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09/08/99

TIP PROJECT: R-5819/R-5820

CONTRACT: C204722

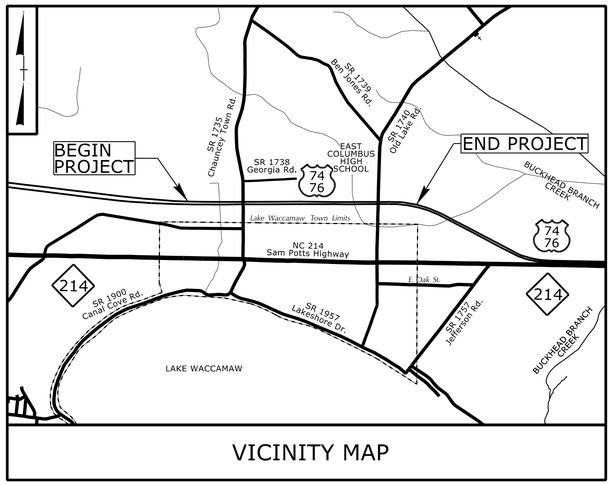
STRUCTURE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5819/R-5820	1	

STATE WBS NO.	F.A. PROJ. NO.	DESCRIPTION
47091.1.1/47092.1.1		PE
47092.2.1		ROW
47092.2.2		UTIL
47092.3.1		CONST



VICINITY MAP

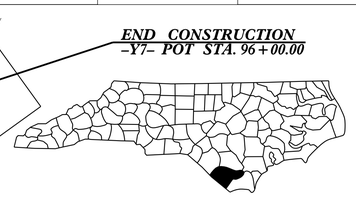
LOCATION: ***US 74/US 76 AT SR 1735 (CHAUNCEY TOWN ROAD) CONVERT AT-GRADE INTERSECTION TO INTERCHANGE (COMBINE W/R-5819)***
US 74/US 76 AT SR 1740(OLD LAKE ROAD) CONVERT AT-GRADE INTERSECTION TO OVERPASS (COMBINE W/R-5820)

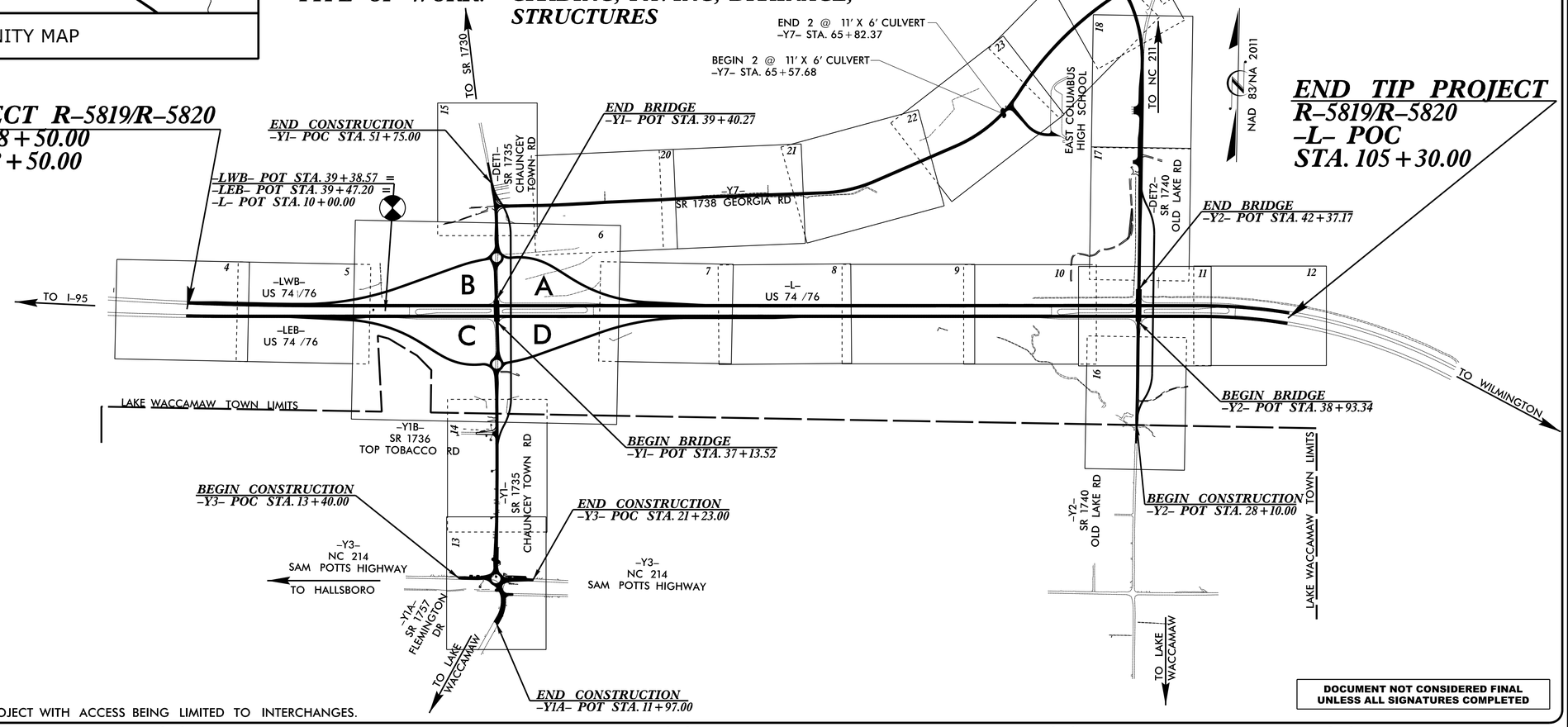
TYPE OF WORK: ***GRADING, PAVING, DRAINAGE, STRUCTURES***

BEGIN TIP PROJECT R-5819/R-5820
-LWB- POC STA. 18+50.00
-LEB- POC STA. 18+50.00

END CONSTRUCTION
-Y2- POT STA. 78+50.00

END CONSTRUCTION
-Y7- POT STA. 96+00.00





END CONSTRUCTION
-Y1- POC STA. 51+75.00

END BRIDGE
-Y1- POT STA. 39+40.27

END 2 @ 11' X 6' CULVERT
-Y7- STA. 65+82.37

BEGIN 2 @ 11' X 6' CULVERT
-Y7- STA. 65+57.68

-LWB- POT STA. 39+38.57 =
-LEB- POT STA. 39+47.20 =
-L- POT STA. 10+00.00

END BRIDGE
-Y2- POT STA. 42+37.17

BEGIN BRIDGE
-Y2- POT STA. 38+93.34

BEGIN BRIDGE
-Y1- POT STA. 37+13.52

BEGIN CONSTRUCTION
-Y2- POT STA. 28+10.00

BEGIN CONSTRUCTION
-Y3- POC STA. 13+40.00

END CONSTRUCTION
-Y3- POC STA. 21+23.00

END CONSTRUCTION
-Y1A- POT STA. 11+97.00

END TIP PROJECT
R-5819/R-5820
-L- POC
STA. 105+30.00

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

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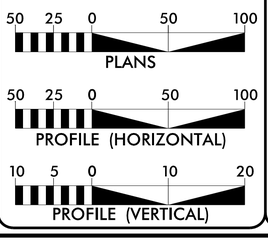
GRAPHIC SCALES



DESIGN DATA

ADT 2022	=	14,400
ADT 2042	=	18,000
K	=	8 %
D	=	55 %
T	=	20 % *
V	=	75 MPH

* 16% TTST + 4% DUAL
FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5819/R-5820	=	2.089 MILES
LENGTH STRUCTURE TIP PROJECT R-5819/R-5820	=	0.113 MILES
TOTAL LENGTH TIP PROJECT R-5819/R-5820	=	2.202 MILES

Prepared in the Office of:
NV5
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 22, 2021

LETTING DATE:
JUNE 21, 2022

JOHN GAUTHIER -NCDOT
PROJECT MANAGER

STRUCTURE DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 019661 ENGINEER KEVIN AUSTIN

DocuSigned by:
L. Kevin Austin
P.E. 4/12/2022
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

4/5/2022
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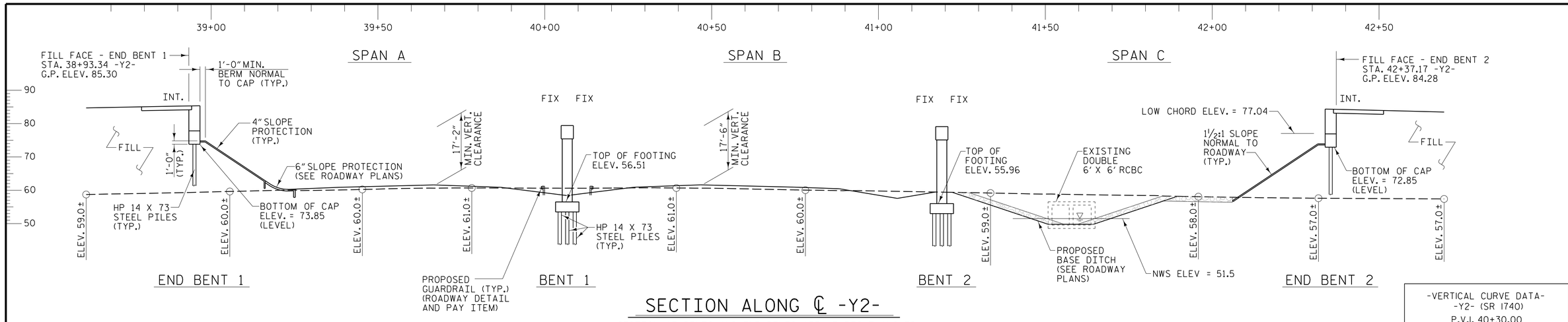
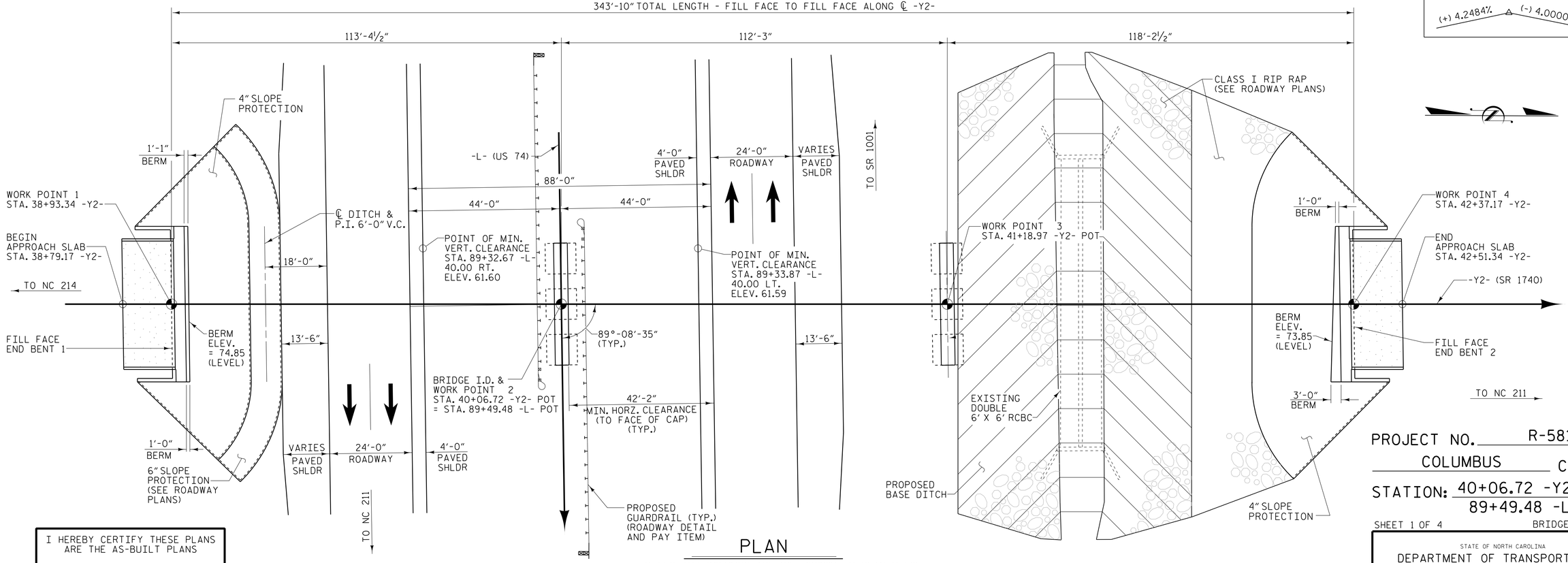


SECTION ALONG ℄ -Y2-

SECTION AT BENTS AND END BENTS ARE AT RIGHT ANGLES

-VERTICAL CURVE DATA-
-Y2- (SR 1740)
P.V.I. 40+30.00
ELEV. 93.72
V_C 693.00'
(+) 4.2484% △ (-) 4.0000%



PLAN

PILES AND COLUMNS ARE NOT SHOWN IN PLAN VIEW

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

HYDRAULIC DATA:

DESIGN DISCHARGE -	440 CFS
FREQUENCY OF DESIGN FLOOD -	25 YEAR
DESIGN HIGH WATER ELEVATION -	56.4
DRAINAGE AREA -	2.6 SQ. MI.
BASE DISCHARGE (Q 100) -	768 CFS
BASE HIGH WATER ELEVATION -	57.7

OVERTOPPING DATA:

OVERTOPPING DISCHARGE -	1344 CFS
FREQUENCY OF OVERTOPPING-	500+ YEAR
OVERTOPPING FLOOD ELEVATION -	59.0

OVERTOPPING OCCURS AT SAG -Y2- STA. 51+54.6

DRAWN BY :	W. B. ALLEN	DATE :	4/21
CHECKED BY :	M. D. METZGER	DATE :	8/21
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	1/22

PLANS PREPARED BY:

NV5
NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036232 MATTHEW DAVID METZGER
Digitally signed by Matthew Metzger
4/12/2022

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT= 89+49.48 -L- POT

SHEET 1 OF 4 BRIDGE NO. 230422

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON -Y2- (SR 1740) OVER -L- (US-74) BETWEEN NC 214 AND NC 211

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-1
1			3			TOTAL SHEETS
2			4			38

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FONDATION LAYOUT

NOTES

ALL PILES AT END BENT 1, BENT 1, BENT 2 AND END BENT 2 ARE HP 14 X 73.

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1, BENT NO. 1, BENT NO. 2 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 125 TONS, 130 TONS, 130 TONS AND 125 TONS PER PILE, RESPECTIVELY.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 250 TONS AND 235 TONS PER PILE RESPECTIVELY. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

DRIVE PILES AT BENT NO. 1 AND BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

STEEL PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1, BENT NO. 1, BENT NO. 2 AND END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT NO. 1 OR END BENT NO. 2 AND AT BENT NO. 1 OR BENT NO. 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NO. 1 AND END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 75,500 FT-LBS TO 107,500 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT ALL BENTS. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON -Y2- (SR 1740)
OVER -L- (US-74)
BETWEEN NC 214 AND NC 211

PLANS PREPARED BY:
NV5
NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER
4/12/2022

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S1-2
1			3			TOTAL SHEETS	38
2			4				

DRAWN BY :	W. B. ALLEN	DATE :	12/21
CHECKED BY :	M. D. METZGER	DATE :	1/22
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	1/22

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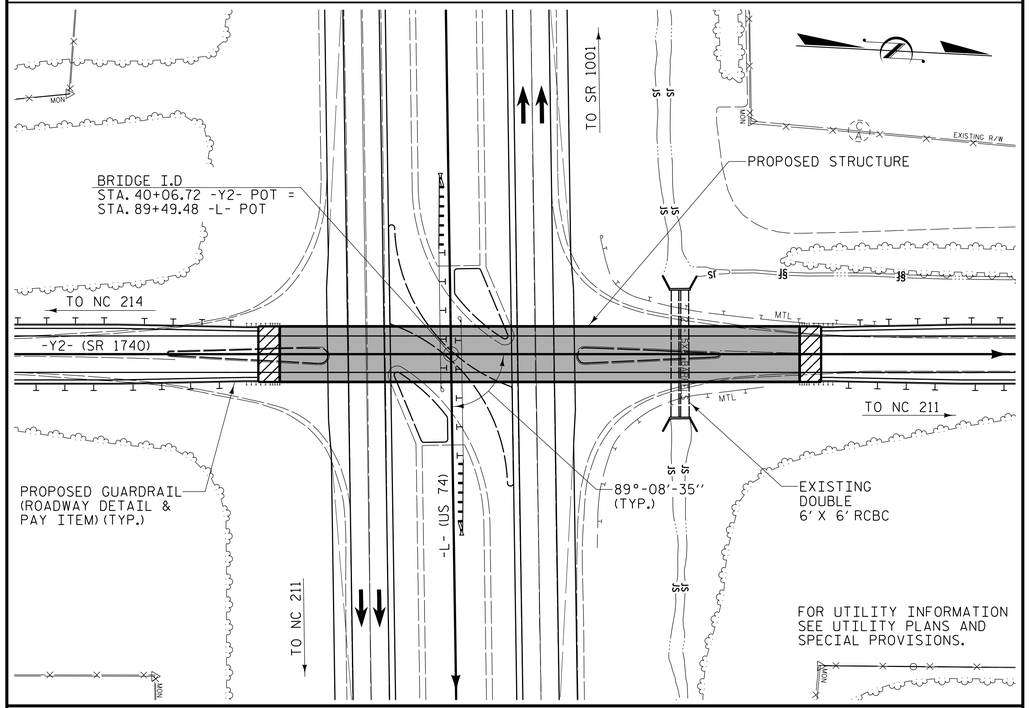
BM#9: NE CORNER OF LIGHT POLE BASE; 222.36' LT. STA. 59+92.36 -Y2- ELEV. 61.33



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIRMENT 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 AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-INPLACE 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.

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

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 2 IS ELEVATION 52.13. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

HYDRAULIC DATA:	
DESIGN DISCHARGE	440 CFS
FREQUENCY OF DESIGN FLOOD	25 YRS.
DESIGN HIGH WATER ELEVATION	56.4
BASE DISCHARGE	768 CFS
BASE HIGH WATER ELEVATION	57.7

OVERTOPPING FLOOD DATA:	
OVERTOPPING DISCHARGE	1344 CFS
FREQUENCY OF OVERTOPPING FLOOD	500+ YRS.
OVERTOPPING FLOOD ELEVATION	✳59.0

✳OT AT SAG STA 51+54.60 -Y2-

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION FOR BENT	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTESSED CONCRETE GIRDERS		PILE DRIVING EQUPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 X 73 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	LUMP SUM	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	FEET	EACH	NO.	LIN. FT.	EACH	EACH	LIN. FT.	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE				13658	12496		LUMP SUM			12	1362.33						684.33		LUMP SUM
END BENT 1						39.9		6141				8	8	696	8	4		337	
BENT 1		LUMP SUM				75.2		15259	2429			21	21	1596	21	8			
BENT 2		LUMP SUM				75.5		15294	2460			21	21	1596	21	8			
END BENT 2						39.9		6141				8	8	736	8	4		471	
TOTAL	LUMP SUM	LUMP SUM	2	13632	12475	230.5	LUMP SUM	42835	4889	12	1362.33	58	58	4624	58	24	684.33	808	LUMP SUM

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON -Y2- (SR 1740)
OVER -L- (US-74)
BETWEEN NC 214 AND NC 211

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-3
1			3			TOTAL SHEETS
2			4			38

PLANS PREPARED BY:

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CARY, NC 27518
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036129 MATTHEW DAVID METZGER
DocuSigned by: Matthew Metzger
4/22/2022

DRAWN BY : W. B. ALLEN DATE : 4/21
CHECKED BY : M. D. METZGER DATE : 1/22
DESIGN ENGINEER OF RECORD: M. D. METZGER DATE : 1/22

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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 × RF	STRENGTH I LIMIT STATE: LIVE-LOAD FACTORS (γ_{LL})	STRENGTH I MOMENT: DISTRIBUTION FACTORS (DF)	STRENGTH I MOMENT: RATING FACTOR	STRENGTH I MOMENT: SPAN	STRENGTH I MOMENT: GIRDER LOCATION	STRENGTH I MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	STRENGTH I SHEAR: DISTRIBUTION FACTORS (DF)	STRENGTH I SHEAR: RATING FACTOR	STRENGTH I SHEAR: SPAN	STRENGTH I SHEAR: GIRDER LOCATION	STRENGTH I SHEAR: DISTANCE FROM LEFT END OF SPAN (ft)	SERVICE III LIMIT STATE: LIVE-LOAD FACTORS (γ_{LL})	SERVICE III MOMENT: DISTRIBUTION FACTORS (DF)	SERVICE III MOMENT: RATING FACTOR	SERVICE III MOMENT: SPAN	SERVICE III MOMENT: GIRDER LOCATION	SERVICE III MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	COMMENT NUMBER
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.14	--	1.75	0.920	1.38	C	E	57.67	0.920	2.04	C	E	104.37	0.80	0.920	1.14	C	E	57.67	
DESIGN LOAD RATING		HL-93 (OPERATING)	N/A		1.78	--	1.35	0.920	1.78	C	E	57.67	0.920	2.69	C	E	104.37	N/A	--	--	--	--	--	
DESIGN LOAD RATING		HS-20 (INVENTORY)	36.000	2	1.64	59.04	1.75	0.920	1.99	C	E	57.67	0.920	2.88	C	E	104.37	0.80	0.920	1.64	C	E	57.67	
DESIGN LOAD RATING		HS-20 (OPERATING)	36.000		2.58	92.88	1.35	0.920	2.58	C	E	57.67	0.920	3.78	C	E	104.37	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.97	53.60	1.40	0.920	6.01	C	E	57.67	0.920	9.29	C	E	104.37	0.80	0.920	3.97	C	E	57.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNGARBS2	20.000		2.84	56.80	1.40	0.920	4.30	C	E	57.67	0.920	6.43	C	E	104.37	0.80	0.920	2.84	C	E	57.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNAGRIS2	22.000		2.65	58.30	1.40	0.920	4.01	C	E	57.67	0.920	5.90	C	E	104.37	0.80	0.920	2.65	C	E	57.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNCOTTS3	27.250		1.97	53.68	1.40	0.920	2.98	C	E	57.67	0.920	4.55	C	E	104.37	0.80	0.920	1.97	C	E	57.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNAGGRS4	34.925		1.60	55.88	1.40	0.920	2.43	C	E	57.67	0.920	3.65	C	E	10.97	0.80	0.920	1.60	C	E	57.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS5A	35.550		1.57	55.81	1.40	0.920	2.38	C	E	57.67	0.920	3.64	C	E	104.37	0.80	0.920	1.57	C	E	57.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS6A	39.950		1.42	56.73	1.40	0.920	2.16	C	E	57.67	0.920	3.27	C	E	104.37	0.80	0.920	1.42	C	E	57.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS7B	42.000		1.35	56.70	1.40	0.920	2.05	C	E	57.67	0.920	3.16	C	E	104.37	0.80	0.920	1.35	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.73	57.09	1.40	0.920	2.62	C	E	57.67	0.920	3.97	C	E	104.37	0.80	0.920	1.73	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT4A	33.075		1.73	57.22	1.40	0.920	2.62	C	E	57.67	0.920	3.90	C	E	104.37	0.80	0.920	1.73	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT6A	41.600		1.40	58.24	1.40	0.920	2.12	C	E	57.67	0.920	3.32	C	E	10.97	0.80	0.920	1.40	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7A	42.000		1.40	58.80	1.40	0.920	2.12	C	E	57.67	0.920	3.26	C	E	104.37	0.80	0.920	1.40	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7B	42.000		1.43	60.06	1.40	0.920	2.16	C	E	57.67	0.920	3.12	C	E	104.37	0.80	0.920	1.43	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT4	43.000		1.37	58.91	1.40	0.920	2.08	C	E	57.67	0.920	3.04	C	E	104.37	0.80	0.920	1.37	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5A	45.000		1.30	58.50	1.40	0.920	1.97	C	E	57.67	0.920	2.97	C	E	104.37	0.80	0.920	1.30	C	E	57.67	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5B	45.000	3	1.29	58.05	1.40	0.920	1.96	C	E	57.67	0.920	2.89	C	E	10.97	0.80	0.920	1.29	C	E	57.67	

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.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING ✱✱

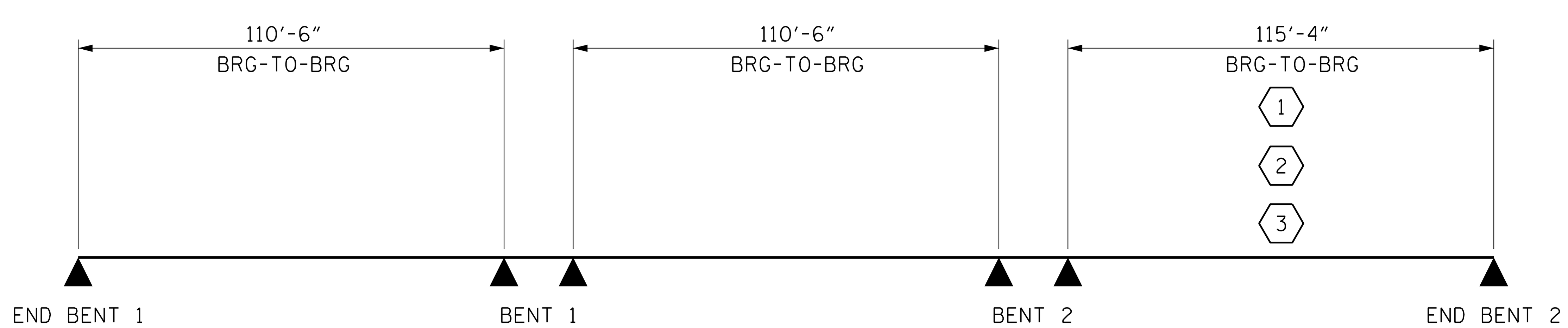
✱✱ SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

EL - EXTERIOR LEFT GIRDER

ER - EXTERIOR RIGHT GIRDER



SPAN A   SPAN B   SPAN C

LRFR SUMMARY

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 4 OF 4

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER — DocuSigned by: Matt Metzger

4/12/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S1-4
1			3				TOTAL SHEETS
2			4				38

ASSEMBLED BY : J. A. PANDOLI	DATE : 6/21
CHECKED BY : M. D. METZGER	DATE : 8/21
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

STD. NO. LRFR1

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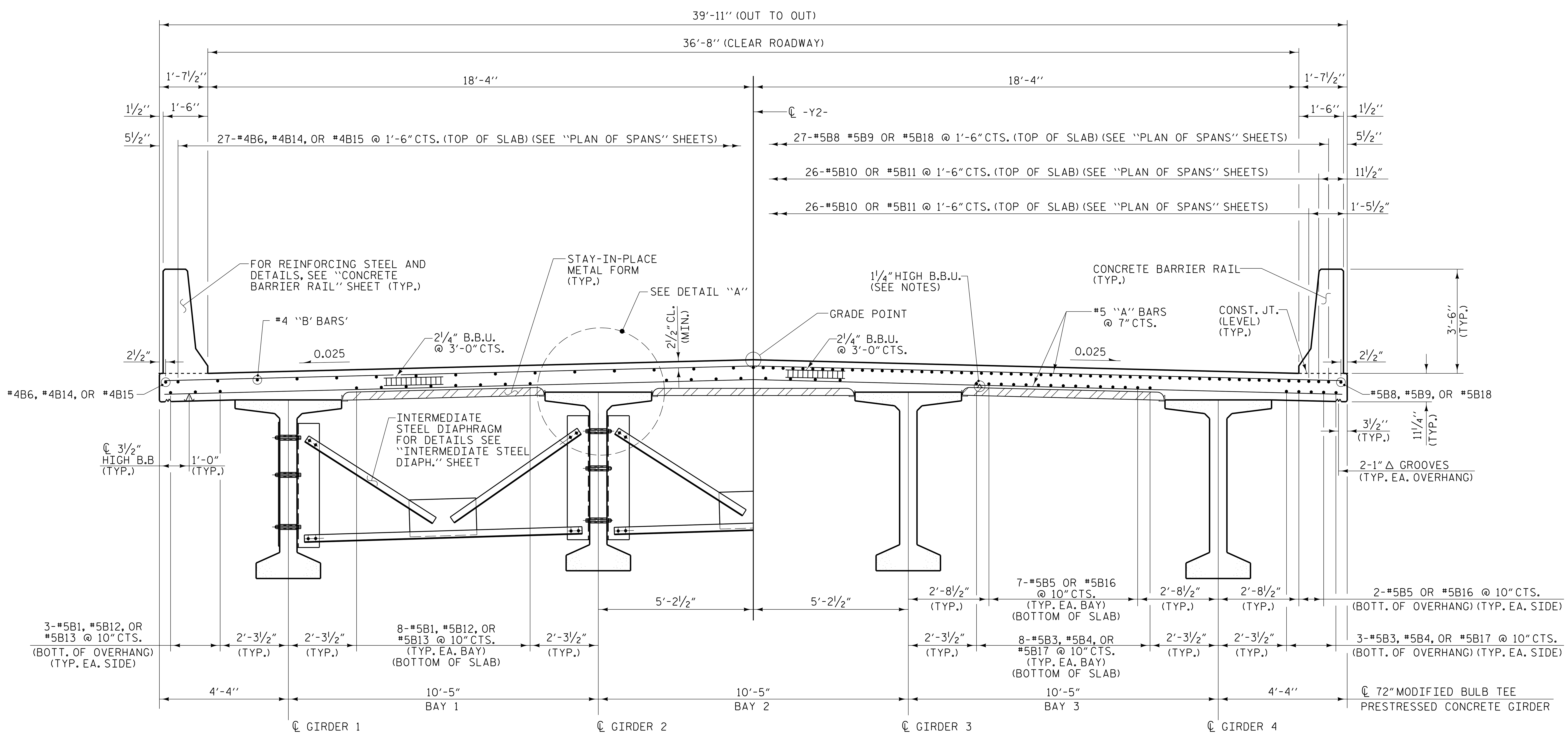
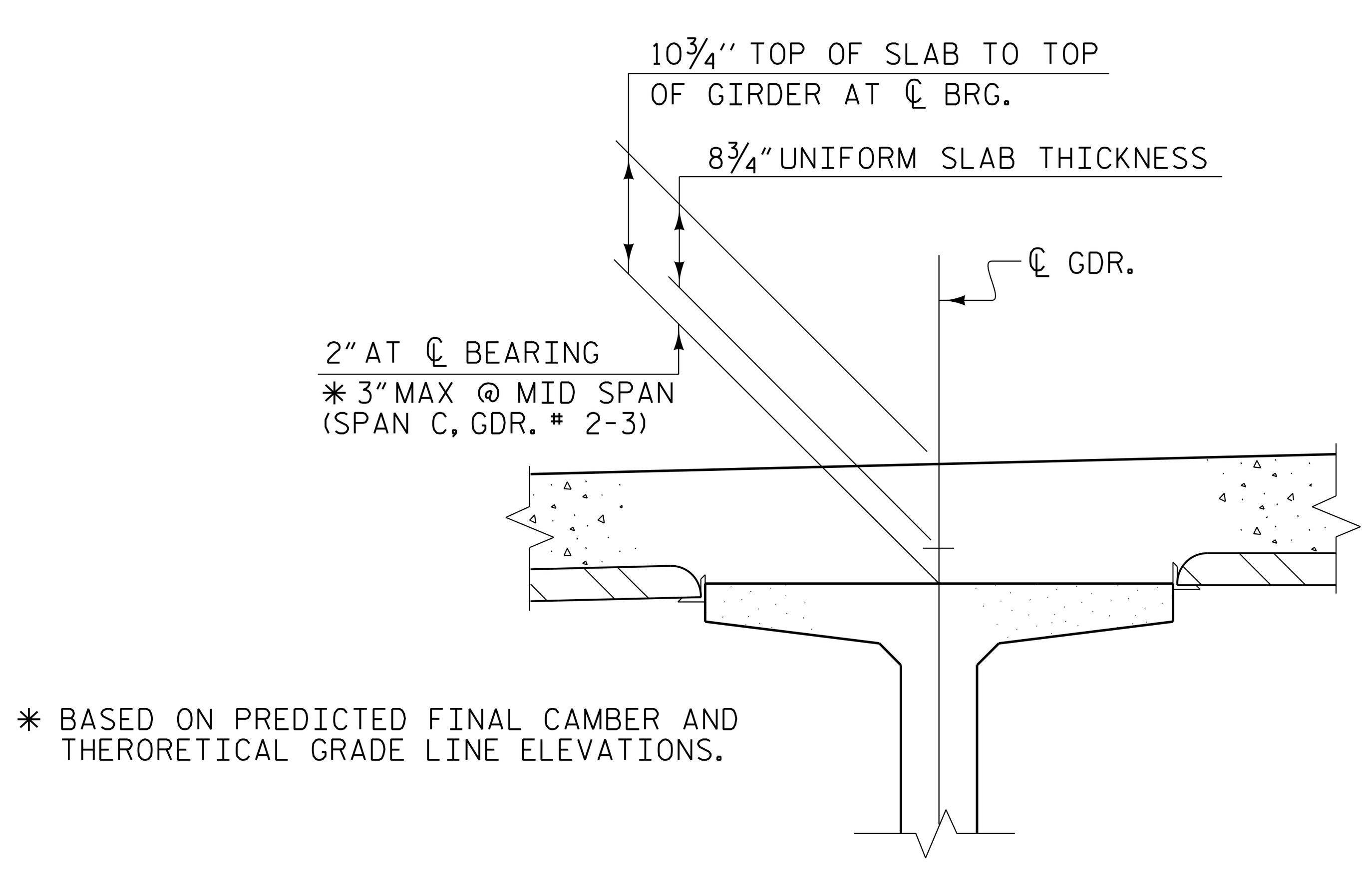


HALF TYPICAL SECTION

SHOWING INTERMEDIATE DIAPHRAGMS

HALF TYPICAL SECTION

SHOWING LINK SLAB



✱ BASED ON PREDICTED FINAL CAMBER AND THERORETICAL GRADE LINE ELEVATIONS.

DETAIL "A"

NOTES:

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER (BBU) AT 4'-0" CENTERS 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 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 ADDTIONAL CONCRETE IS CAST IN THE UNIT.

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.

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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NO.	BY:	DATE:	NO.	BY:	DATE:	S1-5
1			3			TOTAL SHEETS
2			4			38

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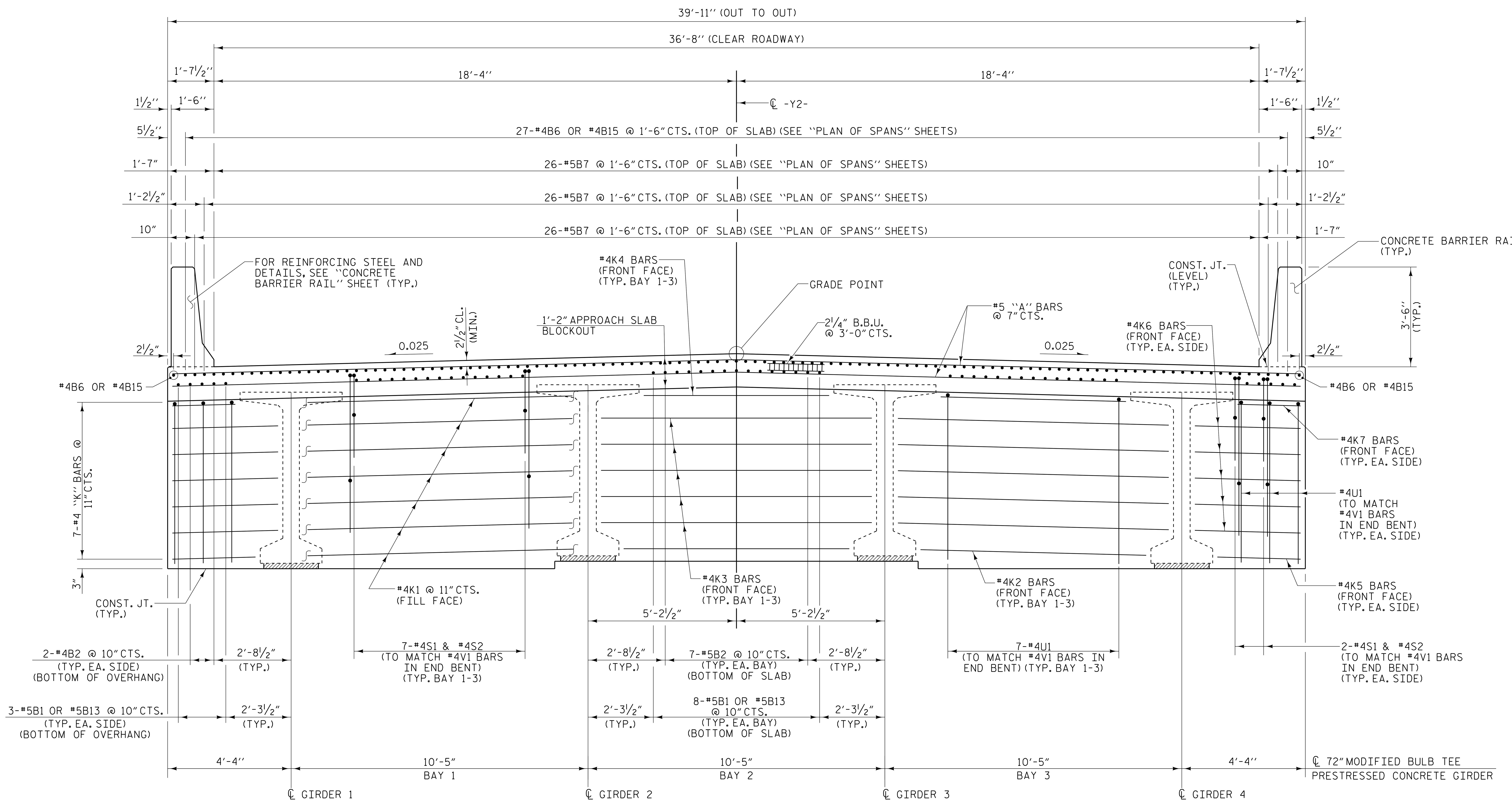

TYPICAL SECTION

(SHOWING INTEGRAL END BENT DIAPHRAGMS)

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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NORTH CAROLINA PROFESSIONAL SEAL 052168 ENGINEER MATTHEW DAVID METZGER
DocuSigned by: Matt Metzger
4/12/2022

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1			3				
2			4				

SHEET NO. S1-6
TOTAL SHEETS 38

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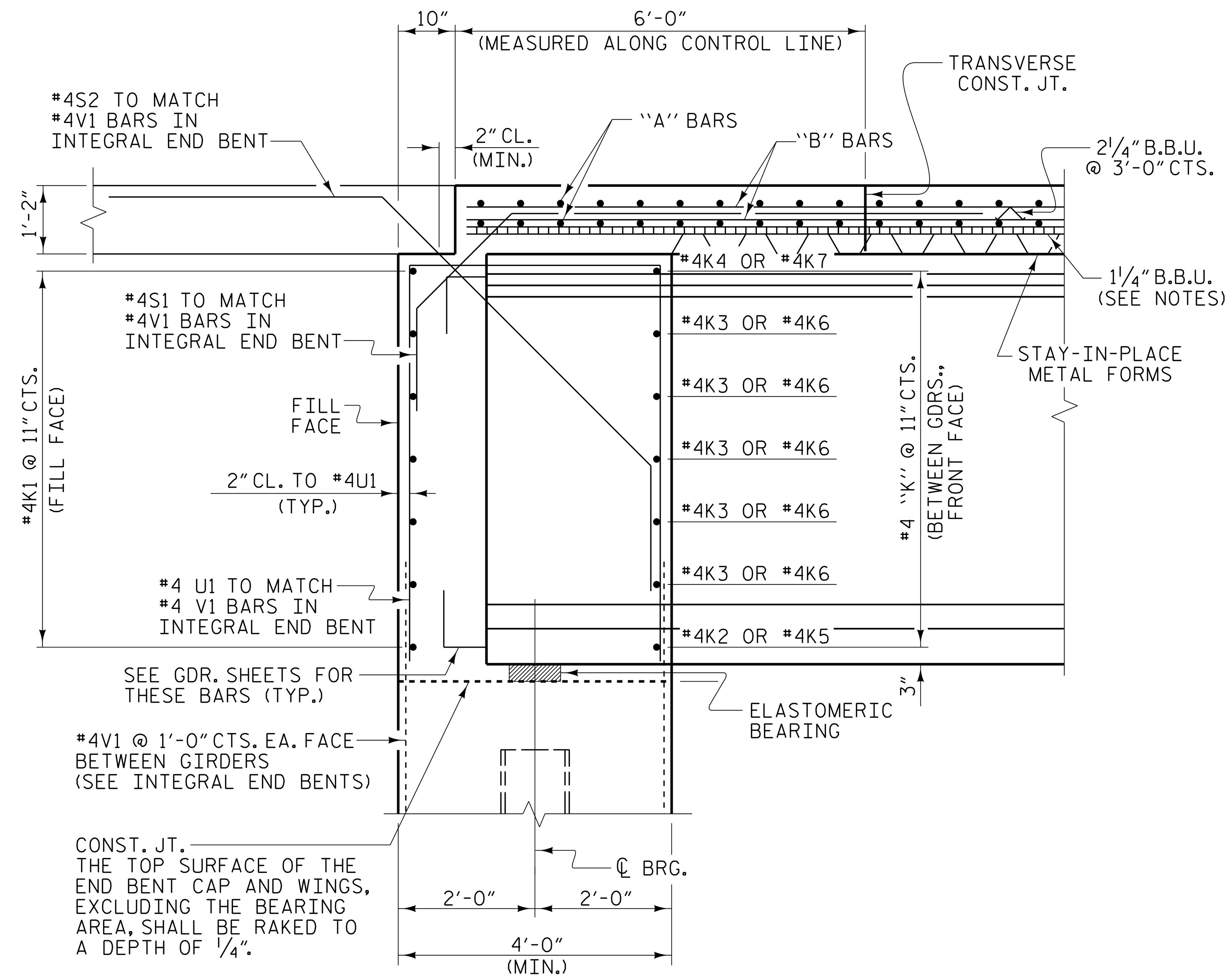
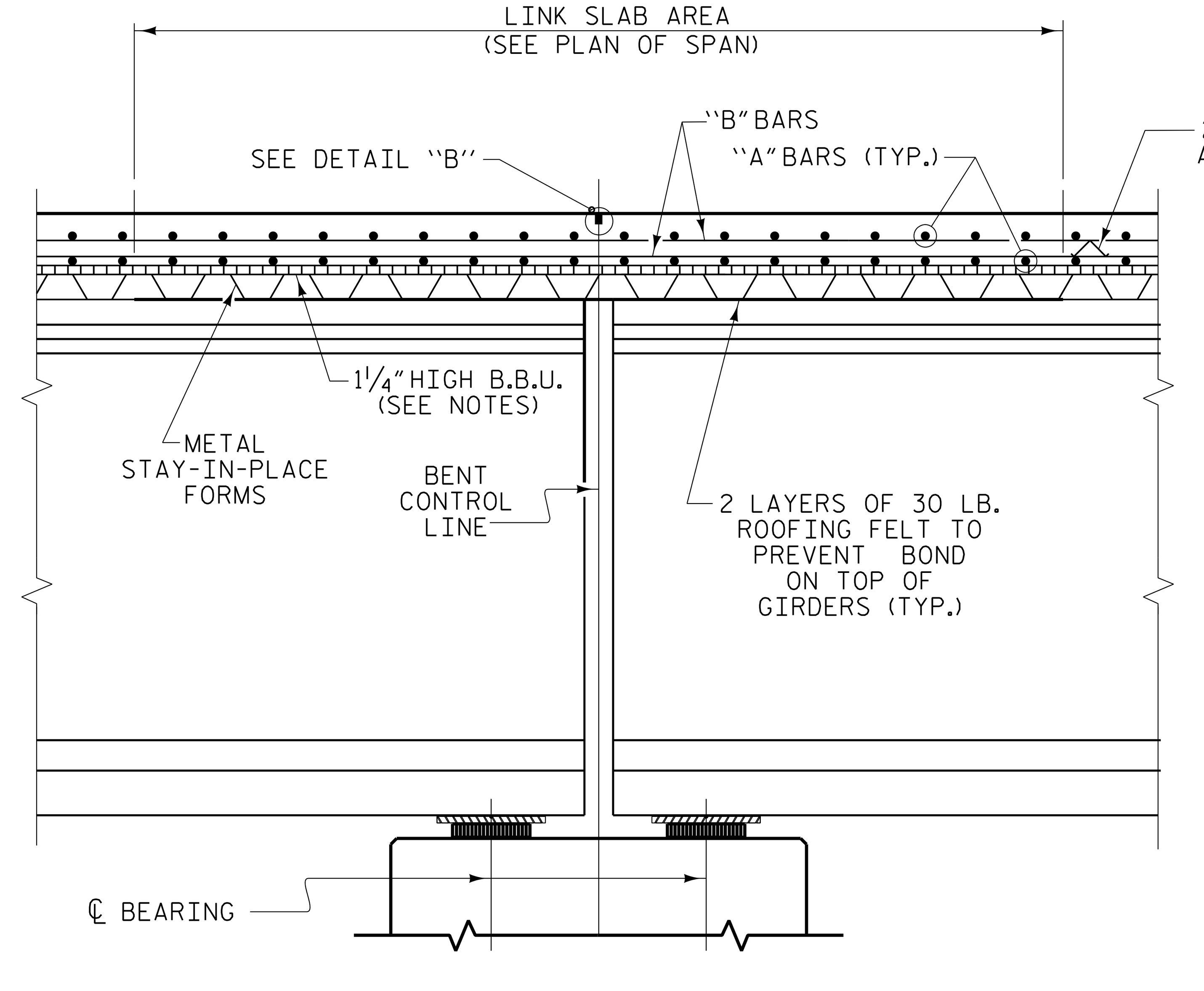
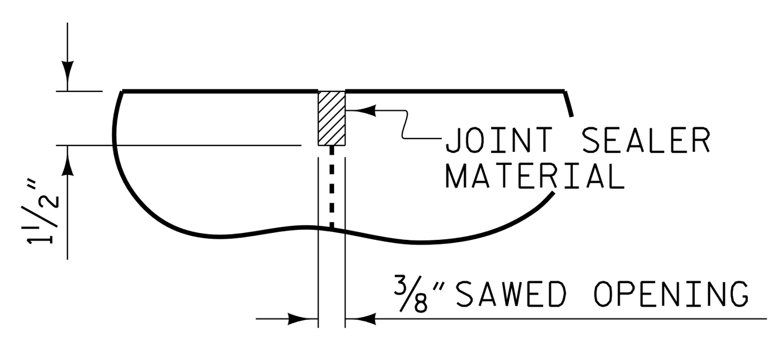


SECTION THRU INTEGRAL END BENTS

SECTION AT END BENT 1 SHOWN, END BENT 2 SIMILAR

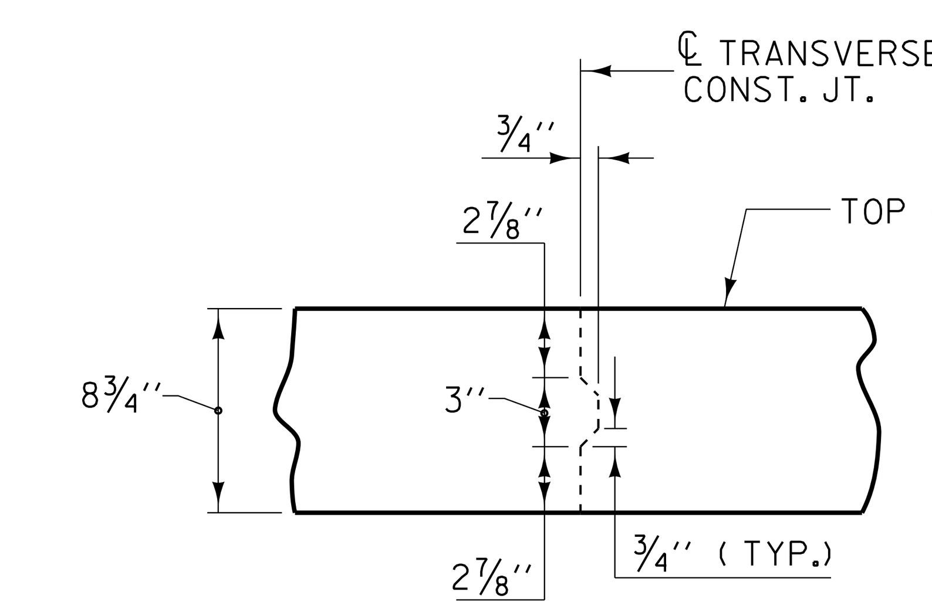


SECTION AT LINK SLAB



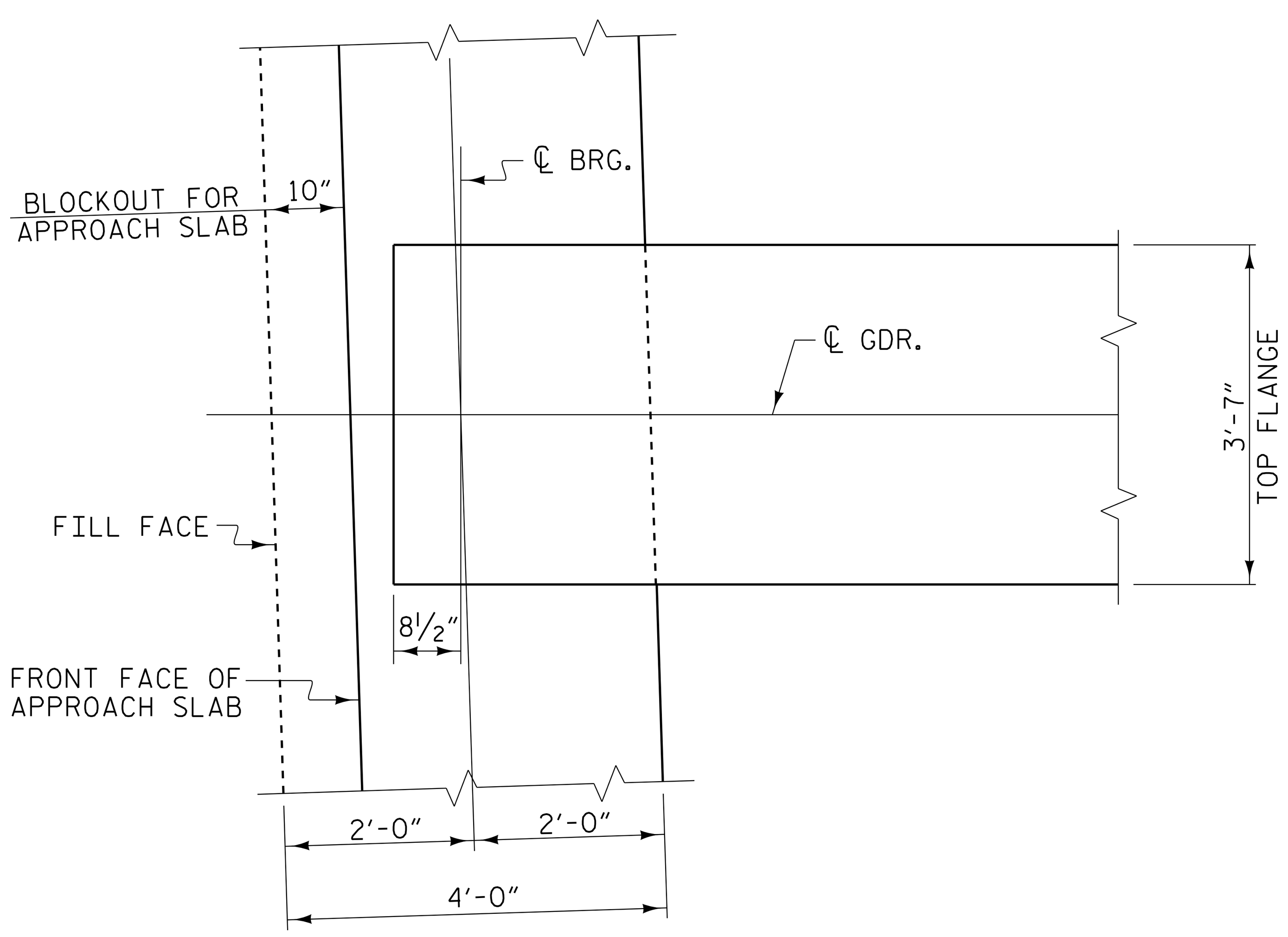
DETAIL "B"

A 1½" DEEP CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE B LOW MODULUS SILICONE SEALANT. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.



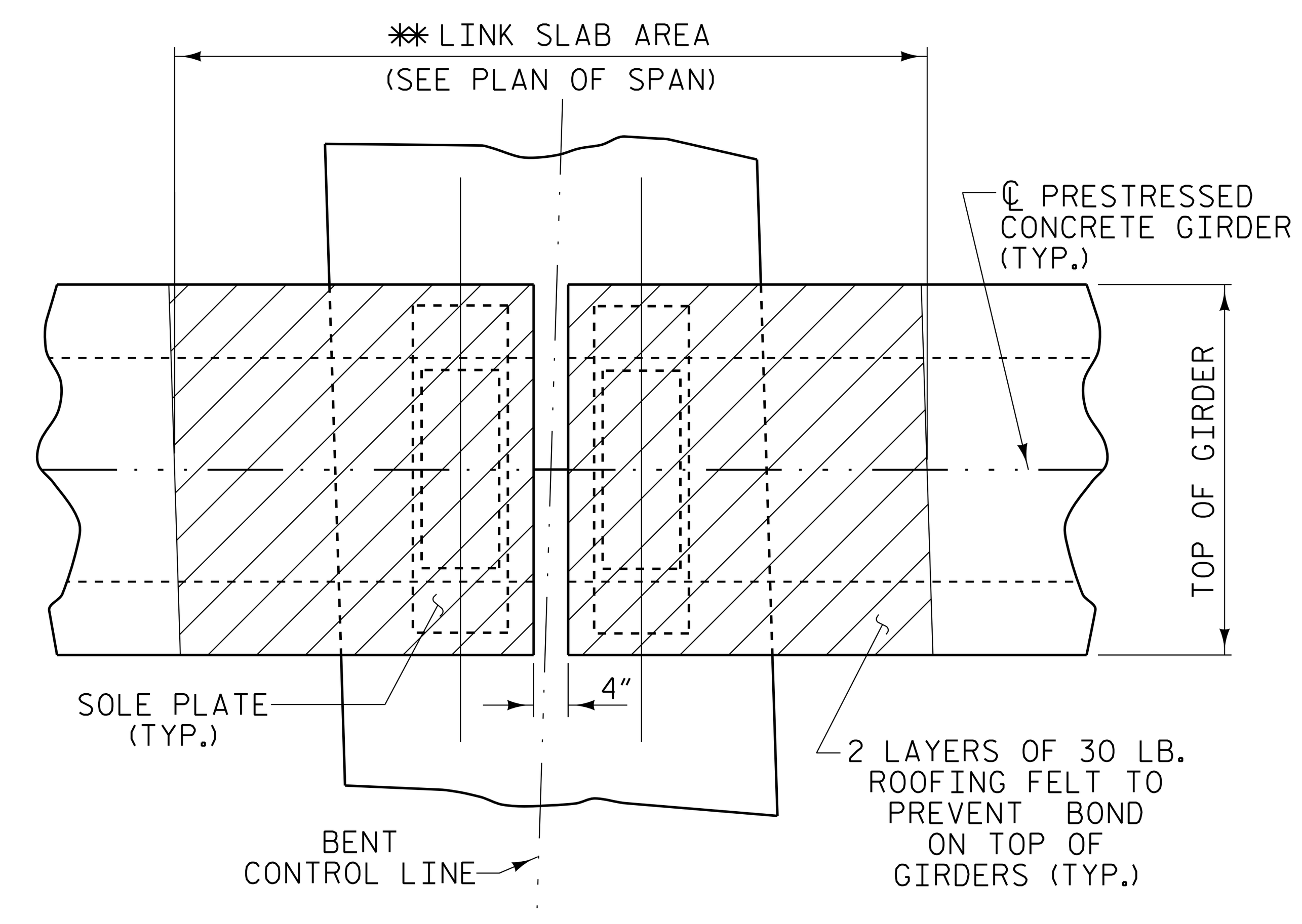
TRANSVERSE CONSTRUCTION JOINT DETAIL

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



PLAN OF GIRDER AT INTEGRAL END BENT

END BENT 1 SHOWN, END BENT 2 SIMILAR



PLAN AT BENT

** THE TOP OF THE 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.

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

PLANS PREPARED BY:

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NO.	BY:	DATE:		NO.	BY:	DATE:		S1-7
1				3				TOTAL SHEETS
2				4				38

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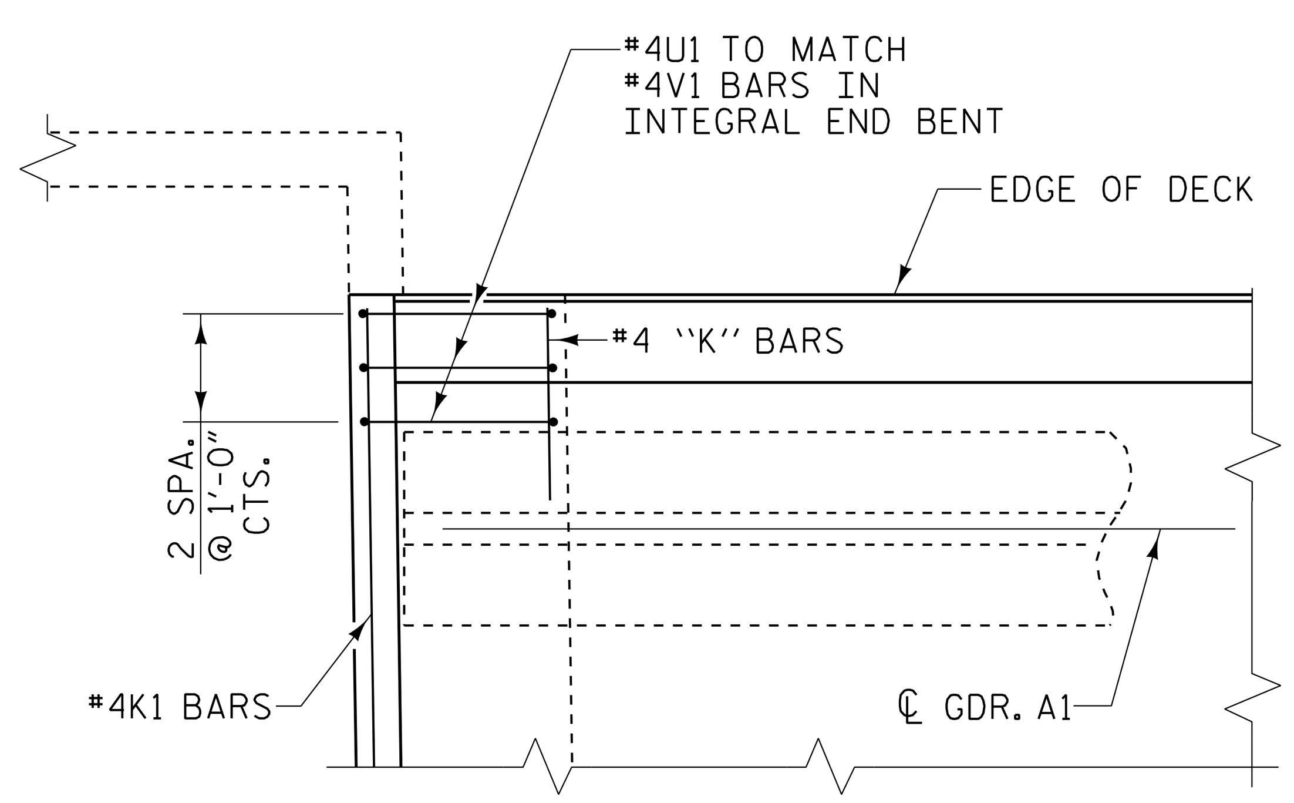
PLAN OF SPAN A



DETAIL "B"
(ALL CORNERS SIMILAR)

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

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2			4		

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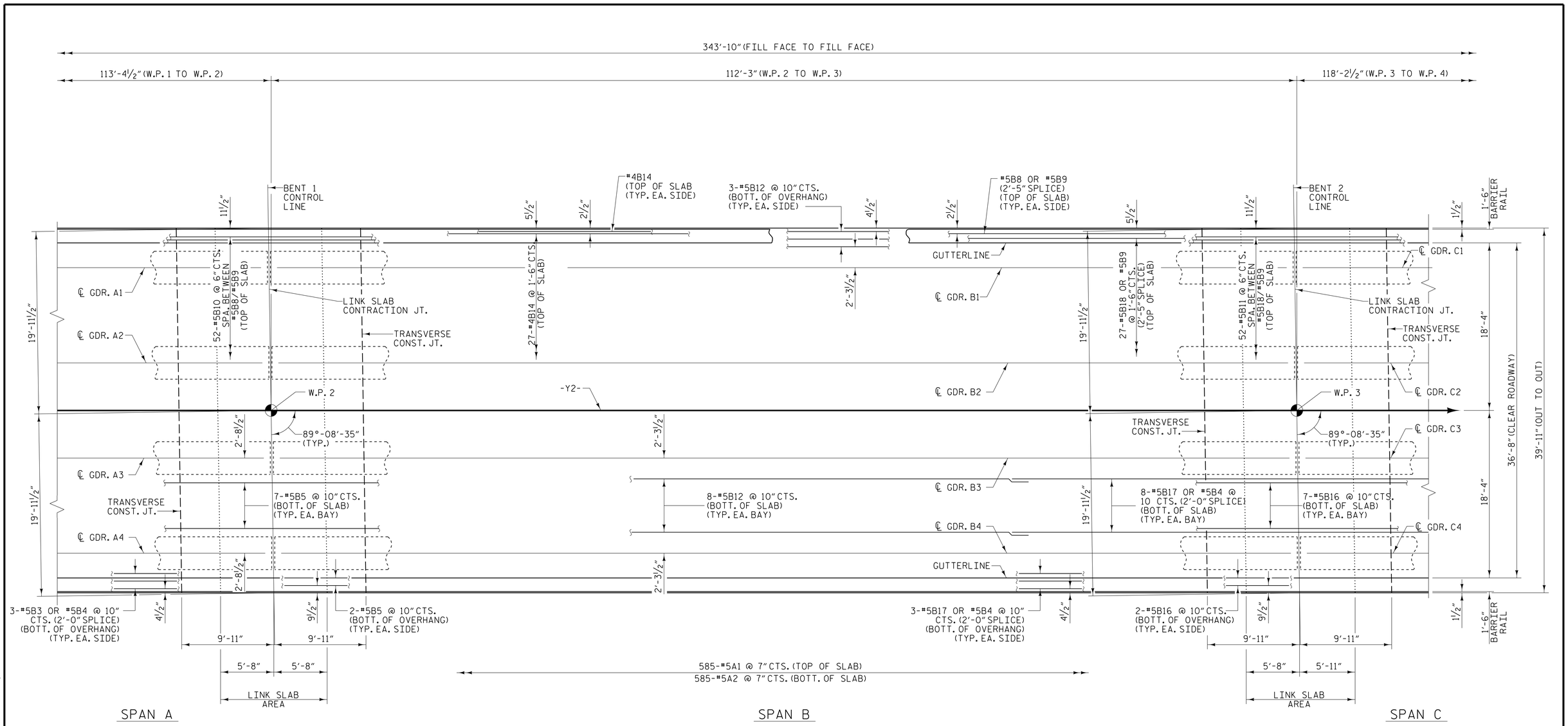

PLAN OF SPAN B

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B

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Docusigned by: Matt Metzger

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-9
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : W. B. ALLEN DATE : 6/21
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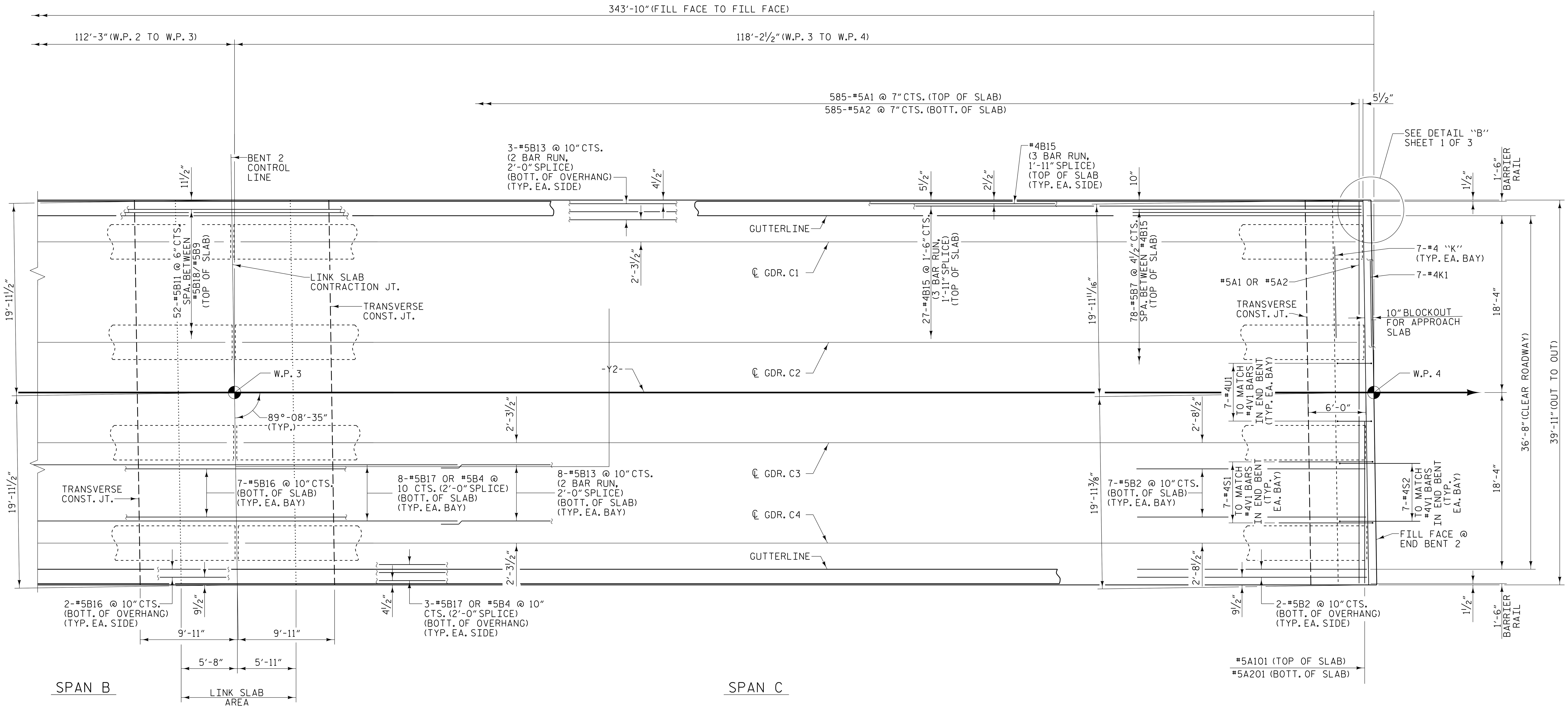

PLAN OF SPAN C

PROJECT NO. R-5819
COLUMBUS COUNTY
STATION: 40+06.72 -Y2- POT

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN C

PLANS PREPARED BY:
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4/12/2022

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1			3			TOTAL SHEETS	38
2			4				

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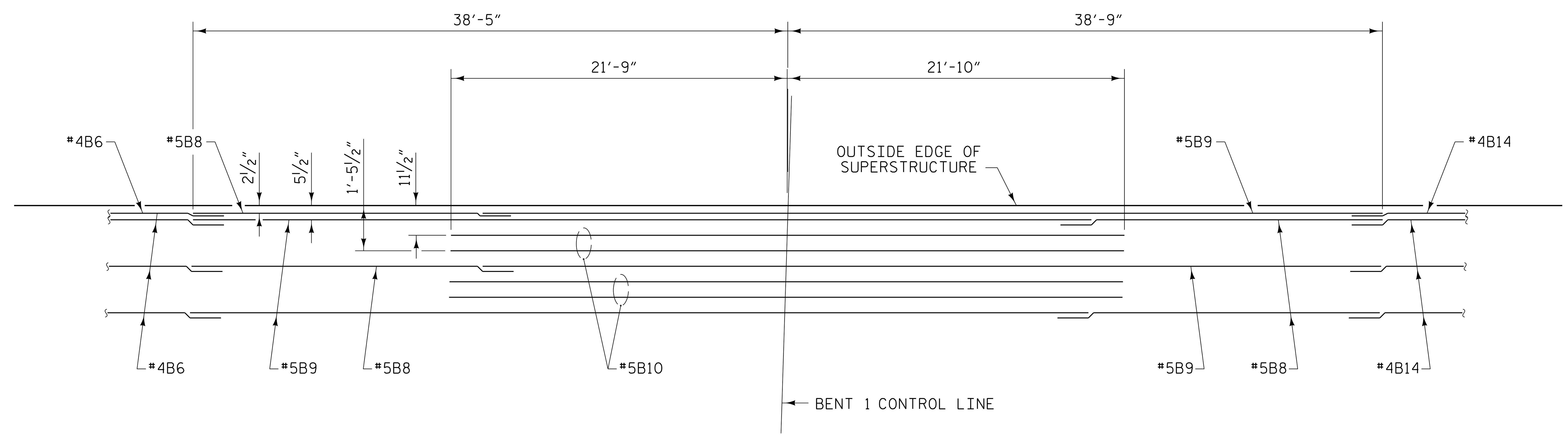
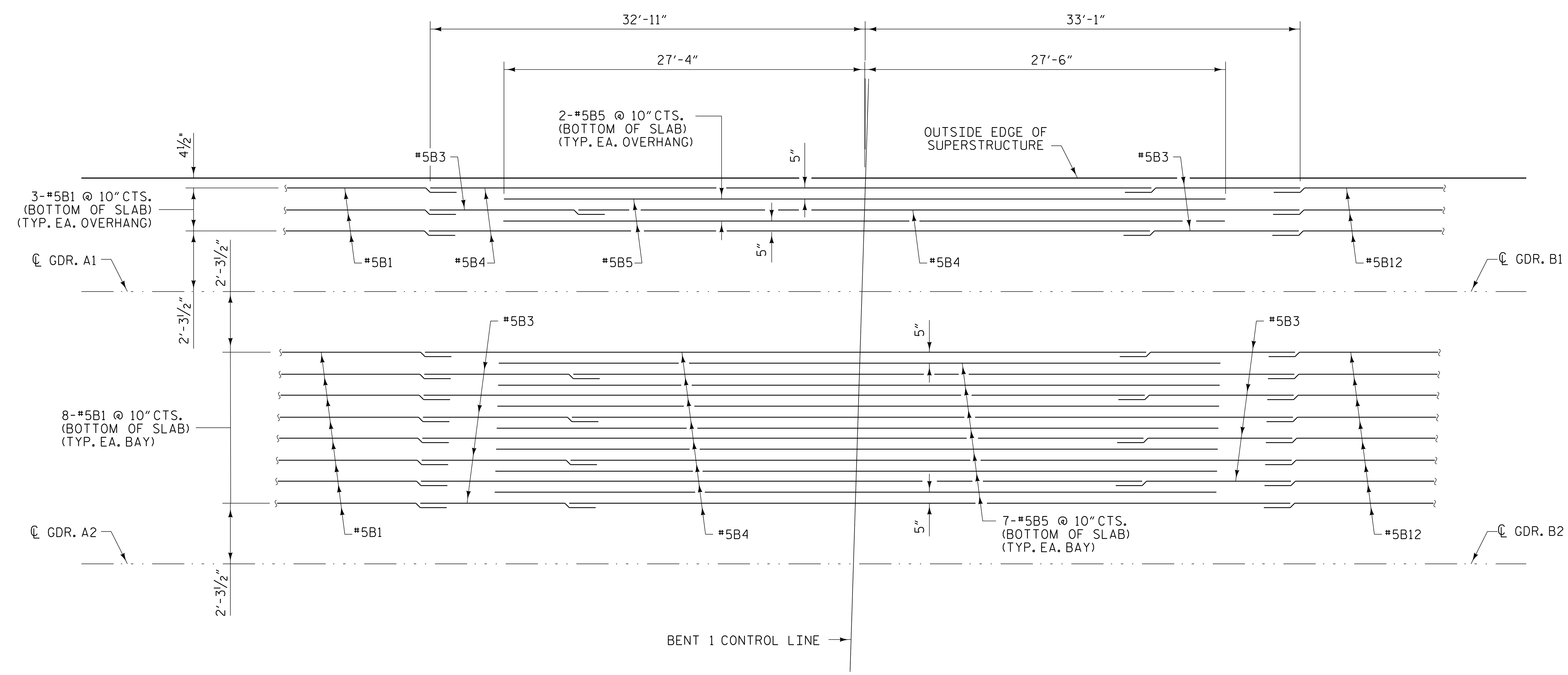


TOP OF DECK "B" BAR PLACEMENT

AT BENT 1



BOTTOM OF DECK "B" BAR PLACEMENT

AT BENT 1

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PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
"B" BAR LAYOUT

PLANS PREPARED BY:

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4/12/2022

DRAWN BY :	M.D. METZGER	DATE :	02/22
CHECKED BY :	L.K. AUSTIN	DATE :	02/22
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	02/22

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SHEET NO. S1-11

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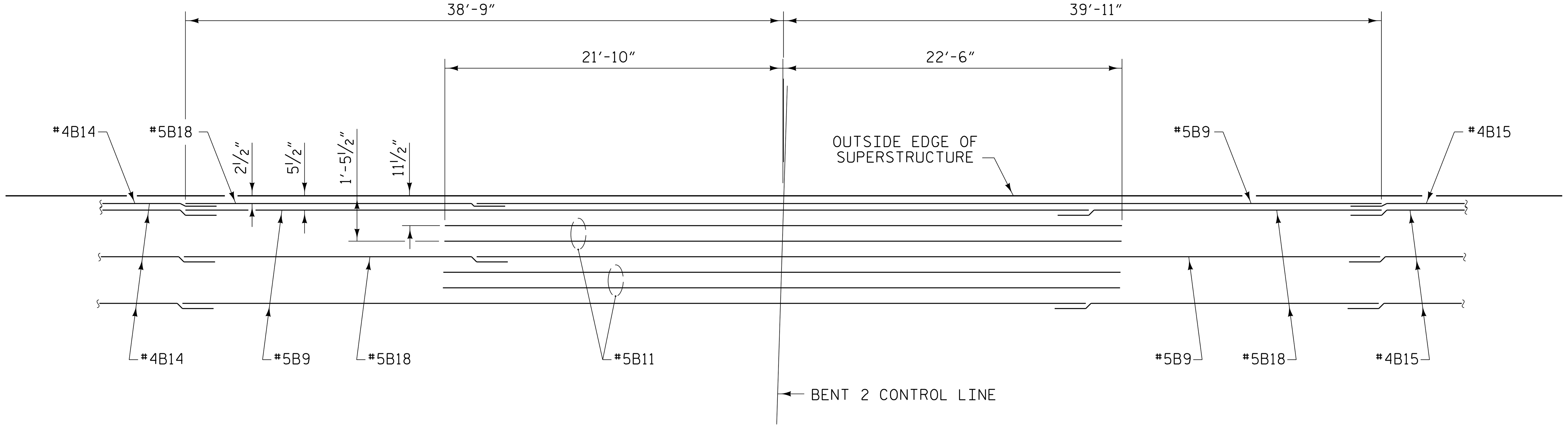
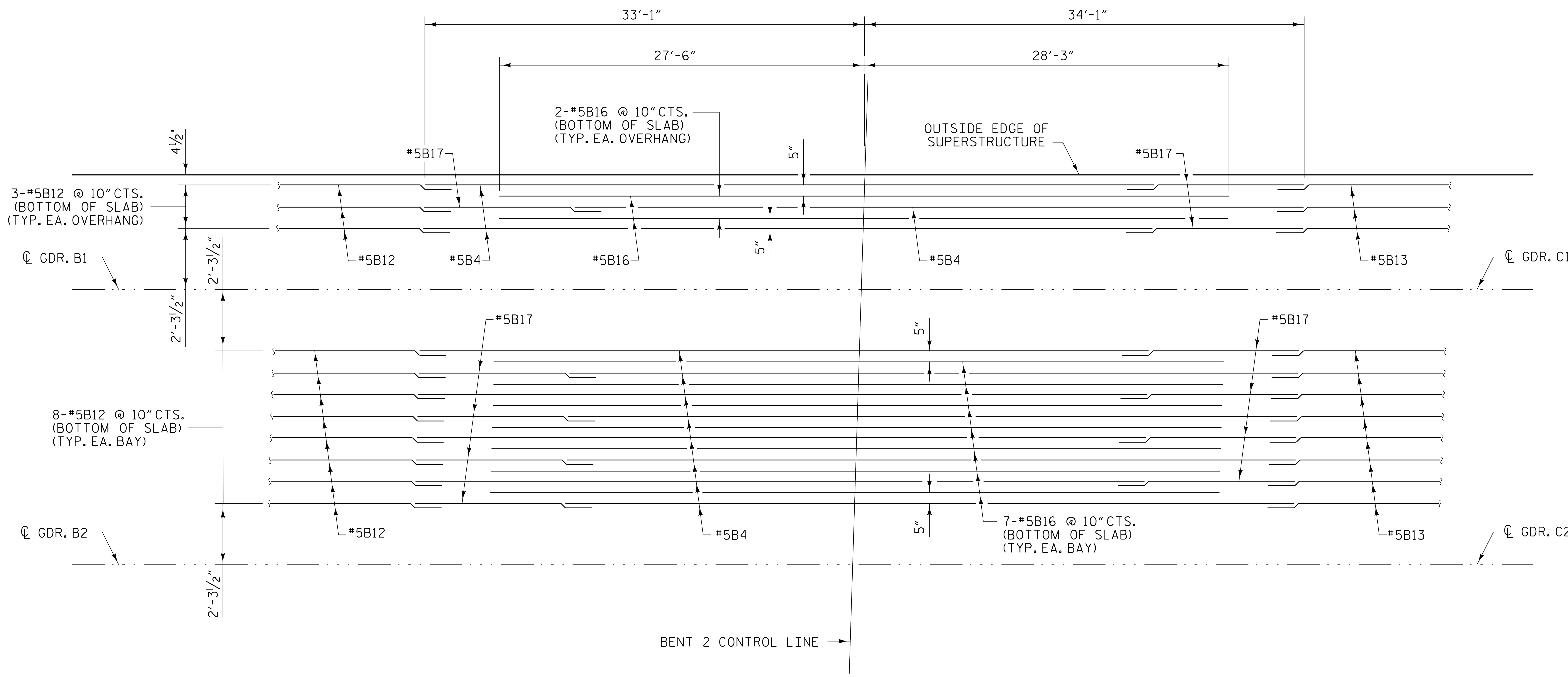


TOP OF DECK "B" BAR PLACEMENT

AT BENT 2



BOTTOM OF DECK "B" BAR PLACEMENT

AT BENT 2

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS "B" BAR LAYOUT

REVISIONS					
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1			3		
2			4		

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DRAWN BY :	M.D. METZGER	DATE :	02/22
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NOTES

FOR DIAPHRAGM DETAILS, SEE "SUPERSTRUCTURE INTERMEDIATE STEEL DIAPHRAGM" SHEET.

FRAMING PLAN

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

PLANS PREPARED BY:

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1			3			TOTAL SHEETS
2			4			38

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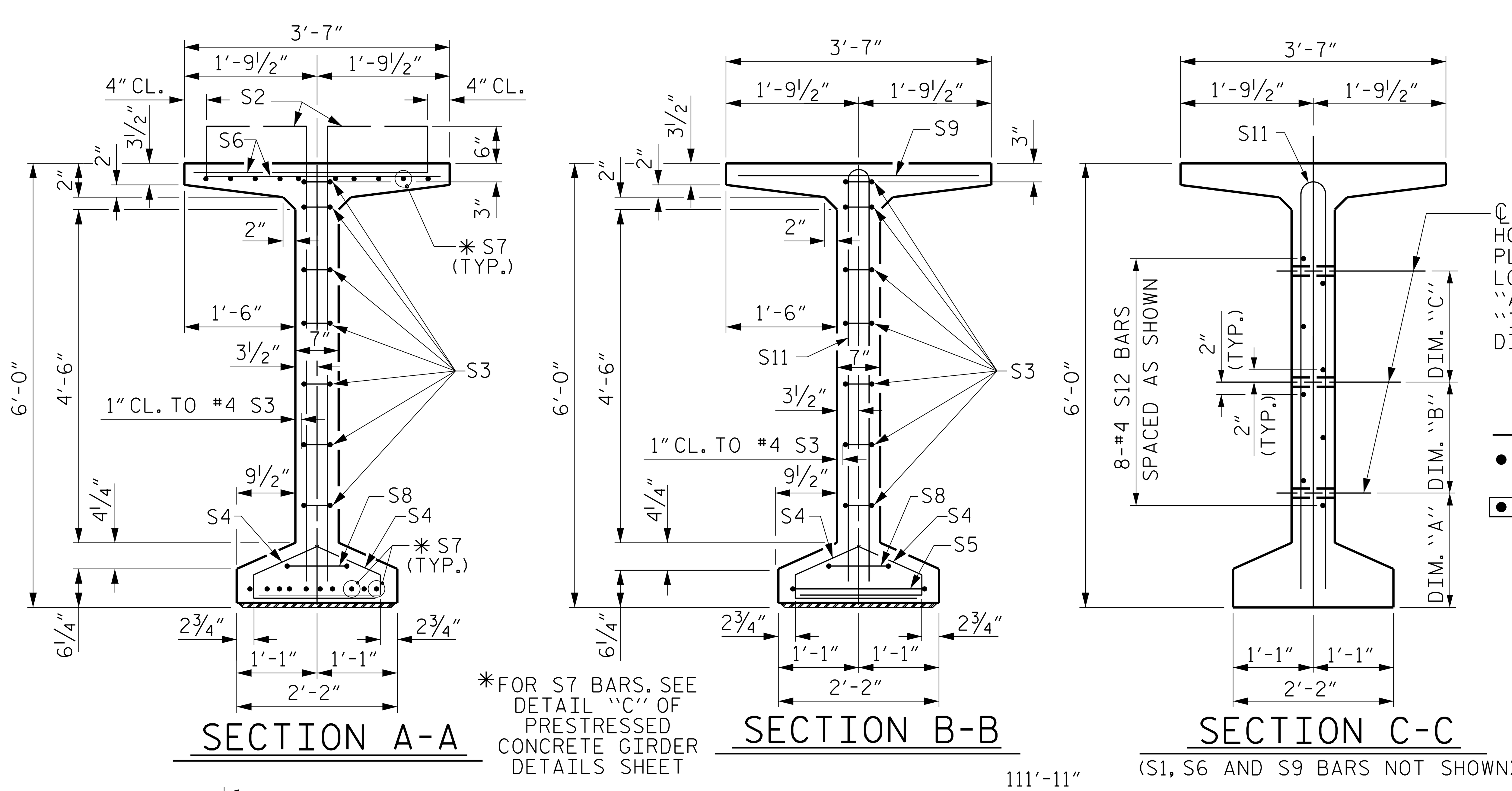
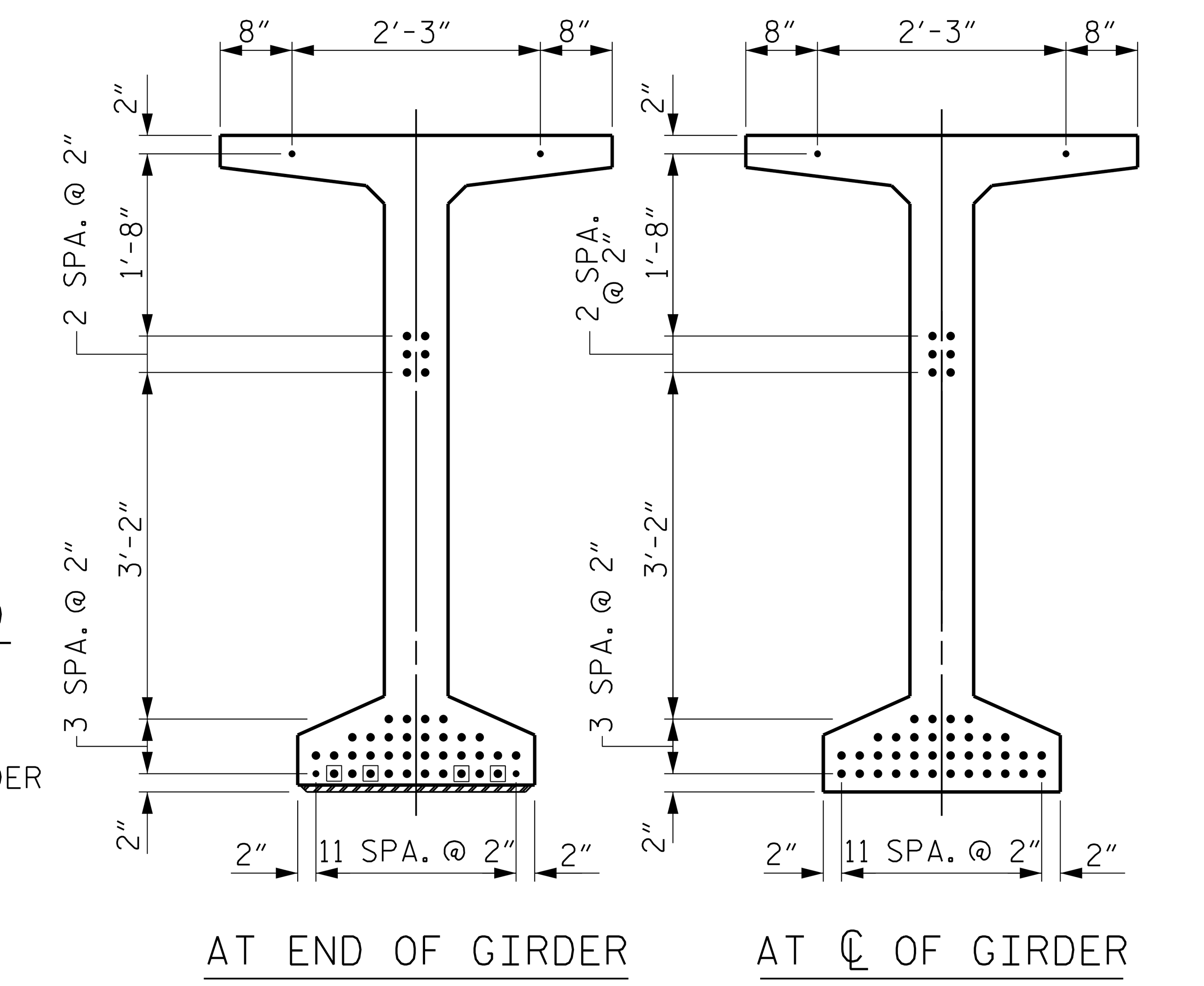


DEBONDING LEGEND
- • FULLY BONDED STRANDS
- ⊙ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



0.6" ∅ LOW RELAXATION STRAND LAYOUT

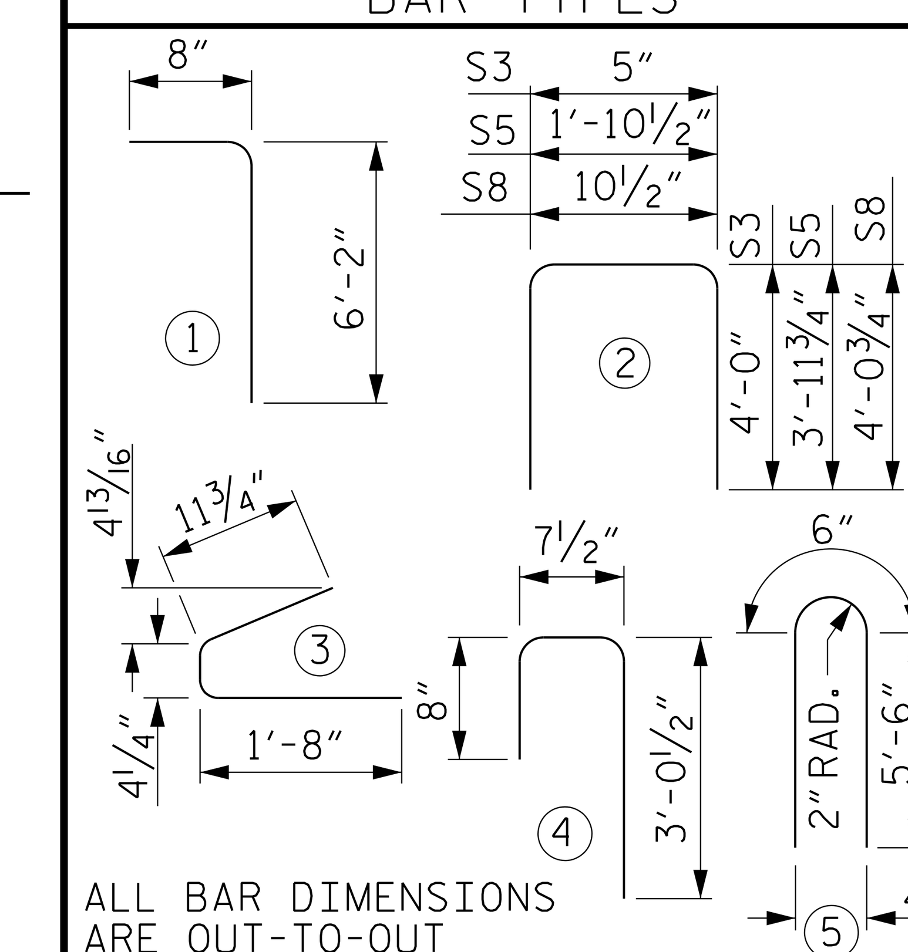
0.6" ∅ L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

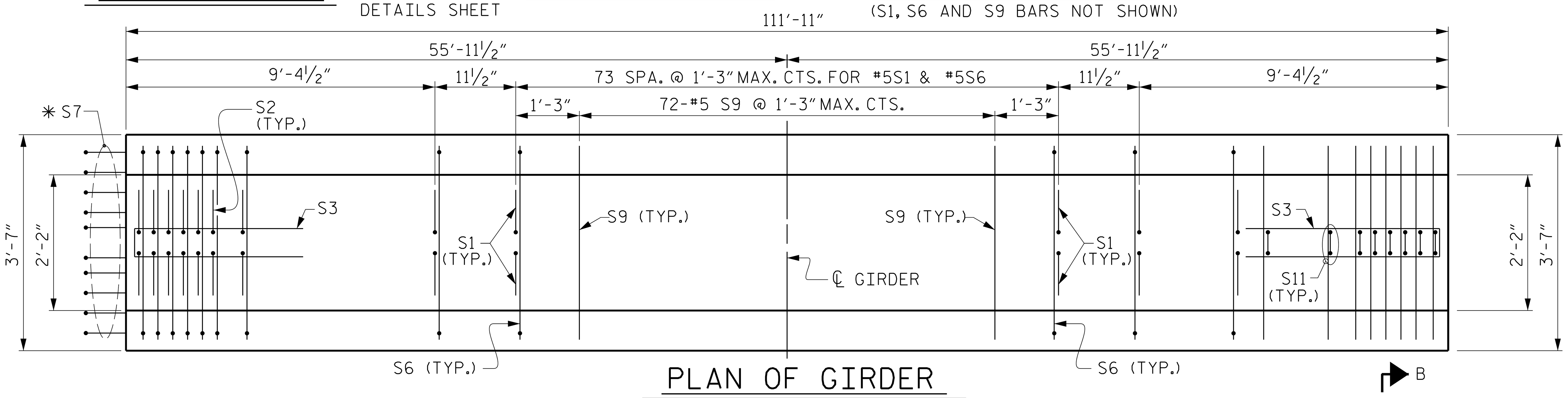
REINFORCING STEEL FOR ONE GDR

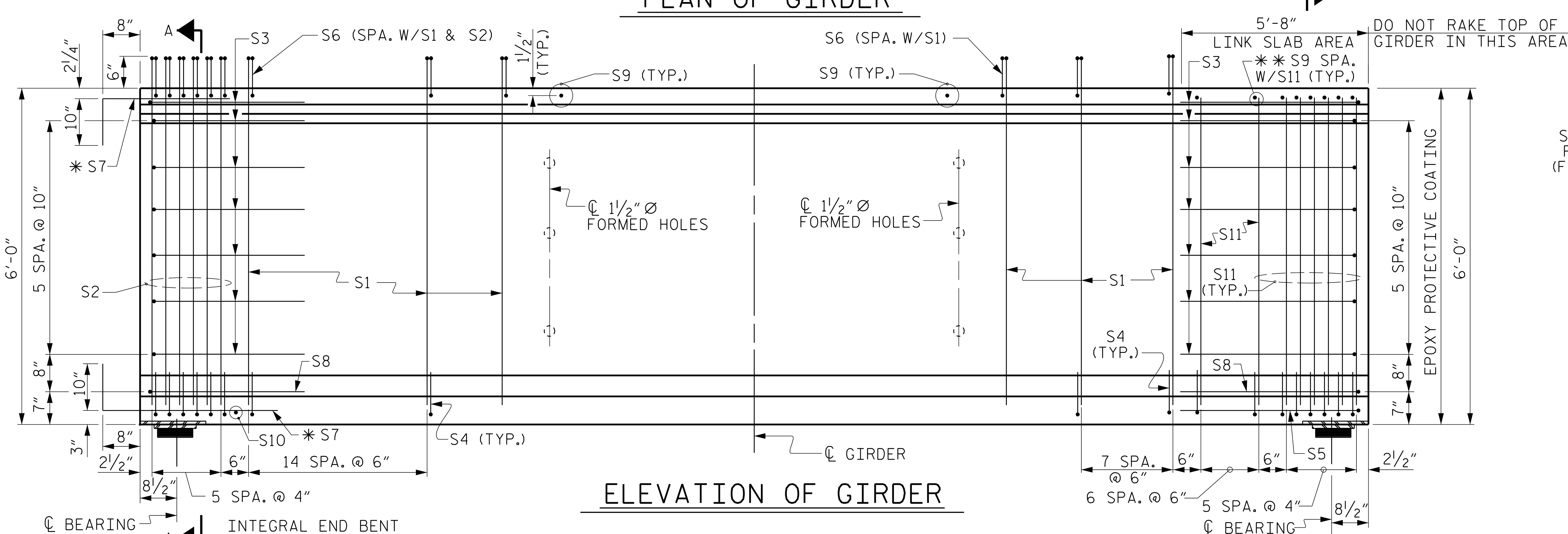
	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	194	#5	1	6'-10"	1383
	S2	12	#5	1	6'-10"	86
	S3	14	#4	2	8'-5"	79
	S4	84	#4	3	3'-0"	168
	S5	1	#5	2	9'-10"	10
	S6	206	#5	4	4'-4"	931
*	S7	20	#5	STR	3'-8"	77
	S8	2	#5	2	9'-0"	19
	S9	94	#5	STR	3'-3"	319
	S10	1	#3	STR	1'-10"	1
	S11	21	#5	5	11'-6"	252
	S12	16	#4	STR	8'-0"	86

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

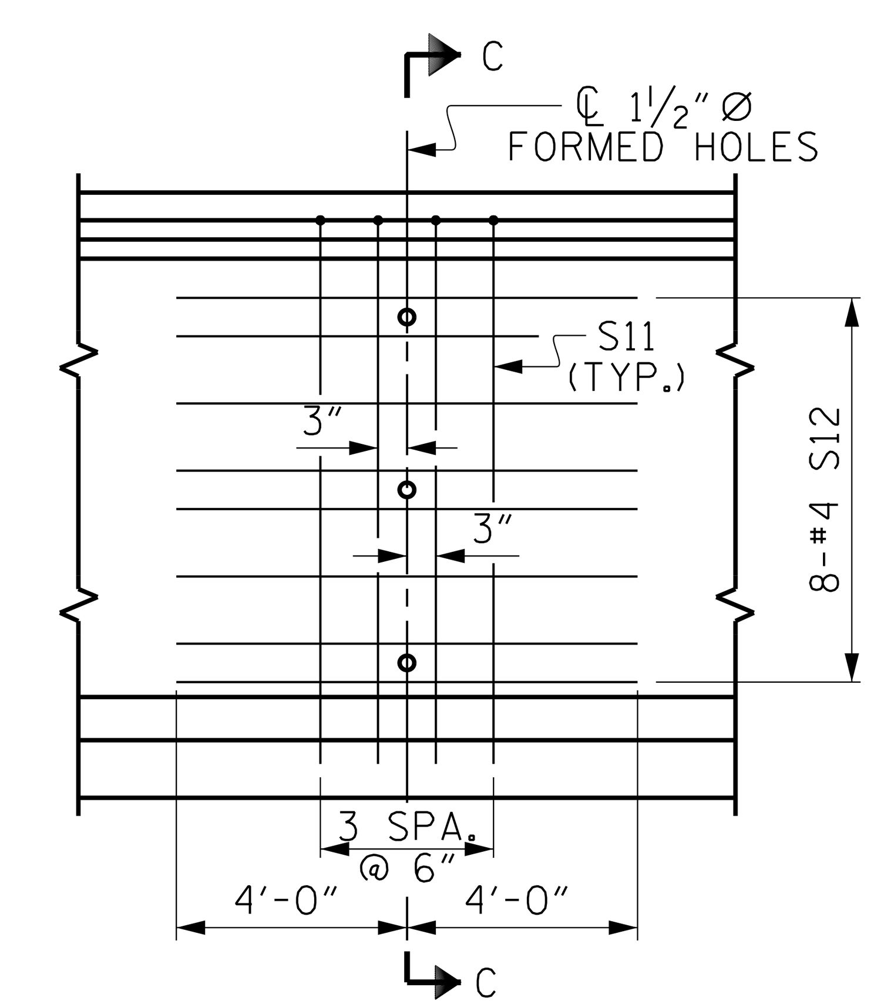
BAR TYPES







** WITHIN LINK SLAB AREA ONLY



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-4 (FOR ALL EXTERIOR GIRDERS AND INTERIOR GIRDERS WITH 70° ≤ SKEW ≤ 110°)

QUANTITIES FOR ONE GIRDER

GIRDERS	REINFORCING STEEL	9000 PSI CONCRETE	0.6" ∅ L.R. STRANDS
	LB.	C.Y.	No.
	3411	24.0	44

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	111'-11"	447'-8"

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 6

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE LINK SLAB - SPAN A

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER — DocuSigned by: Matt Metzger

4/12/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : W. B. ALLEN	DATE : 11/21
CHECKED BY : M. D. METZGER	DATE : 1/22
DRAWN BY : BNB 9/21	
CHECKED BY : AAI 9/21	

REVISIONS

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

SHEET NO. S1-14

TOTAL SHEETS 38

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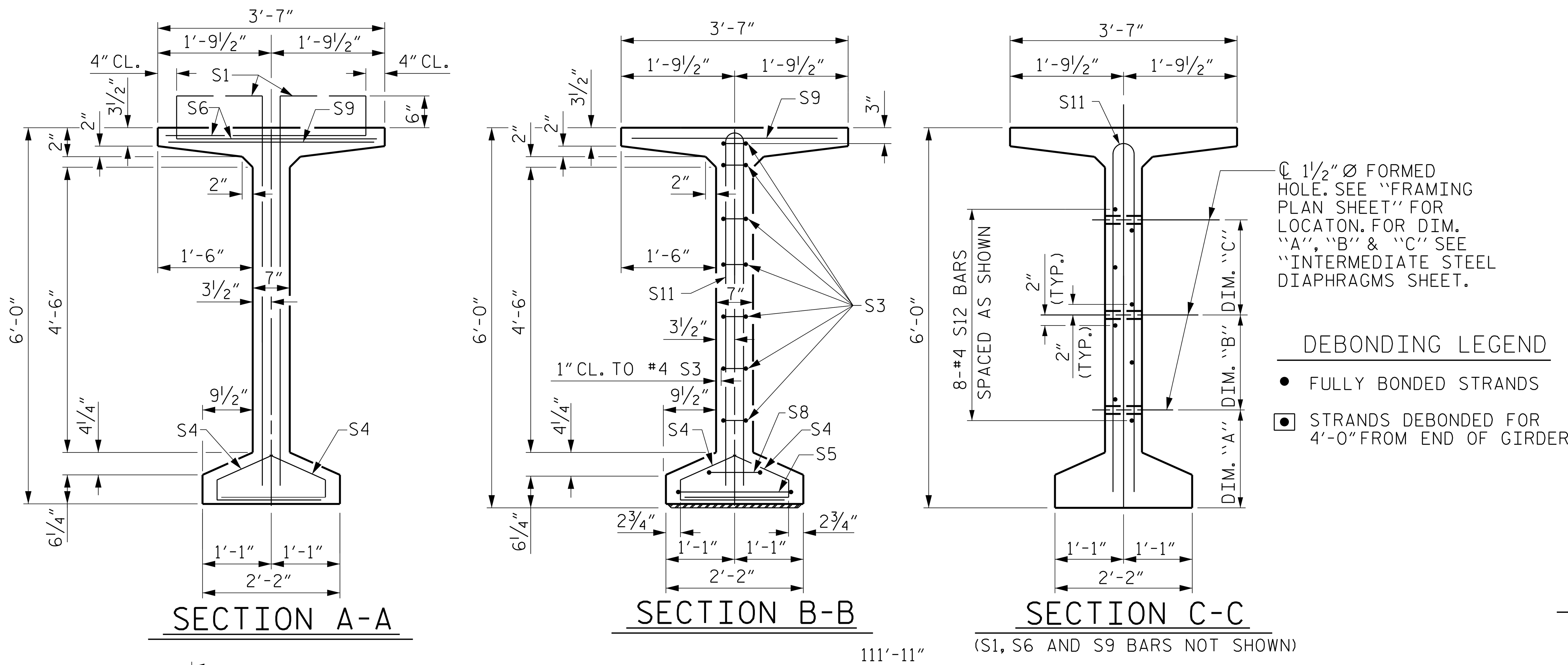
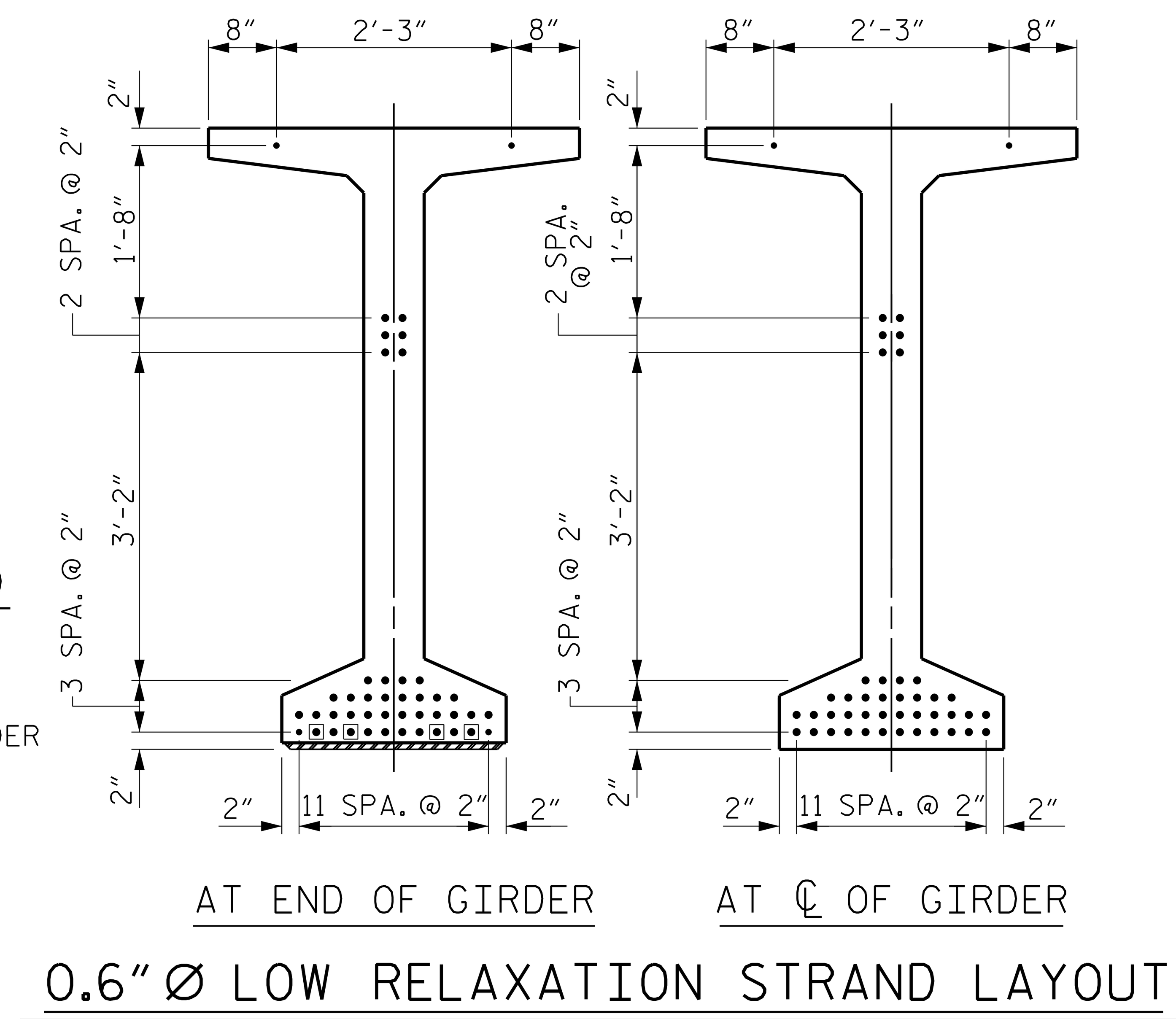


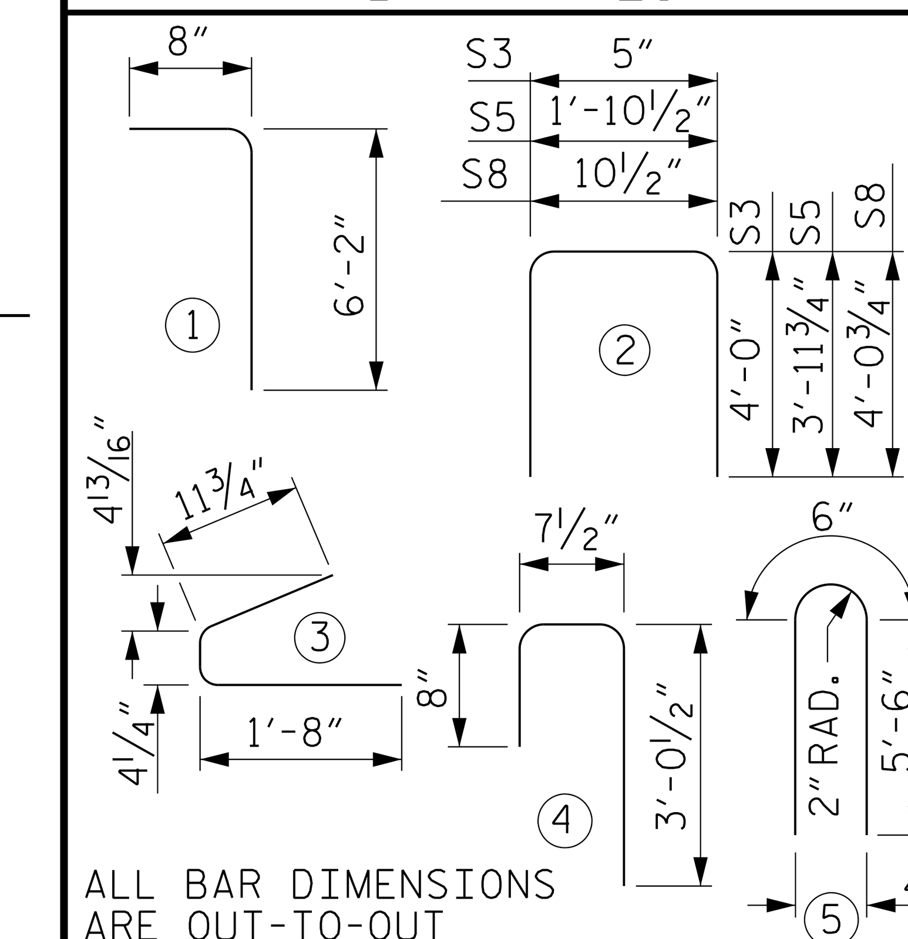


0.6″ Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

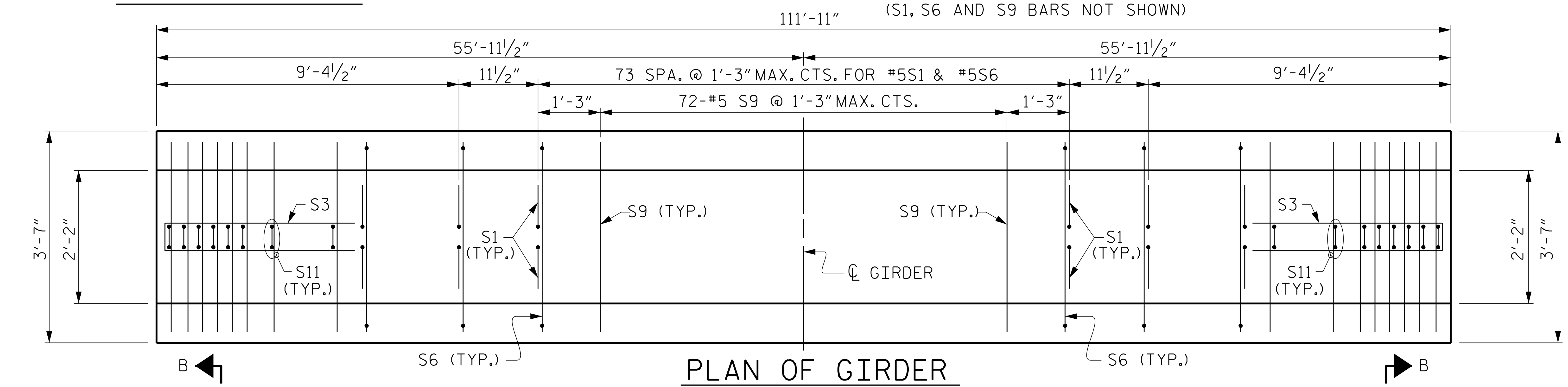
REINFORCING STEEL FOR ONE GDR

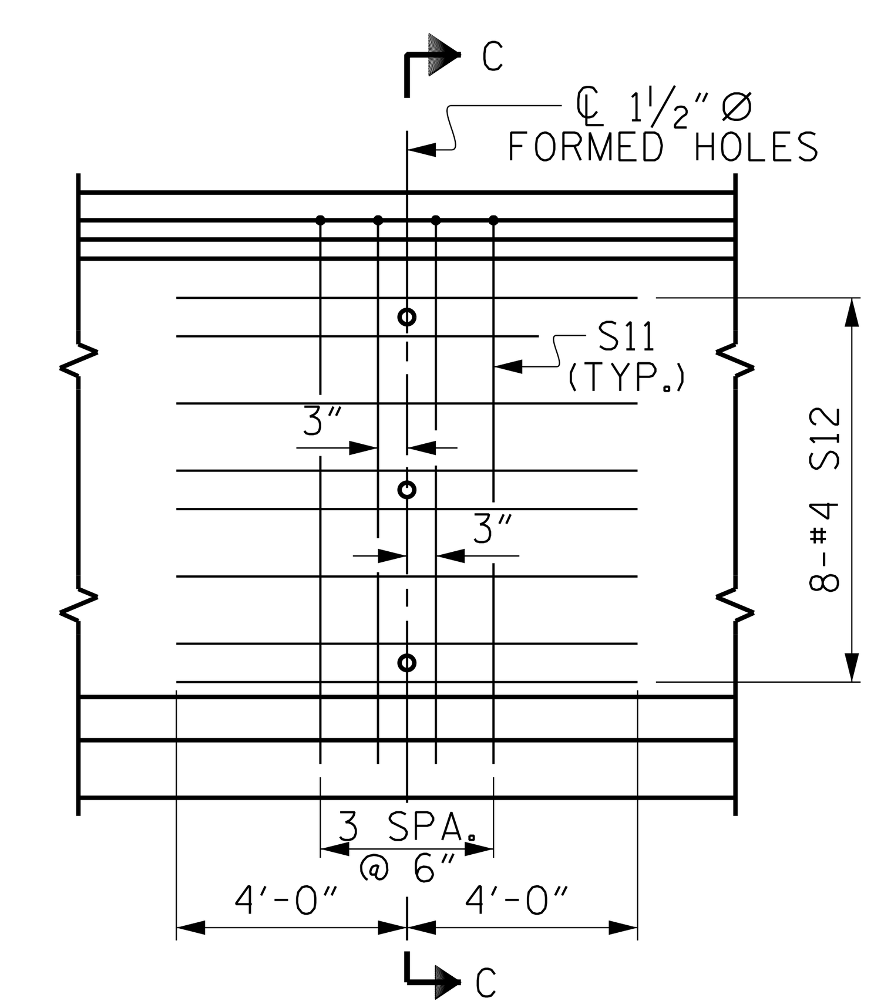
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	180	#5	1	6′-10″	1283
S3	14	#4	2	8′-5″	79
S4	84	#4	3	3′-0″	168
S5	2	#5	2	9′-10″	21
S6	180	#5	4	4′-4″	814
S8	2	#5	2	9′-0″	19
S9	116	#5	STR	3′-3″	393
S11	34	#5	5	11′-6″	408
S12	16	#4	STR	8′-0″	86

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT





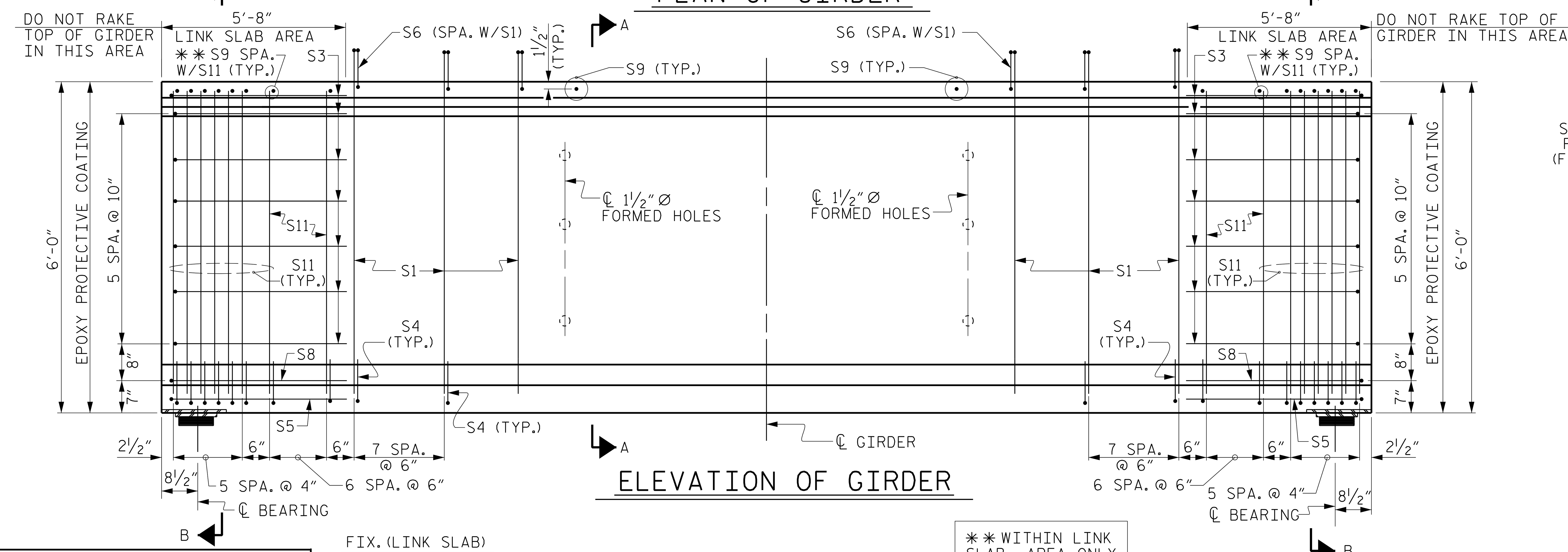
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-4 (FOR ALL EXTERIOR GIRDERS AND INTERIOR GIRDERS WITH 70° ≤ SKEW ≤ 110°)

QUANTITIES FOR ONE GIRDER

GIRDERS	REINFORCING STEEL	9000 PSI CONCRETE	0.6″ Ø L.R. STRANDS
	LB.	C.Y.	No.
	3271	24.0	44

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	111′-11″	447′-8″



∗∗ WITHIN LINK SLAB AREA ONLY

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 6

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

4/12/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72″ PRESTRESSED CONCRETE MODIFIED BULB TEE LINK SLAB - SPAN B

ASSEMBLED BY :	W. B. ALLEN	DATE : 11/21
CHECKED BY :	M. D. METZGER	DATE : 1/22
DRAWN BY :	BNB 9/21	
CHECKED BY :	AAI 9/21	

REVISIONS

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

SHEET NO. S1-15

TOTAL SHEETS 38

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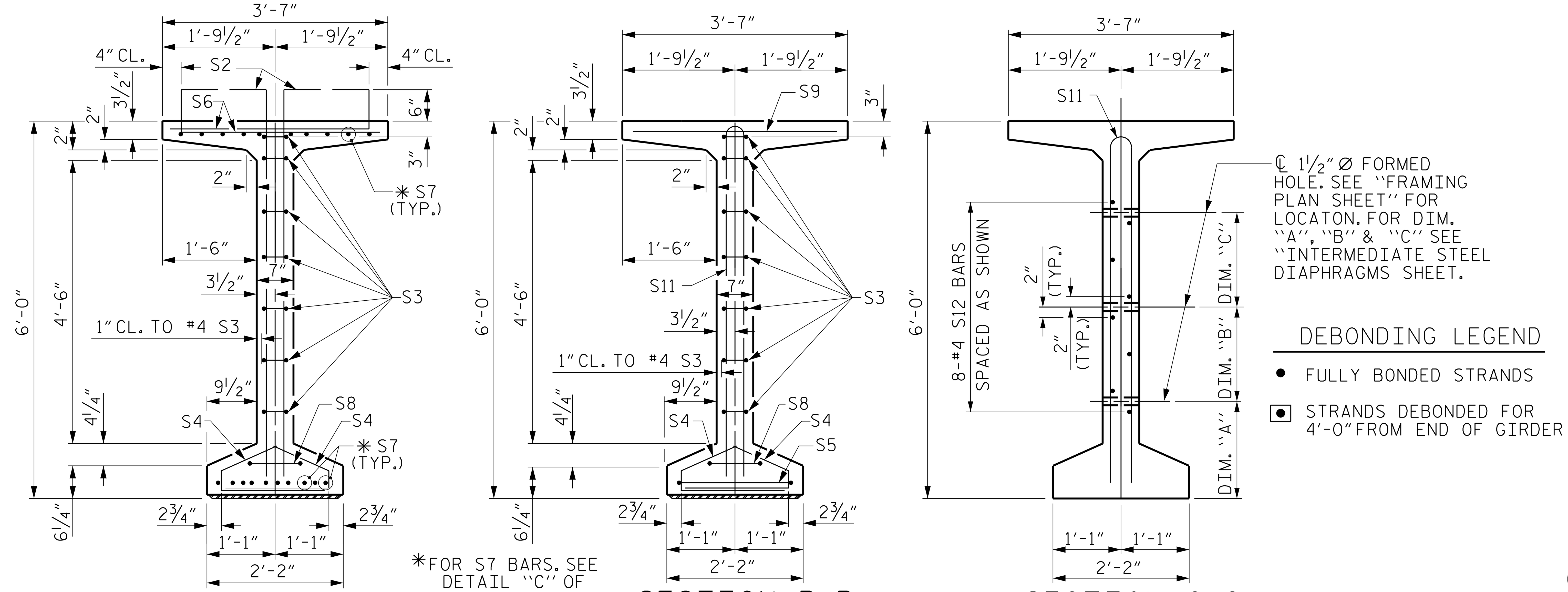


SECTION A-A

*FOR S7 BARS. SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER DETAILS SHEET

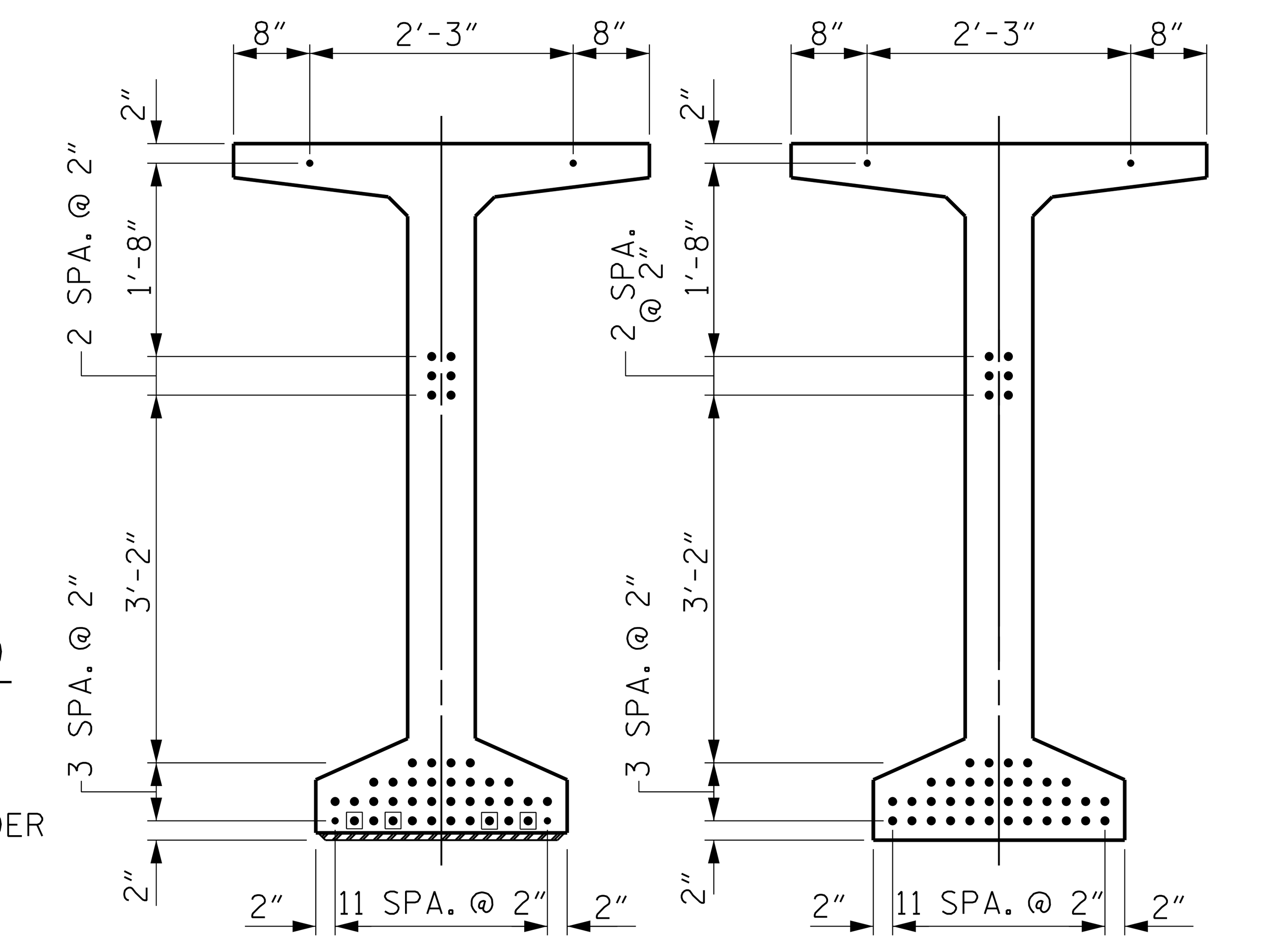
SECTION B-B

SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

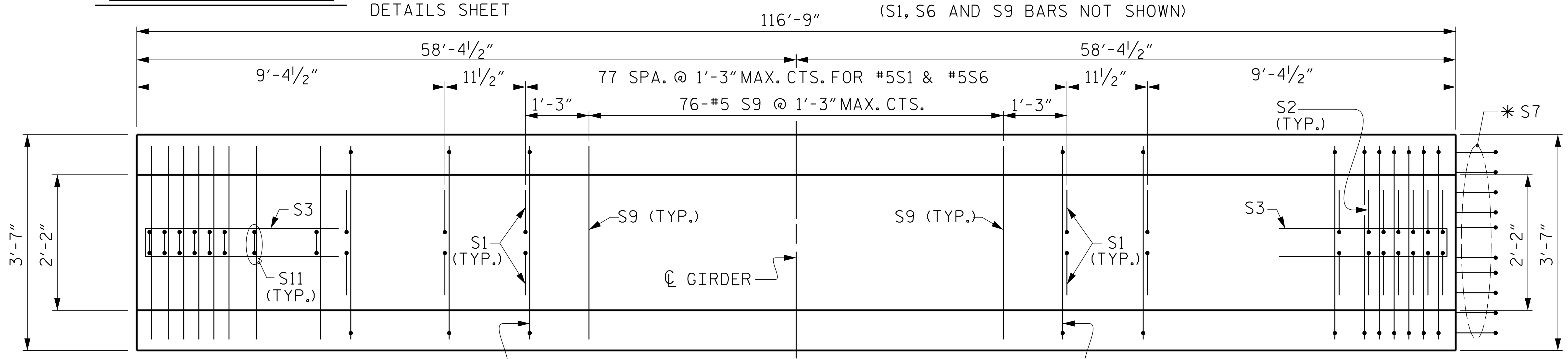
- • FULLY BONDED STRANDS
- ⊡ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



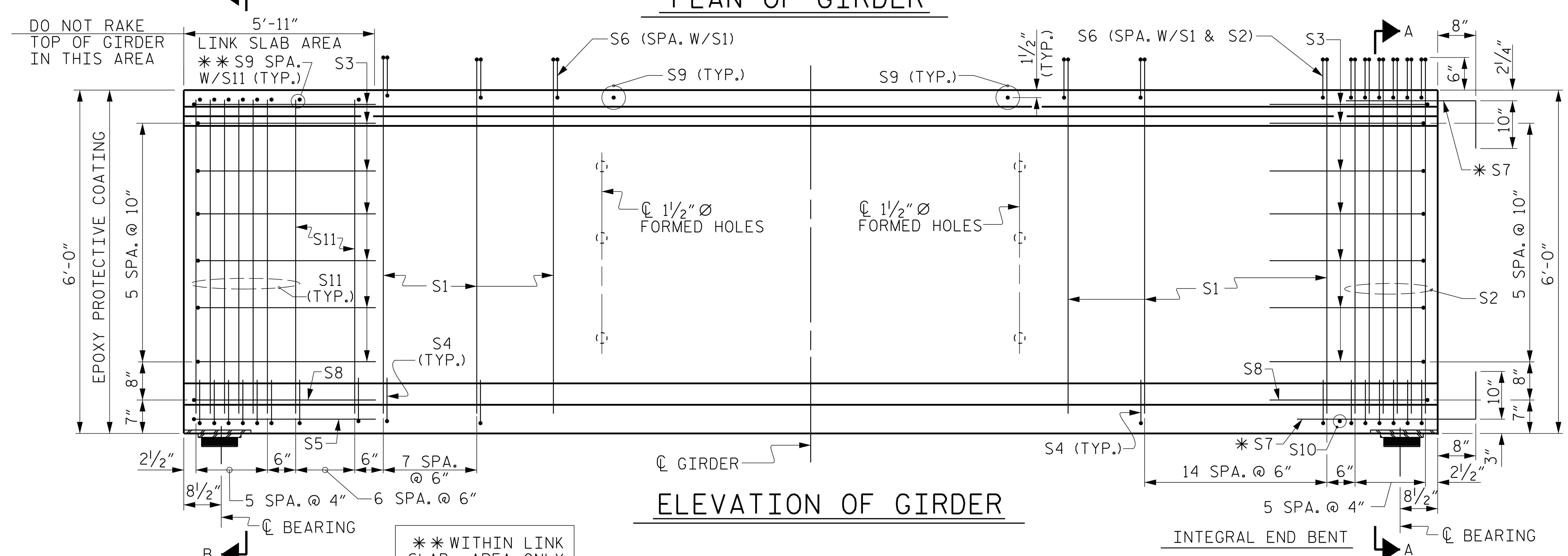
AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

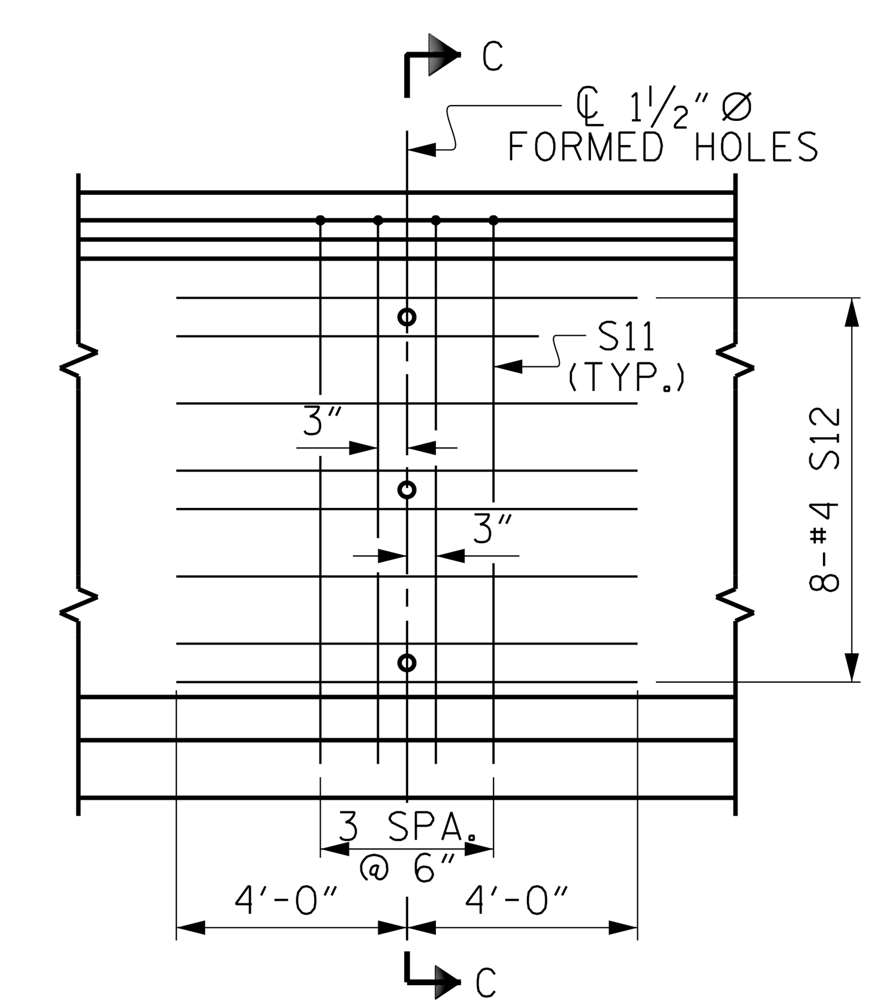


** WITHIN LINK SLAB AREA ONLY

ELEVATION OF GIRDER

FIX. (LINK SLAB)

INTEGRAL END BENT



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-4 (FOR ALL EXTERIOR GIRDERS AND INTERIOR GIRDERS WITH 70° ≤ SKEW ≤ 110°)

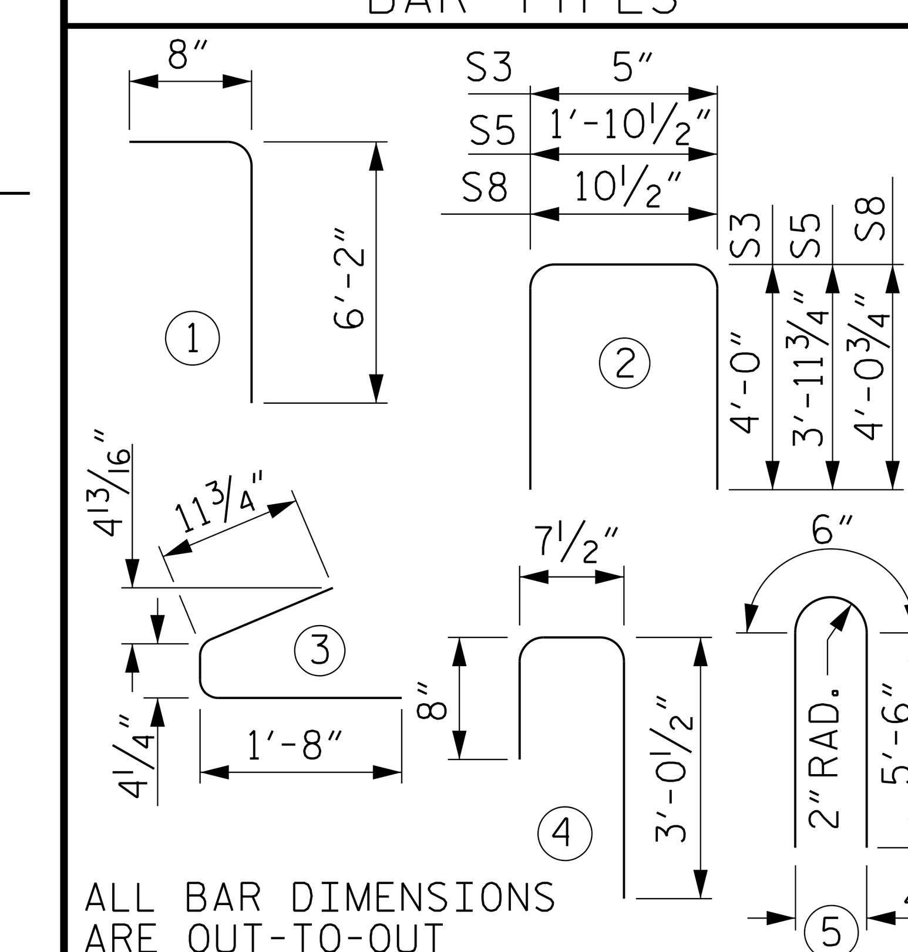
0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	202	#5	1	6'-10"	1440
S2	12	#5	1	6'-10"	86
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S5	1	#5	2	9'-10"	10
S6	214	#5	4	4'-4"	967
* S7	20	#5	STR	3'-8"	77
S8	2	#5	2	9'-0"	19
S9	114	#5	STR	3'-3"	386
S10	1	#3	STR	1'-10"	1
S11	21	#5	5	11'-6"	252
S12	16	#4	STR	8'-0"	86

* 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

GIRDERS	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	3571	25.0	44

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	116'-9"	467'-0"

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 3 OF 6

PLANS PREPARED BY:

NV5

NV5 ENGINEERS & CONSULTANTS, INC.
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CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER

4/12/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE LINK SLAB - SPAN C

REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO. S1-16
1			3			TOTAL SHEETS 38
2			4			

ASSEMBLED BY : W. B. ALLEN DATE : 11/21
CHECKED BY : M. D. METZGER DATE : 1/22
DRAWN BY : BNB 9/21
CHECKED BY : AAI 9/21

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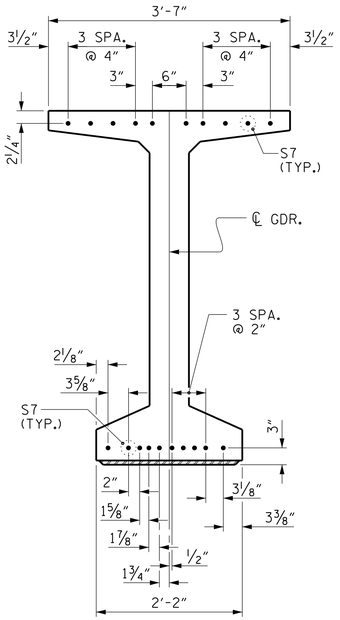
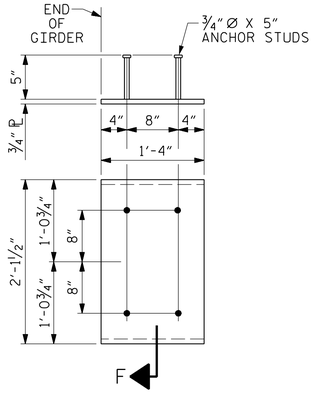


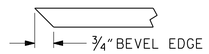
DETAIL "C"

(FOR 72" MODIFIED BULB TEES)



EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)

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 7000 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 THE LINK SLAB REGION, SHALL BE RAKED TO A DEPTH OF ¼".

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 72" MODIFIED BULB TEES ONLY.

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

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-17
1			3			TOTAL SHEETS
2			4			38

PLANS PREPARED BY:

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CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
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NORTH CAROLINA PROFESSIONAL SEAL 042812 ENGINEER MATTHEW DAVID METZGER

DocuSigned by: Matthew Metzger

4/12/2022

DRAWN BY :	W. B. ALLEN	DATE :	6/21
CHECKED BY :	M. D. METZGER	DATE :	8/21
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	1/22

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DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPANS A & B

0.6"Ø LOW RELAXATION	GIRDERS 1 & 4																				
FORTIETH POINTS	0	.025	.05	.075	.1	.125	.15	.175	.2	.225	.25	.275	.3	.325	.35	.375	.4	.425	.45	.475	.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.021	0.041	0.061	0.081	0.100	0.118	0.136	0.152	0.168	0.183	0.197	0.209	0.220	0.230	0.238	0.245	0.250	0.254	0.256	0.257
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.010	0.020	0.030	0.040	0.050	0.059	0.069	0.078	0.086	0.093	0.101	0.108	0.113	0.118	0.123	0.128	0.129	0.131	0.132	0.134
FINAL CAMBER ↑	0.0	1/8"	1/4"	3/8"	1/2"	5/8"	11/16"	13/16"	7/8"	1"	1 1/16"	1 1/8"	1 3/16"	1 5/16"	1 3/8"	1 3/8"	1 7/16"	1 7/16"	1 1/2"	1 1/2"	1 1/2"

0.6"Ø LOW RELAXATION	GIRDERS 1 & 4																				
FORTIETH POINTS	.50	.525	.55	.575	.6	.625	.65	.675	.7	.725	.75	.775	.8	.825	.85	.875	.9	.925	.95	.975	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.257	0.256	0.254	0.249	0.245	0.238	0.230	0.220	0.209	0.197	0.183	0.168	0.152	0.136	0.118	0.100	0.081	0.061	0.041	0.021	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.134	0.132	0.131	0.129	0.128	0.123	0.118	0.113	0.108	0.101	0.093	0.086	0.078	0.069	0.059	0.050	0.040	0.030	0.020	0.010	0.0
FINAL CAMBER ↑	1 1/2"	1 1/2"	1 1/2"	1 7/16"	1 7/16"	1 3/8"	1 3/8"	1 5/16"	1 3/16"	1 1/8"	1 1/16"	1"	7/8"	13/16"	11/16"	5/8"	1/2"	3/8"	1/4"	1/8"	0.0

0.6"Ø LOW RELAXATION	GIRDERS 2 & 3																				
FORTIETH POINTS	0	.025	.05	.075	.1	.125	.15	.175	.2	.225	.25	.275	.3	.325	.35	.375	.4	.425	.45	.475	.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.021	0.041	0.061	0.081	0.100	0.118	0.136	0.152	0.168	0.183	0.197	0.209	0.220	0.230	0.238	0.245	0.250	0.254	0.256	0.257
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.011	0.021	0.032	0.043	0.053	0.063	0.073	0.084	0.092	0.100	0.108	0.116	0.121	0.126	0.131	0.136	0.138	0.140	0.141	0.143
FINAL CAMBER ↑	0.0	1/8"	1/4"	3/8"	7/16"	9/16"	11/16"	3/4"	13/16"	15/16"	1"	1 1/16"	1 1/8"	1 3/16"	1 1/4"	1 5/16"	1 5/16"	1 3/8"	1 3/8"	1 3/8"	1 3/8"

0.6"Ø LOW RELAXATION	GIRDERS 2 & 3																				
FORTIETH POINTS	.50	.525	.55	.575	.6	.625	.65	.675	.7	.725	.75	.775	.8	.825	.85	.875	.9	.925	.95	.975	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.257	0.256	0.254	0.249	0.245	0.238	0.230	0.220	0.209	0.197	0.183	0.168	0.153	0.136	0.118	0.100	0.081	0.061	0.041	0.021	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.143	0.141	0.140	0.138	0.136	0.131	0.126	0.121	0.116	0.108	0.100	0.092	0.084	0.073	0.063	0.053	0.043	0.032	0.021	0.011	0.0
FINAL CAMBER ↑	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 5/16"	1 5/16"	1 1/4"	1 3/16"	1 1/8"	1 1/16"	1"	15/16"	13/16"	3/4"	11/16"	9/16"	7/16"	3/8"	1/4"	1/8"	0.0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN C

0.6"Ø LOW RELAXATION	GIRDERS 1 & 4																				
FORTIETH POINTS	0	.025	.05	.075	.1	.125	.15	.175	.2	.225	.25	.275	.3	.325	.35	.375	.4	.425	.45	.475	.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.021	0.043	0.063	0.084	0.104	0.123	0.141	0.158	0.175	0.191	0.205	0.217	0.229	0.239	0.248	0.255	0.260	0.264	0.267	0.267
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.013	0.025	0.038	0.050	0.062	0.074	0.086	0.098	0.108	0.117	0.127	0.136	0.142	0.148	0.154	0.160	0.162	0.164	0.166	0.169
FINAL CAMBER ↑	0.0	1/8"	3/16"	5/16"	3/8"	1/2"	9/16"	5/8"	11/16"	13/16"	7/8"	15/16"	1"	1 1/16"	1 1/16"	1 1/8"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 3/16"

0.6"Ø LOW RELAXATION	GIRDERS 1 & 4																				
FORTIETH POINTS	.50	.525	.55	.575	.6	.625	.65	.675	.7	.725	.75	.775	.8	.825	.85	.875	.9	.925	.95	.975	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.267	0.267	0.264	0.259	0.255	0.248	0.239	0.229	0.217	0.205	0191	0.175	0.159	0.141	0.123	0.104	0.084	0.063	0.043	0.021	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.169	0.166	0.164	0.162	0.160	0.154	0.148	0.142	0.136	0.127	0.117	0.108	0.098	0.086	0.074	0.062	0.050	0.038	0.025	0.013	0.0
FINAL CAMBER ↑	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/8"	1 1/16"	1 1/16"	1"	15/16"	7/8"	13/16"	3/4"	5/8"	9/16"	1/2"	3/8"	5/16"	3/16"	1/8"	0.0

0.6"Ø LOW RELAXATION	GIRDERS 2 & 3																				
FORTIETH POINTS	0	.025	.05	.075	.1	.125	.15	.175	.2	.225	.25	.275	.3	.325	.35	.375	.4	.425	.45	.475	.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.021	0.043	0.063	0.084	0.104	0.123	0.141	0.158	0.175	0.191	0.205	0.217	0.229	0.239	0.248	0.255	0.260	0.264	0.267	0.267
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.013	0.026	0.039	0.052	0.065	0.077	0.089	0.102	0.112	0.121	0.131	0.141	0.147	0.153	0.160	0.166	0.168	0.170	0.172	0.174
FINAL CAMBER ↑	0.0	1/8"	3/16"	5/16"	3/8"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"	15/16"	1"	1"	1 1/16"	1 1/16"	1 1/8"	1 1/8"	1 1/8"	1 1/8"

0.6"Ø LOW RELAXATION	GIRDERS 2 & 3																				
FORTIETH POINTS	.50	.525	.55	.575	.6	.625	.65	.675	.7	.725	.75	.775	.8	.825	.85	.875	.9	.925	.95	.975	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.267	0.267	0.264	0.259	0.255	0.248	0.239	0.229	0.217	0.205	0.191	0.175	0.159	0.141	0.123	0.104	0.084	0.063	0.043	0.021	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.174	0.172	0.170	0.168	0.166	0.160	0.153	0.147	0.141	0.131	0.121	0.112	0.102	0.089	0.077	0.065	0.052	0.039	0.026	0.013	0.0
FINAL CAMBER ↑	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/16"	1 1/16"	1"	1"	15/16"	7/8"	13/16"	3/4"	11/16"	5/8"	9/16"	1/2"	3/8"	5/16"	3/16"	1/8"	0.0

* INCLUDES FUTURE WEARING SURFACE.

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

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER DETAILS

PLANS PREPARED BY:

NV5

NV5 ENGINEERS & CONSULTANTS, INC.
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DocuSigned by: Matt Metzger
4/12/2022

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2				4			

SHEET NO. S1-18

TOTAL SHEETS 38

DRAWN BY : W. B. ALLEN DATE : 6/21
CHECKED BY : M. D. METZGER DATE : 8/21
DESIGN ENGINEER OF RECORD: M. D. METZGER DATE : 1/22

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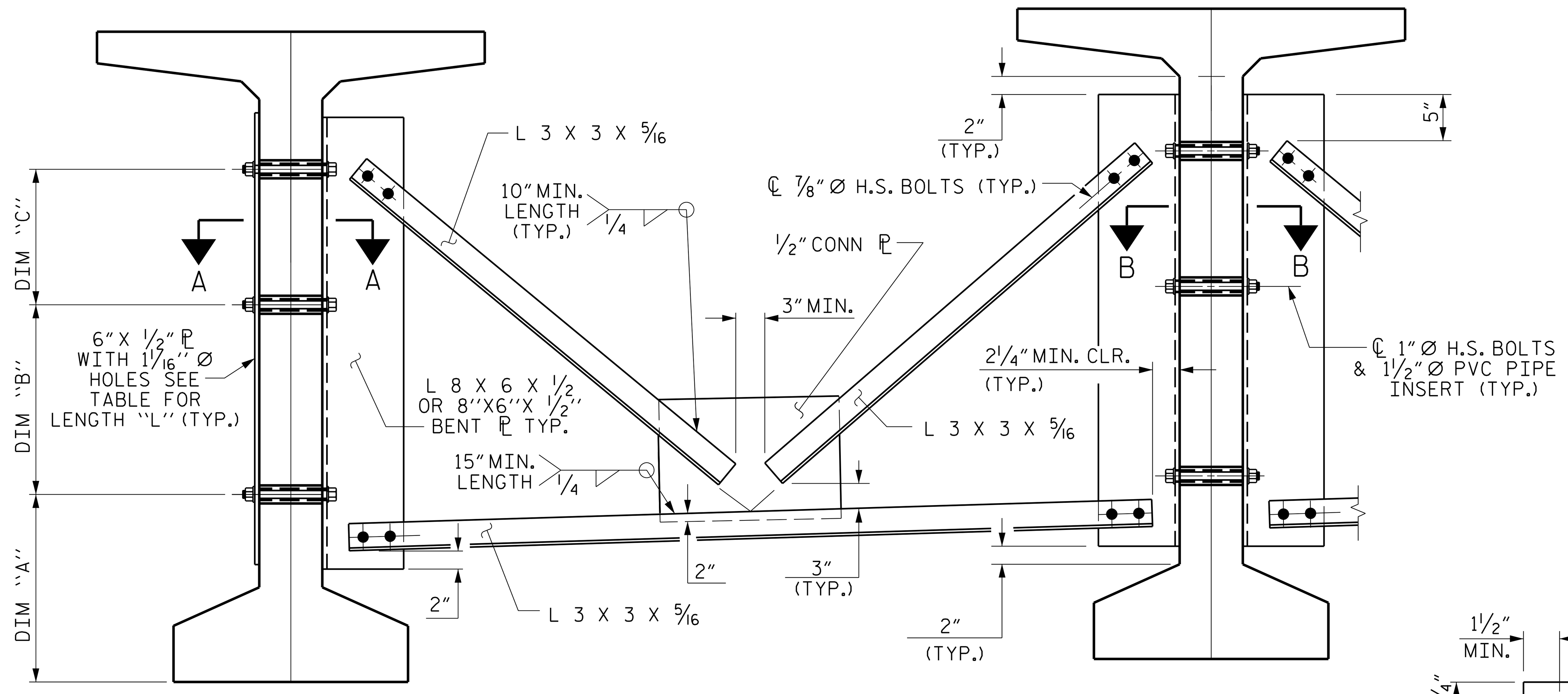
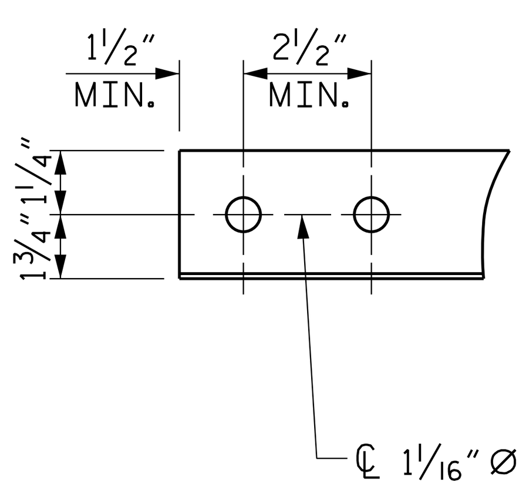


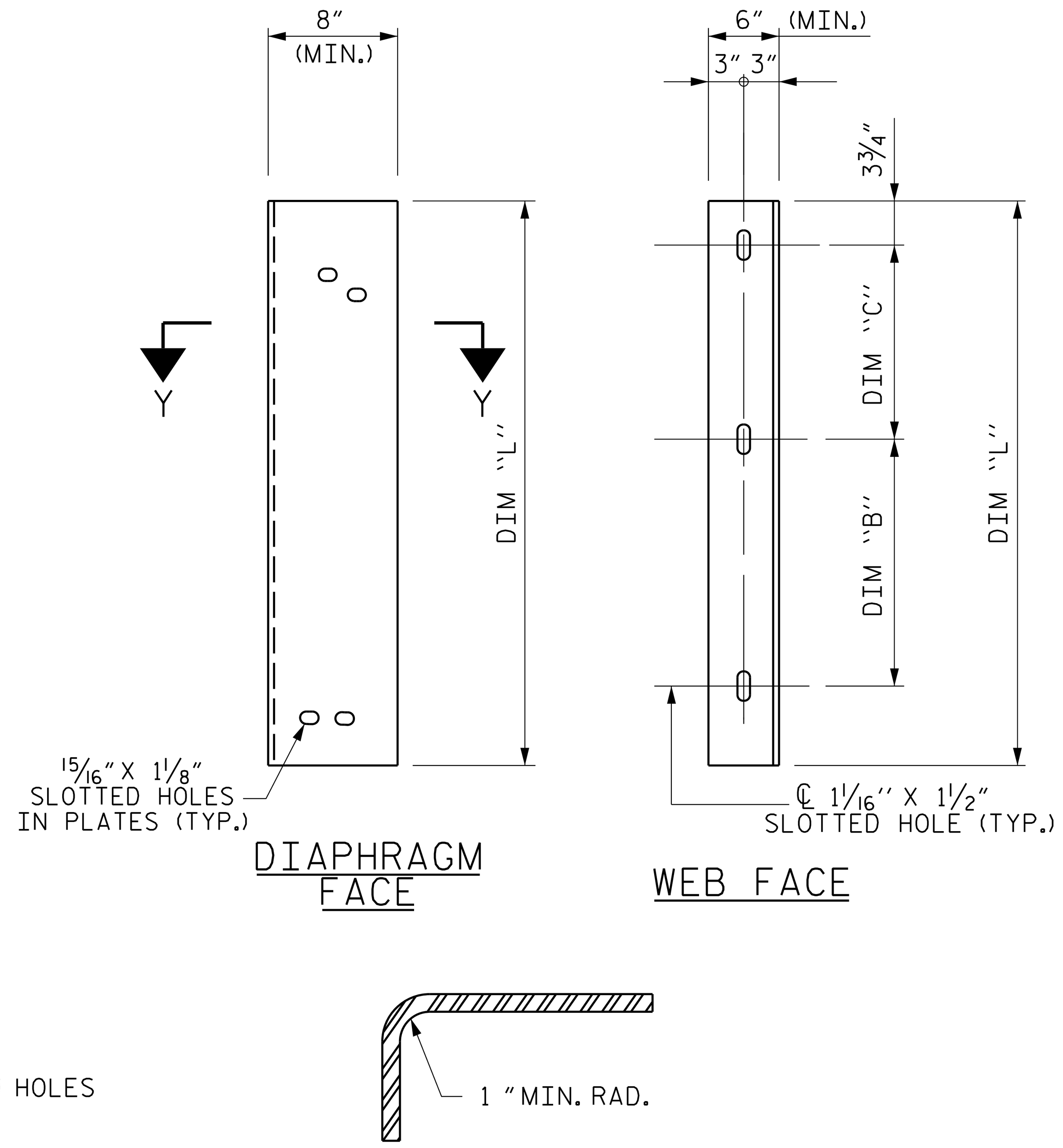
PART SECTION AT INTERMEDIATE DIAPHRAGM

(72" BULB TEE GIRDER SHOWN)



ANGLE END

(L 3 X 3 X 5/16)



CONNECTOR PLATE 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 ANGLE 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 1/4 TURN.

THE PLATES, BENT PLATES, 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 1/4" PROJECTION BEYOND THE NUT.

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

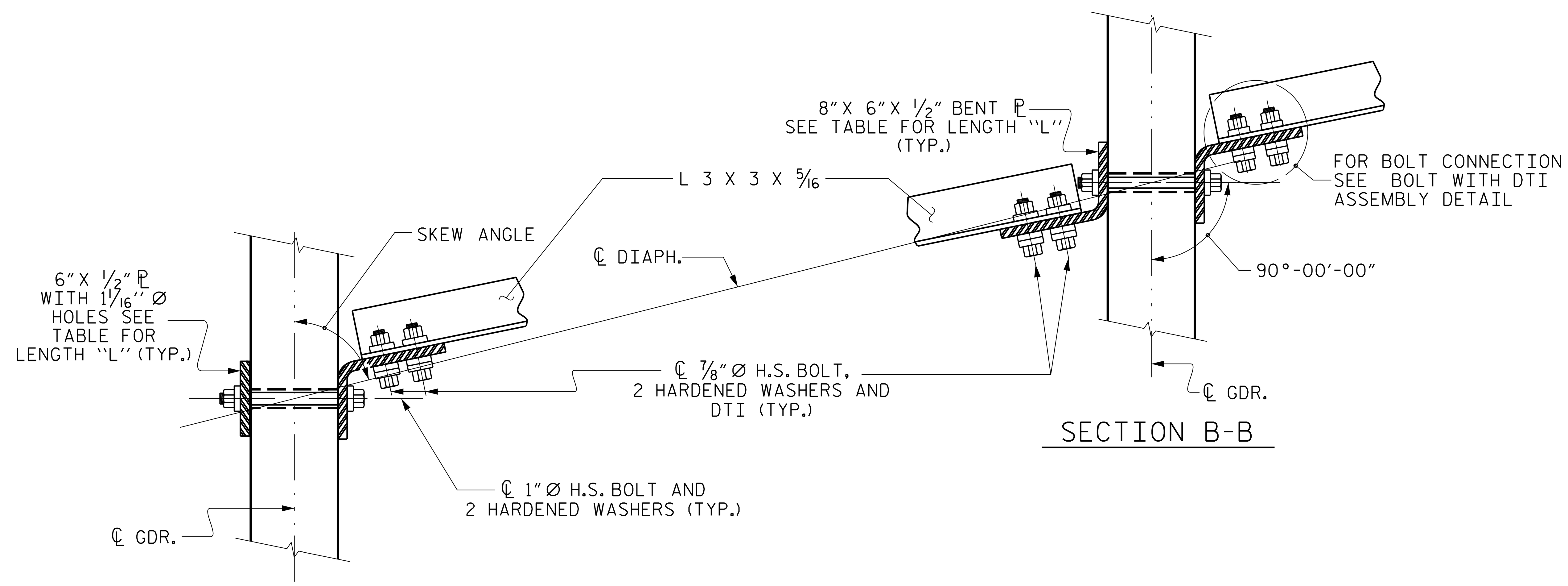
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

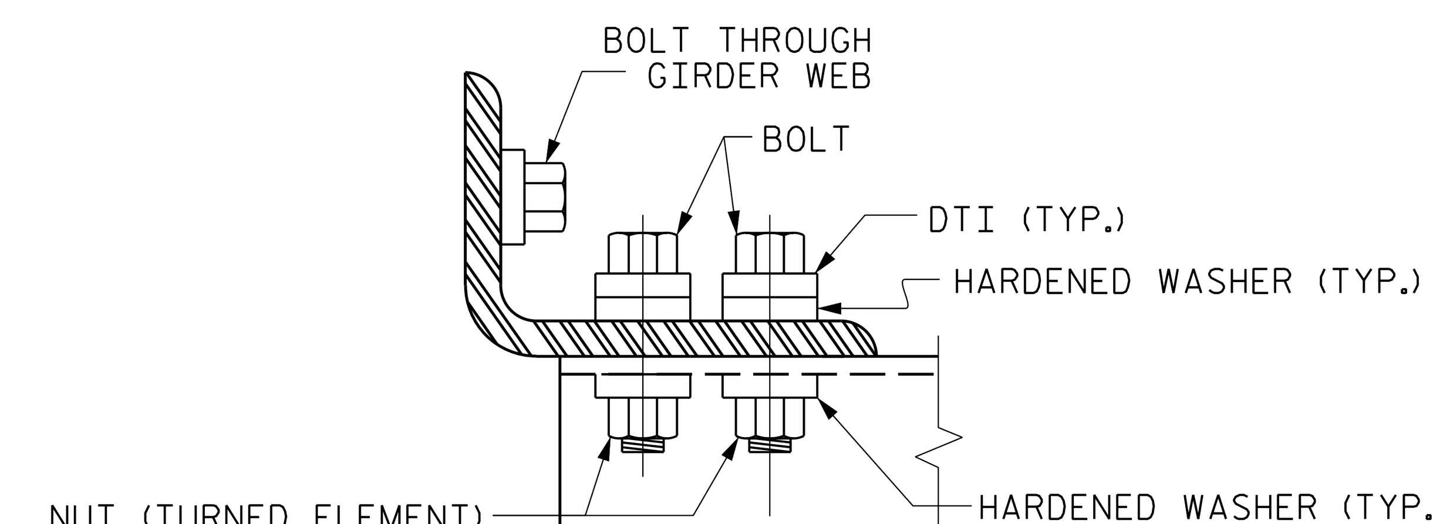
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-8"	1'-9"	1'-3"	4'-2"



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

PLANS PREPARED BY:

NV5

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4/12/2022

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STD. NO. PCG11

ASSEMBLED BY : W. B. ALLEN	DATE : 6/21	
CHECKED BY : M. D. METZGER	DATE : 8/21	
DRAWN BY : RWW 11/09	REV. 10/1/11	MAA/GM
CHECKED BY : GM 11/09	REV. 12/17	MAA/THC

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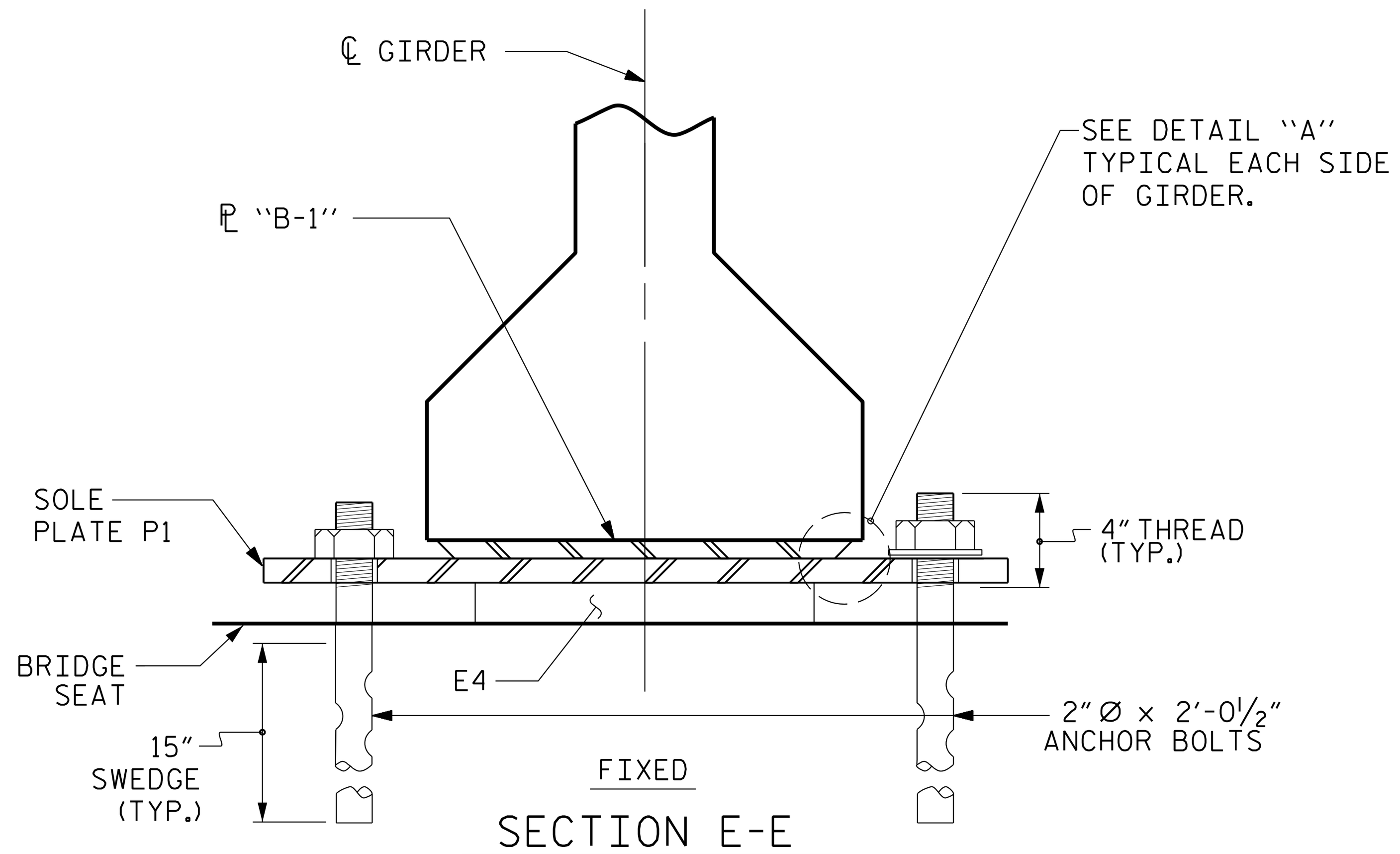
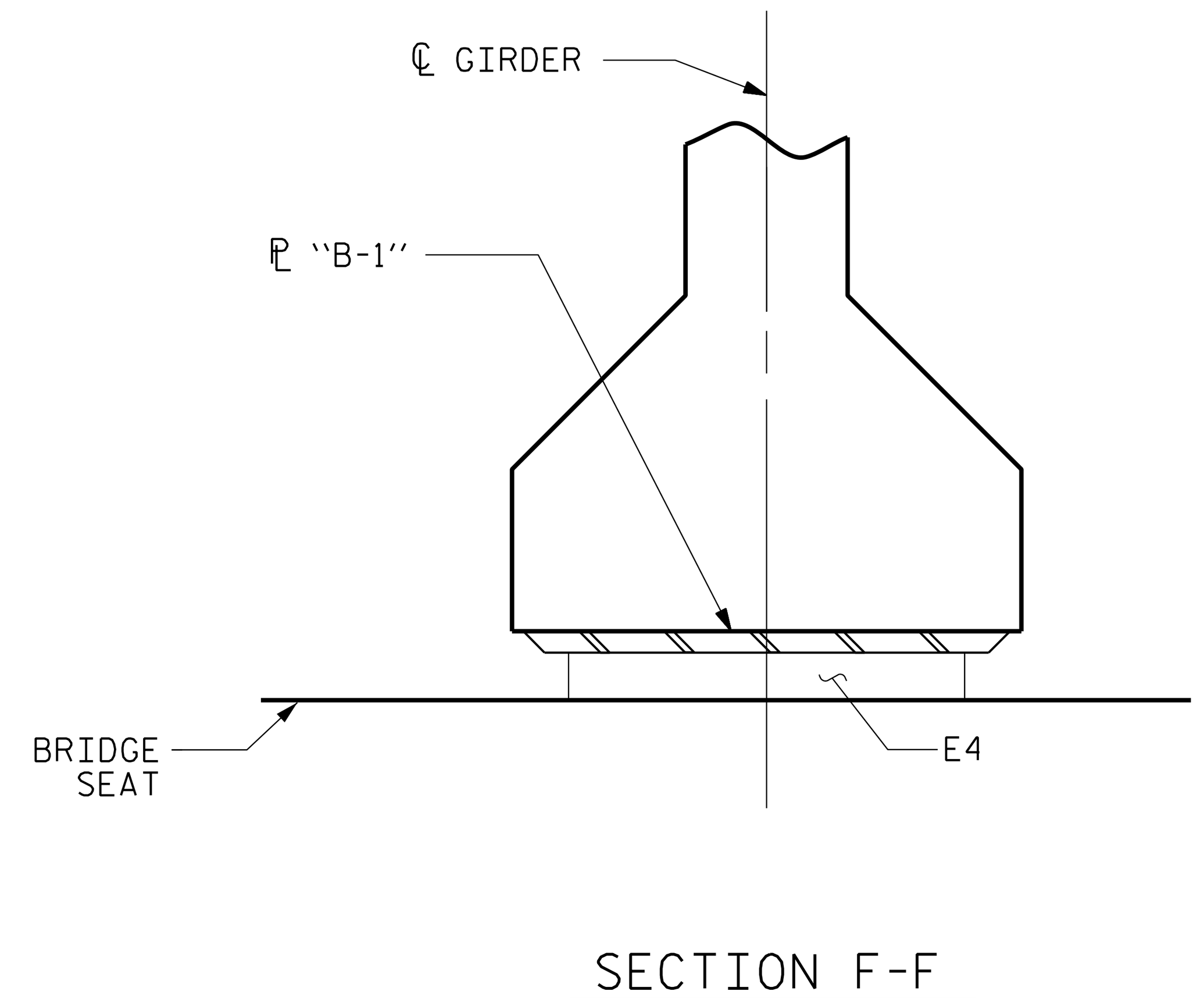
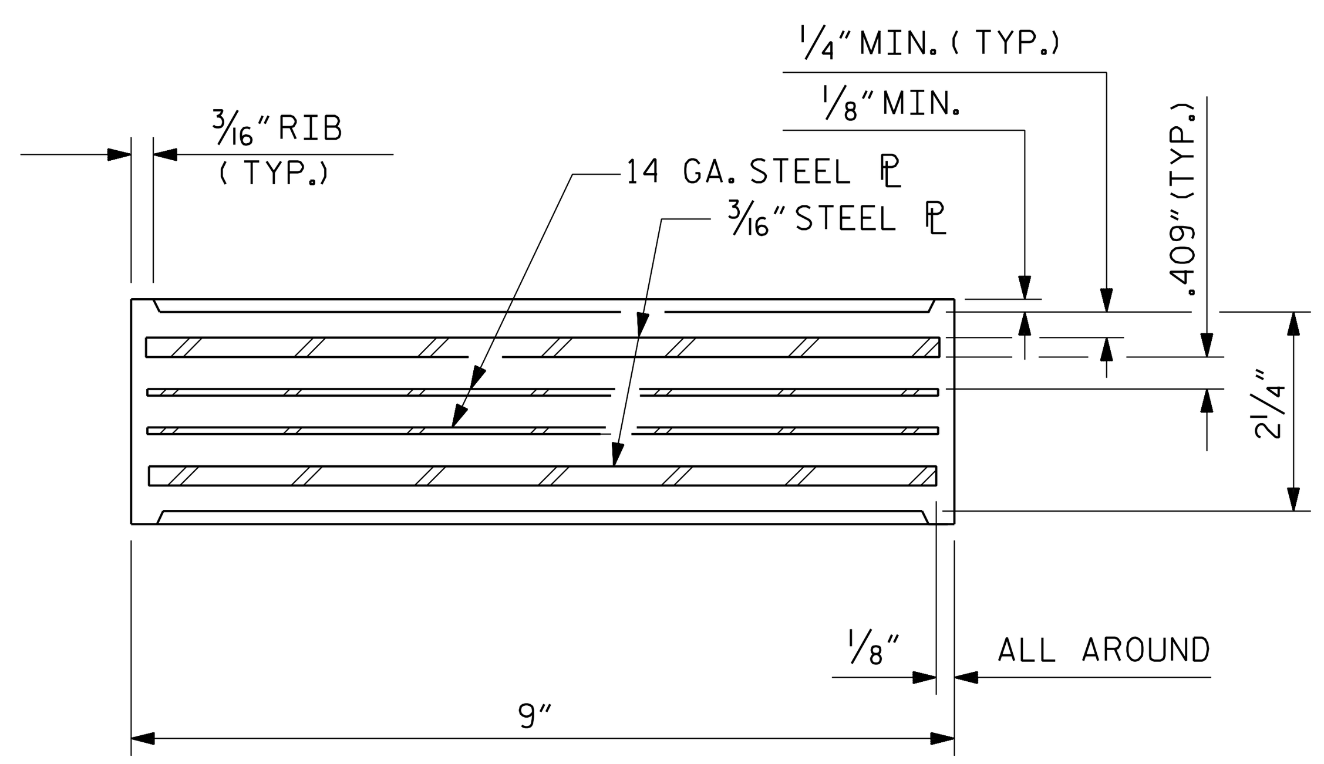


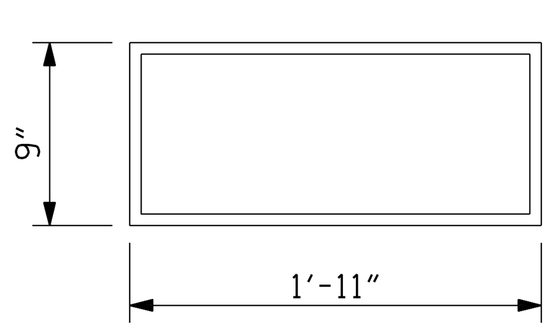
SECTION E-E



SECTION F-F



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (24 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

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

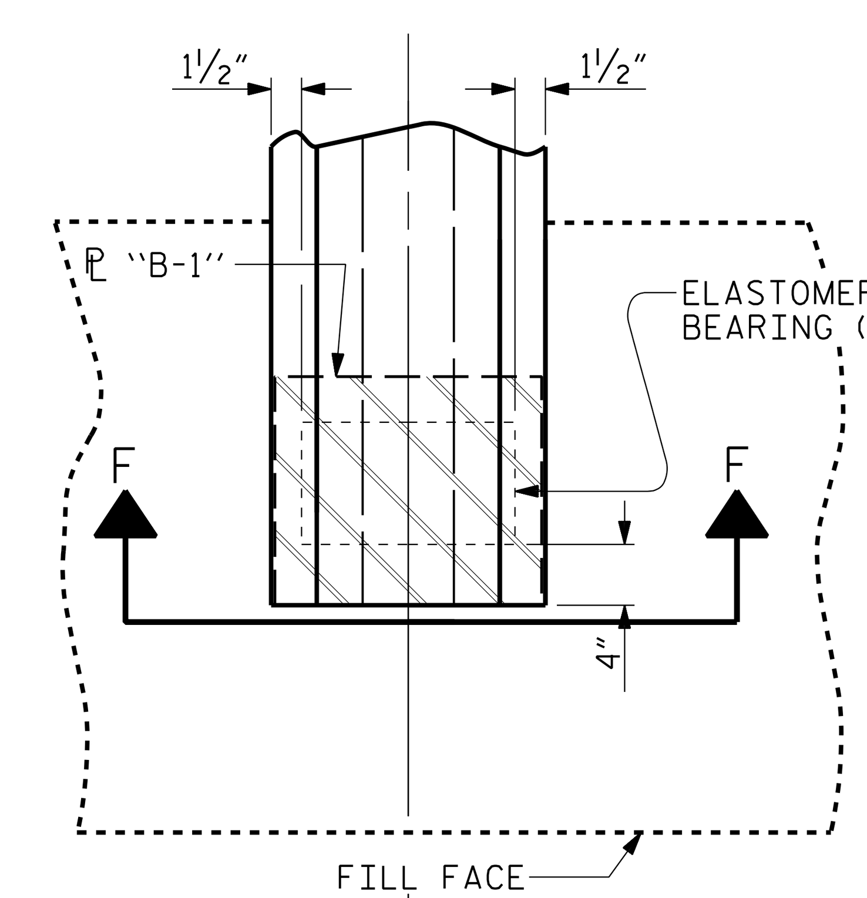
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

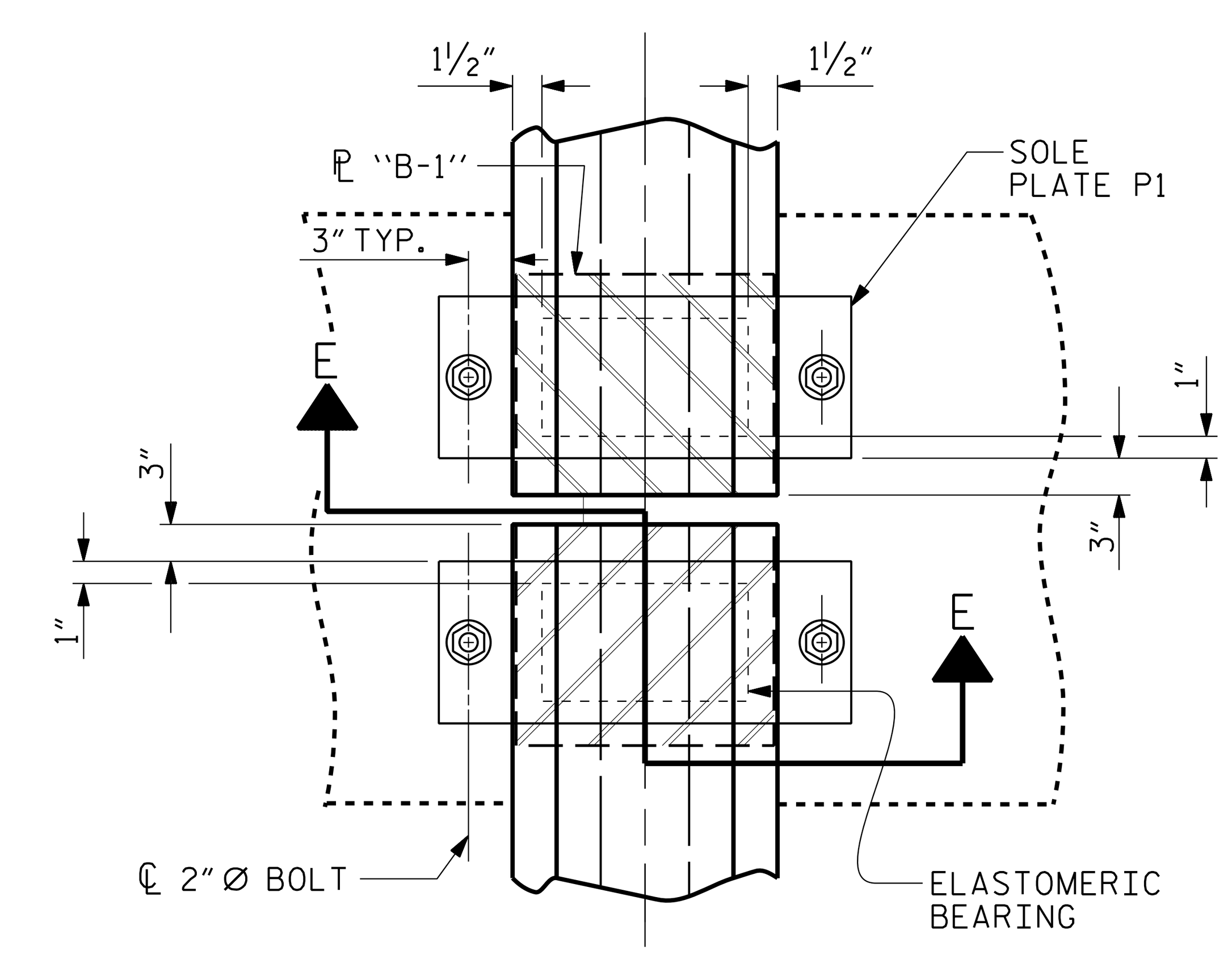
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



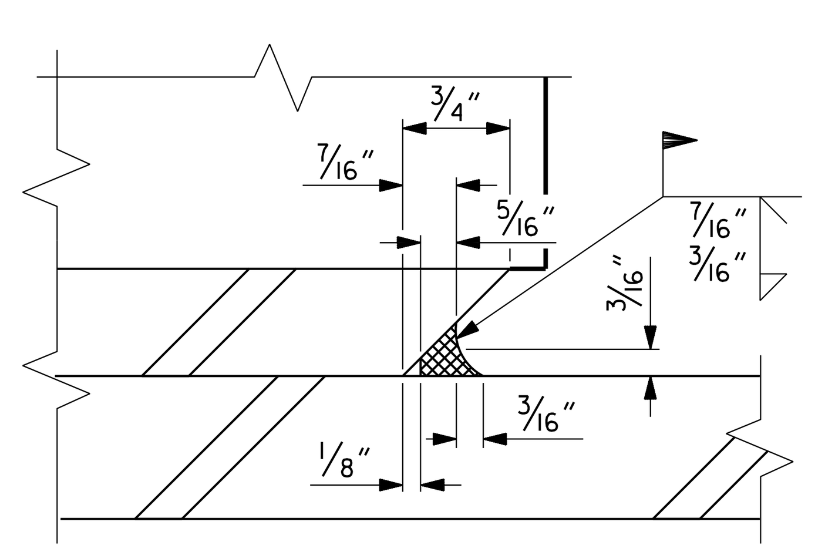
TYPICAL HALF-PLAN
(SHOWING INTEGRAL END BENT)



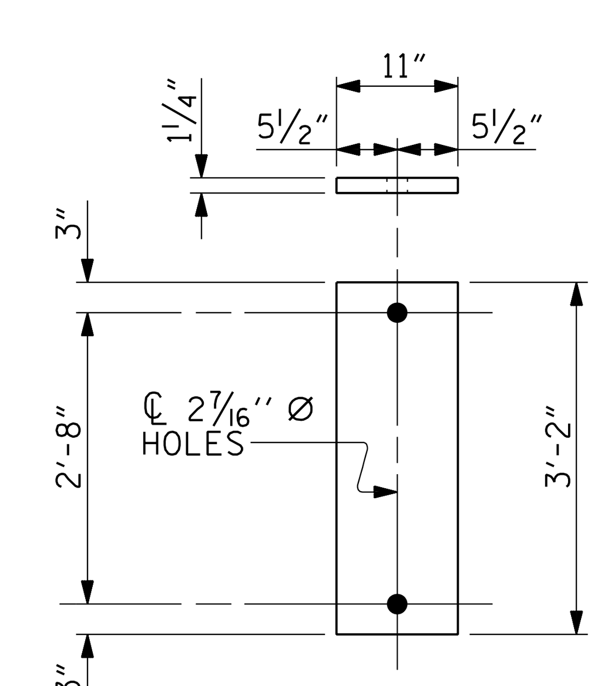
TYPICAL HALF-PLAN
(SHOWING CONTINUOUS BENT)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

PROJECT NO. R-5819
COLUMBUS COUNTY
STATION: 40+06.72 -Y2- POT



DETAIL "A"



P1
(FIXED)
P1 (16 REQ'D)

SOLE PLATE DETAILS ("P")

PLANS PREPARED BY:
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER
4/12/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

ASSEMBLED BY : W. B. ALLEN	DATE : 6/21
CHECKED BY : M. D. METZGER	DATE : 8/21

DRAWN BY : EEM 2/97	REV. 1/15	MAA/TMG
CHECKED BY : VAP 2/97	REV. 12/17	MAA/THC
	REV. 10/21	BNB/AAI

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PLAN OF BARRIER RAIL

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

PLANS PREPARED BY:
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4/12/2022

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2			4				

DRAWN BY :	W. B. ALLEN	DATE :	6/21
CHECKED BY :	M. D. METZGER	DATE :	8/21
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	1/22

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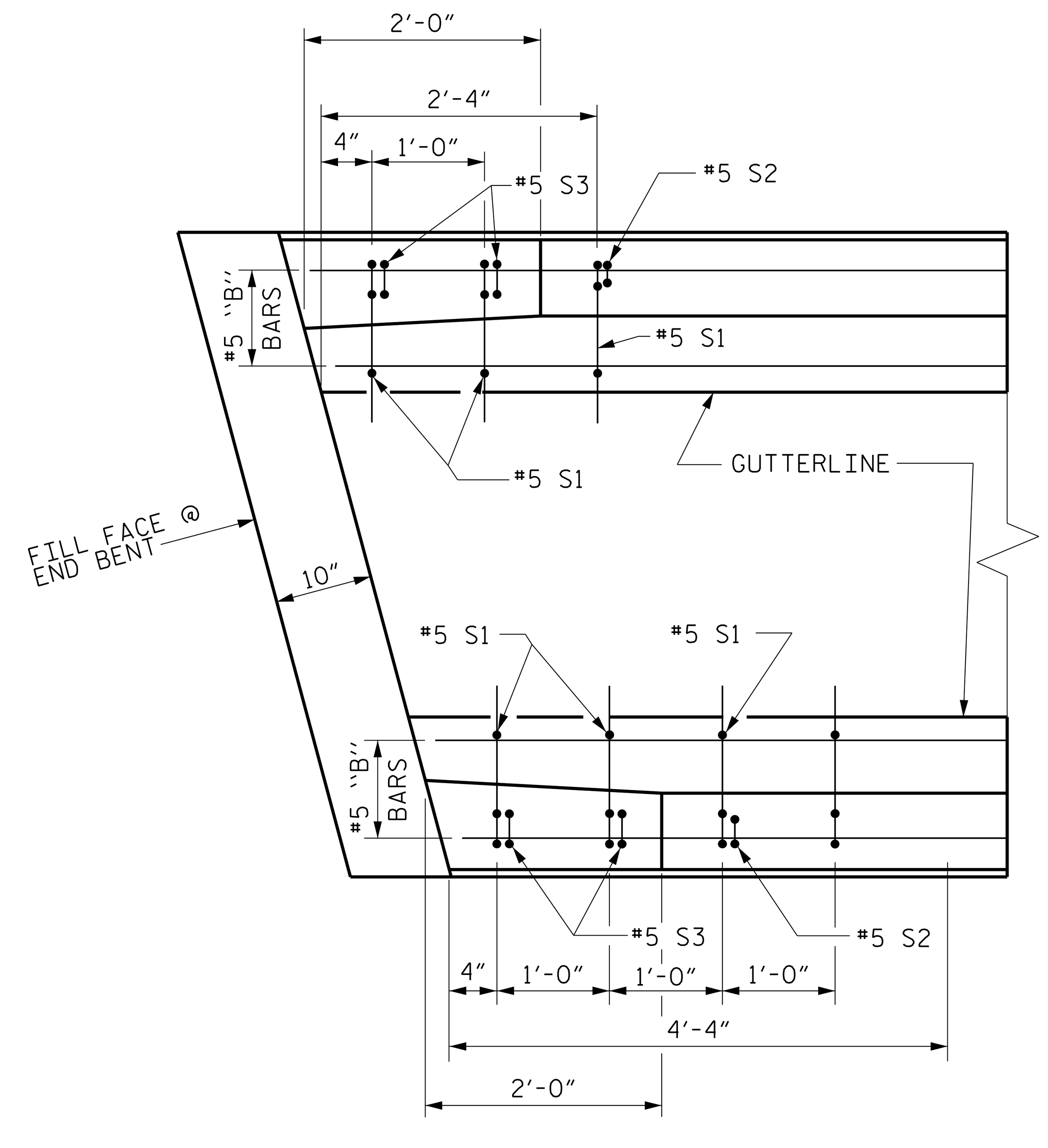
NOTES

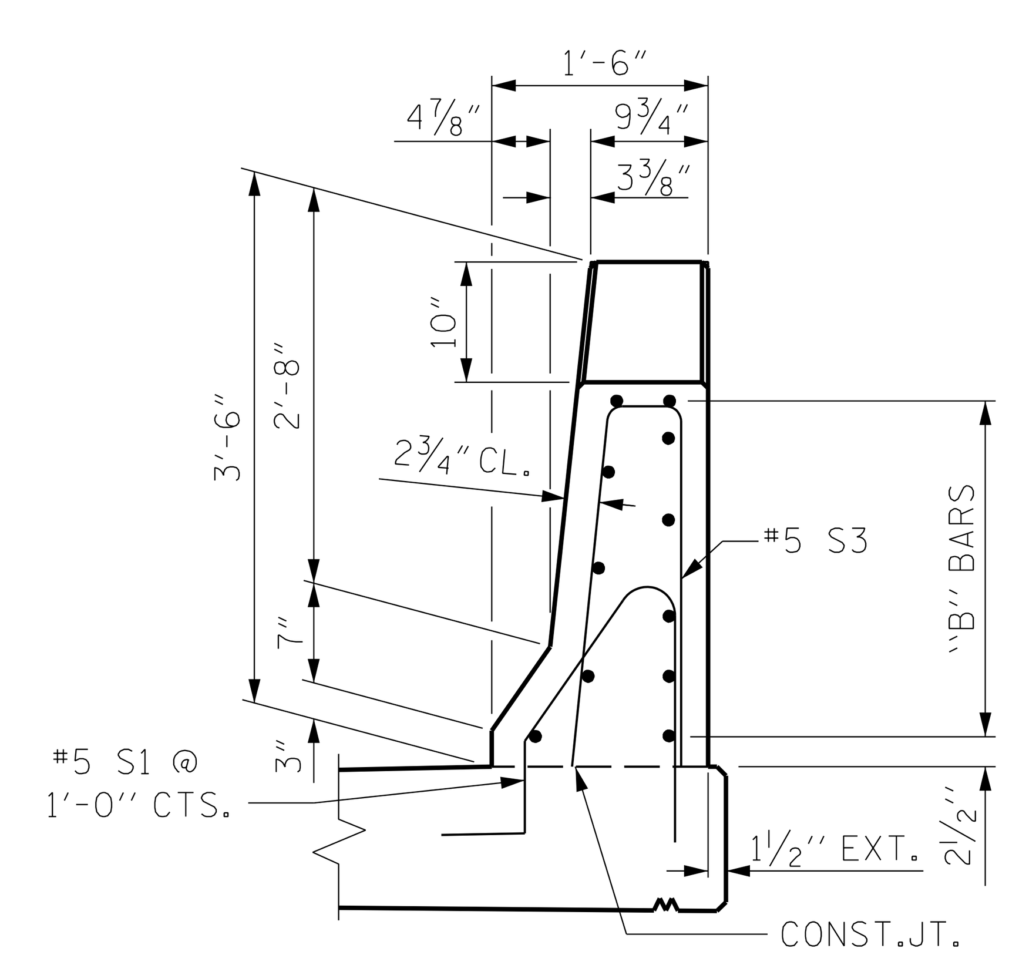
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

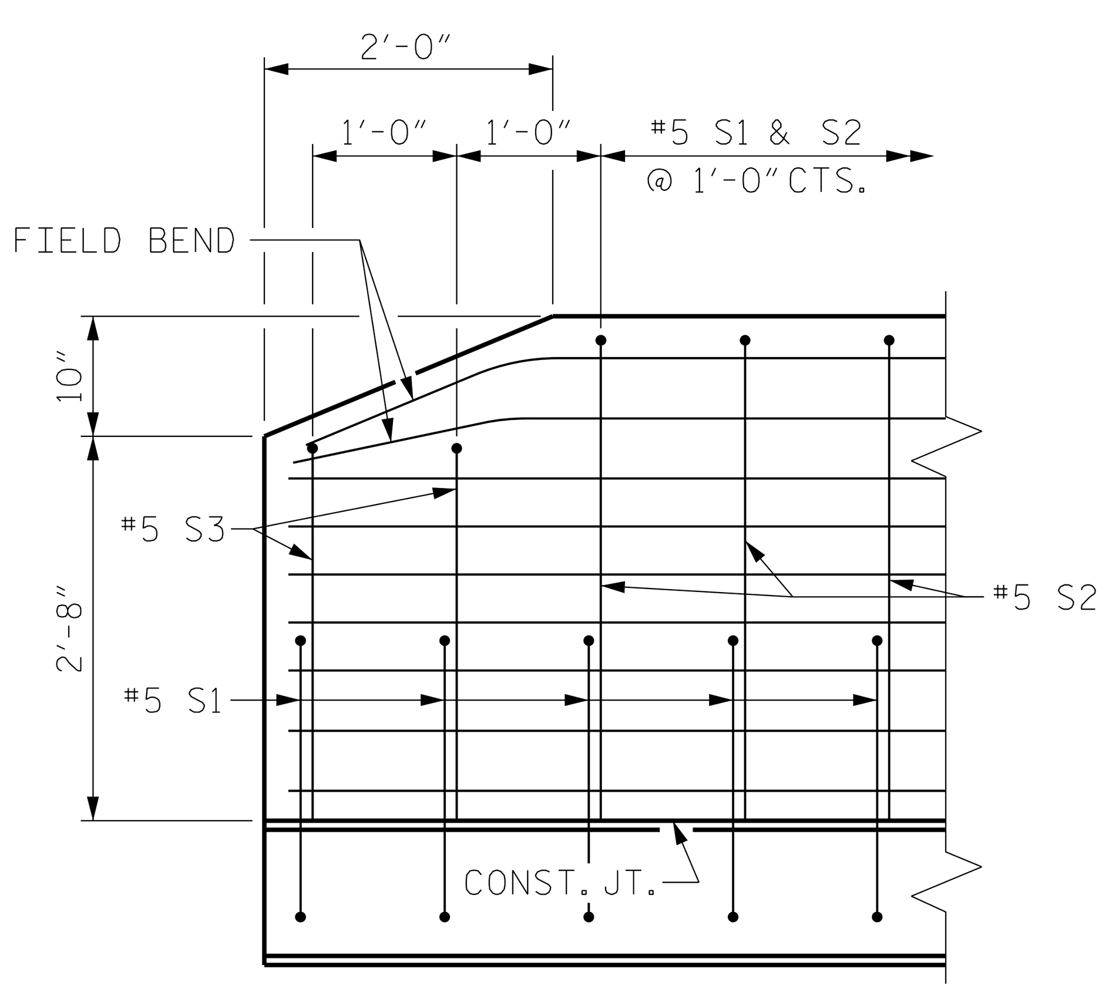
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED 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.



PLAN



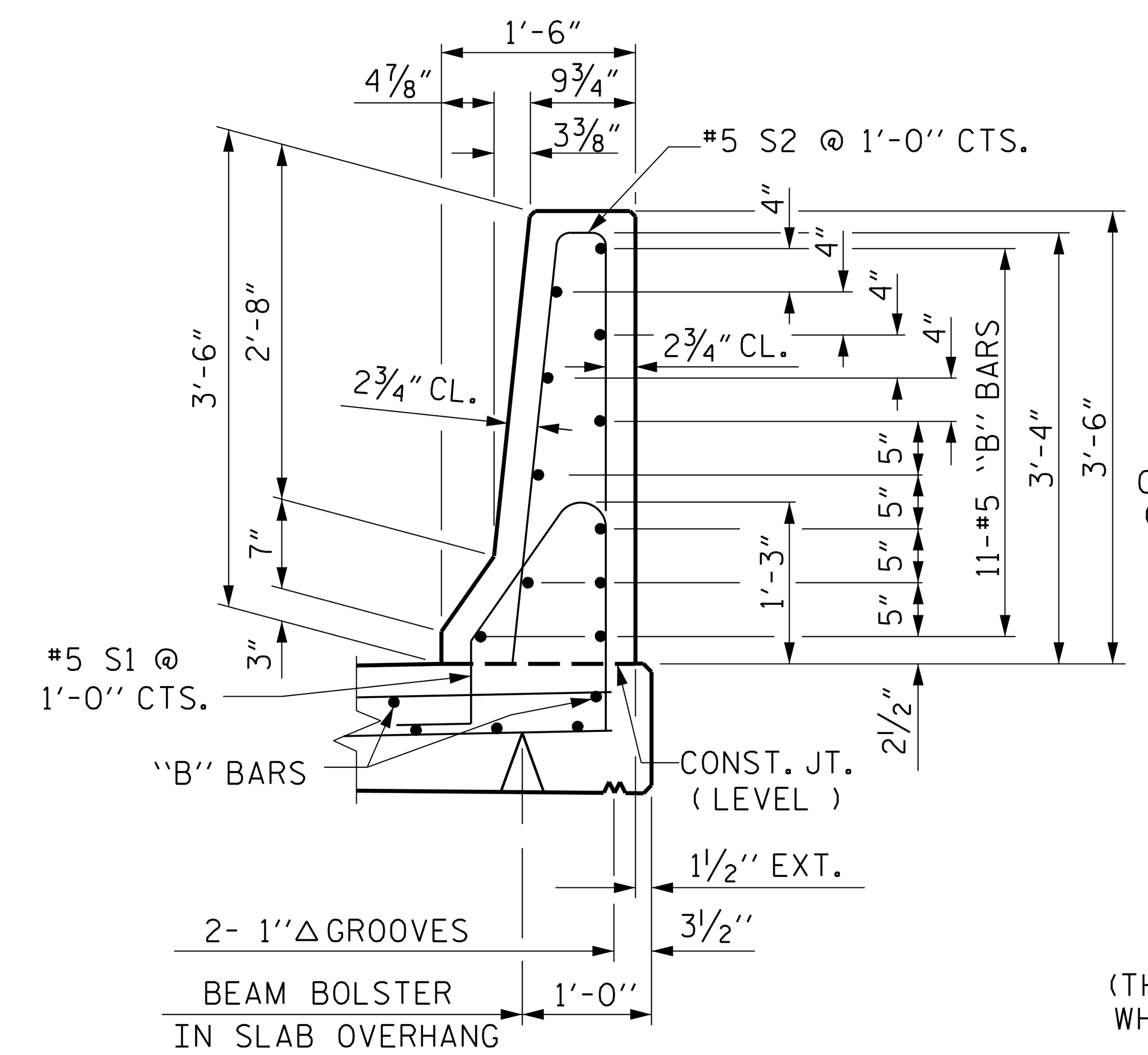
END VIEW



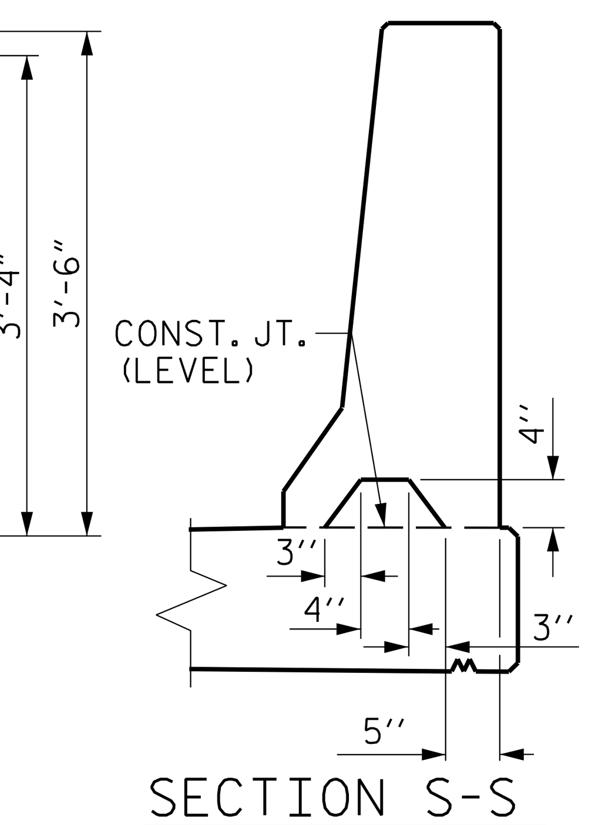
SIDE VIEW

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

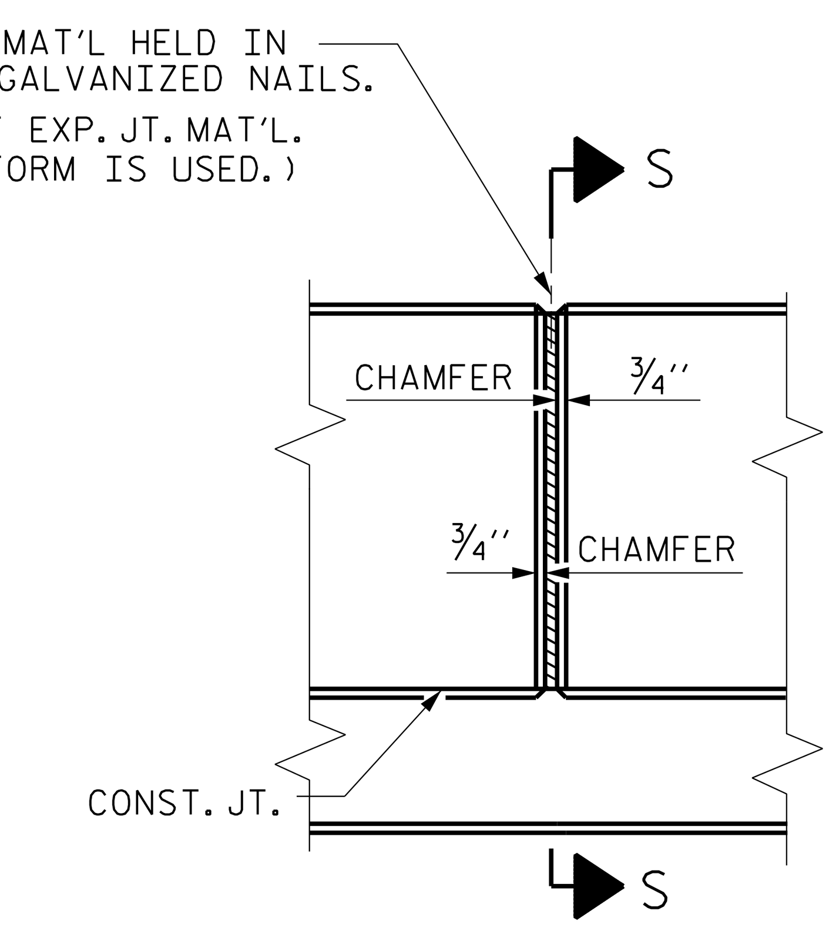


SECTION THRU RAIL



SECTION S-S

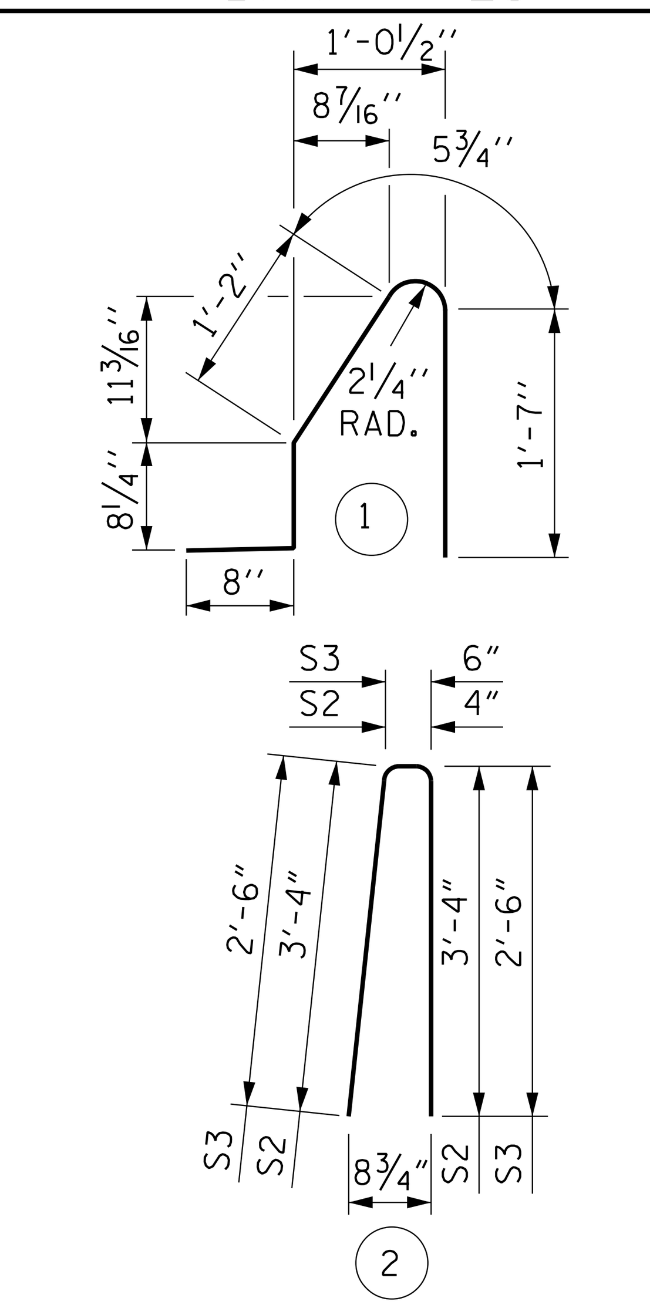
AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	88	#5	STR	27'-9"	2547
* B2	88	#5	STR	27'-8"	2539
* B3	66	#5	STR	28'-11"	1991
* B4	22	#5	STR	29'-0"	665
* S1	712	#5	1	4'-7"	3404
* S2	704	#5	2	7'-0"	5140
* S3	8	#5	2	5'-6"	46

* EPOXY COATED REINFORCING STEEL	16332 LBS.
CLASS AA CONCRETE	92.9 CU. YDS.
CONCRETE BARRIER RAIL	684.33 LIN. FT.

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

PLANS PREPARED BY:

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4/12/2022

ASSEMBLED BY : W. B. ALLEN	DATE : 6/21
CHECKED BY : M. D. METZGER	DATE : 8/21

DRAWN BY : ARB 5/87	REV. 7/12	MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

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STD. NO. CBR1

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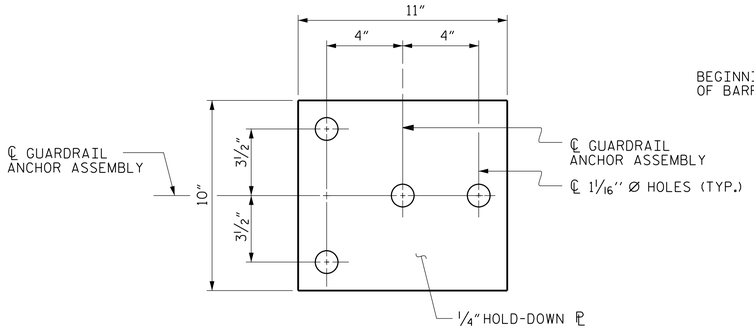
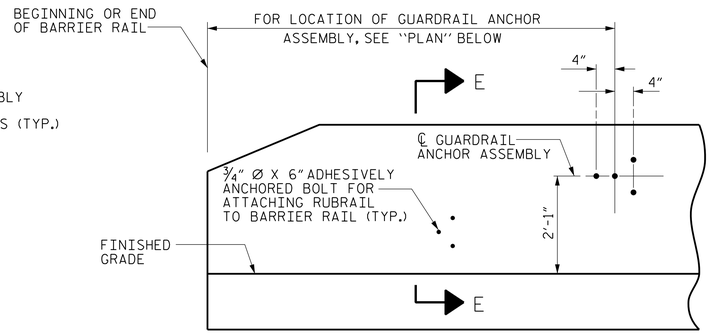


PLAN



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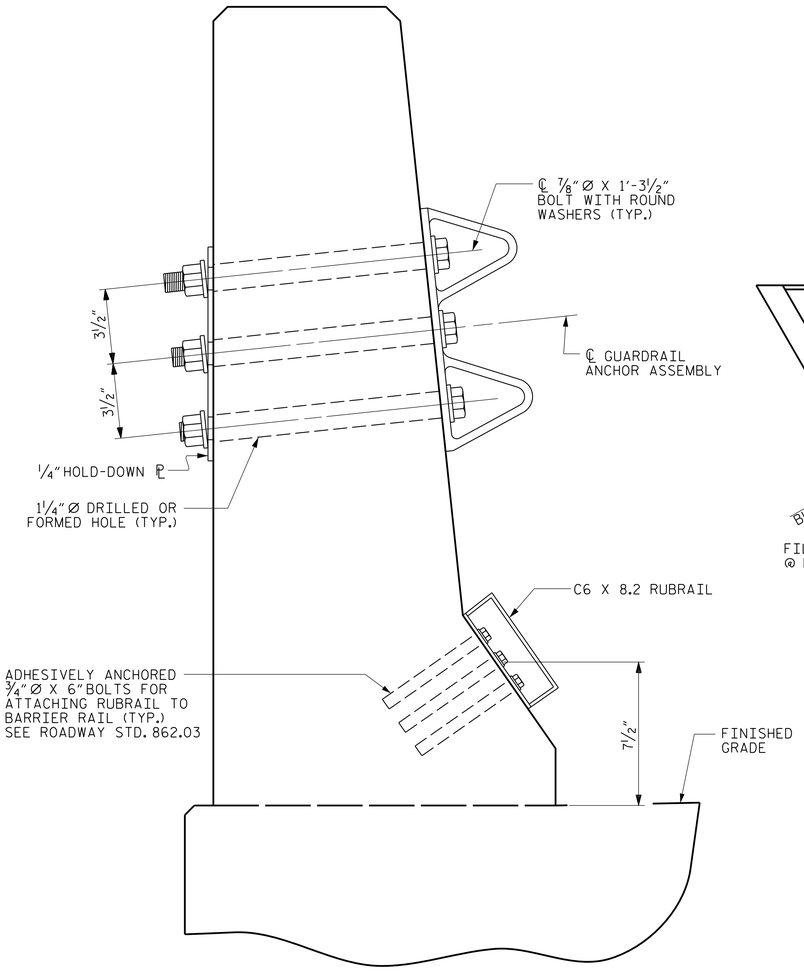
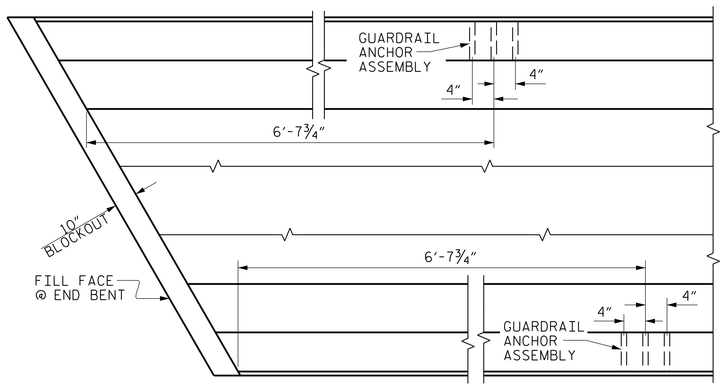


SECTION E-E

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 1/4" HOLD-DOWN PLATE AND 4 - 7/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

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

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

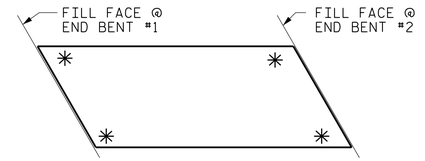
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

ASSEMBLED BY : W. B. ALLEN	DATE : 6/21		
CHECKED BY : M. D. METZGER	DATE : 8/21		
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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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 45266 MATTHEW DAVID METZGER

Docusigned by: Matt Metzger

4/12/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS
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STD. NO. GRA2

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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

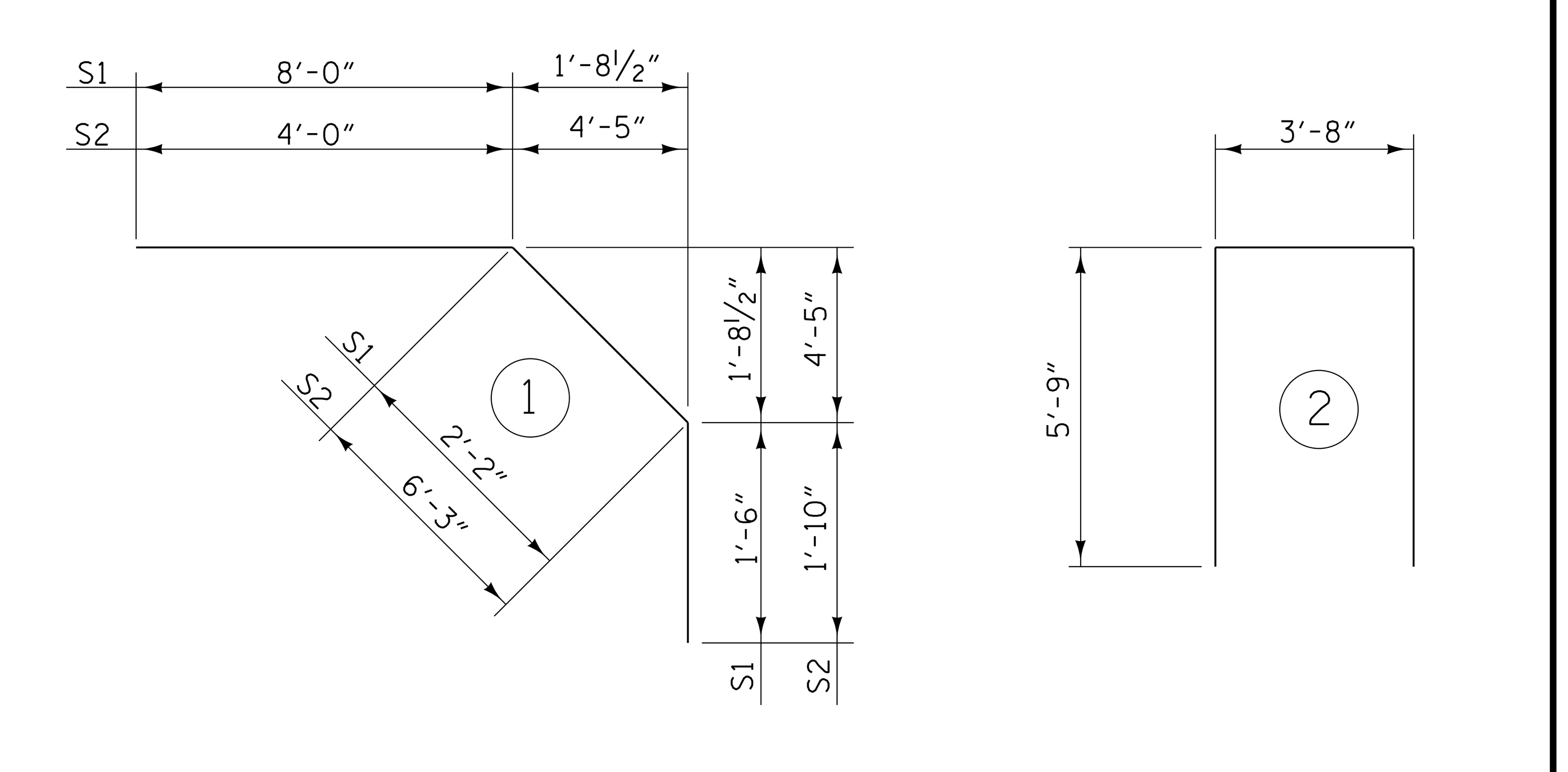
APPROACH SLABS	976	SQ. FT.
BRIDGE DECK	11520	SQ. FT.
TOTAL	12496	SQ. FT.

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	585	#5	STR	39′-7″	24152
A2	585	#5	STR	39′-7″	24152
*A101	2	#5	STR	20′-3″	42
A201	2	#5	STR	20′-3″	42
B1	60	#5	STR	41′-9″	2613
B2	50	#5	STR	24′-0″	1252
B3	30	#5	STR	8′-0″	250
B4	60	#5	STR	60′-0″	3755
B5	25	#5	STR	54′-10″	1430
* B6	58	#4	STR	39′-5″	1527
* B7	156	#5	STR	24′-0″	3905
* B8	29	#5	STR	19′-7″	592
* B9	54	#5	STR	60′-0″	3379
* B10	52	#5	STR	43′-7″	2364
* B11	52	#5	STR	44′-4″	2404
B12	30	#5	STR	50′-1″	1567
B13	60	#5	STR	43′-7″	2727
* B14	29	#4	STR	39′-7″	767
* B15	87	#4	STR	28′-3″	1642
B16	25	#5	STR	55′-9″	1454
B17	30	#5	STR	9′-2″	287
* B18	29	#5	STR	21′-1″	638
K1	14	#4	STR	39′-7″	370
K2	6	#4	STR	7′-11″	32
K3	30	#4	STR	9′-6″	190
K4	6	#4	STR	6′-6″	26
K5	4	#4	STR	2′-11″	8
K6	20	#4	STR	3′-8″	49
K7	4	#4	STR	2′-2″	6
* S1	50	#4	1	11′-8″	390
* S2	50	#4	1	12′-1″	404
U1	54	#4	2	15′-2″	547

REINFORCING STEEL	LBS.	40757
EPOXY COATED REINFORCING STEEL	LBS.	42206

BAR TYPES

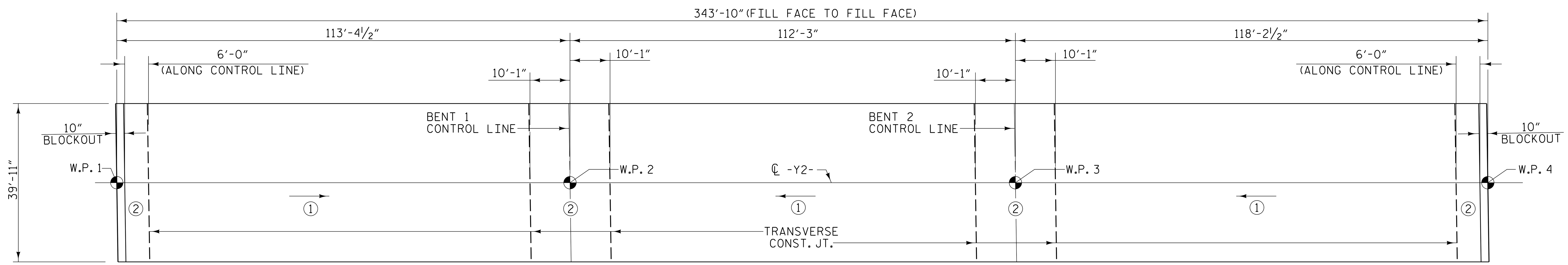


ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	* EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	376.4		
POUR 2	133.1		
** TOTALS	509.5	40757	42206

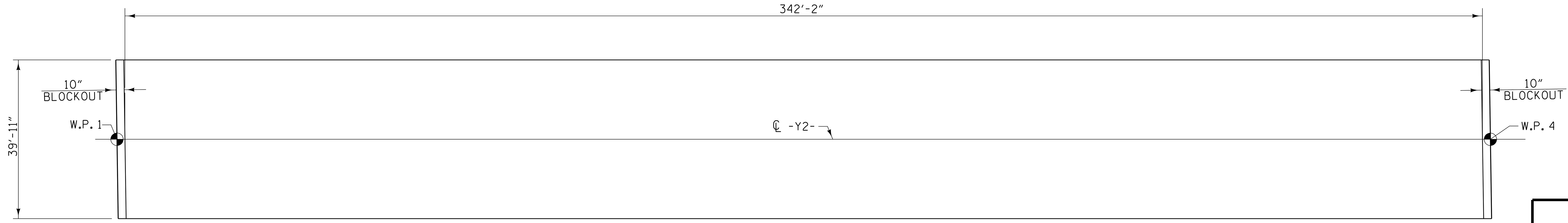
* INDICATES EPOXY COATED REINFORCING STEEL
** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED



POURING SEQUENCE SKETCH

(#) INDICATES POUR SEQUENCE NUMBER

NOTE: POUR 2 CANNOT BE STARTED UNTIL BOTH ADJACENT POURS REACH MINIMUM OF 3000 PSI



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(TOTAL SQ. FT. = 13658)

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PROJECT NO. R-5819
COLUMBUS COUNTY
STATION: 40+06.72 -Y2- POT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

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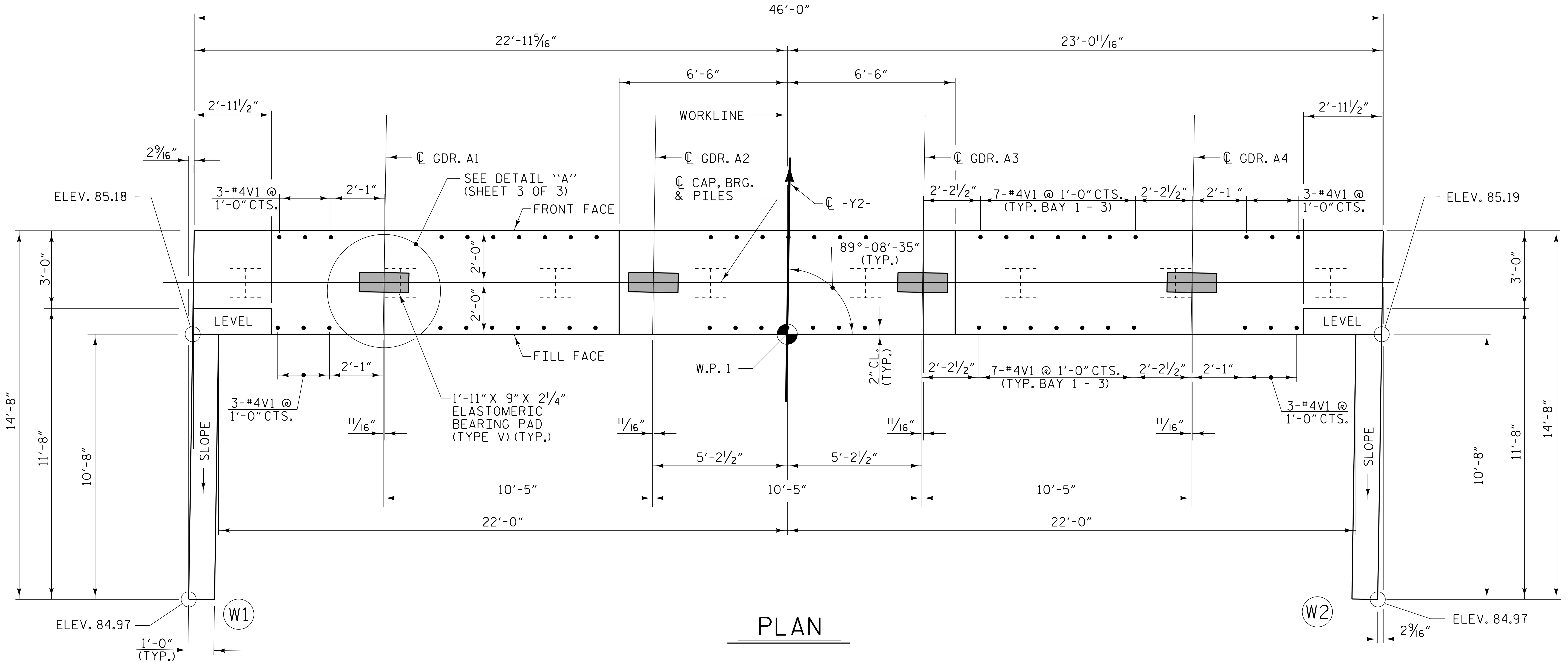

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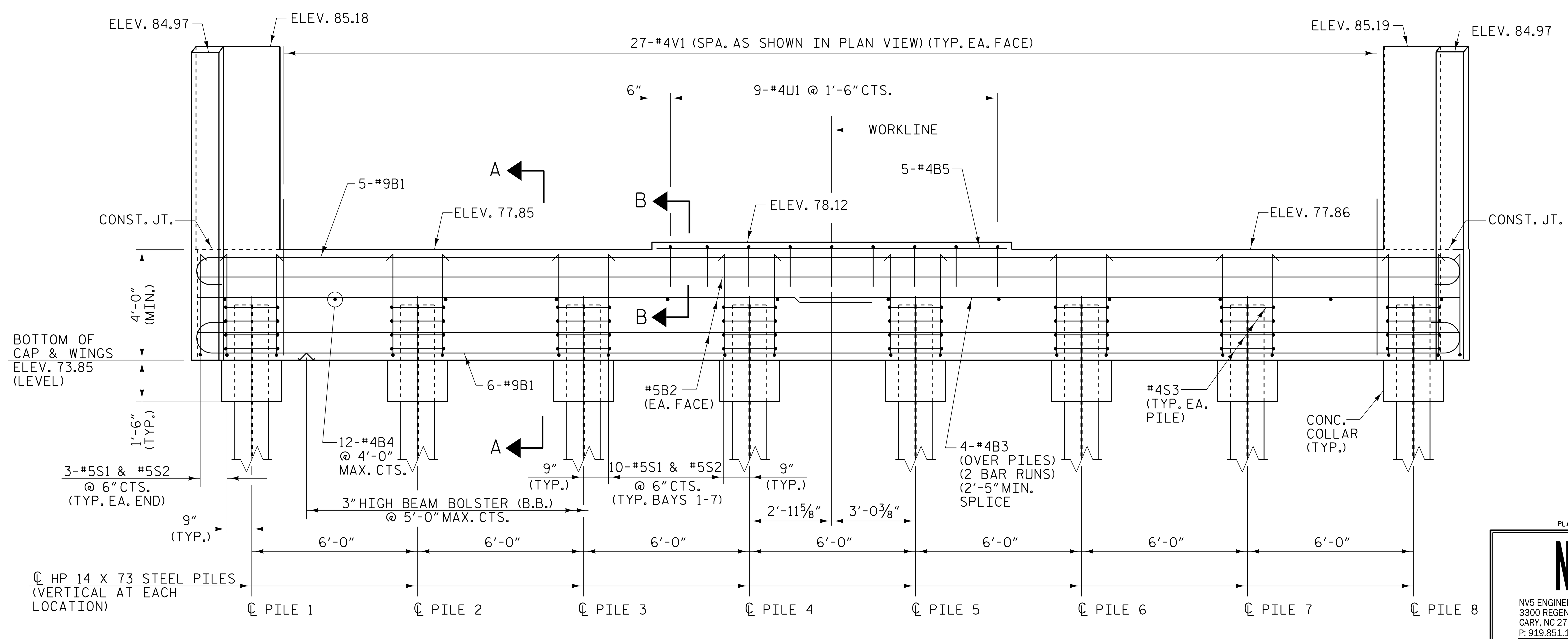

ELEVATION

NOTES

#4V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN THE CAP.

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

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

SEE "GENERAL DRAWING FOUNDATION LAYOUT" FOR ADDITIONAL NOTES FOR DRIVING PILES.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL SEE "INTEGRAL END BENT 1" SHEET 3 OF 3.

FOR PILE SPLICE DETAILS, SEE "INTEGRAL END BENT 2" SHEET 3 OF 3.

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

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STATION: 40+06.72 -Y2- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
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SUBSTRUCTURE

INTEGRAL END BENT 1
WING DETAILS

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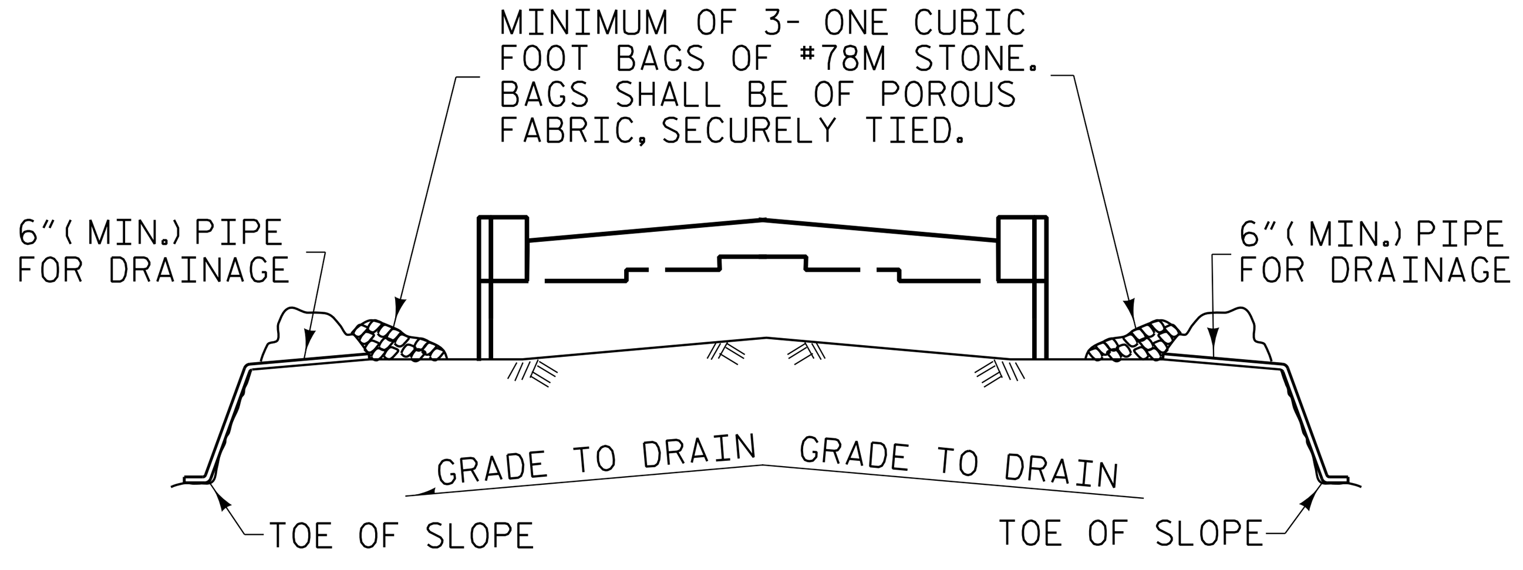
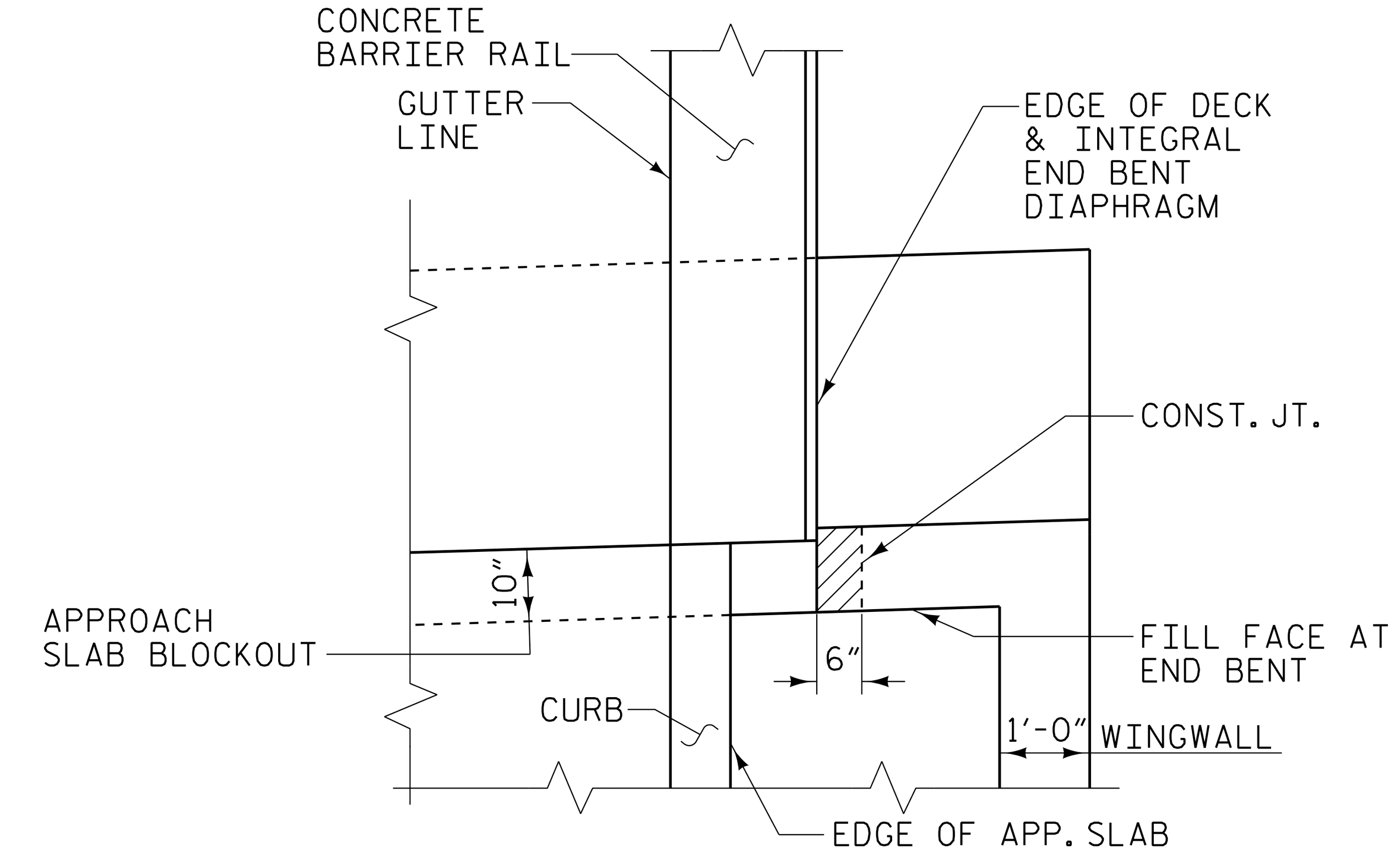


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

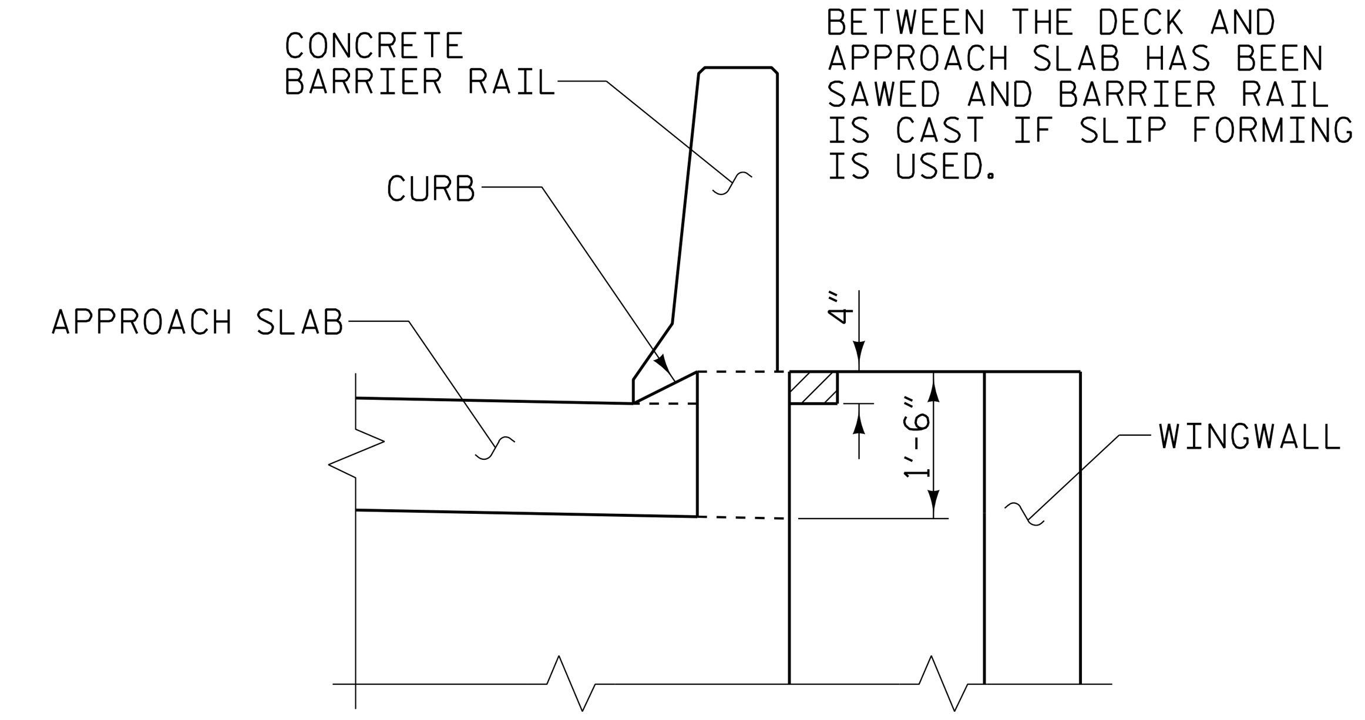
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

TEMPORARY DRAINAGE AT END BENT



PLAN



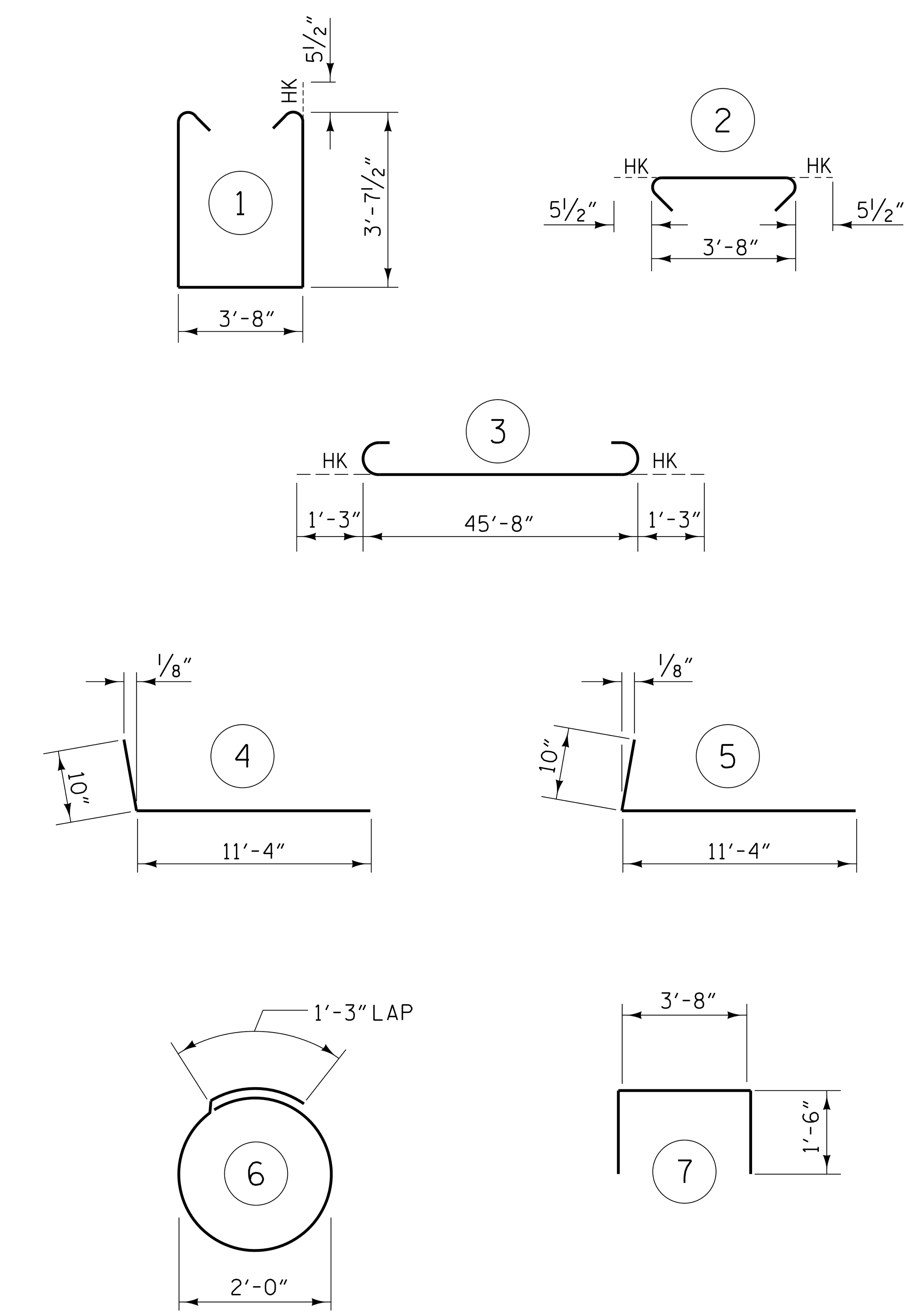
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

ELEVATION

WINGWALL BLOCKOUT

(RIGHT WINGWALL SHOWN, LEFT WINGWALL SIMILAR)

BAR TYPES



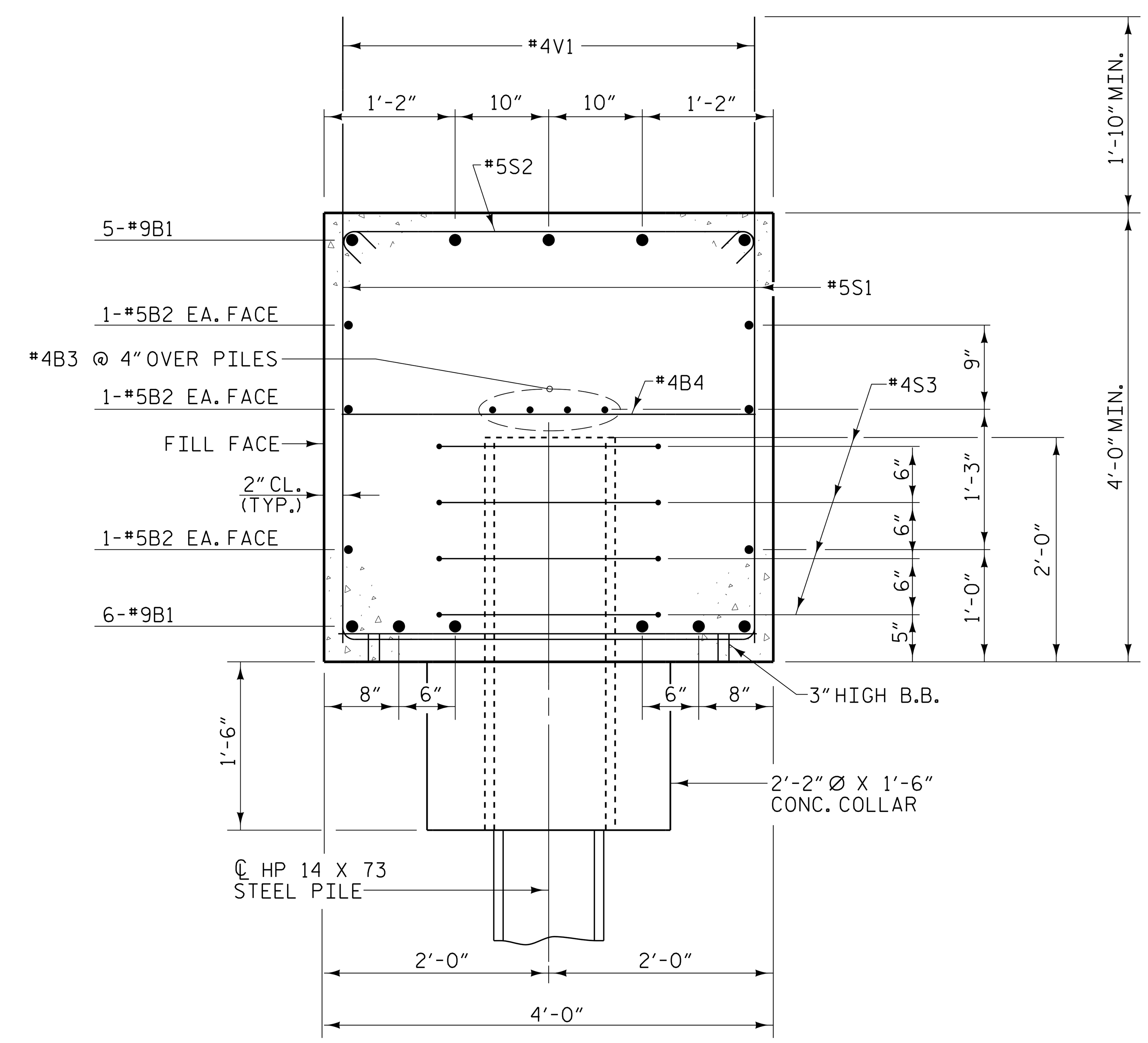
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

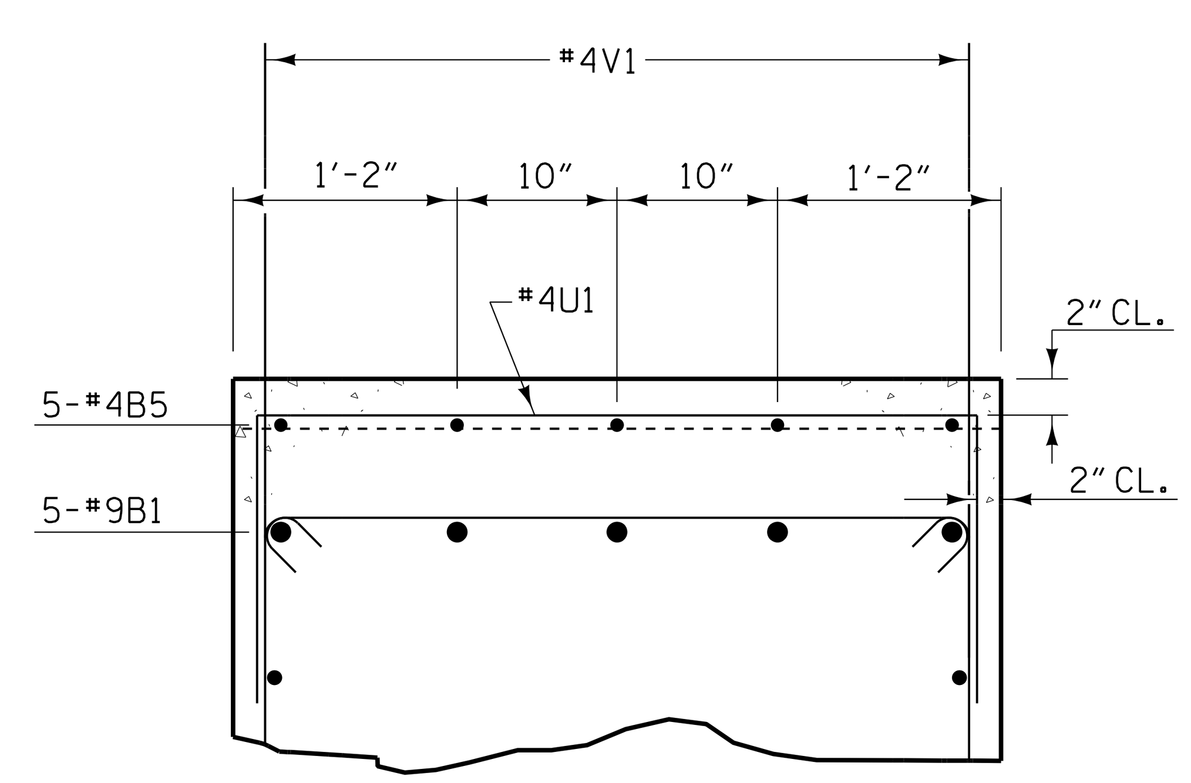
END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	11	#9	3	48'-2"	1801
B2	6	#5	STR	45'-8"	286
B3	8	#4	STR	24'-1"	129
B4	12	#4	STR	3'-8"	29
B5	5	#4	STR	12'-8"	42
H1	32	#5	STR	14'-4"	478
H2	28	#5	4	12'-2"	355
H3	56	#5	STR	2'-7"	151
H4	28	#5	5	12'-2"	355
S1	76	#5	1	11'-10"	938
S2	76	#5	2	4'-7"	363
S3	32	#4	6	7'-7"	162
U1	9	#4	7	6'-8"	40
V1	54	#4	STR	6'-0"	216
V2	16	#5	STR	11'-0"	184
V3	88	#5	STR	6'-8"	612

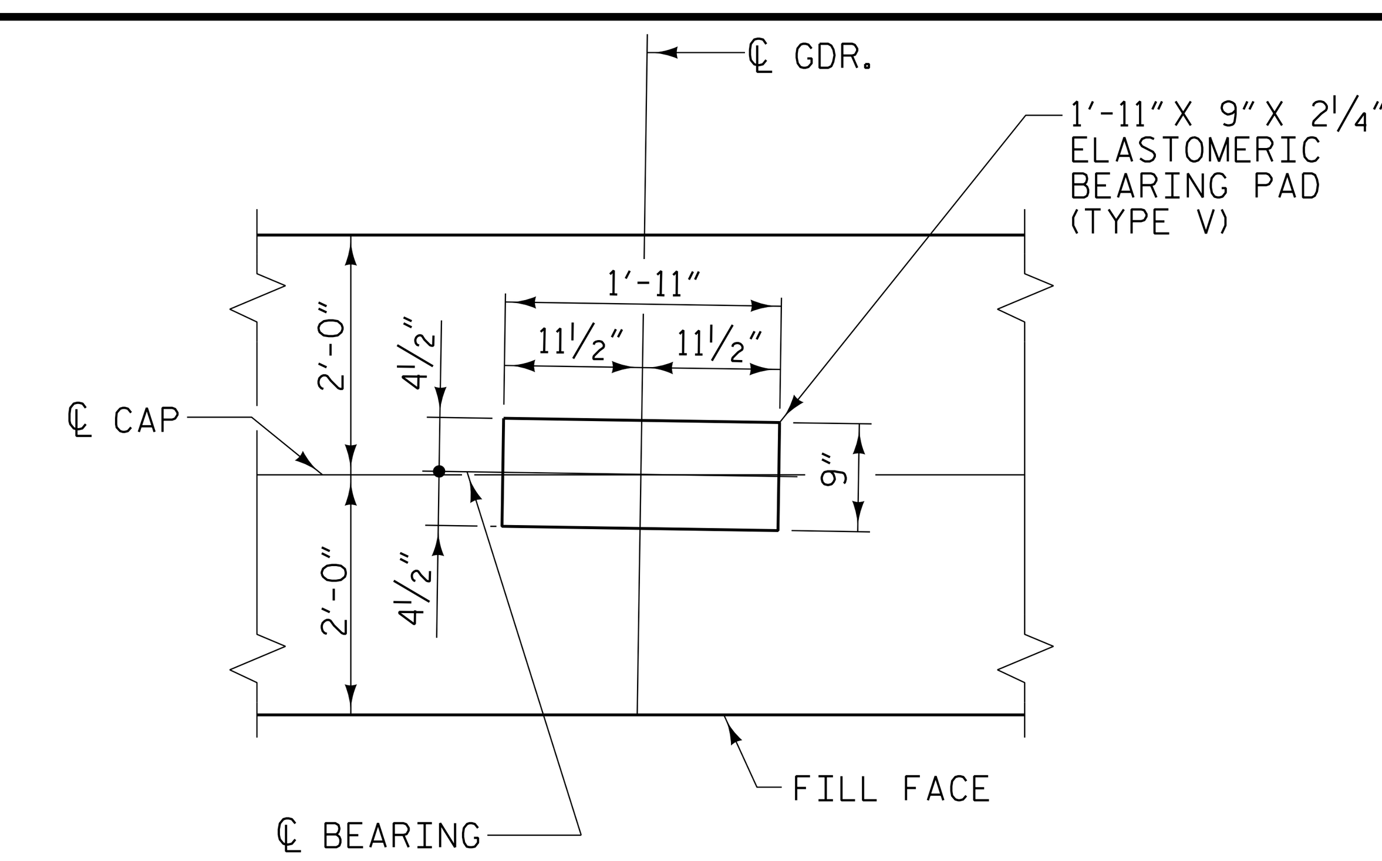
TOTAL REINFORCING STEEL	6141 lbs.
CLASS "A" CONCRETE - CU. YARDS	
POUR 1 (CAP, COLLARS, LOWER WINGS)	32.5 cu. yds.
POUR 2 (UPPER WINGS)	7.4 cu. yds.
TOTAL	39.9 cu. yds.
HP 14 X 73 STEEL PILES 8 PILES REQUIRED - LIN. FEET	696
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES - EACH	8
STEEL PILE POINTS - EACH	8
PILE REDRIVES - EACH	4



SECTION A-A



PART SECTION B-B



DETAIL "A"

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PROJECT NO. R-5819
COLUMBUS COUNTY
STATION: 40+06.72 -Y2- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1 DETAILS

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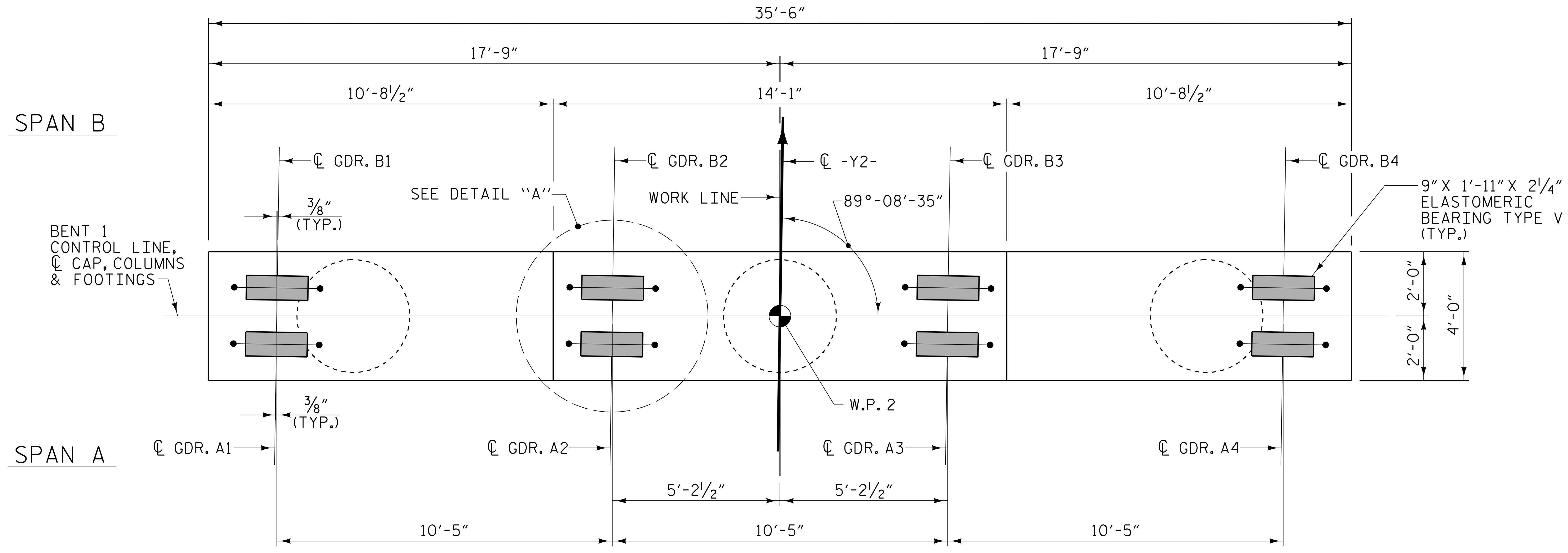

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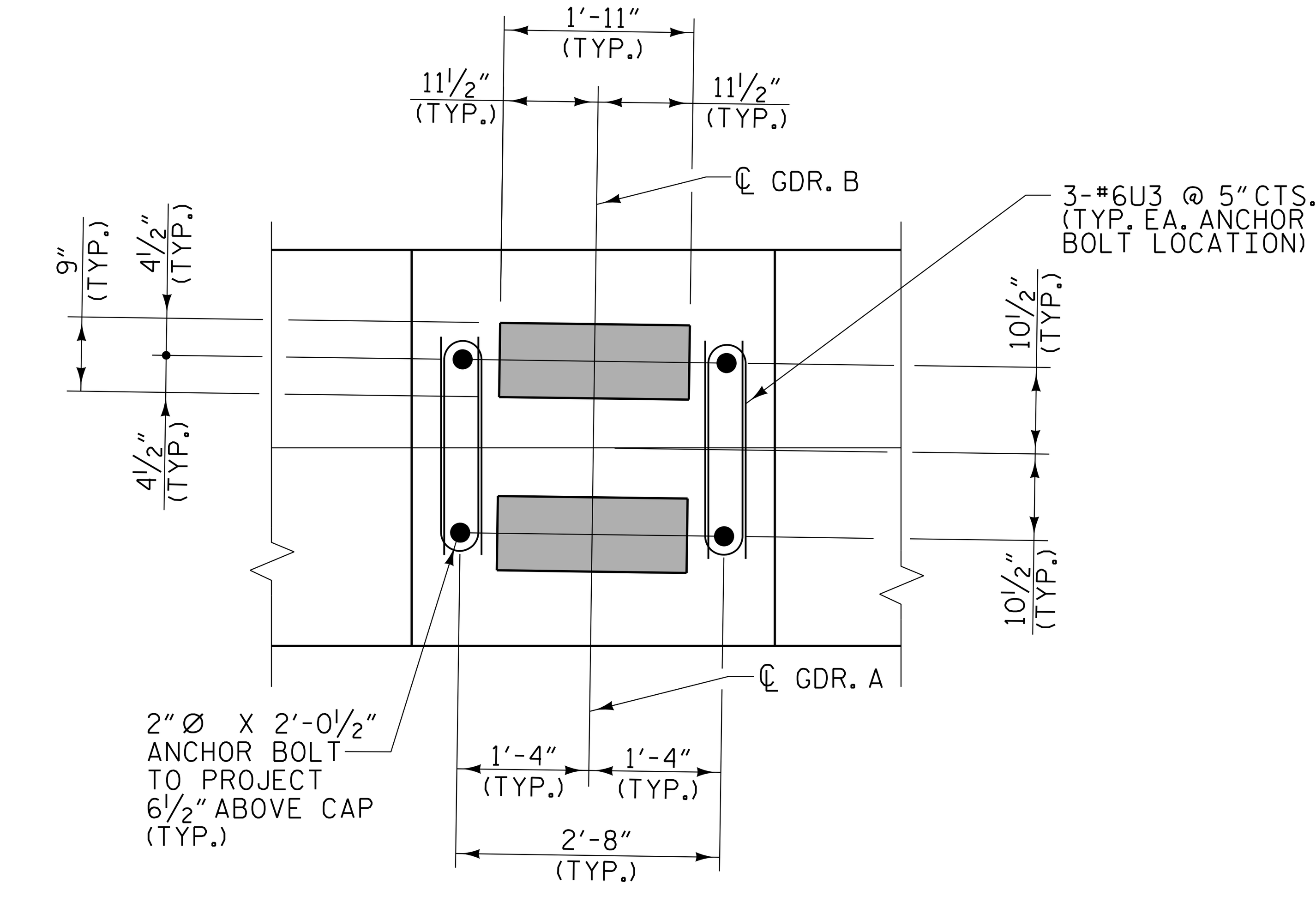
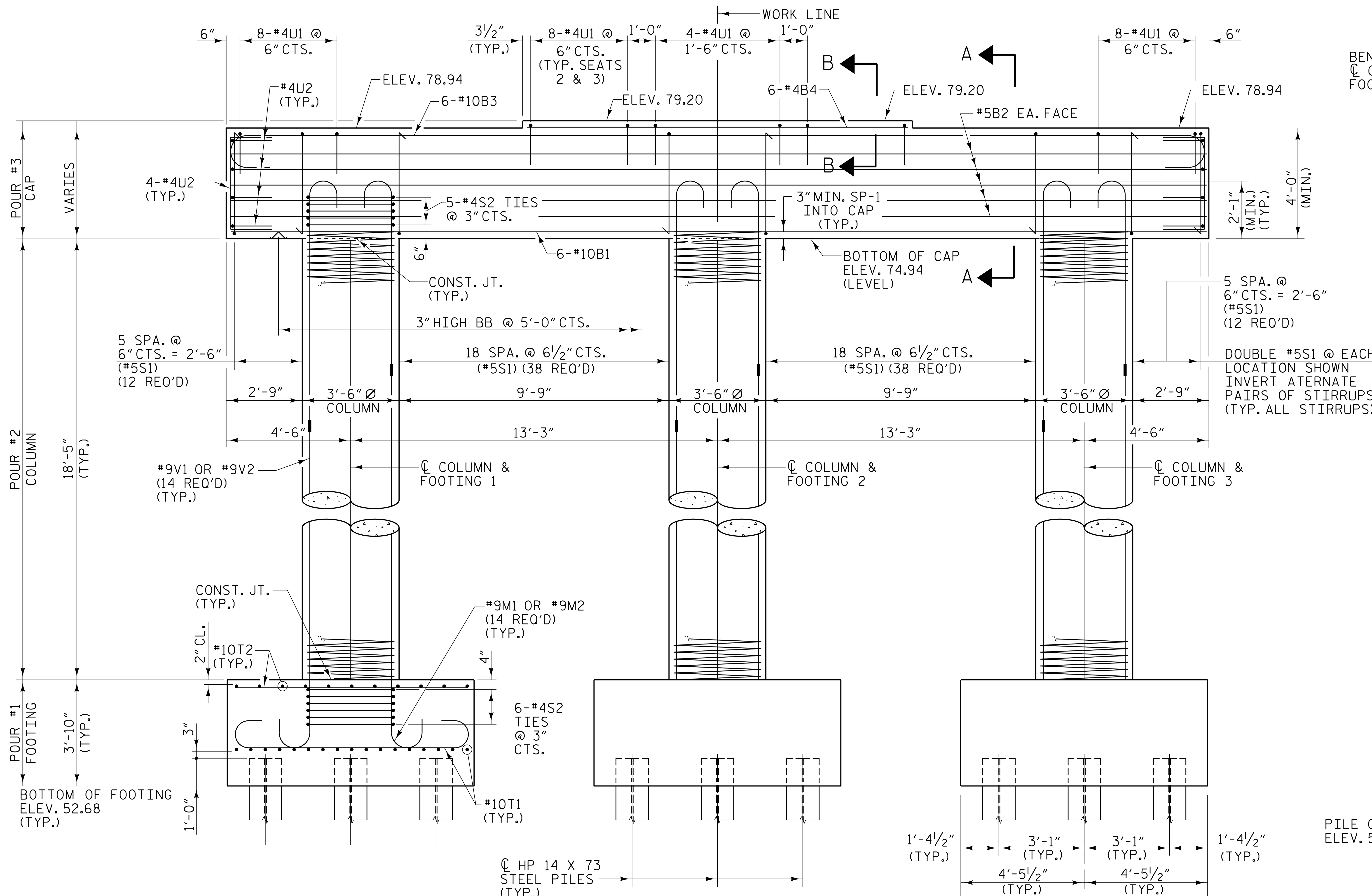


DETAIL "A"
(TYP. EACH GIRDER)



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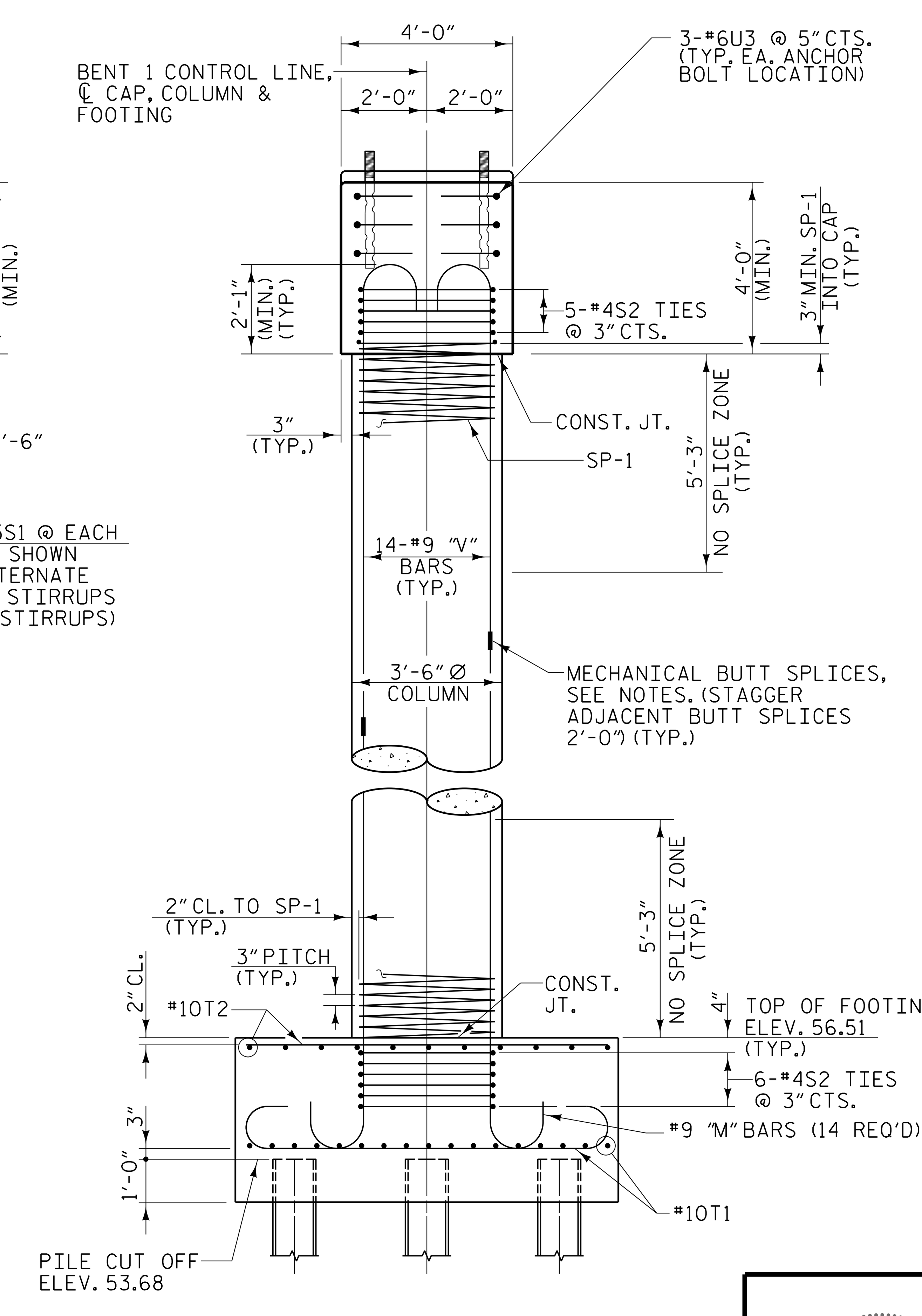

END ELEVATION

NOTES

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

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

LONGITUDINAL REINFORCING STEEL IN THE COLUMN MAY BE SPLICED USING MECHANICAL BUTT SPLICES WHERE SHOWN IN THE ELEVATION VIEW. ADJACENT SPLICES TO BE OFFSET 2'-0". MECHANICAL BUTT SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. MECHCHANICAL BUTT SPLICES SHALL BE SUBMITTED FOR APPROVAL. NO EXTRA PAYMENT WILL BE MADE FOR USING MECHANICAL BUTT SPLICES OR MODIFYING BAR LENGTHS. THE COST WILL BE INCIDENTAL TO REINFORCING STEEL.

FOR PILE SPLICE DETAILS, SEE SHEET 2 OF 2.

FOR SECTIONS A-A & B-B, SEE SHEET 2 OF 2.

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SHEET 1 OF 2

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SUBSTRUCTURE
BENT 1

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1			3					TOTAL SHEETS
2			4					38

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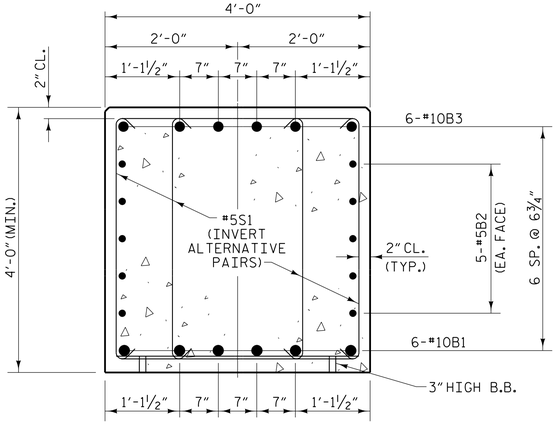
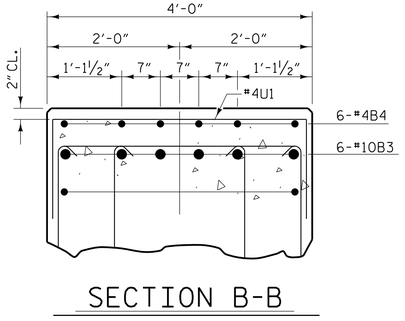
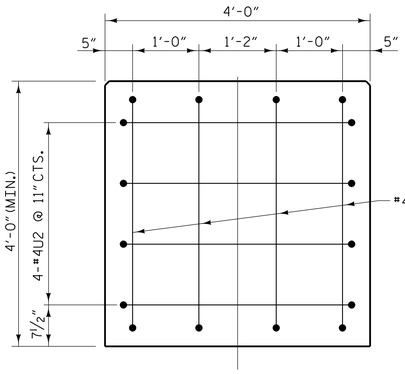


SECTION A-A

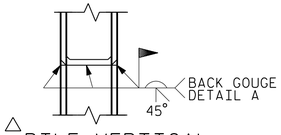


SECTION B-B

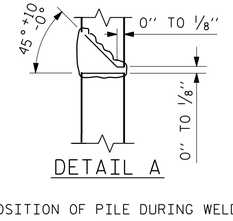


CAP END VIEW

(TYP. EACH END)

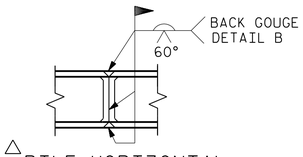


△ PILE VERTICAL

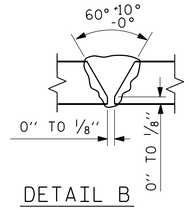


DETAIL A

△ POSITION OF PILE DURING WELDING.



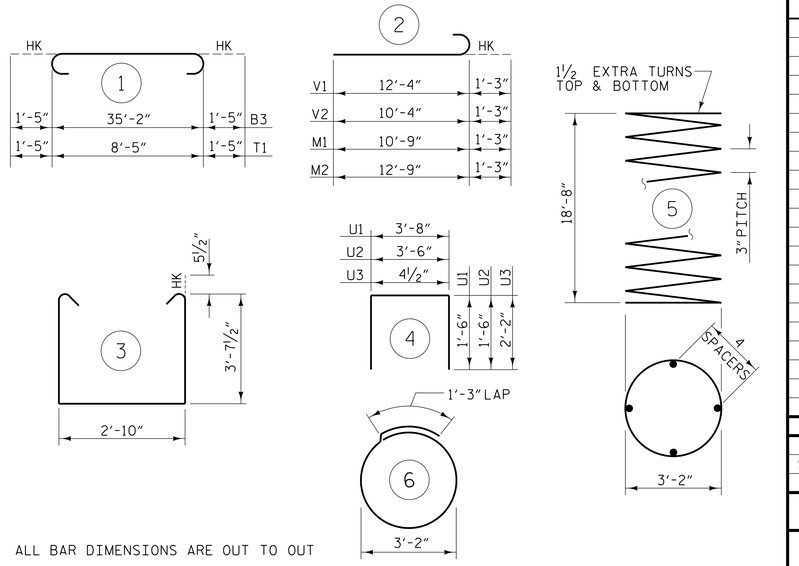
△ PILE HORIZONTAL OR VERTICAL



DETAIL B

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	STR	35'-2"	908
B2	10	#5	STR	35'-2"	367
B3	6	#10	1	38'-0"	981
B4	6	#4	STR	13'-9"	55
M1	21	#9	2	12'-0"	857
M2	21	#9	2	14'-0"	1000
S1	100	#5	3	11'-0"	1147
S2	33	#4	6	11'-3"	248
U1	36	#4	4	6'-8"	160
U2	16	#4	4	6'-6"	69
U3	48	#6	4	4'-9"	342
V1	21	#9	2	13'-7"	970
V2	21	#9	2	11'-7"	827
T1	102	#10	1	11'-3"	4938
T2	66	#10	STR	8'-5"	2390

TOTAL REINFORCING STEEL					15259 lbs.
SPIRAL COLUMN REINFORCING STEEL (SP)					
SP-1	3	**	5	776'-3"	2429

TOTAL SPIRAL COLUMN REINFORCING STEEL 2429 lbs.

CLASS "A" CONCRETE - CU. YARDS

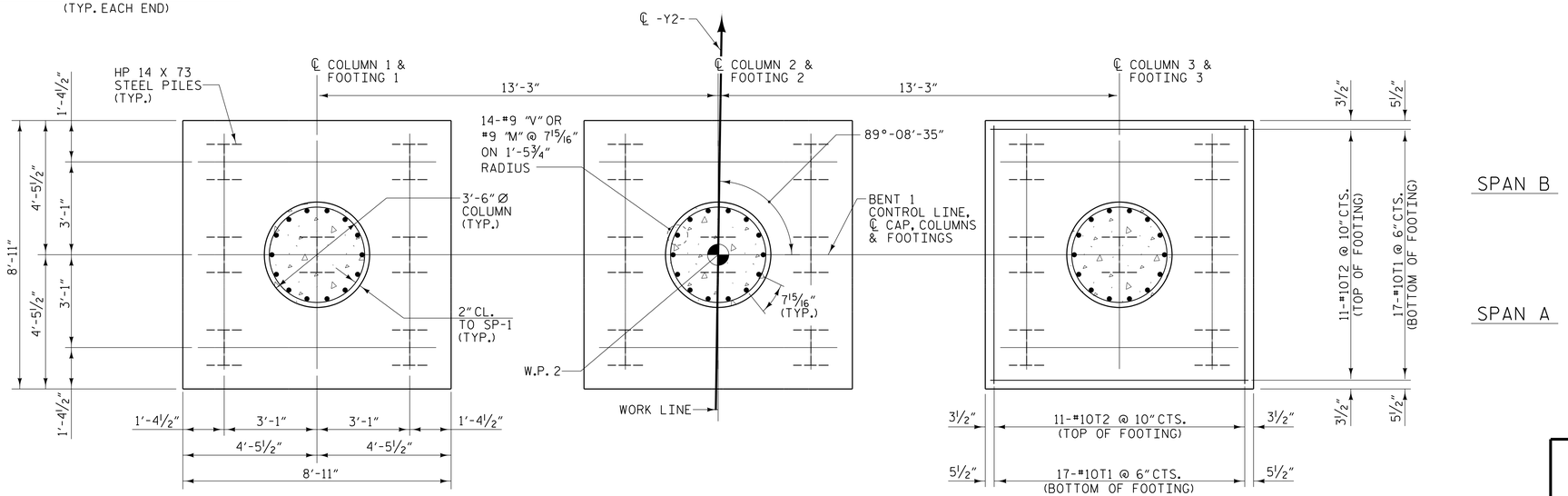
POUR 1 - FOOTINGS	33.9 CU. YDS.
POUR 2 - COLUMNS	19.7 CU. YDS.
POUR 3 - CAP	21.6 CU. YDS.
TOTAL CLASS "A" CONCRETE	75.2 CU. YDS.

HP 14 X 73 STEEL PILES
21 PILES REQUIRED - LIN. FEET 1596

PILE DRIVING EQUIPMENT SETUP FOR
HP 14 X 73 STEEL PILES - EACH 21

STEEL PILE POINTS 21 EA.

PILE REDRIVES 8 EA.



PLAN OF COLUMNS AND FOOTINGS

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING)

PLANS PREPARED BY:

NV5
NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-29
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : W. B. ALLEN DATE : 8/21
CHECKED BY : M. D. METZGER DATE : 1/22
DESIGN ENGINEER OF RECORD: M. D. METZGER DATE : 1/22

DocuSigned by: Matthew Metzger
MATTHEW DAVID METZGER
4/12/2022

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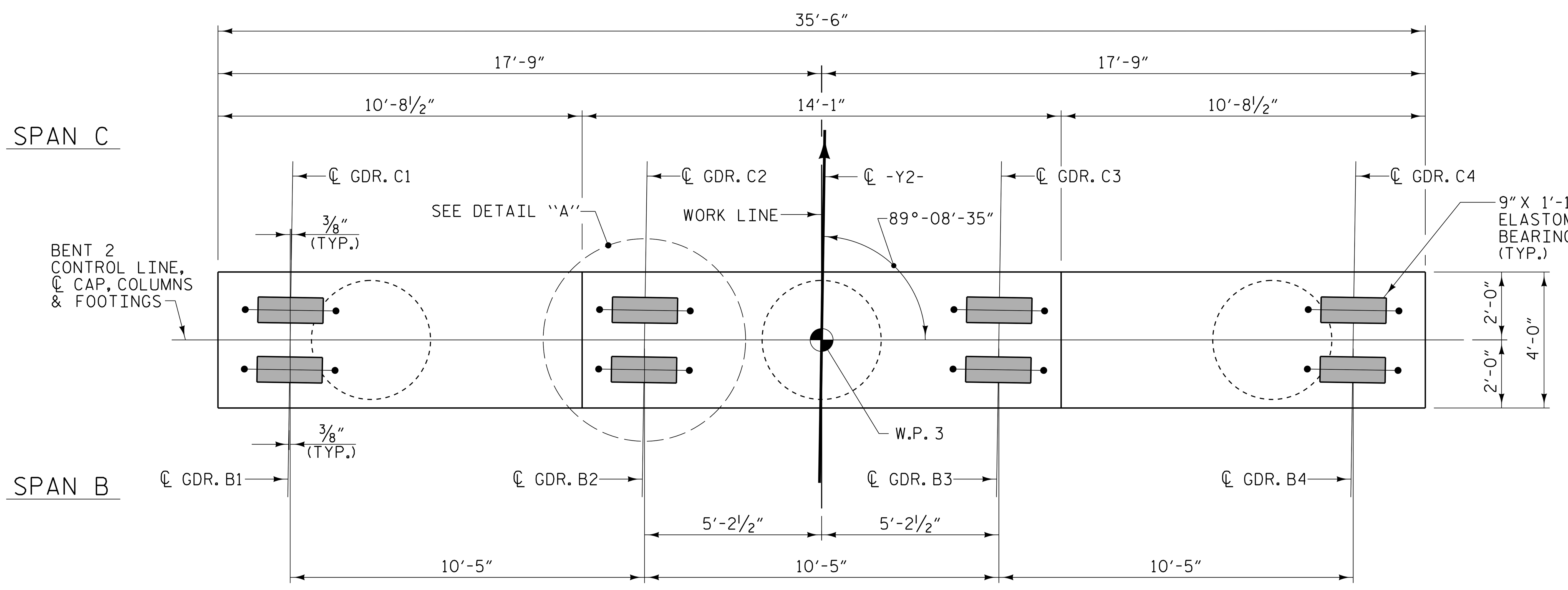
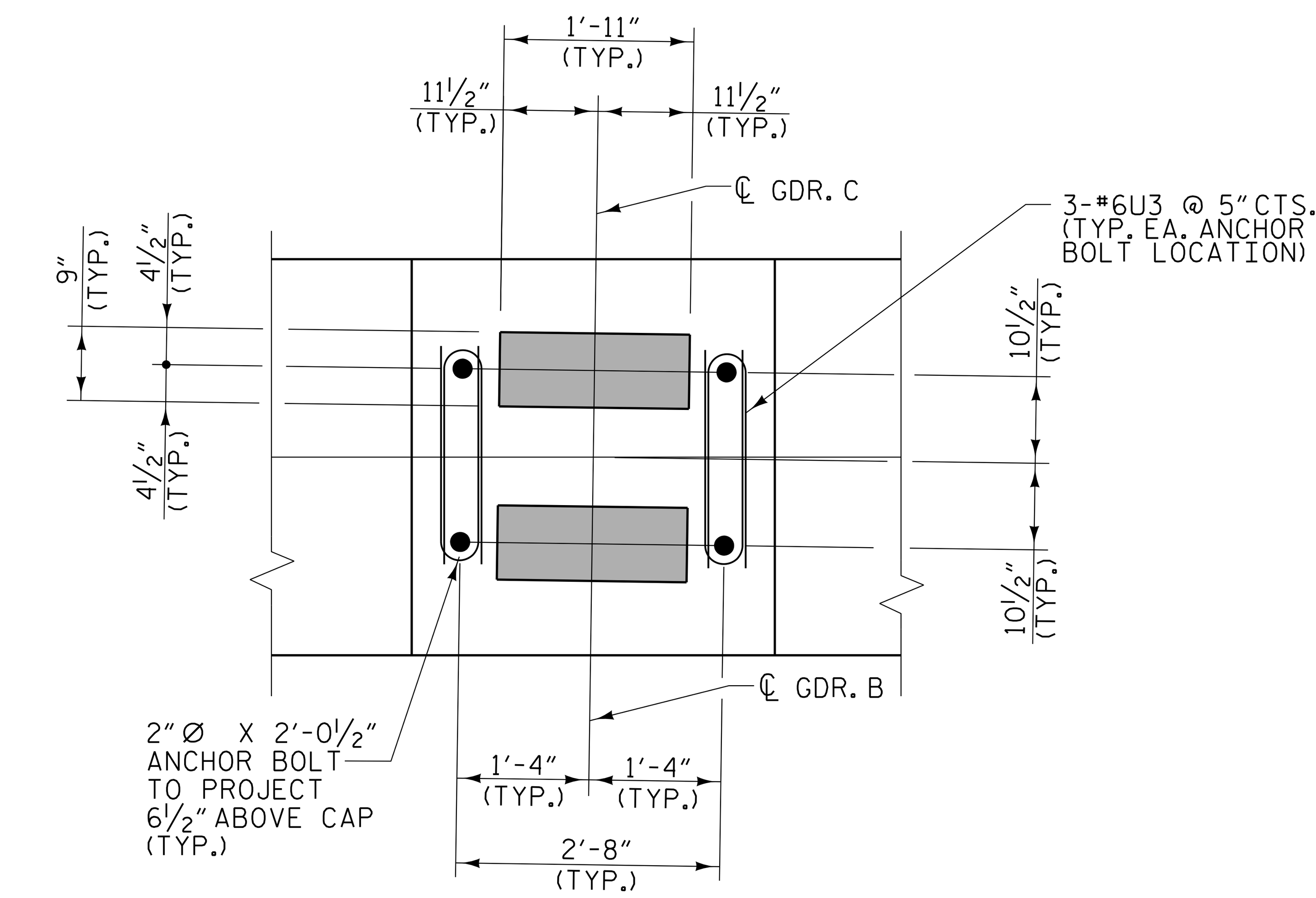
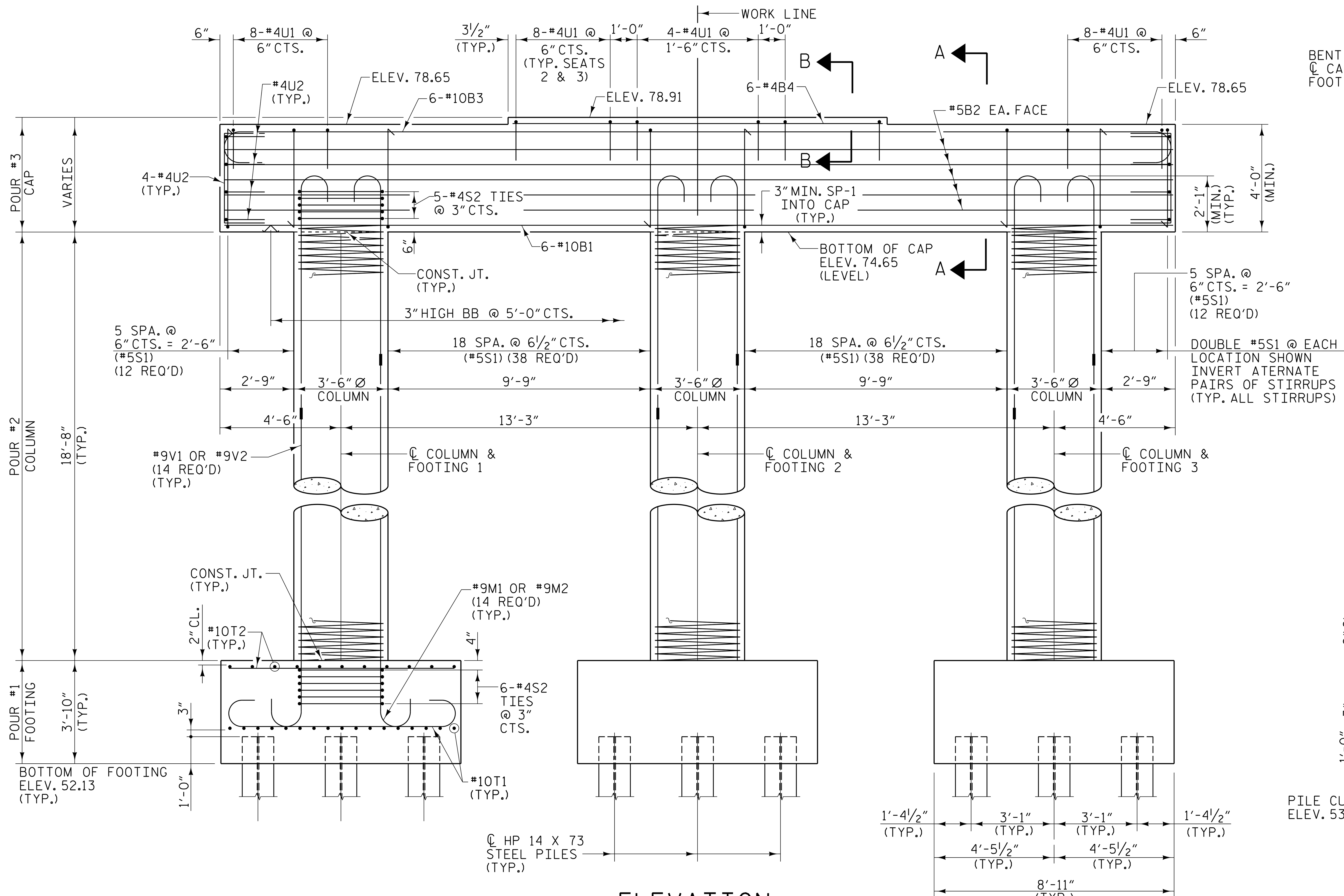


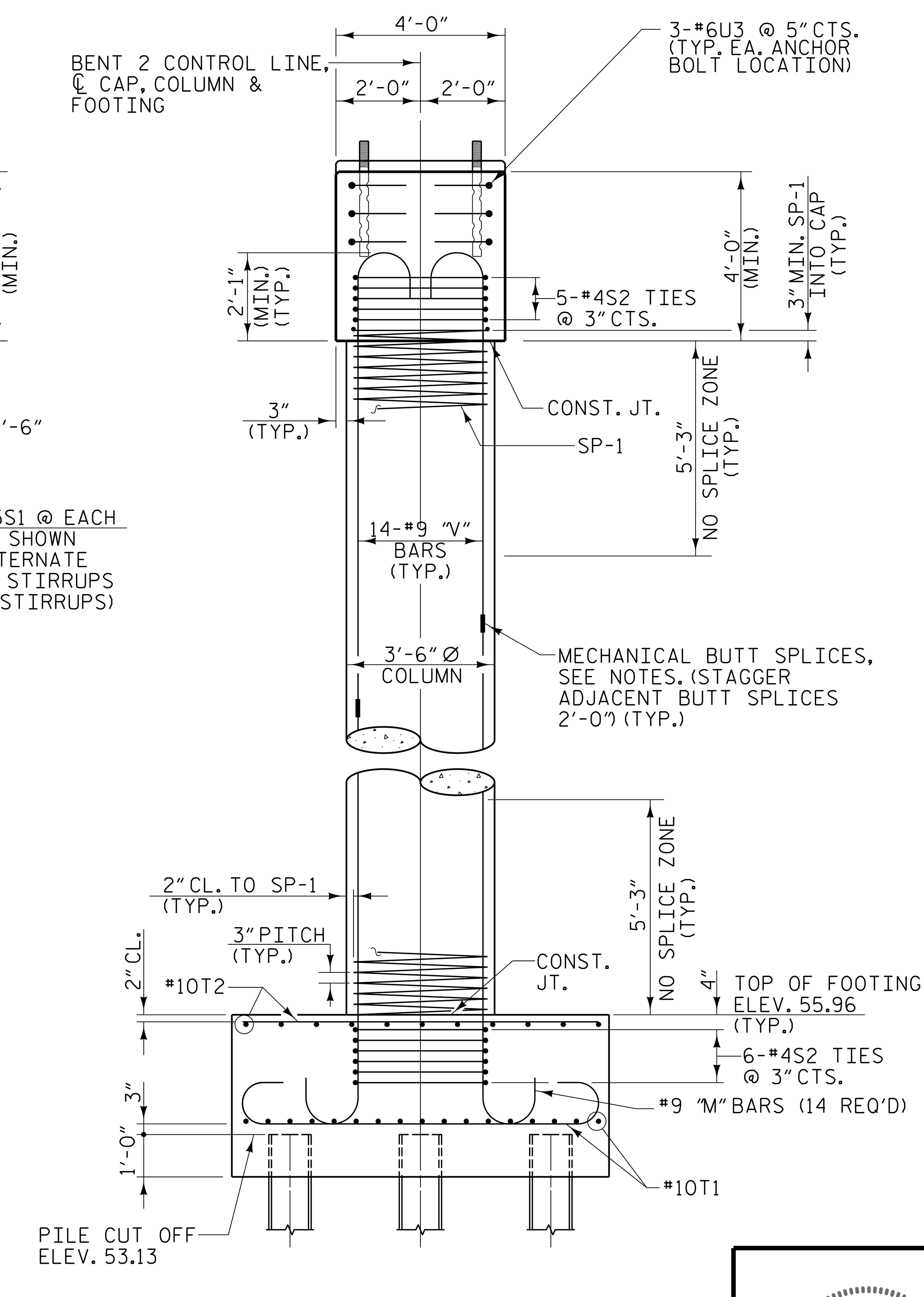
PLAN



DETAIL "A"
(TYP. EACH GIRDER)



ELEVATION



END ELEVATION

NOTES

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

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

LONGITUDINAL REINFORCING STEEL IN THE COLUMN MAY BE SPLICED USING MECHANICAL BUTT SPLICES WHERE SHOWN IN THE ELEVATION VIEW. ADJACENT SPLICES TO BE OFFSET 2'-0". MECHANICAL BUTT SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. MECHCHANICAL BUTT SPLICES SHALL BE SUBMITTED FOR APPROVAL. NO EXTRA PAYMENT WILL BE MADE FOR USING MECHANICAL BUTT SPLICES OR MODIFYING BAR LENGTHS. THE COST WILL BE INCIDENTAL TO REINFORCING STEEL.

FOR PILE SPLICE DETAILS, SEE SHEET 2 OF 2.

FOR SECTIONS A-A & B-B, SEE SHEET 2 OF 2.

PLANS PREPARED BY:
NV5
NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
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NC License # F-1333
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PROJECT NO. R-5819
COLUMBUS COUNTY
STATION: 40+06.72 -Y2- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2

DRAWN BY :	W. B. ALLEN	DATE :	8/21
CHECKED BY :	M. D. METZGER	DATE :	1/22
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	1/22

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER
4/12/2022

REVISIONS							
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1				3			
2				4			

SHEET NO. S1-30
TOTAL SHEETS 38

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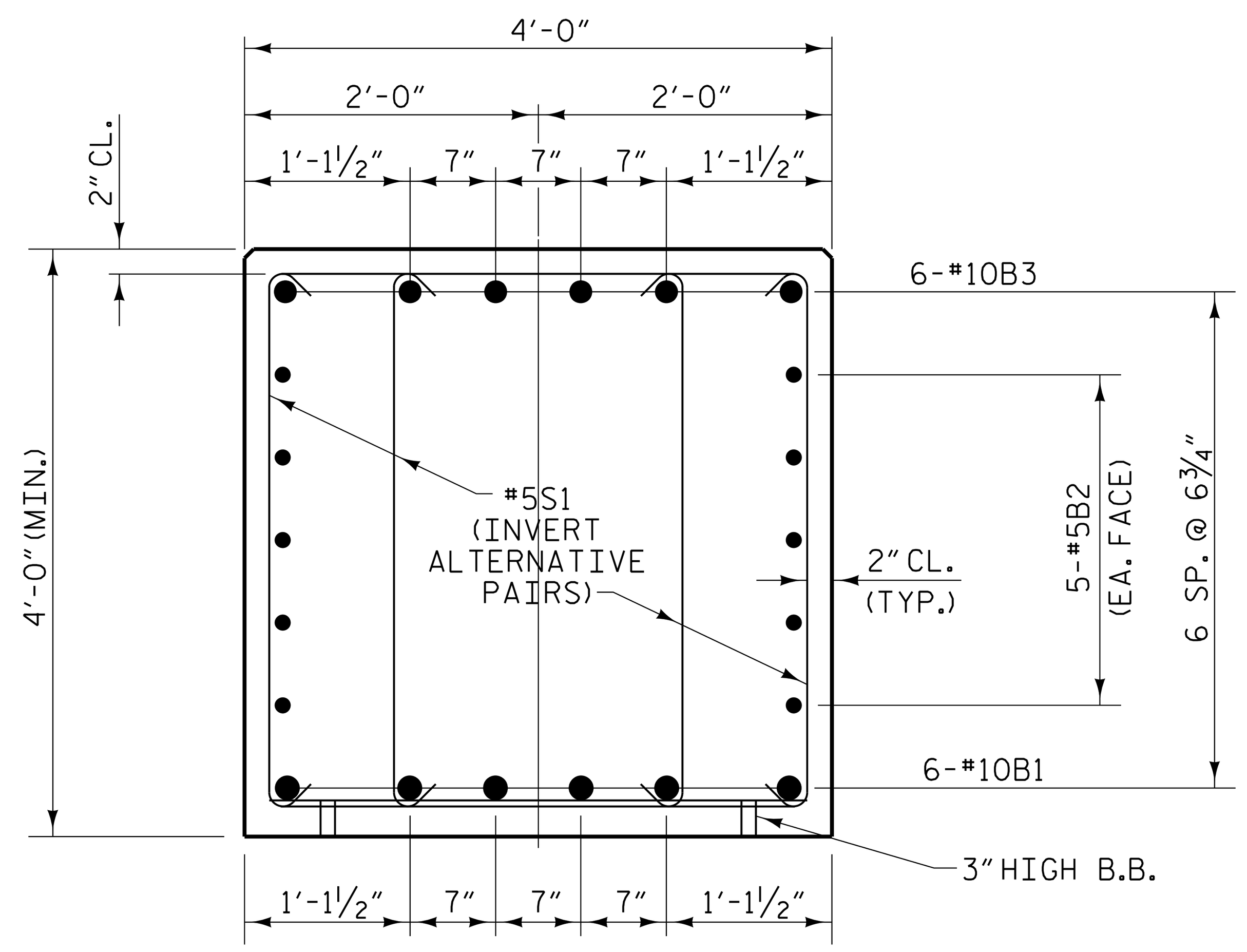
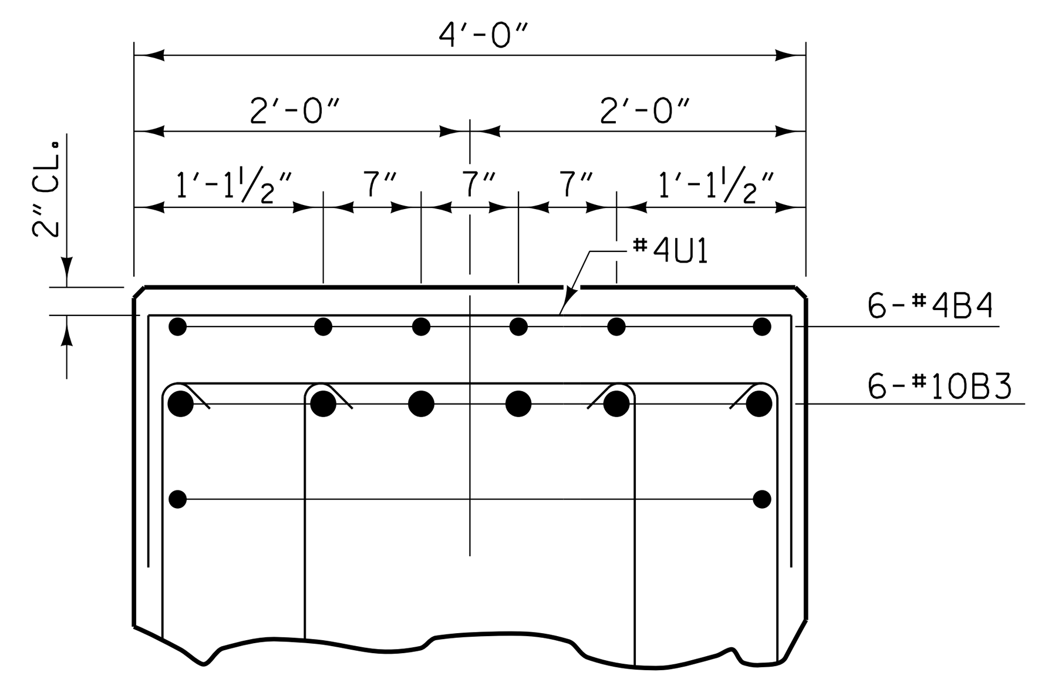
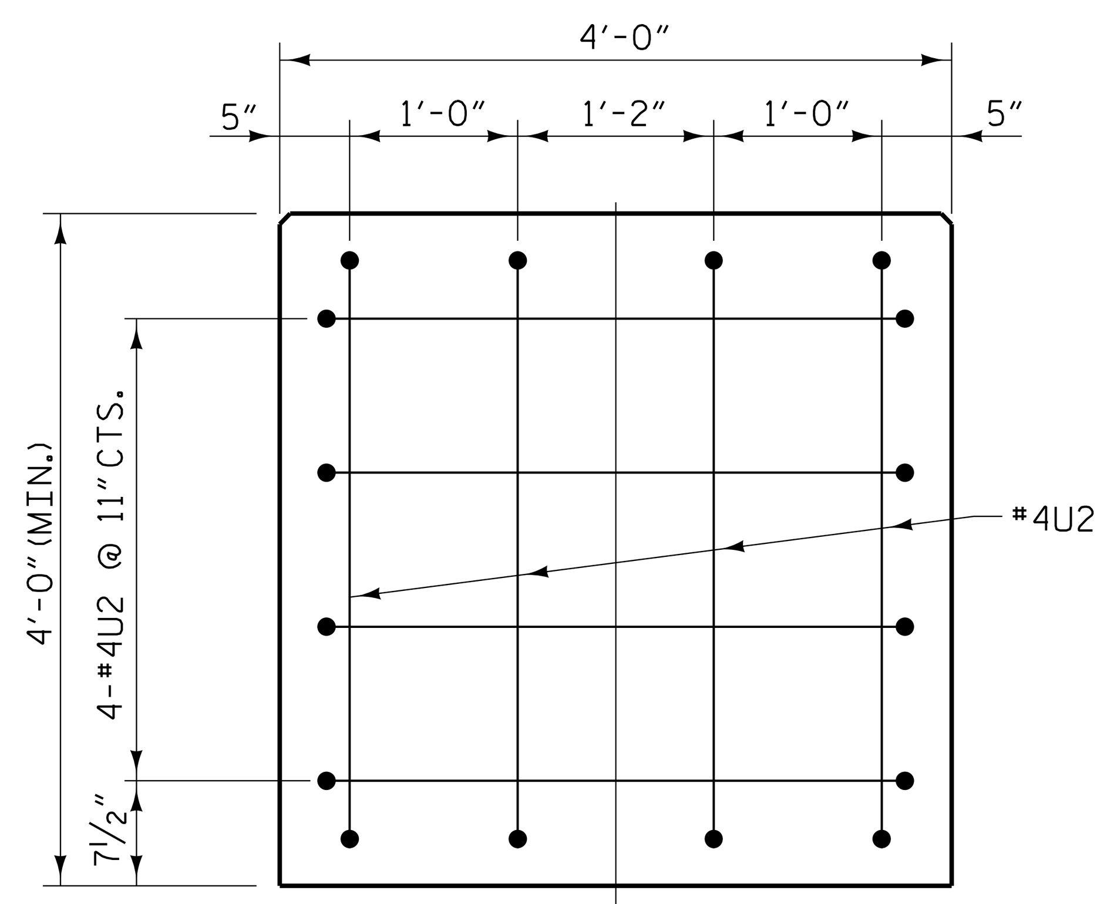


SECTION A-A

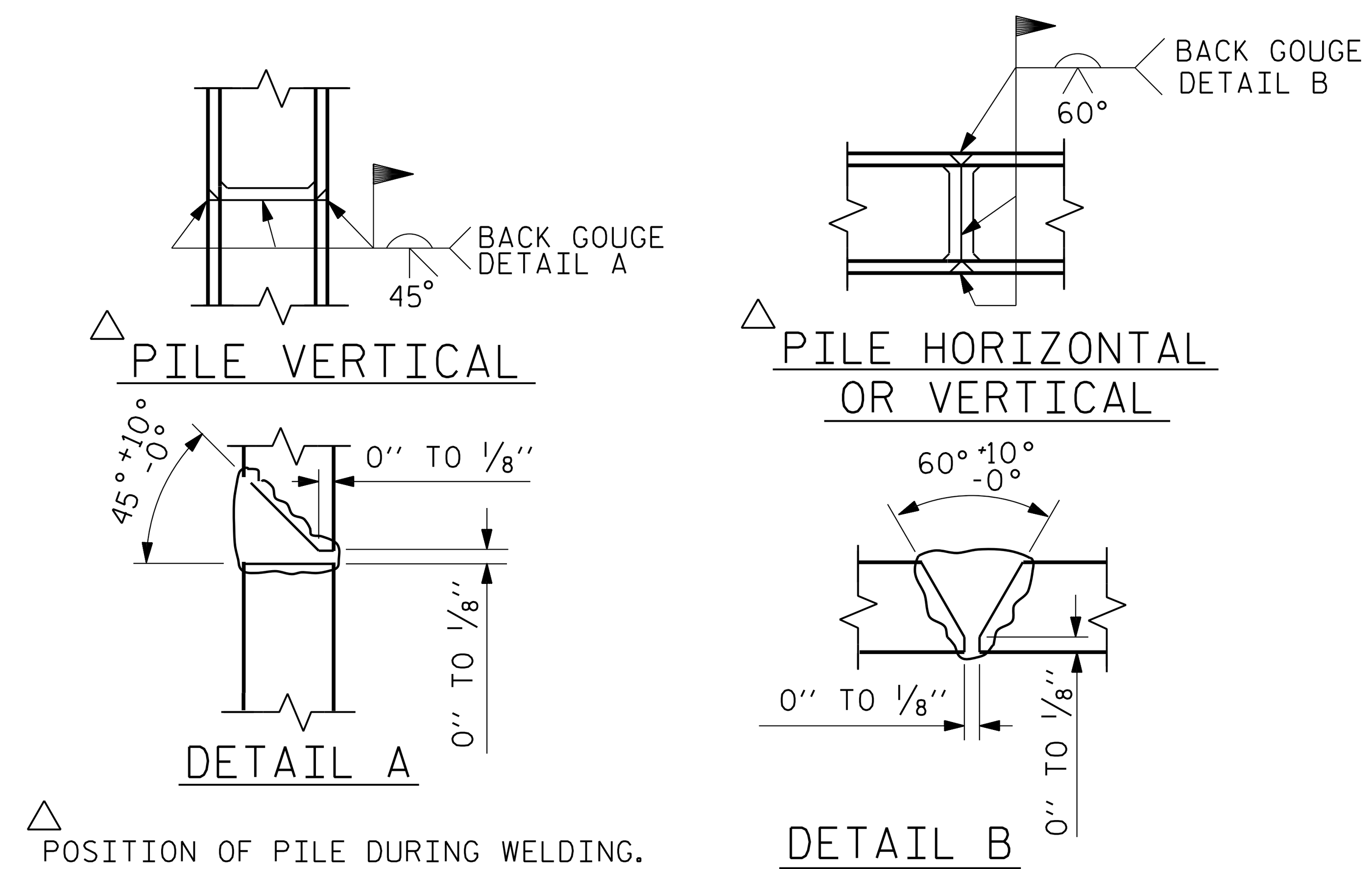


SECTION B-B



CAP END VIEW

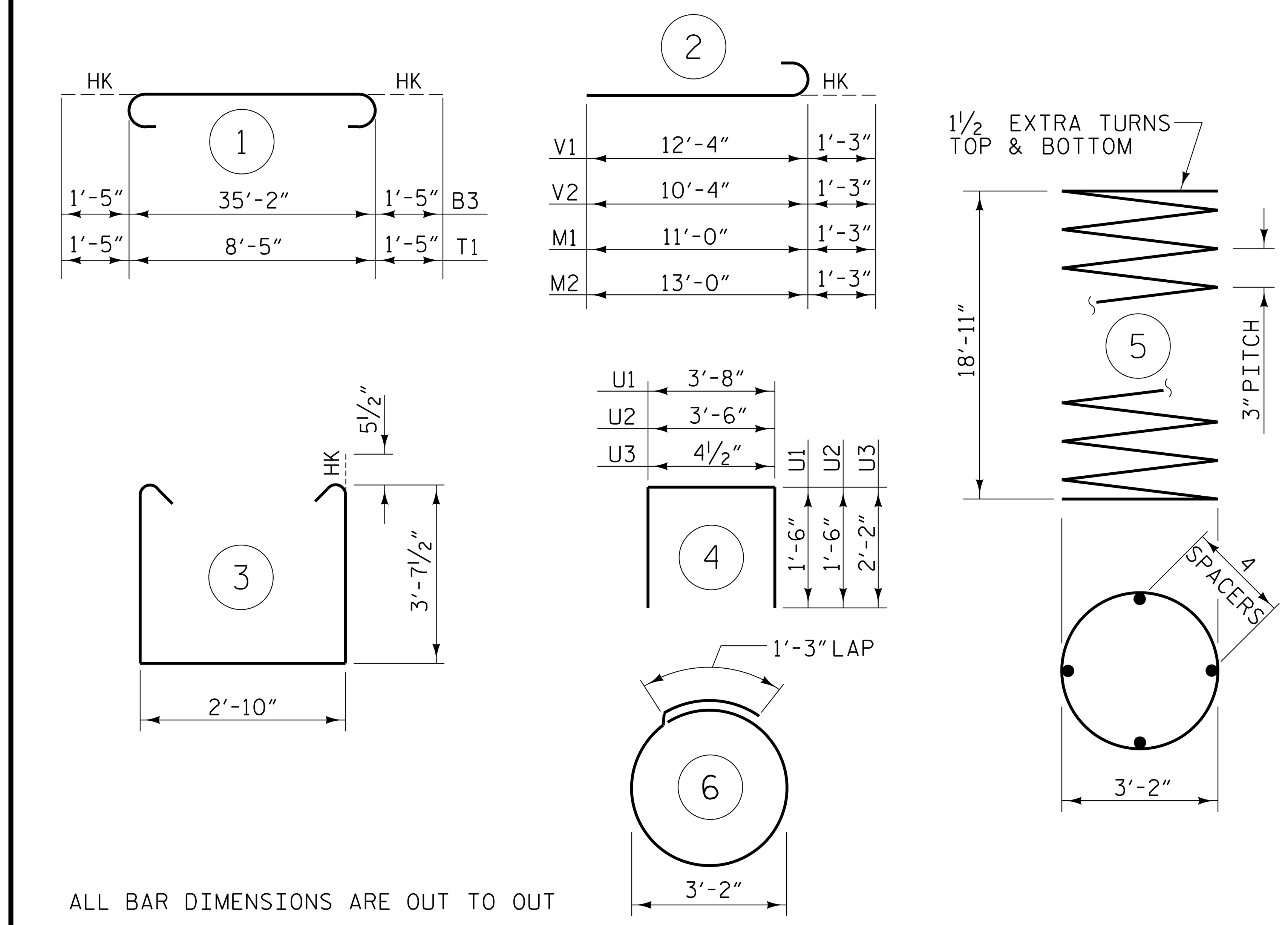
(TYP. EACH END)



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

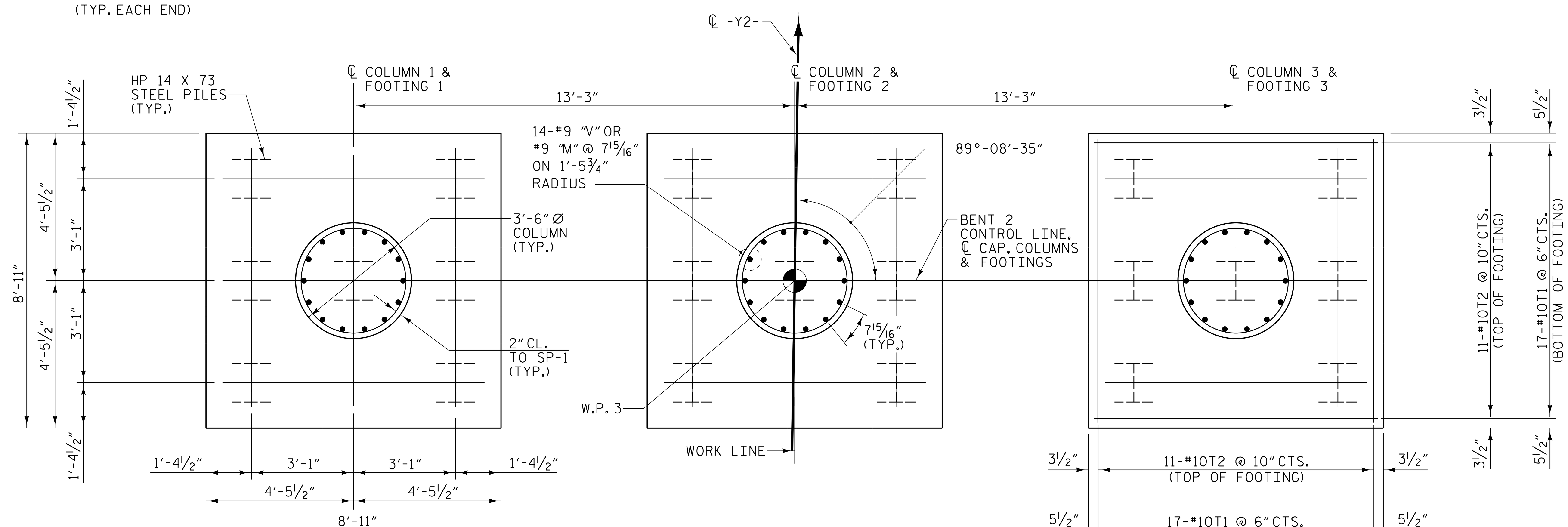
✻✻ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	STR	35'-2"	908
B2	10	#5	STR	35'-2"	367
B3	6	#10	1	38'-0"	981
B4	6	#4	STR	13'-9"	55
M1	21	#9	2	12'-3"	875
M2	21	#9	2	14'-3"	1017
S1	100	#5	3	11'-0"	1147
S2	33	#4	6	11'-3"	248
U1	36	#4	4	6'-8"	160
U2	16	#4	4	6'-6"	69
U3	48	#6	4	4'-9"	342
V1	21	#9	2	13'-7"	970
V2	21	#9	2	11'-7"	827
T1	102	#10	1	11'-3"	4938
T2	66	#10	STR	8'-5"	2390
TOTAL REINFORCING STEEL					15294 lbs.
SPIRAL COLUMN REINFORCING STEEL (SP)					
SP-1	3	✻✻	5	786'-3"	2460
TOTAL SPIRAL COLUMN REINFORCING STEEL					2460 lbs.

CLASS "A" CONCRETE - CU. YARDS	
POUR 1 - FOOTINGS	33.9 CU. YDS.
POUR 2 - COLUMNS	20.0 CU. YDS.
POUR 3 - CAP	21.6 CU. YDS.
TOTAL CLASS "A" CONCRETE	75.5 CU. YDS.
HP 14 X 73 STEEL PILES 21 PILES REQUIRED - LIN. FEET	1596
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES - EACH	21
STEEL PILE POINTS	21 EA.
PILE REDRIVES	8 EA.



PLAN OF COLUMNS AND FOOTINGS

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING)

PLANS PREPARED BY:

NV5

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

PROJECT NO. R-5819

COLUMBUS COUNTY

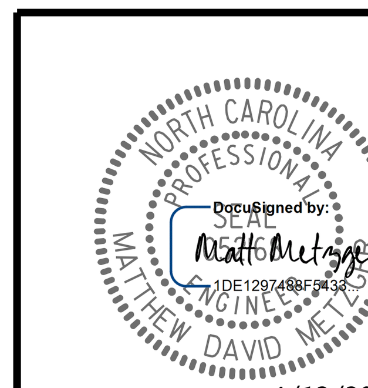
STATION: 40+06.72 -Y2- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2



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REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S1-31
1			3				TOTAL SHEETS
2			4				38

DRAWN BY :	W. B. ALLEN	DATE :	8/21
CHECKED BY :	M. D. METZGER	DATE :	1/22
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	1/22

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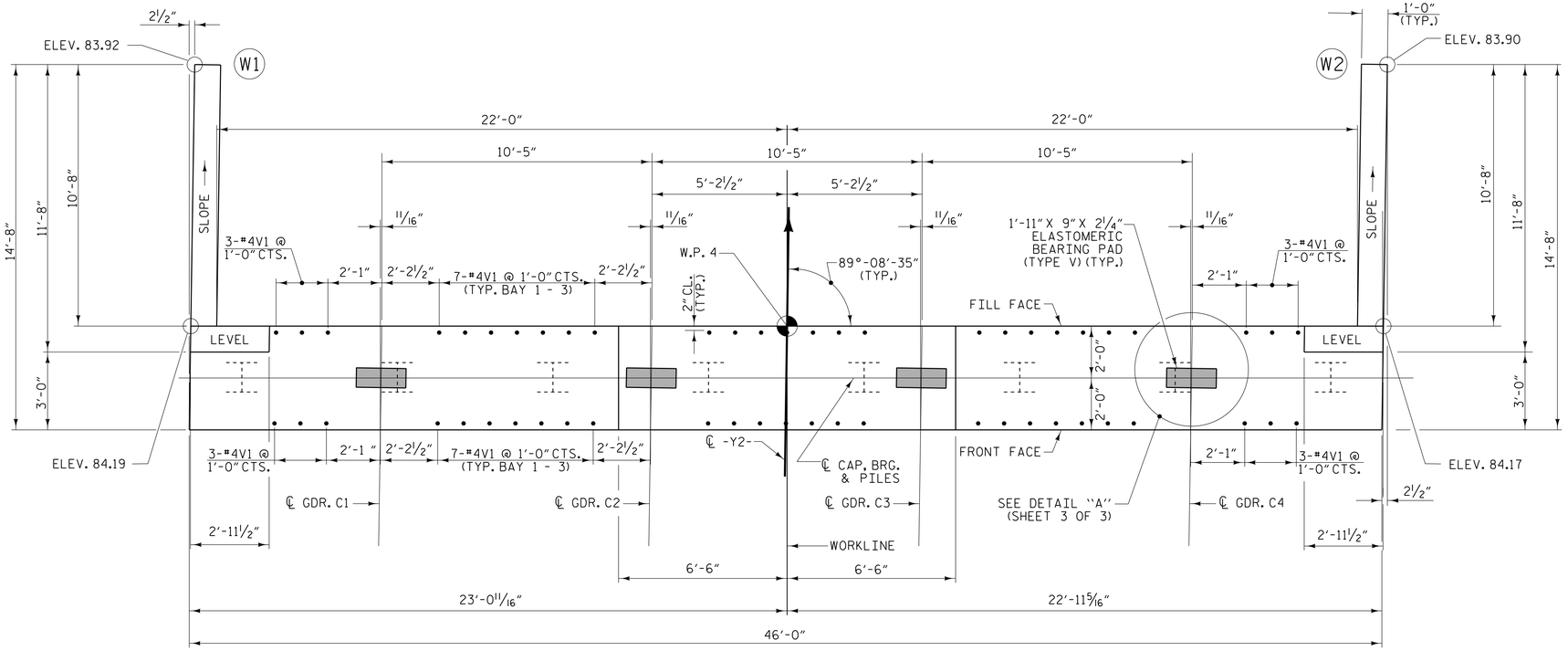
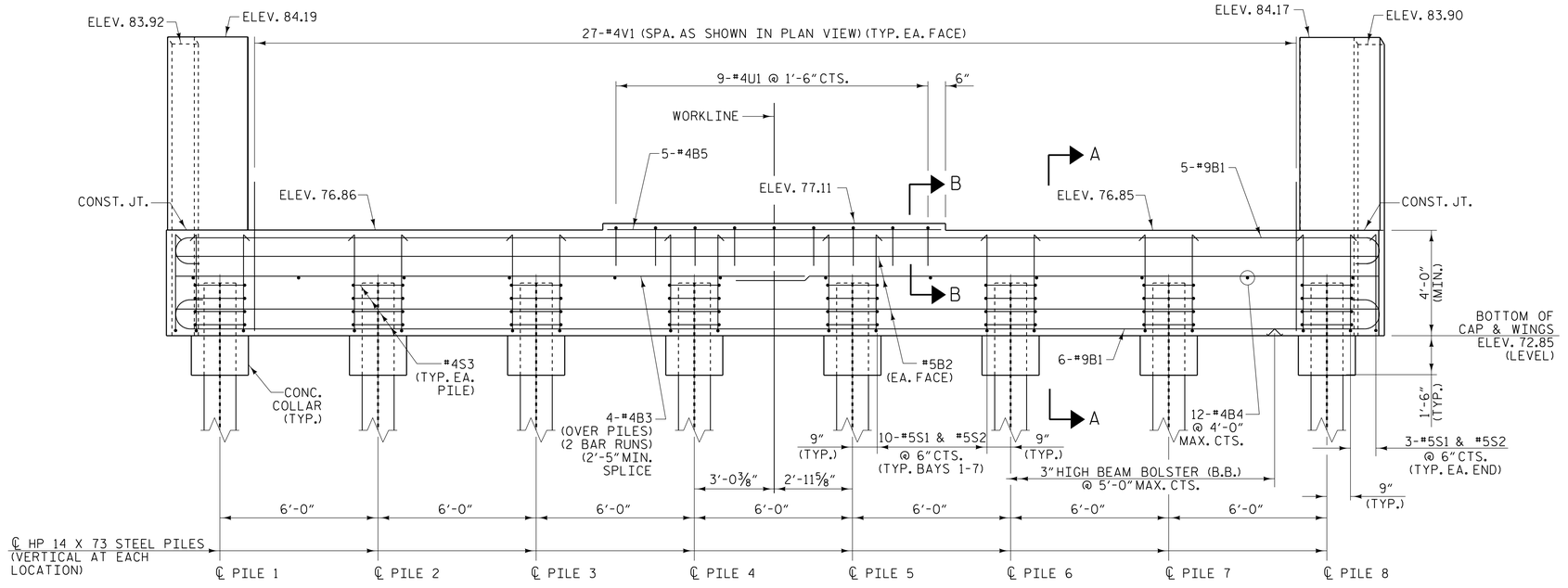


PLAN



ELEVATION

NOTES

#4V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN THE CAP.

THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1), EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

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

SEE "GENERAL DRAWING FOUNDATION LAYOUT" FOR ADDITIONAL NOTES FOR DRIVING PILES.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL SEE "INTEGRAL END BENT 1" SHEET 3 OF 3.

FOR PILE SPLICE DETAILS, SEE "INTEGRAL END BENT 2" SHEET 3 OF 3.

PLANS PREPARED BY:
NV5
NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC license # F-1333
formerly CALYX Engineers & Consultants

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-32
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : W. B. ALLEN DATE : 8/21
CHECKED BY : M. D. METZGER DATE : 1/22
DESIGN ENGINEER OF RECORD: M. D. METZGER DATE : 1/22

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047201 MATTHEW DAVID METZGER
DocuSigned by: Matt Metzger
4/12/2022

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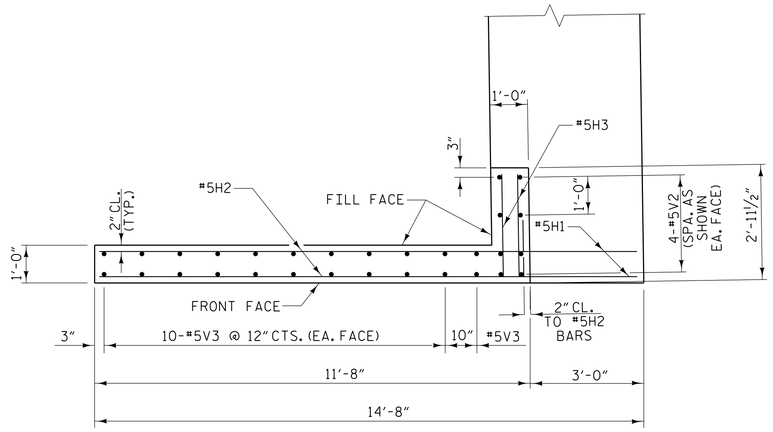
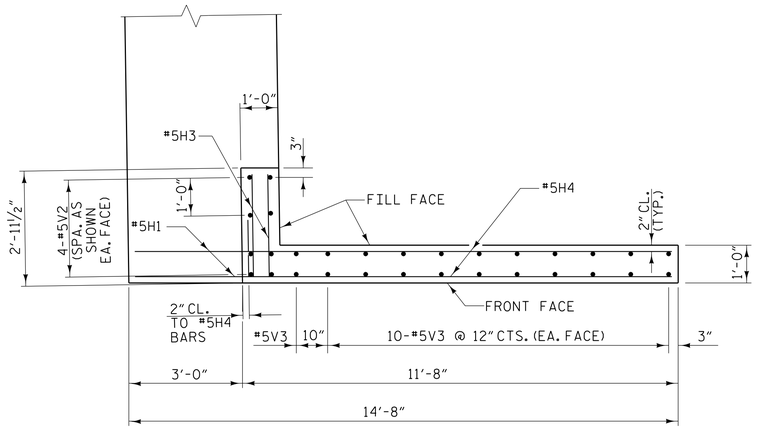
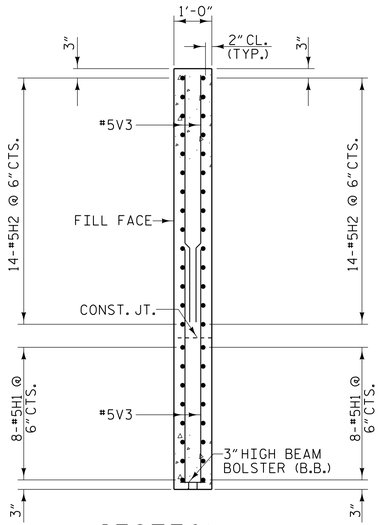


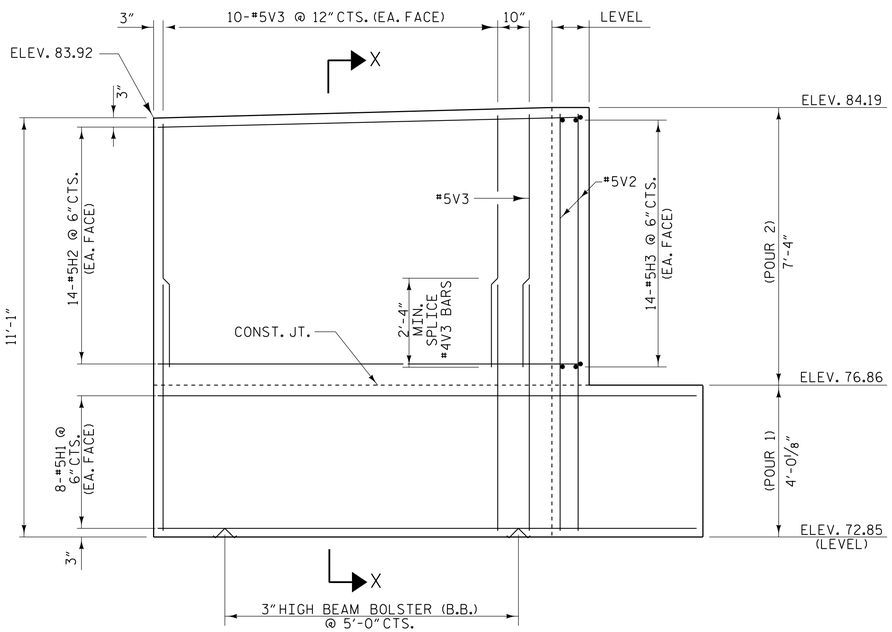
PLAN OF LEFT WING - W1



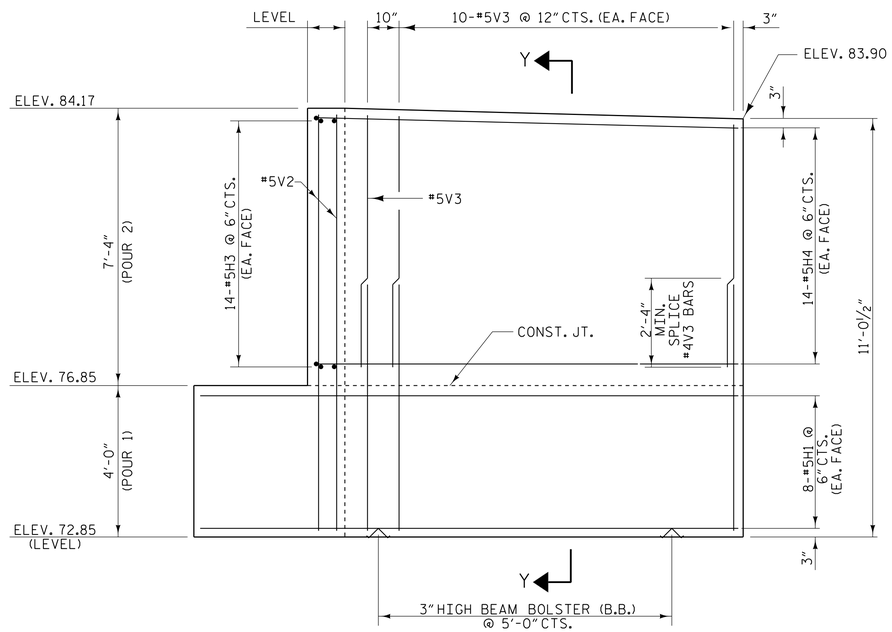
PLAN OF RIGHT WING - W2



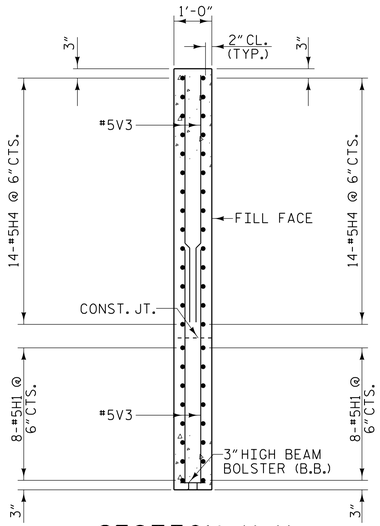
SECTION X-X



ELEVATION OF LEFT WING - W1



ELEVATION OF RIGHT WING - W2



SECTION Y-Y

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2 WING DETAILS

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
formerly CALYX Engineers & Consultants

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NORTH CAROLINA PROFESSIONAL SEAL MATTHEW DAVID METZGER ENGINEER

Docusigned by: Matt Metzger

4/12/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-33
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : W. B. ALLEN DATE : 8/21
CHECKED BY : M. D. METZGER DATE : 1/22
DESIGN ENGINEER OF RECORD: M. D. METZGER DATE : 1/22

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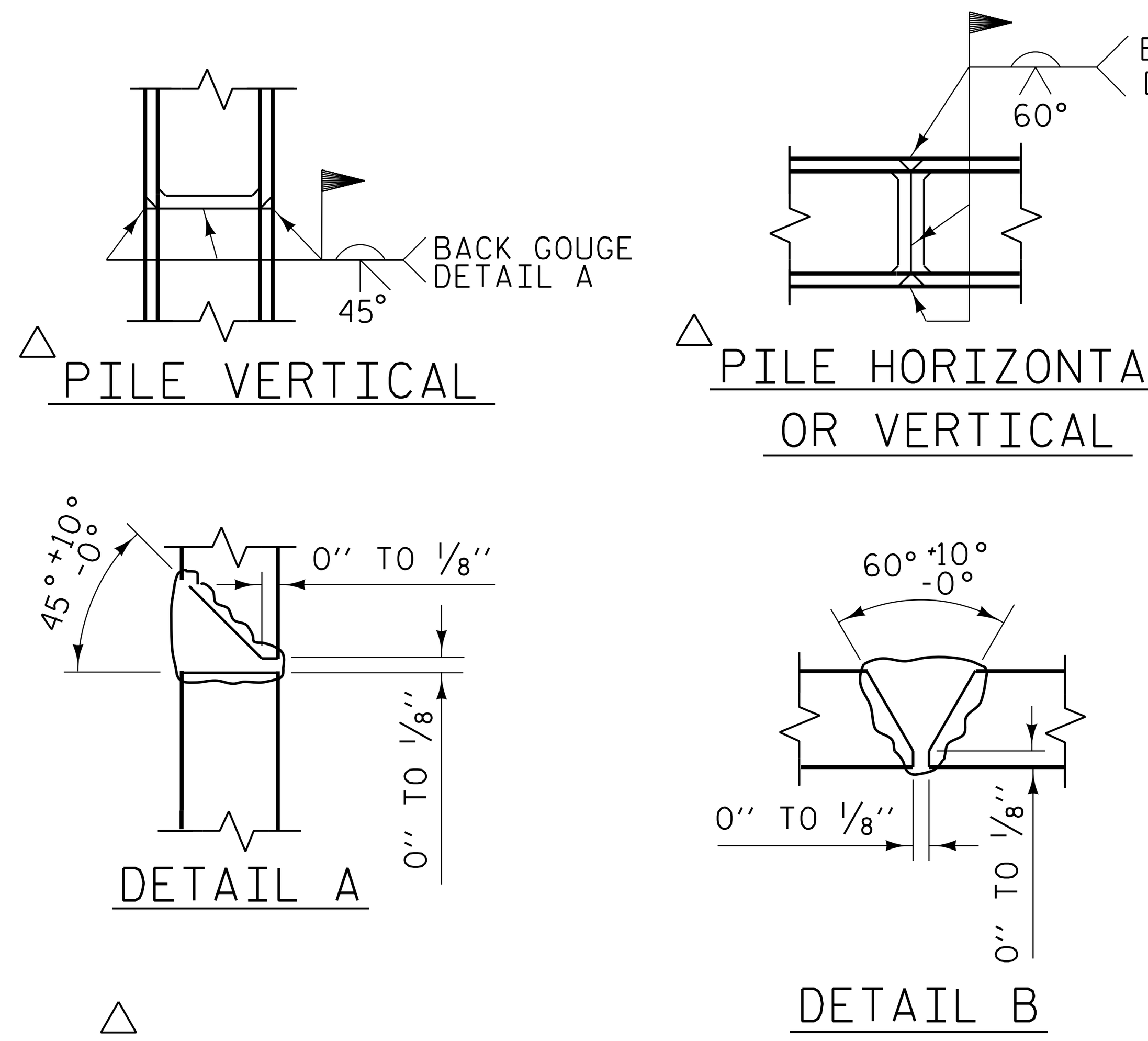
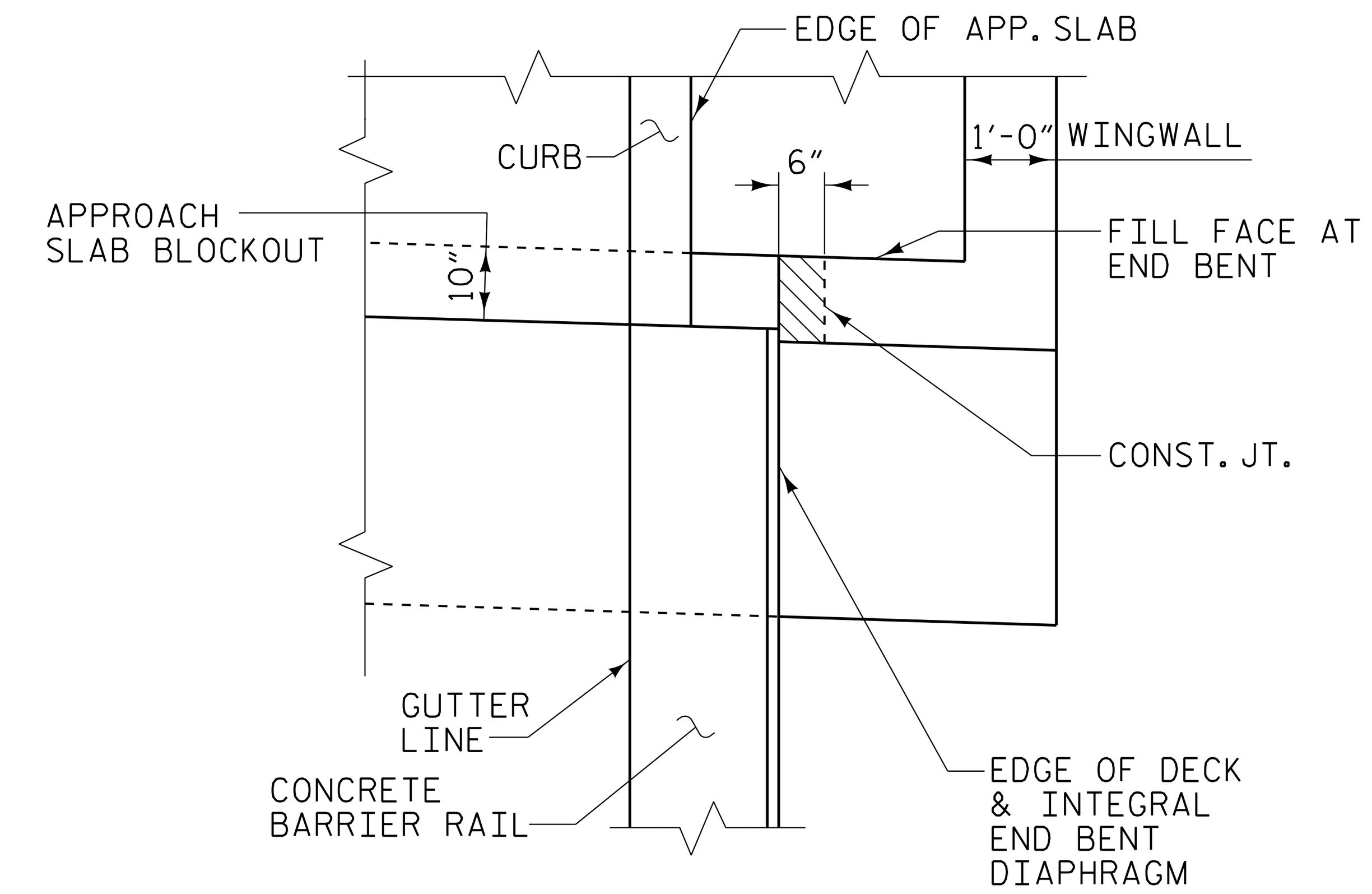
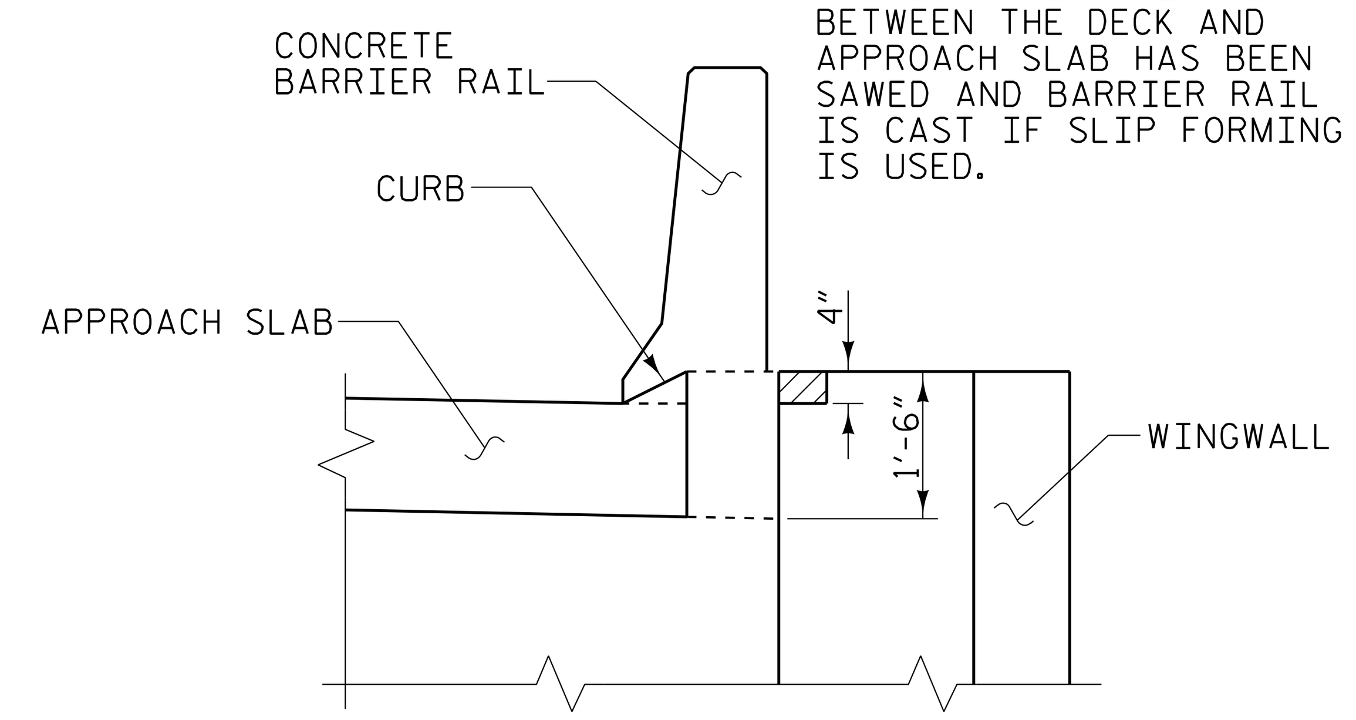


PILE SPLICE DETAILS



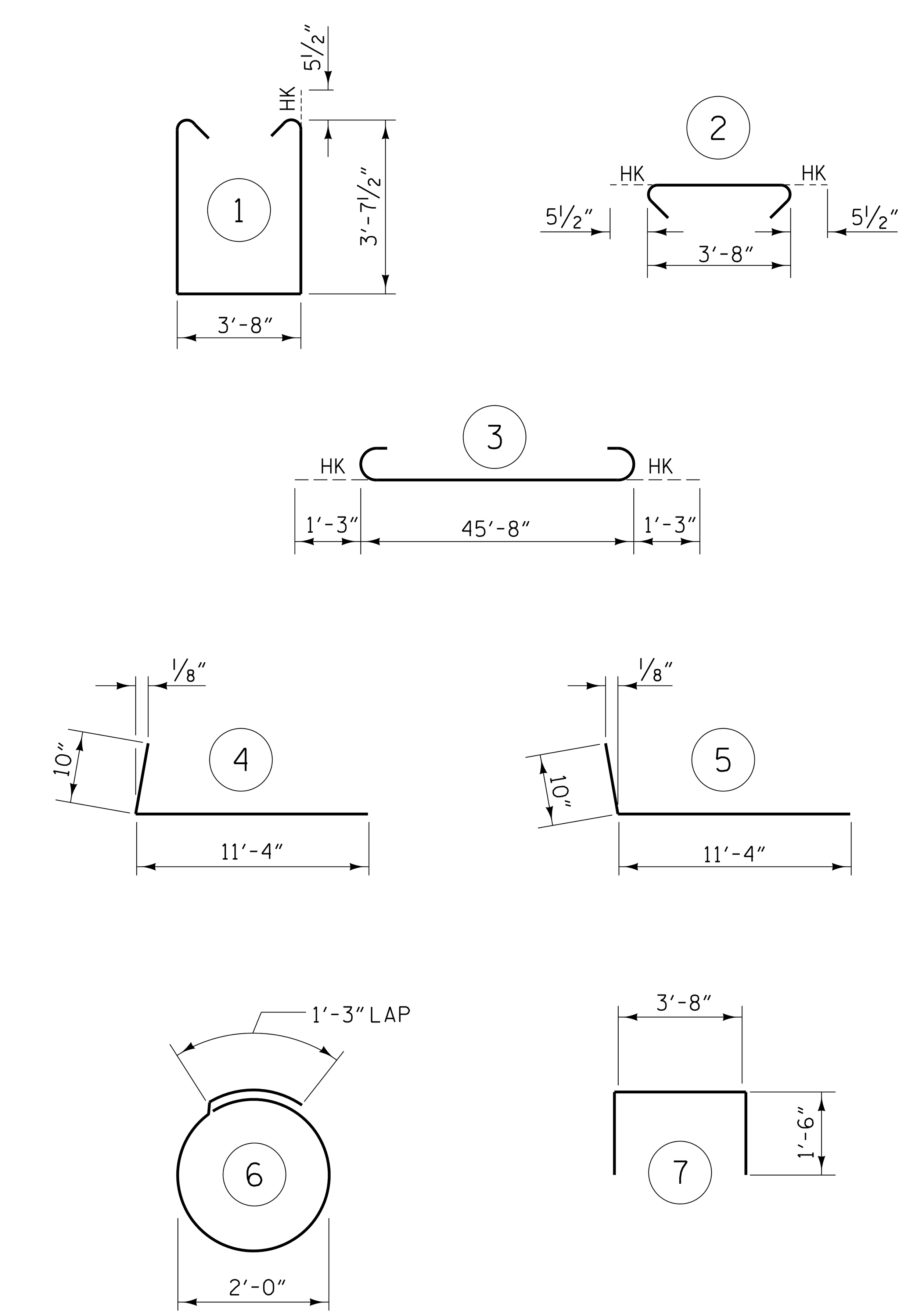
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND BARRIER RAIL IS CAST IF SLIP FORMING IS USED.



WINGWALL BLOCKOUT

(RIGHT WINGWALL SHOWN, LEFT WINGWALL SIMILAR)

BAR TYPES



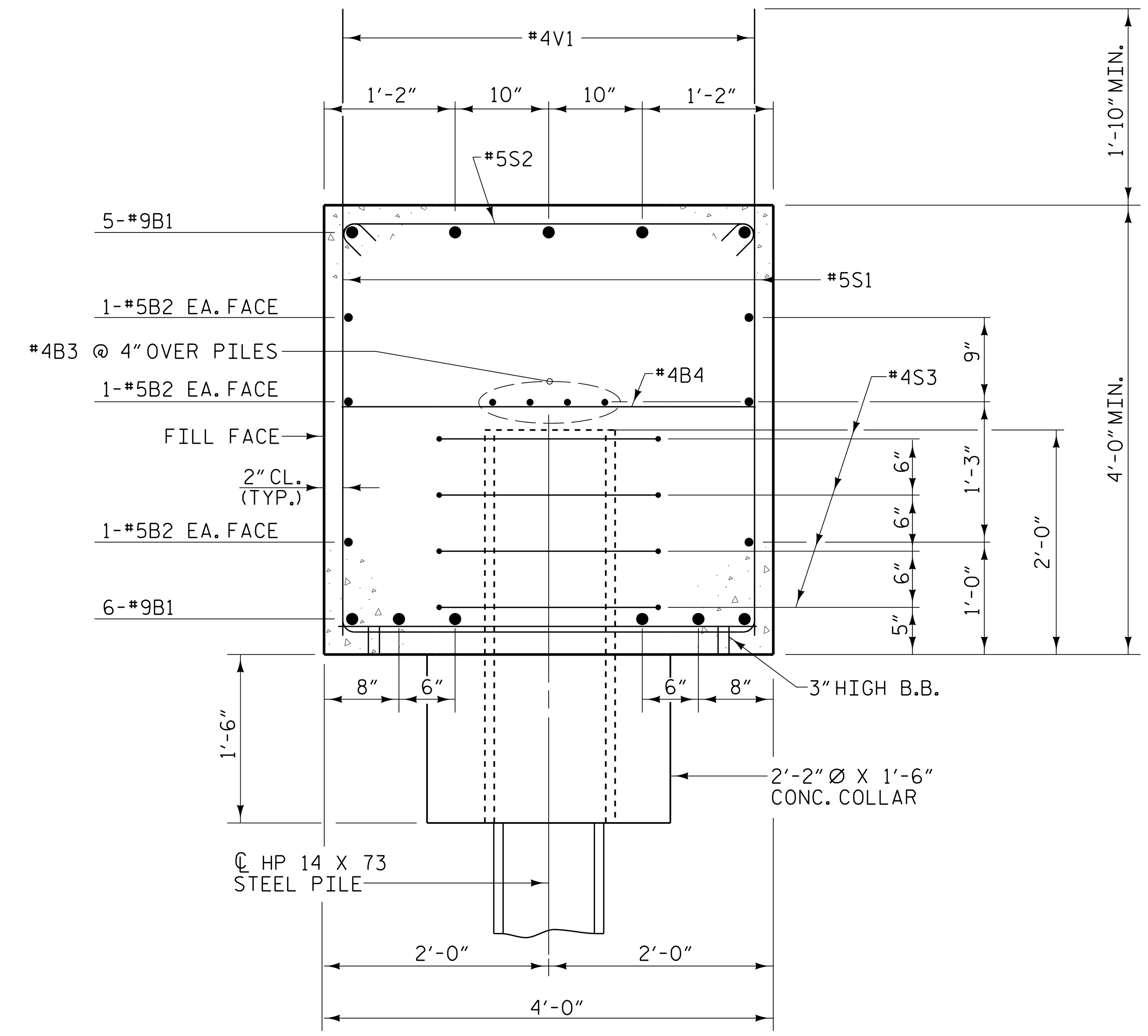
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

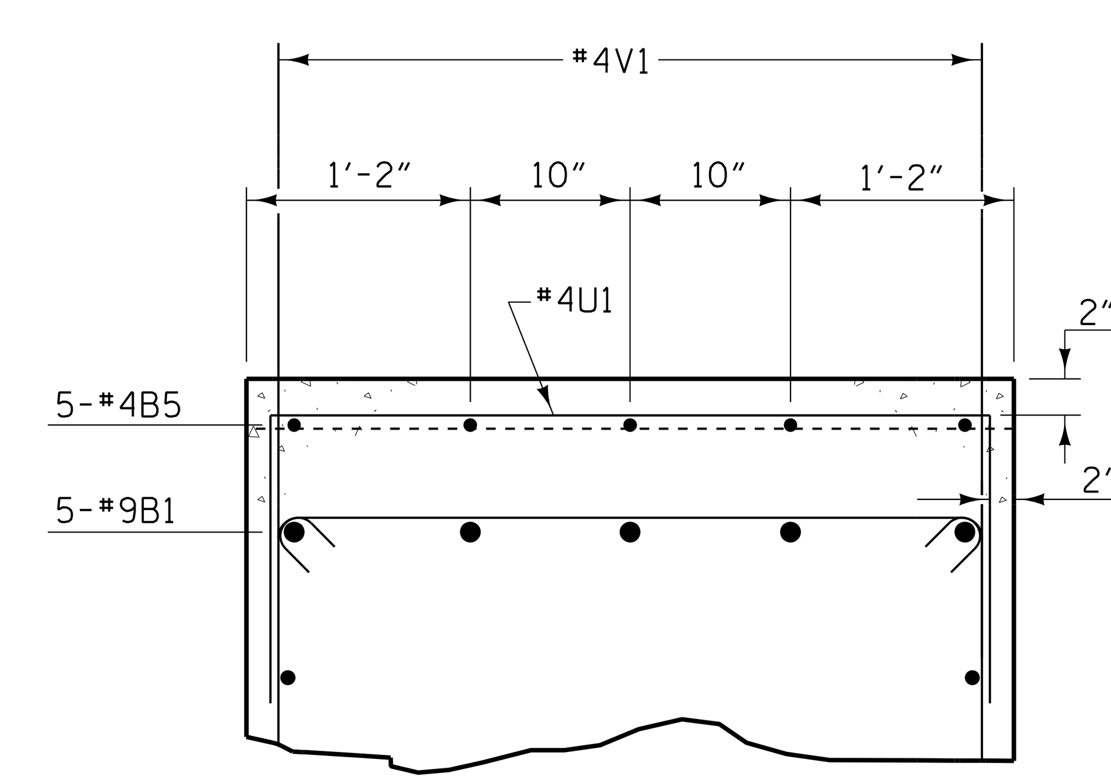
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	11	#9	3	48'-2"	1801
B2	6	#5	STR	45'-8"	286
B3	8	#4	STR	24'-1"	129
B4	12	#4	STR	3'-8"	29
B5	5	#4	STR	12'-8"	42
H1	32	#5	STR	14'-4"	478
H2	28	#5	4	12'-2"	355
H3	56	#5	STR	2'-7"	151
H4	28	#5	5	12'-2"	355
S1	76	#5	1	11'-10"	938
S2	76	#5	2	4'-7"	363
S3	32	#4	6	7'-7"	162
U1	9	#4	7	6'-8"	40
V1	54	#4	STR	6'-0"	216
V2	16	#5	STR	11'-0"	184
V3	88	#5	STR	6'-8"	612

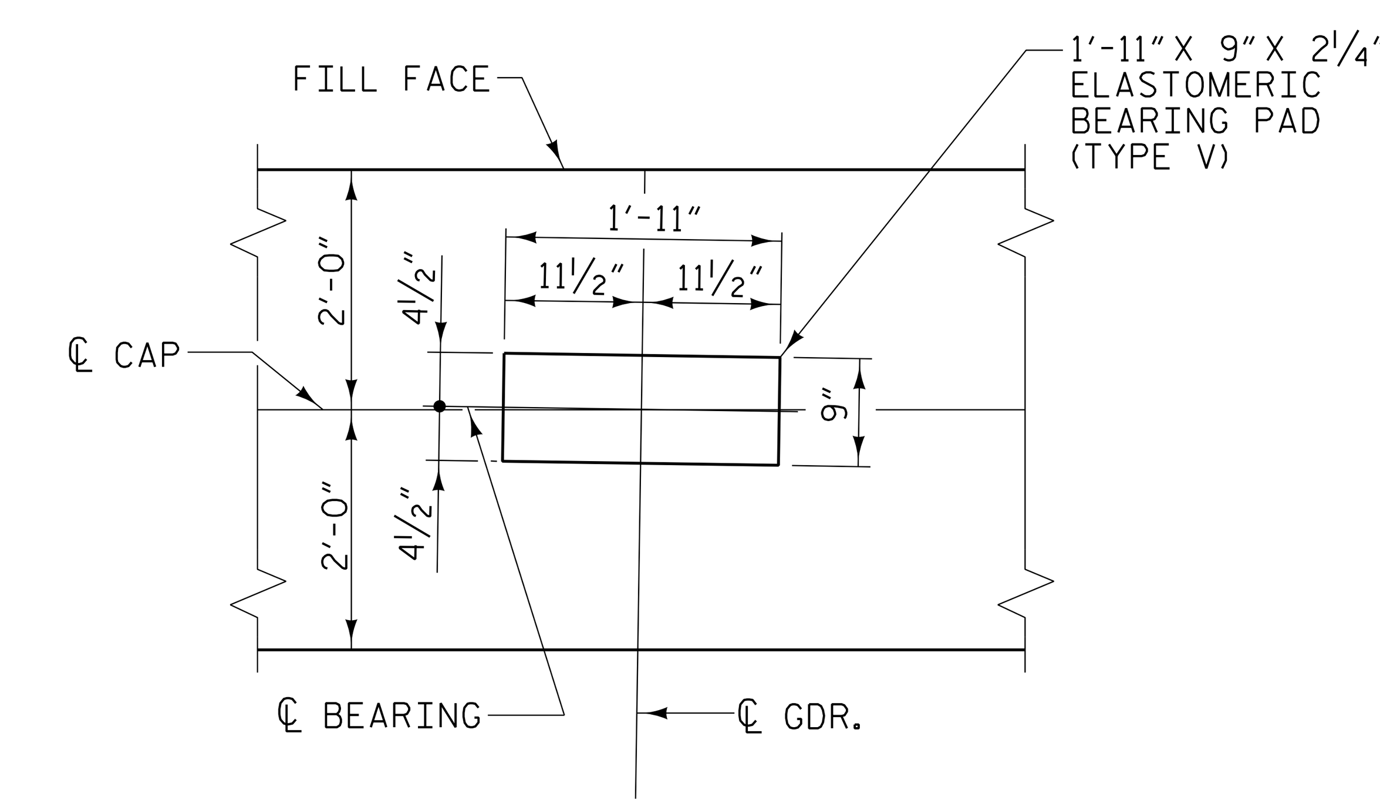
TOTAL REINFORCING STEEL	6141 lbs.
CLASS "A" CONCRETE - CU. YARDS	
POUR 1 (CAP, COLLARS, LOWER WINGS)	32.5 cu. yds.
POUR 2 (UPPER WINGS)	7.4 cu. yds.
TOTAL	39.9 cu. yds.
HP 14 X 73 STEEL PILES 8 PILES REQUIRED - LIN. FEET	736
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES - EACH	8
STEEL PILE POINTS - EACH	8
PILE REDRIVES - EACH	4



SECTION A-A



PART SECTION B-B



DETAIL "A"

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER MATTHEW DAVID METZGER
DocuSigned by: Matt Metzger
4/12/2022

PROJECT NO. R-5819
COLUMBUS COUNTY
STATION: 40+06.72 -Y2- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2 DETAILS

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

SHEET NO. S1-34
TOTAL SHEETS 38

DRAWN BY :	W. B. ALLEN	DATE :	8/21
CHECKED BY :	M. D. METZGER	DATE :	1/22
DESIGN ENGINEER OF RECORD:	M. D. METZGER	DATE :	1/22

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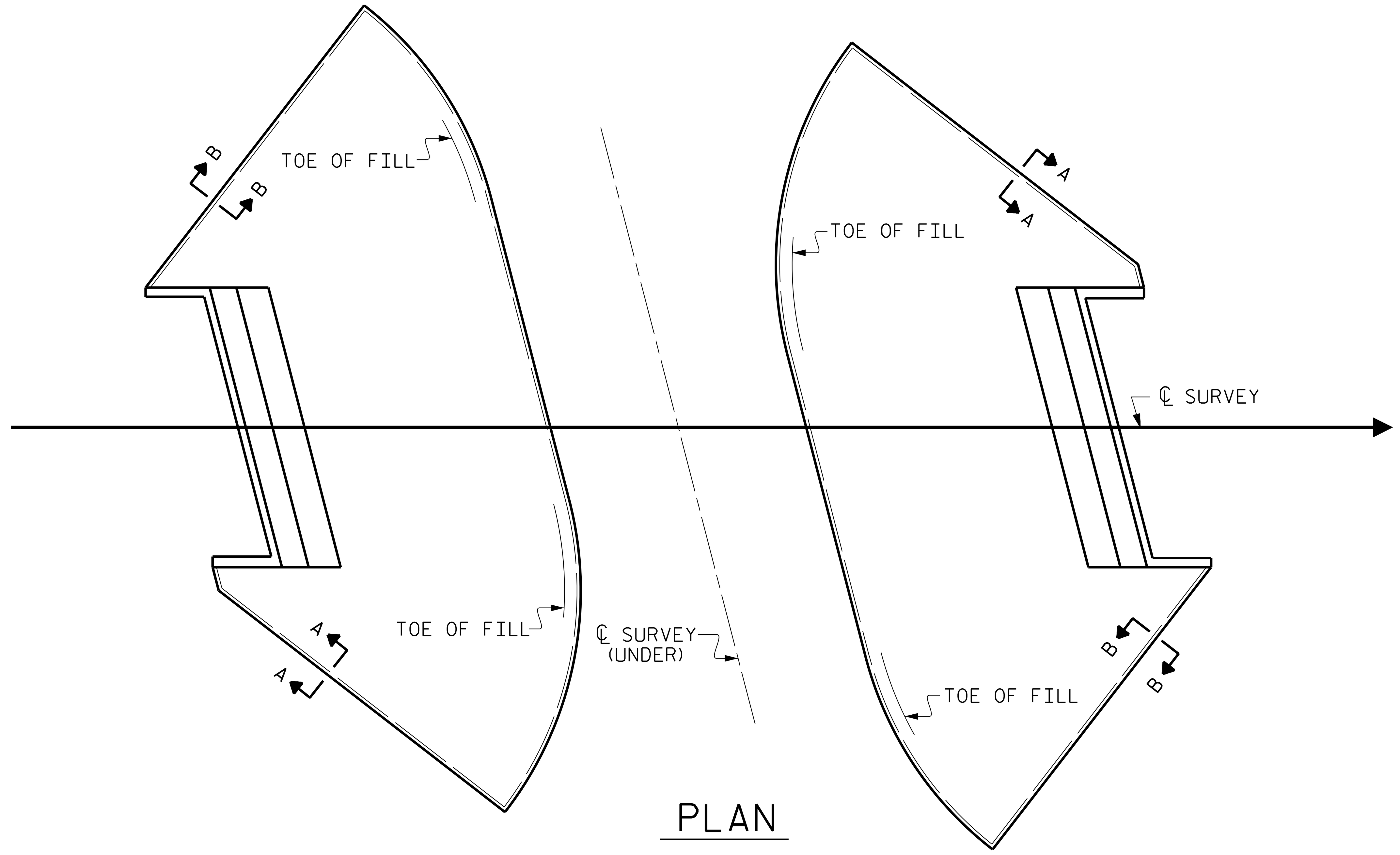


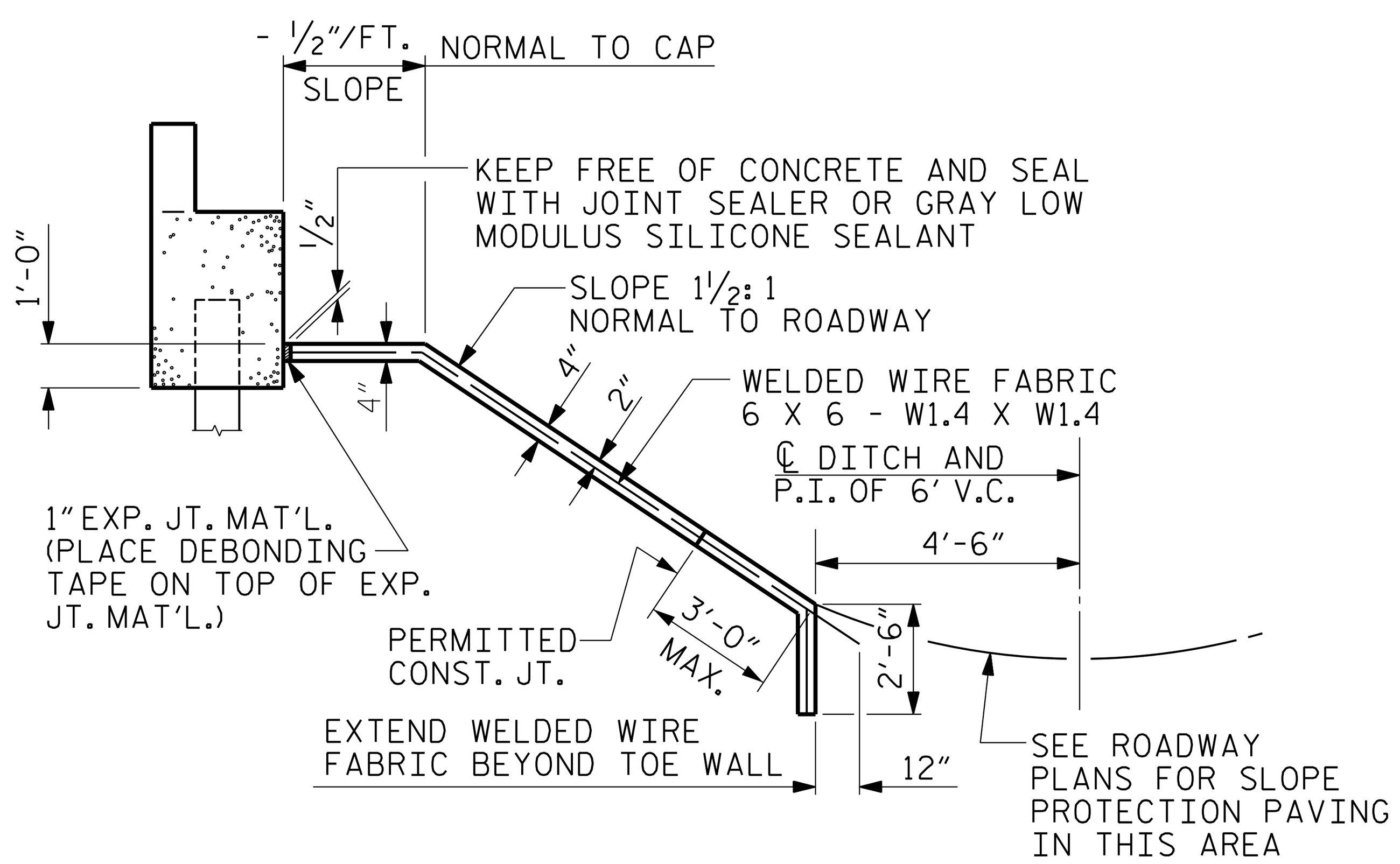
PLAN

GENERAL NOTES

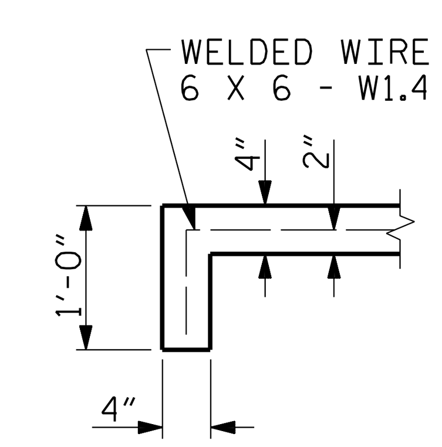
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE 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. 40+06.72 -Y2-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	337	607
END BENT 2	471	847

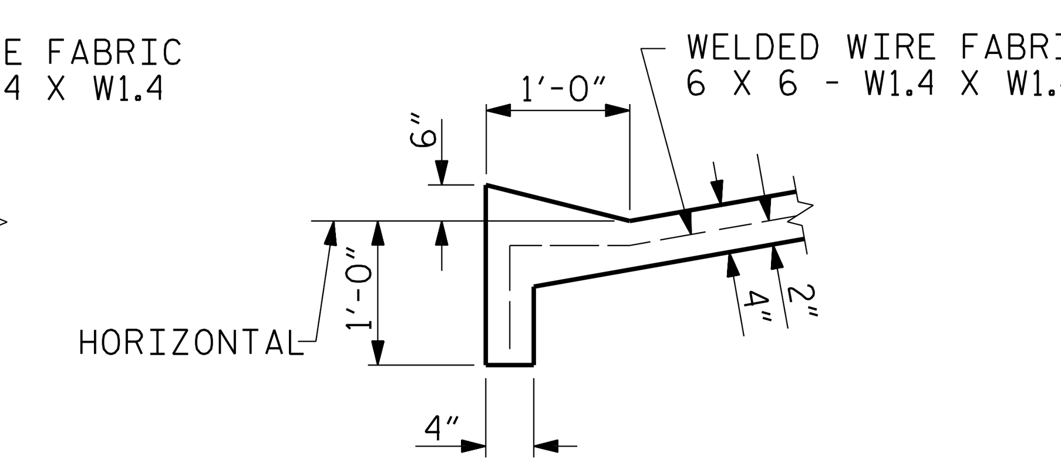
* QUANTITY SHOWN IS BASED ON 5' POURS.



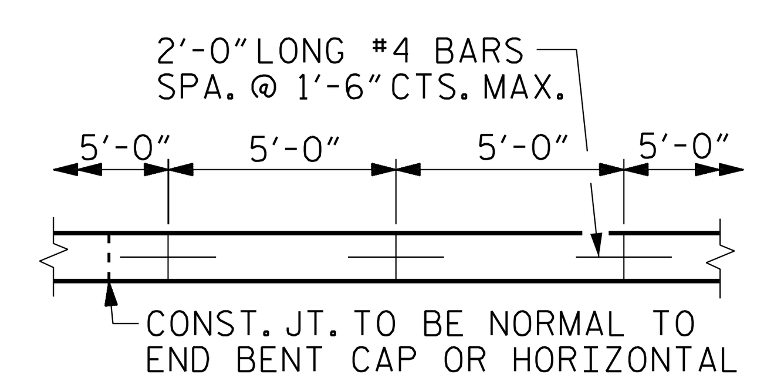
SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH



SECTION A-A

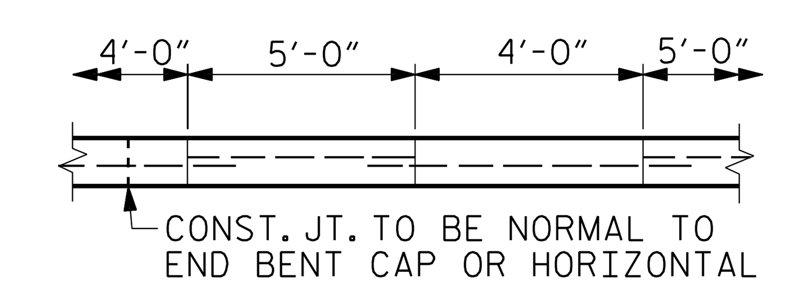


SECTION B-B



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-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER

4/12/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-35
1			3			TOTAL SHEETS 38
2			4			

ASSEMBLED BY : W. B. ALLEN	DATE : 8/21	
CHECKED BY : M. D. METZGER	DATE : 1/22	
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

STD. NO. SP1 (SHT 5)

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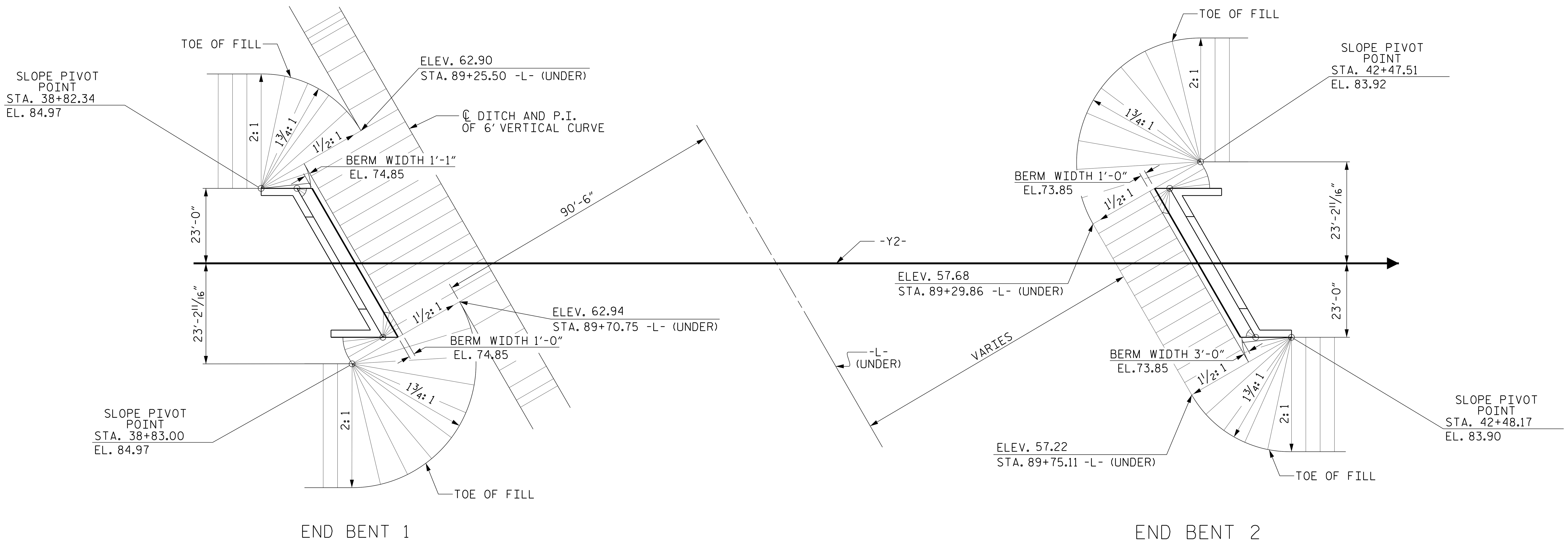
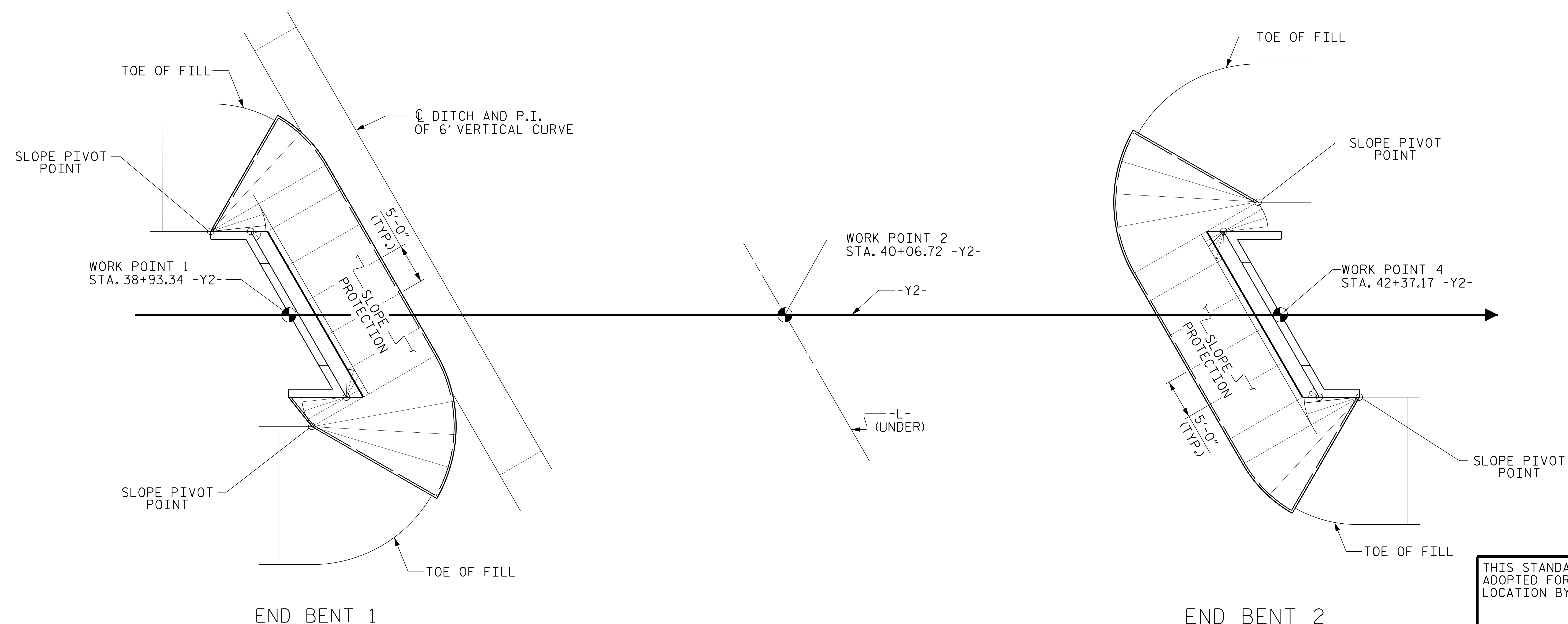


PLAN - GRADING



PLAN - CONCRETE PLACEMENT

(1½ :1 SLOPE)

PLANS PREPARED BY:

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PROJECT NO. R-5819
COLUMBUS COUNTY
STATION: 40+06.72 -Y2- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — MATTHEW DAVID METZGER (DocuSigned by: Matt Metzger)

4/12/2022

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NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S1-36
1			3			TOTAL SHEETS	38
2			4				

ASSEMBLED BY : W. B. ALLEN	DATE : 8/21		
CHECKED BY : M. D. METZGER	DATE : 1/22		
DRAWN BY : WJH 10/88	REV. 10/1/11	MAA/GM	
CHECKED BY : FCJ 10/88	REV. 1/16	MAA/TMG	
	REV. 12/17	MAA/THC	

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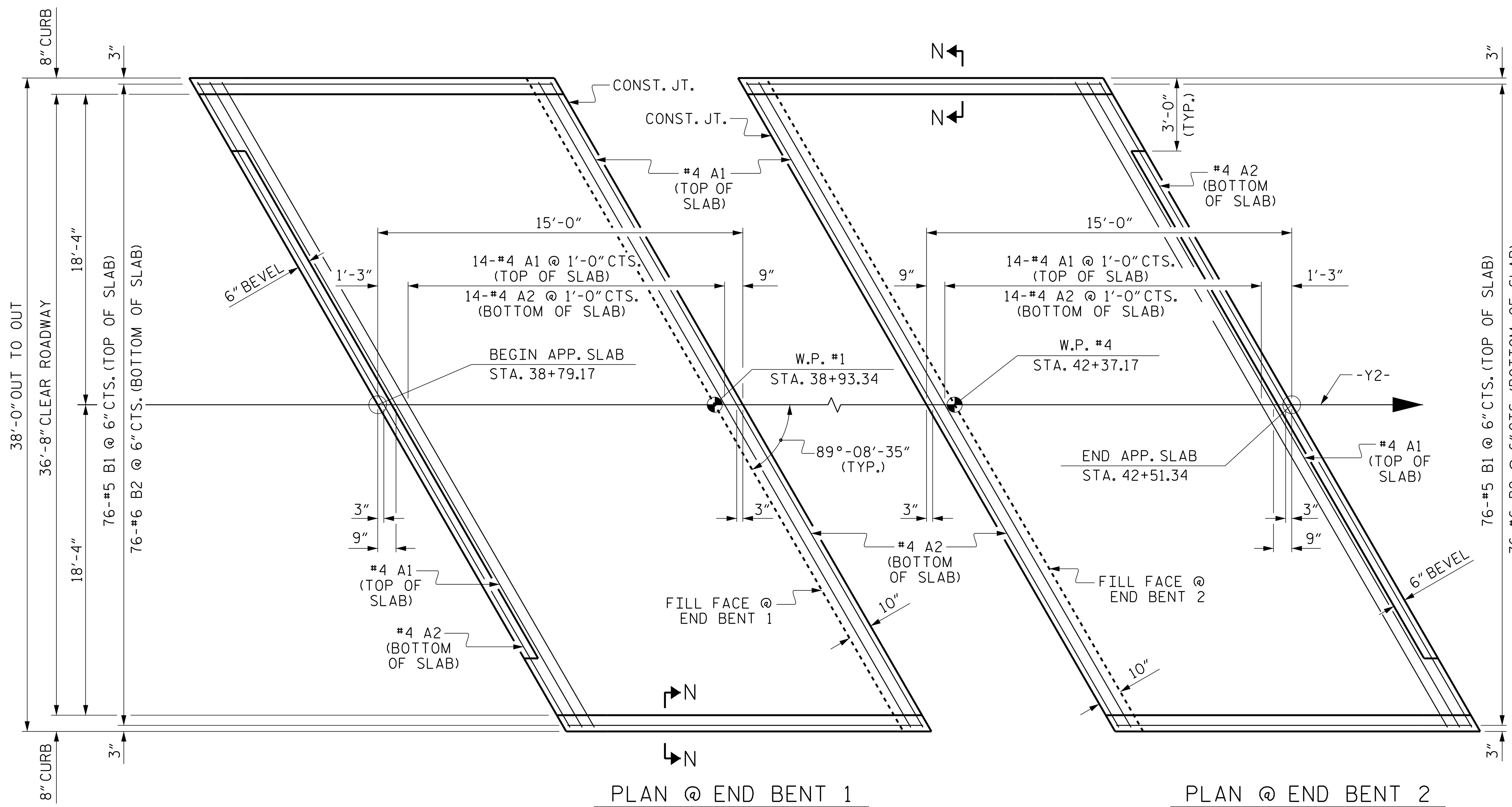


NOTES

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.

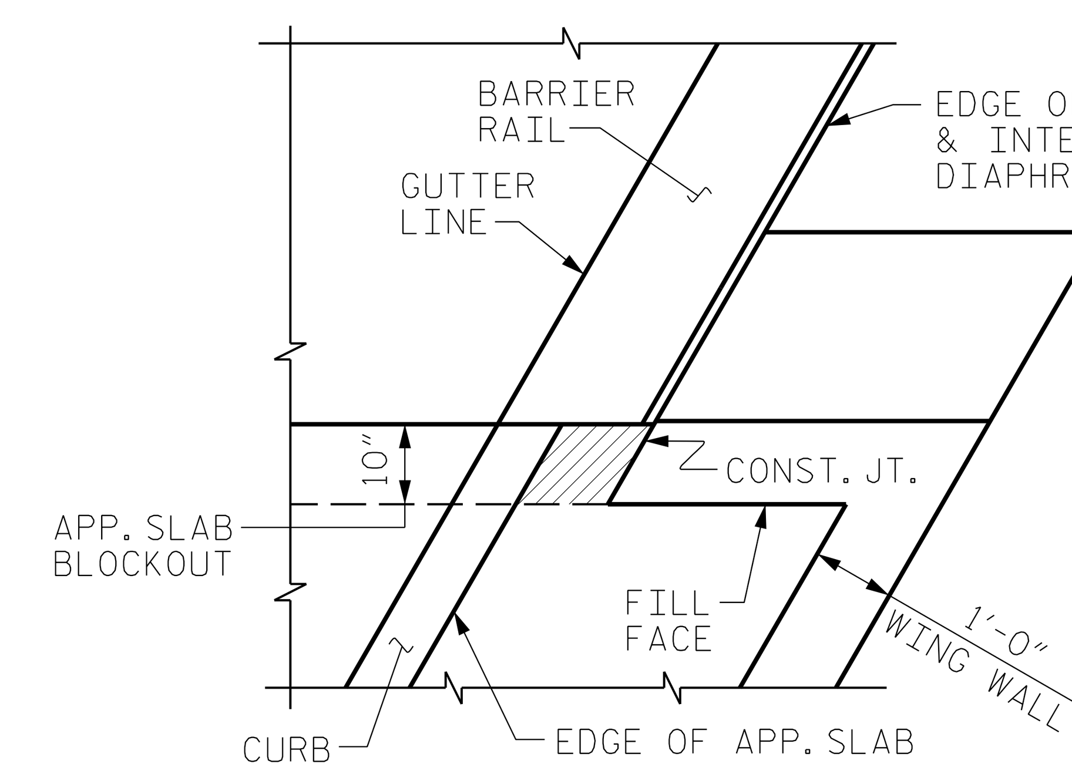
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

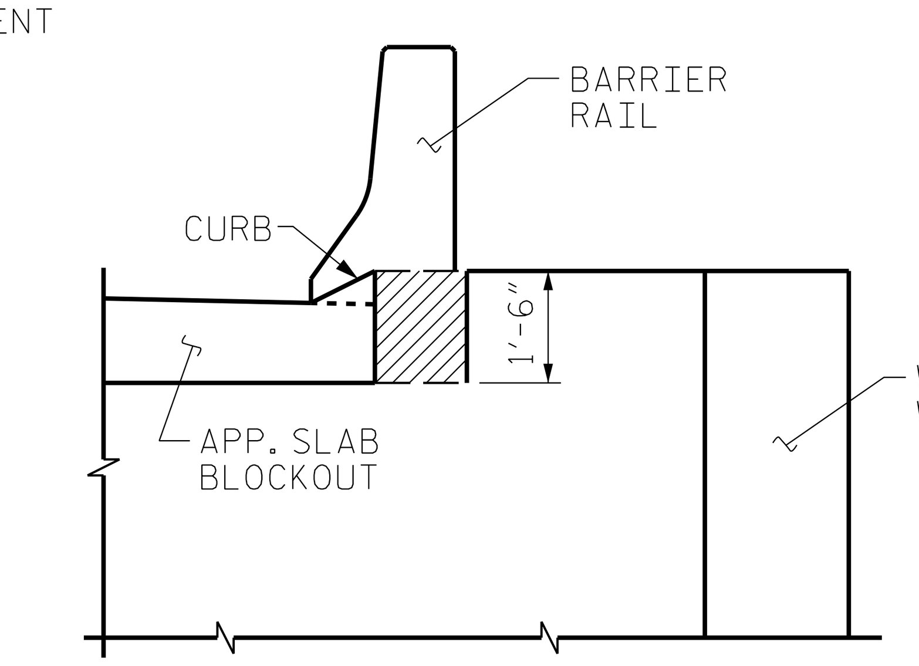
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	16	#4	STR	37'-8"	403
A2	16	#4	STR	37'-8"	403
* B1	76	#5	STR	14'-3"	1130
B2	76	#6	STR	14'-8"	1674
REINFORCING STEEL				LBS.	2077
* EPOXY COATED REINFORCING STEEL				LBS.	1533
CLASS AA CONCRETE				C.Y.	24.6

SPLICE LENGTHS

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



PLAN

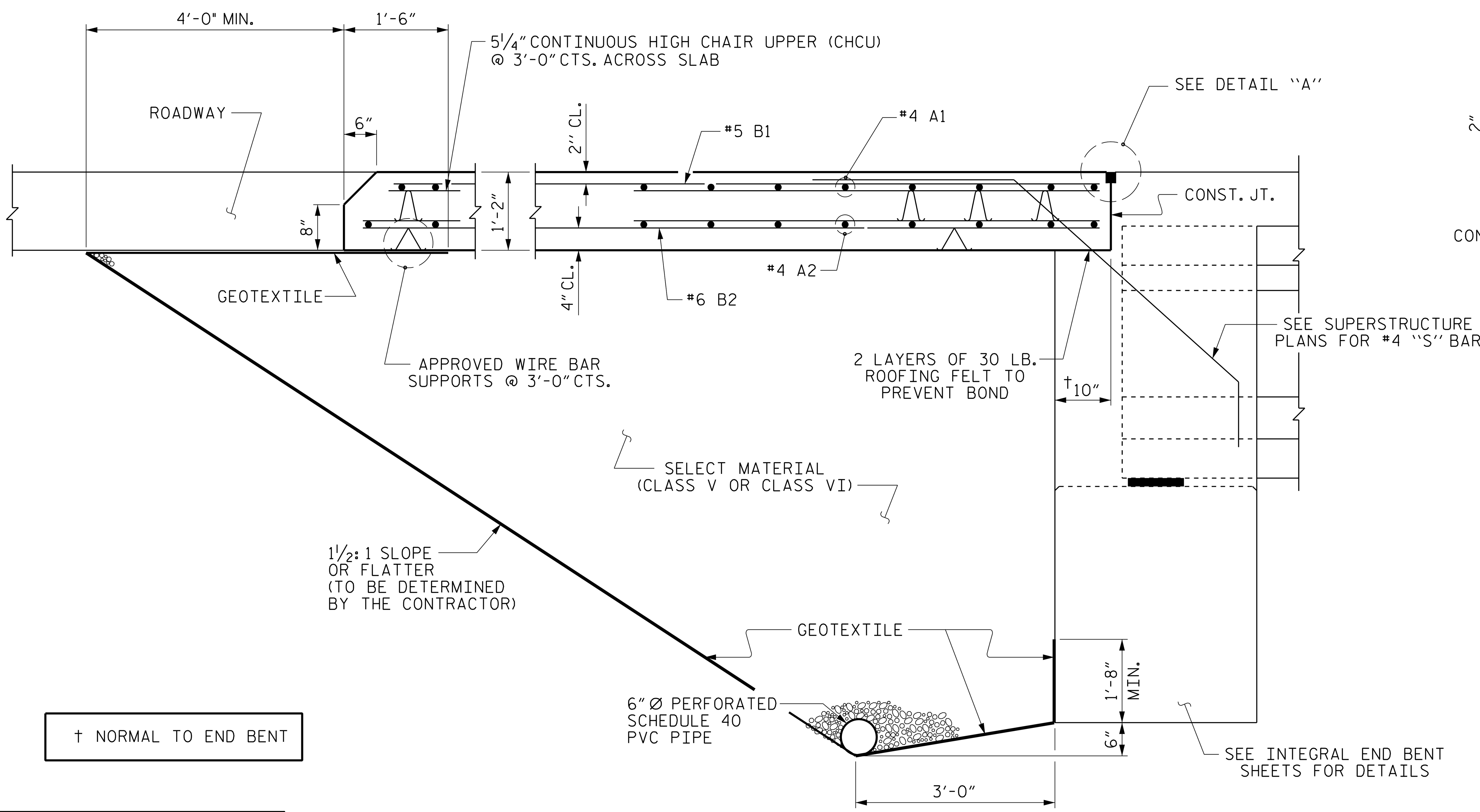


ELEVATION

THE CONCRETE IN THE SHADED AREA SHALL BE POURED ALONG WITH APPROACH SLAB CONSTRUCTION AND AFTER BARRIER RAIL HAS BEEN CAST IF SLIP FORMING IS USED.

APPROACH SLAB BLOCKOUT

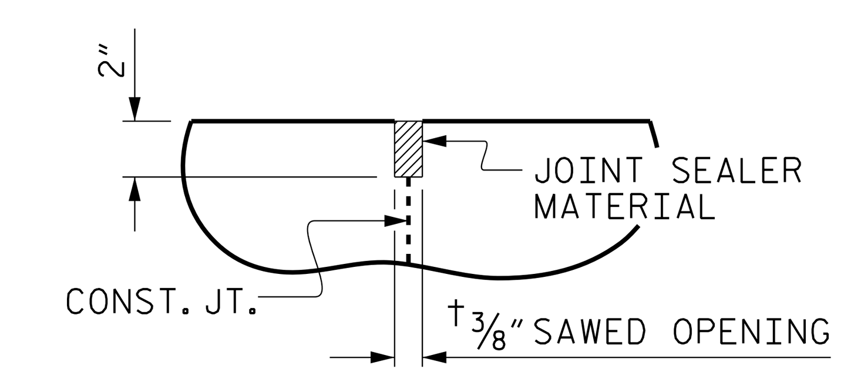
(WHEN APPROACH SLAB HAS CURB)



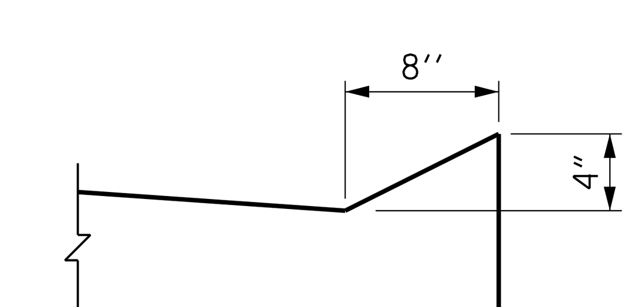
† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)



DETAIL "A"



SECTION N-N

PROJECT NO. R-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
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NC License # F-1333
formerly CALYX Engineers & Consultants

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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

4/12/2022

ASSEMBLED BY :	W. B. ALLEN	DATE : 6/21			
CHECKED BY :	M. D. METZGER	DATE : 8/21			
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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1			3		
2			4		

SHEET NO. S1-37

TOTAL SHEETS 38

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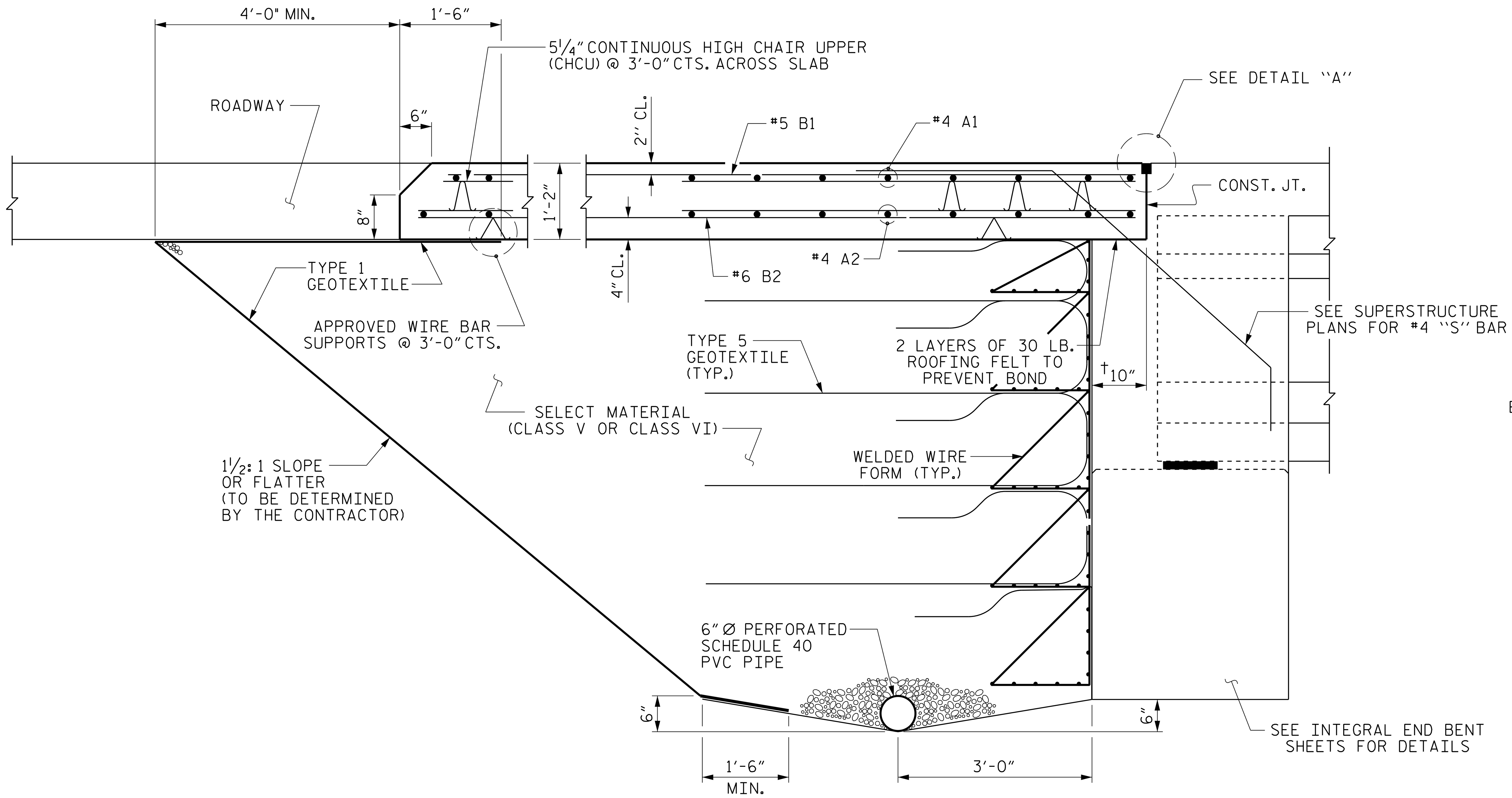
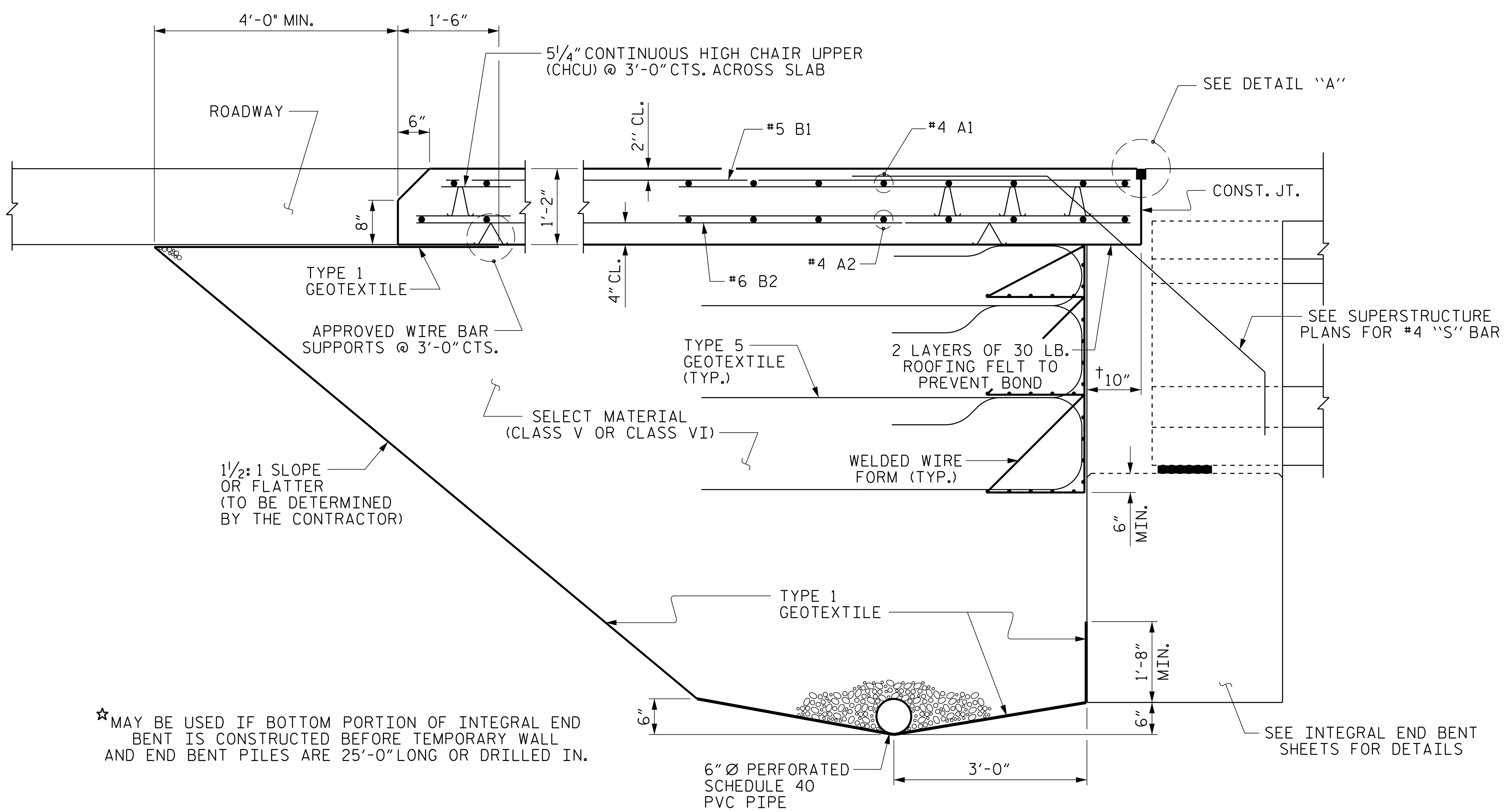


SECTION THRU SLAB

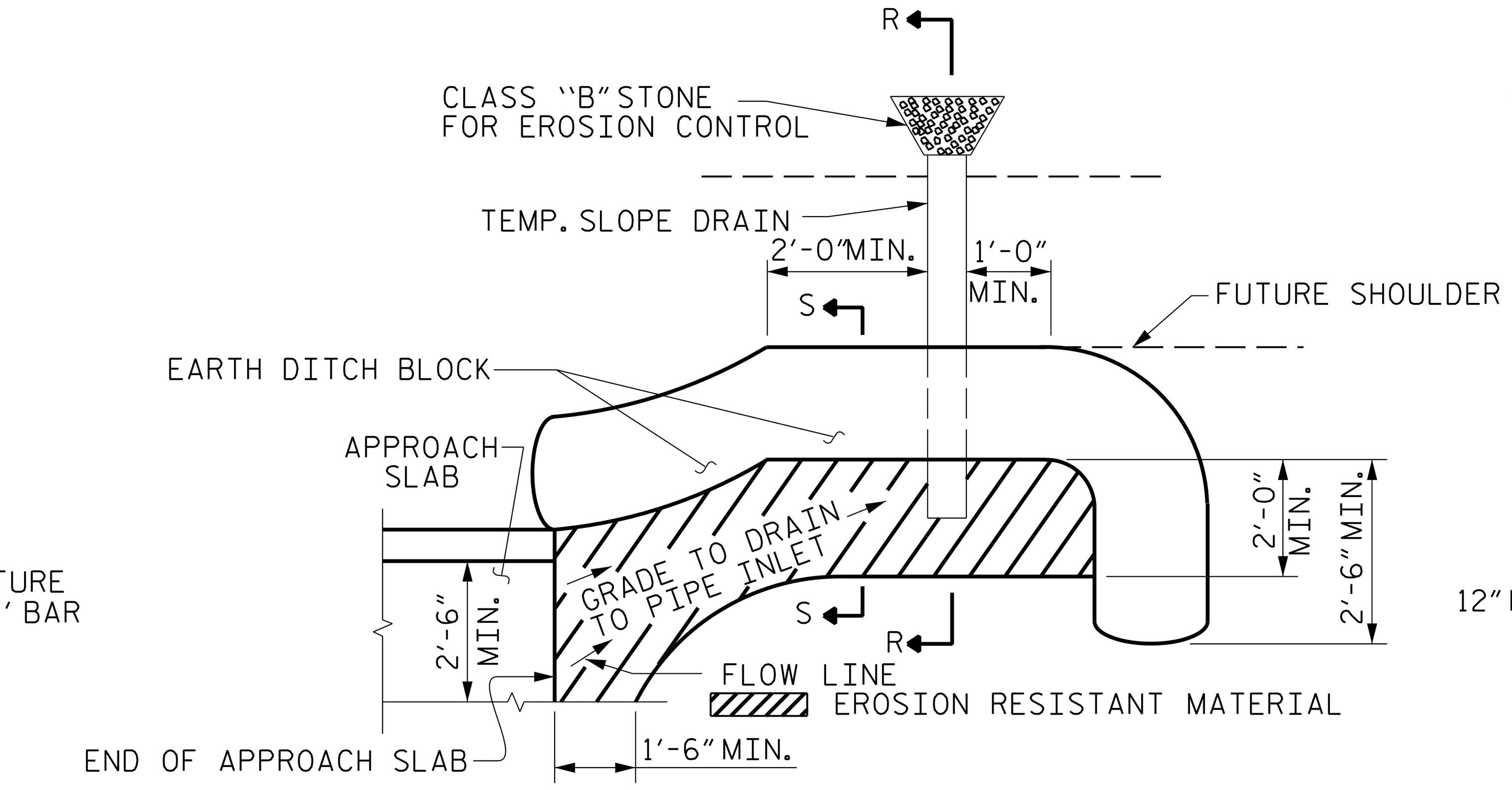
(TYPE A - ALTERNATE APPROACH FILL)



☆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.

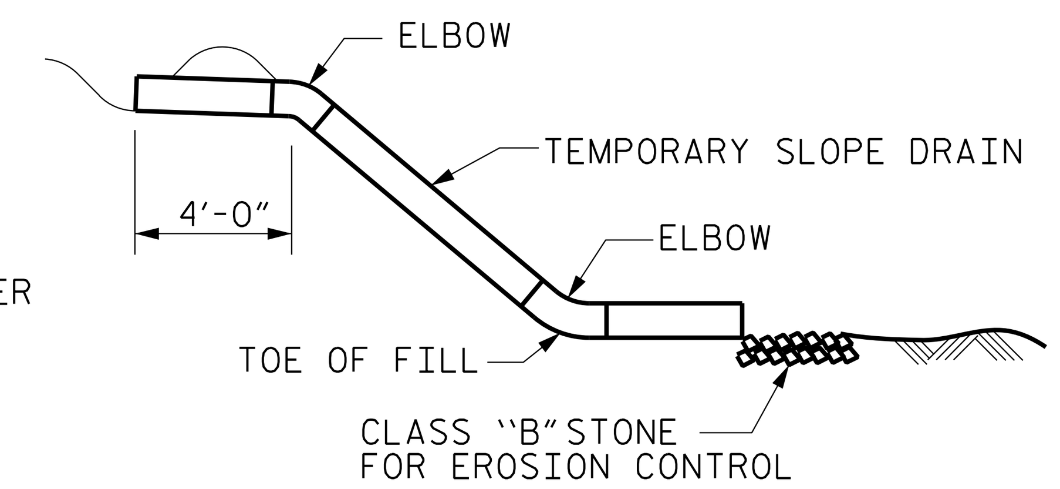
SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)

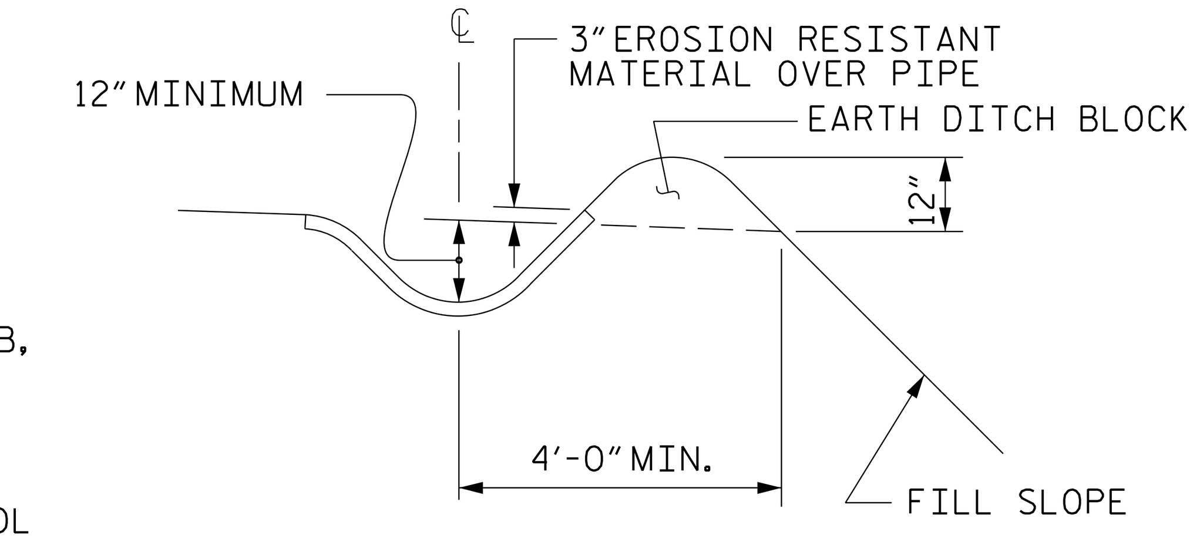


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



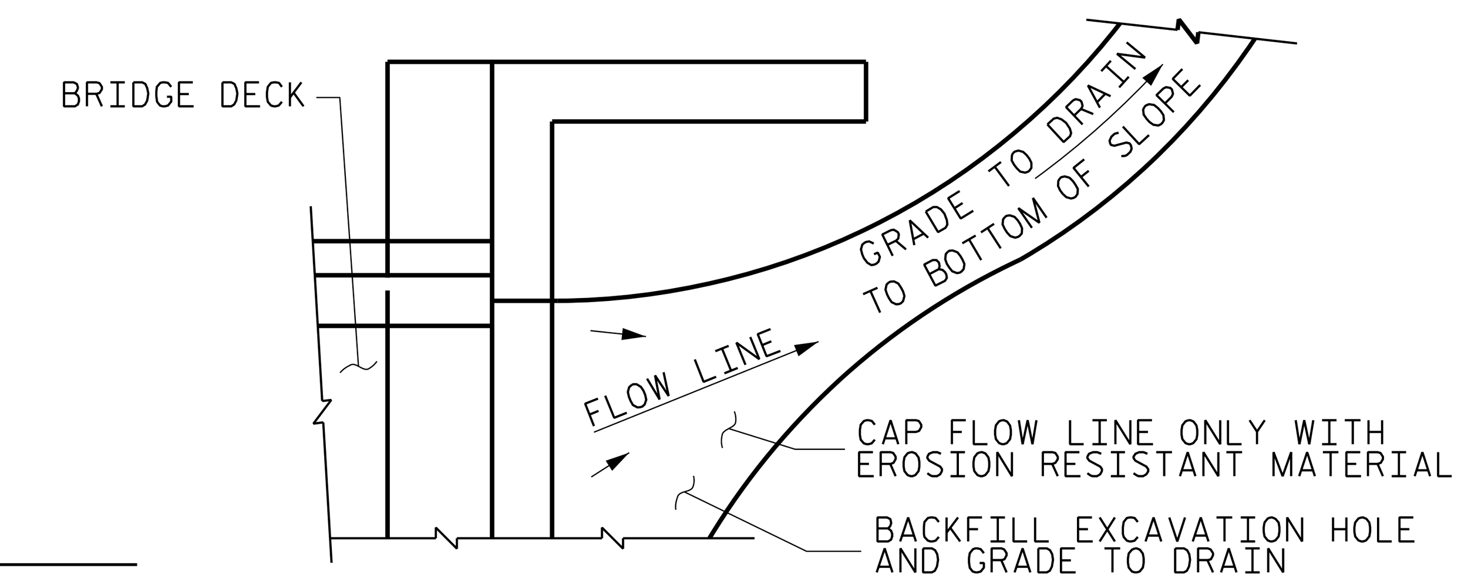
SECTION R-R



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-5819

COLUMBUS COUNTY

STATION: 40+06.72 -Y2- POT

SHEET 2 OF 2

PLANS PREPARED BY:

NV5

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4/12/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

ASSEMBLED BY : W. B. ALLEN	DATE : 6/21
CHECKED BY : M. D. METZGER	DATE : 8/21

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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1			3		
2			4		

SHEET NO. S1-38
TOTAL SHEETS 38

STD. NO. BAS5

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