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See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

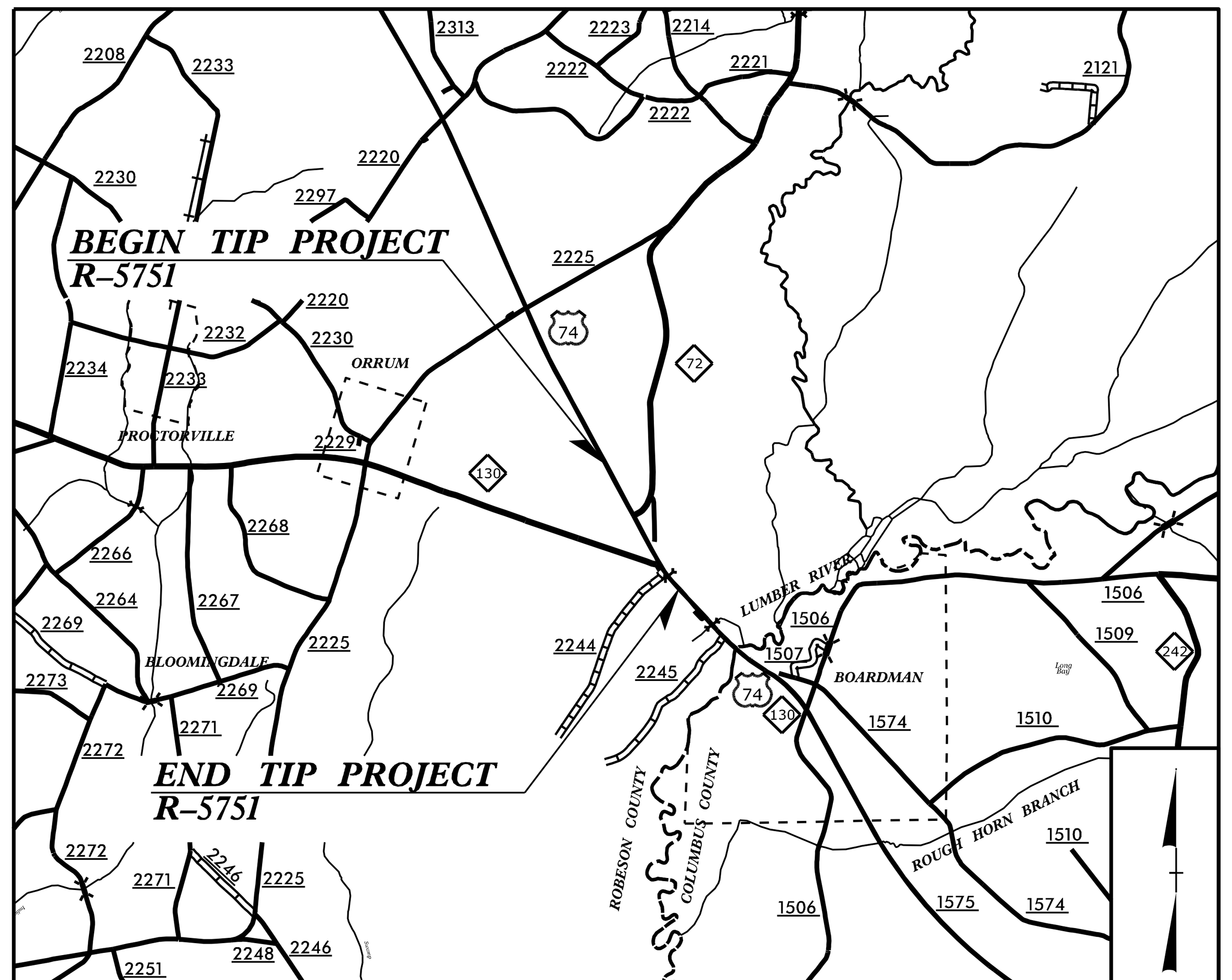
ROBESON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5751	1	

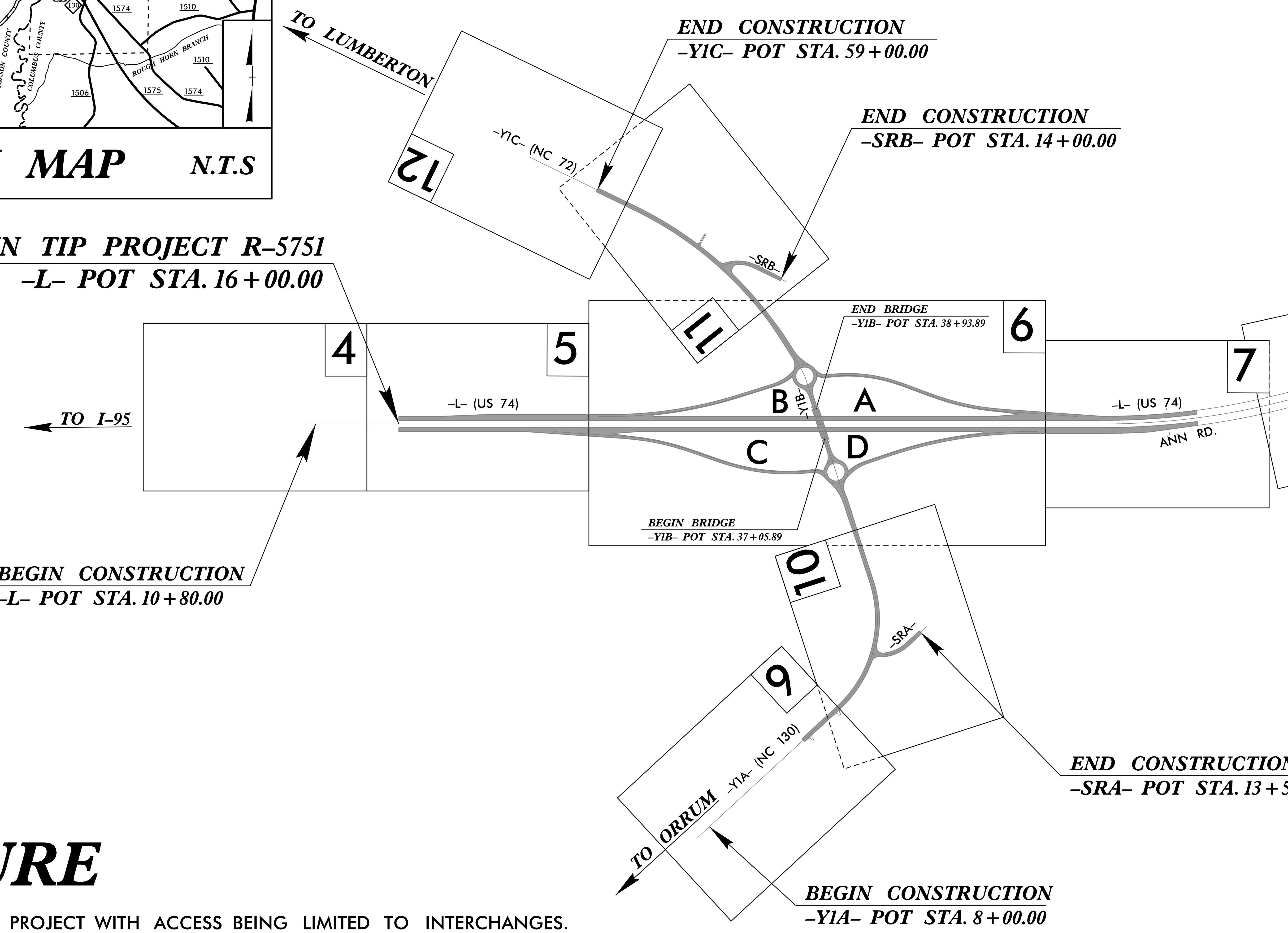
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
53087.1.1	NHP-0074(203)	PE
53087.2.1	N/A	ROW, UTIL
53087.3.1	N/A	CONST.

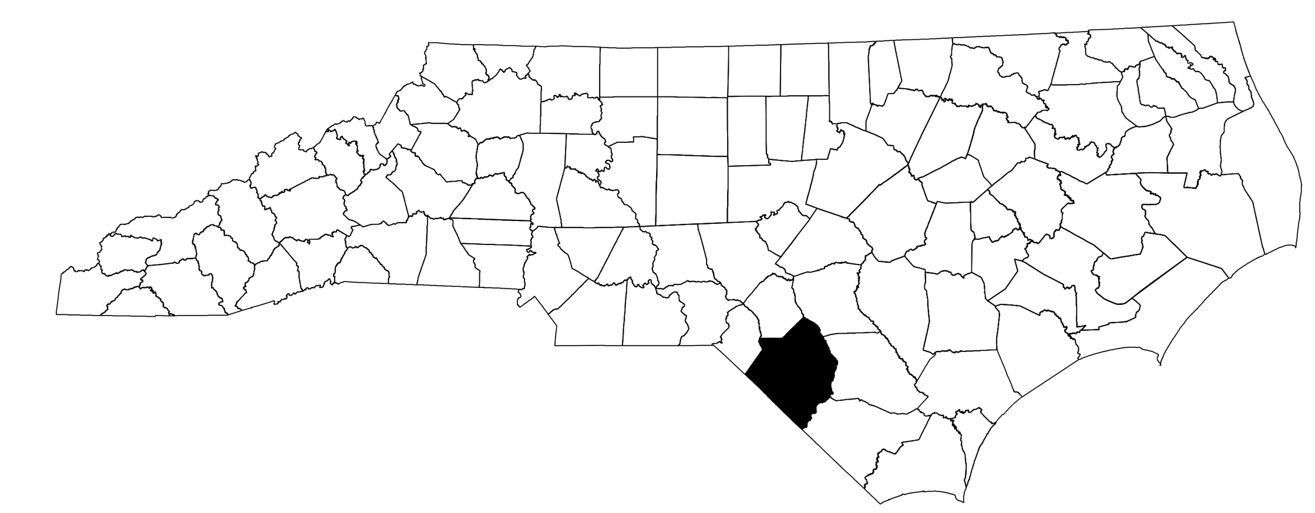
LOCATION: US 74 AT NC 72 /NC 130. CONVERT AT-GRADE INTERSECTION TO INTERCHANGE.

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



VICINITY MAP N.T.S





STRUCTURE

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100 — PLANS
50 25 0 50 100 — PROFILE (HORIZONTAL)
10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2023 = 20,800
ADT 2043 = 30,500
K = 8 %
D = 55 %
T = 19 % *
V = 75 MPH
*(TTST = 12% + DUAL = 7%)
FUNC CLASS = FUTURE INTERSTATE STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5751 = 1.105 MILES
TOTAL LENGTH TIP PROJECT R-5751 = 1.105 MILES

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

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 23, 2021

LETTING DATE:
FEBRUARY 21, 2023

PREPARED FOR:
DIVISION OF HIGHWAYS
DIVISION 6
558 Gillespie St.
Fayetteville, NC 28301
910-364-0603

JARED BOND, PE
PROJECT ENGINEER

SEAN KORTOVICH, PE
PROJECT DESIGN ENGINEER

ALEX HENDERSON
NCDOT CONTACT

STRUCTURAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043245 ENGINEER MICHAEL KENT O'CONNOR, JR.

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TIP PROJECT: R-5751

CONTRACT: C204772

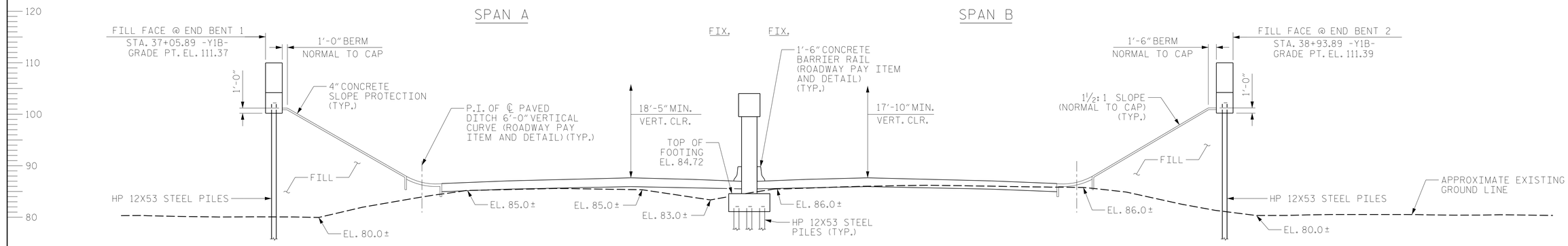
05-JAN-2023 09:41
R:\Roadway\Proj\R5751_Rdy_tsh_structure.dgn
$$$$USERNAME$$$$

37+00 38+00 39+00

-1.5302% +1.2432%
P.I. = 36+15.00
EL. = 110.30'
VC = 110'
GRADE DATA -Y1B-

+1.2432% -1.2270%
P.I. = 38+00.00
EL. = 112.60'
VC = 260'
GRADE DATA -Y1B-

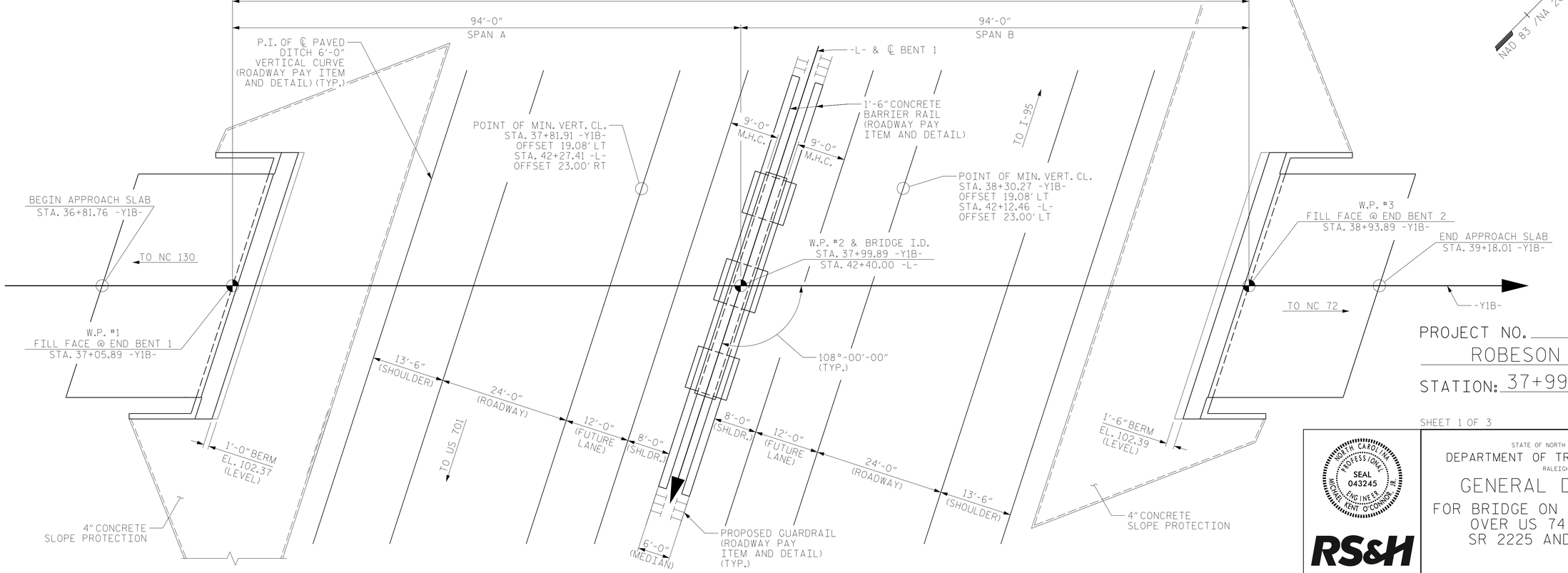
-1.2270% +1.5001%
P.I. = 39+85.00
EL. = 110.33'
VC = 110'
GRADE DATA -Y1B-



INTEGRAL END BENT 1 — BENT 1 — INTEGRAL END BENT 2

SECTION ALONG -Y1B-

SECTIONS AT END BENTS AND BENT TAKEN AT RIGHT ANGLES



PLAN ALONG -Y1B-

PILES AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-

SHEET 1 OF 3 BRIDGE NO. 770535

DRAWN BY :	TWL	DATE :	11/2021
CHECKED BY :	MRA	DATE :	11/2021
DESIGN ENGINEER OF RECORD:	MKO	DATE :	10/2022

10/25/2022
X:\P\1030036026_R-5751 US 74_NC 72_NC_130 Final Design\Design\Structures\CAD\Final Plans\401_001_R5751_SMU_GDI_S-1_770535.dgn
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RS&H

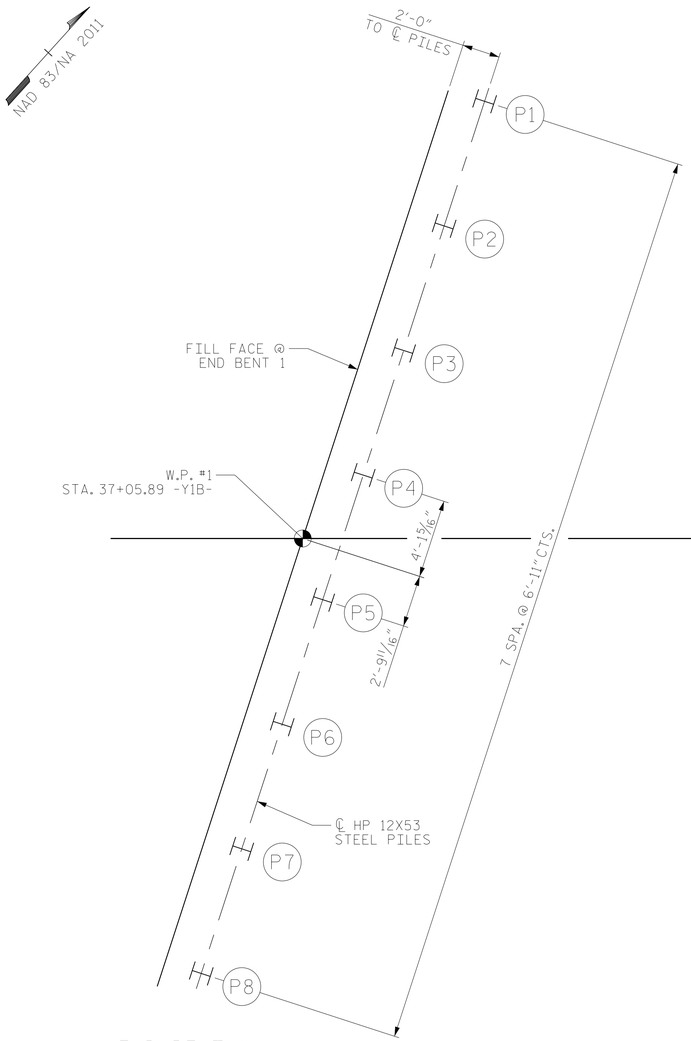
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

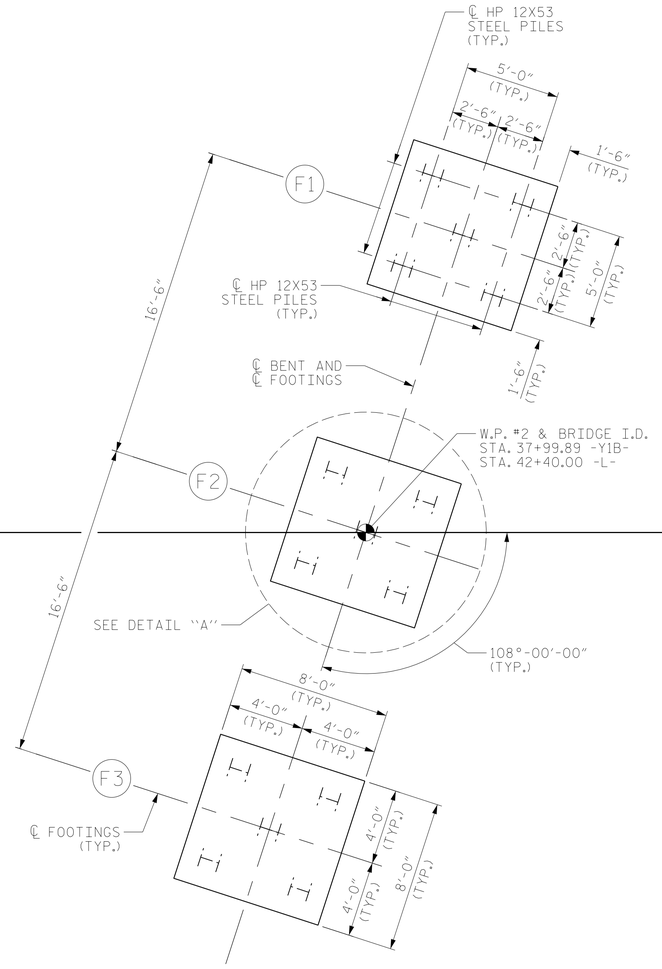
FOR BRIDGE ON NC 72/NC 130
OVER US 74 BETWEEN
SR 2225 AND SR 2214

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

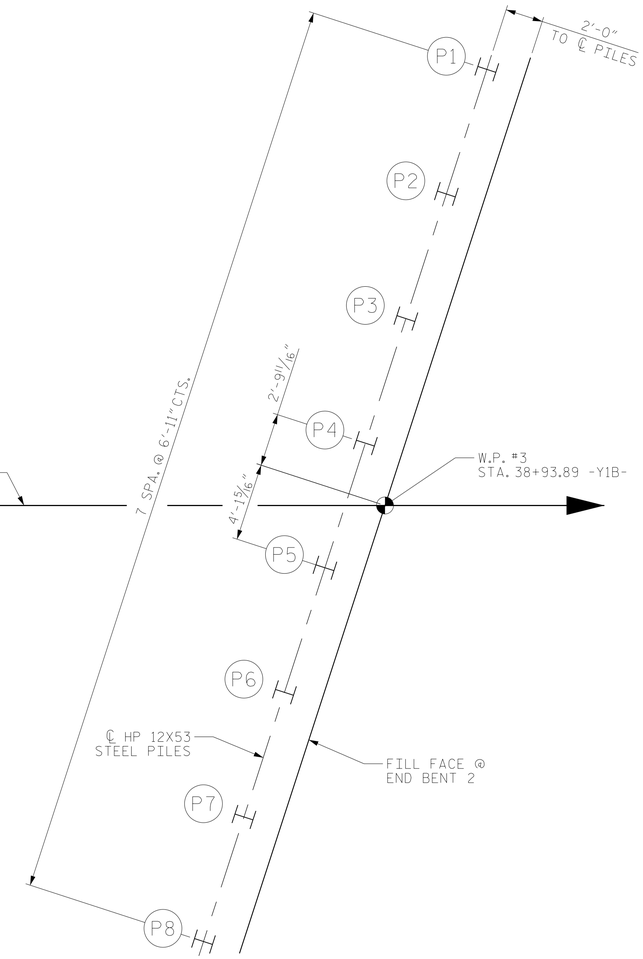


END BENT 1

(INTEGRAL)



BENT 1

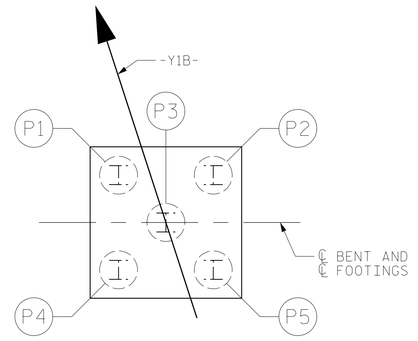


END BENT 2

(INTEGRAL)

FOUNDATION LAYOUT

ALL PILES ARE HP 12X53 STEEL PILES.
ALL PILES ARE VERTICAL.



DETAIL "A"

PILE NUMBERS ARE TYPICAL FOR EACH FOOTING

NOTES

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

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

DRAWN BY : NSC DATE : 08/2021
CHECKED BY : MRA DATE : 02/2022
DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

10/25/2022
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PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 72/NC 130 OVER US 74 BETWEEN SR 2225 AND SR 2214

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

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-8	120	103.00	65		43.0	200	16						
Bent 1, Piles 1-15	120	83.00	60		28.0	200							
End Bent 2, Piles 1-8	120	103.00	65		43.0	200							

**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.

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

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1, Piles 1-8	MAYBE	65	1		
Bent 1, Piles 1-15	MAYBE	60			
End Bent 2, Piles 1-8	MAYBE	65			

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-8	120			0.60			1.00
Bent 1, Piles 1-15	120			0.60			1.00
End Bent 2, Piles 1-8	120			0.60			1.00

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

PROJECT NO. 53087.1.1 (R-5751)

ROBESON COUNTY

STATION: ~38+00 -Y1B-

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Ali Salehian, PE# 046104) on 06-18-2021.
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 when PDAs may be required.

NORTH CAROLINA PROFESSIONAL SEAL 043245 ENGINEER MICHAEL KENT O'CONNOR

SIGNATURE DATE

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION TABLES

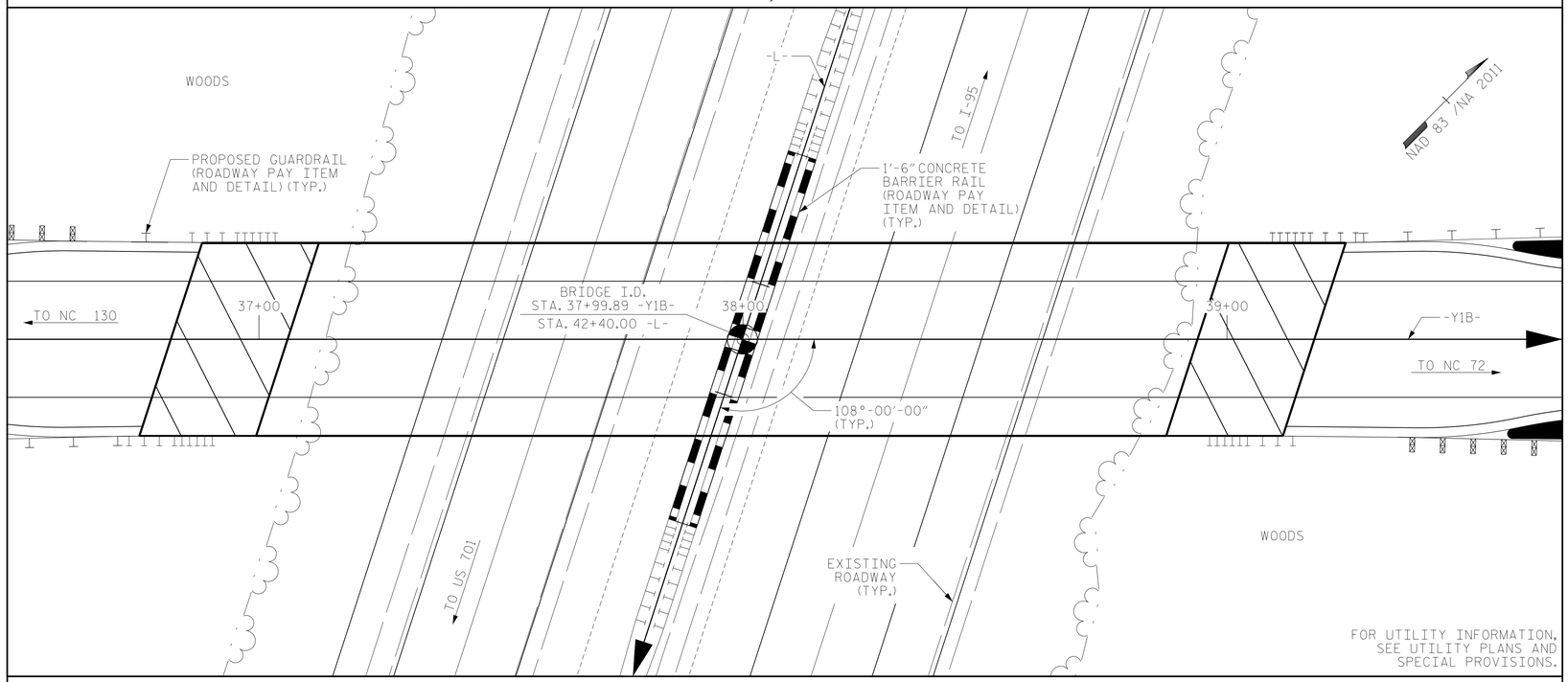
REVISIONS

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

SHEET NO. S-3

TOTAL SHEETS 28

B.M. #3 - BENCHTIE SET IN 11" OAK, 110' LT. OF -L- STA. 40+62. EL. 83.10'



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.

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 OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT 1	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES
	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	EACH
SUPERSTRUCTURE			8,056	8,705					10	924.4	
END BENT NO. 1		1			43.5		7,173				8
BENT NO. 1		1			64.8		15,594	1,851			15
END BENT NO. 2		1			43.5		7,173				8
TOTAL	LUMP SUM	3	8,056	8,705	151.8	LUMP SUM	29,940	1,851	10	924.4	31

	HP 12X53 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	NO.	LIN. FT.	EACH	LIN. FT.	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE				372.5		
END BENT NO. 1	8	520			300	
BENT NO. 1	15	900				
END BENT NO. 2	8	520			300	
TOTAL	31	1,940	16	372.5	600	LUMP SUM

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

NORTH CAROLINA PROFESSIONAL SEAL 043245 ENGINEER MICHAEL KENT O'CONNOR, JR.

RS&H

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 72/NC 130 OVER US 74 BETWEEN SR 2225 AND SR 2214

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

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DRAWN BY : TWL DATE : 11/2021
CHECKED BY : MRA DATE : 11/2021
DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

10/25/2022
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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						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.22	--	1.75	0.80	1.77	A	E	45.51	0.93	1.24	A	I	6.17	0.80	0.80	1.22	A	E	45.51	
		HL-93 (OPERATING)	N/A		1.65	--	1.35	0.80	2.29	A	E	45.51	0.93	1.65	A	I	6.17	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.67	60.12	1.75	0.80	2.42	A	E	45.51	0.93	1.68	A	I	6.17	0.80	0.80	1.67	A	E	45.51	
		HS-20 (OPERATING)	36.000		2.23	80.28	1.35	0.80	3.13	A	E	45.51	0.93	2.23	A	I	6.17	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.63	35.51	1.40	0.80	3.81	A	E	45.51	0.93	2.82	A	I	6.17	0.80	0.80	2.63	A	E	45.51	
		SNGARBS2	20.000		2.19	43.80	1.40	0.80	3.17	A	E	45.51	0.93	2.28	A	I	6.17	0.80	0.80	2.19	A	E	45.51	
		SNAGRIS2	22.000		2.11	46.42	1.40	0.80	3.05	A	E	45.51	0.93	2.16	A	I	6.17	0.80	0.80	2.11	A	E	45.51	
		SNCOTTS3	27.250		1.71	46.60	1.40	0.80	2.47	A	E	45.51	0.93	1.80	A	I	6.17	0.80	0.80	1.71	A	E	45.51	
		SNAGGRS4	34.925		1.48	51.69	1.40	0.80	2.14	A	E	45.51	0.93	1.55	A	I	6.17	0.80	0.80	1.48	A	E	45.51	
		SNS5A	35.550		1.46	51.90	1.40	0.80	2.11	A	E	45.51	0.93	1.56	A	I	6.17	0.80	0.80	1.46	A	E	45.51	
		SNS6A	39.950		1.36	54.33	1.40	0.80	1.97	A	E	45.51	0.93	1.38	A	I	6.17	0.80	0.80	1.36	A	E	45.51	
		SNS7B	42.000		1.31	55.02	1.40	0.80	1.90	A	E	45.51	0.93	1.42	A	I	6.17	0.80	0.80	1.31	A	E	45.51	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.57	51.81	1.40	0.80	2.28	A	E	45.51	0.93	1.66	A	I	6.17	0.80	0.80	1.57	A	E	45.51	
		TNT4A	33.075		1.48	48.95	1.40	0.80	2.28	A	E	45.51	0.93	1.63	A	I	6.17	0.80	0.80	1.48	A	E	45.51	
		TNT6A	41.600		1.35	56.16	1.40	0.80	1.96	A	E	45.51	0.93	1.47	A	I	6.17	0.80	0.80	1.35	A	E	45.51	
		TNT7A	42.000		1.35	56.70	1.40	0.80	1.96	A	E	45.51	0.93	1.45	A	I	6.17	0.80	0.80	1.35	A	E	45.51	
		TNT7B	42.000		1.36	57.12	1.40	0.80	2.00	A	E	45.51	0.93	1.36	A	I	6.17	0.80	0.80	1.38	A	E	45.51	
		TNAGRIT4	43.000		1.34	57.62	1.40	0.80	1.93	A	E	45.51	0.93	1.36	A	I	6.17	0.80	0.80	1.34	A	E	45.51	
		TNAGT5A	45.000		1.28	57.60	1.40	0.80	1.85	A	E	45.51	0.93	1.35	A	I	6.17	0.80	0.80	1.28	A	E	45.51	
		TNAGT5B	45.000	3	1.27	57.15	1.40	0.80	1.84	A	E	45.51	0.93	1.31	A	I	6.17	0.80	0.80	1.27	A	E	45.51	

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.

COMMENTS:

1. GIRDERS DESIGNED AS SIMPLE SPAN FOR FLEXURE AND SHEAR.
2. FACTORED SHEAR AND MOMENT CAPACITIES PROVIDED FOR STRENGTH I LIMIT STATE. SECTION PROPERTIES PROVIDED FOR SERVICE III LIMIT STATE.
3. GIRDERS LOAD RATED AS SIMPLE SPANS.
4. MINIMUM RATING FACTOR FOR EACH VEHICLE IS EQUAL FOR SPANS A AND B.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR GIRDER

TABLE OF SECTION RESISTANCES

		℄ BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	℄ BRG.
EXTERIOR GIRDER (E) SPAN A	ΦVn (KIPS)	506	301	282	214	178	177	178	214	282	301	506
	ΦMn (KIP-FT)	---	7752	8831	8900	8901	8901	8901	8900	8831	7752	---
INTERIOR GIRDER (I) SPAN A	ΦVn (KIPS)	507	302	285	236	194	194	194	236	285	302	507
	ΦMn (KIP-FT)	---	7780	8898	8970	8970	8970	8970	8970	8898	7780	---

SECTION PROPERTIES
SPAN A - EXTERIOR

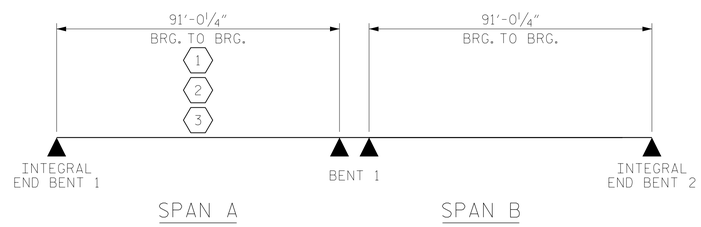
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	54.00	62.25
AREA	IN^2	789.00	1,652.00
Ixx	IN^4	260,741	671,035
Ycg	IN	24.73	42.00
SELF WT.	PLF	821.88	1,720.83
EFF. WIDTH	IN	---	97.50

SECTION PROPERTIES PROVIDED AT MIDSPAN

SECTION PROPERTIES
SPAN A -INTERIOR

	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	54.00	62.25
AREA	IN^2	789.00	1,680.00
Ixx	IN^4	260,741	732,349
Ycg	IN	24.73	42.44
SELF WT.	PLF	821.88	1,750.00
EFF. WIDTH	IN	---	108.00

SECTION PROPERTIES PROVIDED AT MIDSPAN



LRFR SUMMARY

PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-

DRAWN BY : TWL DATE : 10/2021
CHECKED BY : MRA DATE : 10/2021
DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

10/25/2022
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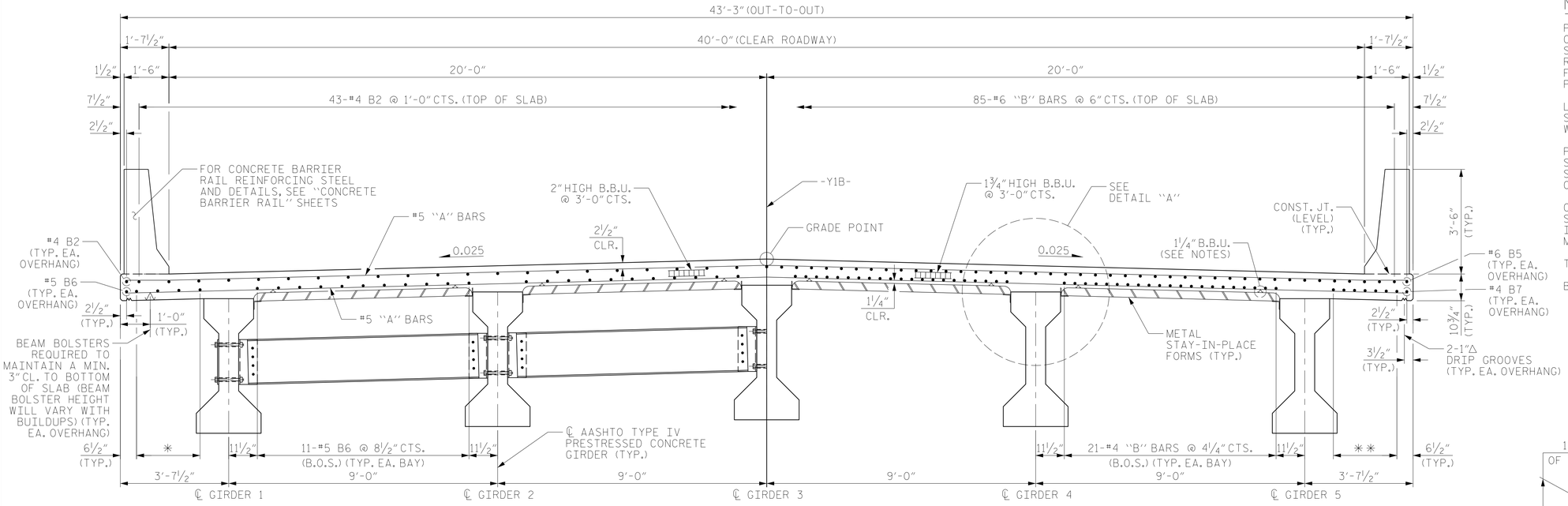
RALEIGH

SUPERSTRUCTURE

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			28

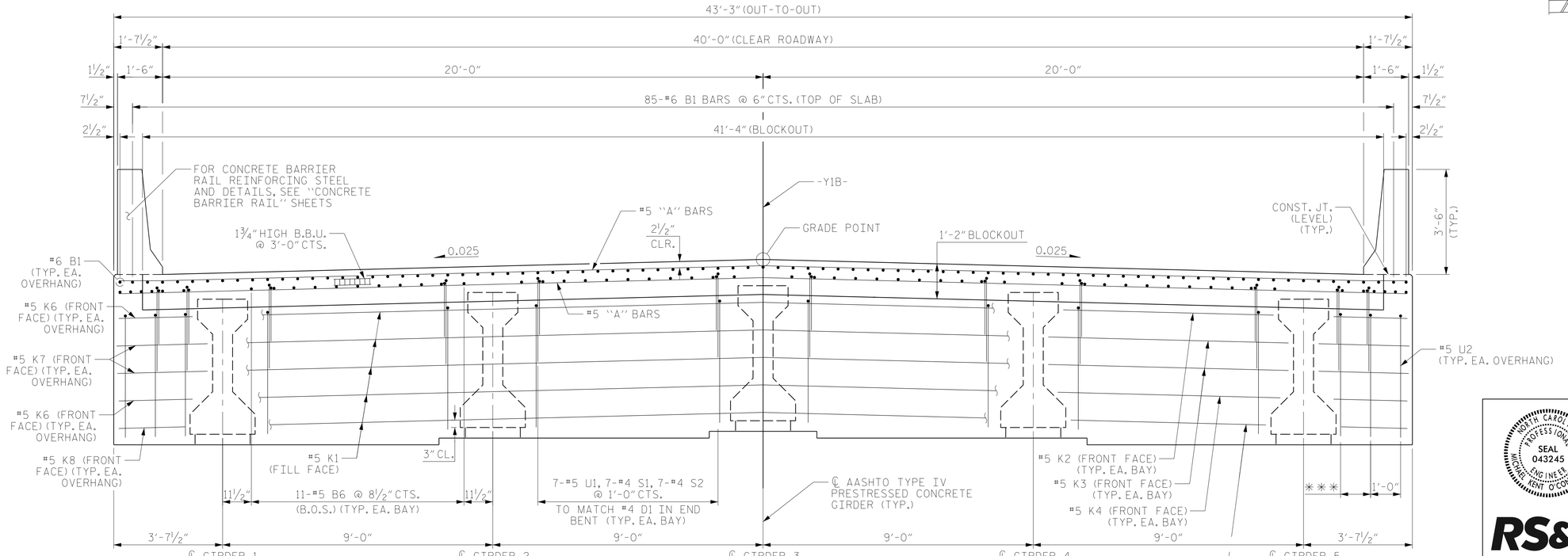


HALF SECTION AT INTERMEDIATE DIAPHRAGM

HALF SECTION AT BENT

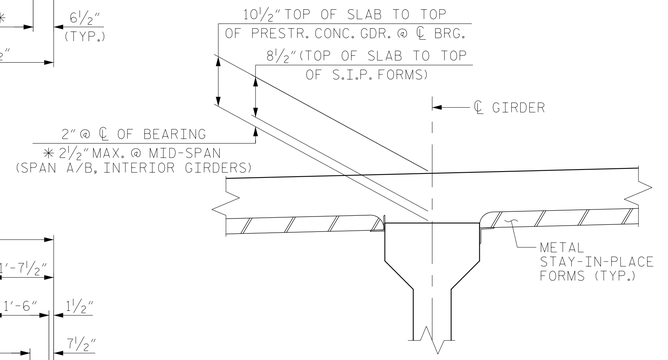
TYPICAL SECTION

* 4-#5 B6 @ 8½" CTS. (B.O.S.) (TYP. EA. OVERHANG)
** 7-#4 "B" BARS @ 4¼" CTS. (B.O.S.) (TYP. EA. OVERHANG)



TYPICAL SECTION AT INTEGRAL END BENT

*** 2-#5 U1, 2-#4 S1, 2-#4 S2 @ 1'-0" CTS. TO MATCH #4 D1 IN END BENT (TYP. EA. OVERHANG)



DETAIL "A"

* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

NOTES:

PROVIDE 1¼" HIGH BEAM BOLSTER UPPERS 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 @ 4'-0" CTS. WITH A HEIGHT TO PROVIDE 2½" CLEAR DISTANCE ABOVE FORMS.

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

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

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

T.O.S. = TOP OF SLAB

B.O.S. = BOTTOM OF SLAB

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 1 OF 2

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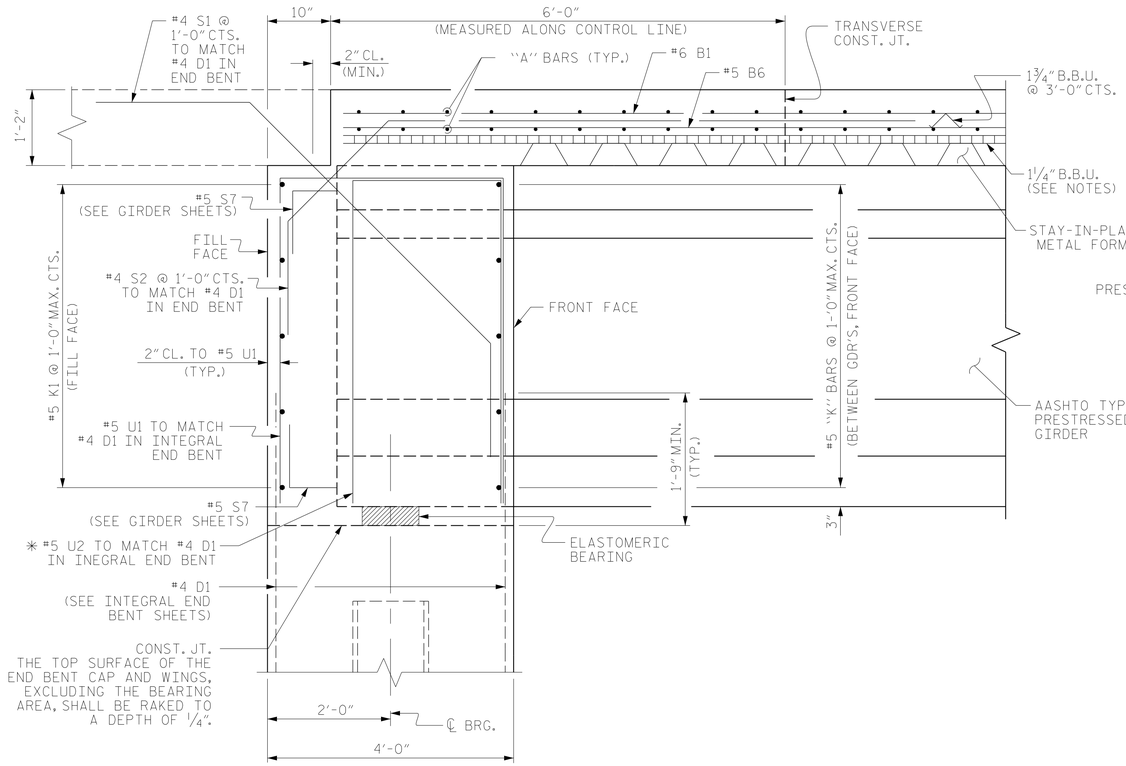
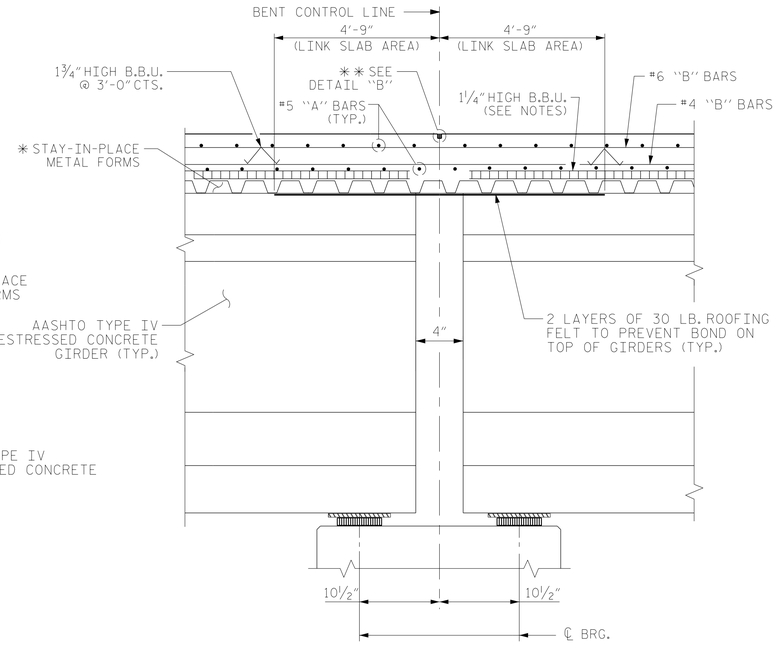
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			28



SECTION THROUGH INTEGRAL END BENT

* #5 U2 LOCATED OUTSIDE OF INTEGRAL END BENT DIAPHRAGM. SEE PLAN OF SPANS AND TYPICAL SECTION FOR PLACEMENT DETAILS.



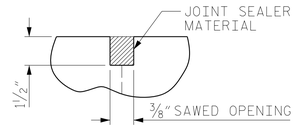
SECTION AT BENT 1 LINK SLAB

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

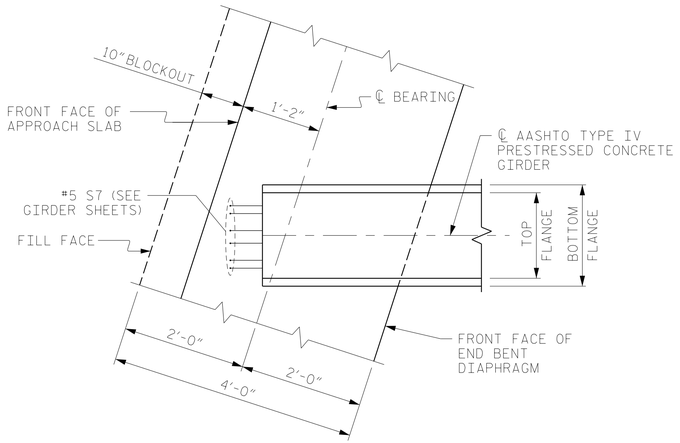
** A 1½" DEEP, ⅜" WIDE CONTRACTION JOINT AT ℄ BENT SHALL BE SAWN WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

NOTE:

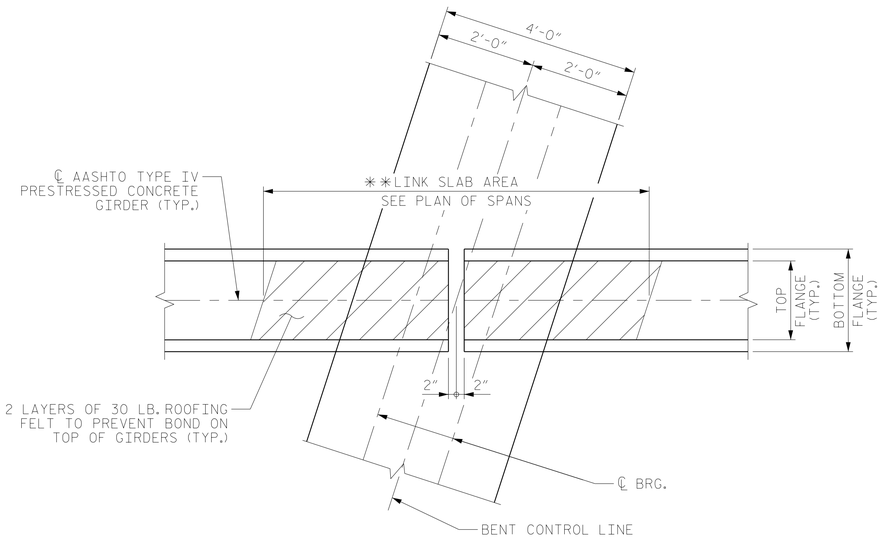
FOR NOTES, SEE SHEET 1 OF 2.



DETAIL "B"



PLAN OF GIRDER AT INTEGRAL END BENT



PLAN OF LINK SLAB

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

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 2 OF 2

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TYPICAL SECTION DETAILS

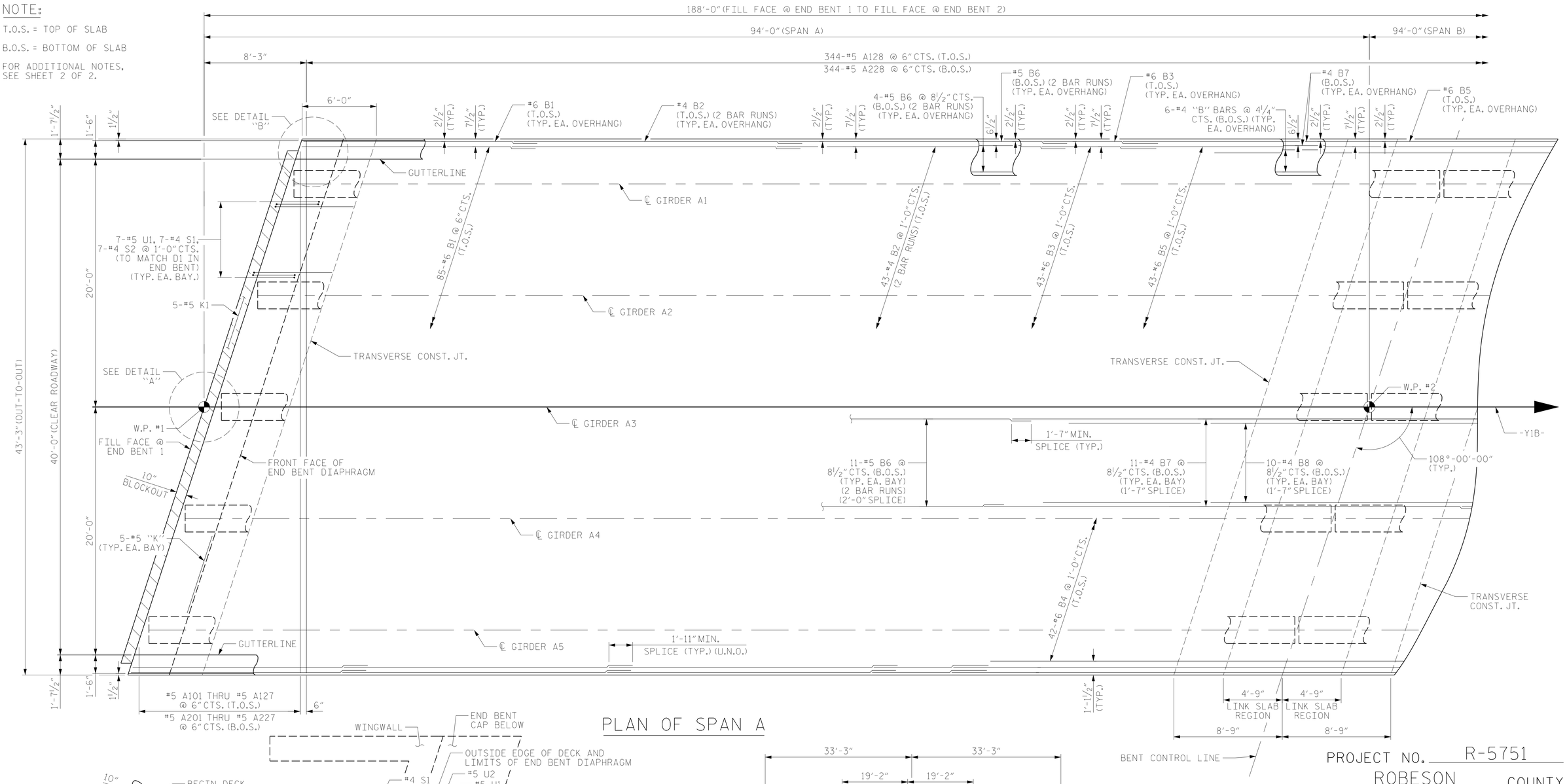
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			28

NOTE:

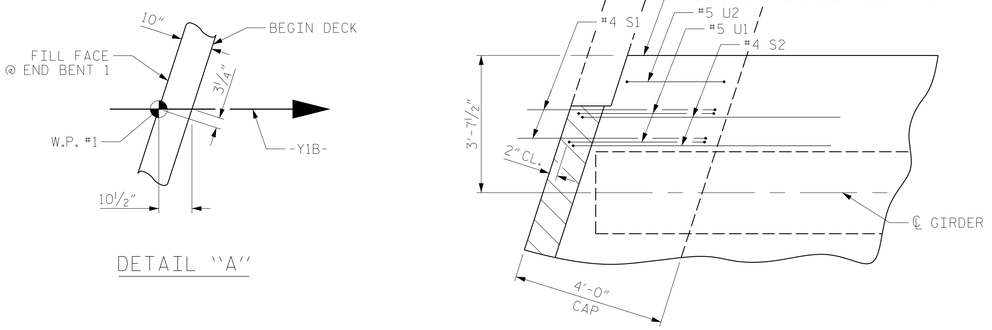
T.O.S. = TOP OF SLAB

B.O.S. = BOTTOM OF SLAB

FOR ADDITIONAL NOTES, SEE SHEET 2 OF 2.



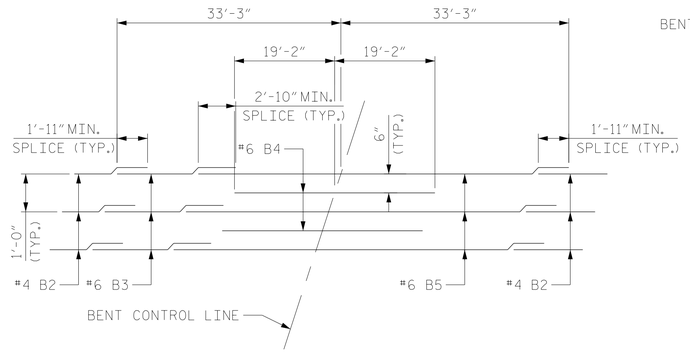
PLAN OF SPAN A



DETAIL "B"

REINFORCEMENT SPACED AS SHOWN ON SHEET S-5

DETAIL "A"



TOP OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 1 OF 2

DRAWN BY : TWL DATE : 10/2021

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SUPERSTRUCTURE

PLAN OF SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			28

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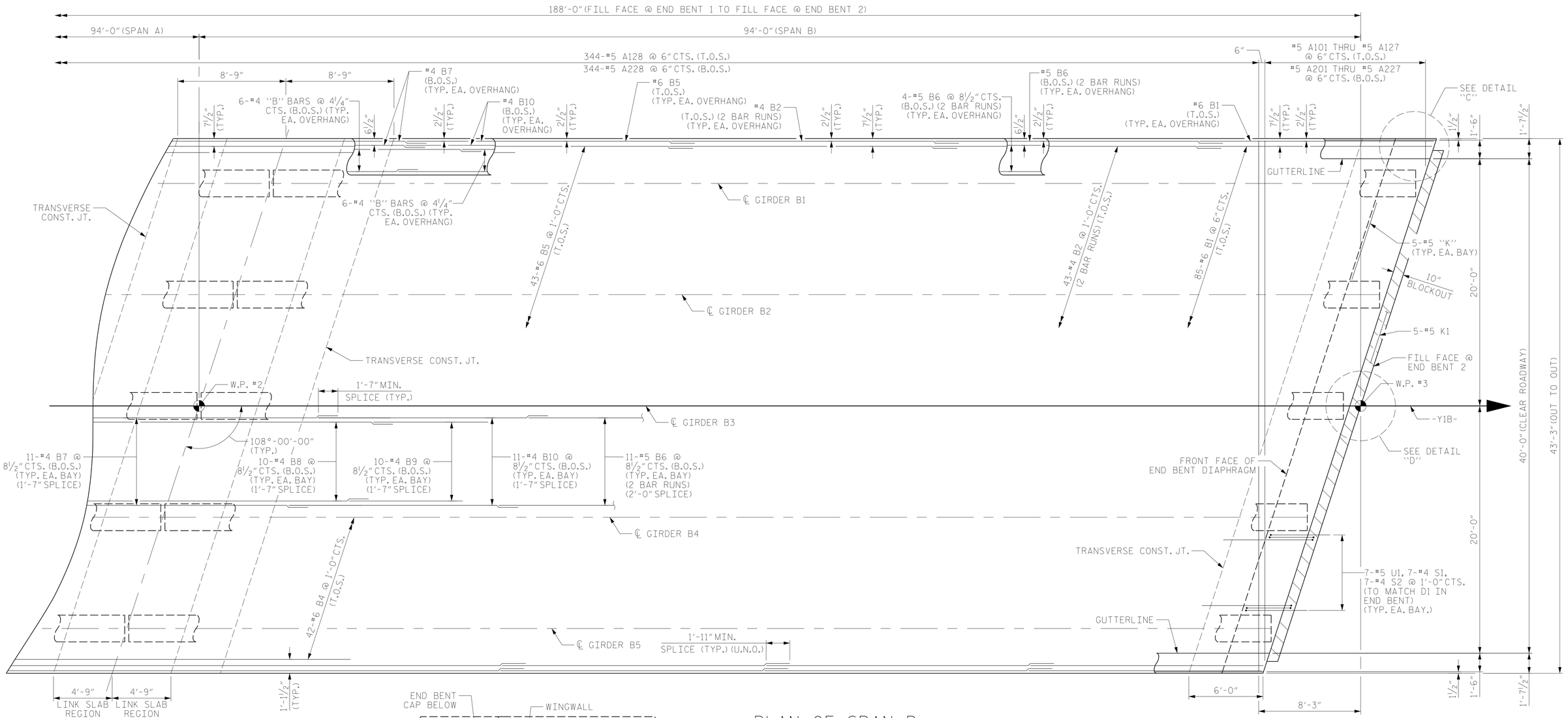


PLAN OF SPAN B

NOTES:

FOR SPLICE LENGTHS NOT SHOWN, REFER TO MINIMUM SPLICE LENGTH TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

FOR END BENT DIAPHRAGM BARS, SEE TYPICAL SECTION SHEETS.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEET.

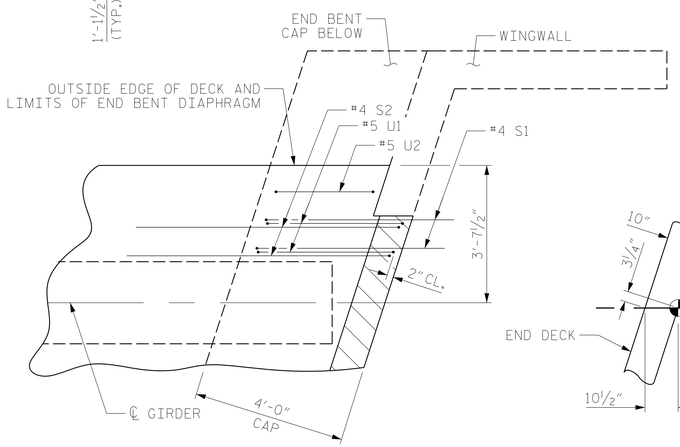
FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

FOR BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TOP OF SLAB REINFORCING STEEL LAYOUT, SEE SHEET 1 OF 2.

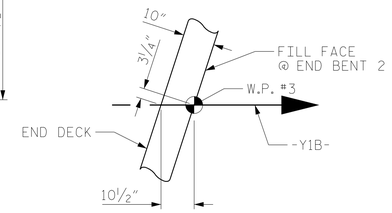
T.O.S. = TOP OF SLAB

B.O.S. = BOTTOM OF SLAB

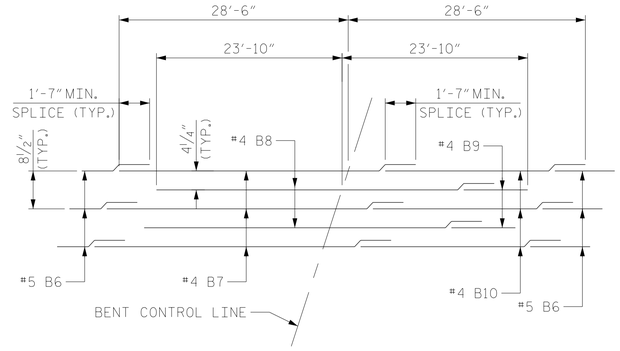


DETAIL "C"

REINFORCEMENT SPACED AS SHOWN ON SHEET S-5



DETAIL "D"



BOTTOM OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 2 OF 2

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SUPERSTRUCTURE

PLAN OF SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			28

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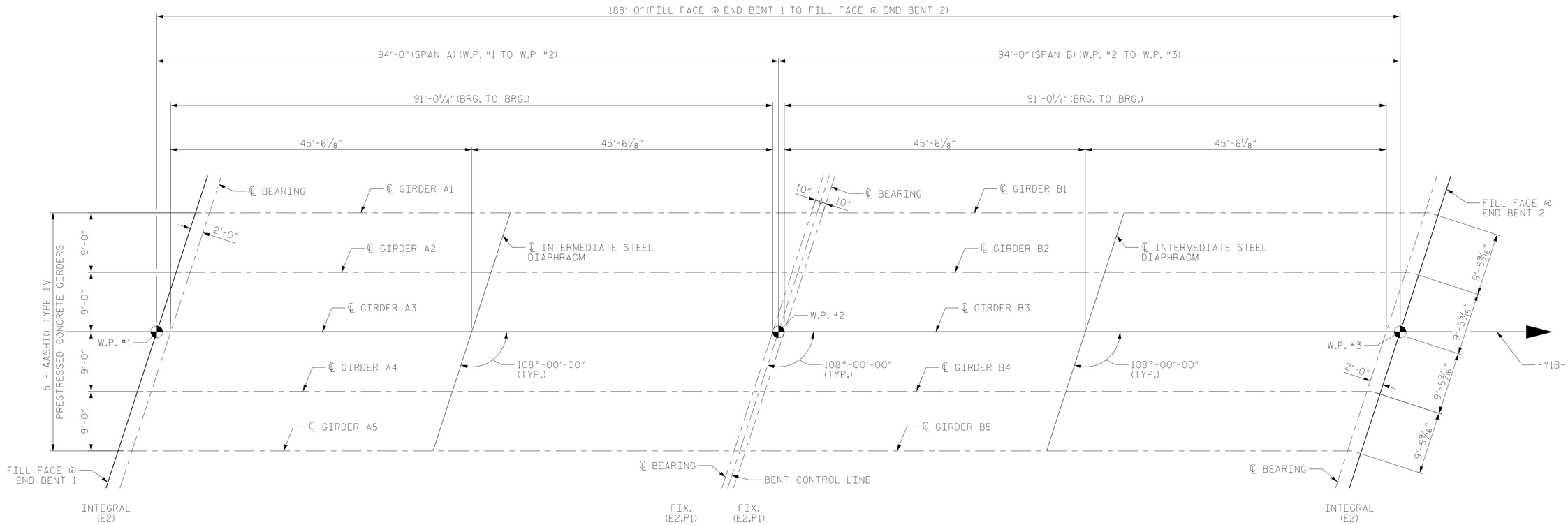
NOTE:

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



SPAN A

SPAN B

FRAMING PLAN

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

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SUPERSTRUCTURE

FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			28

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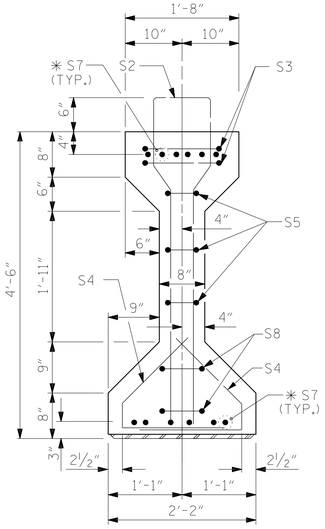
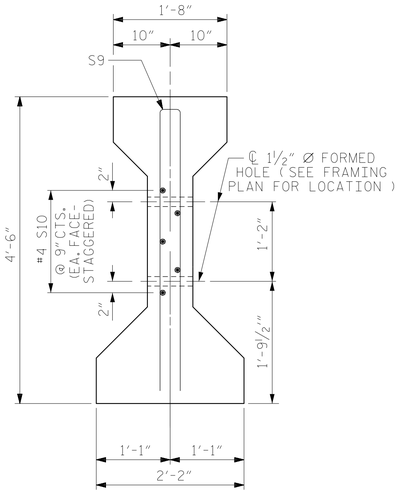


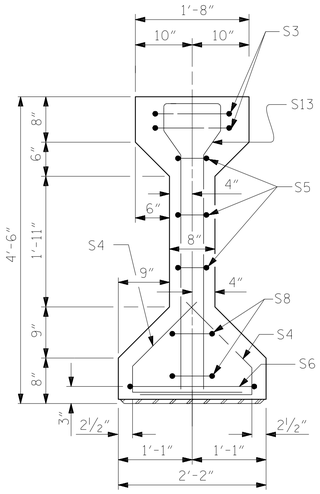
SECTION A-A

✳ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDERS SHEET.

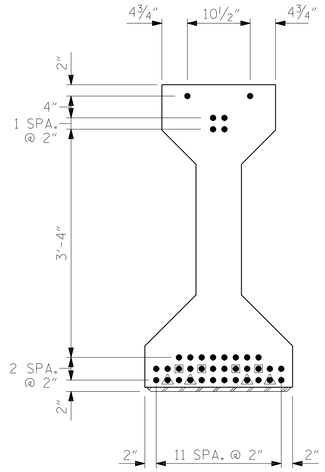


SECTION B-B

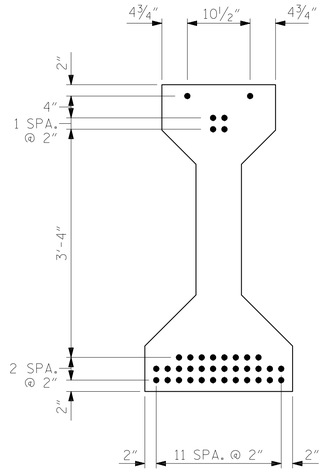
(S1 BARS NOT SHOWN)



SECTION C-C



AT END OF GIRDER

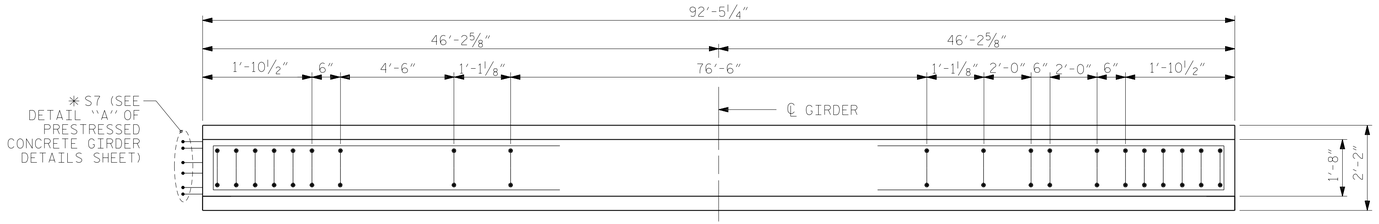


AT ℄ OF GIRDER

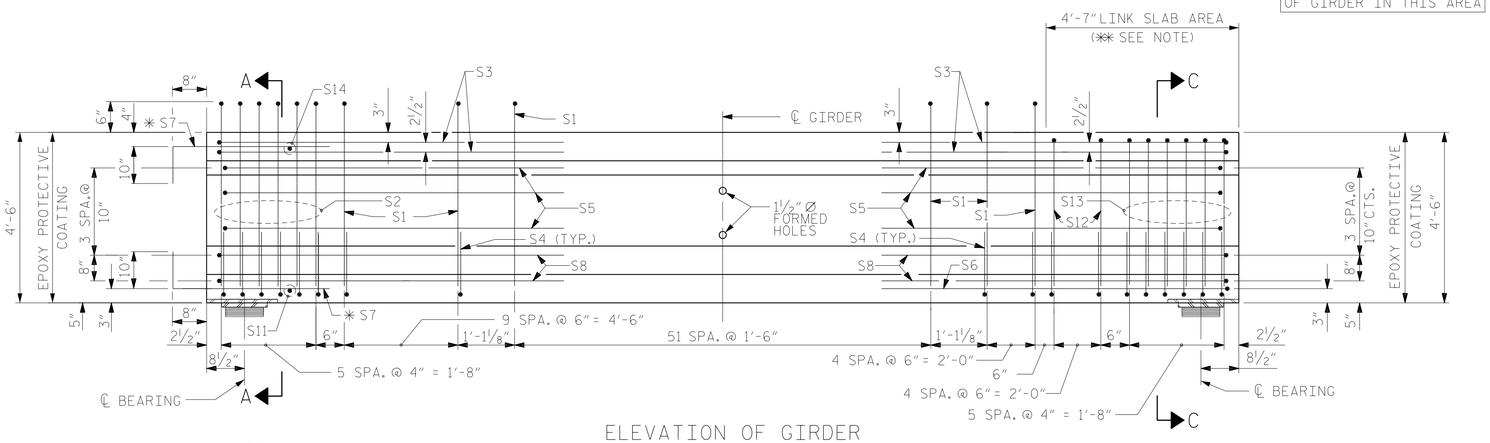
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- FULLY BONDED STRANDS
- DEBONDED FOR 3'-0" FROM END OF GIRDER
- DEBONDED FOR 6'-0" FROM END OF GIRDER



PLAN OF GIRDER

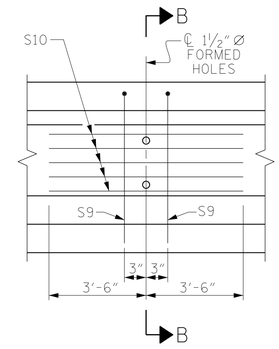


INTEGRAL

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
SPAN A SHOWN, SPAN B SIMILAR

FIX.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL EXTERIOR GIRDERS AND INTERIOR GIRDERS.

0.6" Ø L. R. GRADE 270 STRANDS

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

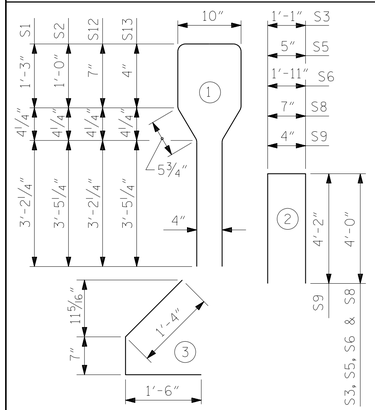
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	67	#4	1	10'-8"	477
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	1	#4	2	9'-11"	7
✳ S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	2	#5	2	8'-8"	18
S10	5	#4	STR	7'-0"	23
S11	1	#3	STR	1'-10"	1
S12	5	#4	1	9'-4"	31
S13	6	#6	1	9'-4"	84
S14	1	#3	STR	1'-4"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
SPAN A & B	1,011	18.8	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
10	92'-5¼"	924'-4½"

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 1 OF 2

ASSEMBLED BY : TWL	DATE : 10/2021
CHECKED BY : MRA	DATE : 10/2021
DRAWN BY : JMB 12/87	REV. 10/1/11 MAA/GM
CHECKED BY : ARB 12/87	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

10/25/2022
X:\P\1030036026_R-5751 US 74_NC 72_NC_130 Final Design\Design\Structures\CAD\Final Plans\401_021_R5751_SMU_G_S-11_770535.dgn
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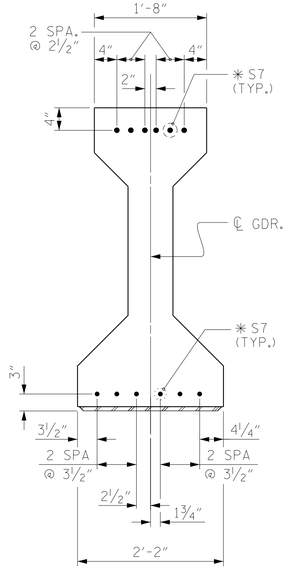
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

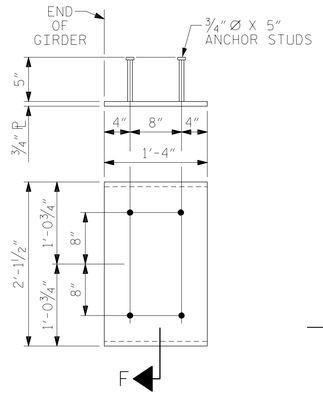
AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			28

STD. NO. PCG3



DETAIL "A"



SECTION "F"

(SEE NOTES)

EMBEDDED PLATE "B-1" DETAILS

(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 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 PSI.

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", AND INDICATED ON THE GIRDER SHEET, SHALL BE RAKED TO A DEPTH OF ¼".

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN A AND SPAN B																				
	GIRDERS 1 AND 5 (EXTERIOR)																				
TWENTIETH POINTS	0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.026	0.052	0.076	0.098	0.118	0.134	0.148	0.157	0.163	0.165	0.163	0.157	0.148	0.134	0.118	0.098	0.076	0.052	0.026	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.017	0.034	0.050	0.065	0.078	0.089	0.098	0.104	0.108	0.109	0.108	0.104	0.098	0.089	0.078	0.065	0.050	0.034	0.017	0
FINAL CAMBER ↑	0	1/8	3/16	5/16	3/8	1/2	9/16	5/8	5/8	11/16	11/16	11/16	5/8	5/8	9/16	1/2	3/8	5/16	3/16	1/8	0
	GIRDERS 2 - 4 (INTERIOR)																				
TWENTIETH POINTS	0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.026	0.052	0.076	0.098	0.118	0.134	0.148	0.157	0.163	0.165	0.163	0.157	0.148	0.134	0.118	0.098	0.076	0.052	0.026	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.017	0.034	0.050	0.065	0.078	0.089	0.098	0.104	0.108	0.110	0.108	0.104	0.098	0.089	0.078	0.065	0.050	0.034	0.017	0
FINAL CAMBER ↑	0	1/8	3/16	5/16	3/8	1/2	9/16	5/8	5/8	11/16	11/16	11/16	5/8	5/8	9/16	1/2	3/8	5/16	3/16	1/8	0

✳ INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBERS", WHICH IS SHOWN IN INCHES (FRACTION FORM).

PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-

SHEET 2 OF 2

DRAWN BY : TWL DATE : 10/2021
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DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

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SUPERSTRUCTURE
DEAD LOAD DEFLECTION TABLES AND PRESTRESSED CONCRETE GIRDER DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			28

10/25/2022
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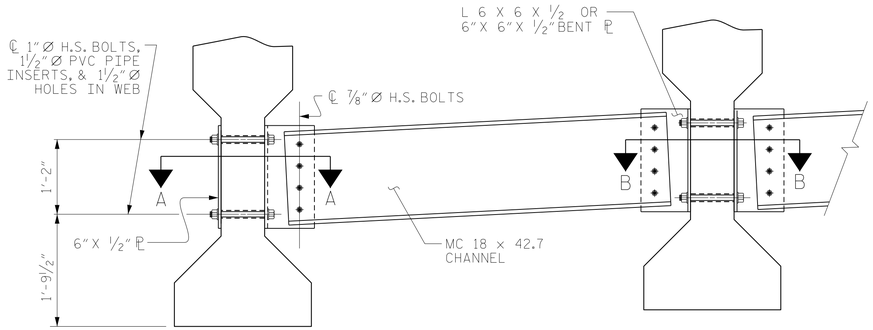
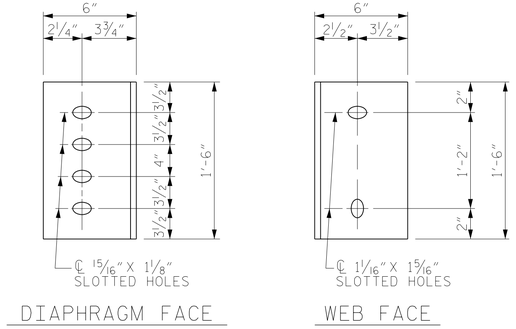


PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTOR PLATE DETAILS

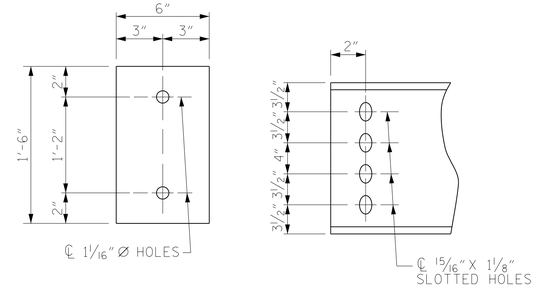
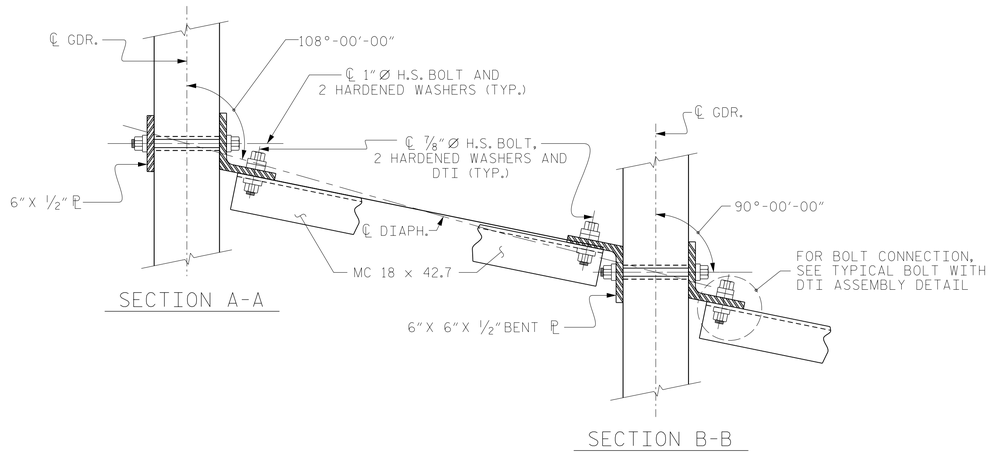
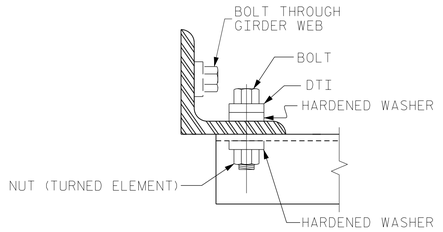


PLATE DETAILS CHANNEL END



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

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

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

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

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

ASSEMBLED BY : TWL	DATE : 10/2021
CHECKED BY : MRA	DATE : 10/2021
DRAWN BY : TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

10/25/2022
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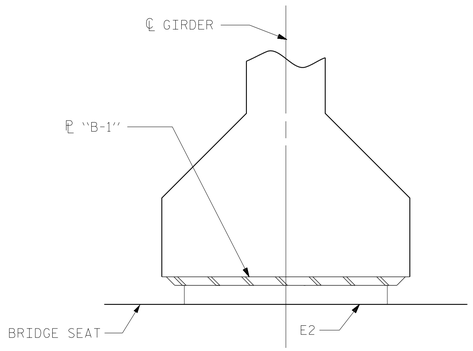
STANDARD

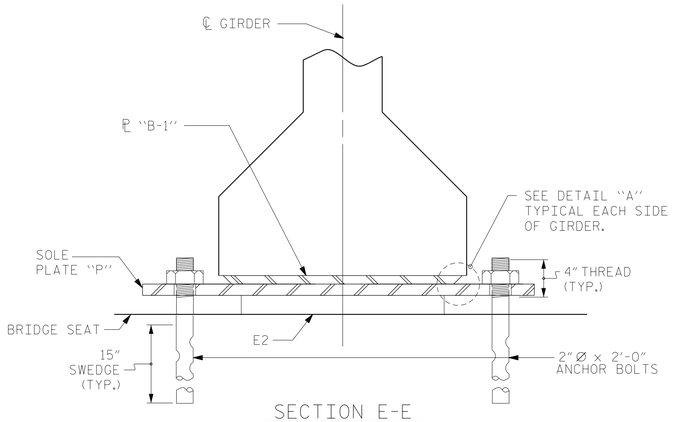
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			28

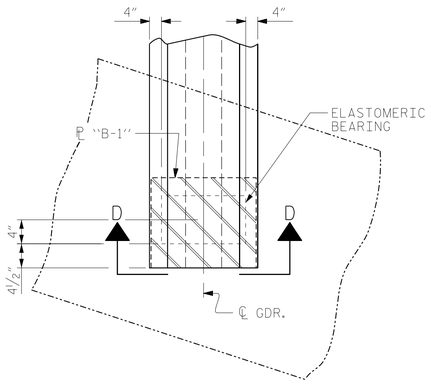
STD. NO. PCG10



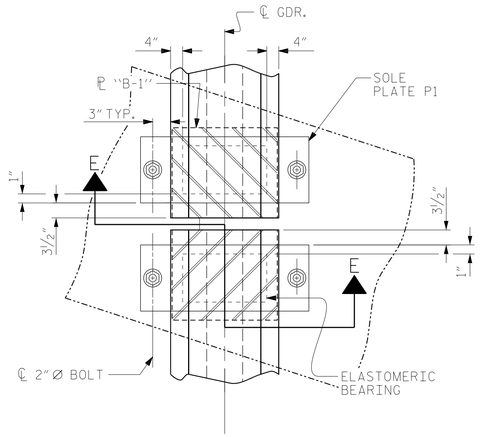
SECTION D-D
(AT INTEGRAL END BENT)



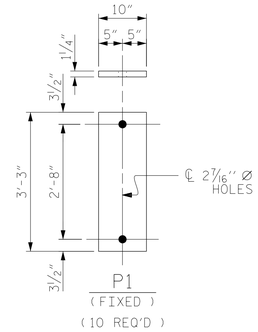
SECTION E-E
(FIXED)



TYPICAL PLAN @ END BENT



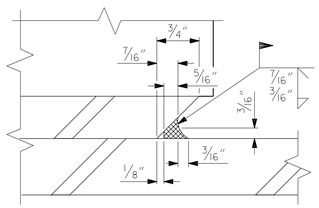
TYPICAL PLAN @ BENT 1



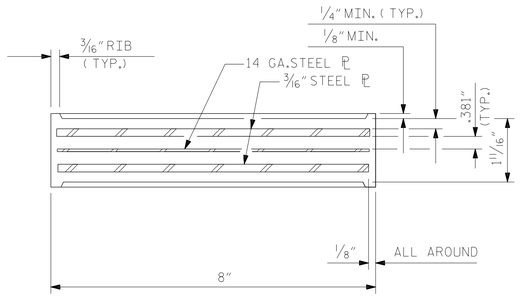
P1
(FIXED)
(10 REQ'D)

SOLE PLATE DETAIL

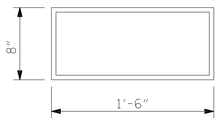
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L.(NO IMPACT)	
TYPE III	205 k



DETAIL "A"



TYPICAL SECTION OF ELASTOMERIC BEARING



E2 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE III

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.

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

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

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

SOLE PLATE P1, BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-

DRAWN BY : TWL DATE : 10/2021
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DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

10/25/2022
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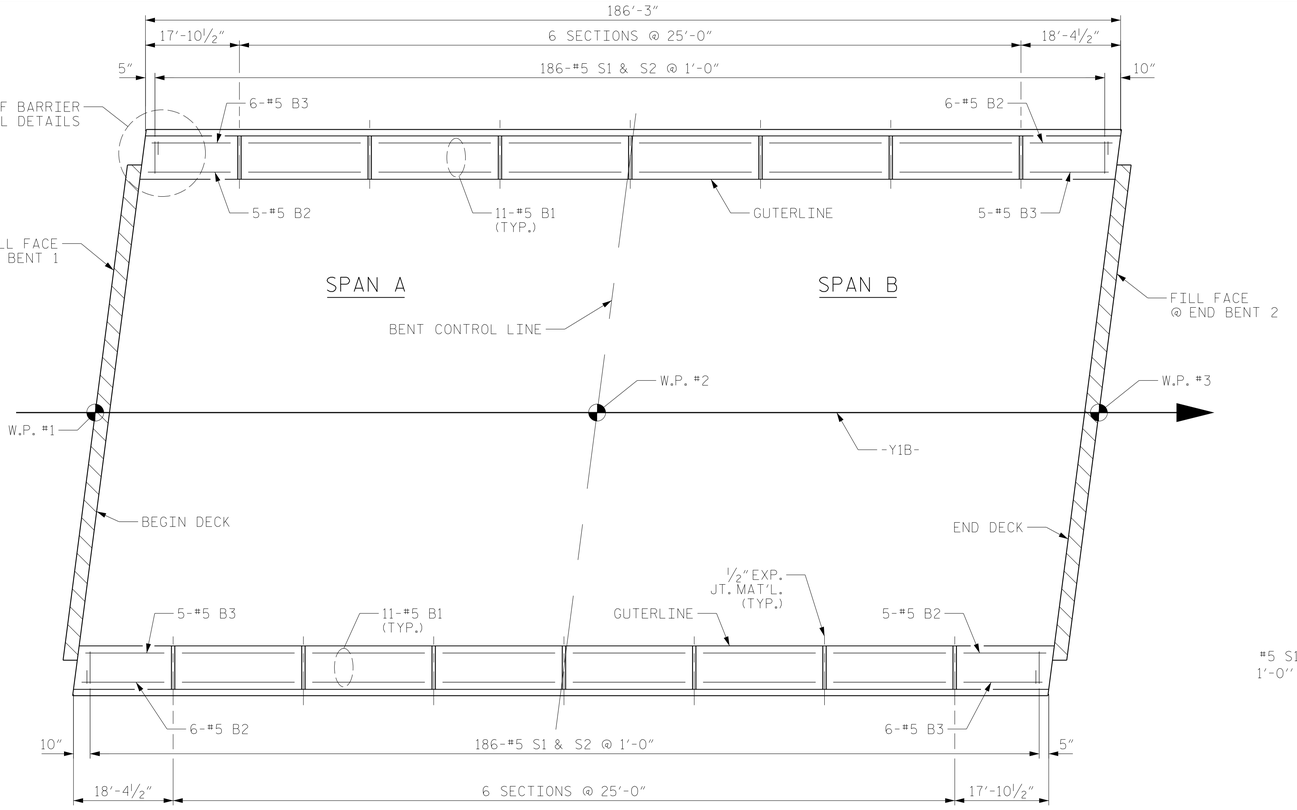
SUPERSTRUCTURE

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			28



PLAN OF BARRIER RAIL

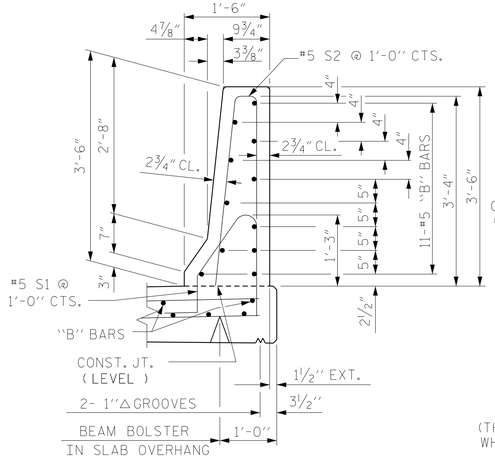
NOTES

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

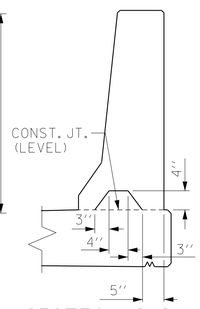
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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.

ANY FIELD CUT EPOXY COATED REINFORCEMENT SHALL BE REPAIRED AS DIRECTED BY THE ENGINEER.



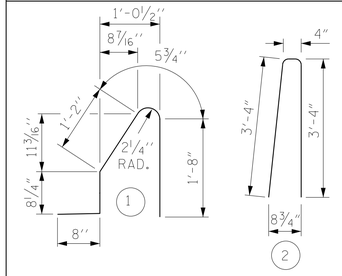
SECTION THRU RAIL



SECTION S-S

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

BAR TYPES



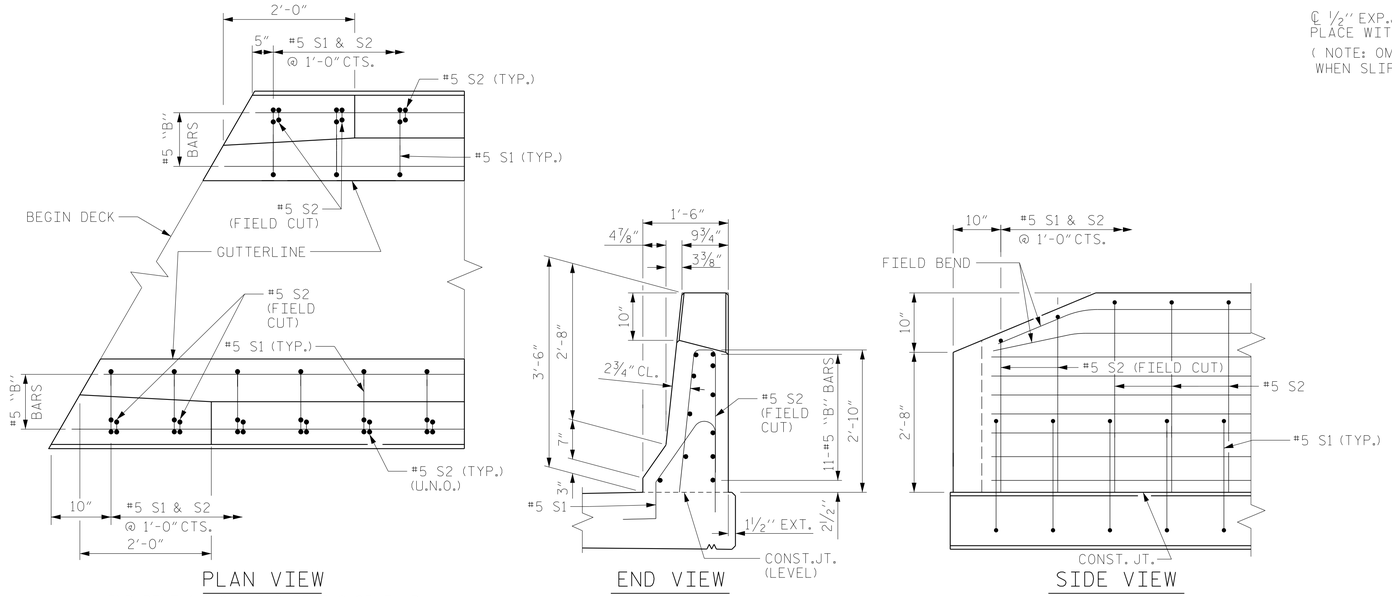
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	132	#5	STR.	24'-7"	3385
✳ B2	22	#5	STR.	17'-10"	409
✳ B3	22	#5	STR.	17'-7"	403
✳ S1	372	#5	1	4'-8"	1811
✳ S2	372	#5	2	7'-0"	2716

✳ EPOXY COATED REINFORCING STEEL	8,724 LBS.
CLASS AA CONCRETE	50.7 CU. YDS.
CONCRETE BARRIER RAIL	372.50 LIN. FT.



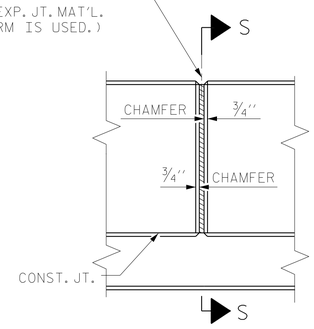
PLAN VIEW

END BENT 1 SHOWN, END BENT 2 SIMILAR

END VIEW

SIDE VIEW

℄ ½" EXP.JT.MAT'L HELD IN PLACE WITH GALVANIZED NAILS.
(NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

END OF BARRIER RAIL DETAILS

PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-

DRAWN BY : TWL DATE : 10/2021
CHECKED BY : MRA DATE : 10/2021
DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

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NORTH CAROLINA PROFESSIONAL SEAL 043245 ENGINEER MICHAEL KENT O'CONNOR, JR.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			28

10/25/2022
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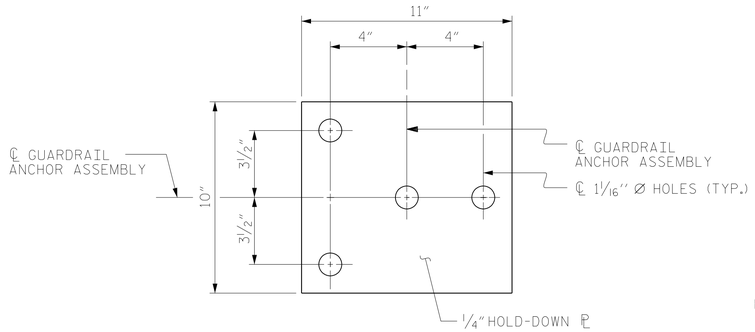
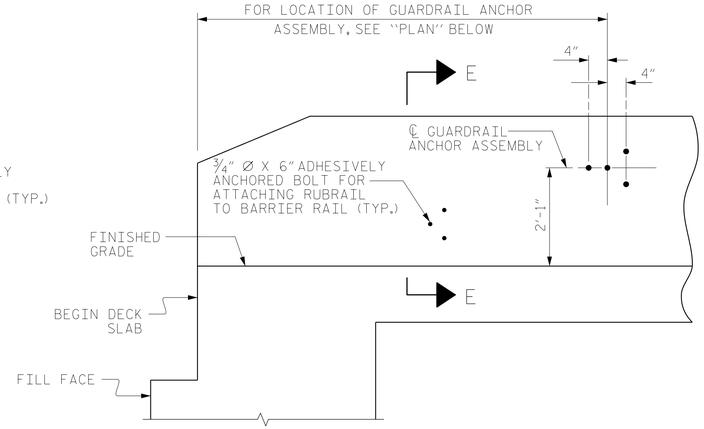
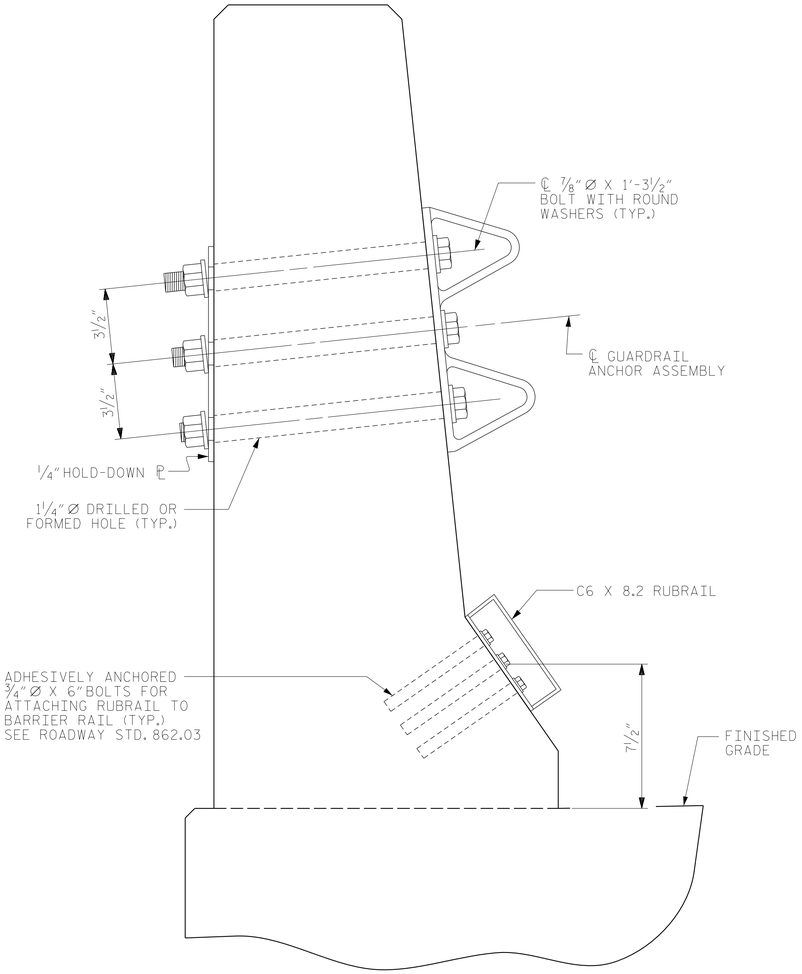


PLAN

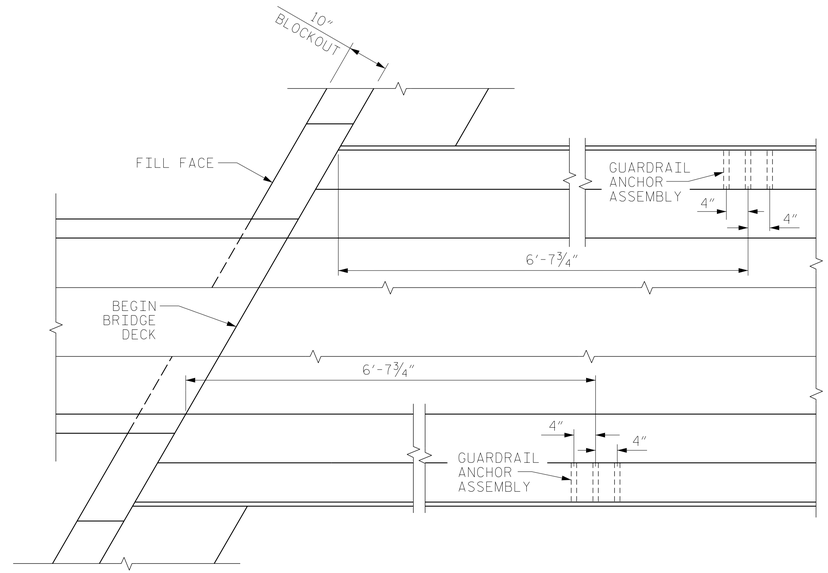


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD-DOWN PLATE AND 4 - ⅞" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

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

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

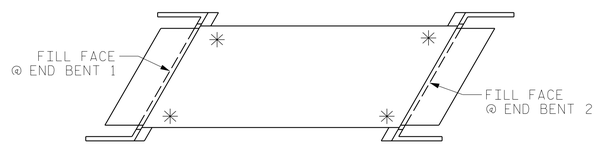
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 CONCRETE BARRIER RAIL.

THE 1 ¼" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ¾" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

ASSEMBLED BY : NSC	DATE : 10/2021		
CHECKED BY : MRA	DATE : 10/2021		
DRAWN BY : TLA 5/06	REV. 7/12	MAA/GM	
CHECKED BY : GM 5/06	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

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1			3			TOTAL SHEETS
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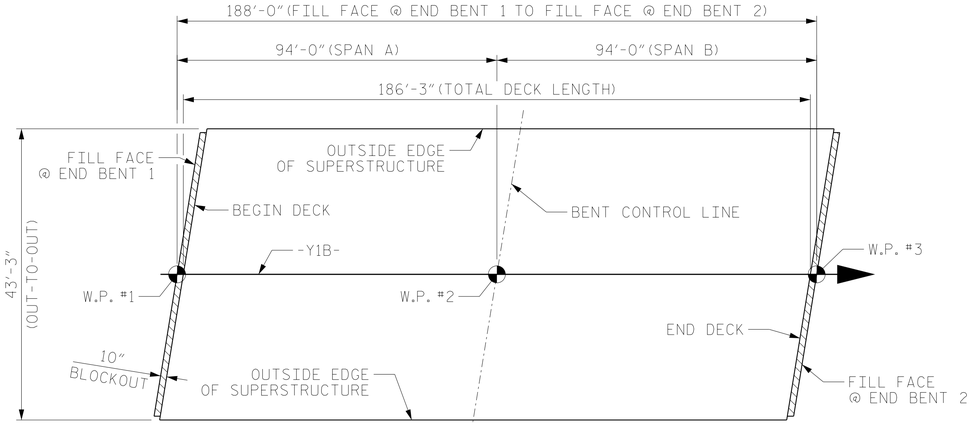
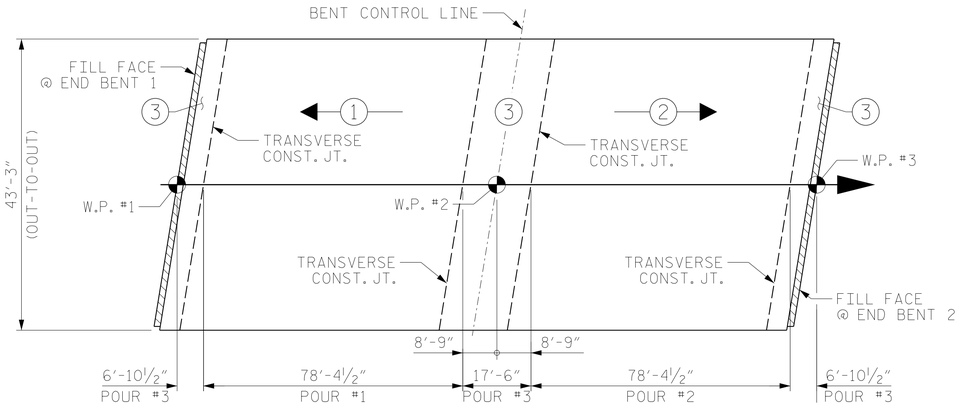
(SHT 1b) STD. NO. GRA2



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 8,056)



POURING SEQUENCE

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

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

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,814 SQ.FT.
BRIDGE DECK	6,891 SQ.FT.
TOTAL	8,705 SQ.FT.

CLASS AA CONCRETE

	CU. YDS.
POUR 1	104.1
POUR 2	104.1
POUR 3	95.6
TOTALS**	303.8

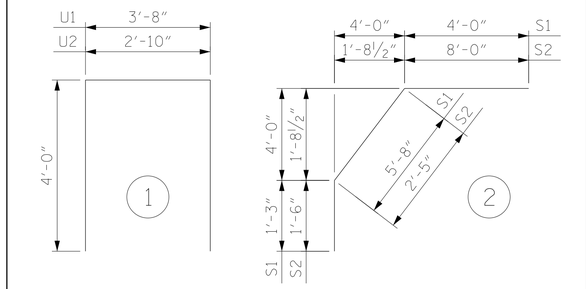
** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A101	2	#5	STR.	2'-0"	4	A208	2	#5	STR.	12'-10"	27
✳A102	2	#5	STR.	3'-7"	7	A209	2	#5	STR.	14'-4"	30
✳A103	2	#5	STR.	5'-1"	11	A210	2	#5	STR.	15'-10"	33
✳A104	2	#5	STR.	6'-8"	14	A211	2	#5	STR.	17'-5"	36
✳A105	2	#5	STR.	8'-2"	17	A212	2	#5	STR.	18'-11"	39
✳A106	2	#5	STR.	9'-9"	20	A213	2	#5	STR.	20'-6"	43
✳A107	2	#5	STR.	11'-3"	23	A214	2	#5	STR.	22'-0"	46
✳A108	2	#5	STR.	12'-10"	27	A215	2	#5	STR.	23'-7"	49
✳A109	2	#5	STR.	14'-4"	30	A216	2	#5	STR.	25'-1"	52
✳A110	2	#5	STR.	15'-10"	33	A217	2	#5	STR.	26'-8"	56
✳A111	2	#5	STR.	17'-5"	36	A218	2	#5	STR.	28'-2"	59
✳A112	2	#5	STR.	18'-11"	39	A219	2	#5	STR.	29'-9"	62
✳A113	2	#5	STR.	20'-6"	43	A220	2	#5	STR.	31'-3"	65
✳A114	2	#5	STR.	22'-0"	46	A221	2	#5	STR.	32'-10"	68
✳A115	2	#5	STR.	23'-7"	49	A222	2	#5	STR.	34'-4"	72
✳A116	2	#5	STR.	25'-1"	52	A223	2	#5	STR.	35'-11"	75
✳A117	2	#5	STR.	26'-8"	56	A224	2	#5	STR.	37'-5"	78
✳A118	2	#5	STR.	28'-2"	59	A225	2	#5	STR.	38'-11"	81
✳A119	2	#5	STR.	29'-9"	62	A226	2	#5	STR.	40'-6"	84
✳A120	2	#5	STR.	31'-3"	65	A227	2	#5	STR.	42'-0"	88
✳A121	2	#5	STR.	32'-10"	68	A228	344	#5	STR.	42'-11"	15398
✳A122	2	#5	STR.	34'-4"	72						
✳A123	2	#5	STR.	35'-11"	75	✳B1	174	#6	STR.	19'-0"	4966
✳A124	2	#5	STR.	37'-5"	78	✳B2	180	#4	STR.	23'-3"	2796
✳A125	2	#5	STR.	38'-11"	81	✳B3	45	#6	STR.	9'-4"	631
✳A126	2	#5	STR.	40'-6"	84	✳B4	42	#6	STR.	38'-4"	2418
✳A127	2	#5	STR.	42'-0"	88	✳B5	45	#6	STR.	60'-0"	4055
✳A128	344	#5	STR.	42'-11"	15398	B6	216	#5	STR.	34'-1"	7679
						B7	54	#4	STR.	40'-0"	1443
A201	2	#5	STR.	2'-0"	4	B8	46	#4	STR.	40'-0"	1229
A202	2	#5	STR.	3'-7"	7	B9	46	#4	STR.	9'-3"	284
A203	2	#5	STR.	5'-1"	11	B10	54	#4	STR.	18'-7"	670
A204	2	#5	STR.	6'-8"	14						
A205	2	#5	STR.	8'-2"	17	K1	10	#5	STR.	43'-1"	449
A206	2	#5	STR.	9'-9"	20	K2	8	#5	STR.	7'-4"	61
A207	2	#5	STR.	11'-3"	23	K3	16	#5	STR.	8'-5"	140
						K4	8	#5	STR.	7'-7"	63
						K5	8	#5	STR.	6'-10"	57
						K6	8	#5	STR.	2'-7"	22
						K7	8	#5	STR.	3'-1"	26
						K8	4	#5	STR.	2'-4"	10
						✳S1	64	#4	2	10'-11"	467
						✳S2	64	#4	2	11'-11"	509
						U1	64	#5	1	11'-8"	779
						U2	4	#5	1	10'-10"	45

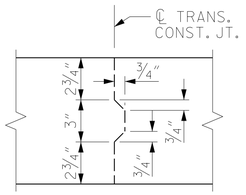
REINFORCING STEEL 29,594 LBS.
✳EPOXY COATED
REINFORCING STEEL 32,479 LBS.

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

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SUPERSTRUCTURE

BILL OF MATERIAL

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1			3			TOTAL SHEETS
2			4			28

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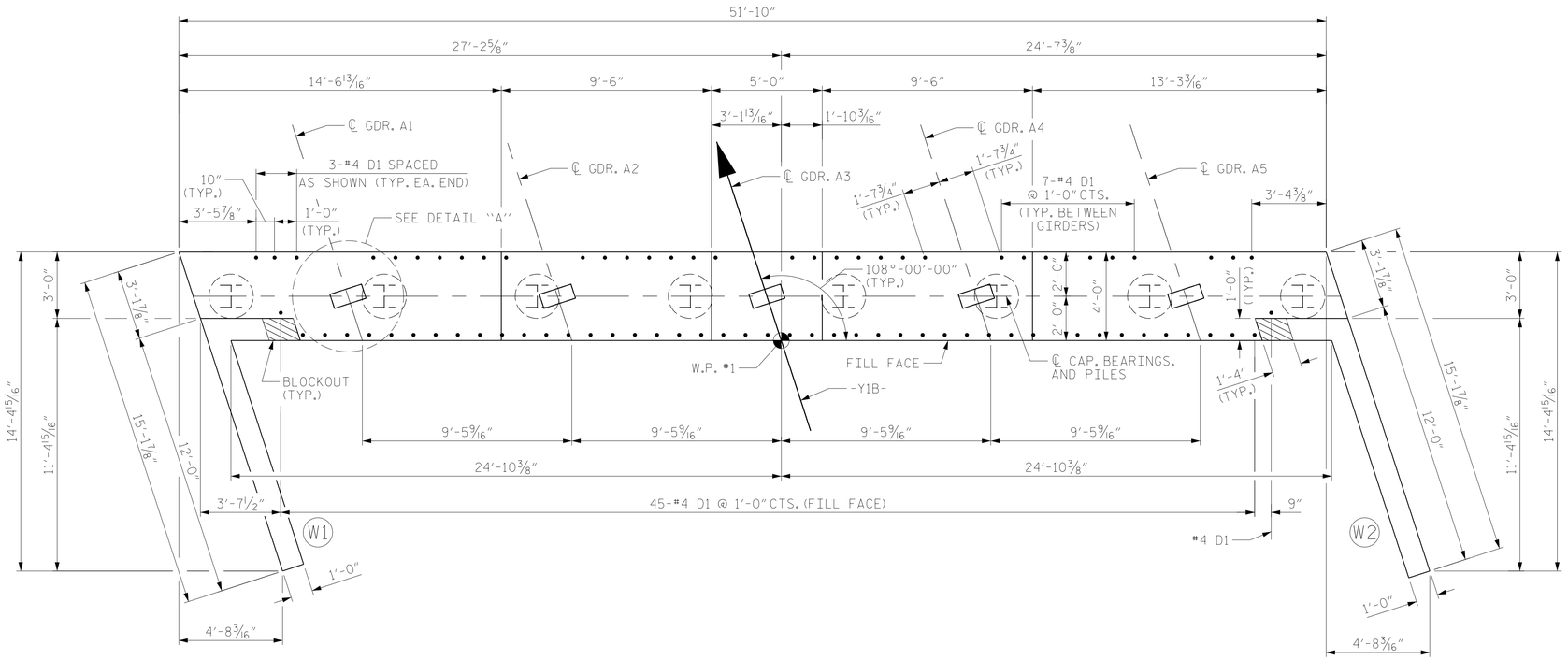
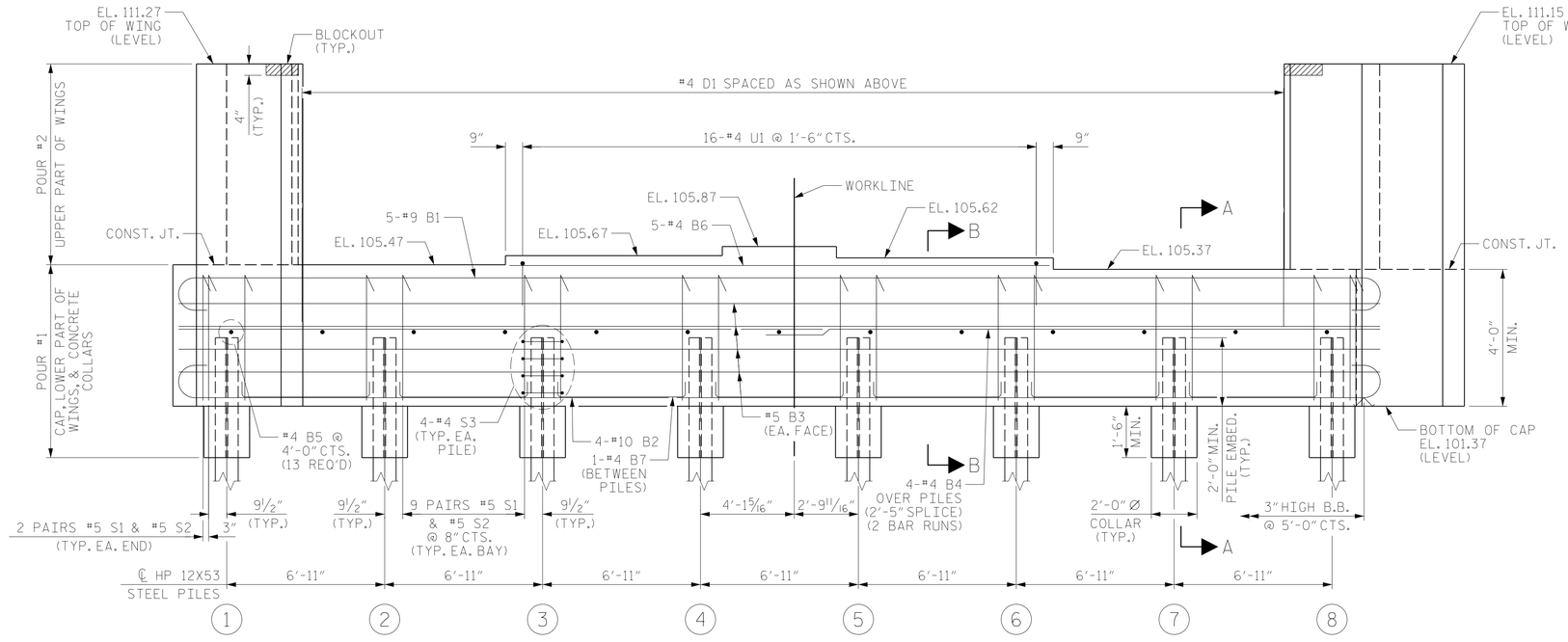


PLAN



ELEVATION

NOTES:

THE CONCRETE IN THE BLOCKOUTS SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

#4 D1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN THE CAP.

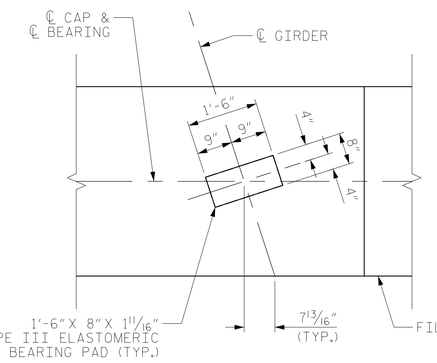
FOR SECTION A-A AND SECTION B-B, SEE SHEET 3 OF 3.

THE TOP SURFACE OF THE END BENT CAP AND LOWER WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

IT SHALL BE BROUGHT TO THE CONTRACTOR'S ATTENTION THAT THE WINGWALLS ARE TO RETAIN NO FILL UNTIL THE INTEGRAL END BENT DIAPHRAGM CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

SEE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAILS.

STIRRUPS NEAR SKEWED ENDS MAY BE SKEWED TO FIT TO ENSURE CONCRETE CLEARANCES.



DETAIL "A"

(TYP. EA. GIRDER)
(PILES AND DOWELS NOT SHOWN FOR CLARITY)

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 1 OF 3

DRAWN BY : TWL DATE : 02/2022
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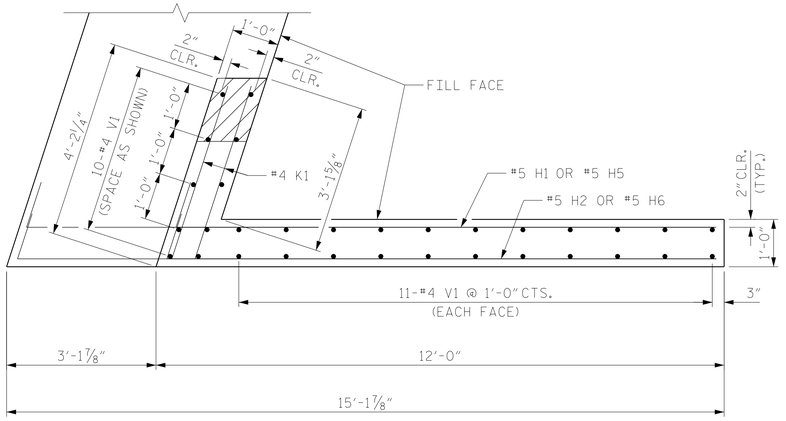
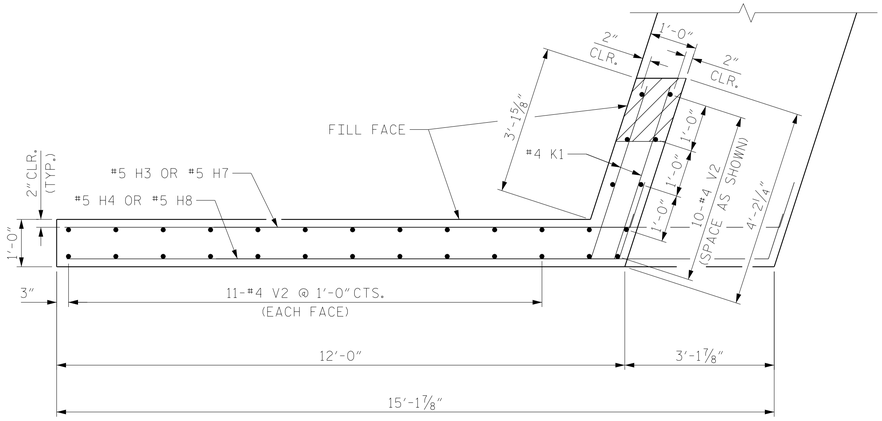
SUBSTRUCTURE

END BENT 1

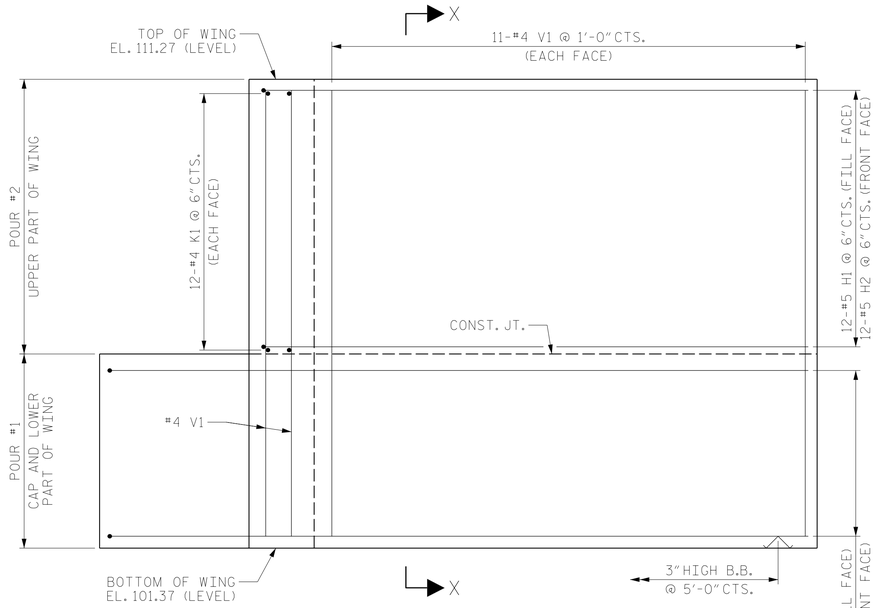
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			28



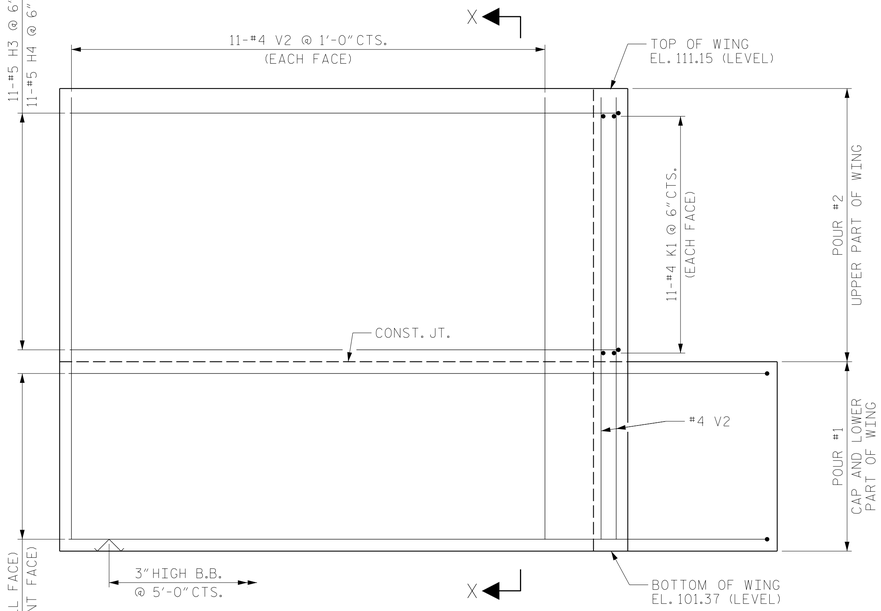
PLAN - W1



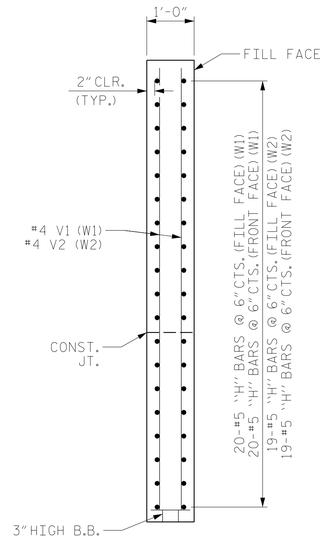
PLAN - W2



ELEVATION - W1



ELEVATION - W2



SECION X-X

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 2 OF 3

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SUBSTRUCTURE

END BENT 1 WING WALL DETAILS

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1			3			TOTAL SHEETS
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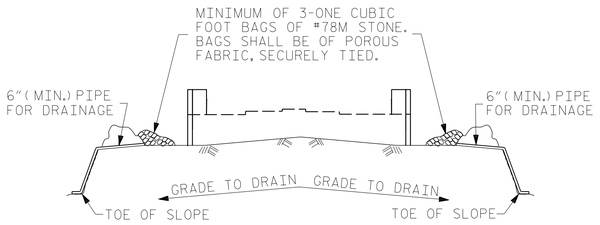
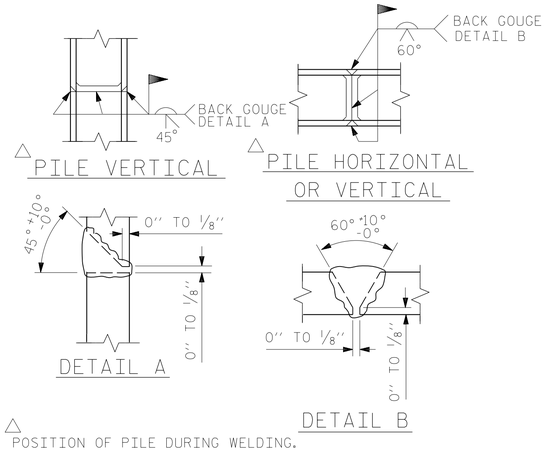


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

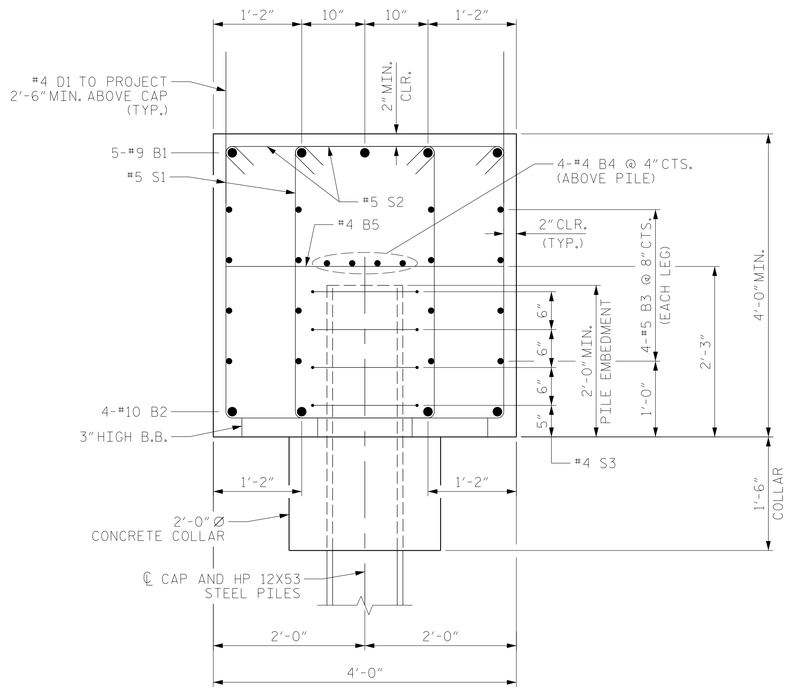
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

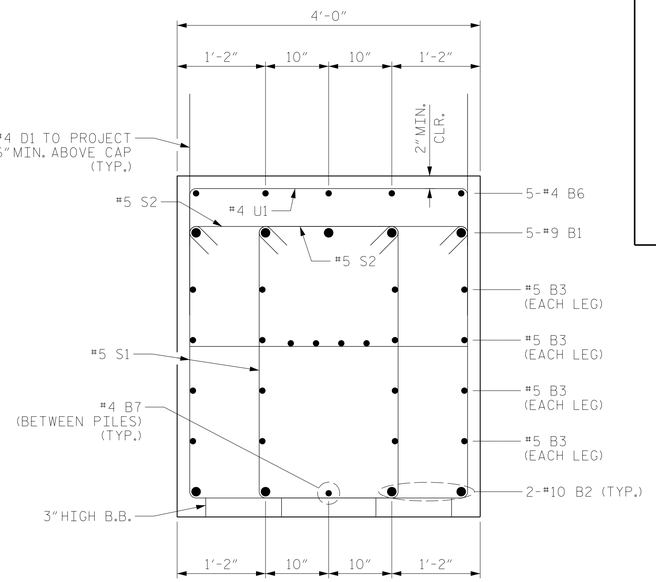


△ POSITION OF PILE DURING WELDING.

PIPE SPLICE DETAILS

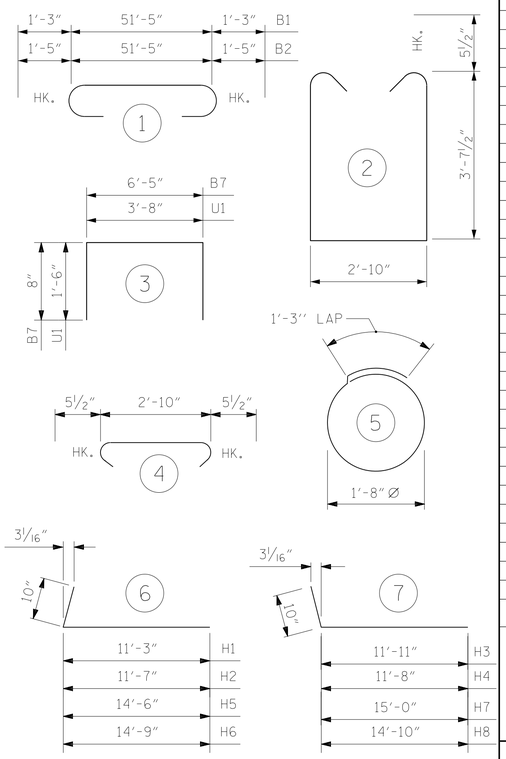


SECTION A-A



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	5	#9	1	53'-11"	917
B2	4	#10	1	54'-3"	934
B3	16	#5	STR	51'-5"	858
B4	8	#4	STR	26'-11"	144
B5	13	#4	STR	3'-8"	32
B6	5	#4	STR	23'-8"	79
B7	7	#4	3	7'-9"	36
D1	80	#4	STR	5'-0"	267
H1	12	#5	6	12'-1"	151
H2	12	#5	6	12'-5"	155
H3	11	#5	7	12'-9"	146
H4	11	#5	7	12'-6"	143
H5	8	#5	6	15'-4"	128
H6	8	#5	6	15'-7"	130
H7	8	#5	7	15'-10"	132
H8	8	#5	7	15'-8"	131
K1	46	#4	STR	3'-10"	118
S1	134	#5	2	11'-0"	1537
S2	134	#5	4	3'-9"	524
S3	32	#4	5	6'-6"	139
U1	16	#4	3	6'-8"	71
V1	32	#4	STR	9'-5"	201
V2	32	#4	STR	9'-4"	200

REINFORCING STEEL 7,173 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 (CAP, LOWER WINGS, AND COLLARS)	37.0 C.Y.
POUR #2 (UPPER WINGS)	6.5 C.Y.
TOTAL CLASS A CONCRETE	43.5 C.Y.

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS

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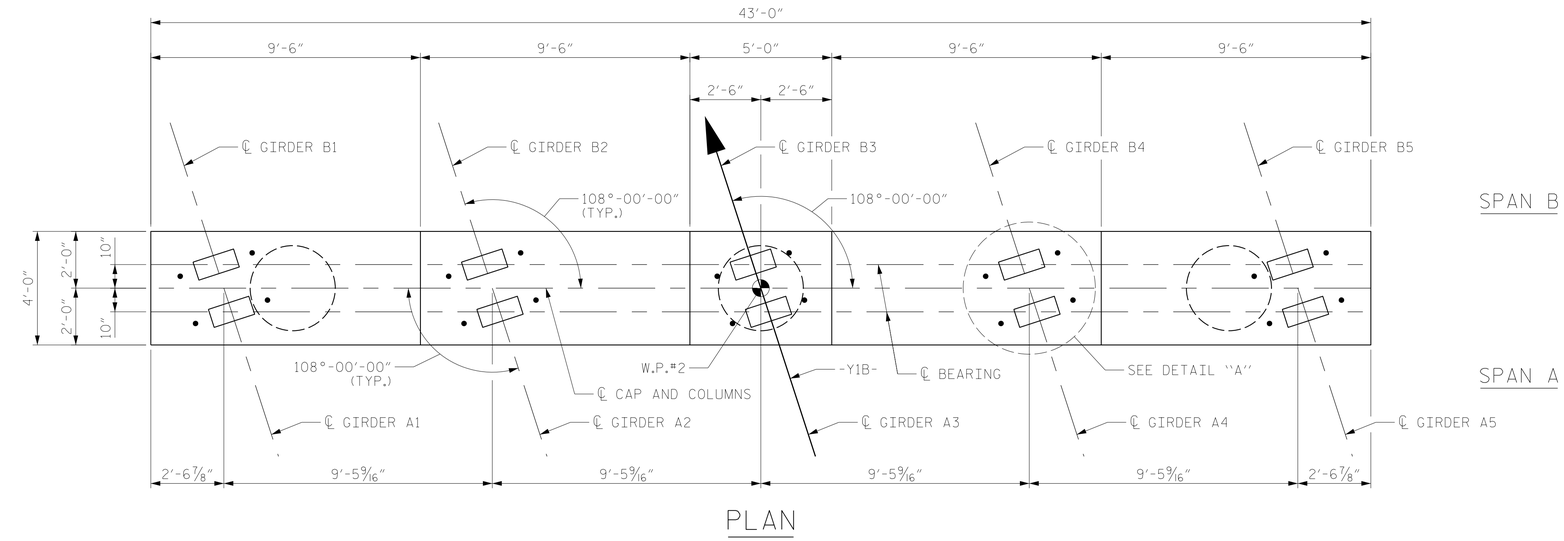
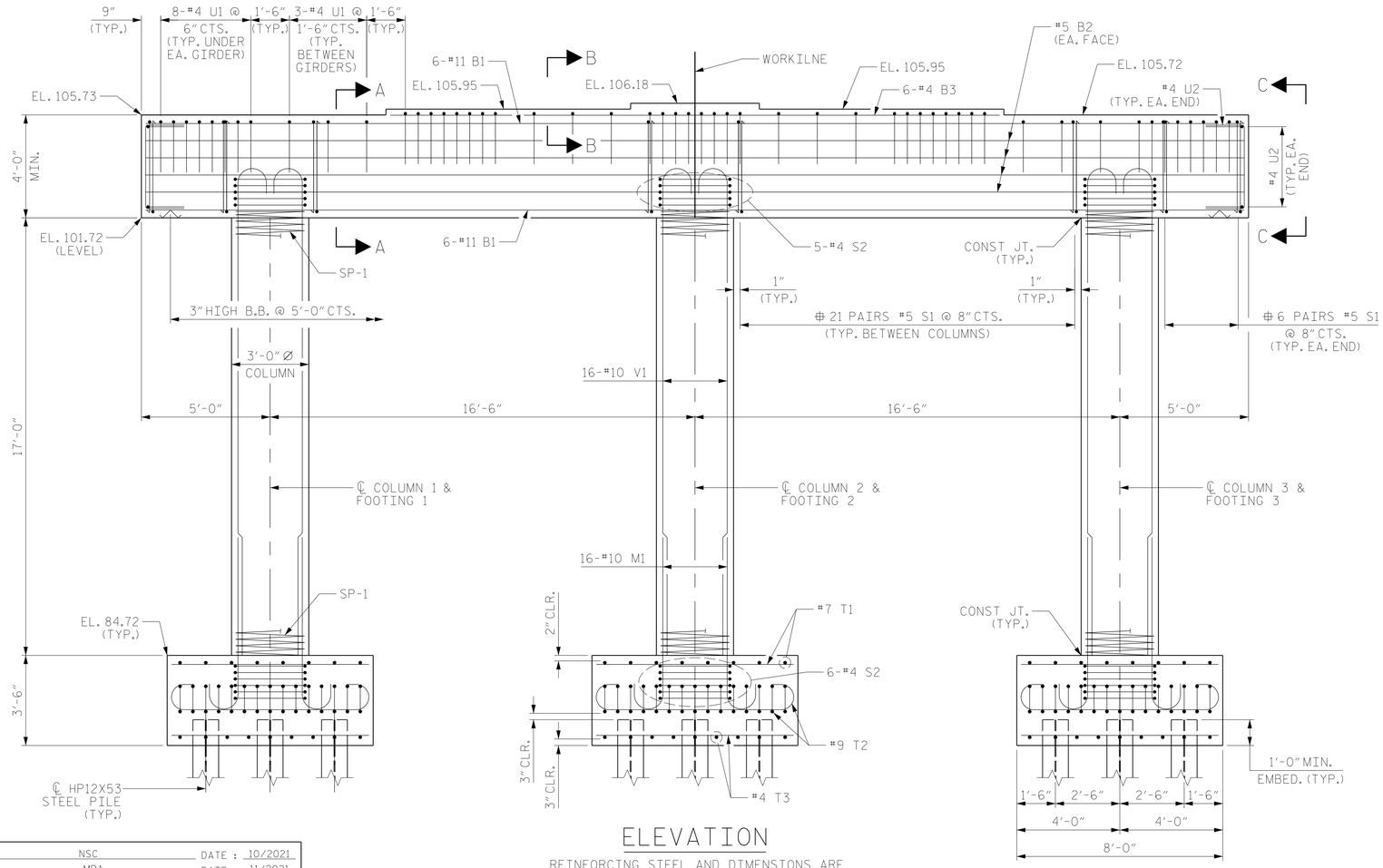


PLAN



ELEVATION

REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH COLUMN AND FOOTING

NOTES:

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

FOR REINFORCING STEEL BILL OF MATERIAL, SEE SHEET 2 OF 2.

STIRRUPS AND #4 U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO AVOID ANCHOR BOLTS.

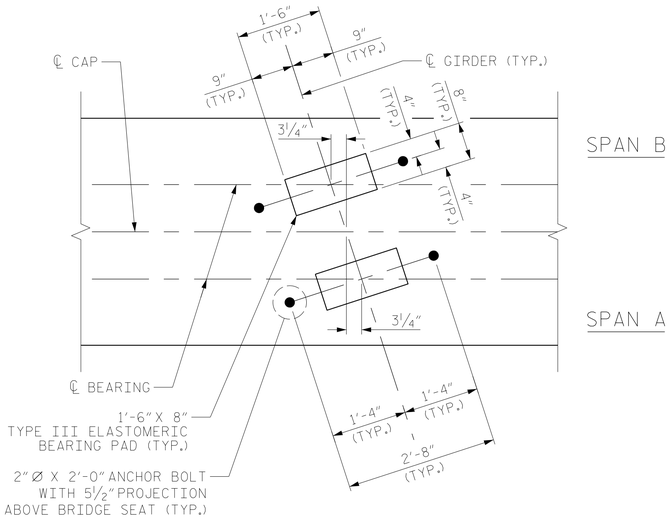
#4 U2 BARS IN ENDS OF CAP MAY BE SHIFTED AS NECESSARY TO AVOID #5 B2 BARS.

HOOKS ON #11 V1 BARS AND #9 T2 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

THE CONTRACTORS ATTENTION SHALL BE CALLED TO THE FACT THAT A MINIMUM OF 1'-6" EARTH COVER OVER ALL FOOTINGS SHALL BE MAINTAINED AFTER CONSTRUCTION IS COMPLETE.

INVERT ALTERNATE #5 S1 STIRRUP PAIRS.

#7 V2 BARS IN PILES MAY BE BENT AS NECESSARY IN ORDER TO MEET MINIMUM COVER REQUIREMENTS.



DETAIL "A"

DIMENSTIONS ARE TYPICAL FOR EACH GIRDER

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 1 OF 2

DRAWN BY : NSC DATE : 10/2021

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RALEIGH

SUBSTRUCTURE

BENT 1

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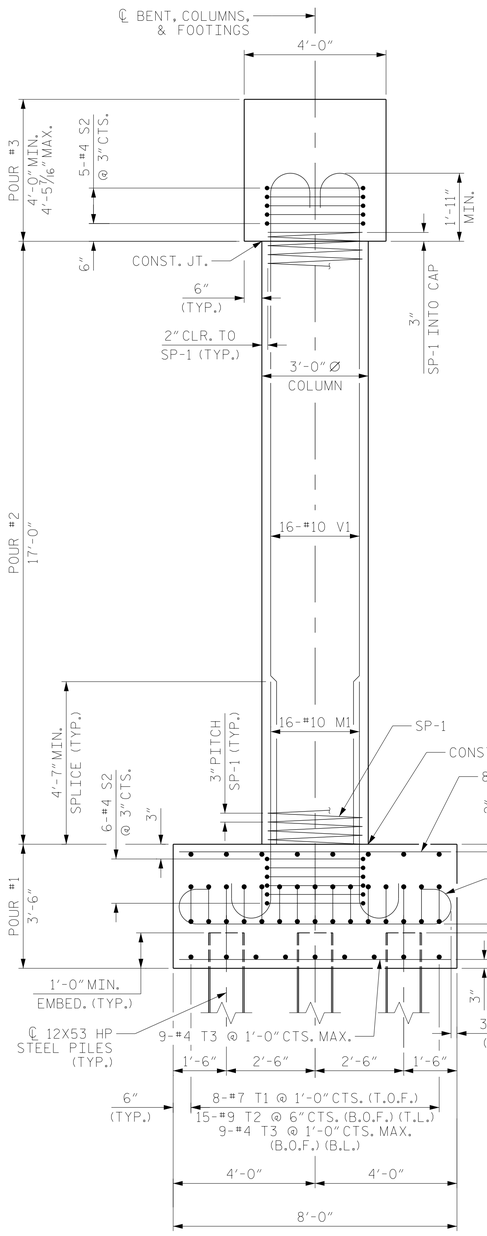
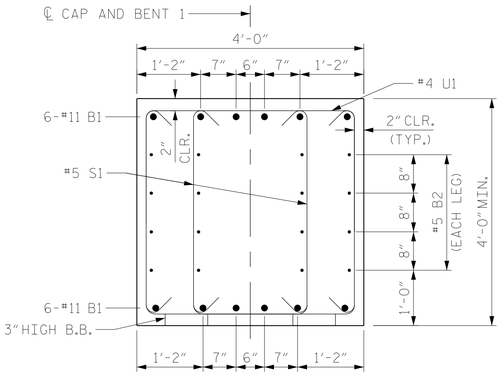
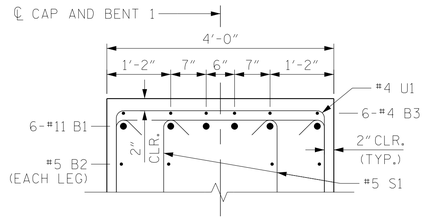


END ELEVATION

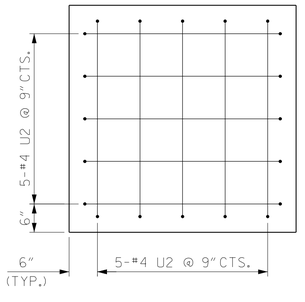
T.O.F. = TOP OF FOOTING
B.O.F. = BOTTOM OF FOOTING
T.L. = TOP LAYER
B.L. = BOTTOM LAYER



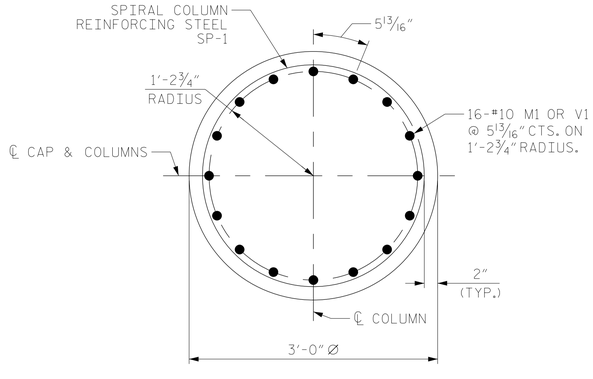
SECTION A-A



PARTIAL SECTION B-B

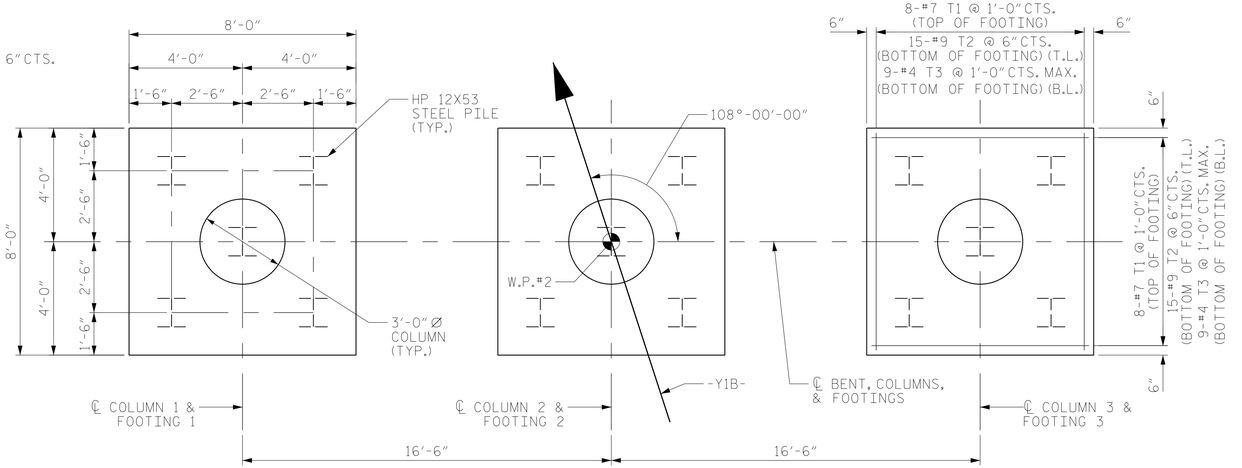


VIEW C-C



COLUMN SECTION

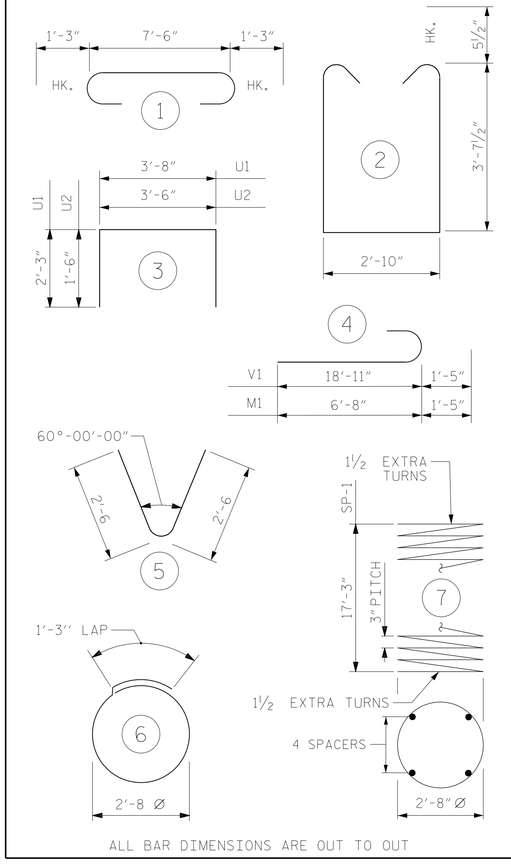
DIMENSIONS OF REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN



PLAN OF FOOTINGS

ALL DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.
HOOKS ON #9 T2 BARS NOT SHOWN FOR CLARITY.
#4 T3 BARS SHALL BE TRIMMED AS NECESSARY AROUND PILES TO MAINTAIN 3" CLR.
T.L. = TOP LAYER
B.L. = BOTTOM LAYER

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#11	STR	42'-8"	2720
B2	16	#5	STR	42'-8"	712
B3	6	#4	STR	23'-8"	95
M1	48	#10	4	8'-1"	1670
S1	108	#5	2	11'-0"	1239
S2	33	#4	6	9'-8"	213
T1	48	#7	STR	7'-6"	736
T2	90	#9	1	10'-0"	3060
T3	54	#4	STR	7'-6"	271
U1	52	#4	3	8'-2"	284
U2	20	#4	3	6'-6"	87
V1	48	#10	4	20'-4"	4200
V2	30	#7	5	5'-0"	307

REINFORCING STEEL 15,594 LBS.

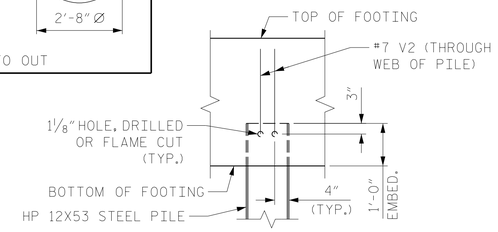
SP-1	3	*	7	591'-8"	1851

SPIRAL COLUMN REINFORCING STEEL 1,851 LBS.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE BREAKDOWN

POUR #1 (FOOTINGS)	24.9 C.Y.
POUR #2 (COLUMNS)	13.4 C.Y.
POUR #3 (CAP)	26.5 C.Y.
TOTAL CLASS A CONCRETE	64.8 C.Y.
FOUNDATION EXCAVATION	LUMP SUM



PILE DETAIL

OTHER REINFORCING IN FOOTING NOT SHOWN FOR CLARITY (TYP. EA. PILE)

SPAN B

SPAN A

PROJECT NO. R-5751
ROBESON COUNTY
STATION: 37+99.89 -Y1B-

SHEET 2 OF 2

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RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

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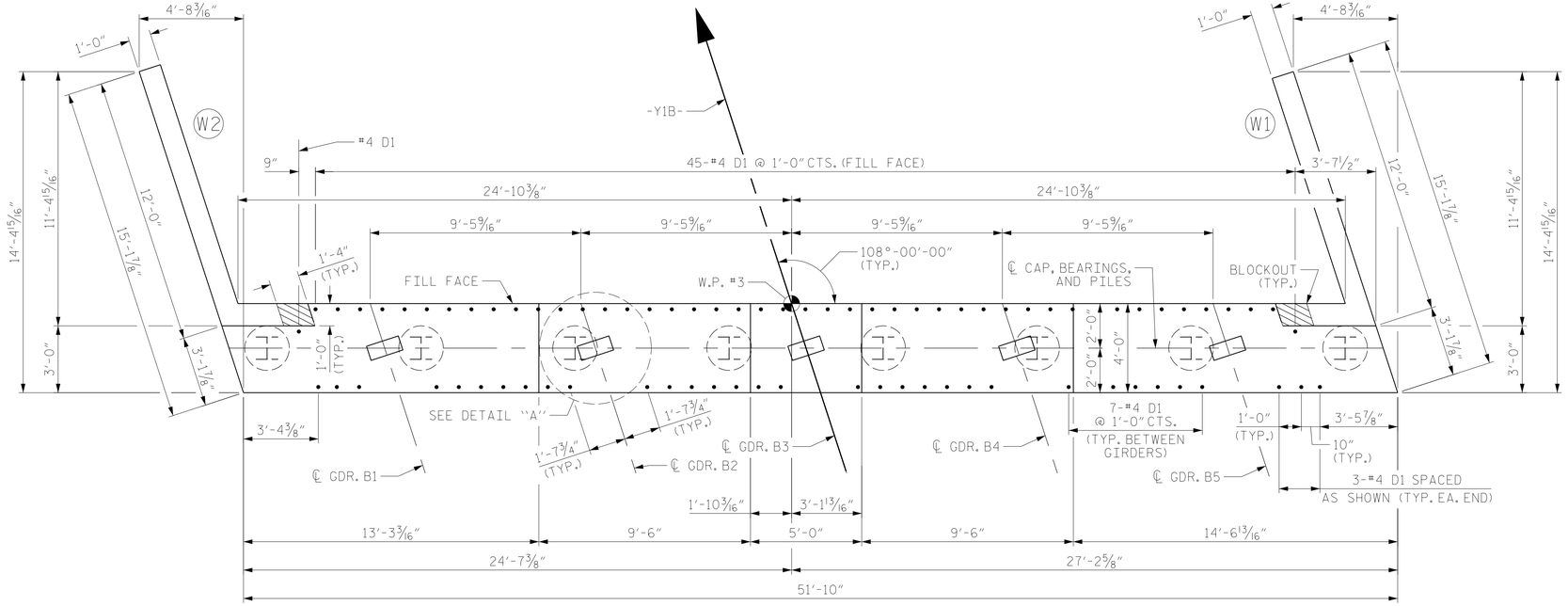
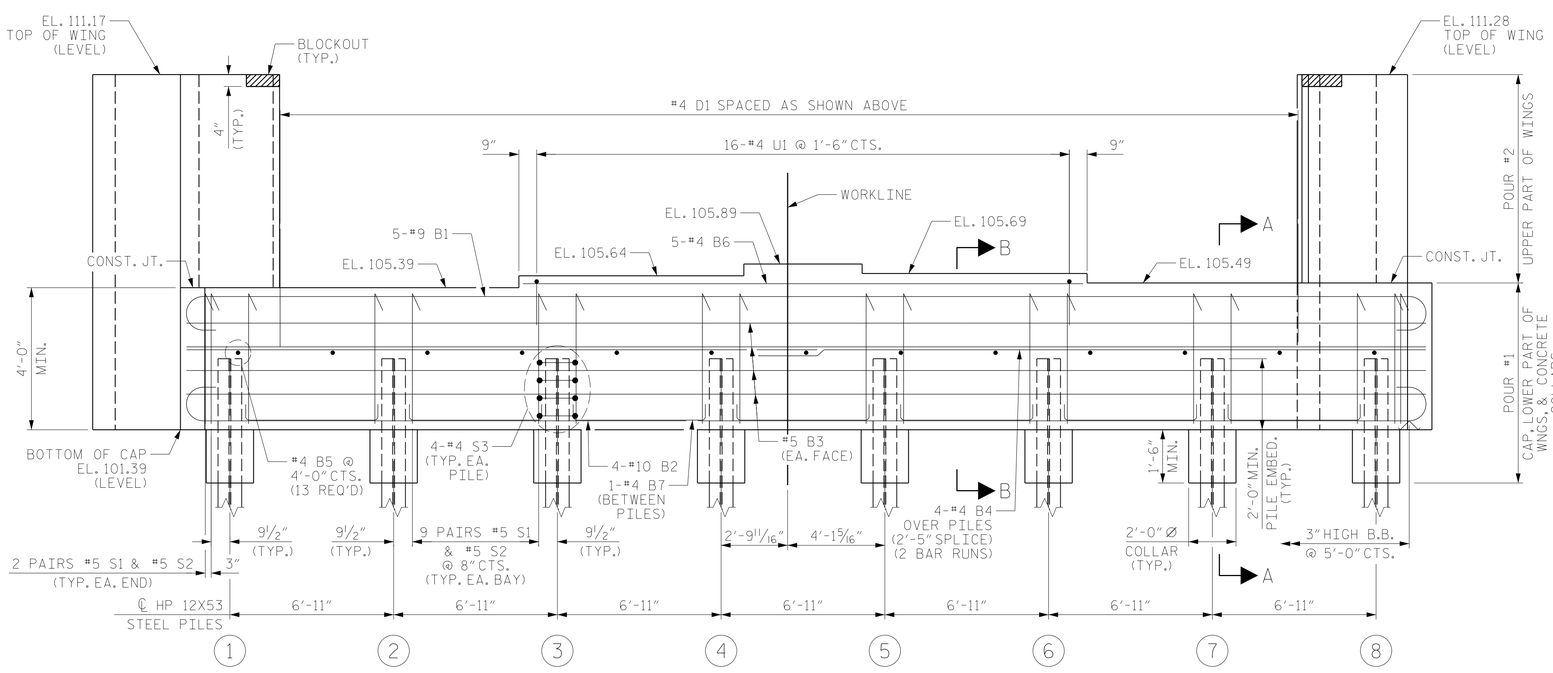
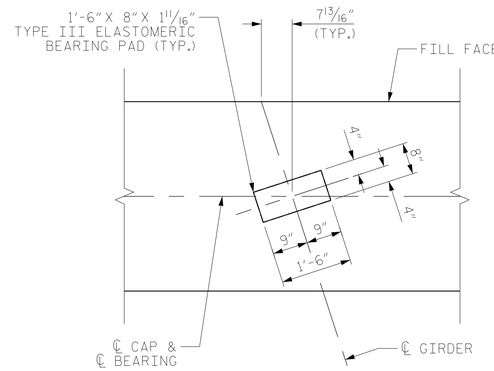


PLAN



ELEVATION



DETAIL "A"

(TYP. EA. GIRDER)
(PILES AND DOWELS NOT SHOWN FOR CLARITY)

NOTES:

THE CONCRETE IN THE BLOCKOUTS SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

#4 D1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN THE CAP.

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

THE TOP SURFACE OF THE END BENT CAP AND LOWER WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

IT SHALL BE BROUGHT TO THE CONTRACTOR'S ATTENTION THAT THE WINGWALLS ARE TO RETAIN NO FILL UNTIL THE INTEGRAL END BENT DIAPHRAGM CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

SEE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAILS.

STIRRUPS NEAR SKEWED ENDS MAY BE SKEWED TO FIT TO ENSURE CONCRETE CLEARANCES.

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 1 OF 3

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SUBSTRUCTURE

END BENT 2

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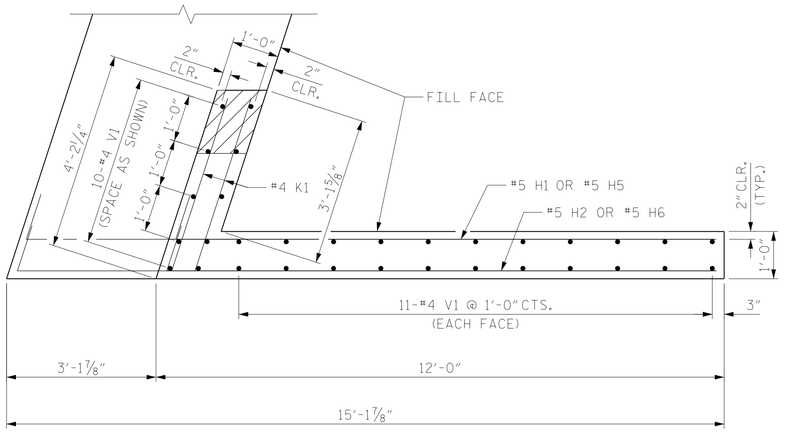
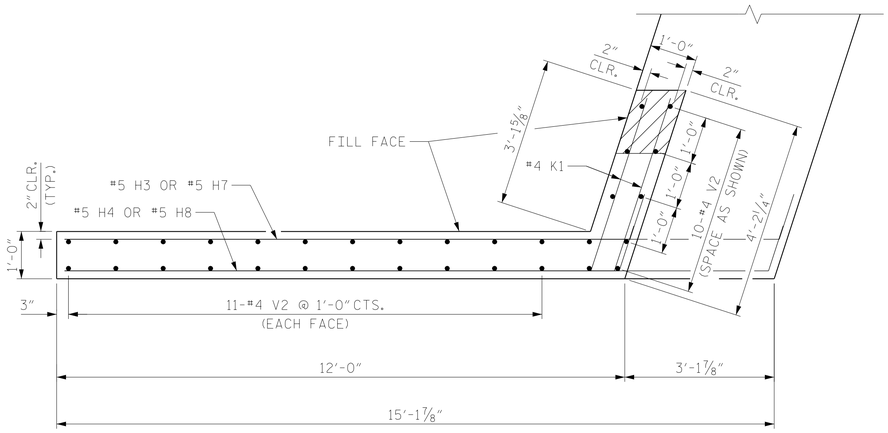
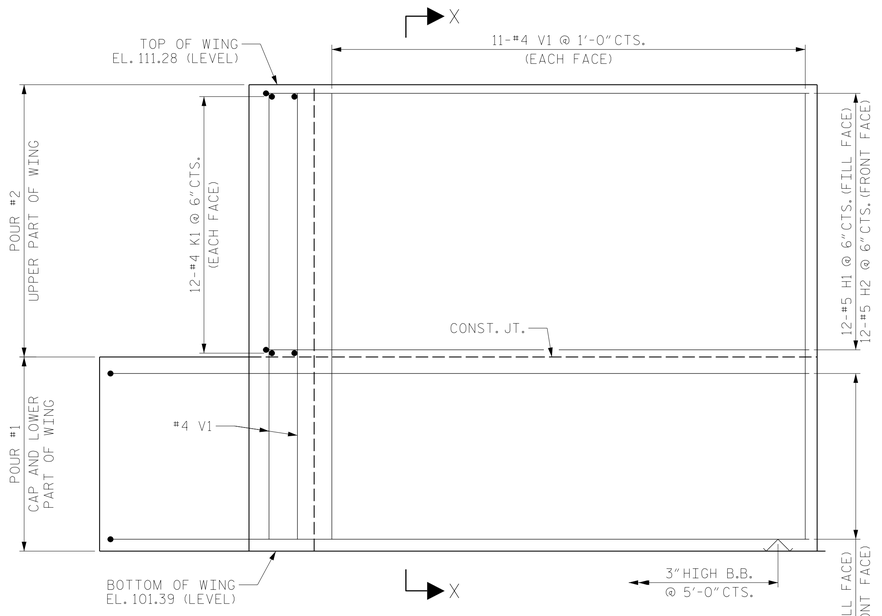


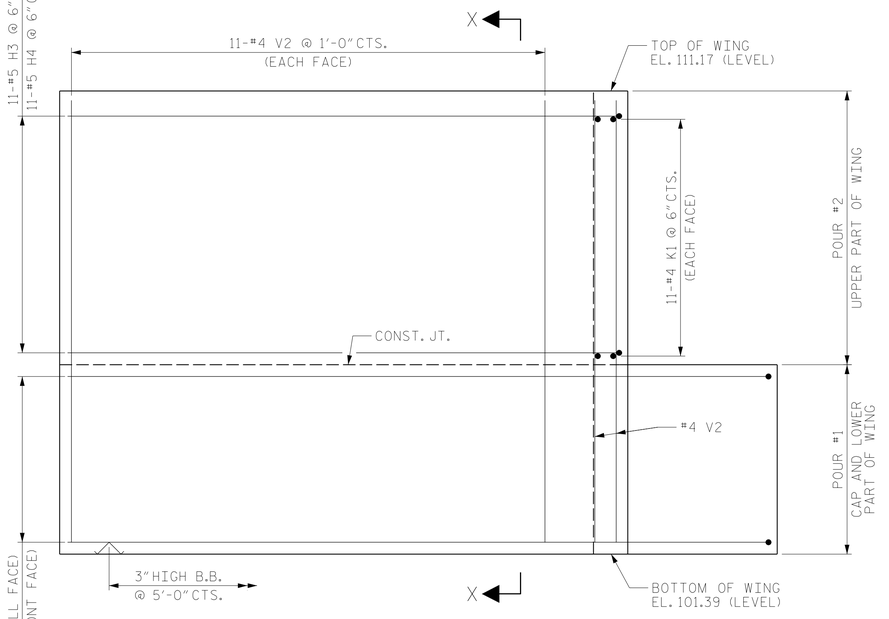
PLAN - W1



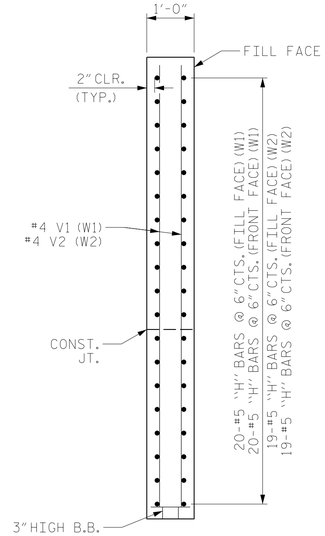
PLAN - W2



ELEVATION - W1



ELEVATION - W2



SECION X-X

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 WING WALL DETAILS

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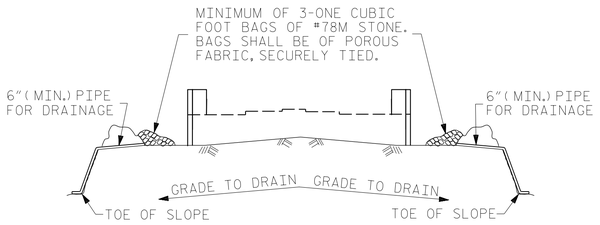
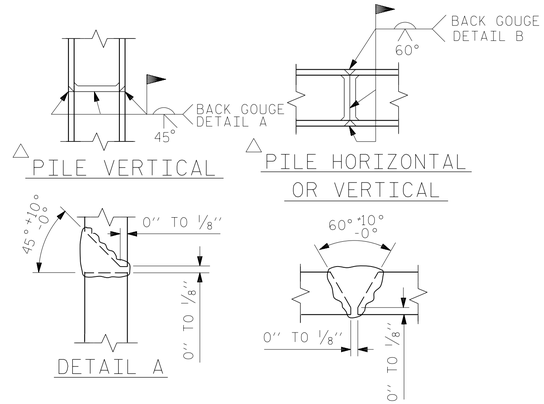


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

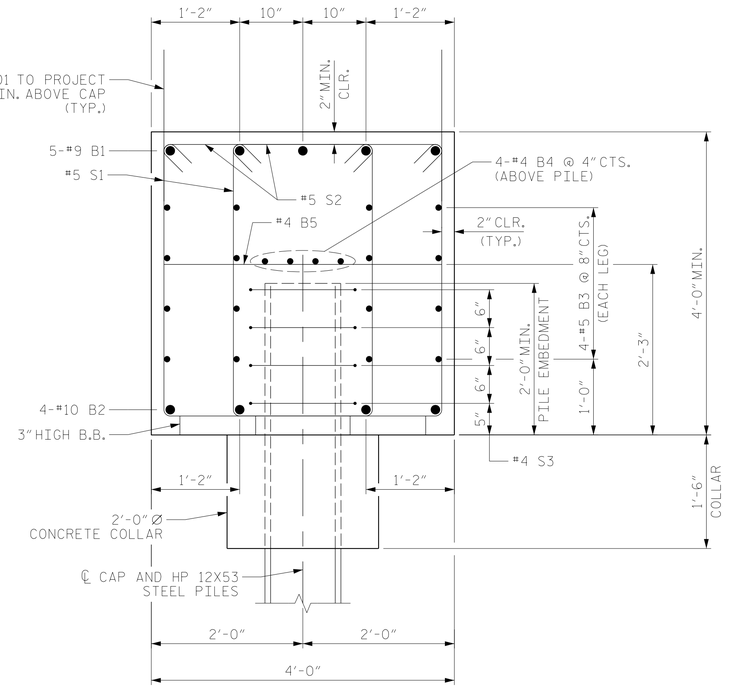
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

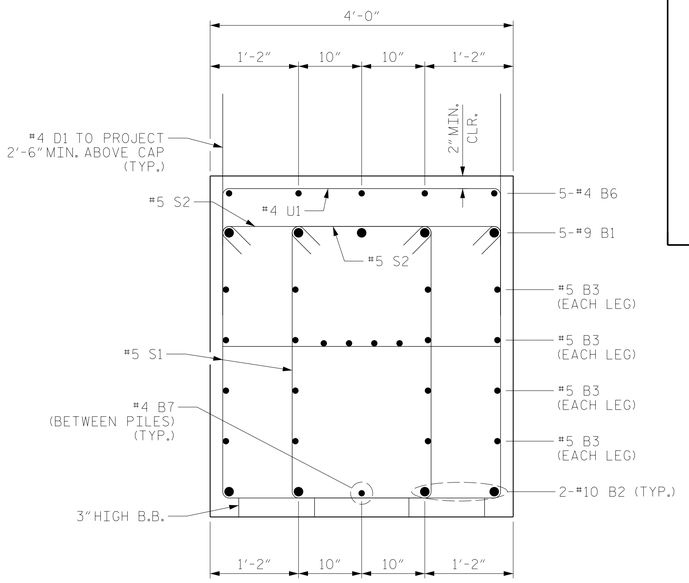


△ POSITION OF PILE DURING WELDING.

PIPE SPLICE DETAILS

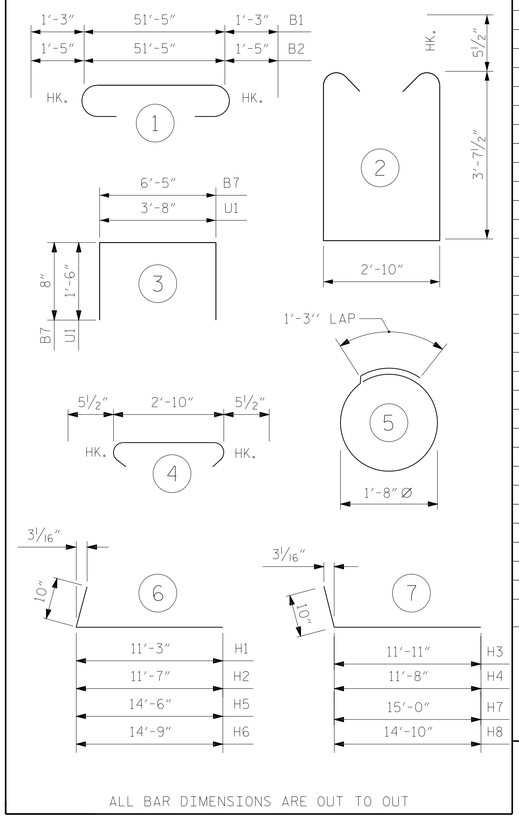


SECTION A-A



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	5	#9	1	53'-11"	917
B2	4	#10	1	54'-3"	934
B3	16	#5	STR	51'-5"	858
B4	8	#4	STR	26'-11"	144
B5	13	#4	STR	3'-8"	32
B6	5	#4	STR	23'-8"	79
B7	7	#4	3	7'-9"	36
D1	80	#4	STR	5'-0"	267
H1	12	#5	6	12'-1"	151
H2	12	#5	6	12'-5"	155
H3	11	#5	7	12'-9"	146
H4	11	#5	7	12'-6"	143
H5	8	#5	6	15'-4"	128
H6	8	#5	6	15'-7"	130
H7	8	#5	7	15'-10"	132
H8	8	#5	7	15'-8"	131
K1	46	#4	STR	3'-10"	118
S1	134	#5	2	11'-0"	1537
S2	134	#5	4	3'-9"	524
S3	32	#4	5	6'-6"	139
U1	16	#4	3	6'-8"	71
V1	32	#4	STR	9'-5"	201
V2	32	#4	STR	9'-4"	200

REINFORCING STEEL 7,173 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 (CAP, LOWER WINGS, AND COLLARS)	37.0 C.Y.
POUR #2 (UPPER WINGS)	6.5 C.Y.
TOTAL CLASS A CONCRETE	43.5 C.Y.

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 043245 ENGINEER MICHAEL KENT O'CONNOR

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1			3			TOTAL SHEETS
2			4			28

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DRAWN BY : TWL DATE : 02/2022
CHECKED BY : MRA DATE : 02/2022
DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

10/25/2022
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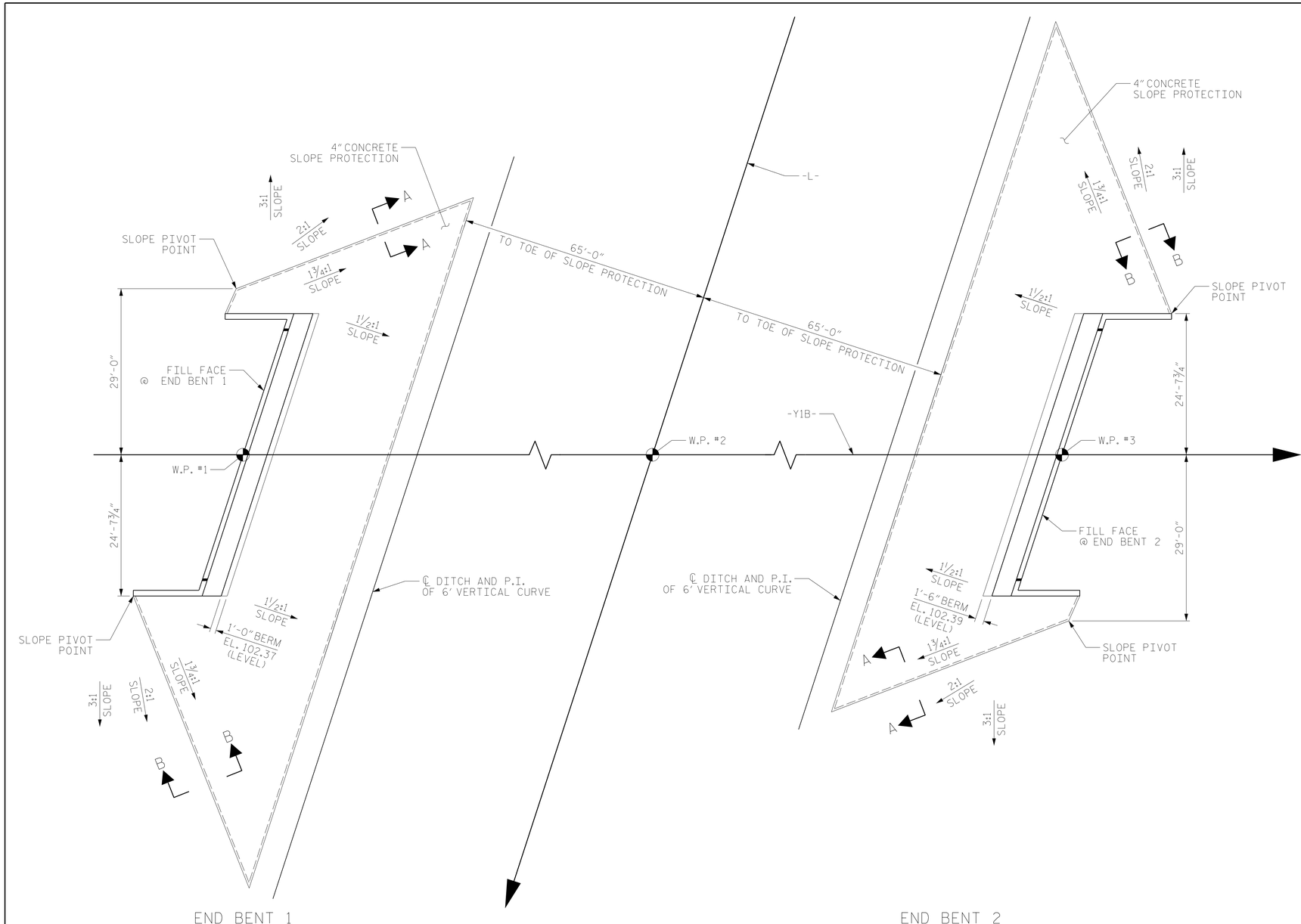


END BENT 1

PLAN

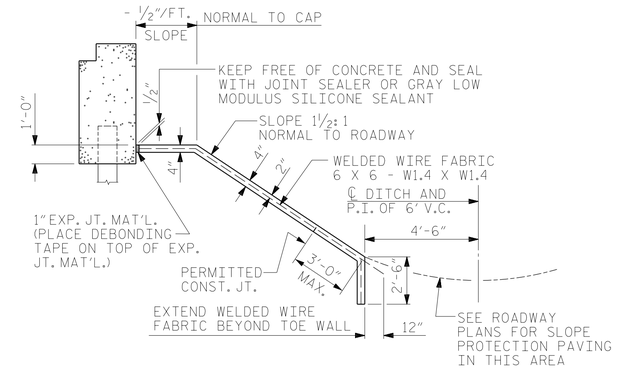
END BENT 2

NOTES:

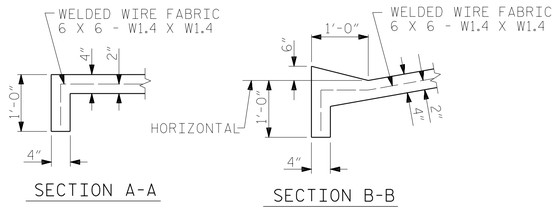
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE ''POURING DETAIL'' WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE ''OPTIONAL POURING DETAIL'' WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6''. THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

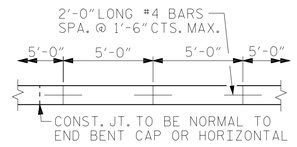
BRIDGE @ STA. 37+99.89 -Y1B-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	300	620
END BENT 2	300	620

* QUANTITY SHOWN IS BASED ON 5' POURS.



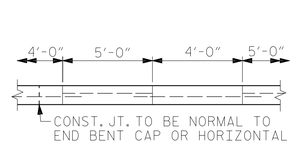
SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH





STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

DRAWN BY : TWL DATE : 10/2021
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DESIGN ENGINEER OF RECORD: MKO DATE : 10/2022

10/25/2022
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STATE OF NORTH CAROLINA
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RALEIGH

SLOPE PROTECTION DETAILS

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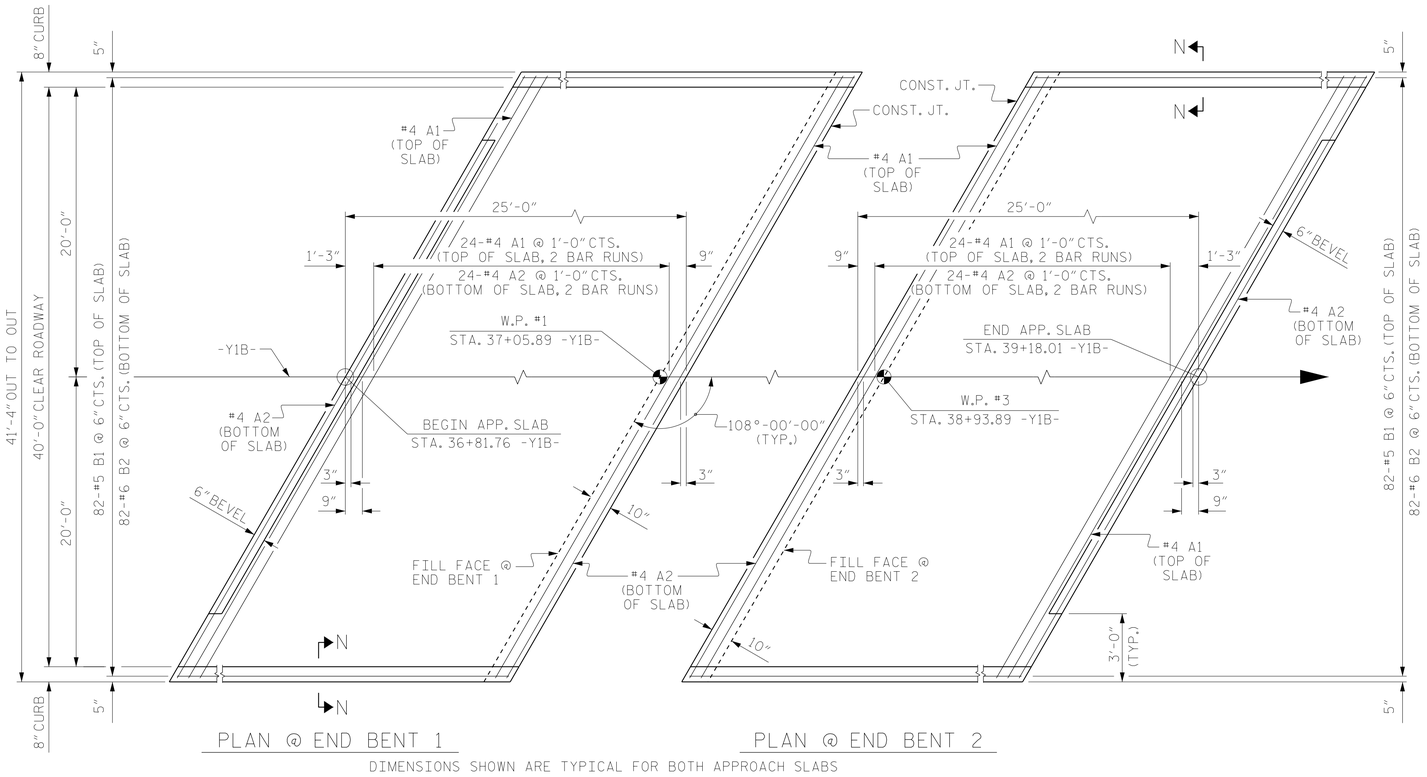
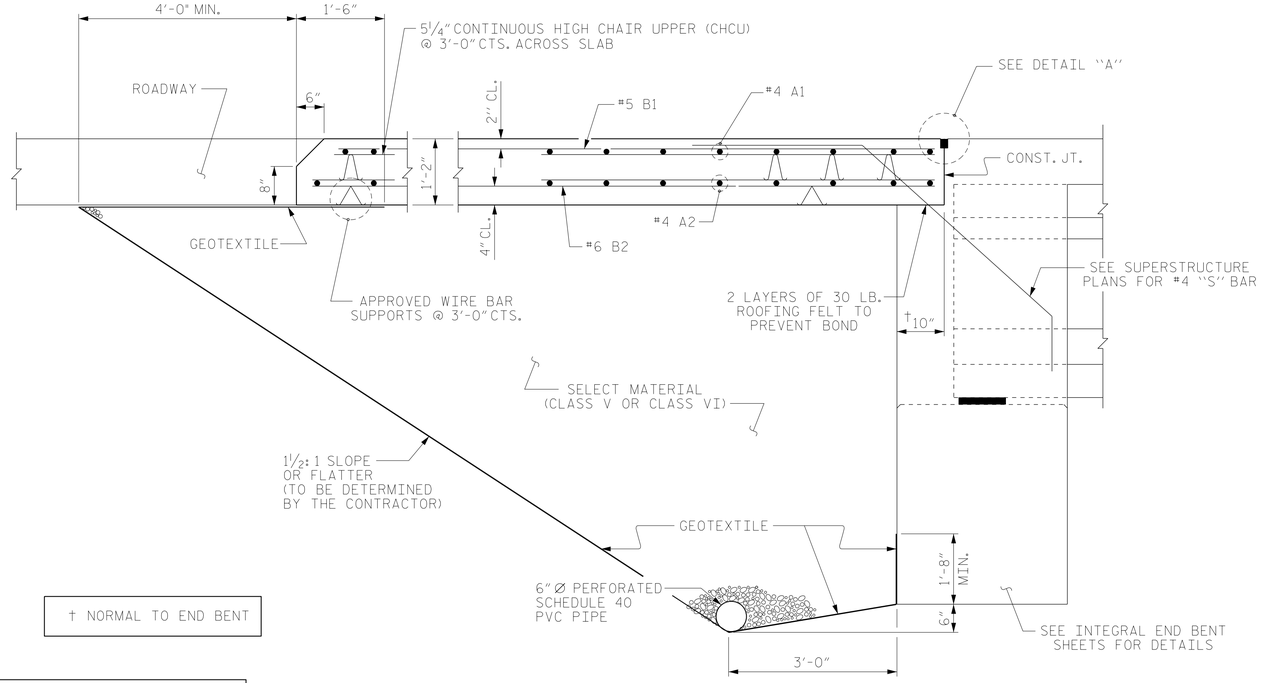
1			3			TOTAL SHEETS
2			4			28



PLAN @ END BENT 1

PLAN @ END BENT 2

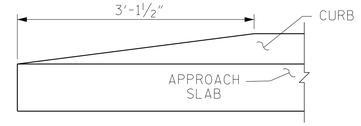
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



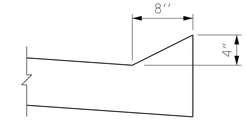
† NORMAL TO END BENT

SECTION THRU SLAB

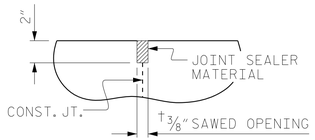
(TYPE I - STANDARD APPROACH FILL)



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N



DETAIL "A"

NOTES

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

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

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

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

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

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

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

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

AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	52	#4	STR	22'-6"	782
A2	52	#4	STR	22'-4"	776
✳ B1	82	#5	STR	24'-1"	2060
B2	82	#6	STR	24'-7"	3028
REINFORCING STEEL					3,804 LBS.
✳ EPOXY COATED REINFORCING STEEL					2,842 LBS.
CLASS AA CONCRETE					44.7 C.Y.

SPLICE LENGTHS

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

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 1 OF 2

ASSEMBLED BY : NSC	DATE : 09/2021		
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DRAWN BY : TLA 10/05	REV. 6/13	MAA/GM	
CHECKED BY : GM 5/06	REV. 12/17	MAA/THC	
	REV. 06/19	BNB/THC	

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RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			28

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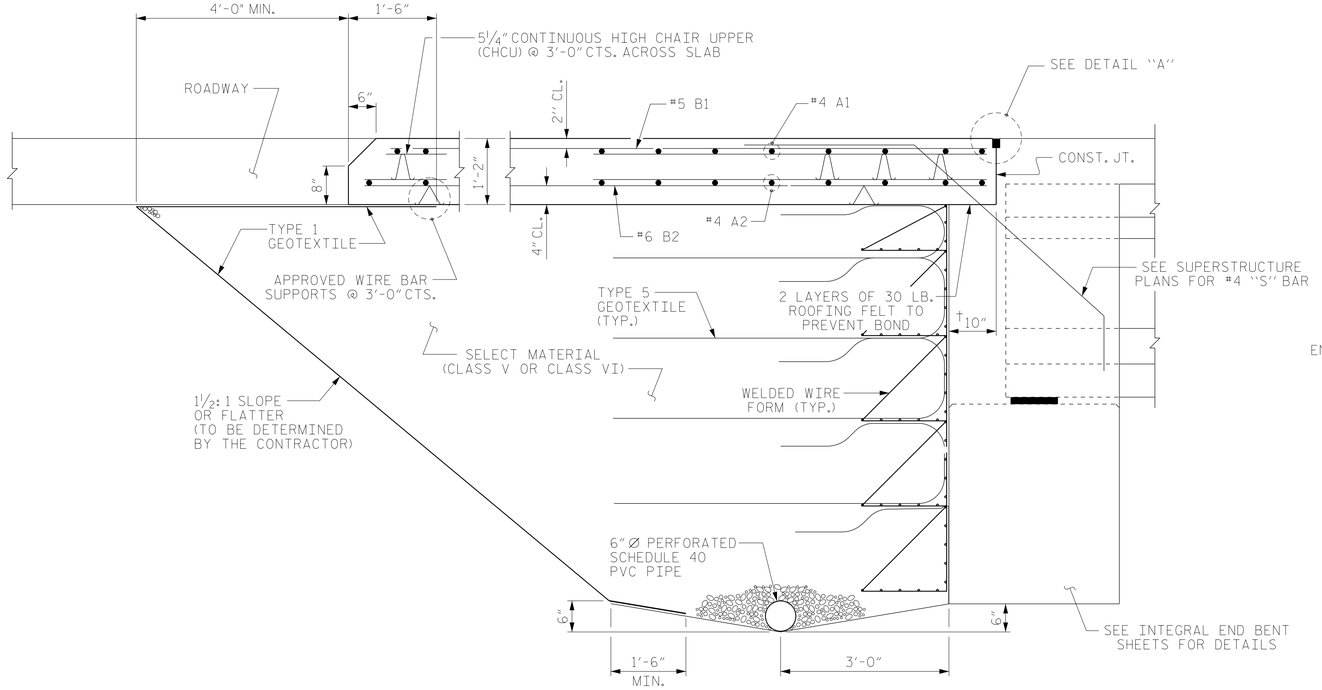
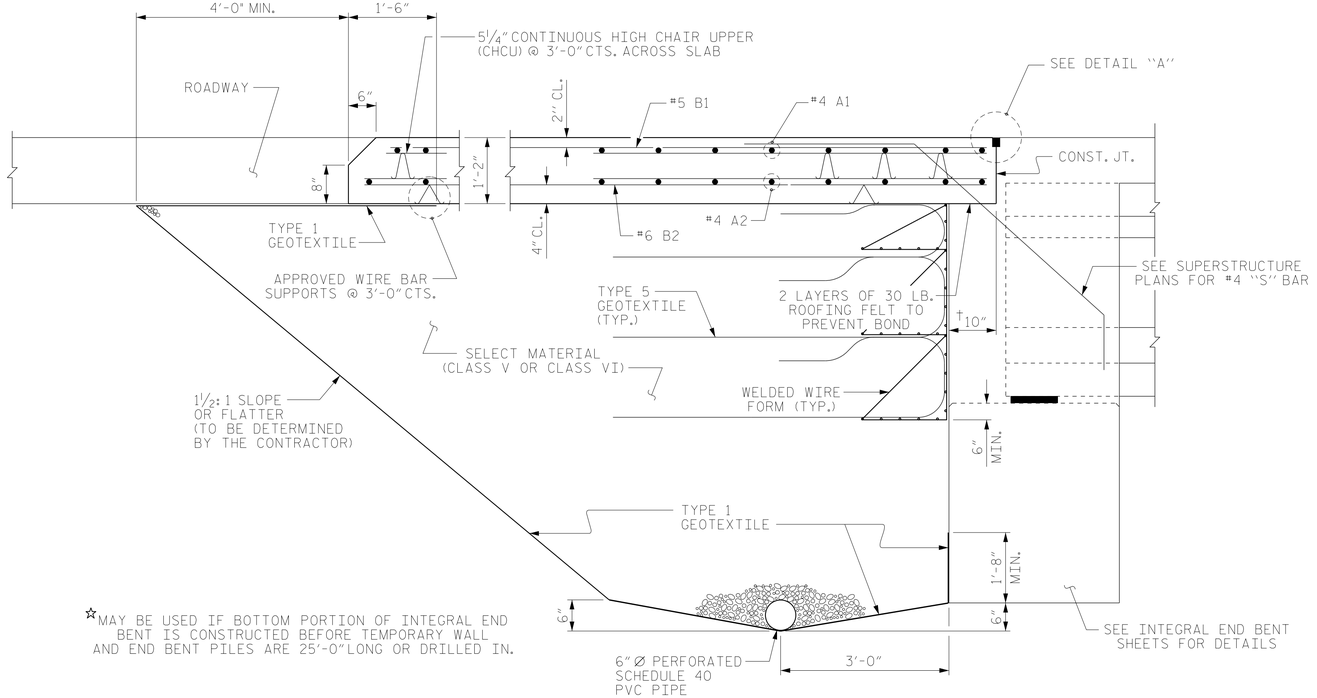
STD. NO. BAS5 (SHT 1b)



SECTION THRU SLAB

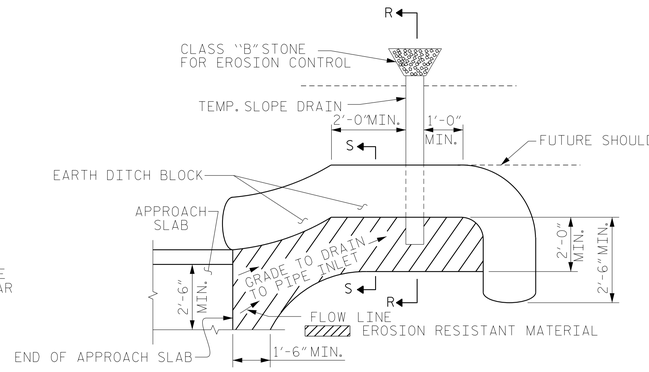
(TYPE A - ALTERNATE APPROACH FILL)



☆MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

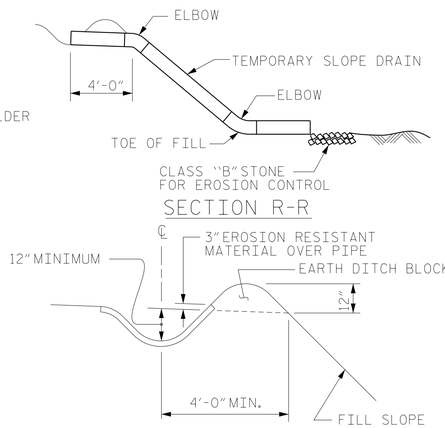
SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)



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.

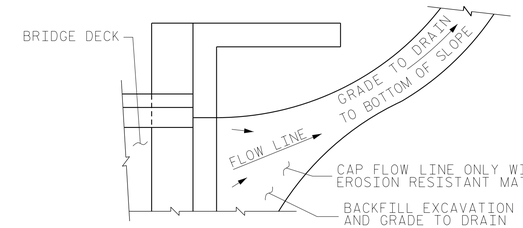
PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

TEMPORARY DRAINAGE DETAIL

NOTES

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

FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

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

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

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

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

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

PROJECT NO. R-5751

ROBESON COUNTY

STATION: 37+99.89 -Y1B-

SHEET 2 OF 2

ASSEMBLED BY : NSC	DATE : 09/2021		
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DRAWN BY : TLA 10/05	REV. 12/21/11	MAA/GM	
CHECKED BY : GM 5/06	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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

STD. NO. BAS5 (SHT 1b)

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

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