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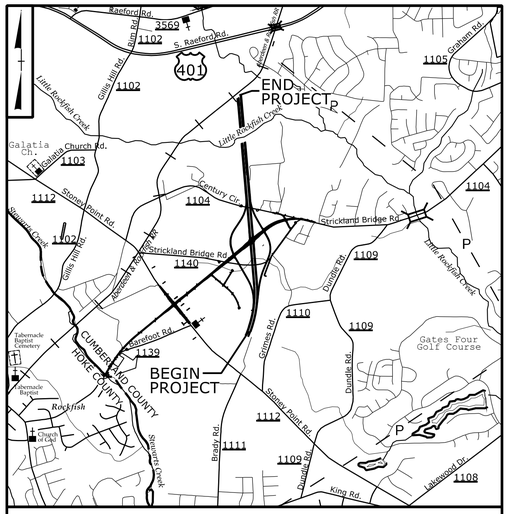
09/08/99

TIP PROJECT: U-2519BB

CONTRACT: C204110

STRUCTURE

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

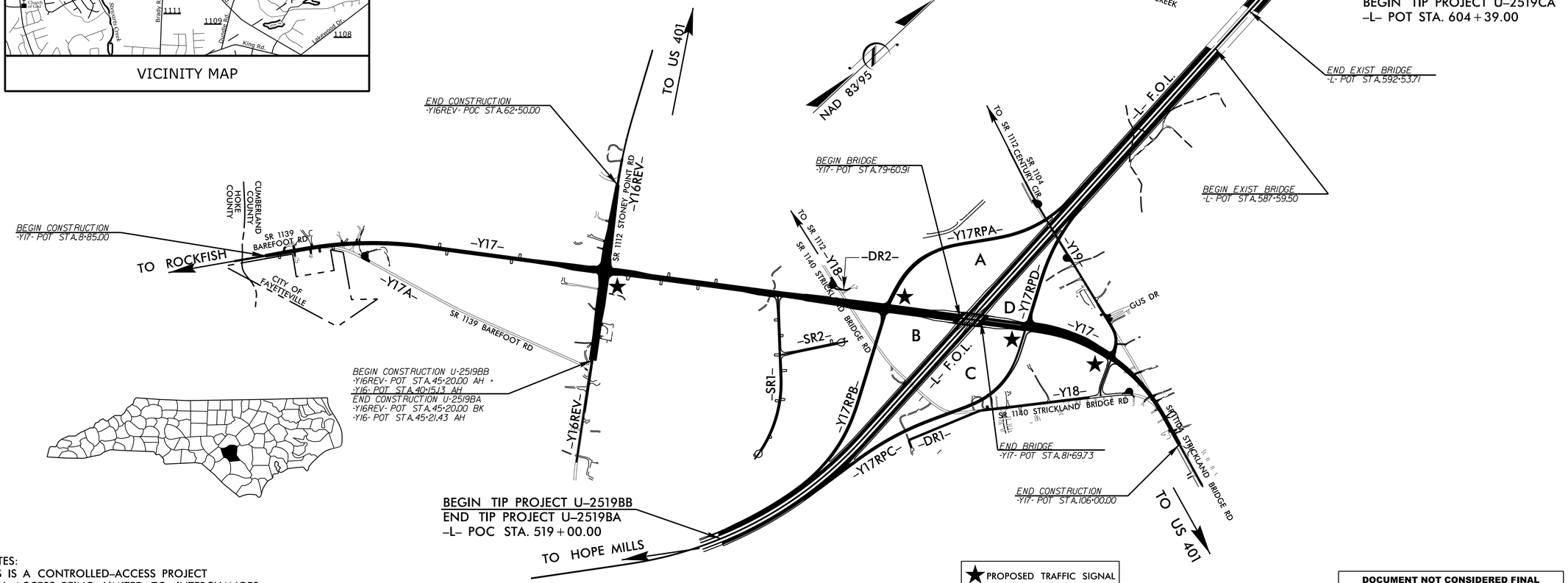
CUMBERLAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519BB	1	

STATE WBS NO.	F.A.PROJ.NO.	DESCRIPTION
34817.1.FR8	NHF-0100(25)	PE
34817.2.FR15	NHF-0100(025)	ROW
34817.2.11	NHF-0100(025)	UTIL
34817.3.15	NHF-0100(025)	CONST

LOCATION: FAYETTEVILLE – OUTER LOOP (F.O.L.) FROM SOUTH OF SR 1104 (STRICKLAND BRIDGE ROAD) TO SOUTH OF US 401

TYPE OF WORK: DRAINAGE, GRADING, PAVING, STRUCTURE, RETAINING WALLS, SIGNING



★ PROPOSED TRAFFIC SIGNAL

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022	=	39,280
ADT 2042	=	48,680
K	=	8 %
D	=	55 %
T	=	12 % *
V	=	70 MPH

* 4% TTST + 8% DUAL

FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519BB	=	1.484 MILES
LENGTH STRUCTURE TIP PROJECT U-2519BB	=	0.040 MILES
TOTAL LENGTH TIP PROJECT U-2519BB	=	1.524 MILES

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

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 29, 2016

LETTING DATE:
JUNE 21, 2022

NCDOT CONTACT: JOHN CONFORTI, REM
NCDOT PROJECT MANAGER

L. KEVIN AUSTIN, PE
NV5
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 019661 ENGINEER L. KEVIN AUSTIN
3/29/2022

DocuSigned by:
L. Kevin Austin
72F7B3720EAA46B...
P.E.

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

3/27/2022
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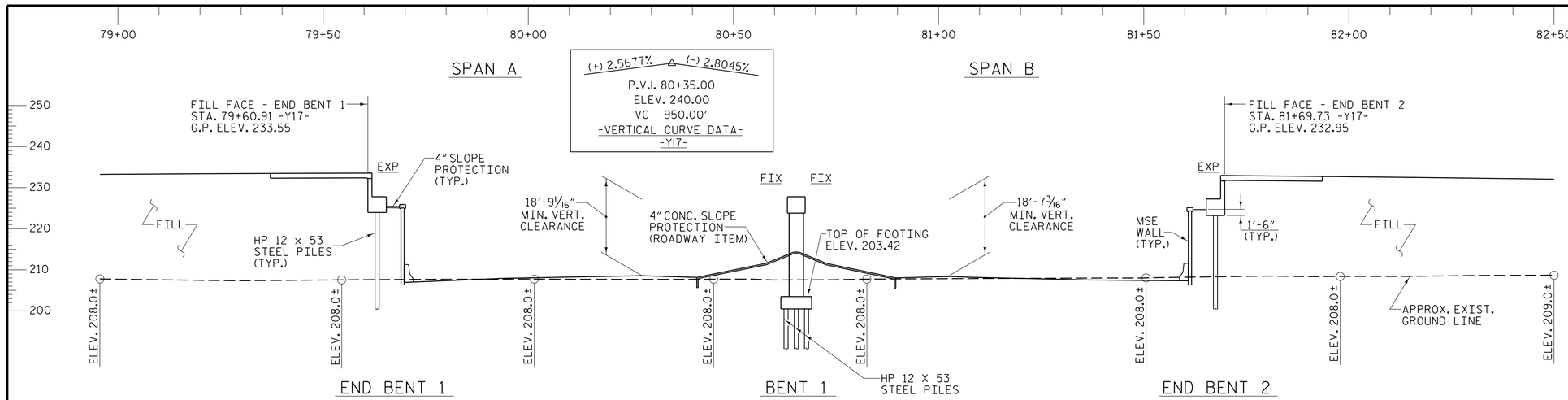
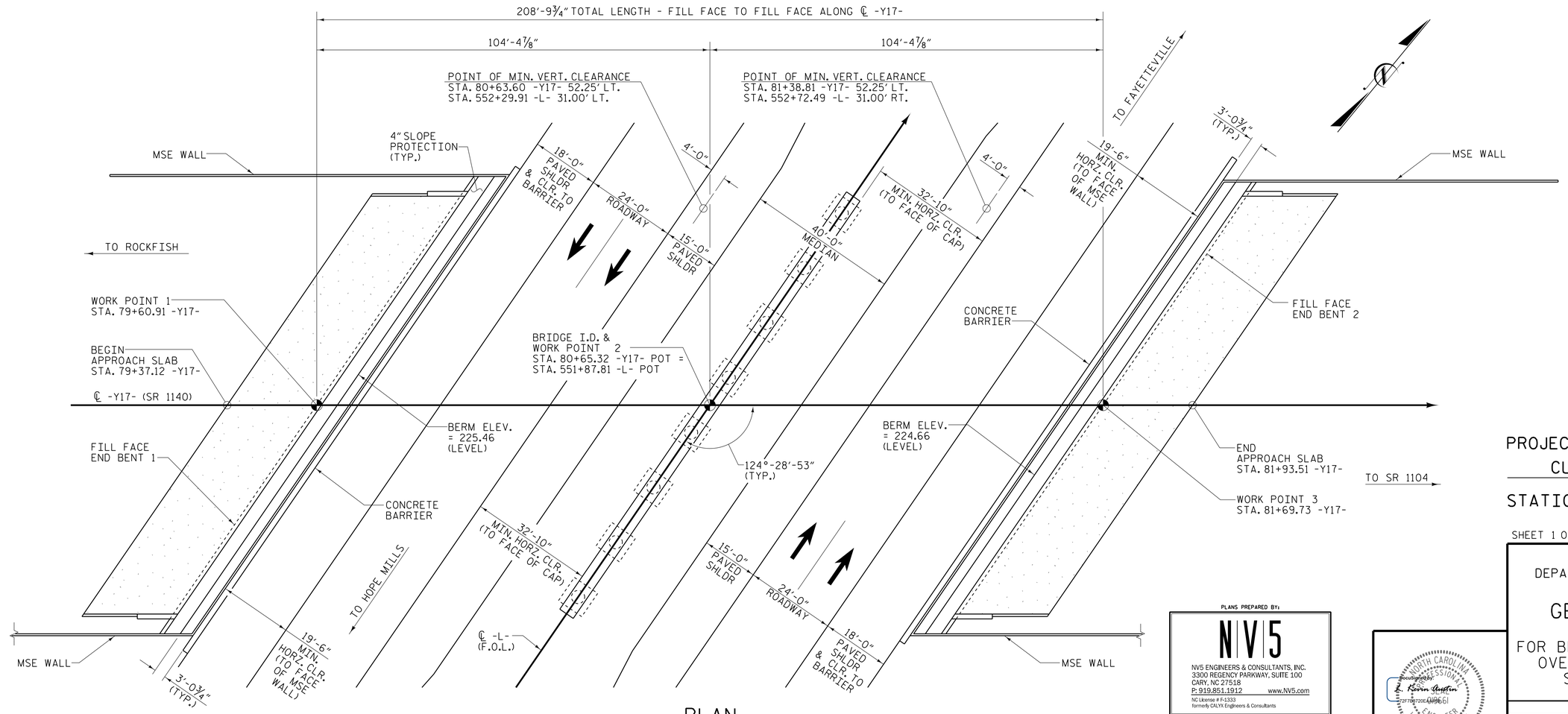
F. A. PROJECT NO. NHF-0100(25)



SECTION ALONG ℄ -Y17-

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



PLAN

(NOTE: PILES NOT SHOWN FOR CLARITY)

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT
551+87.81 -L- POT

SHEET 1 OF 4 BRIDGE NO. 452

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON -Y17- (SR 1140) OVER -L- (F.O.L) BETWEEN SR 1112 AND SR 1104

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

DRAWN BY :	W. B. ALLEN	DATE : 1/17
CHECKED BY :	Z. H. BROWN	DATE : 1/17
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE : 2/22

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
NC License # F-1333
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027159 KEVIN AUSTIN
DocuSigned by: L. Kevin Austin 27F159F720E0466...
3/29/2022

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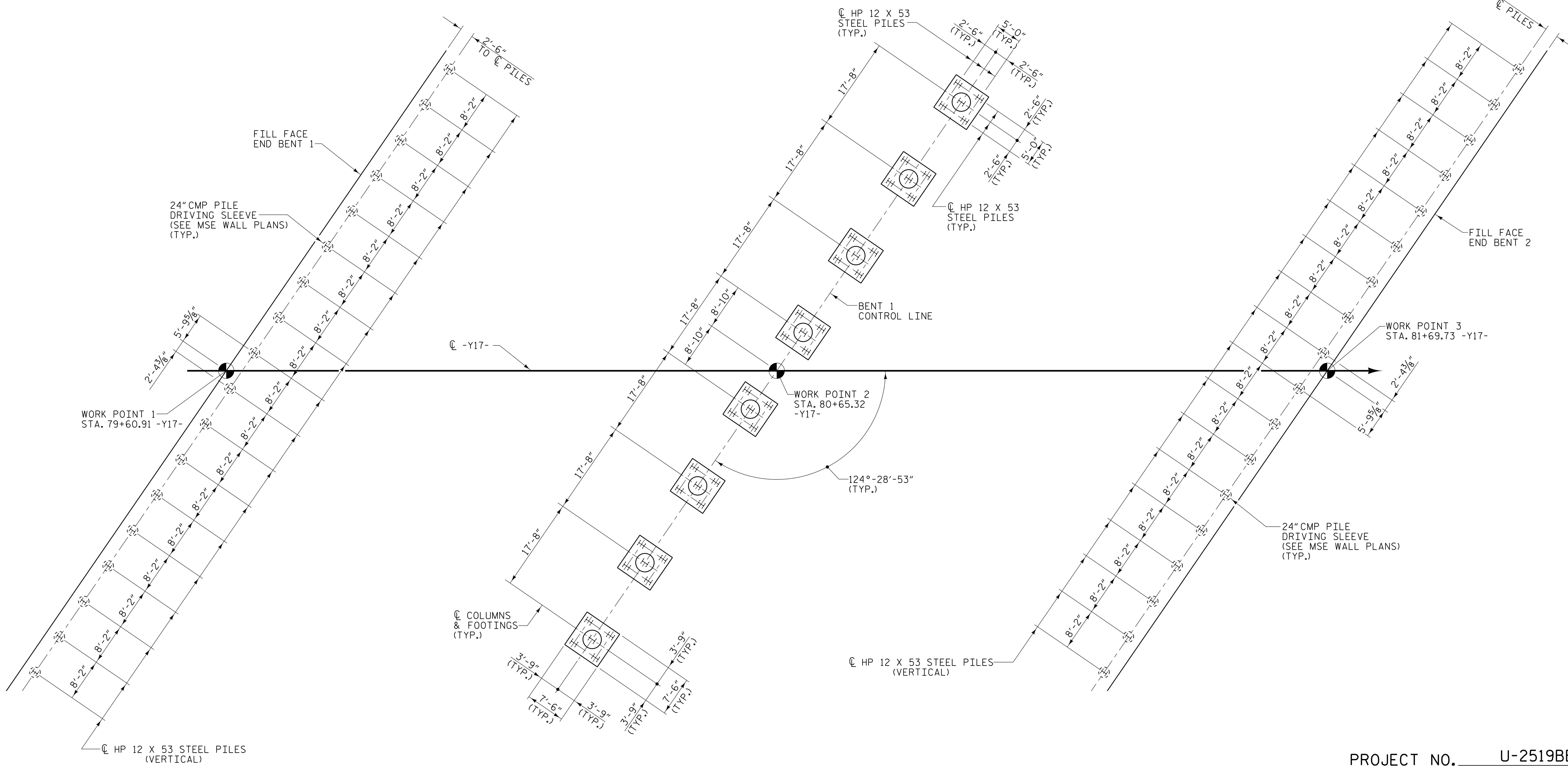

FOUNDATION LAYOUT

NOTES

ALL PILES AT END BENT NO. 1, BENT NO. 1, AND END BENT NO. 2 ARE HP 12 X 53.

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1, BENT NO. 1, AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

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

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

DRAWN BY :	W. B. ALLEN	DATE :	7/17
CHECKED BY :	Z. H. BROWN	DATE :	8/17
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER 019661 L. KEVIN AUSTIN
3/29/2022

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON -Y17- (SR 1140) OVER -L- (F.O.L) BETWEEN SR 1112 AND SR 1104

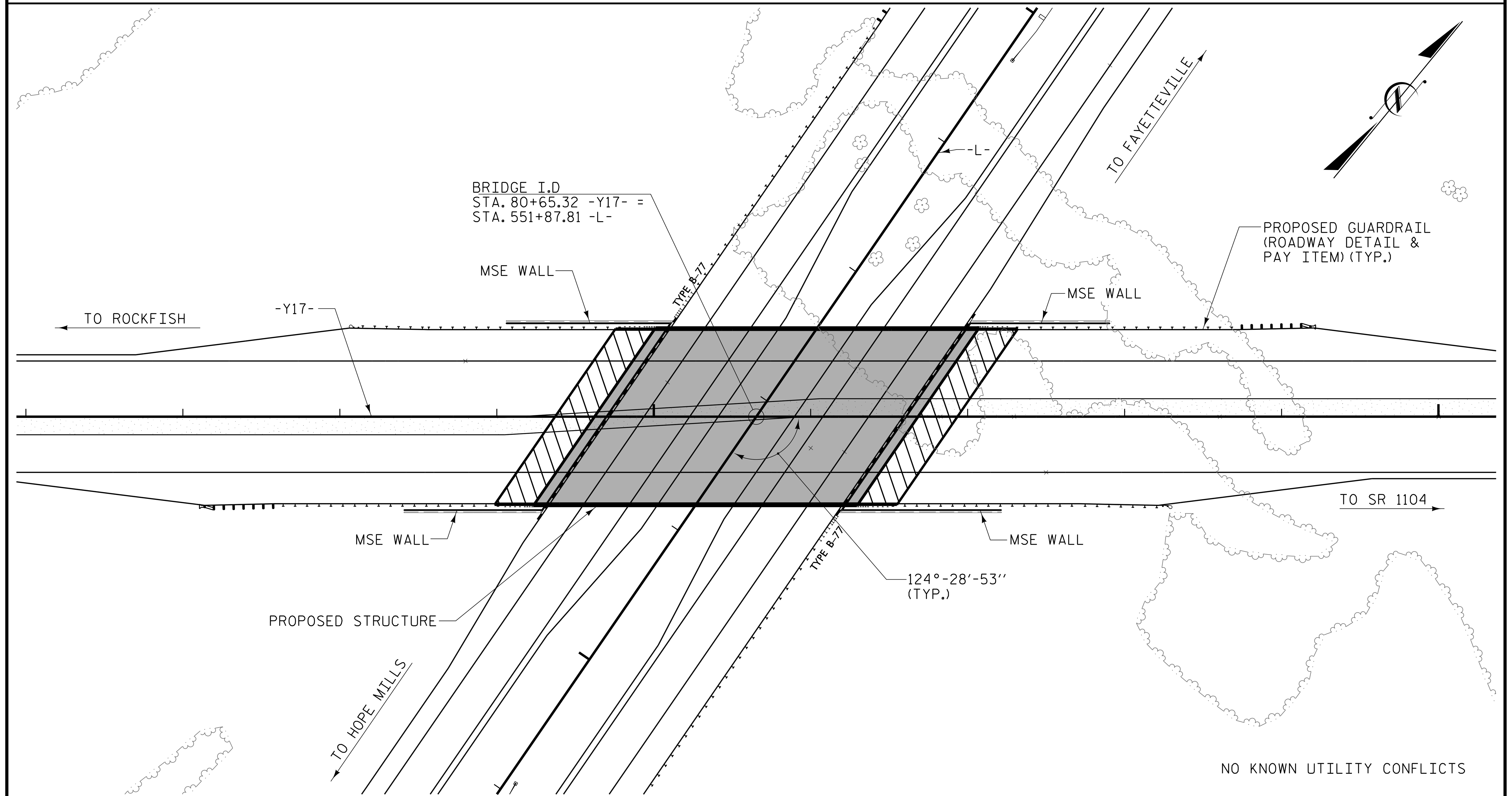
REVISIONS

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

SHEET NO. S-2

TOTAL SHEETS 41

BM #188: 472.85′ LT STA. 544+30.44 -L- ELEV. 211.91



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 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.

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

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

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6′-2″
#4	7′-4″
#5	8′-6″
#6	9′-8″
#7	10′-10″
#8	12′-0″
#9	13′-2″
#10	14′-6″
#11	15′-10″

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30″ (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT AT STATION 80+65.32 -Y17-	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54″ PRESTESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP12X53 STEEL PILES		PILE REDRIVES	TWO BAR METAL RAIL	1′-2″ x 2′-6″ CONCRETE PARAPET	4″ SLOPE PROTECTION	ELASTOMERIC BEARINGS	STRIP SEAL EXPANSION JOINTS
	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	FEET	EACH	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			23429	23591		LUMP SUM			22	2236.67					399.04	428.92		LUMP SUM	LUMP SUM
END BENT 1					112.7		13169				18	18	1350	9			37		
BENT 1	LUMP SUM				211.3		26156	4146			40	40	2200	20					
END BENT 2					117.9		13372				18	18	1305	9			37		
TOTAL	LUMP SUM	1	23429	23591	441.9	LUMP SUM	52697	4146	22	2236.67	76	76	4855	38	399.04	428.92	74	LUMP SUM	LUMP SUM

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

SHEET 3 OF 4

PLANS PREPARED BY:
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NORTH CAROLINA PROFESSIONAL ENGINEER 019661 L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON -Y17- (SR 1140) OVER -L- (F.O.L) BETWEEN SR 1112 AND SR 1104

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

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : L. K. AUSTIN DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

3/27/2022 5:34:09 PM G:\Project\2014\2014062.28\CLIENT\Structures\U2519BB_SMU_GD2_250452.dgn

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT					
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.12	--	1.75	0.834	1.66	A/B	EL	50.13	1.129	1.22	A/B	I	80.20	0.80	0.755	**1.12**	A/B	I	**50.13**	
		HL-93 (OPERATING)	N/A		1.62	--	1.35	0.834	2.15	A/B	EL	50.13	1.129	1.62	A/B	I	20.05	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.56	56.16	1.75	0.834	2.31	A/B	EL	50.13	1.129	1.63	A/B	I	80.20	0.80	0.755	**1.56**	A/B	I	**50.13**	
		HS-20 (OPERATING)	36.000		2.16	77.76	1.35	0.834	3.00	A/B	EL	50.13	1.129	2.16	A/B	I	20.05	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.71	50.09	1.40	0.834	6.87	A/B	EL	50.13	1.129	5.27	A/B	I	80.20	0.80	0.755	3.71	A/B	I	50.13	
		SNGARBS2	20.000		2.69	53.80	1.40	0.834	4.97	A/B	EL	50.13	1.129	3.67	A/B	I	80.20	0.80	0.755	2.69	A/B	I	50.13	
		SNAGRIS2	22.000		2.51	55.22	1.40	0.834	4.64	A/B	EL	50.13	1.129	3.38	A/B	I	20.05	0.80	0.755	2.51	A/B	I	50.13	
		SNCOTTS3	27.250		1.84	50.14	1.40	0.834	3.41	A/B	EL	50.13	1.129	2.55	A/B	I	20.05	0.80	0.755	1.84	A/B	I	50.13	
		SNAGGRS4	34.925		1.51	52.74	1.40	0.834	2.79	A/B	EL	50.13	1.129	2.07	A/B	I	80.20	0.80	0.755	1.51	A/B	I	50.13	
		SNS5A	35.550		1.48	52.61	1.40	0.834	2.74	A/B	EL	50.13	1.129	2.08	A/B	I	20.05	0.80	0.755	1.48	A/B	I	50.13	
		SNS6A	39.950		1.34	53.53	1.40	0.834	2.49	A/B	EL	50.13	1.129	1.88	A/B	I	20.05	0.80	0.755	1.34	A/B	I	50.13	
		SNS7B	42.000		1.28	53.76	1.40	0.834	2.37	A/B	EL	50.13	1.129	1.83	A/B	I	20.05	0.80	0.755	1.28	A/B	I	50.13	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.64	54.12	1.40	0.834	3.03	A/B	EL	50.13	1.129	2.27	A/B	I	80.20	0.80	0.755	1.64	A/B	I	50.13	
		TNT4A	33.075		1.64	54.24	1.40	0.834	3.03	A/B	EL	50.13	1.129	2.22	A/B	I	80.20	0.80	0.755	1.64	A/B	I	50.13	
		TNT6A	41.600		1.33	55.33	1.40	0.834	2.46	A/B	EL	50.13	1.129	1.93	A/B	I	80.20	0.80	0.755	1.33	A/B	I	50.13	
		TNT7A	42.000		1.33	55.86	1.40	0.834	2.46	A/B	EL	50.13	1.129	1.89	A/B	I	80.20	0.80	0.755	1.33	A/B	I	50.13	
		TNT7B	42.000		1.43	60.06	1.40	0.834	2.64	A/B	EL	50.13	1.129	1.85	A/B	I	20.05	0.80	0.755	1.43	A/B	I	50.13	
		TNAGRIT4	43.000		1.30	55.90	1.40	0.834	2.41	A/B	EL	50.13	1.129	1.73	A/B	I	20.05	0.80	0.755	1.30	A/B	I	50.13	
		TNAGT5A	45.000	3	1.23	55.35	1.40	0.834	2.27	A/B	EL	50.13	1.129	1.64	A/B	I	80.20	0.80	0.755	**1.23**	A/B	I	**50.13**	
		TNAGT5B	45.000		1.24	55.80	1.40	0.834	2.29	A/B	EL	50.13	1.129	1.70	A/B	I	20.05	0.80	0.755	1.24	A/B	I	50.13	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

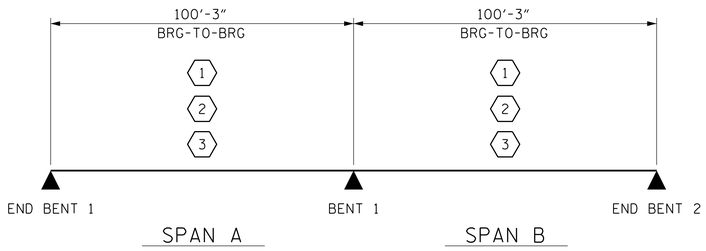
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 4 OF 4

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
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formerly CALYX Engineers & Consultants

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047161 KEVIN AUSTIN
DocuSigned by: K. Kevin Austin 172F7B72720E4BB...
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

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

STD. NO. LRFR1

ASSEMBLED BY : M. D. METZGER DATE : 2/22
CHECKED BY : L. K. AUSTIN DATE : 2/22

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

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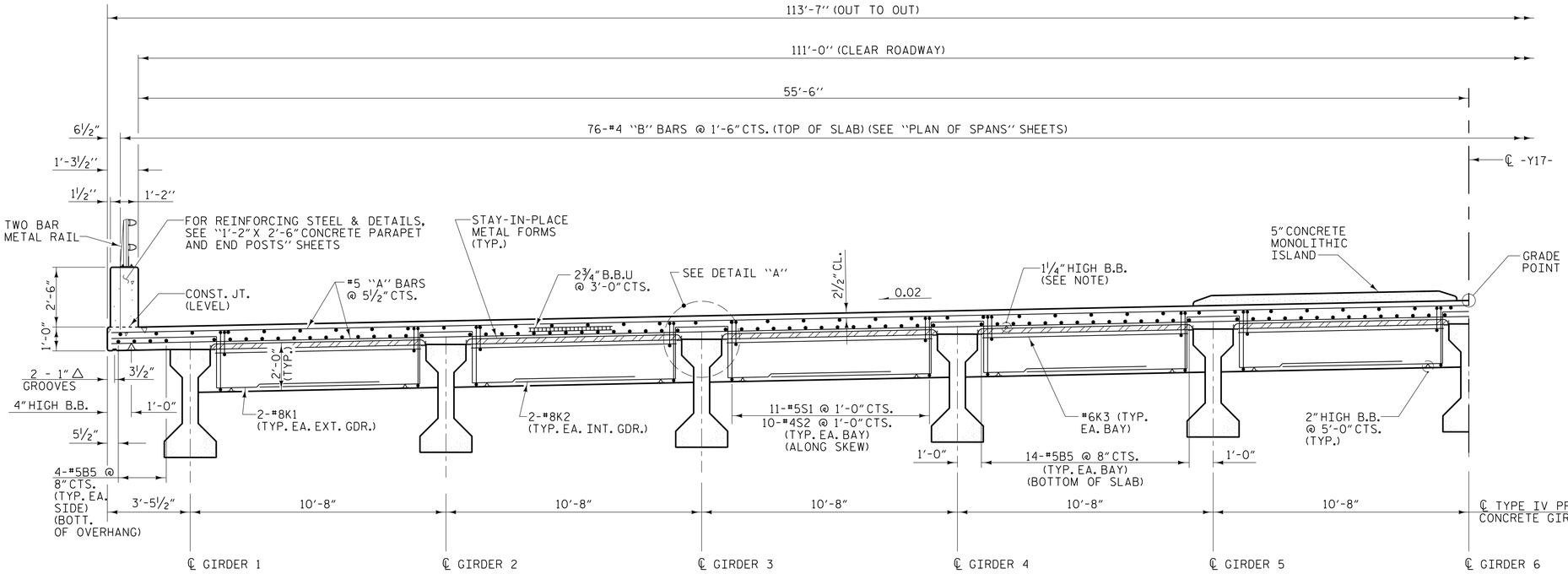
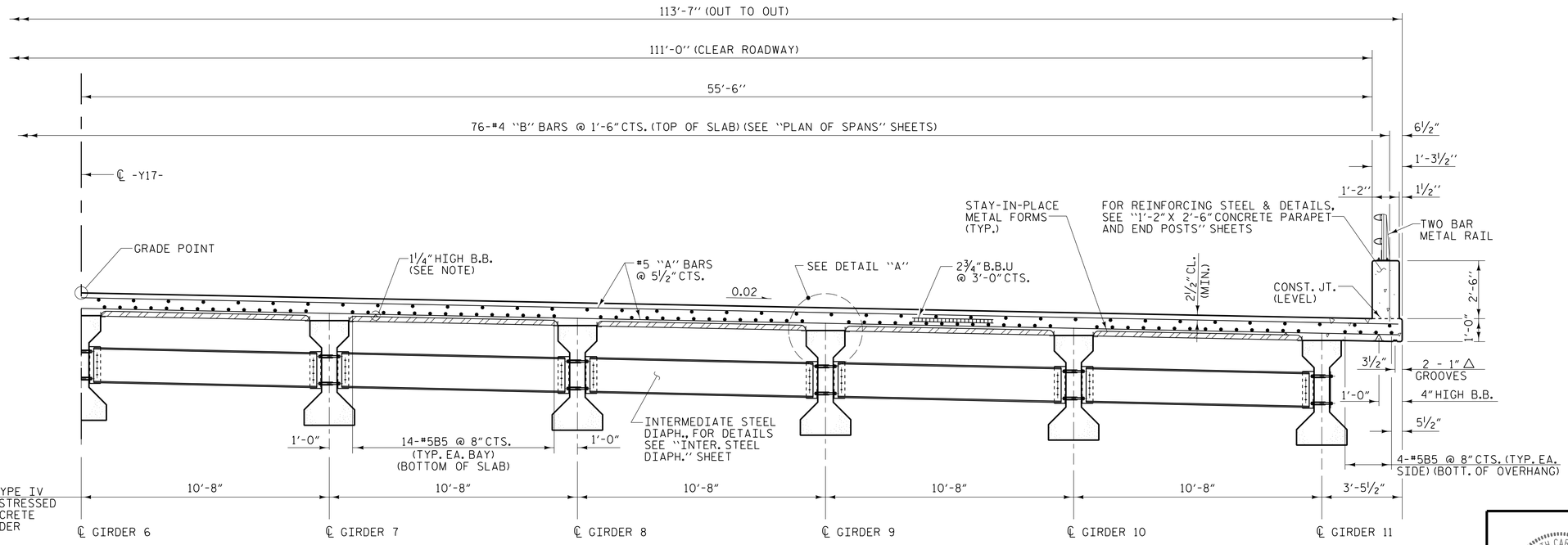


TYPICAL HALF SECTION

(SHOWING END BENT DIAPHRAGMS)



TYPICAL HALF SECTION

(SHOWING INTERMEDIATE STEEL DIAPHRAGMS)

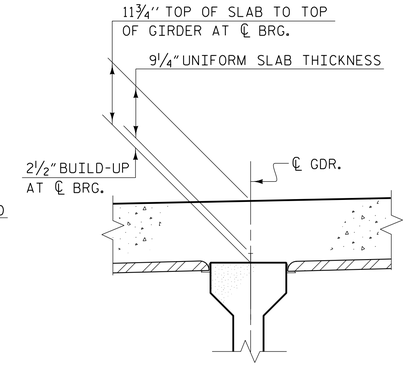
NOTES:

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

LONGITUDINAL STEEL MAY BE SHIFTED AS NECESSARY TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS AND DRAIN PIPES IN THE DECK.

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

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



DETAIL "A"

PLANS PREPARED BY:

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CARY, NC 27518
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PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : G. F. WILSON DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN 036661
Digitally signed by L. Kevin Austin
3/29/2022

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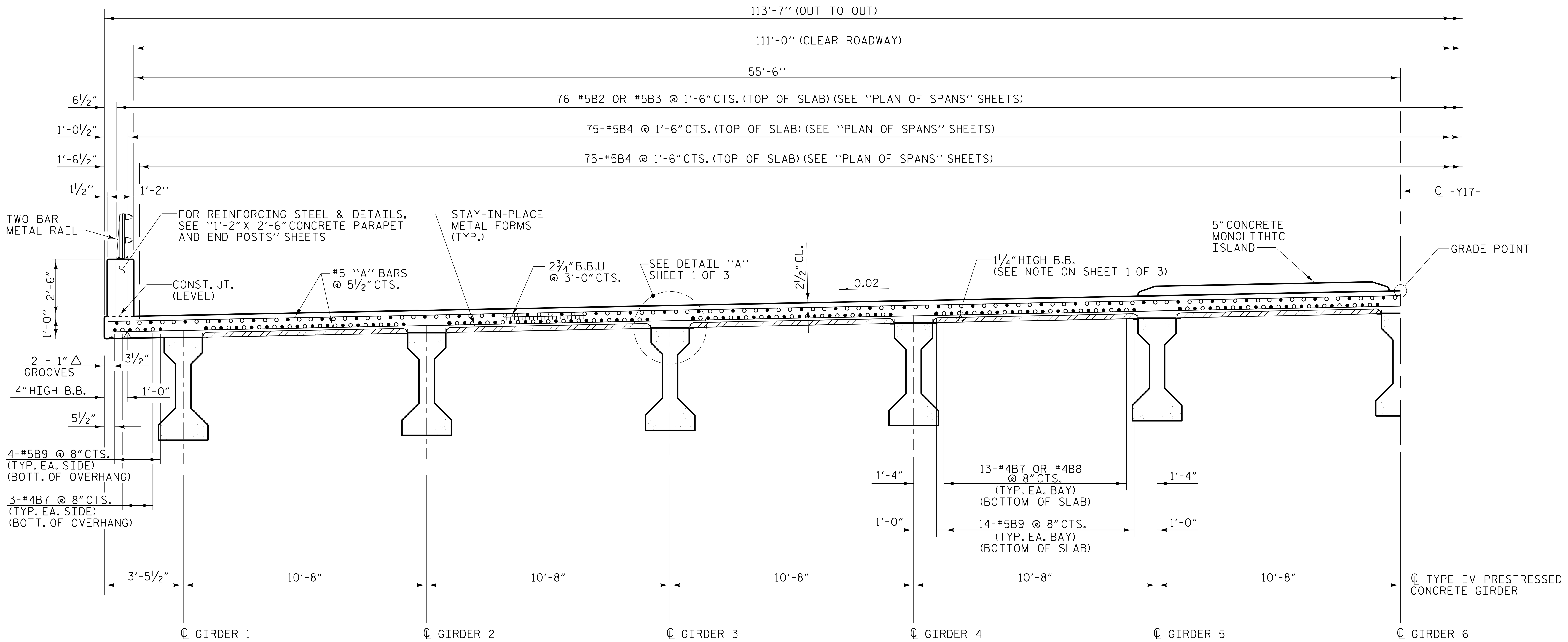
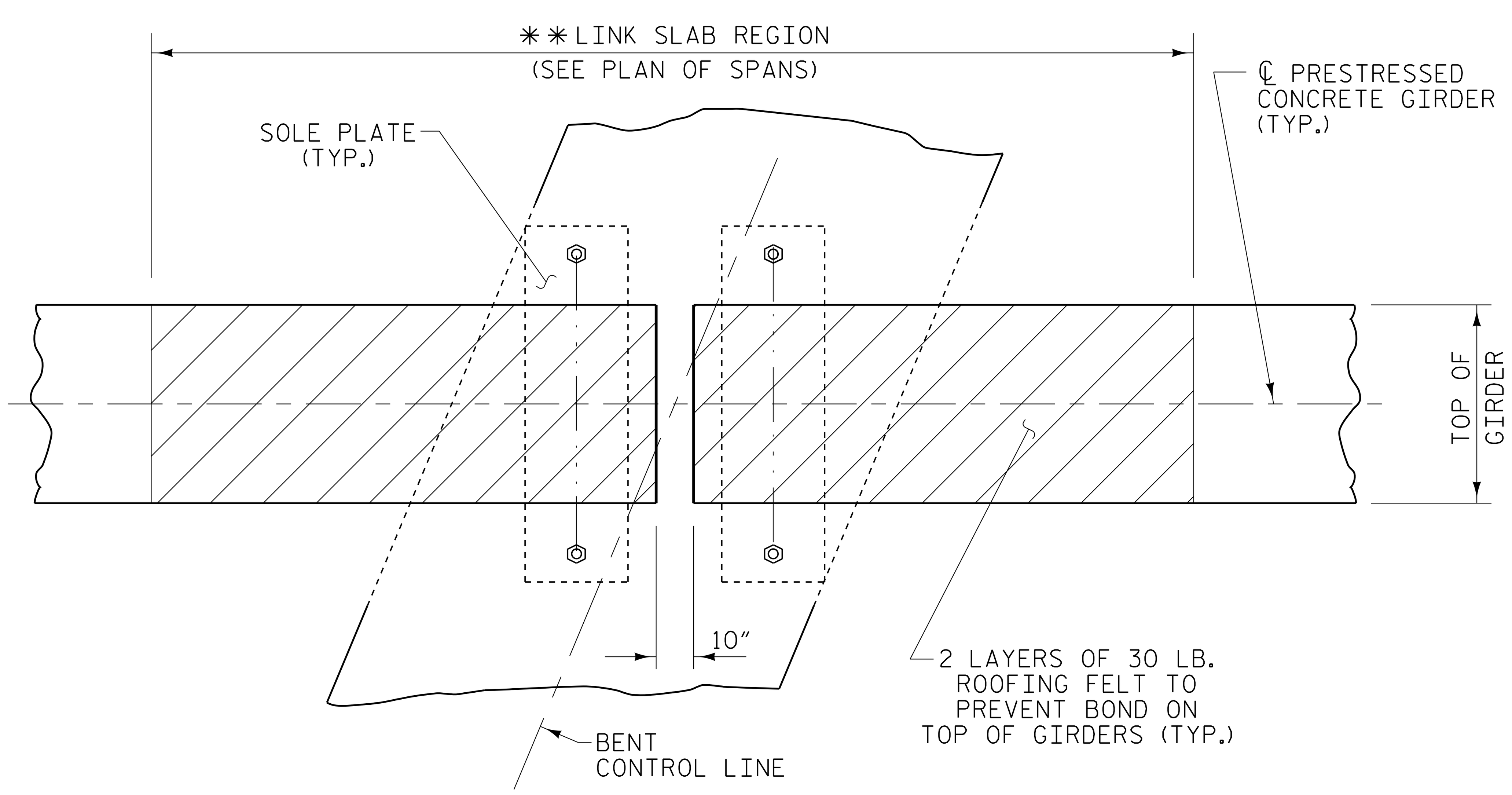
• DENOTES CONTINUOUS REINFORCEMENT

◦ DENOTES NON-CONTINUOUS REINFORCEMENT



TYPICAL HALF SECTION

(SHOWING LINK SLAB)



PLAN OF GIRDERS AT BENT

✱✱ THE TOP OF THE GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH AND FREE OF STIRRUPS, ANCHOR STUDS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

PLANS PREPARED BY:

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CARY, NC 27518
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NORTH CAROLINA PROFESSIONAL ENGINEER 019661 L. KEVIN AUSTIN

DocuSigned by: L. Kevin Austin

3/29/2022

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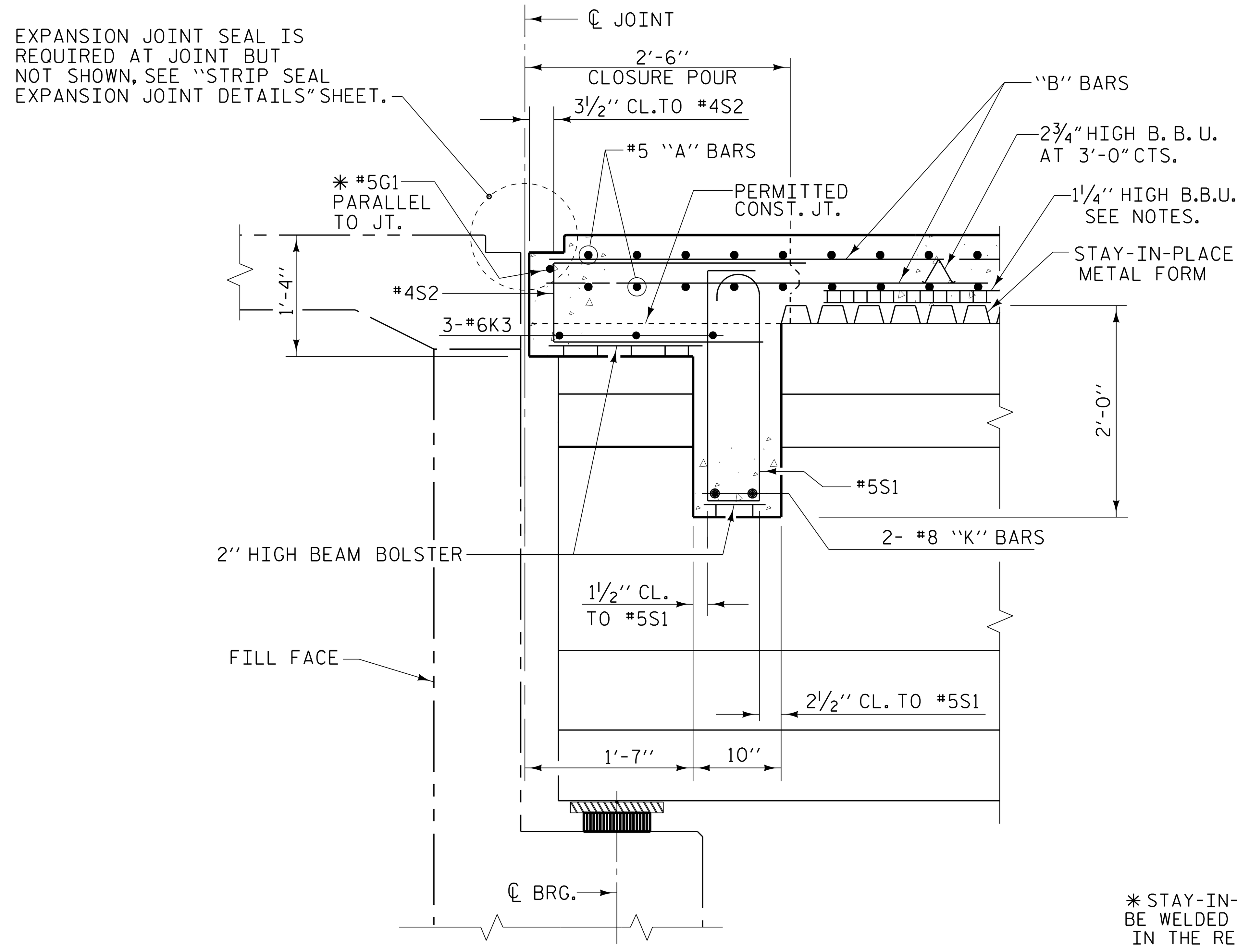
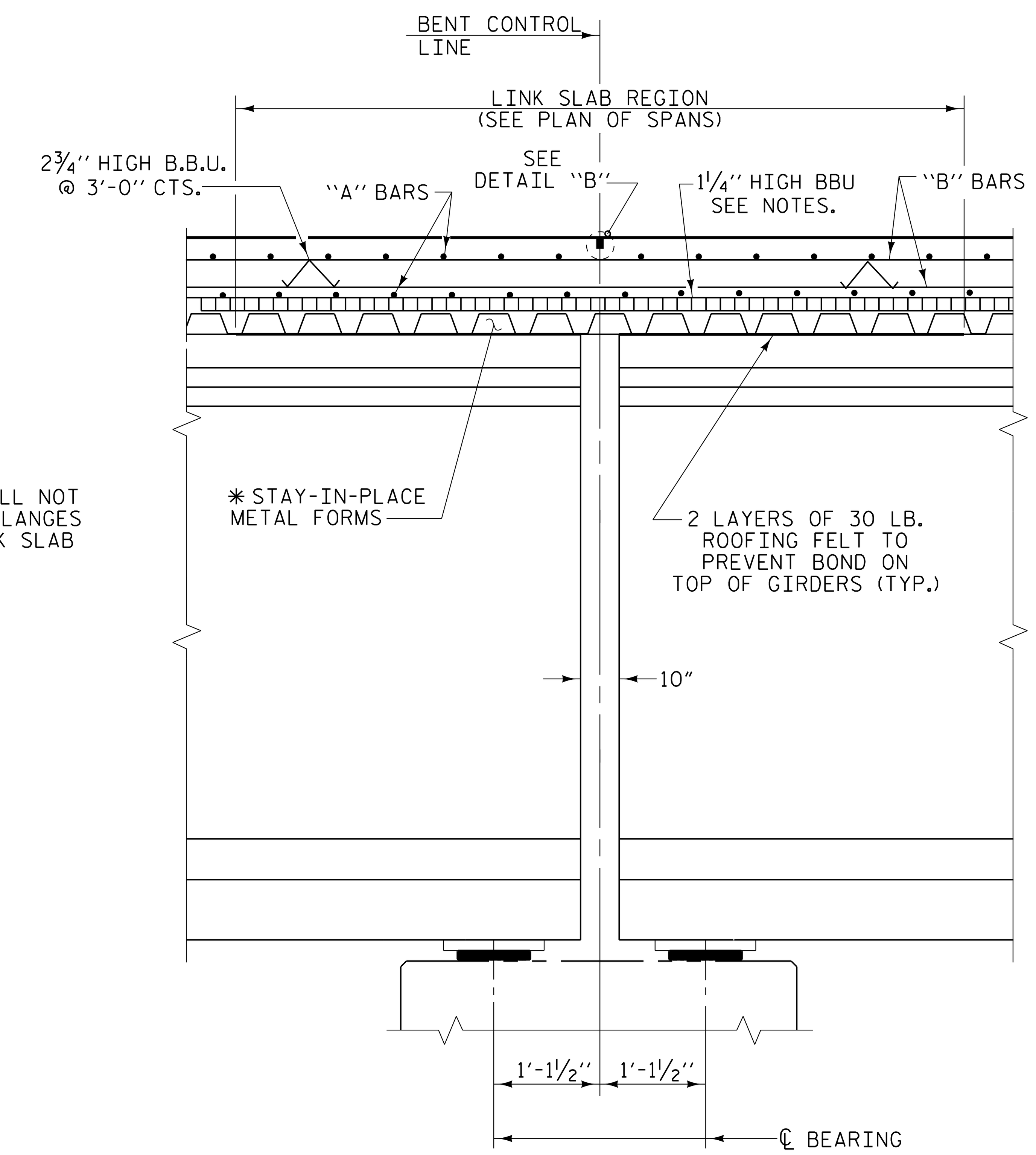


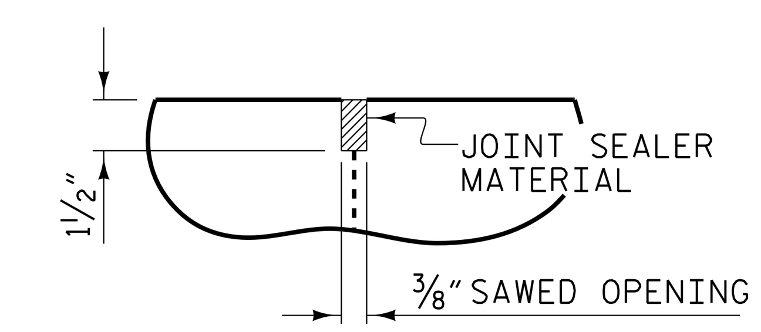
SECTION THRU END BENT DIAPHRAGM

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

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

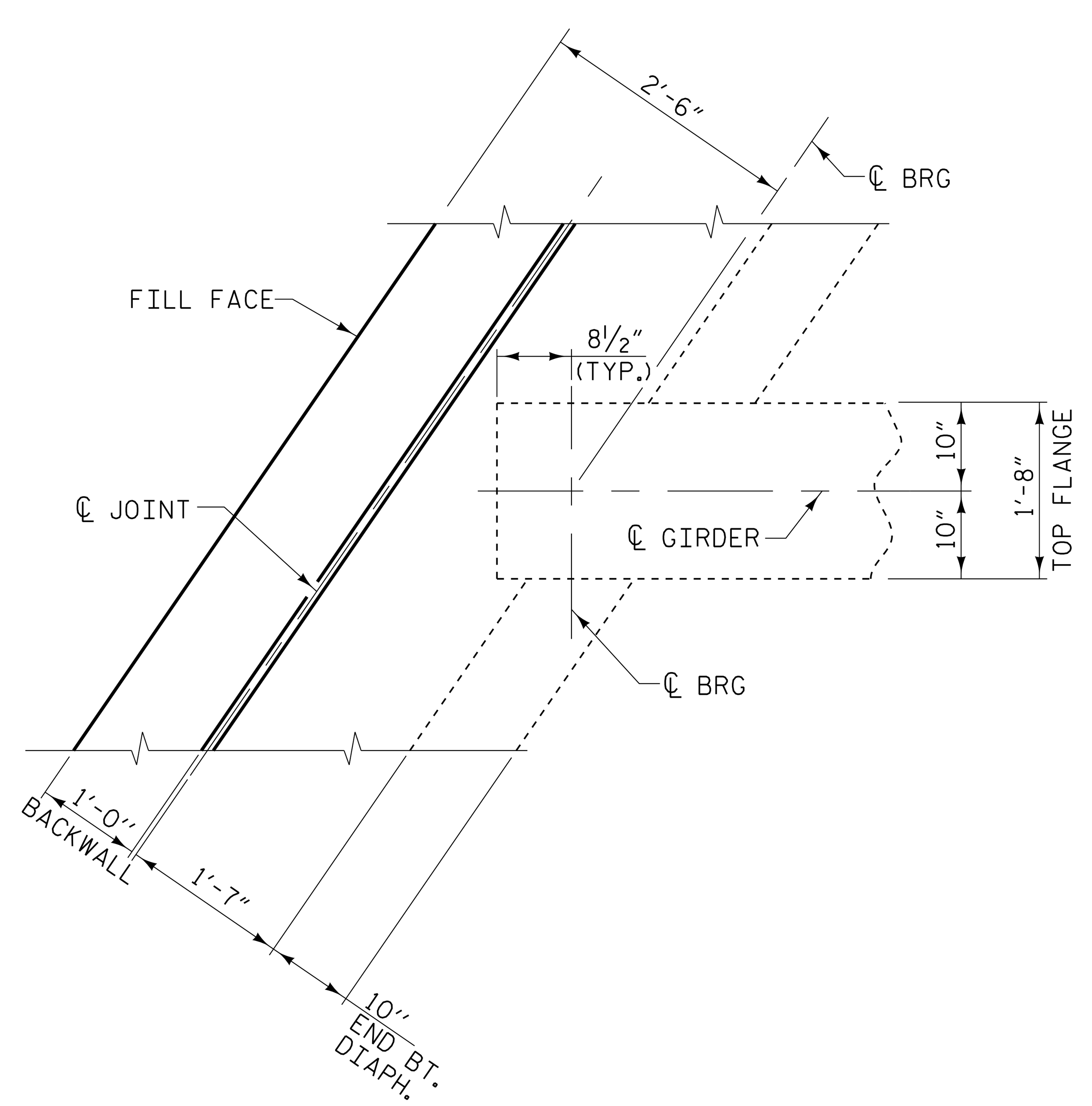


SECTION AT BENT



DETAIL "B"

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



PLAN OF END BENT DIAPHRAGM

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

PLANS PREPARED BY:
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NORTH CAROLINA PROFESSIONAL ENGINEER 019661 L. KEVIN AUSTIN
L. Kevin Austin
3/29/2022

DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	G. F. WILSON	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22

REVISIONS

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SHEET NO. S-7
TOTAL SHEETS 41

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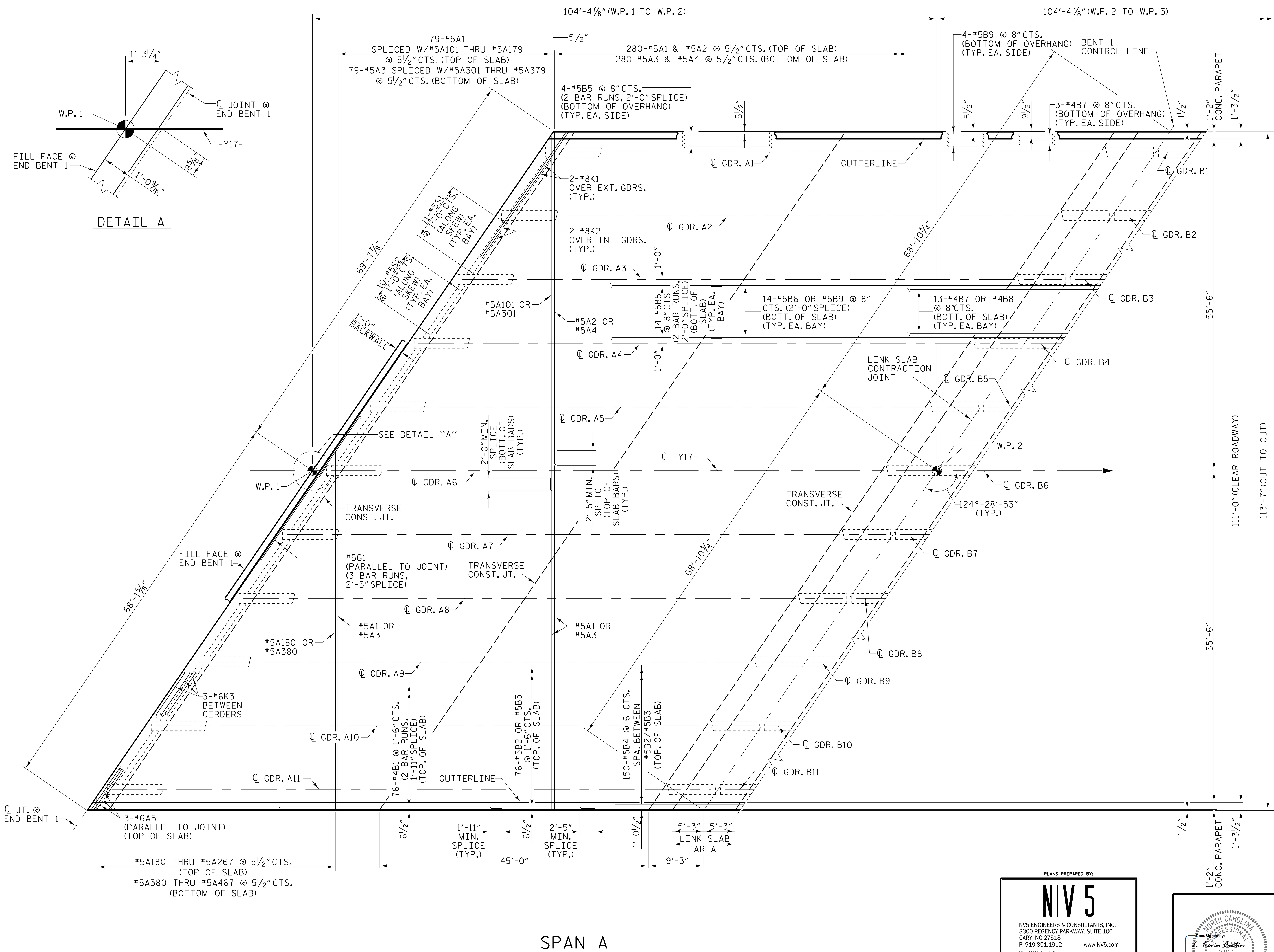
104'-4 7/8" (W.P. 1 TO W.P. 2)
104'-4 7/8" (W.P. 2 TO W.P. 3)
79-#5A1 SPLICED W/#5A101 THRU #5A179 @ 5 1/2" CTS. (TOP OF SLAB)
79-#5A3 SPLICED W/#5A301 THRU #5A379 @ 5 1/2" CTS. (BOTTOM OF SLAB)
280-#5A1 & #5A2 @ 5 1/2" CTS. (TOP OF SLAB)
280-#5A3 & #5A4 @ 5 1/2" CTS. (BOTTOM OF SLAB)
4-#5B9 @ 8" CTS. (BOTTOM OF OVERHANG) (TYP. EA. SIDE)
BENT 1 CONTROL LINE
4-#5B5 @ 8" CTS. (2 BAR RUNS, 2'-0" SPLICE) (BOTTOM OF OVERHANG) (TYP. EA. SIDE)
3-#4B7 @ 8" CTS. (BOTTOM OF OVERHANG) (TYP. EA. SIDE)
1'-2" CONC. PARAPET
1'-3 1/2"
DETAIL A
W.P. 1
℄ JOINT @ END BENT 1
-Y17-
FILL FACE @ END BENT 1
1'-3 1/4"
8 5/8"
1'-0 9/16"
℄ GDR. A1
GUTTERLINE
2-#8K1 OVER EXT. GDRS. (TYP.)
2-#8K2 OVER INT. GDRS. (TYP.)
11-#5S1 @ 1'-0" CTS. (ALONG SKEW) (TYP. EA. BAY)
10-#5S2 @ 1'-0" CTS. (ALONG SKEW) (TYP. EA. BAY)
69'-7 7/8"
68'-10 3/4"
℄ GDR. A2
℄ GDR. A3
℄ GDR. A4
℄ GDR. A5
℄ GDR. A6
℄ GDR. A7
℄ GDR. A8
℄ GDR. A9
℄ GDR. A10
℄ GDR. A11
℄ GDR. B1
℄ GDR. B2
℄ GDR. B3
℄ GDR. B4
℄ GDR. B5
℄ GDR. B6
℄ GDR. B7
℄ GDR. B8
℄ GDR. B9
℄ GDR. B10
℄ GDR. B11
#5A101 OR #5A301
#5A2 OR #5A4
14-#5B5 @ 8" CTS. (2 BAR RUNS, 2'-0" SPLICE) (BOTT. OF SLAB) (TYP. EA. BAY)
14-#5B6 OR #5B9 @ 8" CTS. (2'-0" SPLICE) (BOTT. OF SLAB) (TYP. EA. BAY)
13-#4B7 OR #4B8 @ 8" CTS. (BOTT. OF SLAB) (TYP. EA. BAY)
1'-0" BACKWALL
LINK SLAB CONTRACTION JOINT
SEE DETAIL "A"
2'-0" MIN. SPLICE (BOTT. OF SLAB BARS) (TYP.)
℄ -Y17-
W.P. 2
124°-28'-53" (TYP.)
2'-5" MIN. SPLICE (TOP OF SLAB BARS) (TYP.)
TRANSVERSE CONST. JT.
#5G1 (PARALLEL TO JOINT) (3 BAR RUNS, 2'-5" SPLICE)
FILL FACE @ END BENT 1
68'-1 5/8"
#5A1 OR #5A3
#5A180 OR #5A380
3-#6K3 BETWEEN GIRDERS
76-#4B1 @ 1'-6" CTS. (2 BAR RUNS, 1'-11" SPLICE) (TOP OF SLAB)
76-#5B2 OR #5B3 @ 1'-6" CTS. (TOP OF SLAB)
150-#5B4 @ 6 CTS. SPA. BETWEEN #5B2/#5B3 (TOP OF SLAB)
55'-6"
111'-0" (CLEAR ROADWAY)
113'-7" (OUT TO OUT)
℄ JT. @ END BENT 1
3-#6A5 (PARALLEL TO JOINT) (TOP OF SLAB)
#5A180 THRU #5A267 @ 5 1/2" CTS. (TOP OF SLAB)
#5A380 THRU #5A467 @ 5 1/2" CTS. (BOTTOM OF SLAB)
6 1/2"
1'-11" MIN. SPLICE (TYP.)
2'-5" MIN. SPLICE (TYP.)
45'-0"
1'-0 1/2"
5'-3"
LINK SLAB AREA
9'-3"
1 1/2"
SPAN A

NOTES

FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "SUPERSTRUCTURE 1'-2" X 2'-6" CONCRETE PARAPET" SHEET.

FOR POUR SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 2 OF 2.

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

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NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN 018661

3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

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1			3			TOTAL SHEETS
2			4			41

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NOTES

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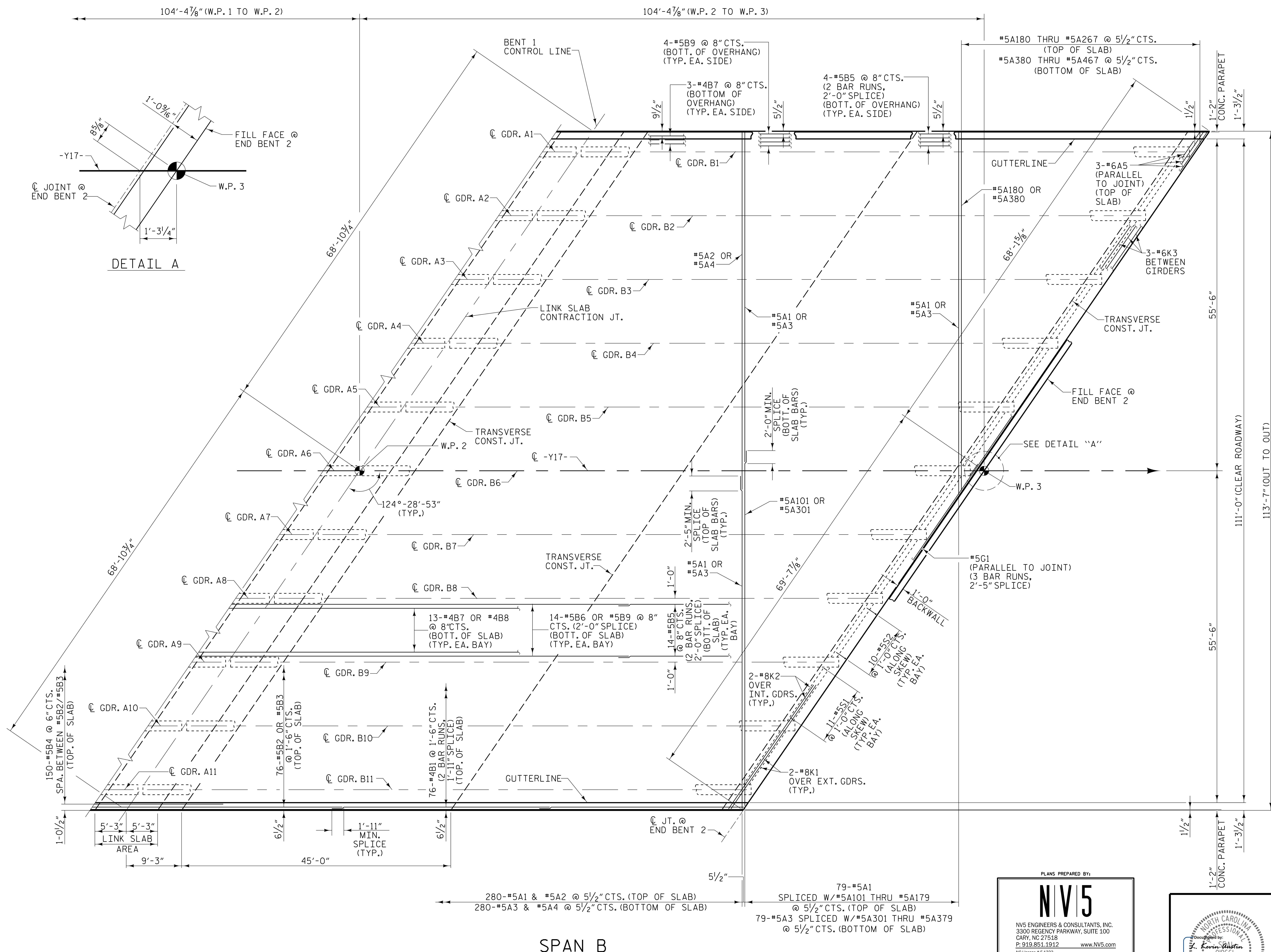

104'-4 7/8" (W.P. 1 TO W.P. 2)
104'-4 7/8" (W.P. 2 TO W.P. 3)
BENT 1 CONTROL LINE
4-#5B9 @ 8" CTS. (BOTT. OF OVERHANG) (TYP. EA. SIDE)
3-#4B7 @ 8" CTS. (BOTTOM OF OVERHANG) (TYP. EA. SIDE)
4-#5B5 @ 8" CTS. (2 BAR RUNS, 2'-0" SPLICE) (BOTT. OF OVERHANG) (TYP. EA. SIDE)
#5A180 THRU #5A267 @ 5 1/2" CTS. (TOP OF SLAB)
#5A380 THRU #5A467 @ 5 1/2" CTS. (BOTTOM OF SLAB)
1'-2" CONC. PARAPET
1'-3 1/2"
1'-0 9/16"
8 5/8"
FILL FACE @ END BENT 2
-Y17-
W.P. 3
℄ JOINT @ END BENT 2
1'-3 1/4"
DETAIL A
℄ GDR. A1
℄ GDR. B1
GUTTERLINE
3-#6A5 (PARALLEL TO JOINT) (TOP OF SLAB)
#5A180 OR #5A380
℄ GDR. A2
℄ GDR. B2
68'-10 3/4"
68'-1 5/8"
3-#6K3 BETWEEN GIRDERS
℄ GDR. A3
#5A2 OR #5A4
℄ GDR. B3
LINK SLAB CONTRACTION JT.
℄ GDR. A4
#5A1 OR #5A3
TRANSVERSE CONST. JT.
℄ GDR. B4
55'-6"
℄ GDR. A5
2'-0" MIN. SPLICE (BOTT. OF SLAB BARS) (TYP.)
FILL FACE @ END BENT 2
℄ GDR. B5
111'-0" (CLEAR ROADWAY)
113'-7" (OUT TO OUT)
W.P. 2
SEE DETAIL "A"
℄ GDR. A6
℄ -Y17-
℄ GDR. B6
124°-28'-53" (TYP.)
#5A101 OR #5A301
2'-5" MIN. SPLICE (TOP OF SLAB BARS) (TYP.)
℄ GDR. A7
℄ GDR. B7
#5G1 (PARALLEL TO JOINT) (3 BAR RUNS, 2'-5" SPLICE)
TRANSVERSE CONST. JT.
#5A1 OR #5A3
1'-0"
69'-7 7/8"
℄ GDR. A8
℄ GDR. B8
1'-0" BACKWALL
13-#4B7 OR #4B8 @ 8" CTS. (BOTT. OF SLAB) (TYP. EA. BAY)
14-#5B6 OR #5B9 @ 8" CTS. (2'-0" SPLICE) (BOTT. OF SLAB) (TYP. EA. BAY)
14-#5B5 @ 8" CTS. (2 BAR RUNS, 2'-0" SPLICE) (BOTT OF SLAB) (TYP. EA. BAY)
10-#5S2 @ 1'-0" CTS. (ALONG SKEW) (TYP. EA. BAY)
℄ GDR. A9
℄ GDR. B9
2-#8K2 OVER INT. GDRS. (TYP.)
55'-6"
℄ GDR. A10
150-#5B4 @ 6" CTS. SPA. BETWEEN #5B2/#5B3 (TOP OF SLAB)
76-#5B2 OR #5B3 @ 1'-6" CTS. (TOP OF SLAB)
76-#4B1 @ 1'-6" CTS. (2 BAR RUNS, 1'-11" SPLICE) (TOP OF SLAB)
℄ GDR. B10
11-#5S1 @ 1'-0" CTS. (ALONG SKEW) (TYP. EA. BAY)
℄ GDR. A11
℄ GDR. B11
GUTTERLINE
2-#8K1 OVER EXT. GDRS. (TYP.)
1'-0 1/2"
5'-3"
5'-3"
LINK SLAB AREA
6 1/2"
1'-11" MIN. SPLICE (TYP.)
6 1/2"
℄ JT. @ END BENT 2
9'-3"
45'-0"
5 1/2"
1 1/2"
9 1/2"
280-#5A1 & #5A2 @ 5 1/2" CTS. (TOP OF SLAB)
280-#5A3 & #5A4 @ 5 1/2" CTS. (BOTTOM OF SLAB)
79-#5A1 SPLICED W/#5A101 THRU #5A179 @ 5 1/2" CTS. (TOP OF SLAB)
79-#5A3 SPLICED W/#5A301 THRU #5A379 @ 5 1/2" CTS. (BOTTOM OF SLAB)
SPAN B

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

PLANS PREPARED BY:

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DocuSigned by: L. Kevin Austin

3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B

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NO.	BY:	DATE:	NO.	BY:	DATE:		S-9
1			3				TOTAL SHEETS
2			4				41

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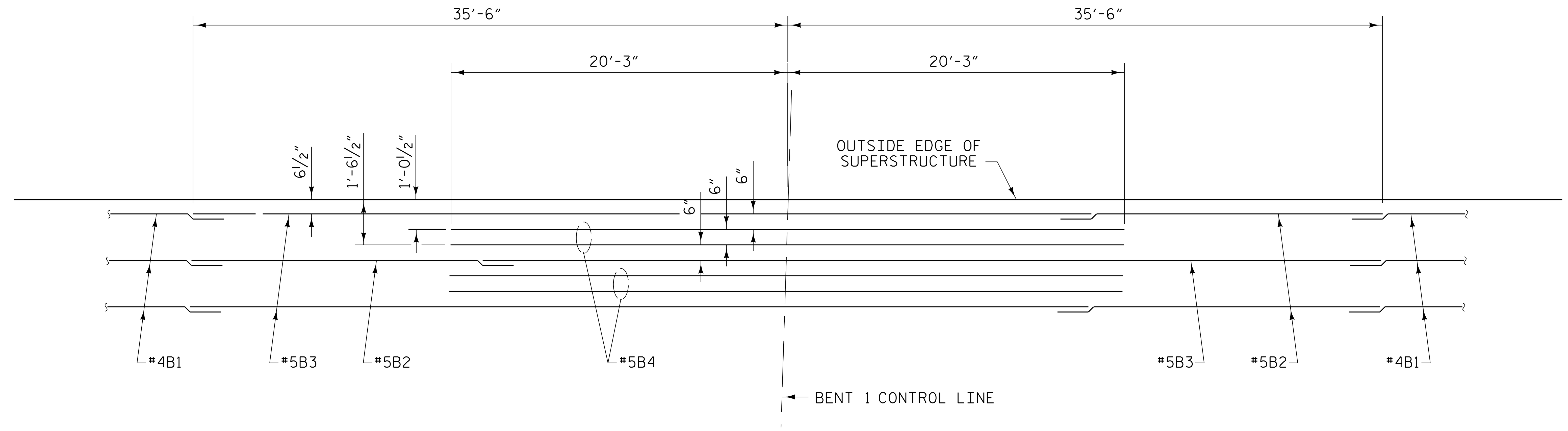
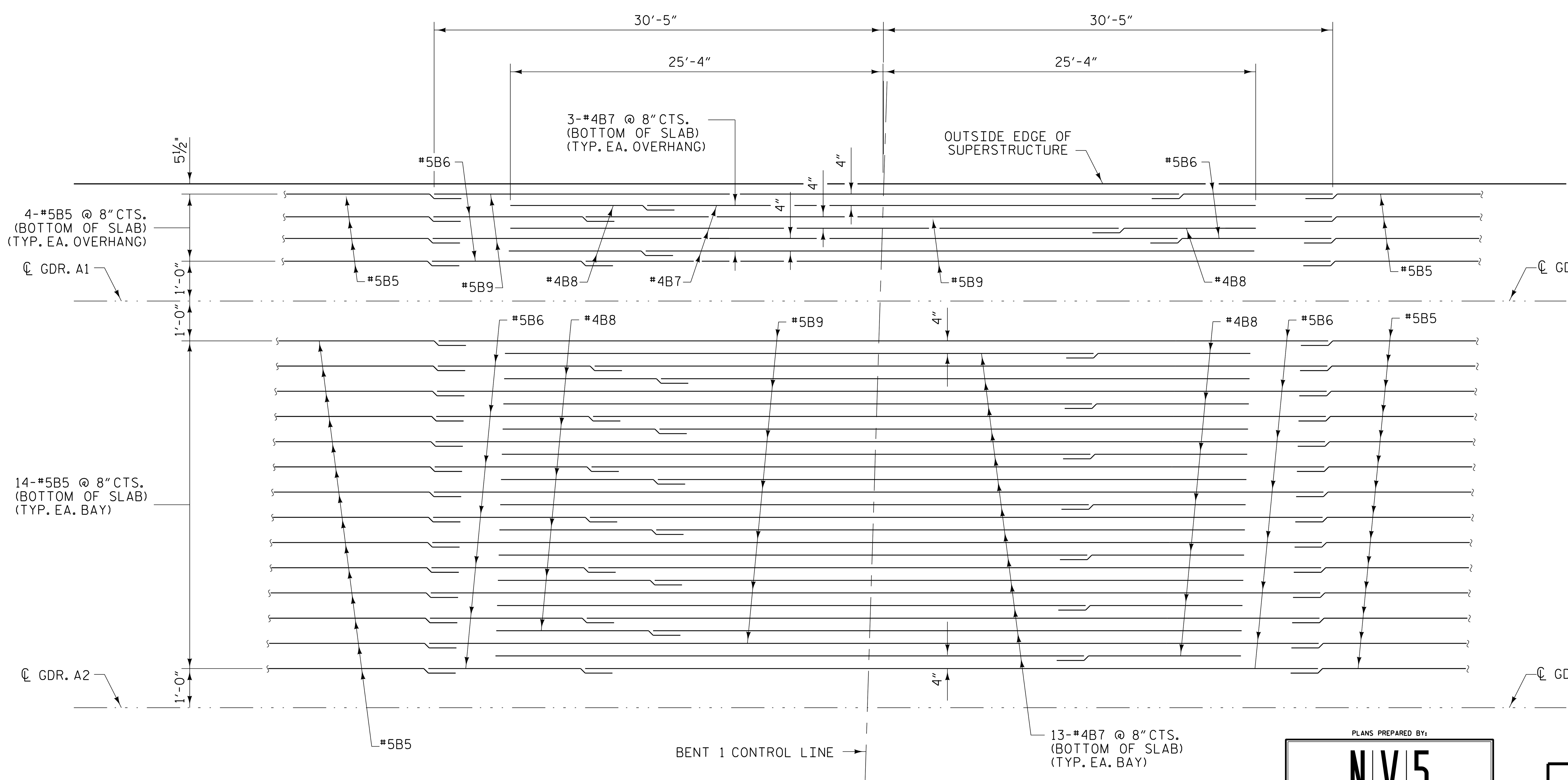


TOP OF DECK "B" BAR PLACEMENT

AT BENT



BOTTOM OF DECK "B" BAR PLACEMENT

AT BENT

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

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STATE OF NORTH CAROLINA
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SUPERSTRUCTURE

PLAN OF SPANS
"B" BAR LAYOUT

REVISIONS						SHEET NO.
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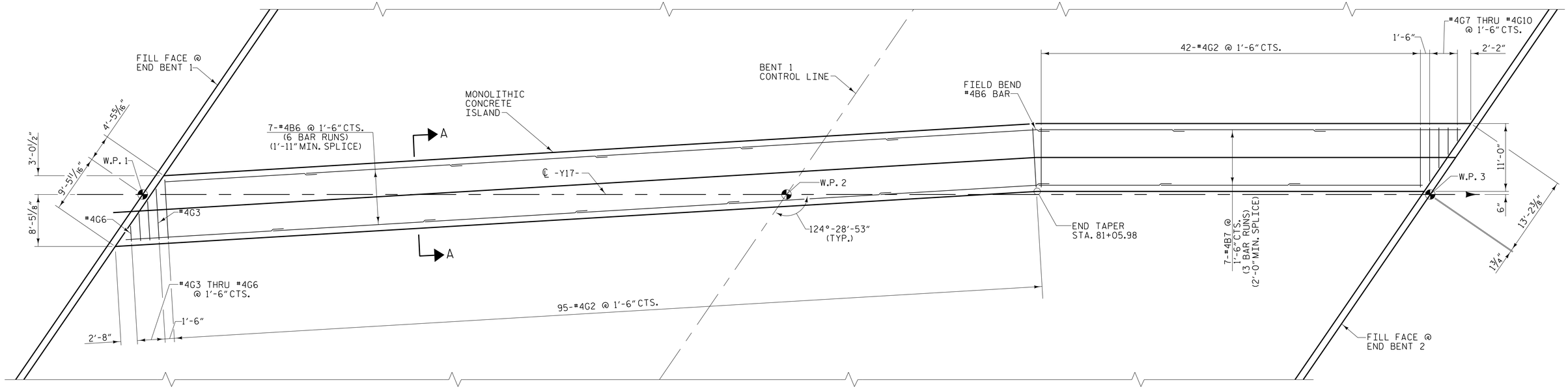
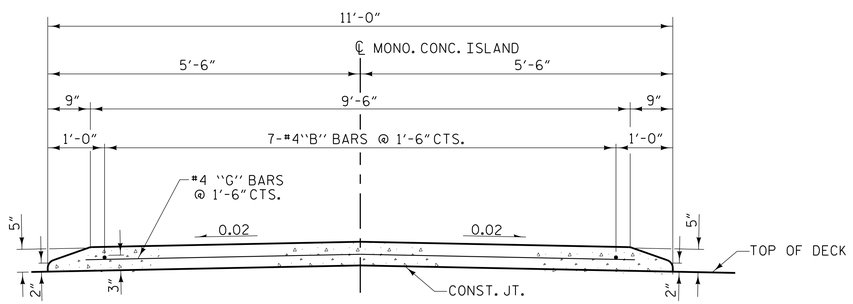
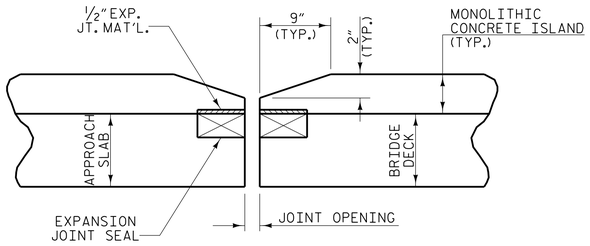


PLAN OF MONOLITHIC CONCRETE ISLAND



SECTION A-A THRU MONOLITHIC CONCRETE ISLAND



DETAIL AT EXPANSION JOINT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B6	42	#4	STR	26'-8"	748
✳ B7	21	#4	STR	24'-3"	340
✳ G2	137	#4	STR	9'-8"	885
✳ G3	1	#4	STR	8'-3"	6
✳ G4	1	#4	STR	6'-4"	4
✳ G5	1	#4	STR	4'-5"	3
✳ G6	1	#4	STR	2'-6"	2
✳ G7	1	#4	STR	8'-9"	6
✳ G8	1	#4	STR	6'-6"	4
✳ G9	1	#4	STR	4'-4"	3
✳ G10	1	#4	STR	2'-2"	1
✳ EPOXY COATED REINF. STEEL					2002 LBS.
CLASS AA CONCRETE					34.6 CU. YDS.

✳ INDICATES EPOXY COATED REINF. STEEL

NOTES

MONOLITHIC ISLAND TO FOLLOW SLOPE OF DECK.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MONOLITHIC CONCRETE ISLAND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAYMENT FOR THE MONOLITHIC CONCRETE ISLAND SHALL BE INCLUDED IN UNIT PRICE FOR "REINFORCED CONCRETE DECK SLAB"

ALL REINFORCING STEEL IN THE MONOLITHIC CONCRETE ISLAND SHALL BE EPOXY COATED.

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Document prepared by:
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

MONOLITHIC CONCRETE ISLAND PLAN AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			41

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FRAMING PLAN

* SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET 1 OF 2 FOR DIMENSIONS.

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SUPERSTRUCTURE
FRAMING PLAN

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NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN
3/29/2022

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-12
1			3			TOTAL SHEETS	41
2			4				

DRAWN BY :	W. B. ALLEN	DATE :	2/17
CHECKED BY :	Z. H. BROWN	DATE :	5/17
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22

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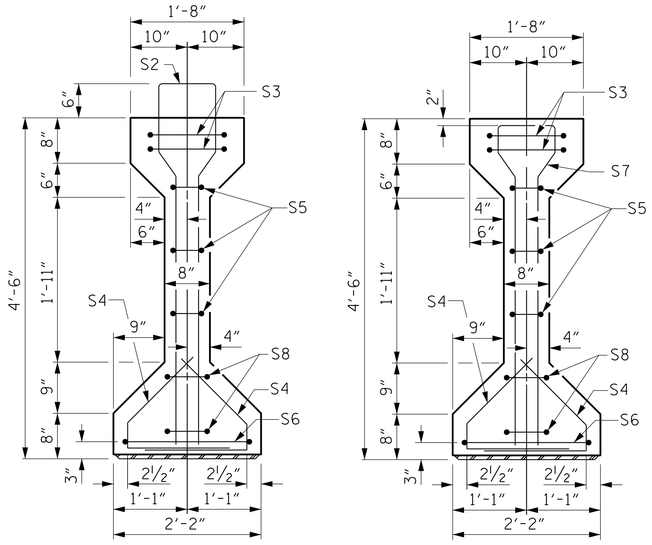
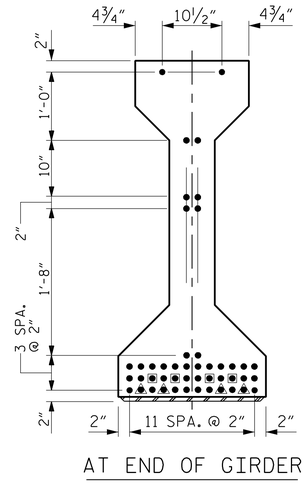


SECTION A-A

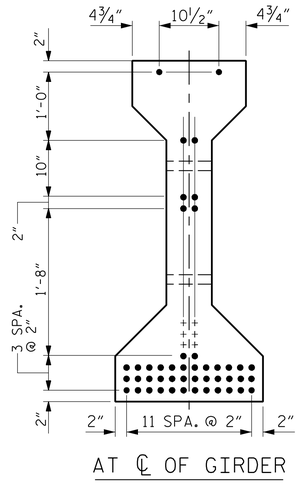
SECTION B-B

DEBONDING LEGEND

- • FULLY BONDED STRANDS
- ⊡ STRANDS DEBONDED FOR 8′-0″ FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 20′-0″ FROM END OF GIRDER

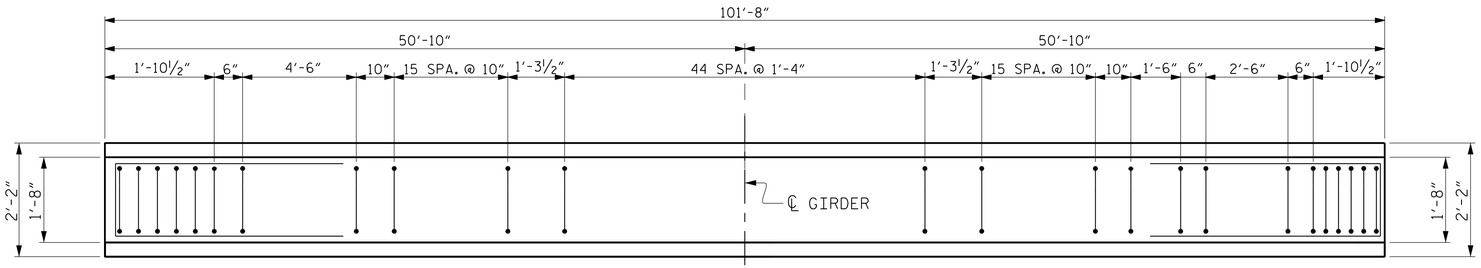


AT END OF GIRDER

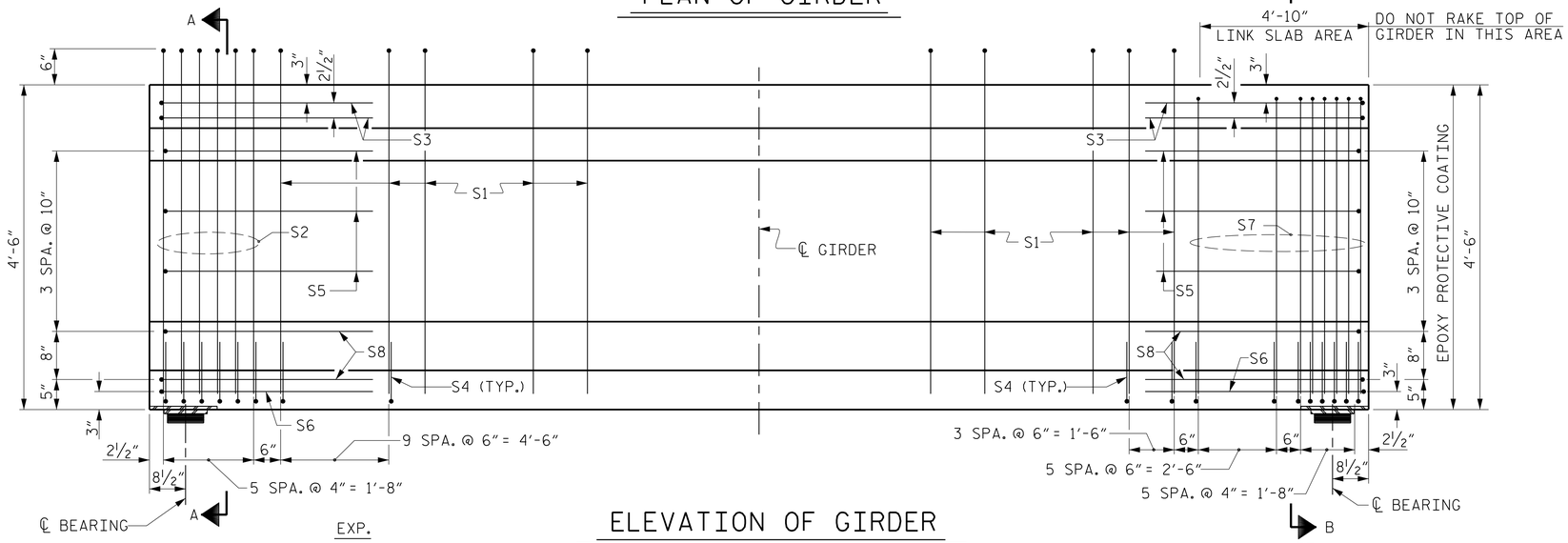


AT ℄ OF GIRDER

0.6″ Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

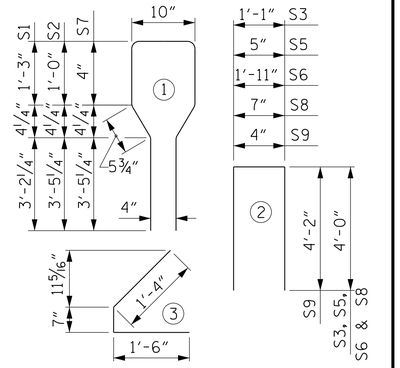
0.6″ Ø L.R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	91	#4	1	10′-8″	648
	S2	6	#6	1	10′-8″	96
	S3	4	#4	2	9′-1″	24
	S4	64	#4	3	3′-5″	146
	S5	6	#4	2	8′-5″	34
	S6	2	#4	2	9′-11″	13
	S7	12	#6	1	9′-4″	168
	S8	4	#4	2	8′-7″	23
EXTERIOR GDR.	S9	4	#5	2	8′-8″	36
INTERIOR GDR.	S9	8	#5	2	8′-8″	72
EXTERIOR GDR.	S10	10	#4	STR	7′-0″	48
INTERIOR GDR.	S11	10	#4	STR	14′-4″	96

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9500 PSI CONCRETE	0.6″ Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GDR.	1236	20.6	46
INTERIOR GDR.	1320	20.6	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
22	101′-8″	2236′-8″

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029661 KEVIN AUSTIN
Docusigned by: L. Kevin Austin
3/29/2022

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER - LINK SLAB (SPANS A AND B)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			41

STD. NO. PCG6 (SHT. 1)

ASSEMBLED BY : M. D. METZGER	DATE : 2/22
CHECKED BY : L. K. AUSTIN	DATE : 2/22
DRAWN BY : BNB 09/21	
CHECKED BY : AAI 09/21	

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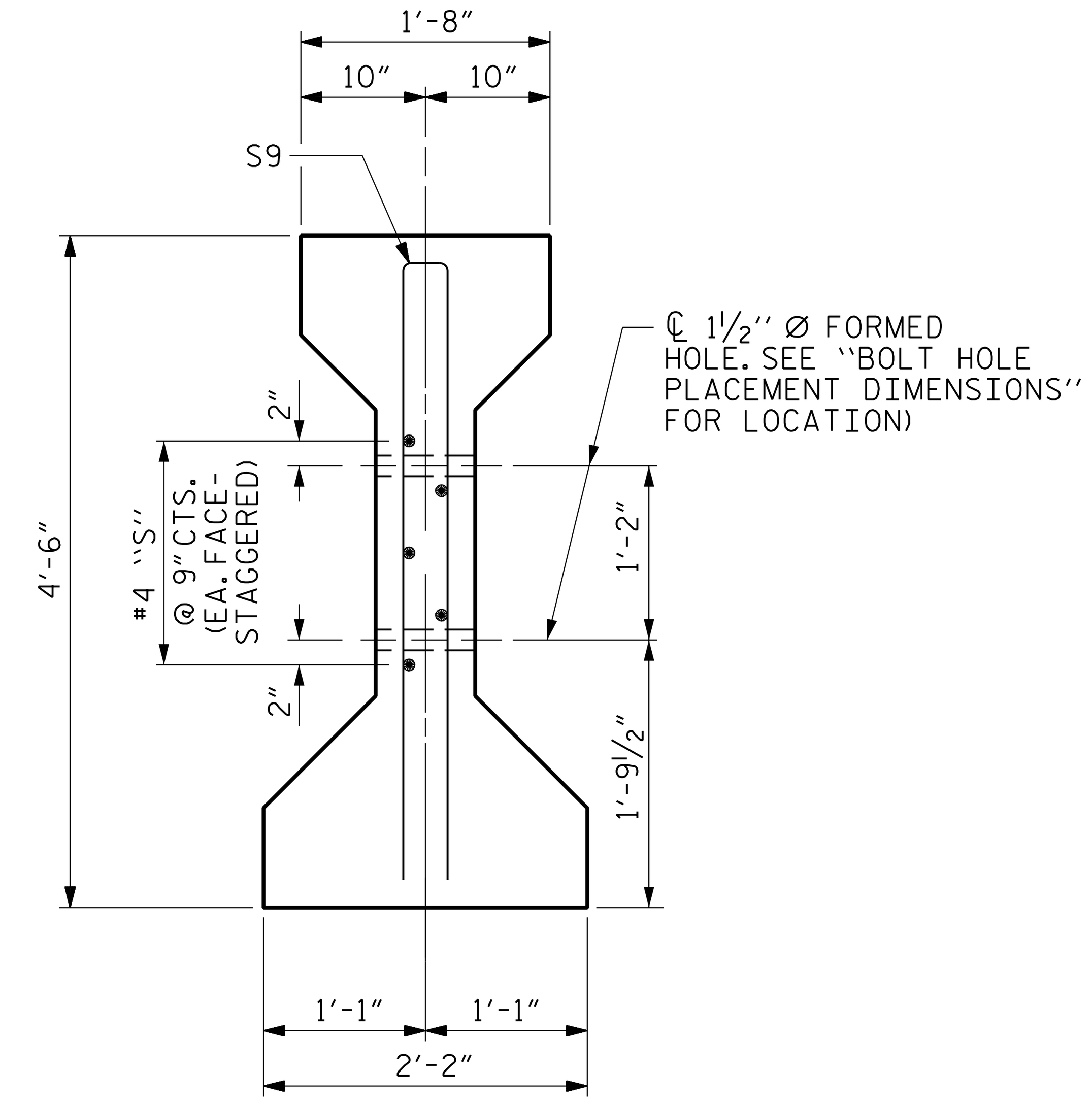
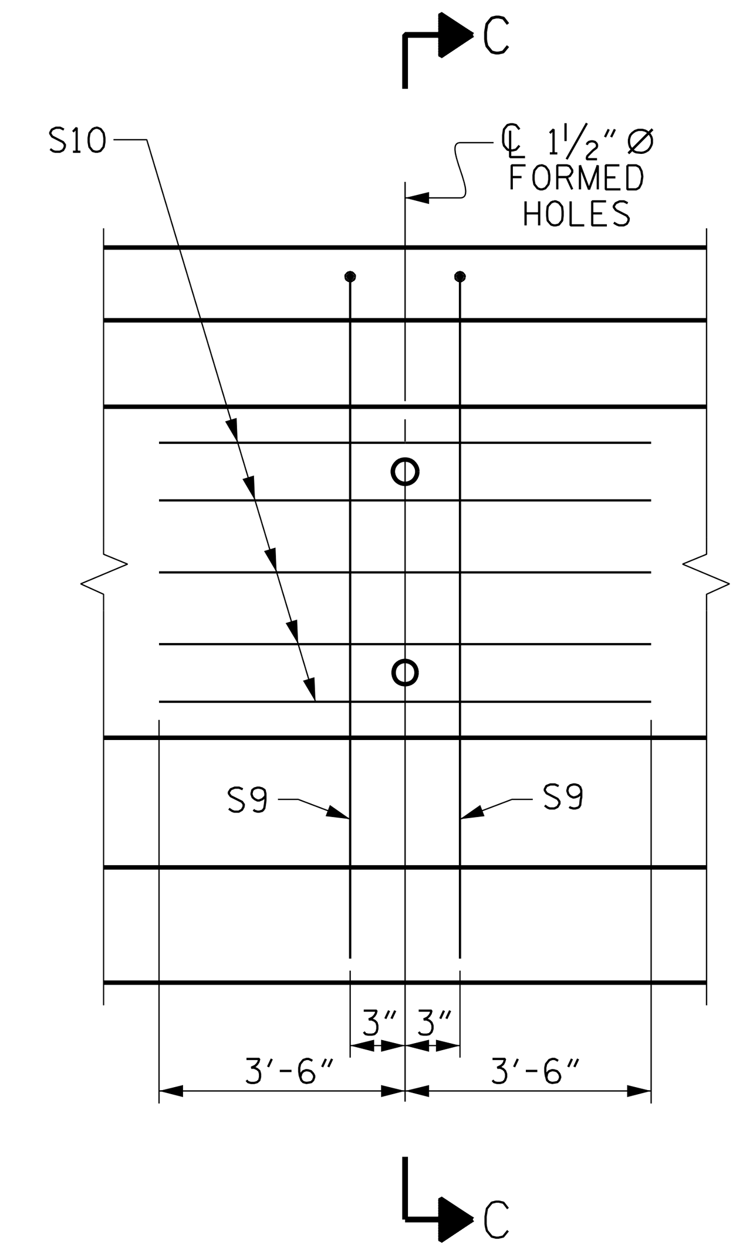
BOLT HOLE PLACEMENT DIMENSIONS				
GIRDER. NO.	SPAN A & SPAN B			
	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"
1	30'-5½"	33'-5"	37'-9½"	-
2 - 10	30'-5½"	7'-4"	26'-1"	30'-5½"
11	37'-9½"	33'-5"	30'-5½"	-

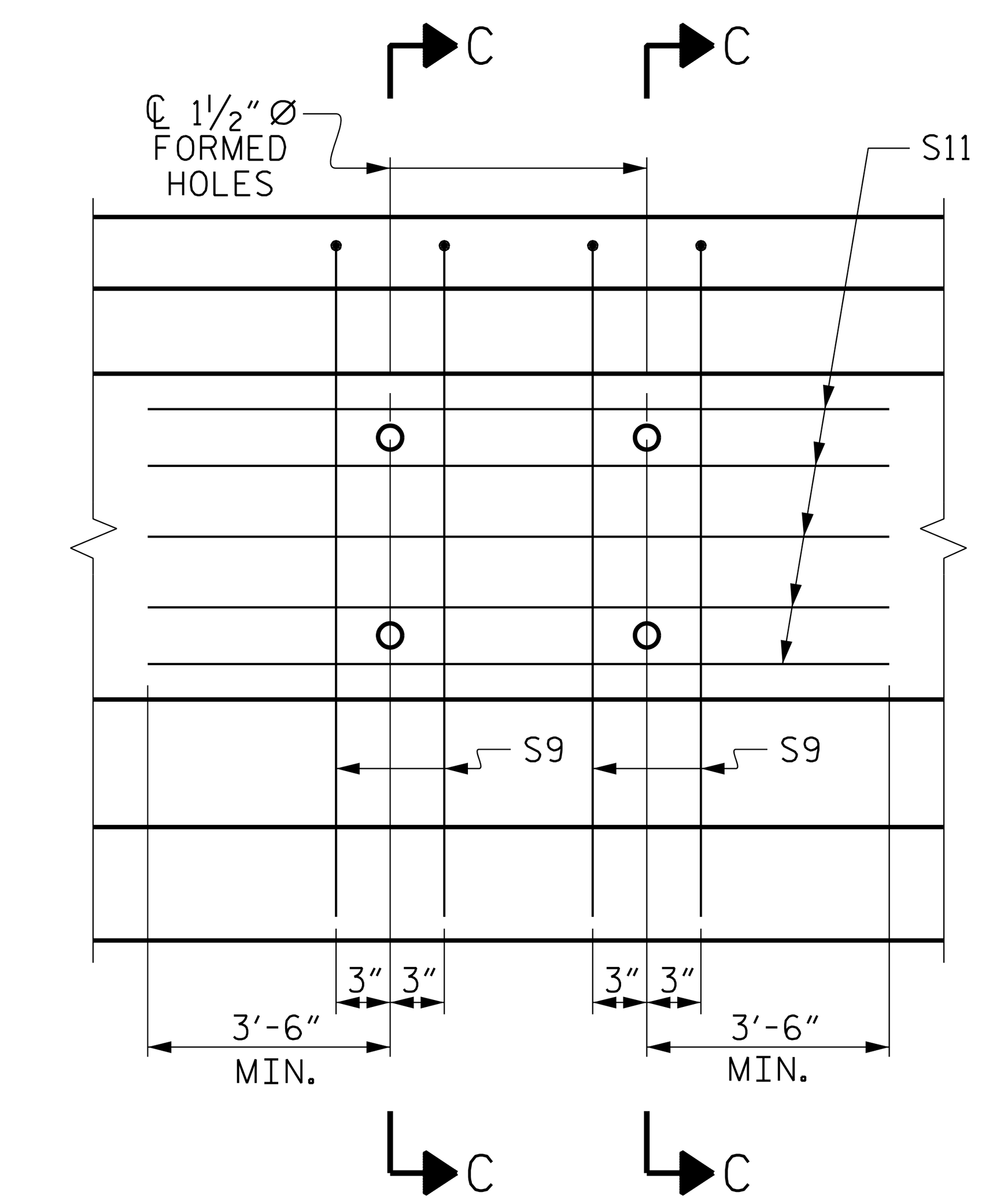


SECTION C-C

(S1 BARS NOT SHOWN)



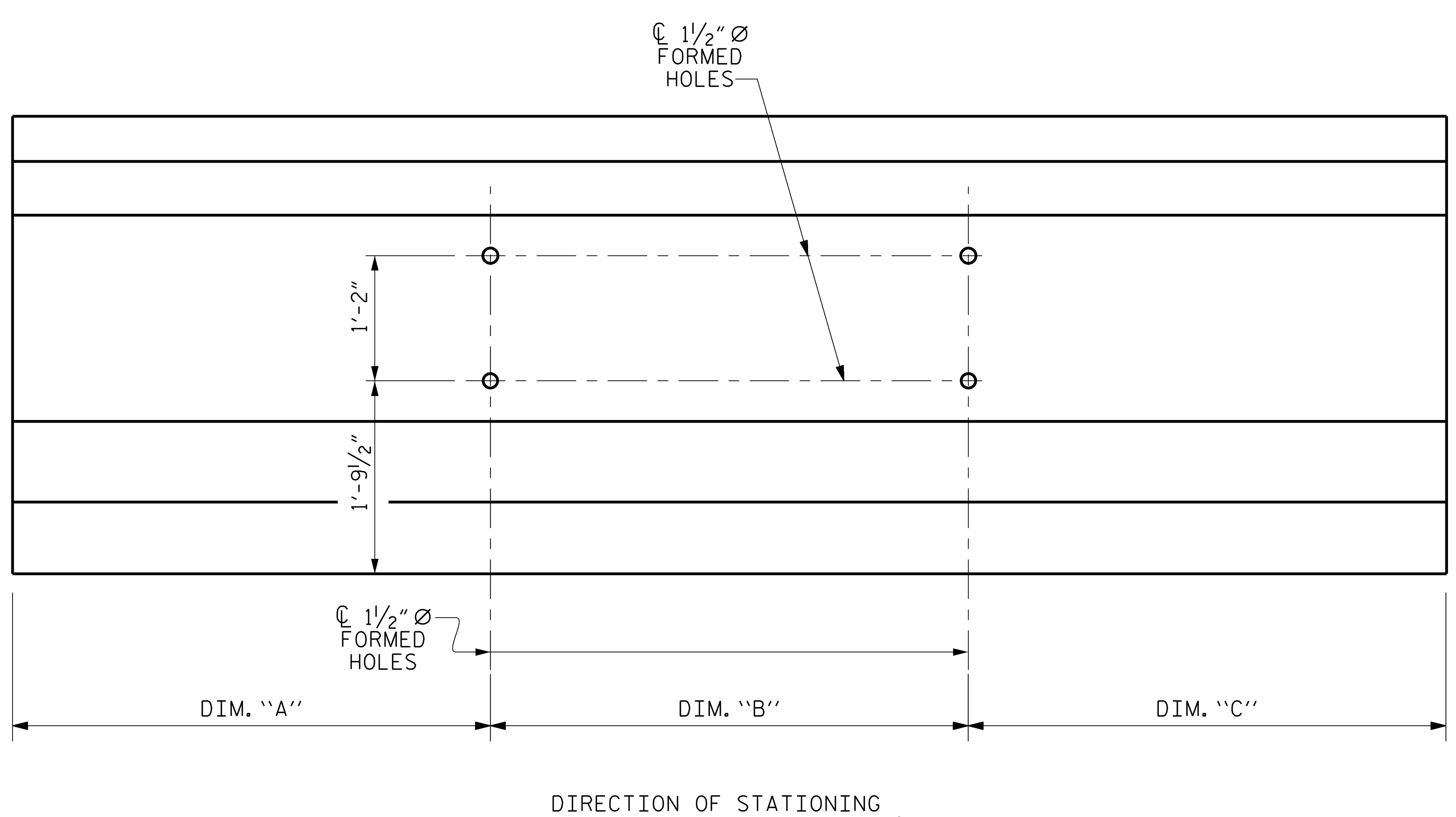
EXTERIOR GIRDER



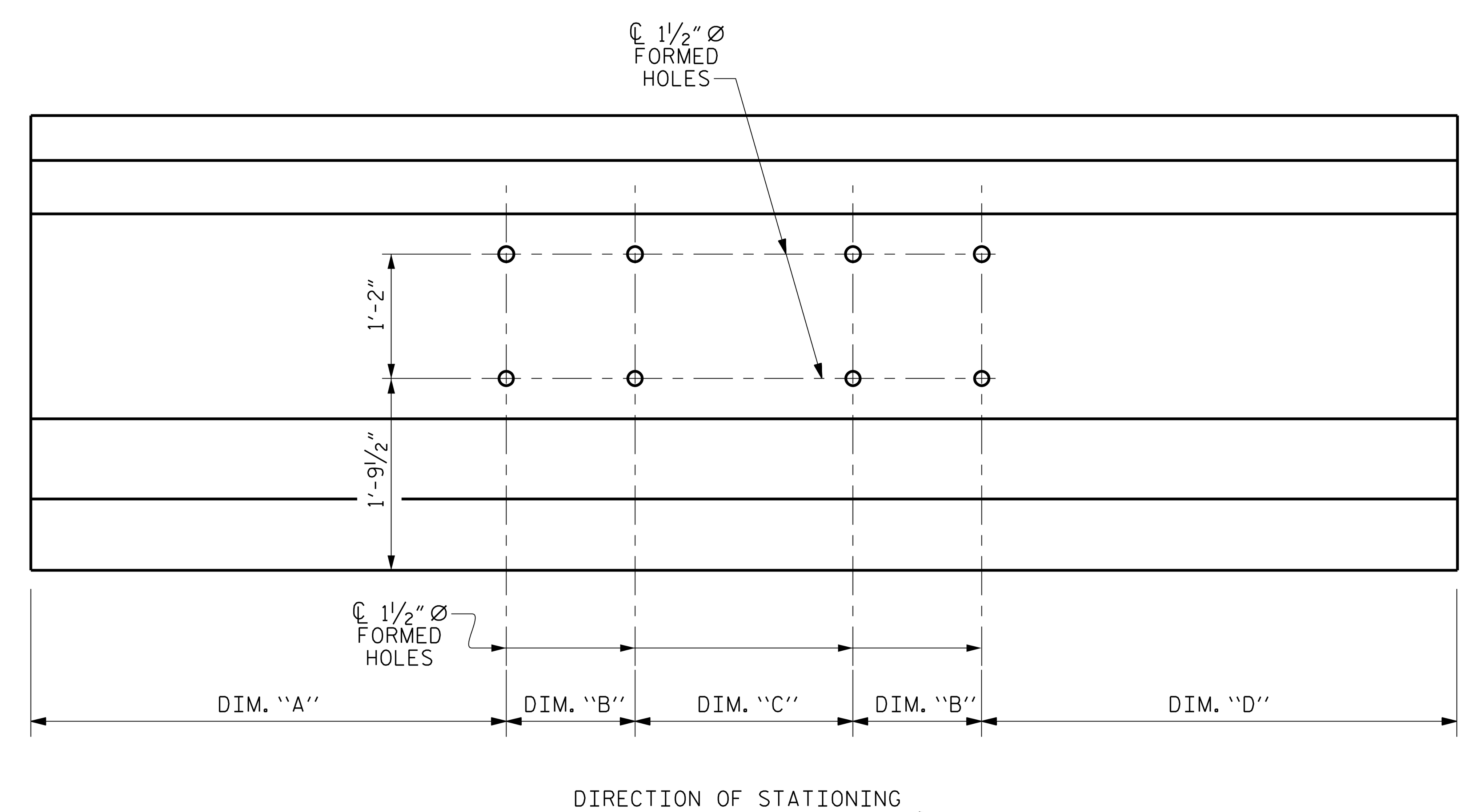
INTERIOR GIRDER

PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER



EXTERIOR GIRDER



INTERIOR GIRDER

BOLT HOLE PLACEMENT

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESTRESSED CONCRETE GIRDER DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			41

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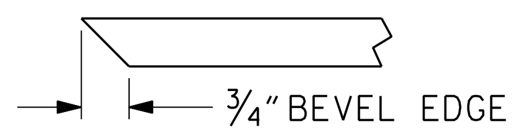
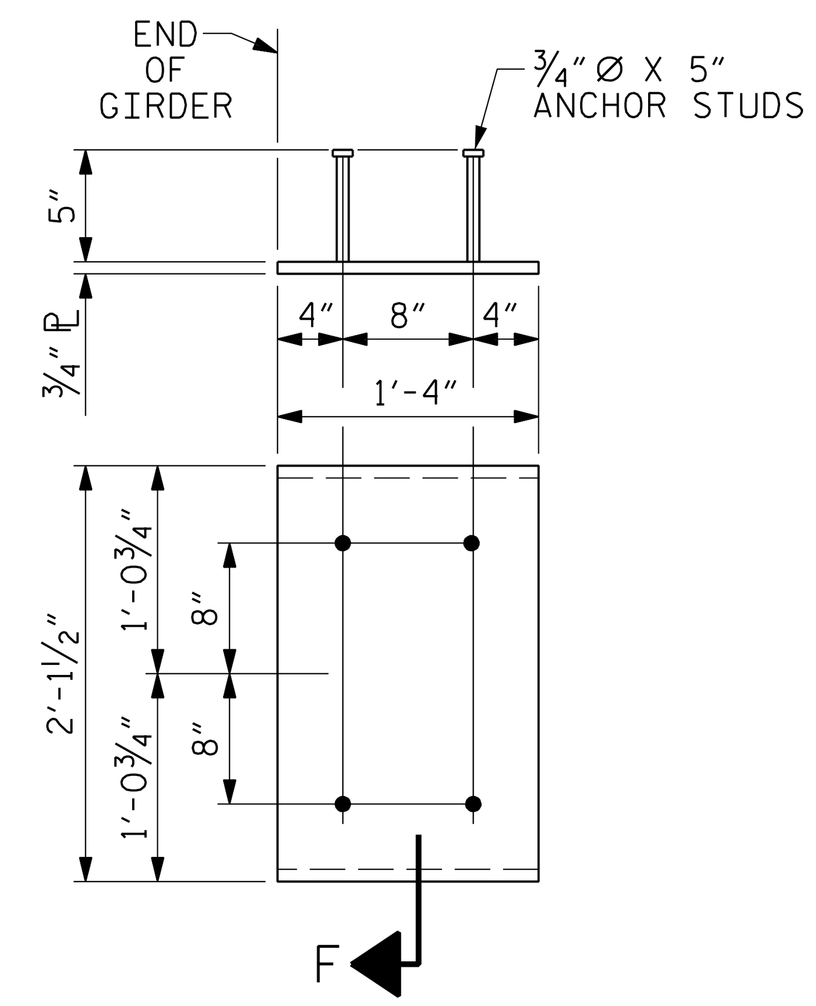
NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN 028651
L. Kevin Austin
3/29/2022

DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22



SECTION "F"

(SEE NOTES)



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

(2 REQ'D PER GIRDER)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

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

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 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 6500 PSI.

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4" AND THE LINK SLAB REGION AS SHOWN ON SHEET 1 OF 3, SHALL BE RAKED TO A DEPTH OF 1/4".

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPANS A & B

0.6" Ø LOW RELAXATION	GIRDERS 1 & 11																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.039	0.076	0.112	0.144	0.173	0.197	0.217	0.231	0.240	0.243	0.240	0.231	0.217	0.197	0.173	0.144	0.112	0.076	0.039	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.027	0.054	0.081	0.107	0.127	0.148	0.161	0.174	0.179	0.183	0.179	0.174	0.161	0.148	0.127	0.107	0.081	0.054	0.027	0.0
FINAL CAMBER ↑	0.0	1/8"	1/4"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	11/16"	3/4"	11/16"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	1/4"	1/8"	0.0
0.6" Ø LOW RELAXATION	GIRDERS 2 - 4, 7, 9 & 10																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.039	0.076	0.112	0.144	0.173	0.197	0.217	0.231	0.240	0.243	0.240	0.231	0.217	0.197	0.173	0.144	0.112	0.076	0.039	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.031	0.062	0.092	0.122	0.146	0.170	0.185	0.196	0.205	0.210	0.205	0.196	0.185	0.170	0.146	0.122	0.092	0.062	0.031	0.0
FINAL CAMBER ↑	0.0	1/16"	3/16"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	5/16"	5/16"	1/4"	3/16"	3/16"	1/16"	0.0
0.6" Ø LOW RELAXATION	GIRDERS 5 & 6																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.039	0.076	0.112	0.144	0.173	0.197	0.217	0.231	0.240	0.243	0.240	0.231	0.217	0.197	0.173	0.144	0.112	0.076	0.039	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.032	0.064	0.095	0.125	0.150	0.174	0.189	0.204	0.210	0.215	0.210	0.204	0.189	0.174	0.150	0.125	0.095	0.064	0.032	0.0
FINAL CAMBER ↑	0.0	1/16"	1/8"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/16"	0.0
0.6" Ø LOW RELAXATION	GIRDER 8																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.039	0.076	0.112	0.144	0.173	0.197	0.217	0.231	0.240	0.243	0.240	0.231	0.217	0.197	0.173	0.144	0.112	0.076	0.039	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.030	0.060	0.089	0.118	0.141	0.164	0.179	0.193	0.198	0.203	0.198	0.193	0.179	0.164	0.141	0.118	0.089	0.060	0.030	0.0
FINAL CAMBER ↑	0.0	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	1/2"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	0.0

* INCLUDES FUTURE WEARING SURFACE.

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

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 3 OF 3

3/27/2022 5:36:10 PM G:\Project\2014\2014062.28\CLIENT\Structures\U2519BB_SMU_G3_250452.dgn

ASSEMBLED BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22

DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMG
	REV. 2/15 MAA/TMG

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL SEAL 019661 ENGINEER L. KEVIN AUSTIN

DocuSigned by: L. Kevin Austin
72F7B3720EAA4B5...

3/29/2022

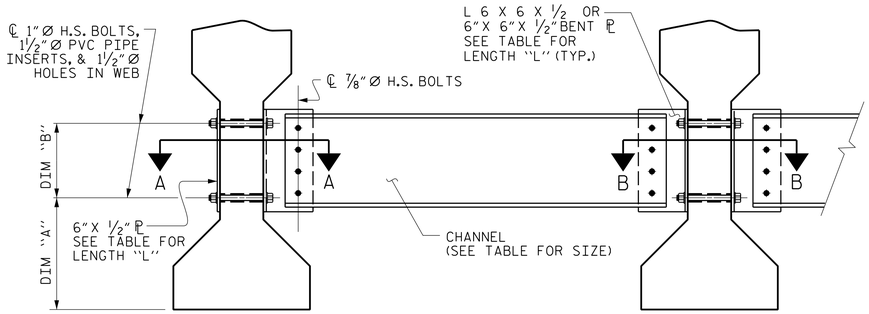
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER DETAILS

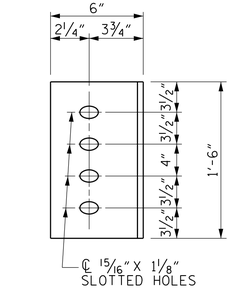
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			41

STD. NO. PCG9 (Sht. 3)



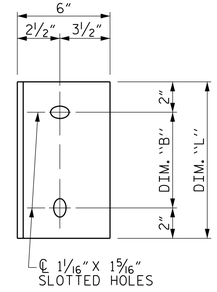
PART SECTION AT INTERMEDIATE DIAPHRAGM

(TYPE III OR TYPE IV GIRDER SHOWN)



DIAPHRAGM FACE

(TYPE III OR TYPE IV GDR.)



WEB FACE

CONNECTOR PLATE DETAILS

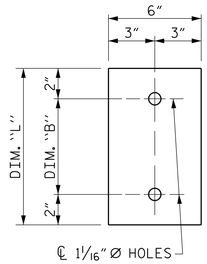
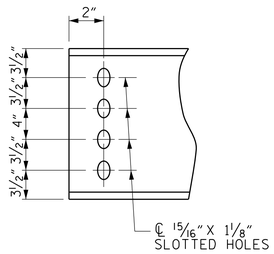
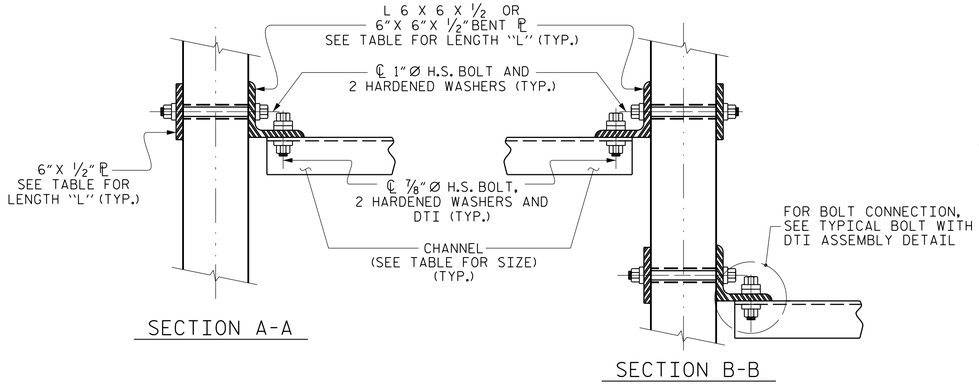


PLATE DETAILS



CHANNEL END

(TYPE III OR TYPE IV GDR.)

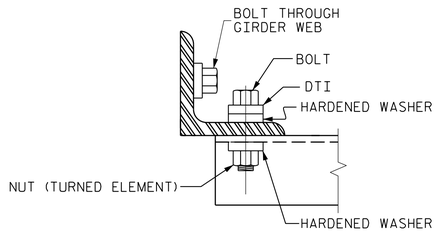


SECTION A-A

SECTION B-B

CONNECTION DETAILS

(SKEW > 110°)



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

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

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

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

TABLE

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

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036261 KEVIN AUSTIN
Docusigned by: L. Kevin Austin
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

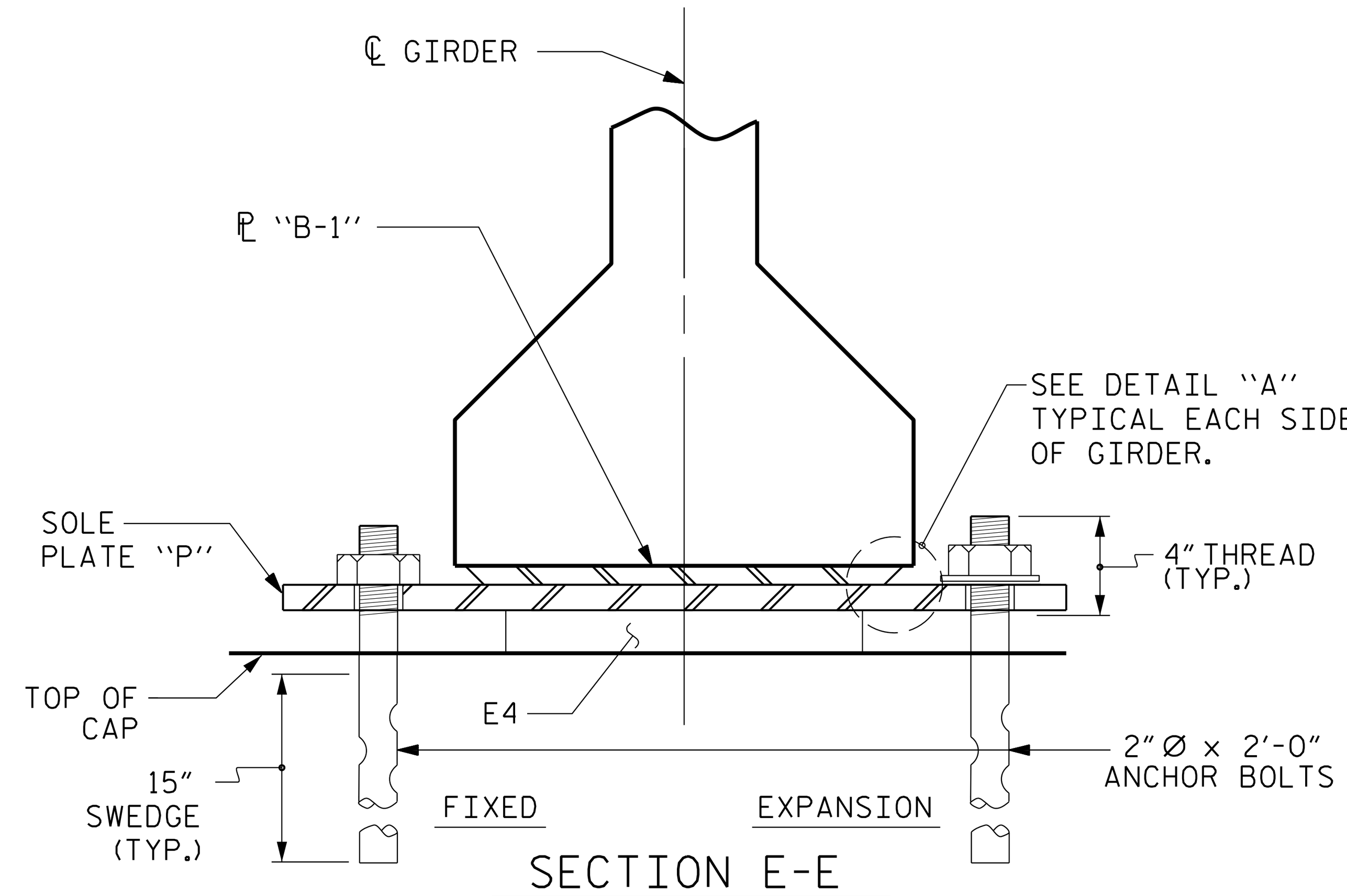
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE II, III, & IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			41

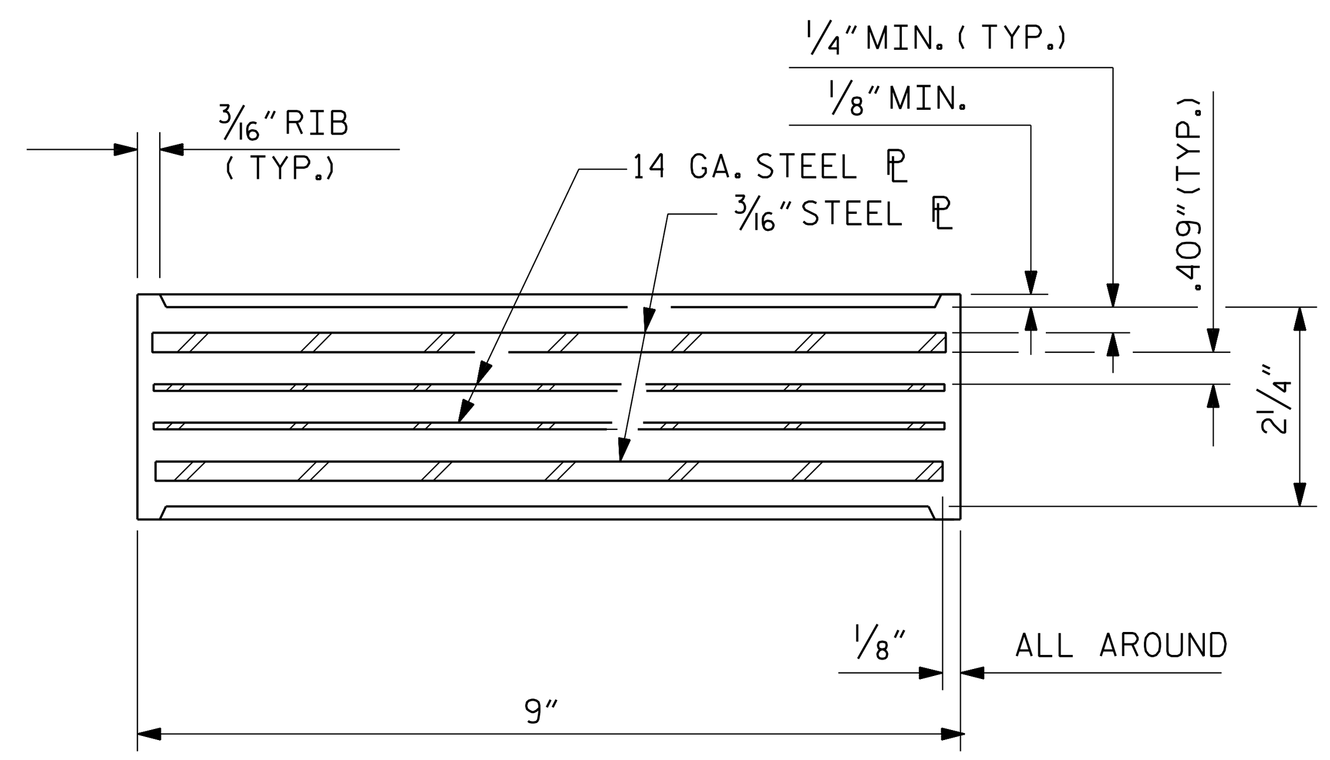
STD. NO. PCG10

ASSEMBLED BY :	W. B. ALLEN	DATE :	8/18
CHECKED BY :	Z. H. BROWN	DATE :	8/18
DRAWN BY : TLA 6/05	REV. 5/1/06RRR		KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11		MAA/GM
	REV. 12/17		MAA/THC

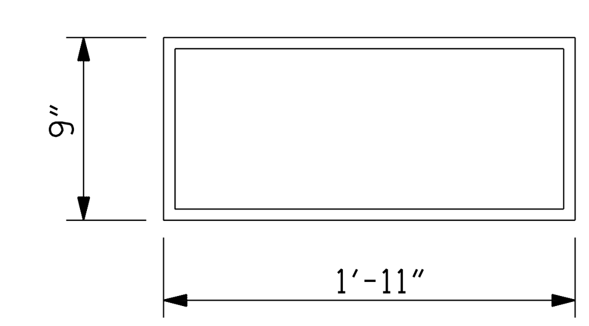
3/27/2022 5:36:17 PM G:\Project\2004\2004062.28\CLIENT\Structures\U2519BB_SMU_04_250452.dgn



SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (44 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 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.

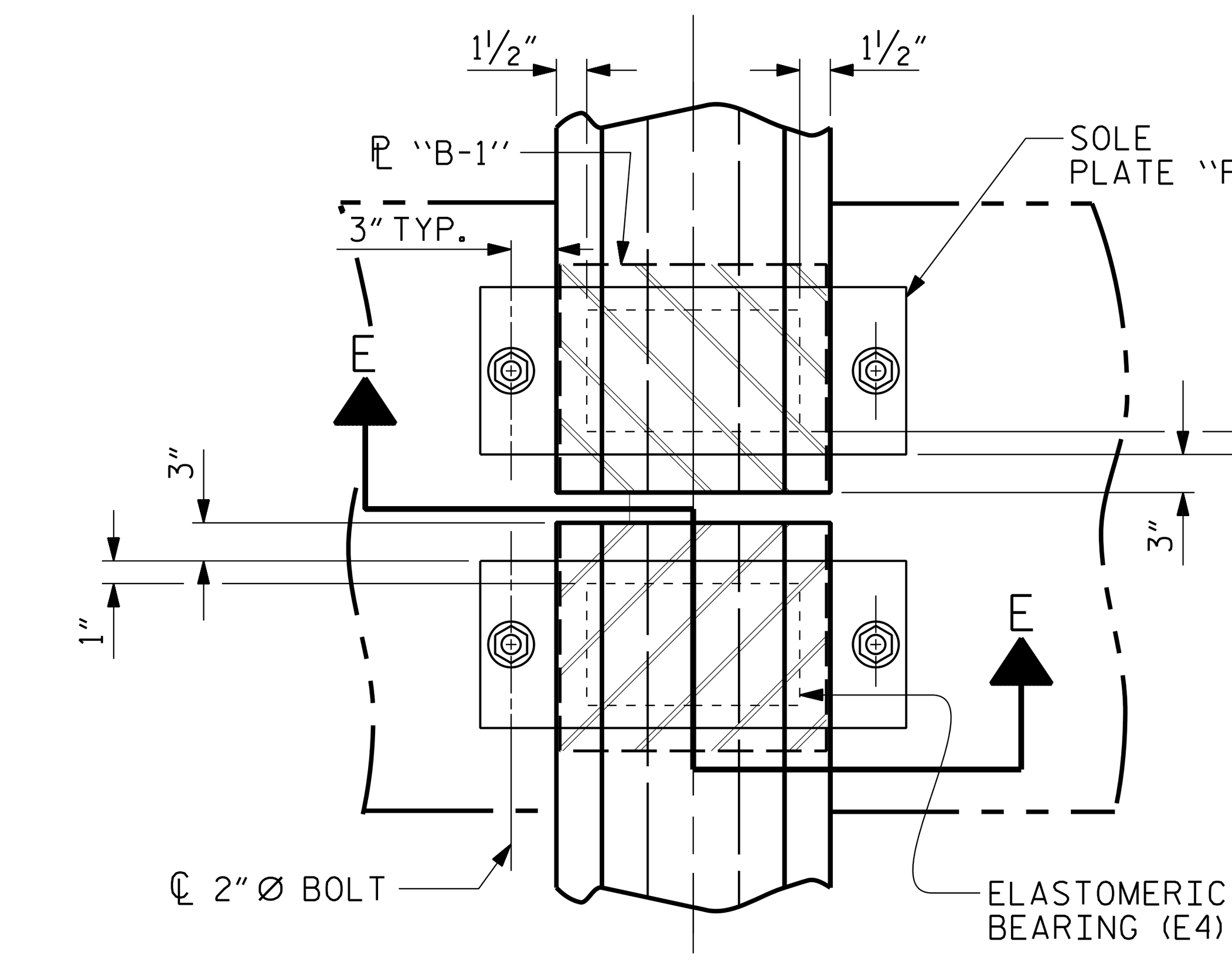
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.

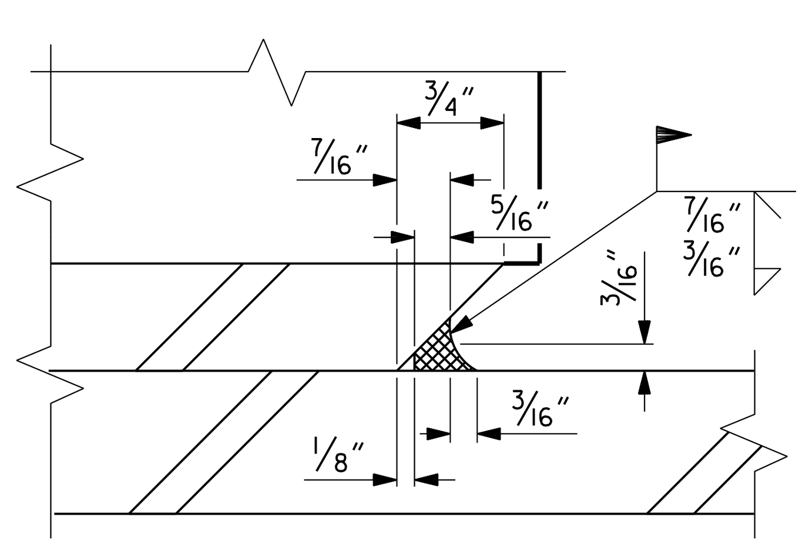
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

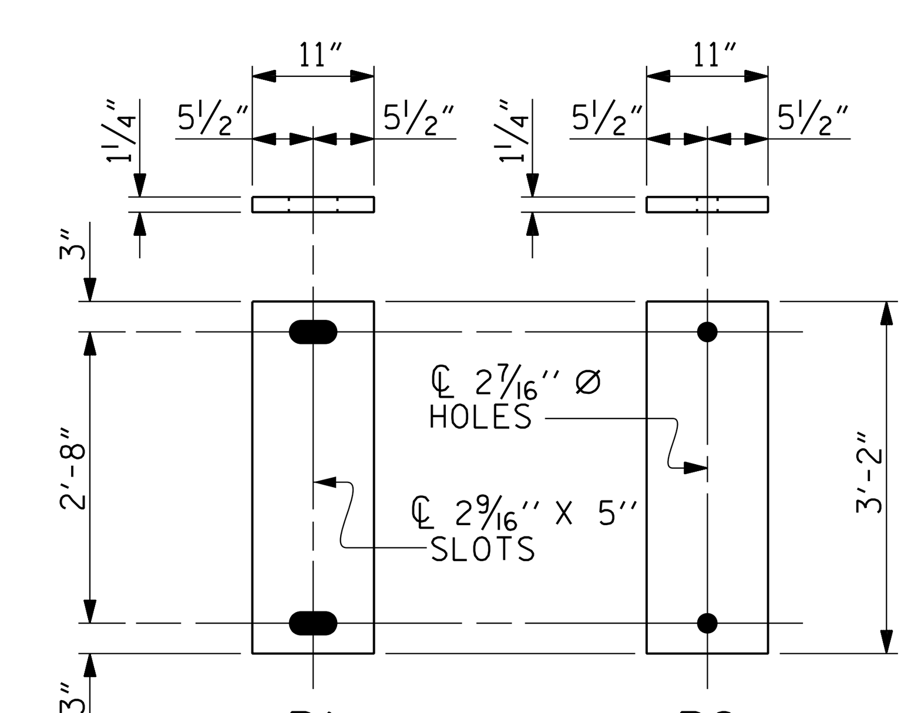


TYPICAL PLAN

(SHOWING SIMPLE SPAN BENT)



DETAIL "A"



P1 (EXPANSION) P1 (22 REQ'D)

P2 (FIXED) P2 (22 REQ'D)

SOLE PLATE (P1) DETAILS

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

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

PLANS PREPARED BY:

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

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER L. KEVIN AUSTIN — DocuSigned by: L. Kevin Austin

3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

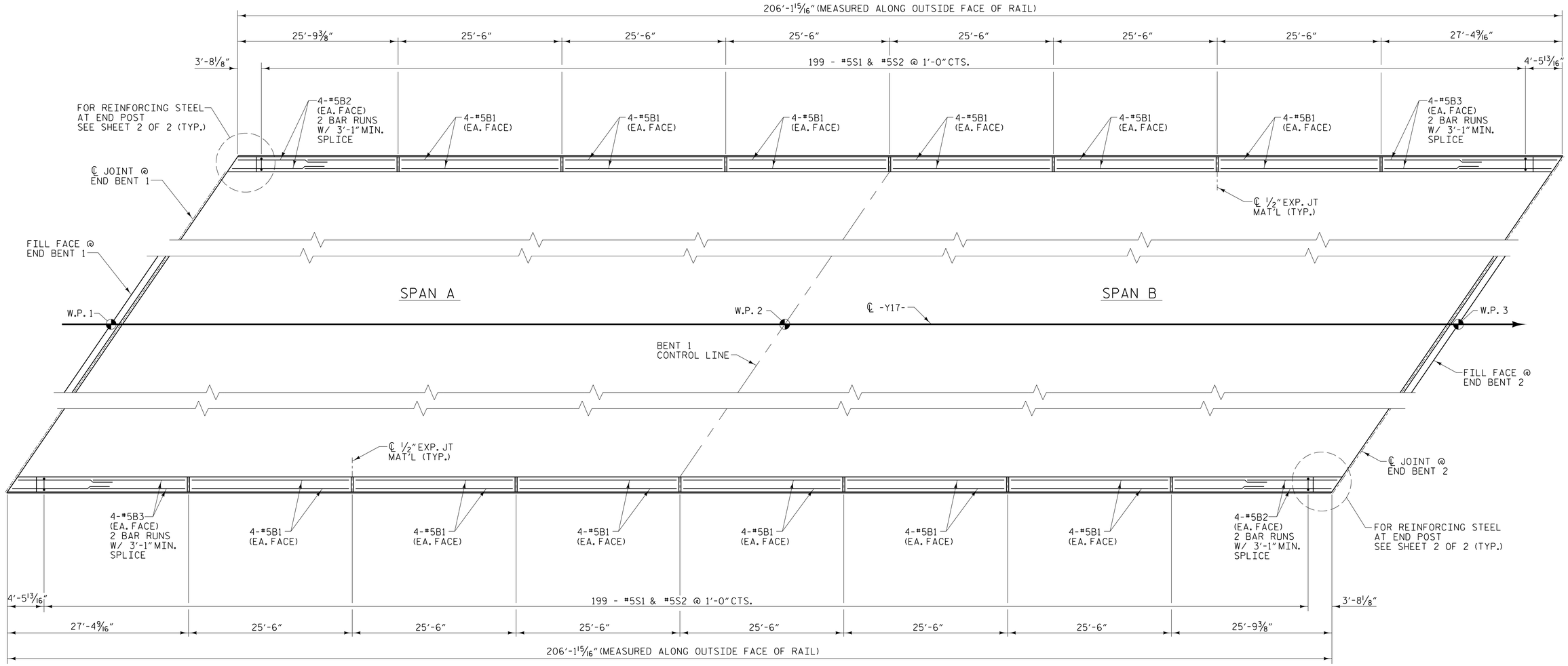
SUPERSTRUCTURE

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			41

DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22



PLAN OF PARAPET

ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF PARAPET

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

1'-2" x 2'-6" CONCRETE PARAPET

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			41

PLANS PREPARED BY:

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3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
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NORTH CAROLINA PROFESSIONAL SEAL 040661 ENGINEER L. KEVIN AUSTIN
Docusigned by: L. Kevin Austin 72F1B3720CA1488...
3/29/2022

DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22

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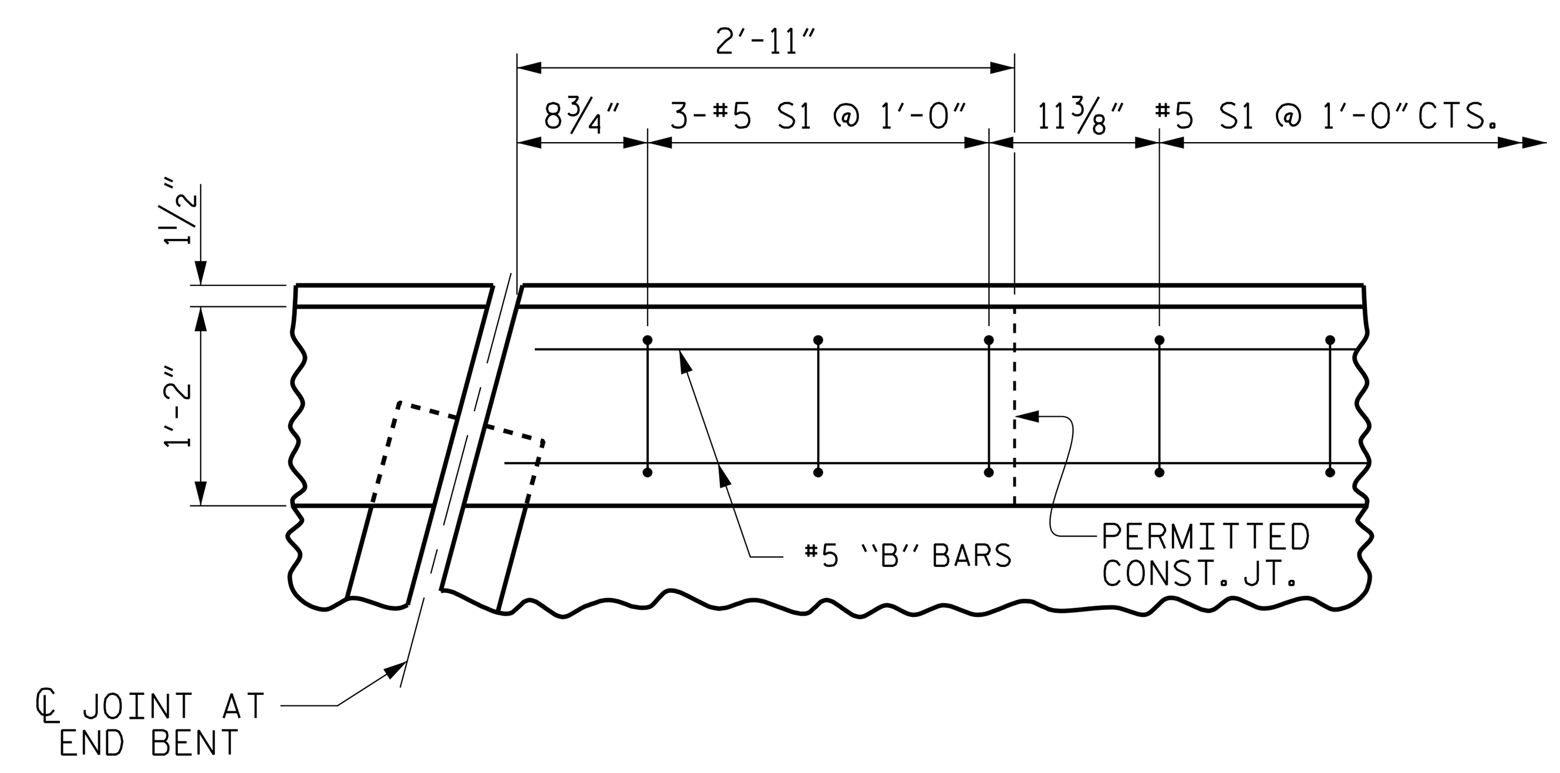
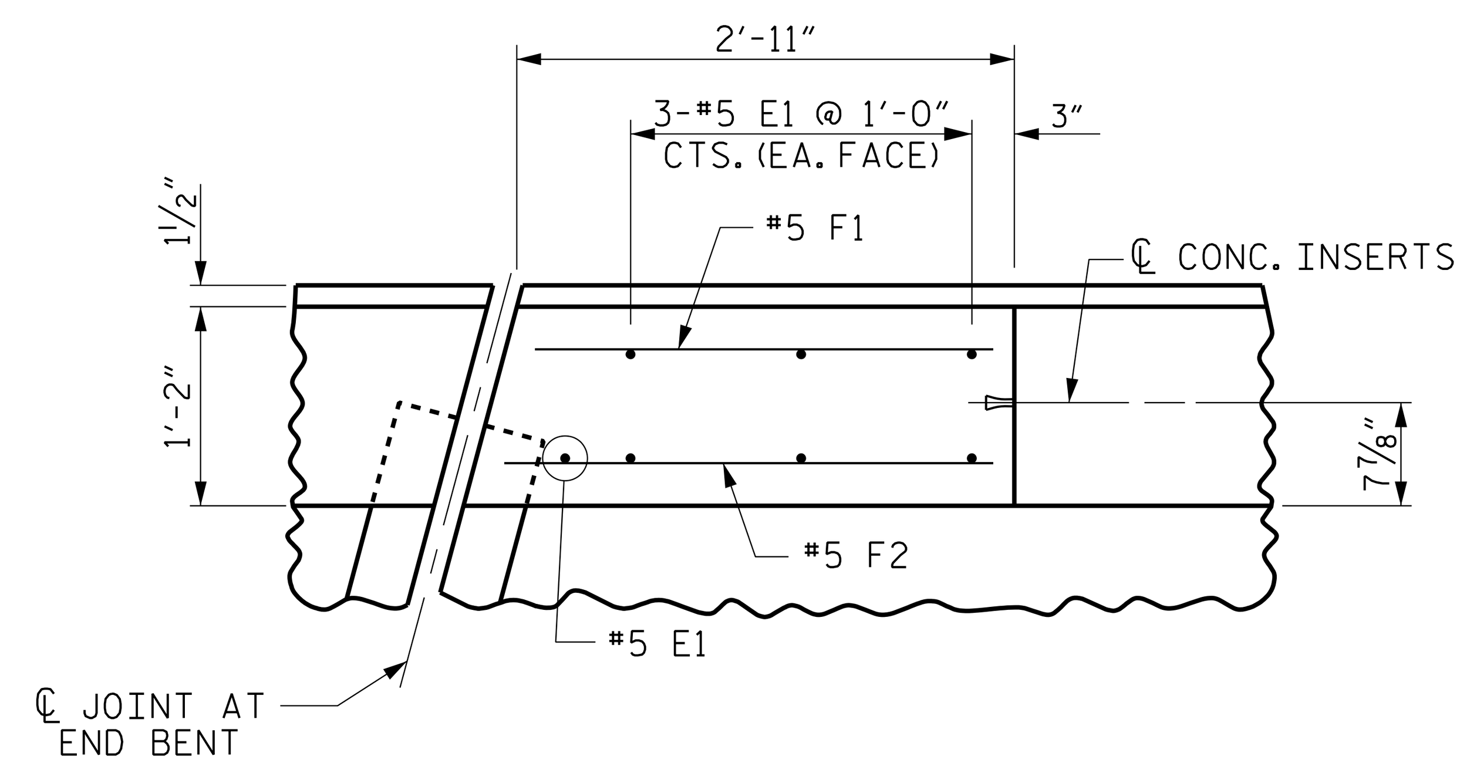


PLAN OF PARAPET



PLAN OF METAL RAIL ATTACHMENT POST

NOTES

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

ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.

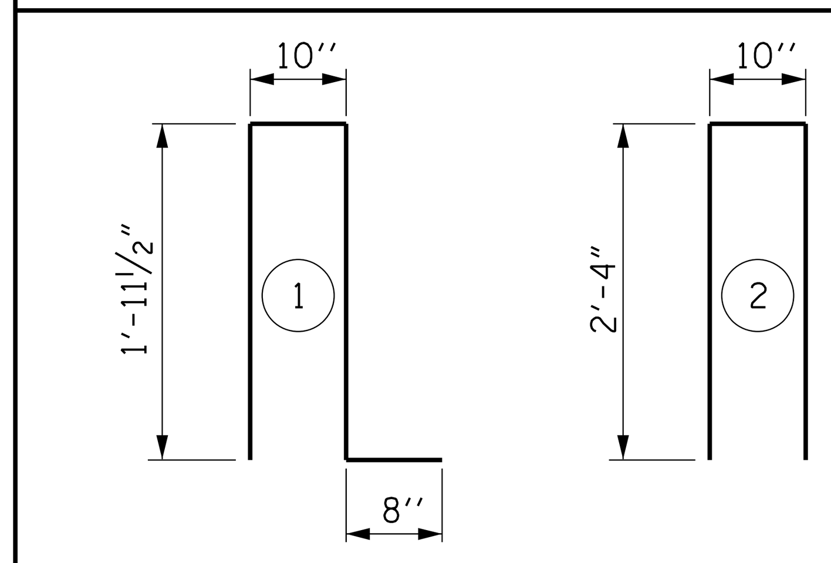
THE #5S1 & #5S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MIMIMUM CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN PARAPET.

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

FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES. SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.

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

BAR TYPE



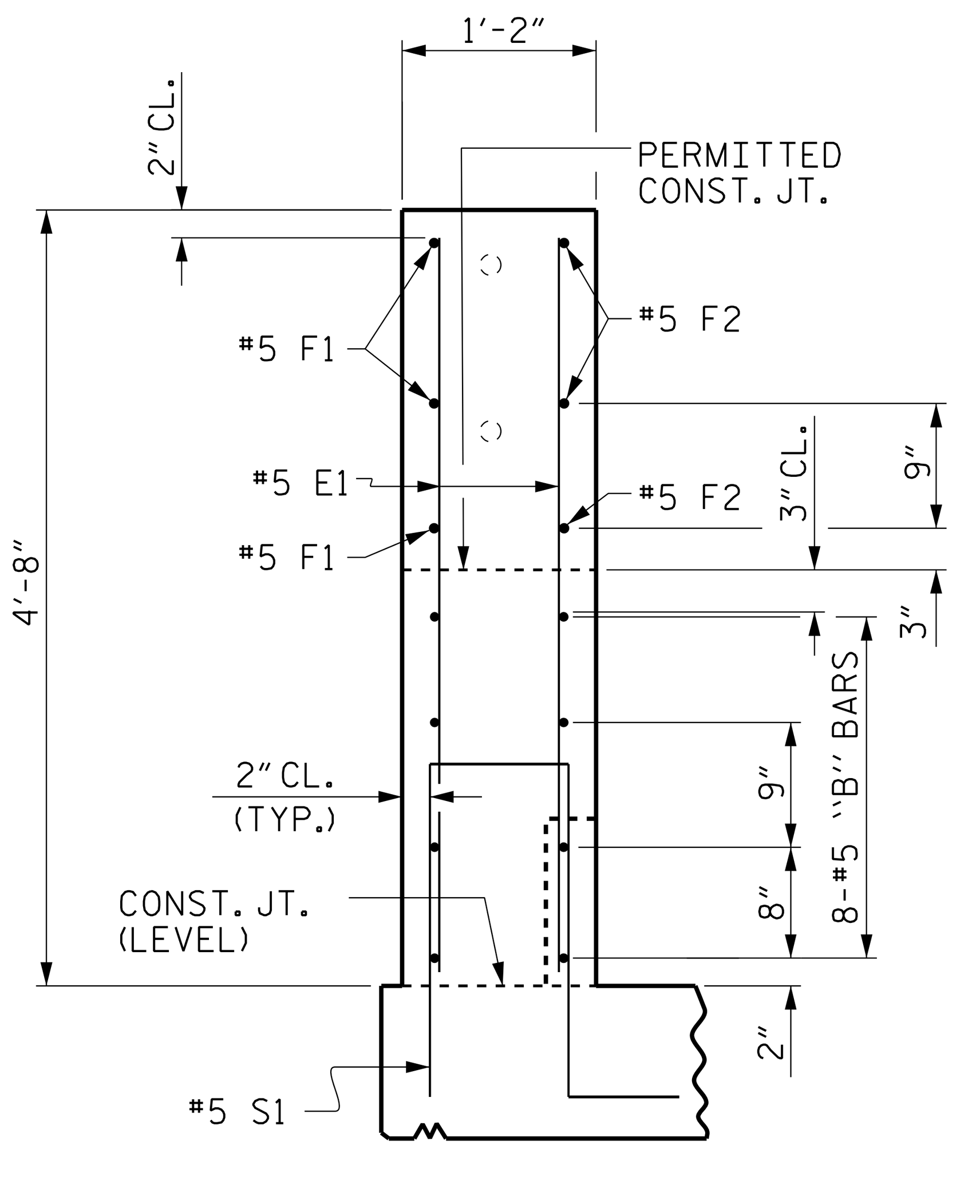
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

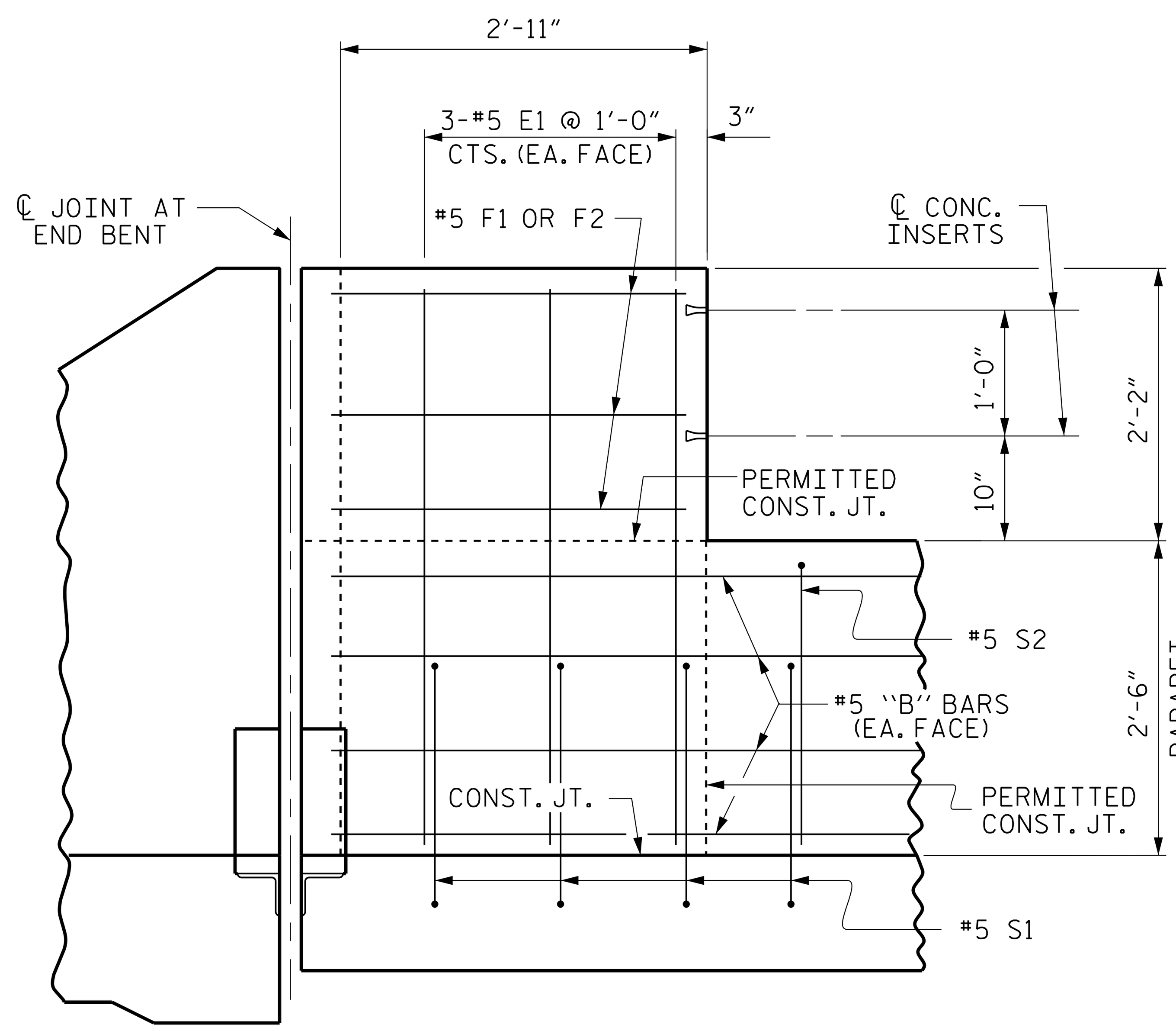
FOR CONCRETE PARAPET

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	96	#5	STR	25'-1"	2512
*B2	32	#5	STR	14'-7"	487
*B3	32	#5	STR	15'-0"	501
*E1	28	#5	STR	4'-6"	131
*F1	12	#5	STR	2'-7"	32
*F2	12	#5	STR	3'-2"	40
*S1	410	#5	1	5'-5"	2316
*S2	398	#5	2	5'-6"	2283

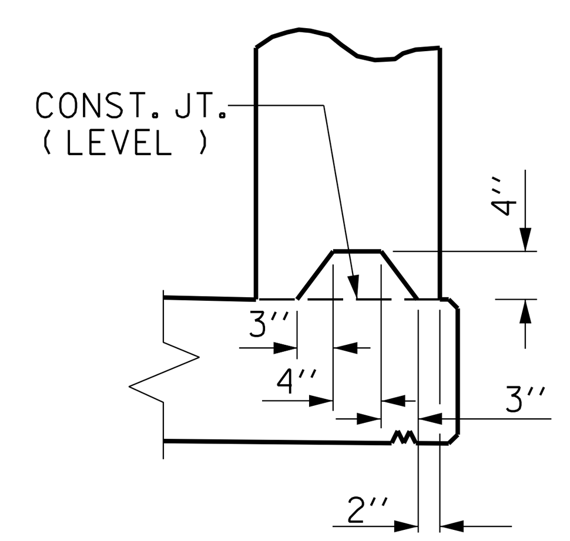
*EPOXY COATED REINFORCING STEEL	8302 LBS.
CLASS AA CONCRETE	45.7 CU. YDS.
CONCRETE PARAPET	412.32 LIN. FT.



END VIEW



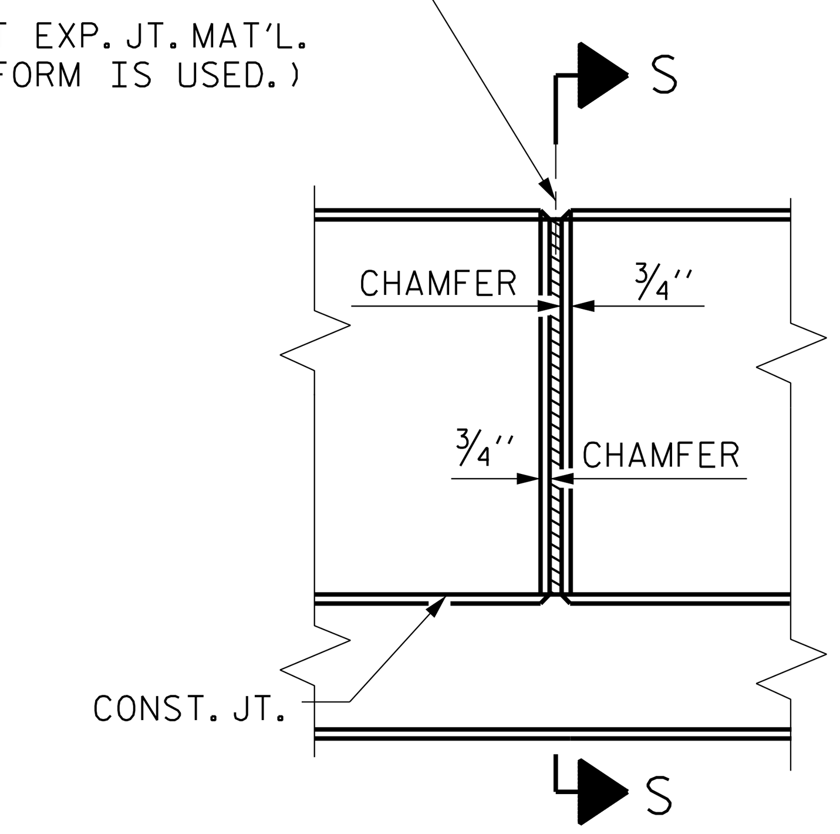
ELEVATION



SECTION S-S

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

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



ELEVATION AT EXPANSION JOINTS

PARAPET AND METAL RAIL ATTACHMENT POST FOR TWO BAR METAL RAIL

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

1'-2" × 2'-6"
CONCRETE PARAPET

PLANS PREPARED BY:
NV5
NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
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NORTH CAROLINA PROFESSIONAL ENGINEER 019661 L. KEVIN AUSTIN
L. Kevin Austin
3/29/2022

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-19
1			3			TOTAL SHEETS	41
2			4				

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : L. K. AUSTIN DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

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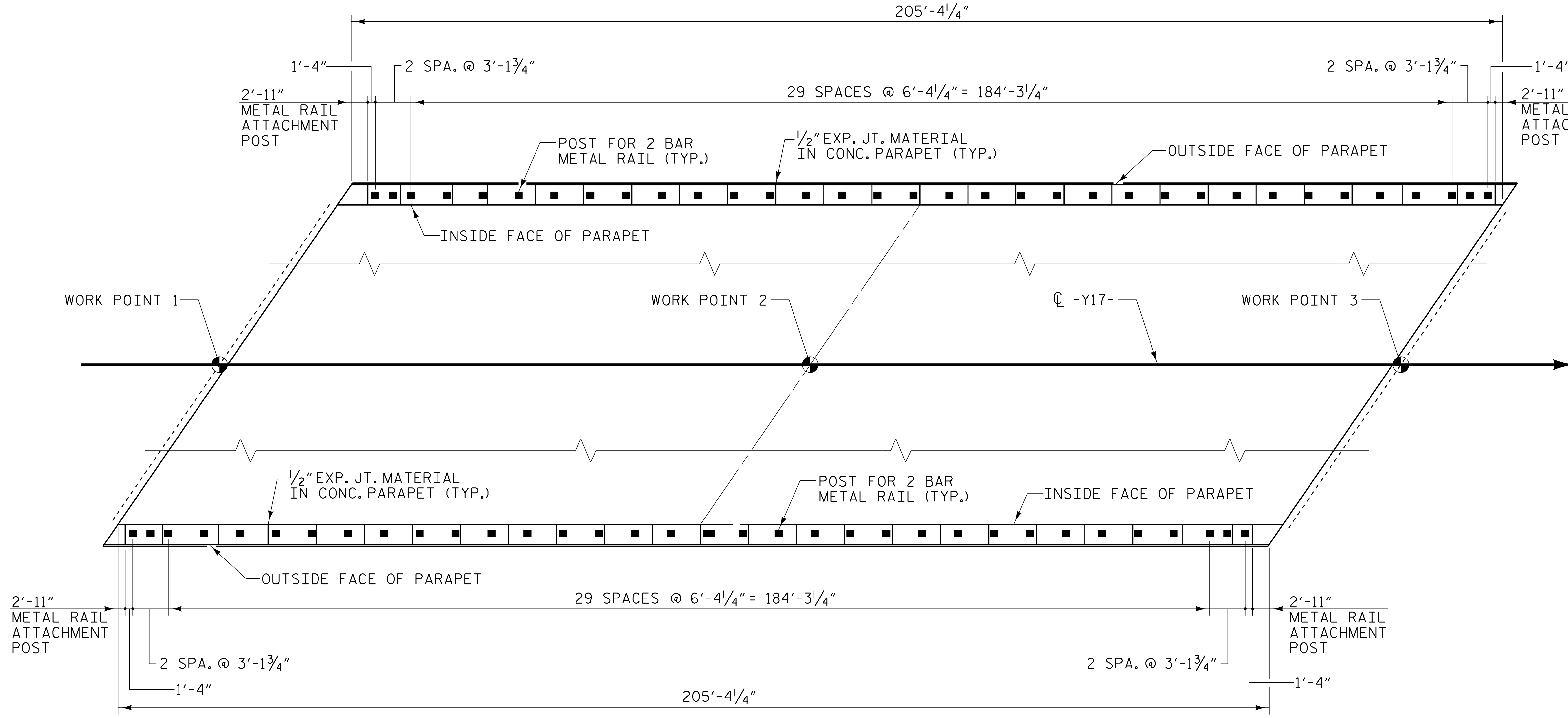


PLAN OF RAIL POST SPACINGS

NOTES

STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".

B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

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

NOTES

METAL RAIL TO END POST CONNECTION

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

A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4"Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4"Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.

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

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

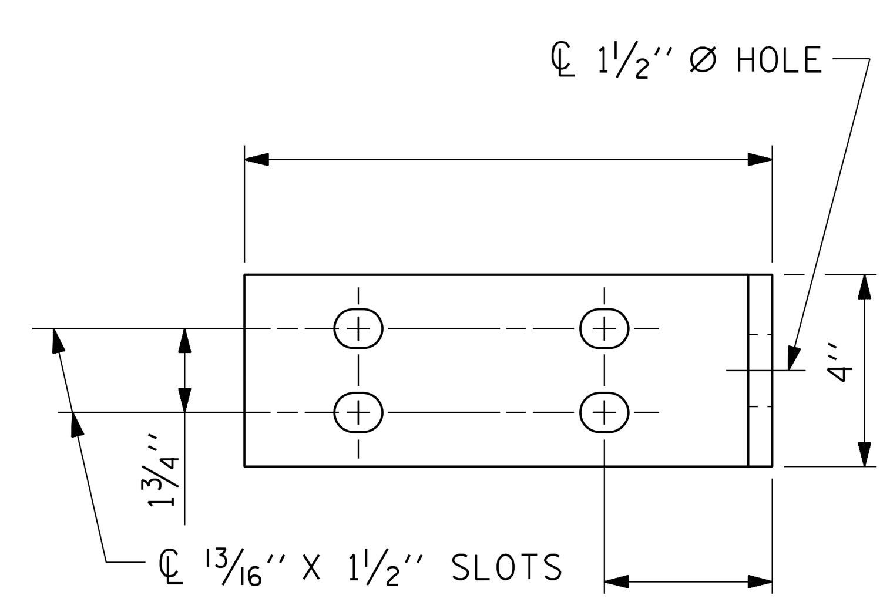
E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4"Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4"Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



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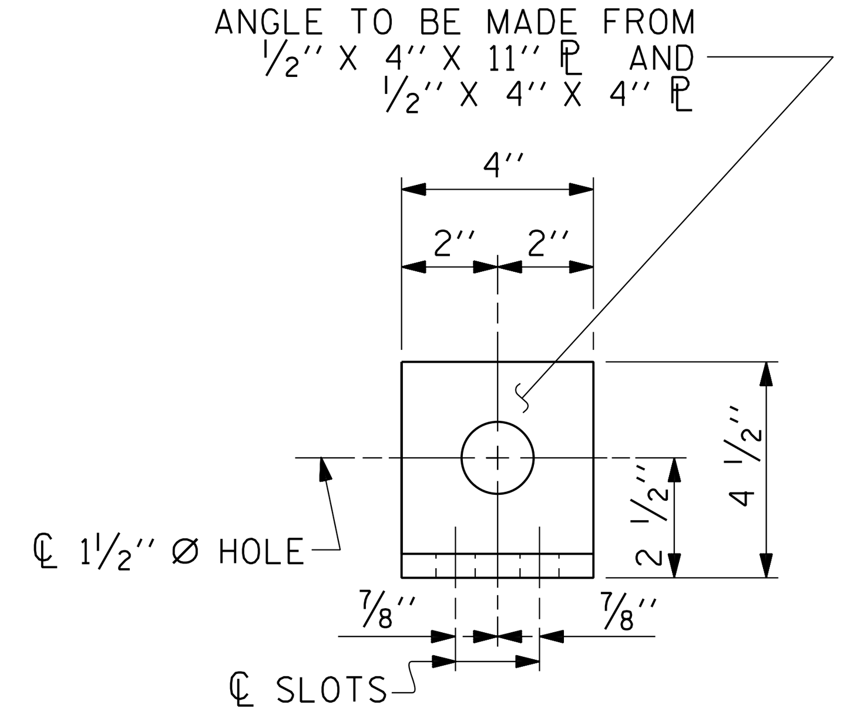
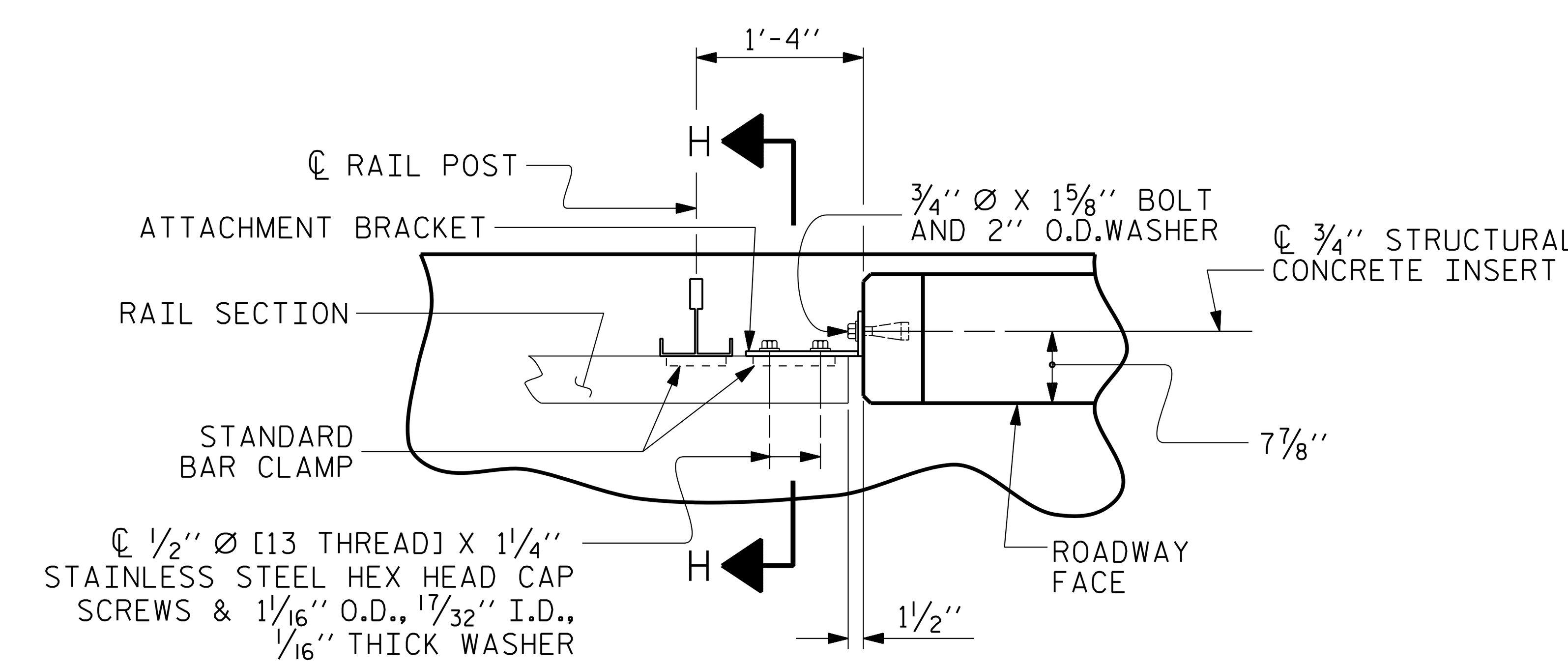
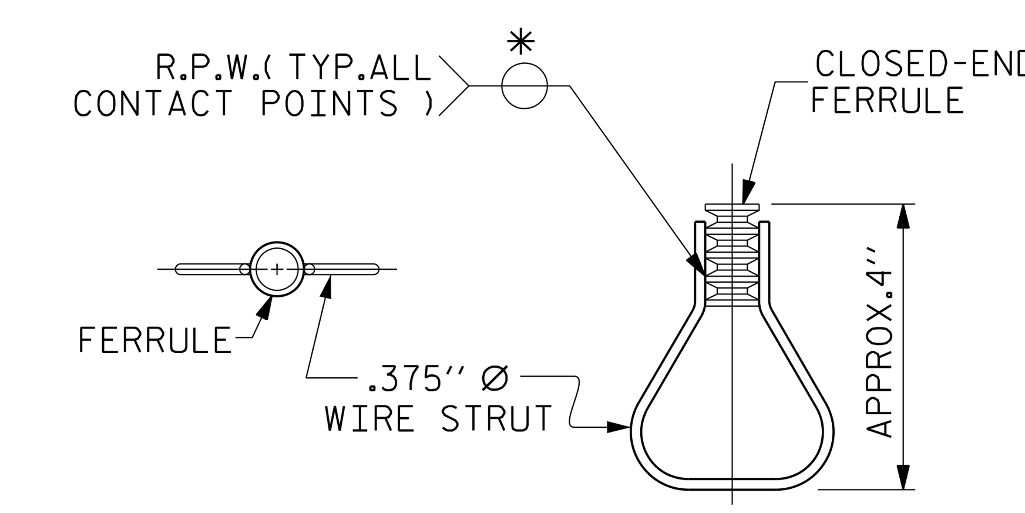


END VIEW (EXP.)



PLAN - RAIL AND END POST



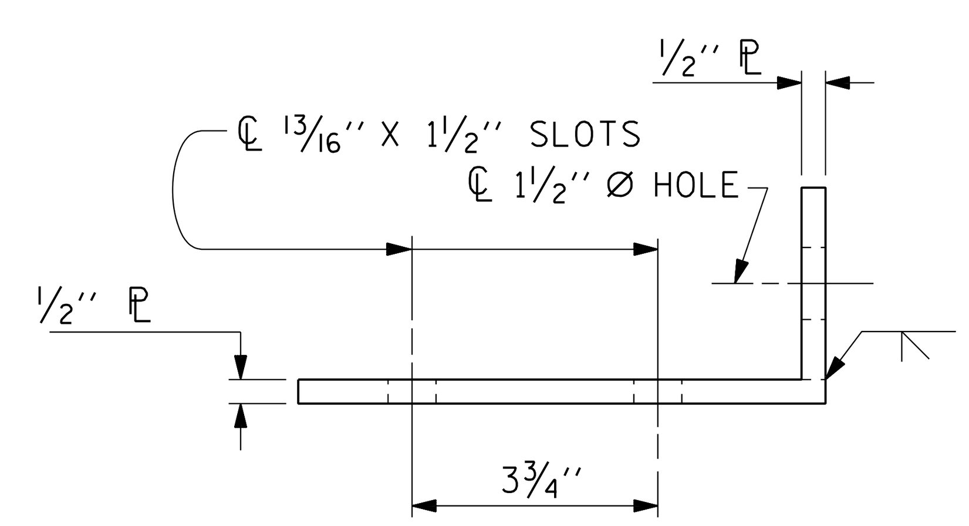
STRUCTURAL CONCRETE INSERT

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

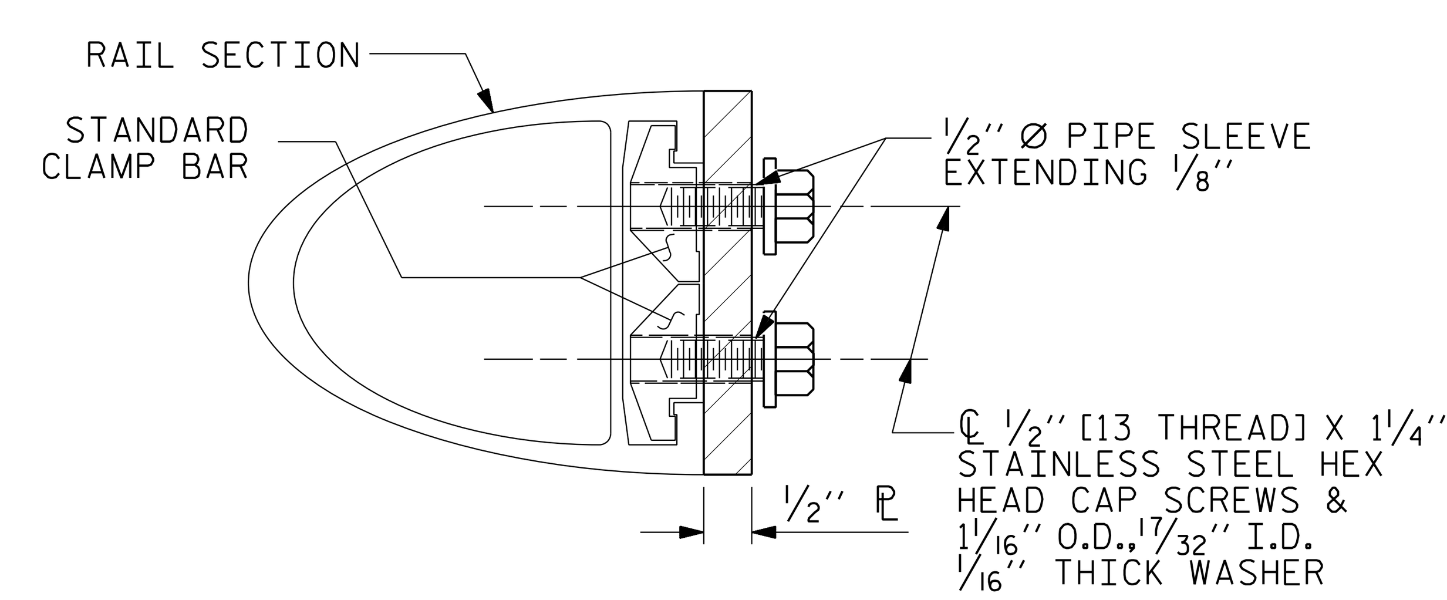
PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT



TOP VIEW



SECTION H-H (EXP.)

EXPANSION

DETAILS FOR ATTACHING METAL RAIL TO END POST

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
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DocuSigned by: L. Kevin Austin
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL L. KEVIN AUSTIN
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

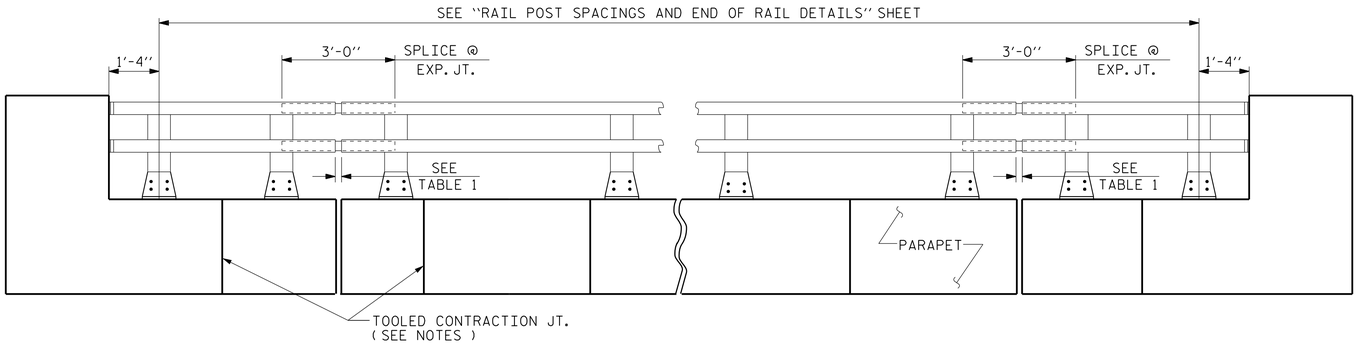
RAIL POST SPACINGS AND END OF RAIL DETAILS FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			41

ASSEMBLED BY : M. D. METZGER	DATE : 2/22
CHECKED BY : L. K. AUSTIN	DATE : 2/22

DRAWN BY : FCJ 1/88	REV. 5/1/06	TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

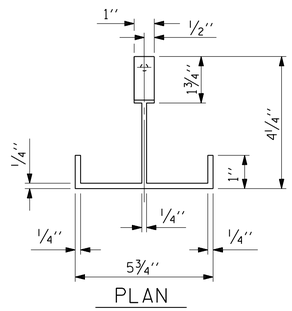
STD. NO. BMR2



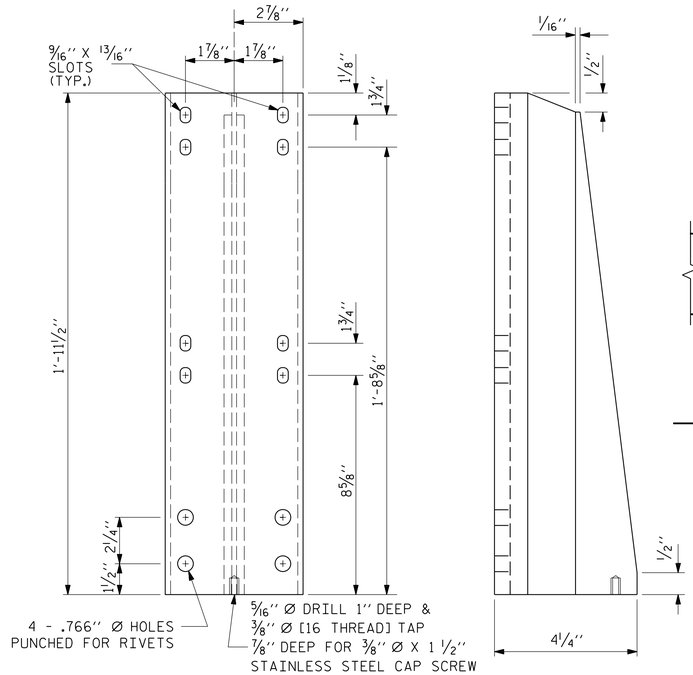
ELEVATION

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

TABLE 1	
℄ EXP. JT. @ 60° F	RAIL OPENING
END BENT 1	1⅜"
END BENT 2	1⅜"

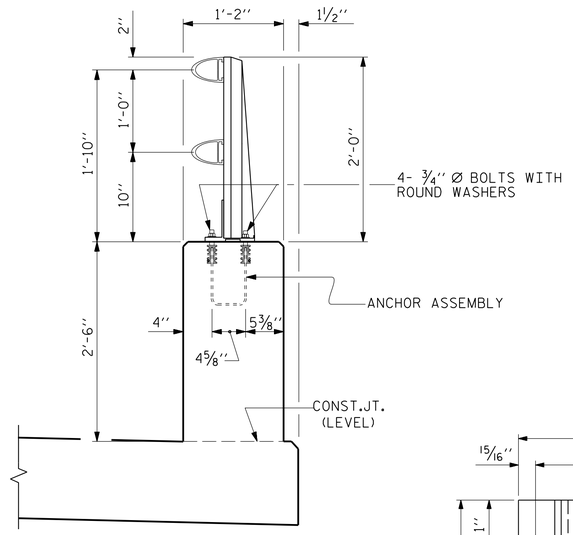


PLAN

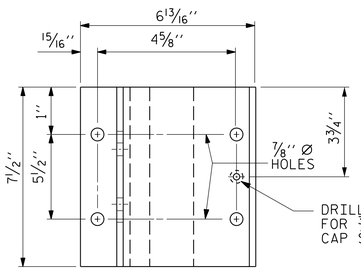


FRONT ELEVATION — SIDE ELEVATION

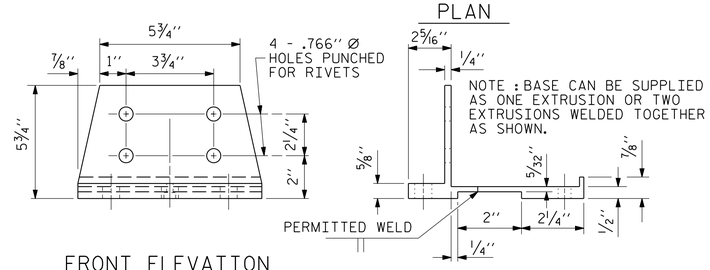
DETAILS OF POST



SECTION THRU PARAPET AND RAIL

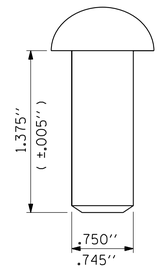


PLAN



FRONT ELEVATION — SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES

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

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH = 399'-0½" LIN. FT.

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 1 OF 2

PLANS PREPARED BY:
NV5 ENGINEERS & CONSULTANTS, INC.
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formerly CALYX Engineers & Consultants

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

NORTH CAROLINA PROFESSIONAL SEAL 027137 ENGINEER KEVIN AUSTIN
Docusigned by: L. Kevin Austin
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			41

STD. NO. BMR3

ASSEMBLED BY : M. D. METZGER	DATE : 2/22	
CHECKED BY : L. K. AUSTIN	DATE : 2/22	
DRAWN BY : EEM 6/94	REV. 10/1/11	MAA/GM
CHECKED BY : RGW 6/94	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

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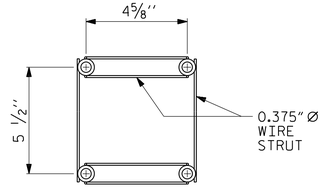
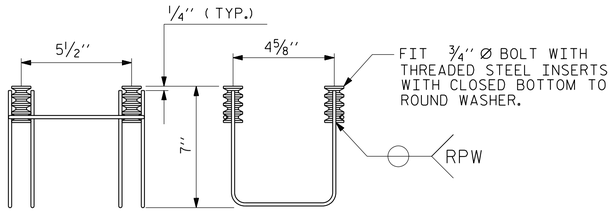


PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(74 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

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

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

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

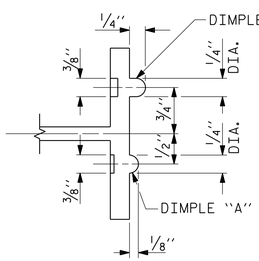
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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

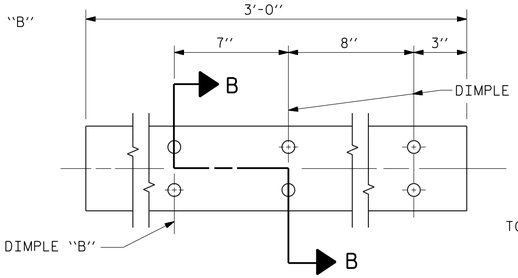
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

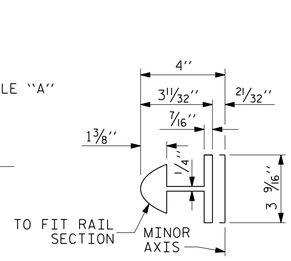
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



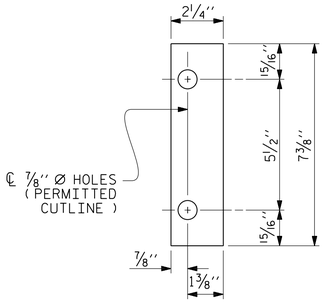
SECTION B - B



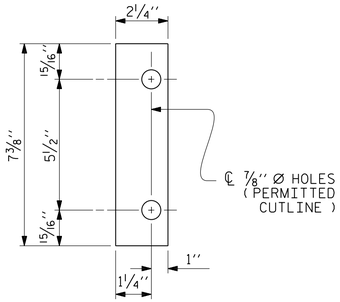
EXPANSION BAR DETAILS



BAR SECTION



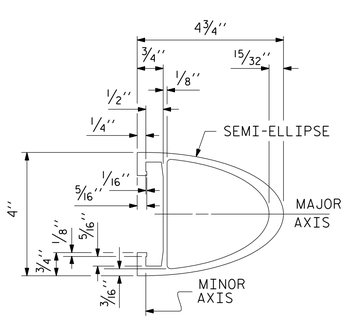
FRONT PLATE



REAR PLATE

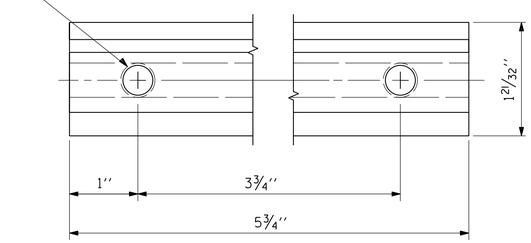
SHIM DETAILS

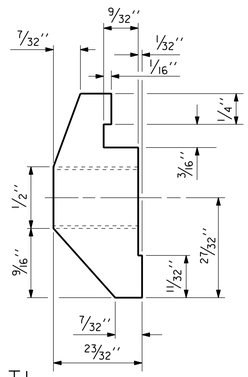
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



RAIL SECTION

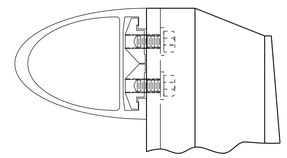
1/2'' Ø [13 THREAD] HOLE FOR 1/2'' Ø X 1'' STAINLESS STEEL HEX HEAD CAP SCREW & 1 1/16'' O.D., 17/32'' I.D., 1/16'' THICK WASHER (TYP.)



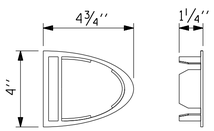


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			41

ASSEMBLED BY : M. D. METZGER	DATE : 2/22		
CHECKED BY : L. K. AUSTIN	DATE : 2/22		
DRAWN BY : EEM 6/94	REV. 5/1/06R	KMM/GM	
CHECKED BY : RGW 6/94	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

PLANS PREPARED BY:

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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040661 KEVIN AUSTIN
Docusigned by: L. Kevin Austin
3/29/2022

STD. NO. BMR4

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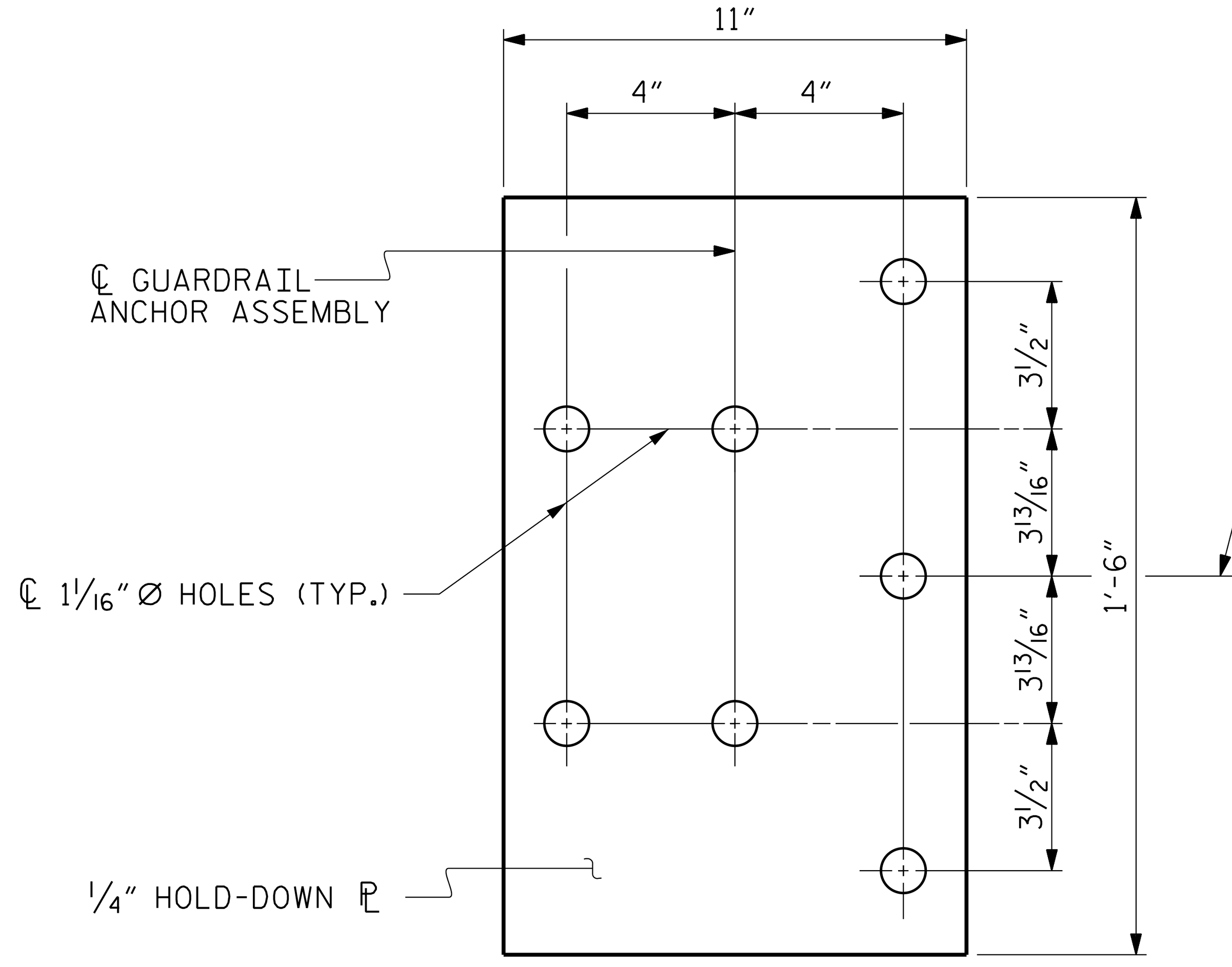
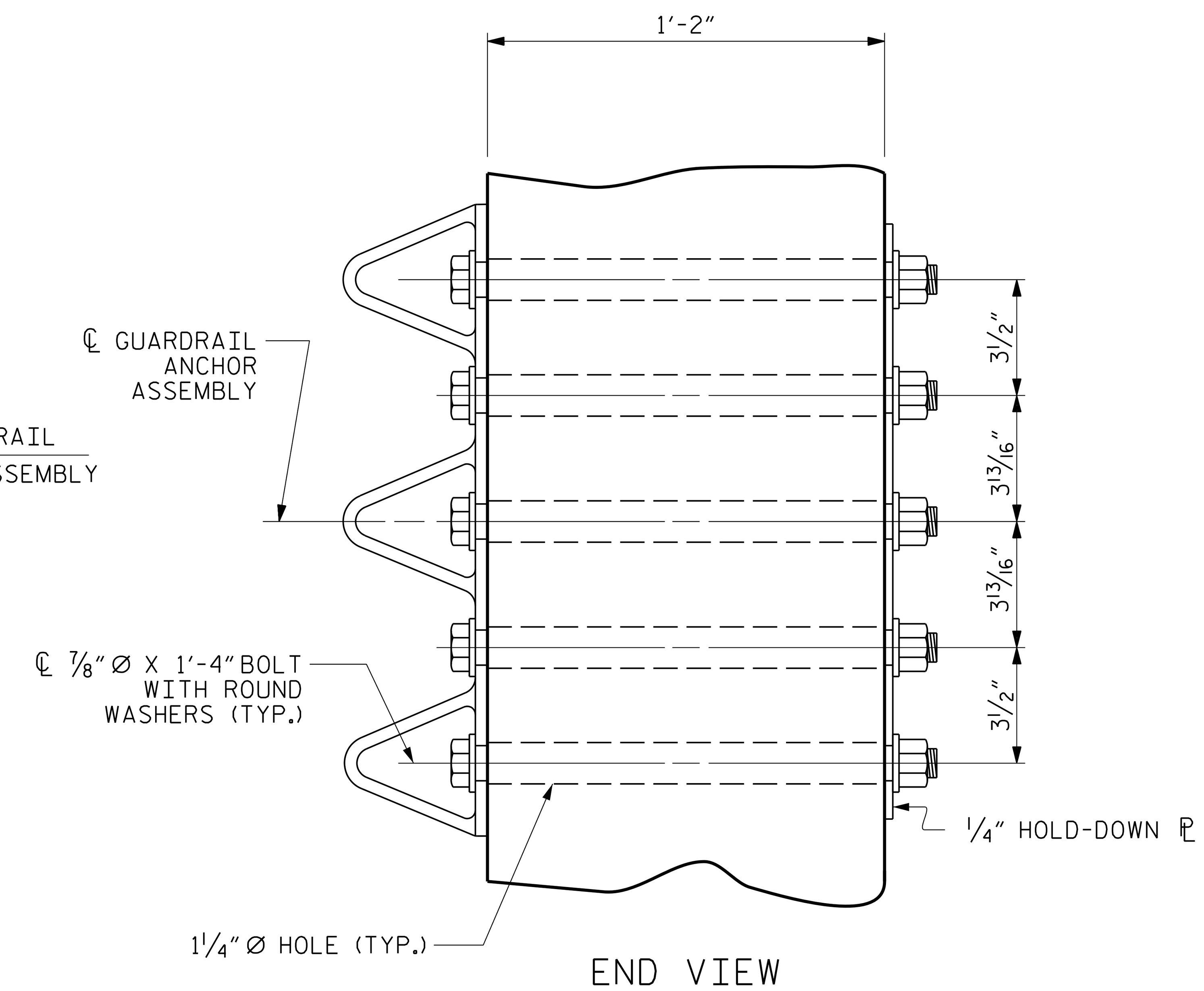


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

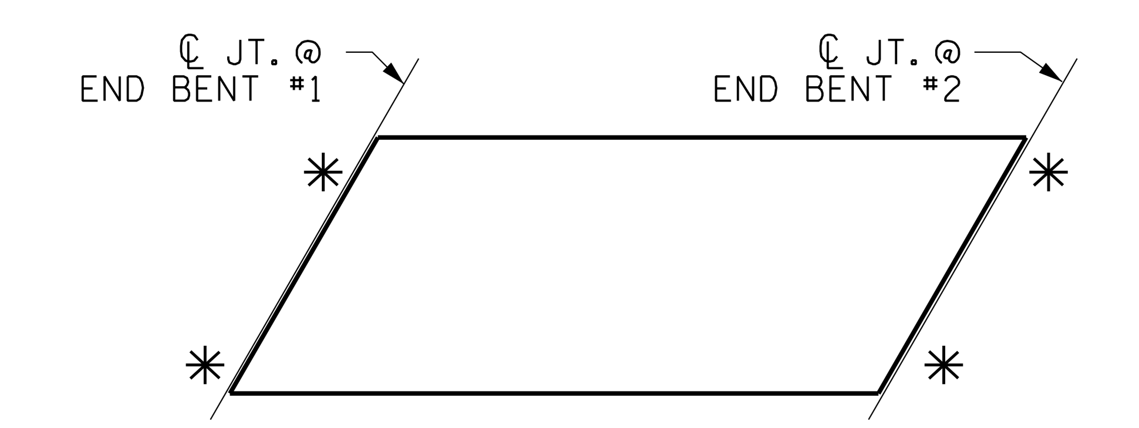
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

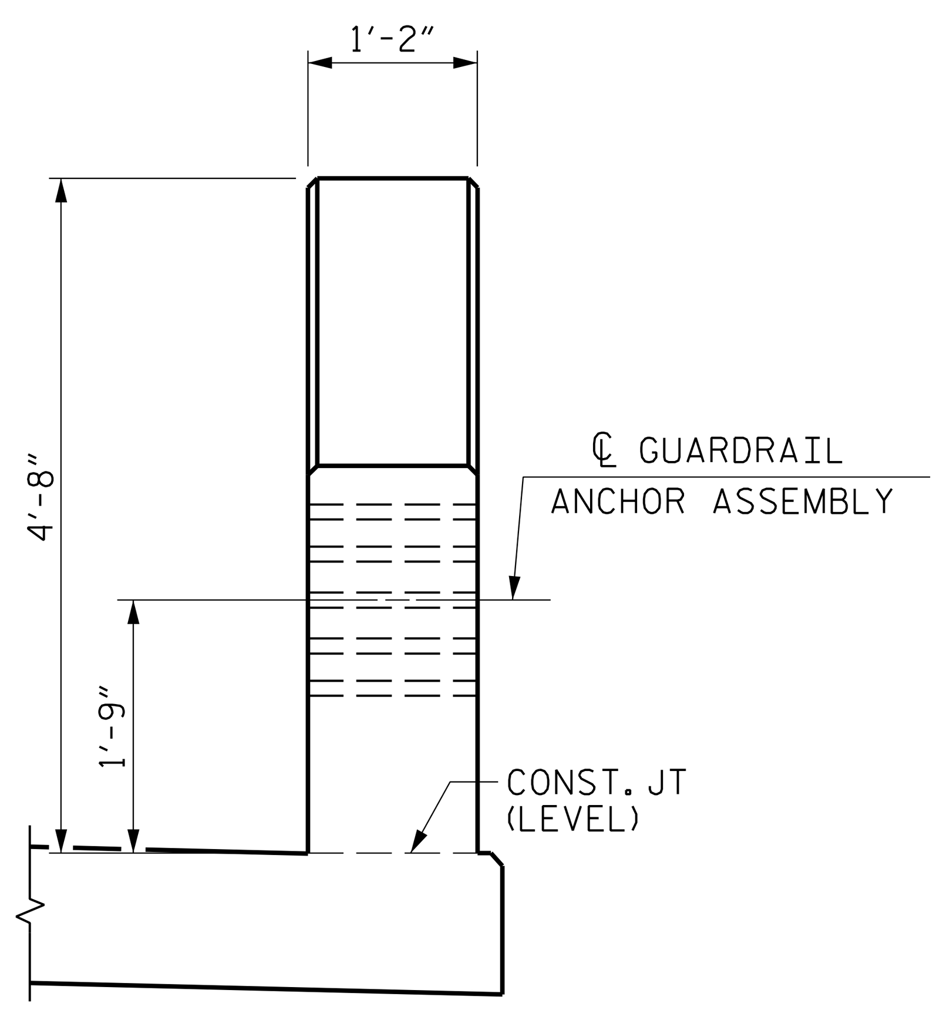
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.



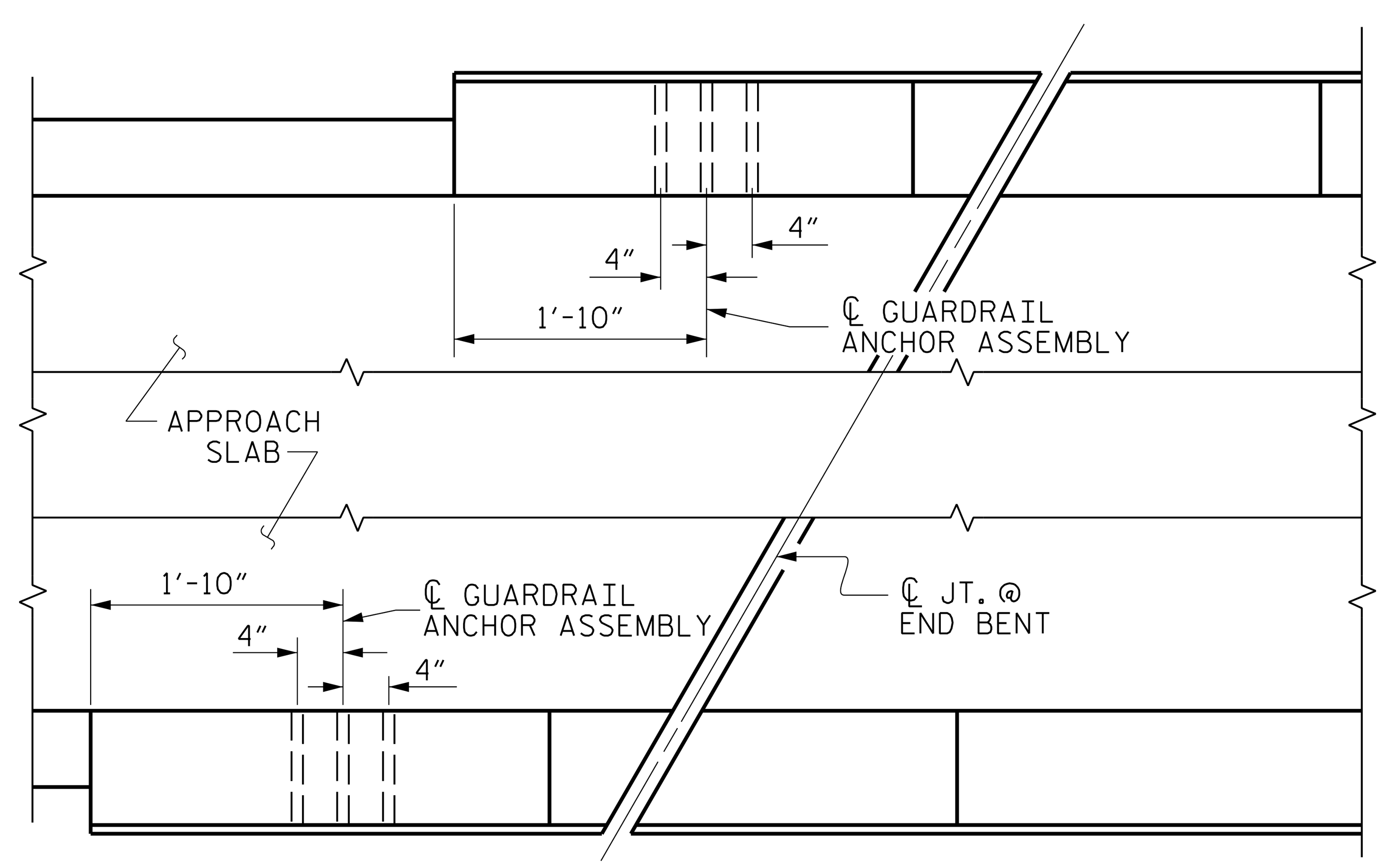
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW

(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

PLANS PREPARED BY:

NV5

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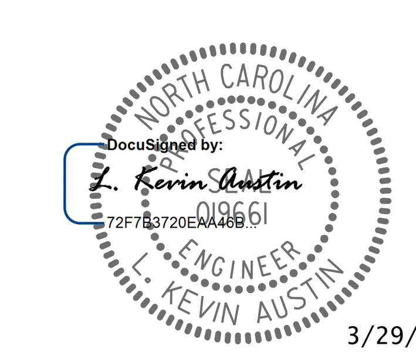

3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-23
1			3					TOTAL SHEETS
2			4					41

ASSEMBLED BY : W. B. ALLEN	DATE : 8/18		
CHECKED BY : Z. H. BROWN	DATE : 8/18		
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

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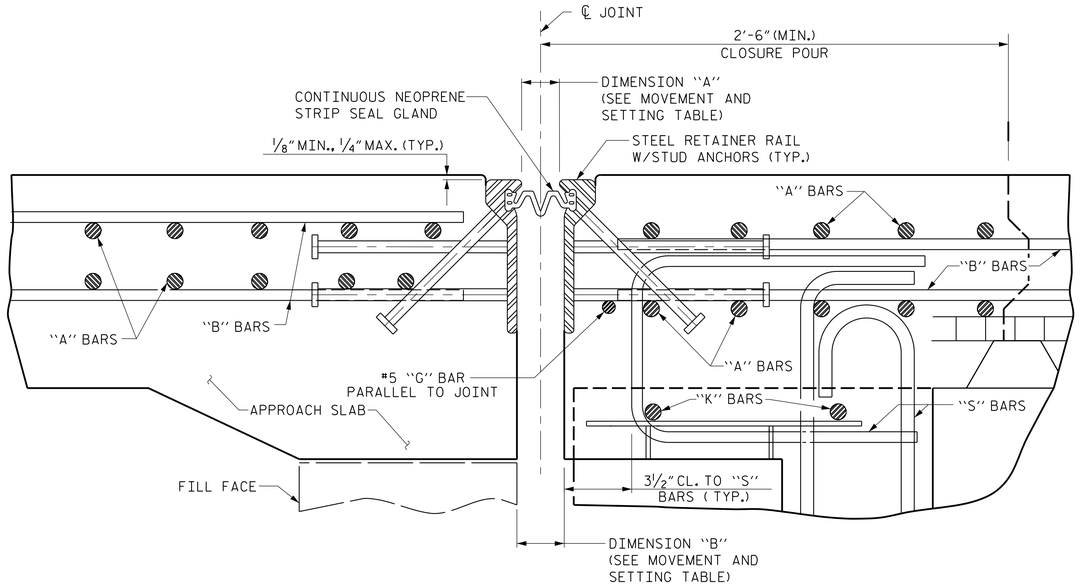
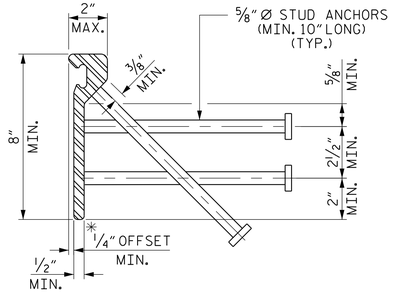


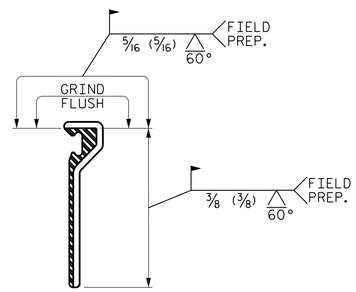
STRIP SEAL EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE



TYPICAL SECTION STEEL RETAINER RAIL

*DIMENSION "B" BASED ON STEEL RETAINER RAIL TOP OFFSET TO FACE OF RAIL OF 1/4" MINIMUM. IF ACTUAL OFFSET IS GREATER ADJUST DIMENSION "B" AS REQUIRED.



STEEL RETAINER RAIL (FIELD SPLICE DETAIL)

JOINT INSTALLATION PROCEDURE:

1. INSTALL THE STRIP SEAL EXPANSION JOINT AS RECOMMENDED BY THE MANUFACTURER.
2. A MANUFACTURER'S REPRESENTATIVE SHALL BE PRESENT DURING INSTALLATION OF THE JOINT.
3. PLACE STEEL RETAINER RAILS IN JOINT OPENING. PROPERLY ALIGN THE RAILS BOTH HORIZONTALLY AND VERTICALLY. DO NOT WELD SUPPORT SYSTEM TO THE METALLIZED SURFACES OF THE STEEL RETAINER RAILS.
4. CONFLICTING REINFORCING STEEL MAY BE SHIFTED SLIGHTLY WHEN NECESSARY.
5. DECK SLAB CONCRETE PLACEMENT OPERATIONS SHALL COMMENCE PER THE POURING SEQUENCE AFTER FINAL JOINT ALIGNMENT IS SET.
6. PROTECT THE STEEL RETAINER RAILS FROM BEING FOULED BY CONCRETE SPILLOVER DURING THE DECK POUR.
7. LOOSEN THE STEEL RETAINER RAIL SUPPORT SYSTEM TO ALLOW MOVEMENT WHILE CONCRETE CURES.
8. RE-LEVEL AND RE-ALIGN STEEL RETAINER RAIL AS REQUIRED ON OPPOSITE SIDE OF JOINT.
9. PLACE APPROACH/DECK SLAB CONCRETE.
10. ONCE THE CONCRETE HAS HARDENED SUFFICIENTLY ON BOTH SIDES OF JOINT, STEEL RETAINER RAILS SHALL BE CLEANED THOROUGHLY AND SEAL CHANNELS SHALL BE INSPECTED TO ASCERTAIN THE ABSENCE OF CONCRETE AND DEBRIS.
11. COAT THE STRIP SEAL LUGS WITH LUBRICANT-ADHESIVE AND INSTALL THE NEOPRENE STRIP SEAL GLAND AS RECOMMENDED BY THE STRIP SEAL EXPANSION JOINT MANUFACTURER.

GENERAL NOTES

FOR STRIP SEAL EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

STEEL RETAINER RAILS AND COVER PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR GRADE 50 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. MIN.

ONLY STEEL RETAINER RAILS OF ONE-PIECE CONSTRUCTION ARE PERMITTED. STEEL RETAINER RAILS CONSISTING OF TWO OR MORE COMPONENTS WELDED TOGETHER TO OBTAIN THEIR FINAL CROSS-SECTIONAL SHAPE ARE NOT PERMITTED.

STUD ANCHORS SHALL BE SHOP WELDED AND SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

SURFACES COMING IN CONTACT WITH STRIP SEAL GLAND SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.

UPON COMPLETION OF SHOP FABRICATION, THE STEEL RETAINER RAILS SHALL BE METALLIZED AS SHOWN IN THE "METALLIZING DETAIL". SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

INSTALLED STEEL RETAINER RAILS SHALL FOLLOW THE ROADWAY SLOPE.

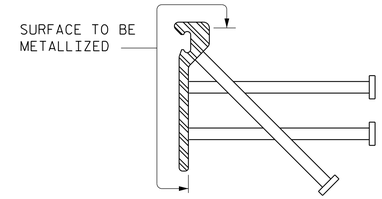
FIELD SPLICES OF THE RETAINER RAILS SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. FINISHED WELDS SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

NEOPRENE STRIP SEAL GLAND SHALL BE CONTINUOUS THROUGHOUT THE JOINT AND SHALL BE COMPATIBLE WITH THE STEEL RETAINER RAILS. FIELD SPLICING THE GLAND IS NOT PERMITTED.

NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.

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

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.



METALLIZING DETAIL

MOVEMENT AND SETTING AT JOINT								
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	DIMENSION "A"			DIMENSION "B"		
			PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	124°-28'-53"	5/8"	2 1/16"	2"	1 13/16"	2 9/16"	2 1/2"	2 5/16"
END BENT 2	124°-28'-53"	5/8"	2 1/16"	2"	1 13/16"	2 9/16"	2 1/2"	2 5/16"

PLANS PREPARED BY:

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039661 KEVIN AUSTIN

Docusigned by: L. Kevin Austin 72F7A372D6A4488...

3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

STRIP SEAL EXPANSION JOINT DETAILS

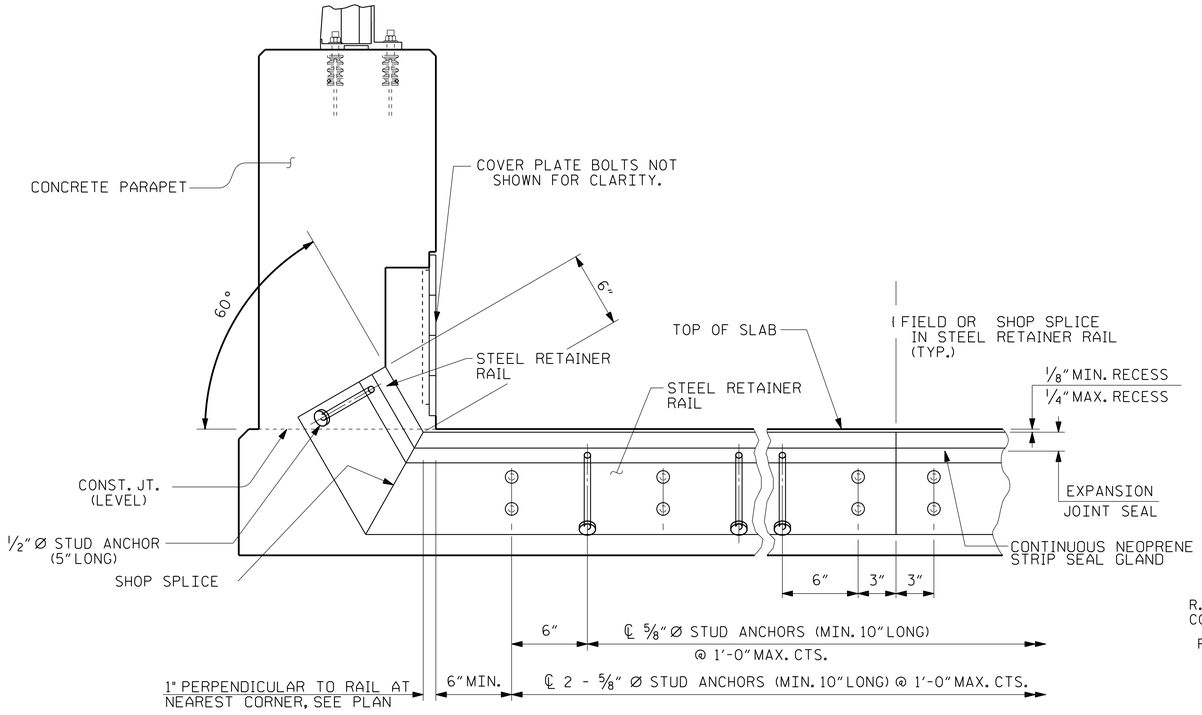
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			41

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

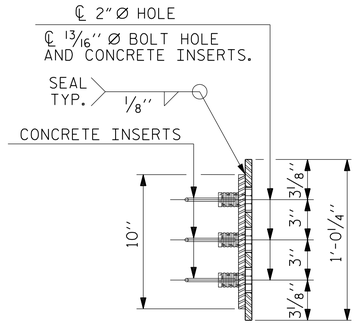
STD. NO. SSEJ1

ASSEMBLED BY : M.D. METZGER DATE : 02/22
CHECKED BY : L.K. AUSTIN DATE : 02/22
DRAWN BY : MAA 6/20
CHECKED BY : BNB 6/20

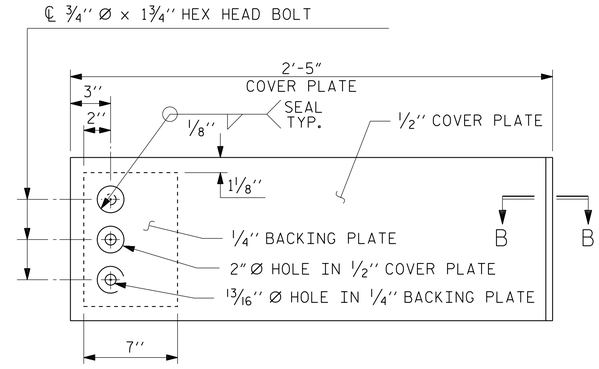
3/28/2022 4:19:34 PM G:\Project\2041\204062.28\CLIENT\Structures\U2519BB_SMU_SSEJ_250452.dgn



SECTION THRU RAIL NORMAL TO JOINT

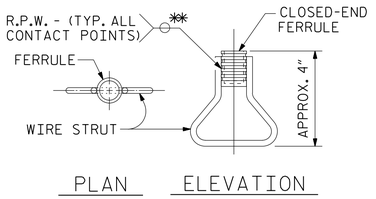


END VIEW



ELEVATION VIEW

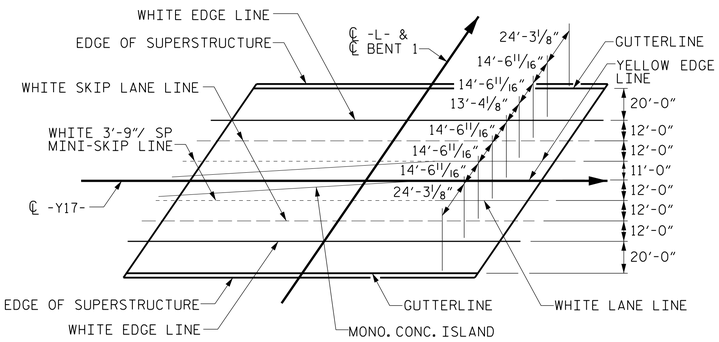
COVER PLATE DETAILS



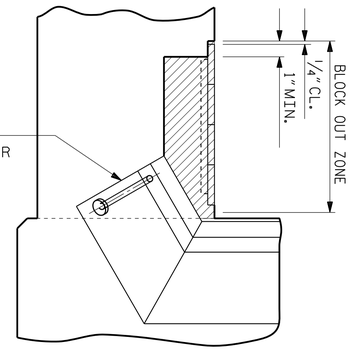
PLAN ELEVATION

CONCRETE INSERT

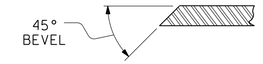
** EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



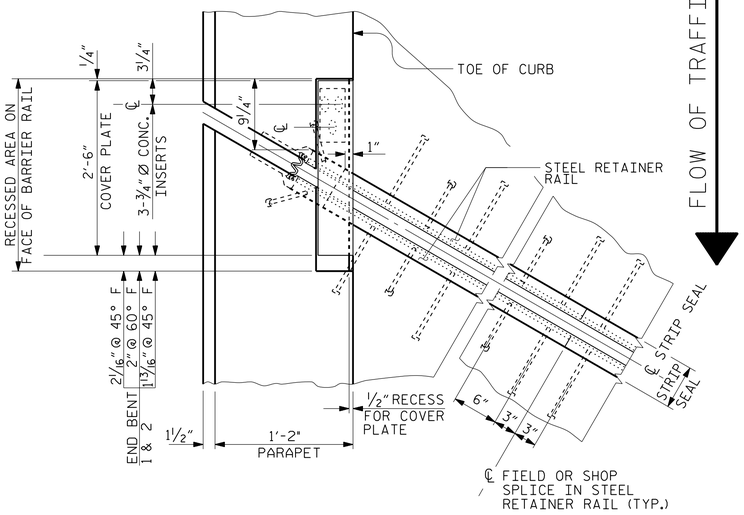
PAVEMENT MARKING ALIGNMENT

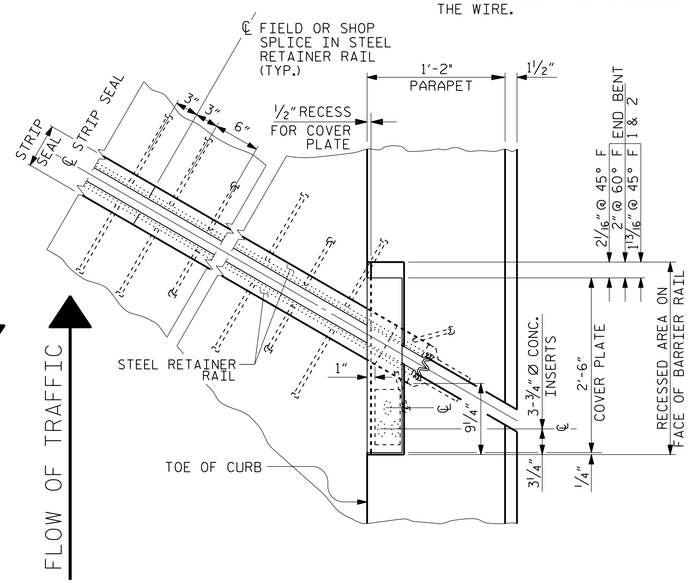


BLOCK OUT DETAIL



SECTION B - B





PLAN OF STRIP SEAL EXPANSION JOINT

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.
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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL SEAL 037207 ENGINEER L. KEVIN AUSTIN
Docusigned by: L. Kevin Austin
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

STRIP SEAL EXPANSION JOINT DETAILS FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			41

ASSEMBLED BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DRAWN BY :	MAA	6/20	
CHECKED BY :	BNB	6/20	

STD. NO. SSEJ2

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BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	438	#5	STR	60'-0"	27410
* A2	280	#5	STR	55'-8"	16257
A3	438	#5	STR	55'-3"	25240
A4	280	#5	STR	60'-0"	17522
* A5	6	#6	STR	10'-6"	95
* A101	2	#5	STR	55'-0"	115
* A102	2	#5	STR	54'-4"	113
* A103	2	#5	STR	53'-8"	112
* A104	2	#5	STR	53'-0"	111
* A105	2	#5	STR	52'-4"	109
* A106	2	#5	STR	51'-8"	108
* A107	2	#5	STR	51'-0"	106
* A108	2	#5	STR	50'-4"	105
* A109	2	#5	STR	49'-8"	104
* A110	2	#5	STR	49'-0"	102
* A111	2	#5	STR	48'-4"	101
* A112	2	#5	STR	47'-8"	99
* A113	2	#5	STR	47'-0"	98
* A114	2	#5	STR	46'-4"	97
* A115	2	#5	STR	45'-8"	95
* A116	2	#5	STR	45'-0"	94
* A117	2	#5	STR	44'-4"	92
* A118	2	#5	STR	43'-8"	91
* A119	2	#5	STR	43'-0"	90
* A120	2	#5	STR	42'-4"	88
* A121	2	#5	STR	41'-8"	87
* A122	2	#5	STR	41'-0"	86
* A123	2	#5	STR	40'-4"	84
* A124	2	#5	STR	39'-8"	83
* A125	2	#5	STR	39'-0"	81
* A126	2	#5	STR	38'-4"	80
* A127	2	#5	STR	37'-8"	79
* A128	2	#5	STR	37'-0"	77
* A129	2	#5	STR	36'-4"	76
* A130	2	#5	STR	35'-8"	74
* A131	2	#5	STR	35'-0"	73
* A132	2	#5	STR	34'-4"	72
* A133	2	#5	STR	33'-8"	70
* A134	2	#5	STR	33'-0"	69
* A135	2	#5	STR	32'-4"	67
* A136	2	#5	STR	31'-8"	66
* A137	2	#5	STR	31'-0"	65
* A138	2	#5	STR	30'-4"	63
* A139	2	#5	STR	29'-8"	62
* A140	2	#5	STR	29'-0"	60
* A141	2	#5	STR	28'-4"	59
* A142	2	#5	STR	27'-8"	58
* A143	2	#5	STR	27'-0"	56
* A144	2	#5	STR	26'-4"	55
* A145	2	#5	STR	25'-8"	54
* A146	2	#5	STR	25'-0"	52
* A147	2	#5	STR	24'-4"	51
* A148	2	#5	STR	23'-8"	49
* A149	2	#5	STR	23'-0"	48
* A150	2	#5	STR	22'-4"	47
* A151	2	#5	STR	21'-8"	45
* A152	2	#5	STR	21'-0"	44
* A153	2	#5	STR	20'-4"	42
* A154	2	#5	STR	19'-8"	41
* A155	2	#5	STR	19'-0"	40
* A156	2	#5	STR	18'-4"	38
* A157	2	#5	STR	17'-8"	37
* A158	2	#5	STR	17'-0"	35
* A159	2	#5	STR	16'-4"	34
* A160	2	#5	STR	15'-8"	33
* A161	2	#5	STR	15'-0"	31
* A162	2	#5	STR	14'-4"	30
* A163	2	#5	STR	13'-8"	29
* A164	2	#5	STR	13'-0"	27
* A165	2	#5	STR	12'-4"	26
* A166	2	#5	STR	11'-8"	24
* A167	2	#5	STR	10'-10"	23
* A168	2	#5	STR	10'-4"	22
* A169	2	#5	STR	9'-8"	20
* A170	2	#5	STR	9'-0"	19
* A171	2	#5	STR	8'-4"	17

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A172	2	#5	STR	7'-8"	16
* A173	2	#5	STR	7'-0"	15
* A174	2	#5	STR	6'-4"	13
* A175	2	#5	STR	5'-8"	12
* A176	2	#5	STR	5'-0"	10
* A177	2	#5	STR	4'-4"	9
* A178	2	#5	STR	3'-8"	8
* A179	2	#5	STR	3'-0"	6
* A180	2	#5	STR	59'-11"	125
* A181	2	#5	STR	59'-3"	124
* A182	2	#5	STR	58'-7"	122
* A183	2	#5	STR	57'-11"	121
* A184	2	#5	STR	57'-3"	119
* A185	2	#5	STR	56'-7"	118
* A186	2	#5	STR	55'-11"	117
* A187	2	#5	STR	55'-3"	115
* A188	2	#5	STR	54'-7"	114
* A189	2	#5	STR	53'-11"	112
* A190	2	#5	STR	53'-3"	111
* A191	2	#5	STR	52'-7"	110
* A192	2	#5	STR	51'-11"	108
* A193	2	#5	STR	51'-3"	107
* A194	2	#5	STR	50'-7"	106
* A195	2	#5	STR	49'-11"	104
* A196	2	#5	STR	49'-3"	103
* A197	2	#5	STR	48'-7"	101
* A198	2	#5	STR	47'-11"	100
* A199	2	#5	STR	47'-3"	99
* A200	2	#5	STR	46'-7"	97
* A201	2	#5	STR	45'-11"	96
* A202	2	#5	STR	45'-3"	94
* A203	2	#5	STR	44'-7"	93
* A204	2	#5	STR	43'-11"	92
* A205	2	#5	STR	43'-3"	90
* A206	2	#5	STR	42'-7"	89
* A207	2	#5	STR	41'-11"	87
* A208	2	#5	STR	41'-3"	86
* A209	2	#5	STR	40'-7"	85
* A210	2	#5	STR	39'-11"	83
* A211	2	#5	STR	39'-3"	82
* A212	2	#5	STR	38'-7"	80
* A213	2	#5	STR	37'-11"	79
* A214	2	#5	STR	37'-3"	78
* A215	2	#5	STR	36'-7"	76
* A216	2	#5	STR	35'-11"	75
* A217	2	#5	STR	35'-3"	74
* A218	2	#5	STR	34'-7"	72
* A219	2	#5	STR	33'-11"	71
* A220	2	#5	STR	33'-2"	69
* A221	2	#5	STR	32'-6"	68
* A222	2	#5	STR	31'-10"	66
* A223	2	#5	STR	31'-2"	65
* A224	2	#5	STR	30'-6"	64
* A225	2	#5	STR	29'-10"	62
* A226	2	#5	STR	29'-2"	61
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* A234	2	#5	STR	23'-10"	50
* A235	2	#5	STR	23'-2"	48
* A236	2	#5	STR	22'-6"	47
* A237	2	#5	STR	21'-10"	46
* A238	2	#5	STR	21'-2"	44
* A239	2	#5	STR	20'-6"	43
* A240	2	#5	STR	19'-10"	41
* A241	2	#5	STR	19'-2"	40
* A242	2	#5	STR	18'-6"	39
* A243	2	#5	STR	17'-10"	37
* A244	2	#5	STR	17'-2"	36
* A245	2	#5	STR	16'-6"	34
* A246	2	#5	STR	15'-10"	33
* A247	2	#5	STR	15'-2"	32
* A248	2	#5	STR	14'-6"	30

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A249	2	#5	STR	13'-10"	29
* A250	2	#5	STR	13'-2"	27
* A251	2	#5	STR	12'-6"	26
* A252	2	#5	STR	11'-10"	25
* A253	2	#5	STR	11'-2"	23
* A254	2	#5	STR	10'-6"	22
* A255	2	#5	STR	9'-10"	21
* A256	2	#5	STR	9'-2"	19
* A257	2	#5	STR	8'-6"	18
* A258	2	#5	STR	7'-10"	16
* A259	2	#5	STR	7'-2"	15
* A260	2	#5	STR	6'-6"	14
* A261	2	#5	STR	5'-10"	12
* A262	2	#5	STR	5'-2"	11
* A263	2	#5	STR	4'-6"	9
* A264	2	#5	STR	3'-10"	8
* A265	2	#5	STR	3'-2"	7
* A266	2	#5	STR	2'-6"	5
* A267	2	#5	STR	1'-10"	4
A301	2	#5	STR	59'-3"	124
A302	2	#5	STR	58'-7"	122
A303	2	#5	STR	57'-11"	121
A304	2	#5	STR	57'-3"	119
A305	2	#5	STR	56'-7"	118
A306	2	#5	STR	52'-11"	110
A307	2	#5	STR	55'-3"	115
A308	2	#5	STR	54'-7"	114
A309	2	#5	STR	53'-11"	112
A310	2	#5	STR	53'-3"	111
A311	2	#5	STR	52'-7"	110
A312	2	#5	STR	51'-11"	108
A313	2	#5	STR	51'-3"	107
A314	2	#5	STR	50'-7"	106
A315	2	#5	STR	49'-11"	104
A316	2	#5	STR	49'-3"	103
A317	2	#5	STR	48'-7"	101
A318	2	#5	STR	47'-11"	100
A319	2	#5	STR	47'-3"	99
A320	2	#5	STR	46'-7"	97
A321	2	#5	STR	45'-11"	96
A322	2	#5	STR	45'-3"	94
A323	2	#5	STR	44'-7"	93
A324	2	#5	STR	43'-11"	92
A325	2	#5	STR	43'-3"	90
A326	2	#5	STR	42'-7"	89
A327	2	#5	STR	41'-11"	87
A328	2	#5	STR	41'-3"	86
A329	2	#5	STR	40'-7"	85
A330	2	#5	STR	39'-11"	83
A331	2	#5	STR	39'-3"	82
A332	2	#5	STR	38'-7"	80
A333	2	#5	STR	37'-11"	79
A334	2	#5	STR	37'-3"	78
A335	2	#5	STR	36'-7"	76
A336	2	#5	STR	35'-11"	75
A337	2	#5	STR	35'-3"	74
A338	2	#5	STR	34'-7"	72
A339	2	#5	STR	33'-11"	71
A340	2	#5	STR	33'-3"	69
A341	2	#5	STR	32'-7"	68
A342	2	#5	STR	31'-11"	67
A343	2	#5	STR	31'-3"	65
A344	2	#5	STR	30'-7"	64
A345	2	#5	STR	29'-11"	62
A346	2	#5	STR	29'-3"	61
A347	2	#5	STR	28'-7"	60
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A350	2	#5	STR	26'-7"	55
A351	2	#5	STR	25'-11"	54
A352	2	#5	STR	25'-3"	53
A353	2	#5	STR	24'-7"	51
A354	2	#5	STR	23'-11"	50
A355	2	#5	STR	23'-3"	48
A356	2	#5	STR	22'-7"	47
A357	2	#5	STR	21'-11"	46

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A358	2	#5	STR	21'-3"	44
A359	2	#5	STR	20'-7"	43
A360	2	#5	STR	19'-11"	42
A361	2	#5	STR	19'-3"	40
A362	2	#5	STR	18'-7"	39
A363	2	#5	STR	17'-11"	37
A364	2	#5	STR	17'-3"	36
A365	2	#5	STR	16'-7"	35
A366	2	#5	STR	15'-11"	33
A367	2	#5	STR	15'-3"	32
A368	2	#5	STR	14'-7"	30
A369	2	#5	STR	13'-11"	29
A370	2	#5	STR	13'-3"	28
A371	2	#5	STR	12'-7"	26
A372	2	#5	STR	11'-11"	25
A373	2	#5	STR	11'-3"	23
A374	2	#5	STR	10'-7"	22
A375	2	#5	STR	9'-11"	21
A376	2	#5	STR	9'-3"	19
A377	2	#5	STR	8'-7"	18
A378	2	#5	STR	7'-11"	17
A379	2	#5	STR	7'-3"	15
A380	2	#5	STR	59'-11"	125
A381	2	#5	STR	59'-3"	124
A382	2	#5	STR	58'-7"	122
A383	2	#5	STR	57'-11"	121
A384	2	#5	STR	57'-3"	119
A385	2	#5	STR	56'-7"	118
A386	2	#5	STR	55'-11"	117
A387	2	#5	STR	55'-3"	115
A388	2	#5	STR	54'-7"	114
A389	2	#5	STR	53'-11"	112
A390	2	#5	STR	53'-3"	111
A391	2	#5	STR	52'-7"	110
A392	2	#5	STR	51'-11"	108
A393	2	#5	STR	51'-3"	107
A394	2	#5	STR	50'-7"	106
A395	2	#5	STR	49'-11"	104
A396	2	#5	STR	49'-3"	103
A397	2	#5	STR	48'-7"	101
A398	2	#5	STR	47'-11"	100
A399	2	#5	STR	47'-3"	99
A400	2	#5	STR	46'-7"	97
A401	2	#5	STR	45'-11"	96
A402	2	#5	STR	45'-3"	94
A403	2	#5	STR	44'-7"	93
A404	2	#5	STR	43'-11"	92
A405	2	#5	STR	43'-3"	90
A406	2	#5	STR	42'-7"	89
A407	2	#5	STR	41'-11"	87
A408	2	#5	STR	41'-3"	86
A409	2	#5	STR	40'-7"	85
A410	2	#5	STR	39'-11"	83
A411	2	#5	STR	39'-3"	82
A412	2	#5	STR	38'-7"	80
A413	2	#5	STR	37'-11"	79
A414	2	#5	STR	37'-3"	78
A415	2	#5	STR	36'-7"	76
A416	2	#5	STR	35'-11"	75
A417	2	#5	STR	35'-3"	74
A418	2	#5	STR	34'-7"	72
A419	2	#5	STR	33'-11"	71
A420	2	#5	STR	33'-2"	69
A421	2	#5	STR	32'-6"	68
A422	2	#5	STR	31'-10"	66
A423	2	#5	STR	31'-2"	65
A424	2	#5	STR	30'-6"	64
A425	2	#5	STR	29'-10"	62
A426	2	#5	STR	29'-2"	61
A427	2	#5	STR	28'-6"	59
A428	2	#5	STR	27'-10"	58
A429	2	#5	STR	27'-2"	57
A430	2	#5	STR	26'-6"	55
A431	2	#5	STR	25'-10"	54
A432	2	#5	STR	25'-2"	52
A433	2	#5	STR	24'-6"	51
A434	2	#5	STR	23'-10"	50

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A435	2	#5	STR	23'-2"	48
A436	2	#5	STR	22'-6"	47
A437	2	#5	STR	21'-10"	46
A438	2	#5	STR	21'-2"	44
A439	2	#5	STR	20'-6"	43
A440	2	#5	STR	19'-10"	41
A441	2	#5	STR	19'-2"	40
A442	2	#5	STR	18'-6"	39
A443	2	#5	STR	17'-10"	37
A444	2	#5	STR	17'-2"	36
A445	2	#5	STR	16'-6"	34
A446	2	#5	STR	15'-10"	33
A447	2	#5	STR	15'-2"	32
A448	2	#5	STR	14'-6"	30
A449	2	#5	STR	13'-10"	29
A450	2	#5	STR	13'-2"	27
A451	2	#5	STR	12'-6"	26
A452	2	#5	STR	11'-10"	25
A453	2	#5	STR	11'-2"	23
A454	2	#5	STR	10'-6"	22
A455	2	#5	STR	9'-10"	21
A456	2	#5	STR	9'-2"	19
A457	2	#5	STR	8'-6"	18
A458	2	#5	STR	7'-10"	16
A459	2	#5	STR	7'-2"	15
A460	2	#5	STR	6'-6"	14
A461	2	#5	STR	5'-10"	12
A462	2	#5	STR	5'-2"	11
A463	2	#5	STR	4'-6"	9
A464	2	#5	STR	3'-10"	8
A465	2	#5	STR	3'-2"	7
A466	2	#5	STR	2'-6"	5
A467	2	#5	STR	1'-10"	4
* B1	304	#4	STR	35'-11"	7294
* B2	76	#5	STR	13'-5"	1064
* B3	60	#5	STR	60'-0"	3755
* B4	150	#5	STR	40'-6"	6336
B5	592	#5	STR	38'-7"	23824
B6	296	#5	STR	7'-5"	2290
B7	136	#4	STR	40'-0"	3634
B8	136	#4	STR	12'-3"	1113
B9	148	#5	STR	55'-11"	8632
* G1	6	#5	STR	47'-6"	297
* K1	8	#8	1	16'-0"	342
* K2	36	#8	2	24'-9"	2379
* K3	60	#6	STR	10'-6"	946
* S1	220	#5	3	5'-10"	1339
* S2	200	#4	4	4'-7"	612
REINFORCING STEEL				LBS.	77725
* EPOXY COATED REINFORCING STEEL				LBS.	78572

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

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

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	190.8		
POUR 2	166.5		
POUR 3	190.8		
POUR 4	166.5		
POUR 5	68.4		
** TOTALS	783.0	77725	78572

** QUANTITIES FOR PARAPET AND MONOLITHIC CONCRETE ISLAND ARE NOT INCLUDED.

GROOVING BRIDGE FLOORS

APPROACH SLABS	4415	SQ.FT.
BRIDGE DECK	19176	SQ.FT.
TOTAL	23591	SQ.FT.

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 1 OF 2

PLANS PREPARED BY:

NV5

NV5 ENGINEERS & CONSULTANTS, INC.
3300 REGENCY PARKWAY, SUITE 100
CARY, NC 27518
P: 919.851.1912 www.NV5.com
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NORTH CAROLINA PROFESSIONAL ENGINEER 019661 L. KEVIN AUSTIN

DocuSigned by: L. Kevin Austin

3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-26
1			3				TOTAL SHEETS
2			4				41

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : G. F. WILSON DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

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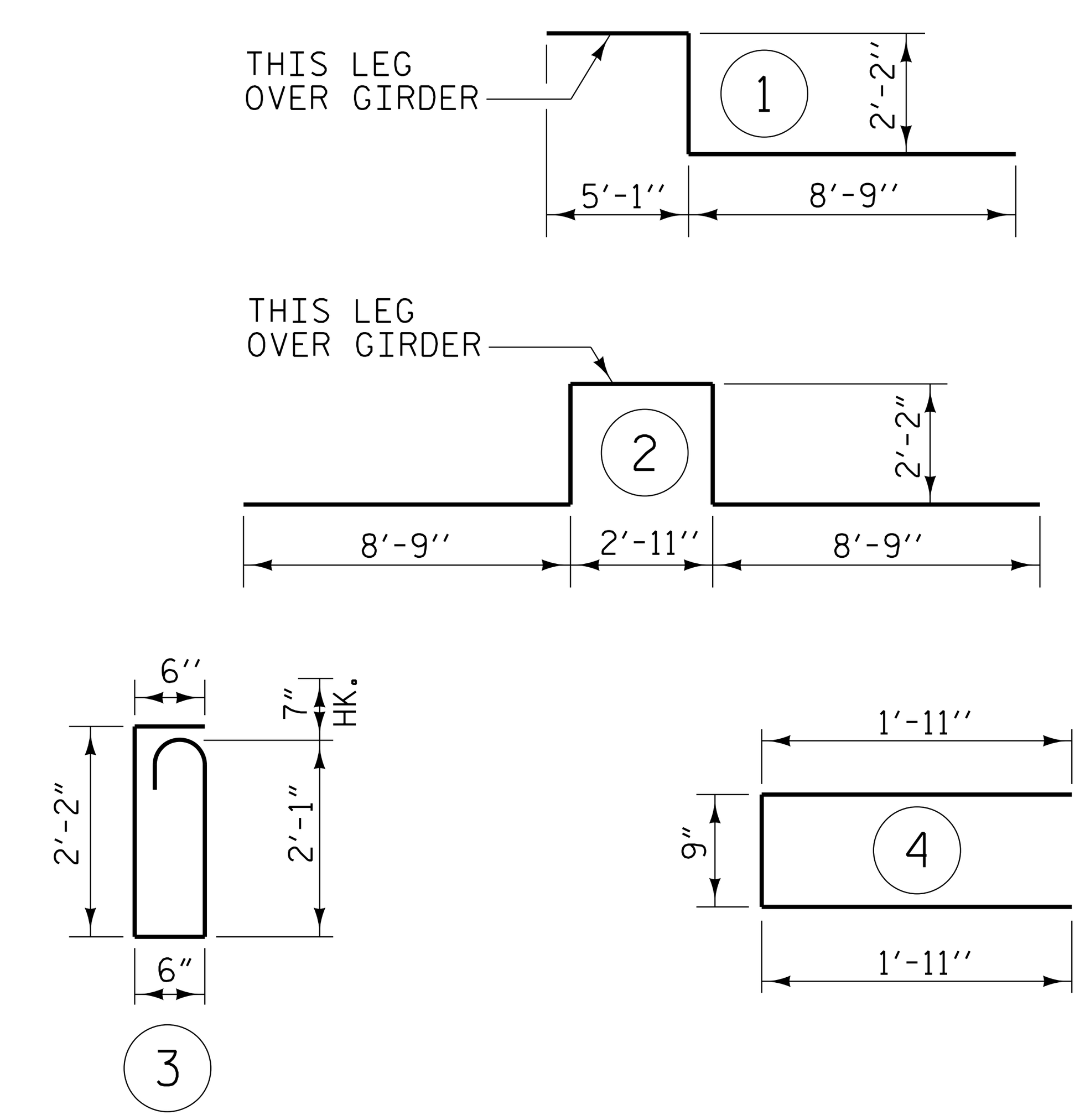
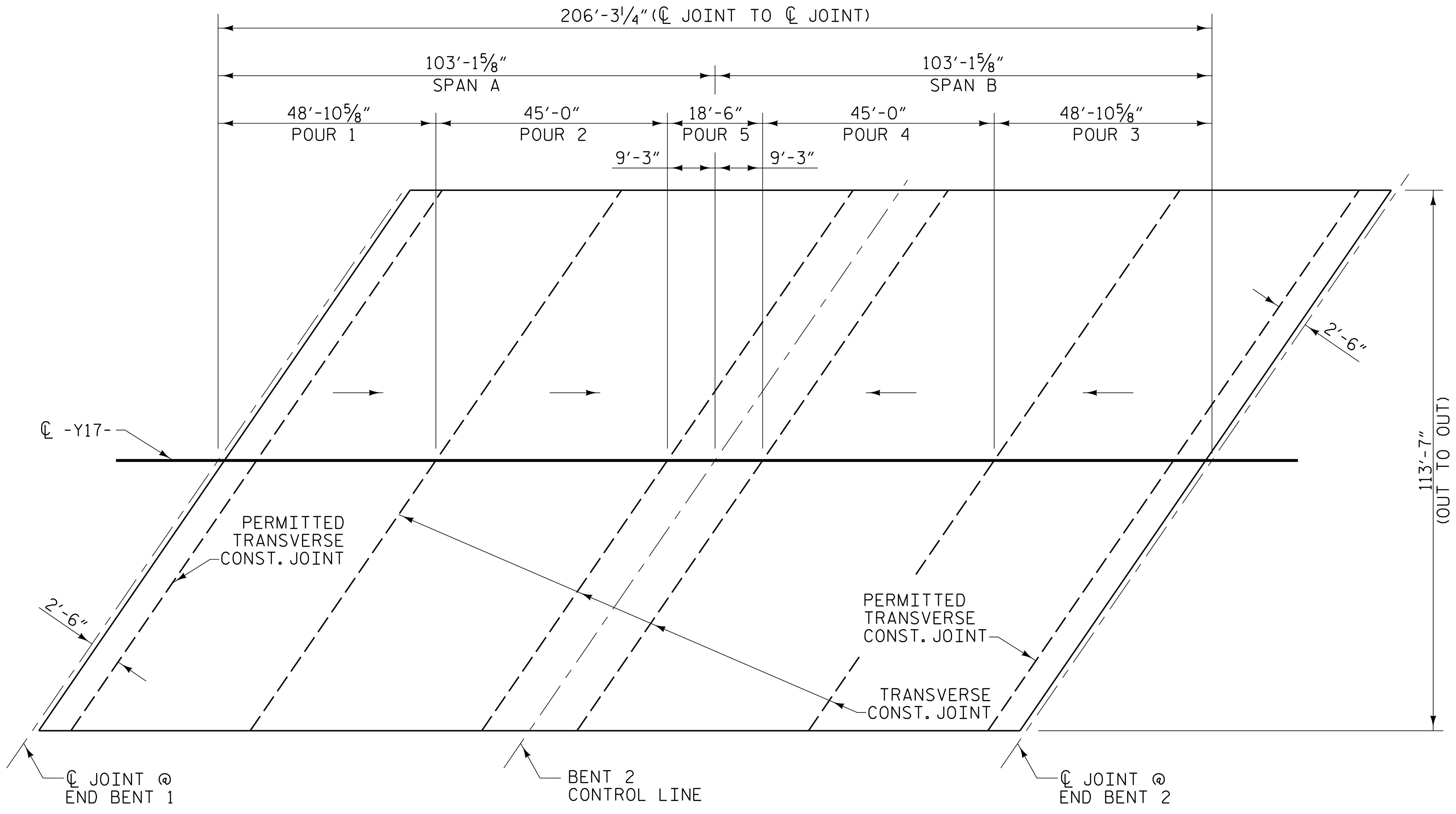
BAR TYPES



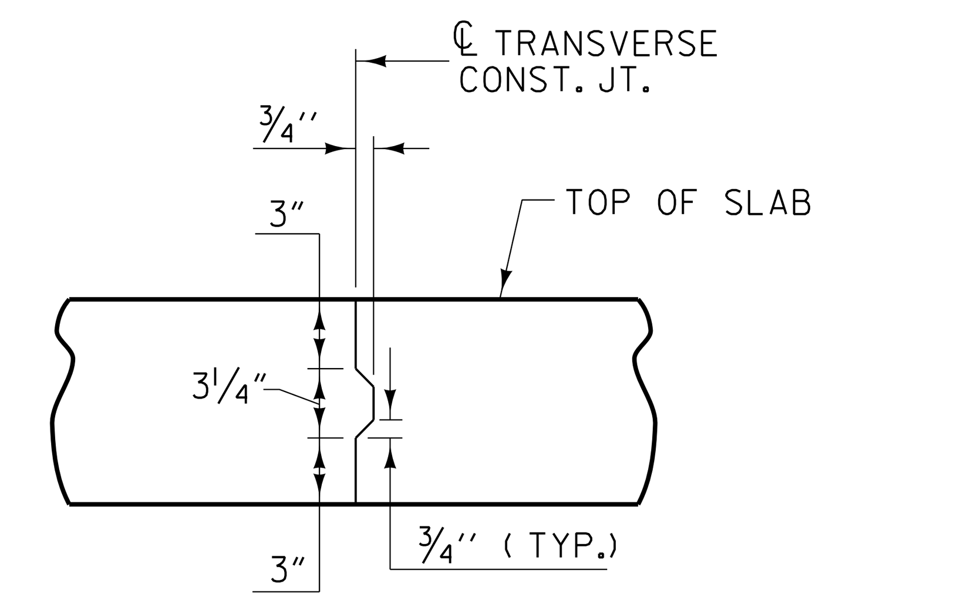
ALL BAR DIMENSIONS ARE OUT TO OUT



POURING SEQUENCE AND LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 23,429)

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



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

PLANS PREPARED BY:

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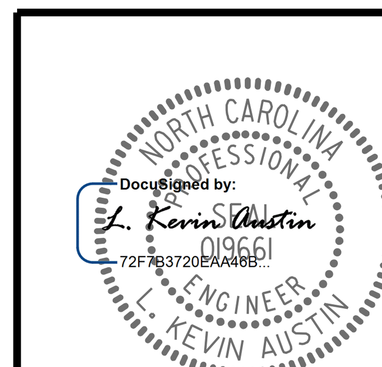
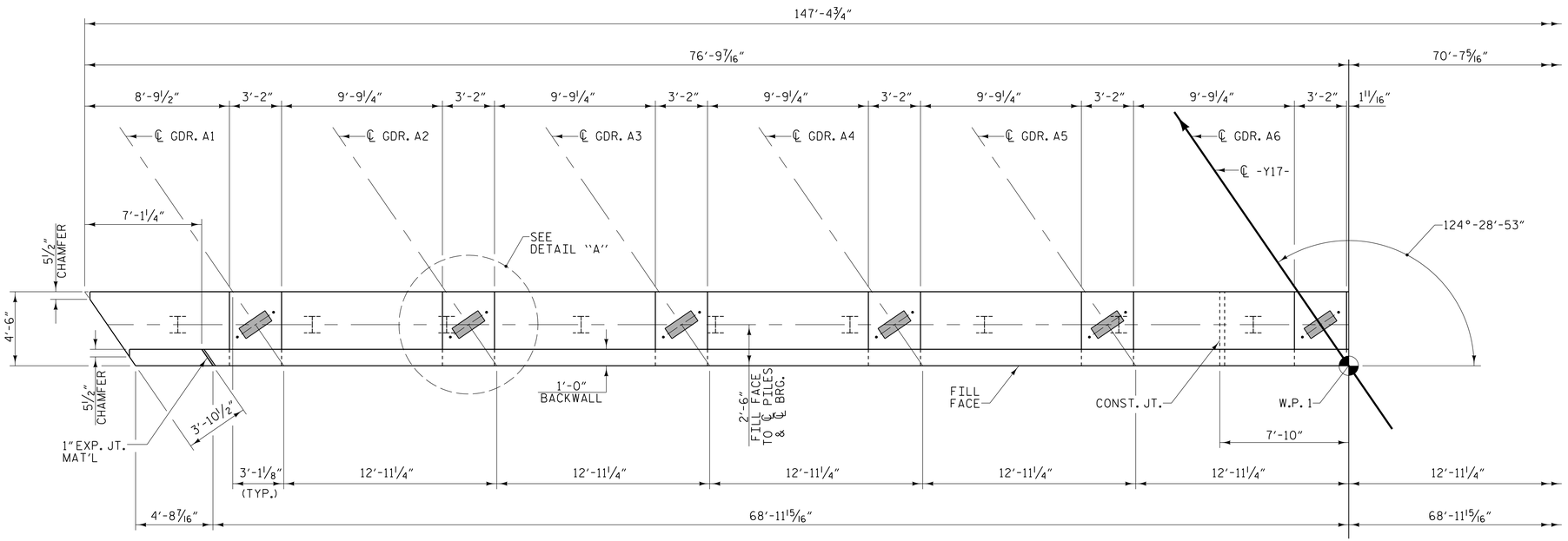


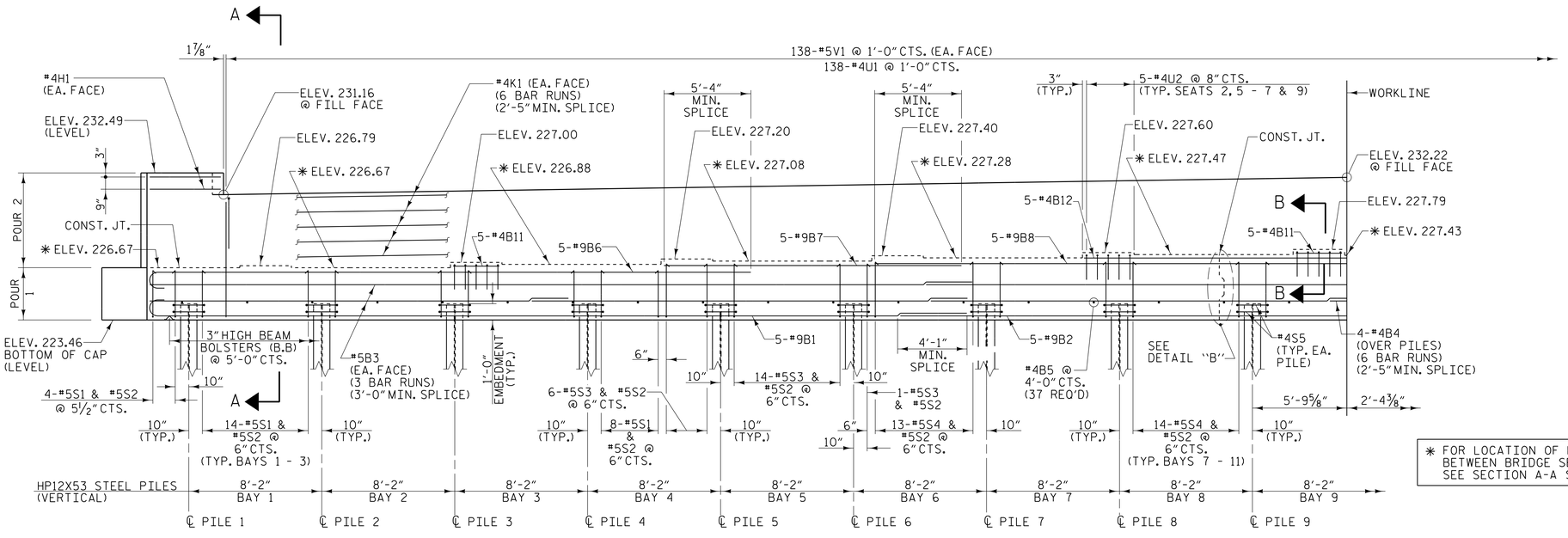
3/29/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			41

DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22



PLAN



ELEVATION

✳ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS. SEE SECTION A-A SHEET 3 OF 3.

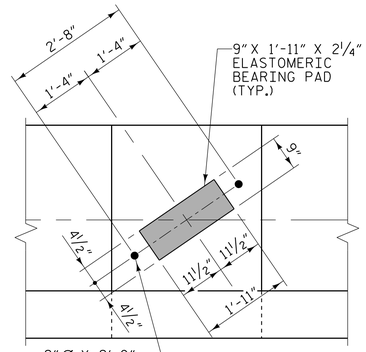
NOTES

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

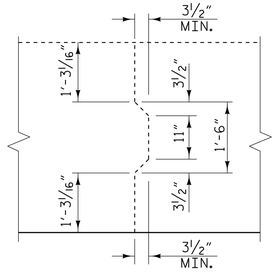
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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



DETAIL "A"
(TYP. EACH GIRDER)



DETAIL "B"

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : L. K. AUSTIN DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

PLANS PREPARED BY:

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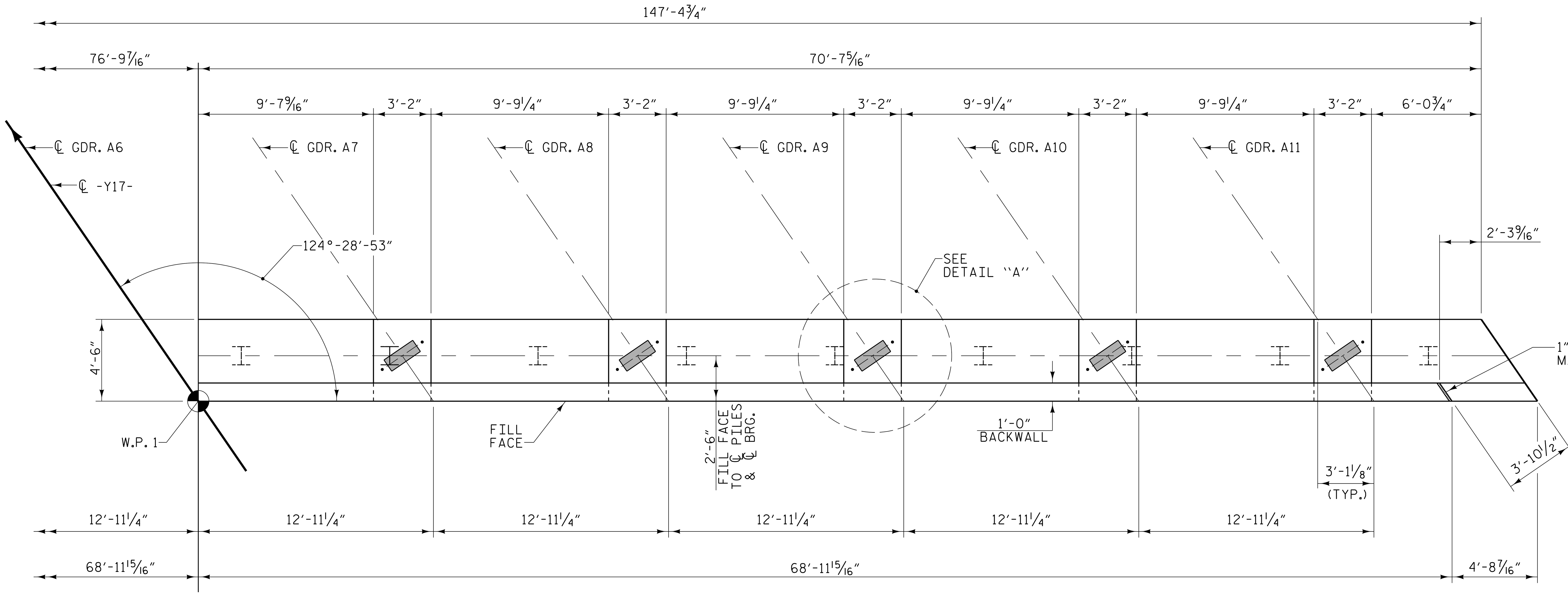
Documents prepared by: L. Kevin Austin
3/29/2022



PLAN

NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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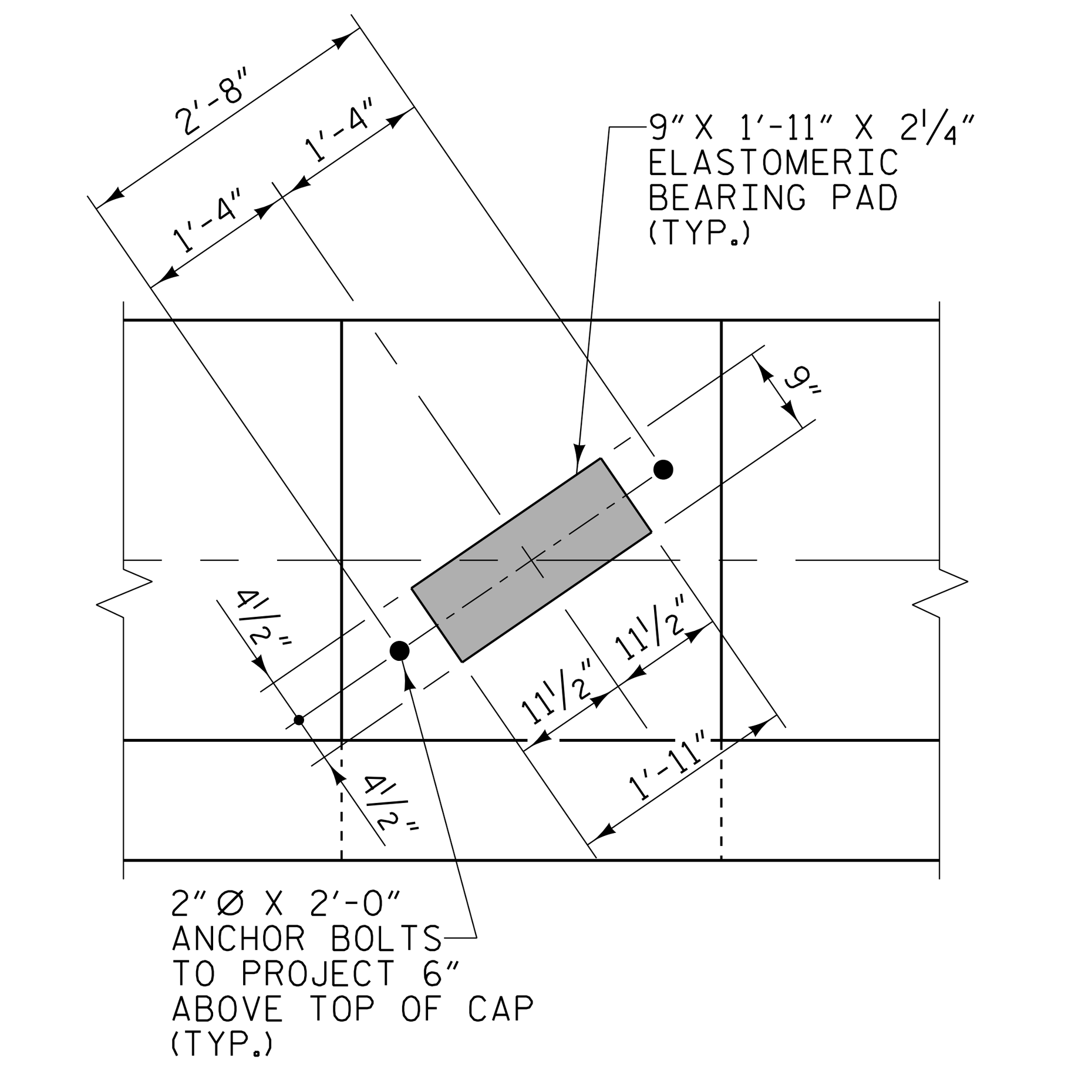
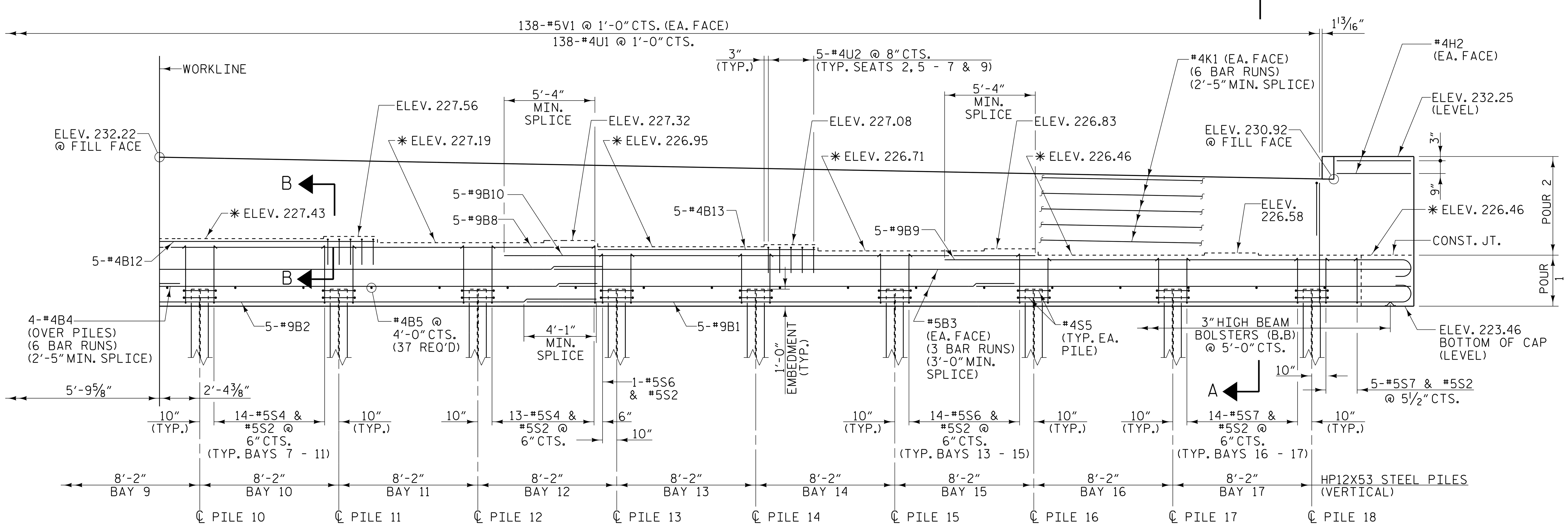


DETAIL "A"

(TYP. EACH GIRDER)



ELEVATION

✱ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS. SEE SECTION A-A SHEET 3 OF 3.

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

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DocuSigned by: L. Kevin Austin
3/29/2022

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-29
1			3					TOTAL SHEETS
2			4					41

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : L. K. AUSTIN DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

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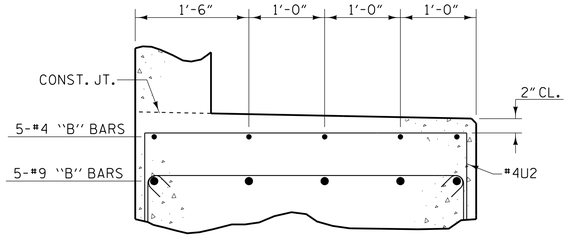
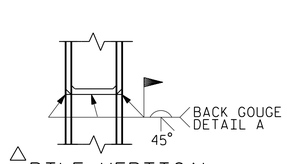
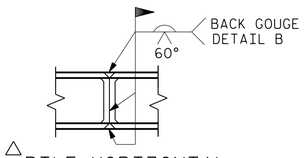


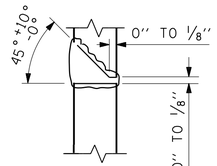
SECTION B-B



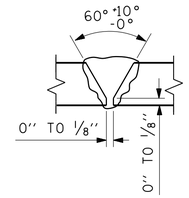
△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL



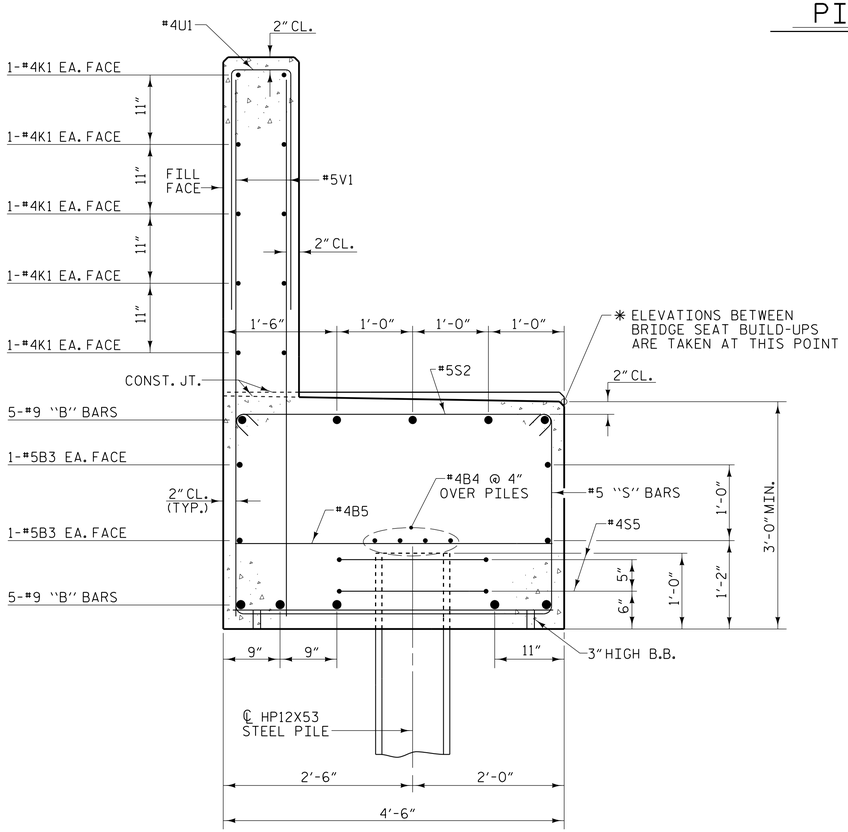
DETAIL A



DETAIL B

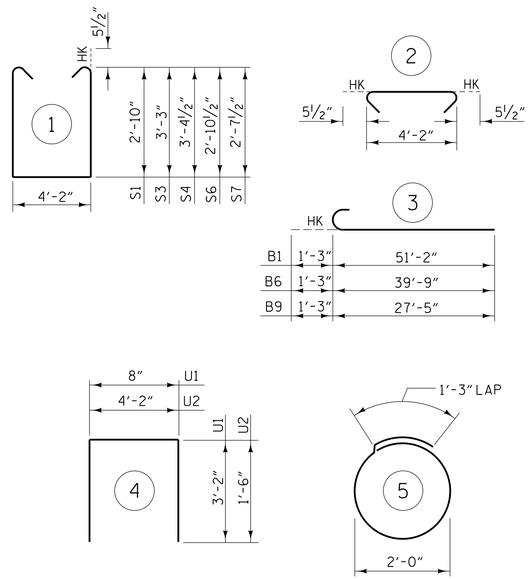
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

BAR TYPES



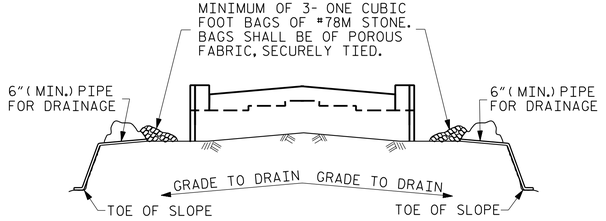
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	3	52'-5"	1782
B2	5	#9	STR	54'-2"	921
B3	12	#5	STR	51'-1"	639
B4	24	#4	STR	26'-7"	426
B5	37	#4	STR	4'-2"	103
B6	5	#9	3	41'-0"	697
B7	5	#9	STR	18'-4"	312
B8	5	#9	STR	54'-7"	928
B9	5	#9	3	28'-8"	487
B10	5	#9	STR	31'-3"	531
B11	10	#4	STR	2'-10"	19
B12	5	#4	STR	28'-9"	96
B13	5	#4	STR	12'-9"	43
H1	4	#4	STR	4'-1"	11
H2	4	#4	STR	4'-3"	11
S1	54	#5	1	10'-9"	605
S2	247	#5	2	5'-1"	1310
S3	21	#5	1	11'-7"	254
S4	96	#5	1	11'-10"	1185
S5	36	#4	5	7'-7"	182
S6	43	#5	1	10'-10"	486
S7	33	#5	1	10'-4"	356
U1	138	#4	4	7'-0"	645
U2	25	#4	4	7'-2"	120
V1	138	#5	STR	7'-1"	1020

TOTAL REINFORCING STEEL	13169 lbs.
CLASS "A" CONCRETE - CU. YARDS	
POUR 1 - CAP (LT.)	40.2 cu. yds.
POUR 2 - CAP (RT.)	47.0 cu. yds.
POUR 3 - BACKWALL	25.5 cu. yds.
TOTAL	112.7 cu. yds.
HP12X53 STEEL PILES	
18 PILES REQUIRED - LIN. FEET	1350
PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	18 EA.
PILE REDRIVES	9 EA.



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

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 3 OF 3

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : L. K. AUSTIN DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

PLANS PREPARED BY:

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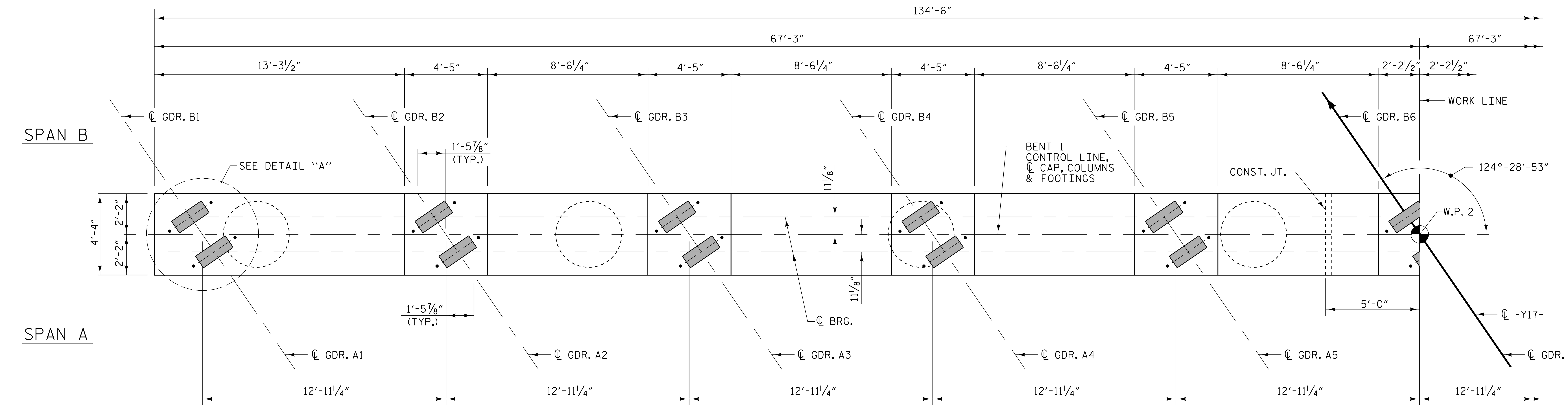
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019661 KEVIN AUSTIN
Docusigned by: L. Kevin Austin
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			41

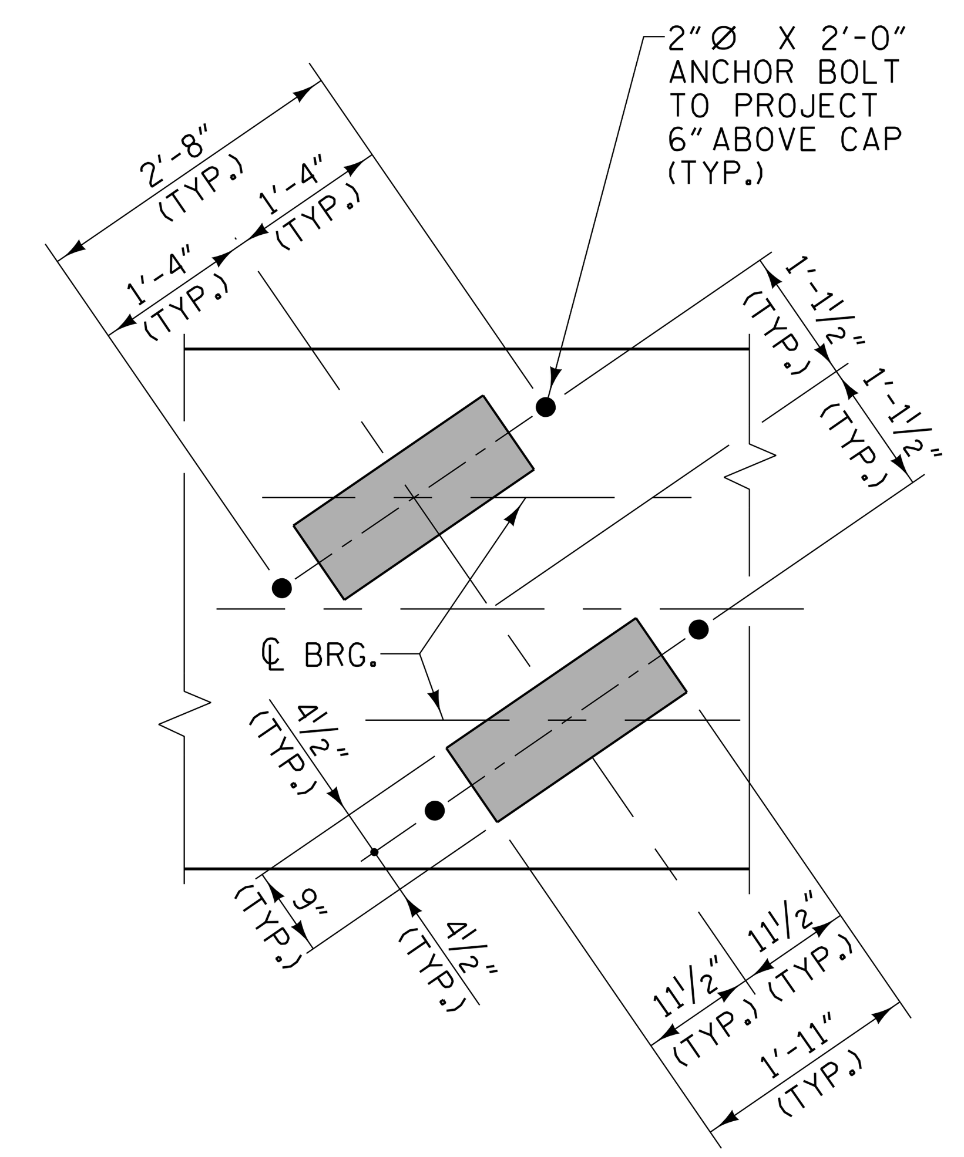


PLAN

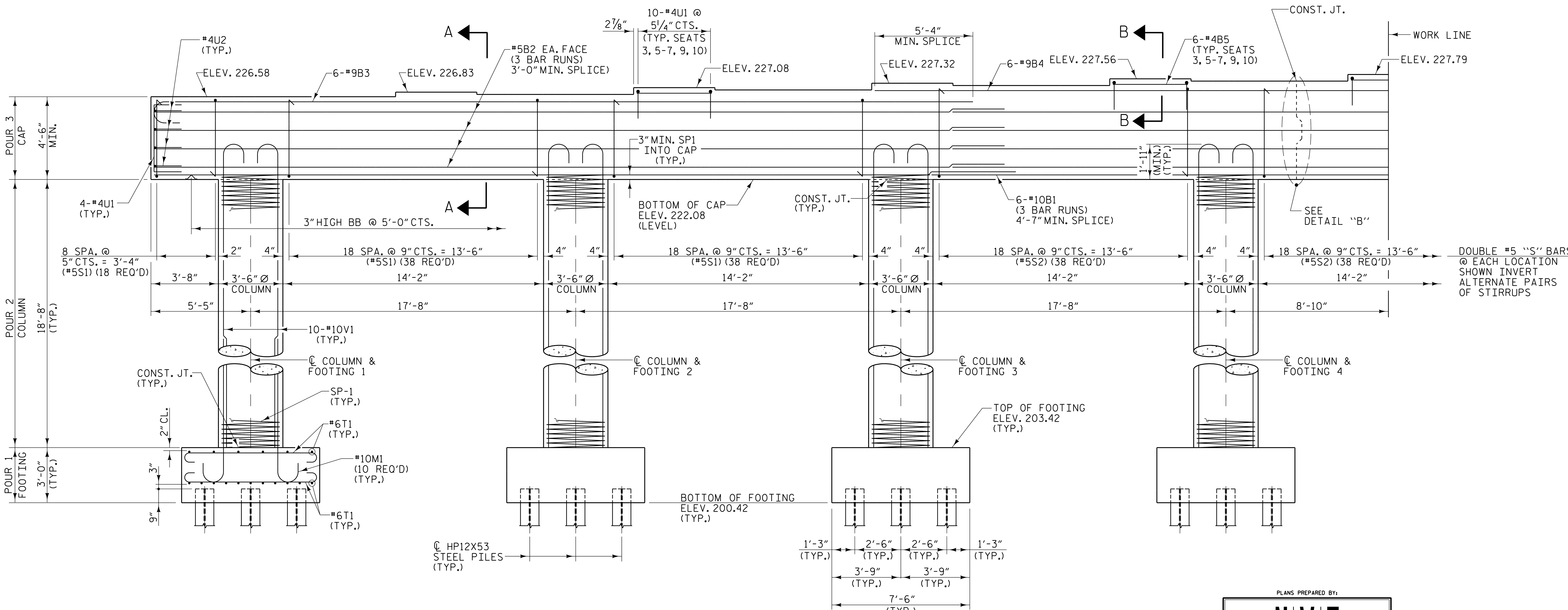
NOTES

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

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

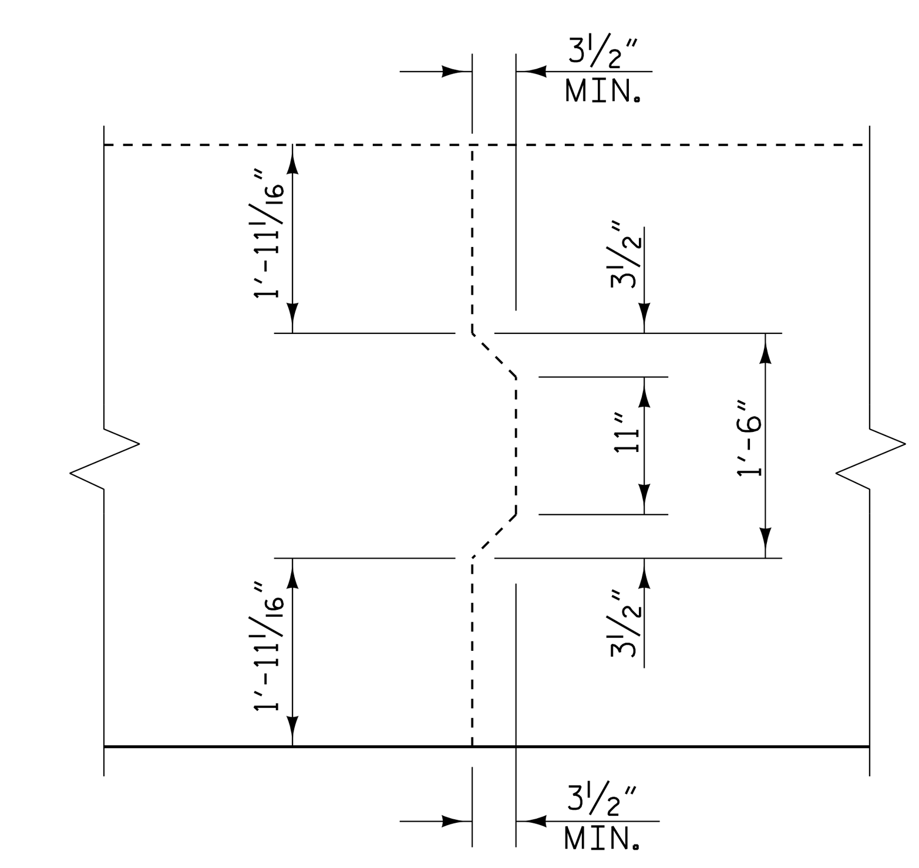


DETAIL "A"
(TYPICAL EACH GIRDER)



ELEVATION

NOTE: REINFORCING STEEL IN FOOTINGS ("T" & "M" BARS) TYPICAL



DETAIL "B"

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1

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

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NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN
3/29/2022

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-31
1			3					TOTAL SHEETS
2			4					41

DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22

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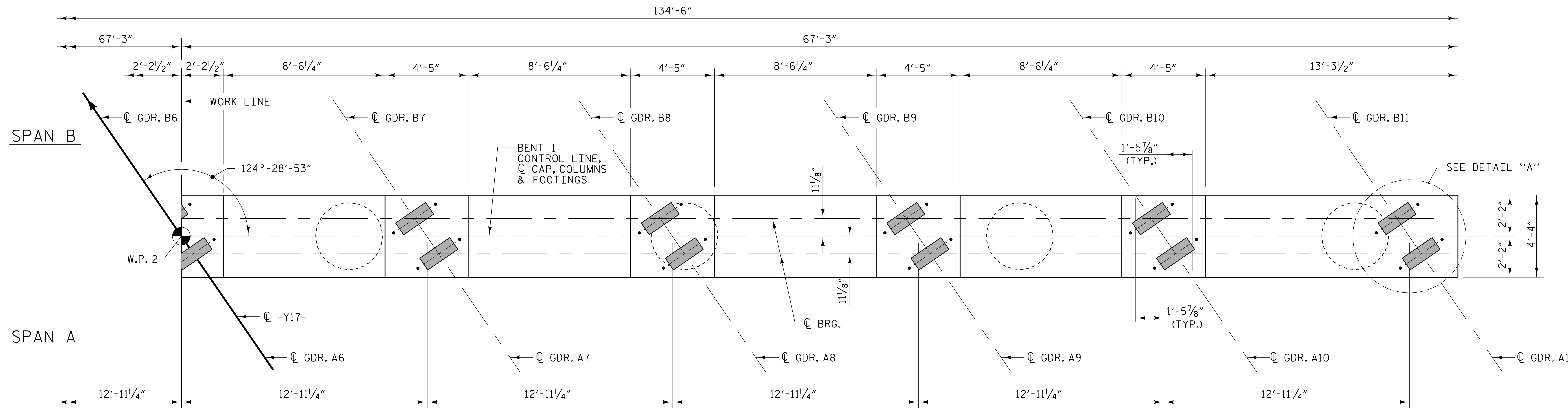
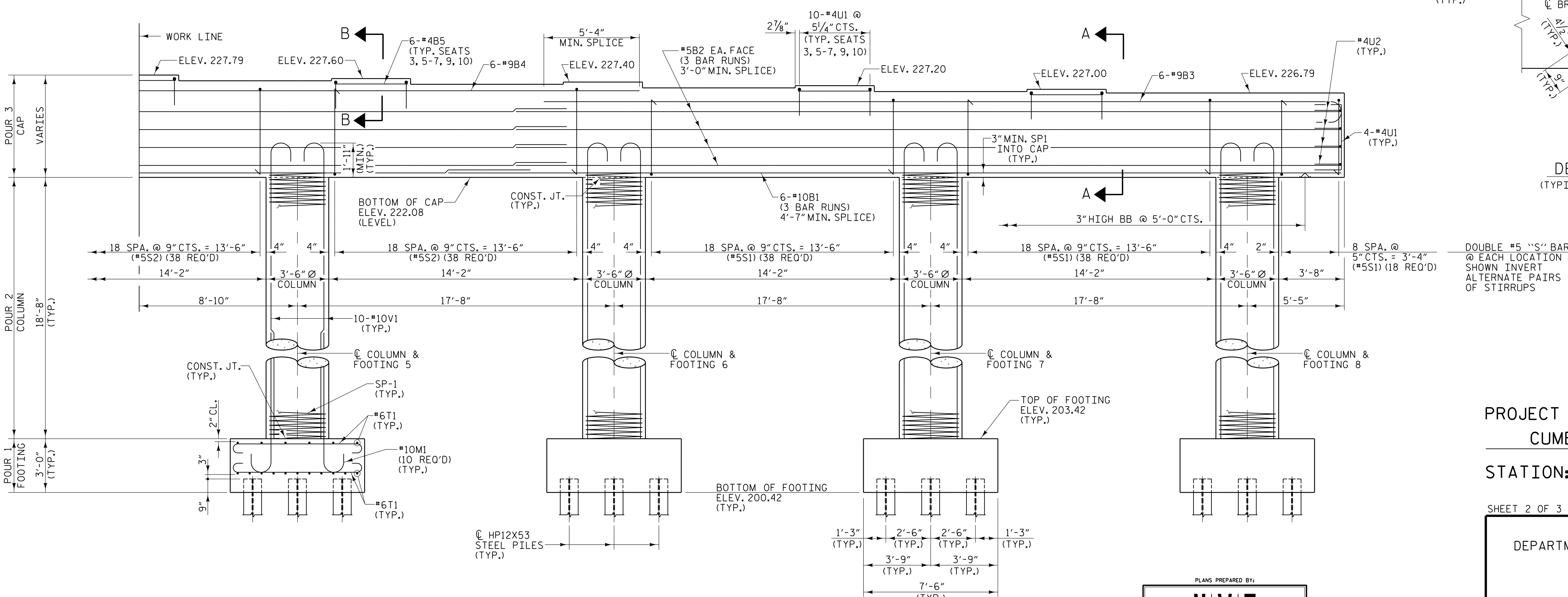
NOTES

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

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

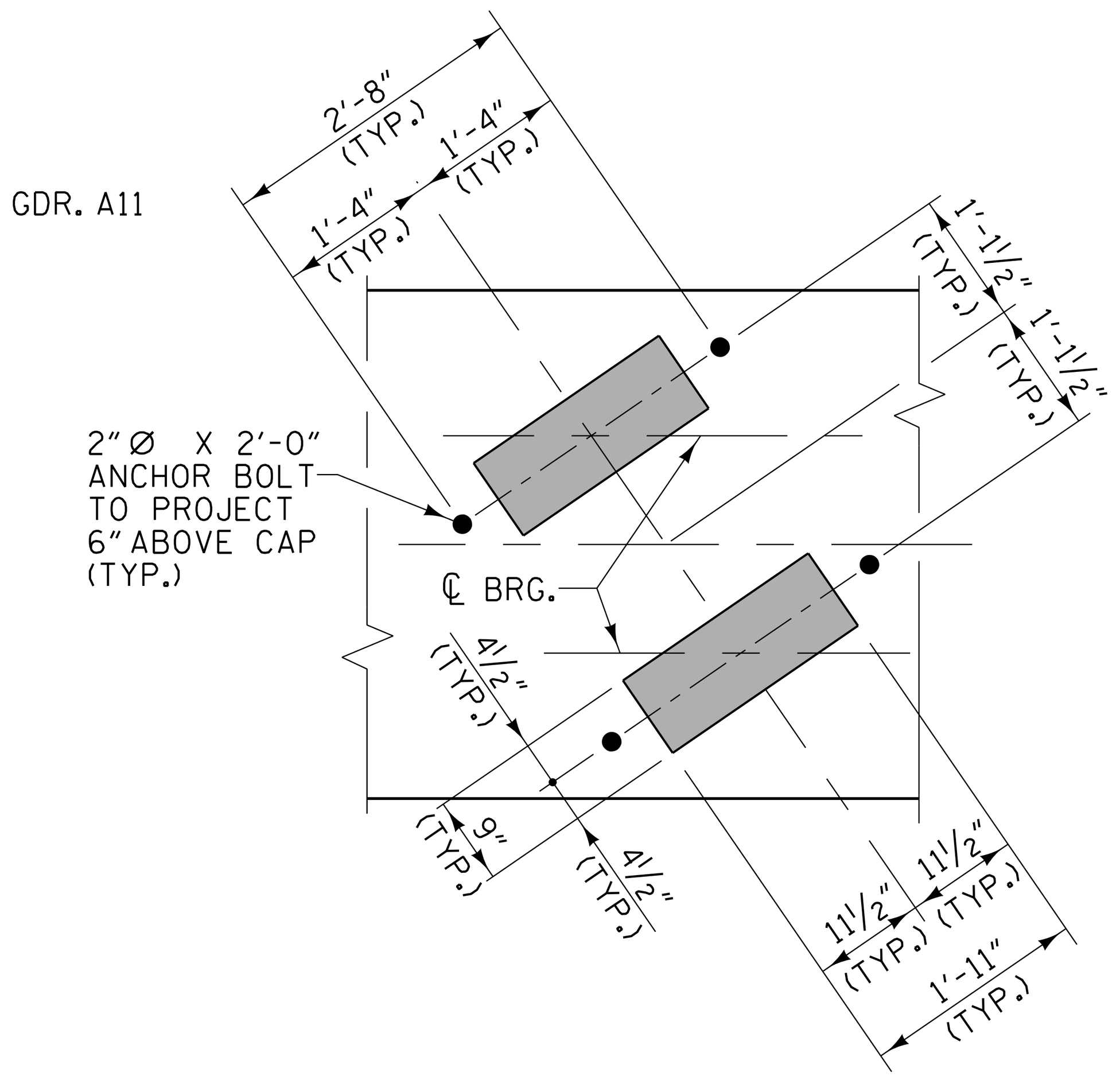


PLAN



ELEVATION

NOTE: REINFORCING STEEL IN FOOTINGS ("T" & "M" BARS) TYPICAL



DETAIL "A"
(TYPICAL EACH GIRDER)

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1

PLANS PREPARED BY:
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019661 L. KEVIN AUSTIN
3/29/2022

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

SHEET NO. S-32
TOTAL SHEETS 41

DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22

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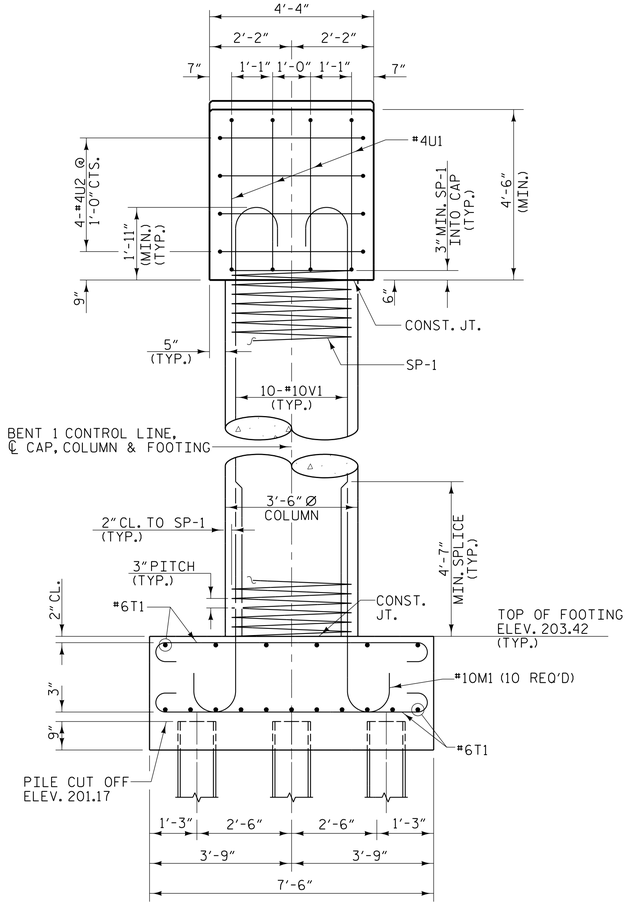
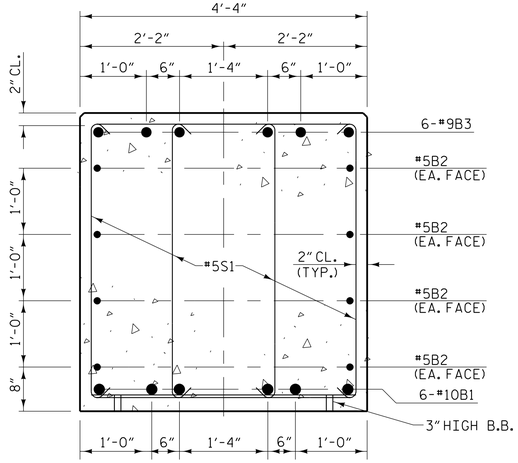
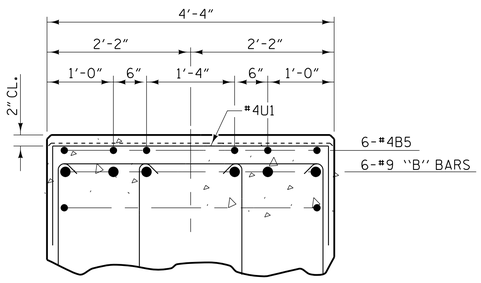


END ELEVATION

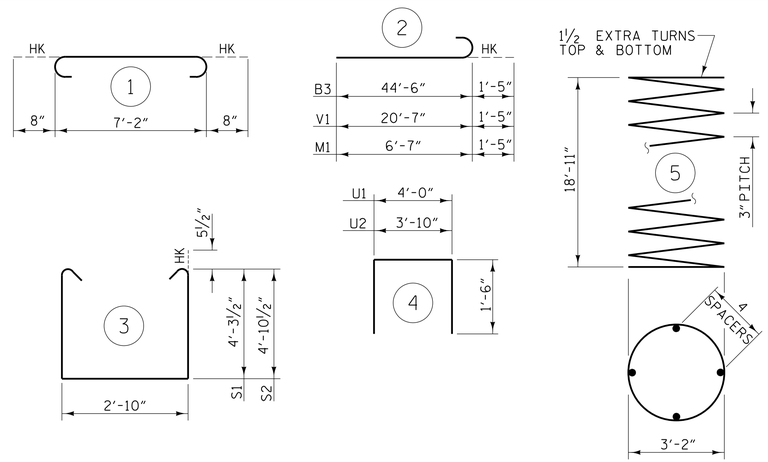


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

FOR PILE SPLICE DETAILS, SEE "END BENT 1" SHEET 3 OF 3.

BILL OF MATERIAL

BENT 1

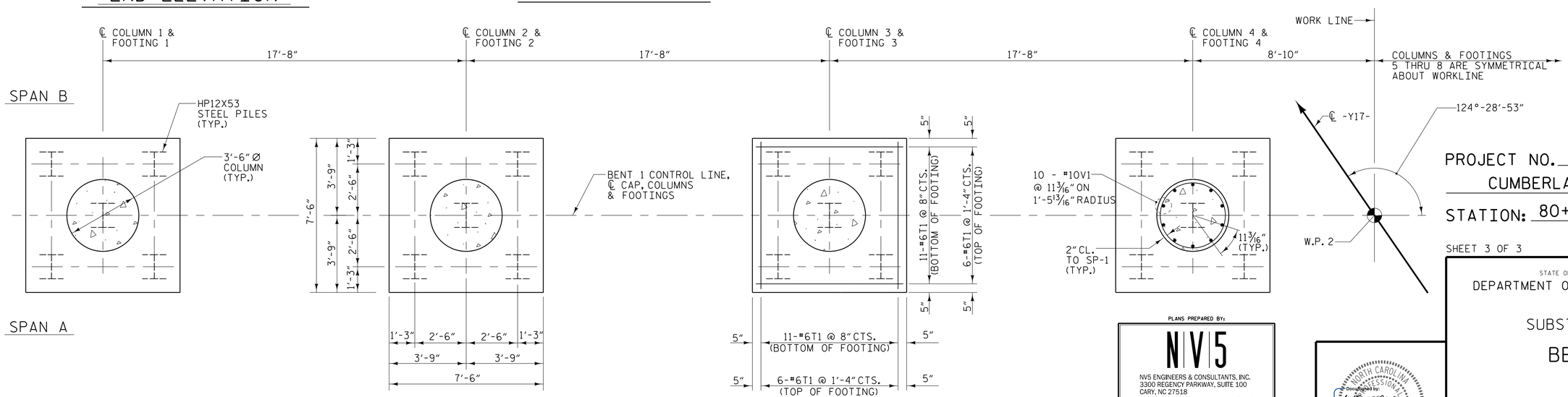
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	18	#10	STR	47'-9"	3698
B2	24	#5	STR	46'-9"	1170
B3	12	#9	2	45'-11"	1873
B4	6	#9	STR	55'-10"	1139
B5	36	#4	STR	4'-1"	98
M1	80	#10	2	8'-0"	2754
S1	188	#5	3	12'-4"	2418
S2	114	#5	3	13'-6"	1605
T1	272	#6	1	8'-6"	3473
U1	68	#4	4	7'-0"	318
U2	8	#4	4	6'-10"	37
V1	80	#10	2	22'-0"	7573

TOTAL REINFORCING STEEL	26156 lbs.
SPIRAL COLUMN REINFORCING STEEL (SP)	
SP-1 8 ** 5 775'-10"	4146
TOTAL SPIRAL COLUMN REINFORCING STEEL	4146 lbs.

CLASS "A" CONCRETE - CU. YARDS

POUR 1 - FOOTINGS	50.0 CU. YDS.
POUR 2 - COLUMNS	53.2 CU. YDS.
POUR 3 - CAP (LT.)	49.0 CU. YDS.
POUR 4 - CAP (RT.)	59.1 CU. YDS.
TOTAL CLASS "A" CONCRETE	211.3 CU. YDS.

HP12X53 STEEL PILES 40 PILES REQUIRED - LIN. FEET	2200
PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	40 EA.
PILE REDRIVES	20 EA.
FOUNDATION EXCAVATION FOR BENT	LUMP SUM



PLAN OF COLUMNS AND FOOTINGS

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING)

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037661 L. KEVIN AUSTIN
Docusigned by: L. Kevin Austin
3/29/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : M. D. METZGER DATE : 2/22
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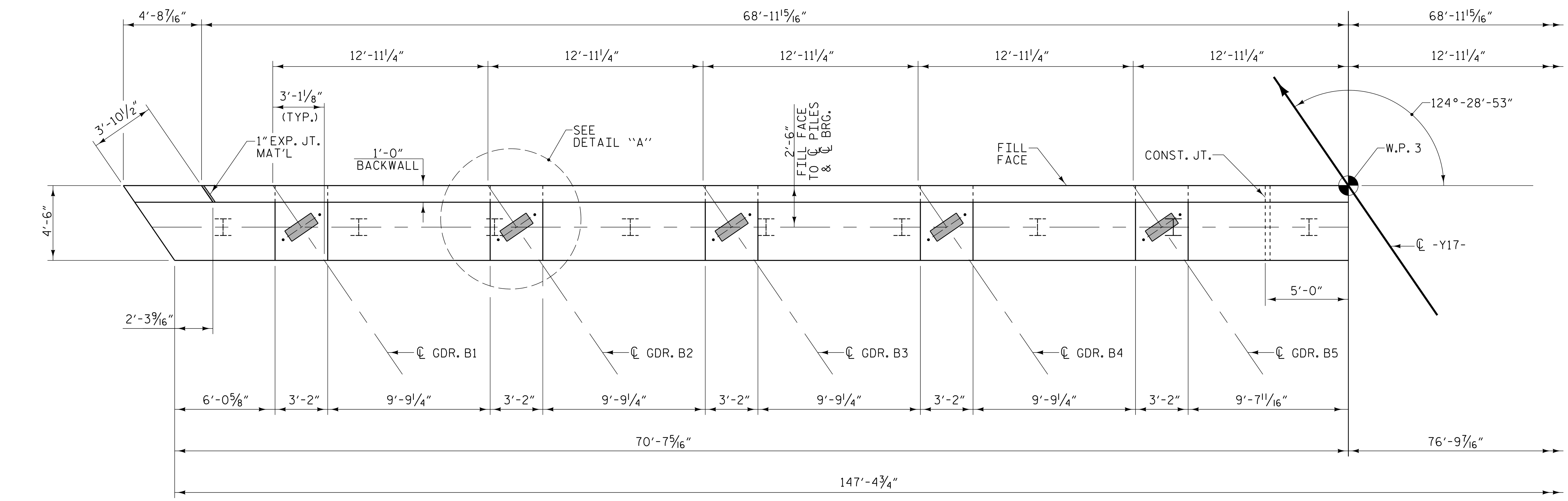
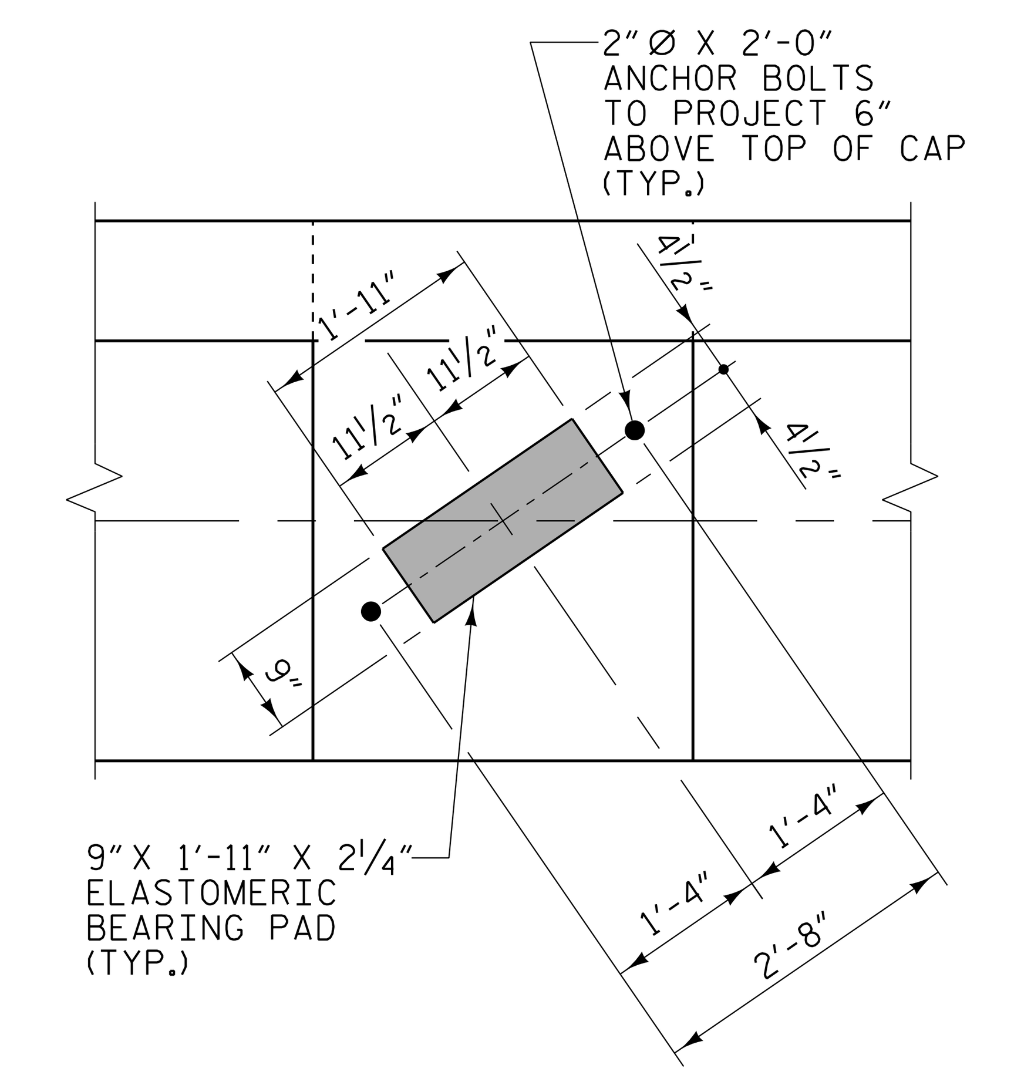
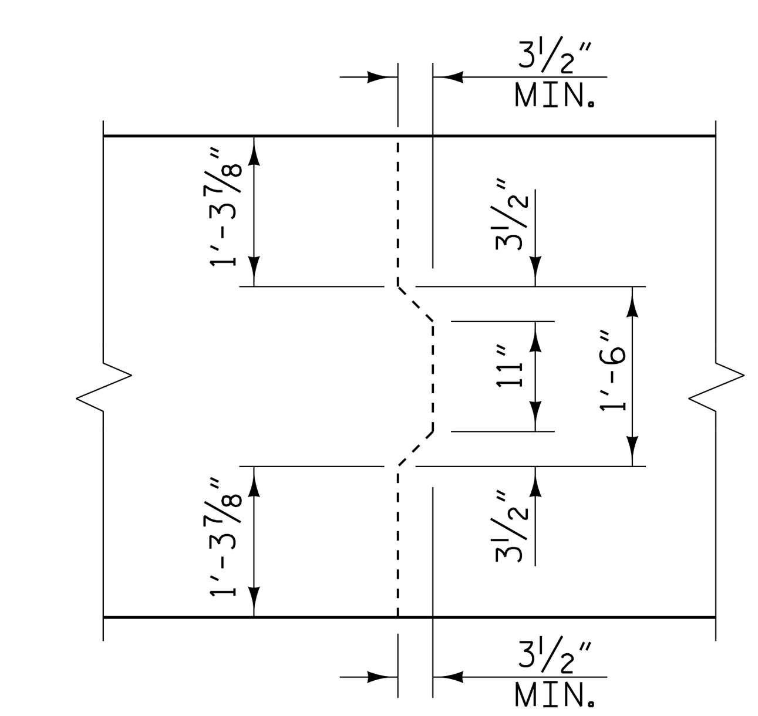


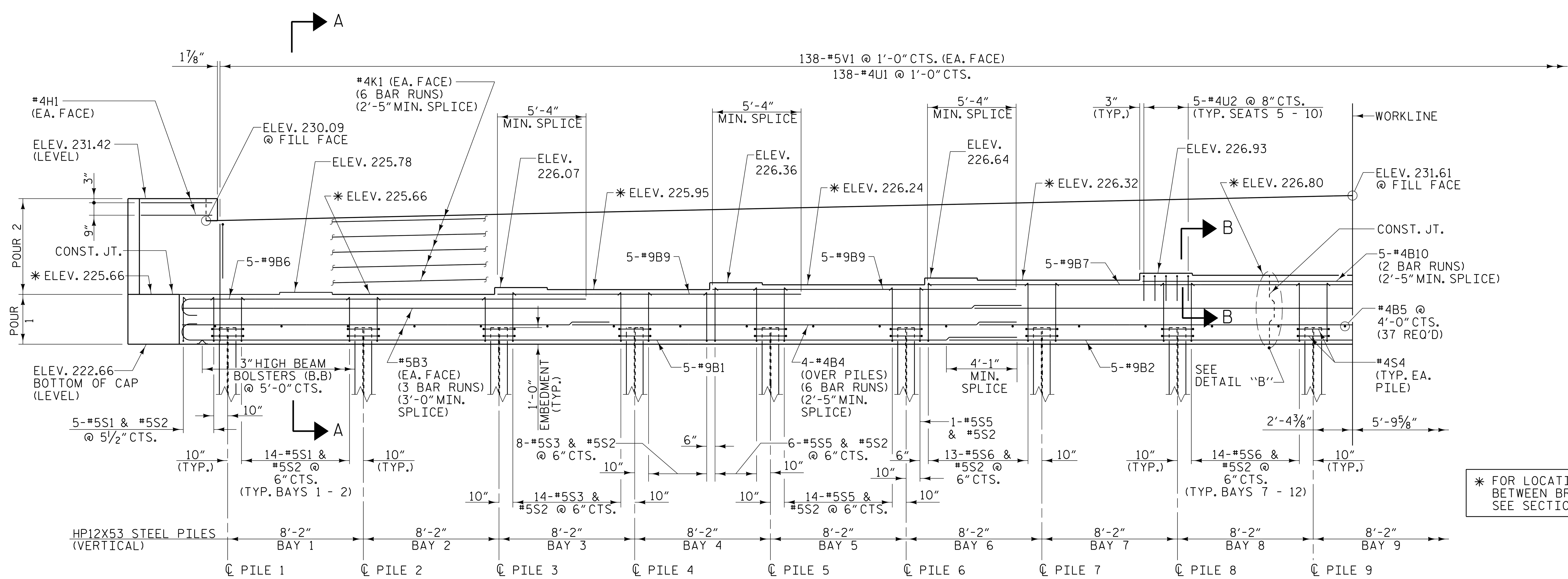
PLAN



DETAIL "A"
(TYP. EACH GIRDER)



DETAIL "B"



ELEVATION

NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

✱ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS. SEE SECTION A-A SHEET 3 OF 3.

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN 3/29/2022

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1			3			TOTAL SHEETS	41
2			4				

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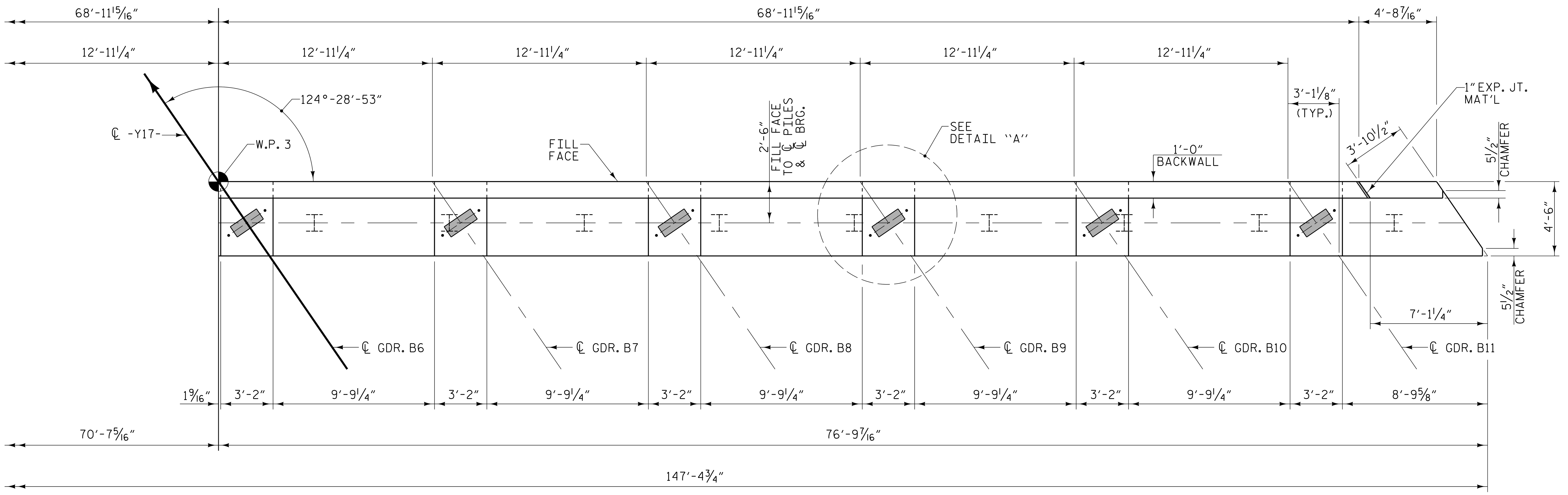


PLAN

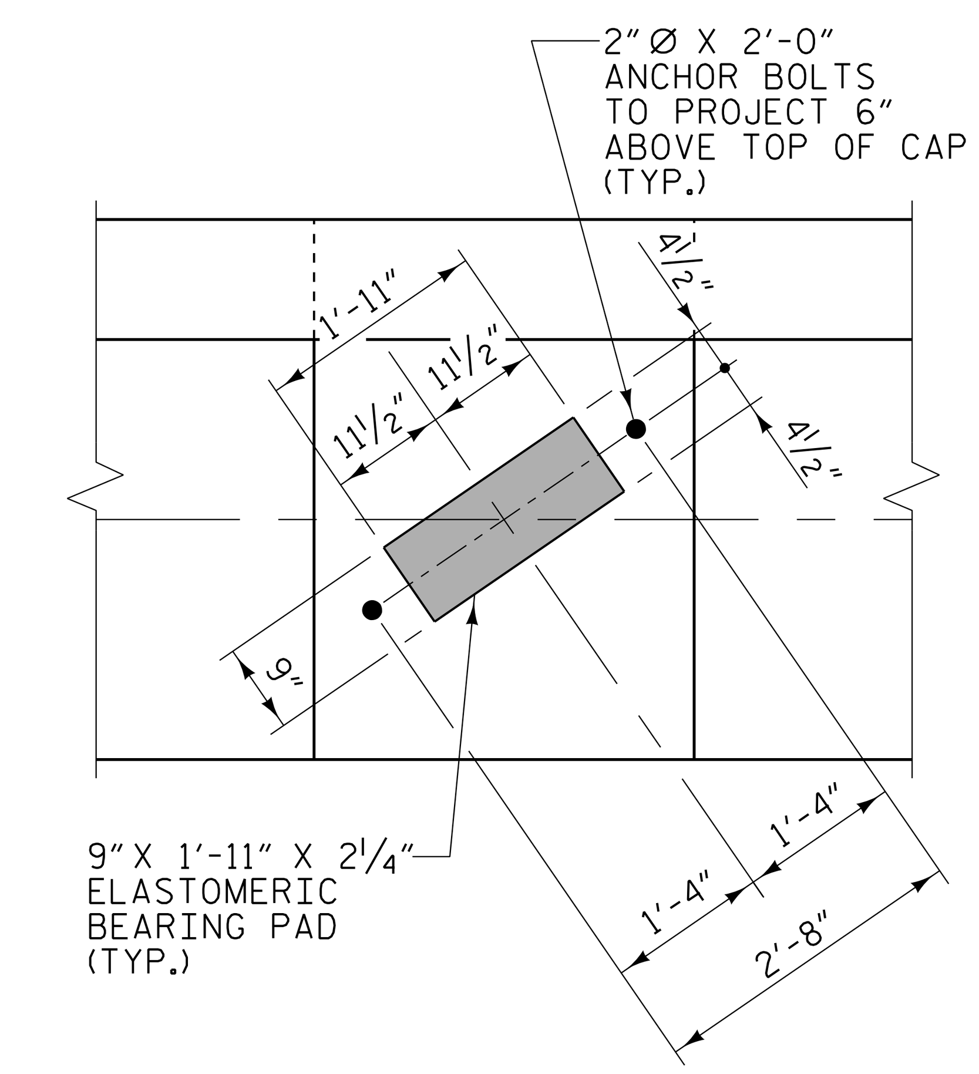
NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

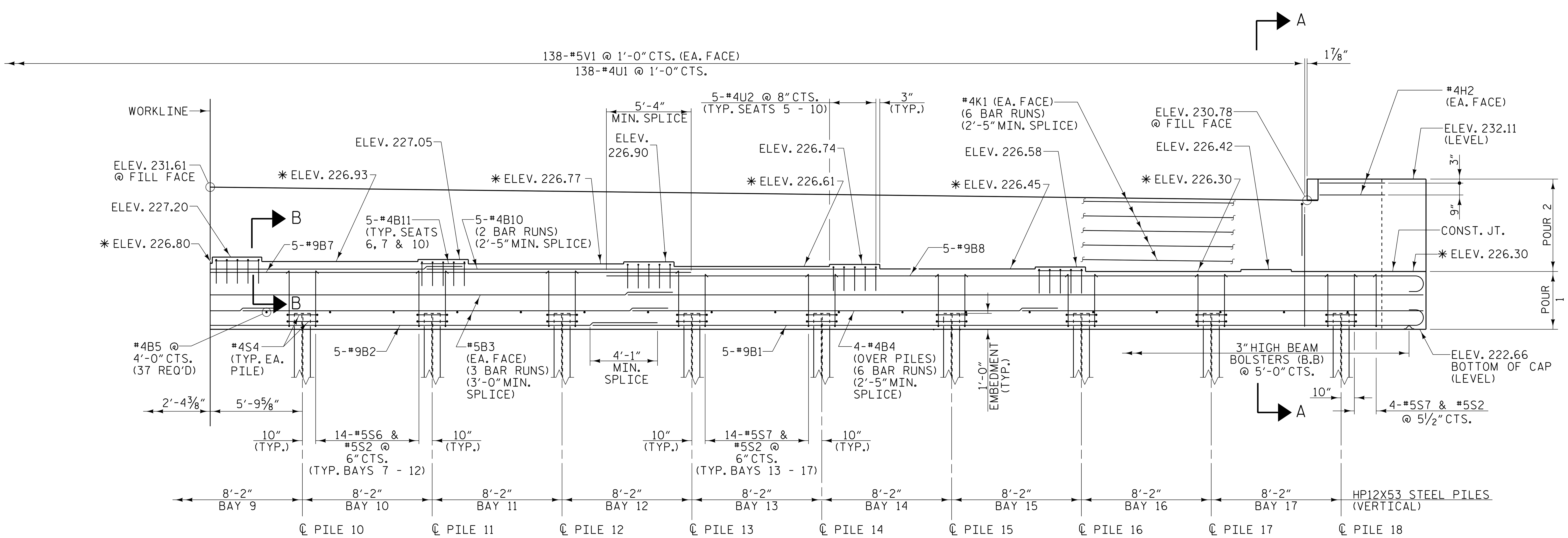
THE TOP SURFACE AREA OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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



DETAIL "A"

(TYP. EACH GIRDER)



ELEVATION

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS. SEE SECTION A-A SHEET 3 OF 3.

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

PLANS PREPARED BY:

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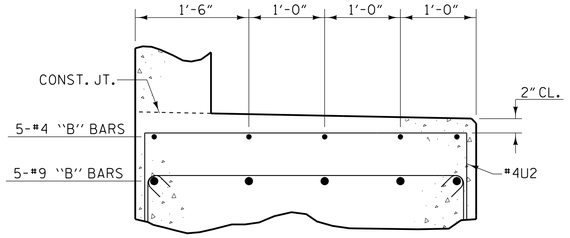
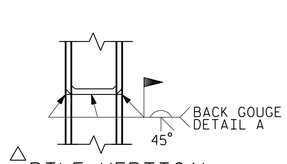
L. Kevin Austin
3/29/2022

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-35
1			3					TOTAL SHEETS
2			4					41

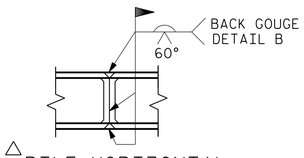
DRAWN BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	2/22



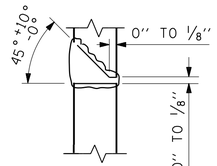
SECTION B-B



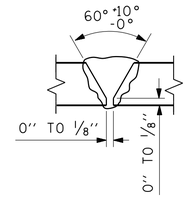
△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL



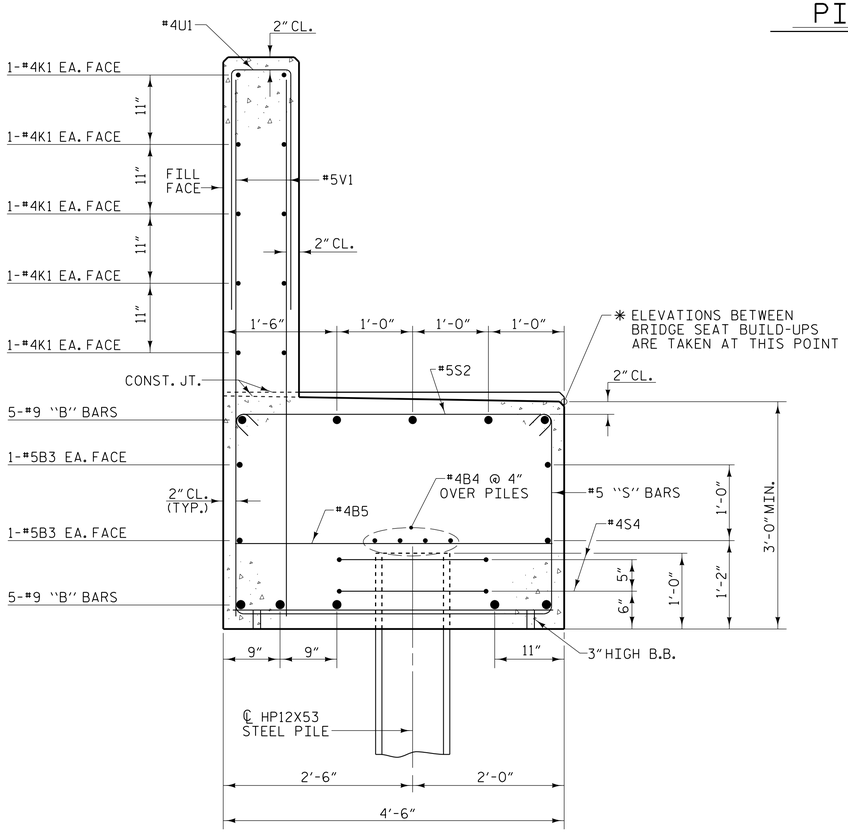
DETAIL A



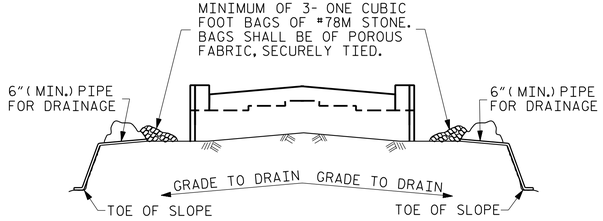
DETAIL B

△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A



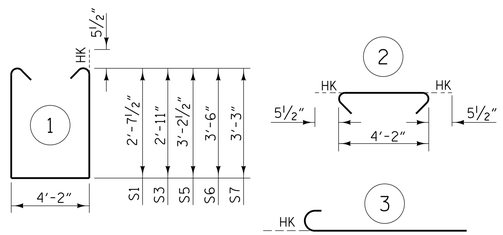
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	3	52'-5"	1782
B2	5	#9	STR	54'-2"	921
B3	12	#5	STR	51'-1"	639
B4	24	#4	STR	26'-7"	426
B5	37	#4	STR	4'-2"	103
B6	5	#9	3	28'-6"	485
B7	5	#9	STR	54'-2"	921
B8	5	#9	3	54'-5"	925
B9	10	#9	STR	18'-4"	623
B10	10	#4	STR	28'-7"	191
B11	15	#4	STR	2'-10"	28
H1	4	#4	STR	4'-3"	11
H2	4	#4	STR	4'-1"	11
S1	33	#5	1	10'-4"	356
S2	247	#5	2	5'-1"	1310
S3	22	#5	1	10'-11"	250
S4	36	#4	5	7'-7"	182
S5	21	#5	1	11'-6"	252
S6	97	#5	1	12'-1"	1222
S7	74	#5	1	11'-7"	894
U1	138	#4	4	7'-4"	676
U2	30	#4	4	7'-2"	144
V1	138	#5	STR	7'-1"	1020

TOTAL REINFORCING STEEL 13372 lbs.

CLASS "A" CONCRETE - CU. YARDS	
POUR 1 - CAP (LT.)	39.2 cu. yds.
POUR 2 - CAP (RT.)	53.3 cu. yds.
POUR 3 - BACKWALL	25.4 cu. yds.
TOTAL	117.9 cu. yds.

HP12X53 STEEL PILES	
18 PILES REQUIRED - LIN. FEET	1305

PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	18 EA.
PILE REDRIVES	9 EA.

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 3 OF 3

DRAWN BY : M. D. METZGER DATE : 2/22
CHECKED BY : L. K. AUSTIN DATE : 2/22
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL SEAL 040661 ENGINEER L. KEVIN AUSTIN
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			41

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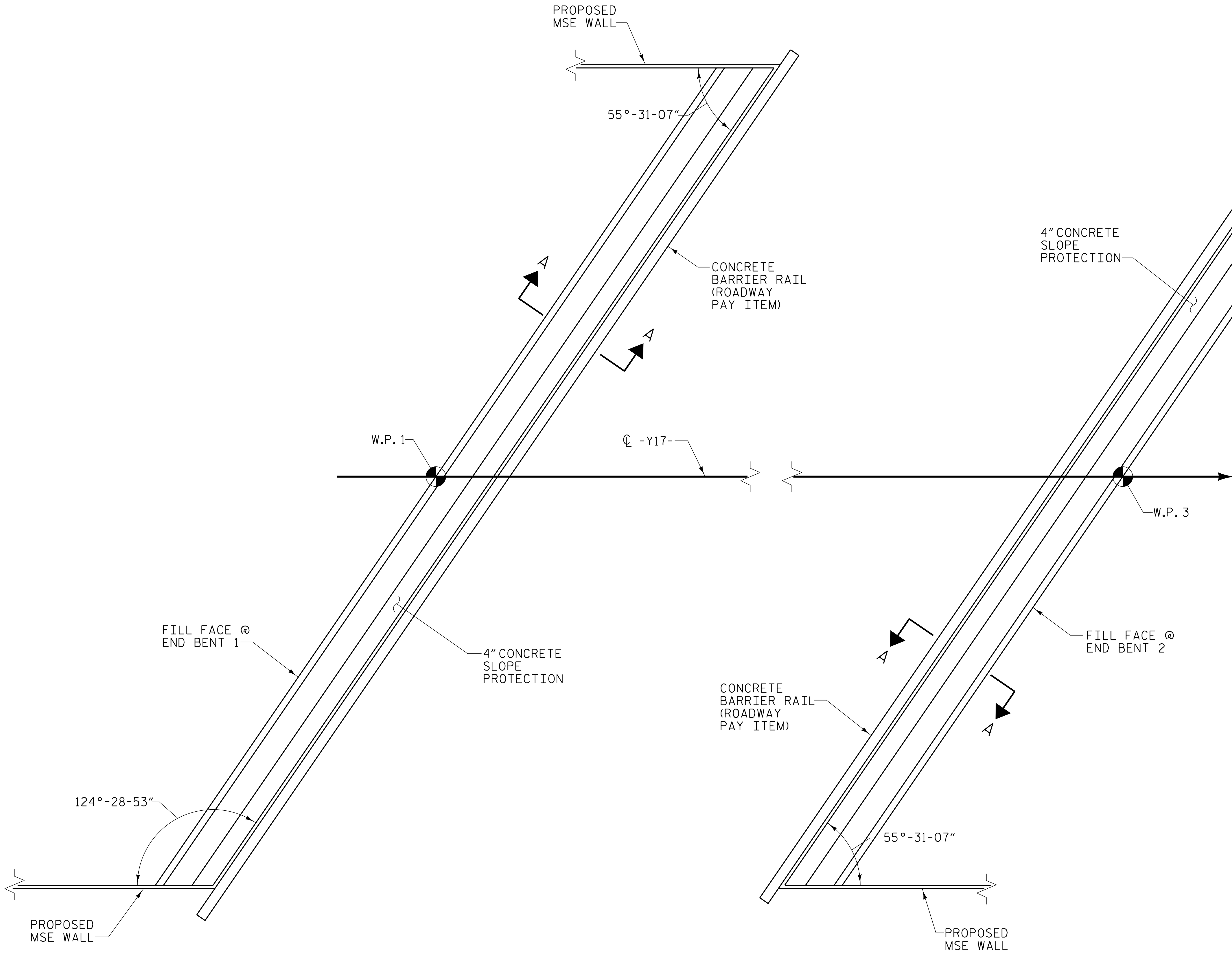
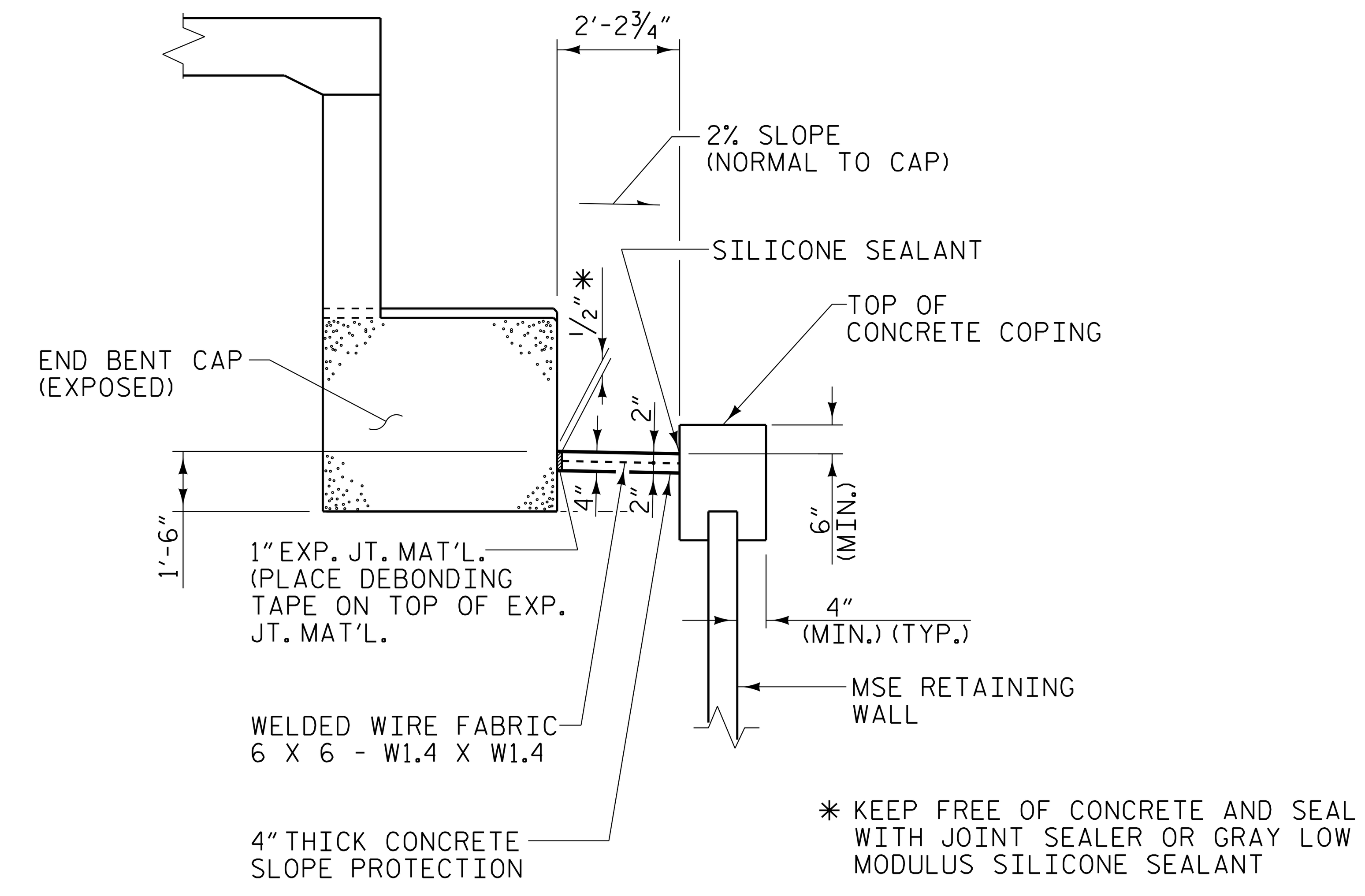


PLAN

NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FINISHED TO THE SATISFACTION OF THE ENGINEER. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 20'' WIDE. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



* KEEP FREE OF CONCRETE AND SEAL WITH JOINT SEALER OR GRAY LOW MODULUS SILICONE SEALANT

SECTION A-A

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

BRIDGE @ STA. 80+65.32 -Y17-	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	37	147
END BENT 2	37	147

PLANS PREPARED BY:
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NORTH CAROLINA PROFESSIONAL SEAL 019661 ENGINEER L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
72F7B3720EAA46B...
3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : W. B. ALLEN DATE : 8/17
CHECKED BY : Z. H. BROWN DATE : 8/17
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

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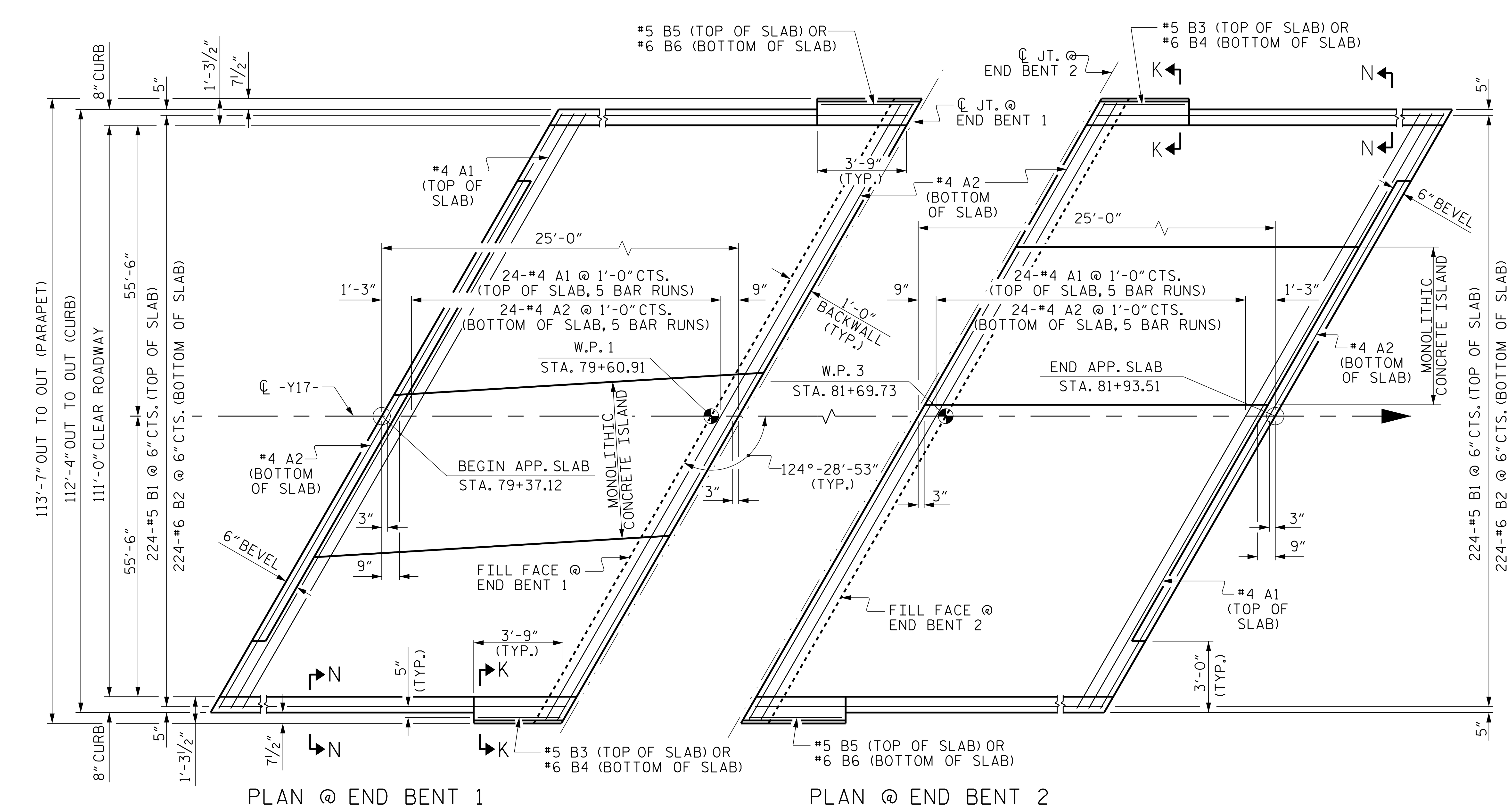
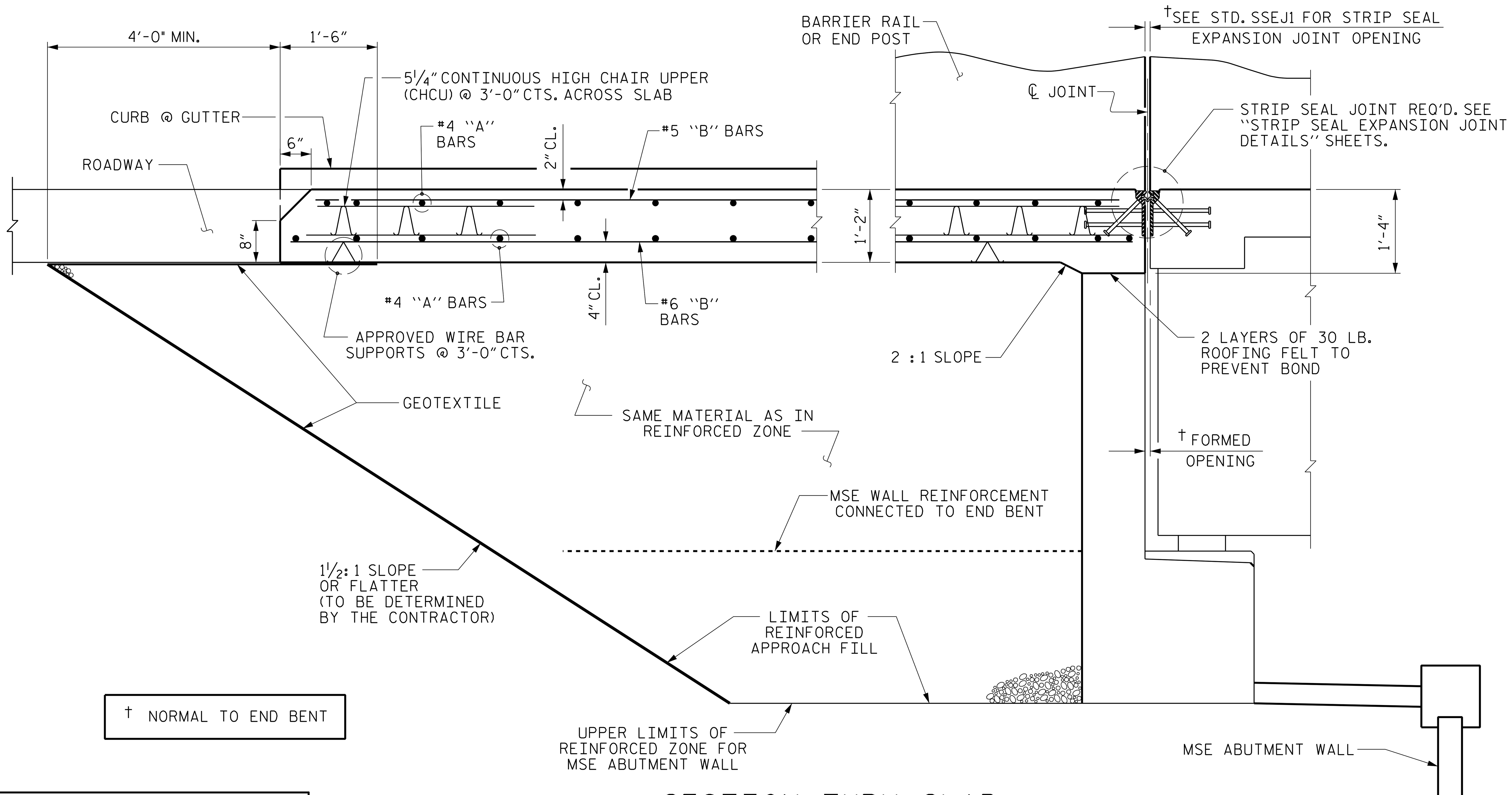


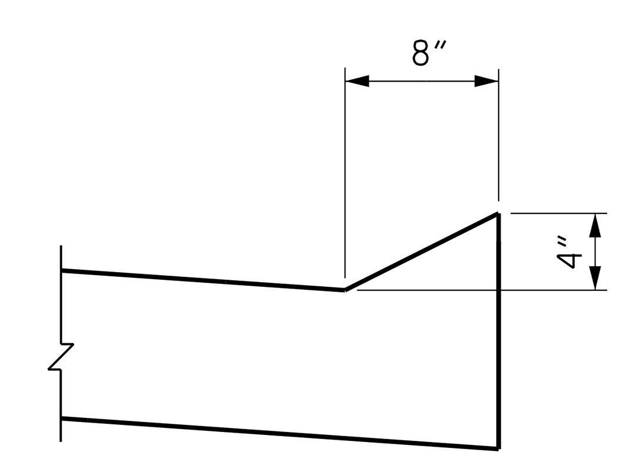
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



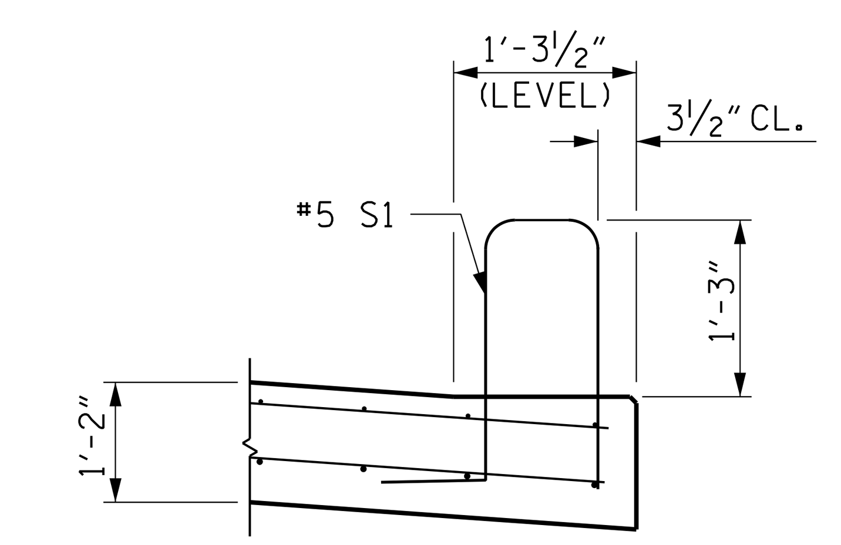
SECTION THRU SLAB

(TYPE III - REINFORCED APPROACH FILL)

† NORMAL TO END BENT



SECTION N-N



SECTION K-K

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT AND BACKFILL MATERIAL SEE ROADWAY PLANS.

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

BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

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

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 STRIP SEAL EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	125	#4	STR	29'-1"	2428
A2	130	#4	STR	28'-10"	2504
* B1	224	#5	STR	24'-1"	5627
B2	224	#6	STR	24'-8"	8299
* B3	1	#5	STR	3'-4"	3
B4	1	#6	STR	3'-4"	5
* B5	1	#5	STR	4'-1"	4
B6	1	#6	STR	4'-1"	6
REINFORCING STEEL **				LBS.	10814
* EPOXY COATED REINFORCING STEEL **				LBS.	8062
CLASS AA CONCRETE **				C.Y.	122.1

** QUANTITIES FOR MONOLITHIC ISLAND AND BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 3 AND 3 OF 3.

SPLICE LENGTHS

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

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

PLANS PREPARED BY:
NV5
NV5 ENGINEERS & CONSULTANTS, INC.
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NORTH CAROLINA PROFESSIONAL ENGINEER 019661 L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
3/29/2022

ASSEMBLED BY :	M. D. METZGER	DATE :	2/22
CHECKED BY :	L. K. AUSTIN	DATE :	2/22
DRAWN BY : EEM 3/95	REV. 6/13	MAA/GM	
CHECKED BY : VAP 3/95	REV. 12/17	MAA/THC	
	REV. 06/19	BNB/THC	

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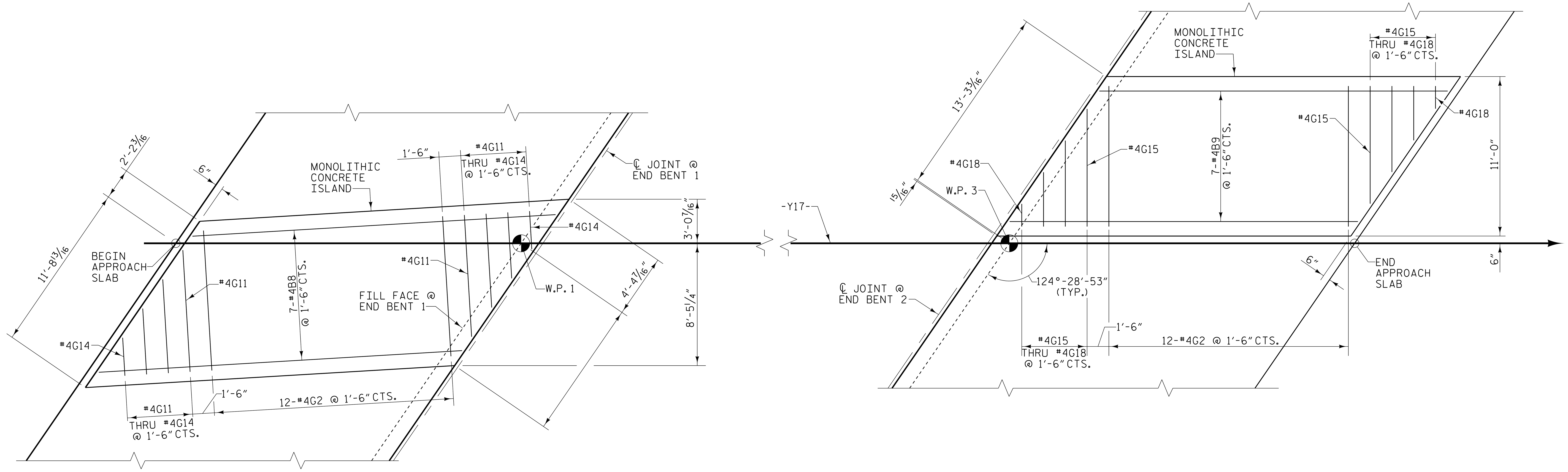
SHEET NO. S-38

TOTAL SHEETS 41

STD. NO. BAS2



END BENT 1

END BENT 2

PLAN OF MONOLITHIC CONCRETE ISLAND ON APPROACH SLABS

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B8	7	#4	STR	25'-0"	117
* B9	7	#4	STR	23'-11"	112
* G2	24	#4	STR	9'-8"	155
* G11	2	#4	STR	8'-4"	11
* G12	2	#4	STR	6'-5"	9
* G13	2	#4	STR	4'-6"	6
* G14	2	#4	STR	2'-7"	3
* G15	2	#4	STR	8'-1"	11
* G16	2	#4	STR	5'-11"	8
* G17	2	#4	STR	3'-9"	5
* G18	2	#4	STR	1'-6"	2
* EPOXY COATED REINF. STEEL					439 LBS.
CLASS AA CONCRETE					8.1 CU. YDS.

* INDICATES EPOXY COATED REINF. STEEL

NOTES

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MONOLITHIC CONCRETE ISLAND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAYMENT FOR THE MONOLITHIC CONCRETE ISLAND SHALL BE INCLUDED IN UNIT PRICE FOR "BRIDGE APPROACH SLABS".

ALL REINFORCING STEEL IN THE MONOLITHIC CONCRETE ISLAND SHALL BE EPOXY COATED.

FOR MONOLITHIC CONCRETE ISLAND SECTION AND DETAILS, SEE SHEET "SUPERSTRUCTURE MONOLITHIC ISLAND PLAN AND DETAILS".

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN 026661
DocuSigned by: L. Kevin Austin
3/29/2022

REVISIONS

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

SHEET NO. S-39
TOTAL SHEETS 41

DRAWN BY : W. B. ALLEN DATE : 4/17
CHECKED BY : Z. H. BROWN DATE : 5/17
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 2/22

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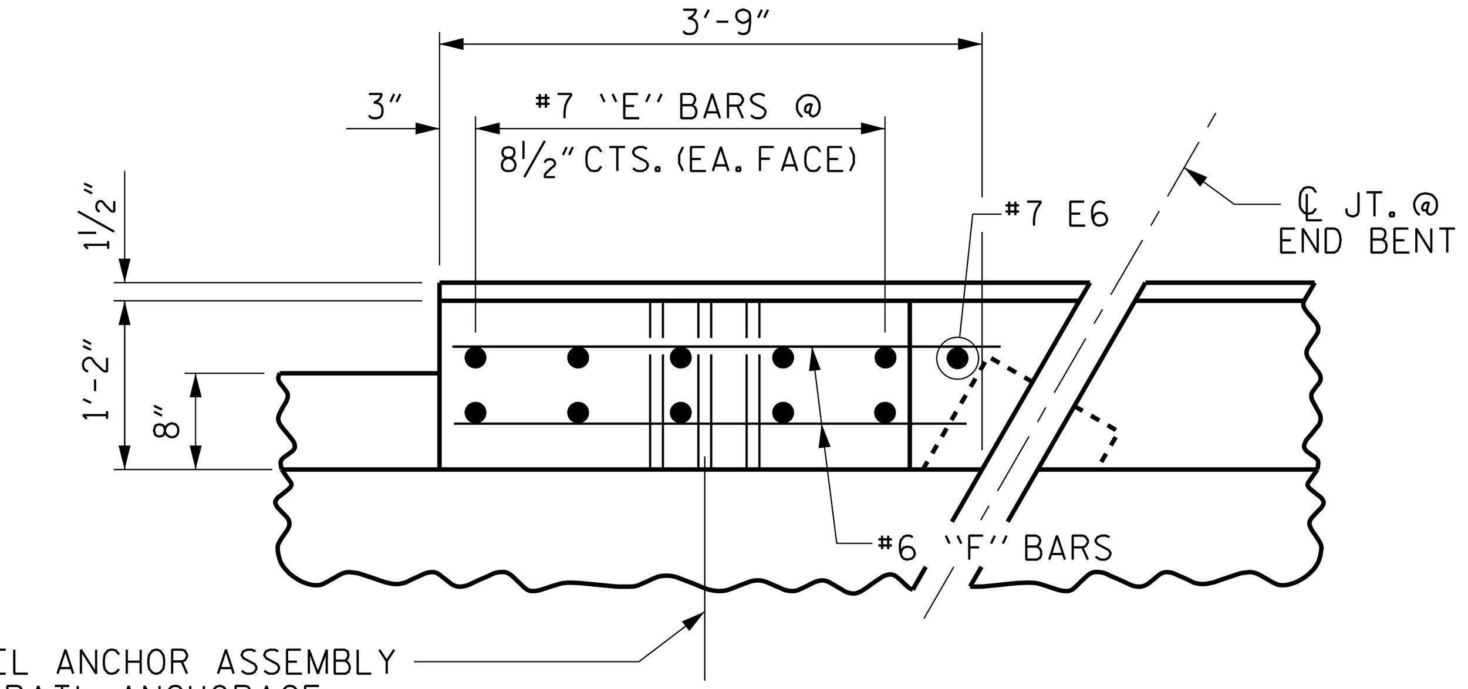
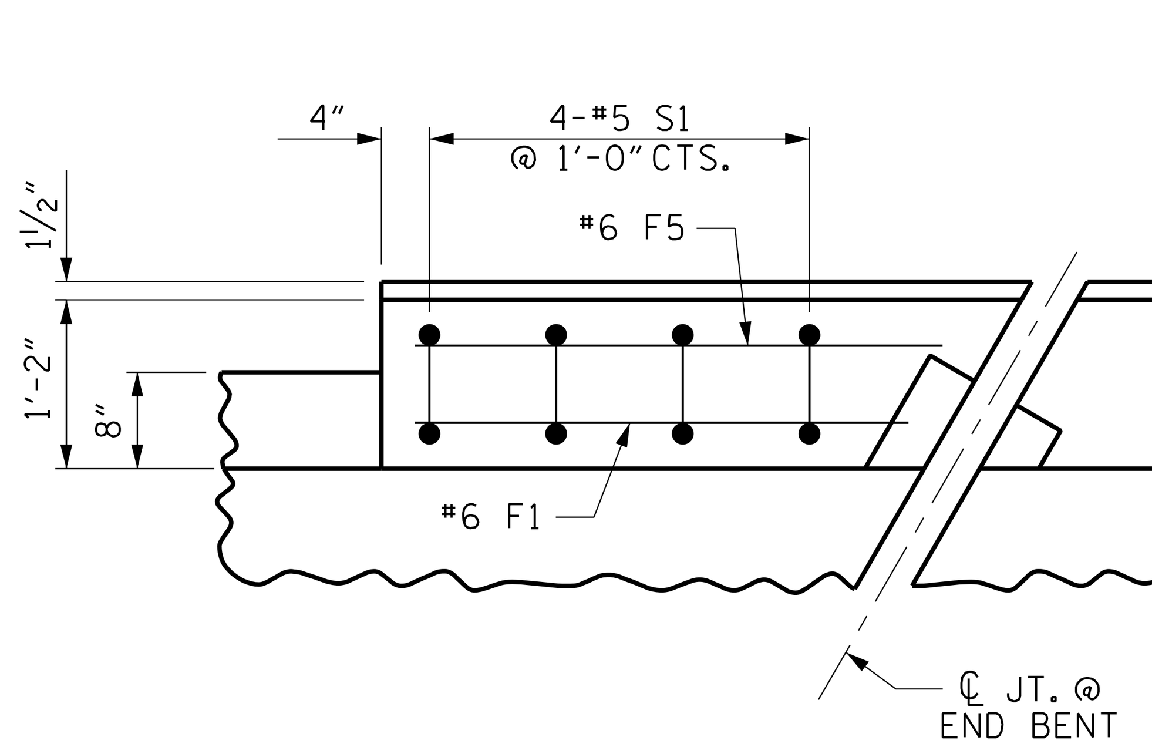




PLAN OF PARAPET

PLAN OF END POST

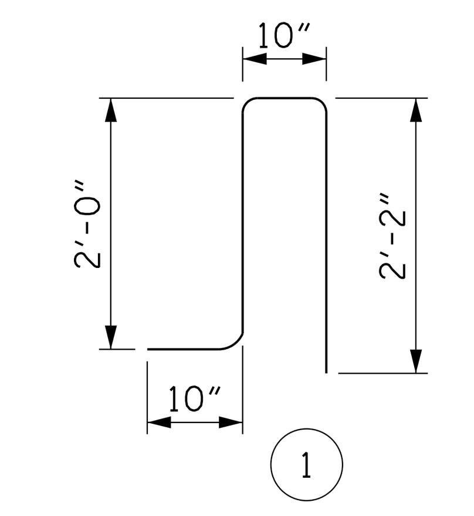
NOTES

THE COST OF THE END POST ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "1'-2" X 2'-6" CONCRETE PARAPET".

THE END POST 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 END POSTS SHALL BE EPOXY COATED.

BAR TYPES

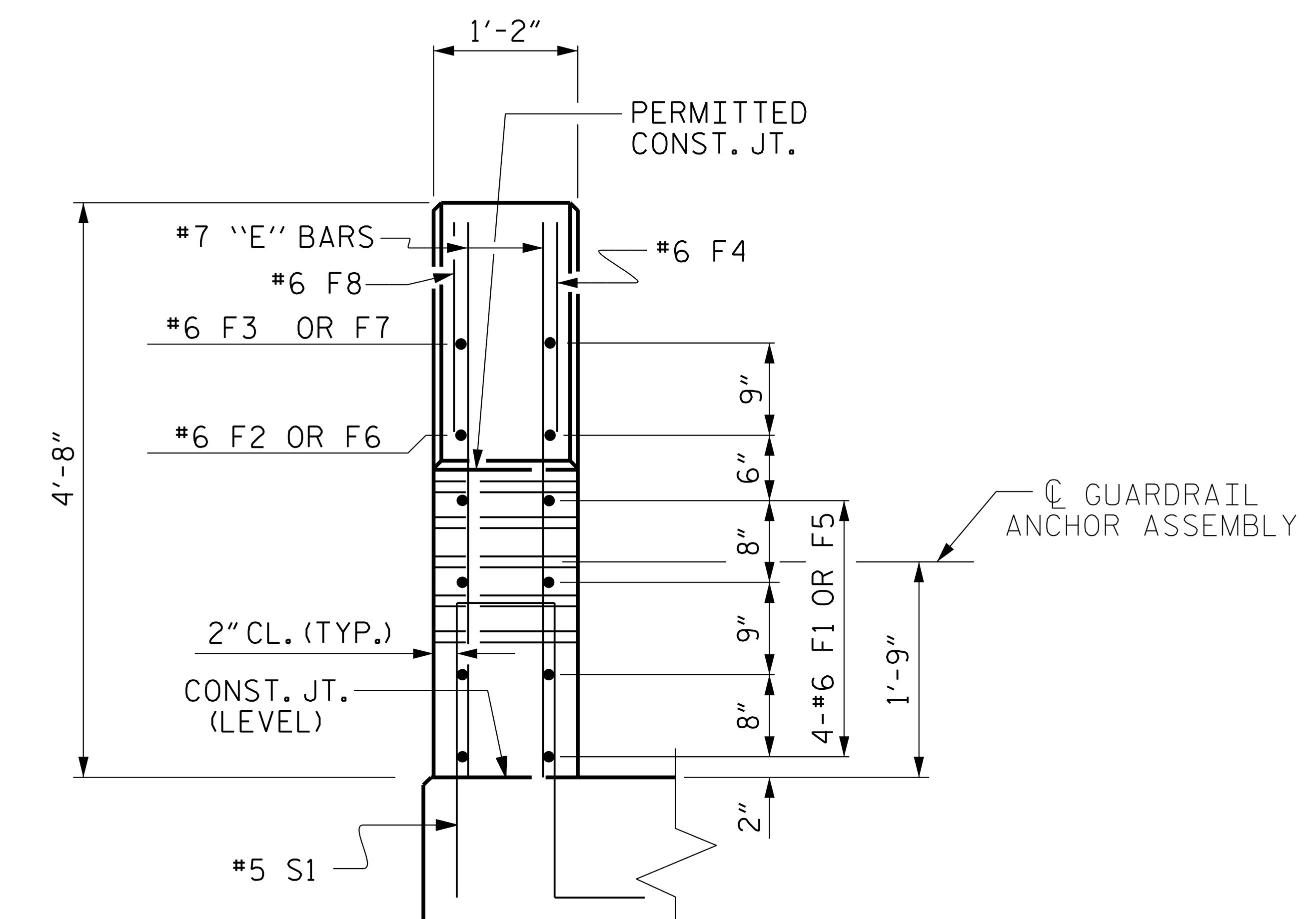


ALL BAR DIMENSIONS ARE OUT TO OUT

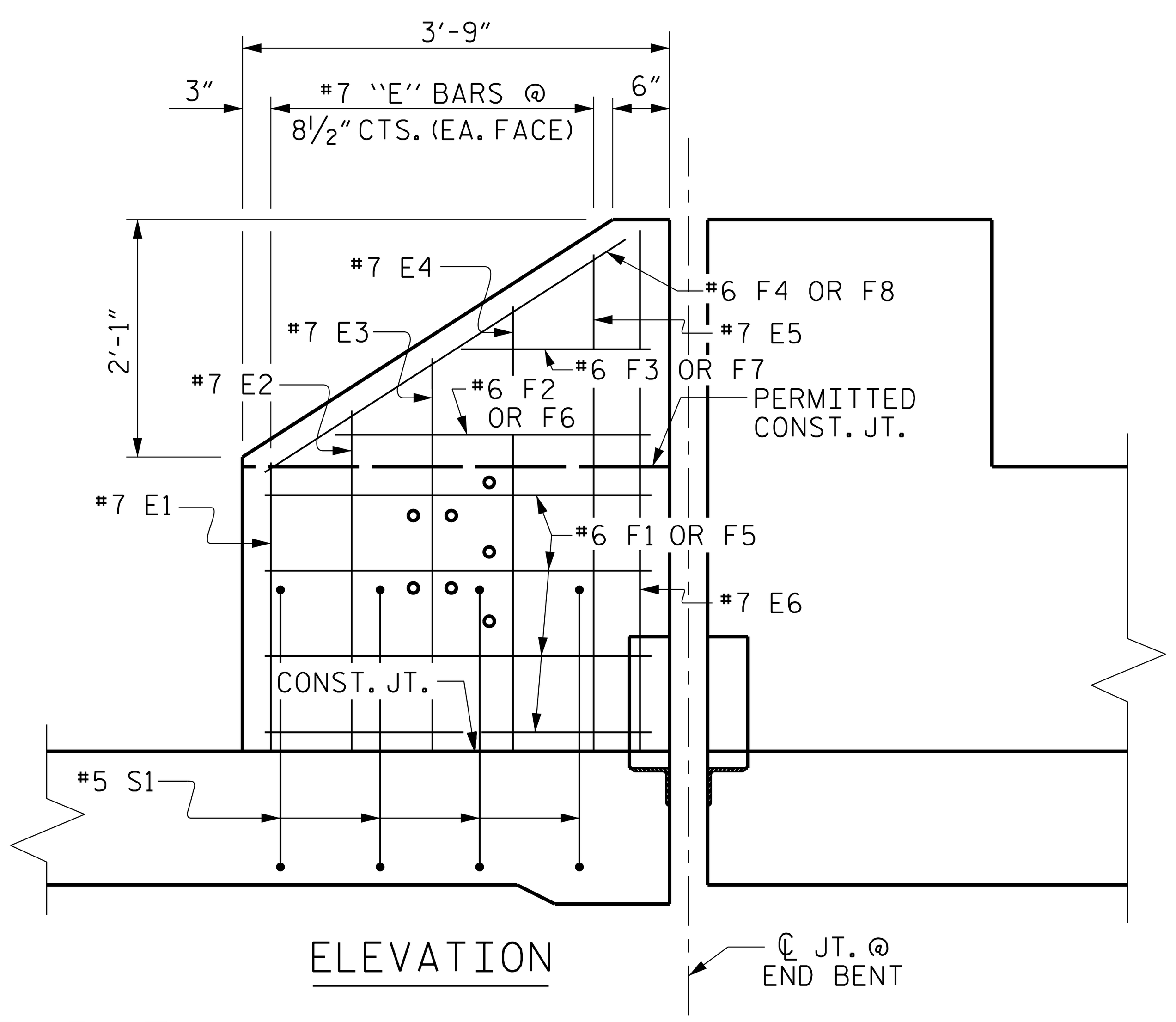
BILL OF MATERIAL FOR 4 END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* E1	8	#7	STR	2'-6"	41
* E2	8	#7	STR	2'-11"	48
* E3	8	#7	STR	3'-5"	56
* E4	8	#7	STR	3'-10"	63
* E5	8	#7	STR	4'-4"	71
* E6	4	#7	STR	4'-6"	37
* F1	16	#6	STR	3'-5"	82
* F2	4	#6	STR	2'-5"	15
* F3	4	#6	STR	1'-4"	8
* F4	4	#6	STR	3'-8"	22
* F5	16	#6	STR	4'-2"	100
* F6	4	#6	STR	3'-2"	19
* F7	4	#6	STR	2'-1"	13
* F8	4	#6	STR	4'-5"	27
* S1	16	#5	1	5'-10"	97

* EPOXY COATED REINFORCING STEEL	LBS.	699
CLASS AA CONCRETE	CU.YDS.	2.7
TOTAL LIN. FT. OF CONCRETE PARAPET		16.60

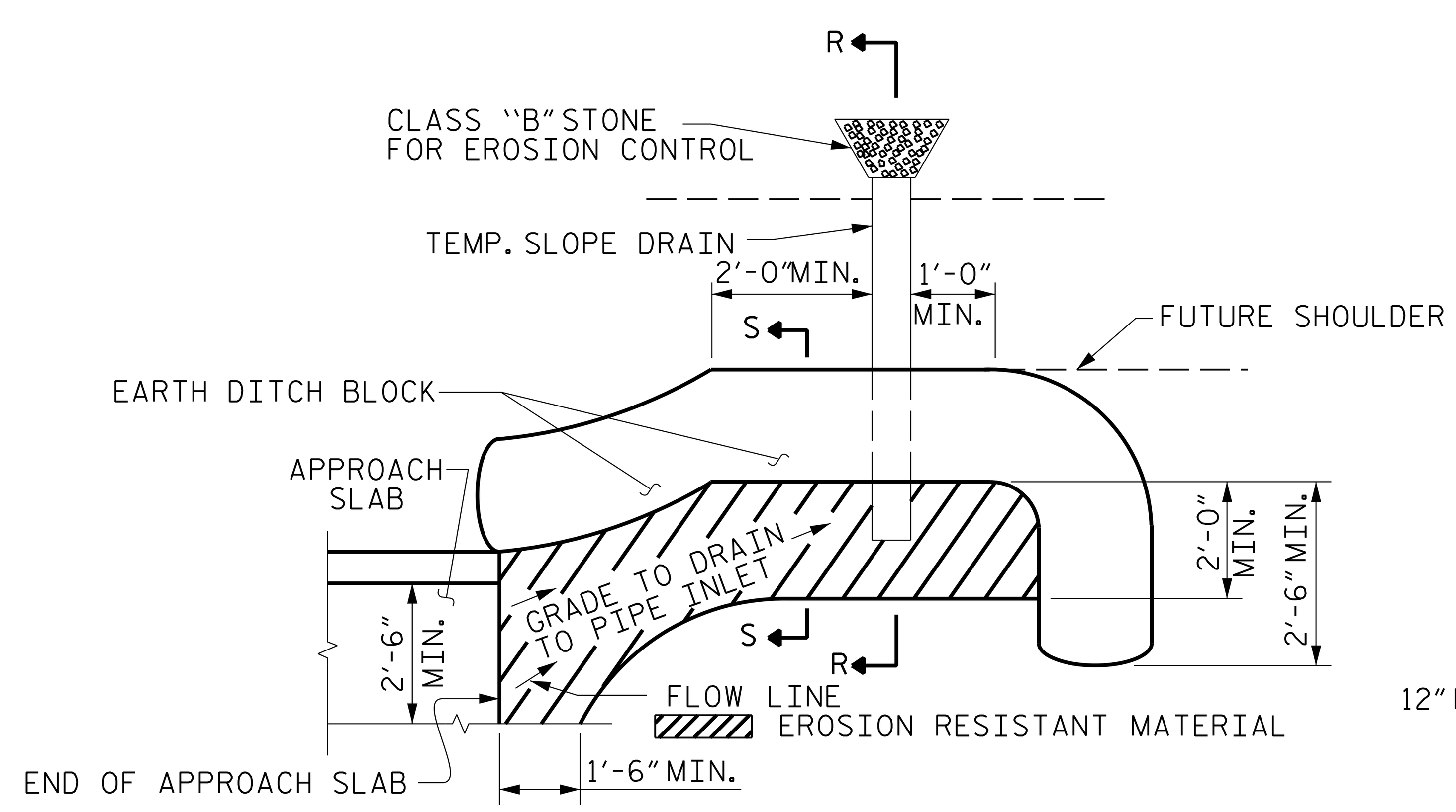


END VIEW



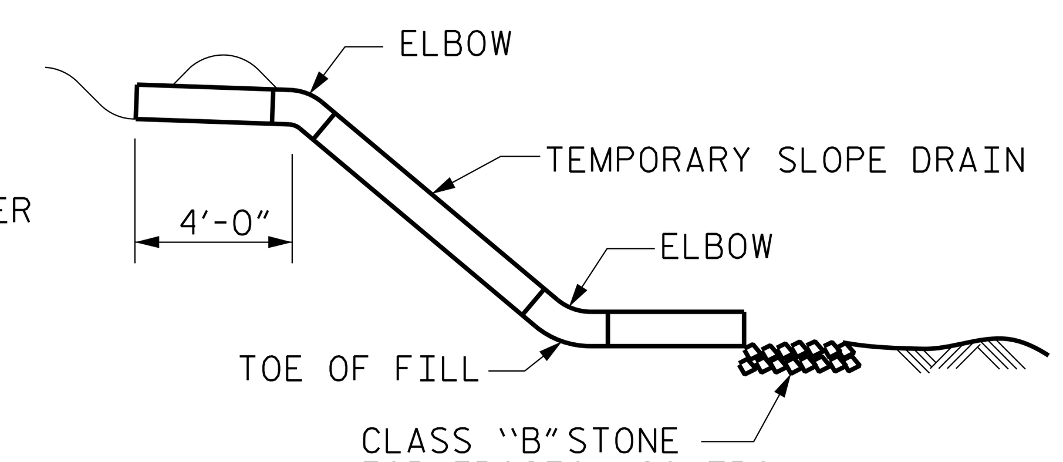
ELEVATION

END POST FOR TWO BAR RAIL

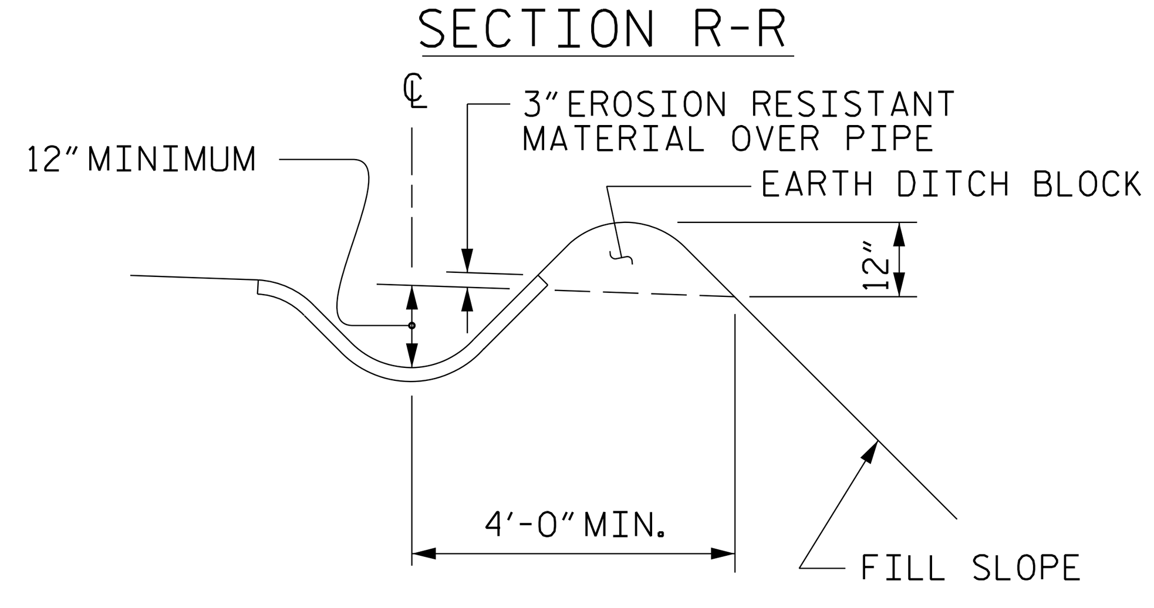


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

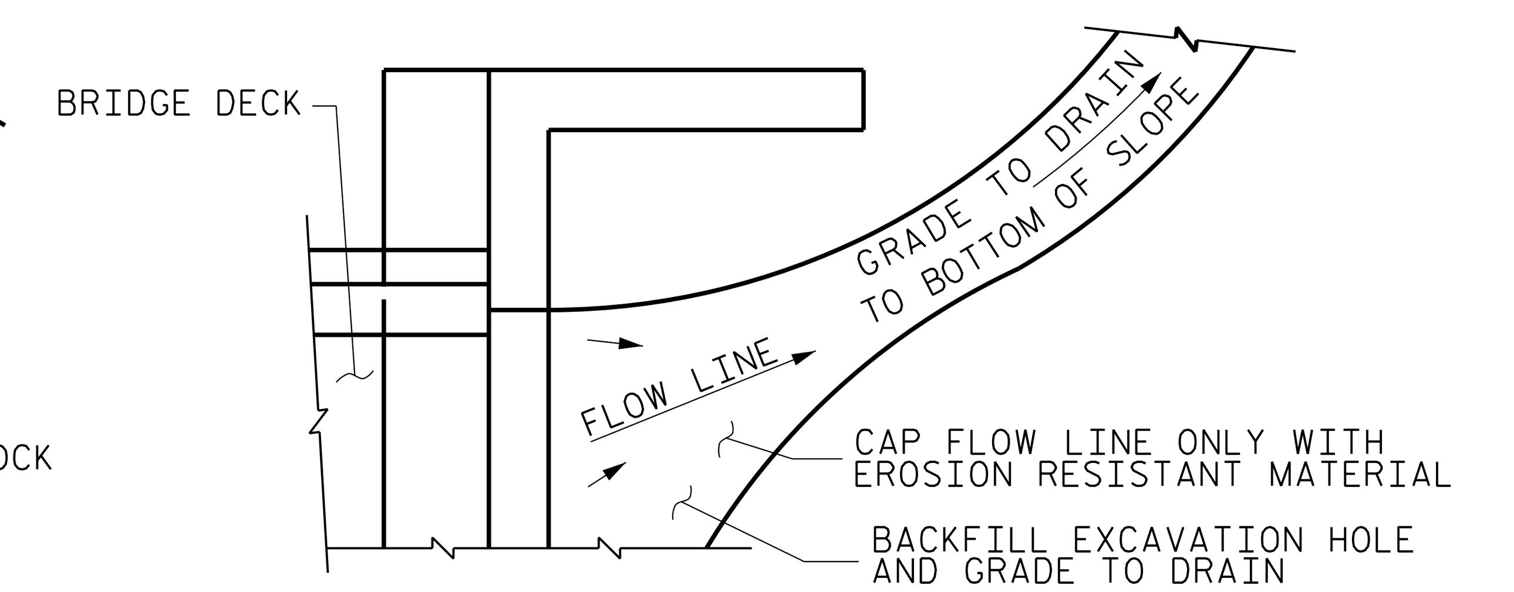
PLAN VIEW



SECTION R-R



SECTION S-S



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

TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PLANS PREPARED BY:

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

L. Kevin Austin
NORTH CAROLINA PROFESSIONAL ENGINEER 039561 L. KEVIN AUSTIN
3/29/2022

PROJECT NO. U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

ASSEMBLED BY : W. B. ALLEN	DATE : 6/18
CHECKED BY : Z. H. BROWN	DATE : 6/18
DRAWN BY : FCJ 11/88	REV. 6/13 MAA/GM
CHECKED BY : ARB 11/88	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			41

STD. NO. BAS4

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

PROJECT NO. U-2519BB

CUMBERLAND COUNTY

STATION: 80+65.32 -Y17- POT

PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032720 KEVIN AUSTIN

Document signed by: K. Kevin Austin

3/29/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

STANDARD NOTES

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

JANUARY, 1990 STD. NO. SN

REV. 6-16-95 EEM (✓) RGW REV. 5-7-03 RWW (✓) JTE REV. 10-1-11 MAA (✓) GM
REV. 8-16-99 RWW (✓) LES REV. 5-1-06 TLA (✓) GM REV. 12-17 MAA (✓) THC

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