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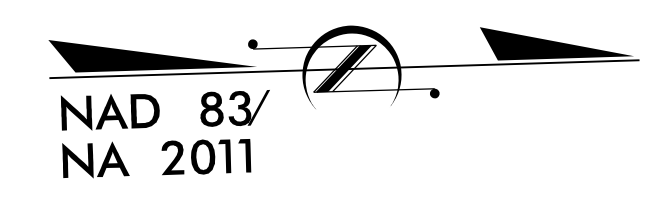
TIP PROJECT: BR-0160
CONTRACT: C204853

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

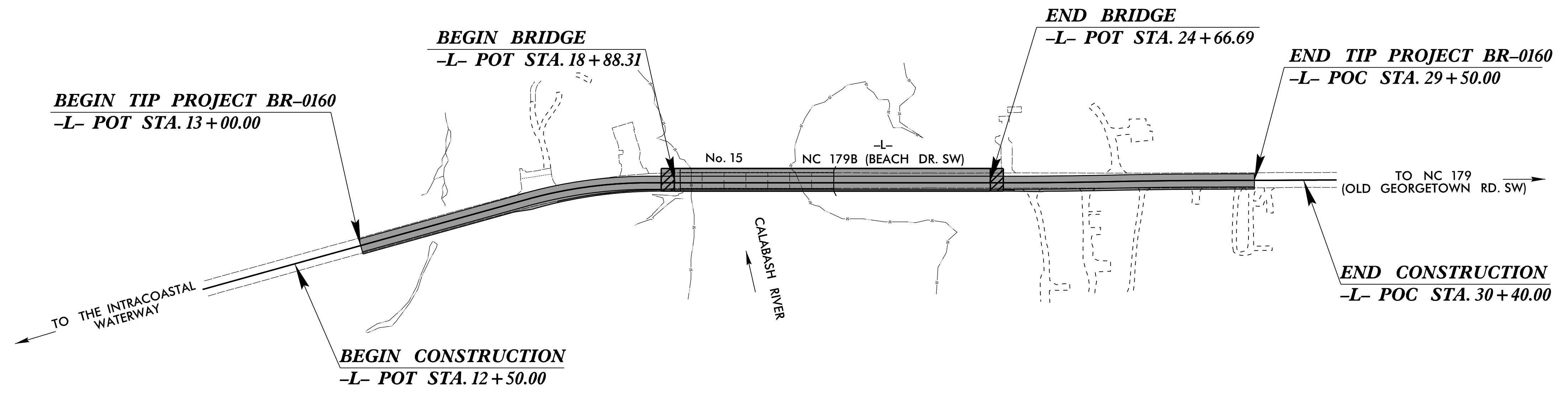
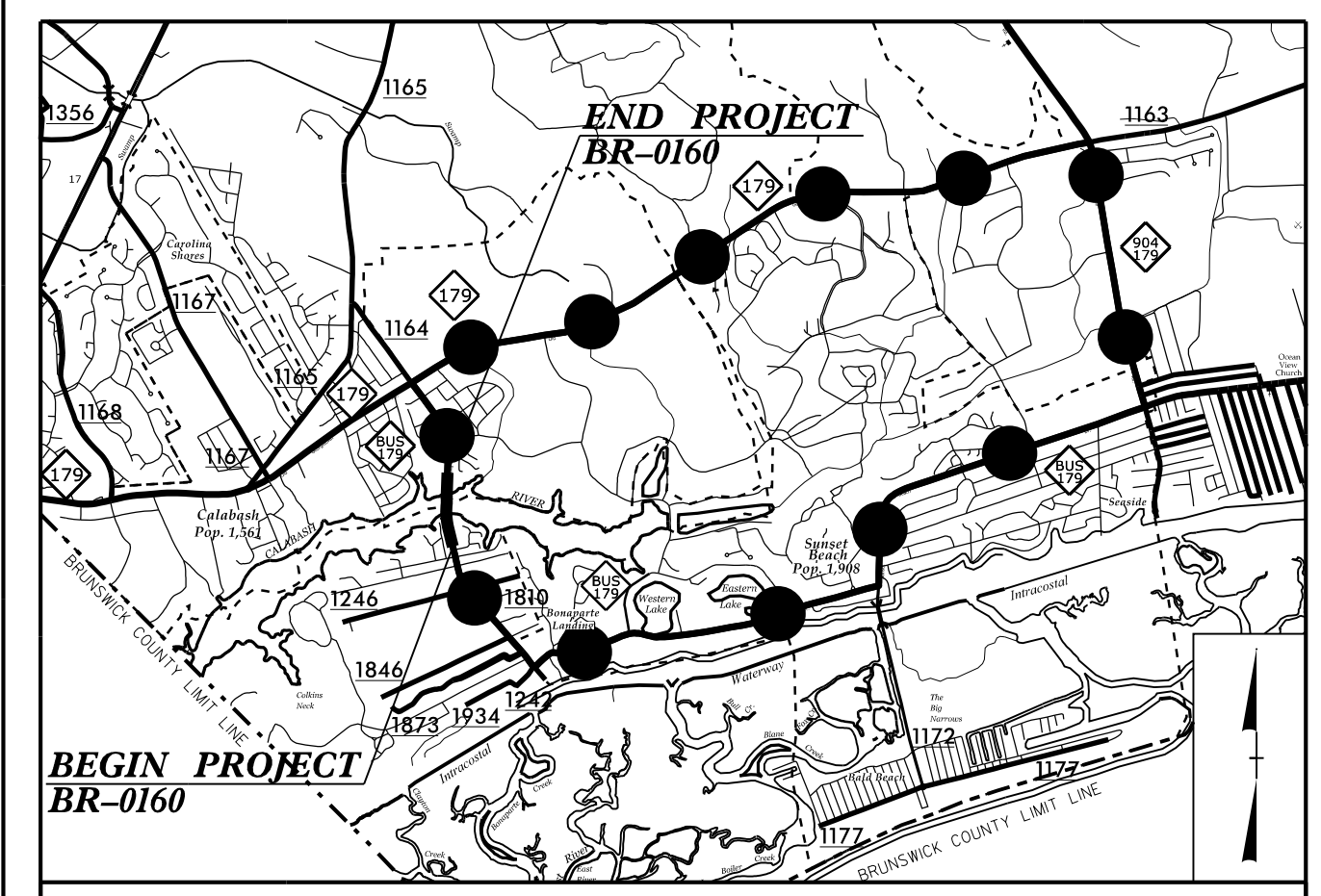
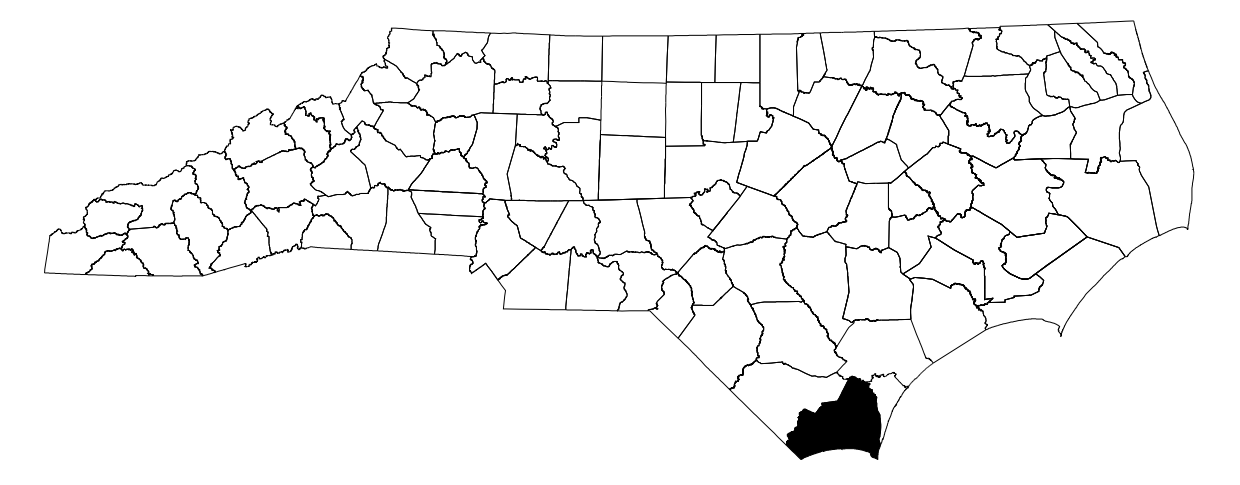
BRUNSWICK COUNTY

LOCATION: REPLACE BRIDGE 15 OVER CALABASH RIVER ON NC 179B (BEACH DR. SW)

TYPE OF WORK: DRAINAGE, GRADING, PAVING, AND STRUCTURE



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0160		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67160.1.1	N/A	PE	
67160.2.1	N/A	ROW	
67160.2.2	N/A	UTIL	
67160.3.1	N/A	CONST	



STRUCTURE

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2023 =	8,800
ADT 2043 =	15,200
K =	
D =	
T =	7%
V =	50 MPH
FUNC CLASS = MAJOR COLLECTOR REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY PROJECT BR-0160	=	0.203 MILE
LENGTH STRUCTURE PROJECT BR-0160	=	0.110 MILE
TOTAL LENGTH PROJECT BR-0160	=	0.313 MILE

PREPARED IN THE OFFICE OF:

RS&H 8521 SIX FORKS ROAD, SUITE 400
 RALEIGH, NC 27615
 NC FIRM LICENSE No: F-0493

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 2018 STANDARD SPECIFICATIONS

RICHARD BOLLINGER, PE
 PROJECT ENGINEER

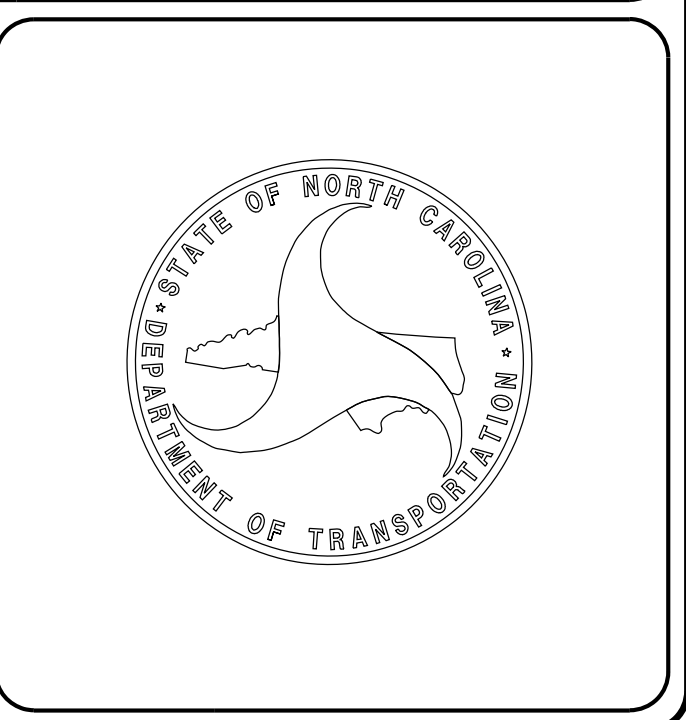
JARED BOND, PE
 PROJECT DESIGN ENGINEER

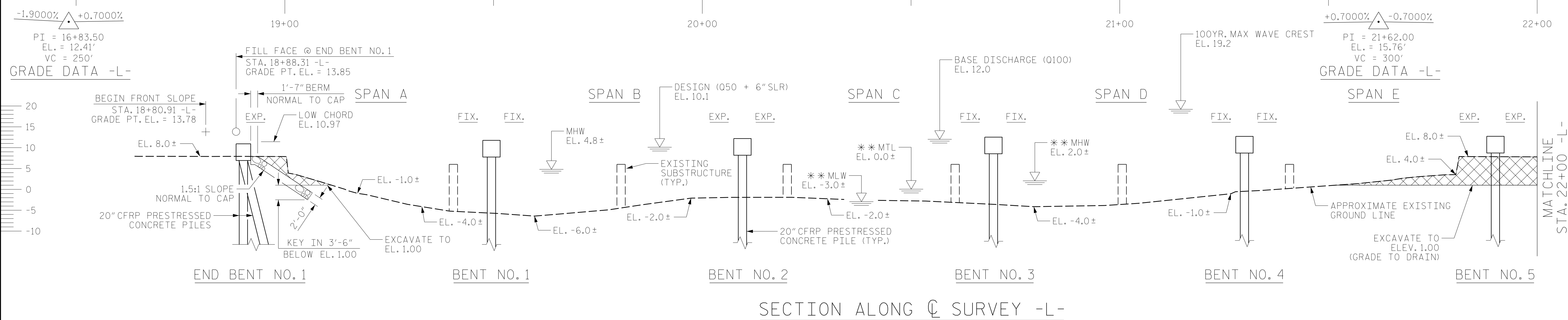
DEREK PIELECH, PE
 NCDOT CONTACT

LETTING DATE:
 MAY 16, 2023

STRUCTURAL ENGINEER

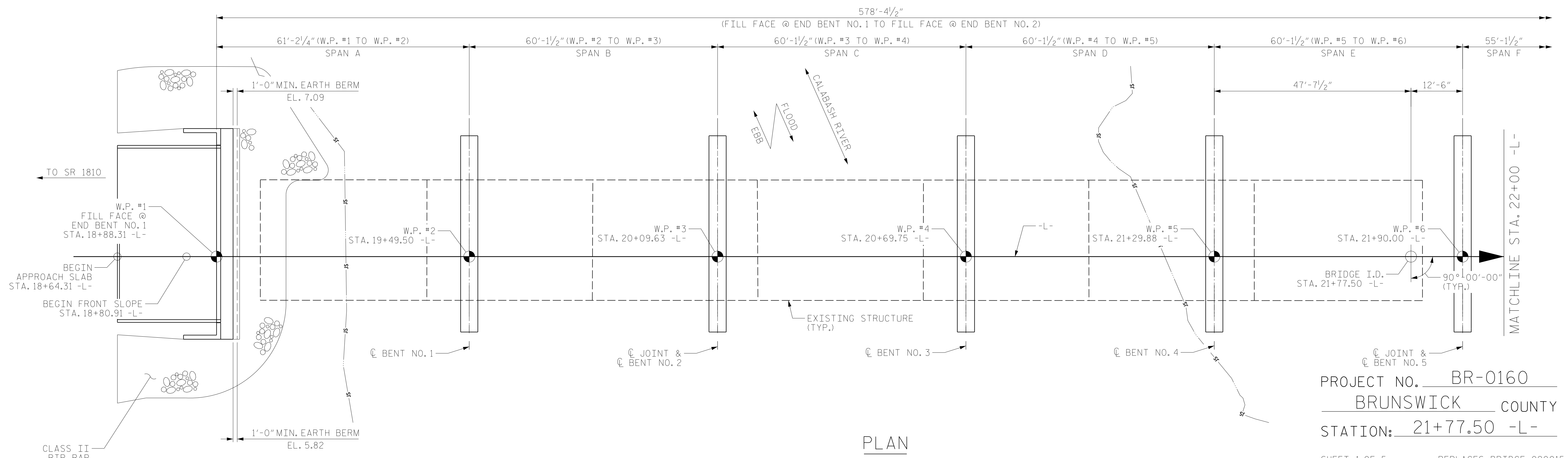
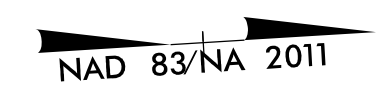
Documented by: [Signature] 4/3/2023
 SIGNATURE: [Signature] P.E.





SECTION ALONG C SURVEY -L-

UNCLASSIFIED STRUCTURE EXCAVATION
 ** MLW, MTL, AND MHW VALUES ARE TAKEN FROM NOAA STATION 8660098 (LITTLE RIVER NECK, SC) APPROXIMATELY 2.3 MILES DOWNSTREAM, IN THE LITTLE RIVER



PLAN

(PILES NOT SHOWN FOR CLARITY)

PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 1 OF 5 REPLACES BRIDGE 090015

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



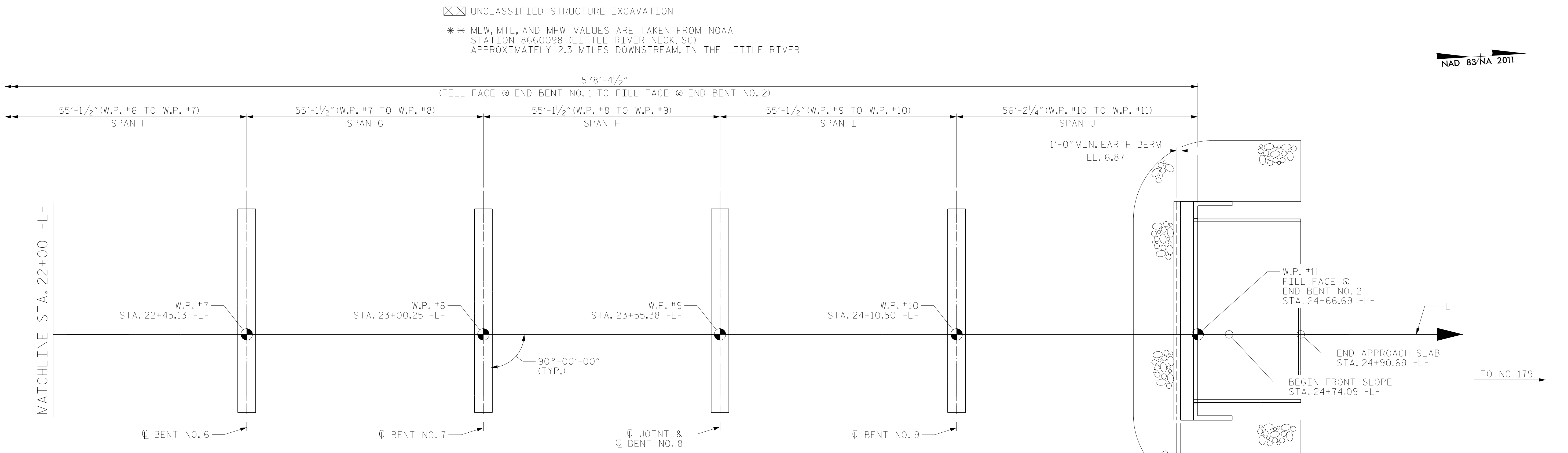
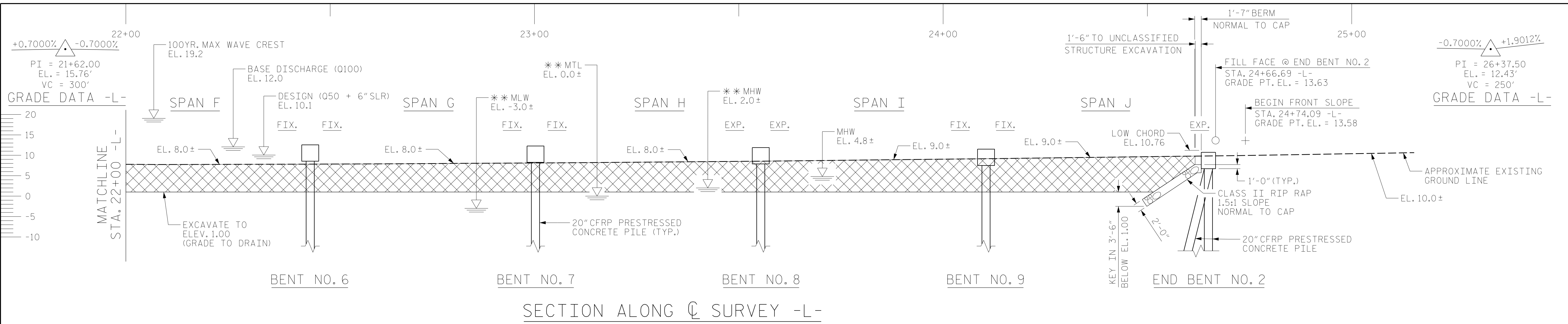
RS&H Architects-Engineers-Planners, Inc.
 8521 Six Forks Road, Suite 400
 Raleigh, NC 27615
 919-926-4100 FAX 919-846-9080
 www.rsandh.com
 North Carolina License No. 50737-F-0403-C-28

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 FOR BRIDGE ON NC 179B
 OVER CALABASH RIVER
 BETWEEN SR 1810 AND NC 179

DRAWN BY :	NSC	DATE :	11/2021
CHECKED BY :	MKO	DATE :	01/2023
DESIGN ENGINEER OF RECORD:	RLB	DATE :	03/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			42



PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 2 OF 5



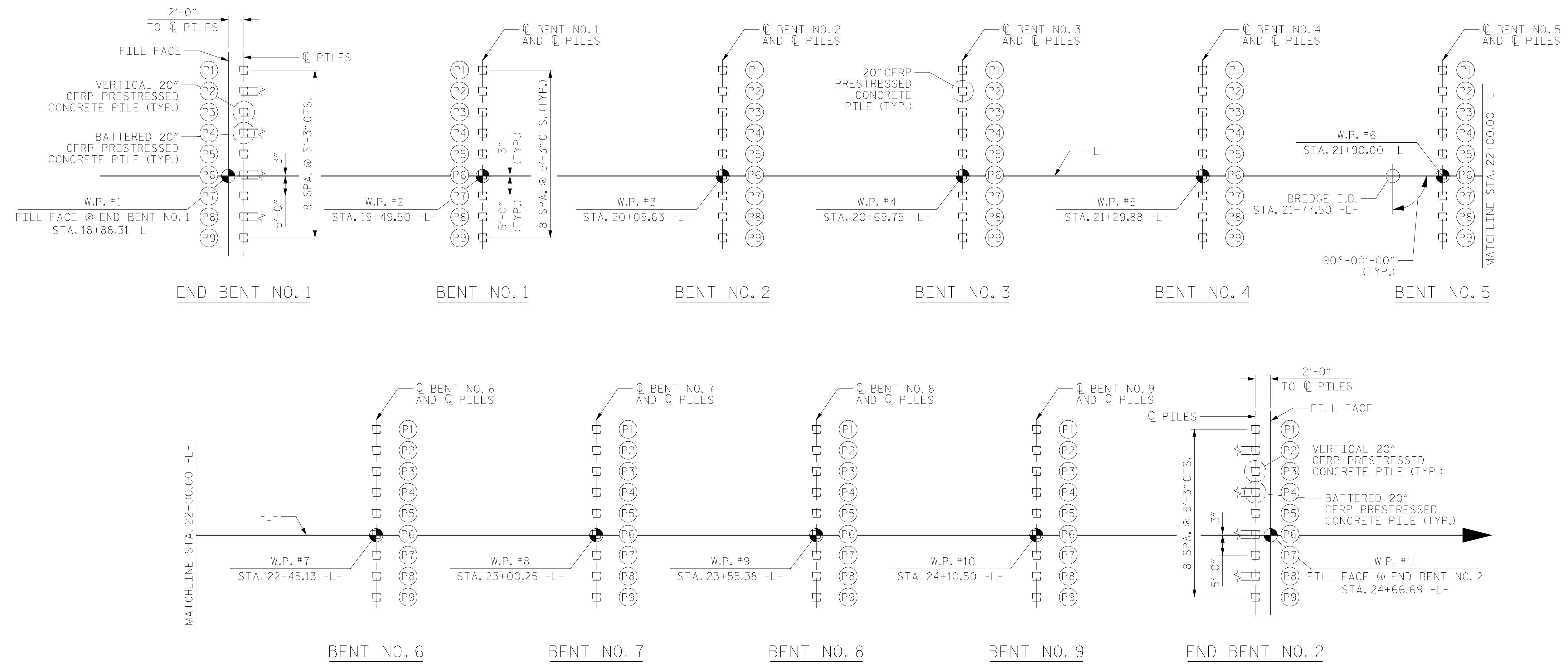
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 BETWEEN SR 1810 AND NC 179

DRAWN BY : NSC DATE : 11/2021
 CHECKED BY : MKO DATE : 01/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

DOCUMENT NOT CONSIDERED
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			42



FOUNDATION LAYOUT
 DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.
 BRACE PILES @ END BENTS ARE TO BE BATTERED AT 3%/FT.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 3 OF 5

DRAWN BY : MRA DATE : 01/2023
 CHECKED BY : MKO DATE : 01/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

3/28/2023
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DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 179B
 OVER CALABASH RIVER
 BETWEEN SR 1810 AND NC 179

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			42

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-9	90	See Substructure Plans	65			120							
Bent 1, Piles 1-9	125		85	-14.5	-34.0	180	29	-34.0	20				
Bents 2 to 4, Piles 1-9	125		85	-14.5	-34.0	180	35	-34.0	20				
Bents 5 to 9, Piles 1-9	125		90	-7	-31.0	175	32	-31.0	20				
End Bent 2, Piles 1-9	90		65			120							

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

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

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1	Yes	65	4	End Bent 1	PDA
Bents 1 to 4	Yes	85		Bents 1 to 4	PDA
Bents 5 to 9	Yes	90		Bents 5 to 9	PDA
End Bent 2	Yes	65		End Bent 2	PDA

*EST = Pile order lengths from estimated pile lengths; PDA = Pile order lengths based on PDA testing. For groups of end bents/bents with pile order lengths based on PDA testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the PDA.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-9	90			0.75			1.00
Bent 1, Piles 1-9	125		5.5	0.75		3	1.00
Bents 2 to 4, Piles 1-9	125		5.5	0.75		8	1.00
Bents 5 to 9, Piles 1-9	125		3.5	0.75		3	1.00
End Bent 2, Piles 1-9	90			0.75			1.00

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

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
End Bent 1, Piles 1-9					YES
Bent 1, Piles 1-9					YES
Bents 2 to 4, Piles 1-9					YES
Bents 5 to 9, Piles 1-9					YES
End Bent 2, Piles 1-9					YES
TOTAL QTY:					99

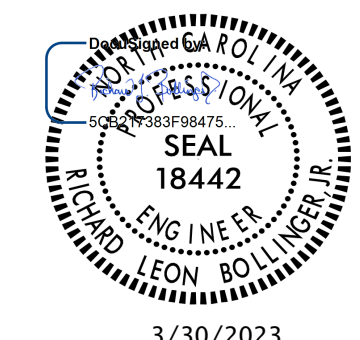
NOTES:

- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Michael G. Batten and 039763) on 03-21-2023.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- For piles, see piles provision and section 450 of the standard specifications.
- It has been estimated that a hammer with equivalent rated energy in the range of 40,000 ft-lbs to 60,000 ft-lbs per blow will be required to drive piles at the end bent and interior bents. This estimated energy range does not release the contractor from providing driving equipment in accordance with subarticle 450-3(d) (2) of the standard specifications.
- Temporary steel casings are required for Predrilling (and Spudding) at bents 1 to 4.
- Spudding may be used instead of Predrilling at bents 1 to 9.
- Observe one month waiting period after constructing the embankment to within 2ft of finished grade before beginning end bent construction at the end bent no. 1 and end bent no. 2. For bridge waiting periods, see roadway plans and section 235 of the standard specifications.
- Test the first production pile of the end bent no. 1 piles with the Pile Driving Analyzer (PDA) during driving, restriking, or re-driving. For PDA testing, see section 450 of the standard specifications.
- Test the first production pile of the end bent no. 2 piles with the Pile Driving Analyzer (PDA) during driving, restriking, or re-driving. For PDA testing, see section 450 of the standard specifications.
- Testing the first production pile with the Pile Driving Analyzer (PDA) during driving, restriking, or re-driving is required at the interior bents 1 to 4 piles. For PDA testing, see section 450 of the standard specifications.
- Testing the first production pile with the Pile Driving Analyzer (PDA) during driving, restriking, or re-driving is required for the interior bents 5 to 9 locations. For PDA testing, see section 450 of the standard specifications.

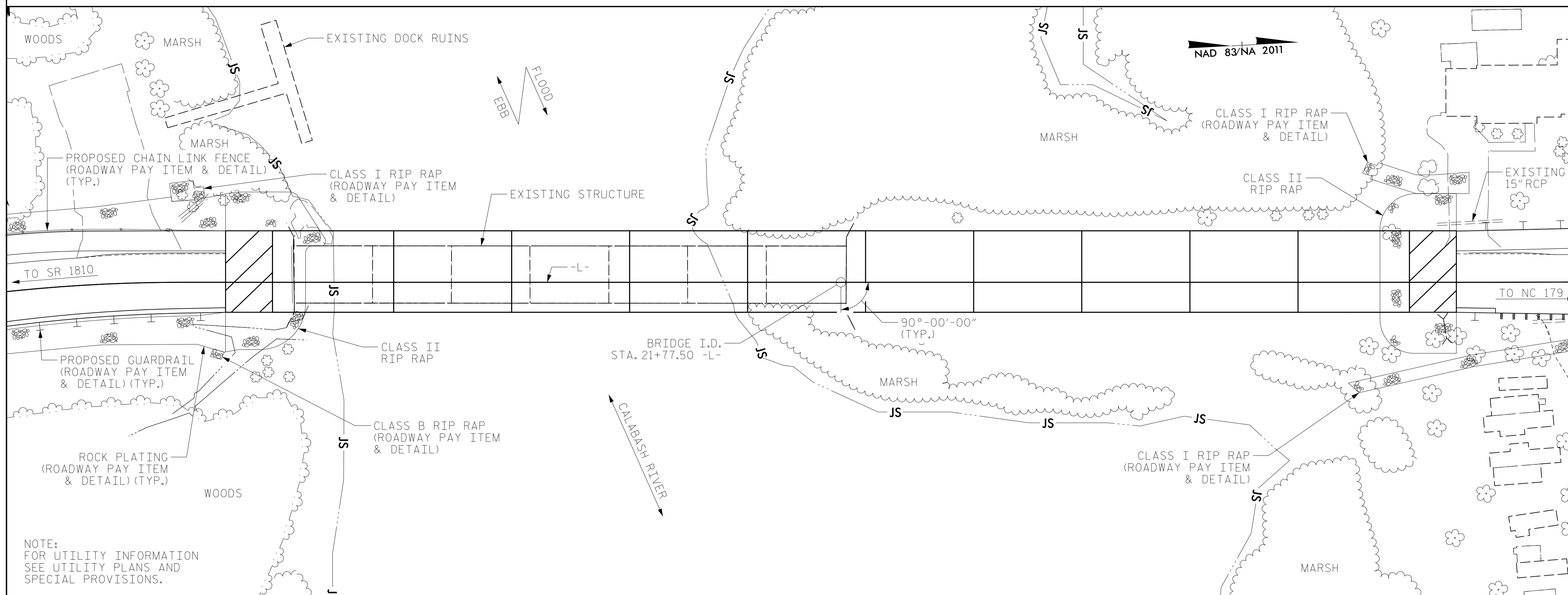
PROJECT NO. BR-0160

BRUNSWICK COUNTY

STATION: 21+77.50 -L-

	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH PILE FOUNDATION TABLES						SHEET NO. S-4
	REVISIONS						TOTAL SHEETS 42
SIGNATURE _____ DATE _____		NO.	BY:	DATE:	NO.	BY:	DATE:
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		1			3		
		2			4		

BENCH MARK #1: RR SPIKE IN 21" OAK 143.00' LT OF -L- STA. 17+64.17, EL. 11.88'



HYDRAULIC DATA

DESIGN DISCHARGE	= N/A
FREQUENCY OF DESIGN FLOOD	= 50 YRS + 6" SLR
DESIGN HIGH WATER ELEVATION	= 10.1' **
DRAINAGE AREA	= 8.16 SQ. MI.
BASE DISCHARGE (Q100)	= N/A
BASE HIGH WATER ELEVATION	= 12.0' ΔΔ

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= N/A
FREQUENCY OF OVERTOPPING FLOOD	= 100+ YRS
* OVERTOPPING FLOOD ELEVATION	= 13.1'
* SAG @ STA. 17+41.19 -L-	

** DUE TO THE BACKWATER EFFECTS FROM THE ATLANTIC OCEAN, HYDRAULIC MODELING FOR THE CALABASH RIVER IN THIS AREA IS INSIGNIFICANT. DESIGN HIGH WATER TAKEN AS FEMA 50 YR. WSEL + 6" SEA LEVEL RISE.

ΔΔ FEMA BASE HIGHWATER ELEVATION TAKEN FROM FEMA FIS FOR BRUNSWICK COUNTY (EFF. 8-28-2018) AND ARE CONTROLLED BY BACKWATER FROM THE ATLANTIC OCEAN.

LOCATION SKETCH

CORROSION PROTECTION NOTES:

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS.

ALL BAR SUPPORTS USED IN THE BARRIER RAIL, CURB, CONCRETE WEARING SURFACE, AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE PRESTRESSED CONCRETE PILES SHALL CONTAIN A MINIMUM OF 25% FLY ASH CLASS F OR A MINIMUM OF 40% GROUND GRANULATED BLAST FURNACE SLAG. ADDITIONALLY, SILICA FUME SHALL BE SUBSTITUTED FOR A MINIMUM 5% OF THE PORTLAND CEMENT BY WEIGHT. MINERAL ADMIXTURES SHALL REPLACE THE CEMENT CONTENT AT A 1:1 RATIO BY WEIGHT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

ALL METALIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS AND IF USED, PRECAST BENT CAPS, SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATION.

THE CONCRETE IN THE CAST-IN-PLACE BENT CAPS OR THE PRECAST BENT CAPS, IF UTILIZED, SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

NOTES:

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

THIS STRUCTURE HAS BEEN DESIGNED WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 5 AND SHEET 2 OF 5 SHALL BE EXCAVATED FOR A DISTANCE OF 19 FT LEFT AND 60 FT RIGHT FOR END BENT NO. 1 AND 57 FT LEFT AND 48 FT RIGHT FOR END BENT NO. 2 OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

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.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

AFTER SERVING AS A TEMPORARY STRUCTURE FOR CONSTRUCTION OF THE PROPOSED BRIDGE, THE EXISTING STRUCTURE, CONSISTING OF 7 SPANS, 1 @ 40'-3", 5 @ 40'-0" AND 1 @ 40'-3" WITH A CLEAR ROADWAY WIDTH OF 29'-4" WITH PPC CORED SLABS ON PPC CAPS WITH STEEL PILES SHALL BE REMOVED.

THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

FERROUS REINFORCEMENT SHALL NOT BE USED IN THE CAST-IN-PLACE SUBSTRUCTURE EXCEPT FOR ANCHOR BOLTS CONNECTING THE SUPERSTRUCTURE TO THE SUBSTRUCTURE. FOR STRUCTURE REINFORCEMENT, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

FOR 3'-8" X 3'-0" PRESTRESSED CONCRETE BENT CAPS, SEE SPECIAL PROVISIONS.

FOR CLASS AA CONCRETE (END BENT), SEE SPECIAL PROVISIONS.

FOR GLASS FIBER REINFORCED POLYMER (GFRP) BAR (END BENT), SEE SPECIAL PROVISIONS.

FOR GLASS FIBER REINFORCED POLYMER (GFRP) BAR, SEE SPECIAL PROVISIONS.

FOR 20" CARBON FIBER REINFORCED POLYMER (CFRP) PRESTRESSED CONCRETE PILES, SEE SPECIAL PROVISIONS.

FOR CARBON FIBER REINFORCED POLYMER (CFRP) STRAND, SEE SPECIAL PROVISIONS.

FOR CARBON FIBER REINFORCED POLYMER (CFRP) BAR, SEE SPECIAL PROVISIONS.

FOR PATH LIGHTING SYSTEM, SEE ELECTRICAL AND LIGHTING SPECIAL PROVISIONS.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 4 OF 5



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON NC 179B
 OVER CALABASH RIVER
 BETWEEN SR 1810 AND NC 179

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			42

TOTAL BILL OF MATERIALS

	REMOVAL OF EXISTING STRUCTURE @ STA. 21+77.50 -L-	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 21+77.50 -L-	CONCRETE WEARING SURFACE	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	PREDRILLING FOR PILES	PILE REDRIVES	42" OREGON RAIL	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS		
	LUMP SUM	LUMP SUM	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LIN. FT.	EACH	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	NO.	LIN. FT.	
SUPERSTRUCTURE					23,909	16,997		LUMP SUM			1,152.3	626.1			LUMP SUM	LUMP SUM	150	8,625	
END BENT NO. 1							33.7						300	330					
BENT NO. 1							27.5		261										
BENT NO. 2							27.5		315										
BENT NO. 3							27.5		315										
BENT NO. 4							27.5		315										
BENT NO. 5							27.5		288										
BENT NO. 6							27.5		288										
BENT NO. 7							27.5		288										
BENT NO. 8							27.5		288										
BENT NO. 9							27.5		288										
END BENT NO. 2							33.7						260	285					
TOTAL	LUMP SUM	LUMP SUM	4	LUMP SUM	23,909	16,997	314.9	LUMP SUM	2,646	50	1,152.3	626.1	560	615	LUMP SUM	LUMP SUM	150	8,625	

TOTAL BILL OF MATERIALS

	GLASS FIBER REINFORCED POLYMER (GFRP) BAR	PILE DRIVING EQUIPMENT SETUP FOR 20" CARBON FIBER REINFORCED POLYMER PRESTRESSED CONCRETE PILES	20" CARBON FIBER REINFORCED POLYMER PRESTRESSED CONCRETE PILES	CARBON FIBER REINFORCED POLYMER (CFRP) STRAND	3'-8" X 3'-0" PRESTRESSED CONCRETE BENT CAPS (ALTERNATE)	CLASS AA CONCRETE (END BENT) (ALTERNATE)	GLASS FIBER REINFORCED POLYMER (GFRP) BAR (END BENT) (ALTERNATE)	ELECTRIC SERVICE POLE (30' CLASS 4)	ELECTRIC SERVICE LATERAL (3 #1/0 USE)	GENERIC LIGHTING ITEM PATH LIGHTING SYSTEM	GENERIC LIGHTING ITEM LIGHTING CONTROL SYSTEM, TYPE SW	GENERIC LIGHTING ITEM STEP LIGHTING LUMINAIRES	
	LIN. FT.	EACH	NO.	LIN. FT.	LIN. FT.	LIN. FT.	CU. YDS.	LIN. FT.	EACH	LIN. FT.	LUMP SUM	EACH	EACH
SUPERSTRUCTURE									1	100		1	62
END BENT NO. 1	5,044.5	9	9	585	7,020		33.7	5,044.5					
BENT NO. 1	4,311.0	9	9	765	9,180	47.0							
BENT NO. 2	4,311.0	9	9	765	9,180	47.0							
BENT NO. 3	4,311.0	9	9	765	9,180	47.0							
BENT NO. 4	4,311.0	9	9	765	9,180	47.0							
BENT NO. 5	4,311.0	9	9	810	9,720	47.0							
BENT NO. 6	4,311.0	9	9	810	9,720	47.0							
BENT NO. 7	4,311.0	9	9	810	9,720	47.0							
BENT NO. 8	4,311.0	9	9	810	9,720	47.0							
BENT NO. 9	4,311.0	9	9	810	9,720	47.0							
END BENT NO. 2	5,044.5	9	9	585	7,020		33.7	5,044.5					
TOTAL	48,888.0	99	99	8,280	99,360	423.0	67.4	10,089.0	1	100	LUMP SUM	1	62

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 5 OF 5



RS&H

RS&H Architects-Engineers-Planners, Inc.

8521 Six Forks Road, Suite 400
 Raleigh, NC 27615
 919-926-4100 FAX 919-846-9080
 www.rsandh.com
 North Carolina License Nos. 50737-F-0403-C-28

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON NC 179B
 OVER CALABASH RIVER
 BETWEEN SR 1810 AND NC 179

DRAWN BY : NSC DATE : 01/2023
 CHECKED BY : MKO DATE : 01/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			42

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	2.07	--	1.75	0.23	3.65	60'	I	29.50	0.23	2.07	60'	I	2.75	0.80	0.23	4.11	60'	I	29.50		
	HL-93(Opr)	N/A	--	2.68	--	1.35	0.23	4.73	60'	I	29.50	0.23	2.68	60'	I	2.75	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	2.54	91.44	1.75	0.23	4.62	60'	I	29.50	0.23	2.54	60'	I	2.75	0.80	0.23	5.21	60'	I	29.50		
	HS-20(Opr)	36.000	--	3.29	118.44	1.35	0.23	6.00	60'	I	29.50	0.23	3.29	60'	I	2.75	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	7.40	99.90	1.4	0.23	10+	60'	I	29.50	0.23	7.40	60'	I	2.75	0.80	0.23	10+	60'	I	29.50	
		SNGARBS2	20.000	--	5.31	106.20	1.4	0.23	9.53	60'	I	29.50	0.23	5.31	60'	I	2.75	0.80	0.23	8.59	60'	I	29.50	
		SNAGRIS2	22.000	--	4.94	108.68	1.4	0.23	9.13	60'	I	29.50	0.23	4.94	60'	I	2.75	0.80	0.23	8.23	60'	I	29.50	
		SNCOTTS3	27.250	--	3.70	100.83	1.4	0.23	6.20	60'	I	29.50	0.23	3.70	60'	I	2.75	0.80	0.23	5.59	60'	I	29.50	
		SNAGGRS4	34.925	--	3.10	108.27	1.4	0.23	5.28	60'	I	29.50	0.23	3.10	60'	I	2.75	0.80	0.23	4.76	60'	I	29.50	
		SNS5A	35.550	--	3.16	112.34	1.4	0.23	5.15	60'	I	29.50	0.23	3.16	60'	I	2.75	0.80	0.23	4.65	60'	I	29.50	
		SNS6A	39.950	--	2.90	115.86	1.4	0.23	4.77	60'	I	29.50	0.23	2.90	60'	I	2.75	0.80	0.23	4.30	60'	I	29.50	
	SNS7B	42.000	--	2.86	120.12	1.4	0.23	4.54	60'	I	29.50	0.23	2.86	60'	I	2.75	0.80	0.23	4.10	60'	I	29.50		
	TTST	TNAGRIT3	33.000	--	3.44	113.52	1.4	0.23	5.83	60'	I	29.50	0.23	3.44	60'	I	2.75	0.80	0.23	5.25	60'	I	29.50	
		TNT4A	33.075	--	3.33	110.14	1.4	0.23	5.87	60'	I	29.50	0.23	3.33	60'	I	2.75	0.80	0.23	5.29	60'	I	29.50	
		TNT6A	41.600	--	3.09	128.54	1.4	0.23	4.84	60'	I	29.50	0.23	3.09	60'	I	2.75	0.80	0.23	4.36	60'	I	29.50	
		TNT7A	42.000	--	2.97	124.74	1.4	0.23	4.88	60'	I	29.50	0.23	2.97	60'	I	2.75	0.80	0.23	4.40	60'	I	29.50	
		TNT7B	42.000	--	2.78	116.76	1.4	0.23	5.10	60'	I	29.50	0.23	2.78	60'	I	2.75	0.80	0.23	4.60	60'	I	29.50	
		TNAGRIT4	43.000	--	2.69	115.67	1.4	0.23	4.82	60'	I	29.50	0.23	2.69	60'	I	2.75	0.80	0.23	4.34	60'	I	29.50	
TNAGT5A		45.000	--	2.69	121.05	1.4	0.23	4.52	60'	I	29.50	0.23	2.69	60'	I	2.75	0.80	0.23	4.08	60'	I	29.50		
TNAGT5B	45.000	3	2.56	115.20	1.4	0.23	4.45	60'	I	29.50	0.23	2.56	60'	I	2.75	0.80	0.23	4.01	60'	I	29.50			

NOTES:

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

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

COMMENTS:

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

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
FOR SPANS A THRU E

PROJECT NO. BR-0160
BRUNSWICK COUNTY
STATION: 21+77.50 -L-

SHEET 1 OF 2

RS&H
RS&H Architects-Engineers-Planners, Inc.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR
60' CORED SLAB UNIT
90° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : NSC DATE : 01/2022
CHECKED BY : MRA DATE : 01/2023
DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	2.08	--	1.75	0.23	3.66	55'	I	27.00	0.23	2.08	55'	I	2.75	0.80	0.23	3.98	55'	I	27.00		
	HL-93(Opr)	N/A	--	2.70	--	1.35	0.23	4.74	55'	I	27.00	0.23	2.70	55'	I	2.75	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	2.51	90.36	1.75	0.23	4.59	55'	I	27.00	0.23	2.51	55'	I	2.75	0.80	0.23	4.99	55'	I	27.00		
	HS-20(Opr)	36.000	--	3.26	117.36	1.35	0.23	5.94	55'	I	27.00	0.23	3.26	55'	I	2.75	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	7.22	97.47	1.4	0.23	10+	55'	I	29.50	0.23	7.22	55'	I	2.75	0.80	0.23	10+	55'	I	29.50	
		SNGARBS2	20.000	--	5.22	104.40	1.4	0.23	9.34	55'	I	27.00	0.23	5.22	55'	I	2.75	0.80	0.23	8.14	55'	I	27.00	
		SNAGRIS2	22.000	--	4.87	107.14	1.4	0.23	8.97	55'	I	21.60	0.23	4.87	55'	I	2.75	0.80	0.23	7.85	55'	I	21.60	
		SNCOTTS3	27.250	--	3.61	98.37	1.4	0.23	6.00	55'	I	27.00	0.23	3.61	55'	I	2.75	0.80	0.23	5.23	55'	I	27.00	
		SNAGGRS4	34.925	--	3.06	106.87	1.4	0.23	5.16	55'	I	27.00	0.23	3.06	55'	I	2.75	0.80	0.23	4.49	55'	I	27.00	
		SNS5A	35.550	--	3.13	111.27	1.4	0.23	5.03	55'	I	27.00	0.23	3.13	55'	I	2.75	0.80	0.23	4.38	55'	I	27.00	
		SNS6A	39.950	--	2.88	115.06	1.4	0.23	4.68	55'	I	27.00	0.23	2.88	55'	I	2.75	0.80	0.23	4.08	55'	I	27.00	
	SNS7B	42.000	--	2.86	120.12	1.4	0.23	4.46	55'	I	27.00	0.23	2.86	55'	I	2.75	0.80	0.23	3.88	55'	I	27.00		
	TTST	TNAGRIT3	33.000	--	3.40	112.20	1.4	0.23	5.72	55'	I	27.00	0.23	3.40	55'	I	2.75	0.80	0.23	4.99	55'	I	27.00	
		TNT4A	33.075	--	3.29	108.82	1.4	0.23	5.77	55'	I	27.00	0.23	3.29	55'	I	2.75	0.80	0.23	5.02	55'	I	27.00	
		TNT6A	41.600	--	3.10	128.96	1.4	0.23	4.78	55'	I	27.00	0.23	3.10	55'	I	2.75	0.80	0.23	4.16	55'	I	27.00	
		TNT7A	42.000	--	2.94	123.48	1.4	0.23	4.83	55'	I	27.00	0.23	2.94	55'	I	2.75	0.80	0.23	4.21	55'	I	27.00	
		TNT7B	42.000	--	2.77	116.34	1.4	0.23	5.04	55'	I	27.00	0.23	2.77	55'	I	2.75	0.80	0.23	4.39	55'	I	27.00	
		TNAGRIT4	43.000	--	2.67	114.81	1.4	0.23	4.77	55'	I	27.00	0.23	2.67	55'	I	2.75	0.80	0.23	4.16	55'	I	27.00	
TNAGT5A		45.000	--	2.69	121.05	1.4	0.23	4.47	55'	I	27.00	0.23	2.69	55'	I	2.75	0.80	0.23	3.90	55'	I	27.00		
TNAGT5B	45.000	3	2.53	113.85	1.4	0.23	4.39	55'	I	27.00	0.23	2.53	55'	I	2.75	0.80	0.23	3.83	55'	I	27.00			

NOTES:

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

COMMENTS:

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

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



LRFR SUMMARY
FOR SPANS F THRU J

PROJECT NO. BR-0160
BRUNSWICK COUNTY
STATION: 21+77.50 -L-

SHEET 2 OF 2

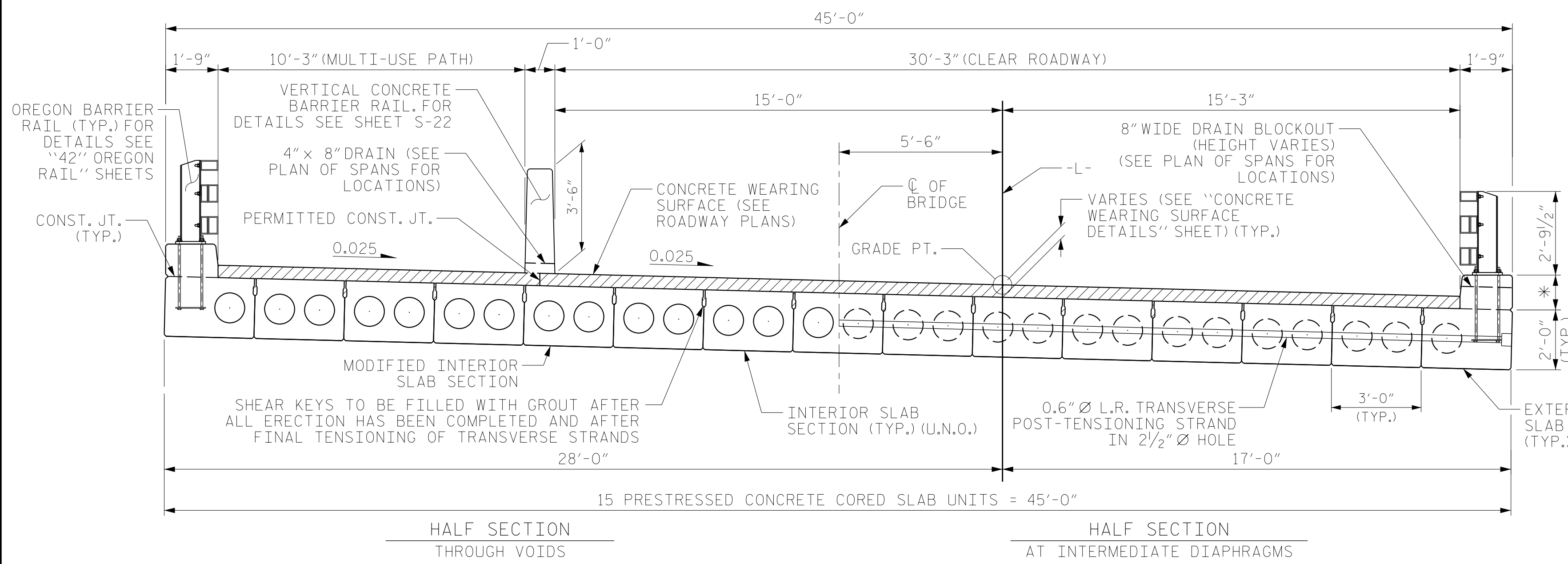
RS&H
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
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919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License No. 50737-5403-C&E

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
LRFR SUMMARY FOR
55' CORED SLAB UNIT
90° SKEW
(NON-INTERSTATE TRAFFIC)

DRAWN BY : NSC DATE : 01/2022
CHECKED BY : MRA DATE : 01/2023
DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

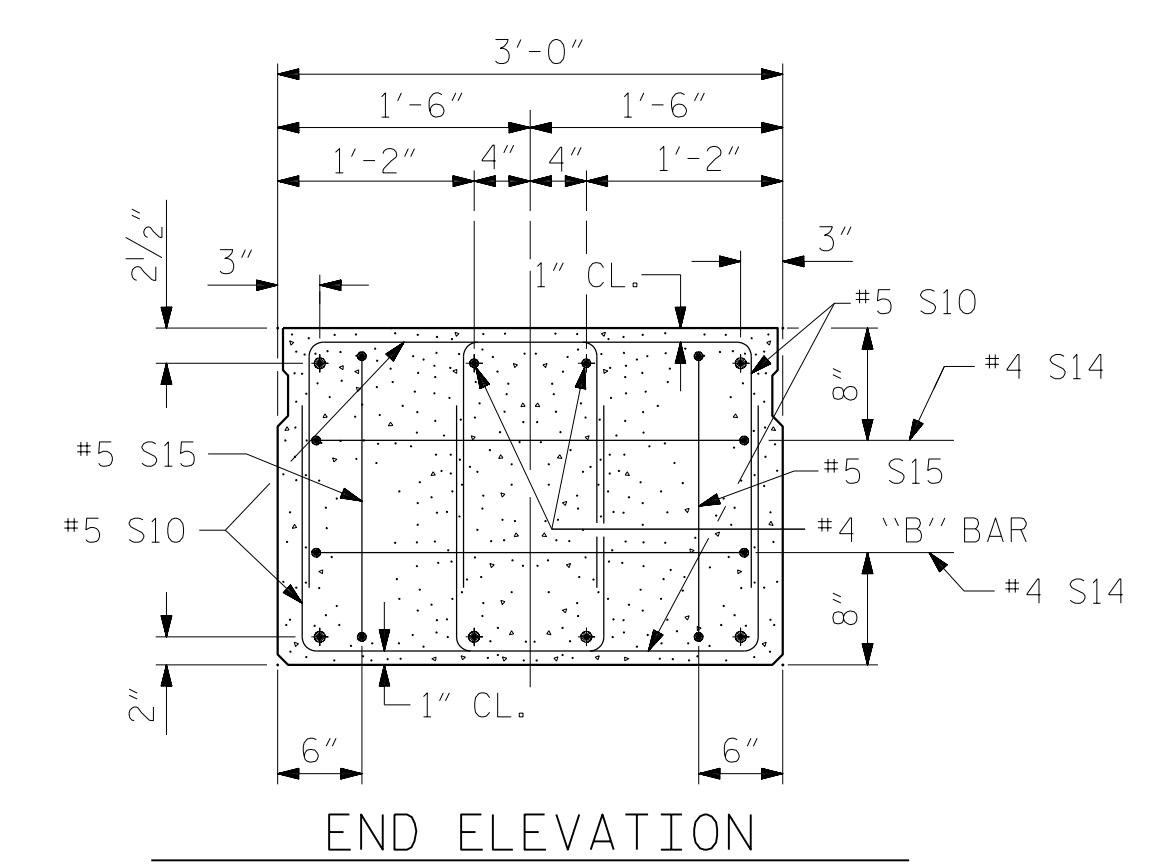
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			42

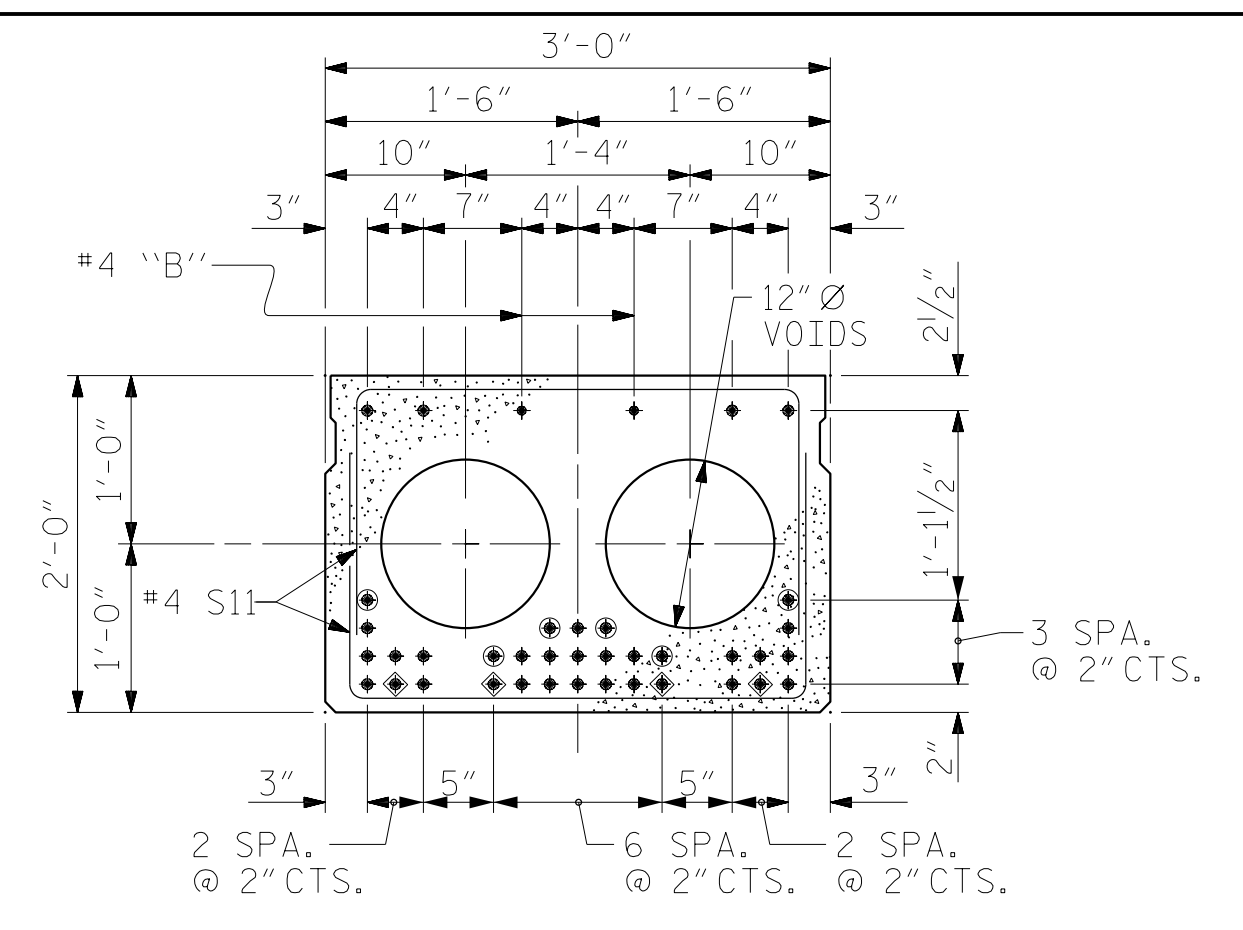


TYPICAL SECTION

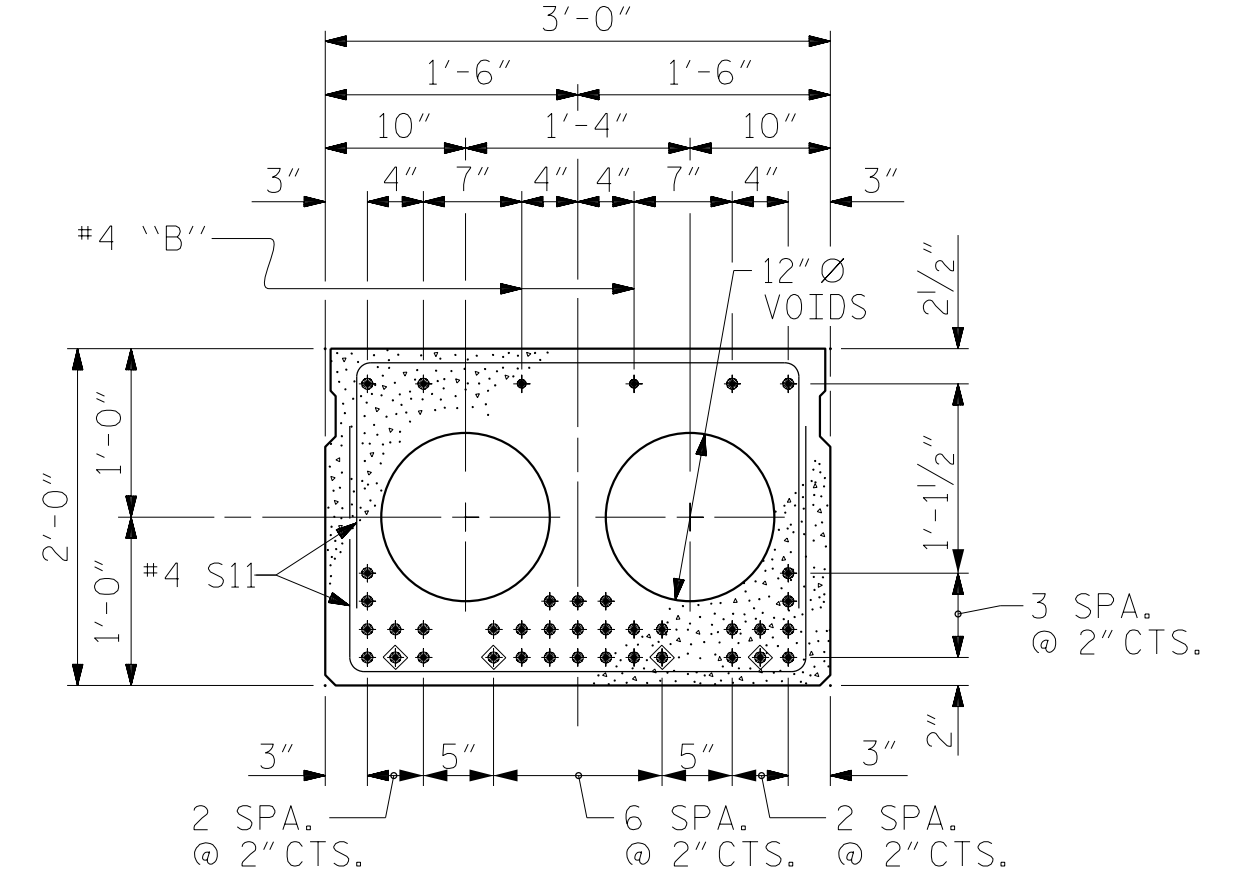
* - THE HEIGHT OF THE CURB VARIES WHILE THE TOP OF THE CURB FOLLOWS THE PROFILE OF THE GUTTERLINE.
FOR CURB HEIGHT AND CONCRETE WEARING SURFACE THICKNESS, SEE "CONCRETE WEARING SURFACE DETAILS" SHEETS.



SHOWING PLACEMENT OF DOUBLE STIRRUPS.
FOR LOCATION OF DOWEL HOLES, SEE SHEET 15 OF 16.
(STRAND LAYOUT NOT SHOWN.)
INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.



INTERIOR SLAB SECTION (55' UNIT)
(31 STRANDS REQUIRED)

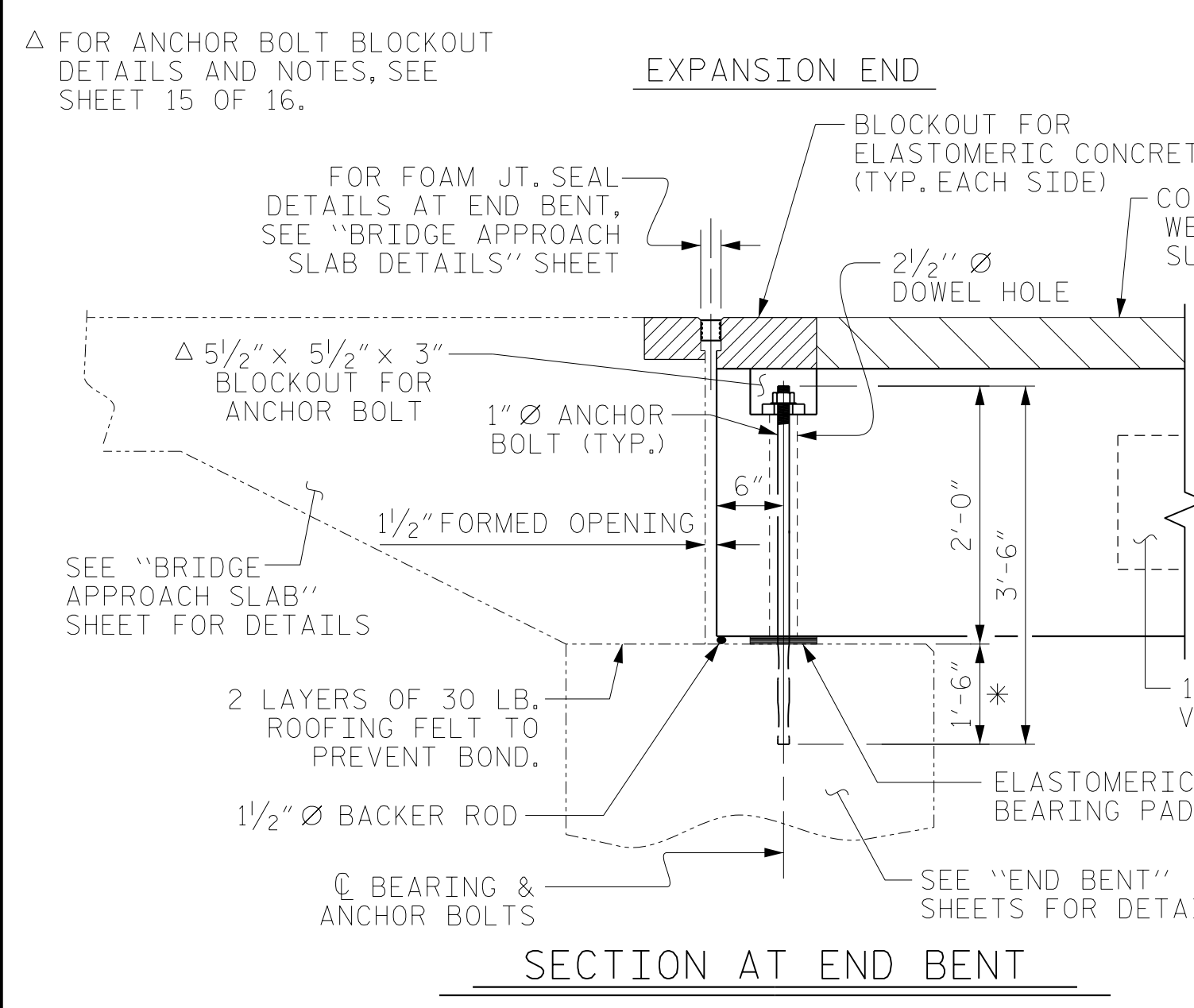


INTERIOR SLAB SECTION (60' UNIT)
(37 STRANDS REQUIRED)

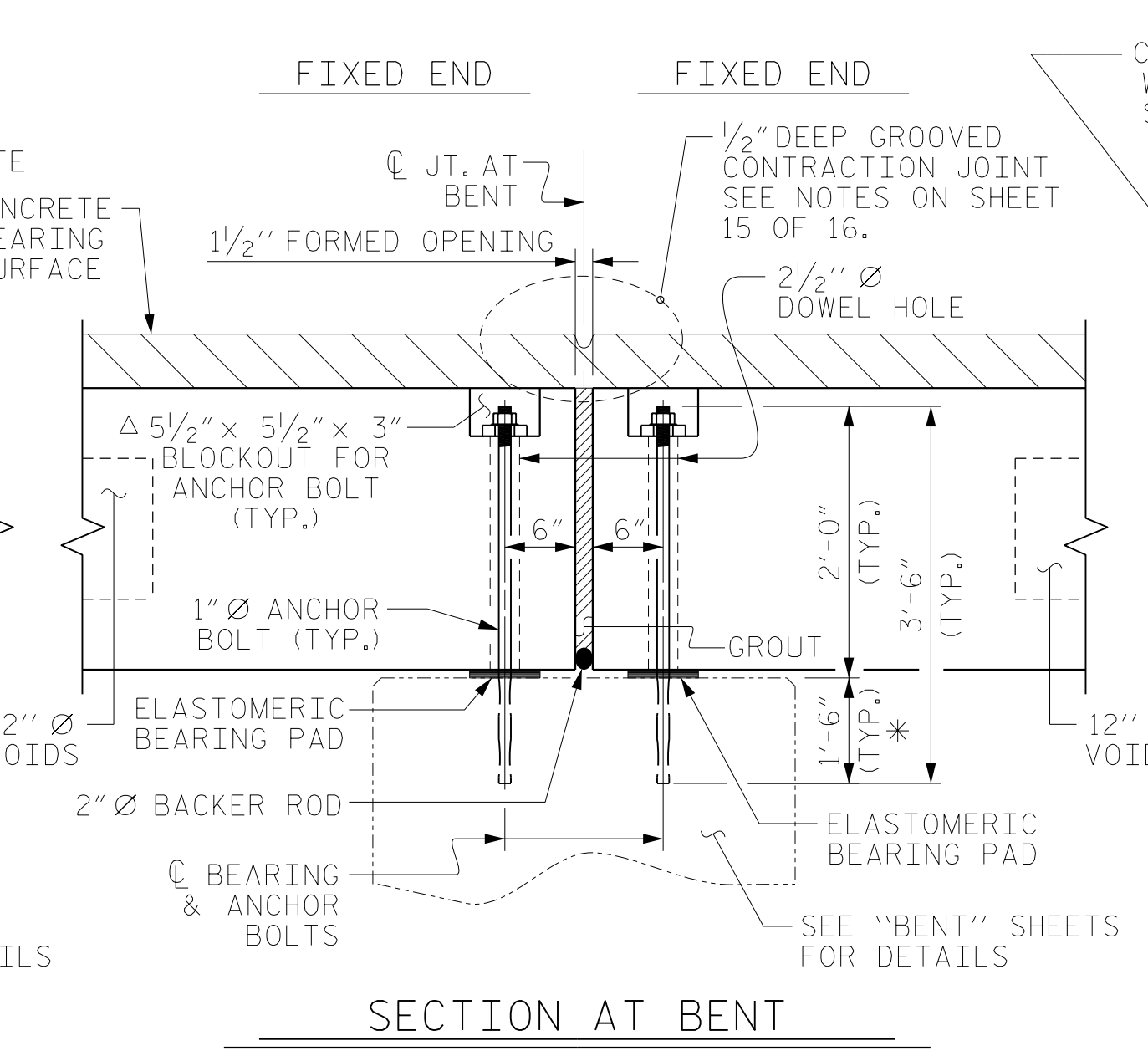
0.6" Ø LOW RELAXATION STRAND LAYOUT

- ◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

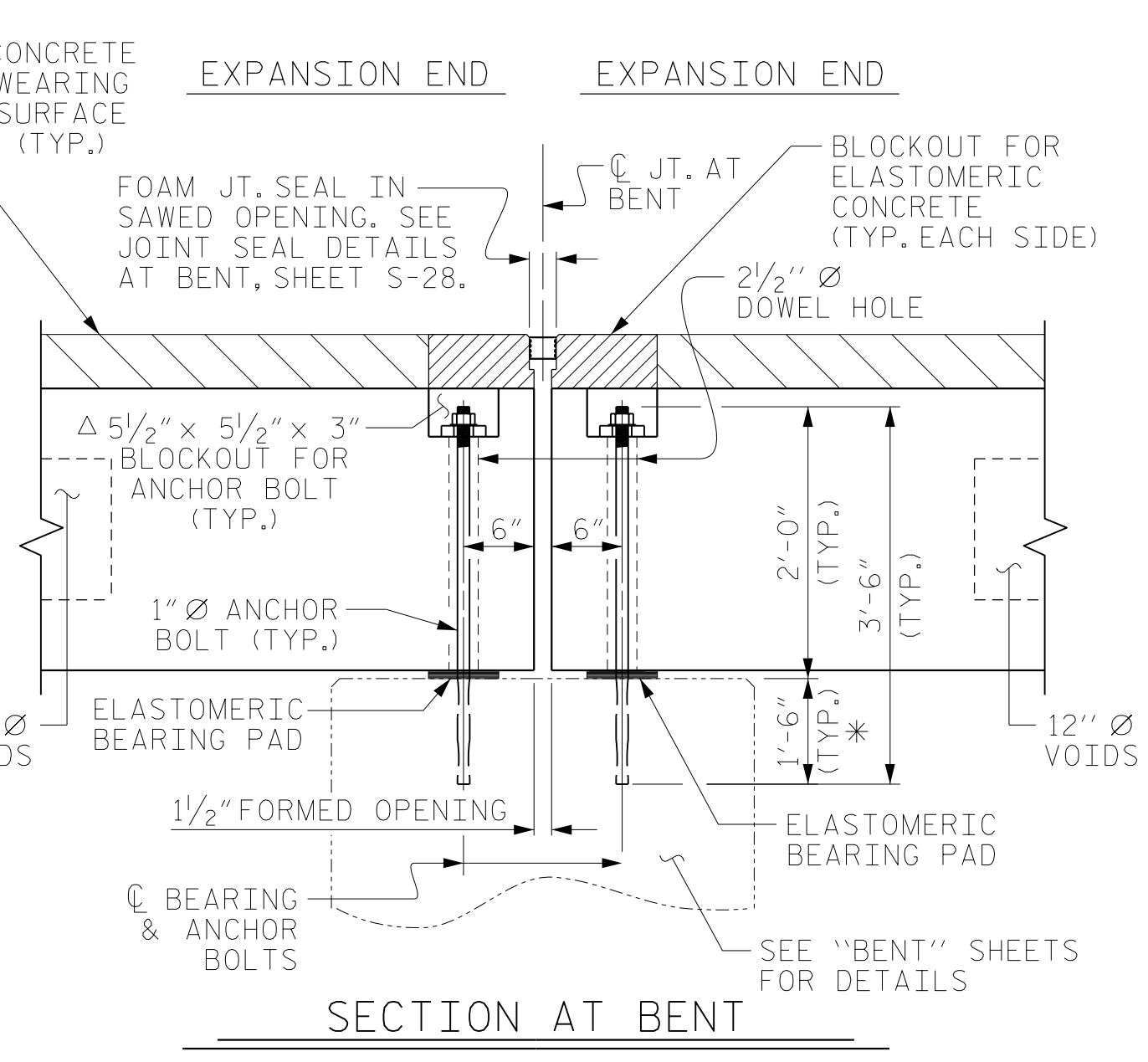
DEBONDING LEGEND



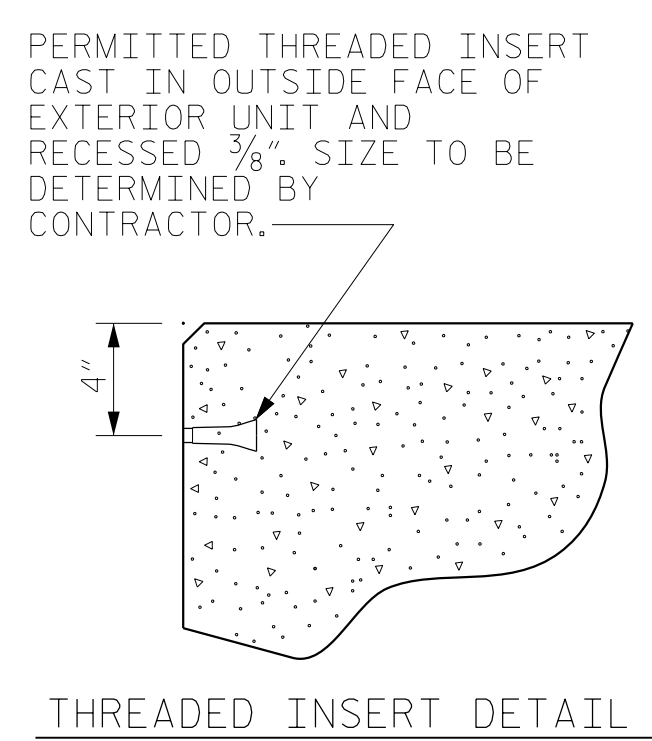
SECTION AT END BENT



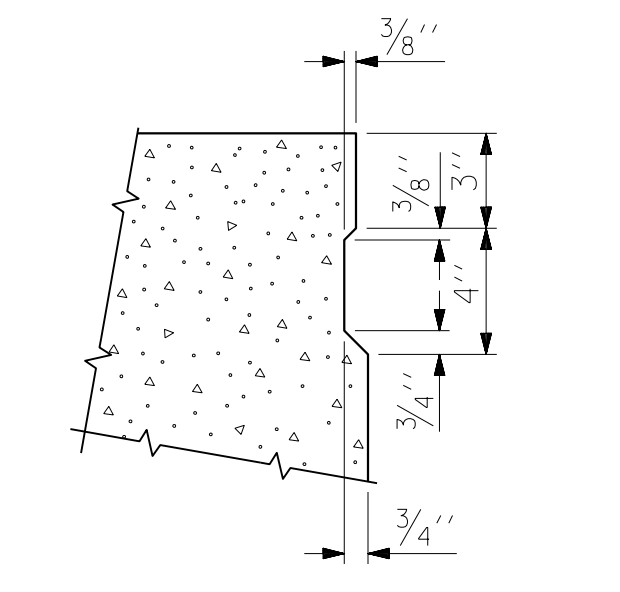
SECTION AT BENT



SECTION AT BENT

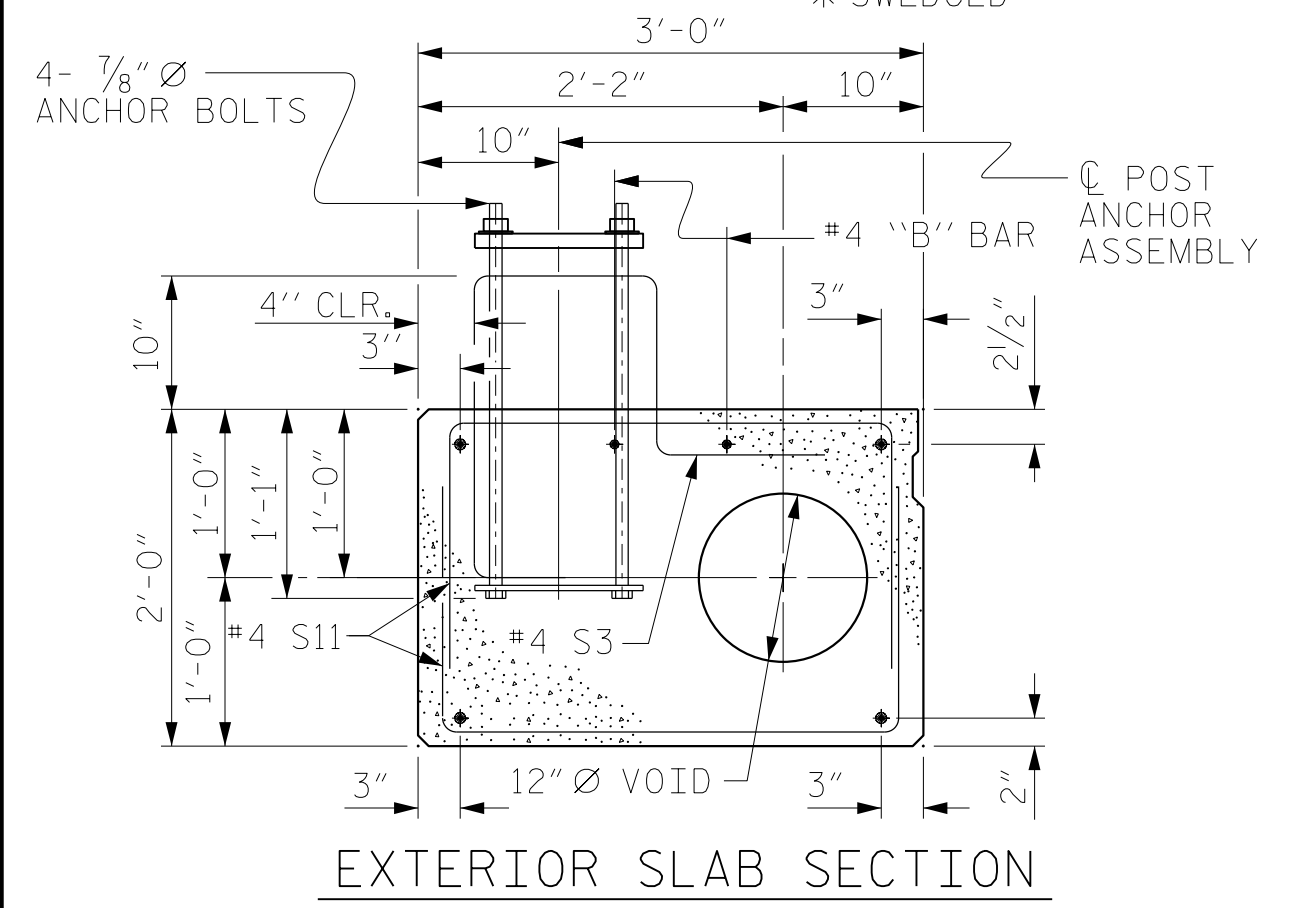


THREADED INSERT DETAIL



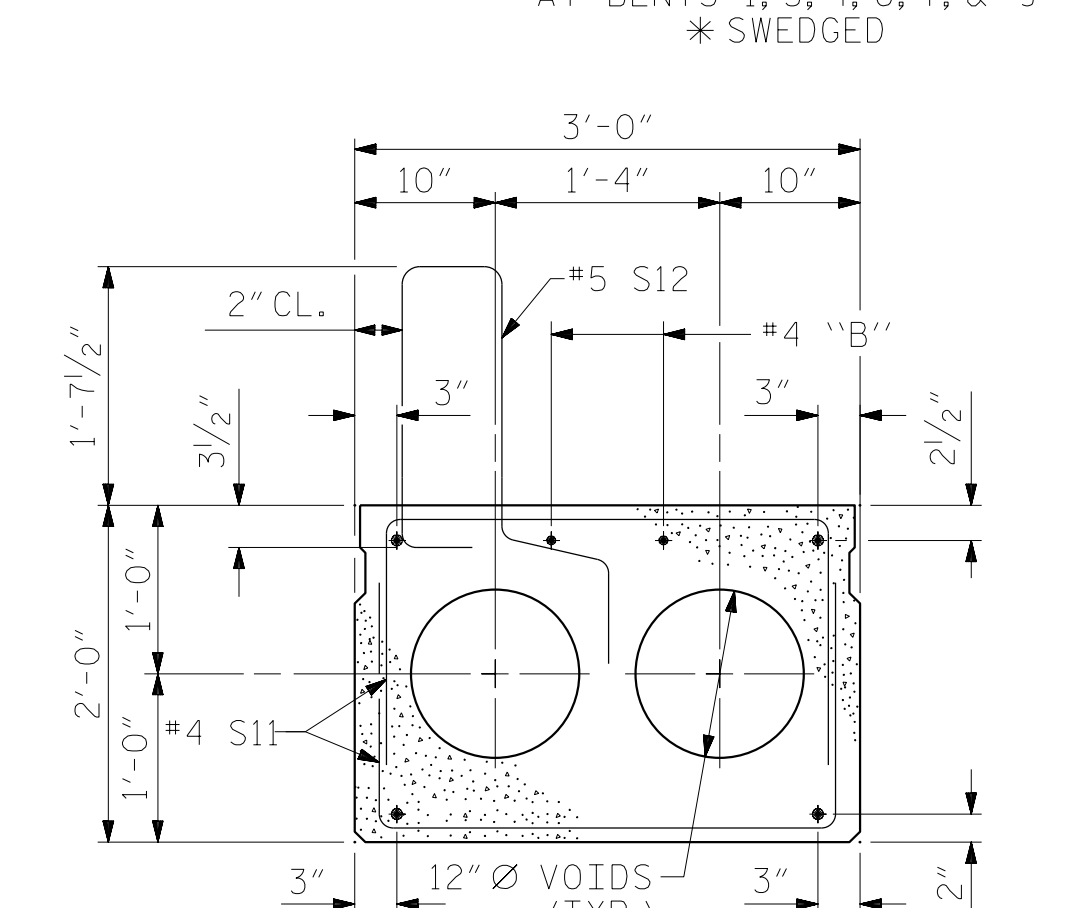
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



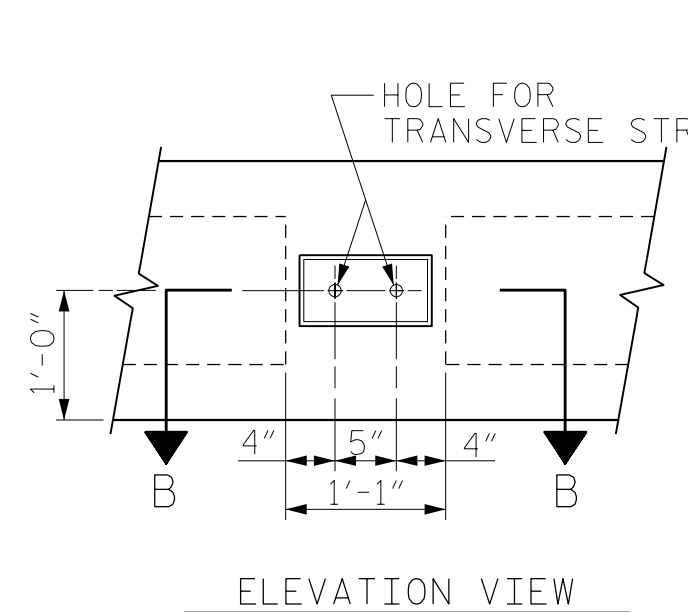
EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

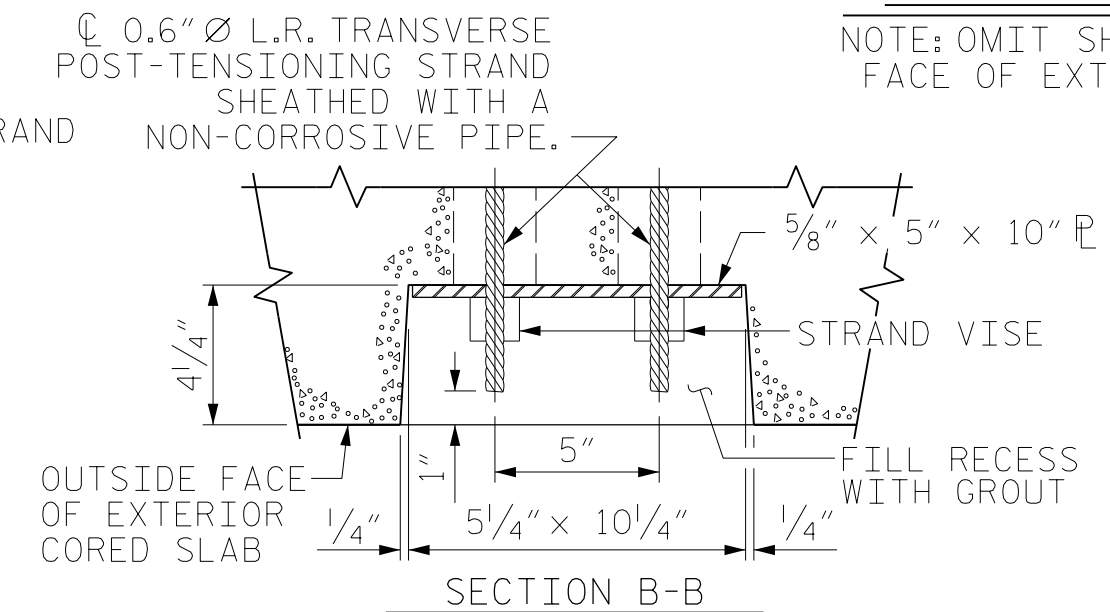


MODIFIED INTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



ELEVATION VIEW



SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND-CORED SLABS

DRAWN BY : MRA DATE : 02/2023
 CHECKED BY : MKO DATE : 02/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

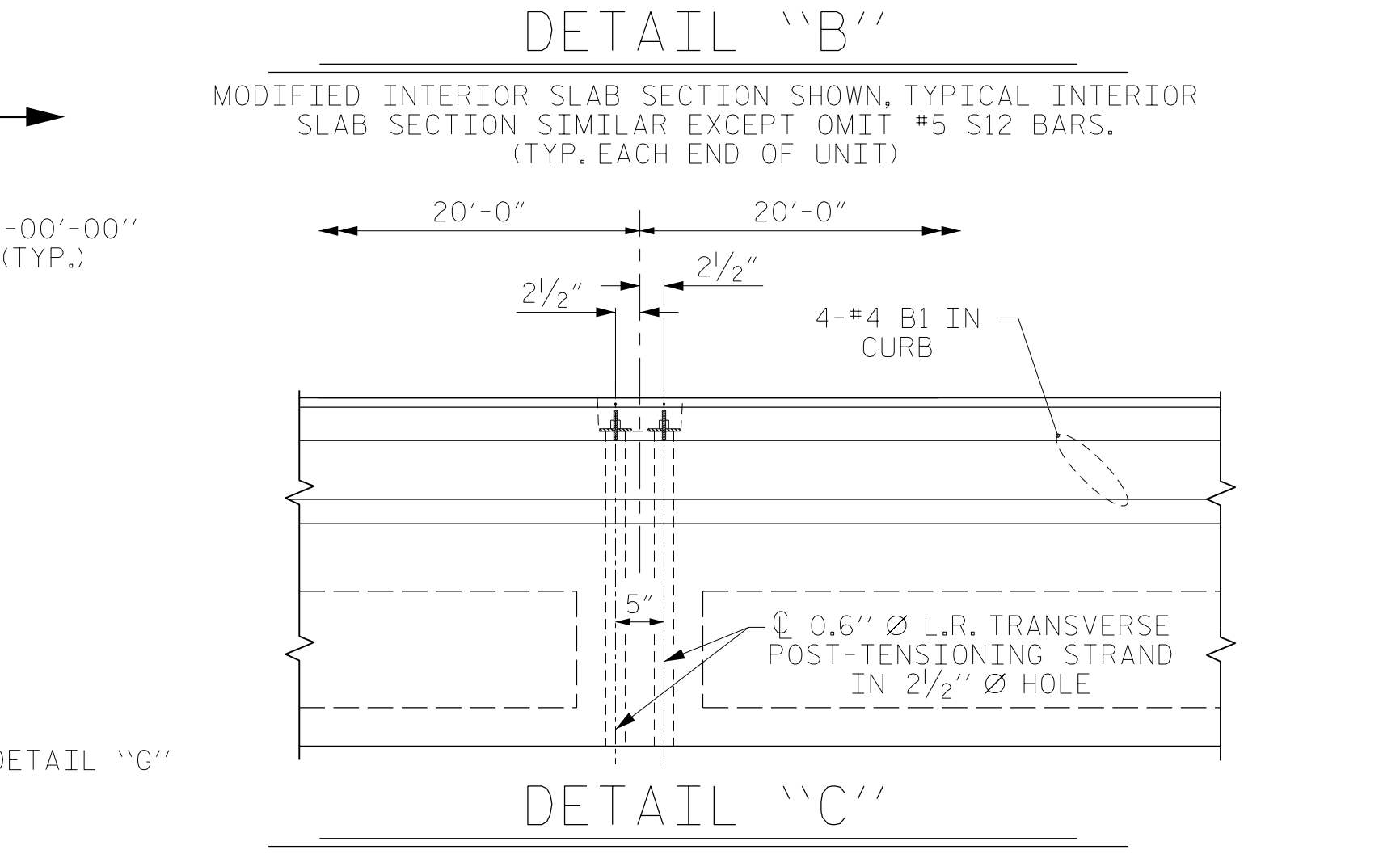
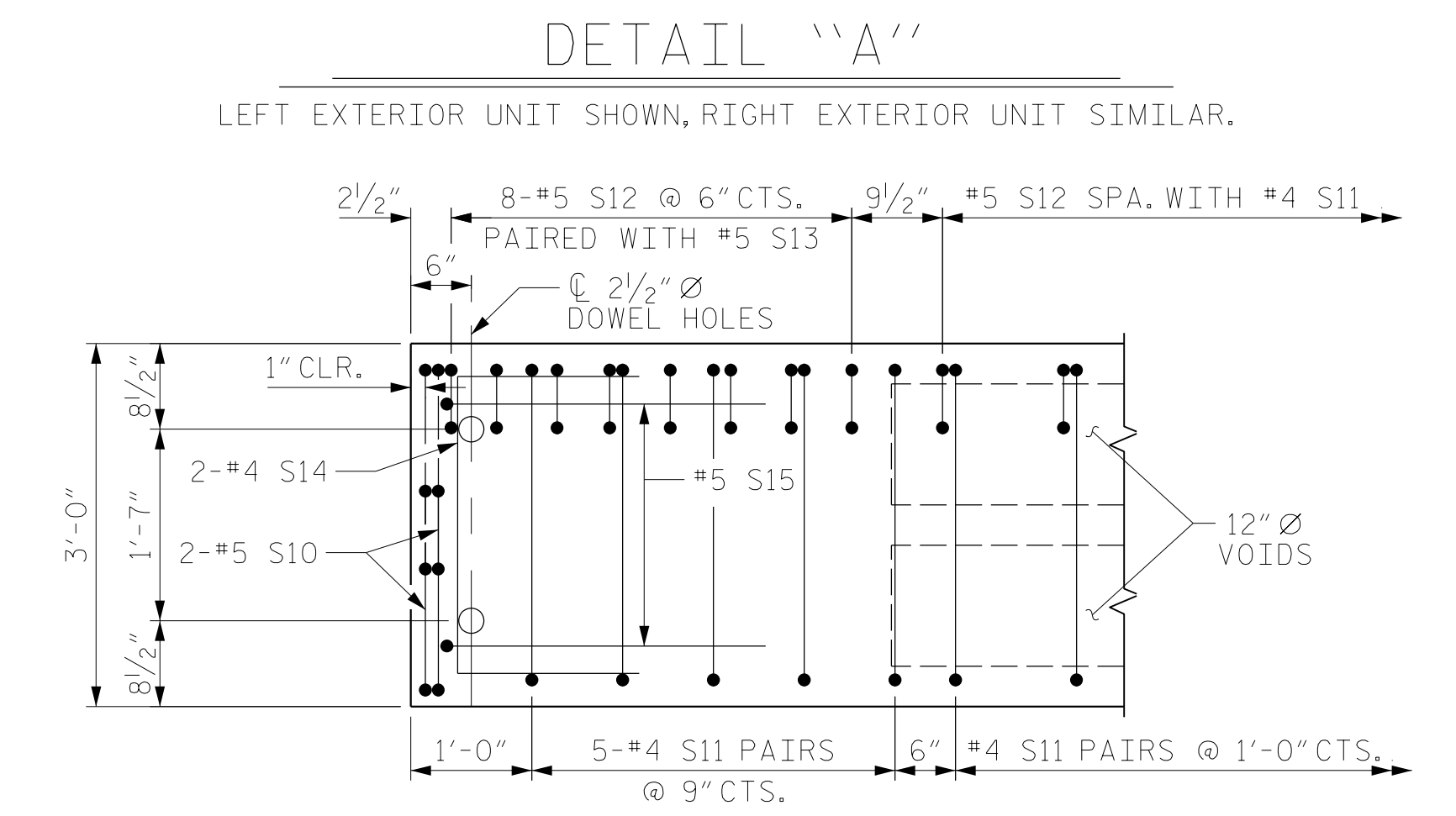
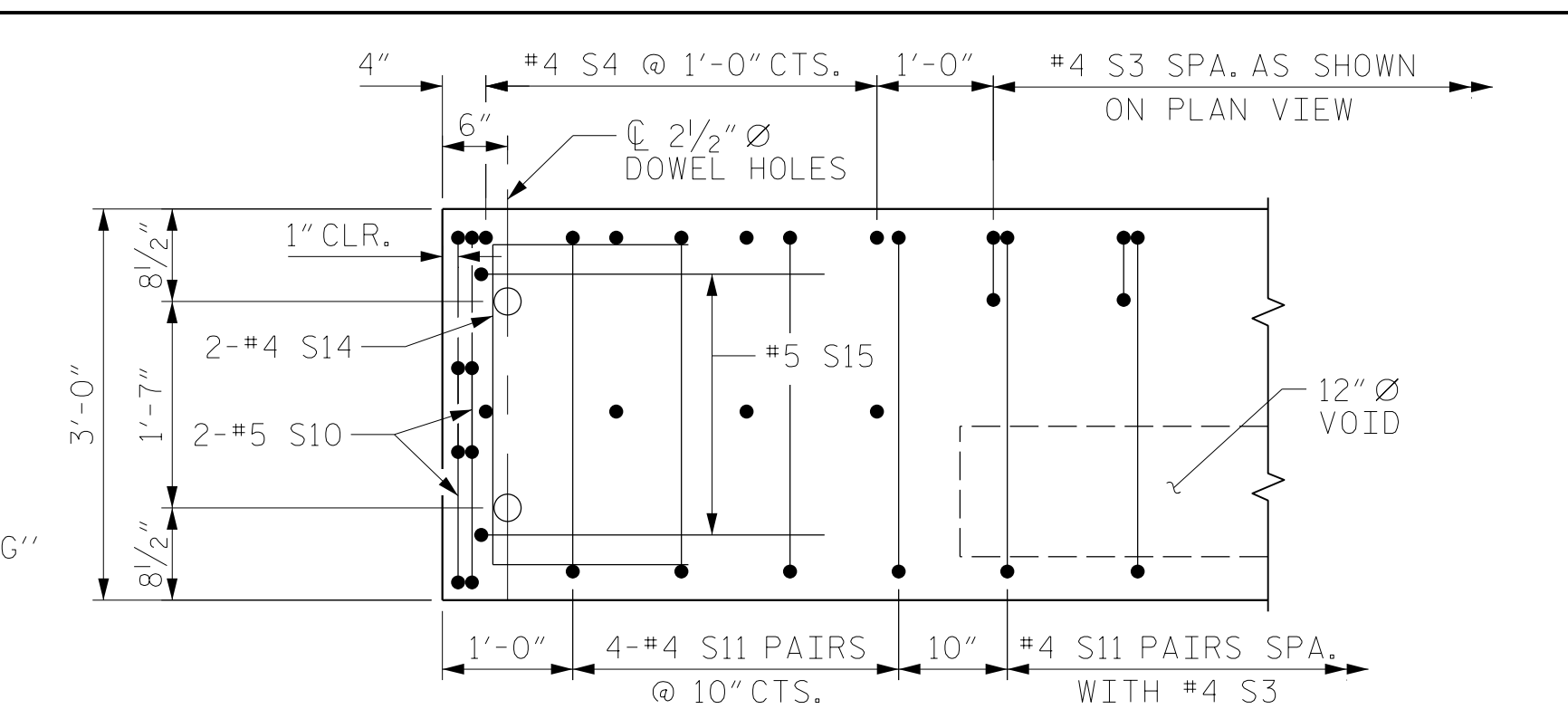
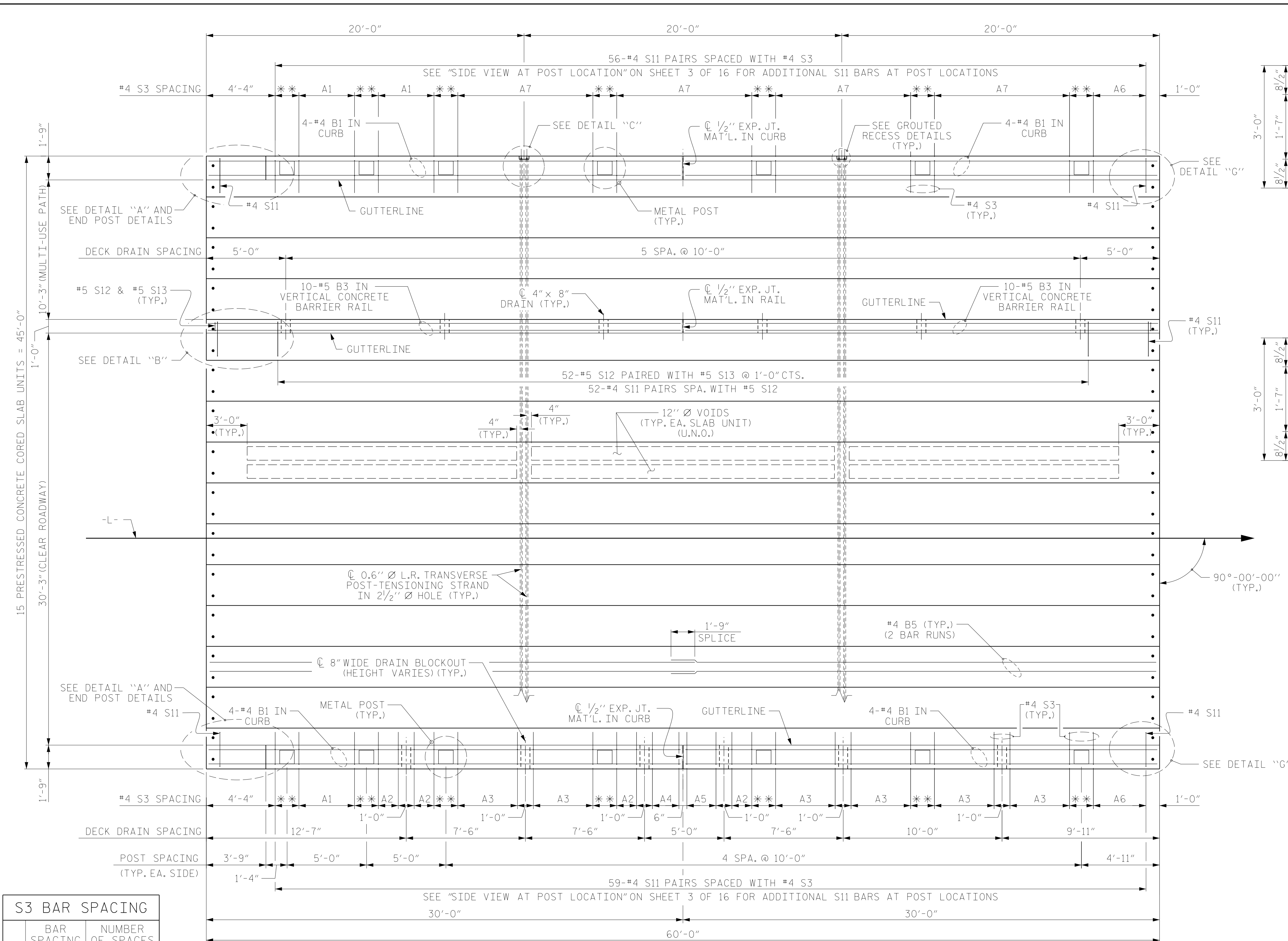
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 1 OF 16

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-9
TOTAL SHEETS 42



S3 BAR SPACING		
BAR SPACING	BAR	NUMBER OF SPACES
A1	10 1/2"	4
A2	7 1/2"	2
A3	11 1/4"	4
A4	10"	2
A5	11"	2
A6	9 1/2"	4
A7	EQUAL	9

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR END POST DETAILS, SEE SHEET 14 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN A
** = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
STATION: 21+77.50 -L-

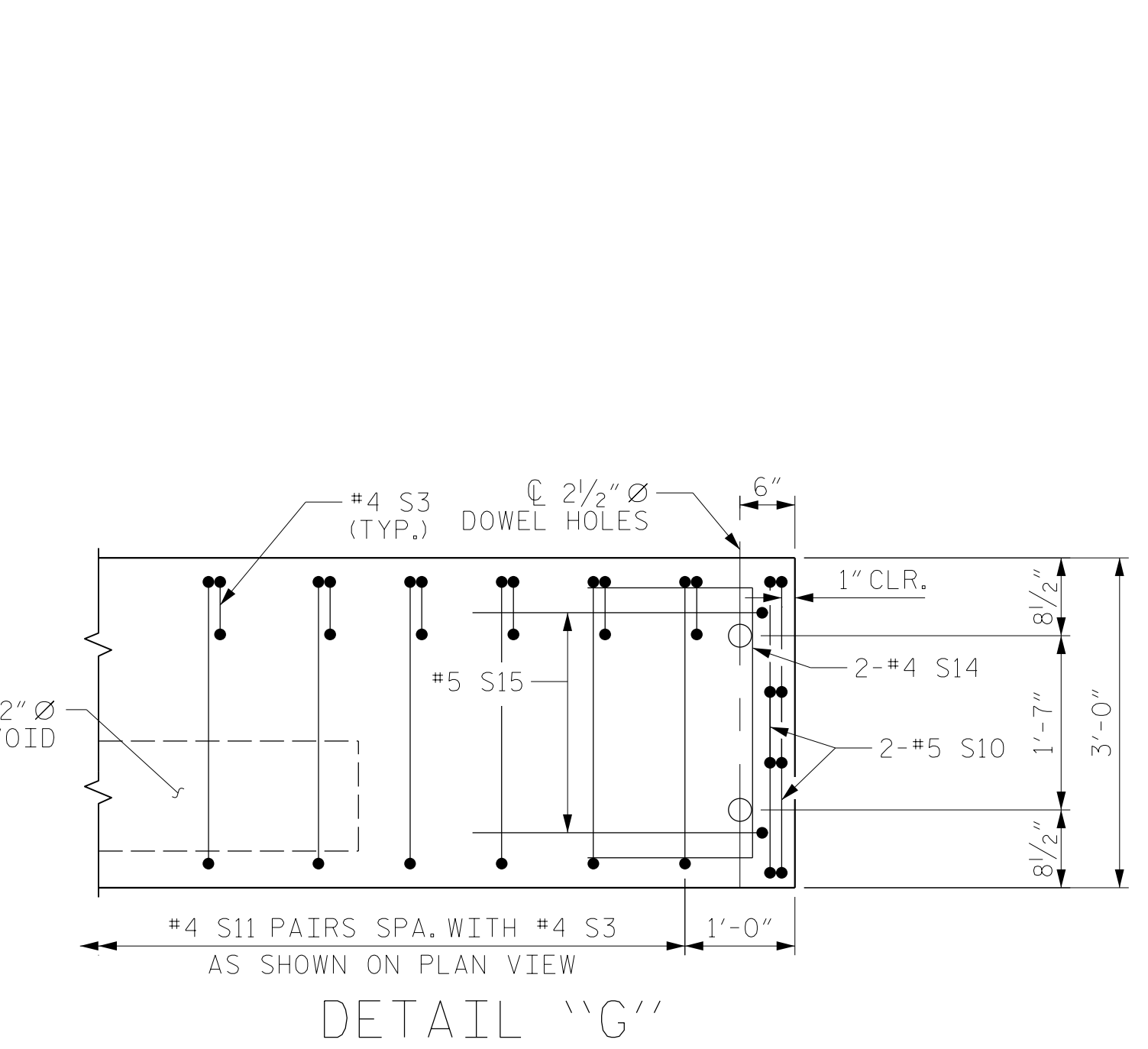
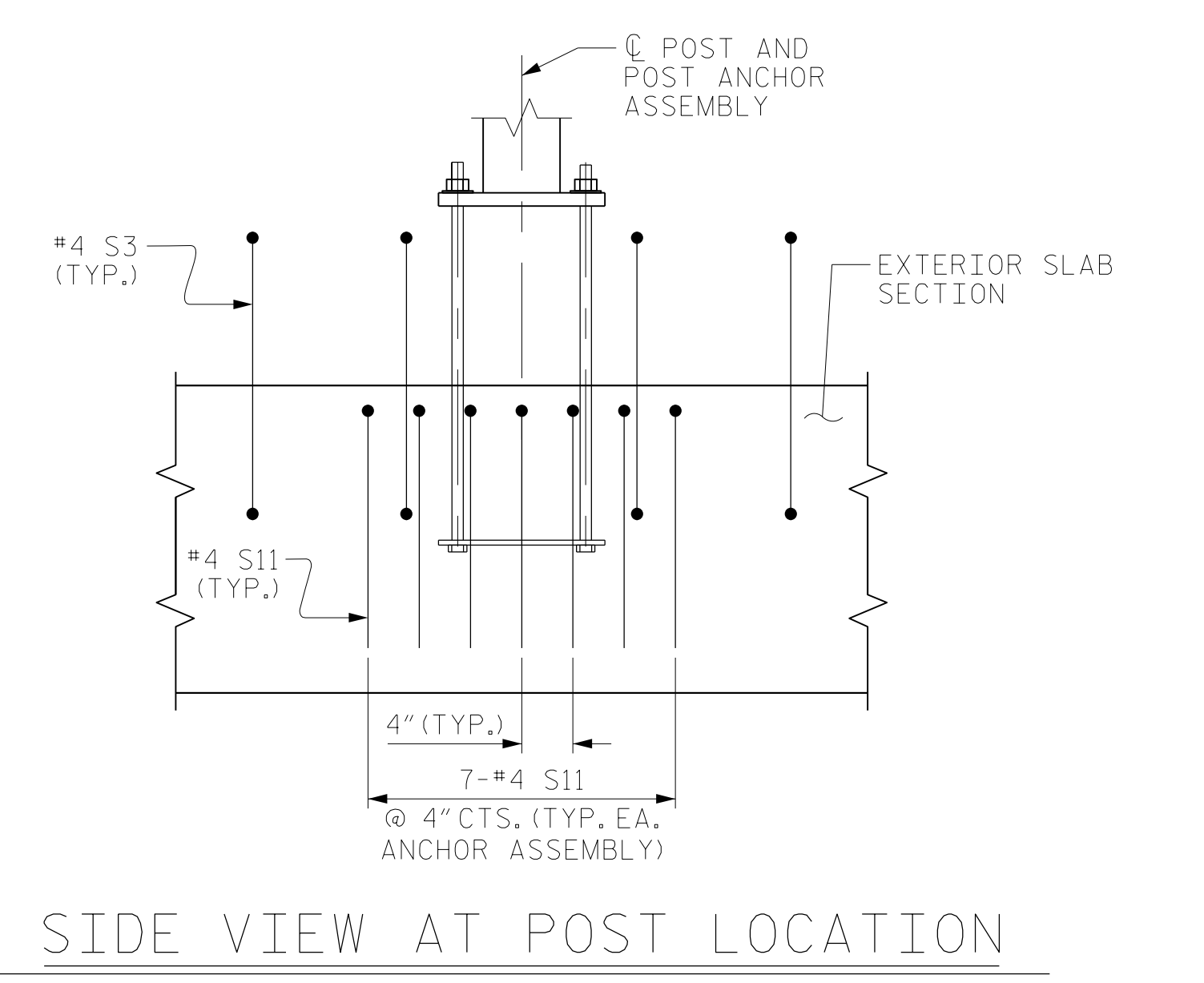
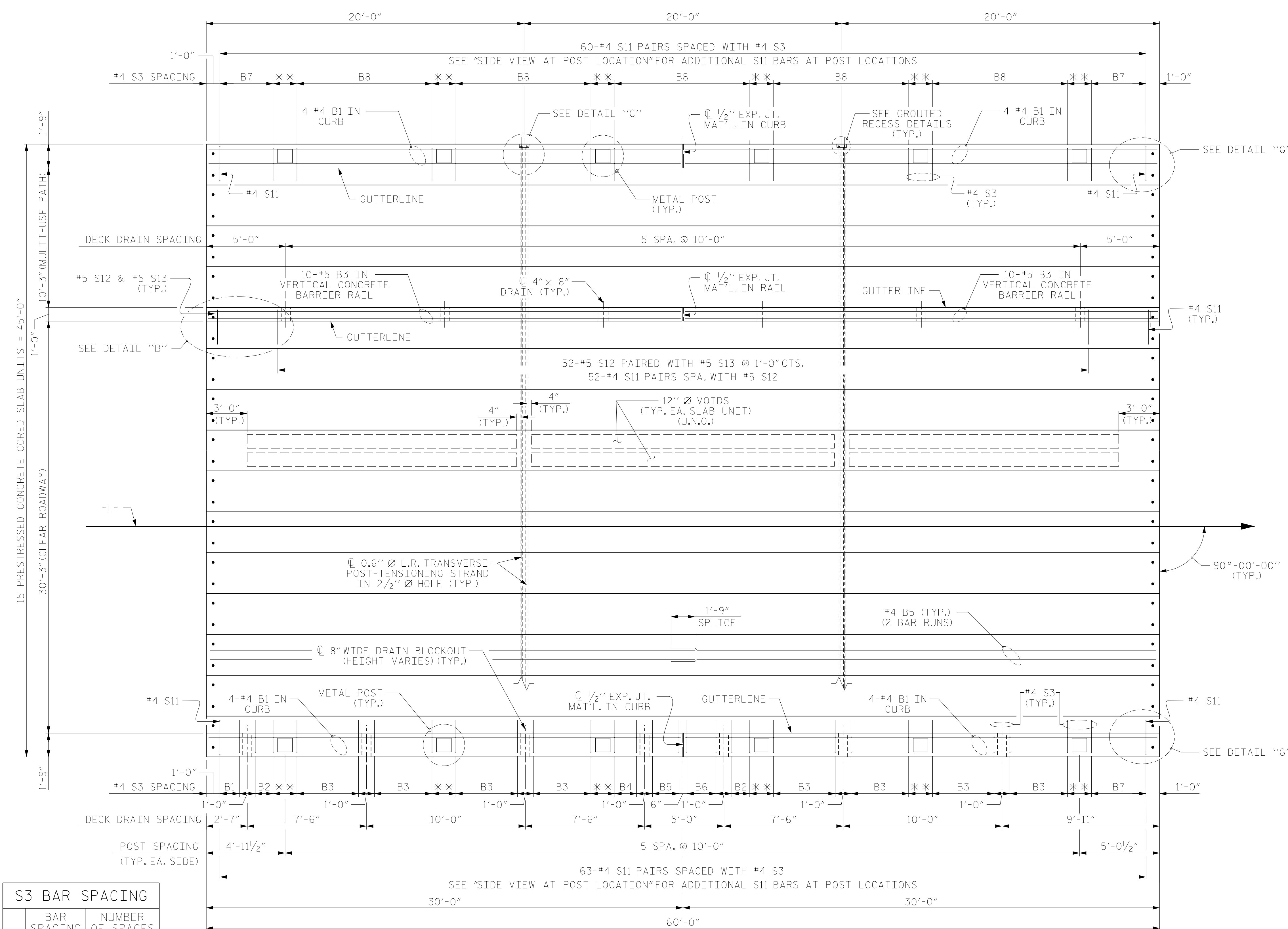
SHEET 2 OF 16



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10	
1			3			TOTAL SHEETS 42	
2			4				

DRAWN BY : MRA DATE : 02/2023
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LEFT EXTERIOR UNIT SHOWN, RIGHT EXTERIOR UNIT SIMILAR. (TYPICAL EACH END OF UNIT U.N.O.)

S3 BAR SPACING		
BAR SPACING	BAR	NUMBER OF SPACES
6 1/2"	B1	2
6 3/4"	B2	2
EQUAL	B3	4
8 1/4"	B4	2
10"	B5	2
11"	B6	2
EQUAL	B7	4
EQUAL	B8	9

NOTES:
 FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
 FOR DETAIL "B" AND DETAIL "C", SEE SHEET 2 OF 16.
 BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
 THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN B
 * * = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 3 OF 16

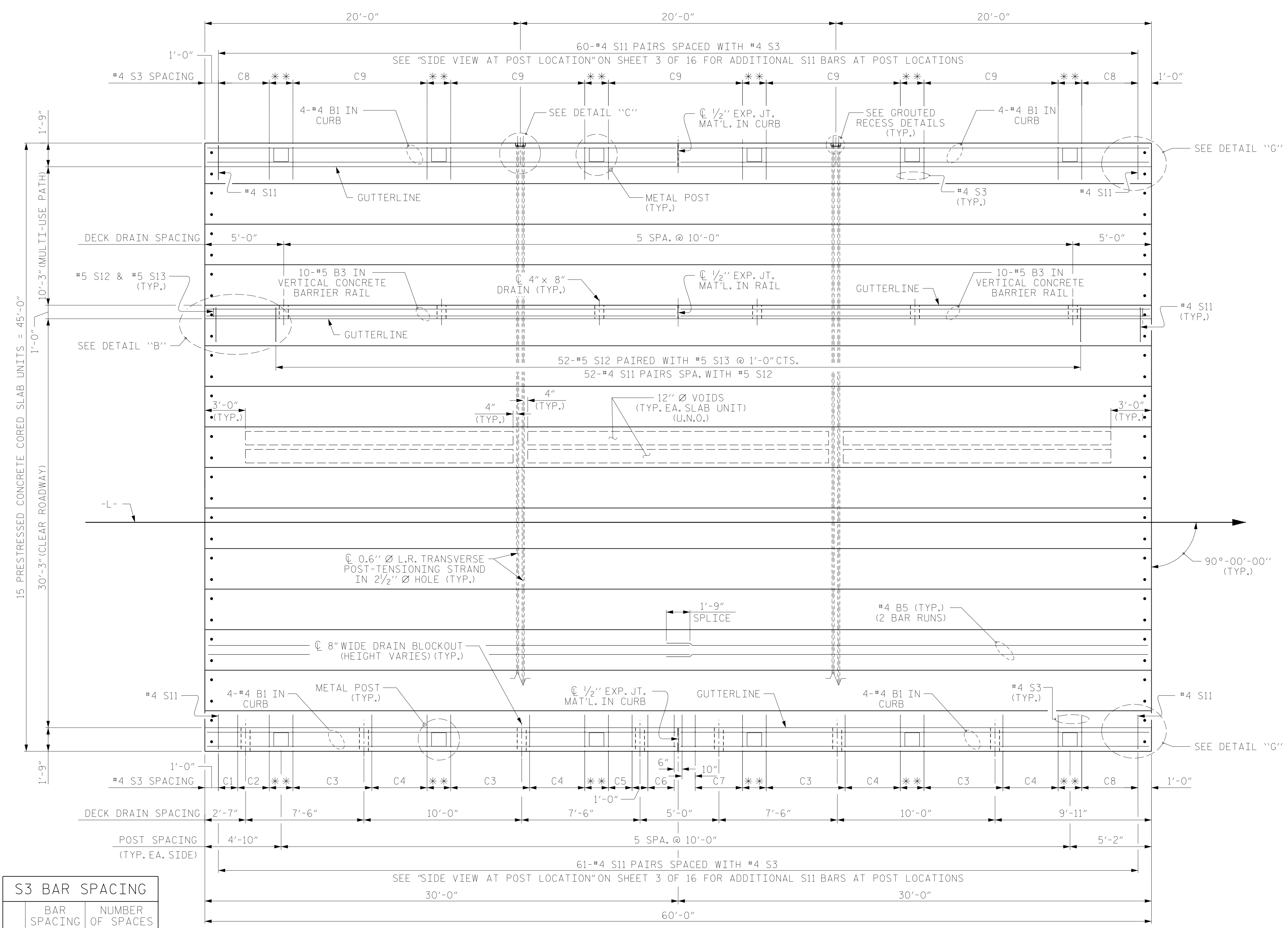
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**PLAN OF 60' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN B**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			42

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S3 BAR SPACING		
BAR SPACING	BAR	NUMBER OF SPACES
C1	6 1/2"	2
C2	1'-0"	2
C3	1'-0"	5
C4	10 1/2"	4
C5	9"	2
C6	10"	2
C7	1'-0"	3
C8	EQUAL	4
C9	EQUAL	9

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR DETAIL "B" AND DETAIL "C", SEE SHEET 2 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN C
* * = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 4 OF 16



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 DEPARTMENT OF TRANSPORTATION
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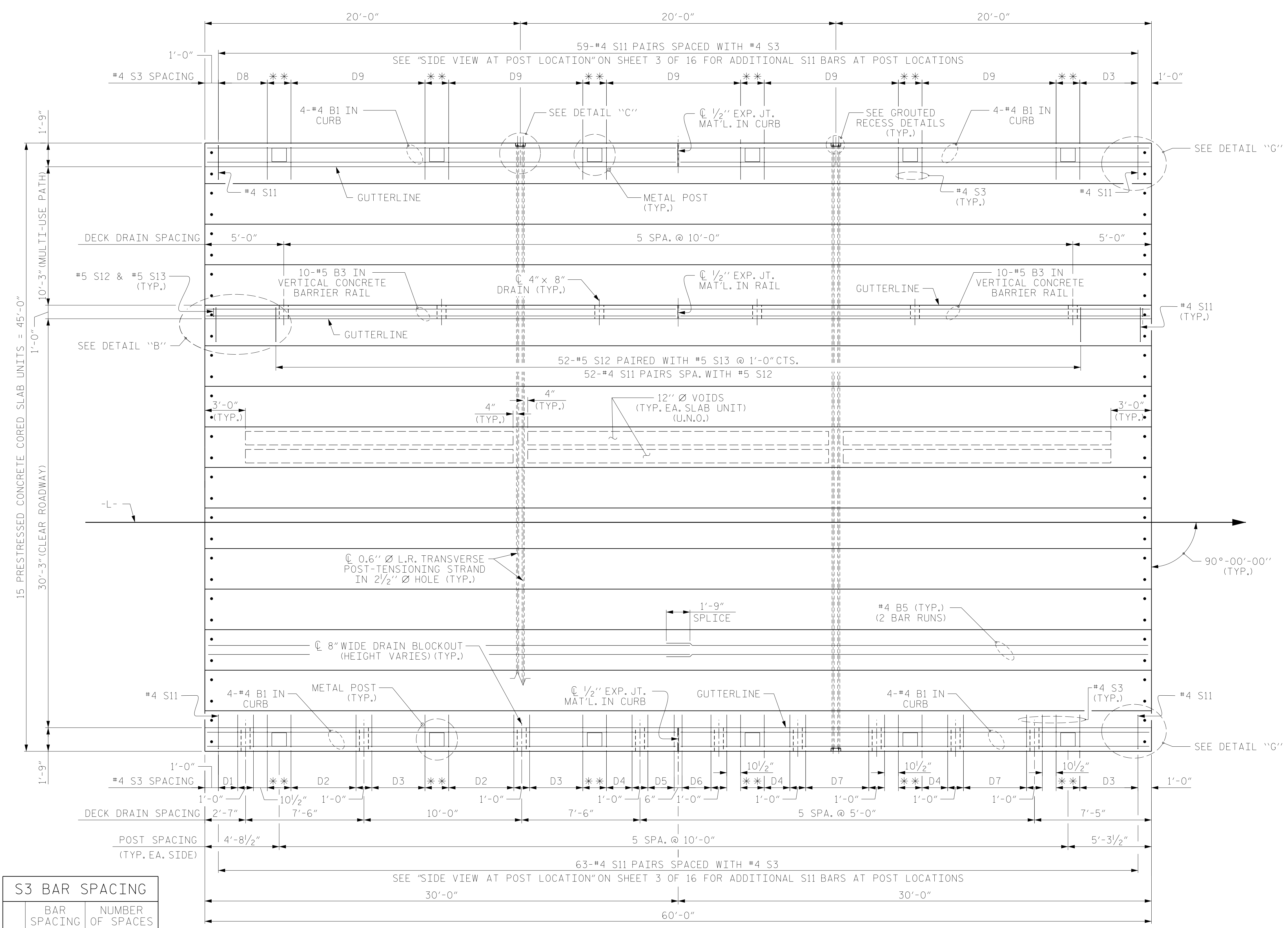
**PLAN OF 60' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN C**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			42

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 SIGNATURES COMPLETED



S3 BAR SPACING		
BAR SPACING	BAR	NUMBER OF SPACES
D1	6 1/2"	2
D2	EQUAL	5
D3	EQUAL	4
D4	9 3/4"	2
D5	10"	2
D6	11"	2
D7	1'-0"	4
D8	EQUAL	3
D9	EQUAL	9

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR DETAIL "B" AND DETAIL "C", SEE SHEET 2 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN D
* * = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 5 OF 16



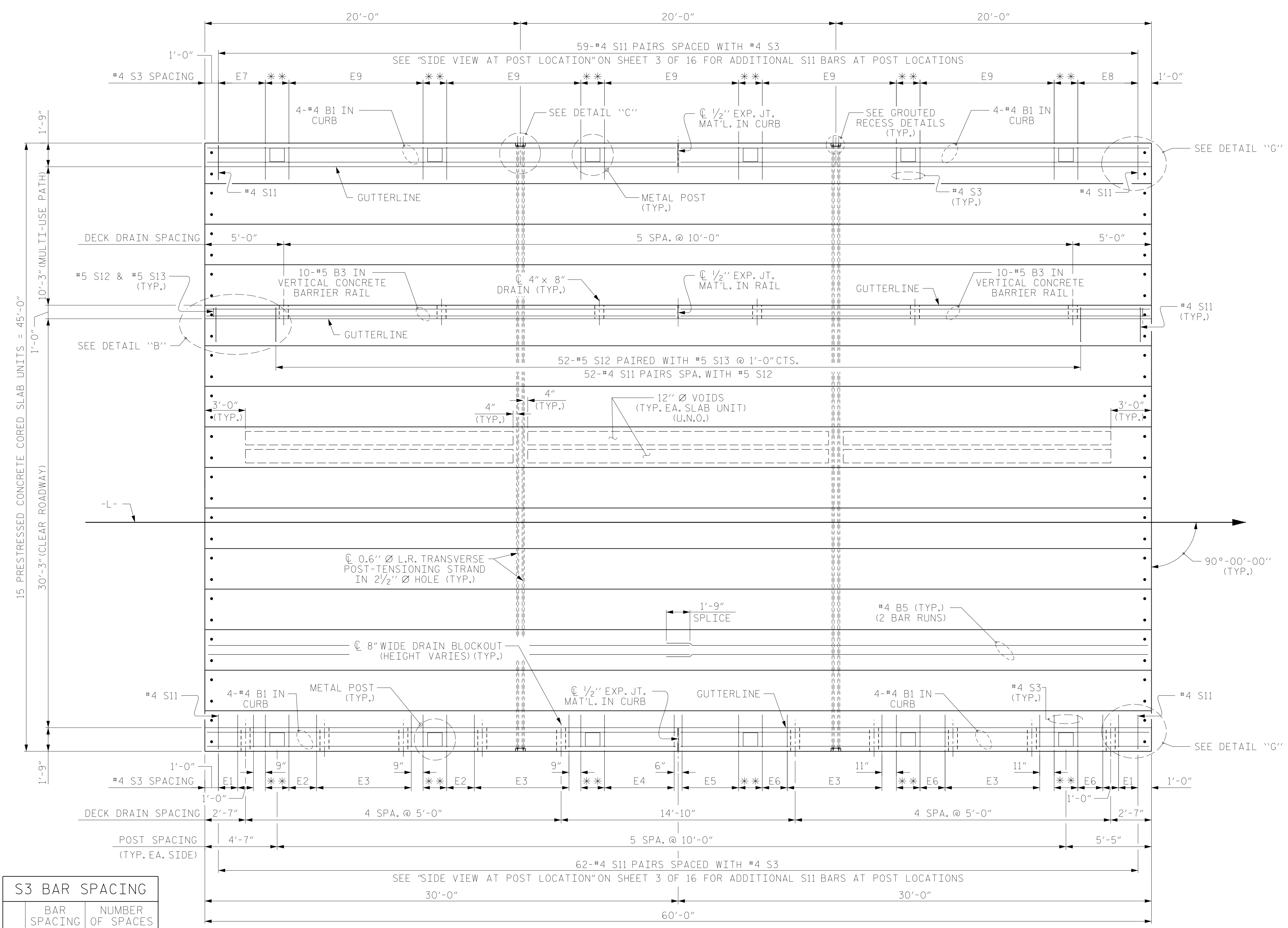
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**PLAN OF 60' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN D**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : MRA DATE : 02/2023
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 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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S3 BAR SPACING		
	BAR SPACING	NUMBER OF SPACES
E1	6 1/2"	2
E2	10 1/2"	2
E3	1'-0"	6
E4	EQUAL	5
E5	EQUAL	4
E6	9 1/2"	2
E7	EQUAL	3
E8	EQUAL	4
E9	EQUAL	9

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR DETAIL "B" AND DETAIL "C", SEE SHEET 2 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN E
* * = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 6 OF 16

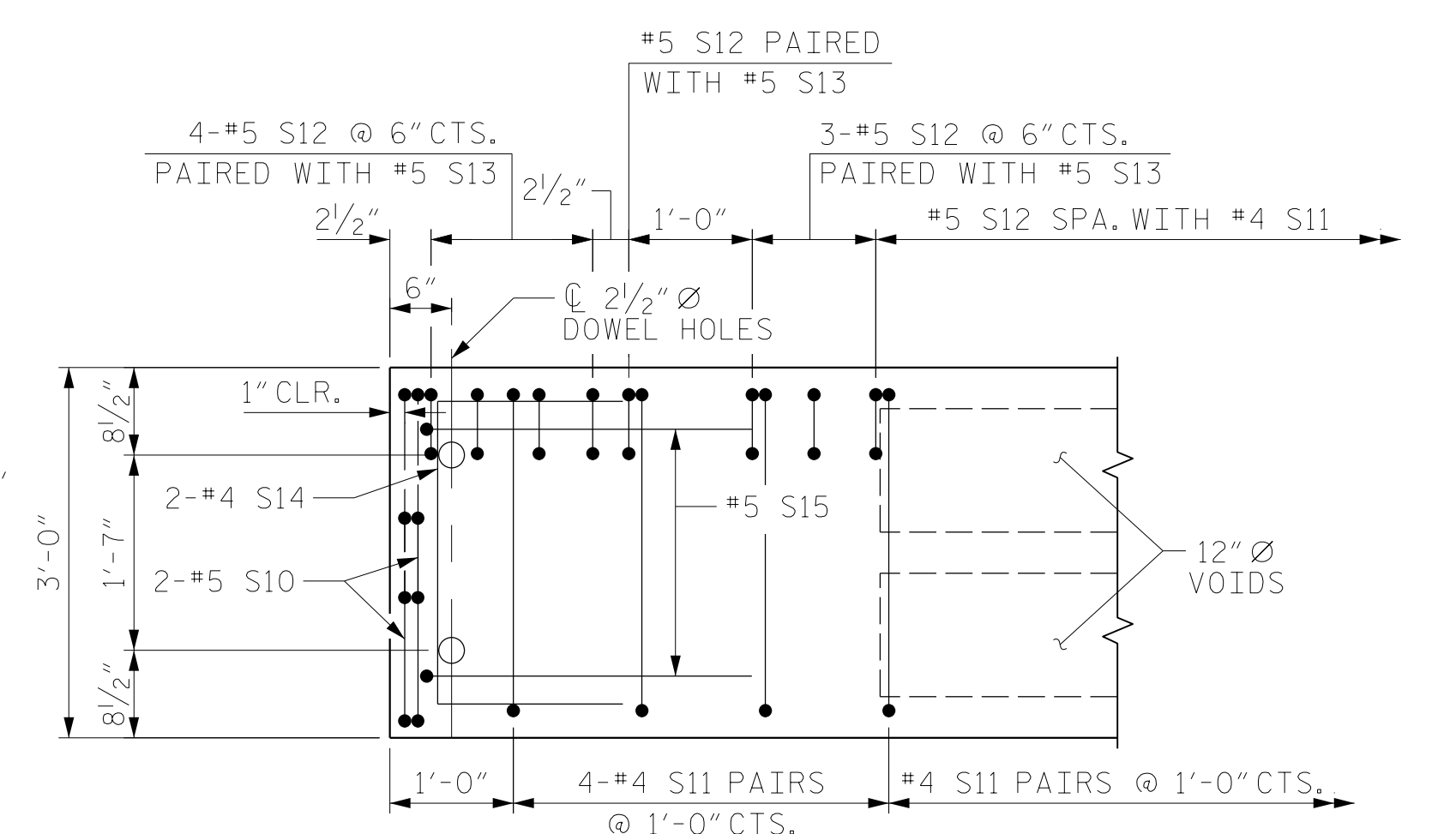
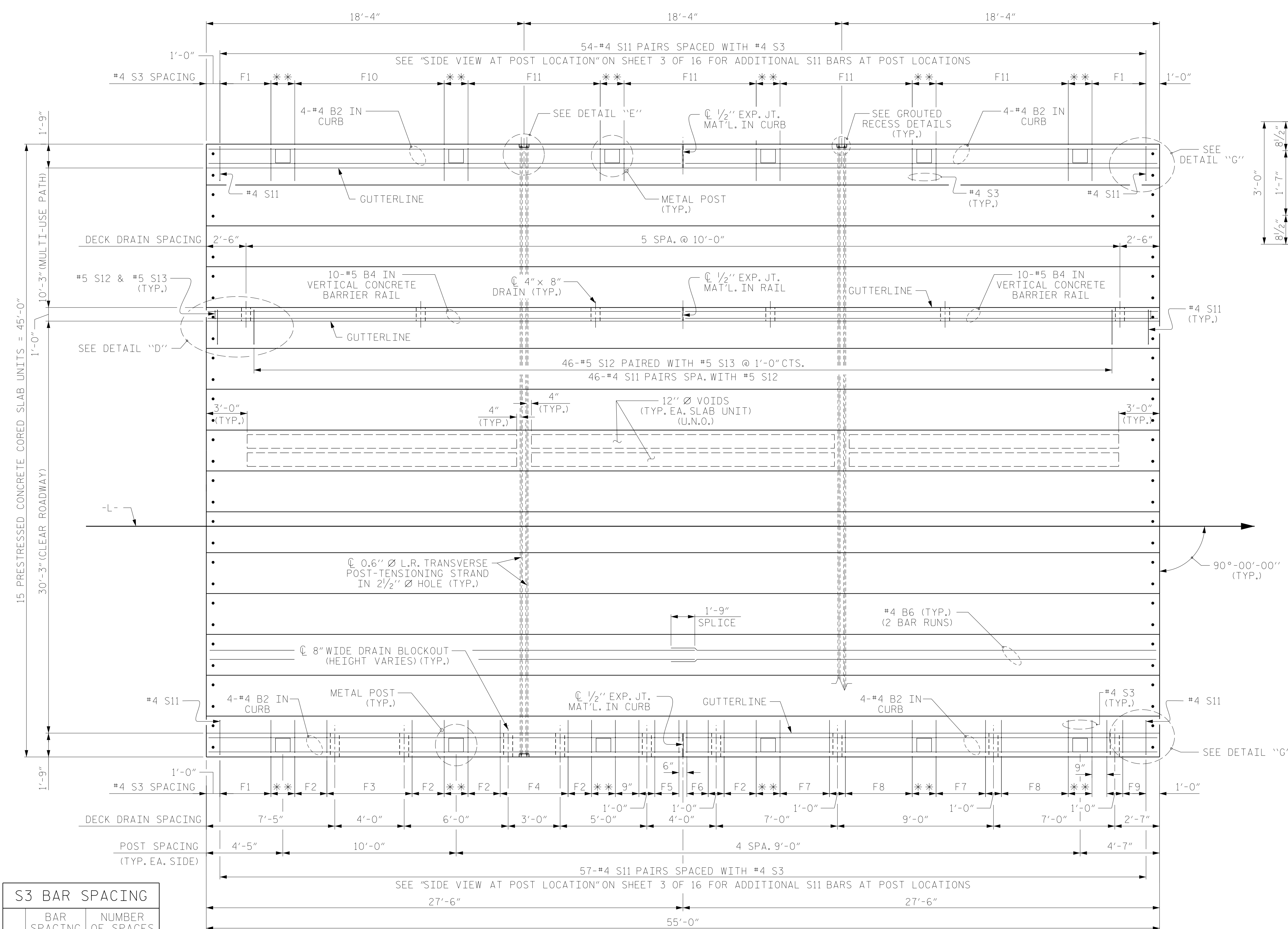


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**PLAN OF 60' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN E**

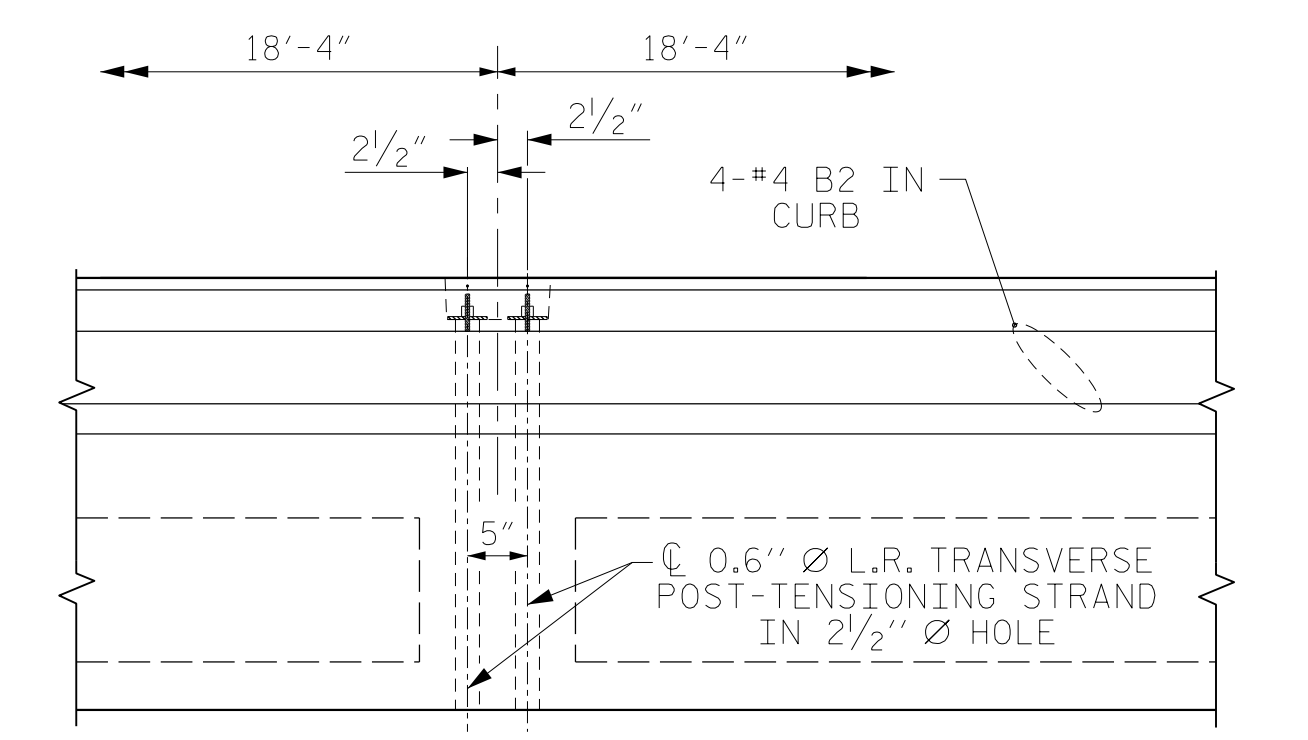
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 CHECKED BY : MKO DATE : 02/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			42



DETAIL "D"
 MODIFIED INTERIOR SLAB SECTION SHOWN, TYPICAL INTERIOR SLAB SECTION SIMILAR EXCEPT OMIT #5 S12 BARS. (TYP. EA. END OF UNIT)



DETAIL "E"
 #4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

S3 BAR SPACING		
BAR SPACING	BAR	NUMBER OF SPACES
F1	EQUAL	3
F2	10 1/2"	2
F3	1'-0"	5
F4	1'-0"	4
F5	8"	2
F6	7"	2
F7	11"	3
F8	11 1/4"	4
F9	6 1/2"	2
F10	EQUAL	9
F11	EQUAL	8

NOTES:
 FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
 FOR DETAIL "G", SEE SHEET 3 OF 16.
 FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
 BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
 THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN F
 ** = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

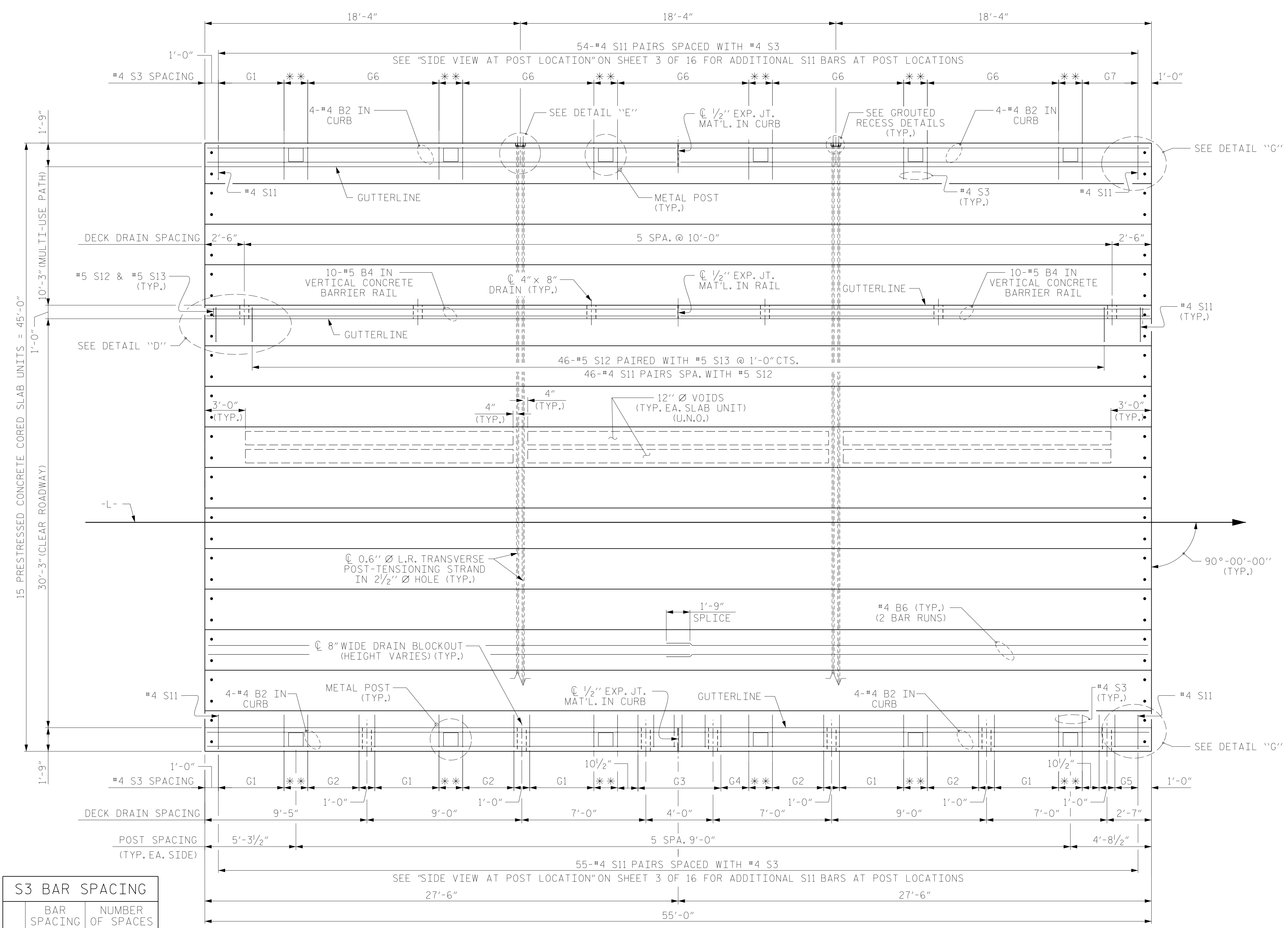
SHEET 7 OF 16



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : MRA DATE : 02/2023
 CHECKED BY : MKO DATE : 02/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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S3 BAR SPACING		
	BAR SPACING	NUMBER OF SPACES
G1	EQUAL	4
G2	1 1/2"	3
G3	1'-0"	5
G4	9 3/4"	2
G5	6 1/2"	2
G6	EQUAL	8
G7	EQUAL	3

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR DETAIL "D" AND DETAIL "E", SEE SHEET 7 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN G
* * = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 8 OF 16



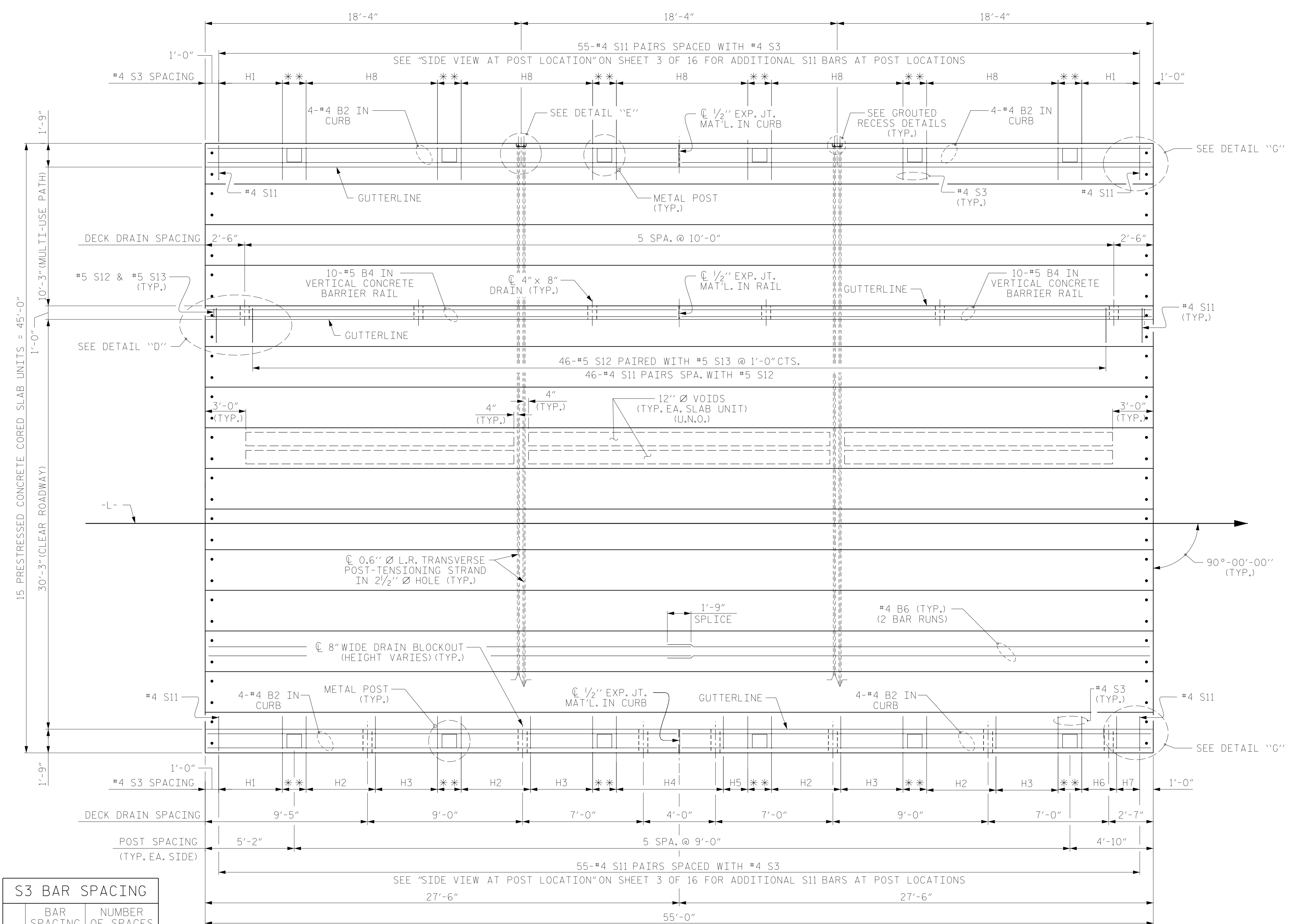
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**PLAN OF 55' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN G**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : MRA DATE : 02/2023
 CHECKED BY : MKO DATE : 02/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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 SIGNATURES COMPLETED



S3 BAR SPACING		
	BAR SPACING	NUMBER OF SPACES
H1	EQUAL	4
H2	1'-0"	4
H3	10 1/2"	4
H4	1'-0"	6
H5	9"	2
H6	1'-0"	2
H7	6 1/2"	2
H8	EQUAL	8

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR DETAIL "D" AND DETAIL "E", SEE SHEET 7 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN H
 ** = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 9 OF 16

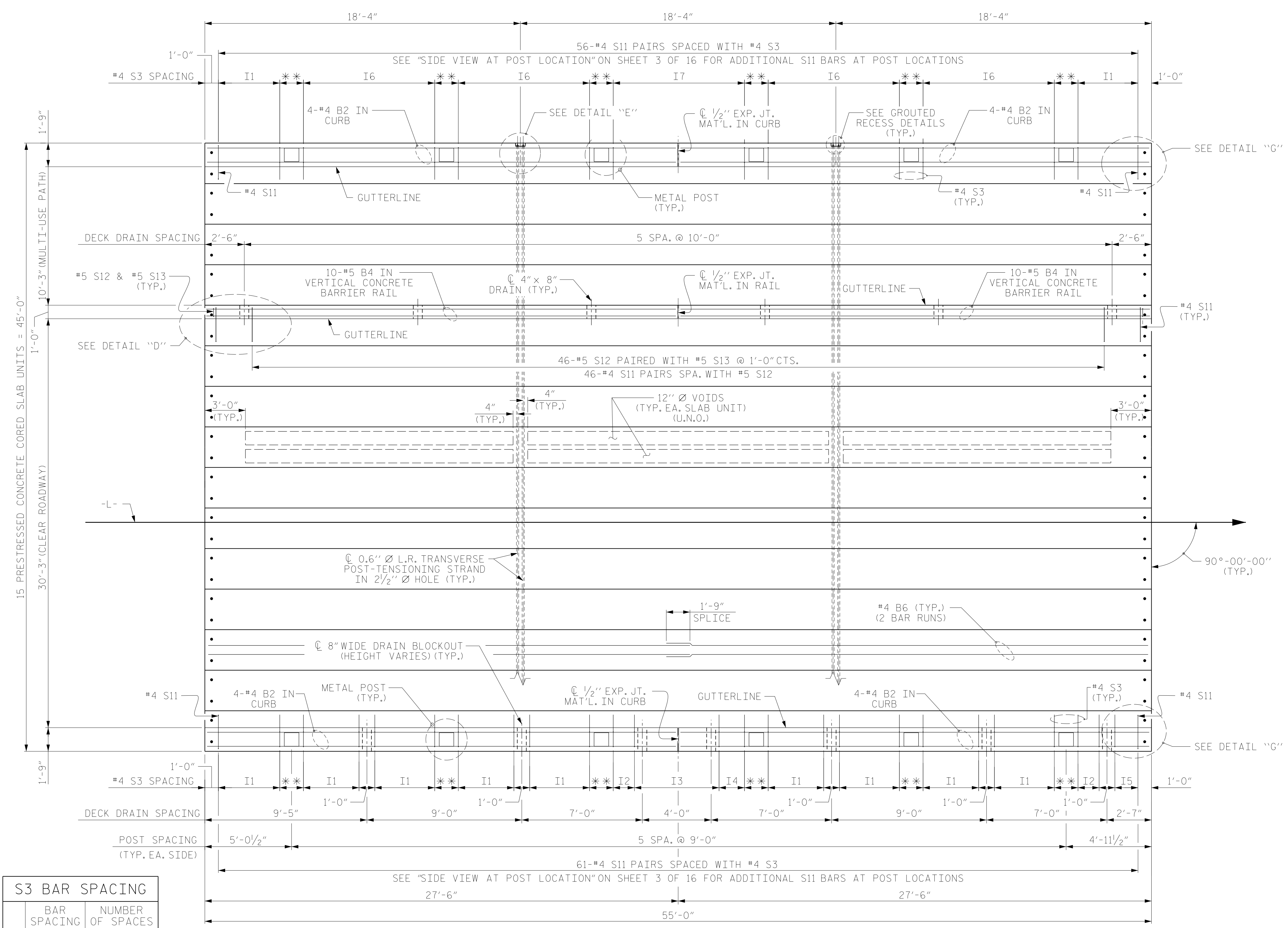


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 PLAN OF 55' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN H

DRAWN BY : MRA DATE : 02/2023
 CHECKED BY : MKO DATE : 02/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17	
1			3			TOTAL SHEETS	
2			4			42	



S3 BAR SPACING		
	BAR SPACING	NUMBER OF SPACES
I1	EQUAL	4
I2	6 3/4"	2
I3	1'-0"	5
I4	8 1/4"	2
I5	6 1/2"	2
I6	EQUAL	8
I7	10"	9

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR DETAIL "D" AND DETAIL "E", SEE SHEET 7 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN I
* * = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 10 OF 16

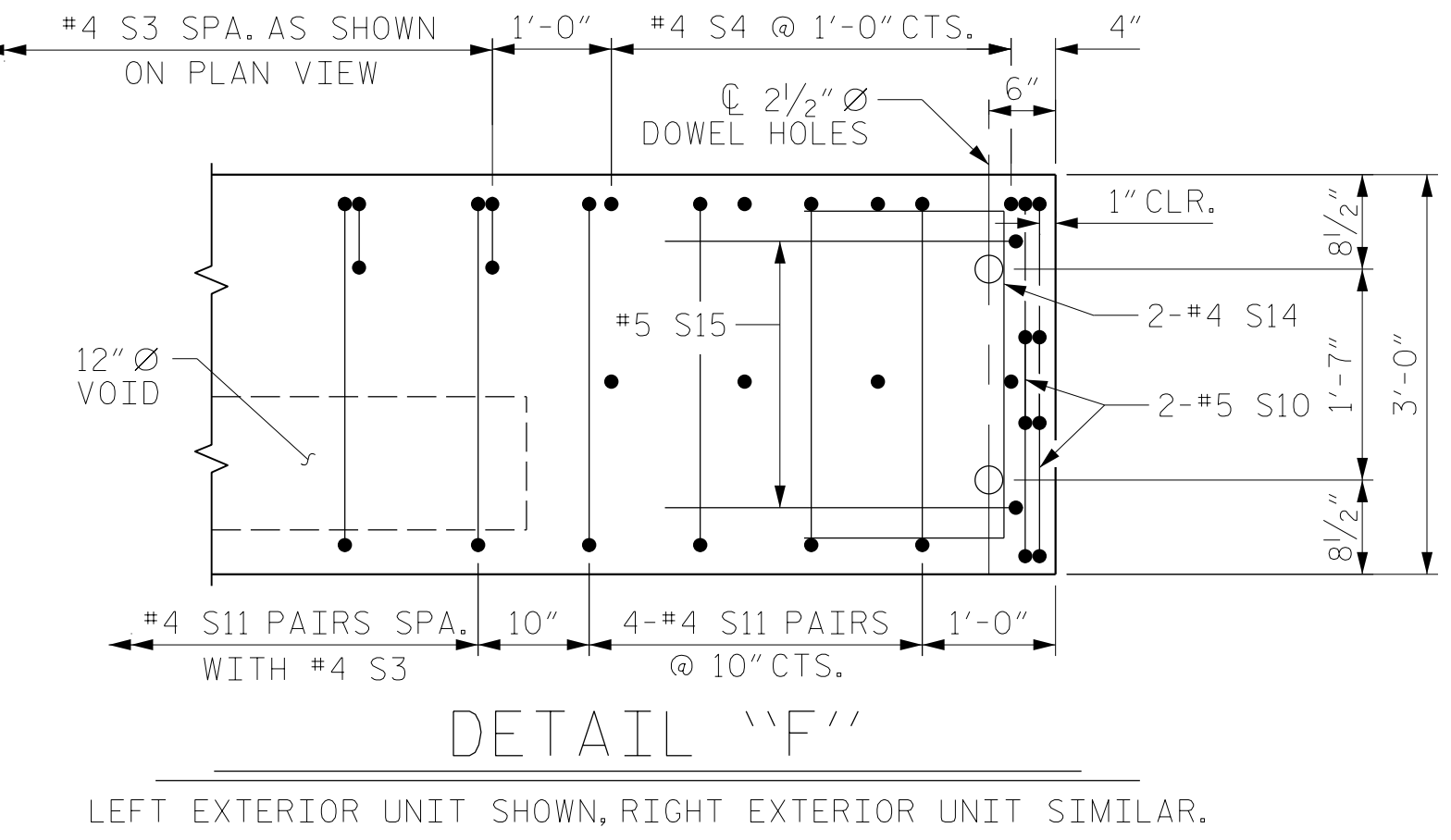
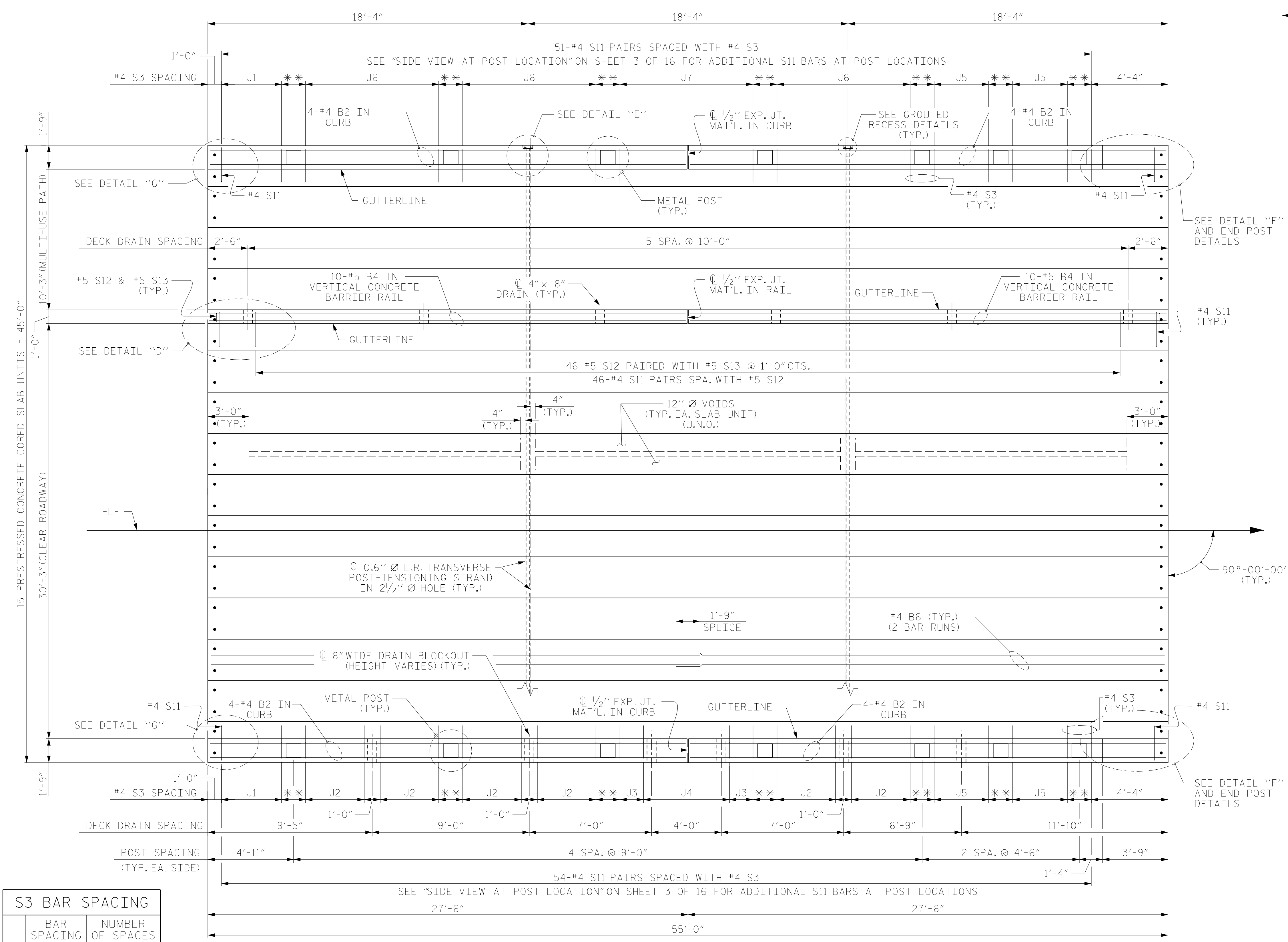


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**PLAN OF 55' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN I**

DRAWN BY : MRA DATE : 02/2023
 CHECKED BY : MKO DATE : 02/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			42



S3 BAR SPACING		
	BAR SPACING	NUMBER OF SPACES
J1	9 1/2"	4
J2	9 3/4"	4
J3	7 1/2"	2
J4	1'-0"	5
J5	1'-0"	3
J6	EQUAL	8
J7	10"	9

NOTES:

- FOR GROUDED RECESS DETAILS, SEE SHEET 1 OF 16.
- FOR DETAIL "D" AND DETAIL "E", SEE SHEET 7 OF 16.
- FOR DETAIL "G", SEE SHEET 3 OF 16.
- FOR END POST DETAILS, SEE SHEET 14 OF 16.
- FOR ADDITIONAL S11 BARS IN EXTERIOR UNITS, SEE SIDE VIEW AT POST LOCATION DETAIL ON SHEET 3 OF 16.
- BLOCKOUTS FOR ANCHOR BOLTS NOT SHOWN FOR CLARITY.
- THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.

SPAN J
* * = 1'-6"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 11 OF 16



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 DEPARTMENT OF TRANSPORTATION
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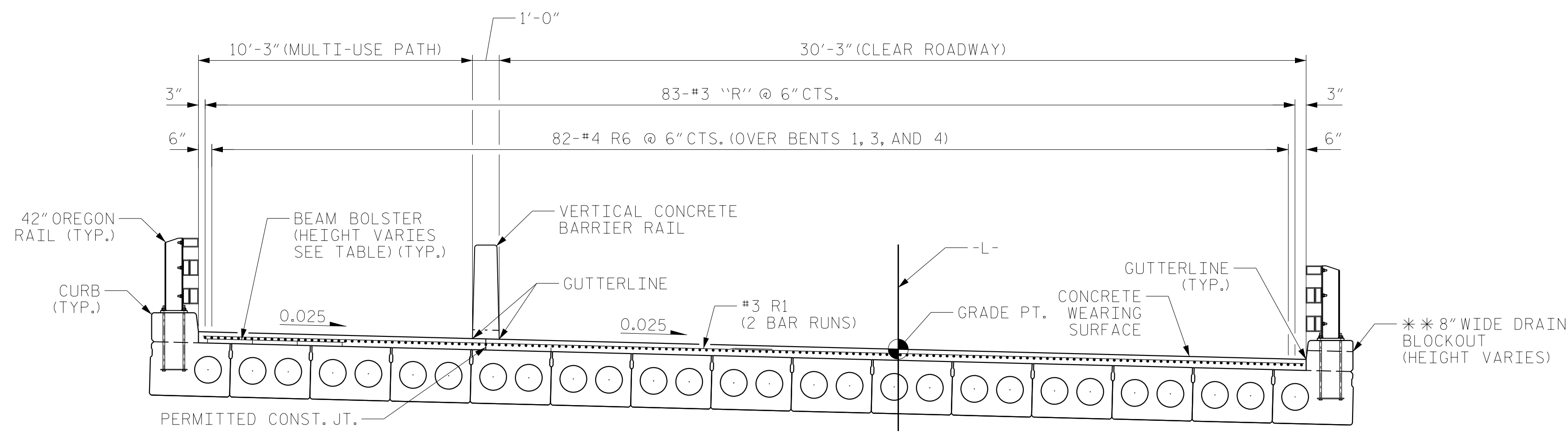
**PLAN OF 55' UNIT
 30'-3" CLEAR ROADWAY
 90° SKEW
 SPAN J**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			42

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REINFORCING STEEL FOR CONCRETE WEARING SURFACE

BEAM BOLSTER HEIGHTS ARE BASED UPON PREDICTED FINAL CAMBER AND THEORETICAL GRADE POINT ELEVATIONS. THESE HEIGHTS VARY BETWEEN CL BEARING AND MID-SPAN FOR ALL SPANS.
 ** THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4" X 8". THE HEIGHT OF THE BLOCKOUT IN THE CURB SHALL EXTEND FROM THE TOP OF THE CORED SLAB UNIT TO THE TOP OF THE DRAIN OPENING.

BEAM BOLSTER HEIGHT		
SPAN	AT CL BEARINGS	AT MID-SPAN
A & B	2 1/2"	3/4"
C, D & E	2 1/2"	1"

SPLICE LENGTH CHART	
BAR SIZE	EPOXY COATED
#3	1'-5"

CONCRETE WEARING SURFACE THICKNESS		
SPAN	AT CL BEARINGS	AT MID-SPAN
A & B	5 1/2"	3 11/16"
C, D & E	5 1/2"	3 5/16"

CURB HEIGHT TABLE		
SPAN	AT CL BEARINGS	AT MID-SPAN
A & B	1'-2"	1'-0 3/16"
C, D & E	1'-2"	1'-0 7/16"

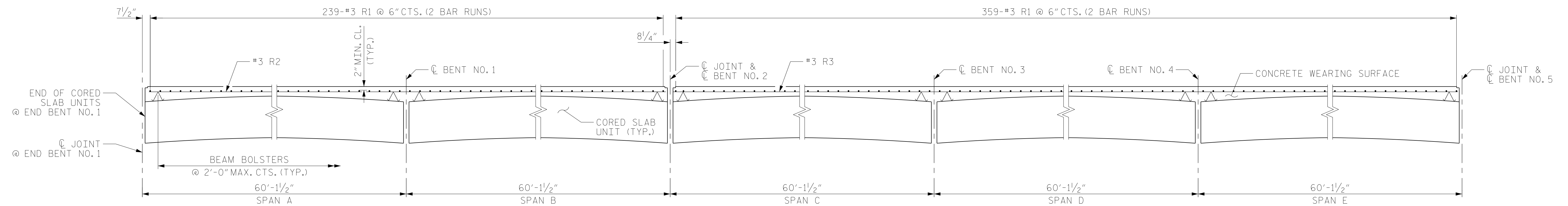
NOTES:
 PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE OREGON RAIL CURB. THE VERTICAL CONCRETE BARRIER RAIL SHALL BE CAST AFTER PLACEMENT OF THE CONCRETE WEARING SURFACE AND THE CONCRETE WEARING SURFACE HAS REACHED A MINIMUM OF COMPRESSIVE STRENGTH OF 3,000 PSI.

THE COST OF REINFORCING STEEL CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE.

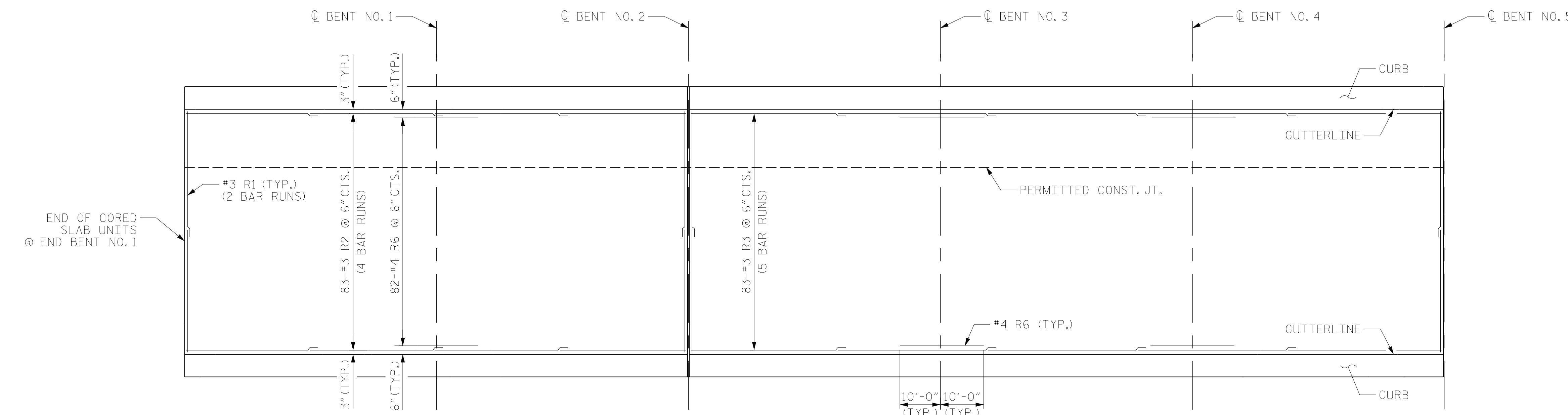
FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

ALL REINFORCING STEEL FOR THE CONCRETE WEARING SURFACE SHALL BE EPOXY COATED.

FOR CONCRETE WEARING SURFACE REINFORCING BILL OF MATERIAL, SEE SHEET 13 OF 16.



ELEVATION



PLAN

#4 R6 REINFORCEMENT IS TYPICAL OVER CONTINUOUS BENTS AS SHOWN
 VERTICAL CONCRETE BARRIER RAIL NOT SHOWN FOR CLARITY.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 12 OF 16



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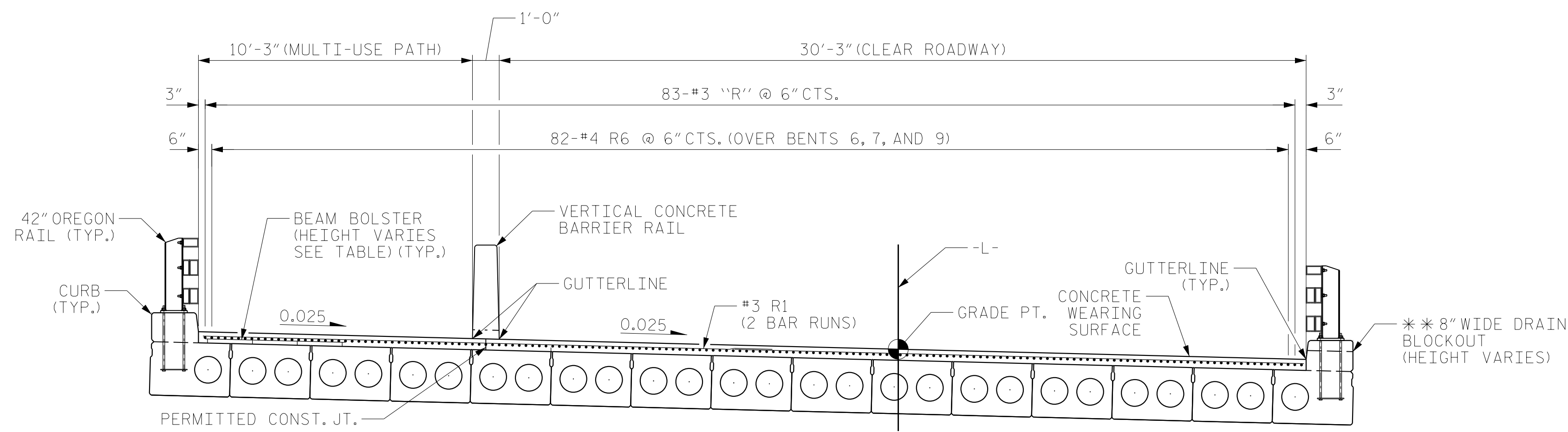
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CONCRETE WEARING SURFACE DETAILS (SPANS A - E)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20	
1			3			TOTAL SHEETS 42	
2			4				

DRAWN BY : NSC DATE : 11/2021
 CHECKED BY : MKO DATE : 01/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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REINFORCING STEEL FOR CONCRETE WEARING SURFACE

BEAM BOLSTER HEIGHTS ARE BASED UPON PREDICTED FINAL CAMBER AND THEORETICAL GRADE POINT ELEVATIONS. THESE HEIGHTS VARY BETWEEN ϕ BEARING AND MID-SPAN FOR ALL SPANS.
 ** THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4" X 8". THE HEIGHT OF THE BLOCKOUT IN THE CURB SHALL EXTEND FROM THE TOP OF THE CORED SLAB UNIT TO THE TOP OF THE DRAIN OPENING.

BEAM BOLSTER HEIGHT		
SPAN	AT ϕ BEARINGS	AT MID-SPAN
F & G	2 1/2"	1 1/2"
H, I & J	2 1/2"	1 1/4"

CONCRETE WEARING SURFACE THICKNESS		
SPAN	AT ϕ BEARINGS	AT MID-SPAN
F & G	5 1/2"	4 3/16"
H, I & J	5 1/2"	4 1/8"

CURB HEIGHT TABLE		
SPAN	AT ϕ BEARINGS	AT MID-SPAN
F & G	1'-2"	1'-0 3/16"
H, I & J	1'-2"	1'-0 5/8"

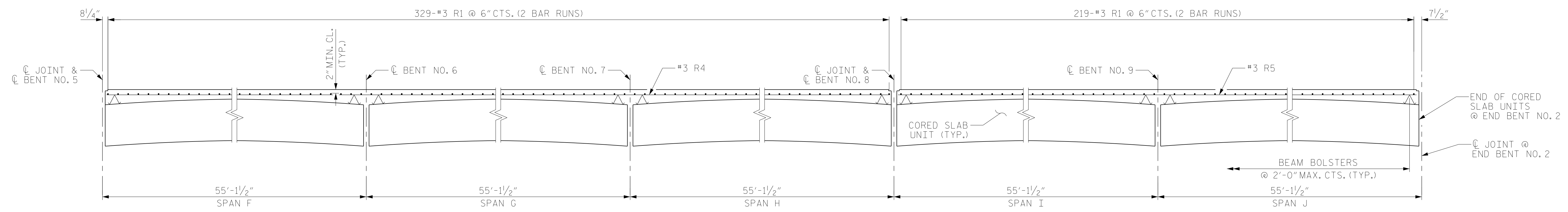
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* R1	2292	#3	STR.	21'-4"	18385
* R2	332	#3	STR.	31'-1"	3881
* R3	415	#3	STR.	37'-2"	5800
* R4	415	#3	STR.	34'-2"	5332
* R5	249	#3	STR.	37'-7"	3519
* R6	492	#4	STR.	20'-0"	6574
* EPOXY COATED REINFORCING STEEL					43,491 LBS.
CONCRETE WEARING SURFACE					23,909 SQ. FT.

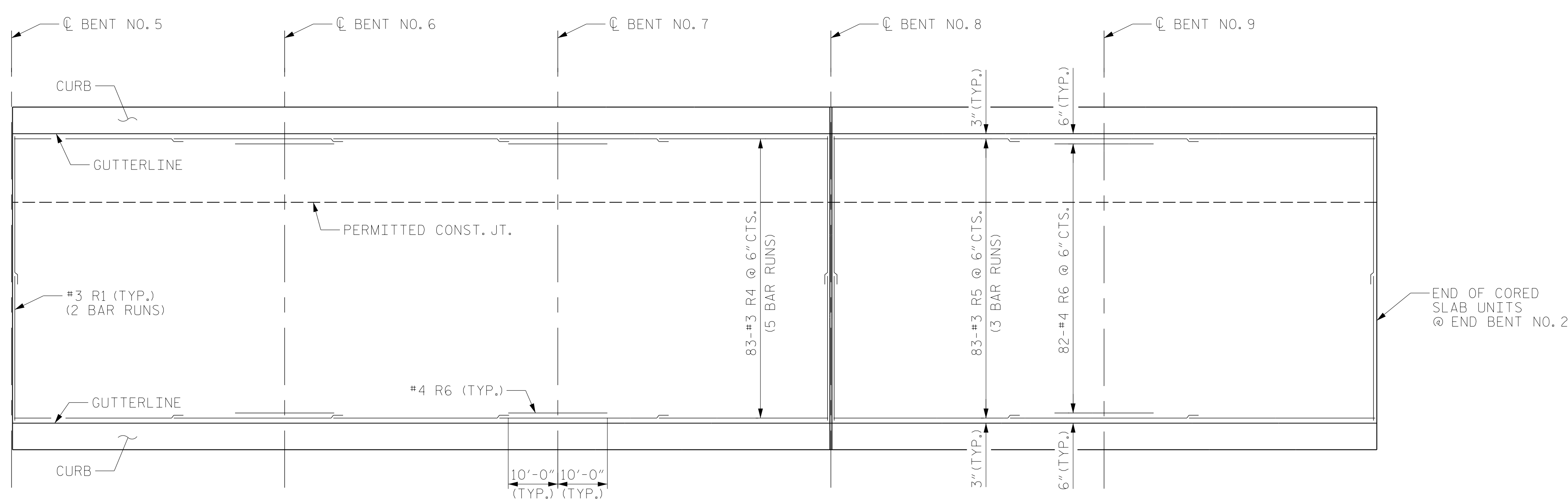
NOTE:
FOR NOTES, SEE SHEET 12 OF 16.

SPLICE LENGTH CHART

BAR SIZE	EPOXY COATED
#3	1'-5"



ELEVATION



PLAN

#4 R6 REINFORCEMENT IS TYPICAL OVER CONTINUOUS BENTS AS SHOWN
 VERTICAL CONCRETE BARRIER RAIL NOT SHOWN FOR CLARITY.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 13 OF 16



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CONCRETE WEARING SURFACE DETAILS (SPANS F - J)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : MRA DATE : 01/2023
 CHECKED BY : MKO DATE : 01/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

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CONCRETE RELEASE STRENGTH	
UNIT	PSI
55' UNITS	6200
60' UNITS	7200

DEAD LOAD DEFLECTION AND CAMBER		
24" C.S. UNIT--0.6" Ø L.R. STRAND	SPAN A THRU E (60'-0 UNITS)	SPAN F THRU J (55'-0 UNITS)
CAMBER (SLAB ALONE IN PLACE)	2 1/4" ↑	1 1/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	1/4" ↓	3/16" ↓
FINAL CAMBER	2" ↑	1 1/2" ↑

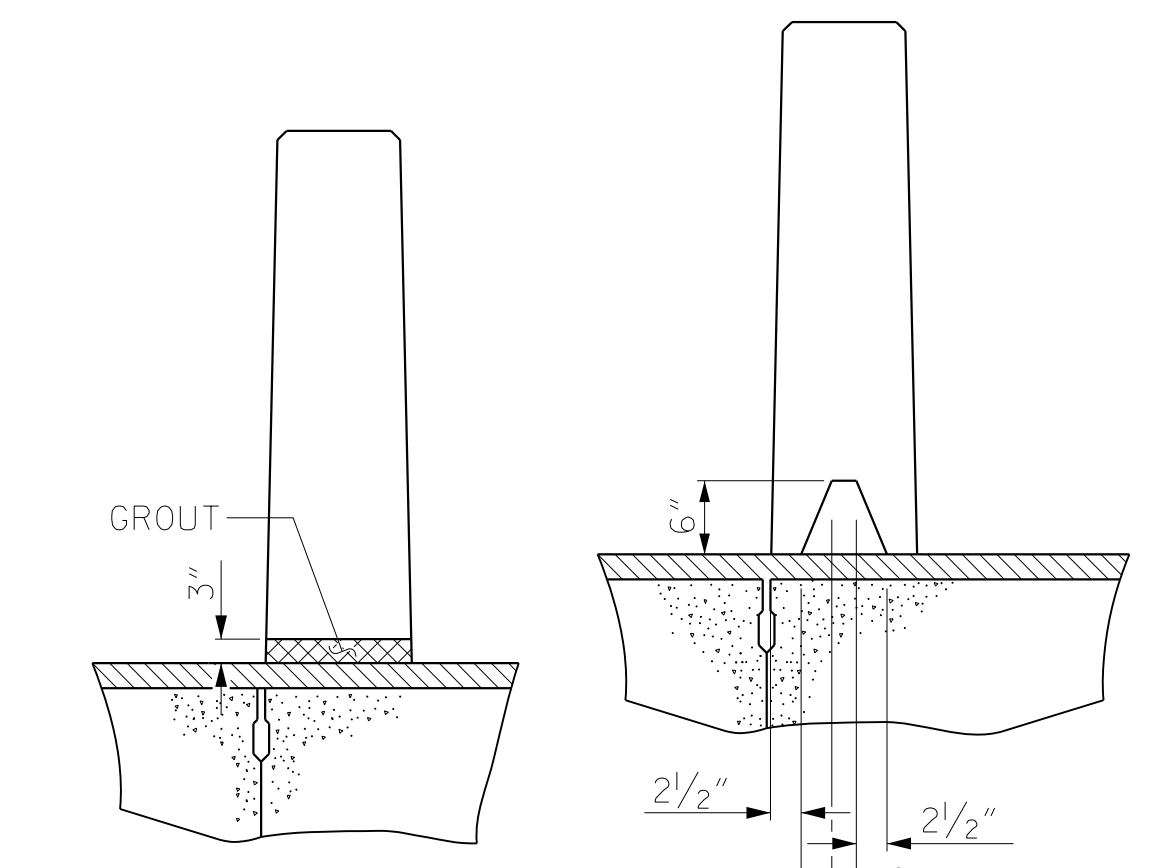
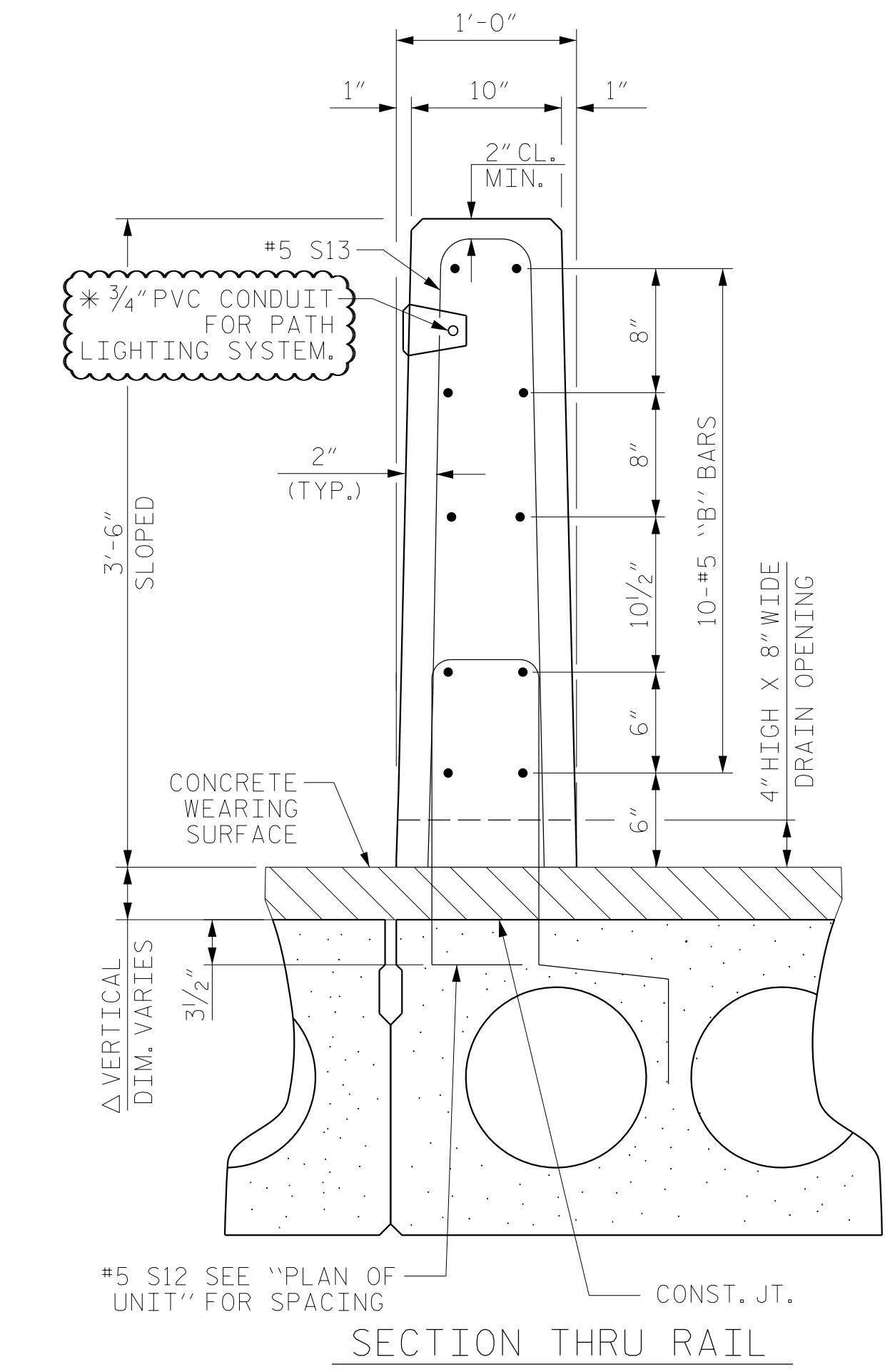
** INCLUDES CONCRETE WEARING SURFACE ONLY PER STRUCTURES DESIGN MANUAL SECTION 6.4.4.

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,344 SQ.FT.
BRIDGE DECK	15,653 SQ.FT.
TOTAL	16,997 SQ.FT.

MULTI-USE PATH GROOVING IS NOT REQUIRED

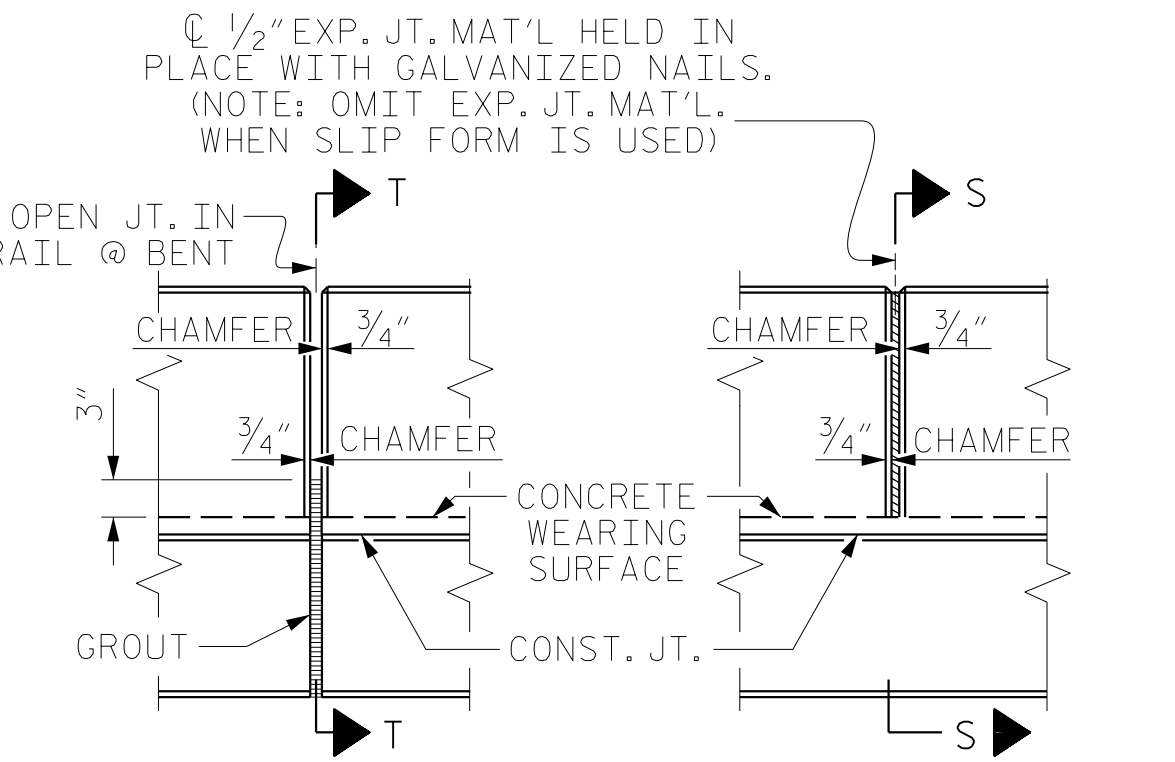
GRADE 270 STRANDS	
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

* FOR PATH LIGHTING SYSTEM DETAILS, SEE ELECTRICAL PLANS.



SECTION T-T
AT OPEN JOINT AT BENT (THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

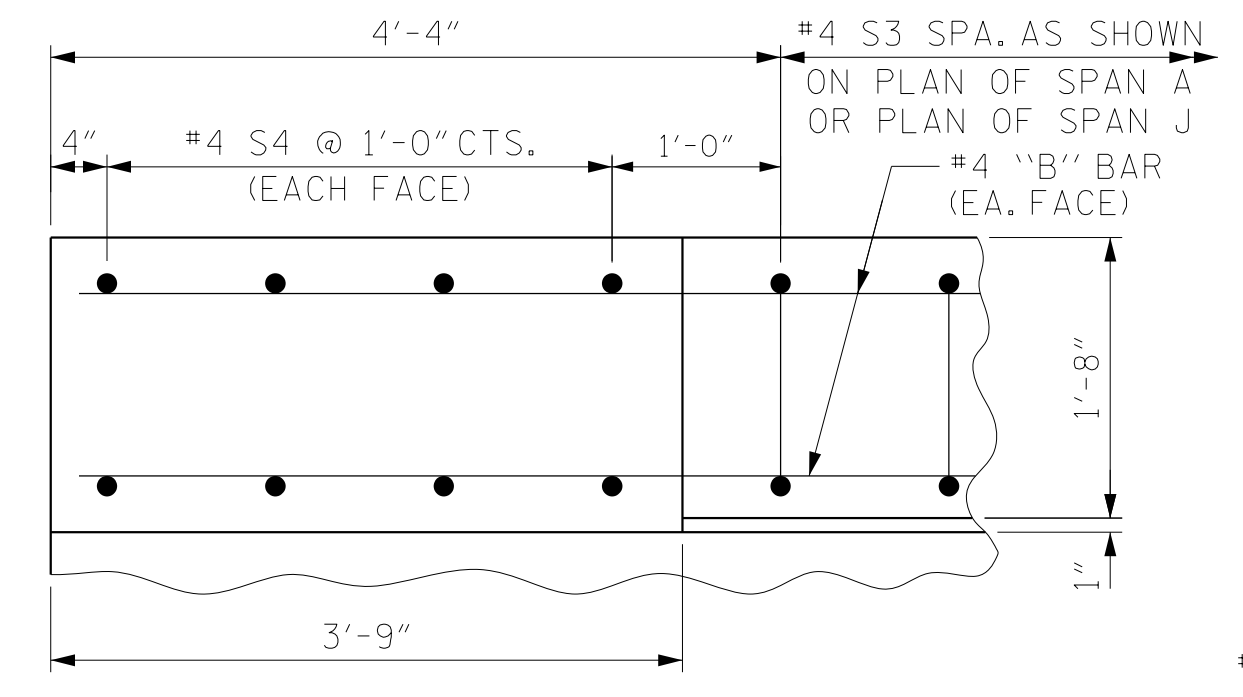
SECTION S-S
AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



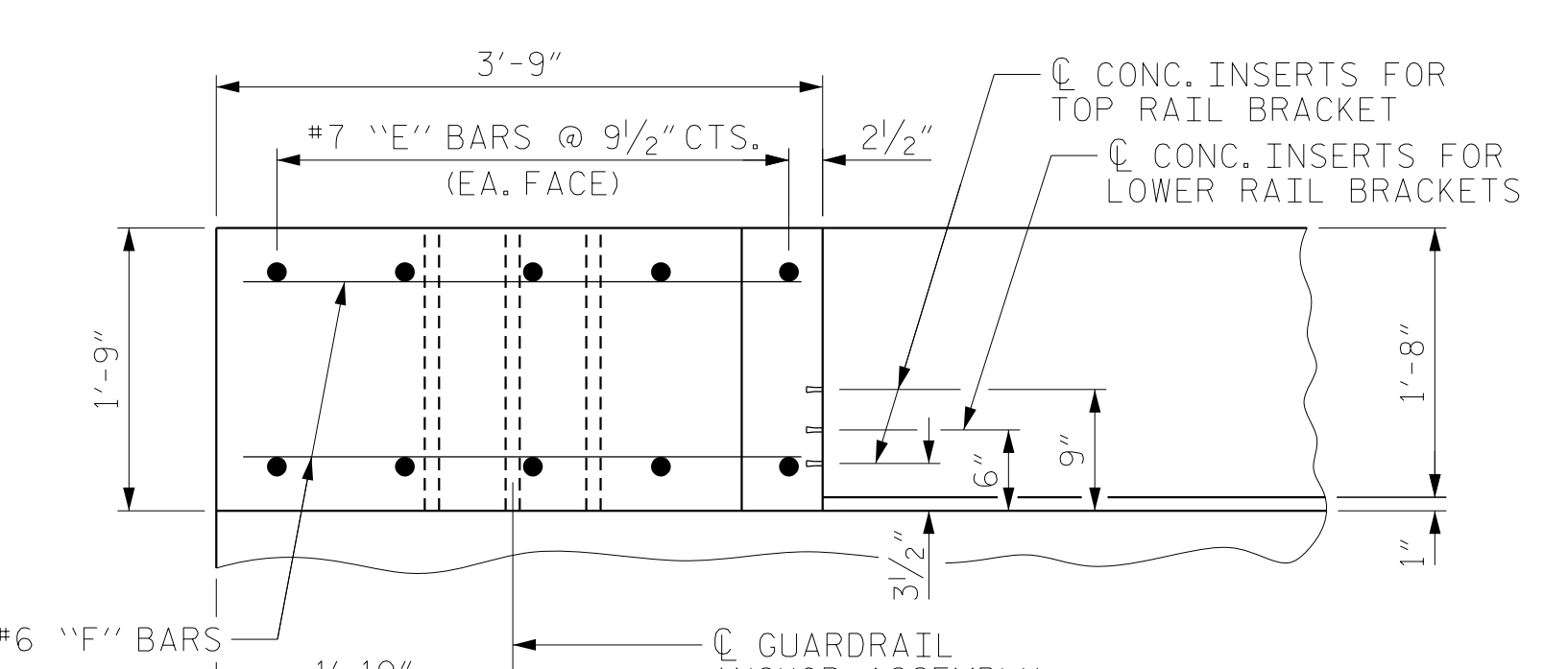
ELEVATION AT EXPANSION JOINTS

VERTICAL CONCRETE BARRIER RAIL DETAILS

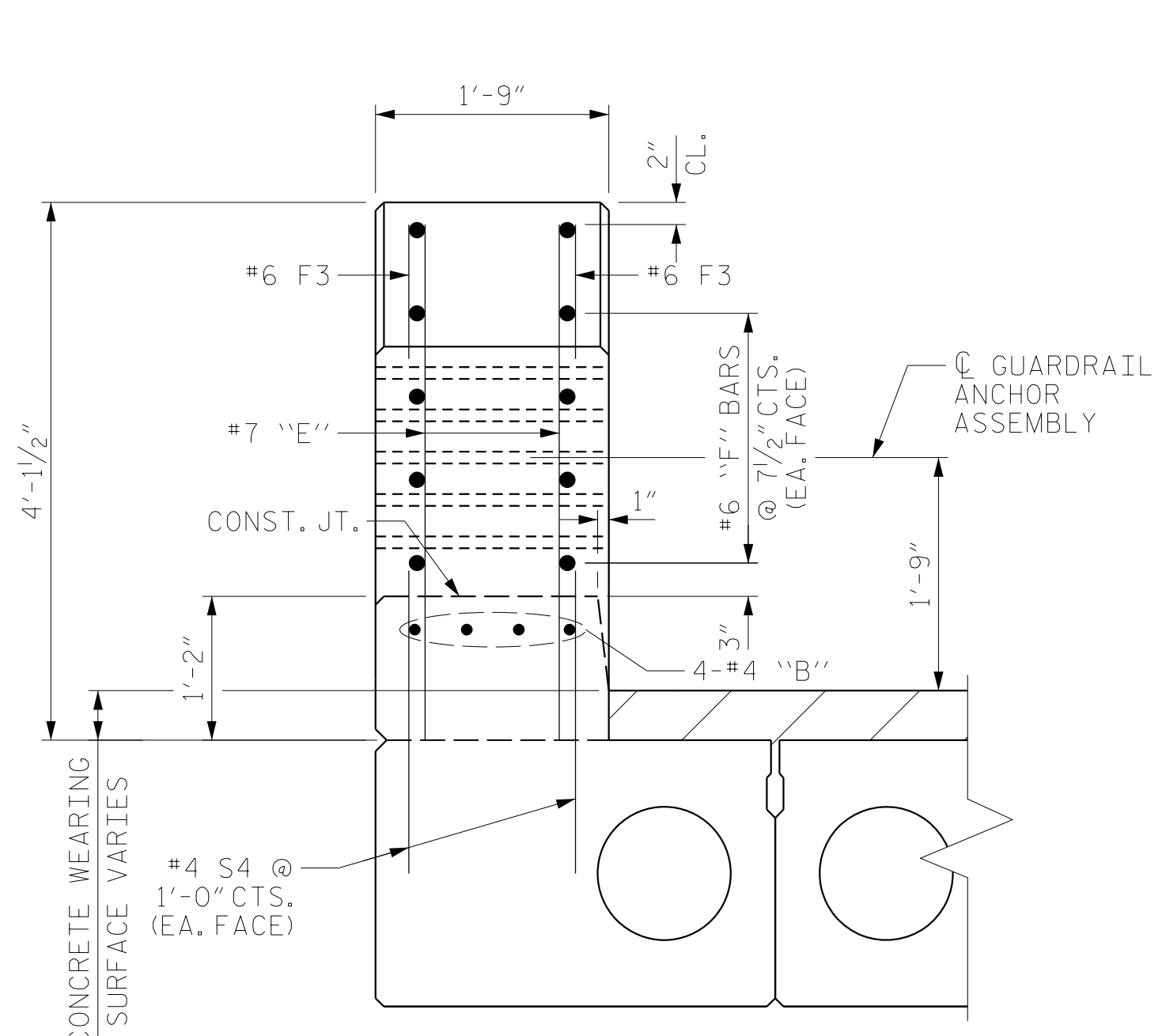
Δ FOR CONCRETE WEARING SURFACE THICKNESS, SEE SHEETS S-20 AND S-21.



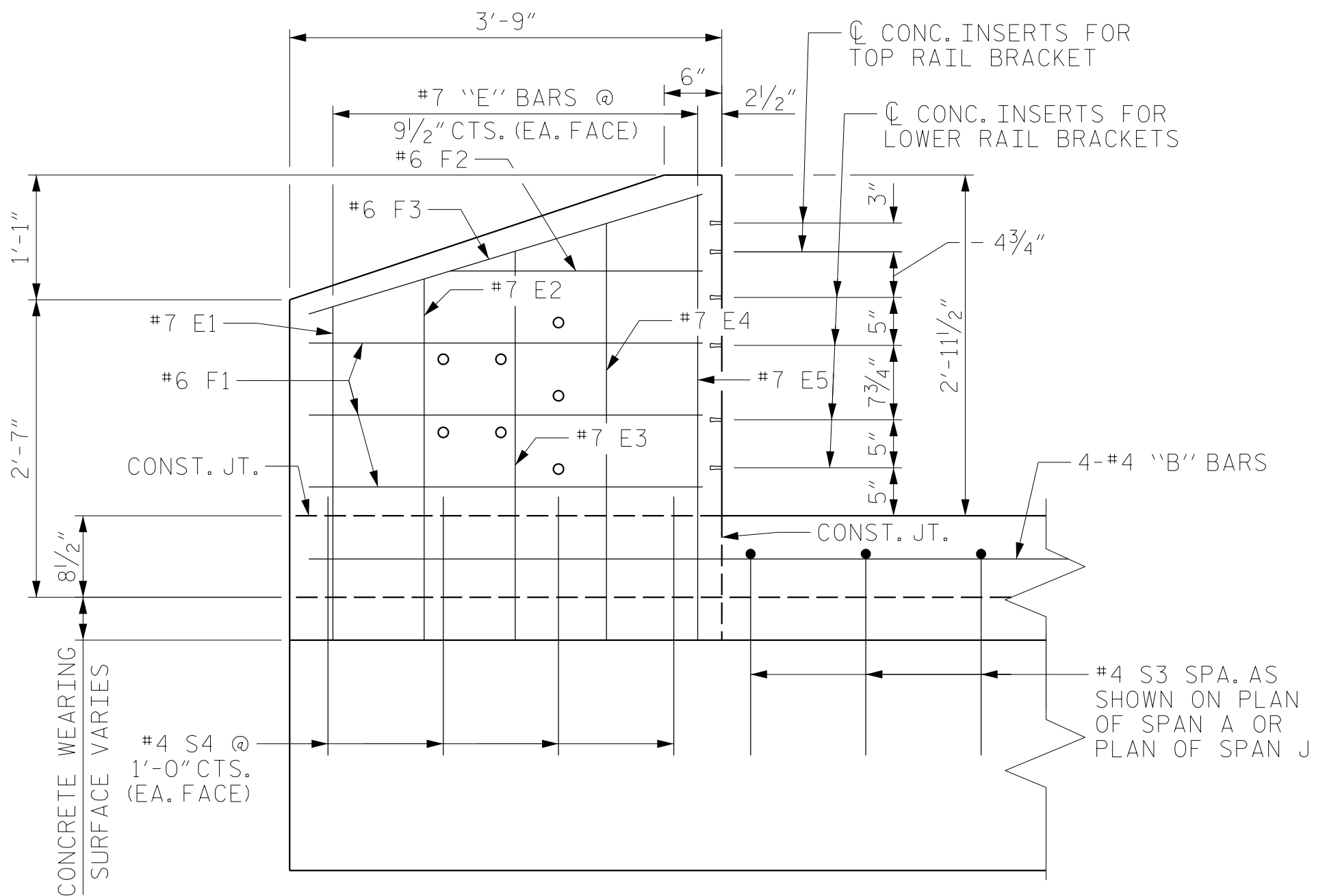
PLAN OF CURB



PLAN OF END POST



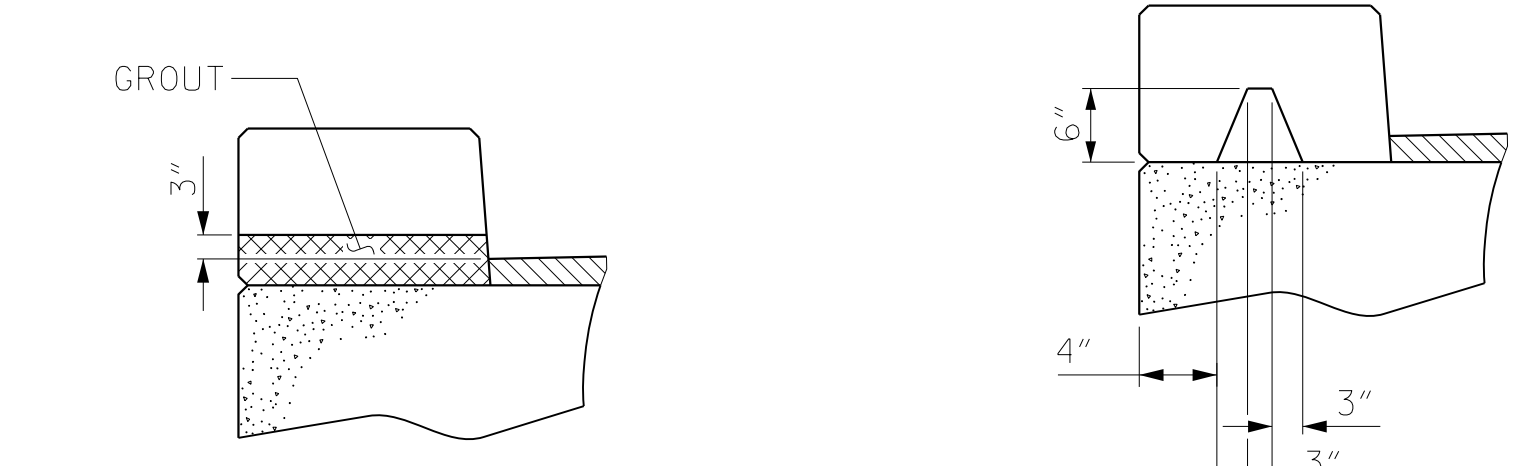
END VIEW



ELEVATION

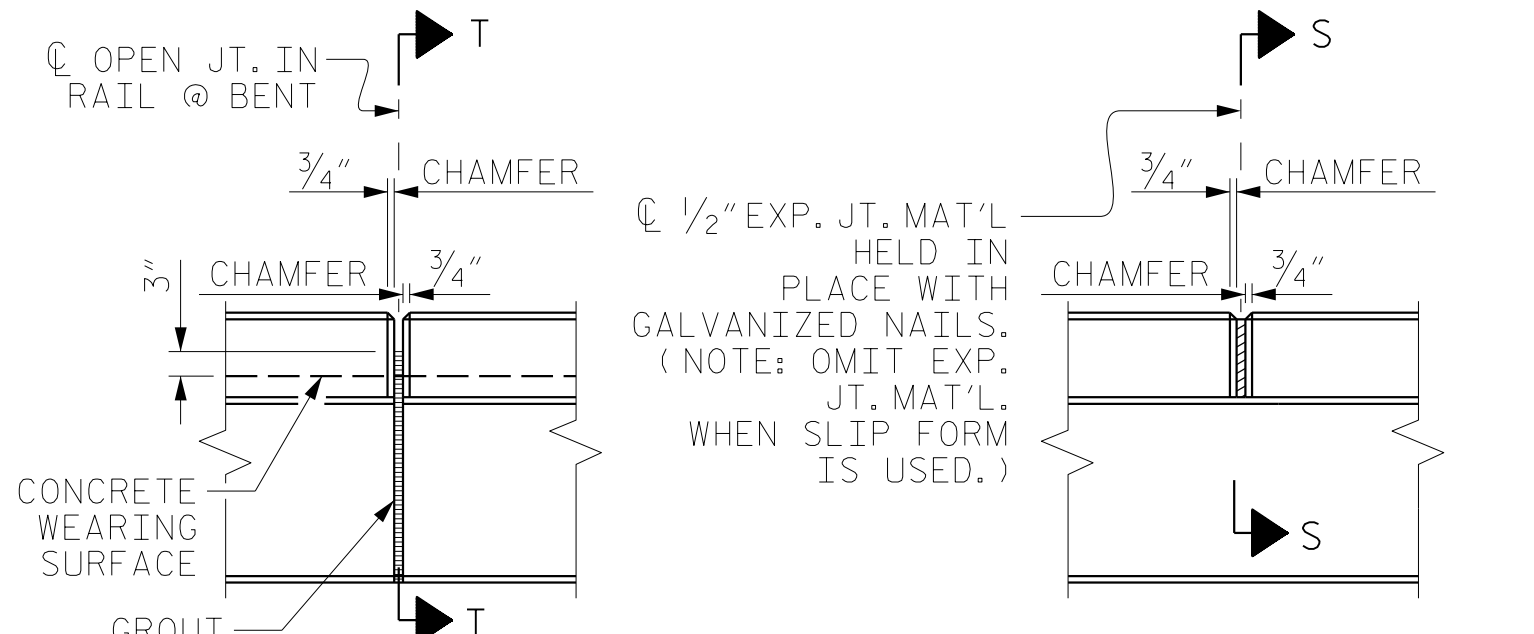
CURB AND END POST FOR 42" OREGON RAIL

THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS.



SECTION T-T
AT OPEN JOINT AT BENT (THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

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



ELEVATION AT EXPANSION JOINTS

CONCRETE CURB SECTION

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PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 14 OF 16



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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.				
S-22				
TOTAL SHEETS				
42				

DRAWN BY : MRA	DATE : 02/2023
CHECKED BY : MKO	DATE : 02/2023
DESIGN ENGINEER OF RECORD: RLB	DATE : 03/2023

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER ONE MODIFIED INTERIOR UNIT	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
60' UNIT						
*B3	20	100	#5	STR	29'-7"	3086
*S13	68	340	#5	2	7'-2"	2542
*EPOXY COATED REINFORCING STEEL						LBS. 5,628
CLASS AA CONCRETE						CU.YDS. 35.7
TOTAL VERTICAL CONCRETE BARRIER RAIL						LN. FT. 300.5

FOR BAR TYPES, SEE SHEET 16 OF 16.

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER ONE MODIFIED INTERIOR UNIT	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
55' UNIT						
*B4	20	100	#5	STR	27'-1"	2825
*S13	62	310	#5	2	7'-2"	2318
*EPOXY COATED REINFORCING STEEL						LBS. 5,143
CLASS AA CONCRETE						CU.YDS. 32.8
TOTAL VERTICAL CONCRETE BARRIER RAIL						LN. FT. 275.6

FOR BAR TYPES, SEE SHEET 16 OF 16.

BILL OF MATERIAL FOR CONCRETE CURB AND END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	80	#4	STR	29'-7"	1581
*B2	80	#4	STR	27'-1"	1448
*E1	8	#7	STR	2'-10"	47
*E2	8	#7	STR	3'-1"	51
*E3	8	#7	STR	3'-4"	55
*E4	8	#7	STR	3'-8"	60
*E5	8	#7	STR	3'-11"	65
*F1	24	#6	STR	3'-5"	124
*F2	8	#6	STR	2'-3"	28
*F3	8	#6	STR	3'-3"	40
*EPOXY COATED REINFORCING STEEL					LBS. 3,499
CLASS AA CONCRETE					CU.YDS. 80.4
TOTAL CONCRETE CURB					LN. FT. 1152.3

THE REINFORCING STEEL AND CONCRETE IN THE CURB AND END POSTS ARE INCLUDED IN THE UNIT PRICE BID FOR THE 42" OREGON RAIL

NOTES

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

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE SL LOW MODULOUS SILICONE SEALANT. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS, CONCRETE CURB AND END POSTS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

PRESTRESSED CONCRETE CORED SLAB UNITS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT ALL FIXED AND EXPANSION ENDS OF CORED SLAB SECTIONS WITH HOLD-DOWN ANCHOR BOLTS, NUTS FOR ANCHOR BOLTS SHALL BE FINGER-TIGHTENED 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 1/2" Ø DOWEL HOLES AT FIXED ENDS OF CORED SLAB SECTIONS WITH HOLD-DOWN ANCHOR BOLTS SHALL BE FILLED WITH NON-SHRINK GROUT TO THE BOTTOM OF THE ANCHOR BOLT BLOCKOUT PRIOR TO INSTALLING THE ANCHOR PLATES, WASHERS, AND NUTS. THE 2 1/2" Ø DOWEL HOLES AT EXPANSION ENDS OF CORED SLAB SECTIONS WITH HOLD-DOWN ANCHOR BOLTS SHALL BE FILLED WITH JOINT SEALER MATERIAL TO THE BOTTOM OF THE ANCHOR BOLT BLOCKOUT PRIOR TO INSTALLING THE ANCHOR PLATES, WASHERS, AND NUTS.

THE ANCHOR BOLT BLOCKOUTS OF CORED SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT PRIOR TO PLACEMENT OF THE WEARING SURFACE.

THE TOP SURFACE OF THE CORED SLAB UNITS SHALL HAVE A 3/8" RAKED FINISH.

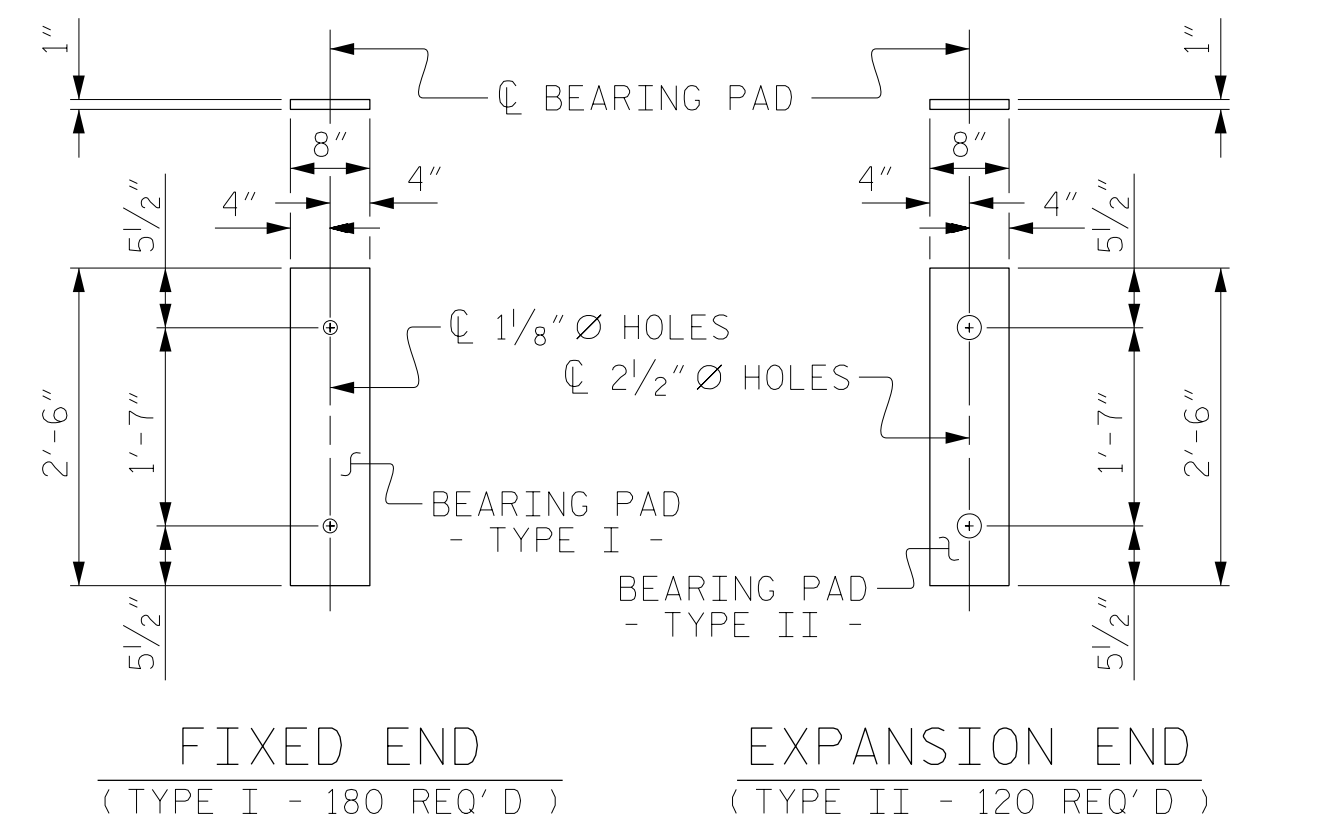
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH SHALL BE TOOLED IN THE TOP OF WEARING SURFACE AT INTERIOR BENTS WITH CONTINUOUS CONCRETE WEARING SURFACE IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS.

APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF ALL RIGHT EXTERIOR CORED SLAB UNITS.

THE COST OF THE METAL RAIL POST ANCHOR ASSEMBLY CAST WITH THE CORED SLAB UNITS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

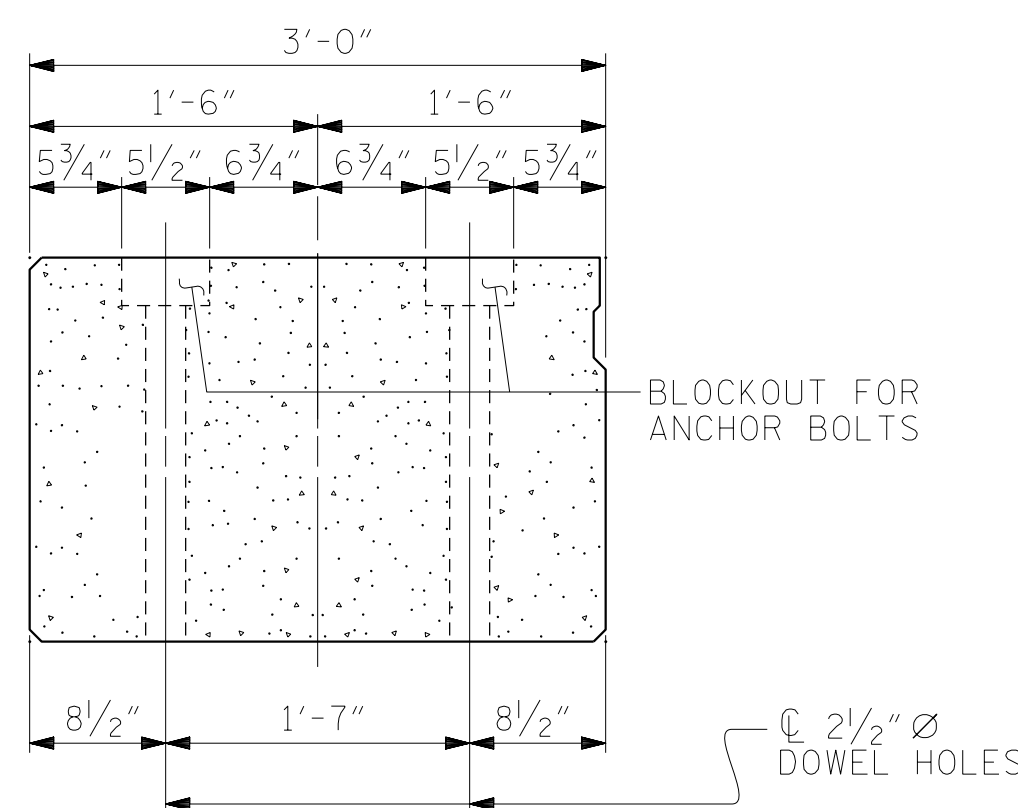
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F1554 GR. 105. ANCHOR PLATES, WASHERS, AND NUTS SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

NO SEPARATE PAYMENT SHALL BE MADE FOR THE ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS. THE COST OF THE MATERIAL AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.



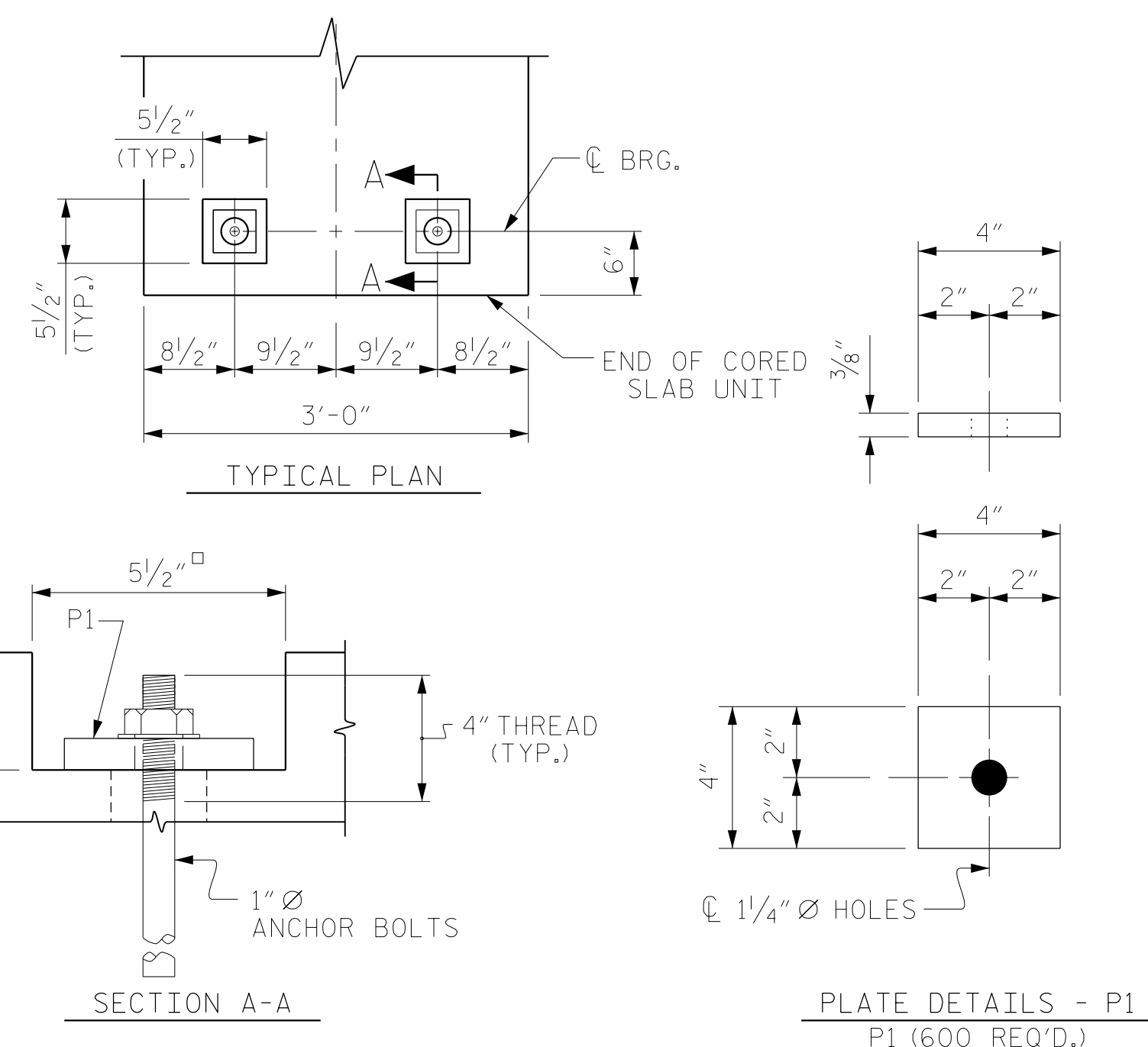
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



END ELEVATION

SHOWING LOCATION OF BLOCKOUT FOR ANCHOR BOLTS AND DOWEL HOLES.



BLOCKOUT DETAIL FOR ANCHOR BOLTS

(TYP. FOR ALL CORED SLABS)

PROJECT NO. BR-0160
BRUNSWICK COUNTY
STATION: 21+77.50 -L-

SHEET 15 OF 16



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

REVISIONS

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

SHEET NO.

S-23
TOTAL SHEETS 42

DRAWN BY: MRA DATE: 02/2023
CHECKED BY: MKO DATE: 02/2023
DESIGN ENGINEER OF RECORD: RLB DATE: 03/2023

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BILL OF MATERIAL FOR ONE 60' CORED SLAB UNIT										
BAR	SIZE	TYPE	LEFT EXTERIOR UNIT			RIGHT EXTERIOR UNIT				
			NUMBER	LENGTH	WEIGHT	NUMBER	LENGTH	WEIGHT		
B5	#4	STR	4	30'-9"	83	4	30'-9"	83		
SPAN A	* S3	#4	4	56	5'-7"	209	59	5'-7"	221	
SPAN B	* S3	#4	4	60	5'-7"	224	63	5'-7"	235	
SPAN C	* S3	#4	4	60	5'-7"	224	61	5'-7"	228	
SPAN D	* S3	#4	4	59	5'-7"	221	63	5'-7"	235	
SPAN E	* S3	#4	4	59	5'-7"	221	62	5'-7"	232	
SPAN A	* S4	#4	STR	8	3'-2"	17	8	3'-2"	17	
	S10	#5	3	8	4'-9"	40	8	4'-9"	40	
SPAN A	S11	#4	3	169	5'-10"	659	175	5'-10"	682	
SPAN B	S11	#4	3	162	5'-10"	632	168	5'-10"	655	
SPAN C	S11	#4	3	162	5'-10"	632	164	5'-10"	640	
SPAN D	S11	#4	3	160	5'-10"	624	168	5'-10"	655	
SPAN E	S11	#4	3	160	5'-10"	624	166	5'-10"	647	
	S14	#4	3	4	5'-7"	15	4	5'-7"	15	
	S15	#5	3	4	7'-1"	30	4	7'-1"	30	
REINFORCING STEEL, LB.										
SPAN A					827				850	
SPAN B					800				823	
SPAN C					800				808	
SPAN D					792				823	
SPAN E					792				815	
* EPOXY COATED REINFORCING STEEL, LB.										
SPAN A					226				238	
SPAN B					224				235	
SPAN C					224				228	
SPAN D					221				235	
SPAN E					221				232	
0.6" Ø L.R. STRANDS, NO.										
SPAN A					37				37	
SPAN B					37				37	
SPAN C					37				37	
SPAN D					37				37	
SPAN E					37				37	
9500 P.S.I. CONCRETE, C.Y.										
SPAN A					11.8				11.8	
SPAN B					11.8				11.8	
SPAN C					11.8				11.8	
SPAN D					11.8				11.8	
SPAN E					11.8				11.8	

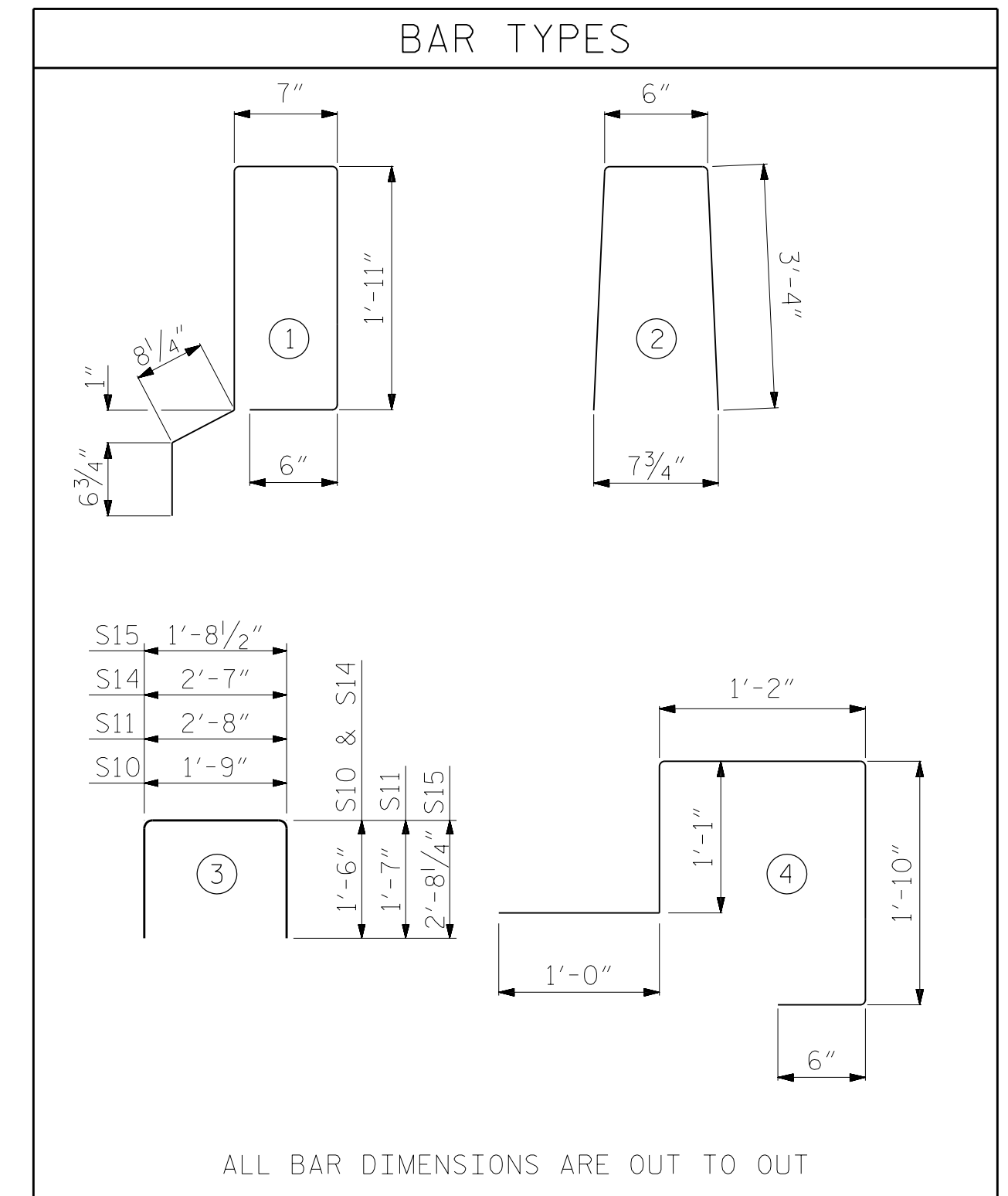
BILL OF MATERIAL FOR ONE 60' CORED SLAB UNIT										
BAR	SIZE	TYPE	INTERIOR UNIT			MODIFIED INTERIOR UNIT				
			NUMBER	LENGTH	WEIGHT	NUMBER	LENGTH	WEIGHT		
B5	#4	STR	4	30'-9"	83	4	30'-9"	83		
S10	#5	3	8	4'-9"	40	8	4'-9"	40		
S11	#4	3	124	5'-10"	484	124	5'-10"	484		
* S12	#5	1				68	5'-8"	402		
S14	#4	3	4	5'-7"	15	4	5'-7"	15		
S15	#5	3	4	7'-1"	30	4	7'-1"	30		
REINFORCING STEEL			LBS.		652	LBS.		652		
* EPOXY COATED REINFORCING STEEL			LBS.		0	LBS.		402		
9500 P.S.I. CONCRETE			CU. YDS.		10.2	CU. YDS.		10.2		
0.6" Ø L.R. STRANDS			No.		37	No.		37		

QUANTITIES ABOVE TYPICAL FOR SPANS A - E.

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT										
BAR	SIZE	TYPE	LEFT EXTERIOR UNIT			RIGHT EXTERIOR UNIT				
			NUMBER	LENGTH	WEIGHT	NUMBER	LENGTH	WEIGHT		
B6	#4	STR	4	28'-3"	76	4	28'-3"	76		
SPAN F	* S3	#4	4	54	5'-7"	202	57	5'-7"	213	
SPAN G	* S3	#4	4	54	5'-7"	202	55	5'-7"	206	
SPAN H	* S3	#4	4	55	5'-7"	206	55	5'-7"	206	
SPAN I	* S3	#4	4	56	5'-7"	209	61	5'-7"	228	
SPAN J	* S3	#4	4	51	5'-7"	191	54	5'-7"	202	
SPAN J	* S4	#4	STR	8	3'-2"	17	8	3'-2"	17	
	S10	#5	3	8	4'-9"	40	8	4'-9"	40	
SPAN F	S11	#4	3	150	5'-10"	585	156	5'-10"	608	
SPAN G	S11	#4	3	150	5'-10"	585	152	5'-10"	593	
SPAN H	S11	#4	3	152	5'-10"	593	152	5'-10"	593	
SPAN I	S11	#4	3	154	5'-10"	601	164	5'-10"	640	
SPAN J	S11	#4	3	159	5'-10"	620	165	5'-10"	643	
	S14	#4	3	4	5'-7"	15	4	5'-7"	15	
	S15	#5	3	4	7'-1"	30	4	7'-1"	30	
REINFORCING STEEL, LB.										
SPAN F					746				769	
SPAN G					746				754	
SPAN H					754				754	
SPAN I					762				801	
SPAN J					781				804	
* EPOXY COATED REINFORCING STEEL, LB.										
SPAN F					202				213	
SPAN G					202				206	
SPAN H					206				206	
SPAN I					209				228	
SPAN J					208				219	
0.6" Ø L.R. STRANDS, NO.										
SPAN F					31				31	
SPAN G					31				31	
SPAN H					31				31	
SPAN I					31				31	
SPAN J					31				31	
8500 P.S.I. CONCRETE, C.Y.										
SPAN F					10.8				10.8	
SPAN G					10.8				10.8	
SPAN H					10.8				10.8	
SPAN I					10.8				10.8	
SPAN J					10.8				10.8	

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT										
BAR	SIZE	TYPE	INTERIOR UNIT			MODIFIED INTERIOR UNIT				
			NUMBER	LENGTH	WEIGHT	NUMBER	LENGTH	WEIGHT		
B6	#4	STR	4	28'-3"	76	4	28'-3"	76		
S10	#5	3	8	4'-9"	40	8	4'-9"	40		
S11	#4	3	108	5'-10"	421	108	5'-10"	421		
* S12	#5	1				62	5'-8"	367		
S14	#4	3	4	5'-7"	15	4	5'-7"	15		
S15	#5	3	4	7'-1"	30	4	7'-1"	30		
REINFORCING STEEL			LBS.		582	LBS.		582		
* EPOXY COATED REINFORCING STEEL			LBS.		0	LBS.		367		
8500 P.S.I. CONCRETE			CU. YDS.		9.4	CU. YDS.		9.4		
0.6" Ø L.R. STRANDS			No.		31	No.		31		

QUANTITIES ABOVE TYPICAL FOR SPANS F - J.



CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
55' UNIT			
LEFT EXTERIOR C.S.	5	55'-0"	275'-0"
INTERIOR C.S.	60	55'-0"	3300'-0"
MOD. INTERIOR C.S.	5	55'-0"	275'-0"
RIGHT EXTERIOR C.S.	5	55'-0"	275'-0"
TOTAL	75	55'-0"	4125'-0"
60' UNIT			
LEFT EXTERIOR C.S.	5	60'-0"	300'-0"
INTERIOR C.S.	60	60'-0"	3600'-0"
MOD. INTERIOR C.S.	5	60'-0"	300'-0"
RIGHT EXTERIOR C.S.	5	60'-0"	300'-0"
TOTAL	75	60'-0"	4500'-0"

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 16 OF 16

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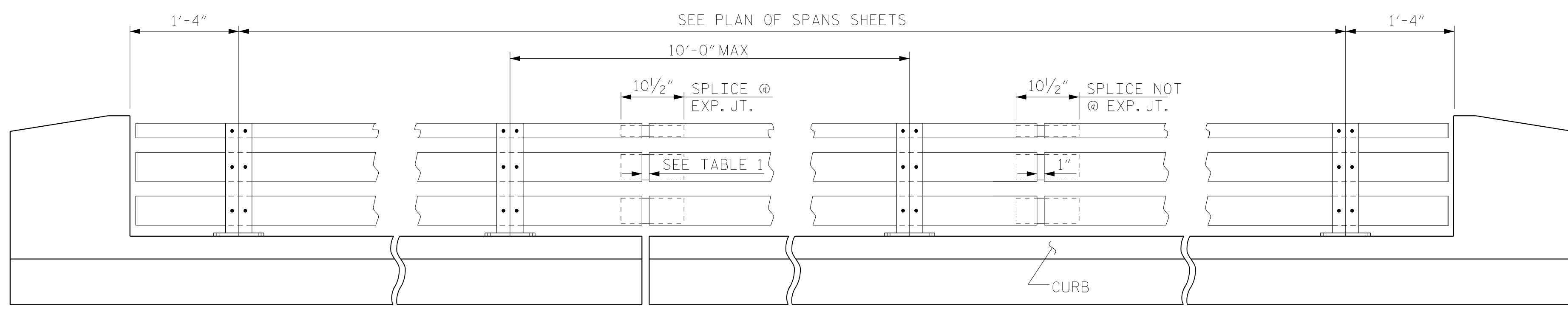
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

3'-0" X 2'-0"
 PRESTRESSED CONCRETE
 CORED SLAB UNIT

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			42
2			4			

DRAWN BY : MRA DATE : 02/2023
 CHECKED BY : MKO DATE : 02/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

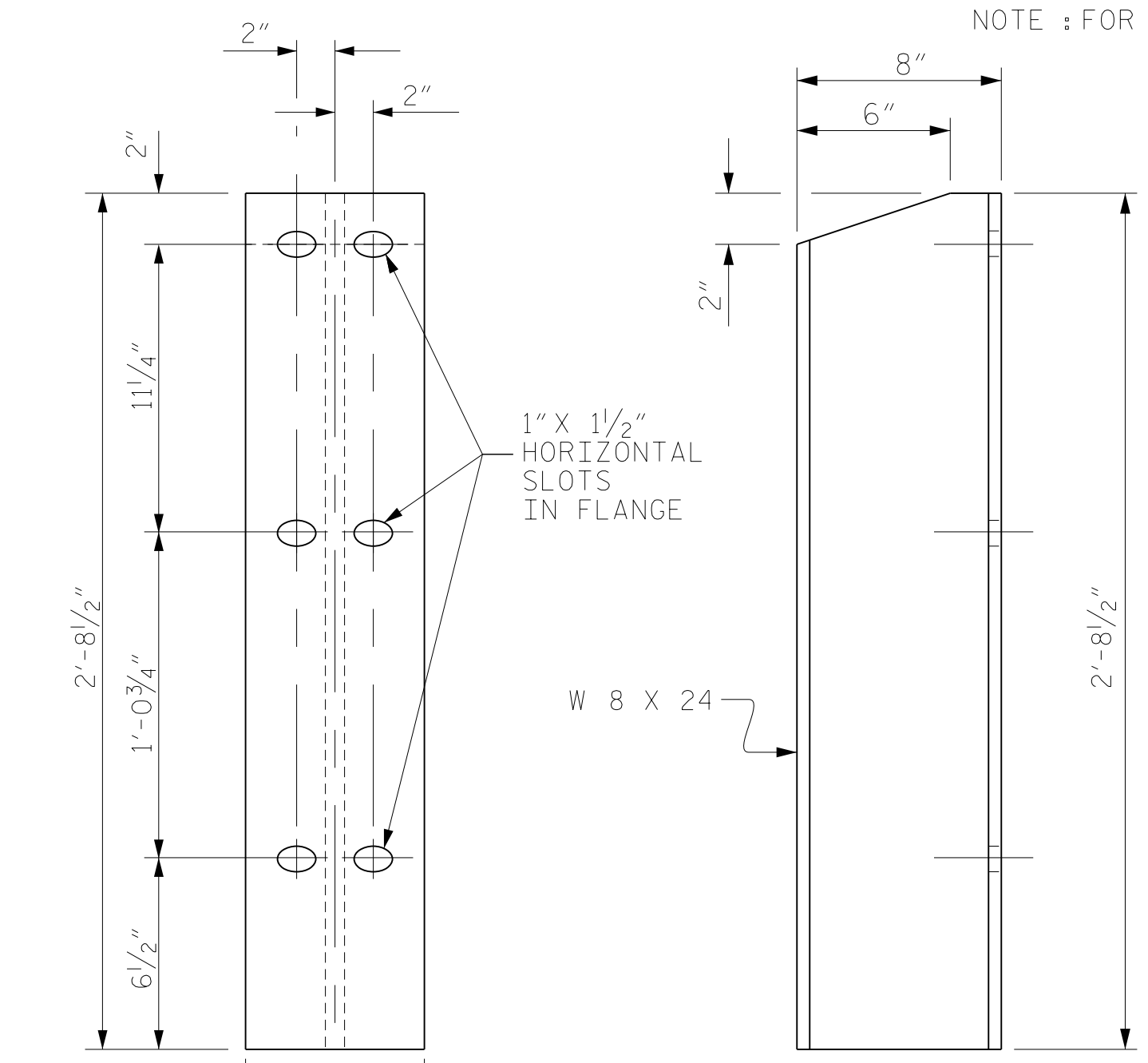
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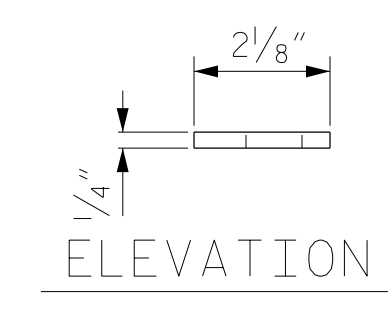
ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 2 OF 2.

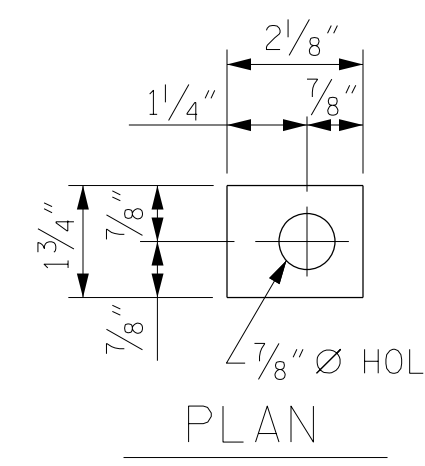
EXP. JT. @	RAIL OPENING
BENT 2	1 1/2"
BENT 5	1 1/2"
BENT 8	1 1/2"



FRONT ELEVATION SIDE ELEVATION
DETAILS OF POST

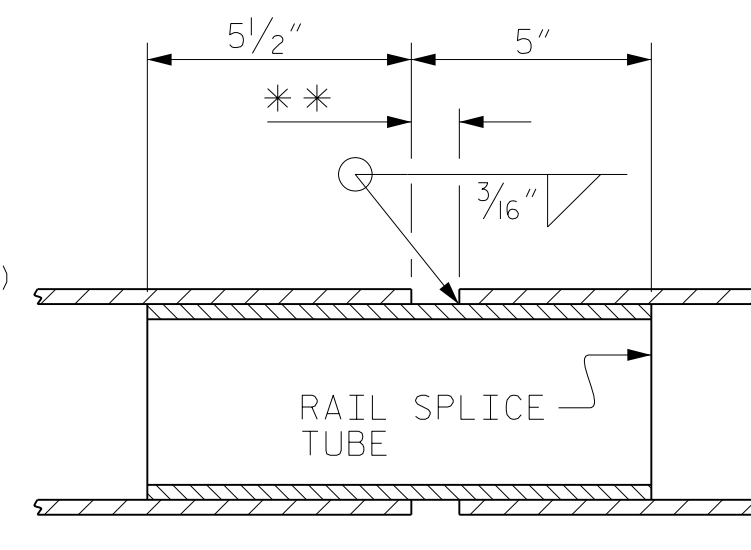
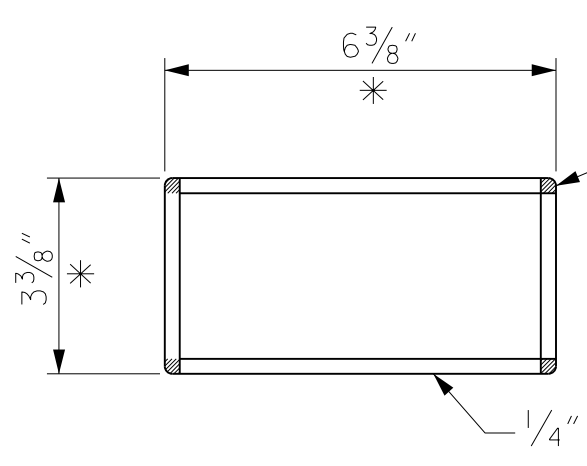


ELEVATION



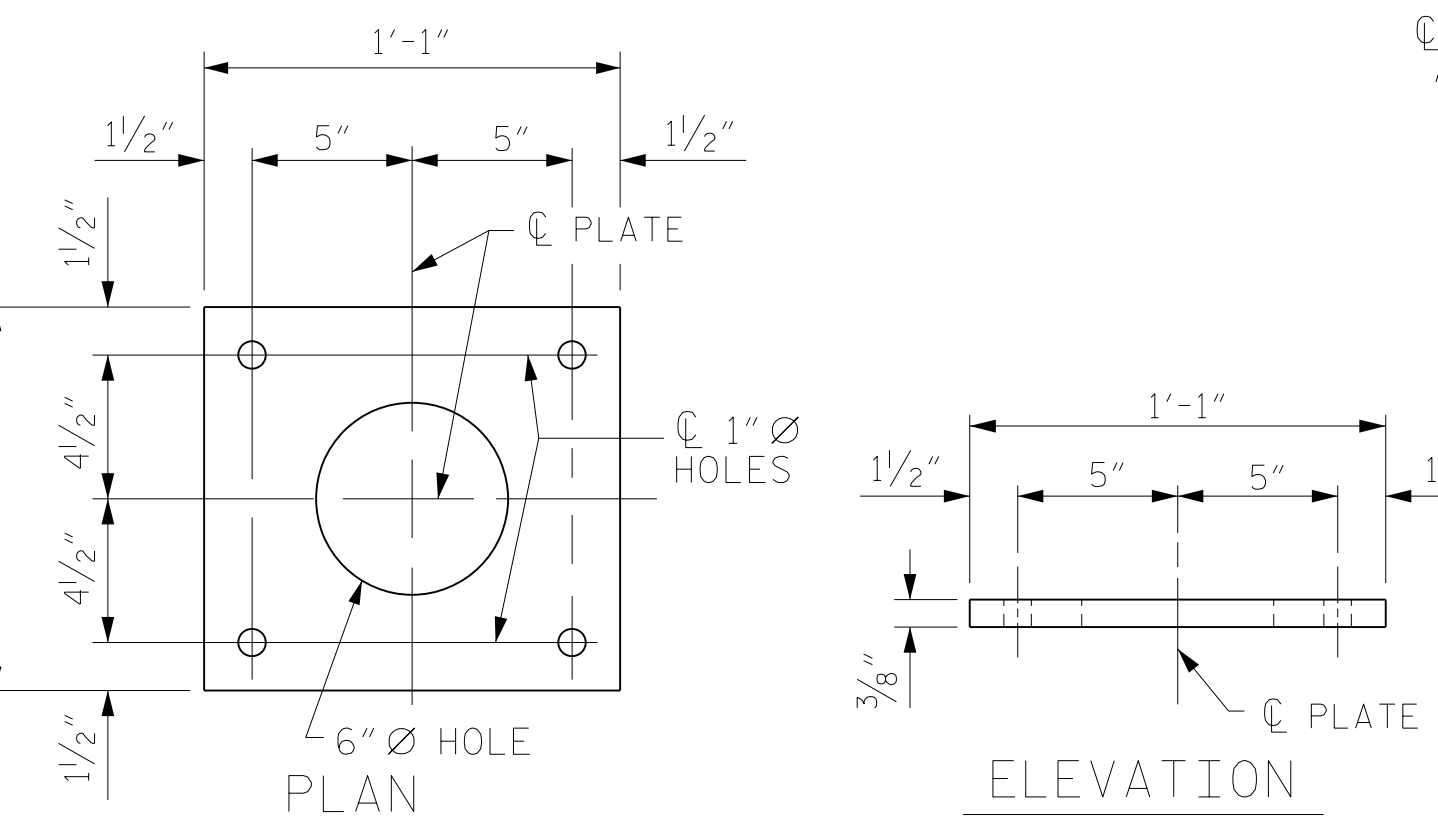
PLAN

PLATE WASHER

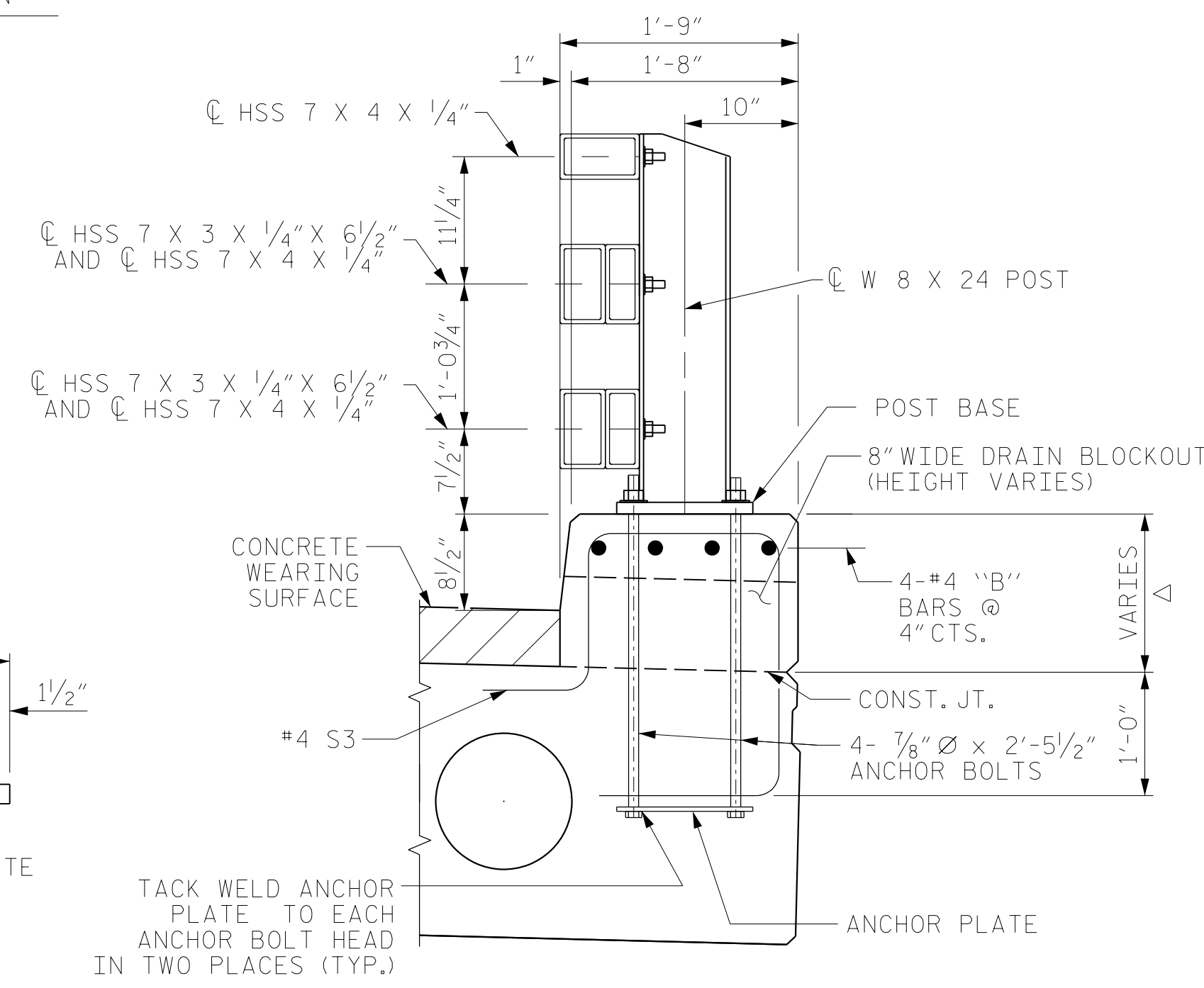


RAIL SPLICE DETAILS

- * - DIMENSION AFTER GRINDING RADIUS ON CORNERS TO MATCH INSIDE OF METAL RAIL. GRIND ALL EDGES PRIOR TO GALVANIZING TO ASSURE FIT.
- ** -1" FOR SPLICE NOT AT EXPANSION JOINT; SEE TABLE 1 FOR OPENING FOR SPLICES AT EXPANSION JOINTS.

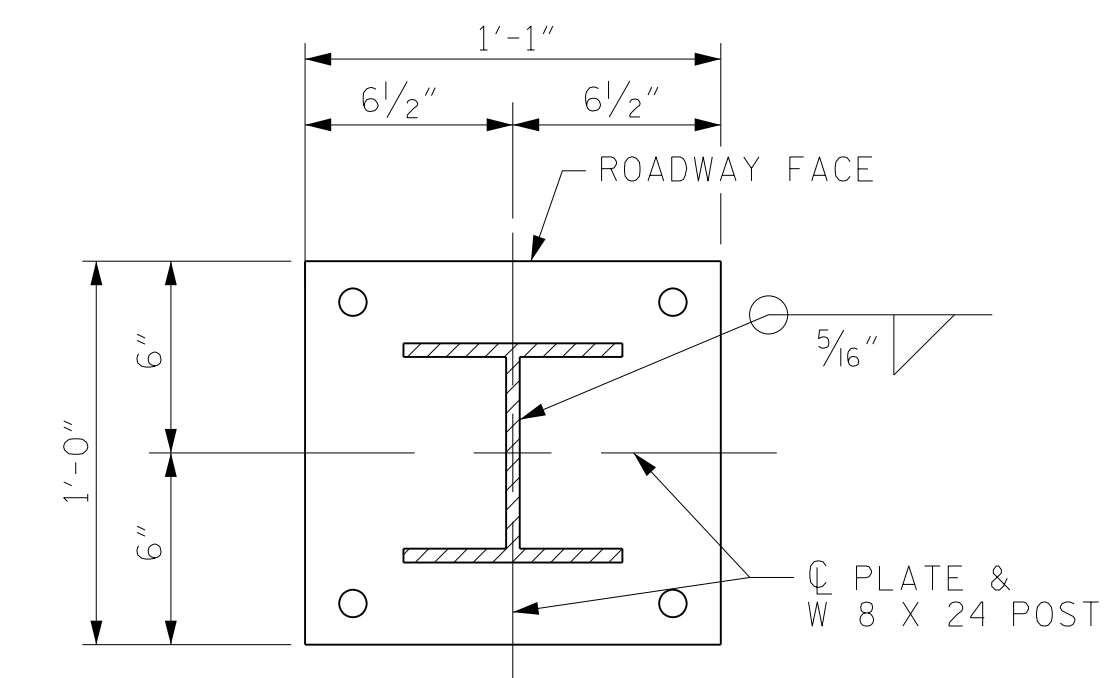


ANCHOR PLATE DETAILS

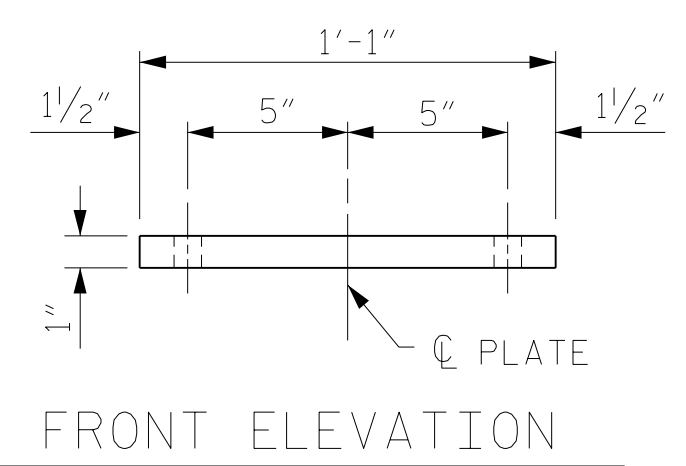


SECTION THRU RAIL

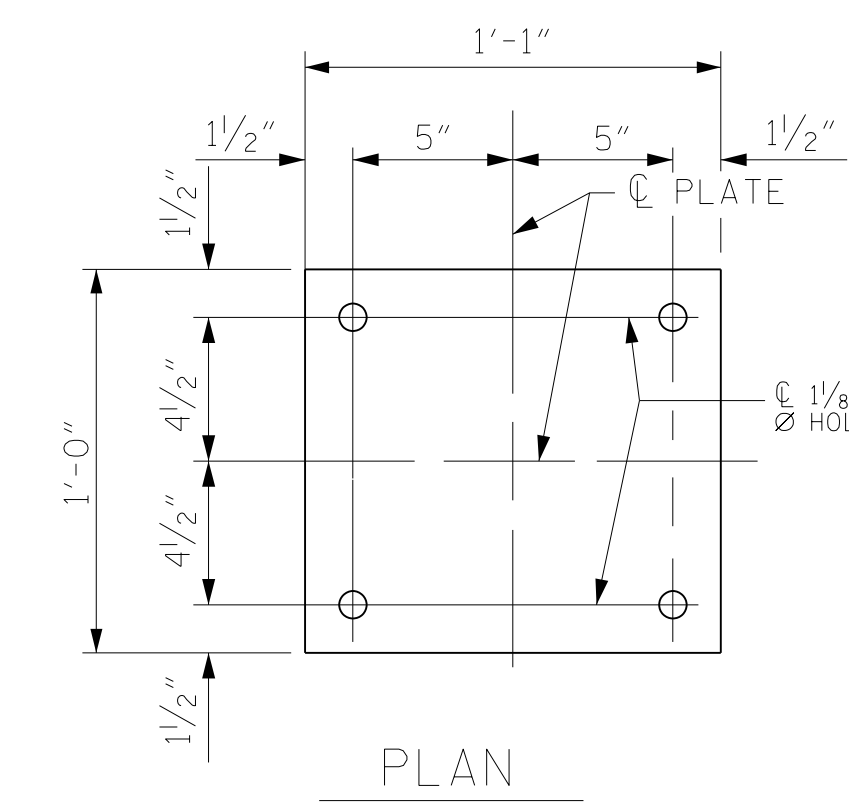
DECK DRAIN IN RIGHT SIDE CURB ONLY.
 Δ SEE CURB HEIGHT TABLE ON SHEET S-20 AND S-21
 THE #4 "B" BARS IN THE CURB MAY BE FIELD CUT TO AVOID DRAIN BLOCKOUTS



POST ATTACHMENT DETAIL



FRONT ELEVATION



PLAN

POST BASE DETAILS

PAY LENGTH 1152.3 LIN. FT.

NOTES

METAL RAIL SHALL BE GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS. ALUMINUM RAIL WILL NOT BE AN OPTION.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, ANCHOR PLATES, AND RAIL SPLICE TUBES: AASHTO M270 GRADE 36 STRUCTURAL STEEL-GALVANIZED TO AASHTO M111.

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.

RAILS: ASTM A500 GRADE B - GALVANIZED TO AASHTO M111.

WELDED RAIL STUDS: ASTM A108-GALVANIZED TO AASHTO M111.

HIGH STRENGTH ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 105. HEAVY HEX NUTS SHALL CONFORM TO ASTM A563 DH, AND WASHERS TO ASTM F436, TYPE 1. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED TO AASHTO M111.

GENERAL NOTES

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

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR11.

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

THE RAIL SECTIONS SHALL BE ATTACHED TO THE POSTS BY TWO THREADED 3/4" Ø WELDED STUDS, PLATE WASHERS, LOCKWASHERS, AND NUTS.

FOR 42" OREGON RAIL, SEE THE STANDARD SPECIFICATIONS.

PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 1 OF 2



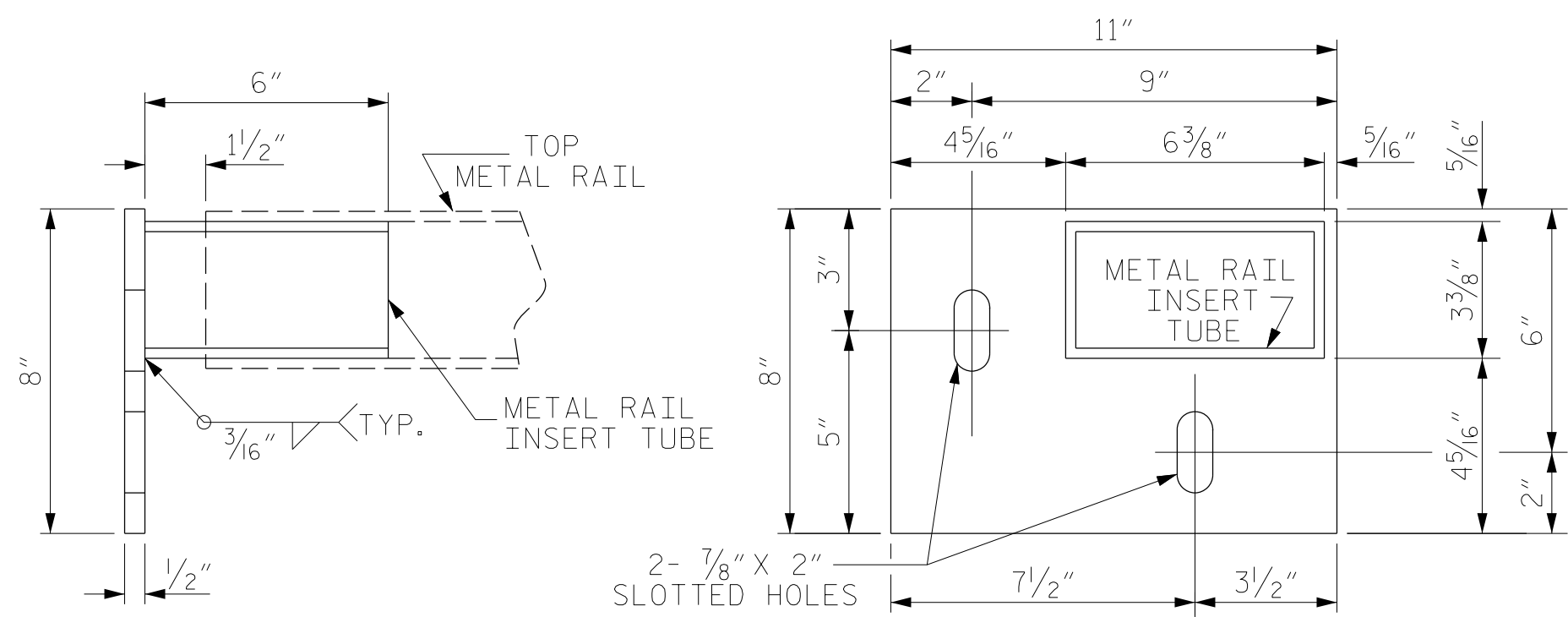
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 42" OREGON RAIL

ASSEMBLED BY : NSC	DATE : 11/2021
CHECKED BY : MRA	DATE : 01/2023
DRAWN BY : RWW 7/14	REV. 12/17
CHECKED BY : TMG 7/14	MAA/THC

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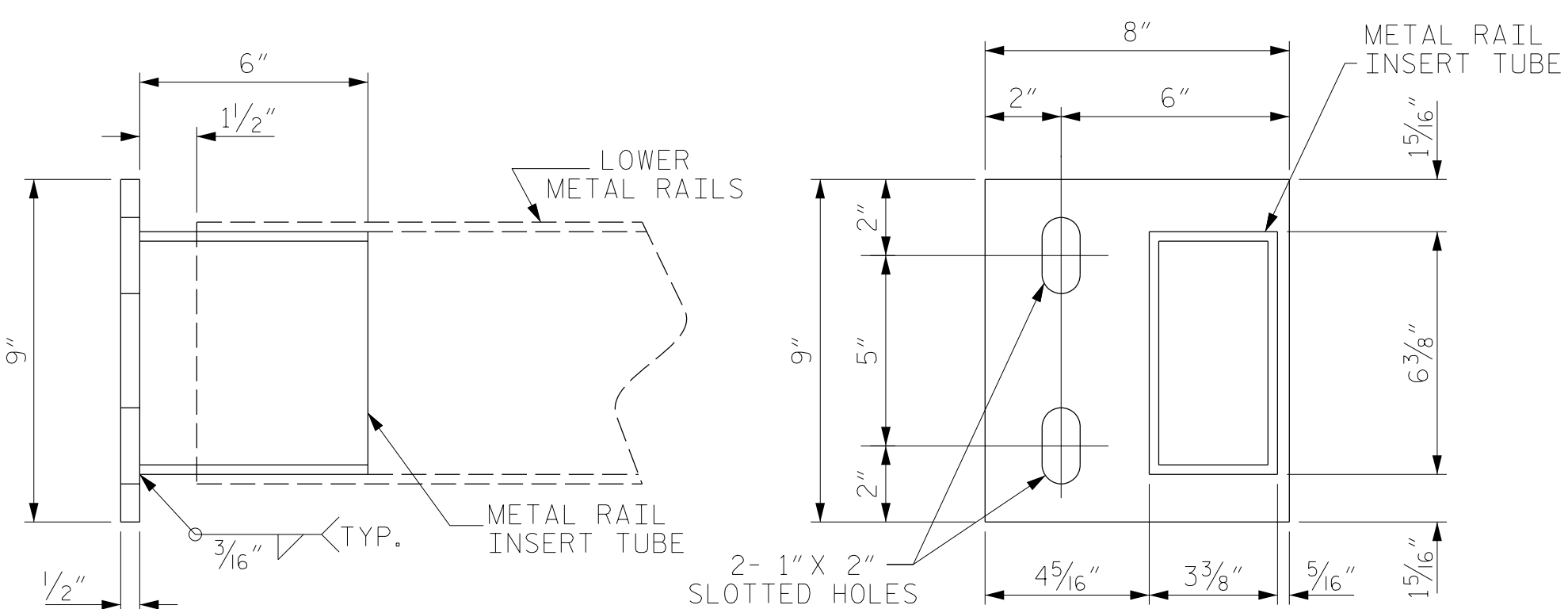
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-25
TOTAL SHEETS	42



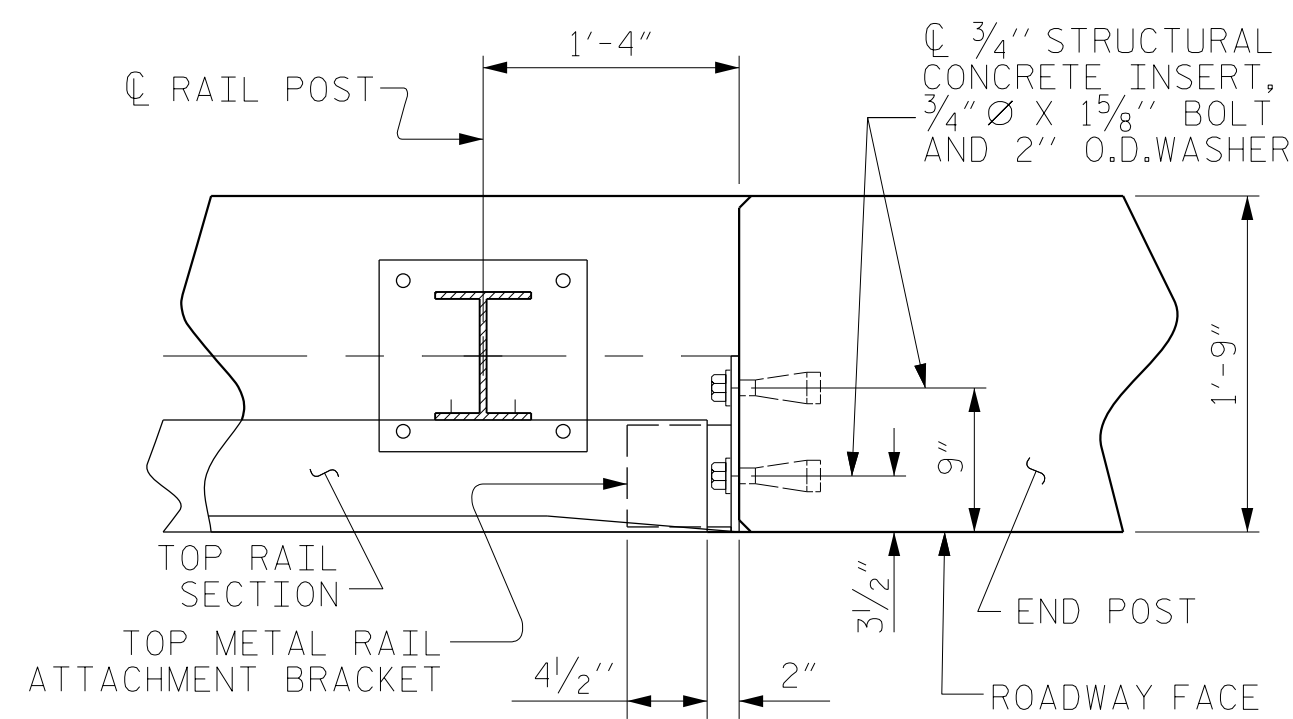
TOP METAL RAIL ATTACHMENT BRACKET

THE METAL RAIL INSERT TUBE SHALL BE FABRICATED FROM 1/4" PLATES.

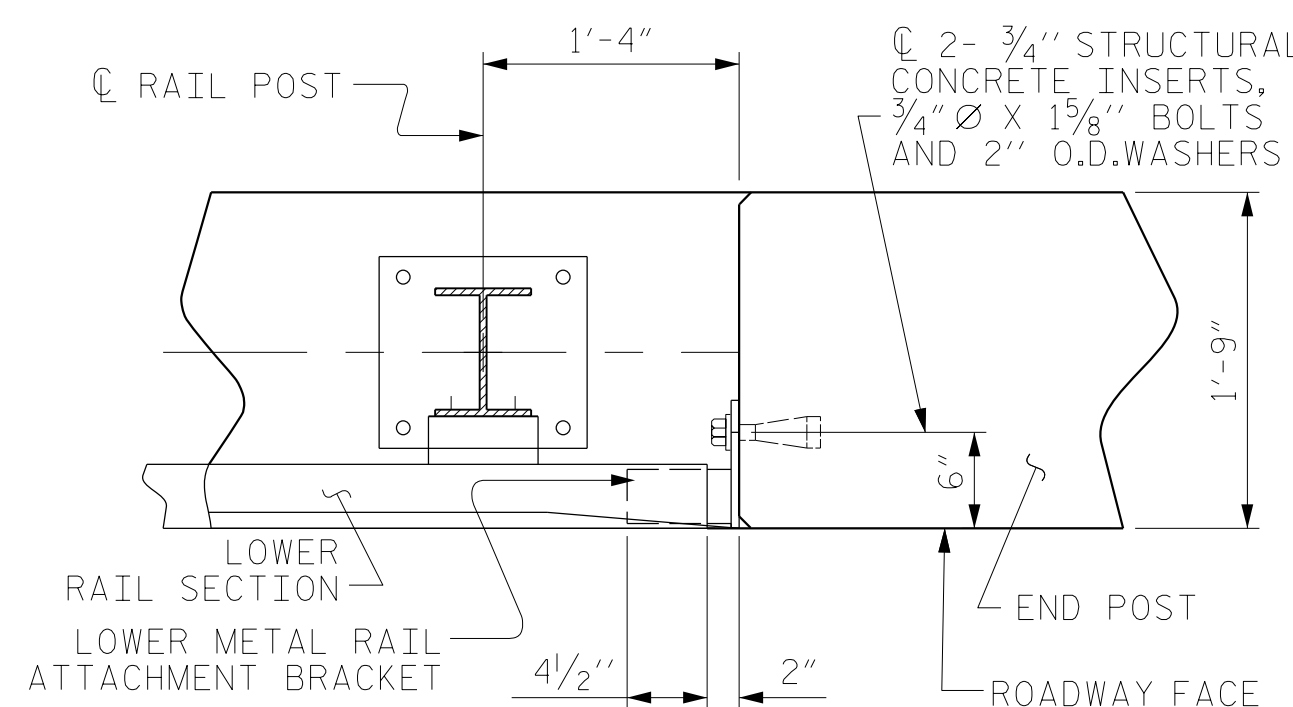


LOWER METAL RAILS ATTACHMENT BRACKET

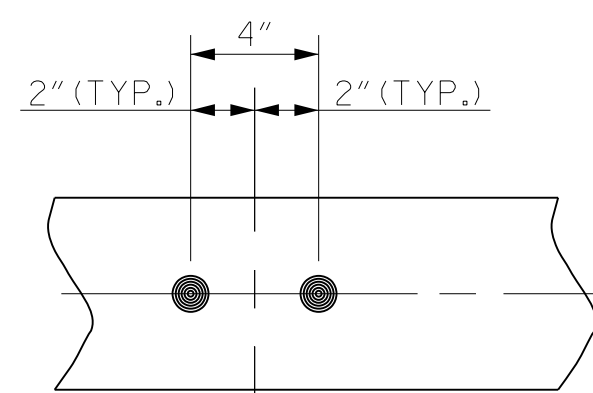
THE METAL RAIL INSERT TUBE SHALL BE FABRICATED FROM 1/4" PLATES.



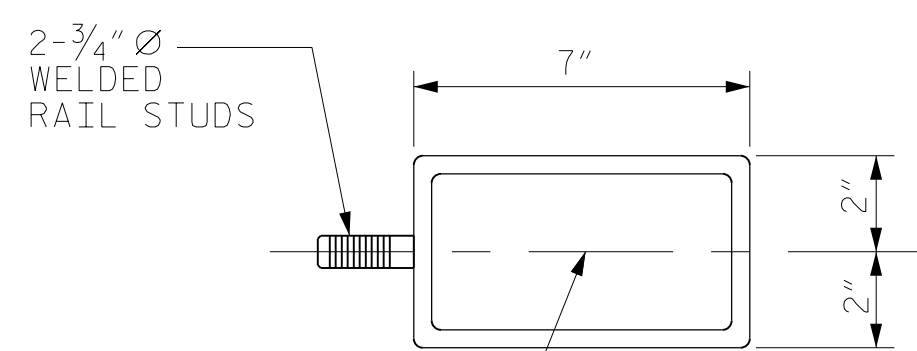
PLAN - TOP RAIL AND END POST



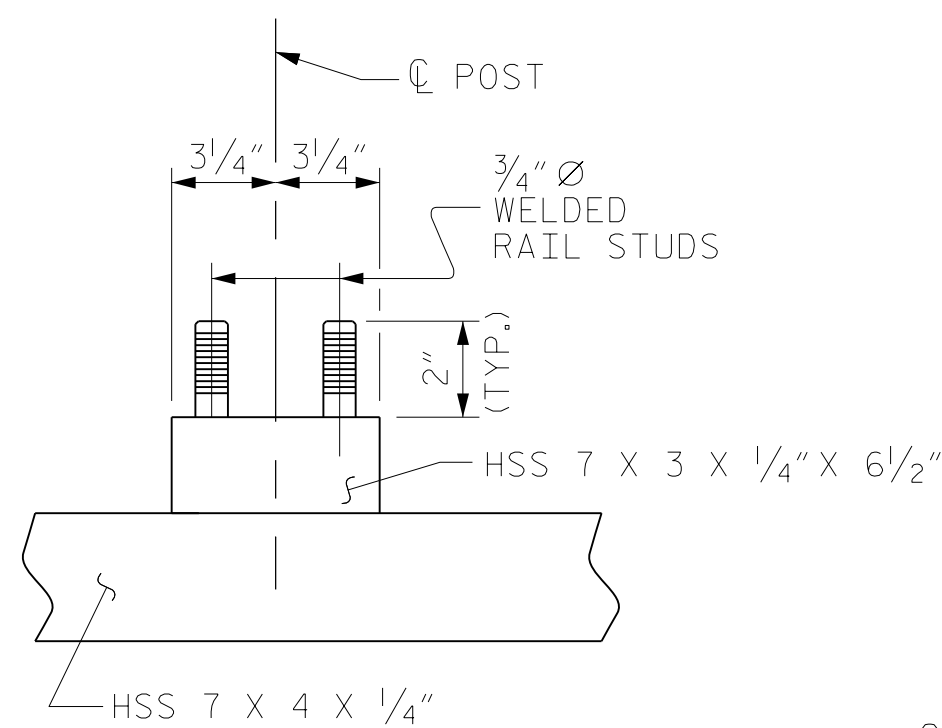
PLAN - LOWER RAIL AND END POST



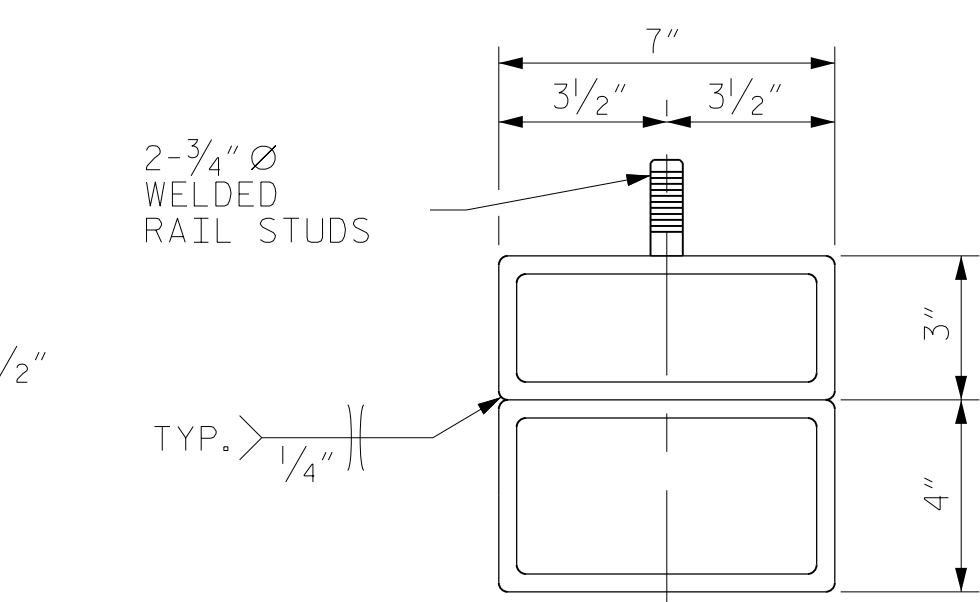
ELEVATION



TOP RAIL SECTION

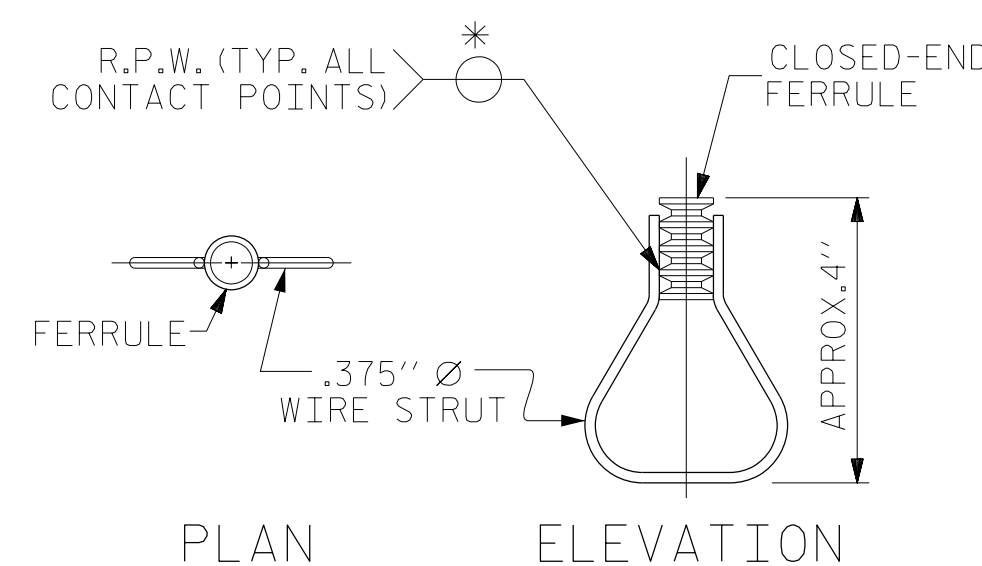


PLAN



SECTION OF LOWER RAILS

RAIL STUD DETAILS



STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

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

- A. FERRULE SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
- B. 1 - 3/4" Ø X 1 1/8" 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 1/8" 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 STRUCTURAL CONCRETE INSERT 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.

NOTES

METAL RAIL TO END POST CONNECTION

EACH METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- A. 1/2" METAL BRACKET PLATE AND 1/4" METAL RAIL INSERT TUBE SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION TO AASHTO M111.
- B. 3/4" STRUCTURAL CONCRETE INSERTS SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 1/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 1/8" BOLT SHALL HAVE N. C. THREADS.

THE 3/4" STRUCTURAL CONCRETE INSERTS WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT, THE 1/2" BRACKET PLATES, AND THE RAIL INSERT TUBES 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 1/8" BOLTS WITH WASHERS SHALL BE REPLACED WITH 3/4" Ø X 6 1/2" BOLTS AND 2" O.D. WASHERS. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 1/8" BOLTS SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLTS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 2 OF 2

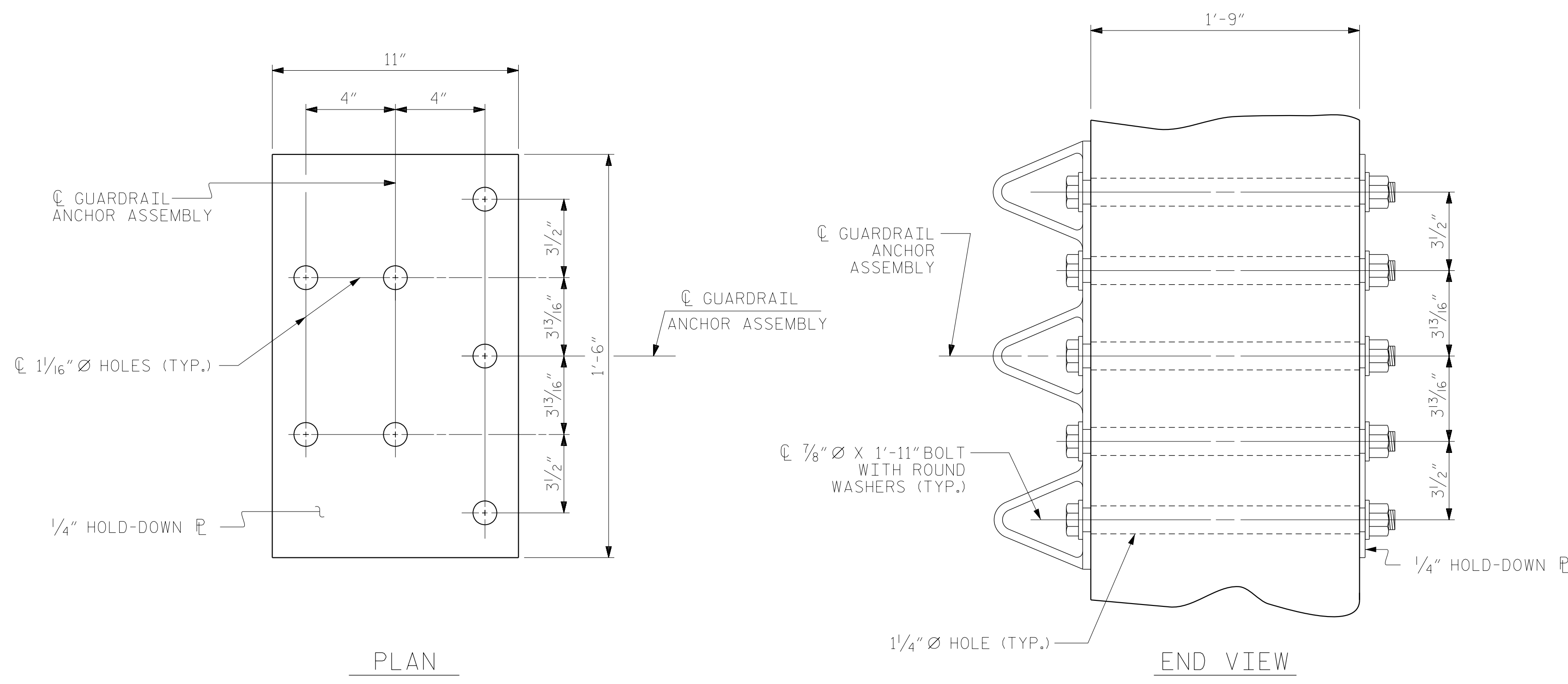
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 RS&H Architects-Engineers-Planners, Inc.
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 www.rsandh.com
 North Carolina License No. 50737-F-0403-C-28

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 END OF RAIL DETAILS
 FOR 42" OREGON RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			42

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ASSEMBLED BY : NSC	DATE : 11/2021
CHECKED BY : MRA	DATE : 01/2023
DRAWN BY : RWW 7/14	REV. 12/17
CHECKED BY : TMG 7/14	MAA/THC



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

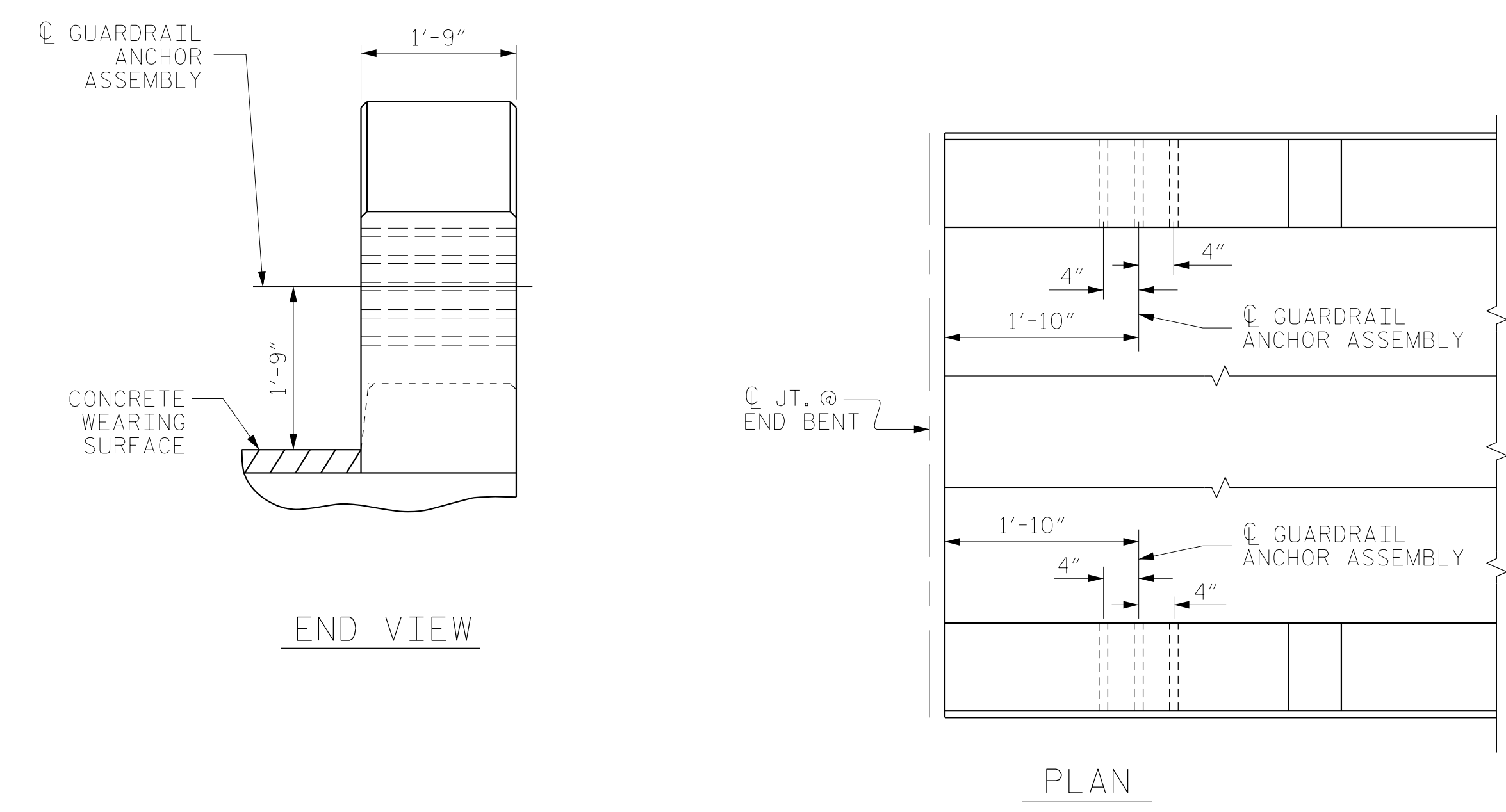
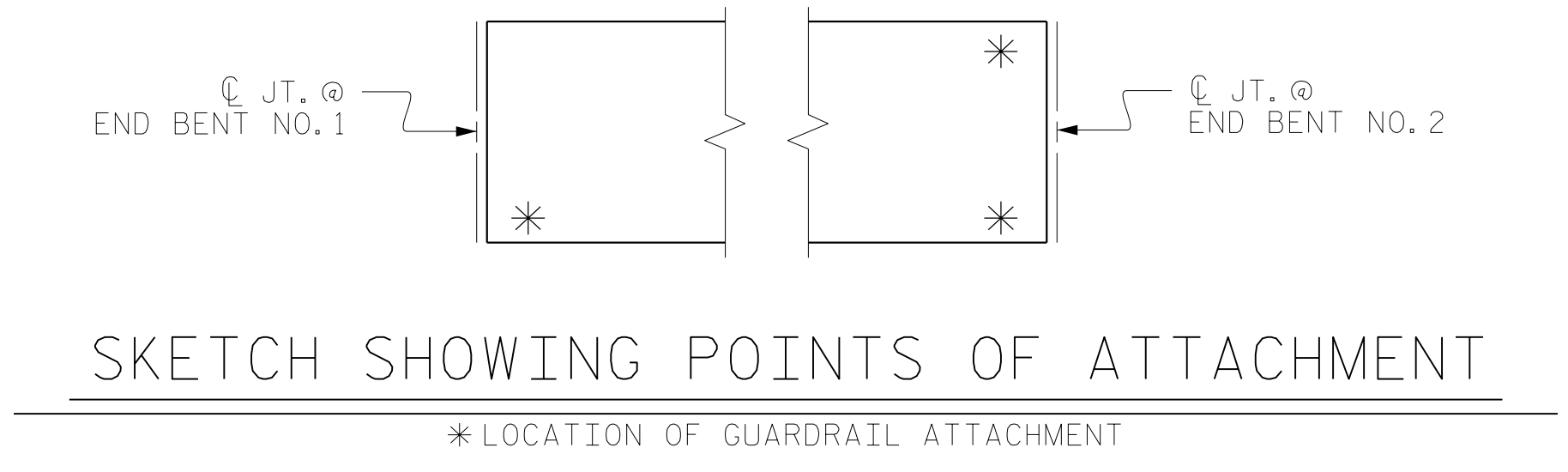
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



LOCATION OF GUARDRAIL ANCHOR AT END POST

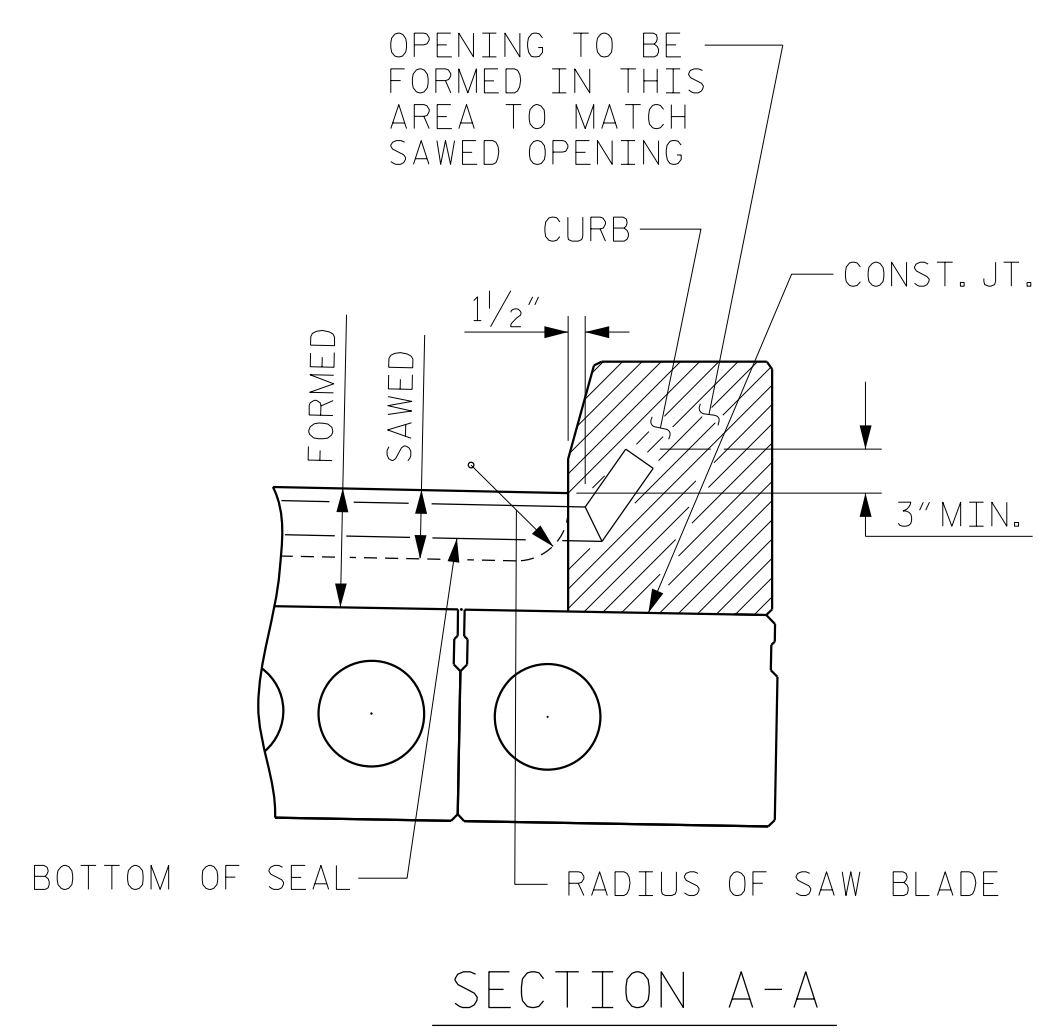
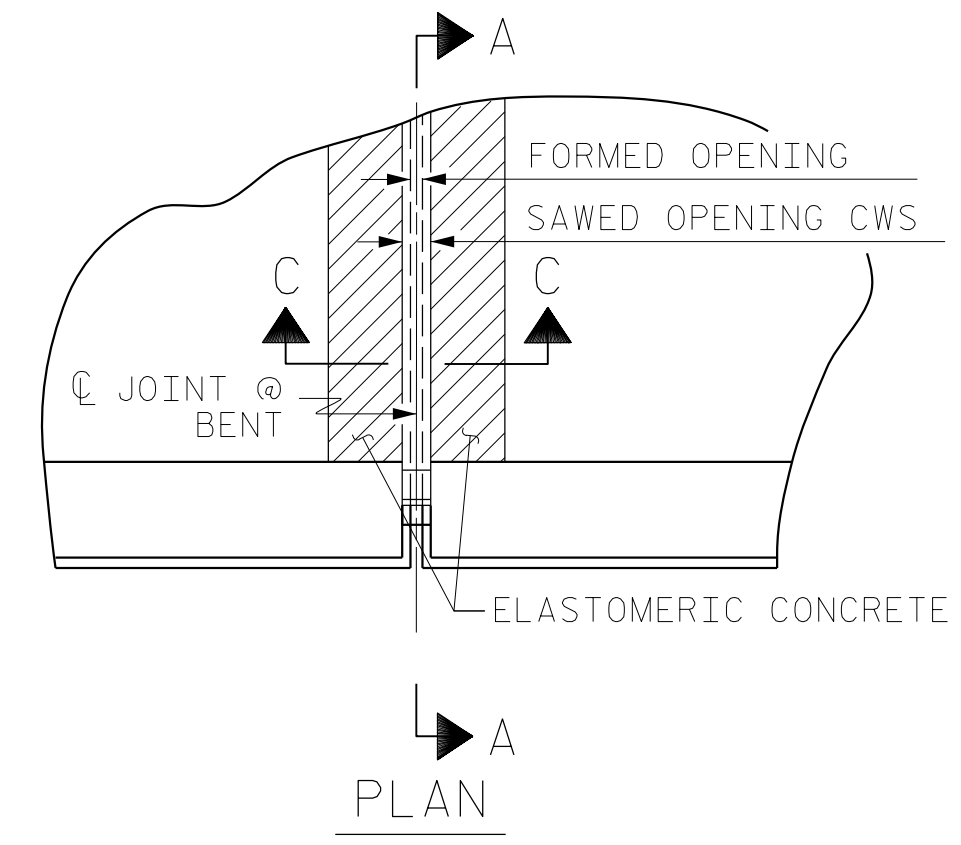
PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

ASSEMBLED BY : NSC	DATE : 11/2020
CHECKED BY : MRA	DATE : 01/2023
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

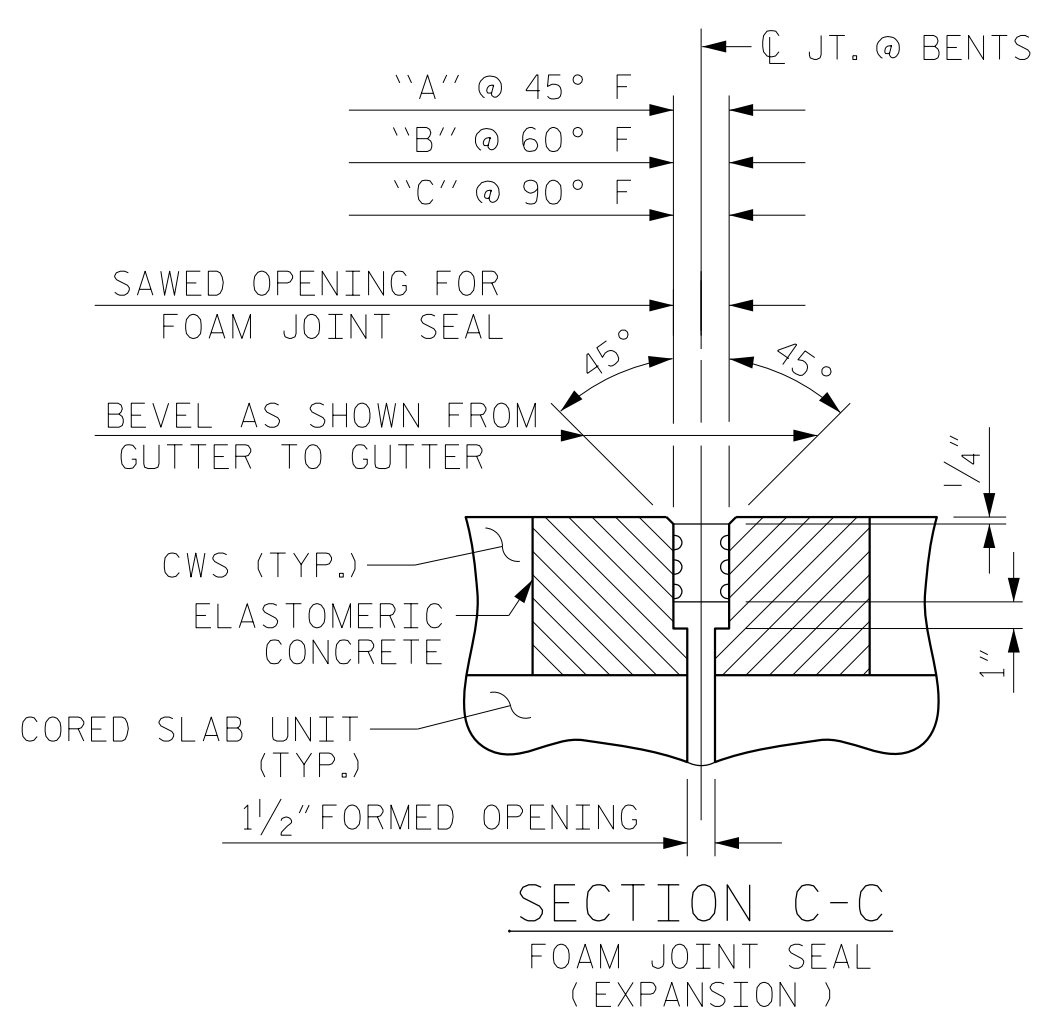
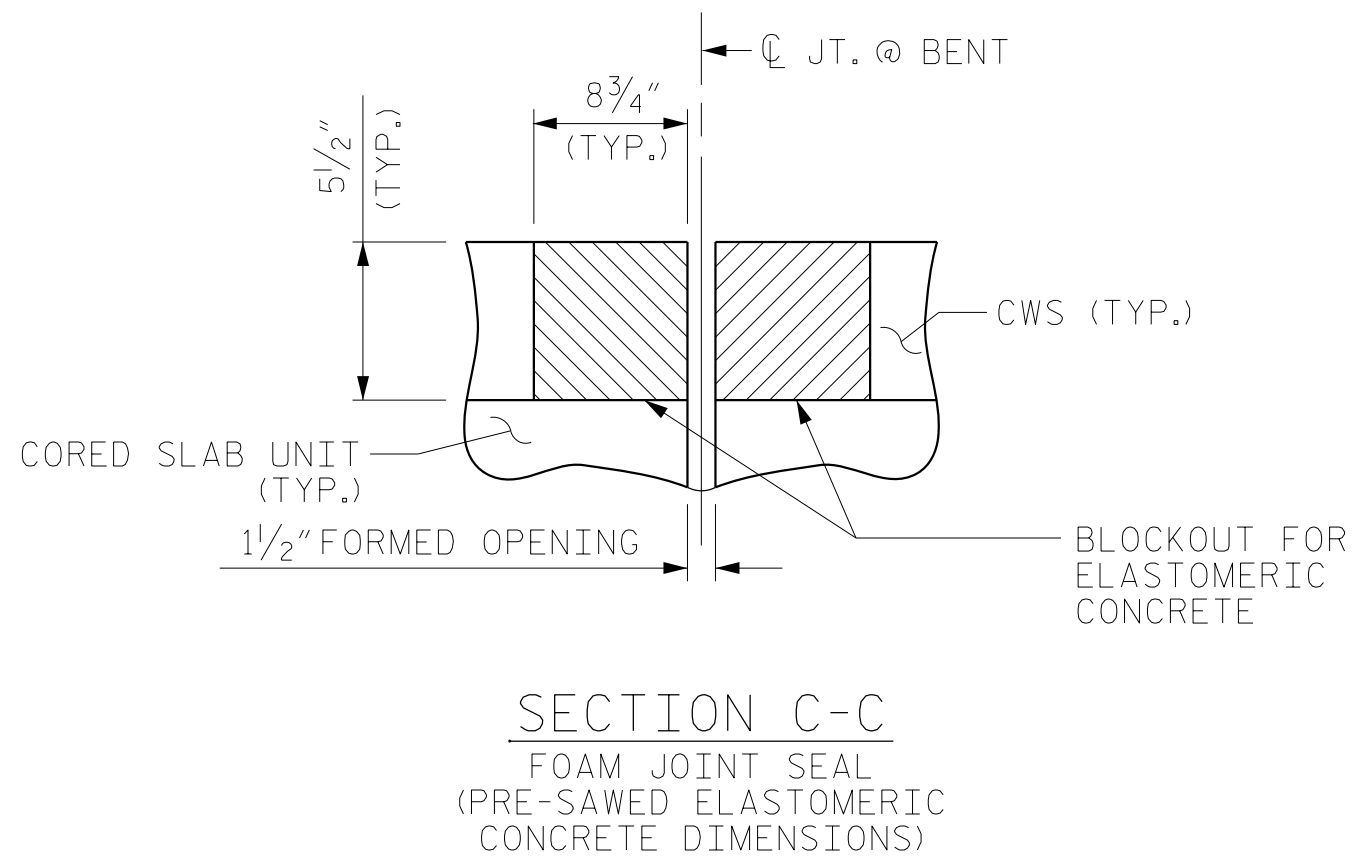
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
STANDARD GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS						S-27
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	42
1			3			
2			4			



NOTES:
 THE JOINTS SHALL BE SAWED AFTER PLACEMENT OF THE CONCRETE WEARING SURFACE (CWS).
 FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.
 FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.
 FOR FOAM JOINT SEAL AT END BENTS, SEE BRIDGE APPROACH SLABS.
 THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 3".



JOINT OPENINGS			
BENT NO.	"A"	"B"	"C"
2	2 1/2"	2 5/16"	2"
5	2 1/2"	2 5/16"	1 5/16"
8	2 7/16"	2 5/16"	2"

ELASTOMERIC CONCRETE	
BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
2	27.7
5	27.7
8	27.7
TOTAL	83.1

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

JOINT SEAL DETAILS @ BENTS

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE CURB.

DRAWN BY : NSC DATE : .01/2022
 CHECKED BY : MRA DATE : .01/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : .03/2023

3/28/2023
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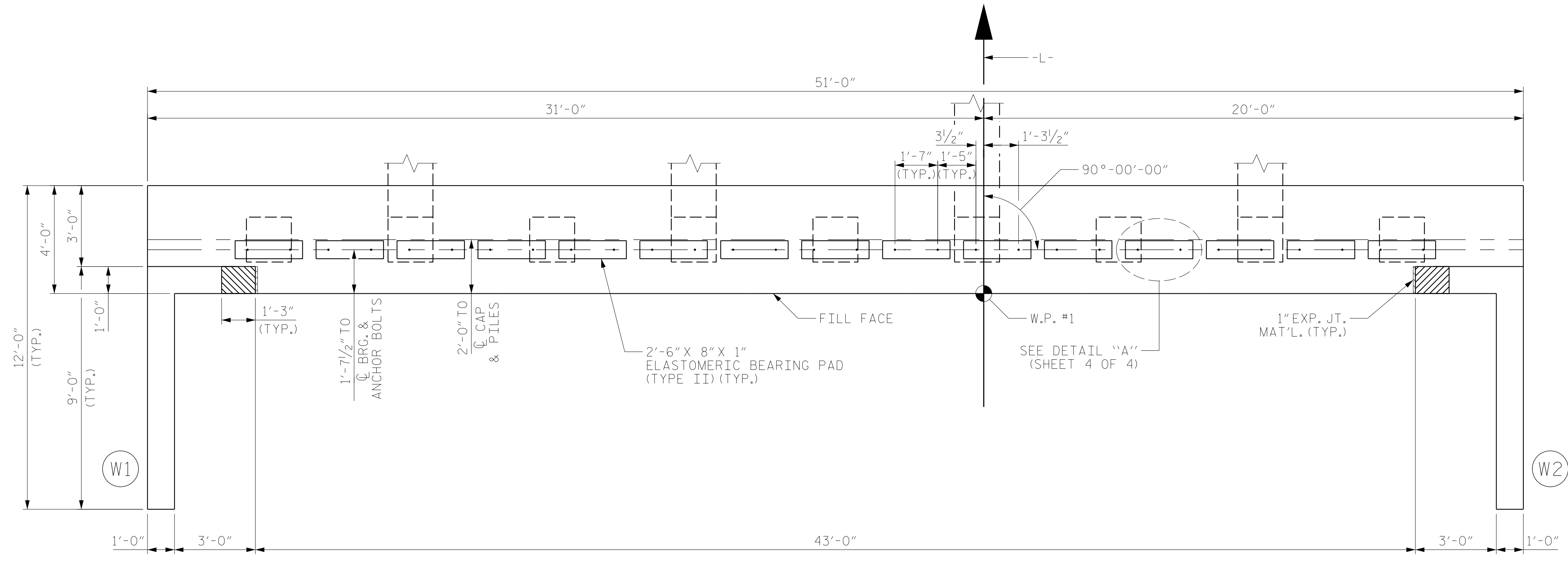
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

FOAM JOINT DETAILS AT BENT

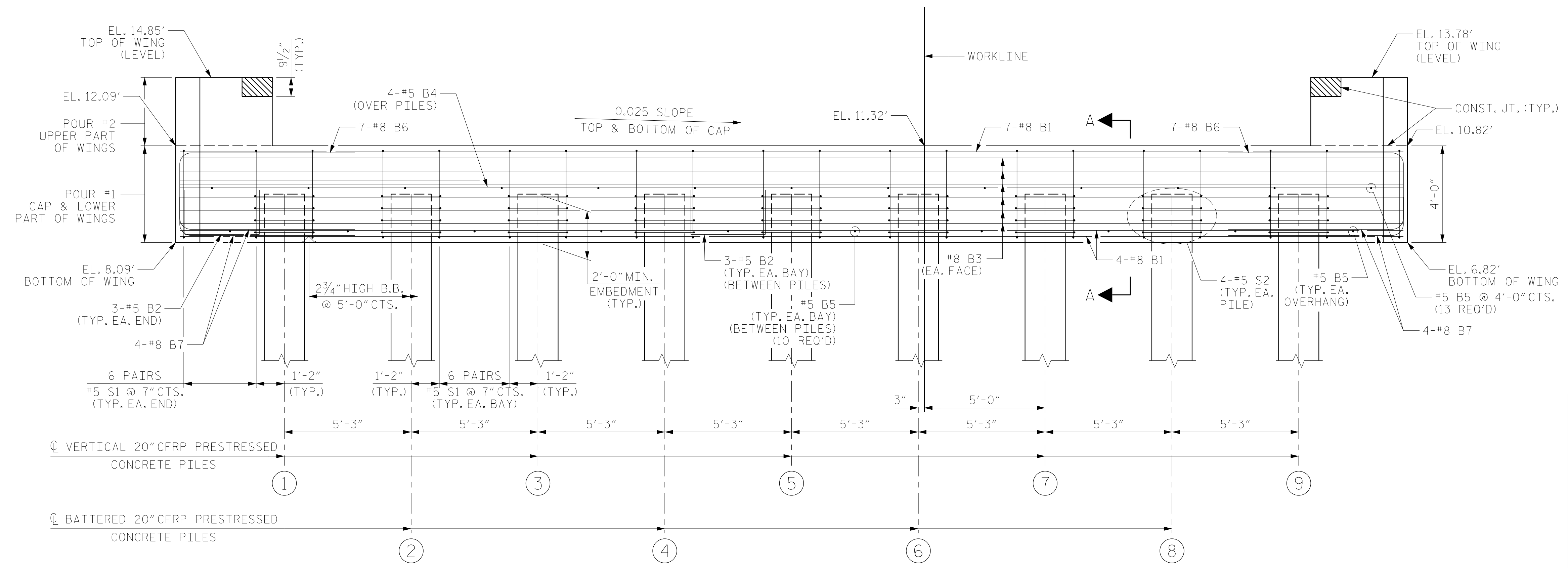
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			42

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- CONCRETE DISPLACED BY THE CONCRETE PILES HAS BEEN DEDUCTED FROM THE CAP CONCRETE QUANTITY.
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE OREGON RAIL CURB IS CAST IF SLIP FORMING IS USED.
- ALL REINFORCING IN THE CAP IS TO BE GLASS FIBER REINFORCED POLYMER (GFRP) BARS. FOR GLASS FIBER REINFORCED POLYMER BARS, SEE SPECIAL PROVISIONS.
- FOR SECTION A-A, SEE SHEET 4 OF 4.
- FOR WING DETAILS, SEE SHEET 3 OF 4.
- ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F1554 GR. 105. ANCHOR PLATES, WASHERS, AND NUTS SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- NO SEPARATE PAYMENT SHALL BE MADE FOR THE ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS. THE COST OF THE MATERIAL AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- THE TOP SURFACE OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- EPOXY COAT THE TOP SURFACE OF THE END BENT CAPS, AND SECTION 420-18(b) LINES 13 AND 14 OF THE STANDARD SPECIFICATIONS SHALL BE DISREGARDED. THE EPOXY PROTECTIVE COATING SHALL NOT BE PLACED WITHIN THE LIMITS OF THE APPROACH SLAB ON THE END BENT CAP. NO SEPARATE PAYMENT SHALL BE MADE FOR THE EPOXY PROTECTIVE COATING AS THIS IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.
- MATERIAL QUANTITIES FOR GFRP BARS INCLUDE THE ANTICIPATED SPLICES DETAILED ON THE PLANS. ADDITIONAL SPLICES REQUIRED DUE TO MANUFACTURING LIMITATIONS WILL BE AT NO ADDITIONAL COST TO THE DEPARTMENT.



PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
①	9.98'
②	9.85'
③	9.72'
④	9.58'
⑤	9.45'
⑥	9.32'
⑦	9.19'
⑧	9.06'
⑨	8.93'

PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 1 OF 4



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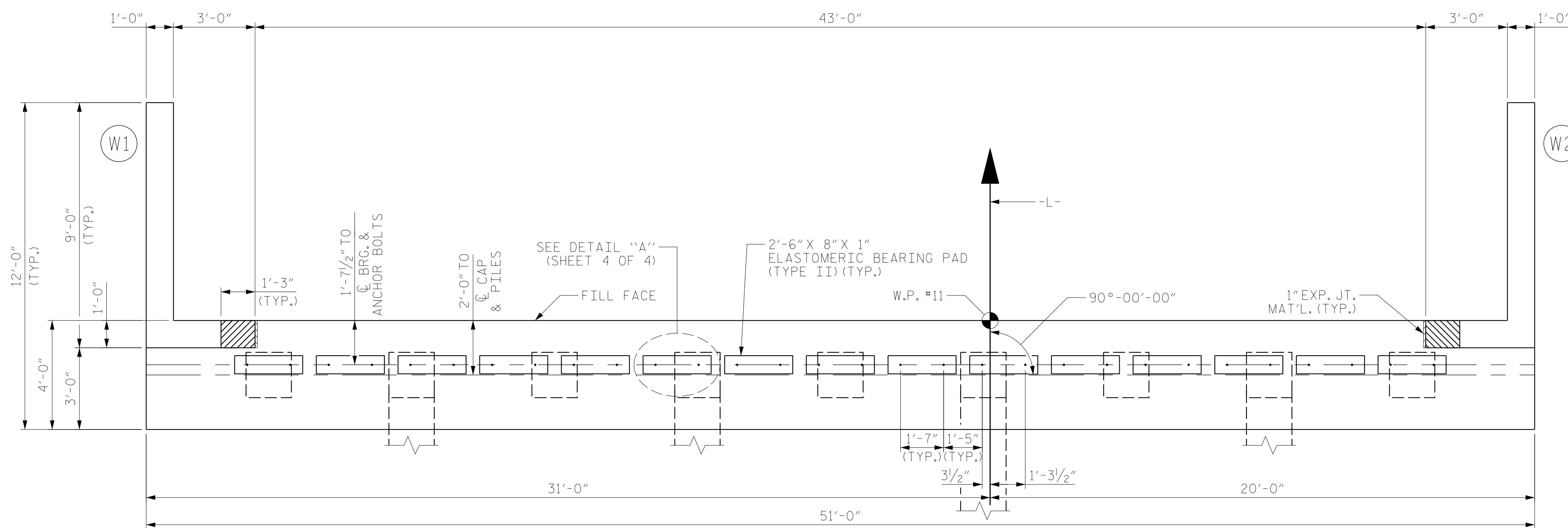
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE						END BENT NO. 1	
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29	
1			3			TOTAL SHEETS 42	
2			4				

DRAWN BY : MRA DATE : 01/2023
 CHECKED BY : MKO DATE : 01/2023
 DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

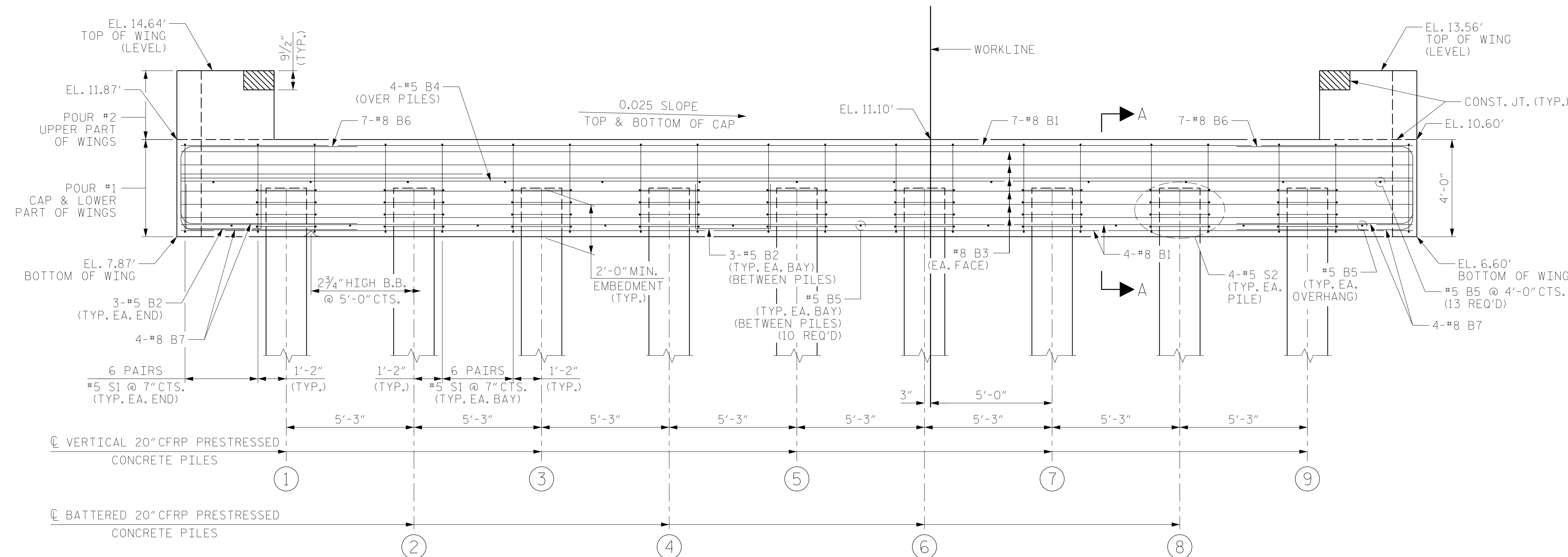
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NOTE

FOR NOTES, SEE SHEET 1 OF 4.



PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
①	9.76'
②	9.63'
③	9.50'
④	9.37'
⑤	9.24'
⑥	9.11'
⑦	8.97'
⑧	8.84'
⑨	8.71'

PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 2 OF 4

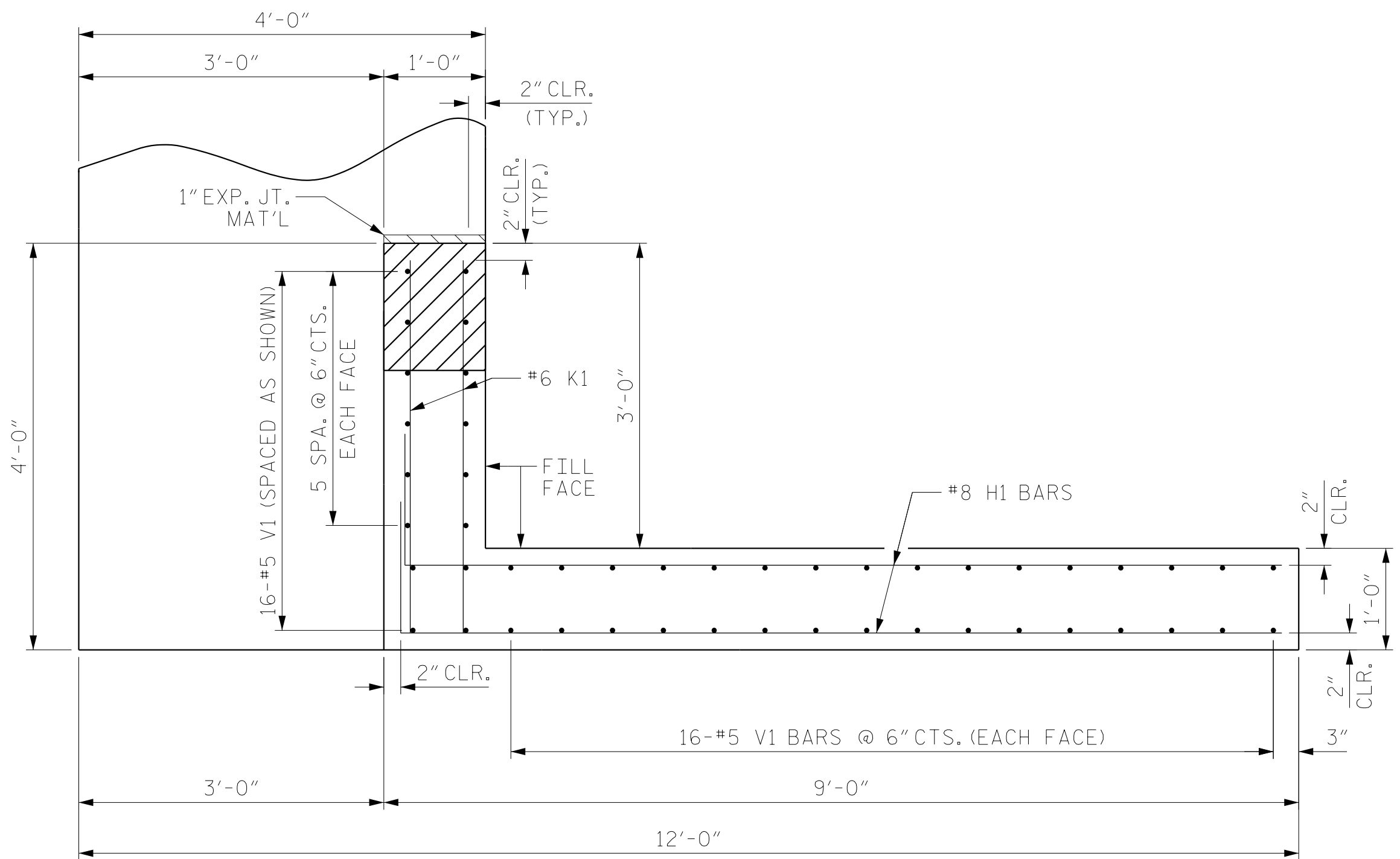


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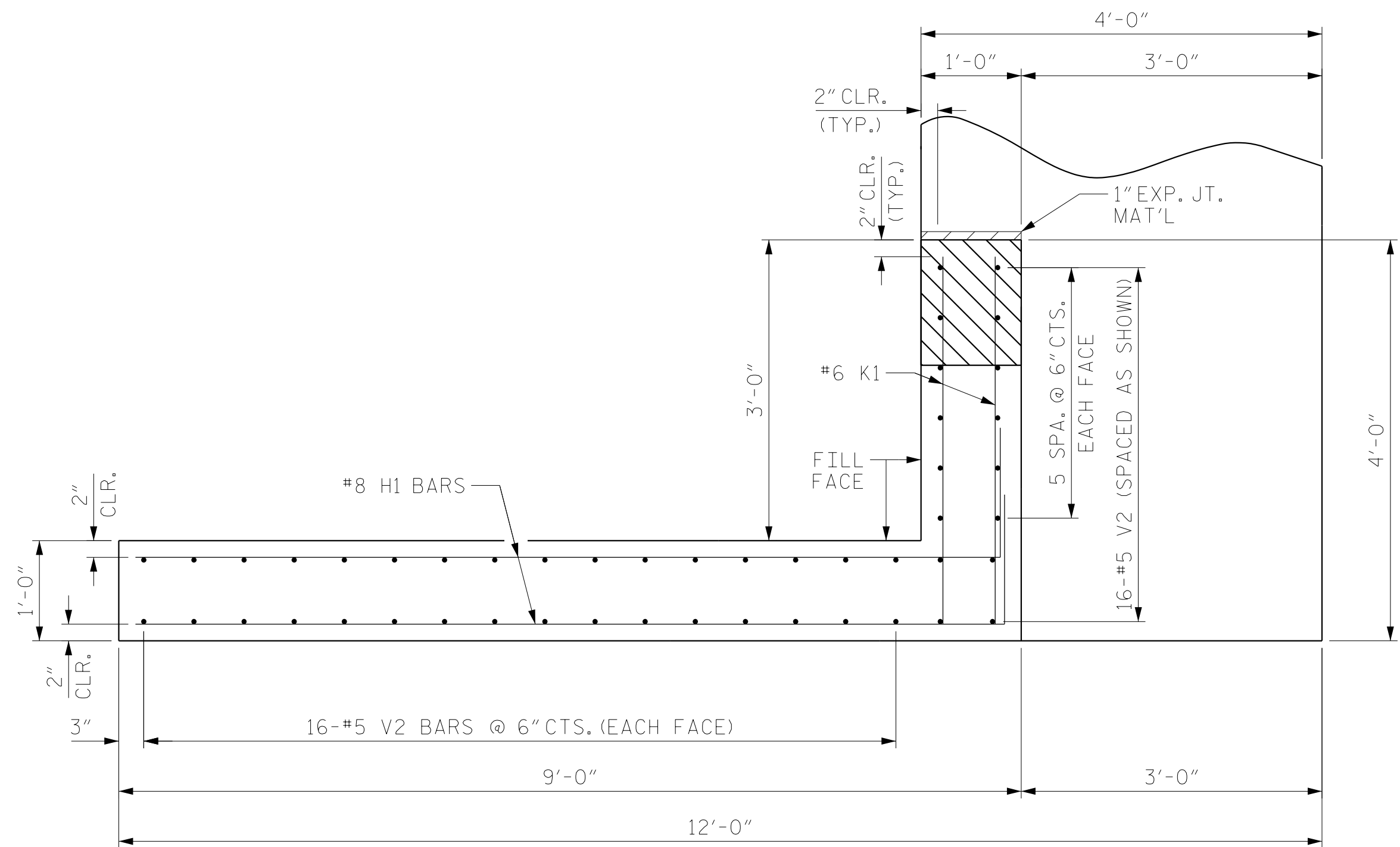
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE						END BENT NO. 2	
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30	
1			3			TOTAL SHEETS	
2			4			42	

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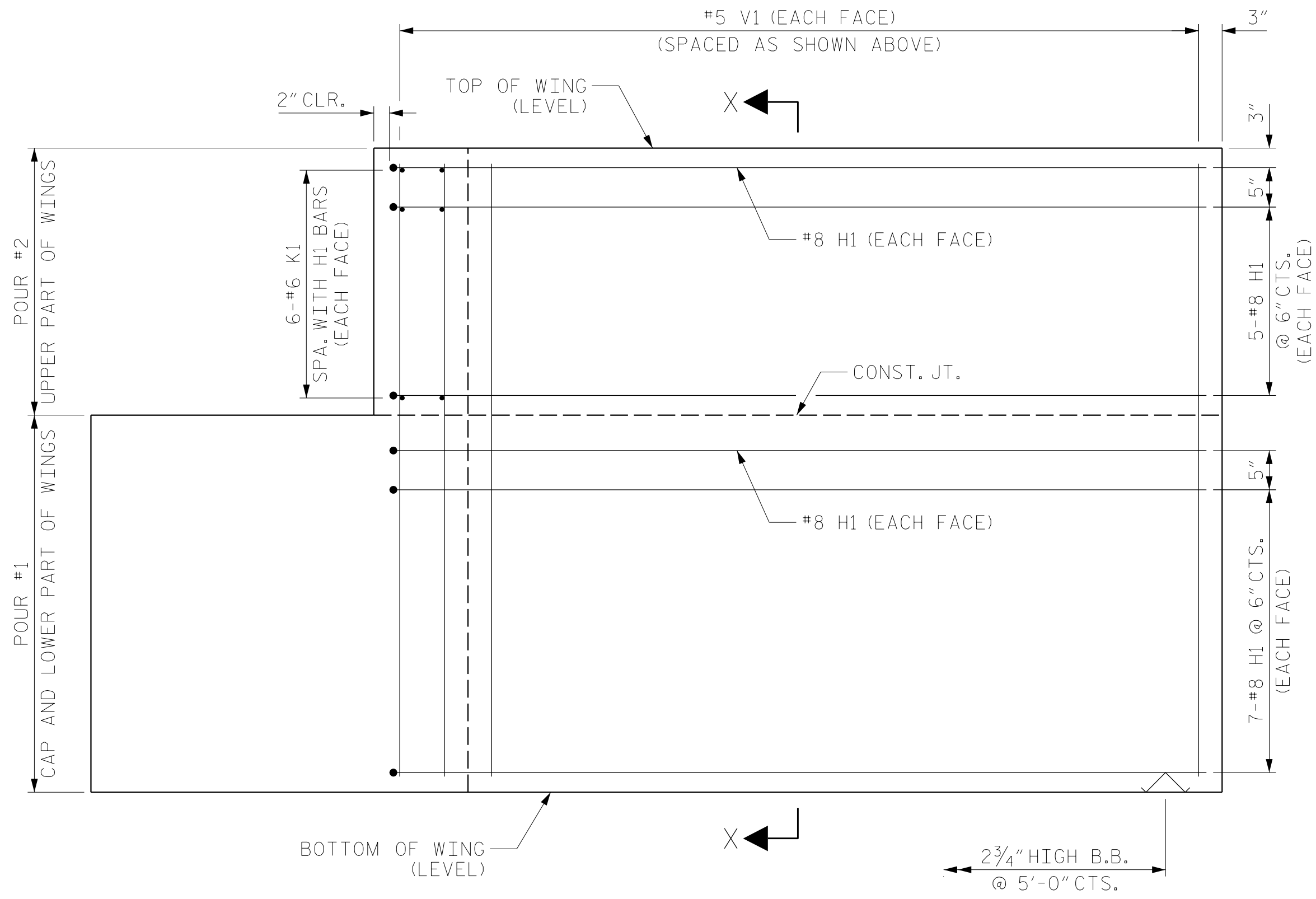
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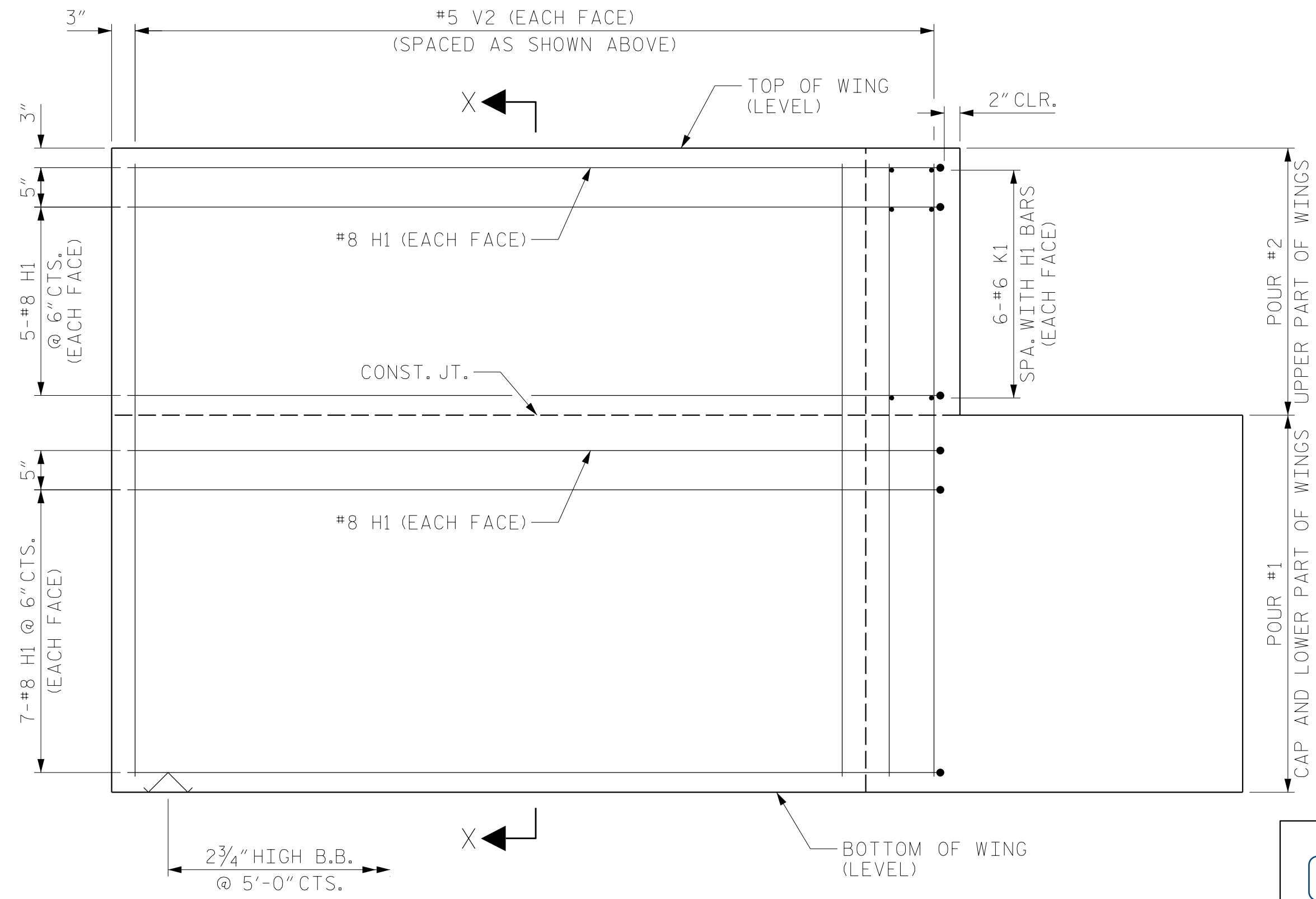
PLAN OF WING (W1)



PLAN OF WING (W2)

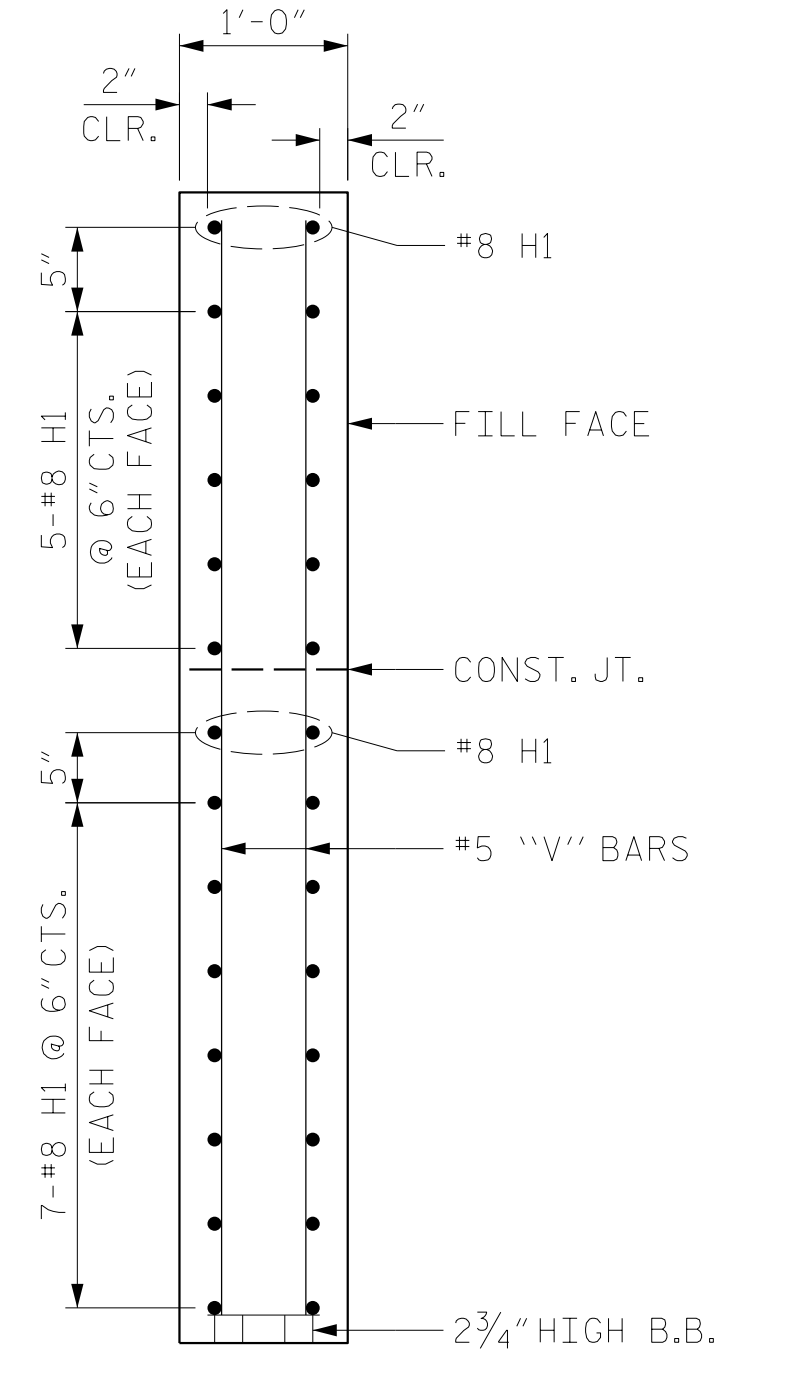


ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS



SECTION X-X

PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 3 OF 4



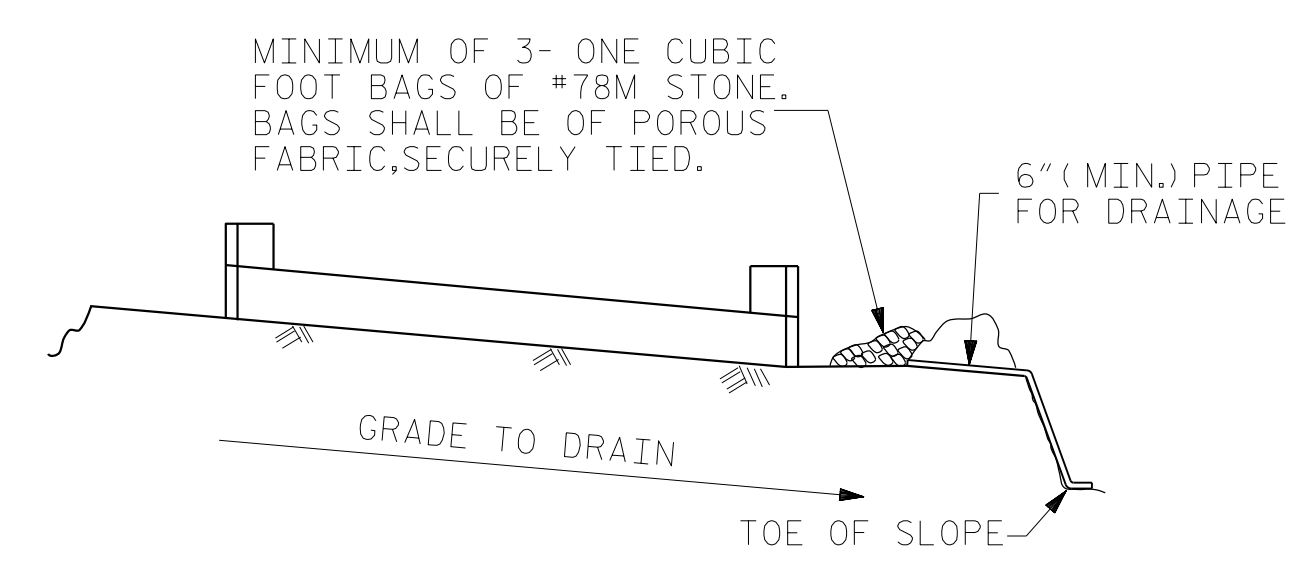
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STATE OF NORTH CAROLINA
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 SUBSTRUCTURE
 END BENT
 WING DETAILS

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			42



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

6" (MIN.) PIPE FOR DRAINAGE

GRADE TO DRAIN

TOE OF SLOPE

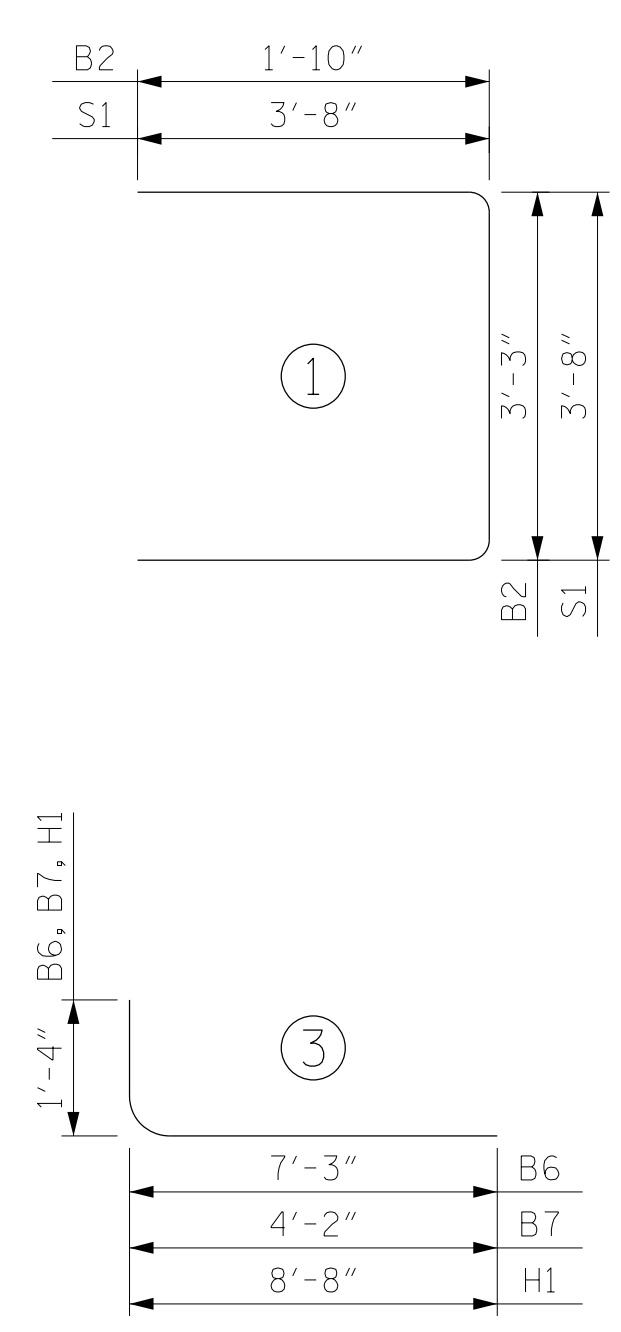
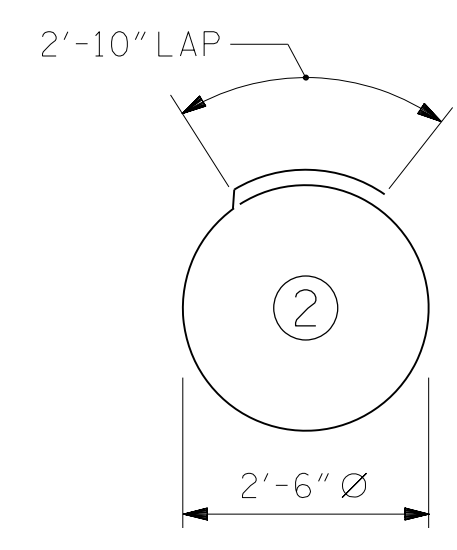
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

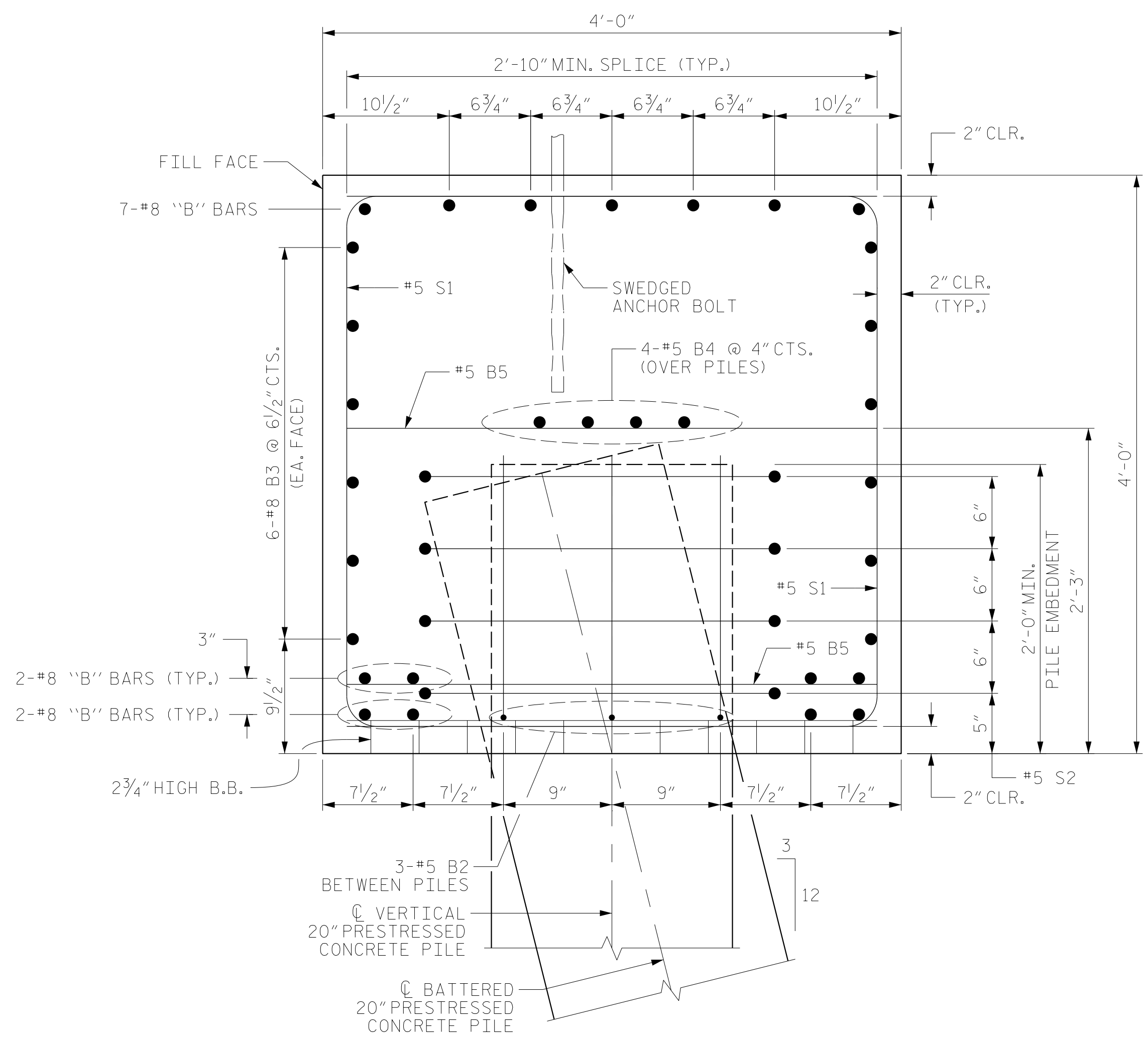
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

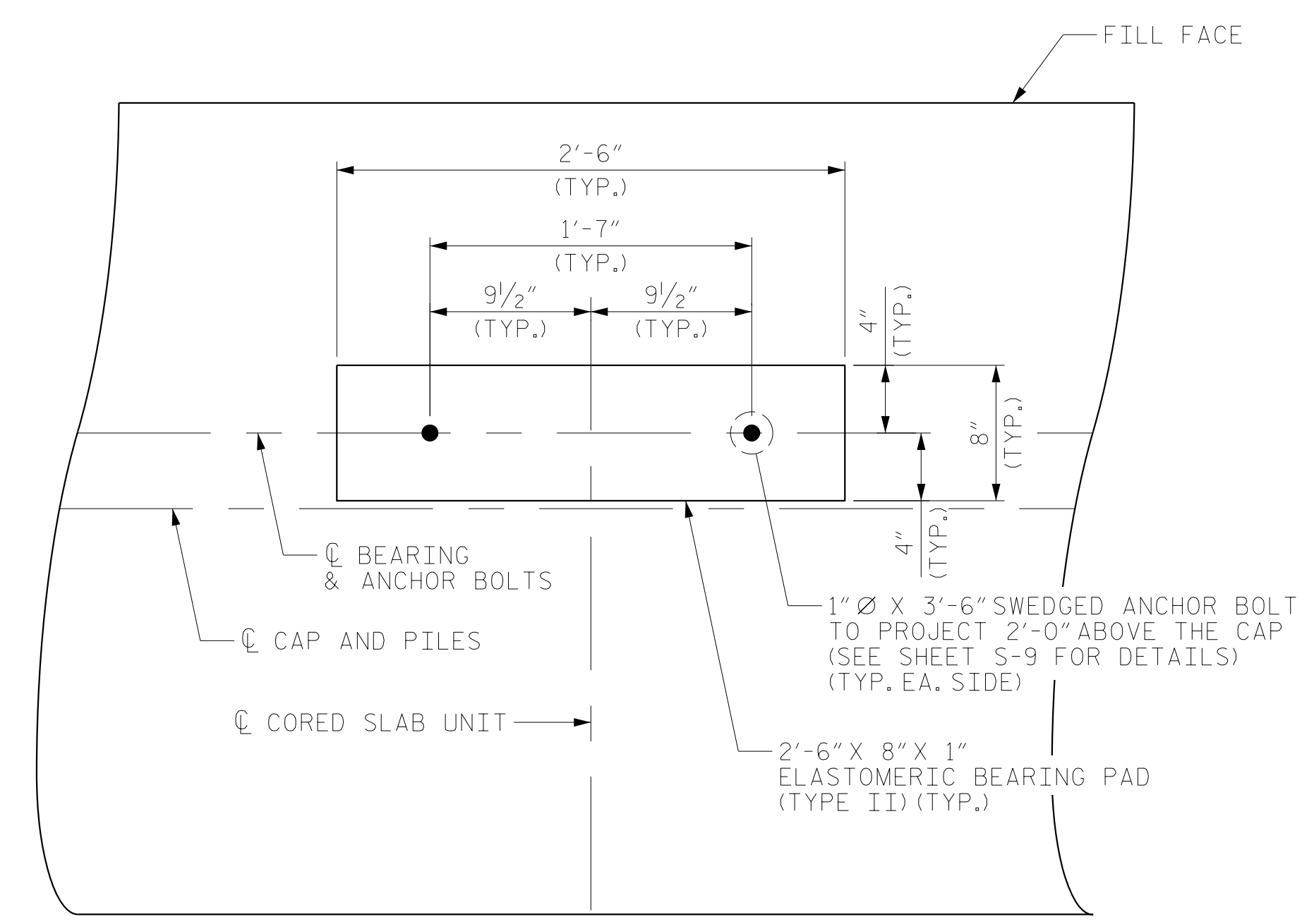
BAR TYPES		BILL OF MATERIAL FOR ONE END BENT				
BAR	NO.	SIZE	TYPE	LENGTH	TOTAL LENGTH	
B1	15	#8	STR	50'-6"	757'-6"	
B2	30	#5	1	6'-11"	207'-6"	
B3	12	#8	STR	50'-6"	606'-0"	
B4	4	#5	STR	50'-6"	202'-0"	
B5	23	#5	STR	3'-8"	84'-4"	
B6	14	#8	3	8'-7"	120'-2"	
B7	16	#8	3	5'-6"	88'-0"	
H1	56	#8	3	10'-0"	560'-0"	
K1	24	#6	STR	3'-8"	88'-0"	
S1	120	#5	1	11'-0"	1320'-0"	
S2	36	#5	2	10'-9"	387'-0"	
V1	48	#5	STR	6'-5"	308'-0"	
V2	48	#5	STR	6'-7"	316'-0"	
TOTAL LIN. FT. #5 BARS				2824.8 LIN. FT.		
TOTAL LIN. FT. #6 BARS				88.0 LIN. FT.		
TOTAL LIN. FT. #8 BARS				2131.7 LIN. FT.		
GLASS FIBER REINFORCED POLYMER BARS				5044.5 LIN. FT.		
CLASS AA CONCRETE BREAKDOWN						
POUR #1 (CAP AND LOWER PART OF WINGS)				31.0 C.Y.		
POUR #2 (UPPER PART OF WINGS)				2.7 C.Y.		
TOTAL CLASS AA CONCRETE				33.7 C.Y.		



ALL BAR DIMENSIONS ARE OUT TO OUT



SECTION A-A



DETAIL "A"

END BENT NO. 2, SHOWN, END BENT NO. 1 SIMILAR BUT OPPOSITE HAND. DIMENSIONS ARE TYPICAL FOR EACH GIRDER. PILES NOT SHOWN FOR CLARITY.

PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 4 OF 4



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 SUBSTRUCTURE
 END BENT NO. 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			42

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NOTES

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

CONCRETE DISPLACED BY THE CONCRETE PILES HAS BEEN DEDUCTED FROM THE CAP CONCRETE QUANTITY.

ALL REINFORCING IN THE CAP IS TO BE GLASS FIBER REINFORCED POLYMER (GFRP) BARS. FOR GLASS FIBER REINFORCED POLYMER BARS, SEE SPECIAL PROVISIONS.

FOR SECTION A-A AND VIEW B-B, SEE SHEET 2 OF 2.

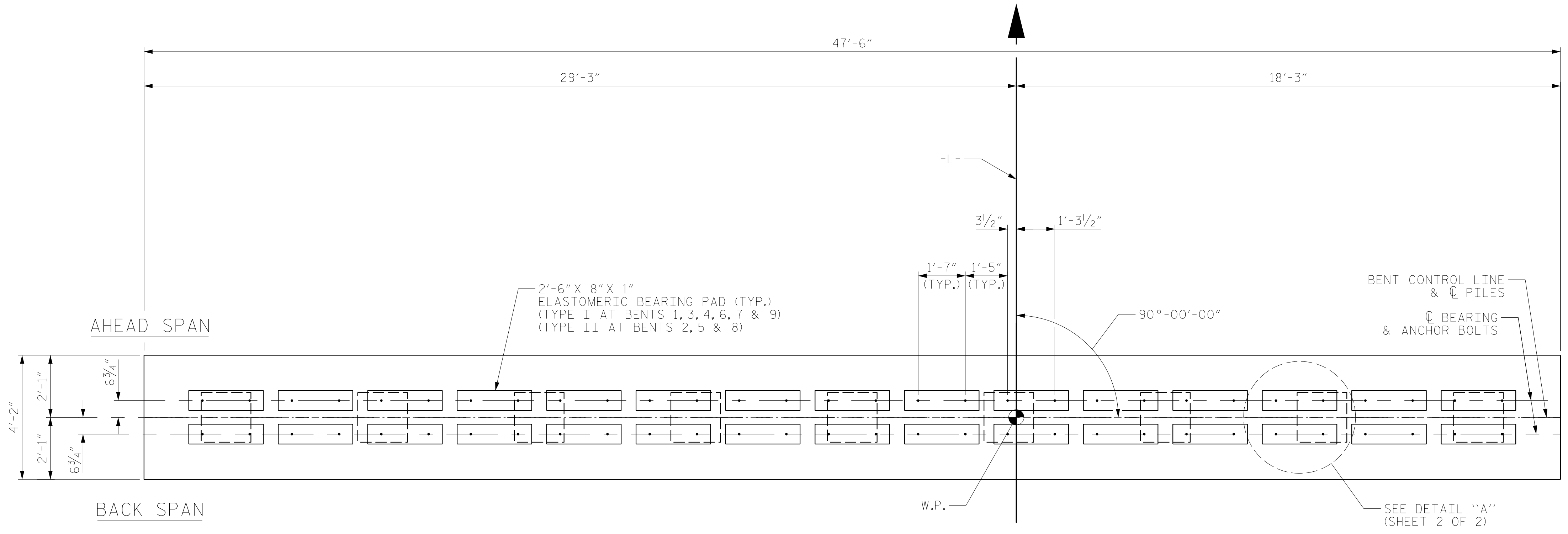
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F1554 GR.105. ANCHOR PLATES, WASHERS, AND NUTS SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

NO SEPARATE PAYMENT SHALL BE MADE FOR THE ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS. THE COST OF THE MATERIAL AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

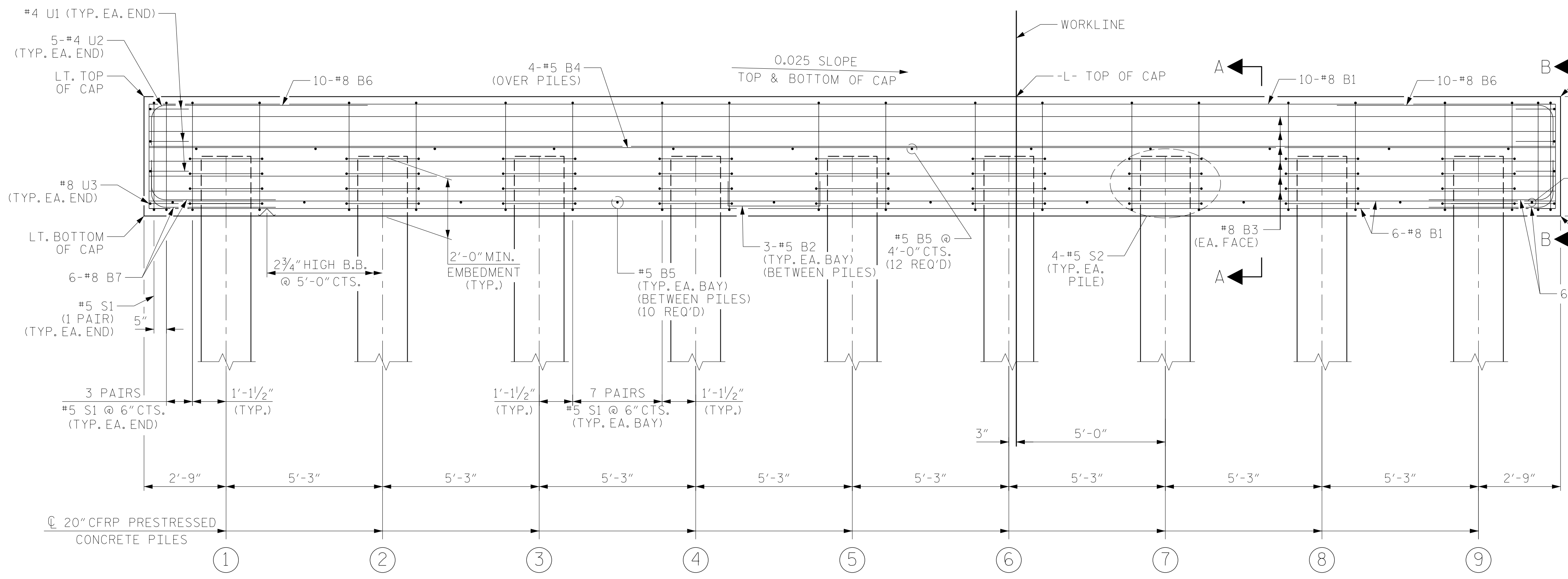
EPOXY COAT THE TOP SURFACE OF THE BENT CAP, SECTION 420-18(b) LINES 13 AND 14 OF THE STANDARD SPECIFICATIONS SHALL BE DISREGARDED. NO SEPARATE PAYMENT SHALL BE MADE FOR THE EPOXY PROTECTIVE COATING AS THIS IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

MATERIAL QUANTITIES FOR GFRP BARS INCLUDE THE ANTICIPATED SPLICES DETAILED ON THE PLANS. ADDITIONAL SPLICES REQUIRED DUE TO MANUFACTURING LIMITATIONS WILL BE AT NO ADDITIONAL COST TO THE DEPARTMENT.



PLAN

PILE NO.	BENT 1	BENT 2	BENT 3	BENT 4	BENT 5	BENT 6	BENT 7	BENT 8	BENT 9
1	10.39'	10.81'	11.16'	11.33'	11.34'	11.19'	10.91'	10.53'	10.14'
2	10.26'	10.68'	11.03'	11.20'	11.21'	11.06'	10.78'	10.39'	10.01'
3	10.13'	10.55'	10.89'	11.07'	11.08'	10.93'	10.65'	10.26'	9.88'
4	10.00'	10.42'	10.76'	10.94'	10.95'	10.80'	10.51'	10.13'	9.75'
5	9.87'	10.29'	10.63'	10.81'	10.81'	10.67'	10.38'	10.00'	9.61'
6	9.74'	10.16'	10.50'	10.68'	10.68'	10.54'	10.25'	9.87'	9.48'
7	9.60'	10.02'	10.37'	10.55'	10.55'	10.41'	10.12'	9.74'	9.35'
8	9.47'	9.89'	10.24'	10.41'	10.42'	10.28'	9.99'	9.61'	9.22'
9	9.34'	9.76'	10.11'	10.28'	10.29'	10.14'	9.86'	9.48'	9.09'



ELEVATION

BENT NO.	LT. BOT. OF CAP	LT. TOP OF CAP	-L- TOP OF CAP	RT. TOP OF CAP	RT. BOT. OF CAP
1	8.46'	12.46'	11.73'	11.27'	7.27'
2	8.88'	12.88'	12.15'	11.69'	7.69'
3	9.23'	13.23'	12.49'	12.04'	8.04'
4	9.40'	13.40'	12.67'	12.21'	8.21'
5	9.41'	13.41'	12.68'	12.22'	8.22'
6	9.26'	13.26'	12.53'	12.08'	8.08'
7	8.98'	12.98'	12.25'	11.79'	7.79'
8	8.59'	12.59'	11.86'	11.41'	7.41'
9	8.21'	12.21'	11.48'	11.02'	7.02'

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 1 OF 2



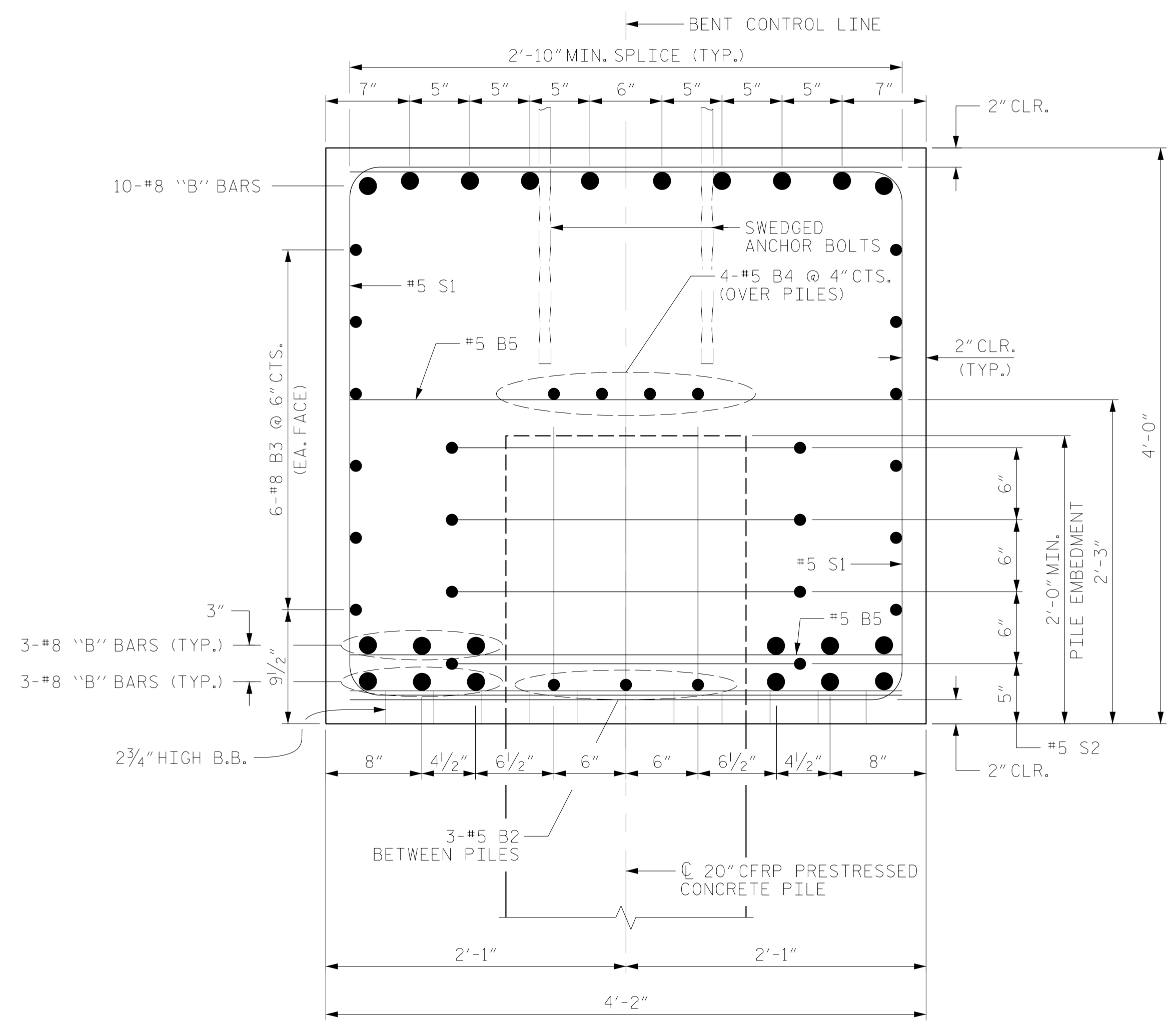
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 RALEIGH
 SUBSTRUCTURE
 BENT NO. 1 THRU 9

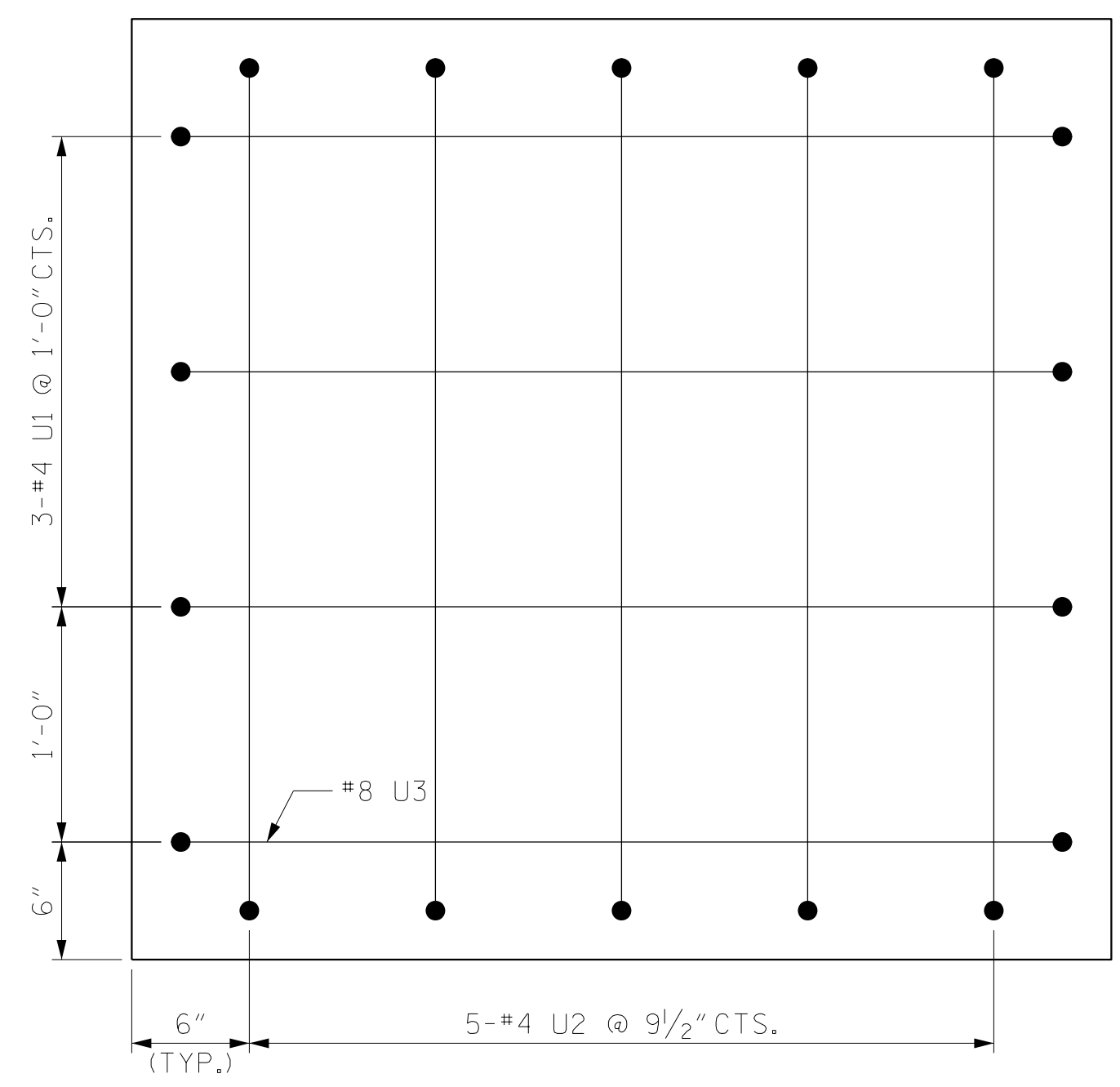
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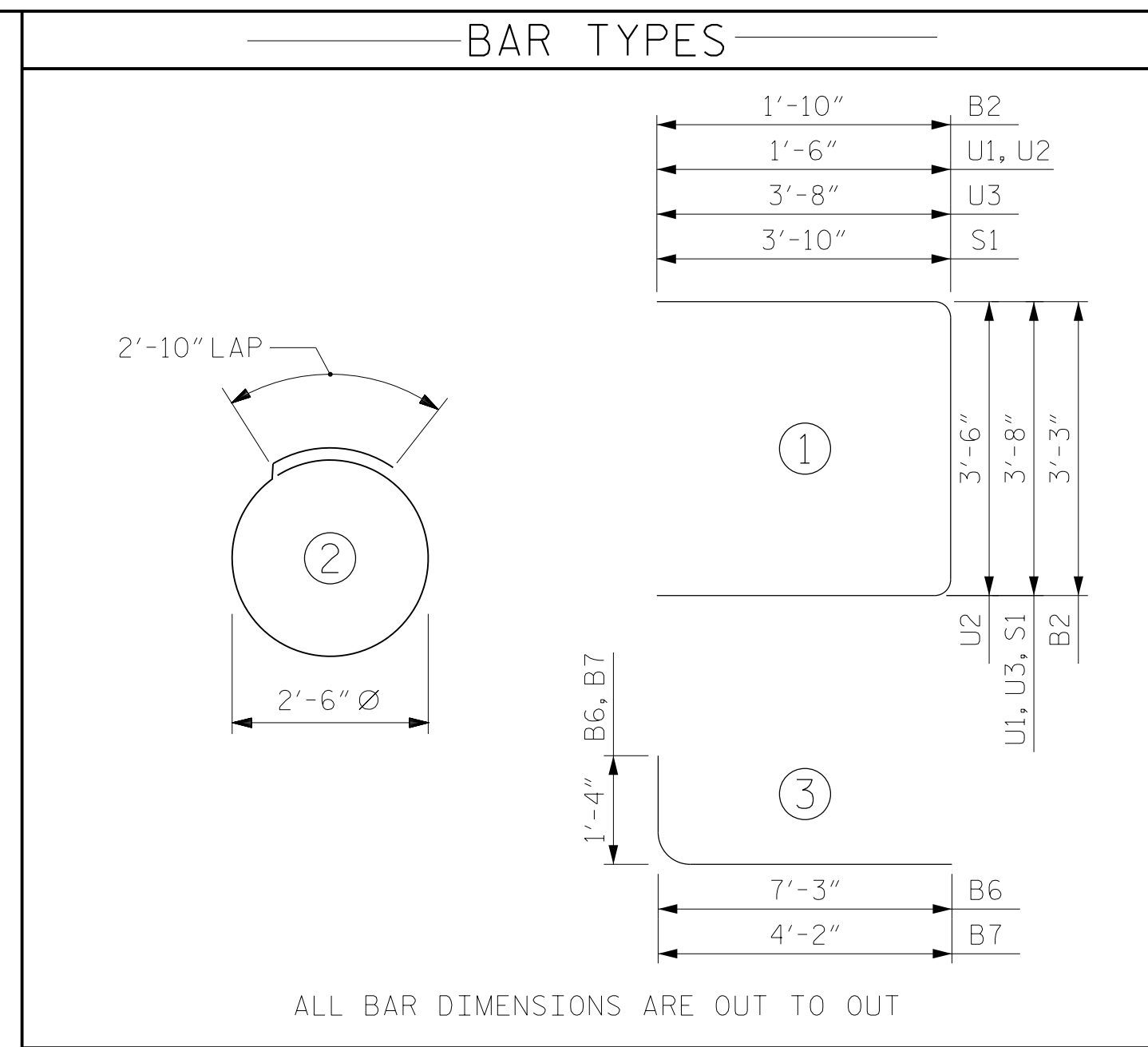
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS 42
2			4			



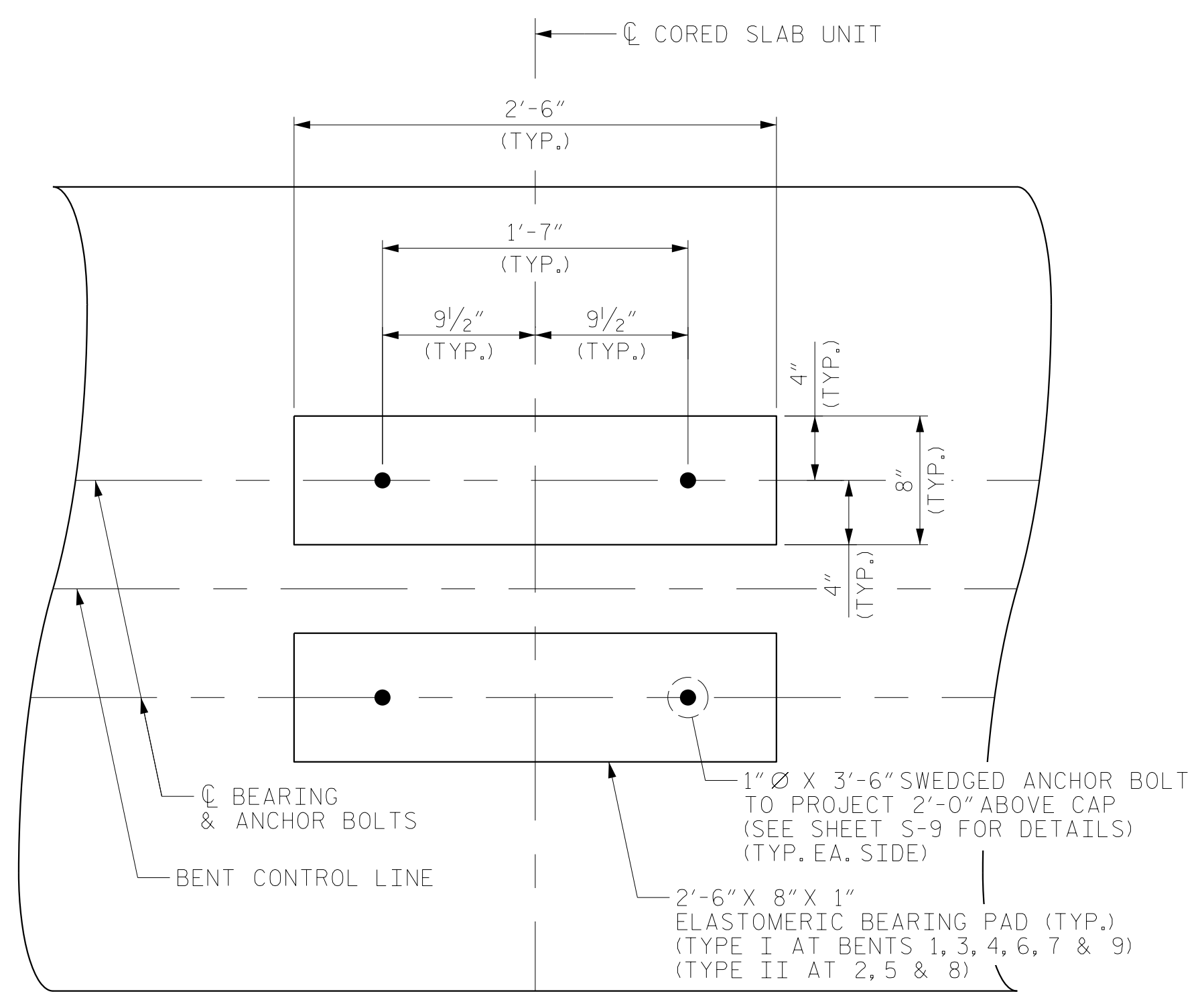
SECTION A-A



VIEW B-B



BILL OF MATERIAL					
FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	TOTAL LENGTH
B1	22	#8	STR	47'-2"	1037'-8"
B2	24	#5	1	6'-11"	166'-0"
B3	12	#8	STR	47'-2"	566'-0"
B4	4	#5	STR	47'-2"	188'-8"
B5	22	#5	STR	3'-10"	84'-4"
B6	20	#8	3	8'-7"	171'-8"
B7	24	#8	3	5'-6"	132'-0"
S1	128	#5	1	11'-4"	1450'-8"
S2	36	#5	2	10'-9"	387'-0"
U1	6	#4	1	6'-8"	40'-0"
U2	10	#4	1	6'-6"	65'-0"
U3	2	#8	1	11'-0"	22'-0"
TOTAL LIN. FT. #4 BARS				105.0 LIN. FT.	
TOTAL LIN. FT. #5 BARS				2276.7 LIN. FT.	
TOTAL LIN. FT. #8 BARS				1929.3 LIN. FT.	
GLASS FIBER REINFORCED POLYMER BARS				4311.0 LIN. FT.	
CLASS AA CONCRETE BREAKDOWN					
POUR #1 (CAP)				27.5 C.Y.	
TOTAL CLASS AA CONCRETE				27.5 C.Y.	



DETAIL "A"

DIMENSIONS ARE TYPICAL FOR EACH CORED SLAB UNIT.
PILES NOT SHOWN FOR CLARITY.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
STATION: 21+77.50 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE					
BENT NO. 1 THRU 9					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.		S-34
TOTAL SHEETS		42

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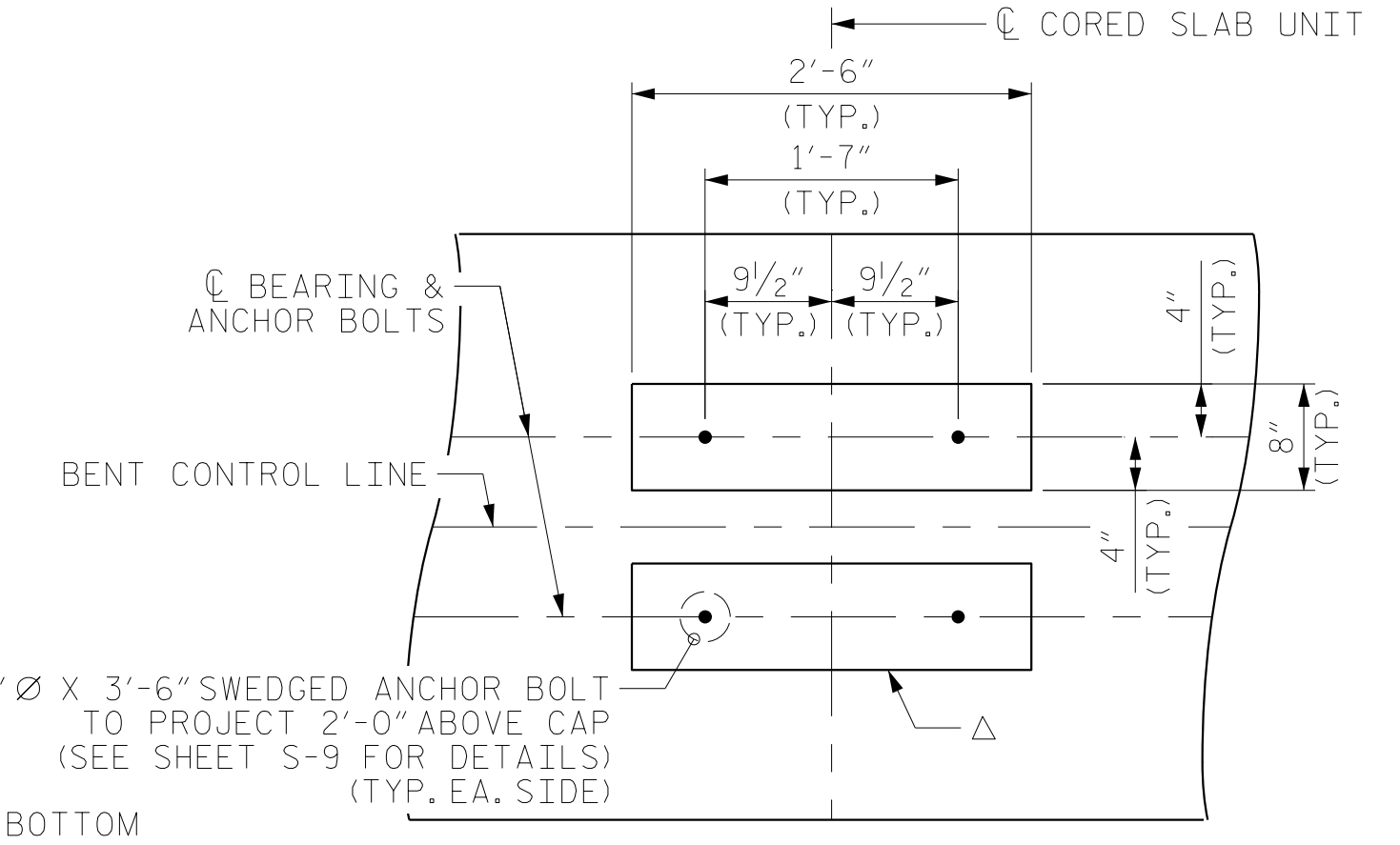
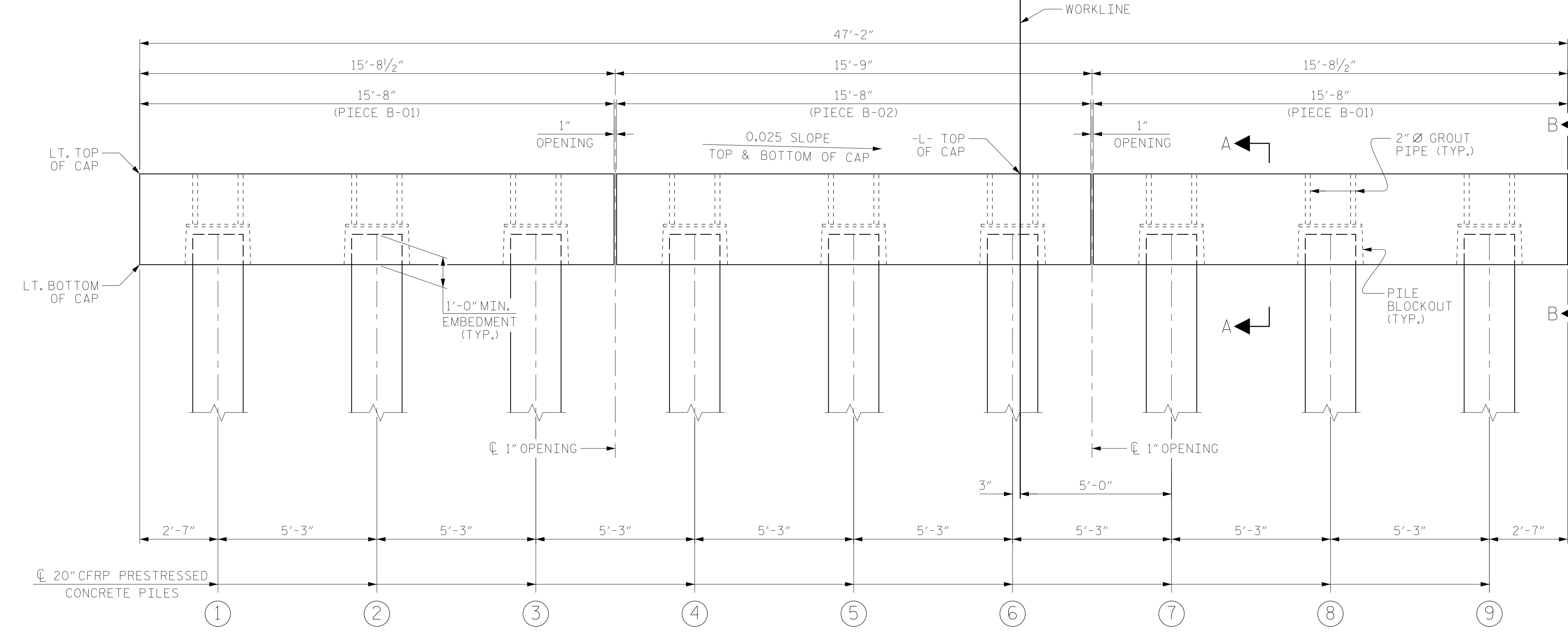
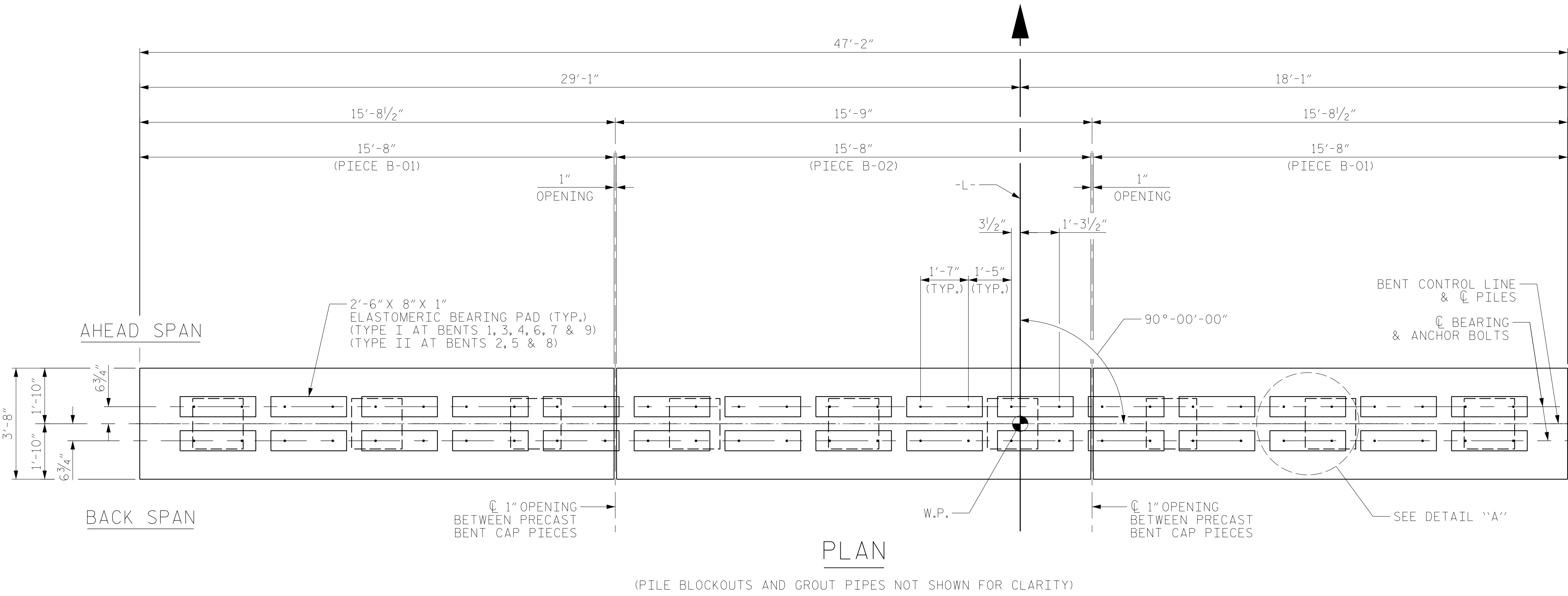
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NOTES

FOR PRECAST CAP DETAILS AND BILL OF MATERIAL, SEE "PRECAST PIECE B-01" AND "PRECAST PIECE B-02" SHEETS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 FOR 3'-8" x 3'-0" PRESTRESSED CONCRETE BENT CAPS, SEE SPECIAL PROVISIONS.

CAP ELEVATIONS					
BENT NO.	LT. BOT. OF CAP	LT. TOP OF CAP	-L- TOP OF CAP	RT. TOP OF CAP	RT. BOT. OF CAP
1	9.46'	12.46'	11.73'	11.28'	8.28'
2	9.88'	12.88'	12.15'	11.70'	8.70'
3	10.22'	13.22'	12.49'	12.04'	9.04'
4	10.40'	13.40'	12.67'	12.22'	9.22'
5	10.41'	13.41'	12.68'	12.23'	9.23'
6	10.26'	13.26'	12.53'	12.08'	9.08'
7	9.98'	12.98'	12.25'	11.80'	8.80'
8	9.59'	12.59'	11.86'	11.41'	8.41'
9	9.21'	12.21'	11.48'	11.03'	8.03'

TOP OF PILE ELEVATIONS									
PILE NO.	BENT 1	BENT 2	BENT 3	BENT 4	BENT 5	BENT 6	BENT 7	BENT 8	BENT 9
1	10.39'	10.81'	11.16'	11.33'	11.34'	11.19'	10.91'	10.53'	10.14'
2	10.26'	10.68'	11.03'	11.20'	11.21'	11.06'	10.78'	10.39'	10.01'
3	10.13'	10.55'	10.89'	11.07'	11.08'	10.93'	10.65'	10.26'	9.88'
4	10.00'	10.42'	10.76'	10.94'	10.95'	10.80'	10.51'	10.13'	9.75'
5	9.87'	10.29'	10.63'	10.81'	10.81'	10.67'	10.38'	10.00'	9.61'
6	9.74'	10.16'	10.50'	10.68'	10.68'	10.54'	10.25'	9.87'	9.48'
7	9.60'	10.02'	10.37'	10.55'	10.55'	10.41'	10.12'	9.74'	9.35'
8	9.47'	9.89'	10.24'	10.41'	10.42'	10.28'	9.99'	9.61'	9.22'
9	9.34'	9.76'	10.11'	10.28'	10.29'	10.14'	9.86'	9.48'	9.09'



PROJECT NO. BR-0160
 BRUNSWICK COUNTY
 STATION: 21+77.50 -L-

SHEET 1 OF 4



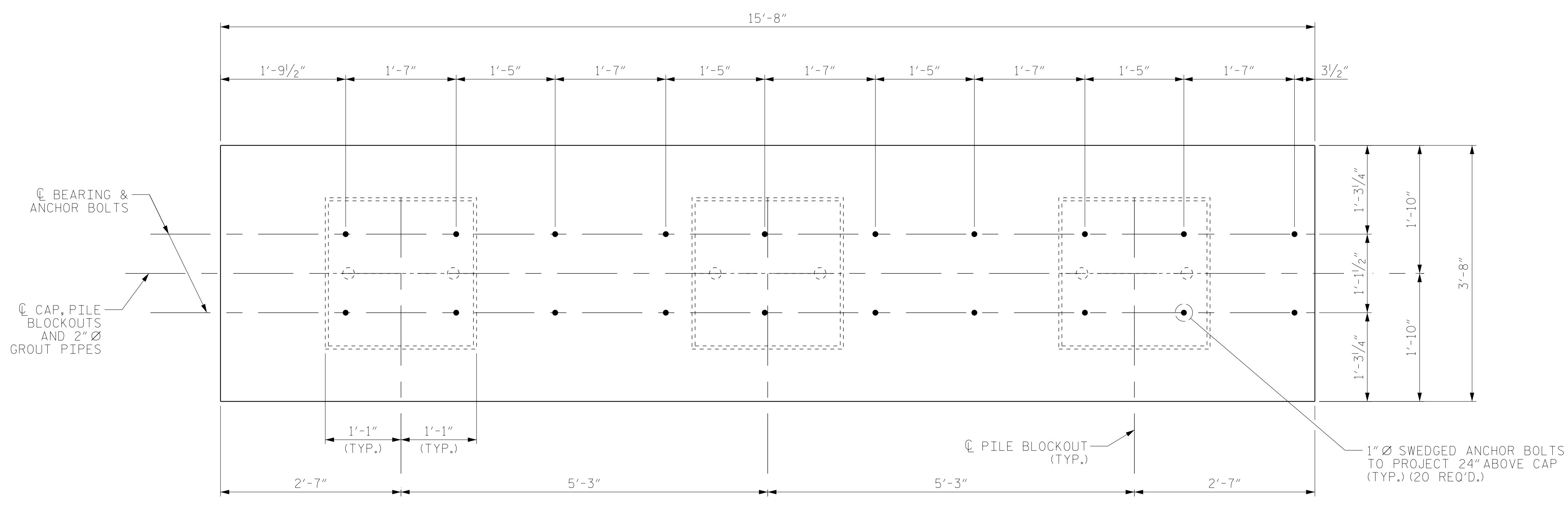
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ALTERNATE BENT OPTION PRECAST BENT BENT NO. 1 THRU 9					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-35
TOTAL SHEETS	42

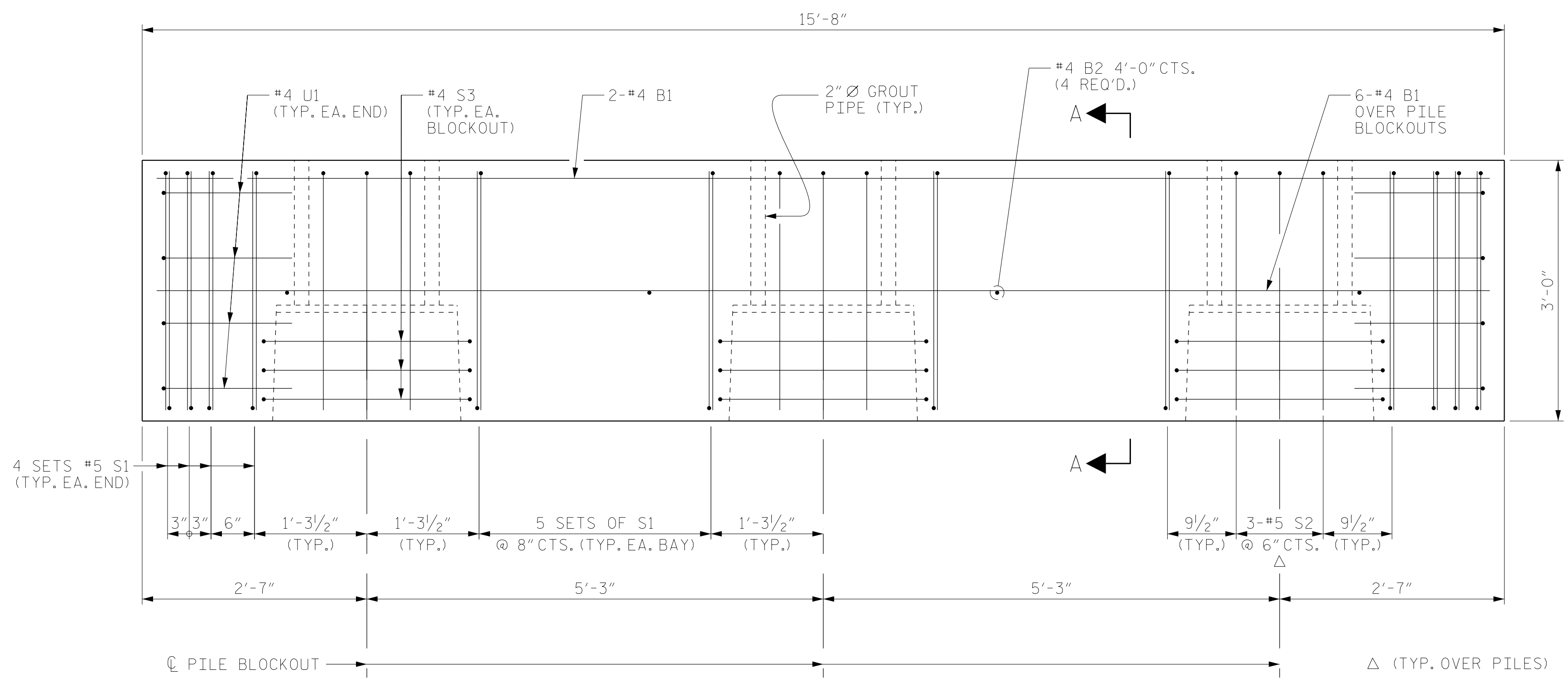
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PLAN

(FOR PILE BLOCKOUT DETAILS, SEE SHEET 4 OF 4)



ELEVATION

(ANCHOR BOLTS NOT SHOWN FOR CLARITY)
FOR SECTION A-A, SEE SHEET 4 OF 4.

BILL OF MATERIAL					
FOR ONE PIECE B-01					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#4	STR	15'-2"	81
B2	4	#4	STR	3'-2"	8
S1	72	#5	1	7'-5"	557
S2	9	#5	1	8'-2"	77
S3	9	#4	2	10'-5"	63
U1	8	#4	1	6'-0"	32
REINFORCING STEEL					818 LBS
4000 PSI PRESTRESS CONCRETE					5.8 C.Y.
PILE BLOCKOUT GROUT ▲					0.4 C.Y.
0.6" Ø L.R. STRANDS					No. 18
BAR TYPES					
ALL BAR DIMENSIONS ARE OUT TO OUT.					

▲ GROUT DISPLACED BY THE 20" PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE GROUT QUANTITY.

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

NOTES

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F1554 GR. 105. ANCHOR PLATES, WASHERS, AND NUTS SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

NO SEPARATE PAYMENT SHALL BE MADE FOR THE ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS. THE COST OF THE MATERIAL AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
STATION: 21+77.50 -L-

SHEET 2 OF 4

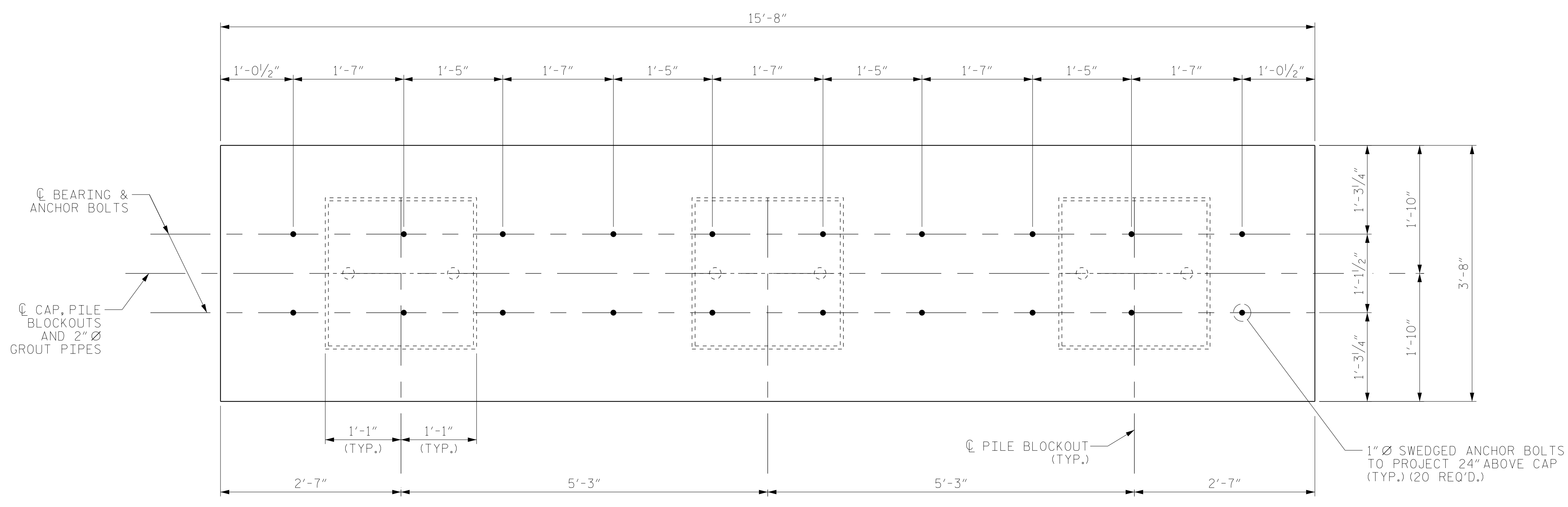


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
ALTERNATE BENT OPTION PRECAST PIECE B-01					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-36
					TOTAL SHEETS 42

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BILL OF MATERIAL					
FOR ONE PIECE B-02					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#4	STR	15'-2"	81
B2	4	#4	STR	3'-2"	8
S1	72	#5	1	7'-5"	557
S2	9	#5	1	8'-2"	77
S3	9	#4	2	10'-5"	63
U1	8	#4	1	6'-0"	32
REINFORCING STEEL					818 LBS
4000 PSI PRESTRESS CONCRETE					5.8 C.Y.
PILE BLOCKOUT GROUT ▲					0.4 C.Y.
0.6" Ø L.R. STRANDS					No. 18
BAR TYPES					



PLAN

(FOR PILE BLOCKOUT DETAILS, SEE SHEET 4 OF 4)

▲ GROUT DISPLACED BY THE 20" PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE GROUT QUANTITY.

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

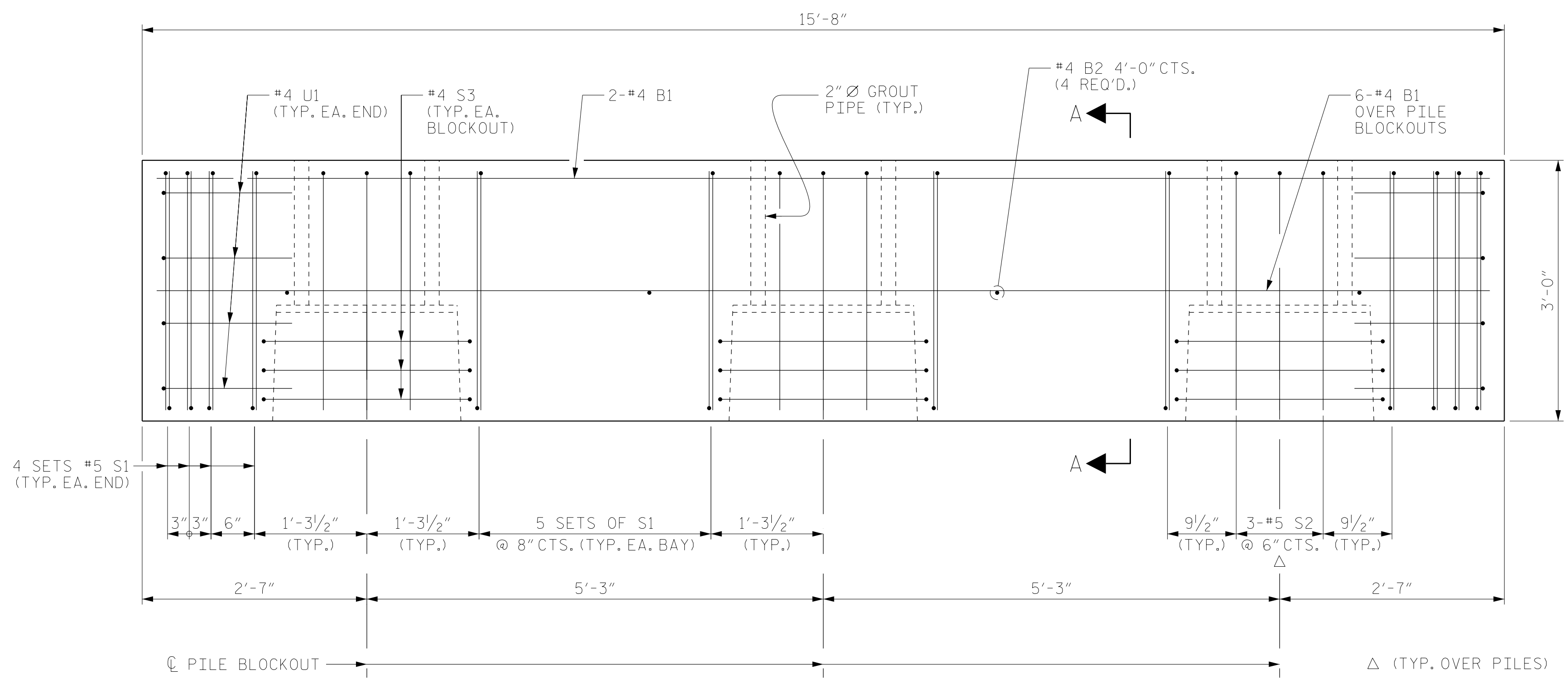
NOTES

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F1554 GR. 105. ANCHOR PLATES, WASHERS, AND NUTS SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

NO SEPARATE PAYMENT SHALL BE MADE FOR THE ANCHOR BOLTS, ANCHOR PLATES, WASHERS, AND NUTS. THE COST OF THE MATERIAL AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

PROJECT NO. BR-0160
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SHEET 3 OF 4



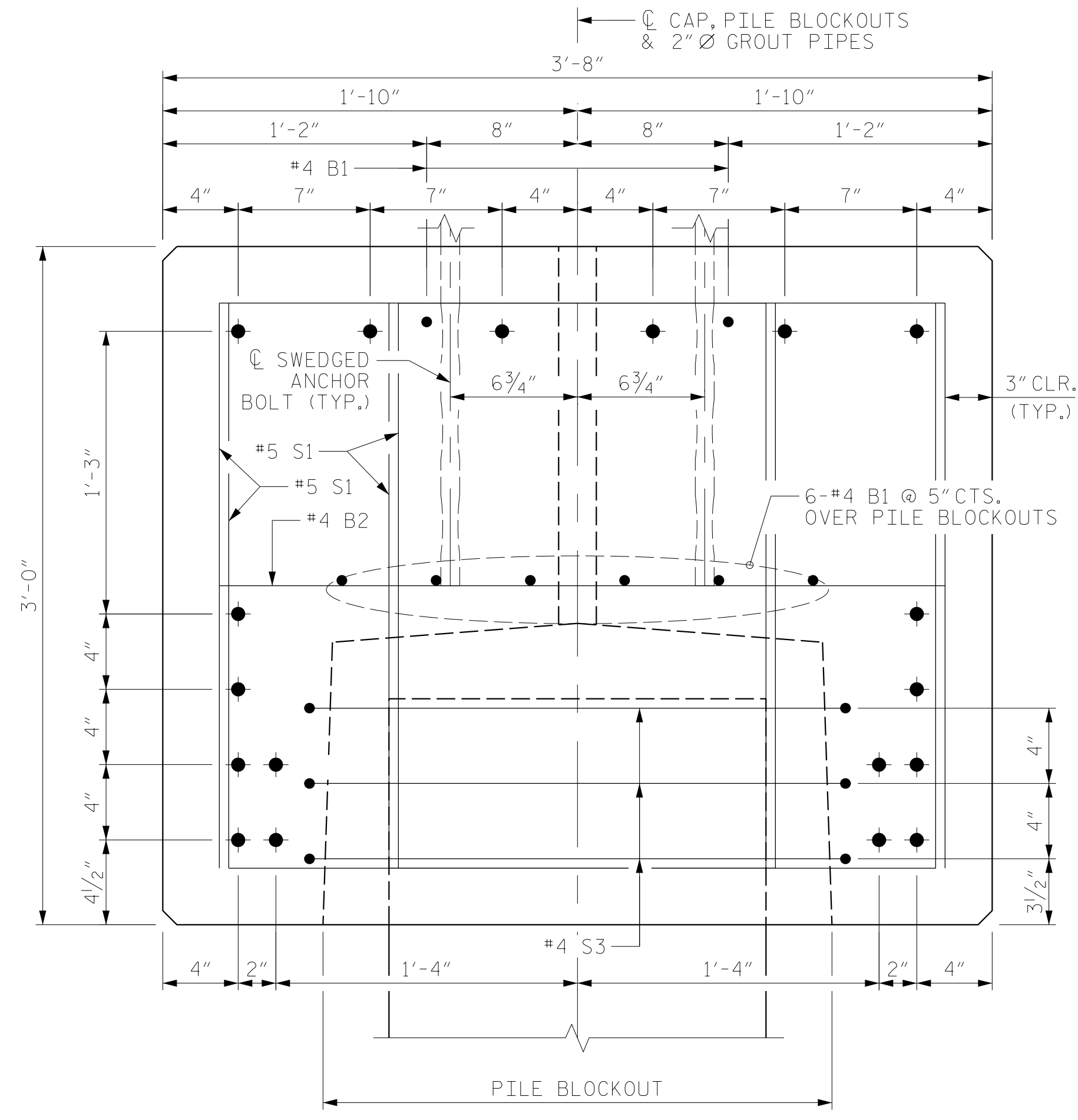
ELEVATION

(ANCHOR BOLTS NOT SHOWN FOR CLARITY) FOR SECTION A-A, SEE SHEET 4 OF 4.

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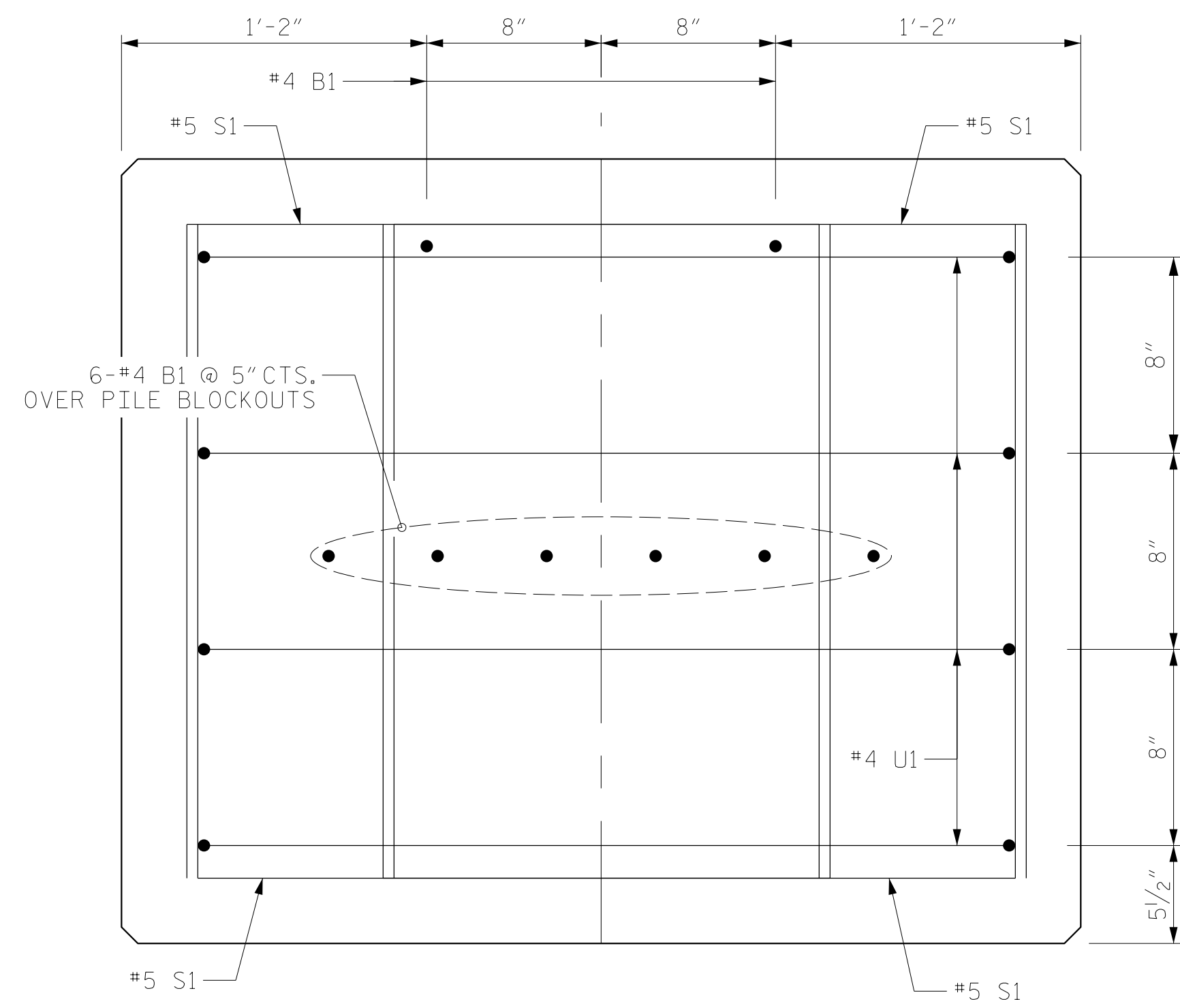
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STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
SUBSTRUCTURE					
ALTERNATE BENT OPTION					
PRECAST					
PIECE B-02					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-37
					TOTAL SHEETS 42



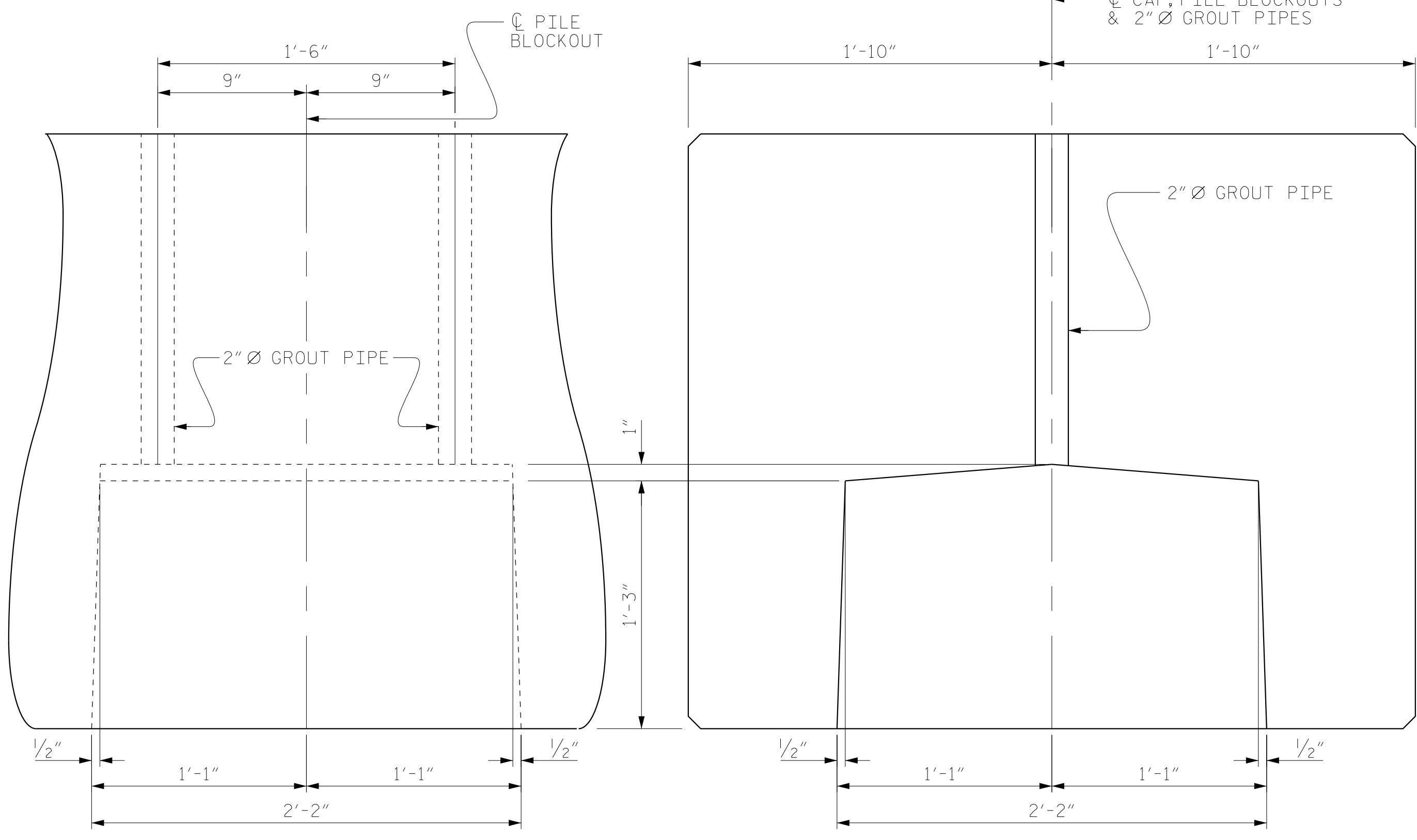
SECTION A-A

(SHOWING 0.6" Ø LOW RELAXATION STRAND LAYOUT)
(18 STRANDS REQUIRED)



END OF CAP VIEW

(TYPICAL BOTH ENDS)



ELEVATION

SECTION

PILE BLOCKOUT DETAILS

(DIMENSIONS ARE TYPICAL EACH BLOCKOUT)

PRESTRESSED CONCRETE BENT CAPS (FOR ONE BENT)			
PIECE	LENGTH	NUMBER	TOTAL LENGTH
B-01	15'-8"	2	31'-4"
B-02	15'-8"	1	15'-8"
TOTAL		3	47.00'

NOTES:

STIRRUPS IN PRECAST PIECES MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS AND GROUT PIPES.

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

ALL REINFORCING STEEL CAST WITH THE BENT CAP SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRECAST BENT CAPS.

WHEN BENT CAPS ARE CAST, A HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING BENT CAPS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM, IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE ENDS OF THE BENT CAP SEGMENTS.

APPLY EPOXY PROTECTIVE COATING TO THE ENDS OF THE BENT CAP SEGMENTS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BENT CAPS SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI.

THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL A METHOD TO LIFT AND SUPPORT THE PRECAST CAP PIECES IN THE PROPER LOCATION AND ELEVATION AS SHOWN ON THE PLANS PRIOR TO PLACEMENT AND CURING OF THE GROUT IN THE PILE BLOCKOUTS. THE METHOD CHOSEN SHALL PROVIDE FOR A WATERTIGHT SEAL AT THE BOTTOM OF THE CAP UNTIL THE GROUT HAS HARDENED SO NO GROUT COMES IN CONTACT WITH THE STREAM.

PRECAST CAPS SHALL CONTAIN CALCIUM NITRATE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

EPOXY COAT THE TOP SURFACE OF THE BENT CAP, SECTION 420-18(b) LINES 13 AND 14 OF THE STANDARD SPECIFICATIONS SHALL BE DISREGARDED. NO SEPARATE PAYMENT SHALL BE MADE FOR THE EPOXY PROTECTIVE COATING AS THIS IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

THE CONCRETE IN THE PRECAST BENT CAPS, IF UTILIZED, SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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SHEET 4 OF 4



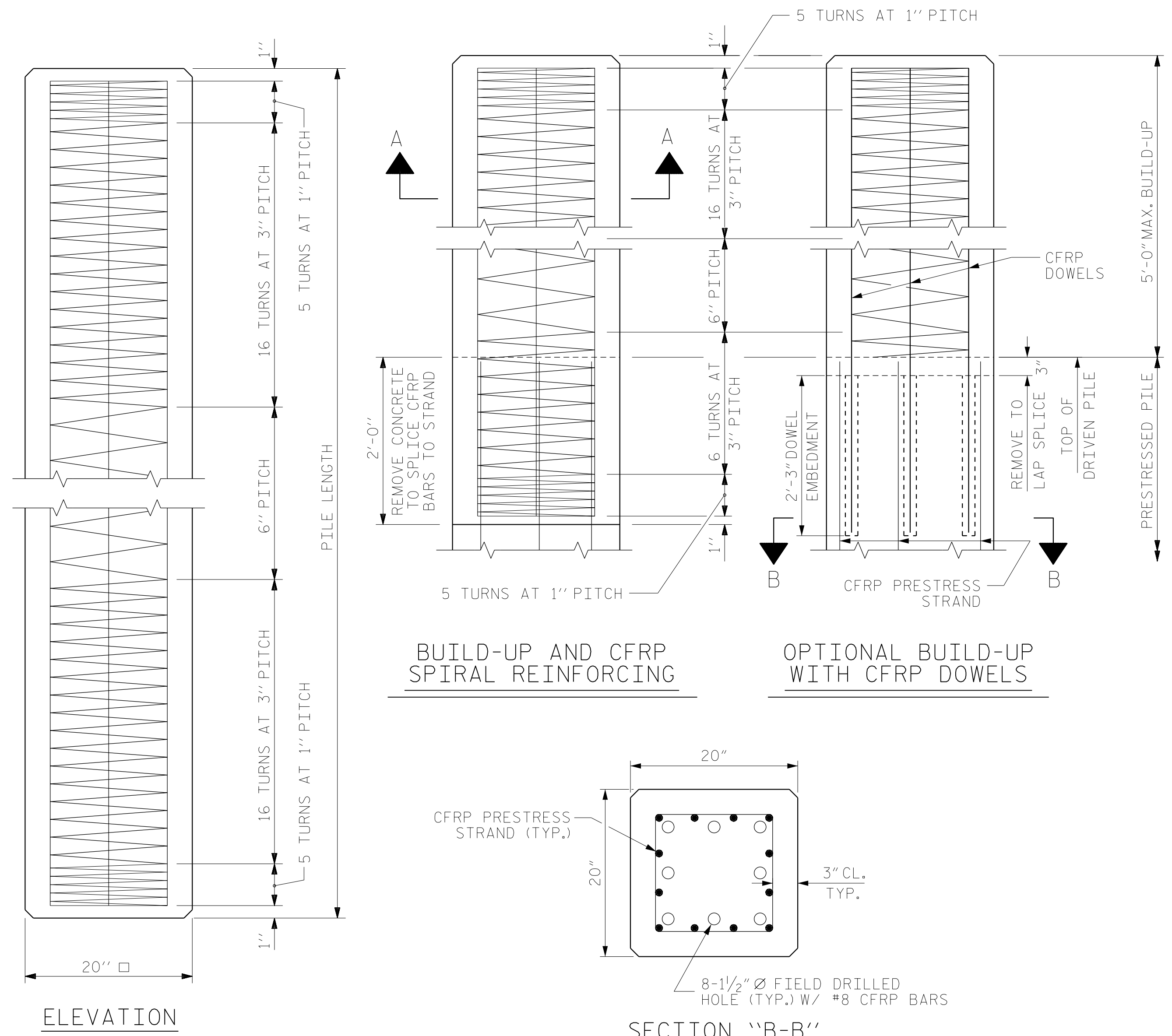
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
**ALTERNATE BENT OPTION
 PRECAST CONCRETE
 BENT NO. 1-9 DETAILS**

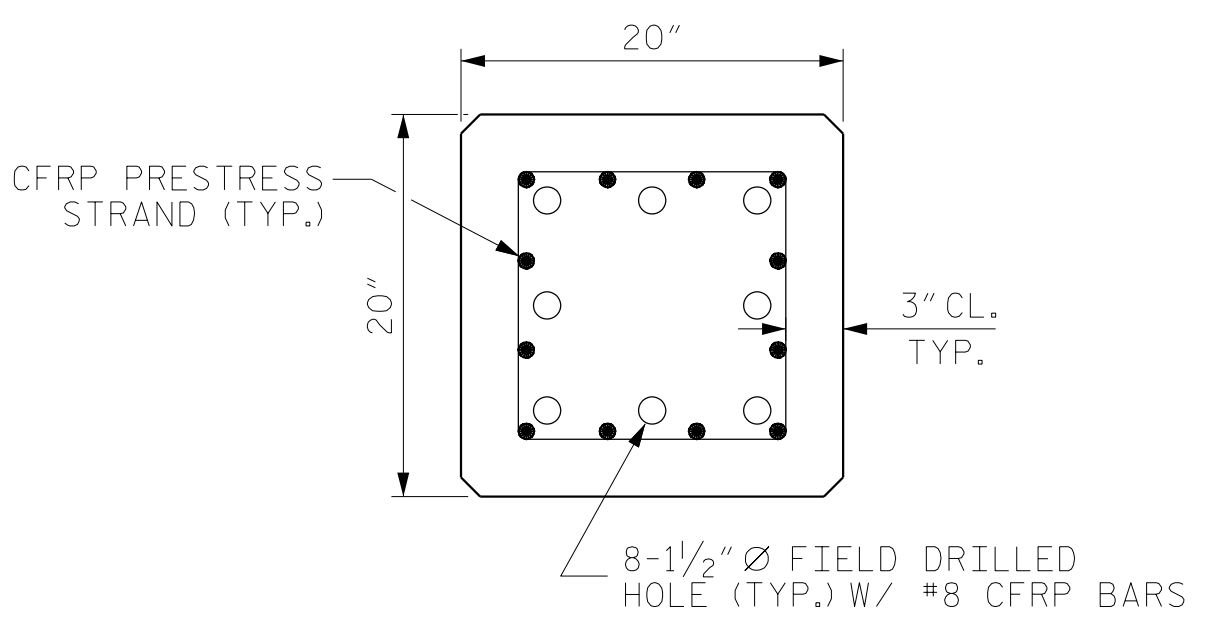
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			42

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BUILD-UP AND CFRP SPIRAL REINFORCING
OPTIONAL BUILD-UP WITH CFRP DOWELS



SECTION "B-B"
 (AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: $f'_c = 5,000$ PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING CFRP. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN 1/2" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE 0.28" Ø CFRP STRAND WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP		TWO POINT PICK-UP	
			0.3L	0.7L	0.207L	0.586L
25'-0"	2.56	5.18	7'-6"	17'-6"		
30'-0"	3.07	6.22	9'-0"	21'-0"		
35'-0"	3.58	7.26	10'-6"	24'-6"		
40'-0"	4.09	8.29	12'-0"	28'-0"		
45'-0"	4.61	9.33	13'-6"	31'-6"		
50'-0"	5.12	10.36	15'-0"	35'-0"		
55'-0"	5.63	11.40	16'-6"	38'-6"		
60'-0"	6.14	12.44	18'-0"	42'-0"		
65'-0"	6.65	13.47			13'-5 1/2"	38'-1"
70'-0"	7.17	14.51			14'-6"	41'-0"
75'-0"	7.68	15.55			15'-6 1/2"	43'-11"
80'-0"	8.19	16.58			16'-6 1/2"	46'-11"
85'-0"	8.70	17.62			17'-7"	49'-10"
90'-0"	9.21	18.66			18'-7 1/2"	52'-9"

NOTES

PRESTRESSED CONCRETE STRENGTH : $f'_c = 10,000$ PSI
 BUILD-UP CONCRETE STRENGTH : $f'_c = 10,000$ PSI

STRAND DATA:

SIZE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
0.6"	0.179	60,749# PER STRAND	42,524# PER STRAND

ALL PRESTRESSING AND SPIRAL STRANDS SHALL BE CFRP STRANDS CONFORMING TO THE SPECIAL PROVISIONS. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

FOR 20" CFRP PRESTRESSED CONCRETE PILES, SEE SPECIAL PROVISIONS.

FOR CARBON FIBER REINFORCED POLYMER (CFRP) STRAND, SEE SPECIAL PROVISIONS.

FOR CARBON FIBER REINFORCED POLYMER (CFRP) BAR, SEE SPECIAL PROVISIONS.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI.

STRAND STRESS SHALL BE RELIEVED BY CUTTING OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, CUT IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE CUT BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 5-5 AND 6-6, MAY BE CUT AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE CUT AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

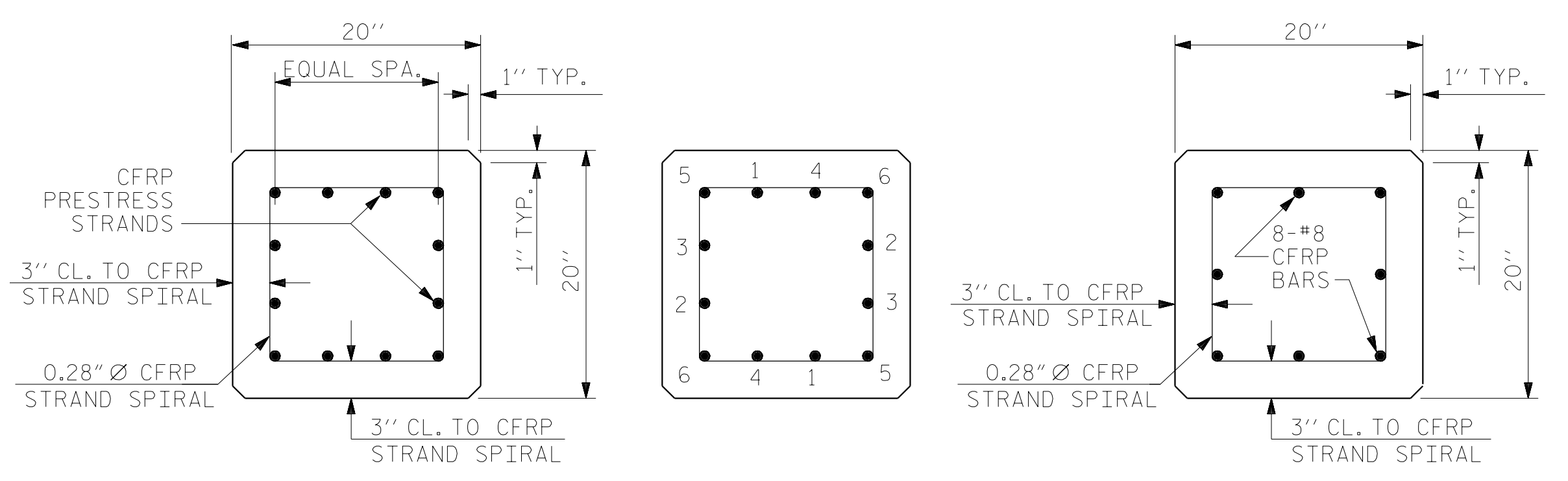
WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2" WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 7,500 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

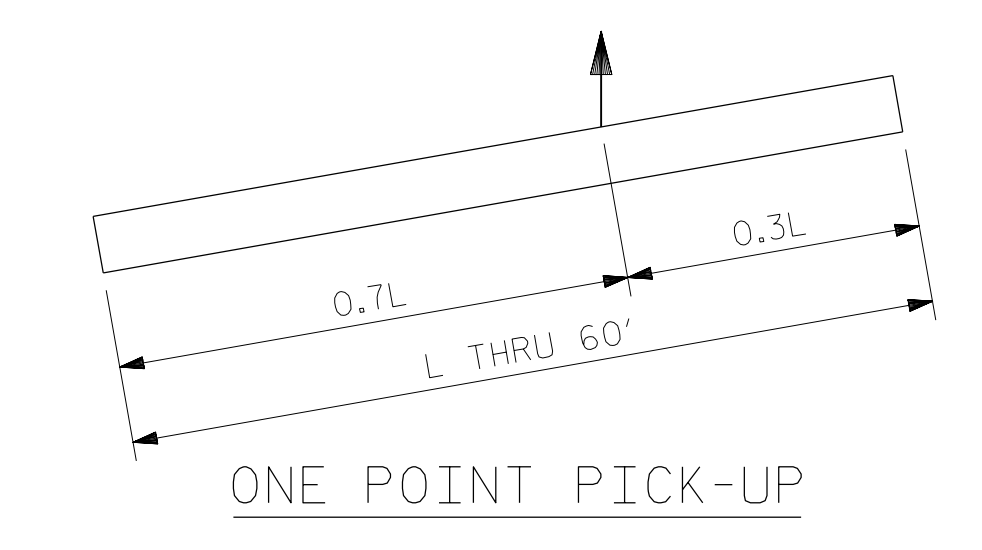
THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

THE CONCRETE IN THE PRESTRESSED CONCRETE PILES SHALL CONTAIN A MINIMUM OF 25% FLY ASH CLASS F OR A MINIMUM OF 40% GROUND GRANULATED BLAST FURNACE SLAG. ADDITIONALLY, SILICA FUME SHALL BE SUBSTITUTED FOR A MINIMUM 5% OF THE PORTLAND CEMENT BY WEIGHT. MINERAL ADMIXTURES SHALL REPLACE THE CEMENT CONTENT AT 1:1 RATIO BY WEIGHT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

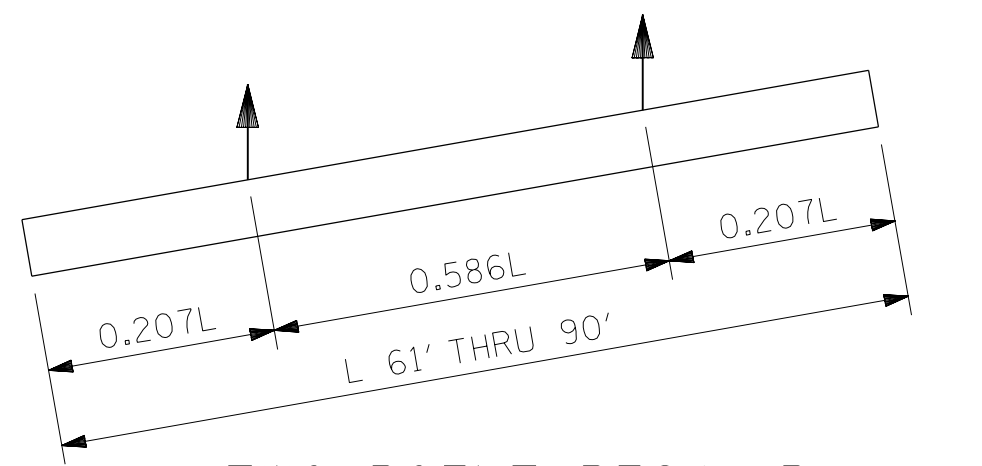


TYPICAL SECTION
TYPICAL PATTERN FOR CUTTING STRANDS
SECTION A-A

0.6" Ø CFRP STRANDS

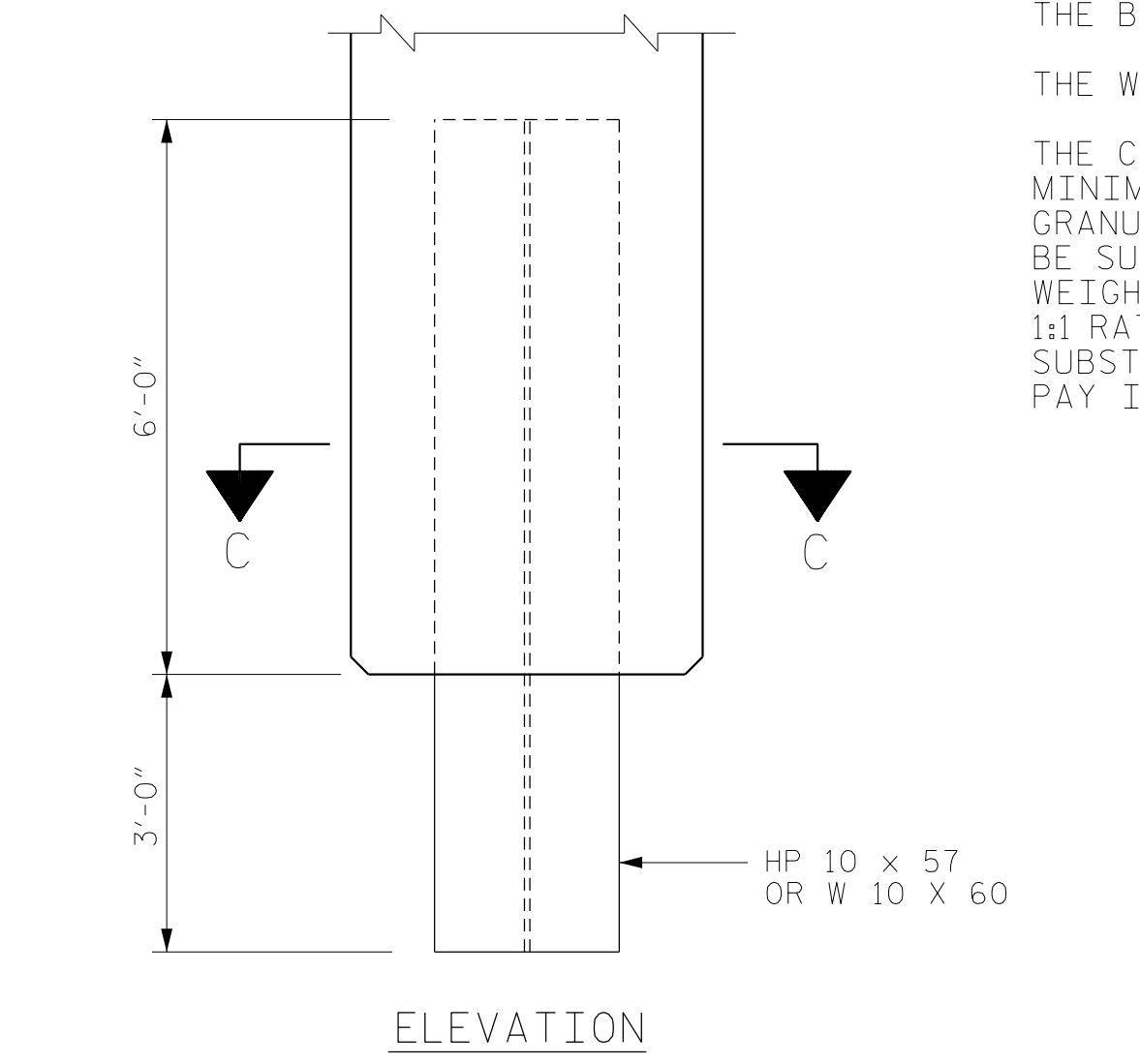


ONE POINT PICK-UP

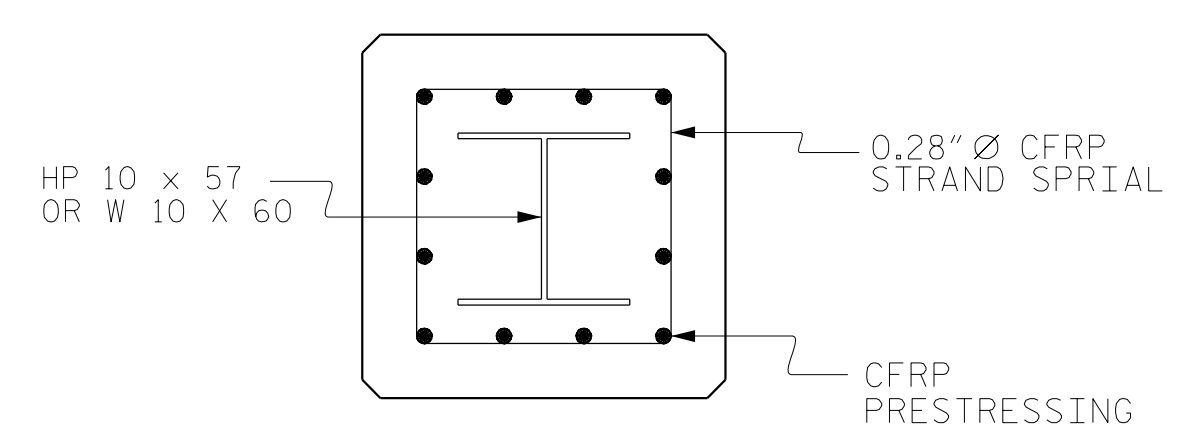


TWO POINT PICK-UP

PICK-UP POINTS



ELEVATION



SECTION C-C
PILE TIP DETAILS

FOR 20" SQUARE PRESTRESSED CONCRETE PILE

PROJECT NO. BR-0160
BRUNSWICK COUNTY
 STATION: 21+77.50 -L-



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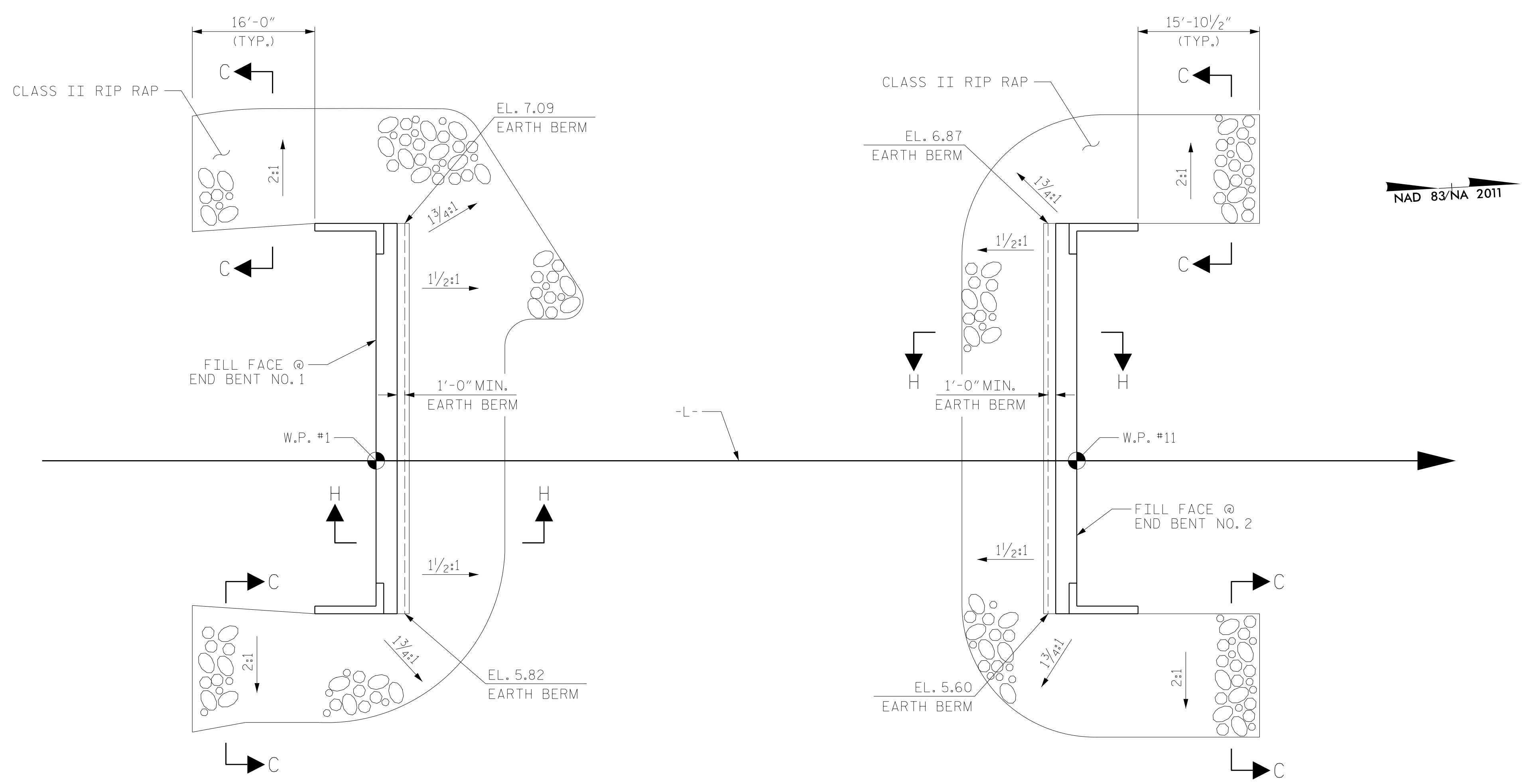
20" CFRP PRESTRESSED CONCRETE PILE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS 42
2			4			

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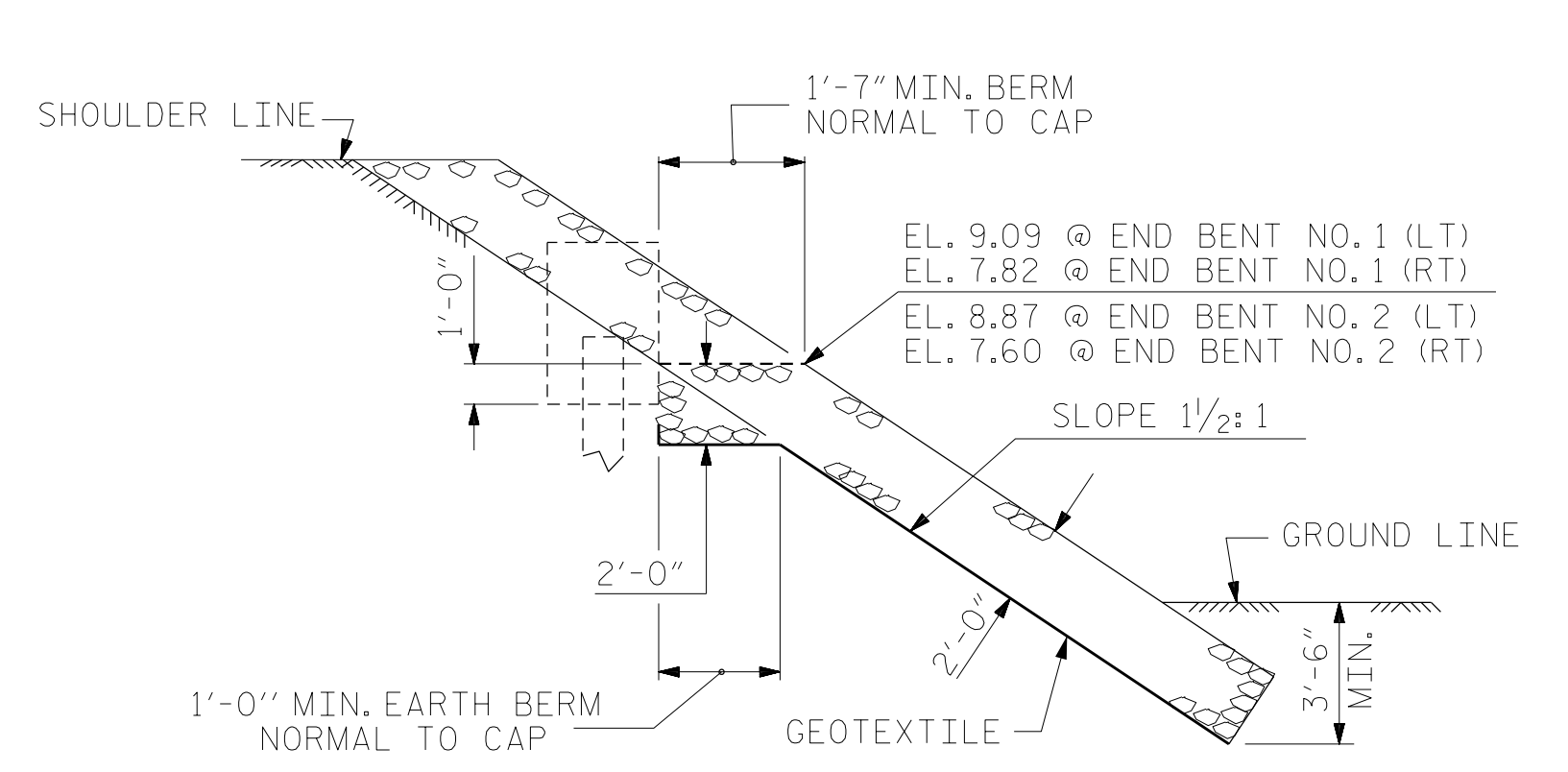
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NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

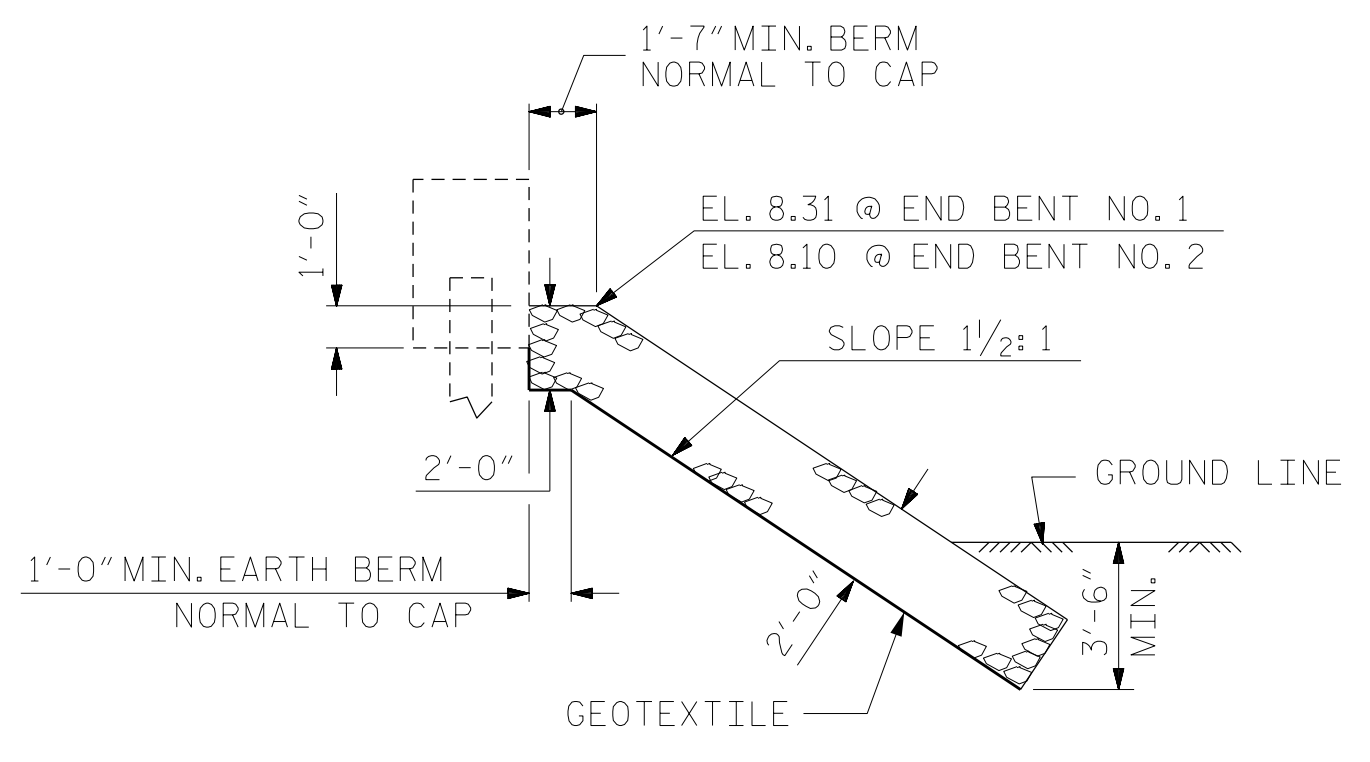


PLAN

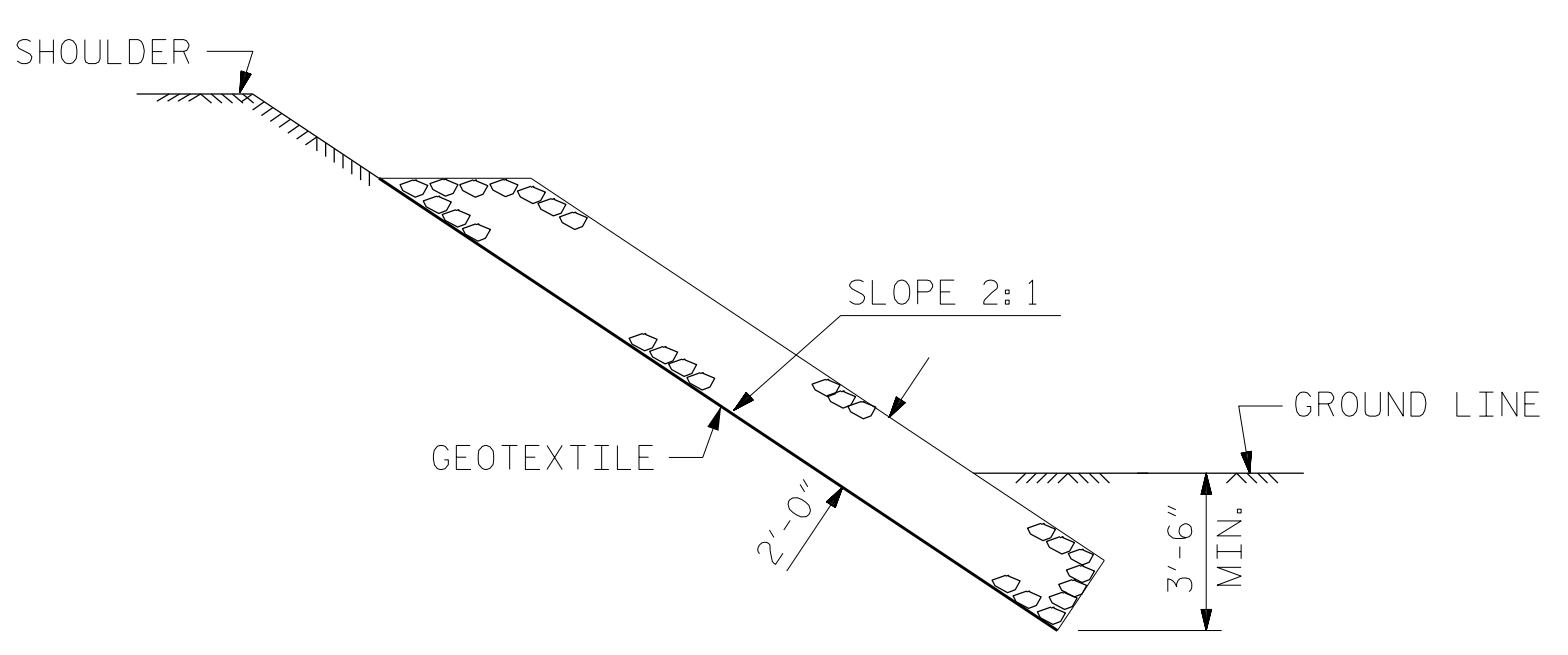
ESTIMATED QUANTITIES		
BRIDGE @ STA. 21+77.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT NO. 1	300	330
END BENT NO. 2	260	285



SECTION H-H



SECTION ALONG -L-
BERM RIP RAPPED



SECTION C-C

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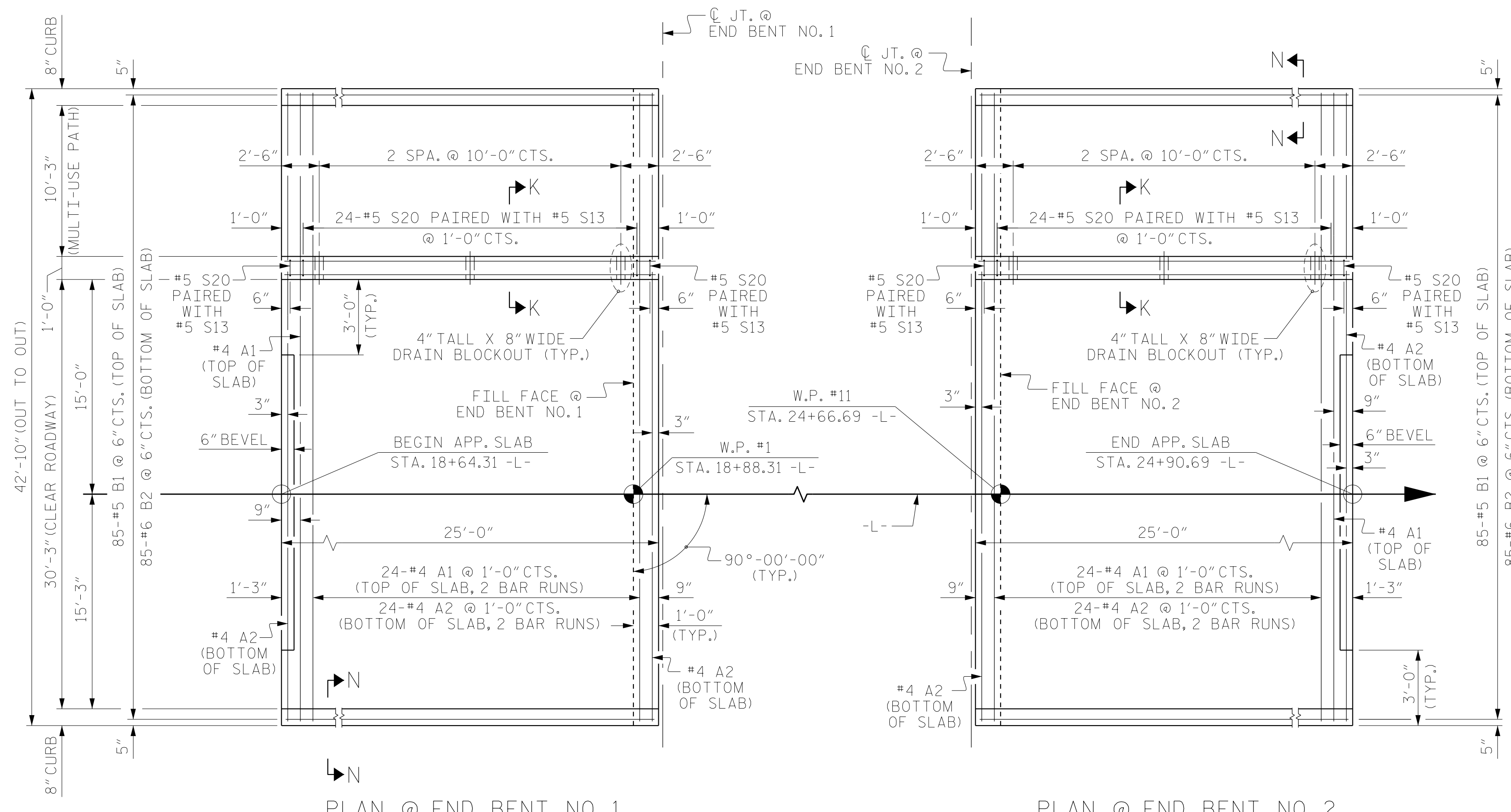
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RALEIGH

RIP RAP DETAILS

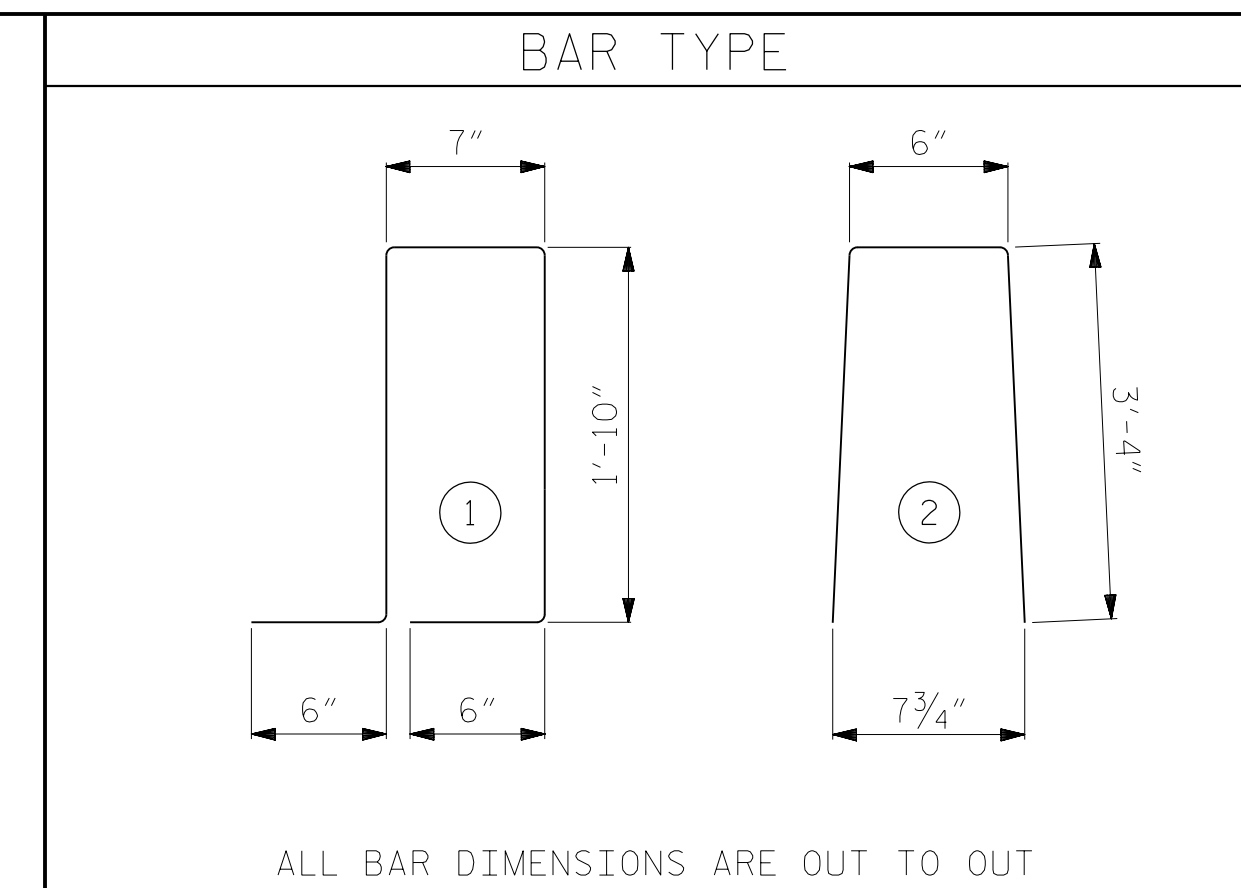
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			42



PLAN @ END BENT NO. 1 PLAN @ END BENT NO. 2
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



NOTES

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 CAP FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE CONCRETE WEARING SURFACE.

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.

THE ENTIRE COST FOR VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB IS INCLUDED IN THE LINEAR FOOT CONTRACT PRICE FOR VERTICAL CONCRETE BARRIER RAIL.

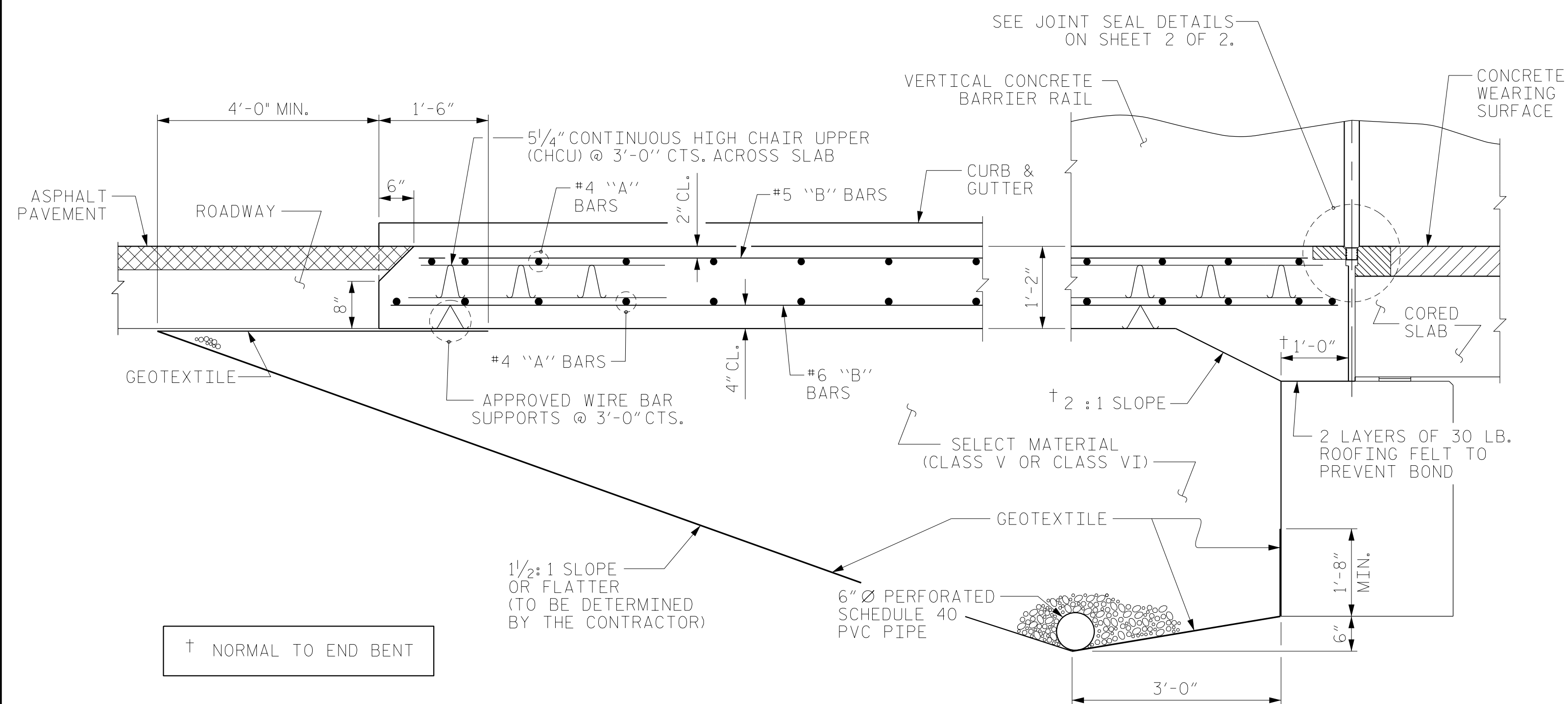
THE VERTICAL CONCRETE BARRIER RAIL SHALL NOT BE CAST UNTIL APPROACH SLAB CONCRETE HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.

FOR FOAM JOINT SEAL DETAILS, SEE SHEET 2 OF 2.

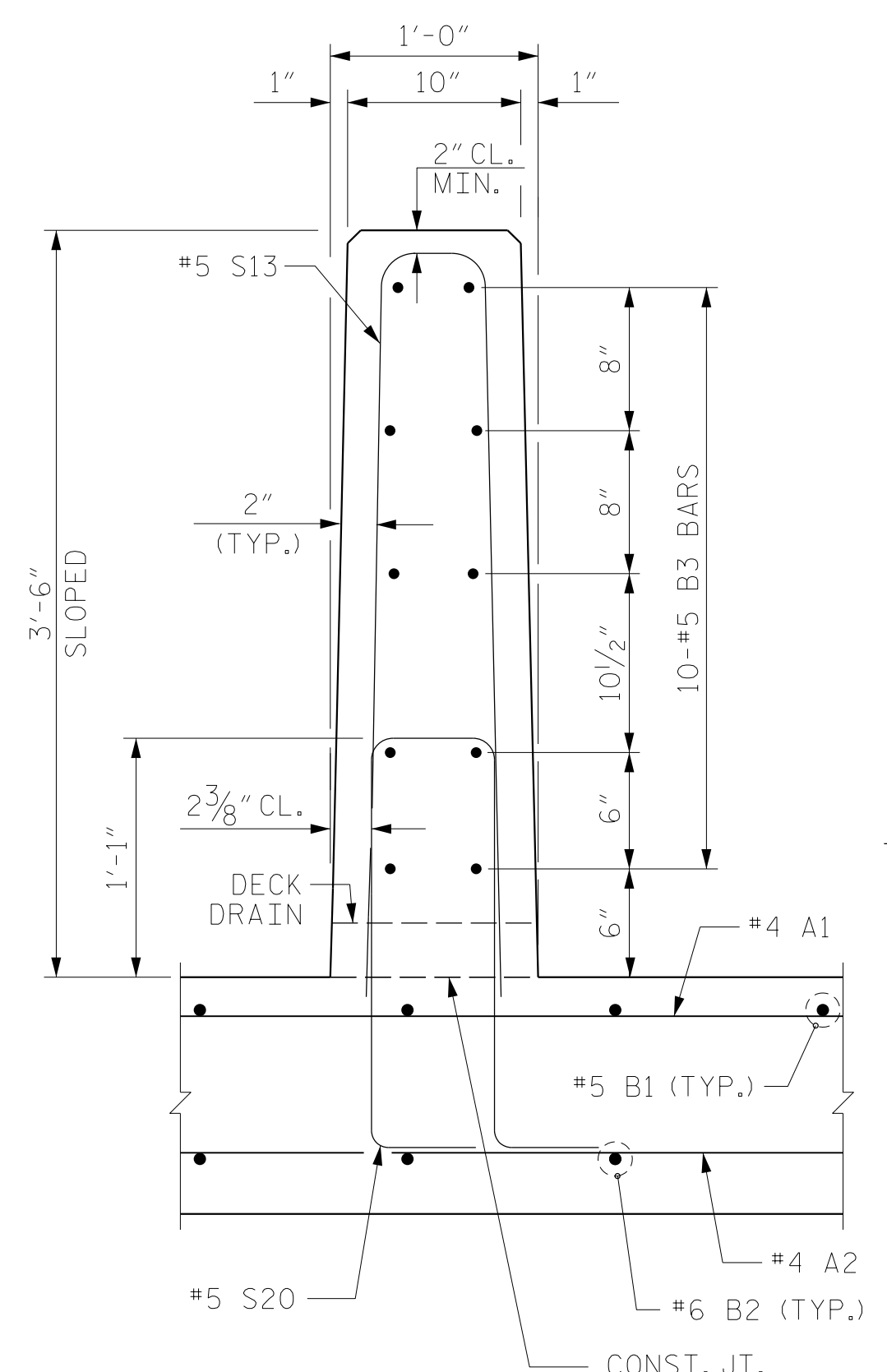
ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.

BILL OF MATERIAL					
APPROACH SLAB AT END BENT NO. 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR.	22'-3"	743
A2	52	#4	STR.	22'-1"	767
*B1	85	#5	STR.	24'-2"	2142
B2	85	#6	STR.	24'-8"	3149
*S20	26	#5	1	5'-3"	142
REINFORCING STEEL					3,916 LBS.
* EPOXY COATED REINFORCING STEEL					3,027 LBS.
CLASS AA CONCRETE					51.6 C.Y.
APPROACH SLAB AT END BENT NO. 2					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR.	22'-3"	743
A2	52	#4	STR.	22'-1"	767
*B1	85	#5	STR.	24'-2"	2142
B2	85	#6	STR.	24'-8"	3149
*S20	26	#5	1	5'-3"	142
REINFORCING STEEL					3,916 LBS.
* EPOXY COATED REINFORCING STEEL					3,027 LBS.
CLASS AA CONCRETE					51.6 C.Y.
VERTICAL CONCRETE BARRIER RAIL FOR TWO APPROACH SLABS					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B3	20	#5	STR.	24'-8"	515
*S13	52	#5	2	7'-2"	389
* EPOXY COATED REINFORCING STEEL					904 LBS.
CLASS AA CONCRETE					6.5 C.Y.
VERTICAL CONCRETE BARRIER RAIL					50.0 LIN. FT.

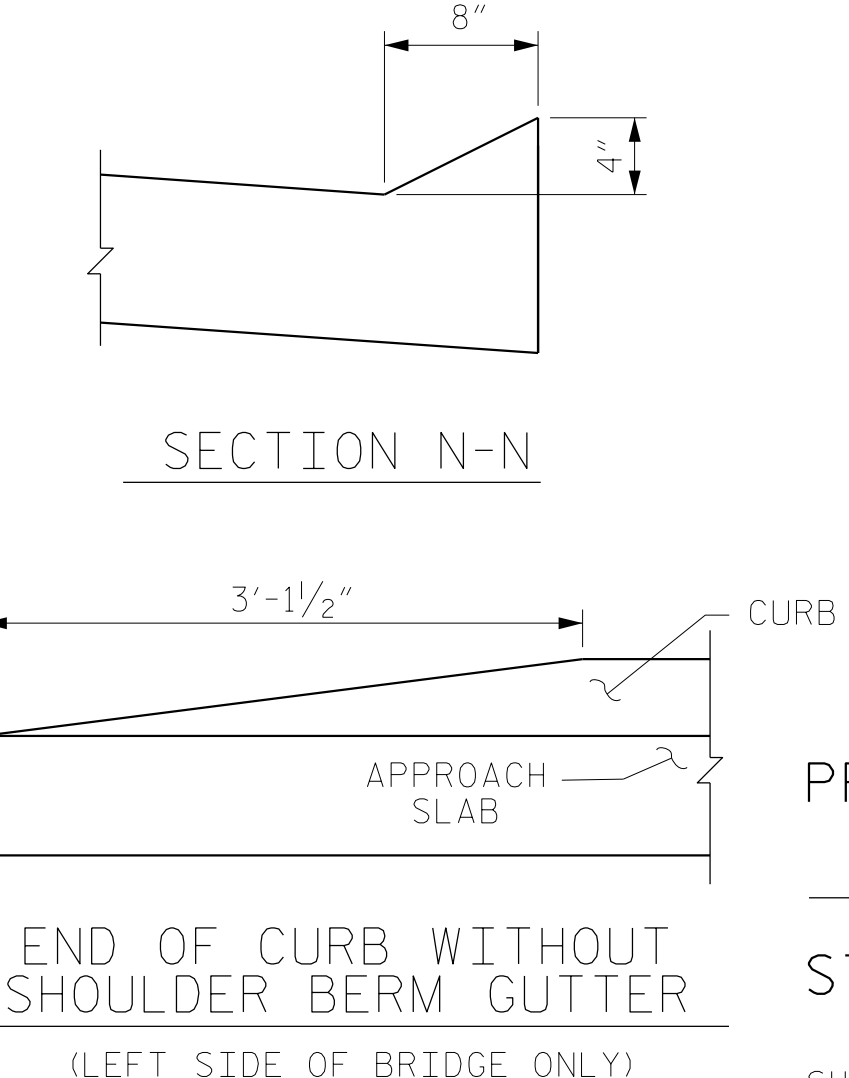
SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER
(LEFT SIDE OF BRIDGE ONLY)

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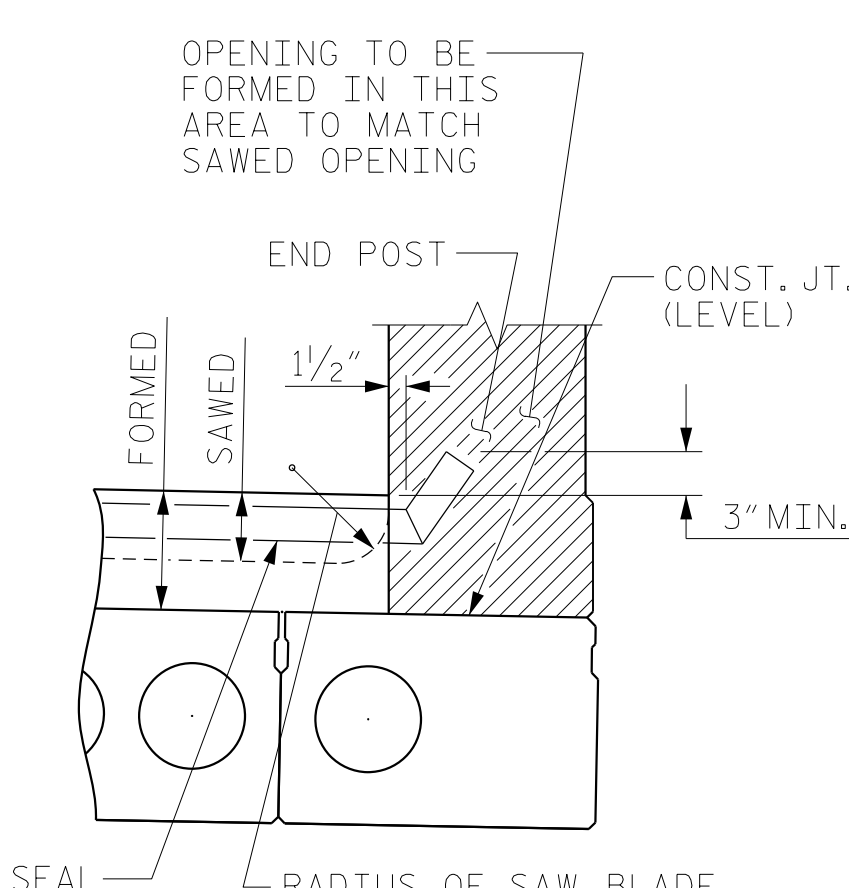
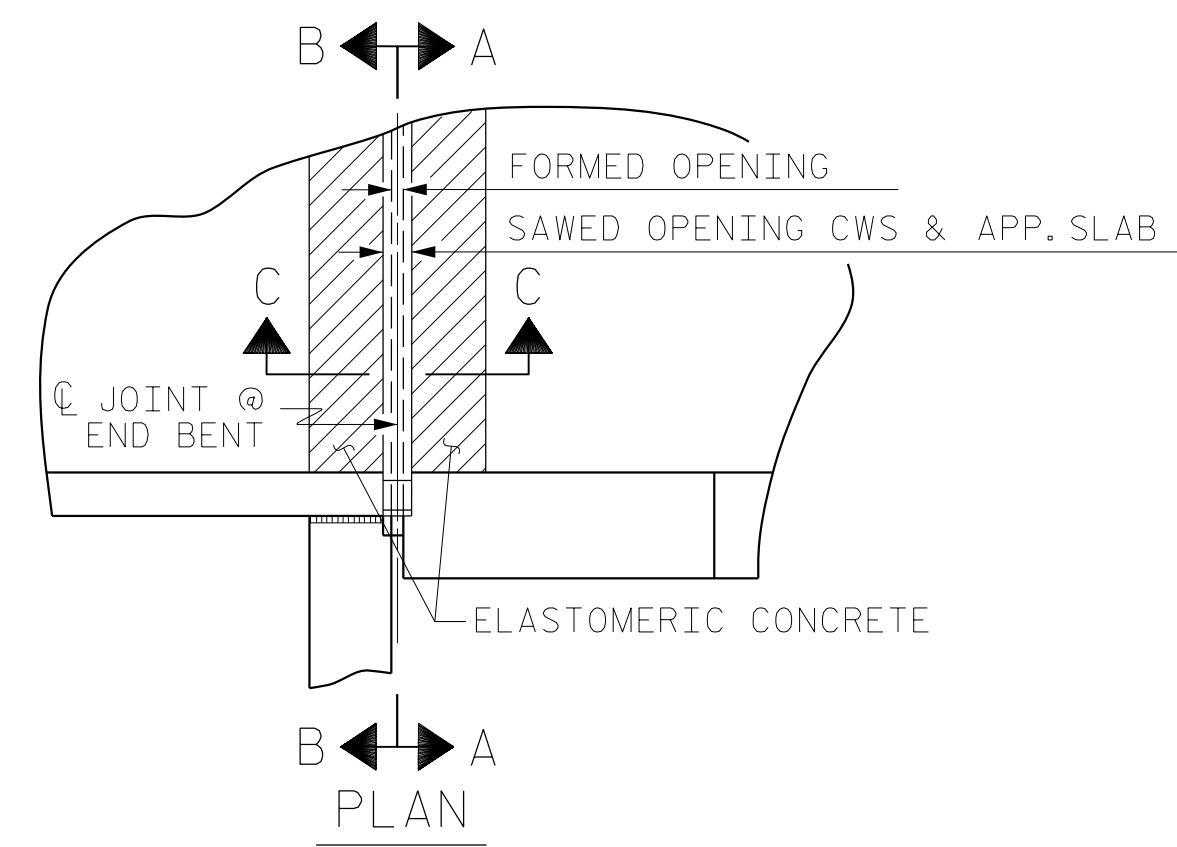
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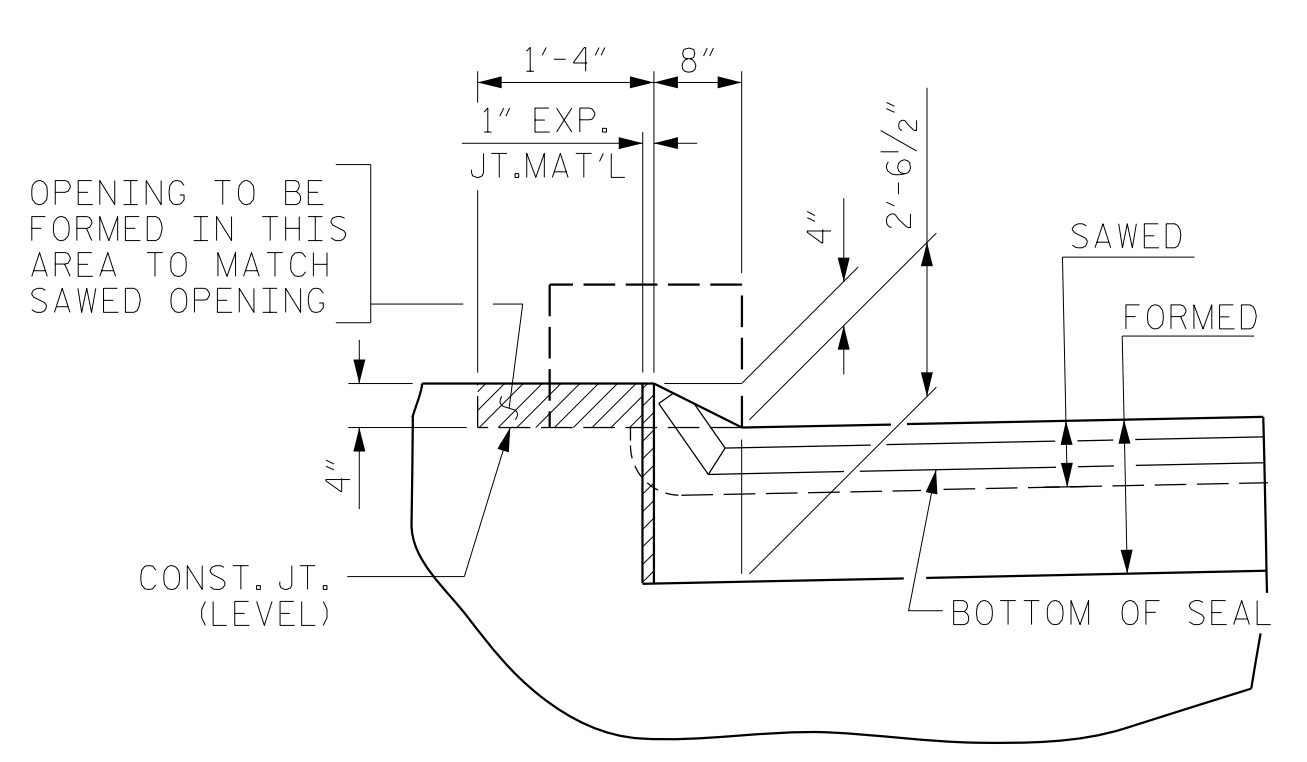
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BRUNSWICK COUNTY
STATION: 21+77.50 -L-

SHEET 1 OF 2

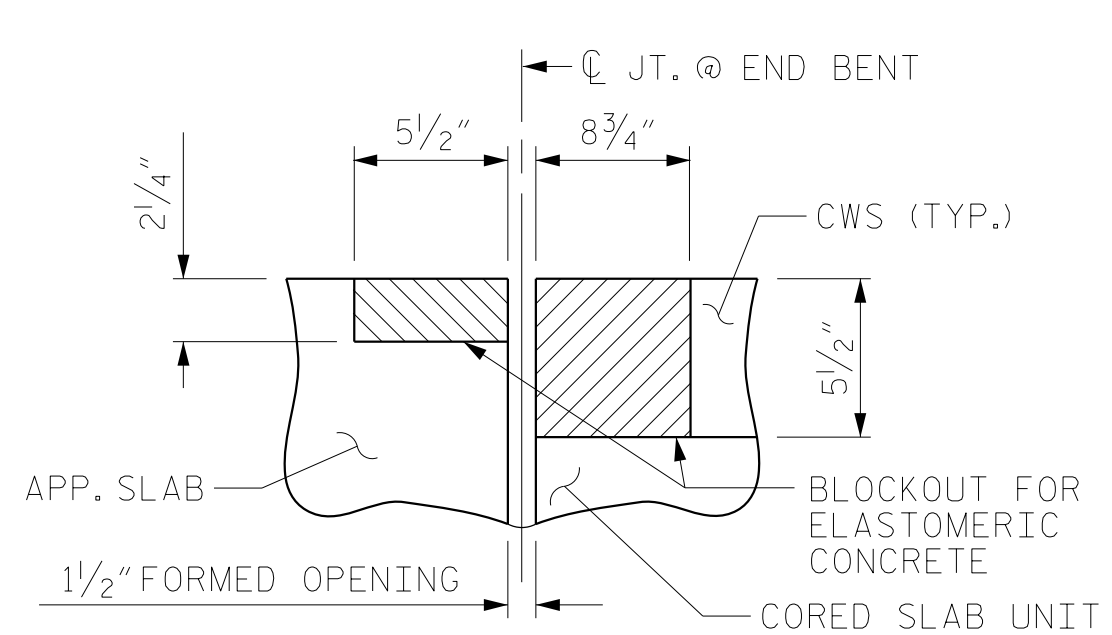
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
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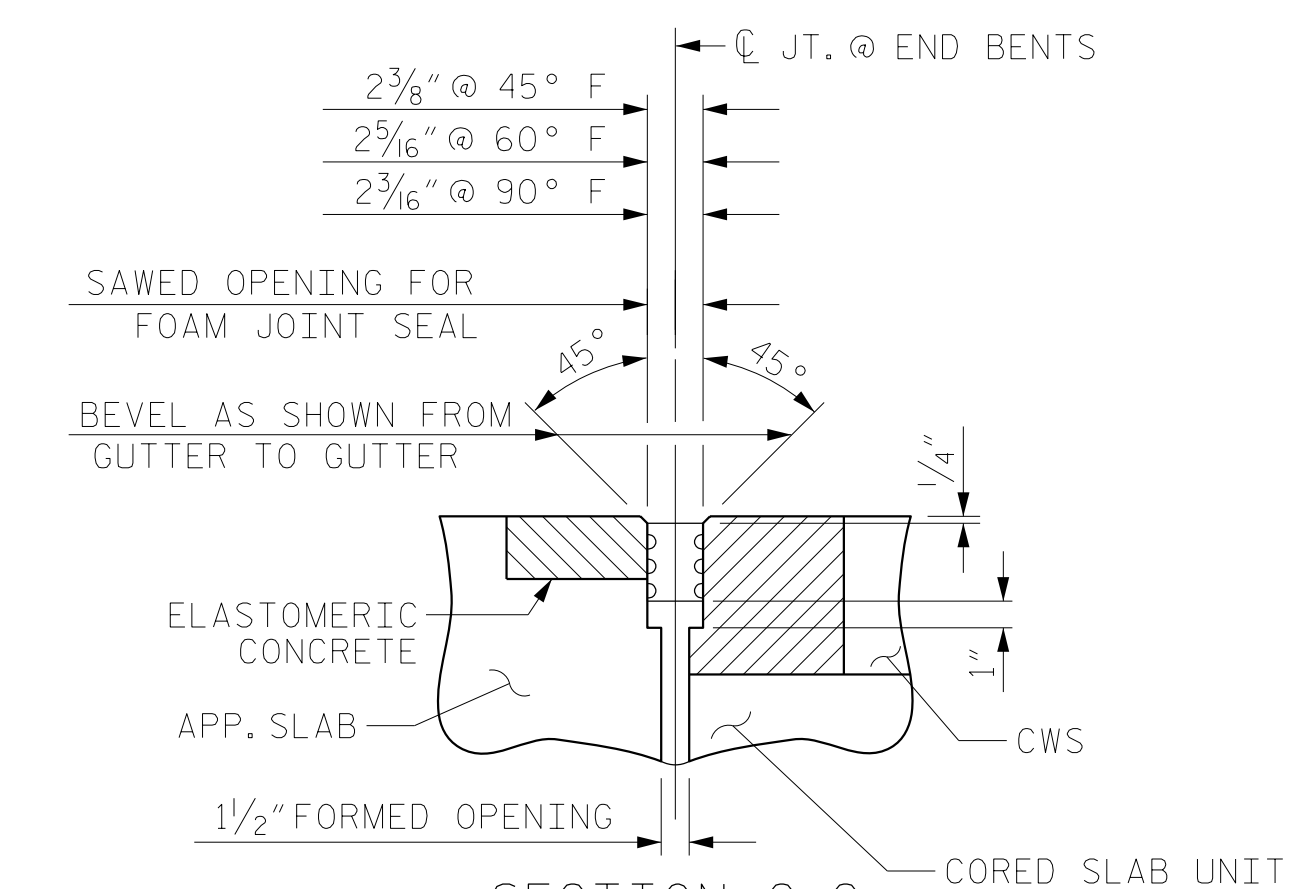
SECTION A-A



SECTION B-B



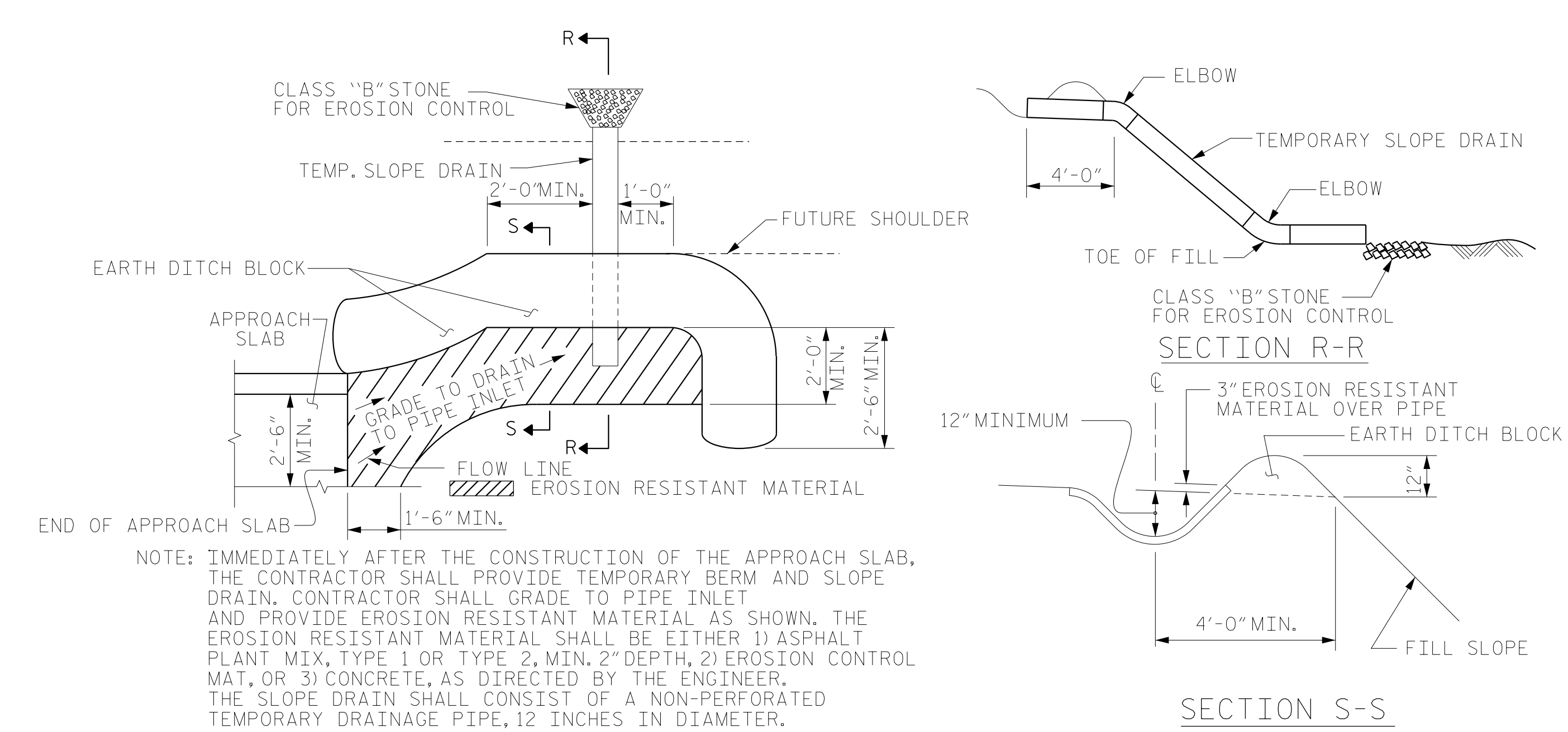
SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)



SECTION C-C
FOAM JOINT SEAL
(EXPANSION)

JOINT SEAL DETAILS @ END BENTS

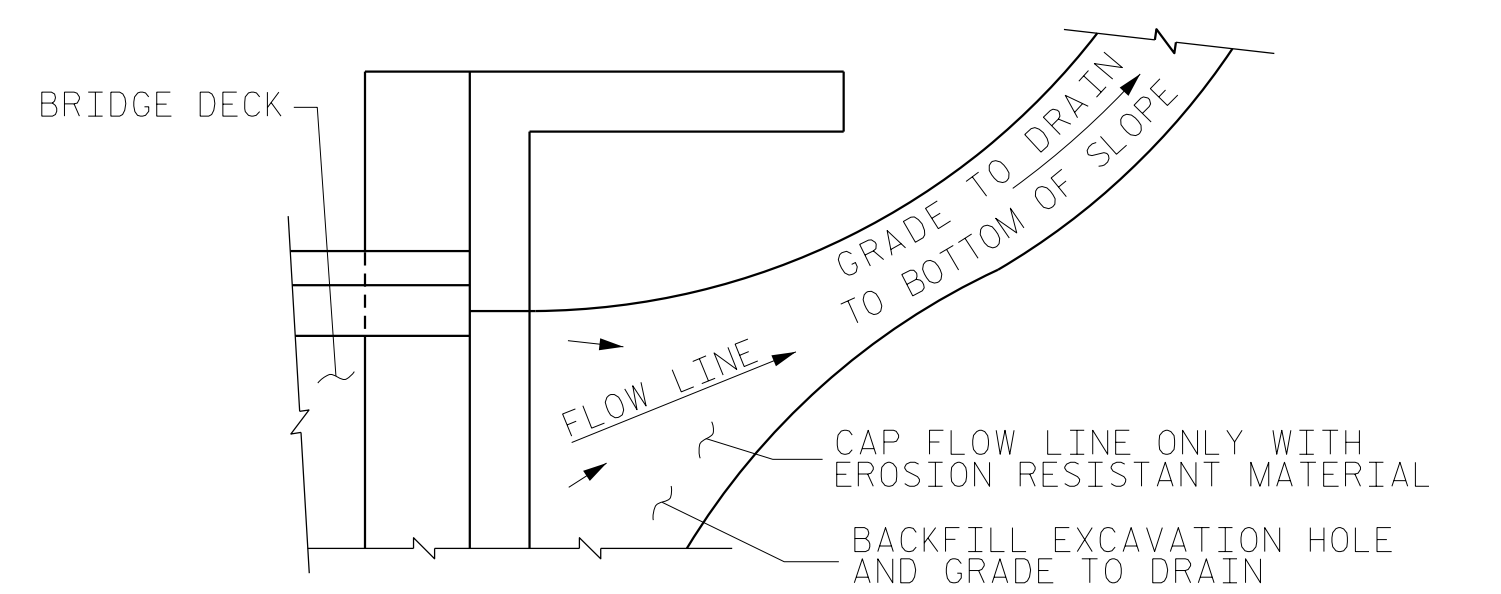
FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE CURB.
END BENT NO. 1 SHOWN.
END BENT NO. 2 SIMILAR BUT OPPOSITE HAND.



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\"/>

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

TEMPORARY DRAINAGE DETAIL

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	17.5
2	17.5
TOTAL	35.0

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.
FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 3\"/>

NOTES

FOR NOTES, SEE SHEET 1 OF 2.

PROJECT NO. BR-0160
BRUNSWICK COUNTY
STATION: 21+77.50 -L-

SHEET 2 OF 2



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**BRIDGE APPROACH SLAB
DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			42

DRAWN BY :	NSC	DATE :	01/2022
CHECKED BY :	MRA	DATE :	01/2023
DESIGN ENGINEER OF RECORD:	RLB	DATE :	03/2023

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN