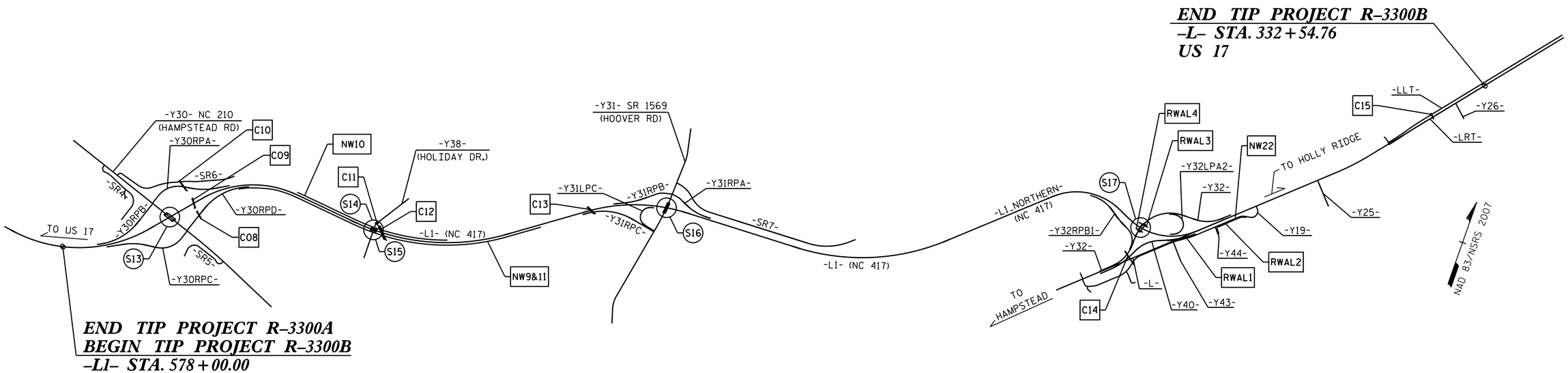

STRUCTURES INDEX

STRUCTURES ID NUMBER	PROJECT STATION	STRUCTURE DESCRIPTION	PAGE RANGE
S13 (700257)	39+82.39 -Y30-	BRIDGE OVER NC 417 (-L1-) ON NC 210 (-Y30-)	S13-01 THRU S13-38
S14 (700258)	658+69.17 -L1- (LL)	LL BRIDGE OVER HOLIDAY DRIVE (-Y38-) ON SB NC 417 (-L1-)	S14-01 THRU S14-30
S15 (700259)	658+69.17 -L1- (RL)	RL BRIDGE OVER HOLIDAY DRIVE (-Y38-) ON NB NC 417 (-L1-)	S15-01 THRU S15-30
S16 (700260)	30+17.11 -Y31-	BRIDGE OVER NC 417 (-L1-) ON HOOVER ROAD (-Y31-)	S16-01 THRU S16-38
S17 (700262)	25+28.04 -Y32-	BRIDGE OVER NC 417 (-L1-) ON US 17 (-Y32-)	S17-01 THRU S17-38
C08	19+49.00 -Y30RPD-	CULVERT UNDER NC 417 NB ON-RAMP FROM NC 210	C08-01 THRU C08-07
C09	612+13.00 -L1-	CULVERT UNDER NC 417 (-L1-)	C09-01 THRU C09-06
C10	16+22.00 -Y30RPA-	CULVERT UNDER NC 417 NB OFF-RAMP TO NC 210	C10-01 THRU C10-07
C11 (700263)	19+80.00 -Y38-	CULVERT UNDER HOLIDAY DRIVE (-Y38-)	C11-01 THRU C11-06
C12 (700264)	660+85.00 -L1-	CULVERT UNDER NC 417 (-L1-)	C12-01 THRU C12-07
C13 (700265)	712+62.00 -L1-	CULVERT UNDER NC 417 (-L1-)	C13-01 THRU C13-06
C14	18+00.00 -Y32-	CULVERT UNDER SB US 17 (-Y32-)	C14-01 THRU C14-08
C15	320+01.00 -L-	CULVERT UNDER US 17 (-L-)	C15-01 THRU C15-07
NW9&11	623+71.35 -L1-	NOISE WALL ALONG OUTSIDE SHOULDER OF NB NC 417 (-L1-)	SW9&11-01 THRU SW9&11-10
NW10	638+10.79 -L1-	NOISE WALL ALONG OUTSIDE SHOULDER OF SB NC 417 (-L1-)	SW10-01 THRU SW10-07
NW22	47+26.28 -Y19-	NOISE WALL ALONG (-Y19-) AND LEEWARD LANE (-Y44-)	SW22-01 THRU SW22-05
RWAL1	249+62.70 -Y40-	RETAINING WALL BETWEEN (-Y40-) AND (-Y19-)	W1 THRU W8
RWAL2	47+85.00 -Y19-	RETAINING WALL BETWEEN ALONG (-Y19-) AND NW22	W9 THRU W12
RWAL3	26+15.39 -Y32-	RETAINING WALL BETWEEN AT END BENT 2 OF STRUCTURE S17 (700262)	W13 THRU W19
RWAL4	24+53.79 -Y32-	RETAINING WALL BETWEEN AT END BENT 1 OF STRUCTURE S17 (700262)	W13 THRU W19

PROJECT NO. R-3300B

PENDER COUNTY

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DRAWN BY : S. S. POOLE DATE : 11/16/21
CHECKED BY : T. R. DUDECK DATE : 11/16/21

DESIGN ENGINEER OF RECORD: T. R. DUDECK DATE : 11/16/21

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURES INDEX

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-00
1			3			TOTAL SHEETS
2			4			

spoole
9/15/2021
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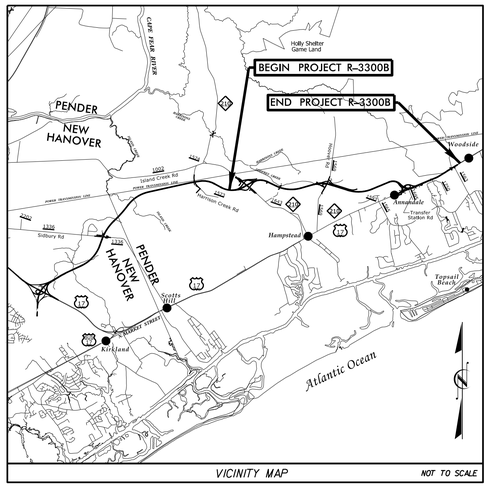
09/08/06

TIP PROJECT: R-3300B

CONTRACT: C204553



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PENDER COUNTY

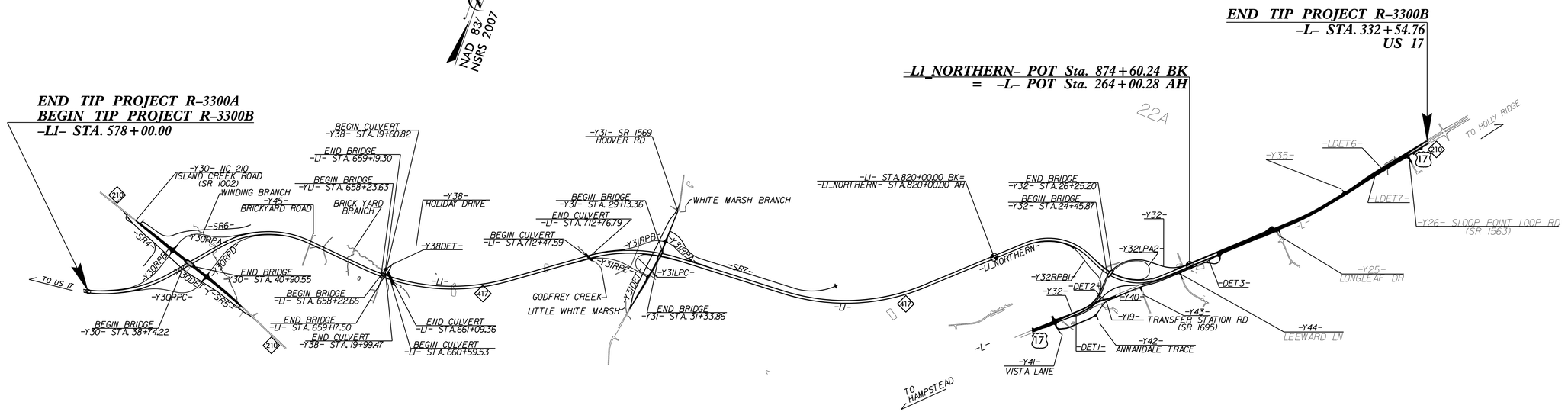
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3300B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
40237.1.2	N/A	PE
40237.2.5	N/A	R/W & UTIL
40237.3.3	N/A	CONSTR

LOCATION: *NC 417 (HAMPSTEAD BYPASS) FROM SOUTH OF NC 210 TO NORTH OF SR 1563 (SLOOP POINT LOOP ROAD).*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNALS, ITS, NOISE WALLS, RETAINING WALLS, AND CULVERTS*

NAD 83/ NSRS 2007



STRUCTURES

DESIGN DATA

ADT 2016 = N/A
ADT 2040 = 55,400
K = 8 %
D = 60 %
T = 6 % *
V = 70 MPH
*(TTST 2% + DUALS 4%)
FUNC CLASS = FREEWAY
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3300B	=	6.898 MILES
LENGTH STRUCTURE TIP PROJECT R-3300B	=	0.018 MILES
TOTAL LENGTH TIP PROJECT R-3300B	=	6.916 MILES

PREPARED IN THE OFFICE OF:
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FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

LETTING DATE:
JANUARY 18, 2022

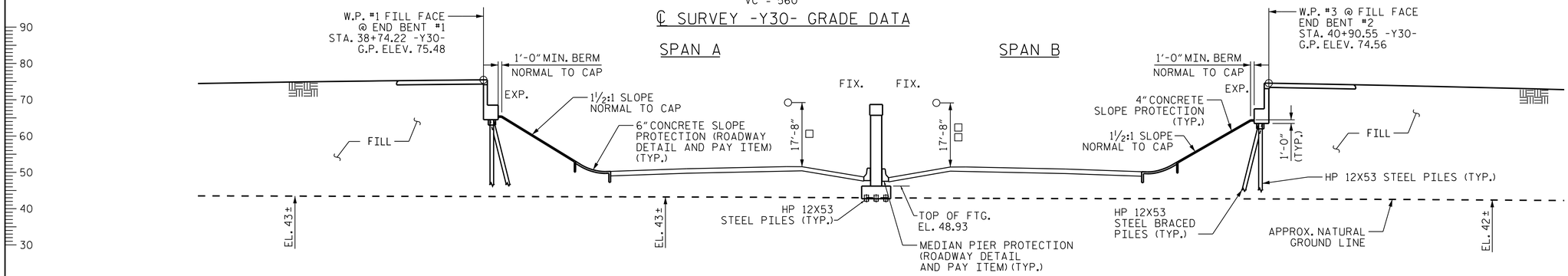
11/17/2021
U:\Structures\Project Structure Control\INDEX SHEET\R-3300B_SMU_TITLE_SHEET.dgn
spoole

38+00 38+50 39+00 39+50 40+00 40+50 41+00 41+50

(+)3.2000% △ (-)3.4077%

PI STA. = 39+55.00 -Y30-
EL = 80.41'
VC = 560'

℄ SURVEY -Y30- GRADE DATA



□ MIN. VERT. CLR. STA. 39+40.75 -Y30-

□□ MIN. VERT. CLR. STA. 39+90.22 -Y30-

END BENT 1 BENT 1 END BENT 2

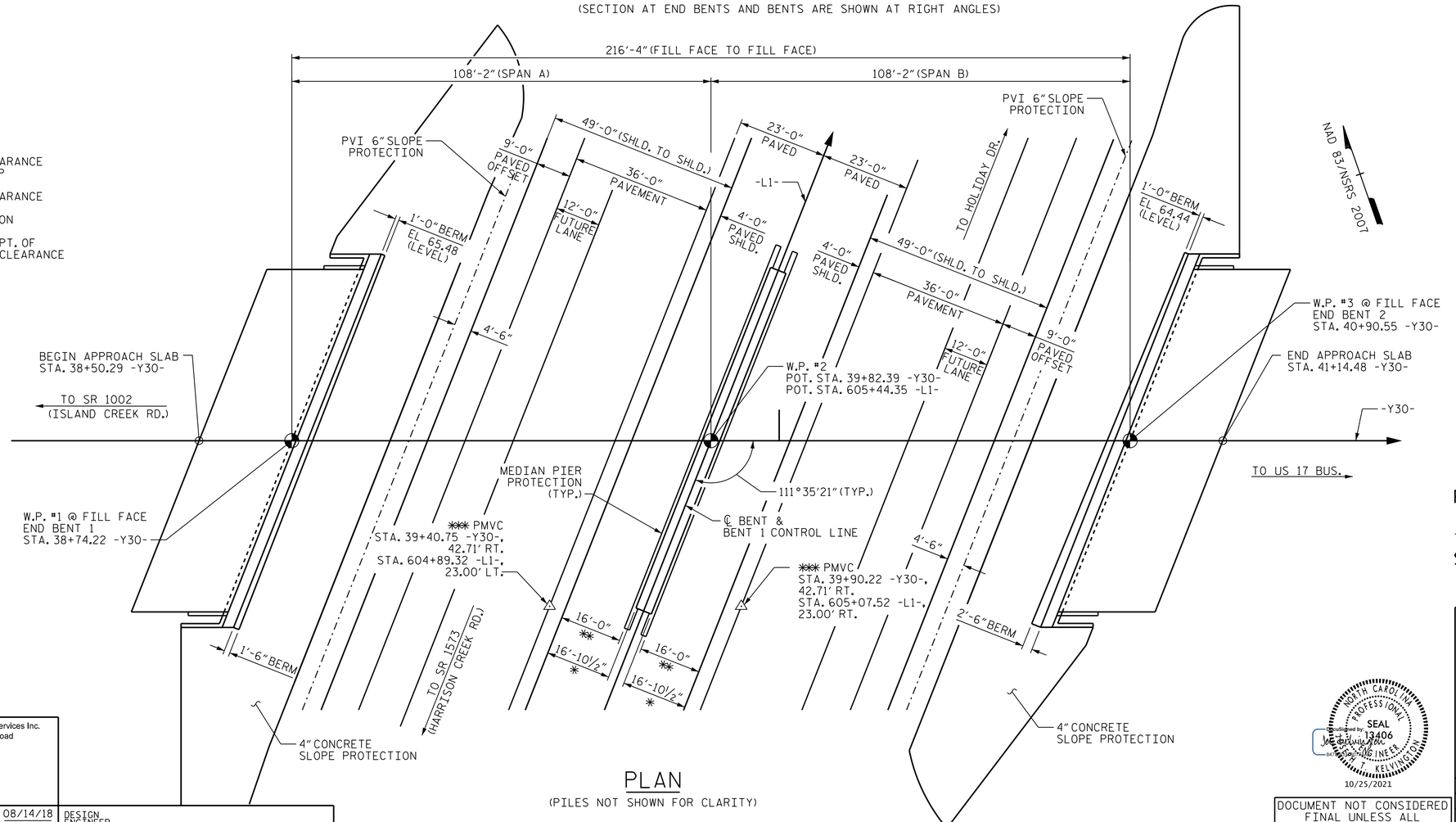
SECTION ALONG ℄ SURVEY -Y30-

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

* MIN. HORIZ. CLEARANCE TO FACE OF CAP

** MIN. HORIZ. CLEARANCE TO FACE OF PIER PROTECTION

*** PMVC DENOTES PT. OF MIN. VERTICAL CLEARANCE



PLAN

(PILES NOT SHOWN FOR CLARITY)

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-
605+44.35 -L1-

SHEET 1 OF 3 BRIDGE #700257

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER NC 417
ON NC 210
BETWEEN US 17 BUS. AND
SR 1002 (ISLAND CREEK RD.)

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. Kelvington
10/25/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
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2			4			38

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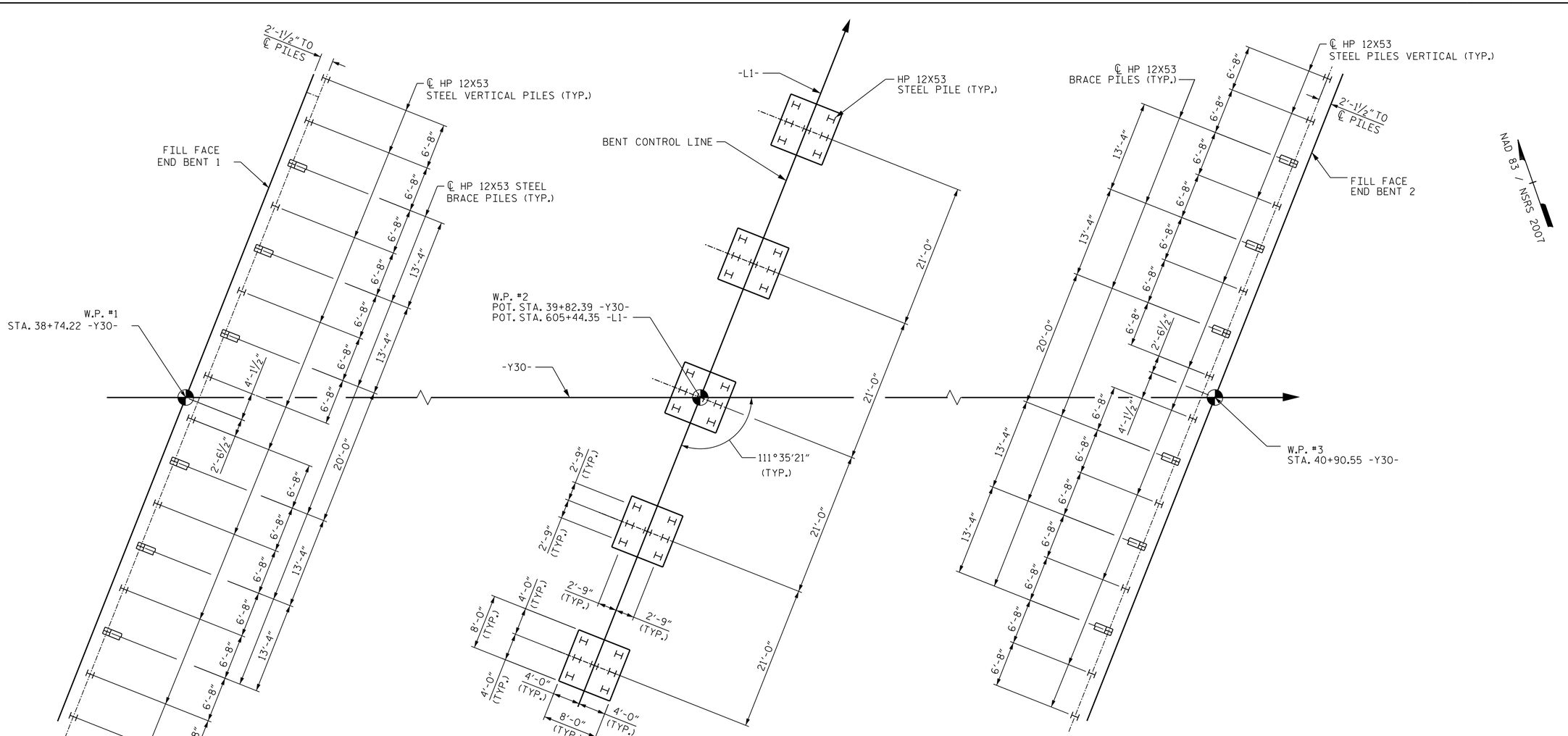
DRAWN BY : J. B. GEILE DATE : 08/14/18
CHECKED BY : N. D'AIUTO DATE : 05/13/19

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21



FOUNDATION LAYOUT

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

INSTALL PILES AT END BENT 1 TO A TIP ELEVATION NO HIGHER THAN -10 FT LT, -4 FT RT.

THE END BENT NO. 1 EMBANKMENT IS TO BE CONSTRUCTED IN STAGES. OBSERVE A 3 MONTH WAITING PERIOD FOR STATE 1 AFTER CONSTRUCTING EMBANKMENT FILL TO EL. 73 FT. BEFORE CONTINUING FILL PLACEMENT. OBSERVE AND ADDITIONAL 3 MONTH WAITING PERIOD FOR STAGE 2 AFTER CONSTRUCTING THE EMBANKMENT TO FINAL GRADE AND PLACING SURCHARGE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

THE END BENT NO. 2 EMBANKMENT IS TO BE CONSTRUCTED IN STAGES. OBSERVE A 2.5 MONTH WAITING PERIOD FOR STAGE 1 AFTER CONSTRUCTING EMBANKMENT FILL TO EL. 69 FT. BEFORE CONTINUING FILL PLACEMENT. OBSERVE AN ADDITIONAL 2.5 MONTH WAITING PERIOD FOR STAGE 2 AFTER CONSTRUCTING THE EMBANKMENT TO FINAL GRADE AND PLACING SURCHARGE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 2 FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLAN AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATION FOR THE SETTLEMENT GAUGES, STAGED CONSTRUCTION, AND SURCHARGE REQUIRED AT END BENTS NO. 1 AND 2.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

INSTALL PILES AT END BENT 2 TO A TIP ELEVATION NO HIGHER THAN -10 FT LT, -7 FT RT.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 255 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

INSTALL PILES AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN -10 FT.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT BENT 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 65 TO 85 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-(D)(2) OF THE STANDARD SPECIFICATIONS.

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

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DRAWN BY : J.E. HAGENBUSH DATE : 01/03/19
CHECKED BY : N. D'AIUTO DATE : 05/13/19

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. KELVINGTON
10/25/2021

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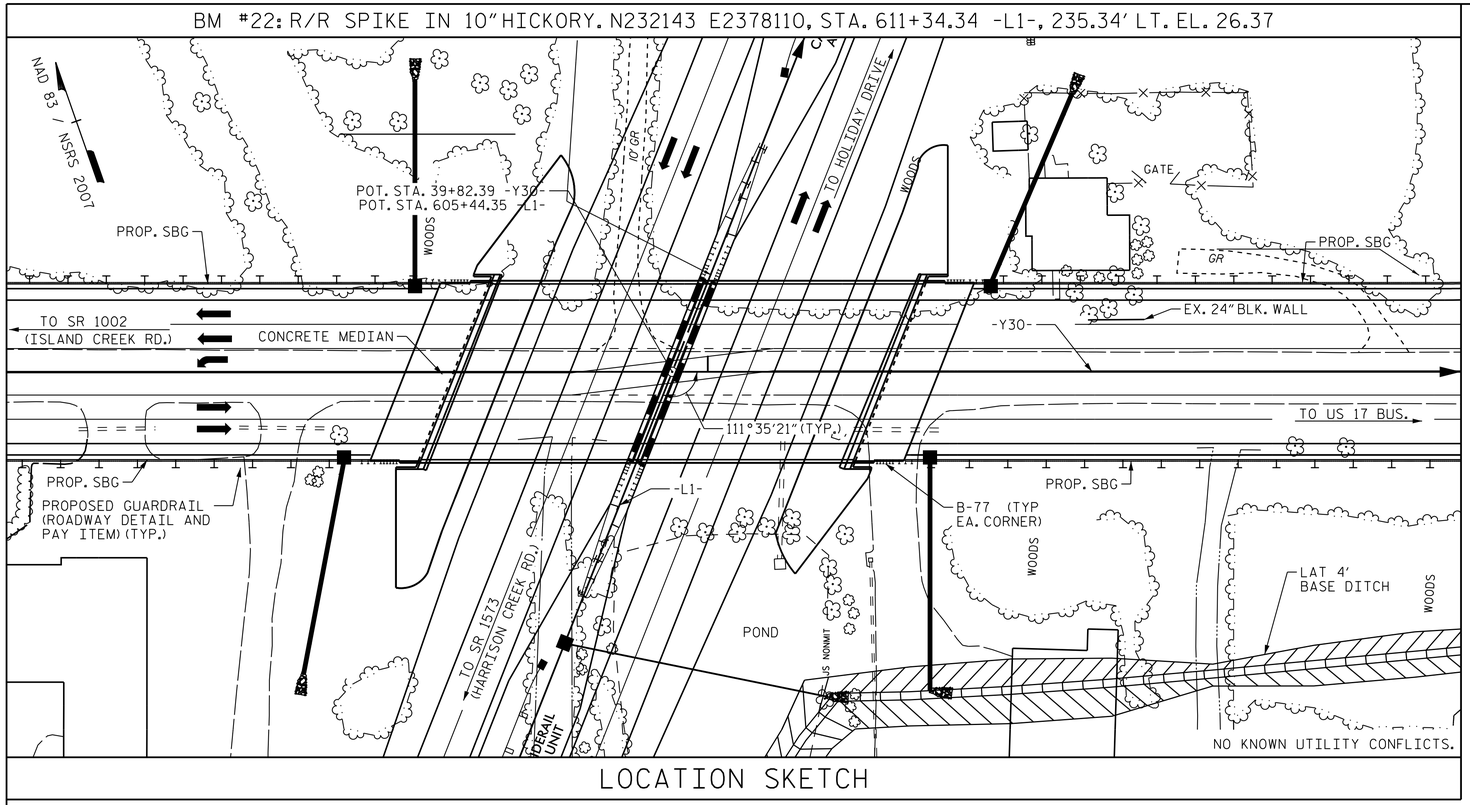
PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER NC 417
ON NC 210
BETWEEN US 17 BUS. AND
SR 1002 (ISLAND CREEK RD.)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-02
1			3			TOTAL SHEETS
2			4			38



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR MODIFIED 54" PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	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	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	MODIFIED 54" PRESTRESSED CONCRETE GIRDERS	
	LUMP SUM	EA.	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.	EA.	NO.	LIN.FT.	EA.	EA.	LIN.FT.	SQ.YDS.	LUMP SUM	LUMP SUM	NO.	LIN.FT.
SUPERSTRUCTURE			19,314	21,869		LUMP SUM								469.64		LUMP SUM	LUMP SUM	20	2,110.0
END BENT 1					94.0		13,698		16	16	1,240	16	8		538				
BENT 1	LUMP SUM				146.3		23,880	1,727	35	35	2,800	35	18						
END BENT 2					95.9		13,734		16	16	1,200		8		532				
TOTAL	LUMP SUM	2	19,314	21,869	336.2	LUMP SUM	51,312	1,727	67	67	5,240	51	34	469.64	1,070	LUMP SUM	LUMP SUM	20	2,110.0

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 3 OF 3

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DRAWN BY : J. B. GEILE DATE : 08/14/18
CHECKED BY : N. D'AIUTO DATE : 05/14/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. Kelvington
10/25/2021

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER NC 417
ON NC 210
BETWEEN US 17 BUS. AND
SR 1002 (ISLAND CREEK RD.)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-03
1			3			TOTAL SHEETS
2			4			38

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.03	--	1.75	0.795	1.03	A	EL	104.10	0.973	1.20	A	I	83.70	0.80	0.719	1.17	A	I	50.00	
		HL-93 (OPERATING)	N/A		1.33	--	1.35	0.795	1.33	A	EL	104.10	0.973	1.57	A	I	83.70	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.33	47.880	1.75	0.795	1.94	A	EL	52.00	0.973	1.67	A	I	83.70	0.80	0.795	1.33	A	EL	104.10	
		HS-20 (OPERATING)	36.000		2.20	79.200	1.35	0.795	2.51	A	EL	52.00	0.973	2.20	A	I	83.70	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.46	46.710	1.40	0.795	5.70	A	EL	52.00	0.973	5.61	A	I	83.70	0.80	0.795	3.46	A	EL	104.10	
		SNGARBS2	20.000		2.36	47.200	1.40	0.795	4.13	A	EL	52.00	0.973	3.90	A	I	83.70	0.80	0.795	2.36	A	EL	104.10	
		SNAGRIS2	22.000		2.14	47.080	1.40	0.795	3.86	A	EL	52.00	0.973	3.59	A	I	83.70	0.80	0.795	2.14	A	EL	104.10	
		SNCOTTS3	27.250		1.71	46.598	1.40	0.795	2.84	A	EL	52.00	0.973	2.71	A	I	83.70	0.80	0.795	1.71	A	EL	104.10	
		SNAGGRS4	34.925		1.34	46.800	1.40	0.795	2.33	A	EL	52.00	0.973	2.10	A	I	83.70	0.80	0.795	1.34	A	EL	104.10	
		SNS5A	35.550		1.32	46.926	1.40	0.795	2.29	A	EL	52.00	0.973	2.10	A	I	83.70	0.80	0.795	1.32	A	EL	104.10	
		SNS6A	39.950		1.40	55.930	1.40	0.795	2.08	A	EL	52.00	0.973	1.89	A	I	83.70	0.80	0.719	1.40	A	I	52.00	
		SNS7B	42.000		1.34	56.280	1.40	0.795	1.99	A	EL	52.00	0.973	1.80	A	I	83.70	0.80	0.719	1.34	A	I	52.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.43	47.190	1.40	0.795	2.55	A	EL	52.00	0.973	2.26	A	I	83.70	0.80	0.795	1.43	A	EL	104.10	
		TNT4A	33.075		1.43	47.297	1.40	0.795	2.53	A	EL	52.00	0.973	2.35	A	I	83.70	0.80	0.795	1.43	A	EL	104.10	
		TNT6A	41.600		1.39	57.824	1.40	0.795	2.06	A	EL	52.00	0.973	1.90	A	I	83.70	0.80	0.719	1.39	A	I	52.00	
		TNT7A	42.000		1.39	58.380	1.40	0.795	2.06	A	EL	52.00	0.973	1.89	A	I	83.70	0.80	0.719	1.36	A	I	52.00	
		TNT7B	42.000		1.41	59.220	1.40	0.795	2.10	A	EL	52.00	0.973	1.81	A	I	83.70	0.80	0.719	1.41	A	I	52.00	
		TNAGRIT4	43.000		1.36	58.480	1.40	0.795	2.03	A	EL	52.00	0.973	1.78	A	I	83.70	0.80	0.719	1.36	A	I	52.00	
		TNAGT5A	45.000		1.29	58.050	1.40	0.795	1.92	A	EL	52.00	0.973	1.69	A	I	83.70	0.80	0.719	1.29	A	I	52.00	
		TNAGT5B	45.000	3	1.28	57.600	1.40	0.795	1.90	A	EL	52.00	0.973	1.70	A	I	83.70	0.80	0.719	1.28	A	I	52.00	

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

FOR LOAD RATING PURPOSE. IT IS ASSUMED A TIME PERIOD AT LEAST 40 DAYS SHALL ELAPSE FROM THE TRANSFER OF PRESTRESSING FORCE INTO ANY GIRDER AND THE PLACEMENT OF DECK SLAB CONCRETE IN THE SPANS.

(#) CONTROLLING LOAD RATING

1. DESIGN LOAD RATING (HL-93)
2. DESIGN LOAD RATING (HS-20)
3. LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

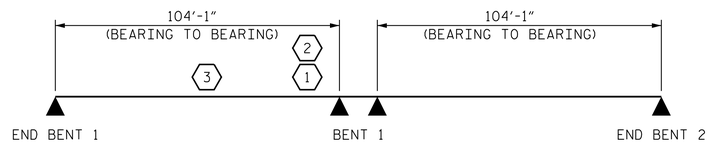
GIRDER LOCATION

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

GIRDER PROPERTIES

54" MODIFIED BULB TEE

AREA = 707 SQ. IN.
WEIGHT = 737 LB/FT.
Y_{BOTTOM} = 27.79 IN.
Y_{TOP} = 26.21 IN.
Ixx = 277,560 $IN.^4$
Iyy = 40,051 $IN.^4$
V/S = 3.23 IN.



LRFR SUMMARY

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

Stantec
Stantec Consulting Services Inc.
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ASSEMBLED BY : J. HAGENBUSH DATE : 08/14/18
CHECKED BY : N. D'AIUTO DATE : 05/14/19
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. Kelvington
10/25/2021

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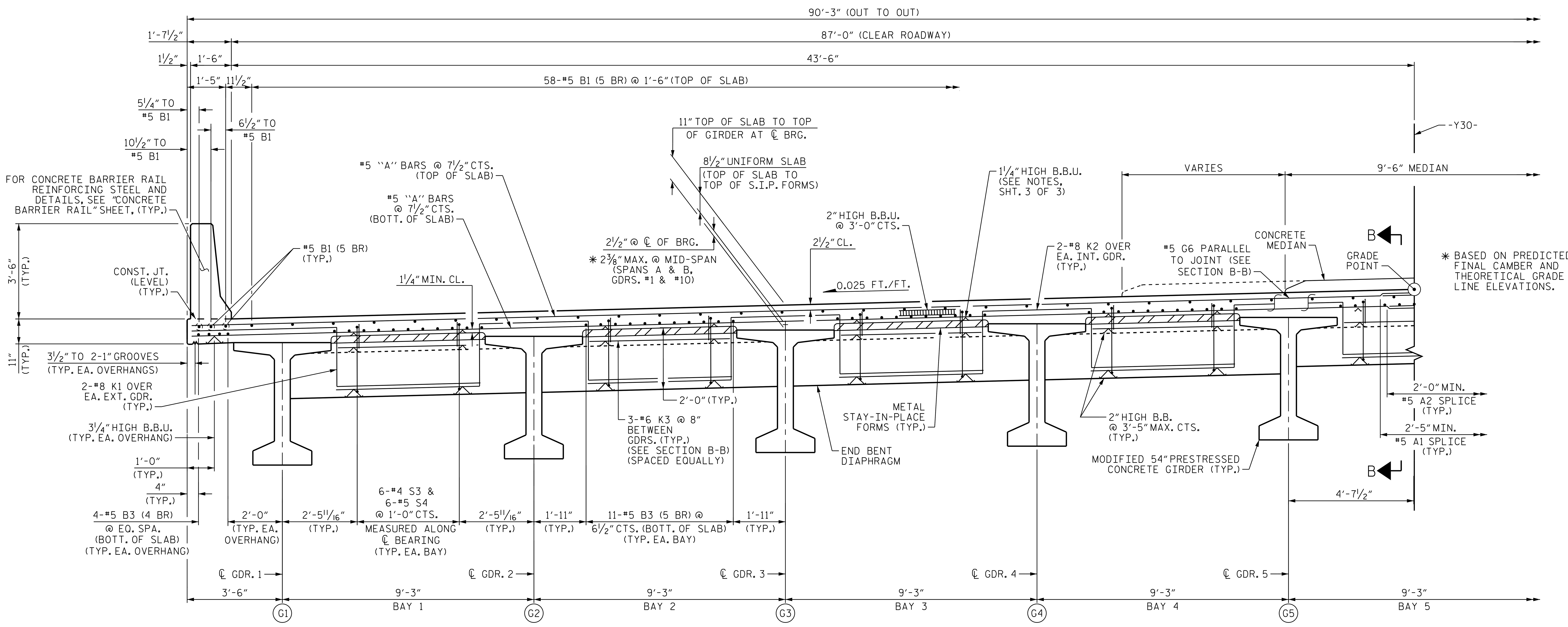
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

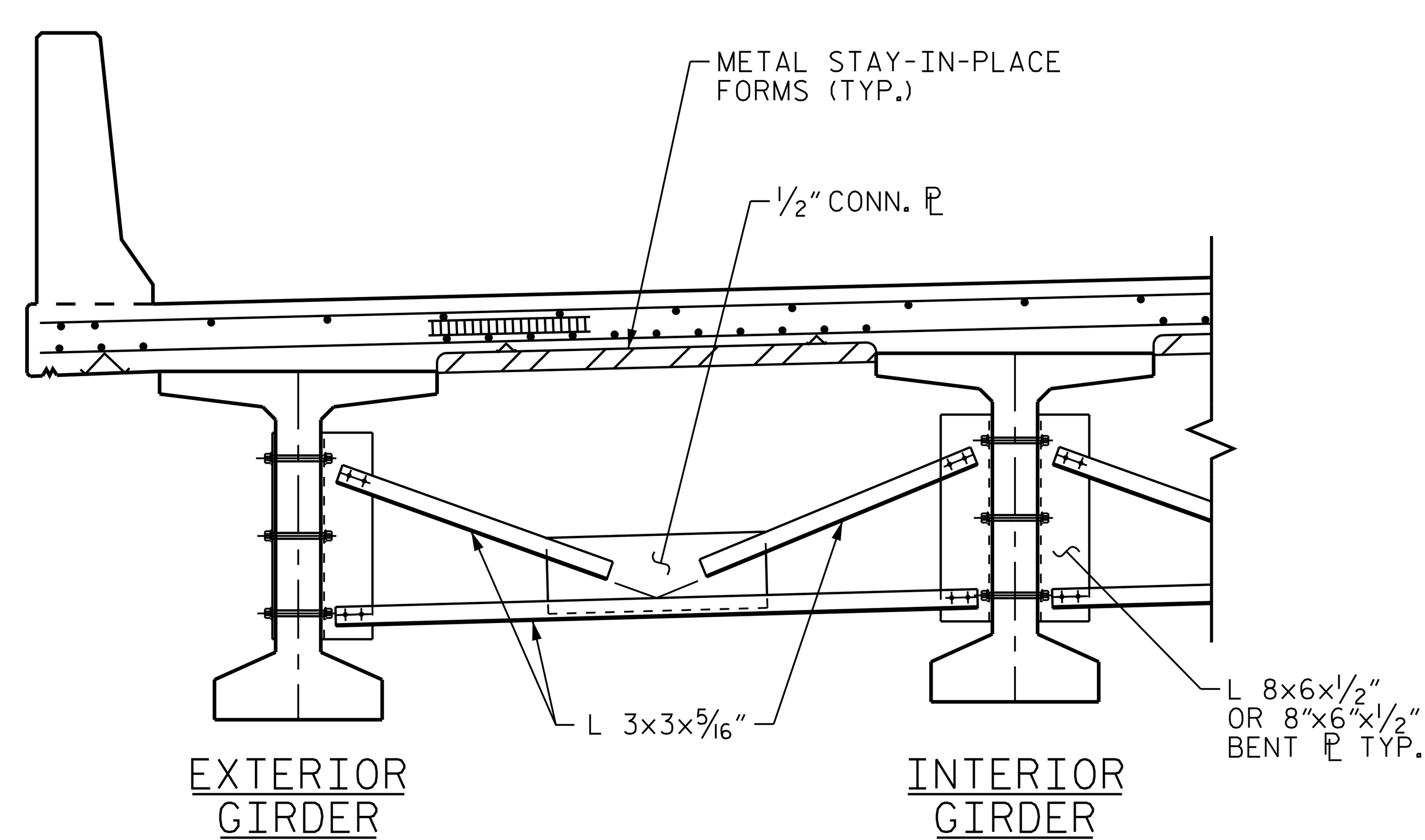
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-04
1			3			TOTAL SHEETS
2			4			38

STD. NO. LRFR1



TYPICAL HALF SECTION AT END BENT DIAPHRAGM

TYPICAL SECTION MIRRORED AT ℄ FOR OPPOSITE SIDE.
SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR NOTES.
SEE SECTION B-B ON SHEET 3 OF 3 FOR SECTION THROUGH END BENT DIAPHRAGM.
FOR CONCRETE MEDIAN GEOMETRY & REFERENCE TO -Y30- SEE SHEET S13-17.



NOTE: FOR ADDITIONAL STEEL INTERMEDIATE DIAPHRAGM DETAILS SEE SHT. INTERMEDIATE STEEL DIAPHRAGMS FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS". (TYP. EA. BAY) (SEE "TYPICAL HALF SECTION AT END BENT DIAPHRAGM" FOR DECK REINFORCEMENT DETAILS).

TYPICAL SECTION AT INTERMEDIATE DIAPRAGMS

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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SEAL 13406 — 10/25/2021

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REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S13-05
1			3			TOTAL SHEETS	38
2			4				

TYPICAL HALF SECTION AT INTERIOR BENT DIAPHRAGM

TYPICAL SECTION MIRRORED AT ℄ FOR OPPOSITE SIDE.
SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR NOTES.
SEE SECTION A-A ON SHEET 3 OF 3 FOR SECTION THROUGH BENT DIAPHRAGM
✱ MEASURED ALONG ℄ BENT AND BENT CONTROL LINE.
FOR CONCRETE MEDIAN GEOMETRY & REFERENCE TO -Y30- SEE SHEET S13-17.

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032406 J. T. KELVINGTON
10/26/2021

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REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S13-06
1			3				TOTAL SHEETS
2			4				38

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CHECKED BY : N. D'AIUTO DATE : 05/14/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/26/21

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NOTES:

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

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

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

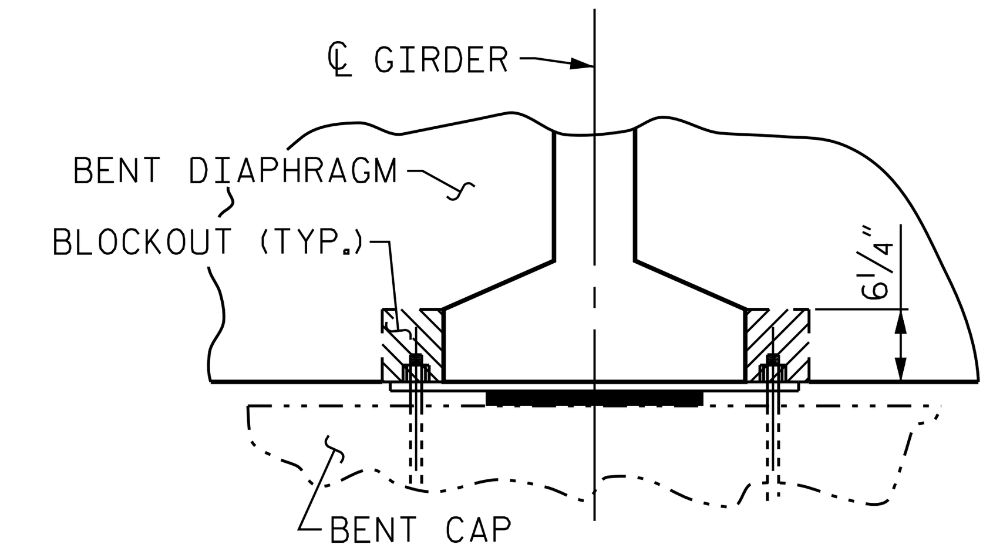
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

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

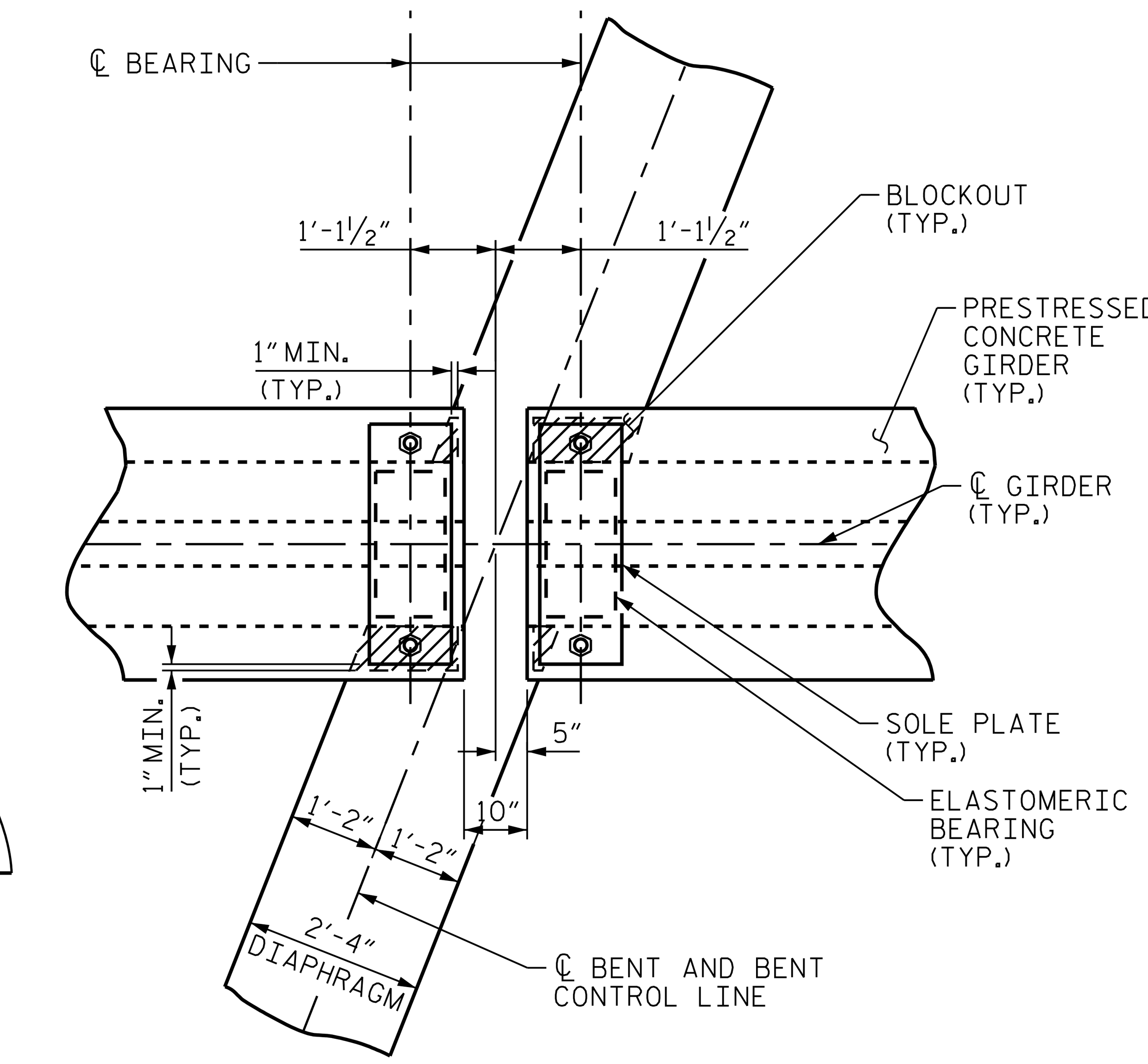
#5 G6 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

ALL REINFORCING STEEL IN CONCRETE BARRIER RAIL AND MEDIANS SHALL BE EPOXY COATED.

A TIME PERIOD OF AT LEAST 40 DAYS SHALL ELAPSE FROM THE TRANSFER OF PRESTRESSING FORCE INTO ANY GIRDER AND THE PLACEMENT OF DECK SLAB CONCRETE IN THE SPANS.

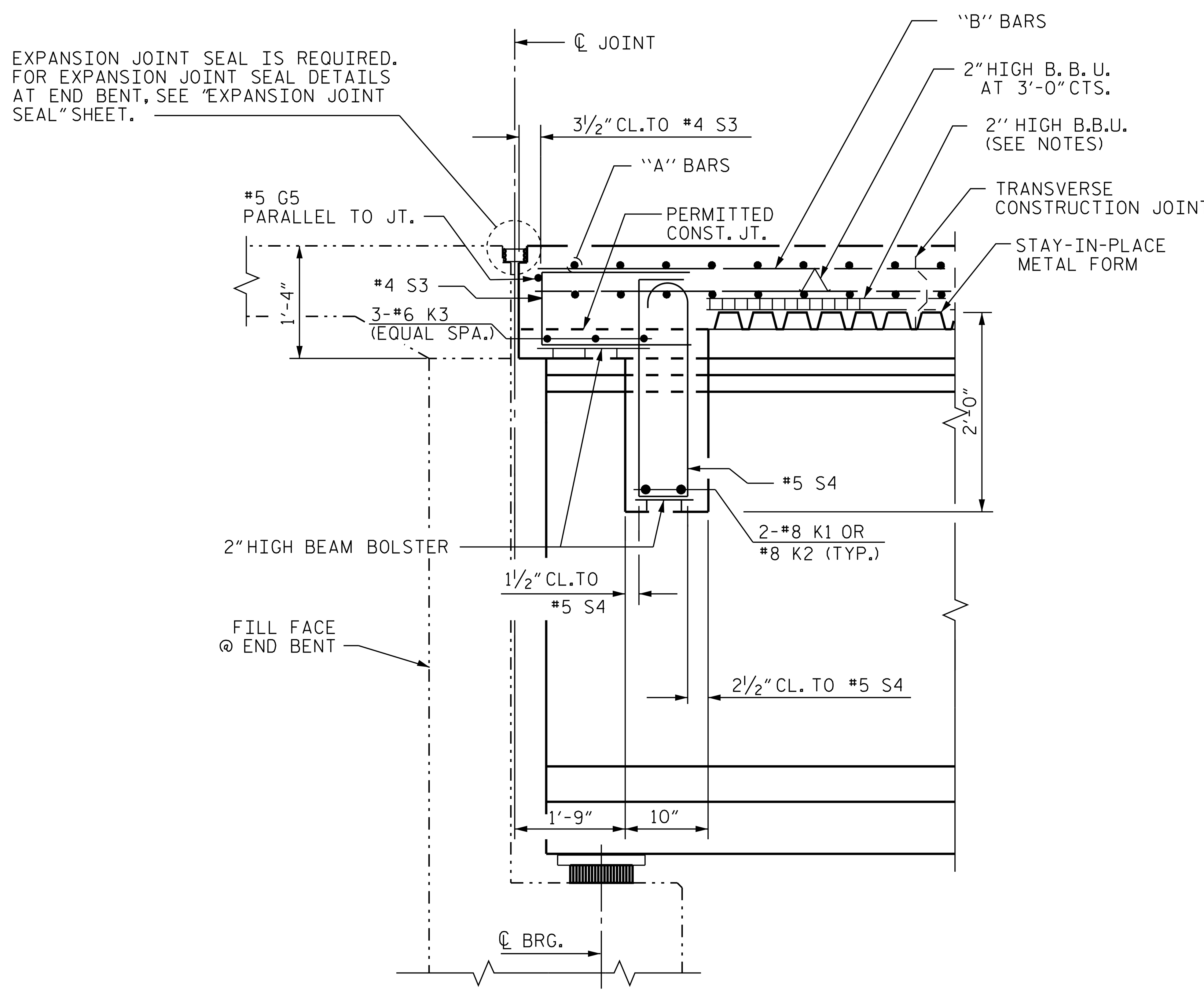


SECTION



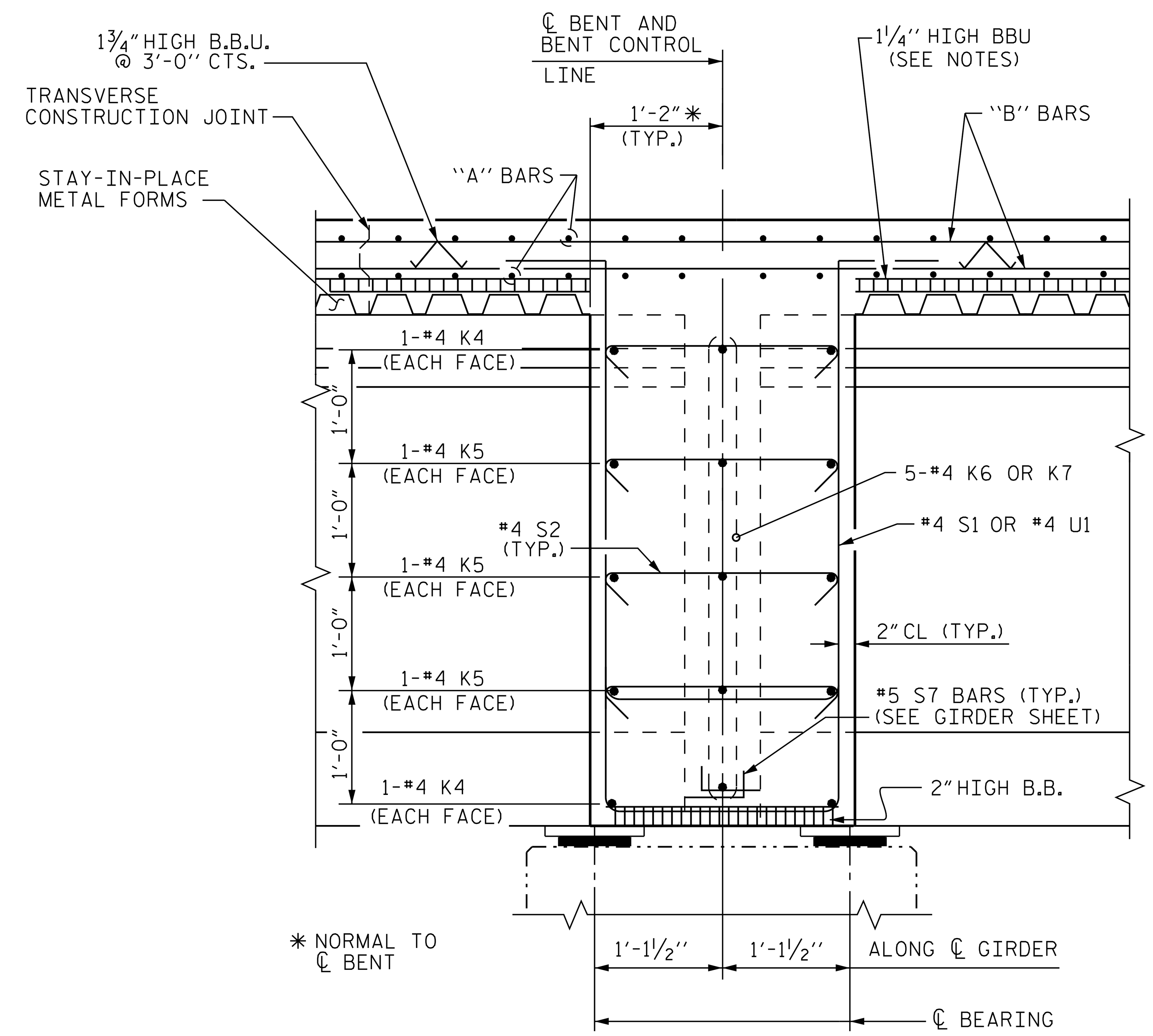
PLAN

BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION B-B

SECTION THRU END BENT DIAPHRAGM



SECTION A-A

SECTION THRU DIAPHRAGM @ INTERIOR BENT

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION (DETAILS)

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
10/25/2021

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REVISIONS						SHEET NO.
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2			4			38

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CHECKED BY : N. D'AIUTO DATE : 05/14/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

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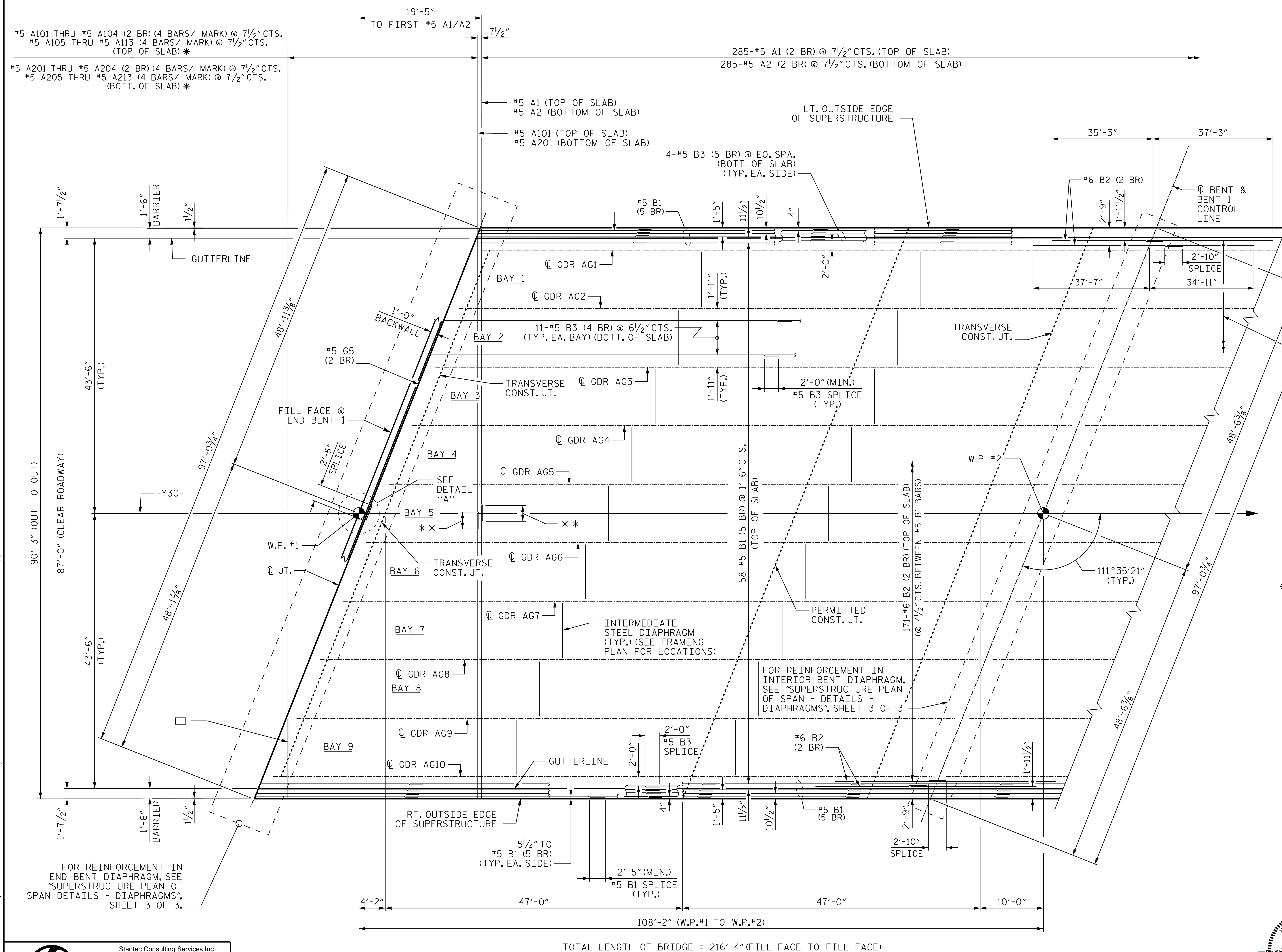

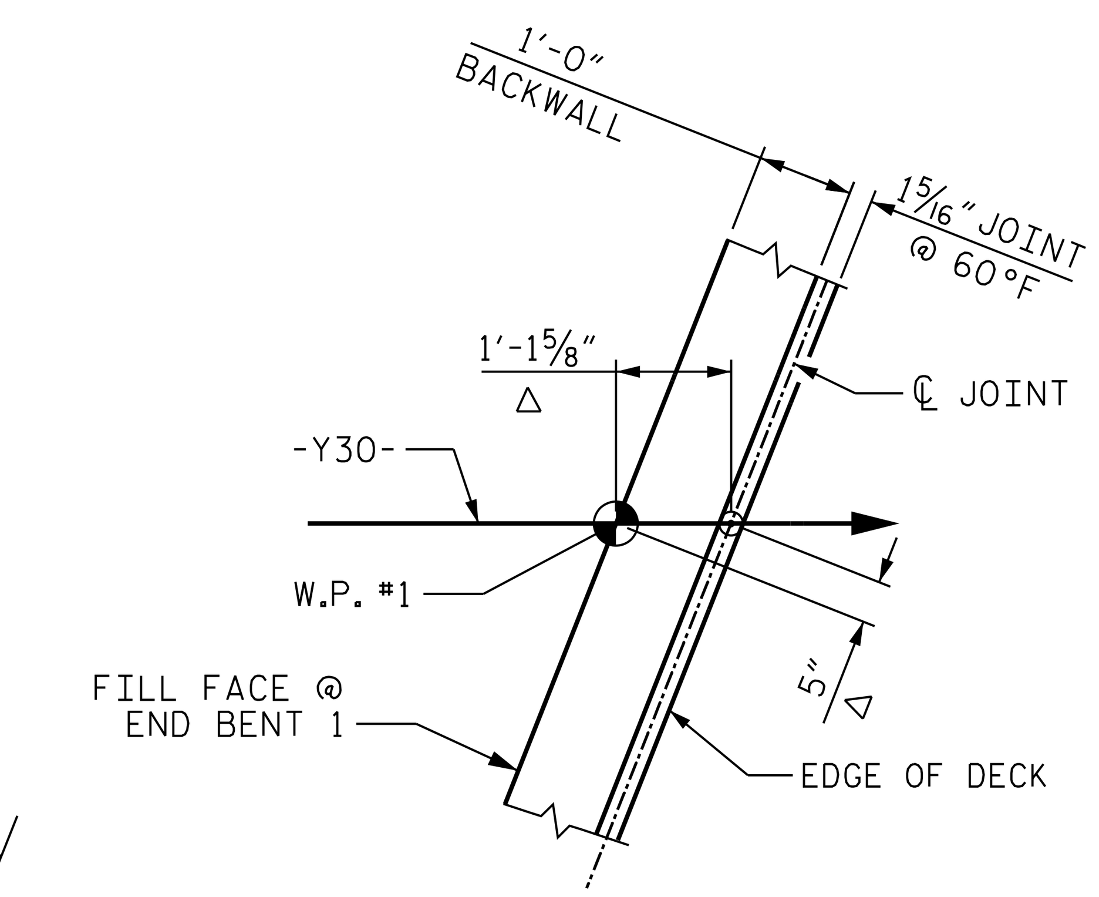

DETAIL "A"

△ MEASURED FROM W.P. TO ℄ JOINT.

NOTES:

FOR BARRIER RAIL DETAILS AND REINF. STEEL SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "PLAN OF SPANS-DIAPHRAGM", SHT. 3 OF 3.

FOR POUR SEQUENCE SEE "BILL OF MATERIAL" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDER" SHEET.

(2 BR) DENOTES 2 BAR RUN
(4 BR) DENOTES 4 BAR RUN
(5 BR) DENOTES 5 BAR RUN

✻✻ - 2'-5" (MIN.) #5 A1, & #5 A101 THRU #5 A104 LAP SPLICE
2'-0" (MIN.) #5 A2, & #5 A201 THRU #5 A204 LAP SPLICE

☐ #5 A113 (4 BAR/ MARK (TOP OF SLAB)
#5 A213 (4 BAR/ MARK (BOTTOM OF SLAB)

PLAN OF SPANS
SPAN A

J1 BARS NOT SHOWN FOR CLARITY, SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS".

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN
(SPAN A)

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S13-08
1			3				TOTAL SHEETS
2			4				38

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 J. T. KELVINGTON
10/25/2021

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DRAWN BY : J.E. HAGENBUSH DATE : 09/06/18
CHECKED BY : N. D'AIUTO DATE : 05/15/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NOTES:

FOR BARRIER RAIL DETAILS AND REINF. STEEL SEE "CONCRETE BARRIER RAIL", SHEET.

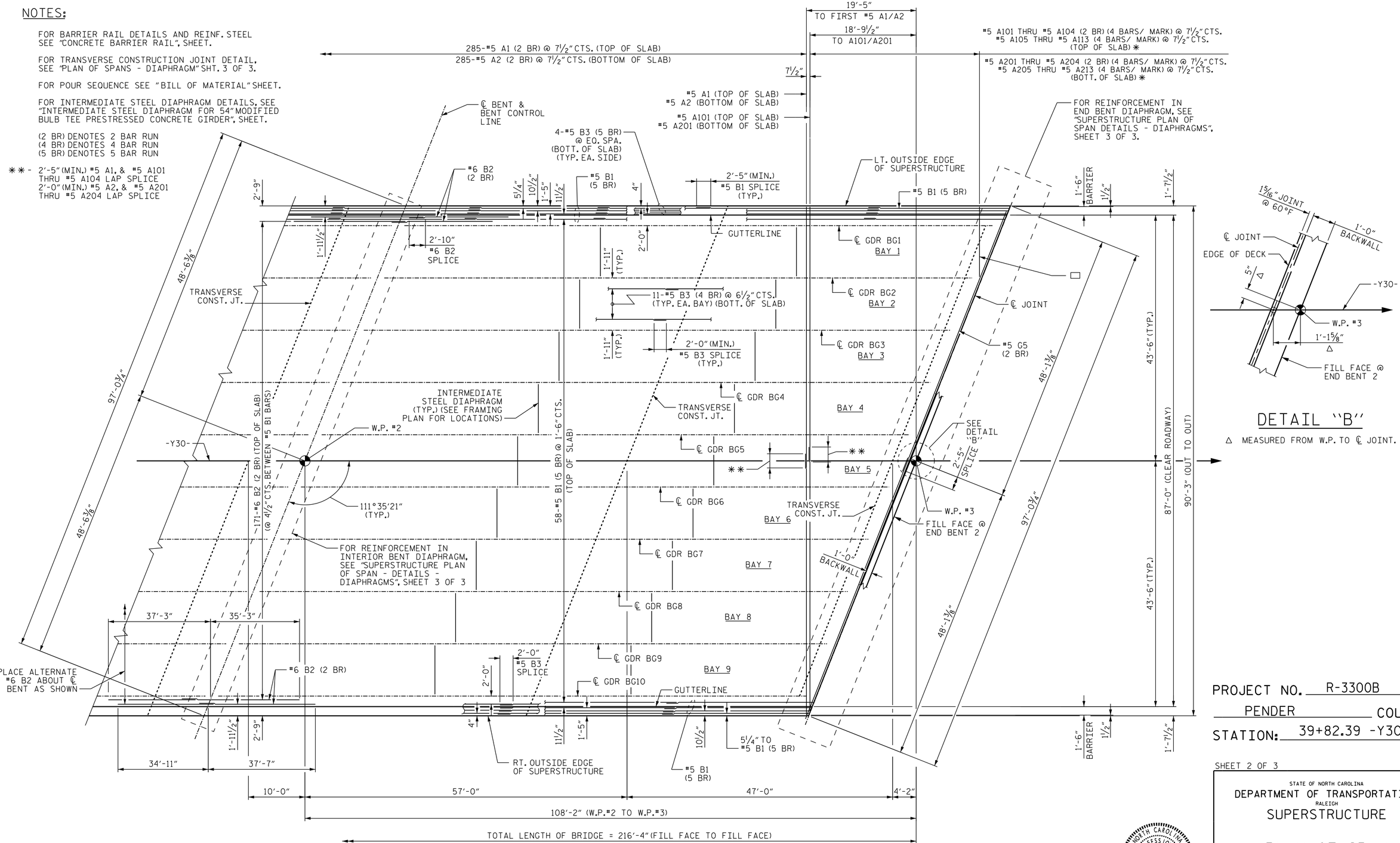
FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "PLAN OF SPANS - DIAPHRAGM" SHT. 3 OF 3.

FOR POUR SEQUENCE SEE "BILL OF MATERIAL" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDER", SHEET.

(2 BR) DENOTES 2 BAR RUN
(4 BR) DENOTES 4 BAR RUN
(5 BR) DENOTES 5 BAR RUN

** - 2'-5" (MIN.) #5 A1, & #5 A101 THRU #5 A104 LAP SPLICE
2'-0" (MIN.) #5 A2, & #5 A201 THRU #5 A204 LAP SPLICE



DETAIL "B"

△ MEASURED FROM W.P. TO ℄ JOINT.

PLAN OF SPANS
SPAN B

J1 BARS NOT SHOWN FOR CLARITY, SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS".

□ #5 A113 (4 BAR/ MARK (TOP OF SLAB)
#5 A213 (4 BAR/ MARK (BOTTOM OF SLAB)

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DRAWN BY : J.E. HAGENBUSH DATE : 09/06/18
CHECKED BY : N. D'AIUTO DATE : 05/15/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
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10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN
(SPAN B)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-09
1			3			TOTAL SHEETS
2			4			38

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NOTES

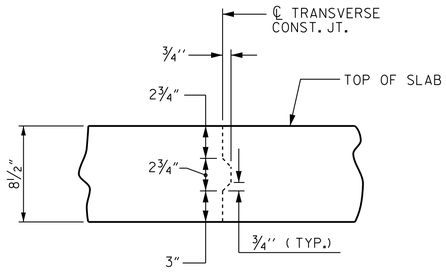
REINFORCEMENT IN DECK AND BARRIER RAIL NOT SHOWN FOR CLARITY (UNLESS NOTED OTHERWISE).

FOR SECTION A-A, SECTION B-B, SEE "TYPICAL SECTION (DETAILS)" SHEET 3 OF 3.

(2 BR) DENOTES 2 BAR RUN

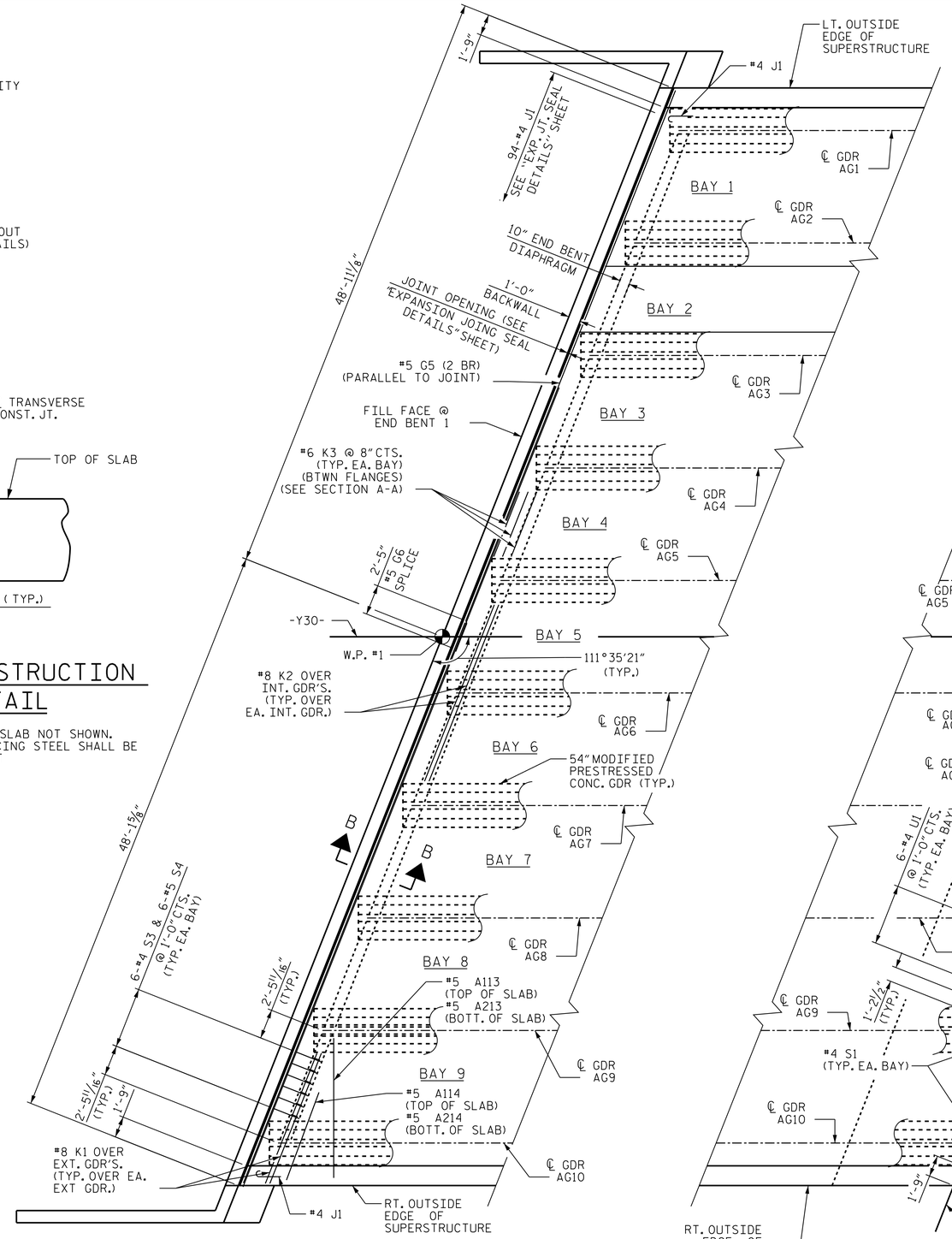
CONCRETE ISLAND NOT SHOWN FOR CLARITY.

FOR DIAPHRAGM ANCHOR BOLT BLOCKOUT DETAIL SEE "TYPICAL SECITON (DETAILS) SHT. 3 OF 3.



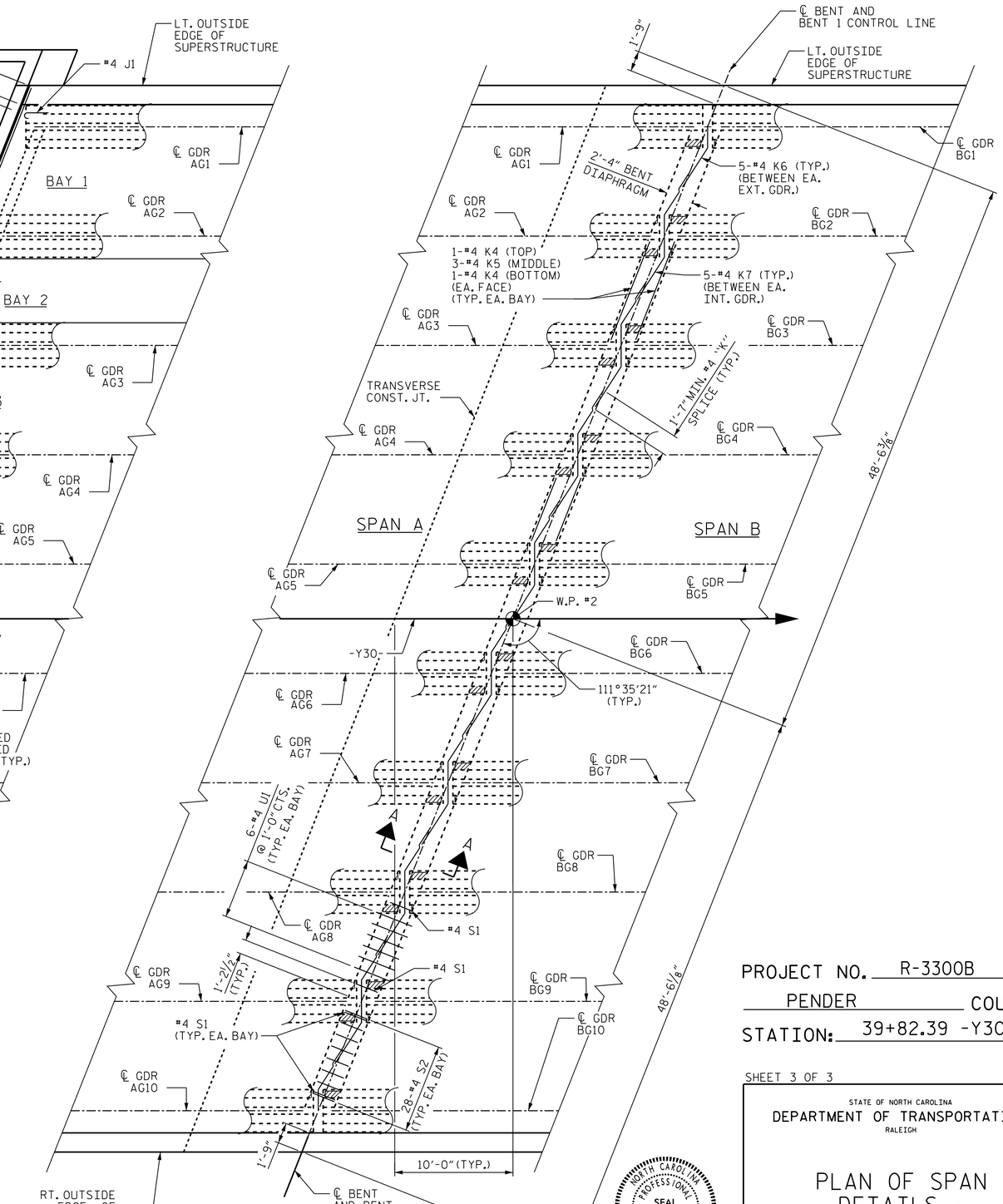
TRANSVERSE CONSTRUCTION JOINT DETAIL

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



TYPICAL END BENT DIAPHRAGM REINFORCING DETAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION



BENT 1 DIAPHRAGM REINFORCING DETAIL

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DRAWN BY : J.E. HAGENBUSH DATE : 09/06/18
CHECKED BY : N. D'AIUTO DATE : 05/15/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOHN TYLER KELVINGTON
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10/25/2021

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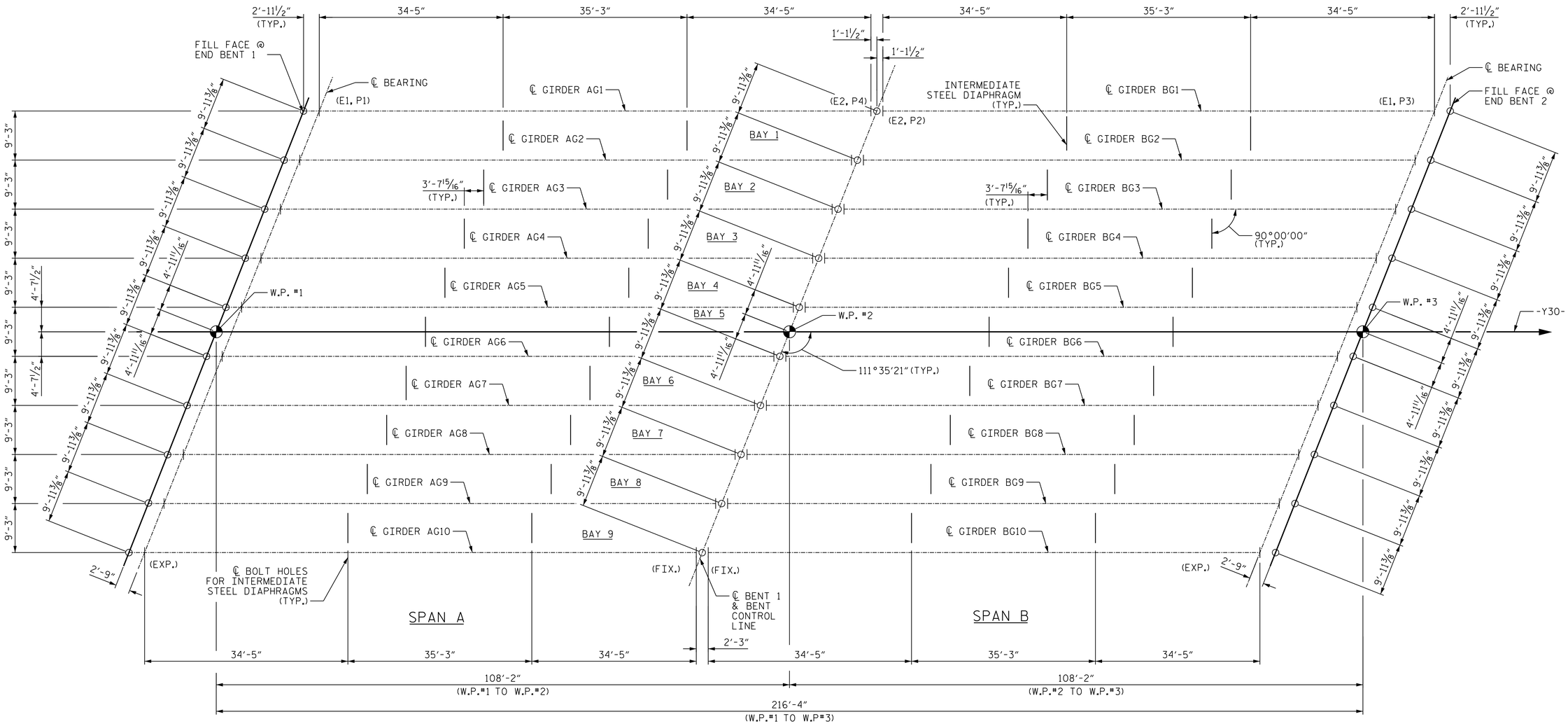
PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN DETAILS - DIAPHRAGMS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-10
1			3			TOTAL SHEETS
2			4			38



FRAMING PLAN

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

NOTES:

(E1, E2, P1, P2, P3 & P4) DENOTES ELASTOMERIC BEARING, & SOLE PLATES, SEE SHEET "ELASTOMERIC BEARING DETAILS" SHEET.

FOR INTERMEDIATE DIAPHRAGM DETAILS SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEETS.

SEE TYPICAL SECTION FOR BENT & END BENT DIAPHRAGMS.

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STATE OF NORTH CAROLINA
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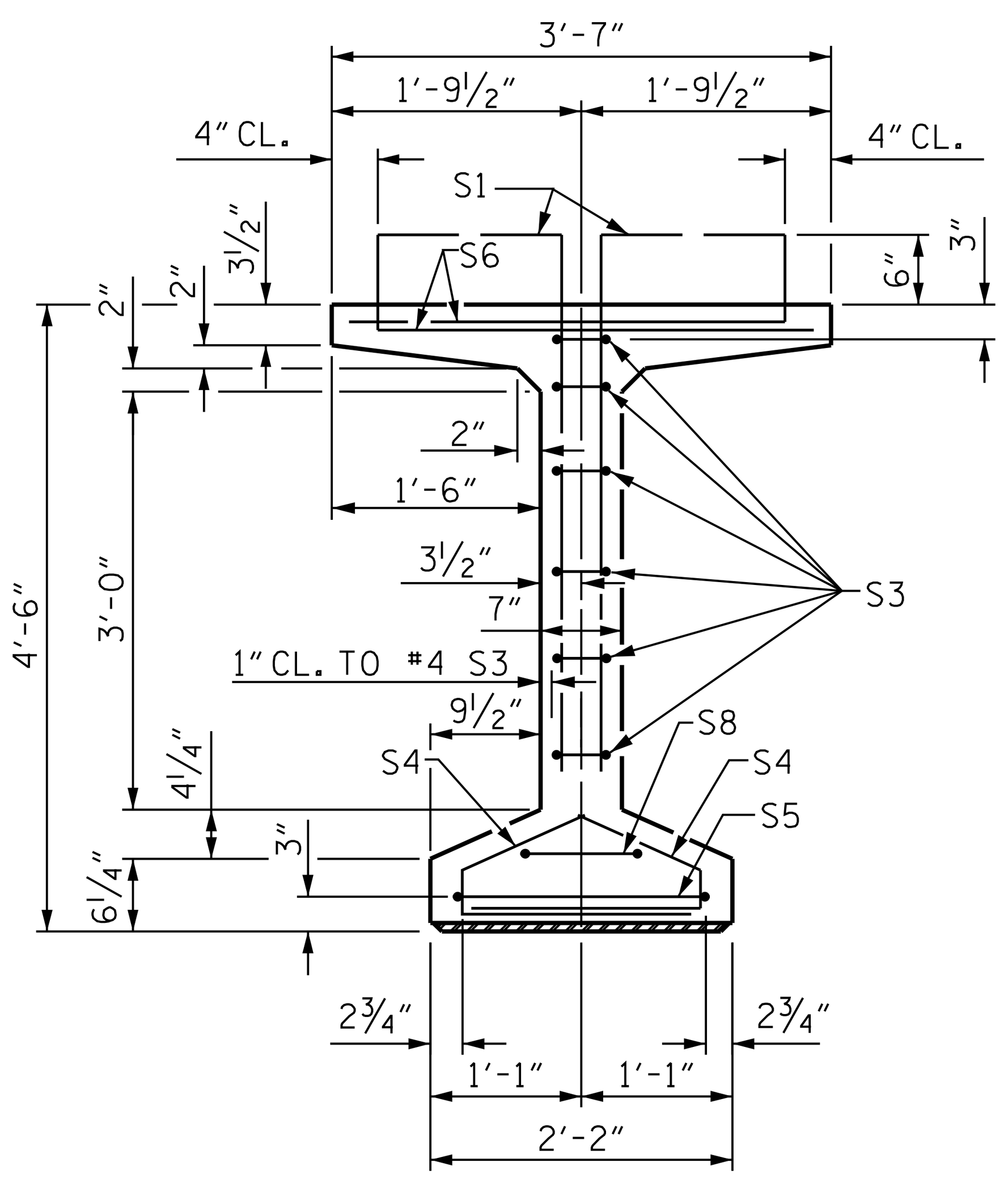
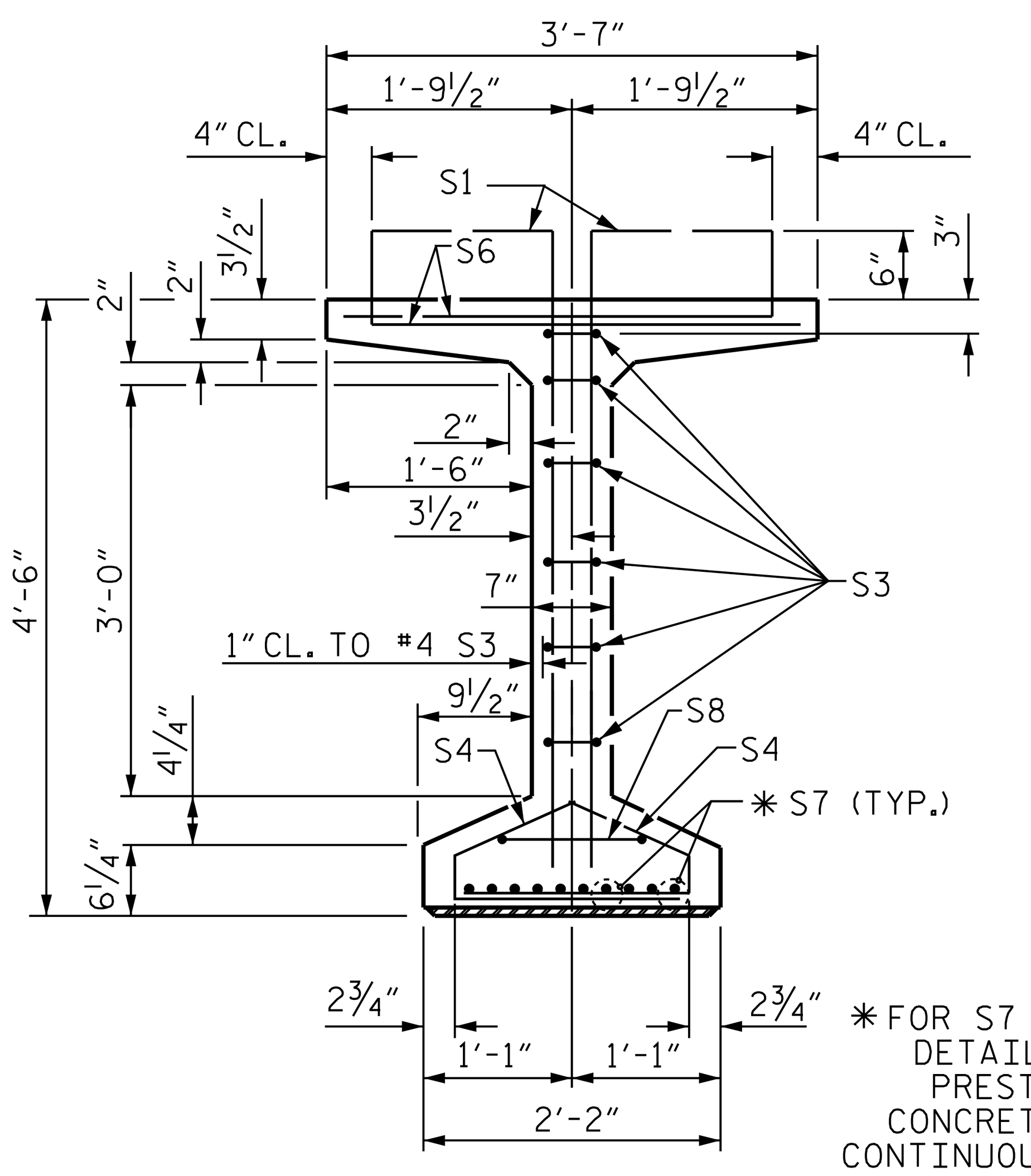
RALEIGH
SUPERSTRUCTURE

FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-11
1			3			TOTAL SHEETS
2			4			38

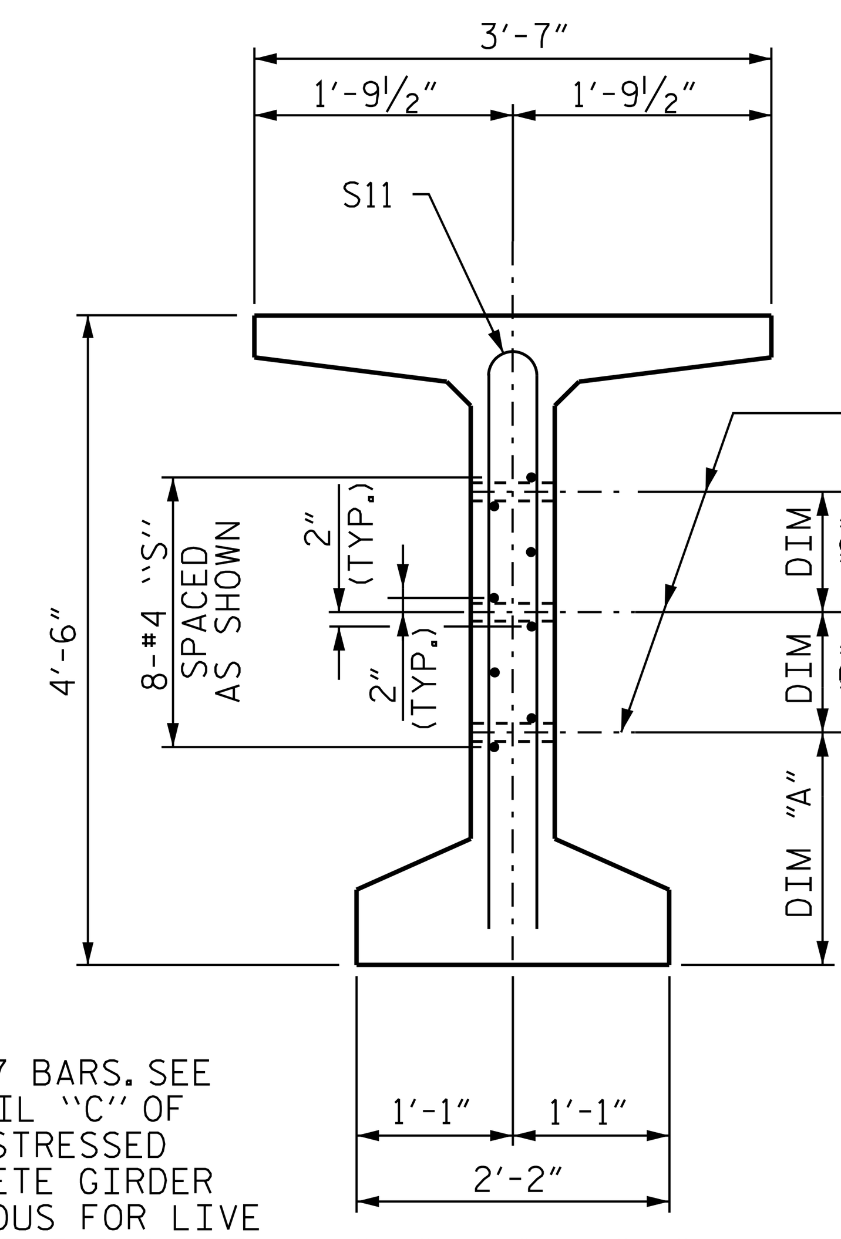


SECTION A-A



SECTION B-B

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



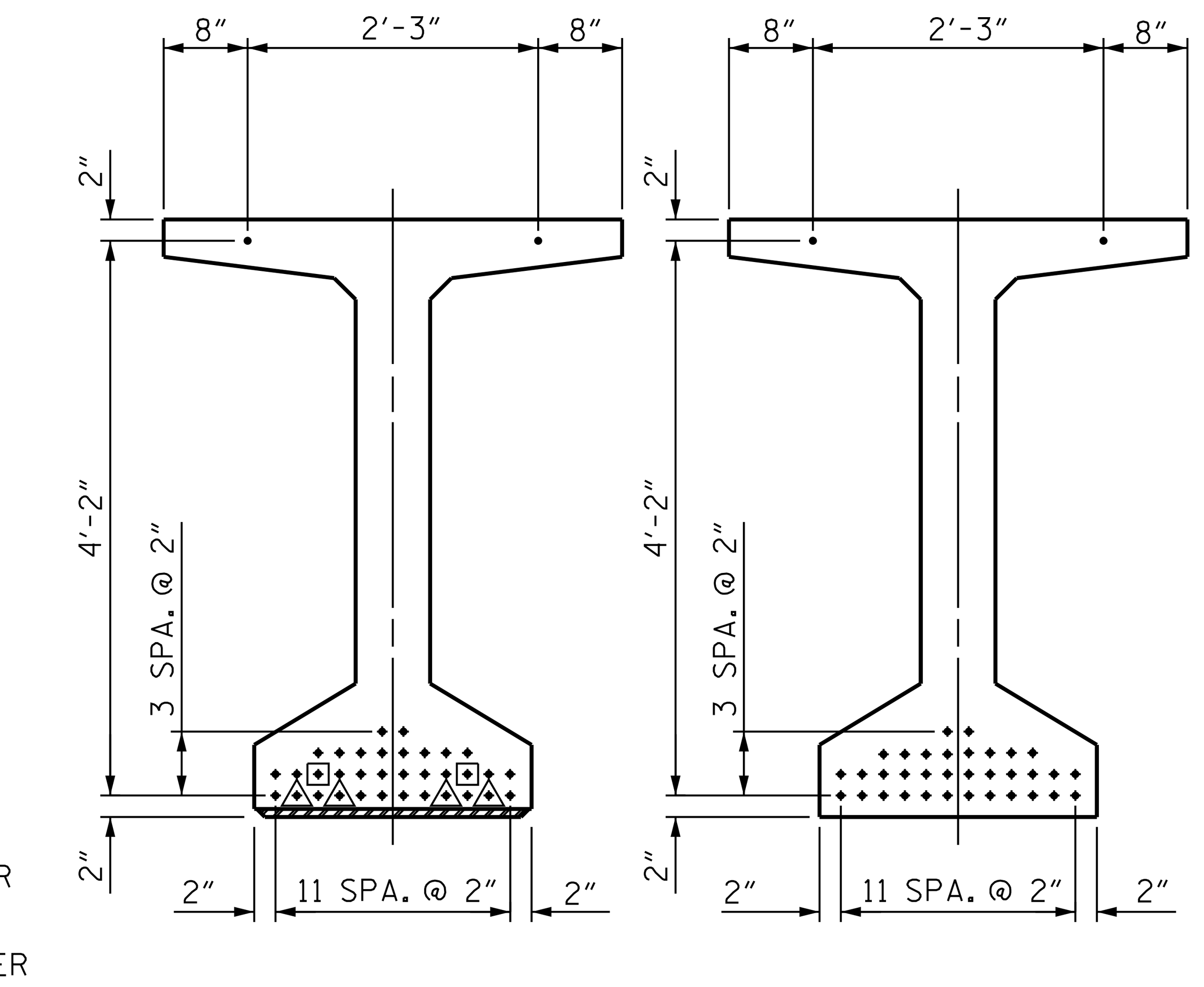
SECTION C-C

(S2, S6 AND S9 BARS NOT SHOWN)

℄ 1½" Ø FORMED HOLE. SEE ELEVATION FOR LOCATION. SEE "INTERMEDIATE STEEL DIAPHRAGM" SHEET FOR DIM "A", DIM "B", & DIM "C"

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- △ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⊡ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER



AT END OF GIRDER — AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

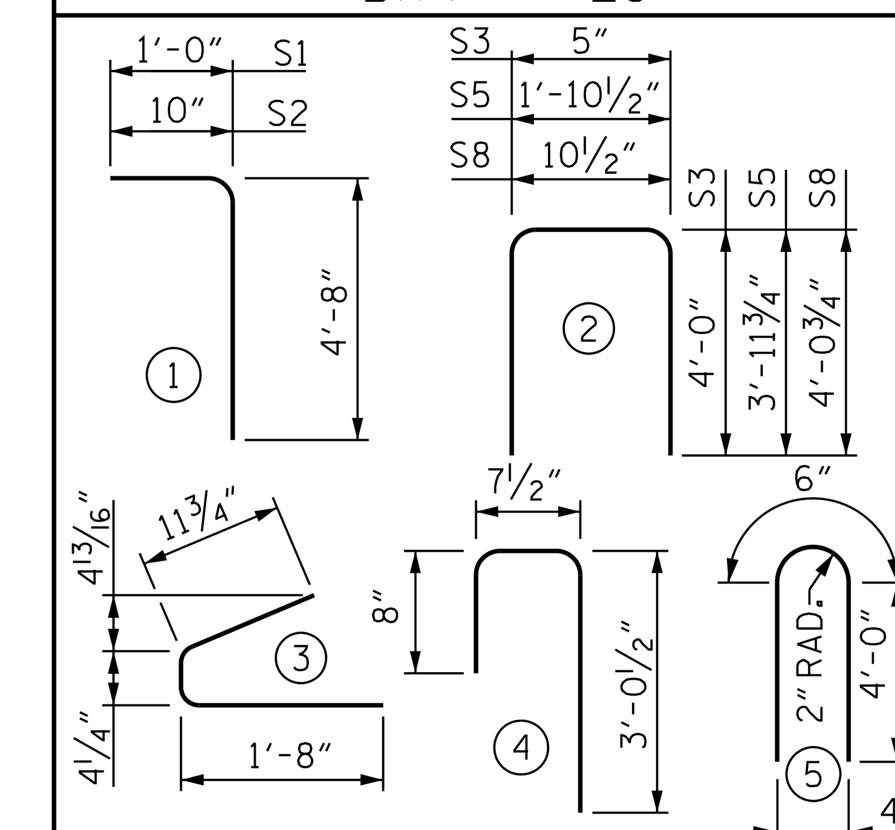
0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

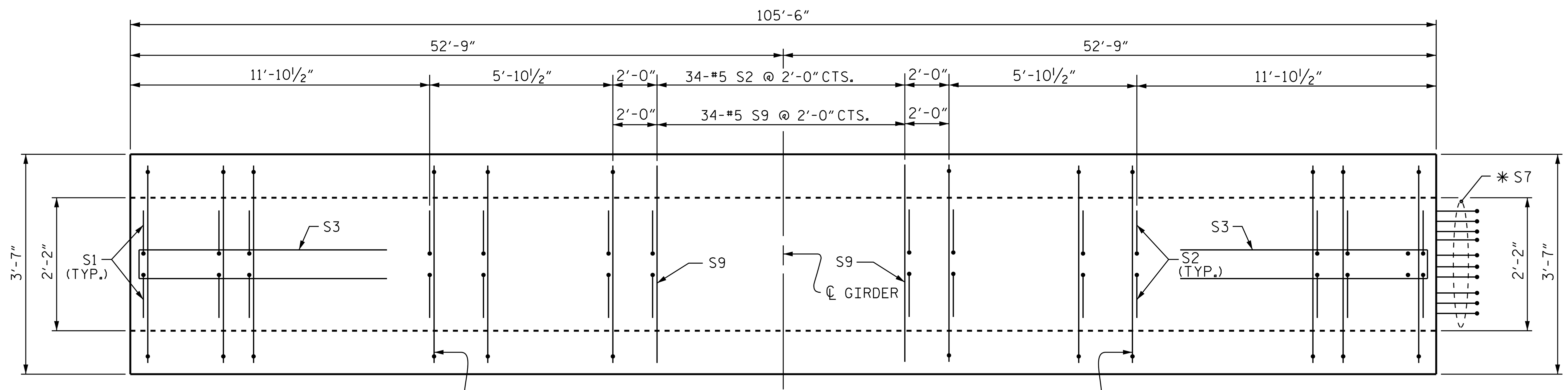
	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	24	#6	1	5'-8"	204
	S2	172	#5	1	5'-6"	987
	S3	12	#4	2	8'-5"	67
	S4	104	#4	3	3'-0"	208
	S5	1	#5	2	9'-10"	10
	S6	196	#5	4	4'-4"	886
	∗ S7	10	#5	STR.	3'-8"	38
	S8	2	#5	2	9'-0"	19
	S9	34	#5	STR.	3'-3"	115
	S10	1	#3	STR.	1'-10"	1
INT. GDR.	S11	16	#5	5	8'-6"	142
EXT. GDR.	S11	8	#5	5	8'-6"	71
INT. GDR.	S12	16	#4	STR.	13'-0"	139
EXT. GDR.	S13	16	#4	STR.	8'-0"	86

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

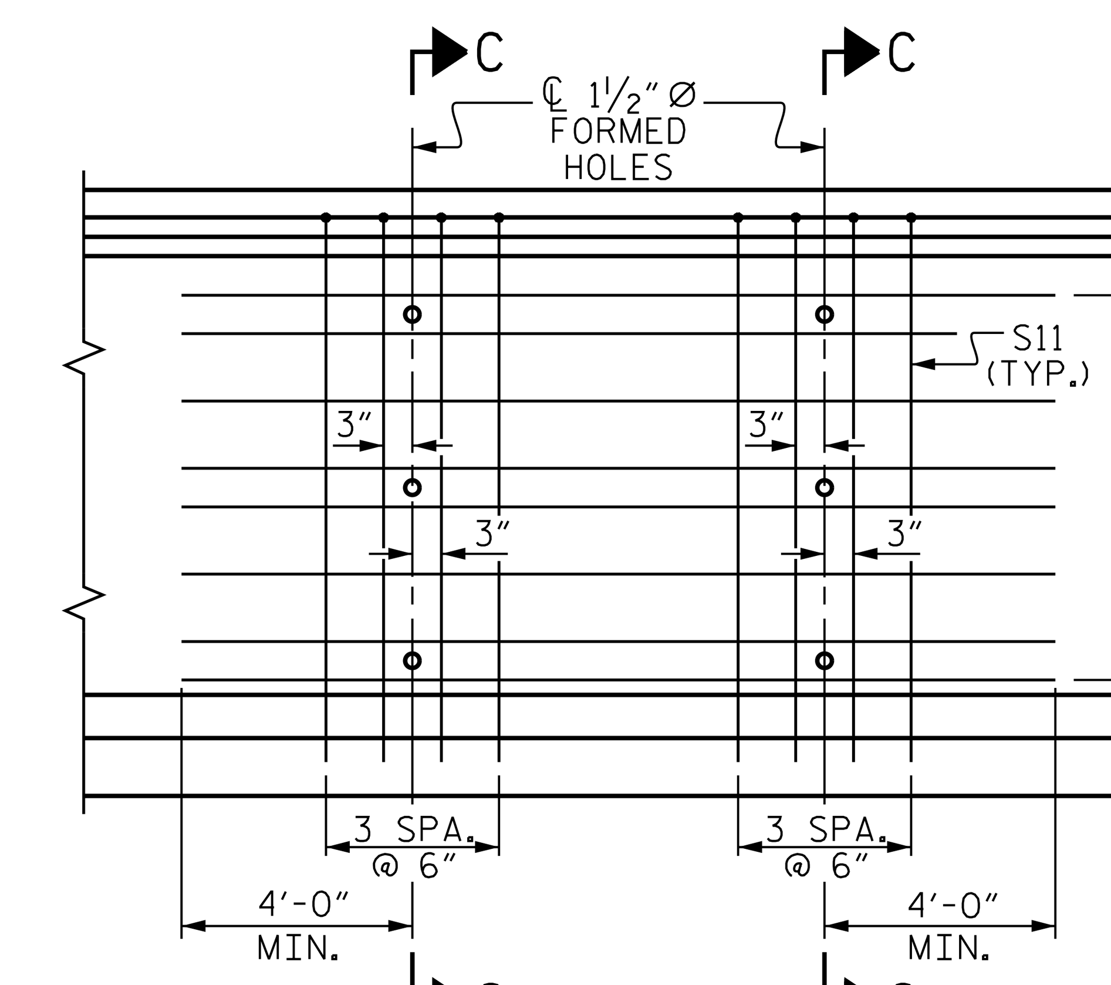
BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT



PLAN OF GIRDER

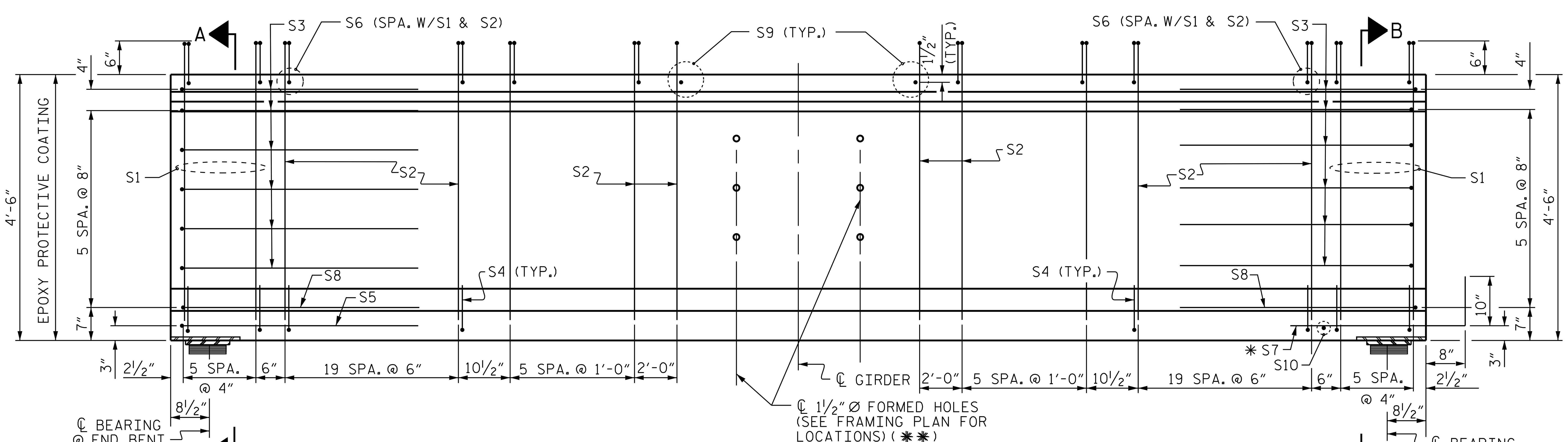


PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR INT. GIRDERS

QUANTITIES FOR ONE GIRDER	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
INT. GIRDER	2,816	19.2	36
EXT. GIRDER	2,692	19.2	36

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
20	105'-6"	2110'-0"

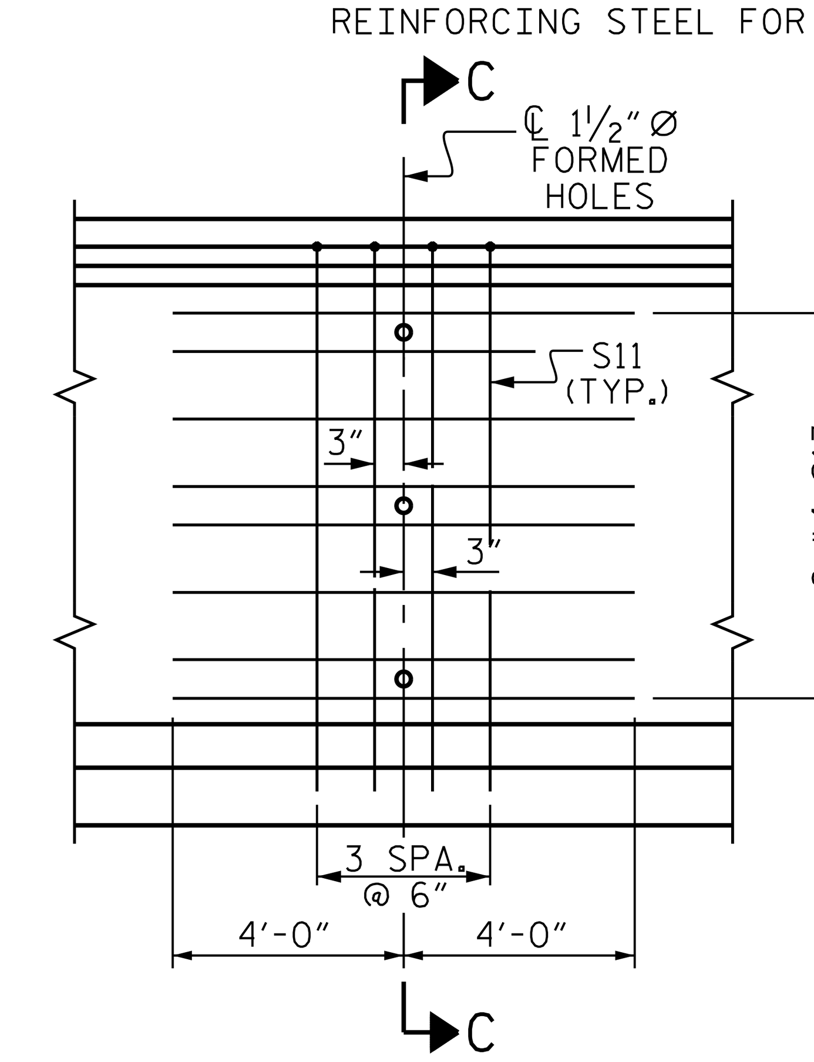


ELEVATION OF GIRDER

SPAN A SHOWN, SPAN B SIMILAR BY ROTATION

(∗∗) EXTERNAL GIRDERS HAVE 2 SETS OF FORMED HOLES, WHILE INTERIOR GIRDERS HAVE 4 SETS.

#5 S2 BARS MAY BE REPOSITIONED AS NECESSARY TO ACHIEVE AT LEAST 3" CLEAR BETWEEN #4 S2 AND #4 S11 PLACED FOR DIAPHRAGM CONNECTIONS.



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR EXT. GIRDERS

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

Stantec

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DRAWN BY : J. B. GEILE DATE : 09/06/18
CHECKED BY : N. D'AIUTO DATE : 05/14/19

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

SEAL 13406 — NORTH CAROLINA PROFESSIONAL ENGINEER — J. T. KELVINGTON — 10/25/2021

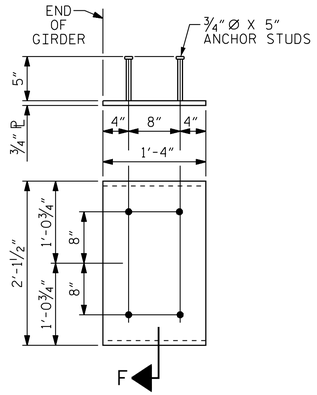
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
MODIFIED 54"
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
(SPANS A & B)

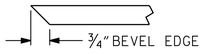
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

SHEET NO. S13-12
TOTAL SHEETS 38



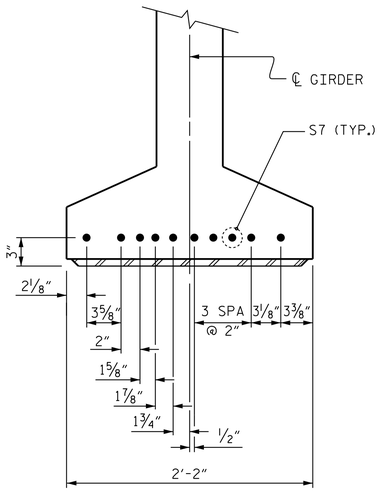
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO 54" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)



DETAIL "C"

(FOR 54" MODIFIED BULB TEES)

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 7,000 PSI.

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", 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 54" 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.

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. SEE STANDARD SPECIFICATIONS FOR CALCIUM NITRITE CORROSION INHIBITOR.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

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DRAWN BY : J. B. GEILE DATE : 09/06/18
CHECKED BY : N. D'AIUTO DATE : 09/11/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. Kelvington
10/25/2021

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-13
1			3			TOTAL SHEETS
2			4			38

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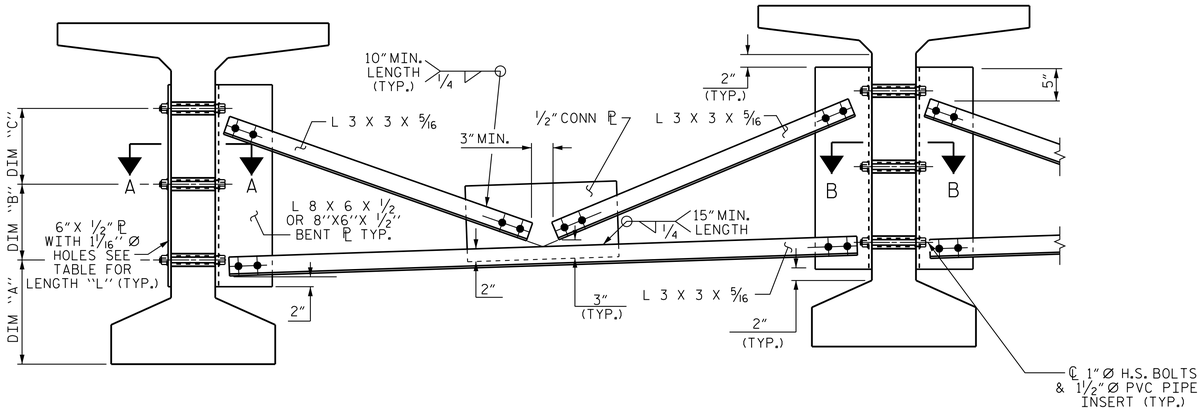
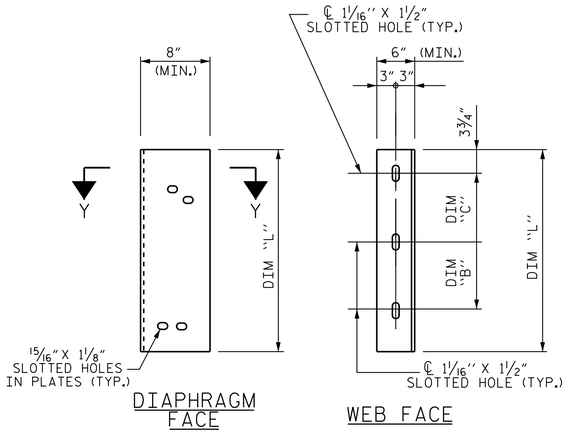


EXTERIOR GIRDER

INTERIOR GIRDER

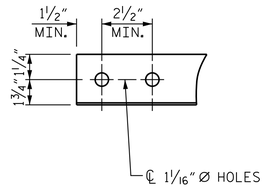
PART SECTION AT INTERMEDIATE DIAPHRAGM

(54" MODIFIED BULB TEE GIRDER SHOWN)



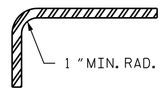
DIAPHRAGM FACE

WEB FACE



ANGLE END

(L 3 X 3 X 5/16)



SECTION Y-Y

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

THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATING (METALIZATION) 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.

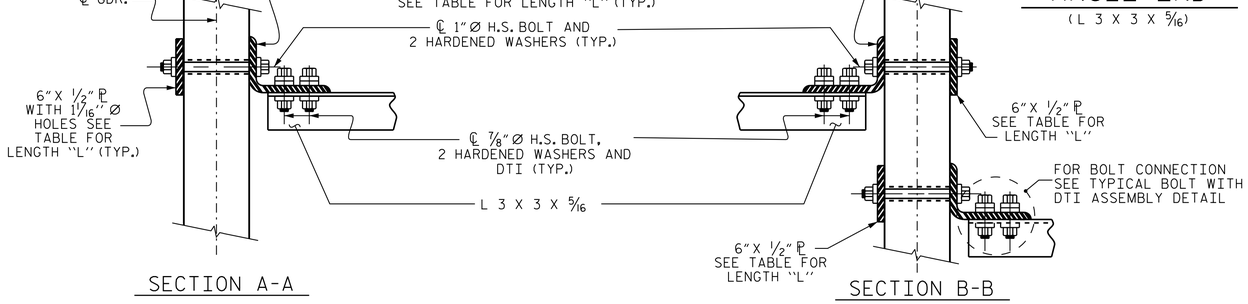
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.



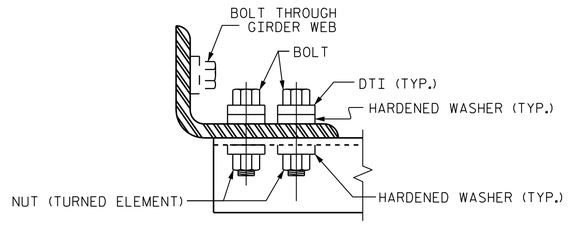
SECTION A-A

SECTION B-B

CONNECTION DETAILS

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
54" BULB TEE	1'-4 1/2"	1'-0"	1'-0"	2'-8"



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

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CHECKED BY : N. D'AIUTO DATE : 05/14/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
DocuSigned by: Jeffrey Kelvington
10/25/2021

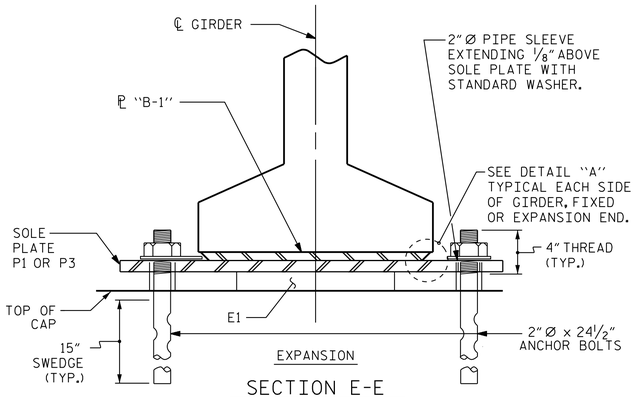
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

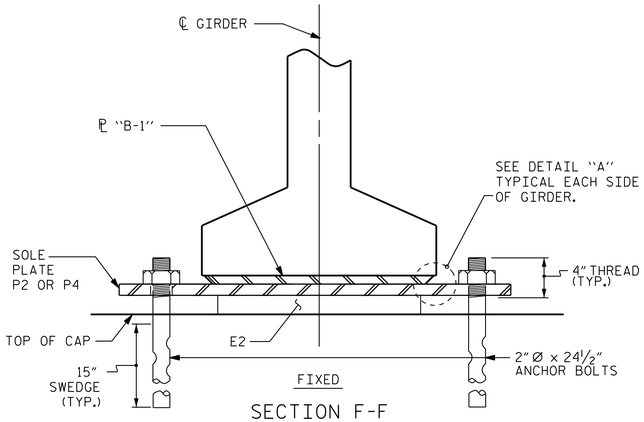
SUPERSTRUCTURE

INTERMEDIATE STEEL DIAPHRAGMS FOR 54"MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

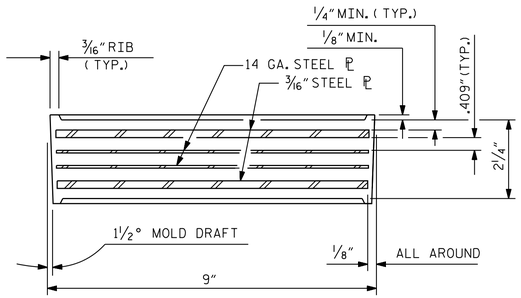
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-14
1			3			TOTAL SHEETS
2			4			38



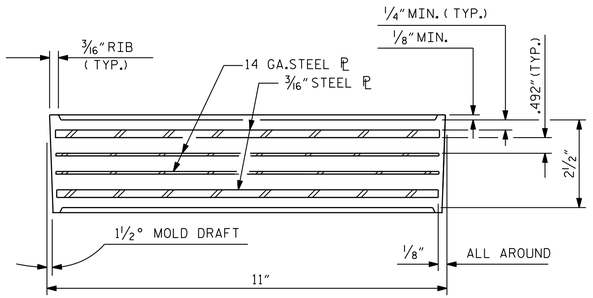
SECTION E-E



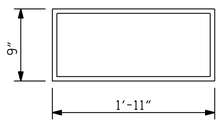
SECTION F-F



TYPICAL SECTION OF ELASTOMERIC BEARINGS



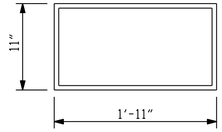
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

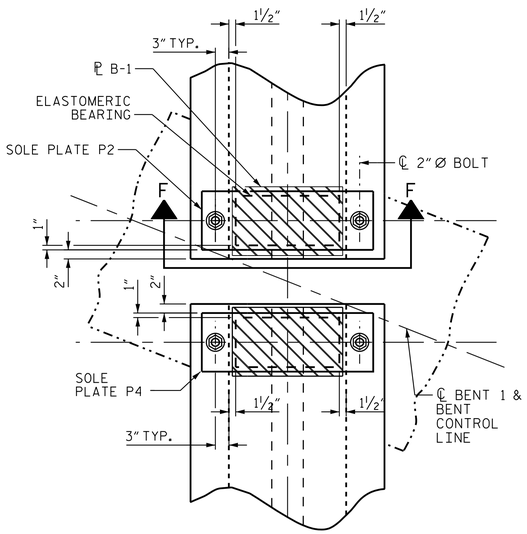
TYPE V



E2 (20 REQ'D)

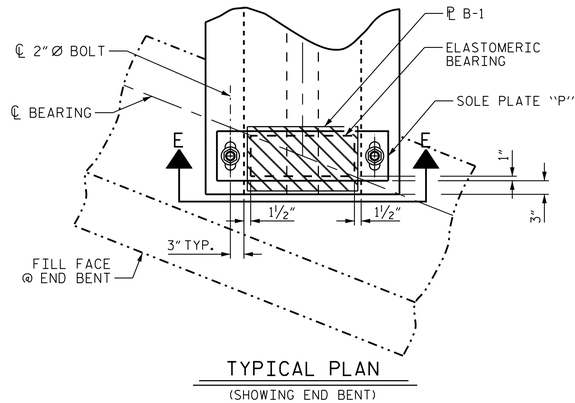
PLAN VIEW OF ELASTOMERIC BEARING

TYPE VI



TYPICAL PLAN

(SHOWING CONTINUOUS BENT)



TYPICAL PLAN

(SHOWING END BENT)

NOTES

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

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

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

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

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

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

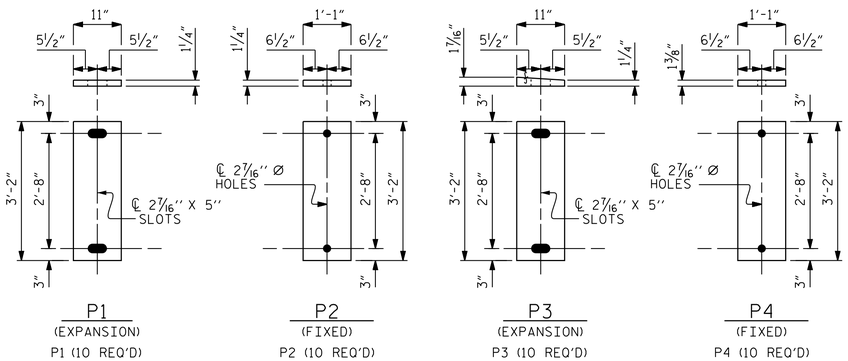
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.

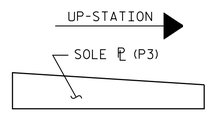
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k
TYPE VI	420 k



SOLE ℙ PLACEMENT DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

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ASSEMBLED BY : J.E. HAGENBUSH DATE : 08/30/18
CHECKED BY : N. D'AIUTO DATE : 05/14/19

DRAWN BY : EEM 2/97
CHECKED BY : VAP 2/97

REV.		
REV. 6/13	AAC/MAA	
REV. 1/15	MAA/TMG	
REV. 12/17	MAA/THC	

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

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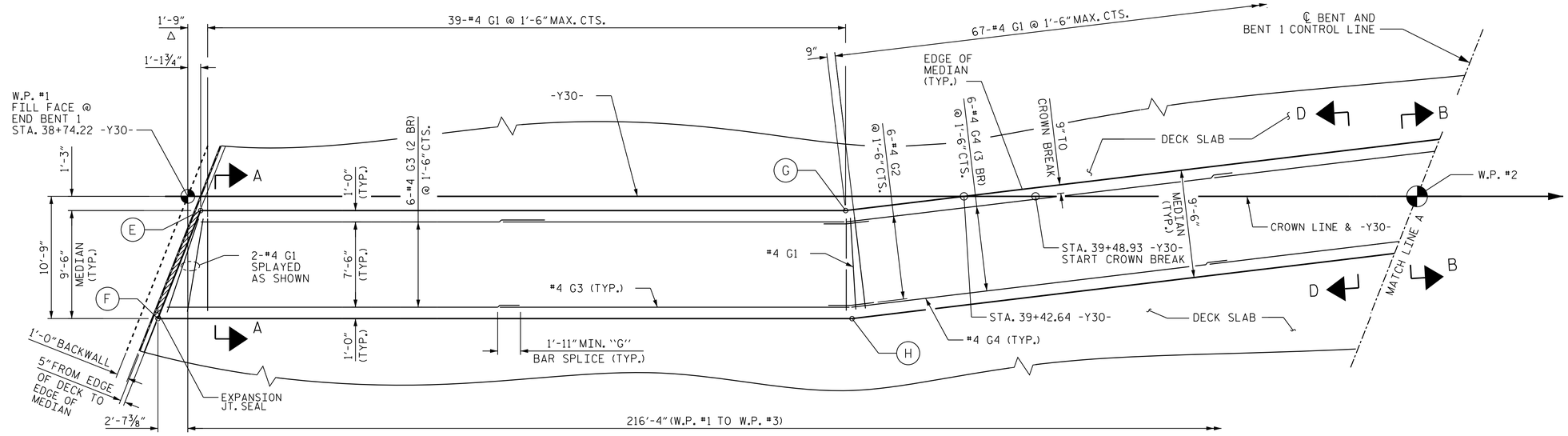
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-15
1			3			TOTAL SHEETS
2			4			38

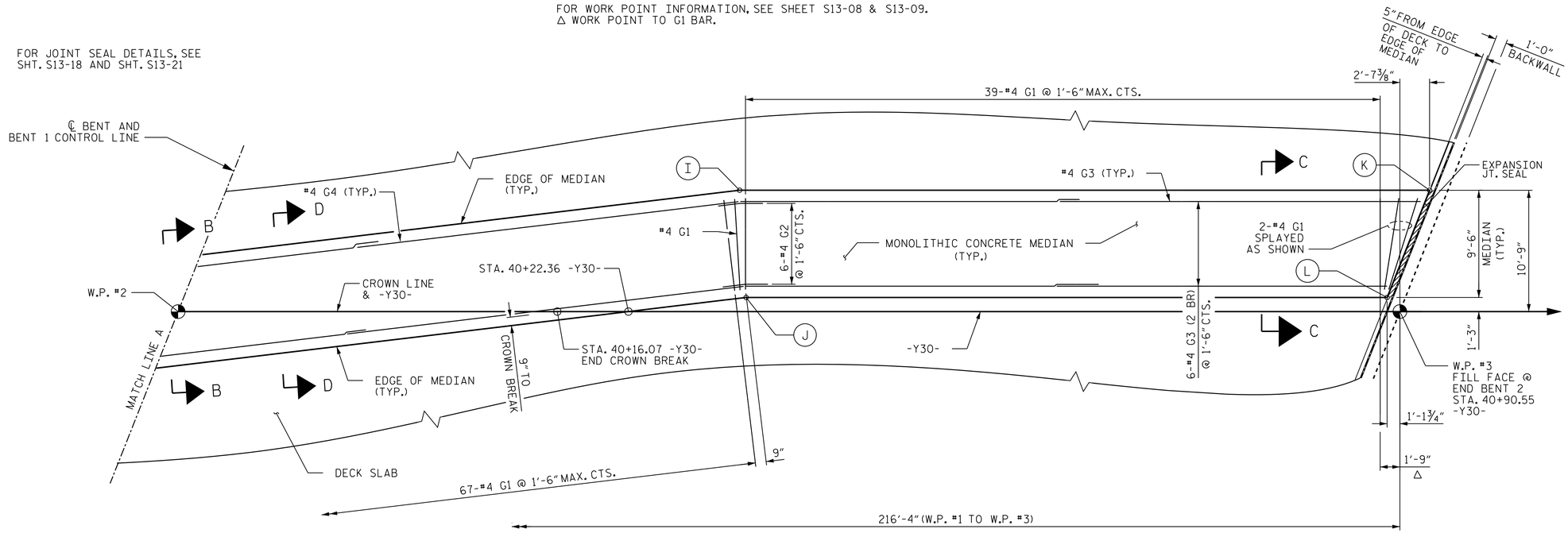
STD. NO. EB4



PLAN OF MONOLITHIC CONCRETE MEDIAN

FOR WORK POINT INFORMATION, SEE SHEET S13-08 & S13-09.
Δ WORK POINT TO G1 BAR.

FOR JOINT SEAL DETAILS, SEE
SHT. S13-18 AND SHT. S13-21



PLAN OF MONOLITHIC CONCRETE MEDIAN

FOR WORK POINT INFORMATION, SEE SHEET S13-08 & S13-09.
Δ WORK POINT TO G1 BAR.

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
MONOLITHIC
CONCRETE MEDIAN
DETAILS

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NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOHN T. KELVINGTON
Digitally signed by John T. Kelvington
10/25/2021

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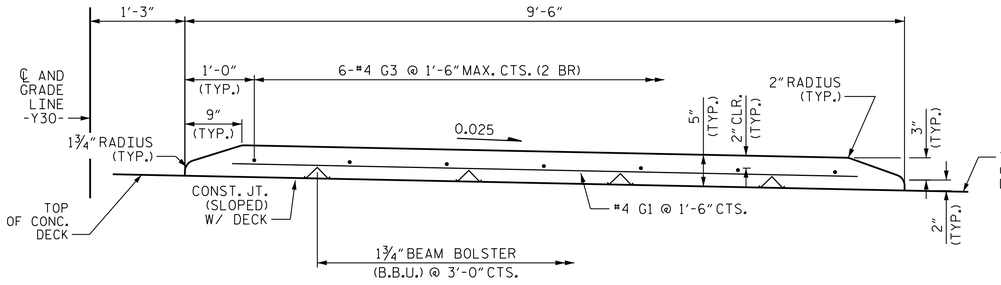
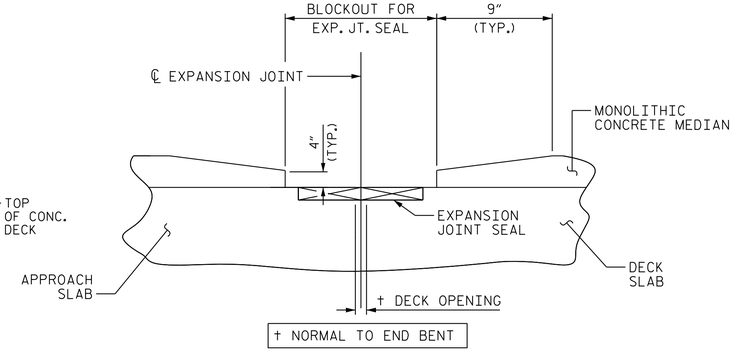


SECTION A-A



SECTION THROUGH MONOLITHIC CONCRETE MEDIAN AT END BENT

END BENT 1 SHOWN, END BENT 2 SIMILAR

NOTES

GROOVED CONTRACTION JOINTS, 1" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MONOLITHIC CONCRETE MEDIAN IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 10 FT. BETWEEN EXPANSION JOINT, NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH. PLACE ½" EXPANSION JOINTS AT 30' INTEVALS.

ALL REINFORCING STEEL IN MONOLITHIC CONCRETE MEDIAN SHALL BE EPOXY COATED.

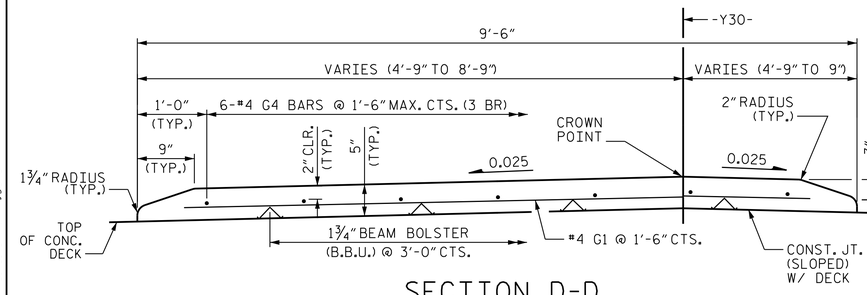
FOR MONOLITHIC CONCRETE MEDIAN ON APPROACH SLAB, SEE "BRIDGE APPROACH SLAB" SHEETS.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE CONCRETE MEDIAN. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

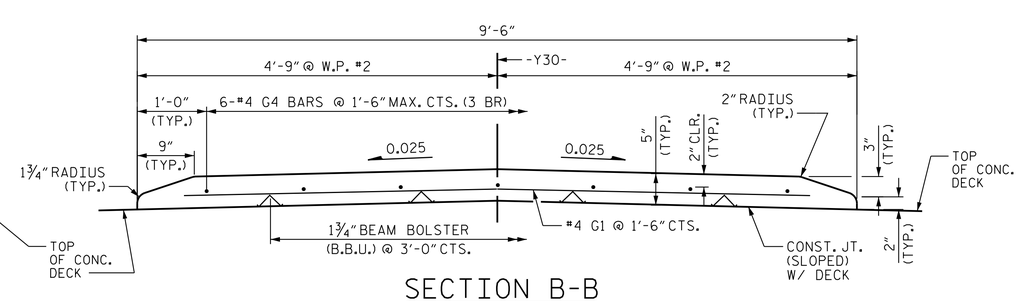
THE CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONCRETE MEDIAN IS INCLUDED IN THE "SUPERSTRUCTURE BILL OF MATERIAL" AND INCLUDED IN THE SQUARE FOOT PRICE FOR "REINFORCED CONCRETE DECK SLAB."

CONCRETE MEDIAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

2" MINIMUM CLEARANCE FROM ALL FINISHED CONCRETE SURFACES TO ALL STEEL REINFORCEMENT.

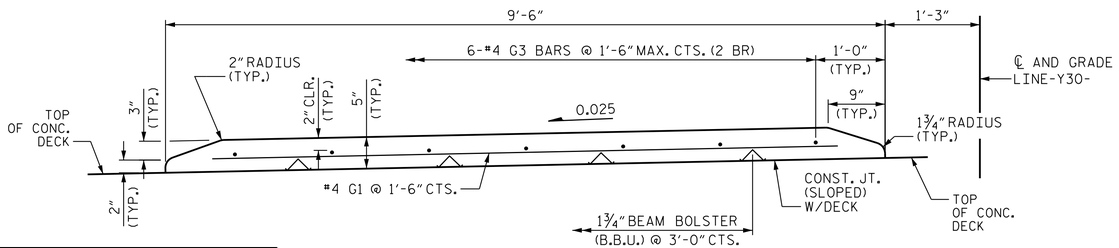


SECTION D-D



SECTION B-B

(MEDIAN CROWN POINT @ W.P. #2)



SECTION C-C

MONOLITHIC CONCRETE MEDIAN LAYOUT

WORK POINT	STATION (-Y30-)	OFFSET (FT.)
Ⓔ	38+75.37	1.25 RT.
Ⓕ	38+71.61	10.75 RT.
Ⓖ	39+32.22	1.25 RT.
Ⓗ	39+32.78	10.75 RT.
Ⓘ	40+32.22	10.75 LT.
Ⓙ	40+32.78	1.25 LT.
Ⓚ	40+93.16	10.75 LT.
Ⓛ	40+89.40	1.25 LT.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 2 OF 2

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DRAWN BY : J. E. HAGENBUSH DATE : 01/25/19
CHECKED BY : N. D'AIUTO DATE : 05/15/19

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by Jay Kelvington
10/25/2021

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
MONOLITHIC CONCRETE MEDIAN DETAILS

REVISIONS						SHEET NO.
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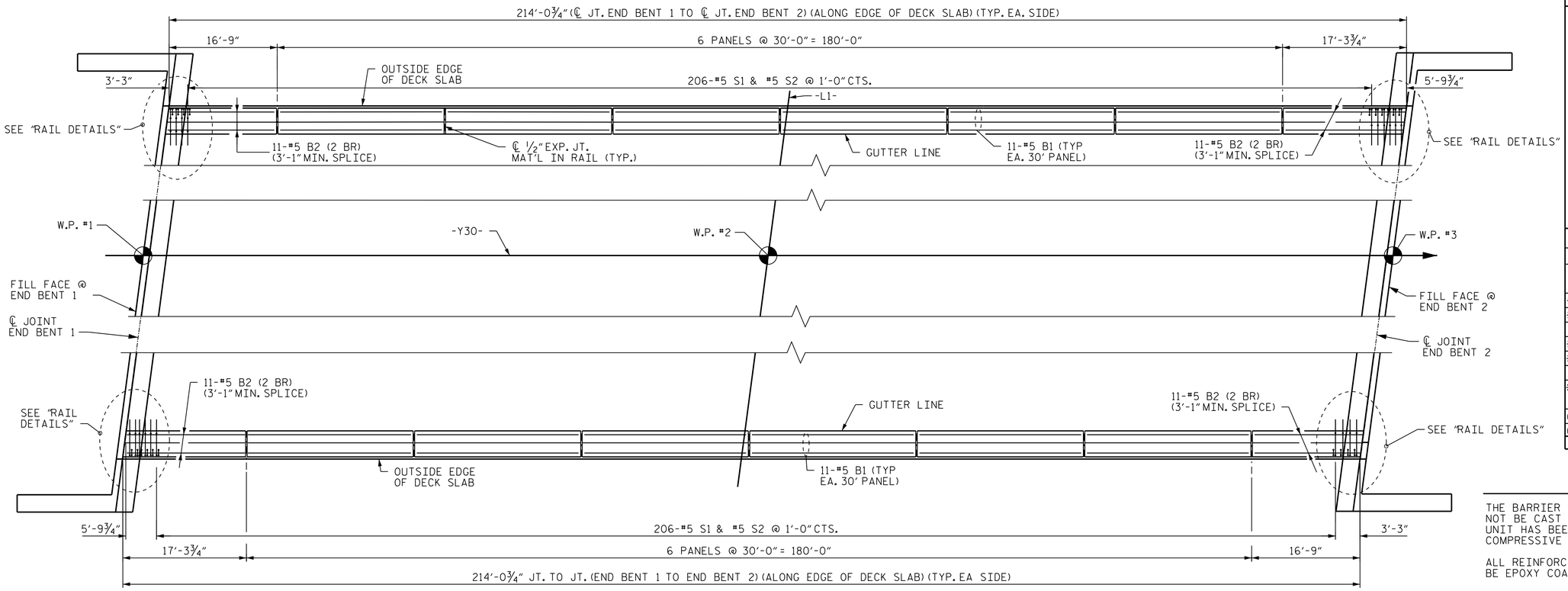
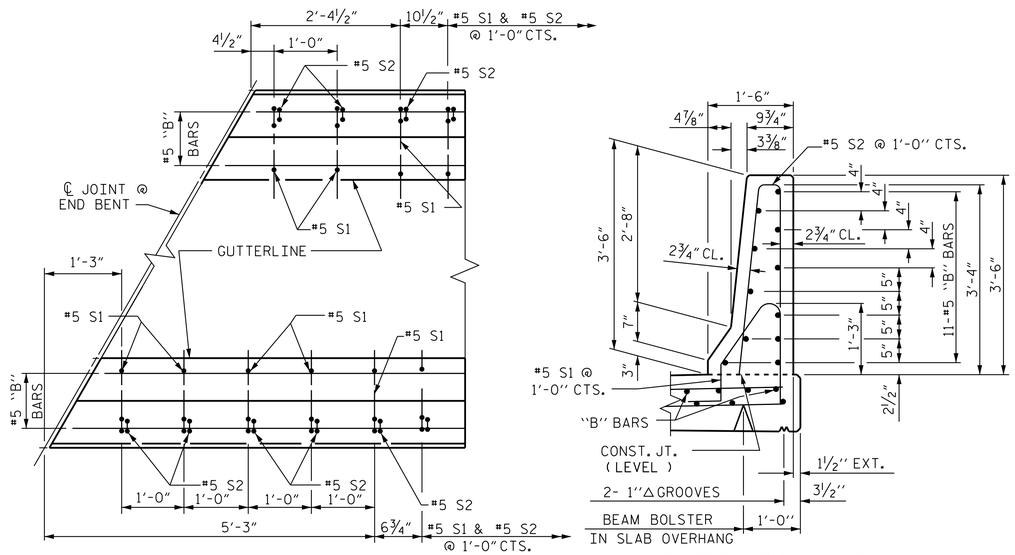
1			3			TOTAL SHEETS
2			4			38



BARRIER RAIL PLAN



PLAN

SECTION THRU RAIL

RAIL DETAILS

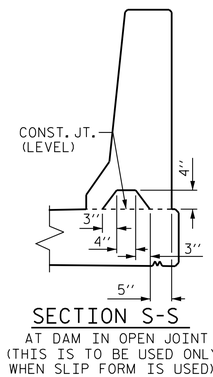
NEAR FILL FACE OF EACH END BENTS

END BENT 1 SHOWN. END BENT 2 SIMILAR BY ROATATION

FOR CONCRETE BARRIER RAIL ON APPROACH SLAB, SEE SHT. S13-37.

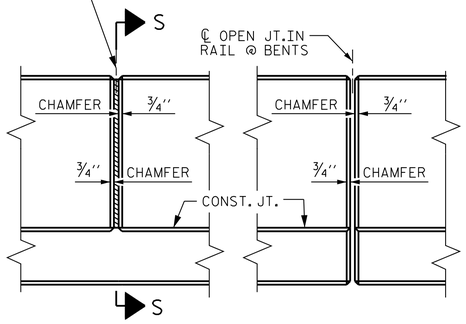
✱ BRIDGE SPANS ONLY

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



SECTION S-S

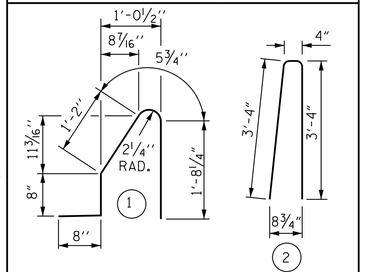
AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



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	132	#5	STR	29'-7"	4073
✱ B2	88	#5	STR	10'-0"	918
✱ S1	428	#5	1	4'-8"	2084
✱ S2	428	#5	2	7'-0"	3125

✱ EPOXY COATED REINFORCING STEEL	10,200	LBS.
CLASS AA CONCRETE	58.7	CU. YDS.
CONCRETE BARRIER RAIL	428.36	LIN. FT.✱

NOTES

THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT 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.

FOR END OF RAIL DETAILS SEE "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3.

CONCRETE & EPOXY COATED REINFORCING STEEL FOR BARRIER ON APPROACH SLAB NOT INCLUDED IN BILL OF MATERIAL ON THIS SHEET.

(2 BR) DENOTES 2 BAR RUN

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

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ASSEMBLED BY : J. B. GEILE DATE : 09/11/18
CHECKED BY : N. D'AIUTO DATE : 05/15/19

DRAWN BY : ARB 5/87
CHECKED BY : SJD 9/87

REV. 7/12 MAA/GM
REV. 6/13 MAA/CM
REV. 12/17 MAA/THC

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

10/25/2021

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

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STD. NO. CBR1

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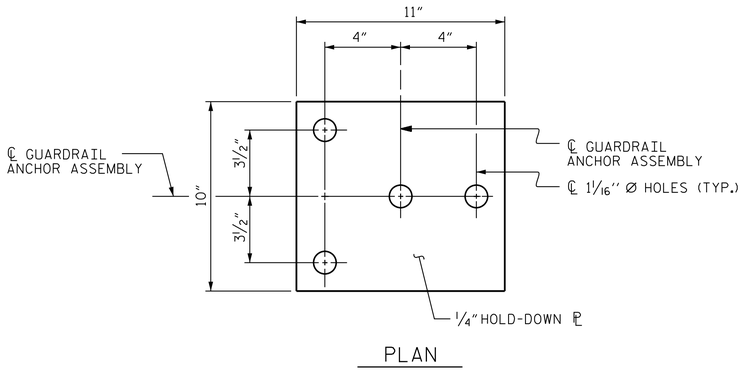
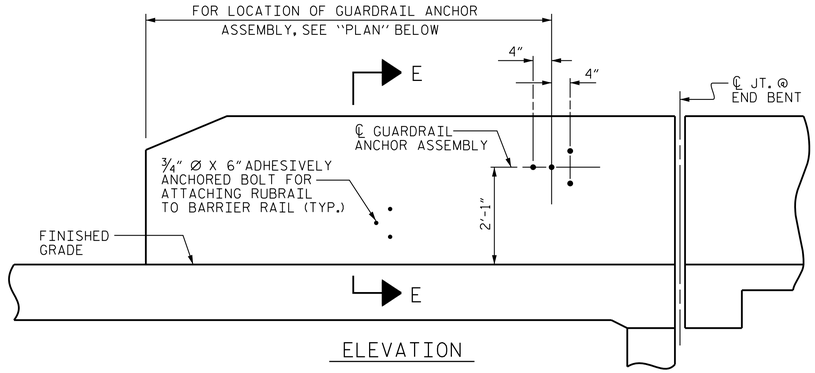
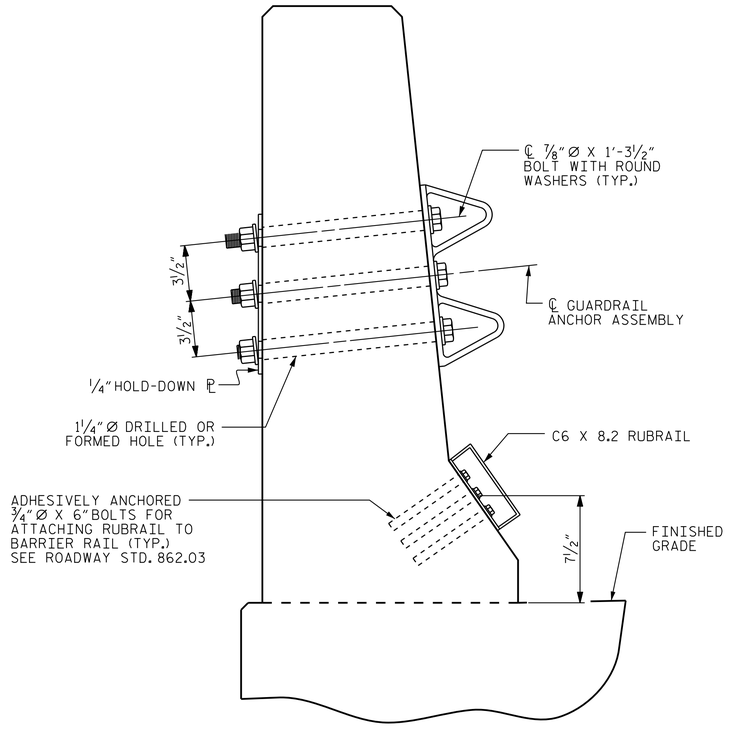


PLAN

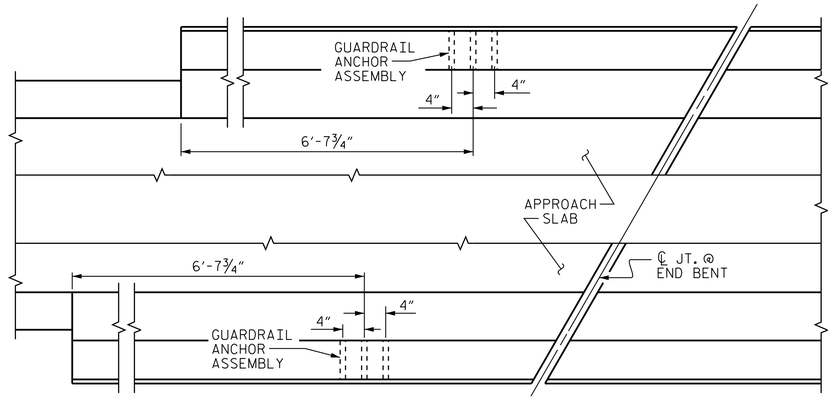


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 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.)

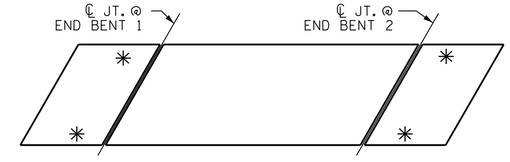
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

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ASSEMBLED BY : J. B. GEILE	DATE : 09/06/17		
CHECKED BY : N. D'AIUTO	DATE : 05/14/19		
DRAWN BY : TLA 5/06	REV. 7/12	MAA/GM	DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21
CHECKED BY : GM 5/06	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally Signed by J. T. Kelvington
10/25/2021

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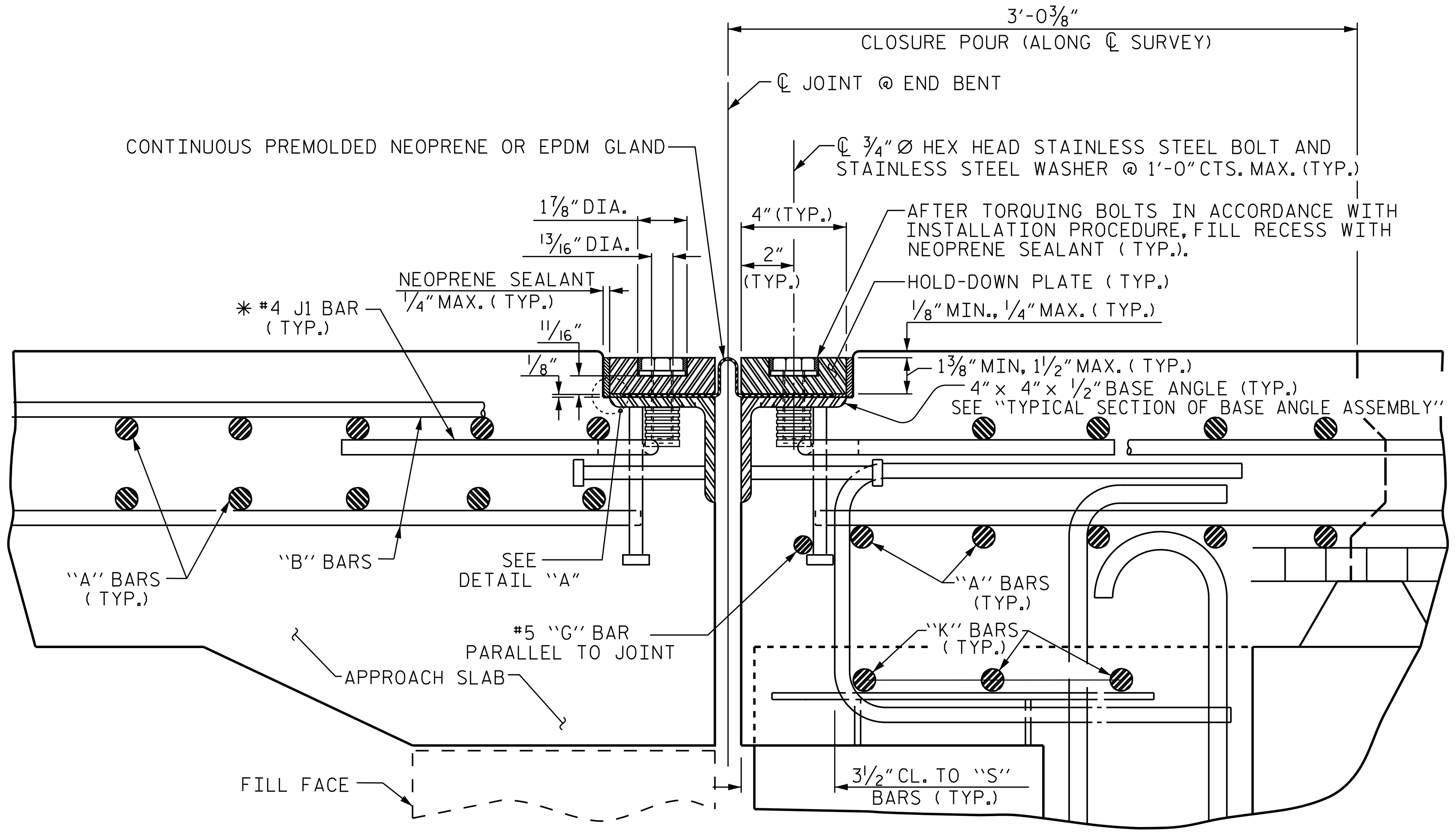
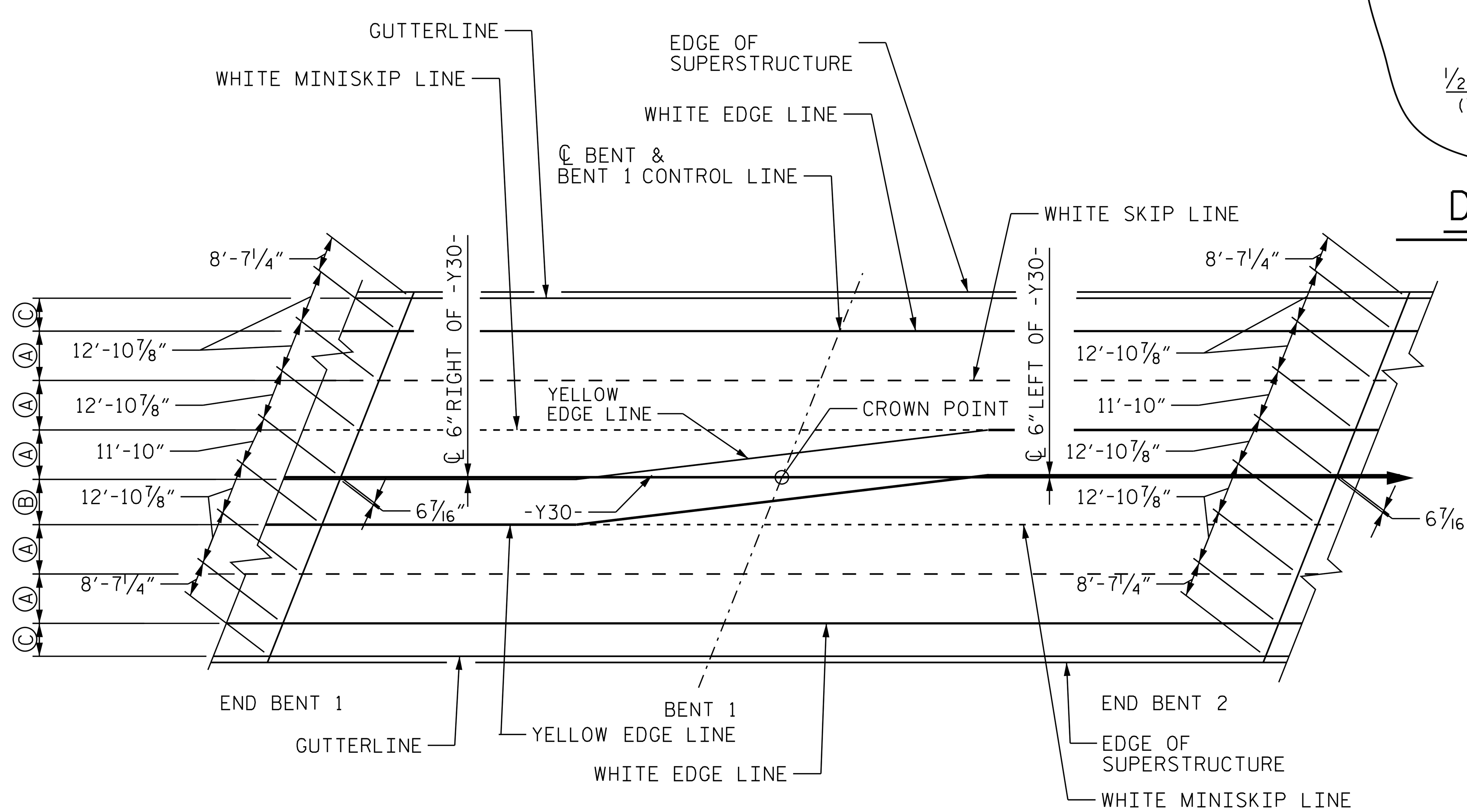


EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

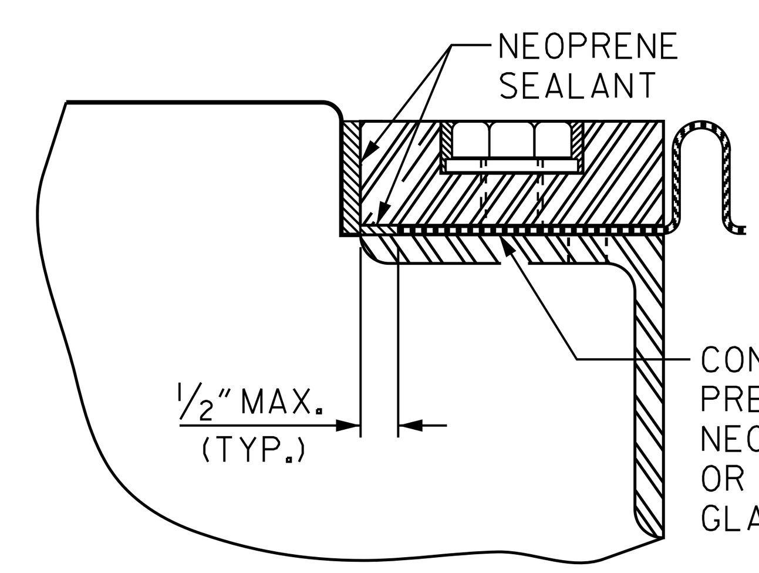


PAVEMENT MARKING ALIGNMENT

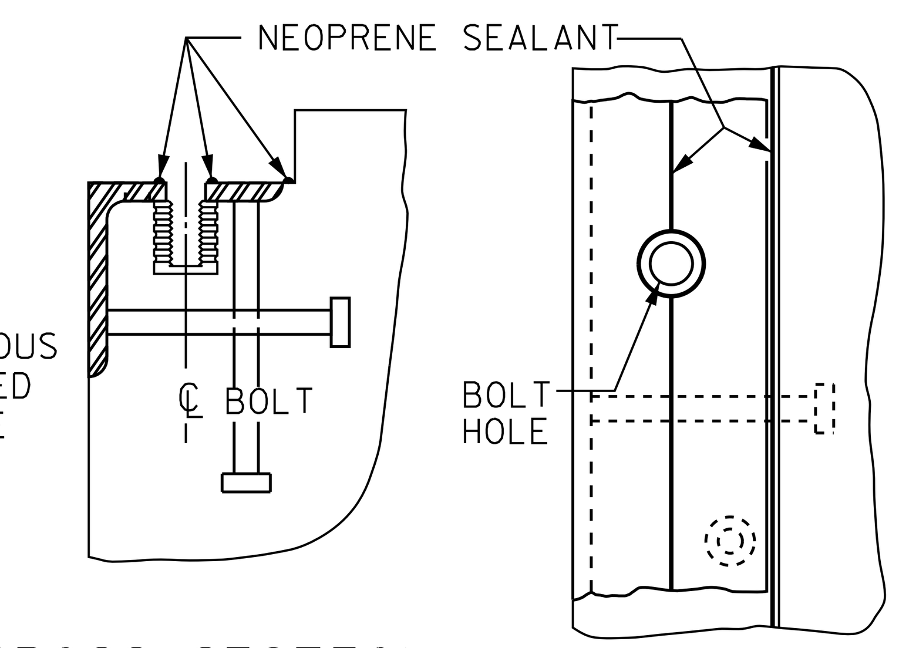
Ⓐ 12'-0"
Ⓑ 11'-0"
Ⓒ 8'-0"

INSTALLATION PROCEDURE

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.



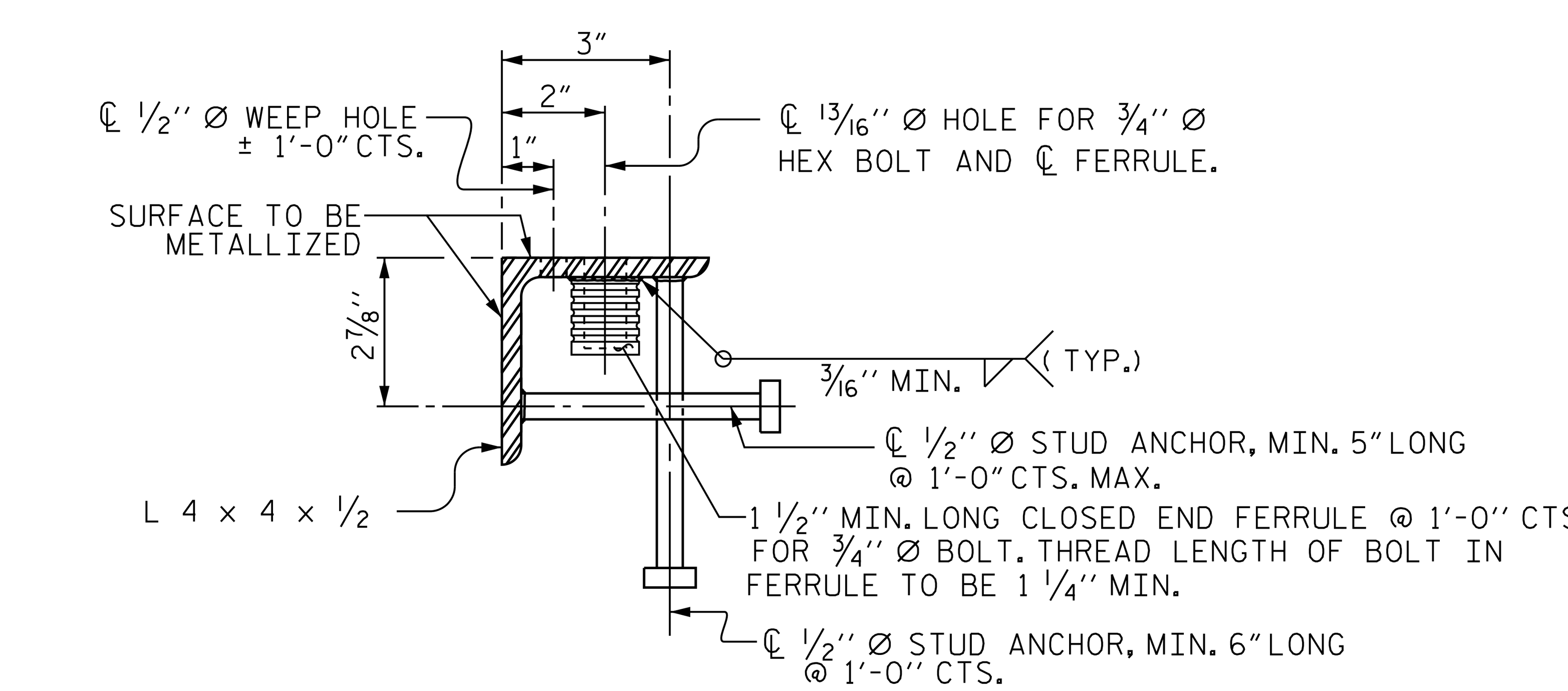
DETAIL "A"



CROSS SECTION   PLAN VIEW

INSTALLATION SKETCH

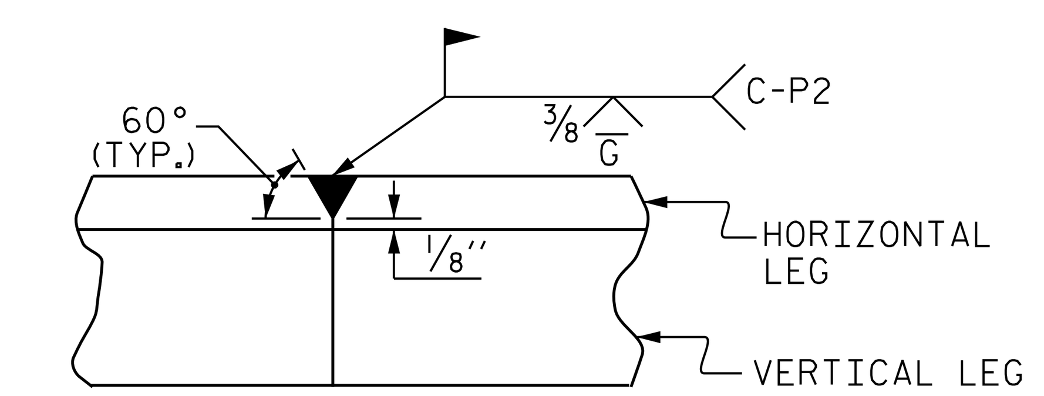
MOVEMENT AND SETTING AT JOINT					
BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	111°35'21"	5/8"	1 3/8"	1 5/16"	1 1/8"
END BENT 2	111°35'21"	5/8"	1 3/8"	1 5/16"	1 1/8"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 39+82.39 -Y30-

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STATE OF NORTH CAROLINA
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RALEIGH

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EXPANSION JOINT SEAL DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 J. T. KELVINGTON
10/25/2021

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ASSEMBLED BY : J. B. GEILE DATE : 05/15/19
CHECKED BY : N. D'AIUTO DATE : 05/15/19
DRAWN BY : REK 9/87
CHECKED BY : CRK 10/87
REV. 10/1/11 MAA/GM
REV. 10/17 MAA/THC
REV. 6/18 MAA/THC
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

STD. NO. EJS1

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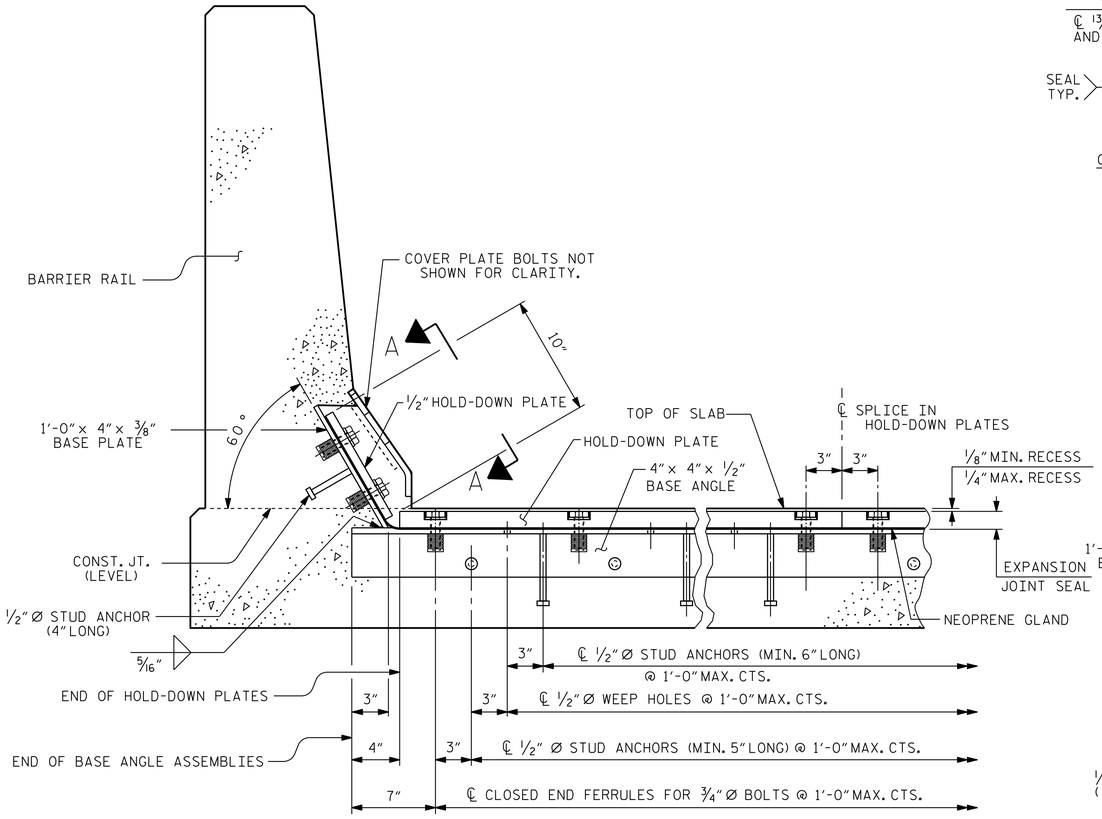
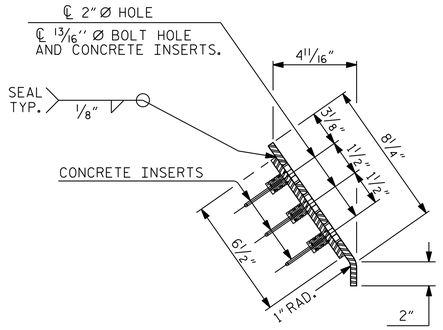
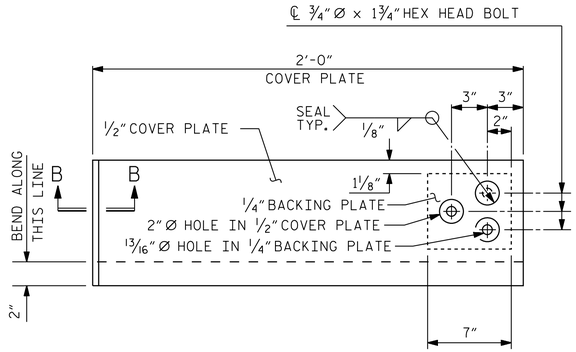


SECTION THRU RAIL NORMAL TO JOINT

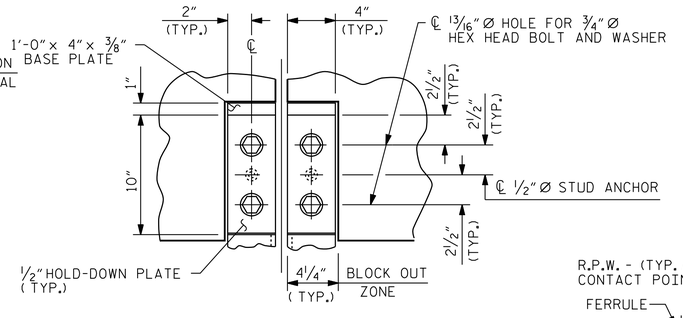


END VIEW

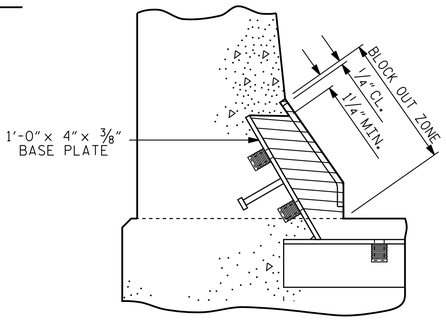


TYPE II - ELEVATION VIEW

COVER PLATE DETAILS

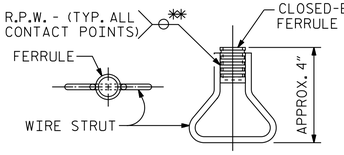


SECTION A - A



BLOCK OUT DETAIL

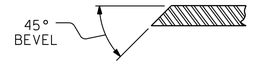
SEE " SECTION A - A " FOR OTHER DETAILS.



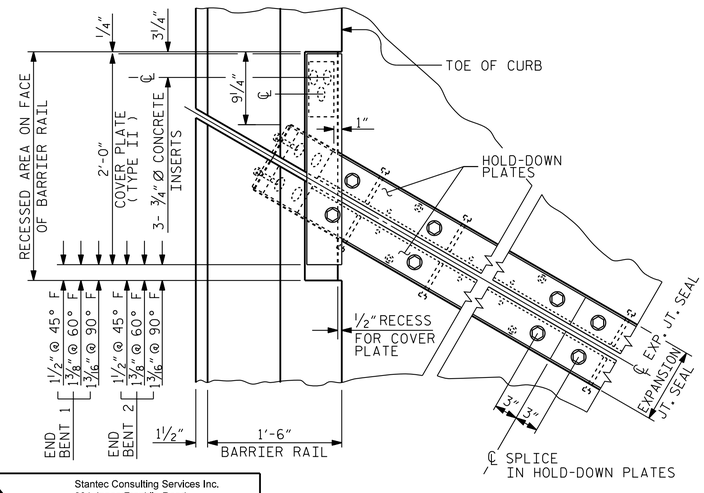
PLAN ELEVATION

CONCRETE INSERT

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

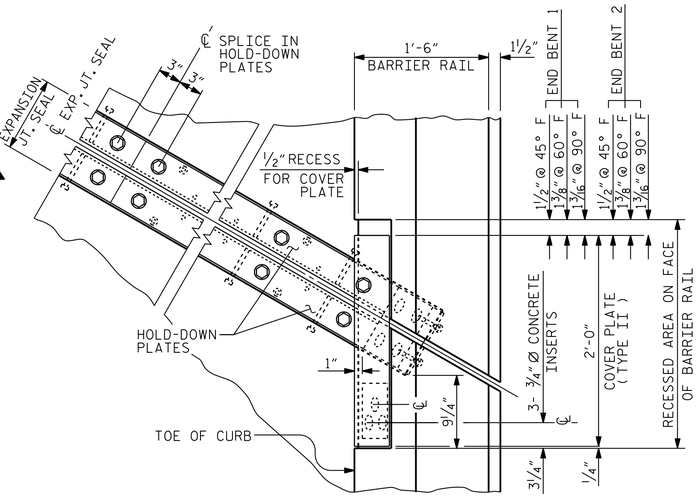


SECTION B - B



FLOW OF TRAFFIC

FLOW OF TRAFFIC



PLAN OF EXPANSION JOINT SEAL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

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ASSEMBLED BY : J. B. GEILE DATE : 05/15/19
CHECKED BY : N. D'AIUTO DATE : 05/15/19

DRAWN BY : REK 9/87
CHECKED BY : CRK 10/87

REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. Kelvington
10/25/2021

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REVISIONS						SHEET NO.
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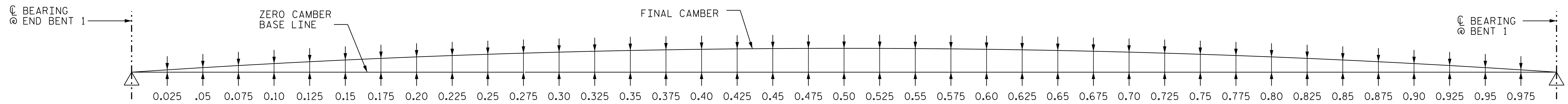
2			4			38

STD. NO. EJS2

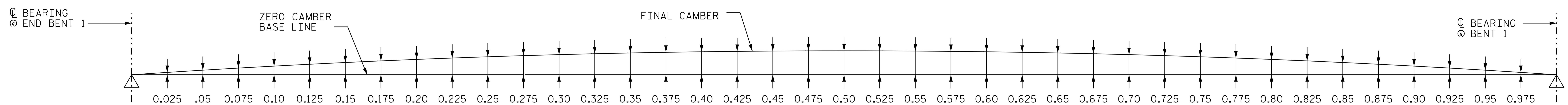


GIRDER 1 & 10

FORTIETH POINTS BETWEEN BRGS.		0.025	.05	0.075	0.10	0.125	0.15	0.175	0.20	0.225	0.25	0.275	0.30	0.325	0.35	0.375	0.40	0.425	0.45	0.475	0.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.026	0.052	0.078	0.103	0.128	0.152	0.174	0.196	0.216	0.235	0.252	0.268	0.282	0.295	0.305	0.314	0.320	0.325	0.327	0.329
DEFLEC. DUE TO SUPERIMPOSED DL * ↓	0.000	0.011	0.022	0.034	0.045	0.056	0.067	0.078	0.090	0.099	0.108	0.117	0.126	0.132	0.138	0.144	0.150	0.152	0.154	0.157	0.159
FINAL CAMBER (OR DEFLECTION) ↑	0	3/16"	3/8"	1/2"	11/16"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 1/2"	1 5/8"	1 11/16"	1 13/16"	1 7/8"	1 7/8"	2"	2"	2 1/16"	2 1/16"	2 1/16"

FORTIETH POINTS BETWEEN BRGS.	0.525	0.55	0.575	0.60	0.625	0.65	0.675	0.70	0.725	0.75	0.775	0.80	0.825	0.85	0.875	0.90	0.925	0.95	0.975	
CAMBER (GIRDER ALONE IN PLACE) ↑	0.327	0.325	0.320	0.314	0.305	0.295	0.282	0.268	0.252	0.235	0.216	0.196	0.174	0.152	0.128	0.103	0.078	0.052	0.052	0.000
DEFLEC. DUE TO SUPERIMPOSED DL * ↓	0.157	0.156	0.154	0.152	0.147	0.141	0.136	0.130	0.121	0.112	0.103	0.094	0.083	0.072	0.060	0.049	0.036	0.024	0.012	0.000
FINAL CAMBER (OR DEFLECTION) ↑	2 1/16"	2 1/16"	2"	1 15/16"	1 7/8"	1 7/8"	1 3/4"	1 5/8"	1 9/16"	1 1/2"	1 3/8"	1 1/4"	1 1/16"	15/16"	13/16"	5/8"	1/2"	5/16"	1/2"	0

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.



GIRDER 2-9

FORTIETH POINTS BETWEEN BRGS.		0.025	.05	0.075	0.10	0.125	0.15	0.175	0.20	0.225	0.25	0.275	0.30	0.325	0.35	0.375	0.40	0.425	0.45	0.475	0.50
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.026	0.052	0.078	0.103	0.128	0.152	0.174	0.196	0.216	0.235	0.252	0.268	0.282	0.295	0.305	0.314	0.320	0.325	0.327	0.329
DEFLEC. DUE TO SUPERIMPOSED DL * ↓	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.089	0.101	0.111	0.120	0.130	0.139	0.145	0.151	0.157	0.163	0.165	0.167	0.169	0.171
FINAL CAMBER (OR DEFLECTION) ↑	0	3/16"	5/16"	7/16"	5/8"	3/4"	15/16"	1"	1 1/8"	1 1/4"	1 3/8"	1 7/16"	1 9/16"	1 5/8"	1 3/4"	1 3/4"	1 13/16"	1 7/8"	1 7/8"	1 7/8"	1 7/8"

FORTIETH POINTS BETWEEN BRGS.	0.525	0.55	0.575	0.60	0.625	0.65	0.675	0.70	0.725	0.75	0.775	0.80	0.825	0.85	0.875	0.90	0.925	0.95	0.975	
CAMBER (GIRDER ALONE IN PLACE) ↑	0.327	0.325	0.320	0.314	0.305	0.295	0.282	0.268	0.252	0.235	0.216	0.196	0.174	0.152	0.128	0.103	0.078	0.052	0.026	0.000
DEFLEC. DUE TO SUPERIMPOSED DL * ↓	0.169	0.166	0.164	0.162	0.155	0.149	0.143	0.136	0.127	0.117	0.107	0.098	0.086	0.073	0.061	0.049	0.037	0.025	0.012	0.000
FINAL CAMBER (OR DEFLECTION) ↑	1 7/8"	1 7/8"	1 7/8"	1 13/16"	1 13/16"	1 3/4"	1 11/16"	1 9/16"	1 1/2"	1 7/16"	1 5/16"	1 3/16"	1 1/16"	15/16"	13/16"	5/8"	1/2"	5/16"	3/16"	0

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SCHEMATIC CAMBER ORDINATES SPANS A & B

SPAN A SHOWN SPAN B SIMILAR.

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER (OR DEFLECTION)" WHICH IS SHOWN IN INCHES.

(+) FINAL CAMBER INDICATES NET UPWARD DISPLACEMENT.

(-) FINAL CAMBER INDICATES NET DOWNWARD DISPLACEMENT.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 T. KELVINGTON

10/25/2021

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
DEAD LOAD DEFLECTIONS SPANS A & B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-16
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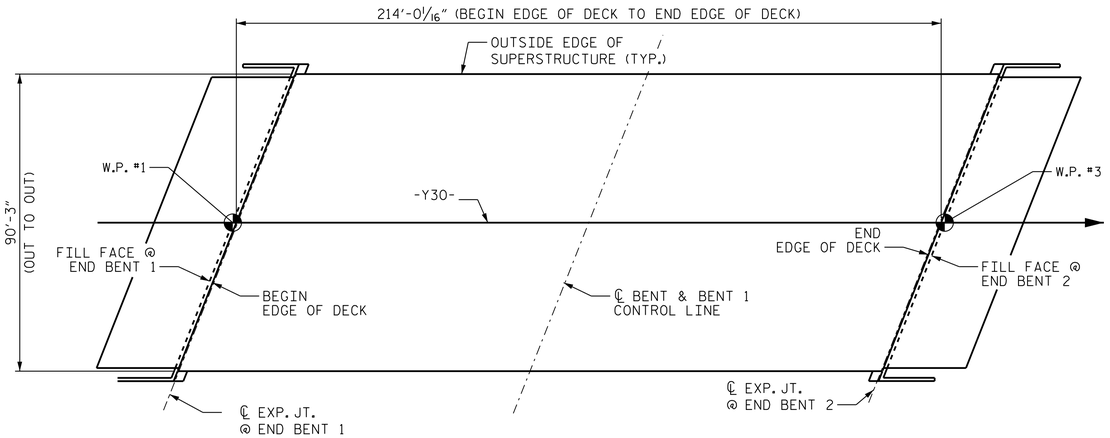
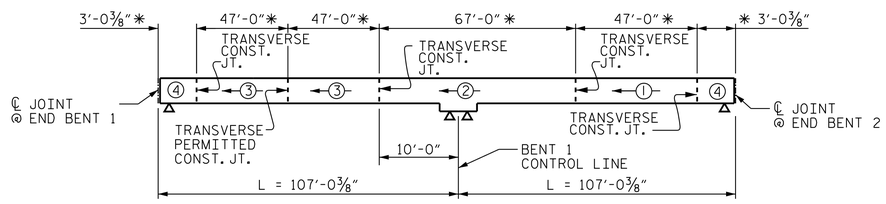
DRAWN BY : J. B. GEILE DATE : 08/31/18
CHECKED BY : N. D'AIUTO DATE : 05/14/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 19,314)

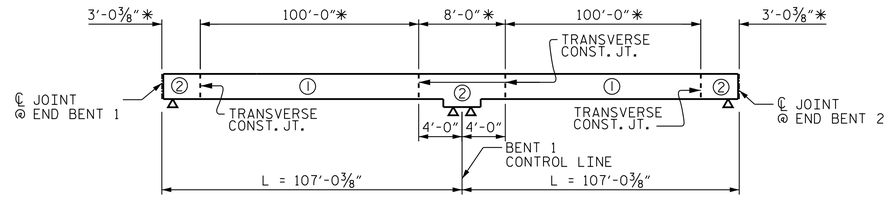


POURING SEQUENCE

* ALONG ℄ AND GRADE LINE -Y30-

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR

L = LENGTH OF EACH SPAN



OPTIONAL POURING SEQUENCE

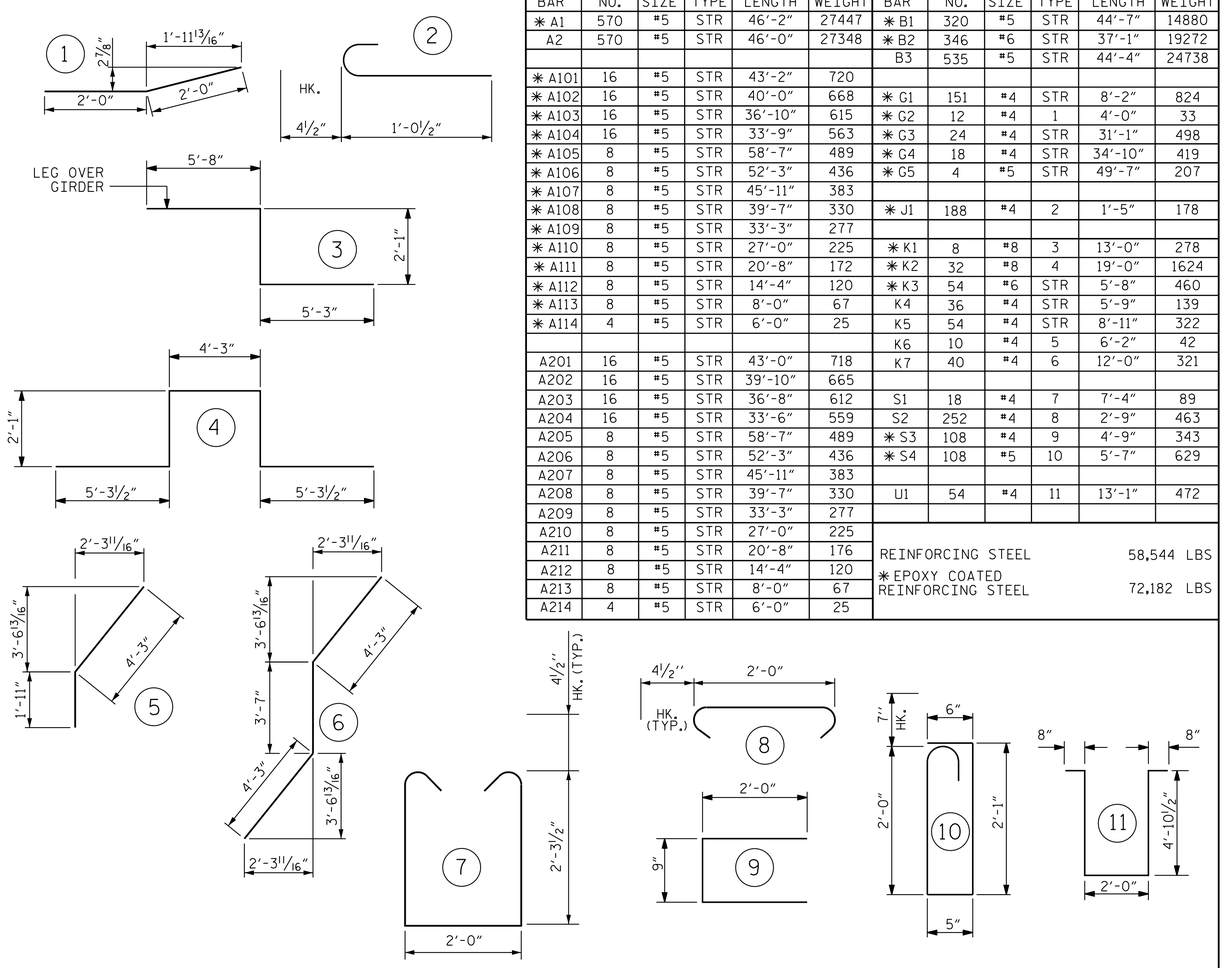
POUR ② CAN NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3000 PSI

* ALONG ℄ AND GRADE LINE -Y30-

GROOVING BRIDGE FLOORS

APPROACH SLABS	3,986 SQ.FT.
BRIDGE DECK	17,883 SQ.FT.
TOTAL	21,869 SQ.FT.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	570	#5	STR	46'-2"	27447	* B1	320	#5	STR	44'-7"	14880
A2	570	#5	STR	46'-0"	27348	* B2	346	#6	STR	37'-1"	19272
						B3	535	#5	STR	44'-4"	24738
* A101	16	#5	STR	43'-2"	720						
* A102	16	#5	STR	40'-0"	668	* G1	151	#4	STR	8'-2"	824
* A103	16	#5	STR	36'-10"	615	* G2	12	#4	1	4'-0"	33
* A104	16	#5	STR	33'-9"	563	* G3	24	#4	STR	31'-1"	498
* A105	8	#5	STR	58'-7"	489	* G4	18	#4	STR	34'-10"	419
* A106	8	#5	STR	52'-3"	436	* G5	4	#5	STR	49'-7"	207
* A107	8	#5	STR	45'-11"	383						
* A108	8	#5	STR	39'-7"	330	* J1	188	#4	2	1'-5"	178
* A109	8	#5	STR	33'-3"	277						
* A110	8	#5	STR	27'-0"	225	* K1	8	#8	3	13'-0"	278
* A111	8	#5	STR	20'-8"	172	* K2	32	#8	4	19'-0"	1624
* A112	8	#5	STR	14'-4"	120	* K3	54	#6	STR	5'-8"	460
* A113	8	#5	STR	8'-0"	67	K4	36	#4	STR	5'-9"	139
* A114	4	#5	STR	6'-0"	25	K5	54	#4	STR	8'-11"	322
						K6	10	#4	5	6'-2"	42
A201	16	#5	STR	43'-0"	718	K7	40	#4	6	12'-0"	321
A202	16	#5	STR	39'-10"	665						
A203	16	#5	STR	36'-8"	612	S1	18	#4	7	7'-4"	89
A204	16	#5	STR	33'-6"	559	S2	252	#4	8	2'-9"	463
A205	8	#5	STR	58'-7"	489	* S3	108	#4	9	4'-9"	343
A206	8	#5	STR	52'-3"	436	* S4	108	#5	10	5'-7"	629
A207	8	#5	STR	45'-11"	383						
A208	8	#5	STR	39'-7"	330	U1	54	#4	11	13'-1"	472
A209	8	#5	STR	33'-3"	277						
A210	8	#5	STR	27'-0"	225						
A211	8	#5	STR	20'-8"	176						
A212	8	#5	STR	14'-4"	120						
A213	8	#5	STR	8'-0"	67						
A214	4	#5	STR	6'-0"	25						

REINFORCING STEEL	58,544 LBS
* EPOXY COATED REINFORCING STEEL	72,182 LBS

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

BAR SIZE	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"			

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	133.5	58,826	60,137
POUR #2	223.1		
POUR #3	267.1		
POUR #4	29.5		
CONCRETE MEDIAN **	30.7		1,780
TOTALS **	683.9	58,826	61,917

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. QUANTITIES FOR MEDIAN ON APP. SLAB ARE NOT INCLUDED.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

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DRAWN BY : J.E. HAGENBUSH DATE : 09/11/18
CHECKED BY : N. D'AIUTO DATE : 05/16/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. TIMOTHY KELVINGTON
Digitally signed by J. Timothy Kelvington
10/25/2021

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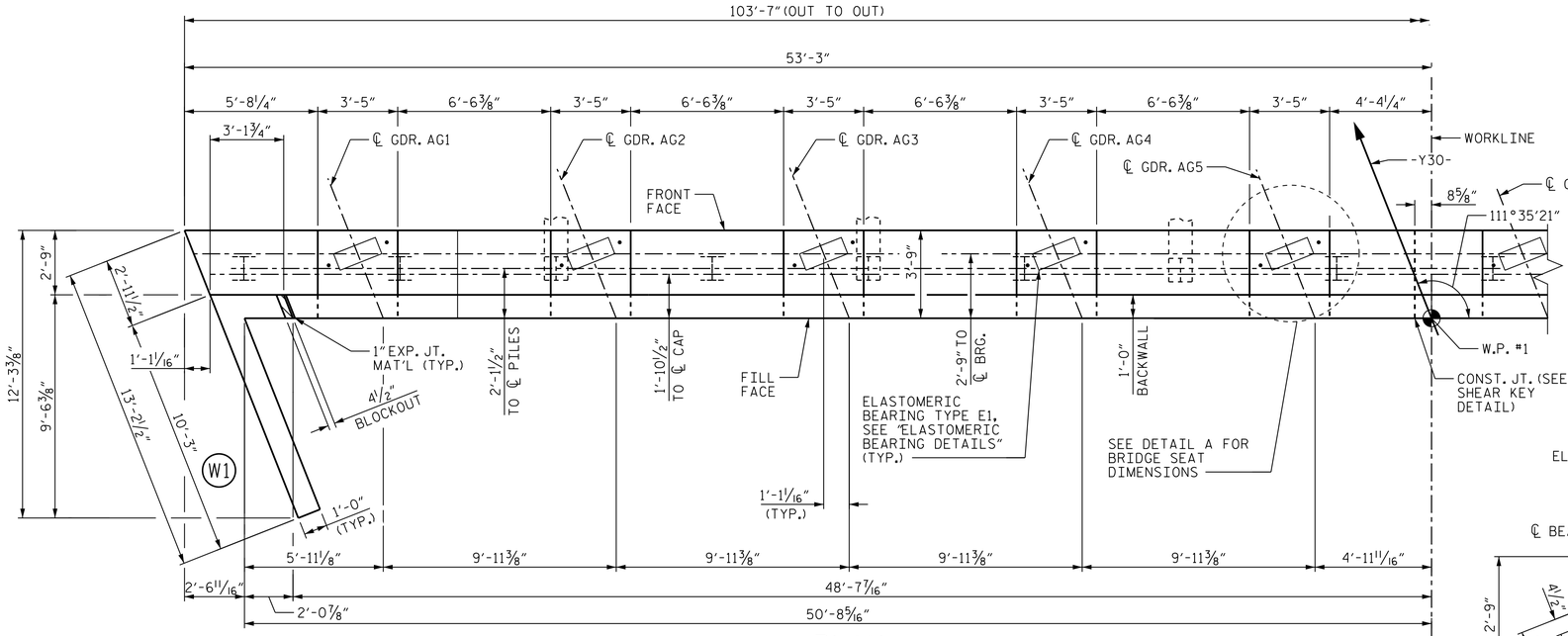
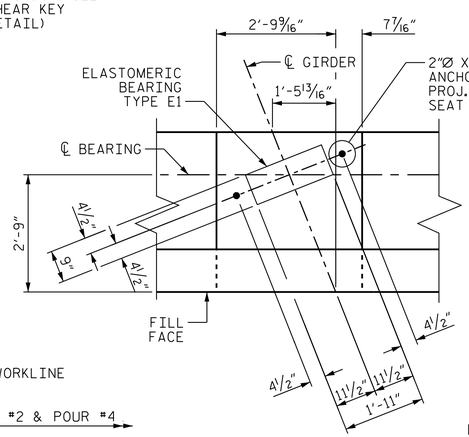
2			4			38

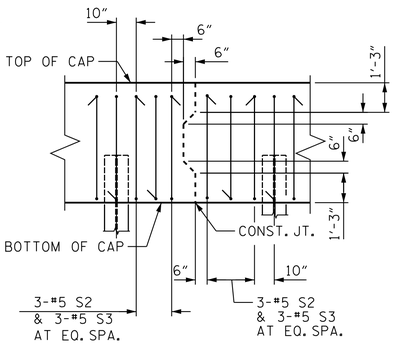


PLAN



DETAIL A

(TYP. EA. BRIDGE SEAT)



SHEAR KEY DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY.
SEE ELEVATION VIEW FOR LOCATION OF SHEAR KEY.
REINFORCING STEEL SHALL BE CONTINUOUS THRU SHEAR KEY.

NOTES

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

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

BACKWALL SHALL BE PLACED BEFORE APPLYING EPOXY PROTECTIVE COATING.

THE TOP SURFACE OF THE CAP, EXCEPT THE BRIDGE SEAT BUILDUPS, SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF ¼"/FT.

FOR WING DETAILS, SEE SHEET 3 OF 4.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

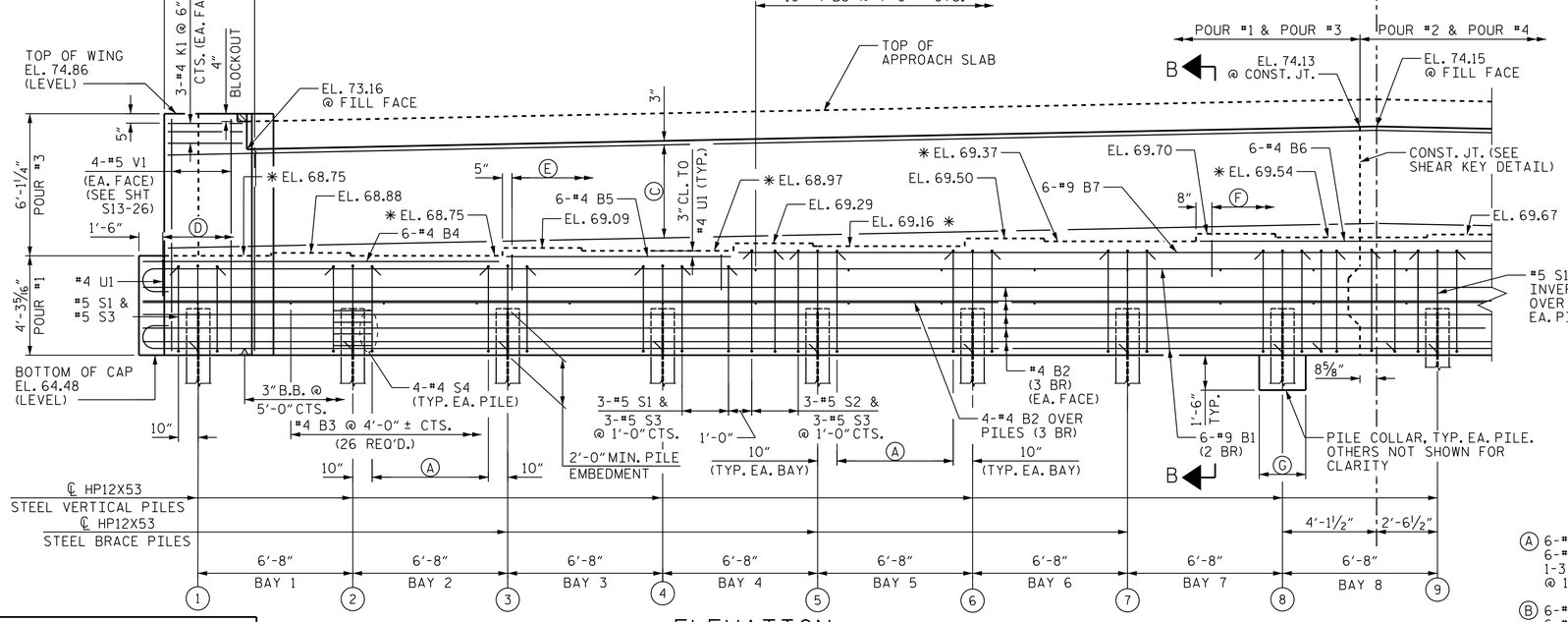
TOP OF PILE ELEVATION = 66.48 (TYP.)

✱ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A" OR "SECTION B-B" ON SHEET 4 OF 4.

(2 BR) DENOTES 2 BAR RUN.

(3 BR) DENOTES 3 BAR RUN.

(4 BR) DENOTES 4 BAR RUN.



ELEVATION

BAR SPLICES NOT SHOWN FOR CLARITY

(D) 10-#4 U1 @ 1'-6" MAX. CTS.

(E) 7-#4 U1 @ 1'-6" CTS.

(F) 9-#4 U1 @ 1'-6" CTS.

(G) 2'-0" DIA. (TYP.)

BAR	MIN. SPLICE
#9 B1	5'-4"
#4 B2	2'-5"
#4 K2	2'-5"

(A) 6-#5 S1 AND 6-#5 S3 (BAYS 1-3 AND 11-15) @ 1'-0" CTS.

(B) 6-#5 S2 AND 6-#5 S3 (BAYS 5-10) @ 1'-0" CTS.

(C) 9-#4 K2 @ 6" CTS. (4 BR) (EA. FACE)

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

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DRAWN BY : J. B. GEILE DATE : 04/03/19
CHECKED BY : N. D'AIUTO DATE : 05/14/19
DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOSEPH T. KELVINGTON
Digitally signed by Joseph T. Kelvington
10/25/2021

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2			4			38

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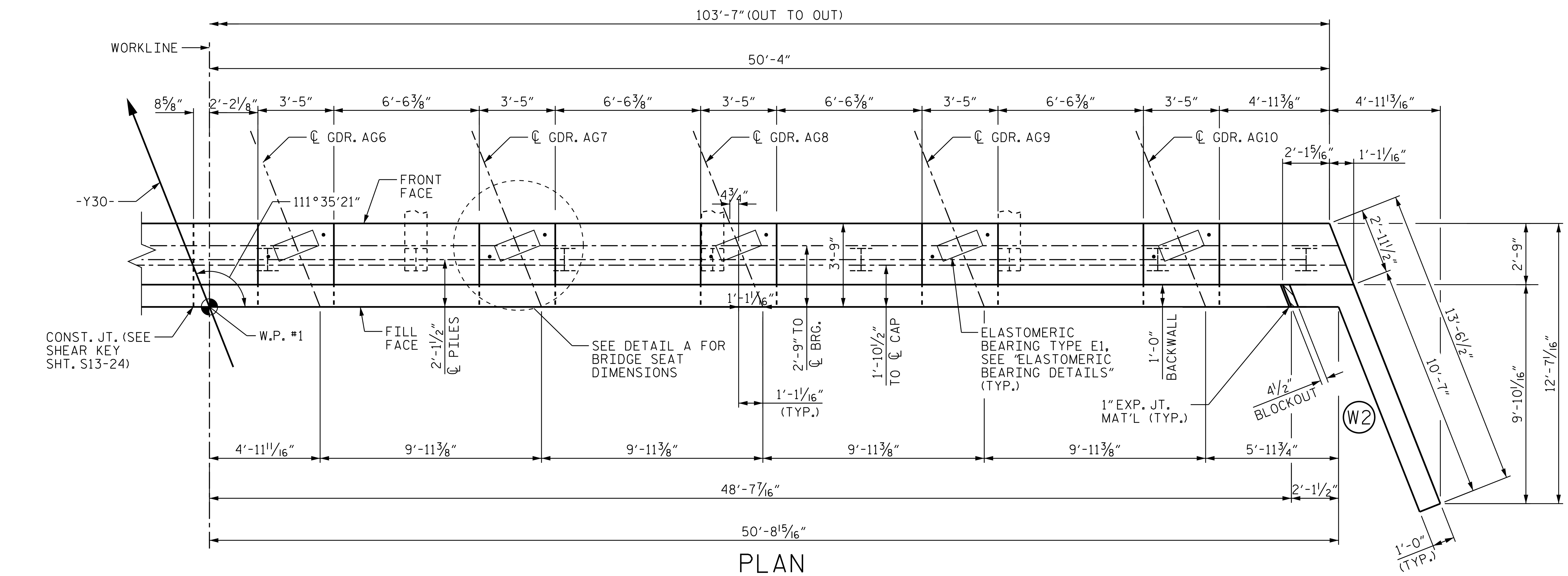


PLAN

NOTES

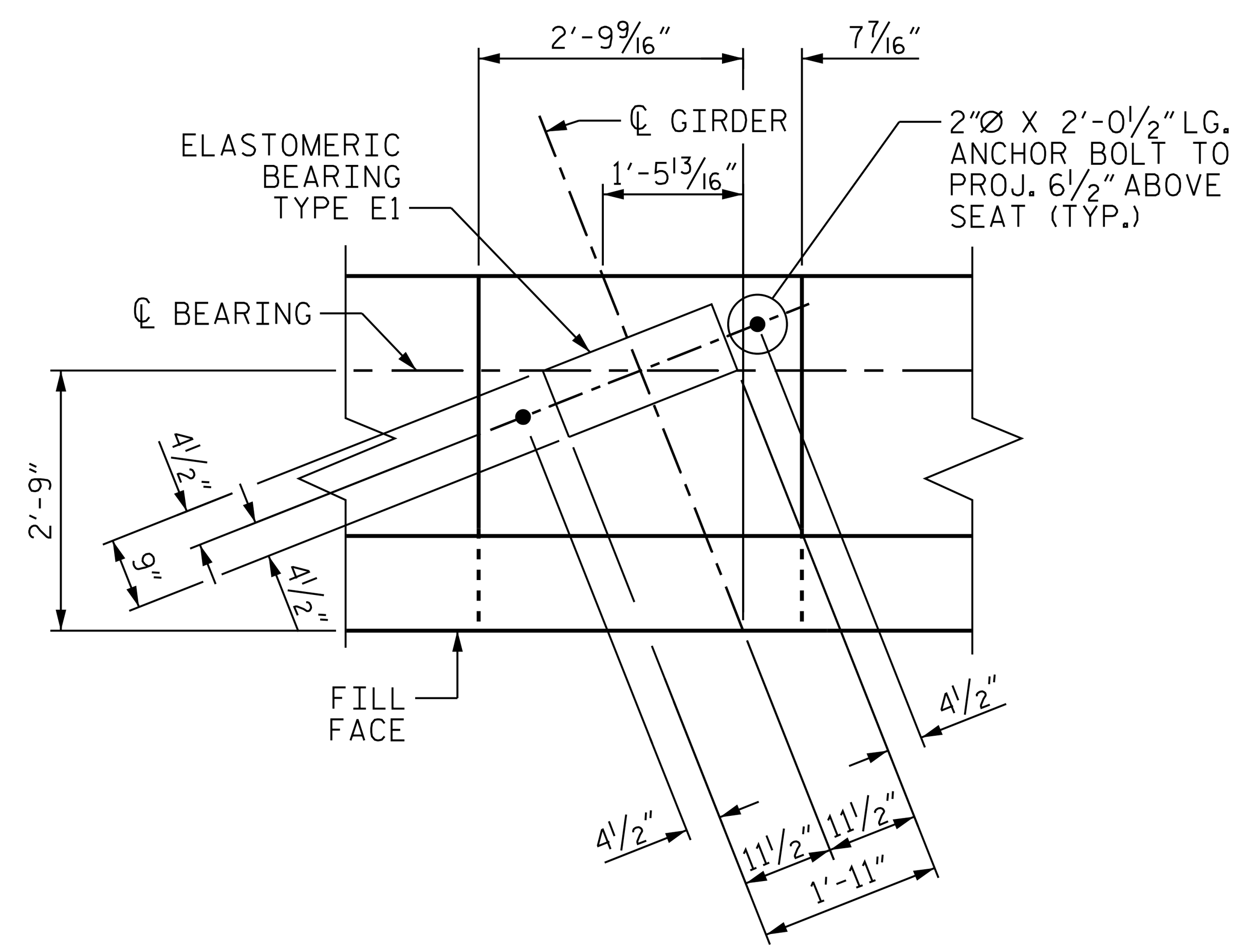
TOP OF PILE ELEVATION = 66.48 (TYP.)

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A" OR "SECTION B-B" ON SHEET 4 OF 4.

(2 BR) DENOTES 2 BAR RUN.

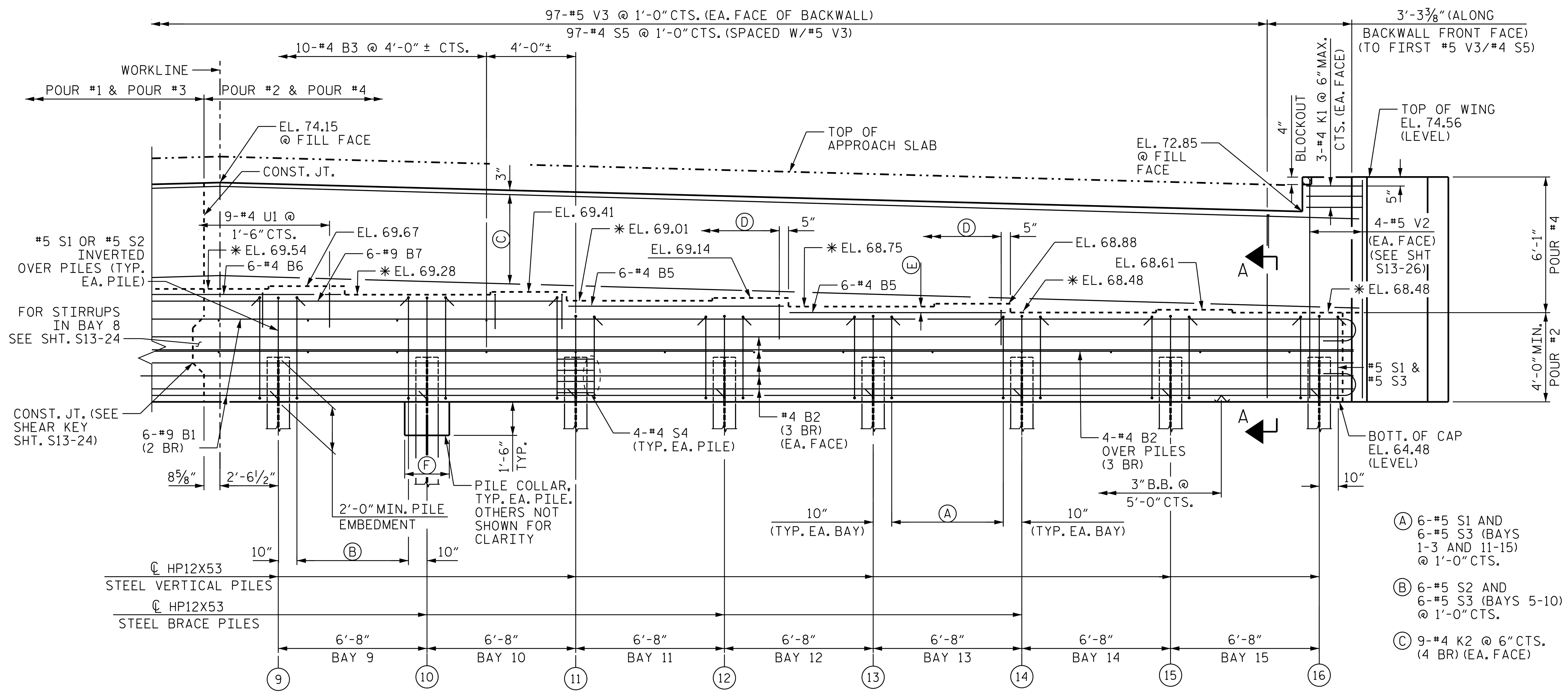
(3 BR) DENOTES 3 BAR RUN.

(4 BR) DENOTES 4 BAR RUN.



DETAIL A

(TYP. EA. BRIDGE SEAT)



ELEVATION

BAR SPLICES NOT SHOWN FOR CLARITY

(D) 7-#4 U1 @ 1'-6" CTS.

(E) 3" TO #4 B5 OR #4 B6

(F) 2'-0" DIA. (TYP.)

(A) 6-#5 S1 AND 6-#5 S3 (BAYS 1-3 AND 11-15) @ 1'-0" CTS.

(B) 6-#5 S2 AND 6-#5 S3 (BAYS 5-10) @ 1'-0" CTS.

(C) 9-#4 K2 @ 6" CTS. (4 BR) (EA. FACE)

BAR	MIN. SPLICE
#9 B1	5'-4"
#4 B2	2'-5"
#4 K2	2'-5"

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 J. T. KELVINGTON

10/25/2021

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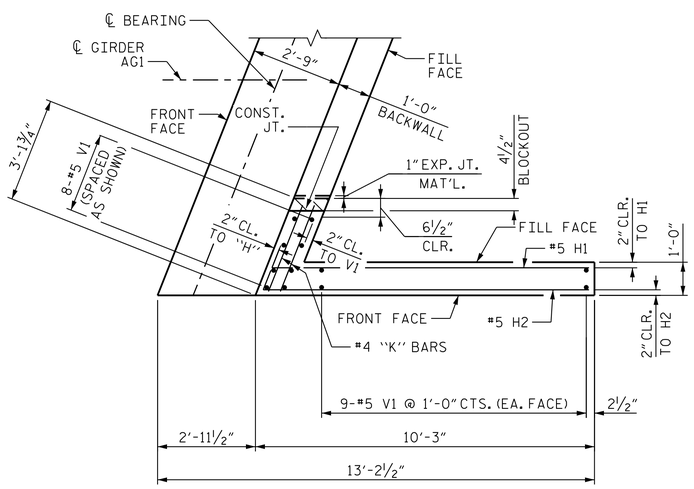
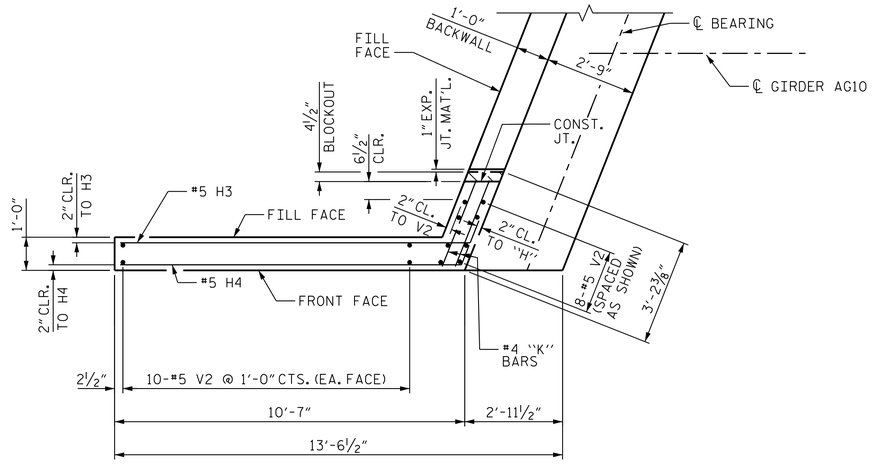


PLAN OF LEFT WING (W1)

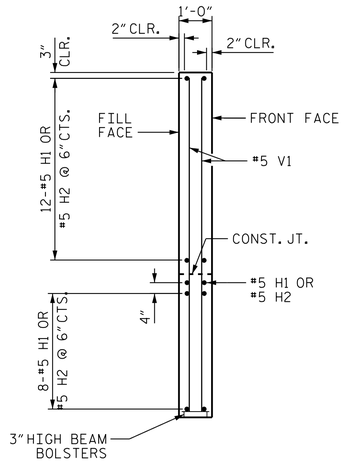


PLAN OF RIGHT WING (W2)

NOTE:

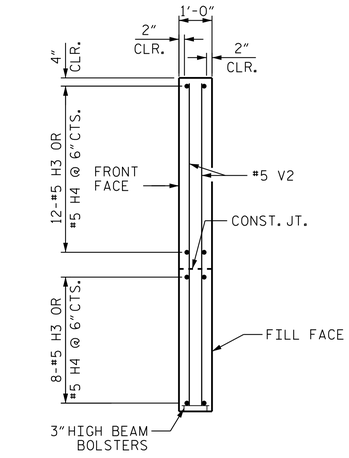
* TOP SURFACE OF END BENT CAP BETWEEN BRIDGE SEAT PEDESTALS SHALL BE SLOPED TRANSVERSELY FROM FILL FACE TO FRONT FACE AT A RATE OF ¼" / FT.

HATCHED AREA OF THE BACKWALL SHALL NOT BE POURED UNTIL THE BARRIER RAIL HAS BEEN CAST IF SLIP FORM CONSTRUCTION OF THE BARRIER IS USED.



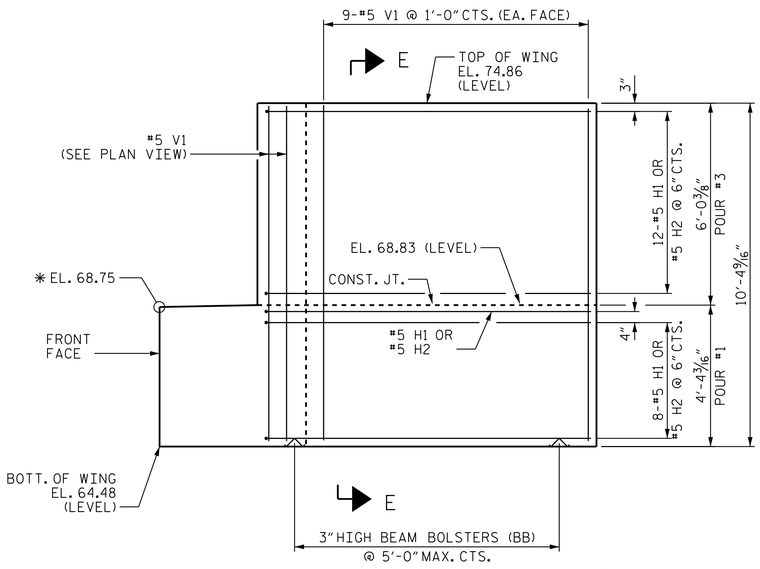
SECTION E-E

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 1 OF 4 FOR DETAILS



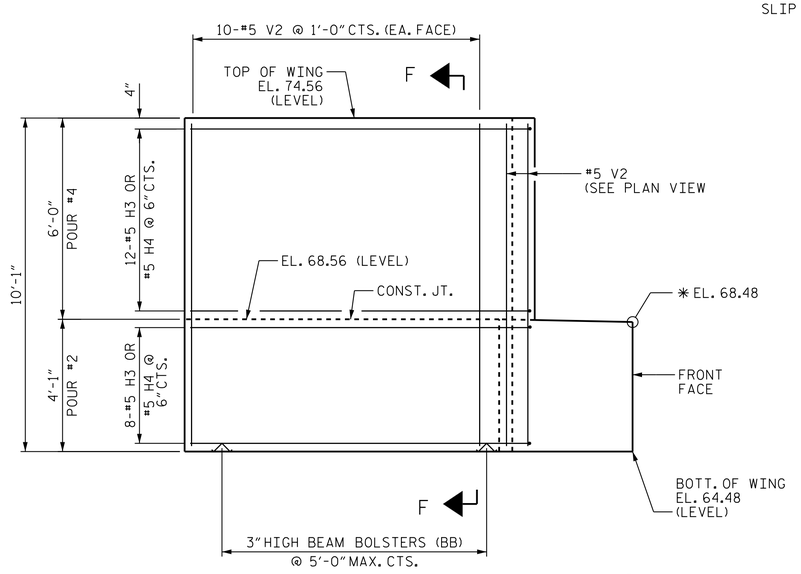
SECTION F-F

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 2 OF 4 FOR DETAILS



ELEVATION OF LEFT WING (W1)

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 1 OF 4 FOR DETAILS



ELEVATION OF RIGHT WING (W2)

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 2 OF 4 FOR DETAILS

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
WING WALL DETAILS

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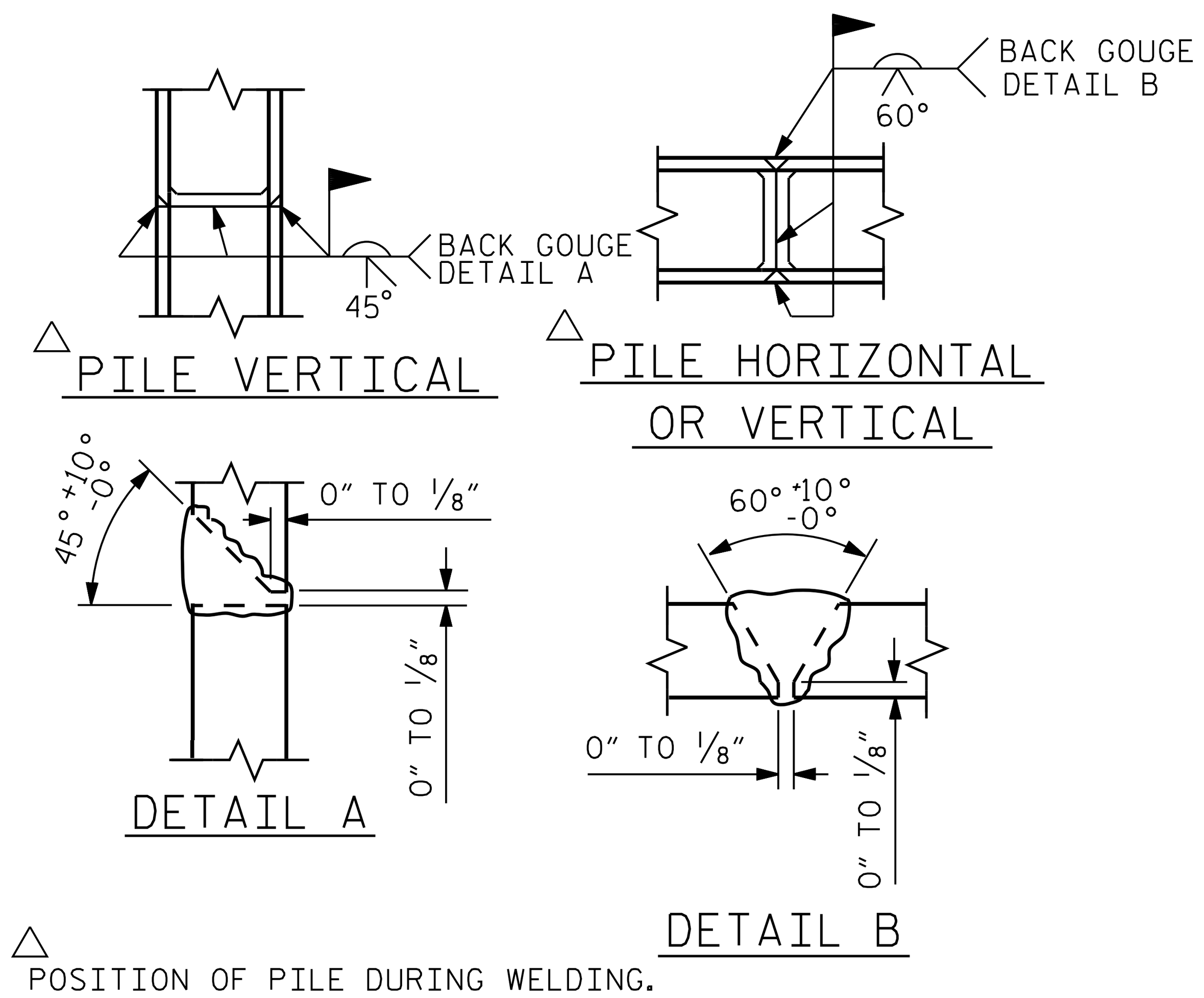
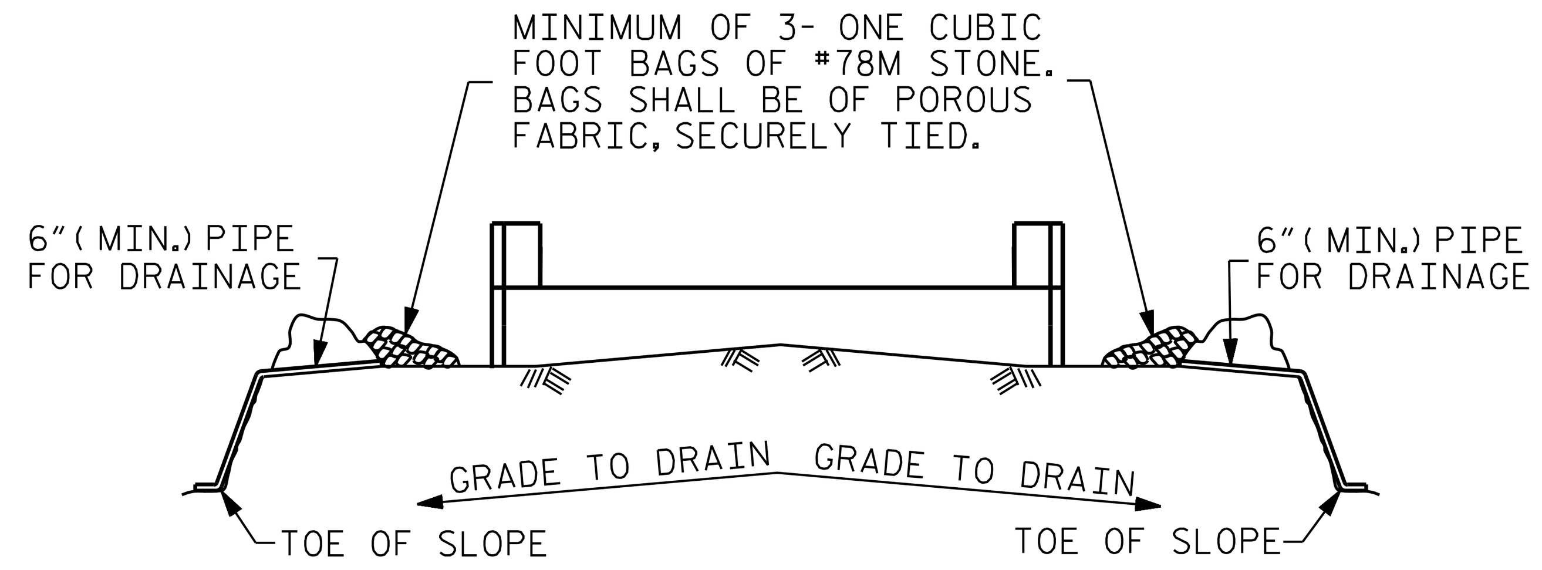


PILE SPLICE DETAILS



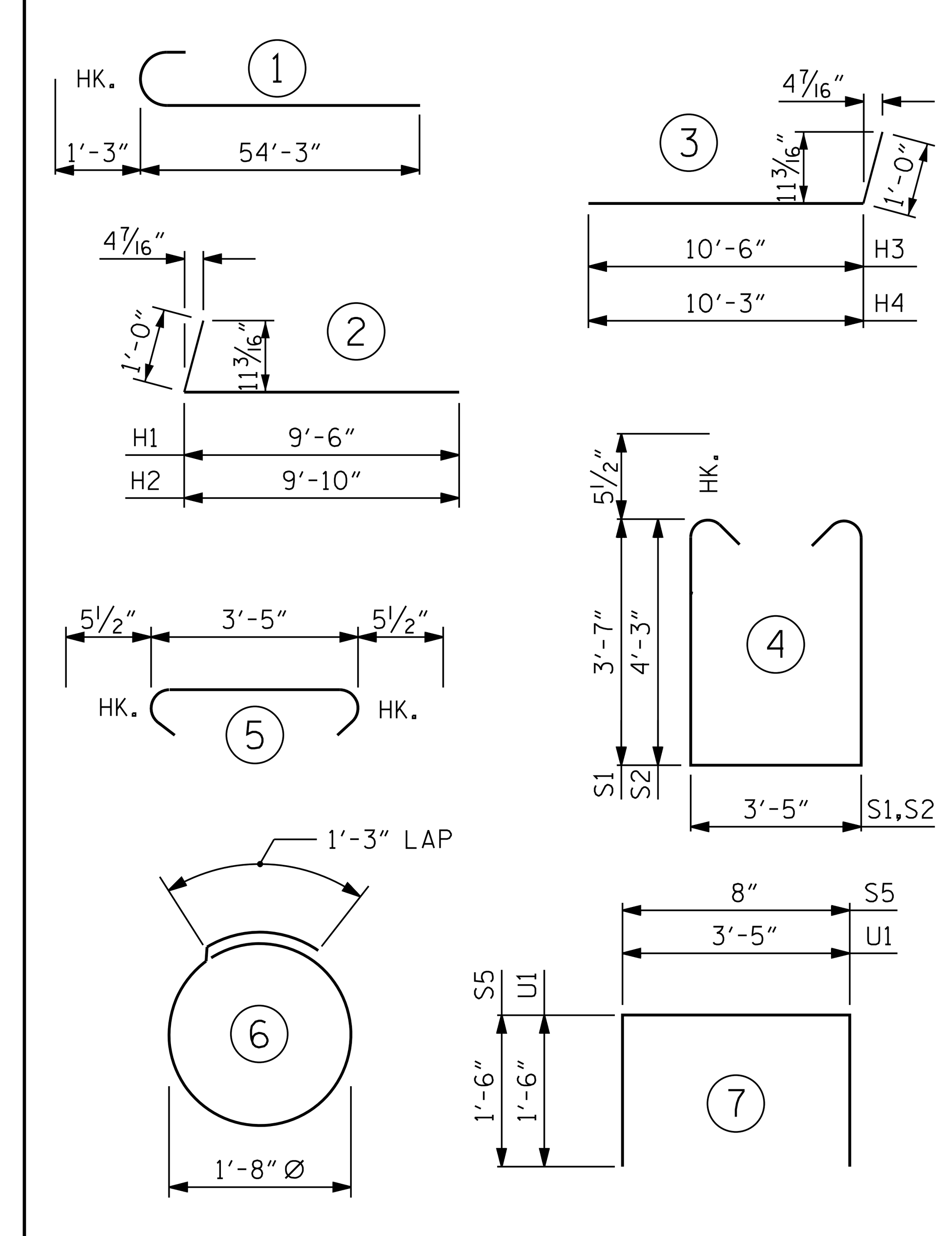
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



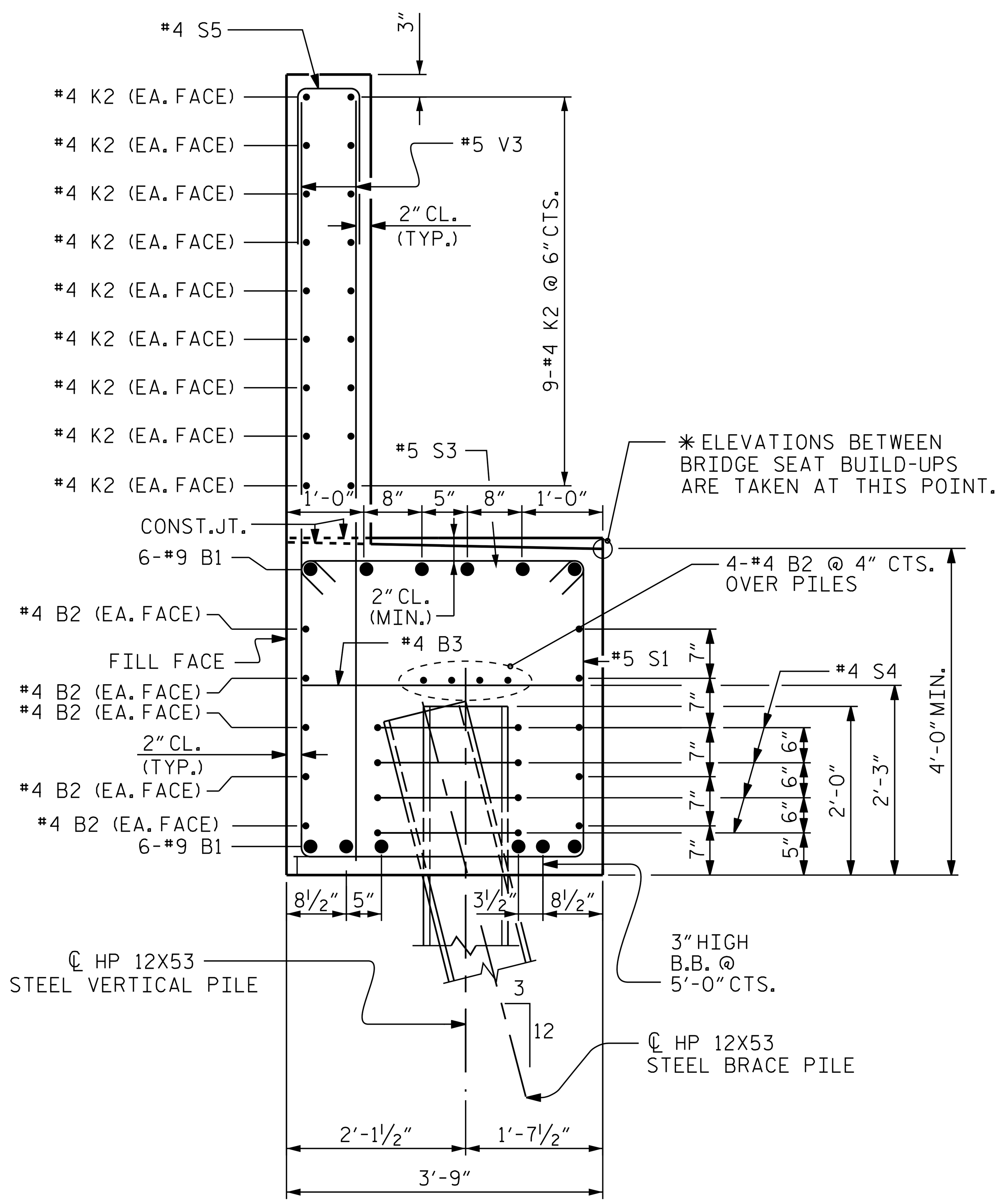
ALL BAR DIMENSIONS ARE OUT TO OUT.

HP 12X53 STEEL PILES		STEEL PILE POINTS	EA. 16
NO: 16	LIN. FT.= 1,240.00	PILE REDRIVES	EA. 8
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES			EA. 16

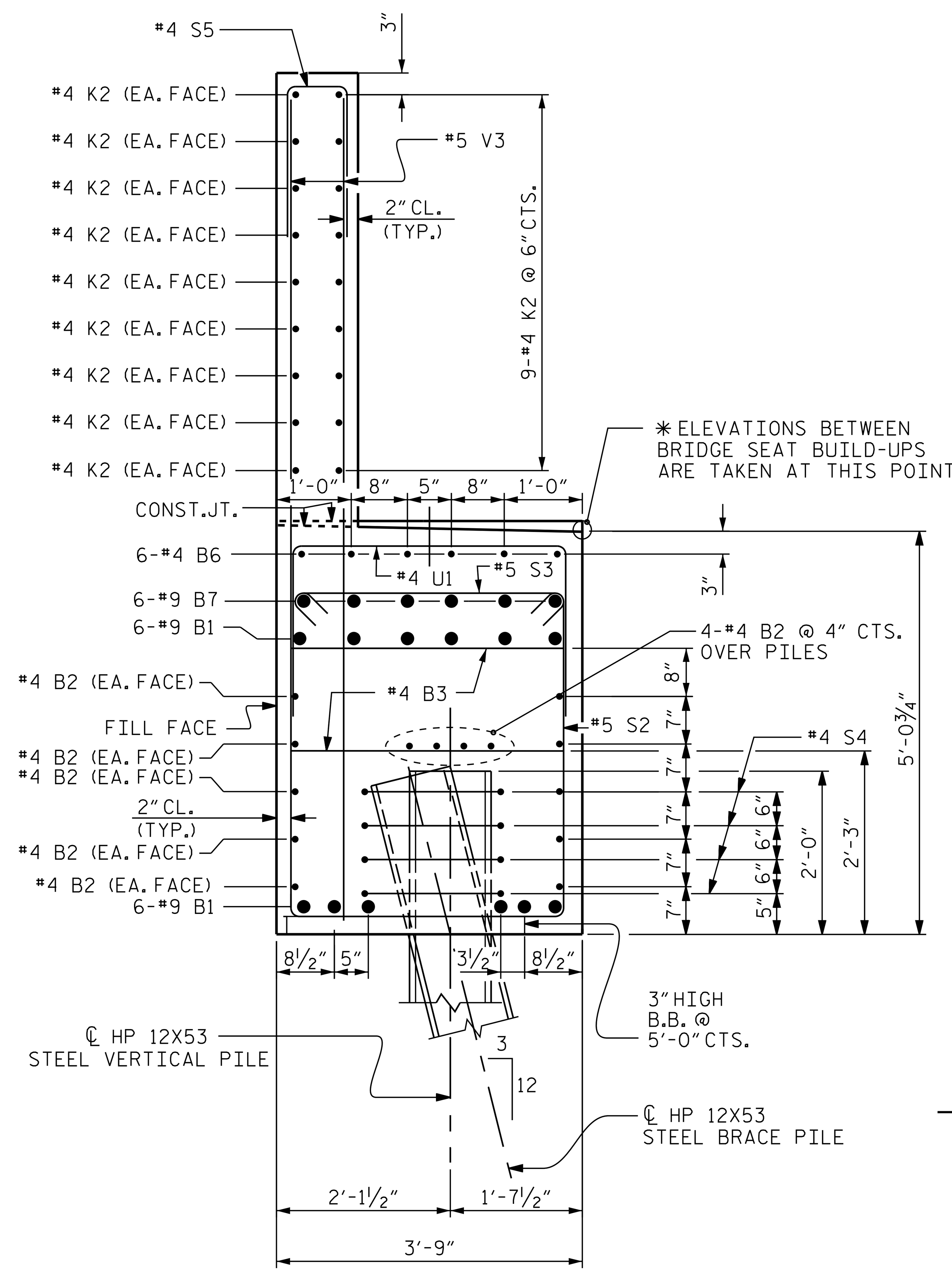
BILL OF MATERIAL
END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	#9	1	55'-6"	4529
B2	42	#4	STR	36'-1"	1012
B3	36	#4	STR	3'-5"	82
B4	6	#4	STR	15'-4"	62
B5	18	#4	STR	9'-8"	117
B6	6	#4	STR	13'-0"	53
B7	6	#9	STR	42'-9"	873
H1	21	#5	2	10'-6"	230
H2	21	#5	2	10'-10"	238
H3	20	#5	3	11'-6"	240
H4	20	#5	3	11'-3"	235
K1	12	#4	STR	2'-9"	23
K2	72	#4	STR	27'-8"	1331
S1	63	#5	4	11'-6'	756
S2	45	#5	4	12'-10"	603
S3	92	#5	5	4'-4"	416
S4	64	#4	6	6'-6"	278
S5	97	#4	7	3'-8"	238
U1	40	#4	7	6'-5"	172
V1	26	#5	STR	10'-0"	272
V2	28	#5	STR	9'-9"	285
V3	194	#5	STR	8'-2"	1653
REINFORCING STEEL					13,698 LBS.

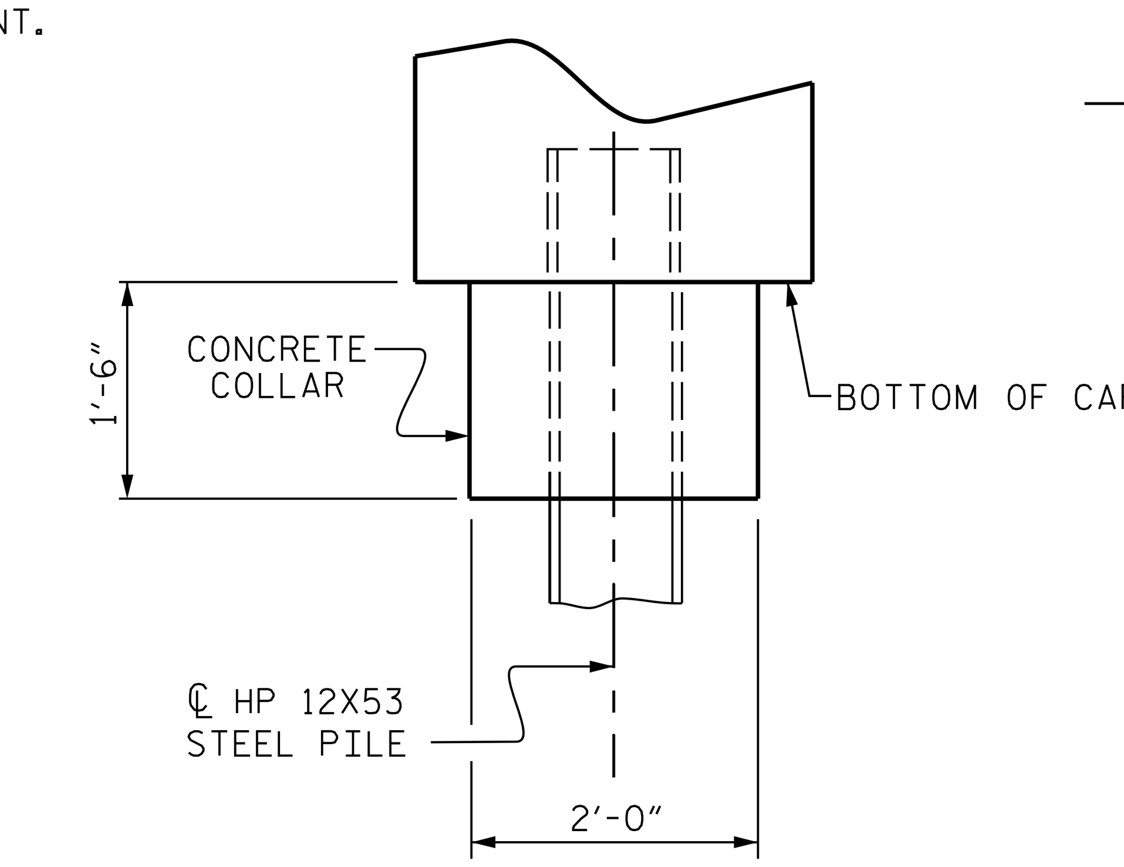
CLASS A CONCRETE BREAKDOWN	
POUR #1 CAP, LOWER PART OF WINGS & COLLARS	36.9 C.Y.
POUR #2 CAP, LOWER PART OF WINGS & COLLARS	34.6 C.Y.
POUR #3 UPPER PART OF WINGS & BACKWALL	11.1 C.Y.
POUR #4 UPPER PART OF WINGS & BACKWALL	11.4 C.Y.
TOTAL CLASS A CONCRETE	94.0 C.Y.



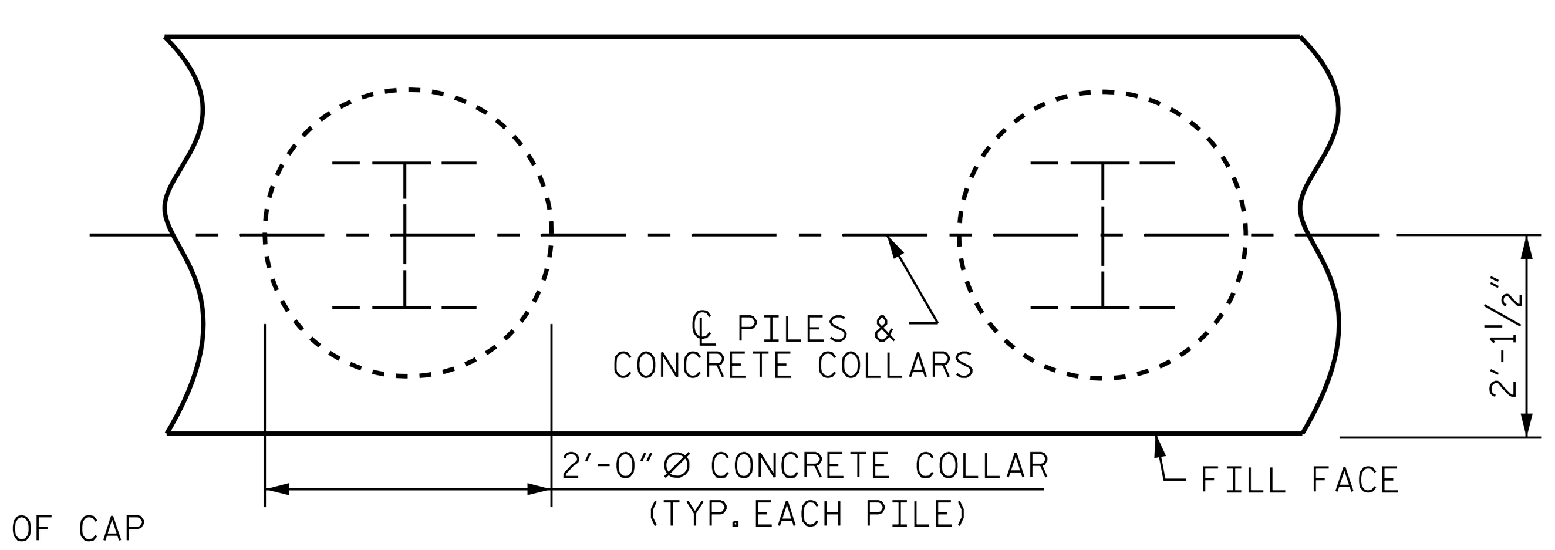
SECTION A-A
ANCHOR BOLTS NOT SHOWN FOR CLARITY



SECTION B-B
ANCHOR BOLTS NOT SHOWN FOR CLARITY
#4 B4, #4 B5 & #4 B8 BARS NOT SHOWN.
SEE ELEVATION VIEWS, SHEET 1 OF 4 & 2 OF 4.



ELEVATION



PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

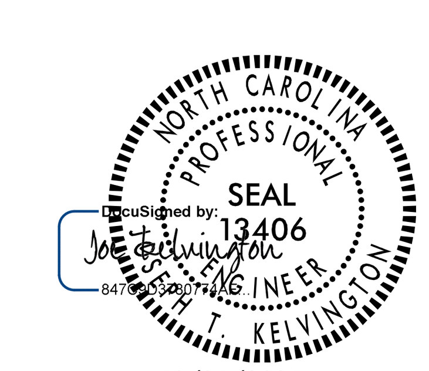
STATION: 39+82.39 -Y30-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS



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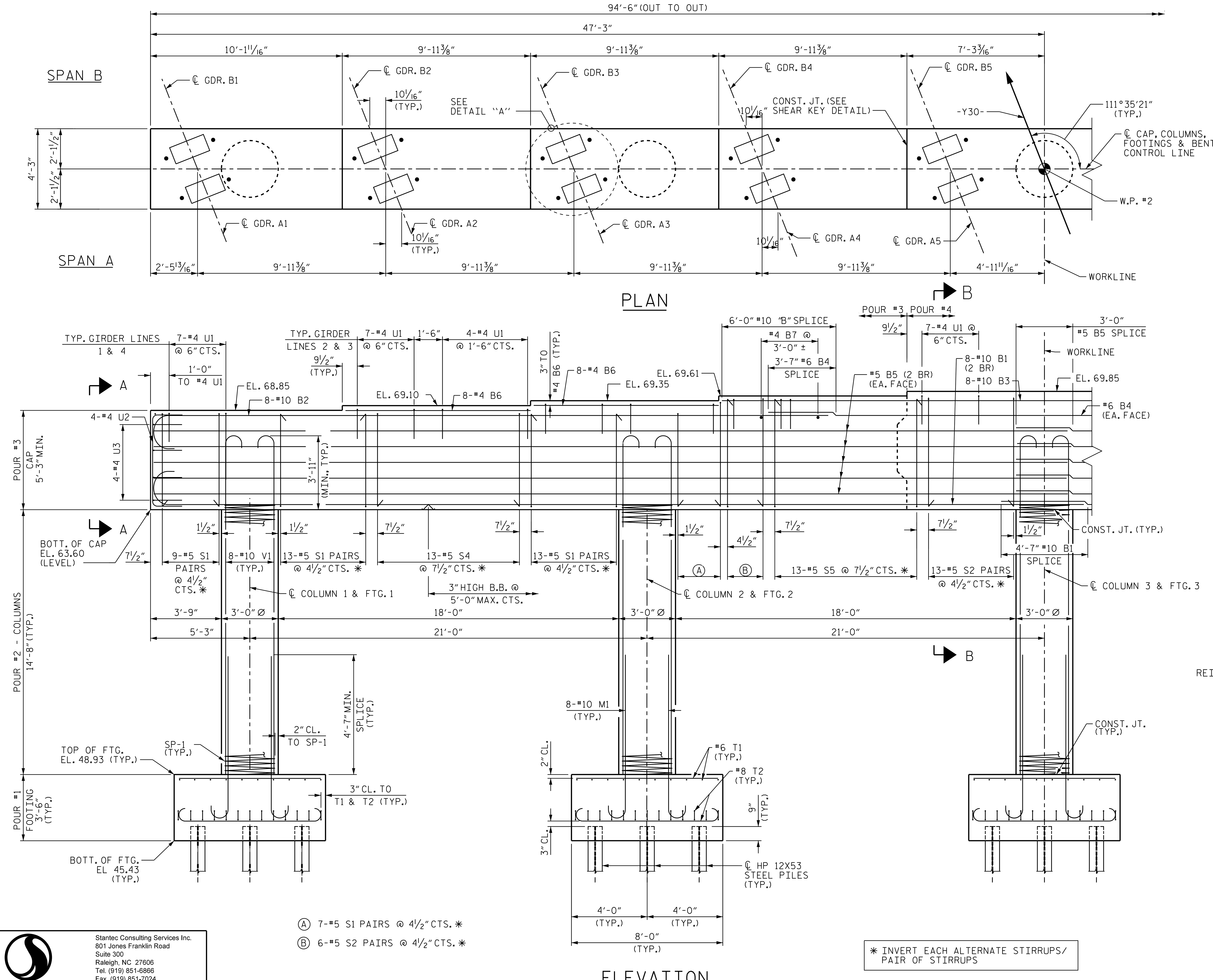
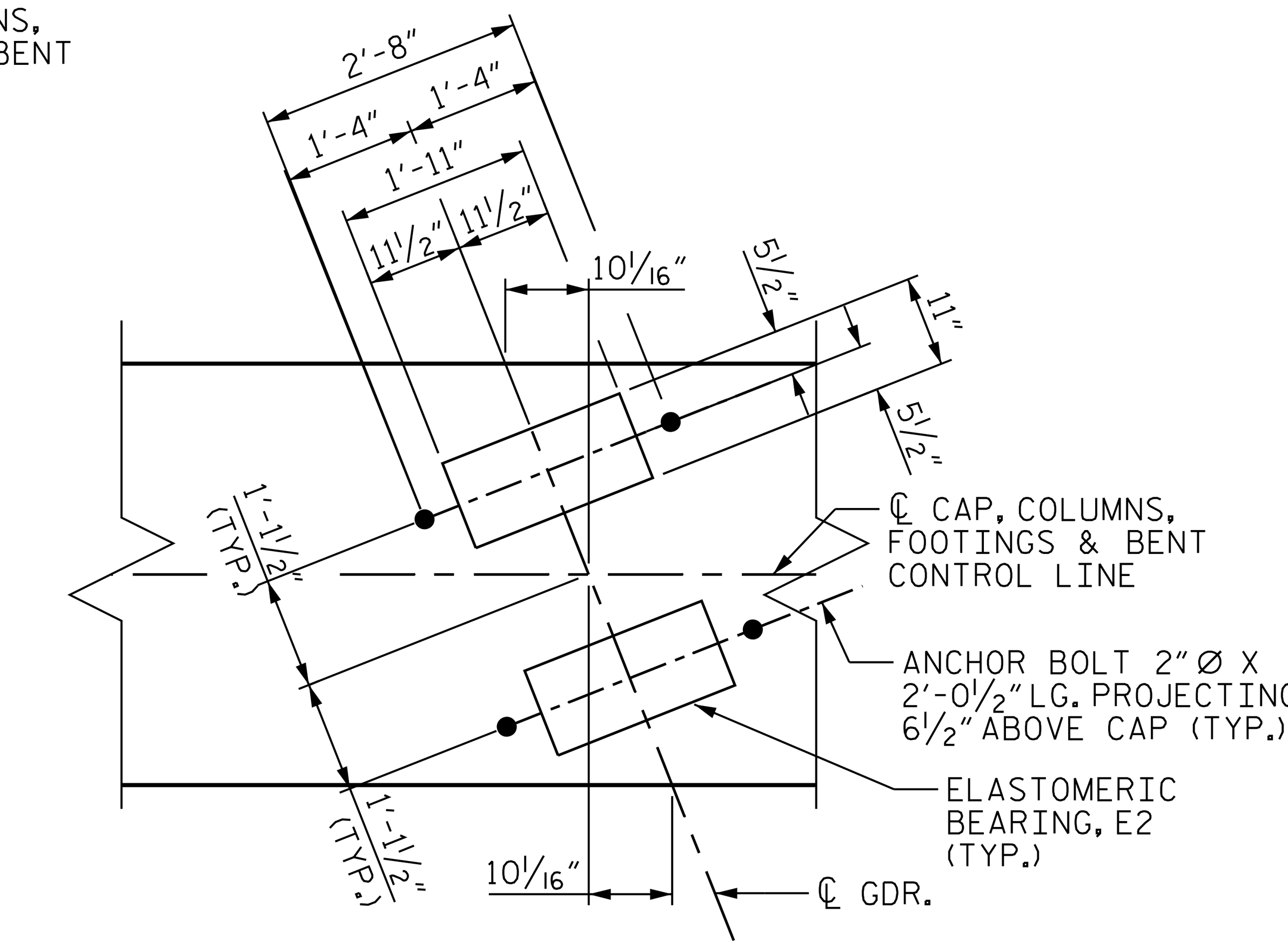
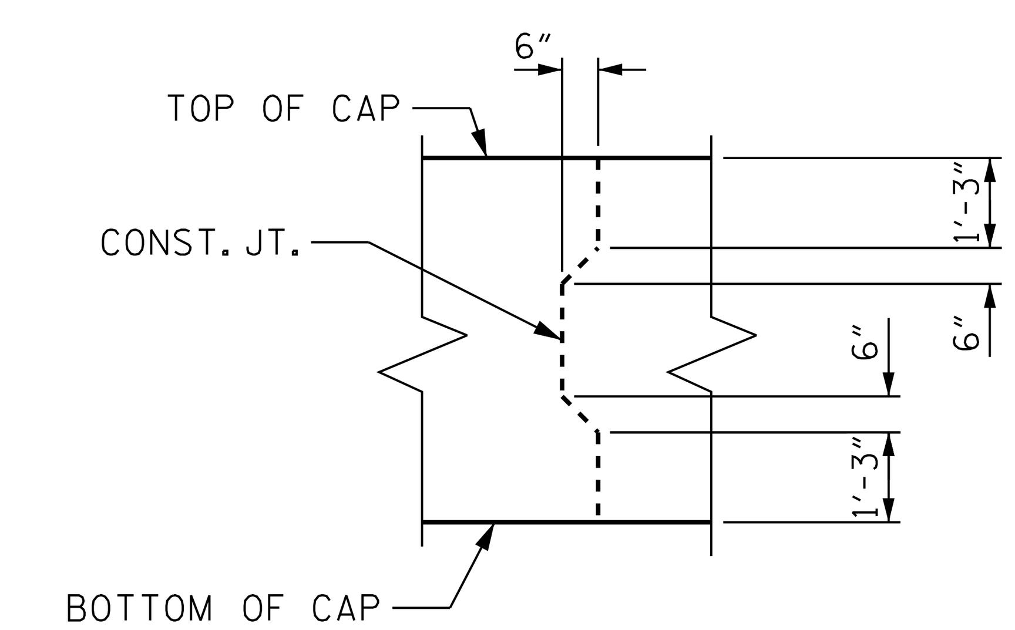




DETAIL "A"

(TYP. EA. BEARING SEAT)



SHEAR KEY DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY.
SEE ELEVATION VIEW FOR LOCATION OF SHEAR KEY.
REINFORCING STEEL SHALL BE CONTINUOUS THRU SHEAR KEY.

NOTES:

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

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

FOR VIEW A-A, VIEW C-C, AND SECTION B-B, SEE BENT 1 DETAILS, SHEET 3 OF 3.

(2 BR) DENOTES 2 BAR RUN.

FOR PILE SPLICE DETAIL, SEE "END BENT 1" SHT. 4 OF 4.

Ⓐ 7-#5 S1 PAIRS @ 4½" CTS. ✱

Ⓑ 6-#5 S2 PAIRS @ 4½" CTS. ✱

✱ INVERT EACH ALTERNATE STIRRUPS/PAIR OF STIRRUPS

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 J. T. KELVINGTON

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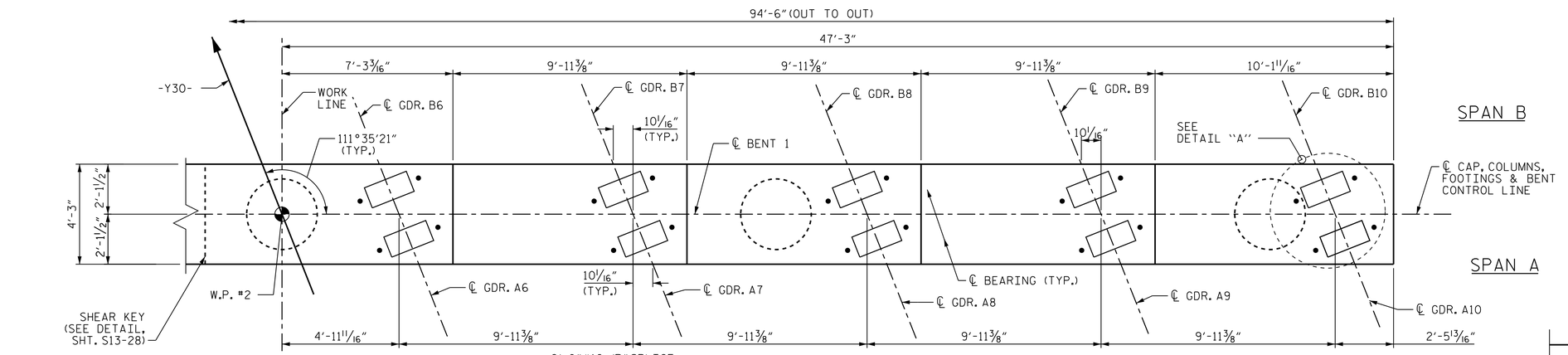

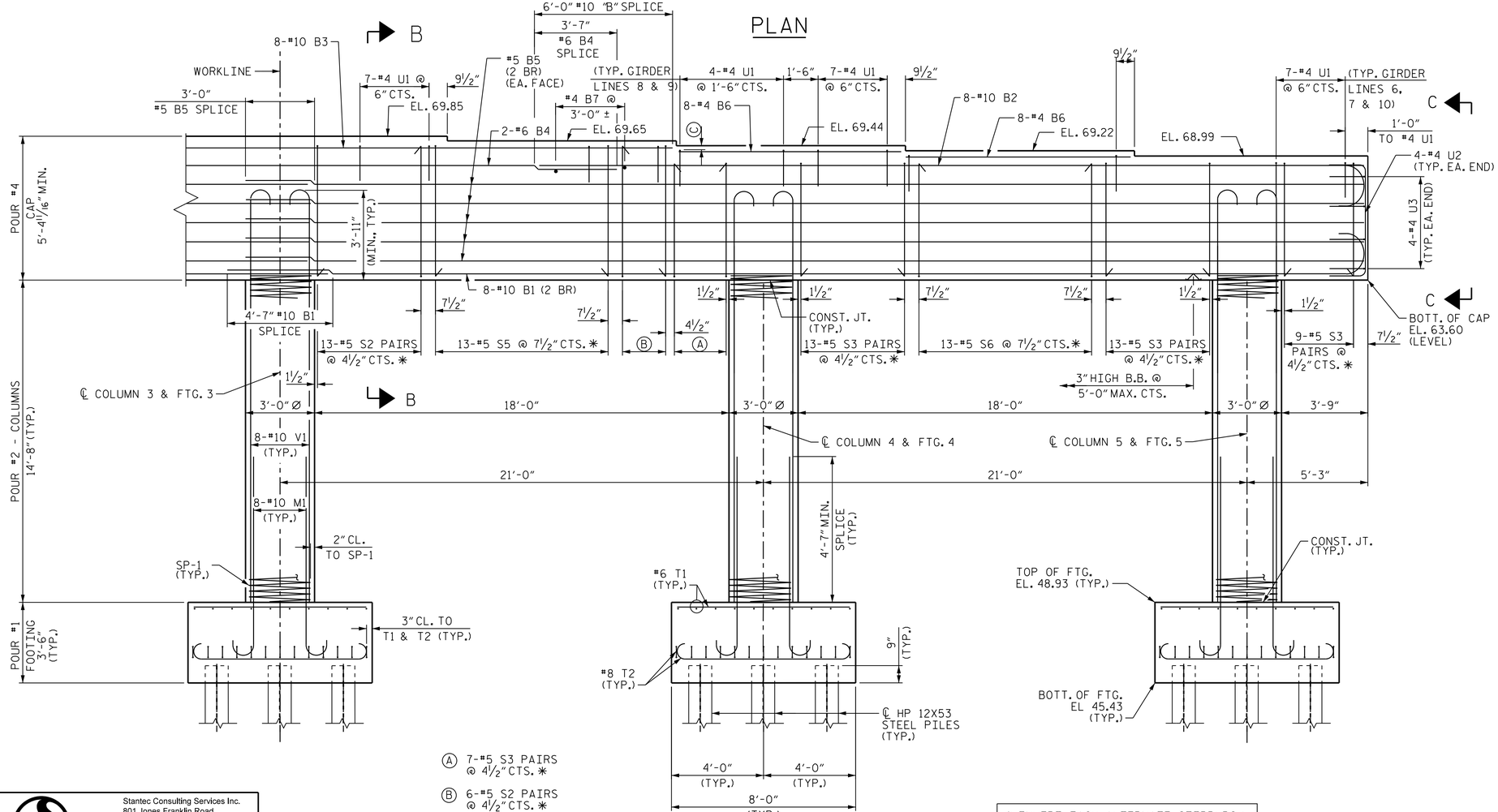

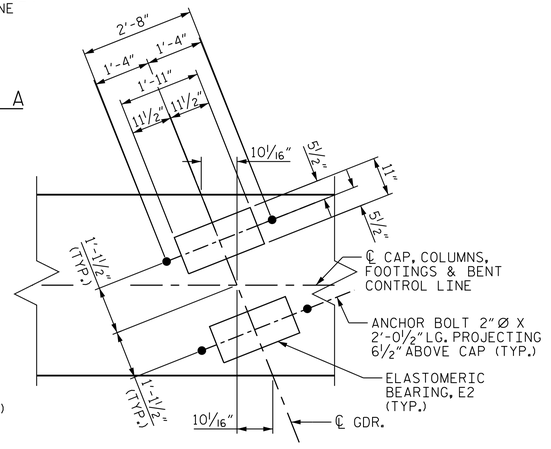

DETAIL "A"

(TYP. EA. BEARING SEAT)

Ⓐ 7-#5 S3 PAIRS @ 4 1/2" CTS. *

Ⓑ 6-#5 S2 PAIRS @ 4 1/2" CTS. *

Ⓒ 2" CL. TO #4 U1 (TYP.)

ELEVATION

* INVERT EACH ALTERNATE STIRRUPS/ PAIR OF STIRRUPS

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

BENT 1

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10/25/2021

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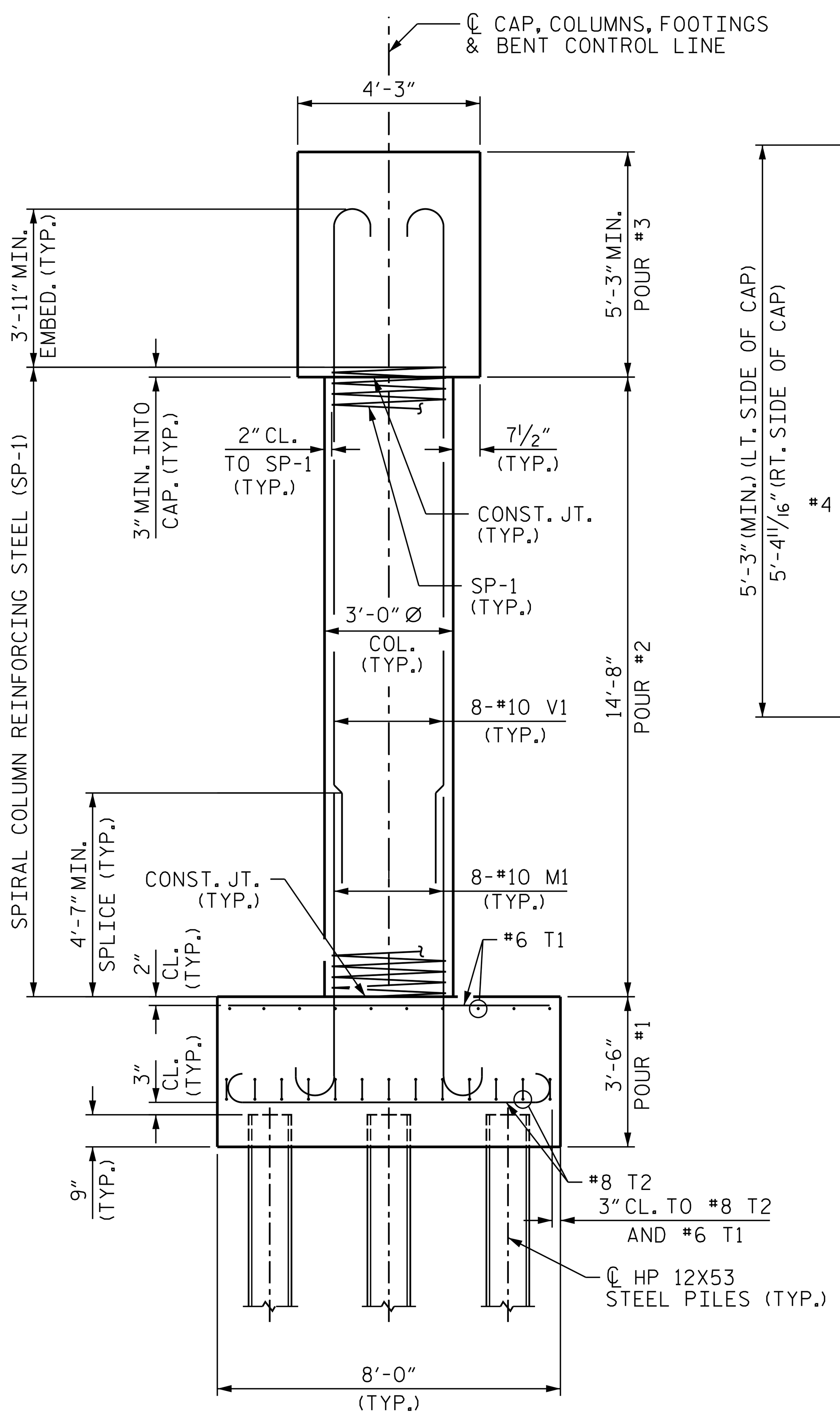
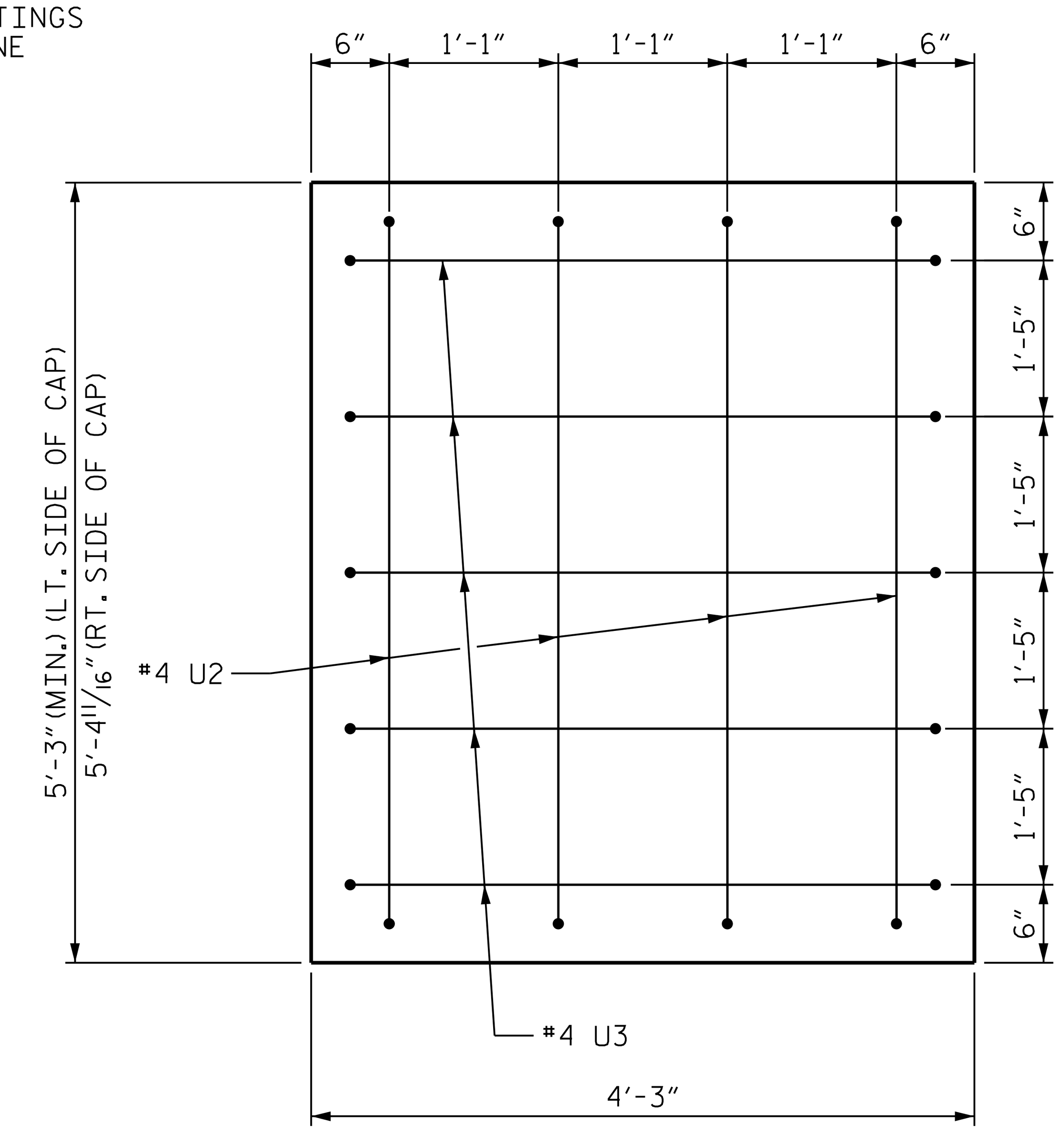
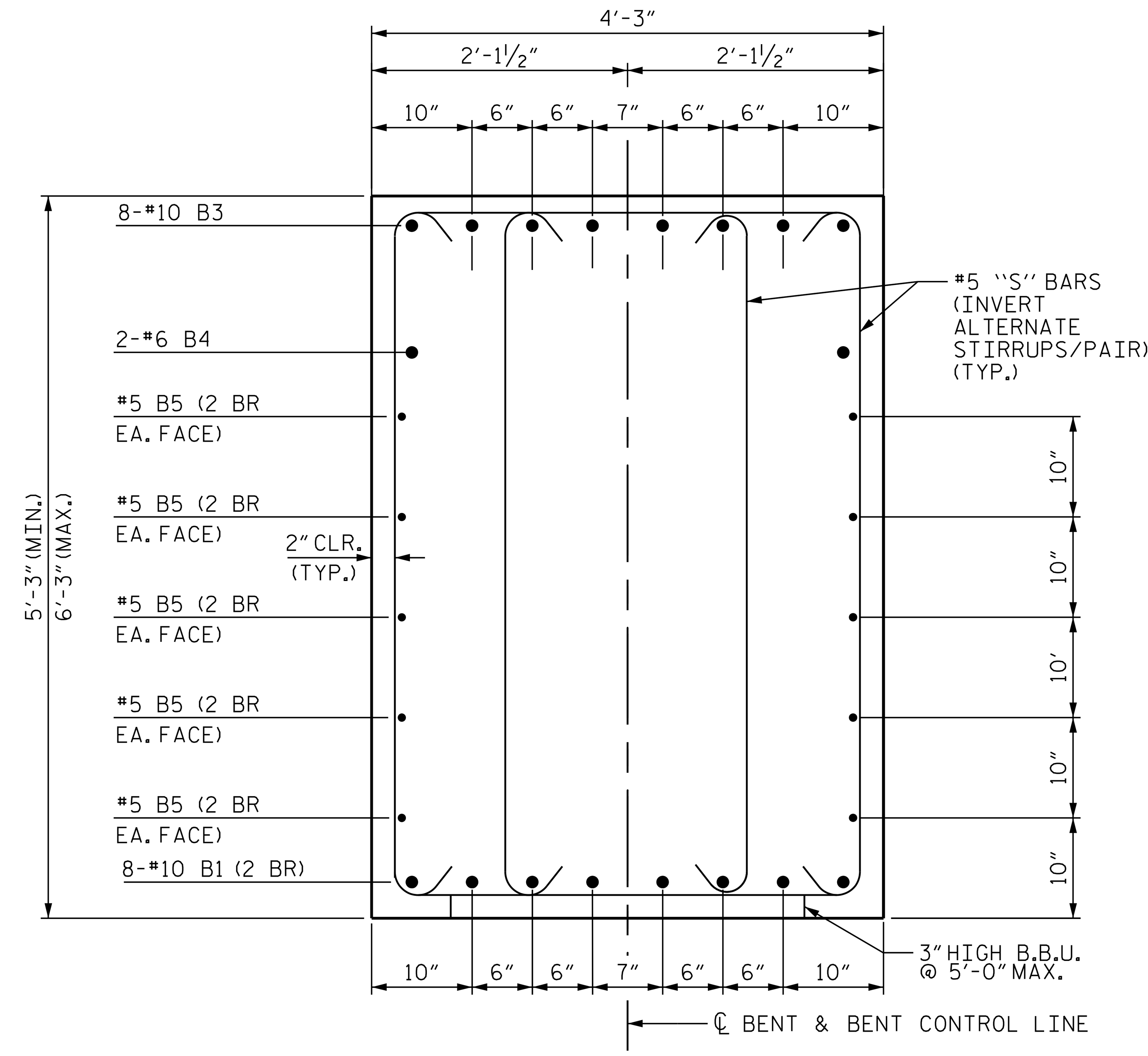


END ELEVATION

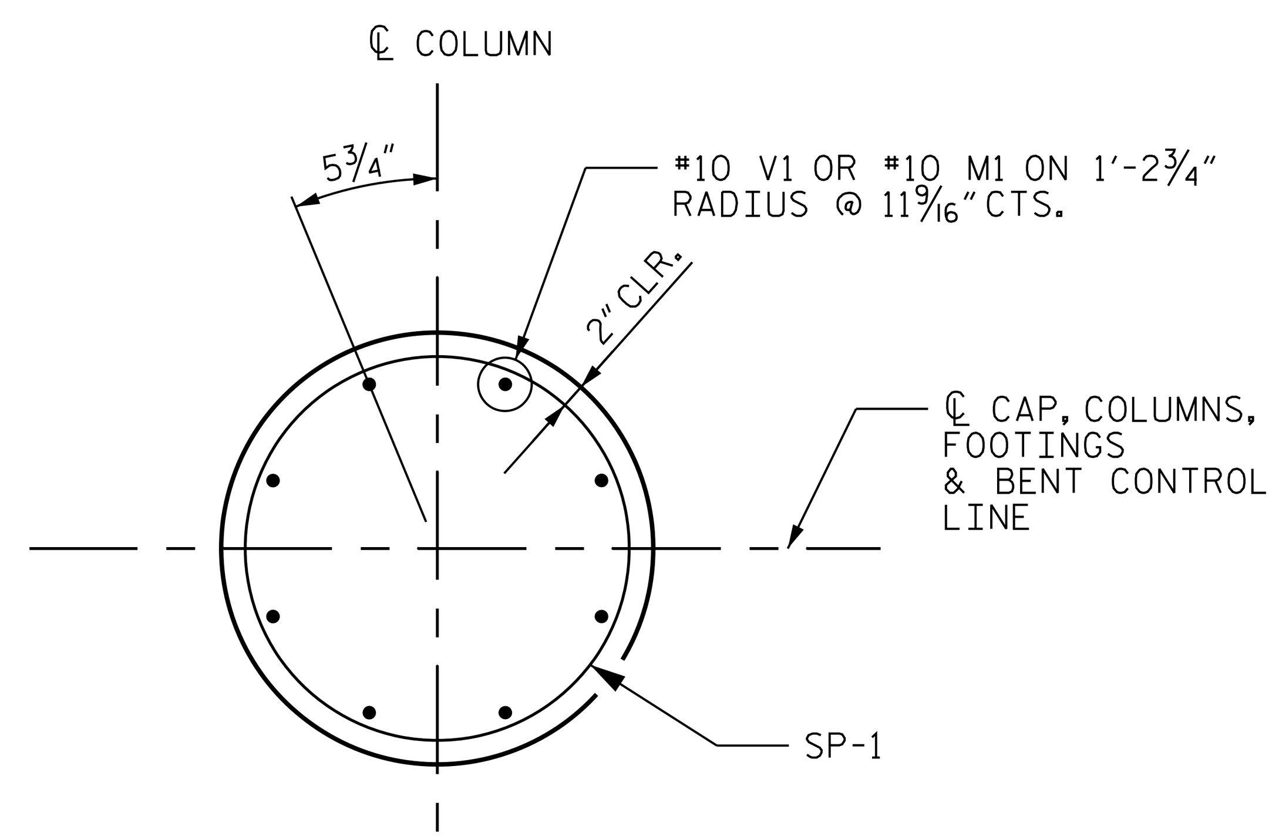


VIEW A-A & VIEW C-C



SECTION B-B & SECTION THRU CAP

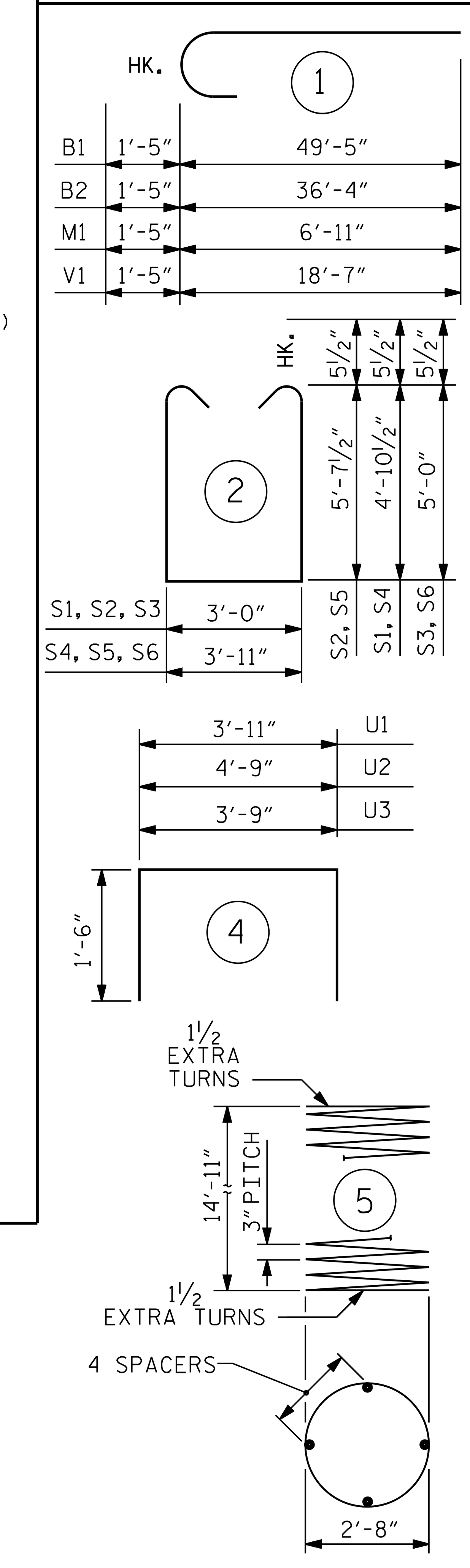
(STEPS NOT SHOWN FOR CLARITY)



SECTION THRU COLUMNS

(TYPICAL EA. COLUMN)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

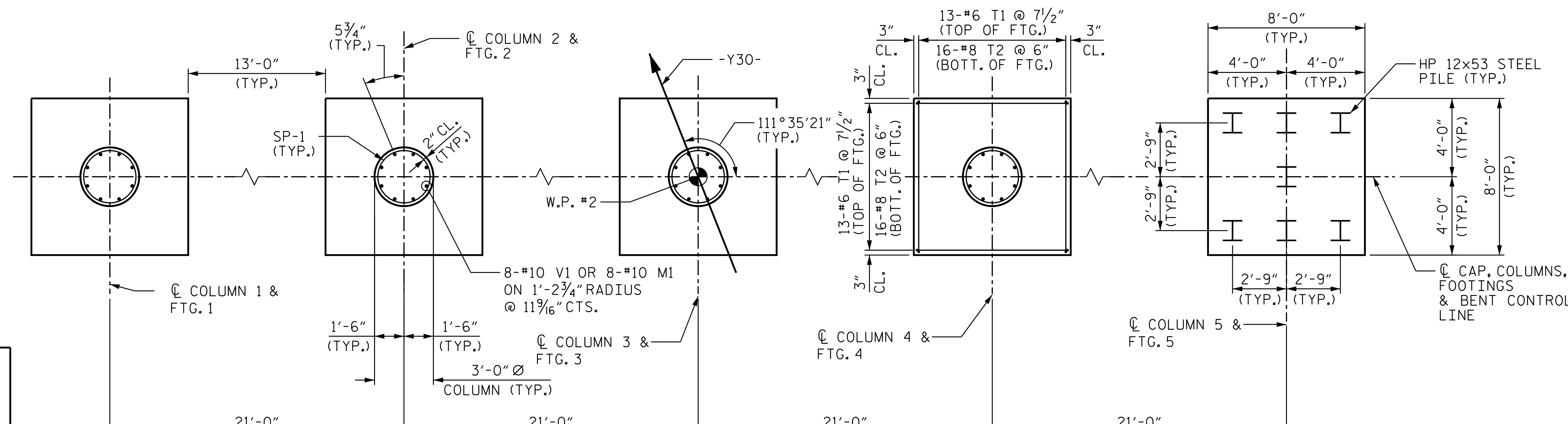
BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	1	50'-10"	3500
B2	16	#10	1	37'-9"	2599
B3	8	#10	STR.	34'-0"	1170
B4	2	#6	STR.	28-10"	87
B5	20	#5	STR.	48'-7"	1013
B6	32	#4	STR.	9'-10"	210
B7	4	#4	STR.	3'-11"	10
M1	40	#10	1	8'-4"	1434
S1	84	#5	2	13'-8"	1197
S2	76	#5	2	15'-2"	1202
S3	84	#5	2	13'-11"	1219
S4	13	#5	2	14'-7"	198
S5	26	#5	2	16'-1"	436
S6	13	#5	2	14'-10"	201
T1	130	#6	STR.	7'-6"	1464
T2	160	#8	3	9'-4"	3987
U1	94	#4	4	6'-11"	434
U2	8	#4	4	7'-9"	41
U3	8	#4	4	6'-9"	36
V1	40	#10	1	20'-0"	3442
REINFORCING STEEL				LBS.	23,880
SP-1	5	**	5	517'-1"	1727

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

SPIRAL COLUMN REINFORCING STEEL	LBS.	1,727
CLASS A CONCRETE BREAKDOWN		
POUR #1 FOOTING	C.Y.	41.4
POUR #2 COLUMNS	C.Y.	19.2
POUR #3 CAP	C.Y.	35.2
POUR #4 CAP	C.Y.	50.5
TOTAL CLASS A CONC.	C.Y.	146.3
HP 12X53 STEEL PILES		
NO. 35	LIN FT.	2,800.00
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES		EA. 35
STEEL PILE POINTS		EA. 35
PILE REDRIVES		EA. 18
FOUNDATION EXCAVATION		LUMP SUM



PLAN OF FOOTING & COLUMNS

(TYPICAL EA. FOOTING)

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 J. T. KELVINGTON

10/25/2021

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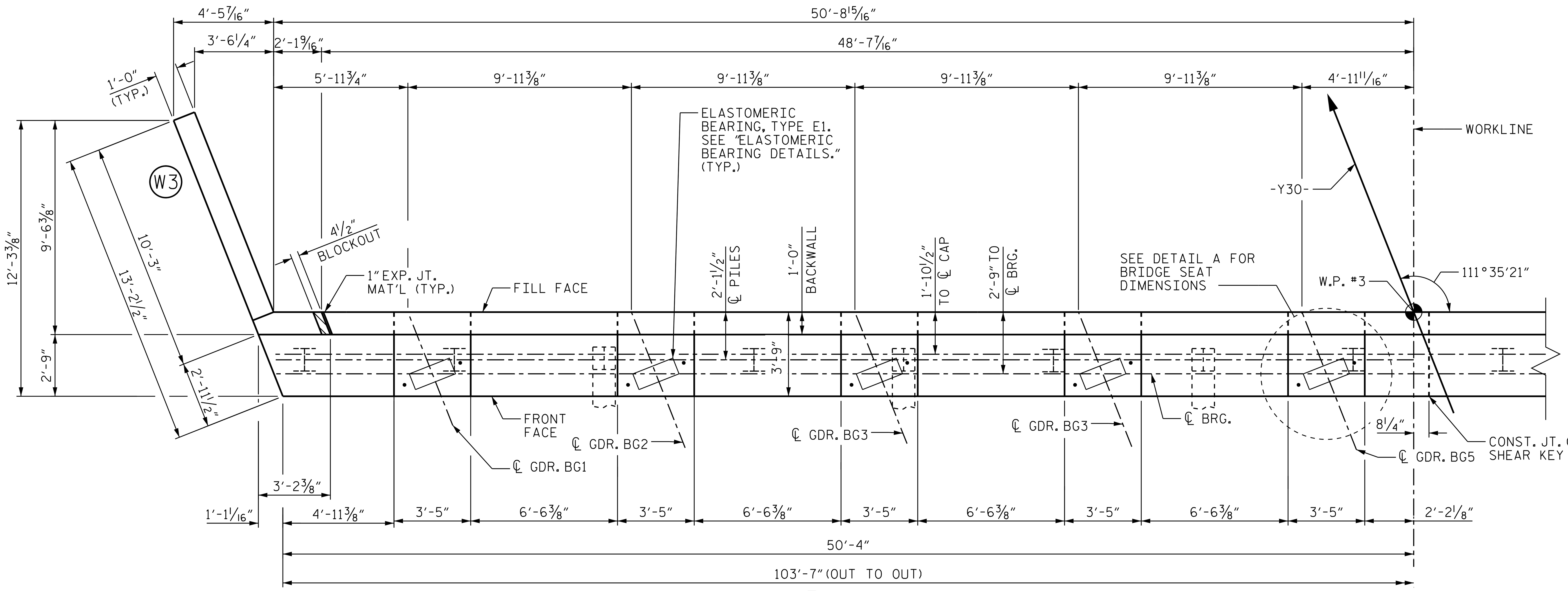


PLAN

NOTES

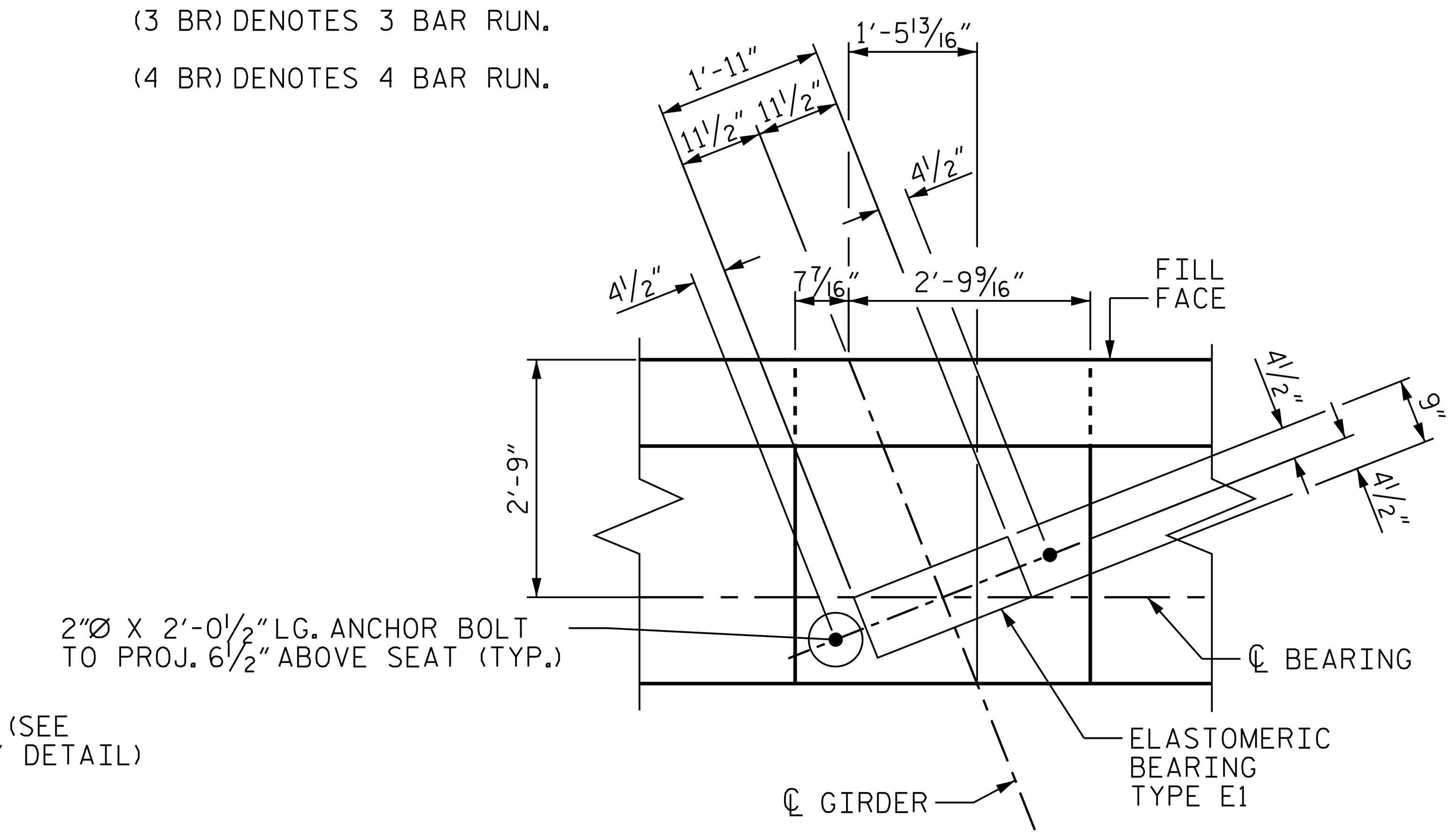
TOP OF PILE ELEVATION = 65.44 (TYP.)

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A" OR "SECTION B-B" ON SHEET 4 OF 4.

(2 BR) DENOTES 2 BAR RUN.

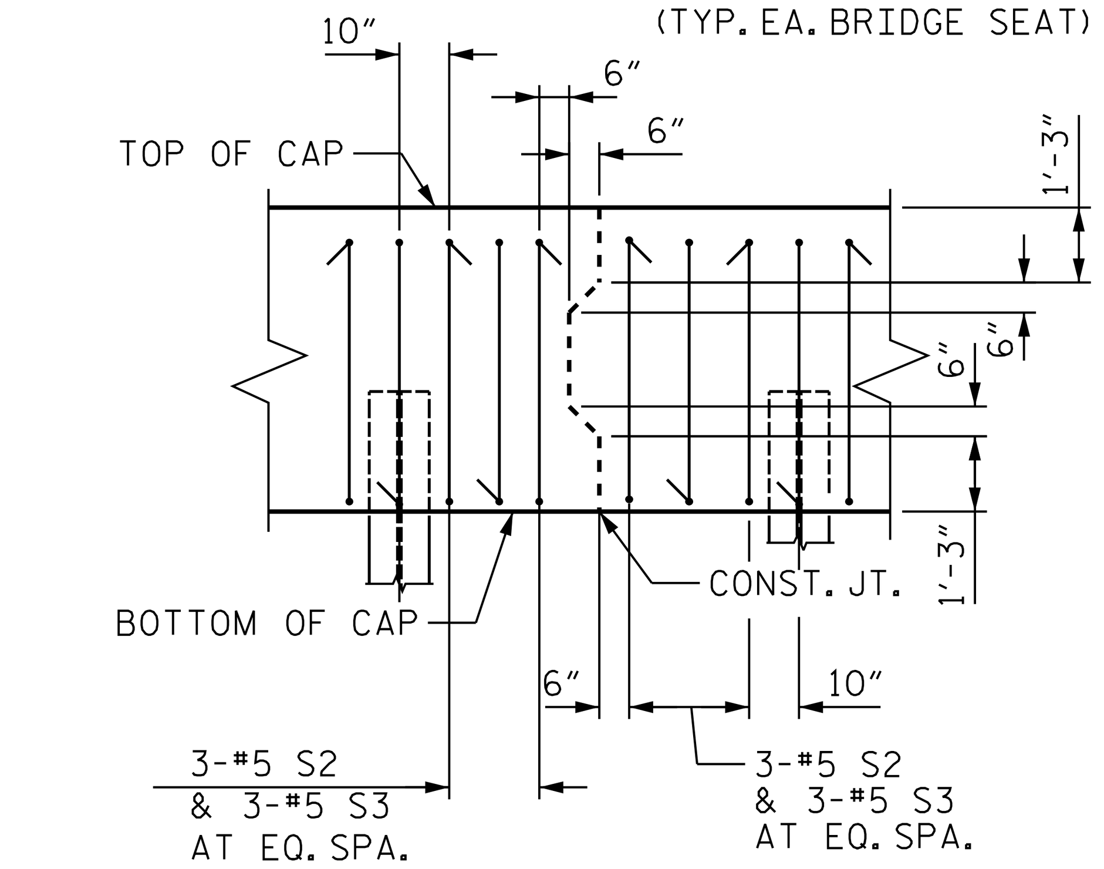
(3 BR) DENOTES 3 BAR RUN.

(4 BR) DENOTES 4 BAR RUN.



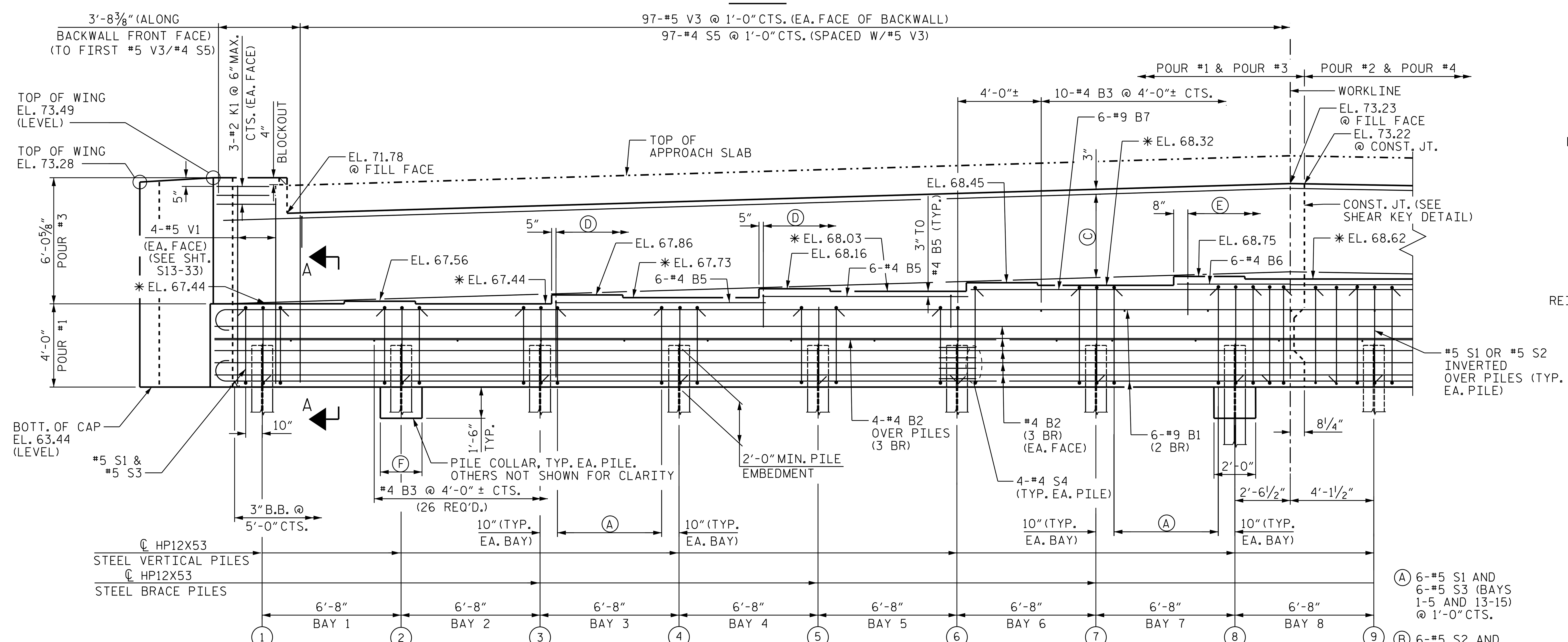
DETAIL A

(TYP. EA. BRIDGE SEAT)



SHEAR KEY DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY.
SEE ELEVATION VIEW FOR LOCATION OF SHEAR KEY.
REINFORCING STEEL SHALL BE CONTINUOUS THRU SHEAR KEY.



ELEVATION

BAR SPLICES NOT SHOWN FOR CLARITY

Ⓐ 6-#5 S1 AND 6-#5 S3 (BAYS 1-5 AND 13-15) @ 1'-0" CTS.

Ⓑ 6-#5 S2 AND 6-#5 S3 (BAYS 6-11) @ 1'-0" CTS.

Ⓒ 9-#4 K2 @ 6" CTS. (4 BR) (EA. FACE)

Ⓓ 7-#4 U1 @ 1'-6" CTS.

Ⓔ 9-#4 U1 @ 1'-6" CTS.

Ⓕ 2'-0" DIA. (TYP.)

BAR	MIN. SPLICE
#9 B1	5'-4"
#4 B2	2'-5"
#4 K2	2'-5"

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 J. T. KELVINGTON
10/25/2021

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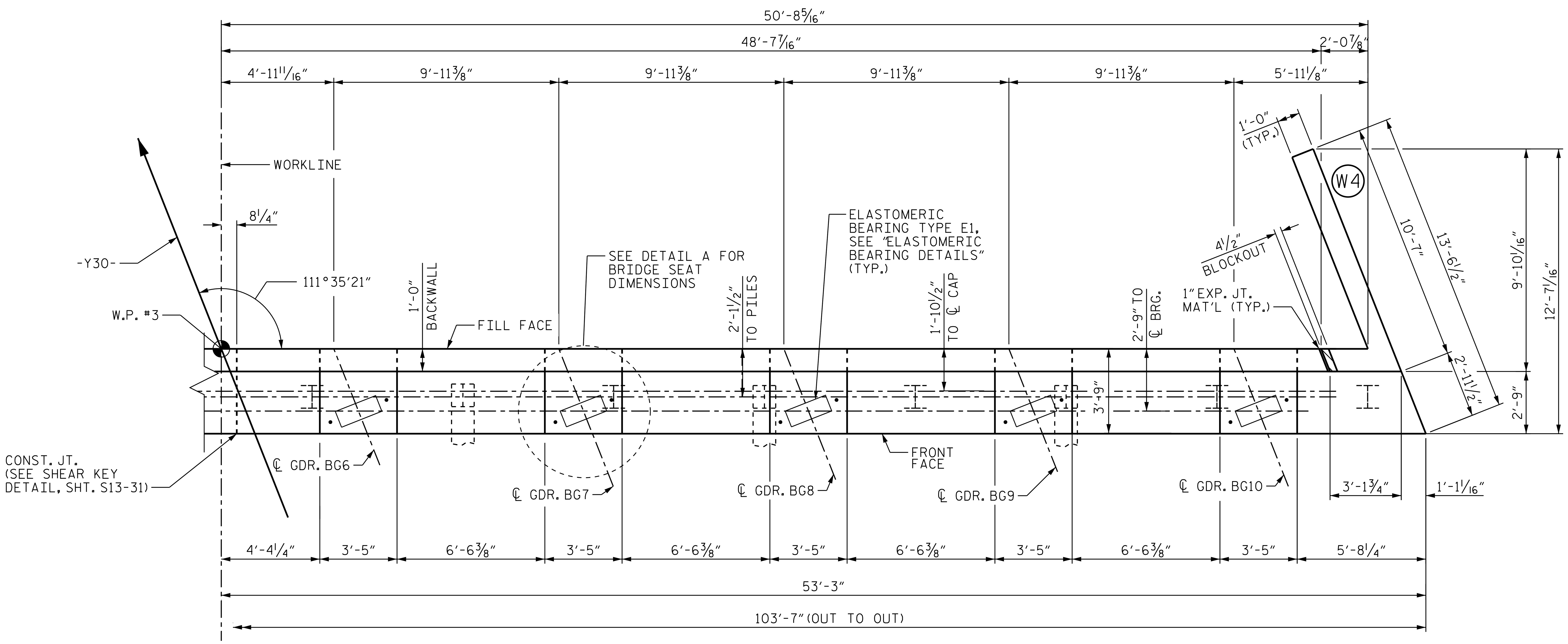
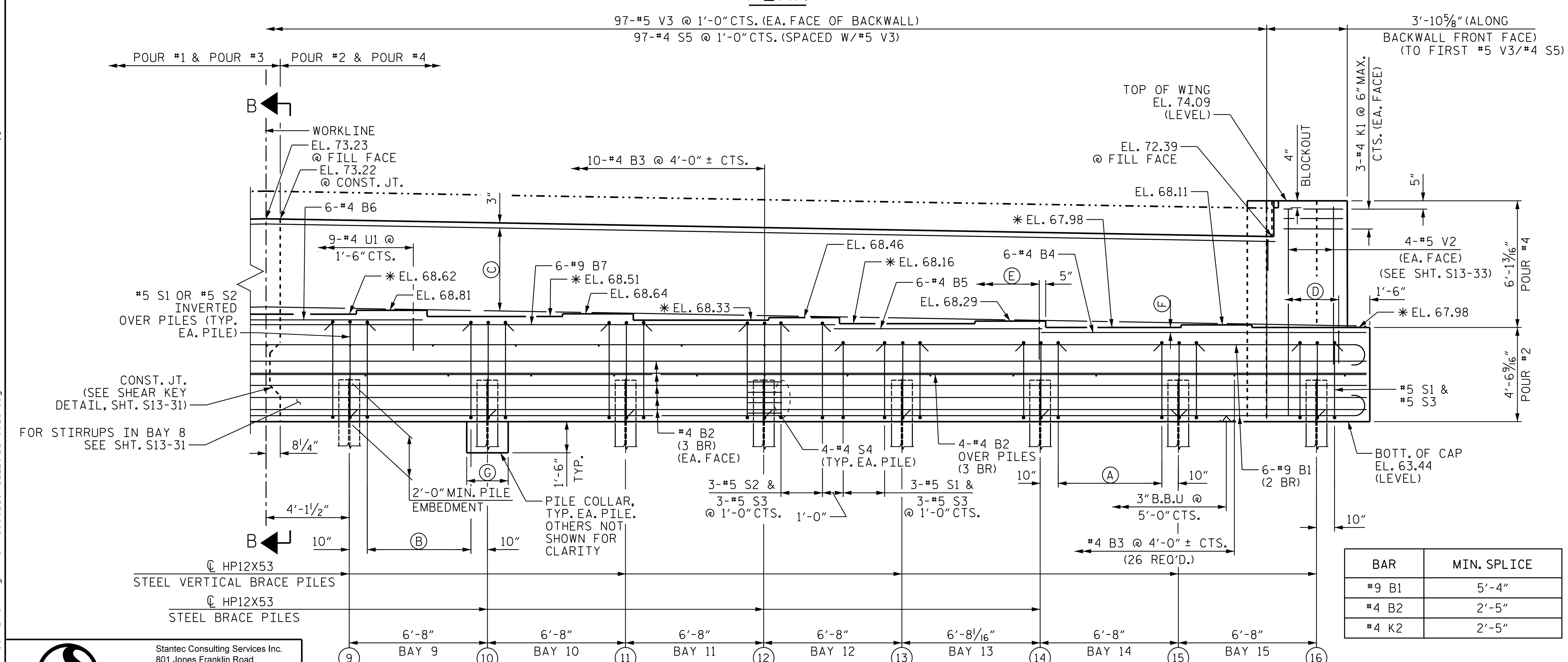


PLAN



BAR	MIN. SPLICE
#9 B1	5'-4"
#4 B2	2'-5"
#4 K2	2'-5"

ELEVATION

BAR SPLICES NOT SHOWN FOR CLARITY

NOTES

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

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

BACKWALL SHALL BE PLACED BEFORE APPLYING EPOXY PROTECTIVE COATING.

THE TOP SURFACE OF THE CAP, EXCEPT THE BRIDGE SEAT BUILDUPS, SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 1/4"/FT.

FOR WING DETAILS, SEE SHEET 3 OF 4.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

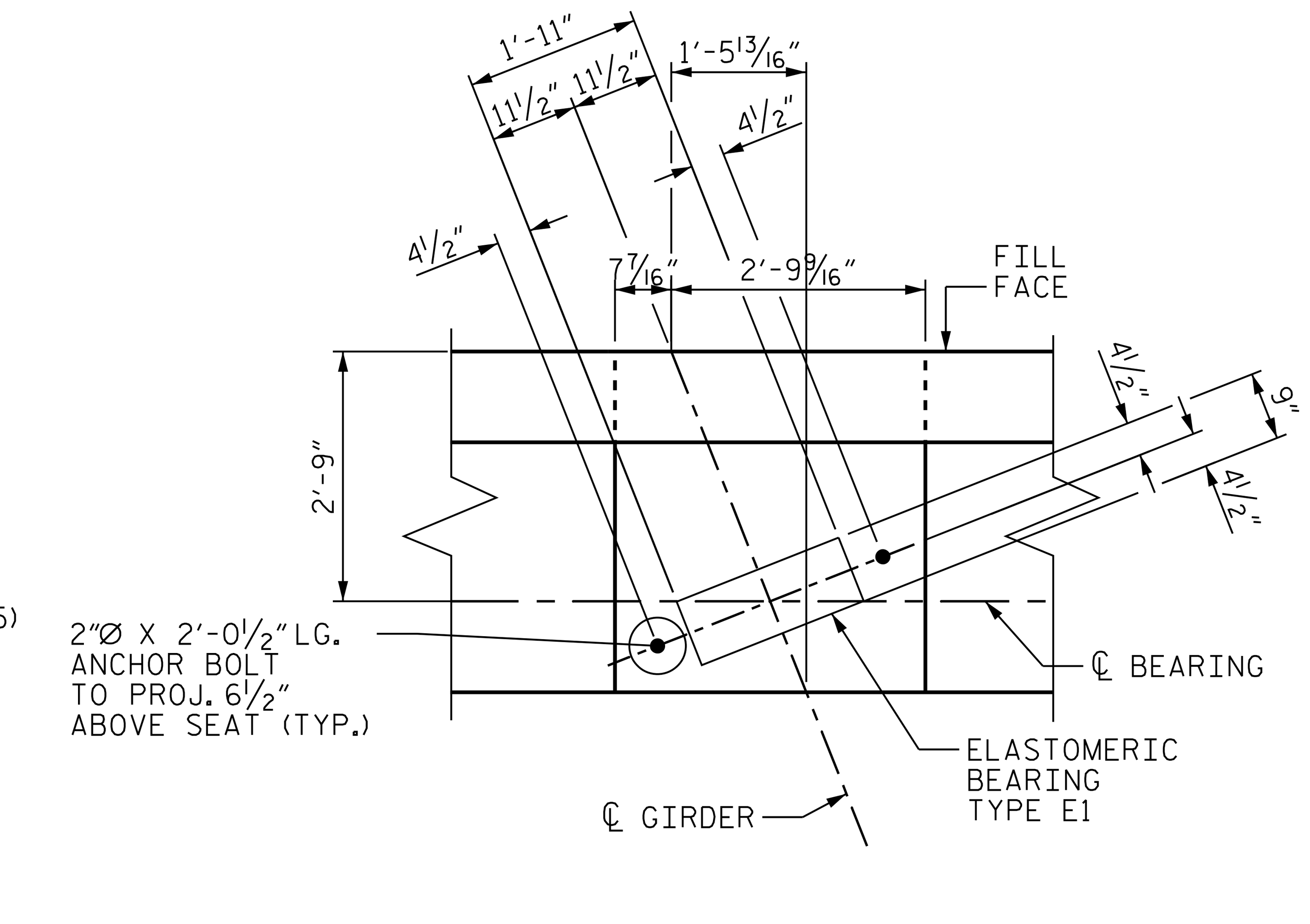
TOP OF PILE ELEVATION = 65.44 (TYP.)

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A" OR "SECTION B-B" ON SHEET 4 OF 4.

(2 BR) DENOTES BAR RUN.

(3 BR) DENOTES 3 BAR RUN.

(4 BR) DENOTES 4 BAR RUN.



DETAIL A

(TYP. EA. BEARING SEAT)

- (A) 6-#5 S1 AND 6-#5 S3 (BAYS 1-5 AND 13-15) @ 1'-0" CTS.
- (B) 6-#5 S2 AND 6-#5 S3 (BAYS 6-11) @ 1'-0" CTS.
- (C) 9-#4 K2 @ 6" CTS. (4 BR) (EA. FACE)
- (D) 10-#4 U1 @ 1'-6" CTS.
- (E) 7-#4 U1 @ 1'-6" CTS.
- (F) 3" TO #4 B4, #4 B5 OR #4 B6
- (G) 2'-0" DIA. (TYP.)

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13406 J. T. KELVINGTON
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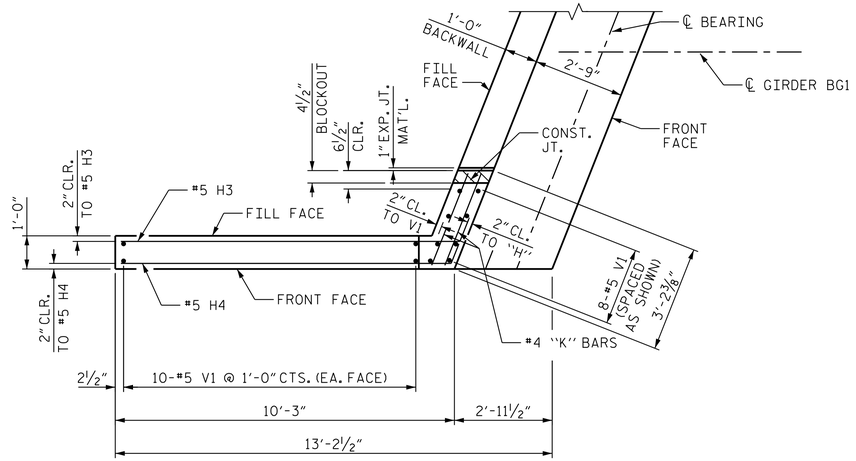
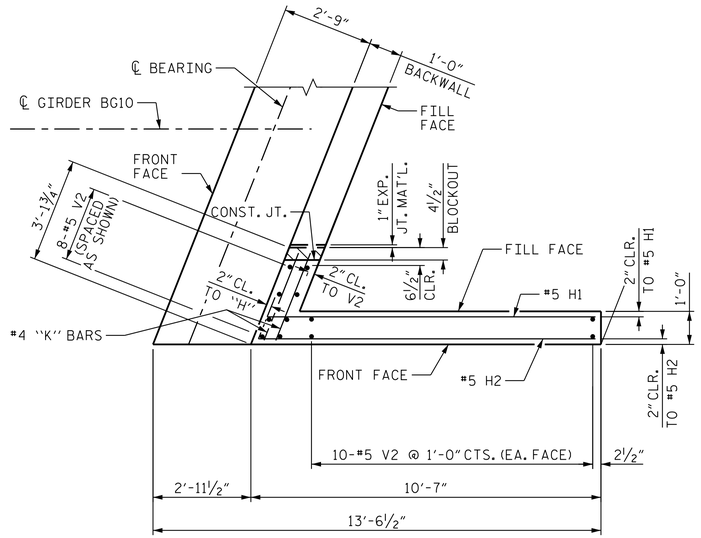
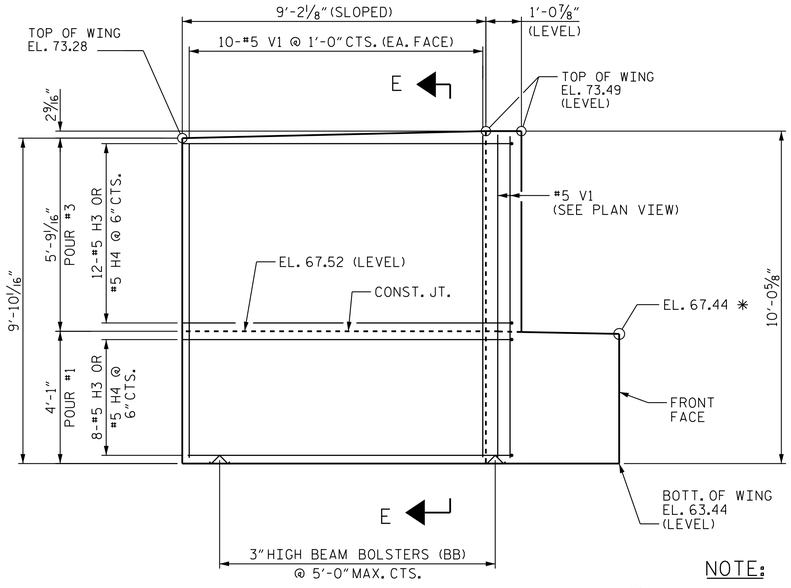


PLAN OF LEFT WING (W3)

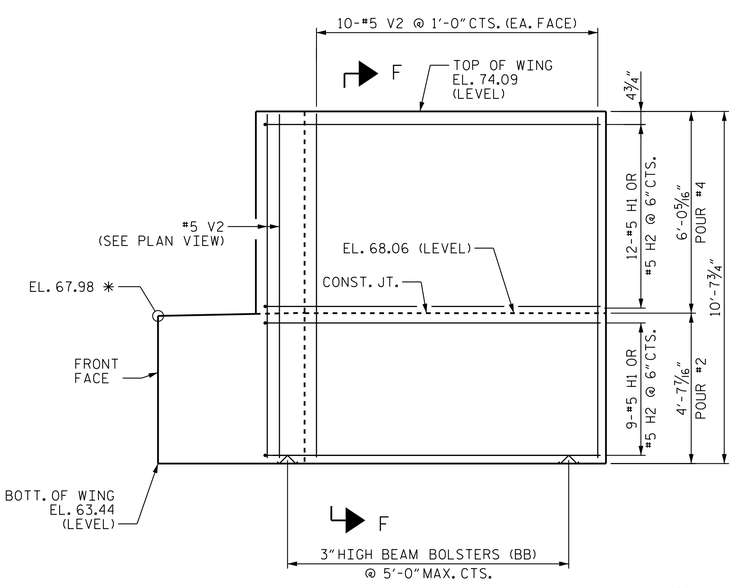


PLAN OF RIGHT WING (W4)



ELEVATION OF LEFT WING (W3)

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 1 OF 4 FOR DETAILS



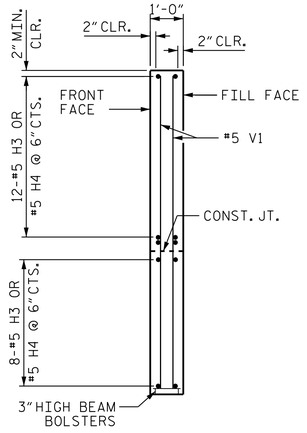
ELEVATION OF RIGHT WING (W4)

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 2 OF 4 FOR DETAILS

NOTE:

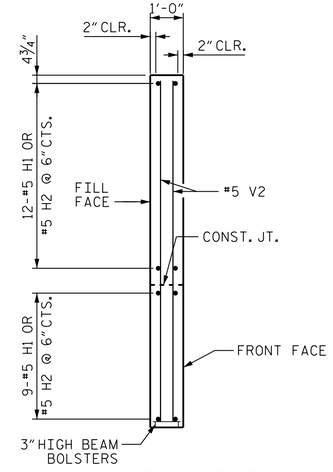
* TOP SURFACE OF END BENT CAP BETWEEN BRIDGE SEAT PEDESTALS SHALL BE SLOPED TRANSVERSELY FROM FILL FACE TO FRONT FACE AT A RATE OF ¼" / FT.

HATCHED AREA OF THE BACKWALL SHALL NOT BE POURED UNTIL THE BARRIER RAIL HAS BEEN CAST IF SLIP FORM CONSTRUCTION OF THE BARRIER IS USED.



SECTION E-E

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 1 OF 4 FOR DETAILS



SECTION F-F

#4 "K" BARS NOT SHOWN FOR CLARITY, SEE SHEET 2 OF 4 FOR DETAILS

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 3 OF 4

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10/25/2021

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END BENT 2 WING WALL DETAILS

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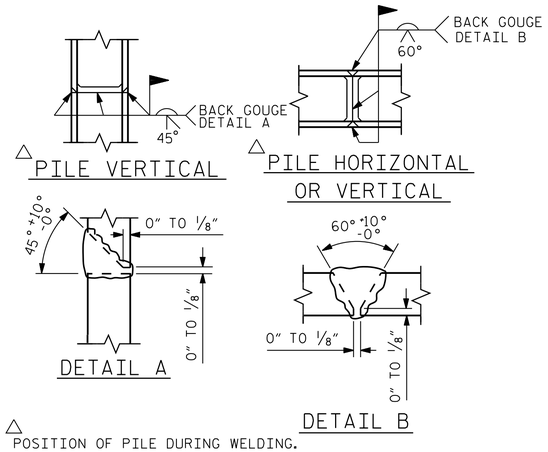
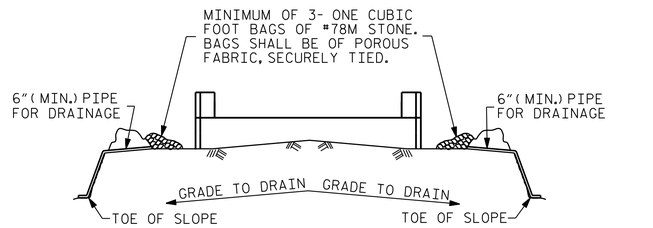


PILE SPLICE DETAILS

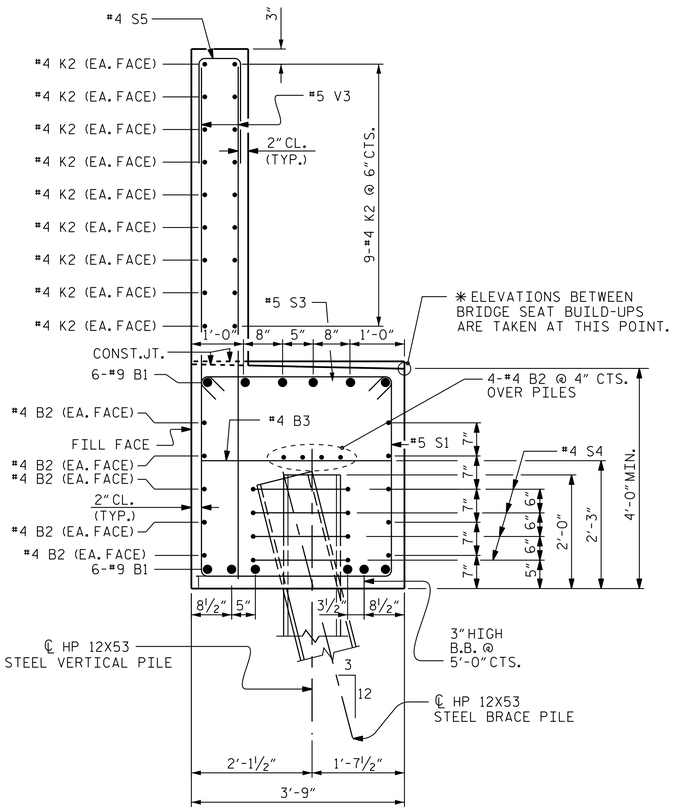


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

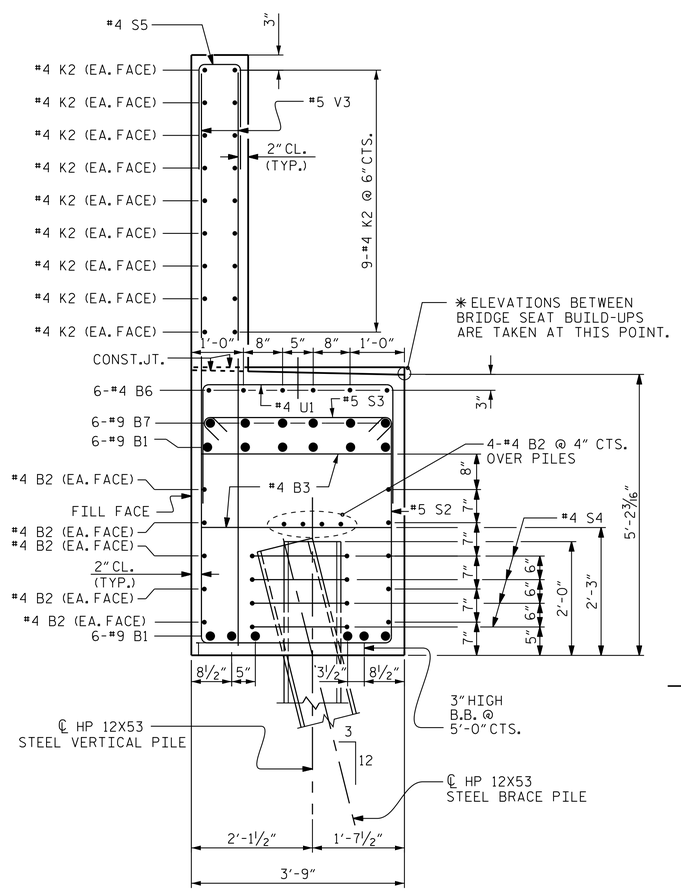
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



SECTION A-A

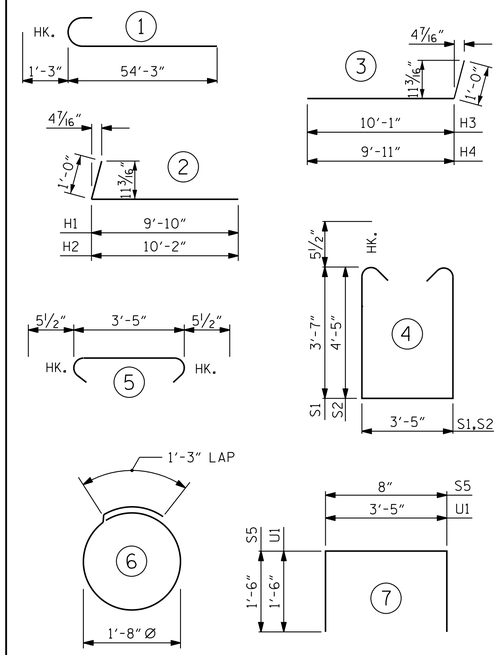
ANCHOR BOLTS NOT SHOWN FOR CLARITY



SECTION B-B

ANCHOR BOLTS NOT SHOWN FOR CLARITY
#4 B4, #4 B5 & #4 B8 BARS NOT SHOWN.
SEE ELEVATION VIEWS, SHEET 1 OF 4 & 2 OF 4.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

HP 12X53 STEEL PILES			
NO: 16	LIN. FT.= 1,200.00	PILE REDRIVES	EA. 8
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES			EA. 16

BILL OF MATERIAL

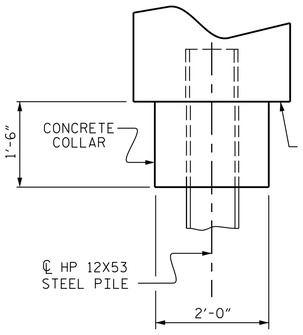
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	#9	1	55'-6"	4529
B2	42	#4	STR	36'-1"	1012
B3	36	#4	STR	3'-5"	82
B4	6	#4	STR	15'-4"	62
B5	18	#4	STR	9'-8"	117
B6	6	#4	STR	13'-0"	53
B7	6	#9	STR	42'-9"	873
H1	21	#5	2	10'-10"	238
H2	21	#5	2	11'-2"	245
H3	20	#5	3	11'-1"	232
H4	20	#5	3	10'-11"	228
K1	12	#4	STR	2'-9"	23
K2	72	#4	STR	27'-8"	1331
S1	63	#5	4	11'-6"	756
S2	45	#5	4	13'-2"	618
S3	92	#5	5	4'-4"	416
S4	64	#4	6	6'-5"	278
S5	97	#4	7	3'-8"	238
U1	40	#4	7	6'-5"	172
V1	28	#5	STR	9'-6"	278
V2	28	#5	STR	10'-3"	300
V3	194	#5	STR	8'-2"	1653

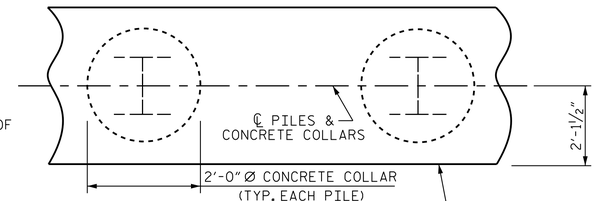
REINFORCING STEEL	13,734 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	35.8 C.Y.
POUR #2	CAP, LOWER PART OF WINGS & COLLARS	37.7 C.Y.
POUR #3	UPPER PART OF WINGS & BACKWALL	11.0 C.Y.
POUR #4	UPPER PART OF WINGS & BACKWALL	11.4 C.Y.
TOTAL CLASS A CONCRETE		95.9 C.Y.



ELEVATION



PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
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END BENT 2 DETAILS

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10/25/2021

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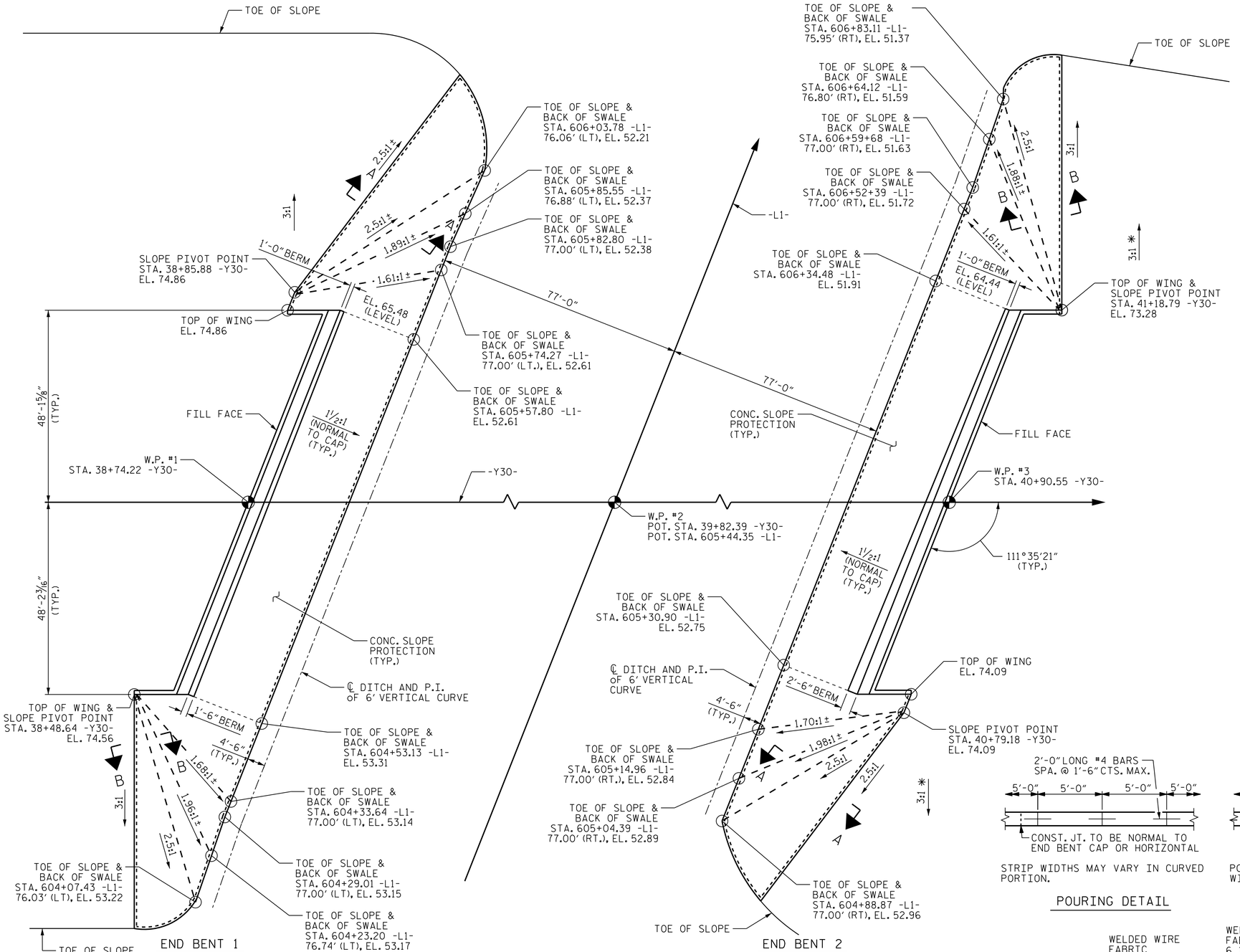


PLAN

ELEVATIONS SHOWN ARE AT TOP SURFACE OF SLOPE PAVING

GENERAL NOTES

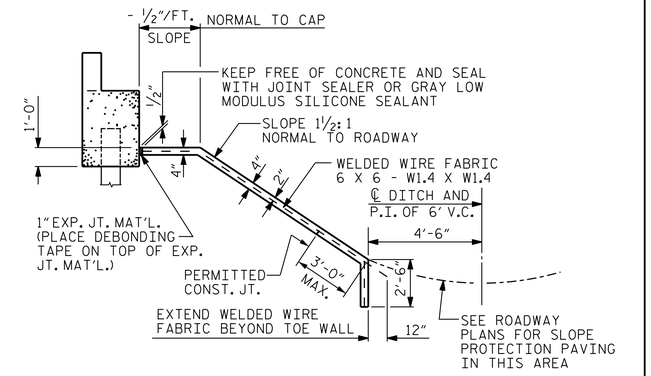
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

ALTERNATE "A"

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

BRIDGE @ STA. 39+82.39 -Y30-	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	538	968
END BENT 2	532	957
TOTAL	1,070	1,925

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

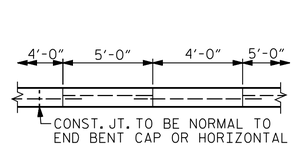


SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH

DETAILS FOR ALTERNATE "A"

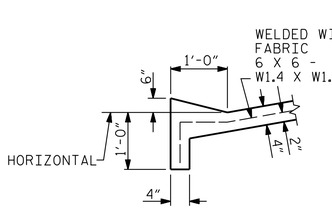
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

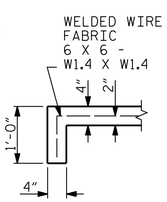


POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



SECTION B-B



SECTION A-A

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

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ASSEMBLED BY : V. T. THOMPSON DATE : 09/11/18
CHECKED BY : N. D'AIUTO DATE : 06/10/19

DRAWN BY : ELR 5/92
CHECKED BY : GRP 6/92

REV. 12/21/11 MAA/GM
REV. 1/16 MAA/TMG
REV. 12/17 MAA/THC

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. Kelvington
10/25/2021

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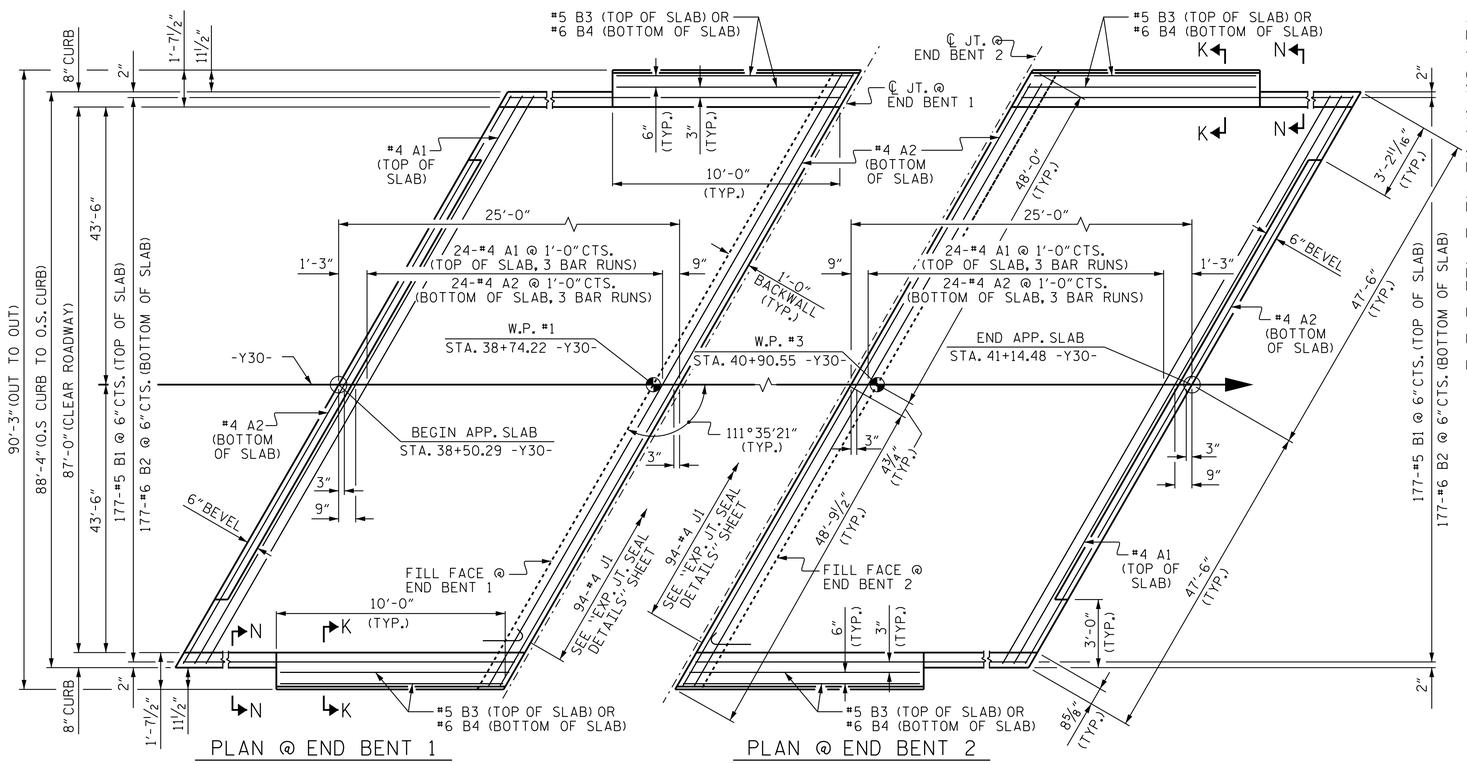
STD. NO. SP1



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

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

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

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

FOR THE 4" 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.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR BARRIER RAIL ON APP. SLAB DETAILS , SEE SHEET 2 OF 3.

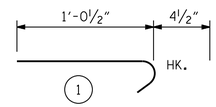
FOR CONCRETE MEDIAN ON APP. SLAB DETAILS , SEE SHEET 3 OF 3.

BILL OF MATERIAL

FOR ONE APPROACH SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	75	#4	STR	33'-0"	1654
A2	78	#4	STR	32'-9"	1707
* B1	177	#5	STR	24'-3"	4370
B2	177	#6	STR	24'-7"	6558
* B3	4	#5	STR	9'-11"	42
B4	4	#6	STR	9'-11"	60
* J1	94	#4	1	1'-5"	89
REINFORCING STEEL ** LBS.					8245
* EPOXY COATED REINFORCING STEEL ** LBS.					6188
CLASS AA CONCRETE ** C.Y.					96.4

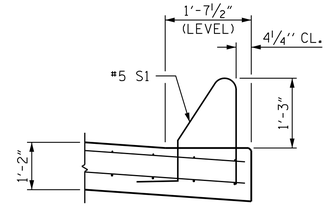
BAR TYPE



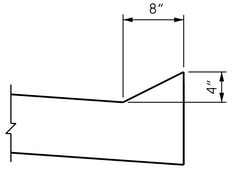
ALL BAR DIMENSIONS ARE OUT TO OUT

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 3.
QUANTITIES FOR CONCRETE MEDIAN ON APP SLAB ARE NOT INCLUDED. SEE SHEET 3 OF 3.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



SECTION K-K



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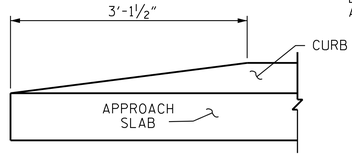
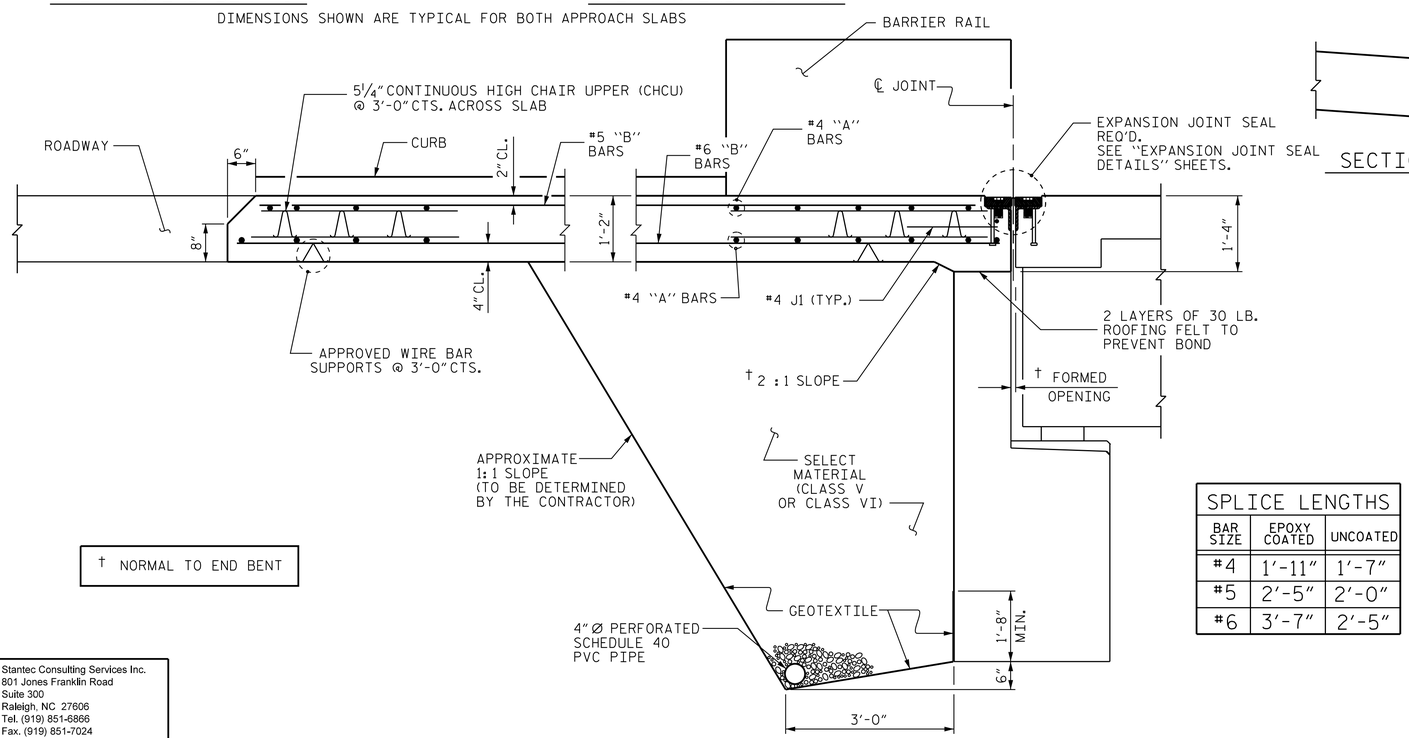


END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)

SPLICE LENGTHS

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

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

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License No. F-0672

DRAWN BY : J. B. GEILE DATE : 09/07/18
CHECKED BY : N. D'AIUTO DATE : 05/20/19

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by Jonathan Kelvington
10/25/2021

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S13-36
1			3			TOTAL SHEETS
2			4			38

STD. NO. BAS4

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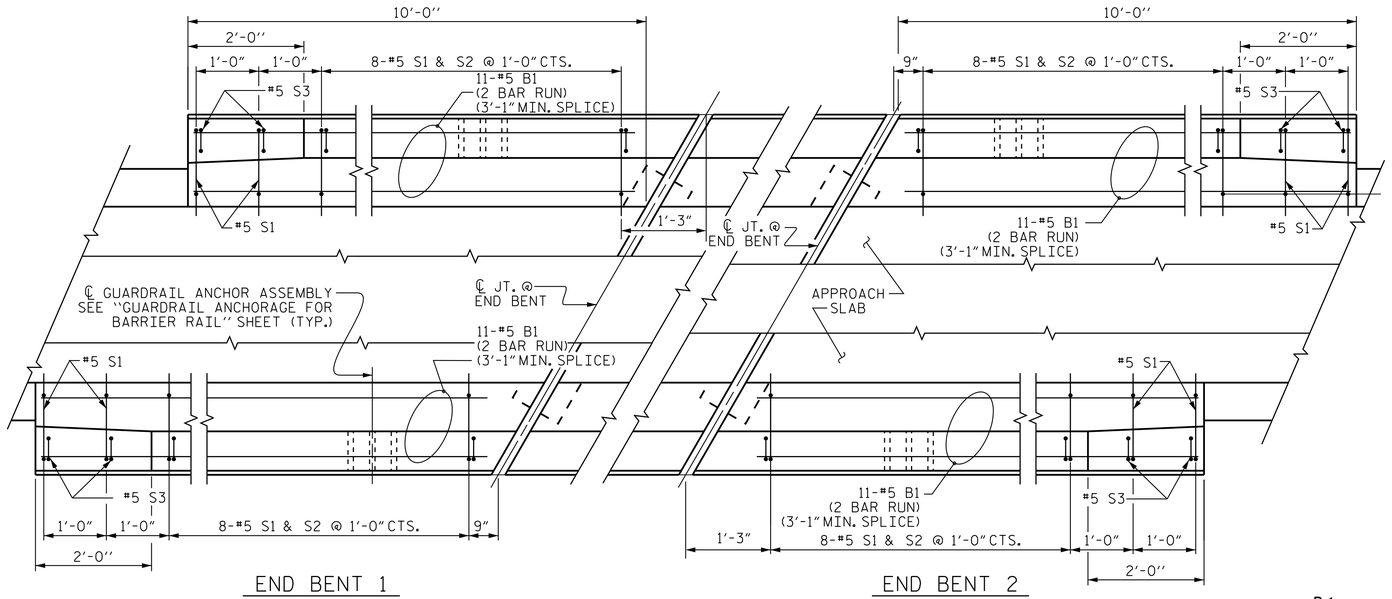


END BENT 1 END BENT 2

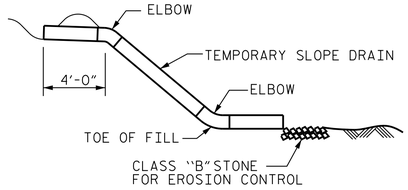
PLAN OF BARRIER RAIL

NOTES

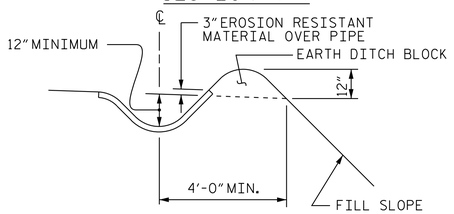
THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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

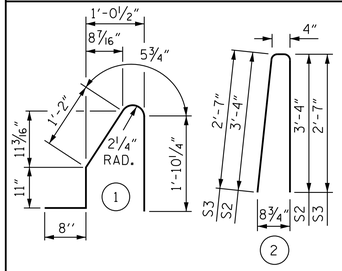
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



SECTION R-R



BAR TYPES

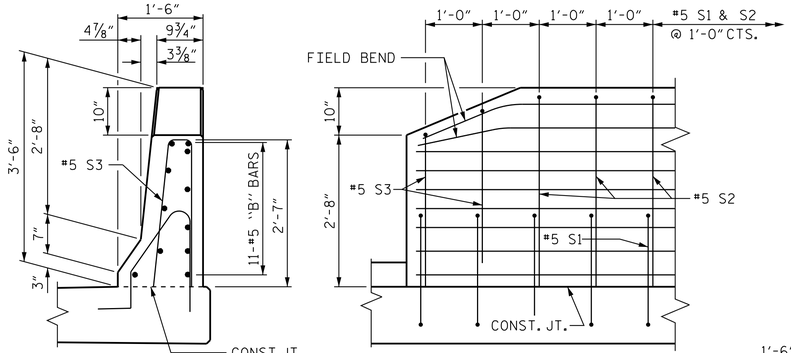


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BARRIER RAIL ONLY (FOR 1 APP. SLABS)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	44	#5	STR	6'-7"	303
✱S1	20	#5	1	5'-1"	107
✱S2	16	#5	2	7'-0"	117
✱S3	4	#5	2	5'-6"	23
✱EPOXY COATED REINFORCING STEEL			LBS.		550
CLASS AA CONCRETE			C.Y.		2.8
CONCRETE BARRIER RAIL			LIN.FT.		20.64



END VIEW

SIDE VIEW

END OF RAIL DETAILS

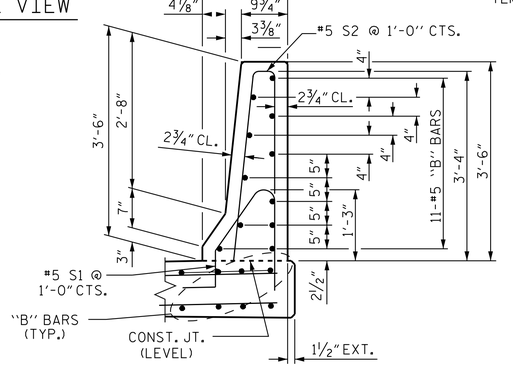
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW

SECTION S-S

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



SECTION THRU RAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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ASSEMBLED BY : J. B. GEILE DATE : 05/30/19
CHECKED BY : N. D'AIUTO DATE : 05/31/19

DRAWN BY : FCJ 11/88
CHECKED BY : ARB 11/88

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

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER T. KELVINGTON
DocuSigned by: J. T. Kelvington
10/25/2021

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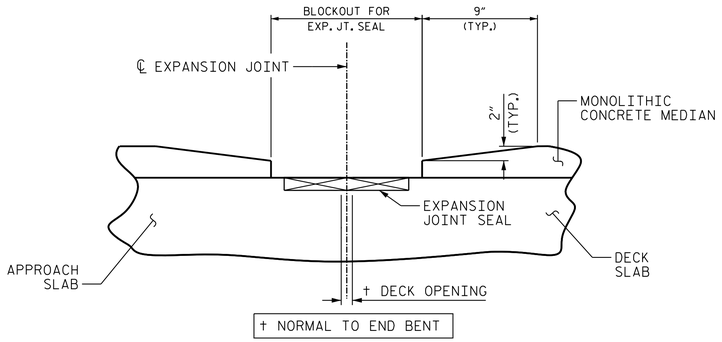
STD. NO. BAS4



SECTION THROUGH MONOLITHIC CONCRETE MEDIAN AT END BENT

END BENT 1 SHOWN, END BENT 2 SIMILAR

MONOLITHIC CONCRETE MEDIAN LAYOUT

WORK POINT	STATION	OFFSET
Ⓐ	38+49.80	1.25 RT.
Ⓑ	38+46.04	10.75 RT.
Ⓒ	38+74.35	1.25 RT.
Ⓓ	38+70.59	10.75 RT.
Ⓜ	40+94.18	10.75 LT.
Ⓝ	40+90.42	1.25 LT.
Ⓞ	41+18.73	10.75 LT.
Ⓟ	41+14.97	1.25 LT.

NOTES

GROOVED CONTRACTION JOINTS, 1" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MONOLITHIC CONCRETE MEDIAN IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 10 FT. BETWEEN EXPANSION JOINT, NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH. PLACE ½" EXPANSION JOINTS AT 30' INTEVALS.

ALL REINFORCING STEEL IN MONOLITHIC CONCRETE MEDIAN SHALL BE EPOXY COATED.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE CONCRETE MEDIAN. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

CONCRETE MEDIAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

2" MINIMUM CLEARANCE FROM ALL FINISHED CONCRETE SURFACES TO ALL STEEL REINFORCEMENT.

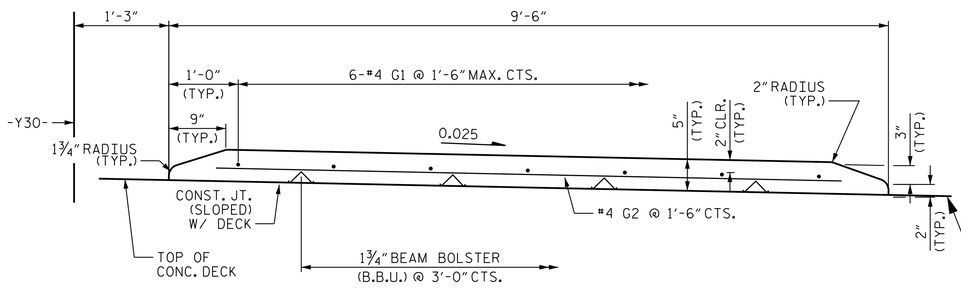
BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

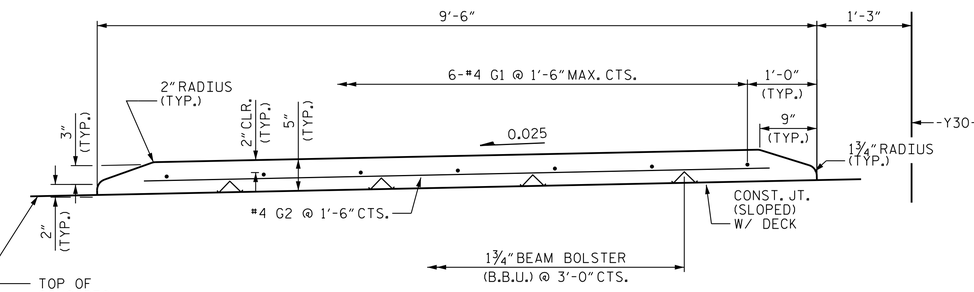
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* G1	6	#4	STR	24'-7"	99
* G2	18	#4	STR	8'-2"	98
* EPOXY COATED REINFORCING STEEL				LBS.	197
CLASS AA CONCRETE				C.Y.	3.5

APPROACH SLAB AT END BENT 2

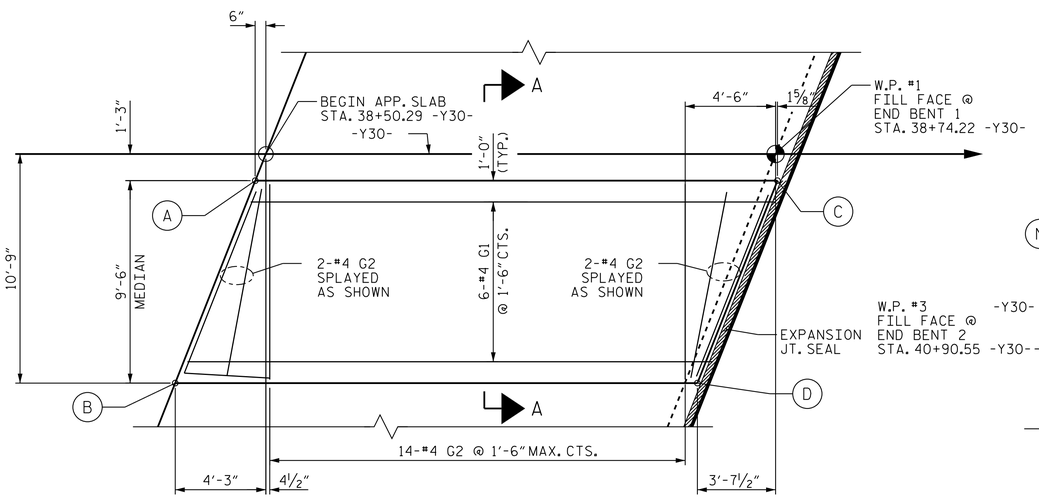
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* G1	6	#4	STR	24'-7"	99
* G2	18	#4	STR	8'-2"	98
* EPOXY COATED REINFORCING STEEL				LBS.	197
CLASS AA CONCRETE				C.Y.	3.5



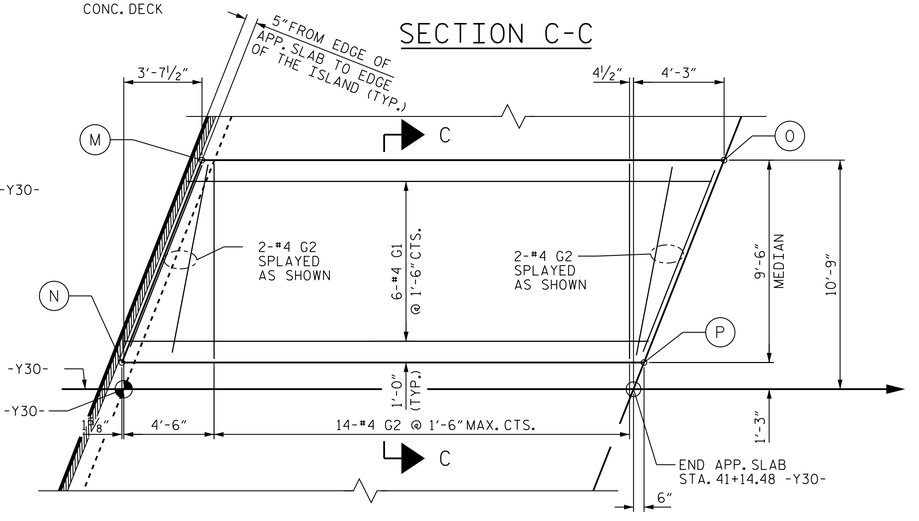
SECTION A-A



SECTION C-C



APPROACH SLAB 1



APPROACH SLAB 2

PLAN OF MONOLITHIC CONCRETE MEDIAN

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 39+82.39 -Y30-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
MONOLITHIC CONCRETE MEDIAN DETAILS

Stantec
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DRAWN BY : J. E. HAGENBUSH DATE : 01/25/19
CHECKED BY : N. D'AIUTO DATE : 06/04/19

DESIGN ENGINEER OF RECORD: J. T. KELVINGTON DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER J. T. KELVINGTON
Digitally signed by J. T. Kelvington
10/25/2021

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PLAN
(PILES NOT SHOWN FOR CLARITY)

* PMVC DENOTES POINT OF MIN. VERTICAL CLEARANCE

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-
21+61.95 -Y38-
SHEET 1 OF 4 BRIDGE #700258

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 049756 ENGINEER MELINDA B. ISENHOUR
10/25/2021

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DRAWN BY : V. T. THOMPSON DATE : 06/14/19
CHECKED BY : N. D'AIUTO DATE : 06/19/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

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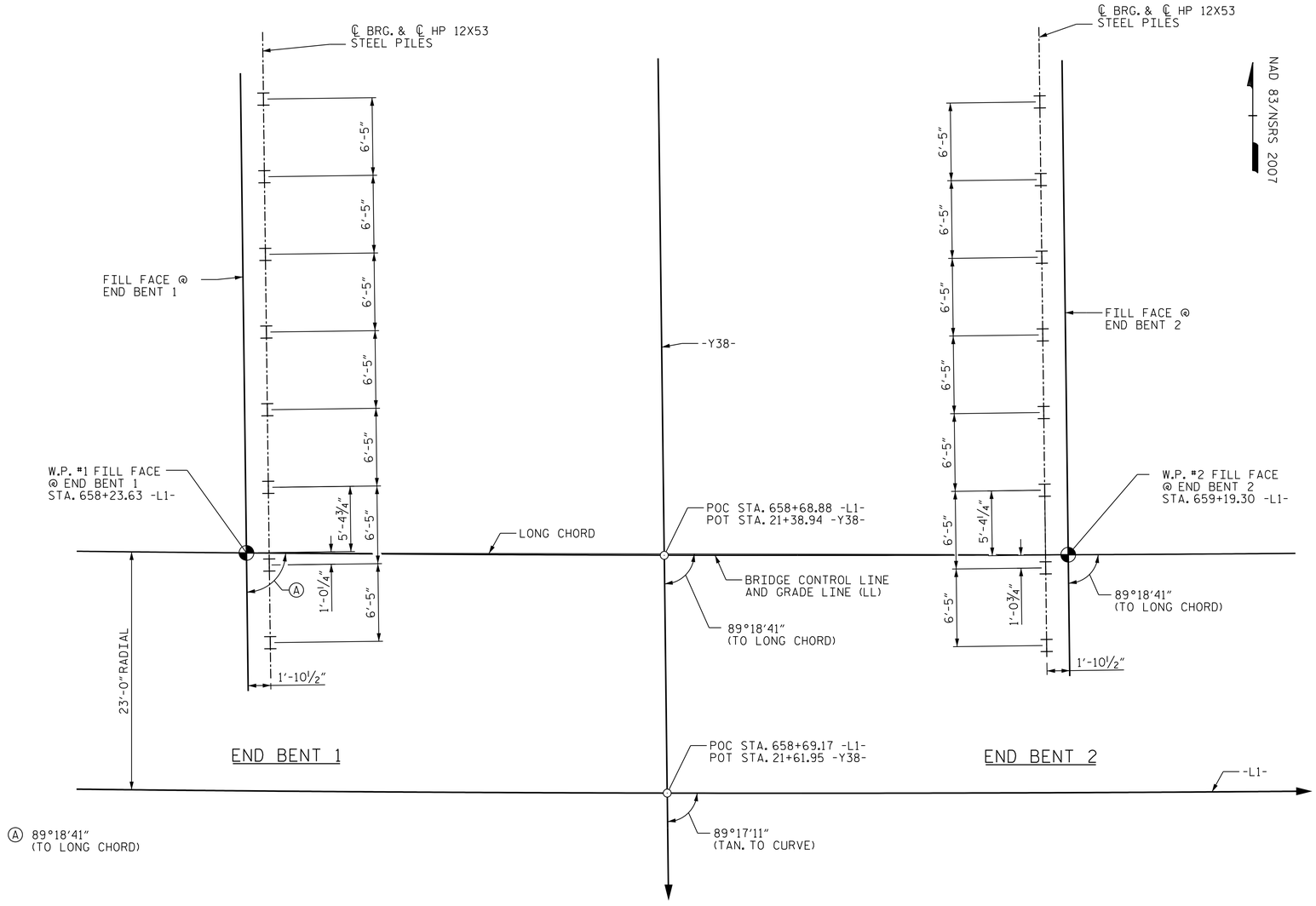

FOUNDATION LAYOUT

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENTS 1 & 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH THE PDA DURING DRIVING RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(LEFT LANE)

REVISIONS						SHEET NO.
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2			4			30

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DRAWN BY : V. T. THOMPSON DATE : 09/02/19
CHECKED BY : N. D'AIUTO DATE : 09/05/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049561 ENGINEER MELVIN B. ISENHOUR
Docusigned by: Melvin B. Isenhour
10/25/2021

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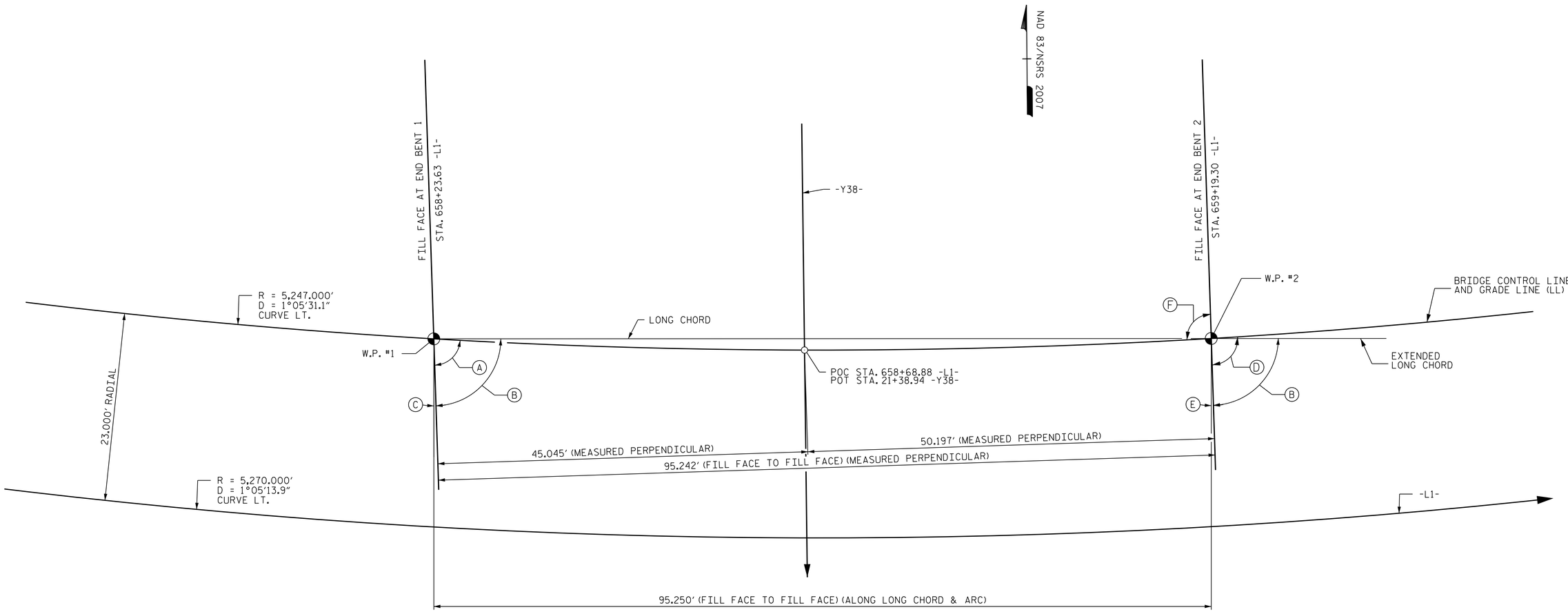

ANGLES	
A	88°47'29" (TAN. TO CURVE)
B	89°18'41" (TYP.)
C	1°12'31"
D	89°49'53" (TAN. TO CURVE)
E	0°10'07"
F	89°49'53" (TAN. TO CURVE)

LONG CHORD LAYOUT

NOTES:

ALL BENTS ARE PARALLEL TO -Y38-.

BRIDGE DECK AND APPROACH SLABS ARE CONCENTRIC WITH ℄ SURVEY -L1-

GIRDERS ARE SET PARALLEL TO THE LONG CHORD

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(LEFT LANE)

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www.stantec.com
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DRAWN BY : V. T. THOMPSON DATE : 05/11/19
CHECKED BY : N. D'AIUTO DATE : 06/11/19

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19758 ENGINEER LINDA B. ISENHOUR
10/25/2021

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-03
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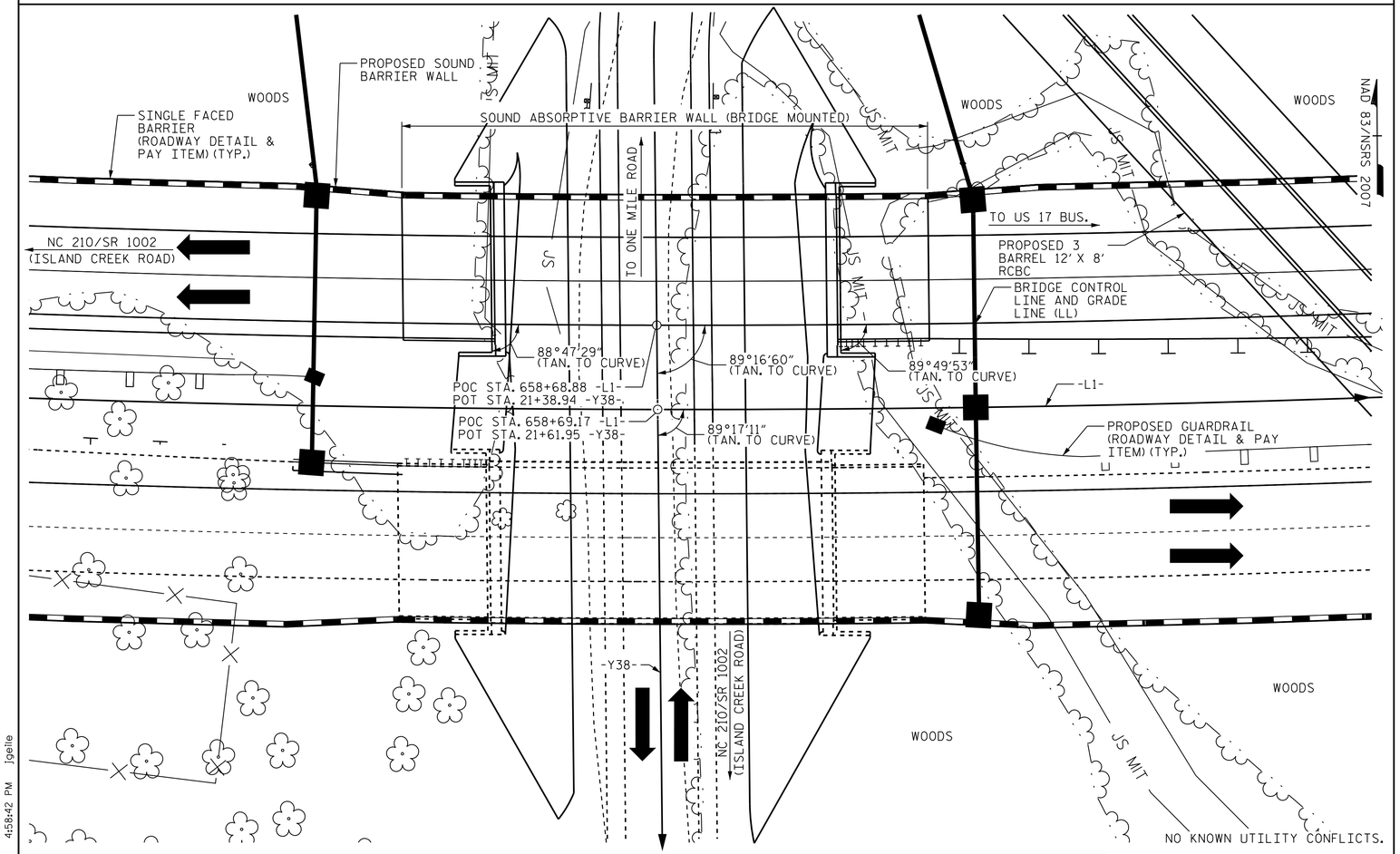
2			4			30

BM #25: R/R SPIKE SET IN PP ON HOLIDAY RD. N232087 E2382638, STA. 658+50.33 -L1-, 778.25' RT. EL. 34.91



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-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 MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

FOR SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED), SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR MODIFIED 54" PRESTRESSED CONCRETE GIRDER, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12x53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)	MODIFIED 54" PRESTRESSED CONCRETE GIRDERS	
	EA.	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	EA.	NO.	LIN.FT.	EA.	EA.	LIN. FT.	SQ.YDS.	LUMP SUM	LUMP SUM	NO.	LIN.FT.
SUPERSTRUCTURE		3,929	4,956									237.17				4	371.67
END BENT 1				38.2		5,928	8	8	440.00	8	4		270				
END BENT 2				38.4		5,972	8	8	480.00	8	4		340				
TOTAL	1	3,929	4,956	76.6	LUMP SUM	11,900	16	16	920.00	16	8	237.17	610	LUMP SUM	LUMP SUM	4	371.67

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DRAWN BY : V. T. THOMPSON DATE : 06/03/19
CHECKED BY : N. D'AIUTO DATE : 09/05/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049561 ENGINEER MELINDA B. ISENHOUR
10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-04
1			3			TOTAL SHEETS
2			4			30

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR						MOMENT						
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.00	--	1.75	0.926	1.31	A	EL	45.75	1.069	1.01	A	I	82.92	0.80	0.863	1.00	A	I	45.75	
		HL-93 (OPERATING)	N/A		1.34	--	1.35	0.926	1.70	A	EL	45.75	1.069	1.34	A	I	82.92	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.35	48.600	1.75	0.926	1.79	A	EL	45.75	1.069	1.35	A	I	82.92	0.80	0.863	1.38	A	I	45.75	
		HS-20 (OPERATING)	36.000		1.78	64.080	1.35	0.926	2.32	A	EL	45.75	1.069	1.78	A	I	82.92	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.23	43.605	1.40	0.926	5.26	A	EL	45.75	1.069	4.34	A	I	82.92	0.80	0.863	3.23	A	I	45.75	
		SNGARBS2	20.000		2.35	47.000	1.40	0.926	3.83	A	EL	45.75	1.069	3.03	A	I	82.92	0.80	0.863	2.35	A	I	45.75	
		SNAGRIS2	22.000		2.20	48.400	1.40	0.926	3.59	A	EL	45.75	1.069	2.79	A	I	82.92	0.80	0.863	2.20	A	I	45.75	
		SNCOTTS3	27.250		1.60	43.600	1.40	0.926	2.61	A	EL	45.75	1.069	2.12	A	I	82.92	0.80	0.863	1.60	A	I	45.75	
		SNAGGRS4	34.925		1.32	46.101	1.40	0.926	2.15	A	EL	45.75	1.069	1.72	A	I	82.92	0.80	0.863	1.32	A	I	45.75	
		SNS5A	35.550		1.29	45.860	1.40	0.926	2.10	A	EL	45.75	1.069	1.73	A	I	82.92	0.80	0.863	1.29	A	I	45.75	
		SNS6A	39.950		1.18	47.141	1.40	0.926	1.92	A	EL	45.75	1.069	1.56	A	I	82.92	0.80	0.863	1.18	A	I	45.75	
		SNS7B	42.000		1.12	47.040	1.40	0.926	1.83	A	EL	45.75	1.069	1.52	A	I	82.92	0.80	0.863	1.12	A	I	45.75	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.43	47.190	1.40	0.926	2.33	A	EL	45.75	1.069	1.88	A	I	82.92	0.80	0.863	1.43	A	I	45.75	
		TNT4A	33.075		1.44	47.628	1.40	0.926	2.34	A	EL	45.75	1.069	1.84	A	I	82.92	0.80	0.863	1.44	A	I	45.75	
		TNT6A	41.600		1.17	48.672	1.40	0.926	1.90	A	EL	45.75	1.069	1.60	A	I	82.92	0.80	0.863	1.17	A	I	45.75	
		TNT7A	42.000		1.17	49.140	1.40	0.926	1.90	A	EL	45.75	1.069	1.57	A	I	82.92	0.80	0.863	1.17	A	I	45.75	
		TNT7B	42.000		1.20	50.400	1.40	0.926	1.95	A	EL	45.75	1.069	1.49	A	I	82.92	0.80	0.863	1.20	A	I	45.75	
		TNAGRIT4	43.000		1.15	49.450	1.40	0.926	1.87	A	EL	45.75	1.069	1.44	A	I	82.92	0.80	0.863	1.15	A	I	45.75	
		TNAGT5A	45.000		1.09	49.050	1.40	0.926	1.77	A	EL	45.75	1.069	1.42	A	I	82.92	0.80	0.863	1.09	A	I	45.75	
		TNAGT5B	45.000	3	1.08	48.600	1.40	0.926	1.75	A	EL	45.75	1.069	1.37	A	I	82.92	0.80	0.863	1.08	A	I	45.75	

LOAD FACTORS:

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

NOTES:

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

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

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

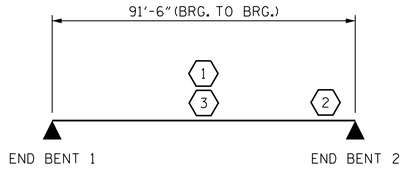
GIRDER LOCATION

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

GIRDER PROPERTIES

54" MODIFIED BULB TEE

AREA = 707 SQ. IN.
WEIGHT = 737 LB/FT.
Y_{BOTTOM} = 27.79 IN.
Y_{TOP} = 26.21 IN.
Ixx = 277,560 IN.^{4}
Iyy = 40,051 IN.^{4}
V/S = 3.23 IN.



LRFR SUMMARY

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

Stantec
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ASSEMBLED BY : V. T. THOMPSON DATE : 08/15/19
CHECKED BY : N. D'AIUTO DATE : 09/15/19

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

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

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

10/25/2021

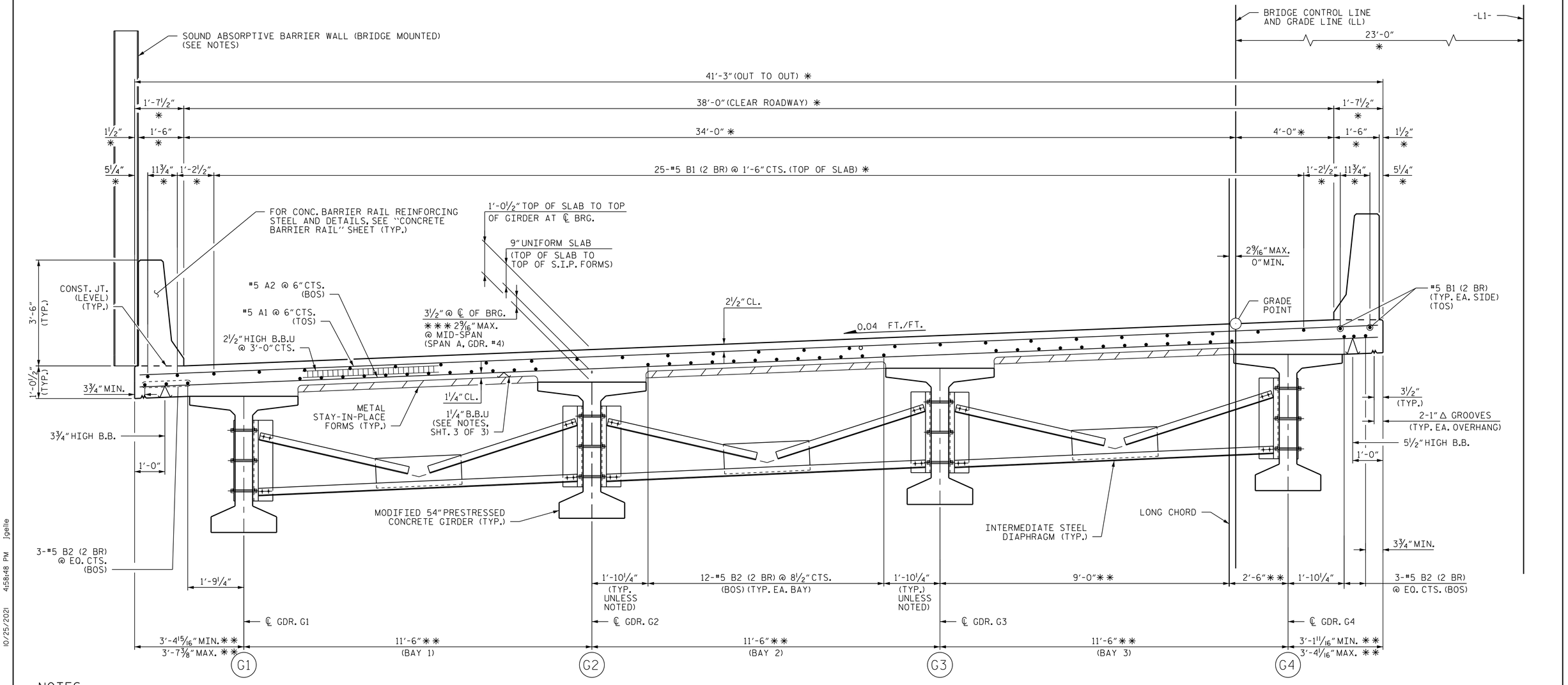
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-05
1			3			TOTAL SHEETS
2			4			30

STD. NO. LRFR1



NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR ADDITIONAL NOTES.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

(2 BR) DENOTES 2 BAR RUN.

✱✱ NORMAL TO LONG CHORD.

✱ DENOTES RADIAL DIMENSION.

(TOS) DENOTES TOP OF SLAB.

(BOS) DENOTES BOTTOM OF SLAB.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAMS FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.

FOR SOUND ABSORPTIVE BARRIER WALL, SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEET.

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

TYPICAL SECTION - INTERMEDIATE DIAPHRAGM

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DRAWN BY : J. HAGENBUSH DATE : 07/01/19
CHECKED BY : N. D'AIUTO DATE : 08/19/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-06
1			3			TOTAL SHEETS
2			4			30

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
10/25/2021

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INTEGRAL DIAPHRAGM
HALF-SECTION REINFORCEMENT
AT FILL FACE

INTEGRAL DIAPHRAGM
HALF-SECTION REINFORCEMENT
AT FRONT FACE

TYPICAL SECTION - END BENT DIAPHRAGM

TYPICAL SECTIONS (AS SHOWN) SAME FOR END BENT 1 AND END BENT 2

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR ADDITIONAL NOTES.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

(2 BR) DENOTES 2 BAR RUN.

** DIMENSION NORMAL TO LONG CHORD.

* DENOTES RADIAL DIMENSION.

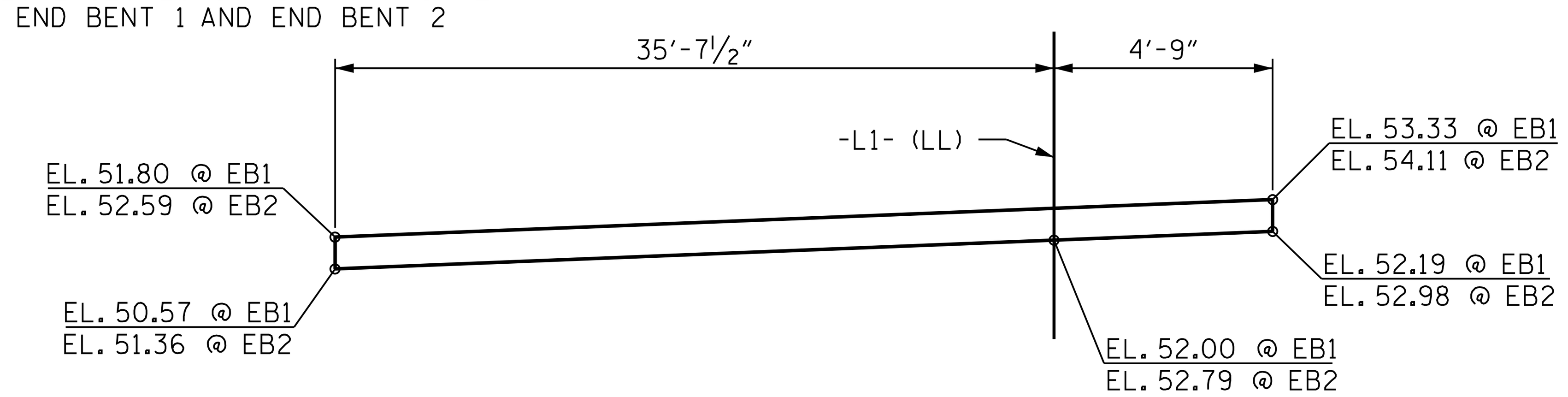
△ DENOTES MEASURED ALONG ℄ BEARING. BARS TO BE PLACED PERP. TO ℄ BRG.

(TOS) DENOTES TOP OF SLAB.

(BOS) DENOTES BOTTOM OF SLAB.

FOR SOUND ABSORPTIVE BARRIER WALL, SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEET.

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



INTEGRAL DIAPHRAGM
APPROACH SLAB BLOCKOUT
ALONG FILL FACE

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DRAWN BY : J. HAGENBUSH DATE : 06/25/19
CHECKED BY : N. D'AIUTO DATE : 08/19/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049756 MALINDA B. ISENHOUR 10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

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

SHEET NO. S14-07
TOTAL SHEETS 30

NOTES

PROVIDE $1\frac{1}{4}$" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF $2\frac{1}{2}$" ABOVE THE TOP OF THE REMOVABLE FORM.

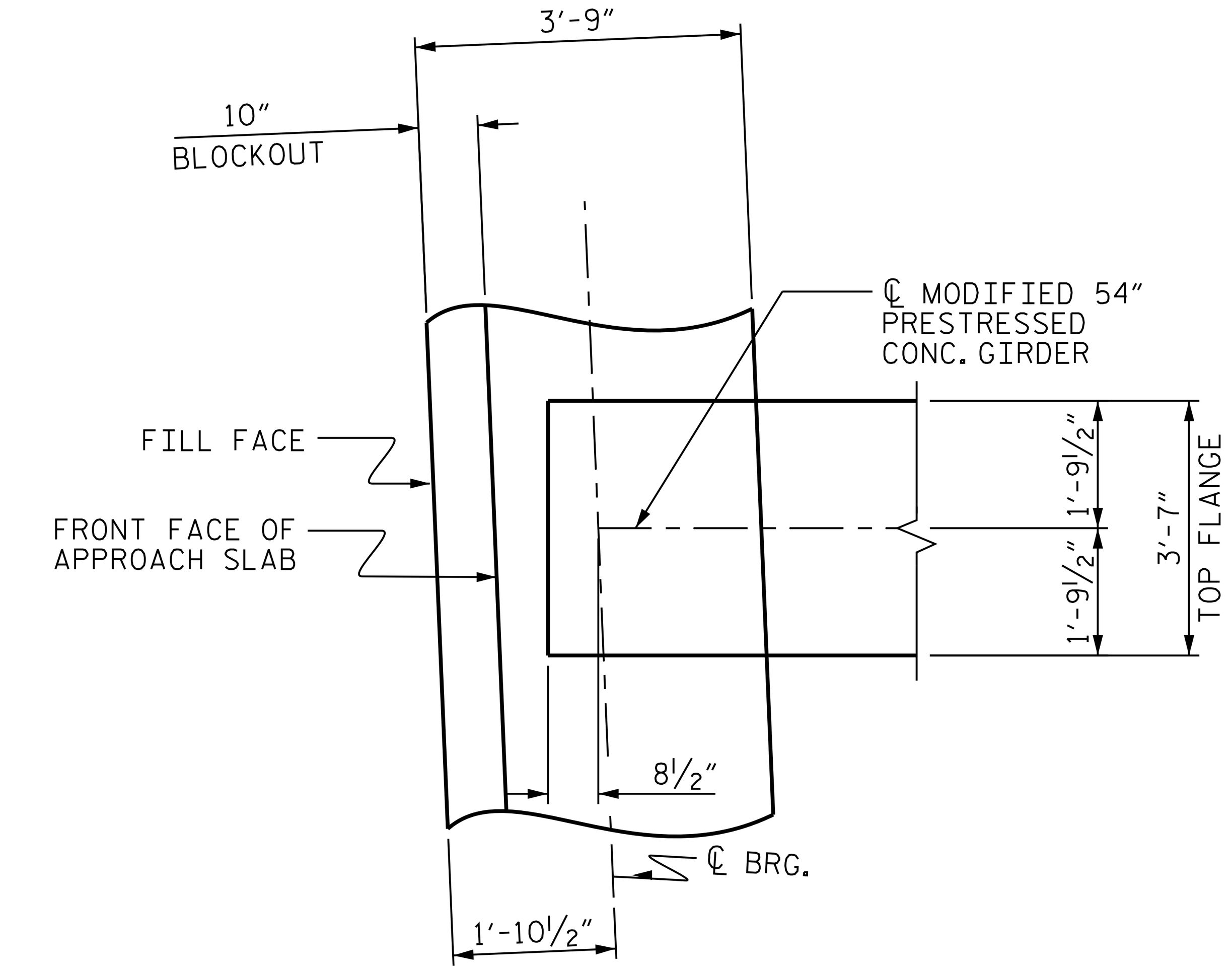
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

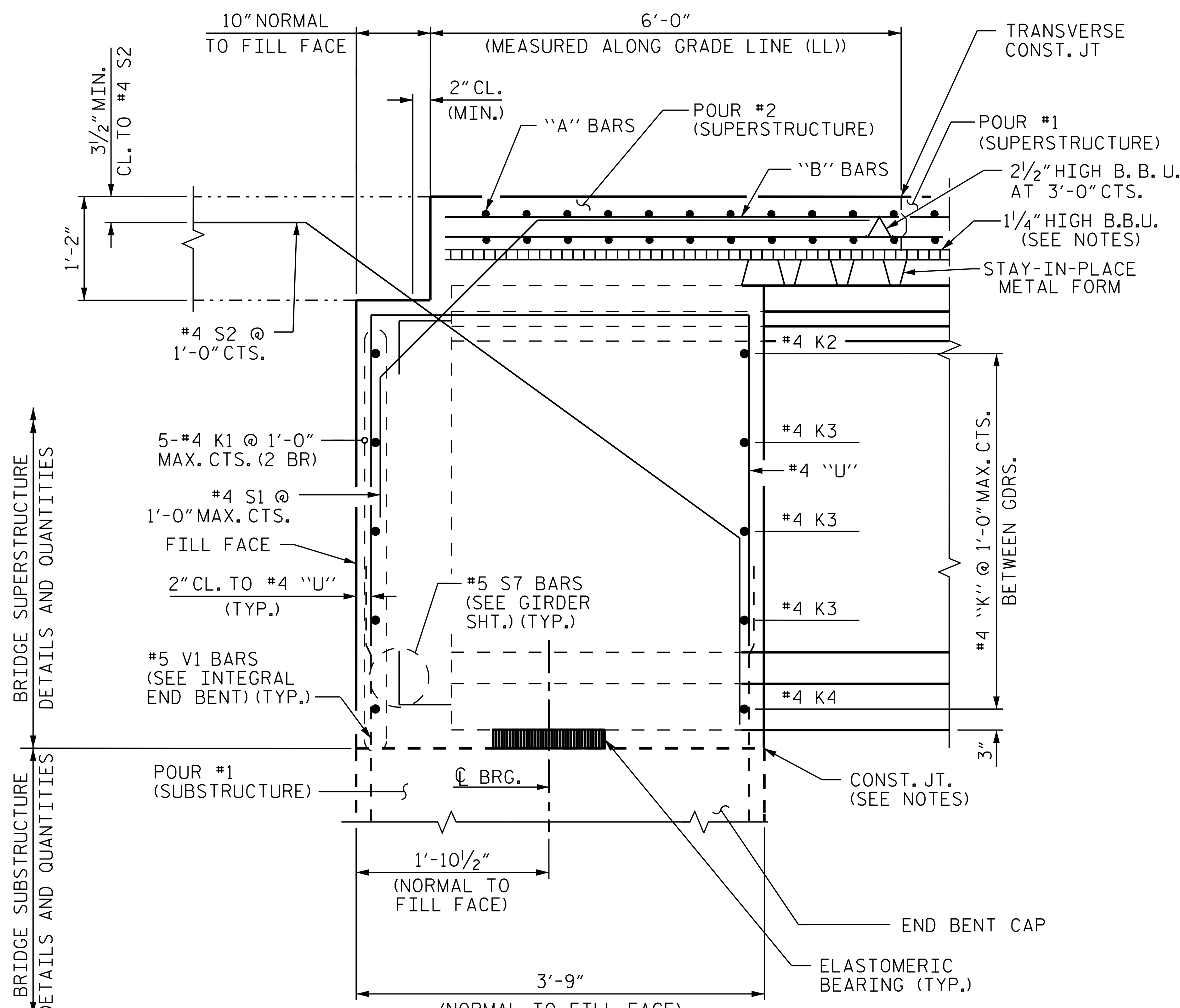
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

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

(2 BR) DENOTES 2 BAR RUN.



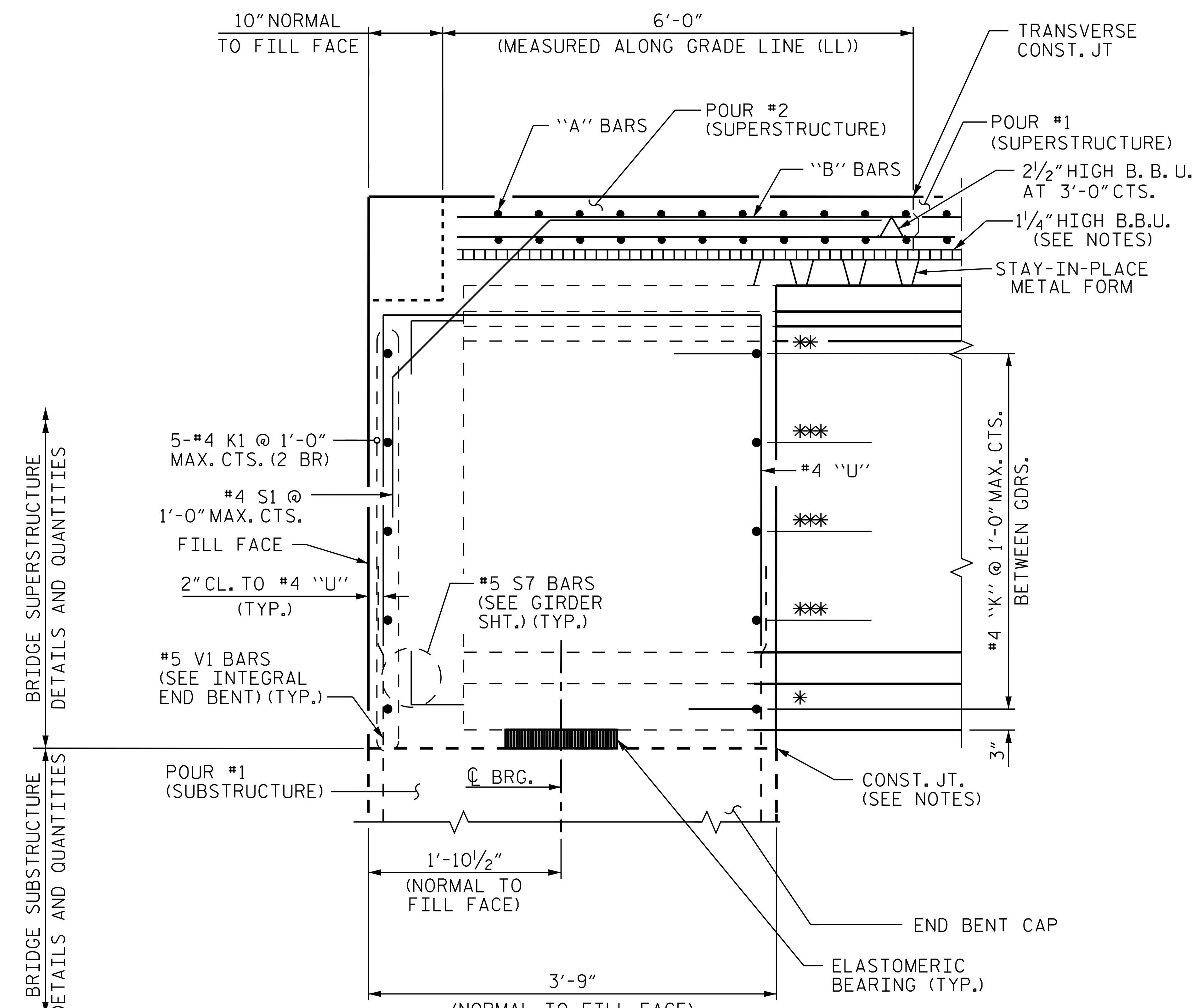
PLAN OF INTEGRAL END BENT



SECTION B-B

SECTION THRU INTEGRAL END BENT DIAPHRAGM.

SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS", SHT. 2 OF 2" FOR MORE DETAILS.



VIEW C-C

* #4 K7 - LEFT OVERHANG
#4 K10 - RIGHT OVERHANG

** #4 K5 - LEFT OVERHANG
#4 K8 - RIGHT OVERHANG

*** #4 K6 - LEFT OVERHANG
#4 K9 - RIGHT OVERHANG

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

(LEFT LANE)

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S14-08
1			3					TOTAL SHEETS
2			4					30

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049756 LINDA B. ISENHOUR
10/25/2021

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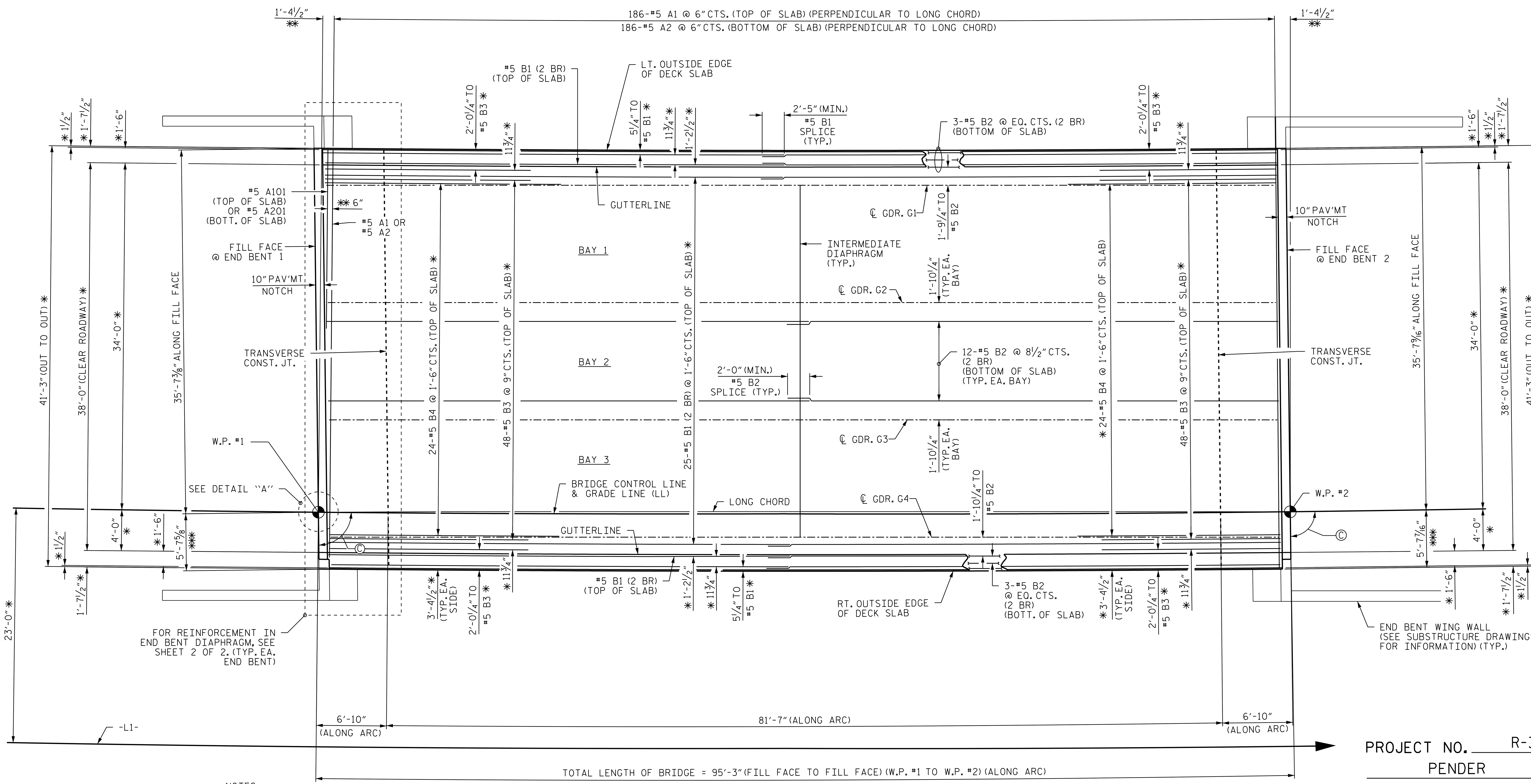
DRAWN BY : J. HAGENBUSH DATE : 07/01/19
CHECKED BY : N. D'AIUTO DATE : 08/19/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

U:\Structures\B4 -Y38-\Drafting\Final\R3300B_SMU_TS03_700258.dgn 10/25/2021 4:58:52 PM jgeile



Ⓒ 89°18'41" (TO LONG CHORD) (TYP.)

NOTES:

(2 BR) DENOTES 2 BAR RUN.

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

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS", SHEET 2 OF 2.

FOR POUR SEQUENCE, SEE "BILL OF MATERIALS" SHEET.

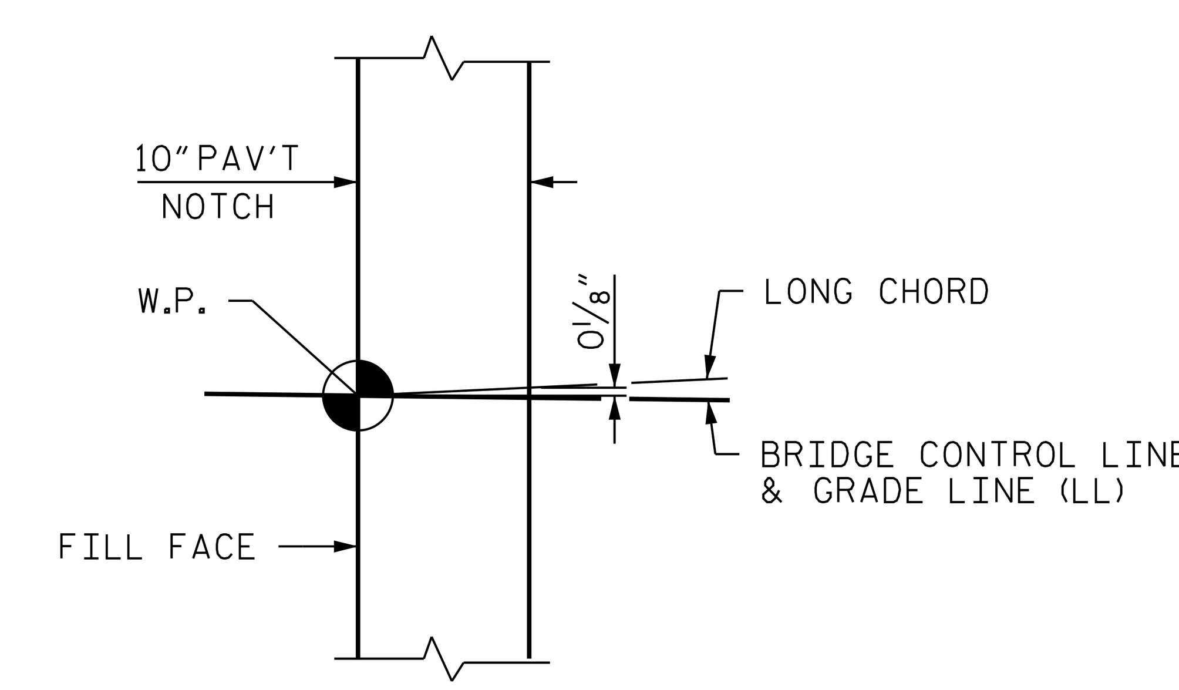
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDER" SHEET.

✱ RADIAL DIMENSION.

SOUND ABSORPTIVE BARRIER WALL POST SPACING NOT SHOWN FOR CLARITY. SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEET FOR DETAILS.

PLAN OF SPAN A

✱✱ PERPENDICULAR TO LONG CHORD
✱✱✱ ALONG FILL FACE



DETAIL "A"
W.P. #2 SIMILAR BY ROTATION

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPANS
(SPAN A)
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-09
1			3			TOTAL SHEETS
2			4			30

SEAL 049756 NORTH CAROLINA PROFESSIONAL ENGINEER MALINDA B. ISENHOUR 10/25/2021

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DRAWN BY : V. T. THOMPSON DATE : 08/16/19
CHECKED BY : N. D'AIUTO DATE : 08/19/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NOTES:

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

FOR POUR SEQUENCE, SEE "BILL OF MATERIALS" SHEET.

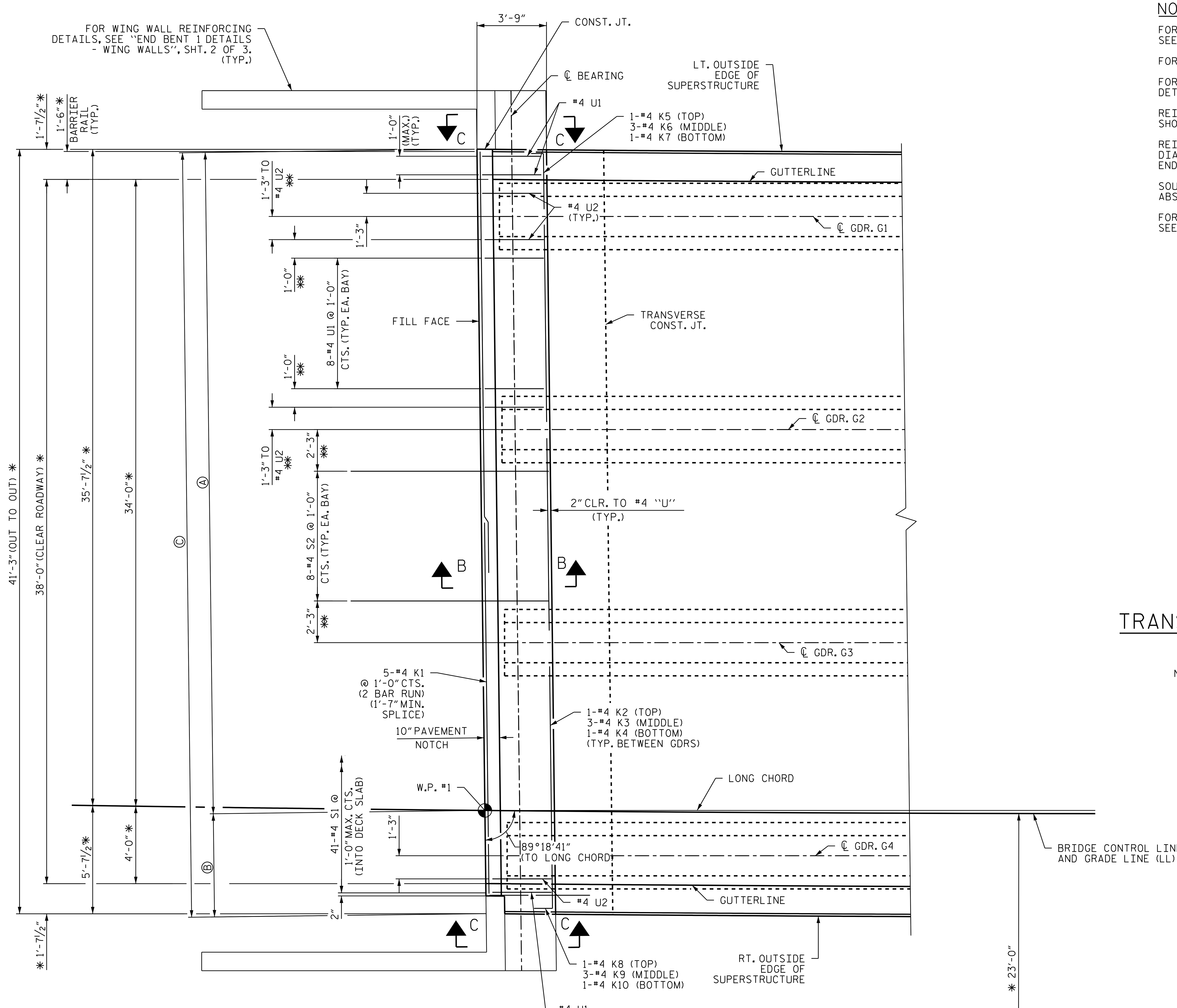
FOR SECTION B-B AND VIEW C-C SEE "TYPICAL SECTION DETAILS", SHT. 3 OF 3.

REINFORCEMENT IN DECK SLAB AND BARRIER RAIL NOT SHOWN FOR CLARITY.

REINFORCING STEEL OUTSIDE EXTERIOR GIRDERS IN DIAPHRAGMS SHOULD REMAIN IN SAME LOCATION END BENT 1 TO END BENT 2.

SOUND ABSORPTIVE BARRIER WALL NOT SHOWN FOR CLARITY. SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEET FOR DETAILS.

FOR TRANSVERSE CONST. JT. LOCATIONS & DETAILS, SEE "BILL OF MATERIALS" SHEET.



END BENT DIAPHRAGM REINFORCING DETAIL

✱ RADIAL DIMENSION

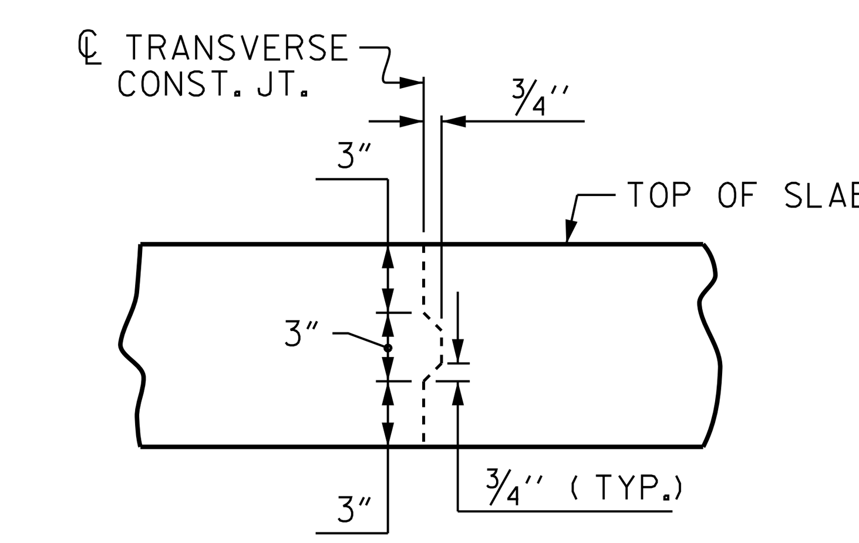
✱✱ (TYP. EA. BAY)

END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION.

Ⓐ 35'-7⅜" ALONG FILL FACE - END BENT 1
35'-7⁵⁄₁₆" ALONG FILL FACE - END BENT 2

Ⓑ 5'-7⅝" ALONG FILL FACE - END BENT 1
5'-7⁹⁄₁₆" ALONG FILL FACE - END BENT 2

Ⓒ 41'-3" ALONG FILL FACE - END BENT 1
41'-3" ALONG FILL FACE - END BENT 2



TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

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

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN DETAILS - DIAPHRAGMS

(LEFT LANE)

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S14-10
1			3					TOTAL SHEETS
2			4					30

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049756 LINDA B. ISENHOUR 10/25/2021

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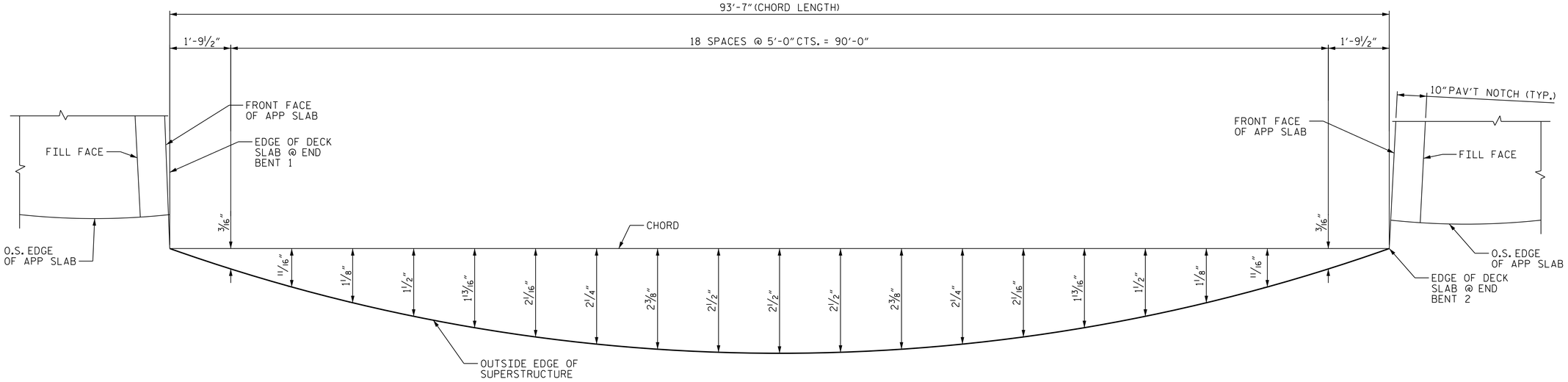
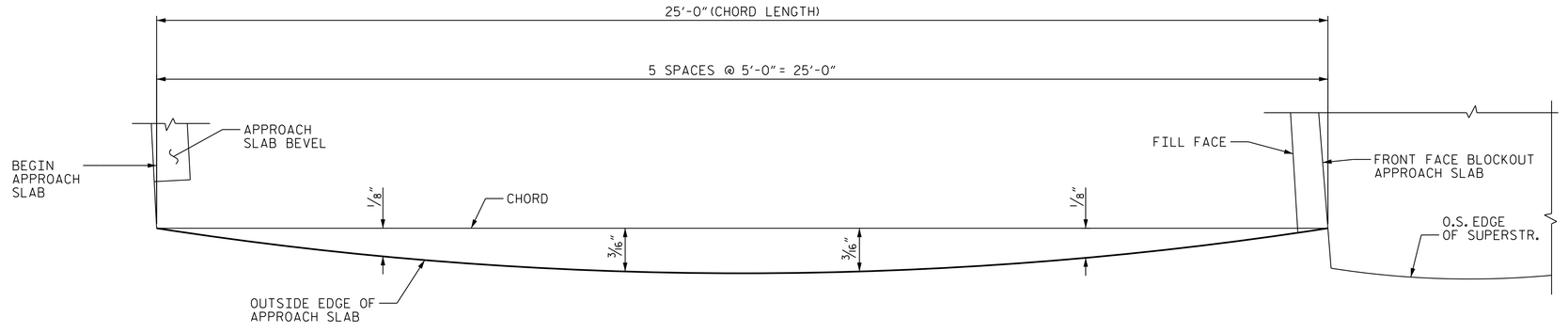
DRAWN BY : N.D'AIUTO DATE : 08/12/19
CHECKED BY : M. B. ISENHOUR DATE : 09/24/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21



CHORD TO ARC OFFSET (DECK SLAB)

(RT. SHOWN, LT. OUTSIDE EDGE OF SUPERSTRUCTURE) (TYP.)
(DIMENSIONS ARE TYP. EA. EDGE OF SUPERSTRUCTURE UNLESS OTHERWISE NOTED)

LEFT SIDE OF APP. SLAB IS COINCIDENT W/O.S. EDGE OF SUPERSTRUCTURE



CHORD TO ARC OFFSET (APPROACH SLAB)

(LT. & RT. OUTSIDE EDGE OF APPROACH SLABS) (TYP.)
(END BENT 1 APP SLAB SHOWN, END BENT 2 APP SLAB SIMILAR)
FOR ADDITIONAL APPROACH SLAB INFORMATION,
SEE APPROACH SLAB SHEETS

LEFT SIDE OF APP. SLAB IS COINCIDENT W/O.S. EDGE OF SUPERSTRUCTURE

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ARC OFFSETS

(LEFT LANE)

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DRAWN BY : V. T. THOMPSON DATE : 06/16/19
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DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19756 MELINDA B. ISENHOUR SENIOR
10/25/2021

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SPAN A

FRAMING PLAN

* ALONG CENTERLINE BOLT HOLES FOR INTERMEDIATE DIAPHRAGM (TYP.)

** ALONG FILL FACE (TYP.)

NOTES:

(E1) DENOTES ELASTOMETRIC BEARING. (SEE "ELASTOMETRIC BEARING DETAILS" SHEET)

SEE TYPICAL SECTION FOR INTEGRAL END BENT DETAILS

ALL DIMENSIONS ARE VERTICAL OR HORIZONTAL UNLESS NOTED OTHERWISE.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

(LEFT LANE)

REVISIONS						SHEET NO.
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SEAL 049756 — NORTH CAROLINA PROFESSIONAL ENGINEER — MELINDA B. ISENHOUR
10/25/2021

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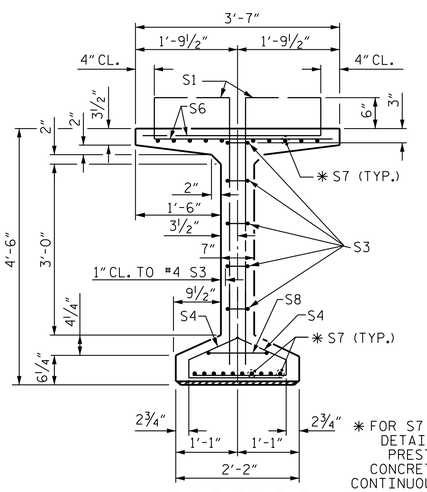
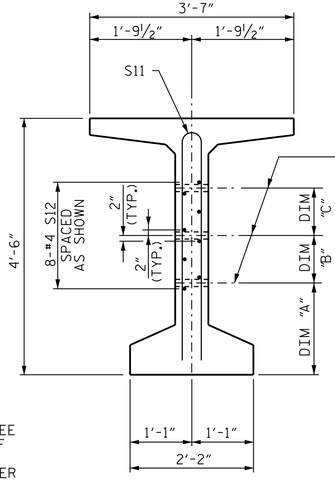


✱ FOR S7 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION B-B

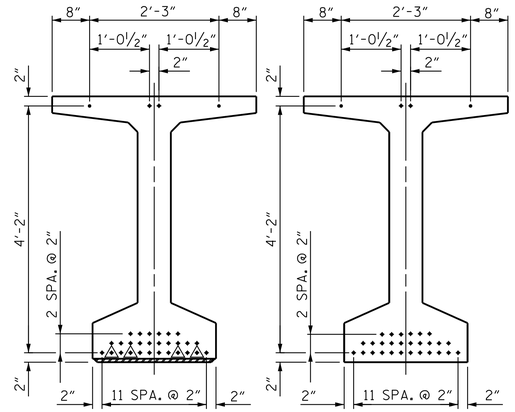


SECTION C-C

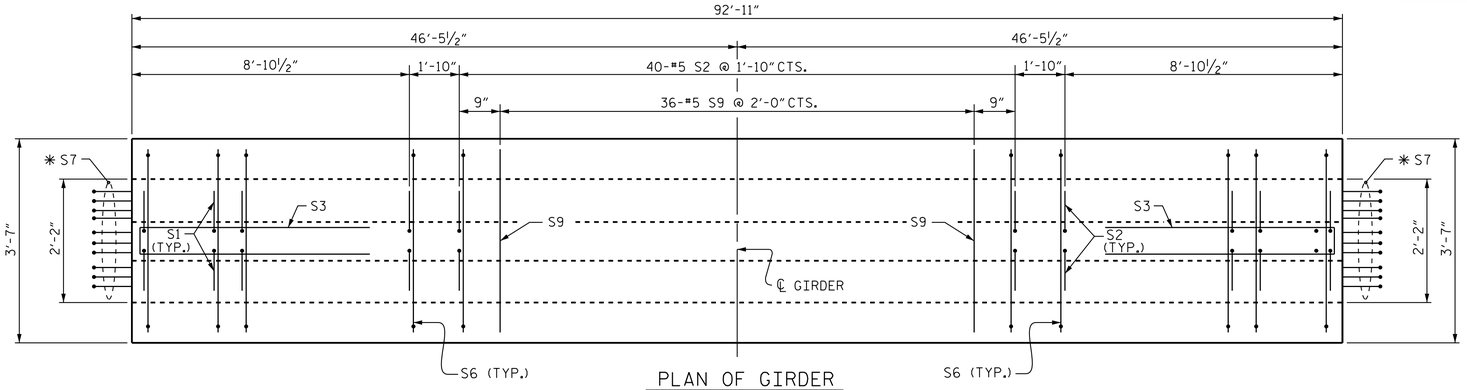
(S2, S6 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

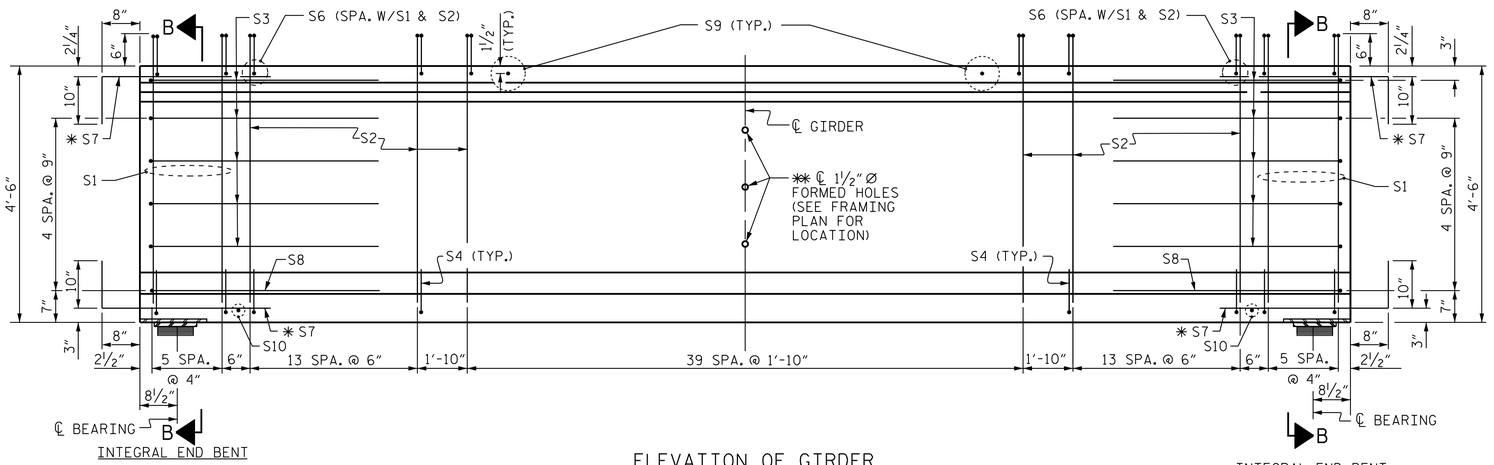
- ● FULLY BONDED STRANDS
- △ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER



0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

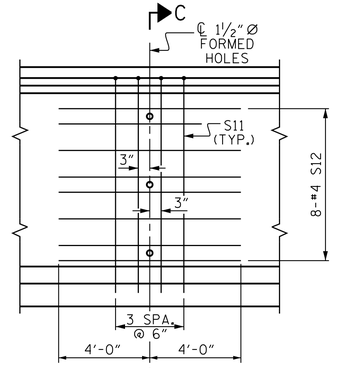


INTEGRAL END BENT

INTEGRAL END BENT

ELEVATION OF GIRDER

✱✱ FOR LOCATION, SEE "INTERMEDIATE STEEL DIAPHRAGM" SHEET FOR DIM "A", DIM "B", & DIM "C"



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

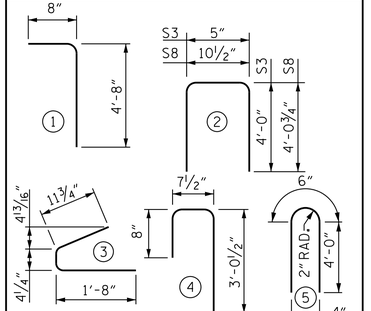
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	24	#6	1	5'-4"	193
S2	136	#5	1	5'-4"	757
S3	10	#4	2	8'-5"	57
S4	80	#4	3	3'-0"	161
S6	160	#5	4	4'-4"	724
✱ S7	40	#5	STR.	3'-8"	153
S8	2	#5	2	9'-0"	19
S9	36	#5	STR.	3'-3"	123
S10	2	#3	STR.	1'-10"	2
S11	4	#5	5	8'-6"	36
S12	8	#4	STR.	8'-0"	43

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER	2,268	16.9	32

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	92'-11"	371'-8"

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

54" MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD PRESTRESSED CONCRETE GIRDER

(LEFT LANE)

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DRAWN BY : V. T. THOMPSON DATE : 05/06/19
CHECKED BY : N. D'AIUTO DATE : 09/04/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
Digitally signed by
10/25/2021

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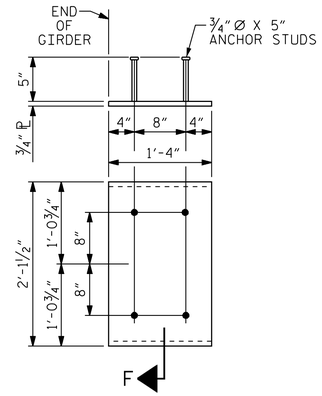
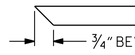


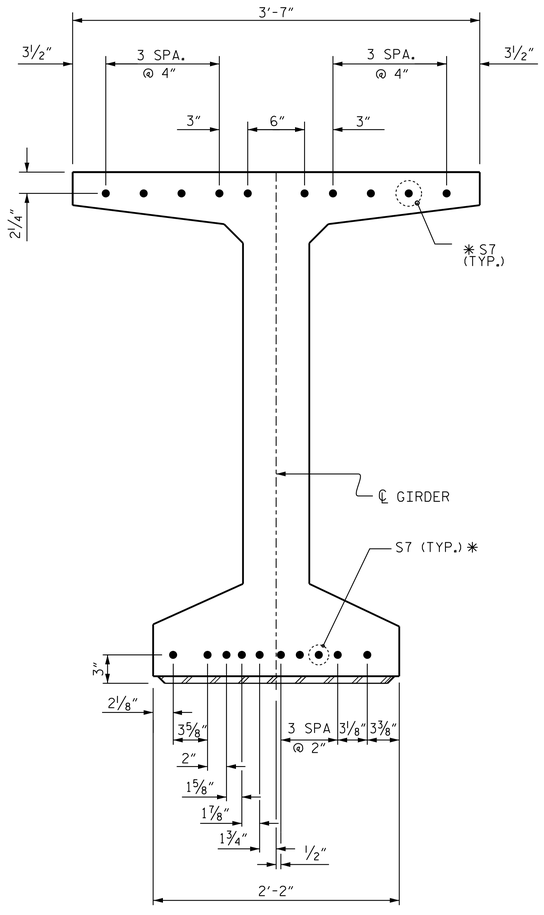
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO 54" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)



DETAIL "C"

(FOR 54" MODIFIED BULB TEES)

✱ SEE NOTE ON SHT. 1 OF 2

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.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,300 PSI.

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

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

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 54" MODIFIED BULB TEES ONLY.

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. SEE STANDARD SPECIFICAIONS FOR CALCIUM NITRITE CORROSION INHIBITOR.

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

(LEFT LANE)

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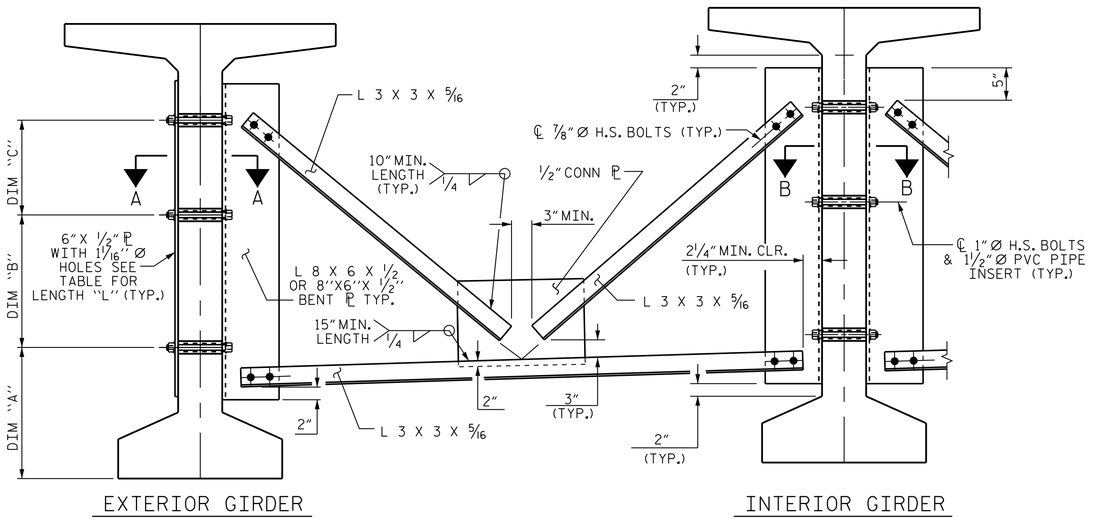
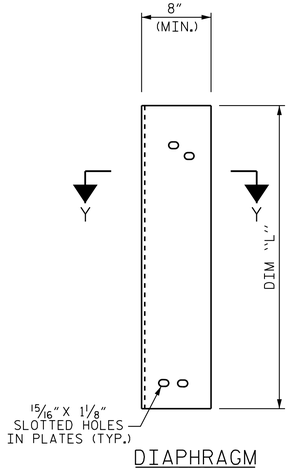
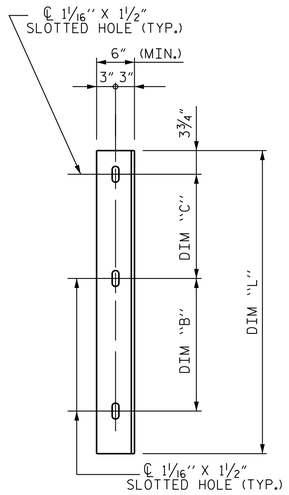


PART SECTION AT INTERMEDIATE DIAPHRAGM

(54" BULB TEE GIRDER SHOWN)



DIAPHRAGM FACE



WEB FACE

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.

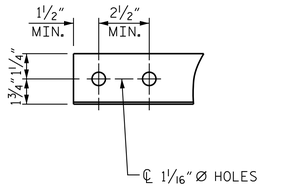
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW. COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

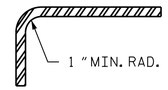
TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
54" BULB TEE	1'-4 1/2"	1'-0"	1'-0"	2'-8"



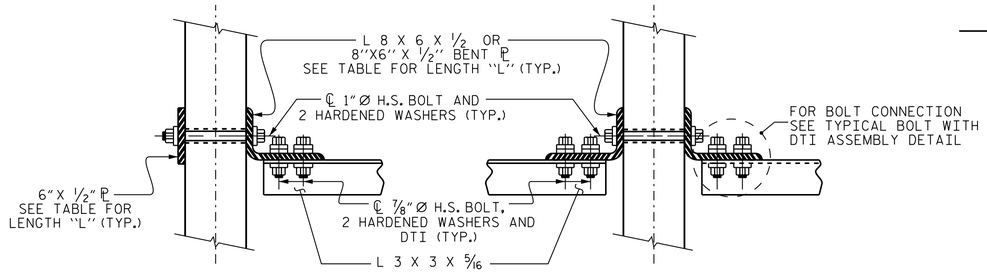
ANGLE END

(L 3 X 3 X 5/16)



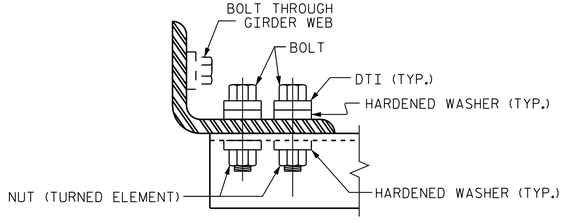
SECTION Y-Y

CONNECTOR PLATE DETAIL



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INTERMEDIATE STEEL DIAPHRAGMS FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

(LEFT LANE)

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DRAWN BY : V. T. THOMPSON DATE : 05/12/19
CHECKED BY : N. D'AIUTO DATE : 06/12/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14976 MARK B. ISENHOUR
DocuSigned by: Mark B. Isenhour
10/25/2021

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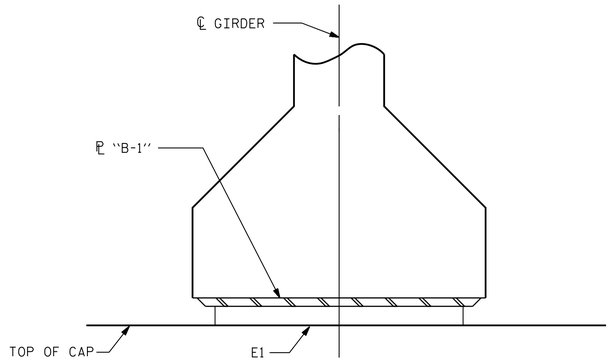

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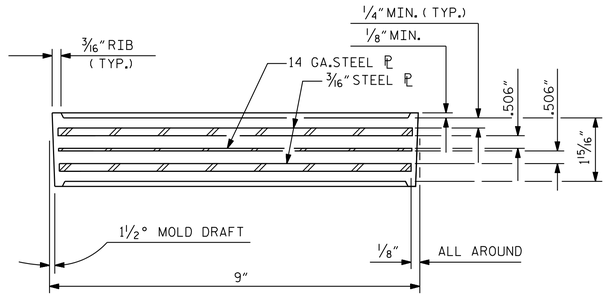
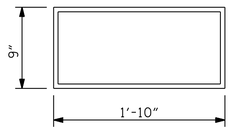
SECTION E-E



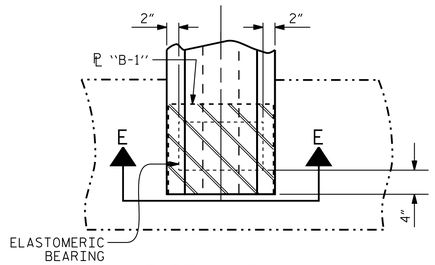
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



TYPICAL PLAN

(SHOWING INTEGRAL END BENT)

NOTES

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

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

PROJECT NO. R-3300B

PENDER COUNTY

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ASSEMBLED BY : V. T. THOMPSON	DATE : 06/11/19		
CHECKED BY : N. D'AIUTO	DATE : 06/11/19		
DRAWN BY : WJH 8/89	REV. 6/13	AAC/MAA	DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21
CHECKED BY : CRK 8/89	REV. 1/15	MAA/TMG	
	REV. 12/17	MAA/THC	

10/25/2021

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
(LEFT LANE)

REVISIONS						SHEET NO.
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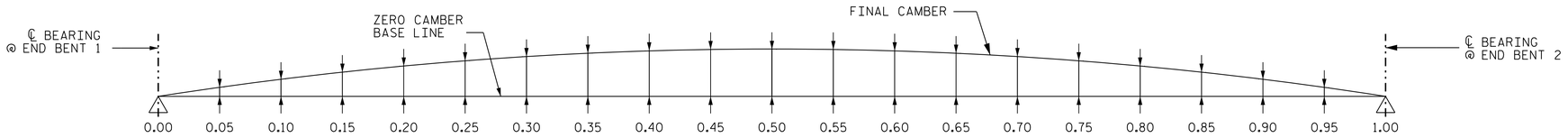
1			3			TOTAL SHEETS
2			4			30

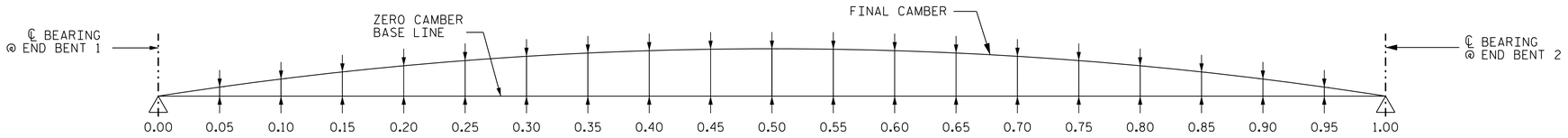
STD. NO. EB3



GIRDER 1

CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.032	0.064	0.094	0.121	0.145	0.166	0.182	0.194	0.202	0.204	0.202	0.194	0.182	0.166	0.145	0.121	0.094	0.064	0.032	0.000
DEFLEC. DUE TO SUPERIMPOSED DL * ↓	0.000	0.020	0.041	0.060	0.079	0.095	0.110	0.120	0.129	0.133	0.136	0.133	0.129	0.120	0.110	0.095	0.079	0.060	0.041	0.020	0.000
FINAL CAMBER ↑	+0"	+1/8"	+5/16"	+7/16"	+1/2"	+5/8"	+11/16"	+3/4"	+3/4"	+13/16"	+13/16"	+13/16"	+3/4"	+3/4"	+11/16"	+5/8"	+1/2"	+7/16"	+5/16"	+1/8"	+0"

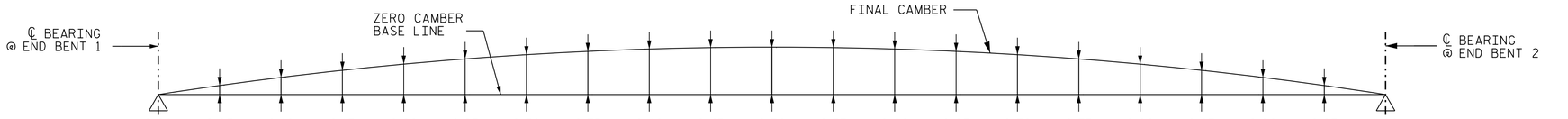
* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.



GIRDER 2 & 3

CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.032	0.064	0.094	0.121	0.145	0.166	0.182	0.194	0.202	0.204	0.202	0.194	0.182	0.166	0.145	0.121	0.094	0.064	0.032	0.000
DEFLEC. DUE TO SUPERIMPOSED DL * ↓	0.000	0.023	0.046	0.067	0.089	0.107	0.124	0.135	0.146	0.150	0.154	0.150	0.146	0.135	0.124	0.107	0.089	0.067	0.046	0.023	0.000
FINAL CAMBER ↑	+0"	+1/8"	+1/4"	+5/16"	+3/8"	+7/16"	+1/2"	+9/16"	+9/16"	+5/8"	+5/8"	+5/8"	+9/16"	+9/16"	+1/2"	+7/16"	+3/8"	+5/16"	+1/4"	+1/8"	+0"

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.



GIRDER 4

CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.032	0.064	0.094	0.121	0.145	0.166	0.182	0.194	0.202	0.204	0.202	0.194	0.182	0.166	0.145	0.121	0.094	0.064	0.032	0.000
DEFLEC. DUE TO SUPERIMPOSED DL * ↓	0.000	0.019	0.038	0.056	0.074	0.088	0.102	0.111	0.120	0.123	0.126	0.123	0.120	0.111	0.102	0.088	0.074	0.056	0.038	0.019	0.000
FINAL CAMBER ↑	+0"	+3/16"	+5/16"	+7/16"	+9/16"	+11/16"	+3/4"	+7/8"	+7/8"	+15/16"	+15/16"	+15/16"	+7/8"	+7/8"	+3/4"	+11/16"	+9/16"	+7/16"	+5/16"	+3/16"	+0"

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES (SPAN A)

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER (OR DEFLECTION)" WHICH IS SHOWN IN INCHES.

(+) FINAL CAMBER INDICATES NET UPWARD DISPLACEMENT.

(-) FINAL CAMBER INDICATES NET DOWNWARD DISPLACEMENT.

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DRAWN BY : V. T. THOMPSON DATE : 06/11/19
CHECKED BY : N. D'AIUTO DATE : 06/11/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049561 ENGINEER MARK B. ISENHOUR
DocuSigned by: Mark Isenhour
10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

(LEFT LANE)

REVISIONS						SHEET NO.
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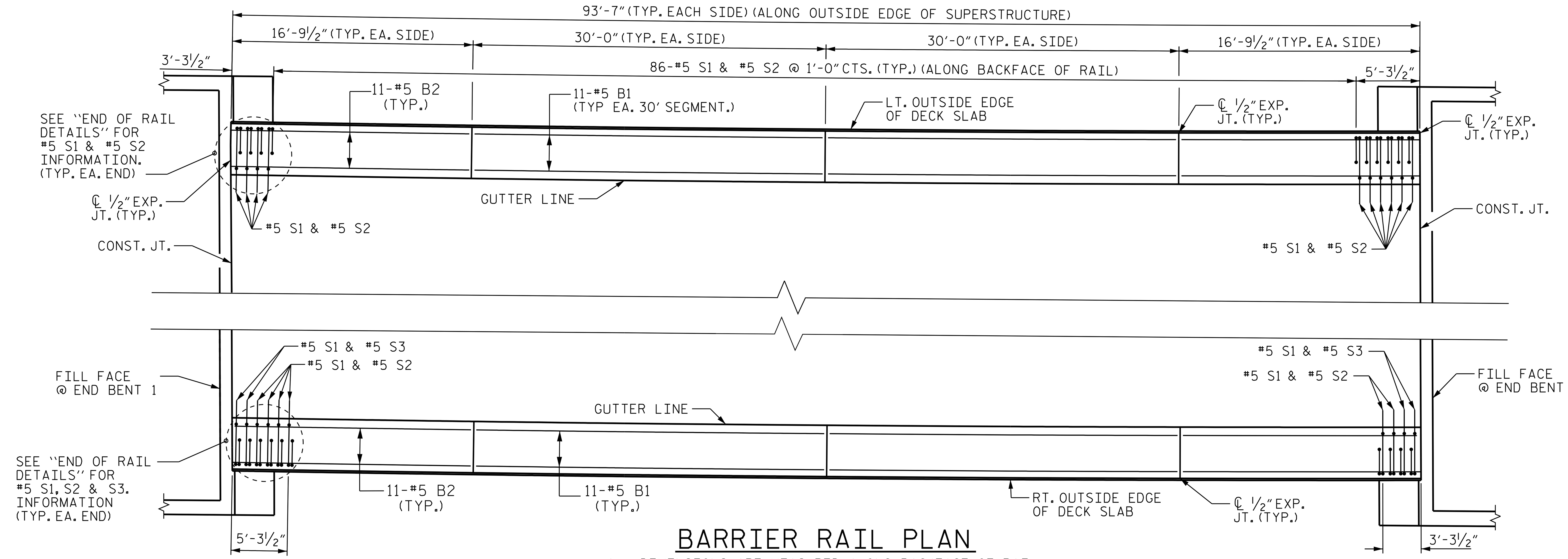


BARRIER RAIL PLAN

ALL DIMENSIONS ARE MEASURED ALONG BACKFACE OF RAIL

SOUND ABSORPTIVE BARRIER WALL POSTS NOT SHOWN FOR CLARITY. FOR SOUND ABSORPTIVE BARRIER WALL LAYOUT, SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" DETAILS SHEET.

NOTES

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

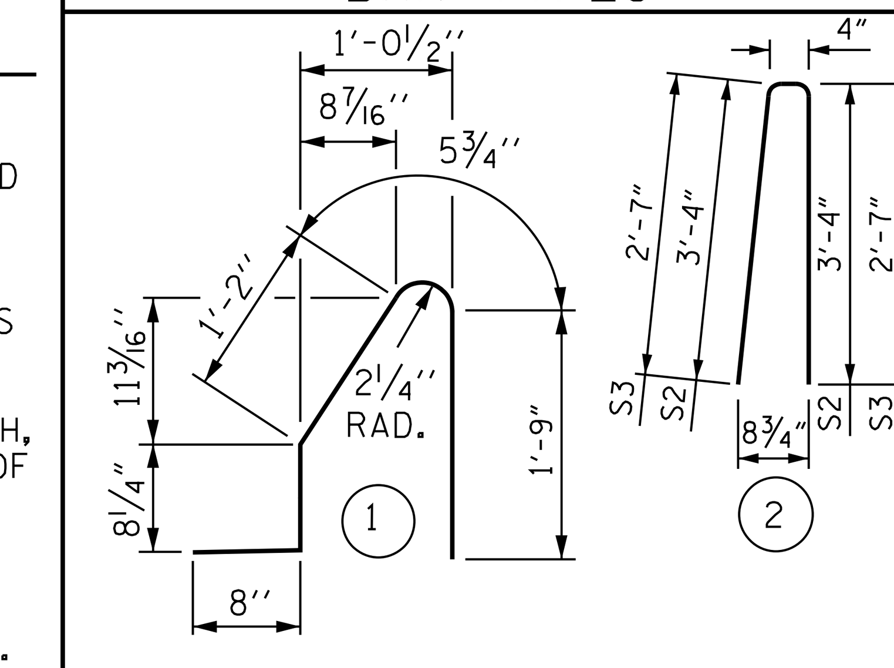
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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.

BARRIER RAIL ON APP. SLAB IS NOT INCLUDED IN QUANTITY TABLE.

FOR BARRIER RAIL ON APPROACH SLAB, SEE APPROACH SLAB SHT. 1 OF 2.

BAR TYPES



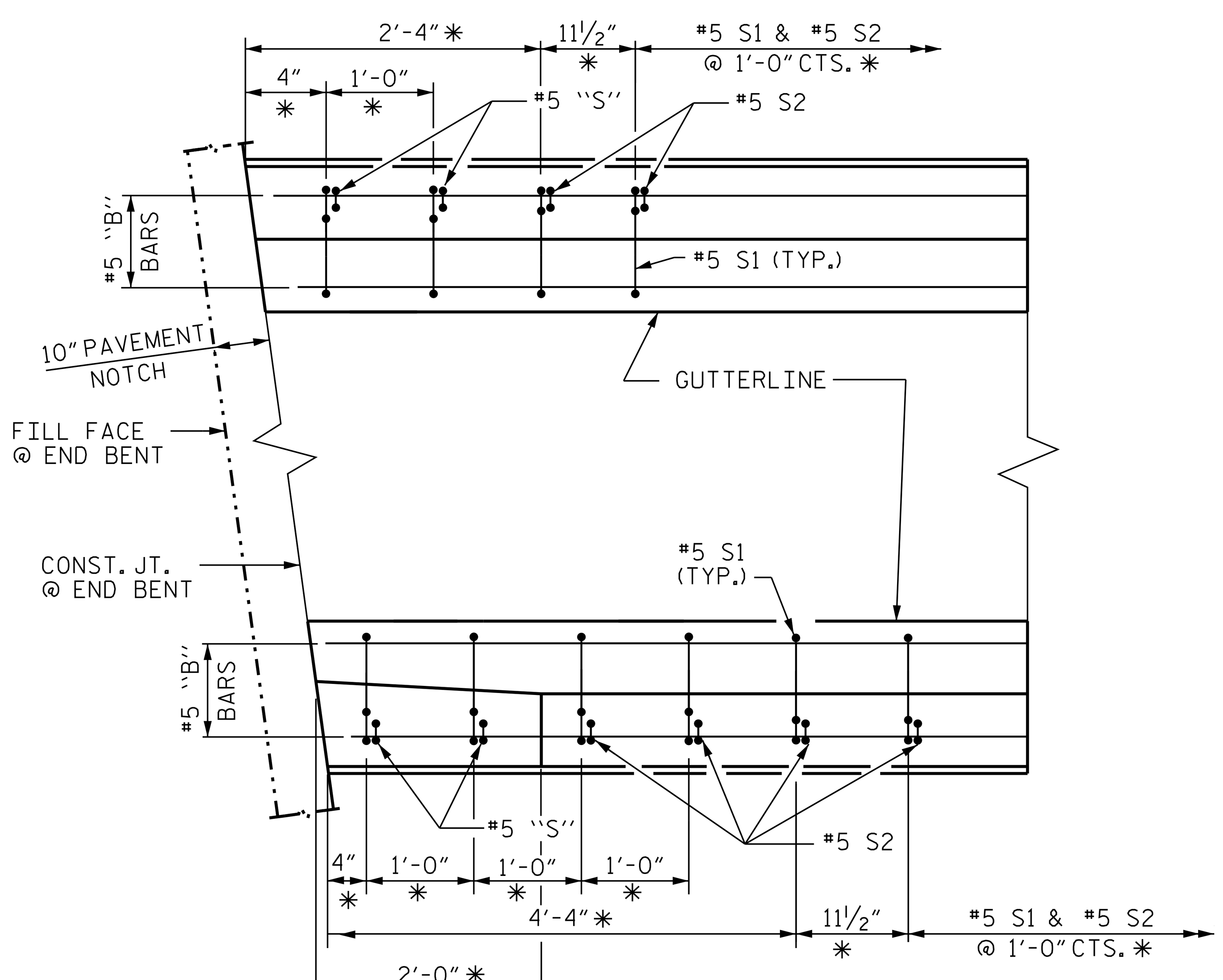
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

CONCRETE BARRIER RAIL ON BRIDGE ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	29'-7"	1358
* B2	44	#5	STR	16'-5"	754
* S1	188	#5	1	4'-9"	932
* S2	184	#5	2	7'-0"	1343
* S3	4	#5	2	5'-6"	23

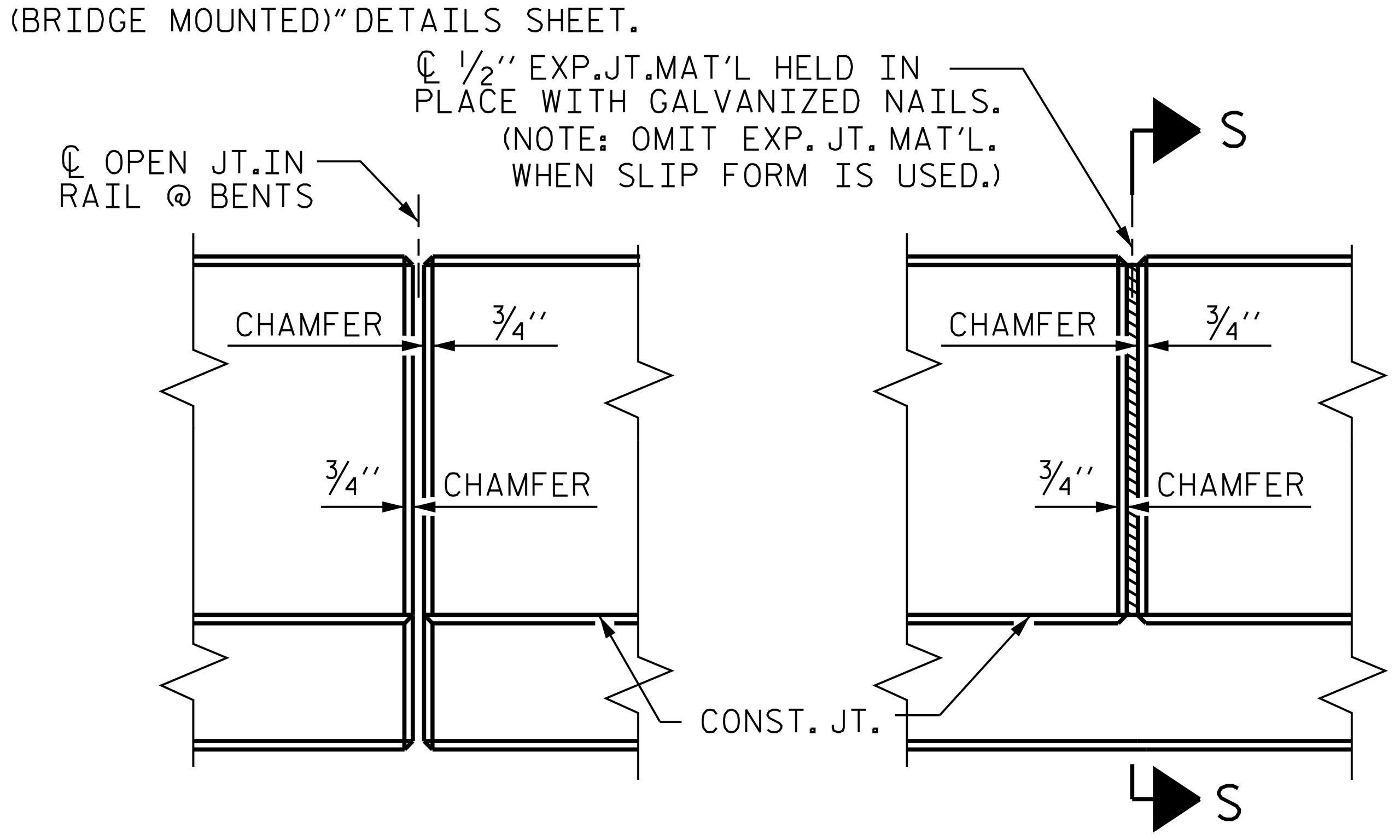
* EPOXY COATED REINFORCING STEEL	4,387 LBS.
CLASS AA CONCRETE	25.7 CU. YDS.
CONCRETE BARRIER RAIL	187.17 LIN. FT.



PLAN

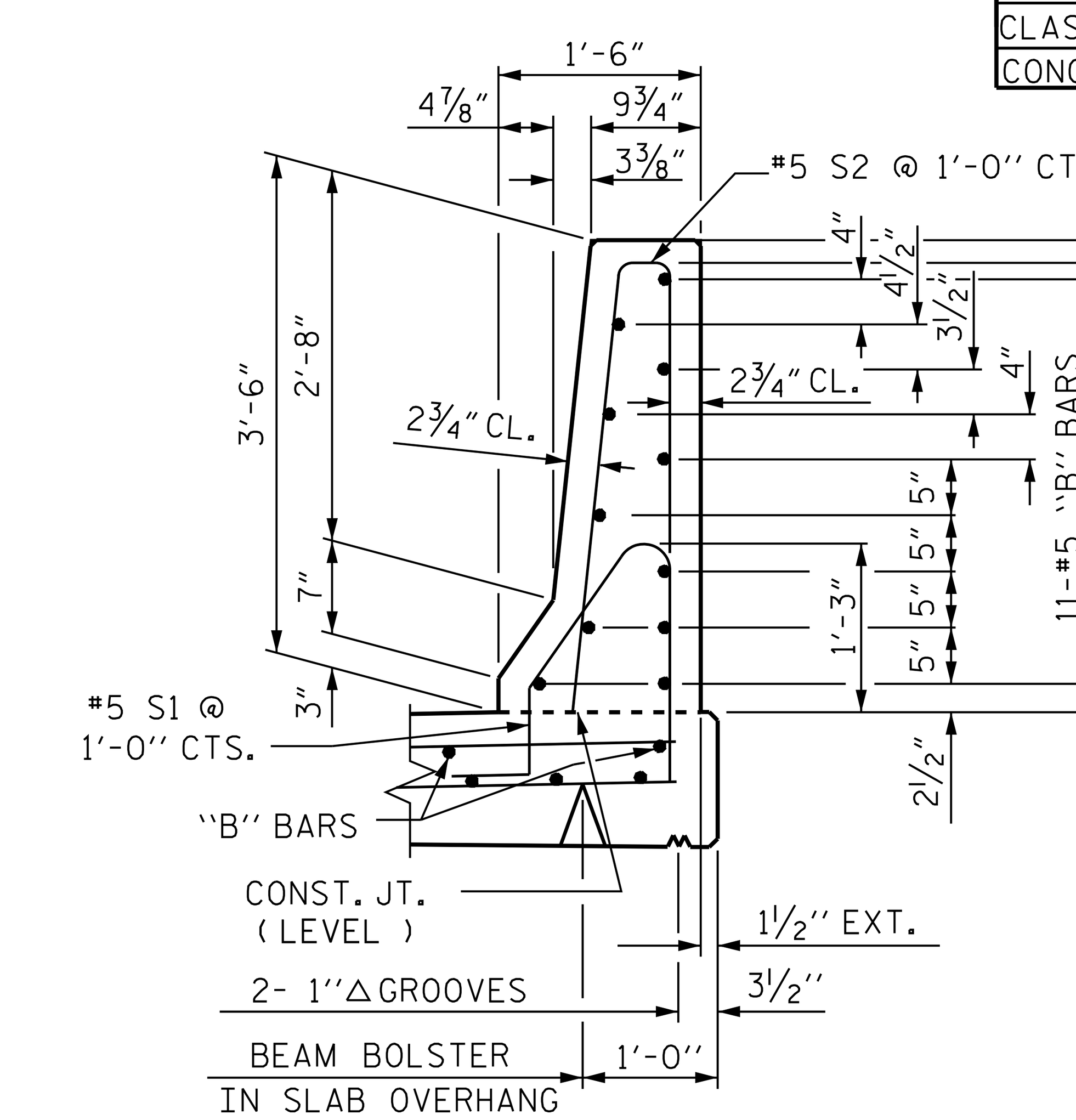
* ALONG BACKFACE OF RAIL

END BENT 1 SHOWN. END BENT 2 SIMILAR BY ROTATION, WITH EXCEPTION OF BEVELED END (AS SHOWN IN "END OF RAIL DETAILS"), WHICH IS ON BOTH ENDS OF RT. SIDE BARRIER RAIL AT END BENT 1 AND END BENT 2. SEE BARRIER RAIL PLAN ABOVE, FOR LOCATION OF #5 S1, #5 S2 & #5 S3.

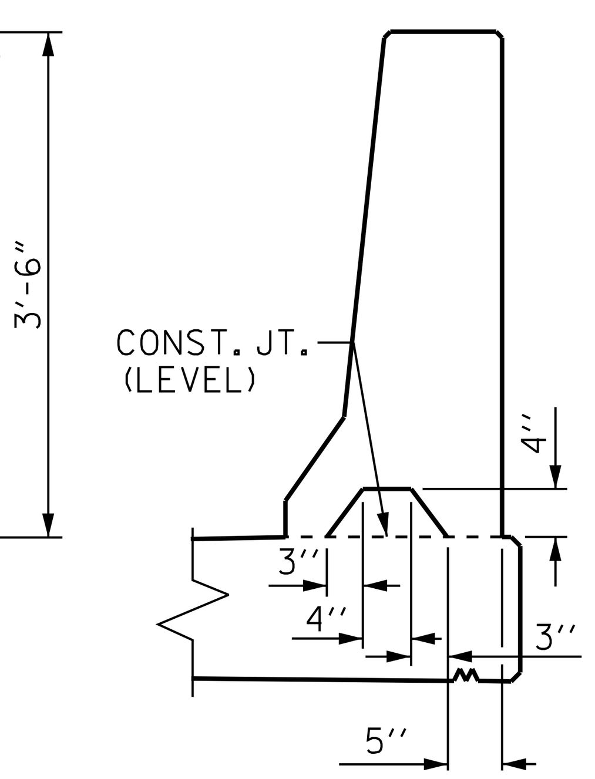


ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

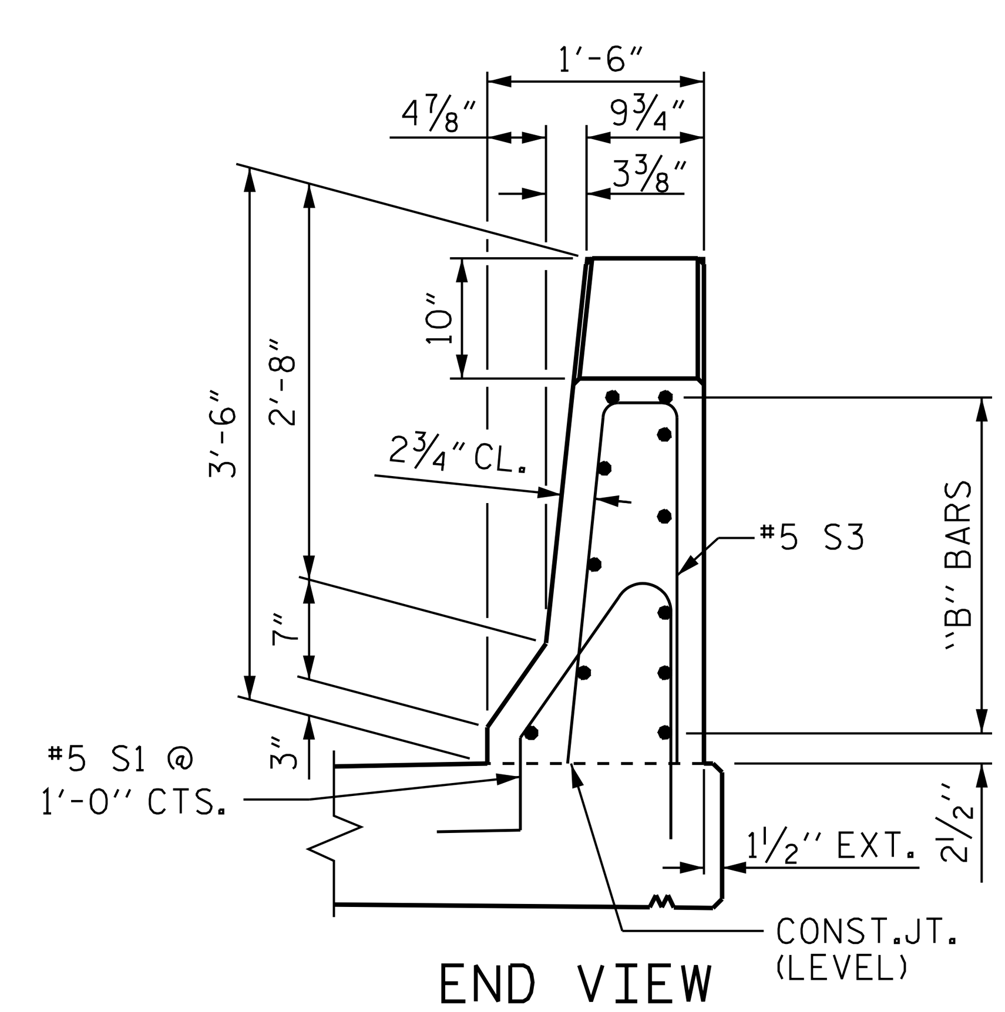


SECTION THRU RAIL

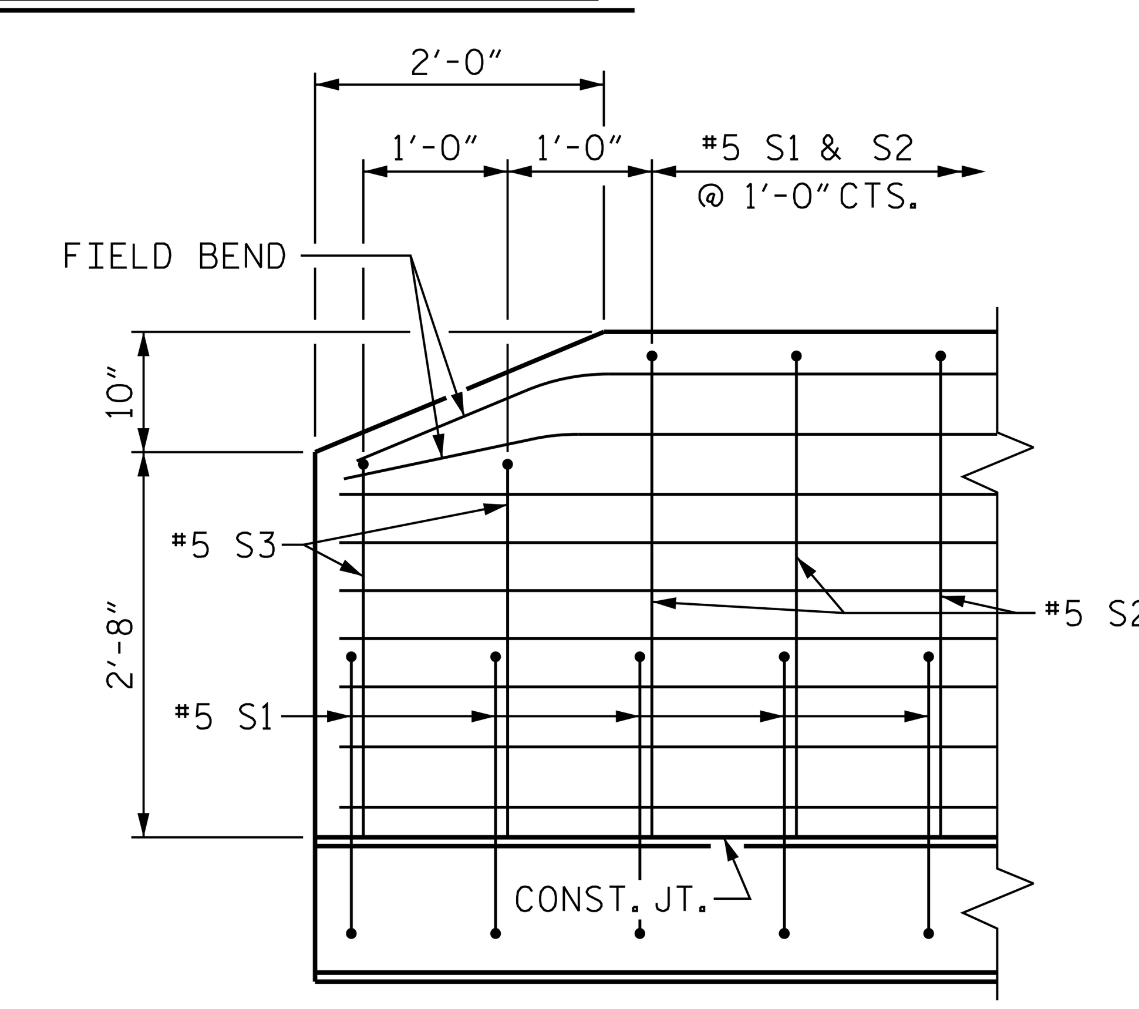


SECTION S-S

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



END VIEW



SIDE VIEW

END OF RAIL DETAILS

APPLICABLE TO EA. END OF THE RT. SIDE OF BRIDGE ONLY.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE BARRIER RAIL

(LEFT LANE)

10/25/2021

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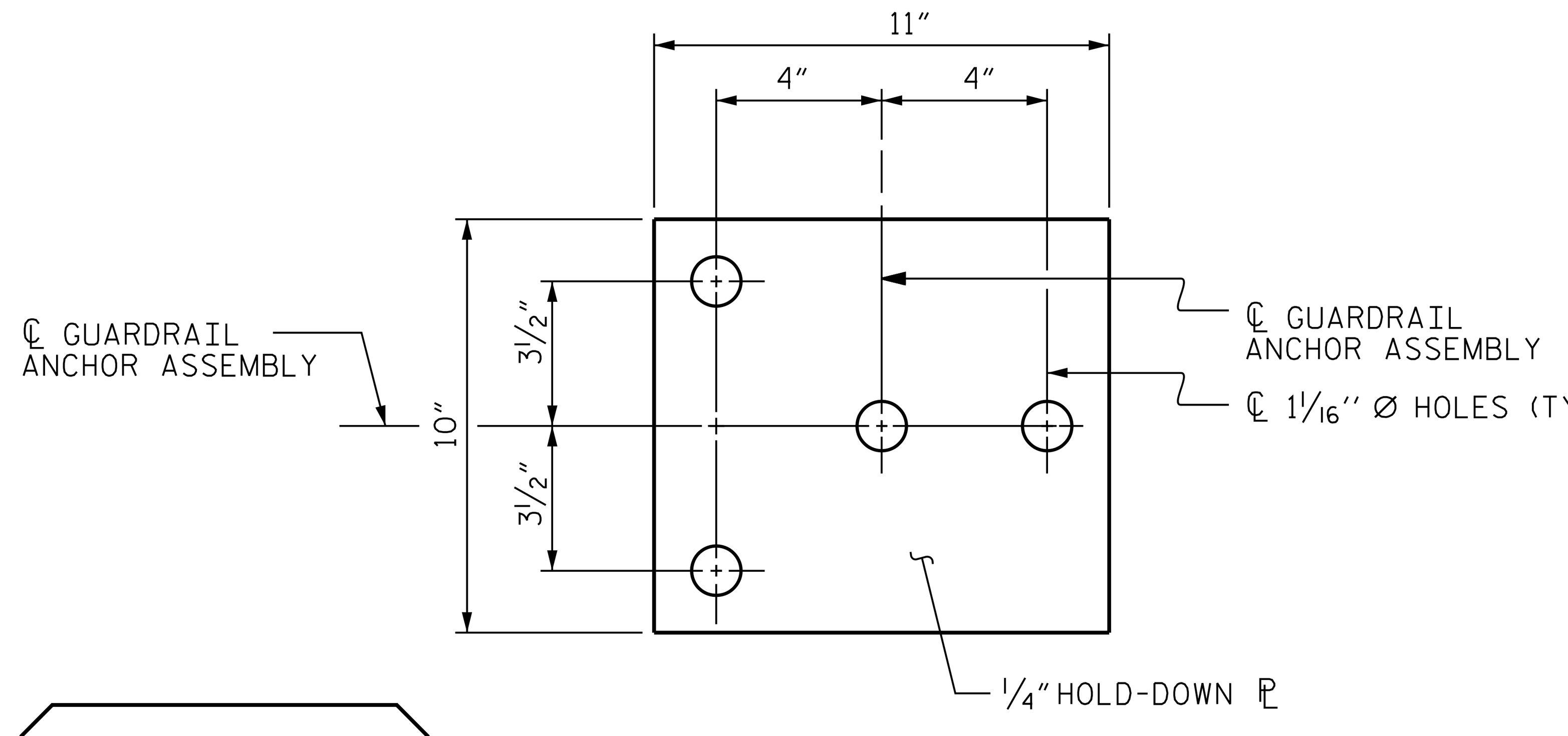
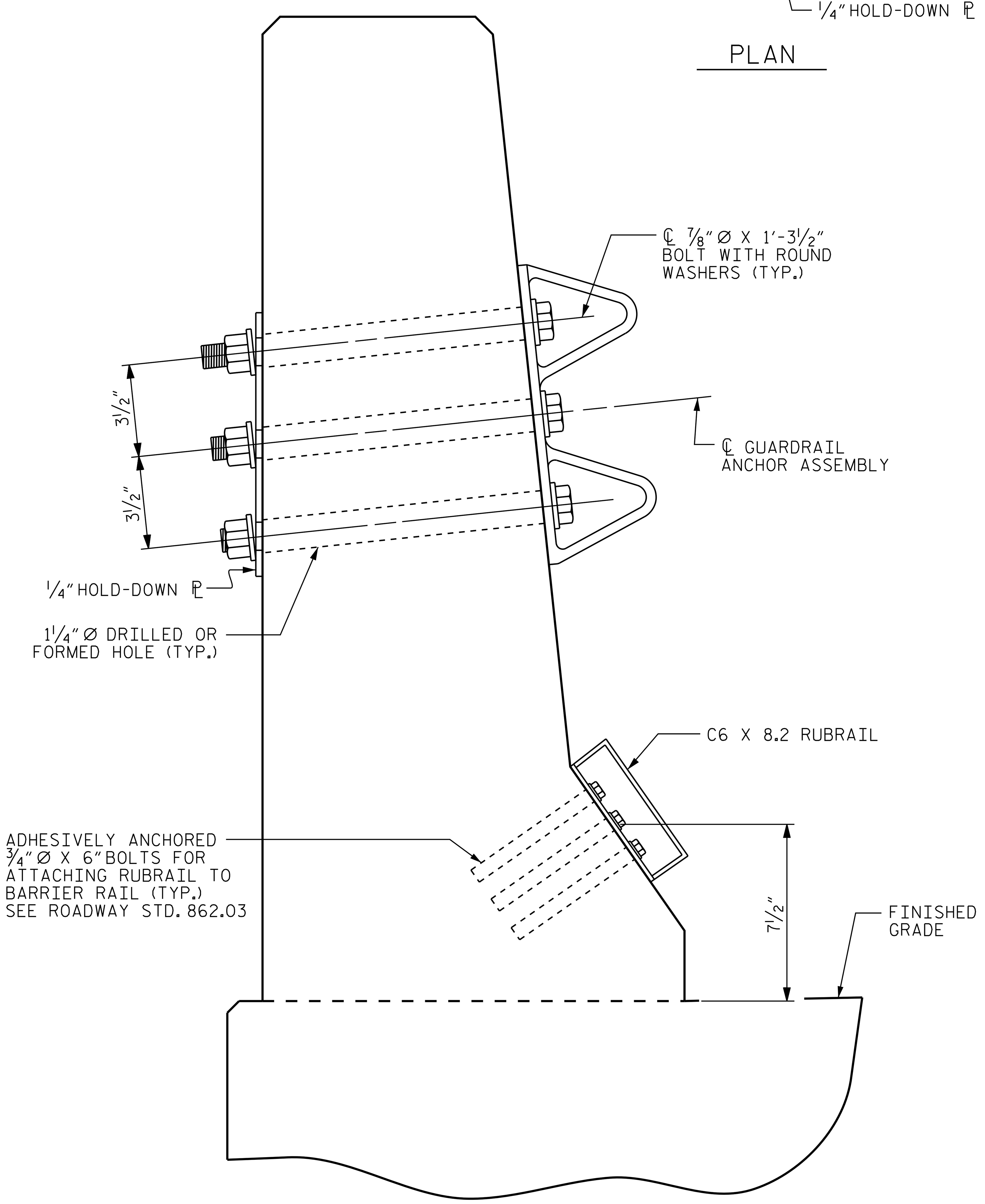
DRAWN BY: V. T. THOMPSON DATE: 06/12/19
CHECKED BY: N. D'AIUTO DATE: 06/12/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE: 10/25/21

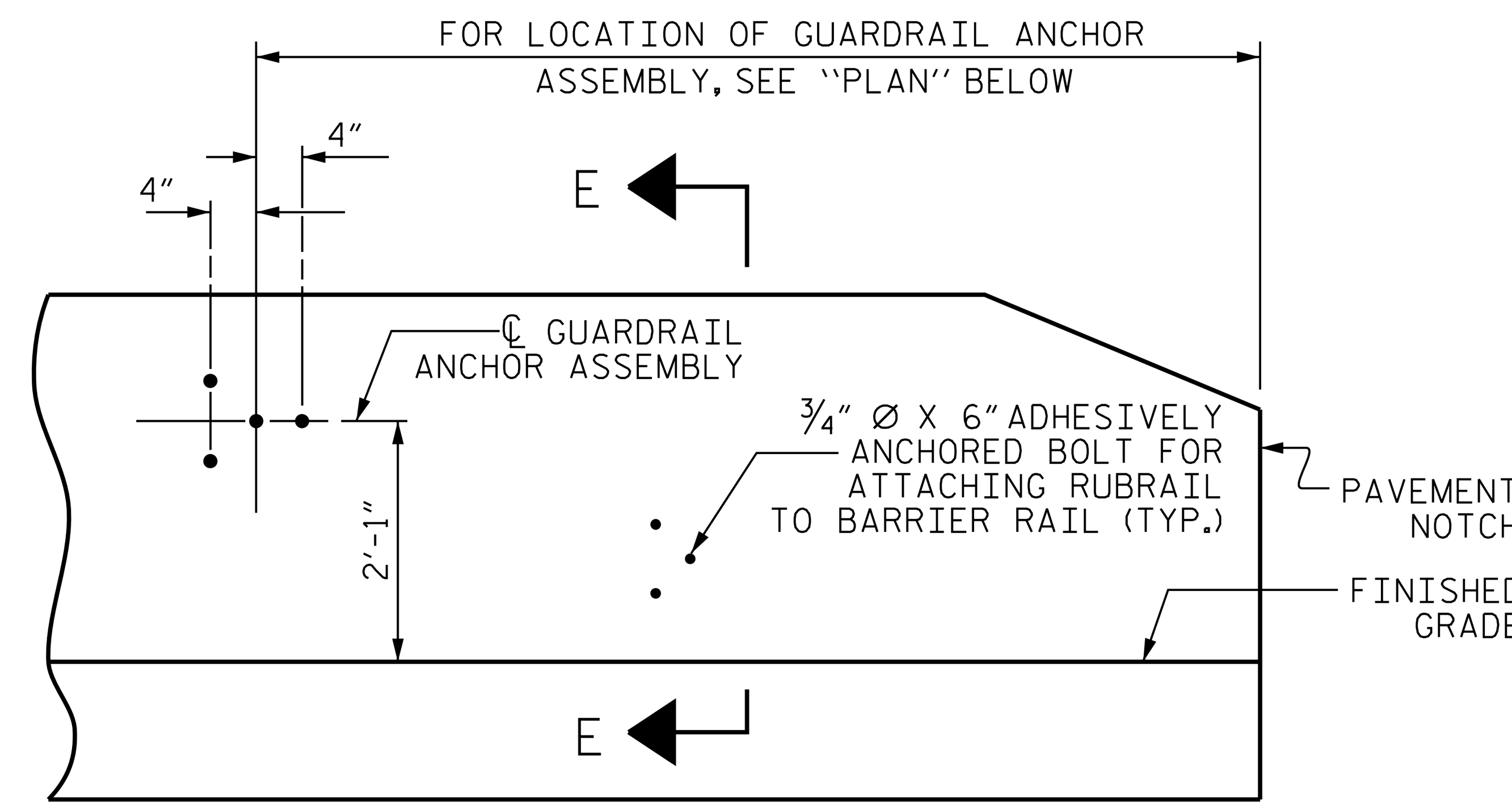


PLAN



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



ELEVATION

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.)

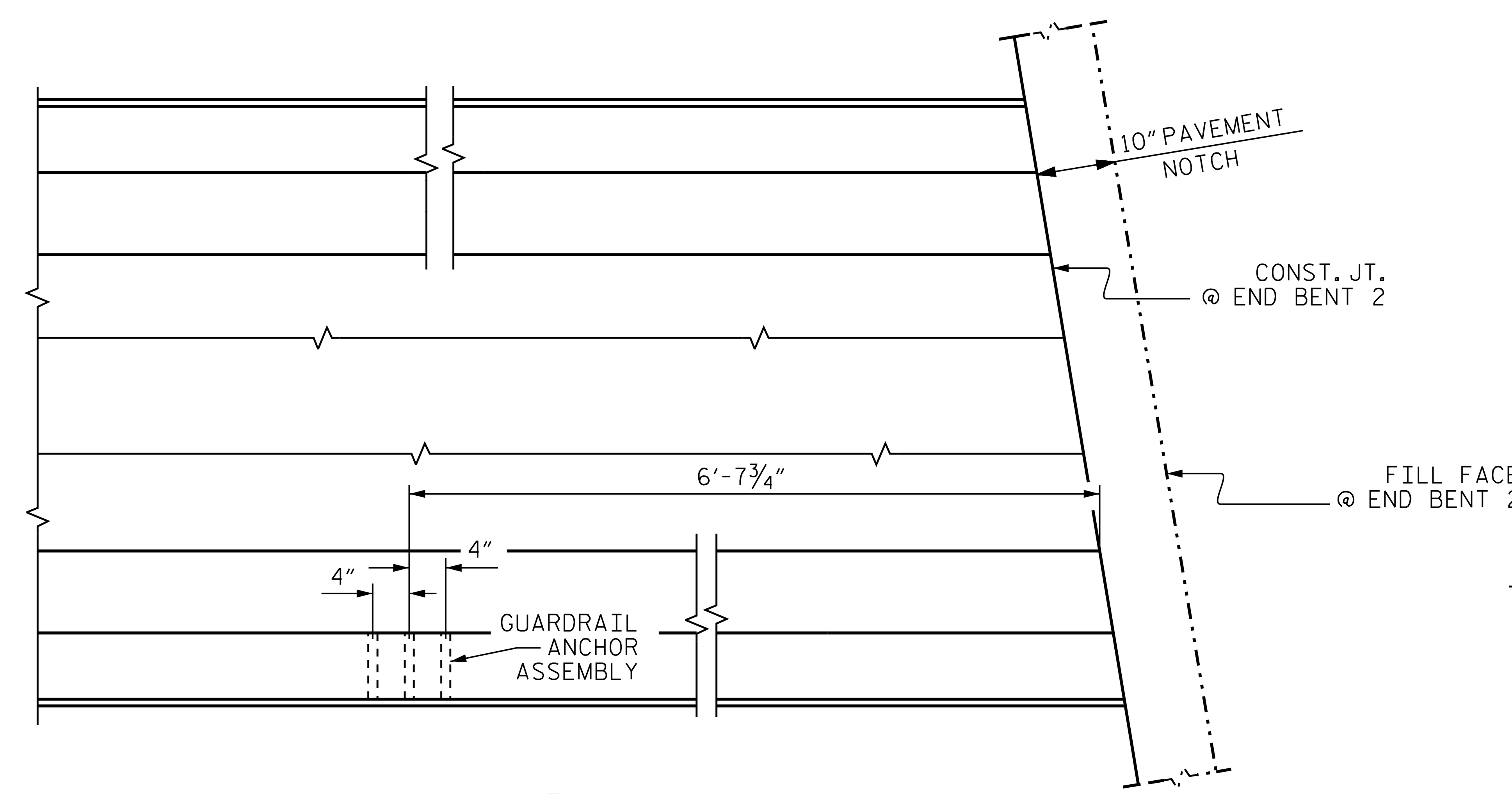
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

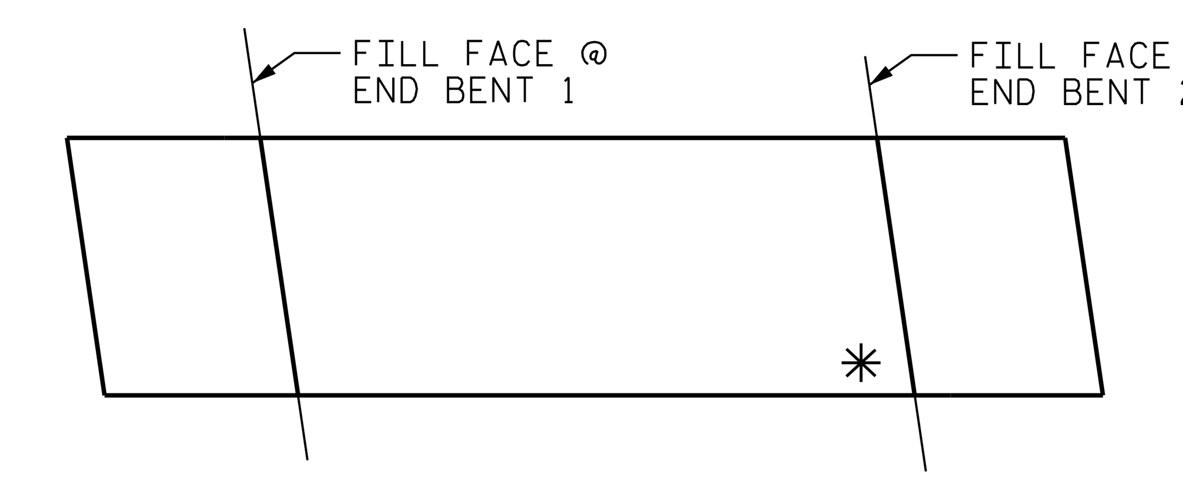
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4″ Ø X 6″ BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4″ Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 2 SHOWN, NO GUARDRAIL ATTACHMENT ON LT. SIDE.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

(LEFT LANE)

REVISIONS							SHEET NO.
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SEAL 049750 — NORTH CAROLINA PROFESSIONAL ENGINEER — LINDA B. ISENHOUR — 10/25/2021

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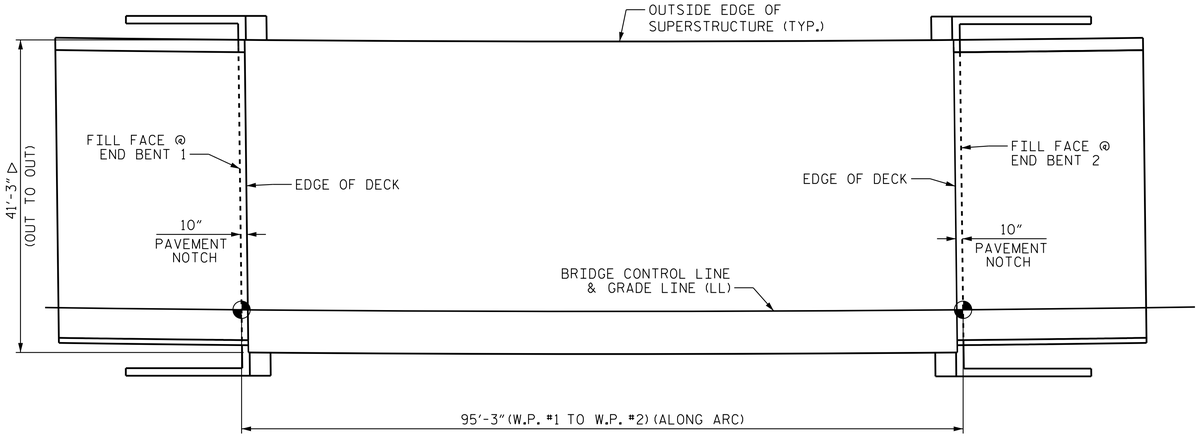
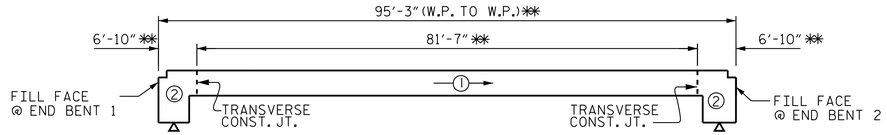
DRAWN BY : V. T. THOMPSON DATE : 05/12/19
CHECKED BY : N. D'AIUTO DATE : 09/06/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 3,929)

△ DENOTES RADIAL DIMENSIONS

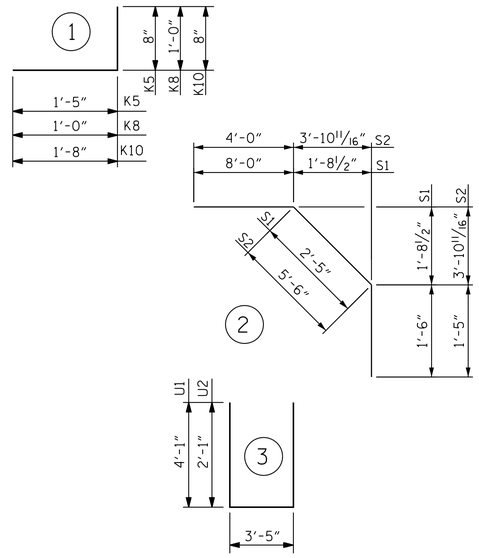


POURING SEQUENCE

** DENOTES ALONG ARC

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	186	#5	STR	40'-11"	7,938
A2	186	#5	STR	40'-11"	7,938
✳ A101	1	#5	STR	25'-1"	27
A201	1	#5	STR	25'-1"	27
✳ B1	58	#5	STR	47'-10"	2,894
B2	84	#5	STR	47'-8"	4,177
✳ B3	100	#5	STR	19'-1"	1991
✳ B4	48	#5	STR	25'-1"	1256
K1	20	#4	STR	21'-3"	284
K2	6	#4	STR	7'-7"	31
K3	18	#4	STR	10'-7"	128
K4	6	#4	STR	9'-0"	37
K5	2	#4	1	2'-1"	3
K6	6	#4	STR	2'-11"	12
K7	2	#4	STR	2'-2"	3
K8	2	#4	1	2'-0"	3
K9	6	#4	STR	2'-6"	11
K10	2	#4	1	2'-4"	4
✳ S1	82	#4	2	11'-11"	653
✳ S2	48	#4	2	10'-11"	351
U1	54	#4	3	11'-7"	418
U2	16	#4	3	7'-7"	82

REINFORCING STEEL	13,158	LBS
✳ EPOXY COATED REINFORCING STEEL	15,110	LBS

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

BAR SIZE	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"			

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	118.5	13,158	15,110
POUR #2	68.4		
TOTALS **	186.9	13,158	15,110

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,692 SQ.FT.
BRIDGE DECK	3,264 SQ.FT.
TOTAL	4,956 SQ.FT.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BILL OF MATERIAL

(LEFT LANE)

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DRAWN BY : J. F. KENNEDY DATE : 06/17/19
CHECKED BY : N. D'AIUTO DATE : 09/05/19

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
10/25/2021

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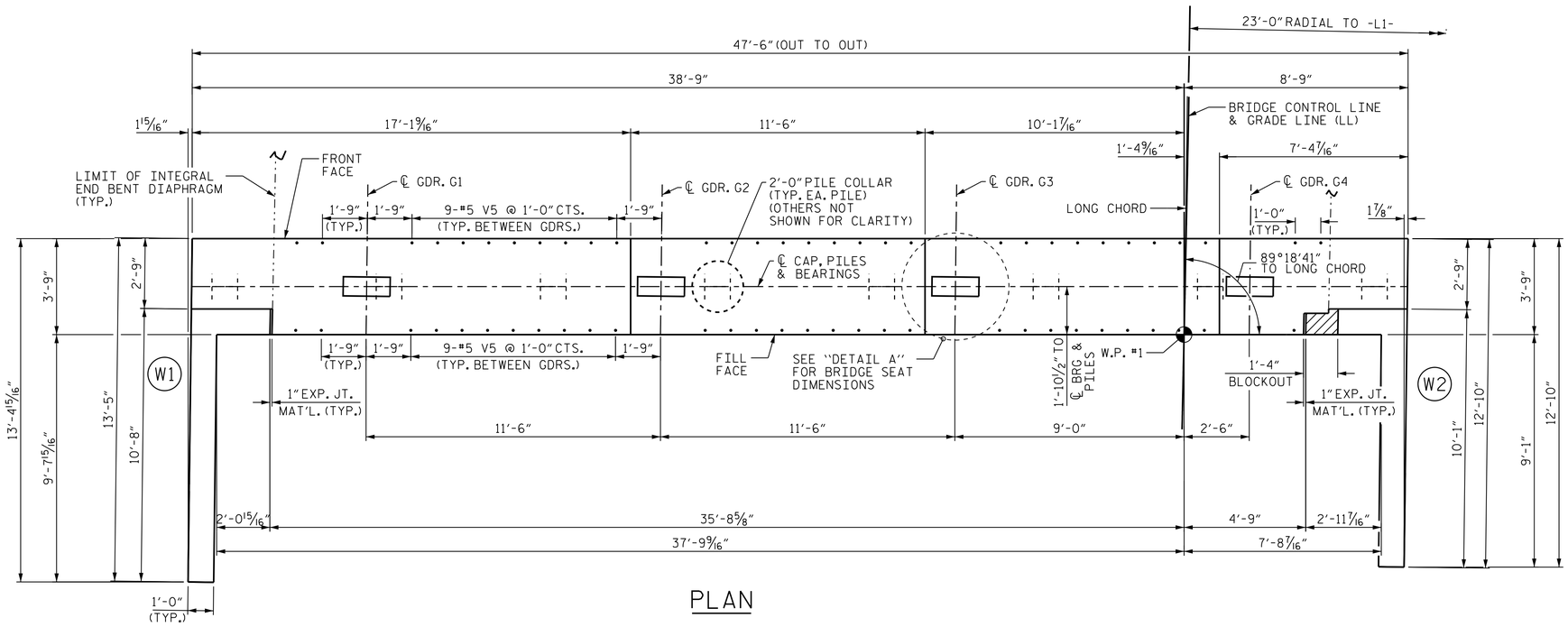


PLAN

NOTES

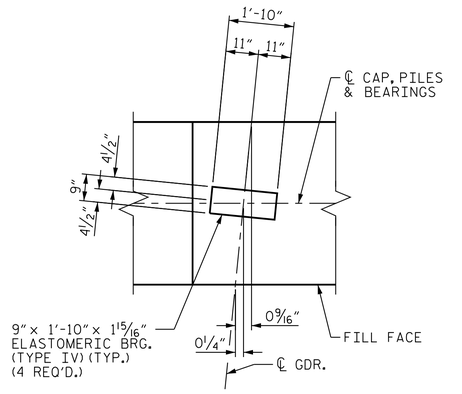
STIRRUPS IN CAP MAY BE SLIGHTY SHIFTED AS NECESSARY ANY CONFLICTS WITH OTHER REINFORCING STEEL.

2 BR DENOTES 2 BAR RUN

SEE "END BENT 1 DETAILS", SHEET 3 OF 3, FOR SECTION A-A

SEE SHEET 2 OF 3 FOR WING WALL DETAILS.

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



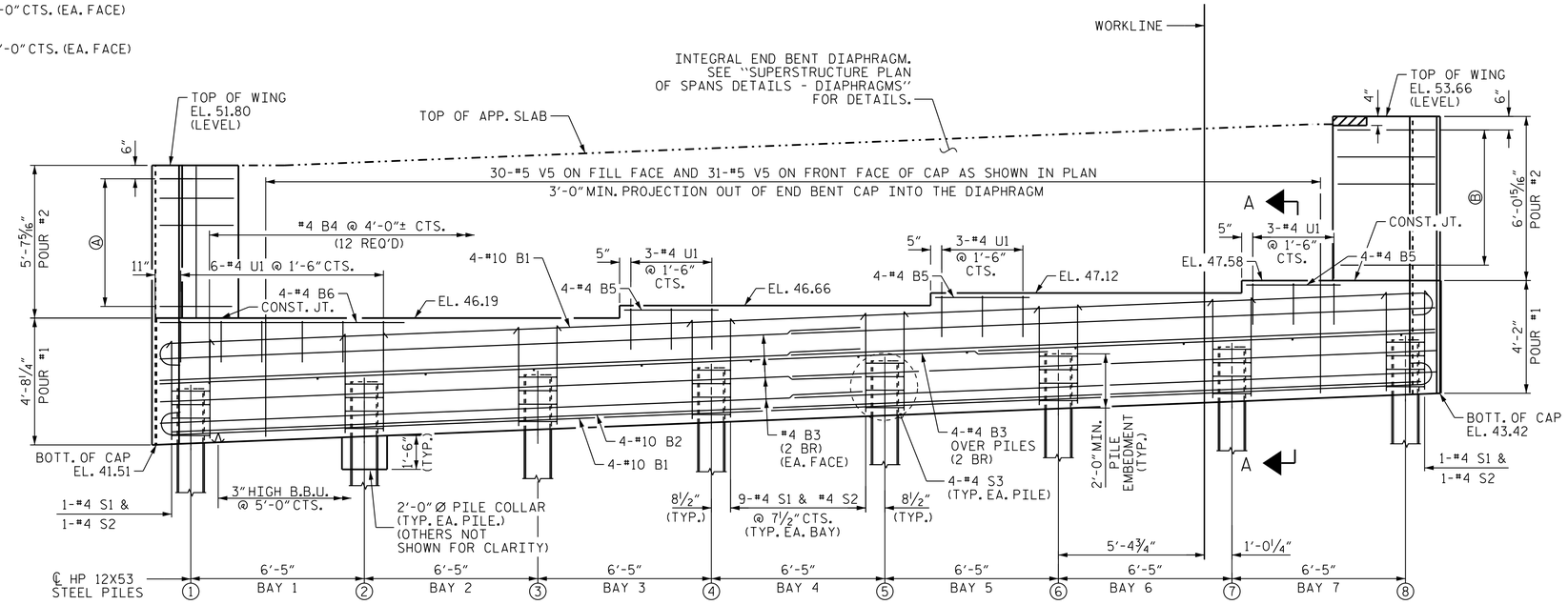
DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING

AT THE CONTRACTORS OPTION, THE BEARING CAN BE PLACED PARALLEL TO THE ℄ CAP.

Ⓐ 6-#4 K1 @ 1'-0" CTS. (EA. FACE)

Ⓑ 6-#4 K2 @ 1'-0" CTS. (EA. FACE)



ELEVATION

SEE MIN. SPLICE CHART FOR SPLICE LENGTH

MIN. SPLICE	
#4 B3	2'-5"

TOP OF PILE ELEVATIONS	
PILE #	ELEVATION
1	43.58
2	43.84
3	44.10
4	44.36
5	44.61
6	44.87
7	45.13
8	45.39

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 3

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License No. F-0672

DRAWN BY : N. D'AIUTO DATE : 08/14/19

CHECKED BY : M. B. ISENHOUR DATE : 09/24/19

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

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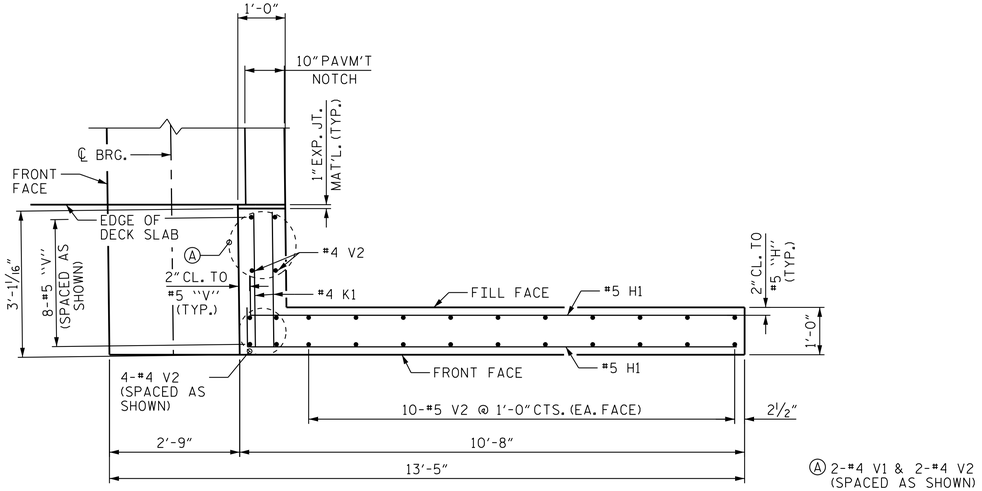
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 1

(LEFT LANE)

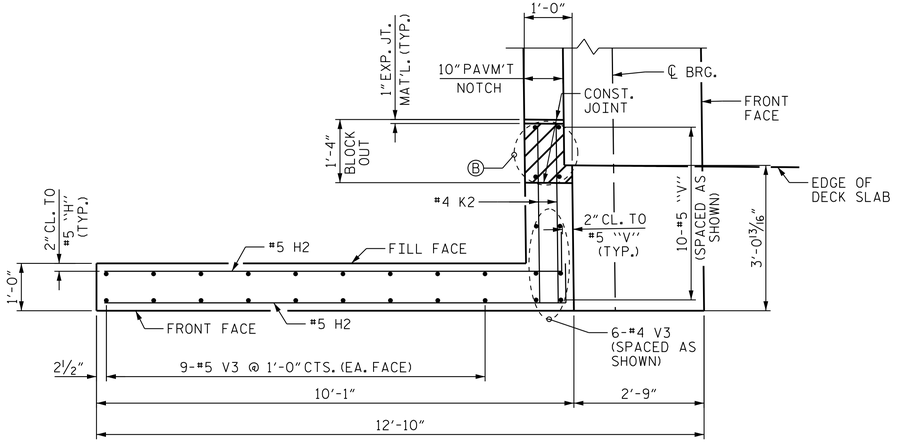
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-21
1			3			TOTAL SHEETS
2			4			30



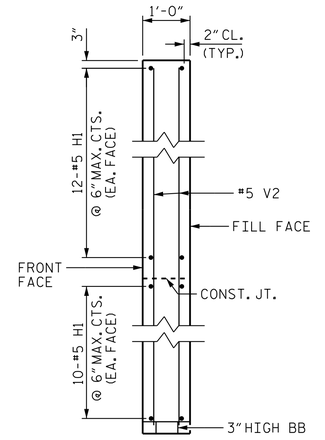
Ⓐ 2-#4 V1 & 2-#4 V2 (SPACED AS SHOWN)

Ⓑ 4-#4 V4 (SPACED AS SHOWN)

PLAN OF LEFT WING (W1)

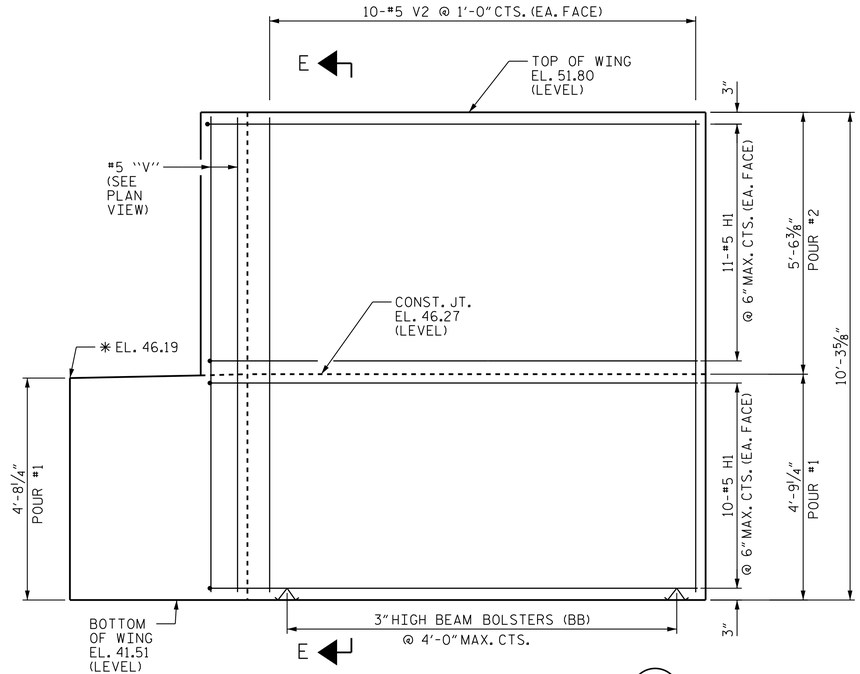


PLAN OF RIGHT WING (W2)



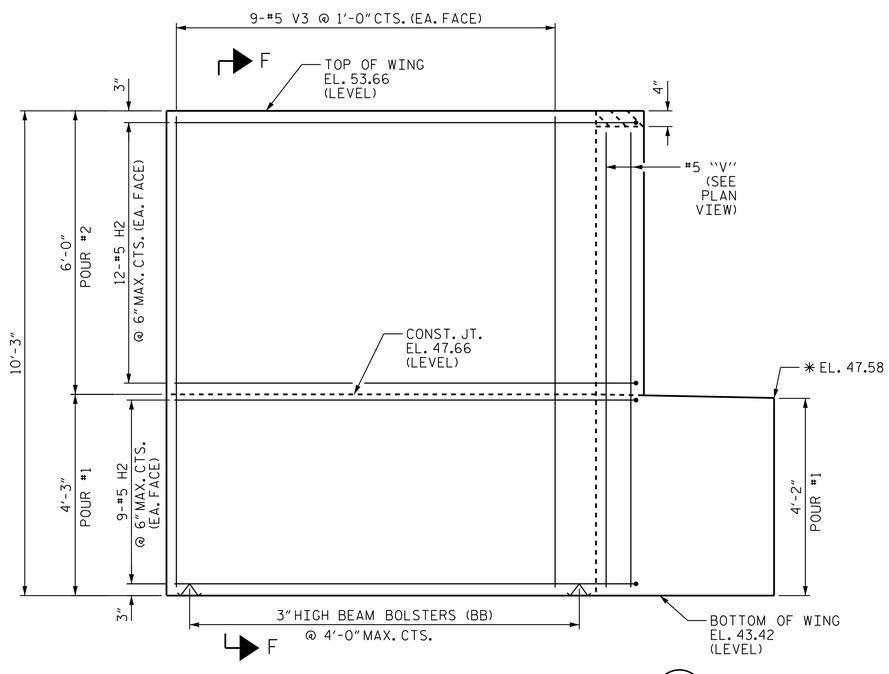
SECTION E-E

#4 "K" BARS NOT SHOWN FOR CLARITY



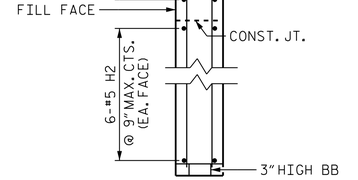
ELEVATION OF LEFT WING (W1)

#4 "K" BARS NOT SHOWN FOR CLARITY



ELEVATION OF RIGHT WING (W2)

#4 "K" BARS NOT SHOWN FOR CLARITY



SECTION F-F

#4 "K" BARS NOT SHOWN FOR CLARITY

NOTES:

* TOP SURFACE OF END BENT CAP BETWEEN EDGE OF DECK SLAB AND END OF CAP SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF 1/4"/FT.

FOR "K" BAR DETAILS, SEE SHT. "END BENT 1".

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License No. F-0672

DRAWN BY : N. D'AIUTO DATE : 08/13/19
CHECKED BY : M. B. ISENHOUR DATE : 09/24/19

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19758 ENGINEER LINDA B. ISENHOUR
Docusigned by: 10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

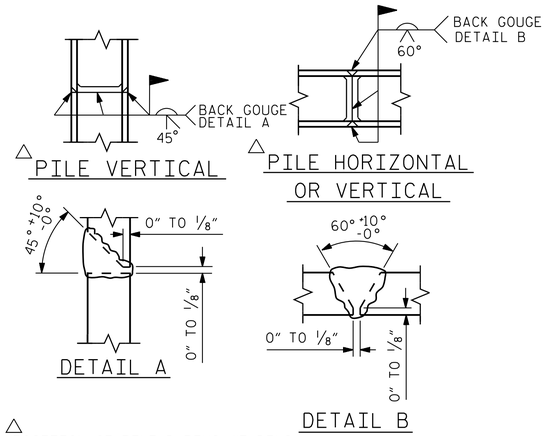
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

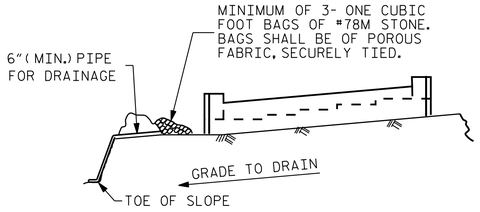
END BENT 1 DETAILS WING WALLS

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-22
1			3			TOTAL SHEETS
2			4			30



PILE SPLICE DETAILS

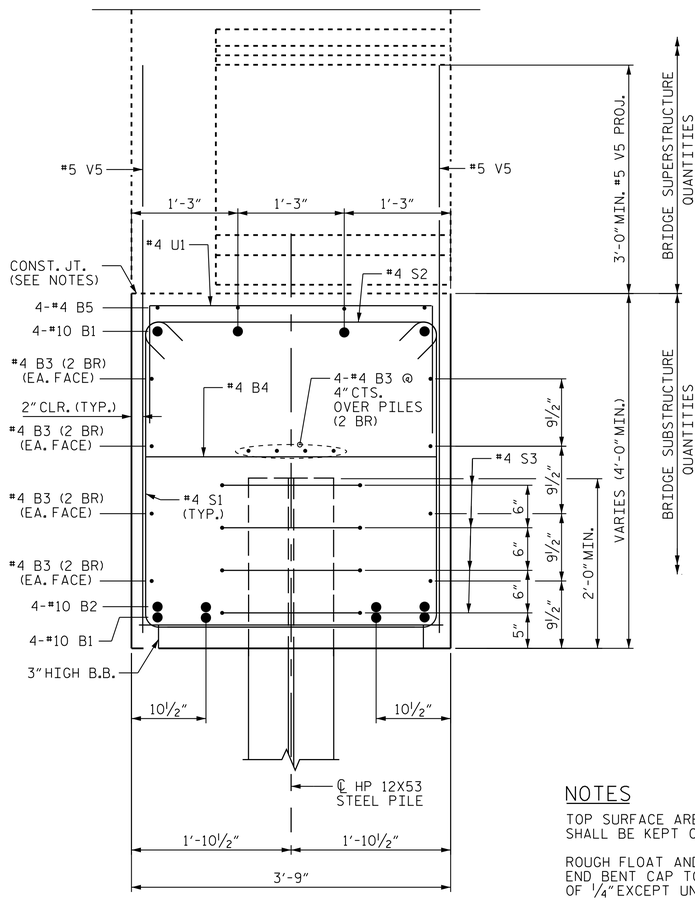


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT



SECTION A-A

SEE "END BENT 1" SHEET 1 OF 3.

PILE COLLAR NOT SHOWN FOR CLARITY.

NOTES

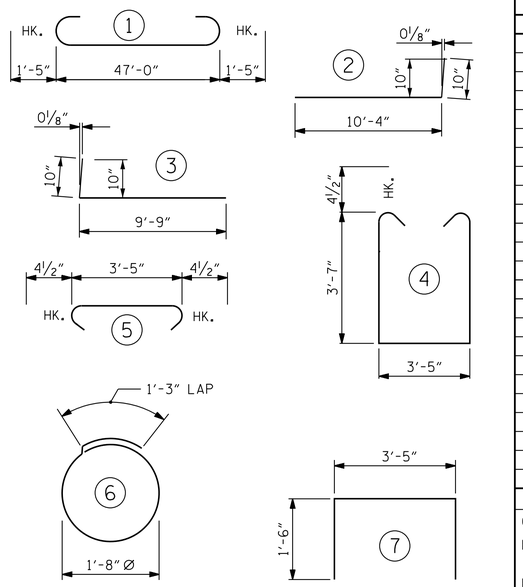
TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP TO PROVIDE MIN. SURFACE AMPLITUDE OF 1/4" EXCEPT UNDER BEARING AREAS.

#10 B1 & #10 B2 BARS IN THE BOTTOM OF CAP ARE BUNDLED.

(2 BR) DENOTES 2 BAR RUN.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

HP 12X53 STEEL PILES	STEEL PILE POINTS	EA. 8
NO: 8 LIN. FT.= 440.00	PILE REDRIVES	EA. 4
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES		EA. 8

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	49'-10"	1716
B2	4	#10	STR	47'-2"	812
B3	24	#4	STR	24'-10"	398
B4	12	#4	STR	3'-5"	28
B5	12	#4	STR	3'-6"	29
B6	4	#4	STR	9'-0"	25
H1	42	#5	2	11'-2"	490
H2	42	#5	3	10'-7"	464
K1	12	#4	STR	2'-9"	23
K2	12	#4	STR	3'-7"	29
S1	65	#4	4	11'-4"	493
S2	65	#4	5	4'-2"	181
S3	32	#4	6	6'-6"	139
U1	15	#4	7	6'-5"	65
V1	2	#5	STR	9'-6"	20
V2	26	#5	STR	9'-10"	267
V3	24	#5	STR	9'-10"	247
V4	4	#5	STR	9'-6"	40
V5	61	#5	STR	7'-3"	462

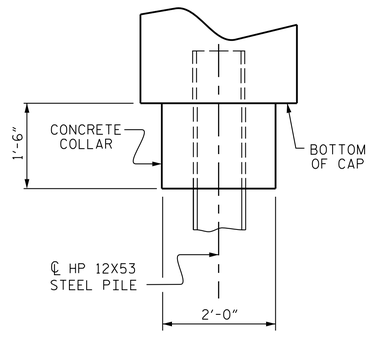
REINFORCING STEEL 5,928 LBS.

CLASS A CONCRETE BREAKDOWN

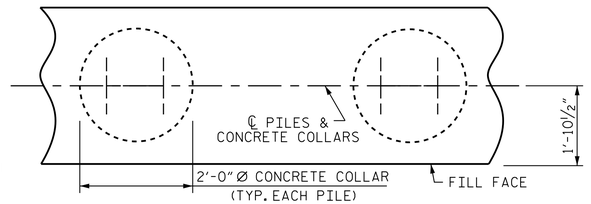
POUR #1 CAP, LOWER PART OF WINGS & COLLARS 32.7 C.Y.

POUR #2 UPPER PART OF WINGS 5.5 C.Y.

TOTAL CLASS A CONCRETE 38.2 C.Y.



ELEVATION



PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 1 DETAILS

(LEFT LANE)

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DRAWN BY : N. D'AIUTO DATE : 08/15/19
CHECKED BY : M. B. ISENHOUR DATE : 09/25/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 040561 ENGINEER MARK BRADLEY ISENHOUR
Digitally signed by
10/25/2021

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REVISIONS						SHEET NO.
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2			4			30

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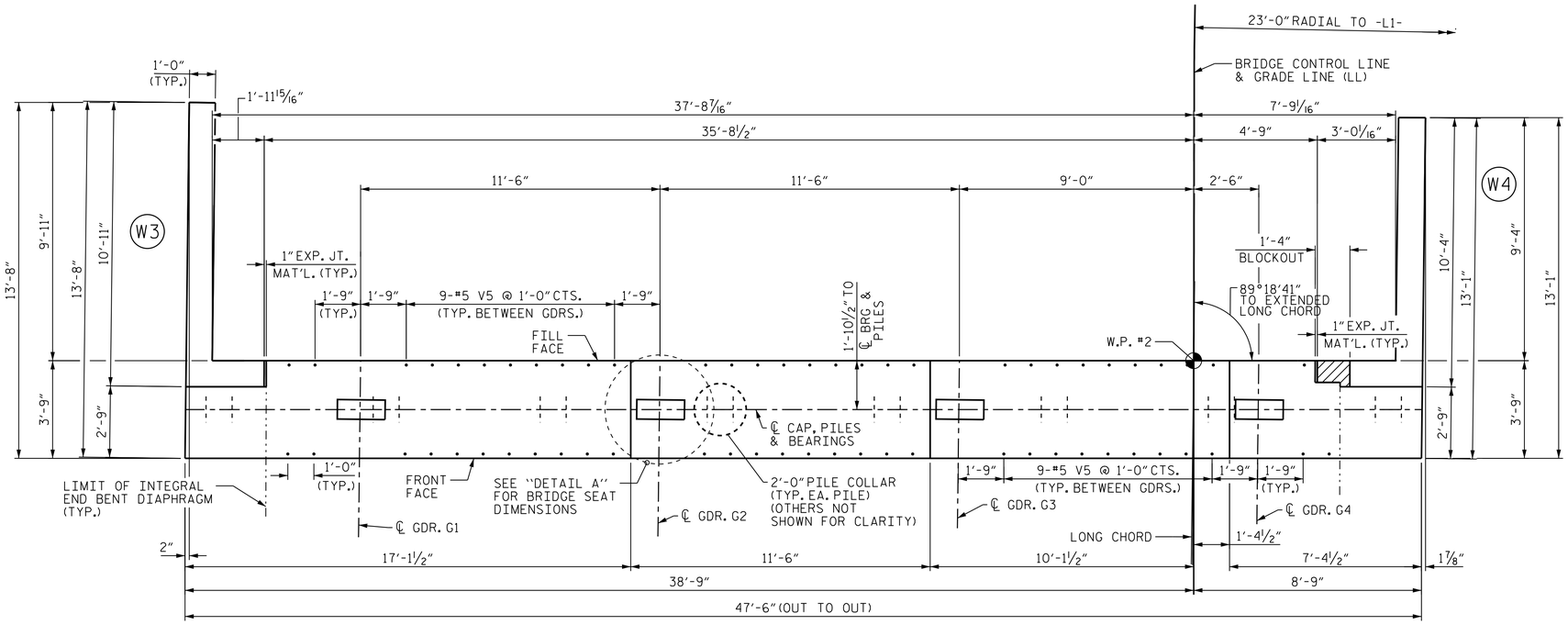


PLAN

NOTES

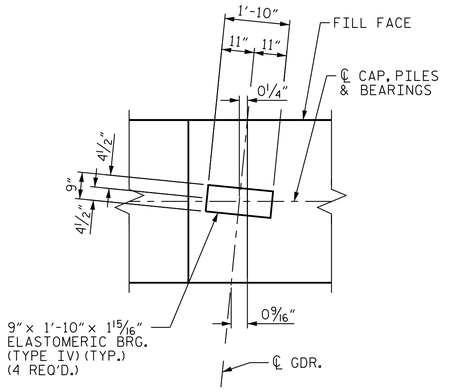
STIRRUPS IN CAP MAY BE SLIGHTLY SHIFTED AS NECESSARY ANY CONFLICTS WITH OTHER REINFORCING STEEL.

2 BR DENOTES 2 BAR RUN

FOR SECTION A-A, SEE "END BENT 2 DETAILS", SHEET 3 OF 3.

SEE SHEET 2 OF 3 FOR WING WALL DETAILS.

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



DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING

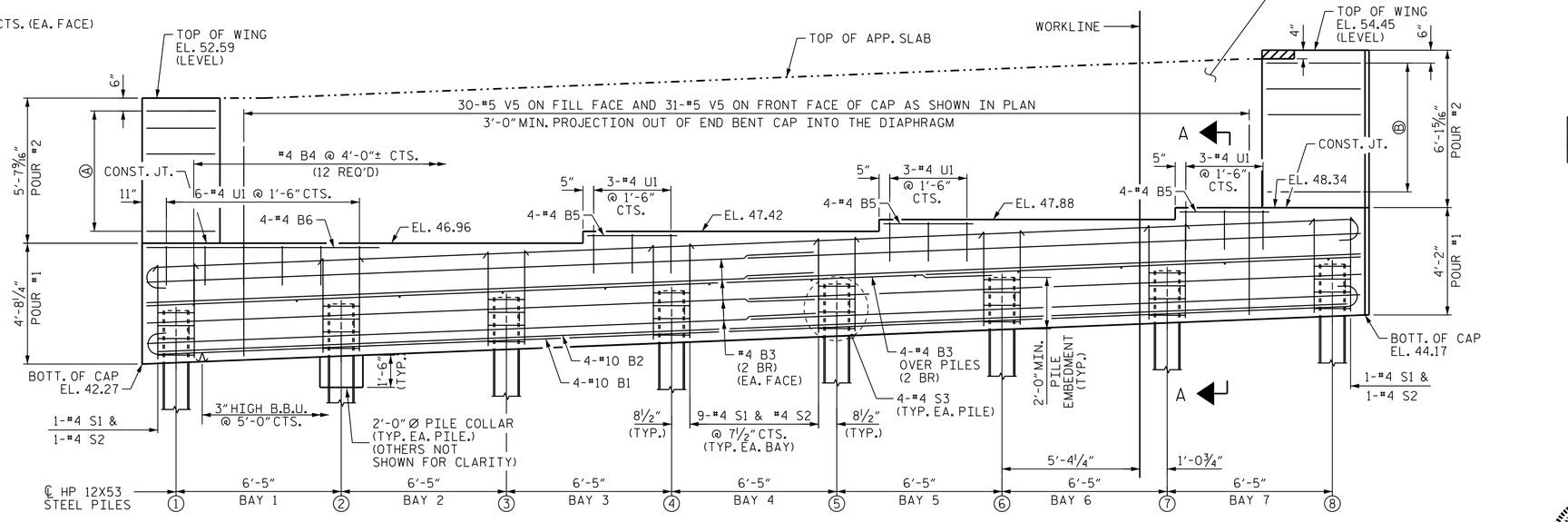
AT THE CONTRACTORS OPTION, THE BEARING CAN BE PLACED PARALLEL TO THE ℄ CAP.

TOP OF PILE ELEVATIONS	
PILE #	ELEVATION
1	44.34
2	44.60
3	44.86
4	45.11
5	45.37
6	45.63
7	45.88
8	46.14

MIN. SPLICE	
#4 B3	2'-5"

Ⓐ 6-#4 K1 @ 1'-0" CTS. (EA. FACE)

Ⓑ 6-#4 K2 @ 1'-0" CTS. (EA. FACE)



ELEVATION

SEE MIN. SPLICE CHART FOR SPLICE LENGTH

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2

(LEFT LANE)

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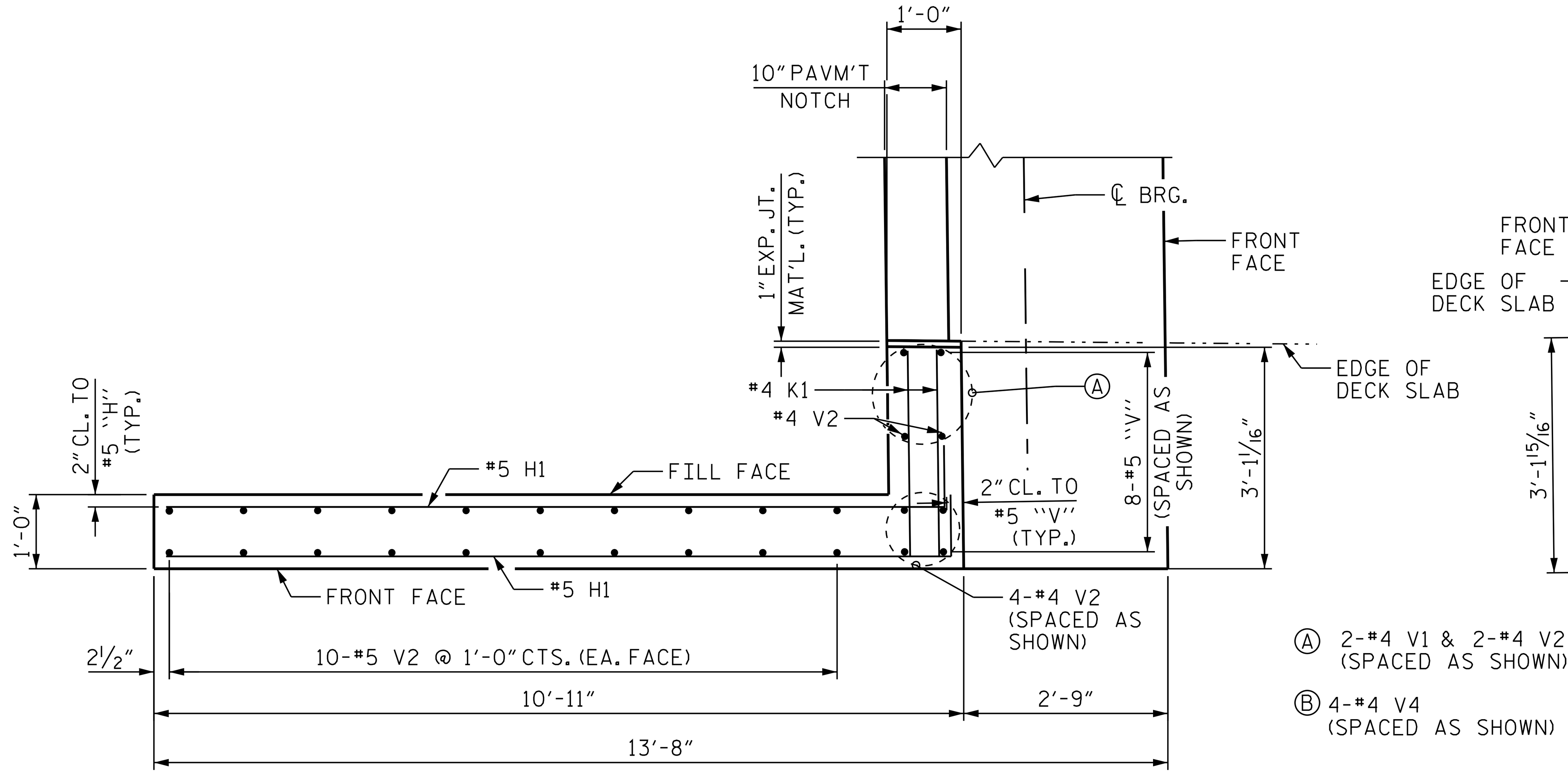
CHECKED BY : M. B. ISENHOUR DATE : 09/26/19

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

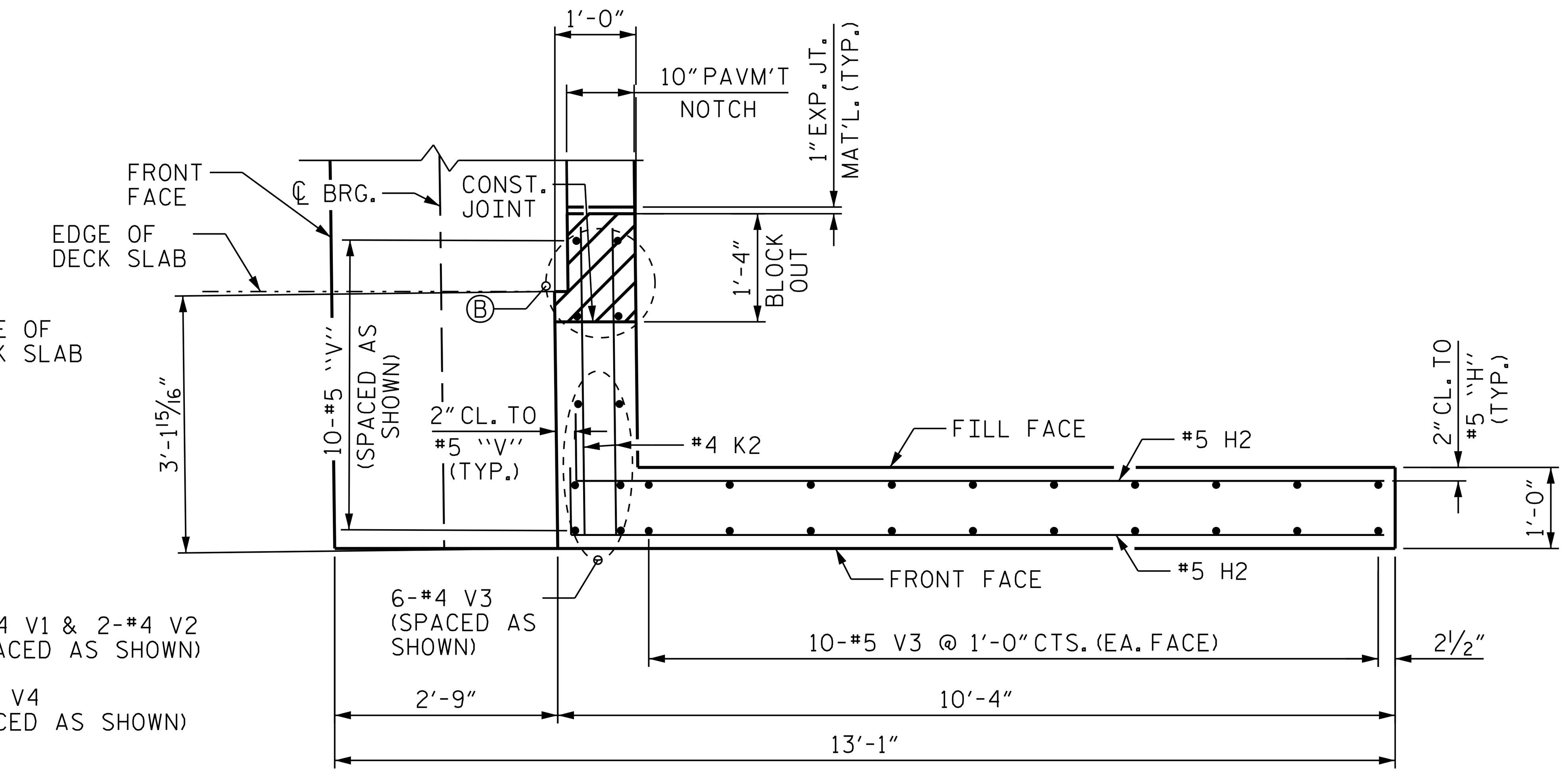
NORTH CAROLINA PROFESSIONAL SEAL 49756 ENGINEER MELINDA B. ISENHOUR
Docusigned by: Melinda Isenhour
10/25/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

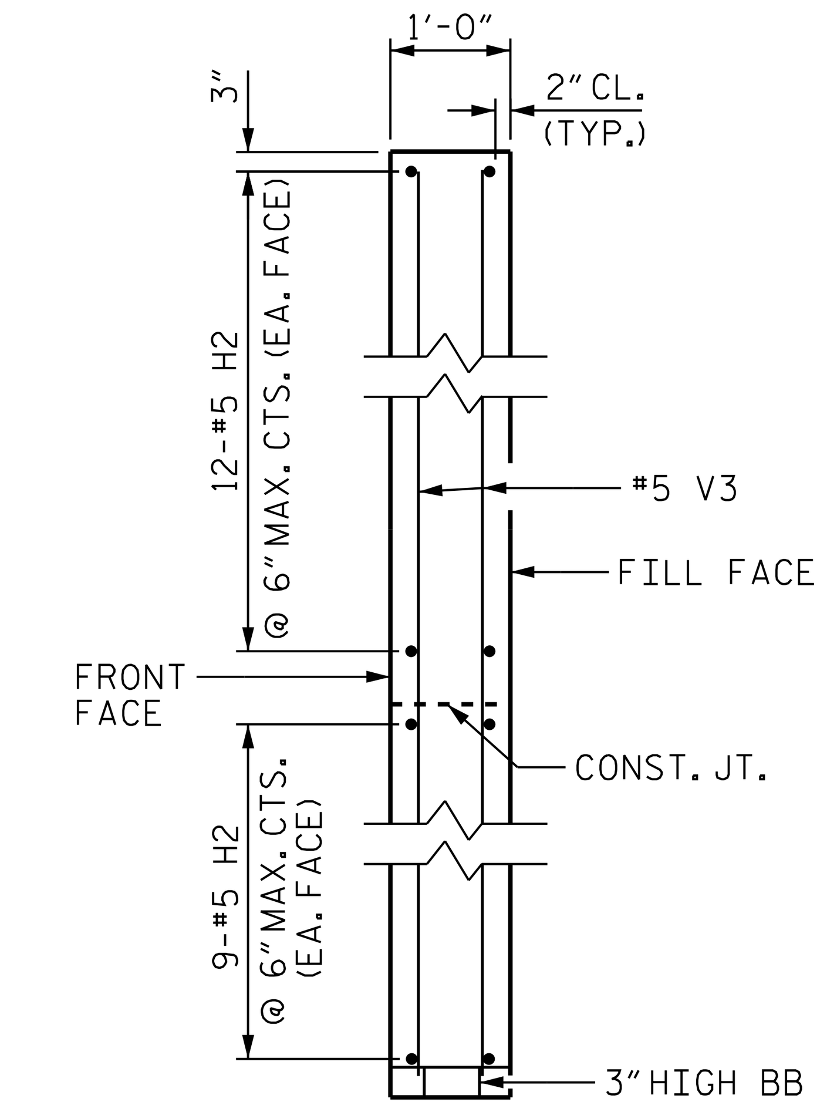
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-24
1			3			TOTAL SHEETS
2			4			30



PLAN OF LEFT WING (W3)

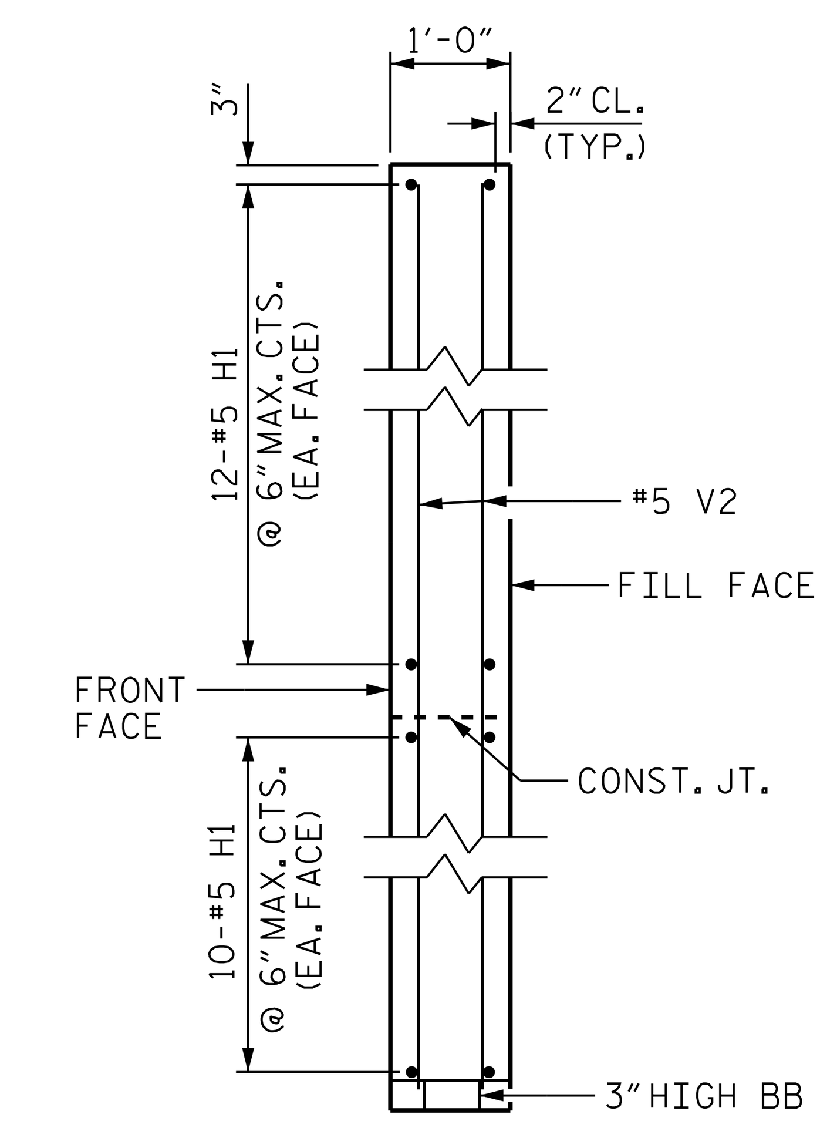


PLAN OF RIGHT WING (W4)



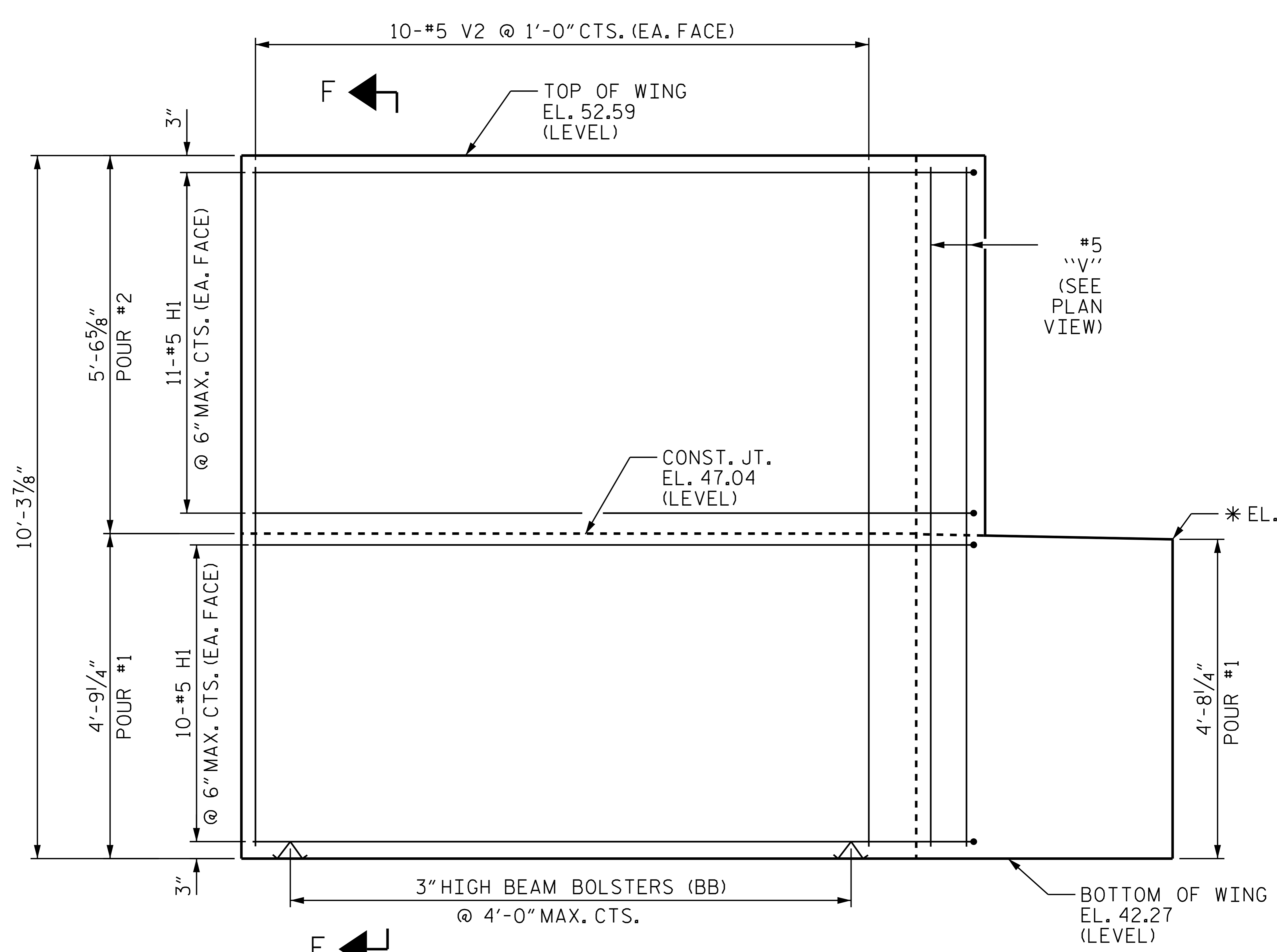
SECTION E-E

#4 "K" BARS NOT SHOWN FOR CLARITY



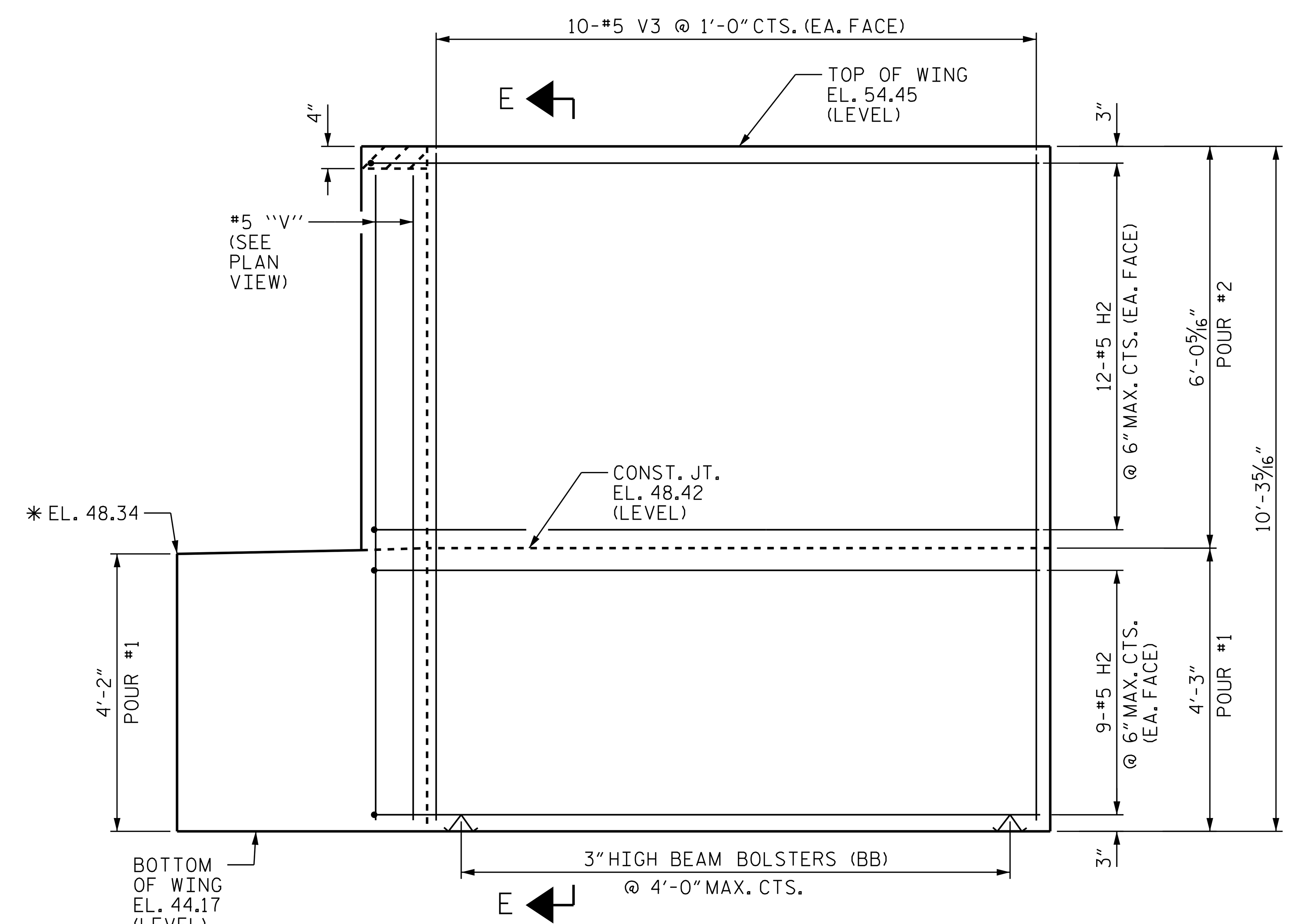
SECTION F-F

#4 "K" BARS NOT SHOWN FOR CLARITY



ELEVATION OF LEFT WING (W3)

#4 "K" BARS NOT SHOWN FOR CLARITY



ELEVATION OF RIGHT WING (W4)

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NOTES:

✱ TOP SURFACE OF END BENT CAP BETWEEN EDGE OF DECK SLAB AND END OF CAP SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF 1/4"/FT.

FOR "K" BAR DETAILS, SEE SHT. "END BENT 2".

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

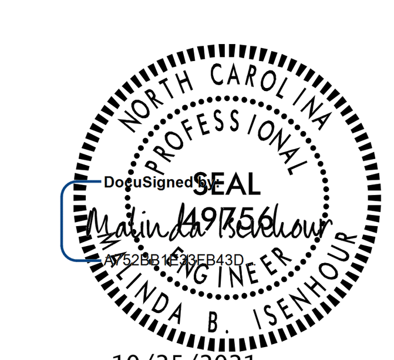
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2 DETAILS WING WALLS

(LEFT LANE)

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S14-25
1			3				TOTAL SHEETS
2			4				30



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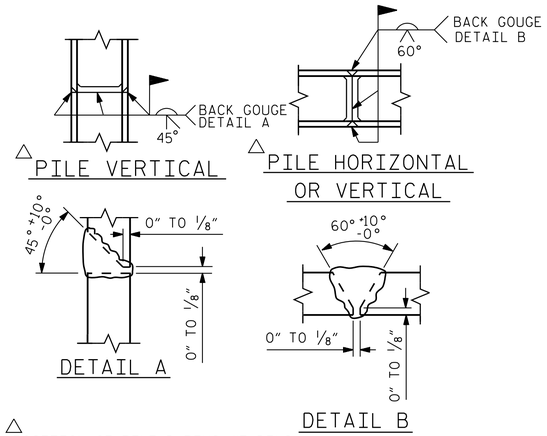
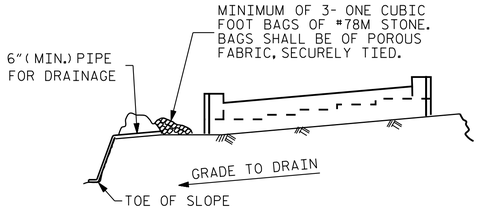


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



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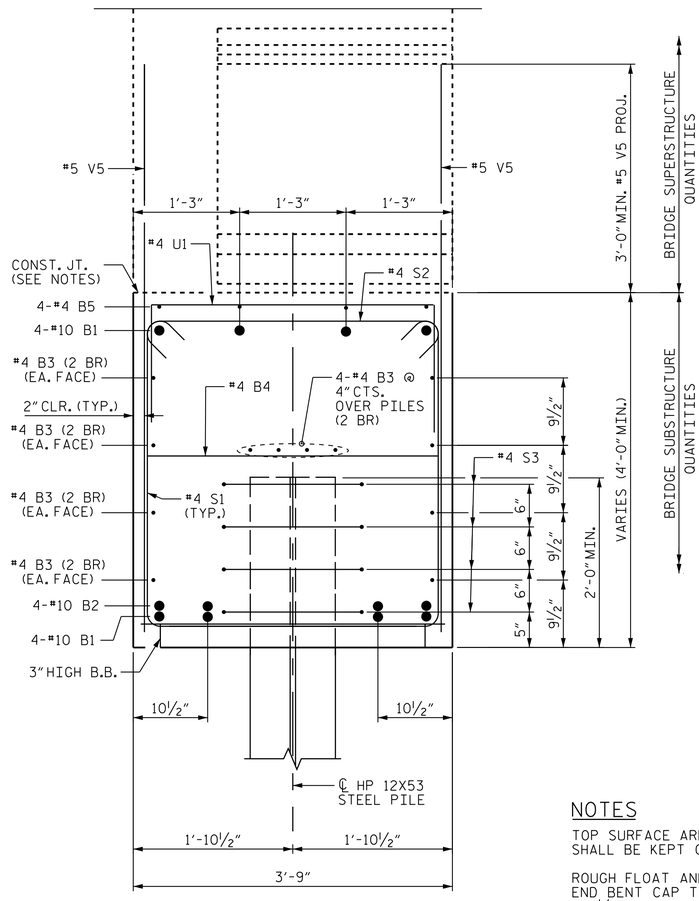
TEMPORARY DRAINAGE AT END BENT



SECTION A-A

SEE "END BENT 2" SHEET 1 OF 3.

PILE COLLAR NOT SHOWN FOR CLARITY.

NOTES

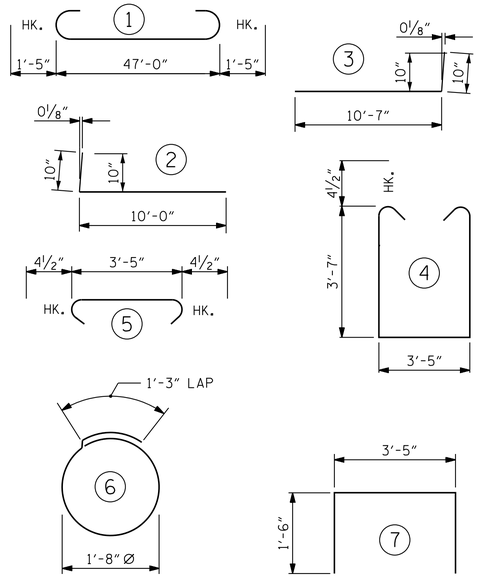
TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP TO PROVIDE MIN. SURFACE AMPLITUDE OF 1/4" EXCEPT UNDER BEARING AREAS.

#10 B1 & #10 B2 BARS IN THE BOTTOM OF CAP ARE BUNDLED.

(2 BR) DENOTES 2 BAR RUN.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

HP 12X53 STEEL PILES	STEEL PILE POINTS EA. 8
NO: 8 LIN. FT.= 480.00	PILE REDRIVES EA. 4
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	EA. 8

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	49'-10"	1716
B2	4	#10	STR	47'-2"	812
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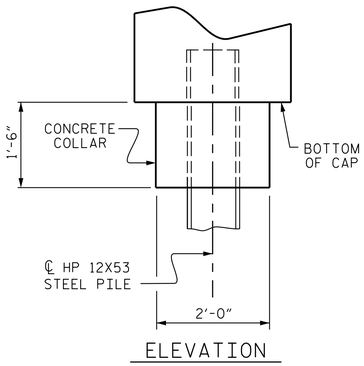
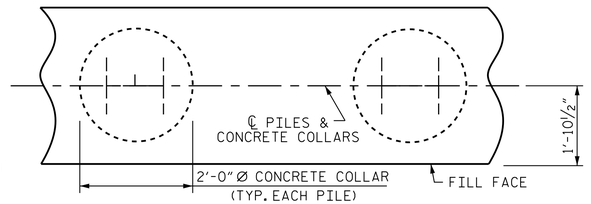
B4	12	#4	STR	3'-5"	28
B5	12	#4	STR	3'-6"	29
B6	4	#4	STR	9'-0"	25
H1	42	#5	3	11'-5"	501
H2	42	#5	2	10'-10"	475
K1	12	#4	STR	2'-8"	22
K2	12	#4	STR	3'-8"	30
S1	65	#4	4	11'-4"	493
S2	65	#4	5	4'-2"	181
S3	32	#4	6	6'-6"	139
U1	15	#4	7	6'-5"	65
V1	2	#5	STR	9'-7"	20
V2	26	#5	STR	9'-11"	269
V3	26	#5	STR	9'-10"	267
V4	4	#5	STR	9'-6"	40
V5	61	#5	STR	7'-3"	462

REINFORCING STEEL	5,972 LBS.
CLASS A CONCRETE BREAKDOWN	
POUR #1 CAP, LOWER PART OF WINGS & COLLARS	32.8 C.Y.
POUR #2 UPPER PART OF WINGS	5.6 C.Y.
TOTAL CLASS A CONCRETE	38.4 C.Y.



ELEVATION



PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2 DETAILS

(LEFT LANE)

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CHECKED BY : M. B. ISENHOUR DATE : 09/26/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049561 ENGINEER MARK B. ISENHOUR
DocuSigned by: Mark B. Isenhour
10/25/2021

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14-26
1			3			TOTAL SHEETS
2			4			30

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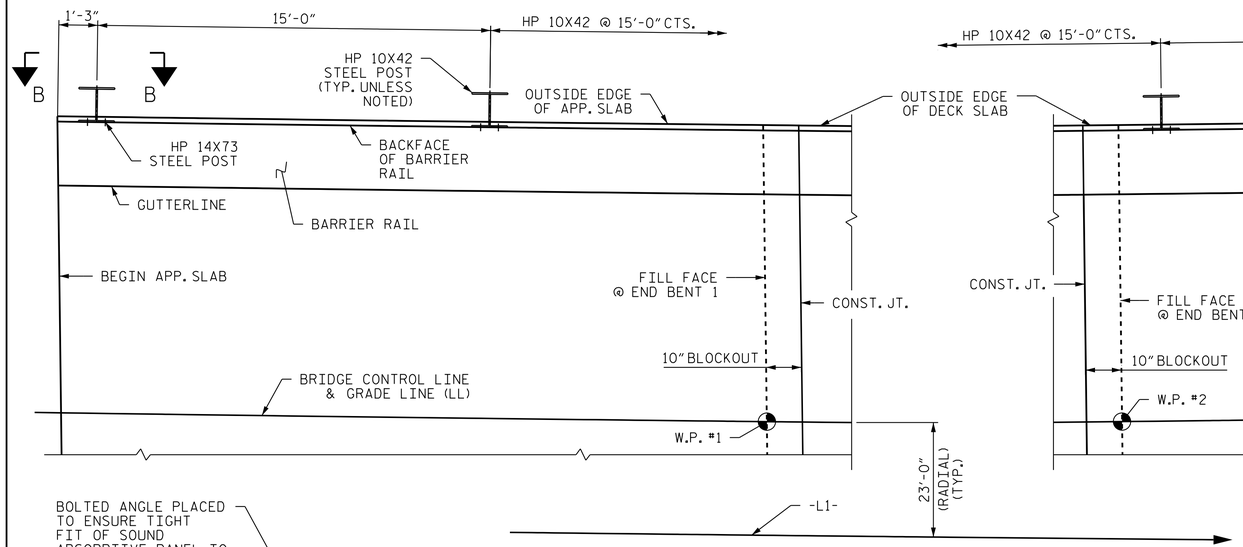
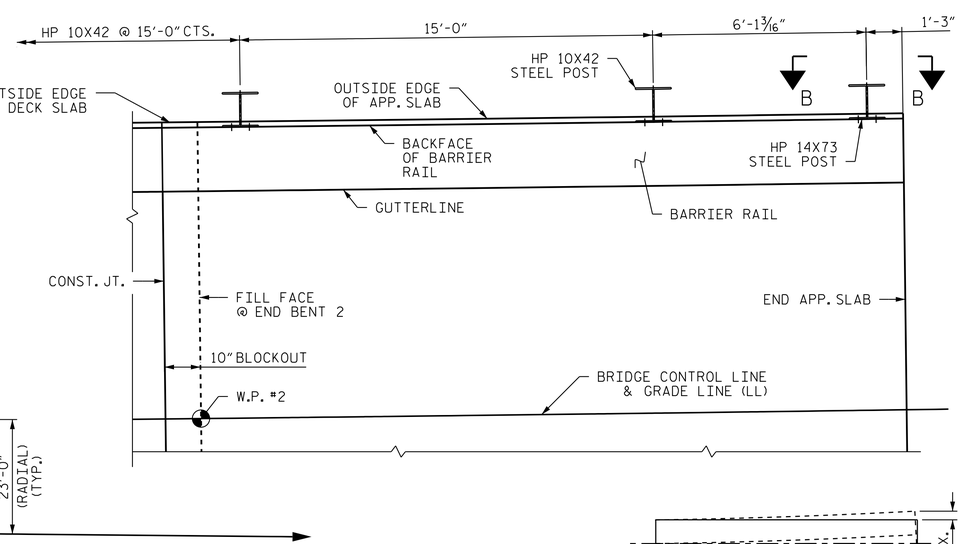
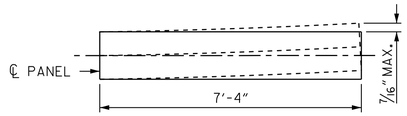


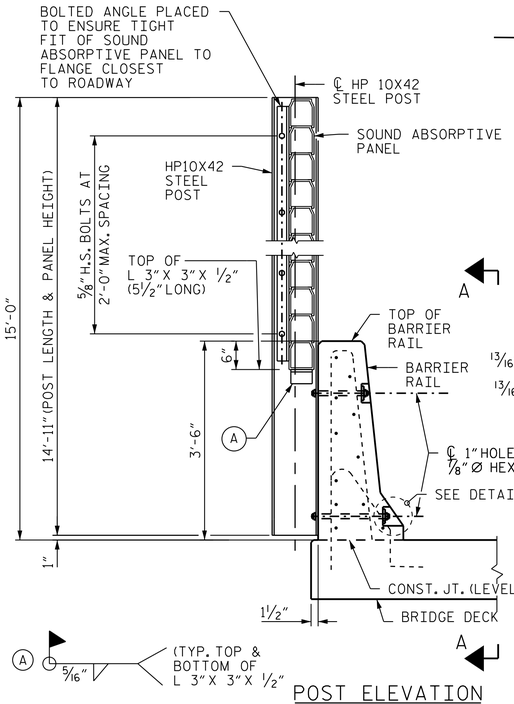


PLAN OF SOUND ABSORPTIVE BARRIER WALL LAYOUT

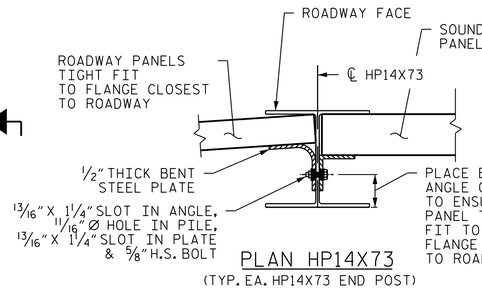
LEFT SIDE OF BRIDGE ONLY. PANELS NOT SHOWN FOR CLARITY.
ALL DIMENSIONS ARE ALONG THE BACKFACE OF BARRIER RAIL.



PANEL BOW TOLERANCE

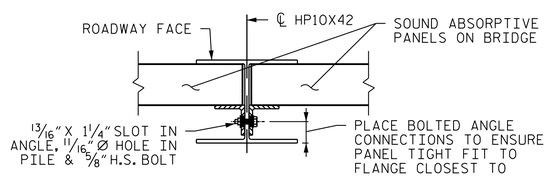


POST ELEVATION



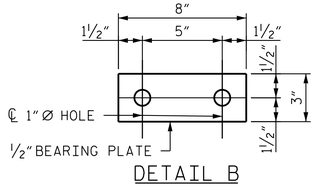
PLAN HP14X73

(TYP. EA. HP14X73 END POST)

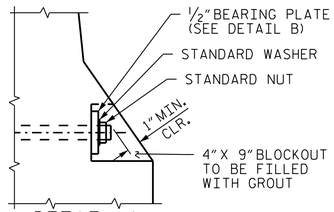


PLAN HP10X42

(TYP. EA. HP10X42 ALONG BRIDGE)

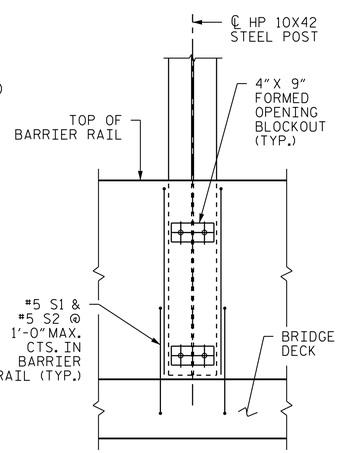


DETAIL B



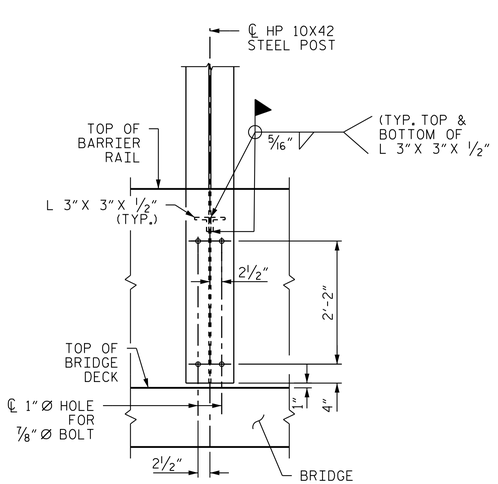
DETAIL A

GROUT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS) (LOWER BLOCKOUT SHOWN, UPPER BLOCKOUT SIMILAR)

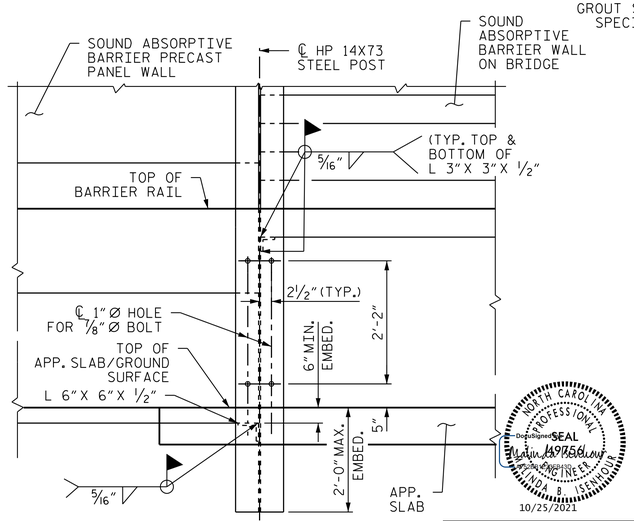


VIEW A-A

#5 S1 & #5 S2 MAY BE SLIGHTLY SHIFTED AS NECESSARY TO CLEAR THE BOLTS.



SECTION THRU POST



VIEW B-B

ABSORPTIVE PANEL QUANTITY	
PANELS	1,745 SQ. FT.

NOTES:

WALL SUPPORT SYSTEM

HP10X42 POSTS & ANGLES SHALL BE AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111 AND IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. REPAIR ANY DAMAGED GAVANIZATION IN ACCORDANCE WITH ARTICLE 1076-7 OF THE STANDARD SPECIFICATIONS.

HP14X73 POSTS, BENT PLATES & ANGLES/LAGGING STOPS SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111 AND IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. REPAIR ANY DAMAGED GAVANIZATION IN ACCORDANCE WITH ARTICLE 1076-7 OF THE STANDARD SPECIFICATIONS.

ALL BEARING PLATES, BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F3125 AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232.

ALL STEEL HP10X42 & HP14X73 POSTS SHALL BE PLUMB.

SOUND ABSORPTIVE BARRIER WALL

SOUND ABSORPTIVE BARRIER WALL SHALL BE DESIGNED TO WITHSTAND A MINIMUM WIND VELOCITY OF 150 MPH AND A MINIMUM WIND PRESSURE OF 0.0689 KSF.

TOTAL WEIGHT OF THE SOUND ABSORPTIVE BARRIER WALL, COMPLETE AND IN PLACE, SHALL NOT EXCEED 300 LBS/FT.

SOUND ABSORPTIVE PANELS WILL BE INSTALLED FOR SOUND ABSORPTIVE BARRIER WALL. FOR SOUND ABSORPTIVE PANEL, SEE SPECIAL PROVISIONS.

PANELS SHALL BE CUT SO THAT THE ENDS ARE SMOOTH AND PERPENDICULAR TO EACH PANEL BASE AND SHALL BE APPROVED BY THE ENGINEER.

EACH PANEL SHALL BE PLACED SO THAT THE TOP OF THE FINISHED PANEL MEETS FLUSH WITH THE TOP OF EACH SUPPORT POST.

SOUND ABSORPTIVE BARRIER WALL & PANELS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROCEDURES OUTLINED BY THE MANUFACTURER.

FOR FILLET WELDS, E70 ELECTRODES SHALL BE USED.

FOR SOUND ABSORPTIVE BARRIER WALL DETAILS AND WALL TURN DETAILS, SEE ROADWAY PLANS.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : N. D'AIUTO DATE : 09/30/19
CHECKED BY : M. B. ISENHOUR DATE : 12/16/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)

(LEFT LANE)

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			30

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NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MATTHEW B. ISENHOUR
DocuSigned by: Matthew B. Isenhour
10/25/2021

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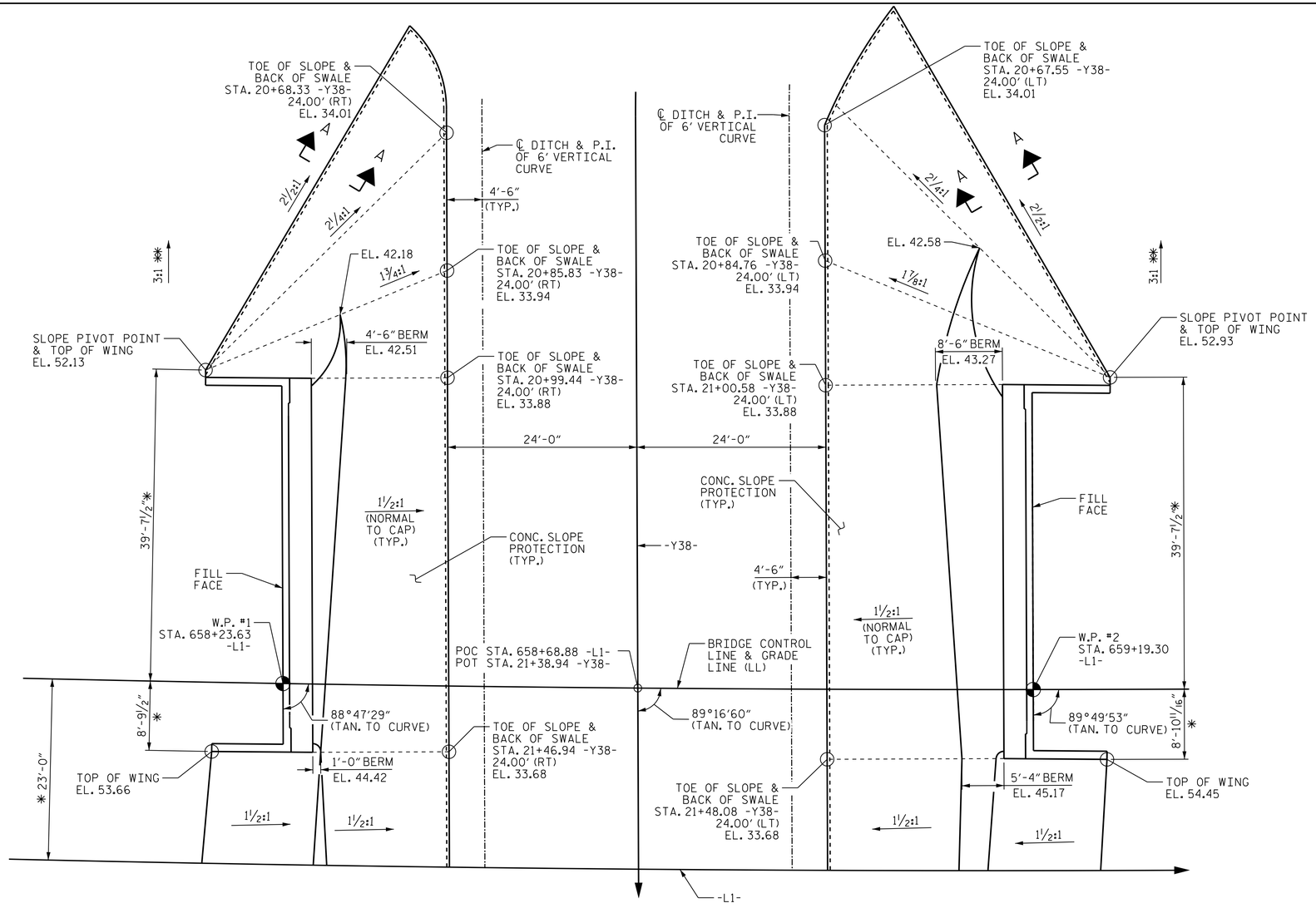


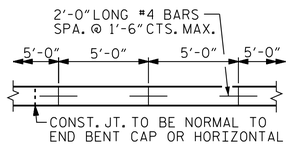
END BENT 1 END BENT 2

PLAN

ELEVATIONS SHOWN ARE AT TOP SURFACE OF SLOPE PAVING.
(SEE POINT A ON SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH)

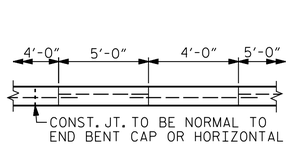
✱ RADIAL DIMENSION

✱✱ TRANSITION FROM 2½:1 SLOPE PROTECTION TO MATCH 3:1 FILL SLOPES PERP. TO -L1-



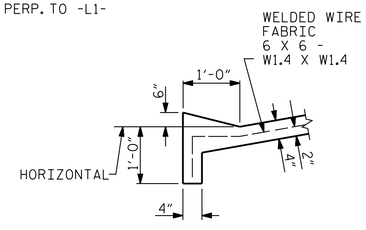
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL



SECTION A-A

GENERAL NOTES

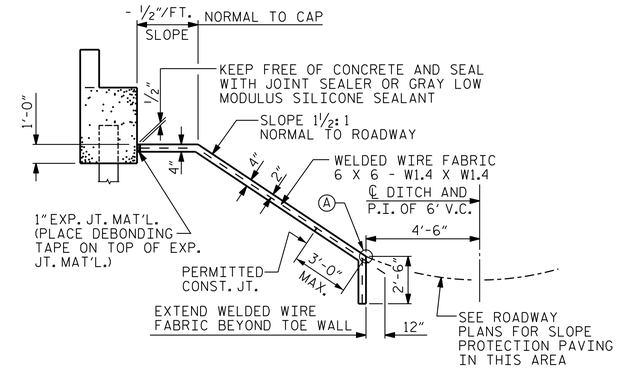
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

ALTERNATE "A"

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

BRIDGE @ STA. 658+69.17 -L1-	4 INCH SLOPE PROTECTION	✱ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	270	486
END BENT 2	340	612
TOTAL	610	1098

✱ QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH

DETAILS FOR ALTERNATE "A"

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

(LEFT LANE)

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : N. D'AIUTO DATE : 08/13/19
CHECKED BY : M. B. ISENHOUR DATE : 09/27/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049561 ENGINEER MELINDA B. ISENHOUR
Docusigned by: Melinda B. Isenhour
10/25/2021

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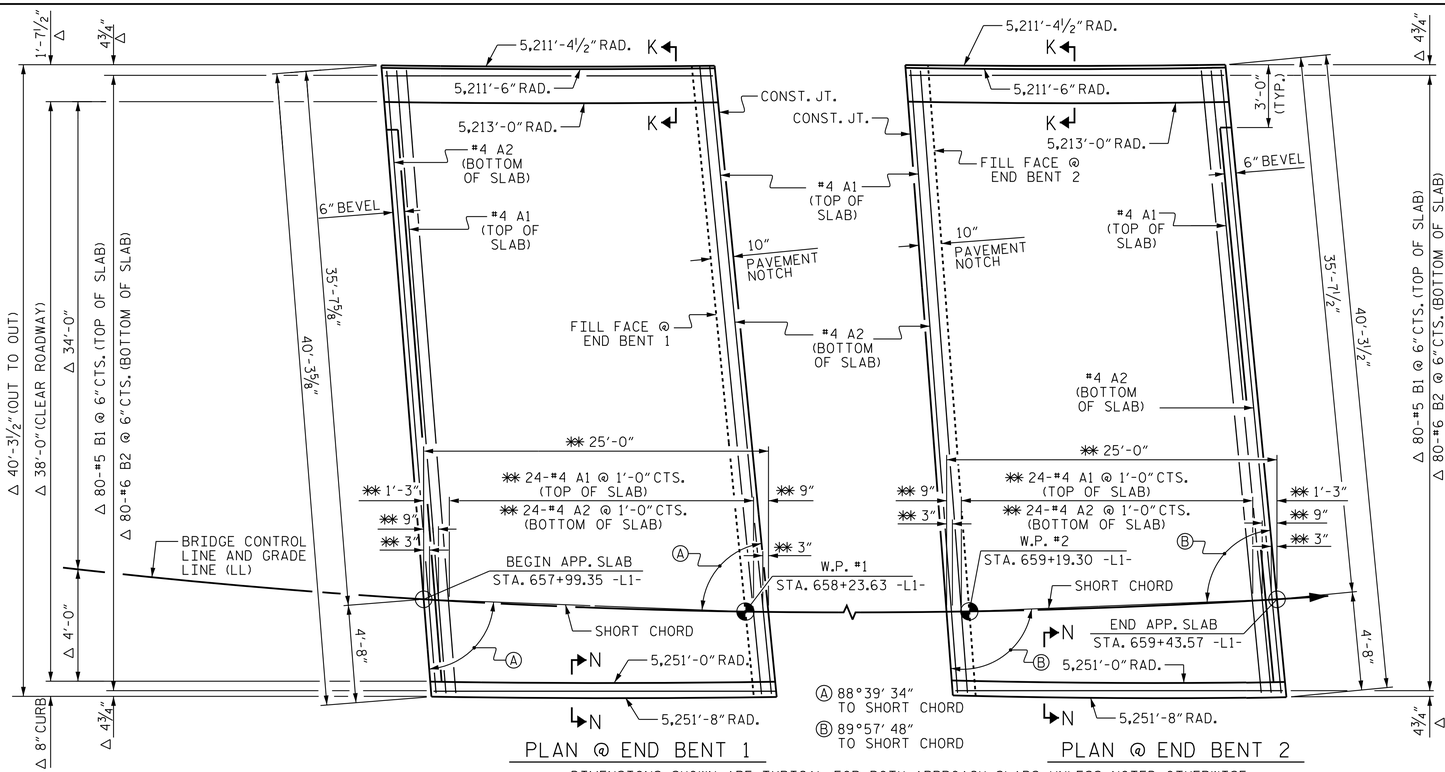


PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS, UNLESS NOTED OTHERWISE.
△ RADIAL DIMENSION
✻✻ ALONG ARC

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 I 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.

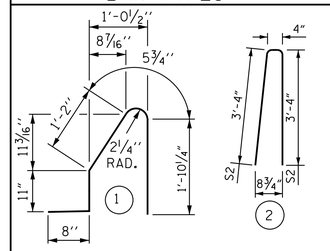
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

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.

FOR ARC OFFSETS ON APPROACH SLABS, SEE "ARC OFFSETS" SHEET.

FOR SECTION A-A, SEE SECTION THRU RAIL ON "CONCRETE BARRIER RAIL" SHEET.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

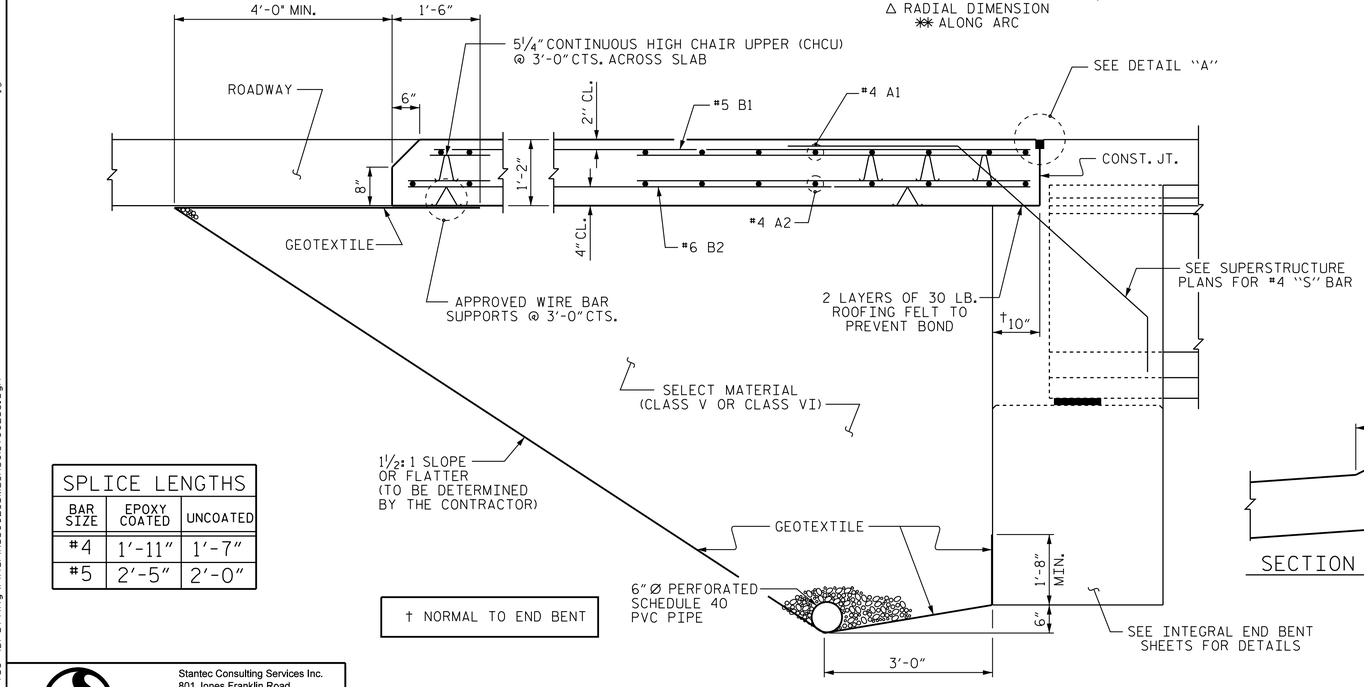
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✻ A1	26	#4	STR	40'-0"	695
A2	26	#4	STR	40'-0"	695
✻ B1	80	#5	STR	24'-1"	2,010
B2	80	#6	STR	24'-8"	2,964
REINFORCING STEEL				LBS.	3,659
✻ EPOXY COATED REINFORCING STEEL				LBS.	2,705
CLASS AA CONCRETE				C.Y.	43.5

FOR ONE BARRIER RAIL ON APPROACH SLAB (2 REQ'D)

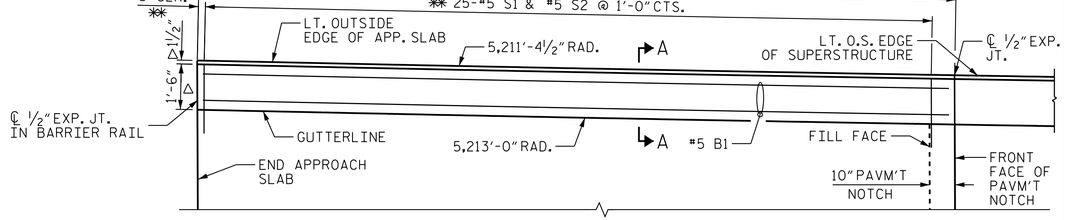
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✻ B1	11	#5	STR	24'-7"	283
✻ S1	25	#5	1	5'-1"	133
✻ S2	25	#5	2	7'-0"	183
✻ EPOXY COATED REINFORCING STEEL				LBS.	599
CONCRETE BARRIER RAIL				LIN. FT.	25.0
CLASS AA CONCRETE				C.Y.	3.5



† NORMAL TO END BENT

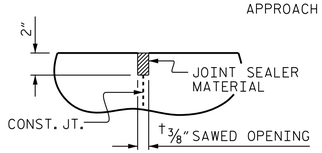
SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

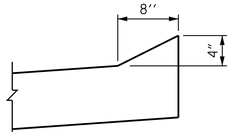


PLAN OF BARRIER ON APP. SLAB

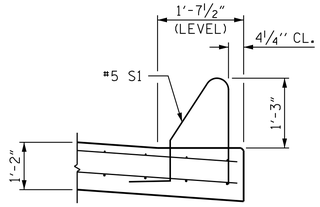
APPROACH SLAB @ END BENT 1 SHOWN. APPROACH SLAB @ END BENT 2 SIMILAR.



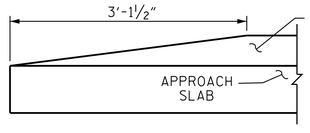
DETAIL "A"



SECTION N-N



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

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

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

(LEFT LANE)

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
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www.stantec.com
License No. F-0672

DRAWN BY : V. T. THOMPSON DATE : 06/11/19
CHECKED BY : N. D'AIUTO DATE : 08/20/19

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14956 MARK BRADLEY ISENHOUR
DocuSigned by: Mark Isenhour
10/25/2021

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SHEET NO. S14-29

TOTAL SHEETS 30

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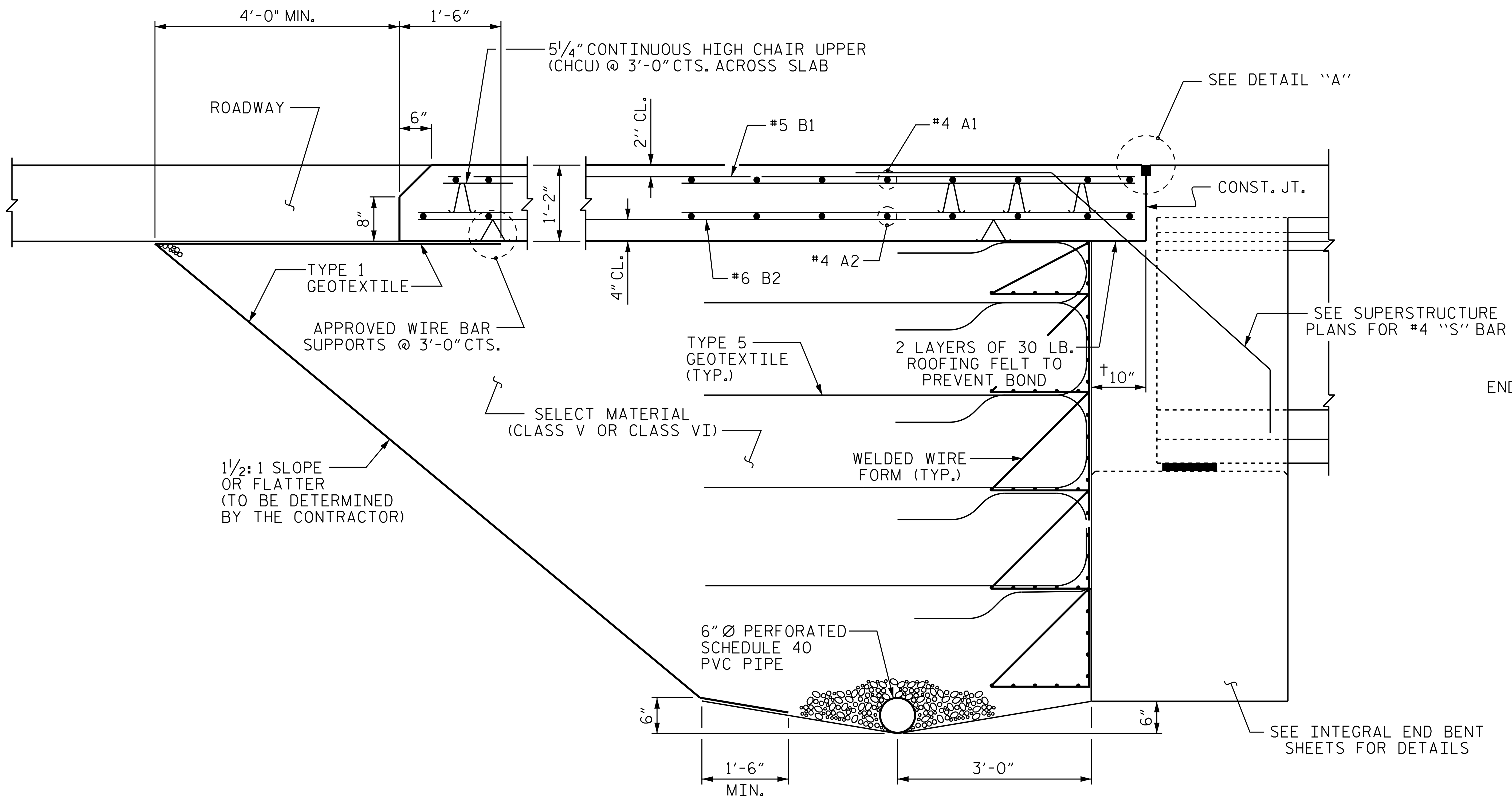
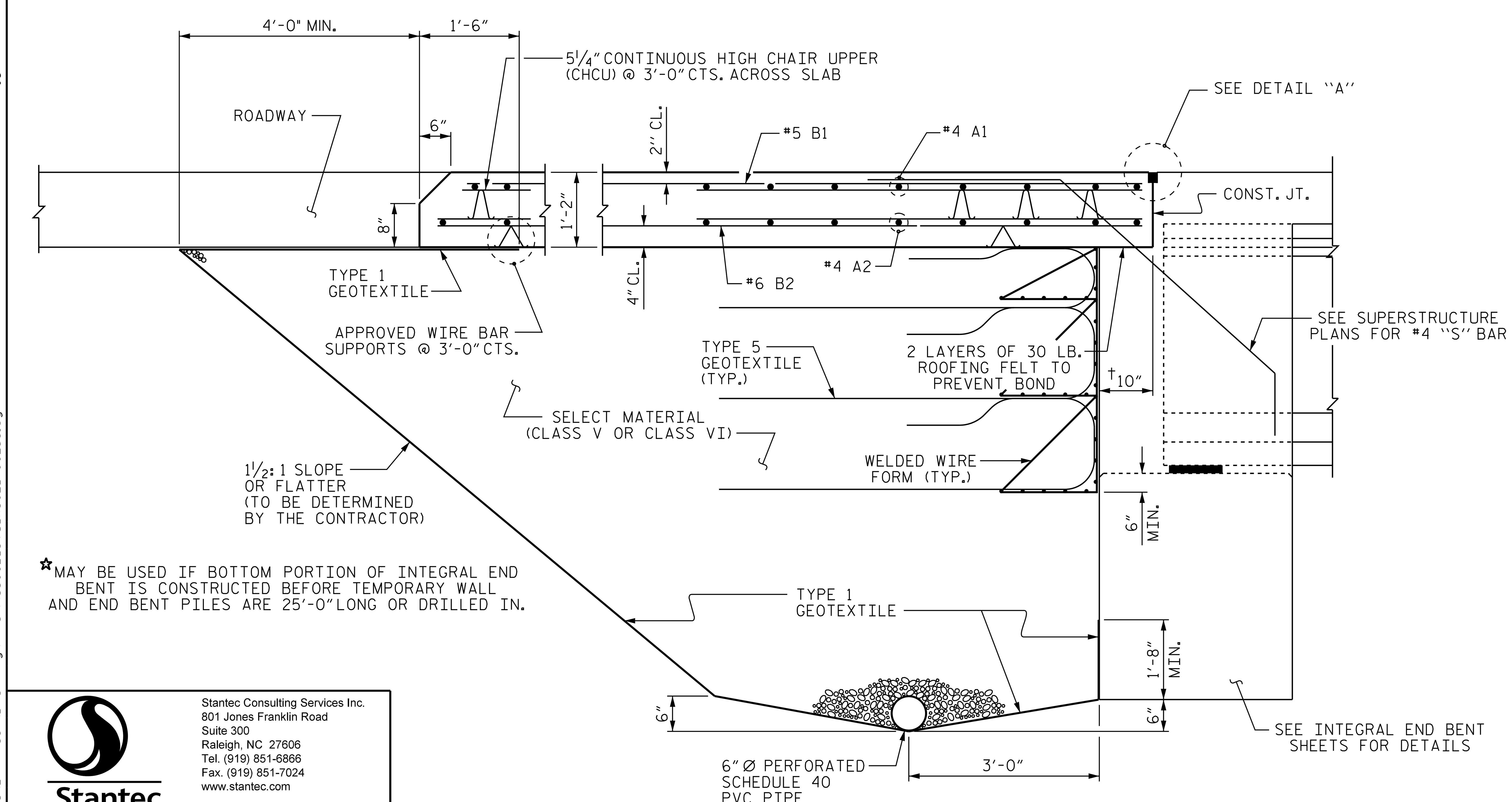


SECTION THRU SLAB

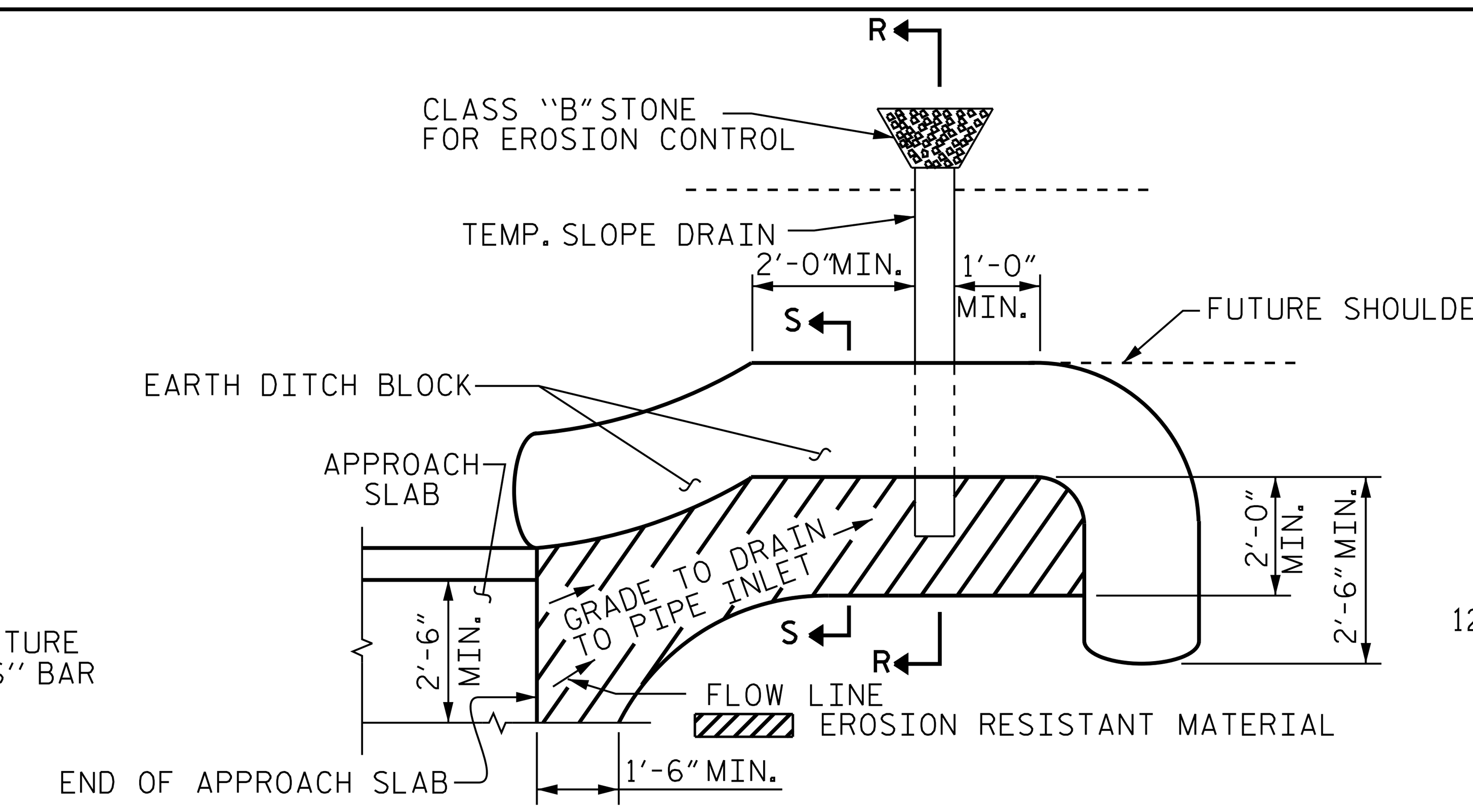
(TYPE A - ALTERNATE APPROACH FILL)



☆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.

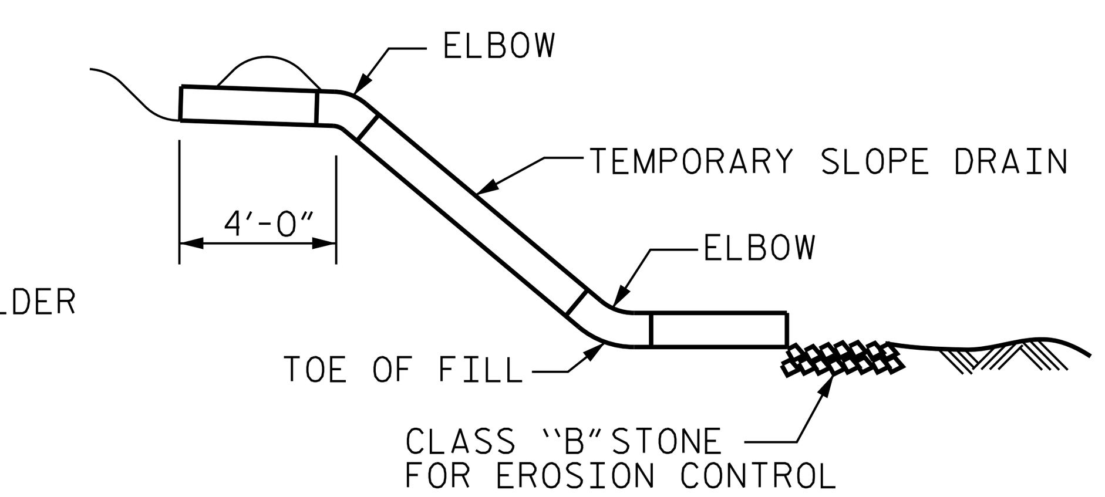
SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)

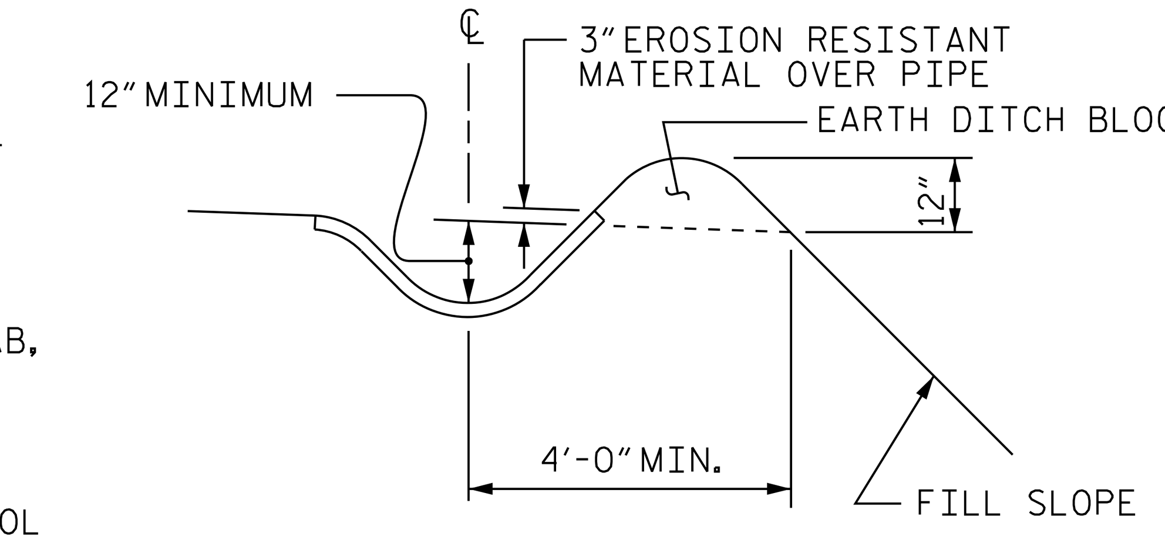


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



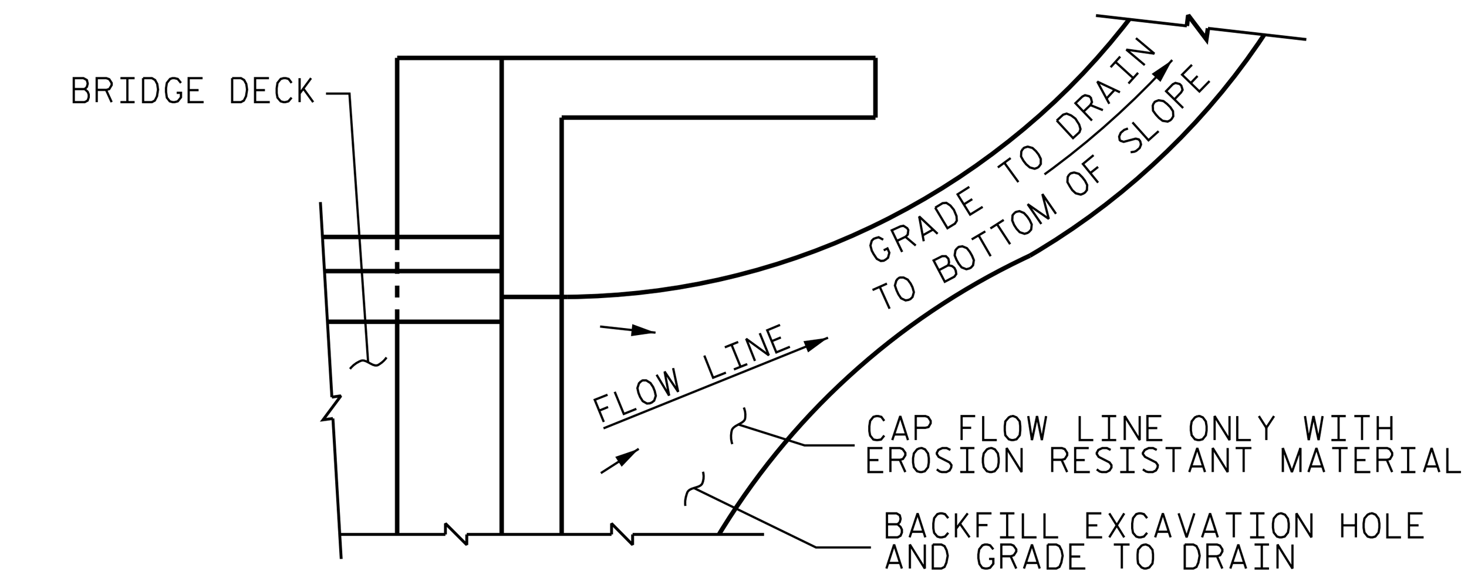
SECTION R-R



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-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19756 MALINDA B. ISENHOUR 10/25/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S14-30
1			3					TOTAL SHEETS
2			4					30

STD. NO. BAS5

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ASSEMBLED BY : V. T. THOMPSON DATE : 06/17/19
CHECKED BY : N. D'AIUTO DATE : 06/18/19

DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM	DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM	
	REV. 12/17 MAA/THC	

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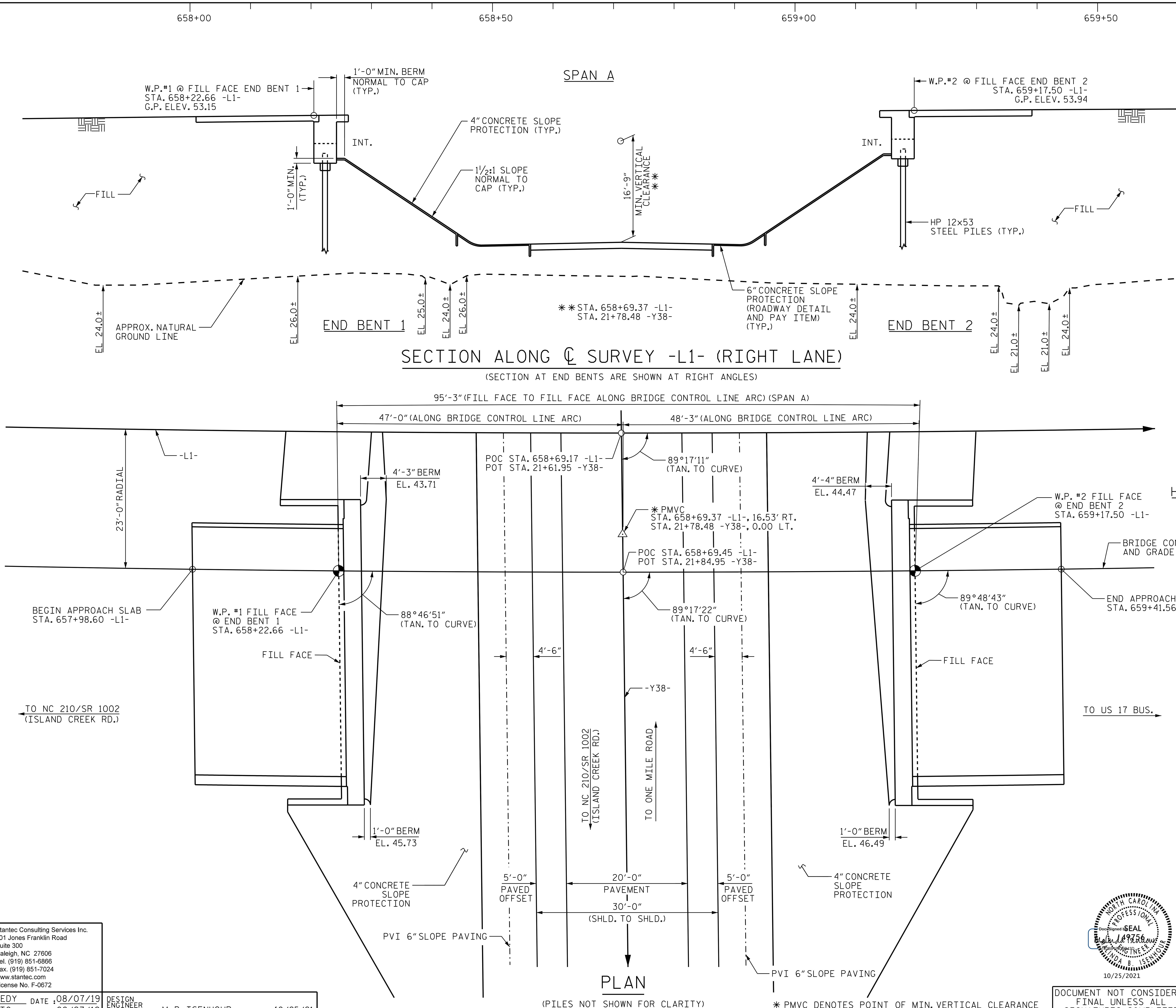

PI STA. = 673+25.67 -L1-
Δ = 39°15'49.78" (LT.)
D = 1°05'13.94"
L = 3,611.44'
T = 1,879.87'
R = 5,270.00'

HORIZONTAL CURVE DATA -L1-

PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-
21+61.95 -Y38-

SHEET 1 OF 4 BRIDGE #700259

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 049756 ENGINEER
10/25/2021

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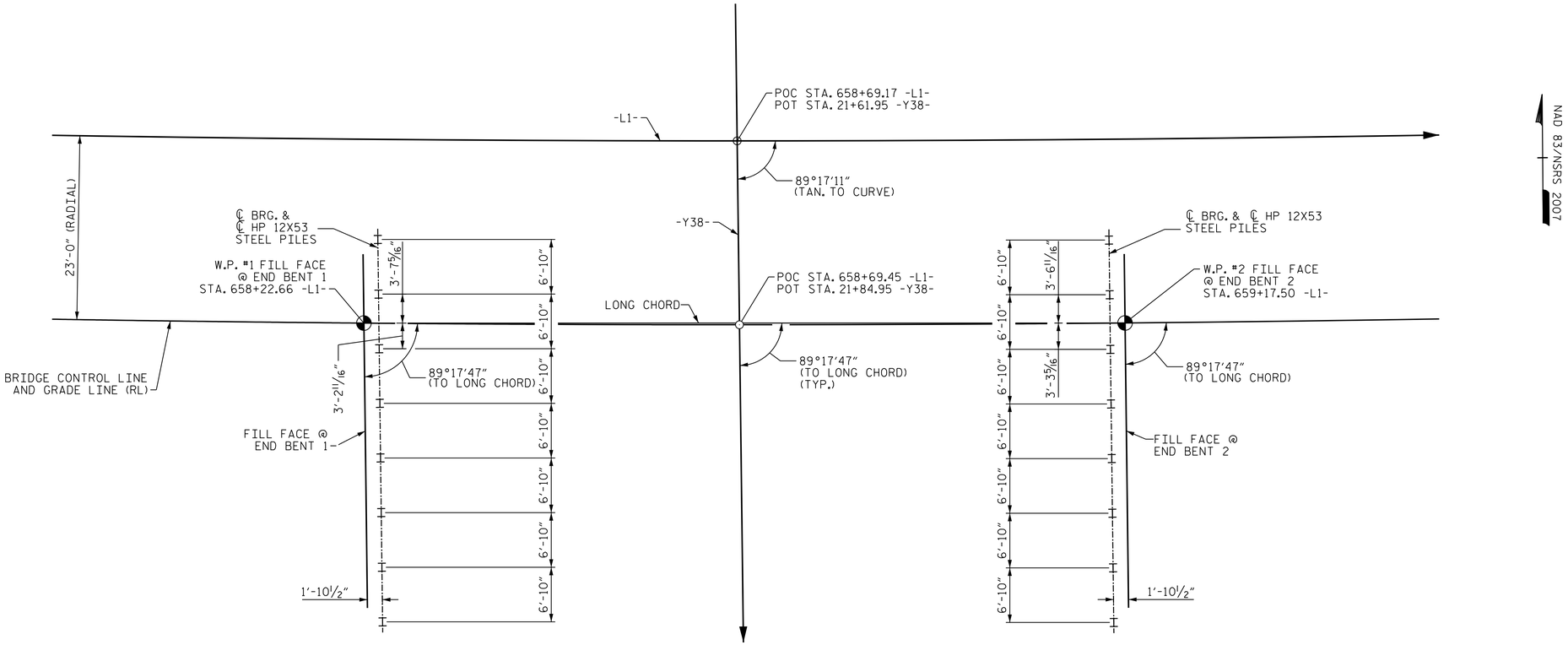
DRAWN BY : J. F. KENNEDY DATE : 08/07/19
CHECKED BY : N. D'AIUTO DATE : 08/27/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

jgelle 10/25/2021 U:\Structures\B5 -Y38-\Drafting\Final\R-3300B_SMU_GD01_700259.dgn



END BENT 1 END BENT 2

NAD 83/NSRS 2007

FOUNDATION LAYOUT

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 125 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 210 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 125 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 210 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENTS 1 & 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 55 TO 75 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENTIN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH THE PDA DURING DRIVING RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

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DRAWN BY : J. HAGENBUSH DATE : 08/16/19
CHECKED BY : N. D'AIUTO DATE : 09/23/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
DocuSigned by:
10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(RIGHT LANE)

REVISIONS						SHEET NO.
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2			4			30

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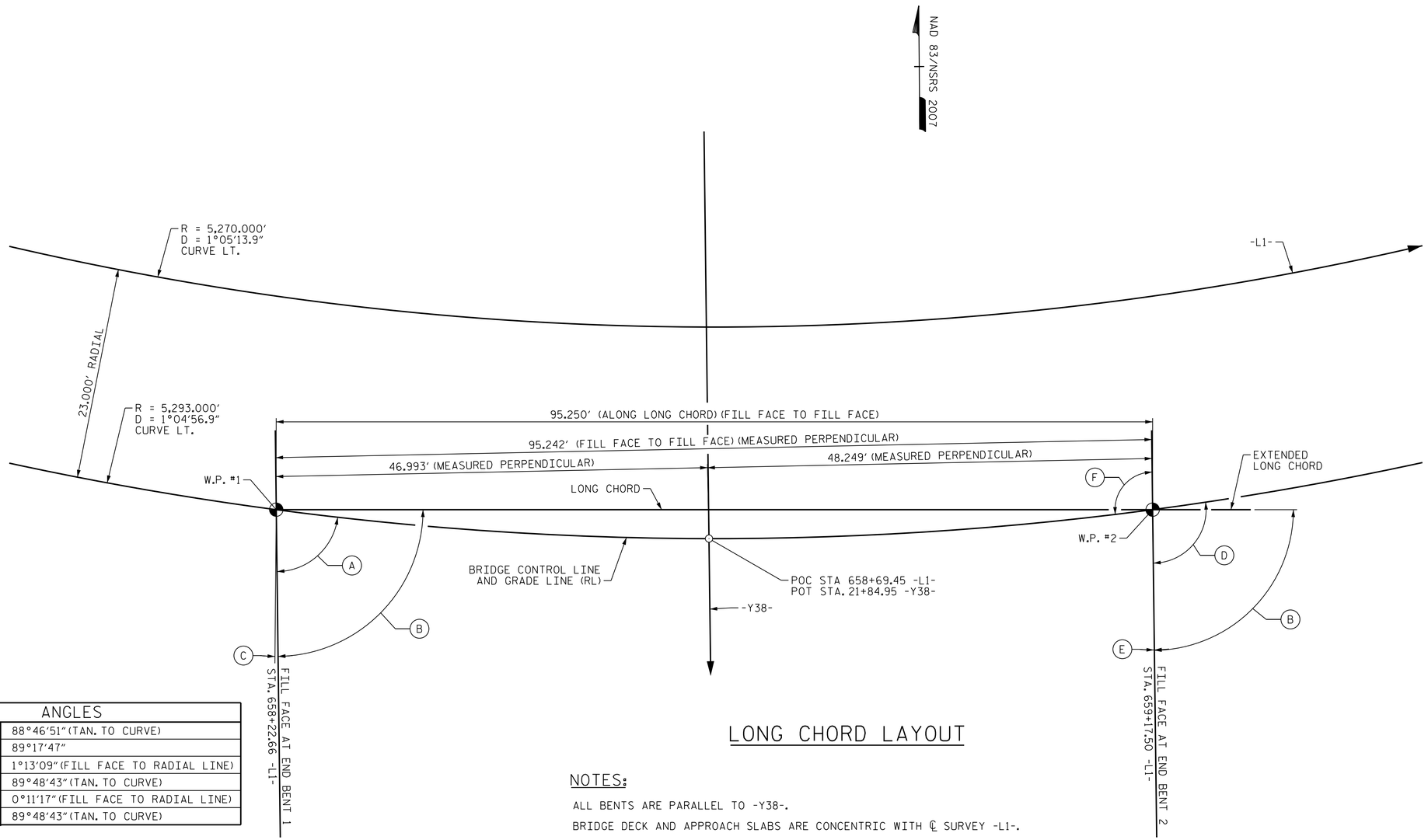

ANGLES	
A	88°46'51" (TAN. TO CURVE)
B	89°17'47"
C	1°13'09" (FILL FACE TO RADIAL LINE)
D	89°48'43" (TAN. TO CURVE)
E	0°11'17" (FILL FACE TO RADIAL LINE)
F	89°48'43" (TAN. TO CURVE)

LONG CHORD LAYOUT

NOTES:

ALL BENTS ARE PARALLEL TO -Y38-.

BRIDGE DECK AND APPROACH SLABS ARE CONCENTRIC WITH ℄ SURVEY -L1-.

GIRDERS ARE SET PARALLEL TO THE LONG CHORD.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(RIGHT LANE)

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DRAWN BY : J. HAGENBUSH DATE : 08/15/19
CHECKED BY : N. D'AIUTO DATE : 08/27/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049756 ENGINEER MELINDA B. ISENHOUR
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10/25/2021

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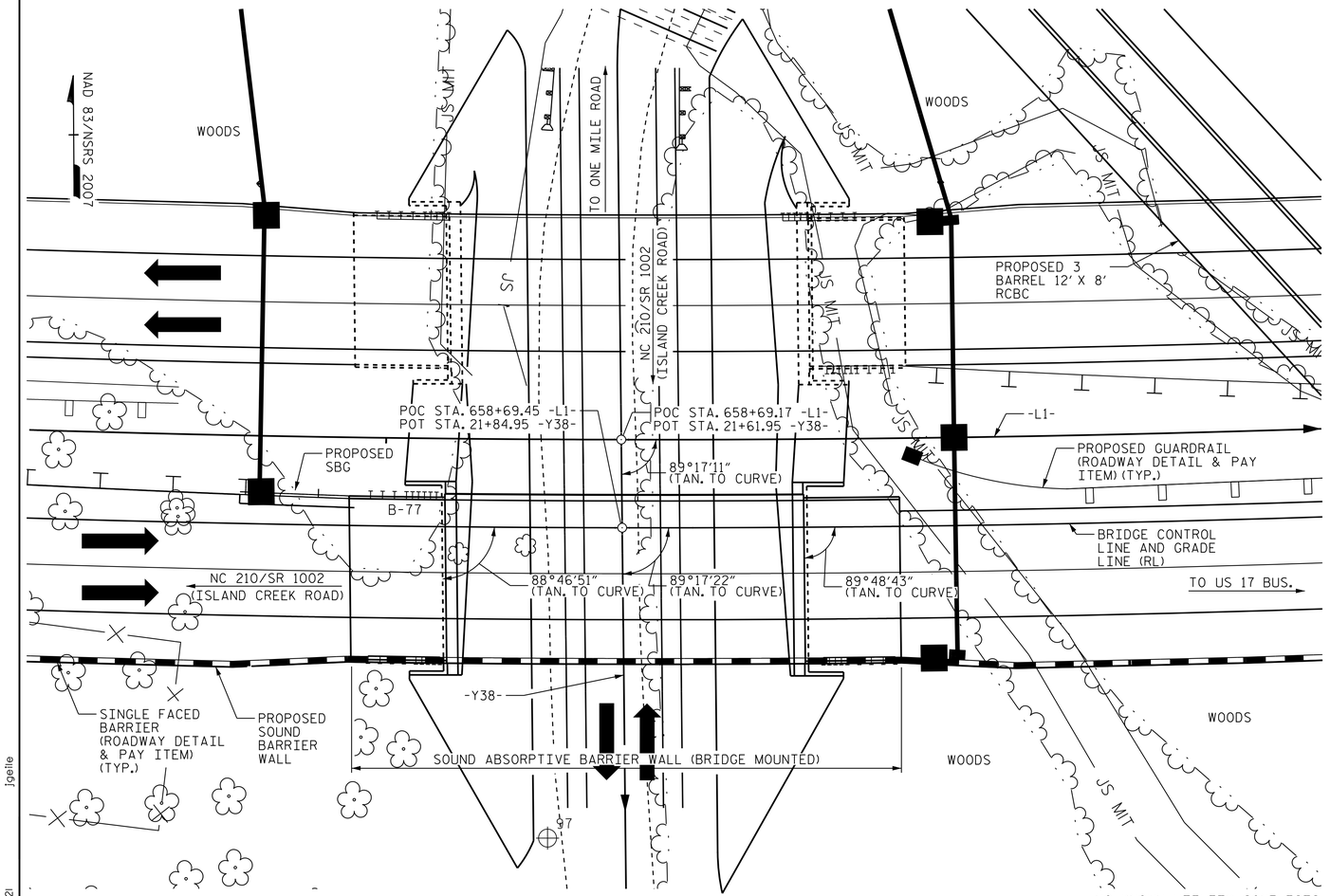
BM #25: R/R SPIKE SET IN PP ON HOLIDAY RD. N232087 E2382638, STA. 658+50.33 -L1-, 778.25' RT. EL. 34.91



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-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 MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

FOR SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED), SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR MODIFIED 54" PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12x53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)	MODIFIED 54" PRESTRESSED CONCRETE GIRDERS	
	EA.	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	EA.	NO.	LIN.FT.	EA.	EA.	LIN. FT.	SQ.YDS.	LUMP SUM	LUMP SUM	NO.	LIN.FT.
SUPERSTRUCTURE		4,215	5,381									237.17				5	464.58
END BENT 1				39.4		6,167	8	8	520.00	8	4		295				
END BENT 2				39.5		6,181	8	8	480.00	8	4		320				
TOTAL	1	4,215	5,381	78.9	LUMP SUM	12,348	16	16	1000.00	16	8	237.17	615	LUMP SUM	LUMP SUM	5	464.58

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER HOLIDAY DR.
ON NC 417
BETWEEN US 17 BUS. AND
NC 210/SR 1002 (ISLAND CREEK RD.)
(RIGHT LANE)

REVISIONS						SHEET NO.
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DRAWN BY : J. F. KENNEDY DATE : 08/07/19
CHECKED BY : N. D'AIUTO DATE : 12/16/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B ISENHOUR
DocuSigned by:
10/25/2021

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.06	-	1.75	0.804	1.17	A	ER	45.75	0.927	1.10	A	I	64.33	0.80	0.751	1.06	A	I	45.75	
		HL-93 (OPERATING)	N/A		1.52	-	1.35	0.804	1.52	A	ER	45.75	0.927	1.97	A	I	73.63	N/A	-	-	-	-	-	
		HS-20 (INVENTORY)	36.000	2	1.46	52.560	1.75	0.804	1.60	A	ER	45.75	0.927	1.82	A	I	64.33	0.80	0.751	1.46	A	I	45.75	
		HS-20 (OPERATING)	36.000		2.07	74.520	1.35	0.804	2.07	A	ER	45.75	0.927	2.56	A	I	73.63	N/A	-	-	-	-	-	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.41	46.035	1.40	0.804	4.69	A	ER	45.75	0.927	6.16	A	I	73.63	0.80	0.751	3.41	A	I	45.75	
		SNGARBS2	20.000		2.49	49.800	1.40	0.804	3.42	A	ER	45.75	0.927	4.31	A	I	73.63	0.80	0.751	2.49	A	I	45.75	
		SNAGRIS2	22.000		2.33	51.260	1.40	0.804	3.21	A	ER	45.75	0.927	3.98	A	I	73.63	0.80	0.751	2.33	A	I	45.75	
		SNCOTTS3	27.250		1.70	46.325	1.40	0.804	2.33	A	ER	45.75	0.927	3.00	A	I	73.63	0.80	0.751	1.70	A	I	45.75	
		SNAGGRS4	34.925		1.40	48.895	1.40	0.804	1.92	A	ER	45.75	0.927	2.44	A	I	73.63	0.80	0.751	1.40	A	I	45.75	
		SNS5A	35.550		1.37	48.704	1.40	0.804	1.88	A	ER	45.75	0.927	2.47	A	I	73.63	0.80	0.751	1.37	A	I	45.75	
		SNS6A	39.950		1.25	49.938	1.40	0.804	1.71	A	ER	45.75	0.927	2.23	A	I	73.63	0.80	0.751	1.25	A	I	45.75	
		SNS7B	42.000		1.19	49.980	1.40	0.804	1.63	A	ER	45.75	0.927	2.18	A	I	73.63	0.80	0.751	1.19	A	I	45.75	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.52	50.160	1.40	0.804	2.08	A	ER	45.75	0.927	2.69	A	I	73.63	0.80	0.751	1.52	A	I	45.75	
		TNT4A	33.075		1.52	50.274	1.40	0.804	2.09	A	ER	45.75	0.927	2.63	A	I	73.63	0.80	0.751	1.52	A	I	45.75	
		TNT6A	41.600		1.24	51.584	1.40	0.804	1.70	A	ER	45.75	0.927	2.31	A	I	73.63	0.80	0.751	1.24	A	I	45.75	
		TNT7A	42.000		1.24	52.080	1.40	0.804	1.70	A	ER	45.75	0.927	2.27	A	I	73.63	0.80	0.751	1.24	A	I	45.75	
		TNT7B	42.000		1.27	53.340	1.40	0.804	1.74	A	ER	45.75	0.927	2.13	A	I	73.63	0.80	0.751	1.27	A	I	45.75	
		TNAGRIT4	43.000		1.22	52.460	1.40	0.804	1.67	A	ER	45.75	0.927	2.06	A	I	73.63	0.80	0.751	1.22	A	I	45.75	
		TNAGT5A	45.000		1.15	51.750	1.40	0.804	1.58	A	ER	45.75	0.927	2.04	A	I	73.63	0.80	0.751	1.15	A	I	45.75	
		TNAGT5B	45.000	3	1.14	51.300	1.40	0.804	1.56	A	ER	45.75	0.927	1.84	A	I	64.33	0.80	0.751	1.14	A	I	45.75	

LOAD FACTORS:

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

NOTES:

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

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

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

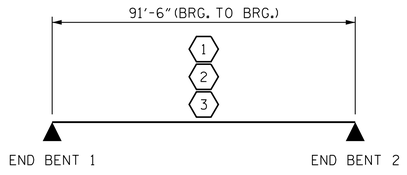
GIRDER LOCATION

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

GIRDER PROPERTIES

54" MODIFIED BULB TEE

AREA = 707 SQ. IN.
WEIGHT = 737 LB/FT.
Y_{BOTTOM} = 27.79 IN.
Y_{TOP} = 26.21 IN.
Ixx = 277,560 IN.^{4}
Iyy = 40,051 IN.^{4}
V/S = 3.23 IN.



LRFR SUMMARY

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

Stantec
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ASSEMBLED BY : J. F. KENNEDY DATE : 08/13/19
CHECKED BY : N. D'AIUTO DATE : 09/15/19

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

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

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

10/25/2021

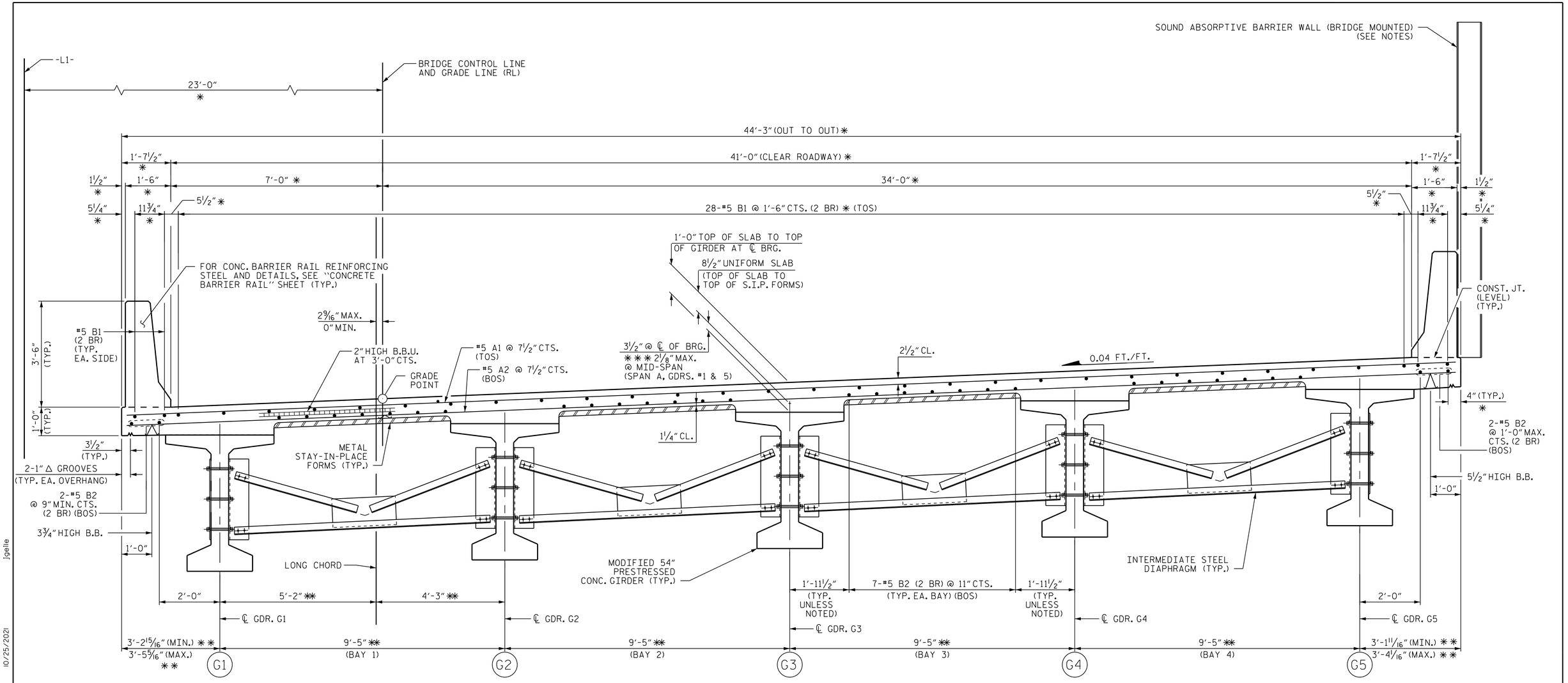
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-05
1			3			TOTAL SHEETS
2			4			30

STD. NO. LRFR1



TYPICAL SECTION - INTERMEDIATE DIAPHRAGM

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR ADDITIONAL NOTES.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

(2 BR) DENOTES 2 BAR RUN.

✳ DENOTES RADIAL DIMENSION.

(TOS) DENOTES TOP OF SLAB.

(BOS) DENOTES BOTTOM OF SLAB.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAMS FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.

FOR SOUND ABSORPTIVE BARRIER WALL, SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEET.

✳✳ DIMENSION NORMAL TO LONG CHORD.

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

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DRAWN BY : J. F. KENNEDY DATE : 08/08/19
CHECKED BY : N. D'AIUTO DATE : 08/27/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

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DocuSigned by: Melinda Isenhour
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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-06
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2			4			30

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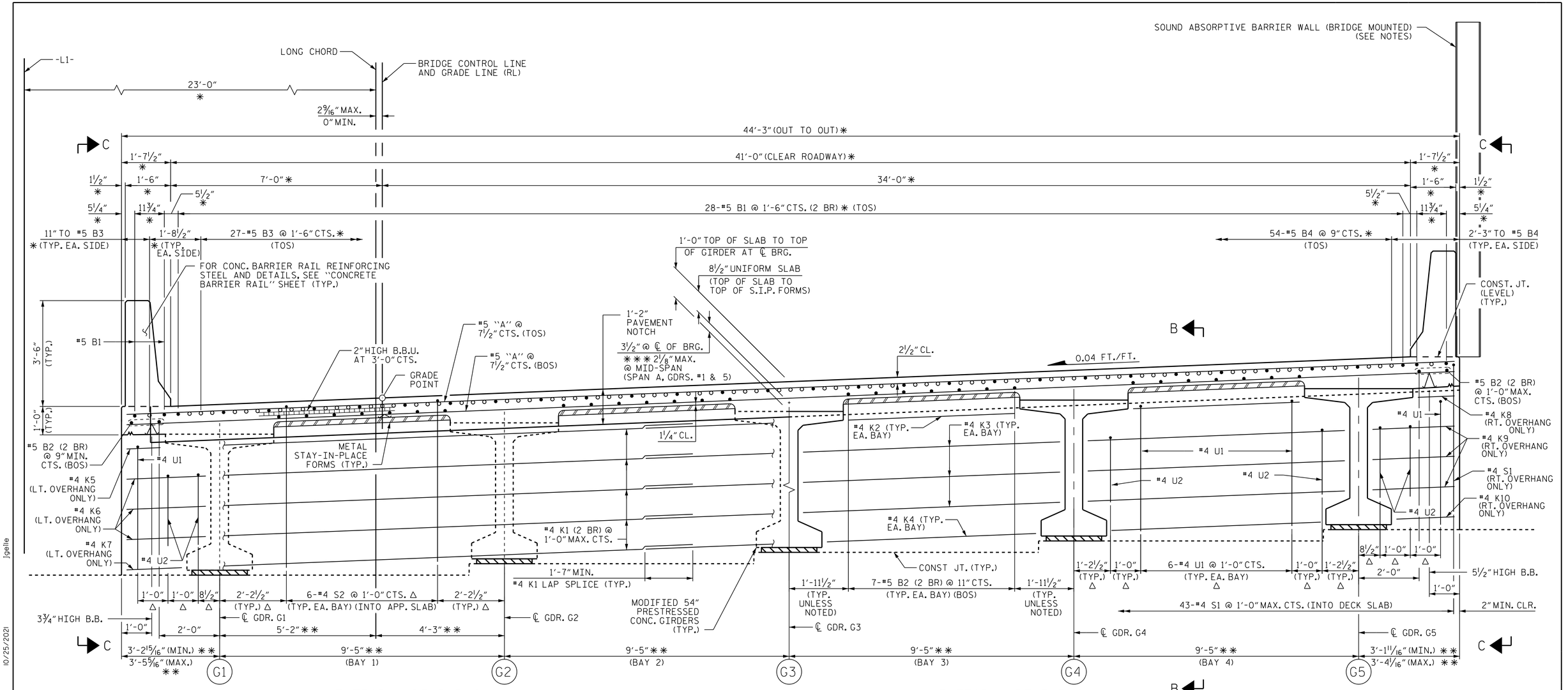


INTEGRAL DIAPHRAGM
HALF-SECTION REINFORCEMENT
AT FILL FACE

INTEGRAL DIAPHRAGM
HALF-SECTION REINFORCEMENT
AT FRONT FACE

TYPICAL SECTION - END BENT DIAPHRAGM

TYPICAL SECTIONS (AS SHOWN) SAME FOR END BENT 1 AND END BENT 2

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR ADDITIONAL NOTES.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

(2 BR) DENOTES 2 BAR RUN.

* DENOTES RADIAL DIMENSION.

△ DENOTES MEASURED ALONG ℄ BEARING. BARS TO BE PLACED PERP. TO ℄ BRG.

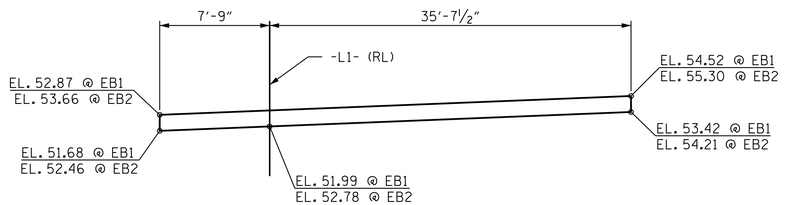
(TOS) DENOTES TOP OF SLAB.

(BOS) DENOTES BOTTOM OF SLAB.

FOR SOUND ABSORPTIVE BARRIER WALL, SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEET.

* * DIMENSION NORMAL TO LONG CHORD.

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



INTEGRAL DIAPHRAGM
APPROACH SLAB BLOCKOUT
ALONG FILL FACE

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NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER LINDA B ISENHOUR
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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-07
1			3			TOTAL SHEETS
2			4			30

NOTES

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

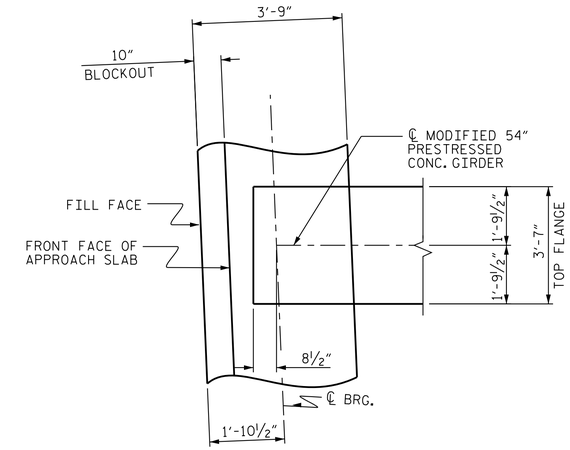
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

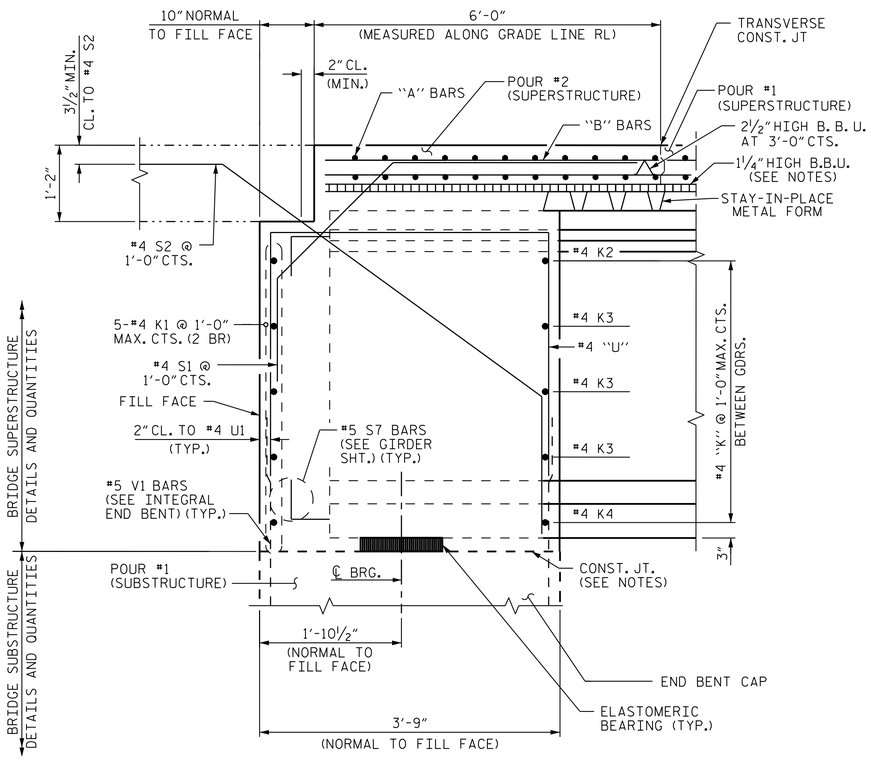
PREVIOUSLY CAST CONCRETE IN THE CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

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

2 BR DENOTES 2 BAR RUN.



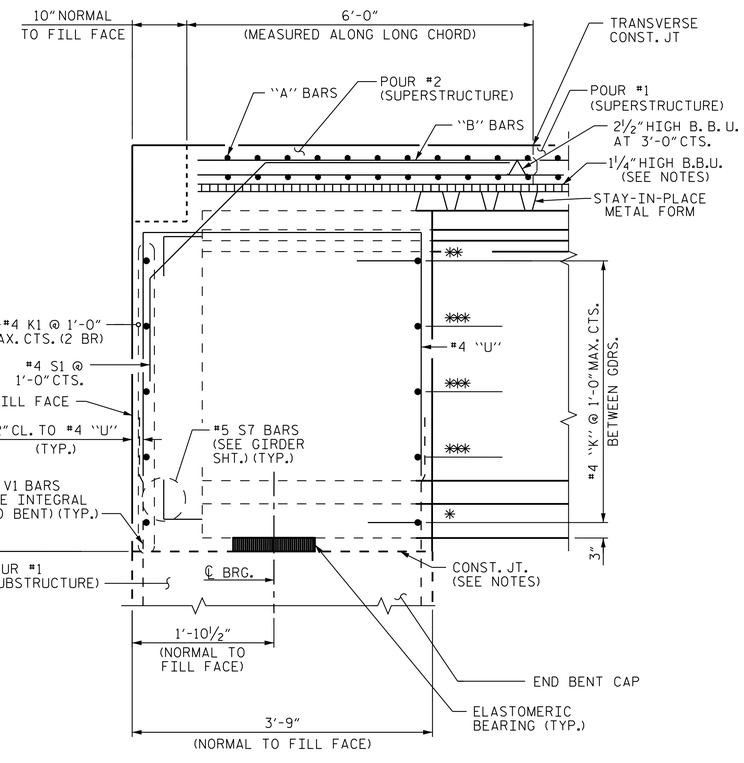
PLAN OF INTEGRAL END BENT



SECTION B-B

SECTION THRU INTEGRAL END BENT DIAPHRAGM.

SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS", SHT. 2 OF 2" FOR MORE DETAILS.



VIEW C-C

* #4 K7 - LEFT OVERHANG
#4 K10 - RIGHT OVERHANG

** #4 K5 - LEFT OVERHANG
#4 K8 - RIGHT OVERHANG

*** #4 K6 - LEFT OVERHANG
#4 K9 - RIGHT OVERHANG

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PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION DETAILS

(RIGHT LANE)

REVISIONS						SHEET NO.
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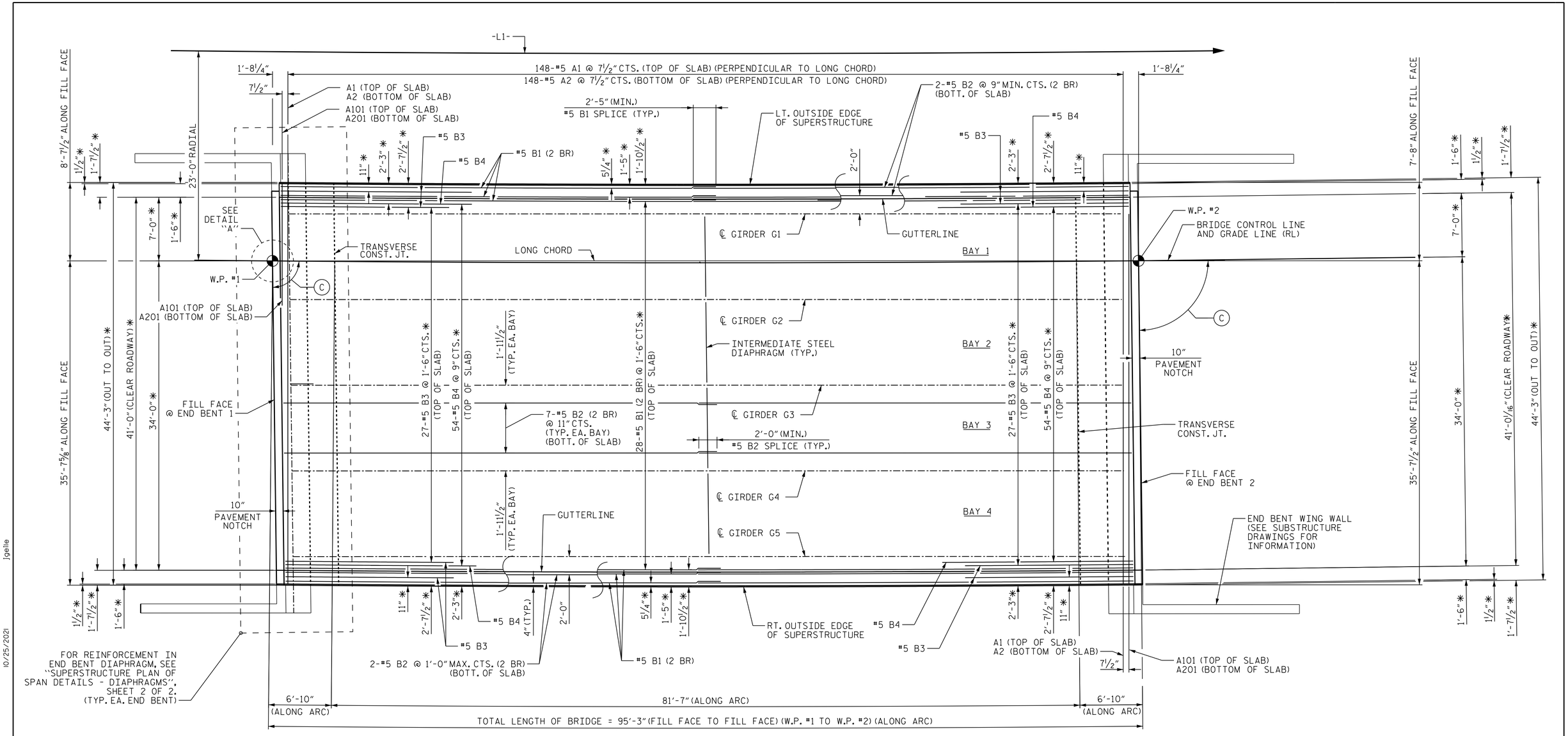
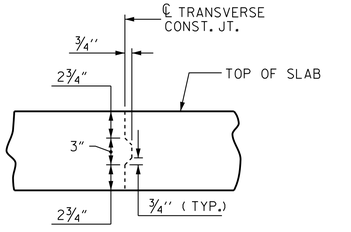


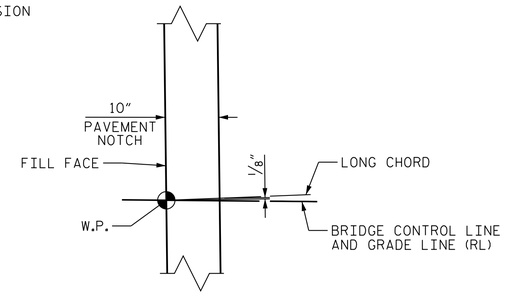
PLAN OF SPAN A

* - DENOTES RADIAL DIMENSION



TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

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



DETAIL "A"

W.P. #2 SIMILAR BY ROTATION.

℄ 89°17'41" (TO LONG CHORD) (TYP.)

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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PLAN OF SPANS (SPAN A)

(RIGHT LANE)

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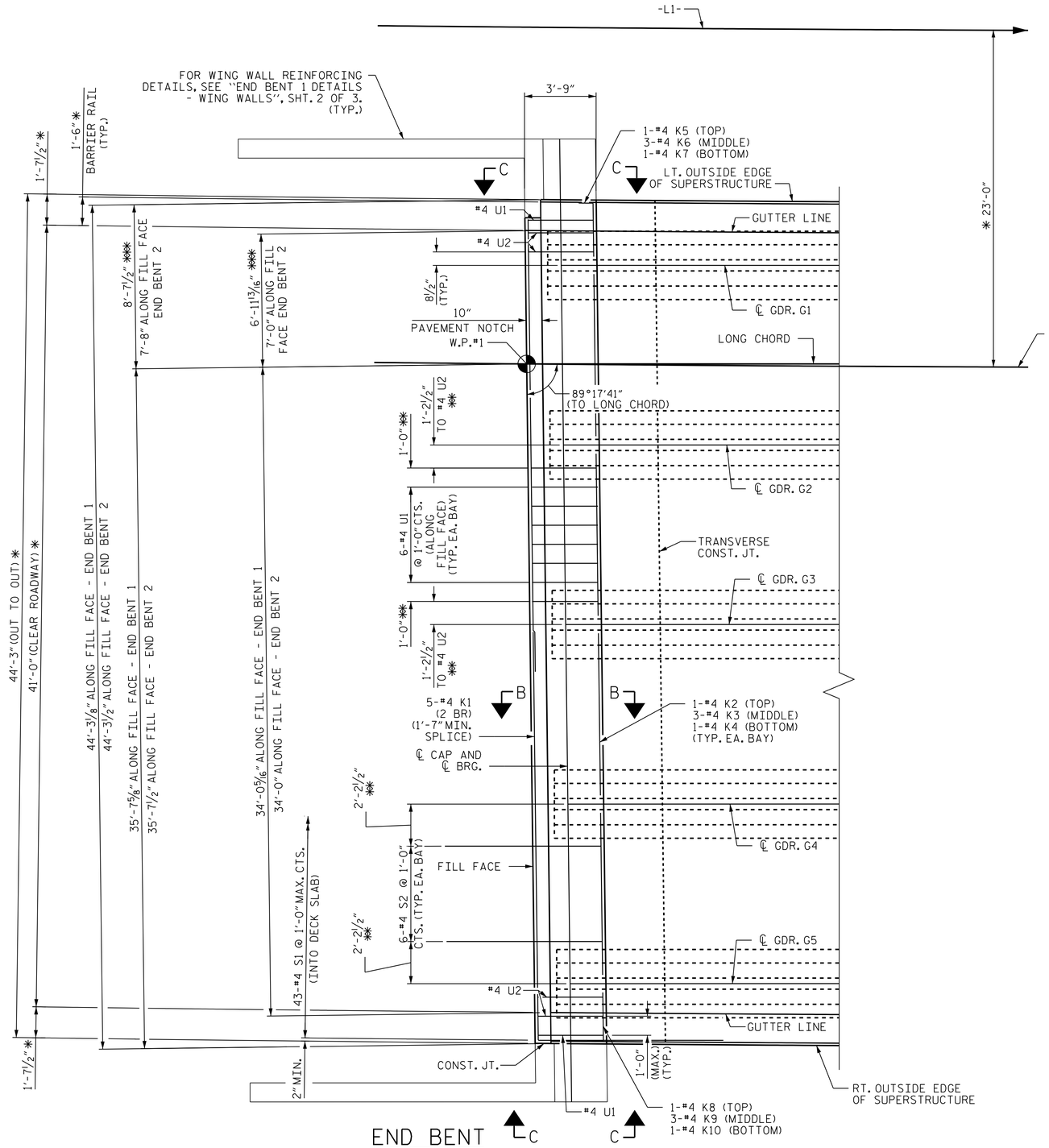

END BENT DIAPHRAGM REINFORCING DETAIL

* RADIAL DIMENSION *** ALONG FILL FACE - END BENT 1

** (TYP. EA. BAY)

END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION.

NOTES

REINFORCEMENT IN DECK AND BARRIER RAIL NOT SHOWN FOR CLARITY.

FOR SECTION B-B & VIEW C-C, SEE "TYPICAL SECTION (DETAILS)" SHEET 3 OF 3.

(2 BR) DENOTES 2 BAR RUN

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

FOR POUR SEQUENCE, SEE "BILL OF MATERIALS" SHEET

REINFORCING STEEL OUTSIDE EXTERIOR GIRDERS IN DIAPHRAGMS SHOULD REMAIN IN SAME LOCATION END BENT 1 TO END BENT 2.

SOUND ABSORPTIVE BARRIER WALL NOT SHOWN FOR CLARITY. SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEETS FOR DETAILS.

FOR TRANSVERSE CONST. JT. LOCATIONS & DETAILS, SEE "BILL OF MATERIALS" SHEET.

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
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RALEIGH

PLAN OF SPANS DETAILS - DIAPHRAGMS

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-10
1			3			TOTAL SHEETS
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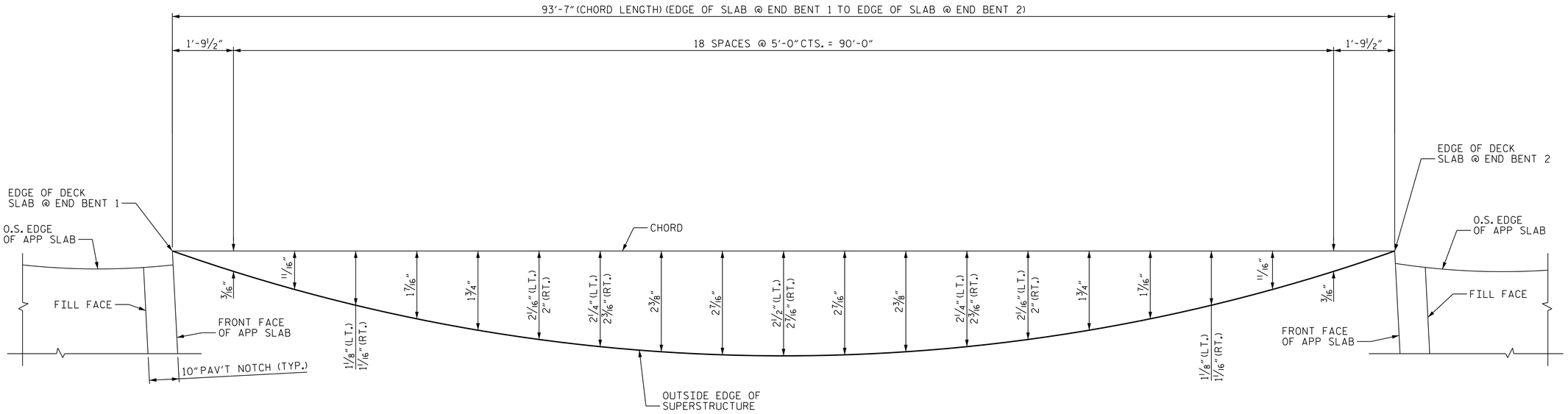
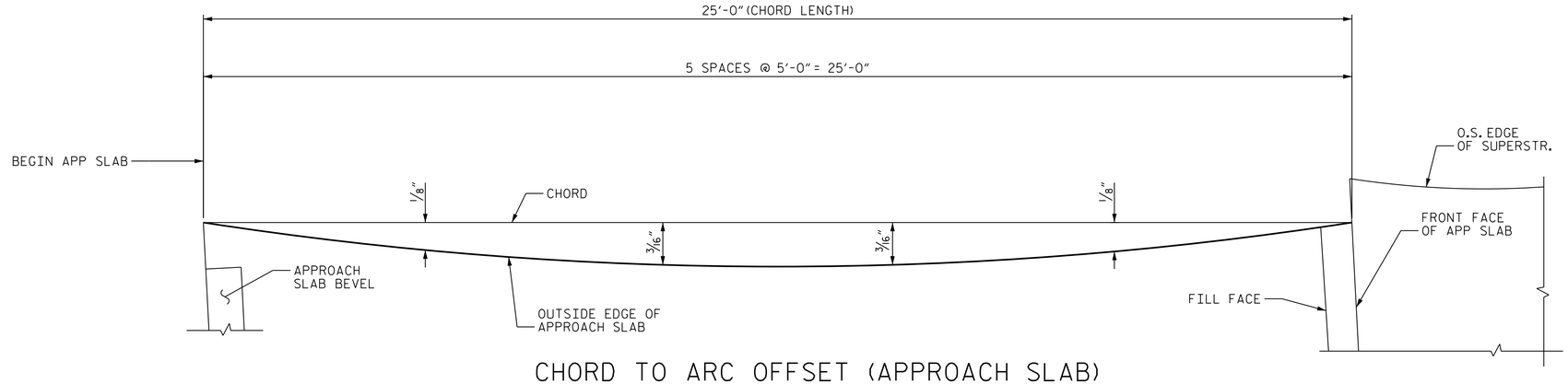


CHORD TO ARC OFFSET (DECK SLAB)

(LT. SHOWN, RT. OUTSIDE EDGE OF SUPERSTRUCTURE SIMILAR)
(DIMENSIONS ARE TYP. EA. EDGE OF SUPERSTRUCTURE UNLESS OTHERWISE NOTED)

RIGHT SIDE OF APP. SLAB IS COINCIDENT W/O.S. EDGE OF SUPERSTRUCTURE



CHORD TO ARC OFFSET (APPROACH SLAB)

(LT. & RT. OUTSIDE EDGE OF APPROACH SLABS) (TYP.)
(END BENT 1 APP SLAB SHOWN) (END BENT 2 APP SLAB SIMILAR)
FOR ADDITIONAL APPROACH SLAB INFORMATION,
SEE APPROACH SLAB SHEETS

RIGHT SIDE OF APP. SLAB IS COINCIDENT W/O.S. EDGE OF SUPERSTRUCTURE

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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ARC OFFSETS

(RIGHT LANE)

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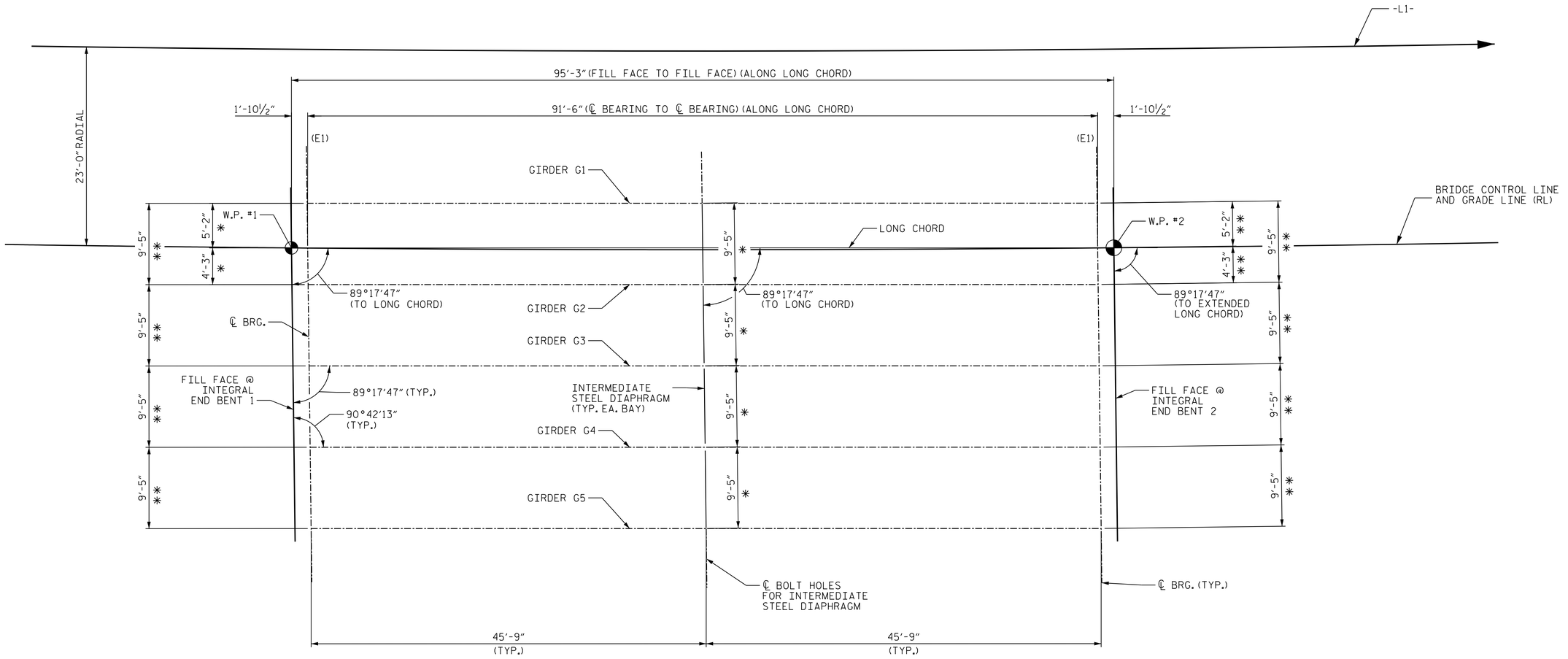

NOTES:

(E1) DENOTES ELASTOMETRIC BEARING. (SEE "ELASTOMETRIC BEARING DETAILS" SHEET)

SEE TYPICAL SECTION FOR INTEGRAL END BENT DETAILS

ALL DIMENSIONS ARE VERTICAL OR HORIZONTAL UNLESS NOTED OTHERWISE.

SPAN A

FRAMING PLAN

* ALONG CENTERLINE BOLT HOLES FOR INTERMEDIATE STEEL DIAPHRAGM

** ALONG FILL FACE (TYP.)

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
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RALEIGH
SUPERSTRUCTURE

FRAMING PLAN

(RIGHT LANE)

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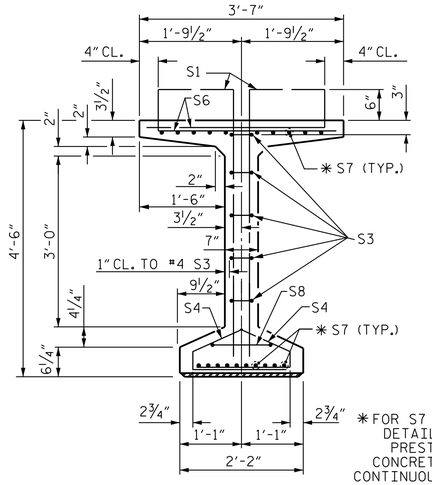
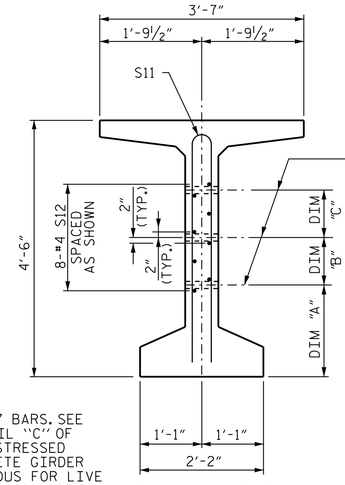


SECTION B-B

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

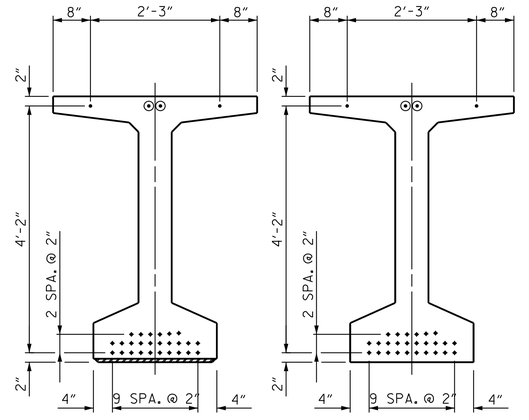


SECTION C-C

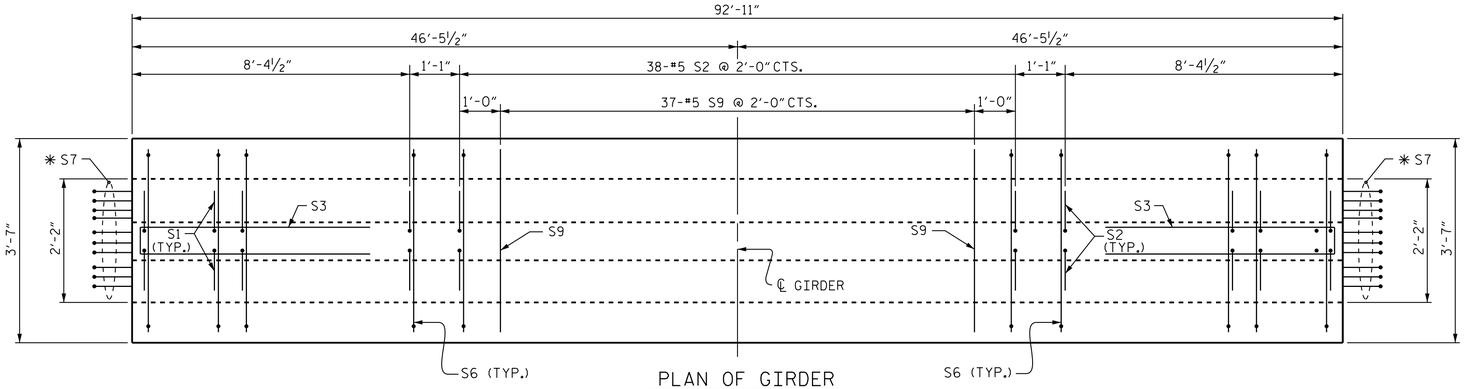
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⊙ FULLY DEBONDED OPTIONAL STRANDS SEE NOTES, SHEET 2 OF 2.

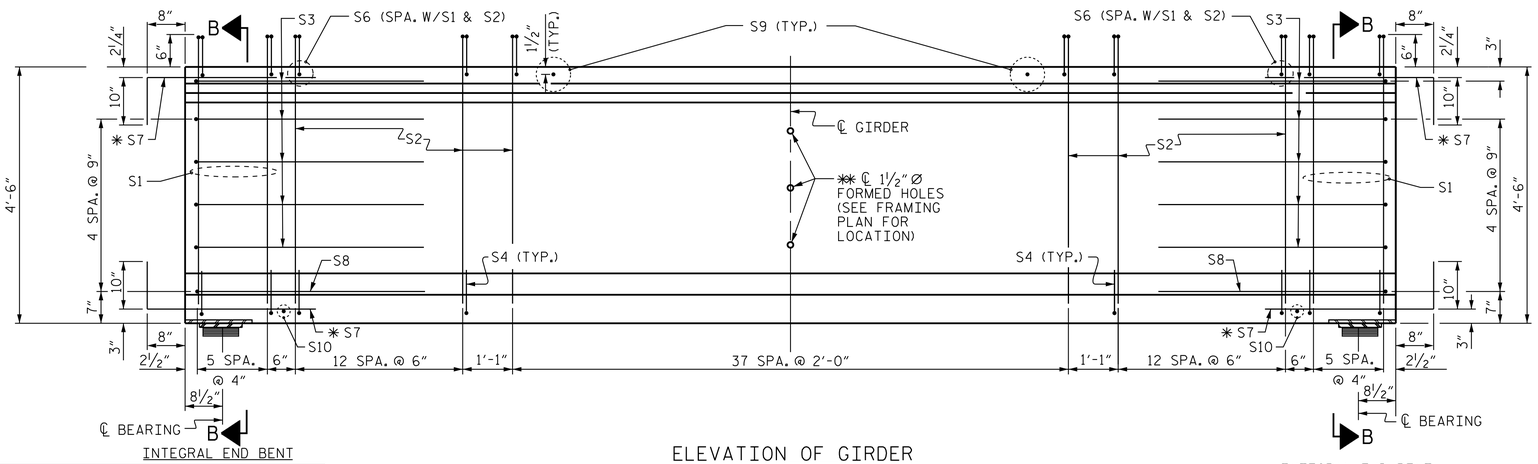
(S2, S6 AND S9 BARS NOT SHOWN)



0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

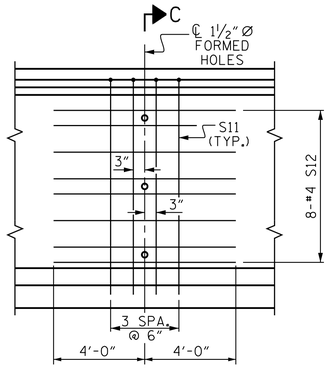


INTEGRAL END BENT

ELEVATION OF GIRDER

✱✱FOR LOCATION OF FORMED HOLES, SEE "INTERMEDIATE STEEL DIAPHRAGM" SHEET FOR DIM "A", DIM "B", & DIM "C"

INTEGRAL END BENT



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

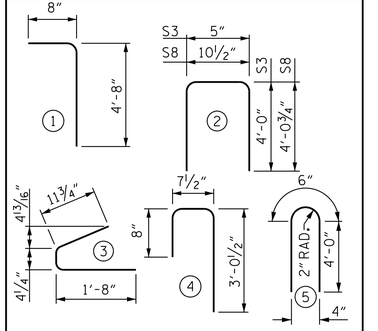
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	24	#6	1	5'-4"	193
S2	128	#5	1	5'-4"	713
S3	10	#4	2	8'-5"	57
S4	76	#4	3	3'-0"	153
S6	152	#5	4	4'-4"	687
✱S7	40	#5	STR.	3'-8"	153
S8	2	#5	2	9'-0"	19
S9	37	#5	STR.	3'-3"	126
S10	2	#3	STR.	1'-10"	2
S11	4	#5	5	8'-6"	36
S12	8	#4	STR.	8'-0"	43

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER	2,182	16.9	28

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	92'-11"	464'-7"

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

54" MODIFIED BULB TEE

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
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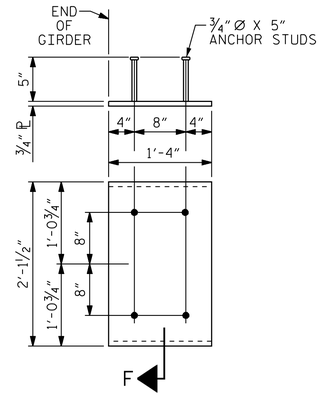
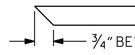


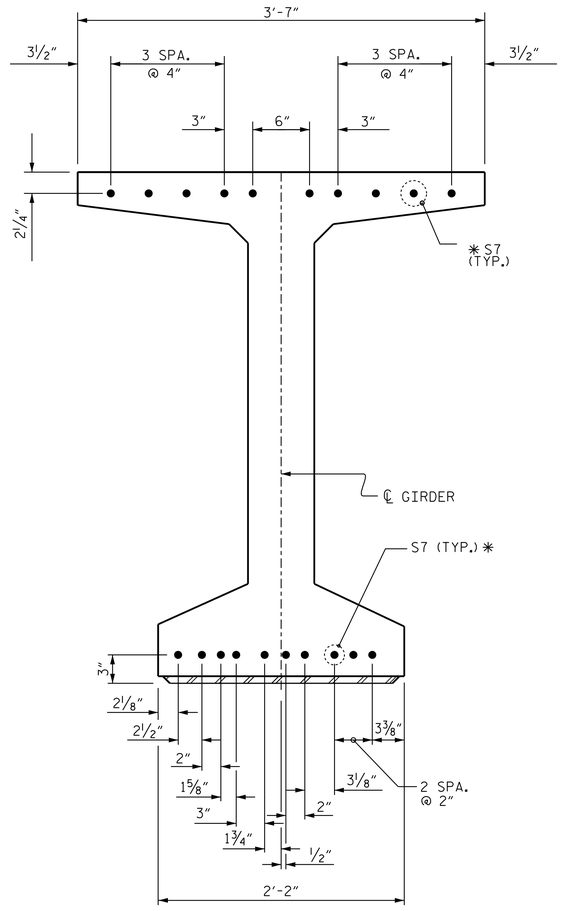
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO 54" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)



DETAIL "C"

(FOR 54" MODIFIED BULB TEES)
* SEE NOTE, SHT 1 OF 2.

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.

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

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

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

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

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", 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 54" 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.

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. SEE STANDARD SPECIFICATIONS FOR CALCIUM NITRITE CORROSION INHIBITOR.

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DRAWN BY : J. F. KENNEDY DATE : 08/13/19
CHECKED BY : N. D'AIUTO DATE : 08/26/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
DocuSigned by: Melinda Isenhour
10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
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RALEIGH

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

(RIGHT LANE)

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1			3			TOTAL SHEETS
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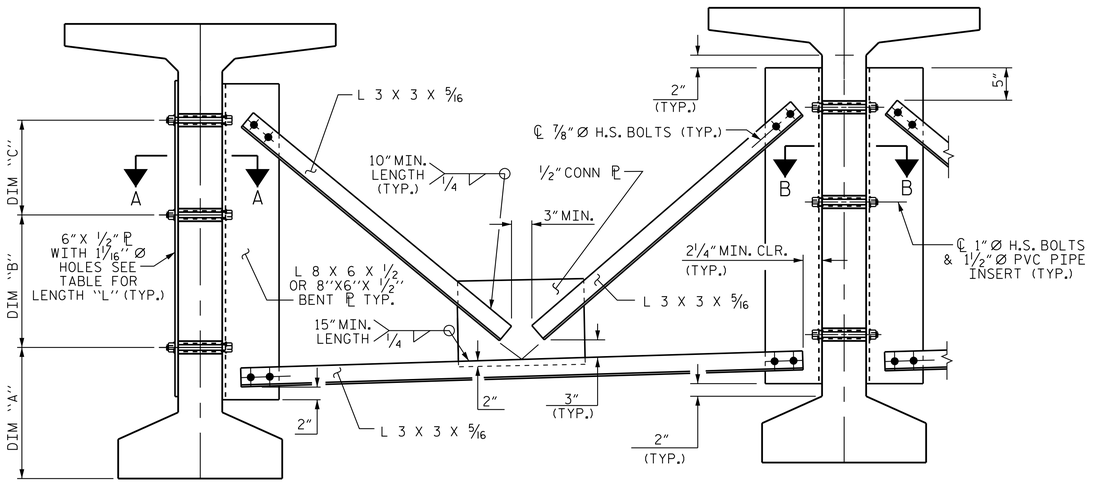
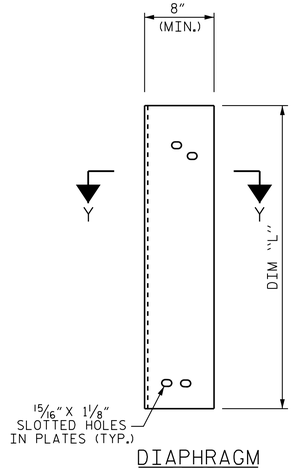


EXTERIOR GIRDER

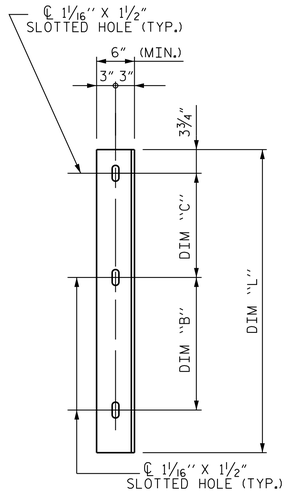
INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

(54" BULB TEE GIRDER SHOWN)



DIAPHRAGM FACE



WEB FACE

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.

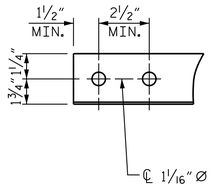
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW. COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

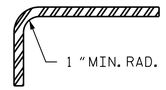
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
54" BULB TEE	1'-4 1/2"	1'-0"	1'-0"	2'-8"

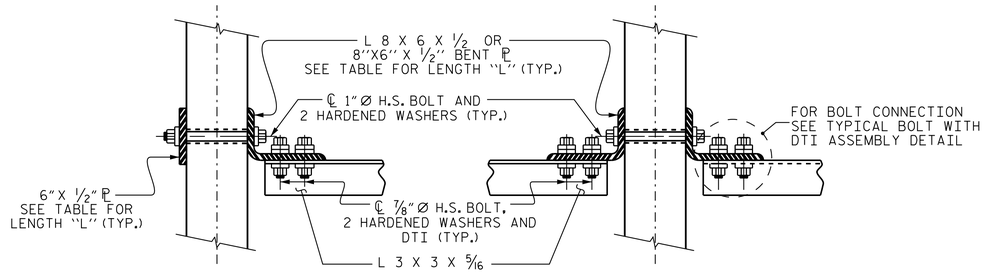


ANGLE END
(L 3 X 3 X 5/16)



SECTION Y-Y

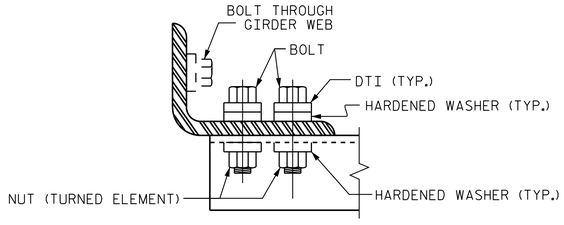
CONNECTOR PLATE DETAIL



SECTION A-A

SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INTERMEDIATE STEEL DIAPHRAGMS FOR 54" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS (RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
Digitally Signed by Melinda B. Isenhour
10/25/2021

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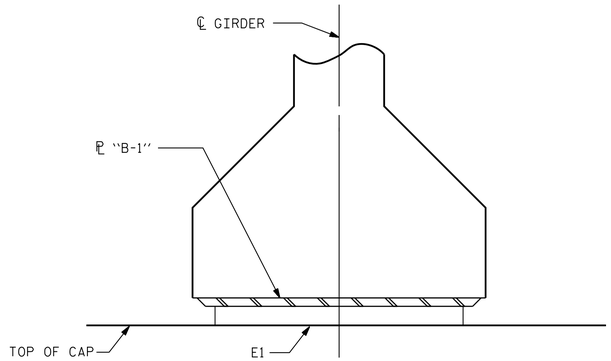
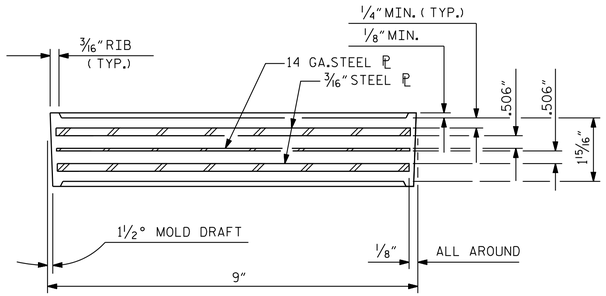
DRAWN BY : J. F. KENNEDY DATE : 08/08/19
CHECKED BY : N. D'AIUTO DATE : 08/26/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

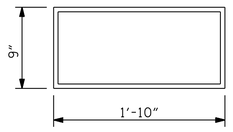


FIXED

SECTION E-E



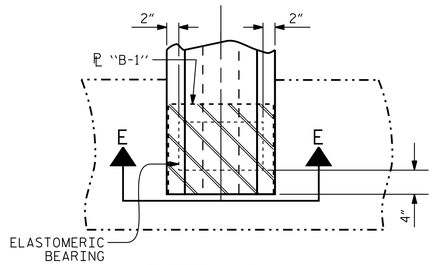
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (10 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



TYPICAL PLAN

(SHOWING INTEGRAL END BENT)

NOTES

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

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

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DRAWN BY : WJH 8/89
CHECKED BY : CRK 8/89

REV. 6/13 AAC/MAA
REV. 1/15 MAA/TMG
REV. 12/17 MAA/THC

DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER LINDA B ISENHOUR
Doc Signed by:
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DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

(RIGHT LANE)

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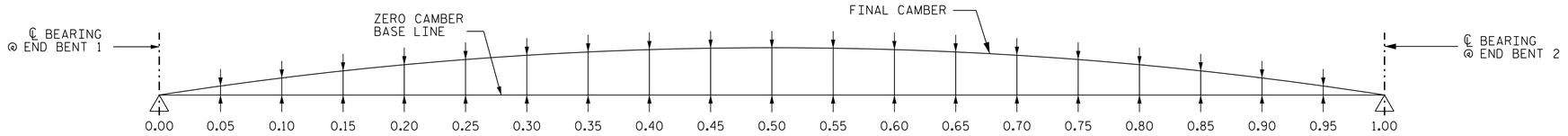
2			4			30

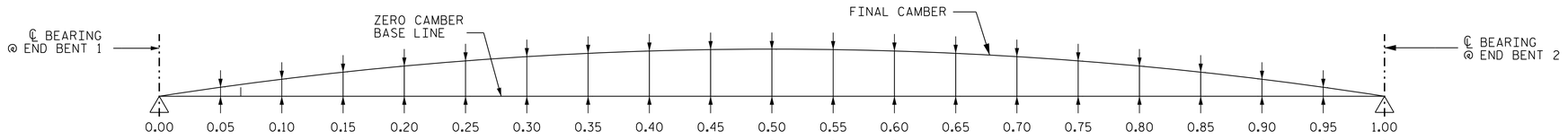
STD. NO. EB3



GIRDERS 1 & 5

	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.036	0.071	0.104	0.134	0.160	0.183	0.201	0.214	0.222	0.225	0.222	0.214	0.201	0.183	0.160	0.134	0.104	0.071	0.036	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ✳ ↓	0.000	0.016	0.033	0.049	0.065	0.078	0.090	0.098	0.106	0.109	0.112	0.109	0.106	0.098	0.090	0.078	0.065	0.049	0.033	0.016	0.000
FINAL CAMBER ↑	+0″	+1/4″	+7/16″	+5/8″	+13/16″	+1″	+1 1/8″	+1 1/4″	+1 5/16″	+1 3/8″	+1 3/8″	+1 3/8″	+1 5/16″	+1 1/4″	+1 1/8″	+1″	+13/16″	+5/8″	+7/16″	+1/4″	+0″

✳ INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.



GIRDERS 2 THRU 4

	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.036	0.071	0.104	0.134	0.160	0.183	0.201	0.214	0.222	0.225	0.222	0.214	0.201	0.183	0.160	0.134	0.104	0.071	0.036	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ✳ ↓	0.000	0.018	0.036	0.054	0.072	0.086	0.100	0.109	0.117	0.120	0.123	0.120	0.117	0.109	0.100	0.086	0.072	0.054	0.036	0.018	0.000
FINAL CAMBER ↑	+0″	+3/16″	+7/16″	+9/16″	+3/4″	+7/8″	+1″	+1 1/8″	+1 3/16″	+1 1/4″	+1 1/4″	+1 1/4″	+1 3/16″	+1 1/8″	+1″	+7/8″	+3/4″	+9/16″	+7/16″	+3/16″	+0″

✳ INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES (SPAN A)

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER (OR DEFLECTION)" WHICH IS SHOWN IN INCHES.

(+) FINAL CAMBER INDICATES NET UPWARD DISPLACEMENT.

(-) FINAL CAMBER INDICATES NET DOWNWARD DISPLACEMENT.

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NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B ISENHOUR
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SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

(RIGHT LANE)

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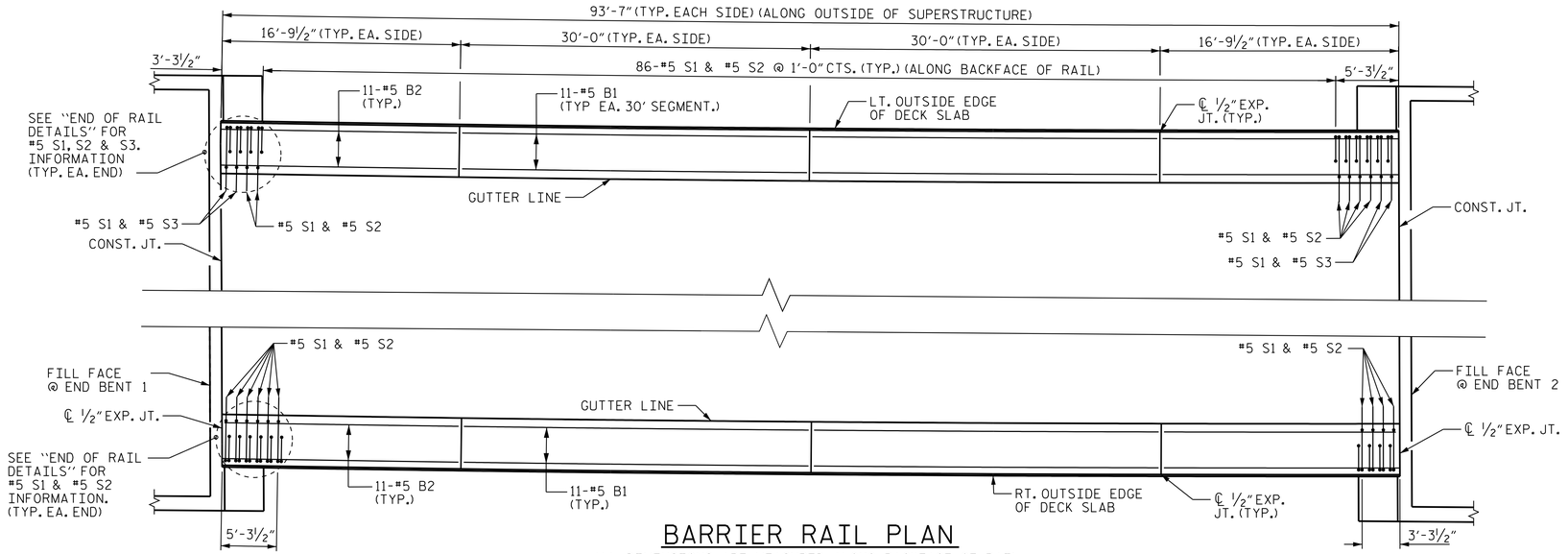


BARRIER RAIL PLAN

ALL DIMENSIONS ARE MEASURED ALONG BACKFACE OF RAIL

SOUND ABSORPTIVE BARRIER WALL POSTS NOT SHOWN FOR CLARITY. FOR SOUND ABSORPTIVE BARRIER WALL LAYOUT, SEE "SOUND ABSORPTIVE BARRIER WALL (BRIDGE MOUNTED)" SHEET.

NOTES

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

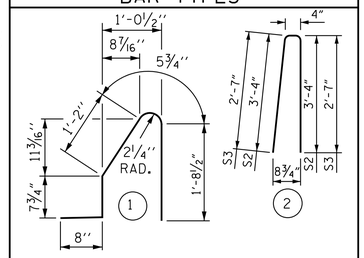
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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.

BARRIER RAIL ON APP. SLAB NOT IS INCLUDED IN QUANTITY TABLE.

FOR BARRIER RAIL ON APPROACH SLAB, SEE APPROACH SLAB SHT. 1 OF 2.

BAR TYPES

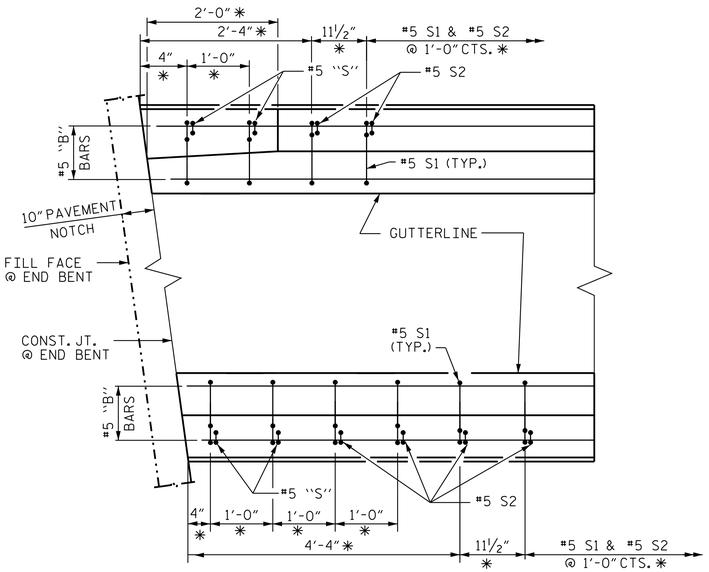


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

CONCRETE BARRIER RAIL ON BRIDGE ONLY

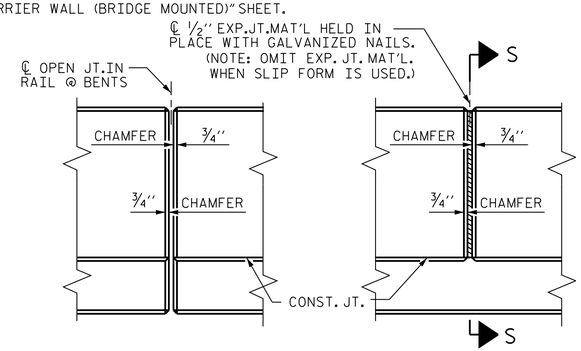
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	29'-7"	1358
* B2	44	#5	STR	16'-5"	754
* S1	188	#5	1	4'-8"	915
* S2	184	#5	2	7'-0"	1343
* S3	4	#5	2	5'-6"	23
* EPOXY COATED REINFORCING STEEL					4,393 LBS.
CLASS AA CONCRETE					25.7 CU. YDS.
CONCRETE BARRIER RAIL					187.17 LIN. FT.



PLAN

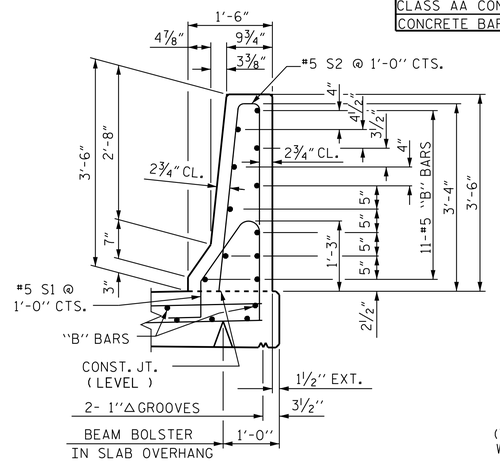
* ALONG BACKFACE OF RAIL

END BENT 1 SHOWN. END BENT 2 SIMILAR BY ROTATION, WITH EXCEPTION OF BEVELED END (AS SHOWN IN "END OF RAIL DETAILS"), WHICH IS ON BOTH ENDS OF LT. SIDE BARRIER RAIL AT END BENT 1 AND END BENT 2. SEE BARRIER RAIL PLAN ABOVE, FOR LOCATION OF #5 S1, #5 S2 & #5 S3.

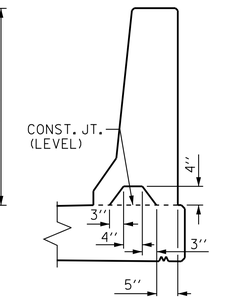


ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

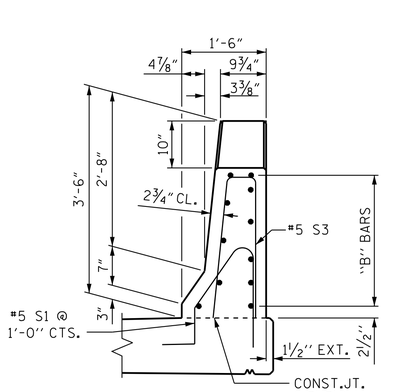


SECTION THRU RAIL

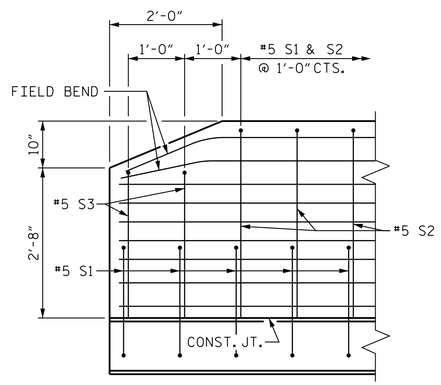


SECTION S-S

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



END VIEW



SIDE VIEW

END OF RAIL DETAILS

APPLICABLE TO EA. END OF THE LT. SIDE OF BRIDGE ONLY.

PROJECT NO. R-3300B

PENDER COUNTY

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CONCRETE BARRIER RAIL

(RIGHT LANE)

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DRAWN BY : J. E. HAGENBUSH DATE : 09/18/19
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DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049756 ENGINEER MELINDA B. ISENHOUR
Doc Signed by:
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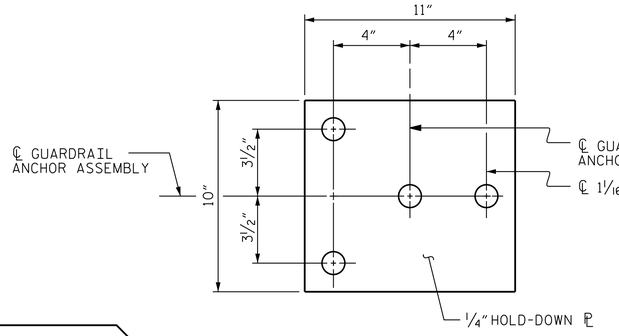
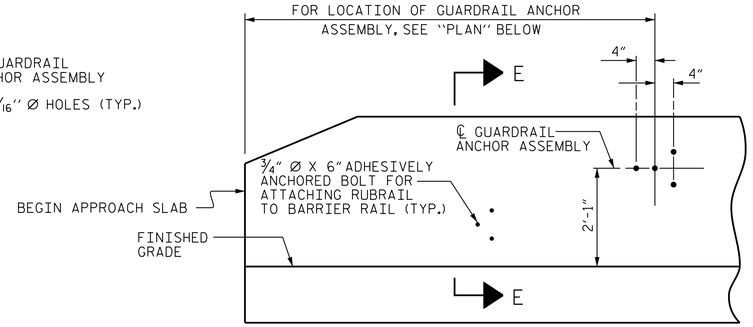
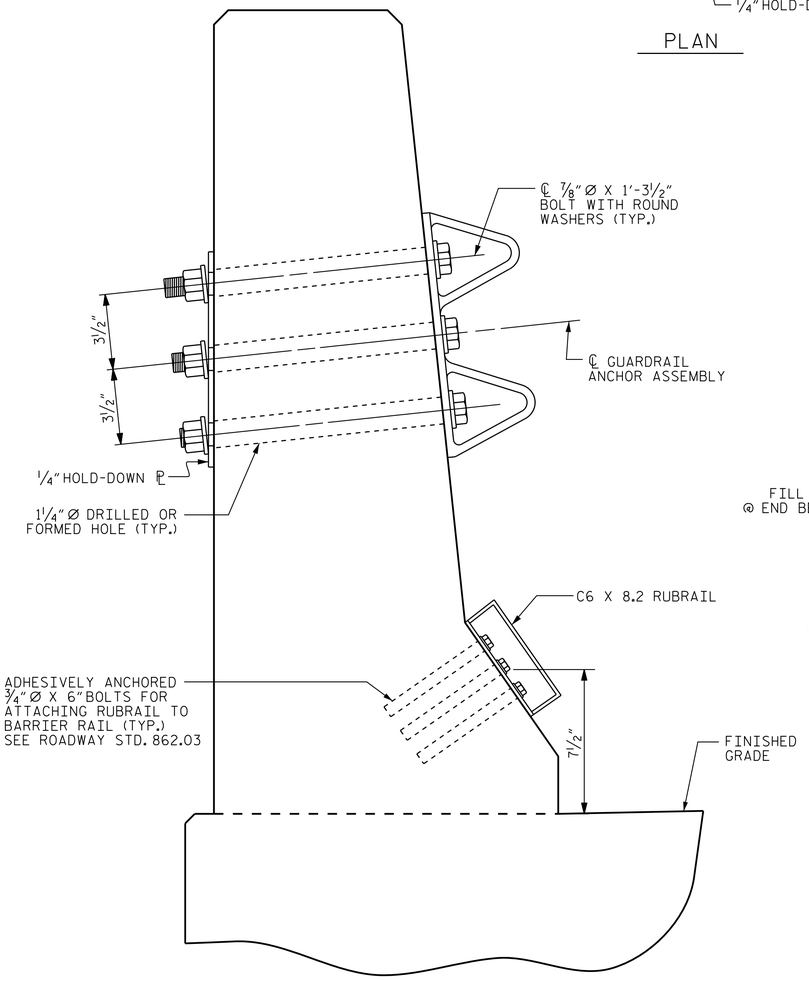


PLAN

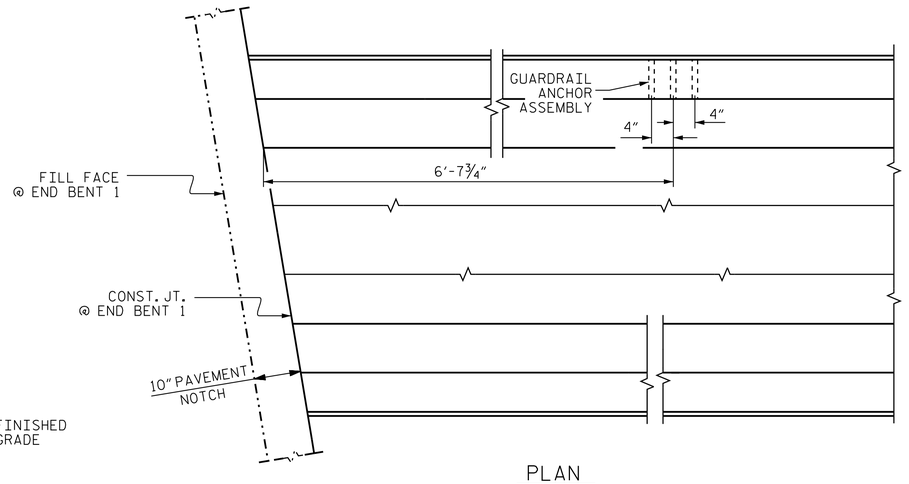


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN.

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.)

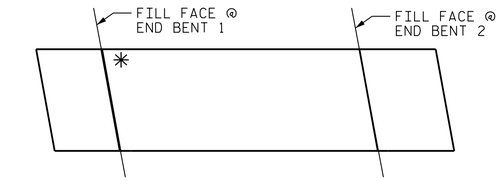
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

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DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 049756 ENGINEER MELINDA B. ISENHOUR
Docusigned by: Melinda B. Isenhour
10/25/2021

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

(RIGHT LANE)

REVISIONS						SHEET NO.
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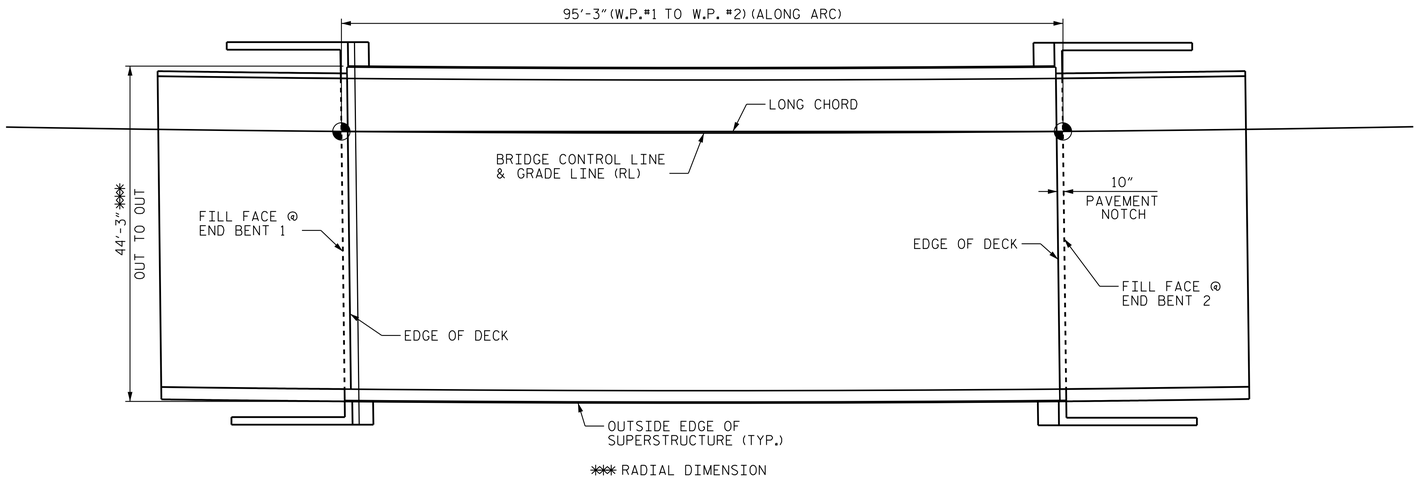
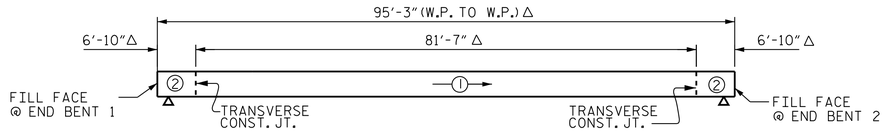
1			3			TOTAL SHEETS
2			4			30



*** RADIAL DIMENSION

LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 4,215)

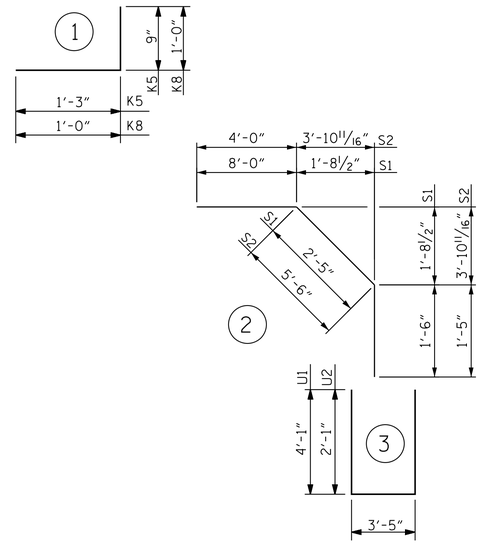


POURING SEQUENCE

Δ DENOTES ALONG ARC

←(#)— = INDICATES POUR NUMBER AND DIRECTION OF POUR

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	148	#5	STR	43'-11"	6,780
A2	148	#5	STR	43'-11"	6,780
✳ A101	2	#5	STR	13'-4"	28
A201	2	#5	STR	13'-4"	28
✳ B1	64	#5	STR	47'-10"	3,193
B2	64	#5	STR	47'-8"	3,182
✳ B3	58	#5	STR	19'-1"	1,155
✳ B4	108	#5	STR	25'-1"	2,826
K1	20	#4	STR	22'-9"	304
K2	8	#4	STR	5'-6"	30
K3	24	#4	STR	8'-6"	137
K4	8	#4	STR	6'-11"	37
K5	2	#4	1	2'-0"	3
K6	6	#4	STR	2'-9"	12
K7	2	#4	STR	2'-2"	3
K8	2	#4	1	2'-0"	3
K9	6	#4	STR	2'-6"	11
K10	2	#4	STR	2'-0"	3
✳ S1	86	#4	2	11'-11"	685
✳ S2	48	#4	2	10'-11"	351
U1	52	#4	3	11'-7"	403
U2	24	#4	3	7'-7"	122

REINFORCING STEEL	11,058 LBS
✳ EPOXY COATED REINFORCING STEEL	15,018 LBS

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	120.4	11,058	15,018
POUR #2	71.0		
TOTALS **	191.4	11,058	15,018

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

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

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

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,837 SQ.FT.
BRIDGE DECK	3,544 SQ.FT.
TOTAL	5,381 SQ.FT.

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CHECKED BY : N. D'AIUTO DATE : 09/18/19
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NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER LINDA B ISENHOUR
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PROJECT NO. R-3300B
PENDER COUNTY
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BILL OF MATERIAL

(RIGHT LANE)

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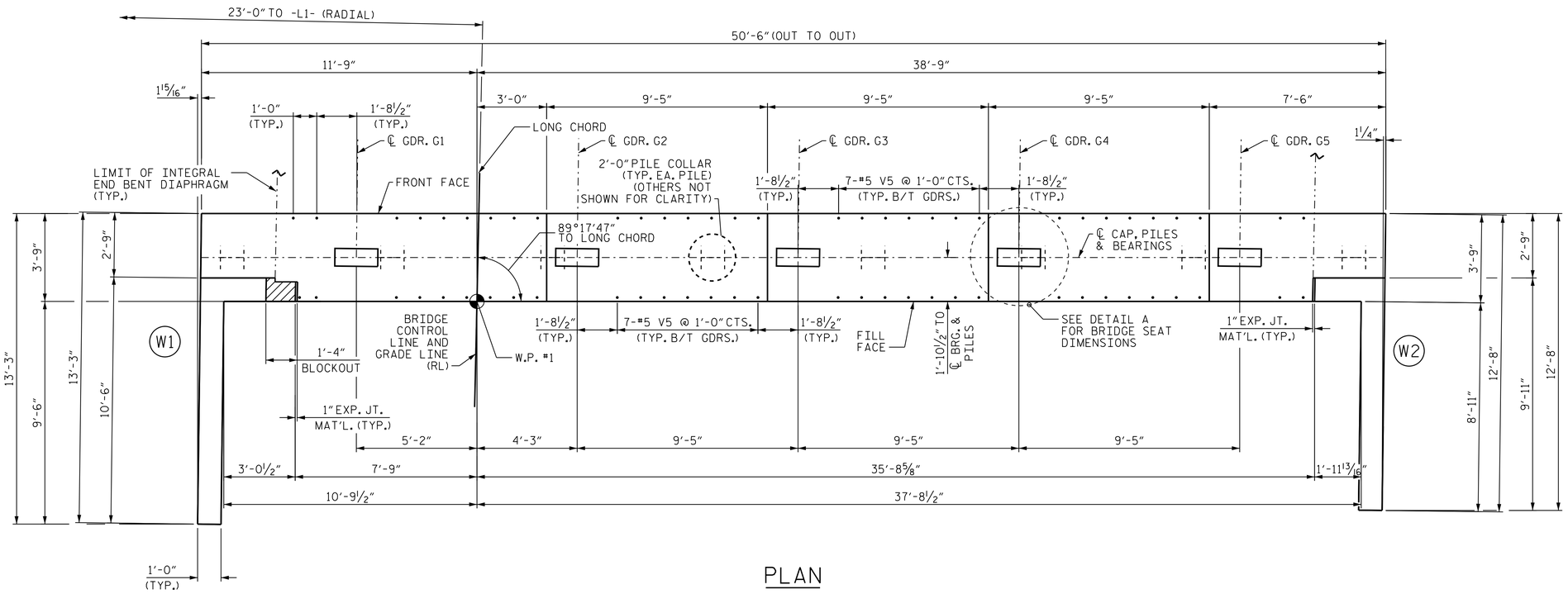


PLAN

NOTES

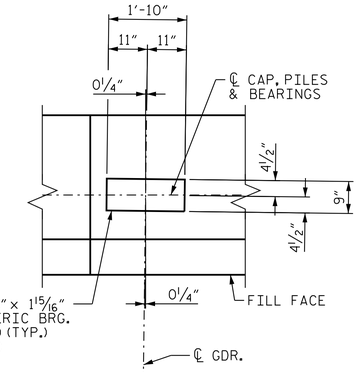
STIRRUPS IN CAP MAY BE SLIGHTLY SHIFTED AS NECESSARY ANY CONFLICTS WITH OTHER REINFORCING STEEL.

2 BR DENOTES 2 BAR RUN

SEE "END BENT 1 DETAILS", SHEET 3 OF 3, FOR SECITION A-A.

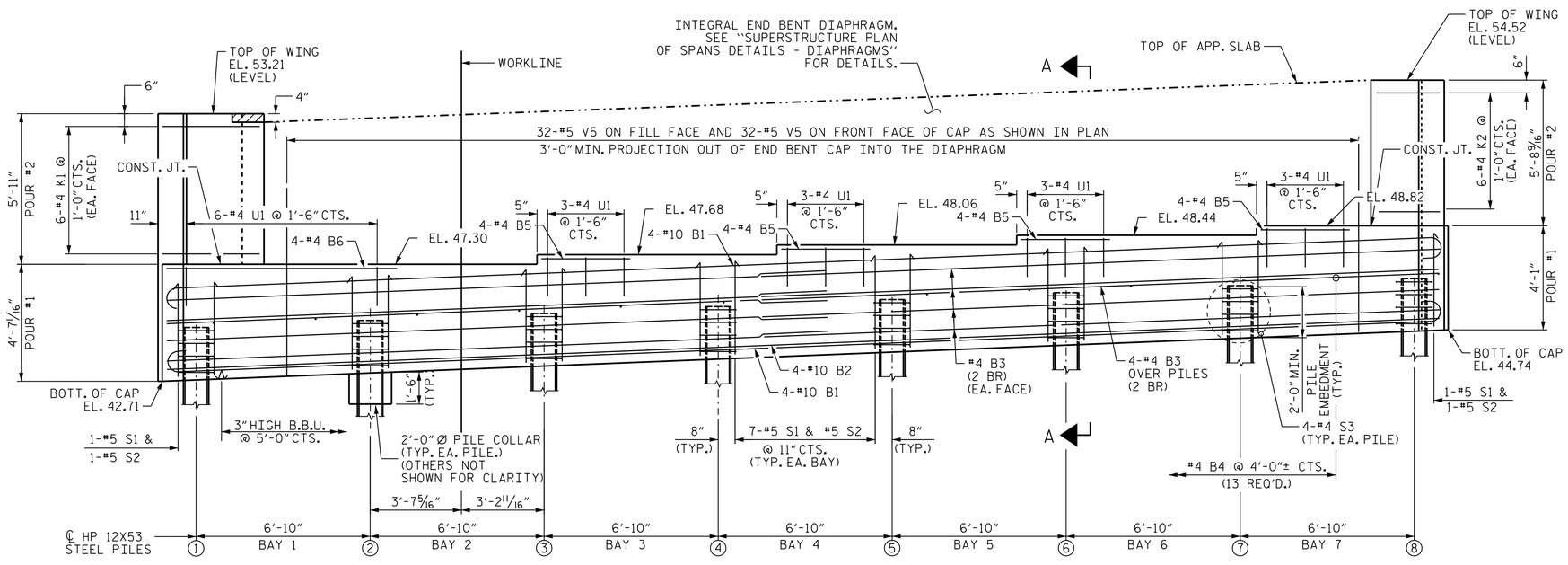
SEE SHEET 2 OF 3 FOR WING WALL DETAILS.

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



DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING AT THE CONTRACTOR'S OPTION, THE BEARING CAN BE PLACED PARALLEL TO THE ℄ CAP.



ELEVATION

SEE MIN. SPLICE CHART FOR SPLICE LENGTH

TOP OF PILE ELEVATIONS	
PILE #	ELEVATION
1	44.84
2	45.09
3	45.35
4	45.61
5	45.87
6	46.13
7	46.38
8	46.64

MIN. SPLICE	
#4 B3	2'-5"

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 1

(RIGHT LANE)

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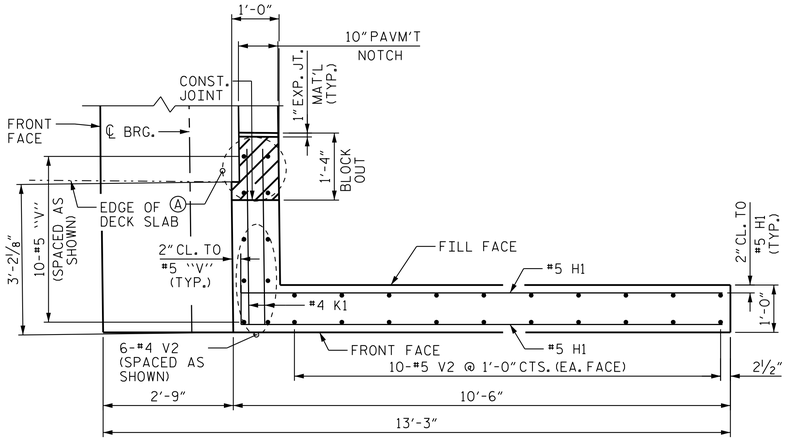
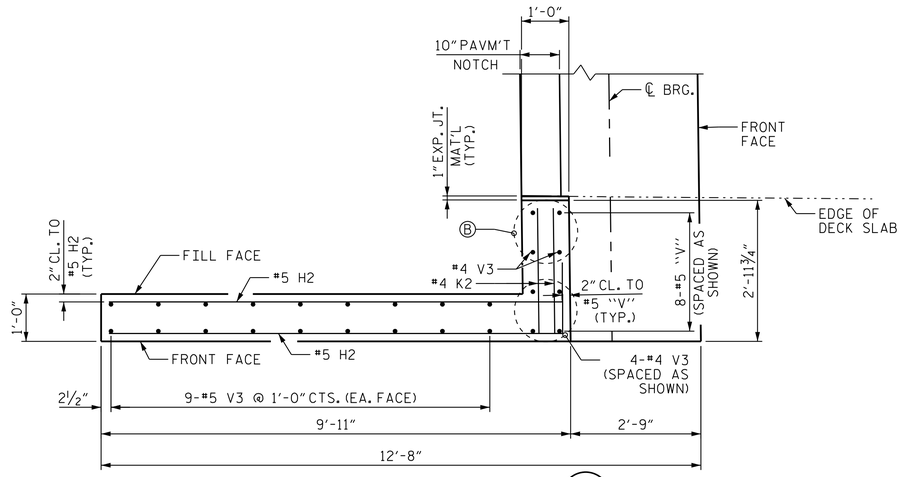


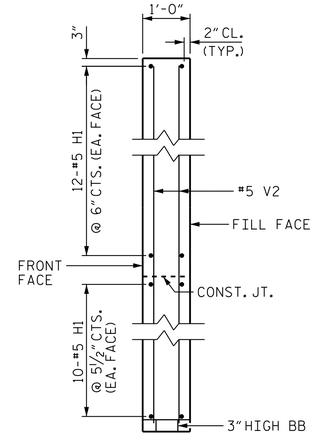
PLAN OF LEFT WING (W1)



PLAN OF RIGHT WING (W2)

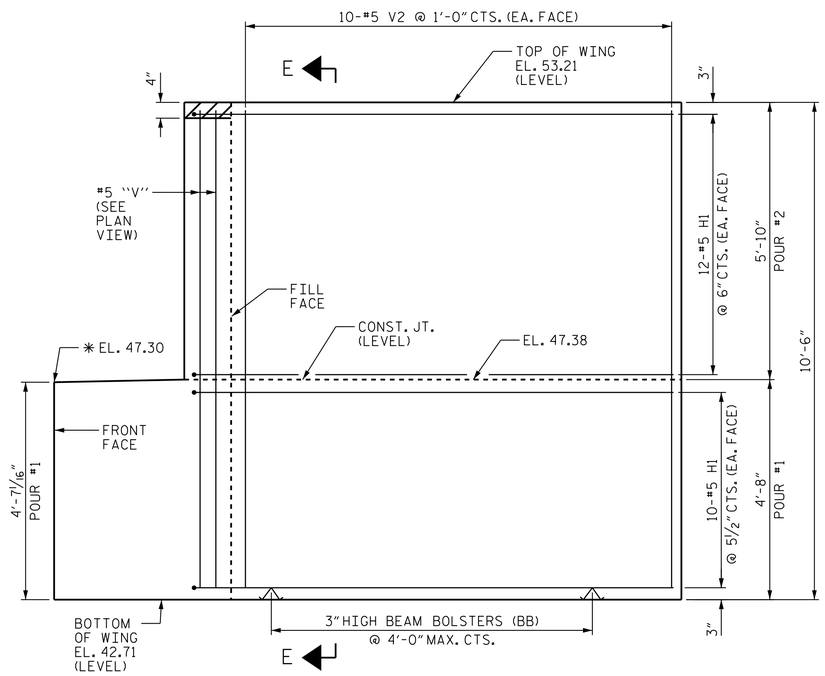
Ⓐ 4-#4 V1 (SPACED AS SHOWN)

Ⓑ 2-#4 V4 & 2-#4 V3 (SPACED AS SHOWN)



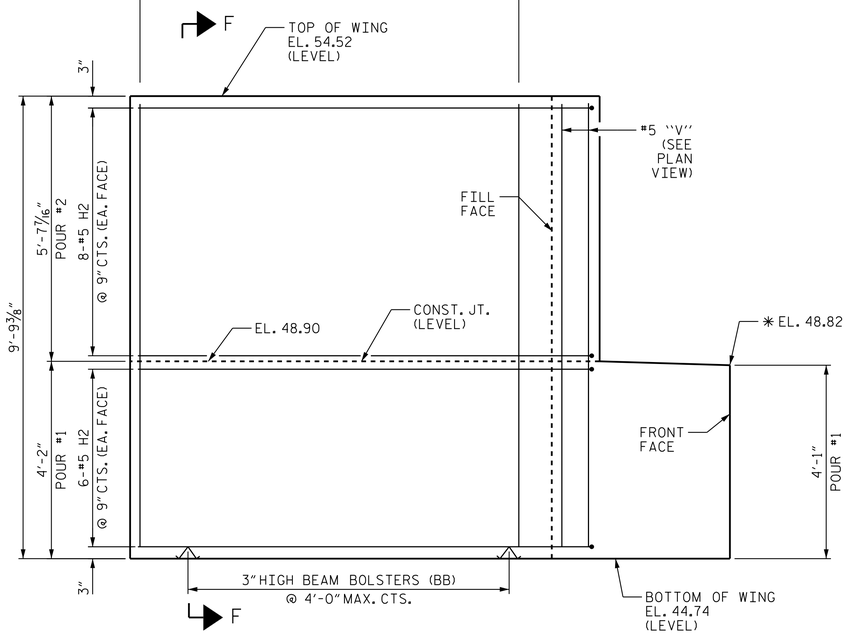
SECTION E-E

#4 "K" BARS NOT SHOWN FOR CLARITY



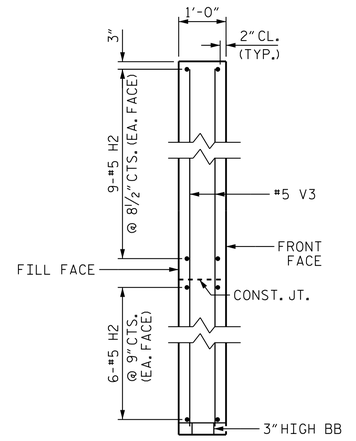
ELEVATION OF LEFT WING (W1)

#4 "K" BARS NOT SHOWN FOR CLARITY



ELEVATION OF RIGHT WING (W2)

#4 "K" BARS NOT SHOWN FOR CLARITY



SECTION F-F

#4 "K" BARS NOT SHOWN FOR CLARITY

NOTES:

✱ TOP SURFACE OF END BENT CAP BETWEEN EDGE OF DECK SLAB AND END OF CAP SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF ¼"/FT.

FOR "K" BAR DETAILS, SEE SHT. "END BENT 1".

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
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END BENT 1 DETAILS WING WALLS

(RIGHT LANE)

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DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

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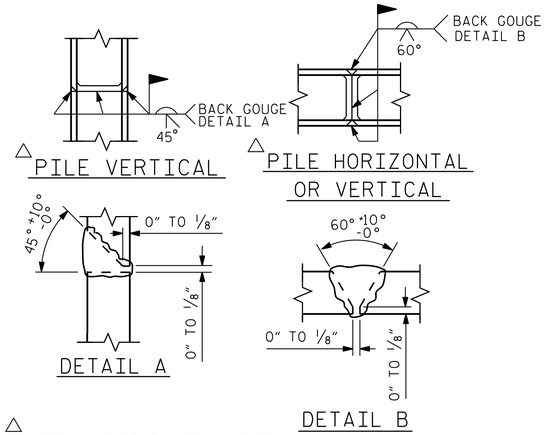
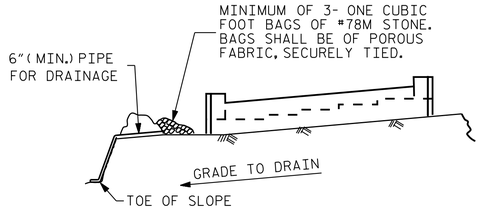


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

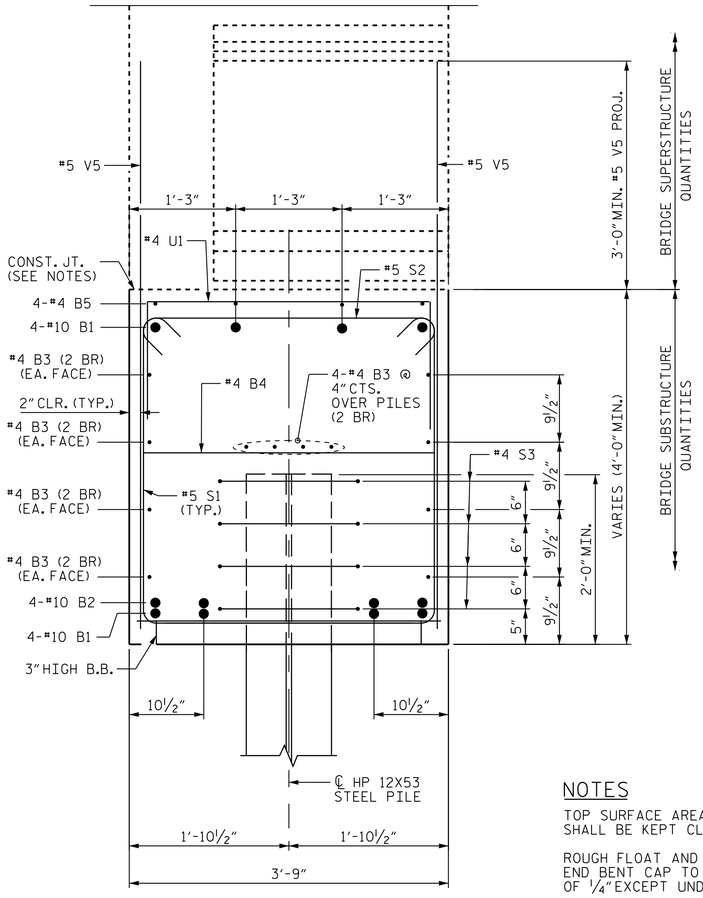


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

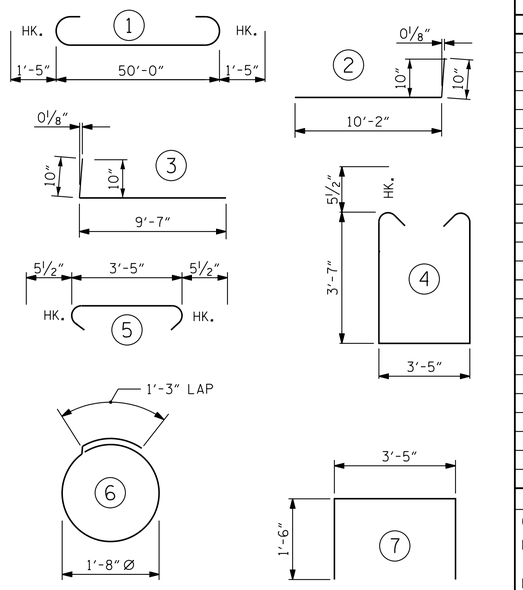


SECTION A-A

SEE "END BENT 1" SHEET 1 OF 3.

PILE COLLAR NOT SHOWN FOR CLARITY.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

HP 12X53 STEEL PILES	STEEL PILE POINTS EA. 8
NO: 8 LIN. FT.= 520.00	PILE REDRIVES EA. 4
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	EA. 8

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	52'-10"	1819
B2	4	#10	STR	50'-2"	864
B3	24	#4	STR	26'-4"	423
B4	13	#4	STR	3'-5"	30
B5	16	#4	STR	3'-6"	38
B6	4	#4	STR	9'-0"	25
H1	44	#5	2	11'-0"	505
H2	28	#5	3	10'-5"	305
K1	12	#4	STR	3'-8"	30
K2	12	#4	STR	2'-7"	21
S1	51	#5	4	11'-6"	612
S2	51	#5	5	4'-4"	231
S3	32	#4	6	6'-6"	139
U1	18	#4	7	6'-5"	78
V1	4	#5	STR	9'-9"	41
V2	26	#5	STR	10'-1"	274
V3	24	#5	STR	9'-4"	234
V4	2	#5	STR	9'-0"	19
V5	64	#5	STR	7'-2"	497

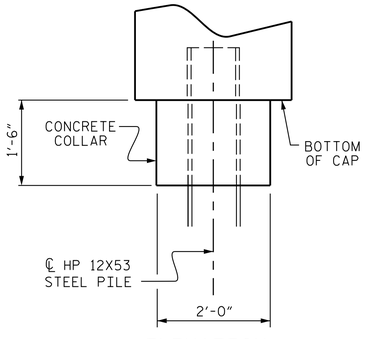
REINFORCING STEEL 6,167 LBS.

CLASS A CONCRETE BREAKDOWN

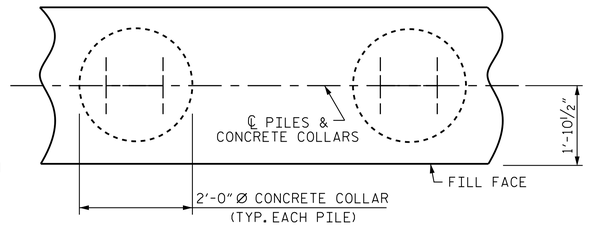
POUR #1 CAP, LOWER PART OF WINGS & COLLARS 34.0 C.Y.

POUR #2 UPPER PART OF WINGS 5.4 C.Y.

TOTAL CLASS A CONCRETE 39.4 C.Y.



ELEVATION



PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP TO PROVIDE MIN. SURFACE AMPLITUDE OF ¼" EXCEPT UNDER BEARING AREAS.

#10 B1 & #10 B2 BARS IN THE BOTTOM OF CAP ARE BUNDLED.

(2 BR) DENOTES 2 BAR RUN.

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
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END BENT 1 DETAILS

(RIGHT LANE)

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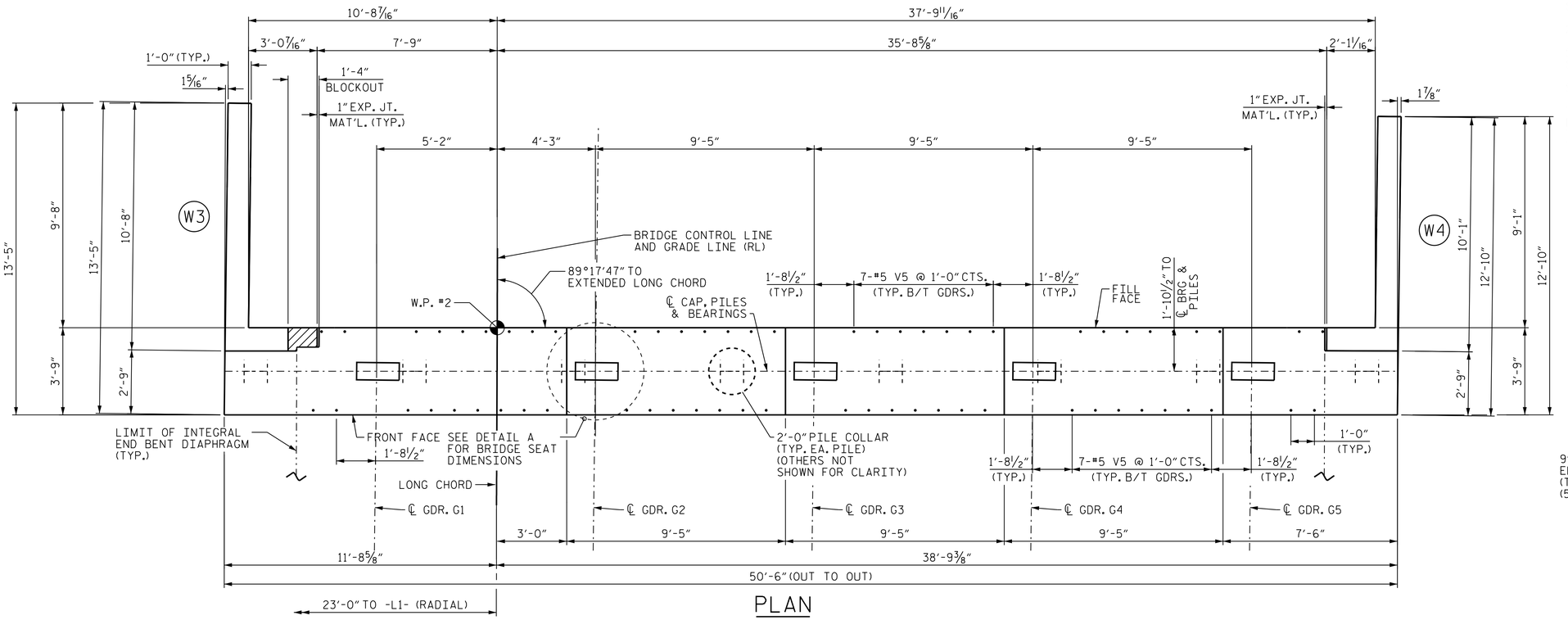


PLAN

NOTES

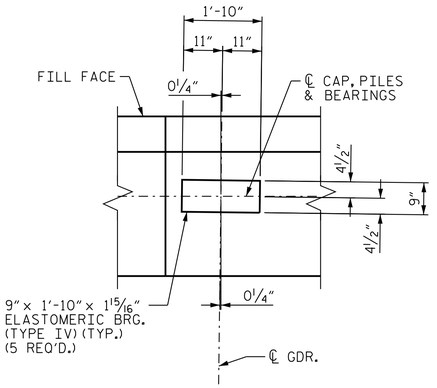
STIRRUPS IN CAP MAY BE SLIGHTLY SHIFTED AS NECESSARY ANY CONFLICTS WITH OTHER REINFORCING STEEL.

2 BR DENOTES 2 BAR RUN

SEE "END BENT 2 DETAILS", SHEET 3 OF 3, FOR SECTION A-A.

SEE SHEET 2 OF 3 FOR WING WALL DETAILS.

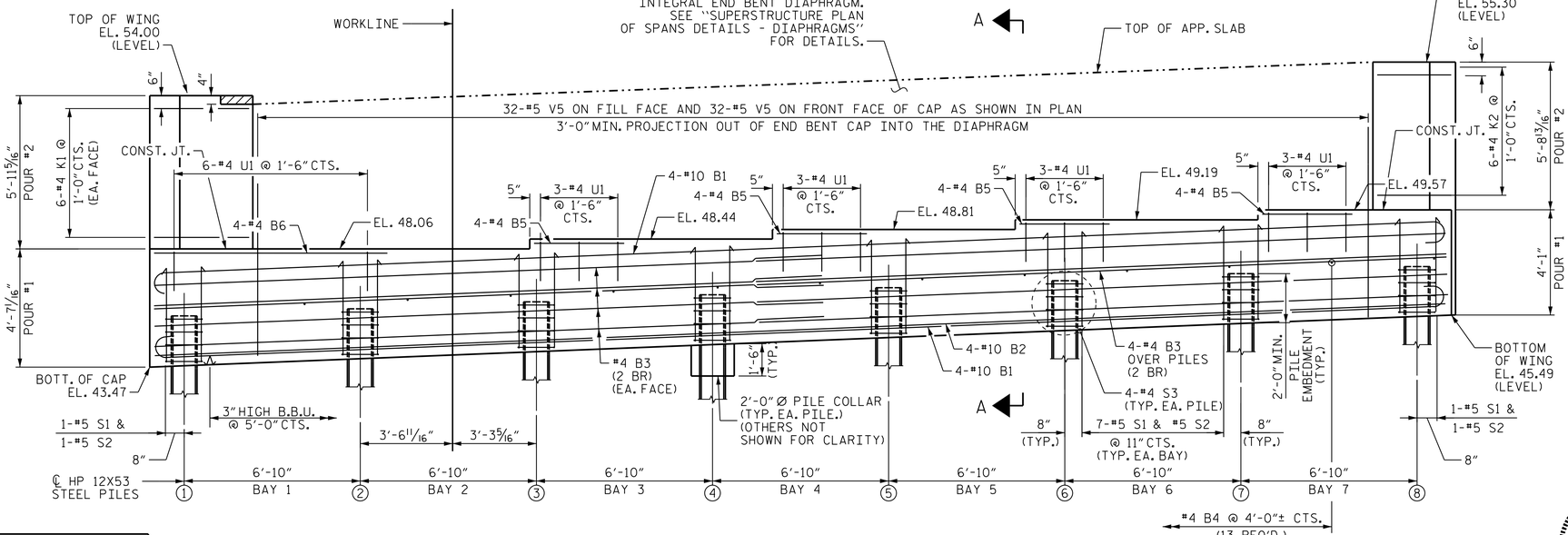
THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA & TOP OF CAP OUTSIDE THE LIMITS OF THE SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".



DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING

AT THE CONTRACTOR'S OPTION, THE BEARING CAN BE PLACED PARALLEL TO THE ℄ CAP.



ELEVATION

SEE MIN. SPLICE CHART FOR SPLICE LENGTH

TOP OF PILE ELEVATIONS	
PILE #	ELEVATION
1	45.54
2	45.81
3	46.09
4	46.36
5	46.63
6	46.91
7	47.18
8	47.45

MIN. SPLICE	
#4 B3	2'-5"

PROJECT NO. R-3300B

PENDER COUNTY

STATION: 658+69.17 -L1-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2

(RIGHT LANE)

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
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Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 09/19/19
CHECKED BY : N. D'AIUTO DATE : 09/23/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MELINDA B. ISENHOUR
DocuSigned by: Melinda Isenhour
10/25/2021

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-24
1			3			TOTAL SHEETS
2			4			30

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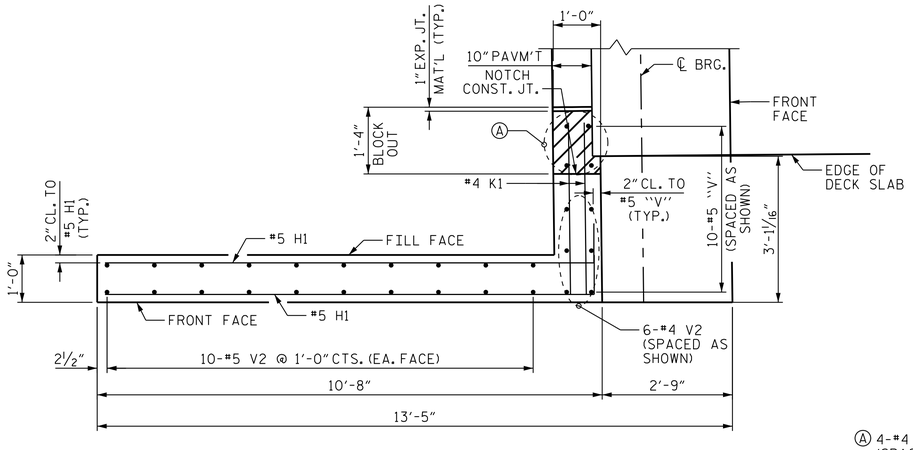
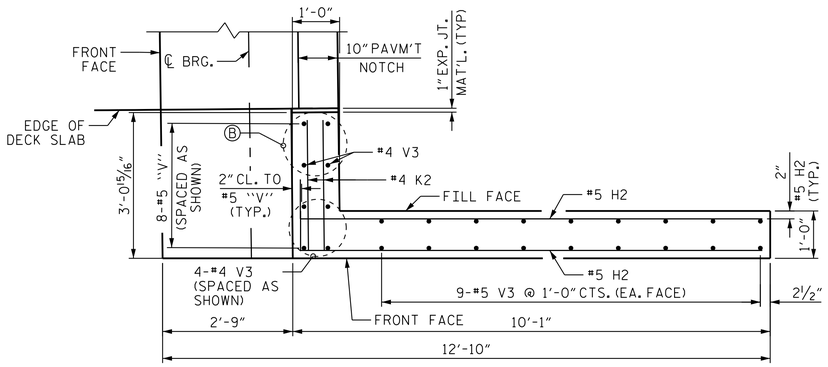


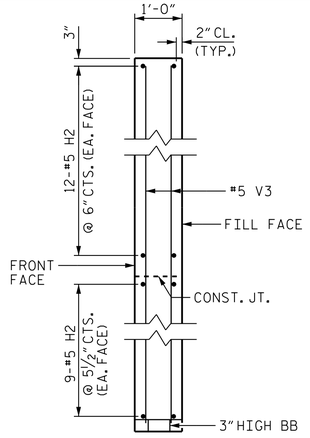
PLAN OF LEFT WING (W3)

Ⓐ 4-#4 V1 (SPACED AS SHOWN)

Ⓑ 2-#4 V4 & 2-#4 V3 (SPACED AS SHOWN)

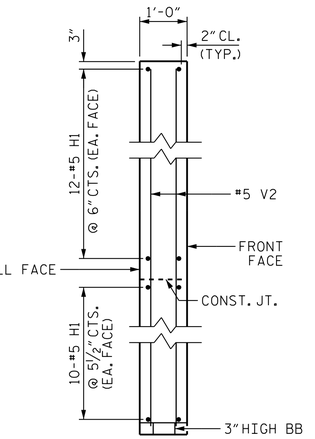


PLAN OF RIGHT WING (W4)



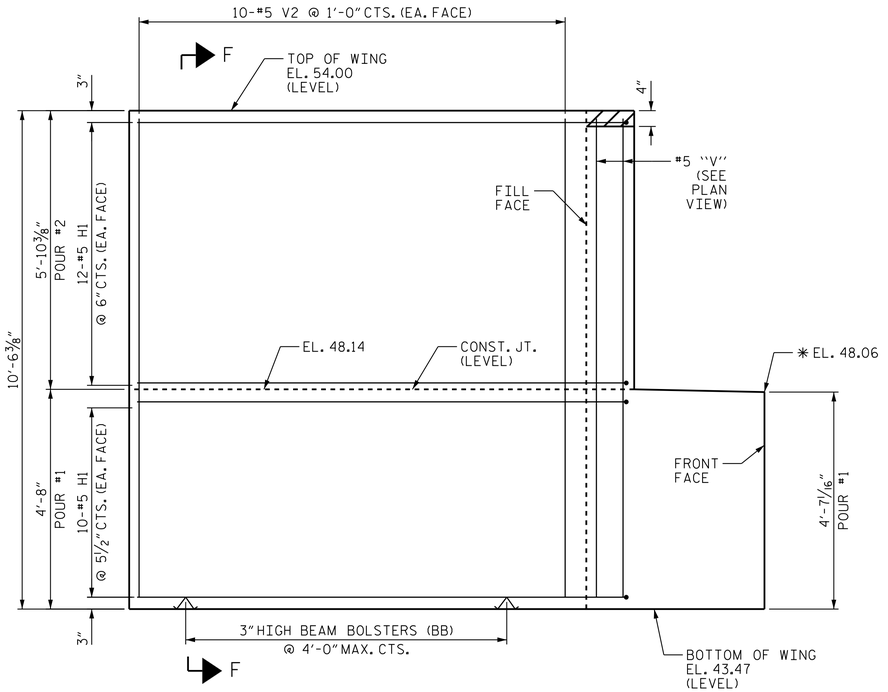
SECTION E-E

#4 "K" BARS NOT SHOWN FOR CLARITY



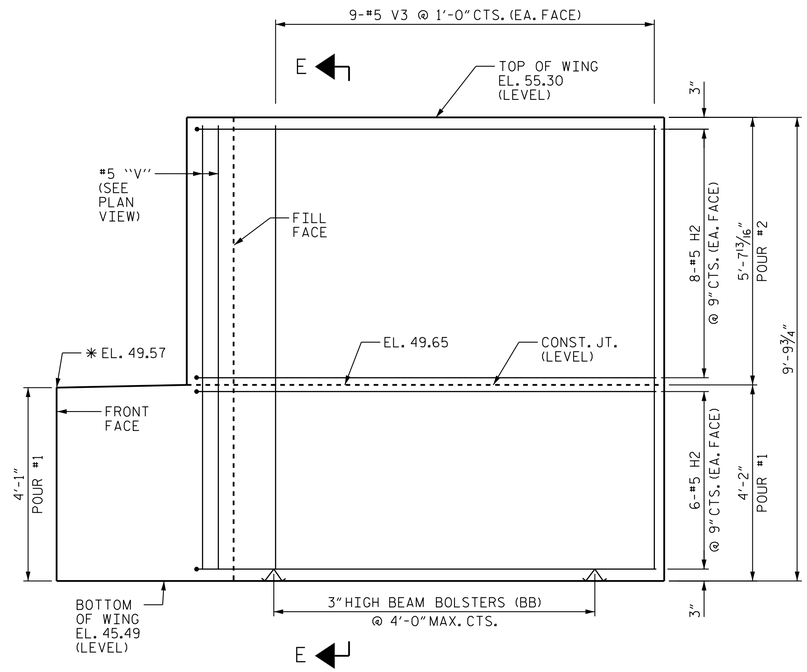
SECTION F-F

#4 "K" BARS NOT SHOWN FOR CLARITY



ELEVATION OF LEFT WING (W3)

#4 "K" BARS NOT SHOWN FOR CLARITY



ELEVATION OF RIGHT WING (W4)

#4 "K" BARS NOT SHOWN FOR CLARITY

NOTES:

✱ TOP SURFACE OF END BENT CAP BETWEEN EDGE OF DECK SLAB AND END OF CAP SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF ¼"/FT.

FOR "K" BAR DETAILS, SEE SHT. "END BENT 1".

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License No. F-0672

DRAWN BY : J. F. KENNEDY DATE : 09/17/19
CHECKED BY : N. D'AIUTO DATE : 19/18/19
DESIGN ENGINEER OF RECORD: M. B. ISENHOUR DATE : 10/25/21

NORTH CAROLINA PROFESSIONAL SEAL 19756 ENGINEER MARK B. ISENHOUR
DocuSigned by:
10/25/2021

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PROJECT NO. R-3300B
PENDER COUNTY
STATION: 658+69.17 -L1-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2 DETAILS WING WALLS

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-25
1			3			TOTAL SHEETS
2			4			30

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