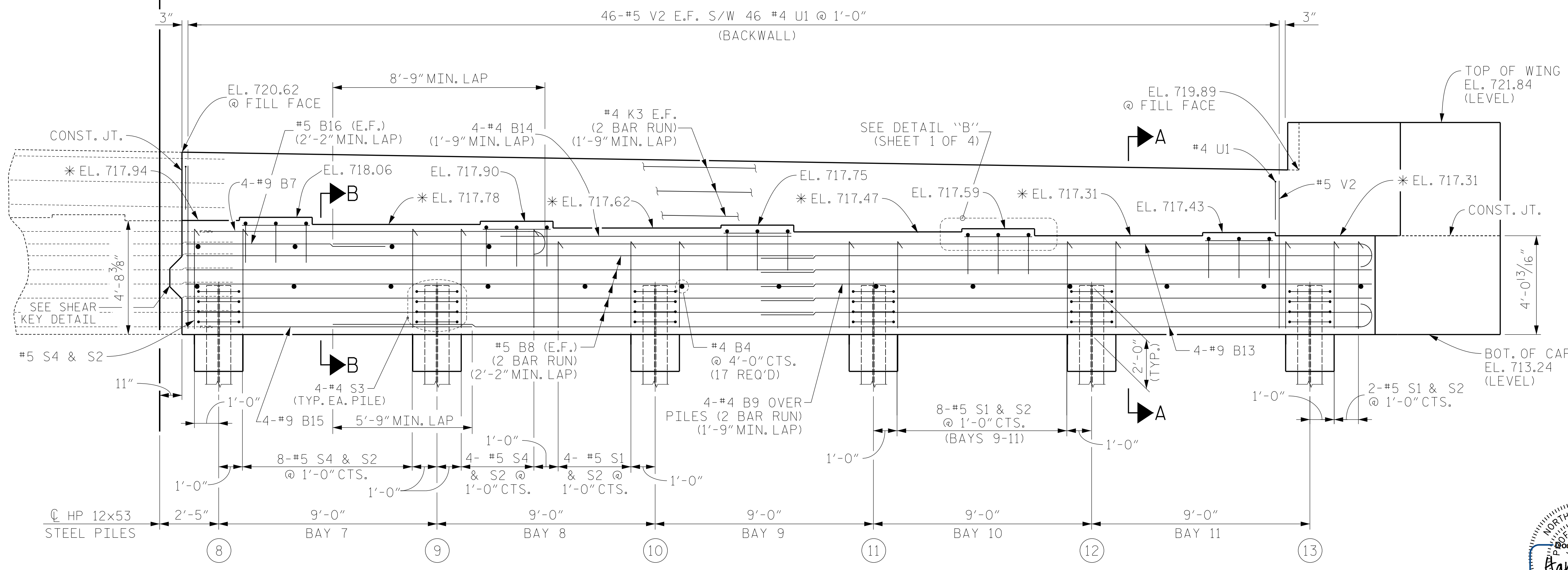


PLAN



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH GIRDER)



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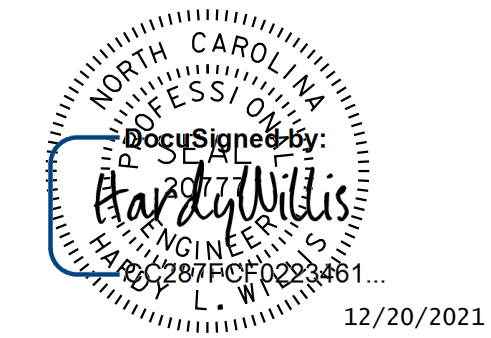
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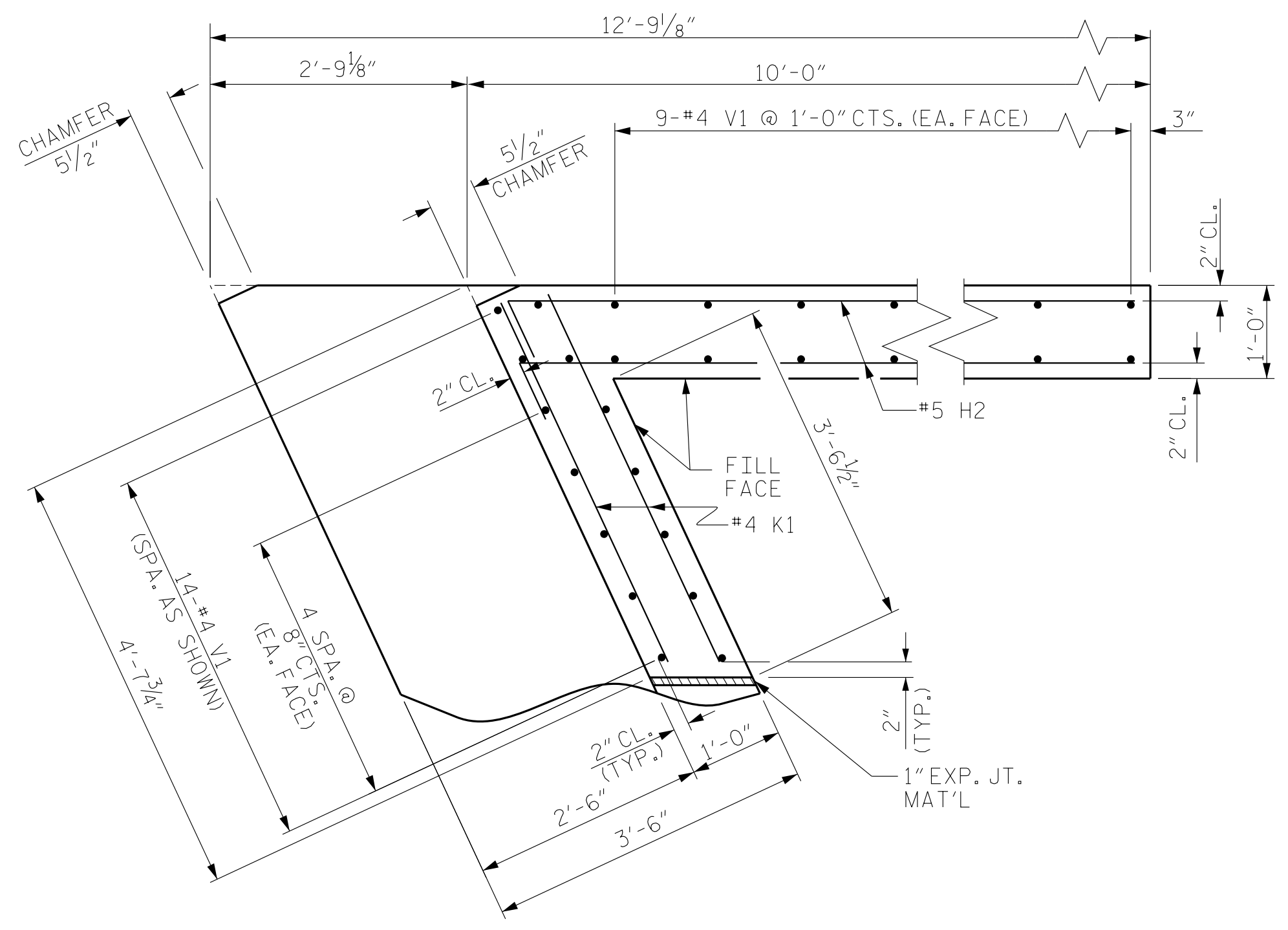
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**SUBSTRUCTURE
 END BENT 2
 STAGE II**

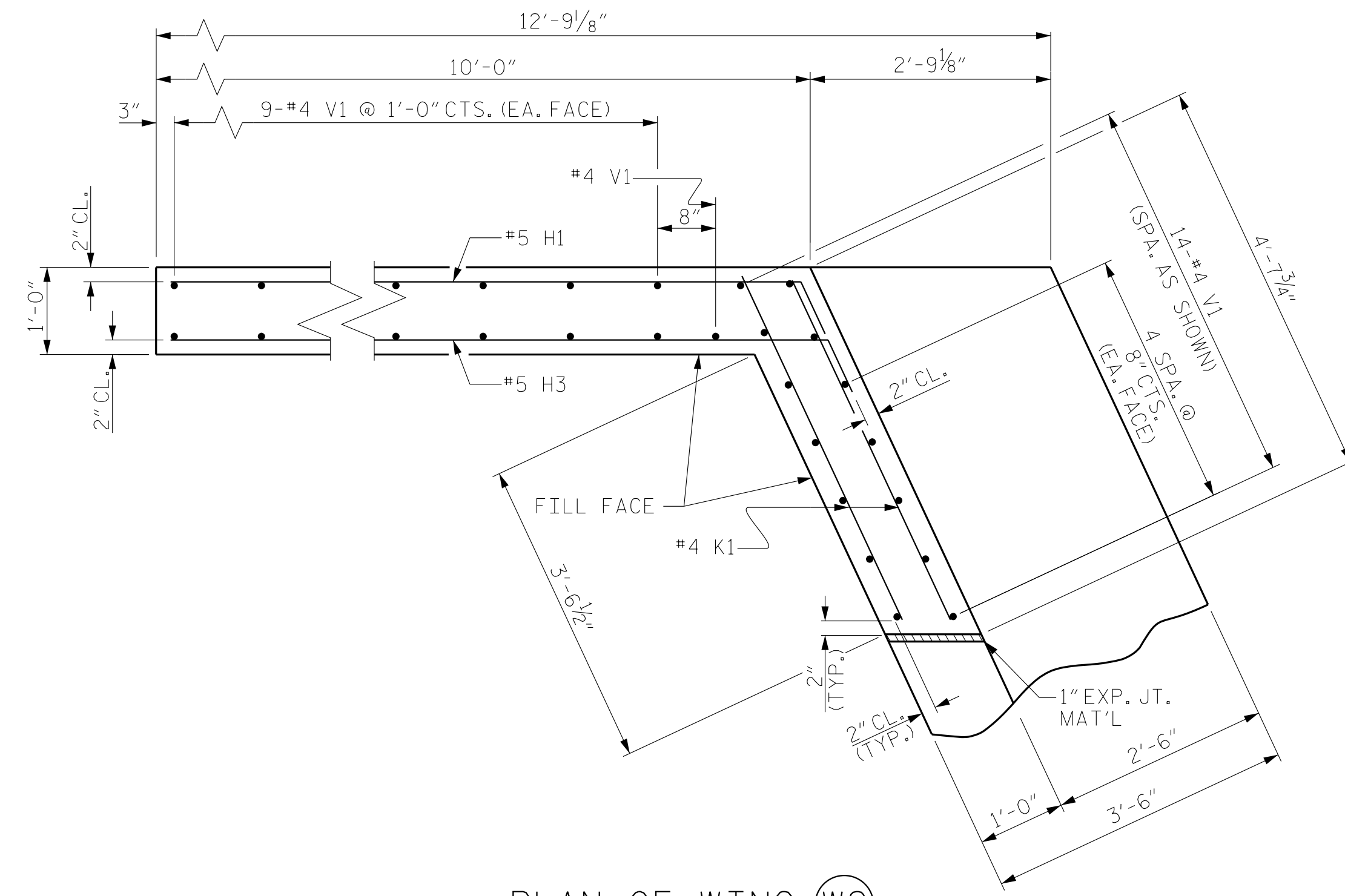


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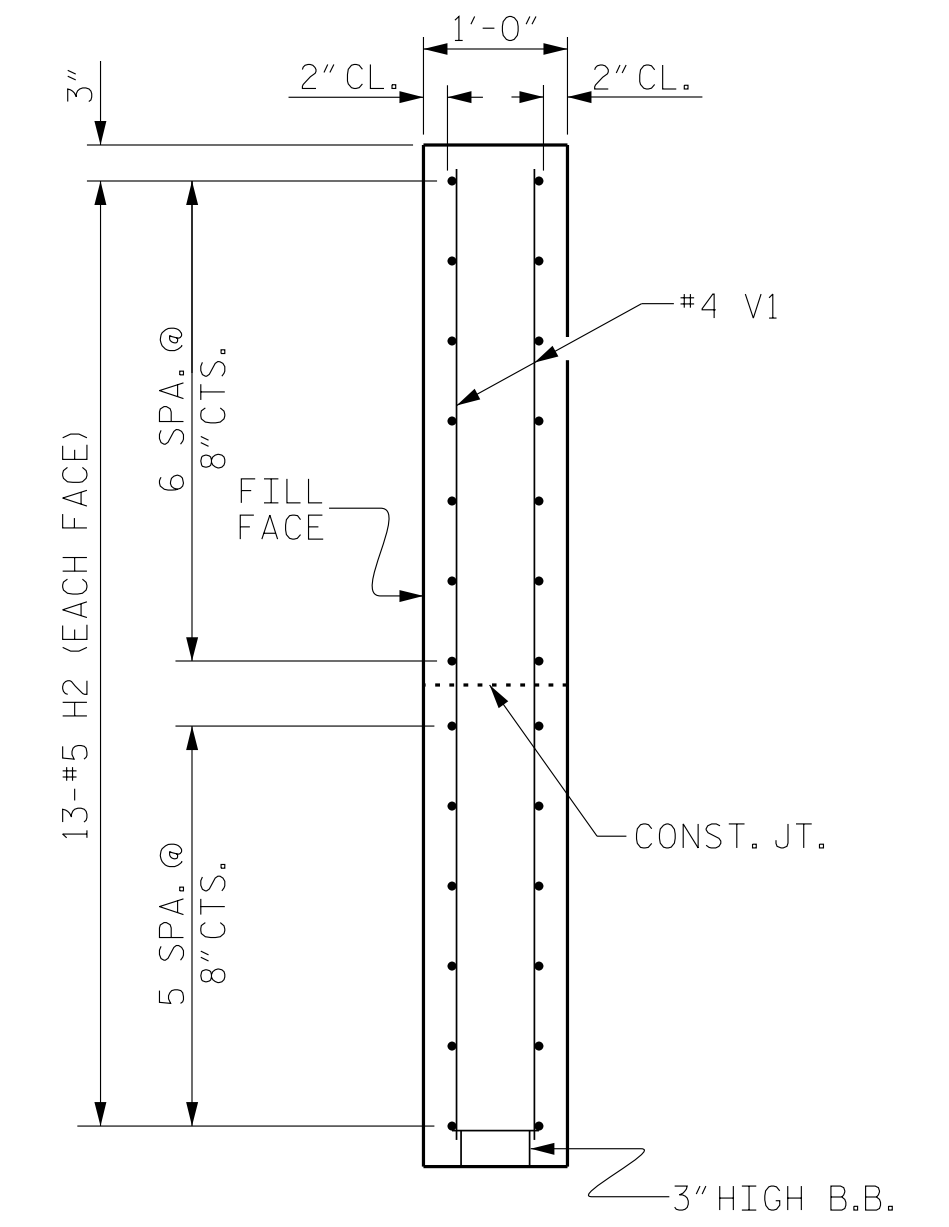
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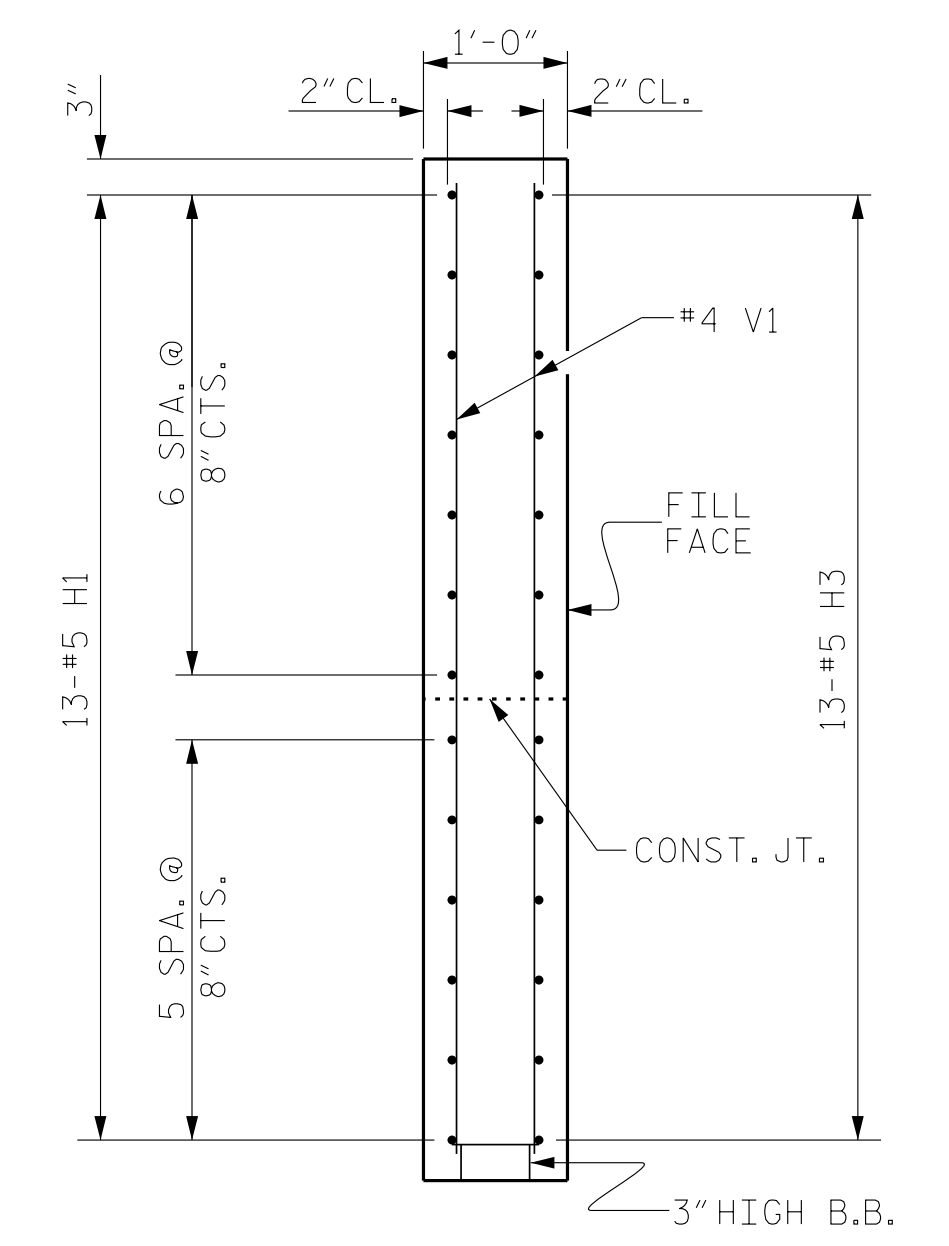
PLAN OF WING (W1)
STAGE I



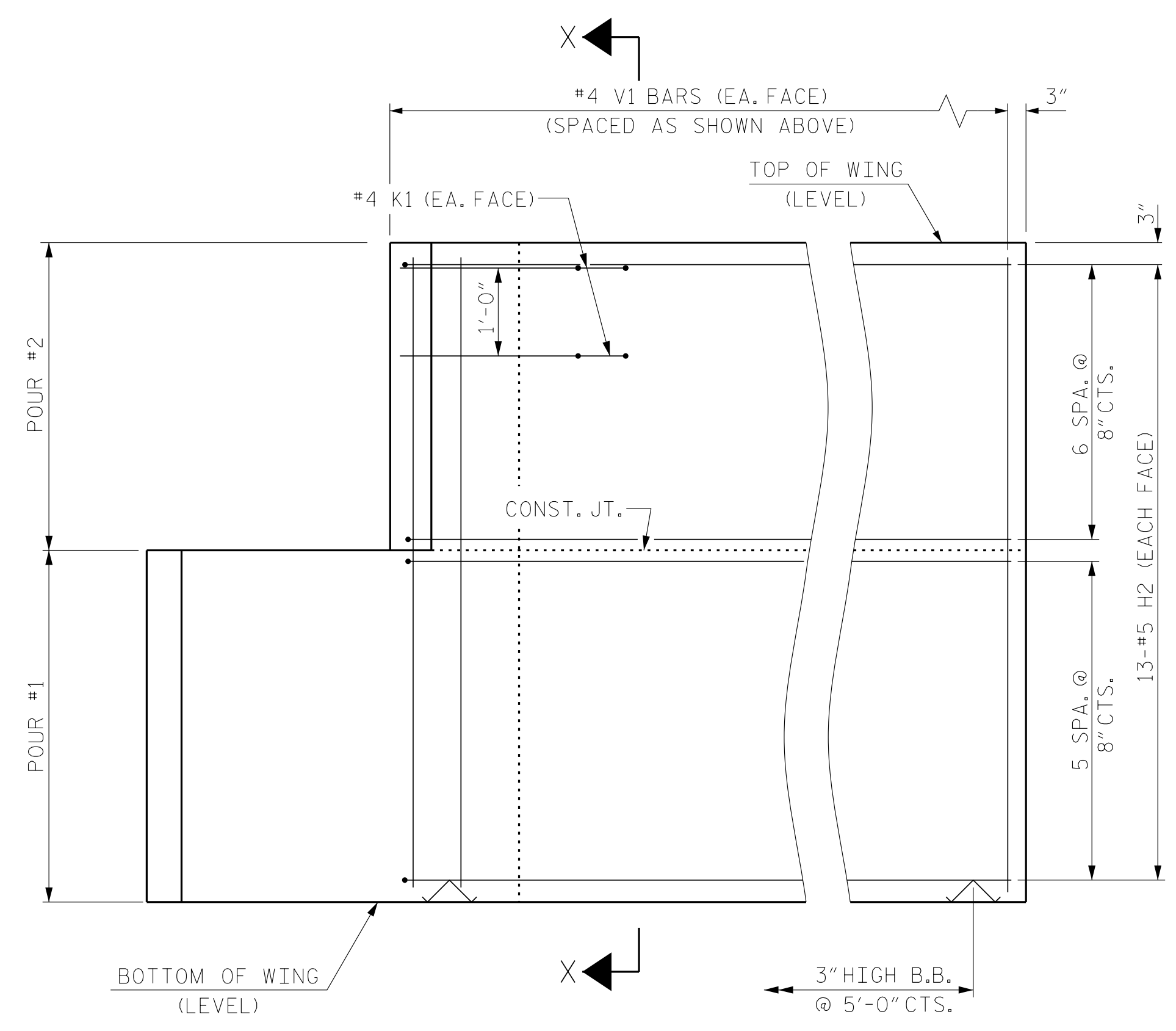
PLAN OF WING (W2)
STAGE II



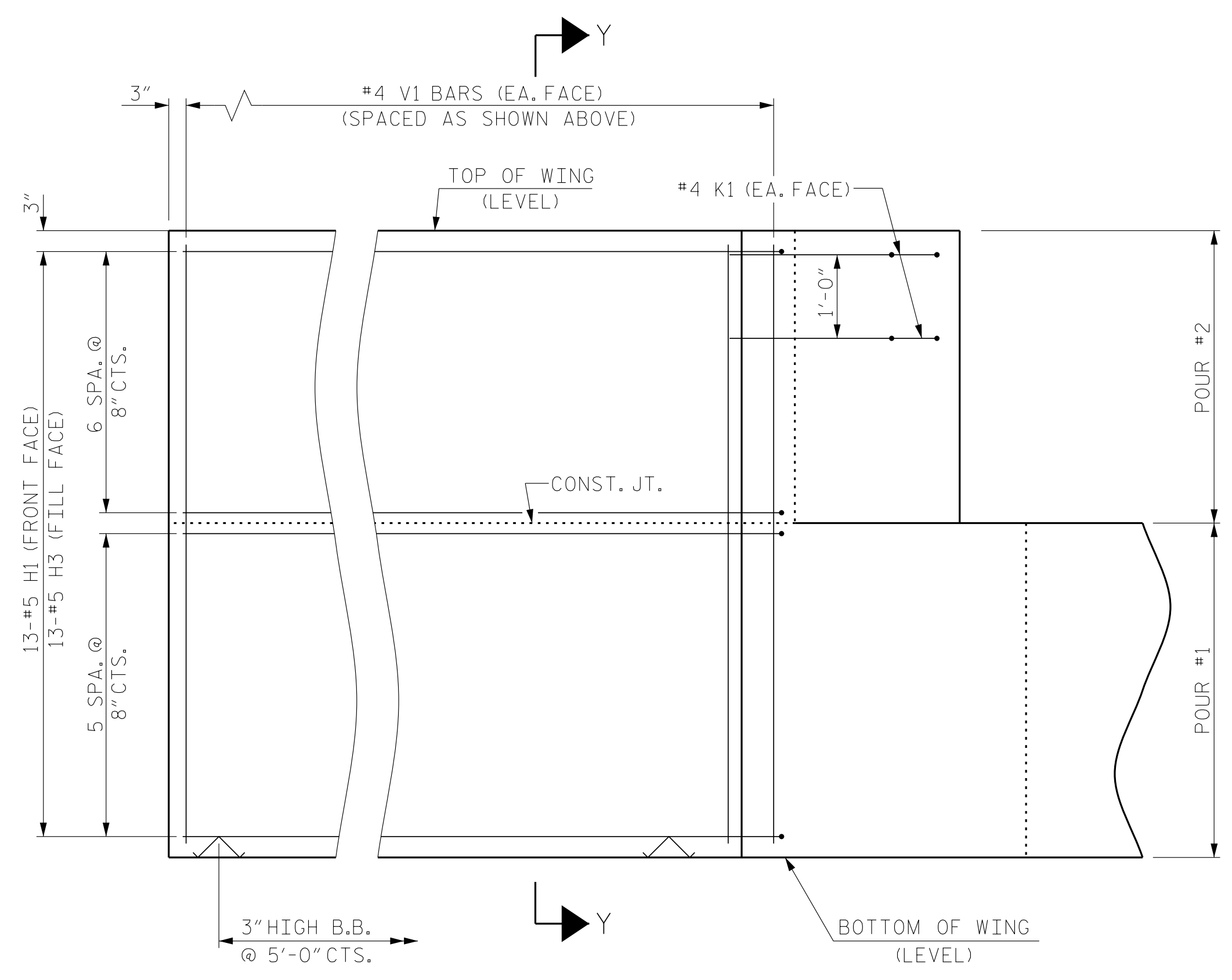
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)
STAGE I



ELEVATION OF WING (W2)
STAGE II

WING DETAILS

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SHEET 3 OF 4

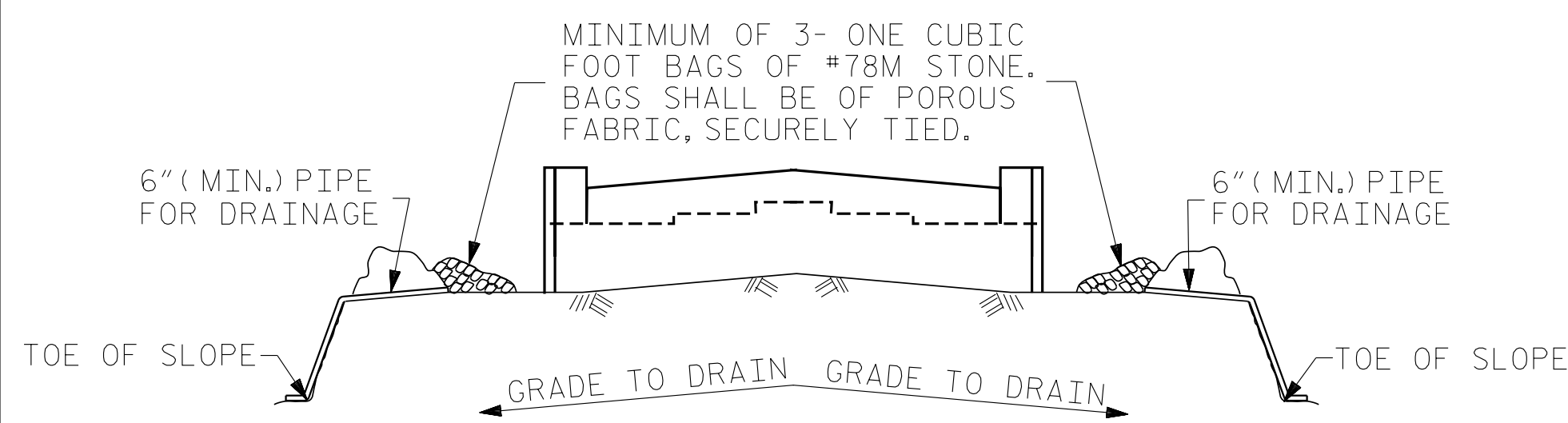
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DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 2
WING DETAILS

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SHEET NO. S-33
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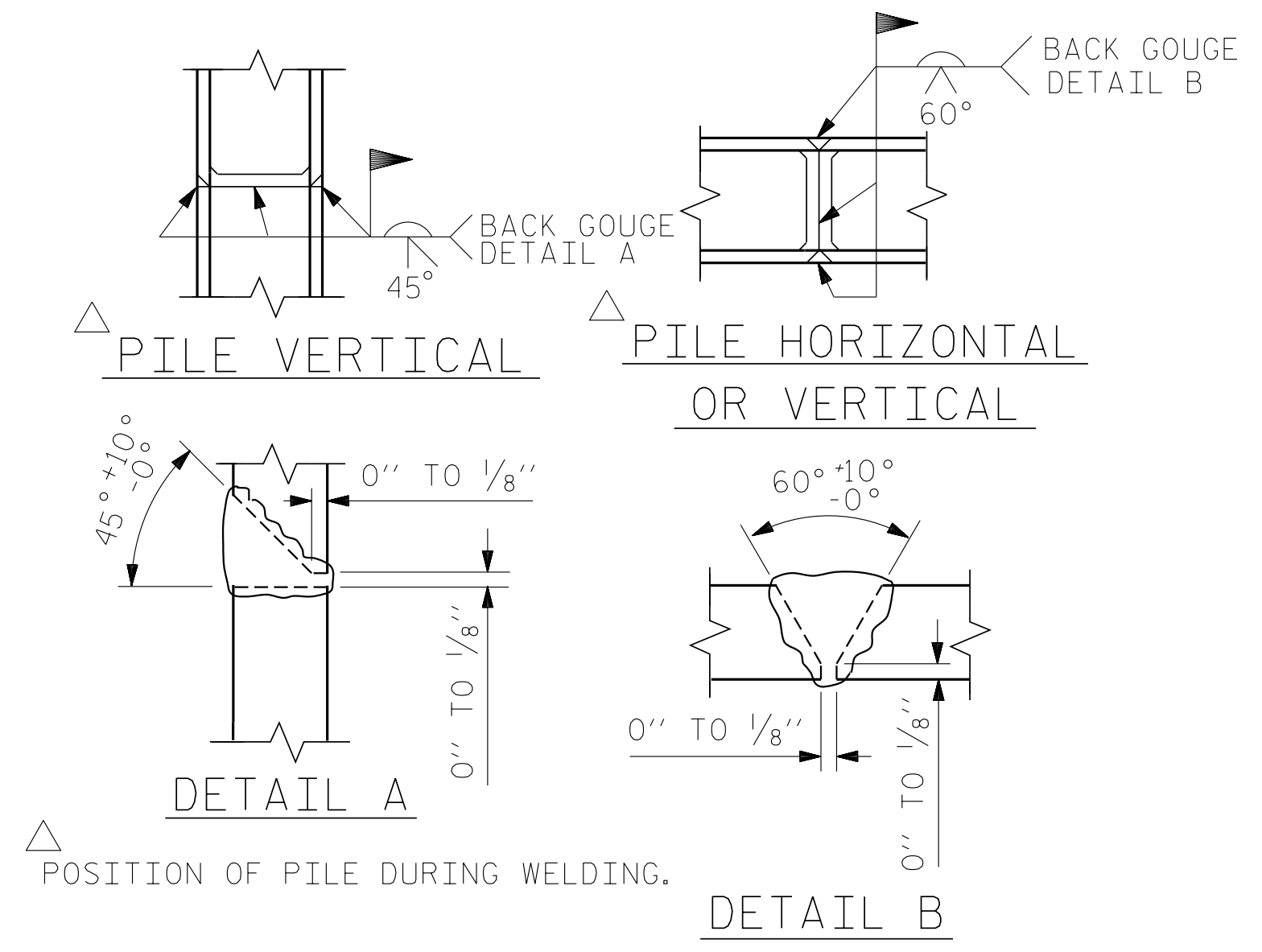


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

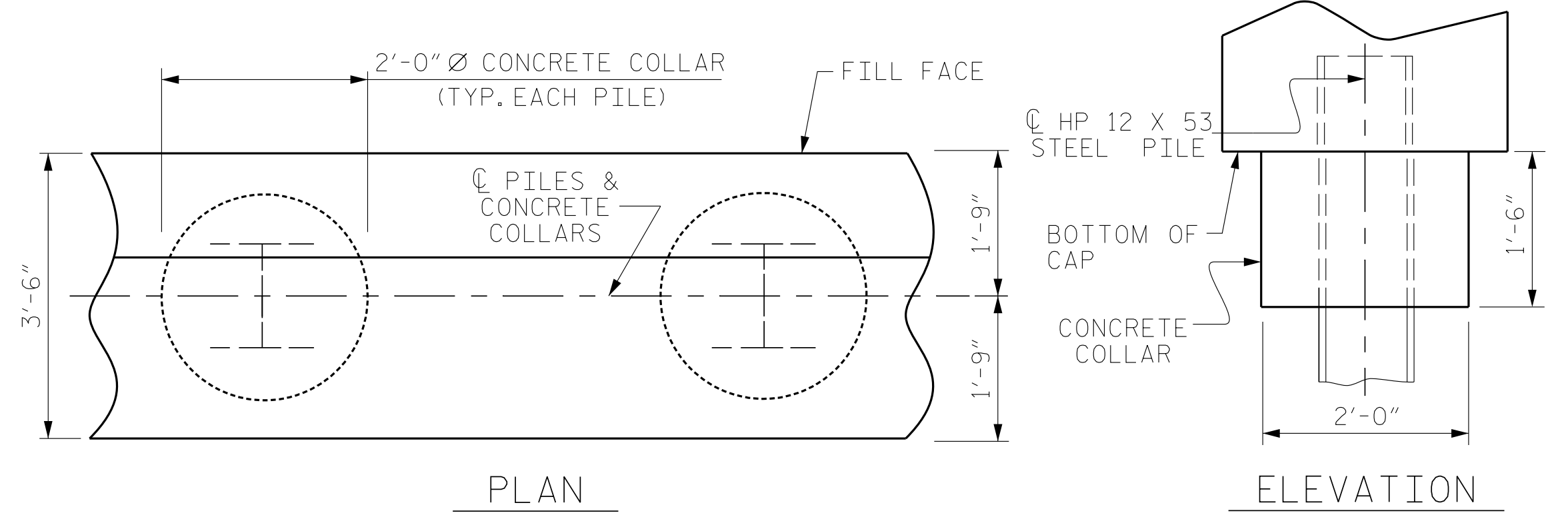
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

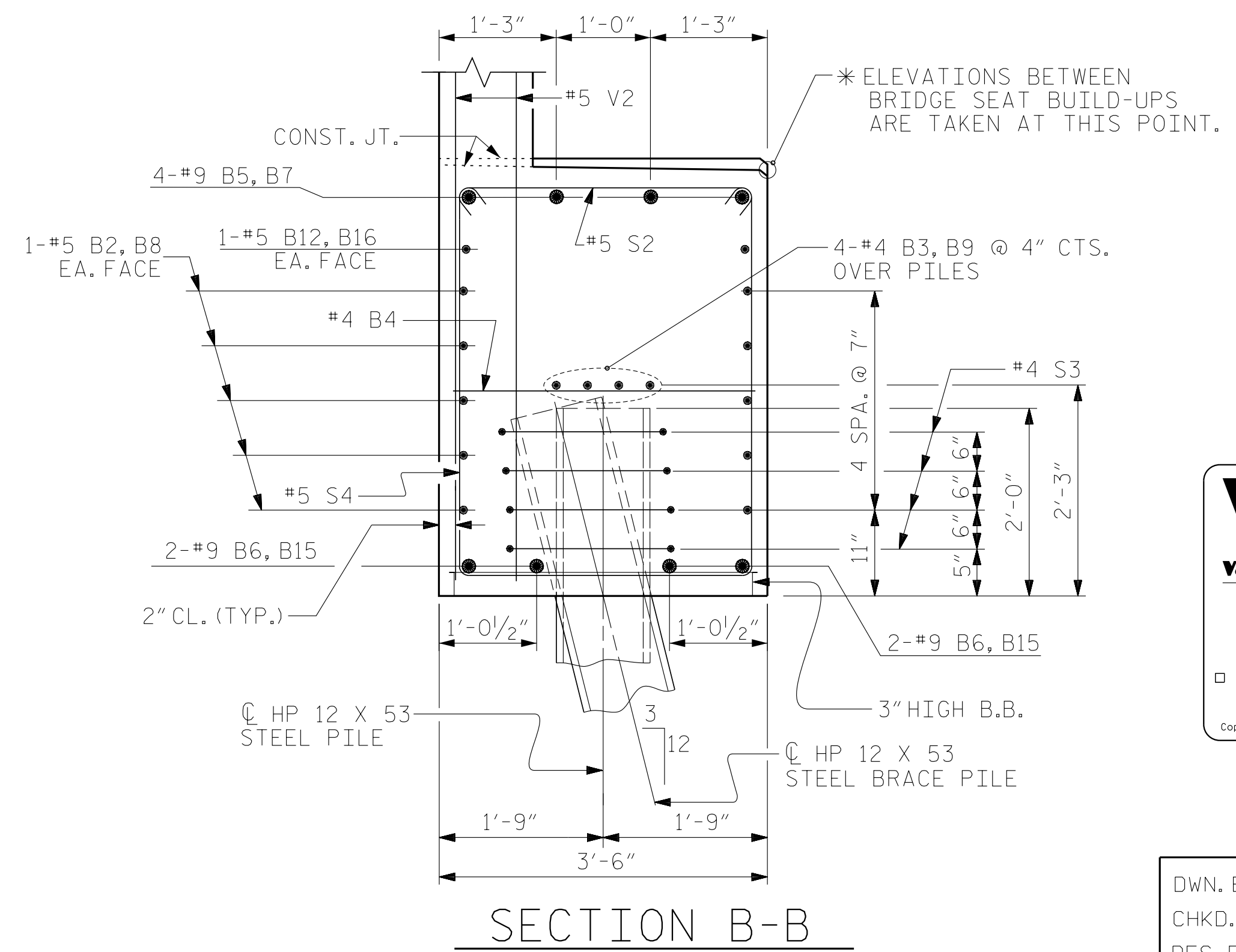
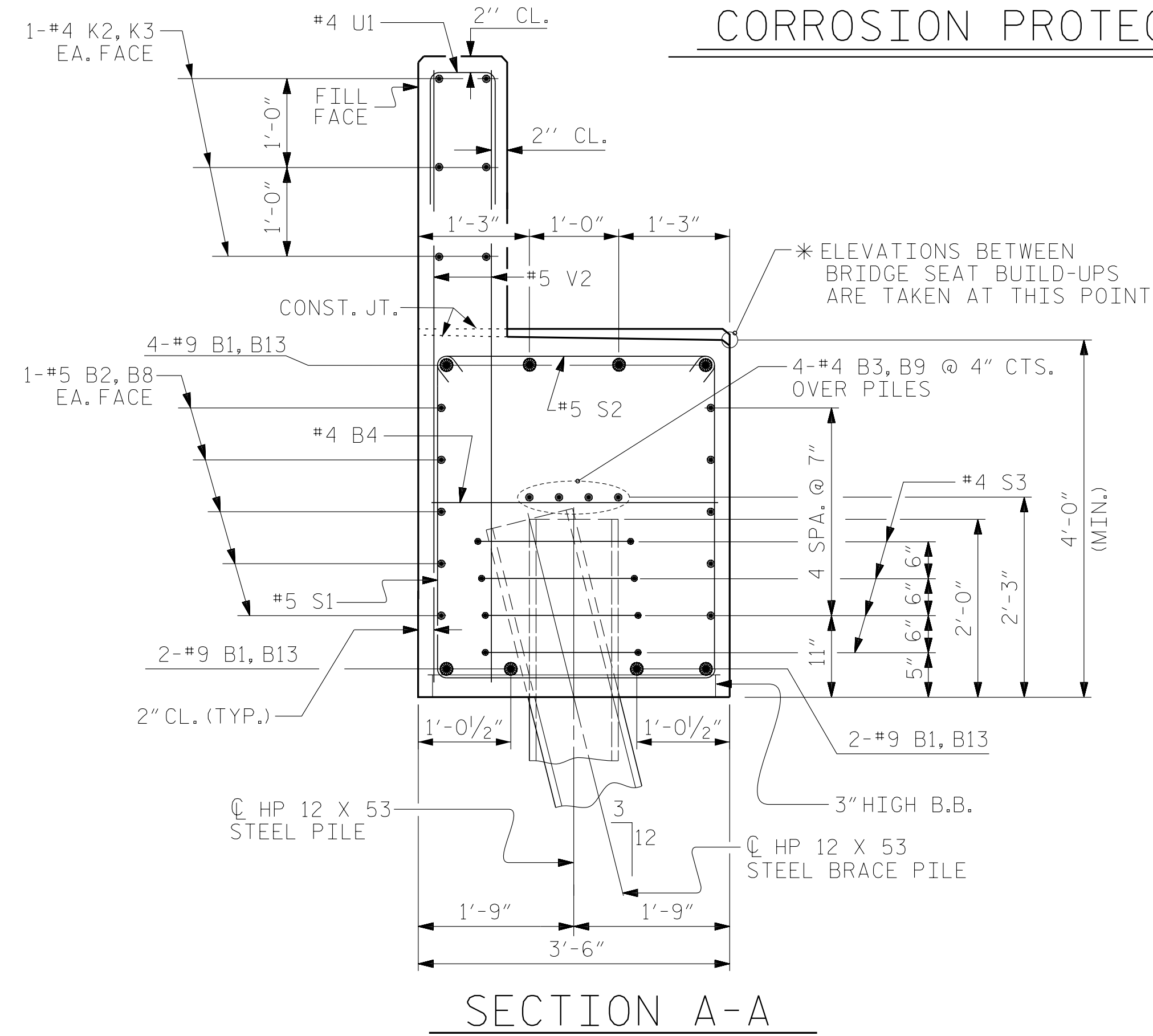
TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS



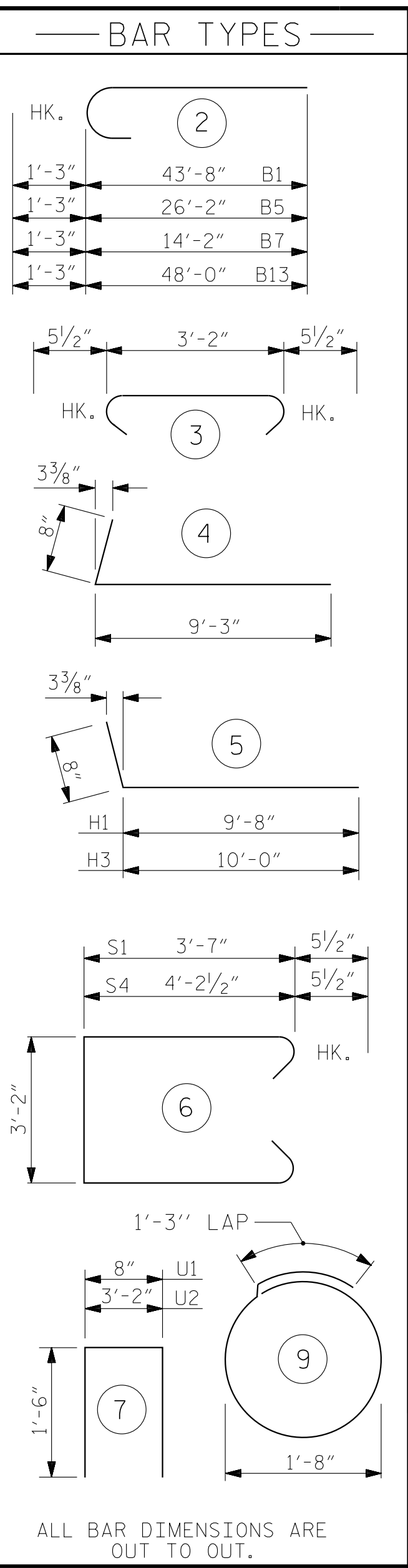
CORROSION PROTECTION FOR STEEL PILES DETAIL



BILL OF MATERIAL

END BENT 2

STAGE I					STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	2	44'-11"	1,222	B4	17	#4	STR	3'-2"	36
B2	20	#5	STR	30'-11"	645	B7	4	#9	STR	15'-5"	210
B3	12	#4	STR	21'-0"	168	B8	20	#5	STR	26'-3"	548
B4	21	#4	STR	3'-2"	44	B9	8	#4	STR	25'-10"	138
B5	4	#9	2	27'-5"	373	B11	20	#4	STR	2'-8"	36
B6	4	#9	STR	23'-2"	315	B13	8	#9	2	44'-0"	1,197
B10	4	#4	STR	12'-6"	33	B14	4	#4	STR	12'-0"	33
B11	24	#4	STR	2'-8"	43	B15	4	#9	STR	11'-2"	152
B12	2	#5	STR	21'-1"	44	B16	2	#5	STR	8'-6"	35
H2	26	#5	4	9'-11"	269	H1	13	#5	5	10'-4"	140
K1	4	#4	STR	4'-3"	11	H3	13	#5	5	10'-8"	145
K2	18	#4	STR	21'-0"	253	K1	4	#4	STR	4'-3"	11
S1	31	#5	6	11'-3"	364	K3	12	#4	STR	26'-0"	208
S2	53	#5	3	4'-1"	226	S1	30	#5	6	11'-3"	352
S3	28	#4	9	6'-6"	122	S2	43	#5	3	4'-1"	183
S4	22	#5	6	12'-6"	287	S3	24	#4	9	6'-6"	104
U1	54	#4	7	3'-8"	132	S4	13	#5	6	12'-6"	169
U2	18	#4	7	6'-2"	74	U1	46	#4	7	3'-8"	113
V1	32	#4	STR	8'-2"	175	U2	15	#4	7	6'-2"	62
V2	108	#5	STR	6'-4"	713	V1	33	#4	STR	8'-3"	182
						V2	92	#5	STR	6'-4"	608
REINFORCING STEEL					5,513 LBS.	REINFORCING STEEL					4,662 LBS.
CLASS A CONCRETE BREAKDOWN						CLASS A CONCRETE BREAKDOWN					
POUR 1: CAP, BOT OF WINGS, PILE COLLARS					36.8 C.Y.	POUR 1: CAP, BOT OF WINGS, PILE COLLARS					30.7 C.Y.
POUR 2: BACKWALL, UPPER PART OF WINGS					8.0 C.Y.	POUR 2: BACKWALL, UPPER PART OF WINGS					7.1 C.Y.
TOTAL CLASS A CONCRETE					44.8 C.Y.	TOTAL CLASS A CONCRETE					37.8 C.Y.
HP 12 X 53 STEEL PILES					NO: 7	HP 12 X 53 STEEL PILES					NO: 6
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					NO: 6
PILE POINTS					NO: 7	PILE POINTS					NO: 6



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PROJECT NO. U-5738

ROWAN COUNTY

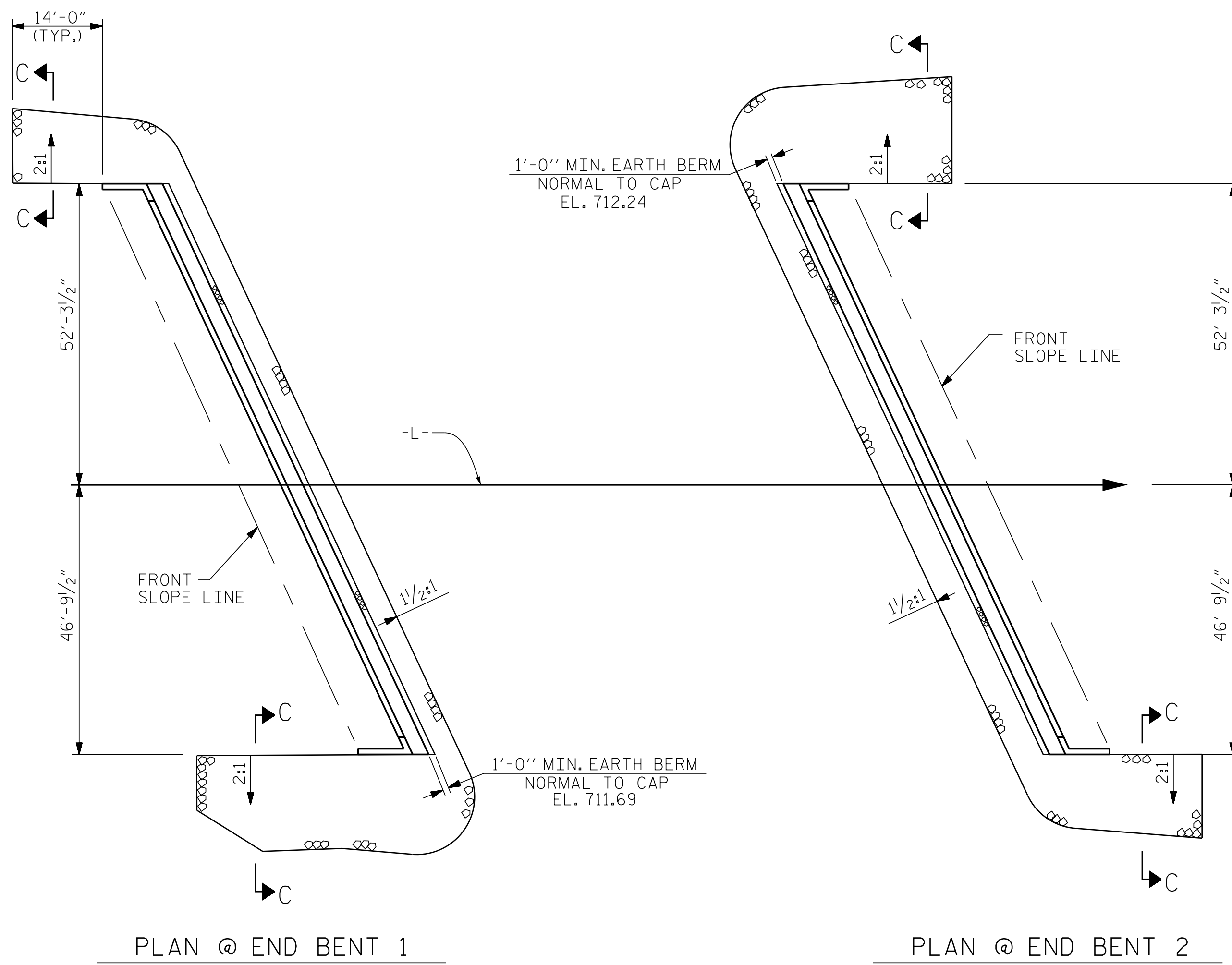
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SHEET 4 OF 4

STATE OF NORTH CAROLINA
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SUBSTRUCTURE
END BENT 2
DETAILS

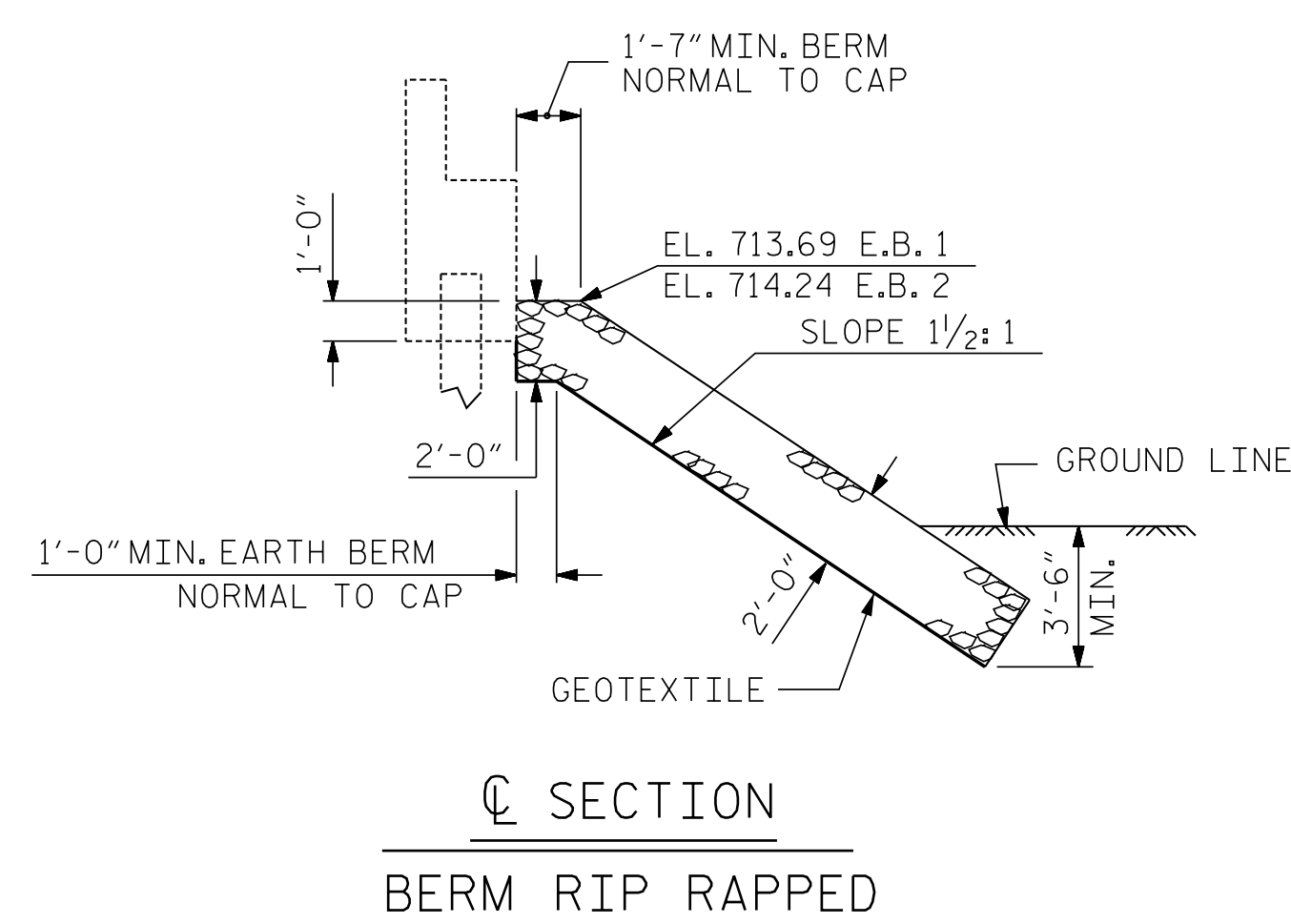
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CHKD. BY: CDB	DATE: 11/18	NO.	BY:	DATE:
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		2		
		3		
		4		
				TOTAL SHEETS
				39



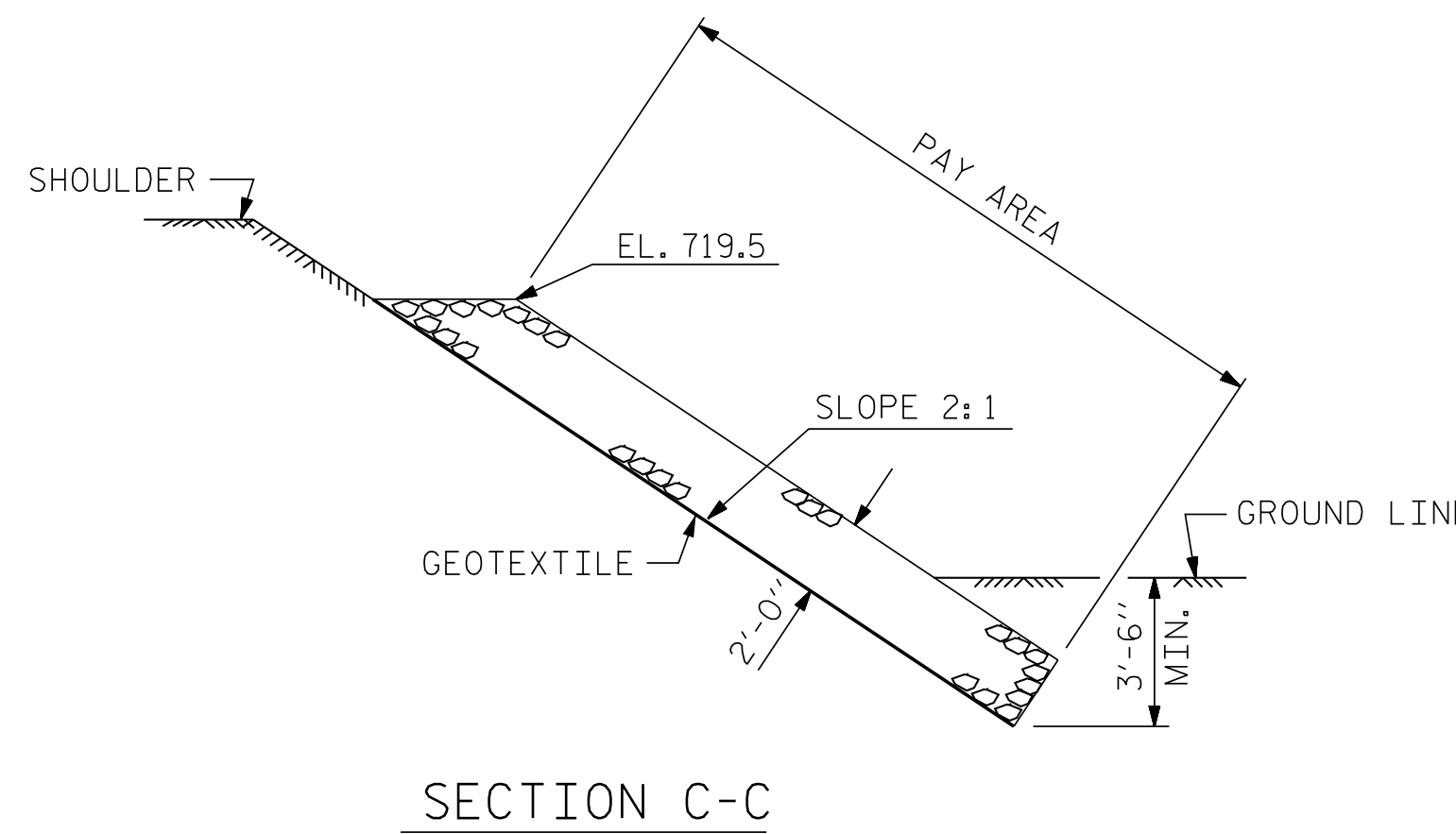
PLAN @ END BENT 1

PLAN @ END BENT 2

ESTIMATED QUANTITIES		
BRIDGE @ STA. 70+72.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	210	235
END BENT 2	250	275



SECTION
BERM RIP RAPPED



SECTION C-C

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PROJECT NO. U-5738
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STATION: 70+72.50 -L-

STATE OF NORTH CAROLINA
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STANDARD
RIP RAP DETAILS

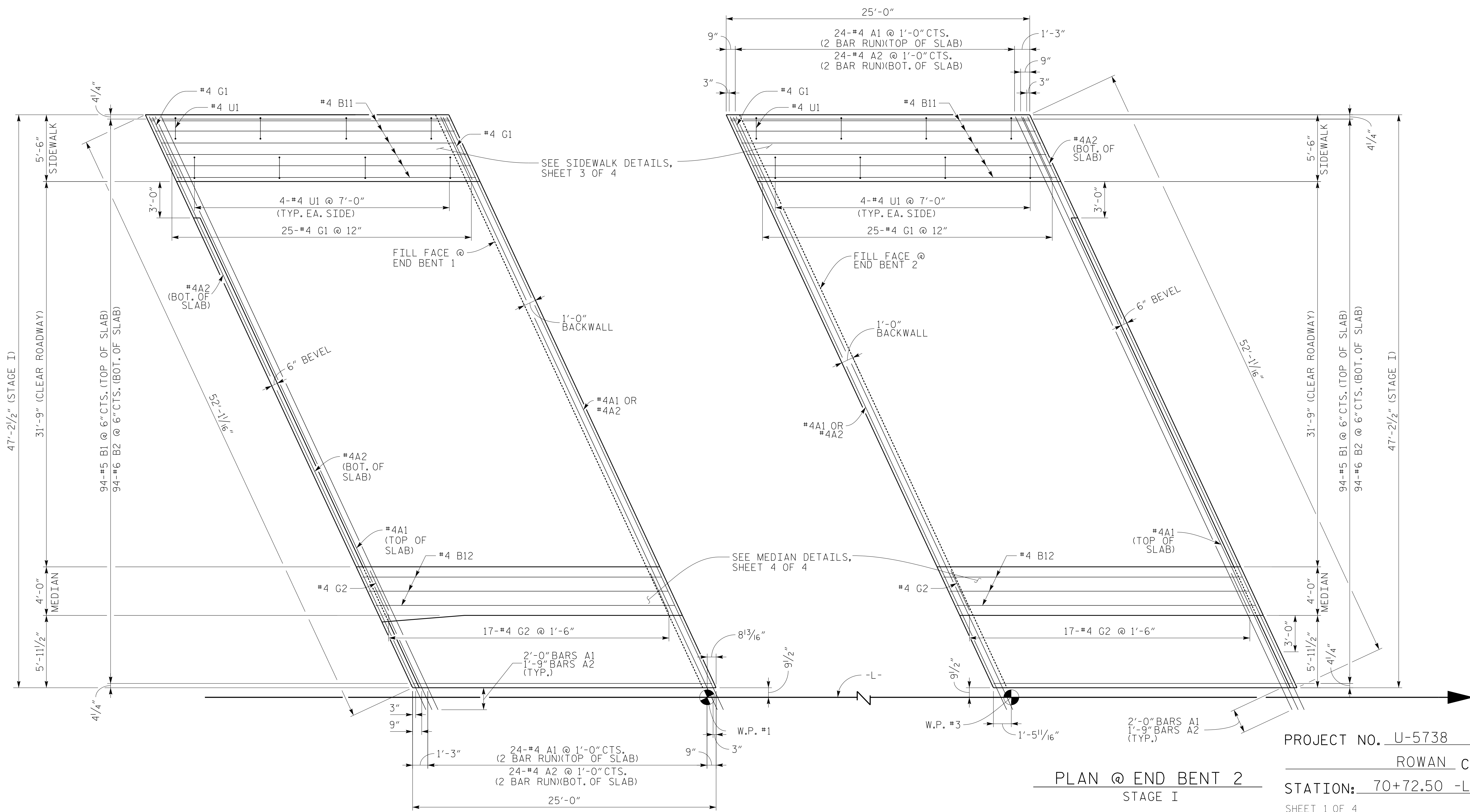


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CHECKED BY : CDB	DATE : 11/18	MAA/GM
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/THC
CHECKED BY : RDU 1/84	REV. 12/21/11	
	REV. 12/17	

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1			3			TOTAL SHEETS
2			4			39



PLAN @ END BENT 1
STAGE I

PLAN @ END BENT 2
STAGE I

PROJECT NO. U-5738
ROWAN COUNTY
STATION: 70+72.50 -L-
SHEET 1 OF 4

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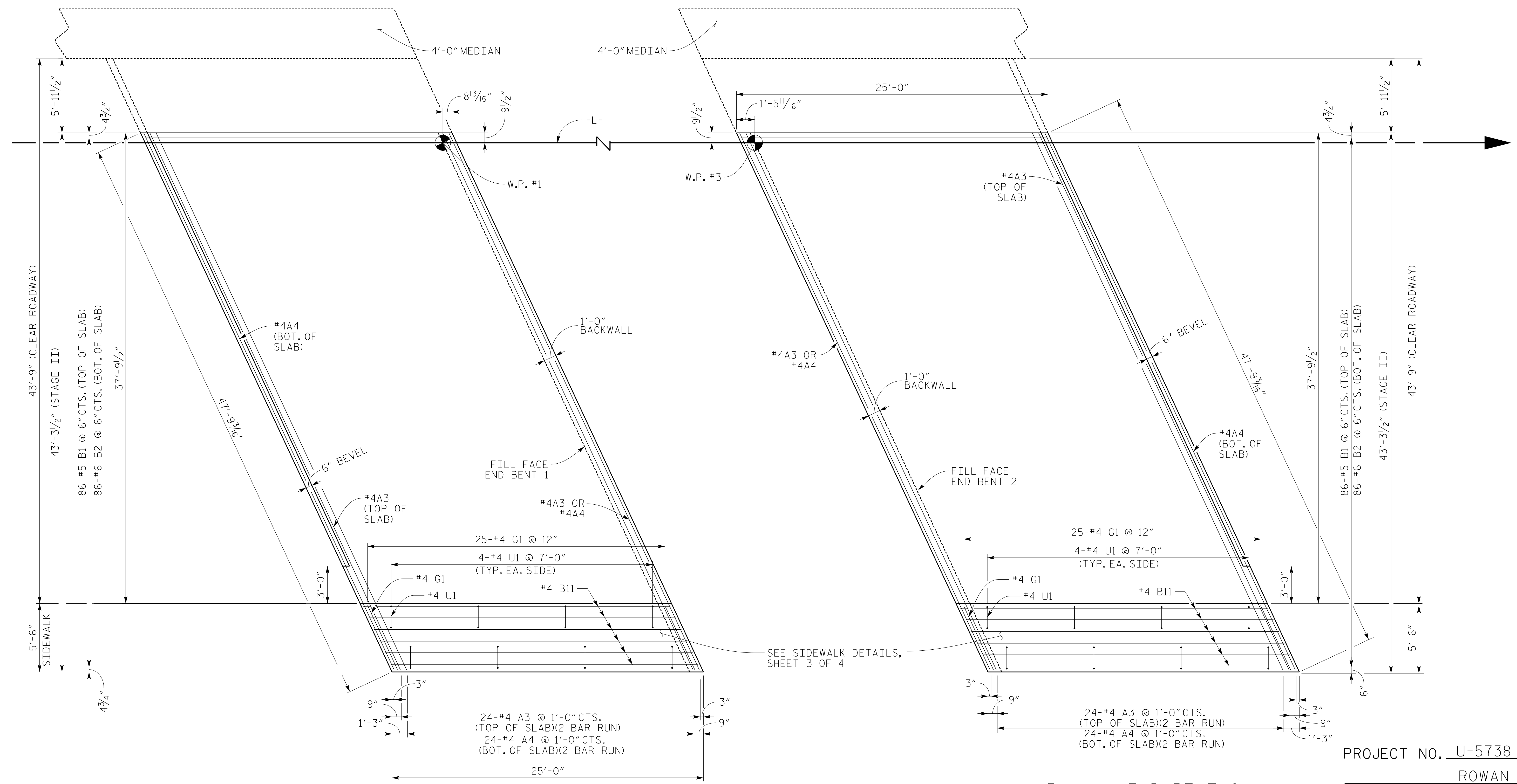
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STATE OF NORTH CAROLINA
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RALEIGH

BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT

STAGE I

REVISIONS						SHEET NO. S-36
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1			3			TOTAL SHEETS 39
2			4			



PLAN @ END BENT 1
STAGE II

PLAN @ END BENT 2
STAGE II

PROJECT NO. U-5738
 ROWAN COUNTY
 STATION: 70+72.50 -L-
 SHEET 2 OF 4

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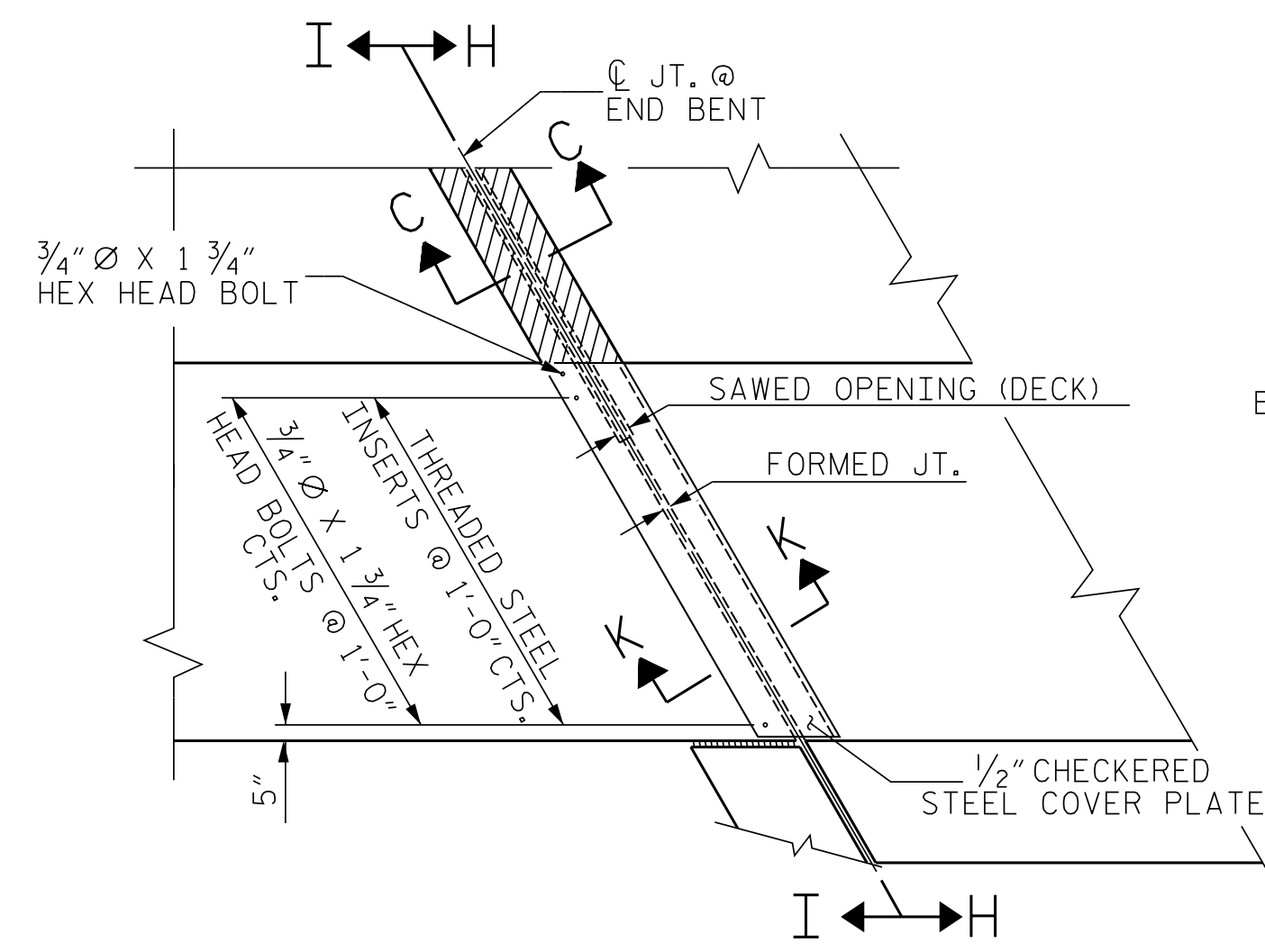
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

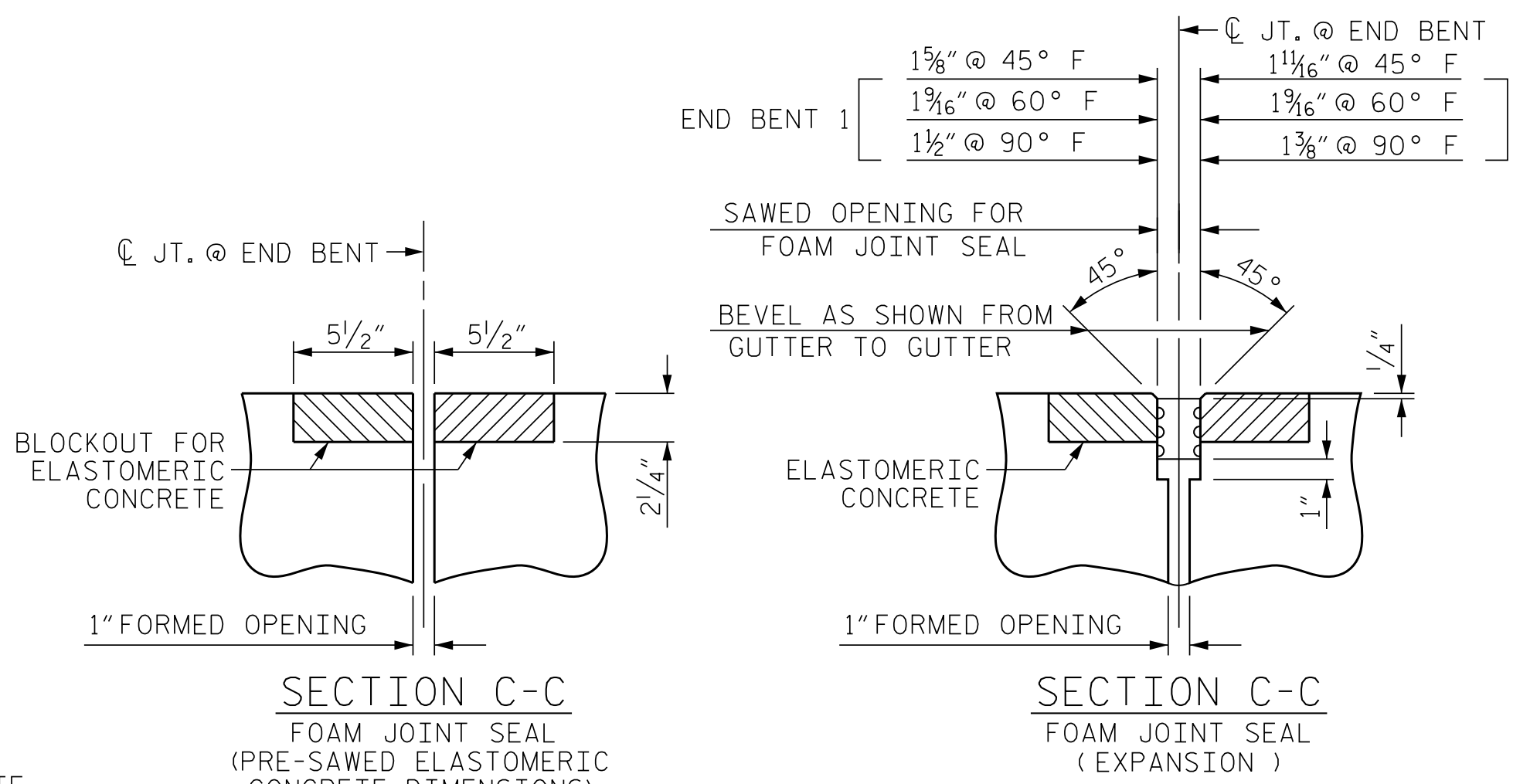
**BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT**

STAGE II

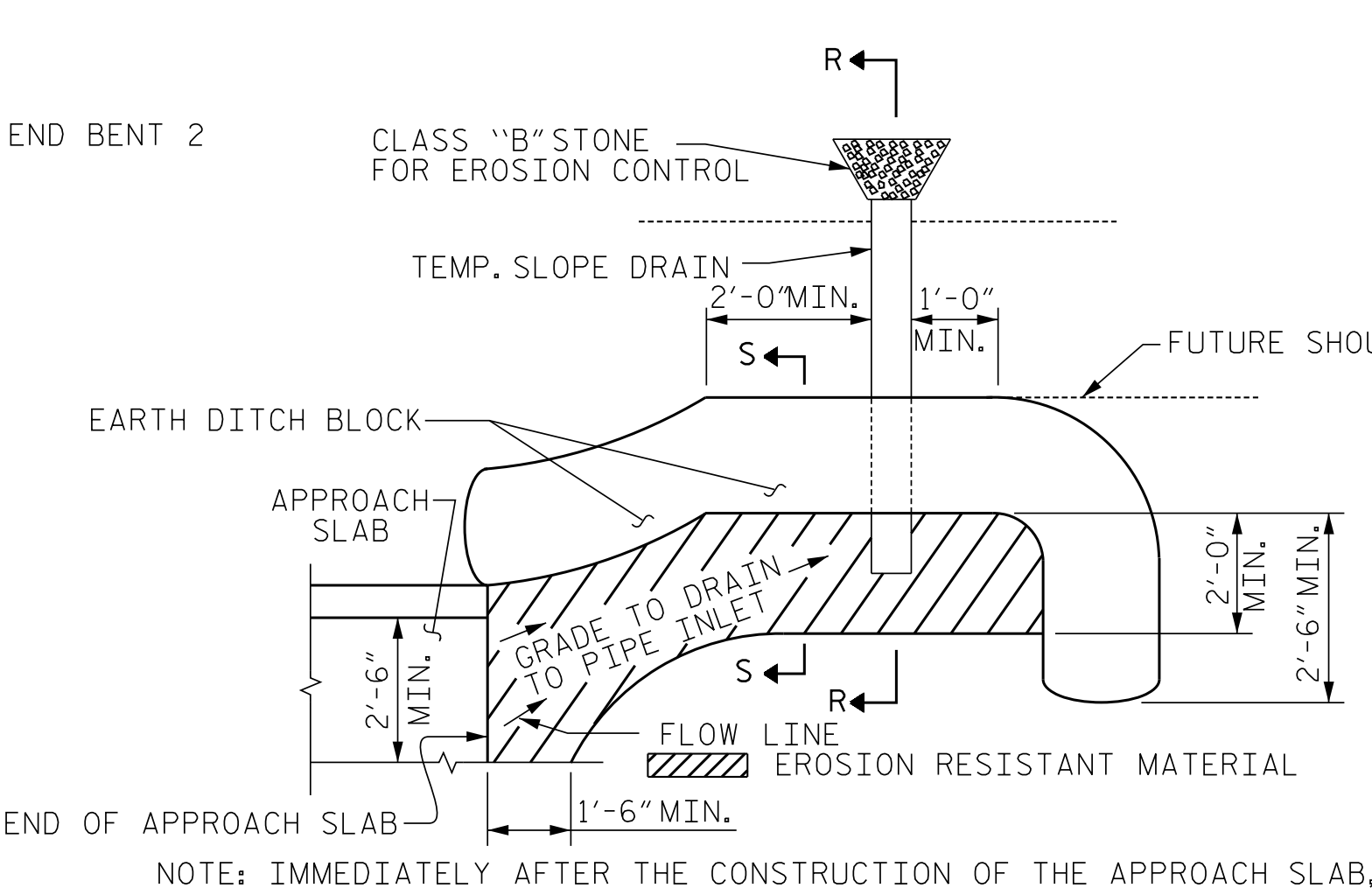
REVISIONS						SHEET NO. S-37
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			



PLAN VIEW OF FOAM JOINT SEAL @ END BENT FOR SIDEWALK

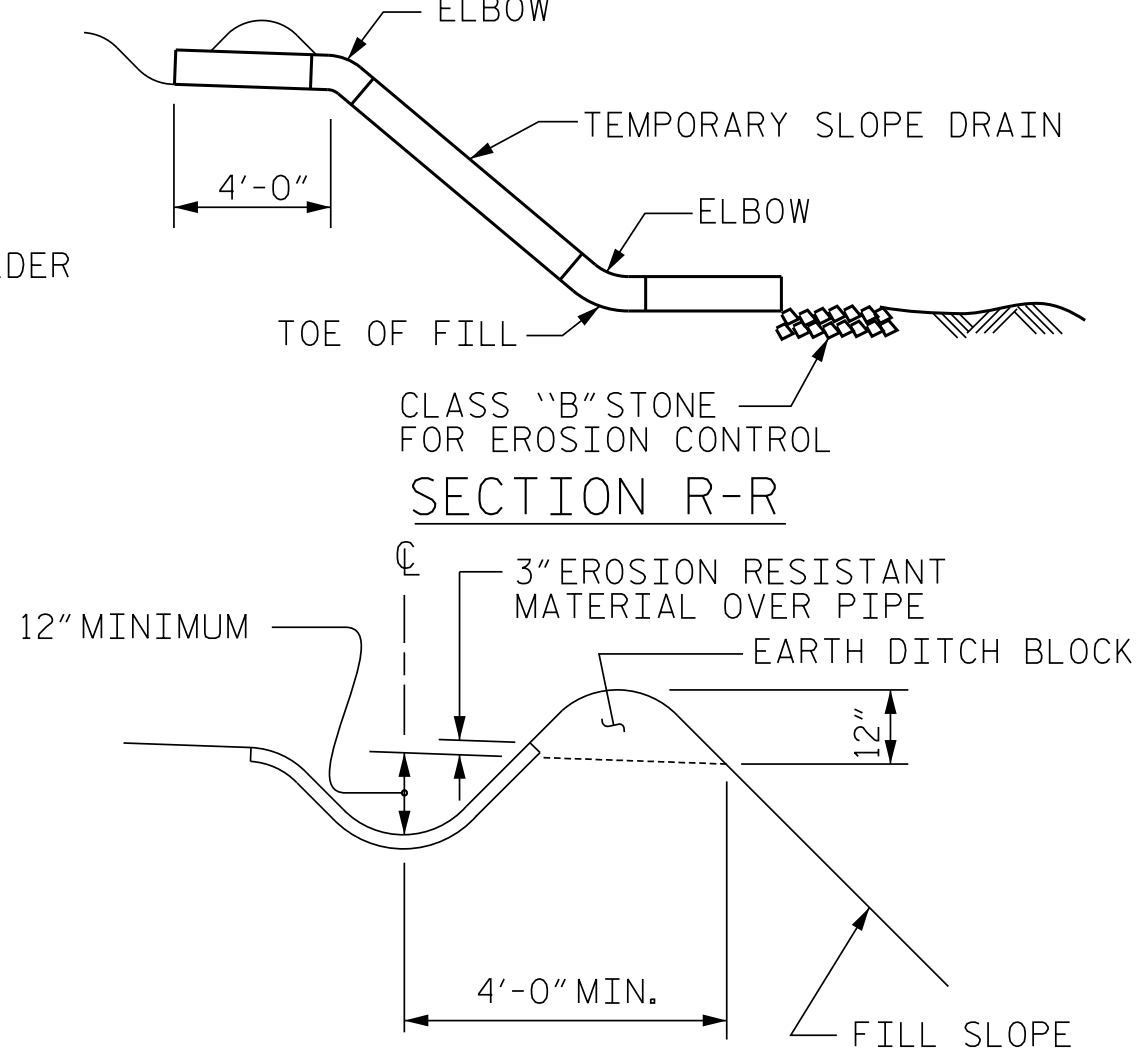


ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1 (STAGE I)	4.5
1 (STAGE II)	4.1
2 (STAGE I)	4.5
2 (STAGE II)	4.1
TOTAL	17.2



PLAN VIEW

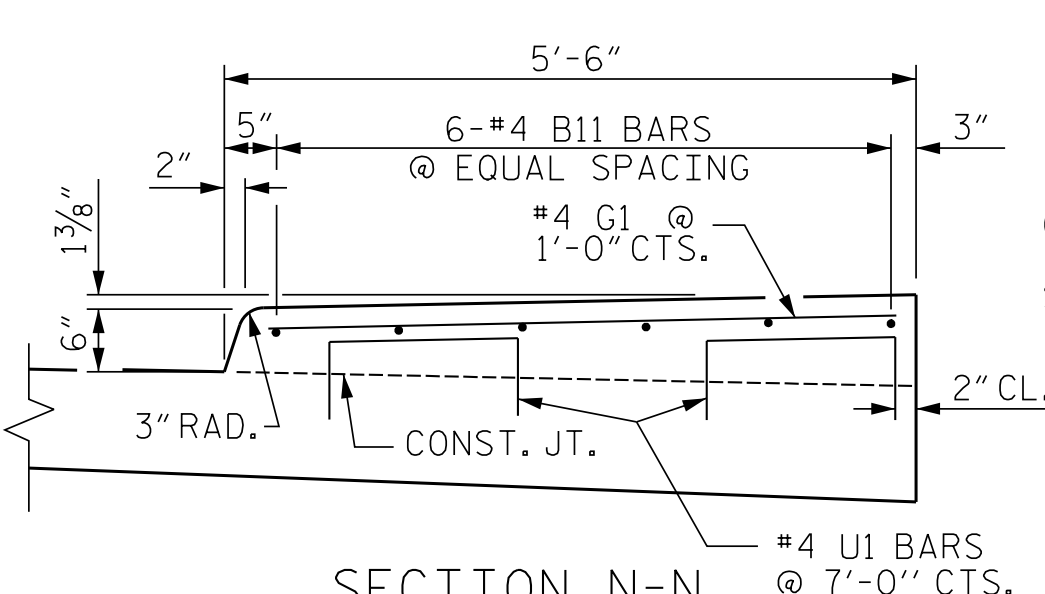
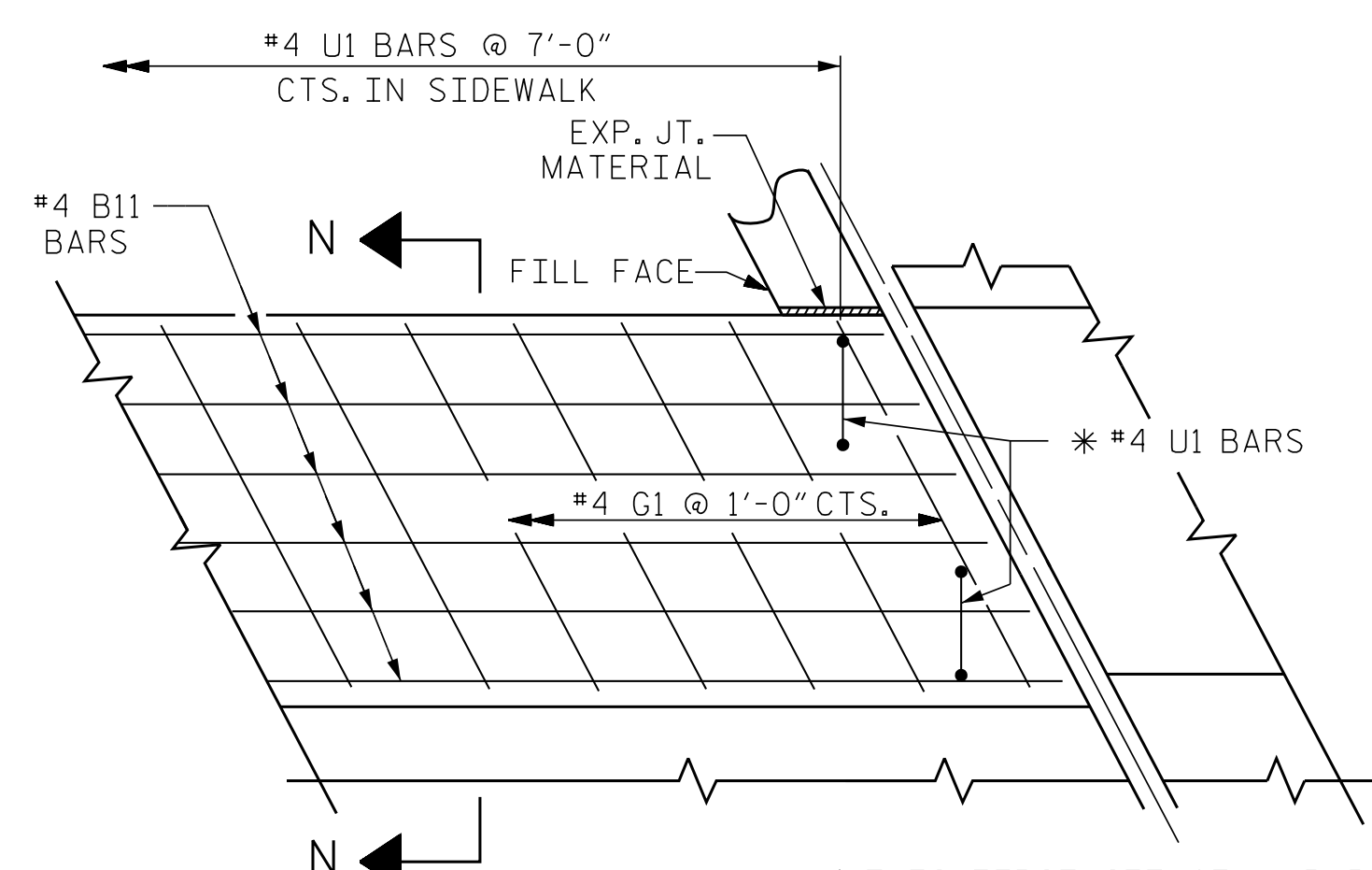
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT. OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.



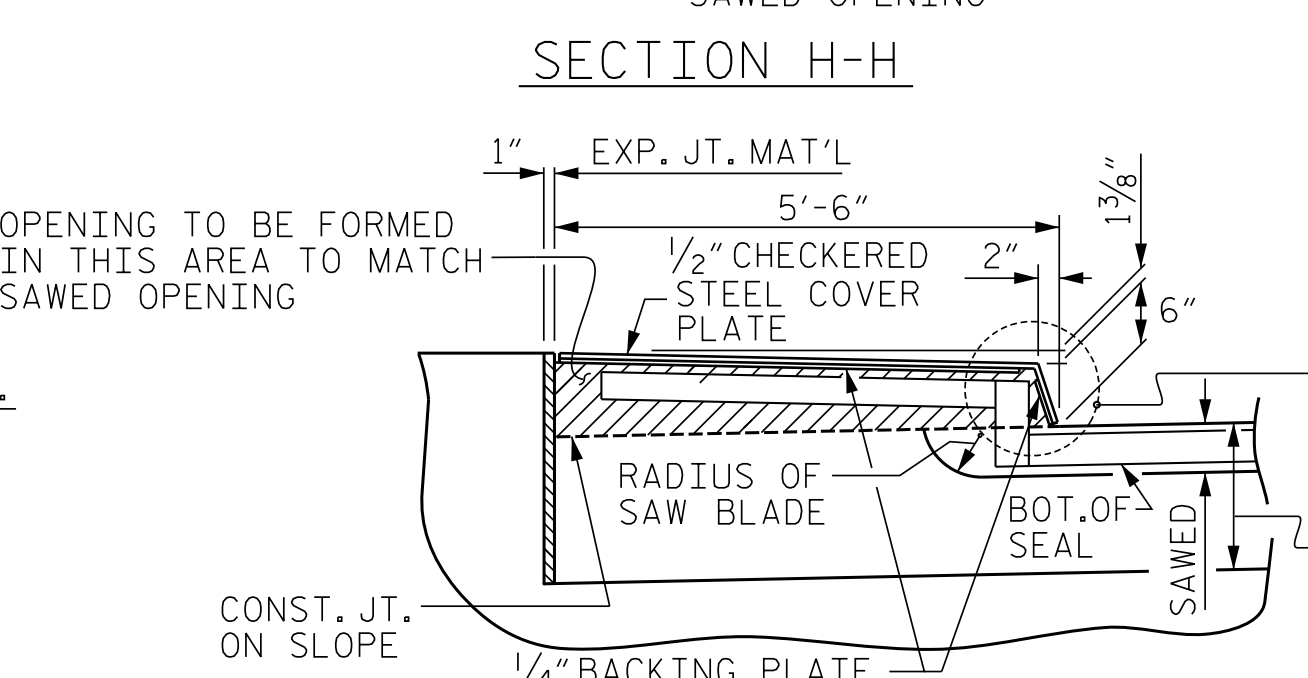
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

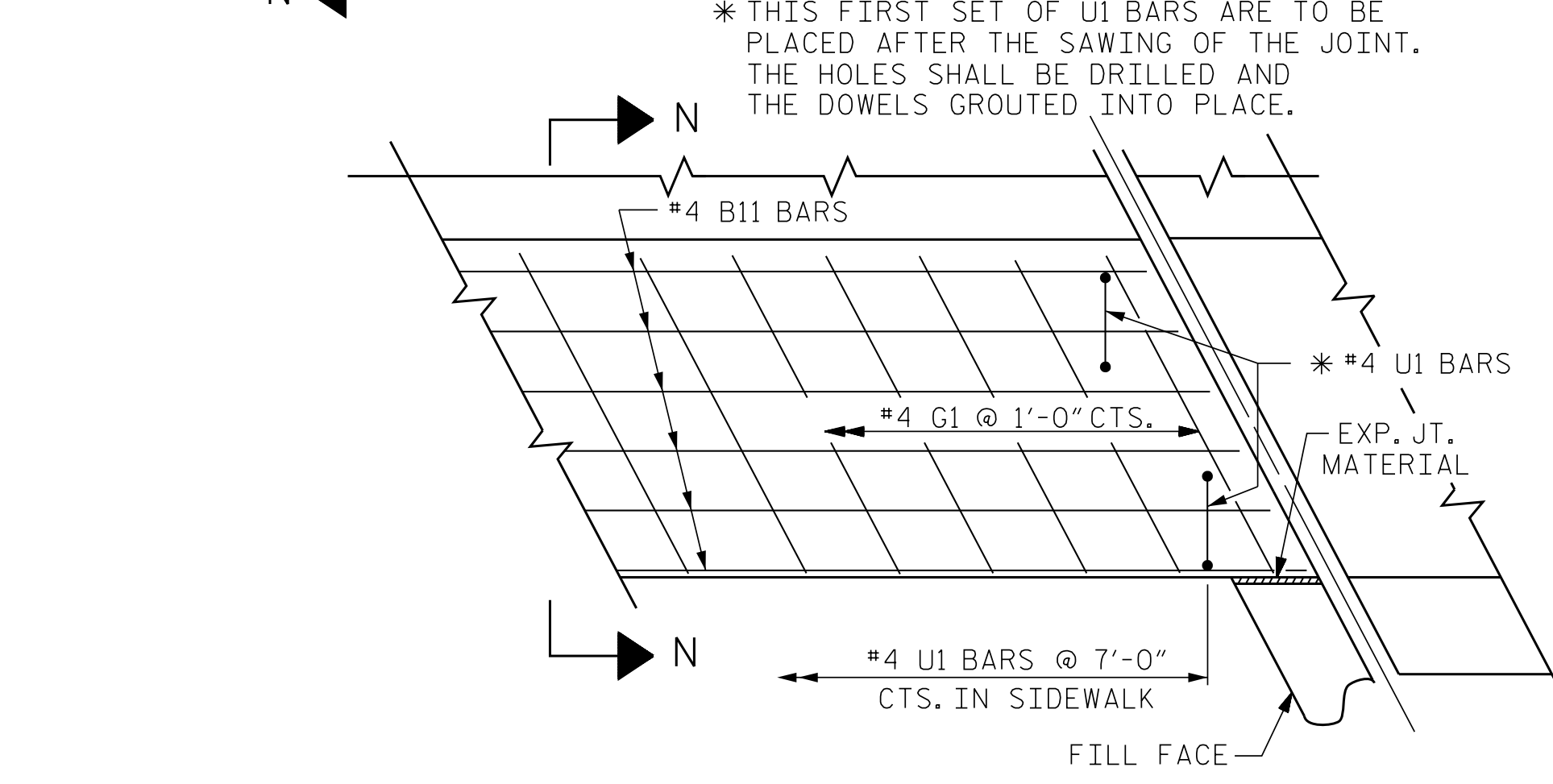
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



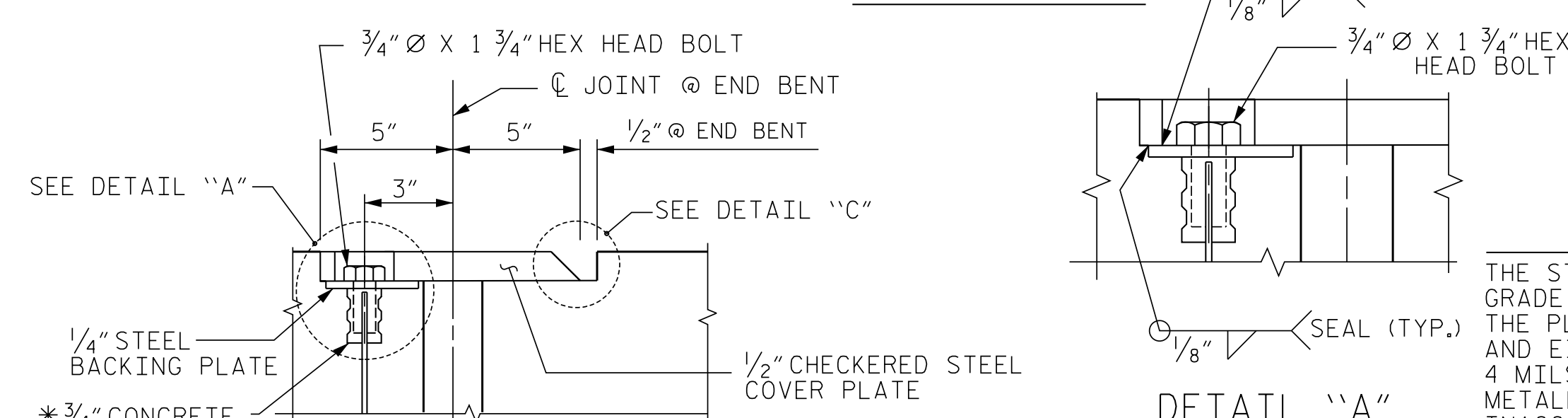
SECTION N-N SIDEWALK DETAILS



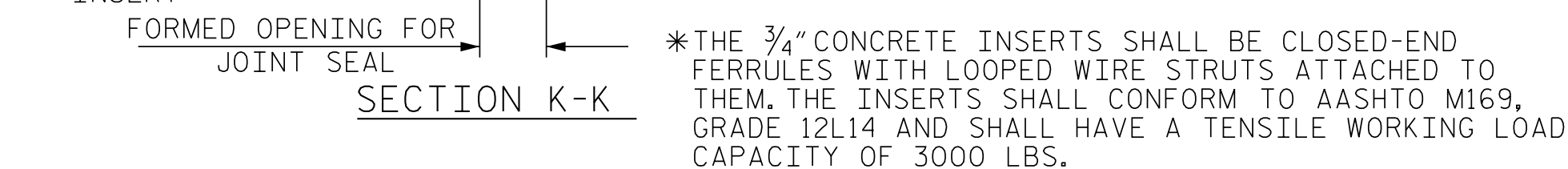
SECTION I-I



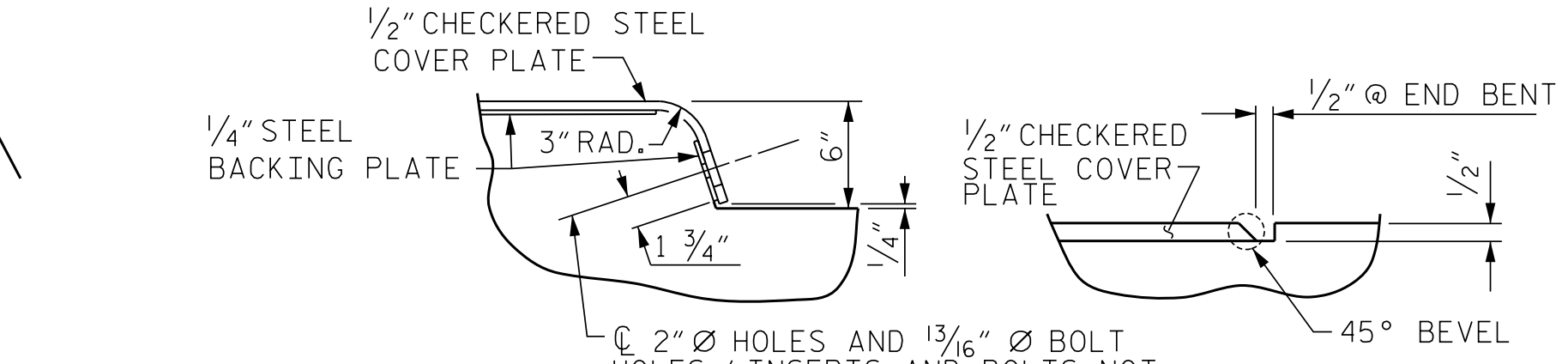
DETAILS OF SIDEWALK ON APPROACH SLAB



DETAIL 'A'



SECTION K-K



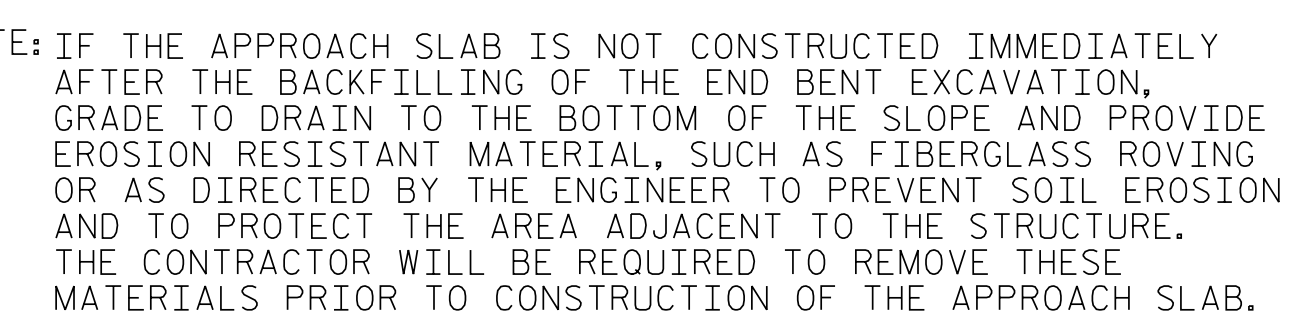
DETAIL 'B' JOINT SEAL DETAILS @ END BENT

NOTES

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIAL BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE 3/4" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "FOAM JOINT SEALS".



TEMPORARY DRAINAGE DETAIL

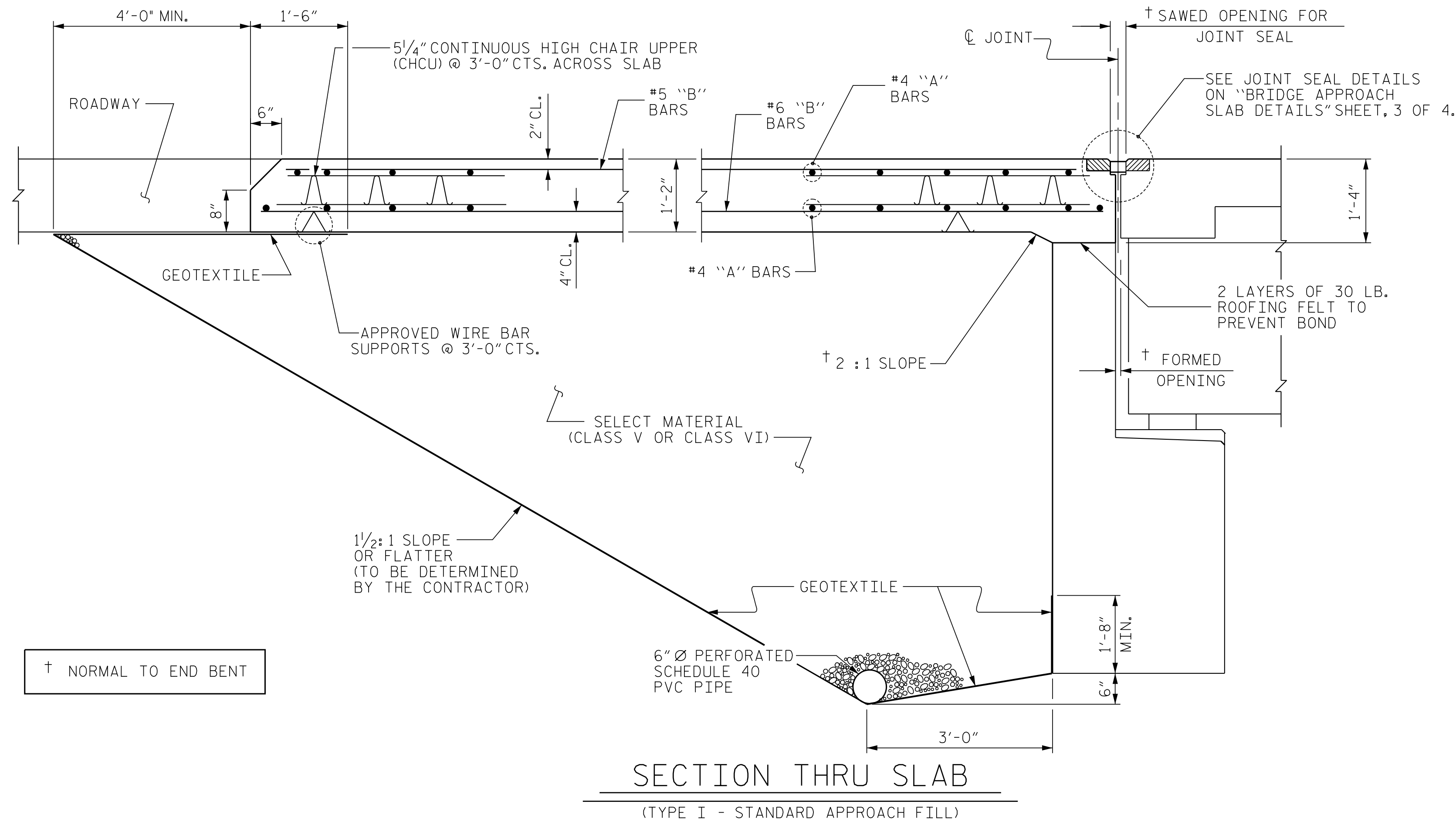
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

ASSEMBLED BY: FRJ	DATE: 11/18
CHECKED BY: CDB	DATE: 11/18
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



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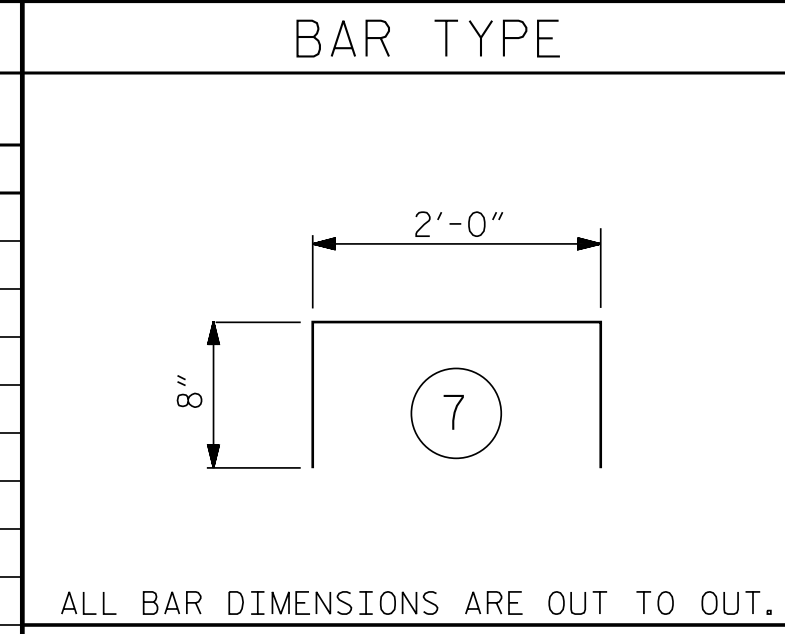
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
SHEET 3 OF 4					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-38
					TOTAL SHEETS 39



† NORMAL TO END BENT

SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)

BILL OF MATERIAL					
APPR. SLAB @ EB1-STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	28'-2"	978
A2	52	#4	STR	27'-11"	970
* B1	94	#5	STR	24'-2"	2369
B2	94	#6	STR	24'-8"	3483
* B11	6	#4	STR	24'-8"	99
* B12	3	#4	STR	23'-6"	47
* G1	25	#4	STR	5'-8"	95
* G2	17	#4	STR	2'-11"	33
* U1	8	#4	7	3'-4"	18
REINFORCING STEEL					4,452 LBS.
* EPOXY COATED REINFORCING STEEL					3,639 LBS.
CLASS AA CONCRETE BREAKDOWN					
POUR 1: APPROACH SLAB					51.1 C.Y.
POUR 2: SIDEWALK, MEDIAN					4.5 C.Y.
STAGE I CLASS AA CONCRETE					55.6 C.Y.
APPR. SLAB @ EB1-STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	52	#4	STR	24'-9"	860
A4	52	#4	STR	24'-7"	854
* B1	86	#5	STR	24'-2"	2168
B2	86	#6	STR	24'-8"	3186
* B11	6	#4	STR	24'-8"	99
* G1	25	#4	STR	5'-8"	95
* U1	8	#4	7	3'-4"	18
REINFORCING STEEL					4,040 LBS.
* EPOXY COATED REINFORCING STEEL					3,240 LBS.
CLASS AA CONCRETE BREAKDOWN					
POUR 1: APPROACH SLAB					46.9 C.Y.
POUR 2: SIDEWALK					3.1 C.Y.
STAGE II CLASS AA CONCRETE					50.0 C.Y.
TOTAL CLASS AA CONCRETE					105.7 C.Y.



ALL BAR DIMENSIONS ARE OUT TO OUT.

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

BILL OF MATERIAL					
APPR. SLAB @ EB2-STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	28'-2"	978
A2	52	#4	STR	27'-11"	970
* B1	94	#5	STR	24'-2"	2369
B2	94	#6	STR	24'-8"	3483
* B11	6	#4	STR	24'-8"	99
B12	3	#4	STR	23'-6"	47
* G1	25	#4	STR	5'-8"	95
* G2	17	#4	STR	2'-11"	33
* U1	8	#4	7	3'-4"	18
REINFORCING STEEL					4,452 LBS.
* EPOXY COATED REINFORCING STEEL					3,639 LBS.
CLASS AA CONCRETE BREAKDOWN					
POUR 1: APPROACH SLAB					51.1 C.Y.
POUR 2: SIDEWALK, MEDIAN					4.5 C.Y.
STAGE I CLASS AA CONCRETE					55.6 C.Y.
APPR. SLAB @ EB2-STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	52	#4	STR	24'-9"	860
A4	52	#4	STR	24'-7"	854
* B1	86	#5	STR	24'-2"	2168
B2	86	#6	STR	24'-8"	3186
* B11	6	#4	STR	24'-8"	99
* G1	25	#4	STR	5'-8"	95
* U1	8	#4	7	3'-4"	18
REINFORCING STEEL					4,040 LBS.
* EPOXY COATED REINFORCING STEEL					3,240 LBS.
CLASS AA CONCRETE BREAKDOWN					
POUR 1: APPROACH SLAB					46.9 C.Y.
POUR 2: SIDEWALK					3.1 C.Y.
STAGE II CLASS AA CONCRETE					50.0 C.Y.
TOTAL CLASS AA CONCRETE					105.7 C.Y.

NOTES

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALKS, RAISED MEDIAN AND END POSTS.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

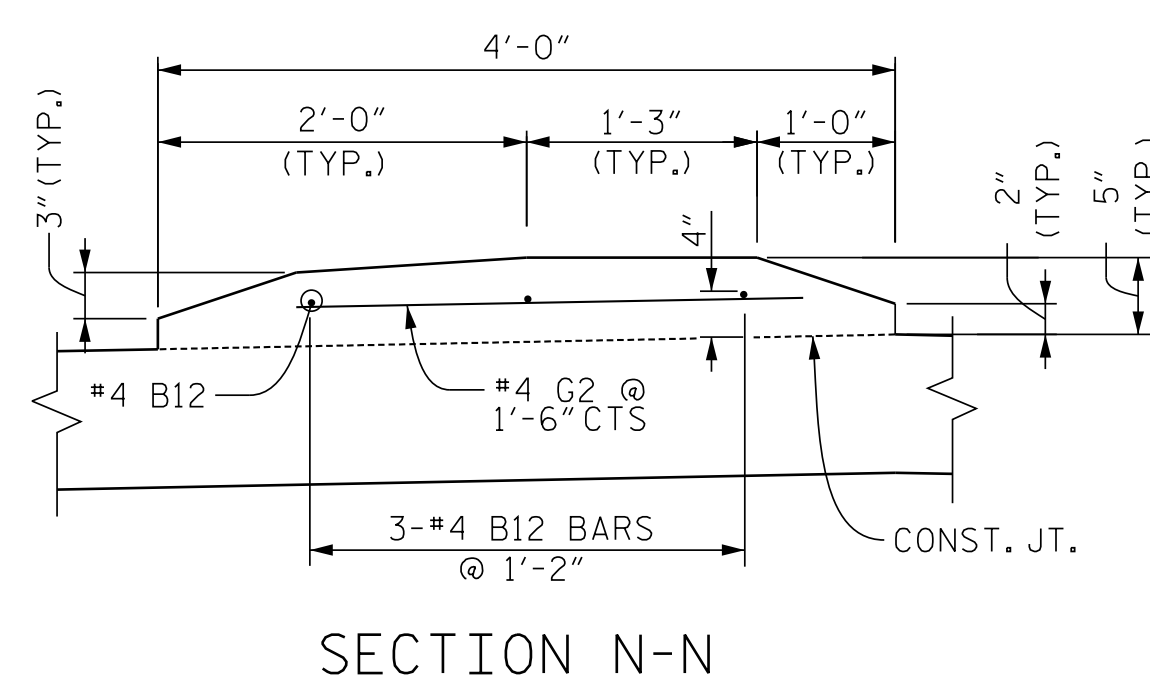
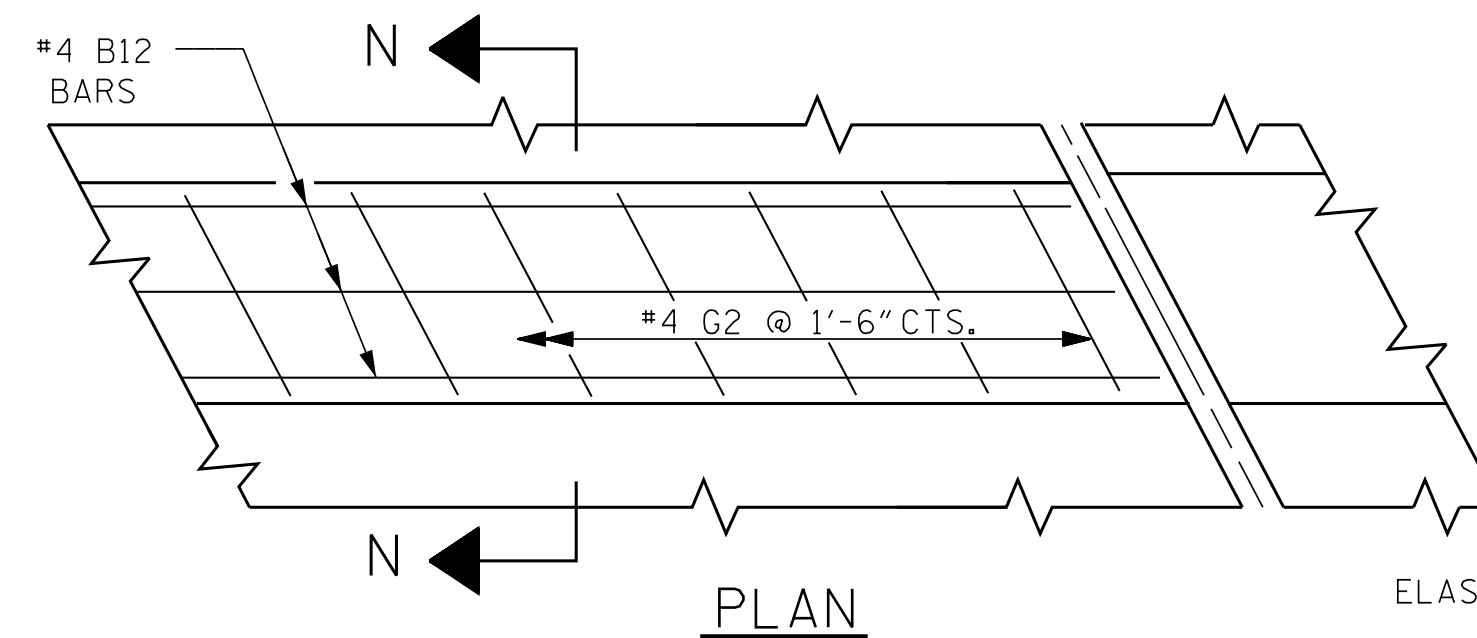
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

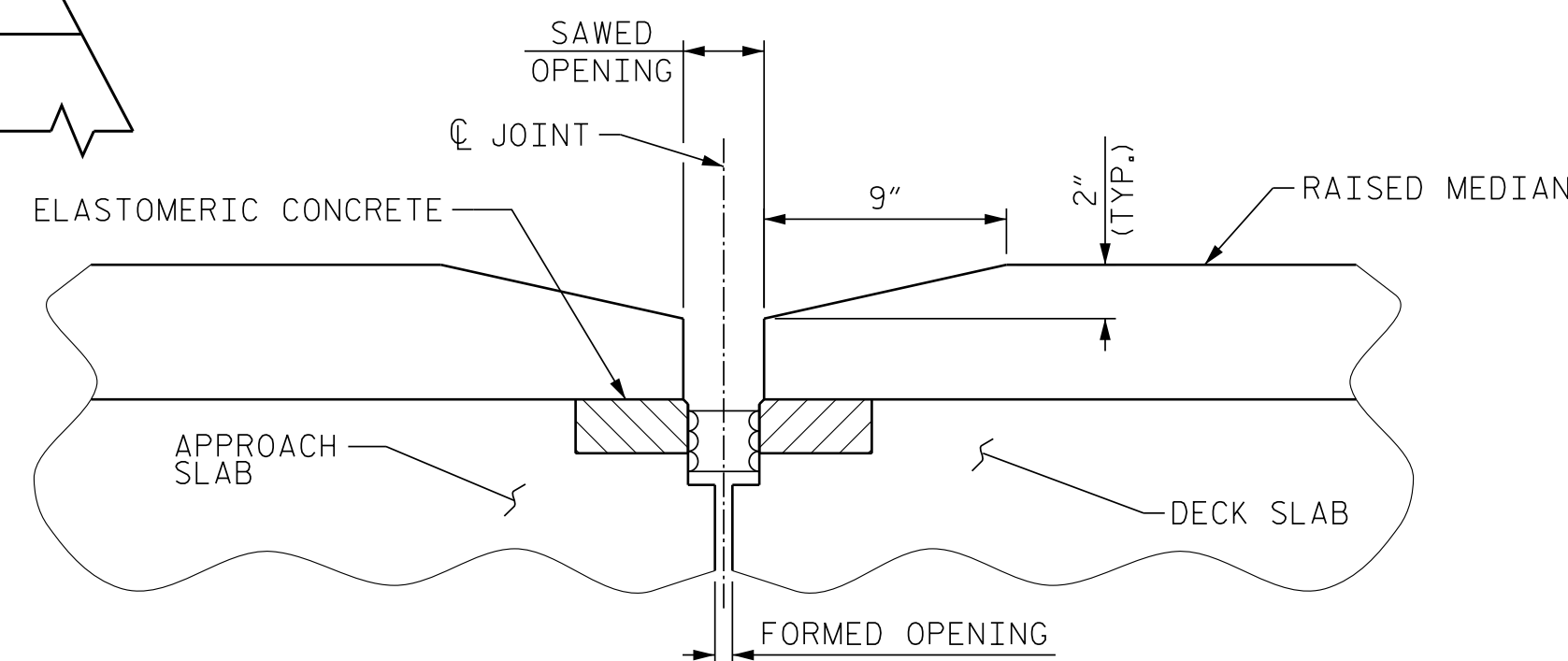
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2" FOR BOTH END BENTS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALKS AND MEDIAN STRIP IN ACCORDANCE WITH ARTICLE 825-101(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.



DETAILS OF MEDIAN ON APPROACH SLAB



SECTION THRU RAISED MEDIAN AT END BENTS
END BENT 1 SHOWN, END BENT 2 SIMILAR

PROJECT NO. U-5738

ROWAN COUNTY

STATION: 70+72.50 -L-

SHEET 4 OF 4

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



12/13/2021

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CHECKED BY : VAP 3/95	REV. 12/17 MAA/THC
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