TIP PROJECT: U-5748

CONTRACT: C204786

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5748		

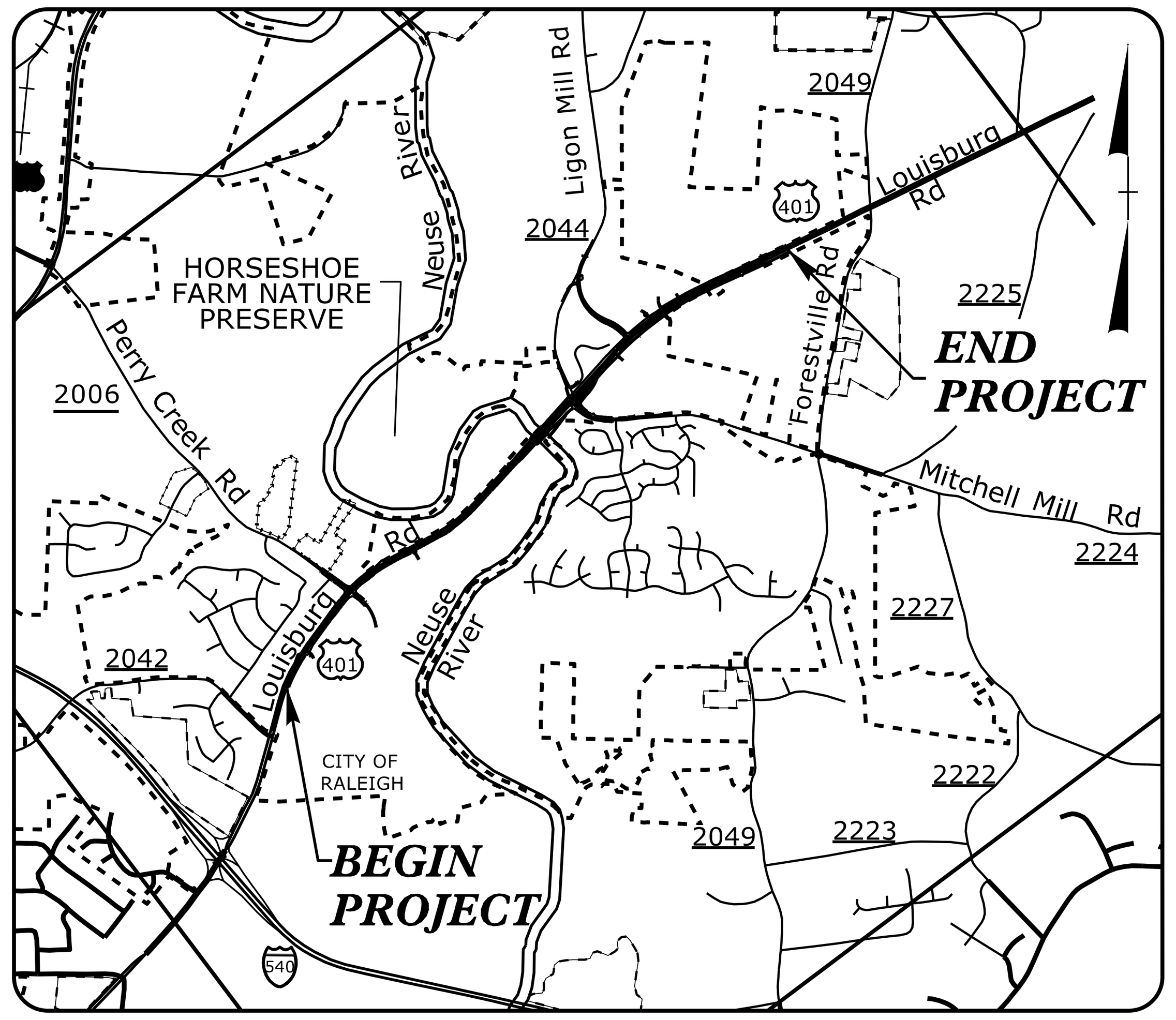
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
50168.1.1		P.E.
50168.2.1		R/W & UTILITIES
50168.3.1		CONSTRUCTION

WAKE COUNTY

LOCATION: US 401 (LOUISBURG RD) AT SR 2044 (LIGON MILL RD) / SR 2224 (MITCHELL MILL RD) AND SR 2006 (PERRY CREEK ROAD) INTERSECTION IMPROVEMENTS

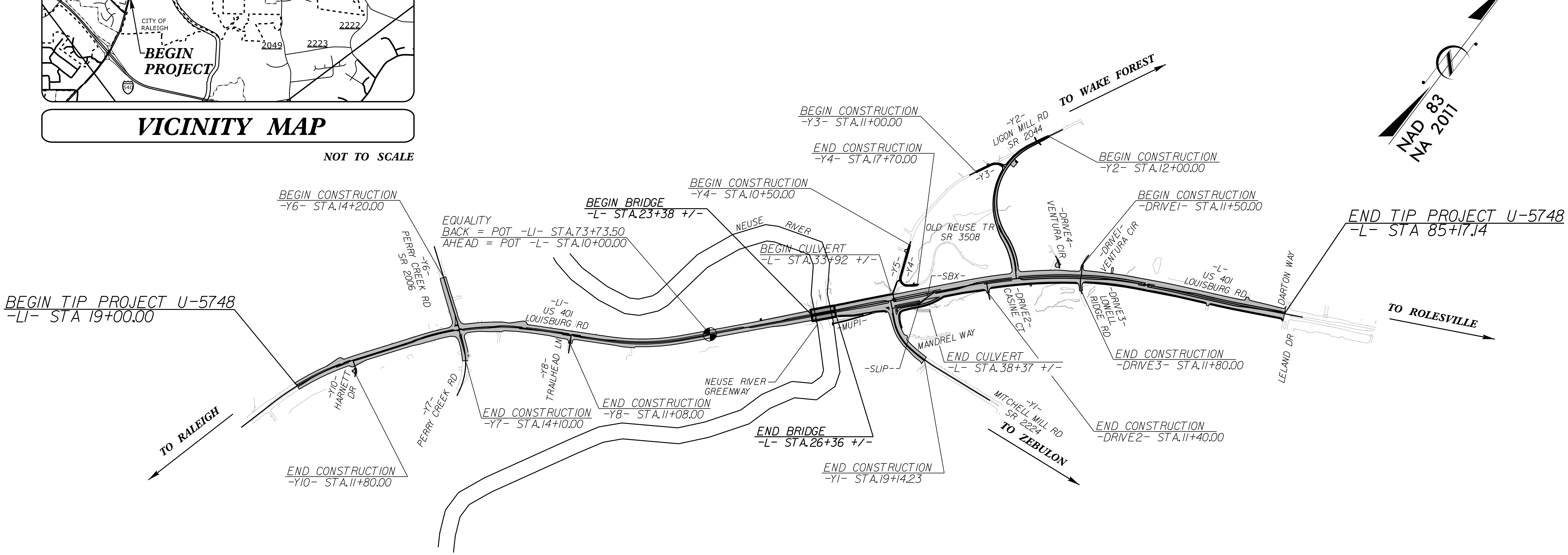
TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS, AND STRUCTURES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



VICINITY MAP

NOT TO SCALE



STRUCTURES

DESIGN DATA
ADT 2022 = 38,425
ADT 2042 = 58,842
K = 10 %
D = 55 %
T = 3% % *
V = 50 MPH
* TTST =1% DUAL 2%
FUNC CLASS = PRINCIPAL ARTERIAL REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5748 =	2.403 MI
LENGTH STRUCTURE TIP PROJECT U-5748 =	0.057 MI
TOTAL LENGTH TIP PROJECT U-5748 =	2.460 MI

Prepared in the Office of :

AECOM
NC FIRM LICENSE No: F-0342
5438 Wade Park Blvd., Suite 200
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 8, 2021

LETTING DATE:
JULY 18, 2023

EDWARD GLENN EDENS JR., P.E.
PROJECT ENGINEER

ELIZABETH WARGO, P.E.
PROJECT DESIGN ENGINEER

JOHN CONFORTI, P.E.
NCDOT PROJECT ENGINEER

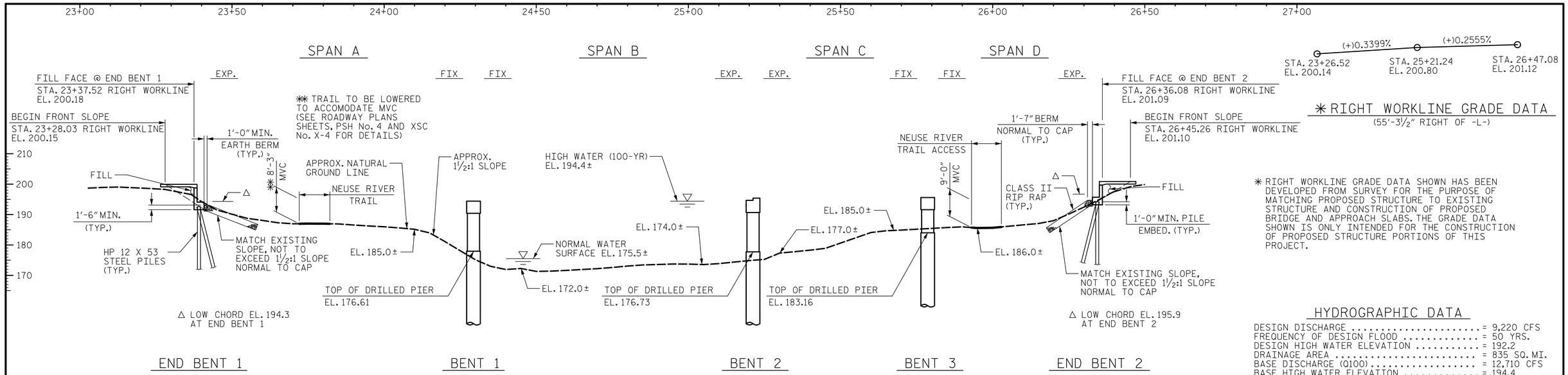
STRUCTURE DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041343 GREGORY R. COLS — 4/19/2023

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030474 JOHN C. MORRISON — John C. Morrison 4/19/2023

SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



✳ RIGHT WORKLINE GRADE DATA SHOWN HAS BEEN DEVELOPED FROM SURVEY FOR THE PURPOSE OF MATCHING PROPOSED STRUCTURE TO EXISTING STRUCTURE AND CONSTRUCTION OF PROPOSED BRIDGE AND APPROACH SLABS. THE GRADE DATA SHOWN IS ONLY INTENDED FOR THE CONSTRUCTION OF PROPOSED STRUCTURE PORTIONS OF THIS PROJECT.

HYDROGRAPHIC DATA

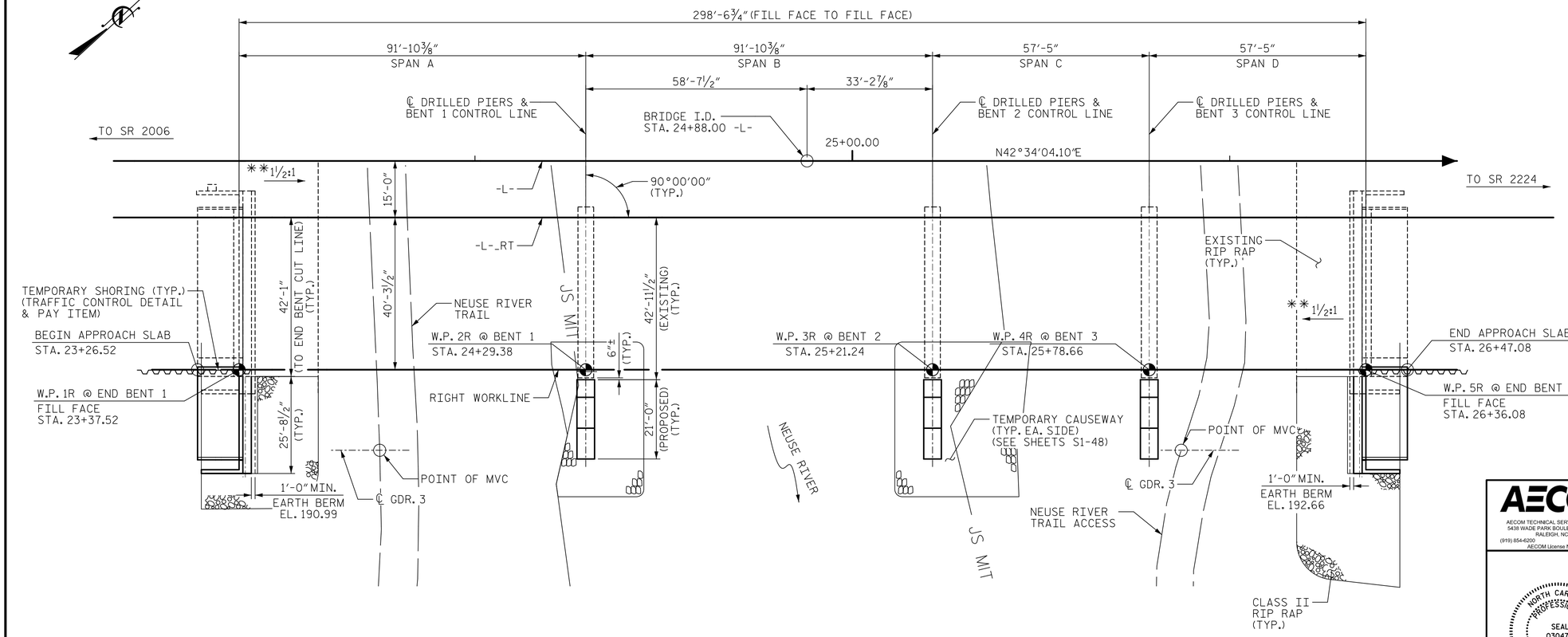
DESIGN DISCHARGE	= 9,220 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 192.2
DRAINAGE AREA	= 835 SQ. MI.
BASE DISCHARGE (Q100)	= 12,710 CFS
BASE HIGH WATER ELEVATION	= 194.4

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 25,590 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500± YRS.
OVERTOPPING FLOOD ELEVATION	= 201.3

SECTION ALONG RIGHT WORKLINE

(SECTIONS AT END BENTS AND BENTS ARE AT RIGHT ANGLES)



PLAN

(PILES NOT SHOWN FOR CLARITY)

✳✳ MATCH EXISTING SLOPE, NOT TO EXCEED 1½:1 SLOPE NORMAL TO CAP

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

WIDENING AND REHABILITATION

SHEET 1 OF 2 OF BRIDGE NO. 911021

AECOM
AECOM TECHNICAL SERVICES OF NC, INC.
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RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NEUSE RIVER ON US-401 BETWEEN SR2006 AND SR2224

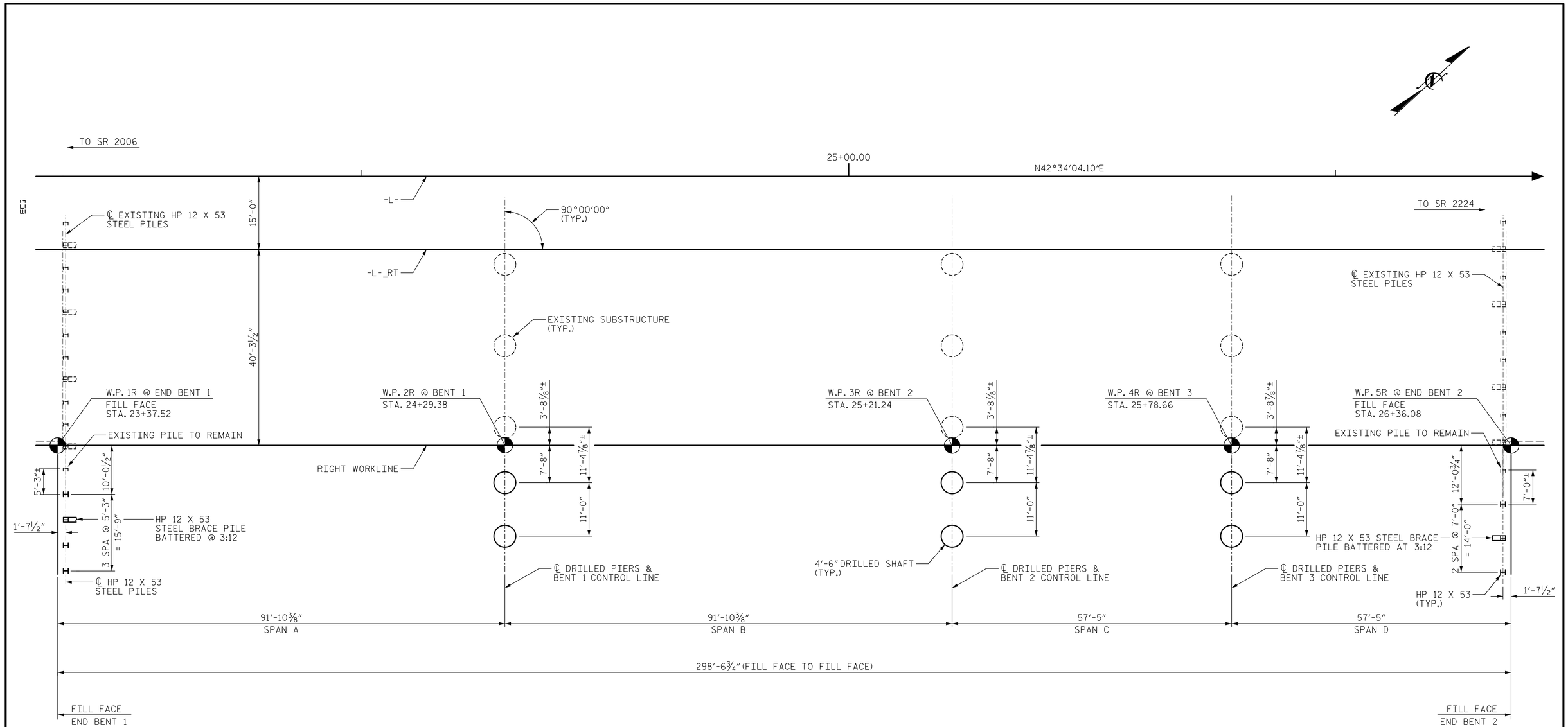
(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-01
1			3			TOTAL SHEETS
2			4			119

DRAWN BY :	M.L. CATER	DATE : 12/2022
CHECKED BY :	J.C. MORRISON	DATE : 12/2022
DESIGNED BY :	D. RITACCO	DATE : 09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE : 09/2020

DATE: 2/9/2023
TIME: 12:34:02 PM

USER: cotterm
DGN: pw:\\acom-nc-pw.bentley.com:AECOM_DSD_WA_20320:Documents\60609754-U-5748_Ugen WIP\900-CAD GIS\900_CADD_NCDOT_TIPStructures\04 Drawings\401_003_U-5748_SMU_GD_S1-01_SW02I



NOTES:

EXISTING PILE LOCATIONS ARE FROM AS-BUILT DRAWINGS.

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

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

INSTALL PERMANENT STEEL CASINGS AT BENT NO. 1 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 167.0.

INSTALL PERMANENT STEEL CASINGS AT BENT NO. 2 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 165.0.

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO CENTERLINE OF PILES.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

DRAWN BY : M. CATER	DATE : 12/2022
CHECKED BY : J.C. MORRISON	DATE : 12/2022
DESIGNED BY : B. LEROY	DATE : 10/2020
DESIGN CHECKED BY : J.C. MORRISON	DATE : 10/2020

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

FOUNDATION LAYOUT

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-02
1			3			TOTAL SHEETS
2			4			119

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 1-4	97	192.47	35			165							
End Bent 2, Piles 1-3	83	194.10	40			140							
							4						

*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.

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-4	97			0.60			1.00
End Bent 2, Piles 1-3	83			0.60			1.00

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

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length per Pier Lin FT	Drilled Pier Length Not In Soil per Pier Lin FT	Drilled Pier Length In Soil per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT
Bent 1, Piers 1-2	456	148.0	65	165			8.2	22.0	YES	167.0	11.2
Bent 2, Piers 1-2	317	143.5	10	163			12.5	22.2	YES	165.0	13.2
Bent 3, Piers 1-2	310	141.5	10	169			6.4	36.2			

*Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

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	MAYBE	40			
End Bent 2	MAYBE	45			
			1		

*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.

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 1-4				YES	
End Bent 2, Piles 1-3				YES	
TOTAL QTY:				7	

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-2	MAYBE	MAYBE	158.5	MAYBE	
Bent 2, Piers 1-2	MAYBE	MAYBE	181.0	MAYBE	
Bent 3, Piers 1-2	MAYBE	MAYBE	220.5	MAYBE	
TOTAL QTY:	3	3	1120	3	

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Ryan P Doyle, PE#045161) on 02/09/2023.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for PDA Testing,SPTs, CSL Testing, and SID Inspections when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...
SIGNATURE DATE

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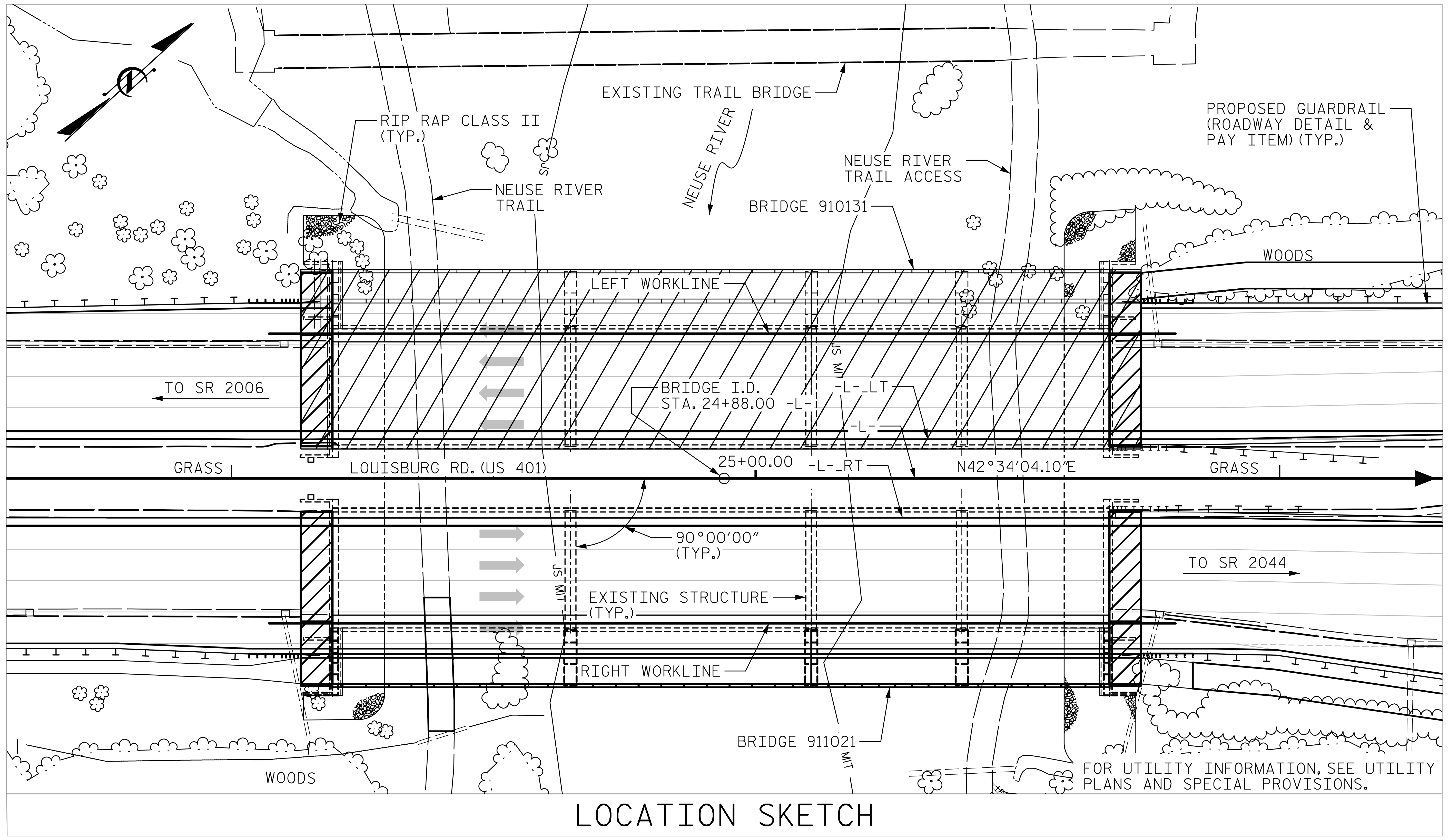
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES
(NORTHBOUND LANES)

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S1-03
1			3				TOTAL SHEETS
2			4				119

BENCHMARK: BM2; RR SPIKE IN 11" OAK; STA. 29+47.41 -L-, OFFSET 220.51' RT; N 777,257 E 2,140,288 EL. 198.37



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAB AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF REINFORCED CONCRETE DECK SLAB.

TEMPORARY SHORING WILL BE REQUIRED FOR MAINTENANCE OF TRAFFIC FOR CONSTRUCTION OF END BENTS. FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THE EXISTING BRIDGE DECK WAS CONSTRUCTED USING 6,000 PSI CONCRETE AND PRESTRESSED CONCRETE GIRDERS HAVING A 28-DAY COMPRESSIVE STRENGTH OF 10,000 PSI.

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.

DIMENSIONS AND ELEVATIONS SHOWN FOR THE EXISTING STRUCTURE ARE FROM THE BEST INFORMATION AVAILABLE. IF FIELD CONDITIONS VARY FROM THE PLANS, MODIFICATIONS MAY BE MADE AS NECESSARY AS DIRECTED BY THE ENGINEER.

FOR LIMITS OF PARTIAL REMOVAL OF EXISTING STRUCTURE, SEE APPLICABLE SUPERSTRUCTURE AND SUBSTRUCTURE SHEETS.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED DOWELS IN PLACE OF EXPOSING AND RETAINING EXISTING STEEL IN THE DECK SLAB AND APPROACH SLAB. ANCHORED DOWELS SHALL MATCH SIZE AND SPACING OF EXISTING BARS CUT AND SHALL BE PLACED IN THE SAME HORIZONTAL PLANE. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS AS FOLLOWS:

#6 BARS: 26.4 KIPS
#4 BARS: 12.0 KIPS

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS AT STA. 24+88.00	REMOVAL OF EXISTING STRUCTURE AT STA. 24+88.00	ASBESTOS ASSESSMENT	4'-6" Ø DRILLED PIERS IN SOIL	4'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-6" DIA. DRILLED PIER	PDA TESTING	SID INSPECTION	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	EPOXY MORTAR REPAIRS	BRIDGE JACKING (TYPE II)	CLASS II SURFACE PREP.	CONCRETE DECK REPAIR FOR PC OVERLAY	45" PRESTRESSED CONCRETE GIRDERS		54" PRESTRESSED CONCRETE GIRDERS		EPOXY COATING CONCRETE GIRDER ENDS
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LF	EACH	EACH	EACH	EACH	SQ. FT.	SQ. FT.	SQ. FT.	LUMP SUM	LBS.	LBS.	SQ. FT.	EACH	SQ. YD.	SQ. YD.	NO.	LIN. FT.	NO.	LIN. FT.	SQ. FT.
SUPERSTRUCTURE											6,963	16,296.4						40	15	15	6	337'-6"	6	544'-2⅝"	550
END BENT 1													16.1		2,520										
BENT 1				44.0	16.4	22.4							27.8		7,405	2,529	5								
BENT 2				44.4	25.0	26.4							29.4		8,136	2,828									
BENT 3				72.4	12.8								20.8		8,283	2,993	2								
END BENT 2													14.8		2,612		2								
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	160.8	54.2	48.8	1	3	3	3	6,963	16,296.4	108.9	LUMP SUM	28,956	8,350	9	40	15	15	6	337.50	6	544.22	550

	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE RE-DRIVES	TWO BAR METAL RAIL	CONCRETE BARRIER RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	EPOXY COATING AND DEBRIS REMOVAL	POLYESTER POLYMER CONCRETE MATERIALS	EPOXY POLYMER CONCRETE MATERIALS (ALTERNATE)	PLACING AND FINISHING FOR POLYMER CONC. OVERLAY	SHOT-BLASTING BRIDGE DECK	SCARIFY-ING BRIDGE DECK	PLUG. OF EXIST. DECK DRAINS	EPOXY RESIN INJECT-ION
	EACH	NO.	LIN. FT.	EA.	EA.	LIN. FT.	LIN. FT.	LIN. FT.	TON	SQ. YDS.	LUMP SUM	LUMP SUM	SQ. FT.	CU. YDS.	CU. YDS.	SQ. YDS.	SQ. YDS.	SQ. YDS.	EA.	LIN. FT.
SUPERSTRUCTURE						288.83	320.56	296.33			LUMP SUM	LUMP SUM		58.6	58.6	1,924.8	1,924.8	1,924.8	30	110
END BENT 1	4	4	140	4					86	95										
BENT 1																				
BENT 2																				
BENT 3																				
END BENT 2	3	3	120	3					147	164										5
TOTAL	7	7	260	7	4	288.83	320.56	296.33	233	259	LUMP SUM	LUMP SUM	410	58.6	58.6	1,924.8	1,924.8	1,924.8	30	115

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

AECOM
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RALEIGH, NC 27607
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030474 JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NEUSE RIVER ON US-401 BETWEEN SR2006 AND SR2224

(NORTHBOUND LANES)

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S1-04
1			3					TOTAL SHEETS
2			4					119

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : M.L. CATER DATE : 12/2022
CHECKED BY : J.C. MORRISON DATE : 12/2022
DESIGNED BY : D. RITACCO DATE : 09/2020
DESIGN CHECKED BY : J.C. MORRISON DATE : 09/2020

DATE: 2/3/2023 TIME: 4:25:59 PM

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	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 (INVENTORY)	N/A	1	1.17	--	1.75	0.930	1.18	B	ER	44.9	0.930	1.26	B	ER	26.7	0.80	0.930	1.17	A	ER	44.4	
		HL-93 (OPERATING)	N/A		1.53	--	1.35	0.930	1.53	B	ER	44.9	0.930	2.13	B	ER	81.4	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.35	48.60	1.75	0.930	1.53	D	ER	27.2	0.930	1.91	D	ER	38.3	0.80	0.930	1.35	B	ER	44.9	
		HS-20 (OPERATING)	36.000		1.99	71.64	1.35	0.930	1.99	D	ER	27.2	0.930	2.79	D	ER	43.9	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.18	42.93	1.40	0.930	4.13	D	ER	27.2	0.930	6.60	D	ER	43.9	0.80	0.930	3.18	B	ER	44.9	
		SNGARBS2	20.000		2.31	46.20	1.40	0.930	3.15	D	ER	27.2	0.930	4.80	D	ER	43.9	0.80	0.930	2.31	B	ER	44.9	
		SNAGRIS2	22.000		2.17	47.74	1.40	0.930	3.00	D	ER	27.2	0.930	4.50	D	ER	43.9	0.80	0.930	2.17	B	ER	44.9	
		SNCOTTS3	27.250		1.63	44.42	1.40	0.930	2.03	D	ER	27.2	0.930	3.12	D	ER	43.9	0.80	0.930	1.63	D	ER	27.2	
		SNAGGRS4	34.925		1.30	45.40	1.40	0.930	1.74	D	ER	27.2	0.930	2.54	D	ER	43.9	0.80	0.930	1.30	B	ER	44.9	
		SNS5A	35.550		1.30	46.22	1.40	0.930	1.70	D	ER	27.2	0.930	2.67	B	ER	17.5	0.80	0.930	1.30	B	ER	44.9	
		SNS6A	39.950		1.27	50.74	1.40	0.930	1.57	D	ER	27.2	0.930	2.49	D	ER	43.9	0.80	0.930	1.27	D	ER	27.2	
		SNS7B	42.000		1.20	50.40	1.40	0.930	1.49	D	ER	27.2	0.930	2.49	D	ER	43.9	0.80	0.930	1.20	D	ER	27.2	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.41	46.53	1.40	0.930	1.93	D	ER	27.2	0.930	2.90	B	ER	72.3	0.80	0.930	1.41	B	ER	44.9	
		TNT4A	33.075		1.41	46.64	1.40	0.930	1.93	D	ER	27.2	0.930	2.82	D	ER	43.9	0.80	0.930	1.41	B	ER	44.9	
		TNT6A	41.600		1.15	47.84	1.40	0.930	1.59	D	ER	27.2	0.930	2.51	B	ER	81.4	0.80	0.930	1.15	B	ER	44.9	
		TNT7A	42.000		1.15	48.30	1.40	0.930	1.61	D	ER	27.2	0.930	2.46	B	ER	8.4	0.80	0.930	1.15	B	ER	44.9	
		TNT7B	42.000		1.18	49.56	1.40	0.930	1.68	D	ER	27.2	0.930	2.33	B	ER	17.5	0.80	0.930	1.18	B	ER	44.9	
		TNAGRIT4	43.000		1.13	48.59	1.40	0.930	1.59	D	ER	27.2	0.930	2.23	D	ER	38.3	0.80	0.930	1.13	B	ER	44.9	
		TNAGT5A	45.000		1.07	48.15	1.40	0.930	1.49	D	ER	27.2	0.930	2.18	B	ER	72.3	0.80	0.930	1.07	B	ER	44.9	
		TNAGT5B	45.000	3	1.06	47.70	1.40	0.930	1.47	D	ER	27.2	0.930	1.96	D	ER	38.3	0.80	0.930	1.06	B	ER	44.9	1

LOAD FACTORS:

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

NOTES:

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

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

EXISTING GIRDERS ARE NOT INCLUDED IN THIS LRFR SUMMARY.

COMMENTS:

1. THE CONTROLLING RATING FACTOR OCCURS AT SPAN B, EXTERIOR GIRDER.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

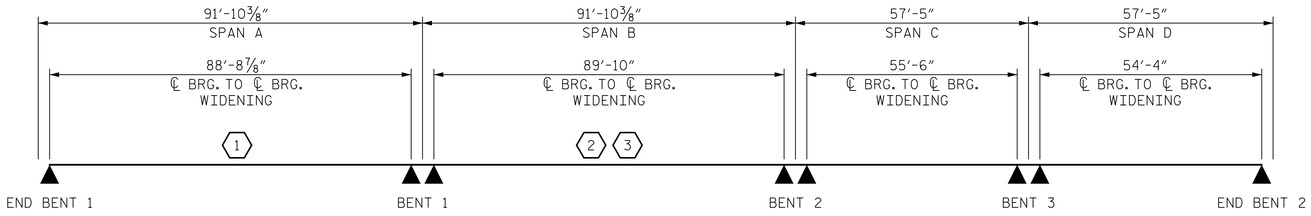
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

AECOM
AECOM TECHNICAL SERVICES OF NC, INC.
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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-05
1			3			TOTAL SHEETS
2			4			119

STD. NO. LRFR1

ASSEMBLED BY : D.R. DRUM	DATE : 05/2021	
CHECKED BY : J.C. MORRISON	DATE : 05/2021	
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

DATE: 2/9/2023
TIME: 12:34:41 PM

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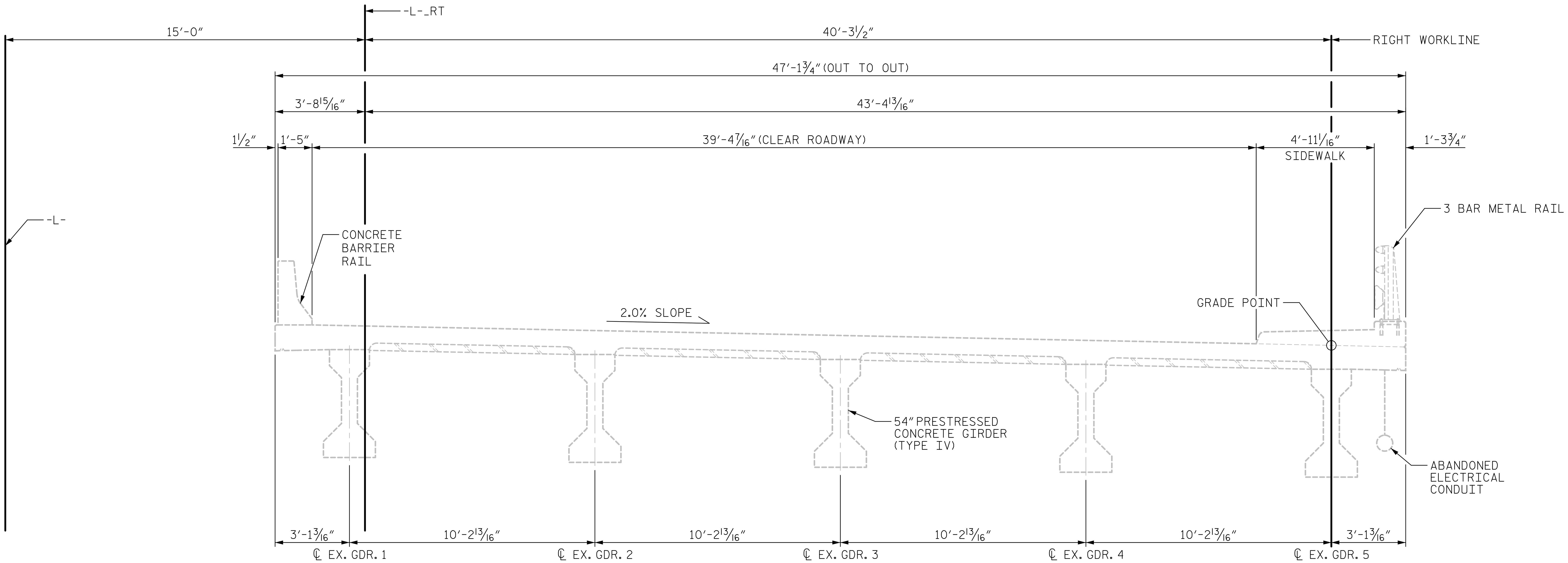
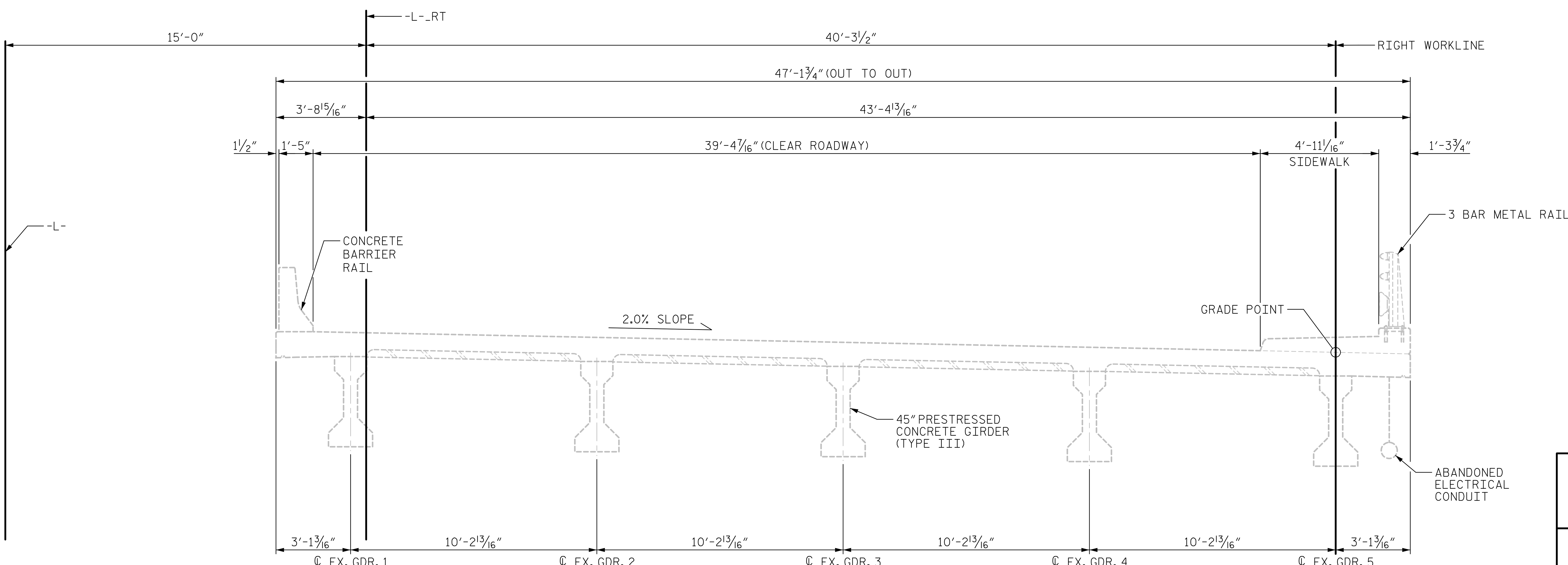


EXISTING STRUCTURE
(SPANS A & B)



EXISTING STRUCTURE
(SPANS C & D)

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 4

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

CONSTRUCTION SEQUENCE

(NORTHBOUND LANES)

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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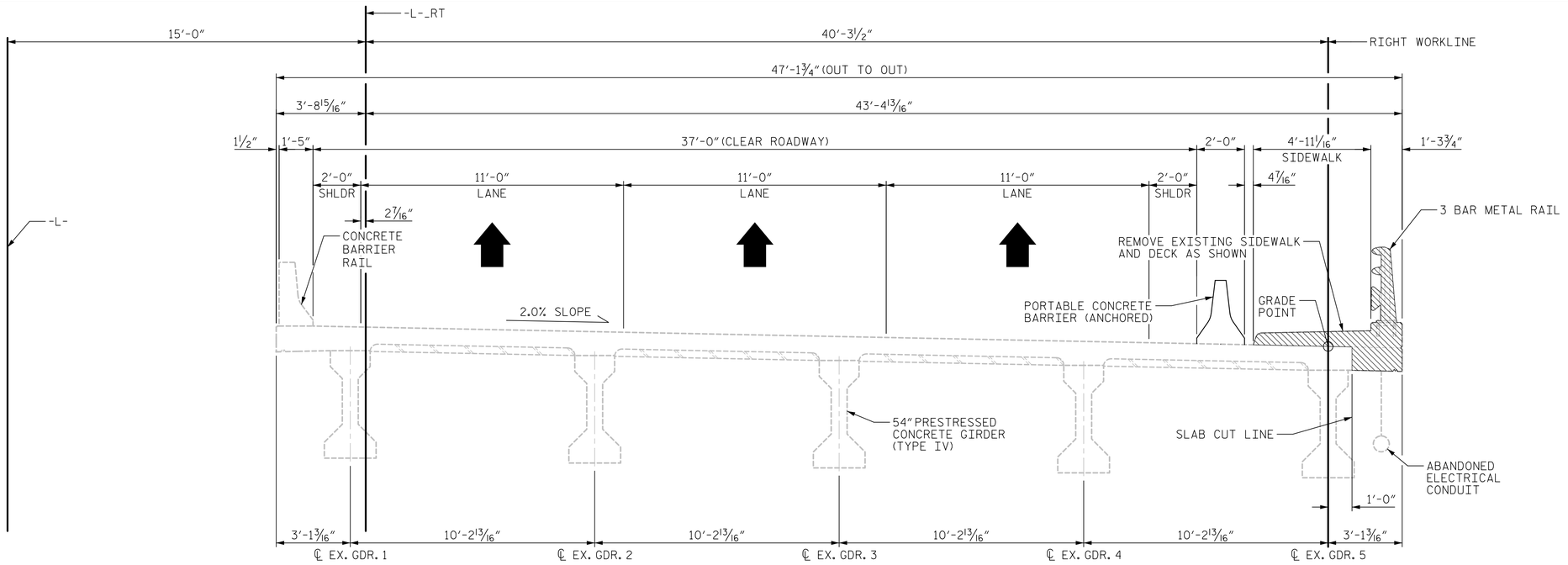
DRAWN BY : M.L. CATER	DATE : 09/2020
CHECKED BY : J.C. MORRISON	DATE : 09/2020
DESIGNED BY : D. RITACCO	DATE : 09/2020
DESIGN CHECKED BY : J.C. MORRISON	DATE : 09/2020

REVISIONS

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

SHEET NO. S1-06
TOTAL SHEETS 119



EXISTING STRUCTURE DEMOLITION

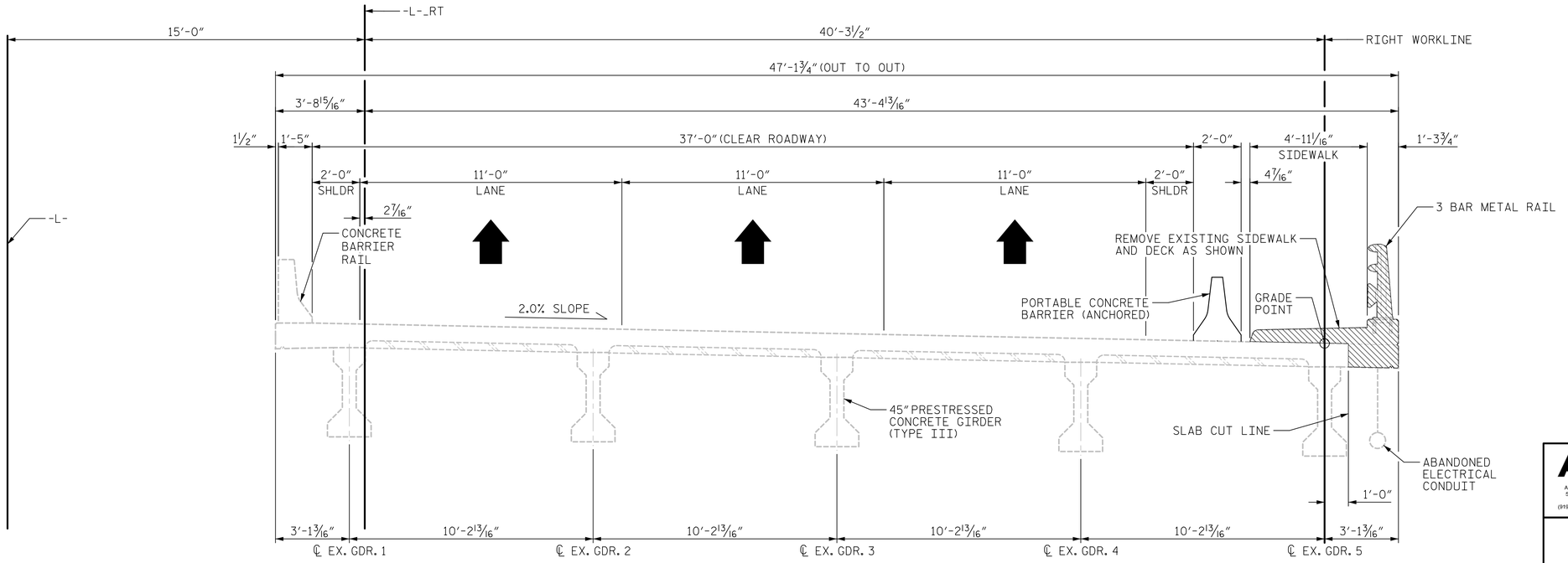
(SPANS A & B)

NOTES:

FOR PHASING OF TRAFFIC DURING EXITING STRUCTURE DEMOLITION AND PROPOSED STRUCTURE WIDENING, SEE TRAFFIC MANAGEMENT PLANS.

STAGING NOTES:

1. PLACE PORTABLE CONCRETE BARRIER (ANCHORED). SHIFT TRAFFIC INTO LANE CONFIGURATION SHOWN.
2. CUT AND REMOVE EXISTING SIDEWALK, SLAB, AND 3 BAR METAL RAIL TO THE LIMITS SHOWN.



EXISTING STRUCTURE DEMOLITION

(SPANS C & D)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 4

DRAWN BY :	M.L. CATER
CHECKED BY :	J.C. MORRISON
DESIGNED BY :	D. RITACCO
DESIGN CHECKED BY :	J.C. MORRISON

DATE : 09/2020 (all)

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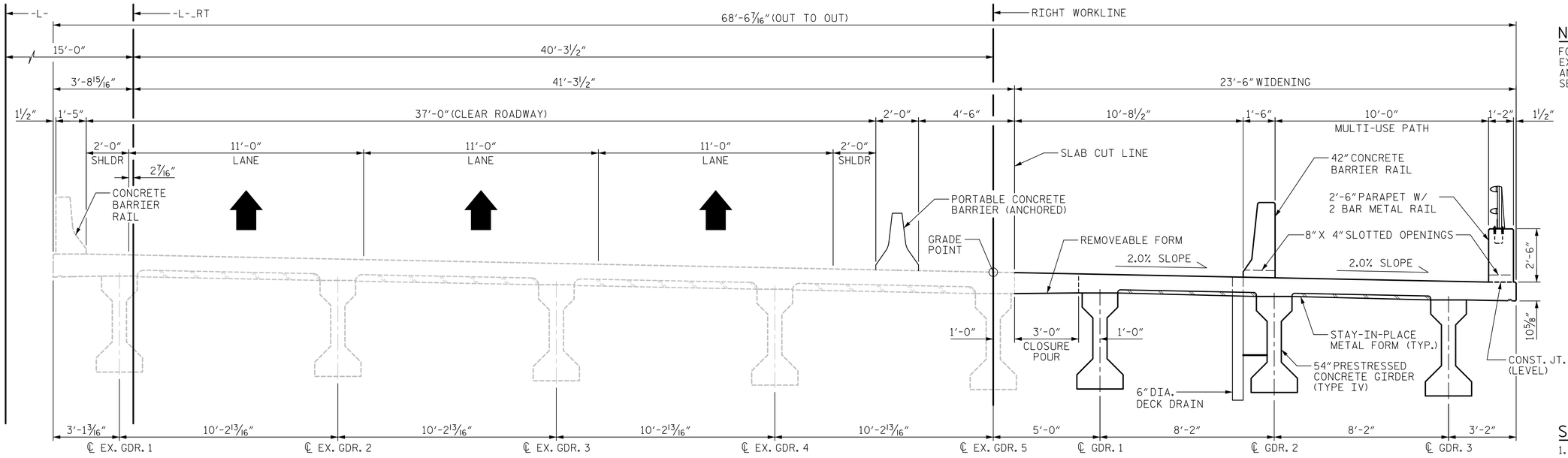
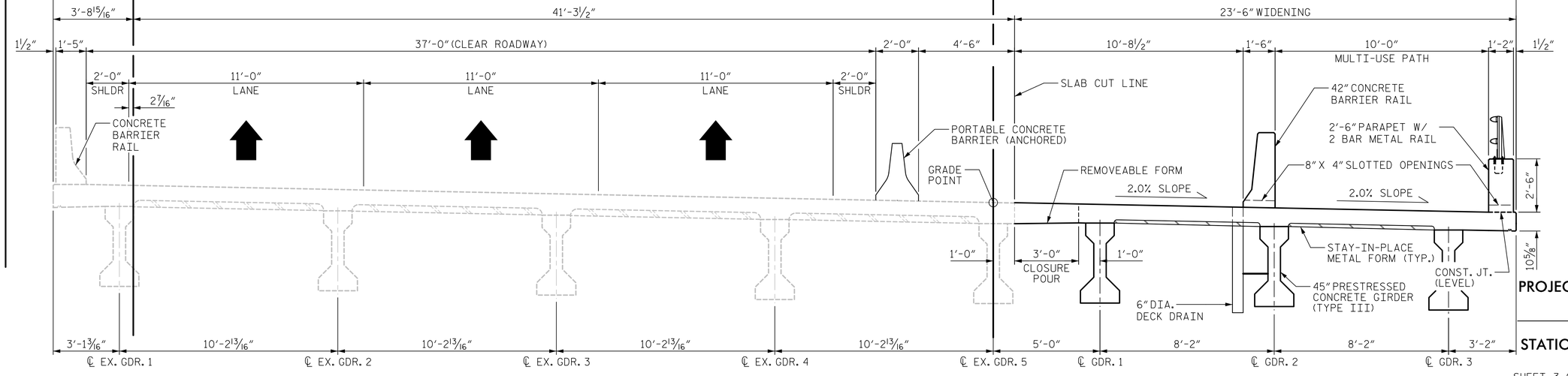
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
CONSTRUCTION SEQUENCE
(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-07
1			3			TOTAL SHEETS
2			4			119



PROPOSED STRUCTURE WIDENING
(SPANS A & B)



PROPOSED STRUCTURE WIDENING
(SPANS C & D)

NOTES:
FOR PHASING OF TRAFFIC DURING EXISTING STRUCTURE DEMOLITION AND PROPOSED STRUCTURE WIDENING, SEE TRAFFIC MANAGEMENT PLANS.

STAGING NOTES:
1. CONSTRUCT WIDENING BEHIND PORTABLE BARRIER (ANCHORED).
2. ONCE COMPLETED, REMOVE PORTABLE CONCRETE BARRIER (ANCHORED).
3. SHIFT TRAFFIC AS SPECIFIED TO PERFORM FOAM JOINT SEAL REPLACEMENT AND INSTALLATION, AND PERFORM PC OVERLAY PER REHABILITATION PLANS.
4. OPEN TRAFFIC TO FINAL CONFIGURATION.

CONSTRUCTION SEQUENCE NOTES

THE FOLLOWING ITEMS SHALL BE PERFORMED IN THIS ORDER. OTHER ITEMS MAY BE PERFORMED AT ANY TIME IN ACCORDANCE WITH THE CONTRACT EXCEPT AS NOTED IN PLANS OR SPECIAL PROVISIONS.

1. BEARING REPLACEMENT (SEE PRESERVATION SHEETS)
2. BRIDGE SUPERSTRUCTURE WIDENING, CLOSURE POUR AND SUBSEQUENT SUPERSTRUCTURE WORK (INCLUDING SAW-CUTTING THE JOINTS, EXCEPT INSTALLATION OF FOAM JOINT SEALS).
3. DECK AND APPROACH SLAB MILLING, PC OVERLAY AND GROOVING WITHIN ROADWAY AREA.
4. SAW-CUTTING OF DECK (WITHIN EXISTING BRIDGE AREA) AND INSTALLATION OF FOAM JOINT SEALS AT ALL JOINTS.

COORDINATE STRUCTURE PLANS WITH TMP PLANS.

DRAWN BY :	M.L. CATER	DATE :	09/2020
CHECKED BY :	J.C. MORRISON	DATE :	09/2020
DESIGNED BY :	D. RITACCO	DATE :	09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	09/2020

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison A2FDE142C82F4AB... 2/10/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
CONSTRUCTION SEQUENCE
(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-08
1			3			TOTAL SHEETS
2			4			119

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 3 OF 4

DATE: 2/9/2023
TIME: 12:35:05 PM

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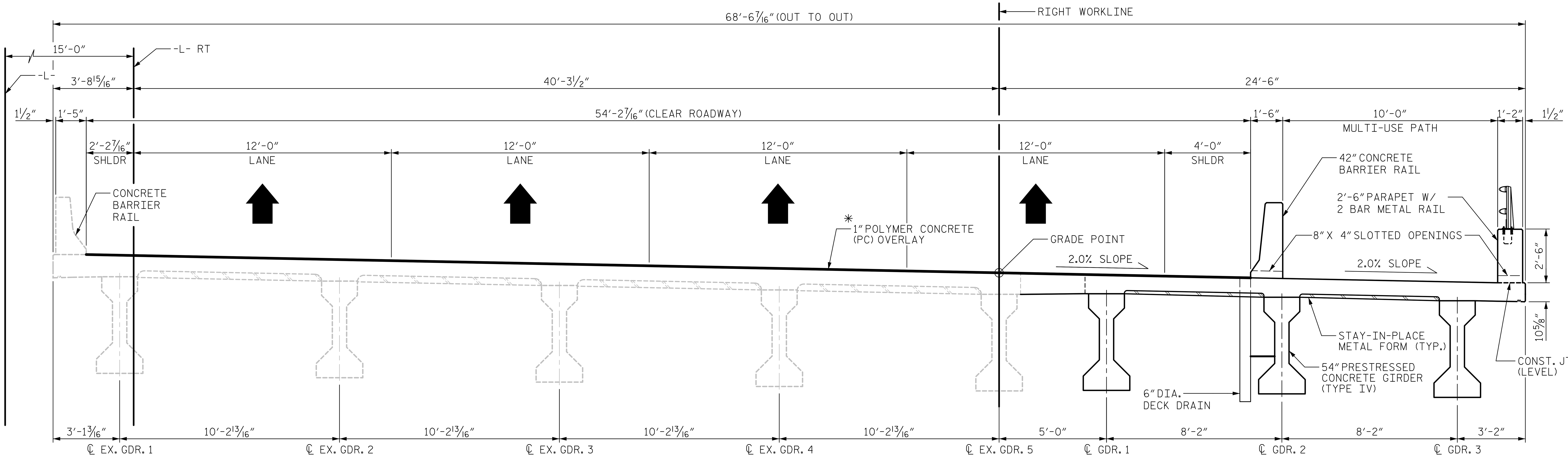
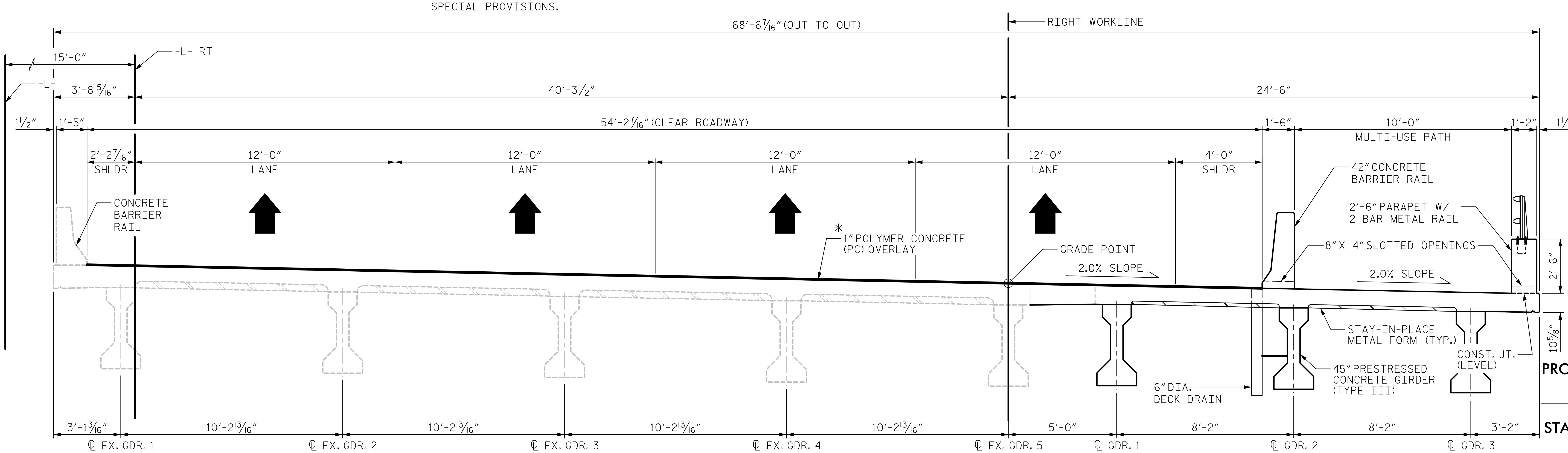


* FOR STAGING OF DECK SURFACE PREPARATION AND PC OVERLAY, SEE TMP PLANS, PRESERVATION PLANS AND SPECIAL PROVISIONS.

FINAL CONDITION
(SPANS A & B)



* FOR STAGING OF DECK SURFACE PREPARATION AND PC OVERLAY, SEE TMP PLANS, PRESERVATION PLANS AND SPECIAL PROVISIONS.

FINAL CONDITION
(SPANS C & D)

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 4 OF 4

TYPICAL SECTION NOTES:

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY IN PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORMS.

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

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

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

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

FOR LOCATION OF DECK DRAINS AND 8" X 4" SLOTTED OPENINGS IN BARRIER RAIL AND PARAPET, SEE "CONSTRUCTION SEQUENCE" SHEET 3 OF 4.

FOR DECK DRAIN LOCATIONS, SEE "TYPICAL SECTIONS" SHEET 2 OF 3.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILD-UPS.

DRAWN BY :	M.L. CATER	DATE :	09/2020
CHECKED BY :	J.C. MORRISON	DATE :	09/2020
DESIGNED BY :	D. RITACCO	DATE :	09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	09/2020

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030474 JOHN C. MORRISON

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DEPARTMENT OF TRANSPORTATION
RALEIGH

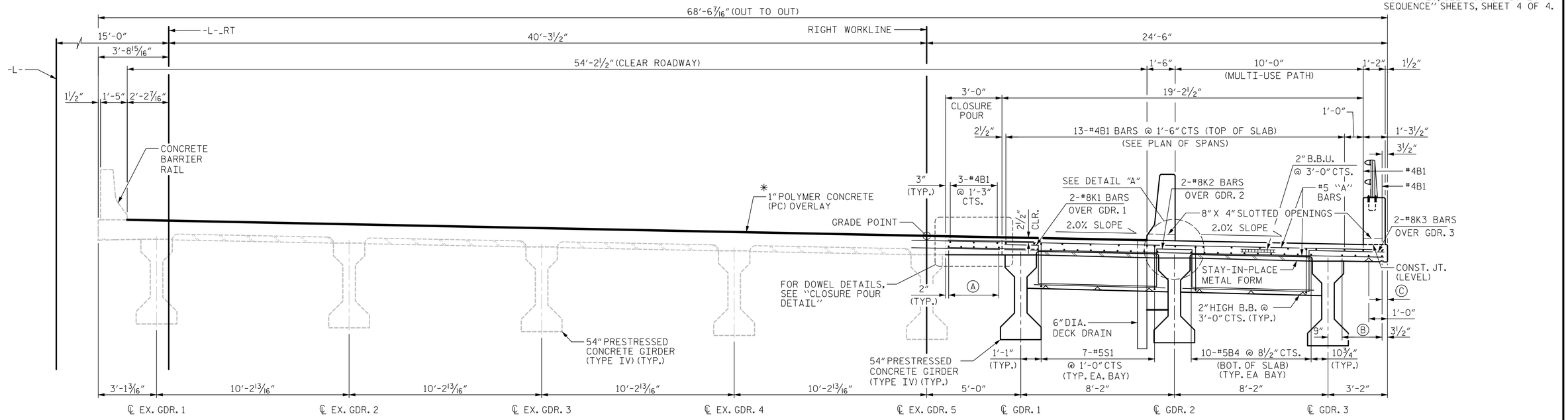
GENERAL DRAWING
CONSTRUCTION SEQUENCE
(NORTHBOUND LANES)

REVISIONS

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

SHEET NO. S1-09
TOTAL SHEETS 119

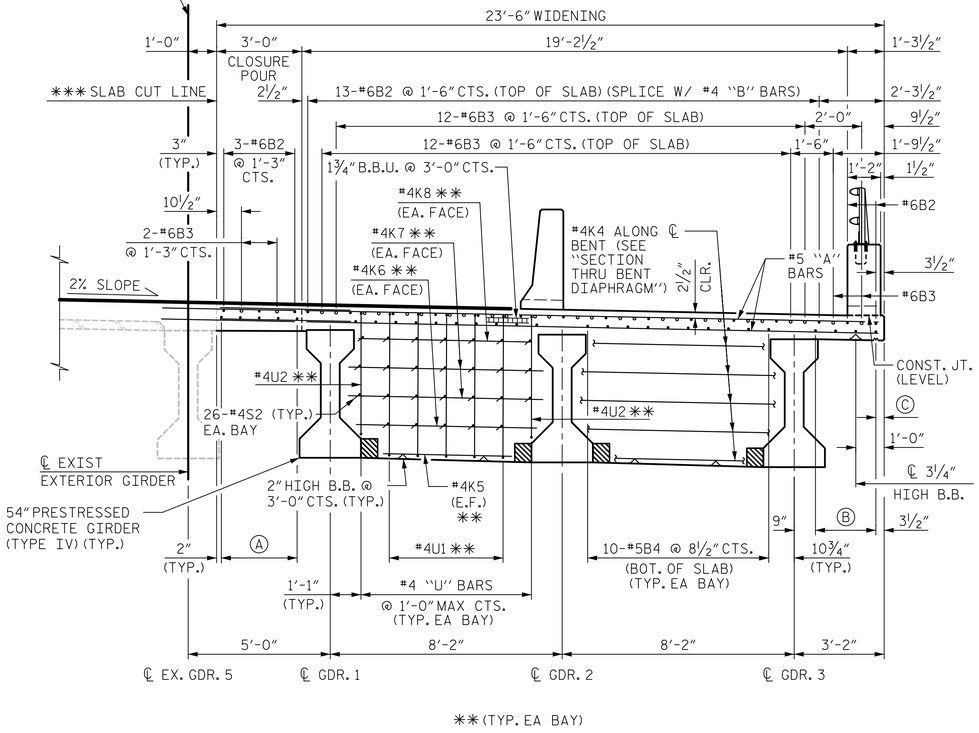
FOR NOTES, SEE "CONSTRUCTION SEQUENCE" SHEETS, SHEET 4 OF 4.



TYPICAL SECTION

(END BENT 1 & BENT 2)
(SPAN A & SPAN B)

*** PRIOR TO DECK REMOVAL, THE CONTRACTOR SHALL SUBMIT METHOD OF REMOVAL OF EXISTING DECK TO SLAB CUT LINE AS SHOWN IN PLANS. CONTRACTOR SHALL ENSURE MEASURES ARE TAKEN TO PROTECT DECK REINFORCING STEEL DURING REMOVAL OPERATIONS.



** (TYP. EA BAY)

PARTIAL TYPICAL SECTION

(BENT 1)

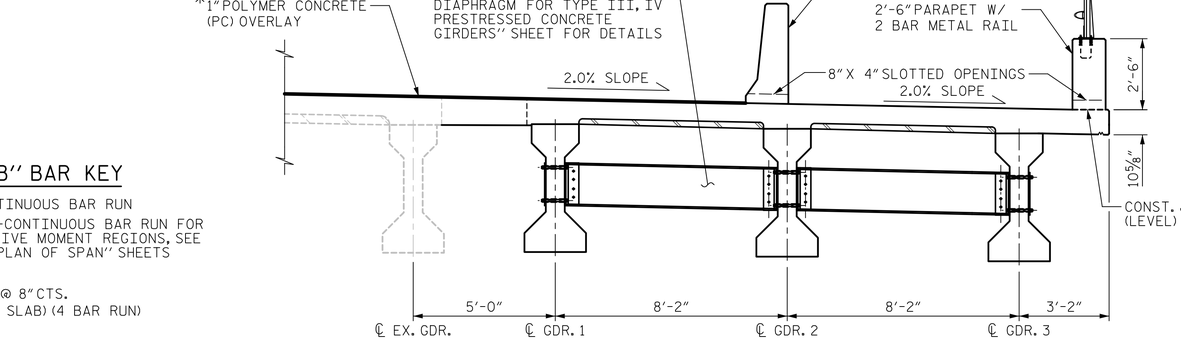
"B" BAR KEY

- ● = CONTINUOUS BAR RUN
- ○ = NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE "PLAN OF SPAN" SHEETS

Ⓐ 5-#5B4 @ 8" CTS. (BOT. OF SLAB) (4 BAR RUN)

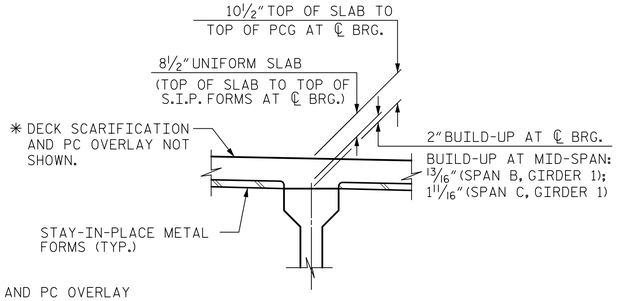
Ⓑ 4-#5B4 @ 8 1/2" CTS. (BOT. OF SLAB) (4 BAR RUN) (TYP. EA. OVERHANG)

Ⓒ 3 1/2" TO ℄ 2 - 1" Δ DRIP GROOVES



PARTIAL TYPICAL SECTION

(INTERMEDIATE DIAPHRAGMS)
(ALL SPANS)



DETAIL "A"

* DECK SCARIFICATION AND PC OVERLAY INSTALLED AFTER WIDENING IS COMPLETE (IN ROADWAY PORTION ONLY). CONSTRUCT DECK SLAB TO FULL THICKNESS SHOWN. SEE PRESERVATION PLANS.

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 3

DRAWN BY : M. CATER	DATE : 10/2020		
CHECKED BY : J.C. MORRISON	DATE : 12/2022		
DESIGNED BY : D. RITACCO	DATE : 09/2020		
DESIGN CHECKED BY : J.C. MORRISON	DATE : 10/2020		

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DEPARTMENT OF TRANSPORTATION
RALEIGH

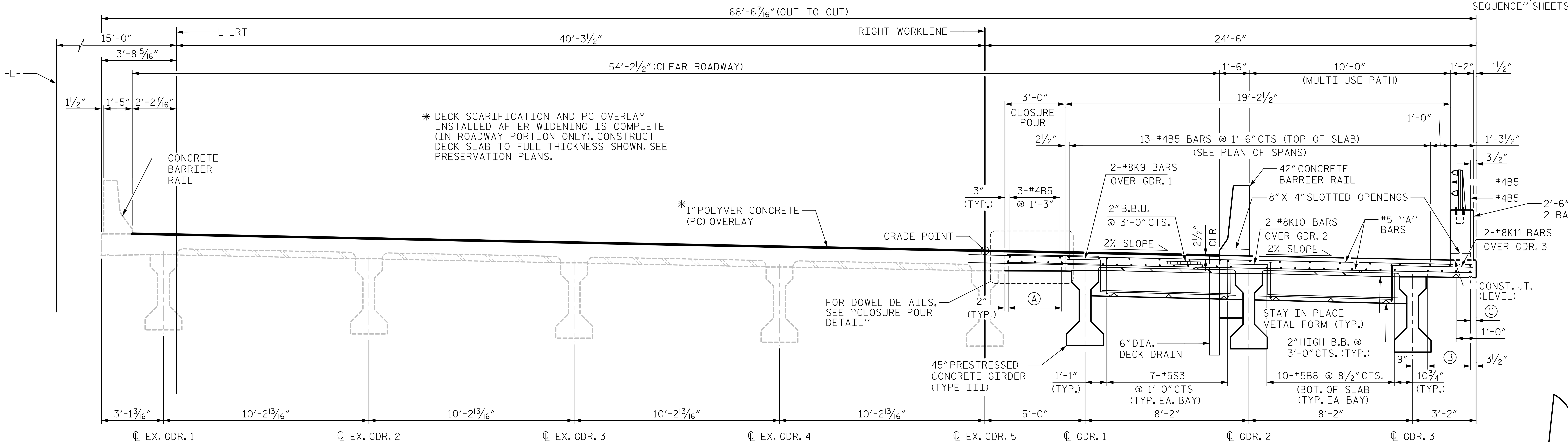
SUPERSTRUCTURE

TYPICAL SECTIONS

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			119

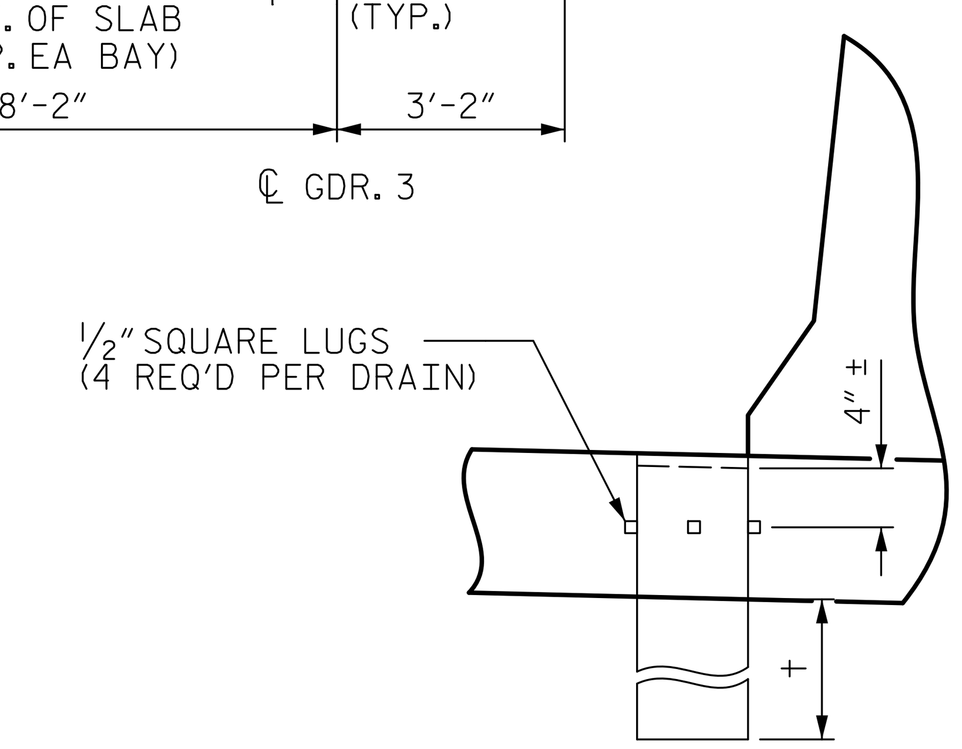
FOR NOTES, SEE "CONSTRUCTION SEQUENCE" SHEETS, SHEET 4 OF 4.



*** PRIOR TO DECK REMOVAL, THE CONTRACTOR SHALL SUBMIT METHOD OF REMOVAL OF EXISTING DECK TO SLAB CUT LINE AS SHOWN IN PLANS. CONTRACTOR SHALL ENSURE MEASURES ARE TAKEN TO PROTECT DECK REINFORCING STEEL DURING REMOVAL OPERATIONS.

TYPICAL SECTION

(END BENT 2 & BENT 2)
(SPAN C & SPAN D)



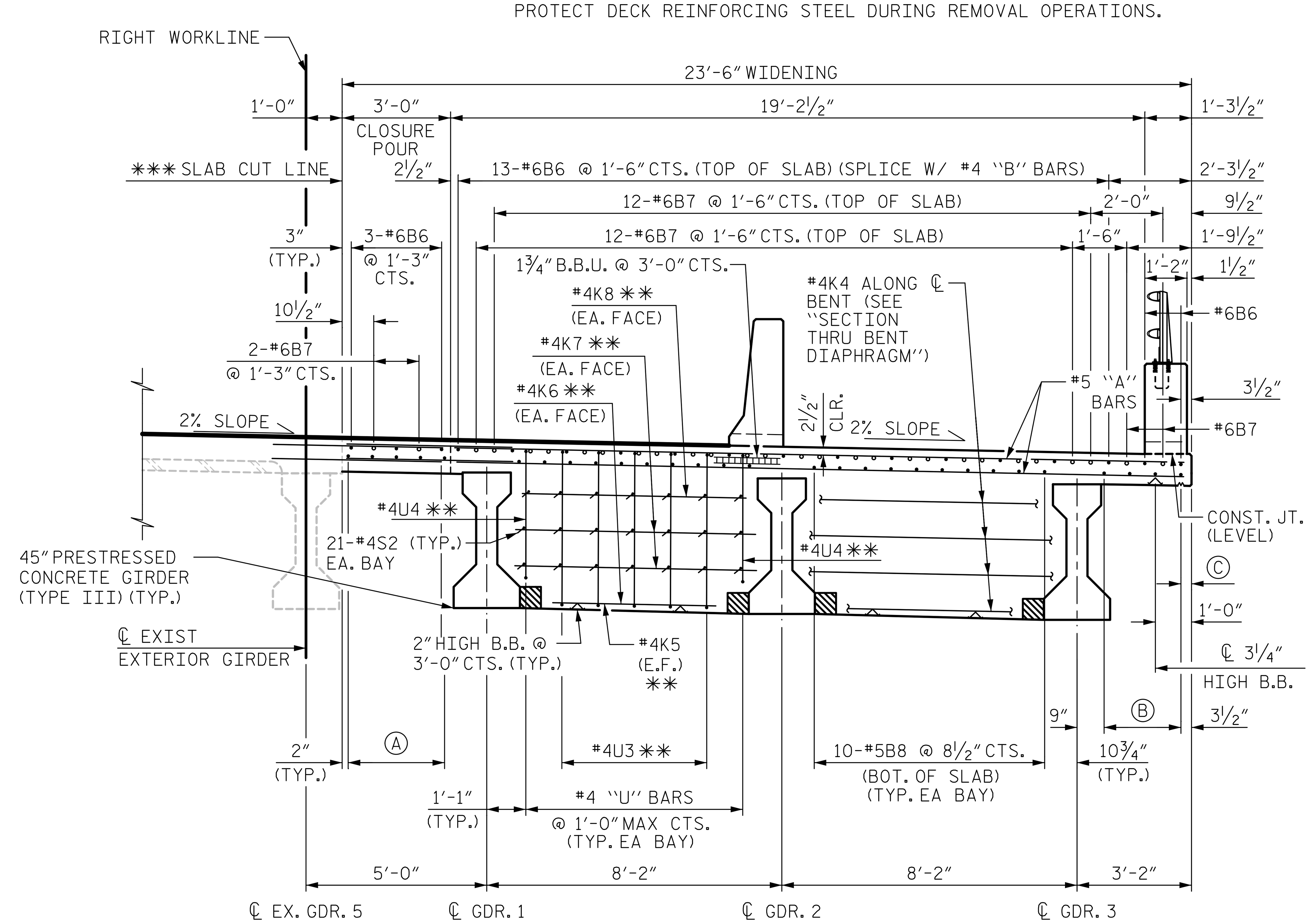
DECK DRAIN DETAILS

† DRAIN TO EXTEND 2" BELOW BOTTOM OF GIRDER (SEE "PLAN OF SPANS" FOR LOCATION OF DECK DRAINS)

TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.

4 - ½" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

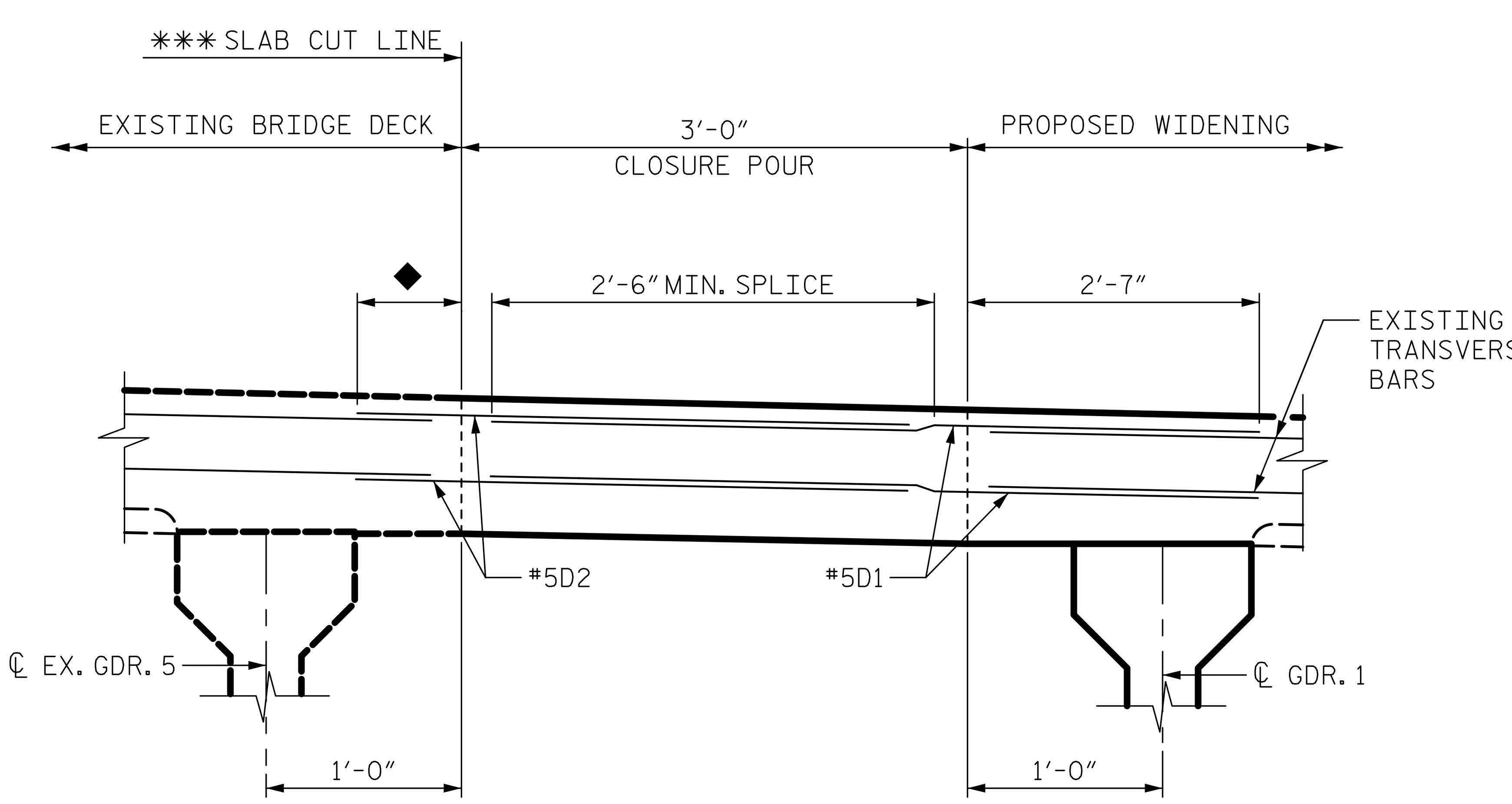
THE 6" DIA. PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.



** (TYP. EA BAY)

PARTIAL TYPICAL SECTION

(BENT 3)



CLOSURE POUR DETAIL

(ALL SPANS)

Ⓐ 5-#5B8 @ 8" CTS. (BOT. OF SLAB) (2 BAR RUN)

Ⓑ 4-#5B8 @ 8½" CTS. (BOT. OF SLAB) (2 BAR RUN) (TYP. EA. OVERHANG)

Ⓒ 3½" TO ℄ 2 - 1" △ DRIP GROOVES

◆ #6D2 DOWELS PLACED IN THE EXISTING DECK SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM. LEVEL ONE FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE DOWEL IS 13.2 KIPS. OVERALL LENGTH SHALL PROVIDE A 2'-6" MIN. EXTENSION INTO CLOSURE POUR. EMBEDMENT LENGTH TO BE DETERMINED BY THE MANUFACTURER OF THE ADHESIVELY ANCHORED ANCHOR SYSTEM. #6D2 BAR LENGTH IS BASED ON A 10" EMBEDEMENT LENGTH. ADHESIVELY ANCHORED DOWEL TESTING SHALL BE IN ACCORDANCE WITH SECTION 420-13 OF THE STANDARD SPECIFICATIONS.

#6D1 AND #6D2 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

"B" BAR KEY

● = CONTINUOUS BAR RUN

○ = NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE "PLAN OF SPAN" SHEETS

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 3

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CHECKED BY : J.C. MORRISON	DATE : 12/2022
DESIGNED BY : D. RITACCO	DATE : 09/2020
DESIGN CHECKED BY : J.C. MORRISON	DATE : 10/2020

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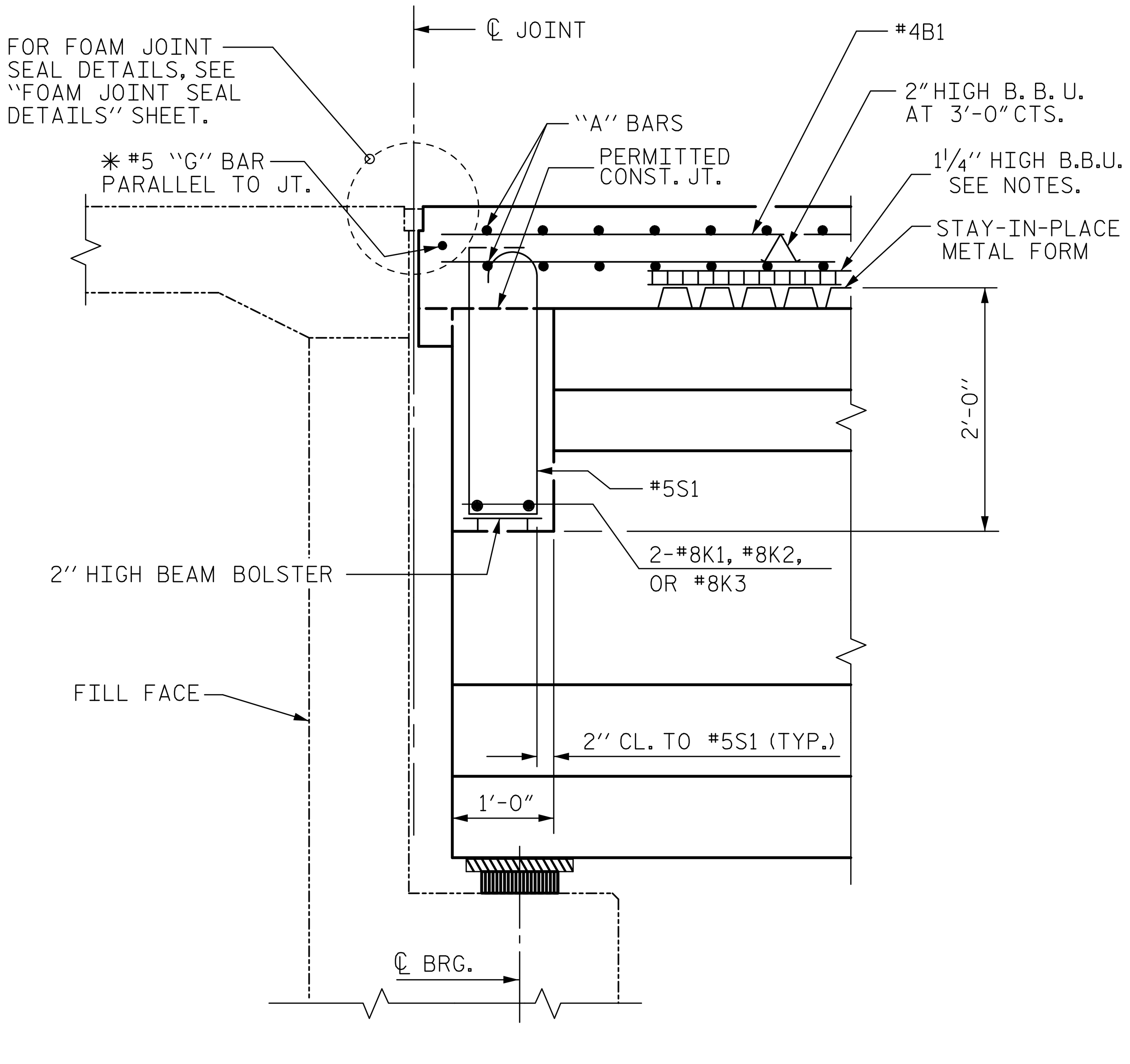
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

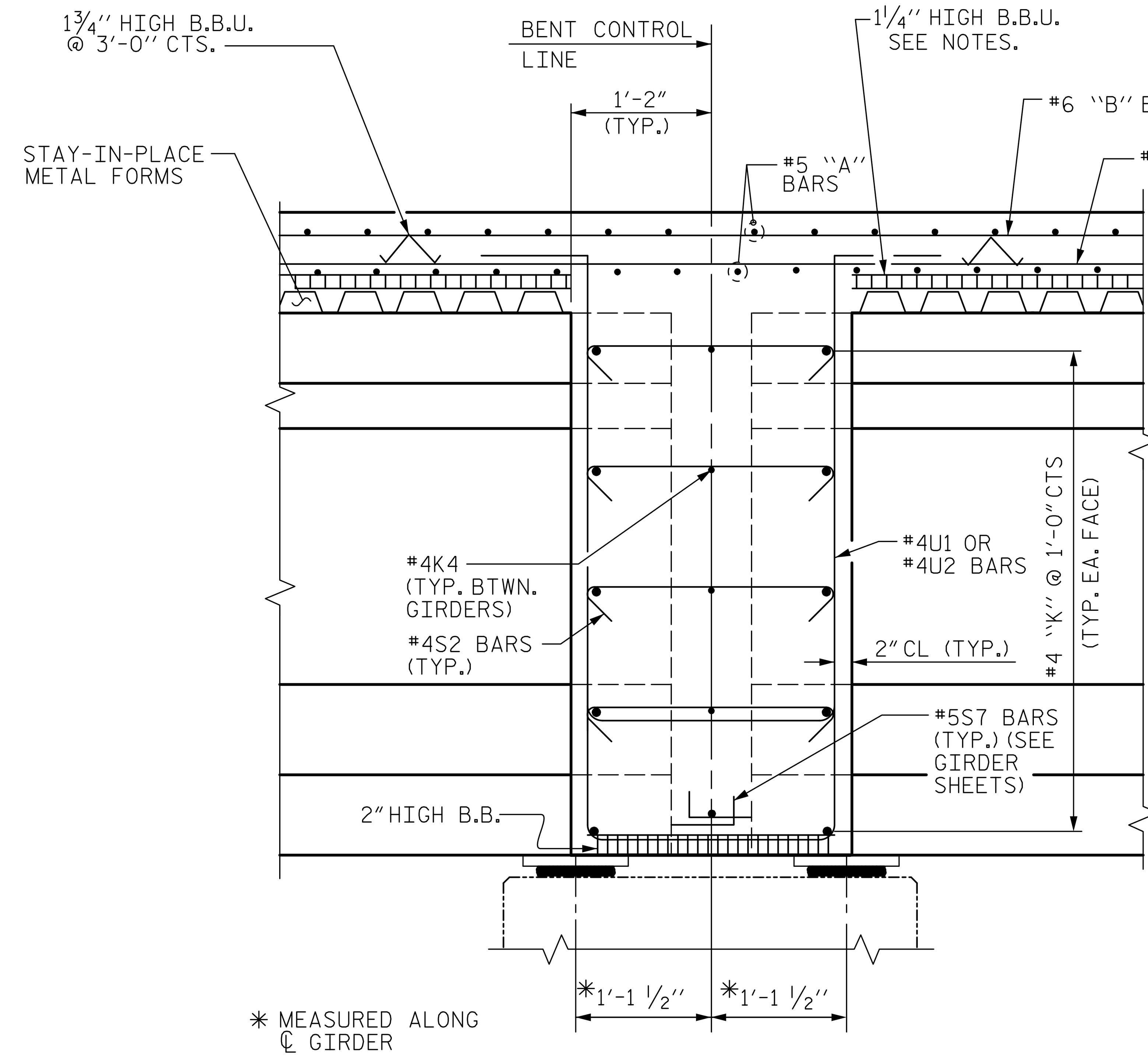
(NORTHBOUND LANES)

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S1-11
1			3			TOTAL SHEETS	119
2			4				

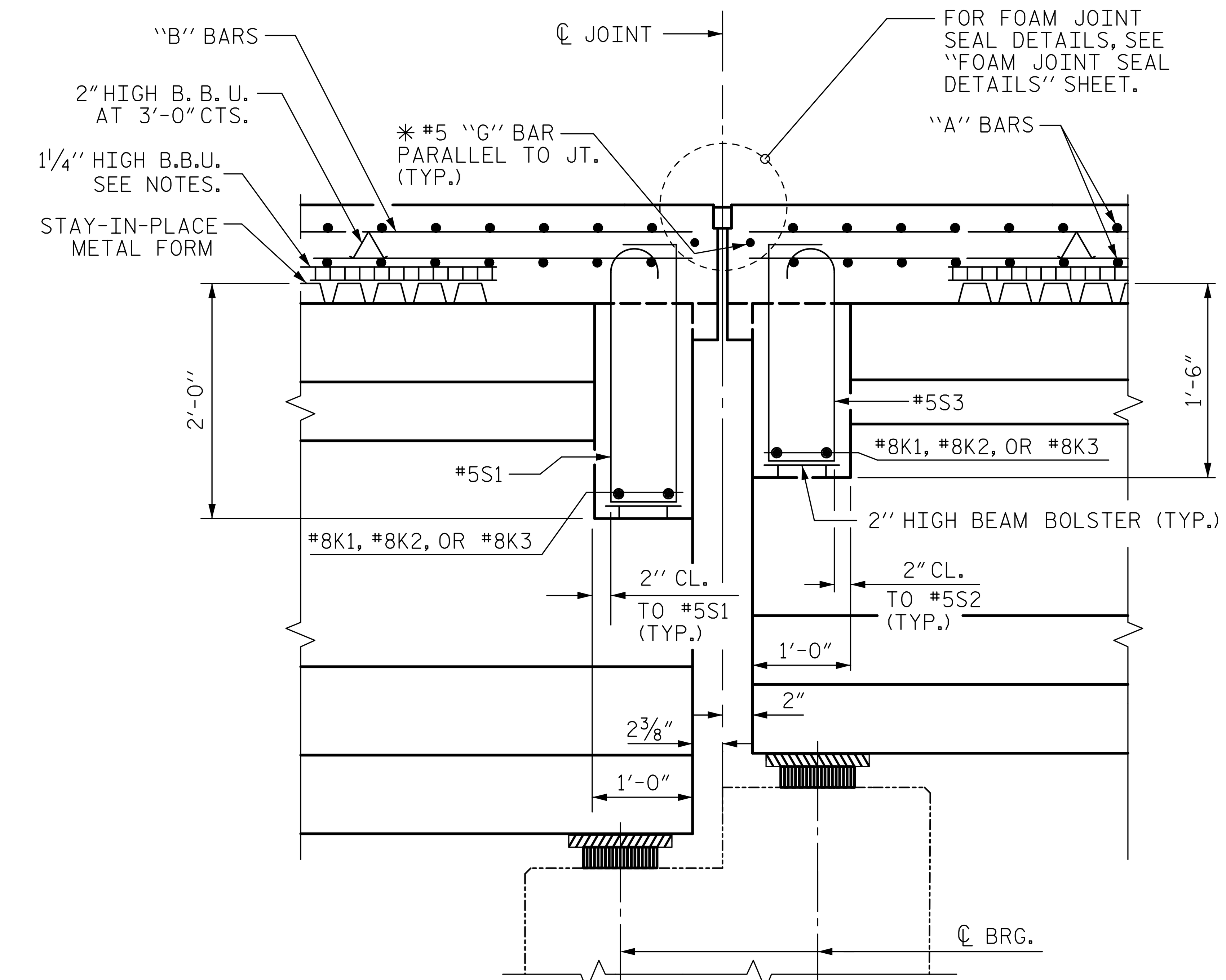


SECTION THRU END BENT 1 DIAPHRAGM

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



SECTION THRU BENT 1 DIAPHRAGM



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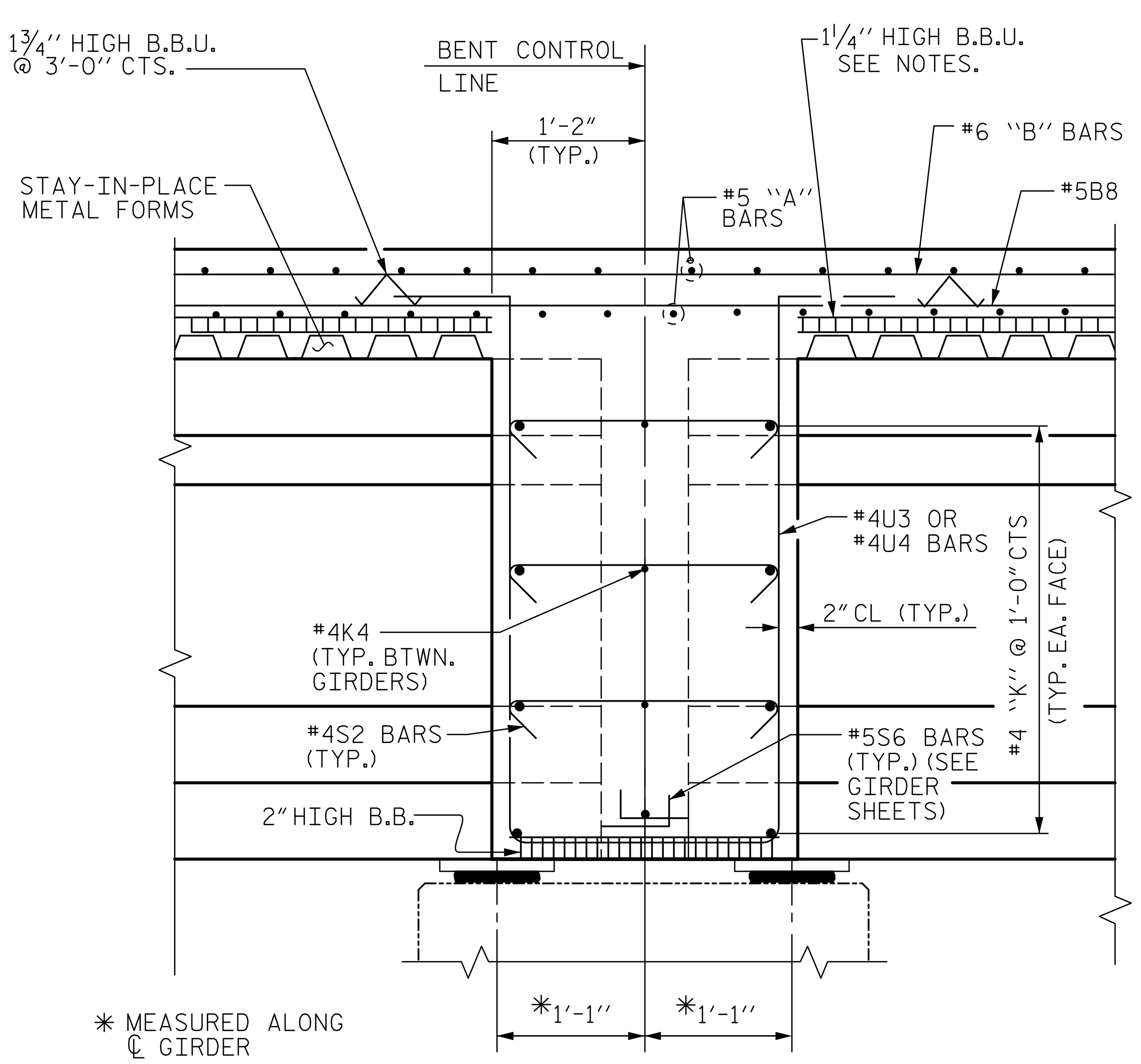

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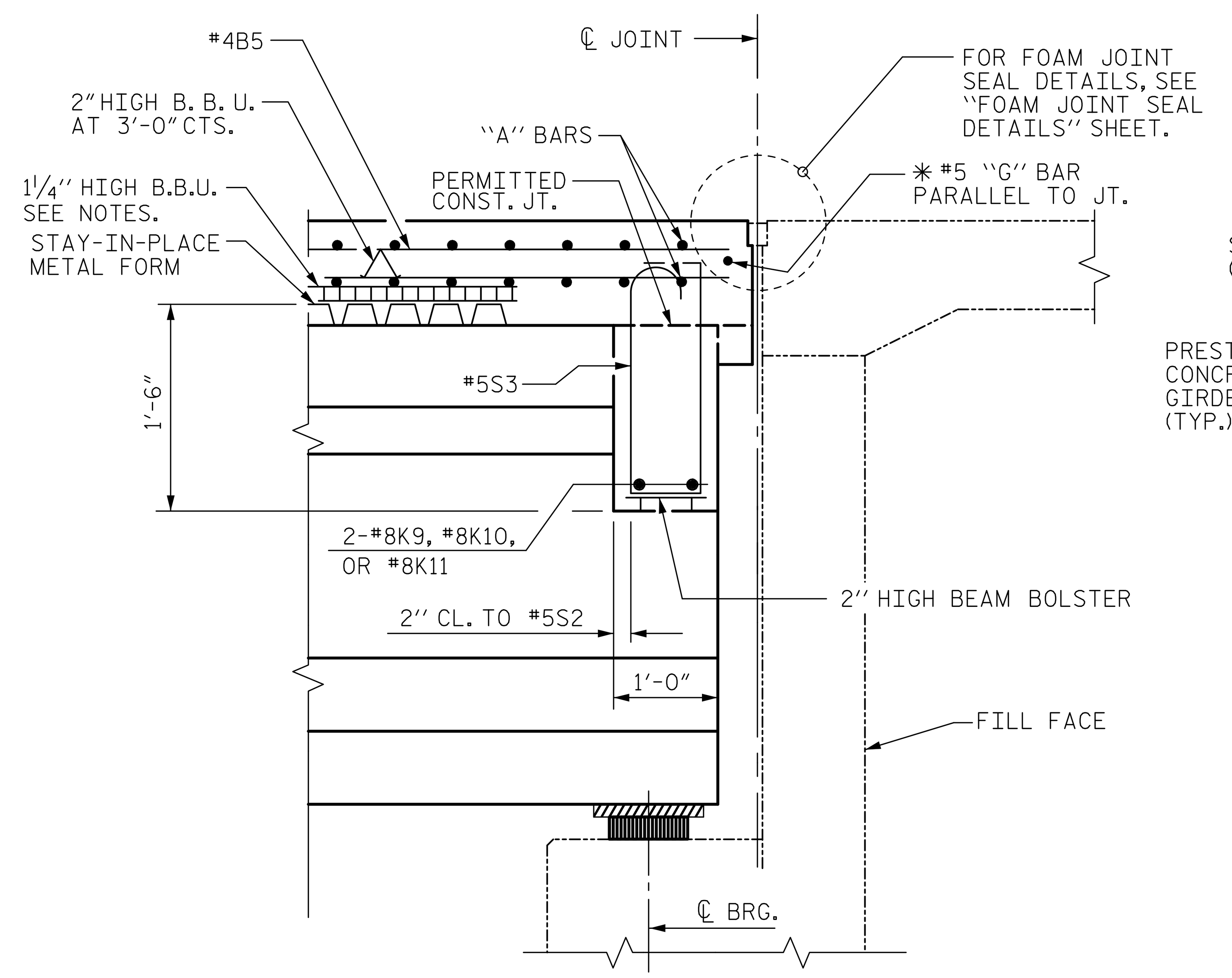

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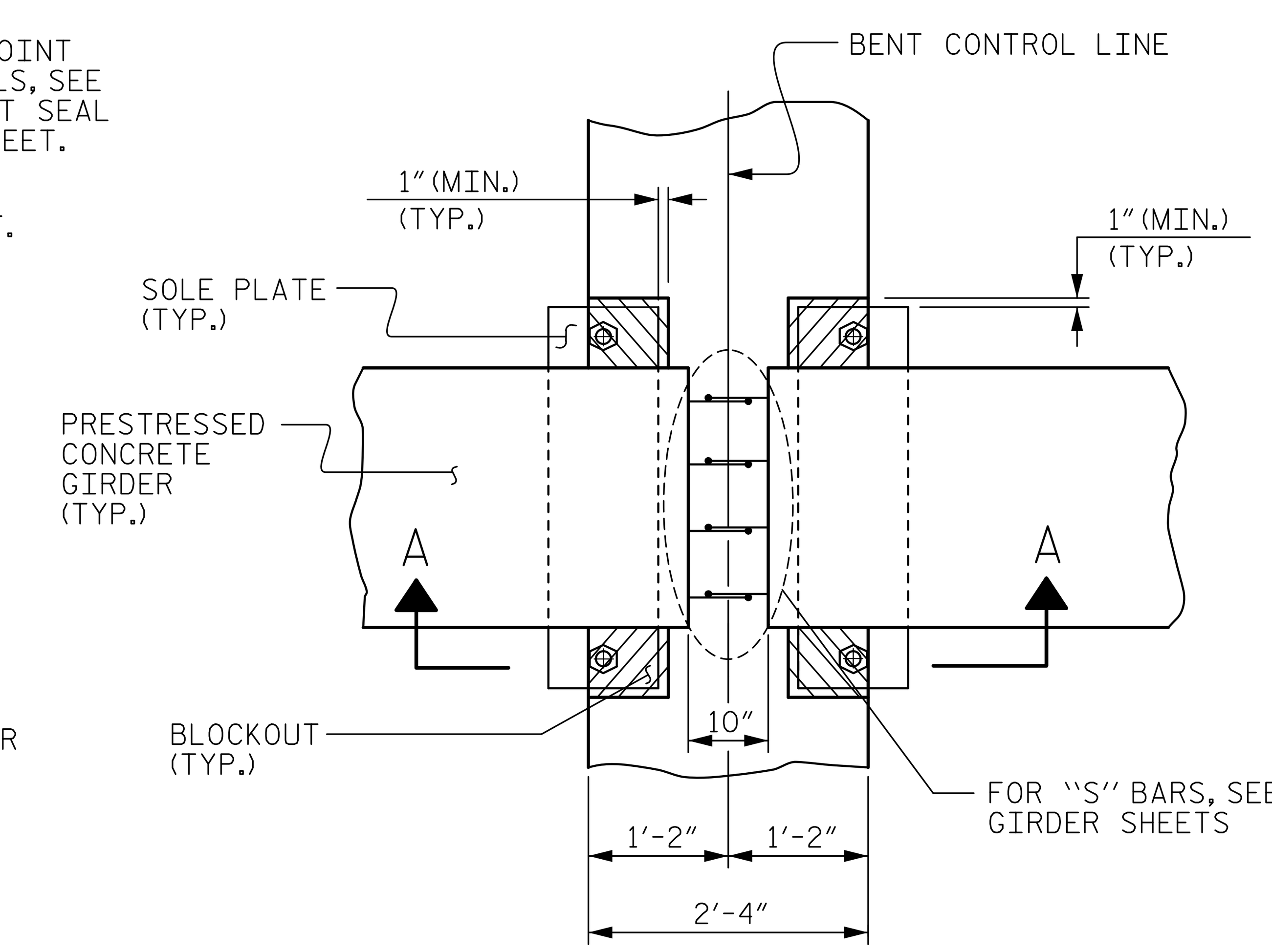
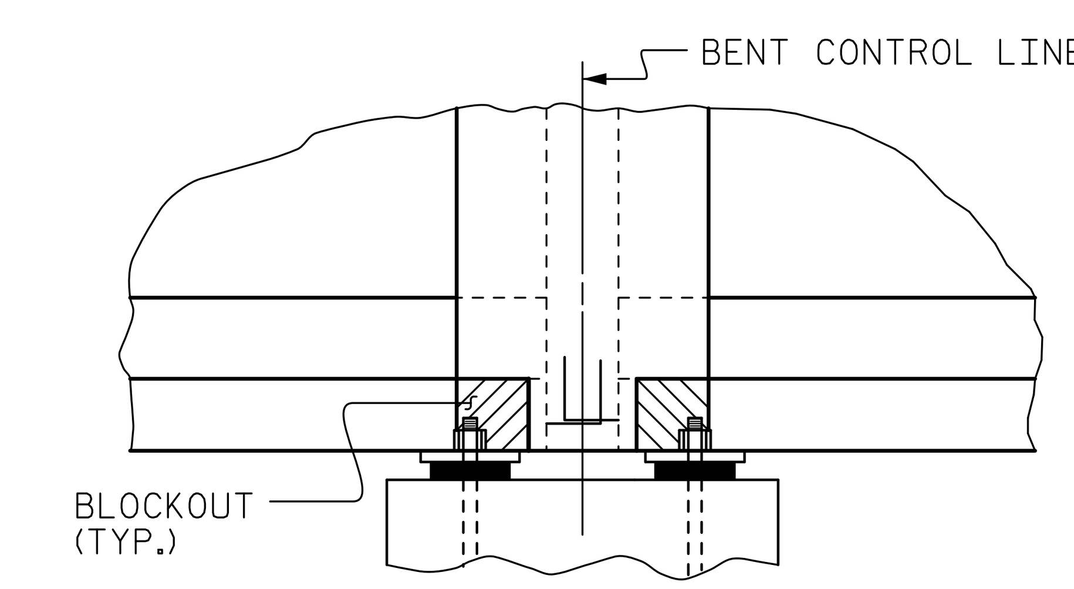


PLAN

BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION A-A

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 3 OF 3

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RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

(NORTHBOUND LANES)

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S1-12
1				3				TOTAL SHEETS
2				4				119

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DESIGNED BY :	D. RITACCO	DATE :	09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	09/2020

DATE: 2/9/2023
TIME: 12:36:00 PM

6" DIA. DECK DRAIN LOCATIONS

11 TOTAL LOCATIONS AT STA. 23+66, 23+71, 23+87, 23+97, 24+07, 25+53, 25+63, 25+73, 25+90, 26+02, AND 26+12

PLAN OF SPAN "A"

(1) 4-#5B4 @ 8½" CTS. (BOT. OF SLAB) (4 BAR RUN)

(2) 5-#5B4 @ 8" CTS. (BOT. OF SLAB) (4 BAR RUN)

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 4

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SUPERSTRUCTURE

PLAN OF SPAN "A"

(NORTHBOUND LANES)

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S1-13
1				3				TOTAL SHEETS
2				4				119

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DESIGN CHECKED BY :	J.C. MORRISON	DATE :	10/2020

PLAN OF SPAN "B"

(1) 4-#5B4 @ 8½" CTS. (BOT. OF SLAB) (4 BAR RUN)

(2) 5-#5B4 @ 8" CTS. (BOT. OF SLAB) (4 BAR RUN)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 4

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SUPERSTRUCTURE

PLAN OF SPAN "B"

(NORTHBOUND LANES)

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S1-14
1			3				TOTAL SHEETS
2			4				119

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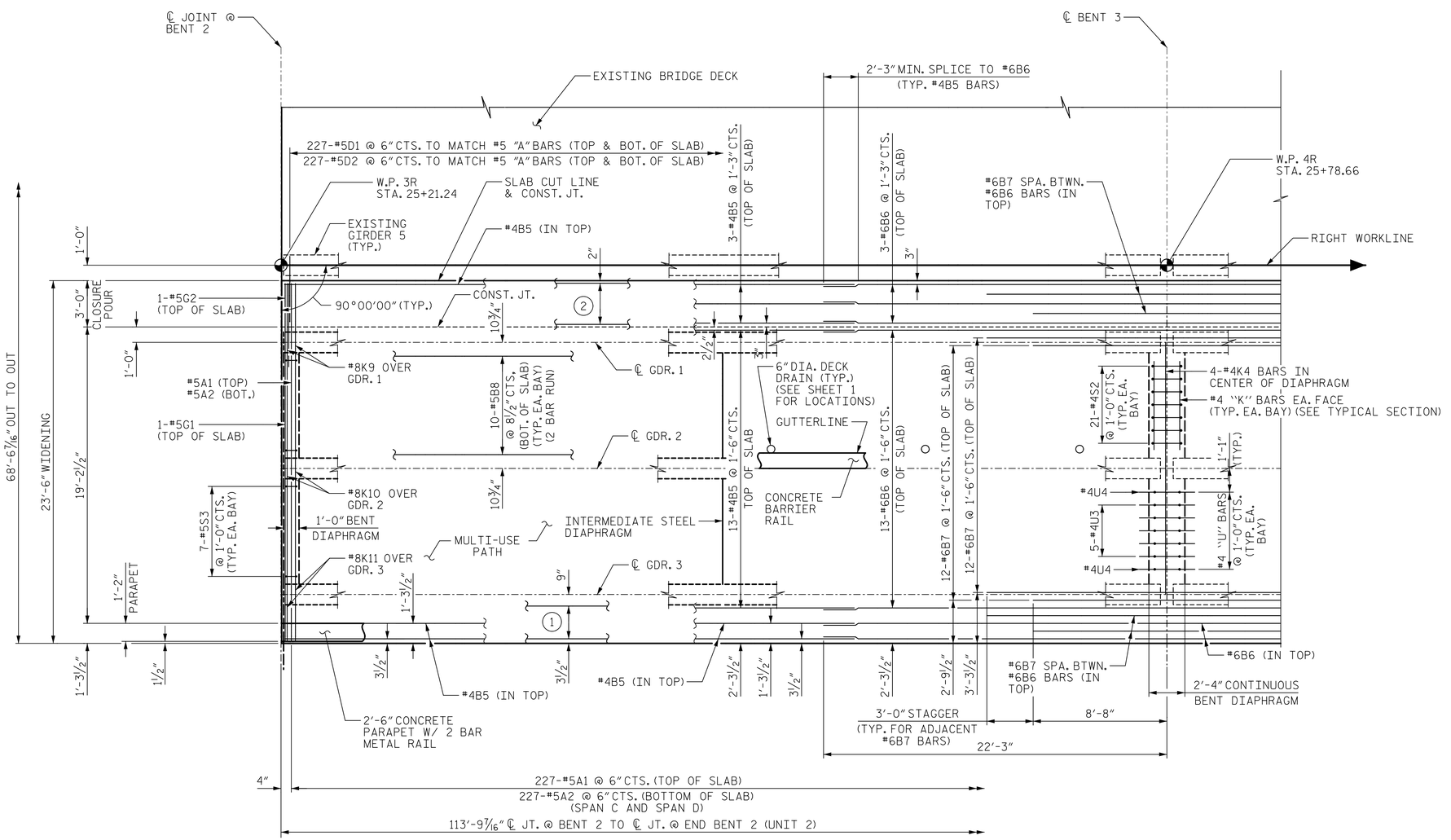
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	10/2020



PLAN OF SPAN "C"

(1) 4-#5B8 @ 8½" CTS. (BOT. OF SLAB) (2 BAR RUN)

(2) 5-#5B8 @ 8" CTS. (BOT. OF SLAB) (2 BAR RUN)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 3 OF 4

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RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "C"

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-15
1			3			TOTAL SHEETS
2			4			119

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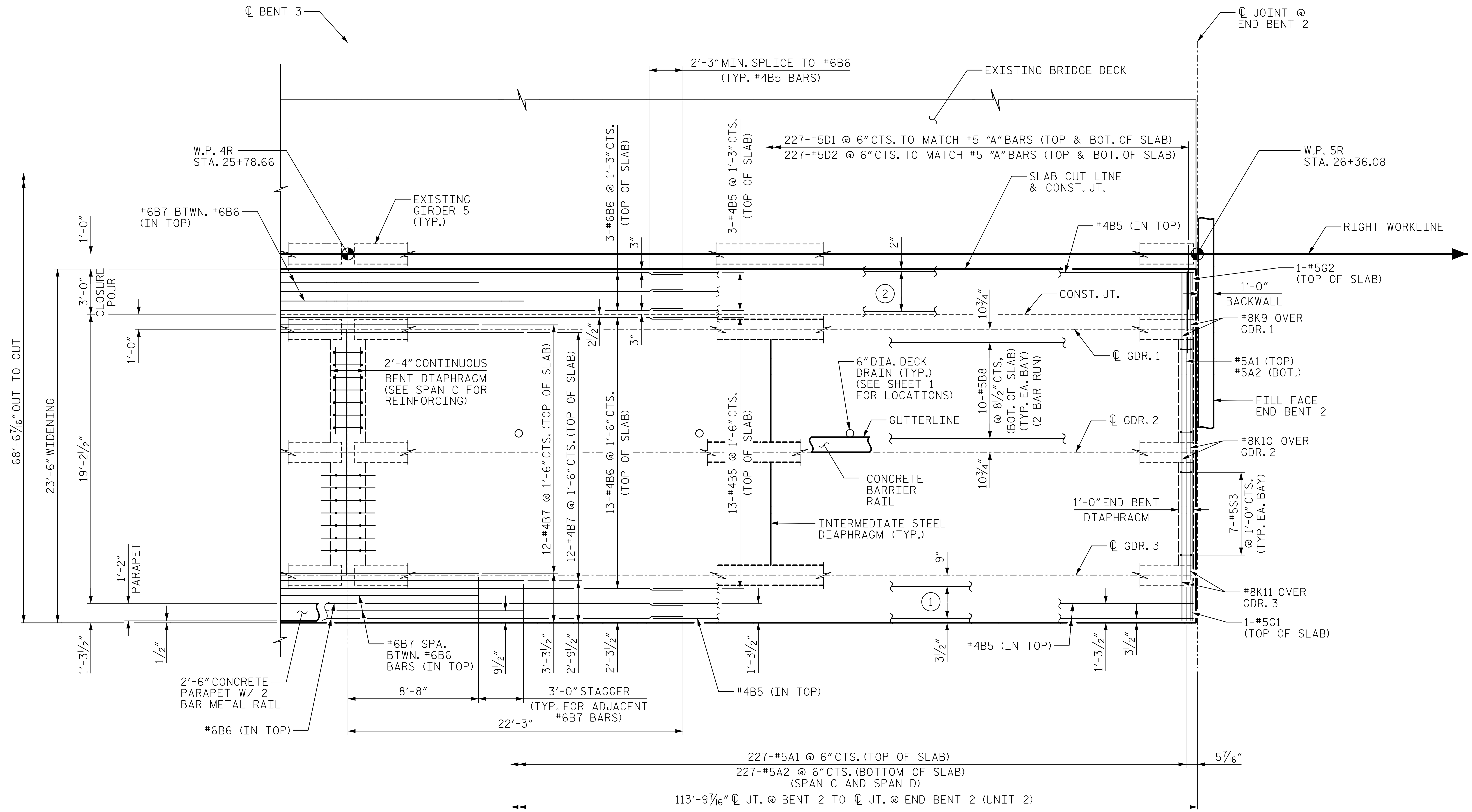
DESIGN CHECKED BY : J.C. MORRISON DATE : 10/2020



PLAN OF SPAN "D"

(1) 4-#5B8 @ 8½" CTS. (BOT. OF SLAB) (2 BAR RUN)

(2) 5-#5B8 @ 8" CTS. (BOT. OF SLAB) (2 BAR RUN)

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 4 OF 4

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SUPERSTRUCTURE

PLAN OF SPAN "D"

(NORTHBOUND LANES)

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

SHEET NO. S1-16
TOTAL SHEETS 119

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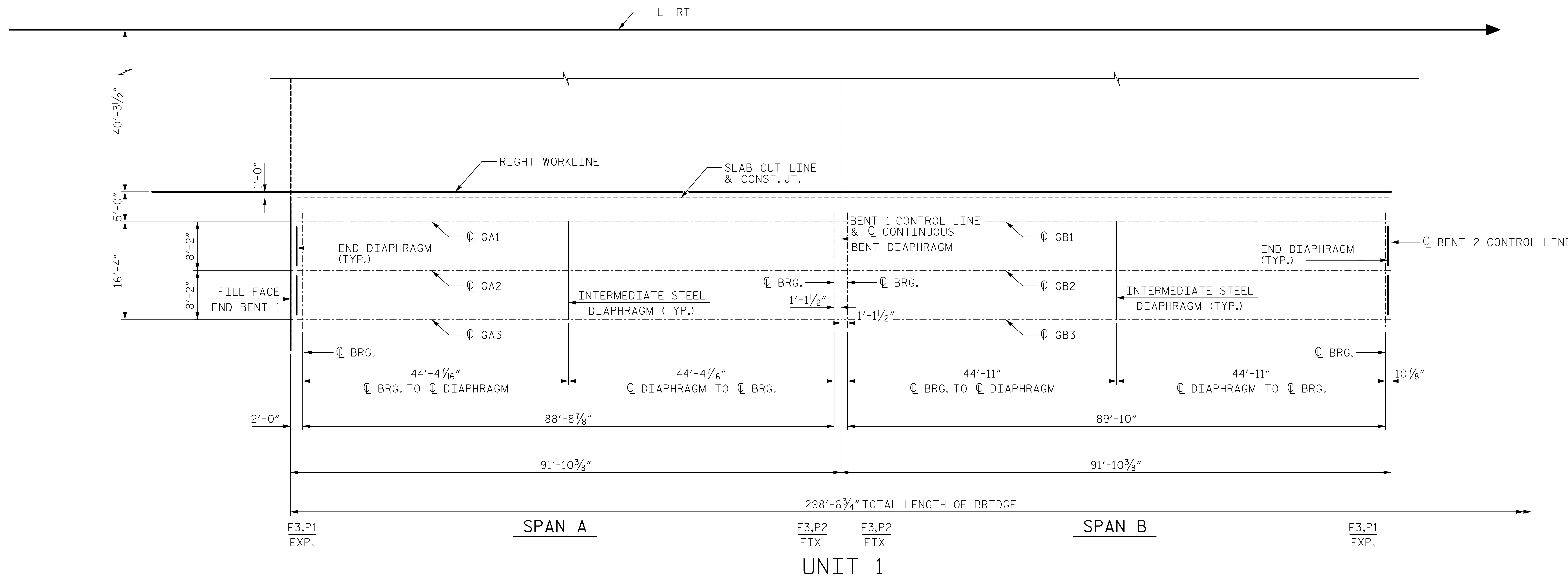
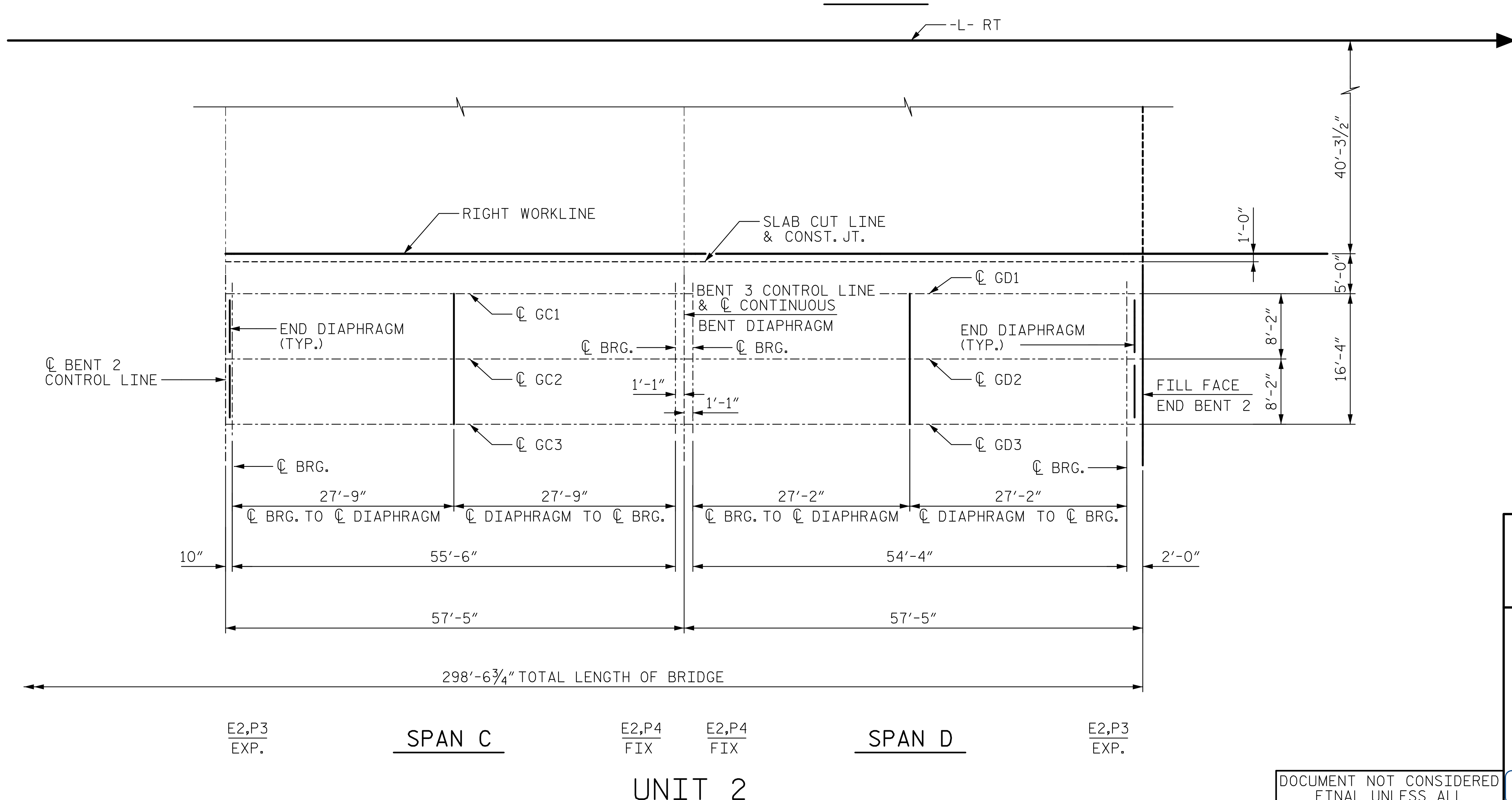
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	10/2020





PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

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SUPERSTRUCTURE

FRAMING PLAN

(NORTHBOUND LANES)

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REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S1-17
1			3				TOTAL SHEETS
2			4				119

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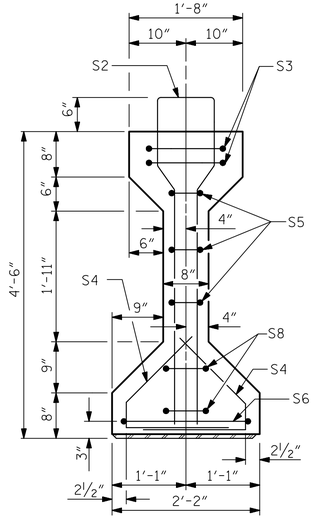
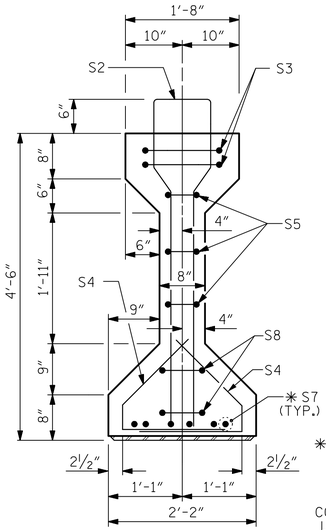
CHECKED BY :	J. MORRISON	DATE :	12/2022
DESIGNED BY :	S. NATARAJAN	DATE :	12/2022
DESIGN CHECKED BY :	J. MORRISON	DATE :	12/2022



SECTION A-A



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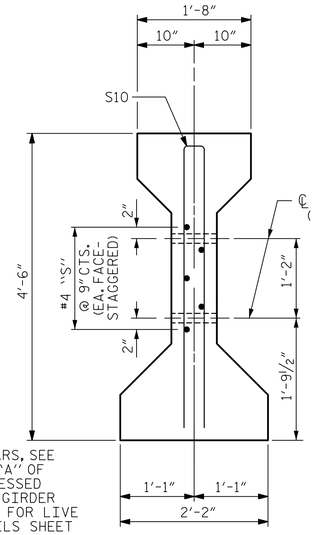
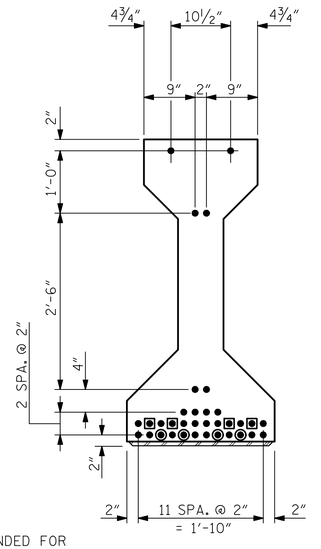


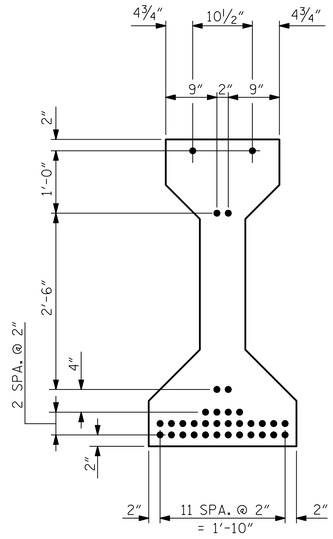
SECTION C-C

(S1 BARS NOT SHOWN)

✳ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



AT END OF GIRDER

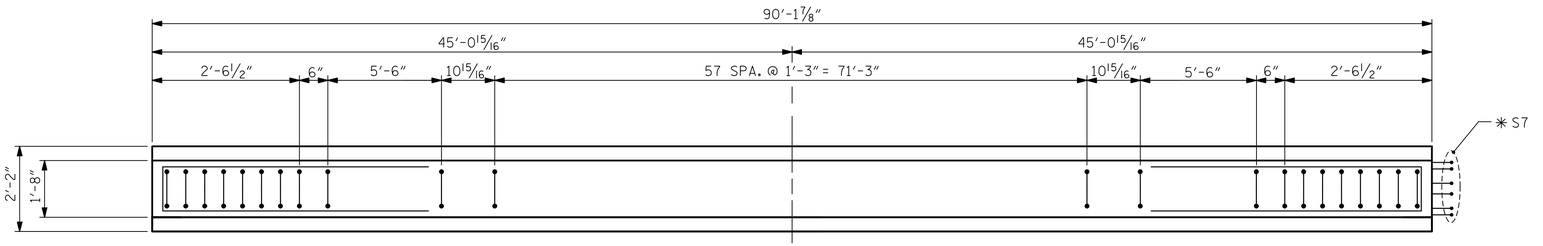


AT ℄ OF GIRDER

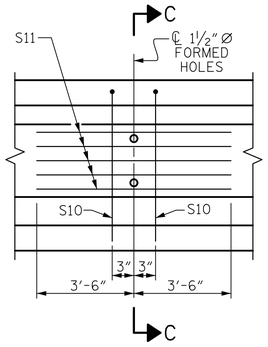
● STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

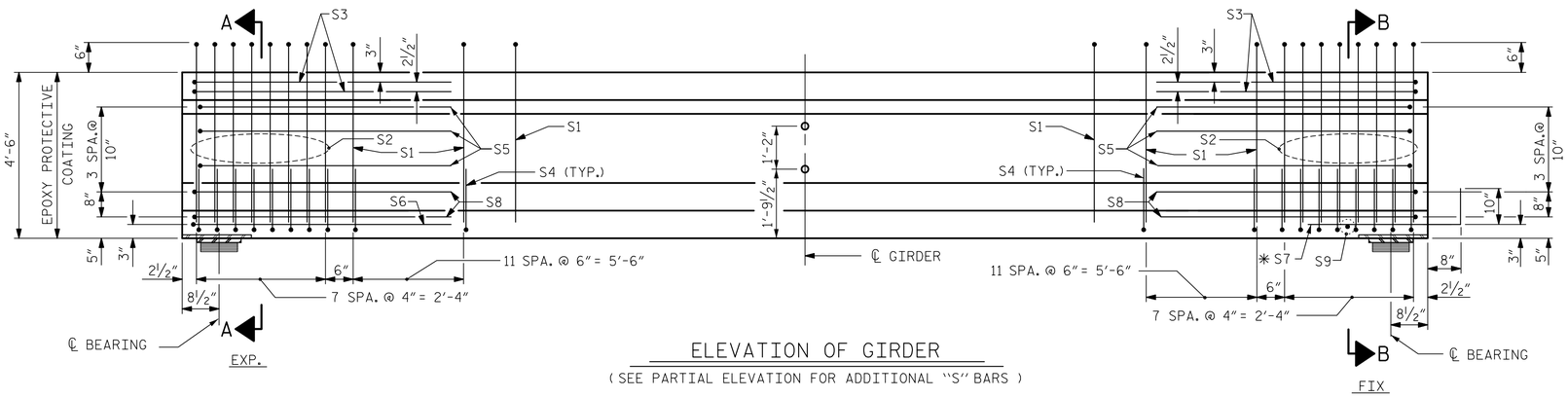


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1, 2 & 3



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

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

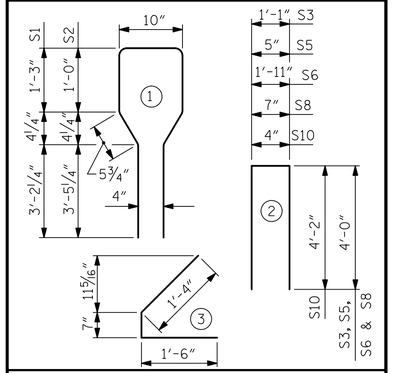
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	74	#4	1	10'-8"	527
S2	16	#6	1	10'-8"	256
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✳S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
GIRDER 1, 2 & 3	1,119	18.3	34

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	90'-1⅞"	270'-5⅝"

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 5

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RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-18
1			3			TOTAL SHEETS
2			4			119

ASSEMBLED BY : M. CATER	DATE : 10/2020
CHECKED BY : J.C. MORRISON	DATE : 05/2021
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

STD. NO. PCG6

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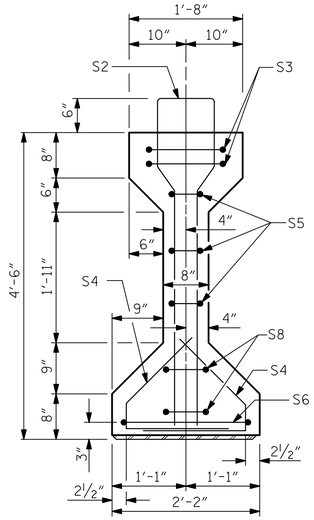
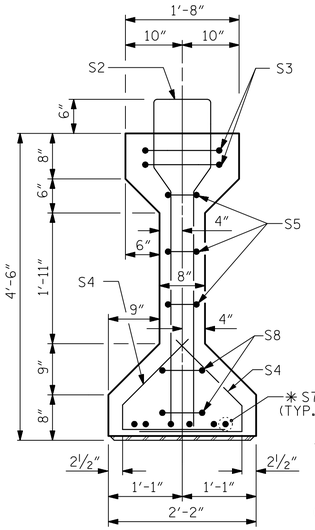
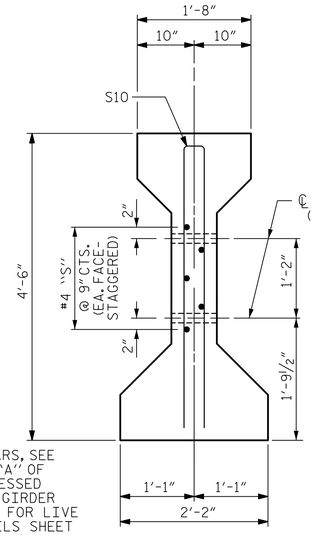


SECTION A-A



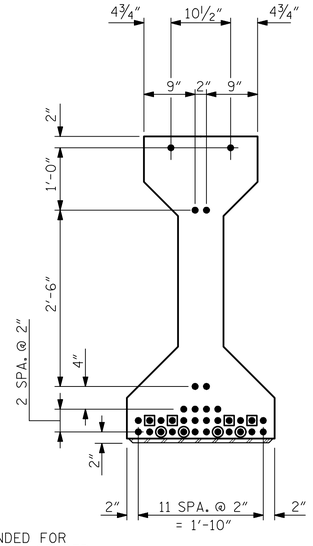
SECTION B-B



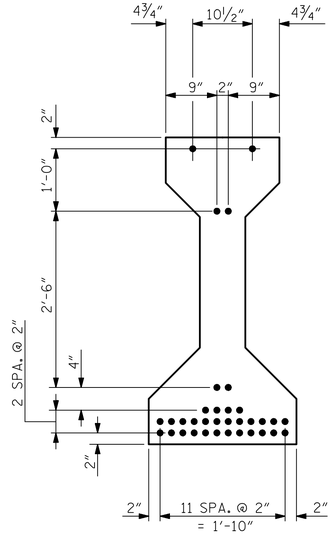
SECTION C-C

(S1 BARS NOT SHOWN)

✳ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



AT END OF GIRDER

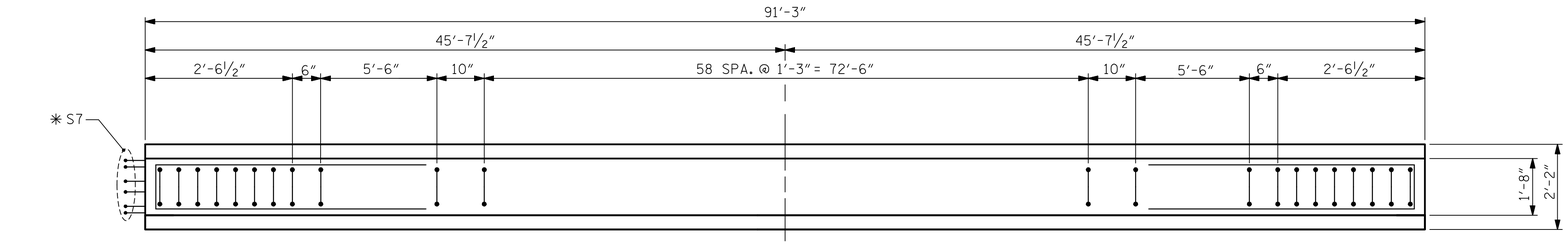


AT ℄ OF GIRDER

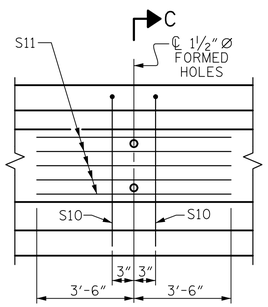
● STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

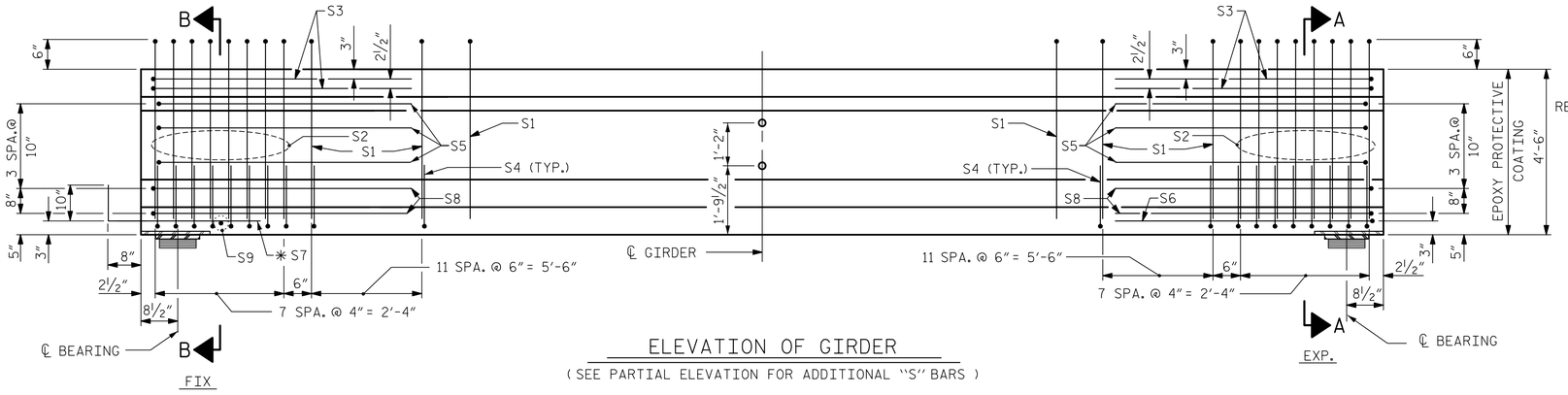


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1, 2 & 3



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

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

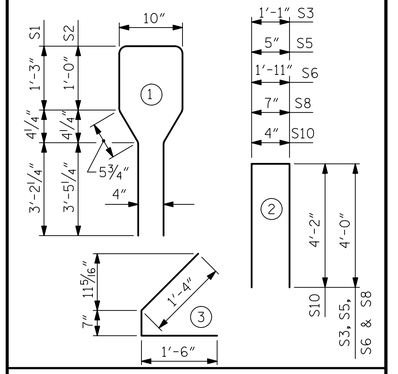
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	75	#4	1	10'-8"	534
S2	16	#6	1	10'-8"	256
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✳S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GIRDER 1, 2 & 3	1,126	18.5	34

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	91'-3"	273'-9"

PROJECT NO. U-5748

WAKE **COUNTY**

STATION: 24+88.00 -L-

SHEET 2 OF 5

ASSEMBLED BY : M. CATER DATE : 10/2020
CHECKED BY : J.C. MORRISON DATE : 05/2021

DRAWN BY : ELR 8/91
CHECKED BY : GRP 8/91

REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
REV. 12/17 MAA/THC

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AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON
DocuSigned by: John C. Morrison 2/10/2023
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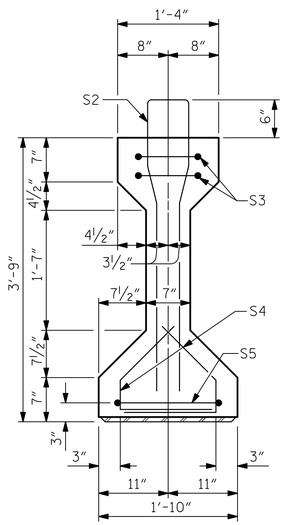
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

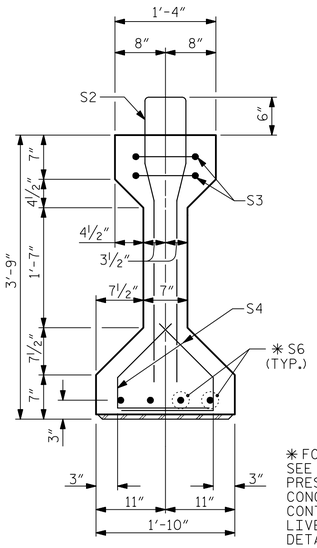
STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-19
1			3			TOTAL SHEETS
2			4			119

STD. NO. PCG6

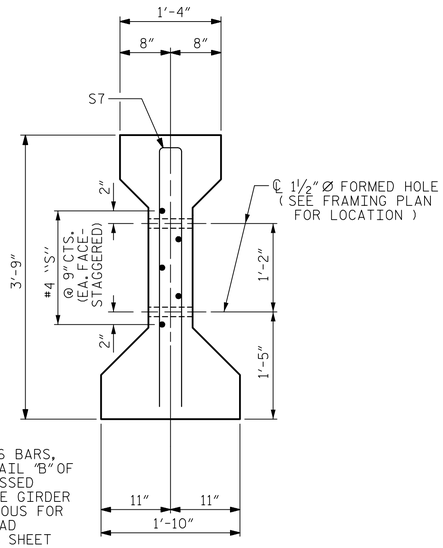


SECTION A-A



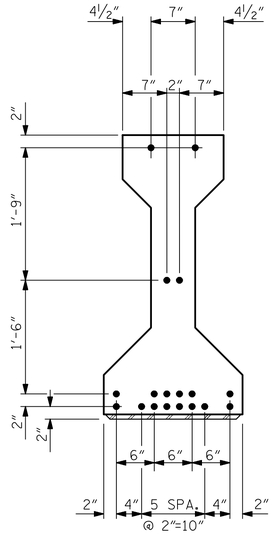
SECTION B-B

✳FOR S6 BARS, SEE DETAIL "B" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

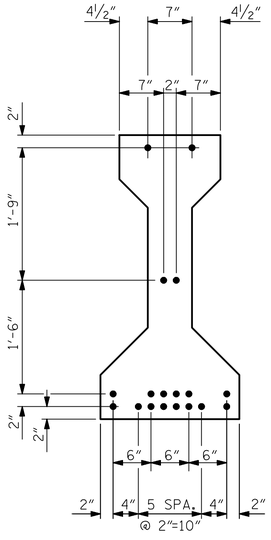


SECTION C-C

(S1 BARS NOT SHOWN)

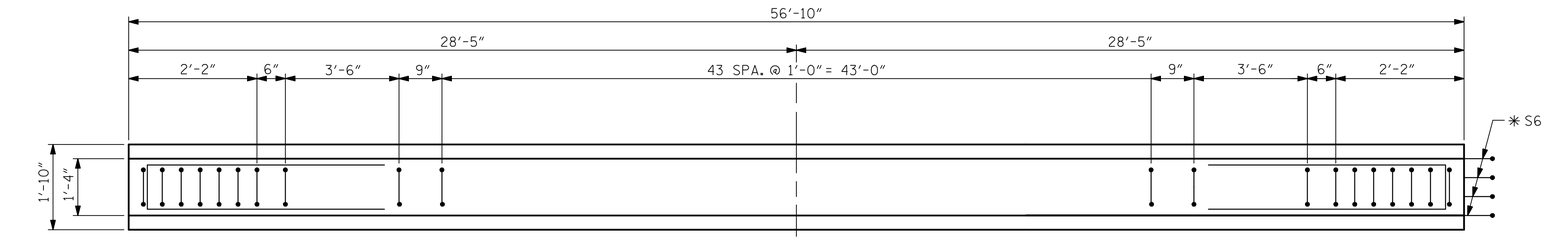


AT END OF GIRDER

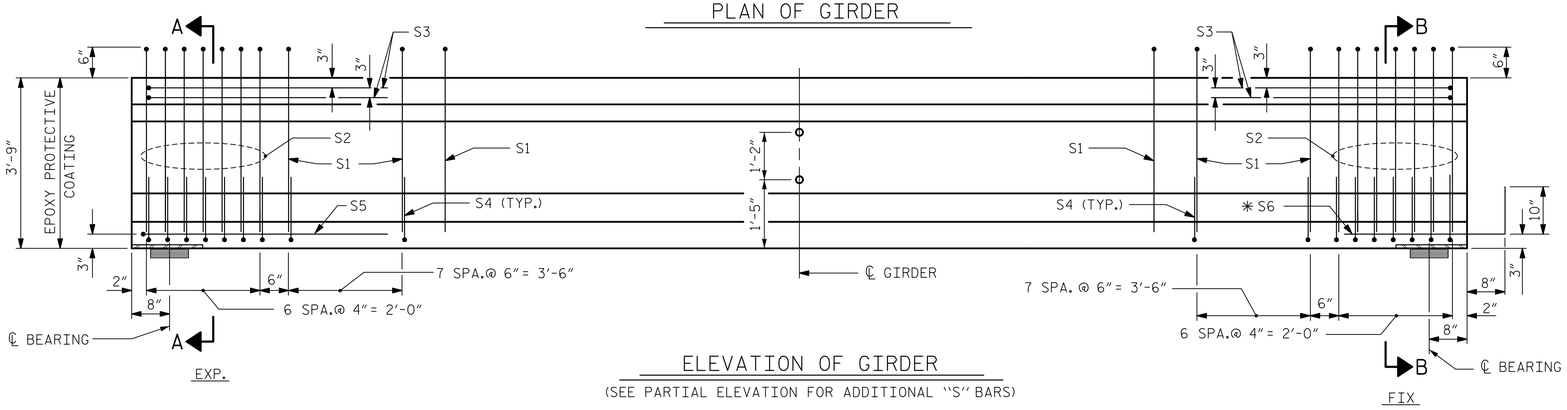


AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT

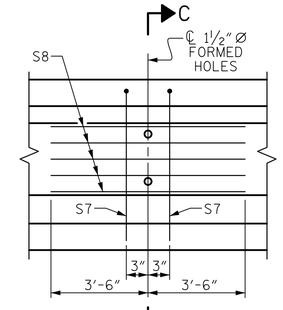


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1, 2 & 3

0.6" Ø L. R. GRADE 270 STRANDS

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

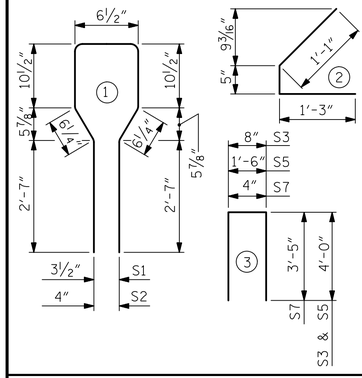
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	60	#4	1	8'-6"	341
S2	14	#6	1	8'-6"	179
S3	4	#4	3	8'-8"	23
S4	60	#4	2	2'-9"	110
S5	1	#4	3	9'-6"	6
✳S6	4	#5	STR	3'-8"	15
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23

✳NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	6,000 PSI CONCRETE	0.6"Ø L. R. STRANDS
	LB.	C.Y.	NO.
GIRDER 1, 2 & 3	712	8.2	18

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	56'-10"	170'-6"

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 3 OF 5

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN C

ASSEMBLED BY : M. CATER	DATE : 10/2020
CHECKED BY : J.C. MORRISON	DATE : 05/2021
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

REVISIONS

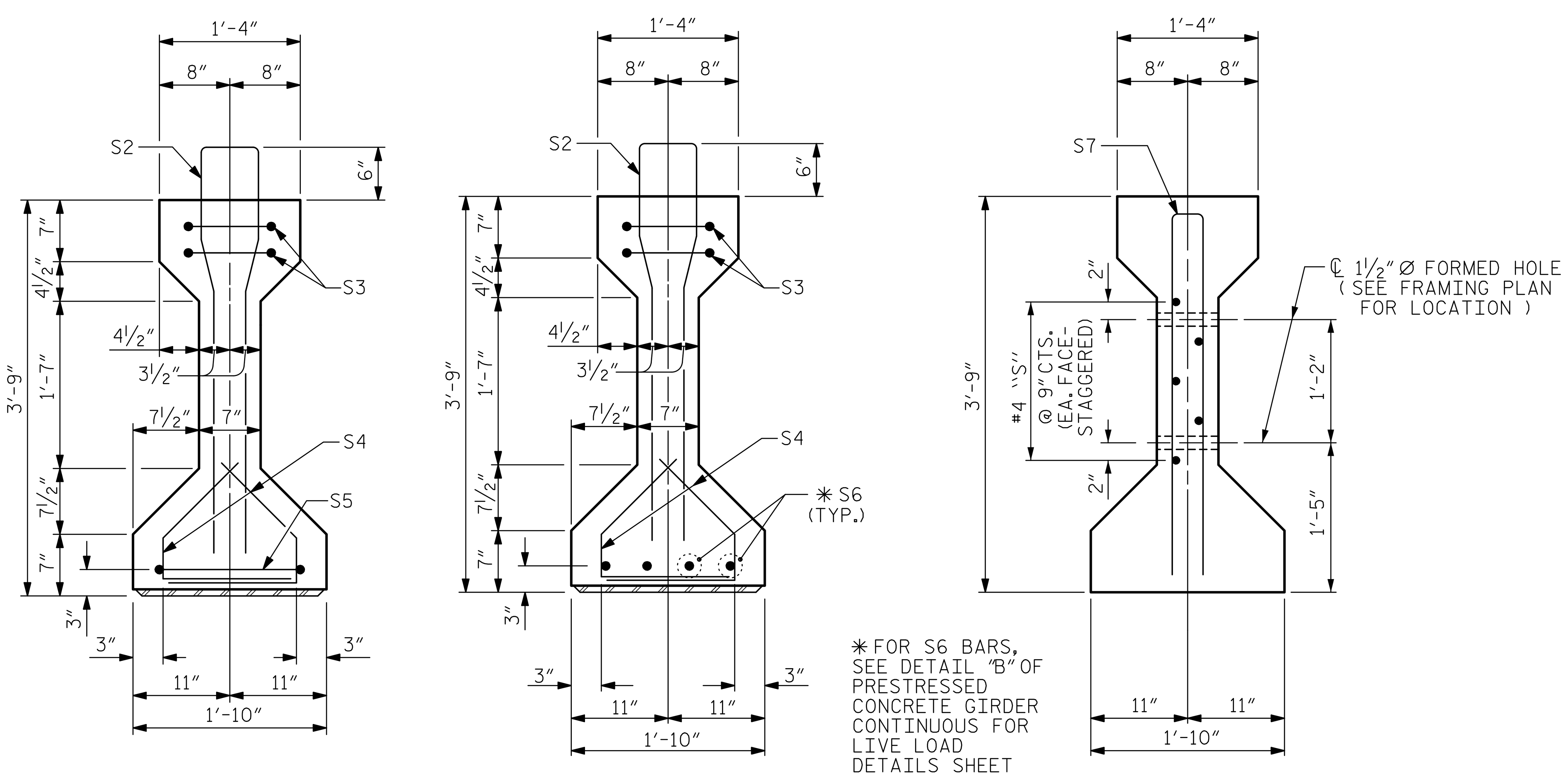
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-20

TOTAL SHEETS 119

STD. NO. PCG5

DATE: 2/9/2023
TIME: 12:37:29 PM



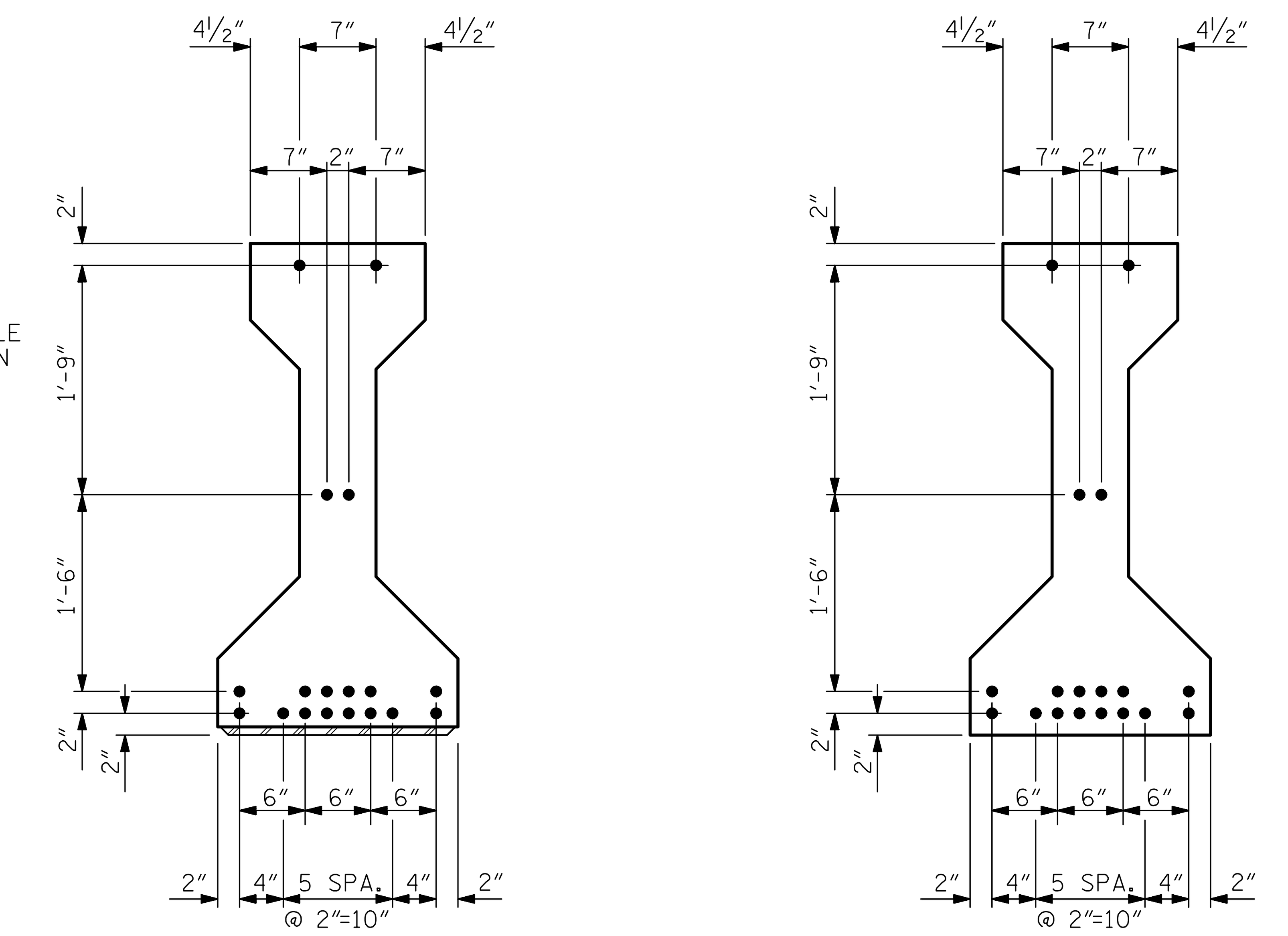
SECTION A-A

SECTION B-B

* FOR S6 BARS, SEE DETAIL "B" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C

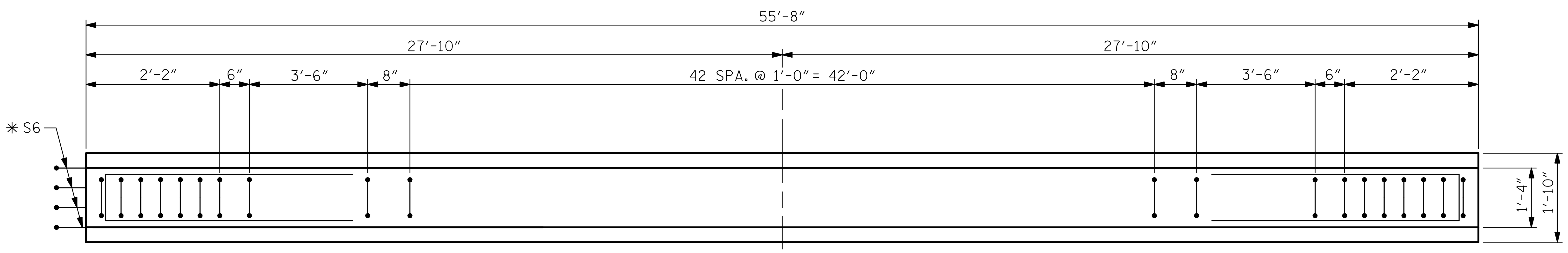
(S1 BARS NOT SHOWN)



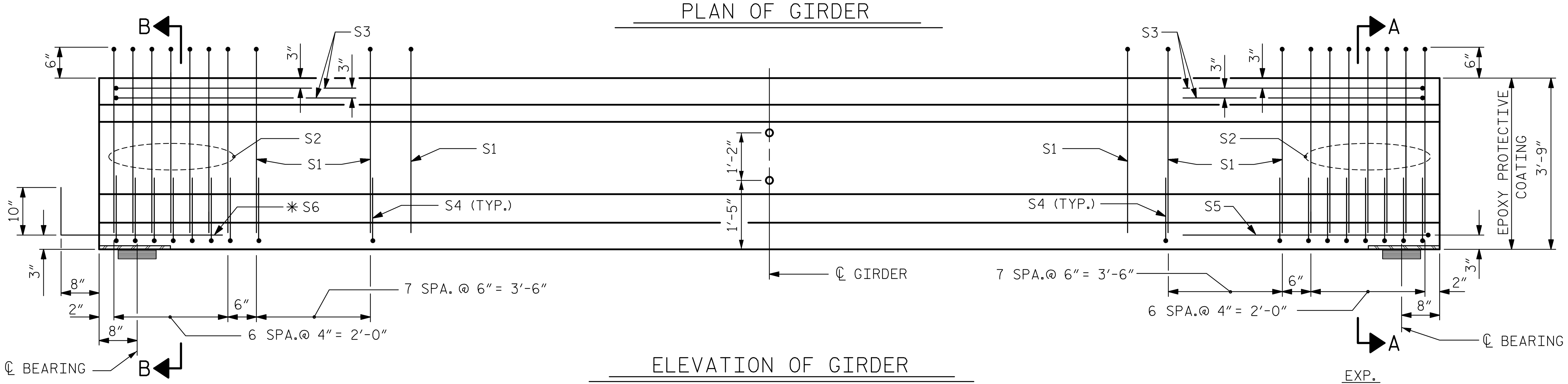
AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

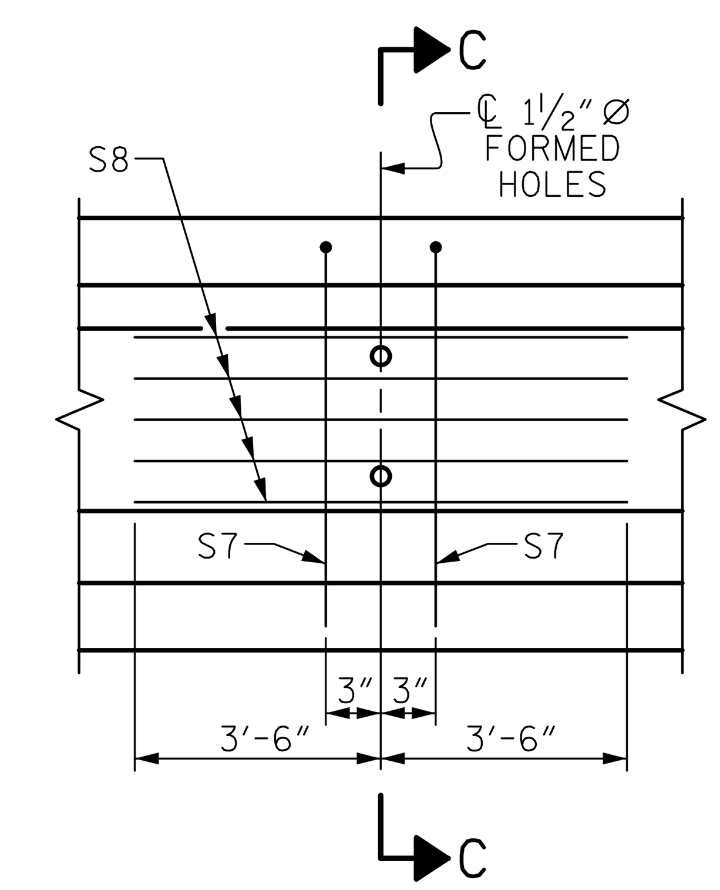


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1, 2 & 3

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

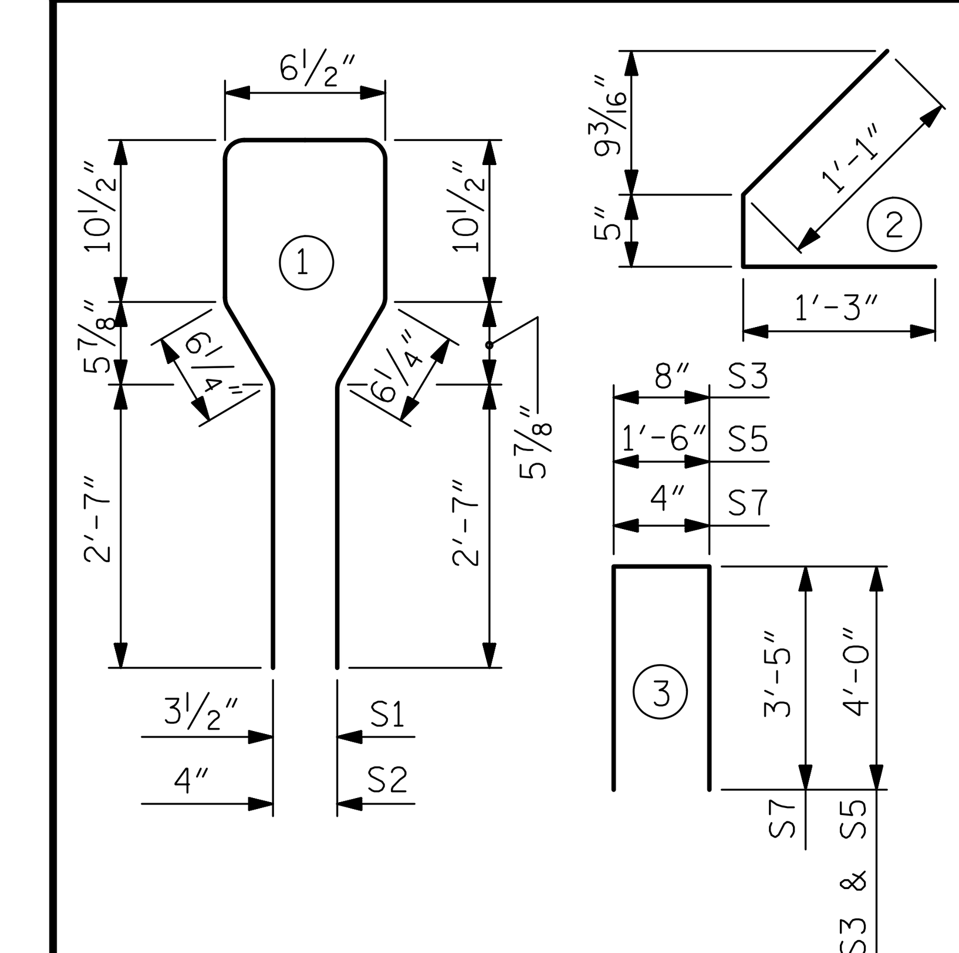
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	59	#4	1	8'-6"	335
S2	14	#6	1	8'-6"	179
S3	4	#4	3	8'-8"	23
S4	60	#4	2	2'-9"	110
S5	1	#4	3	9'-6"	6
* S6	4	#5	STR	3'-8"	15
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	6,000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
GIRDER 1, 2 & 3	706	8.0	18

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	55'-8"	167'-0"

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

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(919) 854-6200 www.aecom.com
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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

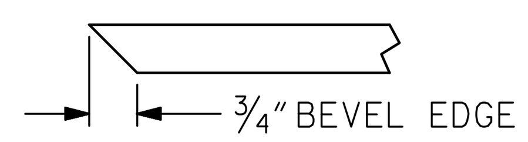
STANDARD
AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD
SPAN D

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S1-21
1			3				TOTAL SHEETS
2			4				119

ASSEMBLED BY : M. CATER DATE : 10/2020
CHECKED BY : J.C. MORRISON DATE : 05/2021

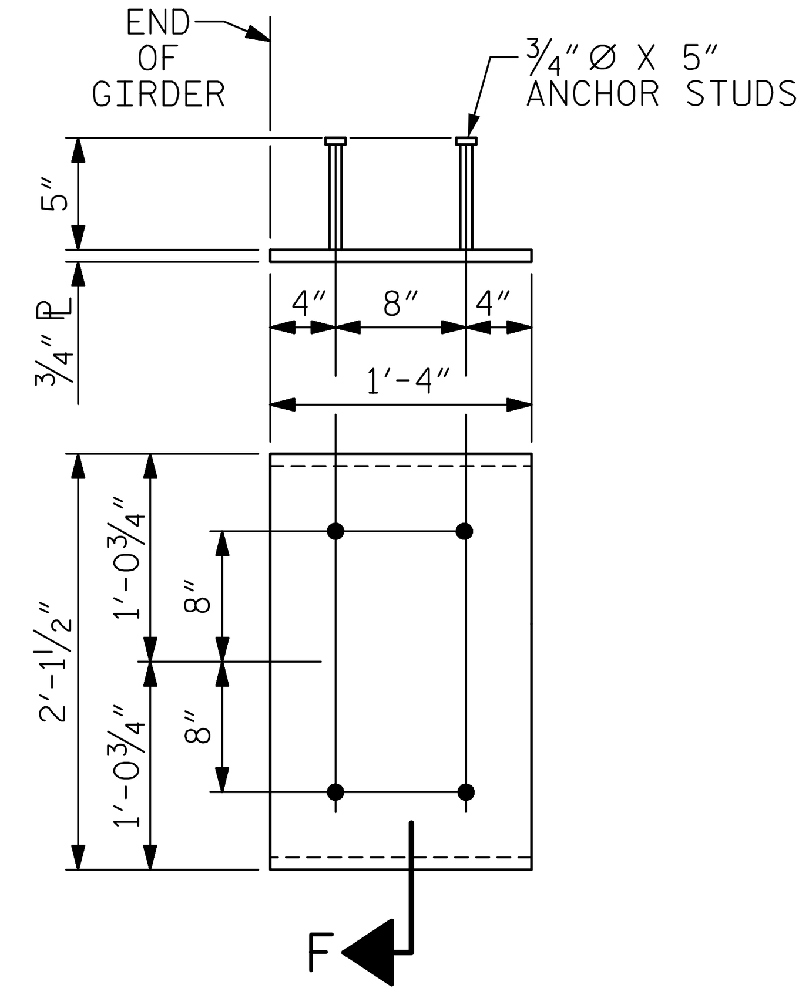
DRAWN BY : ELR 8/91 | REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91 | REV. 1/15 MAA/TMG | REV. 12/17 MAA/THC

STD. NO. PCG5



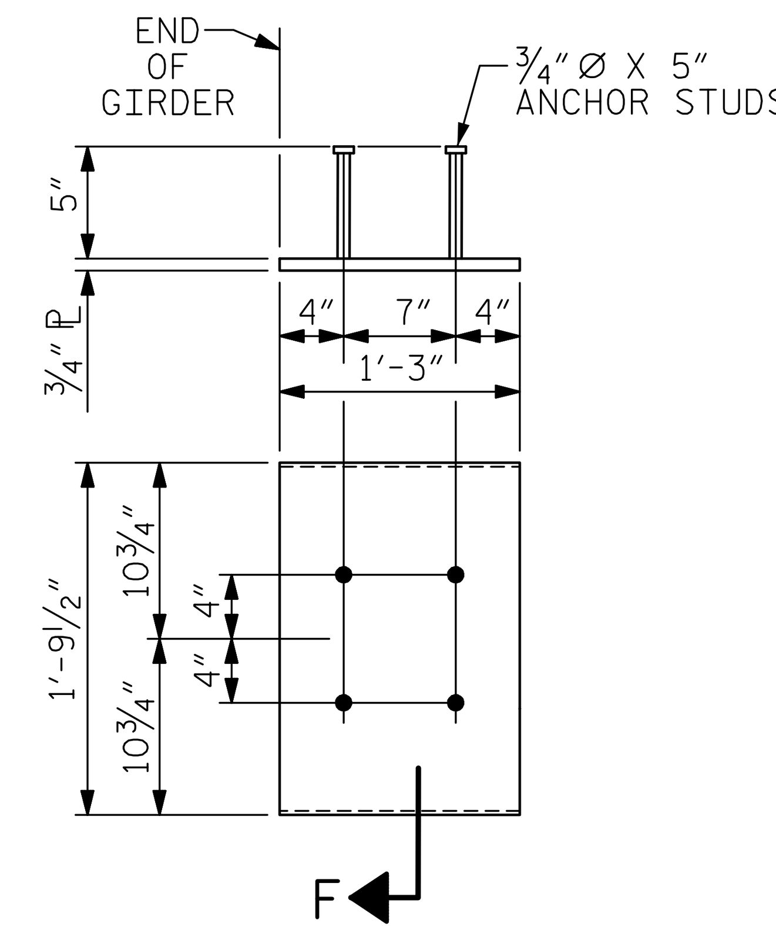
SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE III GIRDER

(2 REQ'D PER GIRDER)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW AND 2′ ON BOTH SIDES AND BOTTOM.

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

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

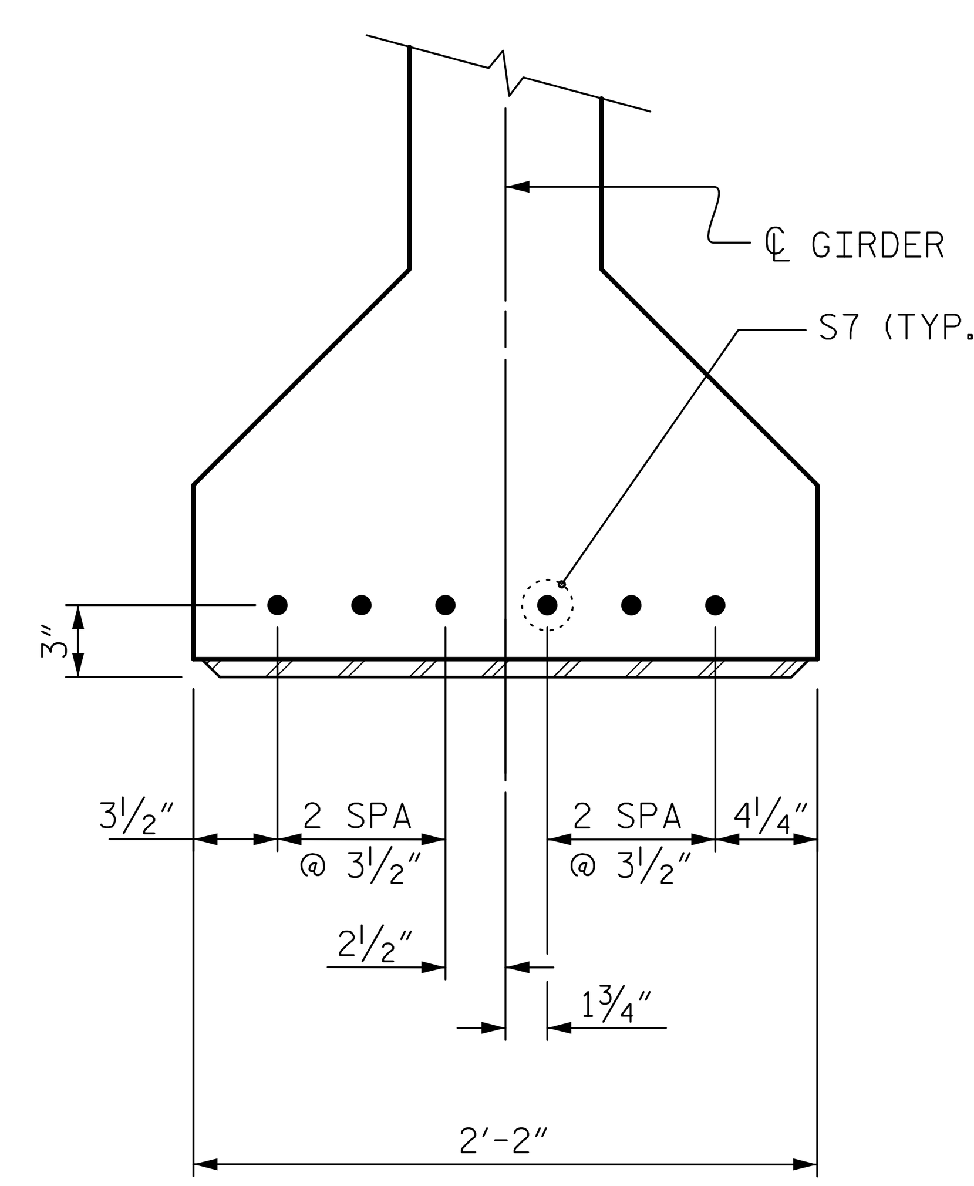
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2″ BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,400 (SPANS A & B) AND 4,800 (SPANS C & D) PSI.

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

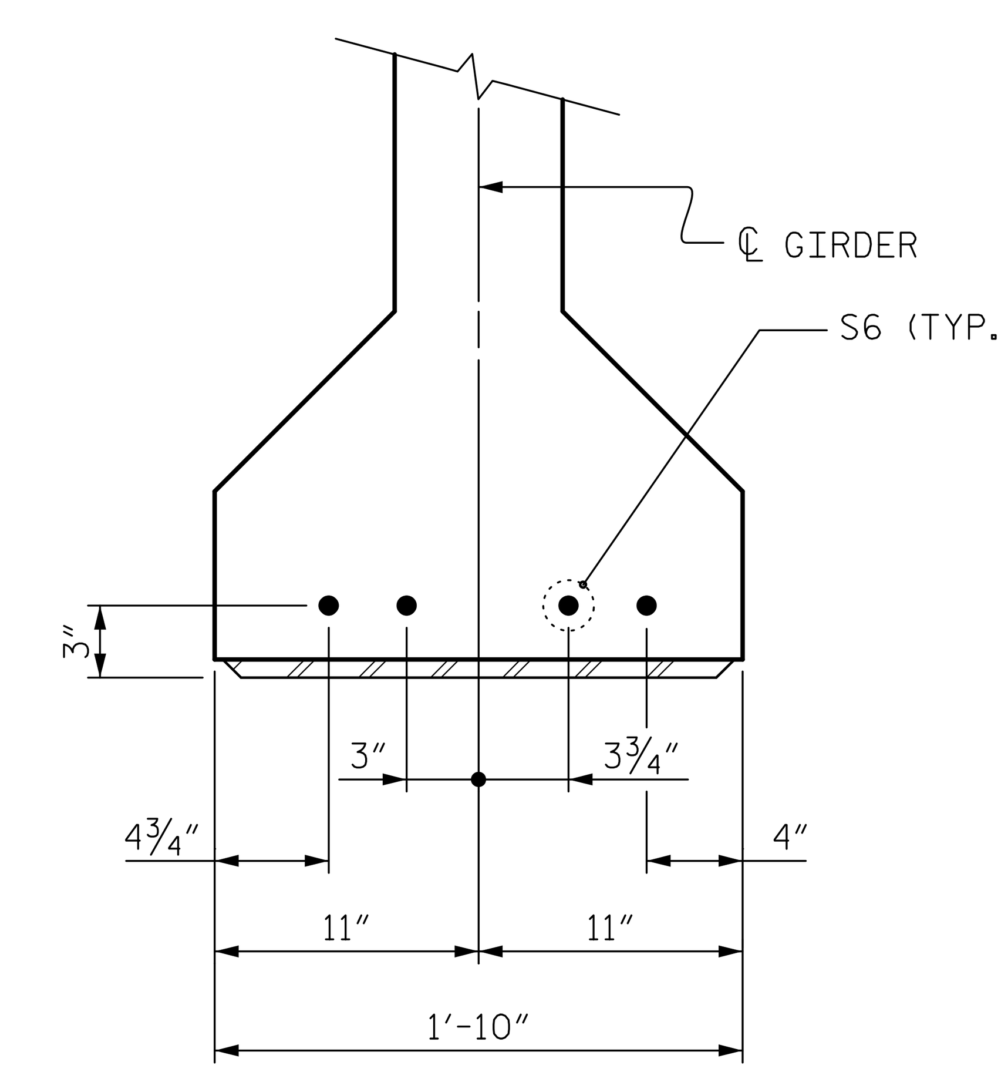
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4″, SHALL BE RAKED TO A DEPTH OF ¼″.

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



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



DETAIL "B"

(FOR AASHTO TYPE III GIRDERS)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 5 OF 5

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

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

SHEET NO. S1-22

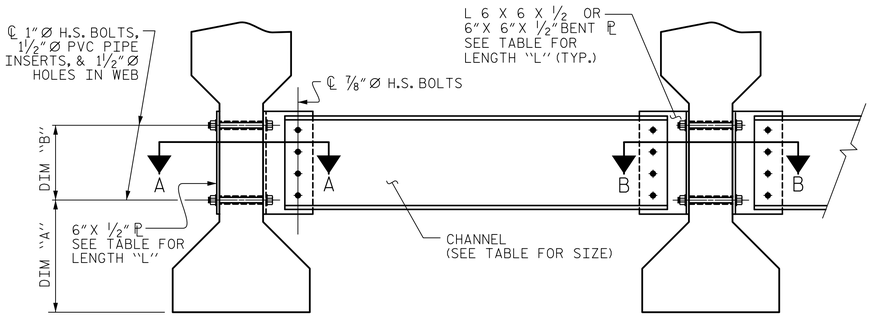
TOTAL SHEETS 119

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. CATER	DATE : 10/2020
CHECKED BY : J.C. MORRISON	DATE : 05/2021

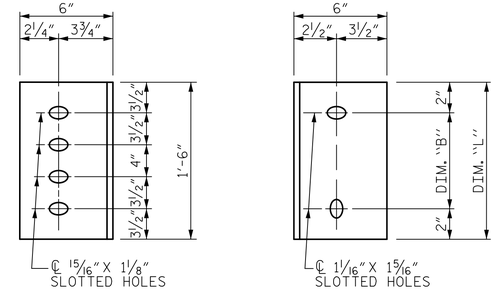
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC

STD. NO. PCG9



PART SECTION AT INTERMEDIATE DIAPHRAGM

(TYPE III OR TYPE IV GIRDER SHOWN)



DIAPHRAGM FACE
(TYPE III OR TYPE IV GDR.)

WEB FACE

CONNECTOR PLATE DETAILS

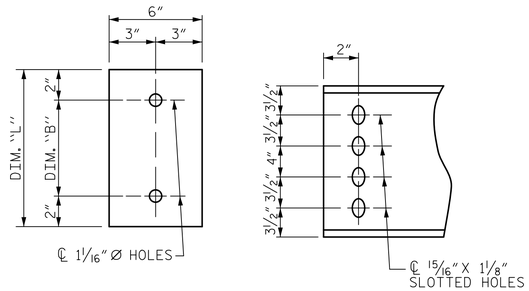
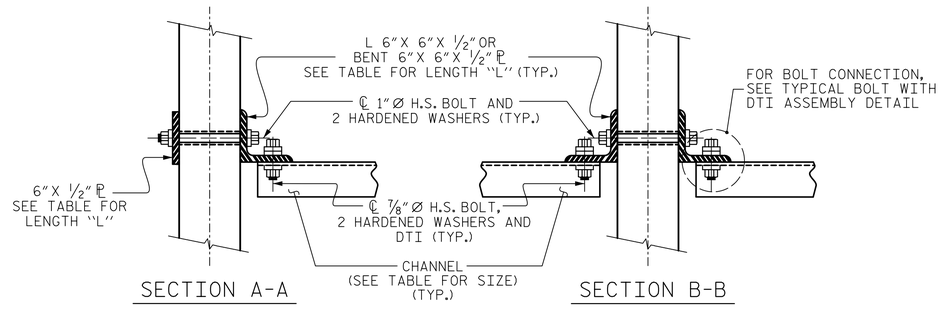


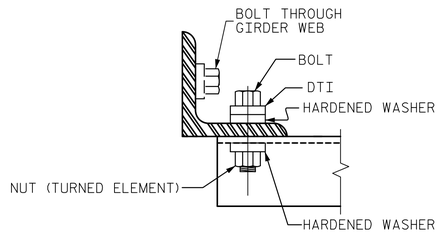
PLATE DETAILS CHANNEL END

(TYPE III OR TYPE IV GDR.)



CONNECTION DETAILS

(FOR SKEW = 90°)



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

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

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

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

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

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
III	MC 18 x 42.7	1'-5"	1'-2"	1'-6"
IV	MC 18 x 42.7	1'-9½"	1'-2"	1'-6"

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

AECOM
AECOM TECHNICAL SERVICES OF NC, INC.
5438 WADE PARK BOULEVARD, SUITE 200
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison A2FDE142C82F4AB... 2/10/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III & IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS
2			4			119

ASSEMBLED BY : M. CATER		DATE : 01/2021	
CHECKED BY : J.C. MORRISON		DATE : 05/2021	
DRAWN BY : TLA	6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY : VC	6/05	REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/THC

STD. NO. PCG10

DATE: 2/9/2023
TIME: 12:38:00 PM

USER: catterm
DGN: pw:\\dotcom-mp.bentley.com:AECOM_DSP1_NA_2020\Documents\406809754-U-5748 Upon MIV\900-CAD 01\590_CADD\DOT_NCDOT_TIP\Structures\04 Drawings\450_04T_U-5748_SMU_06_S1-23_3\02\

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN A

GIRDER 1

0.6" Ø LOW-RELAXATION																					
TWENTIETH POINTS		BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.178	0.176	0.169	0.159	0.145	0.137	0.106	0.082	0.056	0.028	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL	↓	0.000	0.012	0.024	0.035	0.046	0.055	0.063	0.069	0.074	0.076	0.076	0.076	0.074	0.069	0.063	0.054	0.046	0.034	0.023	0.012	0.000
FINAL CAMBER	↑	0	3/16"	3/8"	9/16"	3/4"	7/8"	1"	1 1/16"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/16"	1"	7/8"	3/4"	9/16"	3/8"	3/16"	0

GIRDER 2

0.6" Ø LOW-RELAXATION																					
TWENTIETH POINTS		BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.176	0.176	0.169	0.159	0.145	0.127	0.106	0.082	0.056	0.028	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL	↓	0.000	0.015	0.030	0.044	0.058	0.069	0.080	0.087	0.094	0.096	0.098	0.096	0.093	0.086	0.079	0.068	0.057	0.043	0.029	0.015	0.000
FINAL CAMBER	↑	0	3/16"	5/16"	7/16"	9/16"	11/16"	13/16"	7/8"	15/16"	15/16"	15/16"	15/16"	15/16"	7/8"	13/16"	11/16"	9/16"	7/16"	5/16"	3/16"	0

GIRDER 3

0.6" Ø LOW-RELAXATION																					
TWENTIETH POINTS		BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.178	0.176	0.169	0.159	0.145	0.127	0.106	0.082	0.056	0.028	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL	↓	0.000	0.017	0.033	0.049	0.065	0.077	0.090	0.098	0.106	0.108	0.111	0.108	0.105	0.097	0.089	0.077	0.065	0.049	0.033	0.016	0.000
FINAL CAMBER	↑	0	1/8"	1/4"	3/8"	1/2"	5/8"	11/16"	3/4"	3/4"	13/16"	13/16"	13/16"	3/4"	3/4"	11/16"	5/8"	1/2"	3/8"	1/4"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN B

GIRDER 1

0.6" Ø LOW-RELAXATION																					
TWENTIETH POINTS		BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.178	0.176	0.169	0.159	0.145	0.127	0.106	0.082	0.056	0.028	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL	↓	0.000	0.012	0.024	0.036	0.048	0.057	0.066	0.072	0.077	0.079	0.081	0.079	0.077	0.072	0.066	0.057	0.048	0.036	0.024	0.012	0.000
FINAL CAMBER	↑	0	3/16"	3/8"	9/16"	11/16"	13/16"	15/16"	1 1/16"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/16"	15/16"	7/8"	11/16"	9/16"	3/8"	3/16"	0

GIRDER 2

0.6" Ø LOW-RELAXATION																					
TWENTIETH POINTS		BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.029	0.056	0.083	0.107	0.128	0.146	0.161	0.171	0.178	0.180	0.178	0.171	0.161	0.146	0.128	0.107	0.083	0.056	0.029	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL	↓	0.000	0.015	0.031	0.045	0.060	0.072	0.083	0.090	0.098	0.100	0.103	0.100	0.098	0.090	0.083	0.072	0.060	0.045	0.031	0.015	0.000
FINAL CAMBER	↑	0	3/16"	5/16"	7/16"	9/16"	11/16"	3/4"	13/16"	7/8"	15/16"	15/16"	15/16"	7/8"	13/16"	3/4"	11/16"	9/16"	7/16"	5/16"	3/16"	0

GIRDER 3

0.6" Ø LOW-RELAXATION																					
TWENTIETH POINTS		BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.029	0.056	0.083	0.107	0.128	0.146	0.161	0.171	0.178	0.1860	0.178	0.171	0.161	0.146	0.128	0.107	0.083	0.056	0.029	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL	↓	0.000	0.017	0.036	0.051	0.068	0.081	0.094	0.102	0.110	0.113	0.116	0.113	0.110	0.102	0.094	0.080	0.067	0.051	0.034	0.017	0.000
FINAL CAMBER	↑	0	1/8"	1/4"	3/8"	1/2"	9/16"	5/8"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	5/8"	9/16"	1/2"	3/8"	1/4"	1/8"	0

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

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

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 2

AECOM
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RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
(NORTHBOUND LANES)

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S1-24
1			3			TOTAL SHEETS	119
2			4				

DRAWN BY : D.R. DRUM DATE : 06/2021
CHECKED BY : J.C. MORRISON DATE : 06/2021
DESIGNED BY : G.L. HAMILTON DATE : 11/2020
DESIGN CHECKED BY : J.C. MORRISON DATE : 11/2020

DATE: 2/10/2023
TIME: 12:38:01 PM

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN C

0.6" Ø LOW-RELAXATION	GIRDER 1																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.031	0.037	0.043	0.047	0.050	0.052	0.052	0.052	0.050	0.047	0.043	0.037	0.031	0.024	0.016	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.004	0.008	0.011	0.015	0.018	0.021	0.023	0.025	0.026	0.026	0.026	0.025	0.023	0.021	0.018	0.015	0.011	0.008	0.004	0.000
FINAL CAMBER ↑	0	1/16''	1/16''	1/8''	3/16''	1/4''	1/4"	5/16''	5/16''	5/16''	5/16''	5/16''	5/16''	5/16''	1/4"	1/4''	3/16''	1/8''	1/8''	1/16''	0

0.6" Ø LOW-RELAXATION	GIRDER 2																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.031	0.037	0.043	0.047	0.050	0.052	0.052	0.052	0.050	0.047	0.043	0.037	0.031	0.024	0.016	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.005	0.010	0.015	0.019	0.023	0.027	0.029	0.032	0.033	0.034	0.033	0.032	0.029	0.027	0.023	0.019	0.015	0.010	0.005	0.000
FINAL CAMBER ↑	0	1/16''	1/16''	1/8''	1/8''	3/16''	3/16''	3/16''	3/16''	1/4"	1/4"	1/4''	3/16''	3/16''	3/16''	3/16''	1/8''	1/8''	1/16''	1/16''	0

0.6" Ø LOW-RELAXATION	GIRDER 3																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.031	0.037	0.043	0.047	0.050	0.052	0.052	0.052	0.050	0.047	0.043	0.037	0.031	0.024	0.016	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.006	0.011	0.017	0.022	0.027	0.031	0.034	0.036	0.037	0.038	0.037	0.036	0.034	0.031	0.027	0.022	0.017	0.011	0.006	0.000
FINAL CAMBER ↑	0	1/16''	1/16''	1/16''	1/8''	1/8''	1/8''	3/16''	3/16''	3/16''	3/16''	3/16''	3/16''	3/16''	1/8''	1/8''	1/8''	1/16''	1/16''	1/16''	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN D

0.6" Ø LOW-RELAXATION	GIRDER 1																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.030	0.036	0.042	0.046	0.049	0.051	0.051	0.051	0.049	0.046	0.042	0.036	0.030	0.024	0.016	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.004	0.007	0.011	0.014	0.017	0.020	0.022	0.023	0.024	0.025	0.024	0.023	0.022	0.020	0.017	0.014	0.011	0.007	0.005	0.000
FINAL CAMBER ↑	0	1/16''	1/8''	1/8''	3/16''	1/4''	1/4"	5/16''	5/16''	5/16''	5/16"	5/16''	5/16''	5/16''	1/4"	1/4''	3/16''	1/8''	1/8''	1/16''	0

0.6" Ø LOW-RELAXATION	GIRDER 2																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.030	0.036	0.042	0.046	0.049	0.051	0.051	0.051	0.049	0.046	0.042	0.036	0.030	0.024	0.016	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.005	0.009	0.014	0.018	0.022	0.025	0.027	0.030	0.030	0.031	0.030	0.030	0.027	0.025	0.021	0.018	0.013	0.009	0.005	0.000
FINAL CAMBER ↑	0	1/16''	1/16''	1/8''	1/8''	3/16''	3/16''	1/4''	1/4''	1/4"	1/4"	1/4"	1/4''	1/4''	3/16''	3/16''	1/8''	1/8''	1/16''	1/16''	0

0.6" Ø LOW-RELAXATION	GIRDER 3																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.030	0.036	0.042	0.046	0.049	0.051	0.051	0.051	0.049	0.046	0.042	0.036	0.030	0.024	0.016	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.006	0.010	0.016	0.021	0.025	0.029	0.031	0.034	0.035	0.036	0.035	0.034	0.031	0.029	0.025	0.021	0.015	0.010	0.005	0.000
FINAL CAMBER ↑	0	1/16''	1/16''	1/8''	1/8''	1/8''	1/8''	3/16''	3/16''	3/16''	3/16''	3/16''	3/16''	3/16''	1/8''	1/8''	1/8''	1/8''	1/16''	1/16''	0

✳ INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

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

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

AECOM
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(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

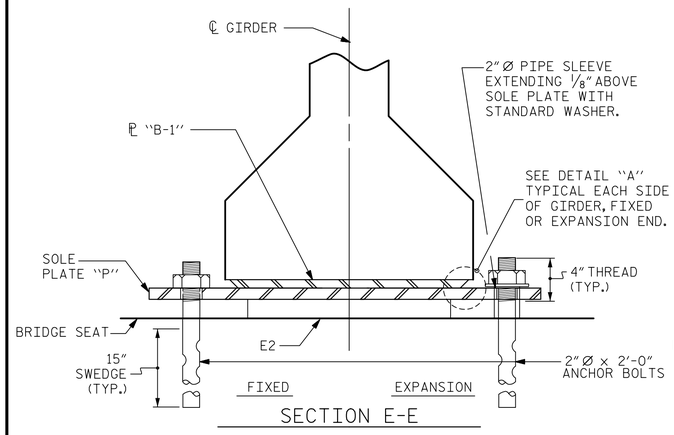
SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

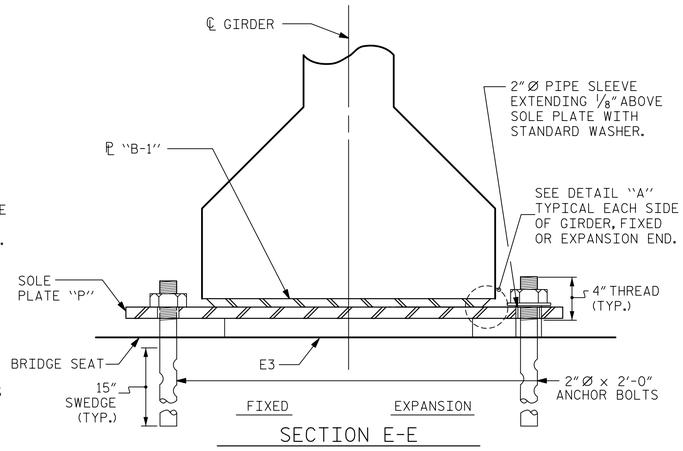
(NORTHBOUND LANES)

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S1-25
1			3				TOTAL SHEETS
2			4				119

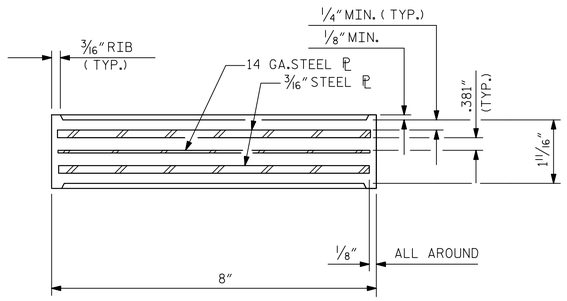
DRAWN BY : D.R. DRUM DATE : 06/2021
CHECKED BY : J.C. MORRISON DATE : 06/2021
DESIGNED BY : G.L. HAMILTON DATE : 11/2020
DESIGN CHECKED BY : J.C. MORRISON DATE : 11/2020



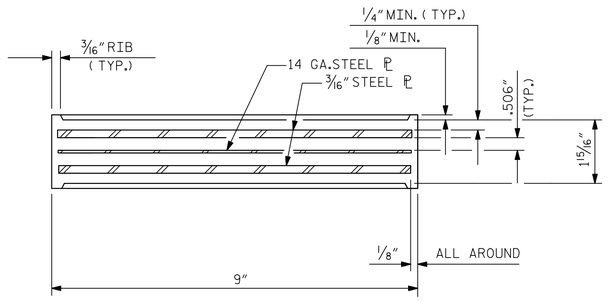
SECTION E-E



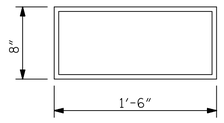
SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



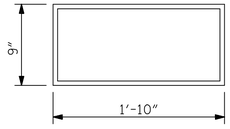
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

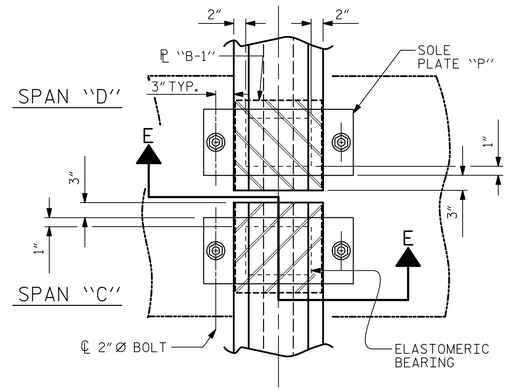
TYPE III



E3 (12 REQ'D)

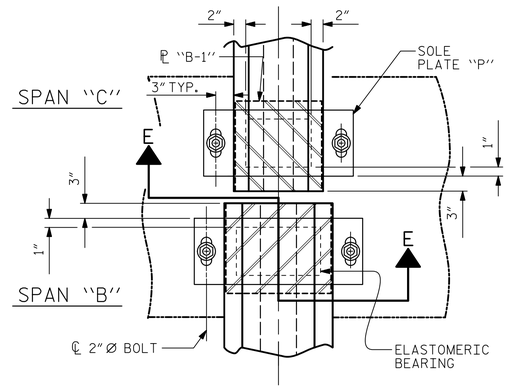
PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



TYPICAL PLAN AT BENT No. 3

(FIXED)

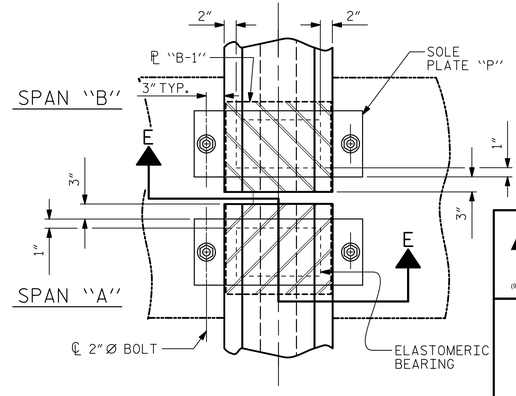


TYPICAL PLAN AT BENT No. 2

(EXPANSION)

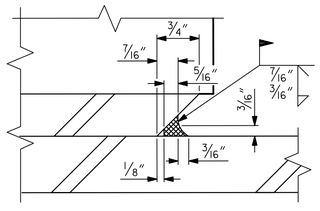
THIS SITUATION TYPICAL AT END BENT No. 2

THIS SITUATION TYPICAL AT END BENT No. 1

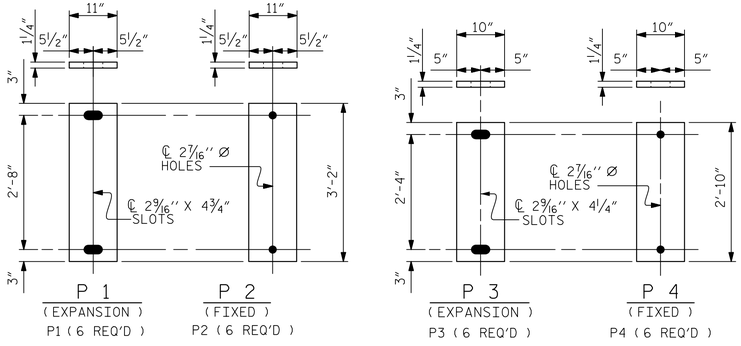


TYPICAL PLAN AT BENT No. 1

(FIXED)



DETAIL "A"



SOLE PLATE DETAILS ("P")

NOTES

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

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

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

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

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

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k
TYPE IV	225 k

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

AECOM
AECOM TECHNICAL SERVICES OF NC, INC.
5438 WADE PARK BOULEVARD, SUITE 200
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

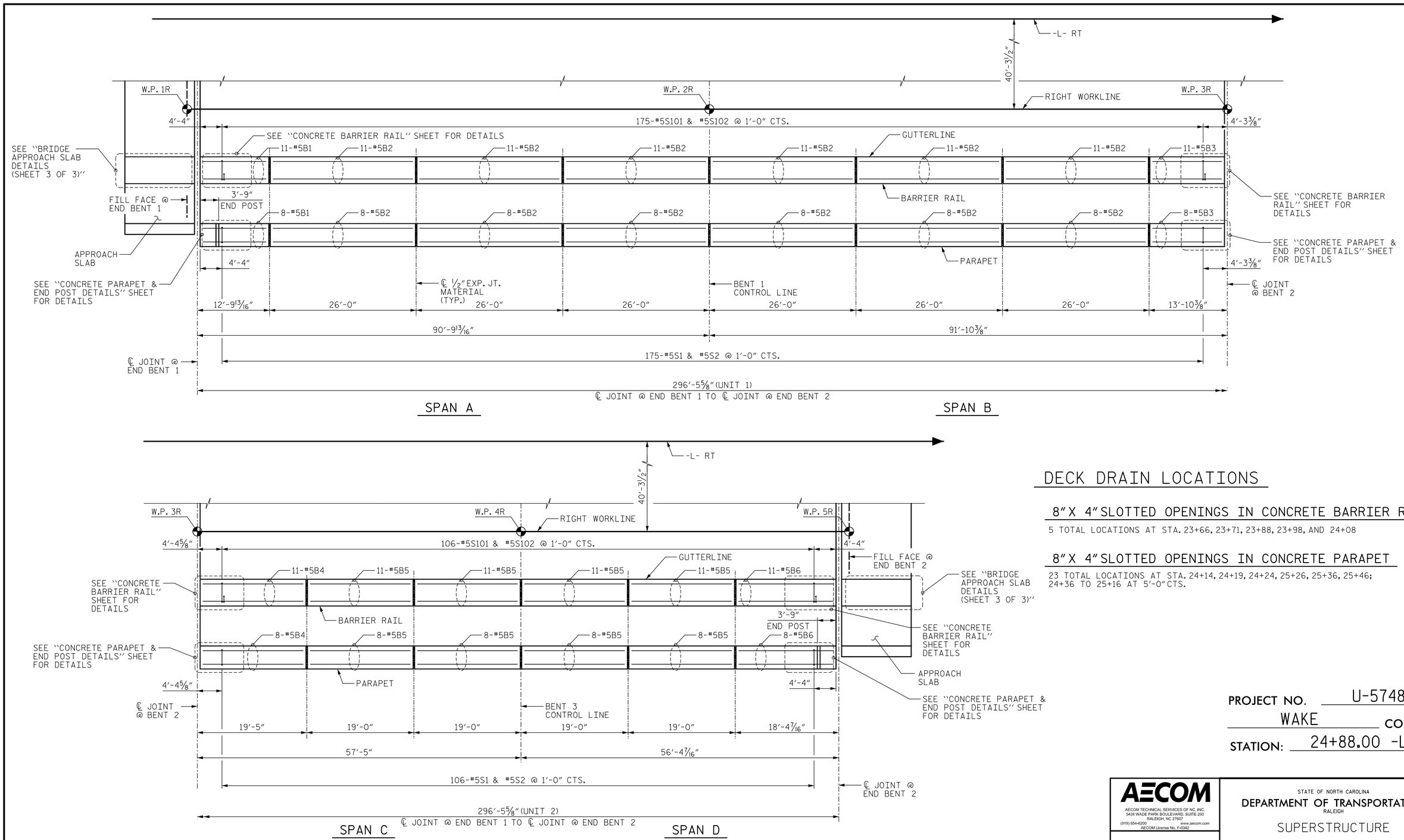
ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26
1			3			TOTAL SHEETS
2			4			119

ASSEMBLED BY : M. CATER		DATE : 01/2021	
CHECKED BY : J.C. MORRISON		DATE : 05/2021	
DRAWN BY : WJH	8/89	REV. 1/15	MAA/TMG
CHECKED BY : CRK	8/89	REV. 12/17	MAA/THC
		REV. 10/21	BNB/AAI

STD. NO. EB3



PLAN

DIMENSIONS SHOWN ALONG OUTSIDE OF DECK

OUTSIDE EDGE OF DECK NOT SHOWN FOR CLARITY

DECK DRAIN LOCATIONS

8"X 4"SLOTTED OPENINGS IN CONCRETE BARRIER RAIL

5 TOTAL LOCATIONS AT STA. 23+66, 23+71, 23+88, 23+98, AND 24+08

8"X 4"SLOTTED OPENINGS IN CONCRETE PARAPET

23 TOTAL LOCATIONS AT STA. 24+14, 24+19, 24+24, 25+26, 25+36, 25+46; 24+36 TO 25+16 AT 5'-0"CTS.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

DATE: 2/9/2023
TIME: 12:38:42 PM

USER: cotern
DGN: pw:\\aecom-nc-pw.bentley.com:AECOM_DS2_NA_2020\Documents\60509754-U-5748 Upon MIN\900-CAD (S)\90_CADD_NCDOT_TIP\Structures\04 Drawings\40_DSS_U-5748_SMU_BRI_SI-27_SI02)

DRAWN BY : D.R. DRUM	DATE : 06/2021		
CHECKED BY : J.C. MORRISON	DATE : 06/2021		
DESIGNED BY : D.R. DRUM	DATE : 06/2021		
DESIGN CHECKED BY : J.C. MORRISON	DATE : 06/2021		

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(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

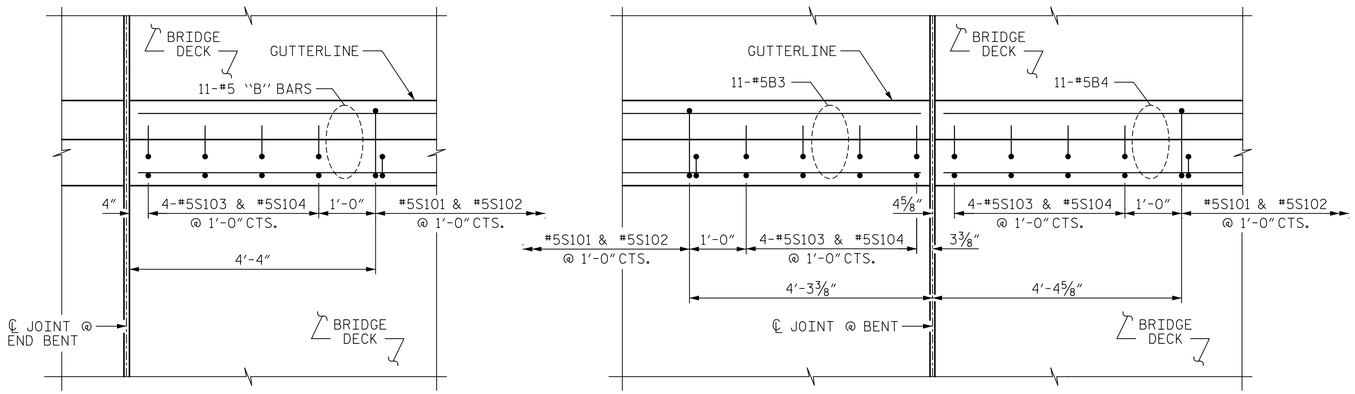
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL & PARAPET

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			119



@ END BENT

END BENT 1 SHOWN, END BENT 2 SIMILAR.

@ BENT 2

PLAN OF BARRIER RAIL

NOTES

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

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

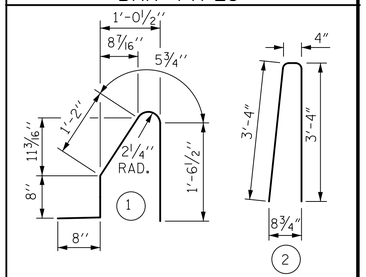
THE #5 S103 AND S104 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S103 AND S104 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE 8" WIDE X 4" HIGH FORMED DRAINAGE SLOTS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR THE "S" BARS IN THE BARRIER.

THE #5S103 & #5S104 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5S103 & #5S104 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

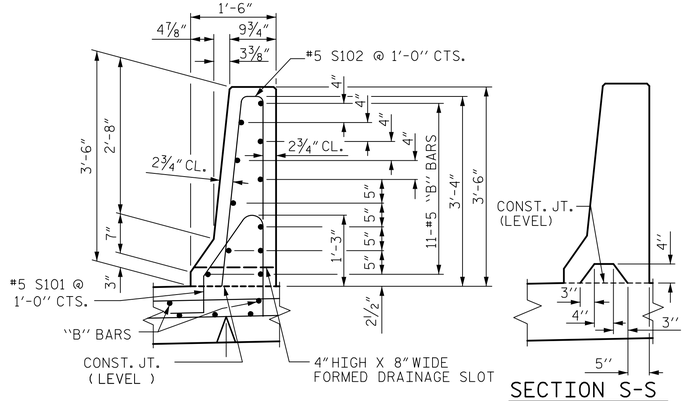
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	11	#5	STR	12'-4"	142
✳ B2	66	#5	STR	25'-7"	1761
✳ B3	11	#5	STR	13'-5"	154
✳ B4	11	#5	STR	18'-11"	217
✳ B5	44	#5	STR	18'-7"	853
✳ B6	11	#5	STR	17'-11"	206
✳S101	281	#5	1	4'-6"	1325
✳S102	281	#5	2	7'-0"	2052
✳S103	16	#5	3	4'-2"	70
✳S104	16	#5	STR	3'-6"	58

✳ EPOXY COATED REINFORCING STEEL	6836	LBS.
CLASS AA CONCRETE	40.4	CU. YDS.
✳✳CONCRETE BARRIER RAIL	296.56	LIN. FT.

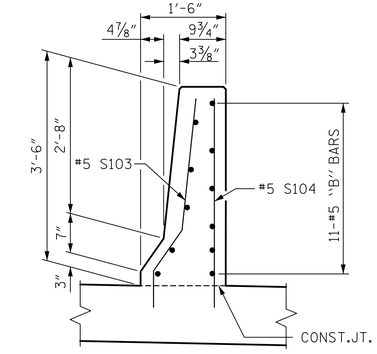
✳✳ DOES NOT INCLUDE APPROACH SLAB. FOR LENGTH OF CONCRETE BARRIER RAIL ON APPROACH SLAB, SEE APPROACH SLAB SHEETS.



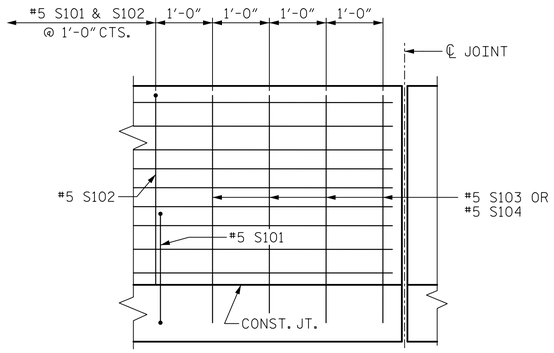
SECTION THRU RAIL

SECTION S-S

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



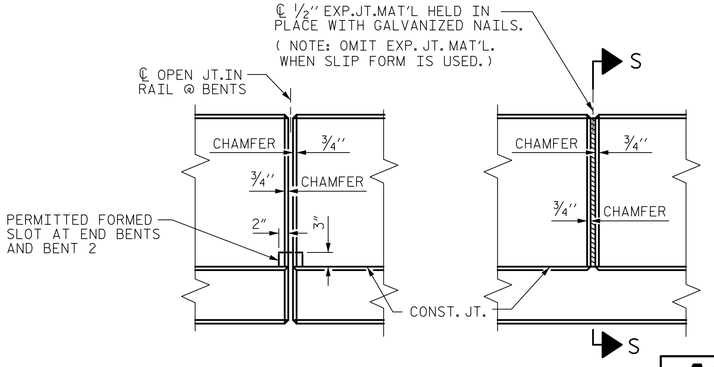
END VIEW



SIDE VIEW

END OF RAIL DETAILS @ EXP. JOINT

FOR ADHESIVE ANCHORING AT SAWED JOINTS



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

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AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison A2FDE142C82F4AB... 2/10/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

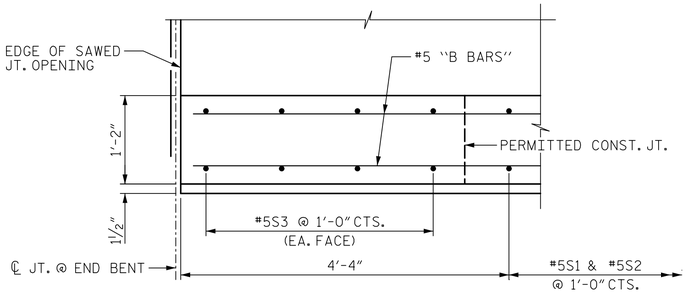
(NORTHBOUND LANES)

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

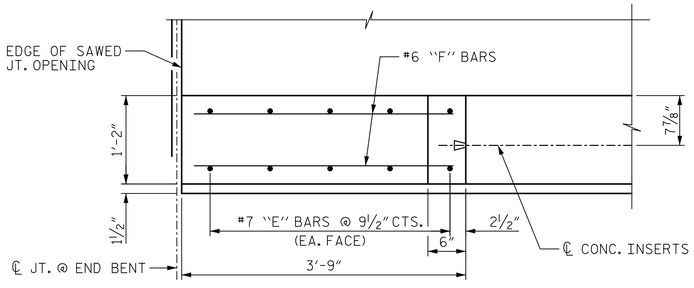
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-28
1			3			TOTAL SHEETS
2			4			119

ASSEMBLED BY : D.R. DRUM		DATE : 06/2021	
CHECKED BY : J.C. MORRISON		DATE : 06/2021	
DRAWN BY : ARB 5/87	REV. 7/12		MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13		MAA/GM
	REV. 12/17		MAA/THC

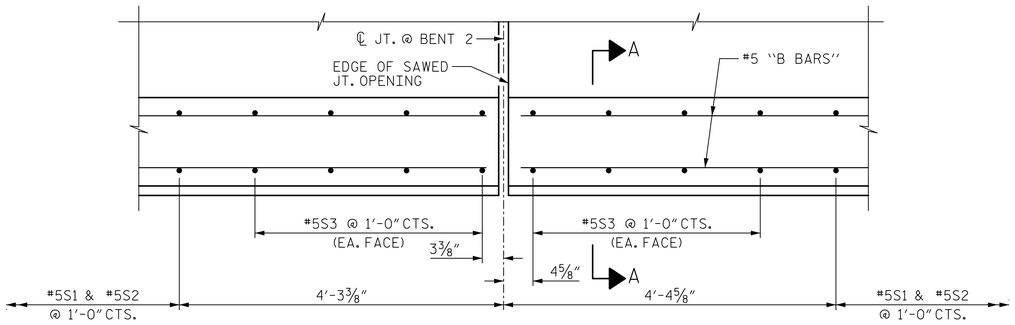
STD. NO. CBR1



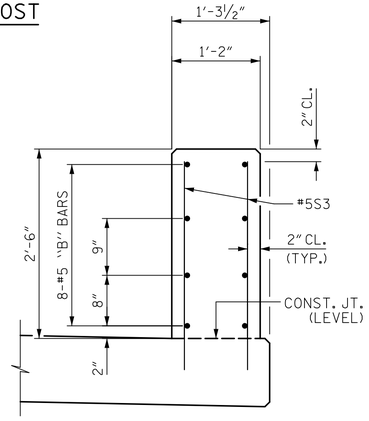
PLAN OF PARAPET @ END BENT



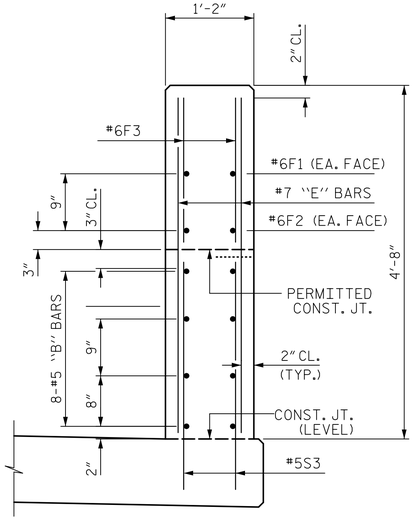
PLAN OF END POST



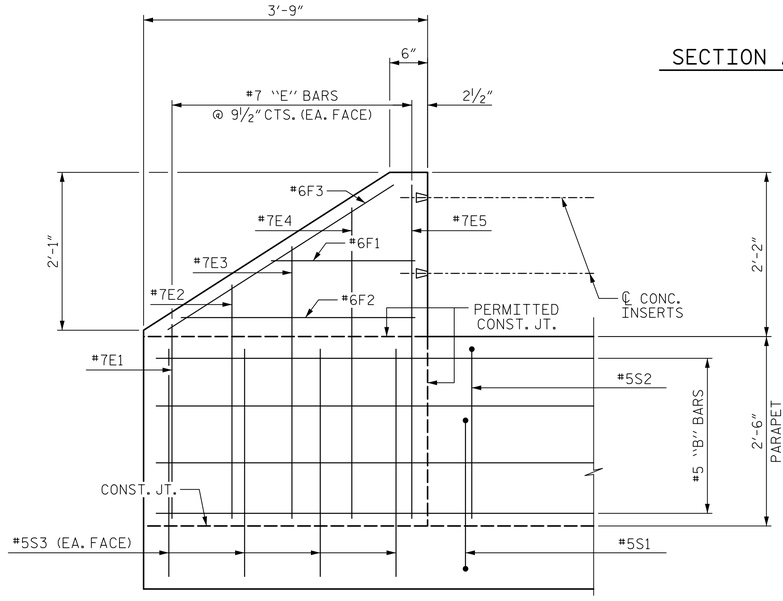
PLAN OF PARAPET @ BENT 2



SECTION A-A



END VIEW



ELEVATION

SECTION THRU PARAPET

PARAPET AND END POST FOR TWO BAR RAIL

NOTES:

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

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

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

THE #5 S1 AND S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MIN. CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN PARAPET.

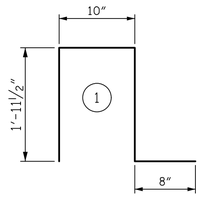
GROOVED CONTRACTION JOINTS ½" IN DEPTH SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

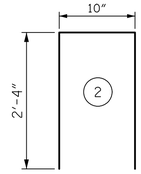
FOR DETAILS AND LOCATION OF GUARDRAIL ANCHORAGE ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEETS.

THE 8" WIDE X 4" HIGH FORMED DRAINAGE SLOTS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR THE "S" BARS IN THE PARAPET.

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

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE PARAPET AND END POST ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	8	#5	STR	12'-4"	103
✳ B2	48	#5	STR	25'-7"	1281
✳ B3	8	#5	STR	13'-5"	112
✳ B4	8	#5	STR	18'-11"	158
✳ B5	32	#5	STR	18'-7"	620
✳ B6	8	#5	STR	17'-11"	149
✳ E1	4	#7	STR	2'-6"	20
✳ E2	4	#7	STR	3'-0"	25
✳ E3	4	#7	STR	3'-6"	29
✳ E4	4	#7	STR	4'-0"	33
✳ E5	4	#7	STR	4'-4"	35
✳ F1	4	#6	STR	1'-9"	11
✳ F2	4	#6	STR	2'-11"	18
✳ F3	4	#6	STR	3'-9"	23
✳ S1	281	#5	1	5'-5"	1588
✳ S2	281	#5	2	5'-6"	1612
✳ S3	32	#5	STR	3'-0"	100

✳ EPOXY COATED REINFORCING STEEL	5,917 LBS.
CLASS AA CONCRETE	32.7 CU. YDS.
2'-6" CONCRETE PARAPET	296.33 LIN. FT.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

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5438 WADE PARK BOULEVARD, SUITE 200
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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023 A2FDE142C82F4AB...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

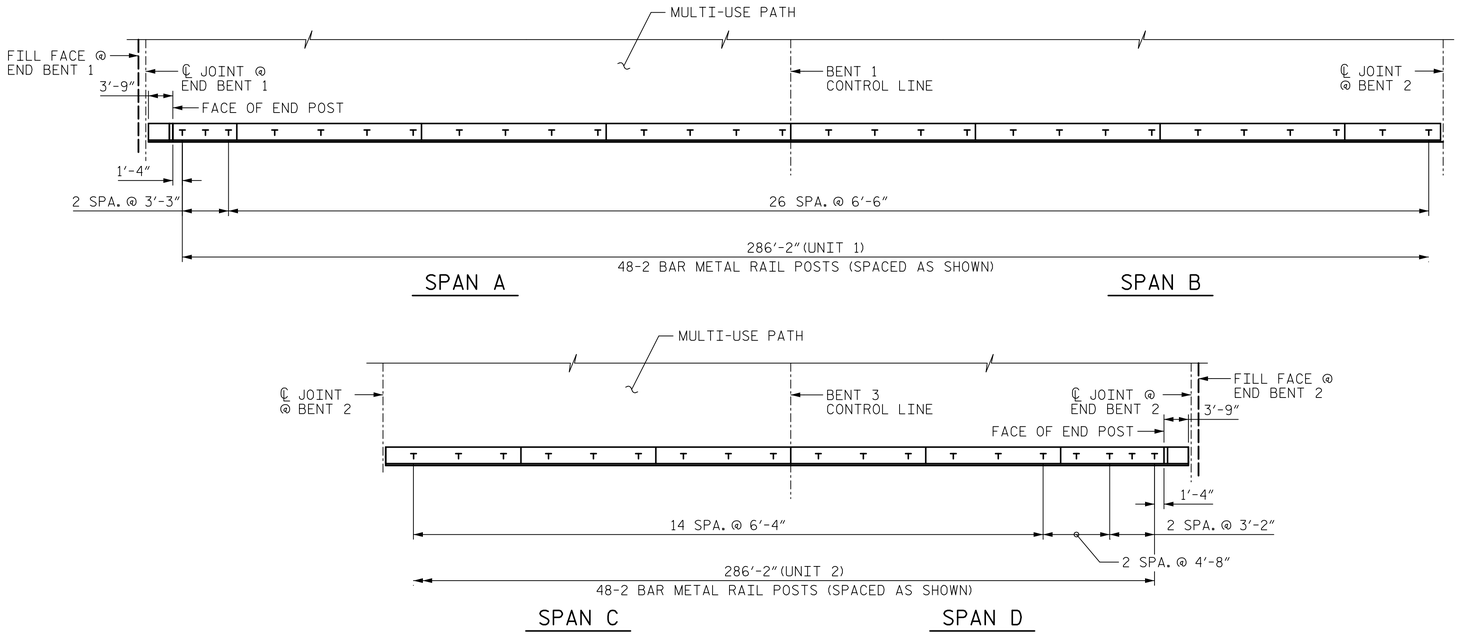
CONCRETE PARAPET & END POST DETAILS
(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-29
1			3			TOTAL SHEETS
2			4			119

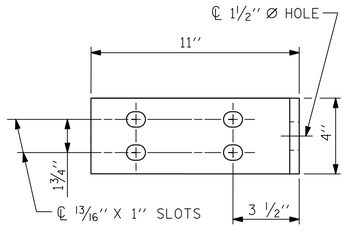
DRAWN BY : D.R. DRUM DATE : 06/2021
CHECKED BY : J.C. MORRISON DATE : 06/2021
DESIGNED BY : D.R. DRUM DATE : 06/2021
DESIGN CHECKED BY : J.C. MORRISON DATE : 06/2021

DATE: 2/9/2023
TIME: 12:39:03 PM

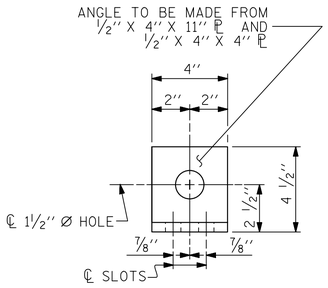
USER: cotter.m
DGN: pw:\\aecom-nc-pw.bentley.com:AECOM_USD_WA_20320.Documents\60609754-U-5748 Ugen Will\900-CAD GIS\90-CADTO_NCDOT_TIP\Structures\04 Drawings\40_059_U-5748_SWI_EP_S1-29_91102



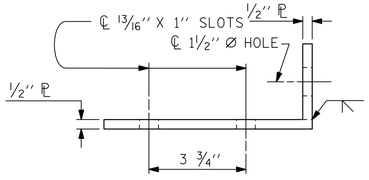
PLAN OF RAIL POST SPACINGS



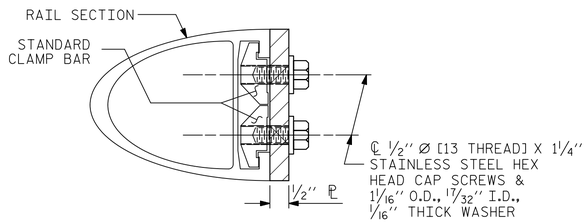
ELEVATION



END VIEW (FIX AND EXP.)



TOP VIEW



SECTION H-H (FIX)

FIXED

NOTES

STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" Ø X 1⅝" 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 ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

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

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

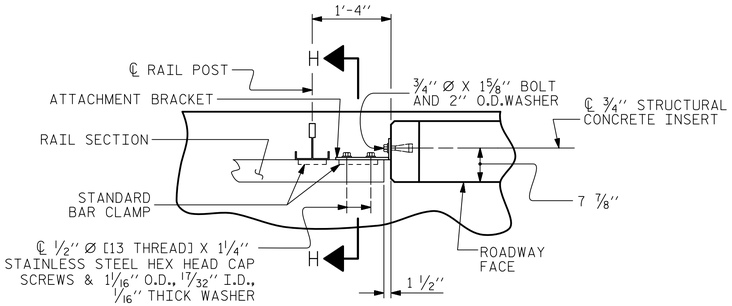
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

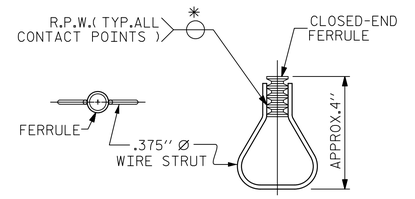
THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 3

DETAILS FOR ATTACHING METAL RAIL TO END POST

ASSEMBLED BY : D.R. DRUM	DATE : 06/2021	REV. 5/1/06RRR	KMM/GM
CHECKED BY : J.C. MORRISON	DATE : 06/2021	REV. 10/1/11	MAA/GM
DRAWN BY : TLA 6/05		REV. 12/17	MAA/THC
CHECKED BY : VC 6/05			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by: John C. Morrison 2/10/2023

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(919) 854-6200 www.aecom.com
AECOM License No. P-0342

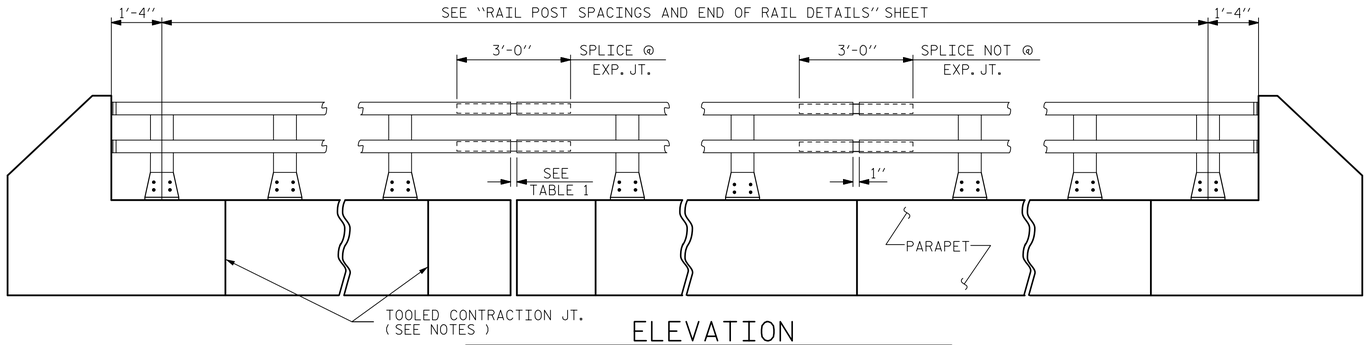
NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
RAIL POST SPACINGS AND END OF RAIL DETAILS
FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-30
1			3			TOTAL SHEETS
2			4			119

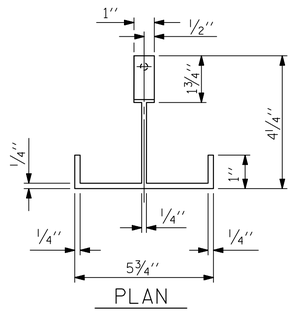
STD. NO. BMR2



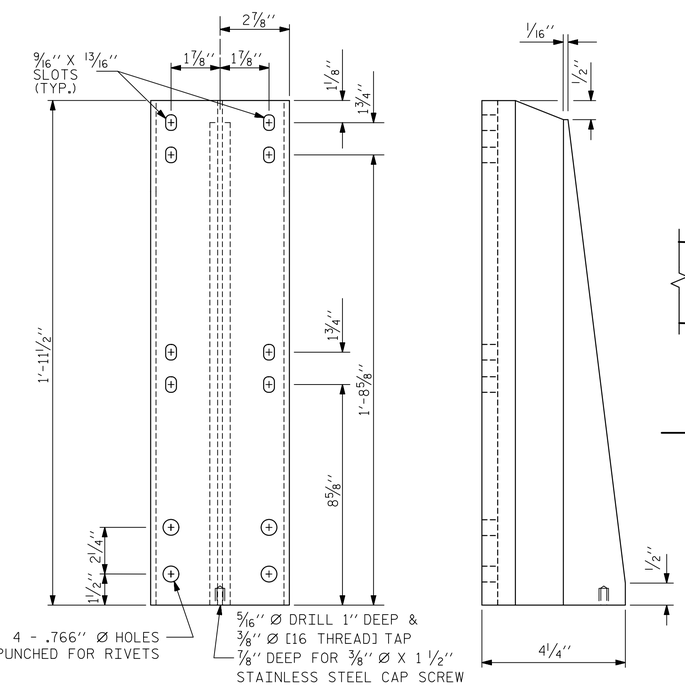
ELEVATION

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

TABLE 1	
℄ EXP. JT. @	RAIL OPENING
BENT 1	1 9/16"

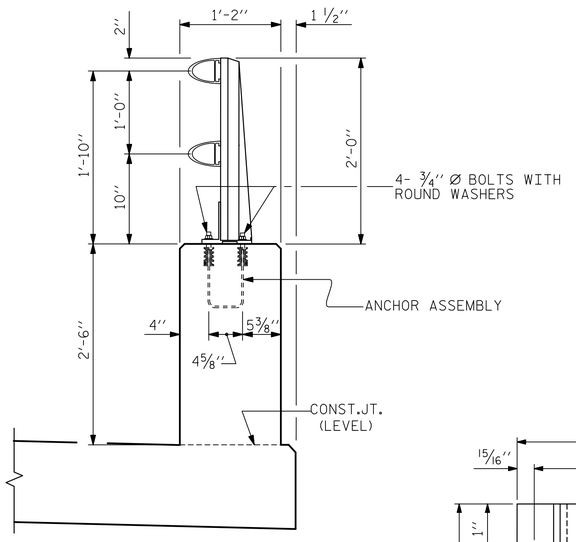


PLAN

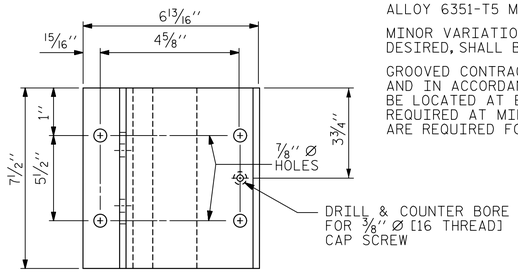


FRONT ELEVATION SIDE ELEVATION

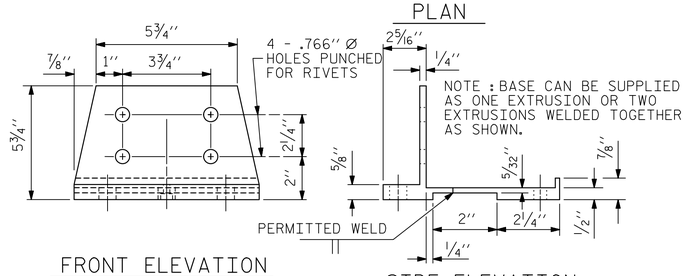
DETAILS OF POST



SECTION THRU PARAPET AND RAIL

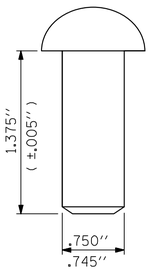


PLAN



FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

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

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

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH = 288.83 LIN. FT.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 3

ASSEMBLED BY : D.R. DRUM		DATE : 06/2021			
CHECKED BY : J.C. MORRISON		DATE : 06/2021			
DRAWN BY : TLA 6/05	REV. 5/1/06RRR	KMM/GM			
CHECKED BY : VC 6/05	REV. 10/1/11	MAA/GM			
	REV. 12/17	MAA/THC			

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-31
1			3			TOTAL SHEETS
2			4			119

STD. NO. BMR3

USER: cafarm
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DATE: 2/9/2023
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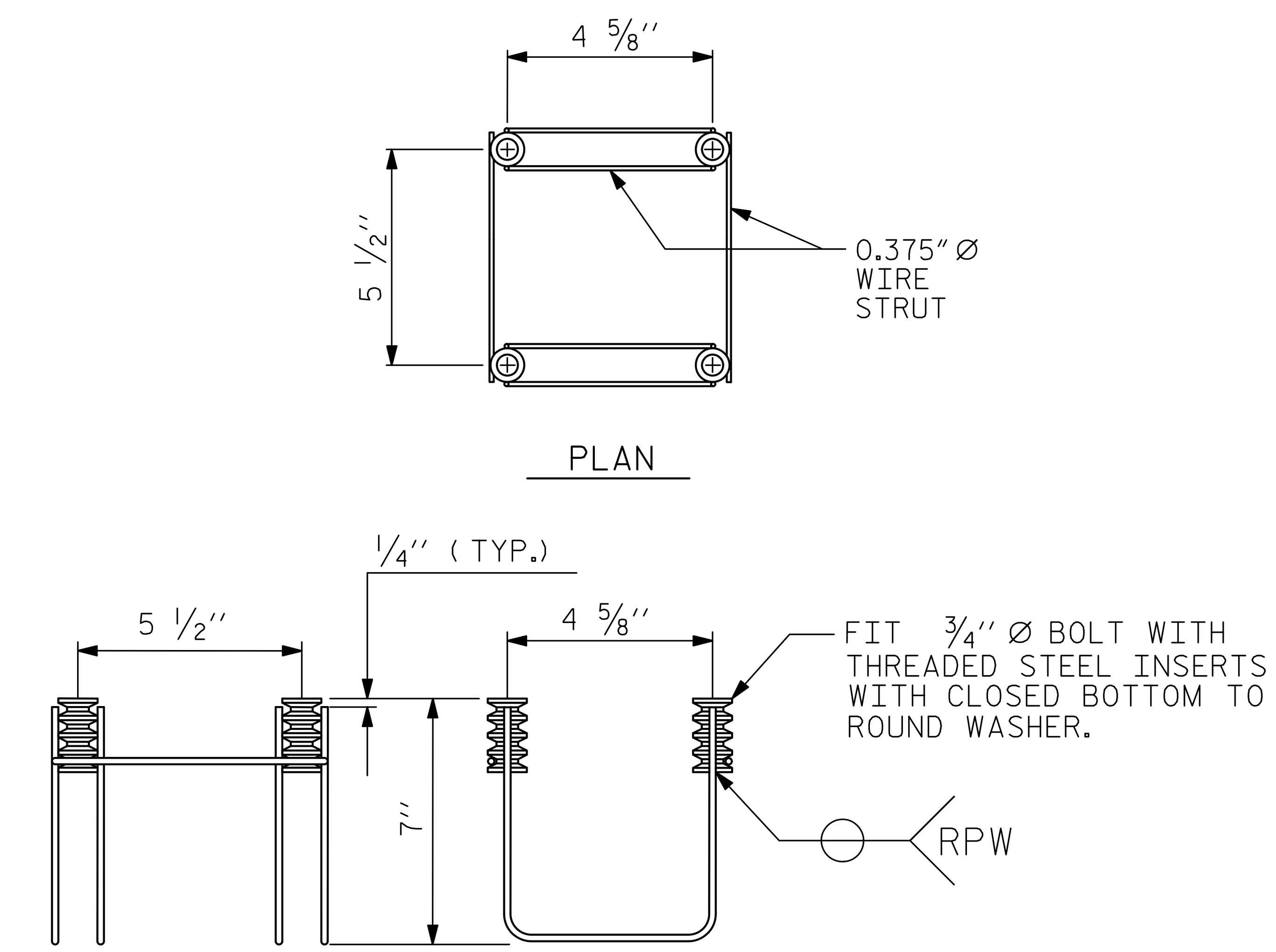


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(48 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2″ FOR 3⁄4″ FERRULES.

B. 4 - 3⁄4″ Ø X 2 1⁄2″ BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3⁄4″ Ø X 2 1⁄2″ GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7⁄16″ Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

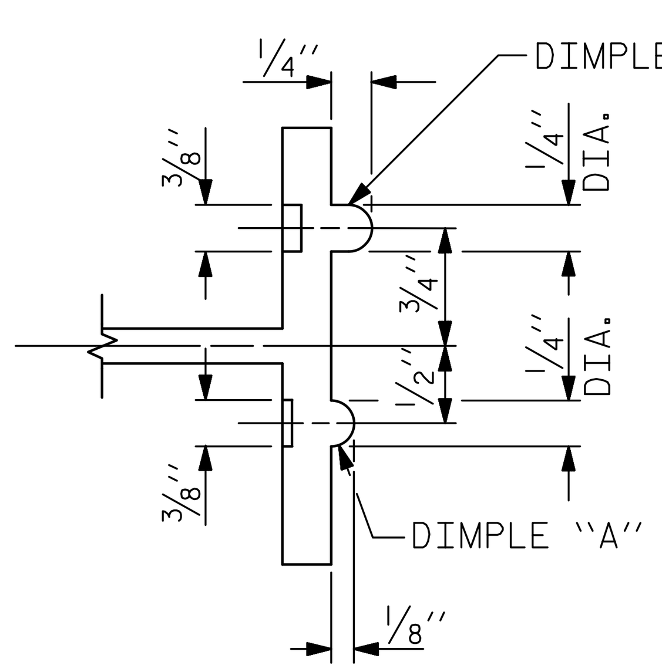
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

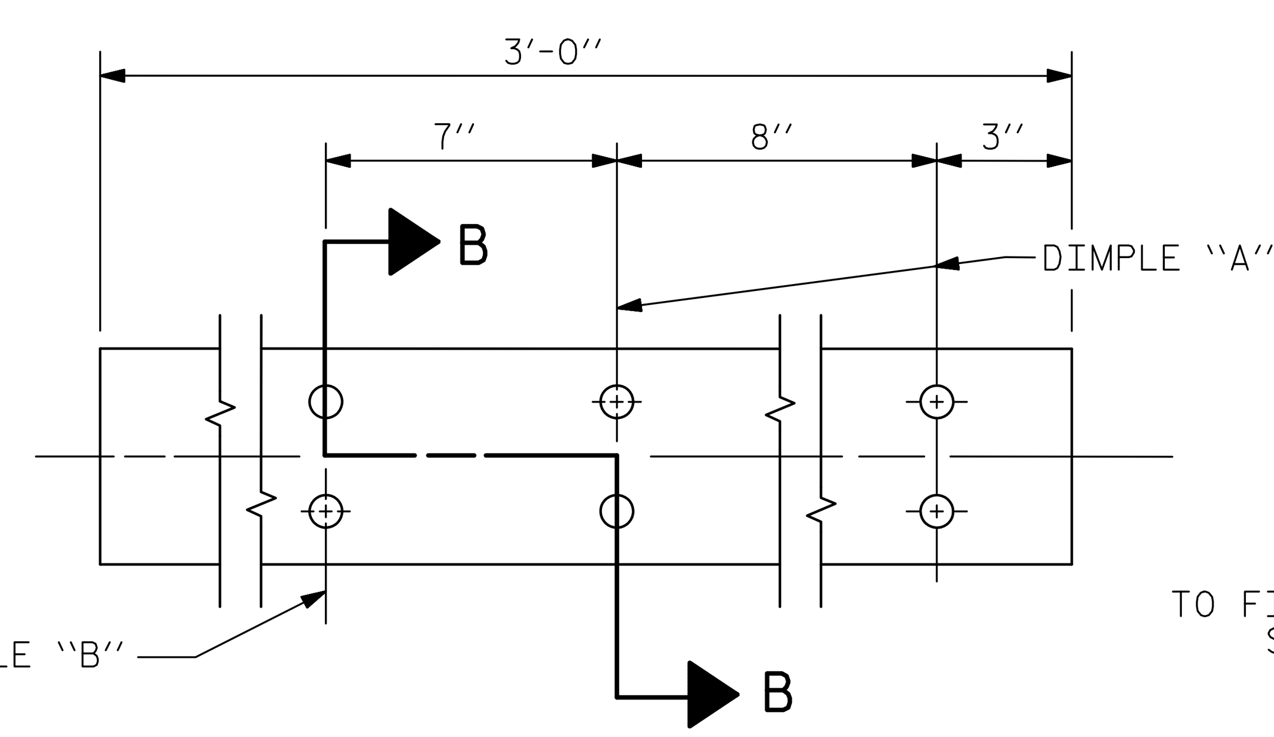
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

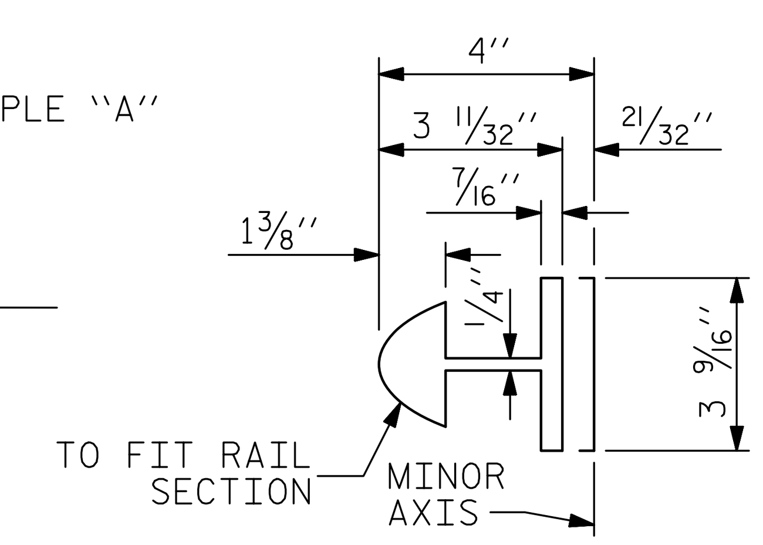
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



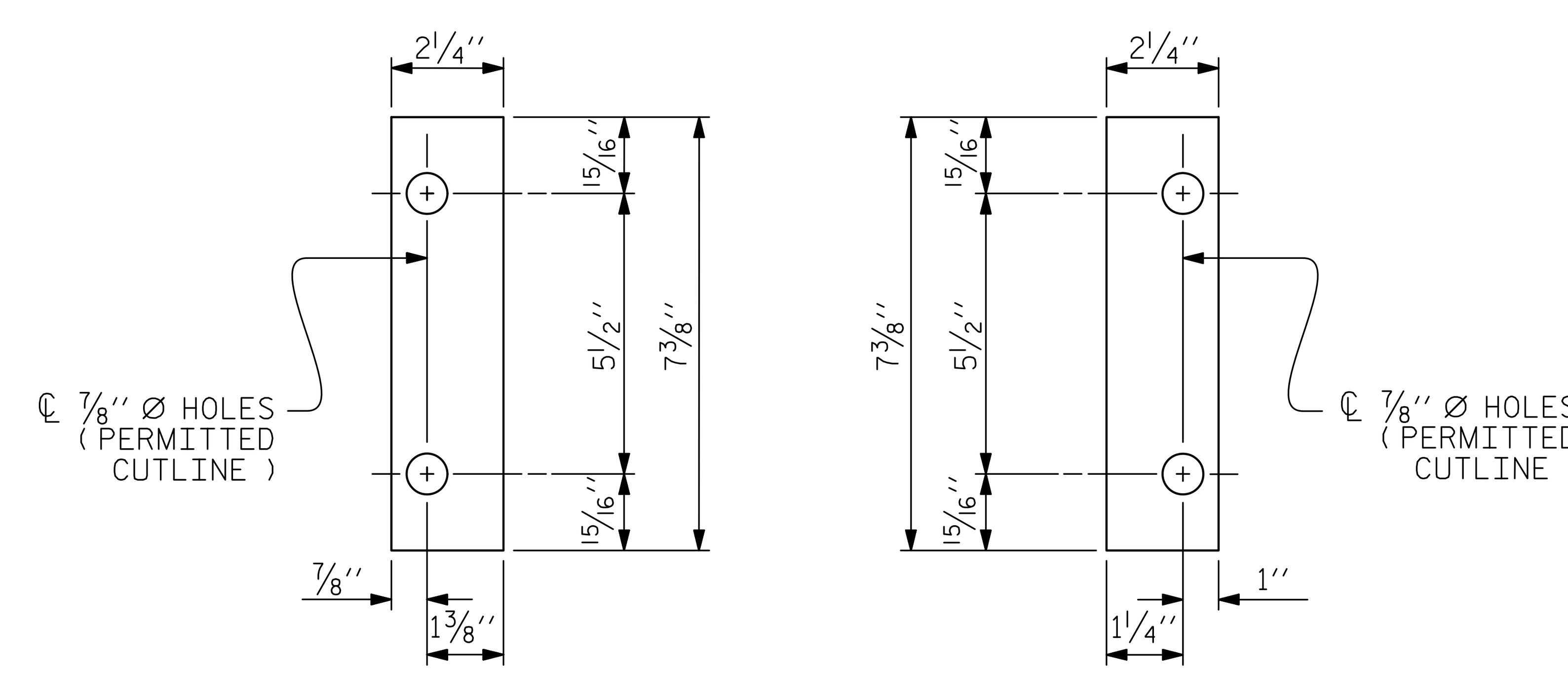
SECTION B - B



EXPANSION BAR DETAILS



BAR SECTION

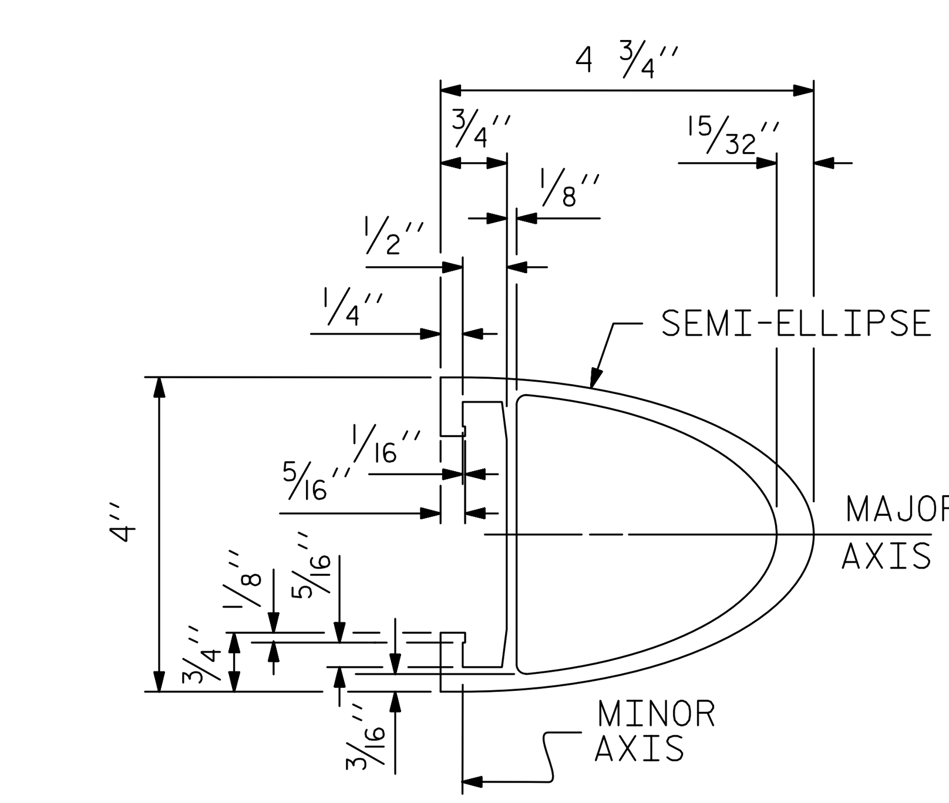


FRONT PLATE

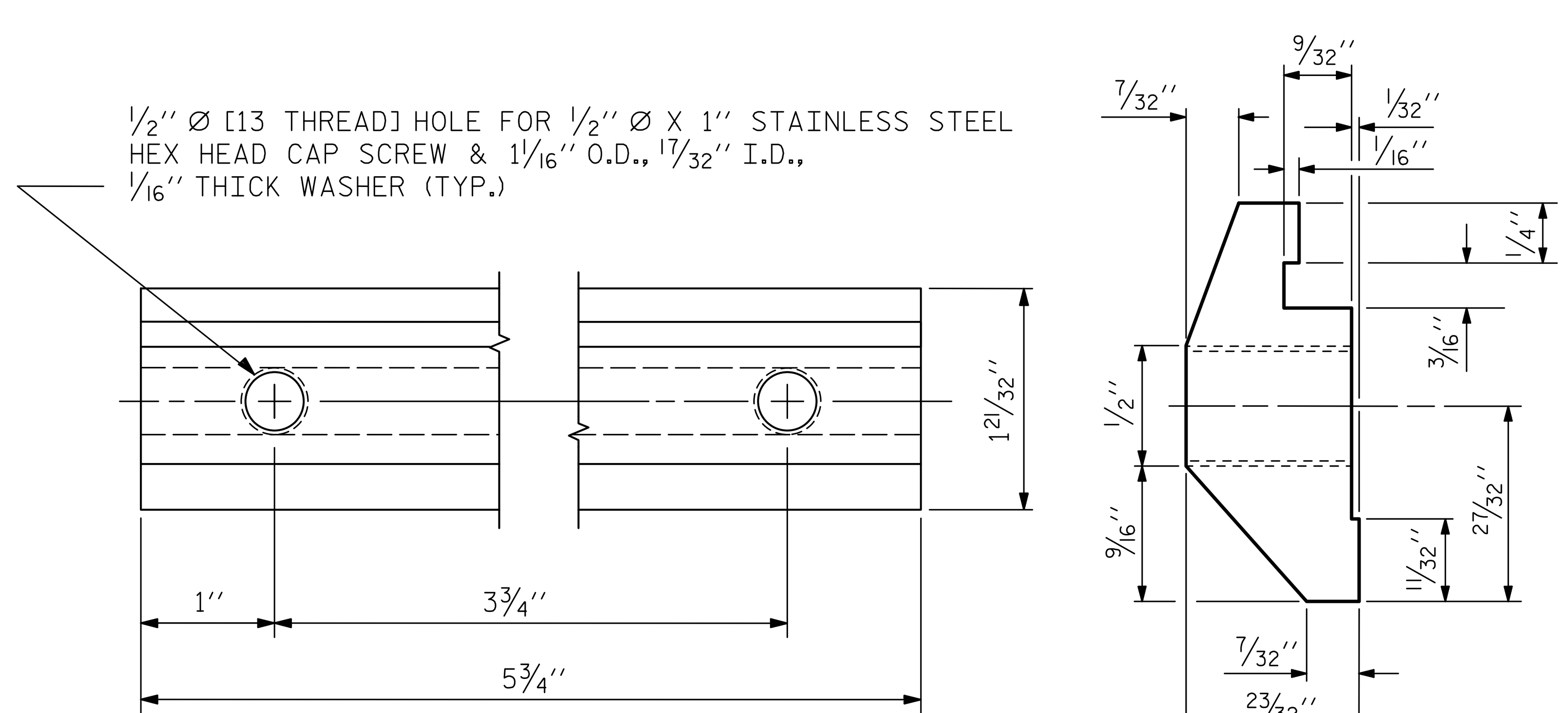
REAR PLATE

SHIM DETAILS

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

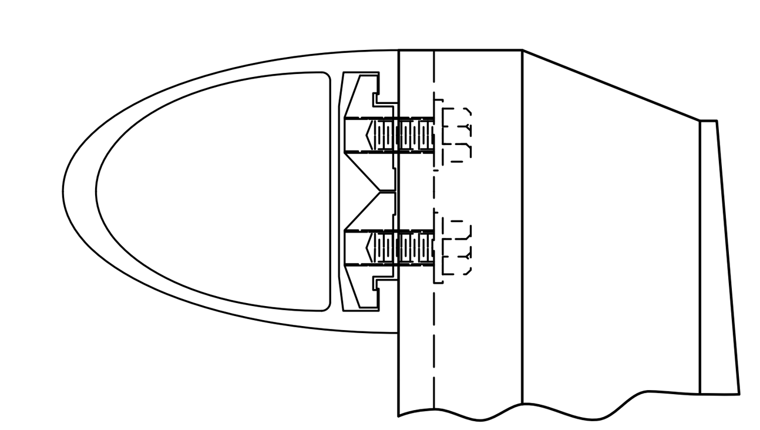


RAIL SECTION

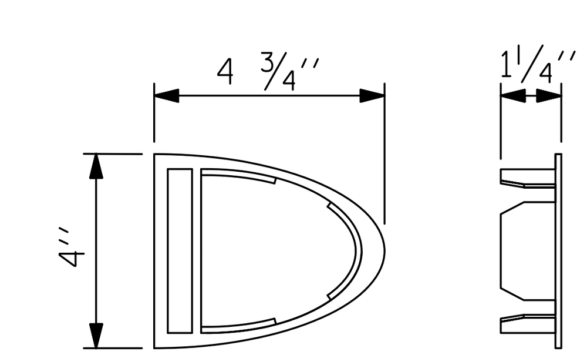


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 3 OF 3

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

(NORTHBOUND LANES)

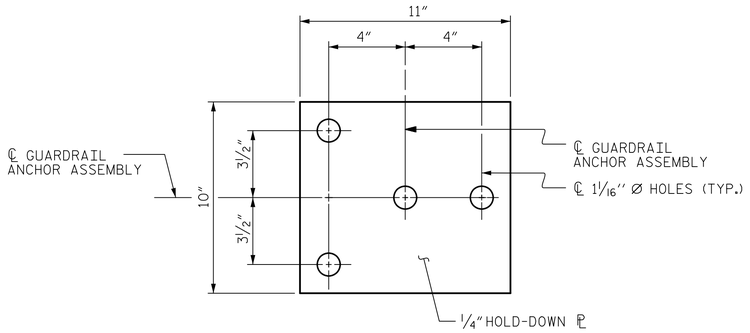
REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S1-32
1				3				TOTAL SHEETS
2				4				119

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

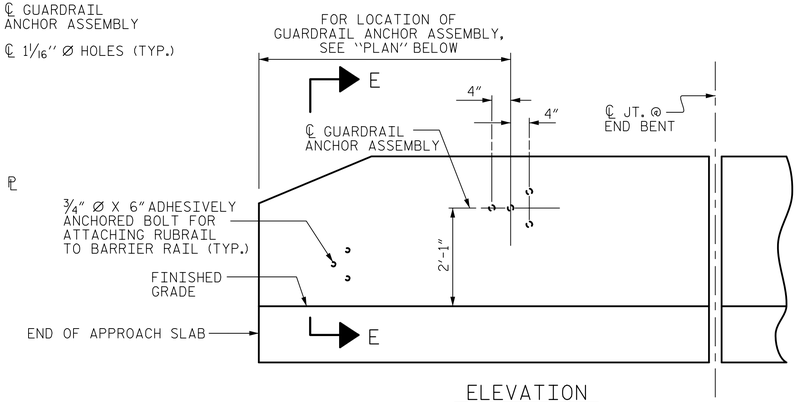
ASSEMBLED BY : D.R. DRUM	DATE : 06/2021
CHECKED BY : J.C. MORRISON	DATE : 06/2021

DRAWN BY : TLA 6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

STD. NO. BMR4

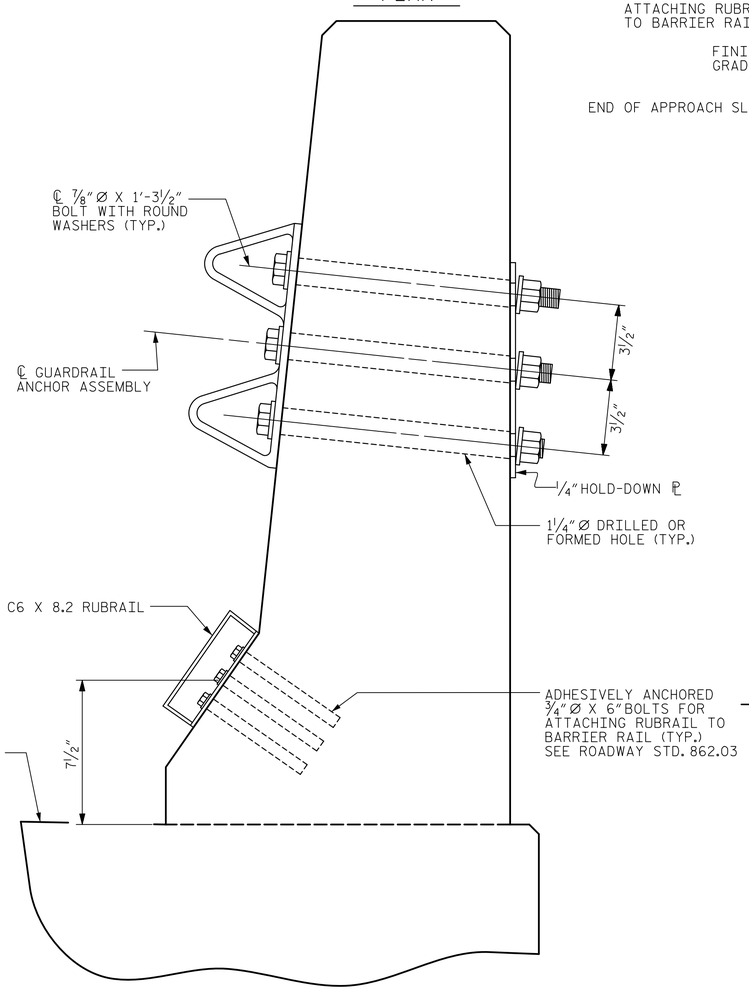


PLAN



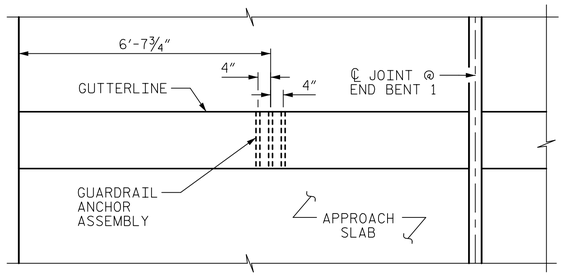
ELEVATION

SHOWING HOLES ON INSIDE FACE OF BARRIER



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 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.)

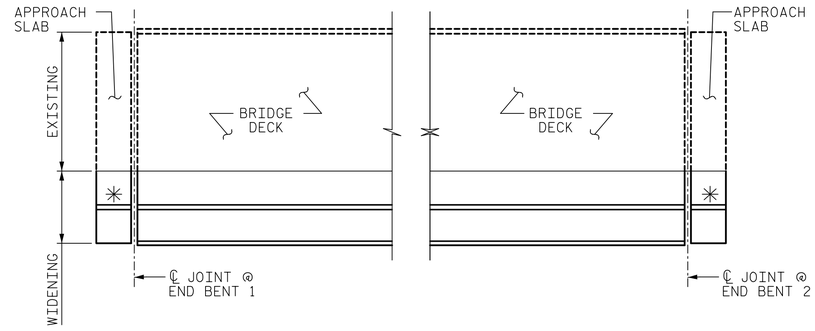
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

ASSEMBLED BY : D.R. DRUM	DATE : 6/2021
CHECKED BY : J.C. MORRISON	DATE : 6/2021
DRAWN BY : TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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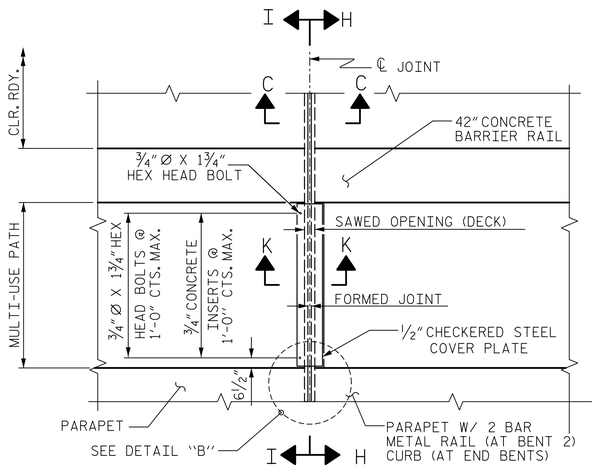
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

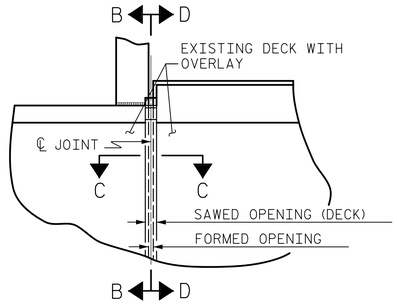
GUARDRAIL ANCHORAGE FOR BARRIER RAIL

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-33
1			3			TOTAL SHEETS
2			4			119

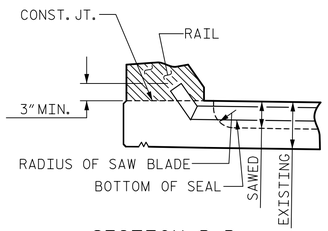


PLAN AT WIDENING

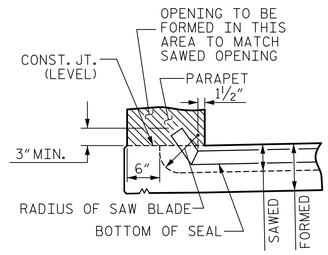


PLAN AT EXISTING BARRIER

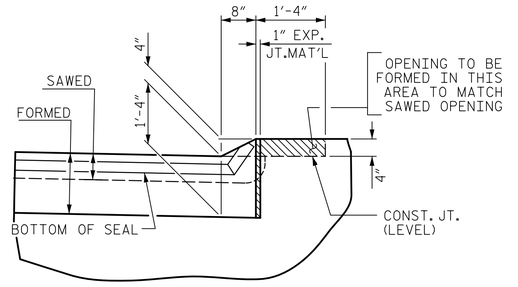
SHOWN AT END BENT, SIMILAR AT BENT 2



SECTION D-D



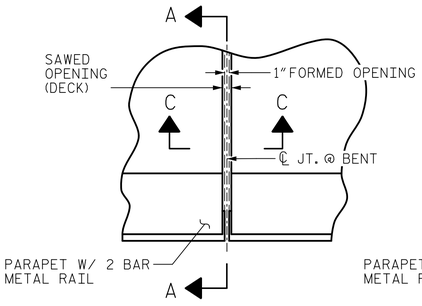
SECTION A-A



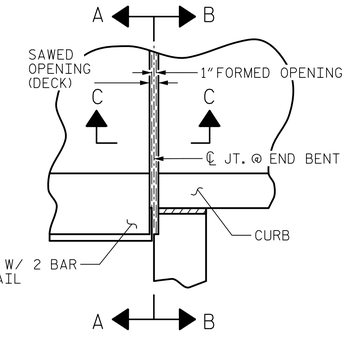
SECTION B-B

FOAM JOINT SEAL DETAILS

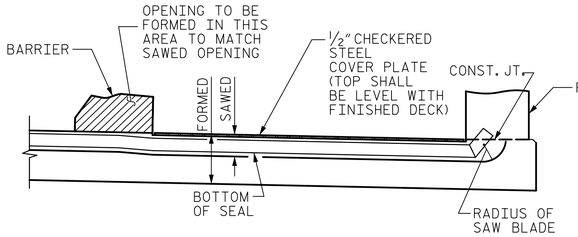
FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE PARAPET.



PLAN AT INTERIOR BENT

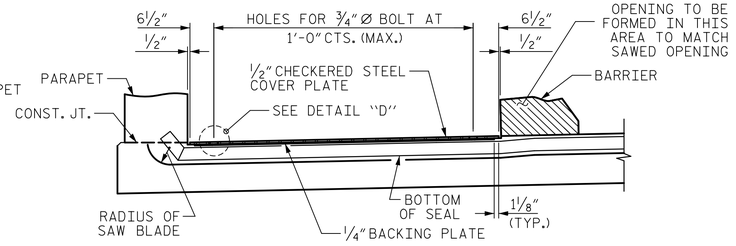


PLAN AT END BENT



SECTION H-H

SHOWN AT INTERIOR BENT
SIMILAR AT END BENT



SECTION I-I

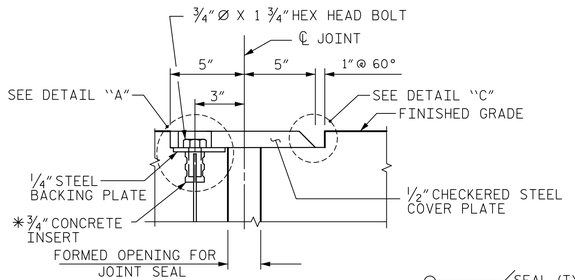
COVER PLATE SYSTEM NOTES:

*THE ¾″ CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

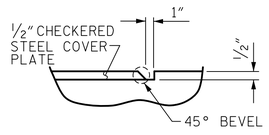
THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS INACCORDANCE WITH THE STANDARD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

THE ¾″ DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

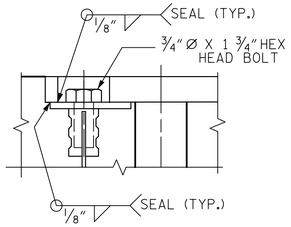
NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR ″FOAM JOINT SEALS″.



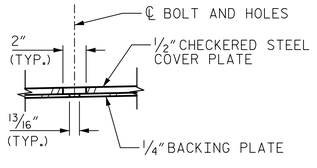
SECTION K-K



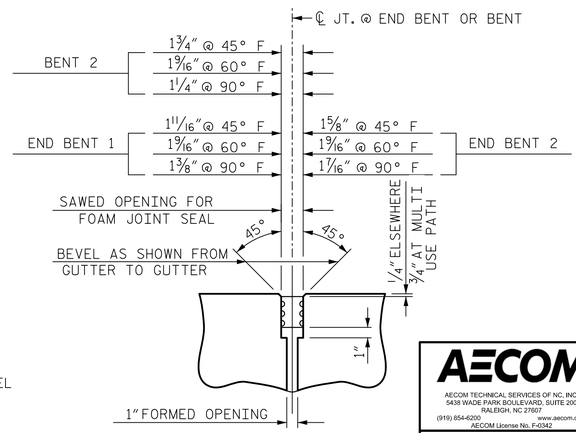
DETAIL ″C″



DETAIL ″A″



DETAIL ″D″



SECTION C-C

FOAM JOINT SEAL
(EXPANSION)

FOAM JOINT SEAL NOTES:

THE NOMINAL UNCOMPRSSED SEAL WITH OF THE FOAM JOINT SEAL SHALL BE 2″.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

FOAM JOINT SEALS SHALL NOT BE INSTALLED UNTIL PC OVERLAY IS COMPLETE.

ELASTOMERIC CONCRETE IS NOT REQUIRED.

DETAIL ″B″

SIDEWALK COVER PLATE, ANCHOR BOLTS, BACKING PLATE, AND RECESS NOT SHOWN

MULTI-USE PATH COVER PLATE DETAILS

DRAWN BY :	G. COLS	DATE :	12/2022
CHECKED BY :	J.C. MORRISON	DATE :	12/2022
DESIGNED BY :	G. COLS	DATE :	12/2022
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	12/2022

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PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FOAM JOINT SEAL DETAILS
(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-34
1			3			TOTAL SHEETS
2			4			119

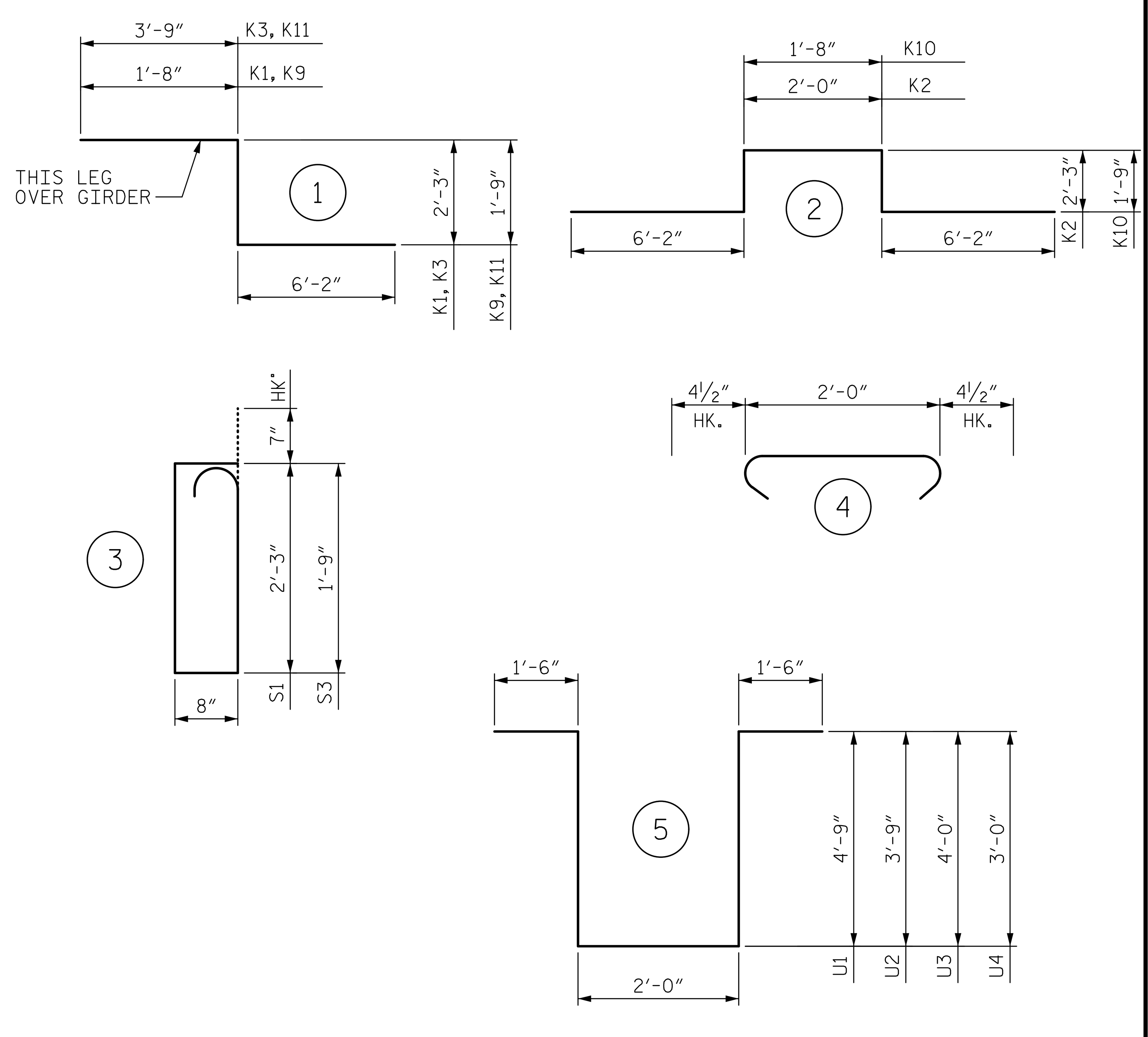
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	592	5	STR	20′-2″	12452
A2	592	5	STR	20′-2″	12452
✱ B1	72	4	STR	31′-10″	1531
✱ B2	54	6	STR	23′-9″	1926
✱ B3	28	6	STR	30′-8″	1290
B4	116	5	STR	47′-6″	5747
✱ B5	36	4	STR	37′-5″	900
✱ B6	18	6	STR	44′-7″	1205
✱ B7	28	6	STR	20′-4″	855
B8	58	5	STR	58′-4″	3529
✱ D1	1184	5	STR	5′-3″	6483
✱ D2	1184	5	STR	3′-6″	4322
✱ G1	4	5	STR	20′-2″	84
✱ G2	4	5	STR	2′-8″	11
✱ K1	4	8	1	10′-1″	108
✱ K2	4	8	2	18′-10″	201
✱ K3	4	8	1	12′-2″	130
K4	9	4	STR	16′-4″	98
K5	8	4	STR	5′-10″	31
K6	8	4	STR	7′-0″	37
K7	16	4	STR	7′-4″	78
K8	8	4	STR	7′-8″	41
✱ K9	4	8	1	9′-7″	102
✱ K10	4	8	2	17′-6″	187
✱ K11	4	8	1	11′-8″	125
✱ S1	28	5	3	6′-5″	187
S2	94	4	4	2′-9″	173
✱ S3	28	5	3	5′-5″	158
U1	10	4	5	14′-6″	97
U2	4	4	5	12′-6″	33
U3	10	4	5	13′-0″	87
U4	4	4	5	11′-0″	29

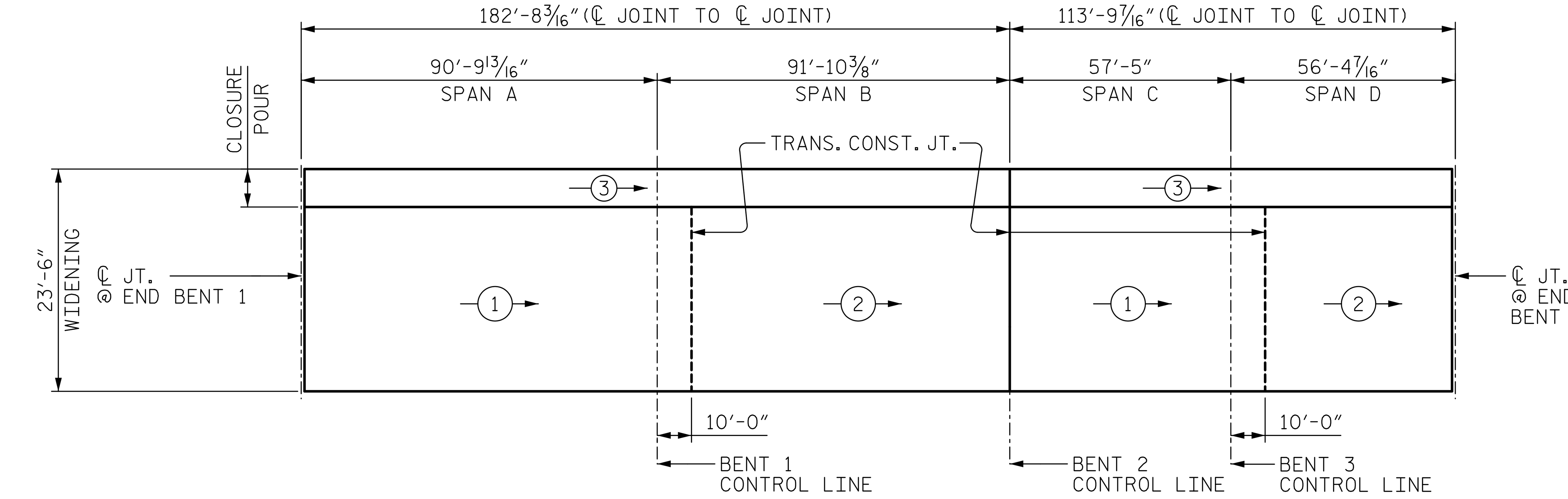
REINFORCING STEEL LBS. 22,353

EPOXY COATED REINFORCING STEEL LBS. 32,596

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.



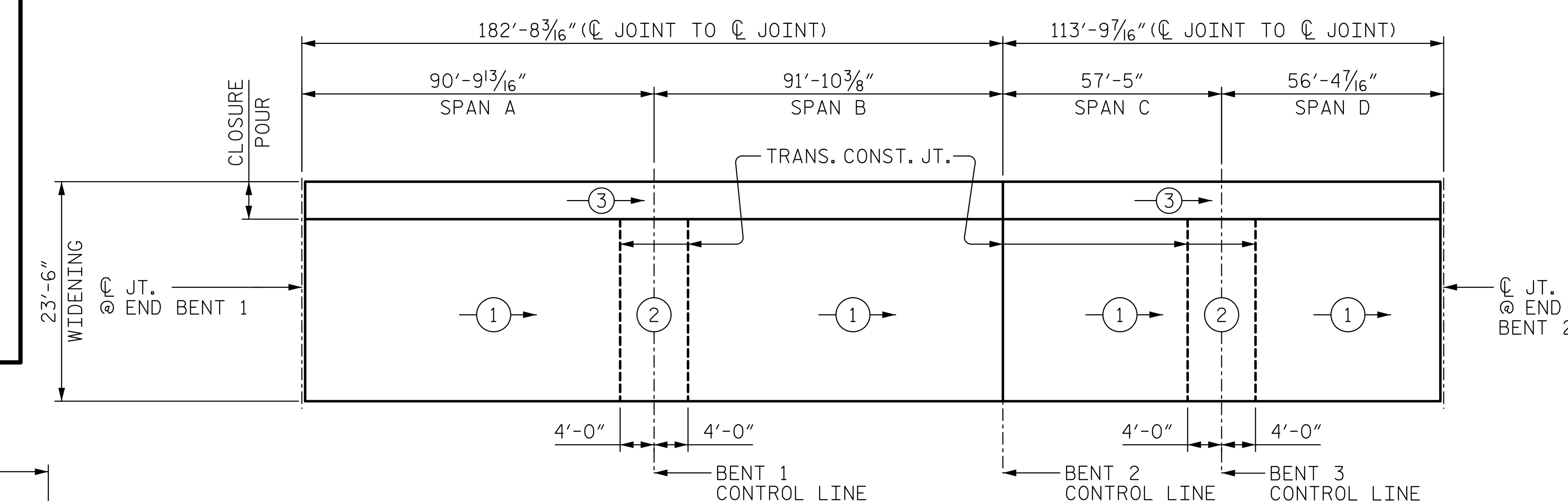
UNIT 1 UNIT 2

POURING SEQUENCE - PLAN

-(#)→ INDICATES POUR NUMBER AND POUR DIRECTION

POUR (2) SHALL NOT BE STARTED UNTIL BOTH ADJACENT POURS (1) REACH A MINIMUM OF 3,000 PSI.

ALL DIMENSIONS MEASURED ALONG -L-



UNIT 1 UNIT 2

OPTIONAL POURING SEQUENCE - PLAN

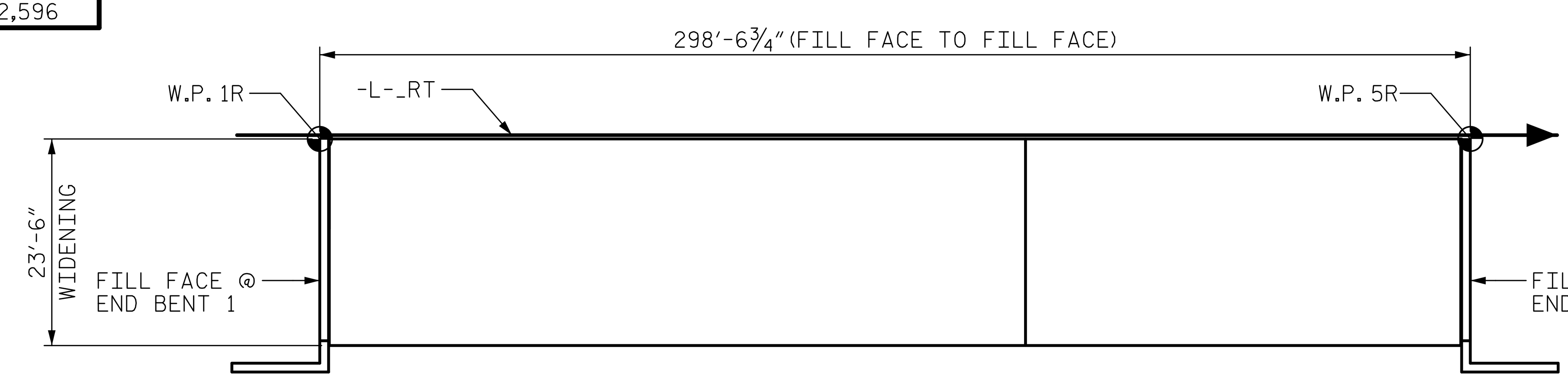
-(#)→ INDICATES POUR NUMBER AND POUR DIRECTION

POUR (2) SHALL NOT BE STARTED UNTIL BOTH ADJACENT POURS (1) REACH A MINIMUM OF 3,000 PSI.

ALL DIMENSIONS MEASURED ALONG -L-

NOTE:

QUANTITIES FOR GROOVING BRIDGE FLOORS ARE INCLUDED IN PRESERVATION SHEETS.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB
(SQ. FT. =6,963)

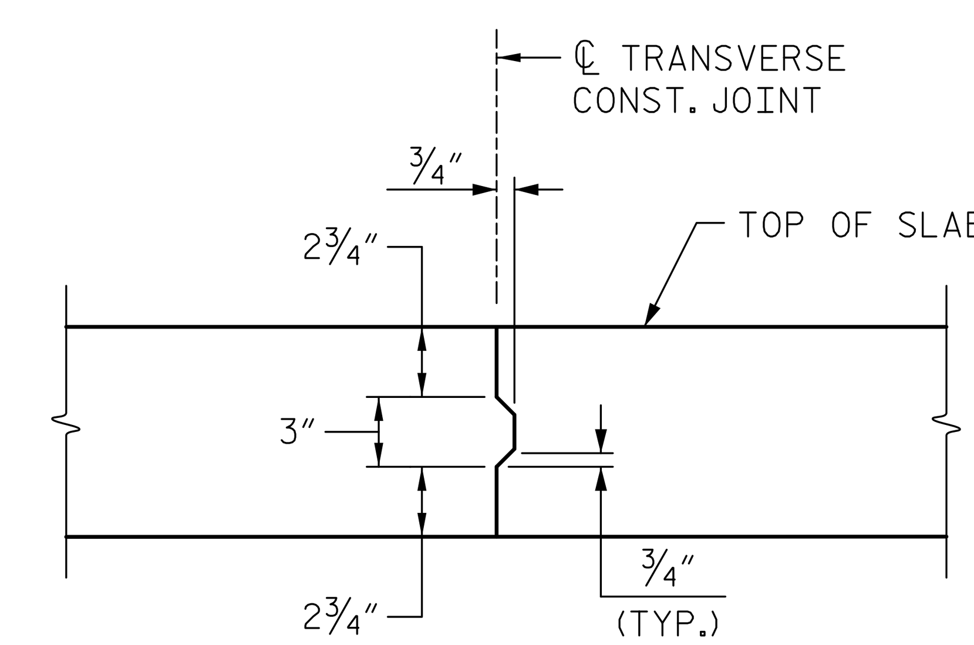
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
SPANS A-D		22,353	32,596
UNIT 1 - POUR #1	74.9	---	---
UNIT 1 - POUR #2	56.6	---	---
UNIT 2 - POUR #1	50.3	---	---
UNIT 2 - POUR #2	31.7	---	---
CLOSURE POUR	17.7	---	---
TOTAL	231.2	22,353	32,596

✱ QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1′-11″	1′-7″	1′-11″	1′-7″	2′-6″
#5	2′-5″	2′-0″	2′-5″	2′-0″	3′-1″
#6	2′-10″	2′-5″	3′-7″	2′-5″	3′-8″
#7	4′-2″	2′-9″			
#8	4′-9″	3′-2″			



TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTES: REINFORCING STEEL IN SLAB NOT SHOWN.

LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

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RALEIGH, NC 27607
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030474 JOHN C. MORRISON
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL (NORTHBOUND LANES)

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S1-35
1			3					TOTAL SHEETS
2			4					119

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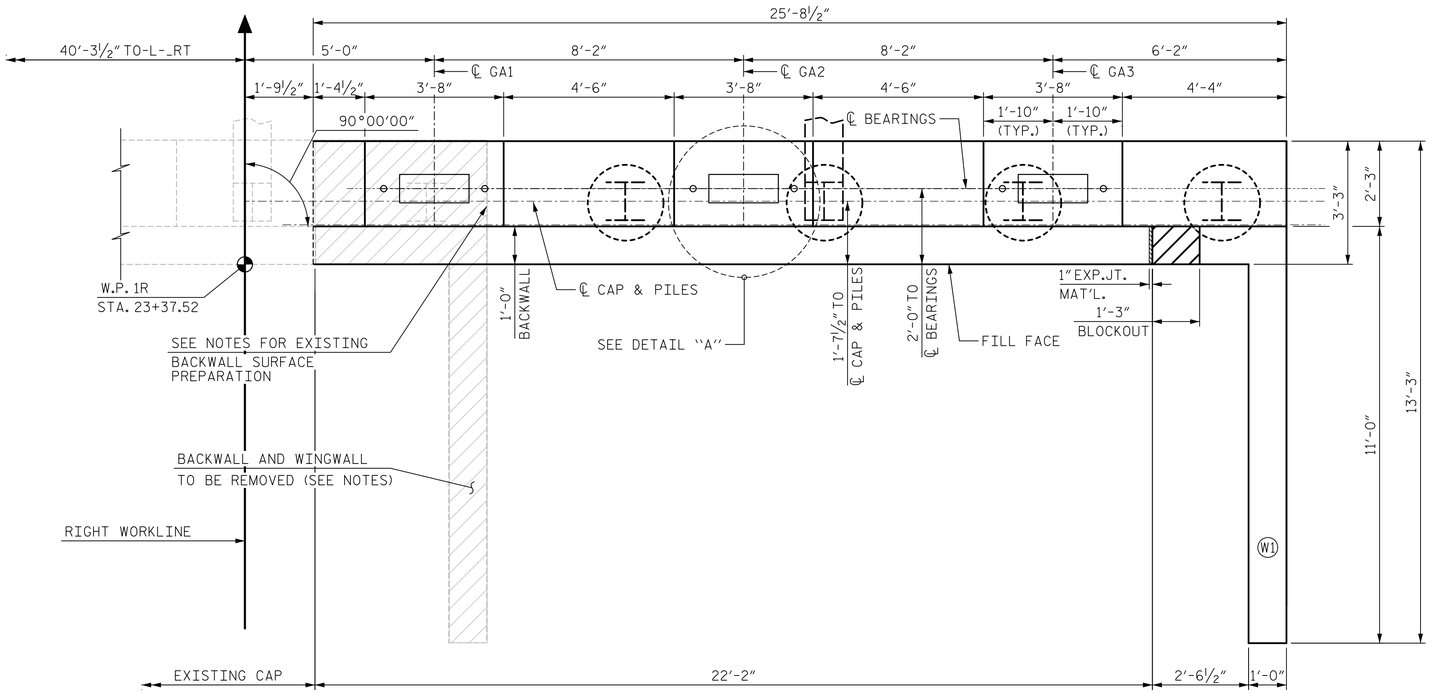
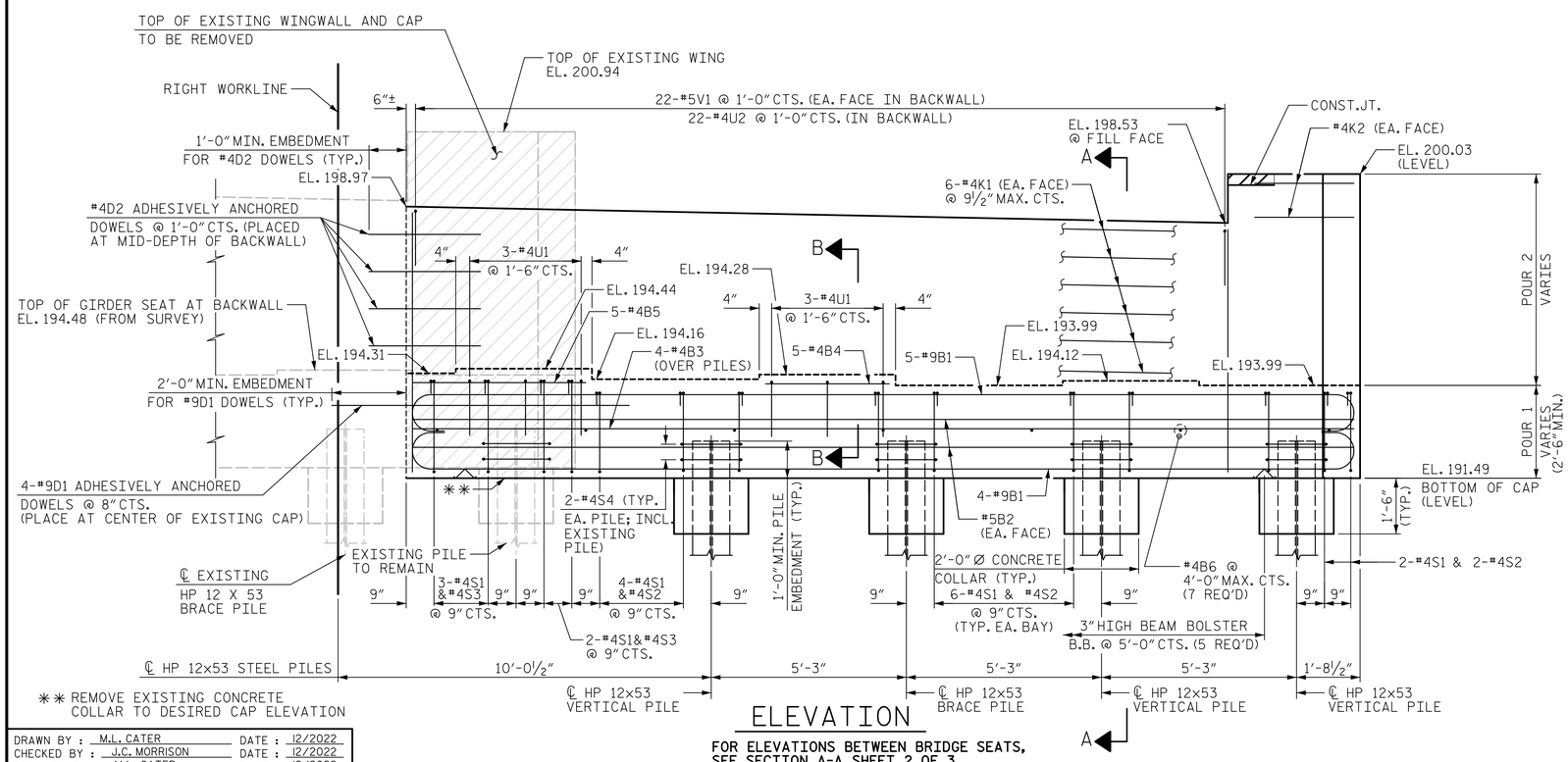
DRAWN BY :	M.L. CATER	DATE :	12/2022
CHECKED BY :	J.C. MORRISON	DATE :	12/2022
DESIGNED BY :	D.R. DRUM	DATE :	06/2021
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	12/2022

STD. NO. BOM2

DATE: 2/9/2023 TIME: 12:40:06 PM



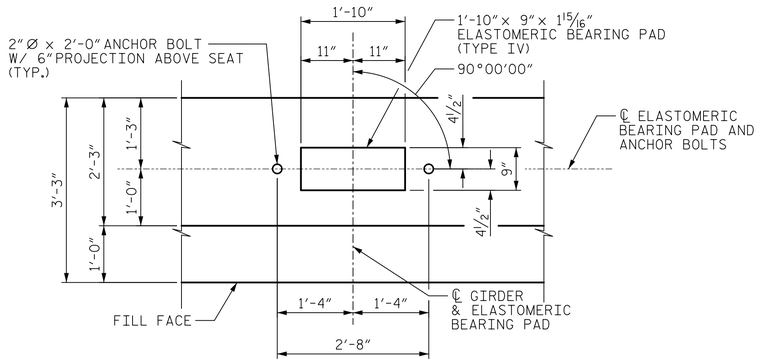
PLAN



** REMOVE EXISTING CONCRETE COLLAR TO DESIRED CAP ELEVATION

ELEVATION

FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A, SHEET 2 OF 3



DETAIL "A"

NOTES:

FOR ADDITIONAL NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WINGWALL DETAILS AND SECTION A-A SEE SHEET 2 OF 3.

INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.

DENOTES LIMIS OF REMOVAL OF EXISTING CAP, BACKWALL AND WINGWALL

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 3

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STATE OF NORTH CAROLINA
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RALEIGH

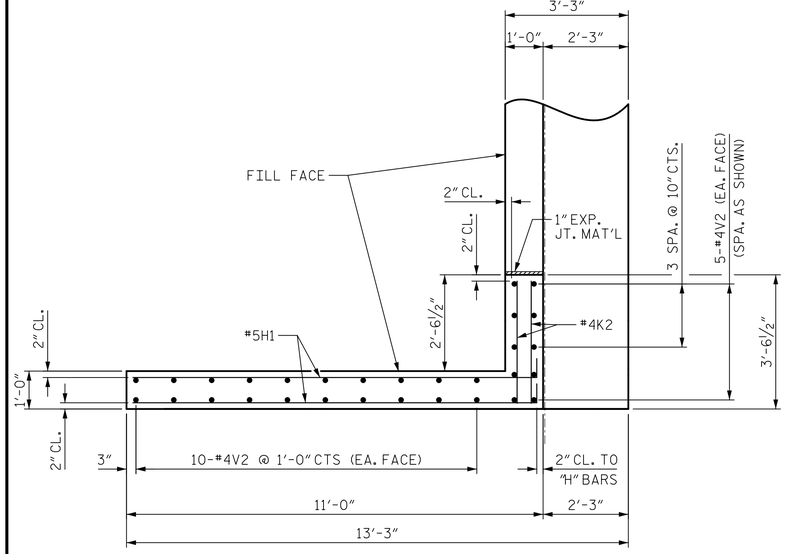
SUBSTRUCTURE

END BENT 1

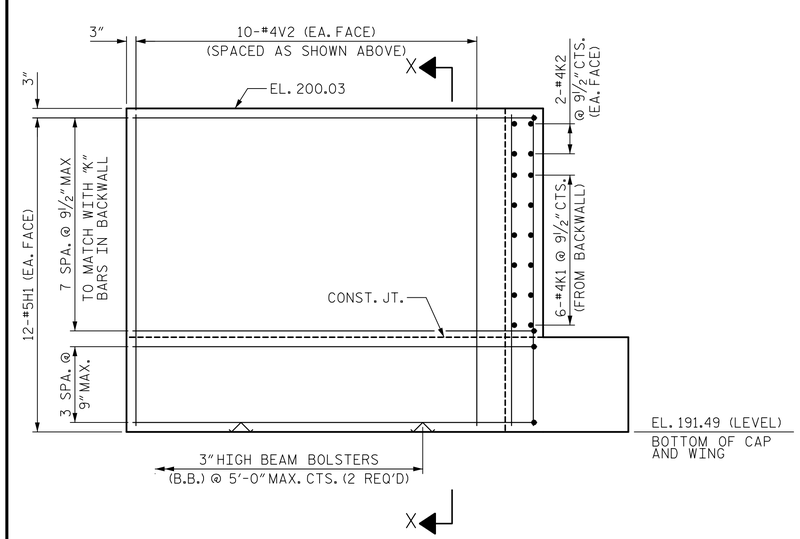
(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-36
1			3			TOTAL SHEETS
2			4			119

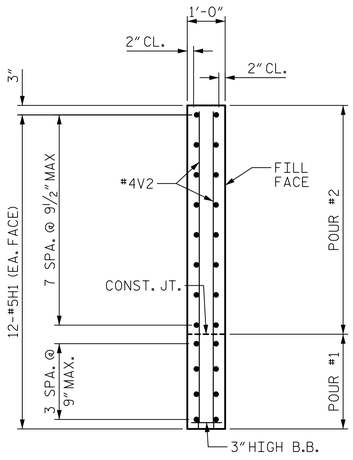
DRAWN BY : M.L. CATER	DATE :	12/2022
CHECKED BY : J.C. MORRISON	DATE :	12/2022
DESIGNED BY : M.L. CATER	DATE :	12/2022
DESIGN CHECKED BY : J.C. MORRISON	DATE :	12/2022



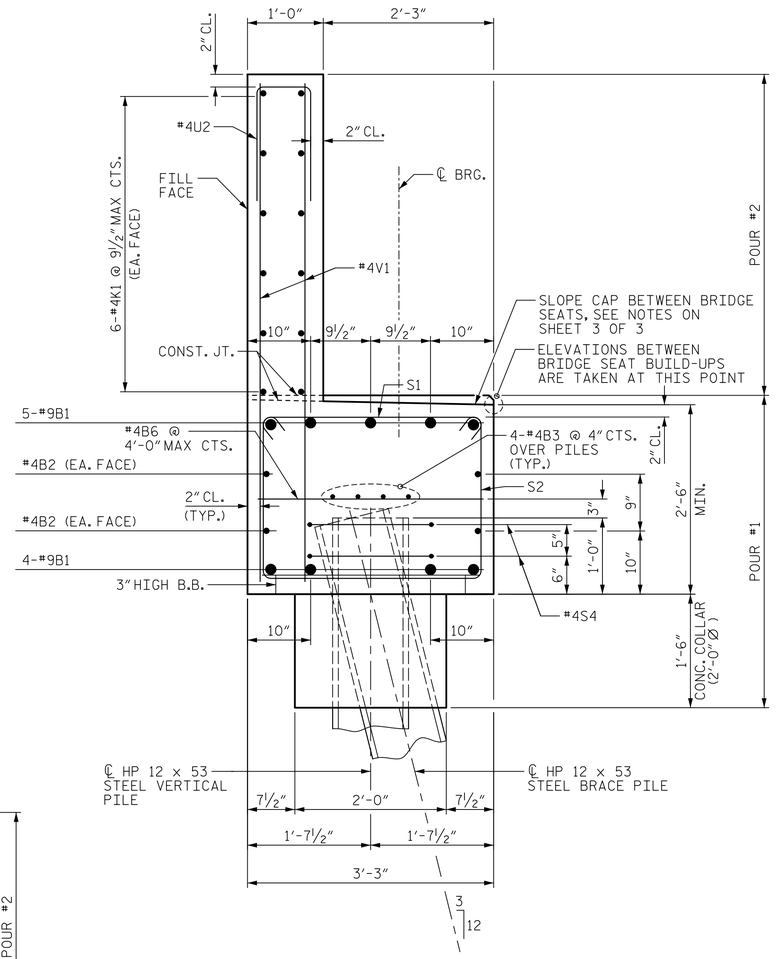
PLAN OF WING W1



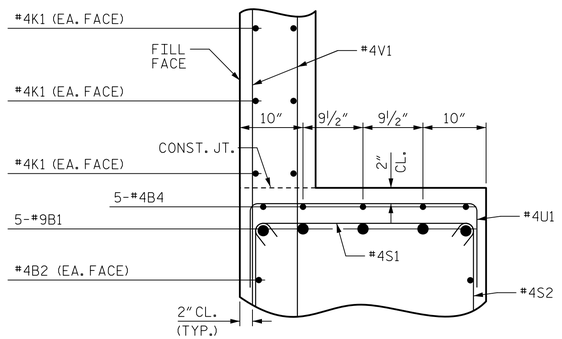
ELEVATION OF WING W1



SECTION X-X



SECTION A-A



SECTION B-B

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 3

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-37
1			3			TOTAL SHEETS
2			4			119

DRAWN BY :	D. KIM	DATE :	12/2022
CHECKED BY :	J.C. MORRISON	DATE :	12/2022
DESIGNED BY :	M.L. CATER	DATE :	12/2022
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	12/2022

DATE: 2/9/2023
TIME: 12:40:26 PM

USER: cater.m
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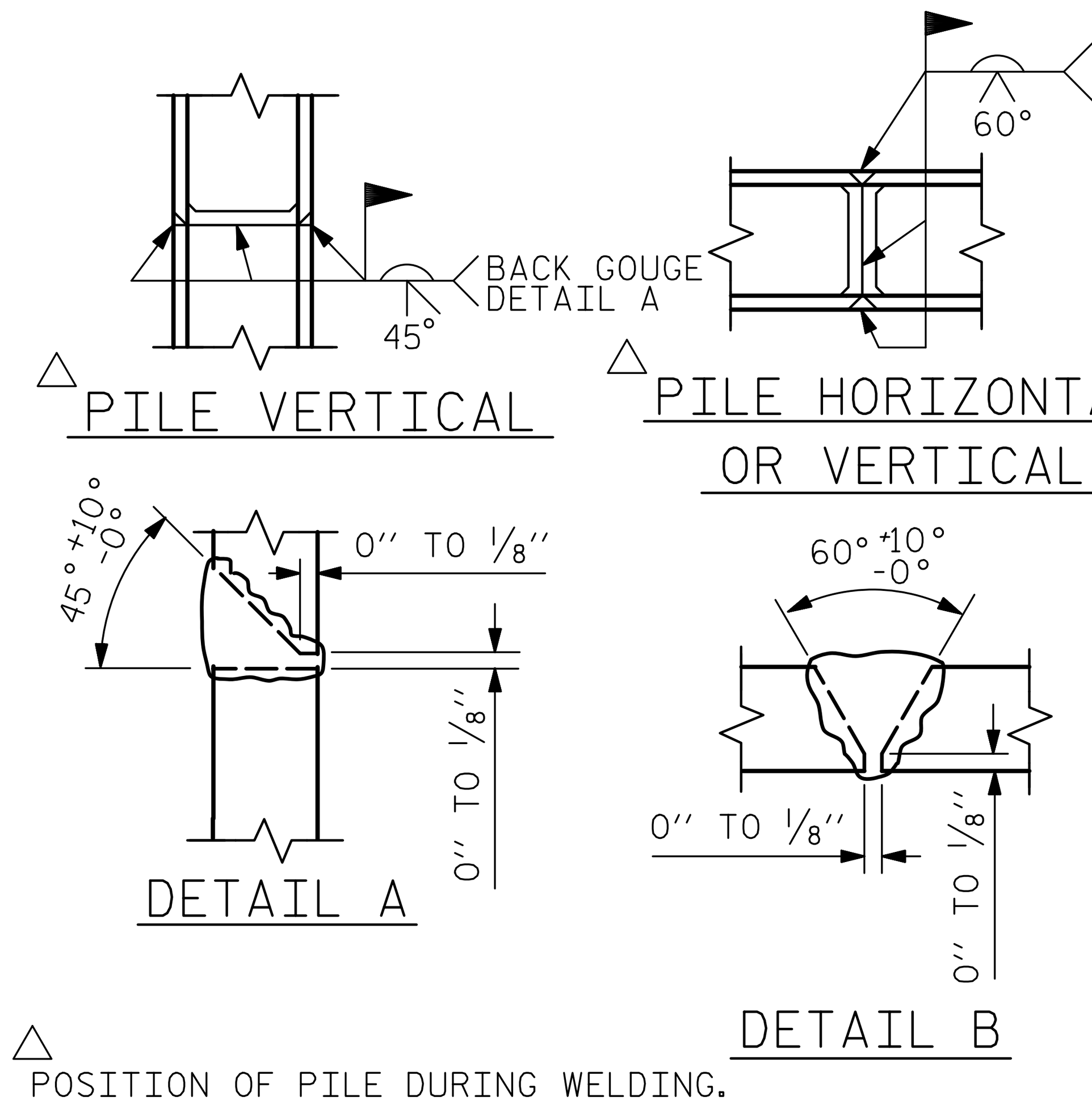
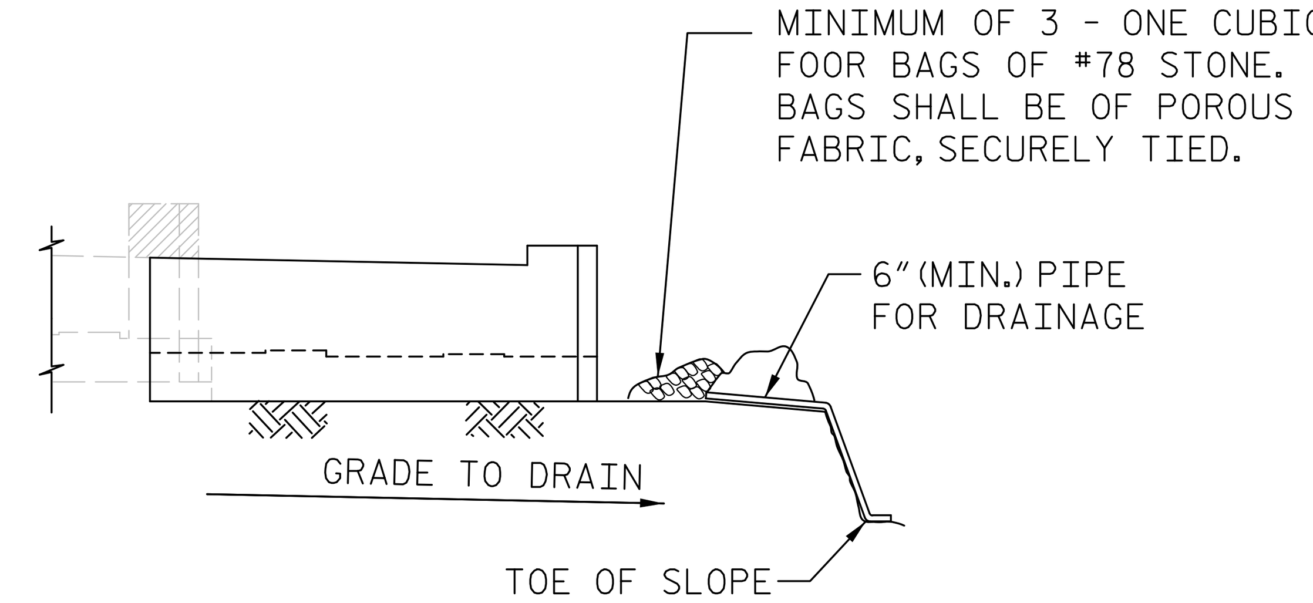


PILE SPLICE DETAILS



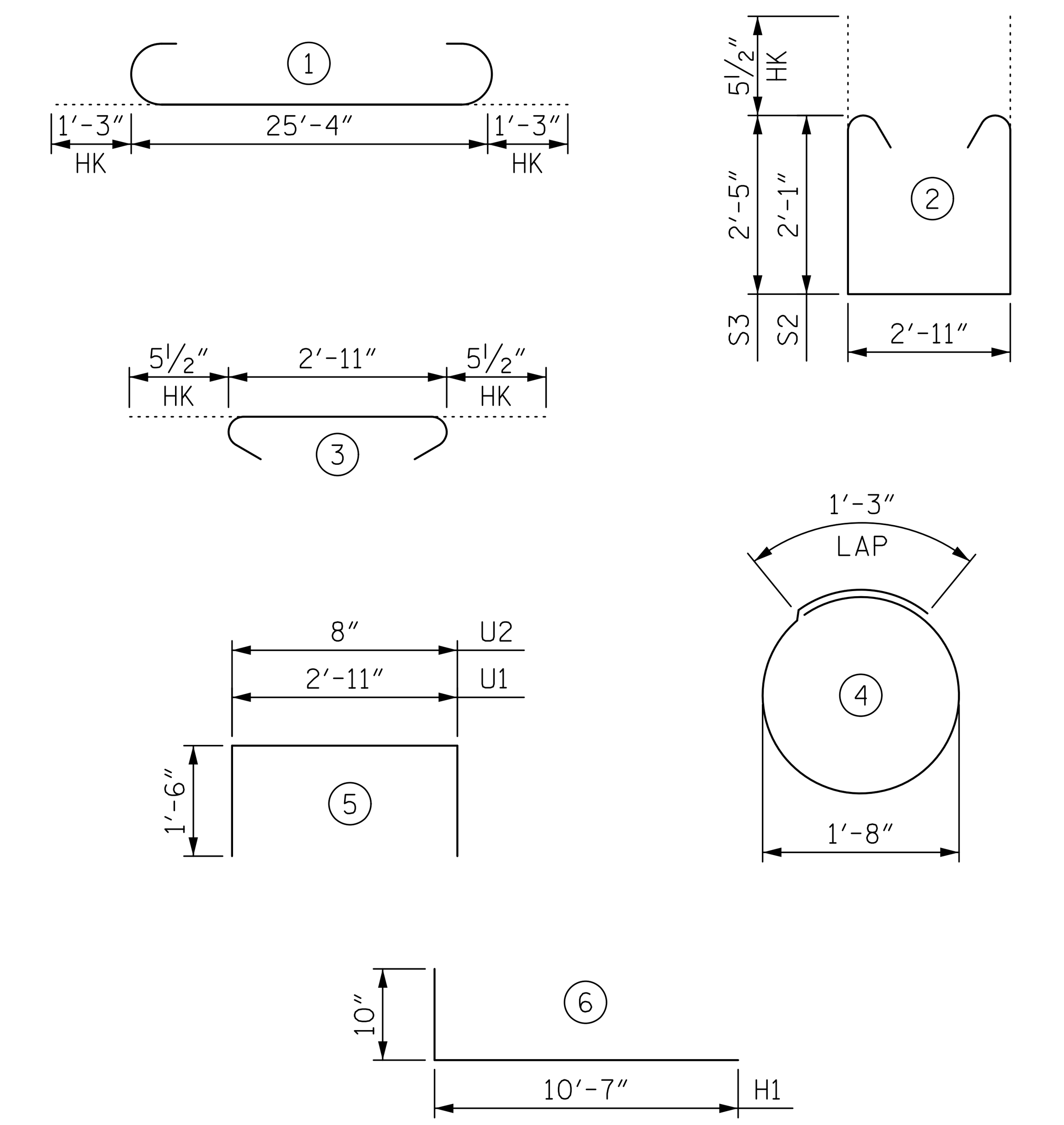
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT 1

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	#9	1	27'-11"	854
B2	4	#5	STR	25'-5"	106
B3	4	#4	STR	25'-5"	68
B4	5	#4	STR	3'-4"	11
B5	5	#4	STR	4'-8"	16
B6	7	#4	STR	2'-11"	14
D1	4	#9	STR	7'-6"	102
D2	4	#4	STR	3'-0"	8
H1	24	#5	6	11'-5"	286
K1	12	#4	STR	25'-9"	206
K2	4	#4	STR	3'-3"	9
S1	29	#4	3	3'-10"	74
S2	24	#4	2	8'-0"	128
S3	5	#4	2	8'-10"	30
S4	10	#4	4	6'-6"	43
U1	6	#4	5	5'-11"	24
U2	22	#4	5	3'-8"	54
V1	44	#5	STR	6'-8"	306
V2	30	#4	STR	8'-2"	164

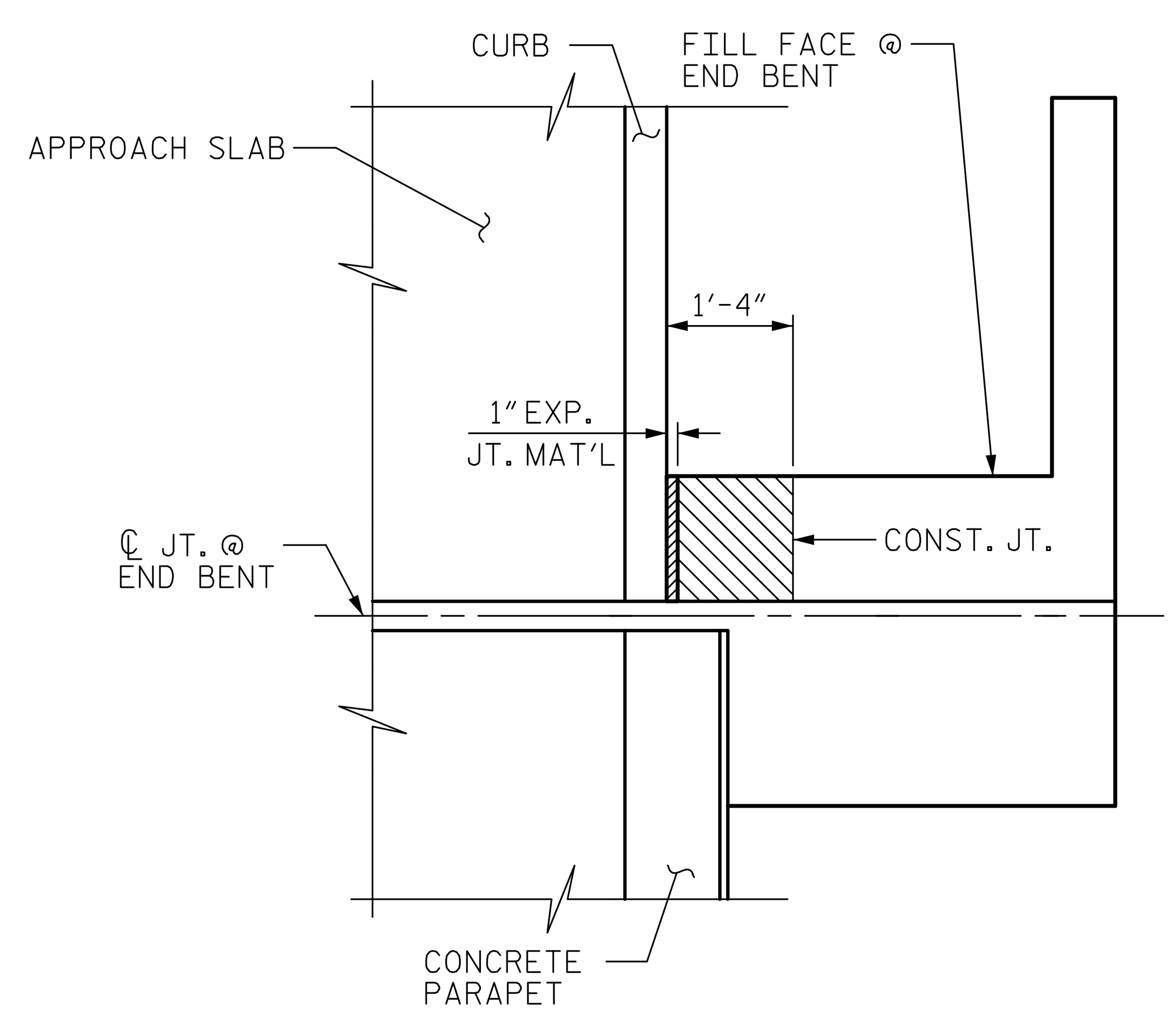
REINFORCING STEEL 2,520 LBS.

CLASS A CONCRETE

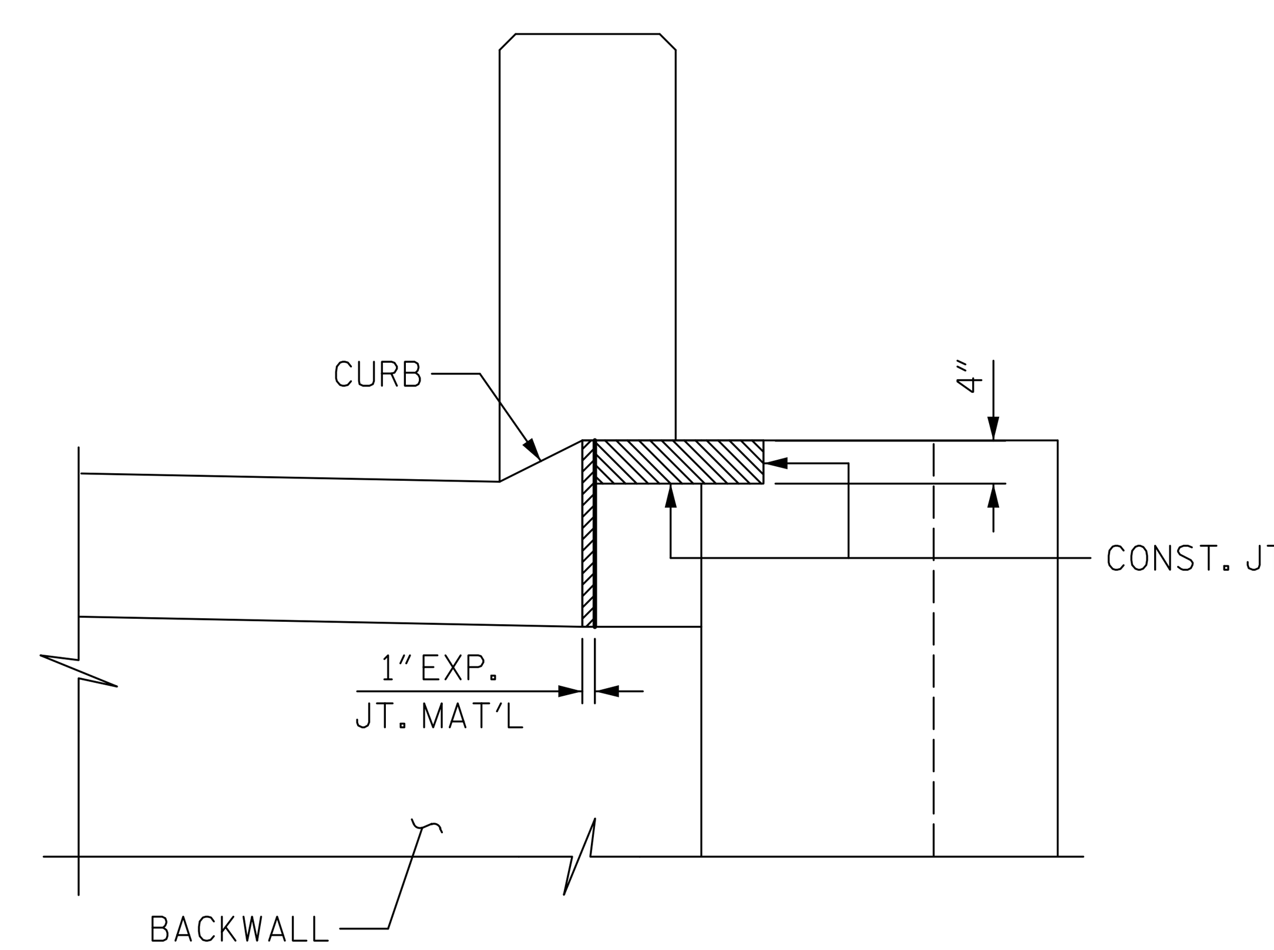
POUR #1 (CAP, COLLARS & LOWER WINGWALLS) 9.2 C.Y.

POUR #2 (BACKWALL & UPPER WINGWALL) 6.9 C.Y.

TOTAL = 16.1 C.Y.



PLAN



ELEVATION

BLOCKOUT IN WINGWALL

NOTES:

REMOVE EXISTING CAP, BACKWALL AND WINGWALL AS SHOWN AND REPAIR WITH CLASS A CONCRETE OR GROUT FOR STRUCTURES. THE COST OF CLASS A CONCRETE OR GROUT SHALL BE CONSIDERED INCIDENTAL TO THE LUMP SUM COST FOR REMOVAL OF EXISTING STRUCTURE.

FACE OF EXISTING END BENT CAP AND BACKWALL SHALL BE ROUGHENED TO 1/4" MIN. AMPLITUDE PRIOR TO PLACEMENT OF PROPOSED END BENT CAP OR BACKWALL.

THE CONTRACTOR SHALL USE AN ADHESIVE ANCHOR SYSTEM FOR THE #9D1 DOWELS AND #4D2 DOWELS. LEVEL 1 FIELD TESTING IS REQUIRED. THE YIELD LOAD FOR #9D1 DOWELS IS 60.0 KIPS. THE YIELD LOAD FOR THE #4D2 DOWELS IS 12.0 KIPS. ADHESIVE ANCHOR SYSTEM SHALL DEVELOP 125% OF THE YIELD LOAD OF THE BAR. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE SECTION 420-13 OF THE STANDARD SPECIFICATIONS.

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

THE CONCRETE IN THE SHADED AREA OF THE WINGWALL SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND PARAPET IS CAST IF SLIP FORMING IS USED.

FOR WING DETAILS, SEE SHEET 2 OF 3.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 3 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(NORTHBOUND LANES)

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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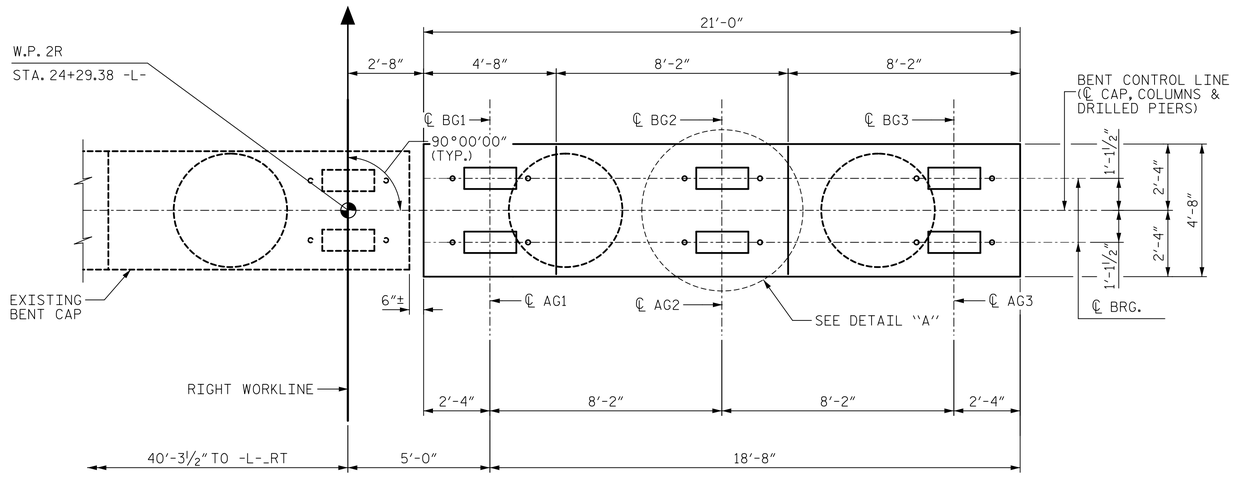
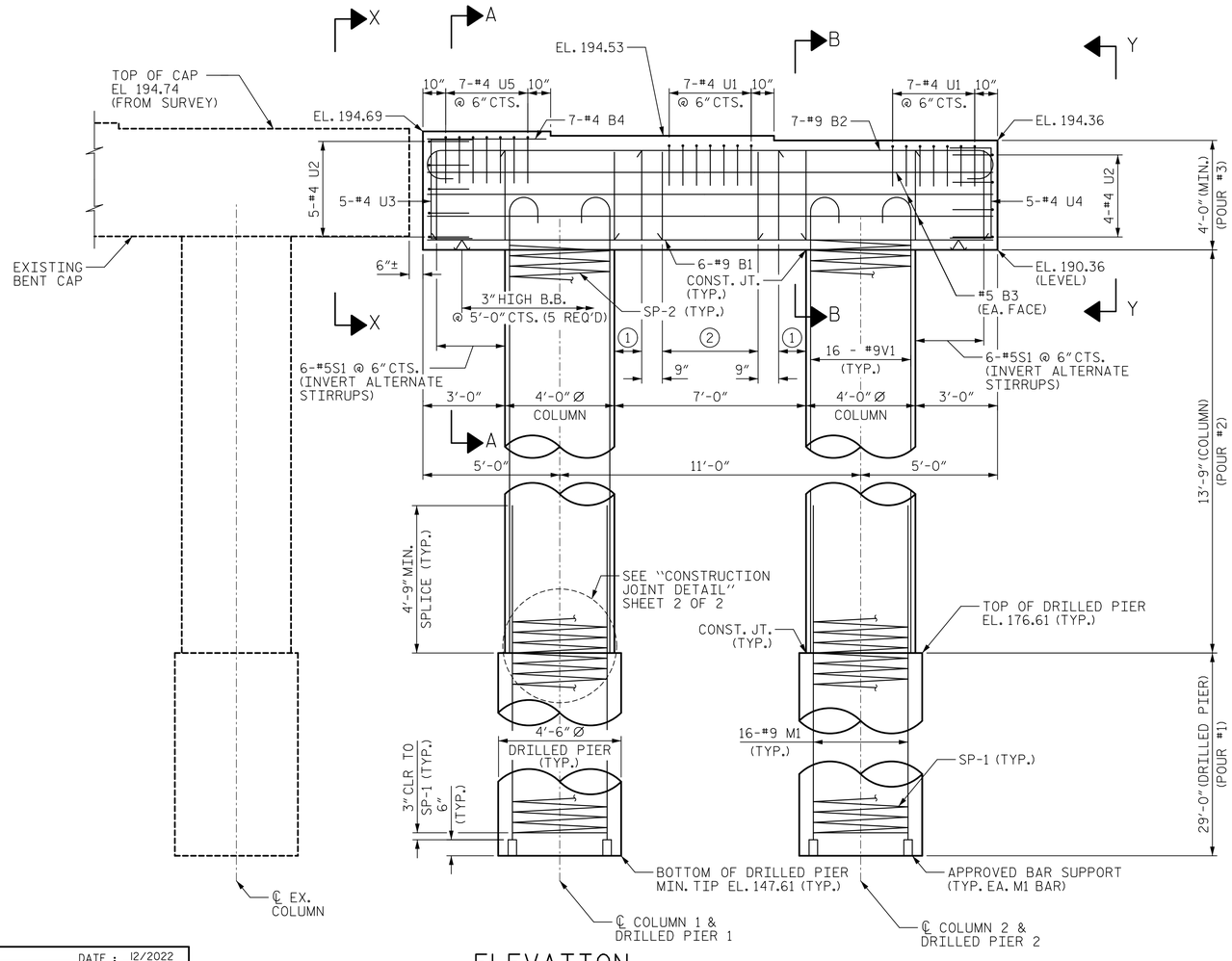
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S1-38
1			3			TOTAL SHEETS	119
2			4				

DRAWN BY :	M.L. CATER	DATE :	12/2022
CHECKED BY :	J.C. MORRISON	DATE :	12/2022
DESIGNED BY :	M.L. CATER	DATE :	12/2022
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	12/2022



PLAN



ELEVATION

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

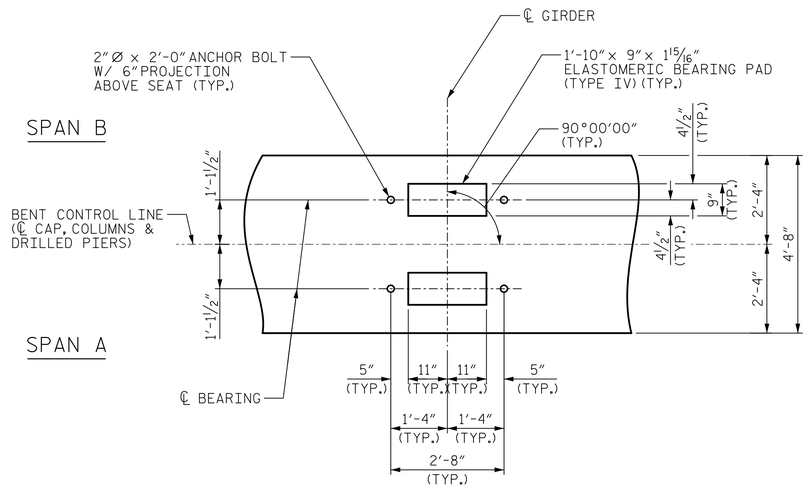
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

DRILLED PIERS SHALL BE TERMINATED ONE FOOT± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

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

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

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



DETAIL "A"
TYP. EA. BEARING

(1) 2-#5S1 @ 6"CTS. (INVERT ALTERNATE STIRRUPS)

(2) 7-#5S1 @ 9"CTS. (INVERT ALTERNATE STIRRUPS)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

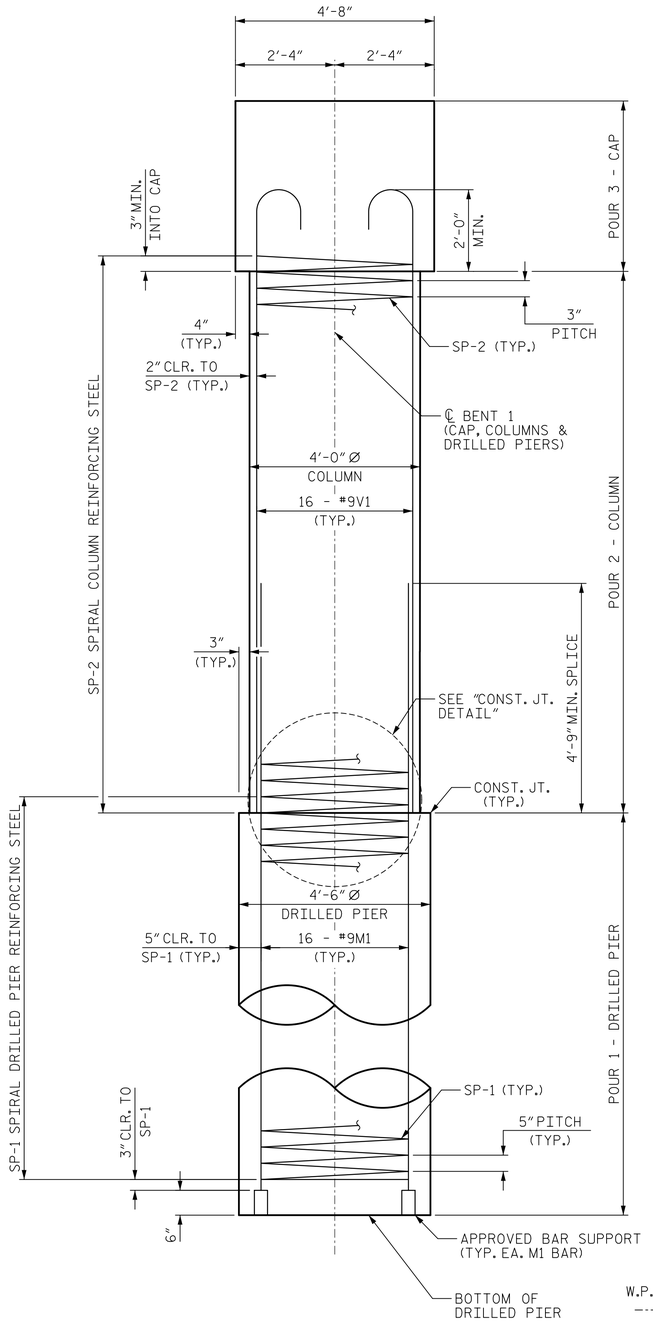
BENT 1

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-39
1			3			TOTAL SHEETS
2			4			119

DRAWN BY : M. CATER	DATE :	12/2022
CHECKED BY : J. MORRISON	DATE :	12/2022
DESIGNED BY : B. LEROY	DATE :	11/2022
DESIGN CHECKED BY : J. MORRISON	DATE :	11/2022

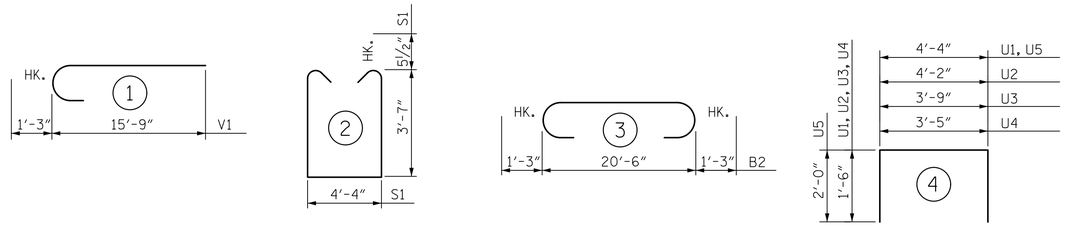
SPAN A



END ELEVATION

SPAN B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	9	STR	20'-8"	422
B2	7	9	3	23'-0"	547
B3	6	5	STR	20'-8"	129
B4	7	4	STR	4'-4"	20
M1	32	9	STR	36'-3"	3944
V1	32	9	1	17'-0"	1850
S1	23	5	2	12'-5"	298
U1	14	4	4	7'-4"	69
U2	9	4	4	7'-2"	43
U3	5	4	4	6'-9"	23
U4	5	4	4	6'-5"	21
U5	7	4	4	8'-4"	39
SP-1	2	**	5	793'-2"	1,655
SP-2	2	*	6	654'-1"	874

REINFORCING STEEL	7,405 LBS.
SPIRAL COLUMN REINFORCING STEEL	2,529 LBS.

CLASS A CONCRETE BREAKDOWN

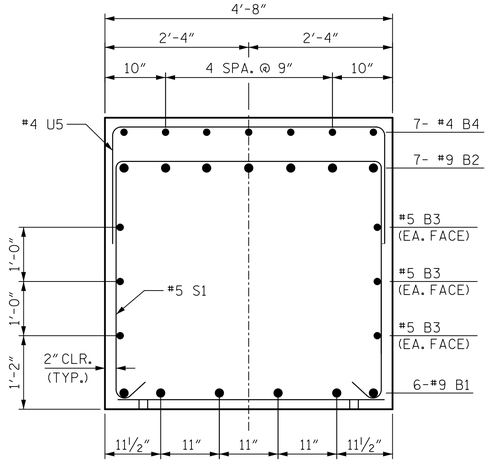
POUR #2 (COLUMNS)	12.8 C.Y.
POUR #3 (CAP)	15.0 C.Y.
TOTAL CLASS A CONCRETE	27.8 C.Y.

DRILLED PIERS

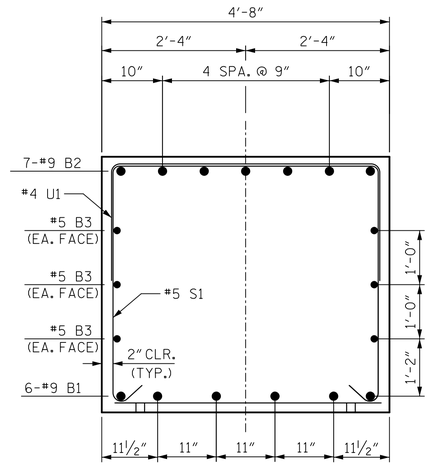
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	34.2 C.Y.

**THE "SP-1" SPIRAL REINFORCING STEEL SHALL BE W21 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

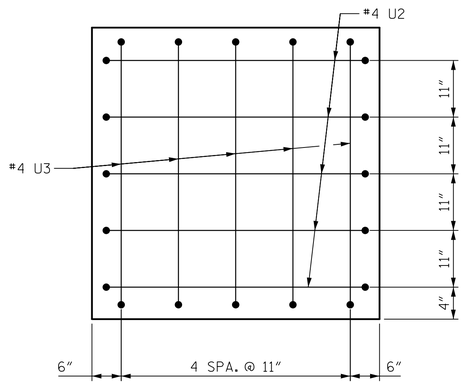
*THE "SP-2" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



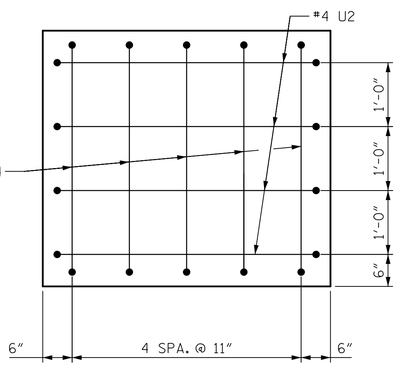
SECTION A-A



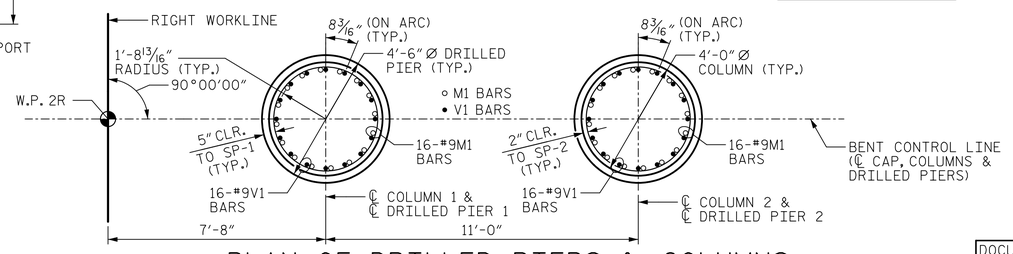
SECTION B-B



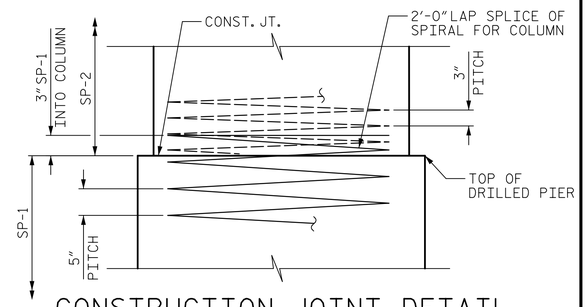
VIEW X-X



VIEW Y-Y



PLAN OF DRILLED PIERS & COLUMNS



CONSTRUCTION JOINT DETAIL

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

DRAWN BY :	M. CATER	DATE :	12/2022
CHECKED BY :	J. MORRISON	DATE :	12/2022
DESIGNED BY :	B. LEROY	DATE :	11/2022
DESIGN CHECKED BY :	J. MORRISON	DATE :	11/2022

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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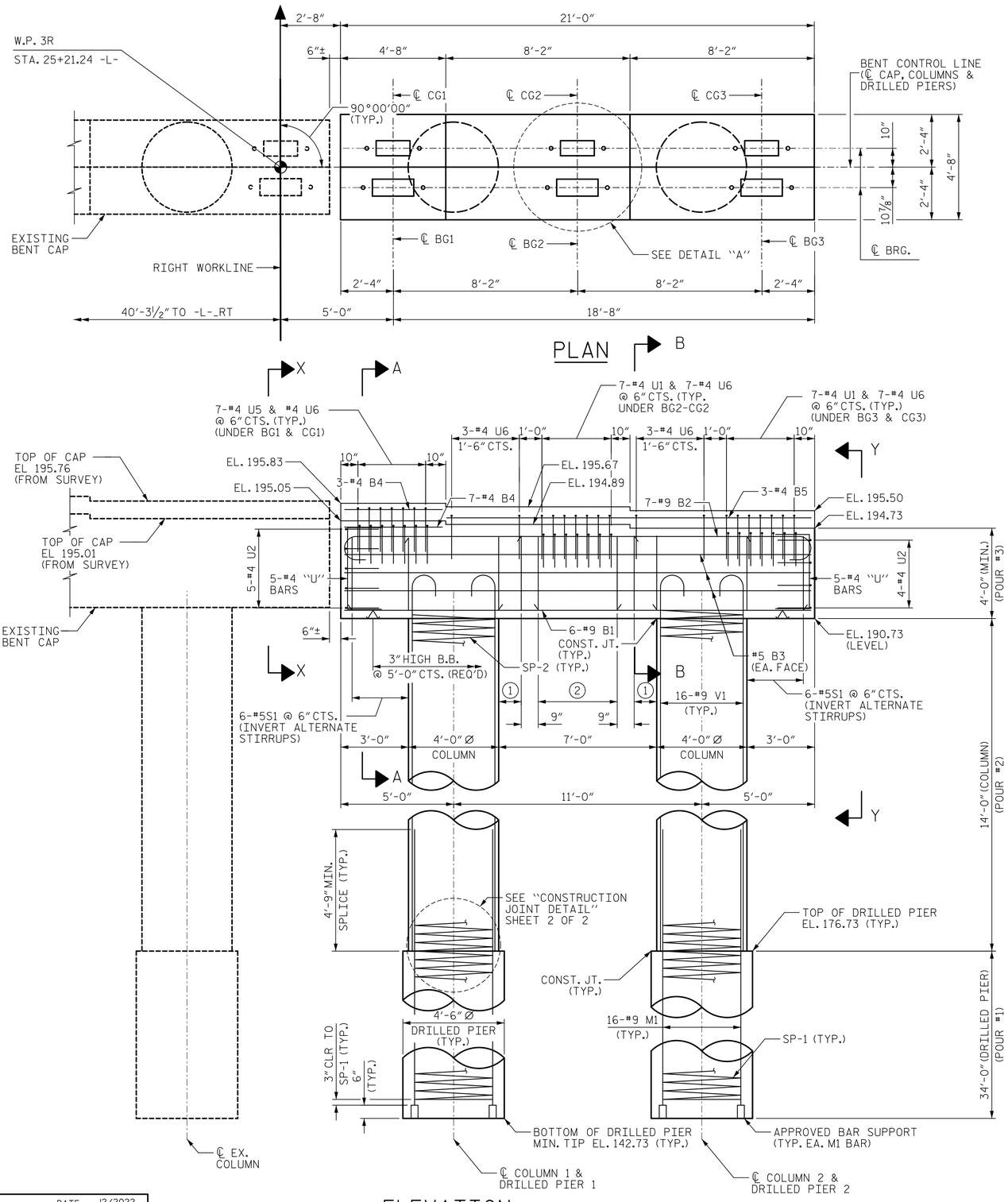
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-40
1			3			TOTAL SHEETS
2			4			119



NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

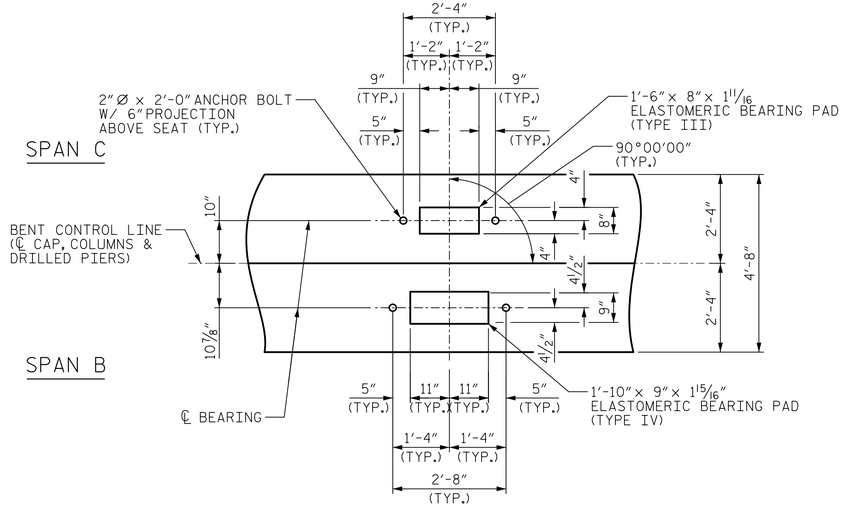
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

DRILLED PIERS SHALL BE TERMINATED ONE FOOT± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

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

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

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



DETAIL "A"

TYP. EA. BEARING

1 2-#5S1 @ 6" CTS. (INVERT ALTERNATE STIRRUPS)

2 7-#5S1 @ 9" CTS. (INVERT ALTERNATE STIRRUPS)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 2

DRAWN BY : M. CATER	DATE : 12/2022		
CHECKED BY : J. MORRISON	DATE : 12/2022		
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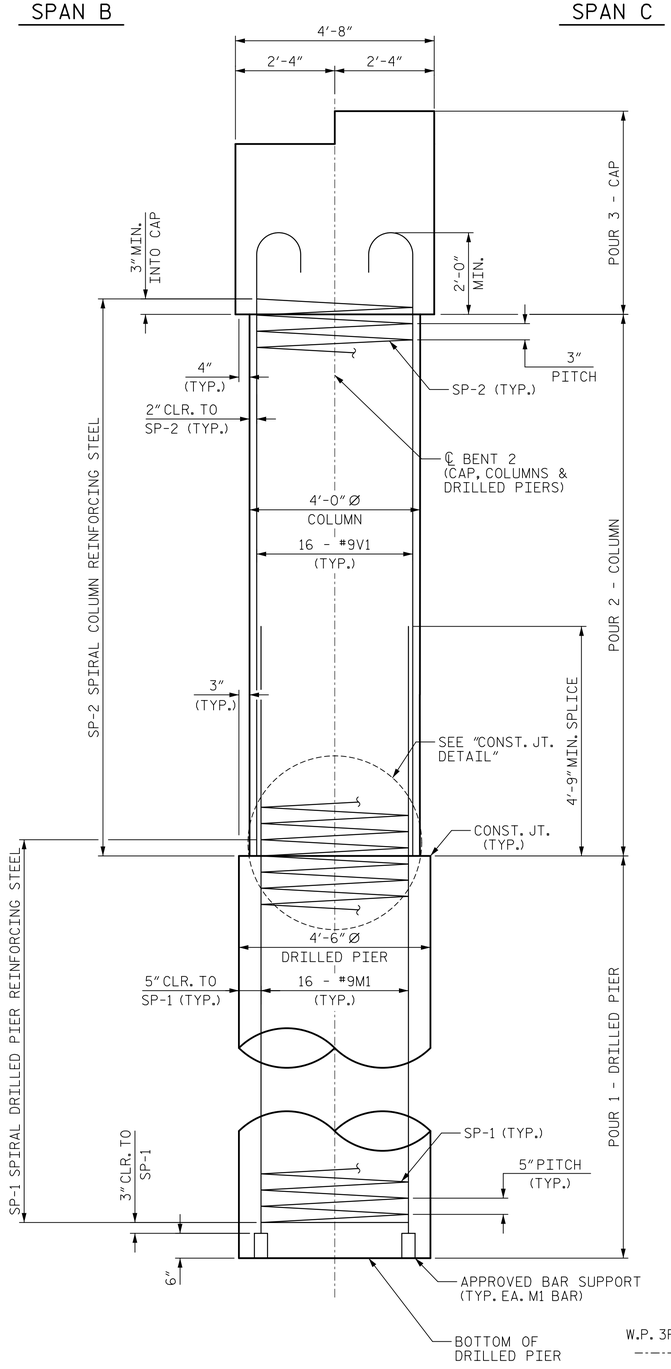
SUBSTRUCTURE

BENT 2

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-41
1			3			TOTAL SHEETS
2			4			119

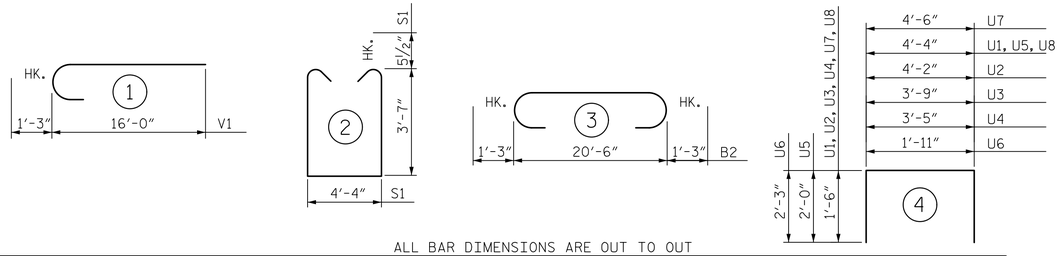
SPAN B



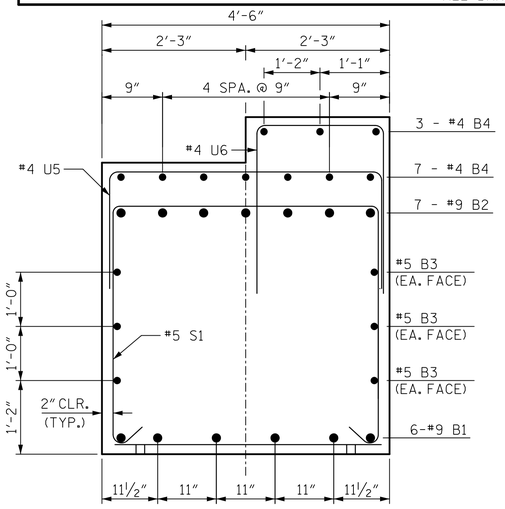
END ELEVATION

SPAN C

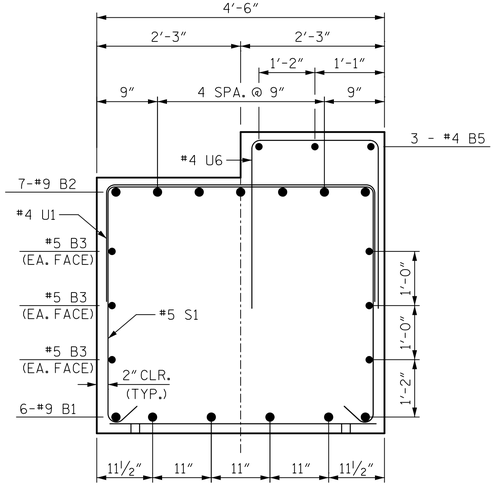
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



SECTION A-A



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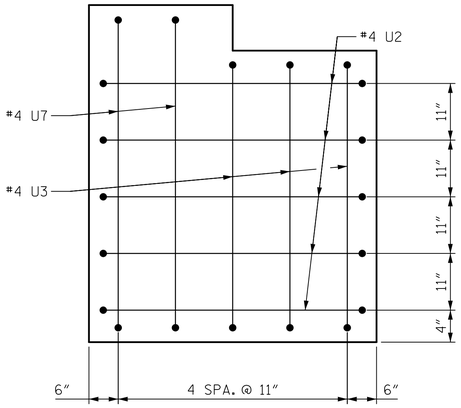
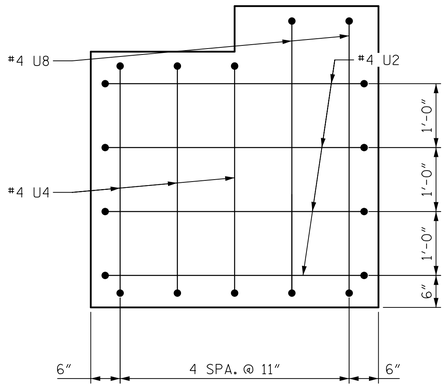


VIEW X-X



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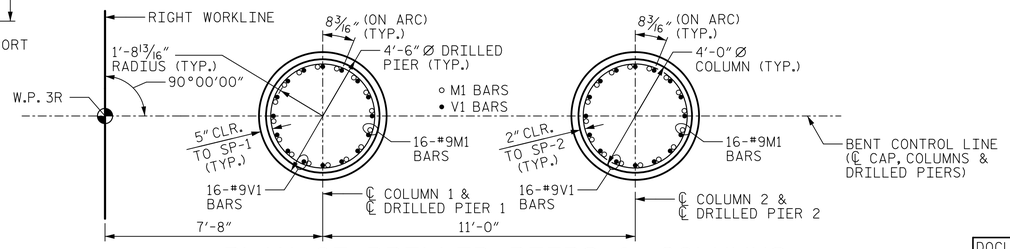


PLAN OF DRILLED PIERS & COLUMNS

BILL OF MATERIAL

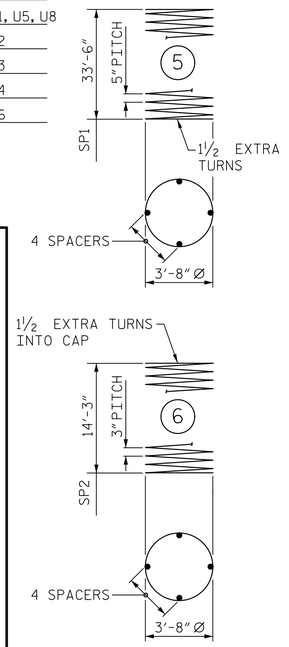
BENT 2

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	9	STR	20'-8"	422
B2	7	9	3	23'-0"	547
B3	6	5	STR	20'-8"	129
B4	10	4	STR	4'-4"	29
B5	3	4	STR	16'-0"	32
M1	32	9	STR	41'-3"	4,488
V1	32	9	1	17'-3"	1,877
S1	23	5	2	12'-5"	298
U1	14	4	4	7'-4"	69
U2	9	4	4	7'-2"	43
U3	3	4	4	6'-9"	14
U4	3	4	4	6'-5"	13
U5	7	4	4	8'-4"	39
U6	27	4	4	6'-5"	116
U7	2	4	4	7'-6"	10
U8	2	4	4	7'-2"	10
SP-1	2	**	5	929'-4"	1,939
SP-2	2	*	6	665'-5"	889

REINFORCING STEEL	8,136 LBS.
SPIRAL COLUMN REINFORCING STEEL	2,828 LBS.

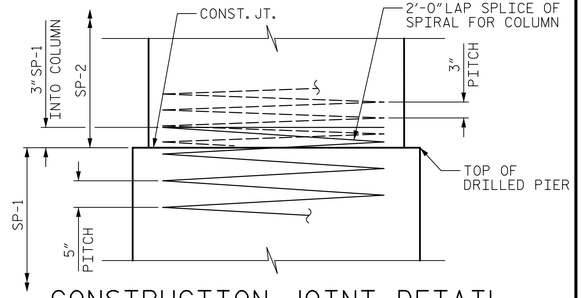
CLASS A CONCRETE BREAKDOWN	
POUR #2 (COLUMNS)	13.0 C.Y.
POUR #3 (CAP)	16.4 C.Y.
TOTAL CLASS A CONCRETE	29.4 C.Y.

DRILLED PIERS	
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	40.1 C.Y.



**THE "SP-1" SPIRAL REINFORCING STEEL SHALL BE W21 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

*THE "SP-2" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



CONSTRUCTION JOINT DETAIL

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

DRAWN BY : M. CATER	DATE : 12/2022		
CHECKED BY : J. MORRISON	DATE : 12/2022		
DESIGNED BY : B. LEROY	DATE : 12/2022		
DESIGN CHECKED BY : J. MORRISON	DATE : 12/2022		

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(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-42
1			3			TOTAL SHEETS
2			4			119

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

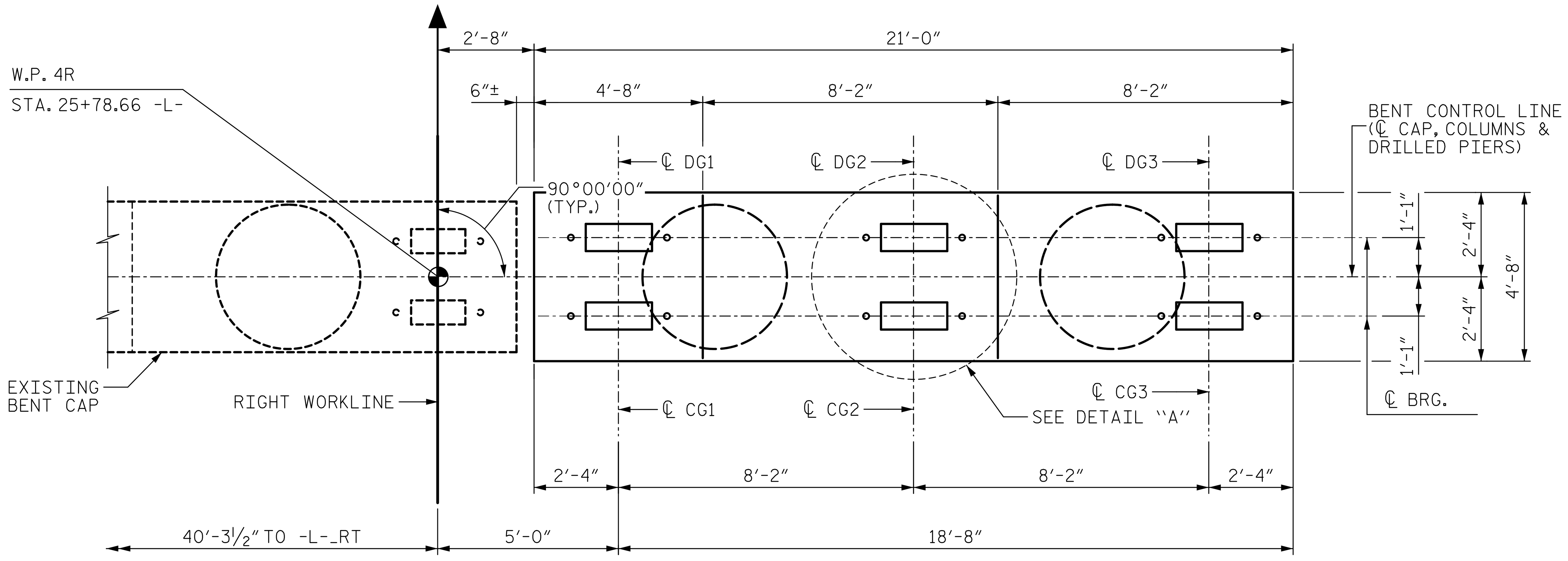
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

DRILLED PIERS SHALL BE TERMINATED ONE FOOT± BELOW GROUND LINE.

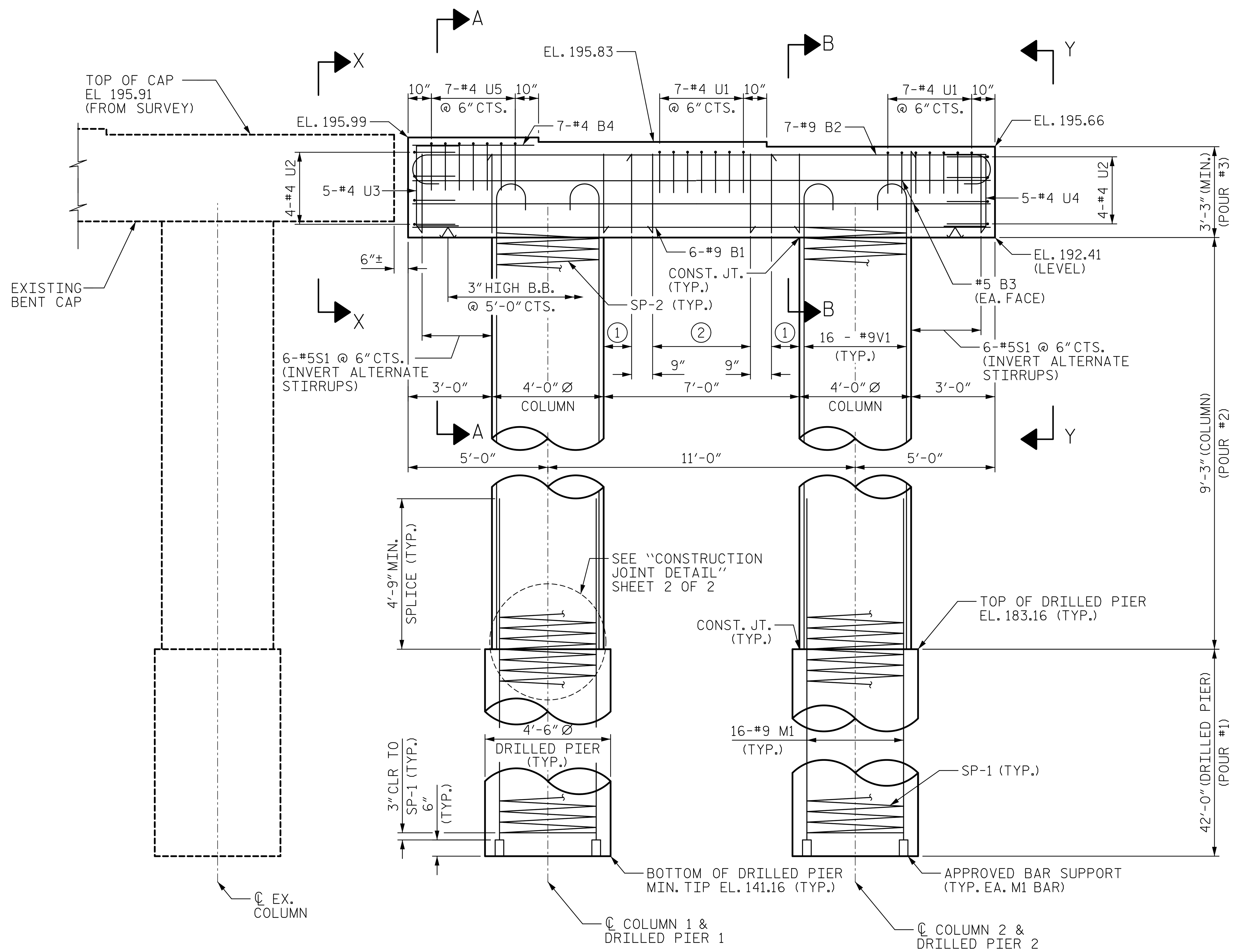
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

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

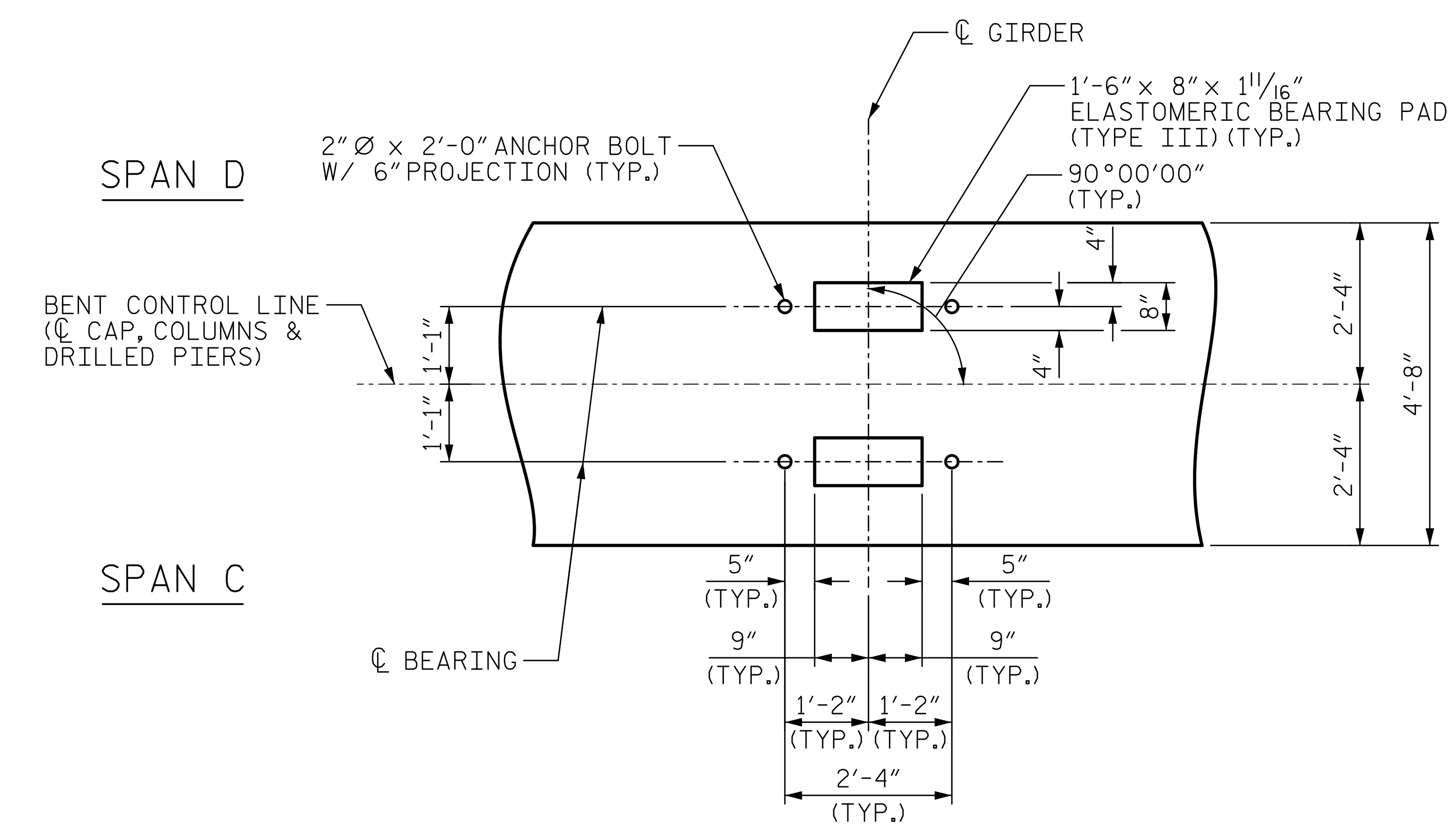
THE TOP SURFACE AREA OF THE BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.



PLAN



ELEVATION



DETAIL "A"

TYP. EA. BEARING

① 2-#5S1 @ 6" CTS. (INVERT ALTERNATE STIRRUPS)

② 7-#5S1 @ 9" CTS. (INVERT ALTERNATE STIRRUPS)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 2

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 3

(NORTHBOUND LANES)

REVISIONS

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

SHEET NO. S1-43

TOTAL SHEETS 119

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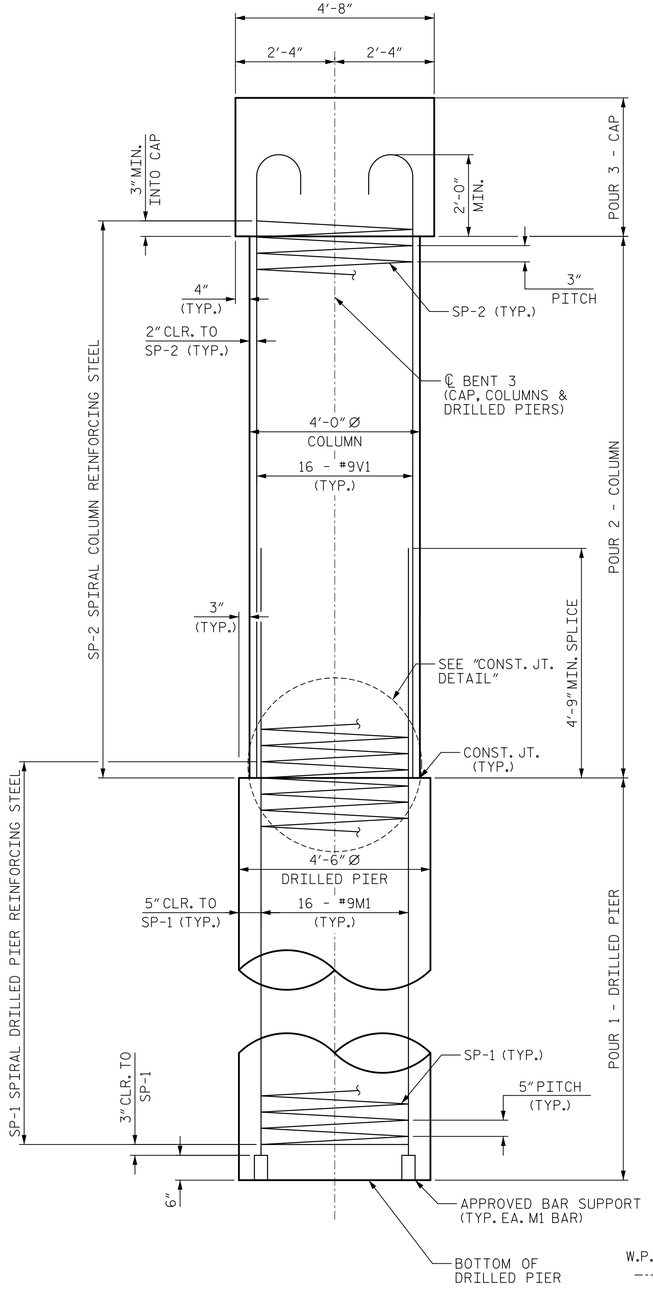
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	12/2022

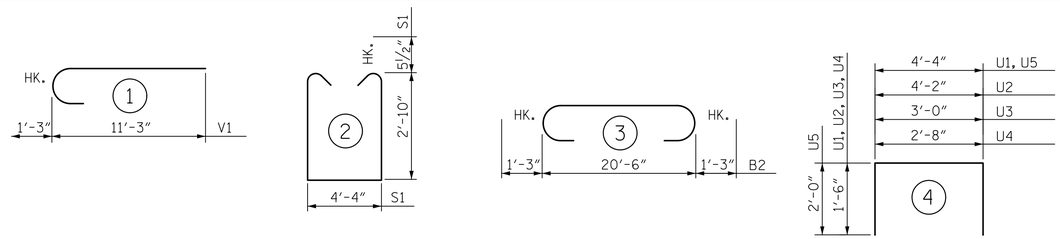
SPAN C

SPAN D



END ELEVATION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 3

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	9	STR	20'-8"	422
B2	7	9	3	23'-0"	547
B3	6	5	STR	20'-8"	129
B4	7	4	STR	4'-4"	20
M1	32	9	STR	49'-3"	5,358
V1	32	9	1	12'-6"	1,360
S1	23	5	2	10'-11"	262
U1	14	4	4	7'-4"	69
U2	8	4	4	7'-2"	38
U3	5	4	4	6'-0"	20
U4	5	4	4	5'-8"	19
U5	7	4	4	8'-4"	39
SP-1	2	**	5	1147'-2"	2,393
SP-2	2	*	6	449'-4"	600

REINFORCING STEEL	8,283 LBS.
SPIRAL COLUMN REINFORCING STEEL	2,993 LBS.

CLASS A CONCRETE BREAKDOWN

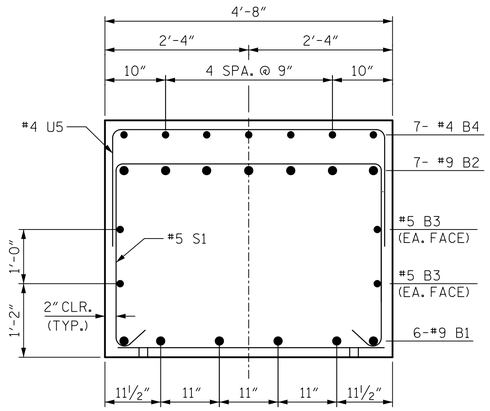
POUR #2 (COLUMNS)	8.6 C.Y.
POUR #3 (CAP)	12.2 C.Y.
TOTAL CLASS A CONCRETE	20.8 C.Y.

DRILLED PIERS

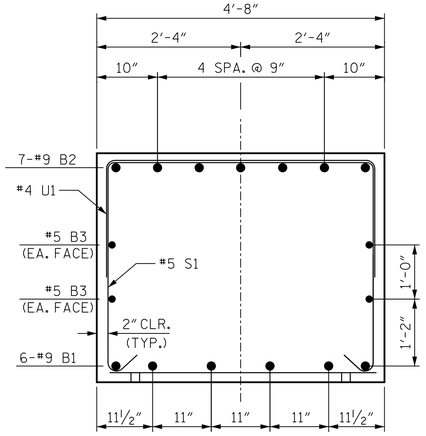
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	49.5 C.Y.

** THE "SP-1" SPIRAL REINFORCING STEEL SHALL BE W21 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

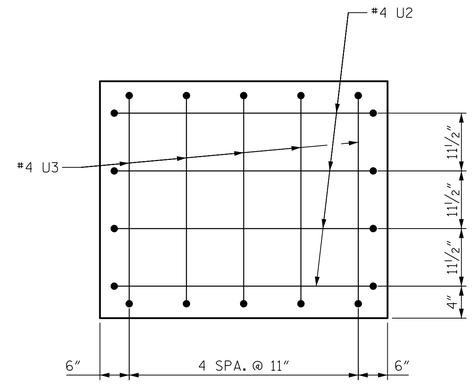
* THE "SP-2" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



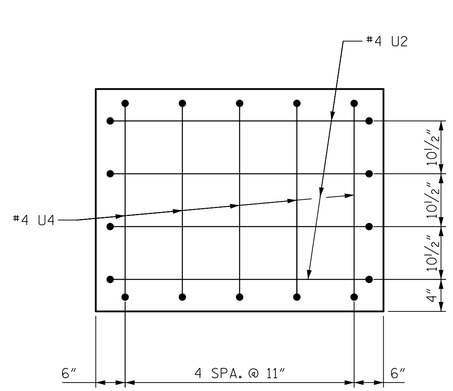
SECTION A-A



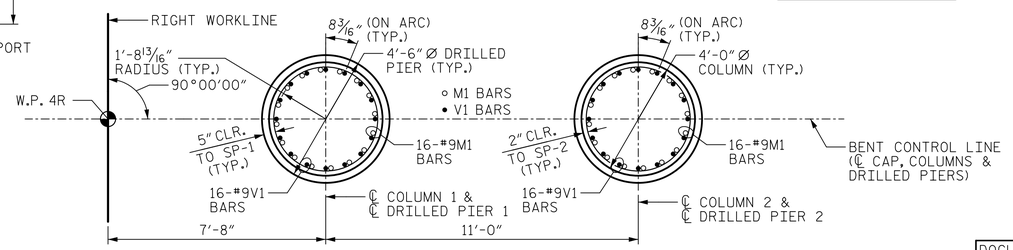
SECTION B-B



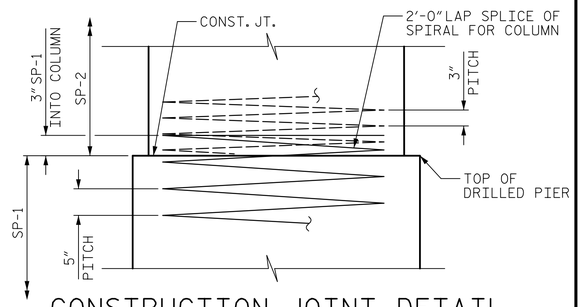
VIEW X-X



VIEW Y-Y



PLAN OF DRILLED PIERS & COLUMNS



CONSTRUCTION JOINT DETAIL

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

DRAWN BY : M. CATER	DATE : 12/2022				
CHECKED BY : J. MORRISON	DATE : 12/2022				
DESIGNED BY : B. LEROY	DATE : 12/2022				
DESIGN CHECKED BY : J. MORRISON	DATE : 12/2022				

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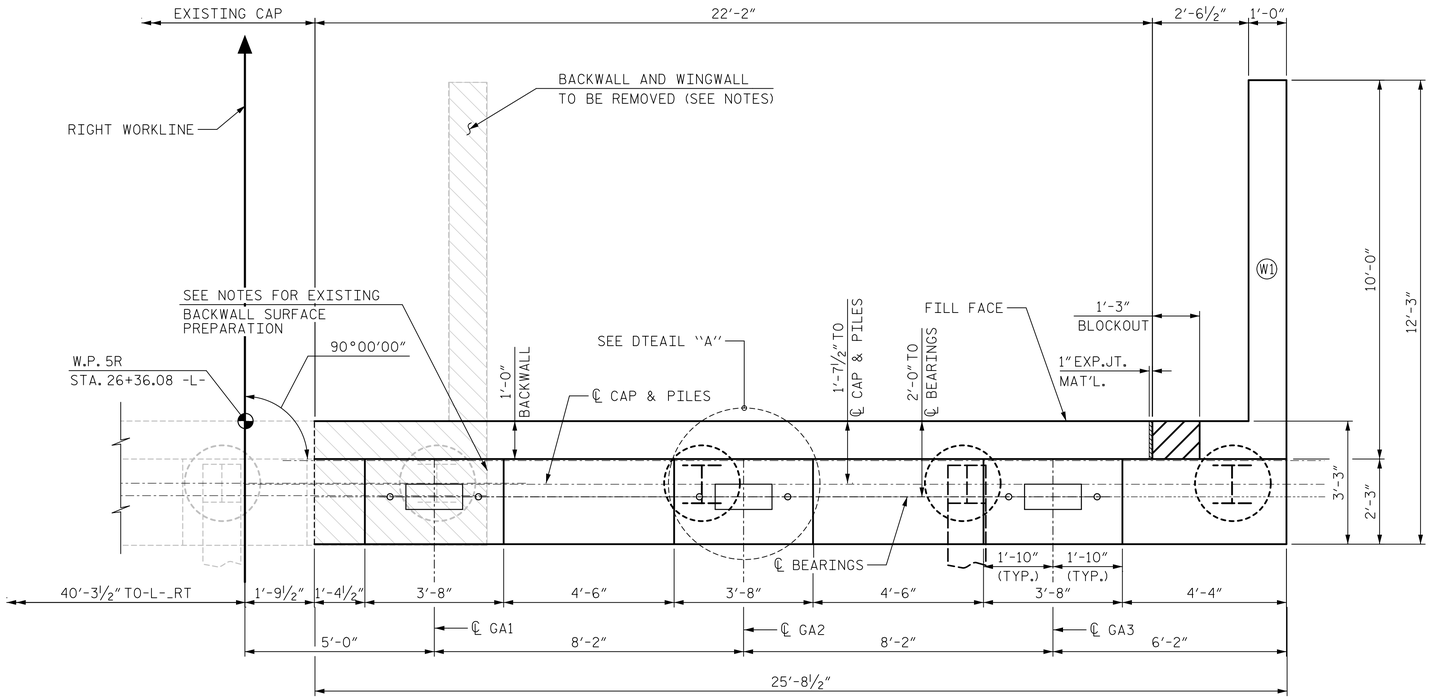
SUBSTRUCTURE

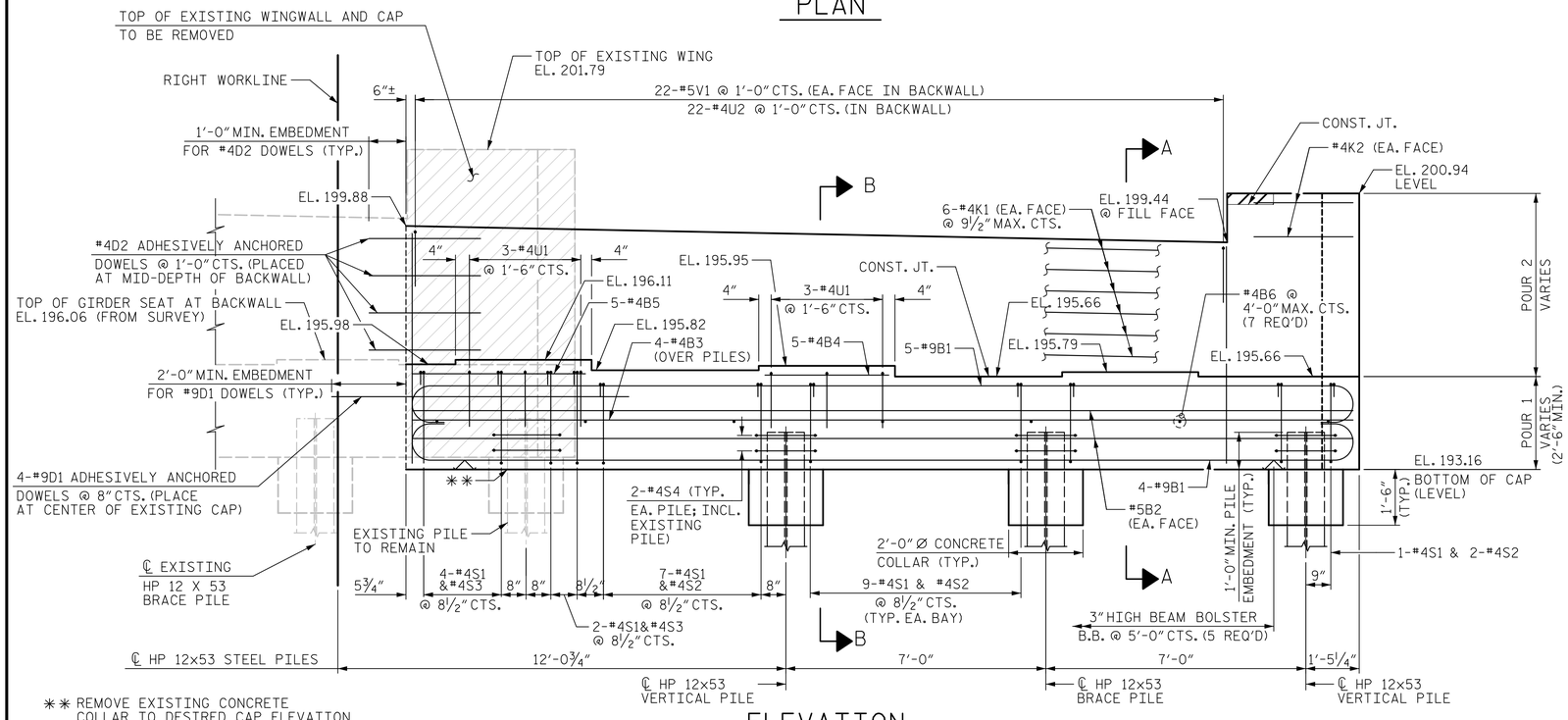
BENT 3

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-44
1			3			TOTAL SHEETS
2			4			119

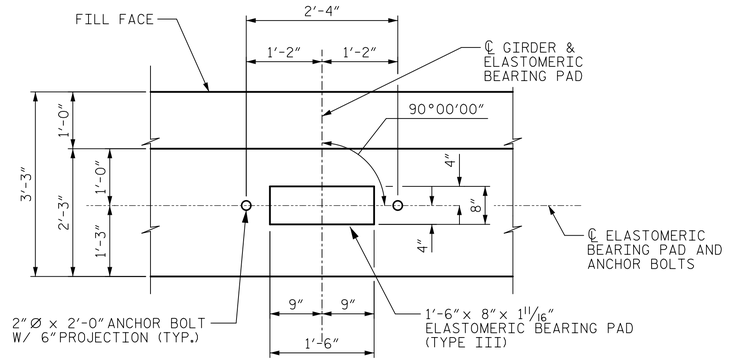


PLAN



ELEVATION

FOR ELEVATIONS BETWEEN BRIDGE SEATS,
SEE SECTION A-A, SHEET 2 OF 3



DETAIL "A"

NOTES:

FOR ADDITIONAL NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WINGWALL DETAILS AND SECTION A-A SEE SHEET 2 OF 3.

INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.

DENOTES LIMIS OF REMOVAL OF EXISTING CAP, BACKWALL AND WINGWALL

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 3

DRAWN BY : D. KIM	DATE : 12/2022					
CHECKED BY : J.C. MORRISON	DATE : 12/2022					
DESIGNED BY : M.L. CATER	DATE : 12/2020					
DESIGN CHECKED BY : J.C. MORRISON	DATE : 12/2020					

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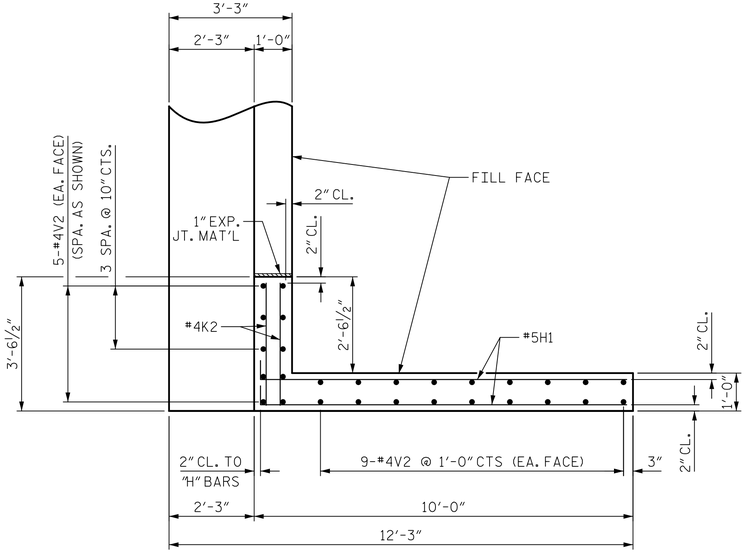
SUBSTRUCTURE

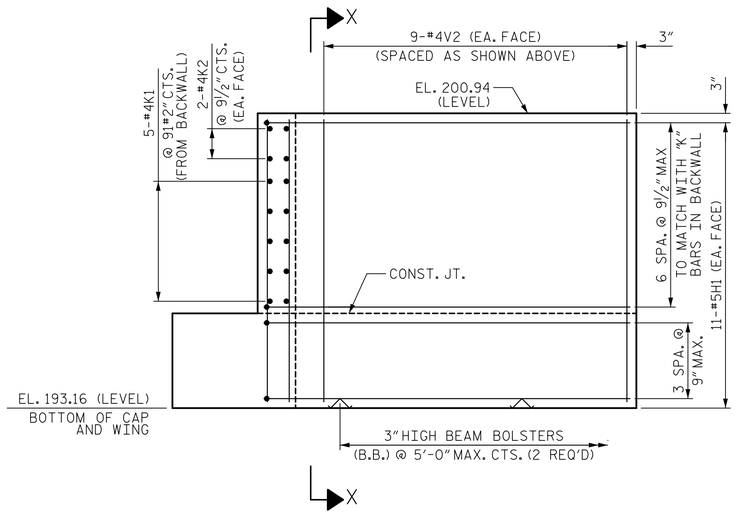
END BENT 2

(NORTHBOUND LANES)

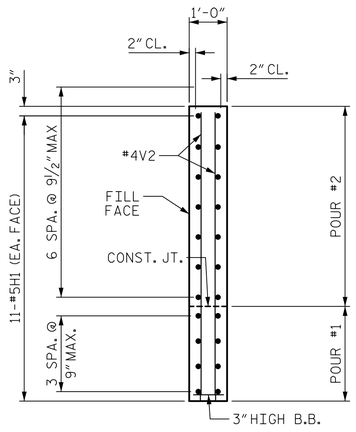
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-45
1			3			TOTAL SHEETS
2			4			119



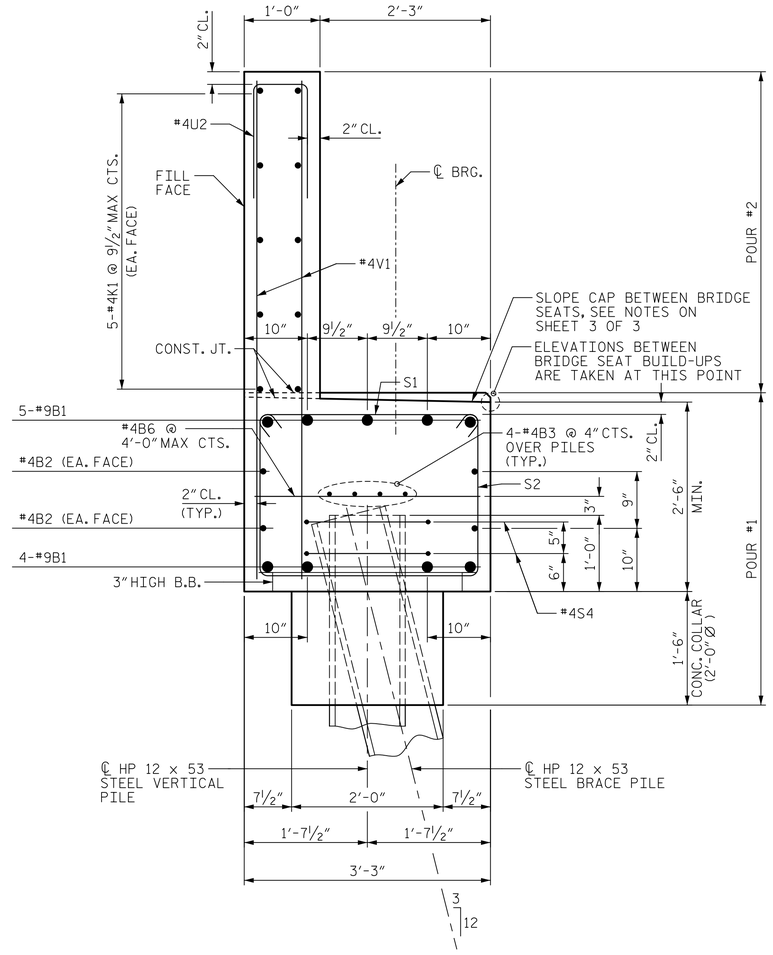
PLAN OF WING W1



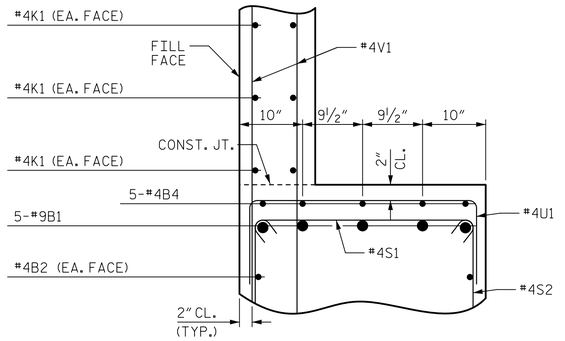
ELEVATION OF WING W2



SECTION X-X



SECTION A-A



SECTION B-B

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 3

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SUBSTRUCTURE

END BENT 2

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-46
1			3			TOTAL SHEETS
2			4			119

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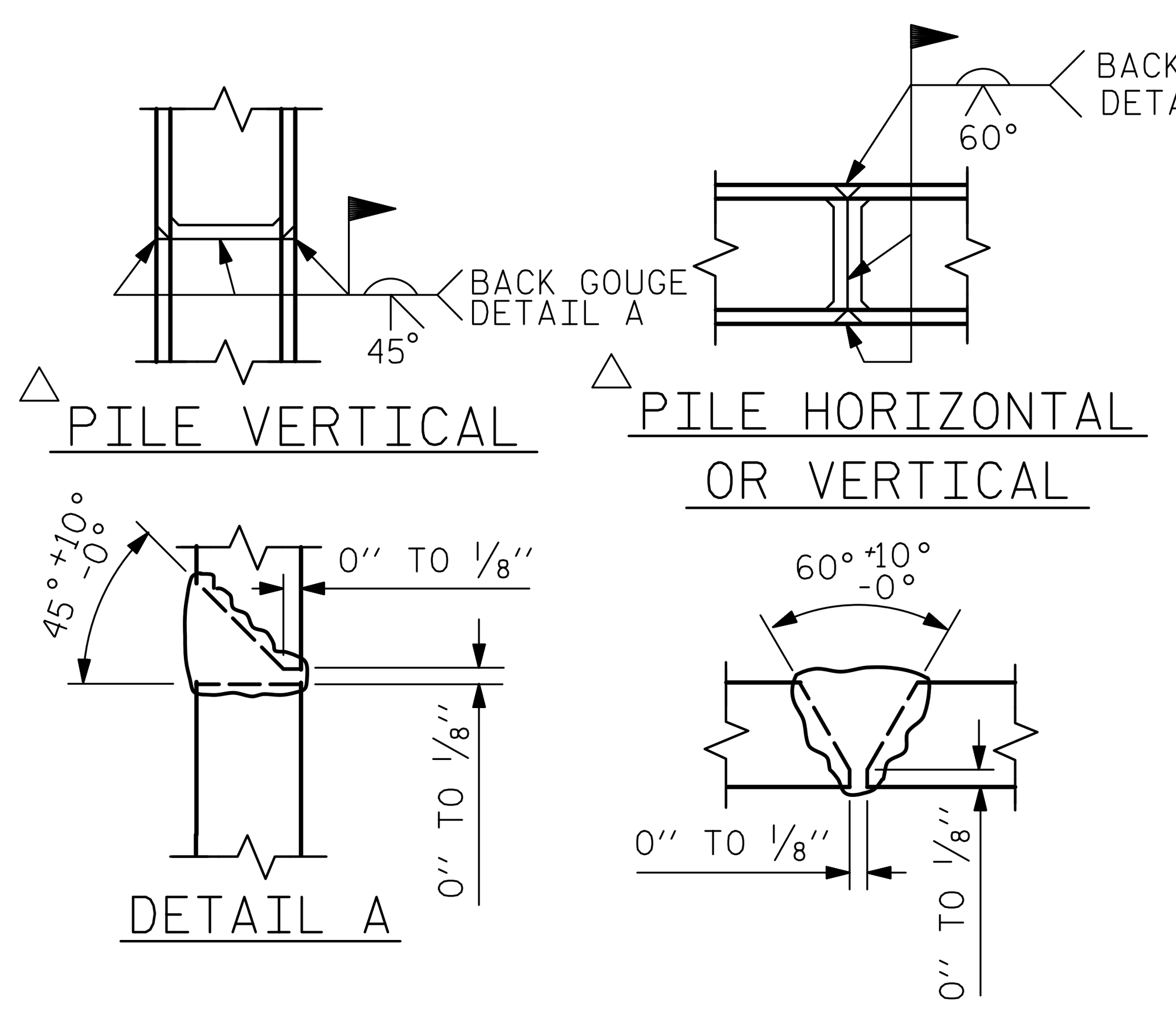
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	12/2022

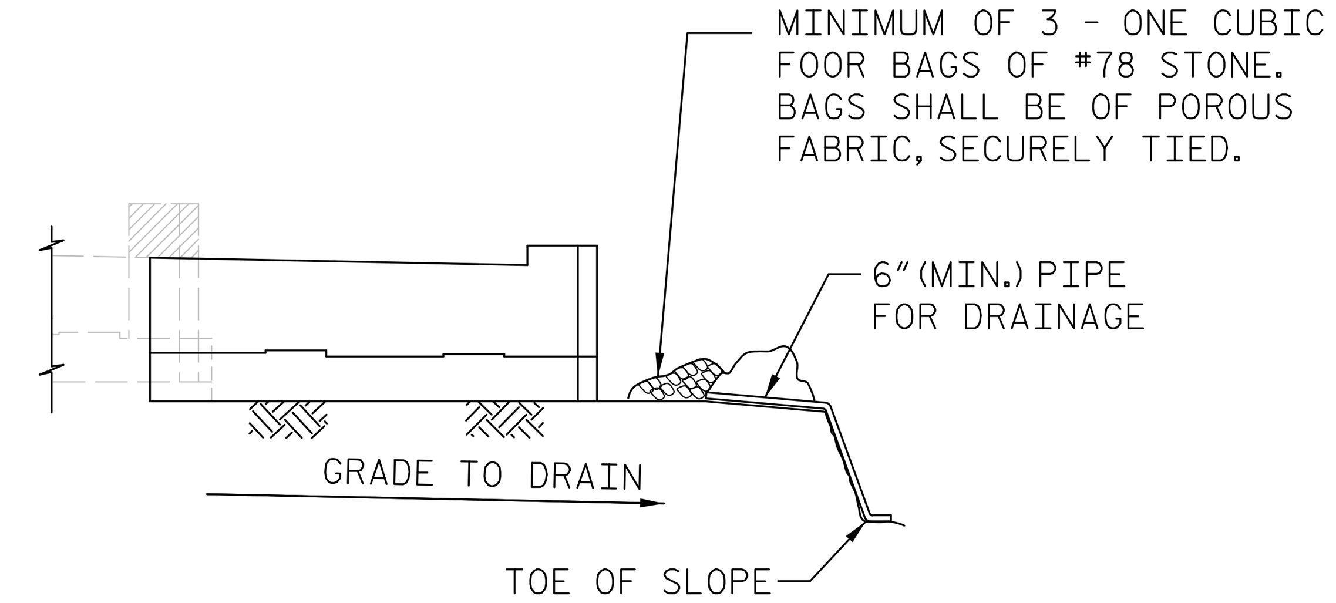
DATE: 2/9/2023
TIME: 12:41:58 PM

USER: cater.m
DGN: pw:\\aecom-nc-pw.bentley.com:aECOM_DS2_NA_2020\Documents\60609754-U-5748 Ligon Mill\60D-CAD GIS\60_CADD_NCDOT_TIP\Structures\04 Drawings\40_093_U-5748_SMU_EB2_2_SI_46_SH02



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



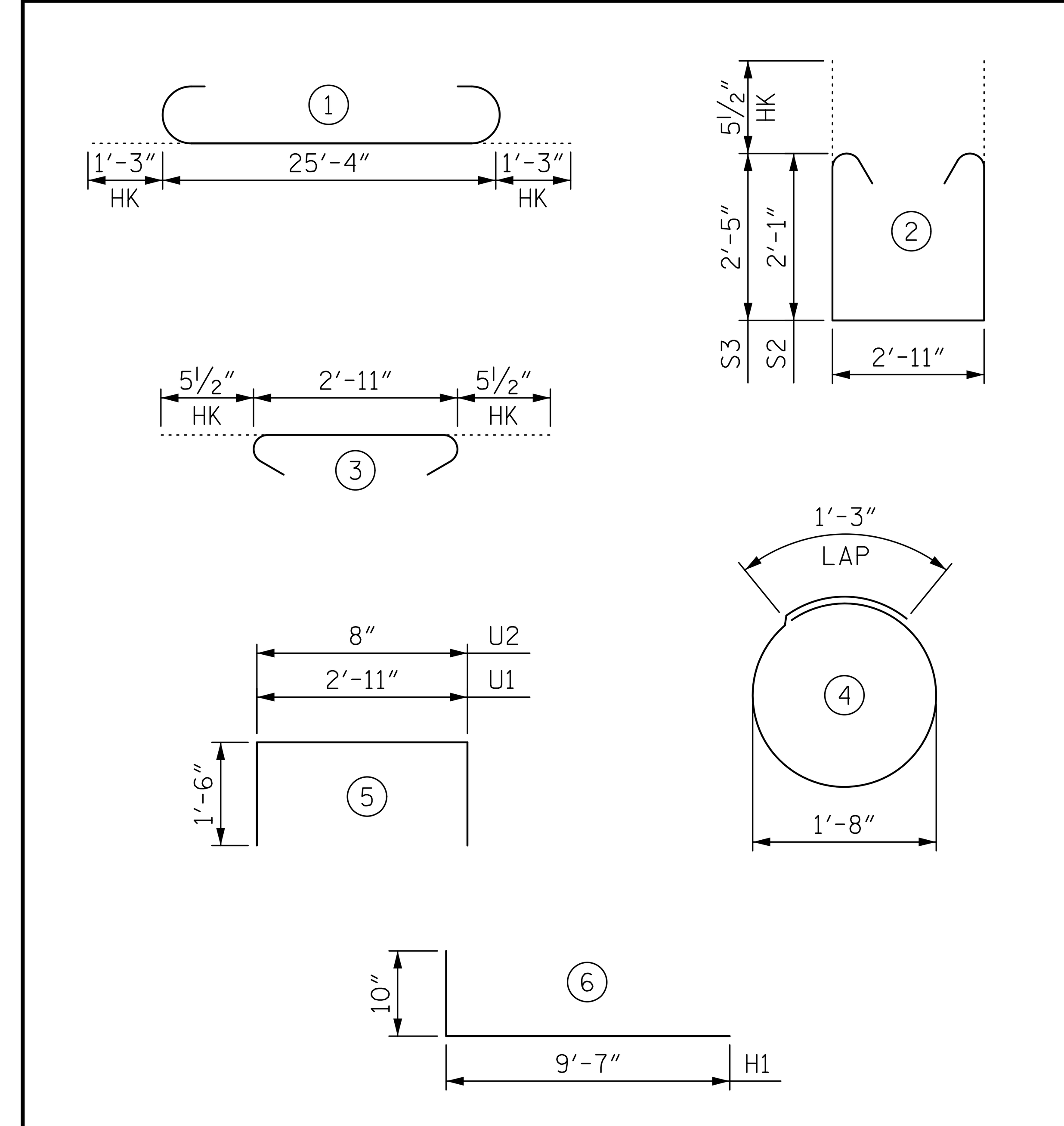
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT 2

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

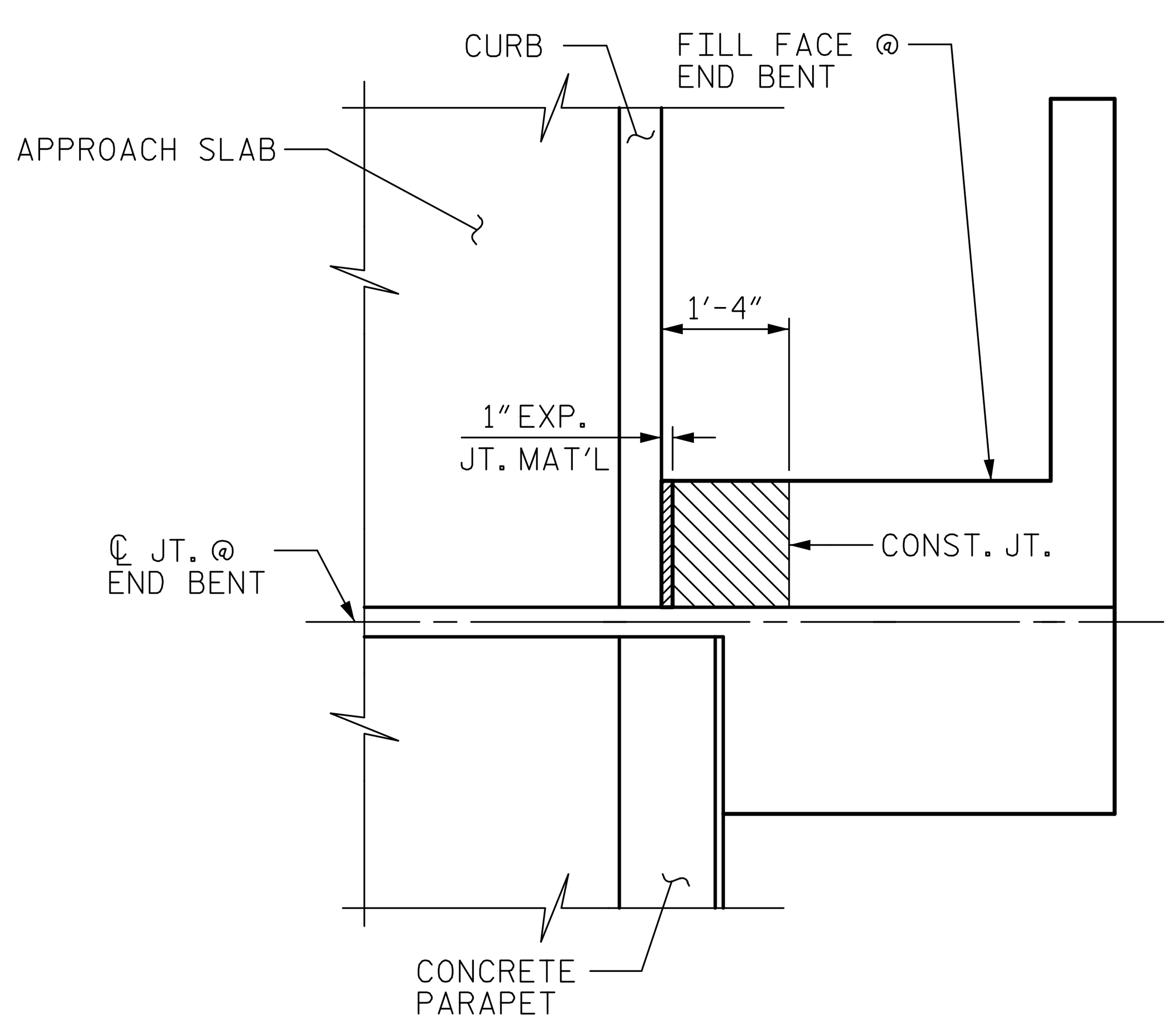
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	#9	1	27′-11″	854
B2	4	#5	STR	25′-5″	106
B3	4	#4	STR	25′-5″	68
B4	5	#4	STR	3′-4″	11
B5	5	#4	STR	4′-9″	16
B6	7	#4	STR	2′-11″	14
D1	4	#9	STR	7′-6″	102
D2	4	#4	STR	3′-0″	8
H1	24	#5	6	10′-5″	239
K1	12	#4	STR	25′-9″	206
K2	4	#4	STR	3′-3″	9
S1	32	#4	3	3′-10″	82
S2	26	#4	2	8′-0″	139
S3	6	#4	2	8′-10″	54
S4	8	#4	4	6′-6″	35
U1	6	#4	5	5′-11″	24
U2	22	#4	5	3′-8″	54
V1	44	#5	STR	5′-11″	272
V2	28	#4	STR	7′-5″	139

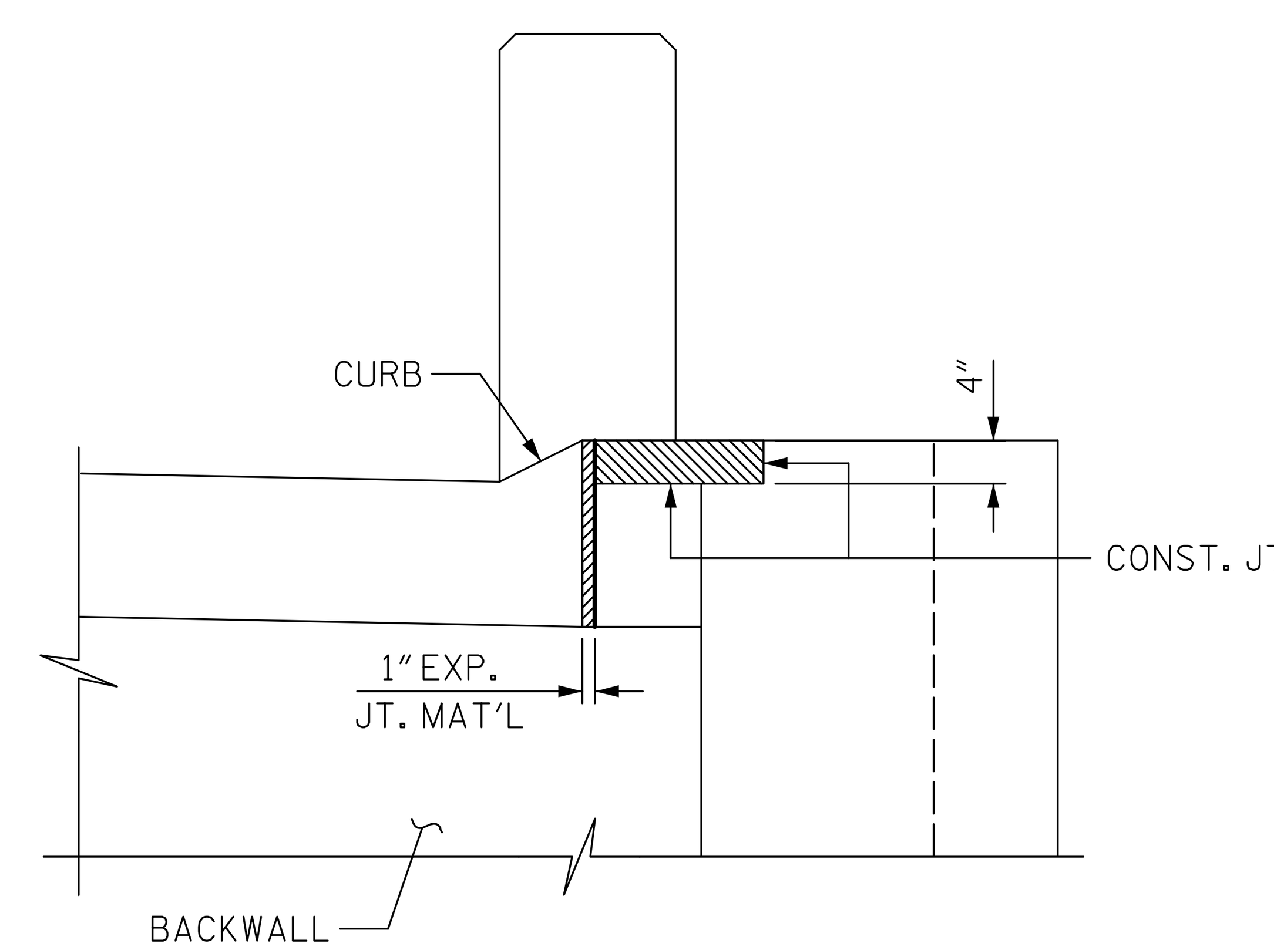
REINFORCING STEEL 2,612 LBS.

CLASS A CONCRETE

POUR #1 (CAP, COLLARS & LOWER WINGWALLS)	9.1 C.Y.
POUR #2 (BACKWALL & UPPER WINGWALL)	5.7 C.Y.
TOTAL =	14.8 C.Y.



PLAN



ELEVATION

BLOCKOUT IN WINGWALL

NOTES:

REMOVE EXISTING CAP, BACKWALL AND WINGWALL AS SHOWN AND REPAIR WITH CLASS A CONCRETE OR GROUT FOR STRUCTURES. THE COST OF CLASS A CONCRETE OR GROUT SHALL BE CONSIDERED INCIDENTAL TO THE LUMP SUM COST FOR REMOVAL OF EXISTING STRUCTURE.

FACE OF EXISTING END BENT CAP AND BACKWALL SHALL BE ROUGHENED TO ¼″ MIN. AMPLITUDE PRIOR TO PLACEMENT OF PROPOSED END BENT CAP OR BACKWALL.

THE CONTRACTOR SHALL USE AN ADHESIVE ANCHOR SYSTEM FOR THE #9D1 DOWELS AND #4D2 DOWELS. LEVEL 1 FIELD TESTING IS REQUIRED. THE YIELD LOAD FOR #9D1 DOWELS IS 60.0 KIPS. THE YIELD LOAD FOR THE #4D2 DOWELS IS 12.0 KIPS. ADHESIVE ANCHOR SYSTEM SHALL DEVELOP 125% OF THE YIELD LOAD OF THE BAR. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE SECTION 420-13 OF THE STANDARD SPECIFICATIONS.

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

THE CONCRETE IN THE SHADED AREA OF THE WINGWALL SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND PARAPET IS CAST IF SLIP FORMING IS USED.

FOR WING DETAILS, SEE SHEET 2 OF 3.

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 3 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(NORTHBOUND LANES)

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S1-47
1			3					TOTAL SHEETS
2			4					119

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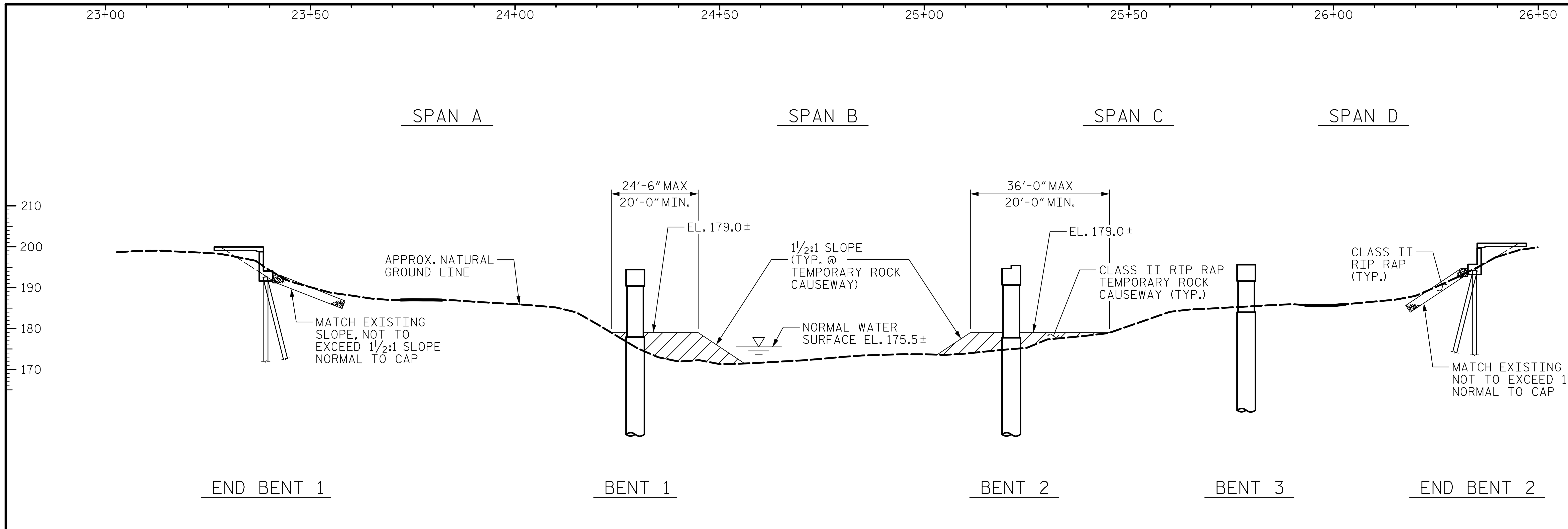


SECTION ALONG RIGHT WORKLINE

NOTES:

THE TEMPORARY ROCK CAUSEWAYS AT BENT 1 AND BENT 2 SHALL NOT BE IN PLACE AT THE SAME TIME. THE FIRST TEMPORARY ROCK CAUSEWAY INSTALLED MUST BE COMPLETELY REMOVED PRIOR TO INSTALLING THE SECOND TEMPORARY ROCK CAUSEWAY.

THE COST OF INSTALLING AND REMOVING TEMPORARY ROCK CAUSEWAY IS INCLUDED IN THE LUMP SUM BID PRICE FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STA. 24+88.00 -L-.

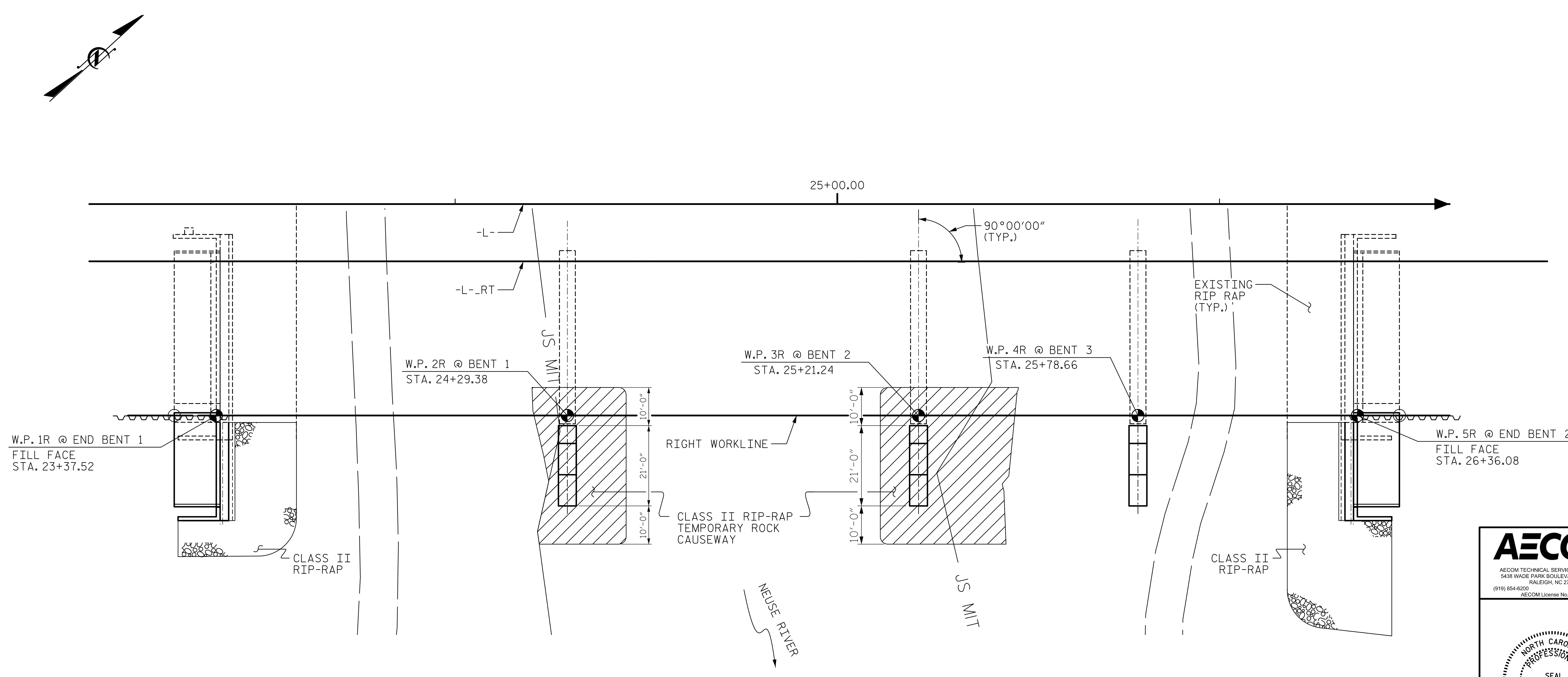
FOR TEMPORARY ROCK CAUSEWAY, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS AT STATION 24+88.00 -L-.

RIP RAP USED FOR TEMPORARY ROCK CAUSEWAY MAY BE USED FOR FINAL BANK STABILIZATION. SEE ROADWAY PLAN SHEET PSH 04 FOR ADDITIONAL INFORMATION.

ESTIMATED QUANTITIES

CLASS II RIP RAP FOR TEMPORARY ROCK CAUSEWAY (NBL) (TONS)		
BENT 1	BENT 2	TOTAL
369	452	821



PLAN

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 1

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AECOM License No. F-0342

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TEMPORARY ROCK CAUSEWAY (NORTHBOUND LANES)

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

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DRAWN BY : M.L. CATER	DATE : 12/2022
CHECKED BY : A.R. VAN VUREN	DATE : 12/2022
DESIGNED BY : D. RITACCO	DATE : 09/2020
DESIGN CHECKED BY : J.C. MORRISON	DATE : 09/2020

REVISIONS

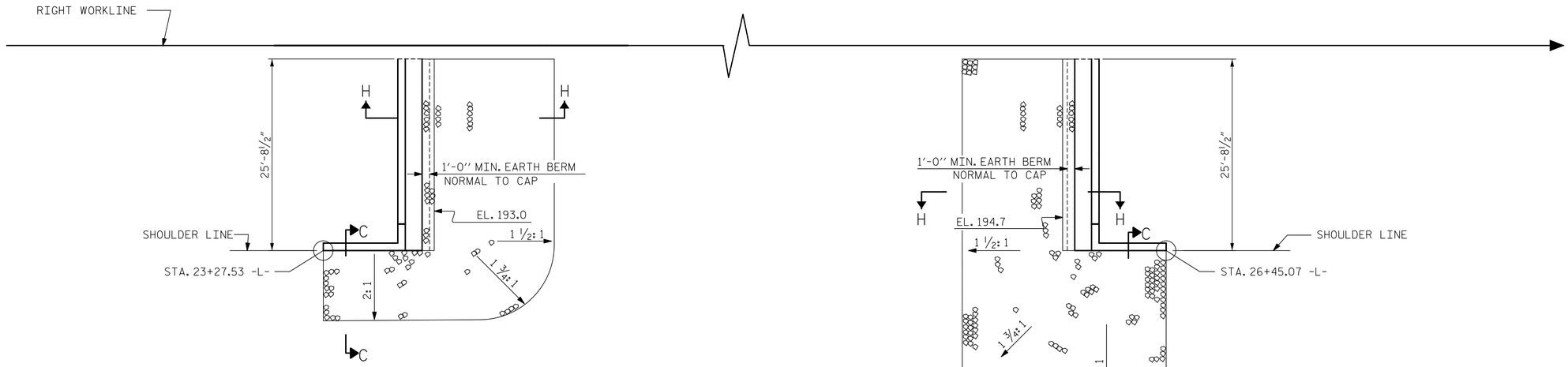
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-48

TOTAL SHEETS 119

NOTES :

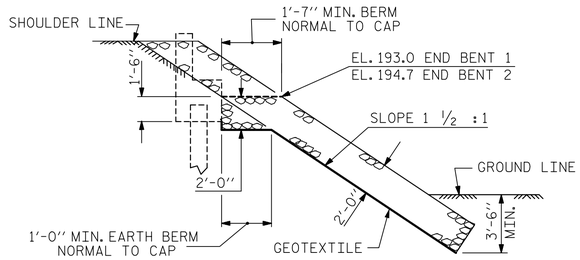
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



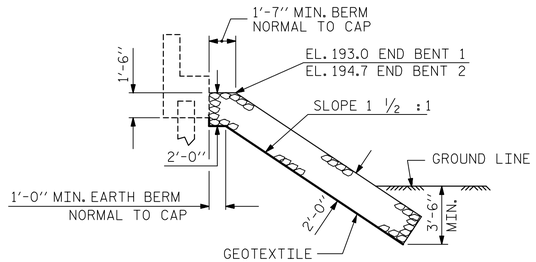
END BENT 1

END BENT 2

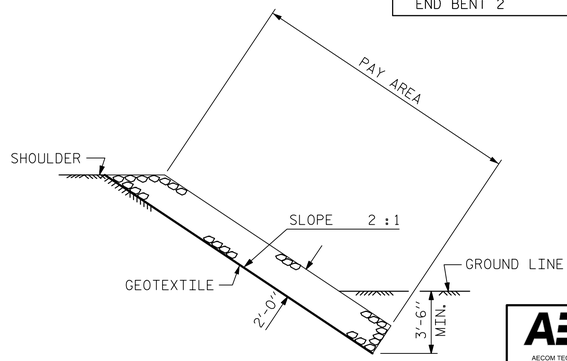
ESTIMATED QUANTITIES		
BRIDGE @ STA. 24+88.00 -L- RIGHT LANE	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	86	95
END BENT 2	147	164



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison A2FDE142C82F4AB... 2/10/2023

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DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-49
1			3			TOTAL SHEETS
2			4			119

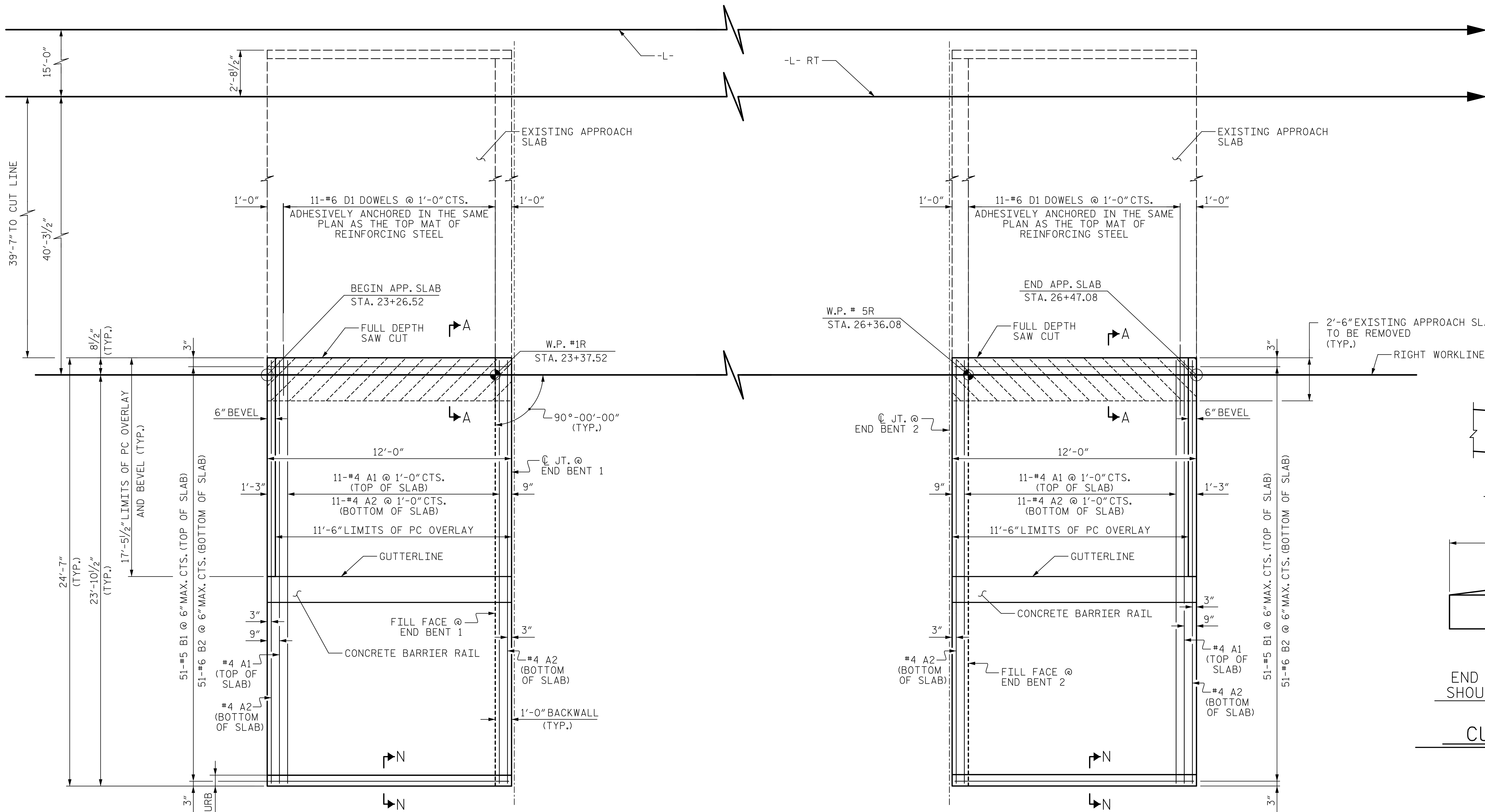
ASSEMBLED BY : M.L. CATER	DATE : 12/2022	
CHECKED BY : A.R. VAN VUREN	DATE : 12/2022	
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM
	REV. 12/17	MAA/THC

STD. NO. RR1

DATE: 2/9/2023
TIME: 12:40:34 PM

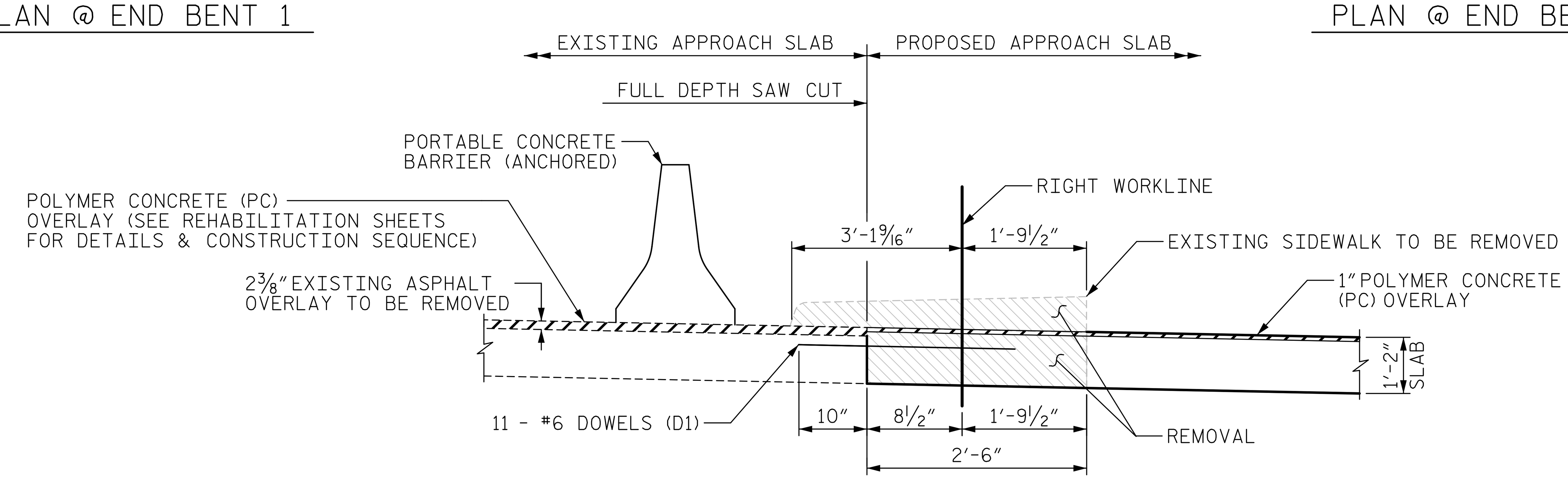
NOTES:

FOR NOTES, SEE SHEET 2 OF 3



PLAN @ END BENT 1

PLAN @ END BENT 2



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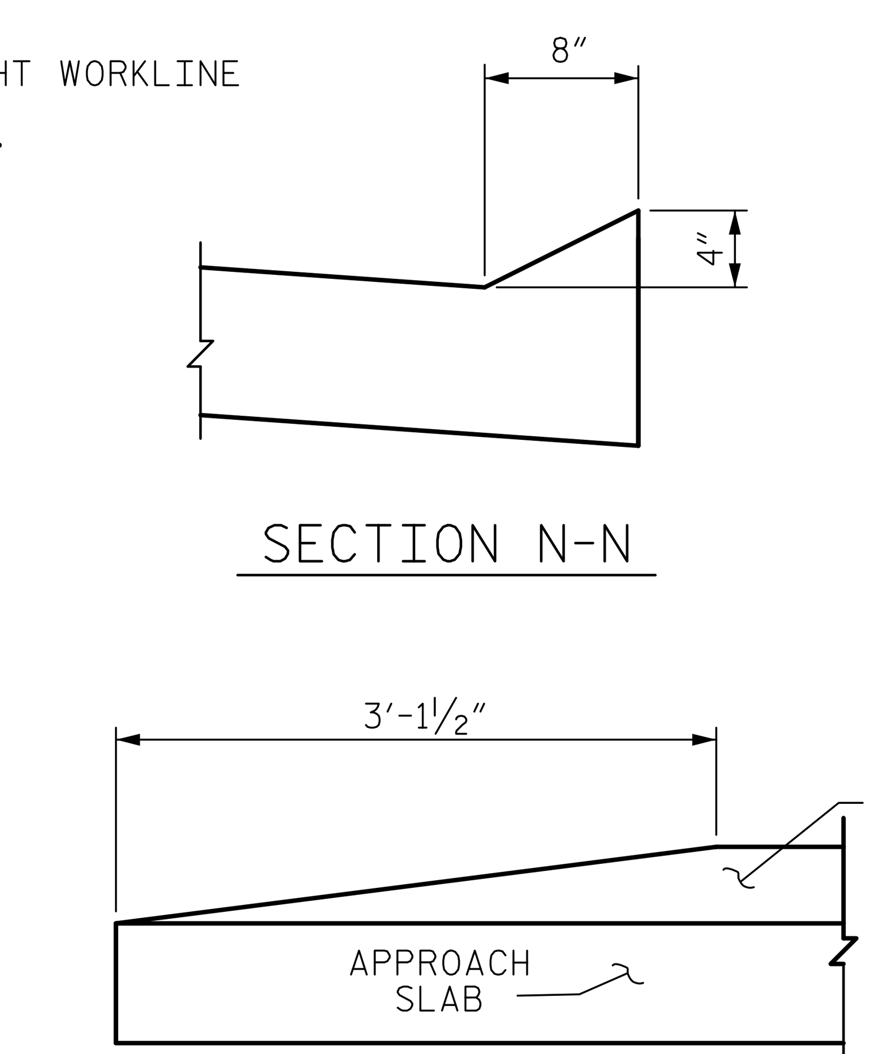

END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 3

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A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

(NORTHBOUND LANES)

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S1-50
1				3				TOTAL SHEETS
2				4				119

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DRAWN BY :	M. CATER	DATE :	08/2021
CHECKED BY :	J.C. MORRISON	DATE :	08/2021
DESIGNED BY :	M. CATER	DATE :	08/2021
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	08/2021

DATE: 2/9/2023
TIME: 12:48:45 PM
USER: caterm
DGN: pw:\\aecom-na-pw.bentley.com:AECOM_DS21_NA_2020\Documents\60609754-U-5748 Upgn M1\900-CAD GIS\910_CAD\70_NCDOT_TIP\Structure\04 Drawings\40_IOU\U-5748_SMU_ASL_S1_50.SII(02)

FOR PLAN FOR BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT, SEE SHEET 1 OF 3

NOTES:

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

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

EXISTING 4" DIA. CORRUGATED PERFORATED DRAINAGE PIPE SHALL BE EXTENDED. COORDINATE DRAIN EXTENSION WITH CONSTRUCTION SEQUENCING AND TEMPORARY SHORING REQUIREMENTS.

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

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

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.

#6 D1 DOWELS TO BE ADHESIVELY ANCHORED IN THE EXISTING APPROACH SLAB. LEVEL ONE FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE DOWELS IS 13.2 KIPS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SECTION 420-13 OF THE STANDARD SPECIFICATIONS. OVERALL DOWEL LENGTH SHALL BE DETERMINED BY THE MANUFACTURER OF THE ADHESIVELY ANCHORED ANCHOR SYSTEM. PLAN LENGTH OF #6 D1 DOWELS BASED ON 10" EMBEDMENT.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

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

THE #5 S104 AND S105 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S104 AND S105 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

THE COST OF TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLABS.

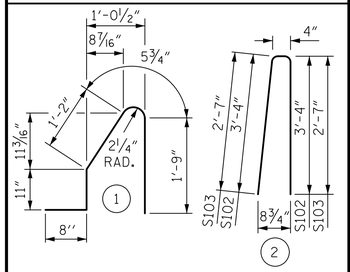
THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

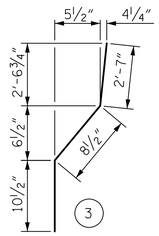
THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN THE BARRIER RAILS SHALL BE EPOXY COATED.

SEE PRESERVATION SHEETS FOR PC OVERLAY DETAILS, QUANTITIES AND CONSTRUCTION SEQUENCING.

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE APPROACH SLAB (2 REQ'D)

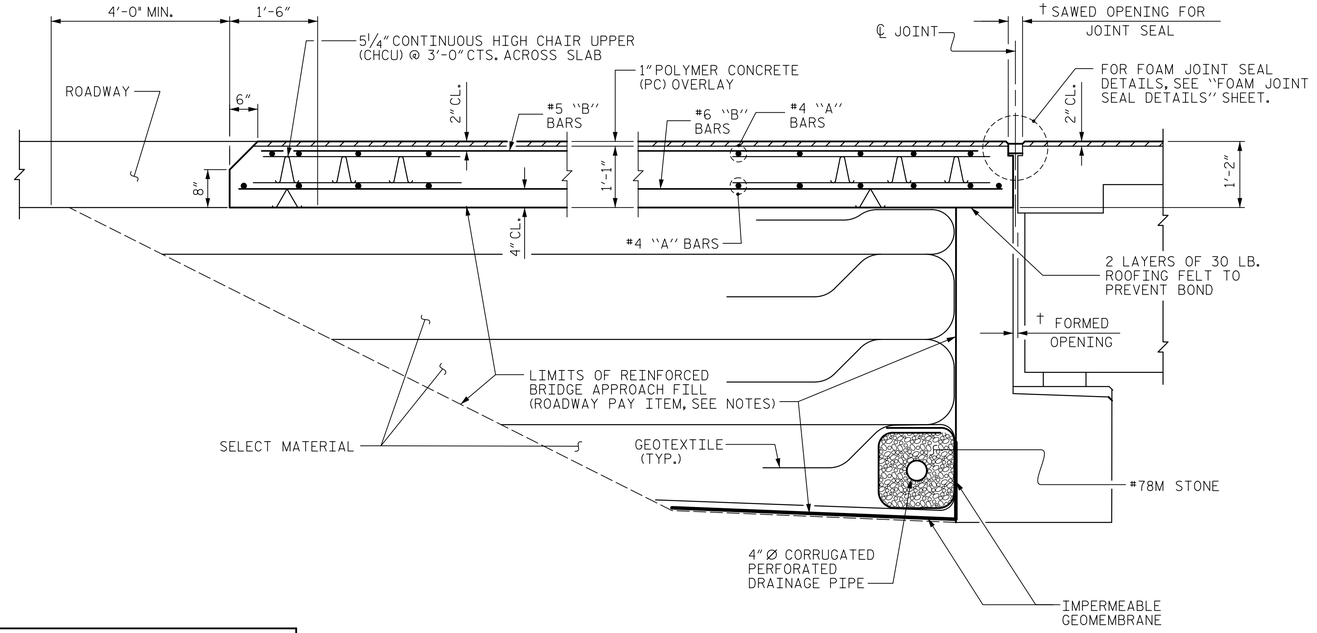
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	12	#4	STR	24'-3"	194
A2	14	#4	STR	24'-3"	227
✳B1	51	#5	STR	11'-2"	594
B2	51	#6	STR	11'-8"	894
✳D1	11	#6	STR	2'-4"	39
REINFORCING STEEL				LBS.	1121
✳EPOXY COATED REINFORCING STEEL				LBS.	827
CLASS AA CONCRETE				C. Y.	13.2

BILL OF MATERIAL FOR ONE BARRIER RAIL (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B101	11	#5	STR	11'-6"	132
✳S101	8	#5	1	5'-0"	42
✳S102	6	#5	2	7'-0"	44
✳S103	2	#5	2	5'-6"	11
✳S104	4	#5	3	4'-2"	17
✳S105	4	#5	STR	3'-4"	14
✳EPOXY COATED REINFORCING STEEL				LBS.	260
CLASS AA CONCRETE				C. Y.	1.7
CONCRETE BARRIER RAIL				LIN. FT.	12.0

SPLICE LENGTHS

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



SECTION THRU SLAB

PAYMENT FOR BARRIER RAIL TO BE ADDED TO THE LINEAR FOOT QUANTITY ON THE BARRIER RAIL SHEET (BR) AND INCLUDED IN THE "TOTAL BILL OF MATERIAL" ON THE GENERAL DRAWING

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 3

ASSEMBLED BY : M.L. CATER		DATE : 08/2021	
CHECKED BY : J.C. MORRISON		DATE : 08/2021	
DRAWN BY : FCJ 11/88	REV. 6/13	MAA/GM	
CHECKED BY : ARB 11/88	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

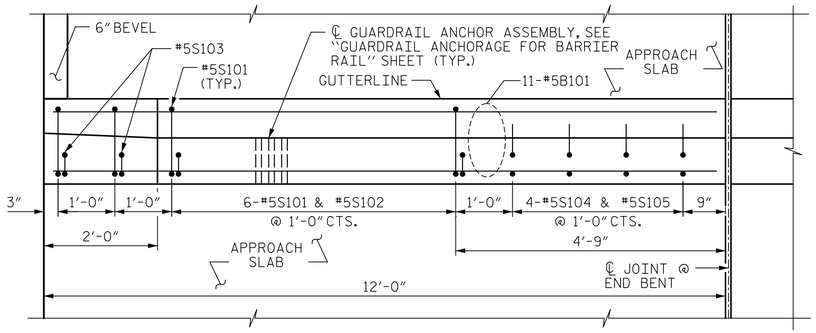
STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-51
1			3			TOTAL SHEETS
2			4			119

STD. NO. BAS2

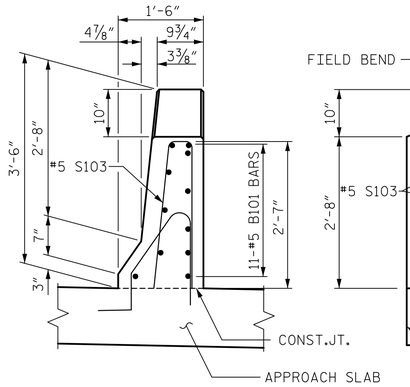


PLAN OF BARRIER RAIL

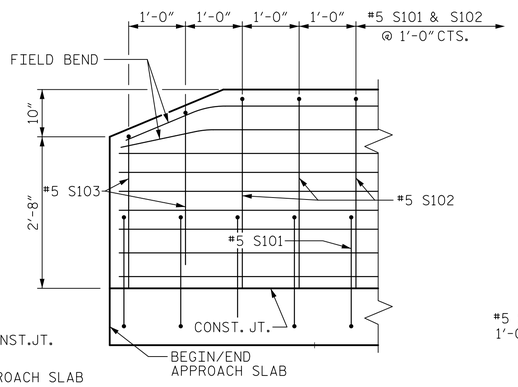
END BENT 1 SHOWN, END BENT 2 SIMILAR.

NOTES:

FOR NOTES, SEE SHEET 2 OF 3

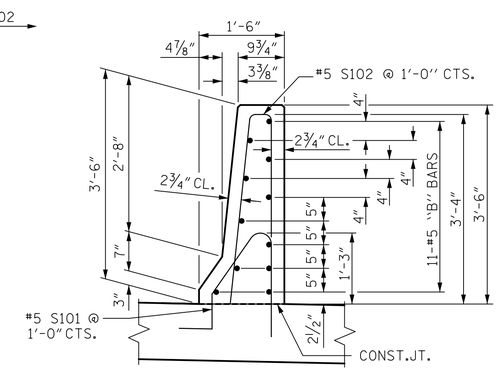


END VIEW

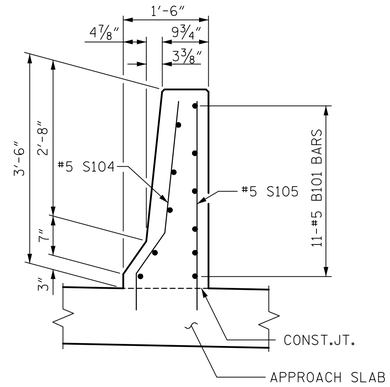


SIDE VIEW

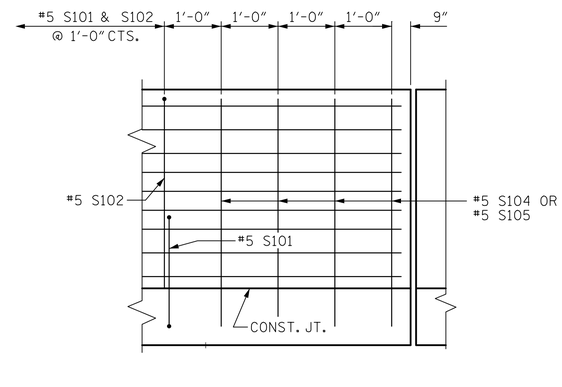
END OF RAIL DETAILS



SECTION THRU RAIL



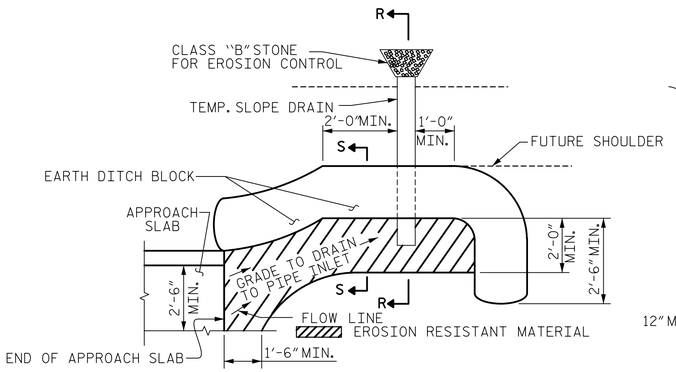
END VIEW



SIDE VIEW

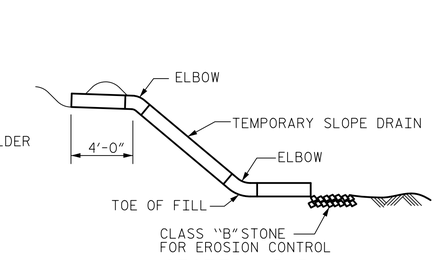
END OF RAIL DETAILS @ EXP. JOINT

FOR ADHESIVE ANCHORING AT SAWED JOINTS

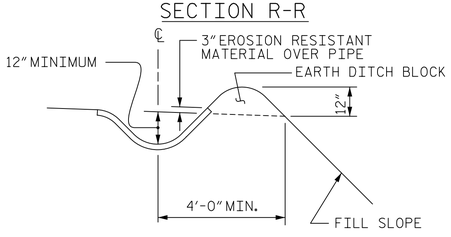


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

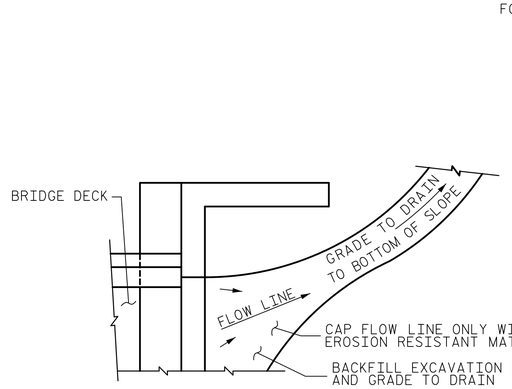
PLAN VIEW



SECTION R-R



SECTION S-S



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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

ASSEMBLED BY : D.R. DRUM, M. CATER	DATE : 08/2021		
CHECKED BY : J.C. MORRISON	DATE : 06/2021		
DRAWN BY : FCJ 11/88	REV. 6/13	MAA/GM	
CHECKED BY : ARB 11/88	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

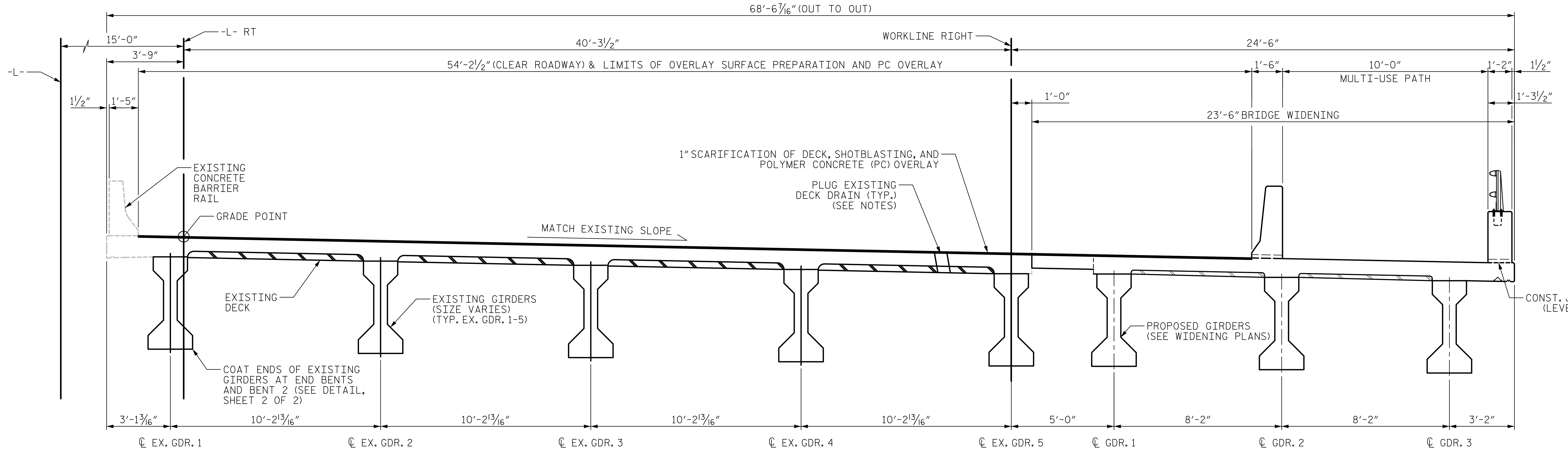
BRIDGE APPROACH SLAB DETAILS
(NORTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-52
1			3			TOTAL SHEETS
2			4			119

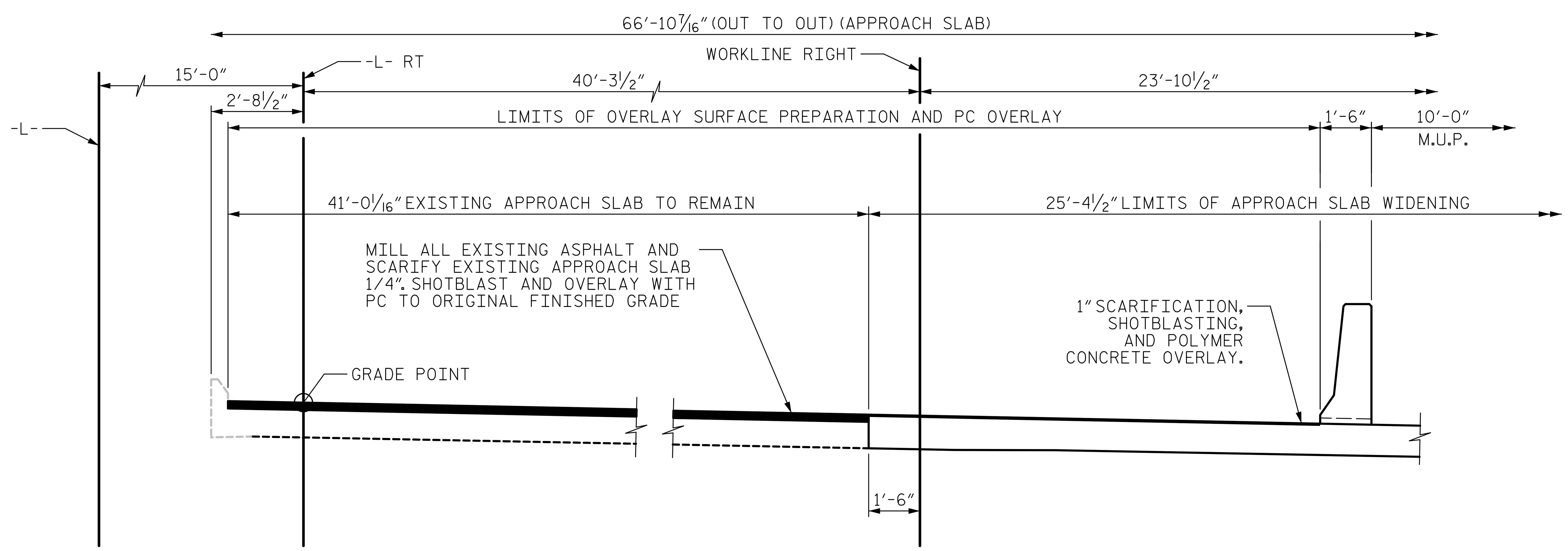
STD. NO. BAS4

DATE: 2/9/2023
TIME: 12:43:08 PM

USER: cotterm
DGN: pw:\\aecom-nc-pw.bentley.com:aECOM_DS2_NA_2020\Documents\60509754-U-5748 Ugon MIW\900-CAD (S)\900_CADD\0_NCDOT_TIPS\Structures\04 Drawings\40_05-U-5748_SMU_A53_SI-52_S(02)



TYPICAL SECTION OF BRIDGE SUPERSTRUCTURE



TYPICAL SECTION OF APPROACH SLAB

NOTES (DECK, OVERLAY, AND GENERAL PRESERVATION):

EXISTING BRIDGE CONCRETE DECK SHALL BE REPAIRED PRIOR TO THE SURFACE PREPARATION AND APPLICATION OF THE PC OVERLAY AT LOCATIONS SHOWN ON THE PLANS OR AS DETERMINED BY THE ENGINEER. IF NECESSARY, SUCH LOCATIONS MAY BE REPAIRED WITH PC.

REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.

QUANTITIES IN TABLES REPRESENT ESTIMATED VALUES OF CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY AFTER REMOVAL OF UNSOUND CONCRETE (MIN.2″ CLEAR TO SAW CUT). SEE SPECIAL PROVISIONS.

LONGITUDINAL CONSTRUCTION JOINTS OF OVERLAYS SHALL BE LOCATED ALONG THE EDGE OF TRAVEL LANES.

SEE TRAFFIC MANAGEMENT PLANS FOR LANE WIDTHS, SEQUENCING AND OTHER TRAFFIC CONTROL MEASURES FOR STAGING OF POLYMER CONCRETE OVERLAY AND SURFACE PREPARATION.

FOR LIMITS OF SHOTBLASTING AND CLASS II REPAIR, SURFACE PREPARATION, AND PC OVERLAY, SEE SURFACE PREPARATION SHEETS.

MILLING OF ASPHALT ON APPROACH SLAB IS CONSIDERED INCIDENTAL TO SCARIFICATION OF BRIDGE DECK. NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

PRESERVATION PLANS ARE PRESENTED TO SHOW THE CONFIGURATION OF THE BRIDGE ASSUMED AT THE TIME OF CONSTRUCTION, IN ACCORDANCE WITH THE REQUIRED CONSTRUCTION SEQUENCE.

FOR PLUGGING OF EXISTING DECK DRAINS, SEE SPECIAL PROVISIONS.

FOR STANDARD REPAIR DETAILS AND NOTES, SEE SHEET S1-61.

A 1″ GROOVE SHALL BE SAWED IN THE TOP OF EXISTING DECK SLAB AND APPROACH SLAB BEFORE REMOVING EXISTING CONCRETE. IN THE EVENT THE 1″ SAW CUT RESULTS IN DAMAGE TO THE REINFORCING STEEL, THE DEPTH OF THE SAW CUT SHALL BE REDUCED TO AVOID SUCH DAMANGE AS DIRECTED BY THE ENGINEER. CARE SHALL BE TAKEN TO OBTAIN A STRAIGHT LINE AT THE TOP AND BOTTOM OF OLD AND NEW CONCRETE. RETAIN EXISTING STEEL AS SHOWN.

FOR PC MATERIALS AND PLACING AND FINISHING OF POLYMER CONCRETE OVERLAY, SEE "POLYMER CONCRETE BRIDGE DECK OVERLAY" SPECIAL PROVISION.

FOR SHOTBLASTING BRIDGE DECK, SCARIFYING BRIDGE DECK, AND CLASS II SURFACE PREPARATION, SEE "OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE" SPECIAL PROVISION.

NOTES (SUBSTRUCTURE):

THE CONTRACTOR SHALL CLEAN AND EPOXY-COAT THE TOPS OF THE EXISTING END BENT CAPS AT END BENTS 1 AND 2, AND THE TOP OF THE CAP AT BENT 2. THE ENTIRE HORIZONTAL SURFACE OF THE CAP SHALL BE COATED EXCEPT UNDER ELASTOMERIC BEARING PADS. THIS OPERATION SHALL BE COMPLETED AFTER BEARING REPLACEMENTS ARE MADE. SEE SPECIAL PROVISIONS.

ESTIMATED QTY "EPOXY COATING AND DEBRIS REMOVAL" = 410 SF

NOTES (CONT'D.)

AT THE TIME OF PREPARATION OF THESE PLANS, IT WAS NOT ANTICIPATED THAT THE FOLLOWING ITEM(S) LISTED WOULD BE REQUIRED. HOWEVER, IT MAY BE DETERMINED IN THE FIELD THAT THE FOLLOWING ITEM(S) LISTED, OR OTHER WORK WILL BE NECESSARY TO PROPERLY COMPLETE THE INTENDED BRIDGE PRESERVATION/REHABILITATION WORK. THE CONTRACTOR SHALL BE PREPARED TO PERFORM SUCH WORK IN A TIMELY MANNER, AS DETERMINED IN THE FIELD. SUCH WORK SHALL BE CONSIDERED EXTRA WORK AND SHALL BE ADDRESSED AS PER ARTICLE 104-7 OF THE STANDARD SPECIFICATIONS. PROJECT SPECIAL PROVISIONS THAT OUTLINE REUQIREMENTS FOR THESE POTENTIAL ADDITIONAL WORK ITEMS HAVE BEEN PROVIDED IN THE PROJECT DOCUMENTS, BUT NOT QUANTITIES HAVE BEEN LISTED. ACTUAL PAY ITEMS, QUANTITIES, AND COSTS WILL BE ESTABLISHED, AS REQUIRED, IF EXTRA WORK IS ENCOUNTERED. UNANTICIPATED ITEMS:

ITEM	DESCRIPTION	UNIT
1	CONCRETE REPAIR (NBL ONLY)	CU. FT.

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 2

DRAWN BY : M. CATER	DATE : 10/2022		
CHECKED BY : G. COLS	DATE : 11/2022		
DESIGNED BY : G. COLS	DATE : 10/2022		
DESIGN CHECKED BY : J. SLOAN	DATE : 11/2022		

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041343 GREGORY R. COLS

DocuSigned by: 2/10/2023

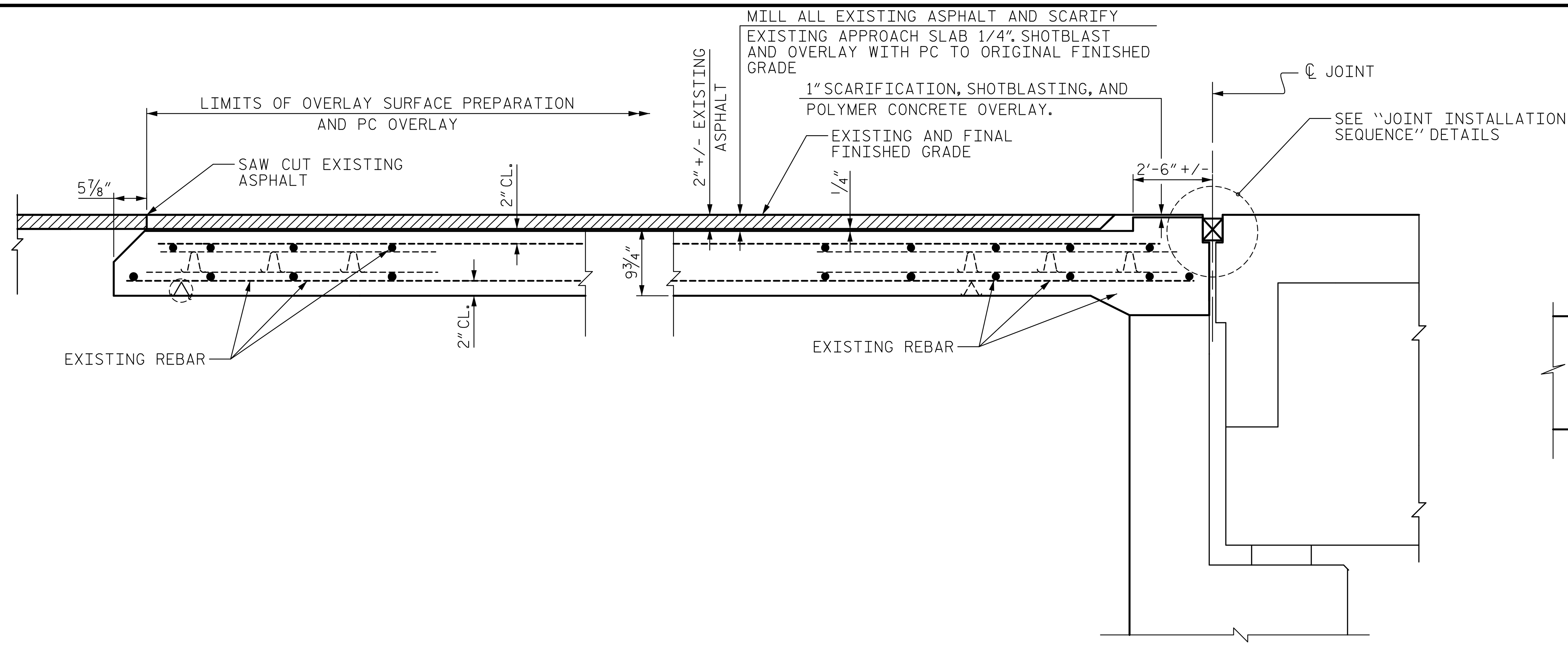
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESERVATION

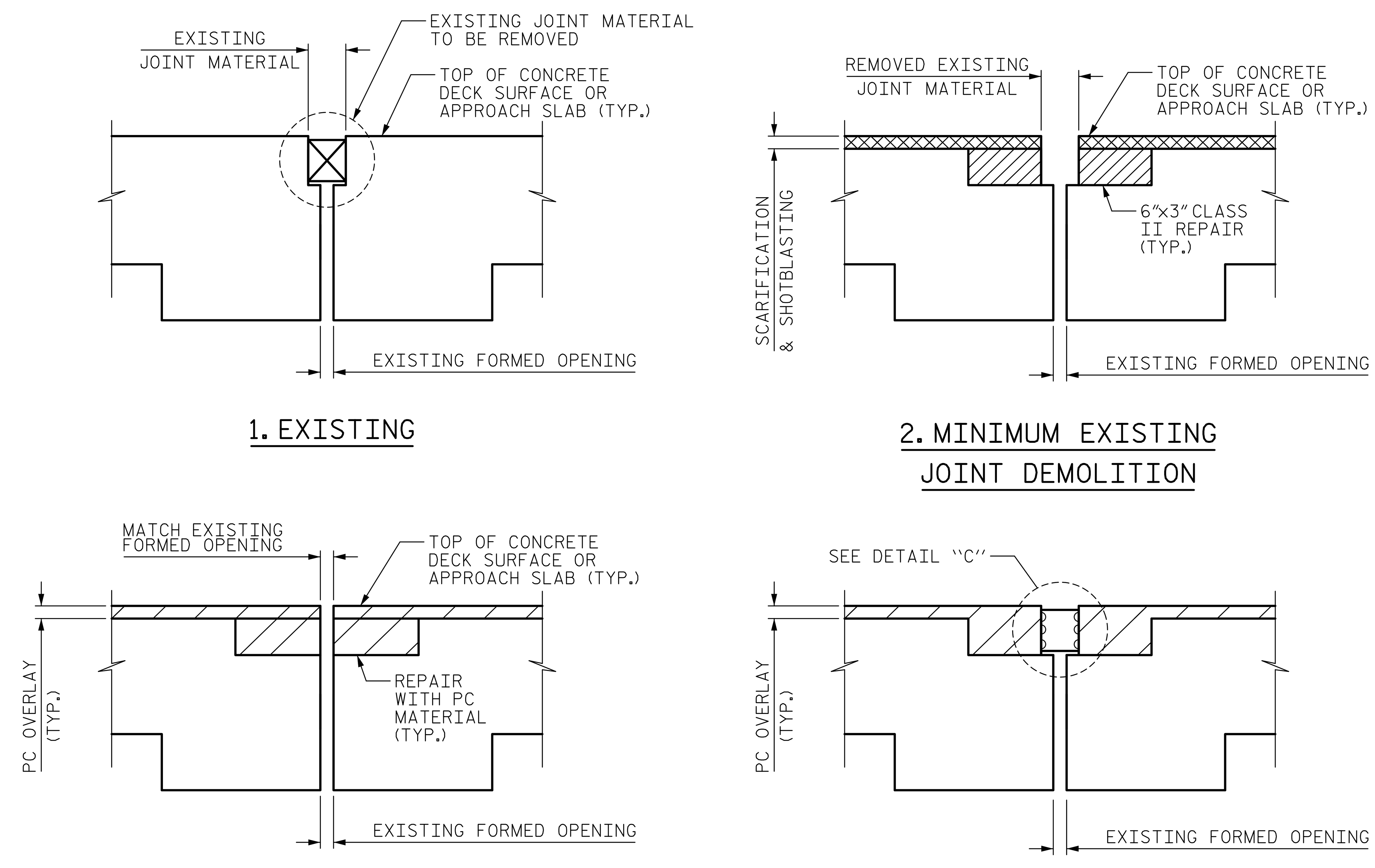
TYPICAL SECTION & DETAILS

(NORTHBOUND)

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S1-53
1				3				TOTAL SHEETS
2				4				119



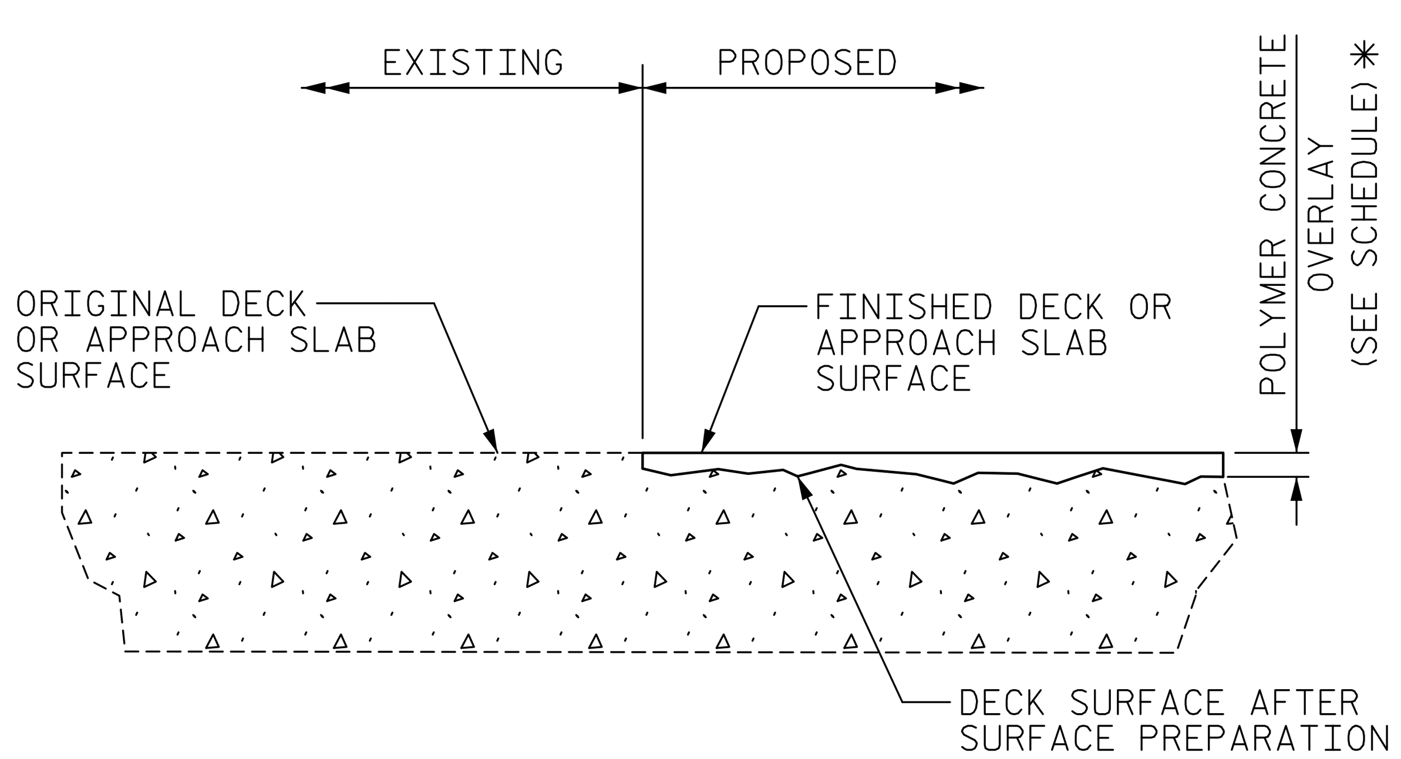
SECTION THRU EXISTING APPROACH SLAB



FOAM JOINT SEAL SHALL BE INSTALLED IN EXISTING AND WIDENED PORTION AS PART OF A SINGLE OPERATION. SEE "FOAM JOINT SEAL DETAILS" SHEET AND TMP PLANS.

JOINT INSTALLATION SEQUENCE

FOR PC OVERLAY THICKNESS, SEE "DETAIL FOR POLYMER CONCRETE OVERLAY"

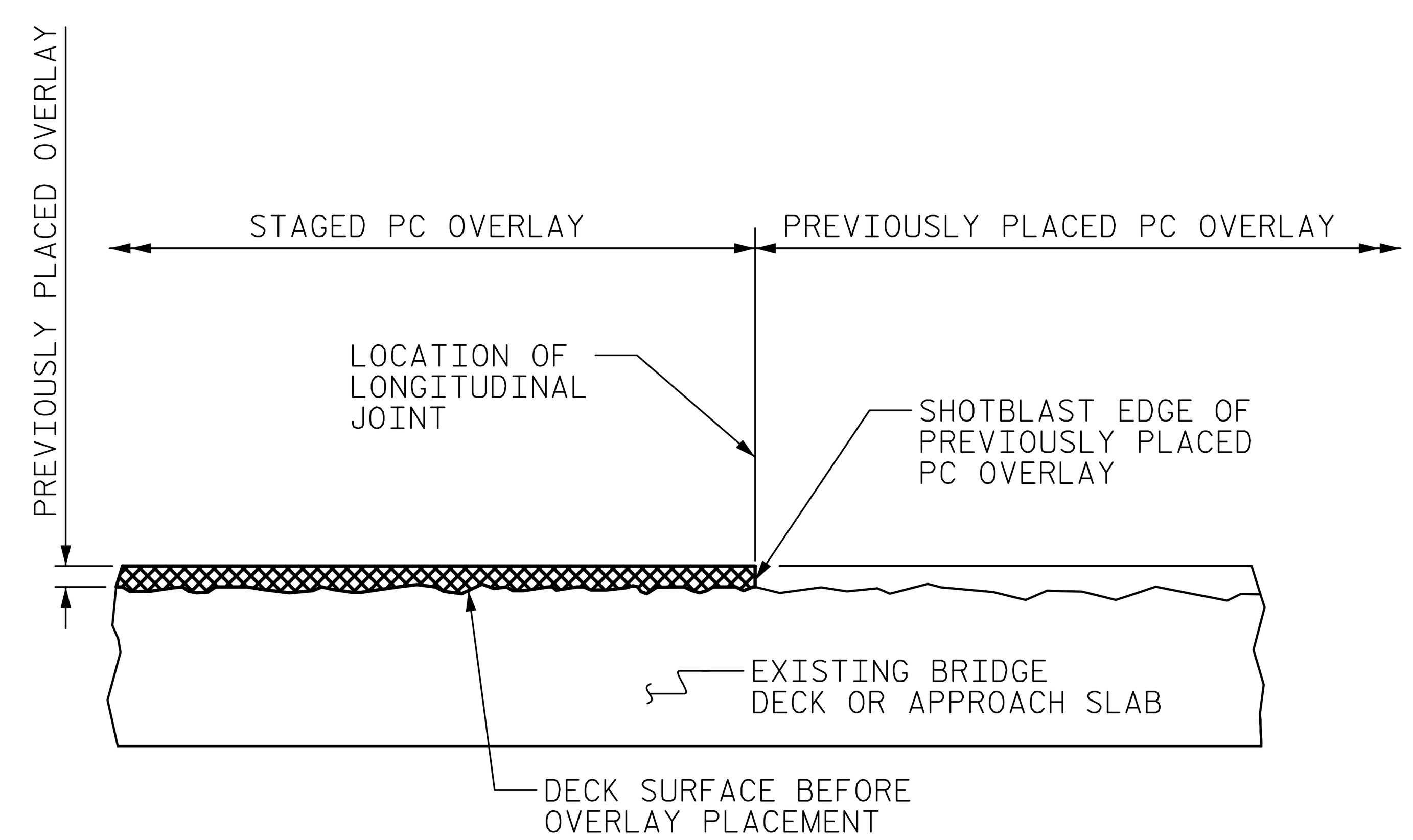


DETAIL FOR POLYMER CONCRETE OVERLAY

✻ POLYMER CONCRETE OVERLAY SCHEDULE

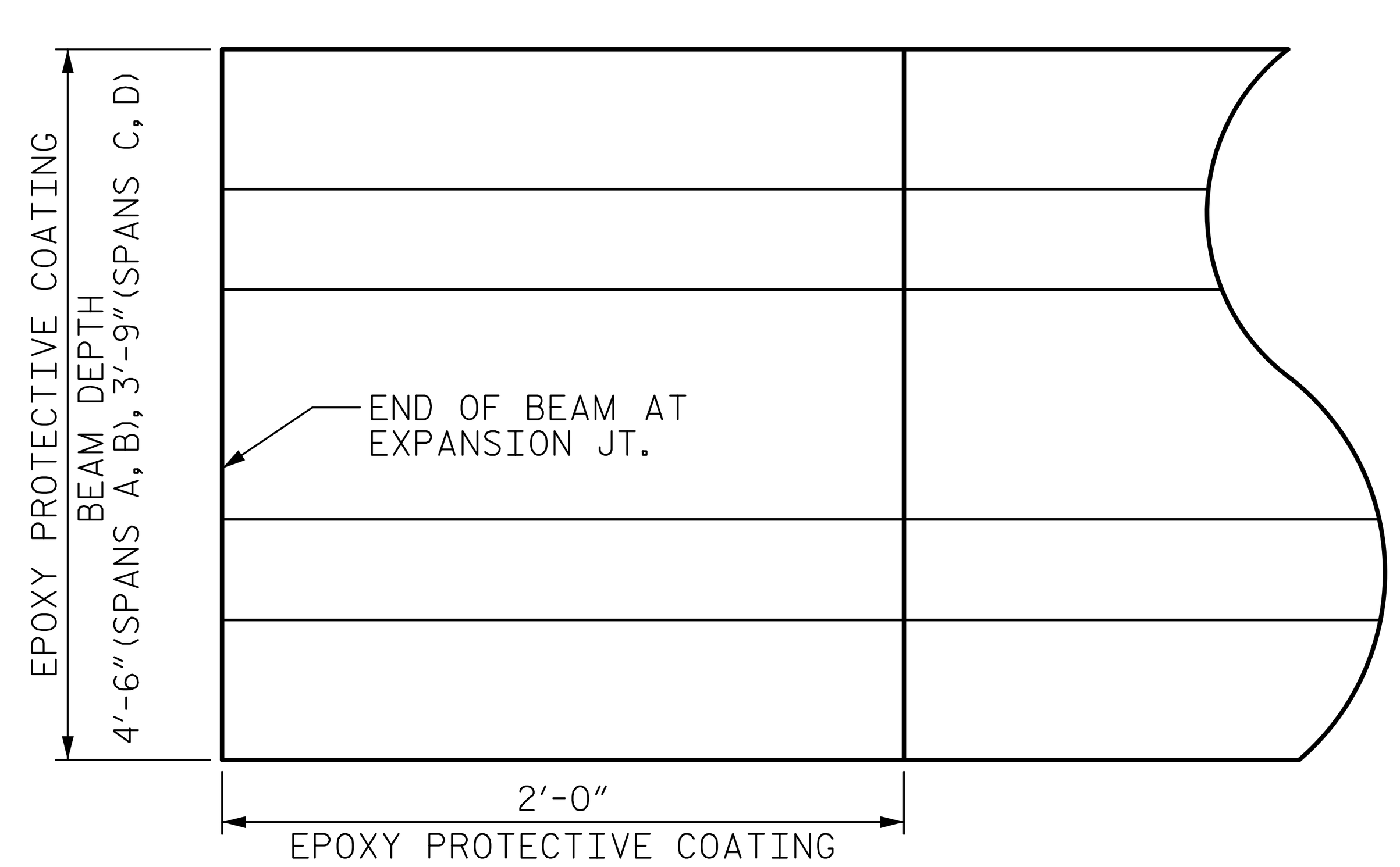
ON EXISTING AND PROPOSED BRIDGE DECK, EXISTING APPROACH SLAB WITH EXPOSED CONCRETE, AND PROPOSED APPROACH SLAB:
1" REMOVAL AND OVERLAY.

ON EXISTING APPROACH SLAB WITH EXISTING ASPHALT OVERLAY:
2¼" +/- REMOVAL AND OVERLAY



STAGED PC OVERLAY JOINT

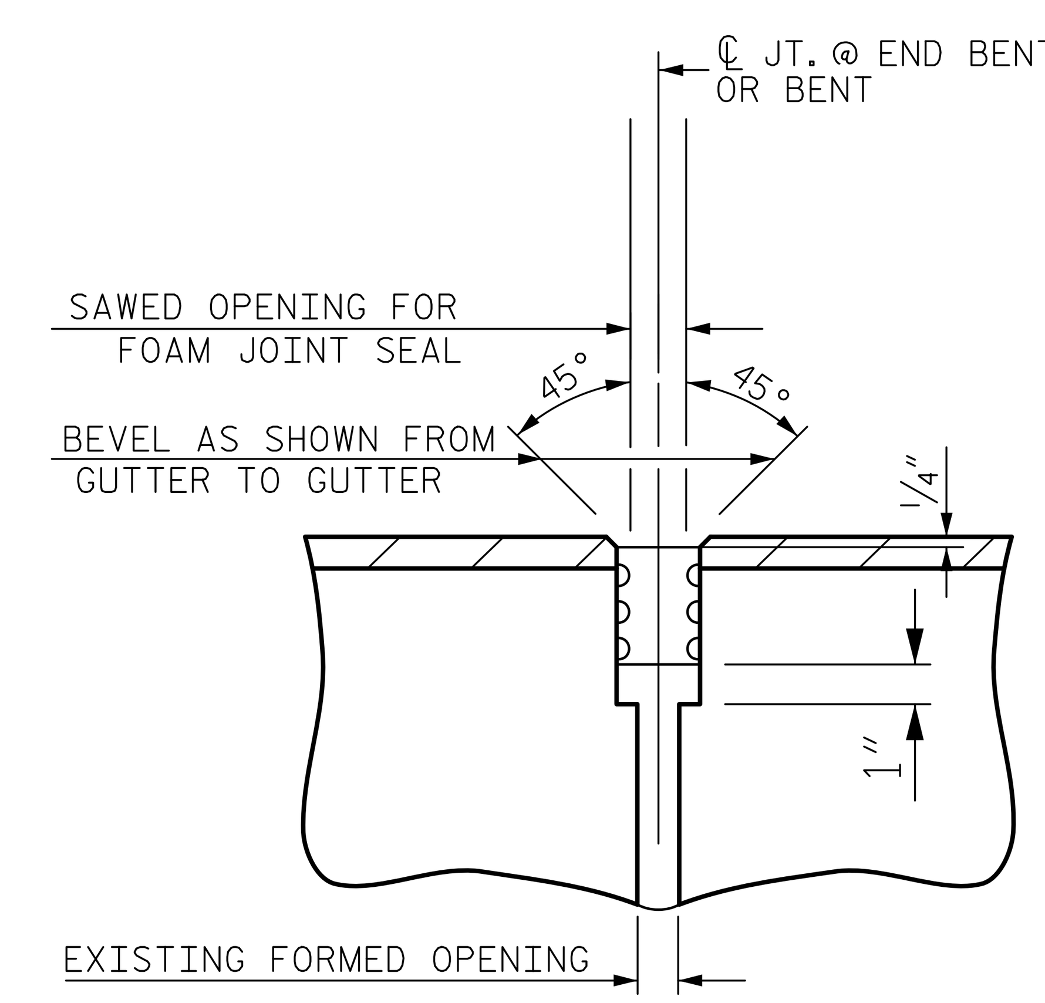
(AS NEEDED)



EPOXY-COAT EXISTING BEAM ENDS (END FACE, BOTTOM, SIDES) AT END BENTS 1 AND 2 AND AT BENT 2. SEE SPECIAL PROVISIONS.

EPOXY COATING DETAIL

EST. QTY. "EPOXY COATING CONCRETE GIRDER ENDS" = 550SF



DETAIL "C"

FOAM JOINT SEAL FOR SAWED OPENING WIDTH AT BENTS AND END BENTS, SEE "FOAM JOINT DETAILS" SHEET.

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DESIGN CHECKED BY :	J. SLOAN	DATE :	11/2022

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESERVATION

TYPICAL SECTION DETAILS

(NORTHBOUND)

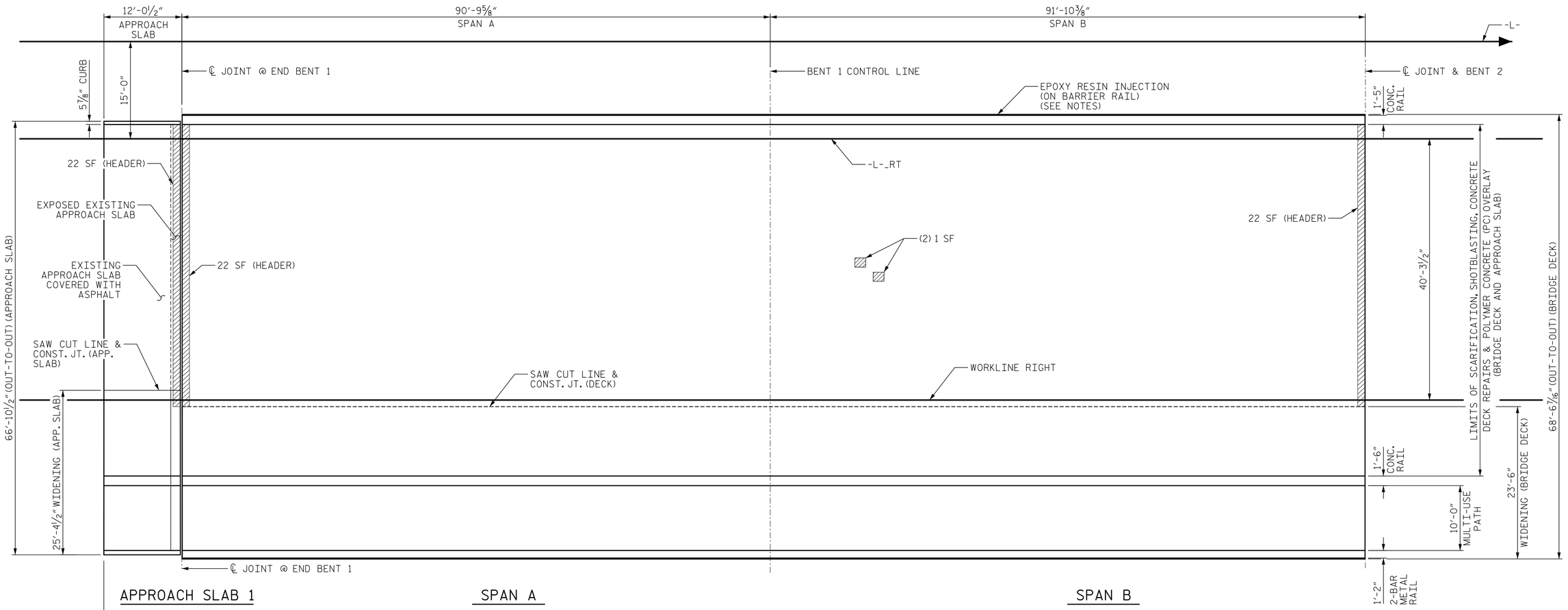
REVISIONS

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

SHEET NO. S1-54

TOTAL SHEETS 119

DATE: 2/10/2023
TIME: 12:43:28 PM



PART PLAN OF BRIDGE DECK & APPROACH SLABS

TOTAL BRIDGE DECK & APPROACH SLAB QUANTITIES

	ESTIMATE	ACTUAL
SCARIFYING BRIDGE DECK	1924.8 SY	
CLASS II SURFACE PREPARATION	15 SY	
CONCRETE DECK REPAIR FOR PC OVERLAY	15 SY	
SHOTBLASTING BRIDGE DECK	1924.8 SY	
POLYESTER POLYMER CONCRETE MATERIALS	58.6 CY	
PLACING AND FINISHING PC OVERLAY	1924.8 SY	
GROOVING BRIDGE FLOORS	16,296.4 SF	
PLUGGING OF EXISTING DECK DRAINS	30 EA	
EPOXY RESIN INJECTION	110 LF	
EPOXY POLYMER CONCRETE MATERIALS (ALTERNATE)	58.6 CY	

CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY

EPOXY RESIN INJECTION: PERFORM EPOXY RESIN INJECTION ON ALL CRACKS IN BARRIER WITH WIDTH 1/32" OR WIDER AT THE DIRECTION OF THE ENGINEER. A TOTAL QUANTITY ESTIMATE IS PROVIDED. SEE SPECIAL PROVISIONS.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESERVATION

DECK SURFACE PREPARATION

SPANS A & B
(NORTHBOUND)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-55
1			3			TOTAL SHEETS
2			4			119

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 2

DATE: 2/9/2023
TIME: 12:43:40 PM

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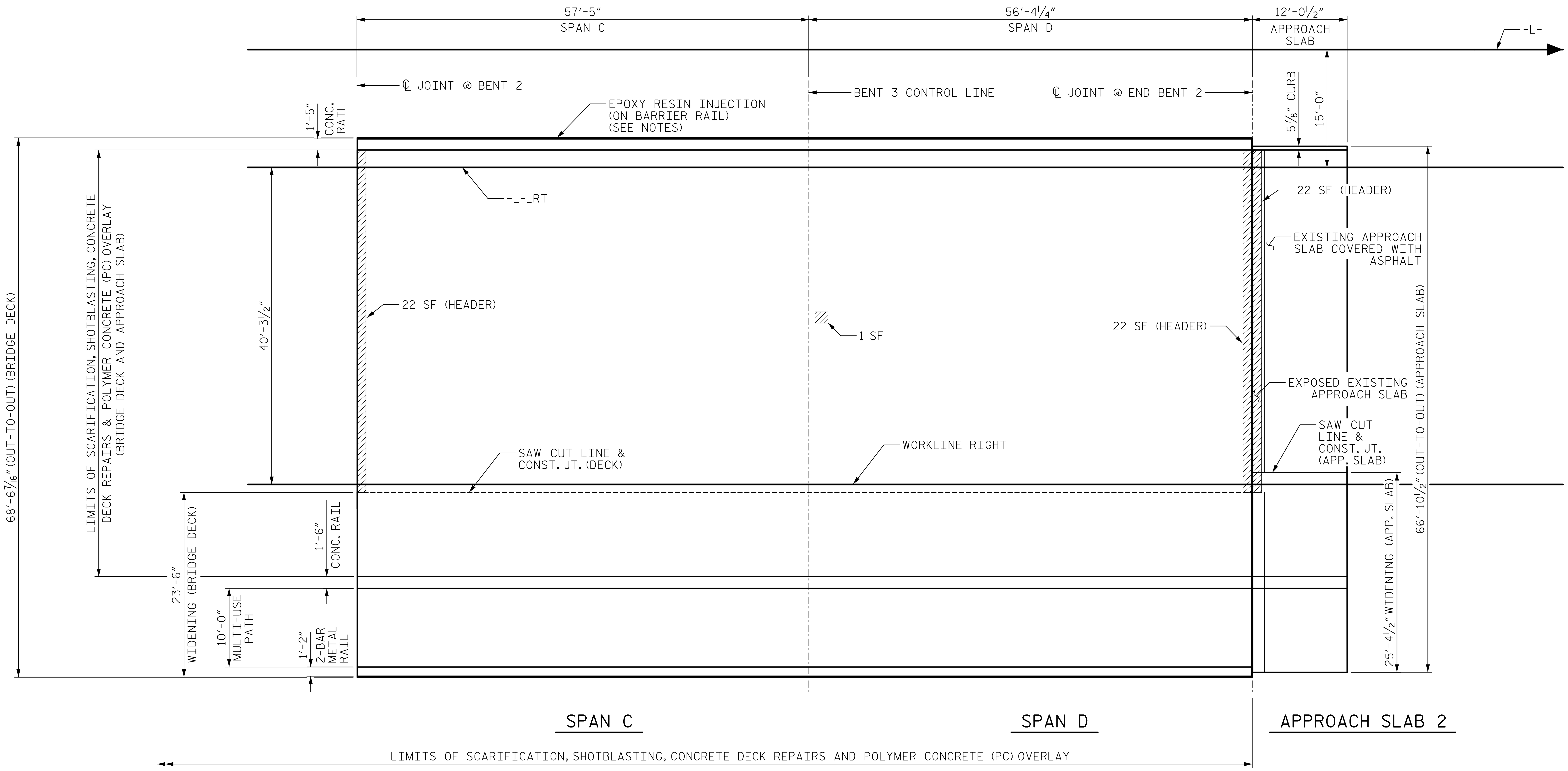

PART PLAN OF BRIDGE DECK & APPROACH SLABS

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 2 OF 2

CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY

EPOXY RESIN INJECTION: PERFORM EPOXY RESIN INJECTION ON ALL CRACKS IN BARRIER WITH WIDTH 1/32" OR WIDER AT THE DIRECTION OF THE ENGINEER. A TOTAL QUANTITY ESTIMATE IS PROVIDED. SEE SPECIAL PROVISIONS.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESERVATION
DECK SURFACE PREPARATION
SPANS C & D
(NORTHBOUND)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-56
1			3			TOTAL SHEETS
2			4			119

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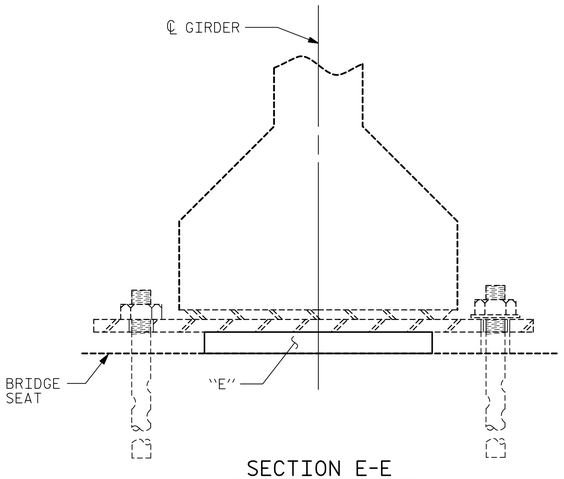
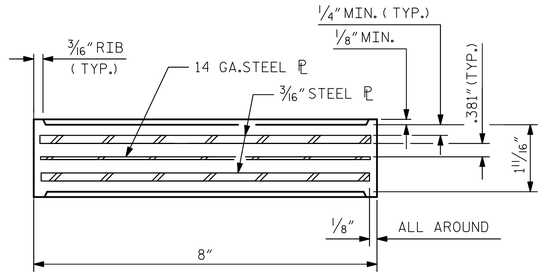
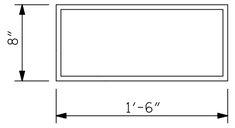


SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS

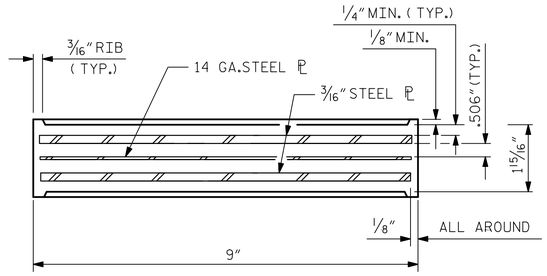


E5 (20 REQ'D)

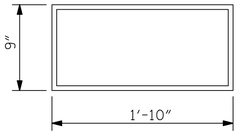
PLAN VIEW OF ELASTOMERIC BEARING

TYPE III

REPLACE ALL EXISTING BEARINGS IN SPANS C AND D



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E6 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

REPLACE ALL EXISTING BEARINGS IN SPANS A AND B

ELASTOMERIC BEARING NOTES

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

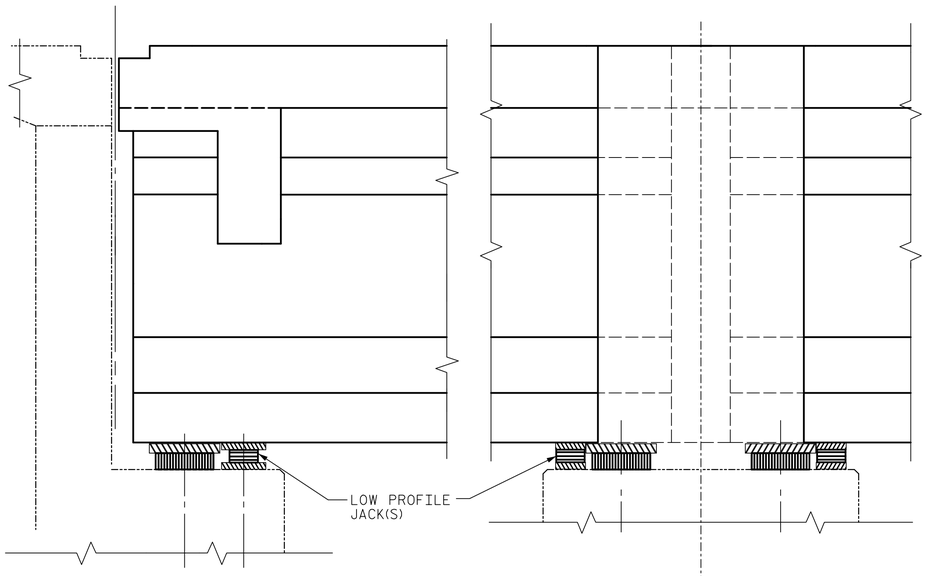
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE II	145K
TYPE III	205K
TYPE IV	225K

ESTIMATED JACKING LOADS

VALUES ARE FOR ENTIRE SUPERSTRUCTURE, ADDITIONAL LOAD TO DEFLECT CONTINUOUS UNIT. LIVE LOADS ARE NOT INCLUDED.

END BENT 1	557K
BENT 1	1150K
BENT 2	555k (SPAN B ONLY)
BENT 2	335k (SPAN C ONLY)
BENT 3	700K
END BENT 2	337K



JACKING AT END BENT

(DETAIL IS FOR ILLUSTRATION ONLY)

JACKING AT INTERIOR BENT

(DETAIL IS FOR ILLUSTRATION ONLY)
(SHOWN AT BENT 1 OR 3, SIMILAR AT BENT 2)

NOTES (BRIDGE JACKING):

FOR BRIDGE JACKING, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL SUBMIT JACKING PLANS AND CALCULATIONS FOR REVIEW AND APPROVAL PRIOR TO MATERIAL PURCHASE OR FABRICATION OF THE JACKING SYSTEM. JACKING PLANS AND CALCULATIONS SHALL BE SEALED BY A PROFESSIONAL ENGINEER LICENSED IN NORTH CAROLINA.

ALL BEAMS AT A SUBSTRUCTURE UNIT WITHIN A SUPERSTRUCTURE UNIT SHALL BE LIFTED AT THE SAME TIME WITH A HYDRAULIC JACKING SYSTEM AND THE SAME DISPLACEMENT (TYPE II JACKING).

THE BEAMS SHALL BE LIFTED ENOUGH THAT THE BEAMS CLEAR THE BEARINGS AND ALL LOAD IS SUPPORTED BY THE JACKS. AFTER JACKING IS COMPLETE THE CONTRACTOR SHALL PROVIDE A METHOD TO SUPPORT THE BEAM FOR DEAD AND LIVE LOADS AND REMOVE THE JACKS DURING REPAIR OPERATIONS. IF THE JACKS REMAIN IN PLACE DURING THE ENTIRE JACKING AND REPAIR OPERATION, THEY SHALL HAVE MECHANICAL LOCK-OFF CAPABILITIES.

IF DURING THE JACKING PROCESS, OR WHILE THE BEAM IS BEING SUPPORTED, THE BEAM SHIFTS FROM ITS ORIGINAL POSITION, ALL WORK SHALL CEASE, THE BRIDGE SHALL BE CLOSED TO TRAFFIC, AND THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

PRIOR TO JACKING, THE CONTRACTOR SHALL ENSURE THERE ARE NO OBSTACLES PREVENTING THE BEAMS FROM BEING LIFTED.

THE MAXIMUM JACKING AT THE END BENTS OR BENT 2 IS 1/4" WITHOUT INSTALLING TRAFFIC BEARING SHIM PLATES. SEE SPECIAL PROVISIONS.

REACTIONS AND ESTIMATED JACKING FORCES LISTED ARE FOR THE CONVENIENCE OF THE CONTRACTOR AND SHALL NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILTY TO PREPARE AND SUBMIT JACKING PLANS AND CALCULATIONS PRIOR TO BEGINNING WORK.

JACKING SCHEMATICS SHOWN ARE FOR REPRESENTATION ONLY AND ARE NOT WORKING DETAILS. CONTRACTOR SHALL COMPLETELY DESIGN JACKING PLAN. SEE SPECIAL PROVISIONS.

BRIDGE SHALL BE CLOSED TO TRAFFIC DURING HYDRAULIC LIFTING OPERATIONS UNTIL LIFTING IS COMPLETE AND BEAMS ARE SUPPORTED BY MEANS OTHER THAN HYDRAULICS, UNLESS ALLOWED BY THE ENGINEER. ALL TRAFFIC CLOSURES SHALL BE COORDINATED WITH THE ENGINEER TWO WEEKS PRIOR TO JACKING OPERATIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO THE EXISTING STRUCTURE BY THE BRIDGE JACKING OPERATIONS AT NO ADDITIONAL COST TO THE DEPARTMENT.

THE CONTRACTOR SHALL PROVIDE BLOCKING FOR ALL JACKS AS NECESSARY. A BLOCKING PLAN SHALL BE INCLUDED AS PART OF THE JACKING PLAN.

THE CONTRACTOR SHALL MONITOR THE PLAN LOCATION OF THE GIRDERS FROM INITIAL JACKING UNTIL GIRDERS ARE SECURED ON THEIR PERMANENT BEARINGS. IF THE PLAN LOCATION OF THESE GIRDERS SHIFT FROM ITS ORIGINAL POSITION. THE CONTRACTOR SHALL SECURE FROM ADDITIONAL MOVEMENT IMMEDIATELY. NOTIFY ENFINEER PRIOR TO PROCEEDING WORK OPERATIONS.

CONTRACTOR TO TAKE APPROPRIATE MEANS TO REMOVE NUT ON ANCHOR BOLT WITHOUT DAMAGING THE ANCHOR BOLT. CONTRACTOR SHALL SUBMIT NUT REMOVAL METHOD TO INCLUDE PROCEDURES THAT WILL LOOSEN BOND BETWEEN INTERLOCKING THREADS TO ENGINEER FOR APPROVAL PRIOR TO REMOVING ANCHOR BOLT NUTS.

JACKING SHALL BE CONDUCTED IN A MANNER SUCH THAT THE SUPERSTRUCTURE WILL NOT BE DAMAGED.

EFFECT OF VIBRATIONS FROM TRAFFIC SHOULD BE CONSIDERED DURING JACKING AND WHEN JACKS ARE LOCKED.

PROVISIONS SHALL BE MADE TO ACCOUNT FOR THERMAL MOVEMENTS DURING THE PERIOD THAT THE STRUCTURE IS RESTING ON TEMPORARY SUPPORTS.

THE BRIDGE SHALL BE INSPECTED PRIOR TO JACKING TO VERIFY THAT ITEMS CONNECTED TO THE SUPERSTRUCTURE WILL NOT BE DAMAGED DURING THE JACKING AND BEARING REPLACEMENT PROCEDURE.

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING THE JACKING TO DETERMINE A JACKING LOCATION AT EACH BEARING AND PROVIDE A DESIGN FOR THE JACKING LOADS. JACKS SHALL HAVE A MINIMUM SAFE LOAD CAPACITY OF 125% OF THE LOAD SPECIFIED IN THE JACKING LOAD TABLE. THE CONTRACTOR SHALL SUBMIT THE JACKING PLAN, DETAILS, PROCEDURES AND SUPPORTING CALCULATIONS TO THE ENGINEER FOR REVIEW AND APPROVAL.

JACKING SHALL BE COMPLETED PRIOR TO WIDENING OF THE EXISTING BRIDGE AND PC OVERLAY.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

DRAWN BY : D. KIM	DATE : 10/2022	
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DESIGNED BY : G. COLS	DATE : 10/2022	
DESIGN CHECKED BY : D. TUTTLE	DATE : 10/2022	

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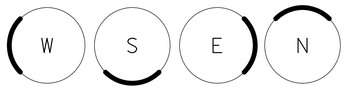
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESERVATION

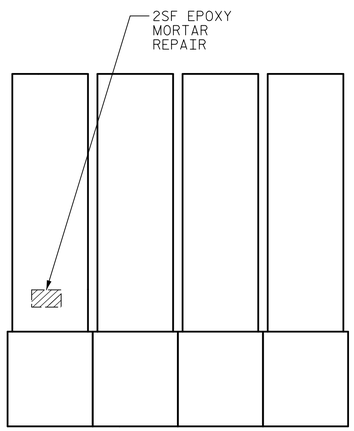
ELASTOMERIC BEARING DETAILS AND JACKING

(NORTHBOUND)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-57
1			3			TOTAL SHEETS
2			4			119



COLUMN & DRILLED PIER KEY



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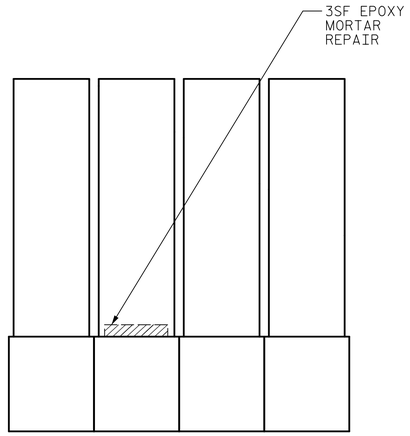

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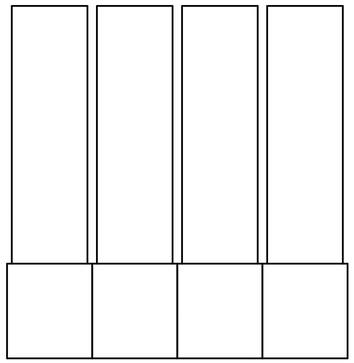


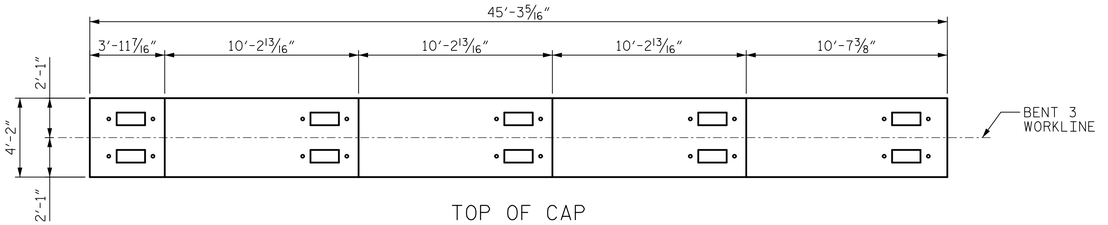
COLUMN & DRILLED PIER 3

EPOXY MORTAR REPAIR AREA

REPAIR QUANTITY TABLE		
BENT REPAIRS		
BENT 1		
	ESTIMATE	ACTUAL
EPOXY MORTAR REPAIR		
CAP	0 SF	
COLUMN	5 SF	
CONCRETE REPAIRS		
CAP	0 CF	
COLUMN	0 CF	
EPOXY RESIN INJECTION		
CAP	0 LF	
COLUMN	0 LF	

NOTES:

FOR REPAIR DETAILS, SEE "REPAIR DETAILS" SHEET.



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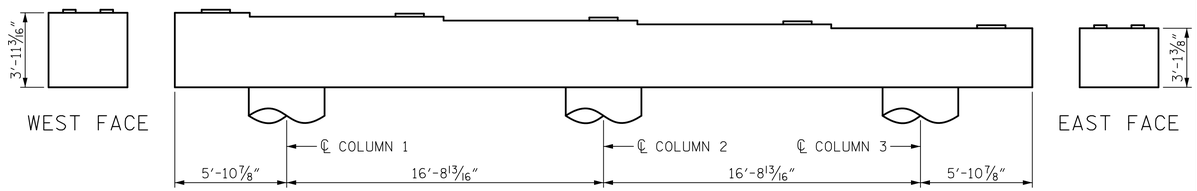
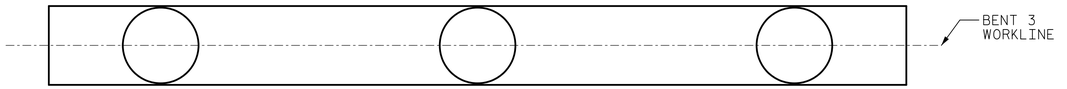


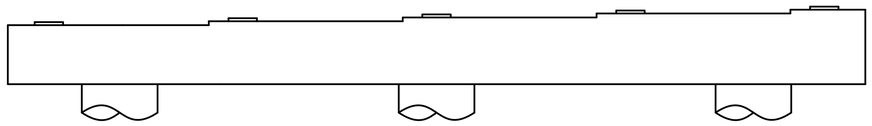
WEST FACE

EAST FACE

SOUTH FACE



SOFFIT



NORTH FACE

BENT CAP

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

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STATE OF NORTH CAROLINA
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RALEIGH

PRESERVATION

BENT 1

(NORTHBOUND)

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

SHEET NO. S1-58

TOTAL SHEETS 119

DRAWN BY : M. CATER DATE : 10/22
CHECKED BY : G. COLS DATE : 10/22
DESIGNED BY : G. COLS DATE : 10/22
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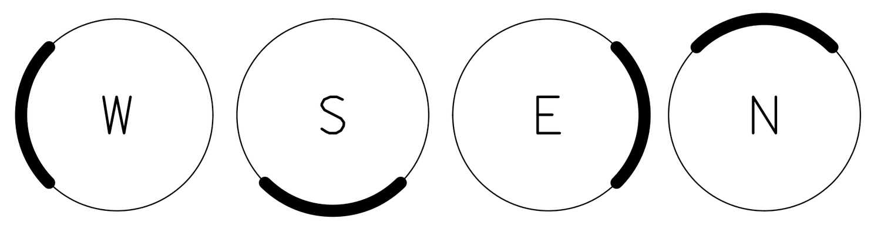
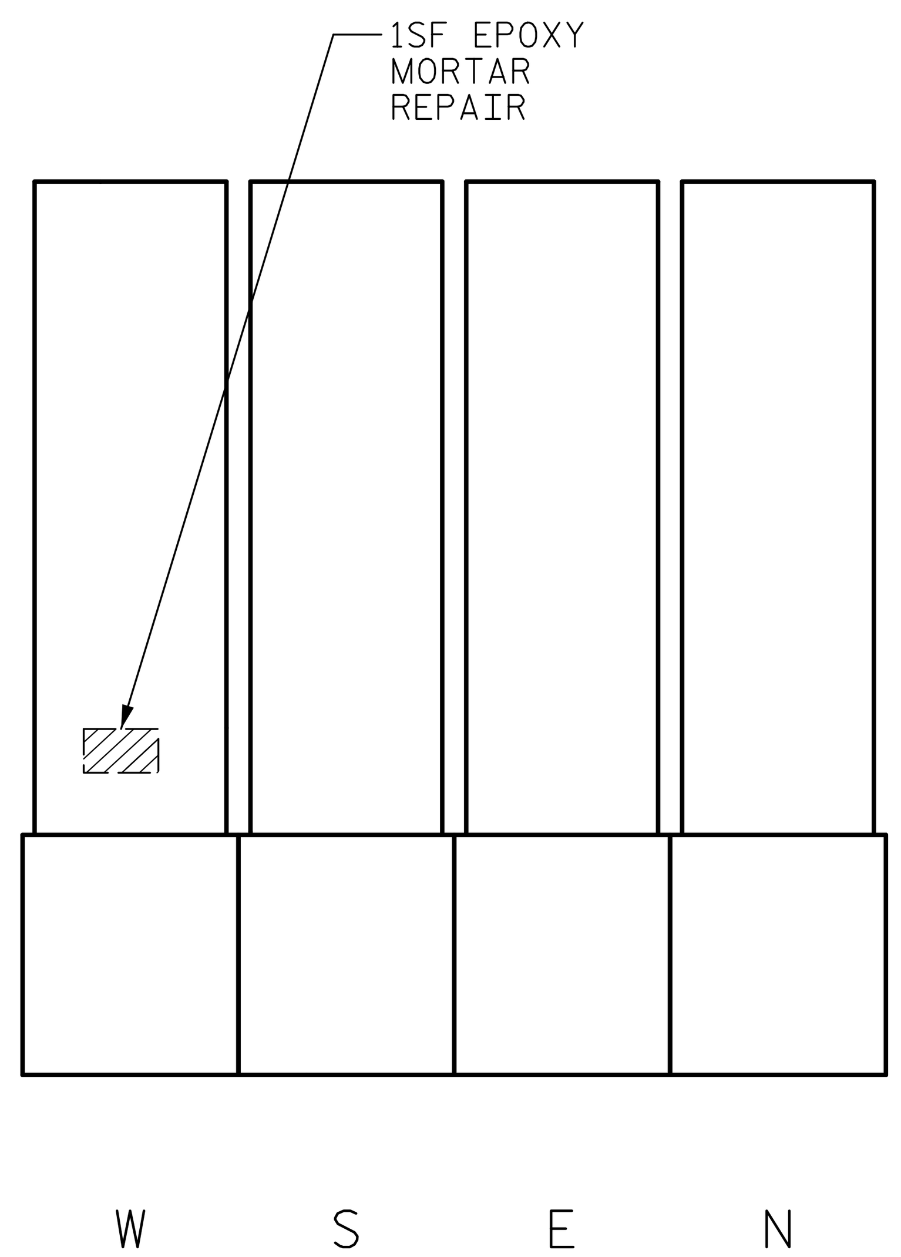


COLUMN & DRILLED PIER KEY



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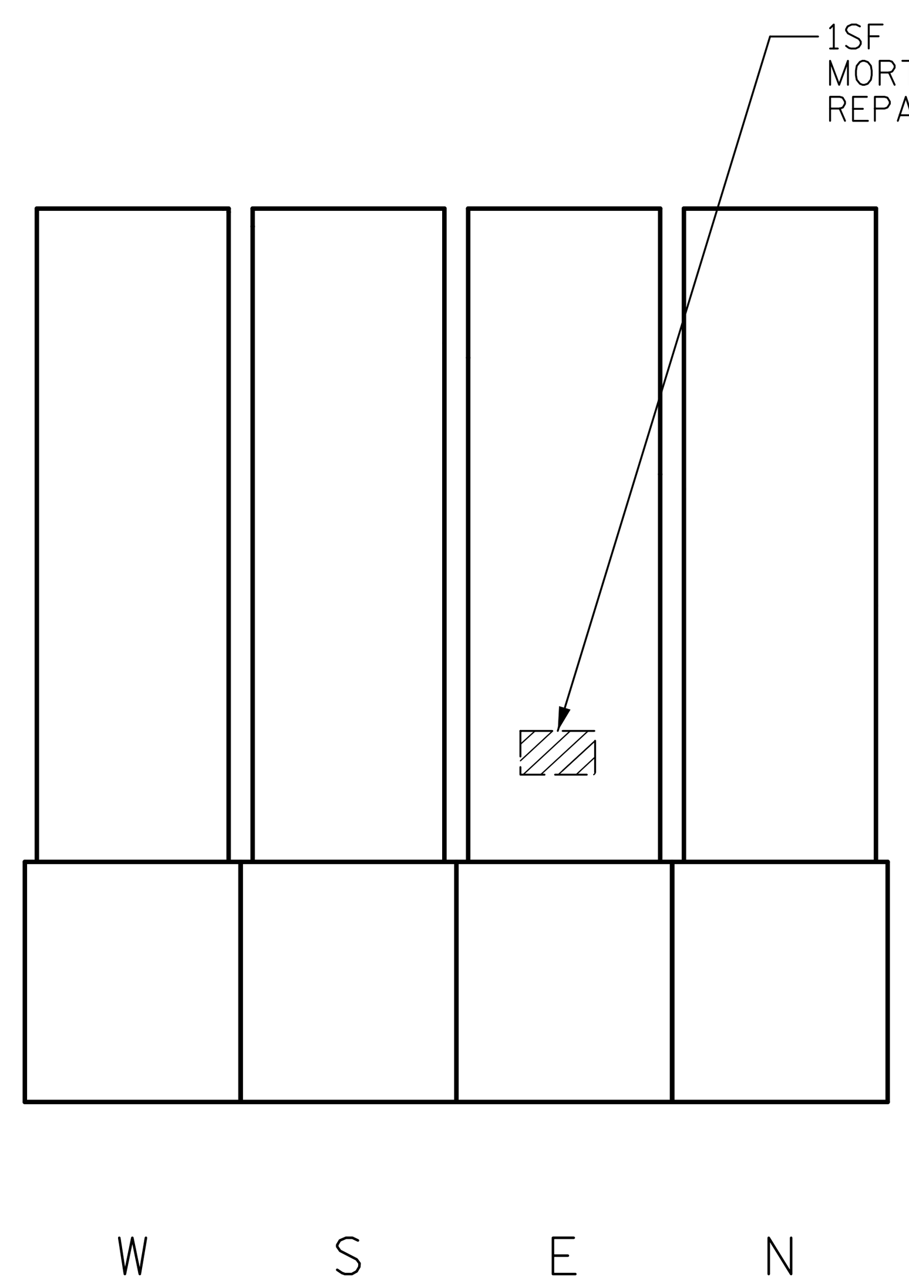

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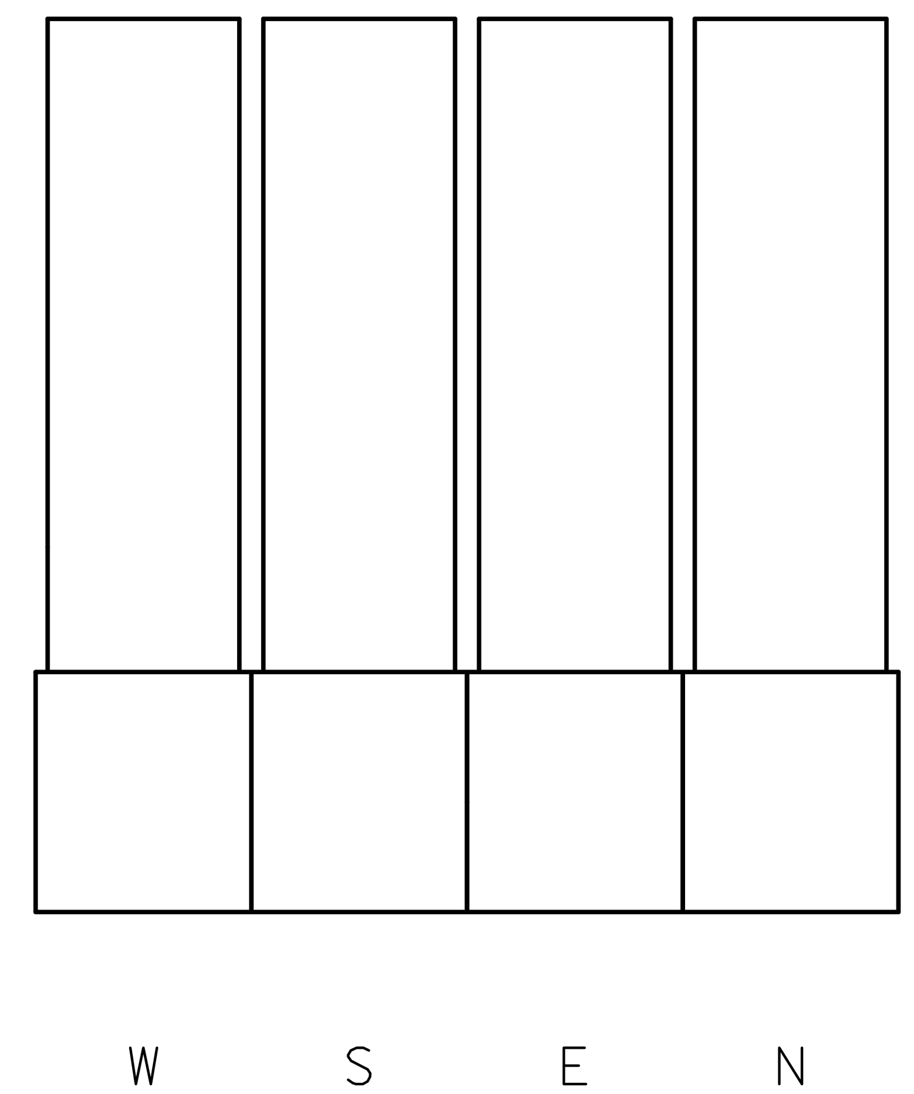
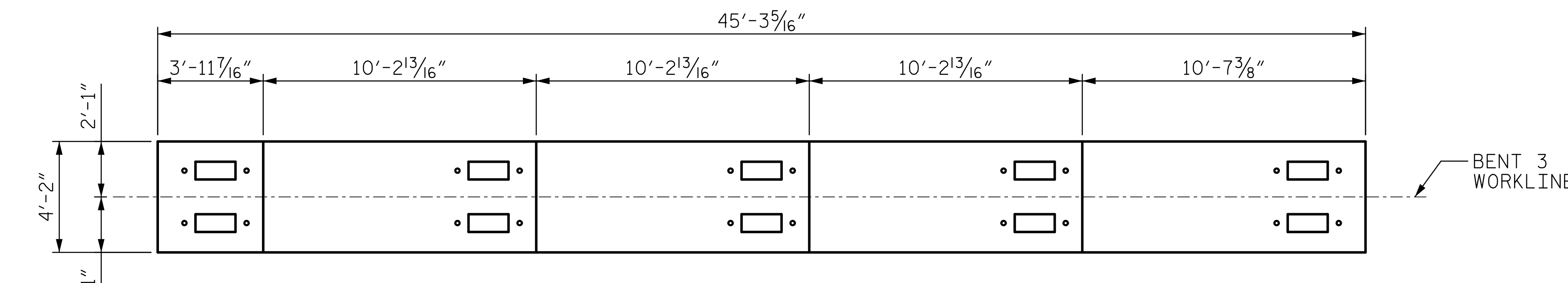
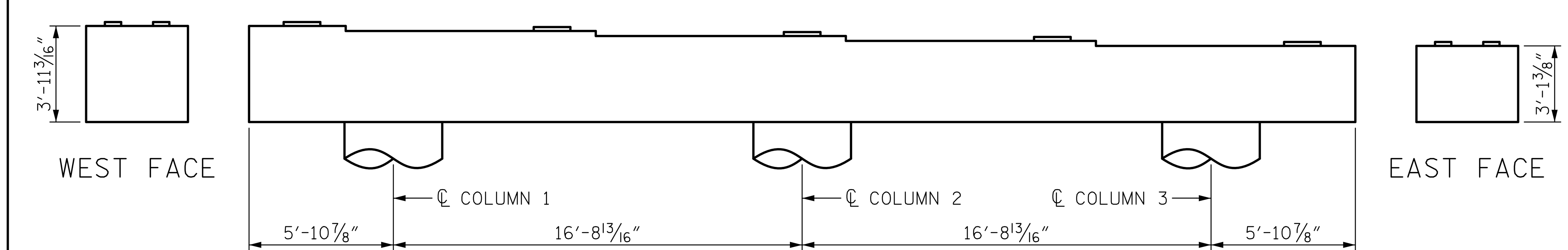


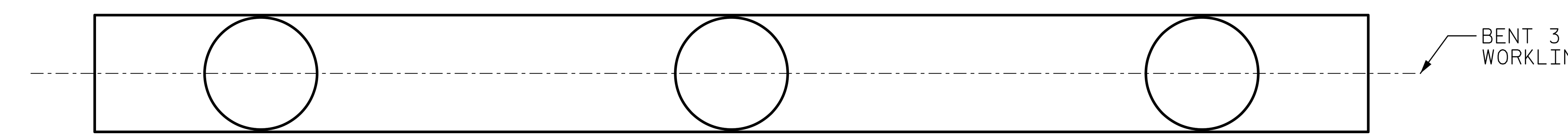
COLUMN & DRILLED PIER 3



TOP OF CAP



SOUTH FACE



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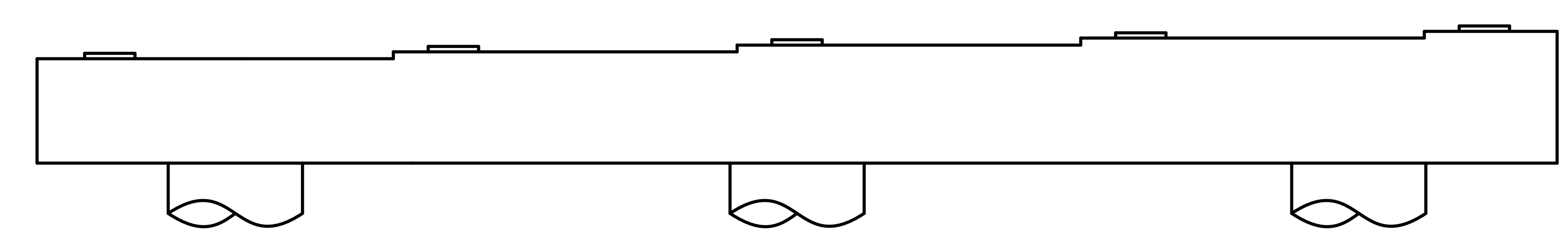

NORTH FACE

BENT CAP

EPOXY MORTAR REPAIR AREA

REPAIR QUANTITY TABLE		
BENT REPAIRS		
BENT 3		
	ESTIMATE	ACTUAL
EPOXY MORTAR REPAIR		
CAP	0 SF	
COLUMN	2 SF	
CONCRETE REPAIRS		
CAP	0 CF	
COLUMN	0 CF	
EPOXY RESIN INJECTION		
CAP	0 LF	
COLUMN	0 LF	

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

NOTES:

FOR REPAIR DETAILS, SEE "REPAIR DETAILS" SHEET.

DRAWN BY : M. CATER DATE : 10/22
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PRESERVATION

BENT 3

(NORTHBOUND)

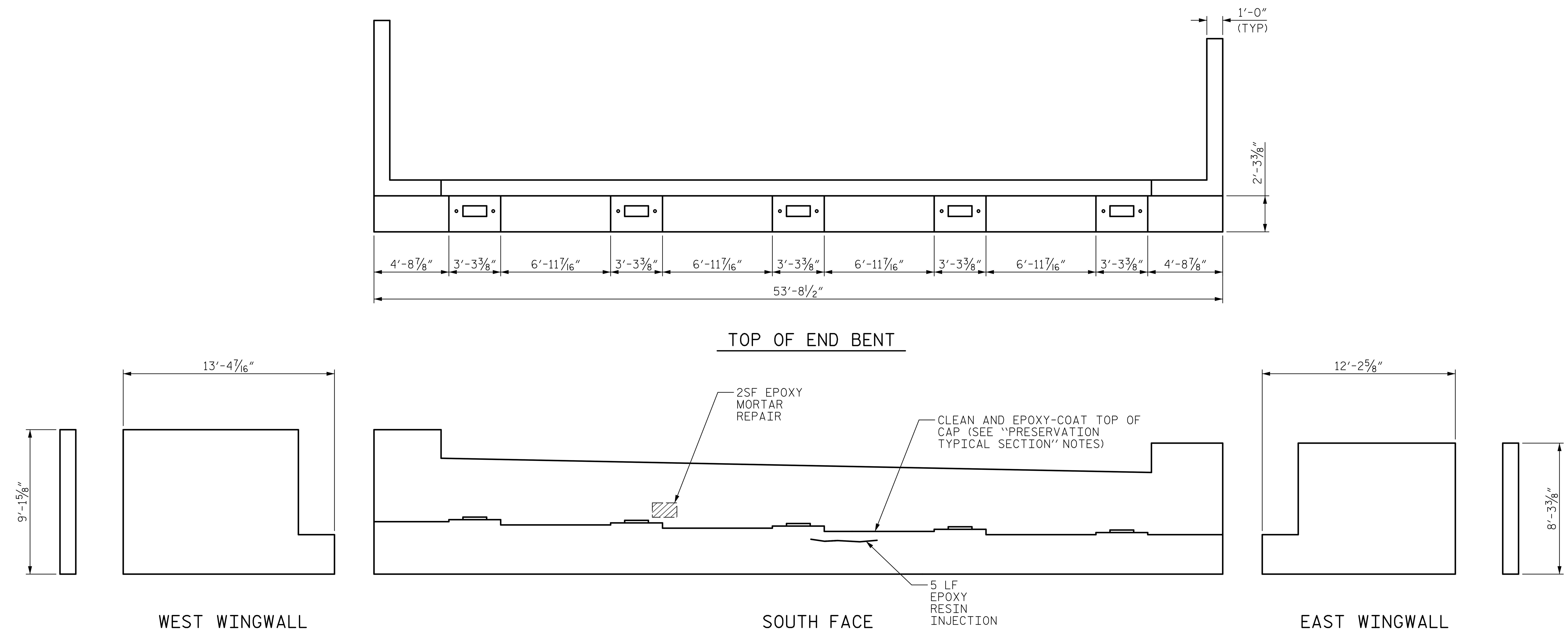
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-59
TOTAL SHEETS 119

NOTES:

EXISTING STRUCTURE SHOWN PRIOR TO WIDENING.

FOR REPAIR DETAILS, SEE "REPAIR DETAILS" SHEET.



EPOXY MORTAR REPAIR AREA

EPOXY RESIN INJECTION

REPAIR QUANTITY TABLE		
BENT REPAIRS		
END BENT 2		
	ESTIMATE	ACTUAL
EPOXY MORTAR REPAIR		
CAP AND BACKWALL	2 SF	
CONCRETE REPAIRS		
CAP AND BACKWALL	0 CF	
EPOXY RESIN INJECTION		
CAP AND BACKWALL	5 LF	

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

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STATE OF NORTH CAROLINA
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PRESERVATION

END BENT 2

(NORTHBOUND)

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

SHEET NO. S1-60

TOTAL SHEETS 119

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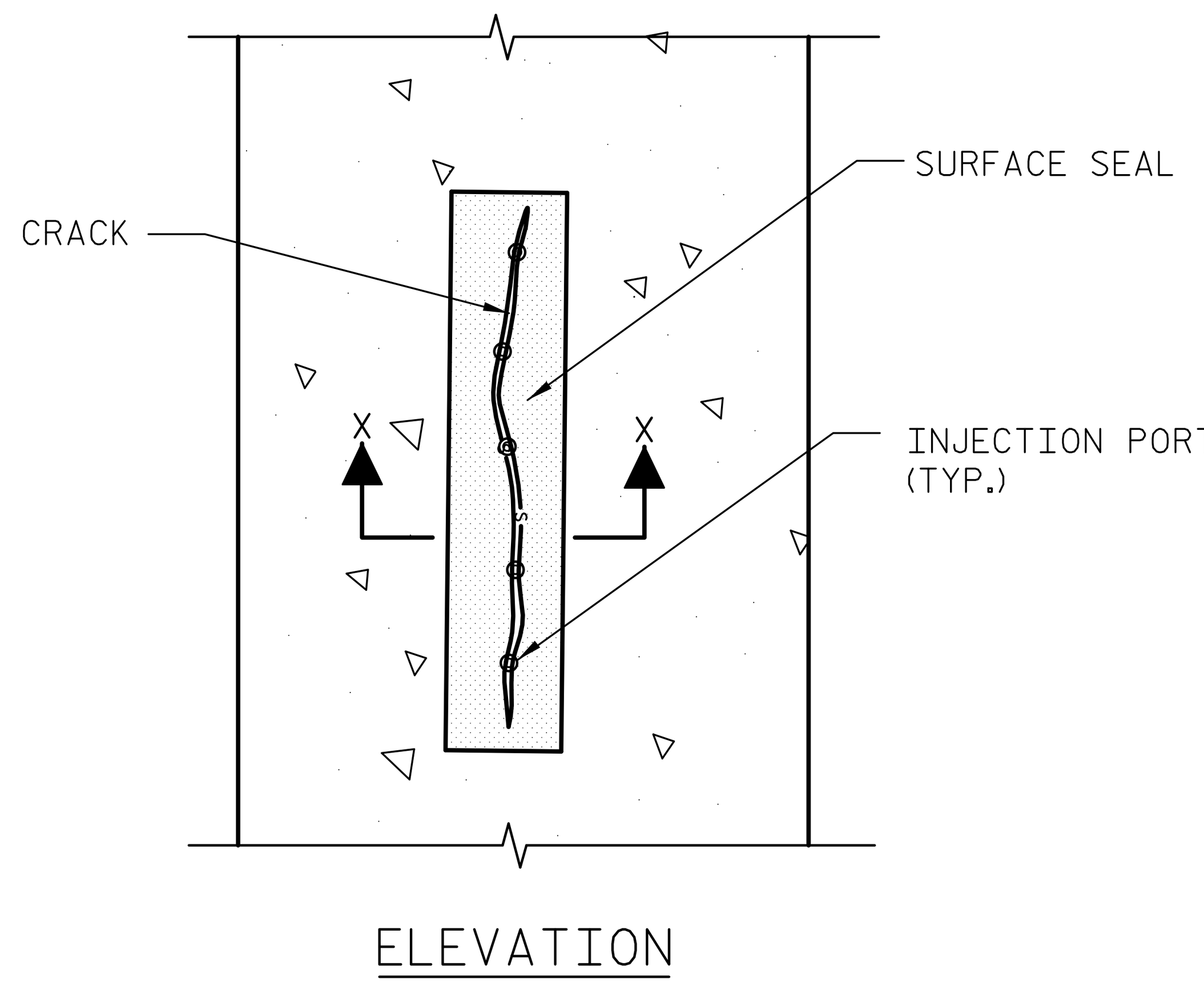
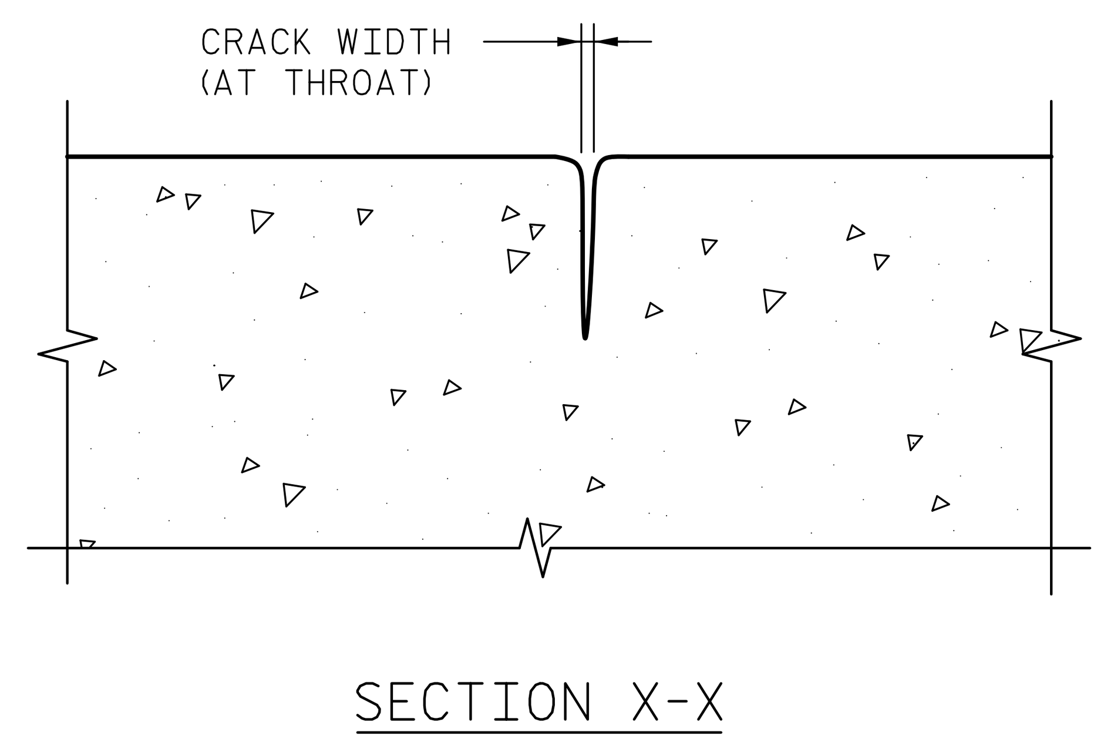
DESIGNED BY :	G. COLS	DATE :	12/2020
DESIGN CHECKED BY :	J. SLOAN	DATE :	12/2022





EPOXY RESIN INJECTION DETAIL

REPAIR CRACKS AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH THE EPOXY RESIN INJECTION SPECIAL PROVISION.

PRESERVATION AND REPAIR NOTES

DEFECTS SHOWN ON THE REHABILITATION PLANS FOR ALL BRIDGES ON PROJECT WERE RECORDED DURING AN INSPECTION IN NOVEMBER 2020. THE CONTRACTOR'S ATTENTION IS BROUGHT TO THE FACT THAT THE CONDITION OF THE STRUCTURE DURING THE REHABILITATION MAY DIFFER FROM THE CONDITION OF THE STRUCTURE DURING THE INSPECTION.

ASSUMED APPROXIMATE REPAIR DIMENSIONS ARE SHOWN IN THE DEFECT TABLES. THE DIMENSIONS SHOWN ARE ONLY FOR DETERMINING AN APPROXIMATE REPAIR QUANTITY FOR THE BID TABULATION. CONTRACTOR SHALL PERFORM ACTUAL REPAIR VOLUME REQUIRED BY THE ENGINEER.

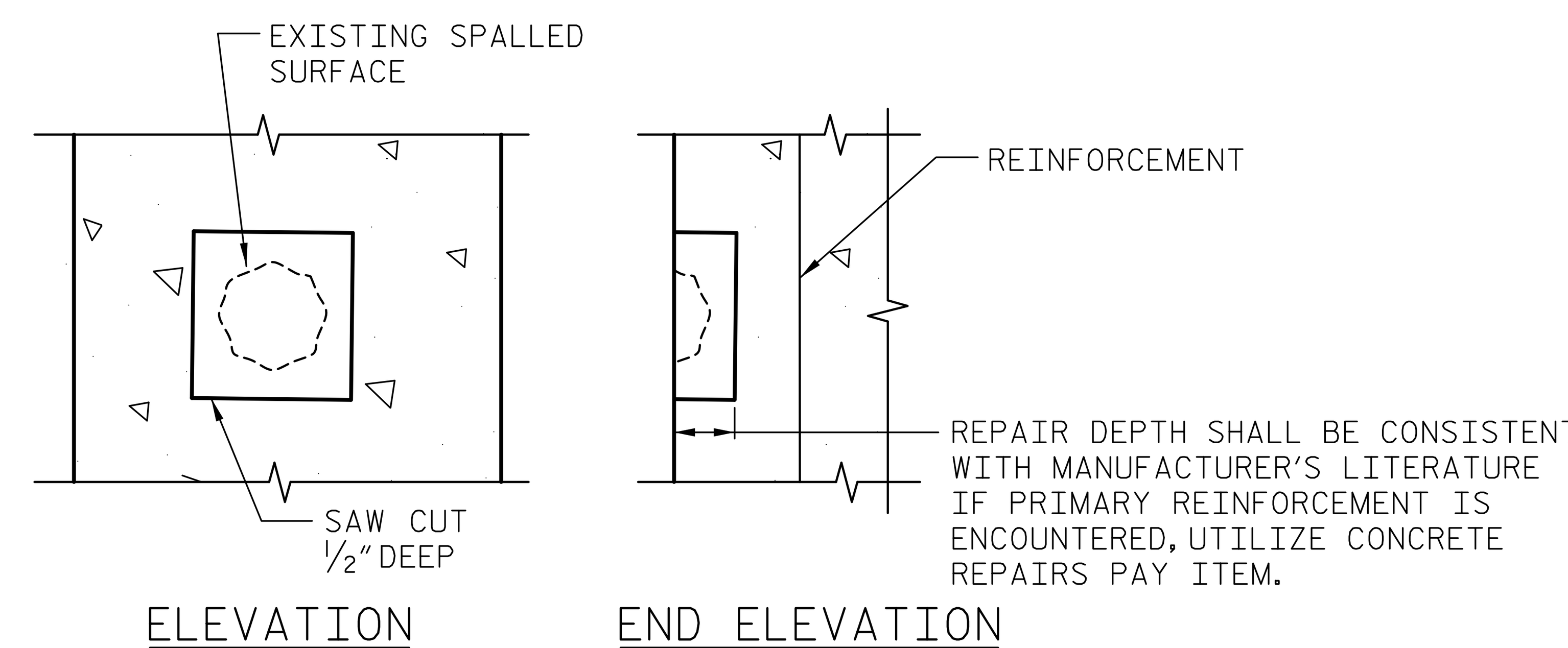
THE ENGINEER SHALL DETERMINE THE ACTUAL REQUIRED DEFECT DIMENSIONS AND THE REPAIR TYPE TO BE PERFORMED FOR EACH DEFECT, IN A MANNER THAT IS CONSISTENT WITH THE INFORMATION SHOWN IN THESE PLANS.

CONTRACTOR SHALL THOROUGHLY CLEAN THE STRUCTURE AND REMOVE ALL VEGETATION, SOIL, DISCOLORATION, AND GREASE, PRIOR TO MAKING REPAIRS.

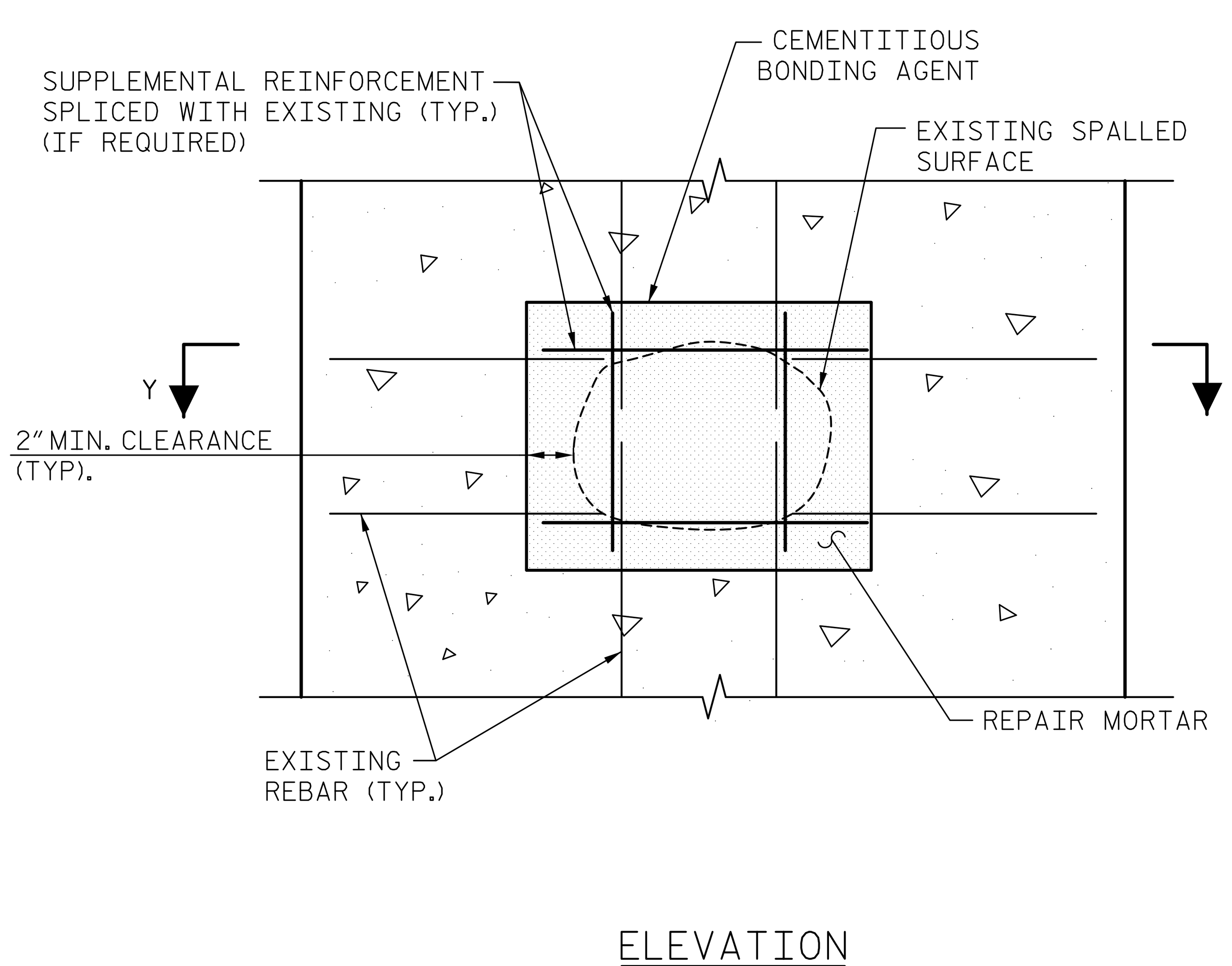
CONTRACTOR SHALL CLIP ALL NAILS, OLD INJECTION PORTS, NAVIGATION SIGNS, OR OTHER METAL ITEMS PROJECTING OUT OF THE STRUCTURE AT THE SURFACE OF THE CONCRETE, PRIOR TO MAKING REPAIRS.

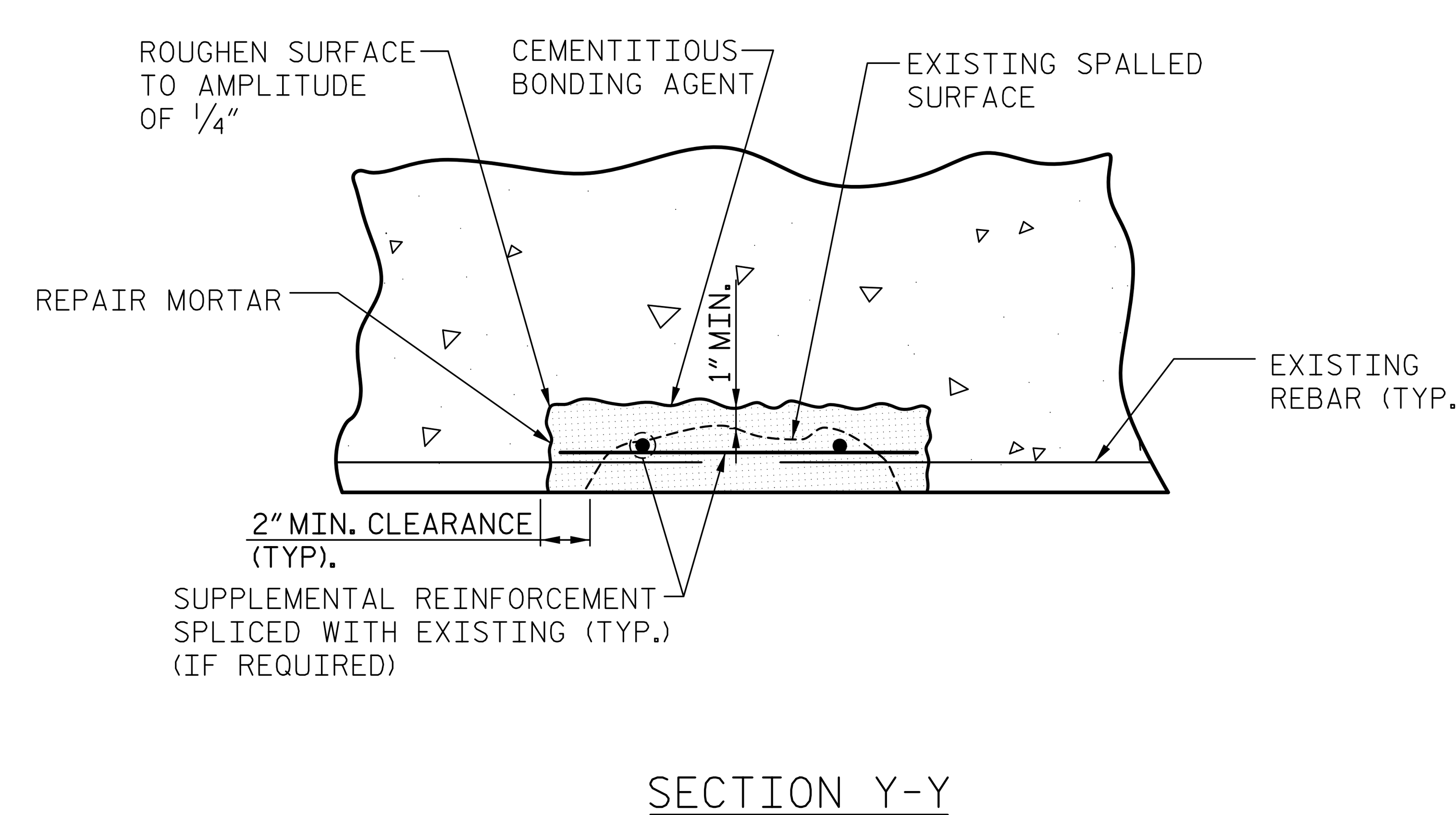
WHEN DETERMINING CONCRETE REPAIR VOLUME, THE REPAIR DEPTH FOR MOST DEFECTS HAS BEEN ASSUMED TO BE 4". THE ENGINEER SHALL DETERMINE THE ACTUAL REPAIR DEPTH IN ACCORDANCE WITH THE SPECIAL PROVISION.

FOR CONCRETE REPAIRS, EPOXY MORTAR REPAIRS, AND EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.



EPOXY MORTAR REPAIRS





CONCRETE REPAIR WITH EXPOSED REBAR

SUPPLEMENTAL REINFORCING SHALL BE INSTALLED IF REQUIRED IN ACCORDANCE WITH THE SPECIAL PROVISION, UNLESS NOTED OTHERWISE OR AS DIRECTED BY THE ENGINEER.

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

DRAWN BY : D. KIM	DATE : 10/2022
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DESIGNED BY : G. COLS	DATE : 10/2022
DESIGN CHECKED BY : J. SLOAN	DATE : 10/2022

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2/10/2023

STATE OF NORTH CAROLINA
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RALEIGH

PRESERVATION

REPAIR DETAILS

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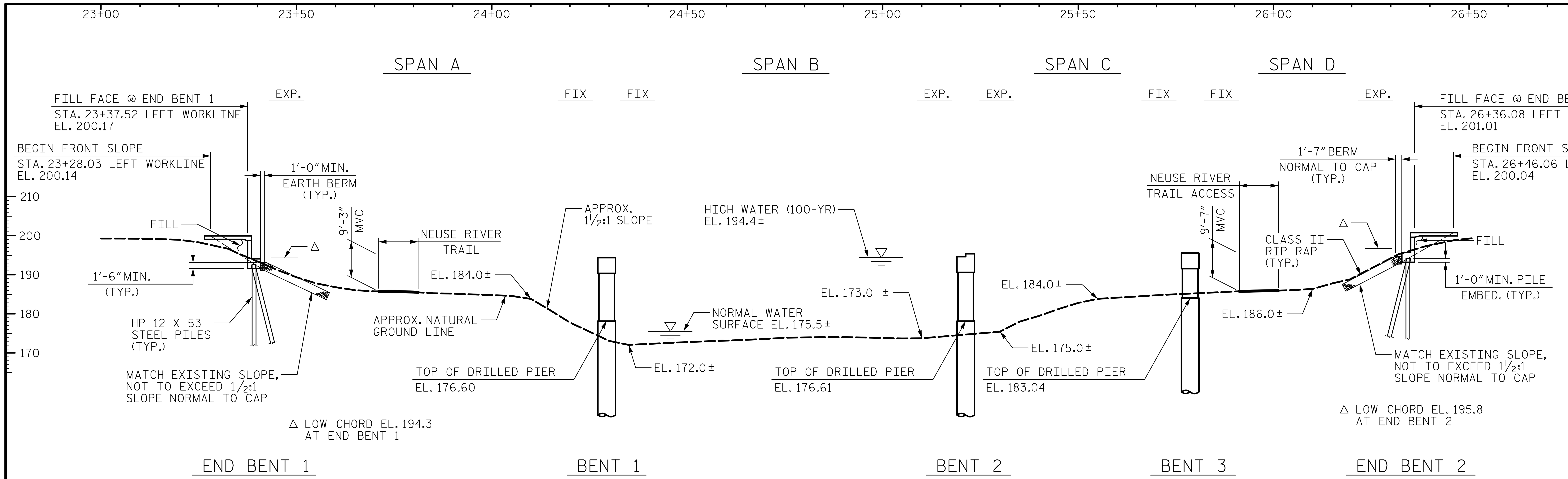
1			3			TOTAL SHEETS
2			4			119



SECTION ALONG LEFT WORKLINE

(SECTIONS AT END BENTS AND BENTS ARE AT RIGHT ANGLES)

(+)0.2794% (+)0.2904%

STA. 23+26.52 EL. 200.14 | STA. 25+21.24 EL. 200.68 | STA. 26+47.08 EL. 201.04

✱ LEFT WORKLINE GRADE DATA

(55'-3½" LEFT OF -L-)

✱ LEFT WORKLINE GRADE DATA SHOWN HAS BEEN DEVELOPED FOR THE PURPOSE OF MATCHING PROPOSED STRUCTURE TO EXISTING STRUCTURE AND CONSTRUCTION OF PROPOSED BRIDGE AND APPROACH SLABS. THE GRADE DATA SHOWN IS ONLY INTENDED FOR THE CONSTRUCTION OF PROPOSED STRUCTURE PORTIONS OF THIS PROJECT.

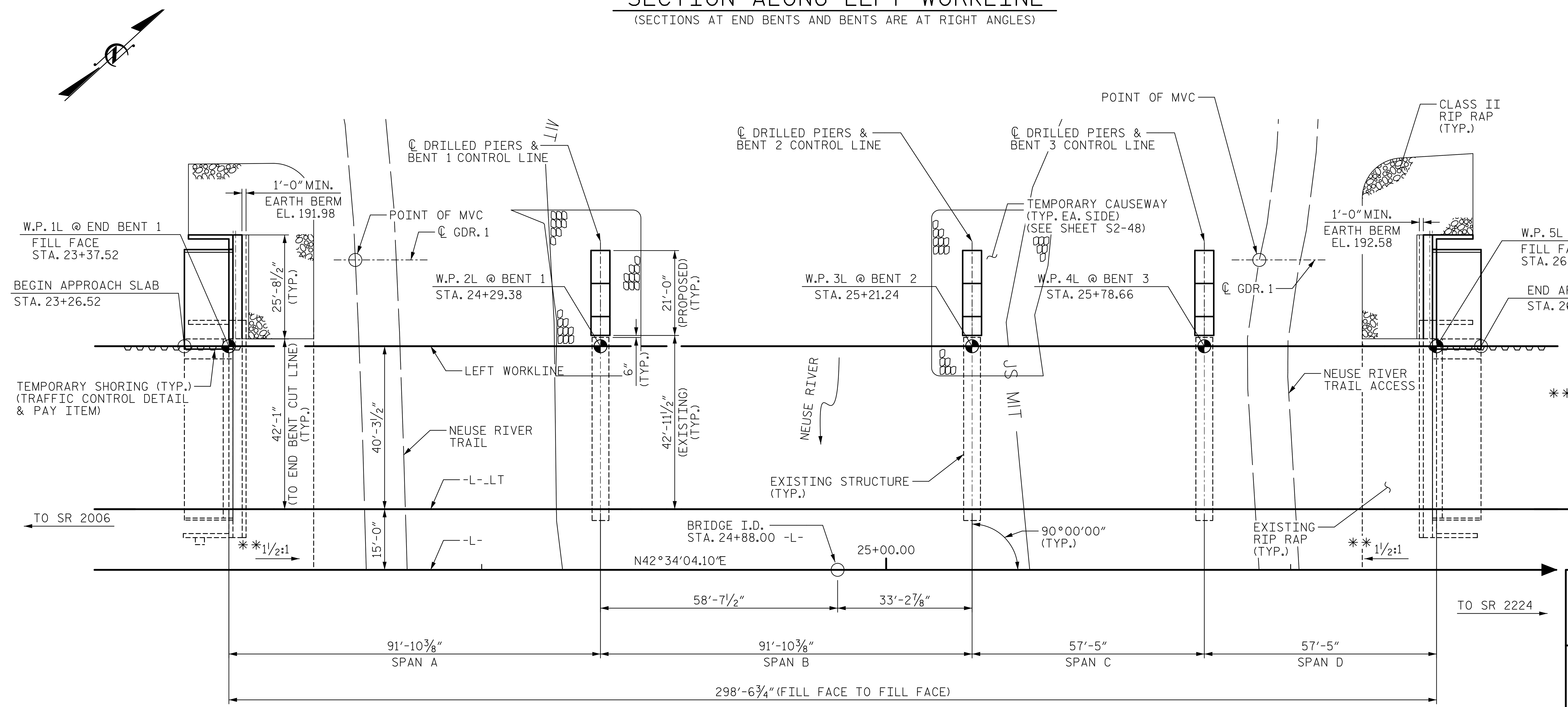
HYDROGRAPHIC DATA

DESIGN DISCHARGE = 9,220 CFS
FREQUENCY OF DESIGN FLOOD = 50 YRS.
DESIGN HIGH WATER ELEVATION = 192.2
DRAINAGE AREA = 835 SQ. MI.
BASE DISCHARGE (Q100) = 12,710 CFS
BASE HIGH WATER ELEVATION = 194.4

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 25,590 CFS
FREQUENCY OF OVERTOPPING FLOOD = 500± YRS.
OVERTOPPING FLOOD ELEVATION = 201.3

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



✱✱ MATCH EXISTING SLOPE, NOT TO EXCEED 1½:1 SLOPE NORMAL TO CAP

PLAN

(PILES NOT SHOWN FOR CLARITY)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 2 WIDENING AND REHABILITATION OF BRIDGE NOS. 910131

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STATE OF NORTH CAROLINA
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GENERAL DRAWING

BRIDGE OVER NEUSE RIVER ON US-401 BETWEEN SR 2006 AND SR 2224
(SOUTHBOUND LANES)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030474 JOHN C. MORRISON

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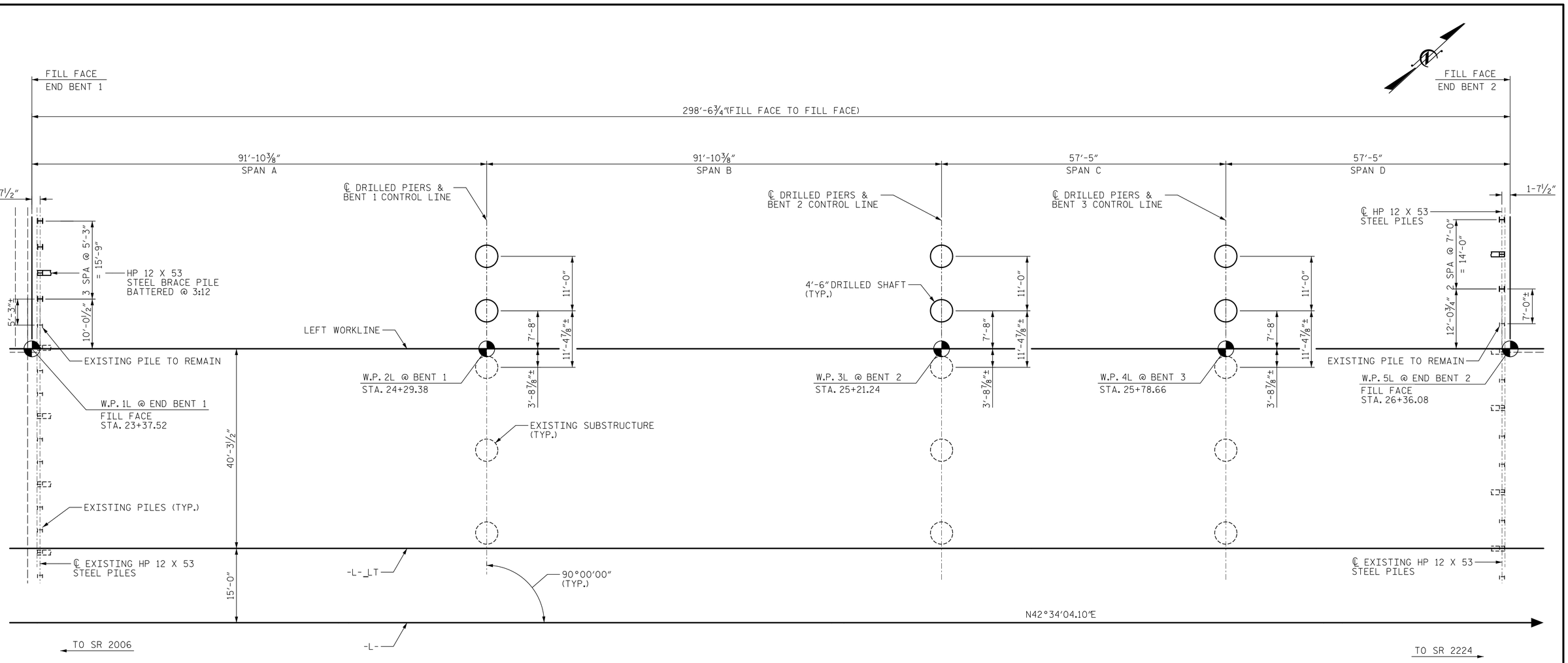
SHEET NO. S2-01
TOTAL SHEETS 119

DRAWN BY :	M.L. CATER	DATE :	12/2022
CHECKED BY :	J.C. MORRISON	DATE :	12/2022
DESIGNED BY :	D. RITACCO	DATE :	09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	09/2020



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO CENTERLINE OF PILES.

NOTES:

EXISTING PILE LOCATIONS ARE FROM AS-BUILT DRAWINGS.

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

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

INSTALL PERMANENT STEEL CASINGS AT BENT NO. 1 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 164.0.

INSTALL PERMANENT STEEL CASINGS AT BENT NO. 2 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 167.0.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

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RALEIGH

SUBSTRUCTURE

FOUNDATION LAYOUT

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-02
1			3			TOTAL SHEETS
2			4			119

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CHECKED BY :	J.C. MORRISON	DATE :	12/2022
DESIGNED BY :	B. LEROY	DATE :	10/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	10/2020

DATE: 2/9/2023
TIME: 12:58:59 PM

USER: cdrrm
DGN: pw:\\aecom-nc-pw.bentley.com:AECOM_DSD_NA_2020\Document\60609754-U-5748_Upon Mill\S00-CAD GIS\S00_CADD_NCDOT_TIP\Structures\04 Drawings\402_005_U-5748_SMU_FL_S2-02_S0031

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 1-4	97	192.47	30			165							
End Bent 2, Piles 1-3	83	194.10	45			140	4						

*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.

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-4	97			0.60			1.00
End Bent 2, Piles 1-3	83			0.60			1.00

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

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length per Pier Lin FT	Drilled Pier Length Not In Soil per Pier Lin FT	Drilled Pier Length In Soil per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT
Bent 1, Piers 1-2	456	143.0	30	162			12.3	22.9	YES	164.0	14.2
Bent 2, Piers 1-2	317	145.5	10	165			8.9	23.8	YES	167.0	11.2
Bent 3, Piers 1-2	310	141.5	10	171			6.0	36.5			

*Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

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	MAYBE	35	1		
End Bent 2	MAYBE	50			

*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.

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 1-4				YES	
End Bent 2, Piles 1-3				YES	
TOTAL QTY:				7	

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-2	MAYBE	MAYBE	183.5	MAYBE	
Bent 2, Piers 1-2	MAYBE	MAYBE	171.0	MAYBE	
Bent 3, Piers 1-2	MAYBE	MAYBE	220.0	MAYBE	
TOTAL QTY:	3	3	1149	3	

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Ryan P Doyle, PE#045161) on 02/09/2023.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for PDA Testing,SPTs, CSL Testing, and SID Inspections when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

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PILE AND DRILLED PIER FOUNDATION TABLES

(SOUTHBOUND LANES)

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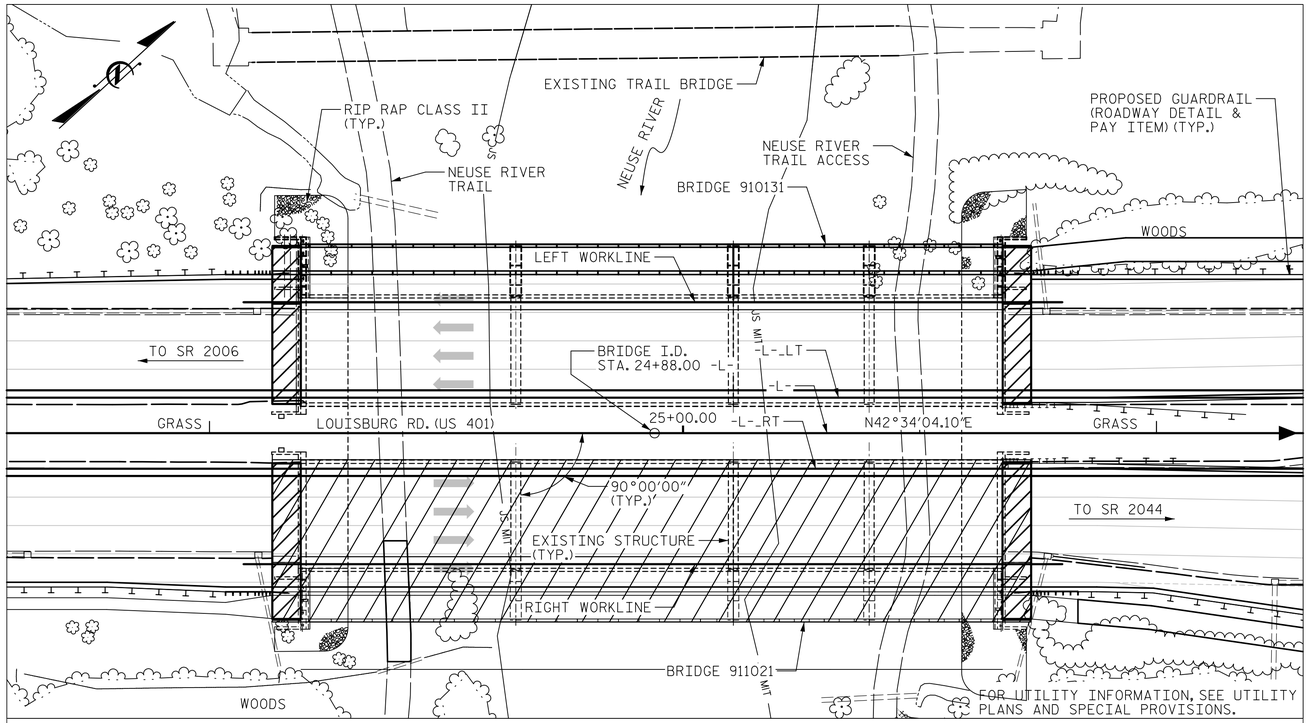
REVISIONS

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

SHEET NO. S2-03

TOTAL SHEETS 119

BENCHMARK: BM2; RR SPIKE IN 11"OAK; STA. 29+47.41 -L-, OFFSET 220.51' RT; N 777,257 E 2,140,288 EL. 198.37



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC-18 - EVALUATING SCOUR AT BRIDGES."

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF REINFORCED CONCRETE DECK SLAB.

TEMPORARY SHORING WILL BE REQUIRED FOR MAINTENANCE OF TRAFFIC FOR CONSTRUCTION OF END BENTS. FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

FOR FLOWABILE FILL (PRESERVATION), SEE SPECIAL PROVISIONS.

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

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THE EXISTING BRIDGE DECK WAS CONSTRUCTED USING 6,000 PSI CONCRETE AND PRESTRESSED CONCRETE GIRDERS HAVING A 28-DAY COMPRESSIVE STRENGTH OF 10,000 PSI.

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 WHATSOVEVER 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.

DIMENSIONS AND ELEVATIONS SHOWN FOR THE EXISTING STRUCTURE ARE FROM THE BEST INFORMATION AVAILABLE. IF FIELD CONDITIONS VARY FROM THE PLANS, MODIFICATIONS MAY BE MADE AS NECESSARY AS DIRECTED BY THE ENGINEER.

FOR LIMITS OF PARTIAL REMOVAL OF EXISTING STRUCTURE, SEE APPLICABLE SUPERSTRUCTURE AND SUBSTRUCTURE SHEETS.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED DOWELS IN PLACE OF EXPOSING AND RETAINING EXISTING STEEL IN THE DECK SLAB AND APPROACH SLAB. ANCHORED DOWELS SHALL MATCH SIZE AND SPACING OF EXISTING BARS CUT AND SHALL BE PLACED IN THE SAME HORIZONTAL PLANE. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS AS FOLLOWS:
#6 BARS: 26.4 KIPS
#4 BARS: 12.0 KIPS

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS AT STA. 24+88.00	REMOVAL OF EXISTING STRUCTURE AT STA. 24+88.00	ASBESTOS ASSESSMENT	4'-6" Ø DRILLED PIERS IN SOIL	4'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-6" DIA. DRILLED PIER	PDA TESTING	SID INSPEC-TION	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFOR-CING STEEL	SPIRAL COLUMN REINFORCING STEEL	FLOWABLE FILL (PRES.)	BRIDGE JACKING (TYPE II)	CLASS II SURFACE PREP.	CONCRETE DECK REPAIR FOR PC OVERLAY	45" PRESTRESSED CONCRETE GIRDERS		54" PRESTRESSED CONCRETE GIRDERS		EPOXY COATING CONCRETE GIRDER ENDS	EPOXY RESIN INJECTION	CONCRETE REPAIRS	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LF	EACH	EACH	EACH	EACH	SQ. FT.	SQ. FT.	SQ. FT.	LUMP SUM	LBS.	LBS.	CU. YD.	EACH	SQ. YD.	SQ. YD.	NO.	LIN. FT.	NO.	LIN. FT.	SQ. FT.	LIN. FT.	CU. FT.	EACH
SUPERSTRUCTURE											6,963	16,296.4						40	18	18	6	337'-6"	6	544'-2⅝"	550	110	1	
END BENT 1													16.1		2,520													4
BENT 1				45.8	24.6	28.4							27.8		7,949	2,813												
BENT 2				47.6	17.8	28.4							29.4		7,918	2,714												
BENT 3				73.0	12.0								20.8		8,283	2,993												
END BENT 2													14.8		2,612		1											3
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	166.4	54.4	50.8	1	3	3	3	6,963	16,296.4	108.9	LUMP SUM	29,282	8,520	1	40	18	18	6	337.50	6	544.22	550	110	1	7

	HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	TWO BAR METAL RAIL	CONCRETE BARRIER RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	EPOXY COATING AND DEBRIS REMOVAL	POLYESTER POLYMER CONCRETE MATERIALS	EPOXY POLYMER CONCRETE MATERIALS (ALTERNATE)	PLACING AND FINISHING FOR POLYMER CONC. OVERLAY	SHOTBLASTING BRIDGE DECK	SCARIFYING BRIDGE DECK	PLUG. OF EXIST. DECK DRAINS
	NO.	LIN. FT.	EA.	EA.	LIN. FT.	LIN. FT.	LIN. FT.	TON	SQ. YDS.	LUMP SUM	LUMP SUM	SQ. FT.	CU. YDS.	CU. YDS.	SQ. YDS.	SQ. YDS.	SQ. YDS.	EA.
SUPERSTRUCTURE					288.83	320.56	296.33			LUMP SUM	LUMP SUM		58.8	58.8	1,924.8	1,924.8	1,924.8	30
END BENT 1	4	120	4					112	124									
BENT 1																		
BENT 2																		
BENT 3																		
END BENT 2	3	135	3					122	135									
TOTAL	7	255	7	4	288.83	320.56	296.33	234	259	LUMP SUM	LUMP SUM	410	58.8	58.8	1,924.8	1,924.8	1,924.8	30

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

AECOM
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NEUSE RIVER ON US-401 BETWEEN SR2006 AND SR2224
(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-04
1			3			TOTAL SHEETS
2			4			119

DRAWN BY : M.L. CATER DATE : 12/2022
CHECKED BY : J.C. MORRISON DATE : 12/2022
DESIGNED BY : D. RITACCO DATE : 09/2020
DESIGN CHECKED BY : J.C. MORRISON DATE : 09/2020

DATE: 2/9/2023
TIME: 4:28:22 PM

USER: cafarm
DGN: I:\w\aecom-nc-pw.bentley.com\AECOM_DSGI_WA_2020\Documents\60609754-U-5748 Upn WW\900-CAD GIS\90-CADTO_NCDOT_TIP\Structural\04 Drawings\402_009_U-5748_SWU_LOC_S2-04_SHO13

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.17	--	1.75	0.930	1.18	B	EL	44.9	0.930	1.26	B	EL	26.7	0.80	0.930	1.17	A	EL	44.4	
		HL-93 (OPERATING)	N/A		1.53	--	1.35	0.930	1.53	B	EL	44.9	0.930	2.13	B	EL	81.4	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.35	48.60	1.75	0.930	1.53	D	EL	27.2	0.930	1.91	D	EL	38.3	0.80	0.930	1.35	B	EL	44.9	
		HS-20 (OPERATING)	36.000		1.99	71.64	1.35	0.930	1.99	D	EL	27.2	0.930	2.79	D	EL	43.9	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.18	42.93	1.40	0.930	4.13	D	EL	27.2	0.930	6.60	D	EL	43.9	0.80	0.930	3.18	B	EL	44.9	
		SNGARBS2	20.000		2.31	46.20	1.40	0.930	3.15	D	EL	27.2	0.930	4.80	D	EL	43.9	0.80	0.930	2.31	B	EL	44.9	
		SNAGRIS2	22.000		2.17	47.74	1.40	0.930	3.00	D	EL	27.2	0.930	4.50	D	EL	43.9	0.80	0.930	2.17	B	EL	44.9	
		SNCOTTS3	27.250		1.63	44.42	1.40	0.930	2.03	D	EL	27.2	0.930	3.12	D	EL	43.9	0.80	0.930	1.63	D	EL	27.2	
		SNAGGRS4	34.925		1.30	45.40	1.40	0.930	1.74	D	EL	27.2	0.930	2.54	D	EL	43.9	0.80	0.930	1.30	B	EL	44.9	
		SNS5A	35.550		1.30	46.22	1.40	0.930	1.70	D	EL	27.2	0.930	2.67	B	EL	17.5	0.80	0.930	1.30	B	EL	44.9	
		SNS6A	39.950		1.27	50.74	1.40	0.930	1.57	D	EL	27.2	0.930	2.49	D	EL	43.9	0.80	0.930	1.27	D	EL	27.2	
		SNS7B	42.000		1.20	50.40	1.40	0.930	1.49	D	EL	27.2	0.930	2.49	D	EL	43.9	0.80	0.930	1.20	D	EL	27.2	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.41	46.53	1.40	0.930	1.93	D	EL	27.2	0.930	2.90	B	EL	72.3	0.80	0.930	1.41	B	EL	44.9	
		TNT4A	33.075		1.41	46.64	1.40	0.930	1.93	D	EL	27.2	0.930	2.82	D	EL	43.9	0.80	0.930	1.41	B	EL	44.9	
		TNT6A	41.600		1.15	47.84	1.40	0.930	1.59	D	EL	27.2	0.930	2.51	B	EL	81.4	0.80	0.930	1.15	B	EL	44.9	
		TNT7A	42.000		1.15	48.30	1.40	0.930	1.61	D	EL	27.2	0.930	2.46	B	EL	8.4	0.80	0.930	1.15	B	EL	44.9	
		TNT7B	42.000		1.18	49.56	1.40	0.930	1.68	D	EL	27.2	0.930	2.33	B	EL	17.5	0.80	0.930	1.18	B	EL	44.9	
		TNAGRIT4	43.000		1.13	48.59	1.40	0.930	1.59	D	EL	27.2	0.930	2.23	D	EL	38.3	0.80	0.930	1.13	B	EL	44.9	
		TNAGT5A	45.000		1.07	48.15	1.40	0.930	1.49	D	EL	27.2	0.930	2.18	B	EL	72.3	0.80	0.930	1.07	B	EL	44.9	
		TNAGT5B	45.000	⟨3⟩	1.06	47.70	1.40	0.930	1.47	D	EL	27.2	0.930	1.96	D	EL	38.3	0.80	0.930	1.06	B	EL	44.9	1

LOAD FACTORS:

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

NOTES:

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

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

EXISTING GIRDERS ARE NOT INCLUDED IN THIS LRFR SUMMARY.

COMMENTS:

1. THE CONTROLLING RATING FACTOR OCCURS AT SPAN B, EXTERIOR GIRDER.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

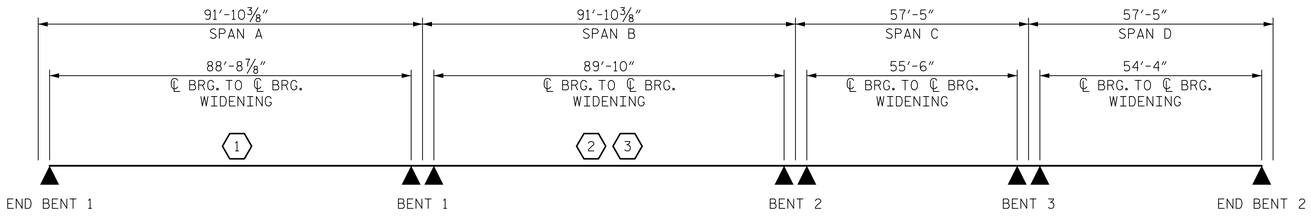
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

AECOM
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DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-05
1			3			TOTAL SHEETS
2			4			119

STD. NO. LRFR1

ASSEMBLED BY : D.R. DRUM DATE : 05/2021
CHECKED BY : J.C. MORRISON DATE : 05/2021

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV. 11/12/08RR	MAA/GM
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC

DATE: 2/9/2023
TIME: 1:25:22 PM

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2/9/2023
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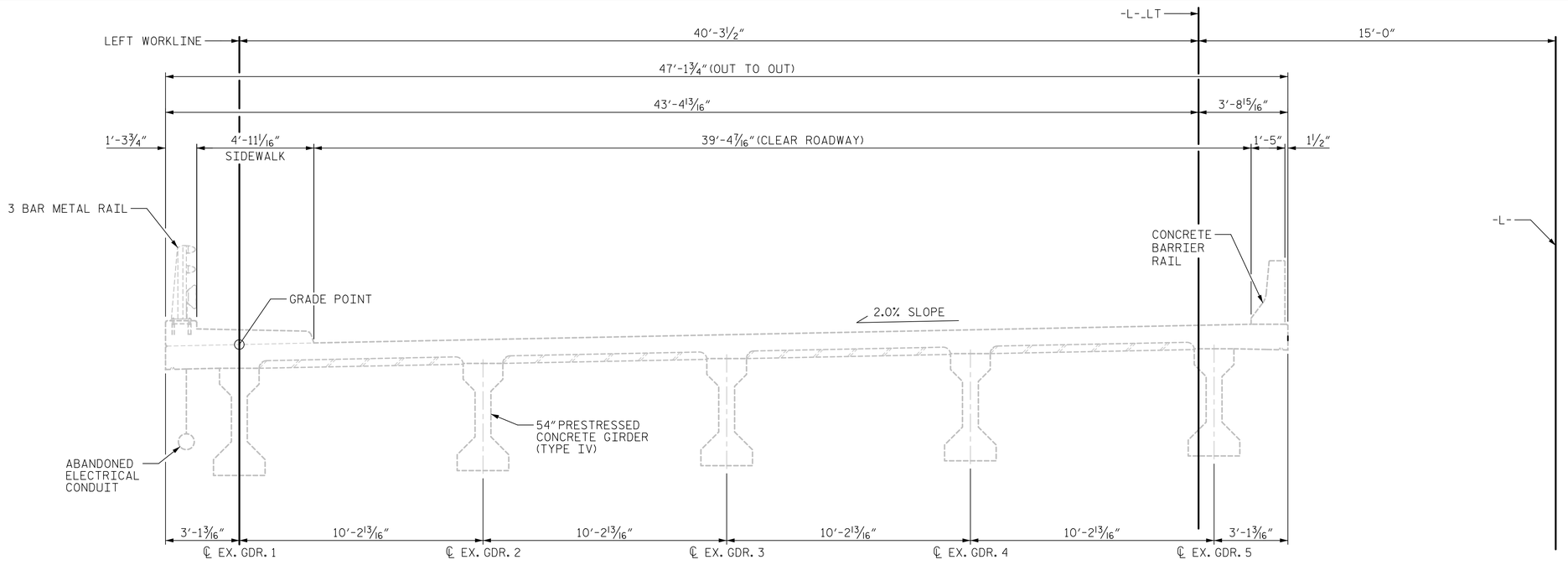
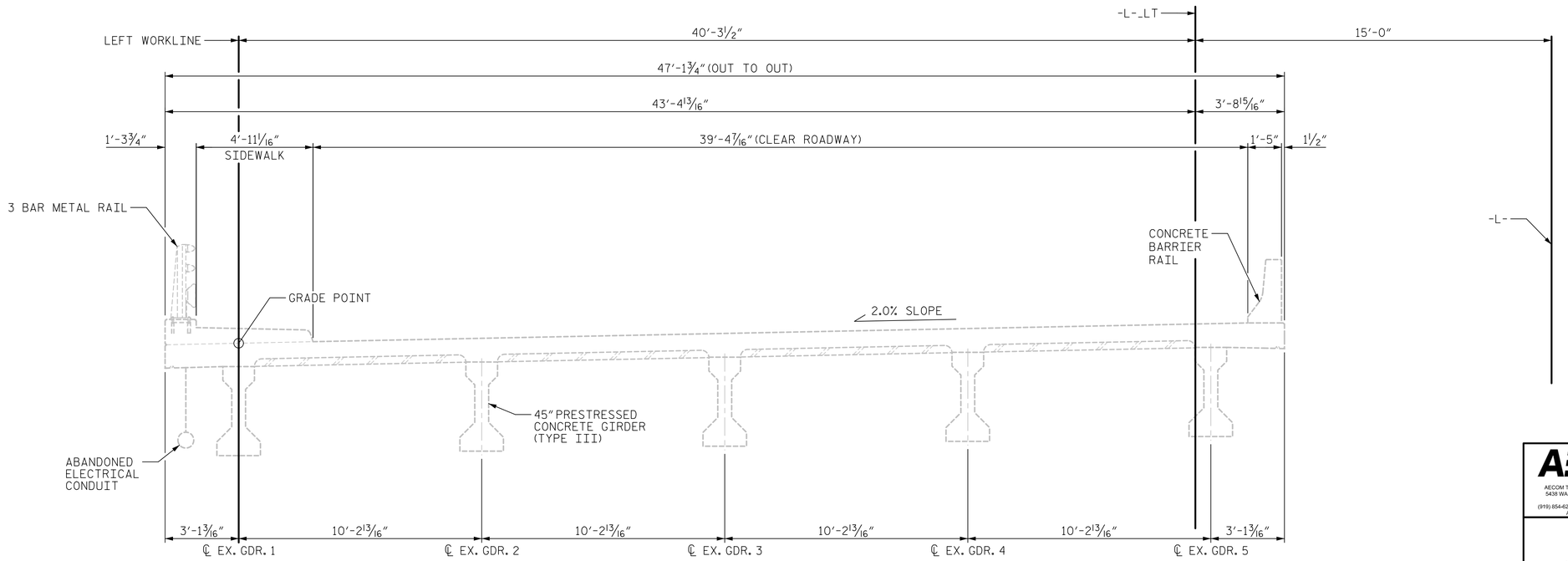


EXISTING STRUCTURE
(SPANS A & B)



EXISTING STRUCTURE
(SPANS C & D)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 4

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

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DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-06
1			3			TOTAL SHEETS
2			4			119

DRAWN BY :	M.L. CATER	DATE :	09/2020
CHECKED BY :	J.C. MORRISON	DATE :	09/2020
DESIGNED BY :	D. RITACCO	DATE :	09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	09/2020

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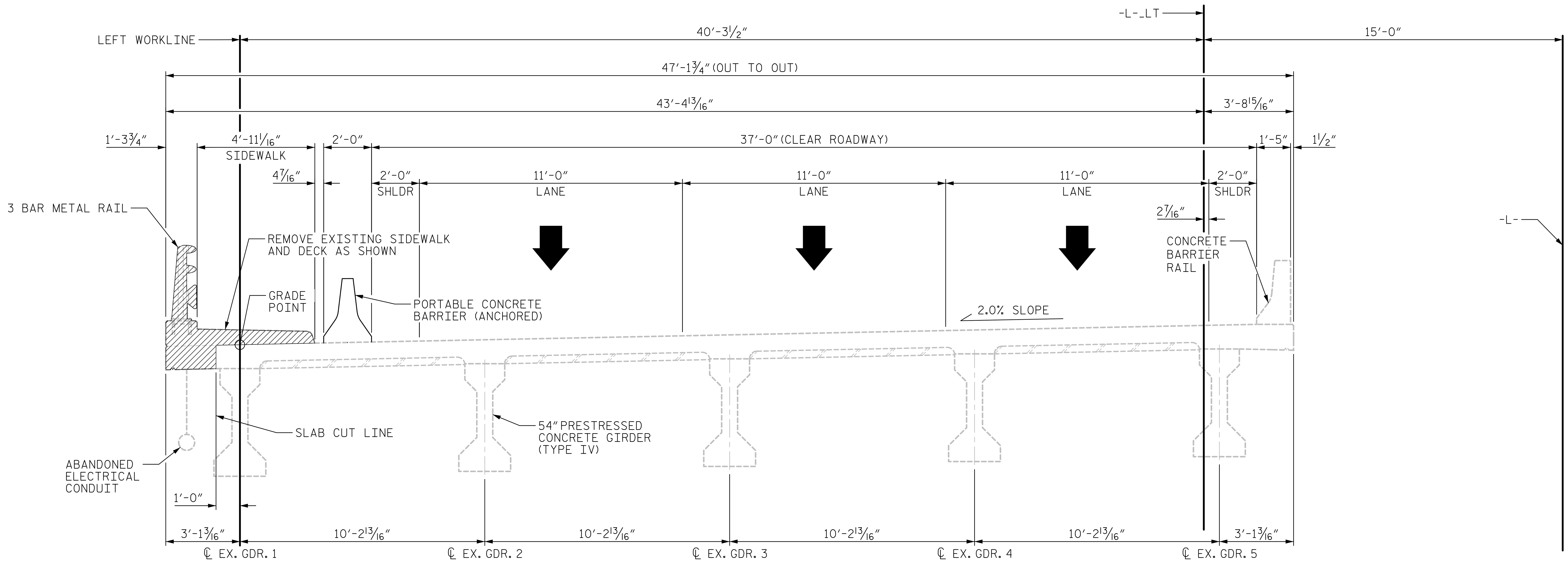
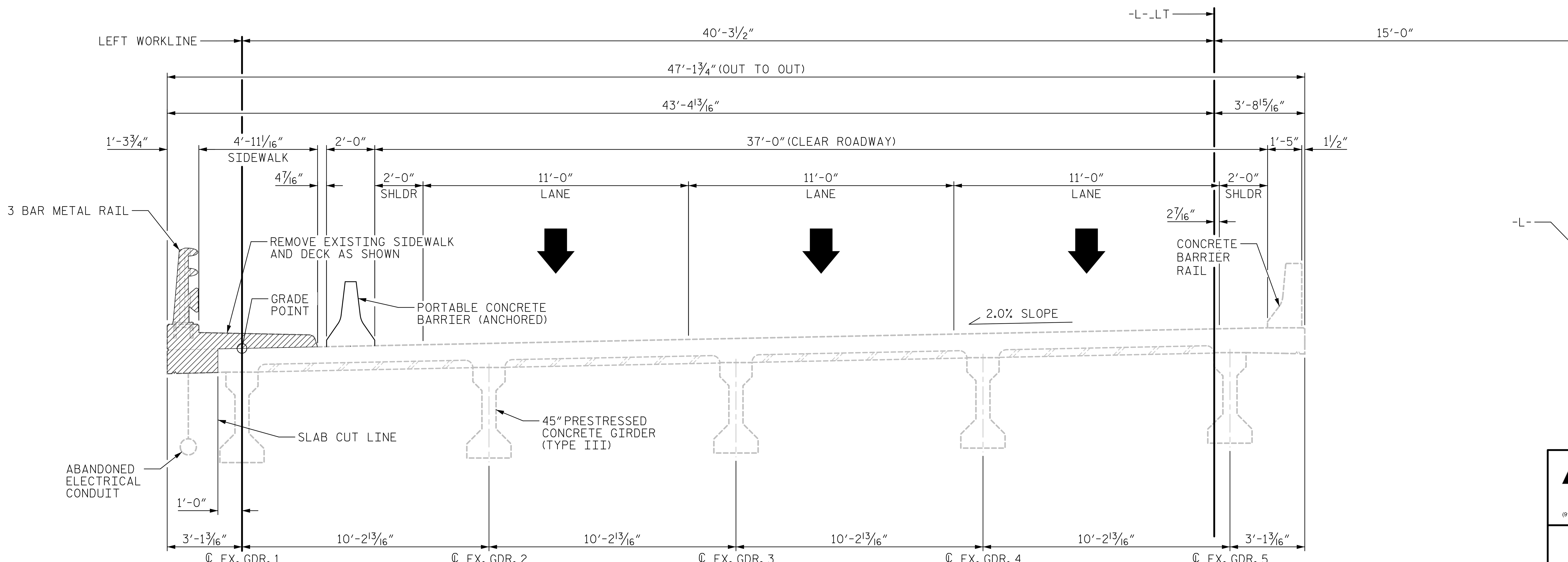
DGN: pw:\\aecom-nc-pwbentley.com:AECOM_DSD_NA_2020\Documents\60609754-U-5748 Upon Mill\900-CAD GIS\900_CADD_NCDOT_TIP\Structures\04 Drawings\402_013_U-5748_SMU_SE01_S2-06_3903



EXISTING STRUCTURE DEMOLITION

(SPANS A & B)



EXISTING STRUCTURE DEMOLITION

(SPANS C & D)

NOTES:

FOR PHASING OF TRAFFIC DURING STAGE I & II CONSTRUCTION SEQUENCE, SEE TRAFFIC MANAGEMENT PLANS.

STAGING NOTES:

1. PLACE PORTABLE CONCRETE BARRIER (ANCHORED). SHIFT TRAFFIC INTO LANE CONFIGURATION SHOWN.
2. CUT AND REMOVE EXISTING SIDEWALK, SLAB, AND 3 BAR METAL RAIL TO THE LIMITS SHOWN.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 4

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DEPARTMENT OF TRANSPORTATION
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CONSTRUCTION SEQUENCE

(SOUTHBOUND LANES)

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S2-07
1			3					TOTAL SHEETS
2			4					119

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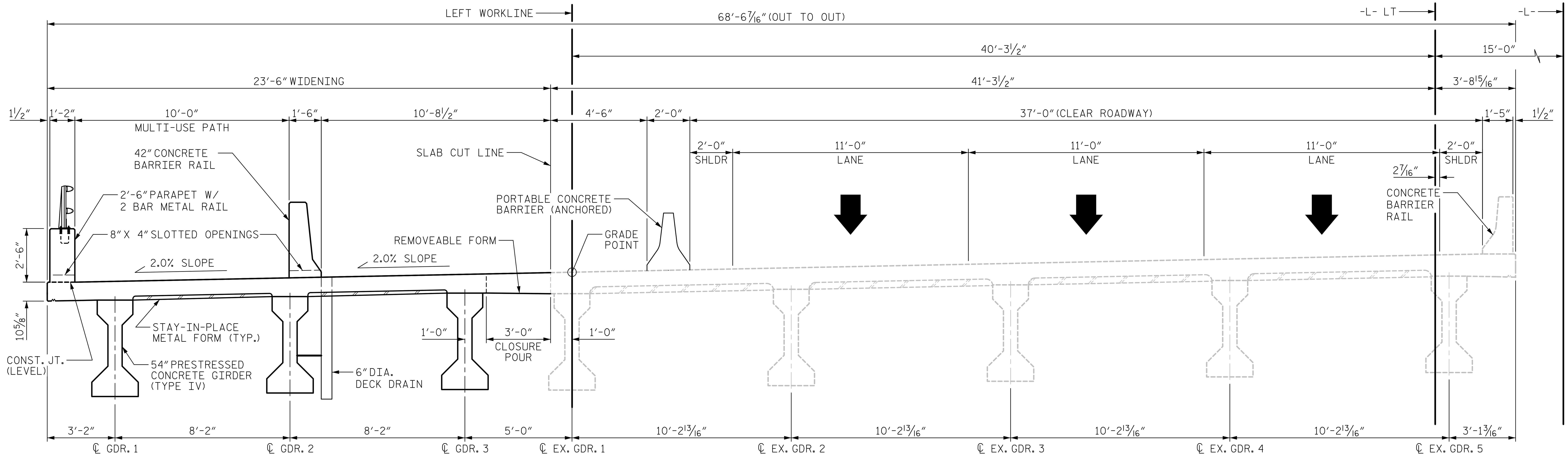
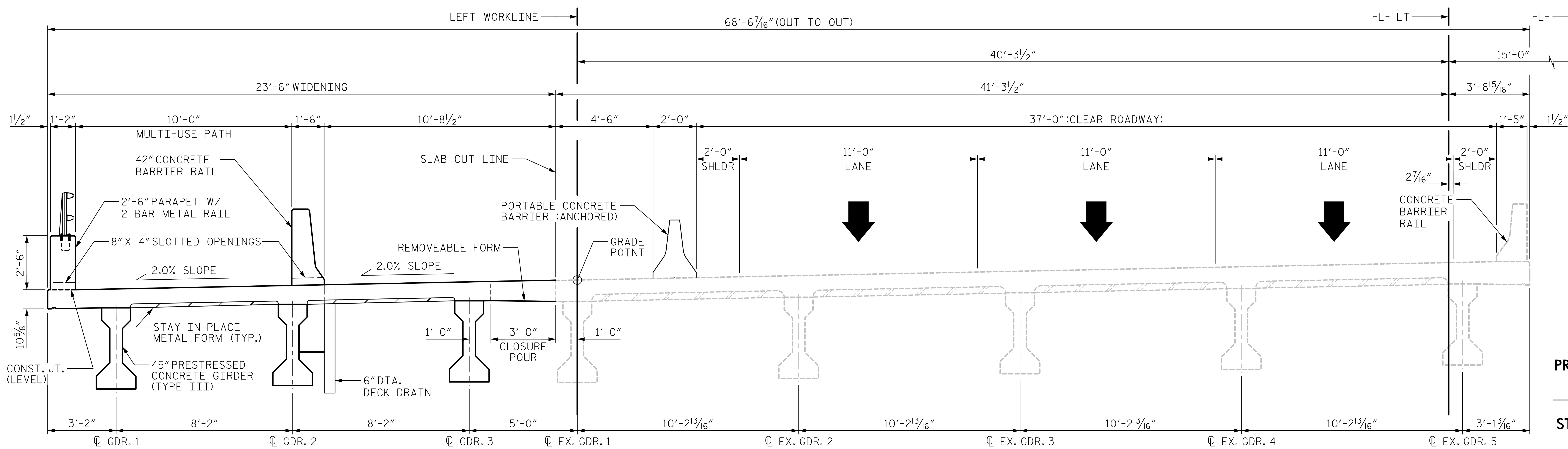
CHECKED BY :	J.C. MORRISON	DATE :	09/2020
DESIGNED BY :	D. RITACCO	DATE :	09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	09/2020



PROPOSED STRUCTURE WIDENING

(SPANS A & B)



PROPOSED STRUCTURE WIDENING

(SPANS C & D)

NOTES:

FOR PHASING OF TRAFFIC DURING EXISTING STRUCTURE DEMOLITION AND PROPOSED STRUCTURE WIDENING, SEE TRAFFIC MANAGEMENT PLANS.

STAGING NOTES:

1. CONSTRUCT WIDENING BEHIND PORTABLE BARRIER (ANCHORED).
2. ONCE COMPLETED, REMOVE PORTABLE CONCRETE BARRIER (ANCHORED).
3. SHIFT TRAFFIC AS SPECIFIED TO PERFORM FOAM JOINT SEAL REPLACEMENT AND INSTALLATION, AND PERFORM PC OVERLAY PER REHABILITATION PLANS.
4. OPEN TRAFFIC TO FINAL CONFIGURATION.

CONSTRUCTION SEQUENCE NOTES

THE FOLLOWING ITEMS SHALL BE PERFORMED IN THIS ORDER. OTHER ITEMS MAY BE PERFORMED AT ANY TIME IN ACCORDANCE WITH THE CONTRACT, EXCEPT AS NOTED IN PLANS OR SPECIAL PROVISIONS.

1. BEARING REPLACEMENT (SEE PRESERVATION SHEETS)

2. BRIDGE SUPERSTRUCTURE WIDENING, CLOSURE POUR AND SUBSEQUENT SUPERSTRUCTURE WORK (INCLUDING SAW-CUTTING THE JOINTS, EXCEPT INSTALLATION OF FOAM JOINT SEALS).

3. DECK AND APPROACH SLAB MILLING, PC OVERLAY AND GROOVING WITHIN ROADWAY AREA.

4. SAW-CUTTING OF DECK (WITHIN EXISTING BRIDGE AREA) AND INSTALLATION OF FOAM JOINT SEALS AT ALL JOINTS.

COORDINATE STRUCTURE PLANS WITH TMP PLANS.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 3 OF 4

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE

(SOUTHBOUND LANES)

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
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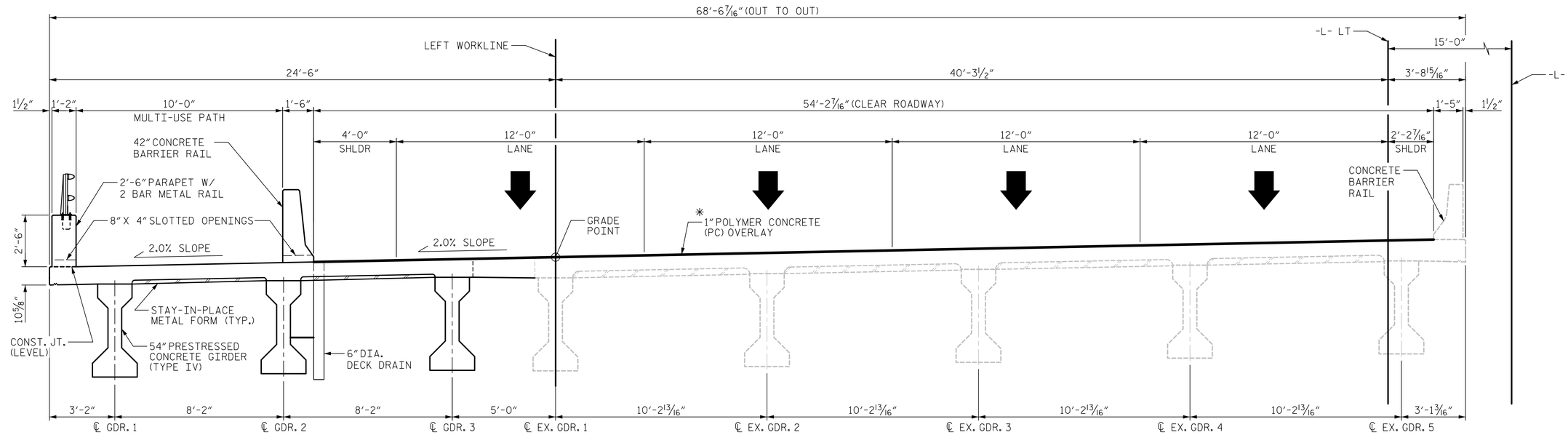
CHECKED BY : J.C. MORRISON	DATE : 09/2020
DESIGNED BY : D. RITACCO	DATE : 09/2020
DESIGN CHECKED BY : J.C. MORRISON	DATE : 09/2020

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

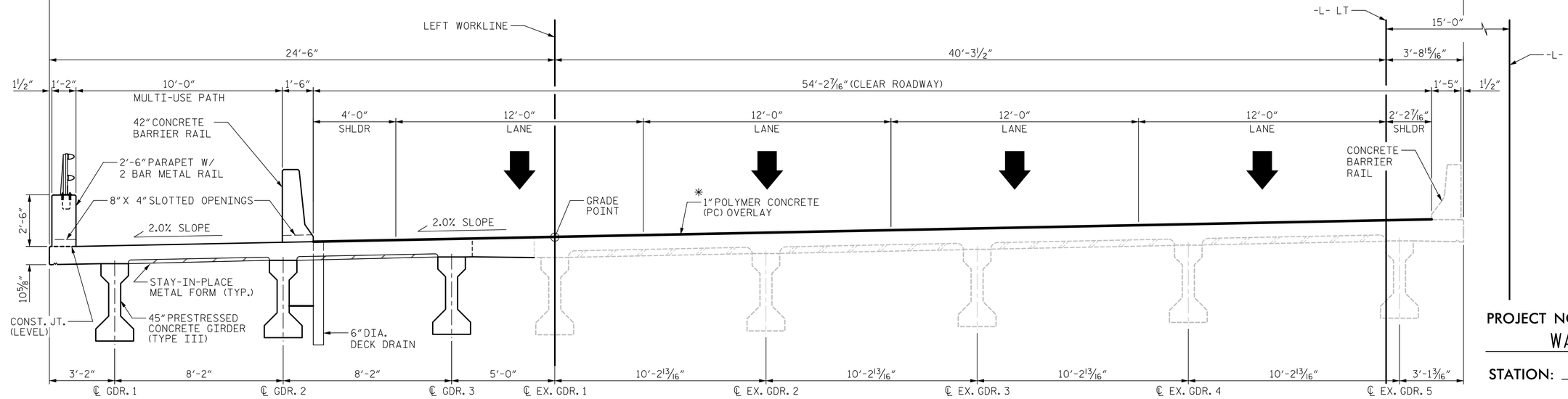
SHEET NO. S2-08

TOTAL SHEETS 119



* FOR STAGING OF DECK SURFACE PREPARATION AND PC OVERLAY, SEE TMP PLANS, PRESERVATION PLANS AND SPECIAL PROVISIONS.

FINAL CONDITION
(SPANS A & B)



* FOR STAGING OF DECK SURFACE PREPARATION AND PC OVERLAY, SEE TMP PLANS, PRESERVATION PLANS AND SPECIAL PROVISIONS.

FINAL CONDITION
(SPANS C & D)

TYPICAL SECTION NOTES:

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

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

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

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

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

FOR LOCATION OF DECK DRAINS AND 8″ X 4″ SLOTTED OPENINGS IN BARRIER RAIL AND PARAPET, SEE "CONSTRUCTION SEQUENCE" SHEET 3 OF 4.

FOR DECK DRAIN LOCATIONS, SEE "TYPICAL SECTIONS" SHEET 2 OF 3.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILD-UPS.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-09
1			3			TOTAL SHEETS
2			4			119

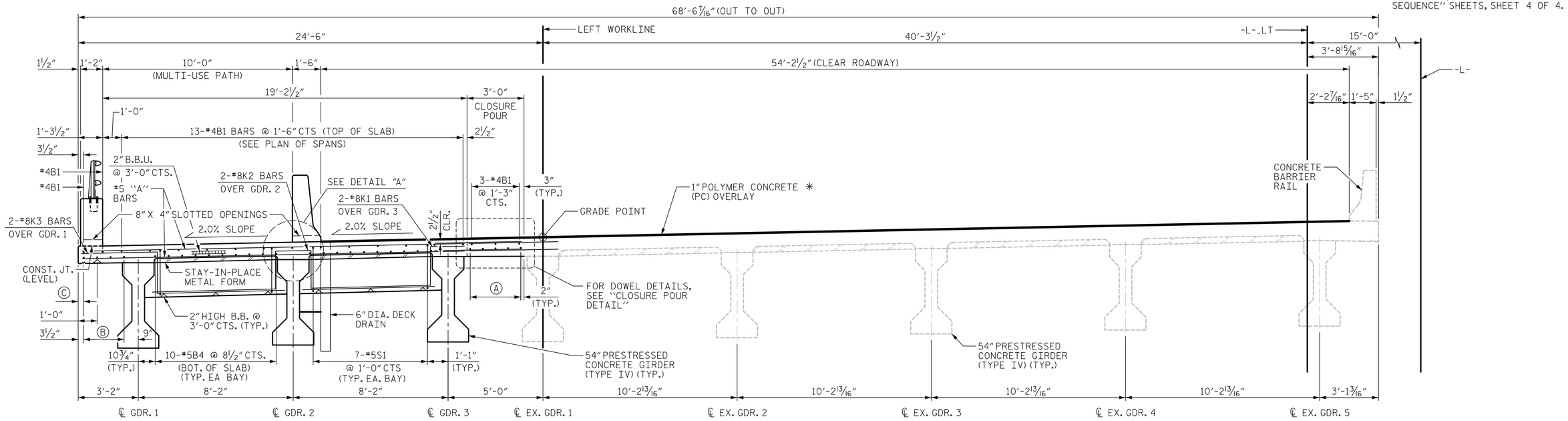
PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 4 OF 4

DATE: 2/9/2023
TIME: 10:00:05 PM

USER: cater.m
DGN: pw:\\aecom-nc-pwbentley.com:AECOM_DS2_WA_2020\Documents\60609754-U-5748_Ugpn MIN\900-CAD GIS\90_CADD_NCDOT_TIP\Structures\04 Drawings\402_09_U-5748_SWJ_SEQ4_S2-09_3003

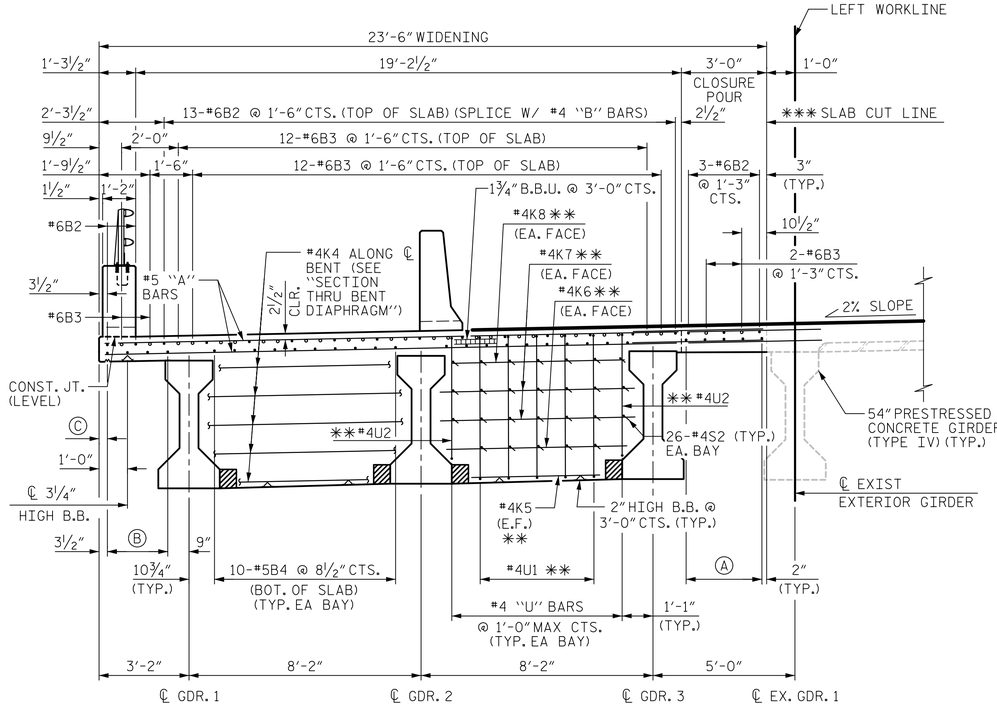
FOR NOTES, SEE "CONSTRUCTION SEQUENCE" SHEETS, SHEET 4 OF 4.



*** PRIOR TO DECK REMOVAL, THE CONTRACTOR SHALL SUBMIT METHOD OF REMOVAL OF EXISTING DECK TO SLAB CUT LINE AS SHOWN IN PLANS. CONTRACTOR SHALL ENSURE MEASURES ARE TAKEN TO PROTECT DECK REINFORCING STEEL DURING REMOVAL OPERATIONS.

TYPICAL SECTION

(END BENT 1 & BENT 2)
(SPAN A & SPAN B)



** (TYP. EA BAY)

PARTIAL TYPICAL SECTION

(BENT 1)

"B" BAR KEY

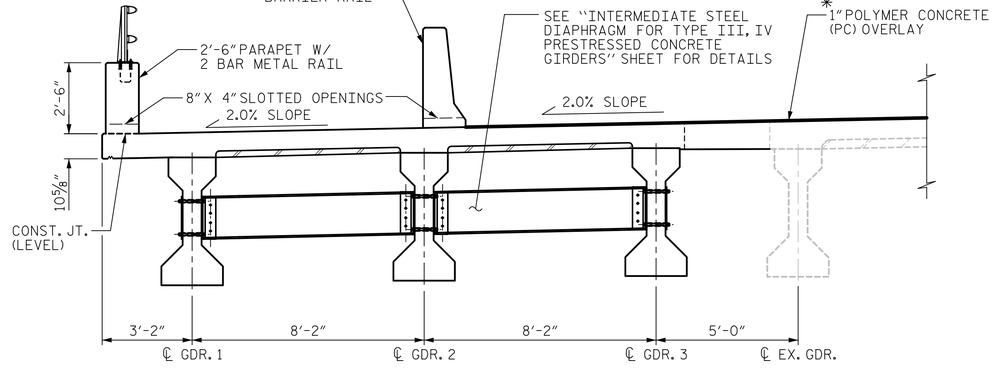
- ● = CONTINUOUS BAR RUN
- ○ = NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE "PLAN OF SPAN" SHEETS

Ⓐ 5-#5B4 @ 8" CTS. (BOT. OF SLAB) (4 BAR RUN)

Ⓑ 4-#5B4 @ 8 1/2" CTS. (BOT. OF SLAB) (4 BAR RUN) (TYP. EA. OVERHANG)

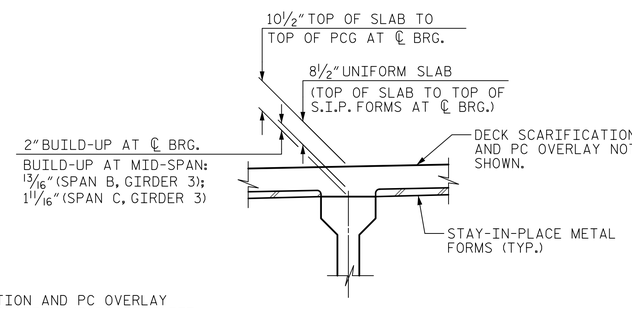
Ⓒ 3 1/2" TO ℄ 2 - 1" Δ DRIP GROOVES

* DECK SCARIFICATION AND PC OVERLAY INSTALLED AFTER WIDENING IS COMPLETE (IN ROADWAY PORTION ONLY). CONSTRUCT DECK SLAB TO FULL THICKNESS SHOWN. SEE PRESERVATION PLANS.



PARTIAL TYPICAL SECTION

(INTERMEDIATE DIAPHRAGMS)
(ALL SPANS)



DETAIL "A"

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

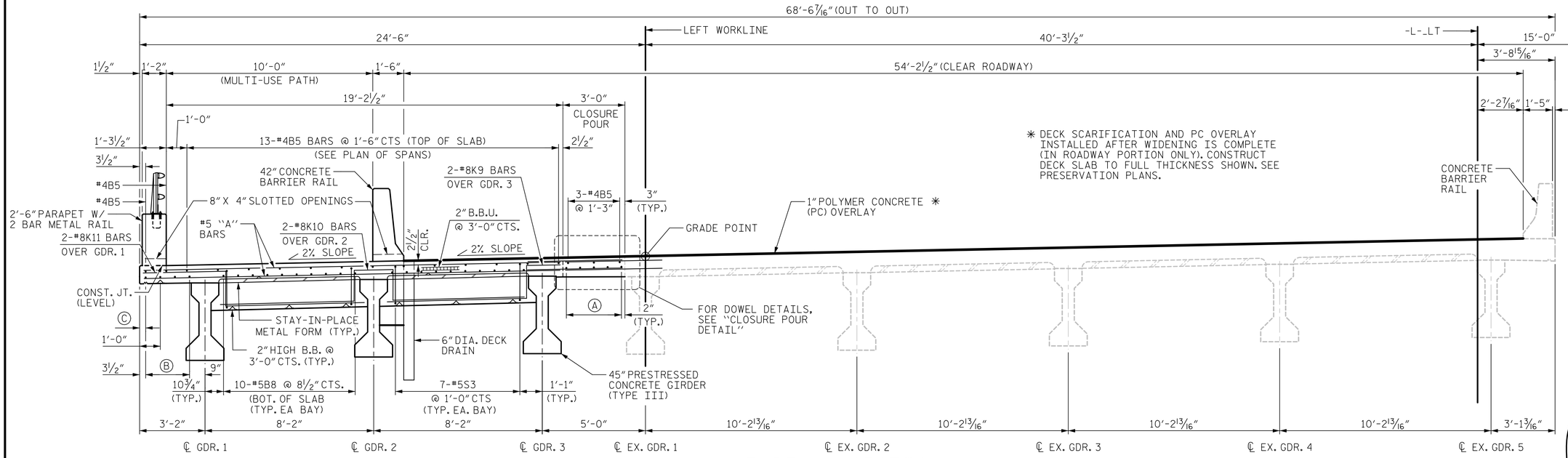
SUPERSTRUCTURE

TYPICAL SECTIONS

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-10
1			3			TOTAL SHEETS
2			4			119

FOR NOTES, SEE "CONSTRUCTION SEQUENCE" SHEETS, SHEET 4 OF 4.

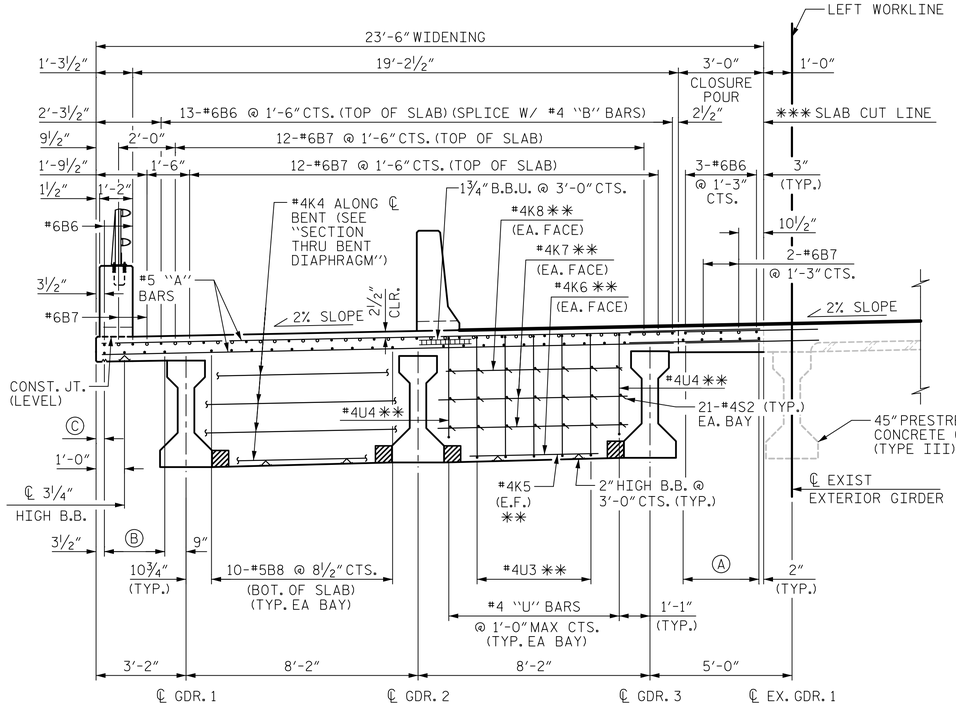


* DECK SCARIFICATION AND PC OVERLAY INSTALLED AFTER WIDENING IS COMPLETE (IN ROADWAY PORTION ONLY). CONSTRUCT DECK SLAB TO FULL THICKNESS SHOWN. SEE PRESERVATION PLANS.

*** PRIOR TO DECK REMOVAL, THE CONTRACTOR SHALL SUBMIT METHOD OF REMOVAL OF EXISTING DECK TO SLAB CUT LINE AS SHOWN IN PLANS. CONTRACTOR SHALL ENSURE MEASURES ARE TAKEN TO PROTECT DECK REINFORCING STEEL DURING REMOVAL OPERATIONS.

TYPICAL SECTION

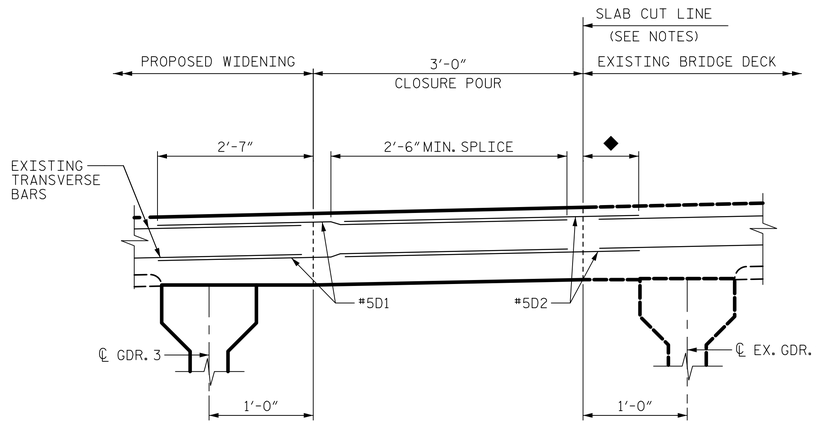
(END BENT 2 & BENT 2)
(SPAN C & SPAN D)



** (TYP. EA BAY)

PARTIAL TYPICAL SECTION

(BENT 3)



CLOSURE POUR DETAIL

(ALL SPANS)

◆ #6D2 DOWELS PLACED IN THE EXISTING DECK SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM. LEVEL ONE FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE DOWEL IS 13.2 KIPS. OVERALL LENGTH SHALL PROVIDE A 2'-6" MIN. EXTENSION INTO CLOSURE POUR. EMBEDMENT LENGTH TO BE DETERMINED BY THE MANUFACTURER OF THE ADHESIVELY ANCHORED ANCHOR SYSTEM. #6D2 BAR LENGTH IS BASED ON A 10" EMBEDEMENT LENGTH. ADHESIVELY ANCHORED DOWEL TESTING SHALL BE IN ACCORDANCE WITH SECTION 420-13 OF THE STANDARD SPECIFICATIONS.

#6D1 AND #6D2 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

Ⓐ 5-#5B8 @ 8" CTS. (BOT. OF SLAB) (2 BAR RUN)

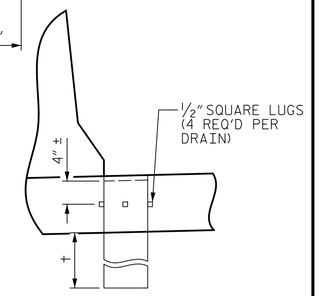
Ⓑ 4-#5B8 @ 8 1/2" CTS. (BOT. OF SLAB) (2 BAR RUN) (TYP. EA. OVERHANG)

Ⓒ 3 1/2" TO ℄ 2 - 1"Δ DRIP GROOVES

"B" BAR KEY

● = CONTINUOUS BAR RUN

○ = NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE "PLAN OF SPAN" SHEETS



DECK DRAIN DETAILS

† DRAIN TO EXTEND 2" BELOW BOTTOM OF GIRDER (SEE "PLAN OF SPANS" FOR LOCATION OF DECK DRAINS)

TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.

4 - 1/2" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" DIA. PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 3

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RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-11
1			3			TOTAL SHEETS
2			4			119

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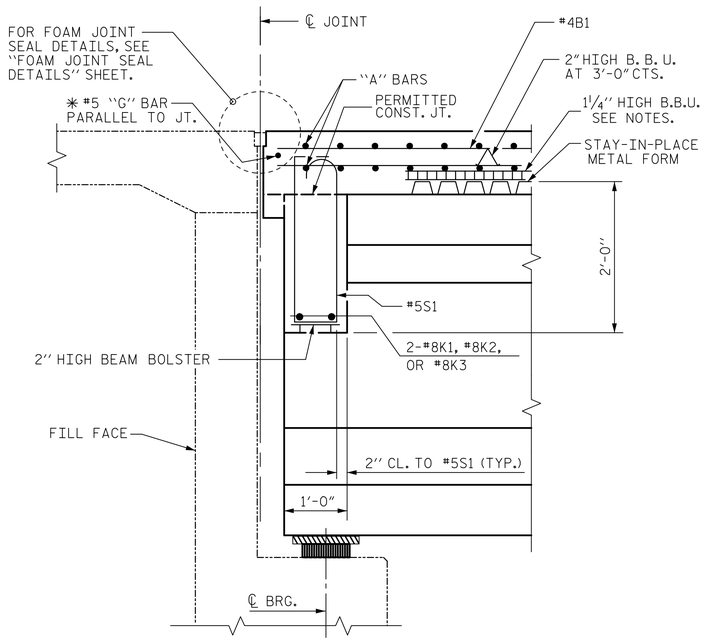
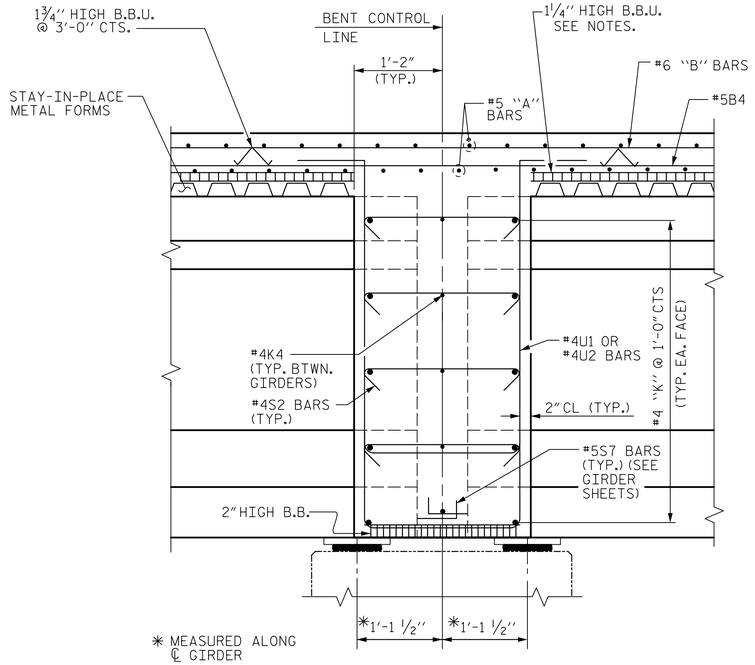
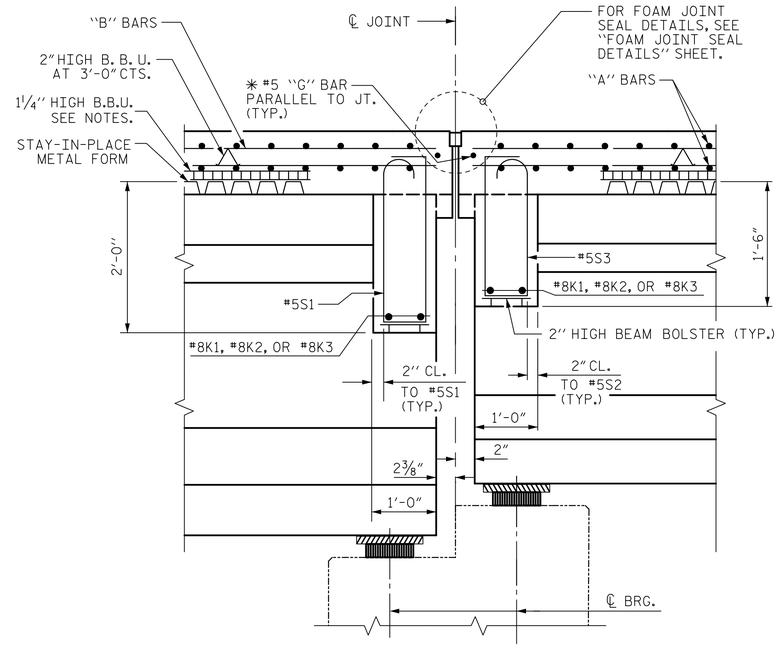


SECTION THRU END BENT 1 DIAPHRAGM

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



SECTION THRU BENT 1 DIAPHRAGM



SECTION THRU BENT 2 DIAPHRAGM

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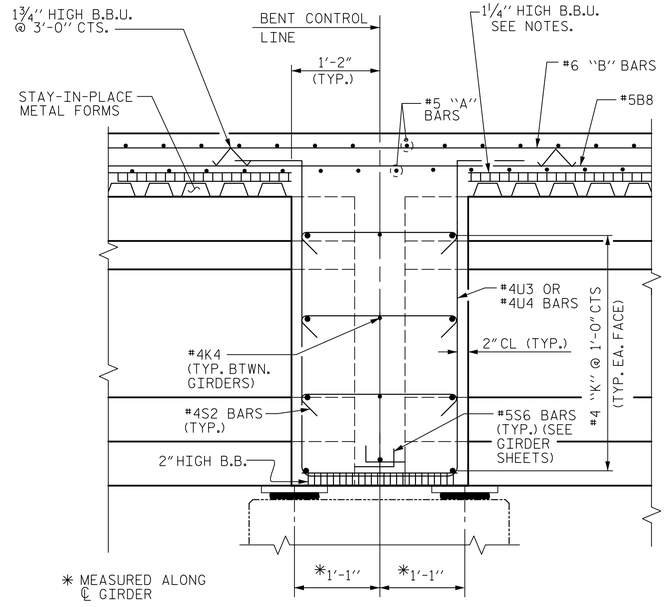

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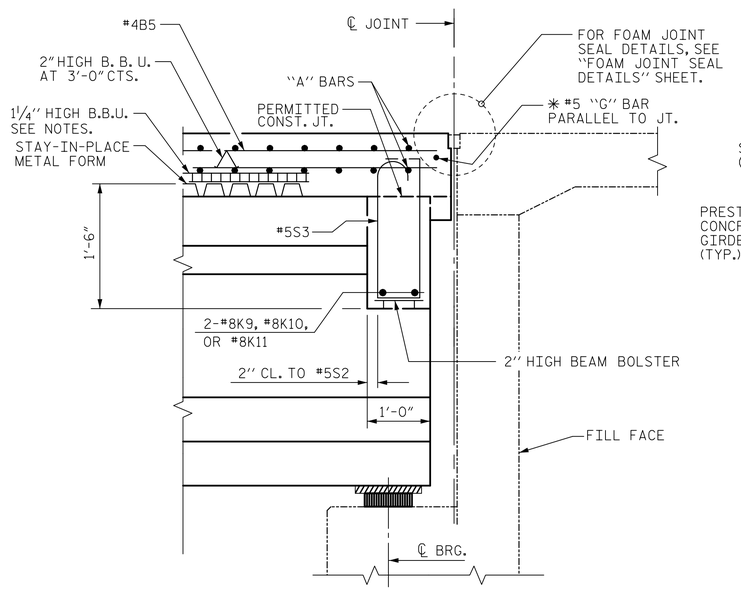

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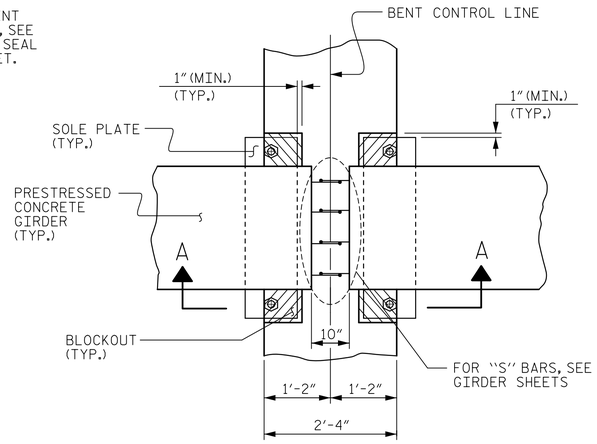
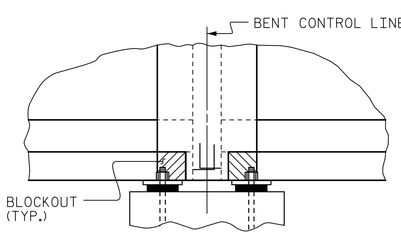


PLAN

BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION A-A

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 3 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-12
1			3			TOTAL SHEETS
2			4			119

6" DIA. DECK DRAIN LOCATIONS

12 TOTAL LOCATIONS AT STA. 23+62, 23+67, 23+82, 23+87, 23+97, 24+07, 25+53, 25+63, 25+73, 25+89, 26+05, AND 26+12

PLAN OF SPAN "A"

(1) 4-#5B4 @ 8 1/2" CTS. (BOT. OF SLAB) (4 BAR RUN)

(2) 5-#5B4 @ 8" CTS. (BOT. OF SLAB) (4 BAR RUN)

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 1 OF 4

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SUPERSTRUCTURE

PLAN OF SPAN "A"

(SOUTHBOUND LANES)

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SHEET NO. S2-13
TOTAL SHEETS 119

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PLAN OF SPAN "B"

① 4-#5B4 @ 8 1/2" CTS.
(BOT. OF SLAB) (4 BAR RUN)

② 5-#5B4 @ 8" CTS.
(BOT. OF SLAB) (4 BAR RUN)

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

SHEET 2 OF 4

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SUPERSTRUCTURE

PLAN OF SPAN "B"

(SOUTHBOUND LANES)

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

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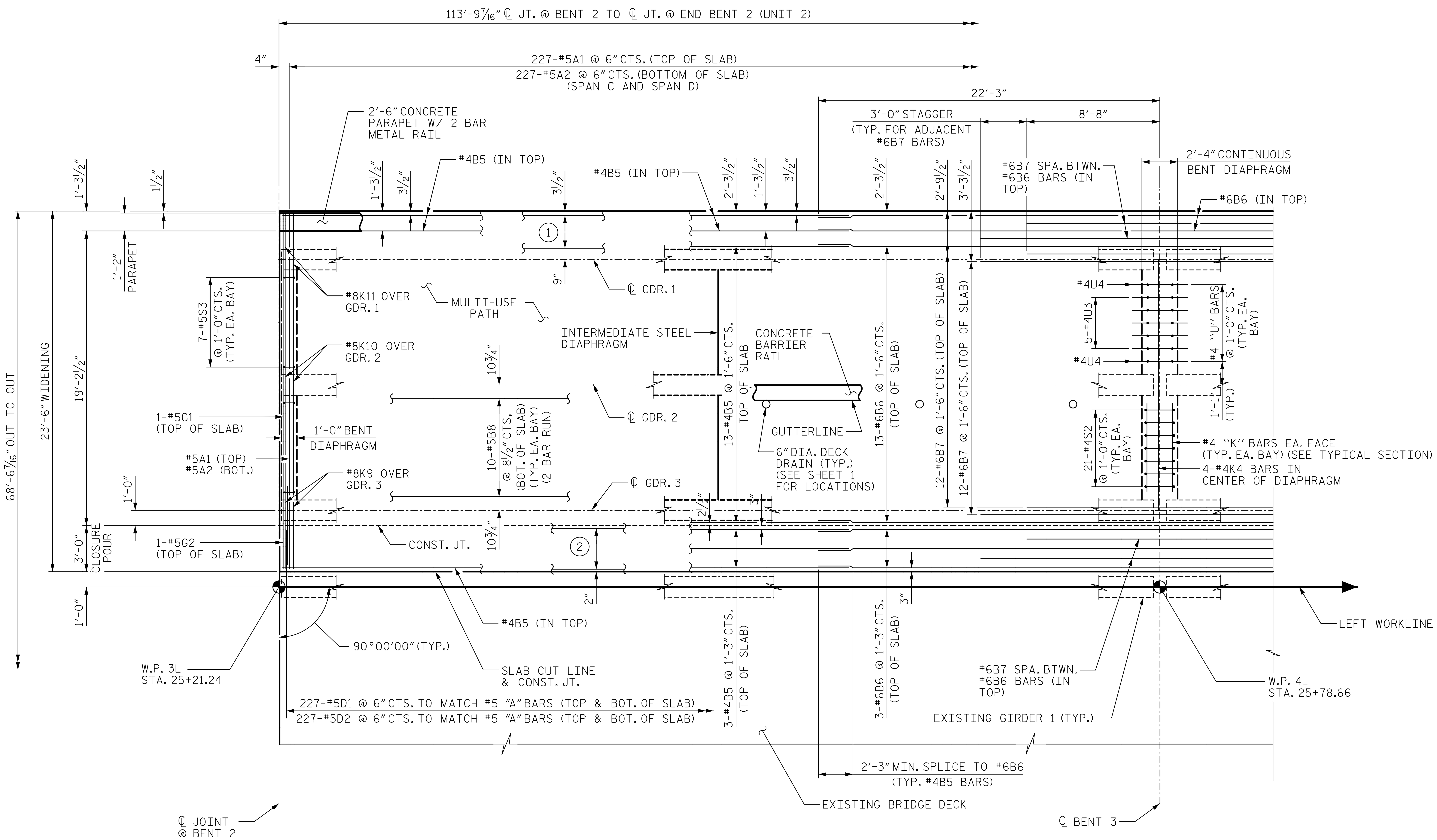
2			4		

SHEET NO. S2-14
TOTAL SHEETS 119



PLAN OF SPAN "C"

1. 4-#5B8 @ 8½" CTS. (BOT. OF SLAB) (2 BAR RUN)
2. 5-#5B8 @ 8" CTS. (BOT. OF SLAB) (2 BAR RUN)

PROJECT NO. U-5748

WAKE COUNTY

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SHEET 3 OF 4

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SUPERSTRUCTURE

PLAN OF SPAN "C"

(SOUTHBOUND LANES)

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SHEET NO. S2-15

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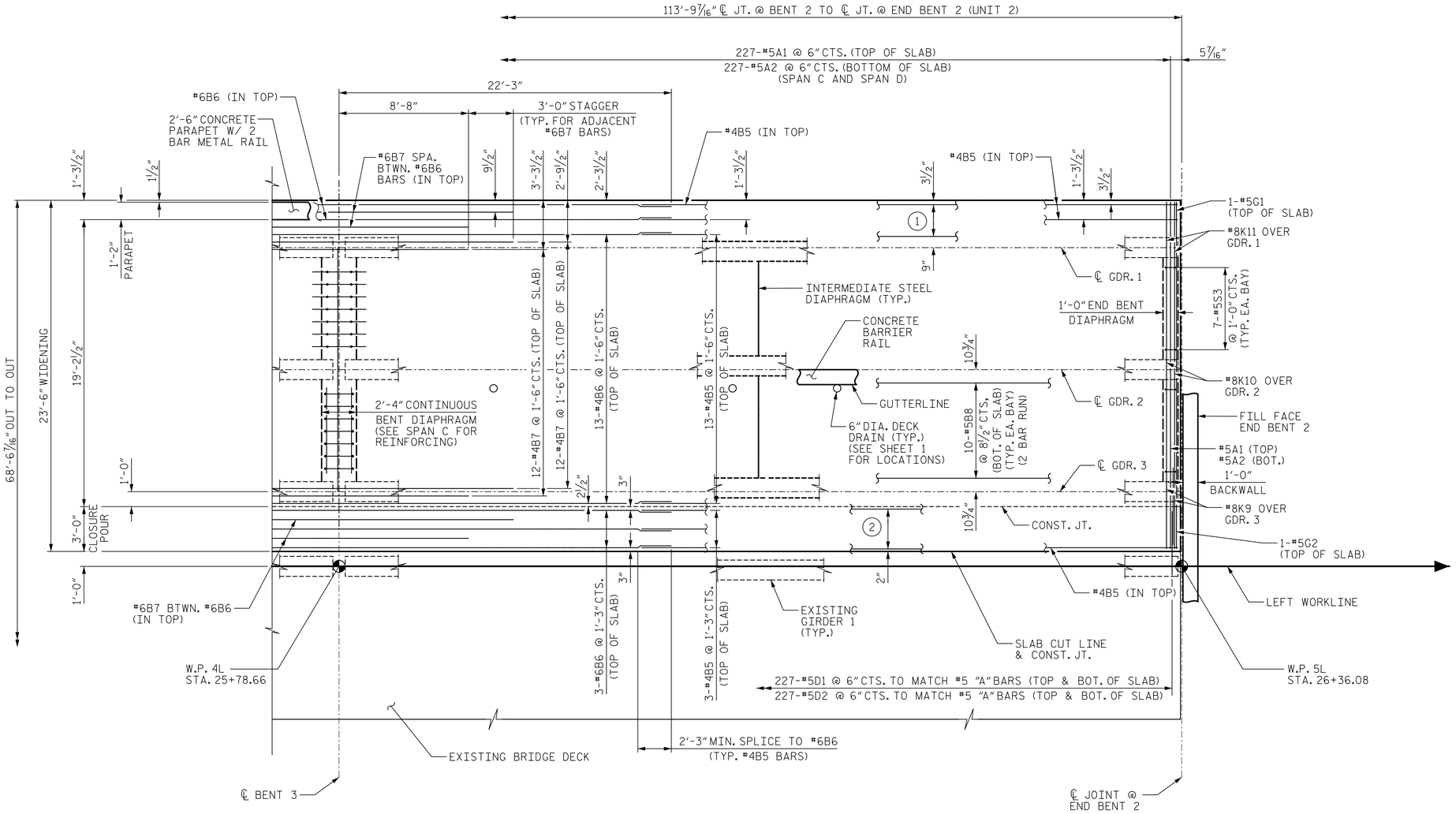

PLAN OF SPAN "D"

(1) 4-#5B8 @ 8 1/2" CTS. (BOT. OF SLAB) (2 BAR RUN)

(2) 5-#5B8 @ 8" CTS. (BOT. OF SLAB) (2 BAR RUN)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 4 OF 4

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SUPERSTRUCTURE

PLAN OF SPAN "D"

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
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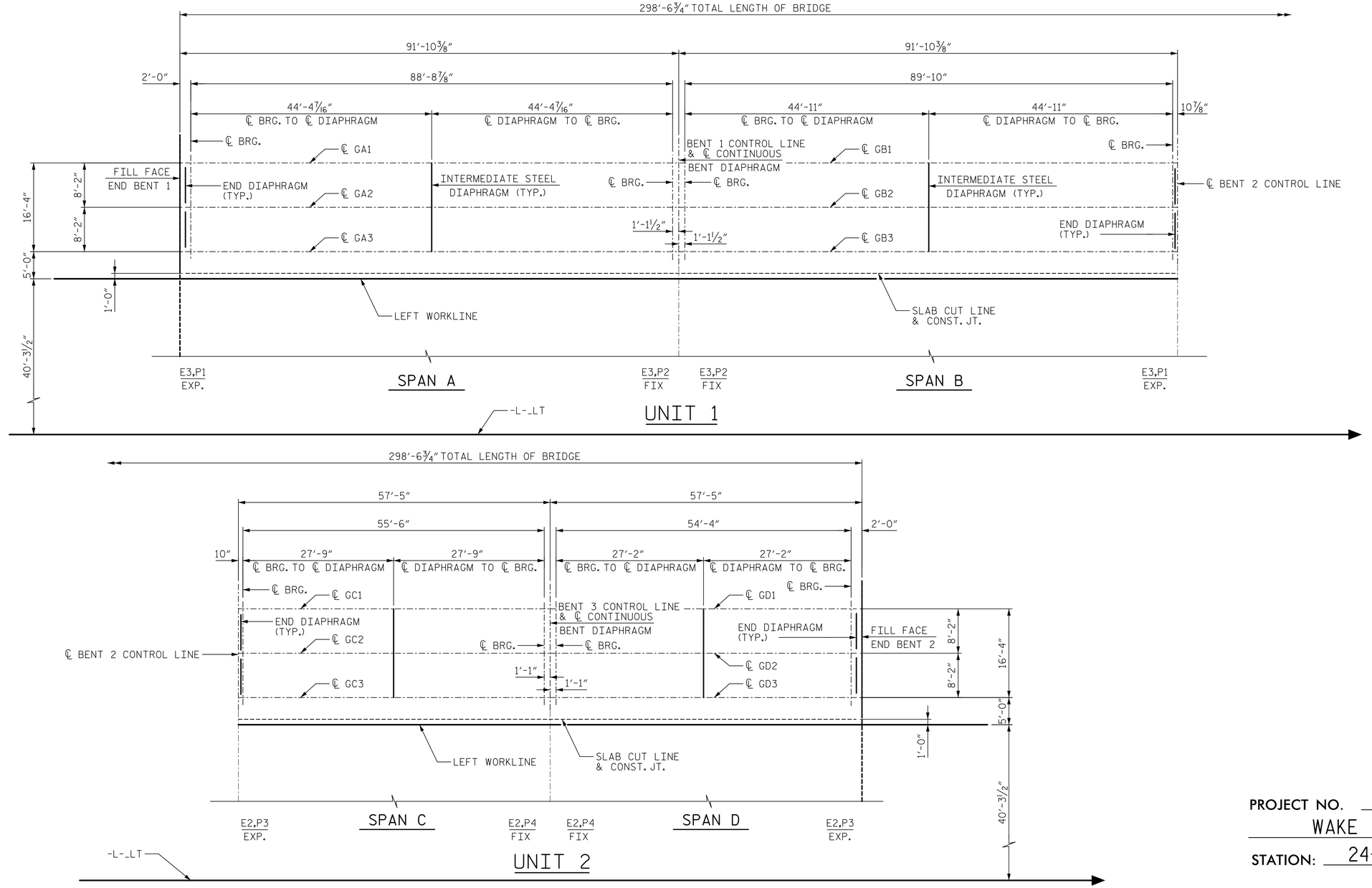
DESIGNED BY :	D. RITACCO	DATE :	09/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	10/2020



PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

AECOM
AECOM TECHNICAL SERVICES OF NC, INC.
5438 WADE PARK BOULEVARD, SUITE 200
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

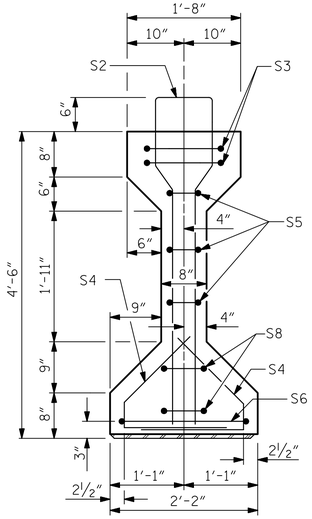
SUPERSTRUCTURE

FRAMING PLAN

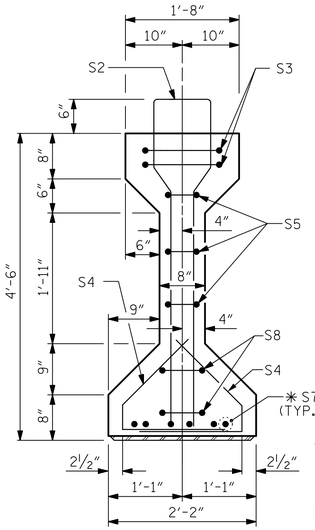
(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-17
1			3			TOTAL SHEETS
2			4			119

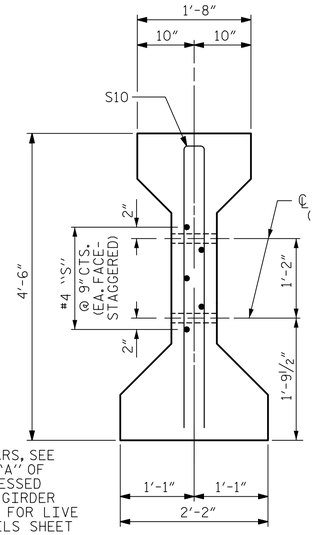
DRAWN BY : M. CATER DATE : 12/2022
CHECKED BY : J.C. MORRISON DATE : 12/2022
DESIGNED BY : S. NATARAJAN DATE : 12/2022
DESIGN CHECKED BY : J.C. MORRISON DATE : 12/2022



SECTION A-A



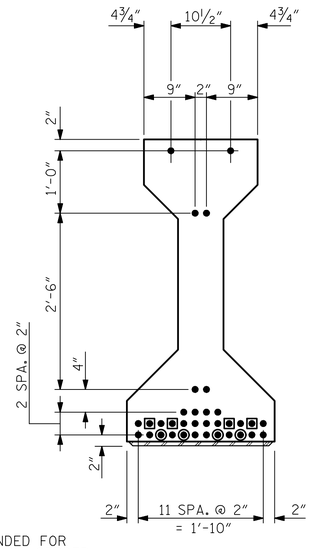
SECTION B-B



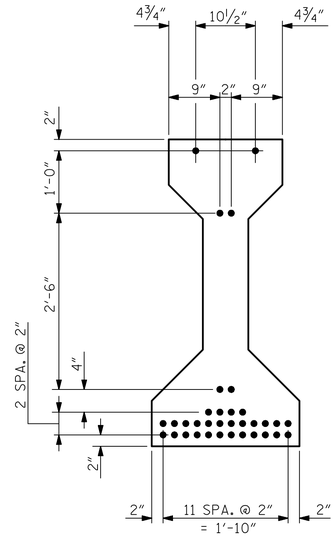
SECTION C-C

(S1 BARS NOT SHOWN)

✳ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



AT END OF GIRDER

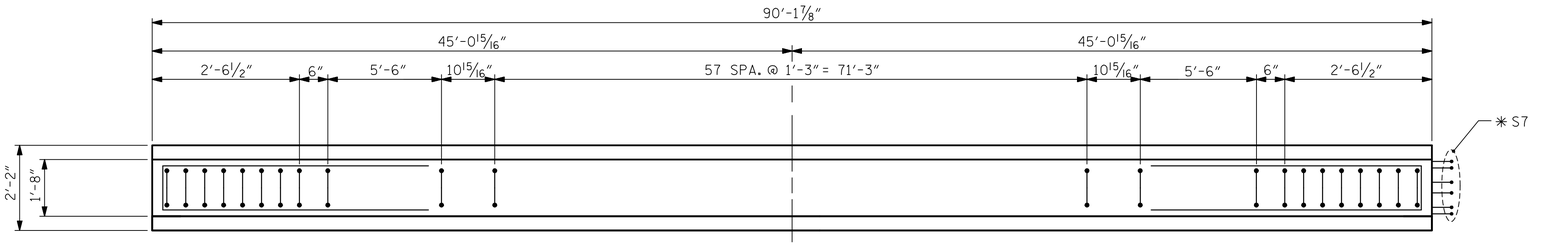


AT ℄ OF GIRDER

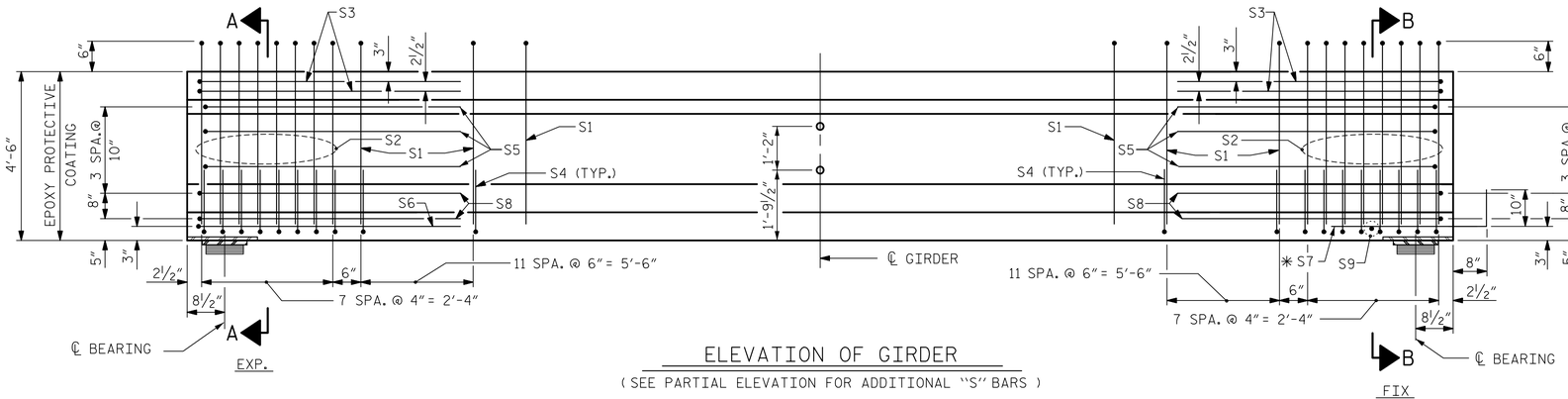
● STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

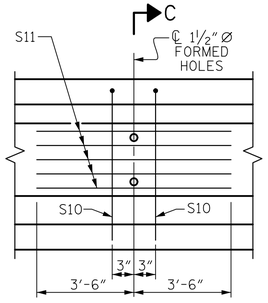


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1, 2 & 3

0.6" Ø L. R. GRADE 270 STRANDS

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

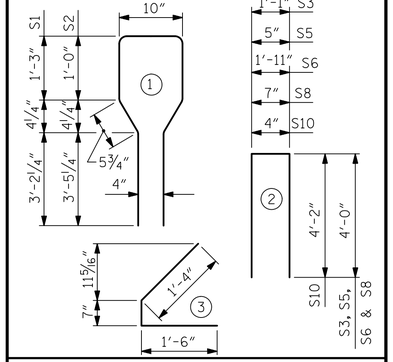
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	74	#4	1	10'-8"	527
S2	16	#6	1	10'-8"	256
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✳S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
GIRDER 1, 2 & 3	1,119	18.3	34

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	90'-1⅞"	270'-5⅝"

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 5

AECOM
AECOM TECHNICAL SERVICES OF NC, INC.
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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD

SPAN A

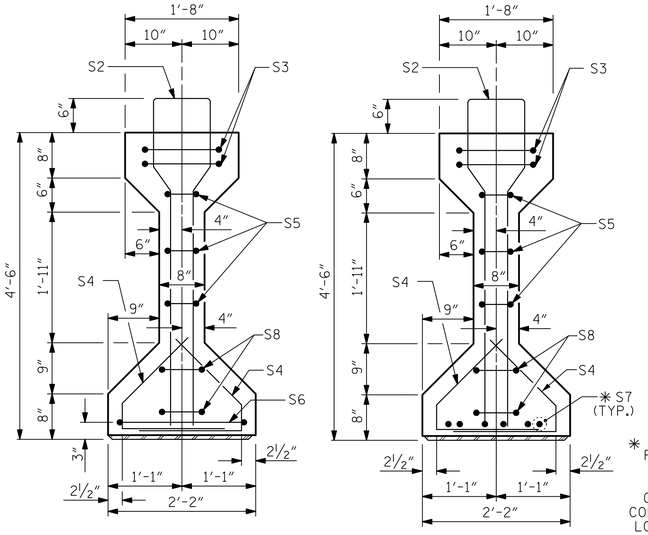
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-18
1			3			TOTAL SHEETS
2			4			119

ASSEMBLED BY : M. CATER DATE : 10/2020
CHECKED BY : J.C. MORRISON DATE : 05/2021

DRAWN BY : ELR 8/91
CHECKED BY : GRP 8/91

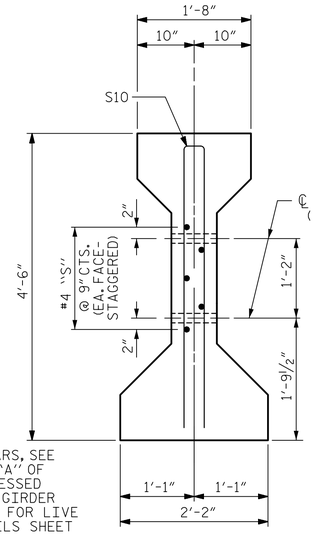
REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
REV. 12/17 MAA/THC

STD. NO. PCG6



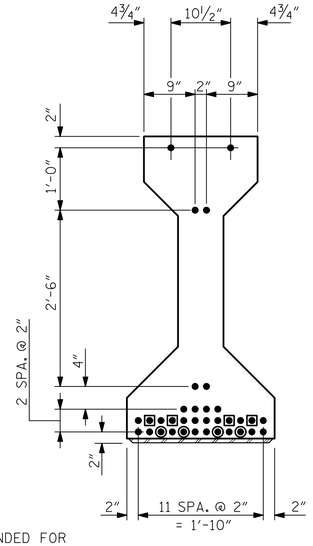
SECTION A-A

SECTION B-B

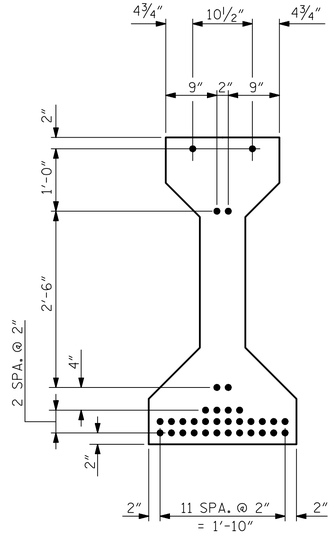


SECTION C-C
(S1 BARS NOT SHOWN)

✳ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



AT END OF GIRDER



AT ℄ OF GIRDER

● STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

0.6" Ø L. R. GRADE 270 STRANDS

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

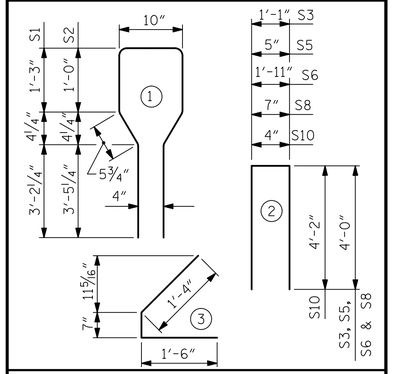
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	75	#4	1	10'-8"	534
S2	16	#6	1	10'-8"	256
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✳S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

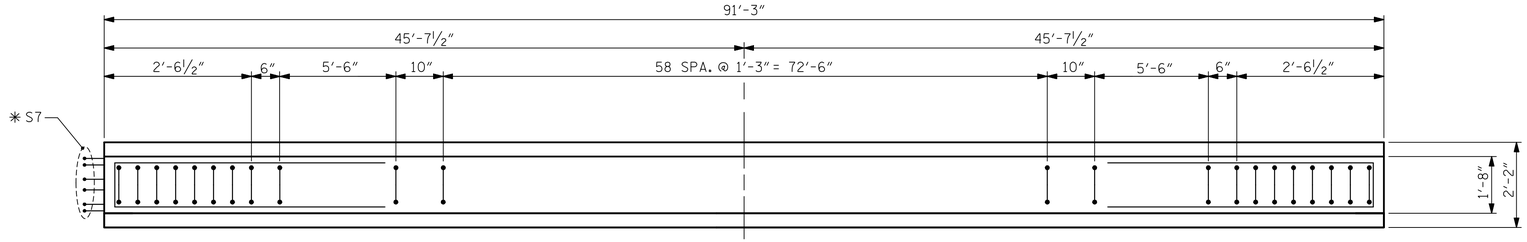


QUANTITIES FOR ONE GIRDER

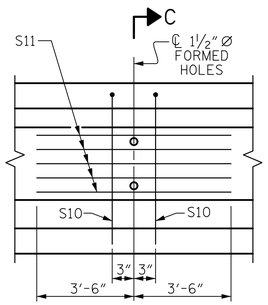
	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GIRDER 1, 2 & 3	1,126	18.5	34

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	91'-3"	273'-9"

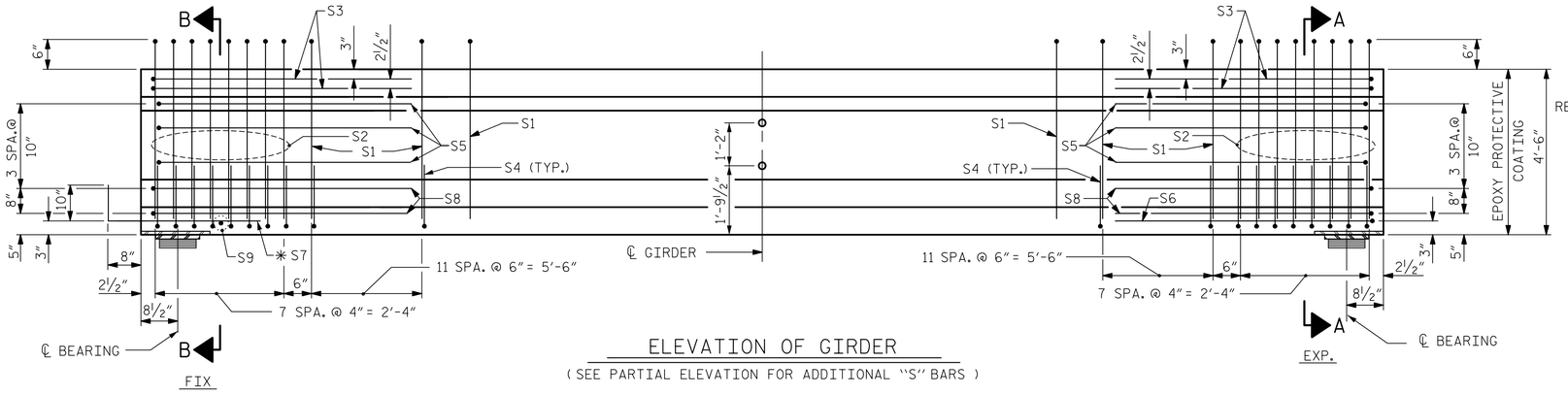


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1, 2 & 3



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

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RALEIGH, NC 27607
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN B

ASSEMBLED BY : M. CATER	DATE : 10/2020
CHECKED BY : J.C. MORRISON	DATE : 05/2021

DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

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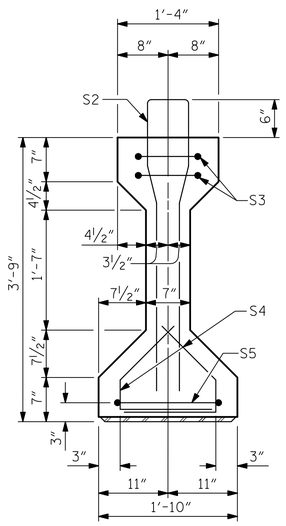
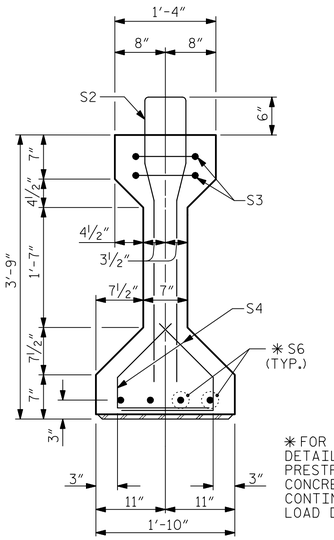
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-19
1			3			TOTAL SHEETS
2			4			119

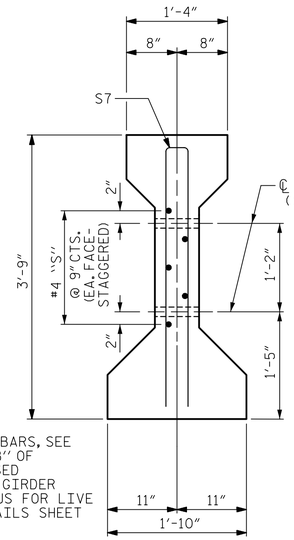
STD. NO. PCG6



SECTION A-A



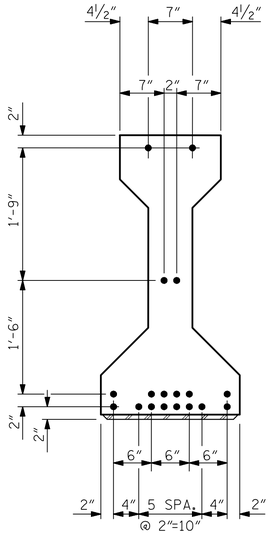
SECTION B-B



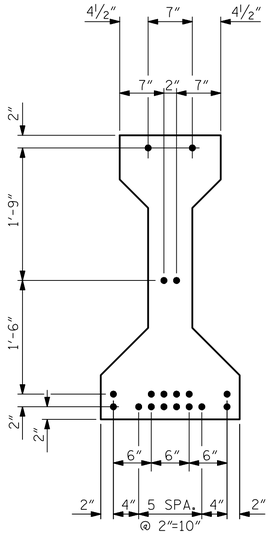
✳FOR S6 BARS, SEE DETAIL "B" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C

(S1 BARS NOT SHOWN)

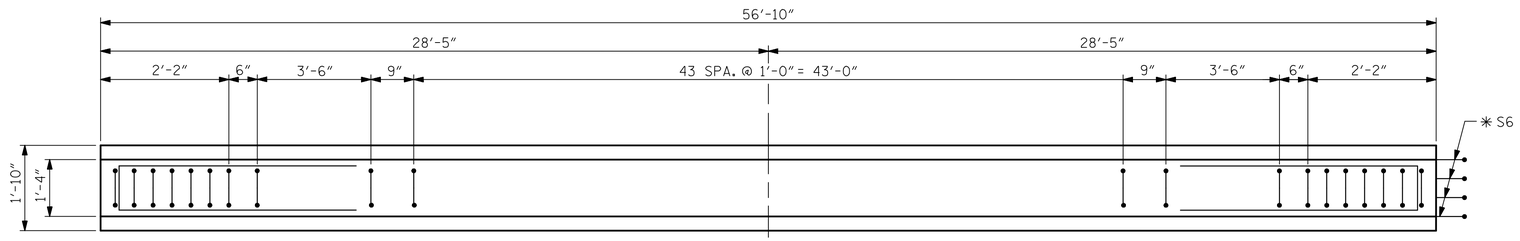


AT END OF GIRDER

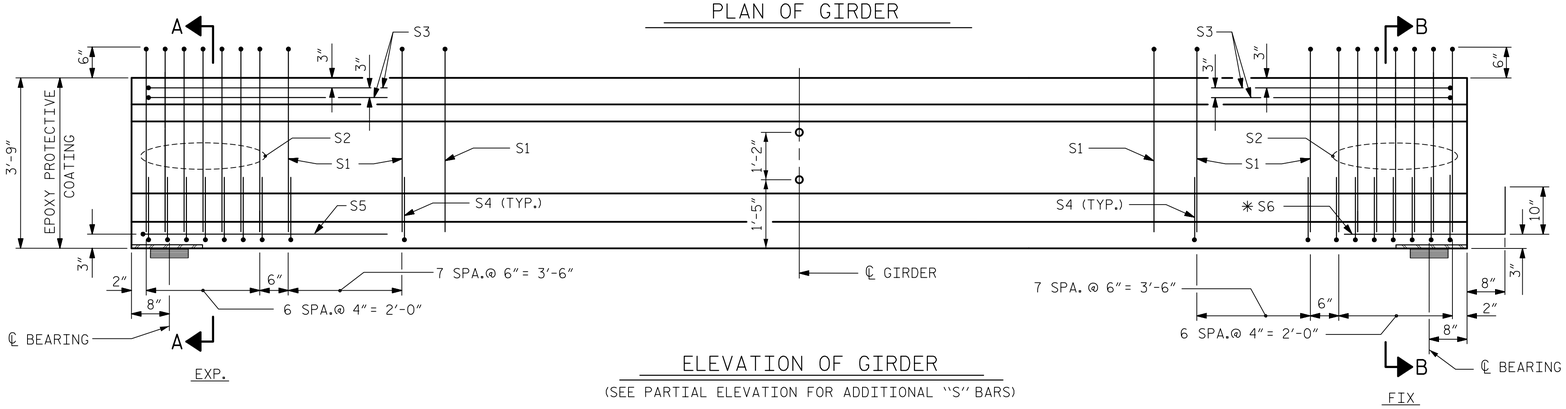


AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT

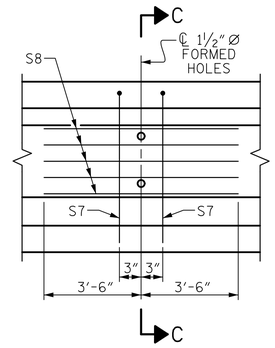


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1, 2 & 3

0.6"Ø L. R. GRADE 270 STRANDS

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

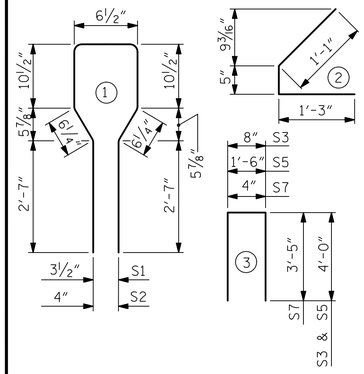
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	60	#4	1	8'-6"	341
S2	14	#6	1	8'-6"	179
S3	4	#4	3	8'-8"	23
S4	60	#4	2	2'-9"	110
S5	1	#4	3	9'-6"	6
✳S6	4	#5	STR	3'-8"	15
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23

✳NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	6,000 PSI CONCRETE	0.6"Ø L. R. STRANDS
	LB.	C.Y.	No.
GIRDER 1, 2 & 3	712	8.2	18

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	56'-10"	170'-6"

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 3 OF 5

ASSEMBLED BY : M. CATER	DATE : 10/2020	
CHECKED BY : J.C. MORRISON	DATE : 05/2021	
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC

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NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023 A2FDE142C82F4AB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

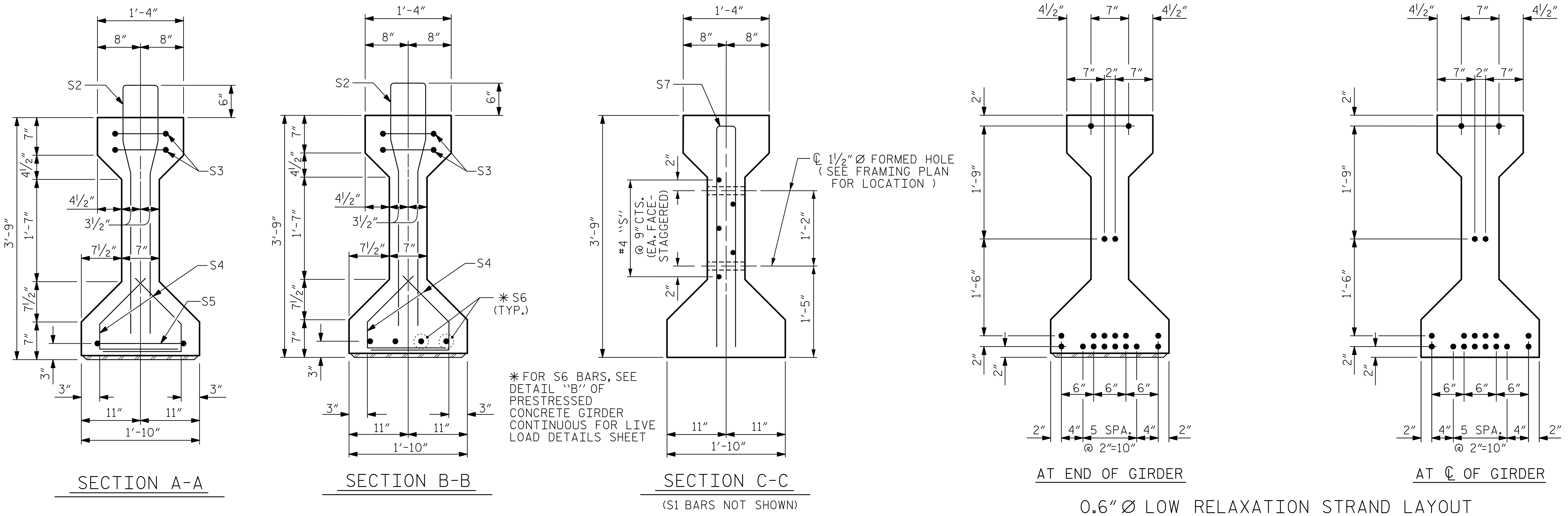
STANDARD
AASHTO TYPE III
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN C

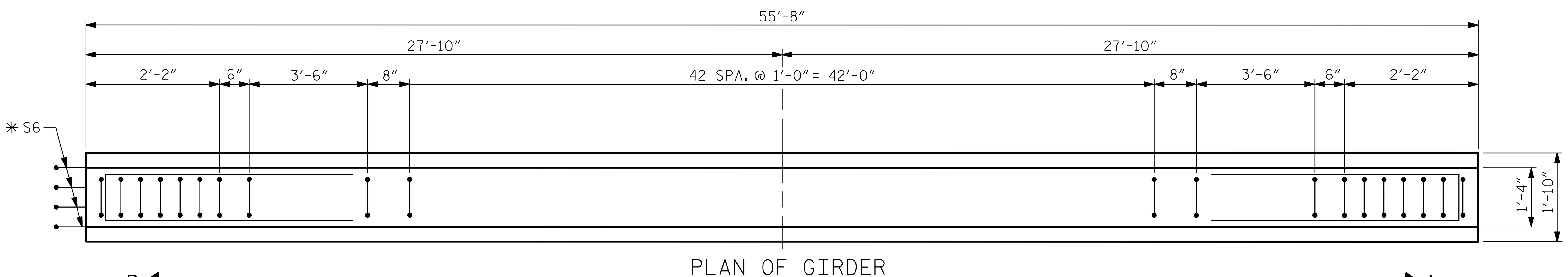
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-20
1			3			TOTAL SHEETS
2			4			119

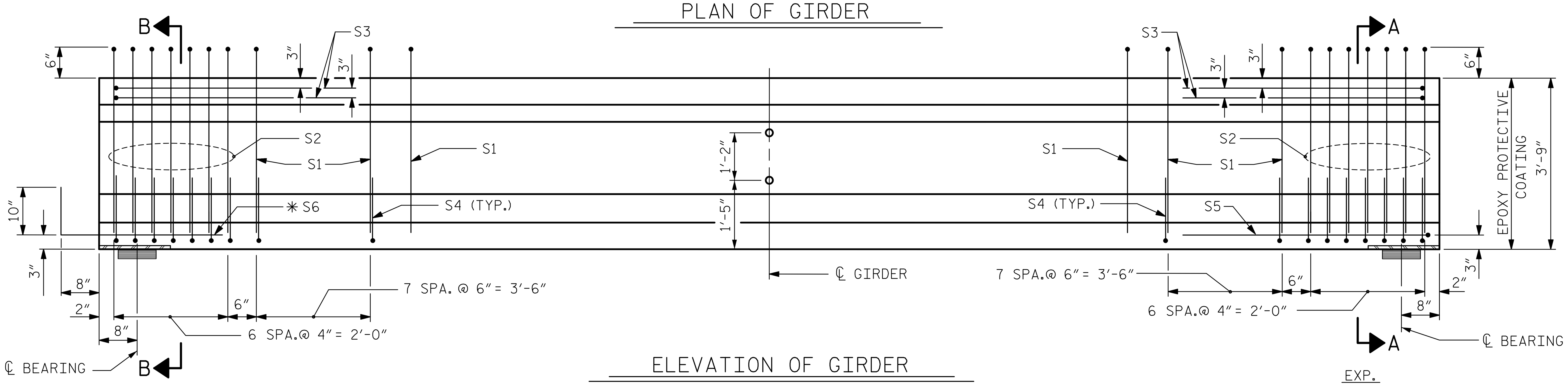
STD. NO. PCG5

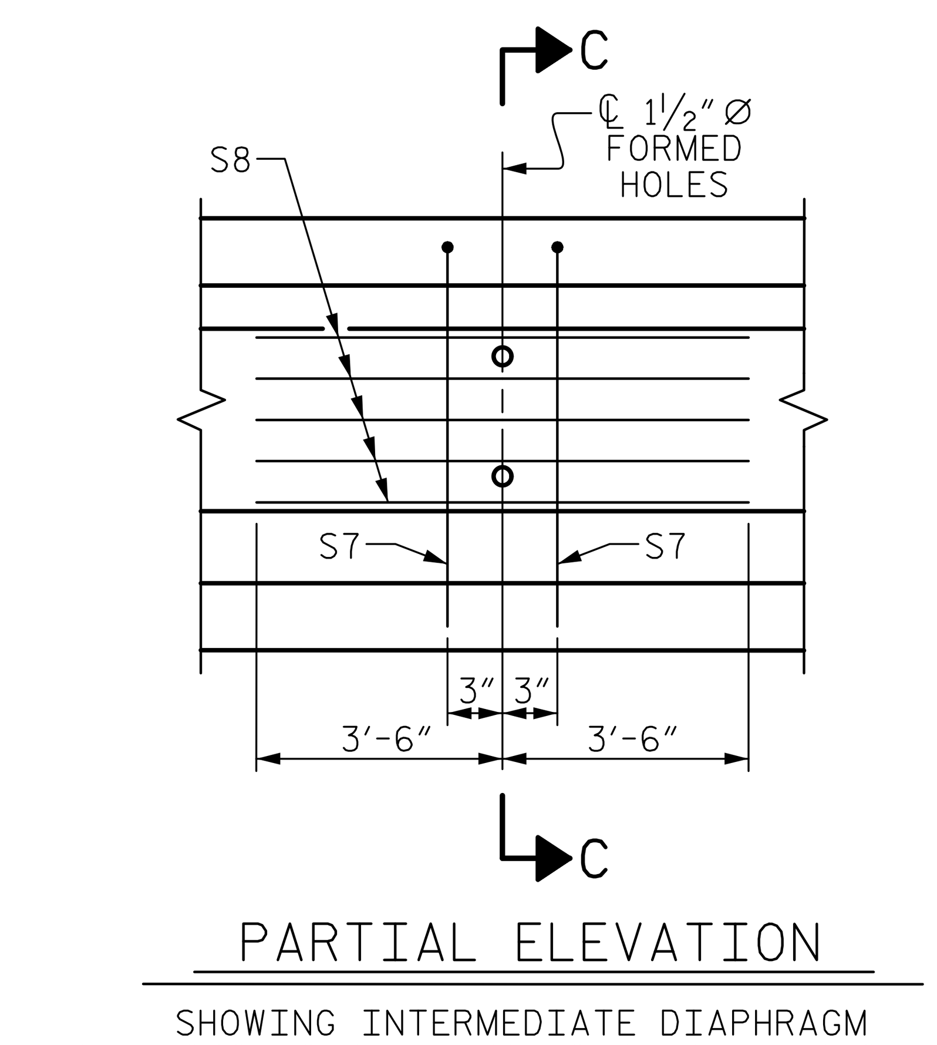
DATE: 2/9/2023
TIME: 10:26:4 PM

USER: cotterm
DGN: pw:\\aecom-nc-pw.bentley.com:AECOM_DS2_NA_2020\Documents\60509754-U-5748 Upon MIN\900-CAD (S)\900_CADD\70_NCDOT_TIP\Structures\04 Drawings\402_04_U-5748_SMU_03-S2-20_9031









0.6" Ø L. R. GRADE 270 STRANDS

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

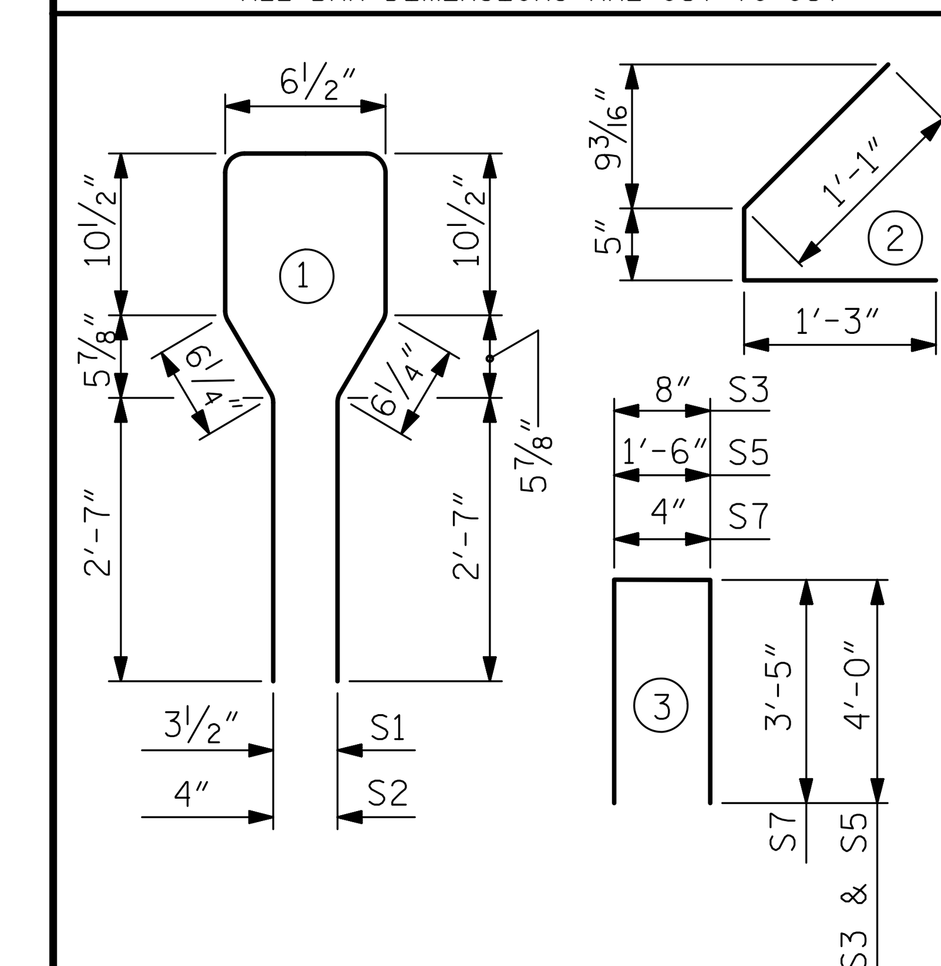
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	59	#4	1	8'-6"	335
S2	14	#6	1	8'-6"	179
S3	4	#4	3	8'-8"	23
S4	60	#4	2	2'-9"	110
S5	1	#4	3	9'-6"	6
* S6	4	#5	STR	3'-8"	15
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL (LB.)	6,000 PSI CONCRETE (C.Y.)	0.6" Ø L. R. STRANDS (No.)
GIRDER 1, 2 & 3	706	8.0	18

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
3	55'-8"	167'-0"

PROJECT NO. U-5748
WAKE COUNTY
STATION: 24+88.00 -L-

AECOM
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RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE III
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN D

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030474 JOHN C. MORRISON
DocuSigned by: John C. Morrison 2/10/2023

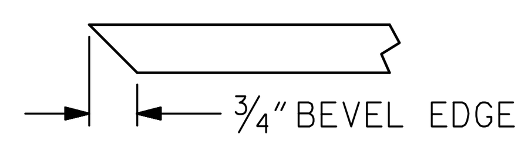
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-21
1			3			TOTAL SHEETS
2			4			119

ASSEMBLED BY : M. CATER DATE : 10/2020
CHECKED BY : J.C. MORRISON DATE : 05/2021

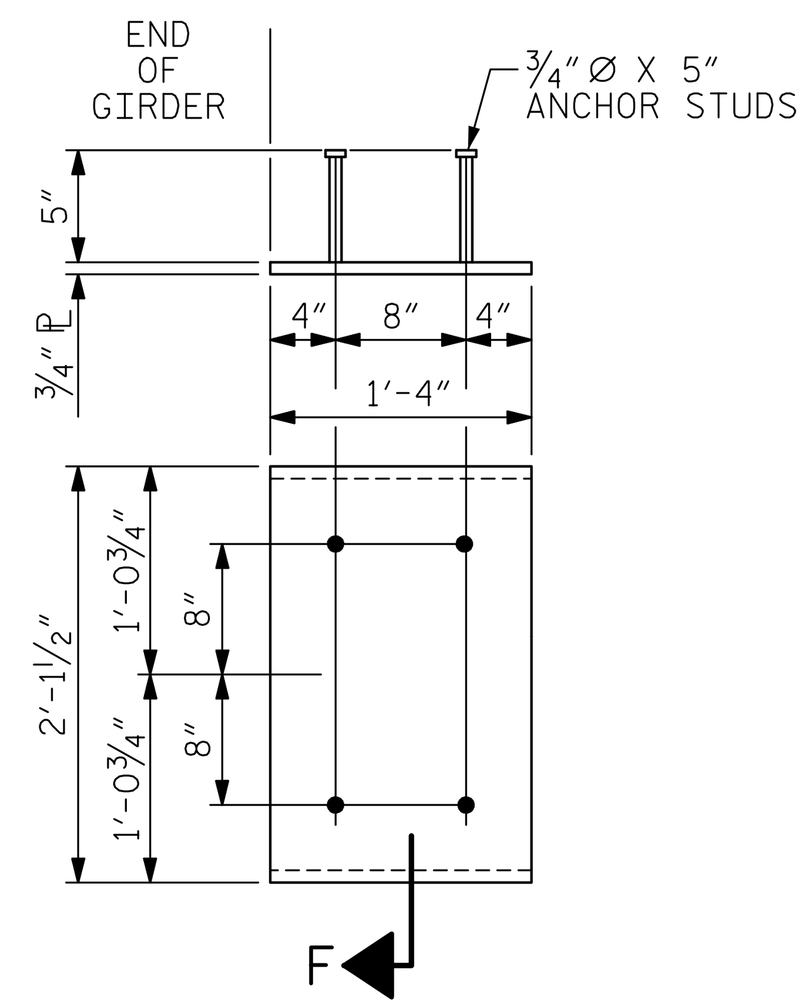
DRAWN BY : ELR 8/91
CHECKED BY : GRP 8/91
REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
REV. 12/17 MAA/THC

STD. NO. PCG5



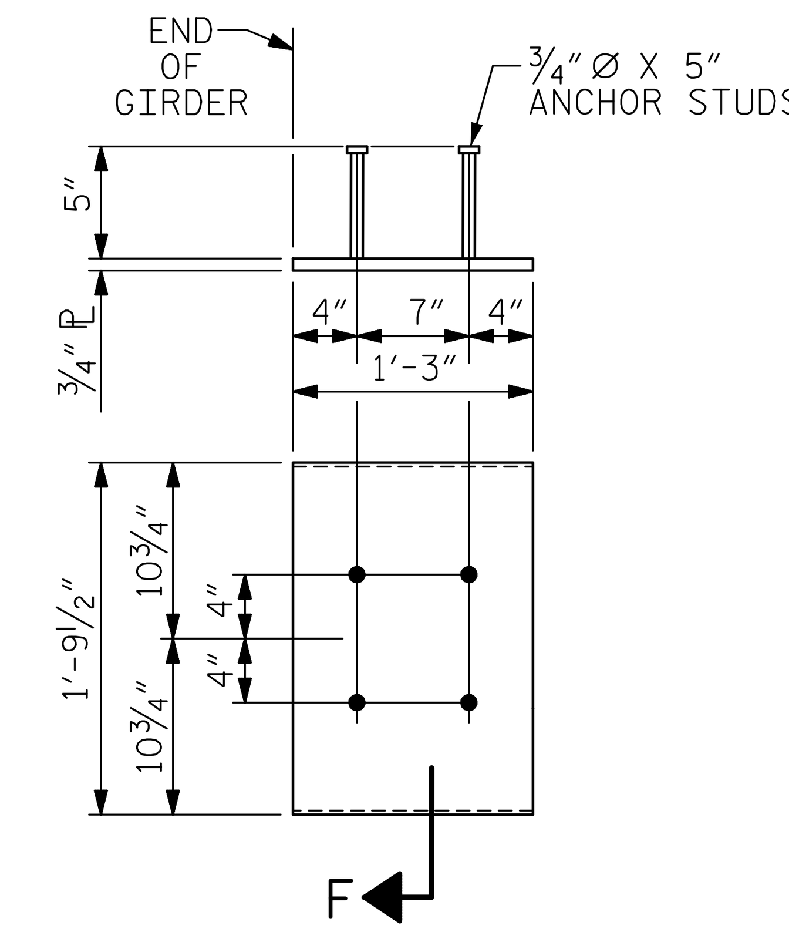
SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE III GIRDER

(2 REQ'D PER GIRDER)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW AND 2' ON BOTH SIDES AND BOTTOM.

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

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

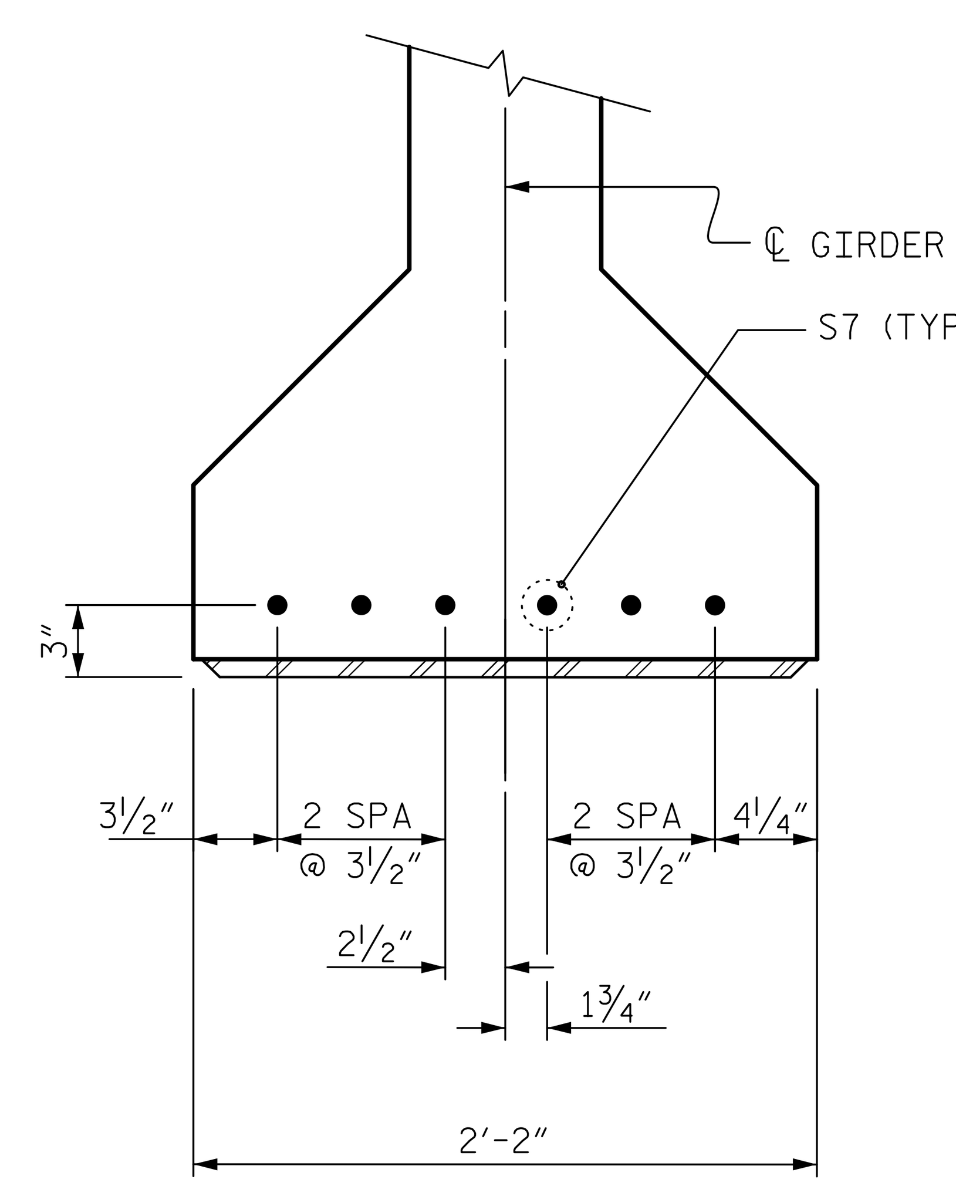
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,400 (SPANS A & B) AND 4,800 (SPANS C & D) PSI.

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

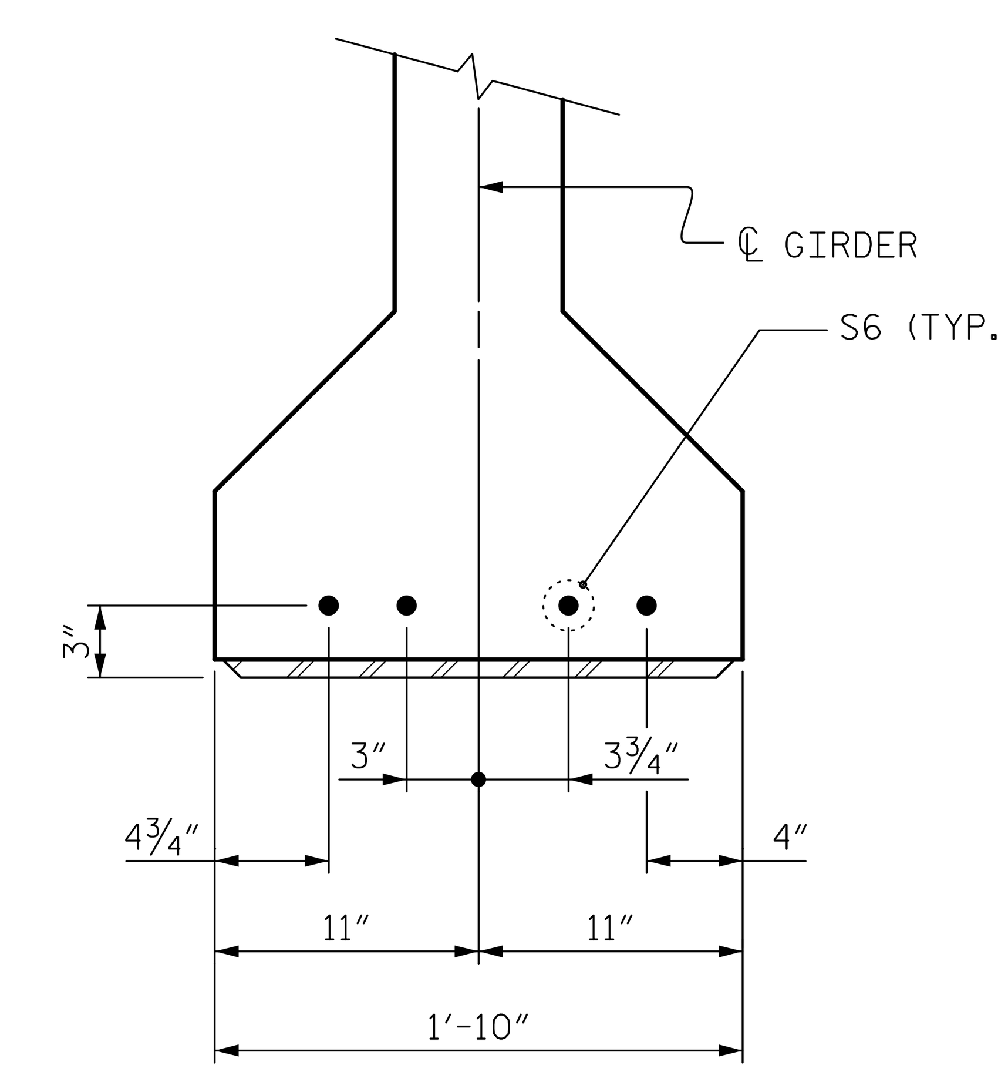
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

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



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



DETAIL "B"

(FOR AASHTO TYPE III GIRDERS)

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 5 OF 5

AECOM

AECOM TECHNICAL SERVICES OF NC, INC.
5438 WADE PARK BOULEVARD, SUITE 200
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

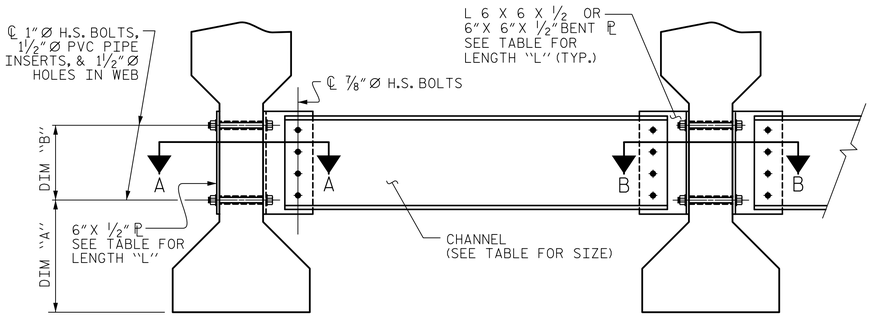
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S2-22
1				3				TOTAL SHEETS
2				4				119

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. CATER		DATE : 10/2020	
CHECKED BY : J.C. MORRISON		DATE : 05/2021	
DRAWN BY : ELR 8/91	REV. 10/1/11		MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15		MAA/TMG
	REV. 12/17		MAA/THC

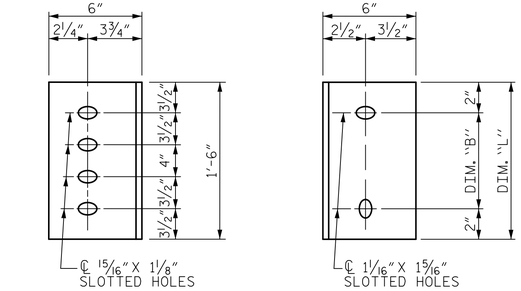
STD. NO. PCG9



EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

(TYPE III OR TYPE IV GIRDER SHOWN)



DIAPHRAGM FACE
(TYPE III OR TYPE IV GDR.)

WEB FACE

CONNECTOR PLATE DETAILS

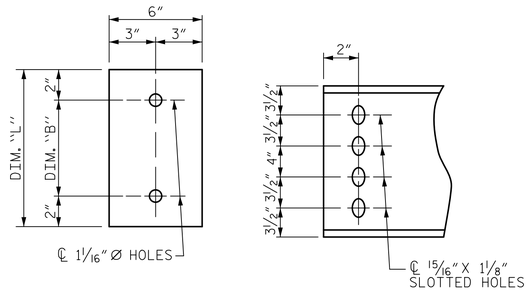
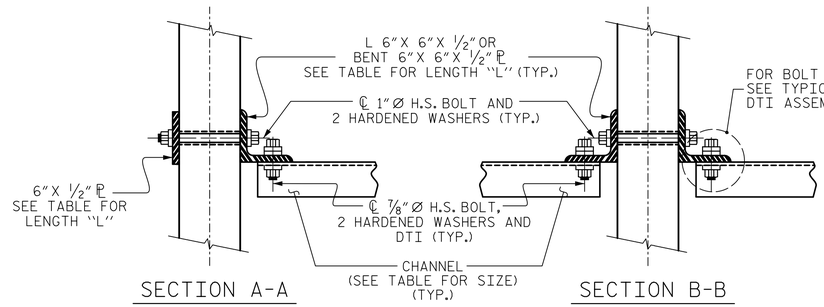


PLATE DETAILS CHANNEL END

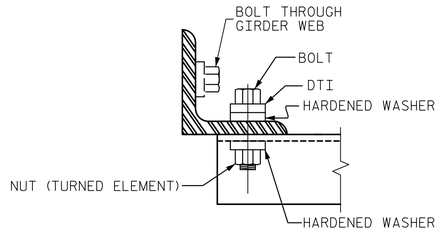
(TYPE III OR TYPE IV GDR.)



SECTION A-A SECTION B-B

CONNECTION DETAILS

(FOR SKEW = 90°)



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼"PROJECTION BEYOND THE NUT.

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

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

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

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

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
III	MC 18 x 42.7	1'-5"	1'-2"	1'-6"
IV	MC 18 x 42.7	1'-9½"	1'-2"	1'-6"

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

DATE: 2/9/2023
TIME: 10:26:44 PM

USER: cater.m
DGN: pw:\\aecom-nc-pw.bentley.com:AECOM_DS2_NA_2020\Documents\60606754-U-5748_Upon Mill\900-CAD GIS\900_CADVO_MCIOT_TIP\Structures\04 Drawings\402_04T_U-5748_SMU_06-32-23.90131

ASSEMBLED BY : M. CATER		DATE : 01/2021	
CHECKED BY : J.C. MORRISON		DATE : 05/2021	
DRAWN BY : TLA 6/05	REV. 5/1/06RRR		KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11		MAA/GM
	REV. 12/17		MAA/THC

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RALEIGH, NC 27607
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AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison A2FDE142C82F4AB... 2/10/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III & IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-23
1			3			TOTAL SHEETS
2			4			119

STD. NO. PCG10

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN A

0.6" Ø LOW-RELAXATION	GIRDER 1																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.178	0.176	0.169	0.159	0.145	0.137	0.106	0.082	0.056	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.017	0.033	0.049	0.065	0.077	0.090	0.098	0.106	0.108	0.111	0.108	0.105	0.097	0.089	0.077	0.065	0.049	0.033	0.016	0.000
FINAL CAMBER ↑	0	1/8''	1/4''	3/8''	1/2''	5/8''	11/16''	3/4''	3/4''	13/16''	13/16"	13/16''	3/4''	3/4''	11/16''	5/8''	1/2''	3/8''	1/4''	1/8''	0

0.6" Ø LOW-RELAXATION	GIRDER 2																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.176	0.176	0.169	0.159	0.145	0.127	0.106	0.082	0.056	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.015	0.030	0.044	0.058	0.069	0.080	0.087	0.094	0.096	0.098	0.096	0.093	0.086	0.079	0.068	0.057	0.043	0.029	0.015	0.000
FINAL CAMBER ↑	0	3/16''	5/16''	7/16''	9/16''	11/16''	13/16''	7/8''	15/16''	15/16"	15/16"	15/16''	15/16''	7/8''	13/16''	11/16''	9/16''	7/16''	5/16''	3/16''	0

0.6" Ø LOW-RELAXATION	GIRDER 3																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.178	0.176	0.169	0.159	0.145	0.127	0.106	0.082	0.056	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.012	0.024	0.035	0.046	0.055	0.063	0.069	0.074	0.076	0.076	0.76	0.074	0.069	0.063	0.054	0.046	0.034	0.023	0.012	0.000
FINAL CAMBER ↑	0	3/16''	3/8''	9/16''	3/4''	7/8''	1''	1 1/16''	1 1/8''	1 3/16''	1 3/16''	1 3/16''	1 1/8''	1 1/16''	1''	7/8''	3/4''	9/16''	3/8''	3/16''	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN B

0.6" Ø LOW-RELAXATION	GIRDER 1																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.029	0.056	0.083	0.107	0.128	0.146	0.161	0.171	0.178	0.186	0.178	0.171	0.161	0.146	0.128	0.107	0.083	0.056	0.029	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.017	0.036	0.051	0.068	0.081	0.094	0.102	0.110	0.113	0.116	0.113	0.110	0.102	0.094	0.080	0.067	0.051	0.034	0.017	0.000
FINAL CAMBER ↑	0	1/8''	1/4''	3/8''	1/2''	9/16''	5/8''	11/16''	3/4''	3/4''	3/4"	3/4''	3/4''	11/16''	5/8''	9/16''	1/2''	3/8''	1/4''	1/8''	0

0.6" Ø LOW-RELAXATION	GIRDER 2																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.029	0.056	0.083	0.107	0.128	0.146	0.161	0.171	0.178	0.180	0.178	0.171	0.161	0.146	0.128	0.107	0.083	0.056	0.029	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.015	0.031	0.045	0.060	0.072	0.083	0.090	0.098	0.100	0.103	0.100	0.098	0.090	0.083	0.072	0.060	0.045	0.031	0.015	0.000
FINAL CAMBER ↑	0	3/16''	5/16''	7/16''	9/16''	11/16''	3/4''	13/16''	7/8''	15/16"	15/16"	15/16"	7/8''	13/16''	3/4''	11/16''	9/16''	7/16''	5/16''	3/16''	0

0.6" Ø LOW-RELAXATION	GIRDER 3																					
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.169	0.176	0.178	0.176	0.169	0.159	0.145	0.127	0.106	0.082	0.056	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.012	0.024	0.036	0.048	0.057	0.066	0.072	0.077	0.079	0.081	0.079	0.077	0.072	0.066	0.057	0.048	0.036	0.024	0.012	0.000
FINAL CAMBER ↑	0	3/16''	3/8''	9/16''	11/16''	13/16''	15/16''	1 1/16''	1 1/8''	1 3/16''	1 3/16''	1 3/16''	1 1/8''	1 1/16''	15/16''	7/8''	11/16''	9/16''	3/8''	3/16''	0

✳ INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

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

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 1 OF 2

AECOM
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-24
1			3			TOTAL SHEETS
2			4			119

DRAWN BY :	D.R. DRUM	DATE :	06/2021
CHECKED BY :	J.C. MORRISON	DATE :	06/2021
DESIGNED BY :	G.L. HAMILTON	DATE :	11/2020
DESIGN CHECKED BY :	J.C. MORRISON	DATE :	11/2020

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN C

GIRDER 1

0.6" Ø LOW-RELAXATION																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.031	0.037	0.043	0.047	0.050	0.052	0.052	0.052	0.050	0.047	0.043	0.037	0.031	0.024	0.016	0.008	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.004	0.011	0.017	0.022	0.027	0.031	0.034	0.036	0.037	0.038	0.037	0.036	0.034	0.031	0.027	0.022	0.017	0.011	0.006	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/16"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/16"	1/16"	1/16"	0

GIRDER 2

0.6" Ø LOW-RELAXATION																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.031	0.037	0.043	0.047	0.050	0.052	0.052	0.052	0.050	0.047	0.043	0.037	0.031	0.024	0.016	0.008	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.005	0.010	0.015	0.019	0.023	0.027	0.029	0.032	0.033	0.034	0.033	0.032	0.029	0.027	0.023	0.019	0.015	0.010	0.005	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	1/4"	1/4"	1/4"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0

GIRDER 3

0.6" Ø LOW-RELAXATION																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.031	0.037	0.043	0.047	0.050	0.052	0.052	0.052	0.050	0.047	0.043	0.037	0.031	0.024	0.016	0.008	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.006	0.008	0.011	0.015	0.018	0.021	0.023	0.025	0.026	0.026	0.026	0.025	0.023	0.021	0.018	0.015	0.011	0.008	0.004	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN D

GIRDER 1

0.6" Ø LOW-RELAXATION																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.030	0.036	0.042	0.046	0.049	0.051	0.051	0.051	0.049	0.046	0.042	0.036	0.030	0.024	0.016	0.008	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.006	0.010	0.016	0.021	0.025	0.029	0.031	0.034	0.035	0.036	0.035	0.034	0.031	0.029	0.025	0.021	0.015	0.010	0.005	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0

GIRDER 2

0.6" Ø LOW-RELAXATION																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.030	0.036	0.042	0.046	0.049	0.051	0.051	0.051	0.049	0.046	0.042	0.036	0.030	0.024	0.016	0.008	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.005	0.009	0.014	0.018	0.022	0.025	0.027	0.030	0.030	0.031	0.030	0.030	0.027	0.025	0.021	0.018	0.013	0.009	0.005	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0

GIRDER 3

0.6" Ø LOW-RELAXATION																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.016	0.024	0.030	0.036	0.042	0.046	0.049	0.051	0.051	0.051	0.049	0.046	0.042	0.036	0.030	0.024	0.016	0.008	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.004	0.007	0.011	0.014	0.017	0.020	0.022	0.023	0.024	0.025	0.024	0.023	0.022	0.020	0.017	0.014	0.011	0.007	0.005	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	1/8"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

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

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

SHEET 2 OF 2

AECOM

AECOM TECHNICAL SERVICES OF NC, INC.
5438 WADE PARK BOULEVARD, SUITE 200
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

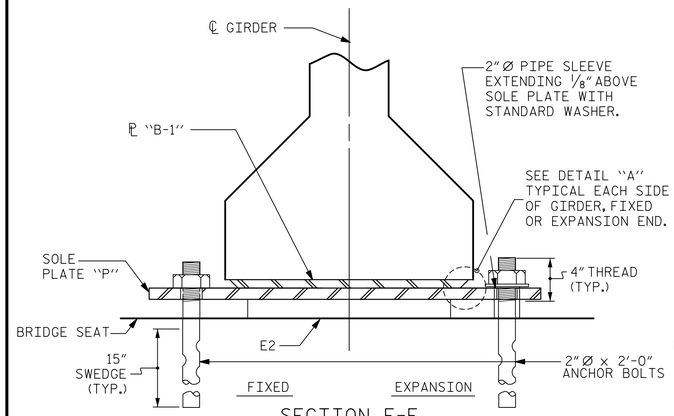
DEAD LOAD DEFLECTIONS
(SOUTHBOUND LANES)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-25
1			3			TOTAL SHEETS
2			4			119

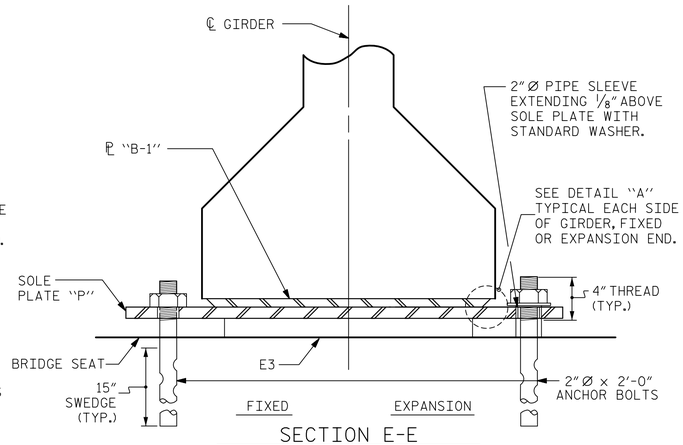
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : D.R. DRUM DATE : 06/2021
CHECKED BY : J.C. MORRISON DATE : 06/2021
DESIGNED BY : G.L. HAMILTON DATE : 11/2020
DESIGN CHECKED BY : J.C. MORRISON DATE : 11/2020

USER: caterm



SECTION E-E



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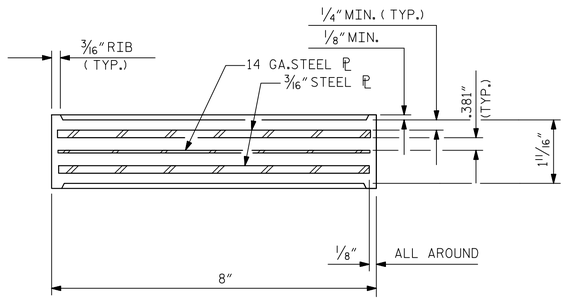
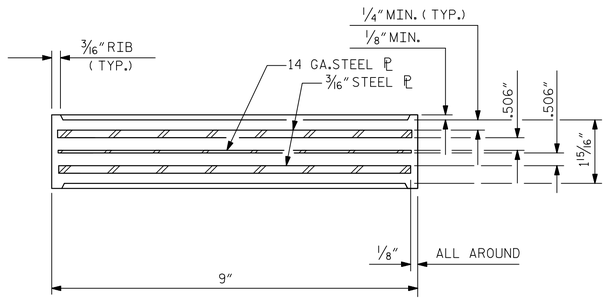
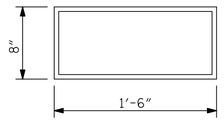


TYPICAL SECTION OF ELASTOMERIC BEARINGS



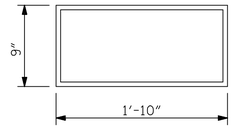
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

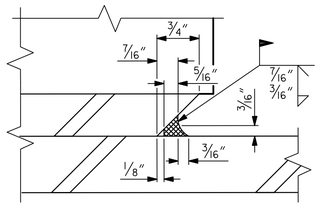
TYPE III



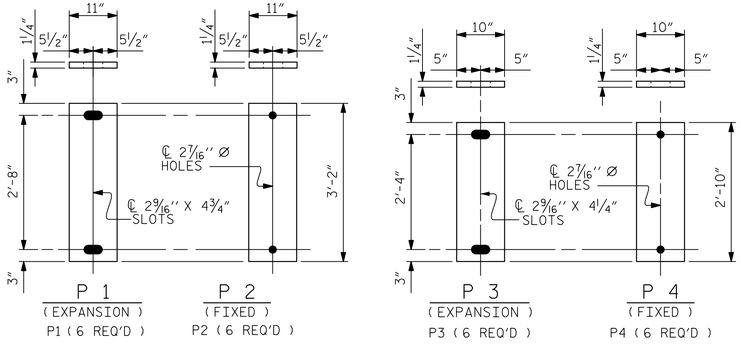
E3 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

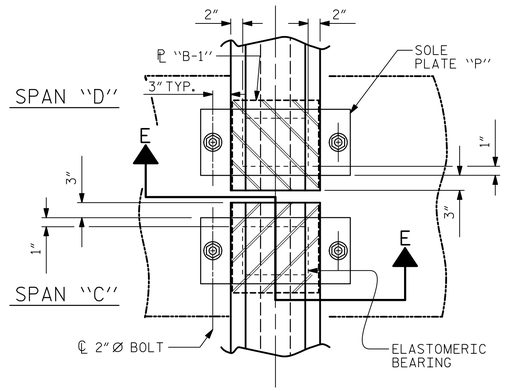
TYPE IV



DETAIL "A"

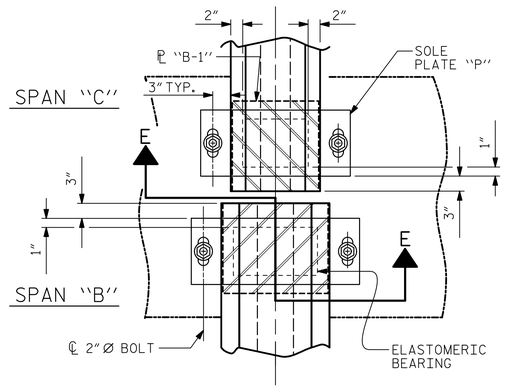


SOLE PLATE DETAILS ("P")



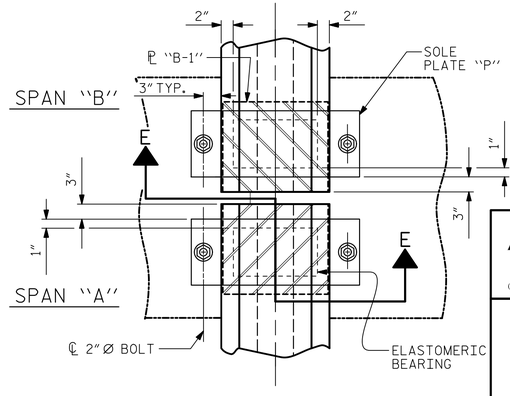
TYPICAL PLAN AT BENT No. 3

(FIXED)



TYPICAL PLAN AT BENT No. 2

(EXPANSION)



TYPICAL PLAN AT BENT No. 1

(FIXED)

NOTES

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

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

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

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

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

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

THIS SITUATION TYPICAL AT END BENT No. 2

THIS SITUATION TYPICAL AT END BENT No. 1

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k
TYPE IV	225 k

PROJECT NO. U-5748

WAKE COUNTY

STATION: 24+88.00 -L-

AECOM
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AECOM License No. F-0342

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison 2/10/2023
A2FDE142C82F4AB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-26
1			3			TOTAL SHEETS
2			4			119

ASSEMBLED BY : M. CATER		DATE : 01/2021	
CHECKED BY : J.C. MORRISON		DATE : 05/2021	
DRAWN BY : WJH	8/89	REV. 1/15	MAA/TMG
CHECKED BY : CRK	8/89	REV. 12/17	MAA/THC
		REV. 10/21	BNB/AAI

STD. NO. EB3