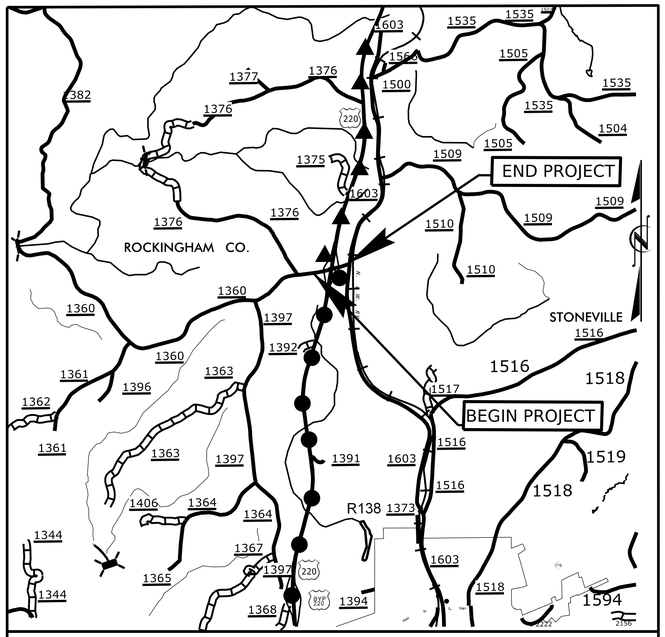
TIP PROJECT: BR-0095

CONTRACT: C204876



VICINITY MAP

EB DETOUR ROUTE

WB DETOUR ROUTE

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

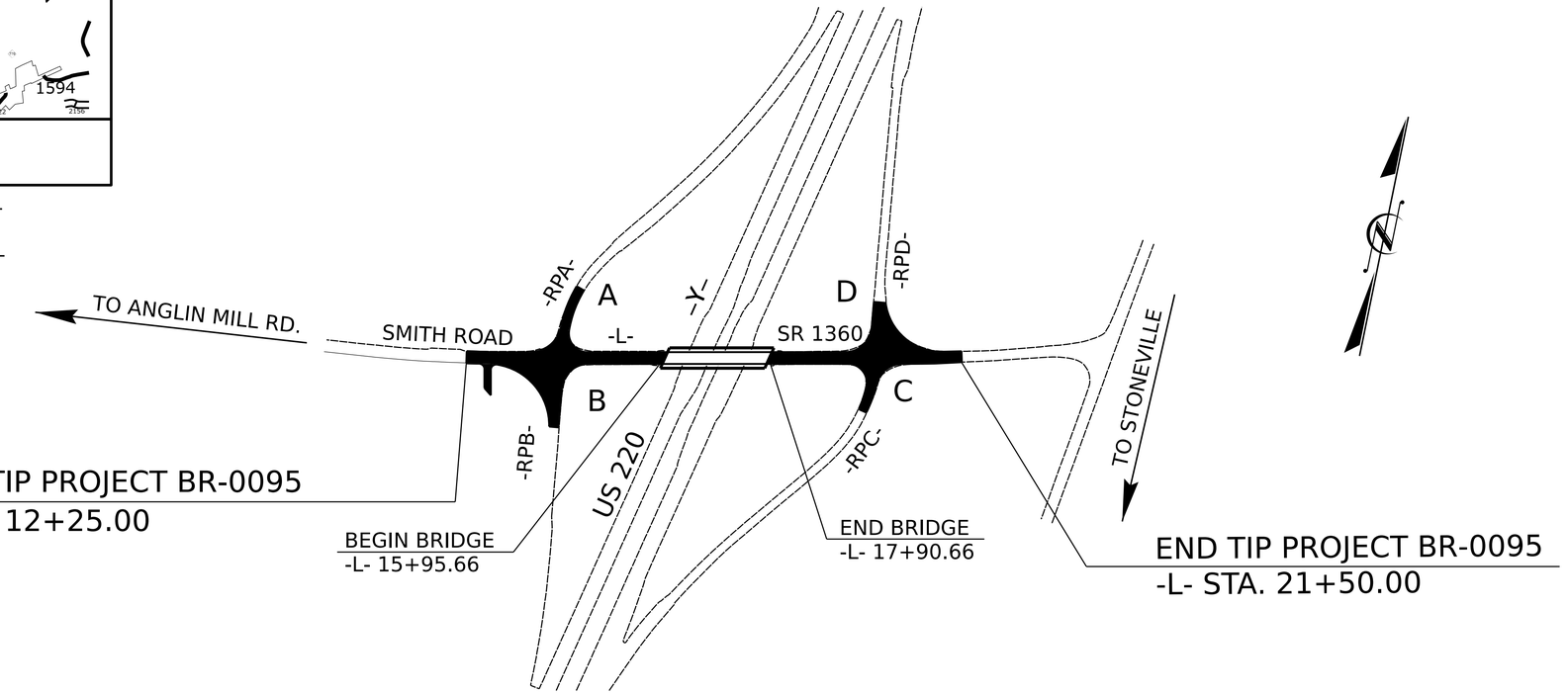
ROCKINGHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0095		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
67095.1.1	-	P.E.
67095.2.1	-	RW/UTIL
67095.3.1	-	CONST.

LOCATION: BRIDGE #780170 ON SR 1360 (SMITH RD) OVER US 220

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



STRUCTURES

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT (2023)	=	862
ADT (2045)	=	1,200
K	=	9 %
D	=	60 %
T	=	6 % *
V	=	50 MPH

* (TTST 2 %, DUAL 4 %)

FUNC CLASS = LOCAL SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0095 = 0.138 MILES

LENGTH STRUCTURE TIP PROJECT BR-0095 = 0.037 MILES

TOTAL LENGTH TIP PROJECT BR-0095 = 0.175 MILES

Prepared in the Office of:

DIVISION OF HIGHWAYS

STRUCTURES MANAGEMENT UNIT

1000 BIRCH RIDGE DR.

RALEIGH, N.C. 27610

2024 STANDARD SPECIFICATIONS

LETTING DATE :

MARCH 19, 2024

KRISTY W. ALFORD, PE

PROJECT ENGINEER

FRANCESCA LEA, PE

PROJECT DESIGN ENGINEER

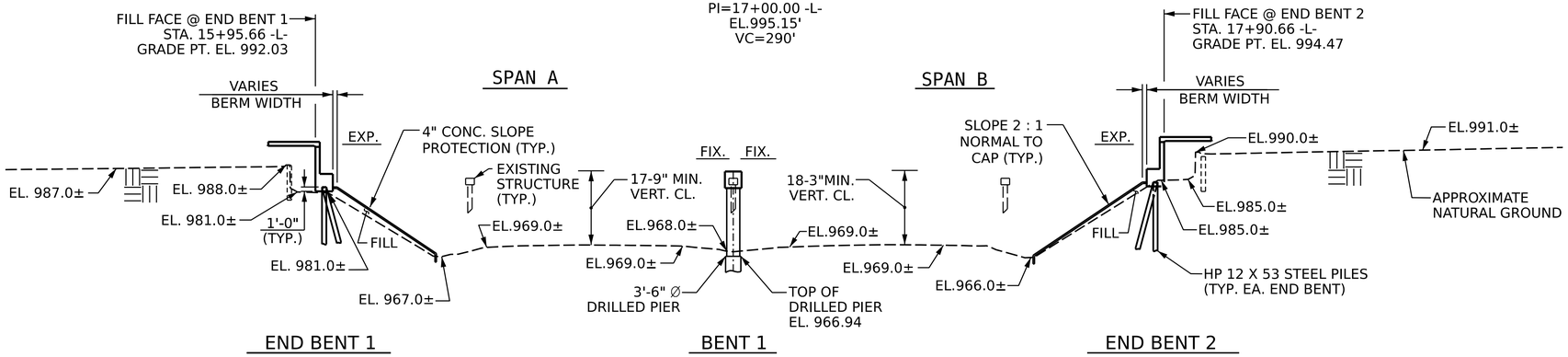
15+50 16+00 16+50 17+00 17+50 18+00 18+50 19+00

1000 990 980 970 960 950

GRADE DATA

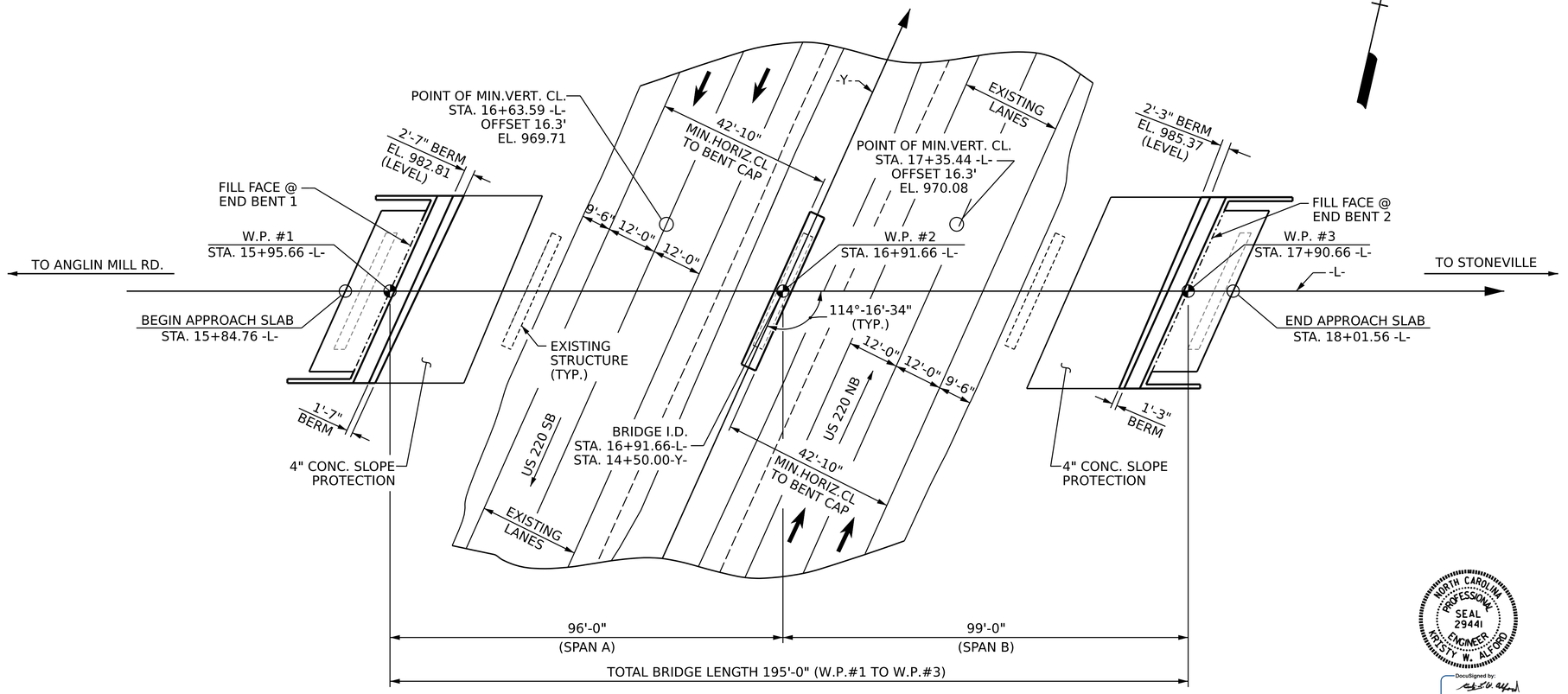
(+)2.90% (-)0.5522%

PI=17+00.00 -L-
EL.995.15'
VC=290'



SECTION ALONG -L-

(SECTION AT END BENTS AND BENT ARE AT RIGHT ANGLES)



PLAN

(PILES NOT SHOWN FOR CLARITY)

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-
14+50.00 -Y-

SHEET 1 OF 3 REPLACE BRIDGE #780170

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
SR 1360 (SMITH RD) OVER US 220
BETWEEN SR 1376 AND US 220/BUS

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by:
F2458389309F40E...
11/16/2023

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by:
B79DADB65D584EF...
11/16/2023

DRAWN BY : Q. T. NGUYEN DATE : 06/2023
CHECKED BY : F. LEA DATE : 08/2023
DESIGN ENGINEER OF RECORD: Z. MALIK DATE : 04/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-01
1			3			TOTAL SHEETS
2			4			29

11/8/2023
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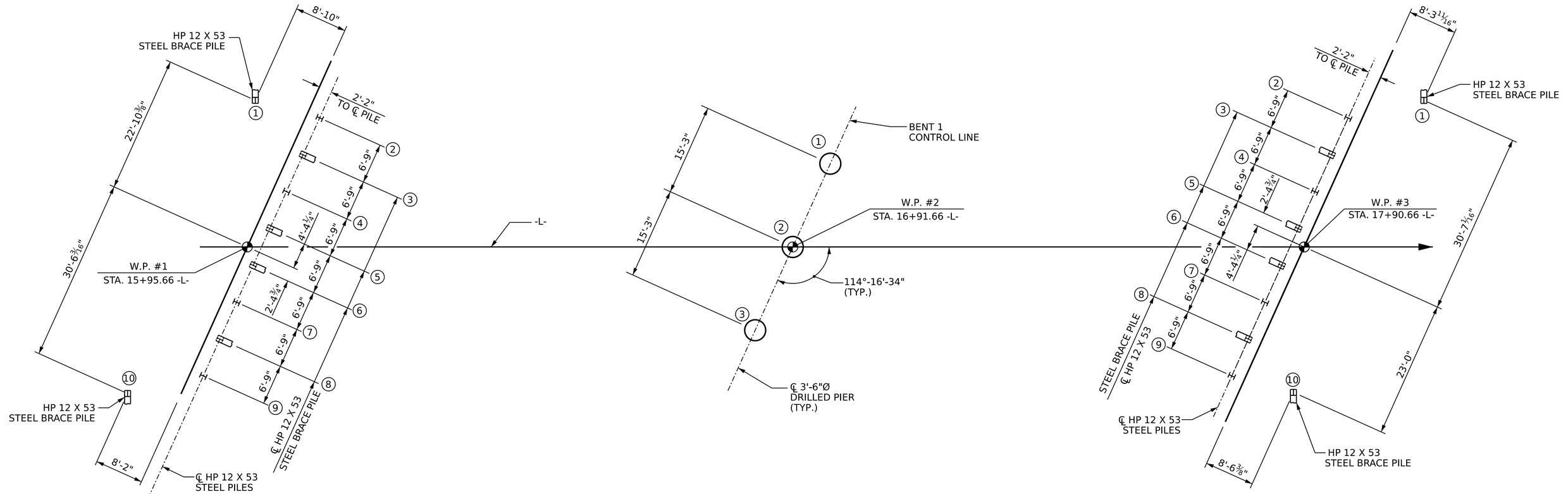

END BENT 1 | BENT 1 | END BENT 2

FOUNDATION LAYOUT

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

NOTES

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

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

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30,000 - 50,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1 & 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
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11/16/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
SR 1360 (SMITH RD) OVER US 220
BETWEEN SR 1376 AND US 220/BUS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-02
1			3			TOTAL SHEETS
2			4			S-29

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DRAWN BY : Q. T. NGUYEN DATE : 05/2023
CHECKED BY : F. LEA DATE : 06/2023
DESIGN ENGINEER OF RECORD: Z. MALIK DATE : 04/2023

10/17/2023
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SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-10	103	983.81	45			190							
End Bent 2, Piles 1-5	103	986.37	45			190							
End Bent 2, Piles 6-10	103	986.37	45			185							

*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 1-5	103	6		0.60	14		1.00
End Bent 1, Piles 6-10	103	5		0.60	10		1.00
End Bent 2, Piles 1-5	103	6		0.60	13		1.00
End Bent 2, Piles 6-10	103	3		0.60	7		1.00
							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 1-3	456	935.0	30				5.2	26.7	NO		
TOTAL QTY:							15.6	80.2			

*Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "42-inch Dia. Drilled Piers" or "42-inch Dia. Drilled Piers Not in Soil" and "42-inch Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the *NCDOT Standard Specifications* .

SUMMARY OF DYNAMIC PILE TESTING/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing				Pile Order Lengths	
End Bent/ Bent No	Dynamic Pile Testing Required? YES or MAYBE	Dynamic Pile Testing Test Pile Length FT	Total Dynamic Pile Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or Dynamic Pile Testing
End Bent 1, Piles 1-10	MAYBE	45	1		
End Bent 2, Piles 1-10	MAYBE	45			

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

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 1-3		MAYBE	134.0		MAYBE
TOTAL QTY:		3	402.0		

*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. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -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 (Matthew Mark Lattin #052709) on 03-31-2023.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for PDA Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, CSL Testing, SID Inspections and PITs when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea

11/16/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

DRAWN BY : Q. T. NGUYEN DATE : 08/2023

CHECKED BY : F. LEA DATE : 08/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-03
1			3			TOTAL SHEETS
2			4			29

11/7/2023
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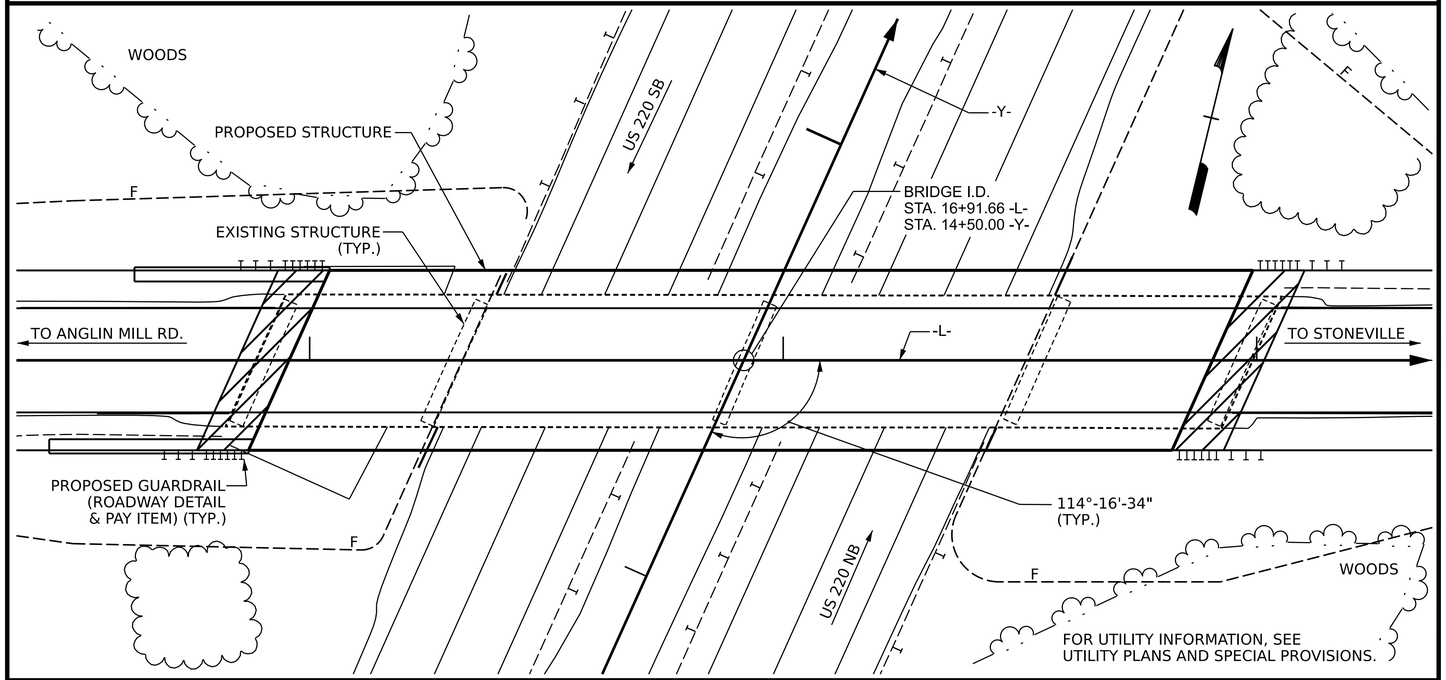
BM #1: STA. 12+98.64 -RPB-, N 10003130 E 1728186, RR SPIKE IN 30" POPLAR TREE, EL. 950.91'



LOCATION SKETCH

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STA. 16+91.66 -L-	ASBESTOS ASSESSMENT	3'-6" DIA. DRILLED PIER IN SOIL	3'-6" DIA. DRILLED PIER NOT IN SOIL	DYNAMIC PILE TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS STA. 16+91.66 -L-
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	EA.	EA.	SQ. FT	SQ. FT	CU. YDS	LUMP SUM
SUPERSTRUCTURE							7,753	7,556		LUMP SUM
END BENT 1									51.5	
BENT 1			80.2	15.6					34.9	
END BENT 2									50.2	
TOTAL	LUMP SUM	LUMP SUMP	80.2	15.6	1	3	7,753	7,556	136.6	LUMP SUM

TOTAL BILL OF MATERIAL

	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDER		PILE DRIVING EQUIPMENT SET UP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	LBS.	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	LIN. FT.	SQ. YDS	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			10	954.0				385.43		LUMP SUM	LUMP SUM
END BENT 1	5,956				10	10	450		215		
BENT 1	9,993	3,173									
END BENT 2	5,834				10	10	450		240		
TOTAL	21,783	3,173	10	954.0	20	20	900	385.43	455	LUMP SUM	LUMP SUM

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

THE EXISTING STRUCTURE CONSISTING OF REINFORCED CONCRETE DECK ON PRESTRESSED CONCRETE GIRDERS WITH SPAN LENGTH OF 42 FT, 2 @ 61.5 FT AND 45.5 FT, WITH A CLEAR ROADWAY WIDTH OF 28 FT ON A REINFORCED CONCRETE CAP ON PPC PILE END BENTS AND REINFORCED CONCRETE CAP ON POST AND BEAM BENT AND LOCATED AT THE EXISTING STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

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.

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

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea B79DADB65D584EF...

11/16/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
SR 1360 (SMITH RD) OVER US220
BETWEEN SR 1376 AND US 220/BUS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-04
1			3			TOTAL SHEETS
2			4			29

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DRAWN BY : Q. T. NGUYEN DATE : 06/2023
CHECKED BY : F. LEA DATE : 08/2023
DESIGN ENGINEER OF RECORD: Z. MALIK DATE : 04/2023

11/7/2023
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVELOAD FACTORS (γLL)	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)	LIVELOAD FACTORS (γLL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inventory)	N/A	⟨1⟩	1.217	--	1.75	0.857	1.41	B	1	47.74	0.917	1.22	B	1	66.83	0.80	0.857	1.31	B	1	47.74	
		HL-93(Operating)	N/A	--	1.577	--	1.35	0.857	1.83	B	1	47.74	0.917	1.58	B	1	66.83	N/A	--	--	--	--	--	
		HS-20(Inventory)	36.00	⟨2⟩	1.523	54.834	1.75	0.857	1.95	B	1	47.74	0.917	1.52	B	1	66.83	0.80	0.857	1.81	B	1	47.74	
		HS-20(Operating)	36.00	--	1.974	71.081	1.35	0.857	2.53	B	1	47.74	0.917	1.97	B	1	66.83	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50	--	4.269	57.633	1.40	0.857	5.75	B	1	47.74	0.917	4.54	B	1	66.83	0.80	0.857	4.27	B	1	47.74	
		SNGARBS2	20.00	--	3.100	62.003	1.40	0.857	4.18	B	1	47.74	0.917	3.23	B	1	66.83	0.80	0.857	3.10	B	1	47.74	
		SNAGRIS2	22.00	--	2.903	63.868	1.40	0.857	3.91	B	1	47.74	0.917	2.99	B	1	66.83	0.80	0.857	2.90	B	1	47.74	
		SNCOTTS3	27.25	--	2.122	57.825	1.40	0.857	2.86	B	1	47.74	0.917	2.27	B	1	66.83	0.80	0.857	2.12	B	1	47.74	
		SNAGGRS4	34.93	--	1.742	60.841	1.40	0.857	2.35	B	1	47.74	0.917	1.88	B	1	66.83	0.80	0.857	1.74	B	1	47.74	
		SNS5A	35.55	--	1.706	60.636	1.40	0.857	2.30	B	1	47.74	0.917	1.90	B	1	66.83	0.80	0.857	1.71	B	1	47.74	
		SNS6A	39.95	--	1.552	62.009	1.40	0.857	2.09	B	1	47.74	0.917	1.73	B	1	66.83	0.80	0.857	1.55	B	1	47.74	
		SNS7B	42.00	--	1.478	62.062	1.40	0.857	1.99	B	1	47.74	0.917	1.70	B	1	66.83	0.80	0.857	1.48	B	1	47.74	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.00	--	1.889	62.338	1.40	0.857	2.54	B	1	47.74	0.917	2.07	B	1	66.83	0.80	0.857	1.89	B	1	47.74	
		TNT4A	33.08	--	1.894	62.641	1.40	0.857	2.55	B	1	47.74	0.917	2.01	B	1	66.83	0.80	0.857	1.89	B	1	47.74	
		TNT6A	41.60	--	1.537	63.921	1.40	0.857	2.07	B	1	47.74	0.917	1.81	B	1	66.83	0.80	0.857	1.54	B	1	47.74	
		TNT7A	42.00	--	1.538	64.593	1.40	0.857	2.07	B	1	47.74	0.917	1.77	B	1	66.83	0.80	0.857	1.54	B	1	47.74	
		TNT7B	42.00	--	1.576	66.177	1.40	0.857	2.12	B	1	47.74	0.917	1.66	B	1	66.83	0.80	0.857	1.58	B	1	47.74	
		TNAGRIT4	43.00	--	1.510	64.943	1.40	0.857	2.03	B	1	47.74	0.917	1.61	B	1	66.83	0.80	0.857	1.51	B	1	47.74	
		TNAGT5A	45.00	--	1.429	64.324	1.40	0.857	1.93	B	1	47.74	0.917	1.60	B	1	66.83	0.80	0.857	1.43	B	1	47.74	
		TNAGT5B	45.00	⟨3⟩	1.417	63.764	1.40	0.857	1.91	B	1	47.74	0.917	1.53	B	1	66.83	0.80	0.857	1.42	B	1	47.74	
EV LOAD RATING		EV2	28.75	--	2.182	62.730	1.30	0.857	3.17	B	1	47.74	0.917	2.44	B	1	66.83	0.80	0.857	2.18	B	1	47.74	
		EV3	43.00	⟨4⟩	1.437	61.787	1.30	0.857	2.08	B	1	47.74	0.917	1.64	B	1	66.83	0.80	0.857	1.44	B	1	47.74	

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.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

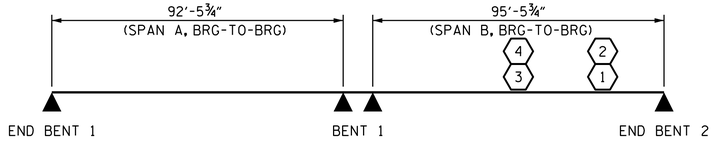
⟨3⟩ LEGAL LOAD RATING **

⟨4⟩ EMERGENCY VEHICLE RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
1 - EXTERIOR LEFT GIRDER



LRFR SUMMARY

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

11/16/2023

DocuSigned by: Francesca Lea

REVISIONS						SHEET NO.
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ASSEMBLED BY : N.S. HART	DATE : 08/2023	
CHECKED BY : F. LEA	DATE : 08/2023	
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM

11/8/2023
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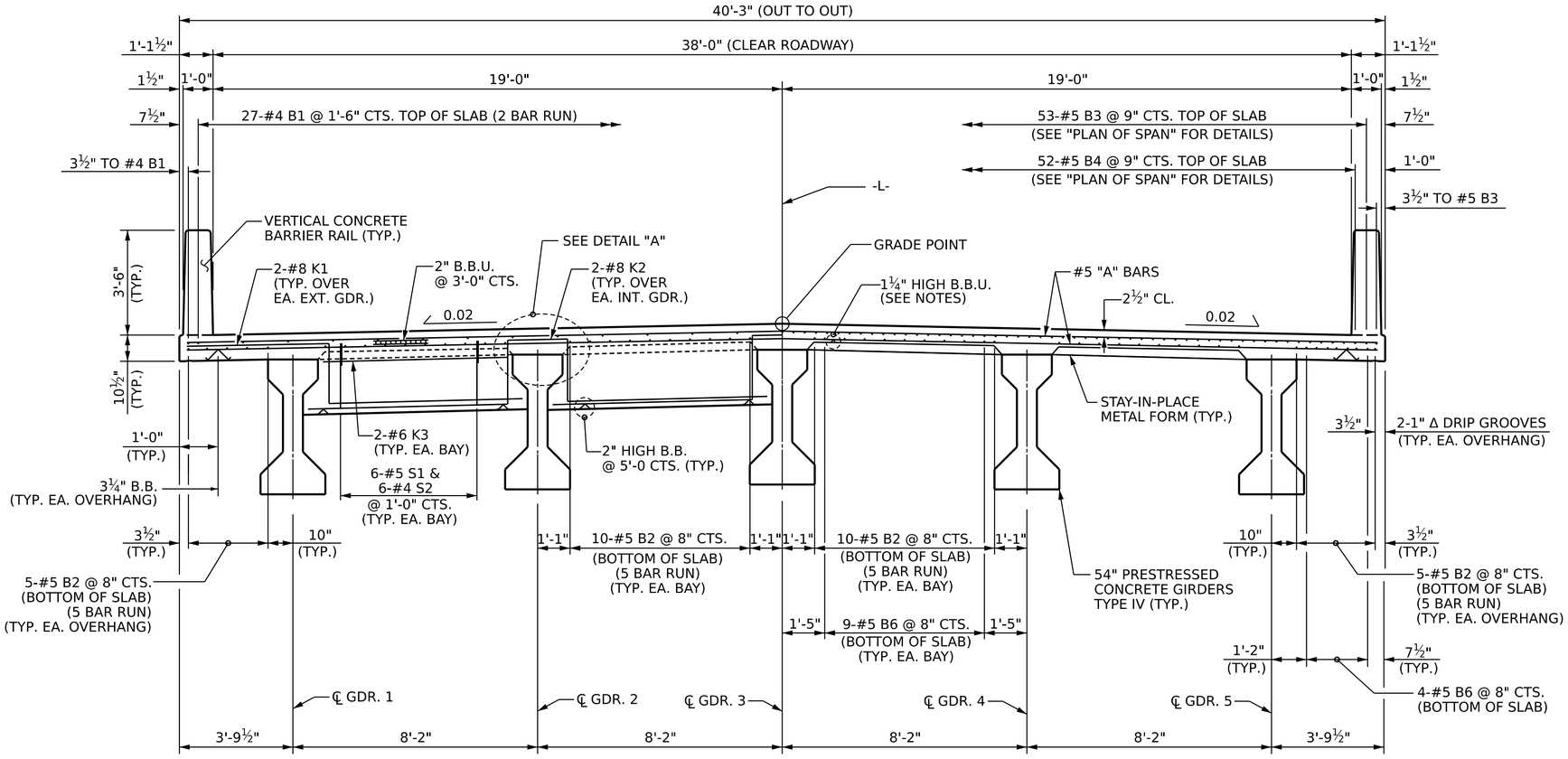


PARTIAL TYPICAL SECTION
END BENT DIAPHGRAM

PARTIAL TYPICAL SECTION
LINK SLAB AT BENT

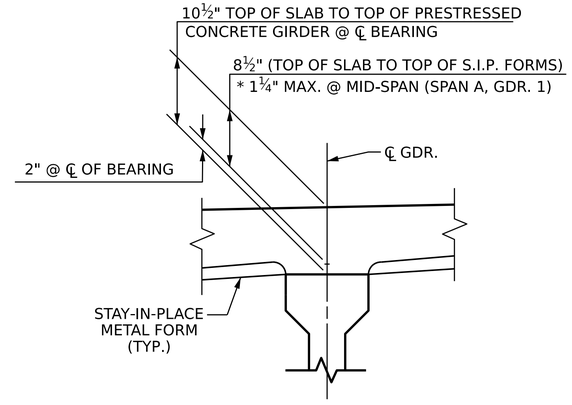
NOTES

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 (C.H.C.M.) @ 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 FORM.

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

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.

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



DETAIL "A"

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

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
B790AD8650584EF...
11/16/2023

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CHECKED BY : N. S. HART DATE : 06/2023
DESIGN ENGINEER OF RECORD: N. S. HART DATE : 02/2023

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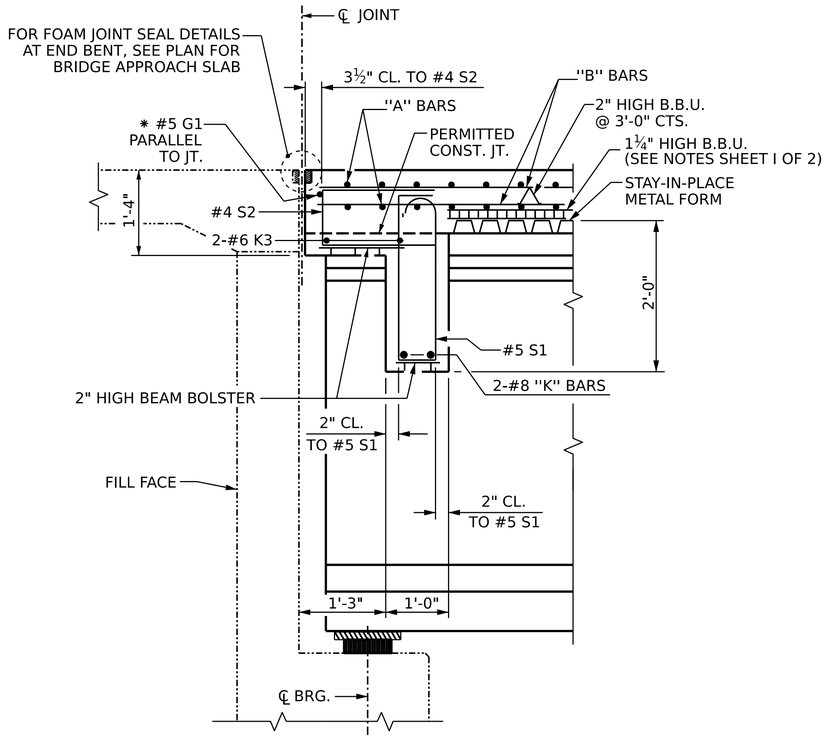
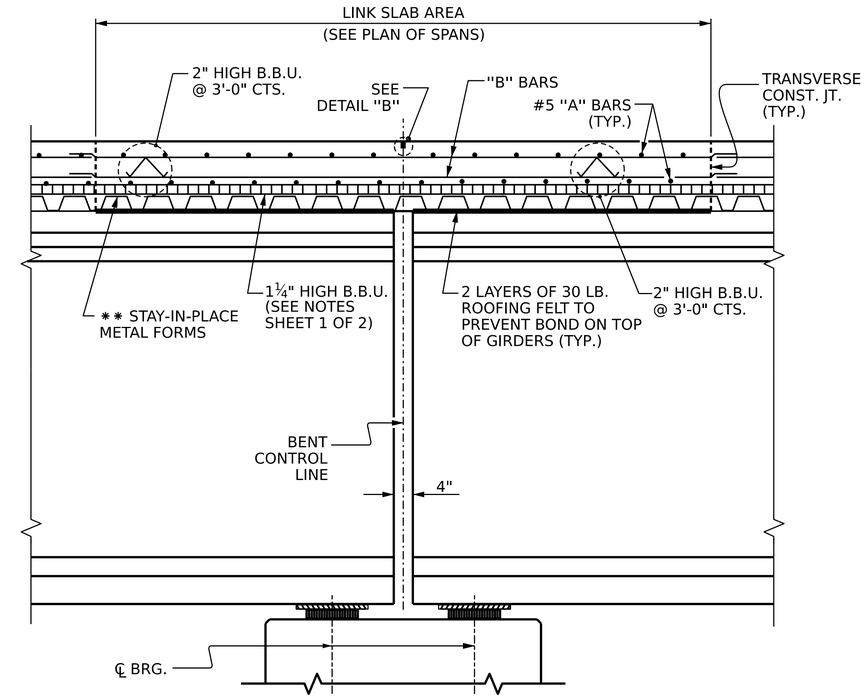


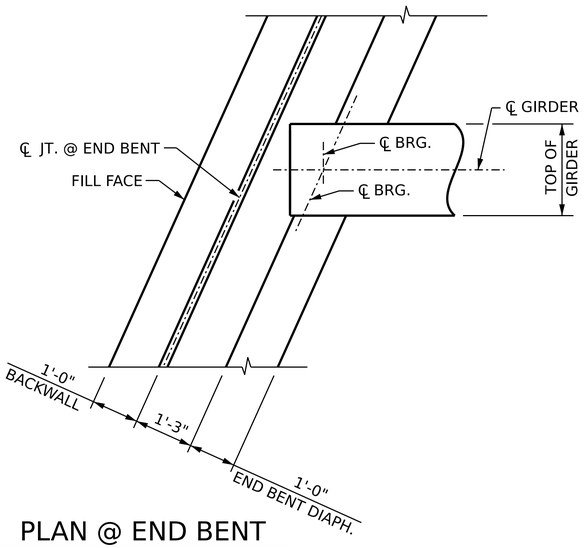
SECTION @ END BENT

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

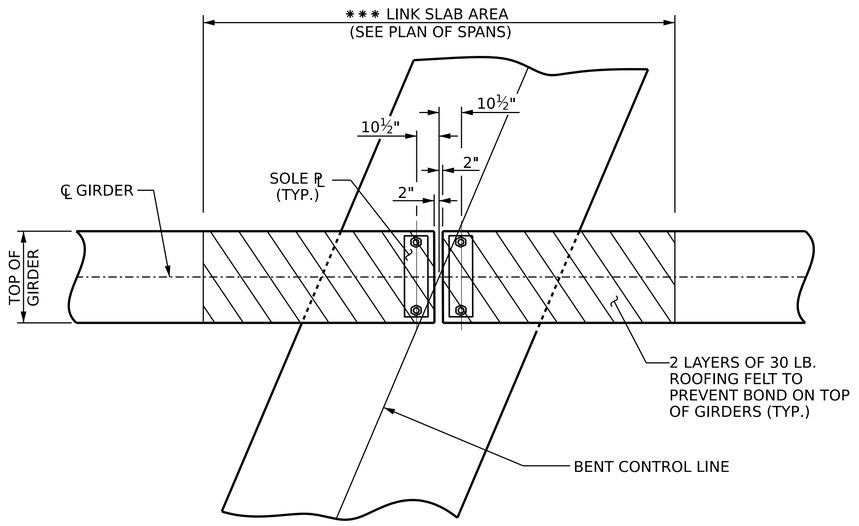


SECTION @ LINK SLAB

** STAY-IN-PLACE METAL FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE REGION OF THE LINK SLAB.

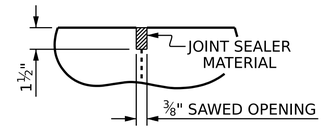


PLAN @ END BENT



PLAN @ BENT

*** THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS/STUDS, ANCHOR STUDS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.



DETAIL "B"

A 1½" DEEP, ⅜" WIDE CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE LINK SLAB DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

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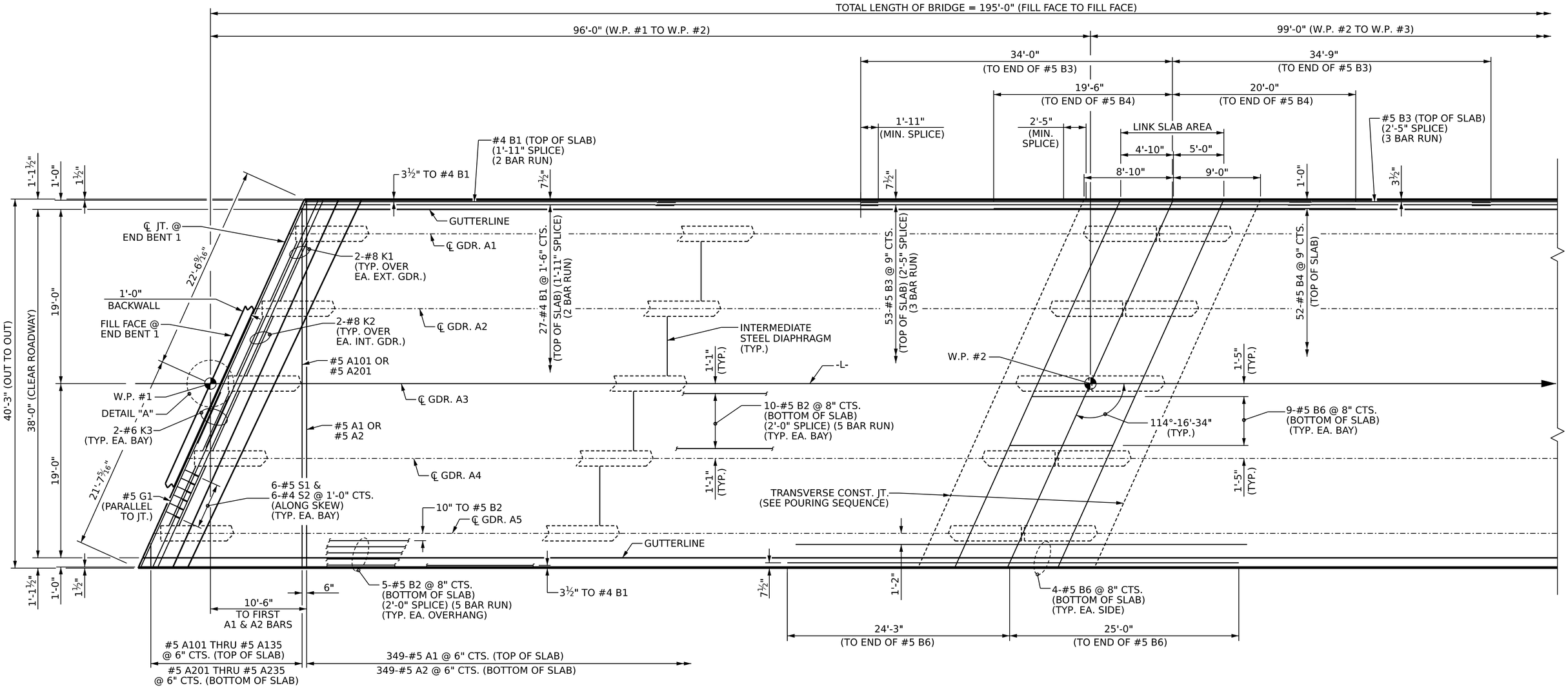

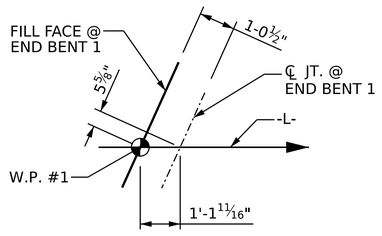

DETAIL "A"

PLAN OF SPAN A

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

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11/16/2023

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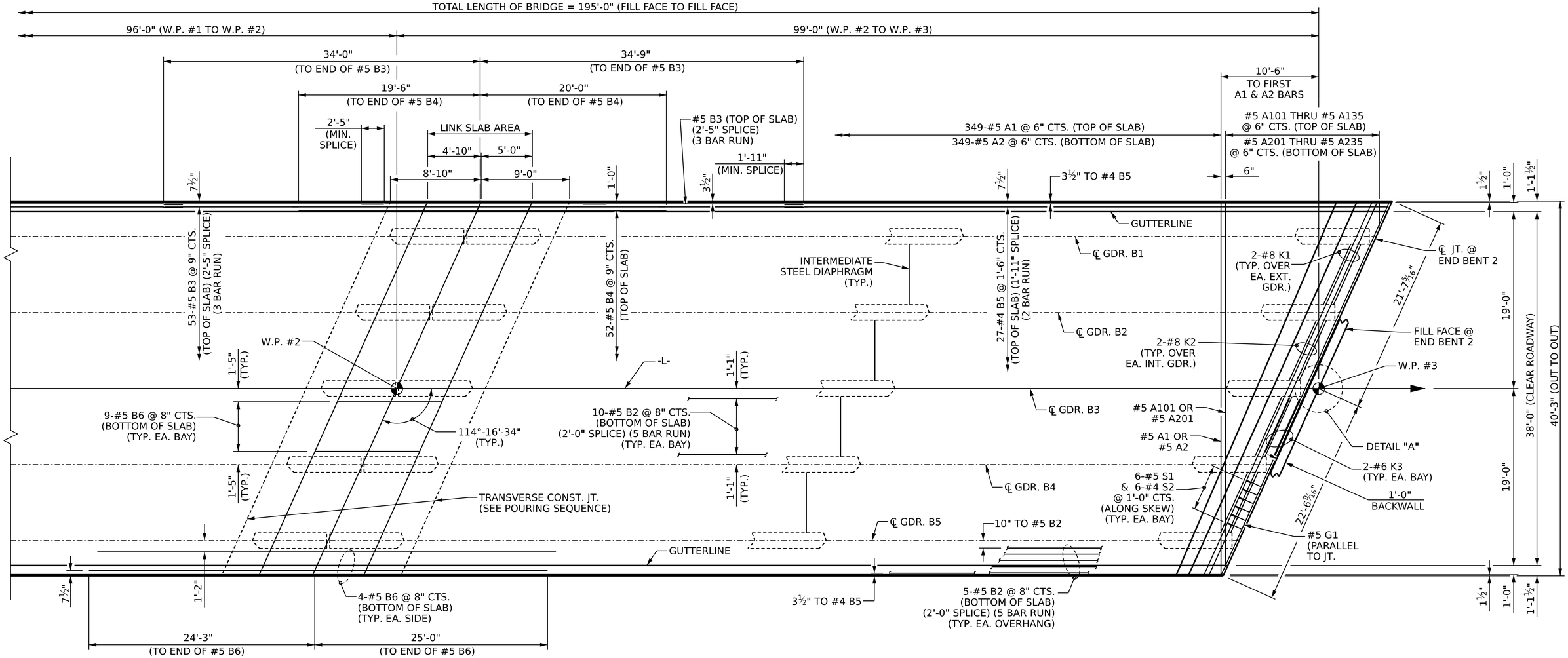
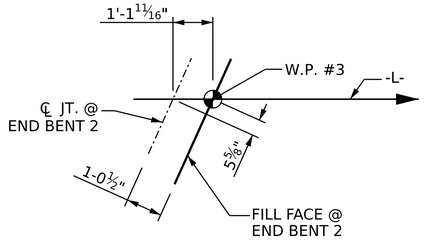


PLAN OF SPAN B

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET



DETAIL "A"

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

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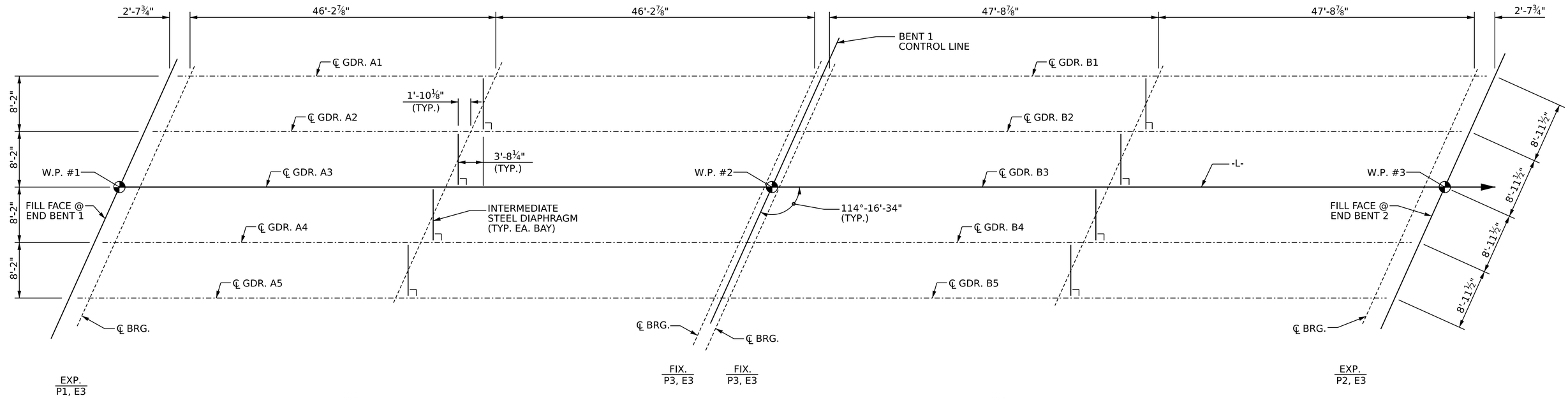
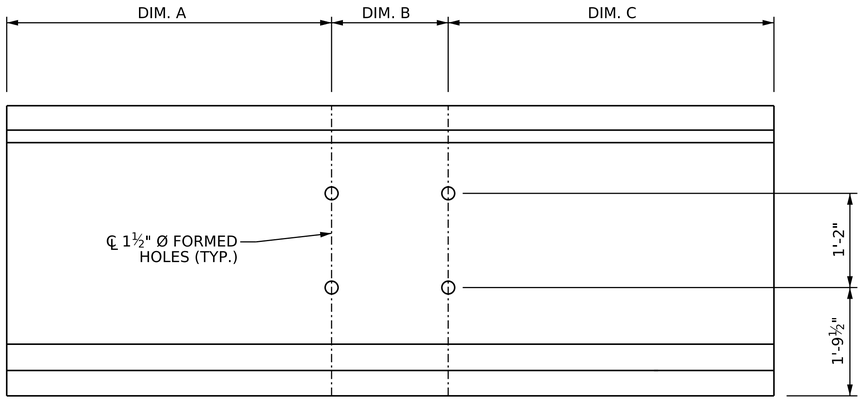


FRAMING PLAN



FORMED HOLE LOCATION			
GIRDER	DIM. A	DIM. B	DIM. C
A1	45'-1¼"	-	48'-9½"
A2, A3, A4	45'-1¼"	3'-8¼"	45'-1¼"
A5	48'-9½"	-	45'-1¼"
B1	46'-7¼"	-	50'-3½"
B2, B3, B4	46'-7¼"	3'-8¼"	46'-7¼"
B5	50'-3½"	-	46'-7¼"

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

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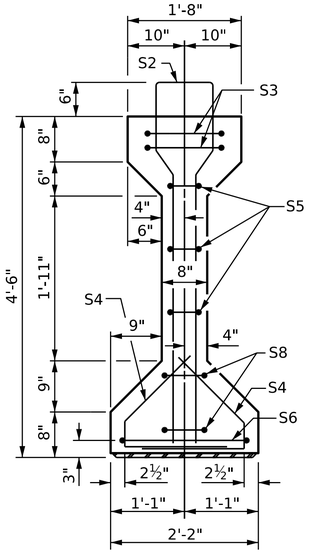
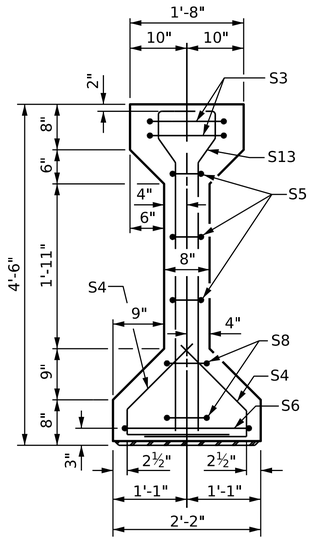
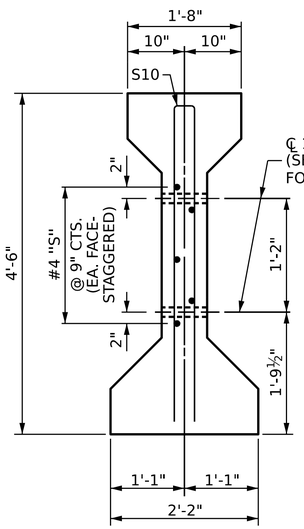


SECTION A-A



SECTION B-B

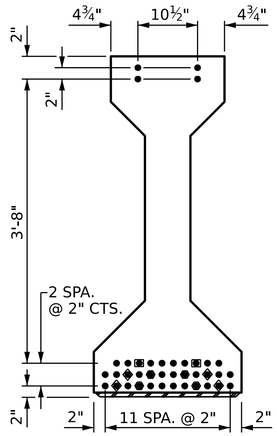


SECTION C-C

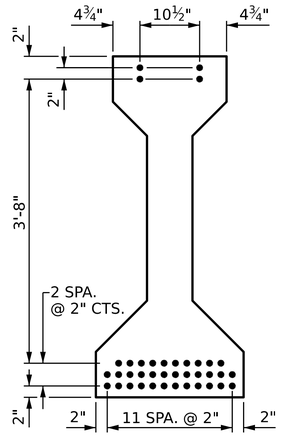
(S1 BARS NOT SHOWN)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

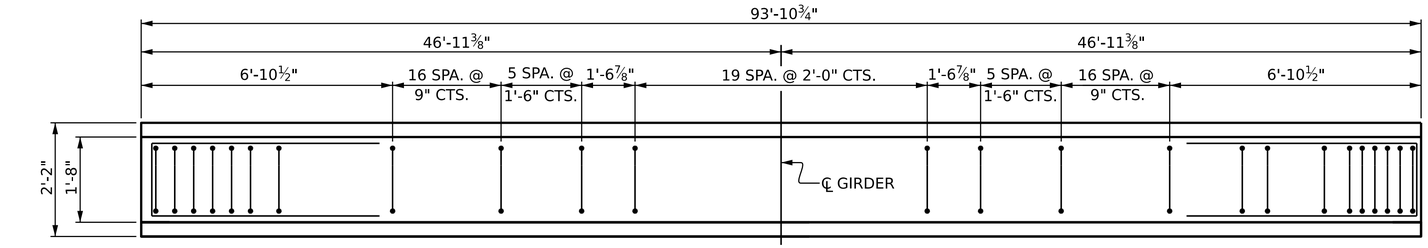


AT END OF GIRDER

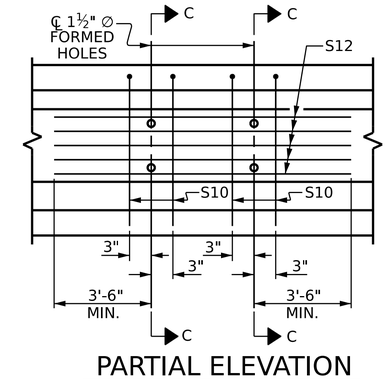


AT ℄ OF GIRDER

0.6" ∅ LOW RELAXATION STRAND LAYOUT

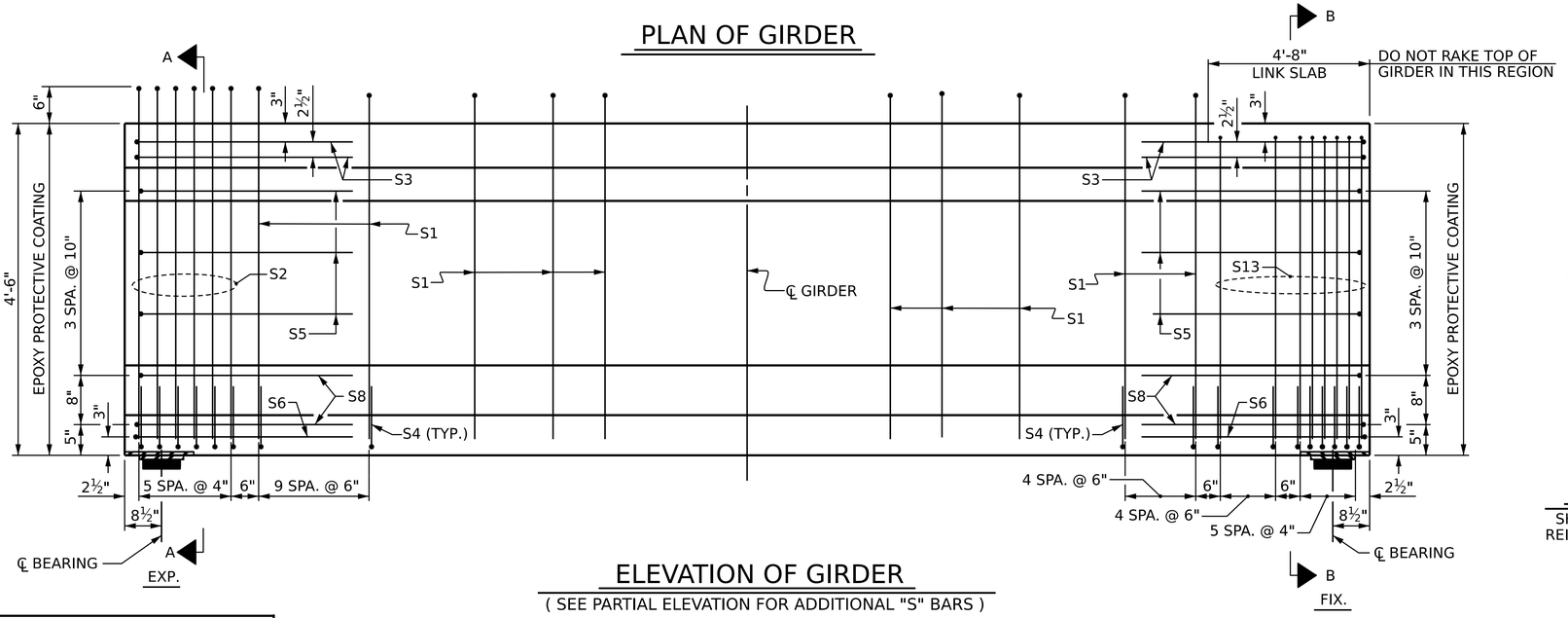


PLAN OF GIRDER



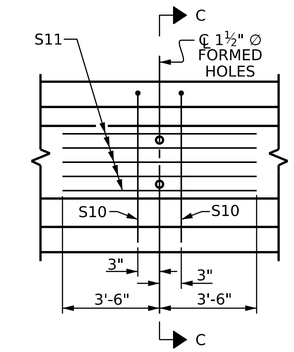
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDERS 2 TO 4



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDERS 1 & 5

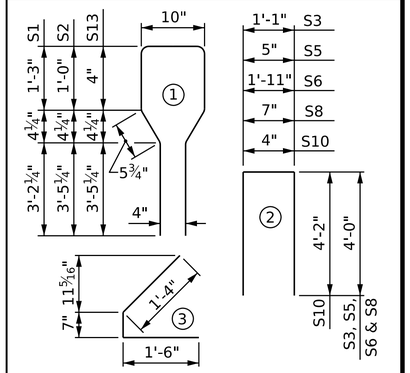
0.6" ∅ L.R. GRADE 270 STRANDS

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	77	#4	1	10'-8"	549
	S2	6	#6	1	10'-8"	96
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	S6	2	#4	2	9'-11"	13
	S8	4	#4	2	8'-7"	23
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	23
INTERIOR GDR.	S12	5	#4	STR	10'-9"	36
	S13	11	#6	1	9'-4"	154

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" ∅ L. R. STRANDS
	LB.	C.Y.	No.
EXT. GIRDER	1,080	19.1	38
INT. GIRDER	1,111	19.1	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	93'-10¾"	469'-5¾"

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER - LINK SLAB SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
11/10/2023

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ASSEMBLED BY : Q. T. NGUYEN	DATE : 07/2023
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DRAWN BY : BNB 09/21	
CHECKED BY : AAI 09/21	

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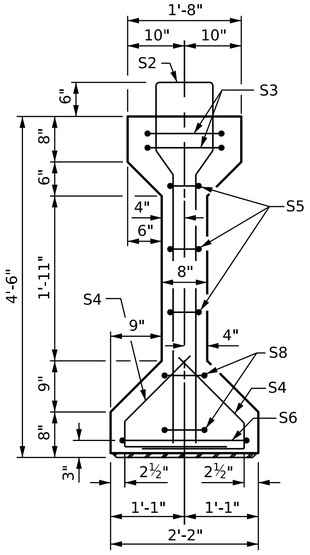
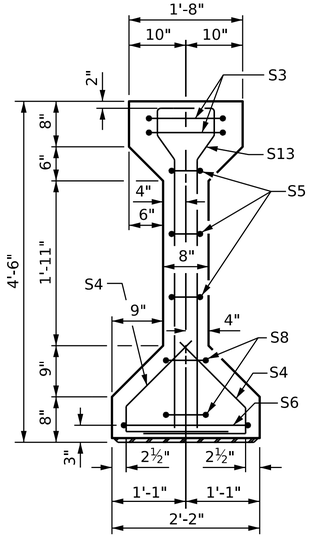
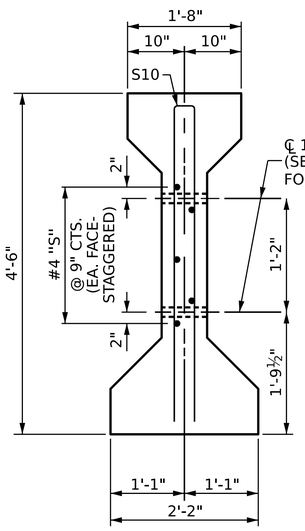


SECTION A-A



SECTION B-B

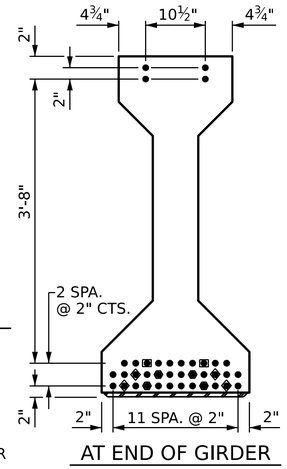


SECTION C-C

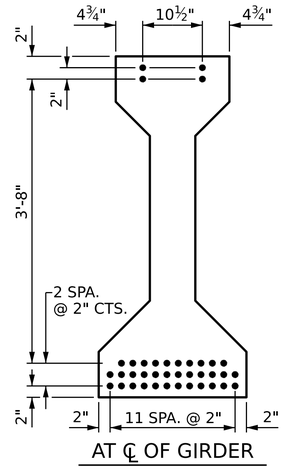
(S1 BARS NOT SHOWN)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

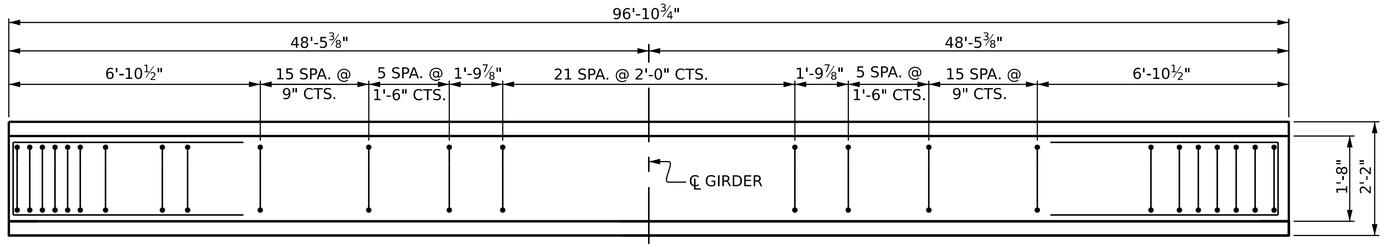


AT END OF GIRDER

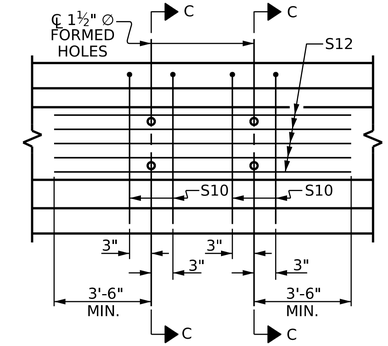


AT ℄ OF GIRDER

0.6" ∅ LOW RELAXATION STRAND LAYOUT

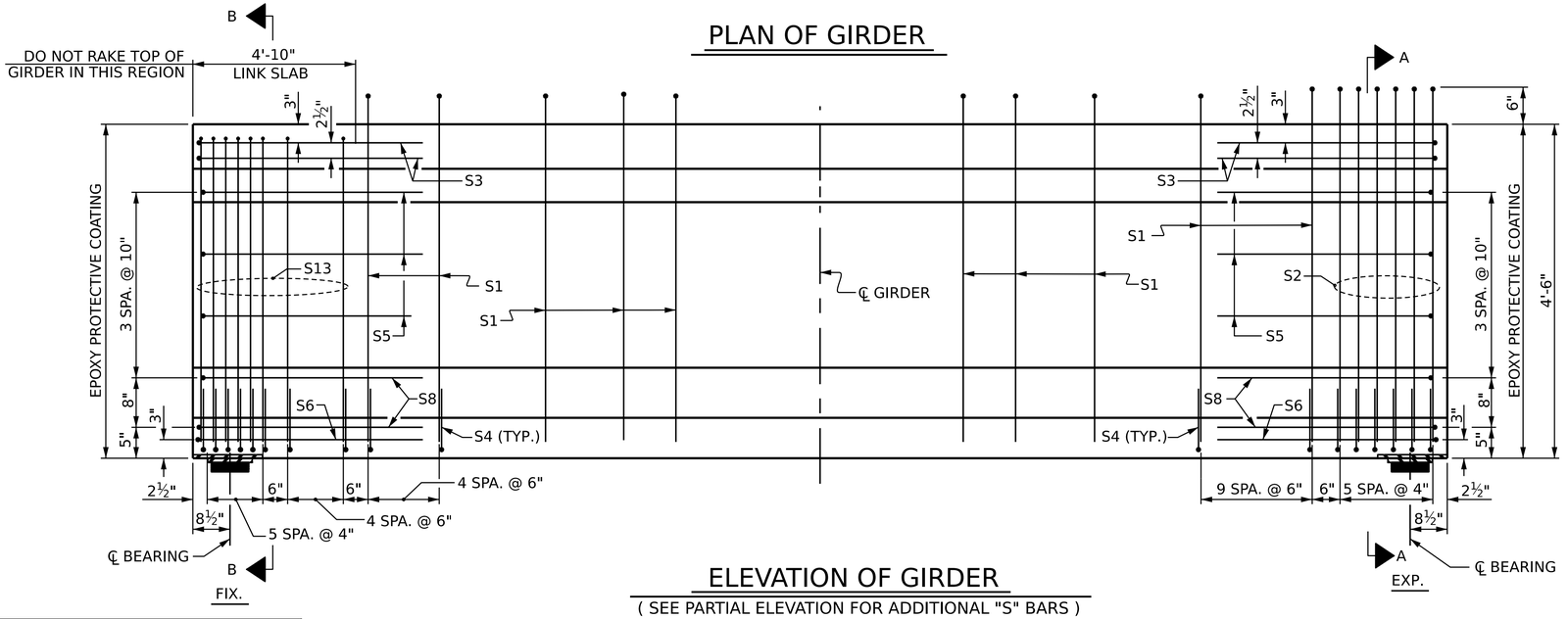


PLAN OF GIRDER



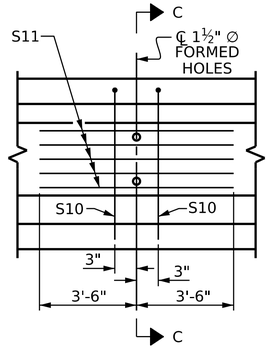
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDERS 2 TO 4



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDERS 1 & 5

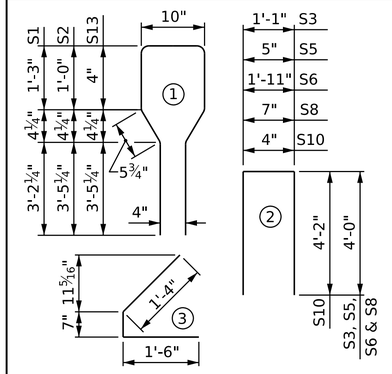
0.6" ∅ L.R. GRADE 270 STRANDS

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	77	#4	1	10'-8"	549
	S2	6	#6	1	10'-8"	96
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	S6	2	#4	2	9'-11"	13
	S8	4	#4	2	8'-7"	23
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	23
INTERIOR GDR.	S12	5	#4	STR	10'-9"	36
	S13	11	#6	1	9'-4"	154

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" ∅ L. R. STRANDS
	LB.	C.Y.	No.
EXT. GIRDER	1,080	19.7	38
INT. GIRDER	1,111	19.7	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	96'-10¾"	484'-5¾"

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER - LINK SLAB SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea B290AD8B6D584EF... 11/16/2023

ASSEMBLED BY :	Q. T. NGUYEN	DATE : 07/2023
CHECKED BY :	N. S. HART	DATE : 07/2023
DRAWN BY :	BNB 09/21	
CHECKED BY :	AAI 09/21	

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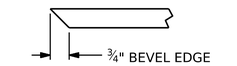
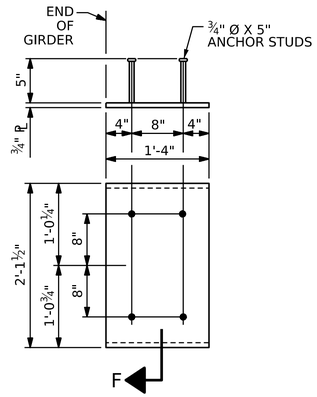
STD. NO. PCG6 (SHT. 1)



SECTION "F"

(SEE NOTES)



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

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

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 0R 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 6500 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" AND LINK SLAB AREAS, SHALL BE RAKED TO A DEPTH OF ¼".

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A GIRDERS 1 THRU 5																				
TWENTIETH POINTS	0	0.050	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	1
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.032	0.062	0.091	0.117	0.141	0.161	0.177	0.188	0.195	0.198	0.195	0.188	0.177	0.161	0.141	0.117	0.091	0.062	0.032	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.018	0.036	0.052	0.067	0.081	0.092	0.102	0.108	0.112	0.114	0.112	0.108	0.102	0.092	0.081	0.067	0.052	0.036	0.018	0
FINAL CAMBER ↑	0"	3/16"	5/16"	7/16"	5/8"	11/16"	13/16"	7/8"	15/16"	1"	1"	1"	15/16"	7/8"	13/16"	11/16"	5/8"	7/16"	5/16"	3/16"	0"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN B GIRDERS 1 THRU 5																				
TWENTIETH POINTS	0	0.050	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	1
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.032	0.063	0.093	0.120	0.144	0.164	0.180	0.192	0.199	0.202	0.199	0.192	0.180	0.164	0.144	0.120	0.093	0.063	0.032	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.021	0.041	0.060	0.077	0.092	0.105	0.116	0.123	0.128	0.130	0.128	0.123	0.116	0.105	0.092	0.077	0.060	0.041	0.021	0
FINAL CAMBER ↑	0"	1/8"	1/4"	3/8"	1/2"	5/8"	11/16"	3/4"	13/16"	7/8"	7/8"	7/8"	13/16"	3/4"	11/16"	5/8"	1/2"	3/8"	1/4"	1/8"	0"

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

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS AND DEFLECTIONS

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
11/16/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
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ASSEMBLED BY :	Z. MALIK	DATE :	07/2023
CHECKED BY :	N. S. HART	DATE :	07/2023
DRAWN BY :	ELR 11/91	REV. 1/15	MAA/TMG
CHECKED BY :	GRP 11/91	REV. 2/15	MAA/TMG
		REV. 12/17	MAA/THC

11/8/2023
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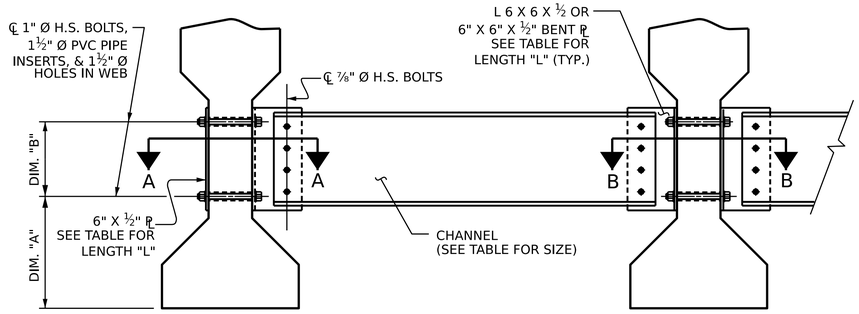
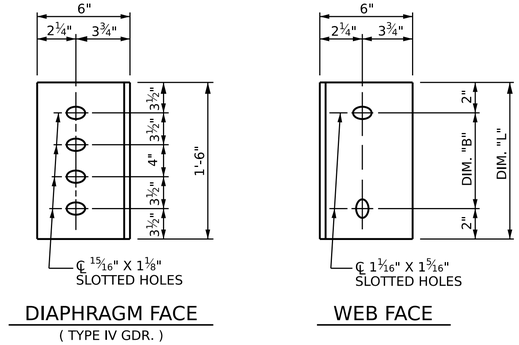


PART SECTION AT INTERMEDIATE DIAPHRAGM

(TYPE IV GIRDER SHOWN)



CONNECTOR PLATE DETAILS

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.

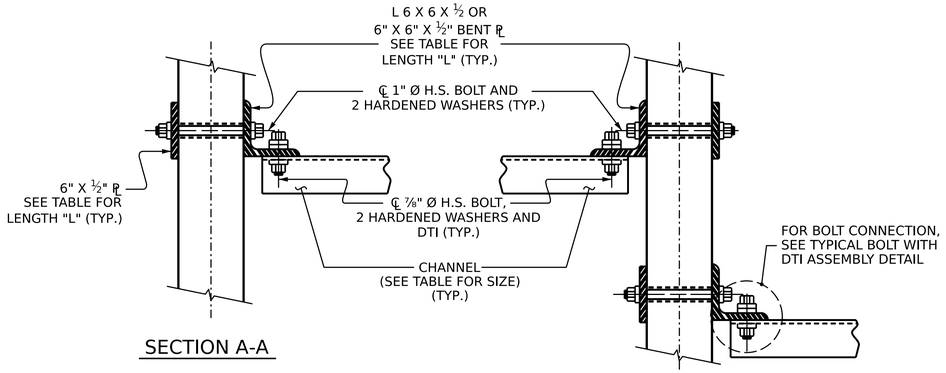
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

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.



CONNECTION DETAILS

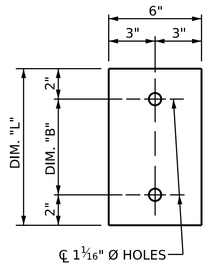
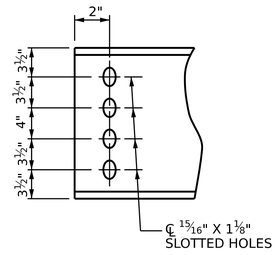
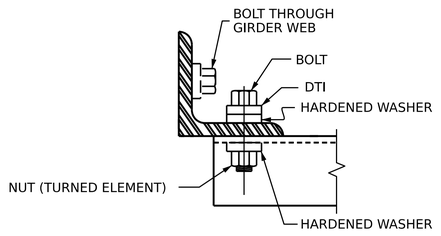


PLATE DETAILS



CHANNEL END

(TYPE IV GDR.)



BOLT WITH DTI ASSEMBLY DETAIL

TABLE

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

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea 11/16/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

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ASSEMBLED BY :	Q. T. NGUYEN	DATE :	05/2023
CHECKED BY :	N. S. HART	DATE :	06/2023
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

10/17/2023
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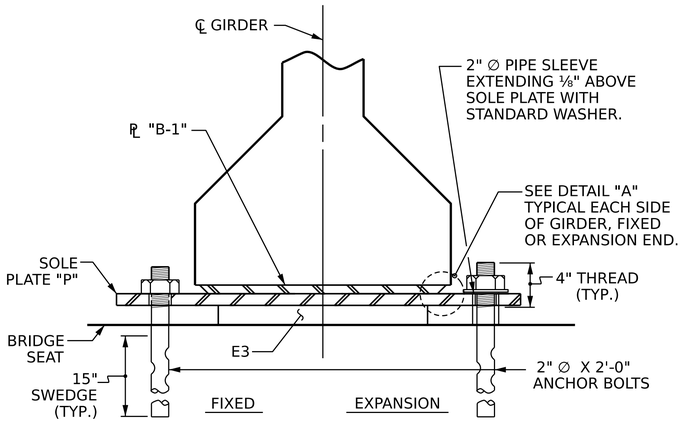
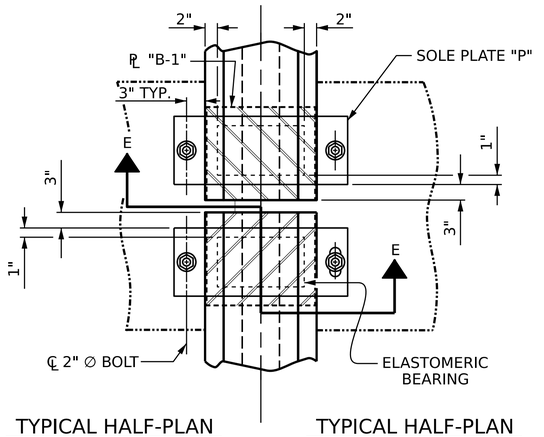
STD. NO. PCG10 (SHT 5)

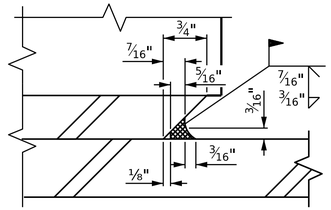


SECTION E-E

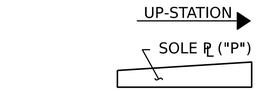


TYPICAL HALF-PLAN
(SHOWING CONTINUOUS BENT)

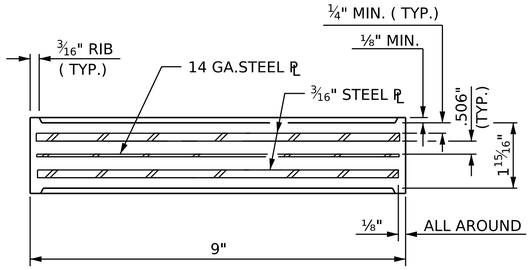
TYPICAL HALF-PLAN
(SHOWING SIMPLE SPAN BENT)



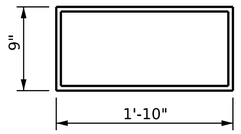
DETAIL "A"



SOLE ℄ PLACEMENT DETAIL



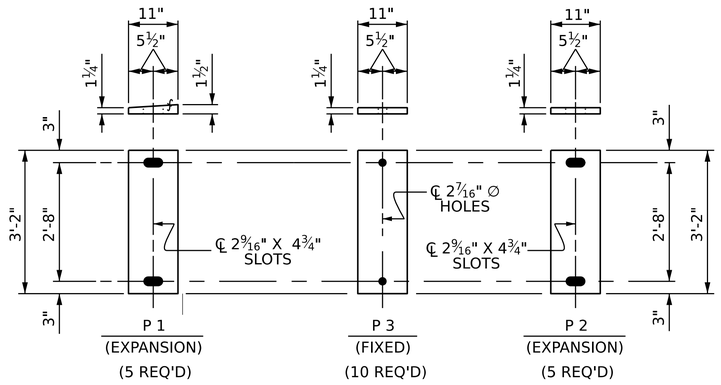
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



SOLE PLATE DETAILS ("P")

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

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" ∅ 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 STANDARDSPECIFICATIONS.

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.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

PROJECT NO. BR-0095
ROCKINGHAM COUNTY
STATION: 16+91.66 -L-

ASSEMBLED BY :	Q. T. NGUYEN	DATE :	05/2023
CHECKED BY :	N. S. HART	DATE :	06/2023
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

11/8/2023
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NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea B790AD8650584EF...
11/16/2023

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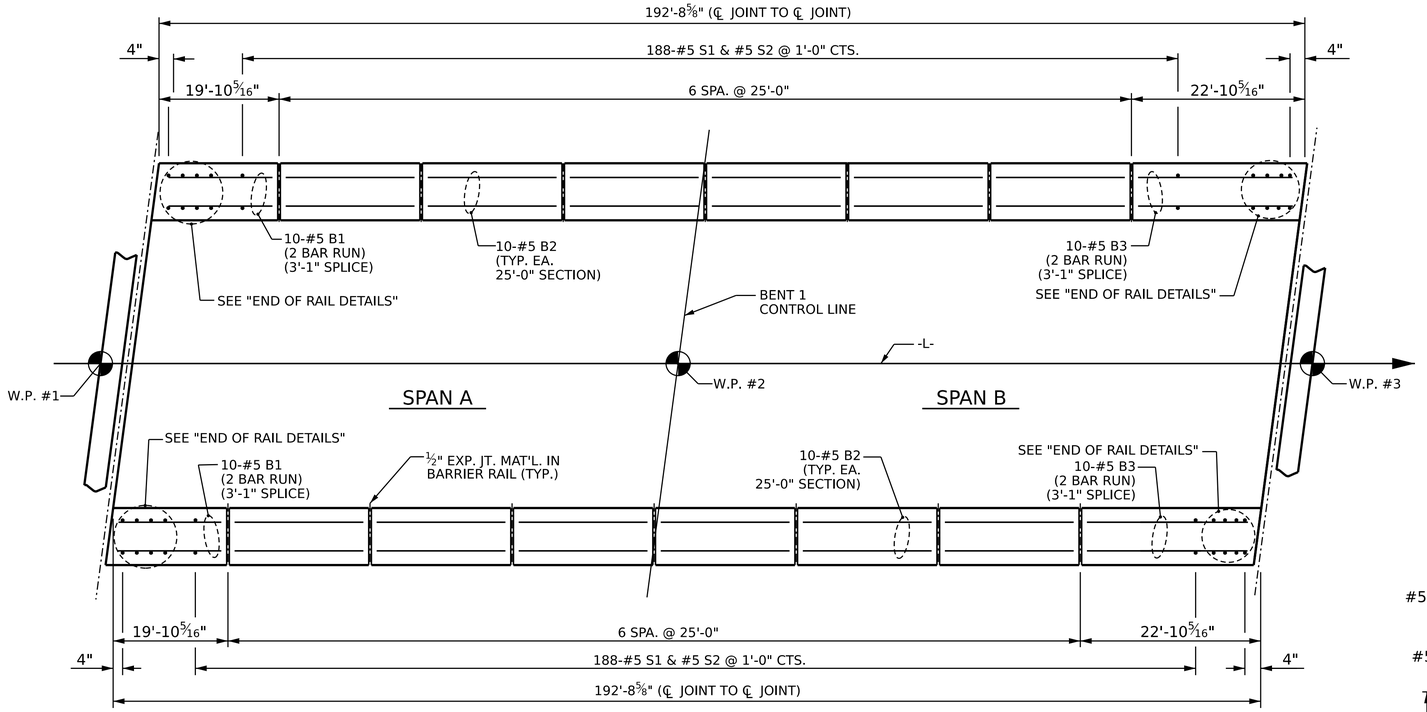
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			29

STD. NO. EB3 (SHT. 3)



PLAN OF VERTICAL CONCRETE 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.

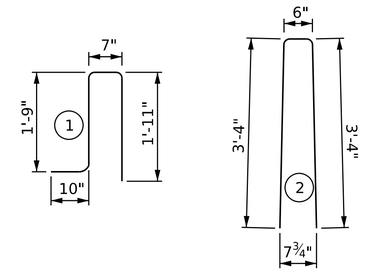
WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 AND S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 AND S4 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.

BAR TYPES

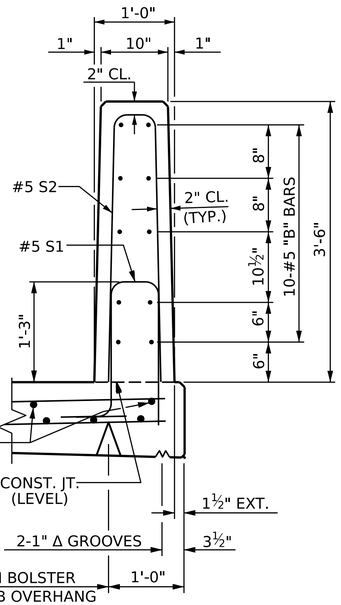


BILL OF MATERIAL

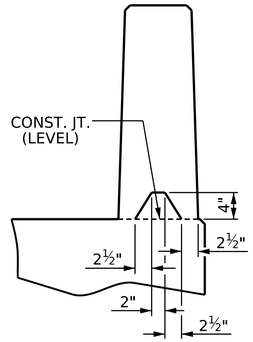
FOR VERTICAL CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	40	#5	STR	11'-5"	476
* B2	120	#5	STR	24'-7"	3077
* B3	40	#5	STR	12'-11"	539
* S1	376	#5	1	5'-1"	1994
* S2	376	#5	2	7'-2"	2811
* S3	16	#5	STR	4'-0"	67
* S4	32	#5	STR	3'-6"	117

* EPOXY COATED REINFORCING STEEL	9,081	LBS.
CLASS AA CONCRETE	45.8	CU. YDS.
VERTICAL CONCRETE BARRIER RAIL	385.43	LIN. FT.

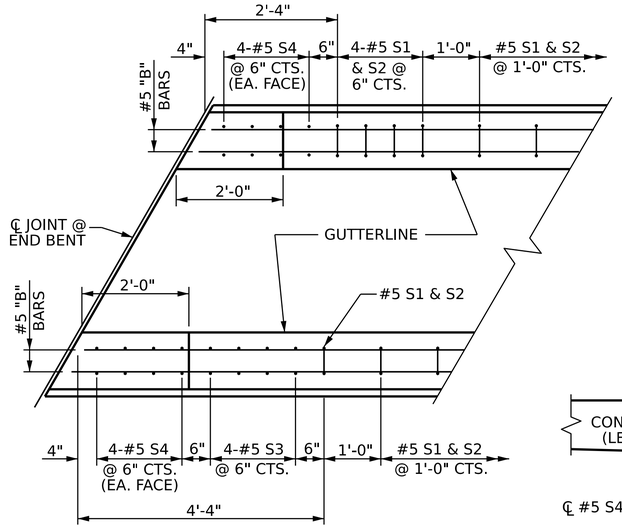


SECTION THRU RAIL

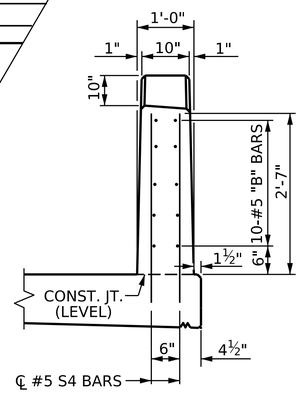


SECTION S-S

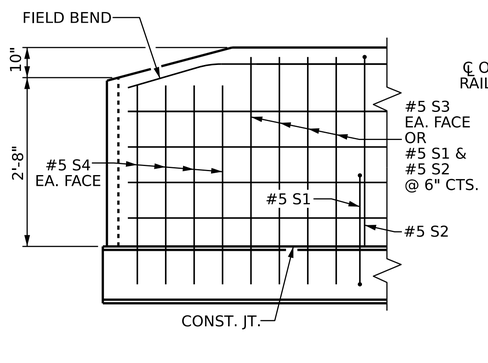
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



PLAN



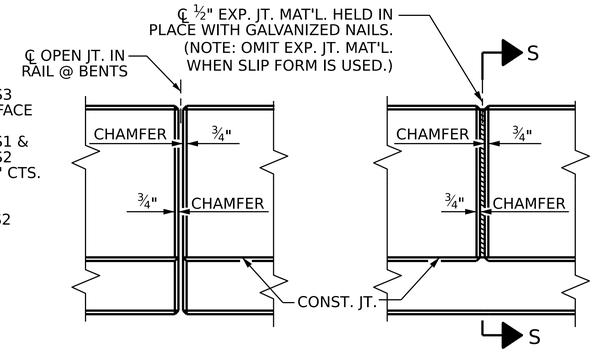
END VIEW



SIDE VIEW

END OF RAIL DETAILS

FOR ADHESIVE ACHORING AT SAWED JOINTS



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea 11/16/2023

ASSEMBLED BY :	Q. T. NGUYEN
CHECKED BY :	Z. MALIK
DATE :	05/2023
DATE :	07/2023
DRAWN BY :	MAA 5/10
CHECKED BY :	GM 5/10

REV.		
REV. 6/13		MAA/GM
REV. 12/17		MAA/THC
REV. 5/18		MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			29

STD. NO. CBR2 (SHT 2)

11/8/2023
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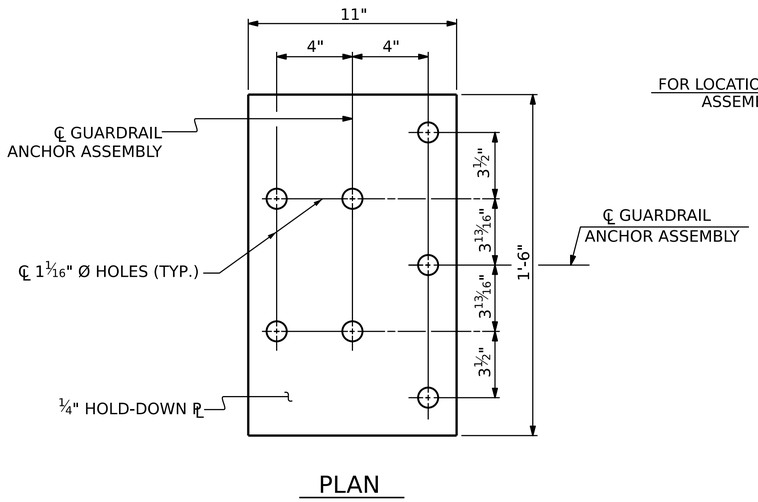
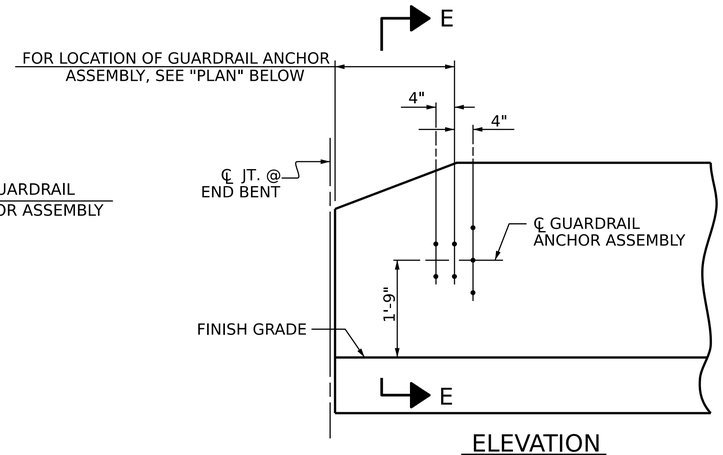


PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD DOWN PLATE AND 7 - ⅞" Ø BOLTS WITH NUTS AND WASHERS.

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞" 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.)

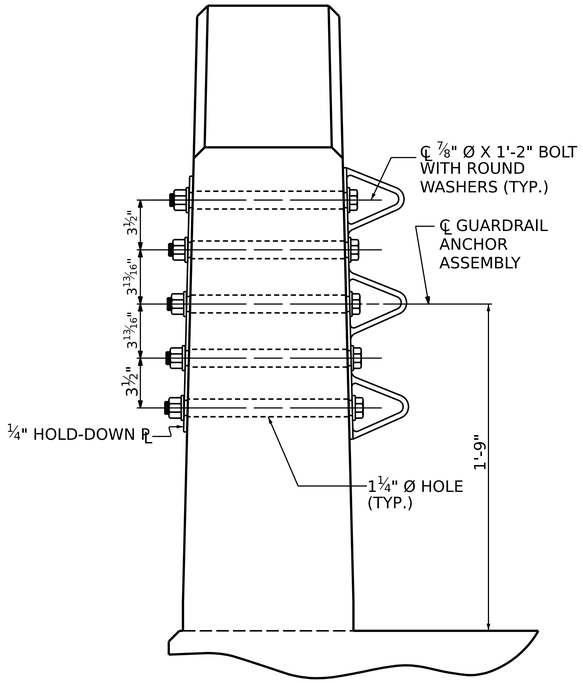
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 VERTICAL CONCRETE BARRIER RAIL.

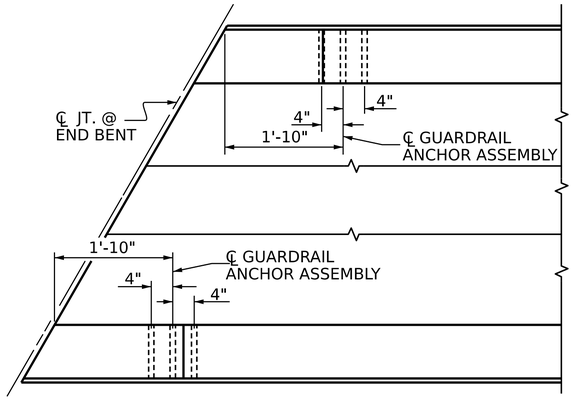
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1¼" 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.



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

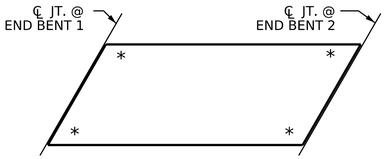


PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

℄ GUARDRAIL
ANCHOR ASSEMBLY



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea 87D9ADB6E6584EF...

11/16/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO	BY:	DATE:	NO	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			29

ASSEMBLED BY :	Q. T. NGUYEN	DATE :	05/2023
CHECKED BY :	Z. MALIK	DATE :	07/2023
DRAWN BY :	MAA 5/10	REV. 1/15	MAA/TMG
CHECKED BY :	GM 5/10	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC

10/17/2023
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(SHT 1a) STD. NO. GRA3

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE			REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)			(LBS.)	(LBS.)
	POUR 1	POUR 2	TOTAL		
SPANS A & B	110.0	136.0	246.0	28,708	25,985
TOTALS **	110.0	136.0	246.0	28,708	25,985

** QUANTITIES FOR BRIDGE RAIL NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	827	SQ.FT.
BRIDGE DECK	6,729	SQ.FT.
TOTAL	7,556	SQ.FT.

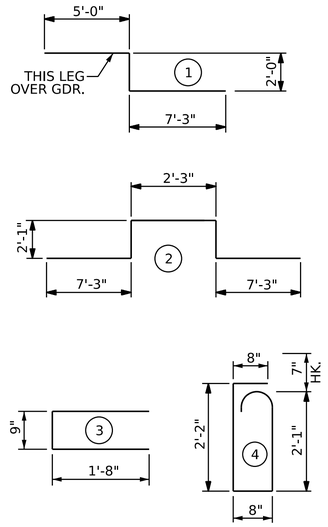
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	349	5	STR.	39'-10"	14500	* A129	2	5	STR.	8'-0"	17	A224	2	5	STR.	13'-7"	28
A2	349	5	STR.	39'-10"	14500	* A130	2	5	STR.	6'-11"	14	A225	2	5	STR.	12'-5"	26
						* A131	2	5	STR.	5'-9"	12	A226	2	5	STR.	11'-4"	24
* A101	2	5	STR.	39'-1"	82	* A132	2	5	STR.	4'-8"	10	A227	2	5	STR.	10'-3"	21
* A102	2	5	STR.	37'-11"	79	* A133	2	5	STR.	3'-7"	7	A228	2	5	STR.	9'-1"	19
* A103	2	5	STR.	36'-10"	77	* A134	2	5	STR.	2'-6"	5	A229	2	5	STR.	8'-0"	17
* A104	2	5	STR.	35'-9"	75	* A135	2	5	STR.	1'-4"	3	A230	2	5	STR.	6'-11"	14
* A105	2	5	STR.	34'-7"	72							A231	2	5	STR.	5'-9"	12
* A106	2	5	STR.	33'-6"	70	A201	2	5	STR.	39'-1"	82	A232	2	5	STR.	4'-8"	10
* A107	2	5	STR.	32'-5"	68	A202	2	5	STR.	37'-11"	79	A233	2	5	STR.	3'-7"	7
* A108	2	5	STR.	31'-3"	65	A203	2	5	STR.	36'-10"	77	A234	2	5	STR.	2'-6"	5
* A109	2	5	STR.	30'-2"	63	A204	2	5	STR.	35'-9"	75	A235	2	5	STR.	1'-4"	3
* A110	2	5	STR.	29'-1"	61	A205	2	5	STR.	34'-7"	72						
* A111	2	5	STR.	27'-11"	58	A206	2	5	STR.	33'-6"	70	* B1	58	4	STR.	32'-3"	1249
* A112	2	5	STR.	26'-10"	56	A207	2	5	STR.	32'-5"	68	B2	250	5	STR.	40'-2"	10473
* A113	2	5	STR.	25'-9"	54	A208	2	5	STR.	31'-3"	65	* B3	165	5	STR.	24'-7"	4231
* A114	2	5	STR.	24'-8"	51	A209	2	5	STR.	30'-2"	63	* B4	52	5	STR.	39'-6"	2142
* A115	2	5	STR.	23'-6"	49	A210	2	5	STR.	29'-1"	61	* B5	58	4	STR.	33'-4"	1291
* A116	2	5	STR.	22'-5"	47	A211	2	5	STR.	27'-11"	58	B6	44	5	STR.	49'-3"	2260
* A117	2	5	STR.	21'-4"	45	A212	2	5	STR.	26'-10"	56						
* A118	2	5	STR.	20'-2"	42	A213	2	5	STR.	25'-9"	54	* G1	2	5	STR.	43'-8"	91
* A119	2	5	STR.	19'-1"	40	A214	2	5	STR.	24'-8"	51						
* A120	2	5	STR.	18'-0"	38	A215	2	5	STR.	23'-6"	49	* K1	4	8	1	14'-3"	152
* A121	2	5	STR.	16'-10"	35	A216	2	5	STR.	22'-5"	47	* K2	6	8	2	20'-11"	335
* A122	2	5	STR.	15'-9"	33	A217	2	5	STR.	21'-4"	45	* K3	8	6	STR.	6'-7"	79
* A123	2	5	STR.	14'-8"	31	A218	2	5	STR.	20'-2"	42						
* A124	2	5	STR.	13'-7"	28	A219	2	5	STR.	19'-1"	40	* S1	48	5	4	6'-2"	309
* A125	2	5	STR.	12'-5"	26	A220	2	5	STR.	18'-0"	38	* S2	48	4	3	4'-1"	131
* A126	2	5	STR.	11'-4"	24	A221	2	5	STR.	16'-10"	35						
* A127	2	5	STR.	10'-3"	21	A222	2	5	STR.	15'-9"	33						
* A128	2	5	STR.	9'-1"	19	A223	2	5	STR.	14'-8"	31						

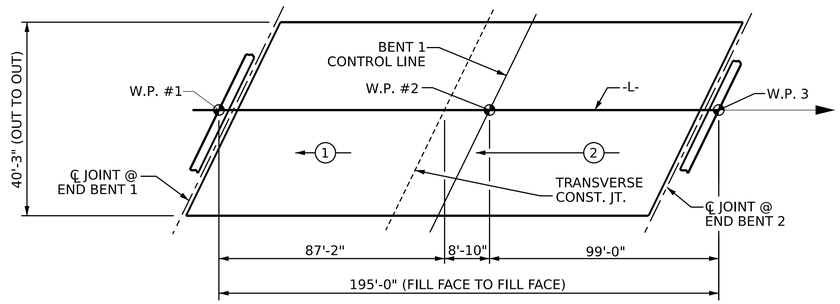
REINFORCING STEEL 28,708 LBS.

* EPOXY COATED REINFORCING STEEL 25,985 LBS.

BAR TYPES

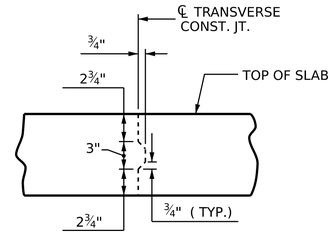


ALL BAR DIMENSIONS ARE OUT TO OUT



POUR SEQUENCE

POUR NUMBER ◯

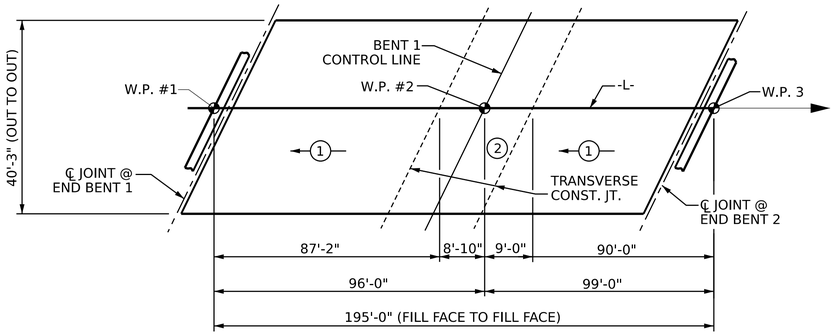


TRANSVERSE CONSTRUCTION JOINT DETAIL

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

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

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

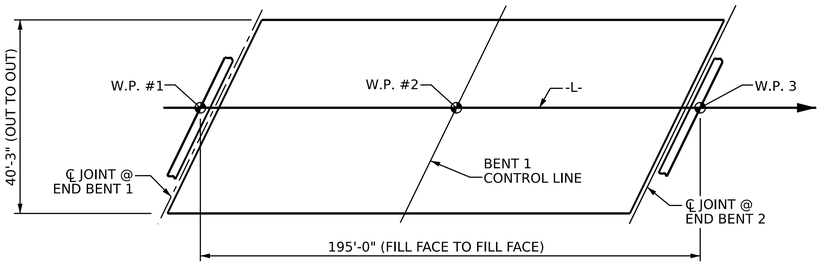


OPTIONAL POUR SEQUENCE

POUR NUMBER ◯

POUR (2) CAN NOT BE STARTED UNTIL BOTH ADJACENT POURS (1) REACHED A MINIMUM OF 3000 PSI

◄◯— POUR DIRECTION



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 7,753)

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea 11/16/2023

ASSEMBLED BY :	Q. T. NGUYEN	DATE :	05/2023
CHECKED BY :	F. LEA	DATE :	08/2023
DRAWN BY :	JMB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY :	SJD 9/87	REV. 12/17	MAA/THC
		REV. 06/19	BNB/THC

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1			3			TOTAL SHEETS
2			4			29

11/8/2023
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STD. NO. BOM2

NOTES

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3.

STIRRUPS AND U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

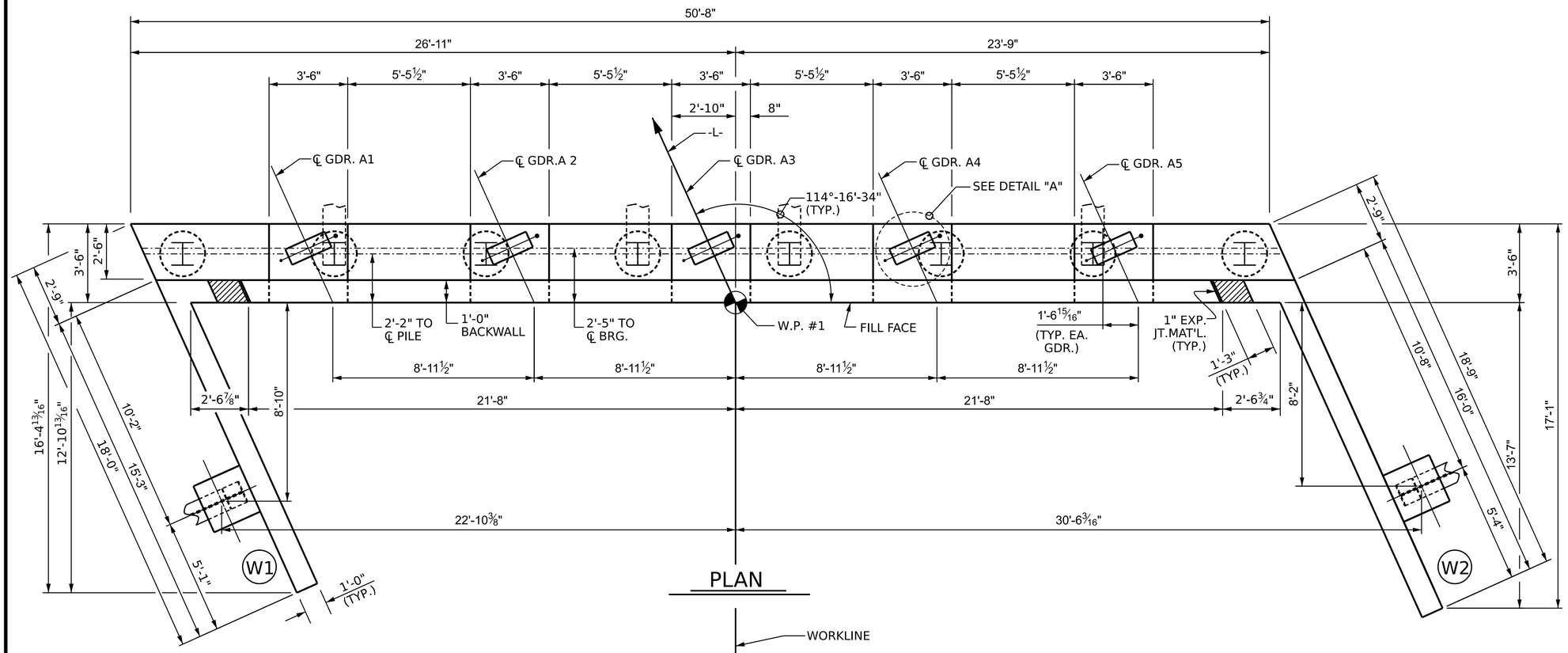
FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

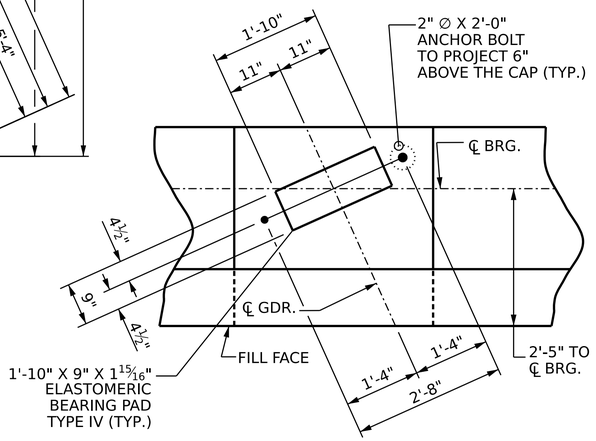
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

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

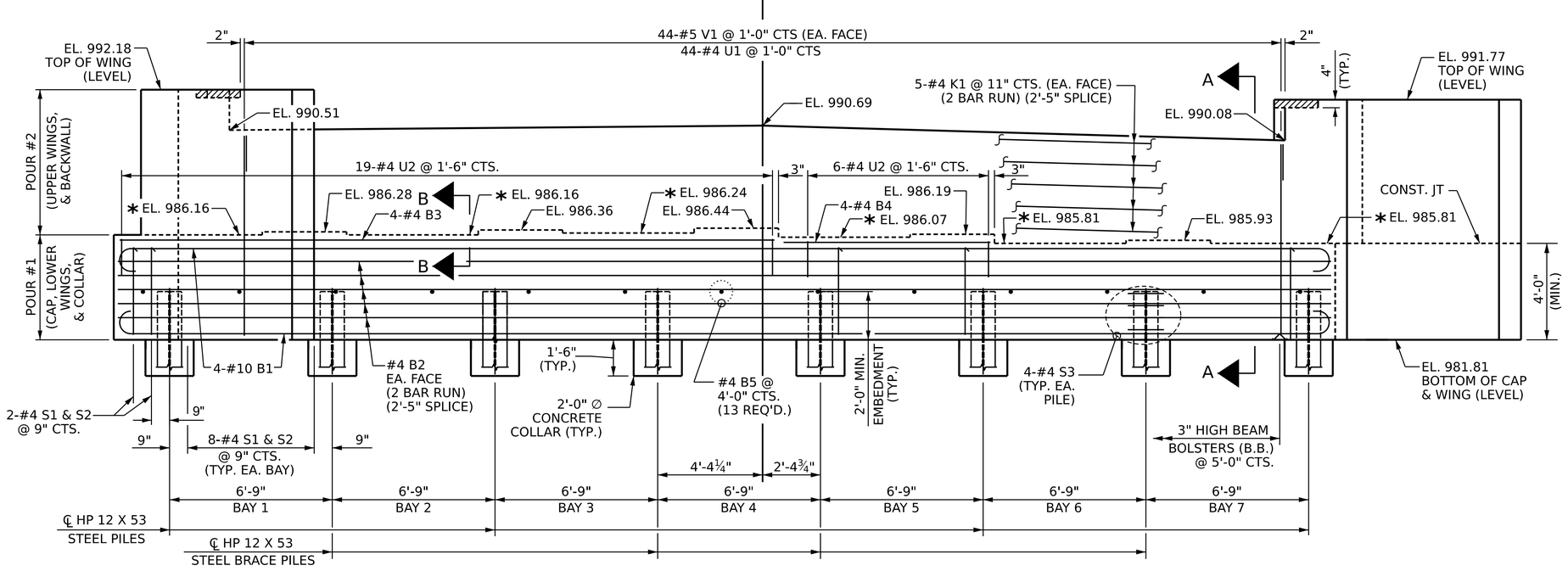


PLAN



DETAIL "A"

(TYP. EA. GDR.)



ELEVATION

(BRACE PILE IN WINGS NOT SHOWN FOR CLARITY)

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
B7B0A2B0259B4EF...
11/16/2023

DRAWN BY : Q. T. NGUYEN DATE : 03/2023
CHECKED BY : Z. MALIK DATE : 03/2023
DESIGN ENGINEER OF RECORD: Z. MALIK DATE : 03/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			29

11/7/2023
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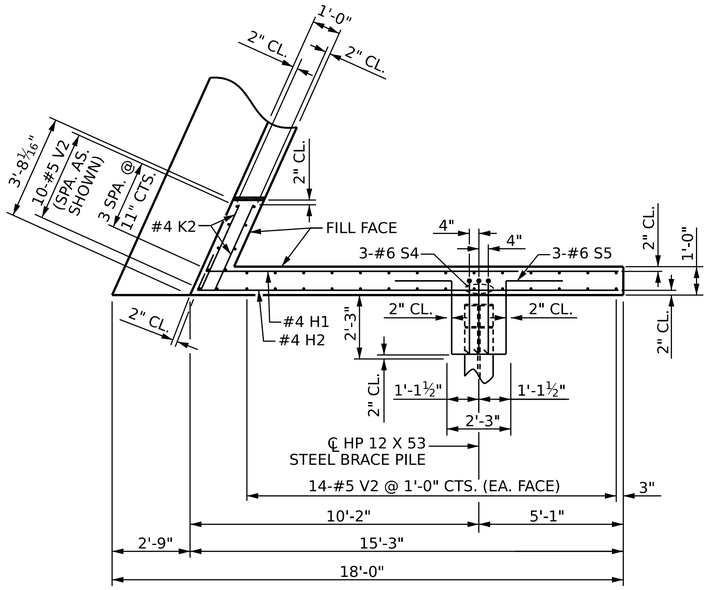
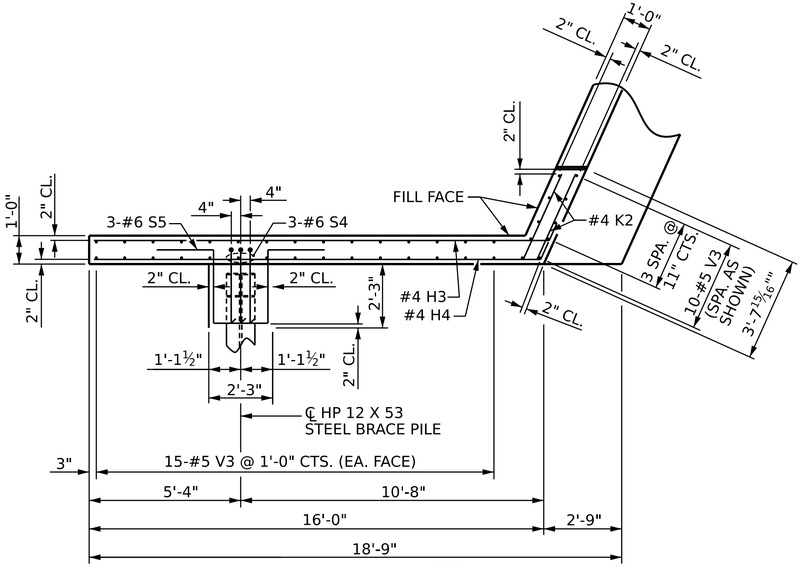
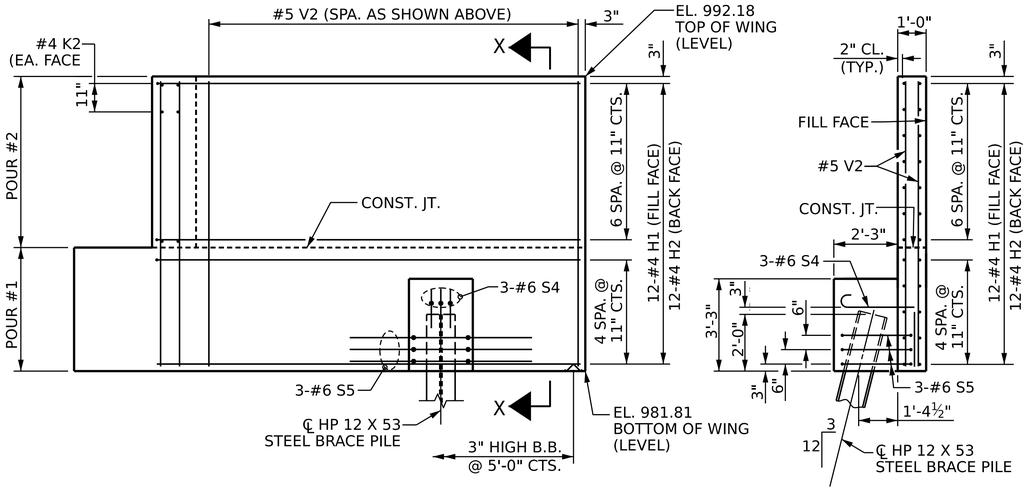


PLAN OF WING W1

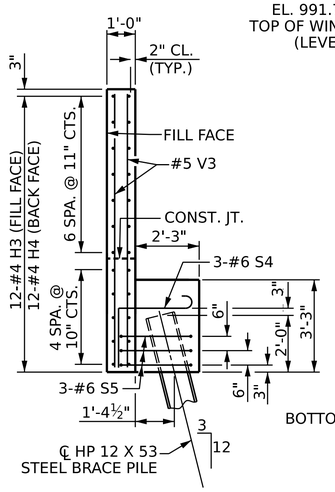


PLAN OF WING W2



ELEVATION OF WING W1

SECTION X-X



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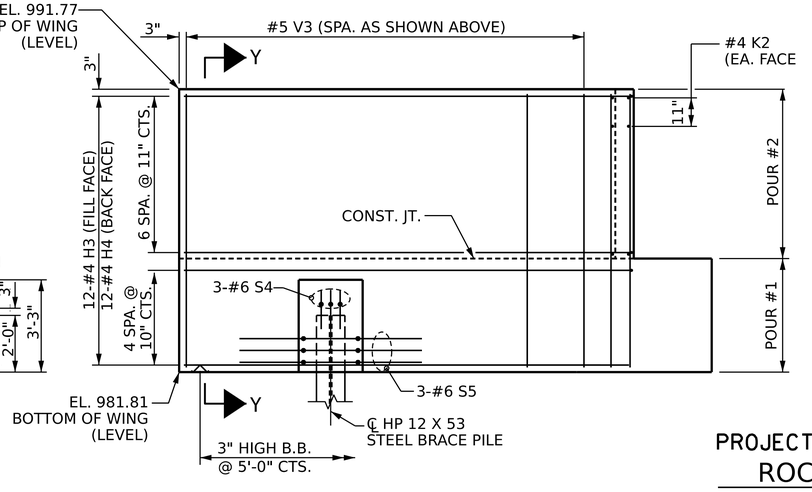

ELEVATION OF WING W2

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
B790ADB65D684EF...
11/16/2023

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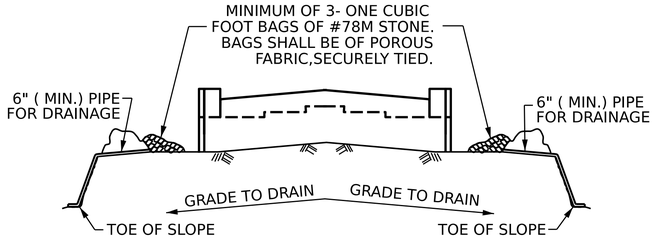
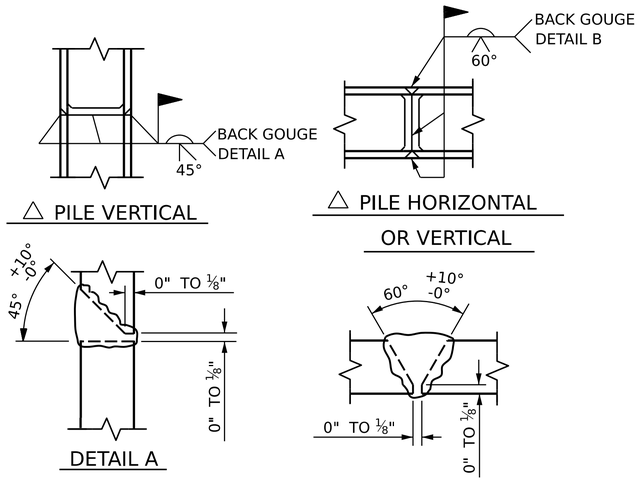


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

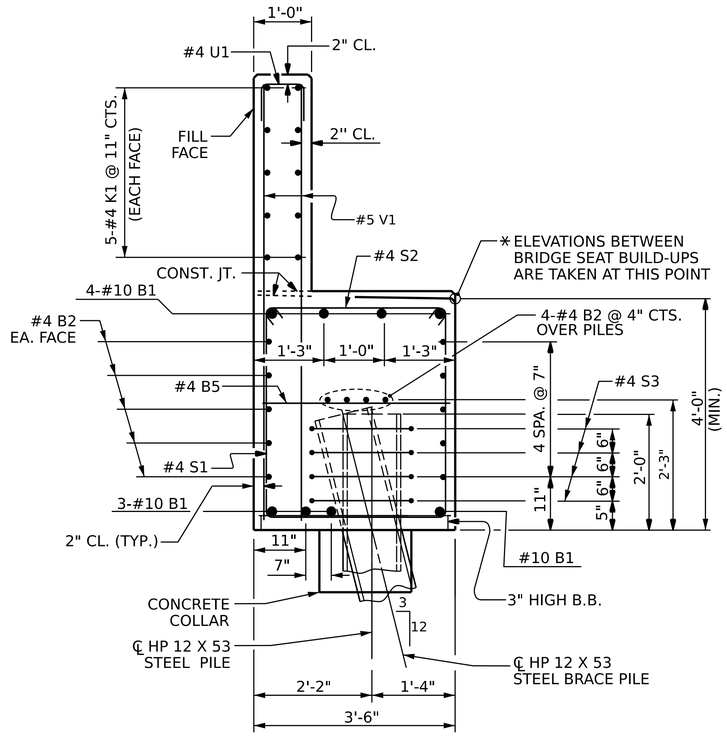
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

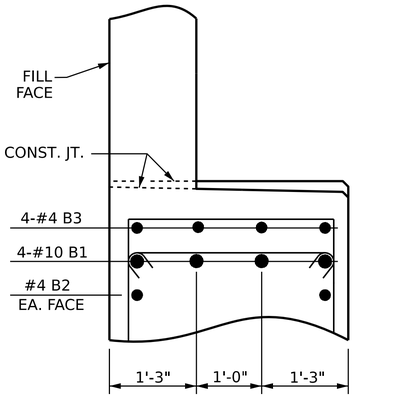


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

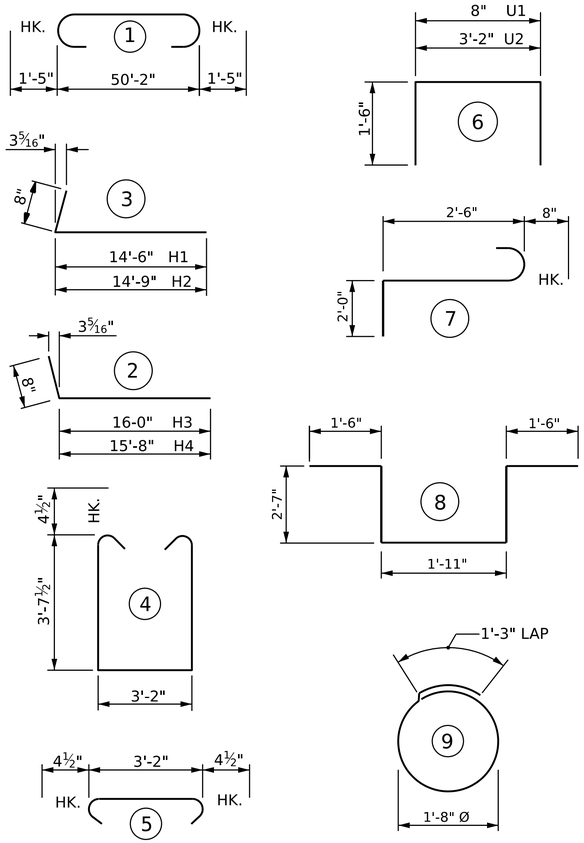


SECTION A-A



PARTIAL SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	53'-0"	1824
B2	28	#4	STR	27'-7"	516
B3	4	#4	STR	27'-2"	73
B4	4	#4	STR	8'-7"	23
B5	13	#4	STR	3'-2"	27
H1	12	#4	2	15'-2	122
H2	12	#4	2	15'-5"	124
H3	12	#4	3	16'-8"	134
H4	12	#4	3	16'-4"	131
K1	20	#4	STR	27'-7"	369
K2	8	#4	STR	3'-3"	17
S1	58	#4	4	11'-2"	433
S2	58	#4	5	3'-11"	152
S3	32	#4	9	6'-6"	139
S4	6	#6	7	5'-2"	47
S5	6	#6	8	10'-1"	91
U1	44	#4	6	3'-8"	108
U2	25	#4	6	6'-2"	103
V1	88	#5	STR	7'-11"	727
V2	38	#5	STR	10'-0"	396
V3	40	#5	STR	9'-7"	400

REINFORCING STEEL LBS. 5,956

CLASS A CONCRETE

POUR #1 (CAP, LOWER WINGS, & COLLARS)	CU. YDS.	36.5
POUR #2 (UPPER WINGS & BACKWALL)	CU. YDS.	15.0
TOTAL	CU. YDS.	51.5

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

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DESIGN ENGINEER OF RECORD: Z. MALIK DATE : 03/2023

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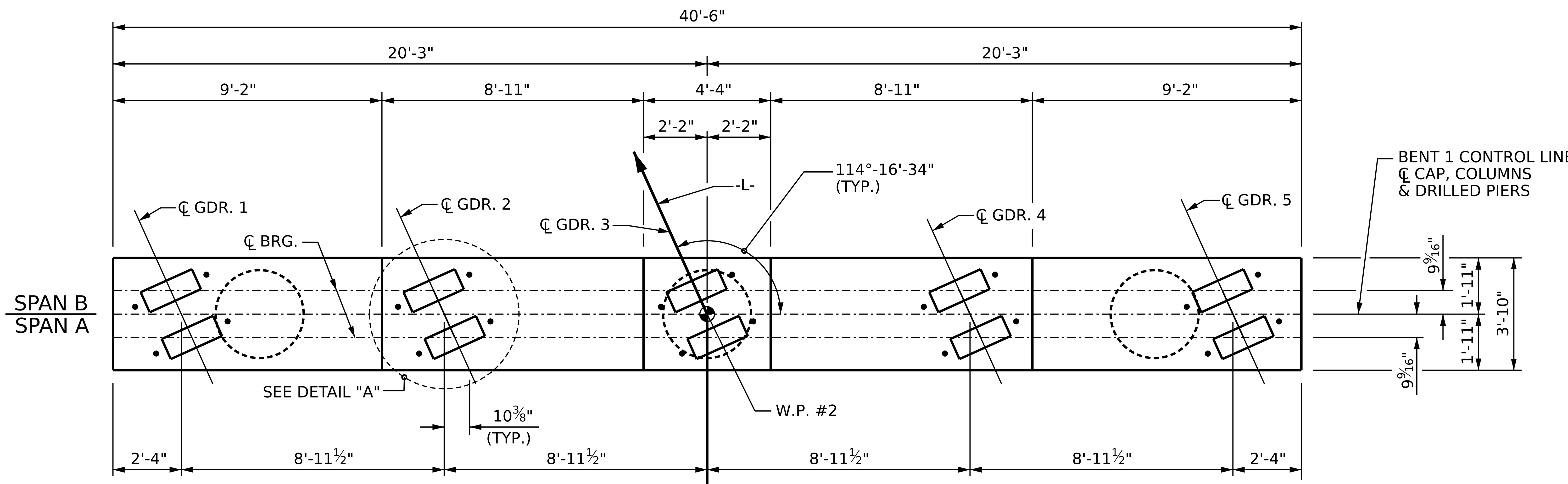

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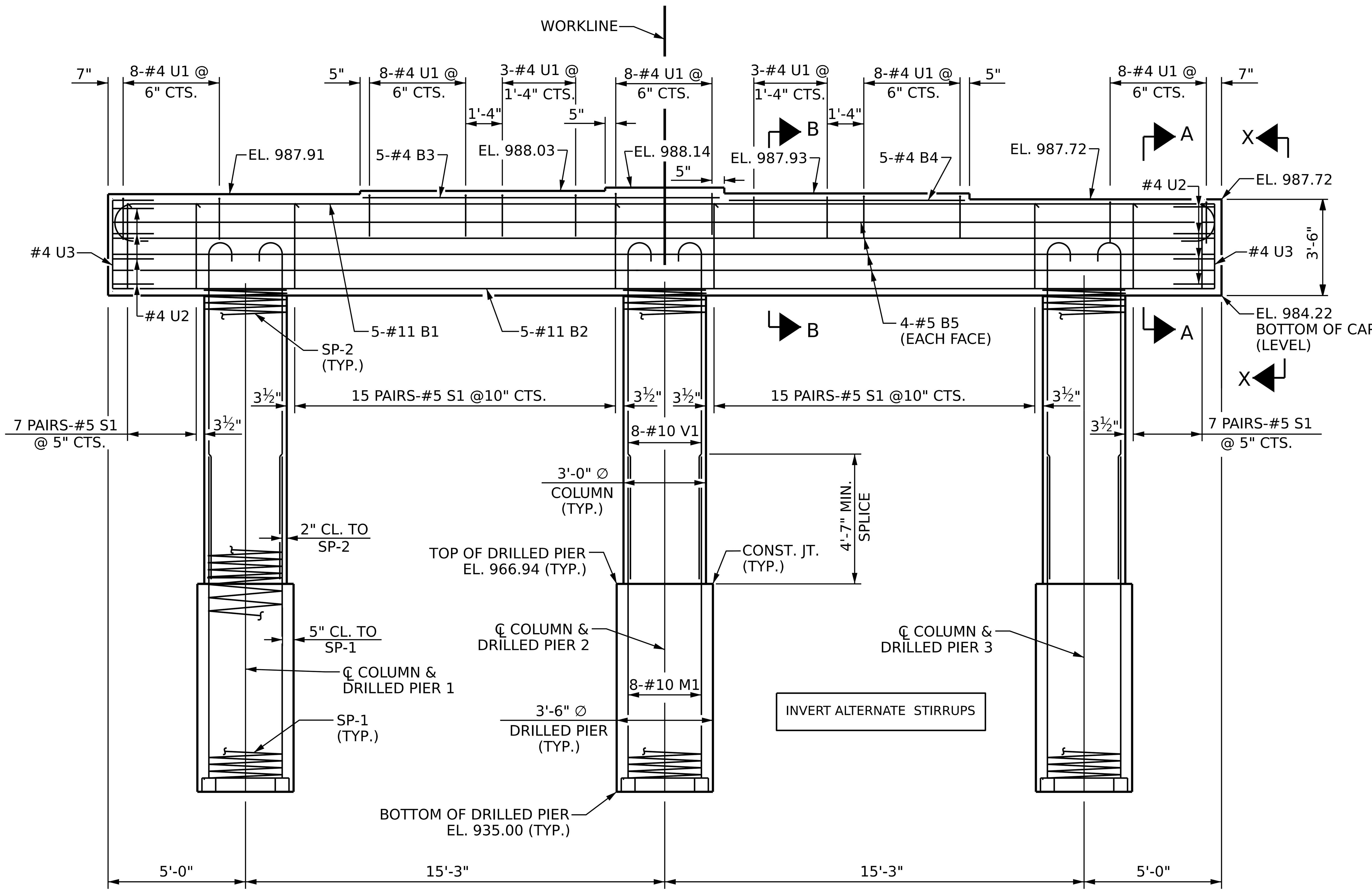
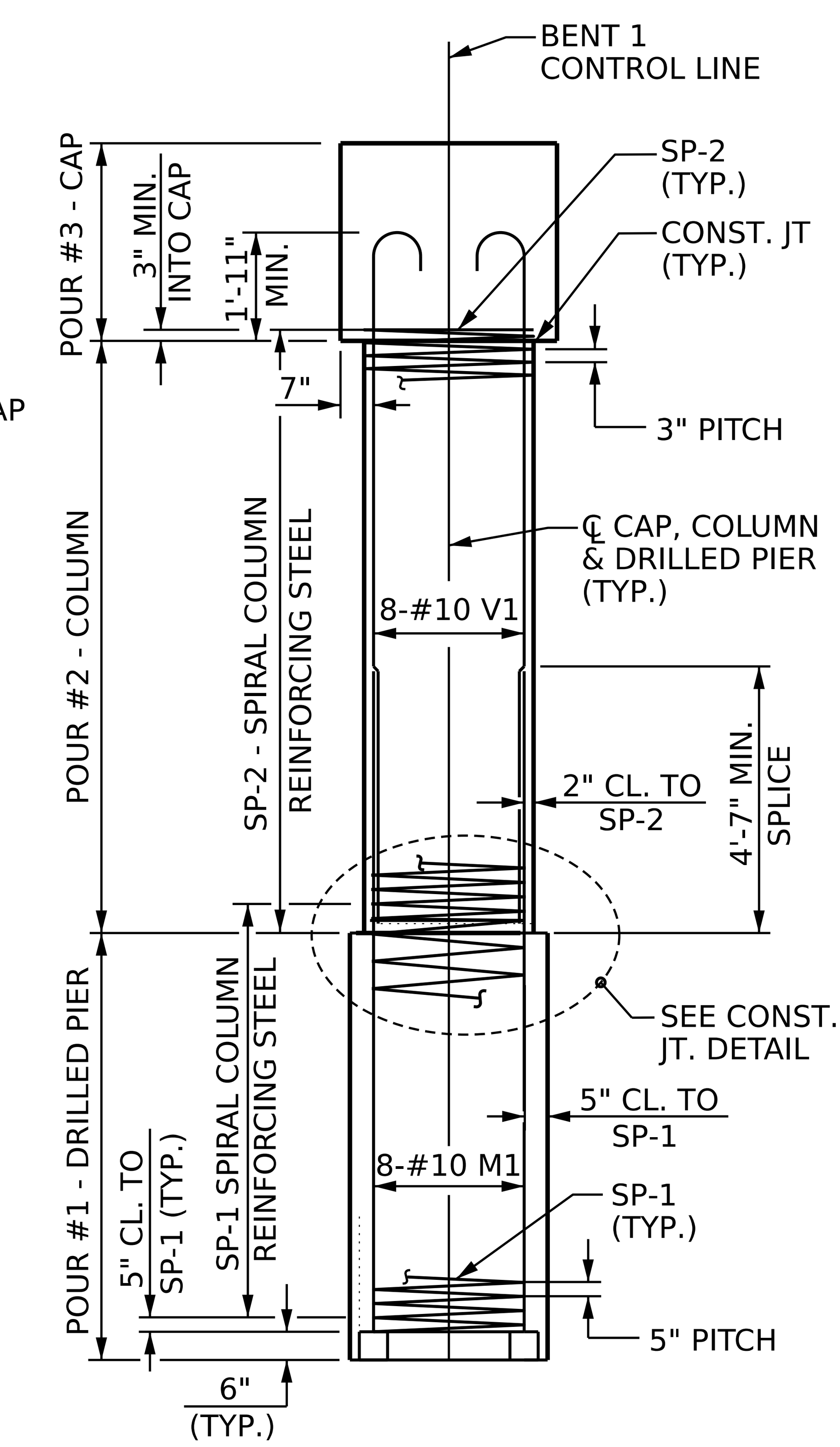
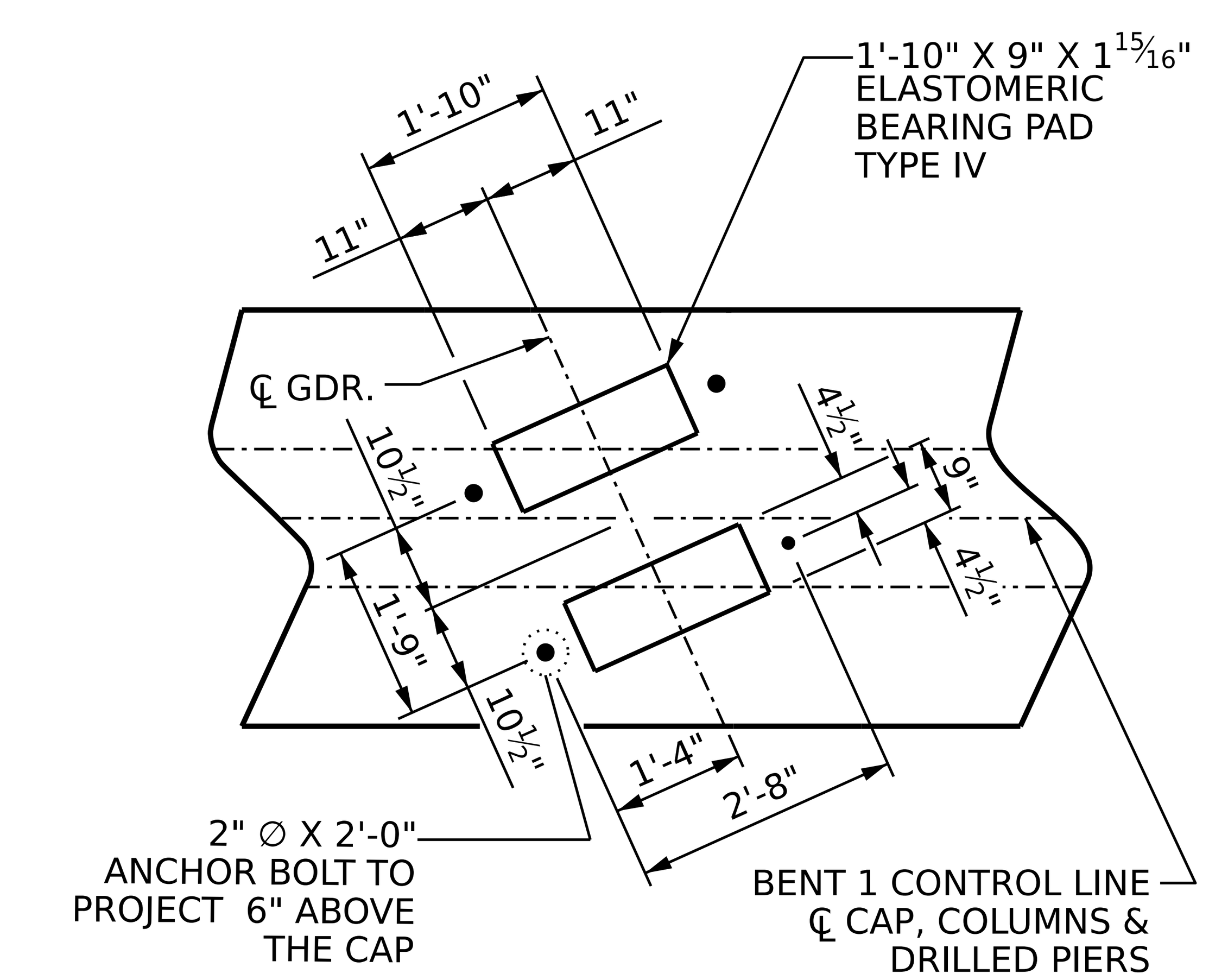


ELEVATION



END ELEVATION



DETAIL "A"

(TYP. EA. GDR.)

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" OR "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIER WILL NOT BE PERMITTED.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

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SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036871 FRANCESCA LEA

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11/16/2023

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

BENT 1

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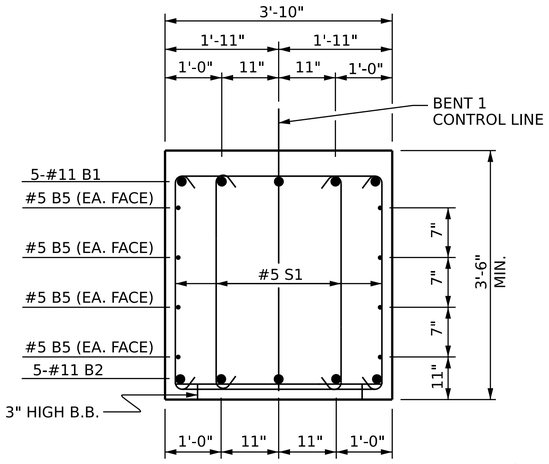
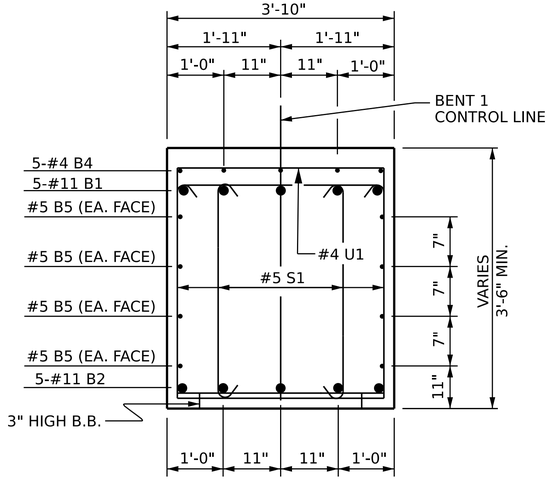
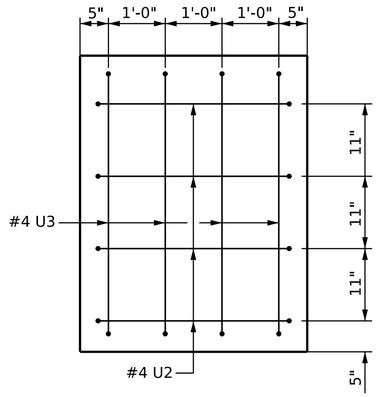


SECTION A-A

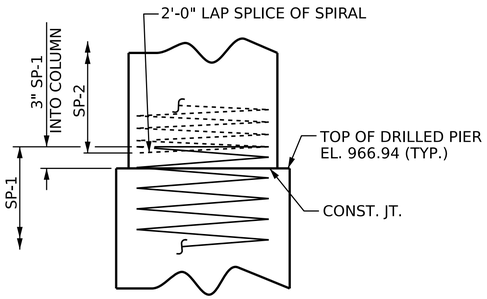


INVERT ALTERNATE
PAIRS OF STIRRUPS

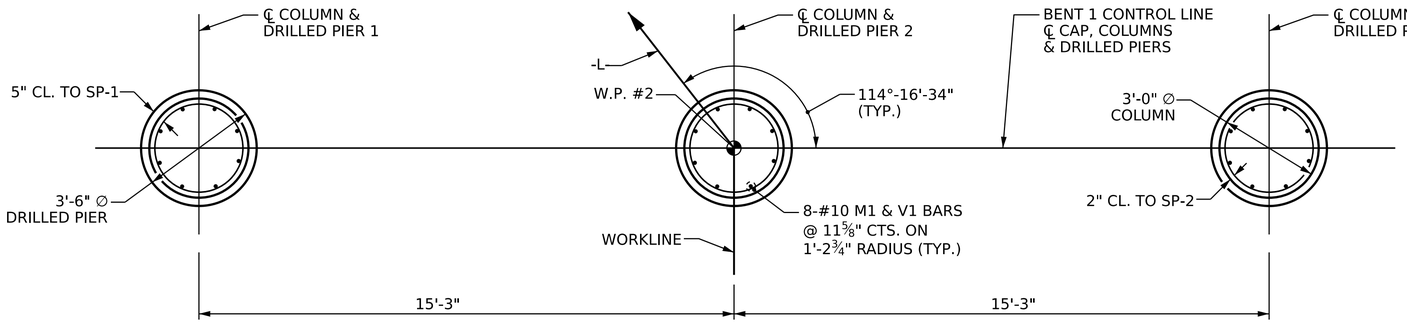
SECTION B-B



SECTION X-X



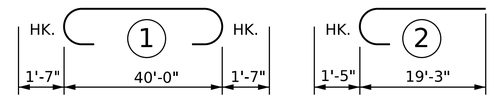
CONSTRUCTION JOINT DETAIL

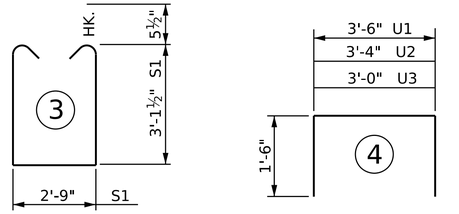


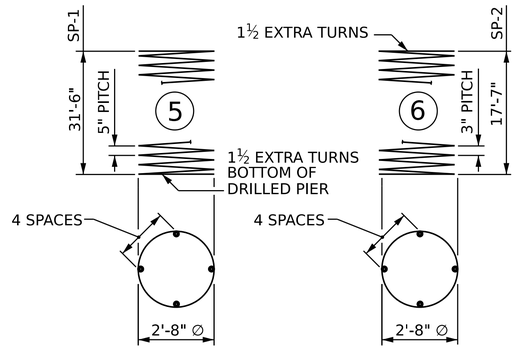
PLAN OF DRILLED PIERS AND COLUMNS

(REINFORCING STEEL AND DIMENSIONS ARE TYPICAL
FOR EACH DRILLED PIER AND COLUMN)

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#11	1	43'-2"	1147
B2	5	#11	STR	40'-2"	1067
B3	5	#4	STR	12'-11"	43
B4	5	#4	STR	8'-7"	29
B5	8	#5	STR	40'-2"	335
M1	24	#10	STR	39'-4"	4062
S1	88	#5	3	9'-11"	910
U1	46	#4	4	6'-6"	200
U2	8	#4	4	6'-4"	34
U3	8	#4	4	6'-0"	32
V1	24	#10	2	20'-8"	2134
REINFORCING STEEL				LBS.	9,993
SP-1	3	*	5	633'-4"	1982
SP-2	3	**	6	594'-1"	1191

SPIRAL COLUMN
REINFORCING STEEL LBS. 3,173

CLASS A CONCRETE

POUR #2 - COLUMN	CU. YDS.	13.6
POUR #3 - CAP	CU. YDS.	21.3
TOTAL	CU. YDS.	34.9

DRILLED PIER CONCRETE

POUR #1 - DRILLED PIERS	CU. YDS.	34.1

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31
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.

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

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11/16/2023

DRAWN BY : Z. MALIK DATE : 4/2023
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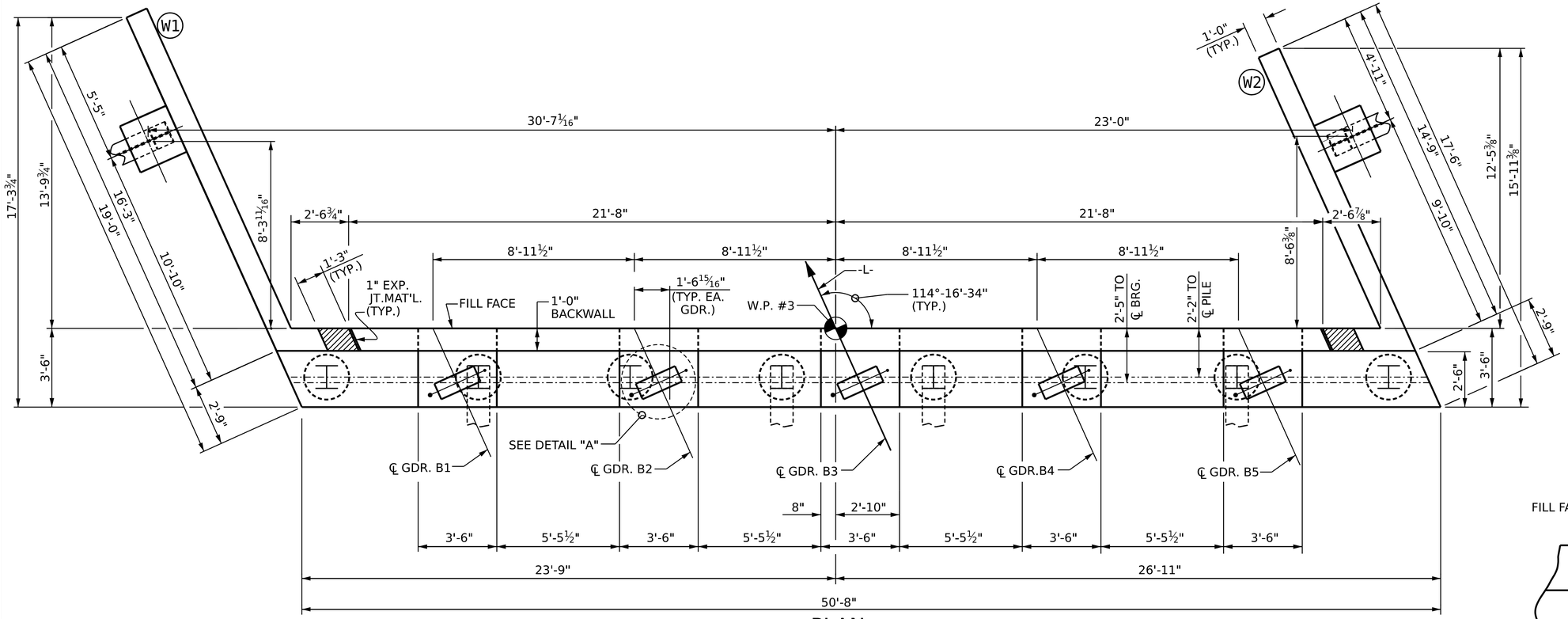
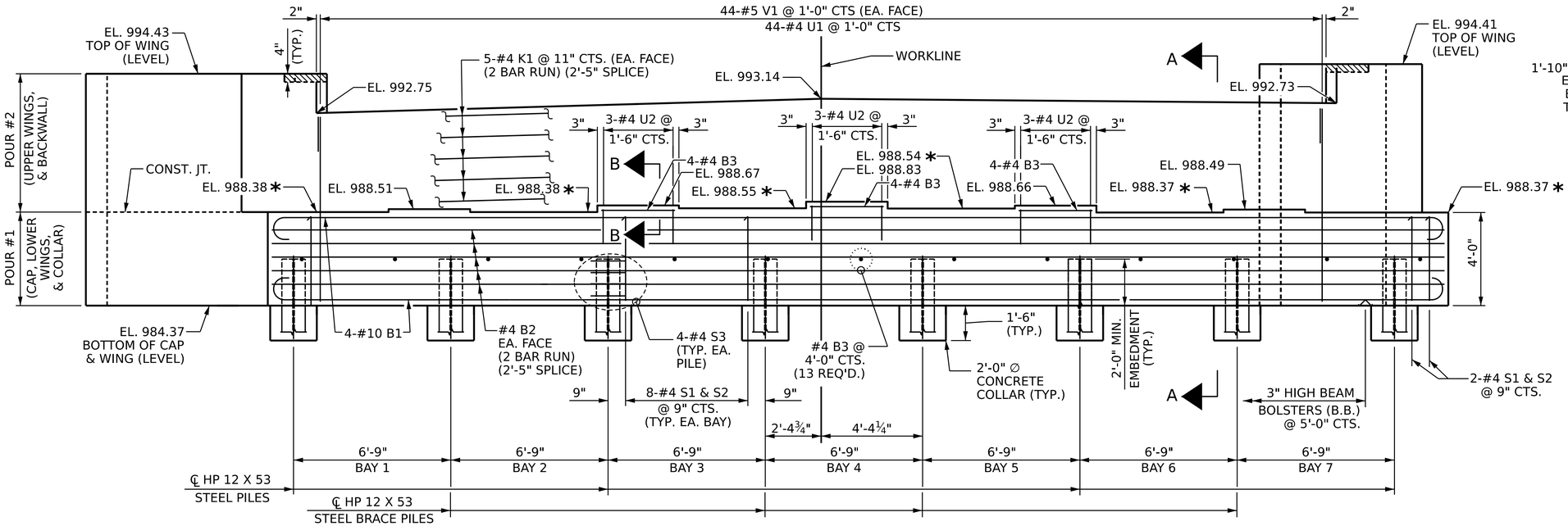
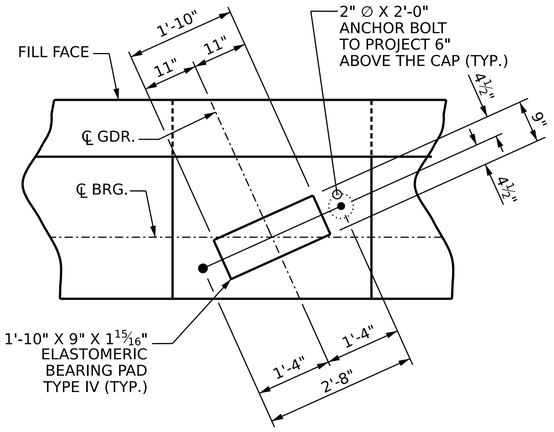


PLAN



ELEVATION

(BRACE PILE IN WINGS NOT SHOWN FOR CLARITY)



DETAIL "A"

(TYP. EA. GDR.)

NOTES

✱ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3.

STIRRUPS AND U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

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

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

11/16/2023

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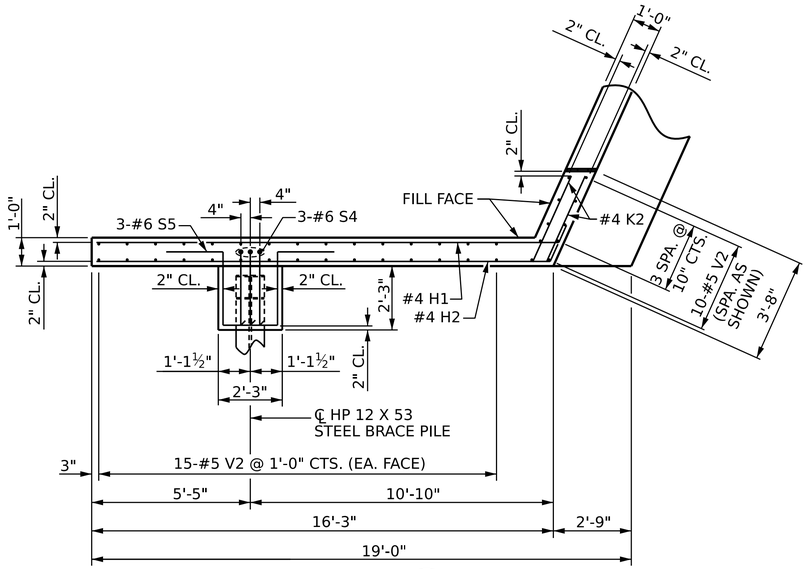
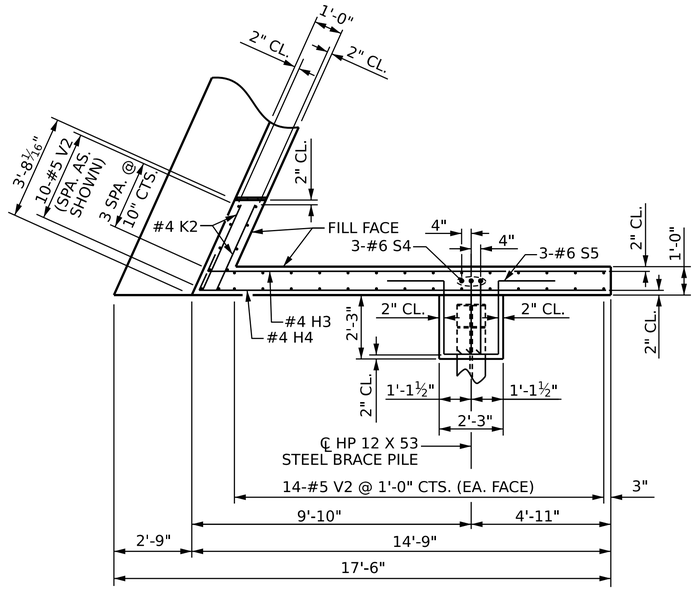
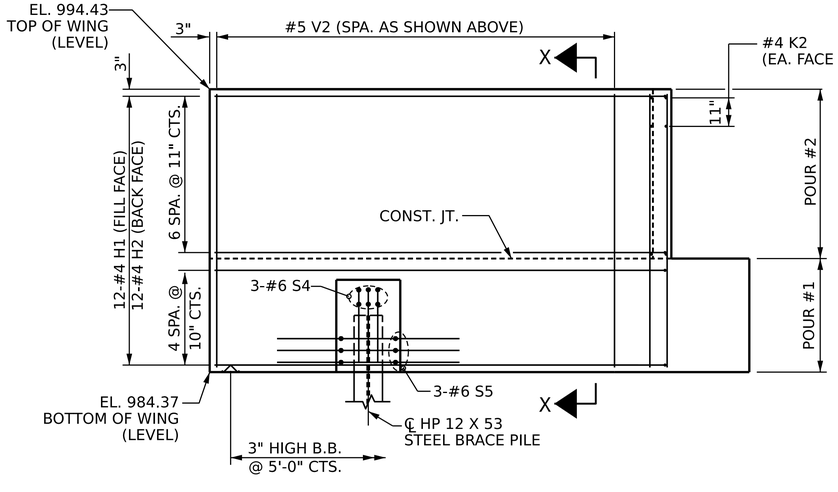


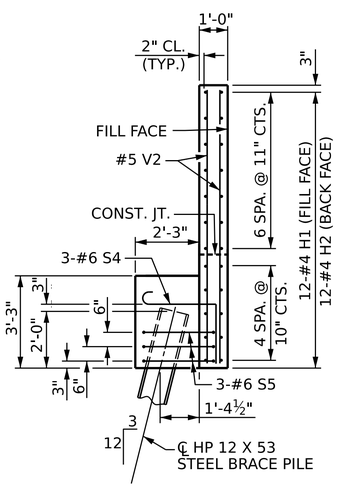
PLAN OF WING W1



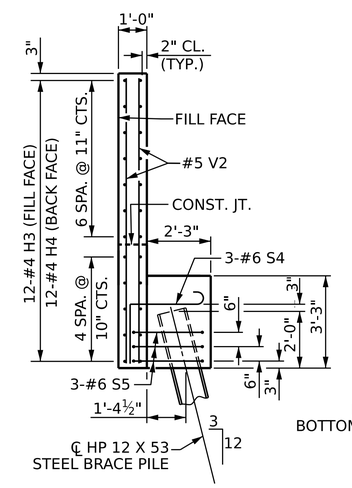
PLAN OF WING W2



ELEVATION OF WING W1



SECTION X-X



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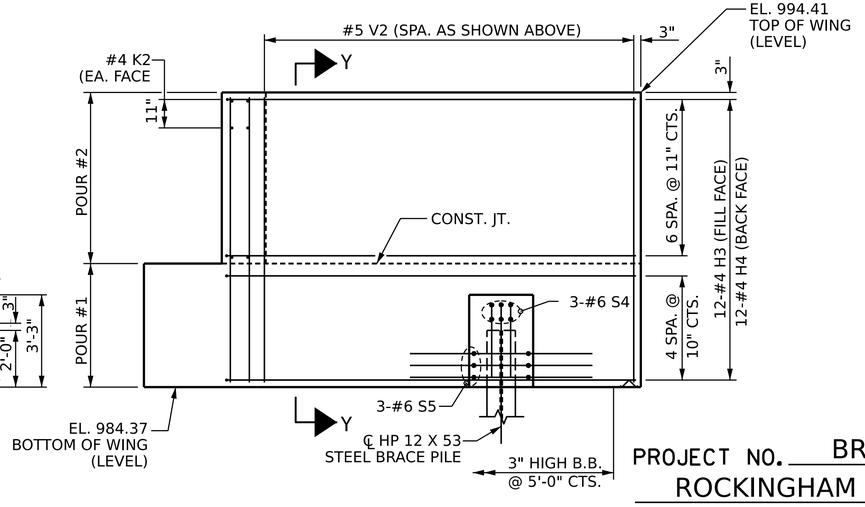

ELEVATION OF WING W2

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

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11/16/2023

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DESIGN ENGINEER OF RECORD: Z. MALIK	DATE : 04/2023				

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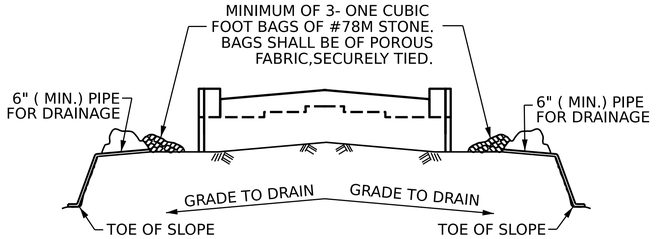
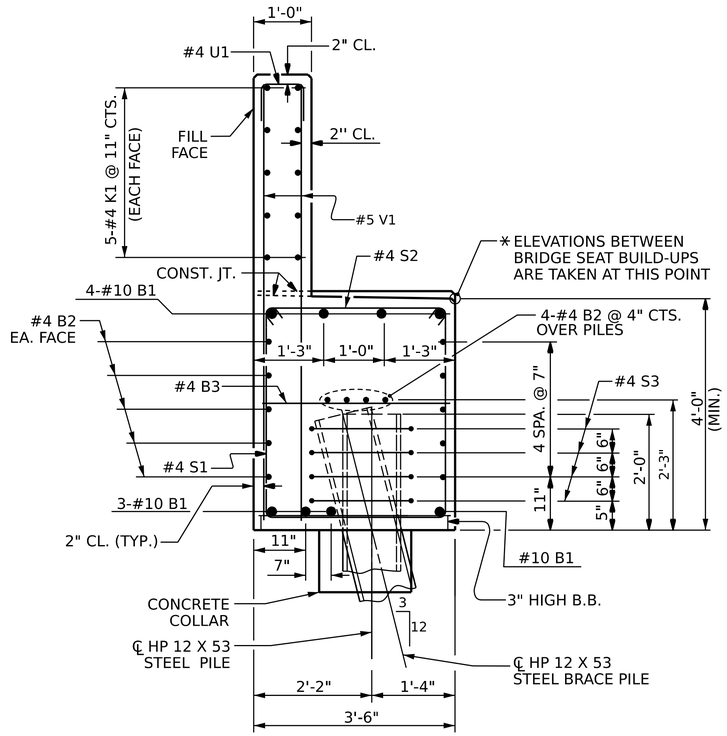


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

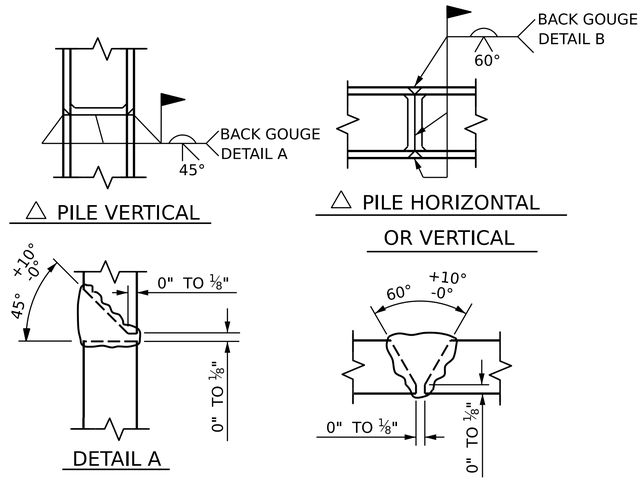
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

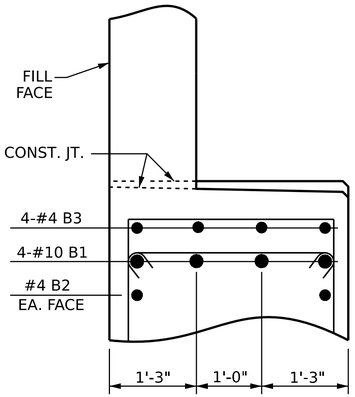


SECTION A-A



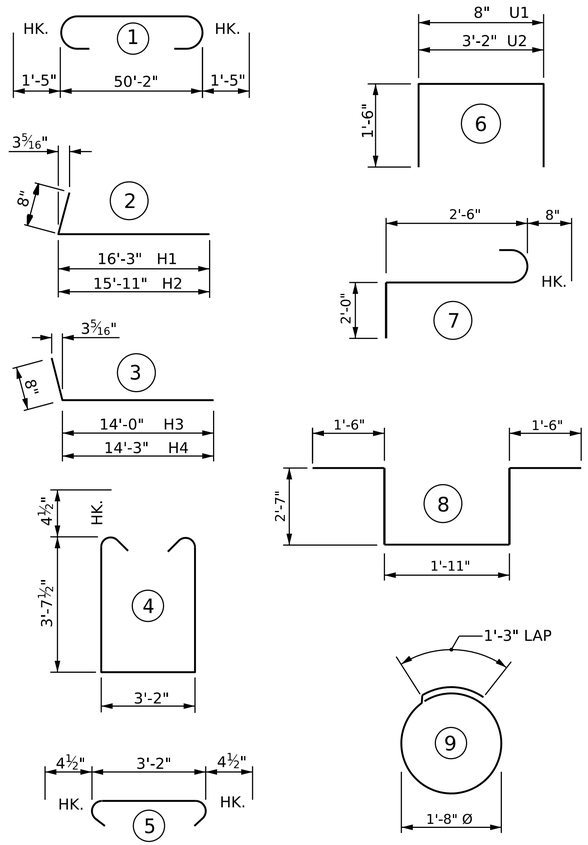
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



PARTIAL SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	53'-0"	1824
B2	28	#4	STR	27'-7"	516
B3	25	#4	STR	3'-2"	53
H1	12	#4	2	16'-11"	136
H2	12	#4	2	16'-7"	133
H3	12	#4	3	14'-8"	118
H4	12	#4	3	14'-11"	120
K1	20	#4	STR	27'-7"	369
K2	8	#4	STR	3'-3"	17
S1	58	#4	4	11'-2"	433
S2	58	#4	5	3'-11"	152
S3	32	#4	9	6'-6"	139
S4	6	#6	7	5'-2"	47
S5	6	#6	8	10'-1"	91
U1	44	#4	6	3'-8"	108
U2	9	#4	6	6'-2"	37
V1	88	#5	STR	8'-0"	734
V2	80	#5	STR	9'-8"	807

REINFORCING STEEL	LBS.	5,834

CLASS A CONCRETE

POUR #1 (CAP, LOWER WINGS, & COLLARS)	CU. YDS.	35.1
POUR #2 (UPPER WINGS & BACKWALL)	CU. YDS.	15.1
TOTAL	CU. YDS.	50.2

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
11/16/2023

DRAWN BY : Z. MALIK DATE : 04/2023
CHECKED BY : F. LEA DATE : 04/2023
DESIGN ENGINEER OF RECORD: Z. MALIK DATE : 04/2023

8/10/2023
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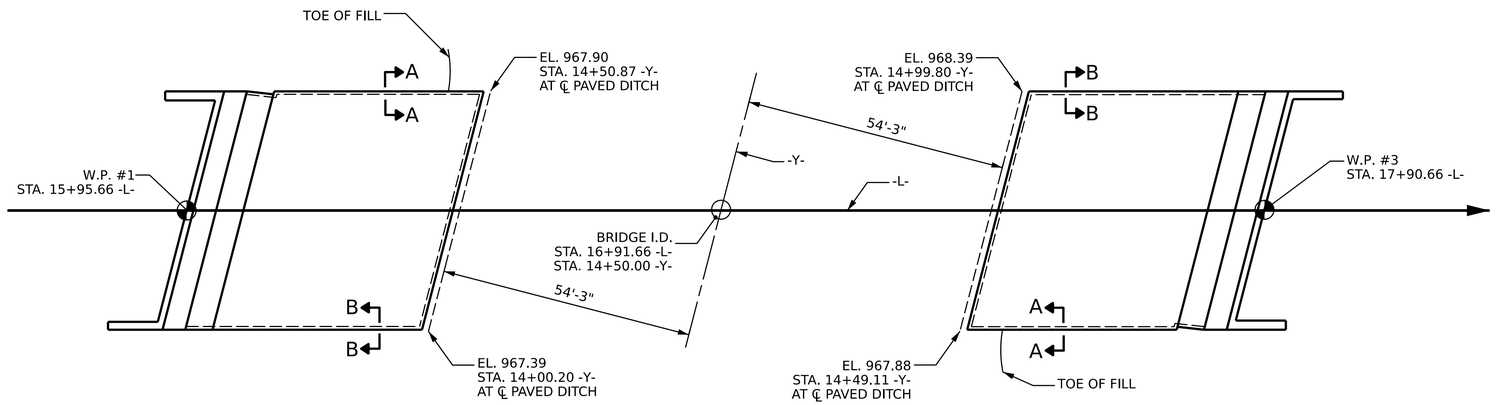


PLAN

GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

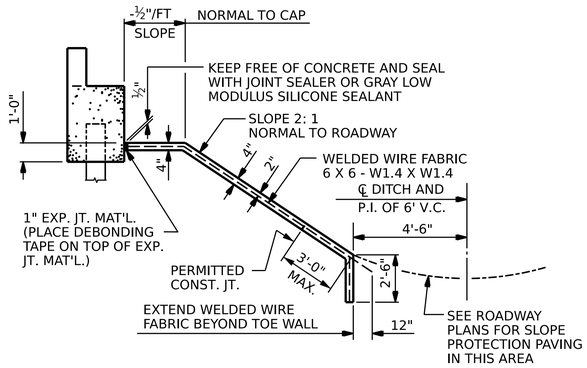
ALTERNATE "A"

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

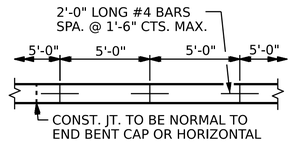
FOR BERM WIDTH AND ELEVATION, SEE GENERAL DRAWING.

BRIDGE @ STA. 16+91.66 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	215	390
END BENT 2	240	435

* QUANTITY SHOWN IS BASED ON 5' POURS.

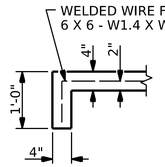


SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH

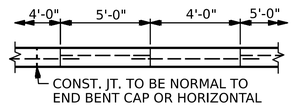


STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

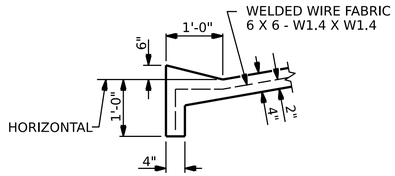


SECTION A-A



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

OPTIONAL POURING DETAIL



SECTION B-B

DETAIL FOR ALTERNATE "A"

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea B70DADB65D584EF...
11/16/2023

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ASSEMBLED BY :	F. LEA	DATE : 08/2023
CHECKED BY :	Z. MALIK	DATE : 08/2023
DRAWN BY : ELR	5/92	REV. 12/21/11 MAA/GM
CHECKED BY : GRP	6/92	REV. 1/16 MAA/TMG
		REV. 12/17 MAA/THC

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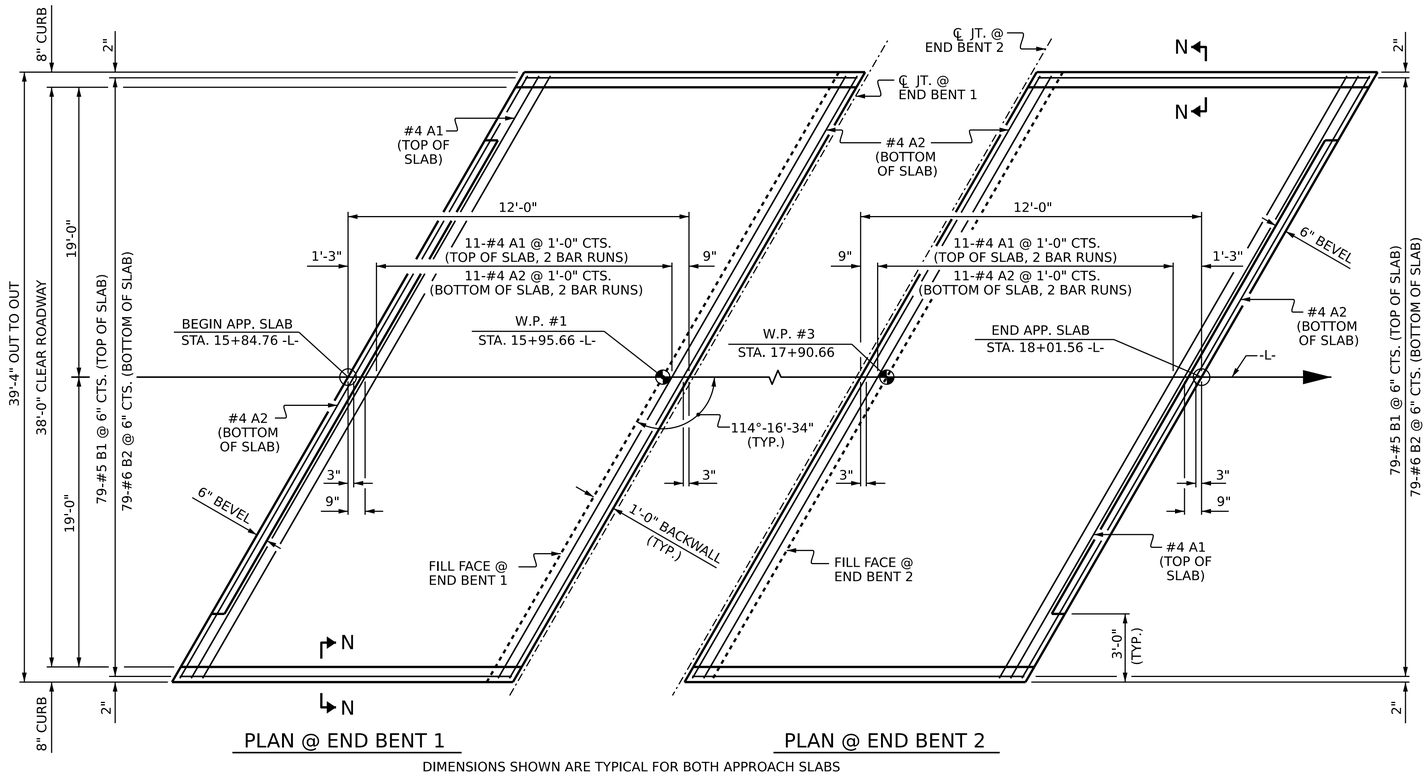
STD. NO. SP1 (SHT 3)



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE VERTICAL BARRIER RAIL.

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

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

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

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT BENT 1

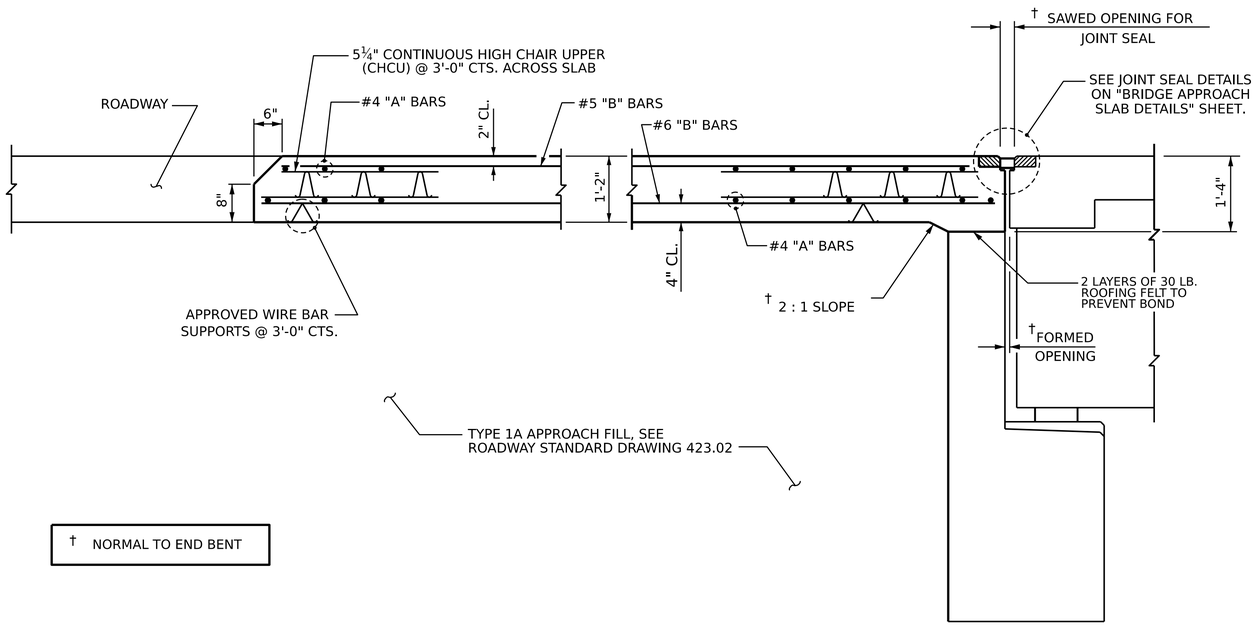
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	24	#4	STR	22'-4"	358
A2	26	#4	STR	22'-2"	385
*B1	79	#5	STR	10'-8"	879
B2	79	#6	STR	11'-8"	1384
REINFORCING STEEL				LBS.	1769
* EPOXY COATED REINFORCING STEEL				LBS.	1237
CLASS AA CONCRETE				C. Y.	20.5

APPROACH SLAB AT BENT 2

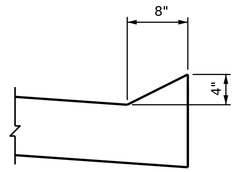
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	24	#4	STR	22'-4"	358
A2	26	#4	STR	22'-2"	385
*B1	79	#5	STR	10'-8"	879
B2	79	#6	STR	11'-8"	1384
REINFORCING STEEL				LBS.	1769
* EPOXY COATED REINFORCING STEEL				LBS.	1237
CLASS AA CONCRETE				C. Y.	20.5

SPLICE LENGTHS

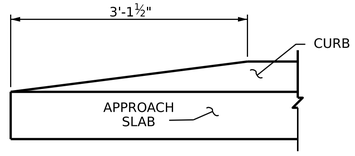
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. BR-0095

ROCKINGHAM COUNTY

STATION: 16+91.66 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL SEAL 36871 ENGINEER FRANCESCA LEA

DocuSigned by: Francesca Lea
B7E0AD8650584EF...
11/16/2023

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ASSEMBLED BY :	Q. T. NGUYEN	DATE :	06/2023
CHECKED BY :	F. LEA	DATE :	08/2023
DRAWN BY :	EEM 3/95	REV. 12/17	MAA/THC
CHECKED BY :	VAP 3/95	REV. 06/19	BNB/THC
		REV. 07/23	BNB/SNM

10/11/2023
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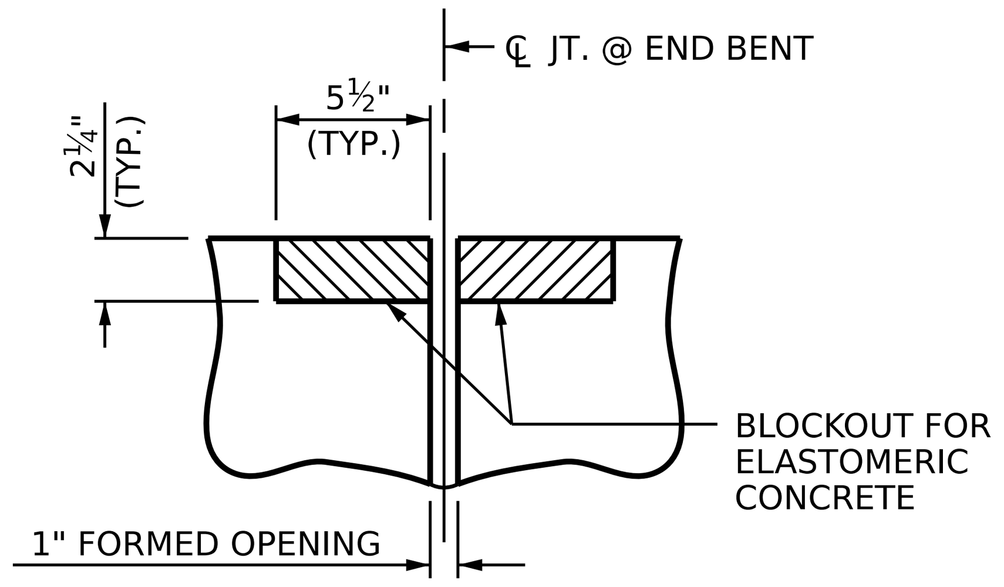
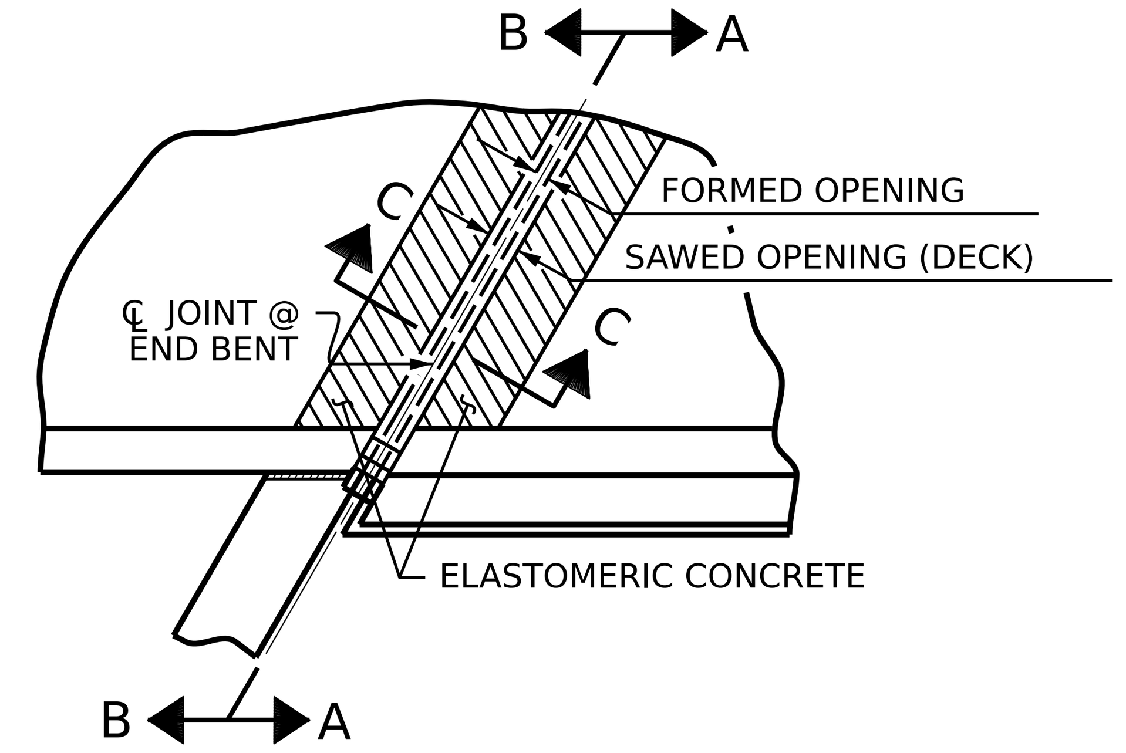
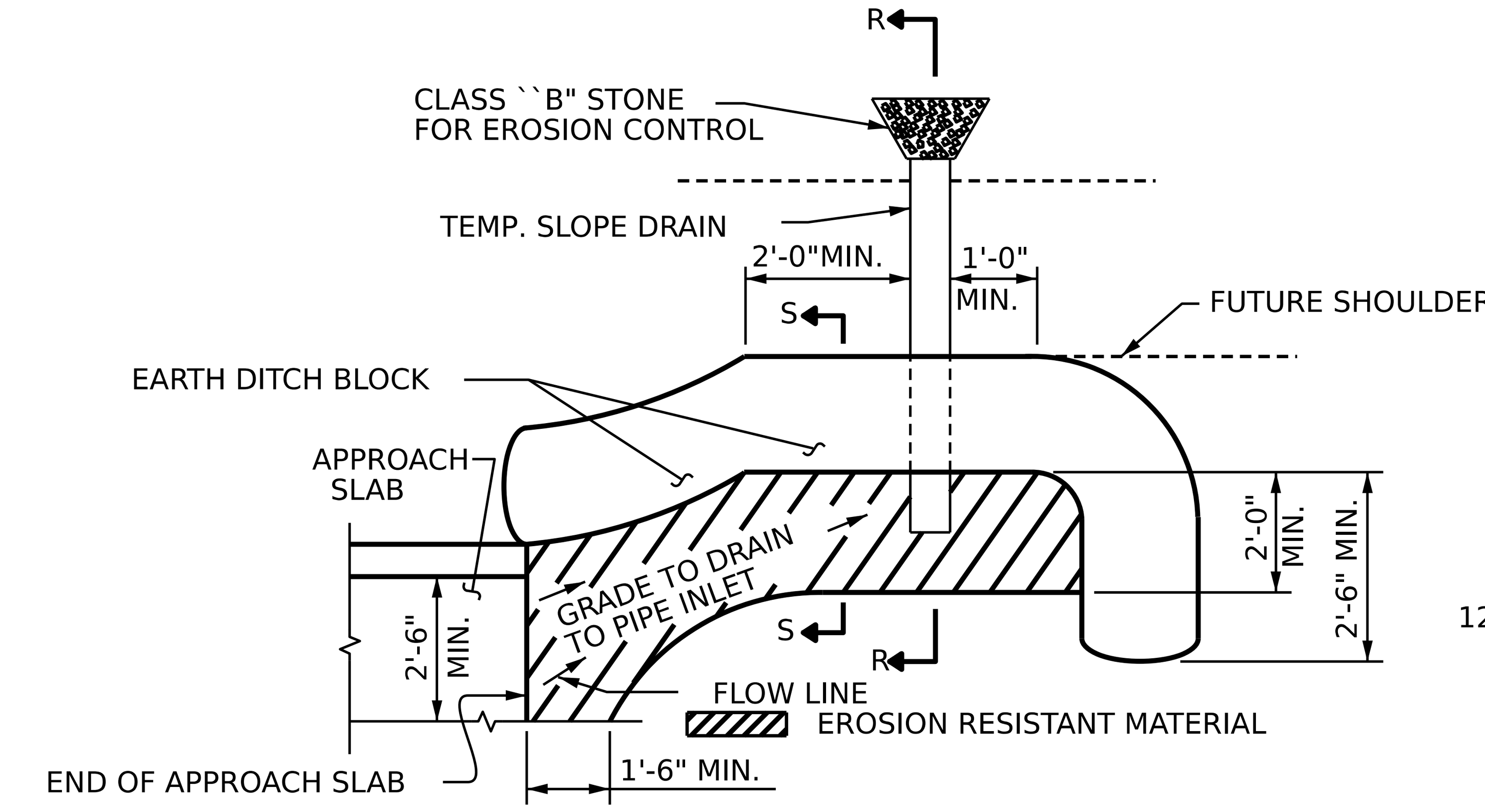
STD. NO. BAS2 (SHT 1b)



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

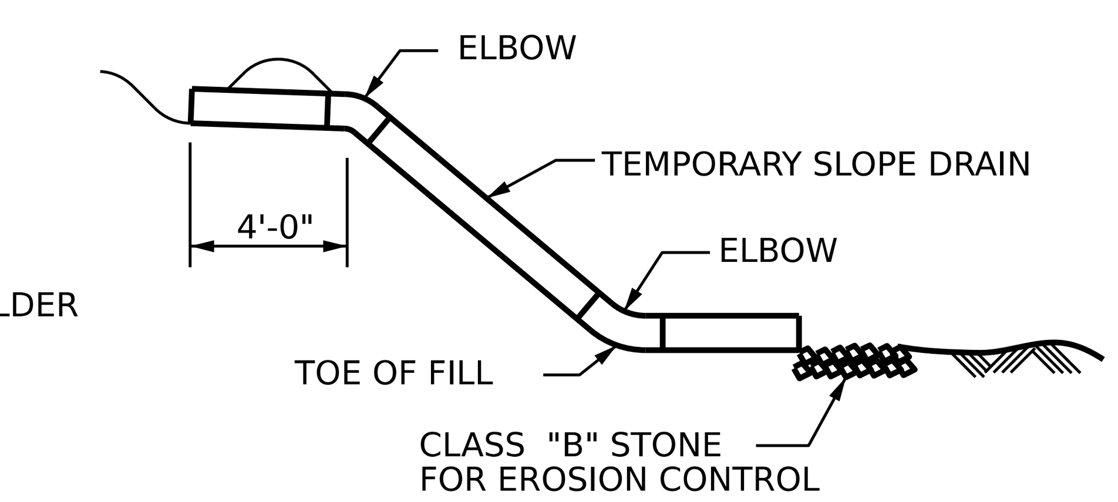


PLAN

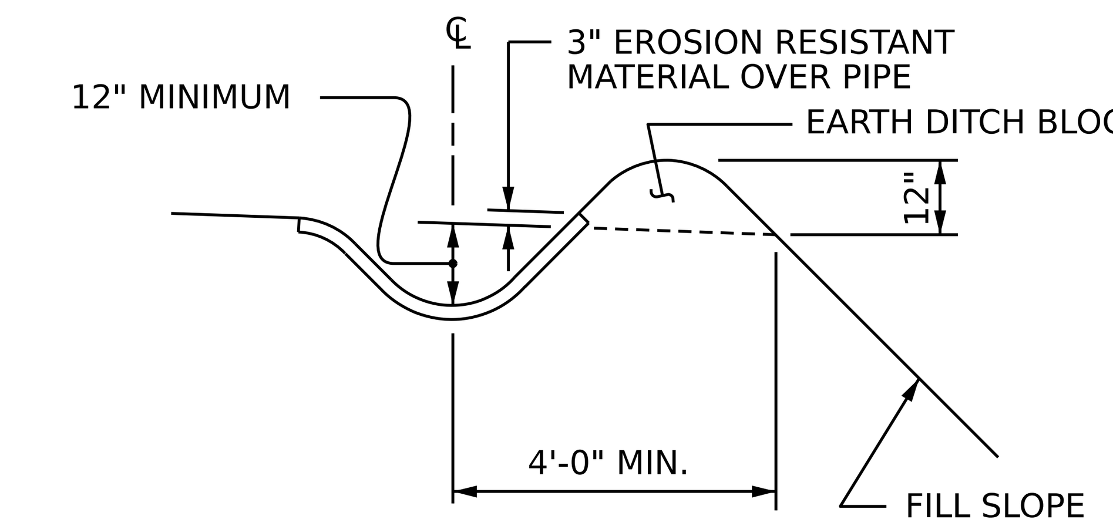


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



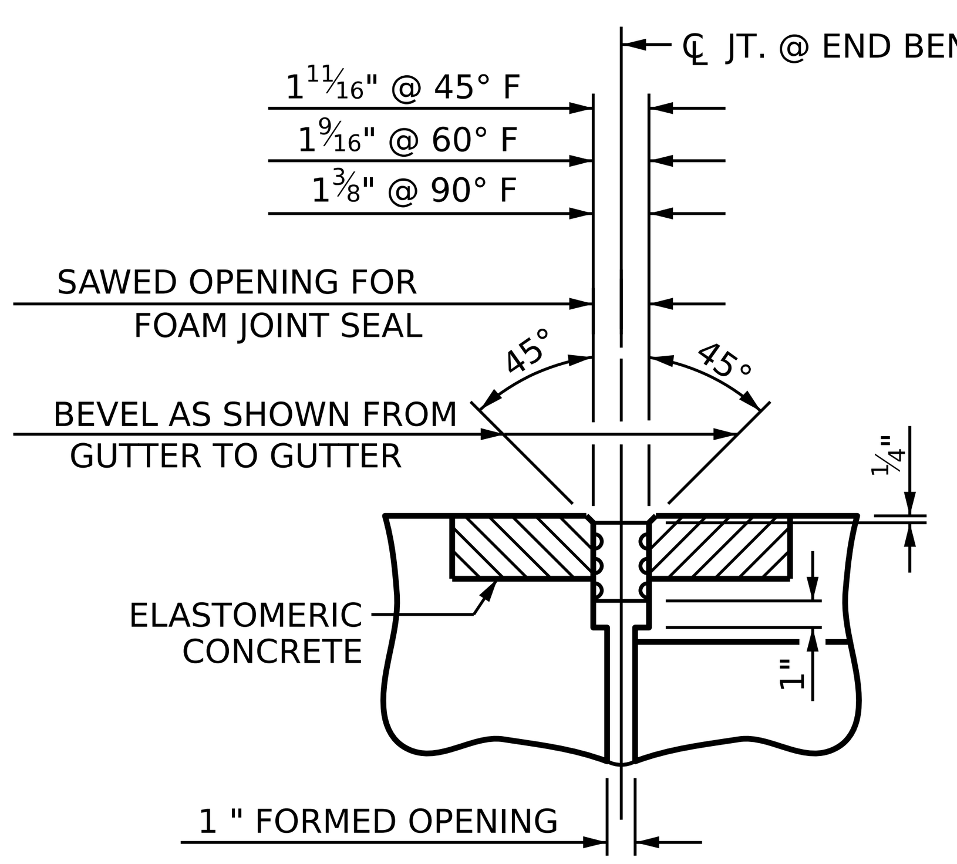
SECTION R-R



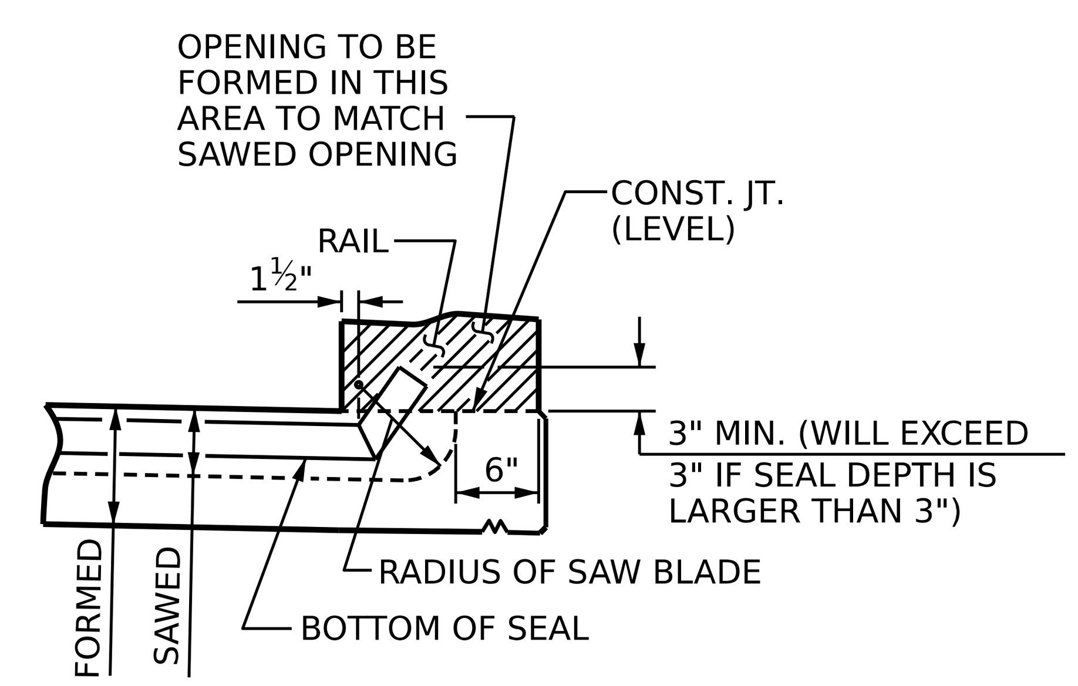
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

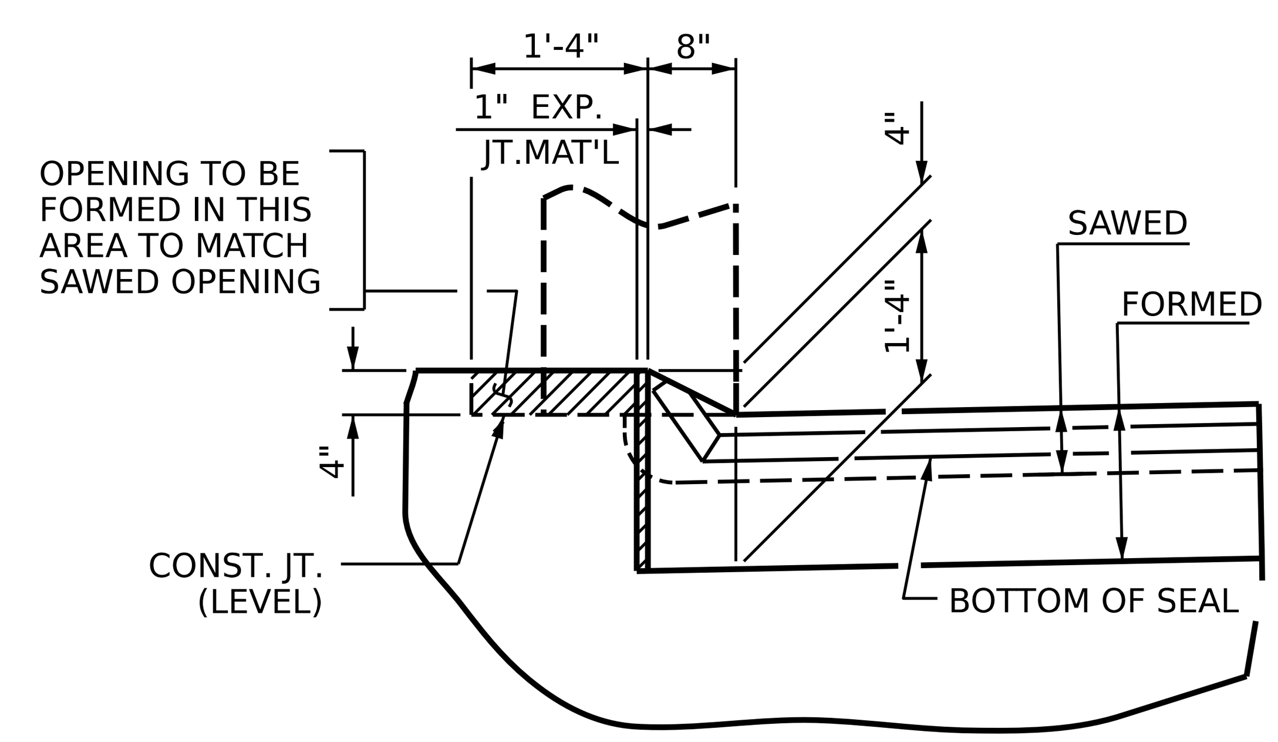
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION C-C
FOAM JOINT SEAL
(EXPANSION)



SECTION A-A



SECTION B-B

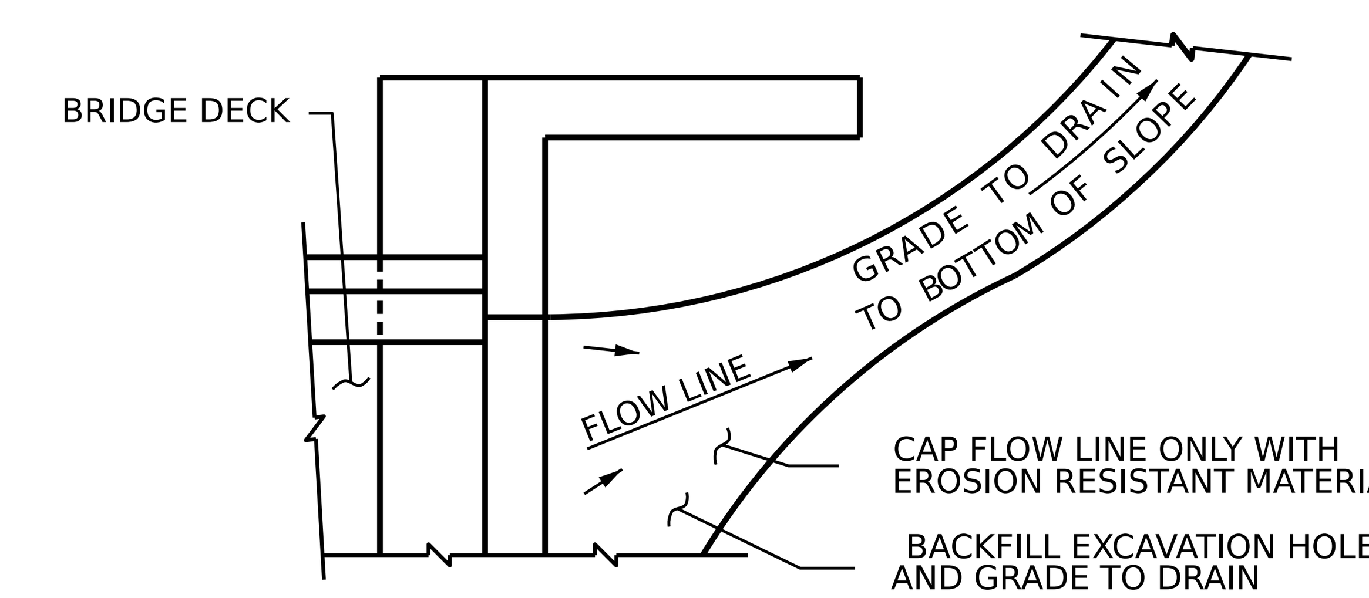
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	8.0
2	8.0
TOTAL	16.0

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE VERTICAL CONCRETE BARRIER RAIL.



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

PROJECT NO. BR-0095
ROCKINGHAM COUNTY
STATION: 16+91.66 -L-

SHEET 2 OF 2

DocuSigned by:
Francesca Lea
11/16/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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ASSEMBLED BY : Q. T. NGUYEN	DATE : 06/2023		
CHECKED BY : ZMALIK	DATE : 08/2023		
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

10/17/2023
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STD. NO. BAS4 (SHT 1b)

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE AASHTO
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{5}{16}$" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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